LAKEPOINTE MIXED USE MASTER PLAN

Draft Supplemental Environmental Impact Statement

King County Department of Development and Environmental Services

November 1997

King County
Department of Development
and Environmental Services
900 Oakesdale Avenue Southwest
Renton, WA 98055-1219

DDES

November 4, 1997

RE: Lakepointe Master Plan Draft Supplemental Environmental Impact Statement

Dear Interested Reader:

A copy of the Draft Supplemental Environmental Impact Statement (EIS) for the Lakepointe Master Plan is attached. This document supplements the 1992 EIS for the Executive Proposed Northshore Community Plan Update. The Lakepointe proposal is located in the newly incorporated City of Kenmore on the former Kenmore Pre-Mix site, southwest of the intersection of NE Bothell Way (SR 522) and 68th Ave NE, at the north end of Lake Washington.

Copies of the Draft Supplemental EIS are available for public review at several libraries -- Kenmore, Bothell, Lake Forest Park, Shoreline, Bellevue, Kingsgate, Kirkland, Redmond, Richmond Beach, Woodinville, the downtown Seattle Public Library, and the Muckleshoot Library. Copies are available for review or purchase at the King County Department of Development and Environmental Services (DDES) during the hours of 8:30 AM and 4:30 PM (except 10:30 AM on Wednesdays). The cost is $17.00 for the Draft Supplemental EIS and $31.00 for the Appendices. If documents are mailed, an additional $4.00 is charged for the Draft Supplemental EIS and $6.00 for the Appendices. Please send requests to King County DDES, 900 Oakesdale Ave SW, Renton, WA 98055-1219, with a check made payable to "King County Office of Finance."

The Lakepointe proposal includes approval of a Master Plan, Commercial Site Development Permit, and Shoreline Substantial Development Permit to allow a mixed-use development on the 50-acre site. The proposal includes phased development of 1,200 residential units, 205,588 square feet of professional office space, 438,627 square feet of retail and commercial space (including a hotel and cinemas), more than 4,000 parking spaces, a marina with 53 boat slips, and construction of a new, elevated roadway that would connect NE Bothell Way and 68th Ave NE. Open space on the site would include 21.2 acres of natural open space, public park area, pedestrian walkways and trails, an esplanade, a public amphitheater, and public access and viewpoints to Lake Washington and the Sammamish River. Pedestrian and bicycle connections to the Burke-Gilman Trail and transit stops along NE Bothell Way would also be provided.

Key environmental issues and options facing the decisionmaker include:

The impacts of additional traffic and the benefits of a new roadway that would bypass and draw traffic away from the intersection of NE Bothell Way and 68th Ave NE.

The visual impacts of tall buildings on the Lakepointe site and the economic benefits of a business and residential center on the site.

The impacts of shoreline development on fish and wildlife and the benefits of allowing the public more access to the shoreline area.

Safe pedestrian and bicycle connections between the Lakepointe site and transit stops and the Burke-Gilman Trail.

Mitigation measures necessary to protect future residents of the site from noise during phased construction and from noise of vehicular and air traffic after construction.

The public is encouraged to participate in the environmental review of the Lakepointe proposal by submitting comments on this Draft Supplemental EIS. A public meeting will be held on **Monday evening, December 8, 1997, 7:00-9:00 PM**, at the Northshore Senior Center, 10201 E Riverside Dr, Bothell, to receive oral comments on the Draft Supplemental EIS.

Written comments or questions on the Draft Supplemental EIS should be addressed to:

Marilyn E. Cox, Responsible Official
King County Department of Development & Environmental Services
900 Oakesdale Ave SW
Renton, WA 98055-1219

All written and oral comments must be received by **4:30 PM, Friday, December 19, 1997**. A response to all comments will be provided in the Final Supplemental EIS, which will be published in early 1998.

Thank you for your interest and participation in the environmental review of the Lakepointe proposal.

Sincerely,

Marilyn E. Cox
Responsible Official

LAKEPOINTE MIXED USE MASTER PLAN

DRAFT SUPPLEMENTAL
ENVIRONMENTAL IMPACT STATEMENT

King County
Department of Development and Environmental Services

November 4, 1997

FACT SHEET

PROJECT TITLE

Lakepointe Mixed Use Master Plan

PROPOSED ACTION

The Proposed Action is for the approval of a Master Plan, Commercial Site Development Permit, and Shoreline Substantial Development Permit. The proposed Master Plan is designed to be consistent with the intent of development conditions established in the 1993 Northshore Community Plan Update and Area Zoning. The Master Plan would dictate the general development pattern and uses for the entire 50-acre site. The Commercial Site Development Permit application, which provides more specific development details for certain aspects of site development, has been submitted for development on 45 acres of the site. Because the specific uses of a 5-acre portion of the site have not been determined, only general information can be provided at this time.

Proposed development described in the Commercial Site Development Permit application consists of phased development of 1,200 residential units, 205,588 square feet of professional office space, 438,627 square feet of retail and commercial space, a marina with 53 boat slips, 4,508 parking stalls, and construction of a new public street connecting NE Bothell Way and 68th Ave NE.

Open space on the site would total 21.2 acres (47.2 percent of the site) and would include natural open space, public park area, pedestrian walkways and trails, and a public amphitheater. The open space areas on the site would provide public access and viewpoints to Lake Washington and the Sammamish River.

ALTERNATIVES

Two alternatives to the Proposed Action are analyzed in this Draft Supplemental Environmental Impact Statement (EIS). Alternative 1, Conceptual Master Plan Illustrated in the Northshore Community Plan, would be consistent with the original conceptual Master Plan illustrated in the Northshore Community Plan. This conceptual plan was shown in the Northshore Community Plan for purposes of illustrating the intent of the Plan. Alternative 1 includes 1,000 residential units and 500,000 square feet of commercial space. Building heights and the elevation of the roadway connecting NE Bothell Way and 68th Ave NE would also differ from the Proposed Action.

Under Alternative 2, the No Action Alternative, existing industrial and storage uses would continue on the site. The goal of the Northshore Community Plan of establishing a pedestrian-oriented mixed-use development on the site would not be met.

LOCATION

The site is located in the Kenmore area of unincorporated King County, near the intersection of NE Bothell Way (SR 522) and 68th Ave NE. The site is approximately bounded by Lake Washington to the west, the Sammamish River channel to the south, 68th Ave NE to the east and NE Bothell Way to the north.

PROPONENT/APPLICANT

Pioneer Towing Company
P.O. Box 82298
Kenmore, WA 98028
Owner Representative: Mike Gleason

LEAD AGENCY

King County Department of Development and Environmental Services
900 Oakesdale Ave SW
Renton, WA 98055-1219

RESPONSIBLE OFFICIAL

Marilyn E. Cox, Chief, SEPA Section
Land Use Services Division
King County Department of Development and Environmental Services

PROJECT MANAGER

Priscilla Kaufmann, Planner
Building Services Division
King County Department of Development and Environmental Services

REQUIRED APPROVALS

King County

--Master Plan Permit (required by the Northshore Community Plan P-Suffix Conditions)
--Shoreline Substantial Development Permit (required by KCC Title 25)
--Binding Site Plan for subdividing land for condominiums (required by KCC Title 19.34)
--Clearing and Grading Permits (required by KCC Title 16.82)
--Building Permits for all structures, including, but not limited to, buildings, signs, fences over six feet in height (required by KCC 16.04)
--Variance from the King County Road Standards (required by KCC 14.42)
--Fire System Permits for fire systems, including, but not limited to, water main extensions, sprinklers, and alarms (required by KCC Title 17)
--Right-of-Way Use Permits (required by KCC 14.28)
--Boundary Line Adjustment (required by KCC 19.08)

Other Possible King County permits

--Variance from the Surface Water Design Manual to use the draft Manual update and for depth of pipes (KCC Title 9).
--Commercial Site Development Permit (KCC Title 21A.41) (Optional)

Other Agencies

--Section 404 Permit, U.S. Army Corps of Engineers
--Hydraulic Project Approval, Washington Dept. of Fish and Wildlife
--Baseline General Permit for Stormwater, Washington Dept. of Ecology
--Water Quality Modifications Permit, Washington Dept. of Ecology

PREVIOUS ENVIRONMENTAL DOCUMENTS

This Supplemental EIS supplements information provided in the Draft and Final EIS documents prepared for the Northshore Community Plan adopted in 1993. These documents are available for review at the King County Department of Development and Environmental Services.

EIS AUTHORS AND PRINCIPAL CONTRIBUTORS

Primary Author, EIS Coordination, Air Quality, Noise, Land Use, Population and Housing, Aesthetics, Historic/Cultural, Public Services and Utilities
Huckell/Weinman Associates, Inc.
205 Lake St. S., Suite 202
Kirkland, WA 98033

Geotechnical, Groundwater, Hazardous Material Analysis
AGRA Earth and Environmental, Inc.
11335 NE 122nd Way, Suite 100
Kirkland, WA 98034-6918

Water Quality, Fisheries/Wildlife Analyses
Beak Consultants, Inc.
12931 NE 126th Place
Kirkland, WA 98034

Noise Impact Analysis
McCulley, Frick & Gilman, Inc.
19203 36th Ave W., Suite 101
Lynnwood, WA 98036

Transportation
Transportation Planning & Engineering, Inc. (TP&E)
2101-112th Ave NE, Suite 110
Bellevue, WA 98004

Drainage and Utility Analyses
kpff Consulting Engineers
1201 3rd Ave, Suite 900
Seattle, WA 98101

Site Planning
The Callison Partnership
1420 Fifth Avenue, Suite 2400
Seattle, WA 98101-2343

LOCATION OF BACK-GROUND INFORMATION

The primary background data for the Supplemental EIS are included in technical appendices, bound in a separate volume. Other information in project files is available at King County Department of Development and Environ-mental Services.

DATE OF DRAFT SEIS ISSUANCE

November 4, 1997

DATE DRAFT SEIS COMMENTS ARE DUE

December 19, 1997

DRAFT SEIS PURCHASE PRICE

Copies of the Draft Supplemental EIS are available for public review at several libraries—Kenmore, Bothell, Lake Forest Park, Shoreline, Bellevue, Kingsgate, Kirkland, Redmond, Richmond Beach, Woodinville, the downtown Seattle Public Library, and the Muckleshoot Library. Copies of the Draft Supplemental EIS may be reviewed or purchased by interested parties at the King County Department of Development and Environmental Services (DDES). The purchase price for the Draft Supplemental EIS is $17, and for the Appendices is $31. Postage costs for mailing the Draft Supplemental EIS ($4 for the Draft Supplemental EIS and $6 for the Appendices) should also be added to the document cost if mailing is requested. Please send your request to: King County DDES, 900 Oakesdale Ave SW, Renton, WA 98055-1219, with a check made payable to "King County Office of Finance."

PUBLIC MEETING

Monday, December 8, 1997
7:00 - 9:00 PM
Northshore Senior Center
10201 E. Riverside Drive
Bothell, WA

TABLE OF CONTENTS

Title Page i
Fact Sheet ii
Table of Contents vi
List of Figures ix
List of Tables x

CHAPTER 1 SUMMARY 1-1

CHAPTER 2 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES 2-1

CHAPTER 3 AFFECTED ENVIRONMENT, IMPACTS, ALTERNATIVES, MITIGATION MEASURES AND UNAVOIDABLE SIGNIFICANT ADVERSE IMPACTS 3-1

EARTH
Affected Environment 3-1
Impacts of the Proposed Action 3-10
Alternatives 3-14
Mitigation Measures 3-14
Unavoidable Significant Adverse Impacts 3-16

AIR QUALITY
Affected Environment 3-17
Impacts of the Proposed Action 3-19
Alternatives 3-21
Mitigation Measures 3-21
Unavoidable Significant Adverse Impacts 3-21

WATER
Affected Environment 3-22
Impacts of the Proposed Action 3-27
Alternatives 3-41
Mitigation Measures 3-42
Unavoidable Significant Adverse Impacts 3-45

PLANTS AND ANIMALS
Affected Environment 3-47
Impacts of the Proposed Action 3-64
Alternatives 3-77
Mitigation Measures 3-78
Unavoidable Significant Adverse Impacts 3-80

TABLE OF CONTENTS (Continued)

NOISE
Affected Environment 3-81
Impacts of the Proposed Action 3-91
Alternatives 3-100
Mitigation Measures 3-100
Unavoidable Significant Adverse Impacts 3-102

TOXIC AND HAZARDOUS MATERIALS
Affected Environment 3-103
Proposed Site Cleanup 3-109
Alternatives 3-110
Mitigation Measures 3-111
Unavoidable Significant Adverse Impacts 3-111

LAND AND SHORELINE USE
Affected Environment 3-112
Impacts of the Proposed Action 3-118
Alternatives 3-121
Mitigation Measures 3-122
Unavoidable Significant Adverse Impacts 3-122

RELATIONSHIP TO PLANS AND POLICIES
Introduction 3-123
Growth Management Act (RCW 36.70A) 3-123
King County Countywide Planning Policies 3-124
King County Comprehensive Plan 3-125
Northshore Community Plan Update and Area Zoning 3-135
King County Shoreline Management Master Program 3-154

POPULATION AND HOUSING
Affected Environment 3-161
Impacts of the Proposed Action 3-163
Alternatives 3-164
Mitigation Measures 3-165
Unavoidable Significant Adverse Impacts 3-165

AESTHETICS, LIGHT AND GLARE
Affected Environment 3-166
Impacts of the Proposed Action 3-169
Alternatives 3-179
Mitigation Measures 3-180
Unavoidable Significant Adverse Impacts 3-181

HISTORIC AND CULTURAL PRESERVATION
Affected Environment 3-182
Impacts of the Proposed Action 3-182
Alternatives 3-183
Mitigation Measures 3-183
Unavoidable Significant Adverse Impacts 3-183

TABLE OF CONTENTS (Continued)

TRANSPORTATION
Introduction 3-184
Affected Environment 3-185
Impacts of the Proposed Action 3-193
Alternatives 3-218
Mitigation Measures 3-218
Unavoidable Significant Adverse Impacts 3-220

PUBLIC SERVICES
Affected Environment 3-221
Impacts of the Proposed Action 3-229
Alternatives 3-235
Mitigation Measures 3-237
Unavoidable Significant Adverse Impacts 3-239

UTILITIES
Affected Environment 3-240
Impacts of the Proposed Action 3-241
Alternatives 3-243
Mitigation Measures 3-244
Unavoidable Significant Adverse Impacts 3-244

LIST OF REFERENCES

DISTRIBUTION LIST

Appendix A Final Technical Report on Earth, Water, Toxic and Hazardous Materials, AGRA Earth & Environmental, Inc.

APPENDICES CONTAINED IN SEPARATE APPENDICES DOCUMENT

B. Lakepointe Technical Report on Natural Resources, Beak Consultants
C. Lakepointe Master Plan Noise Analysis, McCulley, Frick & Gilman, Inc.
D. Lakepointe Development Transportation Impact Analysis, TP&E (Transportation Planning & Engineering), Inc.
E. 1994 Zoning Analysis for Traffic, The TRANSPO Group
F. Technical Information Report, kpff Consulting Engineers
G. Lakepointe Mixed Use Development Design Guidelines, The Callison Partnership
H. Northshore Community Plan Site Sub-districts
I. Barrier-Free Access Plan
J. Air and Marine Navigation

LIST OF FIGURES

1	Vicinity Map and Shoreline Designation Map	2-7
2	Existing Topography and Site Vegetation	2-9
3	Site Plan	2-13
4	Design Sketch – Shoreline Park	2-17
5	Design Sketch – Boardwalk	2-18
6	Design Sketch – Lakepointe Blvd	2-19
7	Recreation Plan	2-22
8	Site Circulation Plan	2-26
9	Phasing Plan	2-31
10	P-Suffix Height Standards	2-34
11	Proposed Height Standards	2-35
12	Building Height Comparisons	2-37
13	Alternative Site Plan	2-39
14	Topography and Slope Map	3-2
15	Generalized Geologic Cross-Section	3-4
16	Soil Types	3-7
17	Existing Wetlands and Vegetation Types	3-49
18	Proposed Marina Structures	3-69
19	Sound Measurement Locations	3-85
20	Existing Land Use Map	3-114
21	Zoning Map	3-117
22	Viewpoint Graphic	3-168
23	View from NE Bothell Way Looking West	3-171
24	View from NE Bothell Way Looking Southeast	3-172
25	View from Burke-Gilman Trail Looking East	3-173
26	View from 68th Ave Looking West	3-174
27	View From Hillside to the North Looking South	3-175
28	View From Lake Washington Looking East	3-176
29	View From Inglewood Dock Looking North	3-177
30	Road Network Surrounding the Site	3-186
31	1993 AM Peak Hour Traffic Volumes	3-188
32	1993 PM Peak Hour Traffic Volumes	3-189
33	Proposed Lane Configuration	3-194
34	No Action Alternative 2005 AM Peak Hour Volumes and Distribution	3-198
35	No Action Alternative 2005 PM Peak Hour Volumes and Distribution	3-199
36	AM Peak Hour Project Traffic	3-200
37	PM Peak Hour Project Traffic	3-201
38	AM Peak Hour Background With Project Traffic	3-202
39	PM Peak Hour Background With Project Traffic	3-203

LIST OF TABLES

1	Proposed Uses by Acreage	2-15
2	Building Area and Use	2-15
3	Proposed Open Space	2-23
4	Proposed On-site Parking	2-28
5	Alternative 1 Uses by Acreage	2-41
6	Engineering Characteristics of Geologic Units	3-6
7	Estimated USLE Sediment Generation During and After Construction, by Phase	3-13
8	Ambient Air Quality Standards	3-18
9	Class AA Water Criteria	3-25
10	Estimated Sediment Yields Reaching Surface Waters	3-30
11	Peak Unmitigated Stormwater Concentrations	3-34
12	Peak Predicted Stormwater Concentrations, With Mitigation	3-35
13	Fish Survey Results	3-54
14	Fish Survey Summary	3-55
15	Existing Shaded Area in Inner Harbor	3-59
16	Summary of Existing Conditions and Proposed Shoreline Treatments and Water Structures	3-70
17	King County Maximum Permissible Sound Levels	3-82
18	City of Seattle Construction Noise Limits	3-83
19	Existing Sound Levels	3-87
20	Sound Levels from Industrial and Traffic Sources	3-88
21	Seaplane Departure Sound Levels	3-90
22	Range of Typical Construction Equipment Noise	3-92
23	Calculated Cumulative Construction Noise Levels	3-94
24	Estimated Ranges of Pile Driver Noise from Various Equipment	3-97
25	Calculated Levels from Project-Related Pile Driving	3-98
26	Summary of Population Information, Northshore Community Planning Area	3-161
27	2005 Trip Generation Comparison	3-196
28	2005 With-Project Vehicle Queuing at Intersections	3-204
29	AM Peak Hour Route Performance Summary	3-208
30	PM Peak Hour Route Performance Summary	3-209
31	AM Peak Hour Intersection Level of Service	3-210
32	PM Peak Hour Intersection Level of Service	3-211
33	Construction Traffic	3-214
34	Trends in Dispatched Calls for Service in Kenmore and Juanita Patrol Districts	3-222
35	Part One Crimes Recorded in Kenmore and Juanita Patrol Districts	3-223
36	Enrollments in Schools Serving the Project Site	3-224
37	Northshore School District Enrollment and Permanent Facility Capacity Projections	3-225
38	Existing Recreation Facilities in the Northshore Community Planning Area	3-227
39	Estimated Domestic Water Demands of the Proposed Action	3-242

CHAPTER ONE

Summary

CHAPTER ONE

SUMMARY

This section provides a summary of the Draft Supplemental Environmental Impact Statement (Draft Supplemental EIS) for the Lakepointe Mixed Use Master Plan. It briefly describes the proposal and two alternatives, and lists anticipated impacts, mitigation measures and unavoidable significant adverse impacts. A matrix in this chapter provides a comparative overview of impacts identified for the proposal and alternatives and mitigation measures for the proposal.

SUMMARY OF THE PROPOSED ACTION

The Lakepointe Mixed Use Master Plan (Proposed Action) consists of three related actions. Approvals are being requested for:

- A Master Plan which outlines design guidelines and development standards for phased development of the entire 50-acre mixed use community consisting of residential, commercial, office and open space uses. The Master Plan is intended to be a blueprint for future development of the site.

- A Commercial Site Development Permit which defines phasing lines, building envelopes, open space, trails, recreation space, the approximate location and square footage of each building, and approximate locations of drainage facilities for a 45-acre portion of the site.

- A Shoreline Substantial Development Permit which provides detail on all development within 200 feet of the Ordinary High Water Mark of the Sammamish River, Lake Washington and the inner harbor.

Development proposed under the requested approvals would consist of 1,200 residential units, 205, 588 square feet of professional office space, 438, 627 square feet of retail and commercial space, a 53 slip marina, approximately 21 acres of open space, and construction of a new public street connecting SR 522 and 68th Ave NE.

SUMMARY OF ALTERNATIVES

The State Environmental Policy Act (SEPA) requires an EIS to evaluate reasonable alternatives to the Proposed Action that could feasibly attain an applicant's objectives but at a lower environmental cost. Two alternatives are analyzed in the Draft Supplemental EIS.

- Alternative 1 is a mixed use plan consistent with the Conceptual Master Plan illustrated in the Northshore Community Plan. Development under this alternative would include 1,000 residential units and 500,000 square feet of commercial space. Various other components of this alternative would differ from the proposal.

- Alternative 2 is the No Action Alternative, which assumes that the existing industrial and storage use of the site would continue for the foreseeable future.

SPONSOR'S OBJECTIVES

The primary objectives of the Lakepointe Master Plan, as formulated by the applicant, are as follows:

- Provide for alternative uses for the property that provide financial return superior to that offered by the existing property uses.

- Develop a mixed use residential and commercial project consistent with the goals and policies of the Growth Management Act, the NSCP and the King County Comprehensive Plan.

- Develop a mixed use project incorporating uses, building heights, forms and locations that conform to current and projected market needs and that will support the complete range of mitigation identified in the P-suffix conditions for the project.

- Provide significant opportunities for public access to shorelines of the Sammamish River and Lake Washington consistent with the development needs of the project and the applicable P-suffix conditions.

- Allow for the implementation of long-term transportation solutions for the Kenmore area, including the dedication of necessary right-of-way and construction of NE Lakepointe Boulevard, consistent with the mixed-use development objectives for the site and based on the project's fair-share responsibilities.

- Establish an expedited permit review process for ultimate project development, while maintaining flexibility in the Master Plan concept to meet changing market needs and development conditions.

MAJOR ISSUES

Key environmental issues and options facing the decision maker include:

The impacts of additional traffic and the benefits of a new roadway that would bypass and draw traffic away from the intersection of NE Bothell Way and 68th Ave NE.

- The visual impacts of tall buildings on the Lakepointe site and the economic benefits of a business and residential center on the site.

- The impacts of shoreline development on fish and wildlife and the benefits of allowing the public more access to the shoreline area.

- Safe pedestrian and bicycle connections between the Lakepointe site and transit stops and the Burke-Gilman Trail.

- Mitigation measures necessary to protect future residents of the site from noise during phased construction and from noise of vehicular and air traffic after construction.

MAJOR CONCLUSIONS

The Lakepointe Mixed Use Master Plan would change the character of the site from industrial and storage uses to a mixed use master planned community. As identified in the RELATIONSHIP TO PLANS AND POLICIES section of this Draft Supplemental EIS, the Master Plan has been designed to be consistent with the intent of development plans, policies and regulations established in the Northshore Community Plan for mixed use development on the site. Increases in traffic volumes and noise would occur from development of the site.

The proposal would result in changes to the natural environment within and immediately adjacent to the site. Changes include increased stormwater runoff, increased input of pollutants to site runoff, establishment of new in-water and over-water structures in the inner harbor, and an increase in human activity in proximity to the site shorelines. The Draft Supplemental EIS identifies mitigation measures to address most of the potential significant impacts.

According to the analyses presented in this Draft Supplemental EIS, key unavoidable significant adverse impacts are anticipated due to: noise increases during construction that would be perceived by on-site residents and businesses; increase in the scale of building heights; cumulative increases in traffic volumes and congestion at certain intersections in the area.

Proposed Action—Lakepointe Mixed Use Master Plan	Alternative 1—Conceptual Master Plan in Northshore Community Plan	Alternative 2—No Action
EARTH **Impacts**		
Site topography would be altered during demolition of existing buildings, shallow excavation for buildings and garages (at or above grade), and fill for a portion of the embankments for the NE Lakepointe Way intersections with NE Bothell Way and 68th Ave. NE.	Similar to the Proposed Action, except that more excavation of contaminated soils would be necessary to construct underground parking garages.	No impact.
Placement of fill would compress underlying peat soils which could cause new areas of settlement at the surface.	Similar to the Proposed Action.	No impact.
Construction of the Proposed Action would result in the potential for erosion/sedimentation impacts to Lake Washington and the Sammamish River during construction.	Similar to the Proposed Action.	Existing erosion conditions would continue.
Seismic hazards posed by loose or soft soils could result in liquefaction and strong ground motion during a major earthquake, necessitating use of pile foundations for all structures.	Same as the Proposed Action.	No impact.
Mitigation Measures ***Required by Code***		
• Additional field explorations, laboratory tests and geotechnical engineering studies recommended by the geotechnical consultant would be accomplished as part of specific design review for structures, utility systems and shoreline enhancements associated with the Proposed Action. This additional analysis is necessary to formulate structure-specific geotechnical criteria for suitable foundation types, site preparation, lateral and vertical pile capacities and utility construction, as well as for specific information on retaining walls, bulkheads, utility support, settlement of soils, pavement support for parking areas and other aspects. Subsequent geotechnical engineering studies would provide detailed foundation design recommendations and appropriate pile test programs.	Same as the Proposed Action.	None.
• A temporary erosion and sedimentation control plan (TESCP) would be developed for construction operations. Erosion control measures that would be called for in the plan include:	Same as the Proposed Action.	None.
Construction entrance – A rock-stabilized temporary entrance pad will be installed at all entrances to the site to minimize mobilization of sediment by construction vehicles. An appropriately drained washing pad for trucks leaving the site is also recommended.	Same as the Proposed Action.	None.
Filter Fabric Fences – Filter fabric fences will be installed in accordance with the King County Surface Water Drainage Manual (SWDM) in locations where sheet wash occurs and any additional areas identified in the TESCP.	Same as the Proposed Action.	None.
Drainage Control Measures and Sedimentation Ponds – Temporary sedimentation ponds will be installed. Grassed-lined swales with straw bale barriers and/or silt fences would be placed in the swales to filter any sediments leaving the sedimentation ponds.	Same as the Proposed Action.	None.

Proposed Action—Lakepointe Mixed Use Master Plan	Alternative 1—Conceptual Master Plan in Northshore Community Plan	Alternative 2—No Action
EARTH **Mitigation Measures (Continued)**		
Plastic Sheeting – Plastic sheeting will be used as a temporary cover for stockpiles not in use, or if severe weather conditions are anticipated.	Same as the Proposed Action.	None.
Hydroseeding and Mulching – Soil areas greater than 5,000 square feet left unworked more than 48 hours during the wet season (October 1 through March 31) will be covered with heavy application of mulch, or plastic sheeting, in accordance with the King County SWDM.	Same as the Proposed Action.	None.
Proposed by Applicant		
• Pile foundation support onto relatively incompressible dense sand and gravels underlying the site would be provided to adequately support the proposed facilities. Additional geotechnical engineering studies would provide detailed foundation design recommendations and appropriate pile test programs.	Same as the Proposed Action.	None.
• Erosion potential associated with pile driving would be reduced through the use of precast concrete or steel displacement-type piling to reduce the amount of required soil cutting.	Same as the Proposed Action.	None.
• Utilities would be designed and installed in a manner to accommodate possible settlement of soils. Some overexcavation (on the order of 1 to 2 feet) and replacement of unsuitable fill soil beneath utilities would occur; the extent of overexcavation would depend largely on the type and size of the utility and its sensitivity to settlement. Flexible connections would be provided where the utilities connect to the project structures.	Same as the Proposed Action.	None.
• Suitable fill soils would be provided under paved areas to provide a stable surface for pavement support, and reduce potential degradation due to settlement of soils. Geogrid reinforcement would be provided where appropriate beneath pavement and sidewalk sections to reduce potential impacts from differential settlement of soils.	Same as the Proposed Action.	None.
• To address methane gas presence, additional engineering studies would determine whether methane mitigation measures are warranted. Measures could include a "plug" of low-permeability backfill in utility trenches, and a low-permeability seal around driven piles. A vapor barrier and increased crawl space ventilation could be provided beneath the enclosed structures. The HVAC design could include active ventilation of all ground floor rooms so that gas accumulation does not occur.	Same as the Proposed Action.	None.

Proposed Action—Lakepointe Mixed Use Master Plan	Alternative 1—Conceptual Master Plan in Northshore Community Plan	Alternative 2—No Action
EARTH **Mitigation Measures (Continued)** ***Proposed by Applicant***		
• To minimize the potential for vibration impacts to off-site structures, it is proposed that off-site structures adjacent to the proposed pile driving activities be monitored, with detected vibration compared to acceptable ground surface accelerations for various structures (i.e. vibration poses less potential impact to pile-supported structures). For the adjacent structures, it is proposed that documentation of existing conditions be established through photographs, surveys and measurement of existing cracks. Prior to the initiation of pile driving, a test pile program to identify the most efficient pile and hammer types, would implemented. The need for possible bracing or reinforcement of nearby structures could be accomplished pending resolution of the test pile program.	Same as the Proposed Action.	None.
Potential		
• Prior to any permits being issued by King County, the applicant shall provide documentation showing that measures to prevent contaminated materials from coming into contact with humans, surface water and groundwater have been identified, evaluated, and required as part of the MTCA cleanup plan.	Same as the Proposed Action.	None.
Unavoidable Significant Adverse Impacts		
The Proposed Action would significantly alter the site through grading and construction of roads, residential and commercial facilities. Some level of ground surface vibration would be unavoidable during pile driving. With successful implementation of the proposed mitigation measures, no significant unavoidable adverse impacts to on-or off-site areas are expected.	Same as the Proposed Action.	No impact.
AIR QUALITY **Impacts**		
The Proposed Action would result in localized increases in particulates and carbon monoxide during the 7-10 year construction period.	Similar to the Proposed Action.	Uses related to sand/gravel processing, construction and vehicle operation/storage would continue to generate particulates, carbon monoxide and other pollutants.
The Proposed Actions would generate additional carbon monoxide, particulates and other automobile-related air pollutants by increasing traffic volumes on the site and in the vicinity.	Less than the Proposed Action due to less overall traffic volumes.	Same as above.

Proposed Action—Lakepointe Mixed Use Master Plan	Alternative 1—Conceptual Master Plan in Northshore Community Plan	Alternative 2—No Action
AIR QUALITY (Continued)		
Mitigation Measures ***Required by Code***		
• Contractors would be required to adhere to PSAPCA's Regulation 1 on Fugitive Dust Emissions, including measures such as wetting down exposed soils, covering or wetting transported earth materials, washing of truck tires and undercarriages, and prompt cleanup of spills or tracked soils on public roads.	Same as the Proposed Action.	None.
• Construction of the SR522/Lakepointe Way NE intersection will require an air quality analysis to determine conformity of the Proposed Actions with National Ambient Air Quality Standards.	Same as the Proposed Action.	None.
Proposed by Applicant		
• Measures to reduce traffic generation (i.e., implementation of a Transit Management Plan to identify transit options, establishment of a transit stop on SR 522, and connection to the regional trail system) would reduce CO emissions.	Same as the Proposed Action.	None.
Unavoidable Adverse Impacts		
Construction of the Proposed Action would result in localized increases in particulates and carbon monoxide during the seven- to ten-year construction period and would contribute to long-term increases in carbon monoxide concentrations in the vicinity of the site.	Similar to but less than the Proposed Action.	No impact.
WATER **Impacts** ***Surface Water***		
Development of the Proposed Action would increase the area in impervious surfaces and decrease the area available for stormwater infiltration.	Same as the Proposed Action.	No impact.
Union full development of the proposal, flows from the 25-year storm would be 26 cfs compared to 16 cfs under existing conditions.	Because of the greater area of impervious surfaces, the volume of stormwater runoff would be higher than under the Proposed Action.	No impact.
Construction of the Proposed Action would result in the potential for soil erosion/sedimentation to Lake Washington and the Sammamish River. Upon full development, erosion from the site would cease.	Same as the Proposed Action.	Existing erosion conditions would continue.
Construction of the marina would result in short-term turbidity in the inner harbor.	Same as the Proposed Action.	Existing barge use of the inner harbor would continue.
Concentrations of fecal coliforms, lead, copper and cadmium in water discharged from the site could exceed state water quality standards prior to dilution in receiving bodies. Dilution would bring all discharges within standards.	Concentrations of fecal coliforms, lead, copper and cadmium would be lower than under the Proposed Action.	Existing pollutant input from existing industrial activities would continue.

Proposed Action—Lakepointe Mixed Use Master Plan	Alternative 1—Conceptual Master Plan in Northshore Community Plan	Alternative 2—No Action
WATER (Continued) **Impacts**		
Groundwater		
Impervious surfaces would decrease the area in pervious surfaces and decrease infiltration to groundwater.	The greater amount of impervious surfaces would result in less infiltration to groundwater than under the Proposed Action.	No impact.
Mitigation Measures		
Surface Water Quantity		
Required by Code		
• All runoff generated by the proposed development would be directed to a storm drainage system which would collect, treat (through an oil/water separator, wetpond, biofiltration swales), and discharge runoff to one location in the inner harbor, one location at Lake Washington, and three locations along the Sammamish River.	Same as the Proposed Action.	None.
Surface Water Quality Construction		
Required by Code		
• King County requires that specific mitigation measures and protocols be followed during the construction phase(s) of development.	Same as the Proposed Action.	None.
• Required mitigation measures would be outlined in the Temporary Erosion and Sedimentation Control Plan (TESCP) that would be submitted to King County DDES with the site Engineering Plans.	Same as the Proposed Action.	None.
Proposed by Applicant		
• The following mitigation measures would be implemented, in addition to provisions required by the King County Surface Water Design Manual:	Same as the Proposed Action.	None.
1. Construction runoff (e.g., concrete wastes, equipment oils) would be collected in sumps (catchment areas with no outlets) and disposed of in approved off-site locations.	Same as the Proposed Action.	None.
2. Inclusion of a water quality/TESCP inspector as part of the TESCP.	Same as the Proposed Action.	None.
3. Use of sediment ponds during construction to retain runoff (KPFF, 1996). Swales (with silt fencing or straw bale barriers) would be used to convey overflow to surface waters (KPFF, 1996).	Same as the Proposed Action.	None.

Proposed Action—Lakepointe Mixed Use Master Plan	Alternative 1—Conceptual Master Plan in Northshore Community Plan	Alternative 2—No Action
WATER - (Continued) **Mitigation Measures** ***Surface Water Quality***		
Potential		
• Provisions for accidental spill response cleanup and notification procedures could be included in contractor agreements.	Same as the Proposed Action.	None.
• Prior to any permits being issued by King County, the applicant could provide documentation showing that measures to prevent contaminated materials from coming into contact with surface water and groundwater have been identified, evaluated, and required part of the MTCA cleanup plan.	Same as the Proposed Action.	None.
Post-Construction		
Required by Code		
• The applicant will maintain all private drainage facilities in accordance with King County SWM requirements.	Same as the Proposed Action.	None.
• Use of water quality treatment facilities meeting the requirements of the 1990 KCSWDM and adopted subsequent revisions.	Same as the Proposed Action.	None.
Proposed by Applicant		
• Use of the draft KCSWDM (1996) design manual criteria for water quality facilities, which exceed the 1990 KCSWDM criteria, including:	Same as the Proposed Action.	None.
1. Use of a wetpond sized in accordance with draft methodology for treatment of the high use vehicular areas,	Same as the Proposed Action.	None.
2. Use of a biofiltration swale meeting draft King County Core Requirement #8 (King County 1996) that would be enhanced with biofiltration prior to sand filtration, and	Same as the Proposed Action.	None.
3. Use of BMPs as required by King County Special Requirement #4 (King County 1996), water quality source controls. Source controls identified in the Stormwater Pollution Control Manual (King County 1995) would be employed such as roofing of dumpster areas.	Same as the Proposed Action.	None.
• Installation and maintenance of a coalescing plate oil/water separator for runoff meeting draft King County manual definition for high use areas (King County 1996).	Same as the Proposed Action.	None.

Proposed Action—Lakepointe Mixed Use Master Plan	Alternative 1—Conceptual Master Plan in Northshore Community Plan	Alternative 2—No Action
WATER - (Continued) **Mitigation Measures** ***Surface Water Quality***		
• Boat moorage would be restricted to recreational users. No live-aboards would be allowed in the marina.	Same as the Proposed Action.	None.
• The marina would not include a fuel dock or waste holding tank pump station.	Same as the Proposed Action.	None.
• Runoff from rooftops would bypass water quality facilities, which would increase facility treatment capacity for runoff from roadways and parking lots.	Same as the Proposed Action.	None.
Potential Measures		
• If the biofiltration swales are to be located over contaminated soil (as determined by DOE), a modified underdrain, as shown in Figure 6.3.1c of the 1996 Draft Manual, with an impervious membrane separating the contaminated soil from the underdrain "drain rock" could be considered as an alternative to the standard design.	Same as the Proposed Action.	None.
• Wet street sweeping of exposed parking areas.	Same as the Proposed Action.	None.
• Stenciling storm drains to read "Dump No Waste Drains To Lake."	Same as the Proposed Action.	None.
• Post, promote and educate boat owners about regulations concerning illegal discharges of waste holding tanks.	Same as the Proposed Action.	None.
• Preclude underwater cleaning of the any boat in the inner harbor.	Same as the Proposed Action.	None.
• Prohibit the use of roof-top materials such as copper and zinc which can contaminate roof-top runoff.	Same as the Proposed Action.	None.
• Provide further restrictions of the use of fertilizers and pesticides on the site.	Same as the Proposed Action.	None.
• Provide restrictions on the type of above water-line work on boats.	Same as the Proposed Action.	None.
• Prior to any permits being issued by King County, the applicant could provide documentation showing that measures to prevent contaminated materials from coming into contact with surface water and groundwater have been identified, evaluated, and required as part of the MTCA cleanup plan.	Same as the Proposed Action.	None.
Groundwater Quality		
• Prior to any permits being issued by King County, the applicant could provide documentation showing that measures to prevent contaminated materials from coming into contact with surface water and groundwater have been identified, evaluated, and required as part of the MTCA cleanup plan.	Same as the Proposed Action.	None.

Proposed Action—Lakepointe Mixed Use Master Plan	Alternative 1—Conceptual Master Plan in Northshore Community Plan	Alternative 2—No Action
WATER (Continued) **Unavoidable Adverse Impacts**		
Surface Water Quantity No significant impacts are anticipated.	Same as the Proposed Action.	No impact.
Surface Water Quality All construction-related erosion from each development phase would be contained on-site with no sediment discharge to adjacent waters. Construction related pollutant impacts would be controlled with no significant impacts anticipated.	Same as the Proposed Action.	No impact.
Post-construction stormwater runoff would be controlled and treated through wetponds, oil/water separators and/or sand filters. Concentrations of four contaminants, lead, copper, cadmium and fecal coliforms, at discharge from water quality facilities may exceed water quality standards prior to dilution in the inner harbor, Lake Washington or the Sammamish River. With dilution in the receiving waters, no significant water quality impacts would be anticipated.	Same as the Proposed Action.	No impact.
Groundwater Quantity None are anticipated.	None are anticipated.	No impact.
Groundwater Quality None are anticipated provided that measures are implemented through the MTCA process to separate water, sewer, and storm drain facilities from contaminated soils, and to minimize impacts from pile driving thorough contaminated soils.	None are anticipate.	No impact.
PLANTS AND ANIMALS **Impacts**		
Plants The Proposed Action would not result in any direct impacts to the two existing on-site wetlands. However, the proposed trail would impact 7,470 sq. ft. of wetland buffer (4,744 sq. ft. of non-vegetated area and 2,725 sq. ft. of vegetated area).	Similar to the Proposed Action.	No impact.
Three trees meeting the "significant tree" criteria as defined in the NSCP would be removed to accommodate the public access trail along the Lake Washington shoreline.	Similar to the Proposed Action.	No impact.
6,500-sq. ft. of trail and 1,900-sq. ft. of public view platform area would be established in the Sammamish River buffer (the majority of this area is currently non-vegetated).	Similar to the Proposed Action.	No impact.
Limited human intrusion would occur into selected portions of the heron habitat area setback.	Similar to the Proposed Action.	No impact.

Proposed Action—Lakepointe Mixed Use Master Plan	Alternative 1—Conceptual Master Plan in Northshore Community Plan	Alternative 2—No Action
PLANTS AND ANIMALS (Continued) **Impacts**		
Fisheries		
Approximately 32,488 sq. ft. of fixed surface area and 12,700 sq. ft. of floating surface area would be located in the inner harbor (compared to 7,642 sq. ft. and 7,795 sq. ft. under existing conditions, respectively). The proposed over-water structures would cast approximately 45 percent more shade than existing conditions. The increased shading would not be expected to increase predation rates on juvenile salmonids.	Similar to the Proposed Action.	No impact.
The Proposed Action would add approximately 100 in-water pilings to the inner harbor, an increase of approximately 30 percent over existing conditions. The increase in in-water structures would not be anticipated to change the character of salmonid predation in the inner harbor.	Similar to the Proposed Action.	No impact.
Bottom pain from boats moored in the marina could leach anti-fouling compounds (used to limit growth of fouling organisms) into the inner harbor. No measurable effect of anti-fouling compounds from bottom paints upon salmonid fishes is anticipated.	Similar to the Proposed Action.	Existing industrial support (barge) use in the inner harbor would continue.
Indirect impacts to fisheries from increased lighting and boat traffic could occur. With proposed mitigation, significant impacts would not be anticipated.	Similar to the Proposed Action.	Existing industrial and storage area lighting would continue.
Increased public access to Lake Washington and the Sammamish River could add to fishing pressure on these waters.	Similar to the Proposed Action.	No public access to the shoreline would continue.
Noise from construction, including noise from pile driving, and occupation (including marine activity), could be detected by salmonids. No significant impact to salmonids would be anticipated.	Similar to the Proposed Action.	No impact.
Mitigation Measures **Plants**		
Proposed by Applicant		
• An additional 0.17 acre area adjacent to the southern portion of the Wetland A buffer would be designated as part of the Wetland A buffer to compensate for public access trail/firelane construction through this buffer. This expansion of the vegetated wetland buffer, as well as enhancement of the existing vegetated wetland and wetland buffer, including blackberry removal and control, would provide improved wildlife habitat along the Lake Washington shoreline.	Same as the Proposed Action.	None.
• Plantings would be used to control movement through most portions of the shoreline, heron habitat, and wetland buffer areas (e.g. dense plantings, addition of native thorny species).	Same as the Proposed Action.	None.

Proposed Action—Lakepointe Mixed Use Master Plan	Alternative 1—Conceptual Master Plan in Northshore Community Plan	Alternative 2—No Action
PLANTS AND ANIMALS (Continued) **Mitigation Measures**		
Plants		
• A buffer of 100 to 130 feet would be provided along most portions of the Lake Washington and Sammamish River shoreline to provide additional plantings and to compensate for the trails and public view platforms proposed along the Sammamish River.	Same as the Proposed Action.	None.
• The proposal would retain the three cottonwood trees located within the vegetated strip along the sites Sammamish River shoreline which meet the Department of Fish and wildlife definition of potential eagle perch trees.	Same as the Proposed Action.	None.
Fisheries		
Proposed by Applicant		
• Project structures within or overhanging the ordinary high water mark along the Sammamish River and the Lake Washington shoreline, the two most significant fish habitat areas along the property, would be avoided.	Same as the Proposed Action.	None.
• Fueling facilities, boat haul-out areas and boat yards at the marina would be prohibited.	Same as the Proposed Action.	None.
• Live-aboard marina residents would not be allowed.	Same as the Proposed Action.	None.
• Any consideration of a breakwater or wave board arrangement would include shoreline openings for unimpeded fish passage.	Same as the Proposed Action.	None.
• In-water construction within the Ordinary High Water Mark would be precluded during the juvenile salmonid outmigration period.	Same as the Proposed Action.	None.
• The level of incident light reaching the shoreline and inner harbor areas, would be minimized through directional lighting and shading. Safety lighting along trails and the marina piers would be designed low to the ground and lampshades that cover the water side of the lamps to deflect glare from the water would be installed. Existing lighting along the north shore of the Sammamish River and along the inner harbor would be removed as industrial uses of the site are phased out.	Same as the Proposed Action.	None.
• Illegal discharges of waste holding tanks from watercraft would be minimized by posting, promoting and educating boat owners about the appropriate regulations.	Same as the Proposed Action.	None.
• The effects of leaching anti-fouling paints would be minimized by discouraging underwater cleaning of watercraft in the inner harbor through moorage leasehold covenants.	Same as the Proposed Action.	None.

Proposed Action—Lakepointe Mixed Use Master Plan	Alternative 1—Conceptual Master Plan in Northshore Community Plan	Alternative 2—No Action
PLANTS AND ANIMALS (Continued) **Mitigation Measures**		
Fisheries		
• The adverse effects of increased shading of shallow water habitat would be mitigated with large openings, grating, clearstory and/or glass structures in overwater decking. Where surface openings are not practical, under-wharf lighting would be used.	Same as the Proposed Action.	None.
• The adverse effects of potentially increasing salmonid predator habitat would be mitigated by 1) increasing the amount of shallow water habitat available for refuge (see mitigation measure below), 2) increasing habitat complexity by adding large rock, boulder/cobble, substrate adjacent to the pilings to increase spaces for salmonid hiding/refuge habitat; 3) surfacing shallow beach areas with appropriate substrate to increase refuge habitat for salmonids; and 4) encouraging dock-side fishing and supporting frequent bass (or other warmwater fish) fishing tournaments focused on the inner harbor to reduce the potential predator base.	Same as the Proposed Action.	None.
• The amount of shallow water habitat in the inner harbor would be increased by 3,000 sq.ft. by removing 115 ft. of bulkhead along the eastern portion and returning the beach area to a gradual slope. The deck work in this area would be opened to allow light penetration below or artificial lighting would be installed beneath the overhang to make this habitat productive for salmonids. This effort would create additional shallow water (<10ft.) littoral area that does not currently exist.	Same as the Proposed Action.	None.
• The unusable in-water structures including pilings and decaying bulkhead stumps in the river, lakefront and inner harbor areas would be removed.	Same as the Proposed Action.	None.
Potential		
• The submerged debris including car tires, cement blocks, and other industrial debris along the Lake Washington shoreline could be removed.	Same as the Proposed Action.	None.
• A turf management plan to minimize the amount of herbicide and fertilizers used to maintain proposed grass areas could be prepared.	Same as the Proposed Action.	None.
• A plan to specify low impact blackberry control techniques could be prepared.	Same as the Proposed Action.	None.
• Placement of above-ground drainage facilities (manholes/structures) within the river shoreline buffer could be mitigated by plantings of taller grasses around such structures and lining of swales with native vegetation.	Same as the Proposed Action.	None.

Proposed Action—Lakepointe Mixed Use Master Plan	Alternative 1—Conceptual Master Plan in Northshore Community Plan	Alternative 2—No Action
PLANTS AND ANIMALS (Continued) **Unavoidable Significant Adverse Impacts**		
The Proposed Action would impact a portion of the Wetland A buffer; expanded shoreline buffer along the Lake Washington and Sammamish River shoreline would increase the amount of wildlife habitat on the site and would compensate for this loss. No significant impacts to plant or wetland communities are anticipated.	Same as the Proposed Action.	None.
The Proposed Action would increase the amount of over- and in-water structures in the inner harbor which could increase salmonid predator habitat. With the proposed mitigation measures (including creation of shallow water habitat and creation of salmonid hiding/refuge habitat), significant impacts to salmonid fish populations are not anticipated. The Proposed Action would increase human activity in the vicinity of heron feeding habitat area.	Same as the Proposed Action.	None.
NOISE **Impacts**		
Construction activities, including pile driving, use of heavy equipment and transport of construction materials, would generate noise through most of the 7-year construction period. These activities would generate maximum sound levels that would be higher than existing levels experienced by receivers to the north, west, and possibly the south in the worst case.	Similar to the Proposed Action, except shorter construction period.	No impact.
Future on-site residents would receive construction noise as later phases are built.	Similar to the Proposed Action.	No impact.
Future on-site residents in Buildings C-1, C-2, and D would be most exposed to noise from industrial activity at the pre-mix plant, and could be subjected to noise exceeding acceptable levels for residential uses.	Similar to the Proposed Action.	No impact.
Some future on-site residents of proposed Building A could be subject to traffic noise levels from 68th Ave. NE exceeding those usually considered acceptable for residential uses according to EPA guidelines and county limits for other noise sources. However, because traffic noise is exempt from the King County Noise Ordinance, no exceedance of noise standards would occur. ***<u>During Construction</u>*** ***Required by Code***	Similar to the Proposed Action.	No impact.
• Consistent with King County noise limits, construction activities would be limited to daytime hours to the extent practicable. This restriction would include all noisy start-up and preparatory activities like starting engines before 7:00 a.m. A possible exception to this restriction could be the construction of some of the on-site roadway system, which could require a round-the-clock work schedule. Noise from any work during nighttime hours (after 10 p.m.) received in residentially zoned areas would be subject to the nighttime noise limits in the King County code.	Same as the Proposed Action.	None.

Proposed Action—Lakepointe Mixed Use Master Plan	Alternative 1—Conceptual Master Plan in Northshore Community Plan	Alternative 2—No Action
NOISE (Continued) **Mitigation Measures** ***Potential***		
• Because construction noise during daytime hours is exempt from the limits in the King County noise rule, no mitigation is required in order to comply with the county noise limits. However, because the potential for on- and off-site noise impacts from uncontrolled construction noise sources is high, and because the construction of the proposed project would take place over at least 6 years, measures to reduce potential noise impacts are warranted. The applicant has indicated that some or all of the following measures could be implemented to reduce construction noise.	Same as the Proposed Action.	None.
• Construction noise could be reduced with properly sized and maintained mufflers, engine intake silencers, engine enclosures, and by turning off idle equipment and confining activities to normal daytime hours. The construction contract could specify that mufflers be in good working order and that engine enclosures be used on equipment when the engine is the dominant source of noise.	Same as the Proposed Action.	None.
• Stationary equipment could be placed as far away from sensitive receiving locations as possible. Where this is not feasible, or where noise impacts could still be significant, portable noise barriers could be placed around the equipment with the opening directed away from the sensitive receiving property thereby reducing sound levels by approximately 10 dBA. These measures are especially effective for engines used in pumps, compressors, welding machines, and similar equipment that operates continuously and contributes to high, steady background noise levels.	Same as the Proposed Action.	None.
• Substituting hydraulic or electric models for impact tools such as jack hammers, rock drills and pavement breakers could also reduce construction and demolition noise. Although backup alarms are exempt from the noise ordinances, where feasible, equipment operators could drive forward rather than backward to minimize noise from this source. Noise from material handling could also be minimized by requiring operators to lift rather than drag materials where feasible.	Same as the Proposed Action.	None.
• Ambient-sensitive vehicle back-up alarms, which sample the ambient sound level when a vehicle is about to back up and emit a signal only 10-dBA louder than the existing level (as opposed to emitting a signal at a preset, maximum level), could be used on the site. Construction contracts would suggest the use of such devices to reduce the noise perceived at off-site locations and thereby reduce possible annoyance.	Same as the Proposed Action.	None.

Proposed Action—Lakepointe Mixed Use Master Plan	Alternative 1—Conceptual Master Plan in Northshore Community Plan	Alternative 2—No Action
NOISE (Continued) **Mitigation Measures** ***Pile Driving Noise*** ***Potential***		
• Pile driving would be limited to weekdays between the hours of 9 a.m. and 5 p.m. This would limit this noise source to those times of the day the those days of the week when most people are most likely to be away from home. This time restriction also would limit pile driving to times when other noise sources would make the addition of pile-driving noise least noticeable.	Same as the Proposed Action.	None.
• Vibratory hammers or hydraulic jack drivers would be used to the extent possible to reduce pile-driving noise by eliminating the impact noise usually associated with pile installation. However, both alternative methods are limited in the pile types they can install and the soil types in which they can be used. Vibratory hammers are most effective in stable, granular soils using non-displacement piles such as h-sections and open-end pipes. Hydraulic jack drivers are suitable for sheet piles, installed in straight lines in cohesive soils. Vibratory hammer pile drivers would be employed to the extent use of such devices is reasonable practicable.	Same as the Proposed Action.	None.
• Where use of vibratory hammers is not possible, the following measures would be employed to the extent practicable. 1. Insert a wooden or plastic dolly between the pile head and the hammer. 2. Apply a damping compound to steel piles to reduce the vibration/ringing. 3. Shroud the lower part of the hammer, this is not generally considered very effective. 4. Silence exhaust gas pulsations from the engines of diesel-powered hammers. 5. Remove any unnecessary hanging chains; fix any loose bolts, panels, or over-slack leader guides. 6. Use a cushioned method in conjunction with a "heavy hammer-short drop" practice. This requires using interference fit guides to prevent kicking, rolling and vibration in the pile. While the overall sound level is NOT substantially reduced, the nature of the sound may be less annoying to people. 7. Regular equipment service and maintenance.	Same as the Proposed Action.	None.
• Use of a Hoesch Noise Abatement Tower would limit noise from pile driving. This device encloses the hammer and driven pile. It was designed to provide the maximum sound level reduction with minimum possible weight. The composite panel is comprised of a 'sandwiched" layer of 2 mm steel, 0.4 mm plastic, and 1.5 mm steel. A polyurethane layer 150 mm thick is foamed on the inner walls of the panels. This enclosure can reduce impact pile driving noise by up to 20 dBA. Drawbacks include the difficulty of using this device on uneven ground, slopes, or in water. This mitigation also can be prohibitively expensive.	Same as the Proposed Action.	None.

Proposed Action—Lakepointe Mixed Use Master Plan	Alternative 1—Conceptual Master Plan in Northshore Community Plan	Alternative 2—No Action
NOISE (Continued) **Mitigation Measures** ***Existing Plant Noise*** ***Potential***		
• The existing concrete plant operation is complying the existing county noise rules based on existing zoning. However, the proposed development of residential buildings on the site would require consideration of some means to reduce the effects of noise from the existing concrete plant. As a part of the building permit review process, analysis of noise conditions may be warranted.	Same as the Proposed Action.	None.
Unavoidable Significant Adverse Impacts		
Sound levels from the existing pre-mix plant would exceed the daytime noise limits for industrial sources affective residential receivers, without some form of mitigation (i.e. noise from the pre-mix plant could impact some residents of the proposed Master Plan). Residents and businesses on the Lakepointe site would be subject to significant noise impacts during all phases of construction.	Same as the Proposed Action.	No impact.
TOXIC AND HAZARDOUS MATERIALS **Proposed Site Cleanup**		
Prior to issuance of any permits by King County, a phased remediation plan for the areas determined by DOE to be contaminated and warranting cleanup must be approved. The specifics of the site remediation plan are currently being determined by the DOE in cooperation with the landowner, under the guidelines of the Model Toxic Control Act. (MTCA). The environmental impacts of site cleanup would be identified as part of the DOE review process under the MTCA.	Same as the Proposed Action.	The MTCA procedures and standards to be followed would be the same as under the Proposed Action. However, residential standards would not have to be met because the site would remain industrial use.
Mitigation Measures		
• The site cleanup would be implemented to reduce or eliminate the potential for exposure of humans to contaminated soils, per DOE requirements. Specific cleanup measures would be determined by the DOE through the MTCA process.	Same as the Proposed Action.	Industrial cleanup standards would be required to be met.
• Prior to any permits being issued by King County, the applicant will provide documentation to King County showing that measures to prevent contact with contaminated material have been required.	Same as the Proposed Action.	None.
Unavoidable Significant Adverse Impacts		
The potential for any unavoidable significant adverse impacts of the cleanup will be identified in the MTCA review process, based on the method of cleanup agreed to by DOE and the applicant. If an engineered cap is the method selected, no significant adverse impacts are anticipated from project construction provided that the mitigation measures identified in the Earth and Water sections of this Supplemental Draft EIS are implemented.	Same as the Proposed Action.	Impacts resulting from cleanup to industrial standards would be identified through MTCA.

Proposed Action—Lakepointe Mixed Use Master Plan	Alternative 1—Conceptual Master Plan in Northshore Community Plan	Alternative 2—No Action
LAND AND SHORELINE USE **Impacts**		
The Proposed Action would result in phased redevelopment and intensification of development on the site and displacement of existing industrial uses. The overall site character would become more urban and consist of a mix of uses.	Similar to but less than impacts of the Proposed Action.	No impact.
Phase 7, the last phase that would displace the Kenmore Pre-Mix, would require a rezone to accommodate planned retail, commercial and/or residential uses.	Similar to the Proposed Action.	No impact.
The proposed building area of approximately 2,400,000 square feet would increase the height and bulk of structures on the site.	Similar to the Proposed Action, except total building area would be approximately 200,000 square feet less than the Proposed Action.	No impact
The proposed land uses would generate a high level of activity on the site throughout the day.	Lesser increase in activity levels than the Proposed Action.	No impact.
Mitigation Measures		
• No specific mitigation measures are required to address identified direct land use impacts other than the features incorporated into the proposal in order to be consistent with the intent of NSCP P-suffix conditions. To ensure that indirect land use impacts are effectively controlled, King County and area cities will implement their adopted land use plans, policies and regulations to guide the location, type, and intensity of future growth.	Same as the Proposed Action	None.
• Implementation of the Proposed Action would result in the intensification of development on the site and displacement of some existing uses. The proposal would be consistent with King County land use designations and policies addressing where urban growth should occur. The analysis in this section concludes that no significant unavoidable adverse impacts are anticipated.	Same as the Proposed Action.	None.
POPULATION AND HOUSING **Impacts**		
At buildout, the Proposed Action would attract approximately 2,250 new residents to the Northshore Community Planning Area.	At buildout, Alternative 1 would attract approximately 1,875 new residents.	The residential needs of the projected Northshore population would need to be accommodated elsewhere in the Northshore area.
At buildout, the Proposed Action would add approximately 1,200 multi-family dwelling units, including 400 senior housing units, to the Northshore Community Planning Area.	At buildout, Alternative 1 would add approximately 1,000 multi-family dwelling units, 200 fewer than the Proposed Action.	The housing needs of the projected Northshore population would need to be accommodated elsewhere in the Northshore area.

Proposed Action—Lakepointe Mixed Use Master Plan	Alternative 1—Conceptual Master Plan in Northshore Community Plan	Alternative 2—No Action
POPULATION AND HOUSING (Continued) **Unavoidable Significant Adverse Impacts**		
With the proposed mitigation measures, no unavoidable significant adverse population or housing impacts are expected.	Similar to the Proposed Action, except less population growth and less provision of housing.	No impact.
AESTHETICS, LIGHT & GLARE **Impacts**		
The aesthetic/visual character of the site would change from an industrial character with one- to two-story buildings to a mixed-use pedestrian-oriented development with nine- to ten-story buildings. Most of the development would be visible from surrounding properties and adjacent roads.	Similar to the Proposed Action, except lesser building area and heights consistent with P-suffix conditions. Viewers from the south could perceive less visual building scale, while viewers from Lake Washington could perceive greater visual building scale.	Existing industrial character of the site would continue.
The Master Plan proposes to modify the building heights set forth in P-suffix conditions, which would allow higher buildings closer to the River, and at future phase buildings in Area H adjacent to NE 175th St. and NE Bothell Way. This would be somewhat offset by reductions in maximum building heights in the west central portion of the site.	Height limits consistent with P-suffix conditions (see above impact).	No impact.
Impacts		
The Proposed Action would result in elimination of existing lighting and the establishment of new light sources for parking lots, trails/walkways, commercial building and signage, and from automobile traffic.	Similar to but less impact than the Proposed Action.	No impact.
Mitigation Measures ***Required by Code***		
• Proposed Design Guidelines are intended to establish an overall and consistent design character for buildings, landscaping, lighting and signage to ensure a harmonious design relationship among the various site uses, and to develop a visual link to Kenmore.	Same as the Proposed Action.	None
Proposed by Applicant		
• The vegetated buffer along the Lake Washington and Sammamish River shorelines would be preserved, expanded and enhanced to provide a visual buffer between the site and off-site areas to the south and west.	Same as the Proposed Action.	None.
• Standards for wattage and shielding of lights would be included in the Master Plan Design Guidelines to minimize light impacts to off-site properties.	Same as the Proposed Action.	None.
Potential		
Low reflective glass could be used to minimize glare to area motorists.	Same as the Proposed Action.	None.

Proposed Action—Lakepointe Mixed Use Master Plan	Alternative 1—Conceptual Master Plan in Northshore Community Plan	Alternative 2—No Action
AESTHETICS, LIGHT & GLARE (Continued) **Unavoidable Significant Adverse Impacts**		
The scale of building heights on the site would increase from existing one- or two-story buildings to buildings up to ten-stories high, and some views of skylines, Lake Washington and the Sammamish River, and surrounding hillsides would be obscured.	Same as the Proposed Action.	No impact.
HISTORIC AND CULTURAL PRESERVATION **Impacts**		
It is possible but not likely that unknown resources of cultural significance could be unearthed during proposed construction.	Same as the Proposed Action.	It is possible but not likely that historic or cultural resources could be unearthed by future industrial activities on the site.
Mitigation Measures ***Proposed by Applicant***		
• If archaeological resources are discovered during construction, the King County Cultural Resources Division, the State Office of Archaeological and Historic Preservation, and appropriate tribes would be notified, and the significance of the findings would be determined.	Same as the Proposed Action.	None.
Unavoidable Significant Adverse Impacts		
No unavoidable significant adverse impacts are expected.	Same as the Proposed Action.	No impact.
TRANSPORTATION **Impacts**		
The Proposed Action would include additions to the area roadway network, including bypass roadway (Lakepointe Way NE) connecting SR522 and 68th Avenue NE.	Similar to the Proposed Action.	Existing roadway system and congestion patterns would remain.
The Proposed Action would generate 13,692 daily trips, including 641 A.M. and 1,463 P.M. peak-hour trips by the year 2005.	Alternative 1 would generate approximately 14,212 daily trips.	Existing 1,116 daily trips would continue.
Under the Proposed Action, the following intersection movements would have traffic volumes exceeding queue capacity in the year 2005: A.M. peak-hour - 68th Ave. NE northbound left-turn and through movements of SR522/58th Ave. NE. P.M. peak-hour - SR522 eastbound through and 68th Ave. NE northbound left-turn and through movements of SR522/68th Ave. NE; 68th Ave. NE northbound left-turn, right-turn and through movements of NE 175th St./68th Ave. NE; and 68th Ave. NE southbound through and right-turn movements of Lakepointe Way NE/68th Ave. NE.	Meaningful comparison of traffic operations cannot be made between the Proposed Action and Alternative 2 because different cycle lengths were used.	Level of service at area intersections would decline from existing conditions.

Proposed Action—Lakepointe Mixed Use Master Plan	Alternative 1—Conceptual Master Plan in Northshore Community Plan	Alternative 2—No Action
TRANSPORTATION (Continued) **Impacts**		
Overall, with the addition of Lakepointe Way NE to the roadway network, with Lakepointe traffic, vehicles in the year 2005 would move along area roadways more quickly than without Lakepointe Way NE.	Same as above.	No new bypass roadway (Lakepointe Way NE) would be provided. Vehicle movement along area roadways would be slower than under the Proposed Action.
A.M. level of service at the intersection of SR522/73rd Ave. NE would decrease from C to D in the year 2005 with the Proposed Action. P.M. level of service at the intersection of SR522/61st Ave. NE would decrease from LOS E to F and level of service at the intersection of 68th Ave. NE/SR522 would improve from LOS D to C in the year 2005 with the Proposed Action.	Same as above.	Level of service at area intersections would decline from existing conditions.
Construction of the Proposed Action would generate approximately 250 off-site vehicle and truck trips per day during the construction period. Traffic associated with existing uses would be eventually eliminated from the site; during the final phases of construction, construction trips would be less than the trips associated with the eliminated uses.	Similar to the Proposed Action.	No impact.
The Proposal would generate demand for area transit, pedestrian, and bicycle facilities. Transit facilities, including transit stops. Would be provided. Pedestrian and bicycle facilities, including sidewalks, trails, crosswalks and connections to existing pedestrian routes and trailhead facilities in the area would be provided.	Similar to the Proposed Action.	No new pedestrian, bicycle or transit facilities would be provided.
The proposed marina would increase the number of beats in the area which could conflict with seaplanes. Because no small maneuverable boats, which could interfere with seaplane take-off/landings, would be allowed at the marina, no significant impacts to seaplane use is anticipated.	Similar to the Proposed Action.	No impact.
Mitigation Measures		
• Transportation mitigations – required, proposed, and potential – are listed below. Mitigation measures will be established in a Transportation Mitigation Agreement signed by King County and the applicant as part of the Master Plan approval. The Agreement will also establish the phasing and timing of implementation of mitigations.	Same as the Proposed Action.	None.
Required by Code		
• Lakepointe Way NE connecting SR 522 and 68th Ave. NE: 1. Construct a five-lane, principal arterial with turn channels and turn pockets. 2. Construct a barrier-free sidewalks and bicycle facilities along the roadway. 3. Lower the Burke-Gilman Trail and construct a grade-separated crossing of Lakepointe Way NE. 4. Lower NE 175th St. and construct a grade-separated crossing of Lakepointe Way NE.	Same as the Proposed Action.	None.

Proposed Action—Lakepointe Mixed Use Master Plan	Alternative 1—Conceptual Master Plan in Northshore Community Plan	Alternative 2—No Action
TRANSPORTATION (Continued) **Mitigation Measures** ***Required by Code***		
• Lakepointe Way NE at SR 522: 1. Reconstruct the intersection to provide dual, north-to-west, left-turn lanes and single, north-to-east, right-turn lane. 2. Construct a separate right-turn lane on SR 522 south of the transit-only lane. 3. Construct crosswalks on the south and east approaches to the intersection. 4. Signalize the intersection and provide pedestrian-actuated phasing, as determined by King County and WSDOT.	Same as the Proposed Action.	None.
• Lakepointe Way NE at 68th Ave. NE: 1. Widen 68th Ave. NE within the existing right-of-way from the north end of the Kenmore Bridge to Lakepointe Way NE. 2. Construct left-turn, left-through, and through lanes on the northbound approach. 3. Construct single left-turn and double right-turn lanes on eastbound approach. 4. Signalize the intersection and provide pedestrian-actuated phasing, as determined by King County and WSDOT.	Same as the Proposed Action.	None.
• Pay Mitigation Payment System (MPS) fees as determined by King County.	Same as the Proposed Action.	None.
• Construct enhanced transit stops on the north and south sides of SR 522 between Lakepointe Way NE and 68th Ave. NE, including seating areas, weather protection, landscaping, and walkways, and provide access from the stops to the Burke-Gilman Trail and residential areas on the Lakepointe site, consistent with King County and WSDOT standards and subject to availability of right-of-way.	Same as the Proposed Action.	None.
• Provide a fair-share contribution for the construction of a pedestrian bridge over SR 522 in the vicinity of the transit stops, subject to approval by WSDOT, and provide a touchdown location on the Lakepointe site for the bridge.	Same as the Proposed Action.	None.
• Develop and implement a Transportation Management Plan (TMP) approved by King County. Strategies to be considered in the TMP include transit subsidies, parking fees, and rent abatement.	Same as the Proposed Action.	None.
• Provide a fair-share contribution to the construction of a new park-and-ride facility in the Kenmore area, or provide 50 commuter parking stalls in a location accessible to the southern enhanced transit stop, as determined in the approved TMP. Provision of a shuttle bus connecting the SR 522 transit stops with residential areas on the Lakepointe site may be required as part of the TMP.	Same as the Proposed Action.	None.

Proposed Action—Lakepointe Mixed Use Master Plan	Alternative 1—Conceptual Master Plan in Northshore Community Plan	Alternative 2—No Action
TRANSPORTATION (Continued) **Mitigation Measures**		
Proposed by Applicant		
• Construct Lakepointe Way NE as an elevated roadway.	Same as the Proposed Action.	None.
• At the intersection of 61st Ave. NE with SR 522, construct an exclusive southbound-to-eastbound, left-turn lane, and implement a southbound-to-westbound, right-turn phase overlap(to be funded through a RID or LID).	Same as the Proposed Action.	None.
• At the intersection of 68th Ave. NE and NE 170th St., provide a signal phase overlap for the southbound-to-eastbound, left-turn lane and the westbound-to-northbound, right-turn lane (to be funded through a RID or LID).	Same as the Proposed Action.	None.
• At the intersection of the 80th Ave. NE with SR 522, restripe the southbound approach to provide separate left-turn and right-turn lanes.	Same as the Proposed Action.	None.
• Lakepointe Way NE at NE Lakepointe Blvd: 1. Construct dual, left-turn lanes for traffic exiting the Lakepointe site. 2. Construct new access roads to replace the east leg of the NE 175th St./65th Ave. NE intersection. 3. Signalize the intersection and provide pedestrian-actuated phasing.	Same as the Proposed Action.	None.
• Limit public moorage at the marina to short-term guest moorage in order to reduce the number of transient boat trips associated with the marina.	Same as the Proposed Action.	None.
Potential		
• Design the proposed eastbound, right-turn lane from SR 522 to Lakepointe Way NE with adequate storage capacity to prevent blockage of the eastbound transit lane on SR 522.	Same as the Proposed Action.	None.
• Prohibit left-turn access to and from SR 522 in the vicinity of its intersections with Lakepointe Way NE and 65th Ave. NE in order to reduce conflicts with traffic patterns created by new lane configurations.	Same as the Proposed Action.	None.
• Provide a fair-share contribution toward construction of the SR 522 Multi-Modal Project proposed for construction by WSDOT.	Same as the Proposed Action.	None.
• Improve non-motorized access to the Lakepointe site from the south via 68th Ave. NE and the Kenmore Bridge over the Sammamish River.	Same as the Proposed Action.	None.

Proposed Action—Lakepointe Mixed Use Master Plan	Alternative 1—Conceptual Master Plan in Northshore Community Plan	Alternative 2—No Action
TRANSPORTATION (Continued) **Unavoidable Significant Adverse Impacts**		
The level of service (LOS) at the intersection of SR522 and 68th Ave. NE is currently at LOS F and is projected to continue to operate at LOS F in the year 2005 with or without the Proposed Action. There is no apparent improvement to capacity that can be made to this intersection without major right-of-way acquisition and local business disruption. Traffic queues would continue to exceed the storage capacity at several locations and affect the traffic operation at adjacent intersections.	Same as the Proposed Action.	No impact.
PUBLIC SERVICES—FIRE **Impacts**		
The Proposed Action would generate additional fire protection and emergency service demands on Fire District 16. The estimated buildout population would generate approximately 151 calls per year, and the commercial/office uses would generate approximately 97 calls per year (based on District 16 call rates) for a total of 248 calls per year.	Alternative 1 would generate approximately 126 residential calls per year and 75 commercial/ office calls per year, for a total of 201 calls per year, 47 fewer than the Proposed Action.	No impact.
District 16 does not expect significant adverse impacts on facilities, equipment or staffing, assuming that adequate built-in fire protection features are provided.	Fewer impacts overall on District 16 facilities, equipment and staffing, due to lower call volume.	No impact.
Mitigation Measures ***Required by Code***		
• All proposed structures would be designed to meet up-to-date fire safety/prevention standards, including those in the Uniform Fire Code and other applicable King County fire safety/prevention regulations.	Same as the Proposed Action.	None.
• The site plan would provide adequate fire/emergency vehicle access to all portions of the site via fire lanes, as required by King County.	Same as the Proposed Action.	None.
Proposed by Applicant		
• Tax revenues generated by development would be available to contribute to future staff and equipment improvements in Fire District 16 (NSCP Draft EIS, 1991).	Same as the Proposed Action.	None.
Unavoidable Significant Adverse Impacts		
Population, employment and recreational uses associated with the Proposed Action would increase fire protection and emergency aid demands in Fire District 16. With the proposed mitigation measures, no unavoidable significant adverse impacts are expected.	Less impact than the Proposed Action, due to less population and employment.	No impact.

Proposed Action—Lakepointe Mixed Use Master Plan	Alternative 1—Conceptual Master Plan in Northshore Community Plan	Alternative 2—No Action
PUBLIC SERVICES—POLICE **Impacts**		
The Proposed Action would generate additional demands for police protection from the King County Sheriff's Department. The estimated buildout population would generate approximately 594 additional police calls for service annually.	Alternative 1 would generate approximately 495 police calls for service, 99 fewer than the Proposed Action.	No impact.
The buildout population would generate demand for approximately 2.2 additional officers and associated equipment, using unofficial officer-to-population ratios.	Alternative 1 would generate demand for approximately 1.9 officers and associated equipment.	No impact.
Proposed by Applicant		
• Security measures, including secured areas and adequate lighting, would be provided during construction, to reduce or eliminate potential problems such as material theft or vandalism.	Same as the Proposed Action.	None.
• Adequate lighting of outdoor public areas and parking garages on the developed site would enhance overall security and public safety.	Same as the Proposed Action.	None.
• On-site security personnel hired directly by on-site employers would enhance overall security and public safety.	Same as the Proposed Action.	None.
• Tax revenues generated by development would be available to contribute to future staff and equipment improvements in the King County Sheriff's Department.	Same as the Proposed Action.	None.
Potential		
• Community crime prevention programs could be developed, which could reduce the demand for police services from the Proposed Action.	Same as the Proposed Action.	None.
Unavoidable Significant Adverse Impacts		
Population, employment and recreational uses associated with the Proposed Action would increase police protection demands on the King County Sheriff's Department. With the proposed mitigation measures, no unavoidable significant adverse impacts are expected.	Less impact than the Proposed Action, due to less population and employment.	No impact.
PUBLIC SERVICES—SCHOOLS **Impacts**		
The 800 non-senior housing units would generate approximately 213 additional students in the Northshore School District at buildout. Enrollment growth would occur gradually with phased development of the Proposed Action.	The 900 non-senior housing units would generate approximately 239 students at buildout, 25 more than the Proposed Action.	No impact.
If the projected District-wide lack of permanent capacity occurs, the students generated by the Proposed Action would represent a significant impact on District facilities by contributing to over capacity conditions.	Slightly greater facility impacts than the Proposed Action.	No impact.

Proposed Action—Lakepointe Mixed Use Master Plan	Alternative 1—Conceptual Master Plan in Northshore Community Plan	Alternative 2—No Action
PUBLIC SERVICES—SCHOOLS (Continued) **Mitigation Measures** ***Required by Code***		
• The applicant would pay impact fees to the Northshore School District to help offset the impacts of additional project-generated students. Impact fee calculations would occur consistent with requirements of the District's Capital Facilities Plan and King County Code 21A.43. The entire amount of the school impact fees would be collected at the time of building permit application. KCC 21A.43 also describes impact fee credits for provision of affordable housing. Fees and credits would be coordinated according to KCC 21A.43. Phasing of the Proposed Action's residential development would enhance the District's ability to provide facilities to accommodate enrollments generated by the Proposed Action.	Same as the Proposed Action.	None.
Proposed by Applicant		
• The applicant would coordinate with the Northshore School District regarding provision of school bus access and student collection points.	Same as the Proposed Action.	None.
• Tax revenues generated by development would be available to contribute to future facility and staffing improvements in the Northshore School District.	Same as the Proposed Action.	None.
Unavoidable Significant Adverse Impacts		
The Proposed Action would generate additional student enrollments in the Northshore School District, contributing to forecasted total student populations that could exceed the permanent facility capacity of the District. With the proposed mitigation measures, no unavoidable significant adverse impacts are expected.	Slightly greater enrollment impacts than the Proposed Action.	No impact.
PUBLIC SERVICES—PARKS AND RECREATION **Impacts**		
The Proposed Action would result in increased use of existing recreational facilities and generate some demand for additional recreation facilities. Using the County Park Plan's local park acreage standard of 7.5 acres per 1,000 residents, the Proposed Action would generate the need for 16.9 acres of additional local park space.	Alternative 1 would generate the need for 14.1 acres of additional local park space.	No impact.
The Proposed Action's residents would contribute to the need for approximately ½ of an additional baseball and softball field, and approximately ¼ of a soccer field and basketball/sport court. If senior citizens are not counted as contributing to athletic facility needs, the resulting demand would be for approximately 0.4 of additional baseball and softball fields, and approximately 0.2 of soccer field and basketball/sport court.	Alternative 1 residents would contribute to the need for approximately 0.4 of an additional baseball and softball field, and approximately 0.2 of a soccer field and basketball/sport court. If seniors are not counted, the resulting demands would be for 0.05 or 0.1 less of these facilities.	No impact.

Proposed Action—Lakepointe Mixed Use Master Plan	Alternative 1—Conceptual Master Plan in Northshore Community Plan	Alternative 2—No Action
PUBLIC SERVICES—PARKS AND RECREATION **Impacts (Continued)**		
The Proposed Action would provide open space and accommodate several types of recreation with pedestrian walkways and trails, open grassy areas, benches, cover view platforms, children's play area, amphitheater, boating facilities, trailhead facilities at the Burke-Gilman Trail and waterfront access. Determination of conformance with King County recreation standards and applicable P-Suffix conditions would be made as part of permit review.	Alternative 1 would provide less open space and less waterfront access than the Proposed Action.	No impact.
Mitigation Measures ***Required by Code***		
• The Proposed Action would be required to comply with the on-site recreation area requirements of King County Code 21A.14.	Same as the Proposed Action.	None.
Proposed by Applicant		
• The Proposed Action would provide numerous outdoor recreation features such as outdoor park area, shoreline access trail, waterfront amenities, amphitheater, water viewing platforms, paths and gardens that would be accessible to the general public and on-site residents (including senior citizens) for passive recreation uses.	Same as the Proposed Action.	None.
• If King County determines that the proposal does not meet all open space and recreation standards, a fee-in-lieu may be required.	Same as the Proposed Action.	None.
• The Proposed Action would provide a direct link to the Burke-Gilman Trail that would allow residents to use the regional trail system for bicycling, rollerblading and walking.	Same as the Proposed Action.	None.
Unavoidable Significant Adverse Impacts		
According to King County Park Plan guidelines, the Proposed Action would generate added demand for active recreational facilities in the Northshore area.	Similar to impacts of the Proposed Action, except demand for 14.1 acres of local parks and active recreation facilities.	No impact.
PUBLIC SERVICES—LIBRARIES **Impacts**		
Development of the Proposed Action would result in an increased demand for library services at the Kenmore branch and possibly the Bothell, Lake Forest and Shoreline branches of the King County Library System. Such increases in demand could contribute to the need for improvements in the library facility at Kenmore.	Similar to but less impact than the Proposed Action.	No impact.
Mitigation Measures		
• Tax revenues generated by development would be available to contribute to future improvements in the King County Library System.	Same as the Proposed Action.	None.

Proposed Action—Lakepointe Mixed Use Master Plan	Alternative 1—Conceptual Master Plan in Northshore Community Plan	Alternative 2—No Action
PUBLIC SERVICES—LIBRARIES (Continued) **Unavoidable Significant Adverse Impacts** The Proposed Action would generate additional demands on the King County Library System, including the Kenmore Library. With the proposed mitigation measures, no unavoidable significant adverse impacts are expected.	Similar to but less impact than the Proposed Action.	No impact.
UTILITIES—WATER SUPPLY **Impacts** The Proposed Action would result in total water demand of approximately 173-174 million gallons per year, or approximately 475,000 gallons per day. The Northshore Utility District would be able to supply the needed volumes of water. **Mitigation Measures** ***Required Measures*** • As part of the permit review process, the King County Fire Marshal would verify that adequate water is available from the Northshore Utility District to provide the fire flow volumes required by the Proposed Action. **Unavoidable Significant Adverse Impacts** No unavoidable significant water system impacts are expected.	Approximately 80 percent as much water demand as the Proposed Action. Same as the Proposed Action. Similar to but less than the Proposed Action.	No impact. None. No impact.
UTILITIES—SEWER/SOLID WASTE **Impacts** ***Sewer*** The Proposed Action would result in total wastewater volumes of approximately 160 million gallons per year or about 440,000 gallons per day. The Northshore Utility District would be able to accommodate the additional wastewater volumes. ***Solid Waste*** The Proposed Action would generate an estimated 1,512 tons of solid waste per year, or about 4.1 tons per day. Eastside Disposal would provide solid waste services.	Approximately 80 percent as much wastewater volume as the Proposed Action. Approximately 80 percent as much solid waste generation as the Proposed Action.	No impact. No impact.

Proposed Action—Lakepointe Mixed Use Master Plan	Alternative 1—Conceptual Master Plan in Northshore Community Plan	Alternative 2—No Action
UTILITIES—SEWER/SOLID WASTE (Continued) **Mitigation Measures**		
Required by Code		
• Sewer lines outside of proposed structures would be sized using design criteria provided by the Northshore Utility District and the Washington State Department of Ecology's *Criteria for Sewage Works Design.* Sewer lines inside the buildings would be sized using the Uniform Plumbing Code.	Same as the Proposed Action.	None.
• Construction, demolition and land clearing debris would be transported to approved disposal locations.	Same as the Proposed Action.	None.
Proposed by Applicant		
• The applicant would coordinate with Eastside Disposal to arrange provision of recycling services to the site.	Same as the Proposed Action.	None.
Unavoidable Significant Adverse Impacts		
No unavoidable significant sewer or solid waste impacts are expected.	Similar to but less than the Proposed Action.	No impact.
UTILITIES—ENERGY **Impacts**		
Puget Sound Energy indicates that the existing electrical and natural gas systems have adequate capacity to serve the Proposed Action.	Approximately 80 percent as much demand for electricity and natural gas as the Proposed Action.	No impact.
Mitigation Measures		
• None proposed.	None proposed.	None.
Unavoidable Significant Adverse Impacts		
No unavoidable significant electricity or natural gas impacts are expected.	Similar to but less than the Proposed Action.	No impact.

CHAPTER TWO

Description of the Proposed Action and Alternatives

CHAPTER TWO

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

This section of the Draft Supplemental Environmental Impact Statement (Draft Supplemental EIS) presents a description of the proposed Mixed Use Master Plan (Master Plan) for the 50-acre site. A brief history of the Master Plan proposal and an overview of prior approvals and environmental review related to the site is also provided. A detailed description of impacts, mitigation measures, and significant unavoidable adverse impacts is contained in Chapter Three of this Draft Supplemental EIS.

A description of the alternatives to the Proposed Action is also provided in this section.

OVERVIEW

Planning Process

Growth Management Act

In 1990, the state legislature passed the Growth Management Act (GMA) which is intended to provide a balance between economic development and the quality of life for all of Washington's residents. The GMA requires that counties adopt Countywide Planning Policies, adopt an Urban Growth Area, and prepare a comprehensive plan to implement the provisions of the GMA. The comprehensive plan must address a range of issues, including urban and rural growth, housing, economic development, the environment, transportation, and public facilities and services. The GMA includes a goal to encourage development in urban areas where adequate public facilities and services already exist or where such services can be provided efficiently.

Countywide Planning Policies

In addressing the requirements of the GMA, the King County Growth Management Planning Council (GMPC) adopted Countywide Planning Policies (CPPs) to provide a framework for the development of comprehensive plans for the county and its cities. The CPPs were adopted by the King County Council in 1992 and ratified by the cities. An initial Urban Growth Area (UGA), which was prepared concurrently with the CPPs , included the Kenmore area and Lakepointe site; the final UGA, which also included the site within it's boundary, was adopted as part of the King County Comprehensive Plan (KCCP). The goal of the UGA is to encourage concentrated development where urban services are already provided. The CPPs direct King County and its cities to direct and support growth within the UGA.

The CPPs call for development of Activity Areas, which are defined as locations containing moderate concentrations of commercial land uses and some adjacent high density residential uses. Commercial uses in Activity Areas are more intense than community or neighborhood commercial areas and are to

serve as a focal point for the community. Activity Areas are to be served by frequent transit service and should promote alternative travel modes, such as ridesharing, bicycle, and pedestrian activity.

King County Comprehensive Plan (1994)

The King County Comprehensive Plan (KCCP), which was updated in 1994 in compliance with the GMA, is the umbrella planning document which guides all community plans in the county (including the NSCP Update and Area Zoning). The KCCP identifies the Kenmore area, including the Lakepointe site, as an Unincorporated Activity Center or Activity Area. The size and mix of land uses within Activity Centers is to be established though community and subarea plans. Design of the Unincorporated Activity Centers needs to include convenient routes for pedestrian, bicycle, transit, automobile, and truck travel within the center.

Northshore Community Plan Update and Area Zoning (1993)

Although the Northshore Community Plan (NSCP) was adopted prior to the 1994 update of the KCCP, it continues to provide policy guidance for land use in the Northshore area. Consistent with the goals and policies identified in the GMA and the CPPs, the 1993 NSCP provided a framework for the current land use and zoning designations for the Kenmore area. The central Kenmore area (including the Lakepointe site) was identified as an Activity Center with policies calling for development of a diversity of land uses to enhance housing, employment, commercial, and recreational opportunities. As stated in the NSCP, "developments within the Activity Center should be designed to create a sense of identity for Kenmore, reduce the reliance on the automobile for transportation, and enhance the area's marine orientation."

The Lakepointe site was identified in the NSCP as a Waterfront and Mixed-Use District. The NSCP calls for redevelopment of the site with commercial and residential uses and public access to portions of the waterfront. The mixed use development would be pedestrian oriented and integrated with other areas of Kenmore. In addition to area-wide zoning designations, the NSCP established property-specific development conditions (P-suffix conditions) for some individual parcels. The P-suffix conditions established for the Lakepointe site call for mixed-use development and include standards for permitted uses, building development, parking, transit and transportation circulation, pedestrian and bicycle circulation, landscaping, vehicular access and circulation, public viewpoints, shoreline enhancement, and affordable housing. The P-suffix conditions also include a requirement that a Master Plan for development be completed and approved before specific development proposals are approved for the site.

Site Zoning and Shoreline Designation

The NSCP established the potential zoning (i.e. zoning designation planned for the site in the future) for the three parcels that comprise the Lakepointe site (refer to the *Land Use* section for additional detail). The potential zoning was actualized (i.e. zoning designation was actually adopted for the site) when the implementing zoning for the 1994 KCCP was adopted by the County Council. Two of the properties are zoned Regional Business, with P-suffix conditions (RB-P), and one (the 5-acre Kenmore Pre-mix site) zoned Industrial, with P-suffix conditions/Potential RB-P. As indicated above, the NSCP established several property-specific P-suffix conditions that are intended to assure a pedestrian-oriented development. As part of the zoning actualization, the Lakepointe Transportation Analysis for NSCP and Area Zoning Amendment (The Transpo Group, 1994) was prepared to identify transportation improvements necessary to accommodate development on the site. This study analyzed and identified

transportation improvements for a master plan development with 1,000 multifamily housing units and 500,000 square feet of office and retail use.

The Lakepointe site lies on the banks of Lake Washington and the Sammamish River, and the areas within 200 feet landward of the Ordinary High Water Mark are designated as an "Urban Environment" under King County's Shoreline Master Program. The shoreline areas on the opposite bank and the channel island of the Sammamish River are designated "Conservancy Environment" (see Figure 1).

Master Planning Process

A Master Plan for the Lakepointe property has been developed over the past three years. The Master Plan is intended to implement the KCCP and NSCP policies for mixed-use development on the site.

A Lakepointe Citizen's Advisory Task Force (Task Force) was formed in October 1995 to work with the applicant, King County and Kenmore citizens to create an overall master plan concept for the site. The Task Force was initiated at the suggestion of Councilmember Maggi Fimia; it is funded by the Lakepointe applicant; and it is facilitated by the King County Dispute Resolution Center. The Task Force provides guidance on development of the Master Plan within the framework of county, state and federal regulations. The mission of the Task Force is to "facilitate a collaborative process between the community, the developer, and the County, to assure the highest quality project which is economically viable and a major asset to Kenmore, while being sensitive to the environmental features of the site". Periodic meetings with the Task Force have been held over the past two years to obtain input on project design issues, project features and necessary improvements.

Environmental Review

King County is using phased review to assess the environmental impacts of development, as provided for in the State Environmental Policy Act (SEPA) (WAC 197-11-060(5)). The NSCP and the Draft and Final EISs for the NSCP were adopted as part of the Determination of Significance for the Lakepointe Master Plan. The NSCP was a programmatic (non-project) action as defined by SEPA. This Supplemental EIS supplements the EIS prepared for the NSCP, adopted in February 1993. It evaluates the impacts of a more specific development proposal designed to be consistent with the intent of the NSCP; certain departures from the NSCP's P-suffix conditions are being sought (i.e., related to building height and parking lot design).

This Supplemental EIS is intended to fulfill SEPA requirements for project buildout. King County will review future building permit applications for consistency with the level and type of development evaluated in the Supplemental EIS, and will determine whether the level of evaluation provided in this Supplemental EIS is sufficient to meet the County's responsibilities under SEPA. Based on that review, King County may determine that no further SEPA review is necessary for a given construction proposal or that additional SEPA review is warranted. It is not anticipated, however, that further environmental review would be required, absent new information or modifications to the proposal that suggest the probability of new significant adverse environmental impacts. This Supplemental EIS is intended to satisfy SEPA disclosure requirements for all implementing project approvals.

Specific actions which comprise the proposal, and which are analyzed in this Supplemental EIS, include approval of a Master Plan, Commercial Site Development Permit, Shoreline Substantial Development Permit (administrative decision on these permits would be made by the DDES director; the Shorelines

Permit is appealable to the State Shorelines Hearing Board), and specific construction permits. The Master Plan, which has been designed to be consistent with the intent of development conditions established in the 1993 NSCP, would dictate the general development standards for the entire 50-acre site. The Master Plan divides the site into eight building areas indicated as Building Areas A through H. A Commercial Site Development Permit application, which defines building envelopes and general uses, has been submitted for development of the first seven building areas on approximately 45 acres of the 50-acre Master Plan area. (Because the 5-acre portion of the Master Plan area not included in the Commercial Site Development Permit application is currently zoned Industrial and the specific Master Plan uses and development characteristics for this area have not been determined, only general information on this area can be provided at this time. When specific development plans for this area are determined and a rezone application is submitted, additional environmental review under SEPA may be required.) The Shoreline Substantial Development Permit application provides specific development details for the area within 200 feet of the Ordinary High Water Mark of the Sammamish River, Lake Washington and the Inner Harbor Channel.

The following documents, prepared as part of previous planning actions and site investigations related to Lakepointe, are incorporated by reference in this document and are referenced throughout this document where appropriate:

Geotech Consultants, Inc. Phase I Environmental Audit – Kenmore Pre-Mix Site. September 24, 1990, 22 pp. + Appendices A-C.

Geotech Consultants, Inc. Phase II Environmental Study – Kenmore Pre-Mix Site. November 30, 1990, 25 pp.

King County. Kenmore Traffic Circulation Study - A Conceptual Alternatives Evaluation. Prepared by The TRANSPO Group, September 11, 1989.

King County Department of Parks, Planning and Resources. Draft EIS, Executive Proposed NSCP Update. Prepared by Huckell/Weinman Associates, Inc., Herrera Environmental Consultants, Inc., and KJS Associates, Inc., May 7, 1991, 299 pp. + Appendices A-C.

King County Department of Parks, Planning and Resources. Final EIS, Executive Proposed NSCP Update. Prepared by Huckell/Weinman Associates, Inc., Herrera Environmental Consultants, Inc., and KJS Associates, Inc., December 7, 1992, 193 pp.

King County Department of Public Works. Feasibility Analysis: Kenmore Central Business District Traffic and Access Study - Final Report. Prepared by David Evans and Associates, Inc., March 5, 1993, 85 pp. + Appendices A-F.

King County Planning and Community Development Division. NSCP Update and Area Zoning (as amended by Ordinance 11653). February 11, 1993, 281 pp. + Appendices 1-4.

Pioneer Towing, Inc., Lakepointe, and King County. Lakepointe Transportation Analysis for NSCP and Area Zoning Amendment. Prepared by The TRANSPO Group, Inc., December 9, 1994, 81 pp. + Appendices A-F.

King County Department of Parks, Planning and Resources. Supplemental Draft EIS, King County Comprehensive Plan. Prepared by Huckell/Weinman Associates, Inc., June 1994, 309 pages + Appendices A-F.

King County Department of Parks, Planning and Resources. Final EIS, King County Comprehensive Plan. Prepared by Huckell/Weinman Associates, Inc., November 1994, 250 pages.

Trammell Crow Company. Groundwater Monitoring Report – Kenmore Site, Kenmore, Washington. Prepared by SEACOR, January 7, 1992, 15 pp. + Appendix

Permit Approval Process

The Lakepointe site is located in King County within the boundaries of the recently incorporated City of Kenmore. The new City of Kenmore and King County will enter into an interlocal agreement which will establish the responsibility for future review and approval of Lakepointe permits. Until that time, the responsibility for review and approval remains with King County. The following discussion explains the permit review and approval process in unincorporated King County.

The Lakepointe project will require a variety of land use permits for full development of the site. Land use permit decisions are classified based on the amount of discretion associated with each decision. Procedures for different types of decisions are distinguished according to who makes the decision, whether public notice is required, whether a public hearing is required before a decision is made, and whether administrative appeals are provided.

The land use permits required by the Lakepointe project are either Type 1 or Type 2 permits. Type 1 permits include building permits, clearing and grading permits, boundary line adjustments, right-of-way use permits; variances to the King County Road Standards, and variances to the King County Surface Water Design Manual. A Type 1 permit decision is made by the director of the King County Department of Development and Environmental Services (DDES). Type 1 decisions do not allow for an administrative appeal and public notice of the decision is not required. Any appeal of a Type 1 permit decision must be made to superior court.

Type 2 permits required by the Lakepointe project include the Shoreline Substantial Development Permit, the Commercial Site Development Permit, and zoning variances, if required. The SEPA threshold determination, including any SEPA threshold determination on a Type 1 permit, is a Type 2 permit. A Type 2 permit decision is made by the director of DDES. However, unlike a Type 1 permit, public notice of the decision on a Type 2 permit is required, and the decision can be administratively appealed to the King County Hearing Examiner. The Hearing Examiner's decision on a Shoreline Substantial Development Permit is appealable to the State Shoreline Hearings Board. Hearing Examiner decisions on all other Type 2 permits are appealable to superior court.

The Lakepointe project includes condominium units which will be established through a residential binding site plan. The decision to approve a binding site plan is also made by the director of DDES, and public notice is required. The decision is recorded with the King County Records and Elections Division. The director's decision can be administratively appealed to the Hearing Examiner, and the Hearing Examiner's decision is appealable to superior court.

Model Toxics Control Act

Historic activities have resulted in the placement of contaminated materials on the Lakepointe site. These include extensive filling of the site with wood debris, concrete, asphalt rubble and soil in the 1950's to raise the elevation of the site above lake level; the use of a portion of the site for a landfill which included stumps, demolition debris, and restaurant wastes; and light industrial uses which included the storage and potential releases of petroleum fuel, and oil.

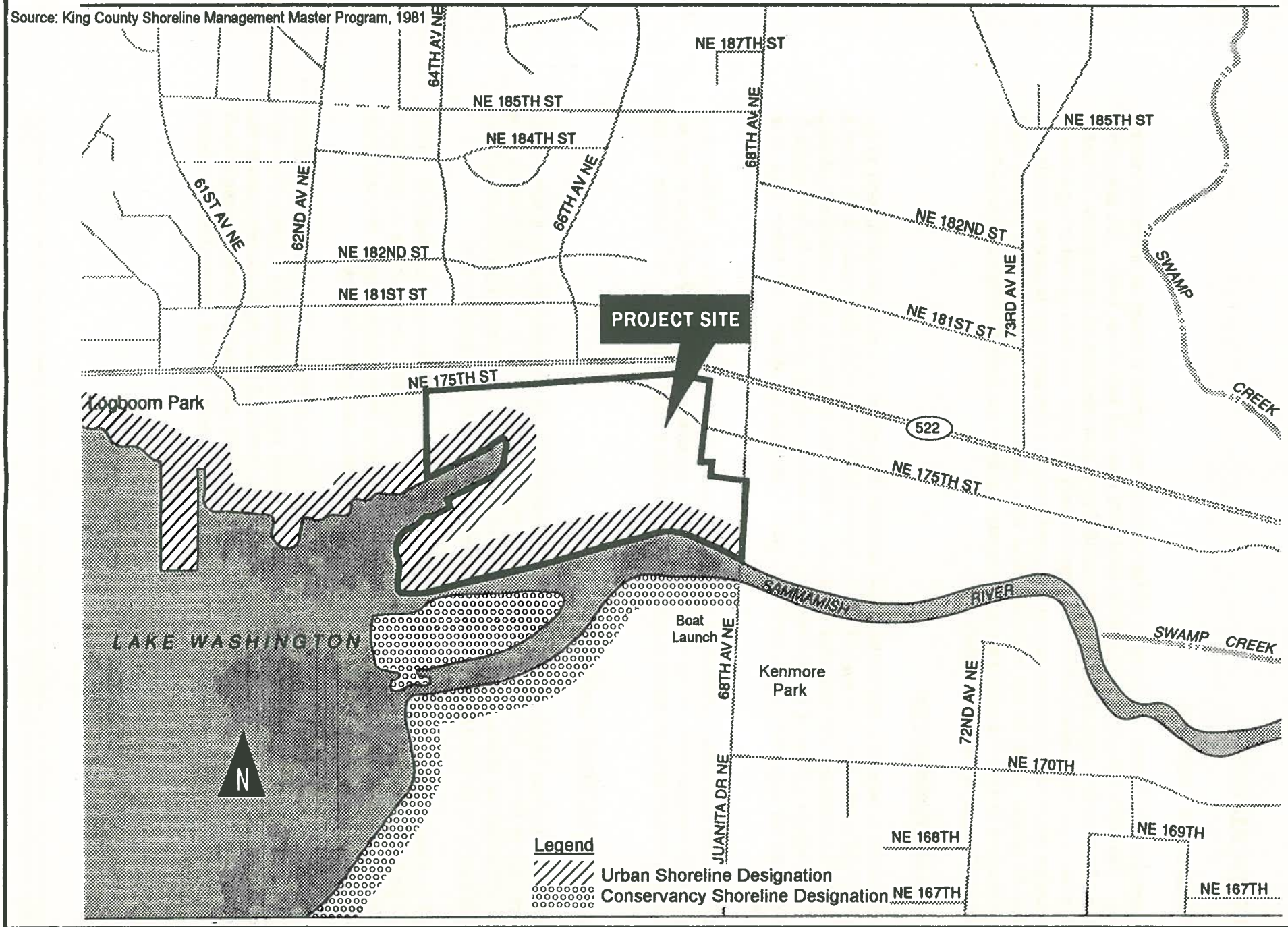
As a result of previous industrial activity on the site, the Washington Department of Ecology (DOE) has established a Site Hazard Assessment List ranking of 1 (highest rank) for the site. Prior to issuance of any permits by King County, a phased remediation plan for the areas determined by DOE to be contaminated and warranting cleanup must be approved consistent with the procedures of the Model Toxics Control Act (MTCA). The specifics of the site remediation plan are currently being determined by the DOE in cooperation with the landowner.

The establishment and implementation of the remediation plan for the site is considered a separate action under MTCA, under the jurisdiction of the DOE. The specific remediation plan will be analyzed consistent with DOE's review process. The MTCA process requires periodic opportunity for public participation. In addition, the MTCA process requires consideration of environmental impacts in the formulation of a remediation plan; therefore, the environmental impacts of any site remediation activities will be considered consistent with DOE requirements. If the final remediation plan precludes certain proposed project development or enhancement/mitigation features from being implemented, changes to the Master Plan will be required; such changes, if so determined by King County to potentially result in significant impacts not disclosed in this Supplemental EIS, may require additional environmental review.

.

SITE LOCATION

The Lakepointe site is located in the Kenmore area of unincorporated King County, southwest of the intersection of NE Bothell Way (SR 522) and 68th Ave NE (see Figure 1 - Vicinity Map). The 50-acre site is bounded approximately by Lake Washington to the west, the Sammamish River channel to the south, 68th Ave NE to the east, and NE Bothell Way to the north.



Huckell/Weinman Associates, Inc.	**Lakepointe Mixed-Use Master Plan**	**Figure 1** **Vicinity and Shoreline Designation Map**

SITE DESCRIPTION

Topography and Vegetation

The approximately 50-acre site consists of four existing tax parcels forming an irregularly shaped property. The site's topography is generally level with river and lake shore banks. Site topography ranges in elevation from approximately 23 feet to 28 feet, with an elevation of approximately 18 feet at the shoreline edge. The majority of the site, approximately 45 acres, has been cleared of vegetation to accommodate the industrial and outdoor storage establishments which have been located on the site over the past 70 years. Most of the vegetation that does exist on-site is located in a narrow band (approximately 5 to 45 feet in width) along the Sammamish River and Lake Washington (refer to Figure 2 - Existing Topography. and Vegetation).

Shoreline and Wetland Areas

The site, which is located at the northeast end of Lake Washington, is a peninsula with water to the south, west and north. The south edge of the site forms the north bank of the Sammamish River where it enters Lake Washington. The west edge of the site borders Lake Washington and consists of a sloping area. The northern portion of the site contains a man-made (dredged) harbor (inner harbor) which is primarily used for industrial-related barge activities. The majority of the inner harbor edge is in bulkhead.

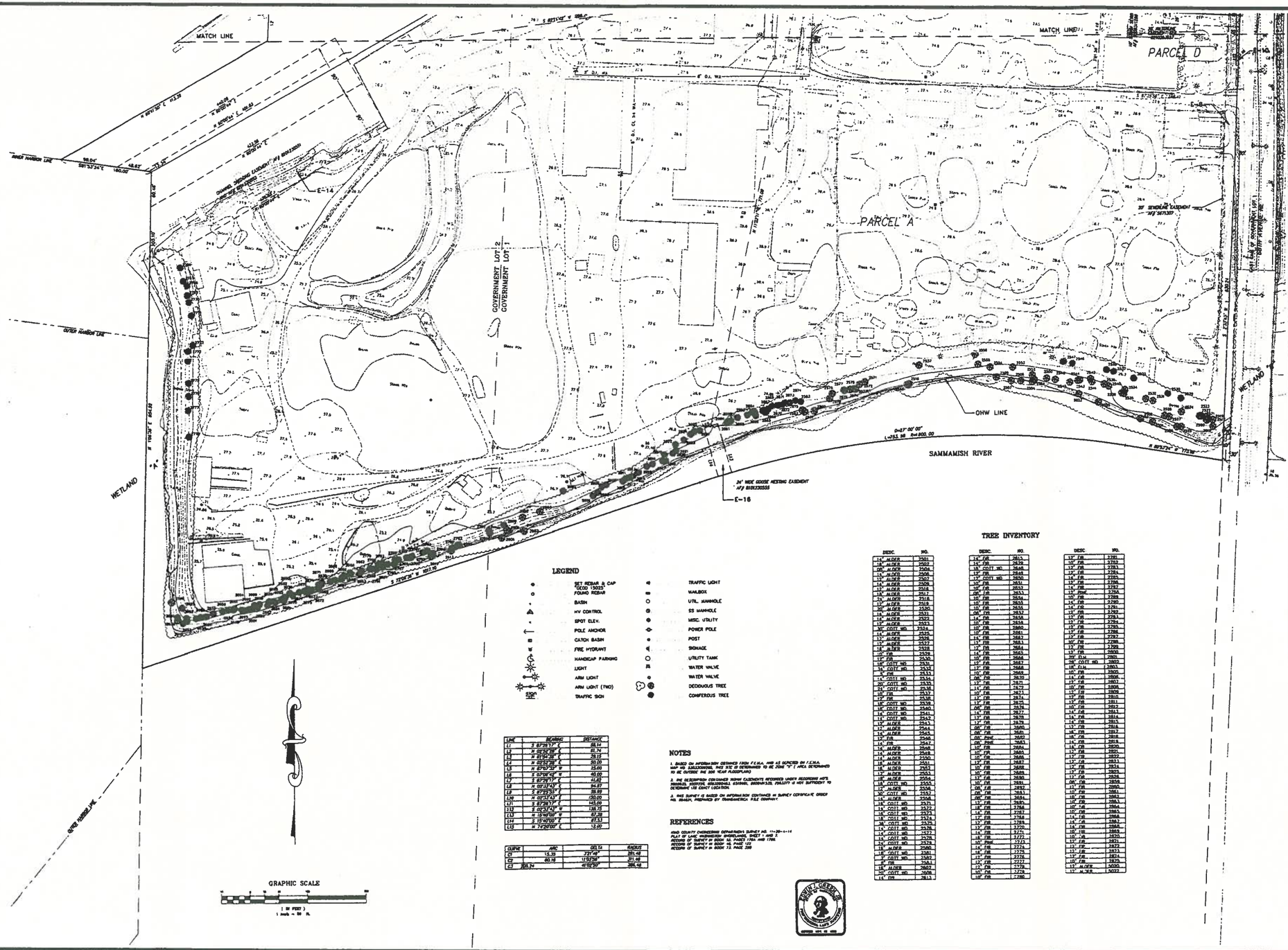
The site contains two wetlands designated in this document as Wetland A and Wetland B. Wetland A is a long, narrow wetland located at the western edge of the site parallel to the Lake Washington shoreline. Wetland B is located at the southeast corner of the site near the Kenmore Bridge on 68th Ave NE. Refer to Figure 2.

Existing Site and Vicinity Land Uses

Over the past 70 years, the site has undergone numerous physical changes, including the grading of the northern edge of the site for construction of a railroad line and SR 522 in 1916, establishment of a lumber mill in the late 1940's, and expansion of the site to the south (placement of fill behind a jetty) in the 1960's (refer to the LAND USE section for additional detail on the history of the site).

Current land uses on the site, which are generally characterized as industrial and warehouse in nature, include the Kenmore Pre-Mix Concrete plant (including Sterling Asphalt), car storage for the Bill Pierre Ford dealership, and several light industrial businesses including Sepia Interior Supply, Western Truck School, Stout Roofing, Pioneer Towing, Waterfront Construction, and Nelbro Packing.

Land uses in the vicinity include the Kenmore Air Harbor, Davidson Marina, Harbor Village, and Tracy Owen Station (Logboom) Park to the west; a boat launch park and Inglewood Country Club and residential area to the south across the Sammamish River; commercial and light industrial uses to the east across 68th Ave NE; commercial uses to the immediate north, northeast and northwest along Bothell Way NE, and single-family residences up the hill further to the north. A King County (formerly Metro) pump station is located adjacent to the northeast portion of the site



Source: Callison Architecture

Huckell/Weinman Associates, Inc.

Lakepointe Mixed-Use Master Plan

Figure 2

Existing Topography & Site Vegetation

PROJECT DESCRIPTION

Lakepointe Development Process

The P-suffix conditions for the Lakepointe property, established in the 1993 NSCP and Area Zoning, call for the approval of a "Master Plan" to guide development of the site. The proposed Master Plan is intended to be a blueprint for future development; it is not meant to fix precise building areas, areas of use by square footage or final locations of open space and pedestrian corridors. Rather, the Master Plan establishes the overall parameters of future development, identifying the likely mix of different uses, the order of magnitude of development (e.g., approximate number of residential units, approximate square footage of commercial development, approximate area of open space), and the general locations of open space, trails and pedestrian corridors and roadways. The Master Plan is intended to be a flexible document, which forms the concept approval against which final development plans for each phase of the site are measured.

The Master Plan is required to set forth the mitigation phasing for the development. Mitigation for transportation impacts will be formalized through a Transportation Agreement prepared by King County and signed by the developer. The mitigation phasing is based on subdistrict development, as required by the NSCP P-suffix conditions. The site will be divided into four subdistricts (refer to Appendix H for an illustration of the four subdistricts). The boundaries of the subdistricts are defined in the Master Plan and consist of the Neighborhood Commercial Subdistrict (approximately 12-18 acres); the Waterfront Subdistrict (approximately 10-14 acres); the Residential Subdistrict (approximately 10-14 acres); and the Waterfront Extension Subdistrict (approximately 4-8 acres). An analysis of how the proposal complies with the NSCP P-suffix conditions is also included in the Master Plan document, along with justifications for proposed modifications to the building height and parking design P-suffix conditions.

The Commercial Site Development Permit (CSDP) application is an optional comprehensive site review process allowed under KCC 21A.41. The CSDP application submitted by the applicant, and which serves as the basis for environmental review in this EIS, is conceptual in nature. Detailed construction drawings for such things as grading, drainage facilities, road construction, and building construction have not been submitted and, therefore, have not been reviewed by King County. The CSDP application does, however, identify phasing lines, building envelopes, open space, trails, recreation space, the approximate location and square footage of each building and the general uses proposed for each building, and approximate locations of drainage facilities such as the wet pond and biofiltration swale. In addition to the development of a conceptual site plan and development phasing plan, the CSDP serves to determine adequacy of facilities and services such as water, sewage disposal, schools, and transportation. The CSDP application also contains a conceptual design for compliance with the state Barrier-Free Code to assure that all areas of the site will be accessible to persons with disabilities.

The Proposed Action involves approval of both a Master Plan and a CSDP; the CDSP must be consistent with the Master Plan. Approval of these applications would not allow any site work to be undertaken. Following approval of the Master Plan and the CSDP, actual construction would be implemented through grading and building permits, which would include detailed construction drawings. Subsequent permit applications would be reviewed under the codes in effect on the date the CSDP complete application was received March 25, 1996. Actual project development could vary somewhat from the approved Master Plan and CSDP, but subsequent permit applications would be reviewed for consistency with the approved plans.

The Shoreline Substantial Development Permit application, required by the King County Shoreline Management Master Program (KCC Title 25), provides site plans and a narrative describing all proposed development within 200 feet of the Ordinary High Water Mark (OHWM) of the Sammamish River, Lake Washington and the Inner Harbor. The Shoreline Substantial Development Permit also includes detail on existing site conditions, historic use of the site, and existing surface and groundwater conditions. The Shoreline Substantial Development Permit contains information on proposed development of drainage features, the marina, the shoreline park, and other project features within shoreline jurisdiction.

Master Plan Compared to Commercial Site Development Permit

The primary difference between the Master Plan Permit, the Commercial Site Development Permit and Shoreline Substantial Development Permit are as follows:

Master Plan

- Provides phasing of development and mitigation phasing by sub-district.
- Provides a narrative discussion of how the Lakepointe mixed-use development complies with the Northshore P-Suffix conditions and justifications for modifications.
- Provides detailed site statistics for land uses by square footage and required parking.
- Contains Design Guidelines for the Lakepointe Mixed-Use Development.
- Identifies building foot prints for floor levels starting at elevation 55 feet through 115 feet (levels above street level).
- Includes Master Plan sketches showing:

  Shoreline Park
  Shoreline Park, Fire Lanes, and Walking Paths
  Lake Washington View Looking West
  Boardwalk Looking East
  Marina View From Residential Unit
  Retail at Marina Boardwalk
  Entry Into Grocery Store Parking
  Burke-Gilman Trail Looking East
  Boulevard Looking East
  Boulevard Looking West

Commercial Site Development Permit

- Provides a conceptual design for a Barrier Free Access Plan and Details.
- Shows Alternative "C" As Interpreted From the NSCP (referred to as Alternative 1 in the EIS).
- Analysis of proposed parking P-Suffix condition modifications.
- Identifies the phasing plan for six phases showing Levels 25, 35, and 45 for each phase (levels below street level and at street level, respectively)
- Analysis of proposed building height P-Suffix condition modifications.

Shoreline Substantial Development Permit

- Provides narrative on existing site conditions.
- Provides narrative describing all proposed development within 200 feet of the OHWM.
- Provides site plans and section diagrams illustrating proposed development within 200 feet of the OHWM, including:

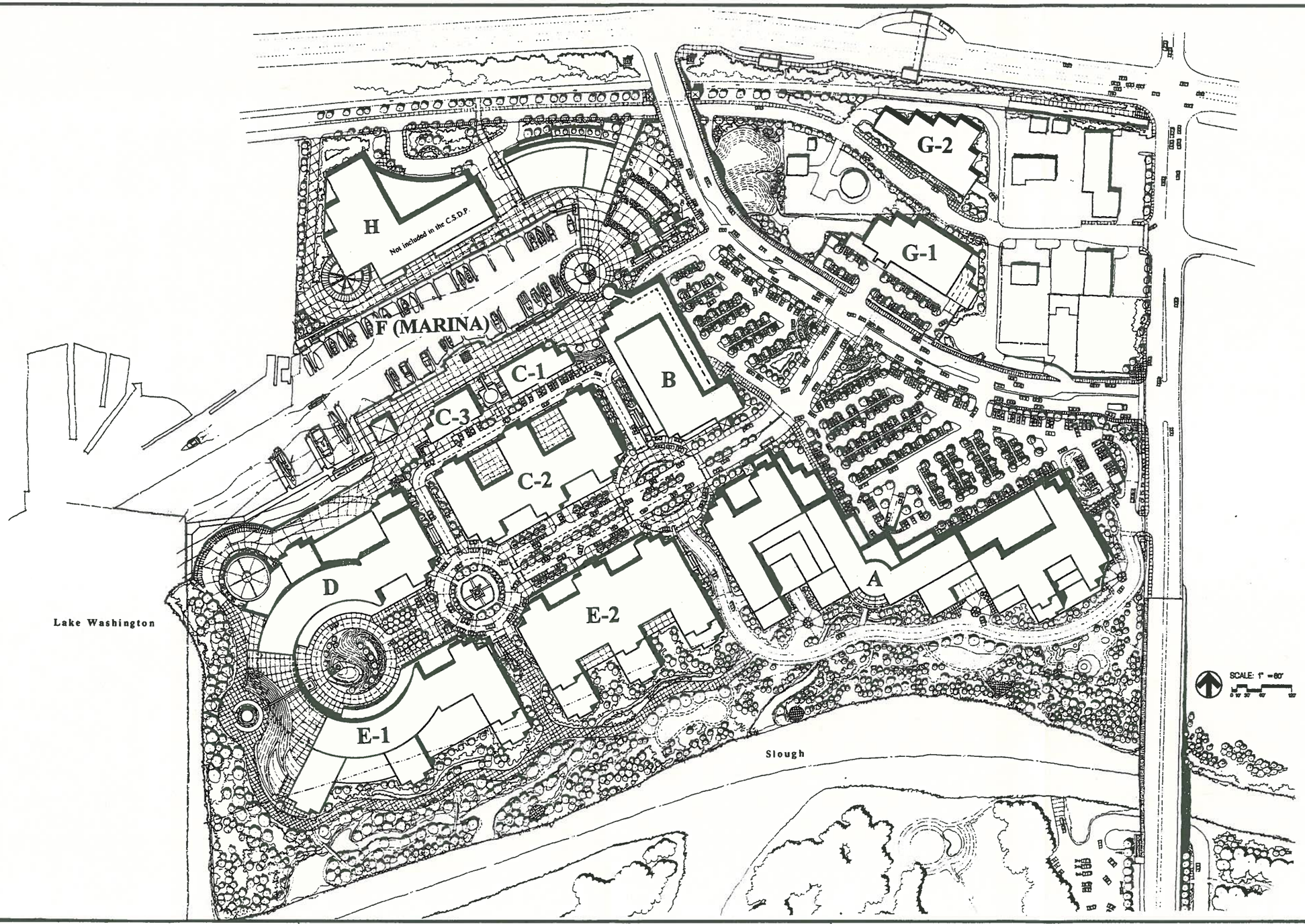
  Portions of residential and commercial buildings
  Shoreline park, trails and fire access lane
  Amphitheater and esplanade
  Marina
  Stormwater swales and outfalls
- Indicates phasing of development by building area.
- Contains a grading plan for all development within 200 feet of the OHWM.

Overall Concept

The Proposed Action is approval of a Master Plan, Commercial Site Development Permit, and Shoreline Substantial Development Permit. The Master Plan approval would dictate the general development pattern for the entire 50-acre site. The Master Plan is divided into eight building areas indicated as Building Areas A through H. A Commercial Site Development Permit, which provides more specific development details for certain aspects of site development, has been submitted for development of the first seven building areas (areas A - G) of the Master Plan. Because the specific uses and development characteristics of Building Area H have not been determined, only general information on this area can be provided at this time. When specific details for this area are determined, and a rezone application is submitted, additional environmental review may be required under SEPA.

The Lakepointe Master Plan project would be a mixed-use development that contains multifamily residential uses consisting of senior living units, for-rent apartments and for-sale condominiums in conjunction with office/retail use consisting of professional offices, food stores, shops, marina, restaurants, cinemas and hotel accommodations (See Figure 3 - Master Plan Site Plan). The intent of the plan is to create a mixed-use neighborhood which relates to and links the Kenmore business center and the Lake Washington waterfront.

The mixed-use development would feature concentrated residential and commercial uses, a pedestrian esplanade, a pedestrian Street, and a shoreline park. A new roadway, Lakepointe Way NE from SR 522 (Bothell Way NE) to 68th Ave NE would provide automobile connection to another new roadway, NE Lakepointe Blvd., which would serve all components of the master plan development.



Source: Callison Architecture

Huckell/Weinman Associates, Inc.	**Lakepointe Mixed-Use Master Plan**	**Figure 3** **Site Plan**

Sponsor's Objectives

The primary objectives of the Lakepointe Master Plan, as formulated by the applicant, are as follows:

- Provide for alternative uses for the property that provide financial return superior to that offered by the existing property uses.
- Develop a mixed use residential and commercial project consistent with the goals and policies of the Growth Management Act, the NSCP and the King County Comprehensive Plan.
- Develop a mixed use project incorporating uses, building heights, forms and locations that conform to current and projected market needs and that will support the complete range of mitigation identified in the P-suffix conditions for the project.
- Provide significant opportunities for public access to shorelines of the Sammamish River and Lake Washington consistent with the development needs of the project and the applicable P-suffix conditions.
- Allow for the implementation of long-term transportation solutions for the Kenmore area, including the dedication of necessary right-of-way and construction of Lakepointe Boulevard, consistent with the mixed-use development objectives for the site and based on the project's fair-share responsibilities.
- Establish an expedited permit review process for ultimate project development, while maintaining flexibility in the Master Plan concept to meet changing market needs and development conditions.

Mix of Uses

Proposed development described in the Commercial Site Development Permit application (Building Areas A through G, 45 acres of the overall 50-acre site) would consists of phased development of up to 1,200 residential units, 205,588 square feet of professional office space, 438,627 square feet of retail and commercial space (including cinemas, an approximately 150-room hotel, and a health club), a private moorage marina with approximately 53 boat slips, approximately 21.2 acres of open space (including, a shoreline park, public amphitheater, esplanade, public view points, landscaped open space and natural open space), 4,464 parking stalls, and construction of a new public street, Lakepointe Way NE, connecting NE Bothell Way and 68th Ave NE. Table 1 summarizes the proposed land uses by acreage.

Table 1
PROPOSED USES BY ACREAGE

Use	Site Acreage	Site Percentage
Built Area (buildings and roadways)	23.2	52
Paved Sidewalks, Trails and Esplanade	5.7	13
Unpaved Trails	0.6	1
Paved Public Space (amphitheater)	0.7	2
Landscaped Open Space	8.3	18
Natural Open Space	5.5	12
King County Pump Station	0.6	1
Stormwater Retention Area	0.4	1
TOTAL	**45**	**100**

Source: Callison Architecture, Inc. 1996.
(Note: total does not include Building Area H)

The primary structured uses (residential, retail/commercial or office) would occur in eight single-use or mixed-use complexes, designated by the letters A through G (see Figure 3). Table 2 lists the amount and type of use in each of these building areas. The marina development area is designated by the letter F. Although not included in the land use calculations presented in Table 2, a future development area at the site's northwest corner, site of the existing Kenmore Pre-mix plant and designated by the letter H, would eventually be developed with a retail/commercial or office use after the buildout period of the first six phases of the Master Plan (assumed to be 2005 and subject to rezone approvals).

Table 2
BUILDING AREA AND USE

Building Area and Use	Number of Dwelling Units	Commercial Square Footage	Office Square Footage	Number of Parking Spaces
A – Mixed[1]	640	87,669	---	1,202
B – Commercial/Retail	---	99,333	60,000	743
C – Mixed[2]	240	54,255	40,100	874
D/E-1 - (Hotel/Health Club)[3]	100	197,370	---	754
E-2 – Residential	220	---	---	432
F – Marina	---	---	---	26
G – Office	---	---	105,488	433
TOTAL	1,200	438,627	205,588	4,464

1 Parcel A dwelling units include 400 senior housing units and 240 apartments.
2. Parcel C dwelling units would include 140 apartments and 100 condominium units.
3 Parcel D and E-1 are structurally connected, so are counted together in this summary. Residential units would be condominiums.

Source: Callison Architecture, Inc., 1996

Under an option to the above development scenario, it is possible that a suitable hotel company would not lease the 161,100 square feet of building space designated for hotel use in building D/E-1 or that market conditions would warrant retail/commercial use as opposed to hotel use. Under this scenario, retail/commercial uses and larger condominium units (unit count would remain at 1,200) could be accommodated in the area proposed for hotel use. The environmental analysis presented in Chapter 3 of this Supplemental EIS contains a discussion of this use scenario, which would generate a higher level of environmental impact. For example, because retail/commercial uses typically generate more traffic than hotel uses, the transportation analysis provides comparative discussion on retail/commercial use of this 161,100 square foot space in relation to that with the proposed hotel. This approach assures that the environmental analysis presented in this document addresses the "worst-case" scenario. Furthermore, by addressing the "worst-case" scenario, this Supplemental EIS intends to cover a range of other possible mixes of uses in the project consistent with this environmental analysis, if that mix is modified as specific project phases develop.

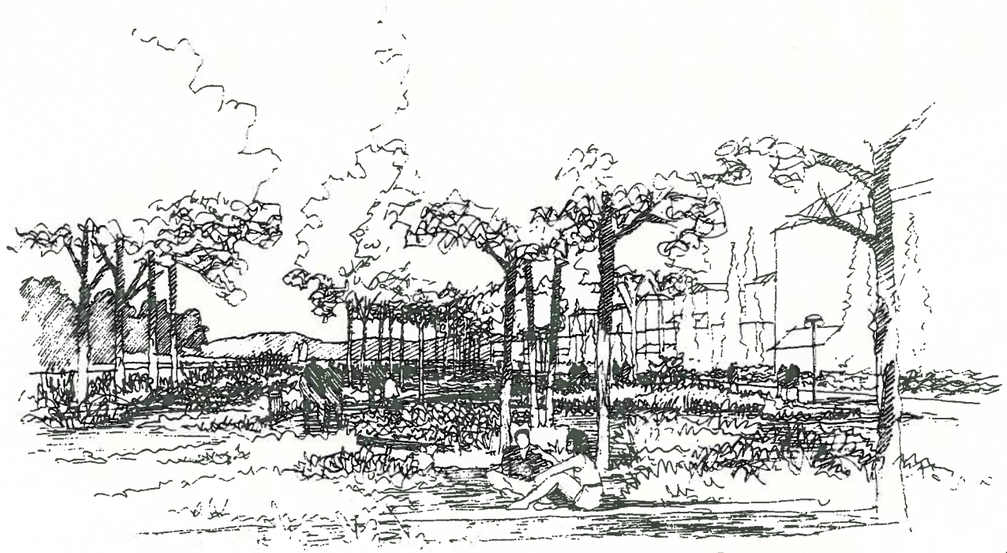
Design Characteristics

The overall design character of buildings, landscaping, lighting and signage for site development would be established by the Master Plan Design Guidelines prepared by the applicant. Developed to be consistent with the intent of the NSCP, the goal of the design guidelines is to ensure a harmonious design relationship among the various site uses (residential, commercial and recreational) and to establish a development which relates to downtown Kenmore. Figures 4 through 6 depict the general design character of various elements of the proposed Master Plan.

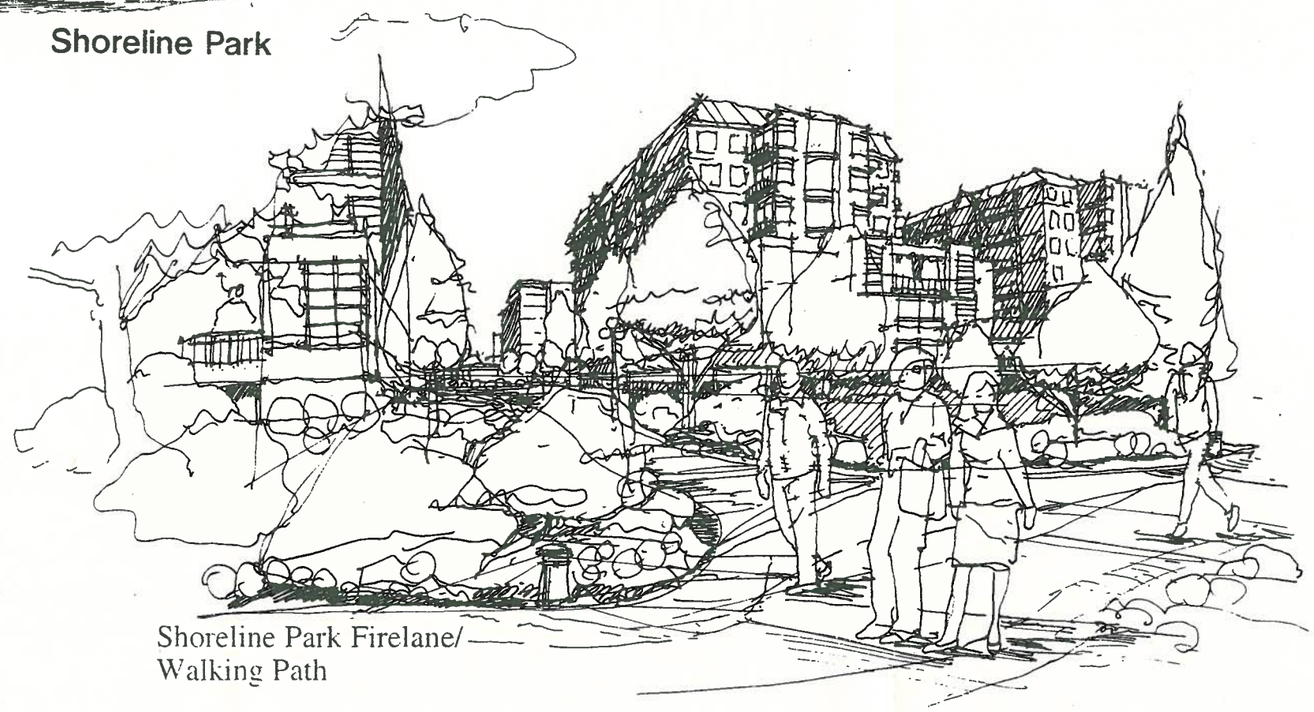
The design guidelines do not prescribe a particular architectural style which all structures must follow. Rather, the design guidelines provide for a variety of architectural styles within a general framework to assure compatibility among all components of the Lakepointe Master Plan, as well as compatibility with the Kenmore community, and consistency with applicable King County development standards. The design guidelines prescribe the general design standards for architectural character, building materials and colors, roof materials, fencing and gating, landscape materials, exterior lighting, and signage. A summary of the proposed Lakepointe Master Plan Design Guidelines is presented in Appendix G.

Residential Units

The 1,200 residential units on the site would be comprised of multifamily apartment type units ranging in size from studio to 3-bedroom units. Differing target residents and ownership types would differentiate the various residential uses on the site. For example, 400 of the units are proposed to be limited to senior citizens (a person over age 62 as defined in KCC 21A.06.1060), 200 of the units would be for sale condominiums, and 600 of the units would be for rent apartments. Because parking and recreational area code requirements for senior housing differ from those for standard apartment or condominium units, a mechanism for verification of senior only occupancy of the senior units would be required The specific mechanism for such verification would be determined at the time of building permit submittal. If building permit applications vary from the approved Master Plan and CSDP in the type of proposed residential uses, the applications would be reviewed for consistency with the approved plans and applicable code requirements (including parking and recreation standards).



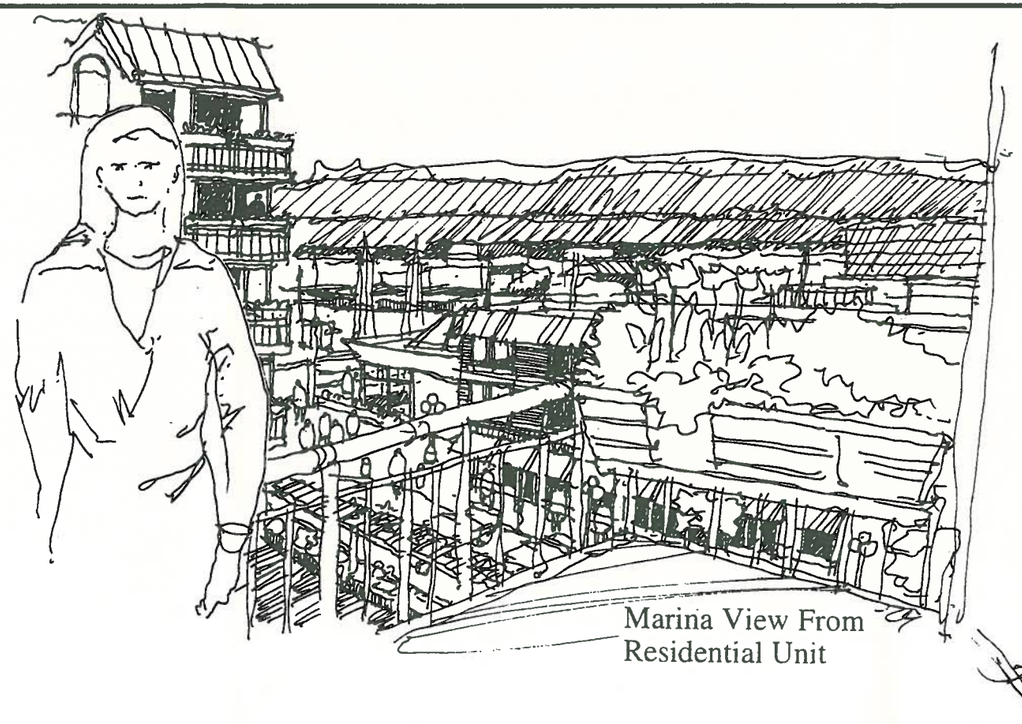
Shoreline Park



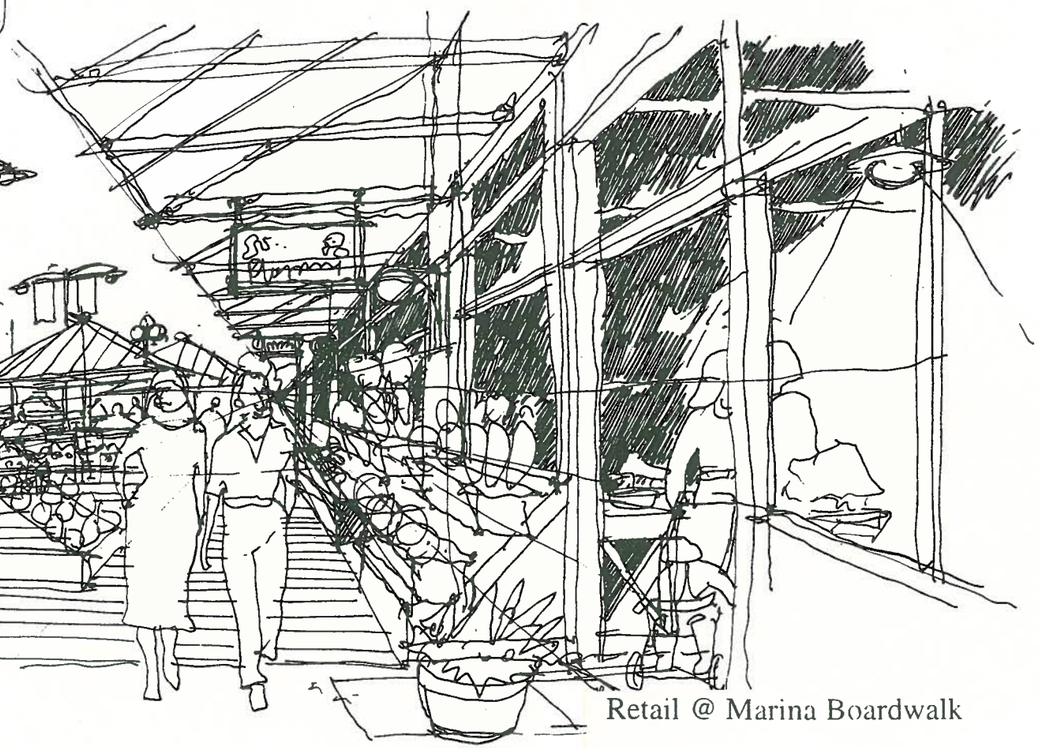
Shoreline Park Firelane/
Walking Path

Source: Callison Architecture

Huckell/Weinman Associates, Inc.	**Lakepointe Mixed-Use Master Plan**	**Figure 4**
		Design Sketch - Shoreline Park



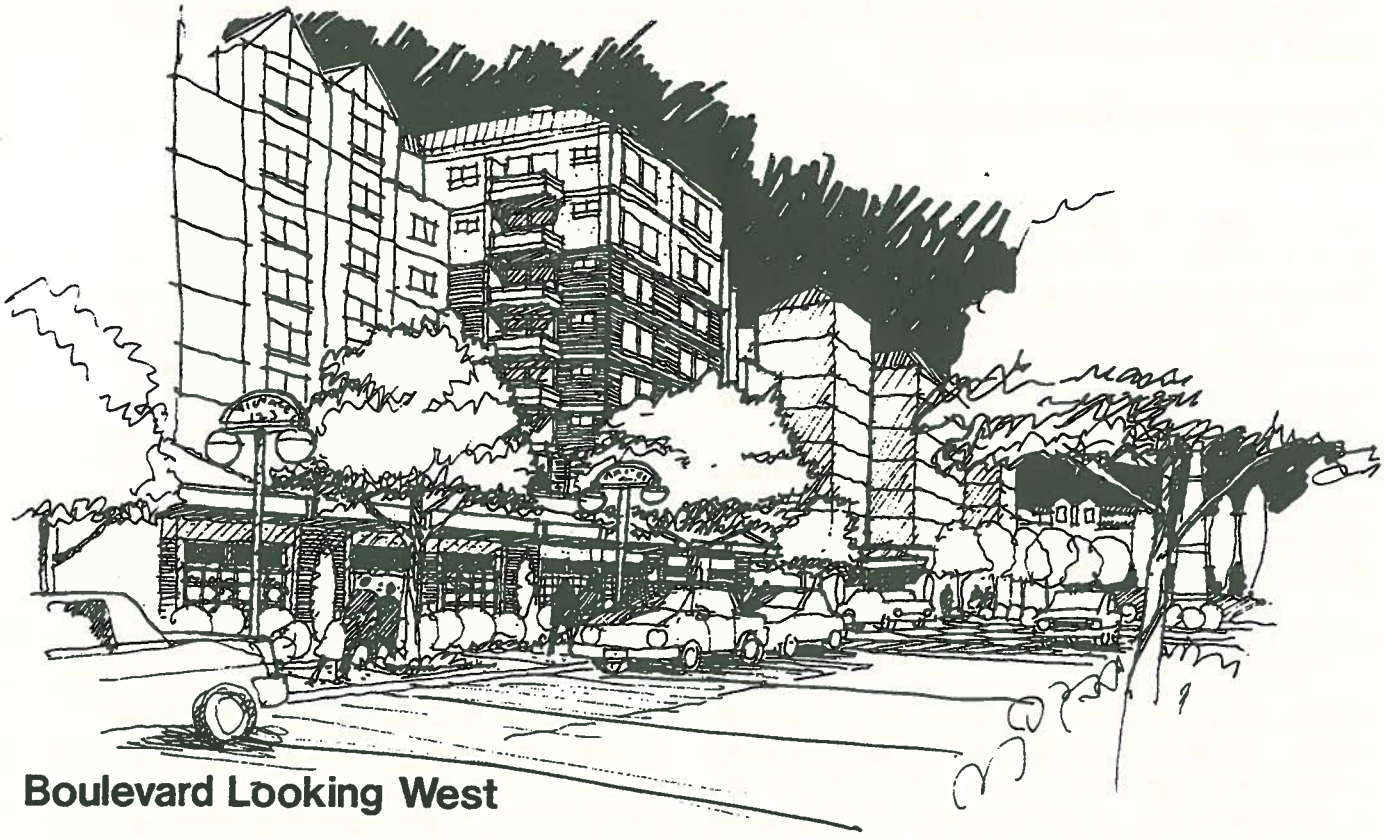
Marina View From
Residential Unit



Retail @ Marina Boardwalk

Source: Callison Architecture

Huckell/Weinman Associates, Inc.	**Lakepointe Mixed-Use Master Plan**	**Figure 5** **Design Sketch - Boardwalk**



Boulevard Looking West

Source: Callison Architecture

Huckell/Weinman Associates, Inc.	Lakepointe Mixed-Use Master Plan	Figure 6 Design Sketch - Lakepointe Boulevard

The units would be distributed among the on-site parcels as shown in Table 2. The residential and mixed-use structures would be generally located along a southwest-northeast "Main Street" axis (Lakepointe Boulevard) and would be oriented to either the boulevard or to nearby recreational shoreline areas.

The 400 senior housing units would be located in Building A and would be oriented toward the Shoreline Park. Two types of senior housing would be provided: 200 "Empty Nester" units would cater to an independent living senior lifestyle, and 200 "Assisted Living" units would provide meal services, shuttle services, recreational activities, laundry services and various methods of monitoring for health assistance and support. Empty Nester units would range in size from studios to 3 bedrooms. Assisted Living units would range in size from studios to 2 bedroom units.

The 600 apartment units would be distributed between Buildings A (240 units), C (140 units) and E-2 (220 units). These units would be available for rent and would range in size from studios to 3 bedrooms.

A total of 200 condominium units would be provided in Building C. These owner occupied units would range in size from studios to 3 bedrooms.

Overall gross site residential density would be approximately 26 dwelling units per acre, based on the 45-acre site.

Approximately 120 affordable housing units would be provided either on the site or off-site in the general vicinity. This would be consistent with NSCP P-Suffix condition P14-10 which states that "affordable housing units amounting to 10 percent of the total number of units in the development shall be provided. The affordable housing units need not be provided within the development, but must be provided in the Northshore Planning Area". It should be noted that the affordable housing units would only be included in the total Master Plan housing count if the affordable housing was provided on the site. Any portion of the affordable housing units provided off-site would not count toward the on-site residential component. (For purposes of this Supplemental EIS, it is assumed that all affordable housing units would be provided on-site, although this is not required by the P-suffix conditions.) If the affordable housing units were proposed to be located off-site, additional environmental review under SEPA would be required for such off-site development.

Retail, Commercial and Office Development

Approximately 438,627 square feet of retail/commercial space is proposed in Buildings A, B, C and D on the site. These uses are intended to meet the everyday needs of Lakepointe residents and to provide services for the greater Kenmore community. In Building A, a 42,082 square foot grocery store and 45,587 square feet of other retail/commercial space, likely including a pharmacy/drug store, are proposed. In Building B, a 50,075 square foot cinema is proposed, along with 49,258 square feet of other retail/commercial space. Building complex C would contain approximately 54,255 square feet of retail/commercial space, likely including restaurants and specialty retail or service establishments. Building D/E-1 would contain approximately 161,100 square feet in hotel use and 36,270 square feet in health club use.

Approximately 205,588 square feet of professional office space would be provided in portions of Buildings B (60,000 square feet) C (40,100 square feet), and G (105,488 square feet).

Marina

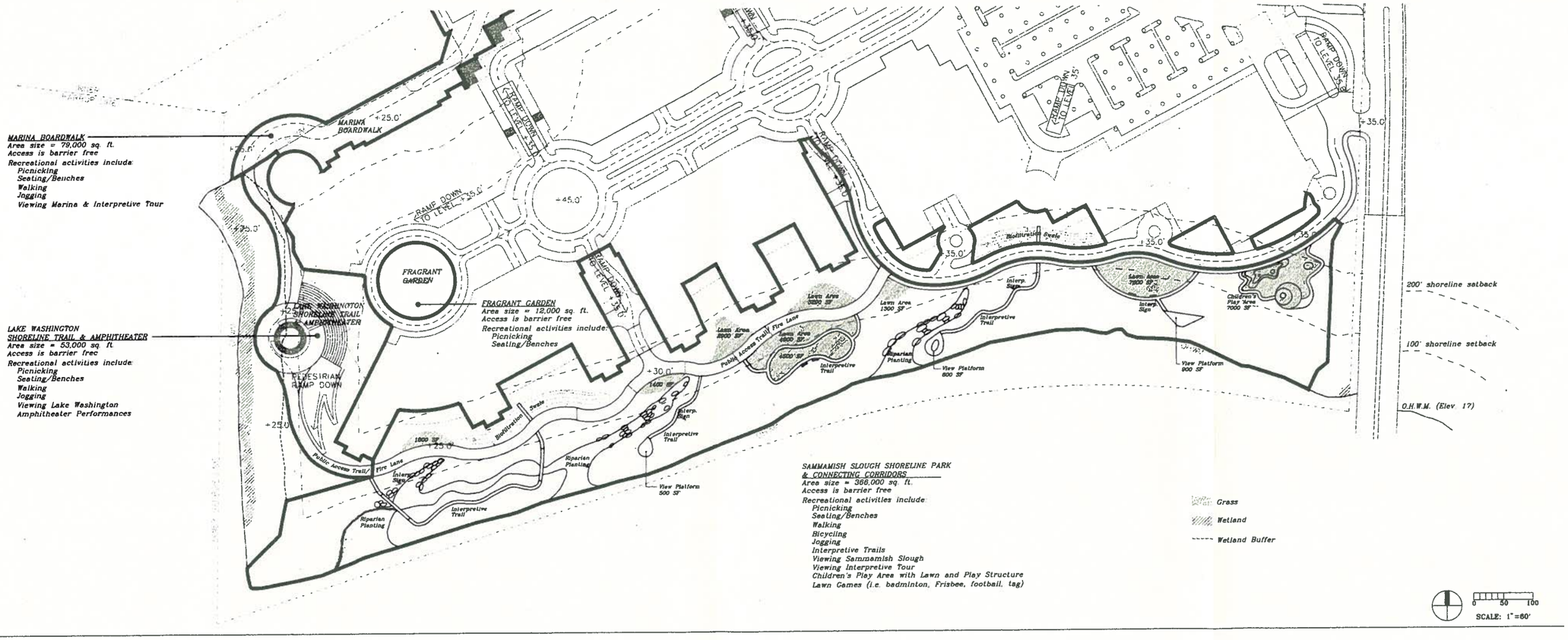
The marina would contain 53 long-term moorage slips plus approximately 200 linear feet of additional moorage dock in the harbor area, for a maximum moorage capacity of approximately 61 boats (refer to Figure 3). Most of the slips would be 40 to 50 feet in length. All moorage slips would be leased on a monthly or longer-term basis except for certain slips potentially usable for guest moorage. The curved linear moorage dock located at the southwest corner of the harbor would be used for short-term guest moorage. The guest moorage is primarily intended to serve adjacent residences or commercial businesses on the site (an example of short-term guest moorage would be a restaurant providing guest moorage for patrons who arrive via boat).

The minimum water depth in the boat harbor is proposed to be 12 feet at low lake surface level. It is anticipated that the proposed dredging of a portion of the inner harbor to be performed by the U.S. Army Corps of Engineers in late 1997 for commercial/industrial activities, would be sufficient for marina construction and no further dredging for marina construction or marina maintenance would be required. Once the commercial/industrial operation at the Kenmore Pre-mix site (Building Area H) ceases, the US Army Corps of Engineers would no-longer conduct any periodic dredging of the inner harbor. If any dredging is required for marina maintenance in the future, permits from the US Army Corps of Engineers and other applicable agencies would be required. A partial depth wave attenuator wall is proposed near the southwest corner of the harbor to provide calm water in the harbor. The marina would include safety and environmental protection features such as fire-protection water systems, pedestrian lighting, safety ladders on moorage docks, restrooms, garbage disposal facilities, signage and possibly a harbormaster to control boat traffic. A public boat sewage pumpout/disposal facility exists on nearby property and is not included in the proposal.

The marina would include various amenities for moorage tenants, possibly including potable water, electricity, cable television, security systems at moorage slips, security gates, storage areas, and shower facilities within buildings (long-term lease moorage agreements would prohibit live-aboard tenants). These types of amenities are typically provided for long-term moorage tenants at Puget Sound marinas as a convenience for tenants who visit boats for several hour periods, or clean and stock boats (similar amenities are provided at the nearby Harbor Village Marina where live-a-boards are also prohibited). Long-term parking (one space for every two slips for holders of long-term lease moorage when on extended boat trips) and short-term drop-off parking (including barrier-free parking) would be provided adjacent to the marina.

Open Space and Recreational Features

The proposal includes a total of 21.2 acres of open space (defined informally as area not in building or roadway area and does not relate to any code requirement), or approximately 47 percent of the 45-acre site. The on-site open space would include approximately 5.5 acres in natural open space and 15.7 acres in public park area, pedestrian walkways and trails, and paved public space (see Figure 7). The open space areas are intended to create a pedestrian friendly community which orients to and takes advantage of the existing shoreline and marine environment. Types and amount of proposed open space are shown in Table 3.



Source: Callison Architecture:

Huckell/Weinman Associates, Inc.	**Lakepointe Mixed-Use Master Plan**	**Figure 7** **Recreation Plan**

Table 3

PROPOSED OPEN SPACE

Type	Acres
Landscaped Open Space*	8.7
Esplanade/Paved Public Space**	5.7
Unpaved Trails	0.6
Natural Open Space***	5.5
Amphitheater	0.7
TOTAL	**21.2**

* Includes stormwater retention area, and landscaped portion of the shoreline park.

** Paved public space includes sidewalks and emergency access lane. The length of the trail system is presented in linear feet later in this section.

*** Includes wetlands, wetland buffers, and natural portion of the shoreline park.

The King County Code, section 21A.14.180 through .200 defines on-site recreation area requirements. For mixed use developments, section 21A.14.180 defines required recreation space for leisure, play and sport activities as 90 square feet, 130 square feet and 170 square feet per dwelling unit for studio/one bedroom, two bedroom, and three bedroom dwelling units, respectively. Outdoor recreation space is required to be on the site, suitable in grade and surface for recreation, have no dimensions less than 20 feet (except trail segments), be accessible to all residents, and accessible to other parks/open space that may be located on adjoining property. Stormwater tracts may be credited for up to 50 percent of the on-site recreation space. Indoor recreation areas, such as those at senior citizen assisted housing, may be credited toward total recreational space requirements, if certain criteria are met. Section 21A.14.190 requires tot/children play areas on the site unless such facilities are available within one-quarter mile. Based on the proposed 600 studio/one bedroom units, 420 two bedroom units and 180 three bedroom units, the proposal would require 3.2 acres (139,200 sq. ft.) of on-site recreation space.

According to the King County definitions of on-site recreation area (KCC 21A.14.180), the Proposed Action would include approximately 11.5 acres (500,000 sq. ft.) of recreation area, exceeding required on-site recreation area by approximately 8.5 acres. The 11.5 acres of on-site area meeting the King County definition of recreation space would consist of approximately 8.5 acres of Lake Washington and Sammamish River Shoreline Park (includes only 50 percent of the biofiltration swales and none of the stormwater retention area), 1.2 acres in shoreline trail and amphitheater, and 1.8 acres in esplanade. Because the specific amount of indoor recreation space included in the Proposed Action has not been defined, indoor recreation area is not included in the recreation area calculations. A final determination on the total amount of on-site recreation space that would meet King County recreation standards would be made as part of permit review.

Shoreline Park

The Shoreline Park is proposed to be a 2,200 foot long linear park located along the entire southern and western property lines, adjacent to the Sammamish River and Lake Washington shoreline. The width of this park would range from 100 to 220 feet and would comprise approximately 7 acres. The park would provide public use areas while maintaining wildlife habitat opportunities in the areas immediately adjacent to the shoreline edge.

In general, the western portion of the shoreline park would be the most natural and least accessible to the public. The northwest corner of the park (adjacent to Lake Washington) would include wetland area and adjacent buffer.

The eastern portion of the park would contain a variety of open grass area, benches and river view platforms. A children's play area with natural play elements (grass, pebbles and kinetic sculpture) would be provided in the northeastern corner of the park. The children's play area would be designed to meet King County Code standards for play equipment (KCC.21A.14.190) and barrier-free code requirements.

A fire access lane for emergency service (required by the King County Fire Department) would parallel the entire length of the shoreline park. Along with providing emergency fire access, this lane would serve as a pedestrian path and would incorporate interpretive signs and information on the natural features of the river and the history of the site. This emergency access lane would be designed consistent with barrier-free code requirements.

The existing plant communities within the shoreline area would be expanded and enhanced with additional plantings of native species, including the remaining wetland and buffer areas. The non-native blackberry would be removed and replaced with native understory and ground cover species. Most of the significant trees within the shoreline area are anticipated to be preserved.

Canal Esplanade and Amphitheater

A waterfront esplanade (boardwalk) would be developed in phases for pedestrian and bicycle use along the existing inner harbor. The approximately 50-foot wide esplanade would be urban in character and would include trees, benches and public viewpoints. The buildings fronting on the esplanade (Buildings B, C-1 and D) would contain retail shops, dining establishments and sidewalk cafes on the ground floors with residences located on the upper floors. A restaurant building (portion of Building Area D) at the western end would provide a marina sign post and architectural icon for the project.

The esplanade would lead to the northwestern edge of the shoreline park and a waterfront amphitheater. The amphitheater, which would have a southwesterly view to Lake Washington, would provide a public gathering place for musical events and other entertainment functions.

Fragrant Garden

The Fragrant Garden would be a 15,000 square foot natural space in a circular area between Parcels D and E-1. The outer area of the garden would accommodate outdoor seating for a restaurant or private patio space.

Streetscape

The Lakepointe Boulevard area is intended to be "pedestrian friendly" with marquees and awnings extending over sidewalks, colorful signs, street trees and limited on-street parallel parking. The proposal includes considerable use of street trees and plantings of new vegetation, particularly in the southern portion of the site. The use of "tree ring" planting areas in parking lots is proposed.

Trails and Walkways

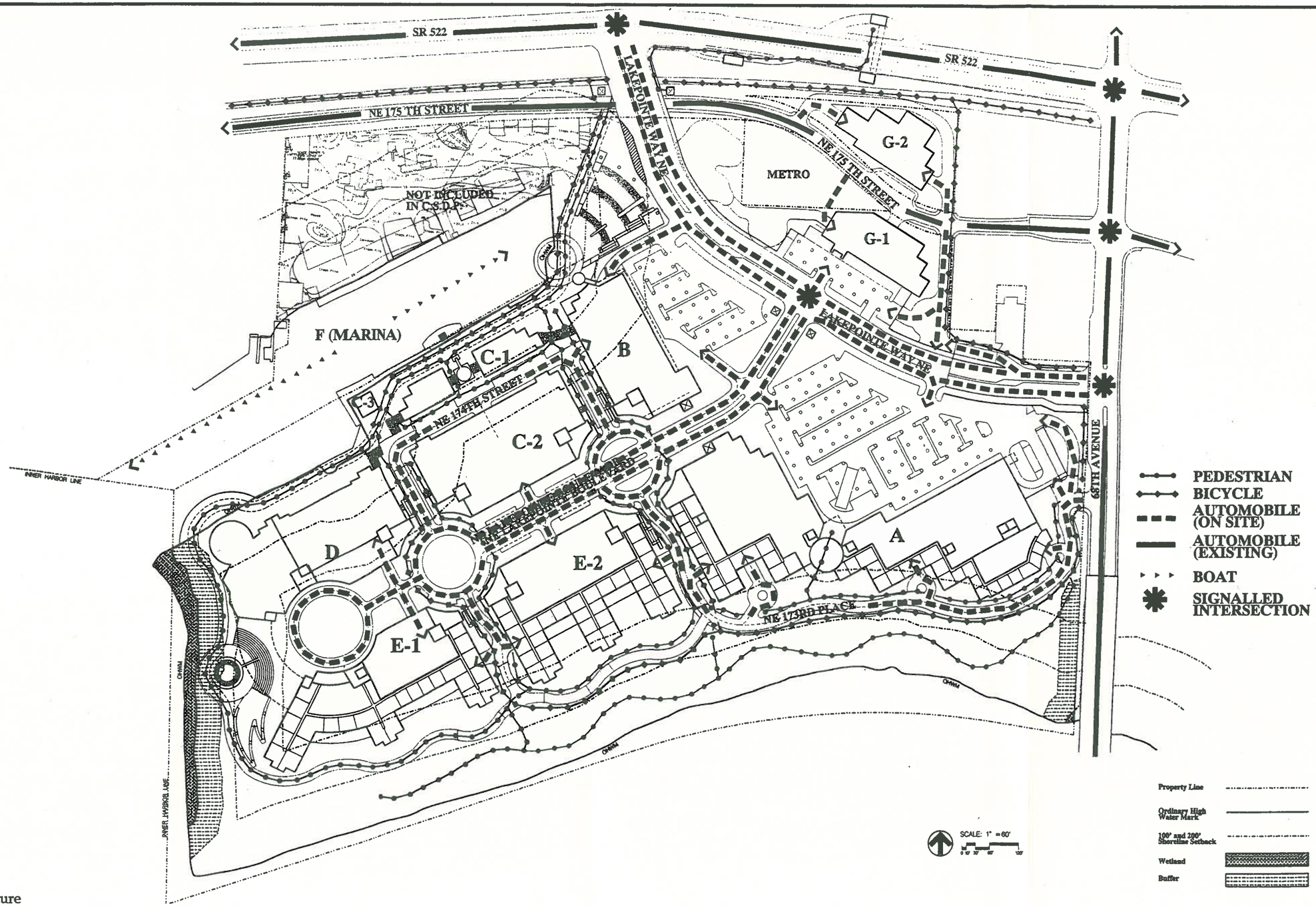
A total of approximately 6,400 linear feet of paved walkways and pedestrian areas (esplanade, sidewalks and emergency access lane) would be provided on the site (see Figure 7). The entire periphery of the site would be dedicated to trail/walkway use. Beginning at the northern portion of the site, a pedestrian/bicycle connection to the Burke-Gilman Trail would link the regional trail system to the waterfront esplanade. The esplanade would follow the southern edge of the harbor toward Lake Washington. From the esplanade, a 120-foot wide shoreline park trail (emergency access lane) would continue along the Lake Washington and Sammamish River shoreline. The shoreline park trail would include a connection to the sidewalk along the west side of 68th Ave NE. Bicycles would be allowed throughout the pedestrian areas, however, where trails are not considered wide enough to safely accommodate bicyclists, cyclists would be required to walk their bikes. Figure 8 illustrates the proposed circulation areas on the site.

In addition to the approximately 6,400 linear feet of paved walkway, the proposal would include approximately 2,600 linear feet of unpaved trails. These unpaved trails would be located between the emergency access lane and the Sammamish River and would include public viewpoints with seating and signage at selected points near the Sammamish River shoreline.

The proposal includes a new elevated Street (Lakepointe Way NE) which would pass over NE 175th St and the Burke-Gilman Trail. In this vicinity, the Burke-Gilman Trail would need to be lowered approximately 3 feet. The Trail would be reconstructed in this area, with appropriate pedestrian and bicycle connections to NE Bothell Way and the rest of the project site.

Access and Circulation

The proposal includes two primary access streets, designated as Lakepointe Way NE and Lakepointe Boulevard. Lakepointe Way NE would be a new 4-lane arterial connecting NE Bothell Way to 68th Ave NE, and is intended to be a bypass route between these two major routes. The right-of-way would be approximately 120 feet wide and 1,250 feet in length, with two lanes in each direction, turn lanes at intersections and a planted median strip. The western end of this Street near 65th Ave NE/NE Bothell Way would be elevated to pass over NE 175th St and the Burke-Gilman Trail, which would both need to be lowered by approximately 3 feet. Lakepointe Way NE's intersection with 68th Ave NE would be located approximately 300 feet south of the current NE 175th St intersection. Signalization would be provided at NE Bothell Way, 68th Ave NE, and at the intersection with Lakepointe Boulevard (see Figure 8). Appendix I to this document contains plans for barrier-free access.



Source: Callison Architecture

Huckell/Weinman Associates, Inc.	**Lakepointe Mixed-Use Master Plan**	**Figure 8** **Site Circulation Plan**

Lakepointe Boulevard would be the primary internal access from Lakepointe Way NE to the site. This 1,200-foot long street would feature two lanes of travel in each direction, access to/from parking garages for residential and commercial uses, a planted median, on-street parking spaces, three traffic circle features, and opportunities for on-street parking. This street is intended to be the "Main Street" area of the Lakepointe development.

One parking lot access from 68th Ave NE is proposed approximately 240 feet south of the Lakepointe Way NE/68th Ave NE intersection (turning movements from this parking lot would be limited to right-in and right-out turns only to minimize traffic conflict potential on 68th Ave NE). Also, access to the Parcel G office structure would be provided from NE 175th St and Lakepointe Way NE.

Emergency access in and around the proposed structures would be available from Lakepointe Way NE, Lakepointe Boulevard, and paved emergency vehicle access routes around the perimeter of the development area. Bus pullout zones would be provided on Lakepointe Way NE and Lakepointe Boulevard.

In accordance with the P-suffix conditions, the applicant would contribute a fair-share component of the funding for construction of a pedestrian overpass of NE Bothell Way. This overpass would not be considered as an element of the Master Plan (refer to the TRANSPORTATION Section of Chapter Three of this document).

A goal of the proposal is to separate bicycles and vehicles wherever possible. The majority of the proposal is intended to be pedestrian/bicycle oriented. Bicycle traffic would be discouraged on Lakepointe Way NE since this new arterial would connect to SR 522 which does not include bicycle lanes. As is standard throughout King County, where separation of bicycles and vehicles is not provided, bicycles are required to follow the rules and traffic patterns of vehicles on the roadway. From 68th Ave NE to Lakepointe Way NE, access to the site would be via the left turn lane, the same as is provided for vehicle traffic. Because bike lanes would not be provided on Lakepointe Way NE, a ramp providing pedestrian and bicycle access to the lower level of the site would be provided immediately west of the 68th Ave NE/Lakepointe Way NE intersection.

Parking

The proposal includes a total of approximately 4,464 parking stalls to accommodate all residential, retail/commercial, office and marina uses on the site. Table 4 describes the provision of parking on the site. The majority of the parking would be provided beneath the proposed structures. Surface parking would be provided for Building Areas A and B, adjacent to Lakepointe Way NE. Limited on-street parallel parking would also be available along Lakepointe Boulevard. The proposal includes the provision of approximately 200 surplus parking stalls (i.e. more stalls than required by King County Code) in Parcels A and B (Phase I); these additional stalls would provide parking as needed for spaces potentially, temporarily obstructed during subsequent phases of construction. Upon build-out of Building Areas A through G, the proposal would include approximately 250 more spaces than required by King County Code. The excess parking could be utilized as general parking for site uses, or could be sold or leased to on-site residents or tenants. Although not required by King County Code, approximately 26 parking spaces would be provided for the marina.

Bicycle parking areas would be provided along the esplanade and along Lakepointe Boulevard. Secured bicycle parking for the residential uses on the site would be provided within each dedicated garage. The

amount of bicycle parking provided would be in accordance with the bicycle parking requirements of KCC 21A.18.130.

Table 4
PROPOSED ON-SITE PARKING

Parcel and Proposed Uses	Required KCC Parking Rate	Required Amount of Parking	Proposed Amount of Parking
Parcel A			
Commercial...	1/300 sq.ft.	292	
Apartments	1.5/unit	360	
Senior Housing	0.5/unit	200	
		852	1,202
Parcel B			
Cinema.	1/3 seats.	533	
Commercial	1/300 sq.ft.	364	
		897	743
Parcel C			
Commercial	1/300 sq.ft.	314	
Apartments	1.5/unit	210	
Condominiums	2.0/unit	200	
		724	874
Parcel D/E-1			
Hotel	1/rm & 1/300sg. ft..	670	
Health Club	1/50 & 1/300sq. ft	338	
		1008	754
Parcel E-2			
Apartments	1.5/unit	330	432
Parcel G			
Office	1/300 sq.ft.	351	433
GRAND TOTAL		4,162	4,464*

Source: Callison Architecture, 1996
* Includes 26 marina spaces not shown on table; parking spaces for marina not required by KCC.

Site Population and Employment

At buildout, the residential components of the proposal would generate a permanent resident population of approximately 2,250, including approximately 1,125 apartment residents, 375 condominium residents and 750 senior unit residents. This resident estimate assumes an average of 1.875 persons per unit based on data provided by the Puget Sound Regional Council's *1995 Population and Employment Forecasts for the Central Puget Sound Region.* (It should be noted that the 1.875 persons per unit estimate is a regional average which is not dependent on the particular residential unit mix described for the Master Plan; therefore, the specific mix of units may vary, depending upon market conditions, but the overall resident population would be consistent with the estimated total).

At buildout, the average daily population of employees on the site would be approximately 1,270 based on the mix of commercial uses currently called for in the Master Plan. This total would include approximately 746 commercial/retail employees and approximately 524 office employees

Utilities

Domestic water, fire protection and irrigation water needs would be met by a looped system of new 12-inch water mains on the site. The system would extend from existing 12-inch mains in NE 175th St and 68th Ave NE. Available fire flow exceeds 5,000 gallons per minute and would meet King County Fire Code requirements for the proposal. Hydrants would be provided at required intervals. All of the structures would be sprinkled and would meet current fire safety codes.

The primary sanitary sewer line to serve the proposal would be below Lakepointe Boulevard, extending from NE 175th St. Sewer connections to other buildings would also be from the 42-inch gravity sewer line under NE 175th St. An existing King County pump station is located adjacent to the northern portion of the site.

Runoff from high use traffic areas on the site (Lakepointe Way NE and Lakepointe Boulevard) is proposed to be directed to a two-celled water quality treatment pond in the southeast corner of the site. Following treatment, this runoff would be released to the inner harbor. Stormwater from the lesser-used impervious roadways (NE 174th St and NE 173rd Place) would be directed to one of two sand filtration/biofiltration swales for treatment. Treated stormwater from the swales would be directed to outfalls to the Sammamish River. Roof runoff from the structures would be collected in storm drains and routed directly to inner harbor or the Sammamish River. Outfalls would be either swales or pipes. Runoff from pedestrian areas near the shoreline would also generally be routed directly to the inner harbor or river (refer to the WATER section of this document for detail).

Concurrent with the lowering of NE 175th St and the Burke-Gilman Trail under Lakepointe Way NE, gas, water, electrical and telephone lines would be relocated to lower depths in approximately the same locations as they currently exist.

Clearing, Grading and Impervious Surfaces

Grading would be required to lower NE 175th St approximately 7 feet and lower the Burke-Gilman Trail 3 feet to accommodate the proposed overpass at Lakepointe Way NE near NE Bothell Way. Much of the proposed fill would occur to raise the elevation of the proposed emergency access road/walkway to 38 feet from an approximate existing grade of 27 feet. This roadway would be raised to provide a roadway at the same elevation as the finished ground level of Building Area A, and to provide a separation between the roadway and adjacent shoreline park and children's play area. The amount of earth movement (displacement of soils for pile and utility placement) that would be required as part of the Model Toxics Control Act remediation plan being proposed by the applicant will be determined by DOE in cooperation with the landowner (refer to the TOXIC AND HAZARDOUS MATERIALS section of Chapter 3 of this document for detail on the site cleanup process).

At buildout, approximately 29.6 acres, or 65 percent of the 45-acre site would have impervious surfaces in roofs, roads, parking lots, sidewalks and other pedestrian areas. Pervious areas on the site after development would be primarily located in open space in the southern portion of the site.

Project Phasing

Development of the Master Plan elements included in the Commercial Site Development Permit application (Building Areas A through G) would be implemented in six phases over the approximately seven year buildout period. The phases would proceed in sequence from A through G, with possibly some overlapping of phases. It is proposed that there would be no gap in the construction process. The general sequence of construction within each individual phase would be as follows: 1) clearing and grubbing; 2) excavation and pile driving; 3) building and roadway construction; and 4) landscaping.

The interior roadway, NE Lakepointe Boulevard, would be developed in phases simultaneously with each building phase. Each phase of NE Lakepointe Boulevard development would include completion of emergency vehicle access lanes and temporary emergency vehicle turn-around.

A description of the building elements proposed within each of the individual phases is provided below. It should be noted that the phasing plan is conceptual, and subject to modification based on specific market conditions and construction requirements. Detailed design and construction drawings for each phase would be submitted by the applicant and reviewed and approved by King County before any on-site work can begin. This would include design and construction drawings for such things as grading, drainage facilities, road and walkway construction, building and marina construction, and open space/parks. Figure 9 illustrates the proposed phasing scheme.

Phase 1 development would include the following:

- Site grading and utility infrastructure work in preparation for and including the construction of the elevated Lakepointe Way NE roadway and the completion of intersections at SR 522 and at 68th Ave.

- Development of Building areas A and B. This area would include one surface parking deck, and two lower level parking floors. Temporary surface parking for Phase 2 uses would also be provided in the Phase 1 area.

- 79,100 SF of platform area surrounding area A.

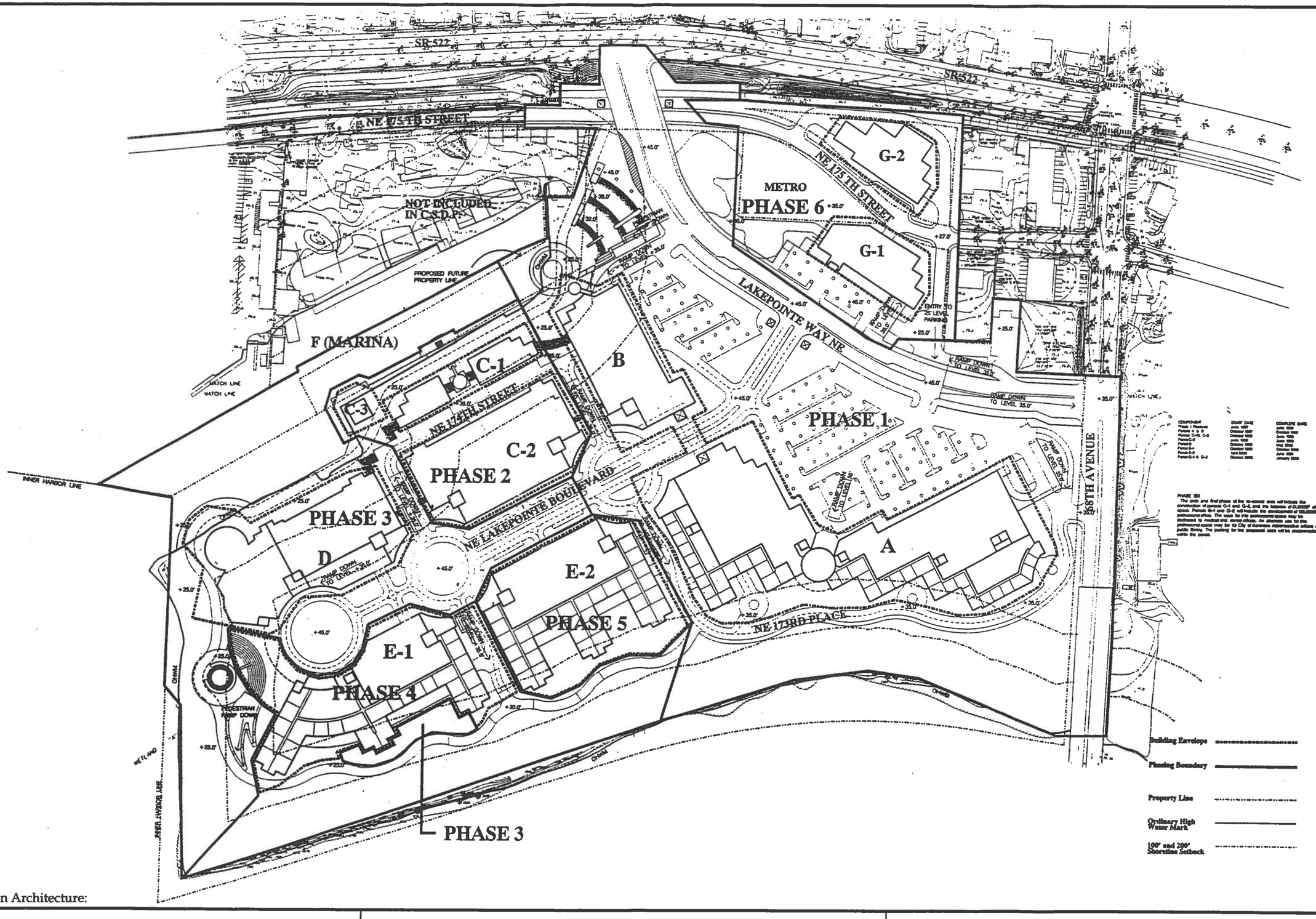
- 76,790 SF of Lakepointe Boulevard extending to the first traffic circle.

- 31,180 SF of firelane constructed on the platform of area A.

- 117,780 SF of shoreline park adjacent to area A.

- 127,500 SF of esplanade along the marina edge.

- 17,450 SF of walkway along the frontage of area A and B.



Source: Callison Architecture:

Huckell/Weinman Associates, Inc.	**Lakepointe Mixed-Use Master Plan**	**Figure 9** **Phasing Plan**

- 24,310 SF of surface water quality detention pond area to collect all the surface water from the elevated Lakepointe Way NE, the 175th access road at grade, the elevated boulevard, and the surface parking decks adjacent to areas A and B.

Phase 2 development would include the following:

- Construction of Building areas C-1, C-2, and C-3.
- Temporary parking for these two areas would be accommodated by a 187,690 SF surface lot reserved for future Phase 2 parcel C-2 construction.
- Parking would be provided within the Building C garage.

Phases 3 and 4 would include construction of the following:

- Building area D and E-1.
- Extension of 39,980 SF of the elevated boulevard and utilities.
- Extension of 96,090 SF of the esplanade amphitheater park and open space.
- Extension of 96,690 SF of the shoreline park.
- Extension of 17,480 SF of the firelane to the southwestern edge of the site where it meets Lake Washington.
- Completion of the south side of the marina along with the esplanade (the balance of the marina to the north would be completed along with the future development of area H).

Phase 5 would include construction of the following:

- Building area E-2.
- 117,780 SF completion of the shoreline park.
- 31,180 SF extension of the firelane.
- A two level parking garage would be associated with Building E-2.

Phase 6 would include the construction of the following:

- Building areas G-1 and G-2.
- 51,900 SF of open space.

- The parking for the proposed uses would be accommodated within the parcel.

In addition to the above phasing, phasing of transportation improvements including construction of NE Lakepointe Boulevard, and other local improvement projects, would be established in a Transportation Mitigation Agreement signed by King County and the applicant as part of Master Plan approval.

Proposed Modifications to P-suffix Conditions

Condition 16(i) of the P-suffix conditions for the Lakepointe project permits the modification of elements of the P-suffix conditions, as long as the goals of the NSCP are met. The Proposed Action calls for two modifications to specific P-suffix conditions, each intended to better implement the goals of the NSCP.

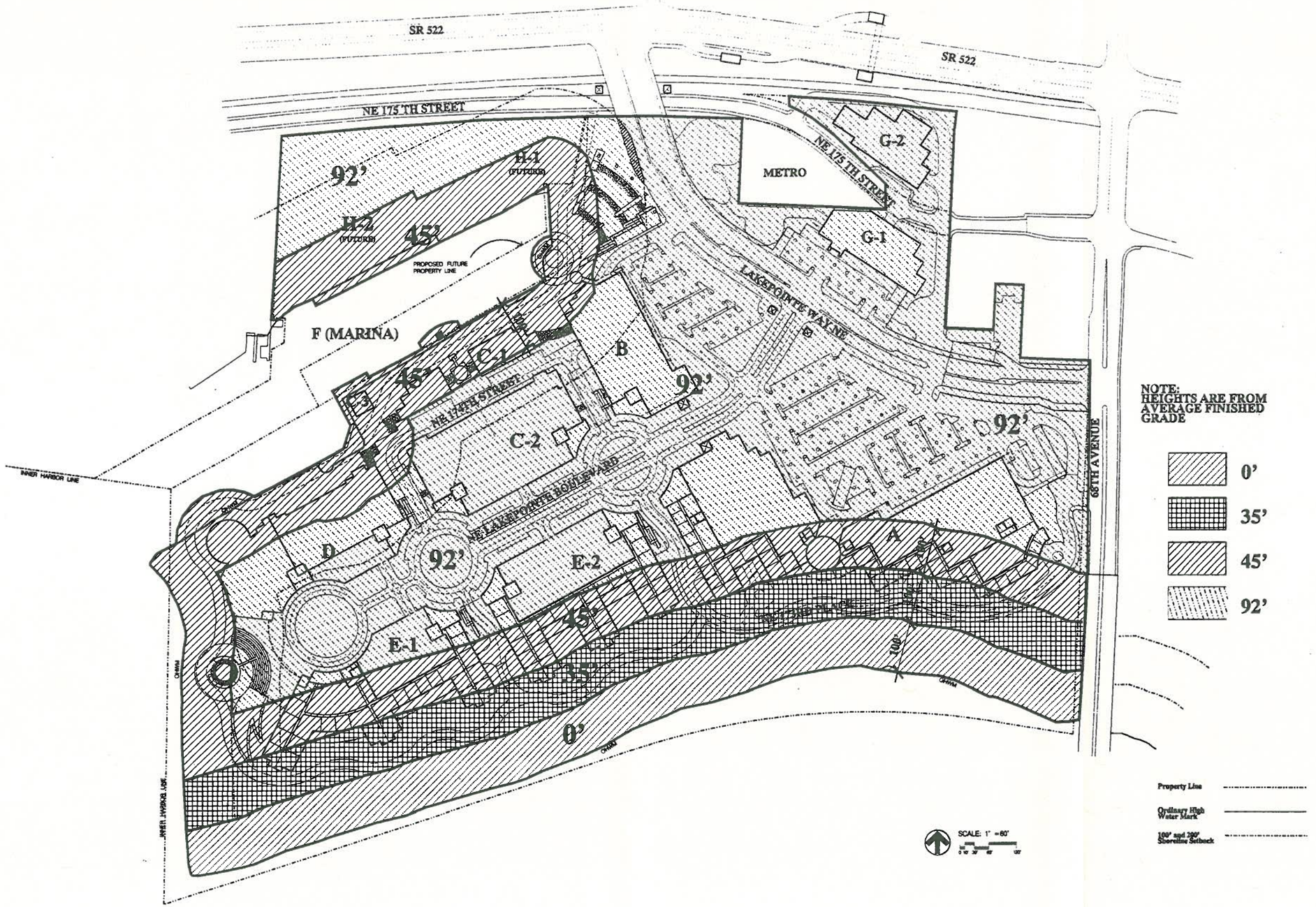
Building Height

The maximum building heights for Master Plan development are detailed in the NSCP P-suffix conditions (see Figure 10) and are summarized as follows:

- Maximum heights shall be 92 feet in the northern and central portions of the mixed use development area.
- A 45-foot height limit shall apply to all development within 100 feet of the channelized edge of the Lake Washington shoreline.
- The boundary of the channelized edge shall extend to the inner harbor line.
- A 35-foot height limit shall apply to all development within the first 200 feet, and a 45-foot height limit to all development within the next 100 feet of the Sammamish River shoreline edge and the Lake Washington shoreline edge that is not channelized.

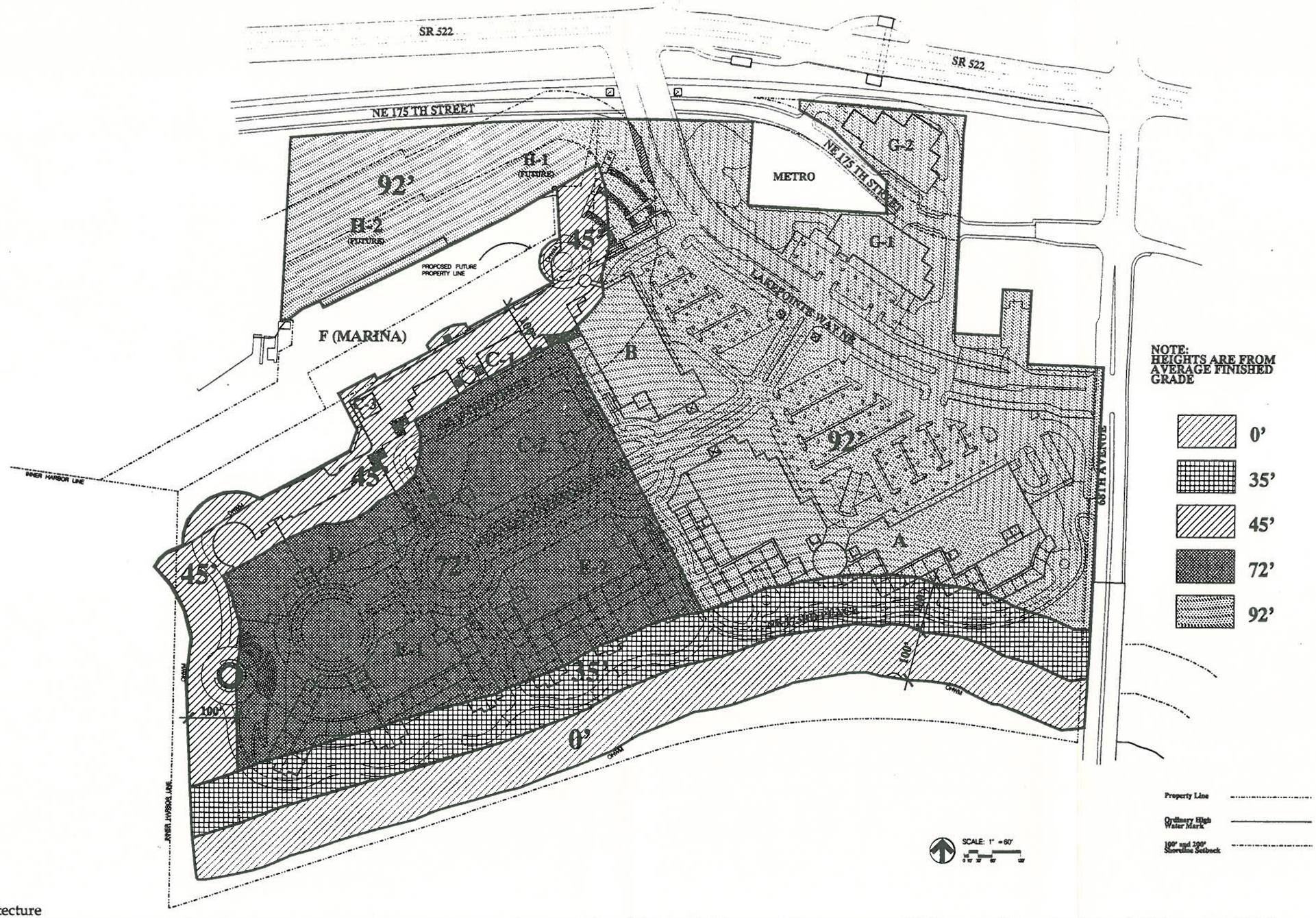
The Master Plan proposes to modify the building heights set forth in the P-suffix conditions (see Figure 11) as follows:

- The 45-foot height limit in the area 200 feet to 300 feet from the Sammamish River would be eliminated.
- In the eastern portion of the site, the area of the 92-foot height limit would be extended in a southerly direction from 300 feet to within 200 feet of the River (in Building Area A).
- In the west central portion of the site (Building Areas C, D and E), building heights would be reduced from 92 feet to 72 feet extending in a southerly direction to within 200 feet of the River (in Building Area E).
- Consistent with the NSCP, the 35-foot height limit between 100 feet and 200 feet of the River would be maintained, and no buildings are proposed within 100 feet of the Sammamish River.



Source: Callison Architecture

Huckell/Weinman Associates, Inc.	Lakepointe Mixed-Use Master Plan	Figure 10 P-suffix Height Standards



Source: Callison Architecture

Huckell/Weinman Associates, Inc.	Lakepointe Mixed-Use Master Plan	Figure 11 **Proposed Height Standards**

- The 45-foot height limit along the northern edge of the inner harbor, in Building Area H, would be increased to 92 feet.

Figure 12 illustrates building elevations under the proposed height limits and compares them to elevations under the P-suffix height limits. In addition, KCC 21A.12.180 allows roof structures housing or screening rooftop equipment and parapet walls to exceed the proposed height limits of the zoning code.

The applicant has described the rationale for the proposed building height modifications as part of the Master Plan submittal. A summary of the applicant's position is provided below.

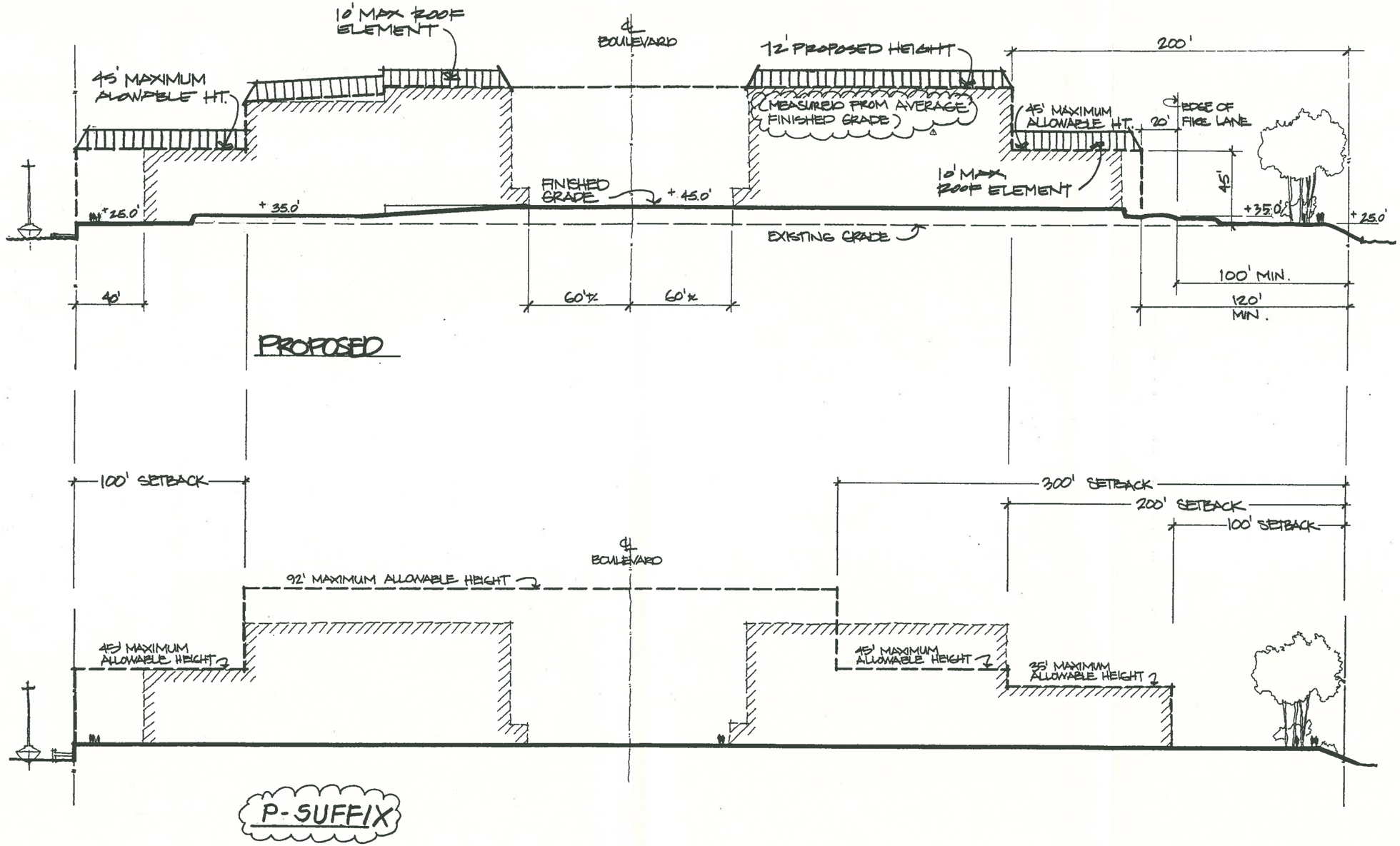
The original concept plan for Lakepointe (which was reflected in the NSCP P-suffix conditions) was based on the premise of taller building heights and more limited public access in the residential area near the western point of the site. That concept plan massed density in taller towers to the western edge of the site, with private townhome communities (at 45-foot and 35-foot heights) bordering the Sammamish River. Much of this area would have been restricted from public vehicular and pedestrian access. The Proposed Action contemplates elimination of the private townhome areas along the River and a significant reduction in building heights in the western portions of the site (from 92 feet to 72 feet maximum), and ensures public access throughout the development. These proposed changes are intended to be consistent with the goals of the NSCP P-suffix conditions.

The increased height limit in the areas between 200 feet and 300 feet of the River would allow higher buildings closer to the River and to residential uses to the south, across the River. This increase in building heights to the south would be offset by the reduction in building heights in the west-central portion of the site. Buildings developed in Building Area H, in the future, would be at a greater height along the northern edge of the inner harbor.

KCC 25.16.030(B) (Shoreline Management Master Program) states that no structure within 200-feet of the shoreline shall exceed a height of thirty-five feet. This requirement may be modified if the view of a substantial number or residences will not be obstructed, if permitted by the applicable provisions of the underlying zoning, and if the proposed development is water related. King County has determined that the proposed buildings within 200-feet of the shoreline meet the height modification criteria and no shoreline variance would be required.

Parking Lot Design

The general design standards for off-street parking are detailed in the NSCP P-suffix conditions (refer to the LAND USE - Relationship to Plans and Policies section of Chapter 3 of this document). One of the general design standards states that a maximum of 60 parking stalls is permitted in any one surface parking lot. At a minimum, parking lots must be separated by buildings, a street, or 12 feet of Type II landscaping.



Source: Callison Architecture

Huckell/Weinman Associates, Inc.	**Lakepointe Mixed-Use Master Plan**	**Figure 12** **Building Height Comparisons**

The applicant proposes to modify the parking standards by including approximately 200 spaces in the surface lot associated with Building Areas A and approximately 100 spaces in the surface lot associated with Building Area B (both lots would be located adjacent to Lakepointe Way NE). Consistent with the intent of the P-suffix conditions, the two parking lots would be separated by a street (NE Lakepointe Boulevard) and landscaping would be provided throughout the surface deck, between parking spaces and around the perimeter of the lots to screen and minimize the visual impact of these elevated parking areas. street trees and bermed landscaping would be provided along the parking lot perimeter adjacent to Lakepointe Way NE to screen views of the parking lot from the roadway. It is anticipated that the uses located in these areas would be those that generate higher volumes of vehicular traffic. Locating the parking areas on elevated decks along Lakepointe Way NE would minimize the vehicular traffic which flows into the site.

ALTERNATIVES TO THE PROPOSED ACTION

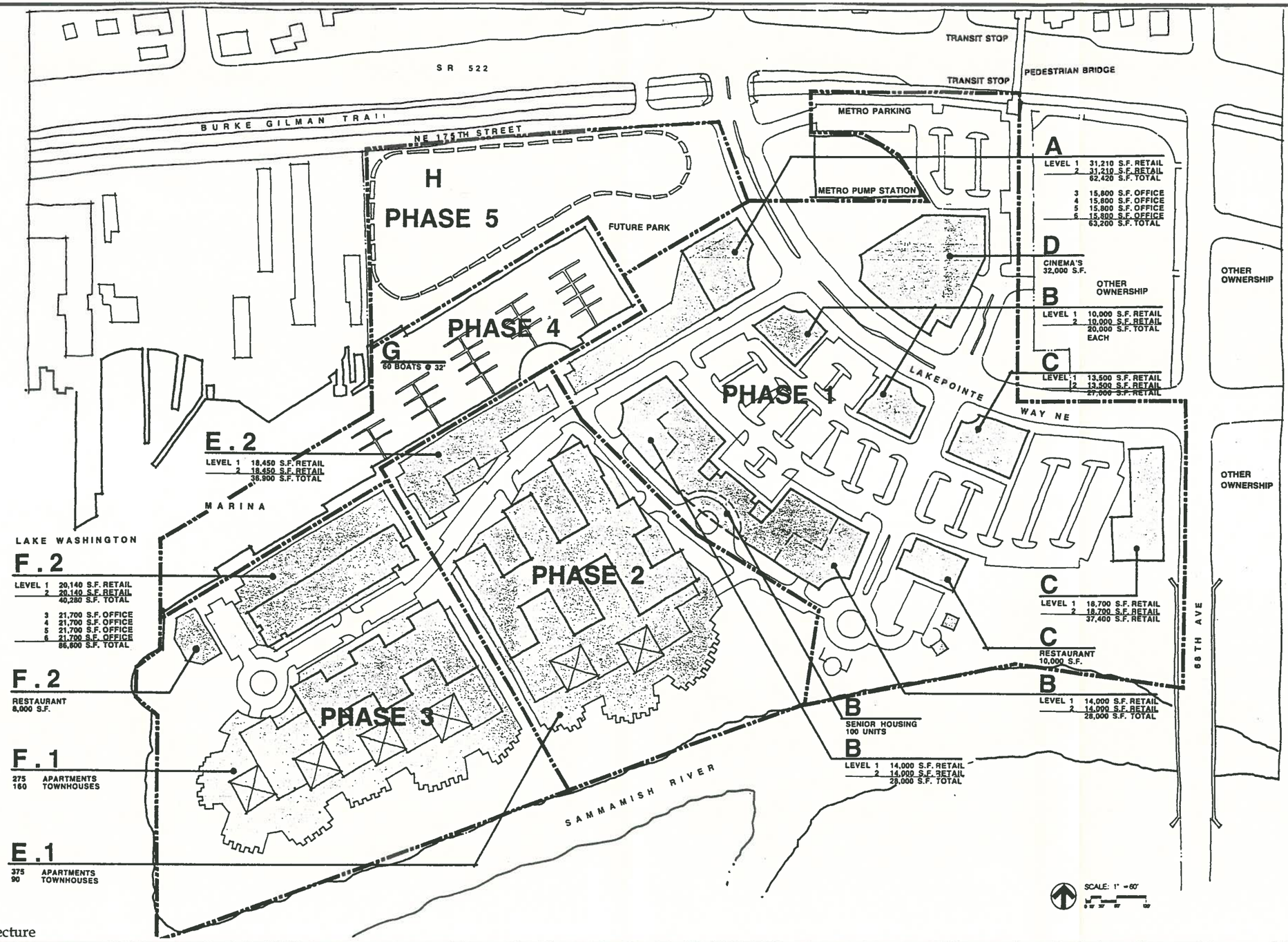
As indicated previously, the 1993 NSCP included a set of specific development conditions for the site. These property-specific development conditions, called P-suffix conditions, were intended to implement the NSCP goal of providing a mixed-use pedestrian-oriented development on the site.

The Alternative Site Plan (Figure 13) is based on the conceptual site plan included in the NSCP (page 255, Map A). As stated on this plan "this map is shown for purposes of illustrating the intent of the P-suffix conditions for the Mixed-use District only, and shall not be used as a development plan for the site. Actual development plans may vary from this map, as long as the intent of the P-suffix conditions is met."

Subsequent to the issuance of the NSCP in 1993, detailed design studies for the site were conducted by the applicant in conjunction with the Citizens Advisory Task Force. These studies analyzed alternative designs for roadway access, pedestrian circulation, building layout, and public open space. These alternative designs were considered and tested against the required P-suffix conditions, but were determined to not be feasible for various reasons. The result of this collaborative design process is the Master Plan described as the Proposed Action in this Supplemental EIS.

The conceptual plan from the NSCP is included to understand the general intent of the NSCP in regards to the site; to clarify how the Proposed Action would differ from the conceptual plan; and, to evaluate, through comparison, whether the Proposed Action, although different in some respects, would meet the intent of the NSCP. The primary differences between the conceptual plan in the NSCP and the Proposed Action include the number of residential units and amount of commercial space; building heights; parking design and location; and, the design and location of the bypass roadway (at-grade vs. elevated). The conceptual plan illustrated in the NSCP is analyzed as an alternative to the Proposed Action and is described below.

The applicant has indicated, however, that this alternative would not meet their objectives and would not be consistent with the outcome of the design process conducted with the Task Force. From the applicant's perspective, no alternatives to the Proposed Action are feasible due to the requirements of the P-suffix conditions and the results of the collaborative design process.



Source: Callison Architecture

Huckell/Weinman Associates, Inc.	Lakepointe Mixed-Use Master Plan	Figure 13 Alternative Site Plan

Alternative 1 - Conceptual Master Plan Illustrated in the Northshore Community Plan

Consistent with the original conceptual Master Plan illustrated in the Northshore Community Plan Update and Area Zoning (NSCP), Alternative 1 includes 1,000 residential units and 500,000 square feet of commercial space compared to 1,200 residential units and approximately 650,000 square feet of commercial space under the Proposed Action. Figure 13 illustrates the Alternative 1 Site Plan. There are various other substantial differences between this alternative and the Proposed Action.

The 1,000 residential units under Alternative 1 would consist of three different types of mulitfamily housing; 100 senior housing apartment units, 650 apartment units, and 250 condominium units. The residential components of Alternative 1 would generate a permanent resident population of approximately 1,850 compared to 2,250 under the Proposed Action.

The 500,000 square feet of commercial space would include approximately 320,000 square feet of retail space and approximately 180,000 square feet of general office use space. The retail uses would include small to medium sized shops and stores, including a grocery store, pharmacy, book and video stores, clothing shops, etc. Also, a variety of restaurants would be provided. As under the Proposed Action, a cinema would be included; however, opposed to the Proposed Action, no hotel would be provided.

Building heights under this alternative would be consistent with the height limitations currently provided in the P-suffix conditions. Refer to page 2-26 of this section for a discussion and illustration of the current P-suffix building height limits.

The Proposed Action departs from the NSCP conceptual plan by proposing an elevated bypass (Lakepointe Way NE) whereas in the NSCP, the bypass was illustrated as at-grade. . Under Alternative 1, NE 175th St would intersect with Lakepointe Way NE at a signalized intersection. NE 175th St would be vacated between Lakepointe Way NE and 68th Ave; the existing signal at NE 175th St and 68th Ave would be removed. Additionally, the Burke-Gilman Trail and NE 175th St would be grade-separated under Lakepointe Way NE at the west end of the site. The primary internal access street (NE Lakepointe Boulevard), which would be elevated under the Proposed Action, would also be at grade under Alternative 1. Because the preliminary planning conducted for the conceptual master plan did not analyze roadway operations, the feasibility and impacts of the at grade road system were not determined

The amount of open space on the site would total 18.8 acres compared to the 21.2 acres under the Proposed Action. The shoreline park under Alternative 1 would be generally similar to that under the Proposed Action, although there would be some roadway and parking lot intrusions in the southeast portion of the site which would not occur under the Proposed Action. Townhome units located along the River would include privately owned backyards which would further restrict public view access of the River compared to the Proposed Action. Because the main access road (described as Lakepointe Boulevard under the Proposed Action) would be closer to the inner harbor, the amount of waterfront esplanade would be significantly reduced in size from that under the Proposed Action. As under the Proposed Action, an on-site trail connection to the Burke-Gilman Trail would be provided.

Table 5 summarizes the land use under Alternative 1. As under the Proposed Action, development of the 5-acre Kenmore Pre-mix area would occur at a future date (see Table 1 for land uses under the Proposed Action).

Table 5

ALTERNATIVE 1 USES BY ACREAGE

Use	Site Acreage	Site Percentage
Built Area (buildings and roadways)	25.2	56
Paved Sidewalks, Trails and Esplanade	6.5	15
Unpaved Trails	0.6	1
Paved Public Space (amphitheater)	0.5	1
Landscaped Open Space	7.1	16
Natural Open Space	4.1	9
Metro Pump Station	0.6	1
Stormwater Retention Area	0.4	1
TOTAL	**45**	**100**

Source: Callison Architecture, Inc. 1996.

The residential development along the Sammamish River shoreline under Alternative 1 would include private gated townhouse communities. Public access in these areas would be restricted, and would be limited to access along the shoreline trail. Access to the shoreline trail would occur at only two locations, at the west and east of the site, compared to a continuous shoreline trail under the Proposed Action.

Due to the at grade nature of Lakepointe Way NE and Lakepointe Boulevard, the majority of surface and structured parking would be located at or above the elevation of these roadways (under the Proposed Action, over 90 percent of parking would be below the elevation of Lakepointe Way NE and Lakepointe Boulevard).

For Alternative 1, as for the Proposed Action, the amount of earth movement (displacement of soils for pile and utility placement) that would be required as part of the Model Toxics Control Act remediation plan would be determined by DOE in cooperation with the landowner (refer to the TOXIC and HAZARDOUS MATERIALS section of Chapter 3 of this document for details on the site cleanup process).

Under Alternative 1, approximately 32.2 acres of the site would be in impervious surfaces compared to 29.6 acres under the Proposed Action.

Alternative 2 - No Action

Under the No Action Alternative, the existing industrial and storage use of the site would continue. The NSCP Update goal of establishing a pedestrian oriented mixed use development on the site would not be met. Public access to Lake Washington and the Sammamish River shorelines would not be provided. Given the site zoning and P-suffix conditions, any future redevelopment of the site would require approval of a mixed use master plan.

As under the Proposed Action, a remediation plan, consistent with MTCA, would be required. The MTCA procedures and standards to be followed for site cleanup would be the same as under the Proposed Action (refer to the TOXIC AND HAZARDOUS MATERIALS section of this document for details).

CHAPTER THREE

Affected Environment, Impacts, Alternatives, Mitigation Measures and Unavoidable Significant Adverse Impacts

CHAPTER 3
AFFECTED ENVIRONMENT, IMPACTS, ALTERNATIVES, MITIGATION MEASURES AND SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

This chapter describes the affected environment, impacts of the Proposed Action and alternatives, mitigation measures, and any significant unavoidable adverse impacts on the environment anticipated from implementation of the Proposed Action or alternatives. Impacts on each element of the environment are discussed for both the Proposed Action and alternatives. Mitigation measures are included for consideration as part of the decision-making process for the proposal.

EARTH

This section summarizes the findings of site analyses conducted by AGRA Earth & Environmental. The full analysis by AGRA is included as Appendix A to this Draft EIS.

AFFECTED ENVIRONMENT

Topography

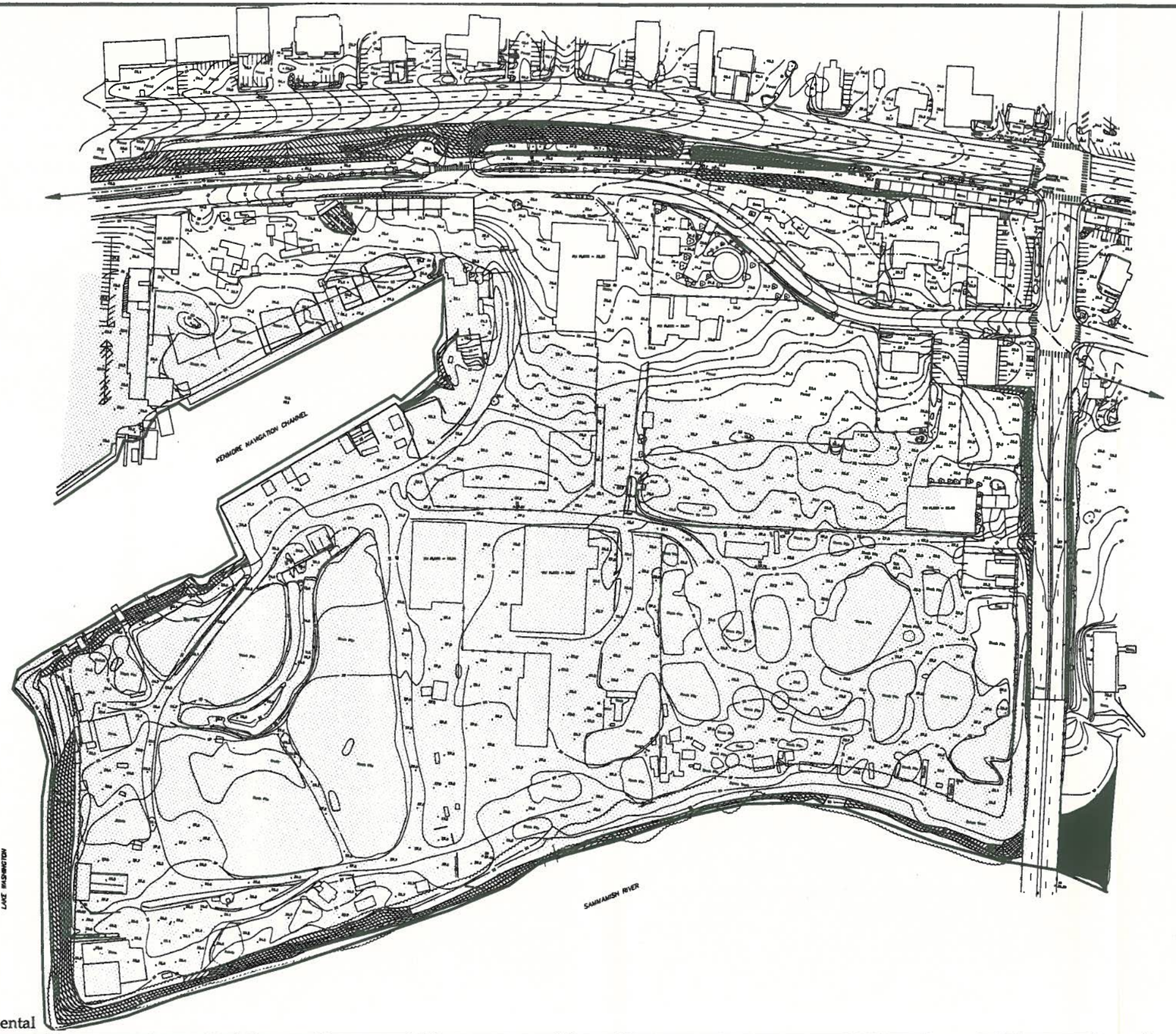
The site is generally level, with the majority of the site having been graded to slopes less than 15 percent, except for roadway and shoreline embankments (along Lake Washington and Sammamish River) that typically exceed 40 percent (these 40 percent or greater slopes generally range from 5 to 10 feet in height). Site elevations range from approximately 30 feet at the northeastern corner to approximately 16 feet at the Lake Washington shoreline (see Figure 14).

Geologic Conditions

Geomorphic Processes

The site is located at the mouth of the Sammamish River at the north end of Lake Washington, within the Puget Lowland basin. The large-scale geomorphic features of the vicinity are the result of Pleistocene Age glaciations, ending with the Vashon glaciation, which receded from the area approximately 13,000 years ago. The native soils underlying the site consist of alluvium deposited during the Holocene Age, following the recession of the Vashon glacier. Significant man-made modifications occurred this century to raise the property elevation above the level of Lake Washington. Similar land modifications occurred on surrounding properties.

Recessional sands and gravels were deposited by glacial meltwaters and river drainages on upland plateaus, and in valleys and lakes. A delta of recessional sand and gravel formed at the mouth of the Sammamish River. Recessional sands and gravels also blanketed the flanks of the trough and river valleys. Once the glacial meltwaters receded, the Sammamish River was fed by precipitation only, resulting in deposition of finer sand and silt alluvium.



LEGEND

HAZARDS AS DEFINED IN SENSITIVE AREAS ORDINANCE (SAO), KING COUNTY CODE (KCC) 21A

- CLASS I SHORELINE
- 100 YEAR FLOODPLAIN
- NORTHERN BOUNDARY OF SEISMIC HAZARD AREA
- SLOPE CATEGORY OF 40% AND ABOVE
- SLOPE CATEGORY OF 15–39%

FEMA FLOODPLAIN HAZARD

- 100 YEAR FLOODPLAIN (APPROX. ELEVATION 18')

NOTES: ALL OTHER AREAS OF SITE HAVE A SLOPE CATERGORY OF 0–15%

EROSION HAZARDS AND LANDSLIDE HAZARDS ARE NOT INDICATED ON THE SITE BY KCC 21A.

0 100 200
SCALE IN FEET

Source: AGRA Earth & Environmental

Huckell/Weinman Associates, Inc.	Lakepointe Mixed-Use Master Plan	Figure 14 Topography & Slope Map

Vegetation on the glaciated lowland generated organic matter (silts and peats) which was eventually deposited at the river delta. This depositional process continues today, although at a slower rate due to urbanization. Urbanized areas now replace most of the dense vegetation that previously contributed to organic sediment loads. No flood controls are implemented along the Sammamish River, but the level of Lake Washington is controlled further downstream at the U.S. Army Corps of Engineers Hiram Chittenden locks.

Following the lowering of Lake Washington in 1916, the Sammamish River was straightened and channelized to facilitate transportation and commercial uses. The south shoreline of the site was formed by the dredged alignment of the straightened river channel. The inner harbor channel (Kenmore Navigation Channel) that angles across the site (maintained by dredging) originally served a timber mill at the head of the channel.

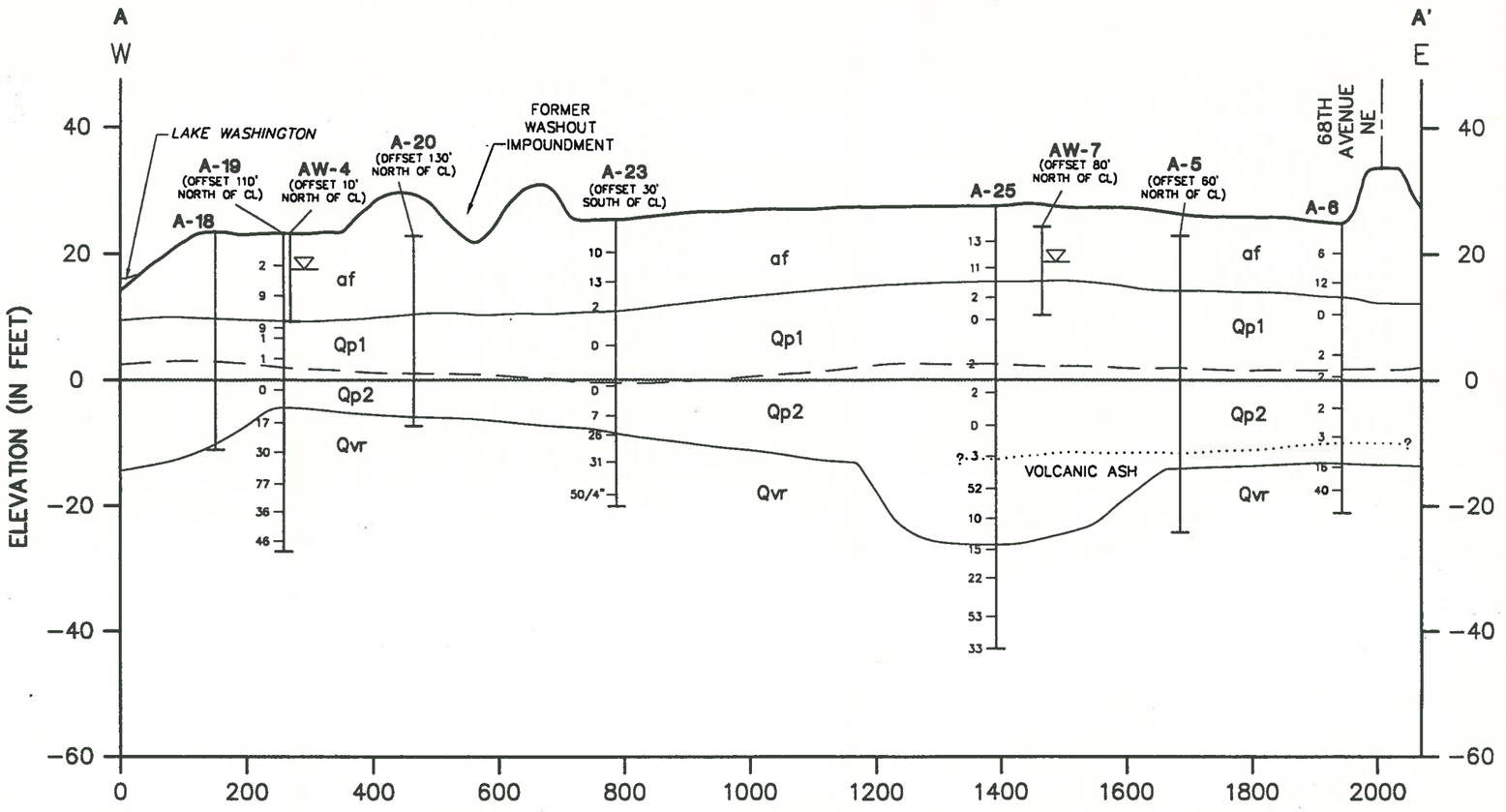
The north end of the site was graded early this century for construction of a railroad, NE Bothell Way and N.E. 175th Street, and industrial developments such as the lumber mill. By 1960, the site was filled towards the river shoreline and inner harbor, and the timber mill was replaced with a concrete plant (Kenmore Pre-Mix plant). By 1980, the site had been filled to an elevation approximately 10 feet above the surrounding lake level, and bulkheads had been constructed along the navigation channel to protect the industrial uses.

Human activities continue to influence the geomorphic process. Net deposition of alluvial sediments continues in the Sammamish River and inner harbor, requiring periodic dredging. The sediment depth off the west shoreline of the site, and outside of dredging areas, appears to be controlled by the lake's wind and wave action. According to a hydrographic survey, sediments accumulate to an average depth of approximately 3 to 5 feet below the lake level in a triangular zone between the dredged channels. Irregularities in the shallow lakebed topography may be due to disturbance by recreational boat traffic. Vegetation protects the southern shoreline of the property from the moderate erosive forces of the Sammamish River. The inner end of the inner harbor is protected from erosion by bulkheads, and there is no evidence of wind-related erosional effects on the vegetated west shoreline (on Lake Washington) of the property. Natural degradation and settlement of the organic sediments underlying the site will continue at a slow rate over time with or without proposed development.

Geologic Units

AGRA Earth & Environmental, Inc. performed 27 soil borings (hollow auger driven into the ground to obtain soil sample) and 8 cone penetrometer explorations (rod driven into the ground to determine soil strength) in 1995 and 1996 ranging in depth from 14 to 71.5 feet below ground surface in order to obtain and define specific on-site geologic conditions. In February 1996, 20 test pits (backhoe excavation to allow visual inspection) were also excavated to depths of 6 to 11 feet below ground surface to explore the wood debris fill and characterize the fill constituents. The four principal geologic units underlying the site, in order of surface to deepest subsurface, include: Wood Debris Fill, Peat and Organic Silt, Loose Alluvium, and Dense Sand and Gravel. Figure 15 illustrates an east-to-west cross-section through the center of the site (refer to Appendix A for additional geologic cross-sections).

The portion of the site south of NE 175th Street (the majority of the site) is underlain by significant thicknesses of very loose fills over soft, compressible peat, organic silt soils, or loose alluvium. Where fills or soft soil conditions occur, dense, bearing conditions are encountered within the underlying sands and gravels at depths of 25 to 45 feet below existing grades.



mL – MODIFIED LAND

ORIGINAL TOPOGRAPHY DISTURBED BY REMOVAL OF SOME PLEISTOCENE DEPOSITS, GRADING AND ARTIFICIAL FILL OF UNKNOWN QUALITY.

af – ARTIFICIAL FILL

ORIGINAL TOPOGRAPHY MODIFIED BY PLACEMENT OF SIGNIFICANT THICKNESS OF ARTIFICIAL FILL. COMPRISES THE WOOD DEBRIS FILL DESCRIBED IN SUBSURFACE EXPLORATIONS.

Qp – PEAT

ACCUMULATION OF ORGANIC MATERIAL (Qp1)
LOOSE ALLUVIUM.
MAY CONTAIN SMALL AMOUNTS OF SAND, SILT, CLAY AND VOLCANIC ASH DEPOSITED IN SWAMPS AND BOGS (Qp2)

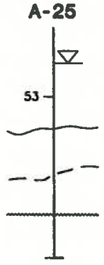
Qvr – VASHON RECESSIONAL OUTWASH

LIGHT BROWN, LOOSELY COMPACTED SAND AND GRAVEL, WELL-ROUNDED FROM STREAM TRANSPORTATION. SORTING VARIES; PARTICLE SIZE VARIES FROM MEDIUM SAND TO COBBLES. NOT DIFFERENTIATED FROM MORE RECENT ALLUVIUM, WHICH MAY CONTAIN SILT, CLAY AND ORGANIC MATTER.

Qvt – VASHON TILL

POORLY SORTED, NONSTRATIFIED LODGMENT TILL DEPOSITED AS GROUND MORAINE. MIXTURE OF CLAY, SILT, SAND, PEBBLES AND COBBLES WITH OCCASIONAL LARGE BOULDERS. STONES ARE SUBANGULAR TO ROUNDED.

LEGEND



SOIL BORING/MONITORING WELL NUMBER AND LOCATION
OBSERVED GROUNDWATER LEVEL
BLOW COUNT (BLOWS/FOOT)
APPROXIMATE BOUNDARY OF GEOLOGIC UNIT
APPROXIMATE BOUNDARY BETWEEN ORGANIC PEATS (Qp1) AND ALLUVIUM (Qp2)
ELEVATION 0 (KING COUNTY BENCHMARK "KC-B-16")
BOTTOM OF HOLE

0 20 40
VERTICAL SCALE IN FEET

0 200 400
HORIZONTAL SCALE IN FEET

REFERENCE:
U.S. GEOLOGICAL SURVEY (USGS) GEOLOGICAL MAP OM-14, "PRELIMINARY SURFICAL GEOLOGIC MAP OF THE EDMONDS EAST AND EDMONDS WEST QUADRANGLES, SNOHOMISH AND KING COUNTIES, WASHINGTON (1975).

Source: AGRA Earth & Environmental

Huckell/Weinman Associates, Inc.	Lakepointe Mixed-Use Master Plan	Figure 15
		Generalized Geologic Cross-Section

The portion of the site north of NE 175th Street is underlain by loose to medium-dense alluvial sands and gravels shown as Qvr, Vashon recessional sands and gravels. Everett soils occur consistent with the Qvr mapped areas. The area between NE 175th Street and Bothell Way also includes numerous utility easements and roadfill embankments.

Fill Materials

The wood debris fill consists predominantly of wood fragments with brick, wire, concrete wash-out products, and a silty sand matrix. The wood debris fill averaged 15 feet in thickness. The fill on most of the site contains an average of 70 percent wood fragments by volume. Concrete and asphalt rubble accounts for approximately 15 percent of the fill by volume, and the remaining 15 percent consists of soils. Fill depths ranged between 2 and 23 feet, with the thinnest layers at the north end of the site, and the deepest fill encountered directly southeast of the inner harbor. The debris fill is capped with a silty sand or silty gravel layer averaging 2 feet thick. The fill toward the north end of the site contains less wood debris and is associated with existing road embankments and utility or building construction. Methane gas was detected in the site areas containing fill; this gas is assumed to originate from the wood waste fill and underlying peat soils.

In the fall of 1996, stockpiles of roofing waste (consisting of shredded wood roofing, asphalt shingles and plastic sheeting) were re-graded across a three-acre area of the south-central portion of the site and stockpiles of concrete wash-out (consisting of a silty gravelly sand) material were re-graded across a six-acre area in the southwest portion of the site. The depth of these fill layers average six inches for the roofing materials and three feet for the wash-out materials.

Peat and Organic Silt

Beneath the fill soils, native peat and organic silt soils are located beneath the southern two-thirds of the site. These soft to very soft organic soils are interbedded with silts, clays and sands, extending to depths of 25 to 44 feet below existing grades in the southern portion of the site.

Alluvium Over Dense Sand and Gravel

Beneath the peats and organic silts is loose alluvium, consisting of interbedded silt, sand and gravel. The loose alluvium grades to dense recessional sands and gravels with hard silt interbeds. These granular soils are interpreted to be post-glacial alluvium and glacial recessional outwash. Medium dense to dense sands and gravels, suitable for supporting foundation loads, are located beneath fill areas at depths ranging from 25 to 50 feet.

The engineering characteristics of the geologic units is shown in Table 6.

Table 6
Engineering Characteristics of Geologic Units

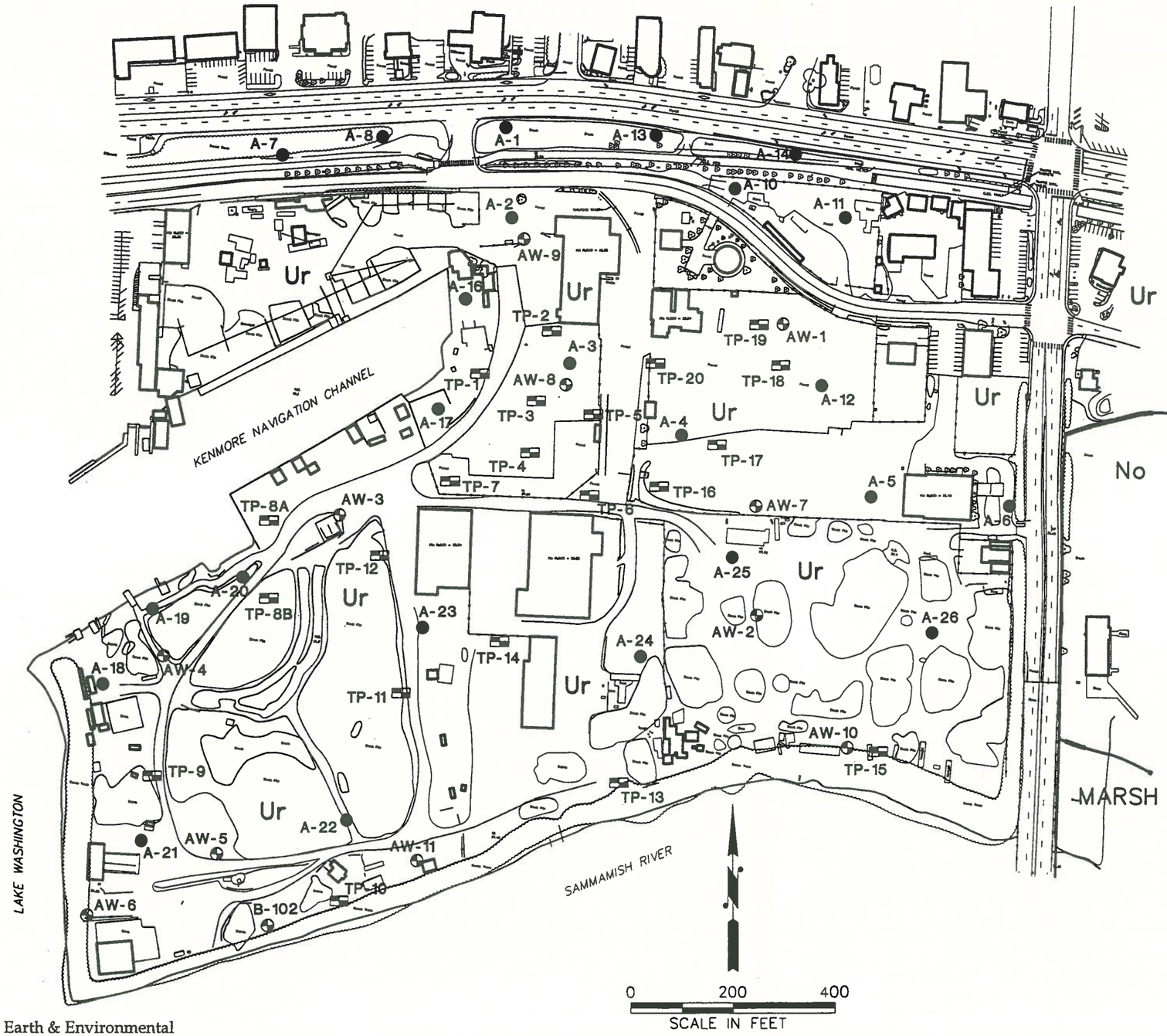
Engineering Characteristics	Wood Debris Fill	Peat and Organic Silt	Loose Alluvium Soils	Dense Sand and Gravels
Texture	Coarse, wood fragments < 8 inches in diameter with concrete slabs and logs.	Finer organic debris with increasing depth, fibrous to amorphous.	Coarsens with depth, silts & clays grading into interbedded fine sands & sandy fine gravels.	Medium sands to coarse gravels, a small amount of silty fine sands.
Relative Density	Loose, but with timber and concrete obstructions.	Very soft	Range from very soft silts to loose sands and gravels.	Medium dense to very dense, occasional hard silts.
Color	Brown to gray	Dark brown	Tan, gray, green-gray, blue-gray	Tan to gray
Moisture Content	Very high: proximity to water table & organic content.	100 to 400%[1]	Silts, clays: 25 to 50%; sands and gravels: 5-15%	Sands and gravels: 5-15%, silts: up to 25%.
Compressibility	Highly compressible	Highly compressible	Low to moderate	Low to very low
Organic Content	70% wood debris by volume	Peat: 90-100%, Organic Silt: 50-80%	Decreases with depth, occurs rarely in sands/gravels	None
Strength Characteristics	Moderate shear strength in current packed condition	Low-strength	Low-strength	High frictional shear strength

1. Moisture content of peat and organic silt based on a comparison of wet weight to dry weight.
Source: AGRA Earth & Environmental, 1996

Soil Classifications

The entire site consists of modified urban land (Ur). Norma (No) and Marsh soils are present to the east of the site, across 68th Ave NE. A map showing the distribution of Soil Conservation Service (SCS) surface soil types is shown in Figure 16. Whereas the geologic unit information presented above is based on subsurface explorations, the SCS soil types are more general and based on field surveys of surface or near-surface conditions. This discussion references the U.S. Department of Agriculture (USDA) Soil Conservation Service (SCS) Soil Survey of King County Area Washington, dated November 1973. Field work for the survey was performed in 1973.

Urban land (Ur) is described by the SCS as "soil that has been modified by disturbance of natural layers with additions of fill materials several feet thick to accommodate large industrial and housing installations. The erosion hazard is slight to moderate." This soil unit corresponds to the modified and developed terrain on site where placement of fill, re-grading and industrial development has occurred. The Urban land soil unit also corresponds to the fill soils that underlie the peninsula that forms the remainder of the site. The corresponding geologic classification for this soil category is artificial fill (af).



Source: AGRA Earth & Environmental

LEGEND

AW-11 — GROUNDWATER MONITORING WELL NUMBER AND LOCATION

A-26 — GEOTECHNICAL BORING NUMBER AND LOCATION

TP-20 — TEST PIT NUMBER AND LOCATION

SCS SOIL TYPES – CURRENT CONDITIONS

Ur – URBAN LAND

SOIL THAT HAS BEEN MODIFIED BY DISTURBANCE OF NATURAL LAYERS WITH ADDITIONS OF FILL MATERIALS SEVERAL FEET THICK TO ACCOMMODATE LARGE INDUSTRIAL AND HOUSING INSTALLATIONS. URBAN LAND DOES NOT CORRESPOND TO A GEOLOGIC UNIT, BUT IS CLASSIFIED AS ARTIFICIAL FILL (AF) OF MODIFIED LAND (ML) IN GEOLOGIC DISCUSSIONS AND ILLUSTRATIONS ACCOMPANYING THIS EIS.

No – NORMA SOILS

POORLY DRAINED SOIL THAT FORMED IN ALLUVIUM, UNDER SEDGES, GRASS, CONIFERS AND HARDWOODS. NORMA SOILS CONSIST OF BLACK, SANDY LOAM TO SILT LOAM. NORMA SOILS CORRESPOND TO QUATERNAY PEAT GEOLOGIC DEPOSITS (QP).

MARSH

AREAS DESIGNATED AS MARSH WERE NOT INCLUDED IN THE SCS SURVEY AND WERE INFERRED TO HAVE BEEN INUNDATED OR INACCESSIBLE. MARSH AREAS CORRESPOND TO QUATERNARY PEAT GEOLOGIC DEPOSITS (QP).

REFERENCE: U.S. DEPARTMENT OF AGRICULTURE (USDA) SOIL CONSERVATION SERVICE (SCS) SOIL SURVEY OF KING COUNTY AREA, WASHINGTON, DATED NOVEMBER 1973.

Huckell/Weinman Associates, Inc.	**Lakepointe Mixed-Use Master Plan**	**Figure 16** **Soil Types**

Soil Limitations

The on-site soils accessible for grading and shallow foundation support are mostly fill soils primarily consisting of wood debris, along with concrete and asphalt rubble. Other soils accessible for grading and shallow foundation support include silty sand and silty gravel. There is also a soil cap above much of the wood debris averaging two feet thick across the site. The wood debris materials are not suitable as structural fill or foundation support due to their marginal strength and compressibility characteristics, subsistence (settlement) potential, and high organic content. Peat and loose alluvium soils underlying the site are also not suitable for foundation support. Minor existing fill associated with road embankments and buildings at the north end of the site may be suitable for structural fill if free of organic material and debris.

Erosion Hazard

According to the King County Sensitive Areas Map Folio and Sensitive Areas Criteria (KCC 21A), there are no identified erosion hazard areas on the site (criteria for erosion hazards include steepness of slopes; soil texture; degree of vegetation cover; and presence of stream courses). Surface water drainage features and sloping grades on-site are not susceptible to significant erosion. Surface water runoff from impervious surfaces (including soil areas compressed by storage and other uses) currently sheet flows to catch basins where it is collected and conveyed, via underground pipe, to Lake Washington and the mouth of the Sammamish River.

The majority of the site consists of unpaved, non-vegetated soils. There is frequent equipment traffic on portions of the site and several stockpiles of construction materials exist. Surface materials include wood waste fill and other fine-grained materials, which contain a significant quantity of silt. Given the low slopes, sediment leaving the site would be of fine-grained texture such as silt and fine sand. Soil erosion estimates were calculated using the Universal Soil Loss Equation (USLE) described in the King County, Washington, Surface Water Design Manual (SWDM). The USLE indicates that the existing soil loss due to erosion from the site is approximately 34.4 tons per year. The majority of erosion is from soil areas used for roadways or storage use. The majority of this eroded soil is assumed by the model to enter Lake Washington or the Sammamish River via catchbasins and pipes. A small amount of erosion is assumed to occur on the near-shore slopes and a zone of non-vegetated shoreline between the higher summer and lower winter lake levels. Barge loading/unloading operations occur along an unprotected section of inner harbor shoreline adjacent to the Kenmore Pre-Mix plant. This loading/unloading activity produces wave action which results in some minor shoreline erosion along this section of inner harbor shoreline. Some spillage of construction materials (sand and/or rock) from the loading/unloading activity occurs, however, barge spillage is not considered erosion and was not considered in the USLE. There are no other surface activities disturbing the lake and river shoreline, and the currents and wave actions are generally weak. Considering the size of the site, the estimate of 34.4 tons of sediment per year (roughly equivalent to three dump truck loads per year) is considered low (AGRA Earth and Environmental, 1997).

Landslide Hazard

According to King County Sensitive Areas Map Folio, there are no identified landslide hazard areas within the project site. Criteria for Landslide Hazards include slopes of relatively impermeable soils steeper than fifteen percent; areas incised by a stream; areas that show risk of avalanche; and any area located in an area of active sediment accumulation. However, in localized areas along the Sammamish River shoreline, slopes which have sparse vegetation may meet the criteria for landslide hazard. Because these slopes are less than 10 feet in height, are underlain by wood debris that has moderate strength, and no evidence of past or potential landslides has been observed, landslide potential in these areas is not anticipated to be significant.

Seismic Hazard

The project site is identified in the King County Sensitive Areas Map Folio as a seismic hazard area. This designation is believed to be based on the loose alluvial soils beneath the site, in conjunction with a shallow groundwater table (AGRA Earth & Environmental, 1997).

Past large earthquakes in Washington most frequently occurred deep beneath the Puget Sound region. The most recent and best documented earthquakes in the Puget Sound area were the 1949 magnitude 7.1 Olympia earthquake and the 1965 magnitude 6.5 Seattle-Tacoma earthquake. Both of these earthquakes occurred within the subducting Juan de Fuca plate at depths of about 34 to 40 miles.

In the site vicinity, earthquake damage would occur due to shaking from earthquake waves and potential liquefaction-induced settlement. Damage from actual fault movement on the site would be highly unlikely.

Seismic Shaking

The U.S. Geological Survey (1975) proposed that the largest earthquake likely to occur in the Puget Sound region could have a magnitude as large as 7.5. It is believed that such an earthquake event could have a peak hard-ground acceleration of about 20 percent of gravity (0.2g) and about 20 to 30 seconds of severe ground shaking. Due to amplification effects within the loose/soft site soils beneath the project site, peak accelerations ranging up to 0.25g to 0.3g could conceivably occur at the ground surface during such an event. This is a conventional assumption regarding severity of acceleration based on USGS and City of Seattle information.

The risk of earthquake events at the site is similar to that of the Puget Sound region as a whole. An earthquake of magnitude 7.5 has an estimated 10 percent probability of exceedance in 50 years, or an estimated occurrence rate (return period) of one event per 475 years. A moderate earthquake of a magnitude of 6.5 could conceivably have a peak horizontal ground acceleration of up to 0.2g at the project site. This moderate earthquake has a higher probability, a 40 percent probability of exceedance in 50 years, or an estimated occurrence rate (return period) of one event per 100 years.

The effects of seismic shaking on structures can be minimized by structural design and construction specifications of current building codes.

Liquefaction Potential

Liquefaction potential is greatest where groundwater levels are shallow and where loose, fine sands occur at depths of 50 feet or less. Liquefaction potential decreases with increasing grain size, clay, and gravel contents, but increases with increasing ground acceleration and duration of shaking. On-site groundwater is at depths of 5 to 8 feet. Because layers of loose, sandy soils are present within the upper 50 feet of the site, liquefaction is an important design consideration for development.

The majority of on-site soils, including wood debris fill, peat and organic silt, and dense sand and gravel are not susceptible to liquefaction. Peat and organic silts deposits are distributed in a horizontal layer of relatively uniform thickness, with no significant unbalanced loading across the site. Therefore, if the underlying loose alluvium liquefies, the risk of seismically-induced lateral spreading within these upper organic layers, is low. Beneath the peats and organic silt, some of the explorations encountered loose alluvial sands with interbeds of silt and gravel. Structures above loose alluvial sands could be susceptible to liquefaction-induced settlement.

IMPACTS OF THE PROPOSED ACTION

Topography and Geology

Topographic Constraints

There are no topographic constraints that would affect the proposed development. The upland portion of the site, where building and road development would occur, is relatively flat with elevations ranging from 23 to 32 feet. Alteration of the site topography under the Proposed Action would be limited to demolition of existing buildings, excavation for building and garage areas (all building demolition and excavation would be required to be conducted in accordance with the negotiated remediation plan with DOE), and fill for a portion of the embankments for the Lakepointe Way intersections with NE Bothell Way and 68th Avenue NE. Utilizing piles to elevate the majority of proposed structures above the existing site elevations would minimize the amount of cut volumes. The amount of earth movement (displacement of soils for pile and utility placement) that would be required as part of the Model Toxics Control Act remediation plan being proposed by the applicant will be determined by DOE in cooperation with the landowner (refer to the TOXICS AND HAZARDOUS MATERIALS section of Chapter 3 of this document for details on the site cleanup process). The placement of fill over peat soils, which would be limited to proposed landscaped areas, would compress the underlying peat soils, resulting in new areas of settlement which could be apparent at the surface. Additional field explorations and geotechnical engineering would be performed during the final design stage to identify measures to minimize settlement impacts. Pilings would be used for structural and roadway foundations and no settlement impact related to structures or roadway placement would be anticipated. Excavated material would be removed from the site in accordance with MTCA (WAC 173-340) and the Dangerous Waste Regulations (WAC 173-303) for recycling or disposal at a permitted facility.

Steeper slopes in the shoreline area, generally less than 10 feet in height, would be protected, stabilized or enhanced. No building or roadway development is planned within or near the slopes along the Lake Washington and Sammamish River shoreline area. Proposed development within or in the vicinity of these slopes would be limited to public viewpoints and stormwater outfall locations. Grading in these areas would be limited and slopes would be planted with native vegetation to minimize any erosion

impacts. The site topography poses no significant constraint to implementing any of the shoreline enhancement or protection options.

Additional Geotechnical Requirements

The near-surface layers of highly compressible soft peat, silt, and wood waste would not be suitable for foundation support. Pile foundations would be needed to support most of the proposed development. Relatively incompressible dense sand and gravel soils suitable for bearing foundation loads are located at depths varying from 34 to 44 feet beneath the existing ground surface. The needed length of piles would thus be on the order of 44 to 64 feet. Roadways, sidewalks, and underground utilities would also require special subgrade preparation, such as geogrid reinforcement (a fabric-like material used to stabilize soil), to tolerate long-term settlements. All pile placement into contaminated site soils would be required to be consistent with the negotiated remediation plan with DOE. Please see Appendix A of Appendix A for further discussion of proposed foundation systems.

Additional field explorations, laboratory tests, and geotechnical engineering studies would be conducted during final design of all proposed utility facilities and in support of specific building permit applications for each phase of development. This additional work is necessary to formulate structure-specific geotechnical criteria for suitable foundation types and capacities, site preparation, and utility construction, and is typically completed at the grading and building permit stage, when more specific design information is available (it is assumed that the additional studies would not alter the conclusions reached in this SEIS; AGRA Earth & Environmental, 1997). Additional geotechnical study would be provided for specific design of retaining walls, bulkheads, and utility support; specific evaluation of potential settlement of fill soils; and other related specific design issues (please see Appendix A of Appendix A for further details). By utilizing pile foundation technology to access soils with adequate engineering strength, no significant impacts relating to foundation support or settlement are anticipated.

Potential Impacts From Pile Driving

Potential Erosion Impacts

The amount of erosion potential related to pile driving depends on the type of pile used. For example, the auger cast concrete pile technique (which entails grading at level area, drilling a hole, and injection of wet cement) requires a significant amount of earth movement which would increase the potential for erosion. Pre-cast concrete or steel displacement-type piles do not require grading or drilling, and erosion potential is not significantly increased. It is anticipated that the proposal would utilize pre-cast concrete or steel displacement-type piles.

Potential Vibration Impacts

Some level of ground surface vibration would be unavoidable during pile driving. Vibrations would be generated at the tip of the pile as it is set into the bearing geologic layer. Transmission of these vibrations would be primarily limited to areas underlain by peat soils; the potential for peat soil layer underlying the site also underlying off-site areas is limited by the Sammamish River to the south, the road bed material underlying 68th Avenue NE to the east, and the alluvium material to the north. Thus, significant levels of vibration are unlikely to be transmitted off-site.

However, to minimize the potential for any vibration impacts to off-site structures, it is proposed by the applicant that adjacent off-site structures to the proposed pile driving activities be monitored, with

detected vibration compared to acceptable ground surface accelerations for various types of structures (i.e. vibration poses less potential impact to pile-supported structures). For the adjacent structures, it is proposed by the applicant that documentation of existing conditions be established through photographs, surveys and measurement of existing cracks. Prior to the initiation of pile driving, a test pile program to identify the most efficient pile and hammer types, would implemented. The need for possible bracing or reinforcement of nearby structures could be determined pending resolution of the test pile program.

Soils and Hazardous Material Constraints

Prior to phased development of certain portions of the site under the Master Plan, phased remediation of the areas determined to be contaminated and warranting cleanup must occur per the MTCA process. The specifics of the site remediation plan are currently being determined by the DOE in cooperation with the landowner. Thus, prior to any construction in the areas of the site deemed to be contaminated, measures to clean up or contain any contaminated soils would be established and implemented (see the TOXIC AND HAZARDOUS MATERIALS section of this document for further details).

The principal hazard from development due to the presence of methane is the potential displacement of oxygen in confined spaces such as poorly ventilated basements or storage rooms, potentially affecting health conditions under these circumstances. Methane is also combustible, and mixtures of oxygen and methane could be explosive in the presence of an ignition source, such as an electrical switch or open flame. However, impacts from methane can be easily mitigated, and specific measures to prevent gas from escaping the ground into structures would be implemented. These measures could include installing a vapor barrier and crawl space ventilation beneath all enclosed structures; in addition, the HVAC system could be designed to include active ventilation of all ground floor rooms so that gas accumulation does not occur.

Erosion Hazard

Construction of the Proposed Action would result in the potential for erosion/sedimentation impacts to Lake Washington and the Sammamish River. Erosion/sedimentation would not be expected to impact off-site properties. The USLE soil erosion model, used to estimate the amount of erosion potential associated with both existing conditions and development of the site, assumes that construction areas in each development phase, including proposed construction within shoreline areas (such as viewing platforms and stormwater outfalls), would be bare ground throughout the phase, a worst-case scenario with no ground cover protection and no sediment traps. Using this assumption, the existing soil loss from erosion over the entire site is calculated at approximately 34.4 tons per year. With implementation of the proposed temporary erosion and sediment control plan (TESCP), it is assumed that no off-site discharge of sediment to the adjacent waters from the construction area would occur. As each phase of construction is completed (over a 7-year time period), the specific developed area is assumed to no longer experience soil erosion, primarily due to the presence of structures and impervious surfaces. Thus, the total amount of soil erosion would gradually decline as each development phase is completed, and would reduce to imperceptible amounts at the conclusion of the 7-year buildout of the project. Following completion of the first construction phase and during the second construction phase, annual soil erosion would be approximately 12.6 tons per year. Table 7 illustrates the gradual reduction in annual soil erosion as each construction phase is completed.

Table 7

Estimated USLE Sediment Generation During and After Construction, by Phase

Prior to Phase	Total Site Sediment Generation (tons/year)
1	34.4
2	12.6
3	12.0
4	7.6
5	5.4
6	3.6
7	1.2

Source: AGRA Earth & Environmental, 1996

The Temporary Erosion and Sedimentation Control Plan (TESCP) would be designed to meet or exceed the King County Erosion and Sedimentation Control standards described in the King County Surface Water Management Manual. The TESCP would include defining limited areas where clearing and grading would occur to minimize the area of ground disturbance activity at any one time; delineating the disturbed area with an erosion controlling silt fence; covering exposed ground areas with grass or straw; establishing sediment ponds to detain runoff from the disturbed area and settle-out sediments (pond size would be determined following detailed site soil analysis); and, providing grass-lined swales to convey stormwater overflow from sediment ponds to receiving waters (straw bale barriers and/or silt fences would be placed in the swales to filter any sediments leaving the sediment ponds).

Landslide and Seismic Hazard

There are no landslide hazard areas or significant steep slopes within the project site. Seismic risks due to loose/soft soils could result in liquefaction and strong ground motion during a major earthquake. This would require deep foundation support (use of piles) for all structures. (As a part of the review of specific building permit applications, additional geologic studies consistent with Section 1804.5 of the Uniform Building Code, which requires that the potential for liquefaction be evaluated for sites which lie within seismic risk zones, would be performed and additional measures to further minimize liquefaction potential would be identified.) Utilities and on-grade paving would require subgrade improvement and allowance for some long-term settlement. Proposed improvements in the strength and compressibility characteristics of site soils (the numerous piles would compress loose soils and improve soil strength and stability, reducing the potential for seismic risk), installation of bulkheads in the marina, and stabilization of shoreline areas through plantings would reduce the likelihood of shallow-seated slope movement near shoreline areas. (As a part of final design review of specific shoreline improvements, additional field evaluation would be performed to identify any additional measures to further reduce the likelihood of slope movement or lateral spreading near shoreline areas.)

ALTERNATIVES

Alternative 1: Conceptual Master Plan in the Northshore Community Plan

The area proposed for development under Alternative 1 would be similar to the Proposed Action; slopes near shorelines would generally remain in open space. Alternative 1 would require the use of pile foundations and other geotechnical-related site preparation techniques similar to the Proposed Action (the amount of excavation and fill required to construct Alternative 1 would be determined by DOE as part of the MTCA cleanup). However, compared to the Proposed Action which would only result in soil displacement from pile and utility placement, Alternative 1 would require excavation to construct underground parking. This underground parking would be required to meet parking requirements of the King County Code. The distribution of grading activities across the site under Alternative 1 would be similar to the Proposed Action, except excavation for elevated roadway supports would not occur since the road would be built at grade. Alternative 1 would require excavating significant quantities of contaminated soils to construct underground parking structures. In comparison, the Proposed Action, with the elevated roadway, would provide parking at or above the existing grade.

The potential erosion hazard impacts under Alternative 1 would be similar to the Proposed Action. There would be differences in the distribution of grading activities across the site, but the differences would not lead to significant differences in the pattern of potential erosion/sedimentation. With the increased amount of excavation, the total site sediment generation potential would be greater than under the Proposed Action. With implementation of a TESCP, erosion and sedimentation would be controlled and reduced in a manner similar to the Proposed Action.

The potential landslide and seismic hazard impacts under Alternative 1 would be similar to the Proposed Action.

Alternative 2: No Action Alternative

Under the No Action Alternative, no construction would occur on-site; however, hazardous material cleanup activities would occur, pursuant to MTCA. These activities would influence the site's topography through excavation, filling and/or remediation of material on the site. Existing rates of soil loss, estimated by the USLE as 34.4 tons per year, would continue presumably until remediation actions are conducted. Depending on the type of site cleanup, it is possible that site erosion could be reduced from existing levels.

MITIGATION MEASURES

Required by Code

- Additional field explorations, laboratory tests and geotechnical engineering studies recommended by the geotechnical consultant would be accomplished as part of specific design review for structures, utility systems and shoreline enhancements associated with the Proposed Action. This additional analysis is necessary to formulate structure-specific geotechnical criteria for suitable foundation types, site preparation, lateral and vertical pile capacities and utility construction, as well as for specific information on retaining walls, bulkheads, utility support, settlement of soils, pavement support for parking areas and other aspects. Subsequent

geotechnical engineering studies would provide detailed foundation design recommendations and appropriate pile test programs.

- A temporary erosion and sedimentation control plan (TESCP) would be developed for construction operations. Erosion control measures that would be called for in the plan include:

  Construction entrance – A rock-stabilized temporary entrance pad will be installed at all entrances to the site to minimize mobilization of sediment by construction vehicles. An appropriately drained washing pad for trucks leaving the site is also recommended.

  Filter Fabric Fences – Filter fabric fences will be installed in accordance with the King County Surface Water Drainage Manual (SWDM) in locations where sheet wash occurs and any additional areas identified in the TESCP.

  Drainage Control Measures and Sedimentation Ponds – Temporary sedimentation ponds will be installed. Grassed-lined swales with straw bale barriers and/or silt fences would be placed in the swales to filter any sediments leaving the sedimentation ponds.

  Plastic Sheeting – Plastic sheeting will be used as a temporary cover for stockpiles not in use, or if severe weather conditions are anticipated.

  Hydroseeding and Mulching – Soil areas greater than 5,000 square feet left unworked more than 48 hours during the wet season (October 1 through March 31) will be covered with heavy application of mulch, or plastic sheeting, in accordance with the King County SWDM.

Proposed by the Applicant

- Pile foundation support onto relatively incompressible dense sand and gravels underlying the site would be provided to adequately support the proposed facilities. Additional geotechnical engineering studies would provide detailed foundation design recommendations and appropriate pile test programs.

- Erosion potential associated with pile driving would be reduced through the use of pre-cast concrete or steel displacement-type piling to reduce the amount of required soil cutting.

- Utilities would be designed and installed in a manner to accommodate possible settlement of soils. Some overexcavation (on the order of 1 to 2 feet) and replacement of unsuitable fill soil beneath utilities would occur; the extent of overexcavation would depend largely on the type and size of the utility and its sensitivity to settlement. Flexible connections would be provided where the utilities connect to the project structures.

- Suitable fill soils would be provided under paved areas to provide a stable surface for pavement support, and reduce potential degradation due to settlement of soils. Geogrid reinforcement would be provided where appropriate beneath pavement and sidewalk sections to reduce potential impacts from differential settlement of soils.

- To address methane gas presence, additional engineering studies would determine whether methane mitigation measures are warranted. Measures could include a "plug" of low-

permeability backfill would be provided in utility trenches, and a low-permeability seal would be provided around driven piles. A vapor barrier and increased crawl space ventilation could be provided beneath the enclosed structures. The HVAC design could include active ventilation of all ground floor rooms so that gas accumulation does not occur.

- To minimize the potential for vibration impacts to off-site structures, it is proposed that adjacent off-site structures to the proposed pile driving activities be monitored, with detected vibration compared to acceptable ground surface accelerations for various structures (i.e. vibration poses less potential impact to pile-supported structures). For the adjacent structures, it is proposed that documentation of existing conditions be established through photographs, surveys and measurement of existing cracks. Prior to the initiation of pile driving, a test pile program to identify the most efficient pile and hammer types, would implemented. The need for possible bracing or reinforcement of nearby structures could be determined pending resolution of the test pile program

Potential

- Prior to building permits being issued by King County, the applicant shall provide documentation showing that measures to prevent contaminated materials from coming into contact with humans, surface water and groundwater have been identified, evaluated, and required as part of the MTCA cleanup plan.

UNAVOIDABLE SIGNIFICANT ADVERSE IMPACTS

The Proposed Action would significantly alter the site through grading and construction of roads, residential and commercial facilities. Some level of ground surface vibration would be unavoidable during pile driving. With successful implementation of the proposed mitigation measures, no significant unavoidable adverse impacts to on- or off-site areas are expected.

AIR QUALITY

AFFECTED ENVIRONMENT

The air quality conditions of the Northshore Planning Area were described and analyzed on pages 94 through 99 of the Northshore Community Plan Update Draft EIS. The analysis presented in the Northshore Community Plan Update Draft EIS was based on 1989 air quality data; this section supplements and updates the Air Quality analysis presented in that document and discusses the probable impacts associated with development of the Lakepointe project.

Climate

Climatic conditions in the Puget Sound Basin are characterized by moderate temperatures, wet winters, and frequent onshore flows of moist marine air. Average daytime high temperatures range from the 30s and 40s in winter to the 60s and 70s in summer. Annual precipitation, concentrated in the winter months, averages from 35 to 40 inches. Winds generally range south to southwest in the winter, and west to northwest in warmer periods. Climate affects air pollution with regard to wind conditions and temperatures; both of these factors influence ambient concentrations of pollutants. Due to low solar heating of the land in winter, temperature inversions may occur, accompanied by stagnant atmospheric conditions. In most cases, these pollutant-trapping inversions have an upper "lid" at altitudes between 1,000 and 6,000 feet, and break up by early afternoon.

Existing Air Quality

Six air quality pollutants have been identified by the U.S. Environmental Protection Agency (EPA) as criteria pollutants -- pollutants with the potential for endangering public health and welfare. The six criteria pollutants include carbon monoxide, ozone, particulates, nitrogen dioxide, sulfur dioxide and lead. Table 8 identifies the National Ambient Air Quality Standards for each criteria pollutant, together with the State and regional standards that also must be met.

There are four major sources of most criteria pollutant emissions in Washington State: motor vehicles, industrial emissions, residential woodstoves/fireplaces and outdoor burning (Washington State Department of Ecology, 1991). Emissions from motor vehicles are Washington's largest source of air pollution -- comprising more than 50 percent of the statewide air emission total (Washington State Department of Ecology, 1993). Criteria pollutants generated by motor vehicles include carbon monoxide, nitrogen oxides, hydrocarbons and particulates.

Three governmental agencies have jurisdiction in the project area for compliance with air quality standards: EPA, Washington State Department of Ecology (DOE), and the Puget Sound Air Pollution Control Agency (PSAPCA). DOE and PSAPCA maintain a network of instrumented air quality monitoring stations throughout the Puget Sound area. These monitoring stations are located in areas that are projected to have higher concentrations for the pollutant being monitored. The nearest monitoring station to the Lakepointe site is located at the Lake Forest Park City Hall, approximately 1.5 miles west of the site. Particulate matter is monitored at this station. The nearest carbon monoxide monitoring station to the Lakepointe site is located at 310 NE Northgate Way, approximately 5 miles south of the site.

Kenmore is located within DOE's four-county Puget Sound Intrastate Air Quality Region. Portions of this region are currently "in attainment" (pollutant emissions are below the standards) for sulfur dioxide, lead,

nitrogen dioxide, carbon monoxide and ozone. Attainment status for carbon monoxide and ozone was granted in October 1996 (PSAPCA, 1996). This was not anticipated by the air quality analysis in the Northshore Community Plan EIS. Portions of the region are "out of attainment" for particulate matter. However, PSAPCA is preparing a particulate matter maintenance plan to present to DOE and EPA that might lead to granting of attainment status in 1997 (PSAPCA, 1996). The project site is located several miles north of the non-attainment area for particulates (primarily the industrial area south of downtown Seattle). The following is a brief discussion of the two most significant pollutants—carbon monoxide and particulates.

Table 8
Ambient Air Quality Standards

Pollutant	National Standards Primary	National Standards Secondary	Washington State Standards	Puget Sound Standards
Carbon Monoxide				
8 Hour Avg.	9 ppm	9 ppm	9 ppm	9 ppm
1 Hour Avg.	35 ppm	35 ppm	35 ppm	35 ppm
Particulate Matter (PM_{10})				
Annual Arith. Mean	50 ug/m^3	50 ug/m^3	50 ug/m^3	50 ug/m^3
24 Hour Avg. [a]	150 ug/m^3	150 ug/m^3	150 ug/m^3	150 ug/m^3
Total Suspended Particulates				
Annual Geo. Mean	No Std.	No Std.	50 ug/m^3	50 ug/m^3
24 Hour Avg.	No Std.	No Std.	150 ug/m^3	150 ug/m^3
Ozone				
1 Hour Avg. [b]	0.12 ppm	0.12 ppm	0.12 ppm	0.12 ppm
Sulfur Dioxide				
Annual Avg.	0.03 ppm	No Std.	0.02 ppm	0.02 ppm
24-Hour Avg.	0.14 ppm	No Std.	0.10 ppm	0.10 ppm [c]
3 Hour Avg.	No Std.	0.50 ppm	No Std.	No Std.
1 Hour Avg. [d]		0.25 ppm	0.25 ppm	
1 Hour Avg.		0.40 ppm	0.40 ppm [c]	
5 Minute Avg. [e]			1.00 ppm	
Lead				
Calendar Qtr. Avg.	1.5 ug/m^3	1.5 ug/m^3		1.5 ug/m^3
Nitrogen Dioxide				
Annual Avg.	0.053 ppm	0.053 ppm	0.053 ppm	0.053 ppm

Notes
1. ppm = parts per million
2. ug/m^3 = micrograms per cubic meter
3. annual, quarter and 30-day standards never to be exceeded, shorter term standards not to be exceeded more than once per year unless noted.

Source: PSAPCA, 1995

[a] Standard attained when expected number of days per year with a 24 hour concentration above 150 ug/m^3 is equal to one or less.
[b] Standard attained when expected number of days per year with an hourly average above 0.12 ppm is equal to one or less.
[c] Sulfur Dioxide short-term standard never to be exceeded.
[d] Not to be exceeded more than twice in seven days.
[e] Not to be exceeded more than once in eight hours.

Carbon Monoxide (CO)

Carbon monoxide is a colorless, odorless, tasteless gas associated with incomplete combustion, generated by motor vehicle traffic and wood-burning stoves and fireplaces. Locally higher concentrations of CO can occur immediately adjacent to major arterials and highways, some industrial sources, or in areas of concentrated wood burning. The gradual replacement of older vehicles with newer vehicles that meet more stringent tailpipe emission standards means that future automobile CO emission rates will be lower than present emission rates.

As noted on page 96 of the Northshore Community Plan Draft EIS, "The greatest source of CO is emissions from motor vehicles; the highest levels occur around areas of heavy or congested vehicle traffic. Consequently, CO pollution is relatively localized in the extent of its effects on the Northshore area." The project site is located near the heavily-traveled SR 522 and 68th Ave NE roadways. Typical daily traffic and peak hour traffic congestion contributes to emissions of carbon monoxide. The highest carbon monoxide concentrations likely occur adjacent to SR 522 and 68th Ave NE. Monitoring data are not available for this location. The nearest carbon monoxide monitoring station to the Lakepointe site is located at 310 NE Northgate Way, approximately 5 miles south of the site. However, based on comparison to other high-traffic locations monitored by PSAPCA (such as NE 45th St at University Way NE and Northgate Way at 3rd Ave NE in Seattle), the expected range of highest CO concentrations in the site vicinity is 5 to 7 ppm for an 8-hour average, below the 9 ppm standard. On-site vehicle traffic associated with the sand/gravel operation, a truck school, vehicle parking and other commercial uses, also contributes to localized carbon monoxide emissions.

Particulate Matter

Particulate matter consists of fine particles of smoke, dust, pollen or other materials that remain suspended in the atmosphere for a substantial period of time. Particulates are emitted from industrial operations, auto and bus traffic, residential wood burning, construction sites and other sources. PM_{10} consists of small particulate matter equal or less than 10 micrometers in diameter. Because of their size, these particulates are respirable and are associated with a variety of respiratory effects. Smaller particulates, such as $PM_{2.5}$, are even more likely to cause health effects. New standards for $PM_{2.5}$ are being developed. Particulate emissions are generally higher during the winter, when more fuel is burned and meteorological conditions favor the concentration of emissions. Wood smoke particulates are the primary interest at the Lake Forest Park monitoring station because the valley topography in Lake Forest Park slows the dispersion of wood smoke particulates (creating inversion-type conditions, particularly during winter weather). This concern was noted in the Northshore Community Plan Update Draft EIS (page 94). The project site does not experience this slower dispersion phenomenon because of its level topography and location near the lake (Knowle, PSAPCA, personal communication, 1996). The sand and gravel operation and other commercial/industrial activities on the site generate some level of airborne particulate matter.

Since 1987, all of PSAPCA's monitoring stations (including the Lake Forest Park station) have been in compliance with the annual standard and, for the past three years, all stations have recorded daily concentrations below the daily standard.

IMPACTS OF THE PROPOSED ACTION

The Northshore Community Plan EIS noted that particulates and carbon monoxide emissions would likely increase in the Kenmore area due to increased traffic and residential uses. The primary concern in the

Community Plan EIS regarding particulates was that woodstove and fireplace emissions would increase concentrations in topographically depressed areas such as valleys and ravines. Even with this concern, the EIS concluded that violations of particulate standards would be unlikely (Northshore Community Plan Draft EIS, page 97). Since 1989, exceedances of particulate standards have been reduced dramatically (PSAPCA, 1996), possibly due to tightening of woodstove emission standards. The Northshore Community Plan Draft EIS noted that with significant increases in traffic, CO levels would also increase, particularly at congested intersections.

Construction

Construction of the Proposed Action would result in localized increases in particulates and carbon monoxide during the seven- to ten-year construction period. Key construction activities contributing to these impacts include: grading and site preparation, and operation of heavy trucks, graders and smaller equipment such as generators and compressors. Fugitive dust could be generated by site earthwork, tracking of soils onto nearby streets, and wind erosion of dry exposed soils. The area most affected by these impacts would be the roadways in the immediate site vicinity. However, fugitive dust impacts would be limited in magnitude since contractors would be required to comply with PSAPCA's Regulation 1, section 9.15 and take reasonable precautions to avoid dust emissions.

Operational

The Proposed Action would generate additional carbon monoxide, particulates and other automobile-related air pollutants by increasing traffic volumes on the site and in the vicinity (see the TRANSPORTATION section for details). Typical traffic-related pollutant concentrations along the major traffic routes of SR 522 and 68th Ave NE would increase slightly over future background conditions. Pollutant contributions from existing commercial uses on the site would be eliminated and emission rates of individual vehicles will be lower as older vehicles are replaced by newer ones.

Woodburning stoves are not proposed to be provided in on-site residential uses, and thus would not contribute to carbon monoxide and particulate emissions. Proposed commercial uses on the site, including the marina, are not expected to generate significant pollutant emissions.

ALTERNATIVES

Alternative 1: Conceptual Master Plan in the Northshore Community Plan

During construction, air quality impacts would be similar to the Proposed Action. The construction of less building square footage on the site under Alternative 1 would likely result in less total emissions of dust and construction vehicle exhaust. Other impacts would be similar to the Proposed Action.

Alternative 2: No Action Alternative

Under the No Action Alternative, existing site uses would continue, and existing levels of dust generation and other air pollutant emissions would continue. Uses related to sand/gravel processing, construction, and vehicle operation/storage would continue to generate particulates, carbon monoxide, and other pollutants.

MITIGATION MEASURES

Required by Code

- Contractors would be required to adhere to PSAPCA's Regulation 1 on Fugitive Dust Emissions, including measures such as wetting down exposed soils, covering or wetting transported earth materials, washing of truck tires and undercarriages, and prompt cleanup of spills or tracked soils on public roads.

- Construction of the SR 522/Lakepointe Way NE intersection will require an air quality analysis to determine conformity of the Proposed Action with National Ambient Air Quality Standards.

Proposed by Applicant

- Measures to reduce traffic generation (i.e., implementation of a Transit Management Plan to identify transit options, establishment of a transit stop on SR 522, and connection to the regional trail system) would reduce CO emissions.

UNAVOIDABLE SIGNIFICANT ADVERSE IMPACTS

Construction of the Proposed Action would result in localized increases in particulates and carbon monoxide during the seven- to ten-year construction period and would contribute to long-term increases in carbon monoxide concentrations in the vicinity of the site.

WATER

This section summarizes the analyses and findings of several technical reports prepared by members of the Lakepointe water resources evaluation team. The team consists of Beak Consultants, KPFF Consulting Engineers and AGRA Earth and Environmental. The full technical reports are included in Appendices B, F and A, respectively.

AFFECTED ENVIRONMENT

Surface Water Quantity

Rivers and Lakes

Sammamish River

The Sammamish River is approximately 15.3 miles long. The river, which has been channelized by the Army Corps of Engineers for its entire length, generally flows north and west from Lake Sammamish to Lake Washington. The Lakepointe site lies adjacent to the north bank of the Sammamish River at its confluence with Lake Washington.

Lake Washington

Lake Washington, which borders the west side of the site, is the largest lake in King County, with a drainage area of 472 square miles and an area of 21,500 acres. The lake has a volume of 2.35 million acre-feet, a mean depth of 108 feet, and a maximum depth of 214 feet. The main inflows to the lake are the Cedar River in the south end (57 %) and the Sammamish River in the north end (27 %). The Lake Washington watershed is considered urban, with approximately 63 percent of its area developed (Metro 1989).

Inner Harbor

The inner harbor extends from Lake Washington into the northeastern portion of the site. The inner harbor, which is approximately 150 feet wide and 500 feet long, currently is utilized by barges and deep draft tugs in support of industrial activity on the site. The US Army Corps of Engineers periodically dredges the inner harbor to support commercial navigation and industrial operations. The middle of the inner harbor is dredged approximately every ten years by the U.S. Army Corps of Engineers to allow access for barges. (US Army Corps of Engineers dredging of the mouth of the inner harbor is scheduled for late 1997). (Future dredging of the inner harbor by the US Army Corps of Engineers is dependent upon the continuation of commercial/industrial activities adjacent to the inner harbor.) As a result of the dredging, water depth drops sharply from the shoreline towards the center of the harbor. Water depth at the edge of existing bulkheads ranges from 15 to 17 feet at ordinary high water.

Site Drainage Characteristics

The Lakepointe site is located within the Lake Washington Drainage Basin (North Section). All runoff generated on the site eventually flows to Lake Washington, although some surface water does reach the Sammamish River at it's confluence with Lake Washington. Surface water drainage from an approximately 24-acre upland area north of NE Bothell Way drains to the site. The majority of this surface water is conveyed under the site, via an underground pipe, to Lake Washington. A portion of the surface water from this off-site area infiltrates to groundwater and migrates to the groundwater table under the site. Refer to Appendix F, Technical Information Report, for maps indicating the various drainage basins in the site vicinity.

The site currently contains approximately 14 acres in impervious surfaces, including 10 acres of parking area, 3 acres of building area and 1 acre of roadway. Existing stormwater flows are calculated to be 16 cubic feet per second (cfs) for the 25-year storm and 22 cfs for the 100-year storm. Surface water from on-site impervious areas currently sheet flows to catch basins where it is collected, conveyed by a pipe, and then discharged at the northeast end of the inner harbor. Precipitation that falls on pervious surfaces on the site infiltrates directly to the groundwater table under the site. The shoreline along the river and lake is currently protected from significant erosion by vegetation and there is no evidence of any areas of significant erosion along the river or lakeshore; however, some minor erosion along the shoreline may occur.

The 1987 King County Sensitive Areas Map Folio designates the majority of the site as 100-year flood plain. The boundary of the 100-year floodplain as shown in the Folio corresponds to the approximate 1960 shoreline of the site, prior to placement of fills that raised the property above the lake level. The Federal Emergency Management Agency (FEMA) has prepared flood profiles and a flood map of the Sammamish River. According to the FEMA information, no flood hazards are profiled above the lake level west of 68th Avenue NE. A comparison of existing site elevations to the flood hazards profiled by FEMA indicates no flood hazards along the river shoreline of the site, and the level of Lake Washington is under control by the U.S Army Corps of Engineers. See Figure 14 in the EARTH section of this document for a graphic illustrating the floodplains.

The FEMA flood hazard area closest to the site is mapped adjacent to the east embankment of 68th Avenue NE This mapped adjacent land has not been filled and is situated at Elevation 17 feet, four feet below the lowest upland portion of the site.

Surface Water Quality

Aquatic resources adjacent to the site include Lake Washington and the Sammamish River. Recorded water quality conditions for the lake and river in the site vicinity are provided below, followed by a discussion of relevant water quality standards for the lake and river. A brief description of general water quality characteristics on the site is also provided.

Lake Washington

The Department of Ecology (DOE) has designated Lake Washington as a "Lake Class" water. Waters of this quality exceed the requirements for all or substantially all uses, including domestic, industrial or agricultural water supply, stock watering, fish rearing, spawning and harvesting, wildlife habitat, recreation, and aesthetic enjoyment.

The Water Resources Section of the Water Pollution Control Division of King County (formally Metro) has established several Lake Washington water quality stations, including one near Kenmore at the north end of the lake near the Sammamish River mouth (Station No. 0804). Initially samples were collected weekly but newer data are collected at least monthly. Data on record include water temperature, turbidity, conductivity, dissolved oxygen, pH and nutrients. Refer to Appendix B for additional detail on Lake Washington water quality.

Trophic water quality data (lake nutrient and productivity condition data) for Lake Washington are available from 1982 to 1996. Historic data from 1981 to 1989 were compared to recent (1990 through 1995) complete water year data (Figure 2.1-1 and Table 2.1-1 of Appendix B). Since 1990, chlorophyll has varied from the historic mean, being lower from 1990 through 1993 and higher from 1994 through 1995. Transparency and phosphorus are slightly above the historic means. Fecal coliforms were above the recent historical average in 1991 and 1992, although the state Lake Class standard for fecal coliform was met during all monitoring. Although Lake Washington appears slightly more productive (i.e. increased input of organic nutrients) in 1996 relative to 1988, transparency was not affected and no significant change in trophic status has occurred.

Sammamish River

The Sammamish River is designated as a Class AA water (extraordinary) along its length from the Marymoor Park Bridge to Kenmore by DOE (State Surface Water Quality standards - WAC Chapter 173-201A-130). The definition of Class AA waters is similar to that of "Lake Class" and includes waters of quality which do not violate the requirements for all or significantly all uses. Sammamish River water quality sampling by King County near the Kenmore Bridge (conducted since 1963) indicated waters with high fecal coliform counts and high nutrient concentrations.

Based on sampling results, King County (1994) determined that Sammamish River water quality in the vicinity of the site is fair. Water quality is being compromised by fecal coliform bacteria, dissolved oxygen and temperature, which frequently violated Class AA standards during monitoring from 1990 to 1993. The majority of the water quality violations occurred during warmer summer months.

The Sammamish River has been identified as "Water Quality Limited" for fecal coliform along 47 percent of its length, including the portion of the river adjacent to the site (Ecology 1994). See the discussion on Surface Water Quality Standards below for more detail.

Surface Water Quality Standards

As indicated, the DOE has designated the Sammamish River and Lake Washington as Class AA (extraordinary) or Lake Class waters. Waters of this quality exceed the requirements for all or substantially all uses (meaning water quality is generally good for such uses), including domestic, industrial or agricultural water supply, stock watering, fish rearing, spawning and harvesting, wildlife habitat, recreation, and aesthetic enjoyment. The characteristics of Class AA and Lake Class waters are presented in Table 9. A discussion on applicable surface water quality standards for the lake and river is provided below.

Site surface water resources include two wetlands. State surface water quality standards are not directly applicable to conditions naturally occurring in wetlands, bogs or fens. At this time, quality criteria for these types of waters have not been established. Wetland waters are often stagnant, which may contribute to one or more of the following conditions: 1) low pH values; 2) low dissolved oxygen concentrations; and 3) warm water temperatures. These types of conditions may violate the standards established for surface water quality, but can be characteristic of high quality wetland waters.

Water Quality Limited List

Section 303(d) of the 1972 Federal Clean Water Act (CWA) requires states to identify and list threatened and impaired waterbodies. The purpose of the listing is to identify segments where, with technology-based pollution control measures, applicable standard(s) are not expected to be met and to indicate the non-compliant water quality parameter(s).

The 1994 303(d) list recorded Sammamish River fecal coliform levels above state standards in four sections of the river, including the reach adjacent to the site (RM 00. To RM 0.6).

Table 9
Class AA Water Quality Criteria

Parameter	
Fecal coliforms	Shall not exceed a geometric mean of 50 organisms per 100 mL, with not more than 10 percent of all samples exceeding 100 organisms per 100 mL.
Dissolved oxygen	Shall exceed 9.5 mg/L (total dissolved gas shall not exceed 110 percent).
Temperature	Shall not exceed 16.0 C due to human activities. When natural conditions exceed 16.0 C, no temperature increases will be allowed which will raise the receiving water temperature by more than 0.3 C.
pH	Shall be in the range of 6.5/8.5, with human-caused variation less than 0.2 units.
Turbidity	Shall not exceed 5 NTU over background when background is less than 50 NTU or less, or have more than a 10 percent increase when background is greater than 50 NTU.
Toxic, radioactive	Shall be below those levels adversely affecting water uses, cause acute deleterious material or chronic effects on aquatic biota, or adversely affect human health.
Aesthetic values	Shall not be impaired by the presence of materials or their effects.

Criteria for freshwater Lake Class are identical to Class AA standards with the exception that:

Parameter	
Dissolved Oxygen	No measurable decrease from natural conditions. Total dissolved gas shall not exceed 110 percent of saturation at any point of sample collection.
Temperature	No measurable change from natural conditions.
pH	No measurable change from natural conditions.

Lake Washington was not identified as a threatened and impaired water in the "Water Quality Limited List".

Impaired Uses and Causes

Section 305 (b) of the 1972 CWA requires all states to prepare biennial reports assessing the water quality defined waterbodies within the state. The 1994 report prepared by DOE addresses supported and impaired uses, and sources and causes of documented impairments of specific waterbodies. The Washington State Water Quality Assessment 305(b) Report listed the causes of Sammamish River water quality impairment as ammonia, pH, dissolved oxygen / organic enrichment, thermal modifications, and fecal coliform. The impaired uses were primary and secondary contact, rearing, harvesting, and salmonid spawning and other fish spawning.

Observed Water Quality Conditions on the Site

During site visits in 1996, on-site waters consisted of puddles during wet weather and a pond containing concrete wash-off. Puddles in areas of vehicle traffic were heavily silted and churned with mud during wet weather. Puddles in the areas of roofing debris piles were oily in appearance by sheen and color.

Groundwater Quantity

A seasonal low water table develops beneath the filled portion of the site in late winter, contrary to local precipitation patterns, due to the influence of the Army Corps of Engineer's maintenance of a lower level in Lake Washington during winter months. The lake surface is maintained at Elevation 21.9 feet (relative to Mean Lower Low Water) during the summer months to accommodate fisheries and recreational needs, and is lowered to Elevation 20.0 (MLLW) during the winter season to maximize runoff capacity and reduce shoreline wave damage from winter storms. A seasonal high water table develops beneath the filled portion of the site between spring and autumn. Upgradient groundwater levels fluctuate seasonally, consistent with seasonal precipitation patterns.

Groundwater levels were measured seasonally between October 1995 and August 1996 in nine monitoring wells on-site (refer to Appendix A for a mapping of monitoring wells). Static water levels in the wells were observed to vary less than 2 feet seasonally during the stated time interval, except for a well located in the southwest corner of the site, where levels varied by almost 3 feet. Groundwater levels beneath the southern, filled portion of the site closely correspond to adjacent surface water levels of Lake Washington. Because the groundwater levels under the site are determined by the lake level, the most recent grading activity on the site have had no effect on the groundwater levels under the site.

Groundwater under the site generally flows south to southwest beneath the north end of the site at a gradient of up to 2 percent, and is relatively flat beneath the south end of the site, where the former lake bed was filled.

Infiltration

Groundwater at the site is recharged by precipitation both on site and off site. Off-site precipitation infiltrates the area's recessional sand and gravel soils (refer to the EARTH section of this document for detail on characteristics of soils in the site vicinity), and migrates onto the north end of the site. Because of the granular and relatively pervious nature of site soils, groundwater that migrates onto the north end of the site (from infiltrated precipitation off-site) almost immediately enters the static groundwater table that corresponds to the adjacent lake level.

Precipitation that falls on paved surfaces on site flows overland to storm collection basins that discharge, via pipes, directly to the inner harbor. The precipitation that falls on pervious surfaces on-site infiltrates directly through the fill to the groundwater table. The groundwater table beneath the site is hydrologically connected to Lake Washington. The overall importance of groundwater recharge from the site to Lake Washington and the Sammamish River is negligible in comparison to other sources of lake and river recharge, due to the size of the overall lake and river basin and the US Army Corps of Engineers control of the lake level.

Groundwater Quality

As part of the Model Toxic Control Act (MTCA) remediaton process, sampling of the groundwater was performed (AGRA Earth and Environmental, 1996) to identify the primary contaminants in the groundwater and to identify on-site sources (historic) of the contamination. The specifics of the site remediation plan are currently being determined by the DOE in cooperation with the landowner. Refer to Appendix A and the TOXIC AND HAZARDOUS MATERIALS section of this document for detail.

Currently, the principal source of groundwater contamination at the site appears to be wood debris fill which extends below the groundwater table. Total petroleum hydrocarbon concentrations in the groundwater are attributed to the presence of creosote-treated timber pile butts in the debris, as well as to the organic wood leachate of the fill and peat soils. Lead concentrations in the groundwater are attributed to lead paint coatings on wood debris. The source of arsenic concentrations in the groundwater is not known, but may be due to the presence of treated piling in the wood debris; copper arsenate is used as a wood preservative.

IMPACTS OF THE PROPOSED ACTION

Surface Water Quantity

Development of the Proposed Action would increase the area of impervious surfaces (i.e., decrease the area available for stormwater infiltration). At full buildout of the first six phases of the Master Plan, approximately 27 acres (approximately 60 percent of the 45 acres included in the first six phases of the Master Plan) would be covered in impervious surfaces, compared to less than 32 percent in the existing condition. The proposed 27 acres of impervious surfaces would include approximately 14 acres of roads, walkways and parking areas, and 13 acres of building area.

All runoff generated by the proposed impervious surfaces would be collected and treated (through oil/water separators, two-celled ponds, or sand filtration/biofiltration swales) by a storm drainage system.

The locations for stormwater discharge would include three outfalls along the Sammamish River shoreline and one outfall at the eastern end of the inner harbor (the treated discharge of stormwater to the inner harbor would be improved as compared to discharge under existing conditions which is currently untreated and turbid discharge). A primary purpose of discharging to the inner harbor would be to provide added flushing of stagnant water in the harbor.

Because the site is located adjacent to Lake Washington and the Sammamish River and stormwater runoff would not impact downstream properties, no detention facilities are required and none are proposed.

Upon full development of the first six phases of the Master Plan, it is estimated that flows of approximately 26 cubic feet per second (cfs) for the 25-year storm and 35 cfs for the 100-year storm would be generated, compared to 16 cfs and 22 cfs under existing conditions, respectively. Because no detention facilities would be provided, the duration of stormwater flow would not be significantly greater than under existing conditions. All stormwater outfalls would be protected from erosion through a combination of armoring and hydraulic energy dissipating devices. There would be no release of stormwater onto unprotected soil banks.

Surface Water Quality

During Construction

Erosion and Sedimentation

Construction of the proposal would be phased over an approximately seven year period. Grading activities, which would increase the potential for erosion, would occur in limited time periods during phased construction periods.

Soil erosion estimates were calculated using the Universal Soil Loss Equation (USLE) described in the King County Surface Water Design Manual (refer to the EARTH section of this document for additional detail). Construction activities on the site would not generally increase the amount of erosion and sedimentation from existing conditions, assuming proper implementation of proposed erosion control measures (refer to the EARTH section of this document for further information on current erosion/sedimentation conditions). With the proposed temporary erosion control measures (including temporary sedimentation ponds), it is assumed that erosion and sedimentation within the area undergoing construction would be contained on the site with no sediment discharge to adjacent waters anticipated; thus, during construction, the only site areas that would contribute to sediment yields would be those portions of the site not undergoing construction. The absence of steep slopes and lack of definitive drainage channels also reduce sediment transport risk.

Because completion of each development phase under the Master Plan would eliminate the existing conditions that contribute to the potential for erosion in that respective area (graded areas with no vegetation under existing conditions would be changed to buildings, roadways and landscaping), the on-site erosion potential would be proportionately reduced as each development phase is completed. Upon full build-out of the Master Plan, calculated on-site sediment would be zero tons per year compared to

34.6 tons per year in the existing condition. Refer to Table 10 for the estimated sediment yields in the existing and post-development condition.

The amount of erosion potential related to pile driving depends on the type of pile used. For example, the auger cast concrete pile technique (which entails grading at level area, drilling a hole, and injection of wet cement) requires a significant amount of earth movement which would increase the potential for erosion. Pre-cast concrete or steel displacement-type piles do not require grading or drilling, and erosion potential is not significantly increased. It is anticipated that the proposal would utilize pre-cast concrete or steel displacement-type piles and the potential for erosion from pile driving would not be significantly increased.

With the proposed temporary erosion control measures during construction and the elimination of existing erosion conditions in the areas of completed development, sedimentation yields to adjacent waters would be reduced from existing conditions and no significant impacts would be anticipated. The placement of all temporary ponds would be required to be consistent with applicable provisions of the site remediation plan currently being determined by the DOE in cooperation with the landowner.

Phosphorus and Nitrogen

Phosphorus and nitrogen are natural components of soils, and are known to increase in stormwater runoff as a function of sediment erosion. In general, nitrate-nitrogen losses from cleared areas have been low when measured (Lynch and Corbett 1990). With the low slope, low potential for sediment delivery relative to the existing condition (no sediment transport anticipated in the areas undergoing construction), and proposed temporary erosion control features, the proposal would have a low risk of phosphorus or nitrogen release.

Petroleum Hydrocarbons

Release of petroleum hydrocarbons from heavy construction equipment would be prevented by mitigation measures such as catchment control of parking/staging areas for the equipment, strict prohibition of oil/fuel dumping by contractors, and contractual specification of accidental spill response procedures and notification requirements. In the construction of the proposal, no construction waste or soils affected by accidental spills would be left on-site. No significant water quality impacts from construction related petroleum hydrocarbons is anticipated.

Temperature

Due to the small volume of controlled surface water discharge compared to the volume of Lake Washington, the Sammamish River mouth, and the inner harbor, the relatively cool weather during the wet season, and the fact that the under existing conditions the site soils are exposed, temperature impacts to Lake Washington, the lower Sammamish River and the inner harbor during construction are not expected to be significant.

Table 10

Estimated Sediment Yields Reaching Surface Waters

I. Existing Site Conditions	
Phase	Existing Sediment Yield Per Phase Area of the Site
Phase 1:	21.8 (tons/year)
Phase 2:	0.6 (tons/year)
Phase 3:	4.4 (tons/year)
Phase 4:	2.4 (tons/year)
Phase 5:	1.8 (tons/year)
Phase 6:	2.4 (tons/year)
Phase 7:	1.2 (tons/year)
TOTAL	**34.6 (tons/year)**

II. Construction		
Phase	Construction Sediment Yield Per Phase*	The Amount of Sediment Generated from the Remainder of the Site
Phase 1:	0.0 (tons/year)	12.8 (tons/year)
Phase 2:	0.0 (tons/year)	12.2 (tons/year)
Phase 3:	0.0 (tons/year)	7.8 (tons/year)
Phase 4:	0.0 (tons/year)	5.4 (tons/year)
Phase 5:	0.0 (tons/year)	3.6 (tons/year)
Phase 6:	0.0 (tons/year)	1.2 (tons/year)
Phase 7:	0.0 (tons/year)	0.0 (tons/year)

* With implementation of proposed temporary erosion control measures, no sediment discharge to adjacent waters anticipated during construction of each phase.

Source: AGRA Earth and Environmental.

Turbidity

It is anticipated that routine dredging of the inner harbor performed by the U.S. Army Corps of Engineers would be sufficient to allow marina construction and no further dredging for marina construction would be required. However, short-term turbidity is expected to increase as a result of activity (bulkhead construction and pile driving) during marina construction; this may also re-suspend polycyclic aromatic hydrocarbons (PAHs) which are likely to occur in bottom sediments of the inner channel due to its historic use. Turbidity during bulkhead construction or pile driving would be temporary and similar to sediment re-suspension now occurring from tug boat prop wash in the inner harbor. Therefore, no change to overall water quality and fish habitat value is anticipated from marina construction as compared to existing conditions (refer to the TOXIC section for additional detail).

Post-Construction (Mixed-Use Master Plan Development)

Development under the Proposed Action would increase the area of impervious surface, decrease the area available for stormwater absorption, and introduce uses which could, without proper water quality treatment, increase pollutant loading to the natural surface water system. To estimate the amount of pollutants in post-development stormwater and to evaluate the potential impact to adjacent waters (Lake Washington, Sammamish River and inner harbor), a water quality study was performed for the proposal. Details on the analysis methodology, treatment features assumed, and findings of the study are provided below.

Water Quality Study Methodology

Specific contaminants and estimates of their concentrations in discharge from the site were evaluated based on the proposed land uses and established data on contaminant concentrations. Specific contaminants with the potential for reaching concentrations above state water quality guidelines or other impact thresholds were identified (refer to Appendix B for detail on study methodology).

The findings of the surface water quality analysis include concentrations that would occur without treatment (unmitigated) and those that would occur with the implementation of measures to remove contaminants and reduce turbidity and temperature (mitigated). Detail on the proposed water quality treatment facilities is provided below. The unmitigated peak concentrations are conservatively high because proposed water quality treatment is not considered, stormwater runoff from the first portion of larger storms is considered (the first wash of water contains the highest concentration of contaminants - later portions of a storm contain more dilution of contaminants) and no dilution of stormwater by receiving waters is considered. The mitigated concentrations reflect the level of constituents in surface water that would result after treatment through proposed water quality facilities.

Water Quality Treatment Features

Storm runoff from the Proposed Action would be treated to remove pollutants in one of three ways. From the high-use-traffic areas (Lakepointe Way NE, NE Lakepointe Boulevard and surface parking areas), stormwater runoff would be routed through an oil/water separator (designed consistent with King County's goal of treating runoff so that there is no visible sheen of total petroleum hydrocarbon (TPH) or less than 10mg/l) and then to a two-celled water quality wetpond. Discharge from the wetpond would be

conveyed by pipe to the north end of the inner harbor to promote flushing of the marina area. Stormwater from the lesser-used roadways (including NE 173rd Place and NE 174th Street) would be directed to one of two sand filtration/biofiltration swales for treatment. Treated discharge from these swales would be conveyed directly to the river in a pipe with an energy dissipator. Rooftop runoff (flat roof tops are not considered pollution generating surfaces by the 1996 draft KCSWM) would be directed in part to the Sammamish River and in part directly to Lake Washington. Excluding rooftop runoff from proposed stormwater treatment facilities would enhance treatment capacity for runoff from streets and parking areas.

A description of the functions and pollutant removal efficiencies of the oil/water separators, wet pond and sand filters with biofiltration systems, is provided below.

Oil and Water Separators - Oil and grease are common constituents in parking lot and roadway runoff from motor vehicles, occurring in direct proportion to the volume of traffic and inversely to the average length of time cars are parked. Longer term parking, as occurs with residences, carries a far lower contaminant burden in runoff than short term parking, such as in lots serving retail/commercial establishments, because most vehicles deposit brake dust, oil and other contaminants shortly after being parked while the engines are still warm. Residence-related parking results in one or two cars occupying a given parking space per day as opposed to a far higher number for retail/commercial establishments. Most parking for the Proposed Action would not be exposed (i.e., would be within garage structures). Exposed short-term parking for the retail and commercial areas would exist in association with Building Area A and along Lakepointe Boulevard. Oil and grease would be effectively removed from runoff from these high-use areas by coalescing plate separators. The coalescing plates would intercept oil as it moves through the separation vault chamber. As oil droplets come into contact with the plates, they would coalesce with other droplets forming larger droplets (Romano 1989). Larger droplets are able to rise to the surface more quickly, where removal occurs. Oil collected on the surface of vault would be removed with a skimming device.

Wetponds - Wetponds maintain a dead storage volume of water to remove dissolved phosphorus by sorption to and settling of fine particles. Nitrogen and phosphorus are removed to a lesser extent through uptake by algae and fringing vegetation (Nussbaum 1990), and denitrification may also remove some nitrogen. Wetponds have been listed as an approved Best Management Practice in the Puget Sound Stormwater Manual (Ecology 1992) for treatment of stormwater.

Overall wetpond performance in removing particulates, and the dissolved constituents that they attract and bind, is a function of residence time and dissipation of hydraulic energy, which relates to the amount of time slowly settling small particles have to settle below the dead water storage (i.e., water remaining in the pond below its outlet elevation) at the pond's bottom. The size, shape, two-celled structure, and dead water depth in proposed wetponds are designed to prevent re-suspension of fine sediments once they are settled on the bottom. In addition, the first portion of a storm's runoff would inflow to the wetpond and mix with the residual water in the wetpond left from the last storm, which would be cleaner because it would have time between storms to settle its fine particle load. Therefore, the first outflow from the wetpond would be mainly the well-cleaned residual water from the previous storm. The following removal efficiencies have been cited for wet retention/detention ponds and for wetponds (US EPA 1993): 80 percent reduction in total suspended solids; 65 percent reduction in total phosphorus (a 35 to 45 percent removal range was used in this analysis); 55 percent reduction in total nitrogen; 75 percent reduction in total lead; and, 60 percent reduction in total zinc.

Maintenance of the wetponds would be performed on a regular basis consistent with the King County Storm Water Design Manual (refer to Appendix B for detail on stormwater facility maintenance).

Sand Filters with Biofiltration - Sand filters would be provided in conjunction with on-site biofiltration treatment systems for water quality treatment of the other impervious areas (non high-use traffic areas). These combined sand filter/biofiltration swales would be sized to treat 60 percent of the two-year runoff, which would represent the larger sand filter size in the draft 1996 King County Stormwater Design Manual. The following average removals have been observed in sand filter systems : 80 percent reduction in total suspended solids; 55 percent reduction in total phosphorus; 51 percent reduction in orth-phosphate; 35 percent reduction in total nitrogen; 80 percent reduction in lead; and, 80 percent reduction in zinc (sources: City of Austin 1990; US EPA 1993; King County 1993).

Water Quality Study Findings

The results of the surface water quality analysis are summarized in Tables 11 and 12. Findings for key contaminants are discussed in the following paragraphs. Please refer to Appendix B for a detailed discussion of the water quality findings.

Based on the analysis presented in Tables 11 and 12, fecal coliforms, lead, copper and cadmium concentrations in water discharged from the site could exceed state water quality standards prior to dilution in receiving bodies (it should be noted that all surface water runoff would receive additional dilution from the receiving water body; i.e. Lake Washington, Sammamish River or inner harbor). These standards are applicable to the receiving surface water and not to the discharge concentrations themselves (WAC 173-201-A). Calculations of dilutions required to meet standards and an assessment of the significance of the discharge quality to the Sammamish River and Lake Washington are provided below.

Heavy Metals

Copper, lead, and cadmium peak discharge concentrations are predicted to be greater than state acute standards (acute is defined as levels expected to result in injury or death to an organism as a result of short-term exposure) for the Sammamish River and Lake Washington.

Table 11

Projected peak unmitigated stormwater concentrations for the Proposed Action resulting from street and residence runoff at inflow to the stormwater treatment facilities. For context, these concentrations are compared to state water quality standards, although these standards are applicable only to receiving waters and not to discharge water.

Updated: 15 May 1997

Parameter	Units	Unmitigated Peak Concentrations	Discharge within Acute Standards?	Unmitigated Peak Concentrations	Discharge within Acute Standards?
		Access Road and Turn Around		**Urban Retail Commercial/ Roadway**	
Total Mercury	*mg/l*	0.0004	yes	0.0006	yes
Total Copper	*mg/l*	0.01	no	0.043	no
Total Zinc	*mg/l*	0.049	no	0.12	no
Total Lead	*mg/l*	0.01	yes	0.16	no
Total Chromium	*mg/l*	0.009	yes	0.053	yes
Total Cadmium	*mg/l*	0.004	no	0.007	no
Total Iron	*mg/l*	0.321	yes	1.04	no
Total NH3-N	*mg/l*	0.2	yes	0.15	yes
NO3-N+NO2-N	*mg/l*	0.36	n/a	0.436	n/a
Total Phosphorus	*mg/l*	0.18	n/a	0.255	n/a
SRP	*mg/l*	0.165	n/a	0.133	n/a
Turbidity	*NTU*	24	unlikely	22	unlikely
TSS	*mg/l*	105	n/a	140	n/a
Fecal coliforms	*CFU/100ml*	24581	*	13780	*
BOD-5 day	*mg/l*	9	n/a	11.6	n/a
Oil/Grease	*mg/l*	16	no	15.3	no

NOTES:

n/a = not applicable; no set standard but must support beneficial uses

Metals standards for a hardness of 40 mg/l; EPA and WAC 173-201A (AA and Lake Class)

All standards are Lake Class or Class AA waters under WAC 173-201A

Oil Grease standards do not exist; recommendation is to avoid any sheen.

* Fecal coliform standards apply to a geometric mean in the receiving water of 50 CFU/ 100 mls for Lake Class or Class AA not a peak discharge occurrence.

TSS = Total Suspended Solids

SRP = Soluble Reactive Phosphorus

BOD = Biochemical Oxygen Demand

a:\22140:jbf:mitinf:wk4, sheet A

Table 12 Water Quality Standards Compared with Peak Predicted Stormwater Contaminant Concentration After Mitigation

Updated: 17 October 1997

Parameter	Units	Acute Standard WAC 173-201A	Peak Concentration of Discharge	Receiving Environment Concentration	Discharge meets standard or dilution necessary o bring into compliance	Peak Concentration of Discharge	Receiving Environment Concentration	Discharge meets standard or dilution necessary to bring into compliance:
			Access Road and Turn Around	Sammamish River		Urban Retail Commercial/ Roadway	Lake Washington (g)	
Total Mercury	mg/l	0.0024	0.0001	n/a	Meets standard	0.00024	n/a	Meets standard
Total Copper	mg/l	0.007	0.004	0.007 (f)	Meets standard	***0.017***	0.007	1.6*
Total Zinc	mg/l	0.052	0.010	n/a	Meets standard	0.048	0.013	Meets standard
Total Lead	mg/l	0.0197	0.002	<0.02 (f)	Meets standard	***0.04***	<0.001	1.1
Total Chromium	mg/l	0.89	0.003	n/a	Meets standard	0.021	n/a	Meets standard
Total Cadmium	mg/l	0.0013	***0.0014***	0.006 (f)	0.09	***0.003***	<0.00002	1.3
Total Iron	mg/l	1	0.11	n/a	Meets standard	0.415	n/a	Meets standard
Total NH3-N	mg/l	24 (c)	0.05	n/a	Meets standard	0.10	0.03	Meets standard
NO3-N+NO2-N	mg/l	n/a	0.36	0.158 (f)	No standard	0.28	0.27	No standard
Total Phosphorus	mg/l	n/a (b)	0.08	0.021(f)	No standard	0.14 to 0.17	0.033	No standard
SRP	mg/l	n/a (b)	0.08	0.013 (f)	No standard	0.07 to 0.09	n/a	No standard
Turbidity	NTU	<5 or 110% bkgnd.	4.8	1(f)	Meets standard	4.5	1.7	Meets standard
TSS	mg/l	n/a	21.0	n/a	No standard	28.1	n/a	No standard
Fecal coliforms	CFU/100ml	50(e)	***15732***	7 (f)	See discussion	***11024***	33	See discussion
BOD-5 day	mg/l	n/a (a)	4.41	n/a	No standard	6.94	n/a	No standard
Oil/Grease	mg/l	avoid sheen	16.0	n/a	See discussion	3.83	n/a	See discussion

Bold italics Denotes concentrations exceeding the acute standards for Lake Washington or Sammamish River.

NOTES: n/a = not available

* Dissolved fraction is used to calculate the dilution because the total concentration is equal to the acute standard (0.007 mg.l).

(a) Dissolved Oxygen (DO) must be >9.5 mg/l

(b) Ecology recommendeds to remain below 0.020 to 0.030 mg/l Total Phosphorus (TP)

(c) Based on a pH of 7.0 and a temperature of 15 deg C.

(d) Based on a hardness in Lake Washington of 44 mg/l of CaCO3 (Calcium Carbonate).

(e) The standard is based on a geometric mean in the receiving water not a peak discharge occurrence.

(f) Sammamish River concentrations were set equal to Lake Sammamish concentrations. Lake Sammamish metals data collected by Beak (October 1994). Other data from Metro Station 062t Dissolved phosphorus listed as SRP

(g) Lake Washington water quality data collected at station 0804 by Metro and by Beak Consultants (metals). Station 0804 data used from t October 1995 through March t996 (average), the most recent water year available.

TSS = Total Suspended Solids

SRP = Soluble Reactive Phosphorus

BOD = Biochemical Oxygen Demand

filename:mltinf1;Sheet D

Copper - Peak storm water runoff concentrations from the proposed wetpond are estimated to exceed the acute copper standard (0.007 mg/l). Because the existing copper concentrations of Lake Washington are equal to the acute standards (0.007 mg/l), it is not possible to calculate a dilution required to bring the discharge into compliance. Since the state acute standard for copper addresses the portion actually dissolved in the receiving body, the dissolved lake concentration (0.001 mg/l) was used to identify the required dilution. The dilution necessary for compliance with the acute copper standard would be 1.6:1.

Cadmium - Estimated peak runoff concentrations of cadmium from the proposed high-use and low-use areas were estimated to exceed the state acute standard of 0.0013 mg/l. The peak cadmium concentration in the wetpond discharge is estimated to be 0.003 mg/l. In Lake Washington, this concentration is currently above receiving water concentration (<0.00002 mg/l) and would require a 1.3:1 dilution to meet the acute standard. The lower use area peak discharge is also estimated to exceed the same acute standard. However, the estimated peak runoff concentration from the low use area (0.0014 mg/l) is lower than the existing cadmium concentration of the Sammamish River (0.006 mg/l) and dilution for compliance with the acute standard cannot be calculated because the cadmium concentration of the Sammamish River is greater than the acute standard. Because Lake Washington is the receiving environment for the Sammamish River, the dilution necessary for compliance was calculated using the lake concentration of <0.00002 mg/l. The dilution necessary for compliance with the acute cadmium standard would be 0.09:1.

Lead - The estimated wetpond peak lead concentration (0.04 mg/l) would exceed the state acute standard of 0.02 mg/l (calculated at a hardness of 44 mg/l of $CaCO_3$) for lead. The total lead concentration in Lake Washington is <0.001 mg/l. The dilution necessary for the wetpond effluent to meet the acute standard would be 1.1:1.

The water quality wetpond would be sized to treat 90 percent of all stormwater runoff (it would treat 60 percent of the 2-year storm which would exceed the King County Stormwater Design Manual standard of treating 30 percent of the 2-year storm). Stormwater flows exceeding the design capacity of the wetpond would flow directly to the inner harbor. However, the first-flush (portion of storm containing the highest concentration of pollutants) of these larger storm events would be treated by the wetpond; flows associated with larger storms that would escape wetpond treatment would be sufficiently diluted so that no significant water quality impacts would occur. Any sediment removed from the stormwater facilities as part of normal maintenance would also remove all trapped metals. Sediment disposal would occur in an approved off-site location. Street sweeping, if employed, would also remove a significant fraction of metal particulates from road surfaces.

Due to the total volume of water in Lake Washington in the immediate vicinity of the site, as compared to the discharge volume from the developed site, the dilutions necessary to bring, copper, cadmium and lead concentrations from the wetpond into compliance with the acute standards would be easily achieved in the lake, and no significant impacts would result.

Fecal Coliforms

During storms, fecal coliform concentrations typically rise even under undeveloped conditions, particularly during the first-flush portions of fall storms. Fecal coliforms originate from natural sources,

including waterfowl and other birds and mammals utilizing wetlands and adjacent lands, and it is not unusual for elevated concentrations to occur in runoff. Based upon the sequential analysis presented in Tables 11 and 12, the peak mitigated fecal coliform concentration could range from 11,024 to 15,753 CFU/100 mL. The peak of this range could only be achieved by a large storm exceeding water quality facility capacity after an extended dry period. However, such peaks are not expected due to proposed mitigation measures to cover all on-site dumpsters and estimated waste generation amounts that would be less than typical suburban/urban developments.

The state standard for fecal coliforms in Class AA surface waters is a geometric mean of 50 CFU/100mL, with not more than 10 percent of all samples obtained over time for calculating the geometric mean value exceeding 100 CFU/100mL. Geometric means determined from samples collected over time are expected to conform to state standards in all receiving waters following water quality treatment, because peak coliform discharges are expected to be lower than typical urbanized development for the reasons described above (i.e. waste generation amounts that would be less than typical suburban/urban developments). Fecal coliforms have limited mobility and survival; they generally do not live much longer than 24 to 96 hours in water. Long-term degradation to Lake Washington, the Sammamish River or the inner harbor from fecal coliforms is not expected to occur.

Nitrate-Nitrogen

Nitrate-nitrogen typically occurs in urban stormwater runoff. Urban sources include fertilizer, eroded soil, organic debris, and atmospheric fallout (Canning 1988). The estimated peak unmitigated discharge for the site is expected to range from 0.28 mg/l (surface parking lot in Building Area A)) to 0.36 mg/l (Lakepointe Boulevard), which is within the range of existing Lake Washington concentrations. The wetpond facility would remove nitrate-nitrogen to some degree (approximately 35 % removal). Discharge from the wetpond would be directed to the inner harbor where treated stormwater would mix with lake waters having a similar nitrate concentration. Sand filtration proposed for treatment of lesser used roadways, by itself, would provide only minimal nitrate removal (analysis conservatively assumed zero nitrate removal). Due to dilution levels in Lake Washington, the inner harbor and the Sammamish River, and the fact that nitrate-nitrogen is not a primary nutrient affecting area waters, no significant adverse impacts are expected from nitrate-nitrogen loading from peak mitigated stormwater discharge into either Lake Washington, the Sammamish River or the inner harbor.

Turbidity

Turbidity (suspension of particles in water) from a developed site is a short-lived phenomenon associated with higher runoff events. With the operation and maintenance of the proposed water quality features (wetponds, biofiltration swales or sand filters), adverse turbidity impacts are not expected. No significant turbidity impacts are expected since runoff from peak storm events would be directed to a wetpond or sand filter/biofiltration facility for sediment removal prior to entry to Lake Washington. Facilities would be designed to draft King County Stormwater Design Manual (1996) criteria and are expected to provide 80 percent total suspended solids removal.

Temperature

Temperature increases can occur from wetponds by release of storm runoff mixed with water detained from the previous storm event, which may have been warmed by solar insolation and air temperatures in the interim. Climate in the Pacific Northwest usually eliminates this concern, since almost all rainfall that generates runoff occurs during the cooler seasons when temperatures are lower. Exceptions can occur when discharge from fall storms or late spring storms is made to coldwater streams or rivers supporting coldwater (salmonid) fisheries. Wetpond discharge would be released to the inner harbor where temperatures are relatively high under existing conditions; therefore, adverse temperature impacts above the existing condition are not likely to occur due to the rarity of summer storm events, the receiving volume relative to discharge volume, and the lack of functional habitat in the inner harbor. Temperature impacts would not occur from stormwater routed through the sand filter/biofiltration facility to the Sammamish River, because of the number of proposed dispersed outfall points (which limits the volume of water at any one point) and cooling that would occur through the swale/sand filtration system.

Acidity (pH)

Changes in pH from the proposed development are difficult to quantitatively predict. Urbanization can influence stormwater runoff pH; however, the effect is primarily atmospheric from sulfuric and nitric acids produced by rainfall altered by automotive exhaust or industrial emissions. Saturation of rainfall with carbon dioxide will naturally cause rainfall to be acidic even in undeveloped areas. To some extent, acidity in rainfall is neutralized (buffered) during overland flow by weak organic salts in soils and dust, phosphates, ammonia and calcium, which will occur on street pavements or through contact with concrete (Novotny and Kincaid 1981). The ability of surface waters to neutralize acidic inputs depends on alkalinity of soils and street pavements. Naturally occurring organic decay in wetlands releases phosphates and ammonia, which can buffer pH changes.

The site would be converted from industrial use to open space and urban uses. Open space, vegetation and wetlands would provide pH buffering on the site; therefore, no significant decline in pH buffering (neutralized) of rainfall is predicted as a result of development. Consequently, no impacts to Lake Washington or Sammamish River, resulting from changes in stormwater pH, are reasonably anticipated after development of Lakepointe.

Oil and Grease; Related Hydrocarbons

Urban stormwater runoff is a prime contributor of hydrocarbons to sediments, although sources such as organic detritus and wind-blown leaves contribute significant amounts of vegetative oils. Oil and grease, total petroleum hydrocarbons, and polycyclic aromatic hydrocarbons are variable on roadways, with residential roads producing approximately one-third as much as arterial roads. Most of the potentially toxic organic pollutants in this category are strongly adsorbed to particulate matter suspended in runoff (Gjessing *et al.* 1984). They will adhere to these particulates and be filtered out reasonably well by swales during conveyance or passage through biofilter devices and during infiltration or interflow passage (water movement through soil). They are also removed to some extent by street sweeping.

Oil and grease are biodegradable; the sand filter/biofiltration swales and the wetpond would provide some degree of biodegradative (decay) capability. The Proposed Action would use a coalescing plate oil/water separator (meeting the County's goal of no visible sheen or a total petroleum hydrocarbon level

of less than 10 mg/l) to remove oils and greases and related compounds from roadway traffic and parking. With the proposed water quality treatment facilities, it is anticipated that no significant impacts to receiving waters from hydrocarbons would occur. (Refer to the section on *Marina Contaminants* below for a discussion on hydrocarbon impacts from boats.)

Phosphorus

Phosphate enrichment is generally the primary cause of eutrophication in most Pacific Northwest freshwater systems. Phosphorus is not a regulated parameter in state surface waters (Chapter 173-201A); however, limiting average phosphorus concentrations in stormwater discharge to below 0.020 to 0.030 mg/l is accepted as one measure to prevent eutrophication (Ecology 1992).

The wetpond employed by the Proposed Action would provide an estimated removal ranging between 35 percent (0.09 mg/l) and 45 percent (0.11 mg/l). The sand filter/biofiltration swales would remove approximately 55 percent (0.1 mg/l) of the total phosphorus (without accounting for any biofiltration removal). As a result, the mitigated total phosphorus concentrations for the project are estimated to range between 0.14 to 0.18 mg/l. These peak phosphorus concentrations would not pose a nutrient problem for Lake Washington, due to the efficiency of the proposed wetpond in removing phosphorus. Since secondary sewage disposal was diverted from the lake in 1963, trophic conditions have improved and overall lake phosphorus concentrations have not posed a water quality problem.

Fertilizers

Portions of the project would be devoted to park areas, gardens, and pedestrian paths and trails. The majority of the proposed park and trail areas would be located on imported fill outside of the proposed engineered cap (refer to the *Toxic and Hazardous Materials* section for details). Maintenance of such areas may require the use of fertilizers on grass and landscaped areas. Runoff from landscaped and grass areas would infiltrate into the soils and may travel within the subsurface interflow toward on-site wetlands, Lake Washington, or the Sammamish River. However, no significant adverse impacts are expected from park land maintenance activities because subsurface transport would promote uptake of nitrogen and mineralization of phosphorus prior to entry into on-site wetlands or surface waters. To further reduce the potential for fertilizer transport, it is proposed that slow release fertilizers low in phosphorus be utilized, any herbicide or pesticide usage be on a minimal "as-needed" basis, and herbicides/pesticides be selected based on minimal subsurface transport potential (King County 1993b).

Marina Contaminants

No dredging would be required for construction of the marina. The greater number of private boat motors associated with the proposed marina, though smaller and generally less prone to leakage than large commercial craft now using the channel, may increase hydrocarbons (this would be perceived as silvery sheen even at a very thin thickness level). This would be offset during the wet season by flushing of the inner harbor with treated stormwater discharge from the stormwater system. During the summer, a sheen may be more visible because flushing of the inner harbor would not occur as often. Volatile components of oil or gas sheen evaporate rapidly and degrade in the atmosphere (U.S. Department of Health and Human Services, 1993); therefore, significant impacts from hydrocarbons in the marina are not anticipated.

Long-term operational impacts from the marina would be mitigated by prohibition of live-aboard tenants who are typically known to increase fecal coliform levels when allowed, lack of pump-out (a pump-out facility is located at the existing marina adjacent to the site) or fueling facilities which would eliminate most of the risk for accidental discharges of waste or fuels, and prohibition of underwater cleaning of boats in the inner harbor. Most above waterline boat repair work, such as sanding and painting, would be performed in boat yards off the site and impacts from this type of work would not be anticipated.

Summary of Surface Water Quality Impacts

During construction, with implementation of the proposed mitigation measures, no significant impacts related to increased erosion potential, phosphorus concentrations or petroleum hydrocarbons, or increased water temperature would be anticipated to occur. Short-term turbidity is expected to result from activity during marina construction. However, this turbidity would be similar to sediment re-suspension now occurring in the commercial/industrial channel, and no significant change from existing conditions is anticipated.

After development of the proposal, it is anticipated that stormwater discharged from treatment facilities on the site would contain levels of fecal coliform, lead, copper and cadmium which could exceed state water quality standards prior to dilution in receiving bodies (Lake Washington, Sammamish River and inner harbor). Dilutions necessary to meet state standards would be obtained in these water bodies, and no significant impacts would be anticipated.

Groundwater Quantity

The Proposed Action would increase the area in impervious surfaces and decrease the area in pervious surfaces, thus reducing the amount of on-site infiltration. Intercepted runoff would be treated through the proposed water quality treatment facilities and released to the inner harbor, Lake Washington and the Sammamish River. The impact of reduced infiltration on the site would be minor, with no reduction in the water table under the site anticipated (water table level is determined by the controlled level of the lake).

The proposed biofiltration swales would be designed to prevent contact between the treated runoff and the underlying fill material, and would minimize mounding of the groundwater table within the fill layer.

Groundwater Quality

Prior to phased development of certain portions of the site under the Master Plan, phased remediation of the areas determined to be contaminated and warranting cleanup under MTCA must occur. Groundwater monitoring would be implemented as an institutional control to document groundwater gradients and contaminant concentrations beneath the site prior to any site preparation and during the period of phased development under the Master Plan. It is anticipated by King County that specific details relating to the level of any allowed disturbance to contaminated soils during construction, technologies to separate temporary and permanent stormwater facilities from contaminated soils, the potential need for establishment of groundwater flow barriers, and measures to minimize groundwater contamination impacts (if any) from pile driving through contaminated soils, will be determined as part of the Agreed Order or Consent Decree under MTCA. The environmental impacts of implementing such measures will

also be identified as part of the DOE's review process under MTCA (see the TOXIC AND HAZARDOUS MATERIALS section of this document for detail).

Although the specific method of site contamination cleanup or containment has not been determined, the applicant's proposal to construct an engineered cap would benefit groundwater quality by preventing surface water runoff from contacting the wood debris fill and transporting contaminants to groundwater.

ALTERNATIVES

Alternative 1 - Conceptual Master Plan Illustrated in the NSCP

Surface Water Quantity

The amount of impervious surfaces under Alternative 1 would be approximately 32.2 acres of the site compared to approximately 29.6 acres of the site under the Proposed Action. As under the Proposed Action, all runoff from the impervious surfaces would be directed to a storm drainage system which would collect, treat, and discharge runoff to Lake Washington and the Sammamish River.

Because of the greater area in impervious surfaces, the volume of stormwater runoff would be higher than under the Proposed Action. However, because the site is located adjacent to Lake Washington, and stormwater runoff would not impact downstream properties, no significant water quantity impacts would be anticipated.

Surface Water Quality

Construction

Because the estimated amount of grading would be approximately the same as under the Proposed Action, the potential for erosion would be similar. As under the Proposed Action, erosion and sedimentation within the area undergoing construction would be contained on the site with no sediment discharge to adjacent waters anticipated from the area undergoing construction. As each phase of construction is completed, the current erosion conditions in that respective area would be eliminated and on-site erosion would be proportionately reduced as each development phase is completed, similar to under the Proposed Action.

Construction related water quality impacts related to phosphorus, nitrogen and temperature would be similar to those under the Proposed Action. With the lesser amount of building square footage, the amount of construction equipment and potential for release of petroleum hydrocarbons would be less than under the Proposed Action.

Construction impacts associated with the marina would be similar to those under the Proposed Action; no significant impacts would be anticipated.

Post-Construction

Because Alternative 1 would result in less automobile traffic and a lower on-site resident/visitor population than under the Proposed Action, pollutant loading from heavy metals (copper, cadmium and

lead), fecal coliform, and hydrocarbons could be lower than under the Proposed Action. The greater amount of impervious surfaces, however, could increase the potential for turbidity and water temperature increases. With the proposed water quality features and dilution capability of receiving waters, significant impacts would not be anticipated.

Long-term operational impacts associated with the marina would be similar to those under the Proposed Action; no significant impacts would be anticipated.

Groundwater Quantity

Alternative 1 would result in approximately 32.2 acres of the site in impervious surfaces compared to 29.6 acres of the site under the Proposed Action. The increase in impervious surfaces would decrease the amount of on-site infiltration.

Groundwater Quality

As under the Proposed Action, phased remediation of the areas determined to be contaminated and warranting cleanup must occur. Thus, prior to any construction in the areas of the site deemed to be contaminated, measures to cleanup or contain the contaminated soils would be established, consistent with MTCA standards. Groundwater quality conditions under development of Alternative 1 would be similar to those under the Proposed Action.

Alternative 2 - No Action

Under the No Action Alternative, the existing stormwater system and site runoff conditions would continue. The existing erosion potential (estimated 34 tons of sediment reaching adjacent waters annually) and industrial use of the inner harbor (which results in pollution to area waters) would continue. No construction would occur on-site; however, hazardous materials cleanup activities would occur, pursuant to MTCA. These activities could include excavation, filling, and/or remediation of materials on the site.

MITIGATION MEASURES

Surface Water Quantity

Required by Code

- All runoff generated by the proposed development would be directed to a storm drainage system which would collect, treat (through an oil/water separator, wetpond, biofiltration swales), and discharge runoff to one location in the inner harbor, one location at Lake Washington, and three locations along the Sammamish River.

Surface Water Quality

Construction

Required by Code

King County requires that specific mitigation measures and protocols be followed during the construction phase(s) of development.

- Required mitigation measures would be outlined in the Temporary Erosion and Sedimentation Control Plan (TESCP) that would be submitted to King County DDES with the site Engineering Plans.

Proposed by the Applicant

The following mitigation measures would be implemented, in addition to provisions required by the King County Surface Water Design Manual:

- Construction runoff (e.g., concrete wastes, equipment oils) would be collected in sumps (catchment areas with no outlets) and disposed of in approved off-site locations.
- Inclusion of a water quality/TESCP inspector as part of the TESCP.
- Use of sediment ponds during construction to retain runoff (KPFF, 1996). Swales (with silt fencing or straw bale barriers) would be used to convey overflow to surface waters (KPFF, 1996).

Potential

- Provisions for accidental spill response cleanup and notification procedures could be included in contractor agreements.
- Prior to any permits being issued by King County, the applicant could provide documentation showing that measures to prevent contaminated materials from coming into contact with surface water and groundwater have been identified, evaluated, and required as part of the MTCA cleanup plan.

Post-Construction

Required by Code

- The applicant will maintain all private drainage facilities in accordance with King County SWM requirements.
- Use of water quality treatment facilities meeting the requirements of the 1990 KCSWDM and adopted subsequent revisions.

Proposed by the Applicant

- Use of the draft KCSWDM (1996) design manual criteria for water quality facilities, which exceed the 1990 KCSWDM criteria, including:

  1) Use of a wetpond sized in accordance with draft methodology for treatment of the high use vehicular areas,

  2) Use of a biofiltration swale meeting draft King County Core Requirement #8 (King County 1996) that would be enhanced with biofiltration prior to sand filtration, and

  3) Use of BMPs as required by King County Special Requirement #4 (King County 1996), water quality source controls. Source controls identified in the Stormwater Pollution Control Manual (King County 1995) would be employed such as roofing of dumpster areas.

- Installation and maintenance of a coalescing plate oil/water separator for runoff meeting draft King County manual definition for high use areas (King County 1996).

- Boat moorage would be restricted to recreational users. No live-aboards would be allowed in the marina.

- The marina would not include a fuel dock or waste holding tank pump station.

- Runoff from rooftops would bypass water quality facilities, which would increase facility treatment capacity for runoff from roadways and parking lots.

Potential

- If the biofiltration swales are to be located over contaminated soil (as determined by DOE), a modified underdrain, as shown in Figure 6.3.1.c of the 1996 Draft Manual, with an impervious membrane separating the contaminated soil from the under drain "drain rock" could be considered as an alternative to the standard design.

- Wet street sweeping of exposed parking areas.

- Stenciling storm drains to read "Dump No Waste Drains To Lake."

- Post, promote and educate boat owners about regulations concerning illegal discharges of waste holding tanks.

- Preclude underwater cleaning of the any boat in the inner harbor.

- Prohibit the use of roof-top materials such as copper and zinc which can contaminate roof-to runoff.

- Provide further restrictions of the use of fertilizers and pesticides on the site.

- Provide restrictions on the type of above water-line work on boats.

- Prior to permits being issued by King County, the applicant could provide documentation showing that measures to prevent contaminated materials from coming into contact with surface water and groundwater have been identified, evaluated, and required as part of the MTCA cleanup plan.

Groundwater Quality

Construction and Post-Construction

Potential

- Prior to any permits being issued by King County, the applicant could provide documentation showing that measures to prevent contaminated materials from coming into contact with surface water and groundwater have been identified, evaluated, and required as part of the MTCA cleanup plan.

UNAVOIDABLE SIGNIFICANT ADVERSE IMPACTS

Surface Water Quantity

No significant impacts are anticipated.

Surface Water Quality

All construction-related erosion from each development phase would be contained on-site with no sediment discharge to adjacent waters. Construction related pollutant impacts would be controlled with no significant impacts anticipated provided that measures are implemented through the MTCA process to separate water, sewer, and storm drain facilities from contaminated soils, and to minimize impacts from pile driving through contaminated soils.

Post-construction stormwater runoff would be controlled and treated through wetponds, oil/water separators and/or sand filters. Concentrations of four contaminants, lead, copper, cadminum and fecal coliforms, at discharge from water quality facilities may exceed water quality standards prior to dilution in the inner harbor, Lake Washington or the Sammamish River. With dilution in the receiving waters, no significant water quality impacts would be anticipated.

Groundwater Quantity

None are anticipated.

Groundwater Quality

None are anticipated provided that measures are implemented through the MTCA process to separate water, sewer, and storm drain facilities from contaminated soils, and to minimize impacts from pile driving through contaminated soils.

PLANTS AND ANIMALS

Background information for this section is contained in Appendix B, *Lakepointe Technical Report on Natural Resources* prepared by Beak Consultants Inc., which contains reports on Plants and Animals, and Fisheries resources.

AFFECTED ENVIRONMENT

Introduction

The site lies on Lake Washington and the Sammamish River which provide habitat for fish and wildlife. Vegetation on the site is primarily limited to an approximately 5 to 45 foot wide strip along the shorelines of the Sammamish River and Lake Washington. The vegetated strip includes significant trees and other vegetation that provides perching trees for eagles and feeding area for Great Blue Heron. Two small wetlands are located along the shoreline perimeter of the site. Vegetation and wildlife habitat in the central portion of the site is sparse due to past and present industrial activities.

The site lies within the Sammamish River Corridor Habitat area identified in the Northshore Community Plan (NSCP) Natural Resource Protection Area P-suffix Condition 3. This P-suffix condition requires project applicants to identify great blue heron nesting, roosting or feeding areas that may be on the project site (although no great blue heron nesting or roosting areas were identified on the site, feeding areas were identified on the site shoreline). Protection of significant trees and habitat for herons, eagles and fish is required by King County and State of Washington policies and regulations All significant trees as defined in KCC 21A.06.1170 and NSCP P-suffix conditions (defined as an existing healthy tree which, when measured four feet above grade, has a minimum diameter of: eight inches for evergreen trees, or twelve inches for deciduous trees) were flagged, surveyed, and mapped (refer to Figure 2).

The site is not within a Washington Department of Fish and Wildlife (WDF) Bald Eagle Site Management Plan area. However, trees meeting the Bald Eagle Site Management Plan guidelines of the WDF were identified. These guidelines call for protection of eagles and retention of cottonwood trees greater than 20 inches in diameter and conifers greater than 28 inches in diameter within 250 feet of Lake Washington or the Sammamish River (refer to Figure 2). A wetland delineation was performed on the project site in March 1995 (see Appendix B).

Shoreline and Wetland Habitat

The site has been extensively filled in the past and has a history of use for a variety of industrial purposes. As a result of the placement of fill material, including construction debris, and disturbance, very little of the site supports vegetation.

With minor exceptions, the only plant communities on the site lie in an approximately 5 to 45-foot wide strip along the shorelines of the Sammamish River and Lake Washington. Typical plant communities lying along the Sammamish River shoreline include upland forest and shrub communities dominated primarily by black cottonwood (*Populus trichocarpa*), red alder (*Alnus rubra*), Douglas-fir (*Pseudotsuga menziesii*) and Himalayan blackberry (*Rubus discolor*). A similar upland plant community occurs along much of the Lake Washington shoreline within the buffer of a long, narrow wetland, identified as Wetland A, located at the northwest corner of the site (see Figure 17). Based on the definition of

significant trees provided in KCC 21A.06.1170 and NSCP P-suffix conditions, the site shoreline area contains approximately 165 significant trees.

Wetland A, which is approximately 0.25 acre in area, lies between fill material to the east and Lake Washington to the west (Figure 17). The hydrology of this wetland is controlled by the lake level; surface water does not significantly influence Wetland A hydrology. This wetland supports both palustrine forested and palustrine scrub-shrub habitat. Wetland A supports a native plant community comprised of red alder, black cottonwood, black locust (*Robinia pseudoacacia*), Pacific willow (*Salix lasiandra*), Sitka willow (*Salix sitchensis*), Douglas' spiraea (*Spiraea douglassii*), cattail (*Typha latifolia*) and soft rush (*Juncus effusus*), as well as invasive, non-native plants such as Himalayan blackberry, reed canarygrass (*Phalaris arundinaceae*), purple loosestrife (*Lythrum salicaria),* bittersweet nightshade (*Solanum dulcamara*) and yellow iris (*Iris pseudacorus).*

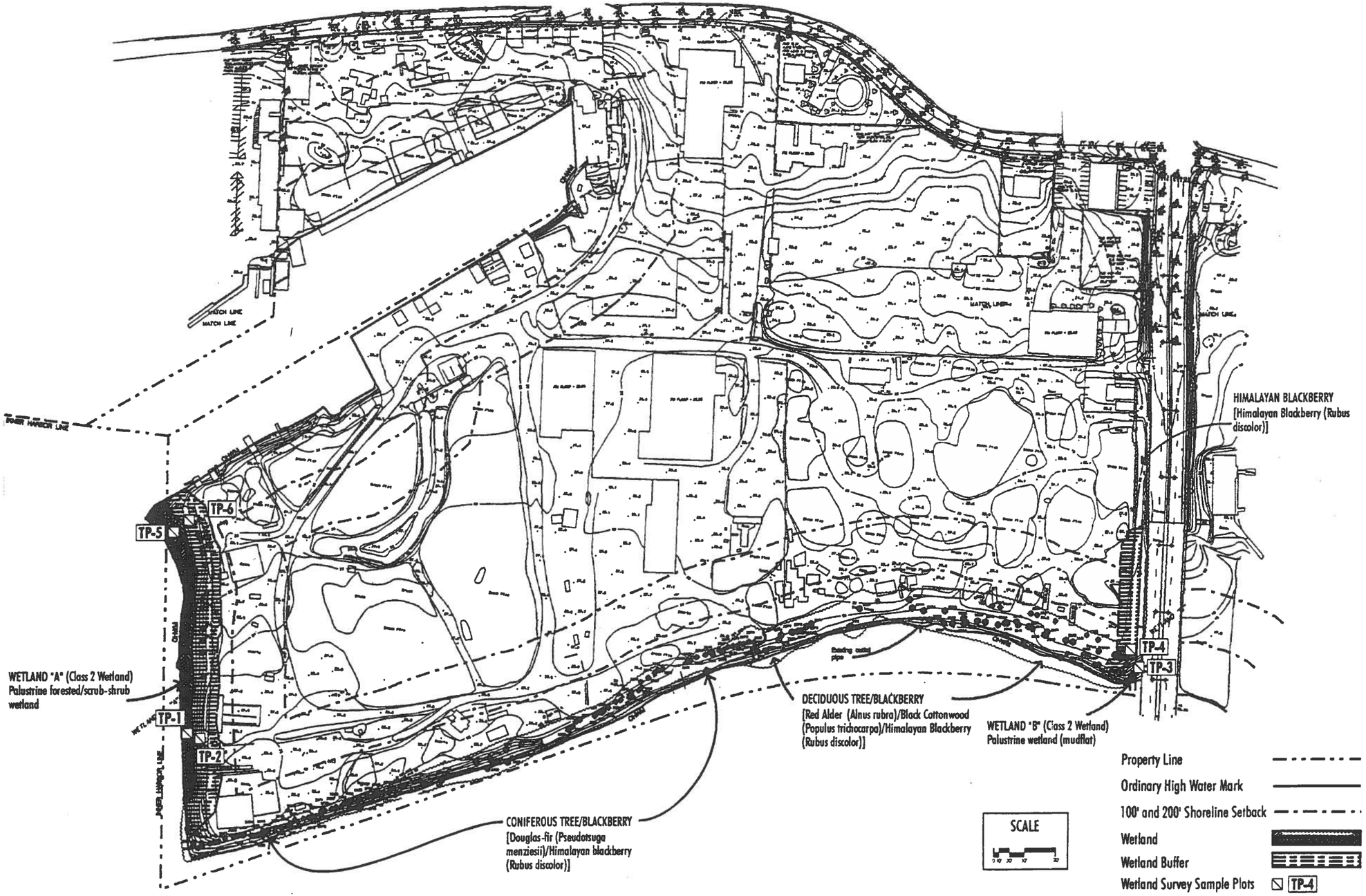
A second wetland, identified as Wetland B, is located at the southeast corner of the Lakepointe site near the 68th Avenue NE bridge (Figure 17). The entire wetland is 1.5 acres in area, approximately .006 acres of which are located on the site. The off-site portion of this wetland, contains willow, reed canarygrass, cattail, Himalayan blackberry, bittersweet nightshade and yellow iris. The on-site portion of Wetland B is shaded by the Kenmore bridge and is a mudflat which is periodically inundated and supports little vegetation.

Under King County's sensitive areas development regulations (KCC 21A.24), both Wetlands A and B would be classified as Class 2 wetlands, requiring a 50-foot buffer and a 15-foot building setback from the edge of the buffer (vegetated buffer areas around the wetlands do not currently satisfy the minimum width required by the sensitive areas regulations). Approximately 11,000 square feet, or approximately one-half, of the Wetland A buffer is vegetated with an overstory of Douglas-fir and understory of Himalayan blackberry . The remaining approximately 11,000 square feet of the buffer is non-vegetated with some portions occupied by industrial activity. The vegetated portion of the Wetland B buffer is approximately 25 feet wide and is comprised of Himalayan blackberry and red alder (refer to Appendix B for more additional information).

Wetlands A and B provide some shoreline protection; very limited water quality improvement due to the limited amount of runoff flowing into these areas; no groundwater recharge support due to their small size; no cultural or socioeconomic functions due to lack of access; and little to no flood/stormwater control. The hydrology of these wetlands is controlled by river and lake levels, and neither wetland provides any base flow (refer to Appendix B, Appendix A for detail on wetland functions and value methodology).

Wildlife Habitat

The upland plant communities along the shorelines of the Sammamish River and Lake Washington follow a narrow linear pattern. The dense blackberry cover provides some seasonal foraging and year round cover for a wide variety of passerine birds and small mammals. The trees along the shoreline provide perch sites and limited shade. Wetlands A and B are small areas with little habitat diversity. However, due to its direct interconnection with Lake Washington, Wetland A offers breeding habitat for waterfowl and passerine birds, foraging habitat for shorebirds, and breeding and foraging habitat for amphibians.



Source: Beak Consultants

Huckell/Weinman Associates, Inc.	**Lakepointe Mixed-Use Master Plan**	**Figure 17** **Existing Wetlands & Vegetation Types**

The channel island and south shore of the Sammamish River located off-site contains primarily palustrine emergent habitat dominated by cattail (*Typha latifolia)* and reed canarygrass *(Phalaris arundinaceae)*. Trees include red alder and black cottonwood. The gradient of the island and river shoreline is more gradual than along the site, potentially providing more foraging opportunities for waterfowl.

Wildlife observed in the Lakepointe project vicinity during fisheries and wetland surveys conducted on the site are listed in Table 4.1-1of Appendix B. A beaver was observed swimming in the inner harbor in April 1996.

Bald eagles have been reported flying over the project site, and two bald eagles were observed perched along the Lake Washington shoreline south of the Sammamish River confluence during the January 3, 1996 fisheries surveys. A known bald eagle nest is located 5.5 miles northwest of the site, approximately 0.5 mile from Puget Sound (14 November 1996 WDFW PHS database review).

King County Comprehensive Plan Natural Environment policies NE 603 and NE 604 call for the preservation of habitat for species designated as threatened, endangered, sensitive or priority. The Bald Eagle is designated as an endangered species in western Washington.

The Washington Department of Fish and Wildlife provides guidelines for the retention of cottonwood trees greater than 20 inches in diameter and conifers greater than 28 inches in diameter within 250 feet of Lake Washington or the Sammamish River for protection of perch trees which could be used by eagles. The vegetated strip along the site's Sammamish River shoreline contains three cottonwood trees which meet the Department of Fish and Wildlife definition of potential perch trees.

Great Blue Heron

The site is identified in the NSCP as being within the Natural Resource Protection Area - Sammamish River Corridor Habitat (P-suffix Condition 3). Development proposals within this area must conduct special wildlife studies to identify any great blue heron nesting, roosting and feeding areas of the site. Any feeding habitat identified on-site must be designated as a Sensitive Areas setback area and an additional 50 foot buffer on each side of the Sensitive Areas Setback Area shall be established. This additional buffer must be revegetated with dense vegetation to prevent human intrusion into the heron habitat area. No portion of the project site is identified as being within the Natural Resource Protection Area - Lake Washington Shoreline Habitat (P-suffix Condition 4).

A special wildlife study was prepared for the site and is included in Appendix B, Lakepointe Technical Report on Natural Resources. As indicated in the study, a great blue heron rookery is located approximately one mile northeast of the site immediately north of the Kenmore Park-and-Ride (14 November 1996 WDFW PHS database review). A second great blue colony has been documented approximately three miles northeast of the Lakepointe project area, and a third is located approximately six miles north of the project site. No roosting or nesting of the herons has been reported along the site's shorelines; however great blue herons have been noted feeding in the project vicinity in the shallow water habitat along the Lake Washington shoreline and in the inner harbor, as well as along the shallows of the island and the Lake Washington shoreline south of the Sammamish River off the site. The

common flight path from the Kenmore Park-and-Ride heron rookery has been reported to be in a south-southwest direction toward Lake Washington (Stenberg pers comm. October 6, 1997)

The most productive shoreline area in the project area for fish, and hence feeding of shore birds, is the Lake Washington shoreline. This coincides with the observed shore bird and diving bird use of the site. The Lake Washington shoreline gradually increases in depth from the shore westward toward the lake center at this location.

The condition of the Sammamish River shoreline along the site does not offer ideal shorebird feeding habitat. Along this section of the Sammamish River there is a narrow band of shallow beach habitat adjacent to an undercut bank which could possibly be used by shorebirds at lower water levels. The river channel drops off abruptly not far from the shoreline as a result of dredging activities in this section of the river. Water depths and velocity at mid- to higher water conditions would likely prevent great blue herons from foraging along the river shoreline adjacent to the site.

The landward portion of the shoreline and the balance of the site do not offer any foraging habitat for great blue herons. The majority of the site is non-vegetated and does not support habitat for heron prey species such as small mammals or amphibians. The vegetated shoreline areas are also not suitable for heron foraging, where blackberry understory exists which prevents the herons from accessing the vegetated areas. Although there are no recorded sightings of roosting activity along the river shoreline of the site, it is possible heron could roost in trees located along the shoreline.

Along the landward portion of the Lake Washington shoreline, the habitat is similar to that along the Sammamish River shoreline, with the exception that the lake is shallow in this location affording greater forage opportunity for heron in the water. Heron have been sighted in this location on three occasions (refer to Appendix B, Lakepointe Technical Report on Natural Resources, Table 4-1).

Heron have been reported most frequently in the vicinity of the island, on the opposite side of the Sammamish River from the site (Moore pers. comm. 17 October 1997).

Fisheries

Introduction

The water bodies of Lake Washington, the Sammamish River and the inner harbor are located adjacent to the site and provide fish habitat.

The Sammamish River basin supports a variety of anadromous salmonids, including chinook (*Onchorhynchus tshawytscha*), coho (*O. kisutch*), and sockeye salmon (*O. nerka*) and steelhead (*O. mykiss*) and cutthroat trout (*O. clarki*). The Sammamish River system also supports runs of non-anadromous kokanee (*O. nerka*) salmon and ad-fluvial cutthroat trout (King County 1993). The mouth of the Sammamish River provides rearing habitat for salmonids and is a migration corridor for adult and juvenile salmon.

Salmon production occurs in tributaries to the Sammamish River (notably Big Bear Creek), and tributaries to Lake Sammamish (notably natural and artificial production in Issaquah Creek). Anadromous juveniles produced in this system emigrate through the Sammamish River, passing by the

site, before reaching Lake Washington. Washington Department of Fish and Wildlife (WDFW) personnel suspect that outmigrating juvenile salmonids may temporarily hold in the shallow beach area at the western edge of the Lakepointe site before migrating through to Lake Washington (L. Fisher, WDFW letter to King County dated 1/5/96).

The State Salmon and Steelhead Stock Inventory conducted by the WDFW identifies the run size status of Sammamish River spawning stocks of coho sockeye and winter steelhead as depressed; meaning escapement, run size or survival levels for these stocks are below normal ranges. Of these depressed stocks, only the wild winter steelhead are of native origin to the Lake Washington basin. None of the Lake Washington stocks are candidates for threatened or endangered status under the Endangered Species Act.

Lake Washington also contains a wide variety of non-salmonid fish species, some of which are considered "warm water" species. Easy access to the Sammamish River from Lake Washington makes it likely that many of these lake species make at least temporary journeys into the river. Non-salmonid fish inhabiting Lake Washington and the Sammamish River are both native and non-native in origin, and include Pacific and western brook lamprey; speckled dace; three-spine stickleback; northern squawfish; yellow perch; black crappie; pumpkinseed; peamouth; brown bullhead; largemouth and smallmouth bass; largescale sucker; and prickly sculpin (Pfeifer and Weinheimer 1992; King County 1993).

The inner harbor's value to salmonid fishes is related to a seasonal juvenile rearing and nighttime resting area as well as a migratory transit area; however, the biological function of the harbor to provide backwater rearing habitat for salmonid fishes is limited due to its industrial use. A reduced shallow nearshore littoral zone and lack of a riparian zone in the inner harbor, due to prior shoreline modifications and dredging, further decreases the aquatic productive capacity of the harbor.

Study Methods

Surveys of the physical and biological characteristics of shoreline areas along the site were designed to establish baseline conditions and to guide project design mitigation. These data, in conjunction with review of available scientific literature and interviews of notable fisheries scientists, were then used in the assessment of potential project impacts. Data gathering was conducted in March through June 1996 and April/May 1997. Study methods included a physical and biological sampling program including electrofishing (brief pulses of alternating AC/DC current that temporarily stun fish allowing capture), beach seining (small-meshed nets used to enclose fish when drawn ashore), and snorkeling. Physical sampling was conducted in January and August 1996; electrofishing was conducted in March, April, May and June 1996; and, snorkeling was conducted in May 1996. Additional physical monitoring (water temperature) and biological sampling (electrofishing and gillnetting) of the inner harbor were performed during the 1997 spring outmigration period (April/May) to improve the understanding of fish utilization of deep water habitats in the inner harbor, and to further identify the period of possible overlap between juvenile salmonids and large predators such as squawfish and bass. A detailed discussion on fisheries study methodology is provided in Appendix B to this document.

1996 Methods

Although beach seining was conducted (refer to Appendix B, for a detailed discussion on the performed beach seining), backpack electrofishing was the most effective method of fish sampling because

nearshore habitats posed a number of constraints to other sampling methods. These constraints included: 1) underwater debris and steep, blackberry-laden banks, which made beach seining impractical in the Lake Washington beach area and the Sammamish River; 2) above water and underwater structures that limited the use of a seine net and a boat-mounted electroshocker along nearshore areas of the inner harbor; and 3) turbid water which made accurate fish observation by snorkeling ineffective from late March through mid-May. A summary of the biological sampling effort is presented in Table 13. Backpack electrofishing was the only sampling technique that could be used consistently along the shallow nearshore portions of all three areas. Only the electrofishing data are of sufficient consistency to compare survey results between sampling areas. Data from other techniques were used in a supplemental fashion to increase the understanding of fish use near the site.

1997 Methods

Water temperature measurements of the inner harbor, utilizing thermographs, were made between April 30 and May 19, 1997 (refer to Section 3.1.1 of Appendix B for detail on water temperature data and methods). Salmonids and predators were sampled in the inner harbor using a boat electrofisher. Electrofishing occurred parallel to and as close to the shoreline as possible. Electrofishing was conducted at sub-lethal levels and stunned fish were collected, identified, measured, and their conditions examined. Stomach contents of known predators were analyzed to assess prey item frequency. Gill nets were used as an ancillary method to sample predator populations. All fish caught in the gillnets were measured and examined (refer to section 3.1.2 of Appendix B for detail on fish sampling methods).

Existing Fisheries Resources

Based on the surveys of the physical and biological characteristics of the shoreline areas along the site conducted by Beak Consultants, Inc., a characterization of physical conditions of the shoreline and the fisheries resource utilizing the waters immediately adjacent to the site was made; (Table 14 below summarizes the results of the biological sampling and Tables 3-3 through 3-5 of Appendix B summarize the physical characteristics of the inner harbor). The physical habitat characteristics were used to derive the assumption of fish use, rather than the presence or absence of fish in the biological surveys. In combination, these results were used conservatively to define all possible use by fish species. A description of the physical and biological characteristics of Lake Washington, the Sammamish River, and the inner harbor is provided below.

Lake Washington Shoreline Characterization

Physical Conditions

Approximately 500 (152 m) feet of Lake Washington shoreline borders the western edge of the site. The Lake Washington shoreline gradually increases in depth from the shore westward towards the center of the lake. Depth contours along the Lake Washington shoreline are displayed in Figure 3-3B of Appendix B. Representative cross section profiles of the shoreline are presented in Figure 3-5 of Appendix B. The Lake Washington shoreline has a considerable area of shallow littoral zone (area situated nearshore less than 10 feet in depth) relative to the Sammamish River and the inner harbor.

Table 3-6. Results of night electrofishing, night seining, day electrofishing, and day snorkeling efforts associated with Lakepointe fisheries studies occurring March through June 1996.

Species	Night electrofishing			Night seining[1]		Day electrofishing			Day snorkeling		
	Inner Harbor	Lakeshore	Sammamish River	Lakeshore	Sammamish River	Inner Harbor	Lakeshore	Sammamish River	Inner Harbor	Lakeshore	Sammamish River
Chinook salmon	0	10	3								
Coho salmon	3	12	7	1							
Sockeye salmon	0	6	3						60[2]		
Cutthroat trout*	2	9	9							1	2
Rainbow trout*	5	4	6						2		
Total salmonids	**10**	**41**	**28**	**1**	**0**	**0**	**0**	**0**	**62**	**1**	**2**
Northern squawfish*	53	8	1	3		6	0	0			
Largemouth bass*	4	0	0						2		
Pumpkinseed*	32	1	0			7	0	0			1
Prickly sculpin*	136	115	134	5	X	55	45	15			6
Three-spine stickleback	181	67	43	3	X	17	8	7	X	X	17
Pacific lamprey	7	0	0			2	0	0			
W. brook lamprey	0	0	1								
Brown bullhead*	5	0	0								
Yellow perch*	0	5	1						3	14	
Largescale sucker	0	0	1								
Total non-salmonids	**419**	**196**	**180**	**8**	**X**	**97**	**53**	**22**	**X**	**X**	**24**

[1] Seining was not practical in the inner harbor area.
[2] School of approximately 60 salmonids, believed to be sockeye.
X - Species present, but not enumerated.
* - Known salmonid predators

Table 3-2. Summary of Lakepointe fisheries surveys including sampling dates; sampling methods; and Secchi transparency and water temperature measured in the inner harbor, Lake Washington and Sammamish River during the surveys.

		Secchi depth (feet)			Water temperature (°C)	
Date (time)	Sampling method	Inner harbor	Lake Washington	Sammamish River	Inner harbor	Sammamish River
3/29/96 (Evening)	Electrofishing, seining	3.0	4.5	NM	NM	11
4/12/96 (Evening)	Electrofishing	3.5	3.4	4.4	NM	13
4/29/96 (Evening)	Electrofishing	3.8	3.5	4.3	17	15
5/06/96 (Evening)	Electrofishing, seining	5.0	4.5	5.2	17	15
5/26/96 (Day)	Snorkeling	9.0	>6.5	5.5	8.5	NM
5/27/96 (Evening)	Electrofishing	7.5	NM	>6.0	14	14
5/30/96 (Day)	Electrofishing	6.0	6.0	>4.5	16.5	16
6/14/96 (Day)	Electrofishing	8.0	NM	>4.5	18	19
6/24/96 (Evening)	Electrofishing	6.4	6.2	>4.5	21	19.5

NM = Not measured

The substrate is small gravel and sand at the wave-swept shoreline. However, it is predominately sand and mud farther from shore. Several large logs lie parallel to the shore along the waterline. A band of Eurasian milfoil (*Myriophyllum spicatum*) extending from the shoreline to at least 50 feet (15 m) from shore was observed in May and June 1996.

The riparian buffer between the existing on-site industrial uses and the lakeshore is approximately 45 feet (14 m) wide and is dominated by reed canary grass and blackberry and also includes mature Douglas fir, red alder, black locust and cattails. The Douglas fir grow in a single row parallel to the lakeshore and are approximately 45 feet (14 m) from shore. The reed canary grass and blackberry grow right to the shoreline and overhang the water.

The Lake Washington shoreline contains no bulkhead, no area of artificial shoreline overhang, and no unfixed floating structures. Submerged car tires, cement blocks, and other industrial debris are present along the entire length of the shoreline. There are 18 emergent and submerged wooden pilings located offshore near the confluence with the Sammamish River. The pilings at the Sammamish River mouth do not support any structure.

Fisheries Conditions

Nighttime electrofishing surveys found that prickly sculpin and three-spine stickleback were the most common species along the Lake Washington shoreline (refer to Table 14). Northern squawfish were collected infrequently, but not in the vicinity of the wooden pilings located near the mouth of the Sammamish River. Yellow perch were collected in May and June along the lakeshore in areas of fresh milfoil (*M. spicatum*) growth. Yellow perch move into shallow water in the spring to spawn and use vegetation or submerged brush as egg attachment sites (Wydoski and Whitney 1979). The yellow perch were likely spawning on or amongst the milfoil. No largemouth bass or pumpkinseed were found along the nearshore area of the lake during the spring 1996 sampling. Suitable habitat occurs for both species at the Sammamish River mouth (location of emergent and submerged pilings), and it is assumed bass and pumpkinseed would be present at least during certain times of the year.

Anadromous salmonids, including juvenile/adult rainbow and cutthroat trout, sockeye fry, coho fry, chinook fry and coho juveniles were collected in Lake Washington (refer to Table 14). More juvenile anadromous salmonids were collected along the Lake Washington shoreline than in the inner harbor or the Sammamish River.

Evening seining survey data were similar to the evening electrofishing survey results. Two seine hauls were attempted along the north end of the shoreline, but the net snagged numerous times on underwater debris and had to be lifted to be freed. Lifting the seine allowed fish to escape the net. Five prickly sculpin, three northern squawfish, and two three-spine stickleback were collected on the evening of 29 March. One yearling coho and one three-spine stickleback were collected on the evening of 6 May.

Daytime electrofishing surveys detected only prickly sculpin and three-spine stickleback. Yellow perch were the most common fish species observed while snorkeling. The perch were scattered along the bottom among fresh milfoil growth. One juvenile/adult rainbow trout was observed during snorkeling. No largemouth bass, pumpkinseed or northern squawfish were observed along the Lake Washington shoreline during daytime snorkeling or daytime electrofishing.

Summary of Physical and Biological Conditions

The lakeshore contains no shoreline treatments, no floating structure and the only significant in-water structure is near the Sammamish River mouth where 18 wooden pilings are located. The lakeshore has an extensive littoral zone. Of the three study areas, salmonids were found in greatest abundance along the Lake Washington shoreline. The primary value of the shallow shoreline habitat is for salmonid rearing and possibly staging prior to further migration offshore into the lake.

Sammamish River Characterization

Physical Conditions

Approximately 2,000 feet (610 m) of the north bank of the Sammamish River border the Lakepointe site. The north bank has a narrow band of shallow beach habitat until the point where the channel is influenced by the ongoing dredging activity; then the depth abruptly increases (Figure 3-7 of Appendix B). The nearshore substrate is influenced by wave action from Lake Washington, and consists of small gravel and sand. Outside the zone of wave influence, the substrate is dominated by sand. It progressively includes a higher proportion of soft or hard silt as the water deepens.

The riparian buffer between the industrial uses and the Sammamish River is approximately 25 feet (8 m) wide. Riparian vegetation includes a single line of mature Douglas fir and black cottonwood, but it is dominated by reed canary grass and dense blackberry bushes that overhang the bank. Due to the width of the Sammamish River at the confluence with Lake Washington and the angle of the river to the sun, the thin band of Douglas fir and black cottonwood provides minimal shading of the river from solar radiation. Such riparian habitat conditions are not exclusive to the Sammamish River mouth, as fish habitat along the entire length of the Sammamish River is limited by warm water temperatures in the summer and a lack of bank cover (King County 1993).

The Sammamish River along the site contains no bulkhead, no area of artificial shoreline overhang, and no floating structures. Root masses and single wooden timbers are present at various points along the north bank and they provide the only in-channel cover in nearshore areas.

Biological Conditions

Nighttime electrofishing surveys indicated that prickly sculpin were the most common species, followed in abundance by three-spine stickleback (Table 14). Yellow perch were collected in the Sammamish River in May and June 1996. Warmwater species were nearly as abundant in the river as they were along the lakeshore.

Five species of salmonids were collected (Table 14). Resident juvenile/adult cutthroat and rainbow trout were collected more frequently in the Sammamish River than in the inner harbor or along the Lake Washington shoreline. Anadromous species of salmonids were more abundant in the Sammamish River than in the inner harbor, but were not as common as along the lakeshore.

Daytime electrofishing surveys collected only prickly sculpin and three-spine stickleback. Three-spine stickleback were the most frequently observed fish species during snorkeling surveys. One adult pumpkinseed was observed in a small floating patch of vegetation. Snorkel surveys detected two juvenile/adult salmonids. No largemouth bass or northern squawfish were observed in the Sammamish River during the spring 1996 snorkel surveys.

Summary of Physical and Biological Conditions

There are no shoreline treatments, no floating structure or no significant in-water structures along the north bank of the Sammamish River. Salmonids were 32 percent less abundant along the north bank of the Sammamish River as they were along the Lake Washington shoreline. The primary utility of the river is as a physically unimpeded migration corridor for adult and juvenile salmonids. The secondary value is for salmonid rearing, but habitat is limited by warm water temperatures in the summer and a lack of instream or bank cover.

Inner Harbor Characterization

Physical Conditions

The US Army Corps of Engineers periodically dredges the inner harbor to support commercial navigation and industrial operations. The middle of the inner harbor is dredged approximately every ten years by the U.S. Army Corps of Engineers to allow access for barges. (US Army Corps of Engineers dredging of the mouth of the inner harbor is scheduled for late 1997). (Future dredging of the inner harbor by the US Army Corps of Engineers is dependent upon the continuation of commercial/industrial activities adjacent to the inner harbor.) As a result of the dredging, water depth drops sharply from the shoreline towards the center of the harbor. Water depth at the edge of existing bulkheads ranges from 15 to 17 feet at ordinary high water. Depth contours of the inner harbor are portrayed in Figure 3-3A of Appendix B. Representative cross section profiles of the southwest shore (west of bulkhead) of the inner harbor are displayed in Figure 3-4 of Appendix B. The southwest shore is the area of the inner harbor that has the most extensive nearshore littoral zone. The majority of the riparian zone of the inner harbor has been altered by shoreline activity related to industrial uses.

Bulkhead extends along portions of both shores of the inner harbor. The majority (59%) of bulkhead is located on the southeast shore. The total length of bulkhead along the inner harbor is 1,041 feet (317 m). In some locations, water intrudes behind the bulkhead for an unknown distance. The material on the inside of the bulkhead is fill.

In addition to bulkhead, artificial overhangs also line the inner harbor. Shoreline overhang shades the water, making fisheries habitat less biologically productive than unshaded areas of the inner harbor (high amounts of shading can reduce the aquatic growth and ultimately reduce fish production). The shoreline is covered by artificial structures in three areas (Figure 3-3A of Appendix B). One shaded area occurs in the eastern corner, where a cement platform is fixed 1.5 feet above the water's surface at ordinary high water (Table 3-4 of Appendix B). The cement overhang is supported by a row of vertical wooden pilings (1 foot in diameter) 0.5 feet apart. As indicated in Table 15, the total area in shoreline overhang is 7,642 square feet.

Offshore in the inner harbor there are numerous in-water structures that are fixed and that provide ambush habitat for salmonid predators. A total of 347 in-water vertical wooden pilings or pier supports are present.

In addition to the fixed structures, unfixed structures such as boats and other floating material are also present in the inner harbor (Table 3-5 of Appendix B). Two barges, regularly used to transport gravel to Kenmore Pre-mix, are temporarily moored in the inner harbor, covering a 13,200 square foot area (Gleason, M., pers. comm., 26 August 1996). The barges are alternatively unloaded and moored in the inner harbor every two to four days. Because the barges are not always present, their operations are estimated to result in a 13,200 square foot area being occupied 50 percent of the year (annual shading equivalent of 6,600 square feet). Likewise, large fishing boats moored in the inner harbor are estimated to occupy a 32,000 square foot area 60 percent of the year (Gleason, M., pers. comm., 26 August 1996) for an annual shading equivalent of 19,200 square feet. Total boat shading is 25,800 square feet. More permanent floating structure is located along the southwest shore of the inner harbor (Table 3-5 of Appendix B). The total area of permanent floating material along the southwest shore is approximately 7,795 square feet. However, the size of this floating material fluctuates depending on the operations of the inner harbor industries. As illustrated in Table 15, the existing shaded area in the inner harbor is 41,237 square feet.

Table 15

Existing Shaded Area in the Inner Harbor

	Existing
Area of shoreline overhang (ft^2)	7,642
Area of floating material (ft^2)	
Floats	7,795
Boats	25,800
Total shaded area	41,237
Linear feet of bulkhead	1,131
Number of in-water pilings	347

Beak Consultants Incorporated, 1997

In addition, the water conditions in the harbor are turbid due to deep draft propeller wash from tug boat use of the harbor.

Biological Conditions

Nighttime electrofishing surveys revealed that the inner harbor primarily supports warmwater fish species. Among the warmwater species, three-spine stickleback, prickly sculpin, juvenile northern squawfish, and juvenile pumpkinseed were found in greatest abundance (refer to Table 14). Of the three areas studied, the inner harbor is the only location where largemouth bass were collected; although juveniles were encountered nearshore, they were not common.

Three-spine stickleback were the most frequently observed species during the 1996 snorkel surveys. (Three-spine stickleback may have been common in the inner harbor because the soft organic substrate provided spawning habitat). A school of approximately 60 (1+ age) juvenile salmonid smolts (≈ 150-200mm) was observed in the northeast end of the inner harbor. Two largemouth bass (≈ 100-150 mm) were observed during snorkel surveys near the vertical wooden pilings in the southeast corner of the inner harbor.

The inner harbor is typical of preferred spawning and nursery areas for largemouth bass. Bass move from offshore areas in the lake to spawning sites in calm coves and wave-protected beaches when temperatures exceed 13°C. Spawning is initiated when temperatures are between 13 and 16°C (Miller and Kramer 1970). Spawning begins earliest in coves and shallow littoral areas where temperatures are generally 1 to 3°C warmer than the main lake (Wydoski and Whitney, 1979).

Bottom temperatures rose and stayed above 13°C generally in mid-May in the inner harbor. It is assumed the backwater cove offers spawning and fry rearing opportunities for largemouth bass in May and June annually.

All of the northern squawfish collected nearshore in 1996 were juveniles. Young squawfish are known to inhabit the shallow waters of lakes until they mature and move offshore (Scott and Crossman 1973). Squawfish are present in bays generally only during the summer as temperatures reach 22°C. Squawfish prefer waters up to or warmer than the maximum available in Lake Washington (Bartoo 1972). Presumably squawfish move inshore in Lake Washington near the project site during summer to spawn.

Coho salmon fry and juvenile/adult rainbow and cutthroat trout were collected in the inner harbor in 1996, but based on electrofishing data, they were not as abundant as they were along the Lake Washington shoreline or the Sammamish River.

Fish sampling surveys in April/May of 1997 also revealed the presence of various warmwater and cold water species in the inner harbor. The cold water species were all salmonid fishes including juvenile chinook, coho, sockeye and resident adult rainbow and cutthroat trout. The juveniles were collected along the perimeter of the inner harbor, usually within 30 ft of the shore via electrofishing, whereas the resident adults were captured by gillnets in deeper more offshore positions than the juveniles. Coho salmon smolts (110-160mm) were found in the greatest abundance (Table 3-6b). The dominance of coho smolts in the catch on 12 May 1997 was most likely the capture of yearling coho salmon released from the Issaquah Salmon Hatchery into tributaries of Lake Sammamish, the Sammamish River and north Lake Washington from 7 through 14 April 1997 (Table 3-1b). The collected coho smolts were likely from the Issaquah Hatchery due to the time period that elapsed between when the smolts were released and when they were captured. Another factor indicating that the coho smolts were of hatchery origin was the great abundance of smolts in the inner harbor on the sampling date (May 12) relative to any other sampling date.

Among the warmwater species, three-spied sticklebacks, and large scale suckers were collected most frequently. Tench, brown bullhead and northern squawfish were also observed in moderate densities. Sticklebacks were only captured by electrofishing techniques and tench were only collected via gillnetting. The other noted warmwater species were collected by both methods.

The only potential predators collected in the inner harbor that were large enough to prey on juvenile salmonids were the resident cutthroat and rainbow trout, brown bullhead, northern squawfish, black crappie, largemouth bass, smallmouth bass, and pumpkinseed. The stomachs of one rainbow, three squawfish and one bullhead were dissected. None of the stomachs contained any salmonid fishes. The squawfish and bullhead were ripe with females possessing well developed eggs and the males supported extended gonadal development, indicating spawning. Many warmwater species curtail or reduce feeding activities during spawning periods (Stein 1970, Helfman 1981).

The following summarizes the condition of salmonid predating in the inner harbor, by fish species.

Northern Squawfish: Sampling conducted for this proposal collected juvenile squawfish (40-80 mm) in the shallow nearshore areas of the inner harbor during spring. Adult squawfish (120-470 mm) were collected in the inner harbor in mid-May 1996 at a surface water temperature of 16°C. The timing of squawfish in the inner harbor was similar to the noted presence of squawfish in nearshore areas of southern Lake Washington (Martz et al. 1996).

Squawfish are voracious predators on small fishes, but primarily target longfin smelt and juvenile sockeye salmon in offshore areas of the lake during fall, winter and spring. According to life history studies of northern squawfish in Lake Washington, squawfish overwinter in deep portions of Lake Washington and do not move into shoreline littoral zones until May or June each year (Bartoo 1972; Olney 1975). Sockeye predation may be seasonal (Levy 1987). As they move inshore in late spring and summer their diet changes to more profitable species and insects in the littoral zone (Ricker 1941; Bartoo 1972; Olney 1975; Eggers 1978; Levy 1987). They especially exploit the abundant prickly sculpin in Lake Washington (Eggers 1978; Eggers et al. 1978).

Movement to inshore areas appears to be primarily related to spawning (Jeppson 1957; Bartoo 1972; White 1975; Martz et al. 1996). Many freshwater species are known to reduce or cease feeding during the spawning season (Stein 1970, Helfman 1981; Martz et al. 1996). Fish sampling in 1997 showed no evidence of salmonids in stomachs collected from inner harbor and all squawfish were noted to be in spawning condition. No literature or information was found indicating squawfish use in water structures as ambush cover.

Thus, salmonid predation in the inner harbor is currently minimized by: the spatial timing of habitat use between squawfish and salmonids overlap for only a brief period at the end of the juvenile outmigration (mid-May to mid-June); squawfish presence in the inner harbor during this overlap period is primarily related to spawning (it is assumed feeding during this period is reduced); and, squawfish shift their diets during the seasonal inshore phase to focus on littoral fish, primarily prickly sculpin, and insect species.

Largemouth Bass: Sampling conducted for this proposal collected or observed yearling largemouth bass (90-150 mm) in the shallow regions of the inner harbor during spring.

Juvenile salmonids use the Lake Washington lakeshore and the inner harbor during outmigration from the Sammamish River in late winter and spring when shoreline water temperatures are in their preferred temperature range. Bass prefer warmer water temperatures and occupy the deep waters of the lake

during winter and move to shoreline habitats when temperatures increase in late spring and early summer, after the majority of outmigrating salmonids have vacated the shallow water areas for cooler and deeper waters offshore (Tabor and Chan 1996). Quiescent backwater areas with piling structure are known spawning areas for bass. The use and timing of abundance of these fish in the inner harbor may be more directly related to spawning, nest protection and juvenile rearing than to adult foraging. Foraging markedly decreases during spawning and nest guarding periods (Stein 1970; Helfman 1981). Largemouth bass are primarily carnivores feeding on both fish and invertebrates. Largemouth bass are known to consume juvenile salmonids, but not in large numbers. Stein (1970) states the value of salmonids as forage for largemouth bass in Lake Washington is thought to be quite limited.

Bass are known to be actively feeding during twilight periods and into the evening. The behavior of salmonids seeking shallow nesting spots nearshore at night where large predators cannot maneuver, may further reduce the probability of enacting with bass.

Salmonid predation in the inner harbor is currently minimized by: largemouth bass not abundant in Lake Washington (Fayram, A.H. 1996); the timing of habitat use between bass and salmonids likely overlap for only a brief period at the end of the juvenile outmigration (mid-May to mid-June); the inner harbor offers suitable characteristics and water temperatures for bass spawning beginning in mid-May annually (it is assumed bass use this area more for spawning than for foraging and that bass feeding is reduced during the spawning season); Lake Washington largemouth bass are not specifically targeting juvenile salmonids; and, salmonid nighttime and predator avoidance behaviors may reduce interaction with bass.

Resident Trout: Both yearling and adult resident rainbow (130-355 mm) and cutthroat trout (120-420 mm) were collected in small numbers during spring sampling in the inner harbor. These fish have been reported to consume large numbers of juvenile salmonids in Lake Washington. However, in-water structure has not been reported to increase their advantage as a predator.

Summary of Physical and Biological Conditions

The majority of shoreline treatments, in-water structure and floating structure located along the site was found in the inner harbor. Warmwater fishes were found to use shoreline areas of the inner harbor more frequently than the other two areas. Salmonids were found to use the shoreline of the inner harbor during their spring outmigration period. However, as determined by electrofishing surveys, salmonids were not as common along the inner harbor nearshore as they were along the Lake Washington shoreline or in the Sammamish River.

Fish habitat in the inner harbor is less optimal than the lake or river for the production of salmonid fishes. The inner harbor is currently an industrialized site with the following habitat conditions: limited natural habitat conditions (majority of shoreline materials are either fill or bulkhead); shallow water habitat, extensively used by juvenile salmonids, is limited; the central portion of the harbor is dredged; there is no riparian vegetation; water is turbid (due primarily to tugs); the amount of artificial shading is relatively high; water temperatures are relatively high; and, artificial lighting exists.

As such, the inner harbor does not currently offer quality rearing habitat conditions for salmonid fishes. It is likely used seasonally (March-June) by juvenile salmonids as a transit zone to other littoral areas in northeastern Lake Washington. Secondarily, it may offer limited seasonal rearing opportunities.

Lighting

Salmonids use the cover of darkness to rest along the nearshore areas of the river and along the waterfront at night. Increased artificial light can expose them to avian predators in the shallow water or fish predators if they moved into deep water to avoid the light. Tabor and Chan (1996) conclude that artificial nighttime lighting may increase predation of sockeye fry in the Cedar River. Refer to Appendix B for additional detail on how lighting levels relate to fish behavior.

The existing level of nighttime lighting along the inner harbor waterfront and along the river bank is relatively high. Located along the Sammamish River are five light standards, 30 feet high, supporting high pressure sodium lamps, which are likely 250 watts each (Sparling and Candela 1996). The cement plant also has numerous site and building safety lighting, including flood lights mounted to the sides of many buildings. Many of these lights illuminate the inner harbor at night.

Due to infrequent spacing of lights, the measured light intensity at ground level varies. The central portion (interior portion) of the site is relatively dark, whereas the site area in the vicinity of the cement plant and along the Sammamish River had an average light level of 2.5-foot candles with high spots exceeding 5.0-foot candles (Sparling and Candela 1996). The high light level spots are located in the vicinity of the cement plant.

Given the high level of existing night lighting adjacent to the inner harbor, the inner harbor's value as resting and nighttime refuge habitat for juvenile salmonid fishes is diminished compared to unlit sections of the lake.

Water Temperature

The highest annual water temperatures for the Sammamish River are typically recorded in July or August and generally range from 18.4 to 22.0 C (King County 1993). High seasonal temperatures are due primarily to the warm surface water of Lake Sammamish flowing into the river and also to the scarcity of riparian trees and shrubs along the banks of the river to provide shade. These high temperatures exceed the thermal optima for most coldwater salmonid species and may impede migration of adult sockeye and chinook salmon in the late summer and early fall. They may also reduce the feeding and growth potential of rearing juvenile salmonids. These temperature recordings do not exceed lethal temperatures reported in the literature which occur around 24 C for the most sensitive salmonid species (USEPA 1986; Bell 1990). Lake Washington surface water temperatures near the site (King County Department of Natural Resources water quality station # 804 in Kenmore) are similar to the Sammamish River due to the high level of river influence on the surface water of the lake at this location.

Surface water temperatures in the backwater area of the inner harbor are anticipated to be similar to or slightly higher than temperatures in the river. Measurements taken during fishery studies recorded temperatures up to 21 C in June 1996 (temperature would be several degrees higher in July and August). Continuous temperature measurements in April and May 1997 recorded daily water temperatures at the surface of the inner harbor between 12 and 17.6 C. The maximum temperature was 20.6 C. Temperatures near the bottom of the inner harbor averaged approximately 1.4 C cooler than surface temperatures. Salmonids have shown a general level of avoidance for water temperatures exceeding approximately 19 C to 21 C (Beak Consultants, 1997).

Fishing Pressure

There is no commercial or active tribal fishery in the Sammamish River. However, sport fishing is a popular activity on the Sammamish River and Lake Washington. The Kenmore area of Lake Washington, near the mouth of the Sammamish River, was noted in the Lake Washington/Lake Sammamish Access Map & Gamefish Guide as a good area in Lake Washington to catch largemouth bass and cutthroat trout (WDFW, no date).

A WDFW public boat launch is located on the south bank of the Sammamish River immediately downstream of the 68th Ave. NE bridge. The boat launch is frequently used by sport anglers and by recreational boaters and jet ski enthusiasts bound for Lake Washington. As a result, boat traffic in the lower reaches of the Sammamish River can be heavy during periods of suitable weather.

IMPACTS OF THE PROPOSED ACTION

Shoreline and Wetland Habitat

The Proposed Action would not result in any direct impacts to the two existing on-site wetlands (Wetlands A and B). However, the public access trail proposed near the Lake Washington shoreline would impact approximately 7,470 square feet (0.17 acre) of Wetland A buffer (including 4,744 square feet of non-vegetated area that has been disturbed by past industrial activities and 2,725 square feet of vegetated area). Approximately 5 percent of the impacted area (2,725 square feet) currently supports vegetation, comprised of a few scattered Douglas fir trees over a dense understory of Himalayan blackberry. Three Douglas fir trees with an average diameter at breast height (dbh) exceeding eight inches, meeting the "significant tree" criteria as defined in the NSCP, would be removed to accommodate the public access trail along the Lake Washington shoreline.

No vegetation would be removed from wetland A; therefore, shoreline protection, stormwater control, and biological support functions, although of limited value for this wetland, would not be affected. Because the hydrology of Wetland A is controlled by the level of the lake, no hydrologic recharge impacts to the wetland would be anticipated from site development.

Construction of the public access trail, the shoreline park and the three public viewpoints proposed along the Sammamish River would not require the removal of any "significant trees" in this area, as defined above.

An alternative design to the proposed stormwater outfalls along the Sammamish River, could include creating wetland "deltas" and an elevated swale to provide a more varied shoreline. This alternative design could support more native wetland plant communities than the proposed design (see Figure 4-6 of Appendix B). These features could be established above elevation 21 feet and consequently would not be flooded during high water periods. The elevated swale would create a small "island" that would be separated from the main shoreline area by wetland vegetation (see Figure 4-6 of Appendix B). Treated stormwater and roof runoff would discharge into the deltas and elevated swale, if constructed, instead of being piped directly to the river from the proposed biofilter swales. However, implementation of the alternative outfall design would result in the removal of approximately 40 "significant trees" compared to removal of 3 "significant trees" under the Proposed Action. Development of this alternative would

conflict with King County policies to preserve "significant trees". The specific concept for shoreline enhancement would be determined as part of the County's review of the Master Plan and Shoreline Substantial Development permit applications.

Wildlife Habitat

The proposed removal of "significant trees" (3 for the proposed trail in the Wetland A buffer) would not significantly impact wildlife habitat on the site because the majority of the existing trees along the shoreline would be retained and would still be available for perching and shading. Approximately 0.06 acre (2,700 square feet) of vegetated wetland buffer area would be disturbed by the project (public access trail); however, the area of vegetated shoreline along Lake Washington and the Sammamish River would be increased by approximately 0.17 acre and 3.25 acres, respectively, with the proposed shoreline habitat plantings.

The most productive shoreline area in the project site vicinity for fish, and hence feeding area for shore birds and diving birds, is the Lake Washington shoreline along Wetland A. No in-water or nearshore impacts would occur in this area. Shoreline vegetation would not be disturbed; however, 2,700 square feet of vegetated wetland buffer would be removed to construct the public access trail along the Lake Washington shoreline. The removal of vegetation in this specific area may increase the potential for human activity to disrupt shore bird feeding activities along the Lake Washington shoreline. On an overall basis, the features constructed in the shoreline buffer (trail, viewpoints) would provide public access to the Lake Washington and Sammamish River shorelines that is currently not available. Human traffic along the shoreline would increase as a result of the Proposed Action, and therefore, would potentially increase disturbance of certain wildlife along the shoreline.

The only birds observed nesting along the shoreline are Canadian geese. The goose nests observed on the site occurred along the Lake Washington shoreline in Wetland A and along the Sammamish River shoreline. Industrial activity on the areas immediately adjacent to the Lake Washington shoreline has not deterred geese from nesting along the shoreline. Geese are expected to continue nesting in the area during and after construction of the Proposed Action. Because the nearest documented eagle nest is located 1.2 miles from the site, nesting bald eagles would not be affected by the proposal.

The proposal would retain the three cottonwood trees located within the vegetated strip along the sites Sammamish River shoreline which meet the Department of Fish and Wildlife definition of potential eagle perch trees.

Great Blue Heron

The NSCP contains P-suffix conditions specifically attached to the Lakepointe property that call for site development to be pedestrian-oriented, with opportunities for public to access to the shoreline. Further, stated goals of the King County Shoreline Master Program (Title 25) include the provision of public access to shoreline areas. The NSCP also contains area wide Natural Resource Protection policies which call for the buffering of great blue heron feeding areas along the site's Sammamish River shoreline and limiting human intrusion. Although these policies conflict in regards to development in proximity to the site's shoreline areas, the Proposed Action has been designed to attempt to meet the intent of both NSCP

policies and Shoreline Master Program. A description of the Proposed Action's relationship to great blue heron habitat along the shorelines of the Sammamish River and Lake Washington is provided below.

Sammamish River Shoreline

The project would increase the area of vegetated buffer along the Sammamish River shoreline from the existing 5- to 45-foot vegetated width to a 100- to 130-foot vegetated width. This vegetated buffer would convert three acres of currently non-vegetated area to a native forest and shrub plant community. In addition, Himalayan blackberry would be removed from the existing vegetated area (approximately 2 acres) and native woody shrub species would be interplanted. Woody debris would also be selectively placed throughout the buffer.

The NSCP Natural Resource Protection Area-Sammamish River Corridor Habitat P-suffix Condition 3 requires great blue heron feeding habitat to be identified as a Sensitive Area setback area, with a 50-foot buffer placed on each side. Since the feeding habitat on-site is limited to the wetted portion of the river shoreline, the designated Sensitive Area setback area under this P-suffix condition is limited to the wetted portion of the site. Therefore, the additional 50-foot buffer would occur approximately 50 feet landward of the river shoreline. (This Sensitive Area Setback area under P-suffix Condition 3 should not be confused with buffers otherwise required around environmentally sensitive areas designated under KCC 21A.24.) The condition further requires the buffer to be planted with dense native plant material to discourage human intrusion into the feeding areas. The requirements of the NSCP would be met by the proposal since a 100- to 130-foot zone along the river would be vegetated, including planting an average of greater than 50 feet of additional vegetation than now exists, and selected areas would be densely planted to exclude human intrusion.

Consistent with the NSCP P-suffix conditions relating to public access throughout the site and to the site's shorelines, controlled public access would, however, be provided along the shoreline in the form of a trail, three view platforms along the river, and several grassy openings for informal recreational use at least 50 feet away from the shoreline. No trees would be removed along the Sammamish River shoreline. The level of human use of the shoreline area would increase above current human presence. The trail and viewpoints have been designed to provide controlled access points to the shoreline area with the intent to establish use patterns that would allow areas of the shoreline to experience either no or low levels of human use. Interpretive signs would be used along the trail system to educate the public about the wildlife value and use of the shoreline area. Plantings are also proposed that would control movement through the shoreline and wetland buffer areas (e.g., dense plantings, addition of native thorny species). To the extent that human intrusion would occur into the heron habitat area in selected areas, opportunities would be inconsistent with heron habitat protection requirements

The proposed buffer along the Sammamish River would be approximately 0.8 acre greater than the required 100-foot SAO buffer required for the river (a King County Class 1 stream). This is 0.65 acre more than that which is required to compensate for the 6,500 square feet of trail and 1,900 square feet of public view platform area established in the Sammamish River buffer (the majority of this area is currently non-vegetated).

Although human activity along the landward portion of the shoreline would increase above current use patterns, the habitat value of the Sammamish River shoreline would be higher than current habitat conditions because of the expansion of the vegetated shoreline area by 3 acres, retention of all trees, and the establishment of a native shrub understory and the addition of downed woody debris.

Additionally, the proposed Sammamish River shoreline buffer plantings meet the wildlife enhancement recommendations for this reach of the river as recommended by King County Surface Water Management's Sammamish River Corridor Conditions and Enhancement Opportunities Plan (December 1993) which states that "A wider riparian/wetland habitat corridor could be created along the right bank of the river." This strategy is recommended by the plan to be combined with a permanent protection strategy for the blue heron rookery.

Lake Washington Shoreline

Construction of the trail/firelane along the project Lake Washington shoreline would require clearing of 2,725 sq. ft. of vegetated wetland buffer, ranging from 25 feet from the lakeshore edge at the closest point to greater than 50 feet from the lakeshore at the furthest point, all located in the northern portion of the Lake Washington project shoreline (refer to Appendix B Technical Report on Natural Resources, Figure 4-4, page 4-11). This clearing would remove three Douglas fir trees (dbh 12- to 14-inches) and one 7-inch dbh big-leaf maple tree. The project would vegetate 7,117 sq. ft. of wetland buffer currently non-vegetated and an additional 7,470 sq. ft. of non-vegetated upland area beyond the buffer along the southern Lake Washington shoreline area. This would provide a buffer along the Lake Washington wetland ranging from 10 feet at the closest public access in the center of the Lake Washington shoreline, 50 feet wide along the northern Lake Washington shoreline, and greater than 100 feet wide along the southern Lake Washington shoreline. The invasive, non-native blackberry vegetation in the currently vegetated areas would be removed and native woody species interplanted in the understory. No public viewpoints could be established along the Lake Washington shoreline, however the public trail forming a portion of the public amphitheater in the central shoreline would form the closest approach to the water (approximately 25 feet) and the narrowest point of the buffer and distance to lake shoreline.

The trail/firelane would change the pattern of human use adjacent to the Lake Washington shoreline. Industrial activities currently occur in this area during daylight hours. However, the Proposed Action would allow 24-hour access to the trail system. The trail would be designed along this shoreline to limit people's access to the trail with the use of a split rail fence along the trail and interpretive signs. Dense or thorny plantings would also be used to discourage off-trail movement to the water's edge.

The above would be intended to limit disturbance to the great blue heron feeding area in the shallow waters along this section of Lake Washington shoreline. Although the NSCP P-Suffix condition applies to the Sammamish River shoreline and not to the Lake Washington shoreline on the Lakepointe site, a 50- to 120-foot wide vegetated buffer would be provided from the lakeshore edge except for approximately 50 linear feet where the trail/firelane comes to within approximately 25 feet of the shoreline via a semi-circular trail. Fencing, dense plantings and interpretive signs would be used to prevent the public from accessing the entire lakeshore and prevent direct viewing of the littoral zone within the narrower buffer zone.

Fisheries

Direct Fisheries Resource Impacts

Under the Proposed Action, the Master Plan calls for some development in areas adjacent to the Sammamish River, Lake Washington ,and the inner harbor; the Master Plan would also include some development over and within the inner harbor. The proposed development features which could directly

impact existing shoreline riparian and fisheries habitat include: a public shoreline park along the north bank of the Sammamish River and Lake Washington; a fixed moorage pier, public esplanade (boardwalk), public viewpoints and plazas along the southern and eastern shores of the inner harbor; and, a marina within the inner harbor.

Anticipated fisheries resource impacts to Lake Washington, the Sammamish River and the inner harbor resulting from the Proposed Action are described below. To provide a conservative analysis of potential impacts, the physical habitat characteristics of the lake, river and inner harbor were used to derive the assumption of fish use rather than the actual presence or absence of fish that resulted from the biological surveys. This approach, therefore, assumes more fish presence than indicated by the biological surveys.

Lake Washington and Sammamish River

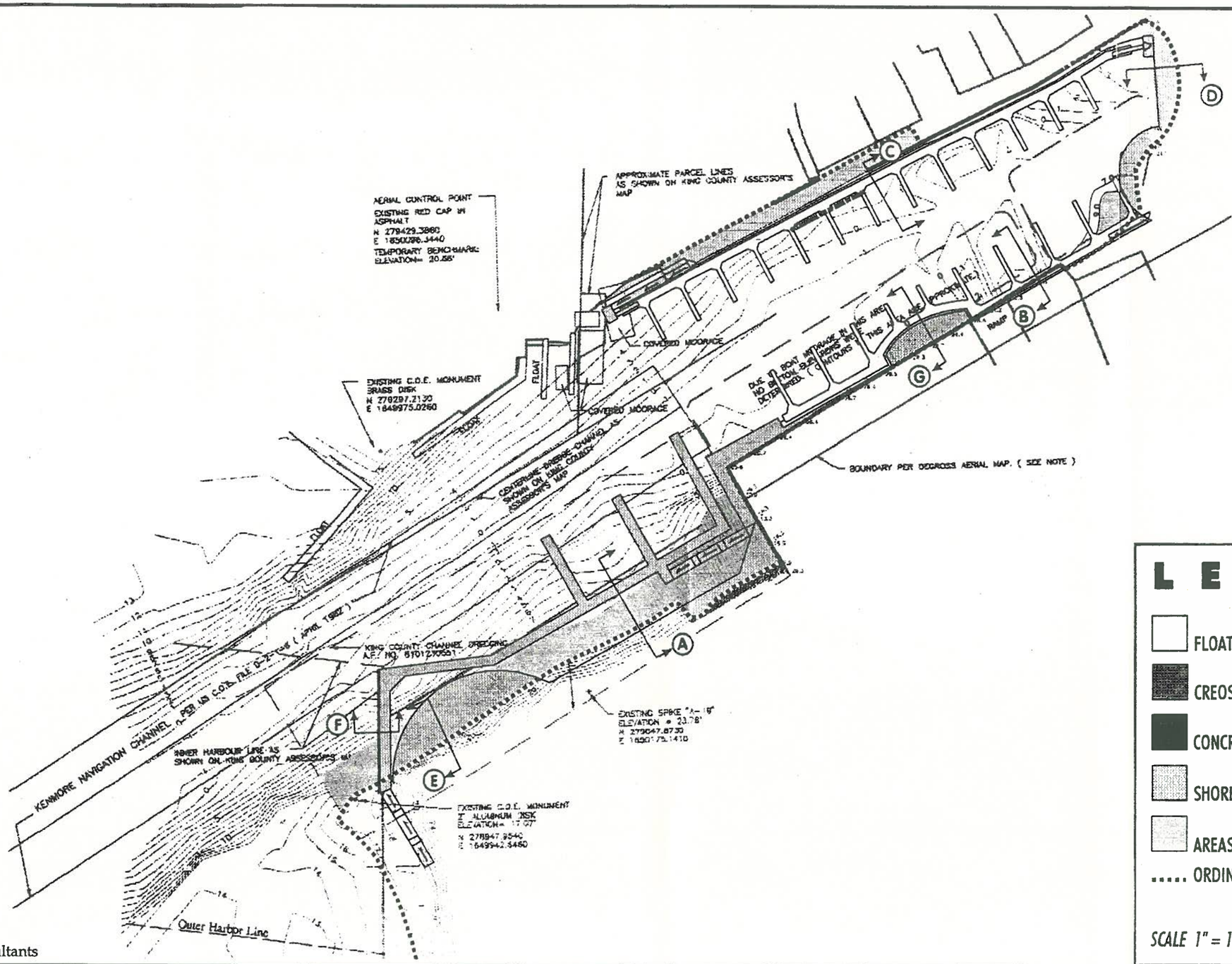
The Proposed Action would not include structures below the "ordinary high water mark" along either the Sammamish River or Lake Washington. Therefore, the physical and biological functions of the lake and the river would not be altered from current conditions. The shoreline park is not expected to significantly modify the riparian zone. However, removal of a few Douglas fir and cottonwoods (not meeting the definition of significant trees per KCC 21A.24) would be required during park construction. Similarly, Douglas fir along the north end of the Lake Washington shoreline may be removed during construction of the public access trail, firelane and amphitheater. Such removal is not expected to affect the function of the riparian zones in these areas for fish species since the trees currently provide little, if any, thermal protection for the river or bankside cover for fish.

Inner Harbor

The proposed development of the public esplanade and marina along and within the inner harbor would require the use of existing bulkheads, new over-water structures (overhangs), new floating structures, and new in-water structures. (It should be noted that although development of the northern portion of the proposed marina, including several slips and shoreline overhang, is not included in the Commercial Site Development permit application and would be subject to a rezone approval as part of a future application, analysis of full development of the marina is provided here to provide a cumulative analysis of all aspects of the proposed marina and identification of appropriate mitigation.) The proposed marina would also include the establishment of fixed and floating piers. A discussion on the fisheries impact from each of these over- or in-water structures is provided below. A graphic representation of all proposed over- or in-water features is presented in Figure 18.

Bulkheads

Existing bulkheads in the inner harbor would be used in conjunction with the proposed floating moorage and fixed wharf structures. No new bulkheads or fill are proposed; therefore, no further loss of shallow water habitat for fish rearing and refuge because of bulkhead construction would occur as a result of this development. In addition, approximately 115 lineal feet of existing bulkhead along the eastern shore would be removed to create approximately 3,000 square feet of shallow water habitat for juvenile salmonids (refer to the mitigation portion of this section for detail).



Source: Beak Consultants

Huckell/Weinman Associates, Inc.	Lakepointe Mixed-Use Master Plan	Figure 18 Proposed Marina Structures

Over-water Structures

Approximately 32,488 square feet of fixed surface area and 12,700 square feet of floating surface area (compared to 7,642 and 7,795 under existing conditions, respectively) would be constructed over the surface waters of the inner harbor as shown in Figure 18 and listed in Table 16. An additional annual equivalent of 14,632 sq.ft. of floating surfaces from boats moored (compared to 25,800 square feet in the existing condition) in the marina are estimated with project development. The proposed over-water structures would cast approximately 45 percent more shade than the existing structures in the harbor.

Table 16

Summary of Existing Conditions and Proposed Shoreline Treatments and Water Structures

	Existing	Proposed
Area of shoreline overhang (ft^2)	7,642	32,488
Area of floating material (ft^2)		
Floats	7,795	12,700
Boats	25,800	14,632
Total shaded area	41,237	59,820
Linear feet of bulkhead	1,131	1,016
Number of in-water pilings	347	449

Source: Beak Consultants, 1997.

Fixed Over-Water Structures

The fixed wharf structures would be built approximately 5 feet above the ordinary high water mark (OHWM) and shoreline overhang would vary from 1 foot to 50 feet in width (see Figure 3-10 of Appendix B). The height of the structures would allow more light to penetrate the water compared to near surface structures, especially along the north shore of the inner harbor where the angle of the sun would provide substantial underwater illumination. To preclude adverse effects of shading, all overhanging structures would be designed to pass ambient light by means of openings, gratings, or clearstory in the decking or they would include artificial lighting beneath the wharf. The fixed moorage pier and public esplanade, which would extend approximately 35 feet offshore, have been designed to allow unhindered light penetration to a majority of the shallow water littoral zone located on the southwest shore (Figure 18).

Under the Proposed Action, the greatest amount of shading impact to salmonid fishes in the inner harbor would occur along the southern harbor shoreline where some usable littoral habitat exists. Although salmonid fish were found in this location, the shoreline has been previously dredged and offers only limited habitat value. Approximately 16,000 square feet of existing shallow water (<10 ft) rearing habitat would likely have some degree of shading from proposed

overhangs. Given the amount of developed structures that would overhang the OHWM and the number of deck openings that would be incorporated into the overhangs to allow passage of ambient light, the amount of shading beneath the overhangs would not be anticipated to adversely affect either salmonid use or aquatic productivity of the shallow water littoral zones in the inner harbor. Overall aquatic productivity may be improved with the anticipated reduction of turbid water conditions in the inner harbor once the cessation of deep draft prop wash from tugs occurs. Some overhanging shade conditions may be a benefit to nearshore salmonid use, given the lack of any riparian zone and associated shading in the inner harbor.

Floating Over-Water Structures

Marina finger piers, access floats and moored boats would cast shade. The annual shade from floating surfaces is estimated to be 27,332 square feet or approximately 0.6 acres (16% of the inner harbor). Both predator and prey species should be attracted to the cover provided by floating structures. However, the available scientific literature suggests these types of structures may be a benefit to small fishes (<100mm). Prey fish species are particularly attracted to floats to obtain protection from predators (Helfman 1979). Helfman observed that fish densities under floats were positively correlated with float surface area. This study strongly implicated shade, provided by the floating objects, as the attractive factor with predator avoidance as the ultimate cause. Shade from surface water cover offers visual cover, decreasing prey visibility while increasing approaching predator visibility. Helfman surmised prey fishes hovering in the shadow of a float are not only more difficult to see, they should also be able to see an approaching predator before the predator sees them. This research supports the common understanding that marina floats and piers in the Pacific Northwest have long been known to attract and be beneficial to juvenile salmonids.

Based on a review of the literature, it is concluded that floating structures would improve survival of salmonids compared to areas without cover, even though both predators and prey are in the same area. Increasing floating surfaces in the inner harbor would not be expected to increase predation rates on juvenile salmonids (Beak Consultants, 1997)

In-Water Structures

The fixed over-water structures would be supported by 449 in-water pilings (compared to the existing 347 in-water pilings in the inner harbor) at an average rate of one pile per 100 square feet. A 30 percent increase in the number of pilings over the current level of pilings in the inner harbor is anticipated with project development (see Table 16). If cement pilings were used, only cured cement would come into contact with surface waters, precluding any influence to pH from the cement.

The existing pilings in the inner harbor which are in good condition and in a suitable location would be retained; the piles not in suitable physical condition would be removed and disposed off-site in a location approved for such disposal. Removal of some existing piling would be required to create fisheries mitigation to improve habitat for juvenile salmonids.

Pilings would support a food base for fish and would add structure and cover for various species. A general perception may exist that piling structures provide cover for salmonid predators and will,

therefore, lower the value of the inner harbor for salmonid use. However, there is little scientific literature to support this contention. Beauchamp et al. (1994) found that piers had no significant effect on densities of littoral fishes. Daytime densities and species composition of fishes associated with piling-supported piers did not differ significantly from adjacent no-pier areas (Beauchamp et al. 1994). In addition, White (1975) found no greater predation on salmonids in areas built out with docks and pilings compared to open water areas in Lake Washington. Similarly, Tabor and Chan (1996) found that largemouth and smallmouth bass rarely preyed on sockeye juveniles emanating from the Cedar River. The authors believe the low predation rate results because habitat utilization by bass/squawfish and salmonid fry rarely overlap during the time of peak outmigration by salmonid fry spawned in the Cedar River.

Sampling conducted for this proposal in 1996 and 1997 collected various fish species regarded as potential salmonid predators (Tables 3.6a, b of Appendix B). The literature concerning salmonid predation in the lake suggest the northern squawfish, largemouth bass, and resident trout have the capacity to take significant quantities of juvenile salmonids. Squawfish and resident trout are considered abundant in Lake Washington, largemouth bass are not (Bartoo, 1972). The following summarizes the anticipated condition of salmonid predating, by fish species, in the inner harbor with the proposal.

Northern Squawfish: Sampling conducted for this proposal collected juvenile squawfish (40-80 mm) in the shallow nearshore areas of the inner harbor during spring. Squawfish are voracious predators on small fishes, but primarily target longfin smelt and juvenile sockeye salmon in offshore areas of the lake during fall, winter and spring.).

Salmonid predation in the inner harbor is currently minimized by: the spatial timing of habitat use between squawfish and salmonids overlap for only a brief period at the end of the juvenile outmigration (mid-May to mid-June); squawfish presence in the inner harbor during this overlap period is primarily related to spawning (it is assumed feeding during this period is reduced); and, squawfish shift their diets during the seasonal inshore phase to focus on littoral fish, primarily prickly sculpin, and insect species.

It is understood that the late spring movement of squawfish to the inner harbor is primarily spawning related. Summer residence is assumed in this warm backwater area, since squawfish seek preferred water temperatures > 22°C (Bartoo 1972). However, target food sources during this period are non-salmonid. It is concluded that an increase in in-water structures with project development would be unlikely to alter the existing predator-prey relationship between northern squawfish and juvenile salmonids.

Largemouth Bass: Sampling conducted for this proposal collected or observed yearling largemouth bass (90-150 mm) in the shallow regions of the inner harbor during spring.

Salmonid predation by largemouth bass in the inner harbor is currently minimized by: largemouth bass not abundant in Lake Washington; the timing of habitat use between bass and salmonids likely overlap for only a brief period at the end of the juvenile outmigration (mid-May to mid-June); the inner harbor offers suitable characteristics and water temperatures for bass spawning beginning in mid-May annually (it is assumed bass use this area more for spawning than for foraging and that bass feeding is reduced during the spawning season); Lake Washington largemouth bass are not specifically targeting juvenile salmonids; and, salmonid nighttime and predator avoidance behaviors may reduce interaction with bass.

It is concluded that an increase in in-water structures with project development is unlikely to alter the existing predator-prey relationship between largemouth bass and juvenile salmonids (Beak Consultants Inc. 1997).

Resident Trout: Both yearling and adult resident rainbow (130-355 mm) and cutthroat trout (120-420 mm) were collected in small numbers during spring sampling in the inner harbor. These fish have been reported to consume large numbers of juvenile salmonids in Lake Washington. However, in-water structure has not been reported to increase their advantage as a predator. As such, it is concluded an increase in in-water structures with project development is unlikely to alter the existing predator-prey relationship between resident trout and juvenile salmonids.

Given the current abundance of potential predators in this location, salmonid fishes are likely exposed to a greater incidence of predation in the inner harbor than elsewhere in the vicinity of the proposed project. This is especially true since prey have little access to shallow shoreline areas for cover. The abundance of proposed in-water structures in the inner harbor would likely enhance spawning opportunities for bass in the inner harbor and potentially add additional ambush cover. However, given the existing habitat in the inner harbor, the anticipated increase would not change the character of the present adverse environment for salmonid fishes.

Marina

The proposed marina would add narrow fixed piers along the south end of the harbor and floating piers around the perimeter as shown in Figure 18. Slips for approximately 50 recreational boats between 30 and 50 feet in length would be provided. Transit moorage for boats 75 to 100 feet in length would be available at the fixed moorage pier. There would be no live-aboard residents. Similarly, no pump out, fueling or haulout facilities would be incorporated, since they exist nearby at marina facilities to the west of the Kenmore Air Harbor facility.

The shading/predation effects of fixed and floating piers from the marina have been included in the previous discussion in this section (Over Water and In-water Structures). All of these structures would be narrow and longitudinal in shape. The fixed piers would be 10 feet wide and the floating finger piers would be 8 feet wide. Although some shading of the surface waters would occur with these features, the shading would alternate with lighted portions of the harbor and would not be expected to extend to the bottom of the harbor. Salmonids of all size classes are known to frequent and use the floating structures of marinas for feeding opportunities and for cover. Predators may also use these structures, but an increase in predation over current levels is not anticipated (White 1975). As indicated previously, floats have been shown to be a benefit to small fish with respect to predator avoidance (Helfman 1979). Heiser and Finn (1970) concluded that predation upon salmon fry within marinas in marine waters of Puget Sound was much less than formerly thought, and may have been less than predation associated with comparable adjacent beach areas.

Marina structures have also been hypothesized to add perching surfaces for avian predators, but an extensive study to monitor avian abundance and feeding behavior at the Port of Seattle's Bell Street Marina showed no concentration of avian predators or increase in feeding behavior at the marina facility during the 1996 juvenile salmonid migration period between April - July (Hotchkiss, D., pers. comm., 20 June 1996). An increase in salmonid predation as a result of the proposed marina features is not anticipated.

The water quality issues of the marina related to fish include turbidity, water temperature, dissolved oxygen, fecal coliforms, and anti-fouling bottom paints. Anticipated changes to each water quality condition with the proposed marina are discussed below.

Turbidity - The present industrial use of the harbor and deployment of deep draft tugs creates turbid conditions in the inner harbor. The proposed marina would increase boat traffic, but the recreational vessels would have near-surface propellers that should not scour and re-suspend bottom sediments given the depth of the inner harbor. The proposed marina would be anticipated to result in a reduction in the frequency of turbid water conditions in the inner harbor once the deployment of deep draft tugs is eliminated, which would improve water clarity and could result in an increase in biological productivity.

Water Temperature - Existing late-summer water temperatures are presently warm in Lake Washington in the vicinity of the inner harbor and may seasonally exceed thermal optima for coldwater species. Marina activities are not anticipated to increase water temperatures of the inner harbor. It is possible that the small amount of surface shading from the marina structures could decrease temperatures. However, the overall effect of this shading is likely not measurable, and would likely have little effect on fisheries conditions in the inner harbor. No effects on Lake Washington or Sammamish River water temperatures from project development would occur.

Dissolved Oxygen - Because the marina would not increase water temperatures or add organic materials increasing biochemical oxygen demand, the marina is unlikely to affect dissolved oxygen concentrations in the harbor.

Fecal Coliforms - The marina would include onshore restroom facilities as well as boats with waste water holding tanks, both potential sources of fecal coliforms. Both sources would be contained and should not result in waste water entering the harbor. The restrooms would be sewered, and connected to King County's Northshore sewer system. The discharge of boat holding tanks is regulated by the US Coast Guard and the DOE, and open water disposal is prohibited (US Coast Guard 1995). Holding tank pump out facilities are not incorporated into the marina plan, so potential spillage impacts would not occur (existing pump-out facilities are available at the marina west of the site). The proposed marina operations would preclude on-board residents. No water quality impacts from fecal coliforms are anticipated.

Anti-fouling bottom paints - Boats kept in the water year-round often have bottom paints laden with anti-fouling compounds to limit the growth of fouling organisms. Often these paints are comprised of soft materials that are easily eroded and toxic compounds (active ingredients) could leach into the water column. Anti-fouling compounds have been a typical contaminant at marinas, especially if a boat yard occurred in conjunction with the marina. Runoff from boat yards typically contain concentrated levels of metals and other toxic compounds.

The proposed marina would not include a boat yard or haulout facility. In addition, the current strength and availability of anti-fouling compounds are substantially restricted compared to recent history. No measurable effect of leaching of anti-fouling compounds from bottom paints upon salmonid fishes in the inner harbor is anticipated.

Post-development Habitat Summary

Development of the proposed Master Plan would result in areas of net improvement to fisheries conditions in the inner harbor. These net improvements, which are described in detail in Table 3-9 of Appendix B, include the following: approximately 3,000 square feet of new shallow-water habitat with substrate improvement; an additional 174 support pilings with refuge habitat; replacement of existing overhang area with lighted area; removal of approximately 58 lineal feet of creosote bulkhead; and removal of 122 burned pilings which provide little or no fisheries habitat.

Indirect Fisheries Resource Impacts

Lighting

Without sufficient mitigation measures, post-development lighting associated with buildings as well as safety lighting associated with the proposed marina, walkways and trails has the potential to increase illumination of the water surface adjacent to the site. Increased illumination could extend feeding periods of both salmonids and salmonid predators into the evening. This extended feeding period could result in increased consumption of salmon fry. Lighting impacts in the inner harbor would be minimized by installing lampshades that cover the water side of the lamps and thus, shade the adjacent water, and by keeping pedestrian lighting low on the moorage docks. Given the existing high level of artificial lighting associated with industrial uses, and the proposed mitigation measures to shield lighting, it is unlikely that project-associated lighting would significantly increase illumination in the inner harbor. At buildout of the Master Plan, the existing industrial lighting would be removed when the cement plant is phased out, decreasing direct illumination in the inner harbor.

Safety lighting associated with the trails along the Sammamish River and Lake Washington is not expected to increase illumination of the river given the current level of illumination provided by on-site industrial lights. Nighttime illumination of the river would decrease when existing lights are removed. In addition, trailside lighting would be beneath and amongst trail side trees, shading devices would be used on the water side of the lamps to deflect glare from the water, building windows would be tinted to reduce illumination from lighted interior space, and pedestrian lighting on the moorage docks would be low, to further decrease illumination. Night performances at the amphitheater could provide additional lighting along the Lake Washington shoreline; however, such activities would not be a regular occurrence and significant impacts would not be anticipated.

Water Temperature

Removal of a few Douglas fir, black locust and black cottonwoods along the northern edge of the Sammamish River (that do not meet the definition of Significant Trees or the definition of potential eagle perch trees) may be required during trail construction and along the Lake Washington shoreline during construction of the lighthouse pier and amphitheater. Such removal is not expected to affect water temperatures in these areas since the trees presently provide little, if any, thermal protection. Given the angle of the sun to these shorelines, the wide surface area of the river and the extensive flat shallow area adjacent to the lakeshore, measurable water temperature changes in these areas are not anticipated. Project development would not be anticipated to increase water temperatures in the inner harbor.

Boat Traffic

Boat traffic in the inner harbor would change from industrial use (barge and tug) to light recreational use private craft 30 to 50 ft. in length) with the proposed development of a moorage facility in the inner harbor. The number of craft would increase, but use would change from deep draft to shallow draft boats. Anticipated harbor speeds would likely be between 2 and 5 knots and traffic would be concentrated in the middle of the harbor. No data are available indicating vessel traffic has an adverse effect upon fish species. There are no anticipated impacts to fish from recreational boat traffic in the inner harbor. It is possible that the use of smaller boats in the harbor would improve water clarity (less shading from turbid water conditions resulting from existing barge and tug use), increase biological productivity and reduce scouring wave action.

Given the level of existing boat traffic in the lake and river, no anticipated changes to salmonid behavior in the river related to increased boat traffic from the proposed marina are anticipated.

Shoreline Recreational Use

Use of the public spaces along the inner harbor would increase the level of human disturbance over the waterway. The primary disturbance would be noise and vibration as discussed in the noise section below.

The public access trail/firelane along the north shore of the Sammamish River and the Lake Washington shoreline would be no less than 100 feet and 45 feet, respectively inshore of the OHWM. Salmonid use of the nearshore areas occurs primarily during the night, when these species move inshore for resting purposes. Little, if any, human disturbance to salmonid use of the Sammamish River or Lake Washington is anticipated since the peak period of human disturbance would not overlap with nearshore salmonid use. Performances at the amphitheater would not be a regular occurrence and significant impacts from human activity on fisheries resources would not be anticipated.

Fishing Pressure

Increased public access to Lake Washington and the Sammamish River would likely add to the fishing pressure on these waters. However, increased fishing access along the north shore of the Sammamish River and Lake Washington is not anticipated to result in an adverse effect upon salmonid populations. Fisheries resource agencies and affected tribes responsible for managing the resource, annually evaluate sport fishing status on a species by species basis, and will recommend sport fishing closures if spawning recruitment levels are not met.

Noise

An increase in the level of noise and shallow water vibration would occur with human activity associated with the overhanging boardwalk and the moorage facility in the inner harbor. Marina activities would occur primarily during daytime hours and salmonid use of marinas has not been shown to be negatively affected (Feist, 1991) No effect of noise from marina operations and associated human activity on salmonid use of the inner harbor is anticipated.

Use of the esplanade and other public spaces would likely occur during both daytime and nighttime hours. Outdoor activities could, include outdoor dining, bars and live outdoor music. Fish have highly

developed sensory capabilities and are sensitive to vibrations in the water. They readily react to sharp vibrations or movement, which may increase their exposure to predation. There is no literature available regarding the response of resting salmonids to such nighttime noise disturbances. Thus, any anticipated effect is unquantifiable. Given the low use and value of the existing habitat in the inner harbor for salmonids, and the likely avoidance of this warm backwater area during the warmest months of the year (July - September), this unquantifiable impact is not anticipated to be significant.

The impact of pile driving on the distribution and behavior of juvenile salmonids was studied during construction of the U.S. Navy Home Port in Everett (Feist 1991). The study concluded that it was conceivable that the sound field generated by pile driving in marine water could be detected by salmonids within 1,000 feet from the source. According to the study, the effects of pile driving appear to be subtle, and include changes in general behavior, reduction in sizes of schools, and reduced presence at the immediate construction area. However, the prevalence of fish schools near the Home Port site did not change significantly with and without pile driving, and schools of juvenile salmonids were observed around the pile driving rigs. Based on the findings of this study, a significant decrease in salmonids or increase in predation would not be anticipated with the proposed pile driving.

ALTERNATIVES

Alternative 1 - Conceptual Master Plan Illustrated in the Northshore Community Plan

Plants

As under the Proposed Action, Alternative 1 would not result in any direct impacts to the existing on-site wetlands. Because the shoreline trail under this alternative would be setback a minimum of 100 feet from the shoreline, and no public amphitheater would be provided, no additional impact to the Wetland A buffer, or removal of significant trees, would occur. However, the enhanced vegetated buffer proposed along the Lake Washington and Sammamish River shoreline (which would provide approximately 3.42 acres of additional wildlife habitat) under the Proposed Action would not be provided under this alternative. Upon development of Alternative 1, the total amount of native plant community and wildlife habitat would be approximately 1.5 acres less than under the Proposed Action.

Fisheries

As under the Proposed Action, no structures below the "ordinary high water mark" along either the Sammamish River or Lake Washington would be provided. Development of the walkway and marina along and within the inner harbor would be the same as under the Proposed Action and would include the use of the same number of existing bulkheads, new over-water structures (overhangs), new floating structures, and new in-water structures. Fisheries impacts from development along the shoreline and within the inner harbor would be the same as under the Proposed Action.

Because the number of on-site residents, site visitors and commercial activity would be less than under the Proposed Action, impacts relating to fishing pressure and noise would be somewhat less than under the Proposed Action. Lighting and water temperature impacts to fisheries would be similar to those under the Proposed Action.

Alternative 2 - No Action

Under the No Action Alternative, the two on-site wetlands would remain in their existing condition. The existing 5 to 45 foot wide vegetated strip along the Lake Washington and Sammamish River shoreline would remain; no expansion and enhancement of the shoreline vegetated strip, and resultant increase in wildlife habitat, would be provided.

Fisheries conditions in Lake Washington, The Sammamish River and the inner harbor would remain as described for the existing condition. Existing lighting conditions along the Sammamish River and industrial use of the inner harbor would continue. The existing floating and in-water structures would remain in the inner harbor.

MITIGATION MEASURES

Shoreline and Wetland Habitat

Proposed by the Applicant

- An additional 0.17 acre area adjacent to the southern portion of the Wetland A buffer would be designated as part of the Wetland A buffer to compensate for public access trail/firelane construction through this buffer. This expansion of the vegetated wetland buffer, as well as enhancement of the existing vegetated wetland and wetland buffer, including blackberry removal and control, would provide improved wildlife habitat along the Lake Washington shoreline.

- Plantings would be used to control movement through most portions of the shoreline and wetland buffer areas (e.g. dense plantings, addition of native thorny species).

- A buffer of 100 to 130 feet would be provided along most portions the Lake Washington and Sammamish River shoreline to provide additional plantings and to compensate for the trails and public view platforms proposed along the Sammamish River.

- The proposal would retain the three cottonwood trees located within the vegetated strip along the sites Sammamish River shoreline which meet the Department of Fish and Wildlife definition of potential eagle perch trees.

Fisheries

Proposed by the Applicant

- Project structures within or overhanging the Ordinary High Water Mark along the Sammamish River and the Lake Washington shoreline, the two most significant fish habitat areas along the property, would be avoided.

- Fueling facilities, boat haul-out areas and boat yards at the marina would be prohibited.

- Live-aboard marina residents would not be allowed.

- Any consideration of a breakwater or wave board arrangement would include shoreline openings for unimpeded fish passage.

- In-water construction within the Ordinary High Water Mark would be precluded during the juvenile salmonid outmigration period.

- The level of incident light reaching the shoreline and inner harbor areas, would be minimized through directional lighting and shading. Safety lighting along trails and the marina piers would be designed low to the ground and lampshades that cover the water side of the lamps to deflect glare from the water would be installed. Existing lighting along the northshore of the Sammamish River and along the inner harbor would be removed as industrial uses of the site are phased out.

- Illegal discharges of waste holding tanks from watercraft would be minimized by posting, promoting and educating boat owners about the appropriate regulations.

- The effects of leaching anti-fouling paints would be minimized by discouraging underwater cleaning of watercraft in the inner harbor through moorage leasehold covenants.

- The adverse effects of increased shading of shallow water habitat would be mitigated with large openings, grating, clearstory and/or glass structures in overwater decking. Where surface openings are not practical, under-wharf lighting would be used.

- The adverse effects of potentially increasing salmonid predator habitat would be mitigated by 1) increasing the amount of shallow water habitat available for refuge (see mitigation measure below), 2) increasing habitat complexity by adding large rock, boulder/cobble, substrate adjacent to the pilings to increase spaces for salmonid hiding/refuge habitat; 3) surfacing shallow beach areas with appropriate substrate to increase refuge habitat for salmonids; and 4) encouraging dock-side fishing and supporting frequent bass (or other warmwater fish) fishing tournaments focused on the inner harbor to reduce the potential predator base.

- The amount of shallow water habitat in the inner harbor would be increased by (+3,000 sq.ft.) by removing 115 ft. of bulkhead along the eastern portion and returning the beach area to a gradual slope. The deck work in this area would be opened to allow light penetration below or artificial lighting would be installed beneath the overhang to make this habitat productive for salmonids. This effort would create additional shallow water (<10ft.) littoral area that does not currently exist.

- The unusable in-water structures including pilings and decaying bulkhead stumps in the river, lakefront and inner harbor areas would be removed.

Potential

- The submerged debris including car tires, cement blocks, and other industrial debris along the Lake Washington shoreline could be removed.

- A turf management plan to minimize the amount of herbicide and fertilizers used to maintain proposed grass areas could be prepared.

- A plan to specify low impact blackberry control techniques could be prepared.

- Placement of above-ground drainage facilities (manholes/structures) within the river shoreline buffer could be mitigated by plantings of taller grasses around such structures and lining of swales with native vegetation.

UNAVOIDABLE SIGNIFICANT ADVERSE IMPACTS

The Proposed Action would impact a portion of the Wetland A buffer; expanded shoreline buffer along the Lake Washington and Sammamish River shoreline would increase the amount of wildlife habitat on the site and would compensate for this loss. No significant impacts to plant or wetland communities are anticipated.

The Proposed Action would increase the amount of over- and in-water structures in the inner harbor which could increase salmonid predator habitat. With the proposed mitigation measures (including creation of shallow water habitat and creation of salmonid hiding/refuge habitat), significant impacts to salmonid fish populations are not anticipated.

NOISE

This section summarizes the Lakepointe Master Plan Noise Analysis prepared by McCulley, Frick and Gilman, Inc. (MFG) in January 1997. Please refer to Appendix C for more detailed information on existing and projected noise conditions.

AFFECTED ENVIRONMENT

Introduction

The human ear responds to a very wide range of audible sound intensities, from the sound of a pin dropping to the roar of a jet engine. In order to address the wide range of audible sound energy levels in meaningful terms, sound levels are usually expressed using the logarithmic decibel (dB) scale. On the dB scale, the threshold of human hearing is 0 dB, and the human perception of a doubling in *loudness* (i.e., what is heard, *not* the sound energy) is expressed as an increase of 10 dB. Therefore, a 70-dB sound level will sound twice as loud as a 60-dB sound level.

For a particular sound, people generally cannot detect differences of 1 dB. Under ideal laboratory situations, differences of 2 or 3 dB can be detected. A 5 dB change would be expected to be perceived under normal listening conditions.

When addressing the effects of noise on people, it is necessary to consider the varying sensitivity of the human ear. Therefore, sound level measurement instruments are designed to respond to or ignore certain frequencies. The frequency-weighting most often used for assessing environmental noise is A-weighting, and measurements from instruments using this system are reported in "A-weighted decibels" (dBA). All sound levels in this evaluation are reported in A-weighted decibels.

Environmental Noise Regulations

Federal regulatory agencies rely on the equivalent sound level (Leq) to evaluate noise impacts. The equivalent sound level is the level of a constant sound that has the same sound energy as the actual fluctuating sound. Because Leq is similar to an average sound level, it is important to identify the time period being considered, with Leq (24), for example, being the equivalent sound level over a 24-hour period.

The day-night sound level, Ldn, is similar to the Leq (24), except that the calculation involves adding 10 decibels to sound levels for each hour between 10 p.m. and 7 a.m. to account for potential sleep interference. In this evaluation, all references to Leq mean the equivalent sound level for a 1-hour period unless otherwise noted.

State and local noise rules do not apply the Leq per se in assessing the effects of environmental noise. But the Leq is a convenient and effective metric for describing noise, and the pertinent state and local limits can be converted to an Leq for comparison with easily measured and calculated sound levels.

The most pertinent noise criteria are those included in the King County Noise Ordinance (King County Code Chapter 12.88-12.100). King County regulates noise based on the districts or land use zones of the noise source and the receiving locations. The most stringent rules apply to sound levels received at residential uses (Table 17 illustrates the noise limits included in the King County Code). Because King County exempts noise originating from traffic traveling on public roads from the maximum permissible levels applied to stationary sources, there are no applicable *standards* that apply to road noise.

Table 17

King County Maximum Permissible Sound Levels (dBA)

District of Sound Source	District of Receiving Property Within King County			
	Rural Day / Night	Residential Day / Night	Commercial	Industrial
Rural	49 / 39	52 / 42	55	57
Residential	52 / 42	55 / 45	57	60
Commercial	55 / 45	57 / 47	60	65
Industrial	57 / 47	60 / 50	65	70

The county noise code exempts noise from temporary construction activities from the maximum permissible levels during day time hours (7 a.m. to 10 p.m. on weekdays and 9 a.m. to 10 p.m. on weekends). The maximum permissible noise limits apply to construction noise received in either rural or residential districts during nighttime hours (KCC 12.94.020 B.1.). The definition of "temporary" construction is not specifically provided in the County Code, and it is possible that long-term construction phasing of large projects would be perceived by nearby residents as a more than temporary condition. For large projects, a long-term construction schedule is typical.

The county noise code also includes a daytime limit for watercraft noise affecting all classes of receiving properties and a nighttime limit for affected residential and rural properties. Taxiing seaplanes are considered watercraft by the county rule, so these limits would govern both boat and airplane noise affecting the proposed residential uses on the project site and on adjacent properties.

King County's maximum permissible noise limits listed in Table 17 may be exceeded only for certain periods of time. Limits may be exceeded by 5 dBA for no more than 15 minutes in any hour, 10 dBA for no more than 5 minutes of any hour or 15 dBA for no more than 1.5 minutes of any hour. These increases are intended to allow for rare, unplanned sound events that would otherwise exceed the permissible levels. These allowed short-term increases do not pertain to watercraft (seaplane) noise.

The City of Seattle employs a similar regulation limiting maximum permissible sound levels based on the zoning of the noise source and receiver. The Seattle noise limits are displayed in 18. Seattle's noise rules include specific limits on construction noise that vary with the types of sounds being generated. Although these rules do not apply to construction noise from the site because the area is outside Seattle, these limits provide criteria against which to assess potential impacts in urban areas, similar to Kenmore. The last several rows of Table 18 display the Seattle limits for construction activities that create "impulsive" noise,

which includes pile driving. These rules suggest that totally uncontrolled noise from some construction activities may be perceived as a noise impact in spite of the fact that the county rule allows an exemption during daytime hours.

Table 18
Seattle Maximum Permissible Sound Levels and Construction Noise Limits (dBA)

Zoning District of Noise Source [25.08.410 & 420]	Zoning District of Receiving Property		
	Residential Day / Night	Commercial	Industrial
Rural	52 / 42	55	57
Residential	55 / 45	57	60
Commercial	57 / 47	60	65
Industrial	60 / 50	65	70
Daytime Construction Noise Limits - at 50' or a real property line, whichever is greater. *Construction noise is limited to the higher levels listed below, **during daytime hours only**, which effectively prohibits construction at night except in special cases.*			
On-site sources like dozers, loaders, power shovels, cranes, derricks, graders, off-highway trucks, ditchers, and pneumatic equip (**maximum+25**) [25.08.425 A.1]			
Residential	80	82	85
Commercial	82	85	90
Industrial	85	90	95
Portable equip used in temporary locations in support of construction like chain saws, log chippers, and powered hand tools (**maximum+20**) [25.08.425 A.2]			
Residential	75	77	80
Commercial	77	80	85
Industrial	80	85	90
Impact types of equipment like pavement breakers, pile drivers, jackhammers, sand-blasting tools, or other impulse noise sources - may exceed maximum permissible limits between 8 a.m. and 5 p.m. weekdays and 9 a.m. and 5 p.m. weekends, but may not exceed the following limits [25.08.425 B]			
All Sources	**All Receivers**		
	Leq(1 hr) 90 dBA		
	Leq(30 minutes) 93 dBA		
	Leq(15 minutes) 96 dBA		
	Leq(7.5 minutes) 99 dBA		

The Environmental Protection Agency (EPA) has provided guidelines for evaluating environmental noise. The EPA has conducted extensive studies to identify the effects of certain sound levels on public health and welfare. The EPA "Levels Document" identifies sound levels "requisite to protect the public health and welfare with an adequate margin of safety" (U.S. EPA, 1974). These sound levels are guidelines, not regulations or standards. EPA specifies an Ldn of 55 dBA for outdoor areas where quiet is a basis for use (i.e. 55-dBA is most suitable for residential uses).

Noise impacts are evaluated based on the relative change in sound levels due to a project. EPA classifies an increase of 0 to 5 dBA as a "slight" impact, an increase of 5 to 10 dBA as a "significant" impact, and an increase of more than 10 dBA as a "very serious" impact. It is unclear whether these guidelines should be applied to short-term sounds or hourly, daily, or annual averages. These criteria are used as a tool to gauge environmental impacts. The EPA guidelines are considered a conservative approach to assessing the potential impacts of changes in noise levels.

The Federal Highway Administration (FHWA) has adopted noise standards that apply to traffic noise associated with its projects. These standards do not apply to this project because they are intended for uses along roads controlled by state or federal agencies, but they are included to provide a perspective on the noise levels discussed. The FHWA defines a noise impact as a traffic noise level (peak-hour Leq) approaching or exceeding 67 dBA in residential land use areas or 72 dBA in commercial areas (U S DOT 1982).

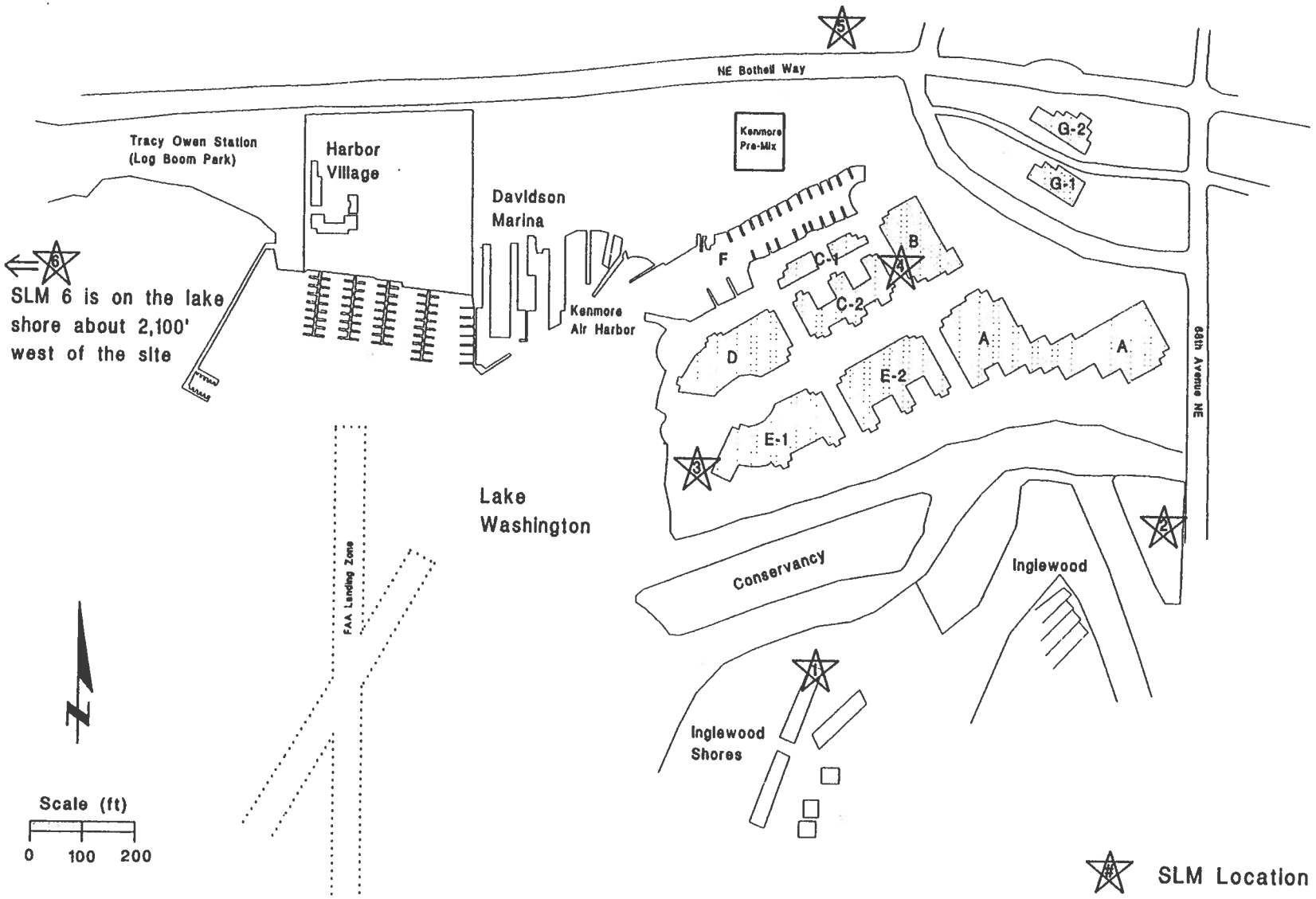
Existing Sound Levels

Existing sound levels were measured at several locations on the site and in the project vicinity during several times of the day on October 30, and December 9, 1996. See Figure 19 for a graphic illustrating the sound measurement locations. Sound level measurements were taken south of the site on the roof of the Inglewood Shores condominiums and at the public boat launch adjacent to the Sammamish River along 68th Avenue NE, and at two locations on-site. These sound level measurements are summarized in Table 18.

Existing sound levels were also measured near residences on the hill north of the project site and in a park on the northwest shore of Lake Washington, west of the site. The measurement on the hill to the north covered a 24-hour period on May 12 and 13, 1997. Two hours from this measurement representing the peak commute periods are included in Table 19, and the entire measurement period is tabulated in Appendix C. The 1-hour measurement to the west was taken the afternoon of May 13, 1997. These sound level measurements can be used to characterize the environmental noise levels due to all noise sources in the area audible during the measurements.

The Inglewood Shores rooftop measurement location (location 1), across the river and approximately 300 feet south of the site, represents sound levels at receivers with full exposure and little if any reduction due to ground effects or intervening obstructions (at ground level, sound levels from activities on the site would be lower due to some attenuation from the intervening ground surfaces and vegetation). Although the maximum single noise source observed from the rooftop of the Inglewood Shores condominiums was from seaplane activity, the more constant noise source was the Kenmore Pre-Mix plant operations.

The sound level measurement along 68th Avenue NE was taken to document traffic related sound levels along the eastern boundary of the site. Traffic dominated the sound environment along 68th Avenue NE. The existing sound levels at the measurement locations are listed in Table 19.



Source: McCulley Frick & Gilman

Huckell/Weinman Associates, Inc.	**Lakepointe Mixed-Use Master Plan**	**Figure 19** **Sound Measurement Locations**

The sound level measurement location on the hill north of the site location 5) was approximately 150 feet from the edge of SR-522, and overlooking the road with full exposure to noise from this source. Most of the homes to the north are at least 150 feet or further from the road and higher on the hill than this measurement location, but no equally suitable spot (e.g., good exposure to the road, without dogs or other intrusive noise sources, and relatively secure) for a long-term measurement was found. So except for differences in distance to the road, this location represents the numerous homes to the north that overlook SR-522, the Kenmore concrete plant, and the proposed project site. Sound levels at these locations are dominated by traffic noise from SR-522, with occasionally audible sounds from vehicles and operations at the concrete plant. Current activities on the rest of the project site (i.e., materials stock-piling and hauling) typically are not audible from these locations because of the dominance of traffic noise. Existing sound levels at most homes on the hill would be at least 3 dBA lower than the levels presented in Table 19 because of the increased distance to SR-522.

A measurement of existing ambient noise levels was taken over 1 hour on the afternoon of May 13, 1997 near the shoreline of Lake Washington in the Log Boom Park, about 2,100 feet west of the project site. Except for being slightly further from SR-522, this location is representative of the homes and the beach-front club along the lake waterfront to the south which are from about 3,300 to over 5,000 feet west of the site. Sound levels in the park were primarily affected by traffic, float planes, and watercraft. This measurement location is probably less affected by noise from SR-522 than the homes further west on the lake front, because the road is much closer to some of these houses. Consequently, existing traffic noise levels may be somewhat understated at this location. This could tend to overemphasize any predicted increases in sound levels as a result of the proposed project.

As shown in Table 19, existing Leq levels due to all noise sources, ranged from 53 to 69 dBA. Measurements were taken on a typical afternoon. Existing sound levels are generally consistent with the King County daytime noise standards (i.e., the off-site measurements at Inglewood Shores are consistent with industrial source to residential receiver standards and on-site levels are consistent with industrial source to industrial receiver standards).

The Harbor Village condominiums west of the project site are shielded from much of the site by existing off-site buildings and other structures. From ground level there are no direct lines of sight to any portions of the site because of an existing two-story commercial building (restaurant and offices) and because of structures (buildings and dock roofs) at the existing marina and air harbor. At elevated locations, sound levels at these condominiums are more subject to traffic noise from SR 522 than noise from the site. Because the existing obstacles significantly block site noise from reaching these residences, no measurements were taken at this location.

Table 19
Existing Sound Levels

Sound Level Measurement (SLM) Locations (Shown in Figure 1)	Start Time	Duration	Leq	Lmax	Lmin	L90
Morning and Afternoon SLMs in the Project Vicinity and On-Site (10/30/96 and 5/12-13/97 as noted)						
(1) Inglewood Shores Condominiums	13:22	60 min.	60.3	81.8	49.3	51.2
(2) 68th Avenue NE	12:39	15 min.	62.7	77.3	49.8	54.7
(3) On-site near the proposed building E-1, representing the setback of Bldg D	15:43	15 min.	53.4	62.9	49.7	51.4
(4) On-site near the proposed building C-2 *With* Kenmore plant operating *and* barge unloading operation	14:56	15 min.	66.1	See note (b)		
Estimated level without traffic noise [a]			65.7 [a]			
(5) Near residences on hill north of site 5/12-13/97 (from 24-hour SLM; see Appendix A)	06:00	60 min	68.7	78.9	56.2	63.6
	17:00	60 min	67.4	86.9	55.0	63.9
(6) Lk Wash Log Boom Park west of site 5/13/97	14:53	60 min	59.6	79.5	47.5	51.6

Note: The Leq is the "average" sound level during the measurement and is generally referred to as the sound level. The Lmax is the highest sound level and the Lmin is the lowest sound level during the measurement. The L90 is the sound level exceeded 90% of the time during the measurement, and this level is often used as the background level.

[a] The estimated sound level without traffic noise is based on subtracting the 55.9 dBA on-site (0) traffic noise level determined in the 12/9/96 measurements from the total measured sound level.

[b] These sound level descriptors are not available for these measurements because the sound levels are calculated from 1-second Leq data. These measurements included time-indexed observations that were used to eliminate some time periods that included noise from extraneous sources. The Ln descriptors are not, therefore, particularly relevant.

Source: Sound level measurements by McCulley, Frick & Gilman, Inc.

Existing Industrial Noise

The on-site sound level measurement locations were selected to document existing sound levels at areas of the site that are proposed to be primarily residential under the Lakepointe Master Plan. On-site sound levels were dominated by Kenmore Pre-Mix operations. During the noise measurements (typical day in terms of activity and production; Kirkpatrick, 1996), the main noise contributor was the off-loading of materials from a barge by a front-end loader. Other contributors to the sound environment at the on-site locations were the seaplanes from the Kenmore Air Harbor and an occasional loud vehicle along SR 522. These sound levels are presented in Table 20 (measurement information is also presented in Table 19)

Table 20

Sound Levels from Industrial and Traffic Sources

Sound Level Measurement (SLM) Periods & Sources	Start Time	Duration	Leq
Early morning SLMs On-Site (SLM #4) and Near SR 522 (December 9, 1996)			
Without Kenmore plant operating Noise primarily from SR 522	05:45 - 06:45	53 min.	55.9
Without Kenmore plant operating; noise primarily from on-site concrete trucks idling	06:45 - 06:54	9 min	60.7
Estimated contribution from concrete trucks			59.0
With Kenmore plant but *no* barge unloading	07:09	11 min.	62.1
Estimated contribution from Kenmore plant			56.5
In front of Kenmore office near SR 522 [a]	05:45	70 min	68.3

Note: The Leq is the "average" sound level during the measurement and is generally referred to as the sound level. The Lmax is the highest sound level and the Lmin is the lowest sound level during the measurement. The L90 is the sound level exceeded 90% of the time during the measurement, and this level is often used as the background level.

[a] This level may overstate traffic noise by up to 3 dBA at this location because the road was very wet during most of the measurement.

Source: Sound level measurements by McCulley, Frick & Gilman, Inc.

The on-site sound level measurements at a location directly across the inner harbor from the Kenmore Pre-Mix facility (measurement location 4) and at the Lone Star Northwest office directly south SR 522 were taken with and without the cement plant operating, and with and without barge loading (these different measurements were taken to identify future noise impacts to potential residential uses on the site). According to the plant manager, the plant normally operates Monday through Friday from 6:30 a.m. to as late as 6:30 p.m. Raw materials are imported by barge, and barge unloading usually occurs about four days

each week (Kirkpatrick, 1996). During barge unloading, which typically occurs four days per week from about 6:30 a.m. to about 5:00 p.m, noise from a front end loader contributed significantly to sound levels measured on the project site.

As shown in Table 20, sound levels generated by the cement plant (including barge unloading) are in compliance with the industrial noise source to industrial receiver noise standard (70 dBA) of the King County Code.

Existing Seaplane Noise

As previously discussed, seaplanes on Lake Washington departing from the Kenmore Air Harbor provided the maximum single sound events recorded at the Inglewood Shores Condominiums (sound measurement location 1) during early afternoon sound level measurements on October 30, 1996 (see Table 19). Table 21 displays seaplane takeoff sound levels derived from the one-hour measurements on the roof of the condominiums and from the lake side measurement in Tracy Station Park (log Boom Park).

As shown in Table 21, measured sound levels from portions of seaplane taxiing and takeoffs exceeded the day and nighttime limits of the King County code. The county's daytime noise limit for watercraft noise is based on a maximum level of 74 dBA, which is not to be exceeded (KCC 12.91.010). During the sound level measurements at Inglewood Shores, the maximum noise occurred when the planes began accelerating to takeoff but were still in the water. In Table 21, the value listed as Lmax is the maximum 1-second Leq during each takeoff, which is often the point of initial takeoff acceleration. This was the only available method for determining the Lmax, but it may understate the actual, very short-term Lmax. The County noise code regulates aircraft taxiing; however, the County noise limits no longer apply during the beginning moments of takeoff and once the plane becomes airborne (refer to Appendix C for additional detail).

Most of the seaplane takeoffs were not extraordinarily loud, and while audible, would probably not be considered as intrusive noise events if they were to occur during daytime hours. One plane (number 4 in Table 21) was exceptionally loud compared with the other planes observed. If any of the observed seaplane takeoffs were to occur during nighttime hours when people were trying to sleep, the associated noise probably would be considered by many people to be intrusive, and could disrupt sleep.

Because Kenmore Air does not schedule flights before 7:00 a.m. or after 10:00 p.m., the seaplane noise does not typically exceed weekday nighttime limits. Seaplane sound levels exceeding 74dBA between 7 a.m. and 9 a.m. on weekends would exceed the nighttime standard. Charter planes can currently depart at any time of the day or night, but due to safety concerns (i.e. no landing lights), most planes land during daylight hours.

The Inglewood Shores Condominiums' exposure to noise from seaplane departures is similar to the potential exposure of a large portion of the project site to seaplane noise. The site would be exposed to slightly higher noise levels associated with taxiing seaplanes than the measurement location because Kenmore Air operations are closer, but site sound levels during seaplane takeoffs would be similar because the distances to the takeoff location are about the same (approximately 800-900 feet).

Table 21

Seaplane Departure Sound Levels

Sound Level Measurement		Duration (secs)	Leq (dBA)	LMax (dBA)	Number of Secs Exceeding 74 dBA
Measurement of six taxi/takeoffs from Inglewood Shores Condos 10/30/96					
#1	Taxi	29	69	75.2	3
	Takeoff	14	55	56.4	2
#2	Taxi	33	68	76.6	2
	Takeoff	7	56	61.1	0
#3	Taxi	26	72	77.7	3
	Takeoff	21	66	71.6	0
#4	Taxi	29	76	81.8	17
	Takeoff	4	63	64.7	0
#5	Taxi	28	71	81.8	5
	Takeoff	41	62	72.2	0
#6	Taxi	40	69	74.4	2
	Takeoff	12	63	70.3	0
Measurement of single taxi/takeoff from lake shore in Log Boom Park 5/13/97					
Taxi		28 sec.	72.5	76.0	7
Takeoff		44 sec.	72.0	76.7	6
King County Noise Limit for Watercraft (day/night) [a]			**74 / 64** [b]		

Note: The Leq is the "average" sound level during the measurement and is generally referred to as the sound level. Here the Lmax is approximated by the highest 1-second Leq.

(a) The class "watercraft" includes seaplanes while taxiing before they takeoff (KCC 12.87.350). This limit applies "anywhere within a receiving property" (KCC 12.91.010). Noise from airborne aircraft is exempt from the limit in the county noise rule (KCC 12.94.010 1.).

(b) The county standard for watercraft noise is a maximum noise limit not to be exceeded (KCC 12.91.010) and not an Leq, which provides an indication of the average sound level over the course of the event. The daytime limit applies on all types of receiving properties; the nighttime limit applies on residential and rural receiving properties.

Source: Sound level measurements by McCulley, Frick & Gilman, Inc.

IMPACTS OF THE PROPOSED ACTION

Construction Noise

It is important to note that many of the assumptions employed in this analysis of potential construction noise impacts are conservative, and are intended to indicate worst-case estimates of cumulative construction noise levels. The following list summarizes the conservative assumptions, some of which are addressed later in this section.

- The tabulation of potential construction noise levels presented in summary in this report is based on cumulative noise as if all equipment operating were operating at the same time. This would generally not be the case, so the estimates of construction noise are likely overstated.
- It was not possible to develop meaningful scenarios regarding potential "source-receptor" conditions that would characterize these special relationships over the entire course of a construction phase. Because of this, only the closest "conjunctions" of each development phase and sensitive receptor were considered. In other words, to represent Phase 1 development at the receptor on the hill to the north, only the distance to the most northerly portion of the Phase 1 area was used (≈430'), even though the southern portion of the Phase 1 area is more than 900' away. This approach overstates noise for those portions of the construction that occur further away than the closest part of the phase development area.
- Possible obstructions to noise transmission, like buildings, were not considered.
- Effects other than distance that would tend to reduce noise propagation through the air were not considered. Factors that would reduce noise transmission to distant locations include atmospheric absorption and atmospheric instability, such as wind, temperature differences or both. These factors would have the greatest effect on reducing high frequency sounds.

Construction activity would occur in many locations on the site throughout the development period. As described in Chapter 2 of this document, the proposed Master Plan would be constructed in six phases over the approximately 7-year buildout period. It is proposed that each phase follow immediately after the previous phase is completed and therefore, there would be no substantial gaps in the construction process. Each phase would be considered a stand alone development (i.e., include roads, buildings, utilities and parking). Construction activity in each phase would include building demolition, grading, pile driving and building construction. A complete description of the individual phases is provided in Chapter 2 of this document.

There would be increases in sound levels on and near construction sites due to the use of heavy equipment, pile driving, and the transportation of construction materials. Table 22 identifies a range of noise levels typically generated by various types of construction activities. The range of sound levels reflects the fact that construction work is highly variable. Equipment may not operate or may idle for long periods of time, depending on the specific construction sequence.

Although construction noise is exempt from daytime noise limits, the impacts of construction noise are evaluated in this document.

Table 22

Ranges of Typical Construction Equipment Noise (dBA)

Construction Activity	Types of Equipment	Range Of Noise Levels (50 feet)
Clearing	Bulldozer	77-96
	Dump Truck	82-94
Grading	Scraper	80-93
	Bulldozer	77-96
Paving	Paver	86-88
	Dump Truck	82-94
Erection	Crane	75-85
	Concrete Mixers	75-85
Materials Handling	Concrete Mixers	75-87
	Concrete Pumps	81-83
	Cranes (movable)	76-87
	Cranes (derrick)	86-88
Stationary Equipment	Pumps	69-71
	Generators	71-82
	Compressors	74-87
Impact Equipment	Pneumatic Wrenches	83-88
	Rock Drills	81-98

Source: U.S. Environmental Protection Agency, 1971

The range of sound levels presented stem from the variety of types of equipment that may be used for particular tasks as well as the different sound levels that may be produced by different operational modes of the same equipment. For example, some equipment will make more noise when handling heavy loads than when simply idling.

The "average" sound levels (Leq) created by the listed equipment also could vary based on the mode of operation. So while a generator would produce a fairly constant sound and sound level, noise from dozers may vary depending on how much dirt they are moving and how quickly they are moving.

Noise Study Methodology

The noise analysis estimated the possible ranges of construction noise that could occur at the most sensitive receiving locations near the project site, including Inglewood Shores condominiums to the south, and homes to the north and west, where existing sound level measurements were taken. These estimates are based on the cumulative sound levels from the variety of construction activities that could occur (i.e., the sound levels that would result if all construction activities occurred at the same time), except pile driving. Pile driving noise is examined separately.

The ranges of sound levels produced by various construction activities and types of equipment are listed in Table 22, and these are the ranges of noise levels used in this analysis to estimate minimum and maximum

sound levels from each construction activity. To accomplish this, all possible construction activities in a given phase (except pile driving) were assumed to occur at one time, and the minimum and maximum sound levels were summed (logarithmically). In reality, many construction activities would occur more sequentially than was assumed, so the calculated construction noise levels represent very conservative estimates. For example, the most likely sequence of construction would include clearing and grubbing, then excavation and pile driving, then building and roadway construction, and finally landscaping. It is highly unlikely that any of these construction activities would occur concurrently. However, this conservative approach was used because although the phasing of the proposed project's construction has been established, it is not possible to determine accurately when, where, and in what combinations the various construction activities would actually occur within each phase.

The final step in the calculation was to consider the noise reductions that would occur with increasing distances between the noise source(s) and the receivers. Distances between sources and receivers were calculated based on the closest part of a given project phase and the closest portion of the residential building or location being considered. For purposes of this estimate, sound levels were assumed to diminish at a rate of 6 dBA for each doubling of the distance between the source and the receiver. So a sound level of 77 dBA measured 50 feet from a bulldozer would be 71 dBA at 100 feet, 65 dBA at 200, 59 dBA at 400 feet, and so on. Because of the potential for sound reflection from intervening water, the estimated construction noise levels at homes along the western shore of the lake include an extra 6 dBA added to the distance-attenuated sound levels. This adjustment likely overstates any such effect.

The resulting ranges of construction noise levels at each receiving location represent very conservative estimates of possible noise associated with construction of each proposed phase of the project because in effect, all construction activities that would occur during the full construction cycle of each phase were assumed to occur at the same time. This approach was necessary because considering the locations and timing of the construction activities within each development phase of the project is too complex and speculative to provide meaningful results. The approach used results in worst-case estimates of where potential noise impacts may occur, and thus provides an indication of where measures to control construction noise should be considered. A summary of the construction noise calculations are presented in Table 23.

Table 23

Calculated Cumulative Construction Noise Levels (dBA)

Sensitive Receiver	Phase 1		Phase 2		Phase 3		Phase 4		Phase 5		Phase 6	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Off-Site Receiving Locations												
Inglewood Condos Near Golf Course	70	81	66	77	66	77	68	79	69	80	65	76
Inglewood Shores Rooftop (SLM1)	66	77	66	77	68	79	70	81	68	79	62	73
Harbor Village Condos [a]	62	73	64	75	66	77	63	74	62	73	60	71
Residences on Hill to North (SLM5)	75	85	73	84	71	82	70	81	71	82	75	85
Houses to west (SLM6) [b]	62	73	62	73	63	74	63	73	62	73	61	72
On-Site Receiving Locations												
Building A			90	101	74	85	75	86	92	103	75	86
Building B			95	106	74	85	74	85	83	94	79	90
Bldg C-2 (SLM4)					74 [a]	85 [a]	74 [a]	85 [a]	81	92	73	84
Building C-2					92	103	86	97	85	96	74	84
Building D							89	100	84	95	68	79
Building E1									92	103	72	83
Building E2											71	82

[a] Note that none of the calculated sound levels consider the shielding effects of buildings, so in some cases, the levels of construction noise are overstated. This is particularly important in the cases marked with this footnote because nearby buildings would represent substantial noise barriers to on-site construction noise sources that were not considered in the calculations. It is not possible to meaningfully consider the barrier effects of buildings or other obstructions because construction activities would move all around the site and create many different source-barrier-receiver geometries.

[b] As mentioned in the text, the calculations of construction noise at the homes on the western shore of Lake Washington include an added 6 dBA to account for the potential reflection of the sound by the intervening water. This probably overstates the effect.

The lower portion of this table with numbers indicate the construction periods when the respective buildings would be under construction, so that the receiving locations associated with each building would not yet exist. For example, Buildings A and B would be constructed during Phase 1 of the proposed project, so these locations were only considered as receiving locations during later phases.

Source: Calculations by McCulley, Frick & Gilman, Inc.

Construction Noise Impacts to Off-Site Locations

Receivers to the North

The receiver location north of the site used to represent the homes on the hill is closer to the project site than most homes on this hill, and has an unobstructed view to SR-522, the site, and the lake. Most of the homes are at least 150 feet further north and higher on the hill, and in some cases, have intervening land forms and/or buildings between them and the road and other noise sources to the south. For these reasons, cumulative construction noise levels at homes further up the hill would be at least 2 dBA lower than the levels shown in Table 23 due to the increased distances to these locations.

The minimum expected cumulative construction noise levels at off-site receptors shown in Table 23 are all less than the construction noise levels permitted by the City of Seattle noise limits for construction activities. Some of the maximum levels are higher than would be allowed by the Seattle regulation, but these levels are conservatively high because not all the construction activity would be occurring simultaneously. Tabulation presented in Appendix C includes distance-adjusted sound level from individual pieces and/or operations of construction equipment. As shown in that tabulation, most of the minimum expected construction noise levels are below existing measured levels. Maximum sound levels would be higher than existing measured levels. Measures to mitigate construction noise levels would lessen calculated levels.

Receivers to the West

Expected minimum and maximum cumulative construction sound levels at receivers west of the site across the water are far below the levels that would be allowed by the Seattle construction noise limits (in spite of the 6dBA adjustment to account for possible reflection during transmission over water). While there were no direct sound level measurements at these homes, the levels measured in Log Boom Park probably understate existing sound levels at these homes because they are closer to SR-522. If this is the case, the minimum cumulative construction noise levels would be roughly the same as existing levels; maximum cumulative construction noise levels would be higher. However, noise levels from individual pieces and/or operations of construction equipment would for the most part be lower than existing levels.

Receivers to the South

Cumulative minimum construction noise levels at Inglewood Shores Condos would not exceed existing noise levels. Maximum cumulative noise levels could exceed existing sound levels, but would not exceed the limits included in the Seattle noise rule. Noise levels from individual pieces of construction equipment and/or single construction operations would be much lower, but such levels could exceed existing levels. Measures to mitigate on-site noise levels would lessen calculated levels.

Construction Noise Impacts to On-Site Locations

Although not subject to the county noise limits during daytime hours, the high levels of construction noise shown in the bottom portion of Table 23 for on-site locations indicate the potential for substantial noise impacts to residential receivers proposed in the Master Plan. Such impacts would be most likely when construction activities would occur closest to sensitive locations and when there would be many simultaneous construction operations (such as paving and building erection). Again, it is unlikely that simultaneous construction activities would occur over any significant time frame. Residents in Building A

would be subject to impacts over the entire construction period of the project (after Phase 1). These levels of construction noise indicate the need for careful consideration of means to reduce noise transmission when any on-site residences would be exposed.

Noise from Existing Sources During Construction

The sound levels presented in Table 23 represent the cumulative sound levels from all construction activities excluding pile driving. During construction, existing sources of noise in the vicinity would continue to contribute to on and off-site sound levels, but non-construction sources would have a minor effect compared with the conservative, cumulative, maximum sound levels presented in Table 23. Sound sources that are quieter by 10 dBA or more than a primary noise source contribute almost no additional sound energy to the cumulative level. For example, adding a 60 dBA sound source to an area with a 70 dBA sound level would increase the overall sound level by only 0.4 dBA. Because the calculated maximum construction noise levels presented in Table 23 are higher than existing noise levels at most off-site and on-site locations, these cumulative construction noise levels represent the maximum expected noise levels, with or without the addition of existing sources.

In the event construction noise levels from the project are much lower than the possible cumulative levels presented in this worst-case impact analysis, sounds from existing sources could be more of a factor in sound levels perceived at off-site locations. For example, adding a 58 dBA sound level from an on-site bulldozer at measurement location 1 would have little or no effect because existing measured levels are already much higher. So the greatest potential for existing sound sources in the area to "enhance" construction noise levels, or vice versa, occurs when the two levels are about the same. In the event two identical levels occur at the same time, it would cause a 3-dBA increase.

On-and Off-Site Pile Driving Impacts

The proposal would require extensive pile driving during all phases of construction. Pile-driving noise is likely to be particularly intrusive to nearby residences because it includes fairly continuous, repetitive banging. Because there would be extensive pile driving associated with all phases of the proposal, pile-driving was considered as a separate construction noise source in addition to the previously considered sources.

It is anticipated that concrete filled pipes or driven grout piles would be used for most or all of the approximately 5,000 piles required for the proposed project. Phase 1 pile driving would require about 17 weeks (2,100 piles), with 7 weeks for Phase 2 (800 piles), 5 weeks for Phase 3 (700 piles), and 4 weeks each for Phases 4, 5 and 6 (500 piles each). Pile driving would not occur concurrently with any other construction activity.

The amount of sound generated by pile driving depends on a number of factors including the type of pile driver, the type of piles, and the material into which the pile is being driven (i.e., the force required). These variables create a large range of potential sound levels, illustrated by the information in Table 24.

Potential off-site noise from project-related pile driving was assessed on the basis of a measurement of a typical diesel-powered pile driver installing a wooden pile. This measurement documented a level of 88 dBA Leq at 100 feet over a full cycle of pile insertion. This level is in the high end of ranges of pile driver noise presented in Table 24, with the exception of diesel hammers driving steel piles which would not be utilized.

Table 24
Estimated Ranges of Pile Driver Noise from Various Equipment (dBA)

Pile Driver Type	Comments/Factors	Pile Type	Leq @ 100 ft (dBA)
Drop Hammer	Varying drop weights and heights	Concrete [a]	75-82
		Steel [a]	76-84
Diesel Hammer	Blows of varying force	Steel [a]	86-100
Vibratory Hammers [b]	Low frequency insertion mechanism	Tubular steel casing	83
	Medium frequency insertion mechanism	H-section steel	60
	High frequency insertion mechanism	Steel sheet or H-section	89
Hydraulic Jack	220,000 kg force	Sheet Steel	55
	220,000 kg force w/ generator	Sheet Steel	68
Auger Boring	Rotary drilled 113 kW	1.5 m diam	77
	Rotary drilled 54 kW	.25 m diam	71

(a) With concrete piles, the noise level was independent of the length of the pile above ground. With steel piles, the noise level decreased by 2 dBA when the pile length above ground was reduced by half.

(b) Low frequency vibratory hammers operate at lower frequencies than the typical "normal frequency modes" of single piles, and so do not promote resonant acoustic energy by making the pile vibrate. Consequently, low-frequency vibratory hammers generally are quieter than diesel or air hammers. Medium and high-frequency vibratory hammers operate at frequencies similar to the natural frequencies of piles, and the vibrating piles produce greater acoustic energy. In addition, the more powerful engines needed for high-frequency oscillator units make noise from this type of pile driving comparable in noise from conventional pile driving systems. However, since the noise itself is not impulsive as it is with impact type hammers, it may by less annoying to nearby listeners.

Source: Compiled by McCulley, Frick & Gilman, Inc. from Literature

The calculation of on and off-site pile driver noise was accomplished using the summation method described for construction noise. The only attenuation factor considered was distance. The only other adjustment employed was the addition of 6 dBA to the distance-reduced sound levels at the homes west of the site, because sound arriving at these locations could be influenced by reflection from the water. The results of the tabulation of potential pile driver noise are presented in Table 25.

The specific sorts of pile-driving equipment and types of piles that would be used for the proposed project cannot be determined until the completion of building-site-specific geotechnical studies. Current information suggests driven grout piles could be used to meet the complex requirements of the project site. Such piles are made by pile driving a hollow steel casing, filling it with concrete, and then removing the casing once the concrete has set. This is currently the preferred type of pile for this site (refer to Appendix C for methodology for estimating noise from other types of piles and pile driving equipment).

Table 25
Calculated Levels From Project-Related Pile Driving (dBA)

Receiver	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
Off-Site Receiving Locations						
Inglewood Condos Near Golf Course	71	67	67	69	71	66
Inglewood Shores Rooftop (SLM1)	67	67	70	71	69	63
Harbor Village Condos [a]	63	65	67	64	63	61
Residences on Hill to North (SLM5)	75	74	72	70	71	75
Houses to west (SLM6) [b]	62	63	63	63	63	62
On-Site Receiving Locations						
Building A		94	75	76	94	78
Building B		98	75	75	84	80
Bldg C-2 (SLM4)			75 [a]	75 [a]	81	76
Building C-2			92	86	87	76
Building D				90	84	69
Building E1					92	67
Building E2						72

[a] Note that none of the calculated sound levels consider the shielding effects of buildings, so in some cases, the levels of pile-driving noise are overstated. This is particularly important in the cases marked with this footnote because nearby buildings would represent substantial noise barriers to on-site construction noise sources that were not considered in the calculations. It is not possible to meaningfully consider the barrier effects of buildings or other obstructions because construction activities would move all around the site and create many different source-barrier-receiver geometries.

[b] As mentioned in the text, the calculations of pile-driving noise at the homes on the western shore of Lake Washington include an added 6 dBA to account for the potential reflection of the sound by the intervening water. This probably overstates the effect.

The shaded portions of this table indicate the construction periods when the respective buildings would be under construction, so that the receiving locations associated with each building would not yet exist. For example, Buildings A and B would be constructed during Phase 1 of the proposed project, so these locations were only considered as receiving locations during later phases.

Source: Calculations by McCulley, Frick & Gilman, Inc.

Calculated off-site sound levels from project-related pile driving are in the low end of the ranges of cumulative construction noise from other sources (see Table 23) and are in the middle range of the noise expected from individual construction sources (see Appendix C). They also are far below the daytime levels allowed by the Seattle noise ordinance for impact types of equipment, such as pile drivers. These limits do not legally apply in this assessment, and are mentioned for reference purposes only.

Potential on-site noise levels from pile driving would be high, and exceed the hourly Leq limit allowed by the Seattle noise ordinance. This suggests the need for consideration of means to reduce pile-driving noise transmission when any on-site residences would be exposed.

Post-Construction On-Site Noise Impacts

Industrial Activities

Measurements of sound levels from the existing pre-mix plant (sound measurement location 4) indicate existing sound levels would exceed the daytime noise limits for industrial sources affecting residential receivers. The sound level measurements from the project site documented a level of about 66 dBA at about 275 feet from the plant (approximate location of proposed building C-2) during barge off-loading. This means that unshielded receiving locations within approximately 600 feet of the plant would be subject to sound levels exceeding the 60 dBA daytime county noise limit during barge loading operations. The plant manager indicated barge loading can occur 12 hours a day, four days a week. Locations within approximately 600 feet of the plant include all of the proposed buildings on the site.

Although the structure of the buildings themselves would act as noise barriers to some portions of the site and especially at ground level locations, at least portions of all of the proposed residential buildings would have direct line of sight to the plant. Noise from the cement plant would be greatest at the highest levels of the buildings where the potential sound-reducing effects of intervening ground and obstacles would be least. Proposed Buildings A and E-2 would be the most shielded from the plant after the construction of the C-1, C-2, and D buildings, which would in turn would be closest and most exposed to noise from the plant.

Traffic Noise

Traffic currently contributes a major portion of the existing acoustic environment in some portions of the site, and this would continue to be the case in the future. Because the expected project-related volumes would comprise a minor portion of total future traffic, traffic noise impacts stemming from the project are likely to be minimal (refer to the TRANSPORTATION section of this document for detail on project related traffic).

However, the Proposed Action would locate residential units within 100 feet of 68th Avenue NE, which currently generates ground-level traffic noise in the low to mid 60s dBA during busy periods of the day (refer to Table 23). Some of the planned residential units in Building A that are at or above street level grade would have an unobstructed line of sight to 68th Avenue NE. The calculated future traffic noise levels (year 2005) from 68th Avenue NE at such locations in Building A (100 feet from the road) is 68 dBA without the Proposed Action, and less than 1 dBA higher with the Proposed Action. These calculated future noise levels exceed the levels usually considered acceptable for residential uses (according to EPA guidelines and county limits for other noise sources), and also exceeds the noise abatement criterion level of 67 dBA established by FHWA. However, traffic noise is allowed to exceed the noise standards of the King County Noise Ordinance.

Seaplane Noise

Sound level measurements of six seaplane takeoffs indicate existing noise from these events exceeds the watercraft limits in the county noise code for residential receiving properties (refer to Table 21). These measurements were taken at the Inglewood Shores condominiums, which are approximately the same distance (900 feet) from the seaplane takeoff area on Lake Washington as would be many of the residential

units that would be constructed as part of the Proposed Action. Proposed buildings with direct exposure to the takeoff area would therefore be subject to similar noise levels as were documented in the measurements.

During the hour-long sound level measurement at Inglewood Shores, there were ten seaplane takeoffs. The peak operational periods are generally from 4-6 p.m. on Fridays and Sundays.

Given the relatively few plane takeoffs in any particular hour, the number of seaplane noise events would rarely if ever be sufficiently high to increase the hourly sound level significantly above the level measured at Inglewood Shores. Further, it is assumed that Kenmore Air would continue to not schedule flights after 10:00 p.m. or before 7:00 a.m. Therefore, even with seasonal or daily variations in the numbers of seaplane takeoffs, seaplane noise would not be anticipated to significantly impact future residents of the site.

ALTERNATIVES

Alternative 1 - Conceptual Master Plan as Illustrated in the Northshore Community Plan

Because the construction methods and general phasing would be similar to that assumed for the Proposed Action, increases in noise resulting from construction of Alternative 1 would be anticipated to be similar to the Proposed Action. However, because the amount of building area would be slightly less than under the Proposed Action, the time period of construction noise would be less.

As under the Proposed Action, the Kenmore Pre-mix site would be the last phase of development, with on-site residents being exposed to noise from the plant. Industrial noise impacts to on-site residents would be similar to those described for the Proposed Action. Impacts to on-site residents from traffic and seaplane noise would be similar to that under the Proposed Action.

No Action

Under the No Action Alternative, the existing industrial noise sources, including the pre-mix plant operations and barge unloading, would continue on the site.

MITIGATION MEASURES

Construction

Required by Code

- Consistent with King County noise limits, construction activities would be limited to daytime hours to the extent practicable. This would include restricting all noisy start-up and preparatory activities like starting engines before 7:00 a.m. A possible exception to this restriction could be the construction of some of the on-site roadway system, which could require a round-the-clock work schedule. Noise from any work during nighttime hours (after 10 p.m.) received in residentially zoned areas would be subject to the nighttime noise limits in the King County code.

Potential

Because construction noise during daytime hours is exempt from the limits in the King County noise rule, no mitigation is required in order to comply with the county noise limits. However, because the potential for on and off-site noise impacts from uncontrolled construction noise sources is high, and because the construction of the proposed project would take place over at least 6 years, measures to reduce potential noise impacts are warranted. The applicant has indicated that some or all of the following measures could be implemented to reduce construction noise.

- Construction noise could be reduced with properly sized and maintained mufflers, engine intake silencers, engine enclosures, and by turning off idle equipment and confining activities to normal daytime hours. The construction contract could specify that mufflers be in good working order and that engine enclosures be used on equipment when the engine is the dominant source of noise.

- Stationary equipment could be placed as far away from sensitive receiving locations as possible. Where this is infeasible, or where noise impacts could still be significant, portable noise barriers could be placed around the equipment with the opening directed away from the sensitive receiving property thereby reducing sound levels by approximately 10 dBA. These measures are especially effective for engines used in pumps, compressors, welding machines, and similar equipment that operate continuously and contribute to high, steady background noise levels.

- Substituting hydraulic or electric models for impact tools such as jack hammers, rock drills and pavement breakers could also reduce construction and demolition noise. Although back-up alarms are exempt from the noise ordinances, where feasible, equipment operators could drive forward rather than backward to minimize noise from this source. Noise from material handling could also be minimized by requiring operators to lift rather than drag materials wherever feasible.

- Ambient-sensitive vehicle back-up alarms, which sample the ambient sound level when a vehicle is about to back up and emit a signal only 10-dBA louder than the existing level (as opposed to emitting a signal at a preset, maximum level), could be used on the site. Construction contracts would suggest the use of such devices to reduce the noise perceived at off-site locations and thereby reduce possible annoyance.

Pile Driving Noise

Potential

- Pile driving would be limited to weekdays between the hours of 9 a.m. and 5 p.m. This would limit this noise source to those times of the day and those days of the week when most people are most likely to be away from home. This time restriction also would limit pile driving to times when other noise sources would make the addition of pile-driving noise least noticeable.

- Vibratory hammers or hydraulic jack drivers would be used to the extent possible to reduce pile-driving noise by eliminating the impact noise usually associated with pile installation. However, both alternative methods are limited in the pile types they can install and the soil types in which they can be used. Vibratory hammers are most effective in stable, granular soils using non-displacement piles such as h-sections and open-end pipes. Hydraulic jack drivers are suitable for sheet piles, installed in straight

lines in cohesive soils. Vibratory hammer pile drivers would be employed to the extent use of such devices is reasonably practicable.

- Where use of vibratory hammers is not possible, the following measures would be employed to the extent practicable.
    - Insert a wooden or plastic dolly between the pile head and the hammer.
    - Apply a damping compound to steel piles to reduce the vibration/ringing.
    - Shroud the lower part of the hammer; this is not generally considered very effective.
    - Silence exhaust gas pulsations from the engines of diesel-powered hammers.
    - Remove any unnecessary hanging chains; fix any loose bolts, panels, or over-slack leader guides.
    - Use a cushioned method in conjunction with a "heavy hammer-short drop" practice. This requires using interference fit guides to prevent kicking, rolling and vibration in the pile. While the overall sound level is *not* substantially reduced, the nature of the sound may be less annoying to people.
    - Regular equipment service and maintenance.
- Use of a Hoesch Noise Abatement Tower would limit noise from pile driving. This device encloses the hammer and driven pile. It was designed to provide the maximum sound level reduction with minimum possible weight. The composite panel is comprised of a "sandwiched" layer of 2 mm steel, 0.4 mm plastic, and 1.5 mm steel. A polyurethane layer 150 mm thick is foamed on the inner walls of the panels. This enclosure can reduce impact pile driving noise by up to 20 dBA. Drawbacks include the difficulty of using this device on uneven ground, slopes, or in water. This mitigation also can be prohibitively expensive.

Existing Plant Noise Mitigation

Potential

- The existing concrete plant operation is complying with existing county noise rules based on existing zoning. However, the proposed development of residential buildings on the site would require consideration of some means to reduce the effects of noise from the existing concrete plant. As a part of the building permit review process, analysis of noise conditions may be warranted.

UNAVOIDABLE SIGNIFICANT ADVERSE IMPACTS

Sound levels from the existing pre-mix plant would exceed the daytime noise limits for industrial sources affecting residential receivers, without some form of mitigation (i.e. noise from the Pre-mix plant could impact some residents of the proposed Master Plan). Residents and businesses on the Lakepointe site would be subject to significant noise impacts during all phases of construction.

TOXIC AND HAZARDOUS MATERIALS

Introduction

The Washington State Department of Ecology (DOE) issued a Site Hazard Assessment report for the Lakepointe property on February 19, 1992. As part of the assessment, DOE identified several on-site geographic areas of regulatory interest. The DOE's assessment and subsequent site ranking was based on DOE's knowledge of site history and site uses, and on the results of previous site characterization studies. The final scoring of the site, using the Washington Ranking Method (Chapter 173-340), resulted in a ranking of 1 (highest rank) on the Site Hazard Assessment List (File TCP ID: N-17-5127-0000). This ranking was based on a quantification of the potential exposure to humans or the environment along specific exposure routes including air, surface water and groundwater.

The following section is a summary of the Draft Technical Report on Toxic and Hazardous Materials prepared for this document by AGRA Earth and Environmental, Inc. The Draft Technical Report is a summary of information provided to and currently under review by DOE. Information provided in this report is preliminary. The full report is included as Appendix A to this document.

Prior to issuance of any building permits by King County, a phased remediation plan for the areas of the site determined by DOE to be contaminated and warranting cleanup must be approved. The specifics of the site remediation plan are currently being determined by the DOE in cooperation with the landowner; therefore, the following section describes the Model Toxic Control Act (MTCA) process, standards for cleanup and various possible cleanup methods for the site currently under evaluation. The establishment and implementation of the remediation plan for the site is an action separate from King County's permit review and approval process. The remediation plan is under the jurisdiction of the DOE, and will be analyzed consistent with DOE's MTCA review process. The MTCA process requires consideration of environmental impacts in the formulation of a remediation plan; therefore, the environmental impacts of any site remediation activities will be considered consistent with DOE requirements. The MTCA process also includes various opportunities for public participation in the formulation of a remediation plan. Further, if the final remediation plan precludes certain proposed project development or enhancement/mitigation features from being implemented, changes to the Master Plan will be required; such changes, if so determined by King County to potentially result in significant impacts not disclosed in this Supplemental EIS, may require additional environmental review.

AFFECTED ENVIRONMENT

Historic Site Activities

Historic activities that may have contributed to contaminants on the site and in the inner harbor occurred in two phases. The first phase consisted of extensive filling and grading activities that raised the elevation of the property above the level of Lake Washington. Significant filling of the site was initiated at the north margin of the site in the 1950's. By 1969, the entire site was filled to its current elevation. Based on subsurface explorations performed at the site in 1996, the fill in the northern margin of the site, immediately south of NE 175th Street and the inner harbor, consists predominantly of wood debris, with lesser amounts of concrete and asphalt rubble, and a minor amount of soil. In the northernmost 100 to

200 feet of the filled area south of NE 175th Street, the fill contains more wood debris than the north margin of the site.

Materials in the north central portion of the site include scrap metal, rubber tires, wire cables and stumps, carpeting, and plastic. The origin of the fill in this portion of the site was reported to be housing demolition debris related to construction of Interstate 5. Between 1965 and 1984, the southern 35 to 40 acres of the site contained a landfill. DOE records indicate that stumps, demolition debris and restaurant wastes had been disposed in this landfill. It should be noted that a 1981 letter received by EPA from Bayside Disposal listed 20 landfills in King County (including the Kenmore Landfill) that Bayside Disposal had used for the disposal of hazardous materials. Bayside Disposal's letter was written in response to EPA's research on historic disposal sites and listed all sites where Bayside may have disposed hazardous substances. However, subsurface explorations on the site (AGRA, 1996) did not encounter evidence of hazardous materials disposed at the site.

The second phase of historic activity that may have contributed to the placement of contaminants on the site consisted of light industrial activities. The light industrial activities on the site included painting and paint refurbishment activities at the southwest corner of the site, temporary (i.e., 90-day) storage of petroleum-contaminated soils prior to recycling at the former Sterling Asphalt plant (the soils were removed in 1992), and storage of 55-gallon drums at various locations for containment of petroleum fuel, aviation fuel, motor oil, concrete form-release oil, and lubricating oil. Several tenants fueled and maintained loaders, excavators, cranes and forklifts at the property. Spills and leaks associated with the fueling and maintenance and general traffic of heavy equipment may have contributed to placement of contamination at the site. These light industrial activities, which were the basis for DOE's ranking, are no longer conducted at the site.

Other industrial activities on the site included the concrete and asphalt plant that replaced the former lumber mill at the north end of the site. A concrete truck fleet was fueled and maintained in a fenced compound occupying the north central portion of the property. Fuels were stored in above-ground storage tanks inside the fenced compound. An unlined impoundment pond was maintained in the west central portion of the property to contain washwater rinsed from the concrete trucks. Sediments from the pond (consisting of a silty gravelly sand) were stockpiled on the site. Roofing waste (consisting of shredded wood roofing, asphalt shingles and plastic sheeting) from a former roofing business located on the site was also stockpiled on the site.

In the fall of 1996, some of the roofing waste was removed from the site. Some remained and was regraded across a three-acre area of the south-central portion of the site, and the stockpiles of concrete wash-out material were regraded across a six-acre area in the southwest portion of the site. The depth of these fill layers averages six inches for the roofing materials and three feet for the wash-out materials.

As a result of historic filling (including landfill) and industrial activity, the portions of the site which contain contaminated soils or debris generally include the area immediately north of the northeast corner of the inner harbor and the area south and southeast of the harbor. Approximately 35 acres of the 50-acre site contain contaminated soils or debris. Refer to Appendix A, Figure 8, for a map indicating the location of contaminated soils on the site.

Site Ranking by the Department of Ecology

As noted in the Introduction, the Lakepointe site has a ranking of 1 on DOE's Site Hazard Assessment List. The presence of benzene (a gasoline constituent) in soils temporarily stockpiled for recycling at the former Sterling Asphalt facility was the determining factor in DOE's site scoring calculations. The asphalt stockpile has been removed from the site for recycling.

Although the soil stockpiles were reportedly covered by tarps, located under partial shelter and bermed, no mechanism existed for the interception of runoff or leachate from the stockpile, constituting improper containment practices. The toxicity and mobility of benzene, along with the improper containment of the soil stockpiles and the proximity of Lake Washington were listed as contributing factors to DOE's priority ranking. DOE's calculations determined that the soil stockpiles posed a threat to human health and to the environment via surface water, air, and groundwater routes. The soil stockpiles were maintained on-site for approximately two months in 1992, then removed.

Other contaminant areas considered for site scoring were the former landfill and the concrete truck wash-out impoundment, but these areas did not contribute to the ranking.

The types of contaminants on the site identified in the SHA include total petroleum hydrocarbons, metals (including arsenic, barium, and lead), polychlorinated biphenyls, and volatile organic compounds. Total petroleum hydrocarbons included diesel and oil in the groundwater at 2,420 to 19,000 parts per billion and in soil at 15 to 2,530 parts per million (ppm). These levels exceeded standards of 1,000 ppb for groundwater and 200 ppm for soils, in the soil piles removed by Sterling Asphalt. Arsenic, barium, and lead were determined to be below groundwater cleanup standards. Soil concentrations of barium and lead exceeded the standards of 200 ppm and 250 ppm respectively. Polychlorinated biphenyls in wood waste exceeded the standard of 1 ppm. Groundwater levels of volatile organic compounds exceeded the standard of 0.20 ppb.

Sediments

In the past, the inner harbor has been periodically dredged by the US Army Corps of Engineers, and sediments within the channel have been sampled for analysis prior to the dredging. The most recent sampling was done in May 1996 (Science Applications International Corporation, 1996). Based on this sampling, the Army Corps will dredge the sediments from the inner harbor that qualify for open water disposal, and leave undisturbed those that do not (Aitken, 1997). (Less toxic sediments qualify for open water disposal; more toxic sediments must be disposed of in a permitted landfill).

Model Toxics Control Act (MTCA)

The investigation and cleanup of contaminated sites (termed Remedial Actions) is governed by the Washington State Model Toxics Control Act (MTCA) (RCW 70.1050) and overseen by DOE. SEPA compliance for remedial actions is included in the MTCA process. The following discussion provides background on the MTCA process.

Options for Remedial Action

Currently, there are six options for DOE's involvement in remedial actions. These options include: Consent Decree, Prospective Purchaser Consent Decree, De Minimis Consent Decree, Agreed Order, Independent Remedial Action, and Enforcement Order (refer to Appendix A for a detailed description of these options). A consent decree is a legally binding, final settlement of liability for a site; however, the issue may be reopened if, for example, new information is discovered.

It is anticipated that the site will be remediated under an Agreed Order or Consent Decree negotiated between the DOE, the State Attorney General, and the landowner. An Agreed Order is a legally binding, administrative order issued by the DOE and agreed to by the landowner. It is not filed in court and requires no settlement. If the applicant follows the activities laid out in the Agreed Order for various phases of work, DOE will not take any enforcement action against the landowner. However, an Agreed Order does not protect a party from being sued and DOE can require additional remedial work not included in the original order. Agreed Orders are subject to public review and comment according to RCW 70.105D.030(2)(a).

Site-Specific Cleanup Levels and Cleanup Action Options

Based on MTCA regulations, DOE defines the approach to the cleanup at any site as a two-step process. First, the potentially liable party (landowner) must establish a cleanup level or standard for the site. Second, a specific type of cleanup action must be selected. DOE selects both the cleanup level and the type of action.

Cleanup Levels

The DOE requires that a site cleanup reduce the health risk on a given site to an acceptable level below a concentration which threatens human health or the environment. The DOE has established three options for setting site-specific soil and groundwater cleanup levels or standards - Methods A, B and C. The options (defined as methods) for setting cleanup levels are explained below.

> **Method A** defines predetermined cleanup levels for 25 of the most common hazardous substances found at sites. These cleanup levels are intended for sites that are not complex, such as small properties where all of the substances are on the Method A list, and where only a few of the listed substances are present.
>
> **Method B** establishes cleanup levels using risk assessment. The DOE has determined the level of risk for each substance using information on how hazardous substances can interact with each other, what the health effects may be, and how the migration of these substances on-site and off-site could threaten human health and the environment. The risk level for carcinogenic substances may not exceed 1 in 1,000,000, and the total level of risk at any site may not exceed 1 in 100,000, using Method B cleanup levels. Ecology intended this method to be used for cleanups where the site is large and/or complex, or where one (or more) of the contaminants on the site is not present on the Method A list.
>
> **Method C** follows the same formula established for Method B. However, MTCA regulations drop the risk for carcinogenic substances to 1 in 100,000 for any individual substance and for

total risk caused by all substances. This method may be used when (1) cleanups under Methods A or B are technically impossible to achieve, (2) background concentrations are higher than Methods A or B cleanup levels, (3) cleaning up a site to Method A or B levels would actually result in greater harm to the environment, or (4) a commercial or industrial property is qualified, under MTCA regulations, for Method C.

The method selected for remediation of groundwater is based on the highest beneficial use of the water, generally assumed to be drinking water use. In areas where groundwater is a current or future source of drinking water, the cleanup levels must be as stringent as Method A levels or concentrations listed in federal laws (generally the Safe Drinking Water Act), or as stringent as levels established by the state board of health.

If it can be demonstrated that groundwater does not serve as a potential source of drinking water and has no potential as a future source of drinking water, DOE uses cleanup levels designed to protect the beneficial use of surface water. To do so, the person undertaking the cleanup action must prove that (1) there are no known or projected points of entry into surface water, (2) the surface water is not a suitable domestic water supply, (3) the flow of groundwater into the surface water will not result in a downstream accumulation of hazardous substances which exceed surface water standards, (4) on-site institutional controls will prevent the use of groundwater between the site and the surface water body, and (5) DOE determines that it is unlikely that the hazardous substances in groundwater below the site will be transported to an area where groundwater is or could be a drinking water source.

When selecting a soil cleanup method (standard), the zoning of the site and adjacent sites is an important factor to consider. Typically, governing bodies use three zoning designations for properties: residential, commercial, and industrial. The DOE determined that soil cleanup levels must exceed Method A or B standards unless the property is not currently a residential area, does not have the potential to become a residential area, and appropriate use restrictions are implemented on the property.

The DOE presumes that residential soil cleanup levels (Method A or B) will be the standards used for commercially-zoned properties also. However, a property owner can use Method C standards if the zoning for the property, adjacent properties, and properties in the general vicinity is commercial or industrial and the present and/or past uses of these properties are in accordance with that zoning. The project will meet Method A or B.

Cleanup Action

The second stage of site cleanup involves selecting the specific cleanup action that will used to clean up the site. A list of the various types of cleanup actions is provided below.

Reuse and Recycling - Implementation of reuse or recycling technology entails the extraction of free product (a pure contaminant, easily extracted or separated from soil or groundwater) or metals from the soil and groundwater. The contaminants must be extracted in sufficient quantity and purity to reuse or recycle as a marketable product.

Destruction or Detoxification - This method entails removing contaminated materials from soils and detoxifying or destroying the material. Detoxification of groundwater entails treatment in the form of either pump and treatment, or biosparging (injection of air and nutrients below the groundwater table to stimulate bacterial decomposition of organic chemicals such as petroleum).

Separation or Volume Reduction - This cleanup technology entails the removal and sorting of contaminated debris. The contaminated material is removed from the site and disposed of in an approved location.

Immobilization of Hazardous Substances - Immobilization technologies entail vitrification or solidification. Vitrification relies on the application of high temperatures to solidify contaminated soil into a rock-like material. Solidification involves the injection of cement into the contaminated material to create a solid.

On-site or Off-site Disposal at an Engineered Facility - This method entails removal of contaminated materials and disposal at an approved facility.

Isolation or Containment - The general philosophy of isolation or containment technologies is to separate the contaminated materials from the natural environment and human contact. Isolation and containment technologies include the capping of contaminated soil with some type of impervious material and/or isolating groundwater with a cutoff wall or similar technology.

The DOE does consider cost when determining the action or actions used to clean up a site.

Public Participation Process

MTCA regulations require public involvement and participation in the process of remediating a site (WAC 173-340-600). A goal of MTCA is "to provide the public with timely information and meaningful opportunities for participation which are commensurate with each site." The public participation process can take many forms, including public notices, public meetings or hearings, the site register, public participation plans, and the participation of regional citizens' advisory committees. In accordance with the Agreed Order negotiations in progress for the project site, the DOE will be responsible for providing public notice in accordance with the requirements of RCW 70.105D.030(2)(a).

Public notice of activities associated with a site cleanup must be made specifically to individuals who reside within the potentially affected area, to the general public via publication in the newspaper or other news media DOE deems to be appropriate, or to individuals who make a timely request, i.e., within the public comment period. The form of the public notice may include distribution of press releases, fact sheets, personal contact, or signs posted at the facility. Any public notice must indicate the dates of the public comment period, and the duration, generally 30 days. In addition, a public meeting must be held if requested within the comment period by ten or more individuals.

The DOE regularly distributes a site register, which is often used to make a public notice. Some of the activities reported in the site register include determinations of "No Further Action", results of Ecology's site hazard ranking, issuance of enforcement orders, issuance of agreed orders or consent decrees, public meetings or hearings, changes in the status of a site, or reports received for sites undergoing independent cleanup actions. The register is published every two weeks and can be received by contacting DOE's headquarters in Olympia by mail at P. O. Box 47600, Olympia, Washington 98504-7600.

PROPOSED SITE CLEANUP

As indicated earlier in this section, prior to issuance of any permits by King County, a phased remediation plan for the areas determined by DOE to be contaminated and warranting cleanup must be approved. The specifics of the site remediation plan are currently being determined by the DOE in cooperation with the landowner. The establishment and implementation of the remediation plan for the site is an action under MTCA separate from King County review and approval of permits. The remediation plan is under the jurisdiction of the DOE and will be analyzed consistent with DOE's review process. The MTCA process requires consideration of environmental impacts in the formulation of a remediation plan; therefore, the environmental impacts of any site remediation activities will be considered during the MTCA process, not as part of this Supplemental EIS.

It is anticipated that the site will be remediated under an Agreed Order or Consent Decree negotiated between the DOE, the State Attorney General, and the landowner. However, if neither an Agreed Order nor a Consent Decree is signed, it is possible that the DOE could require site cleanup under an Enforcement Order. Any site cleanup under an enforcement order would likely occur over a longer time period than is currently contemplated, assuming development of the Lakepointe project.

Site-Specific Cleanup Levels and Cleanup Action Options

The DOE, the State Attorney General, and the landowner had not signed an Agreed Order or Consent Decree at the time this Draft Supplemental EIS was published. However, the landowner has indicated a desire to meet Method B cleanup levels based on complexity of the site contaminants. The landowner has also indicated that his preferred cleanup action is the isolation and containment of contaminants under an engineered cap. An engineered cap is an impervious layer established over the contaminated materials to prevent contact between the materials and surface waters and human contact. The specific type of engineering material and thickness of the cap depends on the particular site characteristics and type of contaminated materials. The currently proposed engineered cap would consist of the proposed buildings and road/parking paving that would be constructed under the Master Plan. An engineered cap is an accepted presumptive remedy for landfills, as described in the U.S. Environmental Protection Agency's *Presumptive Remedy for CERCLA Municipal Landfill Sites* (Directive No. 9355.0-49FS, EAP 5440-F-93-035, dated September 1993).

As currently proposed, approximately 65 percent of the proposed Lakepointe development would consist of impervious building or pavement surfaces, with engineered storm water collection and treatment systems (the specific amount of impervious area may be more or less than the 65 percent depending upon the outcome of the Agreed Order). It is currently proposed by the landowner that the portion of the site that would not be covered by the engineered cap (i.e. the shoreline area) would be in landscaped and natural vegetation with some trail use. The landscaping and trails would be established over imported fill to eliminate the need to excavate in these areas, and to provide a buffer between any contaminated materials and human activity. It is possible that localized removal of contaminated materials in the area not covered by a cap will be required by the Agreed Order or Consent Decree. As with the existing vegetation along the shoreline, the root system of some new landscaping could reach contaminated materials.

According to the landowner, the additional cost of designing the proposed development to serve as an engineered cap for the existing contaminated areas would be relatively low, making the cap the most

cost-effective and implementable cleanup technology available. Therefore, an engineered cap is currently proposed by the landowner as the practicable, permanent and final remedial action for the site. Groundwater monitoring would be implemented as an institutional control to document groundwater gradients and contaminant concentrations beneath the site before any site preparation and during the period of phased development under the Master Plan. Specific details relating to the level of any allowed disturbance to contaminated soils during construction, technologies to separate temporary and permanent stormwater facilities from contaminated soils, and measures to minimize groundwater contamination impact (if any) from pile driving through contaminated soils, would be determined as part of the Agreed Order or Consent Decree. The environmental impacts of implementing such measures would be identified as part of the DOE's review process under MTCA.

Detailed information is needed in order to evaluate the probable significant adverse environmental impacts of the engineered cap proposal. However, King County is deferring this evaluation to DOE to complete as part of the MTCA review process. The DOE has indicated that all of the steps required by MTCA to determine that an engineered cap would be DOE's preferred alternative have not been completed. In addition, cleanup alternatives will need to be evaluated as part of the DOE's review process. Please refer to the Toxic and Hazardous Materials Report included as Appendix A to this document for a discussion on the applicability of the alternative cleanup action to site conditions.

Sampling, analysis, and if necessary, remediation of sediments in the Sammamish River and the inner harbor will be negotiated with DOE separate from the upland remediation action. Although MTCA cleanup standards have not been established for sediments, sediments in the river and inner harbor would be sampled and analyzed for contaminants under separate cleanup negotiations as a part of a comprehensive program to clean up Lake Washington.

ALTERNATIVES

Alternative 1 - Conceptual Master Plan as Illustrated in the Northshore Community Plan

As under the Proposed Action, a remediation plan, consistent with MTCA, would be required. The MTCA procedures and standards to be followed for site cleanup would be the same as under the Proposed Action.

Alternative 2 - No Action

As under the Proposed Action, a remediation plan, consistent with MTCA, would be required. The MTCA procedures and standards to be followed for site cleanup would be the same as under the Proposed Action. However, residential standards would not have to be met because the site would remain in industrial use.

MITIGATION MEASURES

The site cleanup would be implemented to reduce or eliminate the potential for exposure of humans to contaminated soils, per DOE requirements. Specific cleanup measures would be determined by the DOE through the MTCA process.

Prior to any permits being issued by King County, the applicant will provide documentation to the King County Department of Development and Environmental Services, the Seattle-King County Department of Public Health, and the Puget Sound Air Pollution Control Agency, showing that, in addition to non-surface hazardous contaminants, roofing debris and other surface solid wastes identified on the site have been removed or otherwise appropriately mitigated.

UNAVOIDABLE SIGNIFICANT ADVERSE IMPACTS

The potential for any unavoidable significant adverse impacts of the cleanup will be identified in the MTCA review process, based on the method of cleanup agreed to be DOE and the applicant. If an engineered cap is the method selected, no significant adverse impacts are anticipated from project construction provided that the mitigation measures identified in the Earth and Water sections of this Supplemental Draft EIS are implemented.

LAND AND SHORELINE USE - Land Use Patterns

This Chapter describes the site's existing land uses, relationship to surrounding land uses, site and surrounding area zoning classifications, and analyzes potential impacts resulting from the Proposed Action and alternatives. A detailed discussion of the relationship of the Proposed Action to relevant plans, policies and regulations is contained in the *Relationship to Plans and Policies* section of this chapter.

AFFECTED ENVIRONMENT

Area Context

The site is located within the 39 square mile Northshore planning area. As described in the Northshore Community Plan Draft EIS, the planning area has been characterized as a "maturing urban area" with predominantly urban density single-family residential development and infilling that has taken place over the last 10 years.

The western two-thirds of the planning area, which includes the site, is urban in character and consists primarily of single-family residential developments at densities of 3 to 6 dwelling units per acre. Multifamily developments are primarily located near the community business centers in Kenmore, Juanita, Kingsgate and Woodinville.

Activity centers, which contain major concentrations of employment and shopping opportunities in unincorporated areas of the County, are located in Woodinville and Kenmore. Commercial areas are generally located in Kenmore along NE Bothell Way, in Bothell adjacent to Beardslee Boulevard, and in Woodinville along NE 175th Street. Office development is generally located adjacent to major transit routes in Woodinville and in Kenmore. Industrial uses are located along the SR-522 corridor north of Woodinville, along the Woodinville-Redmond Road, along NE 24th Street east of Totem Lake, and along NE Bothell Way adjacent to Lake Washington (including the site).

Additional descriptions of the planning area and land use patterns are contained in the Northshore Community Plan Draft EIS.

History of the Site and Existing Land Uses

Following the lowering of Lake Washington in 1916, the Sammamish River was straightened and channelized in order to facilitate transportation and commercial uses associated with the river. The north end of the Lakepointe site was subsequently graded for construction of a railroad line and establishment of SR-522 (NE Bothell Way) and NE 175th Street. The inner harbor was also established at this time. The site was generally wooded at that time.

In the late 1940's, a lumber mill was constructed north of the inner harbor on what is now the existing Kenmore Pre-mix site and boats supporting the mill began to utilize the inner harbor. By then, the majority of the trees had been cleared and fill material was deposited on the site.

During the 1960's, a jetty was constructed off the southwest corner of the site and the southwest portion of the site was expanded by fill material placed behind the jetty. The Kenmore Pre-Mix cement plant, office and maintenance building were established at the general location of the lumber mill.

During the 1970's, the Kenmore Pre-Mix plant and stockpile areas were extended to their current locations. The majority of the site had been cleared and warehouse and outdoor storage uses were established on the site. During the early and mid decade, material continued to be deposited on the site, with average site elevations reaching approximately 10 feet above 1930 elevations.

During the 1980's and to the present, the site continued to contain Kenmore Pre-Mix facilities, to serve as storage, and to house several businesses. Current businesses on the site also include Sepia Interior Supply, Western Truck Driving School, Stout Roofing, Pioneer Towing Company, Waterfront Construction, Lone Star Northwest, and Nelbro Packing.

Surrounding Land Uses and Building Characteristics

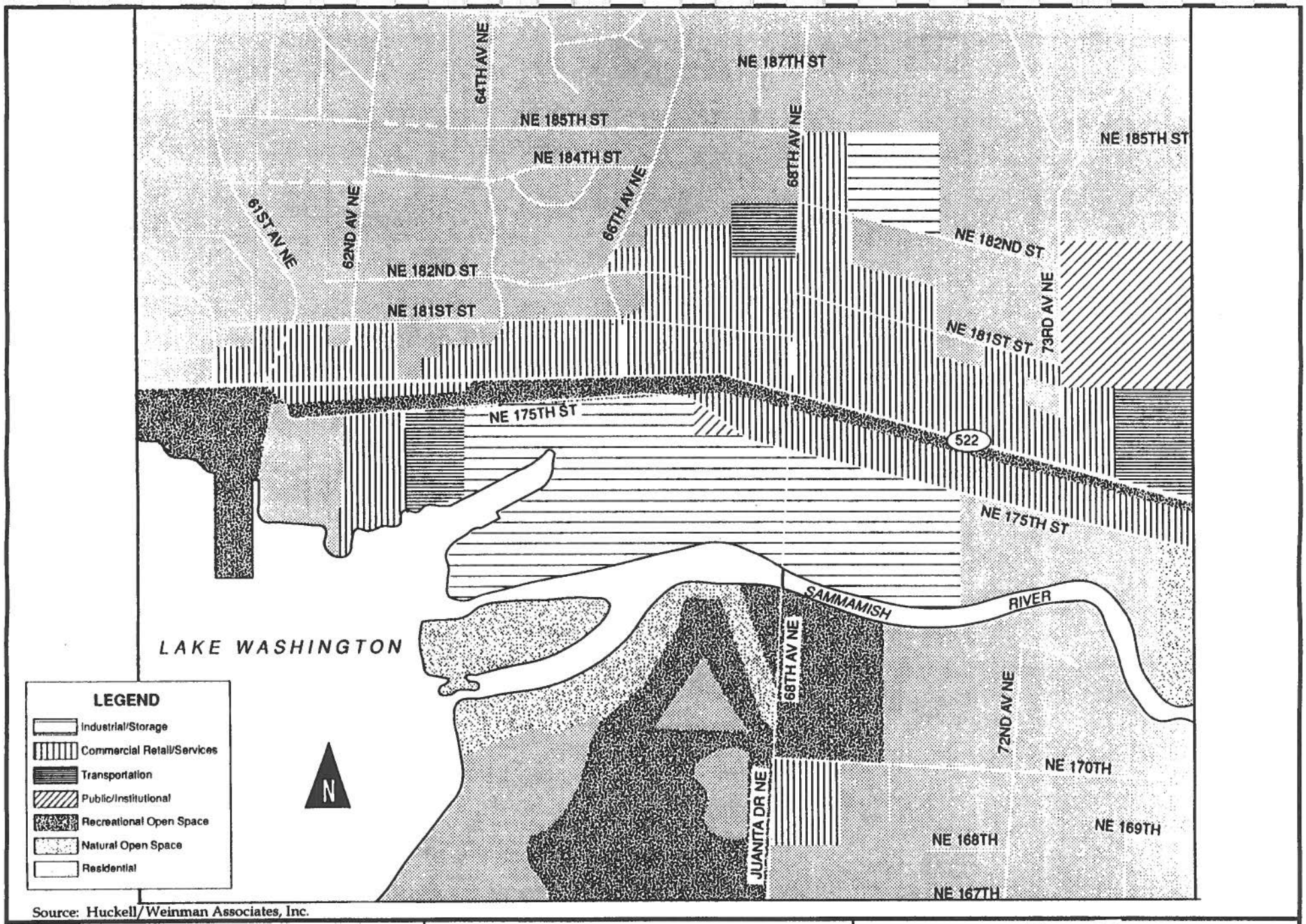
Land Uses

The site is a 50-acre irregular shaped property bounded by Lake Washington to the west, the Sammamish River channel to the south, 68th Avenue NE to the east and NE 175th Street to the north. The site has approximately 1,100 feet of frontage on NE 175th Street to the north and approximately 800 feet of frontage on 68th Avenue to the east. As described above, current uses are primarily industrial in character.

NE Bothell Way, north of the site and immediately north of NE 175th Street, contains the primary concentration of retail and commercial activity in the Kenmore area. The Kenmore commercial corridor on Bothell Way generally begins approximately 0.25 mile east of the intersection of NE Ballinger Way and NE Bothell Way (generally at the boundary of the City of Lake Forest Park) to the west and continues eastward to approximately 0.25 mile east of 80th Avenue NE, a distance of approximately 2 miles. The corridor contains a variety of commercial uses including automobile-oriented businesses (gas stations and auto part stores), restaurants (including fast-food establishments), banks, specialty retail outlets, professional offices, grocery stores and a wide variety of other retail uses. See Figure 20 for an illustration of area land uses.

Due to topography and the location of the Burke-Gilman Trail and NE 175th Street, commercial uses on NE Bothell Way immediately north of the site are limited to the north side of the road. These commercial uses include specialty coffee outlets, a truck rental business, an oil and lubrication service business, two gas stations, a bank, two restaurants, and two auto parts retail businesses. Several commercial uses are also located on NE 175th Street west of the site including a boat sales business and a commercial air harbor (Kenmore Air Harbor).

Commercial uses on 68th Avenue NE immediately east of the site (south of NE Bothell Way), include several professional offices, a medical clinic, a fast food restaurant, and a wholesale plywood sales business. Uses on 68th Avenue NE north of NE Bothell Way include a grocery store, rental store, a pizza parlor, and a self-service car wash.



Source: Huckell/Weinman Associates, Inc.

Huckell/Weinman Associates, Inc.	**Lakepointe Mixed-Use Master Plan**	**Figure 20** **Existing Land Use Map**

The residential areas closest to the site include the area north of NE Bothell Way (consisting of single-family homes on approximately 5,000 to 25,000 square foot lots), townhouses or condominiums in the Inglewood Country Club to the south across the Sammamish River, and the Harbor Village condominium complex located directly east of Tracy Owen Station Park.

Building Characteristics (height and bulk)

The Kenmore area can generally be characterized as suburban in nature. The majority of the commercial structures are low-rise buildings (one-story or two-story) separated by surface parking. Although there are several multifamily developments in the area, single-family homes dominate the residential pattern. The majority of the commercial buildings in the area are between 10 and 30 years old, with scattered newer construction. Residential structures are generally 10 to 40 years old, with some newer infill single-family homes and multifamily structures.

The primary structures on the Lakepointe site include the approximately 25,000-square-foot, two-story Lone Star Northwest office building, the approximately 65,000-square-foot, two-story Sepia Interior Supply building, and the approximately 25,000-square-foot single-story Nelbro Packing building. The approximately 40-foot-tall Kenmore Pre-Mix facility is located in the northwest corner of the site.

The majority of the buildings along NE Bothell Way north of the site are single-use commercial in nature and are one-story to two-stories in height with building footprints ranging from 2,500 to 7,000 square feet. Along NE Bothell Way to the immediate northeast, across 68th Avenue NE, structures are generally multiple use or supermarket use and are single-story with footprints ranging from approximately 13,000 to 40,000 square feet. A single-story fast food outlet and several single-story equipment/lumber storage buildings with building footprints from 10,000 to 30,000 square feet are located on the south side of NE Bothell Way east of the site. Two of the more visually prominent buildings in the area are located northeast of the intersection of 68th Ave. NE and NE 181st St - a self-serve car wash with an approximately 45-foot-high tower; and, a 4-story self-storage building with an approximately 20,000-square-foot footprint.

To the west of the site, between NE 175th Street and Lake Washington, are 2-story buildings associated with the air harbor, a 2-story, 21,000-square-foot storage building associated with a marina and boat sales business, a 2-story restaurant, and several 3-story condominium buildings.

To the south, across the Sammamish River, are two-story attached townhouse units and several 3-story condominium buildings in the Inglewood Country Club.

Existing Land Use Designations

Site Land Use Designations and Zoning

The King County Comprehensive Plan (1994) identifies the Kenmore area, including the Lakepointe site, as an Unincorporated Activity Center or Activity Area. The size and mix of land uses within an Activity Center are to be established through community and subarea plans. The Northshore Community Plan Update and Area Zoning (NSCP) has established policies to guide development in the Kenmore Activity Center. These policies call for development of a diversity of land uses to enhance the area's housing, employment, commercial, and recreational opportunities. Developments within the Activity Center

should be designed to create a sense of identity for Kenmore, reduce the reliance on the automobile for transportation, and enhance the area's marine orientation.

The Lakepointe site was identified in the NSCP as a Waterfront and Mixed-Use District. The NSCP calls for the site to be redeveloped with a mix of commercial and residential uses, as well as provide public access to the waterfront. Refer to the *Relationship to Plans and Policies* portion of this Chapter for detail on applicable Comprehensive Plan and NSCP policies and their relationship to the proposal.

As indicated on page 151 of the NSCP Draft EIS, "the Northshore Community Plan would direct and concentrate future growth in the designated activity centers of Kenmore, Bothell, Woodinville, Redmond, and Kirkland, where infrastructure is in place and public services are available. The plan generally encourages an intensification of land use in cities and activity centers as the most efficient way to accommodate future growth. While similar in type, land uses will generally intensify and the area will become more urban in character."

The NSCP established the potential zoning for the parcels that comprise the Lakepointe site. The potential zoning was actualized (i.e. applied to the site) when the development regulations implementing the King County Comprehensive Plan were adopted in January, 1995. The properties that comprise the site are now zoned as follows: approximately 45 acres of the site are zoned Regional Business, with P-suffix conditions (RB-P); and, approximately 5 acres of the site are zoned Industrial (I), with P-suffix conditions/Potential RB-P (see Figure 21 for an illustration of zoning designations). The RB zone designation is intended to provide for the broadest mix of retail, wholesale, service and recreation/cultural uses serving a regional market and offering significant employment opportunities. Residential development is permitted in the RB zone as part of a mixed use development.

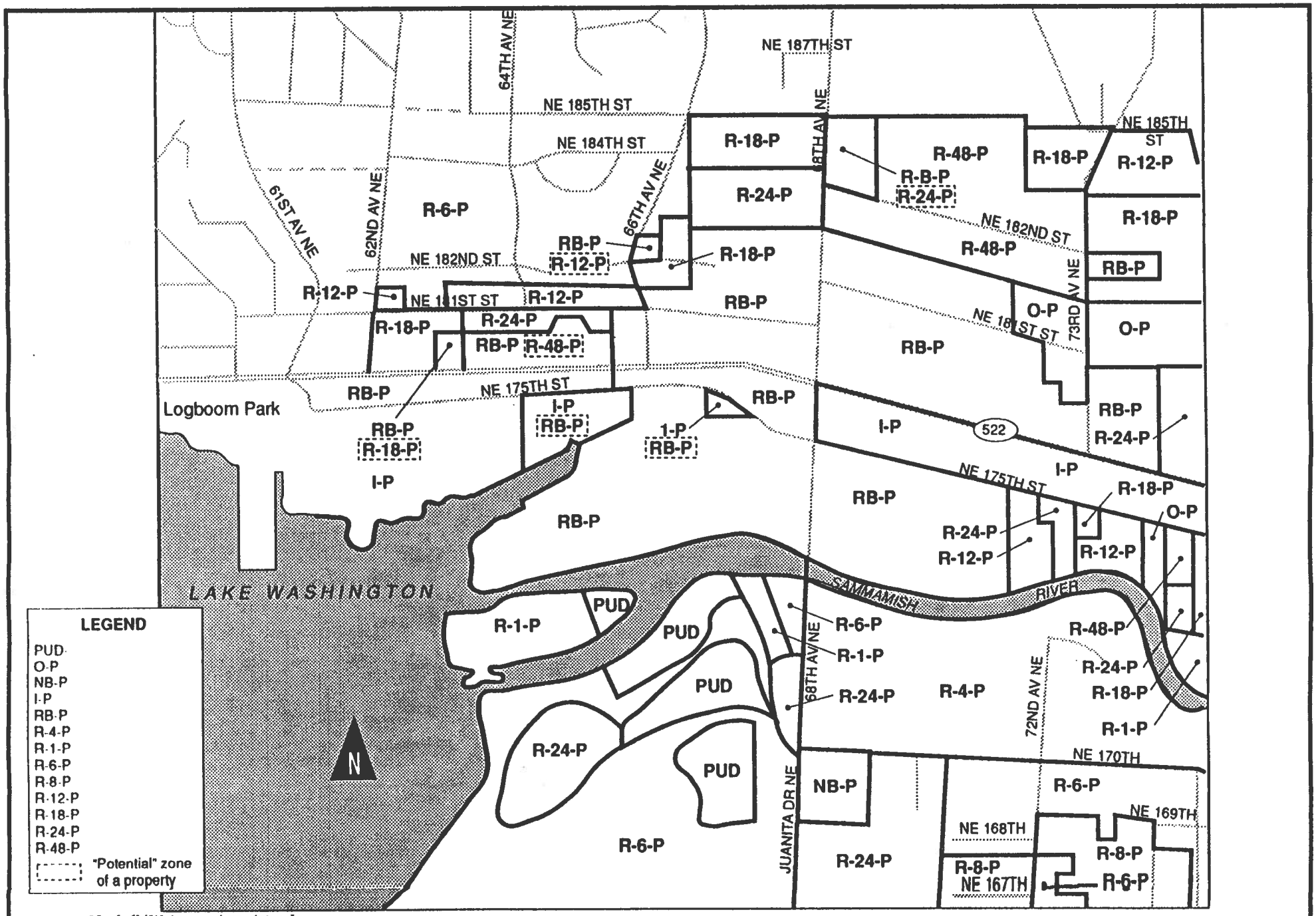
The NSCP also established several site-specific P-suffix conditions that are intended to assure a mixed-use pedestrian-oriented environment. Those conditions include a requirement that a Master Plan for development be completed and approved before specific development proposals are approved. The Master Plan would be binding, and future development proposals would have to be designed in a manner consistent with the Master Plan in order to be approved. Refer to the *Relationship to Plans and Policies* section of this document for detail on the P-suffix conditions.

The portions of the site along the shorelines of Lake Washington, the Sammamish River, and the inner harbor have been designated by the King County Shoreline Master Program as Urban Environment. The purpose of the Urban Environment designation is "to ensure optimum utilization of the shorelines of the state within urbanized areas by permitting intensive use and by managing development so that it enhances and maintains the shorelines of the state for a multiplicity of urban uses." Subject to conditions, the types of land uses permitted in the Urban Environment include commercial, residential and industrial uses.

Surrounding Area Zoning

Zoning designations for properties in the immediate site vicinity were initially established by the NSCP.

As indicated on Figure 21, the majority of the area to the immediate north and northeast of the site, along 175th Street, 68th Avenue NE (north to NE 181st) and NE Bothell Way, is zoned Regional Business (RB). Further to the north, across NE Bothell Way and to the north, is an area primarily zoned Residential (R) with base densities ranging from 6 to 24 dwelling units per acre. To the immediate east, across 68th Avenue NE, is property zoned Industrial (between NE 175th Street and NE Bothell Way) and



Source: Huckell/Weinman Associates, Inc.

Huckell/Weinman Associates, Inc.	**Lakepointe Mixed-Use Master Plan**	**Figure 21** **Zoning Map**

RB (between NE 175th Street and the River). Further to the southeast, across 68th Avenue NE and the Sammamish River, is an area primarily zoned Residential (R) with base densities ranging from 4 to 24 dwelling units per acre. The southeast corner of 68th Avenue NE and NE 170th Street (Simonds Road) is zoned Neighborhood Business (NB). The area to the south of the site, across the Sammamish River is zoned Residential (R) with base densities ranging from 1 to 24 dwelling units per acre. A Planned Unit Development with condominiums and a golf course has been developed on the site (known as the Inglewood Country Club site). The channel island and south shore of the Sammamish River are designated under the Shoreline Management Program as "Conservancy" Environment (refer to Figure 1).

IMPACTS OF THE PROPOSED ACTION

The proposed Lakepointe Master Plan development is intended to be a mixed-use, pedestrian-oriented urban village extension of Kenmore; the general mix of desired uses is set forth in the Northshore Community Plan Update and Area Zoning (as part of the Kenmore Activity Center and P-suffix Development Conditions chapters). The desired uses generally include multifamily housing (apartments and condominiums), parks, trails, waterfront viewpoints, public gathering space, and a marina (refer to CHAPTER 2 of this document for detail). The Proposed Action is designed to be consistent with the intent of the P-suffix conditions in the Northshore Community Plan Update and Area Zoning. A detailed discussion on applicable policies and code requirements is contained in the *Relationship to Plans and Policies* Chapter of this document.

Land Use

Overall, implementation of the Proposed Action would result in the redevelopment and intensification of development on the site and displacement of existing industrial uses. The overall character of the site would become more urban in nature and characterized by a mix of uses.

Implementation of the Proposed Action would involve the phased development of a mixed-use master planned urban community. Over time, industrial use would be replaced by a high density urban village. Proposed development described in the Commercial Site Development Permit application (Building Areas A through G) consists of phased development of residential units, professional office space, retail and commercial space (including cinemas, hotel and health club), a private moorage marina, open space (including, a shoreline park, public amphitheater, boardwalk, public view points and other open space features), parking stalls, and a new public street connecting NE Bothell Way and 68th Avenue NE. Although not proposed at this time, Building Area H (the Kenmore Pre-mix site) is likely to be rezoned in the future and developed with retail, commercial and/or residential uses. Refer to CHAPTER 2 of this document for additional detail on proposed development.

The proposed development would substantially increase the intensity of development on the site. By 2005, the total amount of building area on the site would increase from the existing approximately 100,000 square feet to approximately 2,430,543 square feet (644,245 square feet of commercial/office area and approximately 1,786,303 square feet in residential building space). As currently contemplated by the Master Plan, residential population on the site would increase from zero under existing conditions to approximately 2,250 under the Proposed Action. Employee population on the site would increase from the approximately 203 under existing conditions to approximately 1,270 under the Proposed Action.

The proposed Master Plan would include public open space along the Lake Washington and Sammamish River shoreline. These public open spaces would be linked, via boardwalk and trail, to the Burke-Gilman Trail and Kenmore. Approximately 21 acres of the site would be devoted to open space and recreational uses.

The Proposed Action would result in the displacement of several existing light industrial and storage uses on the site. The existing Kenmore Pre-Mix facility would remain in operation throughout the development of the six phases proposed under the Commercial Site Development Permit application. Phase seven of the Master Plan would involve the replacement of the Kenmore Pre-Mix plant with commercial/retail development.

The residential and commercial uses proposed for the site would be generally compatible with the existing land uses in the immediate site vicinity. However, the scale and intensity of proposed development would be greater and more urban in character than surrounding development. The proposed residential density of approximately 24 dwelling units per acre would be significantly greater than the approximately 4 to 9 single family units per acre to the north of NE Bothell Way, or the residential density of the Inglewood Country Club to the south, across the Sammamish River. In general, NE Bothell Way and the Sammamish River would buffer adjacent residential uses to the north and south, respectively, from on-site development. The provision of a 100 to 220 foot wide shoreline park along the southern edge of the site would provide additional buffering for residential uses to the south. The proposed residential density would be similar to that of the Harbor Village condominium complex located to the west of the site and with the apartment complexes located to the north of the site along 68th Avenue NE.

The proposed commercial use on the site would be more intensive in scale and more urban in character than existing commercial uses along NE Bothell Way. However, it would not be considered incompatible with existing commercial uses in the area.

The Master Plan would include a number of different land uses which would generate different patterns of activity. For example, residents of the senior housing component of the Master Plan would be more likely to remain on the site or in the immediate site vicinity on a daily basis for shopping and recreational activities; residents of the apartments and condominiums would be more likely to leave the site on a daily basis for work or school; the office uses on the site would tend to draw employees and patrons to the site during the weekdays; and the restaurants and cinema would tend to draw employees and patrons to the site during evening hours and weekends. The proposed mix of uses would result in a high level of activity on the site throughout the day and evening.

Zoning

The first six phases of the proposed Master Plan would be located on the 45 acres currently zoned Regional Business (RB-P). The proposed building floor areas and residential densities would meet the criteria for mixed-use development in the RB zone established in KCC 21A. 14. 110-140. The proposed Master Plan is designed to be consistent with the intent of site specific P-suffix conditions established by the Northshore Community Plan and Area Zoning (NSCP). Refer to the *Relationship to Plans and Policies* section of this document for a detailed analysis of consistency of the proposed Master Plan with the NSCP P-suffix conditions.

The final phase of the Master Plan (Phase 7) would be located on the 5 acres currently zoned Industrial (I)/potential RB-P. Because the I zone does not permit a wide range of mixed uses, approval of a rezone application would be required to allow commercial, retail, and/or residential uses. Rezoning this portion of the site to RB, which may be proposed at a later date, would be generally consistent with the policies of the King County Comprehensive Plan and NSCP, and surrounding zoning designations.

The proposed marina would introduce boat traffic which could impact Kenmore Air operations, however, no significant direct impacts to Kenmore Air operations are anticipated (refer to the TRANSPORTATION section for details on the potential for boat traffic from the proposed marina to impact Kenmore Air operations).

Building Height and Bulk

The proposed total building area of approximately 2,400,000 square feet would be substantially greater than the approximately 100,000 square feet of existing building area on the site. The proposed building height and bulk would be greater than the majority of the existing buildings in the immediate site vicinity. The overall character of the site development would change from industrial to urban mixed-use development.

The majority of the proposed structures (Buildings A, B, C, D and E) would be oriented in a linear, northeast to southwest pattern in the center of the site along Lakepointe Boulevard between the Sammamish River and the inner harbor. Total square footage of these building would equal approximately 2,430,548-square-feet, and building heights would range from 7 to 9 stories. Depending on the angle of view, these buildings could appear as one continuous mass of buildings. However, the buildings along Lakepointe Boulevard would be punctuated by four street/emergency access crossings. In addition, the center portion of the site would be approximately 20 feet lower than the majority of the buildings along NE Bothell Way, thus, the contrast between the bulk and scale of the proposed buildings in the center of the site and existing buildings along NE Bothell Way would be reduced.

Buildings G-1 and G-2 in the northeast corner of the site, between the proposed Lakepointe Way NE and NE Bothell Way, would be approximately 90-feet tall. Because these buildings would be in close proximity to NE Bothell Way, the contrast between their bulk and height and that of the immediately surrounding one- to two-story buildings along NE Bothell Way would be more noticeable. Although larger, the proposed buildings in this portion of the site would be similar in scale to buildings to the northeast of the site - the 2-story, approximately 40,000-square-foot supermarket, the 4-story, 20,000-square-foot self-storage building and the approximately 45-foot-high car wash tower.

The last phase of the proposed Master Plan (Building Area H) would replace the existing Kenmore Pre-mix facility with commercial and office use. Although design is conceptual at this time, this area would likely contain two buildings approximately 92 feet tall. Because the existing Kenmore Pre-mix facility is similar to the conceptually proposed buildings in height and bulk, the proposed Master Plan would not significantly change the height and bulk characteristics in this portion of the site. However, the overall character of site development would change from industrial to urban mixed-use development.

Indirect Impacts

Development of a mixed-use master plan on the site was considered as an integral part of the NSCP. The relationship of a mixed-use master plan to surrounding land uses (existing and future) has been considered by King County in designating land uses in the Kenmore area. Adopted planning policies and regulatory controls would guide and control any spin-off development related to the Proposed Action.

Some land use pressures could be experienced in the Kenmore commercial core with buildout of the Lakepointe proposal. The resident and employment population associated with Lakepointe could generate greater demand for goods and services provided in the Kenmore retail areas. This could contribute to increased levels of business activity, to pressure for expansion of business uses in response to increased market opportunities, or conversion or redevelopment of some existing businesses.

It would also result in increased traffic, noise and similar impacts and could result in an increase in rezone applications and building permits, more rapid development of vacant or partly developed land, redevelopment of some existing uses, and intensification of land use in general.

ALTERNATIVES

Alternative 1 - Conceptual Master Plan Illustrated in the Northshore Community Plan

As under the Proposed Action, Alternative 1 would result in the intensification of development on the site and displacement of existing uses. The overall character of the site would become more urban in nature than currently exists. However, the total square footage of building area would be approximately 200,000 square feet less than under the Proposed Action which would result in a somewhat lesser overall building scale. The perceived visual building scale would be more or less than under the Proposed Action, depending on the location of view.

Development under Alternative 1 would be consistent with the intent of the Northshore Community Plan and the uses would be compatible with the existing uses in the area. Although the scale of proposed commercial and residential uses would be greater than existing commercial and residential uses in the area, the scale of the on-site uses would be somewhat less than under the Proposed Action.

The residential population on the site would be less than under the Proposed Action (1,850 compared to 2,250), resulting in less activity such as traffic and pedestrian movement.

Indirect impacts under Alternative 1 would be similar to those under the Proposed Action.

Alternative 2 - No Action

Under the No Action Alternative, the existing industrial land uses would remain on the site. The intent of the Northshore Community Plan to establish a mixed use pedestrian development on the site would not be met. No provisions for public access to Lake Washington or the Sammamish River shorelines would be provided. Given the site zoning and P-suffix conditions, any future redevelopment of the site would be required to be under a mixed use master plan.

MITIGATION MEASURES

No specific mitigation measures are required to address identified land use impacts other than the features incorporated into the proposal in order to be consistent with the intent of NSCP P-suffix conditions. To ensure that indirect land use impacts are effectively controlled, King County and area cities will implement their adopted land use plans, policies and regulations to guide the location, type, and intensity of future growth.

UNAVOIDABLE SIGNIFICANT ADVERSE IMPACTS

Implementation of the Proposed Action would result in the intensification of development on the site and displacement of some existing uses. The proposal would be consistent with King County land use designations and policies addressing where urban growth should occur. The analysis in this section concludes that no significant unavoidable adverse impacts are anticipated.

LAND AND SHORELINE USE - Relationship to Plans and Policies

INTRODUCTION

Several regulations, plans, and policies guide development in unincorporated King County. These include the state Growth Management Act, the King County Countywide Planning Policies, the King County Comprehensive Plan, the Northshore Community Plan Update and Area Zoning, the King County Zoning Code (Title 21A), and the King County Shoreline Master Program. Relevant portions are summarized below followed by a brief discussion of the Lakepointe proposal's consistency with each.

GROWTH MANAGEMENT ACT (RCW 36.70A)

Summary: *The Growth Management Act ("GMA"), first enacted as ESHB 2929 by the 1990 Washington State Legislature and amended in 1991, contains a comprehensive framework for managing growth and coordinating land use planning with the provision of adequate infrastructure. Many provisions of GMA apply to the state's largest and fastest growing jurisdictions, including King County and all its cities; some provisions of GMA (such as requirements to identify and regulate critical areas) apply to all local jurisdictions. GMA is long and quite complex. The following discussion is a brief, selective summary of provisions relevant to the Lakepointe proposal.*

Among other requirements, jurisdictions subject to "GMA" must prepare and adopt:

- *Countywide planning policies for implementation of" GMA";*
- *Comprehensive land use plans containing specified elements and embodying state-wide goals;*
- *Regulations consistent with those plans;*
- *Capital facilities plans (including financing elements) for utilities and transportation systems; and*
- *Programs designating and regulating critical/sensitive areas (including agricultural and forest lands, wetlands, steep slopes, and critical habitat).*

The general planning goals of "GMA" include: directing growth to urban areas; reducing sprawl; providing efficient transportation systems; promoting a range of residential densities and housing types, and encouraging affordable housing; promoting economic development throughout the state; protecting private property rights; ensuring timely and fair processing of applications; maintaining and enhancing resource-based industries; encouraging retention of open space and habitat areas; protecting the environment; involving citizens in the planning process; ensuring that public facilities necessary to support development are adequate prior to occupancy; and preserving lands with historical and archaeological significance.

Comprehensive plans must contain elements dealing with land use, housing, capital facilities, utilities, rural lands, and transportation. Optional elements include conservation, solar energy, and recreation, as well as other areas dealing with the physical environment. Sub-area plans (i.e., neighborhood and community plans) are also authorized.

GMA authorizes the imposition of impact fees for specified public services and facilities -- roads, schools and parks. Such fees must be based on adopted capital facilities plans and facility standards. Among other things, the plan must identify the projected facility needs and sources of funding. GMA also contains general standards for calculating, imposing and expending fees. GMA provides for creation of three Growth Management Planning Hearing Boards for the state of Washington, which will hear petitions alleging noncompliance of local plans and regulations with GMA.

Counties must also designate "urban growth areas" within which urban growth is encouraged and services and facilities are available, or are planned to be available. All cities must be within an urban growth area. Cooperative intergovernmental negotiation is contemplated as the means to determine urban growth area boundaries; a dispute resolution process is also set forth.

Within designated urban growth areas, residential densities are to be sufficient to accommodate 20-year population forecasts. The growth areas should also include greenbelts and open space. Other lands that must be identified in comprehensive plans include lands for public purposes, including utility and transportation corridors, sewage treatment facilities, landfills, schools, recreation, and open space corridors within and between urban growth areas.

Discussion: The framework established by GMA relies on adoption of regional and/or local plans and regulations that can be measured against GMA's goals and objectives. GMA itself does not establish a permitting system or regulations for individual development proposals.

In general, however, the proposal is consistent with the intent of GMA's goals and objectives. For example, the Lakepointe site area is within a designated Urban Area (see discussion on Countywide Planning Policies and King County Comprehensive Plan below) which contains urban services, facilities and transportation systems. Consistent with the King County Comprehensive Plan and Northshore Community Plan (NSCP) targets, the Lakepointe site is designated to accommodate a significant portion of Northshore's forecast population growth. Concentrating development in this designated Urban Area is consistent with GMA's major planning goals, including reducing sprawl; promoting a range of densities and housing types, including affordable housing; and coordinating provision of public facilities to support planned growth.

KING COUNTY COUNTYWIDE PLANNING POLICIES

Summary: *The Countywide Planning Policies (CPPs), drafted by the King County Growth Management Planning Council, were originally adopted by the Metropolitan King County Council in August, 1994 and amended in 1995. The policies are intended to provide a regional policy framework for local jurisdictions to follow in their planning to implement the Growth Management Act. The CPPs also contain development guidelines, standards and recommended processes to be implemented by individual cities and King County. Subject areas addressed in the CPPs include critical areas, land use pattern, transportation, community character and open space, affordable housing, contiguous and orderly development, siting of regional/statewide capital facilities, and economic development. Policies generally encourage concentrating urban development in a defined Urban Growth Area and phasing the provision of adequate services. The CPPs also designate 14 Urban Centers (including Kenmore) as the focus for a significant portion of regional growth over the next 20 years.*

The CPPs also provide that local plans should designate Activity Areas within the UGA, outside designated Urban Centers. Uses and densities should provide local employment, commercial activities and public facilities, and should encourage bicycle and pedestrian travel. Business and office parks are directed primarily to Urban Centers; office development outside Centers should occur in pedestrian-oriented Activity Areas.

Discussion: The Proposed Action is consistent with the Countywide policies identified above. It is, for example, located within the designated Urban Growth Area and within a designated Urban Center. It is, therefore, appropriate for intensive urban development, including higher density residential development and retail/office use.

Other policies and standards contained in the Countywide Planning Policies are intended to provide a guide and framework for local planning and are to be applied to individual development proposals through the King County Comprehensive Plan.

KING COUNTY COMPREHENSIVE PLAN

Summary: Urban Land Use

Urban Growth Areas. *A primary goal of the King County Comprehensive Plan (KCCP) is to focus growth within the unincorporated Urban Growth Area (UGA) close to cities and Urban Centers (U-202).*[1] *Spending for capital facilities will also be focused here to support and help attract growth (U-204). The UGA is shown on the Plan's Land Use Map, and includes the Kenmore area and the Lakepointe site. Collectively, unincorporated UGAs are intended to contain sufficient land to accommodate King County's share of 20 year population and employment growth -- targets of 34,200-41,800 households and 22,000-26,000 jobs by 2012 are adopted for the unincorporated UGA. (U-207) The Northshore UGA is targeted to receive 2,600 to 3,400 new households. (U-303) The UGA is considered long-term and can only be amended consistent with procedures and criteria identified in the Comprehensive Plan and Countywide Planning Policies.*

Growth Strategy/Phasing. *The plan's growth strategy establishes priorities for public facility and service improvements in unincorporated urban areas. The Plan's growth strategy is based primarily on the availability of water and sewer service. Areas where adequate services (as defined in the Plan) are present are designated "full service areas." Areas which do not meet the criteria for adequacy are designated as "service planning areas." The Plan designates the Kenmore area and the Lakepointe site as "full service areas."*

Capital spending will be prioritized and focused, through Capital Improvement Programs, in areas that can best accommodate the plan's growth pattern and meet GMA requirements; the service area designations are a tool to help accomplish this coordination. Transportation spending will be focused on providing adequate facilities for existing development (including vested pipeline development), followed by critical projects within full service areas to support planned growth.

[1] Numbers in parentheses refer to policies in the King County Comprehensive Plan (e.g., U-202 refers to Policy Number U-202 in the "Urban" chapter).

(U-415) Development that does not meet level of service standards will be denied or deferred. Area-wide land use would be reassessed and changed if necessary if the deficiencies cannot be remedied within 10 years.

Residential Land Use. *Plan policies encourage new residential development in portions of the UGA where facilities and services can be provided in a timely and cost-effective manner. (U-501, U-502) All urban residential areas should have a variety of housing types and prices, including multi-family units, townhouses, small lot single family and mobile homes. (U-506) Incentives should be provided to encourage innovative low-cost housing. (U-503) In the UGA, a combination of regulations, incentives, open space acquisition and, where these measures are not effective, reductions in development potential should be used to protect environmentally sensitive areas (e.g. floodplains, wetlands, steep slopes, critical aquifer recharge areas). (U-510) Non-residential uses should be integrated into urban residential neighborhoods to create quality communities with a full range of public services and facilities.*

(U-511) Policies encourage good neighborhood design as a component of quality of life. Standards include preserving natural site amenities, usable open space, and pedestrian mobility. (U-512) Improvement standards should be applied through zoning and subdivision regulations to achieve usable open space, community facilities and non-motorized access. (U-513) Urban residential development should also use lot size averaging, clustering, flexible setbacks and a mix of attached and detached units to achieve design variety. (U-514) Multi-family development should include open space and use variations in facade and roof lines. (U-517) All residential development should provide park sites or contribute a fair share toward meeting local park and outdoor recreation needs.

Activity Centers. *(U-601) The Plan encourages development within existing Unincorporated Activity Centers to meet the needs of the regional economy and to provide employment, housing, shopping, services and leisure-time amenities. (U-602) Existing Unincorporated Activity Centers are designated by the Plan map in Aurora/Richmond, Covington, Kenmore, Kingsgate and White Center. (U-603) New Unincorporated Activity Centers should be designated only when it is demonstrated that additional land supply is needed to meet regional economic and employment needs and if commercial and industrial land supply in cities is shown to be insufficient.*

(U-604) Activity Centers should include a mix of uses, including retail stores, professional offices, business/office parks, heavy commercial uses, manufacturing, health and human services, multi-family and mixed use residential, and open space. (U-606) The amount of retail space should be based on the amount of residential development planned for the surrounding community or sub-region. (U-608) Design standards for centers should reflect compact design, multistory buildings, structured parking, pedestrian access, sign regulations, and building arrangement to minimize land use conflicts. (U-610) Land zoned or used for industrial, commercial or office use should be preserved.

Discussion: Urban Land Use

Urban Growth Area. The Lakepointe site is located within a designated Urban Growth Area (UGA). The Comprehensive Plan Land Use Atlas applies an Activity Center designation/overlay to the property. The Proposed Action would accommodate 1,200 households; this is approximately 35 to 45 percent of Northshore's urban area target.

Growth Strategy/Phasing. The Lakepointe site is located within a "Full Service Area", based on the Plan's criteria for sewer and water service. The Proposed Action would include construction of all on-

site utility extensions. The Proposed Action would also provide transportation improvements including a bypass roadway (Lakepointe Way NE) connecting NE Bothell Way and 68th Avenue NE.

Residential Land Use. The Proposed Action would provide a variety of housing types and prices, including senior housing apartments, general apartments, and condominiums. In addition, 120 affordable housing units would be provided either on or off-site. The Proposed Action has been designed to avoid or minimize impacts to environmentally sensitive areas, including wetlands and shorelines on this urban site. Approximately 21.2 acres (47 percent of the site) would be retained in open space. The open space would include natural and landscaped park area, trails, an amphitheater, shoreline viewpoints and a children's play area. Development guidelines, which would prescribe the general design standards for the Master Plan, would be implemented.

Activity Centers. The Comprehensive Plan designates the downtown Kenmore area, including the site, as an Activity Center. The Proposed Action would include a mix of uses, including multifamily residential, commercial/retail, recreational, and open space. The Proposed Action would provide opportunities for living, working, shopping and recreating in one compact area.

Summary: Economic Development

(ED-101) The Comprehensive Plan is intended to achieve a balance between economic growth and preservation of environmental quality; sustainable economic development will not exceed the long-term capacity of the natural and built environments. (ED-102) Future economic development efforts will be focused on improving the local business climate, supporting local firms, expanding family wage jobs, investing in the local labor force, and providing high quality local government services and infrastructure.

Plan policies also emphasize expanding the regional employment base; (ED-102) retaining and expanding manufacturing and industrial jobs; (ED-301) supporting programs for economically disadvantaged citizens and neighborhoods, job training and education; (ED-401) inventorying and monitoring land supply for industrial and commercial uses (for 6 and 20-year time frames) cooperatively with other jurisdictions; (ED-402) using incentives to encourage redevelopment and infil; (ED-404) fully exploiting the economic benefit of infrastructure on lands adjacent to major public infrastructure; (ED-501) and fostering the use of public/private partnerships for economic development programs.

Discussion: Economic Development

In general, the Proposed Action would support economic development policies by providing a mix of land uses that would support the creation of new jobs in an area which is currently industrial in character and is served by urban infrastructure. At buildout, the Proposed Action would provide an estimated 1,270 retail, service and office jobs compared to approximately 200 industrial and service jobs currently on the site.

Summary: Housing

The Comprehensive Plan's housing policies provide a framework for increasing the range of housing opportunities to meet the needs of King County's diverse population. Policies acknowledge that most housing is provided by the private sector and affordability is affected by a wide range of public actions (such as land use regulations) and market forces.

Policies establish numerical goals for housing units to meet the needs of different income groups. (H-102) Of the housing units provided, 24 percent should be for households earning less than 50 percent of the median income, 39 percent for those earning more than 120 percent of the median income, and 37 percent combined for those households earning between 50 percent and 120 percent of the median income. (H-103) The County's role in increasing affordable housing opportunities will include providing necessary infrastructure and land zoned for a variety of housing types (multi-family, small-lot single-family, townhouses and manufactured housing); (H-108) permitting mixed-use development and re-use of non-residential buildings; (H-201-205) providing density bonuses and other incentives for below market-rate housing, including exemptions from impact fees; (H-206-211) identifying new funding sources for housing; (H-212) new partnerships and cooperative actions with lending institutions; encouraging higher densities and greater flexibility for different housing types; and similar measures. (H-293) The County will also explore expedited permit review for low- and moderate- income housing proposals and (H-205) prioritizing funding and incentives to stimulate housing development in selected areas. (H-109) Urban Planned Developments and other large housing development must provide a mix of housing types and densities, including below-market rate housing affordable to moderate- and middle-income households.

Discussion: Housing

The proposal's 1,200 residential housing units would provide a wide range of housing opportunities. Units would consist of three different types of multifamily housing: 600 apartment units, 400 senior housing apartment units, and 200 condominium units. Housing would be provided in conjunction with shopping, employment and recreational uses.

Approximately 120 affordable housing units would be provided (either on- or off-site). See the NSCP Affordable Housing section of this chapter for a discussion of the number and estimated price/rent of the affordable housing units.

Summary: Natural Resource Lands

Policies for natural resource lands emphasize conserving forest, agricultural and mineral resource lands and promoting continued resource-based industries. The plan is intended to prevent incompatible land uses and activities while also maintaining environmental quality. Designation of resource production districts for farming and forestry are a central part of the approach to protecting these resources.

Discussion: Natural Resource Lands

The Lakepointe site is not located on and would not affect designated Natural Resource Lands.

Summary: Natural Environment

(NE-101-106) In general, the Comprehensive Plan expresses King County's intent to use a balanced approach -- including incentives, regulations and acquisition -- to achieve its environmental policies. (NE-107) Regulations to prevent unmitigated significant adverse impacts will be based on the importance and sensitivity of affected resources.

Air Quality. *(NE-201) Comprehensive Plan policies promote reducing air pollution by providing alternatives to burning yard waste, and educating citizens about the health effects of particulate*

emissions. (NE-202) Air quality impacts should be evaluated during countywide, subarea and local planning.

Water Resources. *King County's water resources include shorelines, rivers, streams, lakes and wetlands, floodplains, and ground water. (NE-301) Uses of water resources should preserve opportunities for other uses; incentives, regulations and other programs should be used to manage resources. (NE-302) Plan policies for water resource protection focus on continued ecological and hydrological functioning of water resources by preventing unmitigated significant adverse impacts. (NE-306) Surface waters should be protected and enhanced on a watershed basis. (NE-306) Regionally Significant and Locally Significant Resource Areas, when adopted legislatively, will use a tiered system of protection. (NE-308) The Shoreline Master Program would be used to preserve shoreline resources, including ecological functions, visual and public access and navigation. (NE-309) The Puget Sound Water Quality Management Plan will be implemented to protect Puget Sound. (NE-310) Stormwater runoff from development shall be managed to prevent significant adverse unmitigated impacts and to promote recharge and infiltration of ground water when feasible; land consumptive activities in the UGA will be balanced with the need to protect developable land. (NE-311) Rivers and streams should be preserved, protected and enhanced for their hydraulic, ecological and aesthetic functions. (NE-313) Lakes sensitive to nutrients should be protected through management of nutrients; management should be accomplished through measurable standards and lake management plans where sufficient information is available.*

(NE-316) King County's goal for wetland protection efforts is no overall net loss of function or value within each drainage basin; regulation will only be used to protect wetland functions, while acquisition, incentives and enhancement will be used to protect and enhance functions and values. (NE-317) Development adjacent to wetlands must be sited to protect wetland functions, provide a buffer, and prevent significant adverse impacts. (NE-318) Areas of native vegetation between wetland systems and incentive programs (e.g. buffer averaging, density transfers) should also be used. (NE-322) Enhancement or restoration of degraded wetlands may be allowed to improve wetland functions pursuant to a management plan and must result in a net improvement to wetland functions. (NE-322b) Wetland alterations may be allowed to accomplish public agency or utility projects, provide necessary road or utility crossings, or avoid a denial of all reasonable use of property. (NE-323) Within the UGA, standards may allow low value isolated class 3 wetlands to be altered. (NE-324) Wetland mitigation proposals should be allowed if they would result in improved wetland functioning within a drainage basin. (NE-329) King County will also cooperatively explore creation of a wetland mitigation banking program.

(NE-330) The existing flood storage and conveyance functions and ecological values of floodplains should be preserved.

(NE-332) The plan designates Critical Aquifer Recharge Areas that are highly susceptible to ground water contamination. (NE-333) Ground water quality will be protected through implementing measures identified in adopted Ground Water Management Plans and adopted wellhead protection programs, and by developing best management practices. (NE-334) Infiltrating runoff will also be used as a method to protect ground water recharge in the UGA where site conditions permit. (NE-335) Ground water policies will also be evaluated and monitored through future zoning decisions.

Geologic Hazards. *Policies for geologic hazard areas -- including erosion hazards, landslide and avalanche hazards, coal mine hazards and seismic hazards -- would be protected through a combination*

of identification and mapping, use of best management practices, special studies; and site design/engineering to ensure that risks are reduced.

Fish and Wildlife Habitat. *(NE-601) Fish and wildlife habitat policies emphasize maintaining a quality environment in the UGA which includes fish and wildlife habitat supporting the greatest diversity of species consistent with the density objectives; wildlife diversity will be maximized in the Rural area. (NE-603) Habitat for species designated as threatened, endangered, sensitive or priority should not be reduced. (NE-604) Plan policies define "fish and wildlife habitat conservation areas" to include habitat for listed threatened and endangered species (and candidate species in the Rural area); salmon of local importance; raptors and herons of local importance; shellfish beds; kelp and eelgrass beds; herring and smelt spawning areas; and riparian corridors. (NE-606) At the project level, identification of species that need protection can occur only once during the development review process. (NE-610) The policies emphasize connecting habitat for threatened, endangered and priority species in a system or network.*

Discussion: Environment

Air Quality. As with all large scale development projects, construction of the Proposed Action would result in localized short-term increases in particulates and carbon monoxide. Construction of the Proposed Action would result in localized increases in particulates and carbon monoxide during the seven- to ten-year construction period. Upon full build-out, the proposal would generate carbon monoxide, particulates and other automobile-related air pollutants by increasing traffic volumes. Please refer to the discussion in the AIR QUALITY section of this Supplemental Draft EIS and to the *Air* section of the NSCP Draft EIS.

Water Resources. The proposed stormwater control system would include wetponds, biofiltration swales, and oil water separators to provide water quality treatment of stormwater runoff.

The site is not located within a designated Critical Aquifer Recharge Area.

The Proposed Action would not include any building or parking development within approximately 120 feet of the Sammamish River or of the western Lake Washington shoreline edge. The proposal would include expansion of the vegetated shoreline along the Sammamish River and Lake Washington. Invasive, non-native plant species would be replaced with native shrub and ground cover species. The Proposed Action would preserve both on-site wetlands (refer to the *King County Shoreline Master Program* discussion portion of this section for additional information).

Geologic Hazards. The site does not contain any identified steep slope or erosion hazard areas. No significant impacts to hazard areas have been identified.

Fish and Wildlife Habitat. Approximately 5.5 acres, or 12 percent of the site, including the Sammamish River and Lake Washington shoreline area and the two on-site wetlands, would be preserved as natural open space. Enhancement of the Sammamish River shoreline and buffer would provide increased vegetated area, diversified plant communities and diversified habitat features (e.g., woody debris). These improvements would increase and improve available wildlife habitat on the site.

Potential fish impacts would be generally restricted to the inner harbor where increased over-water and in-water structure would occur with project development. Existing industrial uses of the inner harbor associated with the project site would be eliminated over time. Water clarity of the harbor would increase and turbid water conditions would decrease when existing tug and barge activity terminate. These actions would enhance the aquatic productivity potential in the harbor by decreasing turbid water conditions. In addition, project development would create approximately 3,000 square feet of additional shallow water littoral habitat that is not currently available for fish (refer to the PLANTS AND ANIMALS section of this document for additional discussion on fish and wildlife resources). Overall, with implementation of mitigating measures, fisheries habitat conditions would improve with project development, as compared to existing conditions.

Summary: Facilities and Services

Designation of "Service Areas" (Full Service Areas [area where infrastructure exists or can be constructed and financed most efficiently] or Service Planning Areas) are used in the Comprehensive Plan as a tool to help focus spending over time in areas where infrastructure exists or can be constructed and financed most efficiently; Service Areas will also indicate spending priorities and facilitate coordination of land use with services and facilities. (F-201-215) This growth strategy and "concurrency" (i.e., a balance between forecast growth and needed/funded infrastructure) will be implemented through subarea plans, functional plans and the annual budgeting and 6-year capital improvement program. (F-212) Land use may need to be reassessed and appropriate zoning changes made if service deficiencies for sewer, water or roads cannot be resolved within 10 years of adoption. Plan policies also provide direction for how King County and other service providers (e.g. school districts and sewer and water districts) will coordinate their planning to meet the goals and requirements of the GMA and the CPPs.

(F-301) Group A water systems are preferred in the Full Service Area of the UGA (Group A water system is defined as a public water system with fifteen or more service connections - WAC 246-290-020). (F-304, 305) Coordination of regional water supply planning is supported. (F-306) Aggressive conservation and re-use measures are required in purveyor plans. (F-308) The Plan authorizes provision of sewer service throughout the UGA; Local Service Areas are no longer considered a valid tool for controlling sewer extensions. All new development in the Full Service Area of the UGA must be served by public sewers.

(F-324) The Plan supports a coordinated watershed approach to surface water management. Use of natural systems is preferred in the UGA, although constructed systems may be necessary to realize urban growth and density goals. (F-325) Class 3 wetlands may not be used as retention ponds for receipt of surface waters diverted from other basins unless no other alternative exists. (F-326) In the UGA, regional stormwater management systems are encouraged to preclude the need for individual on-site facilities, to encourage efficient use of land, and to reduce maintenance costs.

Discussion: Facilities and Services

The Lakepointe site is located in a "Full Service Area" within the UGA. Water and sewer service would be provided by the Northshore Utility District.

Surface water runoff from the site would be collected, treated and released to the adjacent Sammamish River and inner harbor. Treatment facilities would include a two-celled water quality treatment pond and sand filtration/biofiltration swales. Wetlands would not be utilized for detention or treatment purposes.

The Proposed Action would include a bypass roadway between NE Bothell Way and 68th Avenue NE. The applicant would contribute a fair-share component of the funding for construction of a transit stop and pedestrian overpass on NE Bothell Way. Construction of this overpass and transit stop would not be considered a part of the proposal.

Summary: Transportation

The transportation system encouraged by the Comprehensive Plan is intended to support the land use plan and the 20-year growth targets for unincorporated King County. The transportation element of the plan is built on requirements of the GMA and includes an inventory of facilities, uses travel forecasts to identify needs, establishes level of service standards to determine adequacy of facilities, determines deficiencies and needs, includes a long-range financial component, and proposes methods to coordinate and implement the plan's policies including a concurrency management system to monitor and manage coordination of land use and transportation strategies.

The transportation system -- which includes freeways and streets, high capacity transit, HOV lanes and ride sharing facilities, demand management systems, and facilities for pedestrians, bicycles and equestrians -- is intended to be interconnected, multi-modal and balanced. Identified urban arterials would connect parts of the Urban Growth Area; roads in the Rural Area would be designed consistent with rural character and would emphasize safety.

Consistent with the plan's growth strategy, policies and priorities for transportation improvements and investments would emphasize transit and HOV mobility and non-motorized facilities within Activity Areas (Covington, Kenmore, Shoreline, White Center) and Full Service Areas with transit priority; capacity expansion to meet existing needs and future forecast growth, along with expanded transit/HOV and non-motorized mobility, in Full Service Areas without transit priority; a focus on existing needs in service planning areas; and safety improvements in the Rural Area.

Level of service (LOS) standards are established by transportation adequacy measures (TAMs), which measure performance of the transportation system and identify deficiencies. Adopted TAMs range from LOS F for Urban Activity Areas, to LOS E for Full Service Areas with transit priority, LOS D for Full Service Areas without transit priority, LOS C for service planning areas, and LOS B for Rural Areas and Resource Lands. Major components of the TAMs include transit availability; exempting facilities with HOV links from volume/capacity evaluations; using a weighted zonal average to calculate volume/capacity, evaluating volume/links that exceed a critical volume/capacity ratio, evaluating urban connectors in rural areas, and using prescriptive standards to evaluate non-motorized transportation.

A concurrency management system has been developed to evaluate development to ensure that it is consistent with improvements planned to accommodate growth. To meet the concurrency test, improvements must be assured (i.e., financially committed) within six years of the development; development approval will be denied or deferred if the test is not met.

The Comprehensive Plan identifies 600 county-wide transportation improvement projects needed by 2010 at a cost of approximately $1.1 billion. Northshore includes 60 projects for a total of $61 million. Policies emphasize funding essential maintenance, safety and operations costs prior to other costs; and

requiring joint funding of improvements and revenue sharing through interlocal agreements in areas that are annexed or incorporated.

Discussion: Transportation. The proposal would meet relevant transportation policies of the Comprehensive Plan. Please see the discussion in the TRANSPORTATION section of this document for a detailed traffic analysis. The proposal was issued a Certificate of Transportation concurrency on March 26, 1996. The certificate was valid for 90 days from the date of issuance, and the application for the Commercial Site Development was filed within those 90 days.

Summary: Parks and Recreation

King County's park and open space system includes lands used for recreation, for buffers and separation within and between areas, and for supporting natural environmental features, such as wildlife habitat and scenic values. (PR-100) King County's primary focus is to provide regional park and open space services, areas and facilities. This regional open space system emphasizes natural systems and trails, including linked corridors of greenways and waterways. (PR-104) Measures used to achieve this system includes regulations, incentives, and land trades or purchases.

(PR-304) Local park and open space needs are to be evaluated through adopted park and recreation standards. (PR-305) A combination of public and private funding will be used to meet local park and open space needs. (PR-301) Local park and open space needs in unincorporated urban areas will be provided in partnership with cities.

Discussion: Parks and Recreation

The proposal includes a total of 21.2 acres of open space, or approximately 47 percent of the site. The on-site open space would include approximately 5.5 acres in natural area and 15.7 acres in public park area, pedestrian walkways and trails, and paved open space. On-site park area would include a public amphitheater, open grass park area with benches, river view platforms, a children's play area (with natural play elements including grass, pebbles and kinetic sculpture designed consistent with King County standards for play equipment), and approximately 6,400 linear feet of on-site trails and sidewalks with a direct connection to the Burke-Gilman Trail. The proposal would include restrooms (restrooms associated with Building Area A would be open to the public) and trailhead facilities (including signage and dedicated parking in Building Area A).

According to the King County definitions of on-site recreation area (KCC 21A.14.180), the Proposed Action would include approximately 11.5 acres (500,000 sq. ft.) of recreation area, exceeding required on-site recreation area by approximately 8.5 acres. The 11.5 acres of on-site area meeting the King County definition of recreation space would consist of approximately 8.5 acres of Lake Washington and Sammamish River Shoreline Park (includes only 50 percent of the biofiltration swales and none of the stormwater retention area), 1.2 acres in shoreline trail and amphitheater, and 1.8 acres in esplanade. Because the specific amount of indoor recreation space included in the Proposed Action has not been defined, indoor recreation area is not included in the recreation area calculations. A final determination on the total amount of on-site recreation space that would meet King County recreation standards would be made as part of permit review.

Summary: Cultural Resources

Plan policies express King County's commitment to protecting cultural resources and promoting expanded cultural opportunities for residents. The County will maintain and expand its inventory of historic resources, identified in a plan map, to guide decision making. Development is encouraged to retain and enhance significant historic and archaeological resources; environmental review of public and private development proposals will be one tool used to accomplish this policy. The County will also provide incentives for protecting landmarks and for providing art in public places. Coordination with cities will be used as a means to protect and enhance resources within potential annexation areas.

Discussion: Cultural Resources

The Proposed Action would not result in the conversion of use or elimination of any identified historic resource sites. If archaeological resources are discovered during construction, the King County Cultural Resources Division, the State Office of Archaeological and Historic Preservation, and appropriate tribes would be notified, and the significance of the findings would be determined. The proposed site plan includes areas which could be available for public art projects.

Summary: Energy and Communications

Plan policies promote reduced energy consumption, conservation and use of renewable resources. King County's role includes enforcing the energy code, providing incentives to exceed the energy code, making County-owned facilities a model of energy efficiency, and exceeding applicable standards for fuel-efficiency and emissions in the County's motor vehicle fleet. The use of solar access should also be promoted and solar access protected.

The plan calls for King County and electric utilities to cooperatively identify and preserve corridors to accommodate future transmission and distribution lines. Evaluation of the use of existing corridors is encouraged before new corridors are established; King County would facilitate corridor sharing among different utilities. The policies also encourage undergrounding new electrical distribution lines where reasonably feasible and not a health or safety concern. The County will monitor scientific research on electromagnetic fields (EMF); it will inform citizens and take appropriate action if state or federal agencies adopt rules to reduce EMF exposure.

Widespread telecommunications services are encouraged as a means to reduce the need for transportation facilities. Telecommunication and cable service providers are encouraged to maintain state-of-the-art facilities.

Discussion: Energy and Communications

The design of the proposed buildings would be consistent with all applicable local, state and national energy code provisions. No additional electric transmission or distribution facilities (i.e. substations and transmission lines) would be required to serve the proposal. All on-site utilities would be located beneath street level.

NORTHSHORE COMMUNITY PLAN UPDATE AND AREA ZONING

The Northshore Community Plan Update and Area Zoning (NSCP) were adopted by the King County Council on February 11, 1993. The plan includes policies, land use designations, zoning classifications and conditions, and recommended capital improvements to guide growth and development in the planning area. The discussion below summarizes the policies, designations and zoning conditions which most related to the Lakepointe proposal.

Summary: Residential Development

The Northshore Plan provides guidance for balancing the need for future housing with the need for protecting both natural resources and the cultural environment. The King County Comprehensive Plan projected 2,600 to 3,400 new households in the unincorporated portion of the Northshore planning area by 2012. To accommodate this anticipated residential growth, the NSCP proposes accommodating new residential growth in line with the ability of local jurisdictions and the private development community to provide necessary services and infrastructure. Major policies for residential development in the NSCP include:

- *Most new residential development should be concentrated in and adjacent to the Urban Activity Centers of Bothell, Kenmore and Woodinville, where developable land is available and where the most complete range of urban services can be provided.*

- *New multifamily development should be located in Urban, Community and Neighborhood Centers.*

- *New residential development should be designed to harmonize with surrounding areas, provide on-site recreational opportunities (multifamily development) and preserve large trees important to the character of the neighborhood.*

(R-13) The most appropriate locations for higher density residential development, such as multifamily units, is in the Urban Activity Centers of Kenmore, Woodinville, Bothell, Redmond and Kirkland (R-14)[2] where adequate services and facilities are available to serve the proposed development.

To assure that new multifamily development reflects the established environmental and social character of Northshore neighborhoods, the following design elements should be included: (R-15A) the architectural style and scale of new development should be compatible with those of the surrounding neighborhood; (R-15B) site design and layout should reflect the natural topography and vegetation of the area; (R-17) and significant existing vegetation should be retained and augmented with new vegetation wherever possible. (R-16) To provide for a sense of community, common areas and active features such as children's play areas should be included.

(R-19) To enhance pedestrian circulation and transit access in Northshore neighborhoods, new development must provide pedestrian connections to existing trails, community facilities and services, transit and school bus stops, and surrounding neighborhoods. (R-20) In addition, urban high density development must provide a transit management plan which identifies transit options.

---

[2] Numbers in parentheses refer to policies in the NSCP (e.g., R-13 refers to Policy Number R-13 in the "Residential" chapter).

Discussion: Residential Development

As contemplated by the NSCP, the proposal would establish a mix of multifamily housing units within the Kenmore Urban Activity Center (refer to the discussion on the Kenmore Activity Center for additional detail). Development of multifamily housing on the site would take advantage of the full range of urban services and utilities currently available in the immediate site vicinity and would not be anticipated to require significant expansions by utility or service providers.

The proposal would include a total of 21.2 acres of open space, or approximately 47 percent of the site. The on-site open space would include park area, pedestrian walkways and trails, and paved public space. A children's play area with natural play elements, designed consistent with King County standards, would be provided. The majority of the existing trees located on the site (located in a narrow strip along the Sammamish River and Lake Washington Shoreline) would be preserved.

A total of approximately 6,400 linear feet of walkways and pedestrian areas would be provided on the site. The entire periphery of the site will be dedicated to trail/walkway use. Beginning at the northern portion of the site, a pedestrian/bicycle connection to the Burke-Gilman Trail would link the regional trail system to the waterfront esplanade. Bicycles would be allowed throughout the pedestrian areas, however, where trails are not considered wide enough to safely accommodate bicyclists, bicyclists would be required to walk their bikes. Public viewpoints with seating and signage would be provided at selected points near the Sammamish River shoreline.

To assure that multifamily residential building design would be compatible with other project design elements and the Kenmore area, the overall design character of buildings, landscaping, lighting, and signage would be governed by proposed Master Plan Design Guidelines. Refer to Appendix _ for the Design Guidelines.

A Transit Management Plan to identify transit options would be implemented (refer to the TRANSPORTATION section of this document for details).

Summary: Commercial and Industrial Uses

(CI-1) The Community Plan provides policies which direct future commercial and industrial development within the activity centers of Bothell, Kirkland, Redmond, Kenmore and Woodinville. (CI-5 and CI-5) To provide urban vitality and pedestrian activity in commercial development, the following urban design goals are provided: promote the concept of a center through the use of common design themes such as street and landscape materials; accentuate the character of the area through the use of style and materials; emphasize pedestrian components and diminish adverse impacts of automobile access and circulation; encourage pedestrian shopping throughout the retail area; facilitate transit use; integrate urban open spaces for community use; provide a landscaped screen when adjacent to residential uses; and incorporate street trees. (CI-6) To offset the impacts of increased vehicular traffic, a Transportation Management Plan should be implemented for medium and large scale commercial developments.

Discussion: Commercial and Industrial Uses

As contemplated by the NSCP, the proposal would establish commercial (retail and office) use within the Kenmore Activity Center (refer to the discussion on Kenmore Activity Center for additional detail). The Lakepointe proposal includes a set of detailed Design Guidelines (Appendix G) which are intended to

establish a unified design theme throughout Lakepointe. The Lakepointe Design Guidelines include standards which the applicant would meet related to the design of buildings, landscaping, lighting, signage, utilities, the marina, and public space.

Commercial uses would be organized around pedestrian walkways and an esplanade to emphasize pedestrian movement and minimize conflicts with vehicular traffic. For example, a waterfront esplanade would be developed for pedestrian use along the existing industrial barge channel. The approximately 50-foot-wide esplanade would be open and urban in character and would include trees, benches and public viewpoints. The buildings fronting on the esplanade (Buildings B, C-1 and D) would contain retail shops, dining establishments and sidewalk cafes on the ground floors. This active pedestrian environment would be punctuated at the west end by a restaurant and bar structure. The esplanade would lead to the northwestern edge of the shoreline park and a waterfront amphitheater. The amphitheater would provide an opportunity for a public gathering place.

A Transportation Management Plan to identify transit options would be implemented to facilitate transit use.

Summary: Transportation

(T-4) The most intensive and highest density land uses in the Northshore Planning Area should be located in the activity centers (Bothell, Kenmore, Woodinville, Kirkland and Redmond) to allow use of alternative access routes and promotion of pedestrian and bicycle travel. (T-29) Developments in the planning area shall provide public transportation facilities (bus pullouts and bus stop shelters) and (T-30) provide pedestrian/transit access through barriers, particularly fences, that enclose development.

Discussion: Transportation

The Proposed Action would be located within the Kenmore Activity Center and adjacent to SR-522 (which contains several Metro transit routes) and the Burke-Gilman Trail, thus allowing use of existing transit, pedestrian and bicycle routes. Bicycles would be allowed throughout the pedestrian areas, however, where trails are not considered wide enough to safely accommodate bicyclists, cyclists would be required to walk their bikes. The proposal would further encourage the use of transit by contributing a fair-share of the funding for the construction of a new transit stop and pedestrian overpass on SR-522. In addition, a Transportation Management Plan to identify transit options and facilitate transit use would be implemented.

Summary: Natural Resources

(NR-1, NR-2, NR-3, NR-4 and NR-5) The NSCP's natural resource policies are focused on preserving fish and water resources (including the Sammamish River), minimizing erosion impacts from development, minimizing impacts to wetland areas, and water quality, and minimizing wildlife impacts from development. (NR-6) As an element of restoration planning for the Sammamish River, the NSCP provides for the reestablishment of riparian vegetation along the Sammamish River through bank rehabilitation, bioengineering techniques, and habitat enhancement. (NR-10) Wetlands, streams, and other sensitive areas important for control of surface water runoff should remain undisturbed or be rehabilitated, (NR-13) and developments should not alter natural drainage systems without mitigation to eliminate increased risk of flooding, erosion and surface water quality. (NR-14) New development should rehabilitate degraded wetlands (NR-15) and preserve significant wildlife habitat. (NR-17) Public access to water should be provided.

Discussion: Natural Resources

The entire Sammamish River and Lake Washington shoreline area and the two wetlands on the Lakepointe site would be preserved as natural open space. Additional plantings along the Sammamish River shoreline and buffer would provide increased vegetated area, diversified plant communities and diversified habitat features (e.g., woody debris). These improvements would increase and improve available wildlife habitat on the site.

Portions of the site lie within the Urban Shoreline designation of Lake Washington and the Sammamish River. The site is designated as a Natural Resource Protection Area Condition 3 in the NSCP. This designation requires the identification of all Great Blue Heron nesting, roosting or feeding areas that may be on the project site. The site does not contain any Great Blue Heron nesting or roosting areas. The site contains two wetlands referred to in this document as Wetland A and Wetland B. Wetland A is located at the western edge of the site parallel to the Lake Washington shoreline. Wetland B is located at the southeast corner of the site near the Kenmore Bridge.

Potential fish impacts would be generally restricted to the inner harbor where increased over-water and in-water structures would occur with project development. Industrial uses of the inner harbor associated with the site would be phased out. Water clarity of the harbor would be increased by terminating tug and barge activity. In addition, project development would create approximately 3,000 square feet of additional shallow water littoral habitat that is not currently available for fish (refer to the *Plants and Animals* section of this document for additional discussion on fish and wildlife resources).

Public access to Lake Washington and the Sammamish River would be provided from platforms and a public trail connected to the Burke-Gilman Trail and Kenmore. Access to the lake and river would be limited to the trails and view platforms.

As under the existing condition, surface water runoff would be directed to the Sammamish River, Lake Washington, and inner harbor. Stormwater runoff would be treated by either oil/water separators, two-celled wetpond, or sandfiltration/biofiltration swales.

Summary: Parks and Open Space

(P-11) The NSCP recognizes the uniqueness of the Sammamish River and encourages the maintenance and establishment of additional access points to the River. (P-20) To assure adequate provision of parks and open space, designation of park, open space and/or trails should be required of all new development.

Discussion: Parks and Open Space

The proposal includes a total of 21.2 acres of open space, or approximately 47 percent of the site. The on-site open space would include approximately 5.5 acres in natural landscaping, 8.3 acres in public park area, pedestrian walkways and trails, and paved public space.

Recognizing the uniqueness of the Sammamish River, the proposal includes a 2,200-foot-long park located along the entire southern property line, adjacent to the Sammamish River. Termed the Shoreline Park, the primary purpose of the park would be to provide both public access and use, and wildlife

habitat. To provide additional view access points to the river, a pedestrian path incorporating river view platforms and interpretive signs describing the natural features of the river would be provided. To provide wildlife habitat along the Sammamish River shoreline, the plant communities within the shoreline area, including the remaining wetland and buffer areas, would be augment with additional plantings of native species. The non-native Himalayan blackberry would be removed and replaced with native understory and groundcover species. Most of the significant trees within the shoreline area would be preserved.

Other on-site public park and open space areas would include the waterfront esplanade and a public amphitheater.

Summary: Cultural Resources

Cultural resource policies emphasize protecting historic agricultural buildings, landscape features, landmarks, architecture and other tangible associations with events and persons significant in local history which maintain the community's connection with it's past. Sixty-five historic resources currently listed on the King County Historic Resources Inventory are located within the Northshore planning area. (The Kenmore Bridge, Charles Thomas Estate and St. Edward's Seminary are the listed resources in the vicinity of the Lakepointe site). (CR-14) The Northshore plan recommends increasing public awareness and appreciation of the benefits of historic preservation through the use of interpretive signs, roadside markers and other accessible public information on local history.

Discussion: Cultural Resources

The Proposed Action would not result in the conversion of use or elimination of any identified historic resource sites. If archaeological resources are discovered during construction, the King County Cultural Resources Division, the State Office of Archaeological and Historic Preservation, and appropriate tribes would be notified, and the significance of the findings would be determined.

Summary: Kenmore Activity Center

The 1985 King County Comprehensive Plan designated Kenmore as an Urban Activity Center. Urban Activity Centers are intended to be the primary commercial and industrial centers in the County and are to provide employment, shopping and services close to residential areas. A full range of land uses are acceptable in Activity Centers, including office and retail.

The NSCP provides a policy foundation to guide future development and improvement in Kenmore. (K-1) The general policies for directing growth within Kenmore include encouraging a diversity of uses to enhance employment, housing, commercial, recreational, and transit opportunities. (K-2) Development should encourage pedestrian activity, increase a sense of identity for Kenmore, reduce reliance on the automobile, and enhance marine orientation. (K-4) To minimize commercial sprawl, new commercial development should be centered around the 68th Avenue N.E./SR-522 intersection. (K-6) Industrial properties adjacent to Lake Washington and the Sammamish River within the Kenmore Activity Center should be encouraged to convert to mixed uses.

The NSCP recognizes Kenmore's unique opportunities for mixed-use development, including proximate location to SR-522 and 68th Avenue N.E., large under-utilized waterfront parcels and proximity to the Burke-Gilman Trail. To meet King County mixed-use goals, mixed-use development in Kenmore should meet the following conditions: provide pedestrian linkages into other parts of Kenmore; provide for an

easily accessible transit hub and a transportation demand management program; provide further transportation study when parcels are rezoned in order to determine roadway and transit improvements sufficient to mitigate roadway congestion to acceptable levels; provide substantial public access to Lake Washington and Sammamish River waterfront; contribute to Kenmore business improvement district; mitigate for impacts upon affordable housing; provide for community open space; provide for fish and wildlife enhancement; mitigate for impacts to the shoreline edge through riparian vegetation enhancement; provide for easily accessible public viewpoints; provide for convenient pedestrian access to nearby park facilities; and provide environmental review.

Discussion: Kenmore Activity Center

The Lakepointe site has been identified by the NSCP as a location within the Kenmore Activity Center suitable for mixed-use (residential and commercial) development.

To meet the intent of the NSCP policies for mixed-use development on the site, the Proposed Action would include a mix of residential, commercial, office, and public open space. The proposal has been designed to be a pedestrian-oriented development where residents and visitors can experience an "urban village" extension of Kenmore. The design of the proposal is intended to integrate different land uses and activities, and minimize potential conflicts between vehicles, pedestrians and bicyclists. The Proposed Action provides approximately one-mile of Lake Washington and Sammamish River shoreline public access. A waterfront esplanade which would connect to the Burke-Gilman Trail, would be developed for pedestrian use along the existing inner harbor channel. The esplanade would lead to a public amphitheater and shoreline park along the Sammamish River. The pedestrian trail associated with the shoreline park along the Sammamish River would connect to the sidewalk system along the west side of 68th Avenue NE. Wildlife habitat along the Sammamish River shoreline would be enhanced with additional plantings of native species.

When the Lakepointe site was rezoned from Industrial to Regional Business, a transportation study (*Lakepointe Transportation Analysis for Northshore Community Plan and Area Zoning Amendment* - The TRANSPO Group, December 1994) was completed to determine roadway and transit improvements required to mitigate roadway congestion to acceptable levels. The Lakepointe proposal would encourage the use of transit by contributing a fair-share component of the funding for the construction of a new transit stop and pedestrian overpass on SR-522. In addition, the site is located adjacent to the Burke-Gilman Trail allowing connections to and use of existing pedestrian and bicycle routes. A Transportation Management Plan to identify transit options would be implemented. (Refer to the *Transportation* section of this document for a detailed traffic analysis of the Proposed Action).

The proposal would include implementation of an affordable housing plan to provide approximately 120 affordable housing units either on the site or off the site in the Northshore Planning area.

P-Suffix Conditions - Pedestrian-Oriented Area

To implement policies of the Northshore Community Plan related to mixed-use development on the Lakepointe site, special conditions(P-suffix conditions) are attached to the property. The discussion and mitigation below applies specifically to the Lakepointe site (indicated as map A of the NSCP which is shown as Figure 13 in this document). The Mixed-Use District is indented to be a pedestrian-oriented place, where residents and visitors can enjoy an "urban village" extension of Kenmore. The design of the Mixed-Use District is intended to integrate different land uses and activities and minimize the

conflicts between vehicles, pedestrians and cyclists. It includes a new "pedestrian street" that will connect the new Lakepointe Way NE to the waterfront park. Shops and dining establishments will front the street, with residences above.

Mixed business-residential use is recognized as a viable use in the long term for the Lakepointe site. However, any development in this area requires mitigation of environmental impacts. Therefore, a site-specific mitigation plan is incorporated in the P-suffix conditions for this area.

SR-522 in Kenmore is recognized to be at "ultimate design". Roads that are at ultimate design cannot be widened without significant destruction of existing development and potential environmental damage because the land around the roadway is already developed and/or contains natural features. King County recognizes that while some improvement to adjacent roadways is possible, congestion is likely to continue on SR-522.

The King County Department of Public Works has identified transportation improvements which will facilitate traffic flow in Kenmore. Transit improvements have also been identified. The transportation P-suffix conditions identify ways to mitigate transportation impacts as a result of mixed-use development on the Lakepointe site.

The following P-suffix conditions, which are generally quoted directly from the NSCP, apply to the Lakepointe site:

1. Permitted Uses - Summary

Permitted uses shall include those uses permitted in the various zones within the overlay district, except the following:

a. Gasoline service stations
b. Drive-through restaurants
c. Retail nurseries
d. Car washes
e. Stores with outdoor storage
f. Single retail tenants with a gross floor area in excess of 65,000 square feet

For properties in the Neighborhood Commercial, Waterfront, and Waterfront Extension Subdistricts (described below), the location of residential dwelling units shall be prohibited on the ground floor, and retail and service uses are encouraged on the ground floor. Other ground floor uses (including parking) may be permitted when designed so as to be compatible with the pedestrian orientation of the development.

Permitted Uses - Discussion

The proposal has been planned in accordance with the four sub-districts prescribed by the NSCP P-suffix conditions. The Neighborhood Commercial sub-district, Building Areas A, B and G, would accommodate a mix of retail, office, entertainment and housing opportunities. It would be the most dense of the sub-districts. It's location at the intersection of Lakepointe Way and Lakepointe Boulevard would be accessible to by-passing vehicles as well as to Lakepointe residents. Uses generating higher volumes of traffic would be located in this area of the site. Those uses would include major food store,

drug store, and multiplex movie theater in addition to retail tenants. The residential component of this Neighborhood Commercial sub-district would house independent and assisted senior housing units and multifamily apartments.

The Waterfront sub-district along the channelized edge of the inner harbor (Building Areas C and D) would be mixed-use with a higher density of residential use than in the Neighborhood Commercial subdistrict. The Waterfront Subdistrict would have an active boardwalk character with shops, dining establishments and sidewalk cafes on the ground floors with residences located on upper floors. This mixed-use development would include a "lighthouse" structure which would be an architectural icon for the development.

The Residential sub-district, which would include building areas E-1 and E-2, would be the center of residential development on the site. Residential uses in this area would include senior housing, condominiums and apartments (a total of approximately 320 residential units would be provided in this subdistrict). The entire southern edge of the site, along the Sammamish River, would become a new public shoreline park. Housing along the shoreline park would be set back from the shoreline at least 125 feet. The southern edge of the housing buildings would be heavily modulated with deep recesses which allow the park to "finger" out, extending its perceived boundary.

The future uses of the Waterfront Extension sub-district (consisting of building area H) are not determined at this time.

2. Building Development - Summary

Orientation to Pedestrian Street

For properties with frontage on the primary pedestrian street (shown on Figure 13 of this document), the following building setback requirements shall apply.

Street Setback: maximum of 5 feet; larger setbacks shall be allowed if arcades, street-side outdoor cafes, patios, parks, plazas, or other public spaces are provided along the street.

For properties with frontage on the primary pedestrian street, the primary ground floor building entrance should orient to either the street or public spaces such as plazas, arcades, and parks.

For development located on the primary pedestrian street, a minimum of 75 percent of the street shall be fronted by buildings at-grade. A minimum of 50 percent of the buildings on the street shall be fronted by retail or service uses.

Public pedestrian access to the waterfront located at the rear of buildings located on the primary pedestrian street shall be provided a minimum of every 300 feet of street frontage.

Street Facade Requirements

The building street facade of ground floor retail and service uses that front the primary pedestrian street shall include windows and overhead protection. The use of blank walls without facade ornamentation is not permitted along the primary pedestrian street.

Building materials such as concrete, brick, masonry, glass, tile, stone, metal, or wood are required on the building street facade. Sheer, uninterrupted glass curtain walls, all mirrored glass and cinderblocks are not permitted on the building street facade along the primary pedestrian street.

Height

Maximum heights shall be 92 feet in the northern and central portions of the mixed use development area. A 45-foot height limit shall apply to all development within 100 feet of the channelized edge of the Lake Washington shoreline. The boundary of the channelized edge shall extend to the inner harbor line. A 35-foot height limit shall apply to all development within the first 200 feet, and a 45-foot height limit to all development within the next 100 feet of the Sammamish River shoreline edge and the Lake Washington shoreline edge that is not channelized.

Street Frontage

The frontage of Lakepointe Way shall be designed as to be attractive to passing road users and to screen surface parking adjacent to the roadway. For example, parking areas fronting on Lakepointe Drive should be screened either by bermed landscaping or buildings. Street trees shall be provided along Lakepointe Way.

Building Development - Discussion

Orientation to Pedestrian Street

The primary pedestrian-oriented streets would be in the Waterfront district and its side streets which lead to Lakepointe Boulevard, the primary vehicle access onto the site. Ground floor frontage along the Boulevard would serve primarily the garage and residential lobby entries while retail, entertainment and office uses would share frontage along the waterfront esplanade and pedestrian street and along the secondary pedestrian side streets between each of the building areas.

As specified by this P-suffix condition, a minimum of 75 percent of the street would be fronted by buildings and a minimum of 50 percent of this building space would contain retail or service uses. Public access to the harbor waterfront from Lakepointe Boulevard would be spaced from 240 to 350 feet apart.

Street Facade Requirements

As required by this condition, street level buildings fronting the pedestrian street (NE Lakepointe Boulevard) would include windows and overhang protection. The Master Plan Design Guidelines would define the types of building materials and colors to be utilized; building materials would include concrete, brick, masonry, glass, tile, stone, metal and wood. Sheer, uninterrupted glass curtain walls, all mirrored glass and cinderblocks would not be permitted along the pedestrian street

Height

The P-suffix conditions established for the site in the Northshore Community Plan (NSCP) provide height limits for various portions of the site (refer to Figure 10 in Chapter 2 of this document). The Proposed Action proposes to modify the building heights set forth in the P-suffix conditions (refer to Figure 11 of Chapter 2 of this document). The proposed modifications are as follows:

- The 45-foot height limit along the northern edge of the inner harbor, in Building Area H, would be increased to 92 feet.
- The 45-foot height limit in the area 200 feet to 300 feet from the Sammamish River would be eliminated.
- In the eastern portion of the site, the area of the 92-foot height limit would be extended in a southerly direction from 300 feet to within 200 feet of the River (in Building Area A).
- In the west central portion of the site (Building Areas C, D, and E), building heights would be reduced from 92 feet to 72 feet extending in a southerly direction to within 200 feet of the River (in Building Area E).
- Consistent with the NSCP, the 35-foot height limit between 100 feet and 200 feet of the River would be maintained, and no buildings are proposed within 100 feet of the River.

The increased height limit in the areas between 200 and 300 feet of the Sammamish River would allow higher buildings closer to the River and to residential uses to the south, across the River. This increase in building heights to the south would be somewhat offset by the reduction of maximum building heights in the west central portion of the site. The replacement of the 45-foot height limit along the northern edge of the inner harbor with a 92-foot height limit would increase the building heights allowed in future phase buildings in Building Area H adjacent to NE 175th Street and NE Bothell Way.

From street level on Lakepointe Boulevard, the heights of buildings in the eastern portion of the site would remain the same as under the P-suffix conditions and would be approximately 70 feet above street level (because Lakepointe Boulevard would be approximately 20 feet above ground level, the first two building levels would be below street level). In the western portion of the site, the building heights would be approximately 50 feet above street level (20 feet lower than under current P-suffix conditions).

Street Frontage

The Lakepointe Boulevard area is intended to be "pedestrian friendly" with marquees and awnings extending over sidewalks, colorful signs, street trees and limited on-street parallel parking. The proposal includes considerable use of street trees and plantings of new vegetation, particularly in the southern portion of the site. The use of "tree ring" planting areas in parking lots is proposed. Street trees and landscape plantings would be provided between parking areas and Lakepointe Way NE.

3 Parking - Summary

Amount and Location

At full build-out, off-street parking shall be no greater than one space for every 400 square feet of floor area in the waterfront, waterfront extension, and residential subdistricts; provided that during initial phases of development, off-street parking standards may be exceeded in anticipation of future development.

In the Neighborhood Commercial subdistrict, minimum parking requirements for office, retail and commercial uses shall be reduced to one space for every 300 square feet of floor area.

Surface parking shall be located to the greatest degree possible in the rear of buildings that front the primary pedestrian street. Any parking which cannot be accommodated on the rear of the building may be provided on the side of the building.

At full build-out, on-site surface parking shall consume a maximum of 50% of the total site area in the Neighborhood Commercial subdistrict, and 25% of the total site area in the Waterfront, Waterfront Extension, and Residential subdistricts. The remaining off-street parking requirements shall be accommodated using one or a combination of the following:

On-site parking structure
On-street parking spaces
Off-site common parking facility

At full build-out, 75% of the parking in the Waterfront, Waterfront Extension, and Residential subdistricts shall be provided in structures or on-street.

In the Neighborhood Commercial subdistricts of the Pre-Mix site, a maximum of 60 parking stalls are permitted in any one surface parking lot. At a minimum, parking lots must be separated by buildings, street, or 12 feet of type two landscaping.

Design

All parking areas that front sidewalks (except along Lakepointe Way NE) shall be screened by a streetwall and landscaping.

Retail uses shall be provided on the first floor of the street side edges of parking structures.

Parking - Discussion

King County parking standards would require a minimum of approximately 4,188 spaces. The proposal would include approximately 4,464 parking stalls, or 250 more than required, to accommodate all residential, retail/commercial, office and marina uses of the site.

In the Neighborhood Commercial subdistrict, retail/office parking would be provided at the rate of approximately one space for every 265 square feet, rather than for the required 300 square feet of floor area, and in the Waterfront subdistrict, retail/office parking would be provided at the rate of approximately one space for every 330 square feet of building area, rather than for the required 400

square feet of floor area, resulting in more than the required number of parking spaces in these areas. However, less than 50 percent of the Neighborhood Commercial subdistrict surface area, and less than 25 percent of the Waterfront subdistrict, would be in parking.

The P-suffix conditions require a limit of 60 vehicles in any surface lot and a 12 ft. landscape buffer between each surface lot. The proposal is to increase the quantity of vehicles within each surface lot, and to satisfy the landscape requirement by dispersing the planting throughout the surface deck between vehicles and around the edges rather than in isolated 12 ft buffers. It is anticipated that the uses located in the parcels adjacent to Lakepointe Way NE would be those that generate higher volumes of vehicular traffic. Locating the parking areas on elevated decks along Lakepointe Way NE would minimize the vehicular traffic which flows into the central portions of the Lakepointe site. Landscape enhancements would screen and minimize the visual impact of these elevated parking areas.

Approximately 90 percent of parking spaces would be accommodated in parking garages, exceeding the required 75 percent. Additionally, some street parking would be provided for convenience and visitor parking. Each building in each zone would be built atop a parking structure sized amply to support the parking needs of the building uses. These parking facilities would typically be two stories in height, one floor below the entry grade and one at the entry grade.

Some parking in the Waterfront District, within areas B, C-2, and C-3, would be on three levels (two below entry grade), in order to accommodate the parking quantities required for those proposed tenants. Access to these lower parking levels would be via the esplanade frontage road, the service access corridor at the 20 foot level and from within each garage.

Parking facilities at grade would typically be hidden behind building frontages (such as retail restaurants, cafes, and residential lobbies, etc.) or would be enclosed and architecturally treated to enhance the streetscape.

During the phased construction, some parking may be accommodated by surface lots which would later become building sites.

4. Transit and Transportation Circulation Summary

Mitigation for development of the Lakepointe site should emphasize enhancement of transit and non-vehicular use and improvement of local access and circulation within the Kenmore area. Therefore, mitigating conditions include dedication and construction of Lakepointe Way, signalization of the intersection of this road with 68th Avenue and with SR 522, dedication and improvement of a transit stop on SR-522, contribution to development of a pedestrian bridge crossing SR-522, construction of a pedestrian street, provision of commuter parking, the construction of Lakepointe Way and improvements to a new intersection at 65th Avenue NE, and development and enforcement of a transportation management plan on site.

Fair share participation in applicable projects listed in the current Mitigation Payment System Program, as well as contribution towards other transportation projects identified through the Master Plan and development plan approval process.

Furthermore, the requirement that residential development occur throughout the various phases of development of the Lakepointe site will ensure that transit and transportation linkages occur from the very beginning of development.

Transit and Transportation Circulation - Discussion

As specified by this condition, the proposal would include signalization of Lakepointe Way NE with SR-522 and 68th Avenue NE, contributing a fair-share component of the funding for the construction of a transit stop and pedestrian bridge on SR-522, construction of a pedestrian street (NE Lakepointe Boulevard), development and implementation of a transportation management plan (refer to the TRANSPORTATION section of this document for detail), and payment of the required Mitigation Payment System (MPS) fee.

The proposal has been designed so that pedestrians can traverse the site from the retail areas along the esplanade to the park settings on the south side of the site. A total of approximately 6,400 linear feet of walkways and pedestrian areas would be provided on the site.

Residential development would occur throughout the various phases of the development of the Proposed Action to ensure that transit and transportation linkages occur from the beginning of the project.

5. Pedestrian and Bicycle Circulation - Summary

Design of the Mixed-Use District shall emphasize public pedestrian access and linkages to the transit facilities and adjacent sites. This includes contribution to development of a pedestrian bridge across SR-522, if approved by King County and WSDOT. Other, minor pedestrian routes shall be identified through the Master Planning and building permit review processes.

All pedestrian walkways and connections, including shoreline pedestrian routes, shall be accessible and open to the general public. Public vehicular access may be limited to the Residential area. Pedestrian access within the Residential area shall be limited to two public access corridors across the subdistrict.

Bicycle and pedestrian linkages to the Burke-Gilman Trail and to the transit hub below shall be provided. Location of these linkages is subject to the review and approval of King County.

Bicycle parking facilities shall be provided at all major public destination points.

Pedestrian and Bicycle Circulation - Discussion

The periphery of the site is to be dedicated to pedestrians and other non-vehicular uses (i.e., bicycles). Bicycle and pedestrian linkages between the Burke-Gilman Trail and the public spaces of the Lakepointe development would be publicly accessible, barrier-free and readily identifiable. Bicycles would be allowed throughout the pedestrian areas, however, where trails are not considered wide enough to safely accommodate bicyclists, bicyclists would be required to walk their bikes.

The trail along the Sammamish River is planned to incorporate native vegetation and opportunities for natural habitat viewing and interpretive information. All pedestrian walkways and connections would be accessible and open to the general public.

Lakepointe's pedestrian and bicycle routes would be connected at grade across 175th Street to the Burke-Gilman Trail. A stairway adjacent to the elevated roadway would lead pedestrians to the future transit hub and pedestrian bridge crossing SR 522 (pedestrian bridge and transit stop not a part of the proposal). Adjacent to the retail component in Area B, a grand stairway which would lead pedestrians from the retail/commercial area in Building Area B to the waterfront esplanade area. Public access to the shoreline park through the commercial development of area "A" would also be provided.

6. Landscaping and Public Amenities - Summary

All properties that front the pedestrian street must provide sidewalk landscaping and other amenities (street furniture, street trees, and special lighting).

Twenty percent of the entire mixed use development shall be designated as public open space for the general public. A public gathering place which accommodates a minimum of 50 people shall be provided on the site. These public open space areas shall be easily accessible to the pedestrian, and shall be considered in the pedestrian circulation plan. Waterfront access areas, public parks and sensitive area buffers may be utilized to calculate the 20% requirement. Public access shall be provided around the entire waterfront edge of the site.

Street trees shall be provided in all roads constructed with the development. The normal landscaping requirements of the code, with the exception of parking area landscaping, are hereby waived.

Landscaping and Public Amenities - Discussion

The proposal includes a total of 21.2 acres of open space, or approximately 47 percent of the site. The on-site open space would include approximately 5.5 acres in natural landscaping and 15.7 acres (approximately 33 percent of the site) in public park area, pedestrian walkways and trails, and paved public space. The open space areas are intended to create a pedestrian friendly community which would orient to the existing shoreline and marine environment. A detailed listing of the amount of proposed open space is provided in Table 3.

Open space and public amenity elements included in the proposal are as follows:

Shoreline Park - The Shoreline Park is proposed to be a 2,200 foot long linear park located along the entire southern and western property lines, adjacent to the Sammamish River and Lake Washington shoreline. In general, the western portion of the shoreline park would be the most natural. Shoreline access would be limited to three view platforms. The northwest corner of the park (adjacent to Lake Washington) would include wetland and adjacent buffer area. The eastern portion of the park would contain a variety of open grass area, benches and river view platforms. A children's play area, designed consistent with King County standards, with natural play elements (grass, pebbles and kinetic sculpture) would be provided in the northeastern corner of the park. A fire access lane (required by the King County District) would parallel the entire length of the shoreline park. Along with provide emergency fire access, this lane would serve as a pedestrian path and would incorporate interpretive signs and information on the natural features of the river and the history of the site.

Canal Esplanade and Amphitheater - A waterfront esplanade would be developed in phases for pedestrian use along the existing industrial barge channel. The approximately 50-foot wide esplanade would be open and urban in character and would include trees, benches and public viewpoints. The

buildings fronting on the esplanade would contain retail shops, dining establishments and sidewalk cafes on the ground floors with residences located on the upper floors. This environment would be punctuated at the west end by a restaurant and bar structure.

The esplanade would lead to the northwestern edge of the shoreline park and a waterfront amphitheater. The amphitheater, which would have a southwesterly view down Lake Washington, would provide a public gathering place for musical events and other entertainment occasions.

Fragrant Garden - The Fragrant Garden would be a 15,000-square-foot natural space in a circular area between Parcels D and E-1 and would feature a garden of species such as wisteria, clematis and honeysuckle. The outer area of the garden would accommodate outdoor seating for a restaurant or private patio space.

Trails and Walkways - A total of approximately 6,400 linear feet of walkways and pedestrian areas would be provided on the site. The entire periphery of the site would be dedicated to trail/walkway use. Beginning at the northern portion of the site, a pedestrian/bicycle connection to the Burke-Gilman Trail would link the regional trail system to the waterfront esplanade (boardwalk). The esplanade would follow the southern edge of the harbor toward Lake Washington. From the esplanade, a shoreline park trail would continue along the Lake Washington and Sammamish River shoreline. Public viewpoints with seating and signage would be provided at selected points near the Sammamish River shoreline. The shoreline park trail would connect to the sidewalk on the west side of 68th Avenue NE.

7. Vehicular Access and Circulation - Summary

Driveways on the primary pedestrian street shall be limited to an average of one for every two hundred lineal feet.

The on-site vehicular circulation system shall contribute to pedestrian movement and safety by including all of the following items that are feasible, considering the overall design of the development:

- *Pedestrian crosswalks at key crossing areas*
- *Signage that clearly communicates the location of vehicular and pedestrian zones*
- *Designated passenger drop-off areas*
- *Parking on interior roads, to slow down vehicular traffic*
- *The primary pedestrian street shall be built in the Waterfront subdistrict. Actual location may vary based on road and signalization design.*

Vehicular Access and Circulation - Discussion

Lakepointe Boulevard, which would provide primary vehicular access to the site, would provide pedestrian connections to the esplanade (consistent with P-suffix condition 4, Lakepointe Boulevard would serve as the primary pedestrian street and would be located in the Waterfront Subdistrict). Lakepointe Boulevard would include pedestrian crosswalks at key crossing areas; signage that differentiates pedestrian and vehicular areas; designated pedestrian drop-off areas; and limited on-street parking which would help to reduce vehicular speeds.

Driveways from Lakepointe Boulevard would be provided at an average of one every 240 feet.

8. Public Viewpoints - Summary

Public viewpoints, linked with the pedestrian routes shall provide views of the Sammamish River and Lake Washington. Public viewpoints shall be integrated into the pedestrian plan for the site and shall be easily accessible to the public. Development of the public viewpoint areas shall include pedestrian amenities such as seating and signage.

Public Viewpoints - Discussion

Public viewpoints, which would provide views of the Sammamish River and Lake Washington, would be provided along the shoreline trail in the Shoreline Park, at the amphitheater and along the esplanade. All of the viewpoints would be accessible to the general public and would include pedestrian amenities such as seating and signage.

9. Shoreline Enhancement - Summary

The shoreline edge of the Sammamish River and Lake Washington shall be improved to enhance water quality and wildlife and marine habitat. A wetland and riparian enhancement plan subject to the review and approval of King County, shall be performed by a qualified wetland biologist. Setbacks shall be subject to the King County Sensitive Areas Ordinance and the Shoreline Master Program with a minimum 100-foot setback for structures from the river's edge. Variations to adopted setbacks may require off-site mitigation, to be determined in the Master Plan process. No disturbance of the Sensitive Areas Ordinance required buffers is permitted, except at minimum 300 foot intervals, wildlife viewing trails extending into the buffer may be allowed if no significant impact to the wildlife and marine habitat is anticipated to occur. The use of moorage development in the barge channel shall be limited to private use. Public moorage shall be provided, if feasible, on the Lake Washington frontage of the site, subject to approval under the King County Sensitive Areas Ordinance, the Shoreline Master Program and other agencies with jurisdiction. Approval of all water moorage is subject to mitigation if marine/air conflicts. A special study shall be performed to determine if boat moorage will have a negative impact on salmon runs entering the Sammamish River or feeding at the River mouth. If it is found that moorage and associated boat traffic may have an impact, boat moorage shall not be provided. At the time of the creation of this condition package, no setbacks are required along the inner harbor line. Regulations adopted subsequently may require setbacks within this area.

Shoreline Enhancement - Discussion

The Proposed Action includes expansion of the vegetated shoreline along the Sammamish River and Lake Washington, and enhancement of the existing plant communities by removal of invasive, non-native plant species and replacement with native shrub and ground cover species. The vegetated Sammamish River shoreline buffer would respect the 100-foot shoreline buffer distance, and in some

areas, extend beyond that distance. Small wetland deltas and an elevated side channel may also be developed along the Sammamish River shoreline to diversify the shoreline.

The proposal would include a marina with 53 moorage slips. No live-aboards or general public short-term moorage would be allowed (short-term moorage would be limited to guests of on-site commercial uses). The Lakepointe Technical Report on Natural Resources prepared for this Supplemental Draft EIS (Appendix B) is intended to meet the requirement for a special study to determine marina and boat traffic on salmon runs. Based on the findings of the Lakepointe Technical Report on Natural Resources, the proposed marina, and associated boat traffic, would not be anticipated to result in significant impacts to salmonid fish or air/boat traffic utilizing the lake.

10. Affordable Housing - Summary

Affordable housing units amounting to 10% of the total number of units in the development shall be provided. Compliance with this requirement shall be required (a) upon occupancy of the first 400 units at the Pre-Mix site, and (b) thereafter, upon the completion of each additional 260 residential units at the site. Compliance may be achieved through construction of affordable units or provision of adequate security to the County to ensure their future development. The affordable units need not be provided within the development, but must be provided within the Northshore planning area. Units may be either rented or sold. Affordable housing shall be calculated as follows: Rented units shall be provided only to households earning less than 50% of the median income. Monthly rents shall be no greater than 30% of the monthly income from households earning 50% of the median income. Sold units shall be sold to first-time buyers (i.e. person not having owned a home in the past three hears) earning less than 80% of the median income. Home prices shall be Affordable based on FHA lending standards. Covenants shall be established which guarantee the fulfillment of this obligation.

Affordable Housing - Discussion

Consistent with this condition, the applicant and the County would execute an agreement to provide approximately 120 affordable housing units (10 percent of the total proposed residential units). The location of the affordable housing units would be determined during the execution of the agreement between the County and the applicant. The units would be located either on the site or off-site, within the Northshore Planning Area. The affordable housing units would be priced, either for sale or rent, consistent with the prescribed household income levels. At the time of publication of this Draft Supplemental EIS, no agreement specifying the location of the affordable units had been executed. Thus, this Draft Supplemental EIS cannot assess the impacts of these units if they are located off-site. If the affordable units are proposed to be located off-site, additional environmental review will be required.

11. Residential Density - Summary

Residential density at full build-out shall be calculated at the following levels per acre for the gross land area of each subdistrict in the development:

	Minimum	*Maximum*
Neighborhood Commercial	*12 du/ac*	*48 du/ac*
Waterfront & Waterfront Extension	*12 du/ac*	*24 du/ac*
Residential	*24 du/ac*	*48 du/ac*

Residential uses in the mixed use area shall not exceed 75 percent and shall not fall below 50 percent of the total built floor area of the development at full build-out. Where feasible, buildings with non-residential uses (in particular, large buildings), shall include residential uses as well. A minimum of 25% of total floor area of each phase of development shall be residential.

Residential Density - Discussion

A minimum of 25 percent of the total floor area of each phase would be in residential use and the total amount of residential area would be approximately 70 percent of the total built floor area. Residential density within the Neighborhood Commercial, Waterfront, and Residential subdistricts would be approximately 35 du/ac, 17 du/ac and 24 du/ac respectively.

12. Hazardous Waste Removal - Summary

Prior to any development, the applicant shall conduct additional environmental assessment as specified by King County and, if contamination is found, shall prepare a remediation plan and schedule acceptable to the King County Executive. Prior to development of any phase of the project, contamination (if any) on the portion of the site to be developed in that phase shall be remediated in accordance with the remediation plan and all legal requirements. The remainder of the site shall be cleaned up on accordance with the remediation schedule.

Hazardous Waste Removal - Discussion

The Washington State Department of Ecology (DOE) issued a Site Hazard Assessment report for the Lakepointe property on February 19, 1992. The report identified the site as qualifying for a ranking of 1 (highest rank) on the Site Hazard Assessment List. This ranking was based on the potential for exposure to humans of on-site contaminants.

Prior to the issuance of any permits by King County, a Site Remediation Plan consistent with the Model Toxics Control Act and negotiated between DOE, the State Attorney General and the property owner, must be established (*refer to the Toxic and Hazardous Materials section for detail).*

13. Fair Share Mitigation - Summary

In applying the above conditions on individual properties, mitigation "shall be at a reasonable level related to each proposed development".

Fair Share Mitigation - Discussion

Reasonable mitigation for the proposed Master Plan, Commercial Site Development Permit application and Substantial Shoreline Development Permit application would be established through the State Environmental Policy Act (SEPA) and the King County project review process.

14. Phasing Requirements - Summary

The following presents a summary of this P-suffix condition, refer to the NSCP for the complete condition.

The approved Master Site Plan for and all approvals for development of phases of the Pre-Mix site, shall satisfy the following requirements for phasing, provision of mitigation, and development by subdistrict.

a. Subdistrict Development. The Pre-Mix site shall be divided into four subdistricts.

b Phasing. There are no restrictions on when or where development may occur within the Pre-Mix site, so long as it is in accordance with the approved Master Plan.

c Mitigation Phasing Requirements. The purpose of identifying mitigation phasing requirements in the area zoning is to insure that adequate mitigation is in place for development of each portion of the mixed-use development site. These requirements are designed to insure that most of the capital-project roadway mitigations for the entire Pre-mix site shall occur at the beginning of development. Thus most of the roadway related capital infrastructure and amenities will be in place in connection with initial development to support full development of the Pre-Mix site. Certificates of occupancy shall not be issued for a particular subdistrict until the mitigation requirements of that subdistrict have been satisfied or adequate security to ensure their satisfaction has been provided King County (unless these p-suffix conditions or the approved Master Plan set forth a different timetable for completion of the mitigation).

Mitigation provided under these conditions shall be credited where appropriate against mitigation requirements otherwise applicable to the project through the SEPA process or under County codes. The property owner may fund mitigation improvements based upon agreements for reimbursement of portions of such costs by public agencies or other benefited private parties.

The intersection of SR-522 and 68th Avenue currently operates at LOS F. Significant mitigation of this intersection is not possible, and therefore mitigation for the development of the Pre-Mix site must be directed to improving access and circulation in other ways. Satisfaction of the linkage requirements set forth below shall be construed as satisfying the County's concurrence and intersection standards for the overall project.

(1) Startup Phase. Transportation related phasing items shall be provided in connection with development of the startup phase. Additional mitigation requirements shall be triggered to the extent development occurs in individual subdistricts outside of the start-up phase boundaries.

(2) Neighborhood Commercial subdistrict Mitigation. The requirements for the Neighborhood Commercial subdistrict are satisfied with the initial phase development. Therefore, additional mitigation requirements are not set forth for further development in the Neighborhood Commercial subdistrict. Although single-use commercial buildings are not prohibited in this subdistrict, residential and commercial uses in various structures should be integrated to the

greatest degree possible, through the use of walkways and other functional connections between buildings. Further, the prohibition on ground floor residential units will encourage the inclusion of mixed uses in residential structures.

(3) *Waterfront Subdistrict Mitigation. Additional mitigation requirements for the Waterfront Subdistrict, are focused on enhancing open space opportunities in this portion of the mixed-use district and on emphasizing pedestrian connections within the development.*

4. *Residential Subdistrict Mitigation. Additional mitigation/linkage requirements for the residential subdistrict are geared toward enhancing pedestrian connections within the site, reducing reliance on single-occupancy vehicles, and enhancing transit use.*

5. *Waterfront Extension Stage Mitigation. Mitigation requirements for the waterfront extension stage are provided in connection with development of the other subdistricts. Therefore, additional mitigation requirements are not set forth for development in the Waterfront Extension Subdistrict. Development in this subdistrict may not proceed until mitigation for the overall development and Waterfront subdistrict have been provided.*

Phasing Requirements - Discussion

The Proposed Action would be developed into subdistricts as defined in the P-suffix conditions and described in Chapter 2 of this document. Mitigation phasing requirements would be determined as a result of the project and SEPA review.

KING COUNTY SHORELINE MANAGEMENT MASTER PROGRAM

The purpose of the King County Shoreline Management Master Program (Shoreline Master Program) is to implement the Washington State Shoreline Management Act of 1971 and to provide for the regulation of development which impacts those areas of King County under the jurisdiction of the Shoreline Management Act. The Shoreline Master Program regulates property from the Ordinary High Water Mark to a line 200 feet landward. Four different environmental designations, which establish policies and regulations for various types of land uses within the shoreline jurisdiction of each element, have been provided. The environmental designations are: Natural Environment; Conservancy Environment; Rural Environment; and Urban Environment.

The goals, policies and objectives of the Shoreline Master Program which most directly relate to the Proposed Action are described below. The numbers provided in parentheses indicate the specific policies described.

Summary: Urban Environment

The Lake Washington, Sammamish River and inner harbor shorelines on the site are designated "Urban Environment" by the Shoreline Master Program. The purpose of the Urban Environment is to ensure optimum utilization of the shorelines of the state within urbanized areas by permitting intensive use and by managing development so that it enhances and maintains the shorelines of the state for a multiplicity of urban uses. (1) The emphasis for shoreline development in the Urban environment should be given to areas which are already developed (2) but would not displace water dependent uses. (3) Emphasis should be given to developing visual and physical access to the shoreline. (5 and 6) Redevelopment of substandard areas and development of multiple uses should be encouraged. (8) Aesthetic considerations should be actively promoted by means of sign control regulations, architectural design standards, and landscaping requirements. (9) Development should not significantly degrade the quality of the environment. Lake Washington is listed as a Shoreline of Statewide Significance and therefore a more sensitive priority system of uses shall prevail.

Discussion: Urban Environment

The Proposed Action would include a mix of residential, commercial, office and public open space on a site which is currently developed. The proposal has been designed to be a pedestrian-oriented development where residents and visitors can experience an "urban village" extension of Kenmore. The design of the proposal is intended to integrate different land uses and activities and minimize the conflicts between vehicles, pedestrians and cyclists. The proposal would provide approximately one-mile of Lake Washington and Sammamish River shoreline public access. A waterfront esplanade would be developed for pedestrian use along the existing harbor channel and would connect to the Burke-Gilman Trail. The esplanade would lead to a public amphitheater and shoreline park along the Sammamish River. The pedestrian trail associated with the shoreline park along the Sammamish River would include public view platforms. Wildlife habitat along the Sammamish River shoreline would be enhanced with additional plantings of native species.

To assure that design of the proposal would be internally harmonious and compatible with the Kenmore area, the overall design character of buildings, landscaping, lighting, and signage would be governed by Master Plan Design Guidelines prepared by the applicant (Appendix G)

The existing site uses are non-water dependent industrial and storage businesses and no displacement of water dependent uses would occur.

Summary: Shoreline Use Element.

A primary goal of the Shoreline Program is to " preserve or develop shorelines, adjacent uplands and adjacent water areas in a manner that assures a balance of shoreline uses with minimal adverse effect on the quality of life, water and environment."

(2) Program objectives also emphasize that shoreline land and water uses should satisfy the economic, social needs of the regional population without exceeding the physical capacity of the shoreline area. (3) The plan encourages the restoration and enhancement of shoreline areas, (6) and the establishment of multiple uses which are compatible. (7) Unique and fragile areas of the shoreline should be protected from uses or activities that would have an adverse impact, and non-residential uses which are not shoreline dependent should be encouraged to locate away from the shoreline.

Discussion: Shoreline Use Element.

The Proposed Action would consist of mixed use development Plan which would include residential, commercial and recreational elements. Development (within the shoreline area) would include portions of mixed-use buildings and the amphitheater. The Proposed Action would not include any building or parking development within approximately 120 feet of the Sammamish River or of the western Lake Washington shoreline edge; development in this area would be limited to public trails and view platforms. However, commercial uses, which would be generally non-shoreline dependent, would be located on the upland portion of the site. The proposal would include expansion of the vegetated shoreline along the Sammamish River and Lake Washington, and would enhance existing plant communities by removal of invasive, non-native plant species and replacement with native shrub and ground cover species. The proposal would preserve both on-site wetlands.

Summary: Economic Development Element

A primary economic development goal of the Shoreline Master Program is to ensure that "shoreline dependent development should provide long range benefit to man while assuring compatibility with the environmental and physical goals for shoreline areas."

(2) Economic development objectives encourage providing public physical and visual access to the water, (3) with minimal environmental impacts to shoreline lands and waters. (4) Multiple uses of waterfront sites should be encouraged.

Discussion: Economic Development Element

Proposed development located adjacent to the Lake Washington and Sammamish shoreline would be limited to natural open space, park area and public trails and view platforms. Other than the marina, proposed uses on the site within 200 feet of the shoreline would not be considered water dependent. Uses adjacent to the inner harbor would be more urban in character and would include residential housing, restaurants, marina, and other small retail uses. In general, the proposal would provide a mix of land uses that would support the creation of new jobs in an area which is currently industrial in character and is served by urban infrastructure. At buildout, the proposal would provide an estimated 1,270 jobs.

The proposed shoreline park along the Sammamish River and the esplanade along the inner harbor would provide physical and visual access to the water.

Summary: Public Access Element

A goal of the Shoreline Master Program is to increase public access to shorelines areas, provided that private rights, public safety and the natural character of the shoreline are not affected..

(2) Public access should be maintained and regulated; (3) access should be designed to provide for public health, safety and enjoyment; (6) and, shoreline viewpoints should be available to all people.

Discussion: Public Access Element

The periphery of the site would be dedicated to pedestrians and other non-vehicular uses (i.e., bicycles). Bicycle and pedestrian linkages between the Burke-Gilman Trail and the public spaces of the Lakepointe development would be publicly accessible, barrier-free and readily identifiable.

The trail along the Sammamish River is planned to incorporate native vegetation and opportunities for natural habitat viewing and interpretive information features. All pedestrian walkways and connections would be accessible and open to the general public.

Lakepointe's pedestrian and bicycle routes would be connected at grade across 175th Street to the Burke-Gilman Trail. A stairway adjacent to the elevated roadway would lead pedestrians to the future transit hub and pedestrian bridge crossing SR 522. Adjacent to the retail component in Building Area B a stairway would lead pedestrians from the retail/commercial area in Building Area B to the waterfront esplanade. Public access to the shoreline park would also be provided through the commercial development of Building Area A.

Summary: Recreation Element

The recreational goal of the Shoreline Master Plan is to "provide additional shoreline dependent and water oriented recreational opportunities that are diverse, convenient and adequate for the regional population consistent with the carrying capacity of the land and water resource."

(1 and 2) The recreational objectives include making shoreline areas available for public use with minimal adverse impact on the natural environment. (4) The shoreline recreational opportunities should be accessible for people of different ages, health, family status and financial ability.

Discussion: Recreation Element

The proposal includes a total of 21.2 acres of open space, or approximately 47 percent of the site. The on-site open space would include approximately 5.5 acres in natural area and 15.7 acres in public park area, pedestrian walkways and trails, and paved open space. On-site park area would include a public amphitheater, open grass park area with benches, river view platforms, a children's play area (with natural play elements including grass, pebbles and kinetic sculpture), and on-site trails with a direct connection to the Burke-Gilman Trail. All recreational features of the site would be available for use by the general public.

Summary: Circulation Element

Limiting circulation systems in shoreline areas to those which are shoreline dependent or would serve shoreline dependent uses and protect the physical and social environment is a primary goal of the Shoreline Master Program. (2) Circulation system objectives include encouraging alternative routes and modes of travel, (3) encouraging reasonable design of systems which are in character with the proposed use, (4) limiting disruption to shoreline areas, (6) and providing viewpoints.

Discussion: Circulation Element

The shoreline areas of the site would be dedicated to pedestrians and other non-motorized uses (i.e., bicycles). The shoreline park located along the Sammamish River would include a trail with view platforms; the view platforms would allow public views of the river while limiting disruption to shoreline areas. The trail along the Sammamish River is also planned to incorporate native vegetation and opportunities for natural habitat viewing and interpretive information features. All pedestrian walkways and connections would be accessible and open to the general public.

Bicycle and pedestrian linkages between the Burke-Gilman Trail and the public spaces of the Lakepointe development would be publicly accessible, barrier-free and readily identifiable.

A waterfront esplanade would be developed along the existing inner harbor. The approximately 50-foot wide esplanade would be open and urban in character and would include trees, benches and public viewpoints

Summary: Residential Element

The primary goal of the Residential Element of the Shoreline Master Program is to permit a variety of housing types and design with densities and location consistent with the ability of physical and natural features to accommodate them. (1) Objectives of this element include excluding residential development in areas in flood plains, steep slopes or other hazard areas; (2) ensuring that residential development would have minimal impact on shoreline environment, including the preference of planned unit developments that provide public open space; (3) limiting residential development that displaces shoreline dependent uses; (5) and, encouraging residential development that enhance the appearance of the shoreline.

Discussion: Residential Element

The proposal's overall 1,200 residential housing units would provide a wide range of housing opportunities. Units would consist of a variety of multifamily housing: 600 apartment units, 400 senior housing apartment units, and 200 condominium units. Housing would be provided in conjunction with park, trail and esplanade uses which would enhance the appearance of the shoreline. The proposed housing units would not be located in any flood plain, steep slope or other designated hazard areas. No residential housing structure would be located within 120 feet of the shoreline of Lake Washington or the Sammamish River. Proposed residential uses would replace industrial uses that now rely on barges to transport materials.

Summary: Commercial Development Activities

The commercial development policies of the Shoreline Master Program encourage locating commercial development that is not water dependent in the upland portion of the site. No non-water dependent commercial use should not be located over water. Commercial structures that are not shoreline dependent should be located away from the immediate waters edge.

Discussion: Commercial Development Activities

The commercial uses on the site are anticipated to be non-water dependent. Commercial uses on the site would be located in the upland portion of the site and would be organized around pedestrian walkways or the esplanade to emphasize pedestrian movement and minimize conflicts with vehicular traffic. For example, a waterfront esplanade would be developed for pedestrian use along the existing inner harbor. The approximately 50-foot wide esplanade would be open and urban in character and would include trees, benches and public viewpoints. The buildings fronting on the esplanade would contain retail shops, dining establishments and sidewalk cafes on the ground floors. No commercial buildings would be located over water.

Summary: Pleasure Boat Marina Activities

(4) Shoreline Master Program Policies to regulate marina development include provisions to avoid marina use in areas with poor flushing; locating marinas in areas that would minimize pollution; (6) locating marinas in areas of existing high intensity use; (8) confining parking to the shoreline use; (12) encouragement of public use in the marina; (13) and, encouragement of viewpoints, walkways and other public use facilities.

Discussion: Pleasure Boat Marina Activities

The marina would contain 53 moorage slips plus approximately 200 linear feet of additional moorage dock in the harbor area. Most of the slips would be 40 to 50 feet in length. The maximum moorage capacity of the marina would be approximately 61 boats. All moorage slips would be leased on a monthly or longer-term basis except for certain slips potentially usable for guest moorage. Short-term guest moorage would be provided to serve guests of residents and customers of adjacent commercial businesses on the site. An example of short-term guest moorage would be a restaurant providing guest moorage for patrons who arrive via boat. Public use of the marina would be limited to guest moorage and pedestrian use of the walkways to limit potential boat conflicts with Kenmore Air Harbor operations. Additional public moorage would not be provided

The marina would include various amenities for moorage tenants, possibly including potable water, electricity, cable television, security systems at moorage slips, security gates, storage areas, and shower facilities within buildings. (Long-term lease moorage agreements would prohibit live-aboard tenants.) These types of amenities are typically provided for long-term moorage tenants at Puget Sound marinas as a convenience for tenants who visit boats for several hour periods, or clean and stock boats. (Similar amenities are provided at the nearby Harbor Village Marina where live-a-boards are also prohibited.) Long-term parking (one space for every two slips for holders of long-term lease moorage when on extended boat trips) and short-term drop-off parking (including barrier-free parking) would be provided adjacent to the marina.

The stormwater system would include an outfall at the back end of the marina to provide flushing.

Summary: Outdoor Sign Activities

The Shoreline Master Program includes policies to direct outdoor signage in the shoreline area. (1) These policies include provisions that vistas and viewpoints should be free from unnecessary signs; (2) signs should be placed so as not to impair view of the water; (4) and, advertising signs should be limited to shoreline areas of high intensity use.

Discussion: Outdoor Sign Activities

The location and size of outdoor signs on the site are addressed in the proposed Master Plan Design Guidelines prepared by the applicant. These guidelines would include provisions to limit signs in viewpoint areas. It is anticipated that the advertising signs in the shoreline area would be limited to the inner harbor area which would be urban in character. Interpretive signs with information on the natural features of the river and the history of the site would be provided along the trail in the shoreline park.

POPULATION AND HOUSING

AFFECTED ENVIRONMENT

The information presented in this section updates and supplements the population and housing analysis presented in the Draft EIS for the Northshore Community Plan Update (1991).

Population

The Lakepointe site is located in the Northshore Community Planning Area of unincorporated King County. The planning area is approximately 39 square miles in size and includes portions of the Cities of Bothell, Woodinville and Kirkland. In 1995, the population in the unincorporated area was approximately 63,700, a 7.1 percent decrease from the 1990 unincorporated population of 68,600. The decrease in unincorporated population was due in part to the incorporation of Woodinville. The total population within the planning area (including incorporated areas) was 93,100 persons in 1990, and was estimated as 100,400 in 1995, an increase of 7.8 percent (1996 Annual Growth Report, King County). Table 26 summarizes this population information.

The population forecast for unincorporated areas of the Northshore Community Planning Area in 2010 is 71,200, approximately 12 percent higher than the 1995 unincorporated population. The population forecast for the entire planning area (including incorporated areas) is 112,500, approximately 12 percent greater than the 1995 total population. The latest population forecasts for years 2000 and 2010 are considerably lower than those presented in the Northshore Community Plan EIS. For instance, the total community area population forecast in the Community Plan EIS for the year 2000 was 123,200, almost 20,000 more than currently forecast (1996 Annual Growth Report, King County).

Table 26
Summary of Population Information, Northshore Community Planning Area

	1990	1995	2000	2010
Northshore				
Unincorporated Population	68,600	63,700	66,800	71,200
Incorporated Population	24,500	36,700	37,000	41,300
Total Population	93,100	100,400	103,800	112,500

Year 2000 and 2010 populations are current forecasts.
Source: King County Annual Growth Report, 1996

Housing

In 1995, the unincorporated portion of the Northshore Community Planning Area had approximately 21,940 households, and an average household size of 2.9 persons per dwelling unit. In 1990, the unincorporated number of households was approximately 23,600, and the average household size was 2.89 persons per dwelling unit. The decrease in the number of households from 1990 to 1995 was due in part to the incorporation of Woodinville (1996 Annual Growth Report, King County).

In 1995, the unincorporated portion of the Northshore Community Planning Area had approximately 22,640 dwelling units, of which approximately 77 percent were single-family dwelling units, 21 percent

were multifamily dwelling units, and 2 percent were mobile homes. The fact that there are more dwelling units than households in the Northshore area generally reflects vacancies in dwelling units.

The supply of housing affordable for low- and middle-income households in the Northshore Community Planning Area is not precisely identifiable using available data. However, U.S. Census data from 1990 and housing affordability data compiled by King County allow some inferences to be drawn regarding the availability of housing for households with incomes at or below median incomes (please see the housing affordability discussion below).

Likewise, the supply of "senior housing" in the Northshore Community Planning Area is not precisely identifiable using available data (please see the housing affordability discussion below for details on the housing challenges of senior households).

Housing Affordability

The King County "Consolidated Housing and Community Development Plan for 1996-1999" (H&CD Plan) describes housing conditions in the majority of King County outside the City of Seattle. The H&CD Plan describes gaps in housing affordability for home purchasers and renters between the market price and the affordable housing costs for the median income household and for those with lesser incomes. The affordable home purchase payment for the median income household is defined as 25 percent of the median income on a 30-year mortgage. The affordable rental payment is defined as 30 percent of the median renter income (defined by King County as 2/3 of the median household income). The H&CD Plan notes the limited supply of affordable rental housing, the higher cost burden on households earning less than the median household income, and the disproportionate level of need for housing assistance among elderly and minority households (King County, 1995).

Using the home purchase affordability definition above, there was an "affordability gap" of $19,000 for the household earning the median household income of $41,104 in 1994 (King County, Annual Growth Report, 1996). In other words, the average Countywide single-family home resale price of $185,359 was $19,000 more than the median household could afford. The affordability gap has shrunk over the past five years from its peak of $61,400 in 1990, primarily due to lower interest rates. However, the current affordability gap is still large enough to prevent many households from purchasing a home. In the Kenmore/Inglewood vicinity, the average sale price for single-family homes from July 1994 through June 1995 was approximately $197,700 (Seattle-Everett Real Estate Research Committee [SERERC], 1996), indicating relatively less affordable conditions in the site vicinity than for the County as a whole. Relatively few of the single-family homes sold in the site vicinity would be considered affordable to the median-income household.

The median income for rental households in King County is approximately 67.1 percent of median household income, as derived from 1990 U.S. Census data (King County, 1996 Annual Growth Report). In 1995, the estimated median renter income was $28,896, and the affordable rental payment for this household was $722. In 1995, the Countywide average rent for a two-bedroom/one-bath apartment was $661. Further, the Spring 1996 average rents for a two-bedroom/one-bath apartment in Bothell, Juanita and Woodinville/Totem Lake were $649, $682, and $671 respectively (SERERC, 1996). This indicates that affordable housing options are available Countywide and in the site vicinity for the median renter income household. However, for the rental household earning 50% or less of the median renter income, housing options are much more limited. Renters with an average income of $14,448 can afford rents of $360 per month, approximately $300 less than the 1995 Countywide average rent for a two-bedroom/one-

bath apartment. Average rents in the Spring 1996 SERERC report exceeded $360 for all surveyed apartments except for studio apartments in the Beacon Hill, Sea-Tac and Auburn areas (SERERC, 1996).

The King County H&CD Plan indicates that within unincorporated King County and several of the suburban cities served by the King County Housing Authority, there are approximately 69,000 households in need of housing assistance. This need is defined as those earning 0 to 80% of the median income who pay more than 30% of their income for rent or who live in substandard or overcrowded housing. This estimate is based on 1990 Census data, and does not include Seattle or Bellevue residents.

Of the households in need of housing assistance, about 21 percent are elderly households, split approximately in half between renters and owners. Furthermore, elderly households are disproportionately represented within the lower-income categories of 0-30% and 0-50% of median incomes (King County H&CD Plan, 1995). Therefore, housing affordability for elderly households is an important interest of King County.

Affordable Housing P-Suffix Conditions

The 1993 Northshore Community Plan Update contained affordable housing P-suffix conditions that pertain to the proposed action (please refer to the RELATIONSHIP TO PLANS AND POLICIES section for additional discussion of P-suffix requirements). The conditions require that:

- Affordable housing units amounting to 10 percent of the total number of units in the development shall be provided in the first development phase and thereafter upon completion of each additional 260 residential units.
- Compliance may be achieved through construction of affordable units or provision of adequate security to the County to ensure their future development.
- The affordable units can be provided on the site or within the Northshore planning area, and can be either rented or sold.
- Affordable housing is defined as rental units provided to households earning less than 50 percent of the median income, with rents no greater than 30 percent of the monthly income for households earning 50 percent of the median income. Sold units shall be sold to first-time buyers earning less than 80 percent of the median income, and shall be affordable based on FHA lending standards.

IMPACTS OF THE PROPOSED ACTION

Population

The Proposed Action would provide housing that would accommodate a portion of the population growth projected to occur in the Northshore area. At buildout, the Proposed Action would attract approximately 2,250 new residents to the Northshore Community Planning Area. This would include approximately 1,500 condominium and apartment dwellers, and approximately 750 senior housing dwellers. This residential estimate is based on an average of 1.875 persons per multifamily unit as derived from the Puget Sound Regional Council's 1995 Population and Employment Forecasts for the Central Puget Sound Region. The projected 2,250 new residents would represent approximately 19 percent of the projected total population growth in the Northshore area between 1995 and 2010.

Housing

At buildout, the Proposed Action would add approximately 1,200 dwelling units, including 400 senior housing units, to the Northshore Community Planning Area. All of the dwelling units would be multifamily units. In addition to the senior housing units, approximately 580 of the dwelling units would be apartments and 220 would be condominium units.

The Proposed Action would be required to meet the affordable housing P-suffix conditions contained in the Northshore Community Plan. Consequently, the Proposed Action would include approximately 120 affordable housing units either on the site or in the general vicinity. The affordable housing would include units with rents no greater than 30 percent of the monthly income for households earning 50 percent of the median income, and ownership units priced for households at 80 percent of the median income.

ALTERNATIVES

Alternative 1: Conceptual Master Plan in the Northshore Community Plan

Population

Under Alternative 1, the resident population on the site would be approximately 1,875 compared to 2,250 residents under the Proposed Action. Due to provision of 150,000 square feet (or 23 percent) less commercial area under Alternative 1, the amount of visitors to on-site commercial uses on a typical day would be reduced in comparison to the Proposed Action. This alternative does not include a hotel that is included in the Proposed Action.

Housing

Under Alternative 1, a total of 1,000 residential dwelling units would be provided, 200 fewer than under the Proposed Action. Alternative 1 would include approximately 100 affordable housing units either on the site or in the general vicinity.

Alternative 2: No Action Alternative

Population

Under the No Action Alternative, the possibility of accommodating a portion of the projected population growth within the site would not be realized at this time. The residential needs of the projected population would need to be accommodated elsewhere in the Northshore planning area.

Housing

Under the No Action Alternative, the residential housing needs of the projected population would not be accommodated on the site, and would need to be accommodated elsewhere in the Northshore planning area. This could result in higher residential densities in portions of the Northshore planning area than would otherwise occur if on-site residences were constructed. The proposed 120 affordable housing units would not be provided.

MITIGATION MEASURES

Required by Code

- The Proposed Action would provide approximately 120 affordable housing units consistent with the P-suffix requirements in the 1993 Northshore Community Plan Update.

UNAVOIDABLE SIGNIFICANT ADVERSE IMPACTS

With the proposed mitigation measures, no unavoidable significant adverse population or housing impacts are expected.

AESTHETICS, LIGHT & GLARE

AFFECTED ENVIRONMENT

Aesthetics

Existing Visual Character

Area Context

The site is located at the northern tip of Lake Washington in what is commonly called "downtown Kenmore". The primary scenic/visual features in the area include Lake Washington, the Sammamish River, and NE Bothell Way (SR-522). Topography in the area varies from generally level immediately north of Lake Washington and along NE Bothell Way to sloping hillsides north of NE Bothell Way and south of the Sammamish River; east of 68th Avenue NE (east of the site) the overall area topography is level.

The major visual feature in downtown Kenmore is NE Bothell Way, a five-lane roadway which runs east to west. In downtown Kenmore, development along this roadway is characterized as "suburban commercial strip" with low scale (one to two story) commercial and retail buildings and associated parking. The roadway contains numerous signs and billboards. Because of the "strip nature" and automobile orientation of the commercial development along NE Bothell Way, a true center for downtown Kenmore has not been established. The aesthetic character of the area can be considered a high-intensity suburban corridor.

Other visually significant features in the area include the single-family residential area on the hillside north of the site (across NE Bothell Way), the golf course and residential uses on the hillside south of the site (across the Sammamish River), and the commercial uses on 68th Avenue NE.

Site

The site is a 50-acre, irregularly shaped property bounded by Lake Washington to the west, the Sammamish River to the south, 68th Avenue NE to the east and NE 175th Street (frontage road paralleling NE Bothell Way) to the north. The site has approximately 1,100 feet of frontage on NE 175th Street to the north and approximately 800 feet of frontage on 68th Avenue to the east.

The majority of the 50-acre site (approximately 90 percent) is currently developed with light industrial and storage uses. The primary structures on the site include the two-story Lone Star Northwest office building, the single-story Sepia Interior Supply building, the single-story Nelbro Packing building and the approximately 40-foot tall Kenmore Pre-Mix facility. Other uses on the site include the outdoor storage of automobiles and aggregate stockpiles in support of the Kenmore Pre-Mix facility. A naturally vegetated strip, ranging from 25 to 45 feet in width, is located along the Sammamish River and Lake Washington shorelines. This vegetated area contains deciduous and evergreen trees with some underbrush.

Principal Viewer Groups and Selected Viewpoints

The primary viewer group in the project area is motorists using NE Bothell Way and 68th Avenue NE as the roadways pass adjacent to the site. Another viewer group includes residents on the hillside to the north which overlook the site. Views to the site are also afforded to boaters on Lake Washington and users of the Burke-Gilman Trail. Photographs were taken from locations representative of the primary viewer groups and locations where public views would be most affected. Figure 22, Viewpoint Map, illustrates the viewpoint locations.

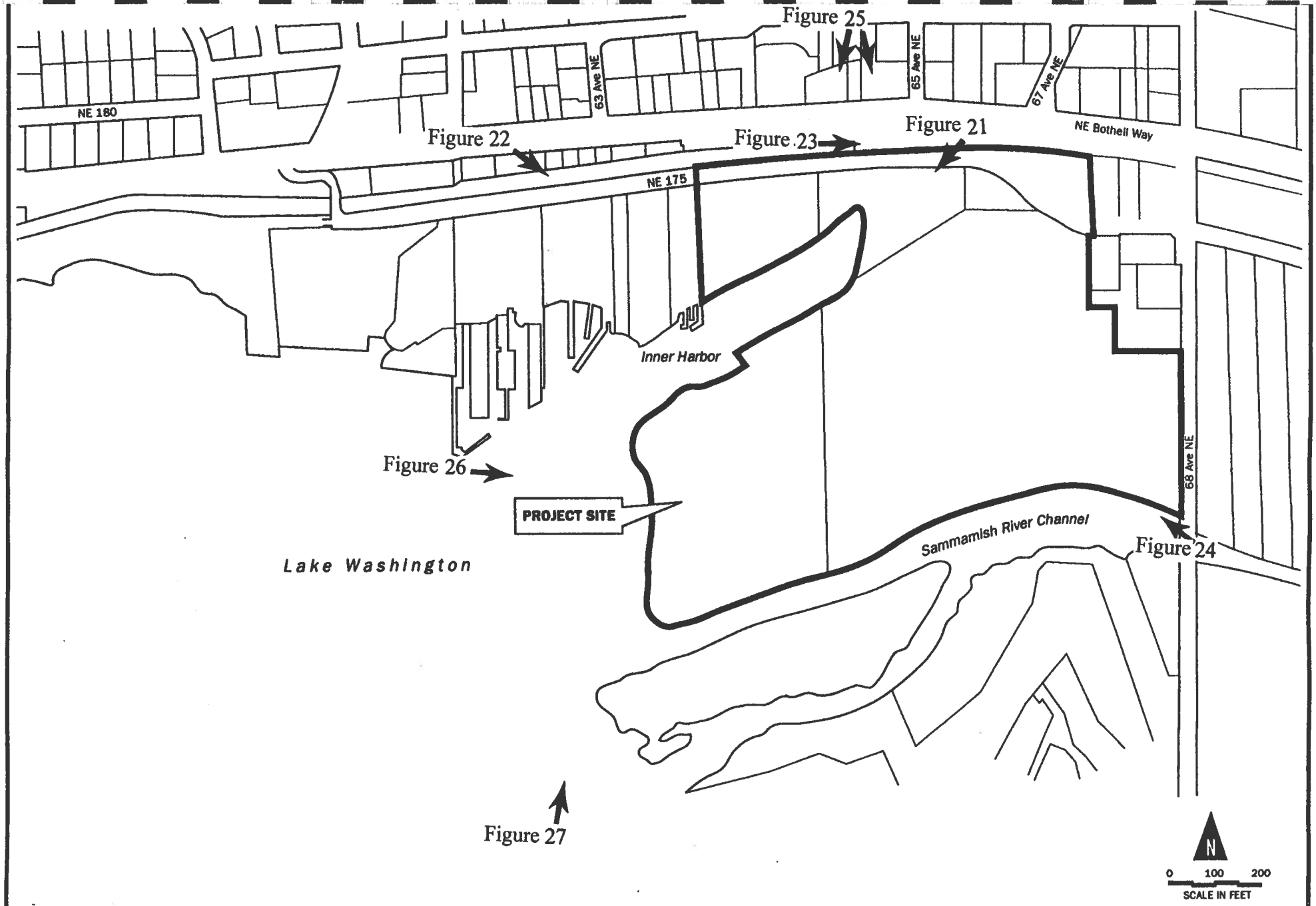
Views to the Site

Portions of the site are visible from NE Bothell Way and the Burke-Gilman Trail to the immediate north. Two typical views from NE Bothell Way and one typical view from the Burke-Gilman Trail are portrayed in Figure 23 (NE Bothell Way looking southwest), Figure 24 (NE Bothell Way looking southeast) and Figure 25 (Burke-Gilman Trail looking east). The elevation of NE Bothell Way ranges from 10 to 25 feet above the site. Views to the site from NE Bothell Way are partially blocked by buildings and vegetation adjacent to the south side of the roadway. However, depending on the location of the motorist on NE Bothell Way, large portions of the site are visible. Views to the site from NE Bothell Way are somewhat panoramic in nature (i.e. view is from above the site) and generally consist of industrial buildings and outdoor storage. The most visually prominent site features are the Lone Star Northwest office building and the Kenmore Pre-Mix facility; more distant views of the auto storage, aggregate stockpiling and the Sepia/Nelbro buildings are also afforded. From the Burke-Gilman Trail, which is generally at the same elevation as the site, views of the Kenmore Pre-mix facility, the Lone Star Northwest office building and the outdoor auto storage are most prominent. More distant views of the Sepia Interior Supply and Nelbro Packing buildings are also available.

A typical view from 68th Avenue NE (at the Kenmore Bridge) is illustrated in Figure 26. As illustrated in this figure, the view of the site primarily consists of the trees and shrubs located along the Sammamish River shoreline. Views of the on-site industrial buildings (including the Kenmore Pre-Mix facility) and outdoor storage areas are effectively screened by this vegetation. Because the majority of the vegetation along the Sammamish River shoreline near the bridge is deciduous, a partial view of the on-site uses is afforded during the winter months.

The site is visible from the hillside north of the site and across NE Bothell Way. A typical viewpoint from this area (Figure 27 - view from the intersection of NE 181st/64th Avenue NE), provides a panoramic overlook of the site, as well as Lake Washington and the northern tip of Finn Hill. The view from this viewpoint includes all site uses and indicates the industrial/storage character of the site.

A view from the end of the public dock at Tracy Owen Station Park (Logboom Park) was utilized to reflect a typical view of the site from a boater on Lake Washington (see Figure 28). The view of the site from the lake would consist primarily of the vegetation along the Lake Washington and Sammamish River shoreline, the Kenmore Pre-mix facility, and a storage enclosure located near the Lake Washington shoreline. Depending upon the location of the boater, partial views of the Lone Star Northwest office building and the Sepia/Nelbro buildings are also afforded.



Source: Callison Architecture

Huckell/Weinman Associates, Inc.	**Lakepointe Mixed-Use Master Plan**	**Figure 22** **Viewpoint Graphic**

Figure 29 illustrates the view of the site from the dock associated with the Inglewood Shores Condominium building to the south, across the mouth of the Sammamish River. The view of the site from this location primarily consists of the trees and shrubs along the shoreline of Lake Washington and the Sammamish River. Views of on-site industrial uses are effectively screened by this vegetation. The majority of the on-site vegetation in this area is evergreen which provides a year-round screening of the interior of the site.

Light and Glare

The site of the Proposed Action is largely developed with numerous sources of light and glare. Glare is currently generated from on-site buildings (including the steel structures of Sepia Interior Supply and Nelbro Packing), the pre-mix plant, auto storage, and vehicles/trucks associated with the on-site uses. Off-site sources of glare include buildings and billboards along NE Bothell Way, 68th Avenue NE and NE 175th Street; residences on the hillside north of NE Bothell Way; and automobile traffic along NE Bothell Way, 68th Avenue NE and NE 175th Street.

The existing level of lighting on the perimeter of the site and in the site vicinity is high. Five 30-foot high light standards supporting high pressure sodium lamps are located along the Sammamish River. The pre-mix plant and site buildings have numerous building lights, including safety lights. Safety lighting is also provided for the outdoor storage areas. Off-site, NE Bothell Way contains numerous street lights, lighted commercial signs, and parking lot lights. Automobile traffic on NE Bothell Way and 68th Avenue NE generates a considerable amount of light. Some residential home and street lighting is also generated on the hillside north of the site.

IMPACTS OF THE PROPOSED ACTION

The Proposed Action would transform the site, with it's industrial and storage uses, to a mixed-use master planned urban community. The Proposed Action would result in a more intensive form of development than presently exists on the site or in the surrounding area. However, the types of uses proposed would be generally compatible with the existing development in downtown Kenmore.

Aesthetics

Visual Character

The aesthetic/visual character of the site would change from an industrial character with one- to two-story buildings to a mixed-use pedestrian-oriented development with buildings nine- to ten-stories high.

The Proposed Action would incorporate a number of measures to provide aesthetic transitions to surrounding uses. For example, the Proposed Action would include Design Guidelines to establish an overall and consistent design character for buildings, landscaping, lighting and signage for site development. The intent of the Design Guidelines is to ensure a harmonious design relationship among the various site uses and to establish a development which provides a visual link to downtown Kenmore. In addition to a visual link, the master plan would provide a physical link between downtown Kenmore and the Lake Washington and Sammamish River shorelines via public on-site trails and open spaces. The Proposed Action also includes the preservation and enhancement of the vegetated buffer along the

Lake Washington and Sammamish River shorelines which would provide a visual buffer between the site and off-site areas to the south.

Views to the Site

Most of the Lakepointe development would be visible from surrounding properties and adjacent roads and highways.

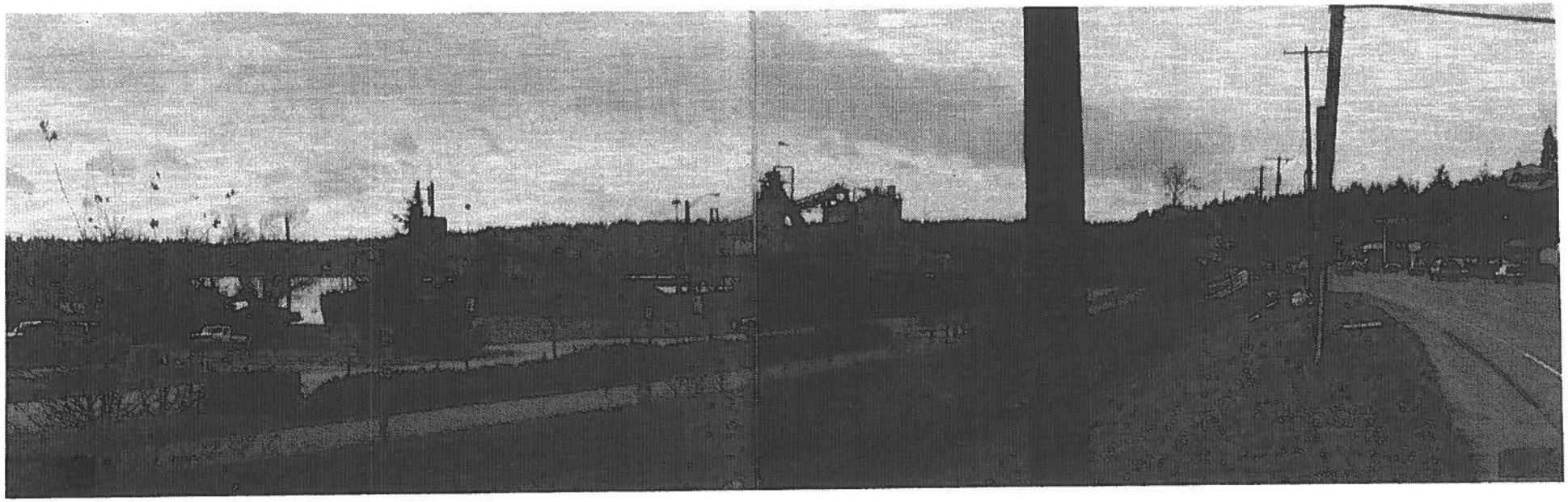
Representative views to the site, with development of the first six phases of the seven-phase Master Plan are shown in Figures 23 through 29. Figure 22 shows the locations from which the view photos were taken. Locations were selected to represent primary viewer groups and locations where public views would be most affected. Because the specific architectural details of the building facades have not been determined at this time, the post-development illustrations are not intended to depict all building features. The intent of the illustrations is to show the proposed building locations and heights and how they would generally appear from various viewpoints. The existing condition photo is included in each of these figures for comparison.

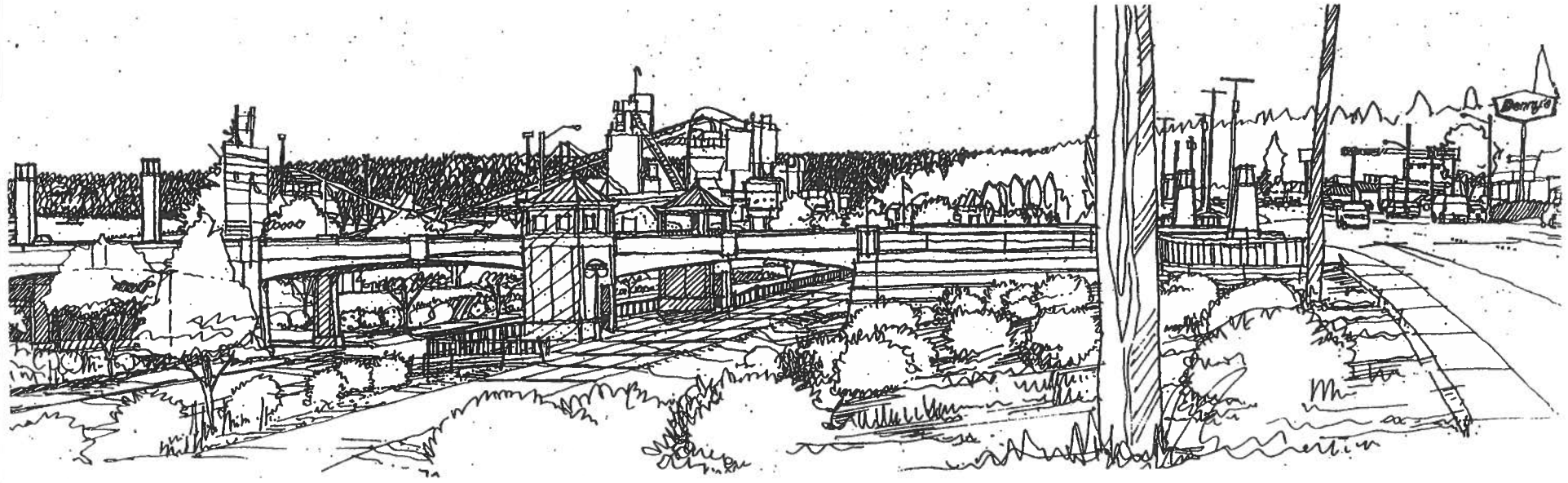
Figure 23 illustrates the view from NE Bothell Way looking west. The proposed elevated Lakepointe Way would be the element of the Master Plan most visible from this viewpoint. More distant views of the proposed lighthouse structure and Building D, both located at the western end of the site, would also be visible. Because the Kenmore Pre-Mix facility would not be replaced until phase 7 of master plan development, the plant would still be visible at this depicted phase of master plan development.

Figure 24 depicts a typical view of the site from NE Bothell Way looking southeast. The view of the site would be substantially changed from the existing condition. Views of the buildings proposed south of the inner harbor (Buildings B, C-1, C-2 and D) would be afforded from this viewpoint. Partial views of Buildings G-1 and G-2 would be provided behind the Kenmore Pre-mix plant. Distant views of Finn Hill would be almost entirely obstructed by the proposed buildings.

A typical view from the Burke-Gilman Trail looking east is illustrated in Figure 25. The view from the trail at this location would primarily consist of the elevated Lakepointe Way and a portion of Building G-2. Because the trail would be lowered by approximately 3 feet to provide an adequate trail passage under Lakepointe Way, the northern bank adjacent to the trail would be taller and steeper than under existing conditions; trees and groundcover would be planted on this slope. To the immediate west of Lakepointe Way and south of the trail, although not within the view angle presented in Figure 25, a stair-stepped promenade entry (with bicycle accessible lane) to the on-site walkway and trail system would also likely be visible from the trail.

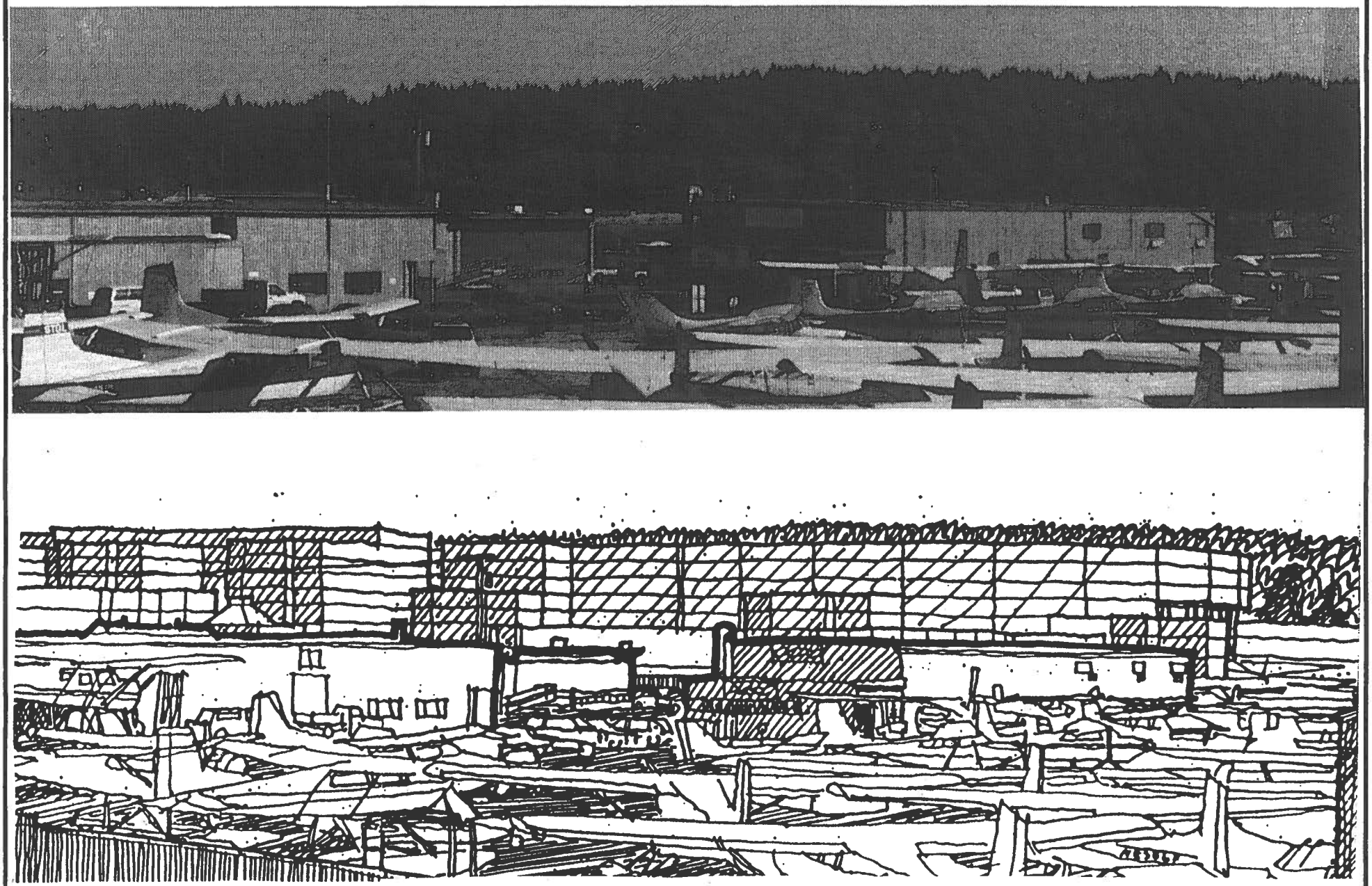
Figure 26 illustrates a typical view of the site from 68th Avenue NE. Because the majority of the existing vegetation along the Sammamish River shoreline would be retained, only partial views of the proposed development would be provided. The most visible element of the Master Plan from this view would be the western portion of Building A and the eastern portion of Building E-2. Because the majority of the retained vegetation along the Sammamish River would be deciduous, a greater view of Buildings A and E-2 would be afforded during the winter months.





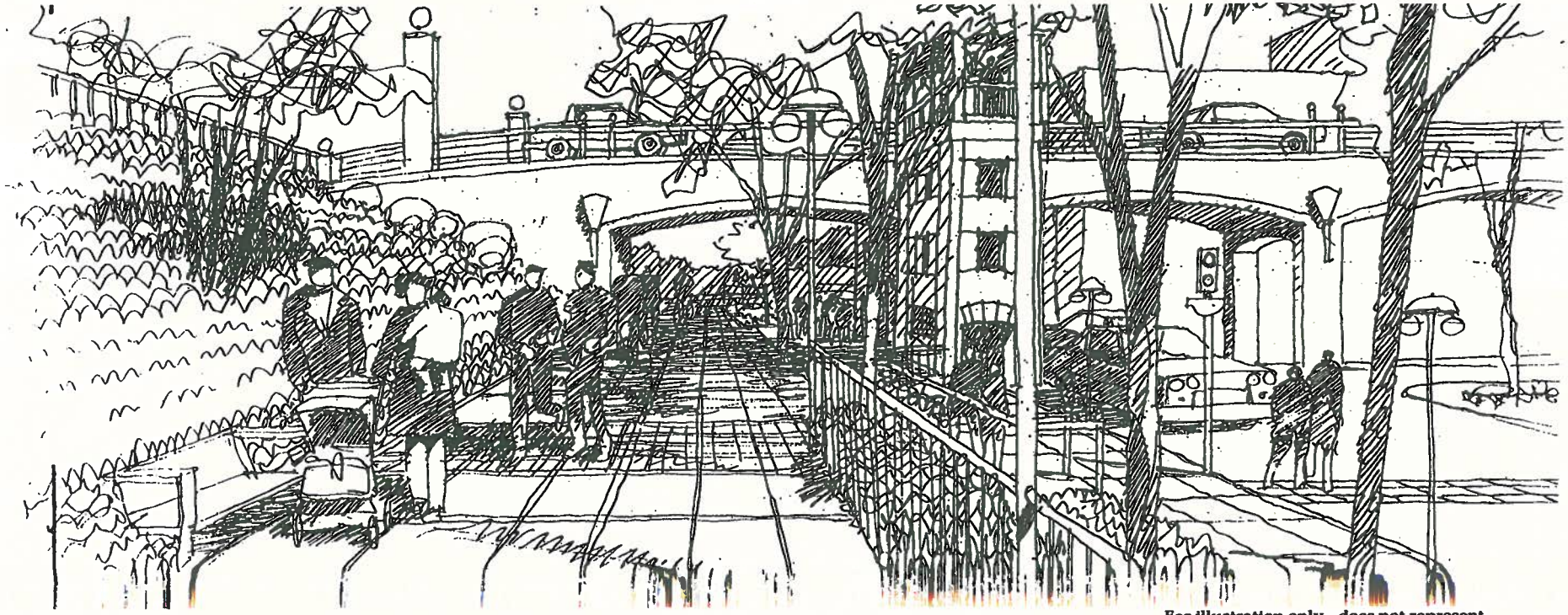
Source: Callison Architecture

Huckell/Weinman Associates, Inc.	**Lakepointe Mixed-Use Master Plan**	**Figure 23** **View From NE Bothell Way Looking West**



Source: Callison Architecture

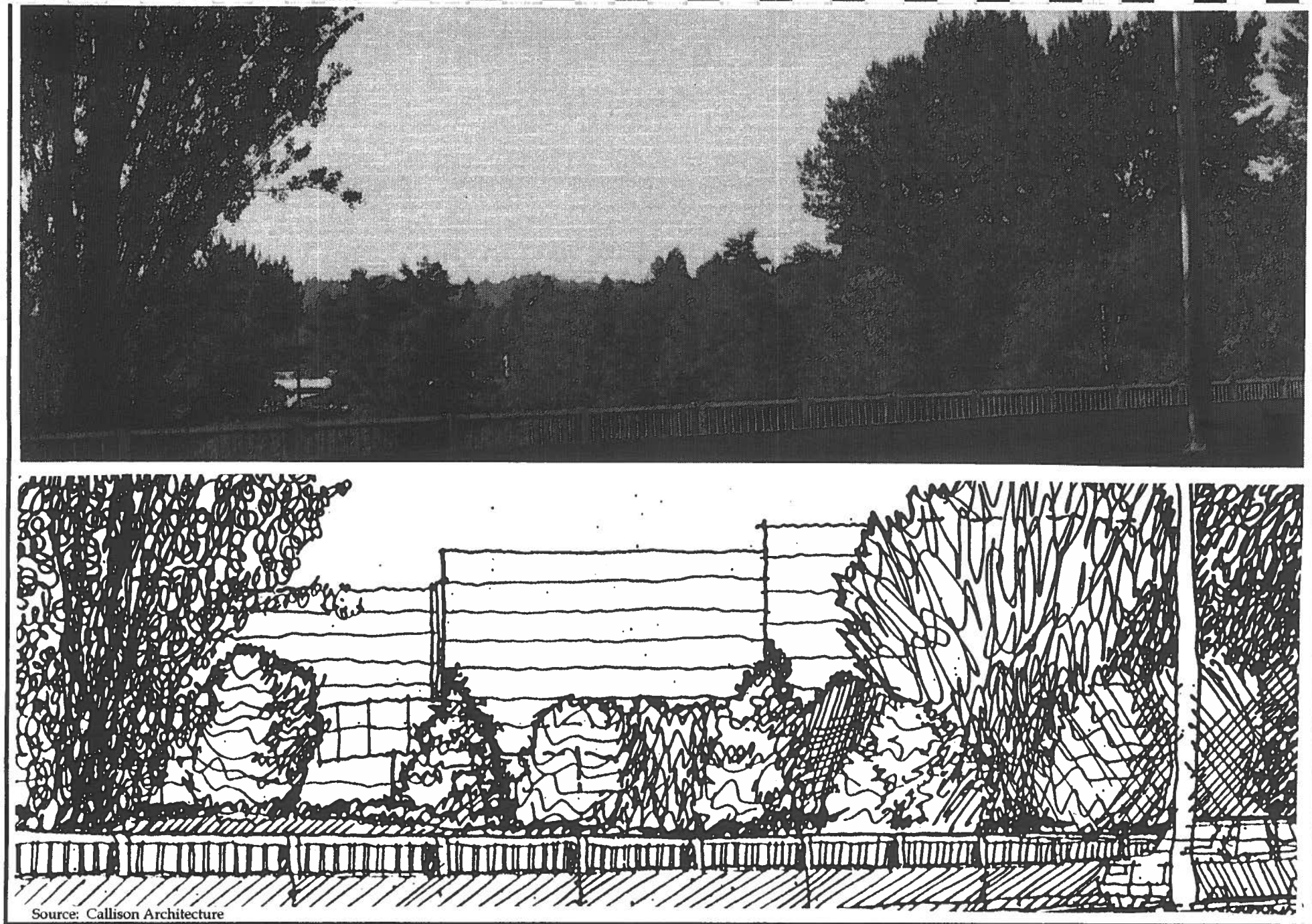
Huckell/Weinman Associates, Inc.	**Lakepointe Mixed-Use Master Plan**	**Figure 24** **View From NE Bothell Way Looking Southeast**



For illustration only - does not represent design elements for code compliance review.

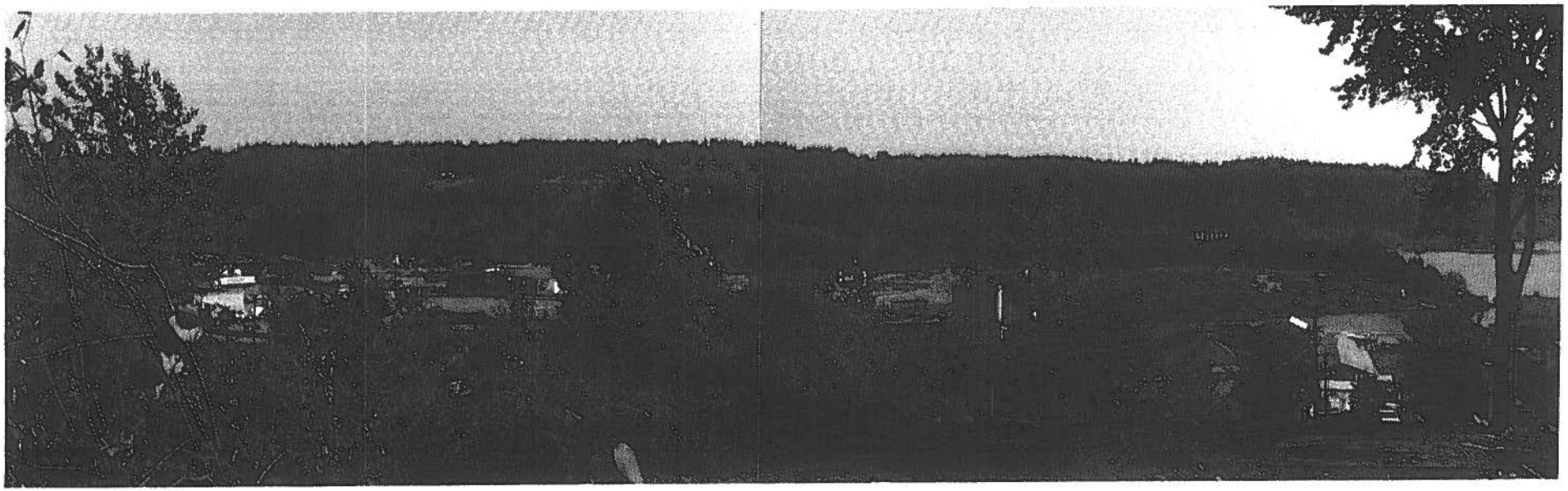
Source: Callison Architecture

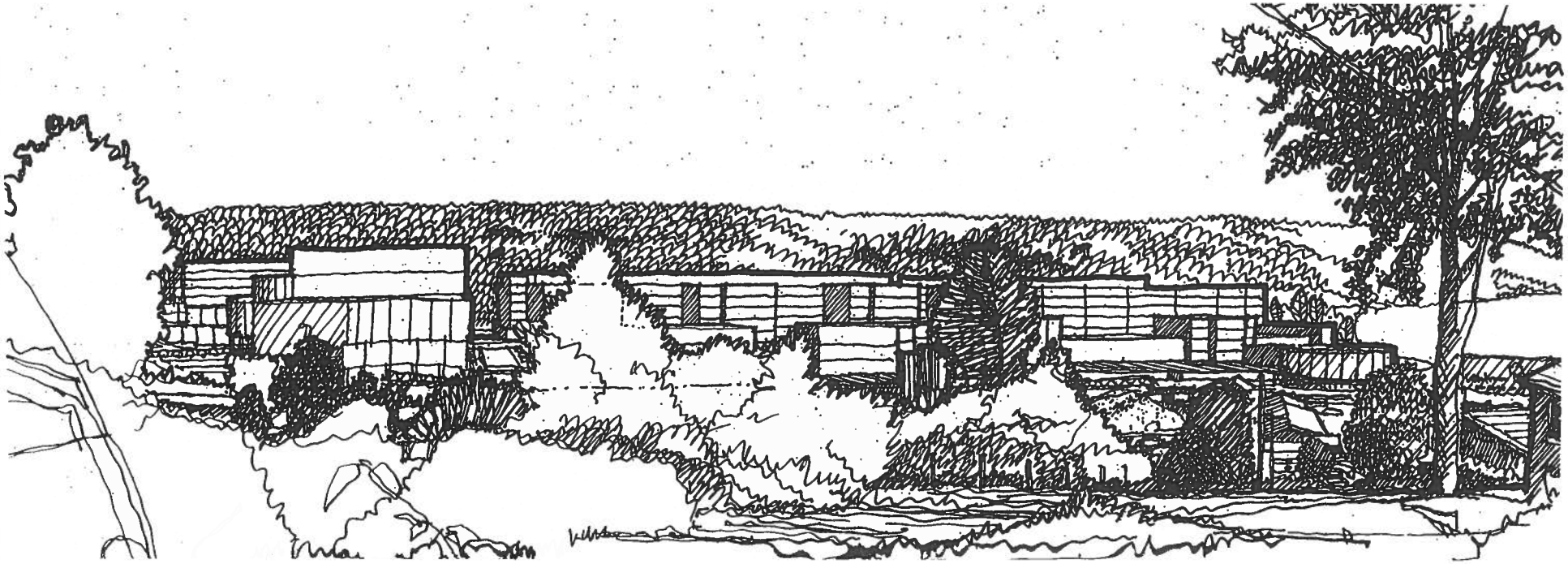
Huckell/Weinman Associates, Inc.	**Lakepointe Mixed-Use Master Plan**	**Figure 25** **View From Burke-Gilman Trail Looking East**



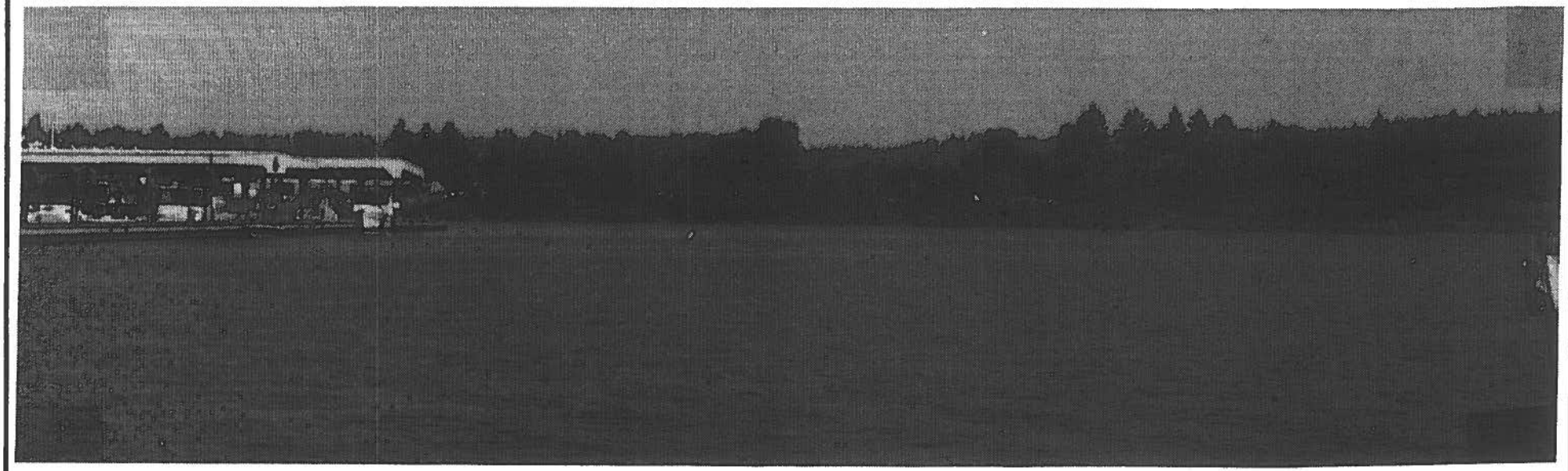
Source: Callison Architecture

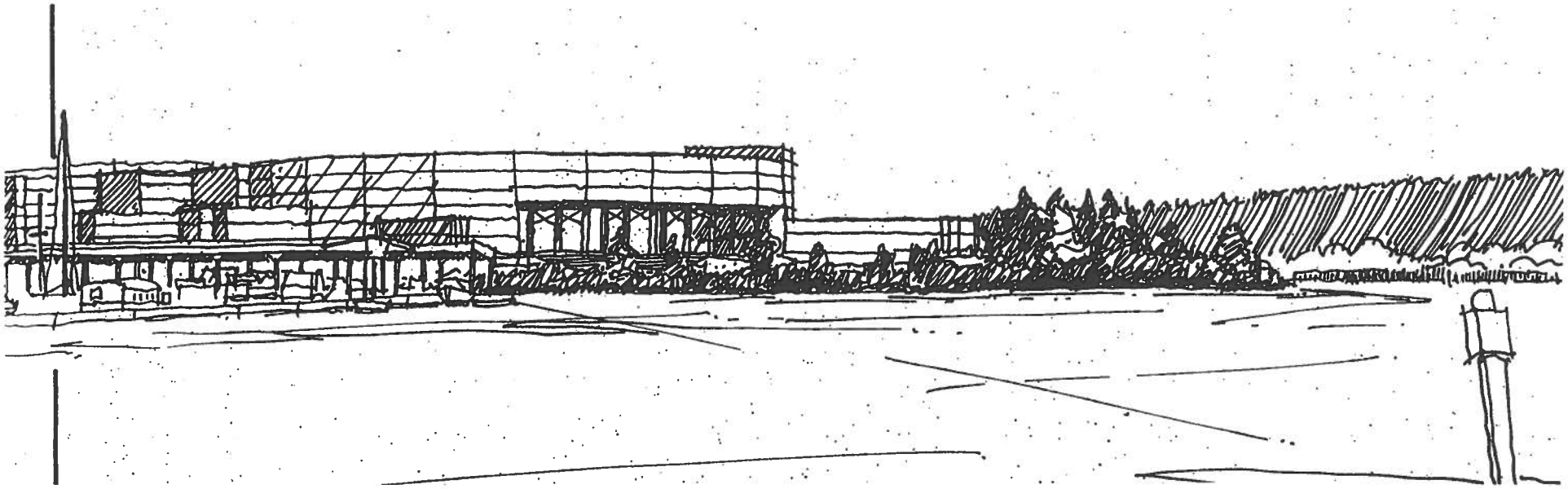
Huckell/Weinman Associates, Inc.	**Lakepointe Mixed-Use Master Plan**	**Figure 26** **View From 68th Avenue Looking West**





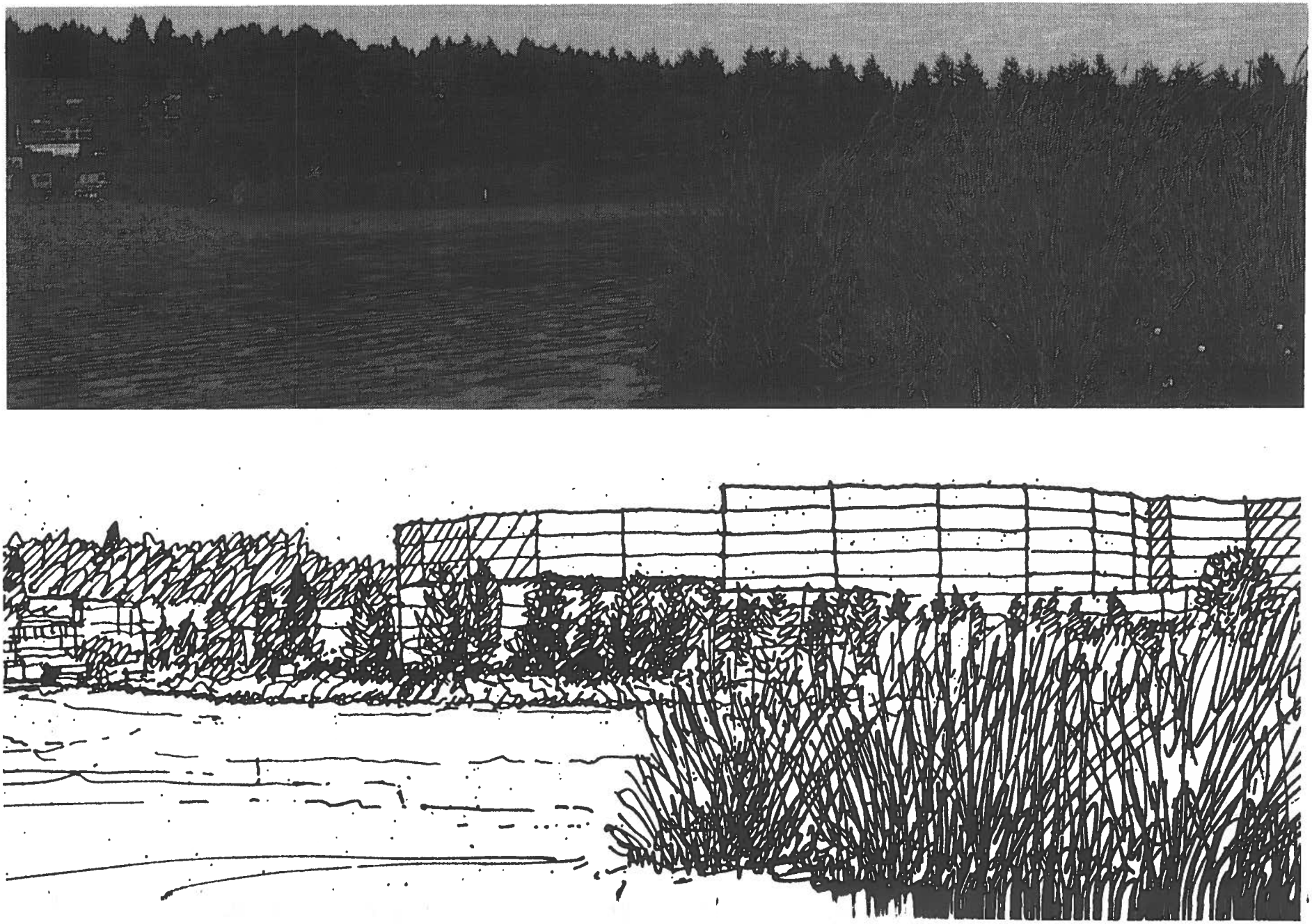
Huckell/Weinman Associates, Inc.	**Lakepointe Mixed-Use Master Plan**	**Figure 27** **View From Hillside to the North Looking South**





Source: Callison Architecture

Huckell/Weinman Associates, Inc.	**Lakepointe Mixed-Use Master Plan**	**Figure 28** **View From Lake Washington Looking East**



Source: Callison Architecture

Huckell/Weinman Associates, Inc.	**Lakepointe Mixed-Use Master Plan**	**Figure 29** **View From Inglewood Dock Looking North**

A typical view from the hillside north of the site and NE Bothell Way is illustrated in Figure 257 This viewpoint indicates that much of the proposed site development would be visible from this panoramic overview of the site. From this viewpoint, the proposed Buildings B, C-2 and D (in the central portion of the site south of the inner harbor) would appear primarily as one solid building mass. Buildings G-1 and G-2 would be clearly visible. Existing views of the on-site vegetation along the Sammamish River and Lake Washington shorelines and the lower portion of Finn Hill would be blocked.

Figure 28 illustrates the view from Lake Washington looking east. The view of the site would be substantially changed from the existing condition. The proposed structures most visible from this viewpoint would be Buildings D, E-1 and C-2. The retained vegetation along the Lake Washington shoreline would also be visible from this viewpoint.

A view from the dock associated with the Inglewood Shores Condominium building to the south, across the mouth of the Sammamish River, is illustrated in Figure 29. This viewpoint indicates that the upper levels of the buildings along the Sammamish River shoreline (buildings E-1, E-2 and A) would be visible. The retained vegetation along the Lake Washington and the Sammamish River shoreline would also be visible.

P-Suffix Height Criteria

The P-suffix conditions established for the site in the Northshore Community Plan (NSCP) provide height limits for various portions of the site (refer to Figure 10 in CHAPTER 2 of this document). The Master Plan proposes to modify the building heights set forth in the P-suffix conditions (refer to Figure 11 of CHAPTER 2 of this document). The proposed modifications are as follows:

- The 45-foot height limit along the northern edge of the inner harbor, in Building Area H, would be increased to 92 feet.

- The 45-foot height limit in the area 200 feet to 300 feet from the Sammamish River would be eliminated.

- In the eastern portion of the site, the area of the 92-foot height limit would be extended in a southerly direction from 300 feet to within 200 feet of the River (in Building Area A).

- In the west central portion of the site (Building Areas C, D, and E), building heights would be reduced from 92 feet to 72 feet extending in a southerly direction to within 200 feet of the River (in Building Area E).

- Consistent with the NSCP, the 35-foot height limit between 100 feet and 200 feet of the River would be maintained, and no buildings are proposed within 100 feet of the River.

The increased height limit in the areas between 200 and 300 feet of the Sammamish River would allow higher buildings closer to the River and to residential uses to the south, across the River. This increase in building heights to the south would be somewhat offset by the reduction of maximum building heights in the west central portion of the site. The replacement of the 45-foot height limit along the northern edge of the inner harbor with a 92-foot height limit would increase the building heights allowed in future phase buildings in Building Area H adjacent to NE 175th Street and NE Bothell Way.

From street level on Lakepointe Boulevard, the heights of buildings in the eastern portion of the site would remain the same as under the P-suffix conditions and would be approximately 70 feet above street level (because Lakepointe Boulevard would be approximately 20 feet above ground level, the first two building levels would be below street level). In the western portion of the site, the building heights would be approximately 50 feet above street level (20 feet lower than under current P-suffix conditions).

Consistent with the exceptions to height limit provisions in KCC21A.12.180, roof structures housing or screening rooftop equipment and parapet walls may exceed the proposed height limits. These rooftop features would not be anticipated to result in substantial visual impacts beyond those previously discussed.

Light and Glare

Project development would result in the elimination of existing lighting and the establishment of new light sources. The lighting sources removed from the site would include: the high pressure sodium lights along the Sammamish River; safety lighting on buildings and the Pre-Mix plant; and, the safety lighting associated with outdoor storage areas, including auto storage. Proposed lighting would include lighting for the surface parking lot along Lakepointe Way and Lakepointe Boulevard; lighting for on-site trails and walkways; commercial and residential building safety lighting; lighted commercial signage and automobile traffic. The Master Plan Design Standards would include criteria for lighting, including shielding and wattage limitations, to reduce the amount of light reaching off-site properties. The amount of lighting on the perimeter of the site would be anticipated to be similar to, but not more than, existing lighting levels. (Refer to the PLANTS AND ANIMALS section of this document for detail on lighting impacts to fish). Because existing lighting in the interior portion of the site is limited, the amount of lighting in this portion of the site would increase with the Proposed Action.

The Proposed Action would eliminate the existing sources of glare on the site including buildings, the pre-mix plant, outdoor auto storage, and truck traffic. New sources of glare from the site with development of the proposal would include reflection from building facades and windows, and reflections from automobile traffic. Because the number of buildings, height of buildings, and number of on-site vehicles would be greater than under existing conditions, the amount of overall potential glare generated on the site would be greater than under existing conditions. However, the glare impact to motorists on NE Bothell Way and 68th Avenue NE would be similar to that generated by existing buildings along these roadways, and no significant glare impacts to motorists would be anticipated.

ALTERNATIVES

Alternative 1 - Conceptual Master Plan Illustrated in the Northshore Community Plan

As under the Proposed Action, the site would change from an industrial character with one- to two-story buildings to a mixed use pedestrian-oriented character with buildings up to ten-stories tall.

Views to the site from development under Alternative 1 would be generally similar to those under the Proposed Action; however, because of the lesser amount of building area and maximum building height zones consistent with those established by the P-suffix conditions, there would be visual differences. Under this alternative, the taller building heights (92 foot zone) would be setback further (approximately

100 feet) from the Sammamish River shoreline. However, the building height would be greater than under the Proposed Action in the west central portion of the site. Consequently, viewers from the south, across the Sammamish River could perceive less visual building scale on the site than under the Proposed Action, while viewers from Lake Washington could perceive greater visual building scale on the site than under the Proposed Action. From Lakepointe Boulevard, the perceived scale of the buildings would be greater than under the Proposed Action. Views from NE Bothell Way, 68th Avenue NE, and the area north of NE Bothell Way, would be similar to those under the Proposed Action.

Overall, light and glare impacts under Alternative 1 would be similar to those under the Proposed Action; however, the lesser building areas and less vehicular traffic could result in slightly lower light and glare levels.

Alternative 2 - No Action

Under the No Action Alternative, the existing industrial and storage character of the site would continue. The existing site uses, including the two-story Lone Star Northwest office building, the single-story Sepia Interior Supply building, the single-story Nelbro Packing building, the approximately 40-foot tall Kenmore Pre-Mix facility, the outdoor storage of automobiles and aggregate stockpiles in support of the Kenmore Pre-Mix facility, would remain. Existing views of the site would continue in their current form.

MITIGATION MEASURES

Required by Code

- Proposed Design Guidelines are intended to establish an overall and consistent design character for buildings, landscaping, lighting and signage to ensure a harmonious design relationship among the various site uses, and to develop a visual link to Kenmore.

Proposed by the Applicant

- The vegetated buffer along the Lake Washington and Sammamish River shorelines would be preserved, expanded and enhanced to provide a visual buffer between the site and off-site areas to the south and west.

- Standards for wattage and shielding of lights would be included in the Master Plan Design Guidelines to minimize light impacts to off-site properties.

Potential

- Low reflective glass could be utilized in the proposed buildings to minimize glare impacts to motorists.

UNAVOIDABLE SIGNIFICANT ADVERSE IMPACTS

The scale of building heights on the site would increase from existing one- or two-story buildings to buildings up to ten-stories high, and some views of skylines and surrounding hillsides would be obscured.

HISTORIC AND CULTURAL PRESERVATION

AFFECTED ENVIRONMENT

The 1991 Northshore Community Plan Draft EIS identified 54 historic sites in the Northshore Planning Area (Northshore Community Plan Draft EIS page 173). Subsequent to the issuance of the Northshore Community Plan Draft EIS, King County identified additional historic resource sites in the area. As of 1996, King County had inventoried 66 historic resource sites in the Northshore planning area, of which 17 are within the County's jurisdiction (Sundberg, 1996). These sites include houses, barns, educational facilities, parks, commercial buildings, cemeteries and religious institutions. The inventoried sites nearest the project site are the Kenmore Bridge (on 68th Ave NE) near the site's southeast corner, the Charles Thomsen Estate ½ mile to the southeast, and St. Edwards Seminary two miles to the south. The Thomsen Estate is designated as a King County Historic Landmark, and the bridge and seminary are potential County landmarks. The bridge is not being considered for landmark status at this time (Sundberg, 1996). Other County landmarks in the Northshore area include the Hollywood School, and Hollywood Farm, both also designated as State historic landmarks. Please refer to the *Land and Shoreline Use, Historic/Cultural Resource Lands* section of the Northshore Community Plan Draft EIS for additional discussion.

Archaeological sites are those that contain evidence of occupation by past cultures. There are three identified archaeological sites in the Northshore area, including two in the Woodinville area and one in the Bothell area (Sundberg, 1996). No archaeological resources have been identified to date on the Lakepointe site or in the site vicinity. Past development of the site for commercial uses is not known to have unearthed any archaeological resources. However, it is possible that native Americans used the site in the past, perhaps for access to Lake Washington.

IMPACTS OF THE PROPOSED ACTION

The Northshore Community Plan Draft EIS (page 174) indicated that unprotected historic resource sites located in the portions of the planning area that are proposed for urban residential, industrial, or commercial uses (including Kenmore) would likely come under strong development pressure and/or be converted to other uses.

The Proposed Action would not result in the conversion of use or elimination of any identified historic resource sites. However, the Proposed Action would generate increased traffic volumes that would use the Kenmore Bridge (see the TRANSPORTATION section for details on 68th Ave NE traffic). The Proposed Action would not directly affect the Charles Thomsen Estate or the St. Edwards Seminary.

There is a possibility that unknown resources of cultural significance could be unearthed during proposed construction. There would be no excavation of existing soils on the site, except for proposed pile foundations. On the basis of currently available evidence, it is not likely that significant archaeological or cultural resources would be found on the site. Thus, no significant impacts to such resources are expected.

ALTERNATIVES

Alternative 1: Conceptual Master Plan in the Northshore Community Plan

The potential for impacts on historic and cultural resources under Alternative 1 is the same as for the Proposed Action.

Alternative 2: No Action Alternative

Under the No Action Alternative, industrial use would continue on the site. It is possible that unknown resources of historic or cultural significance could be unearthed by future industrial activities on the site.

MITIGATION MEASURES

Proposed by Applicant

- If archaeological resources are discovered during construction, the King County Cultural Resources Division, the State Office of Archaeological and Historic Preservation, and appropriate tribes would be notified, and the significance of the findings would be determined.

UNAVOIDABLE SIGNIFICANT ADVERSE IMPACTS

No unavoidable significant adverse impacts are expected.

TRANSPORTATION

Introduction

Several analyses of transportation conditions in the Kenmore area have been prepared and will be referred to in the transportation discussion as noted in parentheses. These include:

Draft EIS, Executive Proposed Northshore Community Plan Update (1991 NSCP Analysis)

Final EIS, Executive Proposed Northshore Community Plan Update (1992 NSCP Analysis)

Feasibility Analysis: Kenmore Central Business District Traffic and Access Study - Final Report (1993 Kenmore Study)

Lakepointe Transportation Analysis for Northshore Community Plan and Area Zoning Amendment (1994 Zoning Analysis) (See AppendixE.)

Lakepointe Development Transportation Analysis -- Final Report (1997 Lakepointe Report) (See Appendix D.)

The 1991 and 1992 NSCP Analyses and the 1993 Kenmore Study analyzed traffic in the larger Kenmore and Northshore communities. The 1994 Zoning Analysis supplemented the 1991 and 1992 NSCP Analyses and was prepared in order to identify transportation improvements necessary to accommodate mixed-use development on the 45-acre Lakepointe site prior to actualizing the potential zoning from Industrial to Regional Business with P-suffix conditions. This analysis assumed 1,000 residential units, 318,000 sq ft or retail, 150,000 sq ft of office space, a six-screen cinema, and a marina. This development concept is similar to that described as Alternative 1, the NSCP Alternative, in this Draft Supplemental EIS.

The 1997 Lakepointe Report was prepared to analyze the specific impacts of the proposed Master Plan and Commercial Site Development Permit and serves as the basis for analysis in this Draft Supplemental EIS. This analysis assumed 1,200 residential units, 191,000 sq ft of retail, 192,000 sq ft of office space, a 150-room hotel, an eight-screen cinema, a 36,000 sq ft health club, and a 52-slip marina. This Draft Supplemental EIS discusses the impacts of traffic that would be generated if the space designated for hotel use is developed instead with retail/commercial uses. However, if this occurs, additional environmental review may be required.

The discussion in this section of the Draft Supplemental EIS differs in format from the presentation normally used in a transportation engineering analysis, and differs slightly from the order of presentation in other sections of this Draft Supplemental EIS. It begins with a description of existing conditions (Affected Environment), then describes and analyzes the impacts of the Proposed Action. However, rather than being presented in a separate section, the analysis of future traffic conditions without development of the Proposed Action (the No Action Alternative, referred to in traffic engineering reports as "background conditions") is interwoven with the discussion of impacts of the Proposed Action in order to facilitate comparisons.

In some parts of the analysis, the Proposed Action is compared to the NSCP Alternative (Alternative 1) as well. However, comparable data is not available for all parts of the traffic analysis due to the fact that different traffic-signal cycle lengths were used in calculating traffic operations in the 1994 Zoning Analysis and the 1997 Lakepointe Report. Cycle lengths of 180 seconds were used in the 1994 Zoning Analysis; however, WSDOT subsequently determined that 140-second and 150-second cycle lengths more accurately reflect existing conditions in the Lakepointe vicinity, thus these are the cycle lengths used in the 1997 Lakepointe Report. A direct comparison of the two sets of data would result in an "apples compared to oranges" type of analysis. Where comparisons are not made to the NSCP Alternative in the following discussion, the reader is referred to the appendices for additional information.

The major tool used in modeling traffic patterns in both the 1994 Zoning Analysis and the 1997 Lakepointe Report was the TRANSYT-7F program, a standard traffic simulation model used by traffic engineers to analyze traffic flow and signal timing in order to reduce delays, stops, and fuel consumption. It should be noted that SR 522 in the vicinity of the Lakepointe site is considered to have reached "saturated conditions" (i.e., maximum capacity). Under saturated conditions, the TRANSYT 7F Model can assist in evaluating how traffic may operate in the future; however, it cannot predict precise numerical values for travel speeds or delays nor queuing (traffic backups) at intersections.

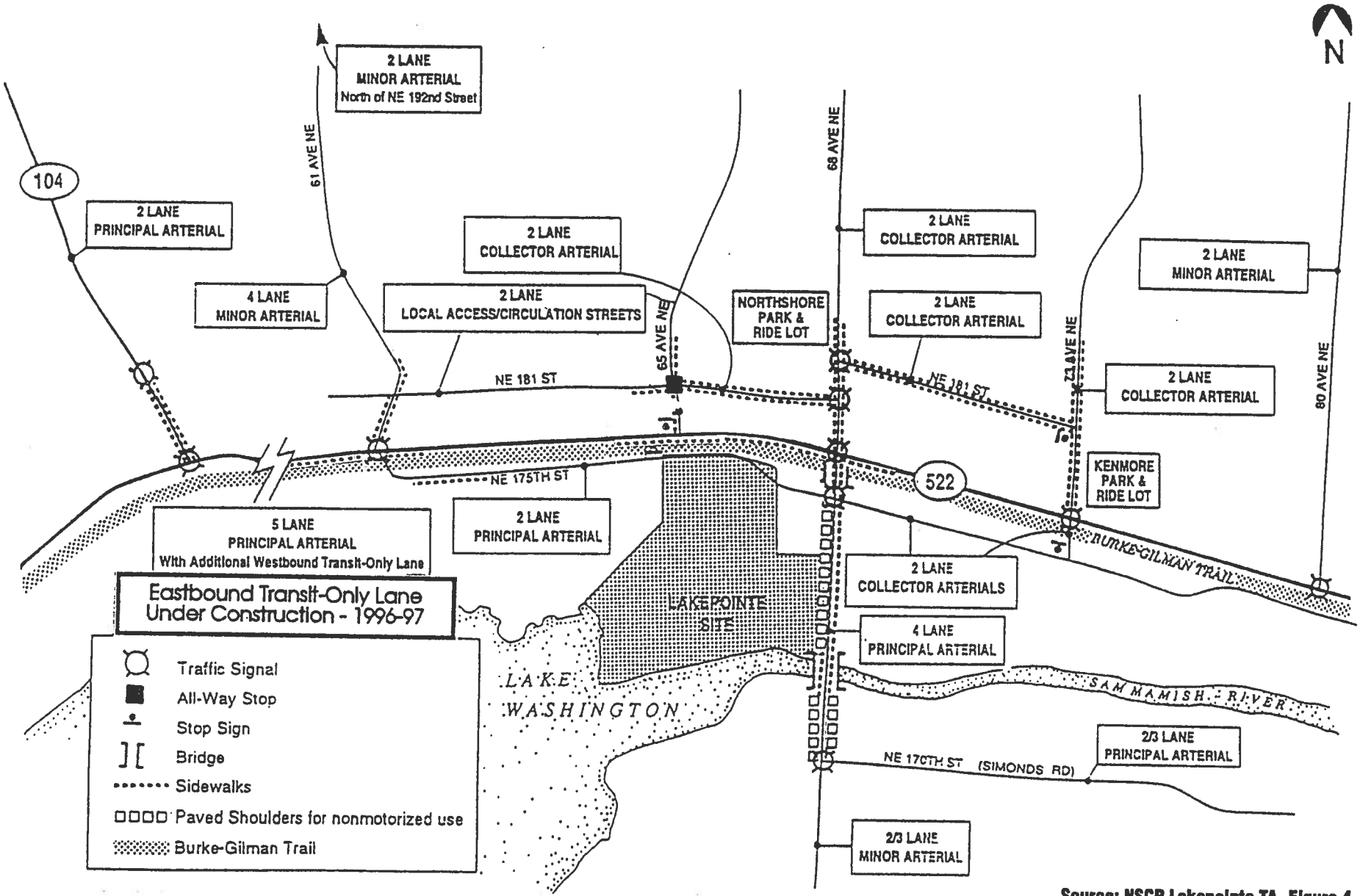
Thus, the key use of the TRANSYT 7F model in the following analysis is to make relative comparisons between existing conditions and future conditions and to evaluate potential changes in traffic operations. The data are not meant to be a precise representation of future traffic conditions.

AFFECTED ENVIRONMENT

The Lakepointe site is located in an area designated by the King County Comprehensive Plan as a Transportation Service Area 1. The purpose of the designation is to assign strategies for providing future transportation services in the area. Major acquisition of right-of-way and disruption of local businesses would be required to increase roadway capacity and improve roadway congestion and delays at the two critical intersections of SR 522 (NE Bothell Way)/SR 104 (NE Ballinger Way) and SR 522/68th Ave NE. Thus, transportation strategies assigned to the Kenmore area focus on allowing roadways to remain congested while investing in safety improvements, High Occupancy Vehicle lanes, improved transit service, and improved pedestrian and bicycle access to transit and other services.

Roadway System

Area roadways are described below and illustrated in Figure 30.



Source: NSCP Lakepointe TA, Figure 4

Source: Transportation, Planning & Engineering, Inc.

Huckell/Weinman Associates, Inc.	**Lakepointe Mixed-Use Master Plan**	**Figure 30** **Road Network Surrounding the Lakepointe Site**

- SR 522, also known as NE Bothell Way, is the principal east-west arterial serving Kenmore. SR 522 includes a westbound transit-only lane from east of 73rd Ave NE, in Kenmore, to NE 145th St and on into Seattle, and a recently-completed eastbound transit-only lane, extending from 41st Ave NE, just west of SR 104 in Lake Forest Park, to east of 73rd Ave NE.

- SR 104, also known as Ballinger Way NE, is a principal arterial connecting SR 522 to I-5, and serving Lake Forest Park and Mountlake Terrace to the west.

- 68th Ave NE is a principal north-south arterial adjacent to the project site.

- 61st Ave NE is a minor arterial to residential areas north of SR 522, northwest of the project site. It also connects to NE 175th St to the south.

- 73rd Ave NE is a north-south collector arterial east of the project site, extending north from NE 175th St.

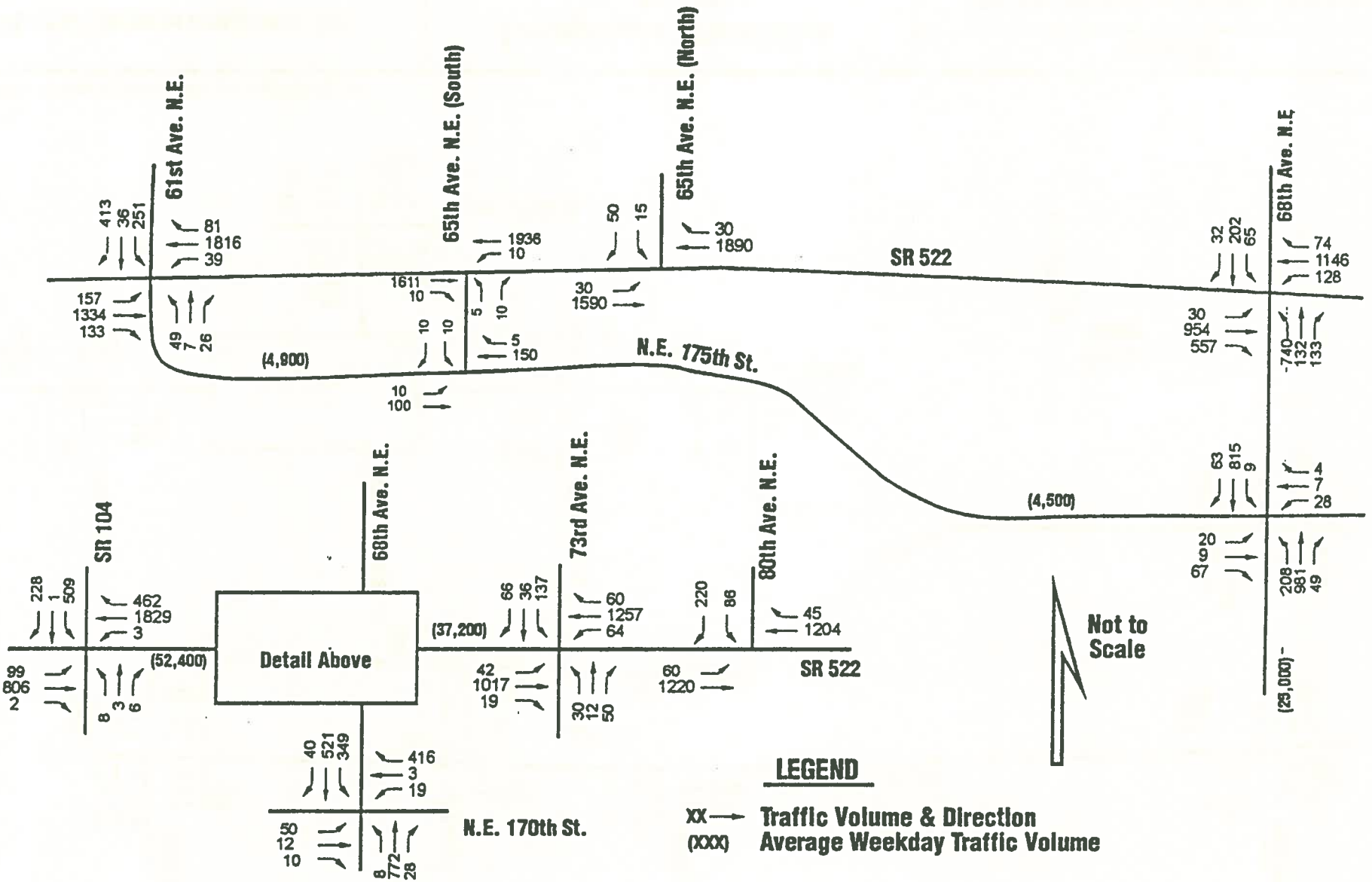
- NE 175th St is an east-west commercial access street that parallels SR 522 south of the Burke-Gilman Trail. It is designated as a principal arterial between 61st Ave NE and 68th Ave NE and as a collector arterial between 68th Ave NE and 73rd Ave NE. Access to the existing uses on the Lakepointe site is via NE 175th Street.

- 65th Ave NE is a two-lane local access street providing access to SR 522 from NE 175th. From SR 522 to NE 181st St, it is classified as a collector arterial.

- NE 181st St is a two lane east-west collector arterial north of SR 522 between 65th Ave NE and 73rd Ave NE.

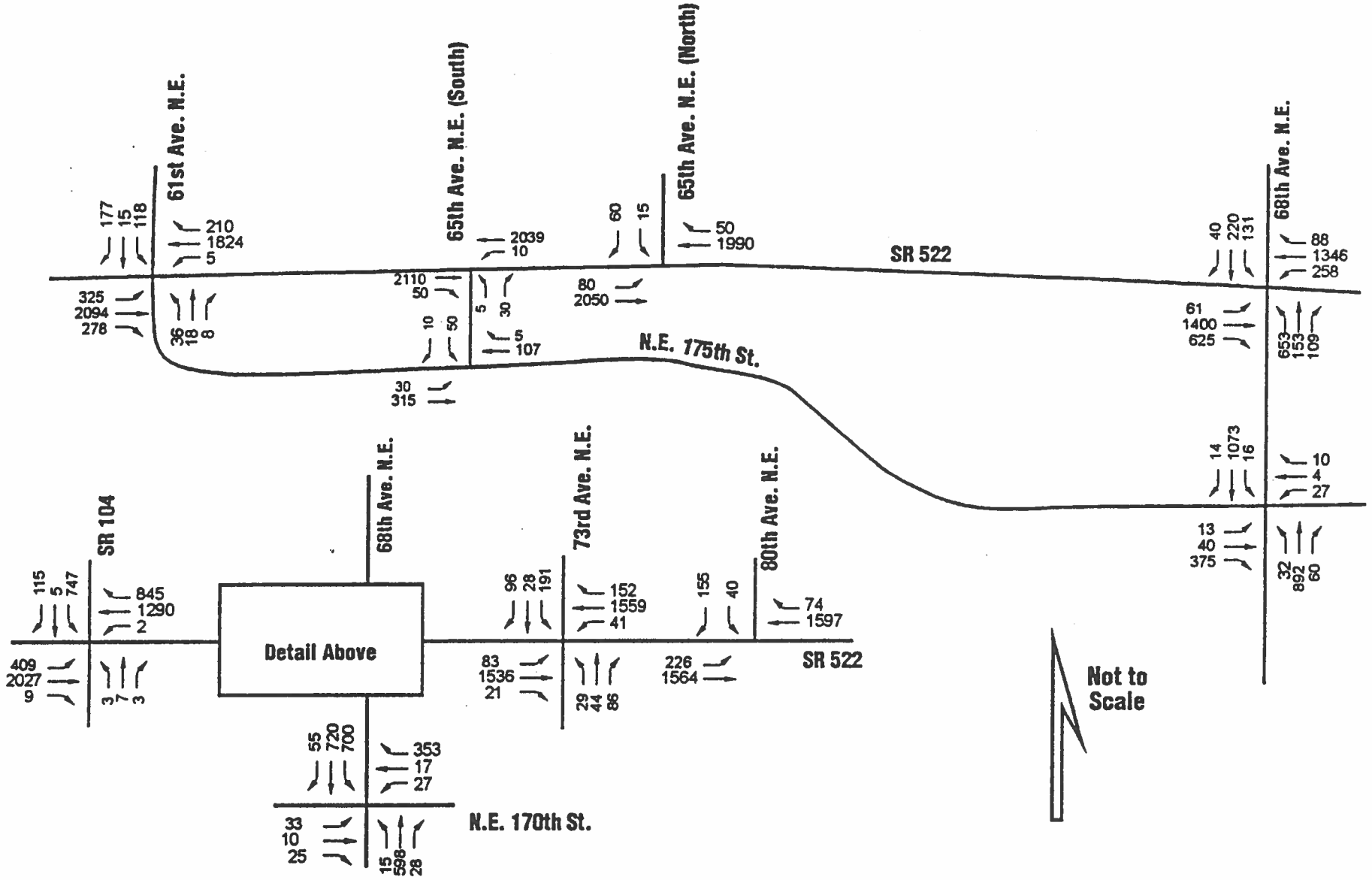
Traffic Volumes

The average daily traffic volumes on the streets surrounding the site and the turning movement traffic volumes during the AM and PM peak hours are shown in Figures 31 and 32. Traffic volume data is taken from the 1994 Zoning Analysis and represents existing conditions in 1993. Data from 1993 are considered to be a valid representation of existing conditions because a review of several studies indicates that traffic volumes remained relatively constant between 1991 and 1994 (1993 Kenmore Study, 1994 Zoning Analysis, 1997 Lakepointe Report, and WSDOT Annual Traffic Reports, 1994 and 1995).



Source: Transportation, Planning & Engineering, Inc.

Huckell/Weinman Associates, Inc.	**Lakepointe Mixed-Use Master Plan**	**Figure 31** **1993 AM Peak-Hour Traffic Volumes**



Source: Transportation, Planning & Engineering, Inc.

Huckell/Weinman Associates, Inc.	**Lakepointe Mixed-Use Master Plan**	**Figure 32** **1993 PM Peak-Hour Traffic Volumes**

Level of Service

Levels of service range from LOS A, which is very good, to LOS F, which reflects conditions which have deteriorated to a "jammed" condition with very long delays. LOS E indicates that an intersection or traffic movement is operating at capacity. For signalized intersections, average vehicle delay is the specific criteria used to determine level of service. For unsignalized intersections, reserve capacity is the criteria used to measure intersection level of service for non-right-of-way traffic movements.

Existing levels of service for site vicinity intersections are presented in Tables 31 and 32. As indicated in these tables, the intersection of SR 522 and 68th Avenue NE operates at LOS F during both the A.M. and P.M. peak hours. The intersection of SR 522/SR 104 operates at LOS F in the PM peak. All other intersections operate at either LOS B, C or D (refer to the LOS discussion in the Impacts of the Proposed Action section for more detail on existing operations of area intersections).

Transit Service

The Lakepointe site and surrounding area are served by daily and expanded peak-hour transit with connections to communities on both sides of Lake Washington (1994 Zoning Analysis). In addition, peak hour express service is provided on 68th Ave NE. In the fall of 1996, there were eight bus routes serving SR 522 at the site frontage, with 58 buses passing the site in the AM peak period and 56 buses in the PM peak period. A transit-only lane is operating in both the eastbound and westbound directions. A King County Park and Ride facility is located north of the site on 68th Avenue NE, and on the north side of SR 522 east of 73rd Avenue NE.

This level of transit service meets the requirements of King County to identify the Kenmore area as a Transportation Service Area 1 with adequate transit service.

Pedestrian and Bicycle Facilities

Non-motorized facilities in the area surrounding the site include the Burke-Gilman Trail, which serves as a major element of the regional bicycle trail system, a bicycle lane on the west side of 68th Ave NE, and sidewalks on both sides of 68th Ave NE, NE 181st St and 73rd Ave NE (1994 Zoning Analysis).

Planned Transportation Improvements

There are several planned transportation improvements in the site vicinity. The 1997 Transportation Needs Report (TNR) is a comprehensive list of recommended improvements to serve County-wide transportation needs through the year 2012. Only those projects listed in the 1997 Capital Improvement Plan (CIP) are funded. All relevant projects listed in the 1997 CIP are shown in Appendix D, including those that have been completed. The 1993 Non-Motorized Transportation Plan (NMTP) constitutes official County policy with regard to non-motorized transportation issues. The policies and projects of the NMTP are integrated into the County's TNR and CIP priority process, allowing non-motorized projects to be evaluated and prioritized as an equal component of the County's overall transportation development program. The planned improvements and/or locations of the planned improvements are

detailed in Appendix D to this document. Some of the primary planned roadway improvements are listed below.

- CIP #100193 and 1997 TNR N-7.30
  68th Ave NE from NE 181st St to NE 185th Street. Widen to three lanes plus bicycle lanes. (Design under way, scheduled for construction in 2001.)

- CIP #100395 and 1997 TNR N-9.10
  Lakepointe Drive from 64th Ave NE/SR 522 to 68th NE. Construct new intersections on SR 522 and on 68th Ave NE for Lakepointe Way NE (implementation would be subject to approval of the Proposed Action).

- CIP #100399 and 1997 TNR N-66
  68th Ave NE/SR 522 from SR 522 to NE 181st. Add northbound lane on 68th Ave NE, matching roadway section to the south, and signal upgrade. (Design programmed to begin in 1999)

- 1997 TNR N-51 (Not CIP-Funded)
  SR 522 from 61st Ave NE to 80th Ave NE Curb, gutter and sidewalk (part of project has been constructed by WSDOT as part of 41st Ave NE to Kenmore Park & Ride Lot Eastbound Transit Lane project).

- 1997 TNR N-64 (Not CIP-Funded)
  SR 522 at 80th Ave NE. Upgrade traffic signal. (Unfunded, high priority, WSDOT)

- 1997 TNR N-66 (Not CIP-Funded)
  73rd Ave NE from SR 522 to NE 175th Street. Reconstruct roadway, upgrade signal (Unfunded, high priority, WSDOT/King County).

- 1997 TNR N-108 (Not CIP-Funded)
  SR 522 Pedestrian Overcrossing west of 68th Ave NE (unfunded, high priority, WSDOT, private, King County) Construction of the project is not dependent upon, or included as an element of, the Lakepointe Master Plan proposal.

The WSDOT is currently in the planning process for the SR 522 Multi-Modal Project, which includes a multi-modal approach to minimizing traffic congestion on the SR 522 corridor by reducing reliance on single-occupancy vehicles.

Air and Marine Transportation

Kenmore Air Harbor

The Lakepointe site is located at the northern tip of Lake Washington, adjacent to the Kenmore Air Harbor. Kenmore Air Harbor, Inc. (Kenmore Air) is a privately owned and operated seaplane base that has operated in its present location in Kenmore since 1946. Kenmore Air is the largest operating seaplane base in the state. The company provides both scheduled and charter commercial seaplane service to destinations in the greater Puget Sound region and southwest Canada. Kenmore Air Harbor also serves as a home to privately owned recreational seaplanes. Kenmore Air currently operates 22

commercial seaplanes and houses approximately 65 privately-owned recreational seaplanes. (Refer to Appendix J for more detail on Kenmore Air operations.)

Kenmore Air provides regularly scheduled commercial flights to the San Juan Islands and Victoria, British Columbia. The frequency of the flights varies seasonally, with summer months having the most travel. Over the 4-month period from May to September 1996, eight departing flights and eight returning flights were scheduled each day for San Juan Island and Victoria passengers combined. During the remaining eight months of the year, six departing and six returning flights are scheduled each day. Charter flights are more numerous in the summer months. Private recreational seaplane use is heaviest in the summer months as well, and typically accounts for approximately 10 percent of total flight operations at Kenmore Air Harbor.

In 1995, Kenmore Air served 50,000 commercial passengers. Passenger demand is growing at an annual rate of 7 to 10 percent, but the number of commercial flight operations is growing at a rate of less than 5 percent. With growing passenger demand, the trend at Kenmore Air has been to use larger planes on scheduled flights, thereby reducing the growth rate in flight operations.

National Transportation Safety Board statistics indicate that seaplanes are very safe, with low overall accident rates and an absence of seaplane-boat accidents nationwide over the past 11 years. During that period, Kenmore Air, which operates in an area that is often congested with boat traffic, experienced no boat-seaplane accidents. The greatest potential for seaplane-boat accidents occurs when small, fast and highly maneuverable boats such as runabouts and jet skis that can change direction suddenly, occupy the general area of seaplane operations.

Marine Traffic

Lake Washington, including the north end at Kenmore, is actively used for boating recreation. Private recreational boats ranging in size from under 10 feet to over 50 feet, use the lake most frequently during the summer months and throughout the year in times of better weather.

Three recreational marina facilities exist at the north end of Lake Washington - Harbor Village Marina, Davidson's Marina and moorage at Kenmore Air Harbor. All three of these marina facilities are located west of the Lakepointe site. A total of 483 moorage slips (wet and dry) is available at these locations. Moorage for recreational boats is also found along the lake's shoreline at private residences.

The Sammamish River is used by small motorized or hand-powered boats for recreational purposes. A public boat launch ramp is located on the south shore of the river immediately west of the Kenmore Bridge. This boat launch is heavily used in the summer months and is used throughout the year in times of better weather. After launching, small boats travel either east toward Lake Sammamish or, more frequently, west to Lake Washington.

IMPACTS OF THE PROPOSED ACTION

Roadway System - Proposed Changes

The Proposed Action includes the construction of a new, elevated, four-lane principal arterial -- Lakepointe Way NE (Figure 33). Lakepointe Way NE would connect 68th Ave NE and SR 522, consistent with the assumption of the 1994 Zoning Analysis. The 1994 Zoning Analysis assumed, however, that Lakepointe Way NE would be built at-grade and that NE 175th St would pass under Lakepointe Way NE and be realigned to connect with Lakepointe Way NE (see Figure 1 of Appendix D.) A local access road would connect the realigned NE 175th St with the signalized intersection with 68th Ave NE. However, the Proposed Action keeps NE 175th St on its current alignment from 61st to 68th Ave NE, and the new elevated roadway, Lakepointe Way NE, would pass over NE 175th St near its intersection with SR 522 just west of 65th Ave NE.

There would be eight access points to the Lakepointe site from the public roadway system (defined here as including Lakepointe Way NE, 68th Ave NE, and NE 175th St) (Figure 31). The eight access points to the Lakepointe site would be as follows:

From Lakepointe Way NE:

- NE Lakepointe Blvd (south of Lakepointe Way NE) would be the major internal roadway in the Master Plan. It would have a traffic signal at its intersection with Lakepointe Way NE and would provide access to nine parking areas (lots and garages).

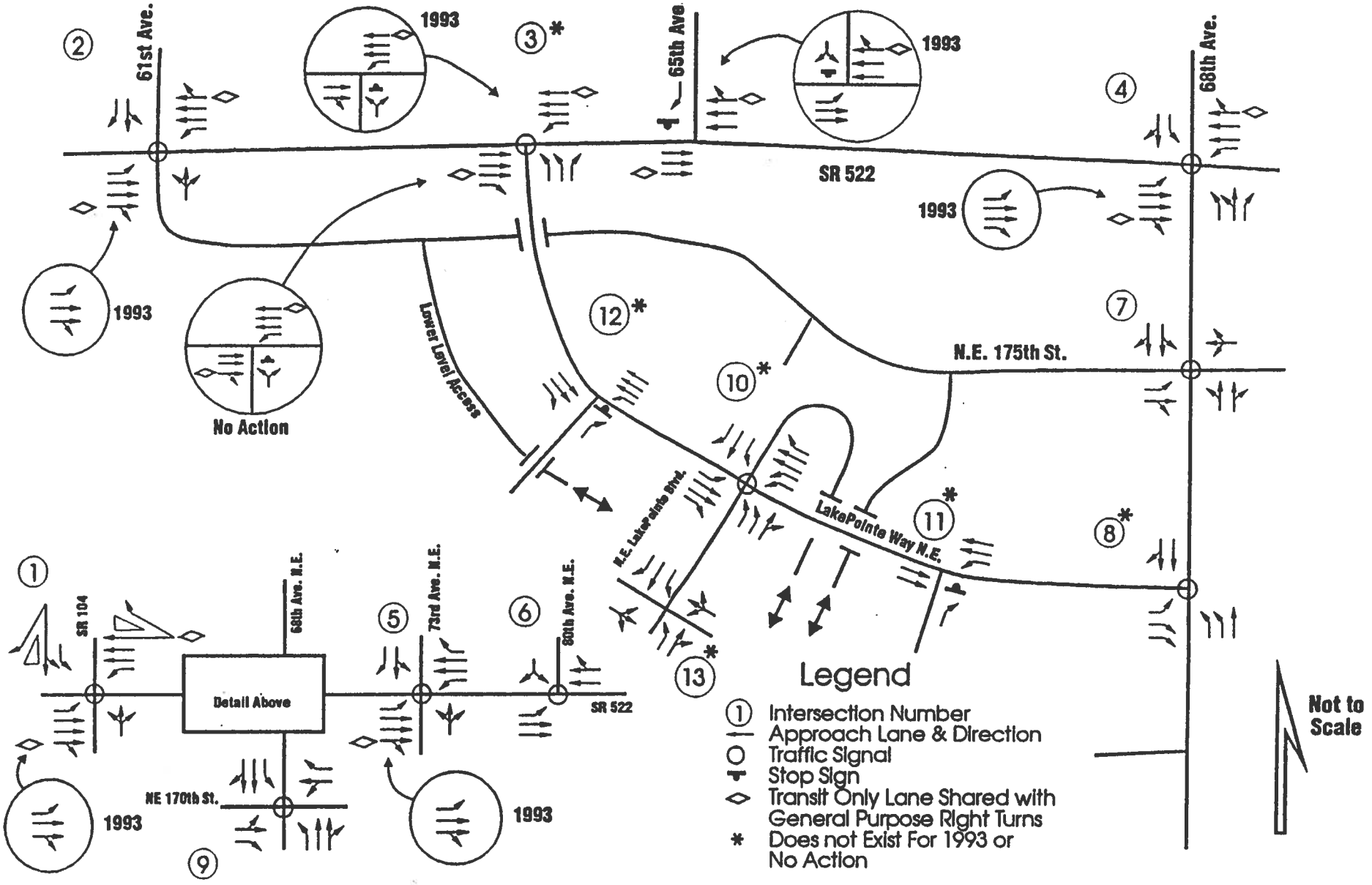
- NE Lakepointe Blvd (north of Lakepointe Way NE) would provide access to the proposed office buildings and surface parking lots north of Lakepointe Way NE (Buildings G-1 and G-2; refer to Figure 3).

- A driveway from Lakepointe Way NE would provide access to the surface parking area associated with Building Area A (refer to Figure 3). This driveway, which would be located on the south side of Lakepointe Way NE approximately 800 feet east of the Lakepointe Way NE/NE Lakepointe Blvd intersection, would be controlled by a stop sign. Turning movements from this driveway to Lakepointe Way NE would be limited to right-turns.

- A second driveway from Lakepointe Way NE would provide access to the parking garage associated with Building Area B (refer to Figure 3). This driveway, which would be located on the south side of Lakepointe Way NE approximately 800 feet west of the Lakepointe Way NE/NE Lakepointe Blvd intersection, would be controlled by a stop sign with turning movements to Lakepointe Way NE limited to right-turns.

From 68th Ave NE

- A driveway on the west side of 68th Ave NE would provide access to the surface parking area associated with Building Area A (refer to Figure 3). Turning movements at this stop sign controlled driveway would be limited to right-in/right-out.



Source: Transportation, Planning & Engineering, Inc.

Huckell/Weinman Associates, Inc.	**Lakepointe Mixed-Use Master Plan**	**Figure 33** **Proposed Lane Configuration**

From NE 175th St

- A driveway on the south side of NE 175th St would provide access to the service area and parking garage associated with Building Area B. This driveway, which would be located under an elevated portion of Lakepointe Way NE, would be controlled by a stop sign.

- A stop-sign controlled driveway on the north side of NE 175th St would provide access to the west side of Building Area G-2.

- Driveways on both the north and south sides of NE 175th St would provide access to the east side of Building Areas G-2 and G-1, respectively.

The new signalized intersection of Lakepointe Way NE with SR 522, just west of 65th Ave NE, would create the need to prohibit left-turn access to and from SR 522 in the vicinity of the intersection. Left-turns would conflict with traffic patterns created by the new traffic signal and the dedicated, signalized, left-turn lane from westbound SR 522 to southbound Lakepointe Way NE. The existing connection between SR 522 and NE 175th St to the south at 65th Ave NE would be removed; the connection at 65th Ave NE between SR 522 and NE 181st St to the north would remain; however, left turns to and from SR 522 would be prohibited. A stop sign would control the intersection of 65th Ave NE with SR 522, and vehicles westbound on SR 522 would be allowed right turns to and from 65th Ave NE.

Left turn access into and out of several private businesses on the north side of SR 522 would also need to be prohibited. The approximate limits of the restriction on the north side of SR 522 would extend from 67th Ave NE on the east to a point 250 feet west of 65th Ave NE. This would affect U.S. Bank, the BP gasoline station, the Nu Lite Restaurant, a commercial building and the Texaco gasoline station. Left turns to and from 67th Ave NE may be allowed to remain, depending upon specific WSDOT requirements.

Trip Generation

The Proposed Action would generate 13,692 daily trips, including 641 AM peak-hour trips and 1,463 PM peak-hour trips (Table 23). These estimates differ slightly from those for the NSCP Alternative, analyzed in the 1994 Zoning Analysis. Under the Proposed Action, daily trips would be less; AM peak-hour trips would be slightly more; and PM peak-hour trips would be roughly the same.

A combination of factors results in different estimates for the Proposed Action compared to the NSCP Alternative:

- Land uses have been defined more precisely in the proposed Master Plan (i.e., residential uses have been broken down into senior housing, mid-rise apartments, and a hotel), allowing for a more precise calculation of trips generated.

- The square footage of proposed land uses has been defined more precisely.

- The "capture rate" has been included in the calculations. Based on the mix of residential, retail, and commercial land uses on the site, it is assumed that residents will make 15 percent fewer trips off-site (i.e., more trips will be "captured" on-site).

Trip-generation rates are based on Institute of Transportation Engineers (ITE) standards. The ITE Trip Generation Report provides average trip-generation rates for different types of land uses based on studies nationwide, and is considered to be the standard in the profession. It should be noted that if a suitable hotel company does not lease the 161,000 sq ft of building space designated for hotel use, or if retail/commercial uses are warranted by market conditions, trip-generation rates would be greater than those noted above. Such a scenario is analyzed in Table 27 under "Development Scenario Without Hotel."

TABLE 27

2005 TRIP GENERATION COMPARISON

	NO ACTION	*PROPOSED ACTION*		*NSCP ALTERNATIVE*
		PROPOSED DEVELOPMENT	*DEVELOPMENT SCENARIO WITHOUT HOTEL*	
Daily Trips	1,116	13,692	14,450	14,212
AM Peak	93	641	684	603
PM Peak	93	1,463	1,548	1,471

Trip-generation data is used in calculating volumes, queues, operations (performance), and levels of service at specific intersections, as described in the following sections.

For a detailed discussion of trip-generation estimates for the Proposed Action, please refer to the 1997 Lakepointe Report (Appendix D).

Trip Distribution

Trip distribution analysis is used to determine points of origin or destination for project-generated trips to and from the site and the routes of travel that will be used. The distribution is based on area-wide models of existing travel patterns, and the information is used to analyze impacts to roadways and intersections. Refer to Appendix D for additional detail on trip distribution.

Residential trips would be distributed 50 percent to the west on SR 522, 15 percent to the south on 68th Ave NE, 25 percent to the east on SR 522 and 10 percent to the north of SR 522. Commercial/office trips would be distributed 30 percent from the west, 30 percent from the south, 25 percent from the east and 15 percent from the north of SR 522. Retail trips would be distributed 15 percent from the west, 35 percent from the south, 20 percent from the east and 30 percent from the north of SR 522. Refer to Appendix D for additional detail on trip distribution.

Traffic Volumes

In order to analyze the impacts of the Proposed Action, AM and PM peak-hour traffic volumes were estimated for the year 2005, both with and without the Proposed Action. The year 2005 is the year in which it is expected that the Proposed Action will be completed (fully built-out).

Figures are provided which show background traffic volumes and distribution without the Proposed Action (No Action Alternative) (Figures 34 and 35), volumes and distribution of traffic generated by the Proposed Action (Figures 36 and 37), and volumes and distribution when the Proposed Action is added to future background traffic (Figures 38 and 39). (Background volumes are those that would exist without development of the Proposed Action in the future, i.e., the No Action Alternative.) Traffic volumes and distribution for Alternative 1 (the NSCP Alternative) are provided in Appendix D, and traffic volumes and distribution on internal roadways on the Lakepointe site are provided in Appendix D. The data provided here is used in the following sections to analyze traffic queues, traffic operations (performance), and levels of service.

Traffic Queues

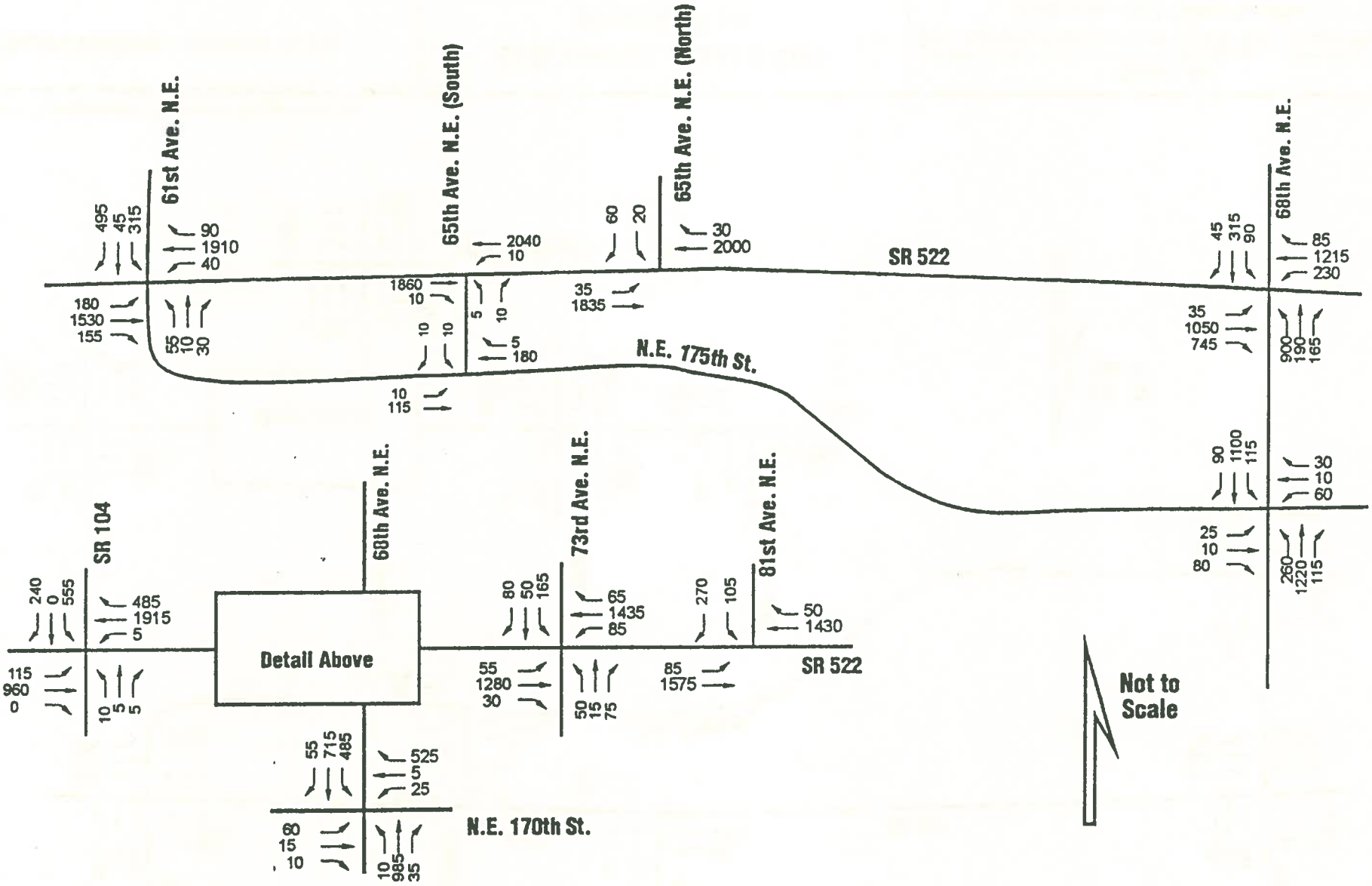
"Traffic queue" is the term used to describe a line of vehicles backed up at an intersection during a red signal. Existing queue capacity at six signalized intersections in the Lakepointe vicinity is described in Table 28, and, using data discussed in the previous sections on trip generation, distribution, and traffic volumes, the number of vehicles expected to queue during AM and PM peak hours at each of the intersections was calculated for the year 2005 with development of the Proposed Action. Meaningful comparisons of queue capacity cannot be made between the Proposed Action and the NSCP Alternative because different cycle lengths were used. Please refer to Appendix D for information on the NSCP Alternative.

The numbers in the column labeled "Existing Movement Queue Capacity" in Table 28 refer to the number of vehicles that can be accommodated (at the rate of 25 ft per vehicle) in existing storage lanes while waiting to make a particular movement at a red signal. The queue capacity for a left-turn movement would be the length of the left-turn pocket without extending into the adjacent through-lane.

A summary of expected queuing in the year 2005 under the Proposed Action is provided below.

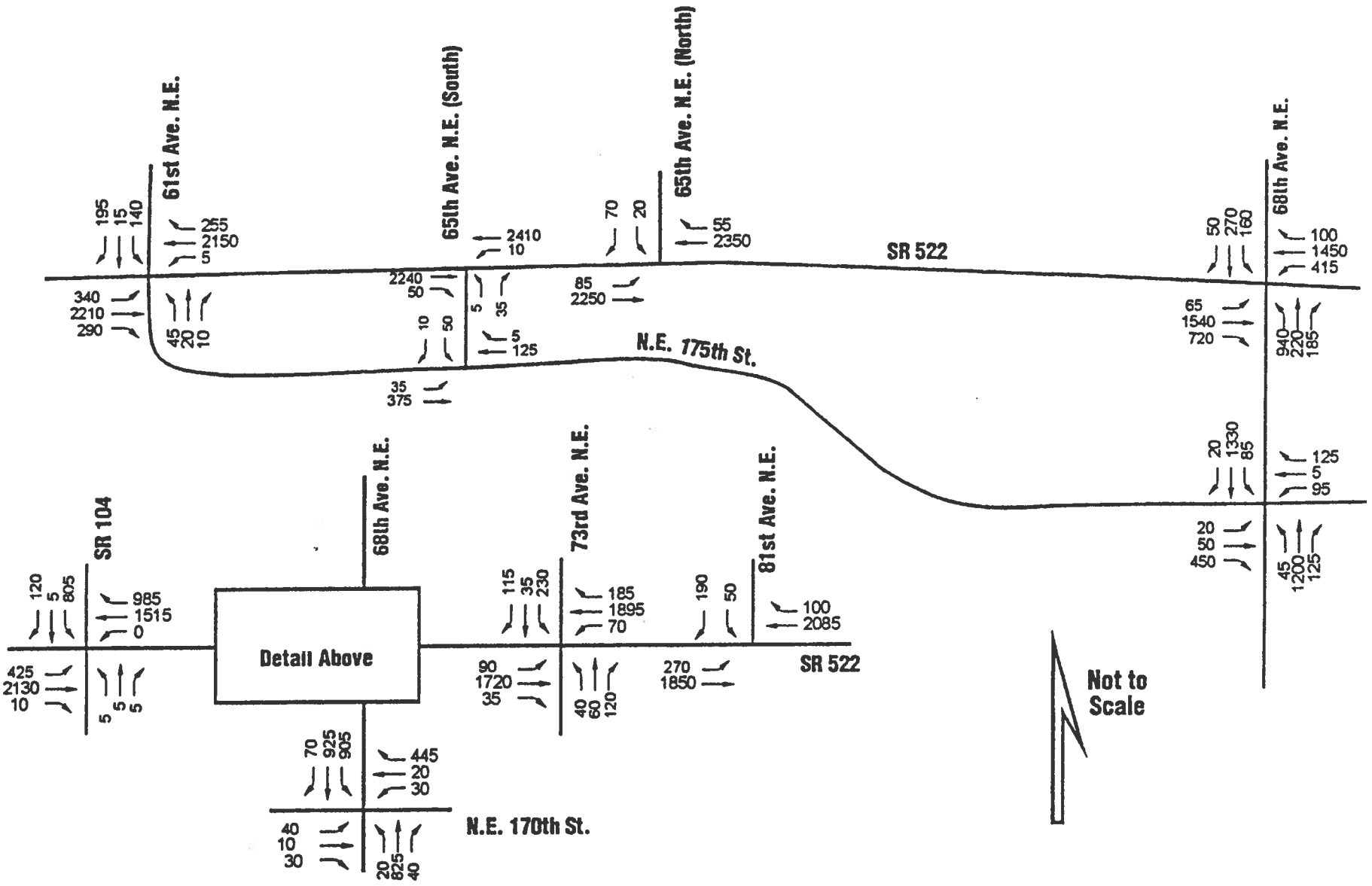
SR 522/68th Ave NE

Adequate queue capacity is available during the AM peak hour for traffic eastbound through the SR 522/68th Ave NE intersection, in the year 2005 under the Proposed Action. During the PM peak hour, eastbound traffic would exceed the available queue capacity by approximately 21 vehicles. This would result in eastbound traffic queuing up to and beyond the proposed signalized intersection of SR 522/Lakepointe Way NE.



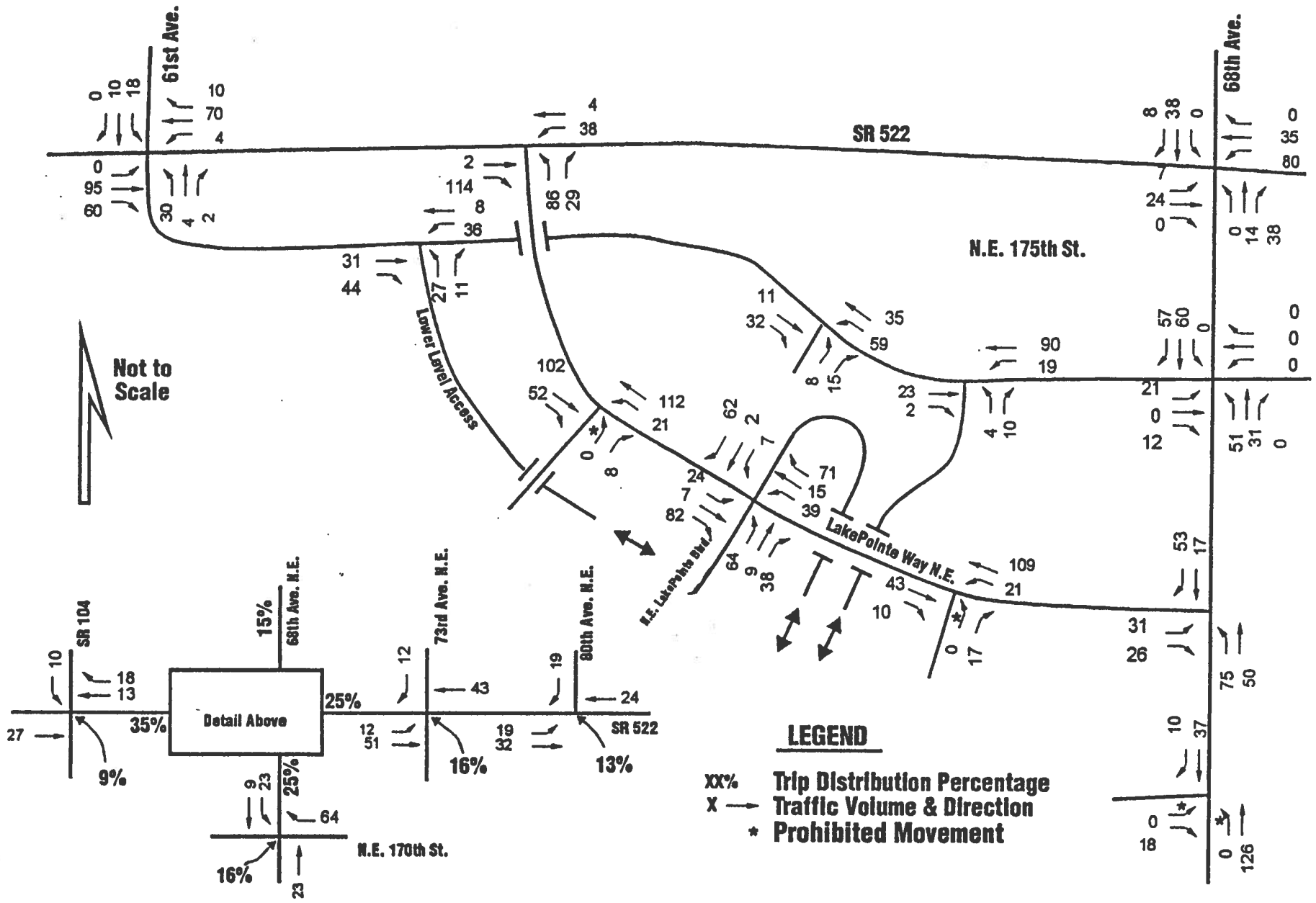
Source: Transportation, Planning & Engineering, Inc.

Huckell/Weinman Associates, Inc.	**Lakepointe Mixed-Use Master Plan**	**Figure 34** **No Action Alternative - 2005 AM Peak-Hour Volumes and Distribution**



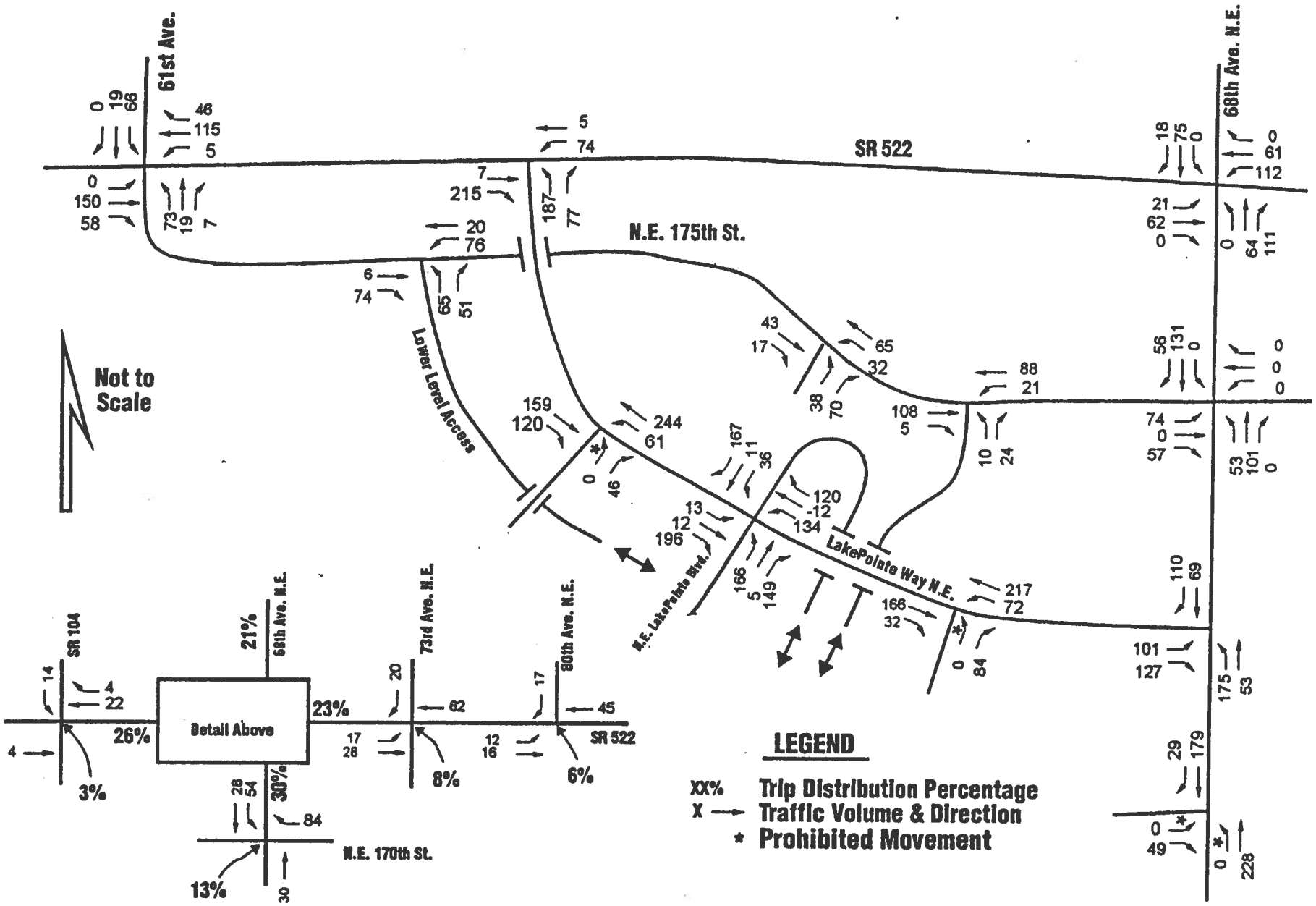
Source: Transportation, Planning & Engineering, Inc.

Huckell/Weinman Associates, Inc.	**Lakepointe Mixed-Use Master Plan**	**Figure 35** **No Action Alternative - 2005 PM Peak-Hour Volumes and Distribution**



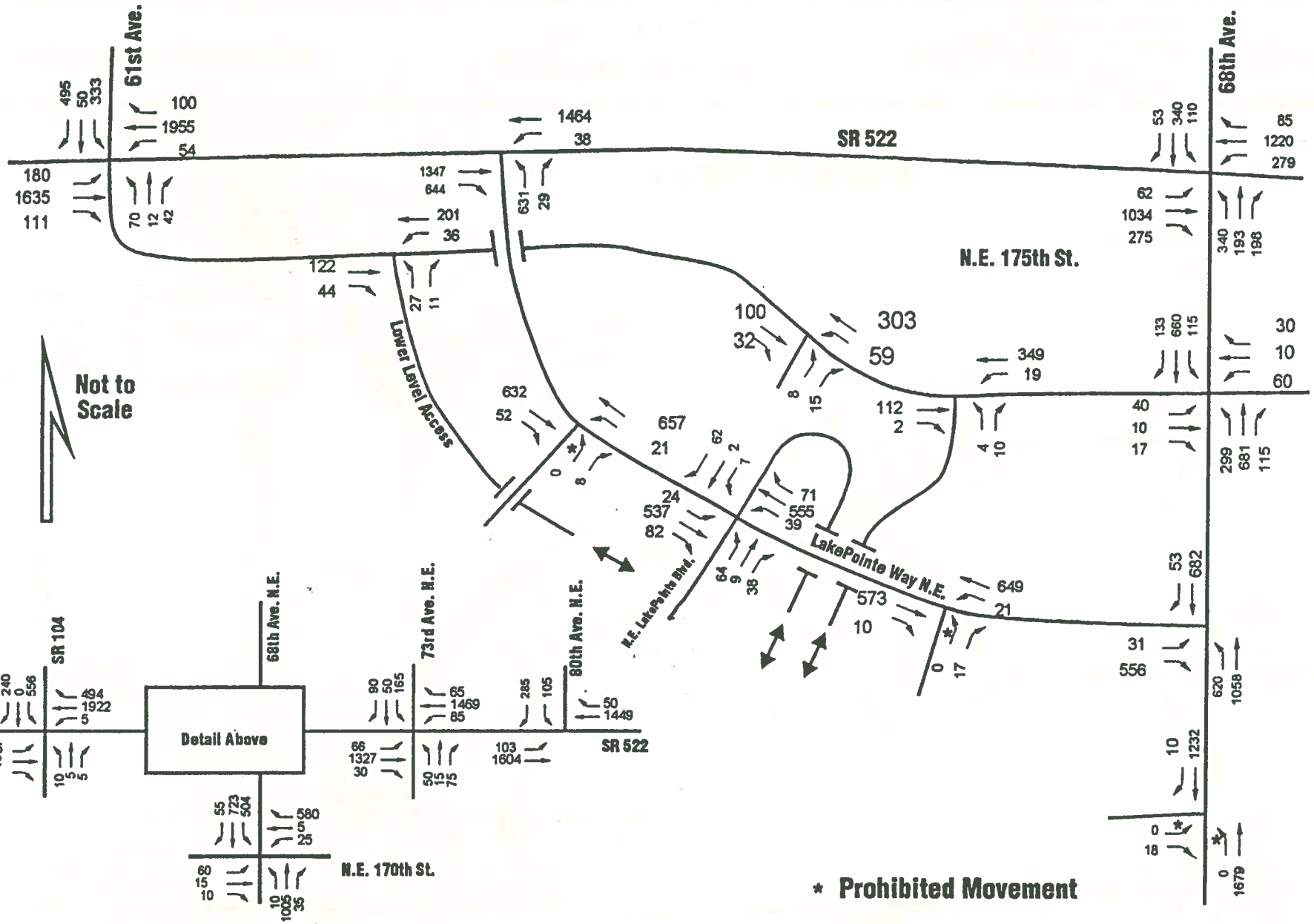
Source: Transportation, Planning & Engineering, Inc.

Huckell/Weinman Associates, Inc.	**Lakepointe Mixed-Use Master Plan**	**Figure 36** **Proposed Action - 2005 AM Peak-Hour Volumes and Distribution**



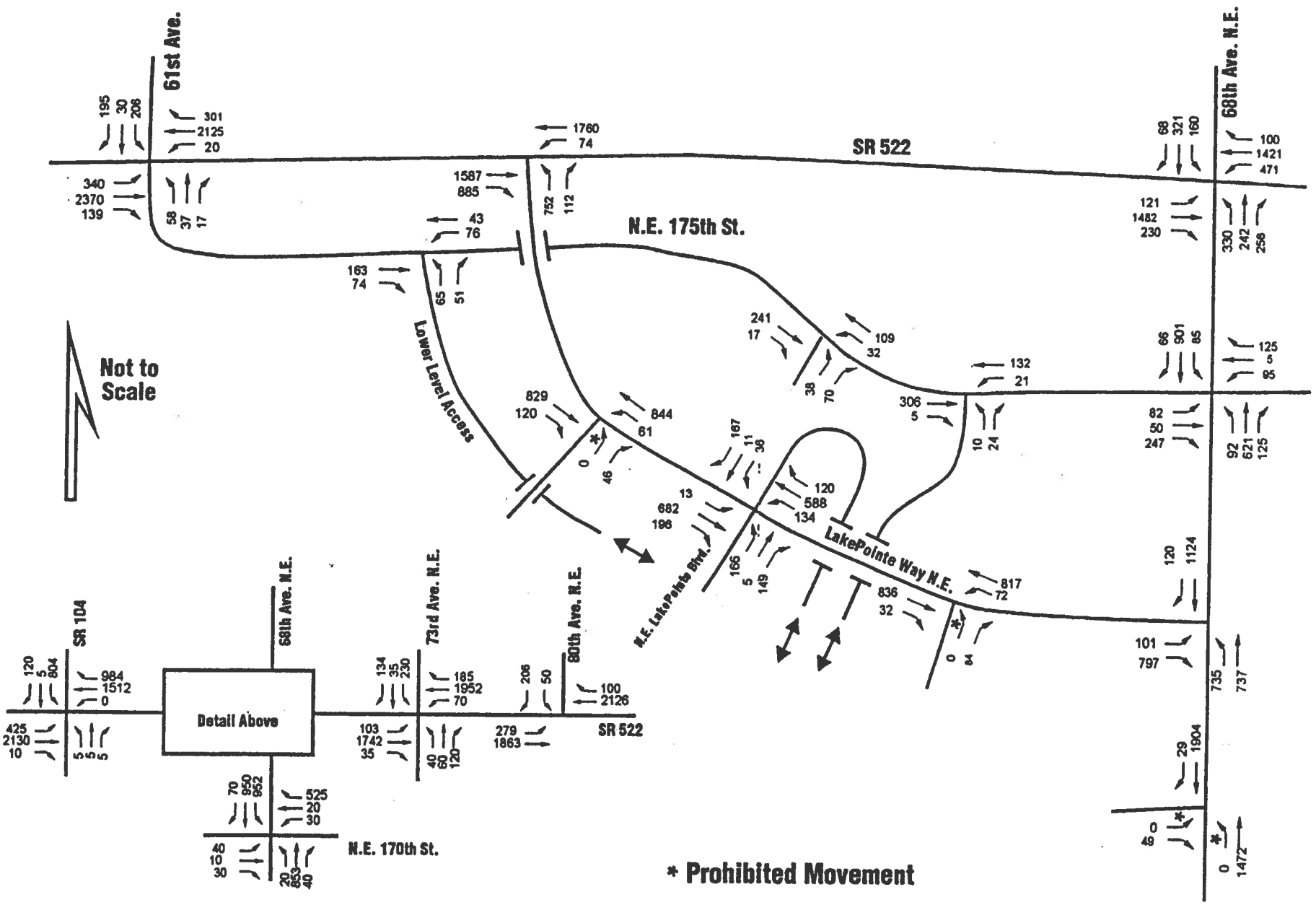
Source: Transportation, Planning & Engineering, Inc.

Huckell/Weinman Associates, Inc.	**Lakepointe Mixed-Use Master Plan**	**Figure 37** **Proposed Action - 2005 PM Peak-Hour Volumes and Distribution**



Source: Transportation, Planning & Engineering, Inc.

Huckell/Weinman Associates, Inc.	**Lakepointe Mixed-Use Master Plan**	**Figure 38** **Proposed Action Added to Background 2005 AM Peak-Hour**



Source: Transportation, Planning & Engineering, Inc.

Huckell/Weinman Associates, Inc.	**Lakepointe Mixed-Use Master Plan**	**Figure 39** **Proposed Action Added to Background 2005 PM Peak-Hour**

TABLE 28

PROPOSED ACTION - 2005
QUEUING AT INTERSECTIONS

INTERSECTION	*MOVEMENT*	*PROPOSED ACTION (VEH.)*		*PROPOSED MOVEMENT QUEUE CAPACITY (VEH.)*
		AM PEAK HOUR	*PM PEAK HOUR*	
SR 522/ 61st Ave. N.E.	EBLT	7	13	16
	EBTH	48	68	257
	WBLT	4	1	5
	WBTH	97	58	128
SR 522/ Lakepointe Way N.E.	EBTH	39	36	128
	WBLT	2	3	6
	WBTH	21	34	74
	NBLT	11	25	60
	NBRT	0	2	30
SR 522/ 68th Ave. N.E.	EBLT	2	4	18
	EBTH	72	95	74
	WBLT	10	35	47
	WBTH	41	34	95
	NBLT/TH	19	43	16
	NBRT	5	2	8
N.E. 175th St./ 68th Ave. N.E.	NBLT/TH/RT	3	26	19
	SBLT/TH/RT	3	11	16
Lakepointe Way N.E./ 68th Ave. N.E.	NBLT	18	20	70
	NBTH	27	18	60
	SBTH/RT	14	34	19
	EBLT	1	4	11
	EBRT	2	24	45
Lakepointe Way N.E./ N.E. Lakepointe Blvd.	EBLT	1	0	9
	EBTH	17	17	60
	EBRT	1	2	10
	WBLT	1	4	15
	WBTH	2	19	45
	WBRT	0	4	6
	NBLT	2	6	13
	NBTH/RT	2	5	6

Note: Shaded cells indicate a queue which exceeds capacity.

The northbound left and through lanes on 68th Ave NE have a combined capacity of approximately 16 vehicles. The model projects that this capacity would be exceeded during the AM and PM peak hours, as it is under existing conditions. This would continue to result in backups northbound on 68th Ave NE at NE 175th St during AM and PM peak hours.

SR 522/Lakepointe Way NE

Queues from traffic eastbound through the SR 522/68th Ave NE intersection would extend into the eastbound lanes west of the SR 522/Lakepointe Way NE intersection during both AM and PM peak hours in the year 2005 under the Proposed Action (see the discussion in the previous section). However, adequate queue capacity would be available at this intersection to handle the overflow.

Queuing at the SR 522/Lakepointe Way NE intersection would be reduced by a proposed right-turn lane from eastbound SR 522 to southbound Lakepointe Way NE. This right-turn lane would be constructed south of the eastbound transit lane and would be free-flowing without traffic signal control. In order to access this right-turn lane, eastbound right-turning vehicles would need to merge into the transit-only lane and share the transit lane with buses from approximately 61st Ave NE to Lakepointe Way NE. Merging would be necessary to avoid being blocked by the queue overflow from SR 522/68th Ave NE in the through lanes and buses in the transit-only lane.

68th Ave NE/Lakepointe Way NE

Adequate queue capacity is available during both the AM and PM peak hours for traffic northbound through the 68th Ave NE /Lakepointe Way NE intersection, in the year 2005 under the Proposed Action. Northbound traffic queues would not backup to the intersection of 68th Ave NE/NE 170th St, and no traffic impact to this intersection would occur.

During the PM peak hour, southbound traffic would exceed the available queue capacity by approximately 15 vehicles. This would result in southbound traffic queuing beyond the intersection of NE 175th St/68th Ave NE (this would be due to the short distance between these two intersections). This southbound queue may also extend back to SR 522, which could increase queues in SR 522 westbound and eastbound movements as drivers wait to turn south onto 68th Ave NE.

NE 175th St/68th Ave NE

Adequate queue capacity is available during both the AM and PM peak hours for traffic southbound through the NE 175th St/68th Ave NE intersection, in the year 2005 under the Proposed Action. Adequate queue capacity is also available during the AM peak hour for traffic northbound through this intersection, although northbound traffic back up from the intersection of SR 522/68th Ave NE could slow movement through this intersection. Signal coordination between the intersections of NE 175th St/68th Ave NE and SR 522/68th Ave NE could alleviate this queue impact.

During the PM peak hour, northbound traffic would exceed the available queue capacity by approximately 7 vehicles; additionally, northbound traffic backup from the intersection of SR 522/68th Ave NE could further slow movement through this intersection. Adequate queue capacity is available during the PM peak hour for southbound traffic, however, southbound traffic back up from the 68th Ave NE/Lakepointe Way NE intersection could slow movement through this intersection.

SR 522/61st Ave NE

Adequate queue capacity would be available during both the AM and PM peak hours for all intersection movements.

Lakepointe Way NE/NE Lakepointe Blvd

Adequate queue capacity would be available during both the AM and PM peak hours for all intersection movements.

Summary

Under the Proposed Action, the following intersection movements would have traffic volumes exceeding queue capacity.

AM Peak Hour

- SR 522/68th Ave: 68th Ave NE northbound left-turn and through movements.

PM Peak Hour

- SR 522/68th Ave NE: SR 522 eastbound through movement; and , 68th Ave NE northbound left-turn and through movements.
- NE 175th St/68th Ave NE: 68th Ave NE northbound left-turn, right-turn and through movements.
- Lakepointe Way NE/68th Ave NE: 68th Ave NE southbound through and right-turn movements.

Traffic Operations/Performance

Traffic operations were analyzed for the year 2005 with development of the Proposed Action. Traffic operations analyzed included total vehicle miles traveled, total vehicle hours traveled, total hours of delay, percent stops (percent of vehicles which stop at the intersection red light), and average speed. System-wide operations were analyzed; in addition, travel along three corridors was analyzed. These corridors were:

- SR 522 between SR 104 and 80th Ave NE
- 68th Ave NE/SR 522 between SR 104 and NE 170th St, using existing roadways
- 68th Ave NE/Lakepointe Way NE/SR 522 between SR 104 and NE 170th St, using the new roadway (Lakepointe Way NE).

An analysis was also done of existing (1993) conditions and background conditions in 2005 without development of the Proposed Action. Meaningful comparisons of traffic operations cannot be made between the Proposed Action and the NSCP Alternative because different cycle lengths were used. In

addition, a complete study of the transportation impacts associated with the NSCP Alternative was conducted in 1994. Please refer to Appendix D for information on the NSCP Alternative. This 1994 study was based on assumptions regarding traffic signal cycle lengths that have subsequently been modified by King County and Washington State Department of Transportation. Therefore, the assumptions in the 1994 study are different than those employed in the current transportation analysis, and consequently produce different traffic operations projections. Nevertheless, the trip generation and trip assignment assumptions for the Proposed Action and NSCP Alternative are essentially the same: thus, it is anticipated that transportation impacts of the NSCP Alternative would be similar. Please refer to Appendix D for further information.

Traffic operations for AM and PM peak hours for the three scenarios are compared in Tables 29 and 30. In all scenarios, the system deteriorates from 1993 to 2005. However, a comparison of the data shows that when Lakepointe Way NE is added to the roadway network, and even when Lakepointe project traffic is added, vehicles would move along travel corridors and through the entire system more quickly in 2005 with development of the Proposed Action than they would in 2005 without the Proposed Action.

The percent change in performance measures with the Proposed Action compared to 2005 without the Proposed Action indicates that with the Proposed Action, total vehicle miles traveled would be approximately the same in both AM and PM peak hours. Percent stops would be greater because there would be three new traffic signals. However, total vehicle hours traveled and total hours of delay would be less, and system speed would be greater, meaning vehicles would travel through the system faster on average with development of the Proposed Action. These system improvements would result from the added capacity provided by the new Lakepointe Way NE arterial connection. The analysis reflects the significant diversion of trips away from the SR 522/68th Ave NE intersection to the Lakepointe Way NE corridor that would occur.

Level of Service

Levels of service (LOS) were analyzed for the year 2005 with development of the Proposed Action. An analysis was also done of existing (1993) conditions and background conditions in 2005 without development of the Proposed Action. Meaningful comparisons of level of service cannot be made between the Proposed Action and the NSCP Alternative because different cycle lengths were used, and you end up with an "apples to oranges" comparison. Please refer to Appendix D for information on the NSCP Alternative

LOS, delay, and volume-to-capacity ratios for AM and PM peak hours for the three scenarios are compared in Tables 31 and 32. (NOTE: In Tables 31 and 32, precise figures are not given for delays of greater than 120 seconds. The reason for this is that as roadways approach LOS F, data from the TRANSYT 7F Model becomes increasingly inaccurate. After 120 seconds, delay, based on the model, becomes exponential, and figures reported would not accurately represent future conditions.)

The intersections of SR 522/SR 104 and SR 522/68th Ave NE are projected to operate at LOS F in the AM and PM peak hours in 2005, both with and without the Proposed Action. The AM delay at SR 522/68th Ave NE would be less with the Proposed Action than without because more trips are removed from the intersection and directed to Lakepointe Way NE than are added by the proposal. The AM delay at SR 522/SR 104 would be greater with the Proposed Action than without. The PM delay is more than 120 seconds at both intersections, both with and without the Proposed Action. In addition, these intersections are fully built with no apparent additional capacity available without significant right-of-way purchases and/or grade-separated roadways (i.e., an overpass or underpass) with ramps.

TABLE 29

PROPOSED ACTION - 2005 AM PEAK-HOUR ROUTE
PERFORMANCE SUMMARY COOMPARED TO EXISTING CONDITIONS

ROUTE	*PERFORMANCE MEASURE*	*1993*	*NO ACTION (2005 W/O PROJECT)*		*PROPOSED ACTION (2005 W/PROJECT)*	
			VALUE	*PERCENT OF 1993*	*VALUE*	*PERCENT OF NO ACTION*
SYSTEM-WIDE	Total Travel (Veh.-Mi.)	9,356	10,904	117%	10,928	100%
	Total Travel Time (Veh.-Hr.)	481	1,169	243%	993	85%
	Total Delay (Veh.-Hr.)	200	841	481%	661	79%
	Percent Stops	51	56	+5%	61	+5%
	System Speed (Mi./Hr.)	19.5	9.3	48%	11.0	118%
MAJOR CORRIDORS						
SR 522 Only (Between SR 104 and 80th Ave. N.E.)	Total Travel (Veh.-Mi.)	7,049	7,956	113%	7,683	97%
	Total Travel Time (Veh.-Hr.)	281	492	175%	450	91%
	Total Delay (Veh.-Hr.)	78	263	337%	229	87%
	Percent Stops	51	56	+5%	71	+15%
	System Speed (Mi./Hr.)	25.1	16.2	65%	17.1	106%
68th Ave. N.E./ SR 522 (Between SR 104 and N.E. 170th St. via SR 522 & 68th)	Total Travel (Veh.-Mi.)	5,224	5,953	114%	5,216	88%
	Total Travel Time (Veh.-Hr.)	235	487	207%	396	81%
	Total Delay (Veh.-Hr.)	28	304	1086%	238	78%
	Percent Stops	39	46	+7%	64	+18%
	System Speed (Mi./Hr.)	22.2	12.2	55%	13.2	108%
68th Ave. N.E./ Lakepointe Wy./ SR 522 (Between SR 104 and N.E. 170th St. Via SR 522, Lakepointe Way & 68th)	Total Travel (Veh.-Mi.)	--	--	--	4,523	--
	Total Travel Time (Veh.-Hr.)	--	--	--	359	--
	Total Delay (Veh.-Hr.)	--	--	--	222	--
	Percent Stops	--	--	--	67	--
	System Speed (Mi./Hr.)	--	--	--	12.6	--

TABLE 30

PROPOSED ACTION - 2005 PM PEAK-HOUR ROUTE PERFORMANCE SUMMARY COMPARED TO EXISTING CONDITIONS

ROUTE	PERFORMANCE MEASURE	1993	NO ACTION (2005 W/O PROJECT)		PROPOSED ACTION (2005 W/PROJECT)	
			VALUE	PERCENT OF 1993	VALUE	PERCENT OF NO ACTION
SYSTEM-WIDE	Total Travel (Veh.-Mi.)	11,924	13,967	117%	14,035	100%
	Total Travel Time (Veh.-Hr.)	787	2,947	374%	2,534	86%
	Total Delay (Veh.-Hr.)	437	2,527	578%	2,109	83%
	Percent Stops	54	55	+1%	60	+5%
	System Speed (Mi./Hr.)	15.1	4.7	31%	5.5	117%
MAJOR CORRIDORS						
SR 522 Only (Between SR 104 and 80th Ave.N.E.)	Total Travel (Veh.-Mi.)	8,543	9,779	114%	9,525	97%
	Total Travel Time (Veh.-Hr.)	465	1,301	280%	1,112	85%
	Total Delay (Veh-Hr.)	220	1,020	464%	838	82%
	Percent Stops	54	54	--	63	+9%
	System Speed (Mi./Hr.)	18.4	7.5	41%	8.6	115%
68th Ave. N.E./SR 522 (Between SR 104 and N.E. 170th St. Via SR 522 & 68TH)	Total Travel (Veh.-Mi.)	5,920	6,787	115%	6,023	89%
	Total Travel Time (Veh.-Hr.)	330	927	36%	628	68%
	Total Delay (Veh-Hr.)	156	720	462%	477	66%
	Percent Stops	47	44	-3%	63	+19%
	System Speed (Mi./Hr.)	18.0	7.3	41%	9.6	132%
68th Ave. N.E./ Lakepointe Wy SR 522 (Between SR 104 and N.E. 70th St.. Via SR 522, Lakepointe Way & 68th)	Total Travel (Veh.-Mi.)	--	--	--	5,354	--
	Total Travel Time (Veh.-Hr.)	--	--	--	540	--
	Total Delay (Veh.-Hr.)	--	--	--	378	--
	Percent Stops	--	--	--	69	--
	System Speed (Mi./Hr.)	--	--	--	9.9	--

TABLE 31

AM PEAK-HOUR INTERSECTION LEVEL OF SERVICE

INTERSECTION	*1993*			*NO ACTION (2005 W/O PROJECT)*			*PROPOSED ACTION (2005 W/PROJECT)*		
	LOS	*DELAY*[1]	*V/C*[2]	*LOS*	*DELAY*[1]	*V/C*[2]	*LOS*	*DELAY*[1]	*V/C*[2]
SR 522/SR 104	D	29.8	0.92	F	60.5	1.03	F	62.3	1.03
SR 522/61st Ave. N.E.	D	28.2	1.04	F	90.9	1.05	F[3]	115.3	1.11
SR 522/Lakepointe Way N.E.	--	--	--	--	--	--	C	17.6	0.70
SR 522/68th Ave. N.E.	F	63.8	1.03	F	>120	>1.20	F	84.8	1.02
SR 522/73rd Ave. N.E.	C	19.7	0.68	C	17.1	0.81	D	27.2	0.81
SR 522/80th Ave. N.E.	D	25.1	0.67	D	29.5	0.97	D[4]	27.3	0.87
68th Ave. N.E./N.E. 175th St.	B	7.3	0.42	B	7.8	0.69	B	5.9	0.56
68th Ave. N.E./Lakepointe Way N.E.	--	--	--	--	--	--	B	11.5	0.60
68th Ave. N.E./N.E. 170th St.	D	31.0	0.65	F	>120	1.20	F[5]	>120	1.20
Lakepointe Way N.E./N.E. Lakepointe Blvd.	--	---	--	--	--	--	C	19.0	0.34
Lakepointe Wy.N.E./East Site Access	--	--	--	--	--	--	A	0.0	N/A
Lakepointe Wy.N.E./West Site Access	--	--	--	--	--	--	A	0.0	N/A
N.E. Lakepointe Blvd./Retail Driveways	--	--	--	--	--	--	A	1.1	N/A

1 Average delay per vehicle for the overall intersection expressed in seconds per vehicle.

2 V/C is reported for the worst case traffic movement at the intersection.

3 LOS can be improved to LOS E (48.3 seconds delay per vehicle) with construction of an exclusive southbound left turn lane and implementation of a southbound right turn phase overlap.

4 LOS can be improved to LOS C (18.3 seconds delay per vehicle) with construction of an exclusive southbound right turn lane.

5 LOS can be improved to LOS D (32.6 seconds delay per vehicle) with implementation of a westbound right turn phase overlap.

TABLE 32

PM PEAK-HOUR INTERSECTION LEVEL OF SERVICE

INTERSECTION	*1993*			*NO ACTION (2005 W/O PROJECT)*			*PROPOSED ACTION (2005 W/PROJECT)*		
	LOS	*DELAY*[1]	*V/C*[2]	*LOS*	*DELAY*[1]	*V/C*[2]	*LOS*	*DELAY*[1]	*V/C*[2]
SR 522/SR 104	F	83.1	1.03	F	>120	1.17	F	>120	1.17
SR 522/61st Ave. N.E.	C	24.7	0.96	E	41.6	1.01	F[3]	94.2	>1.20
SR 522/Lakepointe Way N.E.	--	--	--	--	--	--	C	15.8	0.83
SR 522/68th Ave. N.E.	F	>120	1.13	F	>120	>1.20	F	>120	>1.20
SR 522/73rd Ave. N.E.	D	26.1	0.80	D	32.9	0.94	D	36.4	0.98
SR 522/80th Ave. N.E.	C	18.7	0.89	F	108.1	1.09	F[4]	>120	1.11
68th Ave. N.E./N.E. 175th St.	C	21.7	0.78	D	25.1	0.78	C	16.0	0.48
68th Ave. N.E./Lakepointe Way N.E.	--	--	--	--	--	--	C	20.2	0.77
68th Ave. N.E./N.E. 170th St.	D	27.1	0.79	F	>120	>1.20	F[5]	>120	>1.20
Lakepointe Way N.E./N.E. Lakepointe Blvd.	--	---	--	--	--	--	D	31.7	0.50
Lakepointe Wy.N.E./East Site Access	--	--	--	--	--	--	A	0.3	N/A
Lakepointe Wy.N.E./West Site Access	--	--	--	--	--	--	A	0.8	N/A
N.E. Lakepoint Blvd./Retail Driveways	--	--	--	--	--	--	A	1.9	N/A

1 Average delay per vehicle for the overall intersection expressed in seconds per vehicle.

2 V/C is reported for the worst case traffic movement at the intersection.

3 LOS can be improved to LOS E (58.2 seconds delay per vehicle) with provision for an exclusive southbound left turn lane and implementation of a southbound right turn overlap phase.

4 Delay can be improved to 77.0 seconds per vehicle (LOS F) with construction of an exclusive southbound right turn lane.

5 Delay can be improved to 60.6 seconds per vehicle (LOS E/F) with implementation of a westbound right turn phase overlap.

The intersection of SR 522/61st Ave NE is projected to operate at LOS F in the AM peak hour in the year 2005, both with and without the Proposed Action. However, the delay would be greater with the Proposed Action. The intersection would operate at LOS E in the PM peak hour in the year 2005 without the Proposed Action and at LOS F and a greater delay with the Proposed Action. However, the intersection operation could be improved to LOS E and less delay during the PM peak hour with the construction of a separate left-turn lane from southbound 61st Ave NE to eastbound SR 522 and a phase overlap (controlled by a green arrow) to allow right-turns from eastbound SR 522 to southbound 61st Ave NE at the same time as right turns are made from northbound 61st Ave NE to eastbound SR 522. These improvements can be made with changes in pavement marking and little or no pavement widening.

The intersections of SR 522/73rd Ave NE and SR 522/80th Ave NE are projected to operate at LOS D in the PM peak hour in 2005, both with and without the Proposed Action. The AM peak hour LOS at the SR 522/80th Ave NE intersection would be D in the year 2005, both with and without the Proposed Action. The intersection of SR 522/73rd Ave NE would operate at LOS D in the AM peak hour in the year 2005 with the Proposed Action, compared to LOS C in the year 2005 without the Proposed Action.

The intersection of 68th Ave NE/NE 175th St is projected to operate at LOS B in the AM peak hour in the year 2005, both with and without the Proposed Action. The intersection would operate at LOS D in the PM peak hour without the Proposed Action and at LOS C with the Proposed Action.

The intersection of 68th Ave NE/NE 170th St is projected to operate at LOS F with delays of more than 120 seconds in both the AM and PM peak hours in the year 2005, both with and without the Proposed Action. The operation of this intersection can be improved to LOS E/F with implementation of a phase overlap (controlled by a green arrow) to allow right turns from westbound NE 170th St to northbound 68th Ave NE at the same time as left turns are allowed from southbound 68th Ave NE to eastbound NE 170th St. This phase overlap would increase the capacity of this intersection by allowing for free right turns from westbound NE 170th to northbound 68th Ave NE on a green arrow instead of the current right turns on red light only.

The five proposed intersections with Lakepointe Way NE are projected to operate at LOS C or better during the AM peak hour and LOS D or better during the PM peak hour in the year 2005 with the Proposed Action. The proposed driveway intersections with NE Lakepointe Blvd are expected to operate at LOS A during the AM and PM peak hours. (However, it should be noted that traffic delays at the intersection of SR 522/Lakepointe Way NE could be greater than indicated in Table 27 as a result of traffic queues extending beyond the available queue capacity at the intersection of SR 522/68th Ave NE. See the discussion under Traffic Queues.)

Construction Traffic

Impacts of construction-related traffic differ from what traffic would be when the Lakepointe development has been completed. Thus construction impacts are discussed separately here.

The proposal is projected to be constructed in six phases. Phase 1 would consist of approximately 20 acres of mixed use development and take approximately 12 to 18 months to construct. Phases 2 through 6 would follow in approximately one year increments.

Table 33 shows the estimated truck and construction worker vehicles for Phase 1 and Phases 2 through 6. The concrete trucks are assumed to come from the Lone Star concrete plant which is on the site of the future Phase 7. Phase 1 would include construction of Lakepointe Way NE, the service road under Lakepointe Way NE, and the upland portion NE Lakepointe Blvd. Prior to completion of these roadways, the concrete trucks would either use NE 175th St or use a "back gate" to access construction areas without using a public street. Other construction-related trucks would access the site via NE 175th St, using the traffic signal at the 68th Ave NE intersection. Construction workers would use 61st Ave NE, 65th Ave NE (as long as it remains open to traffic) and 68th Ave NE to reach NE 175th St and the site. Construction workers would park in temporary lots.

During Phases 2 through 5, all trucks, including concrete trucks, would access the site via the service road under Lakepointe Way NE or a temporary access from NE Lakepointe Blvd Construction workers would use either the service road or NE Lakepointe Blvd, depending upon their direction of travel and their parking location. Phase 6 construction traffic is expected to enter the site directly from NE 175th St.

As existing uses are removed from the site on a phased basis, associated traffic would be eliminated from the site. Table 3B of Appendix D shows a total reduction of 1,116 trips per day and 93 trips during each peak hour related to existing uses. This trip reduction would phase in over the life of the construction project.

The intersection of 68th Ave NE and NE 175th St would have 2 to 8 additional peak hour truck trips during project construction. Most of the truck trips would also use the SR 522 intersections. An additional 144 construction worker vehicle trips are projected during the AM and PM peak hours, which would be partially off set by reduced on-site use vehicle trips during Phase 1, and further offset by increased roadway capacity created during Phase 1 for construction of Phases 2 through 6 .

No significant traffic operational impacts are anticipated from the proposed construction.

Transit Service

The applicant will construct a transit stop on the north and south sides of SR 522 between Lakepointe Way NE and 68th Ave NE. A pedestrian overpass over SR 522 would be provided through coordinated efforts with King County and WSDOT to facilitate north-south pedestrian crossings. (The overpass would not be an element of the Proposed Action. The applicant would contribute a fair-share component of the funding for construction.) A new pedestrian crosswalk would be provided at-grade across SR 522 at the new traffic signal to be installed on SR 522 at Lakepointe Way NE. The transit stop on the south side of SR 522 would be connected to the Burke-Gilman Trail via stairs and an elevator.

TABLE 33

CONSTRUCTION TRAFFIC[1]
LAKEPOINTE DEVELOPMENT

	PHASE 1 (Includes Lakepointe Way N.E.)			*PHASE 2-6*		
	TRUCKS PER WEEK	***TRUCKS PER DAY***	***VEHICLE TRIPS, PEAK HR USING STREETS***	***TRUCKS PER WEEK***	***TRUCKS PER DAY***	***VEHICLE TRIPS, PEAK HR USING STREETS***
TRUCK LOADS FROM/TO OFF-SITE						
Earthwork[2]	30	6		36	7	
Other Non-Materials	25	5		25	5	
Subtotal off-site	55	11	2 - 4	61	12	2 - 4
TRUCK LOADS ON-SITE,[3]						
Concrete (from Lone Star)						
Building	65	13		65	13	2 - 4
Road/Bridge	58	12		--	--	
Subtotal On-Site	123	25			--	
Total Trucks	178	36	2 - 4	126	25	4 - 8
CONSTRUCTION WORKERS' VEHICLES						
	VEHICLES PER WEEK	*VEHICLES PER DAY*	*VEHICLE TRIPS PEAK HOUR USING STREETS*	*VEHICLES PER WEEK*	*VEHICLES PER DAY*	*VEHICLE TRIPS PEAK HOUR USING STREETS*
	1,200	240	144[4]	1200	240	144[4]

1. Ledcor Industries Inc. Construction Traffic Estimate
2. Estimated from excavation and embankment estimates prepared by KPFF, with 75% of embankment coming from on-site excavation.
3. The Lone Star Concrete plant has a "back gate" that provides direct on-site access without using public streets during Phase 1.
4. An estimated 60% of the construction workers will be scheduled to start and end work shifts in the peak hour.

Compliance with the P-suffix requirement that the residential component of the Lakepointe development occur throughout the various phases of the development of the Proposed Action would ensure that transit and transportation linkages occur from the very beginning of the project. For example, the first phase of project construction would include sidewalks and crosswalks on the site with connections to transit facilities on SR 522 and 68th Ave NE.

Because the proposed transit stop on SR 522, along with a new signal and crosswalk at the intersection of SR 522/Lakepointe Way NE, would be constructed during the first phase of the project, transit facilities would be established to coincide with development of the first residential units and commercial areas. All transit facilities and pedestrian routes (including sidewalks and crosswalks) would be designed in accordance with King County safety and barrier-free standards.

The proposed mixed use development is designed to allow people to live, work, shop and recreate on the site and to minimize the importance of the automobile and foster the use of the public transit system.

Pedestrian and Bicycle Traffic

The periphery of the Lakepointe site would be dedicated to pedestrian and bicycle use. NE Lakepointe Boulevard, the shoreline, harbor and waterfront would be connected by view and access corridors that traverse the site (refer to Figure 8). Barrier-free, pedestrian, and bicycle links between the site's public spaces, the Burke-Gilman trail and the transit stops would be provided and clearly marked. Public access to views of Lake Washington, the inner harbor, and the Sammamish River, as well as other parts of the development, would be provided at many points around the site (refer to Chapter 2 of this document for detail).

The Shoreline Trail, the soft surface trails to the river's edge, the esplanade, and all pedestrian walkways and connections would be accessible, and open to the general public.

New signalized crosswalks would be provided across SR 522 on the east side of Lakepointe Way NE, across Lakepointe Way NE on the south side of SR 522, across Lakepointe Way NE on the east side of N. E. Lakepointe Blvd, and across 68th Ave NE on the north side of Lakepointe Way NE. Traffic signal timing would be provided at these crosswalks to allow safe crossings by pedestrians. Sidewalks would be provided on the street frontages. This pedestrian linkage would be provided by lower level connections to the Burke-Gilman Trail and NE 175th Street. Direct connection between the Burke-Gilman Trail and the trail and walkway system on the site would be provided via two stop sign controlled crosswalks across NE 175th Street (refer to Appendix D for additional detail on the proposed pedestrian and bicycle system).

A potential alternative off-site connection design would be to prohibit pedestrians on the southwest corner of SR 522 at Lakepointe Way NE. This would be accomplished by not constructing the crosswalk across Lakepointe Way NE directly south of SR 522 or a sidewalk on the west side of Lakepointe Way between SR 522 and NE 175th Street. The potential alternative pedestrian and bicycle connections could include the following: a pedestrian connection from the sidewalk on the south side of SR 522 to the Burke-Gilman Trail at a point west of Lakepointe Way NE; two stop sign controlled crossings of NE 175th Street to the site (same as proposed system); and, an elevator/stair connection to the east sidewalk of Lakepointe Way NE.

Under either of the off-site pedestrian connection system designs, significant pedestrian/vehicular conflicts would not occur. The stop sign controlled crosswalk crossings of NE 175th Street would operate at LOS A. Pedestrian and bicycle safety at these crossings would be high and impacts to traffic flow would be low (operate at LOS A).

Funding of Public and Private Transportation Improvements

One option for funding roadway improvements that would be constructed as part of the Proposed Action would be the creation of a King County Road Improvement District (RID) or City of Kenmore Local Improvement District (LID). If an RID or LID is proposed and created, properties receiving special benefit or increased value as a result of specific transportation improvements would be assessed for that benefit. Other improvements within the proposed assessment district having benefit to the general public would be funded with public funds. An RID or LID would be created by the appropriate governmental entity (County of City Council) having jurisdiction over the property. Public fund participation in an RID or LID would be determined by the appropriate governmental entity at the time the RID or LID is formed.

The possibility of funding the following roadway improvements with an RID or LID is being explored. After construction, these roadways would become public roadways in dedicated City of Kenmore rights-of-way, and their maintenance would become the responsibility of the City:

- Lakepointe Way NE from SR 522 to 68th Ave NE (including intersection improvements), proposed for construction during Phase 1
- Local access roadway directly underneath Lakepointe Way NE from just west of 68th Ave NE to NE 175th St.

The possibility of funding additional transportation improvements with an RID or LID is being explored. Maintenance of these improvements would become the responsibility of the City of Kenmore.

- Reconstruction of NE 175th street and the Burke-Gilman Trail in the vicinity of Lakepointe Way NE
- Transit stops on the north and south sides of SR 522
- Connections from the transit stops to the Burke-Gilman Trail and residential areas on the Lakepointe site

Additional improvements, which are not part of the Proposed Action, could also be funded by an RID or LID. After construction, their maintenance would become the responsibility of King County, WSDOT, and/or the City of Kenmore. These improvements would include:

- A pedestrian bridge over SR 522
- Pedestrian improvements to the Kenmore Bridge on 68th Ave NE

All other on-site driveways, roadways parking areas, required fire lanes, pedestrian walkways, and bicycle trails would be constructed and maintained with private funding.

Air and Marine Transportation

The Proposed Action would include a 53-slip marina. This would increase the number of moorage slips in recreational marinas at the north end of Lake Washington from 483 to 536, an 11 percent increase. If existing moorage slips associated with single-family residences is considered, the percentage increase would be lower. Since public moorage would be limited to moorage for guests of residents and patrons of businesses on-site, the number of transient boat trips associated with the proposed marina would be limited.

The proposed marina would result in recreational boats entering and exiting the marina, which could result in increased boat conflicts with existing Kenmore Air Harbor operations. However, proposed long-term moorage would be limited to boats 30-feet or longer. No permanent moorage is proposed for small, fast or highly maneuverable boats, such as runabouts and jet skis, which are the primary safety concern of seaplanes during takeoffs and landings. Thus, significant impacts to Kenmore Air Harbor operations would not be anticipated.

To accommodate seaplanes that may taxi close to the marina (an unlikely event), overwater marina structures nearest the Kenmore Air Harbor terminal would be constructed to a height low enough to allow a seaplane main wing to pass over.

Because no marina facilities would be located in the Sammamish River, and public moorage would be restricted in the proposed marina, the number of boats using the marina would be limited, and no significant impacts to existing recreational boating in the area would be anticipated.

ALTERNATIVES

The traffic impacts of the No Action Alternative (2005 Without Proposed Action) are interwoven into the previous discussion of impacts from the Proposed Action. The impacts of Alternative 1 (NSCP Alternative) are discussed where appropriate, or the reader is referred to the Appendix D. A brief summary is given below.

Traffic impacts of the No Action Alternative would be generally greater than they would be with the Proposed Action. Both with and without the Proposed Action, the system deteriorates from 1993 to 2005. However, a comparison of the data shows that when Lakepointe Way NE is added to the roadway network and with Lakepointe project traffic added, vehicles would move along travel corridors and through the entire system more quickly in 2005 with development of the Proposed Action than they would in 2005 without the Proposed Action. Land uses on the site under the NSCP Alternative would result in fewer trips generated; however, different roadway configurations may offset these gains. A more precise comparison of impacts cannot be made for the reasons explained in the introduction to the TRANSPORTATION section.

MITIGATING MEASURES

Transportation mitigations – required, proposed, and potential – are listed below. Mitigation measures will be established in a Transportation Mitigation Agreement signed by King County and the applicant as part of the Master Plan approval. The Agreement will also establish the phasing and timing of implementation of mitigations.

Required by Code

- Lakepointe Way NE connecting SR 522 and 68th Ave NE:
  Construct a five-lane, principal arterial with turn channels and turn pockets.
  Construct a barrier-free sidewalks and bicycle facilities along the roadway.
  Lower the Burke-Gilman Trail and construct a grade-separated crossing of Lakepointe Way NE.
  Lower NE 175th St and construct a grade-separated crossing of Lakepointe Way NE.

- Lakepointe Way NE at SR 522:
  Reconstruct the intersection to provide dual, north-to-west, left-turn lanes and single, north-to-east, right-turn lane.
  Construct a separate right-turn lane on SR 522 south of the transit-only lane.
  Construct crosswalks on the south and east approaches to the intersection
  Signalize the intersection and provide pedestrian-actuated phasing, as determined by King County and WSDOT.

- Lakepointe Way NE at 68th Ave NE:
  Widen 68th Ave NE within the existing right-of-way from the north end of the Kenmore Bridge to Lakepointe Way NE.
  Construct left-turn, left-through, and through lanes on the northbound approach.
  Construct single left-turn and double right-turn lanes on eastbound approach.
  Signalize the intersection and provide pedestrian-actuated phasing, as determined by King County and WSDOT.

- Pay Mitigation Payment System (MPS) fees as determined by King County.

- Construct enhanced transit stops on the north and south sides of SR 522 between Lakepointe Way NE and 68th Ave NE, including seating areas, weather protection, landscaping, and walkways, and provide access from the stops to the Burke-Gilman Trail and residential areas on the Lakepointe site, consistent with King County and WSDOT standards, and subject to availability of right-of-way.

- Provide a fair-share contribution for the construction of a pedestrian bridge over SR 522 in the vicinity of the transit stops, subject to approval by WSDOT, and provide a touch-down location on the Lakepointe site for the bridge.

- Develop and implement a Transportation Management Plan (TMP) approved by King County. Strategies to be considered in the TMP include transit subsidies, parking fees, and rent abatement.

- Provide a fair-share contribution to the construction of a new park-and-ride facility in the Kenmore area, or provide 50 commuter parking stalls in a location accessible to the southern enhanced transit

stop, as determined in the approved TMP. Provision of a shuttle bus connecting the SR 522 transit stops with residential areas on the Lakepointe site may be required as part of the TMP.

Proposed by the Applicant

- Construct Lakepointe Way NE as an elevated roadway.
- At the intersection of 61st Ave NE with SR 522, construct an exclusive southbound-to-eastbound, left-turn lane, and implement a southbound-to-westbound, right-turn phase overlap.
- At the intersection of 68th Ave NE and NE 170th St, provide a signal phase overlap for the southbound-to-eastbound, left-turn lane and the westbound-to-northbound, right-turn lane.
- At the intersection of the 80th Ave NE with SR 522, restripe the southbound approach to provide separate left-turn and right-turn lanes.
- Lakepointe Way NE at NE Lakepointe Blvd:
  Construct dual, left-turn lanes for traffic exiting the Lakepointe site.
  Construct new access roads to replace the east leg of the NE 175th St/65th Ave NE intersection.
  Signalize the intersection and provide pedestrian-actuated phasing.
- Limit public moorage at the marina to short-term guest moorage in order to reduce the number of transient boat trips associated with the marina.
- Limit long-term moorage to boats 30 feet or longer in order to minimize conflicts between small, fast, or highly maneuverable boats (such as runabouts and jet skis) and seaplanes during takeoff and landing.
- Construct over-water marina structures near the Kenmore Air Harbor terminal to no more than the maximum height above the water surface that will allow the main wing of a seaplane to pass over the structure.

Potential

- Design the proposed eastbound, right-turn lane from SR 522 to Lakepointe Way NE with adequate storage capacity to prevent blockage of the eastbound transit lane on SR 522.
- Prohibit left-turn access to and from SR 522 in the vicinity of its intersections with Lakepointe Way NE and 65th Ave NE in order to reduce conflicts with traffic patterns created by new lane configurations.
- Provide a fair-share contribution toward construction of the SR 522 Multi-Modal Project proposed for construction by WSDOT.
- Improve non-motorized access to the Lakepointe site from the south via 68th Ave NE and the Kenmore Bridge over the Sammamish River.

UNAVOIDABLE SIGNIFICANT ADVERSE IMPACTS

The level of service (LOS) at the intersection of SR 522 at 68th Ave NE is currently at LOS F and is projected to continue to operate at LOS F in 2005 with or without the Proposed Action. There is no apparent improvement to capacity that can be made to this intersection without major right of way acquisition and local business disruption. Traffic queues would continue to exceed the storage capacity at several locations and affect the traffic operation at adjacent intersections.

PUBLIC SERVICES

AFFECTED ENVIRONMENT

Fire/Emergency Protection

Fire/emergency response to the western half of the Northshore planning area (including the site) is provided by King County Fire District 16 (see page 269 of the NSCP Draft EIS). The District has two fire stations, with the closest station, the District headquarters, located in Kenmore at 18030-73rd Ave NE, approximately one-half mile northeast of the project site. This station is staffed by five or six firefighters per shift, plus three chief officers and one fire prevention specialist (Peterson, 1996). Response is also provided by a station in the Lake Forest Park vicinity, which is staffed by three firefighters per shift. There are two existing approach routes to the site for fire/emergency response vehicles: SR 522 to 65th Ave NE to NE 175th St, and SR 522 to 68th Ave NE to NE 175th St.

The headquarters station is equipped with two Class A, 1,500-gallon-per-minute pumpers, two aid cars, and one rescue vehicle. The station has a total of seven vehicle bays. The second station, located in the Lake Forest Park area, is equipped with two Class A, 1,500-gallon-per-minute engines.

Advanced-life-support, emergency response to the site is provided by paramedics from Station 63 in the Shoreline Fire District. Fire District 16 provides first response/basic life support for emergency aid calls.

There were approximately 2,200 calls for service in the District in 1995. About 70 percent were for emergency aid, 10 percent were for fire-related emergencies, and 20 percent were other minor medical or assistance calls. This level of calls for service has remained stable for the past few years (Peterson, 1996). Using the District's approximate population of 32,800 (King County Annual Growth Report, 1996), the annual call rate is approximately 67 calls per 1,000 population. If population growth occurs in the District consistent with projected trends in the Northshore area (King County Annual Growth Report, 1996), the District's population and total calls for service could increase by about 12 percent (or about 260 calls per year) over the next 15 years. The District also has an unofficial rule-of-thumb that estimates approximately 15 calls annually per 100,000 square feet of commercial/office space (Peterson, 1996).

The existing industrial uses on the Lakepointe site generate very few annual fire/emergency calls for service. In 1996 there were no calls, and in 1995 there was one fire/emergency call to the site (Peterson, 1997).

As described on page 270 of the NSCP Draft EIS, the District's average response time is about six minutes, including dispatch time. However, response time to the site from the headquarters station is approximately two minutes (Peterson, 1996).

The District has mutual aid agreements with neighboring jurisdictions, including Bothell, Shoreline, King County Fire District 41 (Kirkland), Woodinville, Mountlake Terrace and Snohomish County Fire District 10. Depending on the location of the call, the dispatch system automatically requests the appropriate districts for their assistance. This increases the response to major emergency calls by at least one engine from another district (Peterson, 1996). Fire District 16's fire insurance rating is 4 on a scale of 1 to 10, with 1 being the highest and best rating by the Washington Survey and Rating Bureau.

Kenmore Incorporation

A municipality is required to provide for fire and life safety (paramedic) services, but can do so in a variety of ways. A city can provide fire and life safety services itself, it can contract for all services with the county or another city, or it can create a hybrid of these. Fire and paramedic services are anticipated to continue to be provided in Kenmore by King County Fire Protection District 16 on a contracting basis (Phillip K. Kushlan & Associates, 1997).

Police Protection

Police protection for the entire Northshore planning area (including the site) is provided by the King County Sheriff's Department, North Precinct No.2 (page 272 of the NSCP Draft EIS). The Precinct No. 2 station is located at 18118-73rd Ave NE, approximately one-half mile northeast of the site. The site is located in patrol district B1 (known as patrol district A5 at the time of issuance of the NSCP Draft EIS).

Staffing is assigned to precincts based on the number of dispatched calls for service. Although commercial development generates police calls, population is the basis on which need for service is quantified by the Department. King County currently provides approximately one commissioned officer for every 1,000 residents in its service area. Approximately 28 patrol officers are assigned to the Kenmore, Juanita, and Woodinville vicinity extending to West Snoqualmie Valley Road. Approximately two officers per shift are assigned to the Kenmore/Juanita vicinity (Mathis, 1996). Each officer is assigned a vehicle. In 1997, depending upon budgeting and staffing processes, Precinct No. 2 may be assigned two additional officers, one of which may be assigned to the Kenmore area (Mathis, 1996).

The Department received approximately 168,000 calls for service in 1995. The Department's service area, including unincorporated areas and cities contracting for police services, had a population of 635,378 in 1995. Thus, there were approximately 264 calls for service per 1,000 population. The dispatched calls for service in Kenmore and Juanita fluctuated over the past five years, but have declined in the past two to three years as shown in Table 34. Part of the decrease in Kenmore calls for service is due to a reduction in service area for 1996, because of annexations and changes in the definition of the patrol district. The typical average response times in the Kenmore and Juanita patrol districts are 7-9 minutes for the highest priority calls, 18-19 minutes for the second priority calls, and 50-60 minutes for the lowest priority calls (Hillmar, 1997).

Table 34
Trends in Dispatched Calls For Service in Kenmore and Juanita Patrol Districts

Patrol District	1992	1993	1994	1995	1996
Kenmore[1]	3,166	3,204	3,349	2,990	2,641
Juanita[2]	4,651	5,051	4,822	4,703	4,638

1 Area in Kenmore patrol district reduced in 1996.
2 Data include current patrol districts B2, B3, B4 that comprised patrol district A6 prior to 1996.
Source: King County Sheriff's Department, 1995, 1997

Table 35 lists the Part One (most serious) criminal offenses recorded in the patrol districts during 1995 and 1996. The data from the two years show fewer crimes committed in Kenmore in 1996 than 1995, but more crimes committed in the Juanita area in 1996 than 1995.

The Department has mutual aid agreements with adjoining jurisdictions, including the Cities of Bothell, Shoreline, Lake Forest Park and Kirkland.

Table 35
Part One Crimes Recorded in Kenmore and Juanita Patrol Districts

Type of Crime	Kenmore		Juanita	
	1995	1996	1995	1996
Homicide	0	0	0	0
Rape	5	8	15	20
Attempted Rape	2	0	1	0
Robbery, all types	12	2	13	8
Assault, all types	28	10	17	14
Burglary, all types	109	92	166	120
Larceny, all types	347	337	460	497
Vehicle Theft, all types	48	51	49	96
Arson	6	8	14	6
TOTAL	557	508	735	761

Source: King County Sheriff's Department, 1997
See footnotes in previous table regarding patrol districts.

Kenmore Incorporation

A municipality is required to provide for police protection, but it can do so in a variety of ways. A city can provide policing services itself, it can contract for all services with the county or another city, or it can create a hybrid of these. Given the fact that the County is willing to customize its services for cities at agreed upon additional costs, and especially given that a King County Sheriff's Department precinct is located within the boundaries of the proposed City of Kenmore, it is assumed that Kenmore would contract with King County for policing services (Phillip K. Kushlan & Associates, 1997).

Schools

The majority of the Northshore planning area (including the site) is served by the Northshore School District (page 274 of the NSCP Draft EIS). The District operates 21 elementary schools, five junior high schools, three high schools and a secondary alternative school. The schools serving the site vicinity are Kenmore Elementary, Kenmore Middle School and Inglemoor High School. The October 1996 enrollment at these schools is shown in Table 36.

Table 36
Enrollments in Schools Serving the Project Site – October 1996

School	FTE Enrollment	Permanent Capacity	Deficit in Permanent Capacity
Kenmore Elementary (K-6) 19121 71st Ave NE	525.5	440	-85.5
Kenmore Middle School (7-9) 20323 66th Ave NE	889	663	-226
Inglemoor High School (10-12) 15400 Simonds Rd.	1,401	1,137	-264

FTE = Full-time equivalent (half-day kindergarten students counted as 0.5 FTE student)
Permanent capacity is determined by available classroom space in permanent facilities (excludes portable facilities). Portable classroom facilities provide additional capacity to house enrolled students that exceed permanent facility capacity.
Source: Northshore School District, 1996

Table 37 describes the District's current and projected enrollment and capacity conditions. According to October 1996 enrollment data, the District's total full-time equivalent (FTE) enrollment was 18,651 students, of which about 53 percent were elementary students, 25 percent were junior high students and 22 percent were high school students (the District's enrollment for the 1989-90 school year, as indicated in the NSCP EIS was 17,213). The District's enrollment projections are prepared using methods and data provided by the Washington State Superintendent of Public Instruction and population projections developed by the Washington State Office of Financial Management. These methods are based on past enrollment and population trends and do not specifically account for growth from specific development projects such as the Proposed Action. The District's projections forecast declining middle school enrollments after the 1997/1998 school year, and gradual increases in elementary and high school enrollments. In the 1997/1998 school year, the District forecasts total enrollments of 18,778 students, a 0.75 percent increase over the October 1996 enrollments. In the 2001/2002 school year, the District forecasts total enrollments of 19,064 students, a 2.2 percent increase over October 1996 enrollments. Over the long term, the District forecasts 24,483 students by 2015, a 31 percent increase over October 1996 enrollments (forecasts for years between 2002 and 2015 are not currently available).

According to the District's 1996 Capital Facilities Plan, the District's total permanent capacity in the 1996-97 school year (excluding space in portable facilities) was 16,523 students (Table 37). Based on the total FTE enrollment of 18,651 students, the District's permanent facilities lacked the capacity needed to adequately serve 2,128 of its students. The District's 1996 Capital Facilities Plan describes the following planned improvements:

- new junior high school (near Avondale Road/Woodinville-Duvall Road) with capacity for 746 students (1997/1998).
- 10 new Bothell High School classrooms with capacity for 232 students (1997/1998).
- 1 conversion of space to a regular junior high classroom with added capacity for 12 students, Northshore Junior High (1997/1998).
- 1 new science classroom with added capacity for 24 students, Leota Junior High (1998/1999).
- 8 new elementary school classrooms with capacity for 196 students (1999/2000).

- 1 conversion of space to a regular high school classroom with added capacity for 11 students, Woodinville High School (1999/2000).
- 10 new Woodinville High School classrooms with capacity for 237 students (2000/2001)[1].
- 9 new elementary school classrooms with capacity for 220 students (2001/2002).

Table 37
Northshore School District Enrollment and Permanent Facility Capacity Projections

	Oct. 96[1]	97/98	98/99	99/00	00/01	01/02
Elementary						
FTE Enrollment[2]	9,820	9,733	9,775	9,803	9,811	9,923
Permanent Facility Capacity[3,4]	8,869	8,869	8,869	9,065	9,065	9,285
Deficit in Perm. Capacity	-951	-864	-906	-738	-746	-638
Junior High						
FTE Enrollment[2]	4,660	4,712	4,764	4,638	4,628	4,572
Permanent Facility Capacity[3,4]	3,670	4,416	4,440	4,440	4,440	4,440
Deficit in Perm. Capacity	-990	-296	-324	-198	-188	-132
High School						
FTE Enrollment[2]	4,171	4,333	4,437	4,503	4,607	4,659
Permanent Facility Capacity[3,4]	3,984	3,984	4,216	4,216	4,216	4,216
Deficit in Perm. Capacity	-187	-349	-221	-287	-391	-443
District Totals						
FTE Enrollment[2]	18,651	18,778	18,886	18,944	19,046	19,064
Permanent Facility Capacity[3,4]	16,523	17,501	17,525	17,721	17,721	17,941
Deficit in Perm. Capacity	-2,128	-1,277	-1,361	-1,223	-1,325	-1,123

Source: Northshore School District, 1996, 1997

1. October 1996 data are actual enrollments; other data are projections. Data include enrollments in special education, gifted and other programs.
2. FTE = full-time equivalent; one kindergarten student counted as 0.5 FTE.
3. Capacity changes dependent on successful financing and construction of facilities, not yet funded beyond school year 1997/1998.
4. Permanent capacity does not include capacity provided by portable classroom facilities.

New elementary classrooms listed above will be added in the schools most in need of additional permanent space, depending on enrollment growth over the next few years (Vaught, 1997). The new junior high school and additional Bothell High School classrooms are funded by a 1991 bond issue. Improvements scheduled beyond 1997/1998 are not currently funded and depend on future approvals of bonds and levies that will be put up for voter approval within the next two years (Vaught, 1997).

Development of the new school facilities will allow the District to adjust school boundaries and reduce school capacity deficits throughout the district. With the planned facilities, the District is projected to have permanent capacity for 17,941 students by the 2001/2002 school year. However, even with the additional

[1] This Woodinville High School improvement is planned by the District, but is not included in capacity calculations for the 1996 Capital Facilities Plan (as it was in the 1995 Facilities Plan), because of possible uncertainty in the timing of the improvement. It may be included in capacity calculations for later Facilities Plans, depending on the outcome of future facility planning decisions by the District (Vaught, 1997).

capacity, the District will still lack permanent facilities needed for 1,123 students. The District strategically uses portable classroom facilities to provide the additional capacity needed to serve enrolled students. As noted in the 1995 Capital Facilities Plan, page 34, "The mix of permanent and relocatable facilities in the district's six-year plan is the district's concept of the best balance at this time... This Capital Facilities Plan has been organized to provide adequate capacity through a combination of construction/expansion of permanent facilities and installation of relocatables."

The 1996 Capital Facilities Plan describes the District's projected facility needs and establishes service standards, student estimation factors and school impact fees. The plan estimates that approximately 0.59 students and 0.266 students are generated per single-family and multifamily residences, respectively. The impact fees for 1996/1997 are $2,424 per single-family residence and $1,398 per multifamily residence. These impact fees are updated annually, per the King County process described in the County's Ordinance 10162. As noted in the District's Capital Facilities Plan, "The Growth Management Act (GMA) authorizes jurisdictions to collect impact fees to supplement funding of additional public facilities needed to accommodate new development. Impact fees cannot be used for operation, maintenance, repair, alteration or replacement of existing capital facilities used to meet existing service demands. Impact fees [are] calculated based on the district's cost per dwelling unit to purchase land for school sites, make site improvements, construct schools and purchase/install temporary facilities (portables)."

Bus transportation in the Northshore School District is provided to students that reside more than one mile from schools, or where there are pedestrian safety limitations within one mile of schools. School bus transportation would be provided by the District to students on the Lakepointe site.

Parks and Recreation

There are approximately 26 park facilities in the Northshore planning area that provide a wide range of passive and active recreational opportunities (NSCP Draft EIS, page 276).

There are several park and recreation facilities in the vicinity of the Lakepointe site. These include the Burke-Gilman Trail (adjacent to the site), the Sammamish River Boat Launch and Kenmore Park (both directly across the river from the site), Tracy Owen Station Park (Logboom Park, one-half mile west of the site), Swamp Creek Park (one mile north of the site), Saint Edwards State Park (1.5 miles south of the site), Moorlands playfield (1.5 miles southeast of the site), Inglemoor County Park (two miles southeast of the site), and Big Finn Hill Park (2.5 miles south of the site). Privately-owned recreational facilities in the vicinity include Wayne Golf Course (two miles east of the site) and Inglemoor Country Club (one-half mile south of the site). See Table 38 for a list of existing recreational facilities in the Northshore Community Planning Area, approximately in order of proximity to Lakepointe, within each jurisdiction. Refer to Figure 1 for an illustration of park and recreational facilities within approximately 0.5 mile of the site.

The Lakepointe site currently contains no public park or open space features and there is currently no public waterfront access provided on site.

Table 38
Existing Recreational Facilities in the Northshore Community Planning Area

Facility	Address	Recreational Amenities
Within New Kenmore City Limits		
Kenmore	6910 NE 170th St.	9.6 acres, picnic area
Kenmore Logboom	SR 522/60th Pl. NE	16 acres, fishing, picnic, play area, boat moorage
Swamp Creek Wallace	68th Ave NE and NE 195th	17 acres, trails
Linwood Park	NE 193rd Road	
Moorlands	84th Ave NE near NE 155th	2 softball/baseball, 1 football/soccer field
Inglemoor Park	88th Ave NE/Simonds Rd.	9.6 acres, baseball and soccer
King County		
West Hill	NE 195th St./85th Ave NE	7.6 acres
Northshore Pool	9815 NE 188th St.	swimming
Big Finn Hill	NE 132nd to Denny Park	202 acres, 1 softball/baseball
O.O. Denny	Holmes Pt. Dr./NE 124th St	37.5 acres, picnic area
Sixty Acres	NE 116th St./Samm. River	60 acres, 12 football/soccer
Windsor Vista	110th Ave NE/NE 145th St.	0.5 acres, undeveloped
Edith Moulton	108th Ave NE/NE 187th Pl.	23 acres, picnic area
Kingsgate	NE 140th St/116th Ave NE	6 acres, trails
Juanita Beach	9703 Juanita Drive NE	2 softball/baseball, 2 tennis, swim beach, fishing, picnic, play area
Juanita Heights	NE 124th/89th Place NE	3 acres, undeveloped
Juanita Shop	Juanita Drive/93rd Ave. NE	0.5 acres
Juanita Triangle	Juanita Drive/76th Pl. NE	0.5 acres, undeveloped
Gold Creek Lodge	16020 148th Ave NE	38 acres, picnic area
132nd Square	132nd Ave NE/NE 132nd St	9.4 acres, 2 softball/baseball, 1 football/ soccer, picnic tables play area
Waterford Park	Samm. River Trail/Woodin.	4.2 acres, near river
Basset Pond	NE 165th/179th Ave NE	32 acres, undeveloped
Northshore Athletic Fields	NE 145th/Wood.-Red. Road	20 acres, 5 softball/baseball
East Norway Hill	124th Ave NE/NE 155th St.	26 acres, 1 soccer field
South Norway Hill	124th Ave NE/NE 145th St.	9.8 acres
Lake Washington Pool	17525 NE 104th St.	swimming
Mark Twain	132nd Ave NE/NE 107th St.	6.8 acres, play area
Bothell		
Westhill Sports Fields	19417 88th Ave NE	5 soccer fields, par course
Conifer View Park	9055 NE 195th St.	play area, play court
Park at Bothell Landing	9919 NE 180th St.	N'shore Senior Center, Bothell Historic Museum, play, picnic
Sammamish River Park	17995 102nd Ave NE	trails
Mary Murphy Memorial Park	18630 Bothell Way	picnic area
Triangle Park	Main St./Bothell Way	open space
Blyth Park	16950 W. Riverside Drive	Play area, picnic, trails
William Penn Park	19900 100th Ave NE	playfield, picnic, playground
Royal Oaks Park	20144 106th Ave NE	picnic, play court
Brackett's Landing	11101 NE 174th St.	picnic, play area
North Creek Valley	North Creek Pkway	4 multipurpose fields, trails
Washington State		
Sammamish River Boat Launch	68th Ave. NE, near NE 170th	boat launch ramp
Saint Edwards State Park	Juanita Dr., near NE 148th	picnic area, open space, trails

Source: Northshore Community Plan Update, 1993, Huckell/Weinman Associates, Inc., 1997

King County Recreation Area Requirements and Park Standards

King County Code (KCC) 21A.14.180 through .200, defines on-site recreation area requirements. For mixed use developments, section 21A.14.180 defines required recreation space for leisure, play and sport activities as 90 square feet, 130 square feet and 170 square feet per dwelling unit for studio/one bedroom, two bedroom, and three bedroom dwelling units, respectively. Outdoor recreation space is required to be on the site, suitable in grade and surface for recreation, have no dimensions less than 20 feet (except trail segments), be accessible to all residents, and accessible to other parks/open space that may be located on adjoining property. Stormwater tracts may be credited for up to 50 percent of the on-site recreation space. Indoor recreation areas, such as those at senior citizen assisted housing, may be credited toward total recreational space requirements, if allowed by the County. Section 21A.14.190 requires tot/children play areas on the site unless such facilities are available within one-quarter mile.

The NSCP Draft EIS, page 277, generally describes the adopted park standards in effect in 1991. Current park standards are described in the 1996 King County Park, Recreation and Open Space Plan. This Park Plan includes park standards which are intended to be "flexible planning guidelines that address minimum, not maximum goals to be achieved." The Park Plan intends that the standards should be flexible to meet the changing needs of a diverse population of varying ages and interests. Provision of facilities to meet specific recreational interests (such as swimming) may help meet recreational demands while not requiring large amounts of acreage.

The Park Plan defines two general types of parks, regional and local, and defines an acreage requirement of 7.5 acres of local park land per 1,000 residents in urban areas. Local parks are recommended to be 10 to 20 acres in size, dispersed throughout the urban area so that local parks are available with one-half mile or less from all residents. Guidelines for provision of baseball and softball fields is one per 5,000 residents, and the guideline for provision of soccer fields and basketball/sport courts is one per 10,000 residents. These are based on the standards of the National Recreation and Park Association.

Adequacy of Existing Facilities

The existing facilities in the site vicinity accommodate a large variety of recreational uses, such as boating, running, bicycling, rollerblading, hiking, swimming and picnicking. The Northshore Community Planning Area as a whole is deficient in availability of recreational facilities (NSCP, 1993). The NSCP Draft EIS, page 277, estimated an existing deficiency (in 1991) of approximately 155 acres in total park land in the Northshore area, based on the County's standard of 7.5 acres of park land per 1,000 residents in urban areas. The Draft EIS also concluded that with projected Northshore population growth over the planning period (through approximately 2002), approximately 233 to 333 acres of park land would be needed to meet such standards. This estimate does not include acreage for larger resource-based parks, trails or special uses (such as swimming pools). Also, the populations forecasted in the NSCP Draft EIS were nearly 20,000 residents (or 16 percent) greater than currently forecast by King County (1996 Annual Growth Report, King County). This would reduce the deficit in park land identified in the NSCP Draft EIS.

Kenmore Incorporation

With the incorporation of the City of Kenmore, the determination of which park and recreational facilities will remain under King County control and which facilities will be under City of Kenmore control will be determined through formal agreements between the City and County. However, in general, newly-incorporated cities receive responsibility for local parks within their boundaries through a phased approach.

The distinction "local" parks is to differentiate from "regional facilities." In Kenmore, the Burke-Gilman Trail is a regional facility that is foreseen to be maintained by the County. There are five local parks in Kenmore that could be transferred to the City (Linwood, Moorlands, Swamp Creek, Tracy Owen Station and Wallace Swamp Creek Parks). Because of the uniqueness of Kenmore Park (rhododendron garden with rare species), maintenance of this park could be conducted under a cooperative/ joint use agreement between the City and County. For the City of Kenmore, the greatest expense for parks and recreation would be in construction of new facilities and maintenance.

Since most of Kenmore's park land is undeveloped, the City could begin to make regular investment to gradually improve the sites the City would assume after incorporation to the degree the community desired. Such projects could include restroom enhancements, new developed play and picnic areas, urban landscaping treatments, and other items. However, the presence of sensitive areas within several of the existing parks would constrain the ability to development them with additional active recreation facilities. Potentially, the City could further explore joint use arrangements with area schools to supplement recreation needs, which may have some cost benefits.

In 1996, the voters rejected a County-wide ballot measure called the "Recreation and Conservation Initiative" which was intended to fund a wide array of small and large open space projects throughout the County. One of the projects was to provide one million dollars of funding for athletic fields in the Kenmore area that would have served the needs of Kirkland, Bothell and Kenmore residents. Kenmore may want to pursue its own bond measure to build this facility at some future date.

For the first full year of operation of the City of Kenmore (1999) it is anticipated that the County would provide maintenance of all park land in the area at two-thirds the annual cost to the City, and the City would be responsible for the balance (i.e., the City would in effect be receiving a subsidy to ease the costs of transition). In 2000, the City would be responsible for two-thirds, while the County would pay the one-third balance. By the year 2001, the City would bear full financial and administrative responsibility for all local parks within Kenmore.

Libraries

The King County Library System provides library services to the Northshore area. The nearest King County libraries are located in Kenmore, Bothell, and Shoreline. The Kenmore library is located at 18138 73rd Ave NE, approximately one-half mile northeast of the site. The Kenmore library is located in a small portable facility. The Lake Forest library is also a relatively small facility. The Bothell and Shoreline libraries are larger, relatively new facilities built with funds from a countywide bond issue. Each facility provides on-line access to the entire library system catalog, and materials may be requested, obtained and returned at any library (requested items are delivered by the library system to the preferred library).

IMPACTS OF THE PROPOSED ACTION

Fire

With anticipated residential and commercial growth, greater demands will be placed on the fire districts serving the planning area (NSCP Draft EIS, page 271). However, the higher density pattern of development called for in the NSCP could be easier, faster, and less expensive to serve than a lower density, more dispersed pattern of growth (NSCP Draft EIS, page 271).

The Proposed Action would result in phased construction of 10 residential, commercial and office structures, recreational areas, roads and a marina at buildout, requiring fire protection and emergency services. Proposed structures would include approximately 1,200 residential units; 205,600 square feet of professional office space; and 438,600 square feet of retail and commercial space (including cinemas and hotel). In addition, a private moorage marina with approximately 53 boat slips would be provided. The new on-site residents, employees and visitors would generate additional fire protection and emergency service demands on District 16.

Using District 16's existing call-to-population rate of 67 calls per 1,000 population, the estimated Lakepointe population of 2,250 persons at buildout would generate approximately 151 fire/emergency service calls per year. This population-based call estimate would include calls to both residences and outdoor recreational areas. Using a rule-of-thumb suggested by District 16 (15 calls annually per 100,000 square feet of commercial/office space), the Proposed Action would generate approximately 97 fire/ emergency service calls per year to commercial and office uses. Therefore, the total estimated fire/ emergency service call volume generated by the Proposed Action at buildout would be approximately 248 calls per year, an increase of approximately 11 percent over the existing District 16 call volume. The project-related increase in call volume would occur gradually over a period of approximately 7 years.

Fire District 16 would respond to on-site fire/emergency calls from the headquarters station, as well as the Lake Forest Park station, depending on the severity of the call. Mutual aid assistance would be provided by neighboring districts as necessary. The expected response time from the headquarters station would remain at approximately two minutes as under existing conditions, although growth in peak hour traffic could slightly increase response times in the future.

With the Proposed Action, emergency access routes from SR 522 and 68th Ave NE would consist of the proposed Lakepointe Way and the existing NE 175th St. Within the site, emergency access would occur via NE Lakepointe Blvd through the center of the site and fire lanes around all of the proposed structures. Portions of the pedestrian trails/sidewalks on the site would be considered fire lanes and would be designed to accommodate the District's equipment. NE Lakepointe Blvd, a dead end, would include a turnaround with sufficient radius to allow turnaround of fire equipment. Fire flow of approximately 5,000 gallons per minute would be provided on the site. The Proposed Action would be required to meet the County's current fire safety codes, which would result in the provision of numerous built-in fire protection features such as:

- automatic sprinkler systems;
- standpipes;
- hydrants every 300 feet on-center;
- smoke and heat detection systems;
- fire alarm systems;
- pressurizing of stairwells;
- fire department automatic notification and communication systems;
- automatic monitoring of sprinkling and alarm systems;
- automatic elevator recall; and
- other applicable requirements.

The additional call volumes generated by the Proposed Action would contribute to increased demand for the District's services. However, the District does not expect significant adverse impacts on facilities,

equipment or staffing, assuming that adequate built-in fire protection features are provided in the proposal (Baker, 1997).

Police

Anticipated population growth in the planning area will place increased demands on the King County Sheriff's Department and will require additional personnel and equipment to maintain existing service levels (NSCP Draft EIS, page 272). However, a more concentrated, higher density pattern of development as called for in the NSCP could be easier and less expensive to serve than a low density, more dispersed pattern of growth.

Development of the Proposed Action would result in an increased demand for police protection. King County police staff would respond to additional residential and commercial-related calls for service at the Lakepointe site. Residential calls typically involve crimes such as domestic disputes, burglaries, vandalism and property theft. Commercial calls typically involve crimes such as shoplifting, disorderly conduct, assault and robbery. Calls could also be generated by recreation and marina users. During construction, calls may be generated by theft of lumber, supplies, equipment and appliances at residential and commercial building sites. Traffic accidents and violations generated by the proposed development would also contribute to increased volume of police activity in the area. On-site security personnel would likely be hired directly by on-site employers to monitor criminal activity.

Using the King County Sheriff's 1995 annual call-to-population ratio of 264 calls per 1,000 population, the Proposed Action's buildout population of 2,250 residents would generate approximately 594 additional police calls for service annually. This estimate includes calls that would be generated by the on-site commercial and recreational uses, because the countywide call-to-population ratio does not distinguish among calls from different uses.

Using the County's unofficial officer-to-population ratio of approximately one commissioned officer per 1,000 residents, the Proposed Action would generate demand for approximately 2.2 additional officers and associated equipment (i.e., a patrol vehicle) at buildout. King County monitors calls for service and departmental needs on an annual basis and adds or reassigns staff to its precincts as needed to address demands. Additional staffing is dependent on King County budget allocations. The Proposed Action is not expected to result in the need for facility improvements at the Precinct No. 2 station (Mathis, 1996).

King County police would aim to provide average response times to the site comparable to existing conditions. Assuming that areawide call volumes increase over time due to increased development in the area, the likelihood of multiple calls at a time would increase. This could cause longer average response times per call because the on-duty officers would have to prioritize calls. However, the proximity of the Precinct No. 2 station to the site would offer an advantage in response times to the site, as compared to a more remote site. Additional staffing, if provided in future budgets or staff assignments, would allow more on-duty personnel to handle multiple calls, with the goals of increasing levels of coverage and maintaining desired response times. Mutual aid assistance from the City of Bothell police would be provided as needed.

Schools

New and expanded school facilities will be needed to accommodate the growing numbers of Northshore families with school-age children (NSCP Draft EIS, page 275).

The Proposed Action would generate additional enrollment in the Northshore School District. The Proposed Action would result in 580 apartment units, 220 condominium units, and 400 senior housing units at buildout. The senior housing units would be assumed to not generate any additional student enrollment. Using the District's student estimation factor (0.266 students per multifamily dwelling unit), the 800 apartment and condominium units would generate approximately 213 additional students by buildout, of which approximately 113 would be elementary students, 53 would be middle school students and 47 would be high school students. Enrollment growth would occur gradually as phased development occurs through the buildout period. Students generated by the Proposed Action would attend Kenmore Elementary, Kenmore Junior High, and Inglemoor High School, unless future capacity conditions cause reallocation of students to different facilities, such as Bothell High School (Vaught, 1996). Using the District's class size standards, the students generated at buildout of the Proposed Action would create the need for 4.6 additional elementary school classrooms, 2.2 additional junior high classrooms, and 2.0 additional senior high classrooms.

Based on the enrollment projections and facility plans described in the District's 1996 Capital Facilities Plan, the District's enrollments would exceed the permanent capacity of the District's elementary, junior high and high school facilities through at least the 2001/2002 school year, with or without the Proposed Action (Table 37). This assumes that projected enrollment increases will occur as currently forecasted, and that the only capital facility improvements provided by the District will be those identified in the current Capital Facilities Plan. In order to house the students exceeding permanent facility capacity, the District would continue to use portable classroom facilities as necessary.

If the projected districtwide lack of permanent capacity occurs, the additional students generated by the Proposed Action would represent a significant impact on the District's facilities by contributing to the predicted overcapacity conditions. The collection of impact fees, as prescribed by the District's Capital Facilities Plan and King County Code 21A.43 (based on Ordinance 10162) would be the method of mitigating significant impacts on the District. These fees would be applied by the District to contribute to the funding of additional capital facilities.

Parks and Recreation

Population growth in the Northshore area will increase the demand on existing and future park and recreational facilities (NSCP Draft EIS, page 278).

With the Proposed Action, growth in resident and employee populations on the Lakepointe site would increase the use of existing recreational facilities and generate some demand for additional recreational facilities in the area.

Proposed Park and Recreational Facilities

The proposal includes a total of 21.2 acres of open space, or approximately 47 percent of the site, and would provide a range of recreational opportunities. The on-site open space would include approximately 5.5 acres in natural area and 15.7 acres in public park area, pedestrian walkways and trails, and paved open space. Approximately 70 percent of the proposed open space area on the site would be pervious, and 30 percent would be impervious. On-site park area would include a public amphitheater, open grass park area with benches, river view platforms, a children's play area (with natural play elements including grass, pebbles and interactive equipment, designed to meet King County Code standards for play equipment, KCC 21A.14.190), and on-site trails with a direct connection to the Burke-Gilman Trail. A health club available

for public membership is a probable tenant of commercial space on the site. The marina would accommodate public recreational boaters to the site. Public parking and restrooms (e.g., "trailhead" facilities) would be provided on the site for use by the general public.

The proposal would accommodate new public access to the Lake Washington waterfront on the site, which would be an important public amenity for the Kenmore community. The trails, waterfront amenities, outdoor park area, benches, view platforms, amphitheater and other outdoor recreational features would provide passive recreation opportunities for the on-site populations of residents and employees. The connection on the site to the Burke-Gilman Trail would provide access for residents and employees to the regional recreational bicycle network.

Some of the proposed public amenities, such as the Fragrant Garden and the waterfront esplanade, are amenities with intrinsic value for passive recreation. Areas along the esplanade could be used for rest areas (such as benches) and for interpretive locations (such as at the amphitheater and observation areas). Another feature, the intended private recreation club available for public membership, would accommodate recreational activity on the site, even though it would be privately owned. A determination of the total amount of on-site open space and recreational features that would meet King County recreation standards and applicable P-suffix conditions would be made as part of permit review. Please refer to the RELATIONSHIP TO PLANS AND POLICIES discussion of landscaping and public amenities for further discussion.

Relationship to King County Recreation Area Requirements and Park Standards

As indicated previously, KCC 21A.14.180 through .200 defines on-site recreation area requirements. Based on the proposed 600 studio/one bedroom units, 420 two bedroom units and 180 three bedroom units, the proposal would require 3.2 acres (139,200 square feet) of on-site recreation space. According to the King County definitions of on-site recreation area (KCC 21A.14.180), the Proposed Action would include approximately 11.5 acres (500,000 sq. ft.) of recreation area, exceeding required on-site recreation area by approximately 8.5 acres. The 11.5 acres of on-site area meeting the King County definition of recreation area would consist of approximately 8.5 acres of Lake Washington and Sammamish River Shoreline Park (includes only 50 percent of the biofiltration swales and none of the stormwater retention area), 1.2 acres in shoreline trail and amphitheater, and 1.80 acres in esplanade. Because the specific amount of indoor recreation area included in the Proposed Action has not been defined, indoor recreation area is not included in the recreation area calculations. A final determination on the total amount of on-site recreation area that would meet King County recreation area requirements would be made as part of permit review. If King County determines that the requirements of KCC 21A.14.180 have not been met, fees-in-lieu of recreation space could be provided by the applicant. The acceptance of such fees would be at the County's discretion per KCC 21A.14.185.

Using the County Park Plan's local park acreage guideline of 7.5 acres per 1,000 residents, the Proposed Action's 2,250 additional residents at buildout would generate the need for 16.9 acres of additional local park space. This would represent a portion of the growth-related park acreage needs associated with forecasted population increases identified in the NSCP Draft EIS in 1991. The additional residents would contribute to the need for approximately one-half of an additional baseball field and softball field, and approximately one-fourth of a soccer field and basketball/sport court. The expected senior citizen status of approximately 750 residents of the total estimated 2,250 residents, however, should be noted with respect to active recreation demands. Assuming that senior citizens would not appreciably contribute to demands for basketball courts, or baseball, softball and soccer fields, the Proposed Action would contribute to the

need for approximately 0.4 of an additional baseball field and softball field, and approximately 0.2 of a soccer field and basketball/sport court.

The recreational open space contained in the Proposed Action would accommodate a portion of the recreational demands of on-site residents, such as demands for passive recreation, walking and informal public events (e.g. outdoor performances). The on-site paved areas would also support active recreation such as jogging and rollerblading, and a health club with public membership may locate on the site. However, the proposed on-site recreational opportunities do not include public outdoor athletic facilities such as tennis courts or soccer fields. On-site residents would need to travel to off-site locations for these active recreational facilities.

Impacts on Existing Facilities

Even with the provision of on-site recreation opportunities, existing public park facilities near the site, including Tracy Owen Station Park (Logboom Park), the Burke-Gilman Trail and Kenmore Park would likely experience increased use by on-site residents and employees. Other nearby parks, such as St. Edwards State Park, Big Finn Hill Park and Denny Park, would also likely experience increased use due to project-related population growth.

A new street would overpass the Burke-Gilman Trail near the existing 65th Ave NE/NE 175 St intersection. At this overpass, the Trail would need to be re-graded to a lower elevation. This re-grading would temporarily inconvenience Trail users, but would not significantly affect the long-term use of the Trail. The overpass would improve the Trail by eliminating one existing road crossing of the trail.

The additional on-site resident and employee population would likely increase the number of Burke-Gilman Trail users in the vicinity. Pedestrians traveling to/from the site and SR 522 transit stops would increase foot traffic crossing the Trail. This could increase the potential for pedestrian/bicyclist and pedestrian/skater conflicts.

The proposed marina would generate additional recreational boat traffic in Lake Washington west of the site. Access to the marina would be via the inner harbor which is separated from the mouth of the Sammamish River by a significant non-navigable, shallow area along the site frontage of Lake Washington. In addition, the marina would be primarily limited to long-term moorage with no public transient moorage allowed (except for the limited moorage provided for guests of residents and customers of on-site businesses). Therefore, boat traffic generated by the Proposed Action would be limited and would not be expected to interfere with boat traffic at the boat launch itself or recreational boat traffic on the lake (refer to the TRANSPORTATION section for further details).

Libraries

Development of the Proposed Action would result in an increased demand for library services at the Kenmore branch and possibly the Bothell, Lake Forest and Shoreline branches of the King County Library System. Such increases in demand could contribute to the need for improvements in the library facility at Kenmore.

The King County Library System would not be expected to experience significant adverse impacts from the Proposed Action. A portion of the population that would live at the site already reside within King County, and would not represent a source of new demand to the library system as a whole.

ALTERNATIVES

Alternative 1: Conceptual Master Plan in the Northshore Community Plan

Fire

Alternative 1 would provide 1,000 residential units and 500,000 square feet of commercial space, or 200 fewer residential units and 144,000 square feet less commercial space than the Proposed Action. A total of 1,875 residents would be expected at buildout of Alternative 1, 375 fewer than the Proposed Action. The proposed commercial uses would not include a hotel and less structured parking area would be required.

Using the District's existing call rate per 1,000 population, the total resident population at buildout of Alternative 1 would generate approximately 126 calls for fire/emergency services per year. Using the District's rule of thumb for calls generated by commercial space, approximately 75 calls per year would be generated by Alternative 1 commercial space at buildout. Thus, the total annual fire/emergency service call volume estimated to be generated by Alternative 1 at buildout would be approximately 201 calls compared to 248 calls (or 47 fewer) than for the Proposed Action.

Emergency access routes would be conceptually similar to the Proposed Action, varying only according to the specific layout of streets and fire lanes. Provision of fire safety features in the proposed structures under Alternative 1 would be similar to the Proposed Action, except the reduction in size of facilities and elimination of the hotel would result in a smaller overall fire/emergency protection system.

Overall impacts on the Fire District's facilities, staffing and equipment would be marginally less than the Proposed Action, due to an average of 47 (19 percent) fewer calls per year.

Police

Using the County's 1995 annual call-to-population ratio of 264 calls per 1,000 population, Alternative 1's buildout population of 1,875 residents would generate approximately 495 additional police calls for service annually, 99 (or 17 percent) fewer calls than the 594 calls estimated for the Proposed Action. This estimate incorporates calls that would be generated by the on-site commercial and recreational uses. The Alternative 1 buildout population would generate the need for approximately 1.9 officers, using the County's unofficial officer-to-population ratio, as compared to 2.2 officers under the Proposed Action.

Schools

Alternative 1 would result in a total of 1,000 multifamily dwelling units compared to 1,200 units for the Proposed Action. Of these, 900 would be non-senior dwelling units, compared to 800 non-senior dwelling units under the Proposed Action. Using the District's student estimation factor (0.266 students per multifamily dwelling unit), Alternative 1 would generate approximately 239 students at buildout, 26 (or 12 percent) more students than estimated for the Proposed Action. Of these students, approximately 127 would be elementary students, 60 would be junior high students and 52 would be high school students. Using the District's class size standards, the students generated at buildout of Alternative 1 would create the need for 5.2 additional elementary school classrooms, 2.5 additional junior high classrooms, and 2.2 additional senior high classrooms.

Based on the projected enrollments and the District's projected lack of permanent facility capacity, Alternative 1 would result in impacts on the District, similar to, but approximately 12 percent greater than, the Proposed Action. If Alternative 1 was implemented, impact fees would be calculated consistent with King County Code 21A.43, as described above for the Proposed Action, resulting in greater total fees than under the Proposed Action.

Parks and Recreation

Alternative 1's open space and recreational features, including a children's play area, would be designed to be consistent with the recreation space requirements in KCC 21A.14.180 through .200. The exact area of required recreational space would be calculated during King County's permit review, but would be slightly less than the Proposed Action, and would likely exceed the minimum required space. Depending on King County's evaluation of the proposed recreation areas, fees-in-lieu of recreation space may be accepted by the County for Alternative 1.

Using the County Park Plan's local park acreage guideline of 7.5 acres per 1,000 residents, Alternative 1's 1,875 additional residents at buildout would generate the need for 14.1 acres of additional local park space, 2.8 acres less than for the Proposed Action. This would represent a portion of the growth-related park acreage needs identified in the NSCP Draft EIS in 1991. The additional residents would contribute to the need for approximately 0.4 of an additional baseball field and softball field, and 0.2 of a soccer field and basketball/sport court, slightly less than the Proposed Action. The expected senior citizen status of approximately 190 residents of the total estimated 1,875 residents, however, should be noted with respect to active recreation demands. Assuming that senior citizens would not appreciably contribute to demands for basketball courts, or baseball, softball and soccer fields, Alternative 1 would contribute to the need for approximately 0.3 of an additional baseball field and softball field, and approximately 0.2 of a soccer field and basketball/sport court. The total amount of open space on the site under Alternative 1 would be approximately 18.8 acres, or 2.4 acres less than the Proposed Action. The area in shoreline park would be less than under the Proposed Action, with less public access along the river (due to private townhomes in this area), reduced amount of waterfront esplanade, and roads and parking lots replacing some open space in the southeast portion of the site.

Similar to the Proposed Action, the recreational open space contained in Alternative 1 would accommodate a portion of the passive recreational, walking and informal public activity demands of on-site residents. The on-site paved areas would also support active recreation such as jogging and rollerblading, and a health club with public membership may locate on the site. However, similar to the Proposed Action, Alternative 1's on-site recreational opportunities do not include public outdoor athletic facilities such as tennis courts or soccer fields. On-site residents would need to travel to off-site locations for these active recreational facilities.

Alternative 1 would generate increased use of existing public park facilities near the site, including the Burke-Gilman Trail, similar to but less than the Proposed Action. If these impacts were proportional to on-site population, Alternative 1 would generate about 18 percent less demand for these facilities than the Proposed Action.

Similar to the Proposed Action, the marina under Alternative 1 would generate additional boat traffic in Lake Washington west of the site. Boat traffic generated by Alternative 1 is not expected to interfere with boat traffic at the boat launch itself or general traffic on the lake.

Libraries

Alternative 1 would result in slightly less potential for impacts on the Kenmore library than the Proposed Action, due to 375 fewer residents.

Alternative 2: No Action Alternative

Under the No Action Alternative, existing site uses would continue, and there would be no additional impact on provision of fire protection, police, school, park/recreation and library services beyond existing conditions.

MITIGATION MEASURES

Fire

Required by Code

- All proposed structures would be designed to meet up-to-date fire safety/prevention standards, including those in the Uniform Fire Code and other applicable King County fire safety/prevention regulations.
- The site plan would provide adequate fire/emergency vehicle access to all portions of the site via fire lanes, as required by King County.

Proposed by Applicant

- Tax revenues generated by development would be available to contribute to future staff and equipment improvements in Fire District 16 (NSCP Draft EIS, 1991).

Police

Proposed by Applicant

- Security measures, including secured areas and adequate lighting, would be provided during construction, to reduce or eliminate potential problems such as material theft or vandalism.
- Adequate lighting of outdoor public areas and parking garages on the developed site would enhance overall security and public safety.
- On-site security personnel hired directly by on-site employers would enhance overall security and public safety.
- Tax revenues generated by development would be available to contribute to future staff and equipment improvements in the King County Sheriff's Department.

Potential

- Community crime prevention programs could be developed, which could reduce the demand for police services from the Proposed Action.

Schools

Required by Code

- The applicant would pay impact fees to the Northshore School District to help offset the impacts of additional project-generated students. Impact fee calculations would occur consistent with requirements of the District's Capital Facilities Plan and King County Code 21A.43. The entire amount of the school impact fees would be collected at the time of residential building permit application. KCC 21A.43 also describes impact fee credits for provision of affordable housing. Fees and credits would be coordinated according to KCC 21A.43. Phasing of the Proposed Action's residential development would enhance the District's ability to provide facilities to accommodate enrollments generated by the Proposed Action.

Proposed by Applicant

- The applicant would coordinate with the Northshore School District regarding provision of school bus access and student collection points.

- Tax revenues generated by development would be available to contribute to future facility and staffing improvements in the Northshore School District.

Parks and Recreation

Required by Code

- The Proposed Action would be required to comply with the on-site recreation area requirements of King County Code 21A.14.

Proposed by Applicant

- The Proposed Action would provide numerous outdoor recreation features such as outdoor park area, shoreline access trail, waterfront amenities, amphitheater, water viewing platforms, paths and gardens that would be accessible to the general public and on-site residents (including senior citizens) for passive recreation uses.

- The Proposed Action would provide a direct link to the Burke-Gilman Trail that would allow residents to use the regional trail system for bicycling, rollerblading and walking.

Libraries

Proposed by Applicant

- Tax revenues generated by development would be available to contribute to future improvements in the King County Library System.

UNAVOIDABLE SIGNIFICANT ADVERSE IMPACTS

Fire

Population, employment and recreational uses associated with the Proposed Action would increase fire protection and emergency aid demands in Fire District 16. With the proposed mitigation measures, no unavoidable significant adverse impacts are expected.

Police

Population, employment and recreational uses associated with the Proposed Action would increase police protection demands on the King County Sheriff's Department. With the proposed mitigation measures, no unavoidable significant adverse impacts are expected.

Schools

The Proposed Action would generate additional student enrollments in the Northshore School District, contributing to forecasted total student populations that could exceed the permanent facility capacity of the District. With the proposed mitigation measures, no unavoidable significant adverse impacts are expected.

Parks and Recreation

According to King County Park Plan guidelines, the Proposed Action would generate added demand for active recreational facilities, such as ballfields, in the Northshore area.

Libraries

The Proposed Action would generate additional demands on the King County Library System, including the Kenmore Library. With the proposed mitigation measures, no unavoidable significant adverse impacts are expected.

UTILITIES

AFFECTED ENVIRONMENT

Water Supply

The Northshore Utility District supplies water to existing users on the site and in the vicinity. There are 12-inch diameter water mains in both 68th Ave NE and NE 175th St, with existing pressure of approximately 125 pounds per square inch (psi). Existing fire flow available in the site vicinity is approximately 5,000 gallons per minute (gpm), based on water availability certificates received from the District for this project. An existing 8-inch cast iron/ductile iron water main constructed in 1974 and 1980 provides domestic water and fire flow to existing uses on the site.

The Northshore Utility District provides domestic water from three reservoirs located at NE195th St/5th Ave NE, 88th Ave NE/NE 190th St, and NE 150th St/81st Ave NE. All reservoirs are tied into the system that serves the project site. The District's planning documents indicate a total 1993 metered average water consumption of 4.9 million gallons per day (mgd) (KPFF, 1997). The Utility District's water consumption forecast based on area zoning is 6.9 mgd in the year 2002 and 7.2 mgd in 2012. Water consumption that would be generated by the Proposed Action was considered in these estimates. The District has indicated they have ample capacity and no deficiencies in terms of service within its area (KPFF, 1997).

Sewer/Solid Waste

Sewer

The Northshore Utility District supplies sanitary sewer service to existing users on the site and in the vicinity. There is a 42-inch diameter reinforced concrete pipe gravity sewer main in NE 175th St. Existing sanitary sewer services on the site connect to the 42-inch gravity sewer by way of 8-inch PVC gravity mains. The District is tributary to King County Department of Natural Resources' (formerly METRO) Seattle West Point Treatment Plant and Renton Treatment Plant.

A pump station is located adjacent to the northern portion of the site. Other sewer mains associated with this pump station include a 78-inch diameter pipe, and two 132-inch diameter pipes are located under the Burke-Gilman Trail. Existing buildings east of the pump station connect by gravity main to the 78-inch pipe.

Solid Waste

Unincorporated areas of King County are served by private garbage collection companies, which receive franchises through the Washington State Utilities and Transportation Commission (WUTC). Eastside Disposal currently serves the Kenmore area. Refuse is taken to the Houghton Transfer Station in Kirkland, and then to the Cedar Hills Regional Landfill. Eastside Disposal provides full residential recycling service for glass, aluminum, tin, cardboard, mixed paper, newspaper, and plastic bottles.

The King County Comprehensive Solid Waste Management Plan (CSWMP) guides the County's solid waste planning. A waste characterization study in the 1992 CSWMP estimated waste disposal rates of 0.26 tons/multifamily resident/year, and 0.73 tons/commercial employee/year. These are equivalent to rates of 1.42 pounds/multifamily resident/day, and 4.0 pounds/commercial employee/day (CSWMP, Appendix B, 1992).

Some of the existing commercial/industrial uses on the site generate solid waste, likely including cardboard, wood, plastic and paper. Also, a stockpile of construction debris, including waste roofing materials, was removed from a portion of the site in 1996 (refer to the TOXIC AND HAZARDOUS section for details).

Energy

Electrical service in the site vicinity is provided by Puget Sound Energy (formerly known as Puget Sound Power and Light Company). Electrical facilities in the Northshore area include a major north-south 230 kV power line corridor in the western portion of the Northshore area, substations and a network of 115 kV transmission lines (NSCP, 1991). Existing on-site uses are served by underground transmission lines along NE 175th St. Future growth in the Northshore area will require additional energy supplies. Puget Sound Energy expects an increase of approximately 220 megawatts in energy demand over the next thirty years. Meeting this demand will require approximately eight 25-megawatt substations or approximately one substation every three to four years over the thirty-year period. It is also likely that increased energy demands will require the routing of additional transmission lines through the area (NSCP, 1991).

Puget Sound Energy (formerly known as Washington Natural Gas) provides natural gas service to the site vicinity. The system consists of a network of mains and distribution lines located throughout the area. The nearest gas mains are a 4-inch high pressure line along NE 175th St and a 6-inch high pressure line along 68th Ave NE. Decisions to expand the existing system are guided by long-range plans developed within the company and existing system capabilities. It is the general policy of Puget Sound Energy to construct as many interties as possible within its existing system before seeking additional connections to its supply line, Northwest Pipeline (NSCP EIS, 1991). This policy ensures that maximum efficiency is obtained from the existing distribution and supply system. When no further expansion can occur efficiently, a new connection to the pipeline will be made to furnish additional supplies (NSCP EIS, 1991).

IMPACTS OF THE PROPOSED ACTION

Water Supply

The Proposed Action would obtain water for domestic, irrigation and fire protection purposes through extensions from the existing water lines in 68th Ave NE and NE 175th St. The on-site water lines would be installed in a looping configuration around the site perimeter and under NE Lakepointe Blvd, with extensions to the proposed structures. Fire protection for the area along NE Lakepointe Blvd is proposed to be a 12-inch diameter private system with combined domestic and fire main within the building.

The Proposed Action would generate domestic water demands as shown in Table 39. Residential demand is based on 90 gallons per person per day, and an assumed occupancy of 3.5 persons per residence, based on Utility District criteria. It should be noted that this assumed occupancy is inconsistent with the average permanent population of 1.875 persons per residence used in the POPULATION AND HOUSING section of this EIS. The latter ratio is considered to be more applicable for population estimates, since it is based on 1990 population and housing data (refer to the POPULATION AND HOUSING section). This level of demand would result in residential water use of approximately 138 million gallons per average year at buildout. Commercial/retail water demand would be an estimated 33 million gallons per year at buildout. Water use for irrigation is estimated at 1.7 million gallons per year (peak day of 37,000 gallons per day) at buildout. Therefore, total site water demand is estimated as approximately 173 to 174 million gallons per year at buildout, or approximately 475,000 gallons per day.

Estimated fire flow demands of the Proposed Action would be approximately 3,500 gpm for a four-hour duration (actual fire flow requirements would be determined by the King County Fire Marshal). The Northshore Utility District would be able to supply the needed volumes of water to serve the Proposed Action (KPFF, 1997). Water District boundary expansion would not be necessary. Water availability certificates for the proposed project were submitted with the Commercial Site Development Permit application.

Table 39
Estimated Domestic Water Demands of the Proposed Action

PHASE	AVERAGE DAY	PEAK WEEK	PEAK 4-MONTH	AVERAGE YEAR
1	0.25 MG	2.6 MG	33 MG	92 MG
2	0.06 MG	0.6 MG	8 MG	21 MG
3 & 4	0.07 MG	0.8 MG	10 MG	28 MG
5	0.07 MG	0.8 MG	10 MG	28 MG
6	0.02 MG	0.1 MG	2 MG	5 MG
TOTAL	0.47 MG	4.9 MG	63 MG	174 MG

Source: KPFF, 1997

Sewer/Solid Waste

Sewer

The Proposed Action would obtain sanitary sewer service by extension from the existing sewer line in NE 175th St. A main sewer line would be provided under NE Lakepointe Blvd, and individual buildings would connect to this main sewer line. A pump station may be required, depending on the location and elevation of the sewer connection to the existing 42-inch diameter gravity system in NE 175th St. This pump station would likely be incorporated below-grade, beneath the Lakepointe Way roadway structure or within the lower parking level. The design elevation of the connection would be important, to avoid sewer backup into the site system during high-flow periods. Detailed design of the system would determine the need for this possible pump station. All sewer lines outside of proposed structures would be sized using design criteria provided by the Northshore Utility District and the Washington State Department of Ecology's *Criteria for Sewage Works Design.* Sewer lines inside the buildings would be sized using the Uniform Plumbing Code.

The Proposed Action would generate daily wastewater volumes of approximately 357,000 gpd, or 130 million gallons per year, based on Northshore Utility District criteria of 85 gallons per person per day, and 3.5 persons per residence. Proposed commercial/retail uses would generate daily wastewater flows of approximately 82,200 gpd, or about 30 million gallons per year, based on a conservative estimate of 1,800 gallons per acre of commercial/retail use per day. Therefore, the total estimated wastewater volume generated by the Lakepointe project at buildout would be approximately 160 million gallons per year, or about 440,000 gallons per day. The Northshore Utility District would be able to accommodate the expected additional wastewater volume. King County Department of Natural Resources confirms that existing sewage facilities would have the capacity to treat sewage generated by the Proposed Action (KPFF,1997).

Sewer availability certificates were submitted with the Commercial Site Development Permit application.

Solid Waste

Using the factors cited in the CSWMP, the Proposed Action would generate an estimated 1,512 tons of solid waste per year from residential and commercial sources (approximately 4.1 tons per day). Residential

uses would generate an estimated 585 tons for disposal per year, and commercial uses would generate an estimated 927 tons per year (based on an estimated 1,270 employees). Eastside Disposal would provide solid waste collection and residential recycling services to the site. Provision is made for recycle/trash centers and storage areas at grade level (elevation 25), beneath each building parcel development. Service access to these areas would be along the service corridor road at elevation 25. As required by King County, construction, demolition and land clearing debris would be transported to approved disposal locations. Any materials deemed contaminated would be transported to an approved site identified in the site remediation plan currently being formulated by the DOE, in cooperation with the landowner.

Energy

Puget Sound Energy has indicated that the existing electrical system has adequate capacity to serve the entire project (KPFF, 1997). Upgrades to some localized lines and transformers may be required. Puget Sound Energy has indicated they would determine the exact scope of upgrades at the building permit stage of on-site improvements.

Puget Sound Energy has indicated that the existing natural gas system has adequate capacity to serve the Proposed Action (KPFF, 1997). They have indicated that the location of site-specific natural gas improvements would be identified at the building permit stage of on-site improvements.

ALTERNATIVES

Alternative 1: Conceptual Master Plan in the Northshore Community Plan

Water Supply

Total water consumption and domestic flow rates for Alternative 1 would be approximately 80 percent of the Proposed Action, based on the number of residential units and amounts of commercial square footage contemplated under Alternative 1. The fire flow requirements would be similar to the Proposed Action since fire flow is governed by individual building sizes rather than the number of individual units.

Sewer/Solid Waste

Total sewage flows and solid waste generation for Alternative 1 would be approximately 80 percent of the Proposed Action.

Natural Gas and Electricity

Total use of natural gas and electricity for Alternative 1 would be approximately 80 percent of the Proposed Action.

All other impacts on utility systems would be similar to the impacts that would result from the Proposed Action.

Alternative 2: No Action Alternative

Under the No Action Alternative, existing uses of the site would continue; no additional impacts on the provision of utilities would result.

MITIGATION MEASURES

Required by Code

- As part of the permit review process, the King County Fire Marshal would verify that adequate water is available from the Northshore Utility District to provide the fire flow volumes required by the Proposed Action.

- Sewer lines outside of proposed structures would be sized using design criteria provided by the Northshore Utility District and the Washington State Department of Ecology's *Criteria for Sewage Works Design.* Sewer lines inside the buildings would be sized using the Uniform Plumbing Code.

- Construction, demolition and land clearing debris would be transported to approved disposal locations.

Proposed by Applicant

- The applicant would coordinate with Eastside Disposal to arrange provision of recycling services to the site.

UNAVOIDABLE SIGNIFICANT ADVERSE IMPACTS

Water

No unavoidable significant water system impacts are expected.

Sewer/Solid Waste

No unavoidable significant sewer or solid waste impacts are expected.

Energy

No unavoidable significant electricity or natural gas impacts are expected.

LIST OF REFERENCES

The primary references within this EIS are the technical reports contained in Appendices A - J to this document. Please refer to these appendices for more detailed information on the topics they address.

Several references are "incorporated by reference" into this EIS, as discussed on page 2-4. These include:

Geotech Consultants, Inc. *Phase I Environmental Audit – Kenmore Pre-Mix Site*. September 24, 1990, 22 pp. + Appendices A-C.

Geotech Consultants, Inc. *Phase II Environmental Study – Kenmore Pre-Mix Site*. November 30, 1990, 25 pp.

King County. *Kenmore Traffic Circulation Study - A Conceptual Alternatives Evaluation*. Prepared by The TRANSPO Group, September 11, 1989.

King County Department of Parks, Planning and Resources. *Draft EIS, Executive Proposed NSCP Update*. Prepared by Huckell/Weinman Associates, Inc., Herrera Environmental Consultants, Inc., and KJS Associates, Inc., May 7, 1991, 299 pp. + Appendices A-C.

King County Department of Parks, Planning and Resources. *Final EIS, Executive Proposed NSCP Update*. Prepared by Huckell/Weinman Associates, Inc., Herrera Environmental Consultants, Inc., and KJS Associates, Inc., December 7, 1992, 193 pp.

King County Department of Public Works. *Feasibility Analysis: Kenmore Central Business District Traffic and Access Study - Final Report*. Prepared by David Evans and Associates, Inc., March 5, 1993, 85 pp. + Appendices A-F.

King County Planning and Community Development Division. *NSCP Update and Area Zoning* (as amended by Ordinance 11653). February 11, 1993, 281 pp. + Appendices 1-4.

Pioneer Towing, Inc., Lakepointe, and King County. *Lakepointe Transportation Analysis for NSCP and Area Zoning Amendment*. Prepared by The TRANSPO Group, Inc., December 9, 1994, 81 pp. + Appendices A-F.

King County Department of Parks, Planning and Resources. *Supplemental Draft EIS, King County Comprehensive Plan.* Prepared by Huckell/Weinman Associates, Inc., June 1994, 309 pages + Appendices A-F.

King County Department of Parks, Planning and Resources. *Final EIS, King County Comprehensive Plan.*_Prepared by Huckell/Weinman Associates, Inc., November 1994, 250 pages.

Trammell Crow Company. *Groundwater Monitoring Report – Kenmore Site, Kenmore, Washington*. Prepared by SEACOR, January 7, 1992, 15 pp. + Appendix

The following list is organized by element of the environment addressed in this EIS. The following list includes several references that were originally cited in the technical report by Beak Consultants. For the sake of brevity, this reference list directs the reader to the page where the full citation is listed in the Beak Consultants report.

EARTH

U.S. Department of Agriculture, Soil Conservation Service, *Soil Survey of King County*, 1973.

U.S. Geological Survey, *A Study of Earthquake Losses in the Puget Sound, Washington Area*, 1975. USGS Open File Report 75-375.

AIR QUALITY

Washington Department of Ecology, 1991. Regarding pollutant emission sources.

Puget Sound Air Pollution Control Agency, *Air Quality Data Summary*, 1995, 1996.

Puget Sound Air Pollution Control Agency, Personal communications with Ken Knowle, December 1996, October 1997.

Puget Sound Air Pollution Control Agency, Regulation 1, Addressing dust controls during construction, no date.

U.S. Environmental Protection Agency, Statement regarding National Ambient Air Quality Standards, 1997.

WATER

Washington Department of Ecology, Regarding Water Quality Limited designation, 1994. Please see Beak Consultants (Appendix B) page 2-52 for full reference.

Washington Department of Ecology, Regarding Section 303d of 1972 Federal Clean Water Act. Please see Beak Consultants (Appendix B) page 2-52 for full reference.

Washington Department of Ecology, State surface water quality standards, 1992. Please see Beak Consultants (Appendix B) page 2-52 for full reference.

Washington Department of Ecology, Stormwater Management Manual for the Puget sound Basin, 1991. Please see Beak Consultants (Appendix B) page 2-52 for full reference.

Lynch and Corbett, 1990. Please see Beak Consultants (Appendix B) page 2-49 for full reference.

Nussbaum, 1990. Please see Beak Consultants (Appendix B) page 2-50 for full reference.

City of Austin, 1990; EPA, 1993; King County, 1993. Please see Beak Consultants (Appendix B) pages 2-48, 2-49, 2-52 for full reference.

KPFF, 1997. Please see Beak Consultants (Appendix B) page 2-49 for full reference.

Watson et al, 1989. Please see Beak Consultants (Appendix B) page 2-53 for full reference.

Canning, 1988. Please see Beak Consultants (Appendix B) page 2-47 for full reference.

Novotny and Kincaid, 1981. Please see Beak Consultants (Appendix B) page 2-50 for full reference.

Gjessing et al, 1984. Please see Beak Consultants (Appendix B) page 2-48 for full reference.

King County, 1993. Please see Beak Consultants (Appendix B) page 2-49 for full reference.

U.S. Department of Health and Human Services, 1993. Please see Beak Consultants (Appendix B) page 2-52 for full reference.

PLANTS AND ANIMALS

Washington Department of Fish and Wildlife (WDFW), 1996. Priority Habitats and Species database review.

Fisher, L., WDFW letter to King County, January 5, 1996.

Pfeifer and Weinheiner, 1992, King County, 1993. Please see Beak Consultants (Appendix B) page 3-77 for full reference.

Wydoski and Whitney, 1979. Please see Beak Consultants (Appendix B) page 3-79 for full reference.

King County, 1993, Regarding fisheries. Please see Beak Consultants (Appendix B) page 3-76 for full reference.

Gleason, August 1996. Personal communication regarding moorage of fishing boats in inner harbor. Please see Beak Consultants (Appendix B) page 3-74 for full reference.

Scott and Crossman, 1973. Please see Beak Consultants (Appendix B) page 3-77 for full reference.

Bartoo, 1972. Please see Beak Consultants (Appendix B) page 3-73 for full reference.

Olney, 1975. Please see Beak Consultants (Appendix B) page 3-77 for full reference.

Ricker, 1941. Please see Beak Consultants (Appendix B) page 3-77 for full reference.

Stein, 1970. Please see Beak Consultants (Appendix B) page 3-77 for full reference.

Helfman, 1981. Please see Beak Consultants (Appendix B) page 3-75 for full reference.

Levy, 1987. Please see Beak Consultants (Appendix B) page 3-76 for full reference.

Eggers, 1978. Please see Beak Consultants (Appendix B) page 3-74 for full reference.

Jeppson, 1957. Please see Beak Consultants (Appendix B) page 3-75 for full reference.

Martz, 1996. Please see Beak Consultants (Appendix B) page 3-76 for full reference.

Tabor and Chan, 1996. Please see Beak Consultants (Appendix B) page 3-78 for full reference.

Sparling and Candela, 1996. Please see Beak Consultants (Appendix B) page 3-77 for full reference.

King County, 1993. Regarding water temperatures. Please see Beak Consultants (Appendix B) page 3-76 for full reference.

U.S. Environmental Protection Agency, 1986, Bell, 1990. Please see Beak Consultants (Appendix B) pages 3-78 and 3-73 for full reference.

Washington Department of Fish and Wildlife, no date. Lake Washington/Lake Sammamish Access Map and Game Fish Guide.

Beauchamp et al, 1994. Please see Beak Consultants (Appendix B) page 3-73 for full reference.

White, 1975. Please see Beak Consultants (Appendix B) page 3-78 for full reference.

Hotchkiss, D., Personal communication, June 20, 1996. Please see Beak Consultants (Appendix B) page 3-75 for full reference.

U.S. Coast Guard, 1995. Please see Beak Consultants (Appendix B) page 3-78 for full reference.

NOISE

King County Noise Regulations, KCC 12.88-12.100.

Seattle Noise Limits.

U.S. Environmental Protection Agency, 1974. "Levels Document."

U.S. Department of Transportation, 1982. Regarding Federal Highway Administration guidelines.

Kirkpatrick, 1996, Personal communication regarding Kenmore Pre-Mix operations.

TOXIC AND HAZARDOUS MATERIALS

Washington Department of Ecology, Lakepointe Site Hazard Assessment, February 1992.

Washington Department of Ecology. Waste Ranking Method, WAC 173-340.

LAND USE/RELATIONSHIP TO PLANS AND POLICIES

King County Comprehensive Plan, 1994.

King County Shoreline Management Master Program, 1981.

Washington State Growth Management Act, RCW 36.70A.

King County Countywide Planning Policies, 1994, amended 1995.

Northshore Community Plan Update and Area Zoning, February, 1993.

Executive Proposed Northshore Community Plan Update Draft Environmental Impact Statement, May 1991.

The Transpo Group, *Lakepointe Transportation Analysis for Northshore Community Plan and Area Zoning Amendment,* December 1994.

King County P-suffix conditions regarding Lakepointe site.

Phillip K. Kushlan and Associates, *Analysis of the Feasibility of the Proposed City of Kenmore,* 1997.

POPULATION AND HOUSING

King County, *Annual Growth Reports*, 1995, 1996.

King County, *King County Consolidated Housing and Community Development Plan for 1996-1999"*, 1995.

Seattle-Everett Real Estate Research Committee, *Seattle-Everett Real Estate Report, Spring 1996*, 1996.

HISTORIC AND CULTURAL PRESERVATION

Sundberg, Charlie, King County, Personal communication regarding historic/cultural resources in Northshore area, 1996.

TRANSPORTATION

Washington Department of Transportation, Annual Traffic Reports, 1994, 1995.

King County Transportation Needs Report, 1997.

King County Nonmotorized Transportation Plan, 1993.

National Transportation Safety Board, Regarding seaplane safety, no date.

PUBLIC SERVICES

King County Sheriff's Department, Personal communication with Rob Mathis, October 1996.

King County Sheriff's Department, Personal communication with and data from Joe Lewis, December 1995.

King County Sheriff's Department, Personal communication with and data from Grace Mitchell, January, 1997.

King County Sheriff's Department, Personal communication with and data from Jim Hillmar, February, 1997.

King County Fire District 16, Personal communication with and data from Bob Peterson, February 1997.

King County Fire District 16, Personal communication with and data from Chief Fred Baker, January 1997.

Northshore School District, *1996 Capital Facilities Plan*, 1996.

Northshore School District, Personal communications with and data from Dan Vaught, Carole Shaw, October and December 1996, February 1997.

King County, *King County Park, Recreation and Open Space Plan*, 1996.

UTILITIES

King County, *King County Comprehensive Solid Waste Management Plan,* 1992.

King County DDES, Certificates of Sewer and Water Availability, September 1996.

Lakepointe Draft EIS
Distribution/Notification List

Federal Agencies

Army Corps of Engineers
Department of Housing and Urban Development
Environmental Protection Agency
Federal Aviation Administration
Fish and Wildlife Service

Washington State Agencies

Department of Ecology
Department of Fish and Wildlife
Department of Natural Resources
Parks & Recreation Commission
Department of Transportation
Department of Community, Trade
and Economic Development
Utilities and Transportation Commission

King County Government

Department of Natural Resources - Solid Waste Division
Department of Natural Resources - Wastewater Treatment Division
Department of Natural Resources - Water and Land Resources Division
Department of Parks and Recreation
Department of Public Safety - Marine Unit
Department of Public Safety - Sheriff
Department of Transportation - Road Services Division
Department of Transportation - Transportation Planning Division
Fire Marshall
Metropolitan King County Council
Office of Cultural Resources - Landmarks and Heritage Program
Office of Cultural Resources - Public Art Program
Strategic Planning Functions - Economic Development
Strategic Planning Functions - Growth Management

Regional/Local Agencies

Bothell Water & Sewer Department
Fire Protection District No. 4 (Shoreline)
Fire Protection District No. 5 (Lake Forest Park)
Fire Protection District No. 16 (Bothell)
Fire Protection District No. 36 (Woodinville)
Fire Protection District No. 41 (Kirkland)
Lake Forest Park Water Department
Northshore School District No. 417
Northshore Utility District
Puget Sound Air Pollution Control Agency
Puget Sound Regional Council
Puget Sound Energy
Redmond Sewer Utility
Regional Transit Authority
Seattle-King County Department of Public Health
Shoreline School District No. 412
Shoreline Wastewater Management District
Shoreline Water & Sewer District
Water District No. 83

Cities

Bellevue
Bothell
Kirkland
Lake Forest Park
Redmond
Seattle
Shoreline
Woodinville

Tribes

Duwamish Indian Tribe
Lummi Nation
Muckleshoot Indian Tribe
Puyallup Tribe
Snoqualmie Tribe
Suquamish Tribe
Swinomish Tribal Community
Tulalip Tribe
Upper Skagit Indian Tribe

Libraries

Bellevue Library
Bothell Library
Kenmore Library
King County Library System
Kingsgate Library
Kirkland Library
Lake Forest Park Library
Muckleshoot Library
Redmond Library
Richmond Beach Library
Seattle Public Library
Shoreline Library
Woodinville Library

Newspapers

Daily Journal of Commerce
Eastside Week
Issaquah Press
Journal-American
Morning News Tribune
Northshore Citizen
Seattle Post-Intelligencer
Seattle Times
Snoqualmie Valley Reporter
Valley Daily News
Woodinville Weekly

Community Groups

Cascade Bicycle Club
Friends of Northshore
Kenmore Incorporation Committee
Lakepointe Citizens' Advisory Task Force
Seattle Audubon Society
Washington State Environmental Council
Woodinville Chamber of Commerce

Individuals

I would suggest we say the following:
"Notice of the availability of the Lakepointe Draft Supplemental EIS was sent to approximately 1,500 individuals on the Lakepointe Party-of-Record List."

APPENDIX A

FINAL TECHNICAL REPORT ON EARTH, WATER, TOXIC AND HAZARDOUS MATERIALS

FINAL TECHNICAL REPORT ON EARTH, WATER, TOXIC AND HAZARDOUS MATERIALS LAKEPOINTE MASTER PLAN EIS KING COUNTY, WASHINGTON

Submitted to:

Pacific Rim Equities
11 Crescent Key
Bellevue, Washington 98006

Submitted by:

AGRA Earth & Environmental, Inc.
11335 N.E. 122nd Way, Suite 100
Kirkland, Washington 98034-6918

May 1997

6-91M-10459-E

RECEIVED
JUN 2 1997
SEPA

AGRA
Earth & Environmental

AGRA Earth &
Environmental. Inc.
11335 NE 122nd Way
Suite 100
Kirkland. Washington
U.S.A. 98034-6918
Tel (206) 820-4669
Fax (206) 821-3914

30 May 1997
6-91M-10459-E

Pacific Rim Equities
11 Crescent Key
Bellevue, Washington 98006

Attention: Mr. Mike Gleason

Subject: **Final Technical Report on**
Earth, Water, Toxic and Hazardous Materials
Lakepointe Master Plan EIS
King County, Washington

Dear Mr. Gleason:

As requested by you, AGRA Earth & Environmental, Inc. (AEE) is pleased to submit this final technical report as partial response to the "Scope of Work, Lakepointe Master Plan, (File Nos. A95P0105, A95P0218, A95P0219), Supplemental Environmental Impact Statement," dated 3/5/96, as prepared by King County Department of Development and Environmental Services (DDES). Specifically, we have addressed the assigned portions of the following sections of the EIS:

ELEMENTS OF THE NATURAL ENVIRONMENT

A. EARTH
- Affected Environment
- Significant Impacts
- Mitigation Measures
- Significant Unavoidable Adverse Impacts

C. WATER
- Affected Environment
  2. Groundwater (all subsections)
- Significant Impacts
  1. Surface Water (subsections d., e., f., g., and h.)
  2. Groundwater (all subsections)
- Mitigation Measures
- Significant Unavoidable Adverse Impacts

ELEMENTS OF THE BUILT ENVIRONMENT
B. TOXIC AND HAZARDOUS MATERIALS
Affected Environment
Significant Impacts
Mitigation Measures
Significant Unavoidable Adverse Impacts

We previously prepared a Draft Technical Report dated 8 November 1996. State and county agency comments on the Draft Technical Report were generated between 19 November 1996 and 21 April 1997. This Final Technical Report includes AGRA's responses to those comments and memoranda listed in Callison Architecture's memorandum to Barbara Questad, King County Department of Development and Environmental Services (DDES), State Environmental Policy Act (SEPA) Section, dated 29 April 1997. *Substantive changes, clarifications and edits to the Draft Technical Report will be indicated in this final report with italics. Sections pertaining to erosion and groundwater were substantially reworded, based on the cumulative comments received on the draft technical report.*

Copies of this Final Draft Technical report will be distributed to the following:

Beak Consultants, Inc.	1 copy
Callison Architecture, Inc.	1 copy
Heller, Ehrman, White & McAuliffe	1 copy
King County DDES	15 copies
KPFF	1 copy
Pacific Rim Equities	3 copies
Phillips, McCullough, Wilson, Hill & Fisko	1 copy
Pioneer Towing Company, Inc.	1 copy

We appreciate this opportunity to be of service to you and would be pleased to discuss the contents of this report with you at your convenience.

Respectfully submitted,

AGRA Earth & Environmental, Inc.

Deborah H. Gardner, R.P.G.
Project Geologist

James S. Dransfield, P.E.
Vice President

DHG/JSD/caj

TABLE OF CONTENTS
6-91M-10459-E

INTRODUCTION 1

1.0 EARTH 1
- 1.1 Affected Environment 4
  - 1.1.1 Topography 4
  - 1.1.2 Geology 5
  - 1.1.3 Erosion Hazard 12
  - 1.1.4 Landslide Hazard 14
  - 1.1.5 Seismic Hazard 14
- 1.2 Significant Impacts 16
  - 1.2.1 Topography/Geology 16
  - 1.2.2 Erosion Hazard 18
  - 1.2.3 Landslide and Seismic Hazard Areas and Steep Slopes 21
- 1.3 Mitigation Measures 22
- 1.4 Significant Unavoidable Adverse Impacts 22

2.0 WATER 22
- 2.1 Affected Environment 22
  - 2.1.1 Surface Water 22
  - 2.1.2 Groundwater 22
- 2.2 Significant Impacts 25
  - 2.2.1 Surface Water 25
  - 2.2.2 Groundwater 27
- 2.3 Mitigation Measures 30
- 2.4 Significant Unavoidable Adverse Impacts 30

3.0 TOXIC AND HAZARDOUS MATERIALS 30
- 3.1 Affected Environment 30
  - 3.1.1 Site Ranking by Ecology 30
  - 3.1.2 Contaminant Maps 33
  - 3.1.3 Historic Site Activities 33
  - 3.1.4 Administration of the Model Toxics Control Act 34
- 3.2 Significant Impacts 41
  - 3.2.1 Impacts Without Cleanup 41
  - 3.2.2 MTCA Cleanup Standards 42
  - 3.2.3 Site Conditions Which May Warrant Cleanup 42
  - 3.2.4 Discussion of Remedial Alternatives 42
- 3.3 Mitigation Measures 48
- 3.4 Significant Unavoidable Adverse Impacts 48

4.0 LIST OF REFERENCES 49

TABLE OF CONTENTS
(Continued)

List of Figures

Figure 1	—	Sensitive Areas Ordinance (SAO) Hazard Map
Figure 2	—	Site and Exploration Plan
Figure 3	—	Generalized Geologic Cross Section A-A'
Figure 4	—	Generalized Geologic Cross Section B-B'
Figure 5	—	Generalized Geologic Cross Section C-C'
Figure 6	—	Distribution of SCS Soil Types - 1968
Figure 7	—	Groundwater Gradient Map for 05 August 1996
Figure 8	—	Soil Contaminant Concentrations
Figure 9	—	Groundwater Contaminant Concentrations

Appendices

Appendix A	—	Preliminary Geotechnical Engineering Evaluation, Proposed Kenmore Lakepointe Development, Kenmore (King County), Washington

FINAL TECHNICAL REPORT ON
EARTH, WATER, TOXIC AND HAZARDOUS MATERIALS
LAKEPOINTE MASTER PLAN EIS
KING COUNTY, WASHINGTON

6-91M-10459-E

INTRODUCTION

On 5 March 1996, a final scope of work was issued by King County for the Lakepointe Mixed Use Community (King County File Nos. A95P0105, A95P0218, and A95P0219) Supplemental Environmental Impact Statement. The scope of work identified Earth and Water as Elements of the Natural Environment, and Toxic and Hazardous Materials under Elements of the Built Environment as topics to be addressed in the Supplemental Environmental Impact Statement (EIS). The following report addresses affected environment and significant impacts for earth, groundwater and a portion of surface water issues, and toxic and hazardous materials. Discussions of mitigation measures and significant unavoidable adverse impacts are included at the end of each section where relevant.

1.0 EARTH

A *Preliminary Geotechnical Engineering Evaluation* of the subject site was initiated by AGRA Earth & Environmental, Inc. (AEE) in September 1995 and completed on 8 November 1996. *The preliminary geotechnical report is included as a technical appendix to this Final Technical Report. No changes have been made to the November 1996 report. The purpose of the geotechnical evaluation was to explore subsurface soil and groundwater conditions, determine the physical character of the soil underlying the site, determine whether groundwater seepage zones are likely to influence construction logistics, and provide preliminary recommendations for foundation design, grading and utility installation. Descriptions of these exploration methods and the types of information they provide are presented below in this section.*

Our exploration was accomplished by drilling soil test borings, advancing electric cone penetrometers, and excavating soil test pits to various depths across the site. A total of 27 soil borings and eight cone penetrometer explorations were advanced on the site. Boring depths ranged from 14 to 71.5 feet below the existing ground surface. Eleven of the soil borings were completed as groundwater monitoring wells to characterize subsurface soil and groundwater conditions. Static water levels were generally six to twelve feet below existing grades. In February 1996, 20 test pits were excavated to depths of six to eleven feet below ground surface to explore the wood debris fill and characterize the fill constituents. A copy of the geotechnical report is included as a technical appendix (Appendix A) to this EIS.

Soil borings are drilled using a hollow auger through which core samples are obtained at regular intervals, and are usually terminated when they encounter dense to very dense soil conditions. By visually examining the core samples obtained from each boring, vertical changes in soil and groundwater seepage conditions are documented in each boring. By comparing the soil types encountered at various depths between each boring, horizontal changes may be extrapolated or inferred. This information is summarized and visually presented on geologic cross-sections of the property.

Electric cone penetrometer exploration consists of pressing a rod vertically into the soil and continually recording both the force required to advance the rod and the friction imposed by the surrounding soil types. Abrupt changes in pressure and/or friction signify major changes in soil conditions at known depths. The depths of these abrupt changes are used to refine the periodic record provided by the soil borings. Penetrometer explorations do not allow sampling or direct visual observation of the soil or groundwater conditions encountered, and are not capable of penetrating into very dense or gravelly conditions.

Soil test pits are excavated using a backhoe, and allow continual, direct, visual observation of the soils and groundwater seepage conditions exposed in two-foot wide, ten-foot long and six- to twelve-foot deep excavations, and exposed in the stockpile of materials temporarily removed from each test pit. The use of test pit explorations was especially important for characterizing the subsurface conditions at the Lakepointe site. Test pit explorations allowed direct observation of the character and constituents of the fill material underlying the property, documentation of the small proportion of soil and high proportion of wood and lumber products in the fill, and identification of the relatively consistent composition and geographic expanse of the fill across approximately 35 acres of the 45-acre site.

The main fill layer constitutes the upper ten to fifteen feet of the site that emerged in the 1960s as a peninsula on Lake Washington. Specifically, the peninsula of fill that constitutes three-fifths of the 45-acre site the site is the subject of a negotiated cleanup with the Washington State Department of Ecology (DOE). The geotechnical attributes of the principal fill layer are discussed in the Earth Section of this Final Technical Report, and the environmental attributes are discussed in the Toxics and Hazardous Materials Section. Both sections will include a discussion of the estimated 85,000 cubic yards constituting the main peninsular fill, updated with a discussion of 1996 grading activities that resulted in the surficial regrading of an estimated 9,300 cubic yards of material or debris that accumulated at the site during the 1990s.

The southern three-fifths of the *45-acre* site is underlain by significant thicknesses of very loose fills over soft, compressible peat and organic silt soils. *The northern two-fifths of the site are underlain by fills that directly overlie loose to medium dense, alluvial sands and gravels, without the intermediate layer of compressible organics.* Special foundation systems will be necessary for buildings constructed above these soil conditions. Roadways, sidewalks, and underground utilities will also require special subgrade preparation to tolerate long-term total and differential settlements. In general, *five* layers of material underlie the site:

- *Recent Fills*
- Wood Debris Fill
- Peat and Organic Silt
- Loose Alluvium
- Dense Sand and Gravel

Recent Fills

Existing stockpiles of roofing waste were regraded across a three-acre area of the south-central portion of the site, and existing stockpiles of concrete wash-out material were regraded across a six-acre area in the southwest portion of the site in September or October 1996. The roofing waste consists of a mixture of shredded wood roofing shingles, three-tab asphalt shingles, built-up roofing (a sandwich of roofing tar and tarpaper layers), plastic sheeting, nails and paper products, and was spread in a layer averaging six inches thick across the area between exploration locations A-24, AW-11, TP-13 and TP-14 shown on the Site and Exploration Plan, Figure 2. The roofing waste layer is piled up to six feet deep at one location at the crest of the slope above the Sammamish River shoreline.

The concrete-washout material consists of a silty gravelly sand to sandy gravel mixture created by emptying and rinsing concrete trucks into a wash-out pond and then dredging the solids from the water into stockpiles encircling the pond. Use of the wash-out pond was discontinued in spring 1996 and allowed to dry out over the following summer. In September or October 1996, approximately 6,800 cubic yards of the stockpiled material were regraded to backfill the former pond and level the six acre area. A layer of concrete wash-out ranging from one to five feet high, and averaging three feet high, covers the six acre area bounded by exploration locations AW-3, AW-5, AW-11 and TP-14 shown on the Site and Exploration Plan, Figure 2. The area was regraded to shed runoff towards the north.

The presence or redistribution of these fill materials at the subject site does not have any influence on AEE's preliminary geotechnical evaluation, recommendations, or conclusions. As stated above, AEE recommends special foundation systems or special subgrade preparations for buildings, roadways, sidewalks, and underground utilities constructed above fills or compressible native soils. From a geotechnical standpoint, the materials redistributed across the surface are not classified any differently from other fill layers or from the underlying compressible native soils; foundation loads must be transferred through surficial fills and through compressible native soils to bear on dense, native sands and gravels encountered at depths of 25 to 50 feet below the existing ground surface.

Wood Debris Fill

The wood debris fill is composed predominantly of wood fragments with brick, wire, concrete wash-out products, and a silty sand matrix. The wood debris fill averaged fifteen feet in thickness *over an area of approximately 35 acres, resulting in an estimated volume of 85,000 cubic yards.* The fill on the majority of the site contains an average of 70 percent wood fragments by volume. Concrete and asphalt rubble accounts for approximately 15 percent of the fill by volume, with the balance consisting of soil *that occupies the interstices of the wood and concrete debris*. Between two and 23 feet of fill were encountered on the subject site, with the thinnest layers encountered at the north end of the site, and the deepest fills encountered next to the dredged barge channel. The debris fill is capped with a silty sand or silty gravel layer *ranging from one- to four-feet thick and* averaging two feet thick. The fills

encountered towards the north end of the site were associated with existing road embankments, building and utility construction, and contained less wood debris. *The area underlain by wood debris fills closely corresponds to the area underlain by peat soils, shown on the Site and Exploration Plan, Figure 2.*

Peat and Organic Silt

Beneath the fill soils, native peat and organic silt soils were encountered beneath the southern two-thirds of the site. *Areas underlain by peat or organic soils are indicated on the Site and Exploration Plan, Figure 2.* These soft to very soft organic soils were interbedded with silts, clays and sands, and extended to depths of 25 to 44 feet below existing grades beneath the south end of the subject site.

Alluvium Over Dense Sand and Gravel

Beneath the peats and organic silts, the explorations encountered loose alluvium, consisting of interbedded silt, sand and gravel. The loose alluvium grades to dense recessional sands and gravels with hard silt interbeds. These granular soils are interpreted to be post-glacial alluvium and glacial recessional outwash. Medium dense to dense sands and gravels, suitable for supporting foundation loads, were encountered beneath the filled portions of the site at depths of 25 to 50 feet.

1.1 Affected Environment

1.1.1 Topography

A topographic map of the site showing slope categories and areas of flood, erosion, landslide and erosion and seismic hazards as defined by King County Code 21A is provided as Figure 1, Sensitive Areas Ordinance (SAO) Hazard Map.

The majority of the property has been graded flatter than 15 percent, except for roadway and shoreline embankments, which typically exceed 40 percent. No erosion or landslide hazards are indicated for the property or vicinity in the Sensitive Areas Ordinance Folio. However, the majority of the site is mapped as a seismic hazard area, and is mapped within the 100-year floodplain. The boundary of the 100-year floodplain as shown in the SAO Folio corresponds to the approximate 1960 shoreline of the property, prior to placement of fills that raised the property above the lake level. The Federal Emergency Management Agency (FEMA) has prepared flood profiles and a flood map of the Sammamish River. According to the FEMA information, no flood hazards are profiled above lake level west of 68th Avenue N.E. A comparison of existing site elevations to the flood-hazards profiled by FEMA indicates no flood hazards along the river shoreline of the site, and the level of Lake Washington is under control by the U.S. Army Corps of Engineers.

The FEMA flood hazard area closest to the Lakepointe project is mapped adjacent to the east embankment of 68th Avenue N.E. The mapped, adjacent land has not been filled, and is

situated at Elevation 17 feet, 4 feet below the lowest elevation on the subject property. The FEMA flood area is included on Figure 1 for comparison to the SAO mapping.

The lowest developed elevation on the property is a wharf at the east end of the inner harbor situated at Elevation 21 feet. The remainder of the upland area is situated above Elevation 24 feet. The 100-year flood hazard profiled at Elevation 21 feet by FEMA occurs approximately 2.6 miles upstream from 68th Avenue N.E. The 500-year flood hazard at Elevation 21 feet occurs approximately 1.6 miles upstream from the site.

1.1.2 Geology

Geologic conditions are shown on the Site and Exploration Plan, Figure 2. Three generalized cross-sections are provided as Figures 3 through 5 to illustrate the general geologic conditions underlying the site. The purpose of the geologic map is to delineate areas underlain by peat soils; however, the surface of the property and surrounding lands consist entirely of artificial fill or modified land. Therefore, the geologic units shown on Figure 2 represent the native soil conditions below the existing fill layer. Four principal geologic units underlie the site:

- Recent Fill and Wood Debris Fill
- Peat and Organic Silt
- Loose Alluvium
- Dense Sand and Gravel

The portion of the site south of N.E. 175th Street is underlain by significant thicknesses of very loose fills over soft, compressible peat, organic silt soils, and/or loose alluvium. Where fills or soft soil conditions occur, dense, bearing conditions are encountered within the underlying sands and gravels at depths of 25 to 45 feet below existing grades. Special foundation systems will be necessary for buildings constructed above these soil conditions. Roadways, sidewalks, and underground utilities will also require special subgrade preparation to tolerate long-term settlements.

The portion of the site north of N.E. 175th Street is underlain by loose to medium dense alluvial sands and gravels. Furthermore, the area between N.E. 175th Street and Bothell Way N.E. includes numerous utility easements and roadfill embankments. Future construction in the vicinity of these rights-of-way will need to be protective of existing right-of-way embankments, utility structures, and utility backfills.

Engineering Characteristics of Wood Debris Fills

The fills are composed predominantly of wood debris with brick, wire, concrete wash-out products, and a silty sand matrix. The fill soils beneath the majority of the site contain an average of 70 percent wood debris by volume and average 15 feet in thickness.

Texture — The texture of the debris is coarse, and includes logs, timber piling stubs, and oversize concrete slabs. The wood fragments were typically less than 8 inches in diameter. The fragments were torn during test pit excavation, and average lengths of the wood fragments are not available. Fragments appeared to be several feet in length, and one log approximately 8 feet long was removed from test pit TP-15. The matrix consists of silty fine sands, and occasionally includes sandy fine gravels of concrete wash-out products.

Relative Density — The relative density of the fill is loose, although timber and concrete obstructions account for *misleadingly high densities.*

Color — The wood mixture is brown, and the soil matrix is generally gray.

Moisture Content — The moisture content is very high, due to the high organic content of the debris, and the proximity to the water table. Moisture contents of the soil matrix above the water table ranged from 12 to 16 percent.

Compressibility — The debris fill is moderately compressible, and the organic components are subject to degradation (and further subsidence) over time. Degradation rates are highest where the material is subject to fluctuating moisture conditions, lowest in either dry or saturated states. *Compressibility of the concrete washout material is low; some settlement will occur in regraded areas if the fill was not deliberately compacted.*

Organic Content — Organic content of the *wood debris* fill *and surficial roofing waste* is high, averaging 70 percent wood debris by volume. *Organic content of the concrete wash-out is zero percent, except where mixed at the boundary with the wood debris.*

Strength Characteristics — The debris fill generally possesses moderate shear strength characteristics in its current, packed condition.

Recent surficial fills were not specifically explored for AEE's Preliminary Geotechnical Engineering Evaluation, and are not addressed in that report. The engineering characteristics of the surficial fills, regraded areas, or existing stockpiles do not differ significantly from the engineering characteristics listed above for wood debris fill. No additional geotechnical investigations of surficial fills, above and beyond the building-specific studies that are already required for design purposes, are warranted.

Engineering Characteristics of Peat and Organic Silt

Native peat soils were encountered beneath the southern two-thirds of the site. These soils extended to depths of 15 to 35 feet below existing grades beneath the southern two-thirds of the subject site.

Texture — The peat soils contain finer organic debris with increasing depth, grading from fibrous to amorphous in texture with depth.

Relative Density — The relative density of the peat and organic soil is very soft.

Color — The color of the peat and organic silt is dark brown.

Moisture Content — The moisture content of peat and organic silt soils typically ranges from 100 to 400 percent, due to the high organic content.

Compressibility — The peat and organic silts soils are highly compressible.

Organic Content — Organic content decreases with depth. The peat soils consist of 90 to 100 percent organic matter by weight, and the organic silt soils are comprised of 50 to 80 percent organic matter by weight.

Strength Characteristics — The peat and organic silts soils demonstrate negligible strength characteristics.

Engineering Characteristics of Loose Alluvium

Soft or loose alluvial soils were encountered beneath the south half of the site. These soils extended to depths of 25 to 45 feet below existing grades beneath the south end of the subject site.

Texture — The texture of these soils coarsens with increasing depth, with silts and clays grading into interbedded fine sands, and sandy fine gravels.

Relative Density — The relative densities range from very soft silts to loose sands and gravels.

Color — The color of inorganic silts, clays, sands and gravels varies between tan, gray, green-gray, and blue-gray.

Moisture Content — Inorganic silts and clays have moisture contents ranging from 25 to 50 percent, and saturated sands and gravels have moisture contents of 5 to 15 percent.

Compressibility — The silt and sand alluvium demonstrate low to moderate compressibility characteristics, and the loose sands and gravel are typically of low compressibility.

Organic Content — Organic content in the alluvial soils decreases with depth. Organic matter occurs in lenses and randomly scattered in the inorganic clays and silts, and occurs rarely in the alluvial sands and gravels.

Strength Characteristics — Soft, inorganic silts and loose sands and gravels are generally low strength soils.

Engineering Characteristics of Dense Sands and Gravels

Beneath loose alluvium, subsurface explorations encountered medium-dense to dense sands and gravels. Interbeds of dense, silty sands and hard silts were occasionally encountered. These granular soils are interpreted to be glacial recessional outwash, but are not easily distinguished from overlying alluvial sands and gravels. The relative density, especially of the finer-textured interbeds, as well as the reduced potential for organic interbeds provide the distinguishing characteristics for the purposes of this discussion. Medium-dense to dense sands and gravels, suitable for supporting foundation loads, were encountered beneath the filled portion of the site at depths of 25 to 50 feet.

Texture — The texture of these soils ranges from medium sands to coarse gravels. Interbeds consisting of silts and silty fine sands account for a small volume of the material.

Relative Density — By definition, these sands and gravels range from medium dense to very dense. Hard silt interbeds are occasionally encountered.

Color — The color ranges from tan to grey.

Moisture Content — The moisture content of the sands and gravels ranges from 5 to 15 percent. Silt interbeds may demonstrate moisture contents of up to 25 percent.

Compressibility — The sands and gravels are of low to very low compressibility.

Organic Content — Organic matter is a rare occurrence in glacial recessional outwash sands and gravels, and was not encountered in sands and gravels at greater depths at this site.

Strength Characteristics — Dense sands and gravels exhibit high frictional shear strength.

Field Investigations

The Site and Exploration Plan shows the locations of all test pits, soil borings and cone penetrometer explorations, and is provided as Figure 2. Logs of AEE's subsurface explorations

are incorporated in the *Preliminary Geotechnical Engineering Evaluation*, prepared by AEE and dated 8 November 1996.

Geotech Consultants, Inc. performed a Phase II Environmental Assessment of the subject site in November 1990. Seven shallow groundwater monitoring wells were installed and sampled. A supplemental soil assessment was performed in the vicinity of two underground storage tanks (USTs) located on the lot north of N.E. 175th Street. The results of the assessment were presented in a report entitled *Revised: Phase II Environmental Study—Kenmore Pre-Mix Site*, dated 24 January 1991. The results of further study were presented in a report entitled *Supplemental Sampling and Testing in the Proximity of Monitoring Well B-103*, dated 22 July 1991.

SEACOR resampled four wells remaining on site in December 1991, and presented the results in a *Groundwater Monitoring Report* dated 7 January 1992. Washington Department of Ecology (Ecology) also performed a *Site Hazard Assessment* of the property, dated 19 February 1992.

AEE initiated a *Preliminary Geotechnical Engineering Evaluation* for the subject site in September 1995. This report was finalized on 8 November 1996. A total of 27 soil borings ranging from 14 to 71.5 feet and 8 cone penetrometer explorations ranging from 31 to 47 feet were advanced on the site, and along existing and proposed right-of-ways, between September 1995 and February 1996. Eleven of the soil borings were completed as groundwater monitoring wells to characterize subsurface soil and groundwater conditions. Wells were installed with screen depths ranging from 4 to 14 feet bgs. In March 1996, twenty test pits were excavated to depths of 1 to 11 feet below ground surface to view and explore the wood debris fill and characterize the fill constituents for both geotechnical and environmental purposes.

The results of groundwater sampling and analysis, and wood debris fill characterization are discussed in AEE's *Phase II Environmental Assessment*, dated May 1996, and *Groundwater Analytical Results—August 1996* report dated 8 November 1996, as well as the Toxic and Hazardous Materials section of this report. Activities that have taken place on the site since August 1996 do not change any of our previous conclusions.

The only geotechnical study performed for the site and known to AEE is AEE's Preliminary Geotechnical Engineering Evaluation dated 8 November 1996. Several off-site geotechnical studies were reviewed as part of this scope of work. These included studies performed for the Kenmore Interceptor sewer alignment that passes through the north margin of the subject site, and for the 68th Avenue N.E. Burke Gilman trail underpass. The reports reviewed were:

> *Geotechnical Findings Report, Kenmore Interceptor Land Section and Structures, by CH2M Hill, Kramer, Chin & Mayo, and associated firms, dated May 1986.*

Report, Geotechnical Engineering Services, Missing Link Trail Underpass at 68th Avenue Northeast, by GeoEngineers dated 9 May 1990.

We also reviewed field boring logs and cross sections for construction of the existing 68th Avenue N.E. bridge, performed by Neil Twelker, P.E., date unavailable.

Soils

Currently, the entire site and surrounding land surface consists of modified urban land, with the exception of marsh soils underneath the north abutment of the 68th Avenue N.E. bridge that crosses the Sammamish River. *Because the entire site and surrounding lands are currently mapped as modified urban land, there are currently no significant boundaries between soil types that can be mapped on the site.*

This discussion references the U.S. Department of Agriculture (USDA) Soil Conservation Service (SCS) Soil Survey of King County Area Washington, dated November 1973. A map showing the current distribution of SCS surface soil types is included as Figure 6.

Urban land (Ur) is the only soil category is currently encountered on the surface of the subject site. Urban land is described by the SCS as "soil that has been modified by disturbance of natural layers with additions of fill materials several feet thick to accommodate large industrial and housing installations. The erosion hazard is slight to moderate." This soil unit corresponds to the modified and developed terrain comprising the entire site where placement of fill, regrading, and industrial development is documented. The Urban land soil unit also corresponds to the fill soils that underlie the entire peninsula that forms the majority of the site. *The corresponding geologic classification for this soil category is artificial fill (af). The artificial fill layer is* shown on the geologic cross-sections included with this report *as Figures 3, 4 and 5.*

Geomorphic Processes

The property is located at the mouth of the Sammamish River, at the north end of Lake Washington, within the Puget Lowland basin. The Sammamish River flows west into Lake Washington off the southwest corner of the subject site. The large-scale geomorphic features of the vicinity are the result of Pleistocene Age glaciations, ending with the Vashon glaciation, which receded from the area approximately 13,000 years ago. The native soils underlying the site consist of alluvium deposited during the Holocene Age, following the recession of the Vashon glacier. Significant man-made modifications were performed this century to raise the property elevation above the level of Lake Washington. These modifications occurred both onsite and offsite.

Recessional sands and gravels were deposited by glacial meltwaters and their proceeding river drainages on the upland plateaus, in valleys, and in lakes. A delta of recessional sand and

gravel formed at the mouth of the Sammamish River and prograded into the Lake Washington trough. Recessional sands and gravels also blanket the flanks of the trough and river valleys. Once the glacial meltwaters receded, the Sammamish River was fed by precipitation only, resulting in lower depositional energies, and deposition of finer sand and silt alluvium.

Revegetation of the glaciated lowland resulted in a significant source of organic matter that eroded from upstream sources and were deposited downstream. Organic silts and peats were subsequently deposited as the river delta at the mouth continued to prograde into the lake reservoir, building the property up towards the surface elevation of the lake. This depositional process continues today, although at a slower rate due to urbanization. Urbanization replaces the dense vegetation that previously contributed to the organic sediment load of the river, and includes installation of sedimentation and erosion controls to protect surface water quality. No flood controls are implemented along the Sammamish River, and the lake level is controlled further downstream at the U.S. Army Corps of Engineers Hiram Chittenden locks, where freshwater is discharged to Puget Sound. Upstream of the site, urban flooding risks are mitigated by civil engineering design as part of the urbanization process.

Following the lowering of Lake Washington in 1916, the Sammamish River was straightened and channelized in order to facilitate transportation and commercial uses. The south shoreline of the property was formed by the dredged alignment of the straightened river channel. The Kenmore Navigation Channel that angles across the site is also maintained by dredging, and originally served a timber mill located at the head of the channel.

The north end of the site was graded early this century for construction of a railroad, for Bothell Way and for N.E. 175th Street, and for associated industrial developments such as the lumber mill. By 1960, the property was being filled towards the river shoreline and the navigation channel, and the timber mill was replaced with a concrete plant. By 1980, the property had been filled to an elevation approximately ten feet above the surrounding lake level, and bulkheads had been constructed along the navigation channel to protect the industrial-use shorelines.

Modern geomorphic processes continue to be dominated by human activities. Net deposition of alluvial sediments continues in the Sammamish River Navigation Channel, as well as in the Kenmore Navigation Channel. The continued sediment accumulation requires periodic dredging. The sediment depth off the exposed west shoreline of the site, and outside the limits of dredging activities, appears to be controlled by erosive wind and wave action of Lake Washington. According to the hydrographic survey prepared by Reid Middleton for the Shoreline Permit, sediments accumulate to an average depth of approximately three to five feet below the lake level in a triangular zone between the dredged channels. Irregularities in the shallow lakebed topography may be due to disturbance by recreational boat traffic.

Vegetation protects the southern shoreline of the property from the moderate erosive forces of the Sammamish River. The inner end of the Kenmore Navigation Channel is protected from erosion by bulkheads, and there is no evidence that wind forces off Lake Washington have an erosional effect on the vegetated western shoreline of the property. Aside from the erosion processes discussed, natural degradation and settlement of the organic sediments underlying the site will continue at a slow rate over time.

Soil Limitations

The on-site soils accessible for grading are predominantly the existing fill soils. As described previously, the fill soils contain an average of 70 percent wood debris, and 15 percent concrete and asphalt rubble. The remainder consists of silty sand and silty gravel. There is a *thin* soil cap above the wood debris that averages 2 feet thick across the site. The wood debris materials are not suitable as structural fill due to their low strength, moderate compressibility characteristics, and high organic content.

Where soils are encountered in volumes that are worth segregating from debris, the soils should be classified in accordance with the Washington Model Toxics Control Act (MTCA) *and with the Dangerous Waste Regulations (WAC 173-303)* for *allowable recycling or off-site disposal*. Please refer to Section 1.2.1 for the related discussion of soil disposal options. Minor quantities of existing fill associated with the road embankments and building construction at the north end of the site may be suitable for *reuse as* structural fill, if they are essentially free of organic material and debris.

The existing fill soils will not be suitable for supporting structural loads. Building structures will require deep foundations. Light duty driveways, parking or sidewalks could be constructed atop these on-site fills after improvement by some over-excavation and replacement with adequate structural fill. Structural fill may be required for preloading, utility trenches, and grade changes. The Site and Exploration Plan, Figure 2, displays areas underlain by compressible soils, as do the geologic cross-sections, Figures 3, 4, and 5.

1.1.3 Erosion Hazard

According to the King County Sensitive Areas Criteria (KCC 21A) there are no *mapped* erosion hazard areas located within the Lakepointe project site. *The criteria for erosion hazards include steepness of slopes, soil texture, degree of vegetation cover, and presence of stream courses, seasonal or perennial drainage channels. This discussion addresses four geographic categories of erosion hazard on the property: recent fills and surficial stockpiles, perimeter slope areas, bulkheads, and the relatively flat-lying upland portions of the property.*

Recent grading of the former concrete wash-out impoundment in 1996 resulted in leveling six acres of five- to fifteen-foot tall stockpiles that were prone to erosion, but also eliminated the impoundment which had served as a sediment trap. The six acre area of former stockpiles was sloped to shed runoff towards the north and was mulched and hydroseeded as part of

a preliminary grading permit and erosion control submittal to King County in December 1996. The presence of roofing waste fills in the south central portion of the property does not pose additional erosion hazards above and beyond the former stockpiled conditions. Aggregate stockpiles are maintained for commercial sale in the southeast quadrant of the property. The combination of heavy equipment traffic, flat grades and silty materials does result in large puddles of turbid water in the stockyard; commercial stockpiles are not otherwise considered significant erosion hazards. Transportation of aggregate to the site results in a continuous supply of coarse-grained material; however, the heavy equipment traffic and flat-lying grades combine to minimize erosion of coarse materials.

The types of materials on the surface consist of stockpiled construction materials, woodwaste fill, and other fine-grained materials. Most of the surface materials were observed to contain a significant *proportion* of silt. Considering the surface soils and the low slopes, sediment leaving the site would be of fine-grained texture, such as silt and fine sand. In subsection 1.2.2 of the Significant Impacts section we have estimated the amount of sediment eroding from the site, based on existing conditions. *Subsection 2.1.2 addresses the subject of infiltration.*

The majority of the property can be characterized as *relatively flat-lying,* bare soil without the protection of pavement or vegetation. The existing conditions *of the upland portions of* the site do not include *perennial or seasonal* surface water drainage channels or sloping grades that would be susceptible to erosion*, other than the lake and river that form the site boundaries.*

The steepest slopes on the property are confined to the perimeter shorelines and street embankments, which are predominantly vegetated and comprise a very small percentage of the area of the property. There is no evidence of *major* erosion problems along the river shoreline or street embankments bordering the site. *Localized erosion of the soil cover exists in a two-foot zone confined between the winter and summer shorelines, and is visible during low winter lake levels. The cause of erosion appears to be a combination of winter storm action and summer wave action. Human disturbance of the vegetation cover and exposed soil is also evident along scattered trails that access the shoreline. Otherwise,* the shoreline along Lake Washington and the Sammamish River is protected by vegetation that receives little disturbance; currents and wave action are weak at these locations. The majority of the navigation channel shoreline is protected from surface activities by bulkheads. However, a 400-foot section of unprotected *and unvegetated* shoreline is used as a staging area for a shoreline construction contractor. This unprotected area is periodically disturbed by the staging activities.

Currently, site runoff is collected in a series of catch basins aligned east-west that drain the central portion of the site. These catch basins drain towards the west and discharge through a pipe located at the east end of the inner navigation channel. The discharge outlet is situated

above winter low water levels but is submerged beneath the summer high water level. Evidence of erosion is visible beneath the wharf that projects above the waters of the inner channel; however, the cause of erosion can not be attributed solely to the discharge outlet. Erosion may be a result of bulkhead disrepair, commercial fishing and industrial barge activity, and fresh groundwater seepage. Significant quantities of turbid runoff discharge from the outlet during winter storm events. The outlet likely deposits significant quantities of sediment several feet beyond the discharge point.

A large-diameter corrugated metal pipe (CMP) outfalls to the southern shoreline of the site. The site is not plumbed to the CMP, and the alignment of the CMP corresponds to a municipal alignment that originates off-site to the north, at or beyond Bothell Way N.E.

1.1.4 Landslide Hazard

According to King County Sensitive Areas (KCC 21A) maps, no landslide hazard areas are mapped within the project site. *However, localized areas along the southern shoreline meet the KCC 21A criteria of: slopes of impermeable soils steeper than fifteen percent and subjected to springs or groundwater seepage; any area that has shown movement in the last 10,000 years; areas incised by stream incision, erosion or undercutting wave action; areas that show risk of avalanche; and, any area located in an area of active sediment accumulation. The western shoreline slope meets the first criteria and the southern shoreline slopes meet the third criteria for landslide hazards.* No evidence of past or potential landsliding or natural sediment deposition on the upland area has been observed on the project site.

The potential for seismic landsliding is considered to be the same along the southern river shoreline as in the interior of the site; adjacent river dredging does not extend deep enough to negatively influence the stability of the southern margin of the exposed land surface. The potential for seismic landsliding is elevated along the inner channel, where deep dredging activity undermines the northwestern shoreline of the site. This elevated potential for seismic landsliding is partially mitigated by existing bulkhead construction. However, during the design phase, slope stability along the shorelines may be more thoroughly investigated.

Shallow-seated slope movements at the site margins are relatively unlikely due to the interlocking character and moderate shear strength of the wood debris fill that extends beneath the low water line. The wood debris fill is unlikely to suffer shallow-seated movements due to the effects of wave erosion or loss of vegetation for the same reasons. The overlying sandy fill at the site boundary is protected from shallow-seated movements by its existing vegetative cover.

1.1.5 Seismic Hazard

The project site is mapped as a seismic hazard area according to the KCC 21A ordinance, due to the loose alluvial soils beneath the site, in conjunction with a shallow groundwater table.

Earthquakes

Large earthquakes reported historically in Washington most frequently occurred deep beneath the Puget Sound region. The most recent and best-documented earthquakes in the Puget Sound area were the 1949 magnitude 7.1 Olympia earthquake and the 1965 magnitude 6.5 Seattle-Tacoma earthquake. Both of these earthquakes occurred within the subducting Juan de Fuca plate at depths of about 34 to 40 miles.

The major cause of damage from an earthquake would be due to shaking from earthquake waves and potential liquefaction-induced settlement. Damage due to actual fault movement beneath the proposed structure would be highly unlikely. The U.S. Geological Survey (1975) proposed that the largest earthquake likely to occur in the Puget Sound region could have a magnitude as large as 7.5. It is believed that such an earthquake event could have a peak hard ground acceleration of about 20 percent of gravity (0.2g) and about 20 to 30 seconds of severe ground shaking. Due to amplification effects within the loose/soft site soils beneath the project site, peak accelerations ranging up to 0.25g to 0.3g could conceivably be experienced at the ground surface during such an event.

Earthquake maps included with the 1988 NEHRP manual entitled Recommended Provisions for the Development of Seismic Regulations for New Buildings indicate that a bedrock site acceleration of approximately 0.3 is appropriate for an earthquake of magnitude 7.5. An earthquake of this size would have a 10 percent probability of exceedance in 50 years, or a return period of 475 years. A moderate earthquake event is generally considered to be associated with a magnitude 6.5 earthquake, which could conceivably have a peak horizontal ground acceleration of up to 0.2g at the project site. This would be considered a higher probability event having a 40 percent probability of exceedance in 50 years (return period of 100 years).

The risk of such earthquake events to impact the project site would be similar to that of the Puget Sound area as a whole. The effects of seismic shaking on the proposed structures would be minimized by the structural design and construction specifications deemed necessary under current building codes.

Liquefaction Potential

Liquefaction potential has been found to be greatest where the groundwater level is shallow and where loose, fine sands occur within a depth of about 50 feet or less. Liquefaction potential decreases with increasing grain size, clay, and gravel contents, but increases as the ground acceleration and duration of shaking increases. As previously stated, groundwater at the site was generally observed at depths of about 5 to 8 feet.

The majority of the soils beneath the site would not be susceptible to liquefaction, *based on the results of our preliminary study*. These soils include the wood debris fill, peat and organic silt, and the dense sand and gravel. The peat and organic silt deposits are distributed in a

horizontal layer of relatively uniform thickness, with no significant unbalanced loading across the site. Therefore, the risk of seismically induced lateral spreading within these upper organic layers, should the underlying loose alluvium liquefy, is considered to be low. However, additional analysis and modeling should be performed during design to evaluate the potential for lateral spreading, particularly along the margins of the site.

Beneath the peats and organic silt, some of the explorations encountered loose alluvial sands with interbeds of silt and gravel. Because layers of loose, sandy soils were encountered within the upper 50 feet at the site, liquefaction is considered to be an important design consideration for the proposed development. *Section 1804.5 within the Uniform Building Code (UBC) requires that the potential for liquefaction be evaluated for sites which lie in seismic risk zone 3. According to Figure 16.2 within the 1997 UBC the site lies within seismic zone 3. Table 16-I indicates a seismic zone factor 0.3 for the project site. In the absence of a site-specific peak ground acceleration determination, the seismic zone factor may be assumed to equal the peak ground acceleration. As indicated in the previous Earthquake section, peak accelerations ranging from 0.25 to 0.3 may be experienced at the site.* Structures above the loose alluvial sands may be susceptible to liquefaction-induced settlement. Analysis of the liquefaction potential and induced settlements should be performed during design of specific structures.

1.2 Significant Impacts

1.2.1 Topography/Geology

Additional Geotechnical Requirements

Additional field explorations, laboratory tests, and geotechnical engineering studies would need to be accomplished for design of the buildings and facilities associated with the project development. This additional work is necessary to formulate structure-specific geotechnical criteria for suitable foundation types and capacities, site preparation, and utility construction. For general site development, additional geotechnical study is necessary for specific aspects of the site development such as: design of retaining walls, bulkheads, and utility support; evaluation of settlement due to site filling, and its effect on pavement design; *potential for liquefaction and lateral spreading;* and other aspects.

Additional field explorations and geotechnical engineering, *typical and appropriate for the scale of construction proposed and geologic conditions encountered,* will also be necessary for preliminary site development such as site preparation, overexcavation of unsuitable materials, fill placement, and utility installation. The geotechnical criteria for final design should be based upon specific information such as building types, locations and structural loadings, pavement grades, utility types and grades, and other *design* information which is not yet available.

Based on the results of AEE's Preliminary Geotechnical Engineering Evaluation dated 8 November 1996 and updated on 30 May 1997, piling will be installed to transfer all foundation loads to a suitable layer at depth. A suitable bearing surface is first encountered at depths of 25 to 50 feet below the existing ground surface. Piles will likely be either closed-end steel pipe piles (which would be backfilled with concrete after driving) or precast concrete piles. Installation of piling will be one component of cap construction. Piling may support portions of an engineered cap, but will not penetrate the cap.

Ground surface vibration will be unavoidable during pile driving. Vibrations will be generated at the driving point as it is set into the bearing layer. These vibrations will be attenuated by overlying peat and fill soils, and are unlikely to be transmitted off site beyond the areas underlain by peat soils. These vibrations would be monitored at the nearest structures, and compared to acceptable ground surface accelerations for various structures. Vibration would pose less of a problem for pile-supported structures. For other nearby structures, pre-construction documentation of conditions would be established by photographs, survey and instrumentation of existing cracks. The production pile driving would be preceded by a test pile program, during which the most efficient pile and hammer types would be established, and the need for possible bracing or reinforcement of critical nearby structures could be accomplished as necessary.

One additional, building-specific geotechnical study will be submitted per phase of construction. Seven phases of construction are currently proposed over the next ten years; however, the exact timing of the phased development may be influenced by market conditions.

Topographic Constraints

No topographic constraints exist that would affect the siting of the structures, protection of the sensitive areas (above and beyond the planned setbacks), or scheduling of construction. All of the major structures are to be located in the upland portions of the site. The upland site is relatively flat with elevations ranging from 23 to 32 feet. The shoreline area contains steeper slopes, generally less than ten feet in height. A range of alternatives for shoreline protection, stabilization, or enhancement may be considered. The site topography poses no significant constraint to implementing any of these shoreline alternatives.

The placement of additional fills would surcharge the underlying, compressible peat soils, renewing settlement of the wood debris fill layer. It is assumed that settlements of the existing fill layer have mostly stabilized over the last twenty years; however, the placement of additional fill will result in compression of the underlying peat soils, resulting in new settlements apparent at the surface. Additional fills are unlikely in proposed building areas, where new loads will be supported on piling, but are likely in perimeter landscape areas. Additional field explorations and geotechnical engineering will be performed to address potential settlements once the desired, design criteria have been made available. Potential

settlements may have implications for landscape maintenance, pavement and utility design, as well as remedial design.

The placement of fill will significantly increase the potential for settlements, while the use of piling will significantly reduce the potential for settlements by supporting the weight of surficial structures. The use of light-weight fills may result in moderate, short-term settlements.

Soil Disposal Options

Ecology performed a Site Hazard Assessment of the property 1992, resulting in the site ranking of 1, the highest priority for remediation. The causes and implications of the ranking are discussed in the Toxic and Hazardous Materials section of this report.

Due to historic site uses, the results of previous investigations, and the site ranking, soil excavated from the site must be characterized in accordance with the requirements of the Model Toxics Control Act (WAC 173-340) and the Dangerous Waste Regulations WAC 173-303-110 prior to export or disposal. *The waste characterization and disposal process will be one element of remedial design required for a negotiated cleanup under MTCA.* The results of characterization will allow classification of the soil that may permit on-site reuse or *on-site or off-site* disposal under MTCA. As discussed in the Affected Environment subsection of the Earth section of this report, soils disposed of on-site may or may not meet the geotechnical requirements for structural fill.

1.2.2 Erosion Hazard

In order to estimate the amount of soil erosion that may occur during construction, we used the Universal Soil Loss Equation (USLE), as described in the King County, Washington, Surface Water Design Manual (SWDM). This equation is the most widely used method of estimating soil loss due to erosion in the United States, and was the method specified in the Lakepointe Master Plan Scope of Work. The equation estimates soil loss due to erosion by taking into account site factors such as rainfall, soil type and the soil's susceptibility to erosion, site topography, ground cover, and erosion control measures utilized during construction. Each factor within this equation is discussed subsequently with the equation as follows:

$$A = R * K * LS * CV * PR$$

Where:

- A = *annual sediment yield in tons per acre*
- R = *rainfall erosion index*
- K = *soil erodibility factor*
- LS = *length-slope factor*
- CV = *cover factor*
- PR = *erosion control practice factor*

The rainfall erosion index R, factors into the equation the erosive energy imparted by a design storm event. As directed within the SWDM data for the design storm event was obtained from figure 3.5.1c within the SWDM which provides the 2-year 24-hour total precipitation amounts in inches.

K, the soil erodibility factor, is a quantitative description of the inherent erodibility of a particular soil type. This factor reflects the fact that different soils erode at different rates when all other factors are kept the same. The intrinsic physical properties of each soil type determines the susceptibility of the soil to erode. The K value utilized within the calculations for the project site was derived from published values. The values used were estimated assuming the surface of the project site is bare and the near-surface site soils consist of a heterogeneous mix of fill soils which have a generally moderate to high silt content.

The length-slope factor, LS takes into account the effects of slope length and gradient (topography) of the project site. The site was divided into several groups based upon slope gradient and slope length, with each group assigned an individual length-slope factor. Thus for each group within each phase of the project the amount of erosion was determined using the appropriate length-slope factor with the results summed to give the total amount of anticipated sediment eroded for each phase. However it should be noted that the majority of the site is generally flat with little topographic relief, thus the amount of erosion would be minimal. The remainder of the site is composed of limited areas of slightly to moderately steep slopes which will contribute relatively larger amounts of sediment per unit area, although the percentage of the site consisting of steeper slopes is relatively small, and these steeper slopes are predominantly vegetated.

The cover factor, CV, refers to the type and amount of ground cover present at the site. Ground cover reduces the amount of erosion by acting to hold the soils in place or by dissipating the erosive energy of surface water. In general, the CV value increases with decreasing cover or for cover which has less ability to resist erosion. Thus, the worst case scenario is considered to be bare ground with no cover which would be assigned a CV value of 1. A value of 1 was used within the erosion calculations for this project, as suggested within the SWMD, for determining erosion amounts during the construction phase.

PR, the erosion control practice factor, reflects the condition of the on-site soils during construction and the types of erosion control measures taken. SWDM indicates that a factor of 1.3 should be utilized, which assumes no ground cover and that the all slopes have been compacted and are smooth.

For the purposes of calculating sediment yield from the site, the majority of the site was defined as a homogeneous unit, because the site is relatively level. However, the shoreline slopes and all other slopes were taken into consideration during calculation of soil loss.

Therefore our calculations conservatively approximate existing conditions, assuming the worst-case scenario of no ground cover protection and no sediment traps. The estimated sediment yield quantities for the existing conditions are listed by phase area below. It is estimated that construction will proceed in seven phases over an estimated ten year period.

EXISTING CONDITION SEDIMENT YIELD TABLE

Phase 1 Area	21.8 tons per year
Phase 2 Area	0.6 tons per year
Phase 3 Area	4.4 tons per year
Phase 4 Area	2.2 tons per year
Phase 5 Area	1.8 tons per year
Phase 6 Area	2.4 tons per year
Phase 7 Area	1.2 tons per year
Total Existing	34.4 tons per year

The SWDM version of the USLE estimates the sediment loss during construction by assuming that the surface area for each phase will consist of bare ground throughout construction with no sediment detainment. However, it should be emphasized that during construction appropriate temporary erosion and sedimentation controls (TESC) will be implemented to minimize the potential for off-site migration of sediments generated by construction activities. With each phase of development TESC measures will be undertaken to trap sediment within the construction area and stabilize future undeveloped areas. Thus, sediment discharge would be significantly reduced, provided TESC measures are properly implemented.

During construction of the Phase 1 Area, sediment yield calculations indicate that approximately 34.4 tons of sediment per year could be generated across the entire site, if no erosion control measures were implemented other than those assumed by the USLE. However, upon completion of each phase area, the amount of sediment each area contributed to the overall sediment yield of the site would be reduced to essentially zero since surface water controls such as storm sewers and detention ponds would be operating. Thus, after each phase area was completed the total sediment yield of the site would decrease by the amount it was previously contributing. Our final built-out condition assumes a best-case scenario, that the site has been capped and that all runoff is intercepted except on vegetated shoreline slopes. The following table illustrates the decreasing sediment yield for the site as each phase area is completed. The values provided below take into account all the remaining areas which have not been developed, including the shoreline areas.

CONSTRUCTION SEDIMENT YIELD TABLE	
Phase Completed	Total Site Sediment Yield*
Phase 1	12.6
Phase 2	12.0
Phase 3	7.6
Phase 4	5.4
Phase 5	3.6
Phase 6	1.2
Phase 7	0.0
*After phase completion (tons per year)	

The estimate of 34.4 tons of sediment is roughly equivalent to three dump truck loads per year, which is not surprising considering the expanse of the property (45 acres), the lack of vegetation, and the constant source of fine-grained and coarse-grained sediment that is transported daily across the property. Assuming a wet-weight density of 125 pounds per cubic foot, the 34-ton estimate translates to a thickness of 0.003 inches of soil loss per year distributed across the 45-acre site. The annual soil loss estimate would be significantly higher if the site sloped more steeply, and would be significantly lower if the site were vegetated.

1.2.3 Landslide and Seismic Hazard Areas and Steep Slopes

No landslide hazard areas or significant steep slopes are anticipated to be impacted by the proposal. Existing seismic risks due to the loose/soft soils that exist at depth beneath the site would not be aggravated by surface activities. These *deep, soft soil* conditions could result in liquefaction and strong ground motions during a major earthquake. This will likely require deep foundation support for all structures.

Utilities and on-grade paving will require subgrade improvement and allowance for some long-term settlement. Site development will also involve some improvement in the strength or compressibility characteristics of site soils and stabilization of shoreline areas. This will serve to reduce the likelihood of shallow-seated slope movement.

1.3 Mitigation Measures

Installation of pile foundations will mitigate the risk of ongoing site subsidence. In many areas, the net result of grading will be less loading on the site than currently exists, and therefore the rate of subsidence would be reduced.

Erosion hazards associated with pile driving will be mitigated by the use of pre-cast concrete or steel displacement-type piling to reduce generation of soil cuttings and minimize concrete spills..

Seismic hazards, including seismically-induced landsliding, will be the same for the site as for surrounding geographic Puget Lowland region. Potential impacts from seismic hazards will be mitigated by adherence to applicable building codes and standards during design and construction.

TESC measures will be implemented to control erosion through the construction phases. Soils generated during construction will either remain on site and be capped or may be transported off site and disposed at an appropriate disposal facility in accordance with MTCA requirements.

1.4 Significant Unavoidable Adverse Impacts

Noise during pile driving will be significant, and unavoidable. Pile driving installation may be limited to daytime working hours to minimize the impact of noise.

2.0 WATER

2.1 Affected Environment

2.1.1 Surface Water

By others.

2.1.2 Groundwater

Groundwater levels were measured seasonally between October 1995 and August 1996 in nine monitoring wells on-site (AW-1 through AW-9). Two southern shoreline wells (AW-10 and AW-11) were added in February 1996, and a well installed previously by others (B-102) was included in the April 1996 survey. Static water levels in the wells were observed to vary less than two feet seasonally during the stated time interval, except in well AW-5, where levels varied by almost three feet. Groundwater levels beneath the southern, filled portion of the site closely correspond to adjacent surface water levels *in both* Lake Washington *and the Sammamish River. Groundwater gradients inferred from measurements obtained on 5 August 1996 are presented on Figure 7. Although the groundwater elevations in each well change seasonally, the overall gradient patterns show minimal variation during the course of the year.*

A seasonal low water table develops beneath the filled portion of the site in late winter, contrary to local precipitation patterns, due to the influence of Lake Washington. The lake surface is maintained at *approximately* Elevation *18.4* feet *(relative to King County Aerial Survey Datum) between 1 May and 1 October* to accommodate fisheries and recreational needs, and is *maintained at Elevation 16.5 annually between 1 December and 1 March to increase storage capacity and minimize the potential for shoreline erosion*. A seasonal high water table develops beneath the filled portion of the site between spring and autumn.

One groundwater monitoring well, AW-9, was installed in native, granular soils at the north, upgradient end of the property. Upgradient groundwater levels fluctuate seasonally, consistent with seasonal precipitation patterns.

Groundwater consistently flows south to southwest beneath the north end of the site at a gradient of up to 2 percent, and levels are relatively flat beneath the *southern two-thirds* of the site, where the former lakebed was filled. Minor mounding of groundwater conditions is evident seasonally near the former concrete washout impoundment, *where subsurface conditions are less permeable than in the surrounding wood debris fill.* The impoundment *was backfilled in September or October 1996.*

The shoreline is the most probable discharge location of all groundwater flows. Shoreline discharge appears to be slightly inhibited behind existing bulkheads of the inner navigation channel, based on historic groundwater level measurements. Discharge is concentrated at the northwest corner of the site where groundwater elevations in the native sands and gravels drop rapidly to equilibrate with the adjacent lake level. No other variations in subsurface geology or seasonal groundwater fluctuations were encountered that would suggest that groundwater discharge is concentrated along any particular stretch of the undeveloped lake or river shoreline.

A cleanup action plan negotiated with DOE will address the feasibility, location, and required degree of effectiveness of groundwater barrier(s), as well as appropriate discharge points for contaminated or non-contaminated waters, if intercepted.

Infiltration

The principal sources of groundwater recharge at the site are the adjacent lake and river. Other than the bulkheads along the inner navigation channel, no geologic or hydrologic barriers to surface water or groundwater flow are in evidence along the shoreline of the site. Secondary sources of recharge include runoff, infiltration and evapotranspiration. Runoff flows directly into the inner navigation channel of Lake Washington and to a lesser degree into the Sammamish River, both bodies of surface water that recharge the groundwater table. For the purposes of this discussion, evapotranspiration is considered to be negligible. The mechanism of infiltration at the subject site does occur, and is the focus of the remainder of this subsection.

Groundwater at the property is recharged by precipitation both on-site and off-site. *Some proportion of* off-site precipitation *that lands in upgradient urbanized areas to the north* infiltrates the recessional sand and gravel soils, and migrates south beneath the north end of the site. Because of the granular and relatively pervious nature of site soils, groundwater that migrates onto the north end of the site almost immediately equilibrates with the adjacent lake level *at the northwest corner of the site. Along the east margin of the site, the gradient transition occurs much more slowly, and infiltration from upgradient aquifers off-site appears to play a slight role in groundwater recharge on-site.*

Overall, grades are relatively flat-lying, allowing infiltration to act as a component of surface water dissipation. *Although the majority of the exposed soil surface has been compacted by heavy equipment traffic over the years, the exposed soil layer is relatively thin, inequitably compacted, and demonstrates varying permeabilities through to the underlying wood debris layer. No measurements of surface infiltration rates were performed for this study; however, observations of ponding areas before and after rainfall events support the mechanisms of both runoff and infiltration. Furthermore, the observed mechanism of lateral interflow in the uppermost six inches of the fill material does not preclude the mechanism of vertical infiltration, especially on broad, poorly drained, horizontal surfaces; the existing layer of soil that overlies the wood debris fill does not constitute an impermeable cap, and must not be confused as such.*

The overall contribution of infiltration from the subject site to Lake Washington and the Sammamish River is very small when compared to the contribution from runoff. The contribution to the Sammamish River is considered negligible; the lowermost 2,000 feet of the river west of 68th Avenue N.E. is virtually equilibrated with Lake Washington, and is not distinguished from the lake for the purposes of this discussion. Lake Washington occupies a drainage area of approximately 302,000 acres, and receives 84% of its recharge from the Cedar River and Sammamish River drainage basins; the balancing 16% percent of recharge to Lake Washington originates within the 302,000 acre drainage area. (BEAK, 1996).

The maximum theoretical contribution from combined runoff and infiltration on-site (45 acres) is fifteen-thousandths of one percent (0.00015) of the Lake Washington drainage basin (302,000 acres), or two-ten thousandths of one percent of the recharge volume from the three drainage basins combined. Infiltration alone would constitute some divided proportion of the two-ten thousandths of one percent (0.000024).

Potential Contaminant Sources

This discussion addresses potential sources of groundwater contamination at the Kenmore Industrial Park. For greater details, please reference the Toxic and Hazardous Materials section. Tasks that must be performed prior to construction on site include the following:

1) Negotiation of a cleanup action plan between the Washington State Attorney General, DOE, and the property owner; and
2) Preparation of an Engineering Design Report in accordance with MTCA.

Presently, the principal source of groundwater contamination at the site appears to be the wood debris fill. The fill material extends below the groundwater table. Total petroleum hydrocarbon (TPH) concentrations in the groundwater are attributed to the presence of creosote-treated timber pile butts in the debris, to the history of construction traffic, and to the organic wood leachate of *both* the fill and peat soils. Lead concentrations in the groundwater are attributed to lead paint coatings on wood debris. The source of arsenic concentrations in the groundwater is not known, but may be due to the presence of treated piling in the wood debris; copper arsenate is used as a wood preservative.

Copper concentrations have not been characterized since the time of DOE's Site Hazard Assessment of the subject site in 1992, when concentrations in the surface water impoundment and various sediments were found to be one to two orders of magnitude below MTCA cleanup standards, respectively. No studies of copper concentrations have been performed since 1992.

Other potential sources include tenant storage of 55-gallon drums of petroleum products on the east and south bulkheads of the Kenmore Navigation Channel, and south of the Nelbro Packing, Inc. warehouse. Drums of petroleum product are also stored at Waterfront Construction's area, southwest of the south bulkhead, and at the aggregate stockyard, for maintenance and/or fueling of heavy equipment. *Storage of fuel oil and asphalt products on adjacent properties is not considered potential on-site sources of contamination.*

TPH concentrations measured in the groundwater may be due to the various surface activities listed above; however, concentrations are relatively consistent across the filled portion of the property. Furthermore, the organic wood and peat matrix is suspected to contribute to or interfere with the TPH concentrations. Variations in sample turbidity appear to have the greatest affect on contaminant concentrations. No significant contaminant concentration trends have been observed that distinguish potential surface sources from the general conditions observed beneath the filled portion of the property.

2.2 Significant Impacts

2.2.1 Surface Water

Critical Flows for Sediment Transport

Surface water will be collected in a storm drainage system and piped to outfalls at the dredged channel and the Sammamish River. Aside from the wood debris matrix, the soils we encountered at the proposed drainage swale locations were silty SAND, SAND, silty sandy GRAVEL, and sandy GRAVEL. The most critical soil type with respect to erosion would be

the silty sand, with an average particle size of approximately 0.5 to 1 millimeter. According to Chow (1959), a permissible unit tractive force of 0.05 pounds per square foot would be recommended for design of a *bioswale*; these soils would be considered easily erodible. A permissible channel velocity in a gently sloping grass-vegetated channel in easily erodible soils would be 5 feet per second or less.

Estimated Increases in Shoreline Erosion

Offshore sediments which may be subject to erosion include silts and fine sands (SAIC, 1996), susceptible to localized erosion at outfall locations. Flow energy will be quickly dissipated as the discharge enters the Sammamish River and Lake Washington. Additional armoring may be required locally at the outfalls so that erosion is not initiated at those locations. *Location-specific outfall analysis will* be addressed in final design.

Existing erosion problems on the waterfront are limited to localized denuded portions of the shoreline bank. *Upland erosion occurs on a broad scale, and the effects are concentrated at one outfall.* The proposed grading and drainage improvements *and implementation of TESC measures during construction* would eliminate these existing erosion problems. *Sediment will continue to reach adjacent surface waters at the existing rate until such time as efficient TESC measures are implemented.*

Pile driving activities will require the use of heavy equipment including crawler-mounted cranes and trucks. The site temporary erosion and sedimentation control plan will address the features required during construction so that the impact of this activity is minimized.

Piles will likely be either closed-end steel pipe piles (which would be backfilled with concrete after driving) or precast concrete piles. Piles would be installed with a hardened steel driving point or H-pile "stinger" attached to the pile tip. The driving point will aid in pile penetration through the variable composition of the upper fill layers. Both of these are displacement-type piles, installed by driving, and generate little or no soil cuttings.

Sediment Accumulation

As part of the site water quality and drainage plan, sediments would be accumulated in catch basins as well as on-site stormwater detention ponds (Callison Architects, Inc., 1996). Other sediment traps would be incorporated into the temporary erosion and sedimentation control plan, to be developed by the project civil engineer. *Infiltration of storm water is not proposed.*

No sediment will reach Lake Sammamish, which is located approximately fifteen miles upstream from the subject site. Sediments may reach Lake Washington or the Sammamish River in the event that the proposed storm system depending on the design of the proposed storm facilities.

2.2.2 Groundwater

The purpose of this discussion is to address potential alterations to groundwater flow as a result of the proposed development. Grading activities occurred between the publication of the Scope of Work in March 1996 and Draft Technical Report in November 1996; alterations due to these activities are briefly and qualitatively addressed in this subsection.

Recent grading activities with roofing waste and concrete washout stockpiles are unlikely to have influenced groundwater quality. Roofing waste stockpiles have been predominantly removed since the most recent groundwater monitoring event. Furthermore, the effects on the groundwater table from the surficial roofing waste would be indistinguishable from the effects of the underlying wood debris fill, which has a very similar composition. In the southwest portion of the site, concrete washout stockpiles existed throughout the environmental and geotechnical investigations that have been performed at the site between 1991 and 1996. The only potential change in groundwater quality would be an improvement due to the termination of the truck washing activities.

Recent regrading activities at the surface have no effect on the groundwater gradient in the vicinity of the roofing waste, but do have a slight effect on groundwater gradient in the vicinity of the former concrete washout pond. The discontinued use of the impoundment for washing concrete trucks eliminated one major point source of recharge to the groundwater beneath the southwestern portion of the site. It should be noted, however, that water rinsed into the impoundment was pumped from the adjacent inner navigation channel, and that no net effect on groundwater quantity resulted from pumping, rinsing, or discontinued use. Groundwater remains mounded beneath the former pond feature to a lesser degree than before the pond was backfilled. The mounding appears principally due to seasonal adjustments in the adjacent lake level, combined with the low permeability of the concrete washout. Infiltration may also play a role at the north end of the former pond, now that the six acre area has been graded to shed runoff towards the north; in addition to ponding, runoff to the lake has also been observed during heavy rainfall.

The most significant alteration to groundwater that would result from the proposal would be the interception and diversion of all surface runoff. *However, the proposed alteration is not anticipated to pose a significant impact on groundwater gradient or quantity.* Runoff would no longer infiltrate vertically through *the upper portion of the* wood debris fill underlying the site*; however, the lower portion of the wood debris fill would continue to exist below the groundwater table*. Intercepted runoff would be treated in accordance with surface water management standards, and discharged to Lake Washington. Lake Washington is the current and proposed receptor of all site runoff. *Furthermore, because the lowermost 2,000 feet of the Sammamish River flow west into Lake Washington, the lake serves as the immediate receptor for all site runoff.*

Interception of runoff and elimination of vertical infiltration will not influence the existing groundwater gradient beneath the site, nor will they influence groundwater temperature. Groundwater quality may be improved by an unknown degree by essentially halving the volume of wood debris fill that is currently exposed to water infiltration.

Potential Impacts to Groundwater

Groundwater contamination issues are discussed in detail in the Toxic and Hazardous Materials section of this report. Potential impacts to groundwater from contaminants on-site will be reduced by the interception and diversion of all runoff. The interception of runoff will eliminate infiltration of runoff through the wood debris fill into the water table.

The surface soils may have been exposed to surface spills of petroleum, and contain arsenic, barium or lead compounds. All three metals are a common Puget Lowland background element. As a suspended solid, the soil contributes to the turbidity and total contaminant concentrations in the groundwater. The groundwater table beneath the filled portion of the site rises and falls with the seasonally-controlled lake level; however, lateral flow rates may not be capable of mobilizing suspended contaminants towards surface waters. Therefore, the potential impacts due to surface construction activities may result in a short-term negative effect on groundwater quality. *Although the proposed development is estimated to take place over a ten year period, the effects of surface construction activities are considered short-term under the condition that proper TESC measures are implemented during construction.* An anticipated impact of project remedial design is the long-term improvement of groundwater quality.

Surface activities such as demolition of existing structures are not expected to impact groundwater at the site. Project construction, however, may disrupt the existing soil cap, *depending on the final elevation of the lower level floor. Removal of the surficial soil layer would expose more permeable wood debris fills that would readily allow infiltration of runoff to the groundwater table. Removal of the surface soils will expose more permeable wood debris, allowing more rapid infiltration of precipitation through the fill.* Surface soils disrupted by construction or removed by planned excavations may filter through the loose matrix of the wood debris fill toward the groundwater table. *Proper TESC measures should be implemented to minimize this effect.*

Installation of piles through the fill and peat layers into underlying sands and gravels is not expected to pose a significant adverse affect on groundwater quality or gradient. Either steel or pre-cast concrete piling may be used at the site. The use of augercast piling, which generates soil cuttings and surface concrete spills is not recommended at this site for geotechnical reasons. Installation of piling will be one component of cap construction. Piling will support portions of an engineered cap.

Temporary construction dewatering and installation of footing drains may be required at the northern margin of the site. Excavation at the north end of the site will encounter native sands and gravels at shallow depths; no groundwater contaminants have been encountered to date in the upgradient well installed at the site. Installation of a footing drain behind and north of the northernmost structure planned at the site will not significantly alter groundwater flow, gradients, or recharge on or off the property. Footing drains will not be required for pile-supported structures.

Bioswales may be constructed within the 100-foot or 200-foot setback from the existing shoreline. These facilities *will* be *underlain by an engineered cap where warranted* to prevent contact between the treated runoff and the underlying fill materials. *Construction of these swales will take place at or below the shoreline and will possibly involve cofferdam construction and dewatering of potentially contaminated groundwater. Both groundwater and surface water will be subjected to turbid runoff during construction of the swales, and will require storage and treatment along with implementation of appropriate TESC measures.*

Aspects of groundwater flow such as potential upwelling through the lake bottom have not been evaluated for this technical report. In the event that upwelling occurs, it is most likely recharged by gravelly aquifers confined at depth below the thick layers of peat. However, significant confined pressures were not encountered in any of the deep geotechnical borings advanced at the site. Upwelling action could be artificially induced, if desired, by installation of groundwater barriers along the shoreline of the site; groundwater flow would be forced outward through the underlying peat during winter and spring, and inward during summer and fall, driven by lake levels that become seasonally imbalanced with groundwater levels. Another potential source of temporary, artificial upwelling would be the placement of significant depths of fill on the upland portions of the site; this action would be temporary and taper over the long term.

The proposed changes in site use will not adversely impact groundwater quantity, and will improve groundwater quality over the long-term. As discussed above, the engineered impervious surface area will benefit groundwater quality by preventing runoff from contacting the upper portions of the wood debris fill. The intercepted runoff will be treated in accordance with surface water management standards and discharged to Lake Washington.

Relative Risk Evaluation

A Substantial and Disproportionate evaluation of remedial alternatives, *including a relative risk evaluation,* and performed in accordance with Ecology's current draft guidelines dated June 1996, will be incorporated into the *cleanup action plan being negotiated* for the site. Refer to the Toxic and Hazardous Materials section of this report for a more detailed discussion of the MTCA process.

2.3 Mitigation Measures

The proposed remedial action of capping the site would reduce but not prevent leaching, as the wood debris fill extends below the groundwater/ lakewater elevation. Therefore, capping would only mitigate leaching of the portion of fill that exists above the summer high water table, and beneath the capped area.

Implementation of proper TESC measures through the construction phases will mitigate potential impacts to groundwater.

2.4 Significant Unavoidable Adverse Impacts

No significant, unavoidable adverse impacts to groundwater quantity or quality are anticipated. No significant unavoidable adverse impacts to surface water quantity are anticipated.

3.0 TOXIC AND HAZARDOUS MATERIALS

3.1 Affected Environment

3.1.1 Site Ranking by Ecology

Ecology prepared a Site Hazard Assessment (SHA) report for the property dated 19 February 1992. As part of the assessment, Ecology identified several geographic management areas of regulatory interest. Ecology's assessment and the subsequent site ranking was based on Ecology's knowledge of site history and site uses, and on the results of previous site characterization studies. The final site scoring of the site using the Washington Ranking Method (WARM), as outlined in Chapter 173-340, resulted in a ranking of 1 (highest rank) on the Site Hazard Assessment List (File TCP ID: N-17-5127-0000). The ranking was based on a quantification of the potential exposure to humans or the environment along specific exposure routes including air, surface water and groundwater. The presence of benzene (a gasoline constituent) in soils temporarily stockpiled for recycling at the Sterling Asphalt facility was the determining factor in Ecology's site scoring calculations, resulting in the ranking of 1. *Other contaminant and pathway combinations resulted in lower rankings.*

Although the stockpile was reportedly covered by tarps, located under partial shelter and bermed, no mechanism existed for the interception of runoff or leachate from the stockpile, constituting improper containment practices. The toxicity and mobility of benzene, along with the improper containment of the soil stockpiles and the proximity of Lake Washington (a fishery resource) were listed as contributing factors to Ecology's priority ranking. Ecology's calculations determined that the soil stockpiles posed the greatest threat to human health and to the environment via surface water, air, and groundwater routes.

The temporary stockpile site was located near the northwest corner of the existing aggregate stockyard, between wells AW-2 and AW-7 shown on Figure 2. Other exposure pathways considered for site scoring were the former landfill (assumed to be situated within the west-central portion of the site) and the concrete truck washout pond. The location of the

impoundment corresponds to the assumed location of the former landfill. Subsequent investigation determined that the landfill is not confined to the vicinity of the impoundment, but that the entire site is underlain consistently by wood debris fill. As such, the entire filled portion of the site appears to comprise the landfill.

Overall, contaminant concentrations are slightly elevated above residential cleanup standards. The following types of contaminants were encountered in various media at the Kenmore Industrial Park:

Total Petroleum Hydrocarbons (TPH)

Gasoline-range TPH and associated benzene, toluene, ethylbenzene, and total xylene (BTEX) compounds are encountered in the groundwater at the Kenmore Industrial Park at concentrations well below cleanup standards. Benzene, the BTEX compound for which the site was ranked 1 by Ecology, was encountered in one well (AW-2) at a concentration well below the cleanup standard. No gasoline-range TPH or BTEX compounds were detected in the site soils or wood debris. *The cleanup standard for gasoline is 100 parts per million in soil and 1,000 parts per billion in groundwater.*

Diesel- and oil-range TPH are present in non-turbid groundwater samples at concentrations adding up to 2,420 parts per billion (ppb). Concentrations in turbid groundwater samples range up to 19,000 ppb; it is currently not known whether the high concentrations in the turbid samples are due to contaminated sediment or to organic particles (peat) in the groundwater. Diesel- and oil-range TPH are present in 13 out of 16 soil samples analyzed at concentrations ranging from 15 to 2,530 parts per million (ppm). *The cleanup standard for diesel and oil is 200 parts per million in soil and 1,000 parts per billion in groundwater.*

TPH was either undetected, or detected below the MTCA cleanup standard for soil in a sediment sample collected by Ecology from a stockpile of soils dredged in 1992 from the Kenmore Navigation Channel by a site tenant, Waterfront Construction.

Metals

Arsenic concentrations in non-turbid groundwater samples range from undetected to 150 ppb, and exceed cleanup standards in four wells. Arsenic exists both in the dissolved and suspended solid phase in the groundwater at the site. Arsenic is detected in site soils below cleanup standards. *The cleanup standard for arsenic is 20 parts per million in soil and 5.0 parts per billion in groundwater.*

Barium concentrations in non-turbid groundwater samples are well below cleanup standards. Barium exists both in the dissolved phase and as a suspended solid in groundwater at the site. Barium concentrations exceed cleanup standards at ranges of 292 to 1,510 ppm in three soil or wood samples. Barium is common in Puget

Lowland soils. *The cleanup standard for barium is 200 parts per million in soil and 1,120 parts per billion in groundwater.*

Total lead concentrations in non-turbid groundwater samples range from undetected to 300 ppb, and exceed cleanup standards in four wells. Lead exists predominantly as a suspended solid in groundwater at the site. Lead concentrations exceed cleanup standards at ranges of 292 to 1,510 ppm in three soil or wood samples. *The cleanup standard for lead is 250 parts per million in soil and 2.0 parts per million in groundwater.*

Polychlorinated Biphenyls (PCBs)

PCBs were detected in 1991 in one turbid groundwater sample collected from one well. A subsequent investigation of both soil and groundwater at the site of that well did not detect any PCBs. No PCBs were detected in any subsequent groundwater sampling events at the site. PCBs were detected at concentrations below cleanup standards in two soil samples collected by AEE. PCBs were detected in a wood sample, at a concentration slightly elevated above the cleanup standard for soil. *The cleanup standard for PCBs is 1.0 parts per million in soil and 0.1 parts per billion for groundwater.*

Volatile Organic Compounds (VOCs)

Several chlorinated VOCs were detected in groundwater located in the vicinity of the former impoundment, but at concentrations below cleanup standards. Vinyl chloride was encountered in groundwater in the southwest well, AW-6, at a concentration above the cleanup standard. No VOCs have been detected in the site soils. Acetone was detected at a concentrations well below cleanup standards for groundwater in a water sample collected by Ecology from a former concrete washout impoundment. *The cleanup standard for vinyl chloride is 0.526 parts per million in soil and 0.20 parts per billion in groundwater. The cleanup standard for acetone is 8,000 parts per million in soil and 800 parts per billion in groundwater.*

Proposed Marina

The proposed marina will be located within the Kenmore Navigation Channel. Sediments within the channel are periodically sampled for analysis and dredged. The results of the most recent sampling event are presented in a report prepared by Science Applications International Corporation (SAIC), titled *PSDDA Sediment Characterization for the Kenmore Navigation Channel, Kenmore, Washington*, dated 24 May 1996. Sediments were analyzed in accordance with the Puget Sound Dredged Disposal Analysis (PSDDA) protocols. The analytical results indicated that sediments to be dredged from the inner harbor qualified for open water disposal, although some sediments sampled from the outer channel did not qualify. *The sediments that did not qualify are the subject of negotiations for on-site, upland disposal.*

The sediment sample collected from the area of the proposed marina exceeded the PSDDA screening level for low molecular-weight polycyclic aromatic hydrocarbons (LPAHs); however, a subsequent bioassay determined that the sediments demonstrated no toxic effects and therefore qualify for open water disposal. Sediments in the channel are potentially subject to impact from the same contaminants as the upland areas, due to surface runoff.

3.1.2 Contaminant Maps

Maps showing the exploration locations and contaminant concentrations for both the soil and groundwater media are included as Figures 8 and 9, respectively.

3.1.3 Historic Site Activities

Historic activities that may have contributed to the placement of contaminants on the site and in the Kenmore Navigation Channel occurred in two phases. The first phase consisted of extensive filling and grading activities that raised the elevation of the property above the level of Lake Washington. The second phase consisted of the use of the developed property as an industrial park. The timing of these events is based on information obtained from Ecology's *Site Hazard Assessment* (SHA) report, dated 19 February 1992. This information is supplemented by AEE's review of stereopairs of aerial photographs of the property provided by Walker & Associates of Tukwila, Washington.

Significant filling activities became evident at the north margin of the property by 1956. By 1969, the entire property appeared to have been filled to its current elevation. Based on the subsurface explorations performed by AEE at the site, the fill consists predominantly of wood debris, with lesser amounts of concrete and asphalt rubble, and a minor soil matrix. A larger proportion of soil is encountered within the fill at the north end of the site. Components of the fill that were encountered less frequently included scrap metal, rubber tires, wire cables and stumps, carpeting, and plastic. The origin of the fill was reported to be housing demolition debris related to construction of the Interstate I-5, and the debris encountered is consistent with the reported source. According to the SHA, the property was operated as a private landfill between 1965 and 1984. Records "indicated that stumps, demolition debris and restaurant wastes had been disposed. However, a 1981 letter received by EPA from Bayside Disposal listed 20 landfills in King County (including the Kenmore Landfill) potentially used by the company for the disposal of hazardous materials." Bayside Disposal's letter was written in response to EPA's research on historic disposal sites. AEE's subsurface explorations did not encounter any evidence that the implicated hazardous materials were disposed at the site.

Light industrial activities that may have contributed to the placement of contaminants at the site include painting and paint refurbishment activities at the southwest corner of the site, temporary storage of petroleum-contaminated soils prior to recycling at the asphalt plant, and storage of 55-gallon drums at various locations for containment of petroleum fuel, aviation fuel, motor oil, concrete form-release oil, and lubricating oil. Several tenants fueled and

maintained loaders, excavators, cranes and forklifts at the property. Spills and leaks associated with the fueling and maintenance and general traffic of heavy equipment may have contributed to placement of contamination at the site.

Other activities included the concrete and asphalt plant that replaced the former timber mill at the north end of the site. A concrete truck fleet was fueled and maintained in a fenced compound occupying the north central portion of the property. Fuels were stored in above-ground storage tanks (ASTs) inside the fenced compound. An unlined impoundment was maintained in the west central portion of the property to contain washwater rinsed from the concrete trucks. Excess concrete was emptied onto the ground surface surrounding the impoundment, or was recycled into Ecology blocks.

Placement of fill and subsequent light industrial activities potentially have the same effect on the Kenmore Navigation Channel. Storm runoff from the developed upland area results in sedimentation of the channel. Groundwater beneath the filled portion of the site is hydrologically equilibrated with the adjacent surface water, but is also relatively static. Furthermore, bulkheads form a barrier along the majority of the inner channel shoreline, reducing the potential for migration of contaminants between groundwater and surface water.

3.1.4 Administration of the Model Toxics Control Act

The investigation and cleanup of the Lakepointe site is governed by the Washington State Model Toxics Control Act (RCW 70.105D) [MTCA] and overseen by Ecology. The following sections briefly describe how MTCA cleanup regulations (WAC 173-340) and Ecology administer the cleanup process at sites in general, and specifically how the regulations affect the Lakepointe site.

Options for Remedial Actions

Currently, there are six options for Ecology involvement in remedial actions at cleanup sites:

1. Consent Decree (WAC 173-340-520): A consent decree, a formal legal agreement filed in court, may be requested by a potentially liable party or initiated by Ecology. The consent decree spells out the work requirements for the site and the terms under which the work must be completed. The terms of the consent decree require agreement between the applicant, Ecology and the state Attorney General's office, and must undergo a public review and comment period before they can be finalized. Consent decrees can protect the applicant from legal action by other parties that may incur cleanup expenses at the site and facilitate legal claims against other parties that may be responsible for portions of the cleanup costs.

2. Prospective Purchaser Consent Decree: A party which has no liability for the cleanup of a site, but wishes to purchase the site for redevelopment or reuse may pursue this option. The reuse of the site must result in a substantial public benefit and

the applicant must contribute substantial new resources toward the cleanup that might not otherwise be available. The resulting requirements are finalized in a consent decree, allowing the purchaser to estimate the cost of cleanup.

3. *De Minimus* Consent Decree: Applicants, usually landowners, whose contribution to a site is "insignificant in amount and toxicity" may apply for this modified consent decree. Generally, the applicant will pay for a portion of the cleanup costs, without conducting the actual cleanup. Ecology usually only agrees to this type of consent decree if the applicant is affiliated with a different, larger cleanup on which Ecology is also involved.

4. Agreed Orders (WAC 173-340-700): An agreed order is a legally binding, administrative order issued by Ecology and agreed to by the applicant. It is not filed in court and requires no settlement. If the applicant follows the activities laid out in the agreed order for various phases of work, Ecology will not take any enforcement action against the applicant. However, an agreed order does not protect an party from being sued and Ecology can require additional remedial work not included in the original order. Agreed orders are subject to public review.

5. Independent Remedial Action: Property owners who remediate their sites without direct oversight from Ecology may request Ecology's review and approval, following completion of the cleanup actions taken. To address this situation, Ecology has established a voluntary program, the Independent Remedial Action Program. This program requires the applicant to submit a cleanup report for the site to Ecology, along with a fee to cover Ecology's review costs. Based on the review, Ecology may either identify areas where additional work is needed, or issue a "No Further Action" determination. However, Ecology reserves the right to additional review of the site at any future point in time, even if a "No Further Action" letter is issued.

6. Enforcement orders (WAC 173-340-540): MTCA authorizes Ecology to issue administrative orders requiring cleanup activities without an agreement from the landowner or the potentially liable party. These enforcement orders are usually issued in the case of an emergency, or if Ecology believes a cleanup solution will not be reached in a timely manner through negotiation. If landowner fails to comply with the enforcement order, Ecology can initiate the site cleanup themselves and recover the costs from the landowner, at three times the amount spent by Ecology. In addition, the state's Attorney General's Office may issue a fine to the landowner of up to $25,000 per day. These enforcement orders are subject to public notification requirements.

A cleanup action plan will be negotiated between Ecology, the state Attorney General, and the landowner.

Site-Specific Cleanup Levels

Based on MTCA regulations, Ecology defines the approach to the cleanup at any site as a two-step process. First, the potentially liable party must establish cleanup standard(s) for the site. Several factors concerning groundwater and soil should be considered, because these factors can significantly influence the cleanup standard selected. The potentially liable party will then choose a remedial program that attains the selected cleanup standard after completion of remediation. The following paragraphs further define this process.

Establishing a cleanup standard (WAC 173-340-700): Ecology recognizes that eliminating all risks at a cleanup site is not possible. Ecology does require that a site cleanup reduce the risk to what Ecology believes is an acceptable level. This acceptable level must be below a concentration which causes illness in humans, for each cancer-causing (carcinogenic) substance and non-carcinogenic substance. If a site contains more than one of these substances, the combined risk of the substances must considered. These risks have been translated into three options for setting site-specific soil and groundwater cleanup levels.

Method A defines predetermined cleanup levels for 25 of the most common hazardous substances found at sites. Ecology intended these cleanup levels for sites that are not complex, such as small properties, where only a few of the listed substances are present, and where all of the substances are on the Method A list.

Method B establishes cleanup levels using a standard formula which incorporates risk assessment. Ecology has predetermined the level of risk for each substance using information on how hazardous substances can interact with each other, what the health effects may be, and how the migration of these substances on-site and off-site could threaten human health and the environment. The risk level for carcinogenic substances may not exceed 1 in 1,000,000, and the total level of risk at any site may not exceed 1 in 100,000, using Method B cleanup levels. Ecology intended this method to be used for cleanups where the site is large and/or complex, or where one (or more) of the contaminants on the site is not present on the Method A list.

Method C follows the same formula established for Method B. But, MTCA regulations drop the risk for carcinogenic substances to 1 in 100,000 both for individual substances and for total risk caused by all substances. The total risk of the site still cannot exceed 1 in 100,000. This method may be used when (1) cleanups under Methods A or B are technically impossible to achieve, (2) background concentrations are higher that Methods A or B, (3) cleaning up a site to Method A or B levels would actually result in greater harm to the environment, or (4) a commercial or industrial property is qualified, under MTCA regulations, for Method C. Any potentially liable party using Method C carries the burden of proof that the resulting cleanup standard will protect human health and the environment.

The available technology for removal of some contaminants from soil and water is not always effective enough to reduce concentrations to established cleanup standards. In these cases, Ecology may allow a higher standard for these substances, pending improvements in technology. Occasionally, the cleanup standard is below the concentration detectable by laboratory instruments. In this case, the lowest reliable measurement is used as the standard, until lower detection limits become available.

Ecology will not allow the cost of cleaning up a site to set a standard other than those established by these three methods. Ecology believes using cost to permit less stringent standards than those set by the three methods would compromise the protection of human health and the environment and is inconsistent with the intent of the Model Toxics Control Act.

Factors affecting groundwater cleanup standards: The standard selected for remediation of groundwater is based on the highest beneficial use of the water, generally assumed to be drinking water use. In areas where groundwater is a current or future source of drinking water, the cleanup levels must be as stringent as Method A levels, or concentrations listed in federal laws, generally the Safe Drinking Water Act, or levels established by the state board of health. Cleanup standards more stringent than these levels could be established by Ecology if they feel stricter levels are necessary for protection of human health and the environment.

If it can be demonstrated that groundwater does not serve as a potential source of drinking water and has no potential as a future source of drinking water, Ecology uses cleanup levels designed to protect the beneficial use of surface water. To do so, the person undertaking the cleanup action must prove that (1) there are no known or projected points of entry into surface water, (2) the surface water is not a suitable domestic water supply, (3) the flow of groundwater into the surface water will not result in a downstream accumulation of hazardous substances which exceed surface water standards, (4) on-site institutional controls will prevent the use of groundwater between the site and the surface water body, and (5) Ecology determines that it is unlikely that the hazardous substances in groundwater below the site will be transported to an area where groundwater is or could be a drinking water source. Surface water cleanup standards are often stricter than groundwater cleanup standards. Current standards are listed in Ecology Publication #94-145, *Model Toxics Control Act Cleanup Levels and Risk Calculations (CLARC II) Update.*

Factors affecting soil cleanup standards: The zoning of the site and adjacent sites is an important factor to consider when selecting a soil cleanup standard. Typically, governing bodies use three zoning designations for properties: residential, commercial, and industrial. For residential properties, Ecology determined that soil cleanup levels must exceed Method A or B standards unless the property is not currently a residential

area, does not have the potential to become a residential area, and appropriate use restrictions are implemented on the property. Ecology has the option to set standards more stringent than Method A or B for residential property, if needed to protect human health and the environment.

For commercially-zoned properties, Ecology presumes that residential soil cleanup levels will be the standards used. However, a property owner can use Method C standards if the zoning for the property, adjacent properties, and properties in the general vicinity is commercial or industrial and the present and/or past uses of these properties are in accordance with that zoning. Ecology expects that only properties located within the interior of a large commercial or industrial corridor will qualify for this exemption. In addition, institutional controls will be required if the standard used is less stringent than Method B. Institutional controls (WAC 173-340-440) include physical measures, such as fences or signs to restrict access to the site, or limits to on-site activities, including zoning restrictions and prohibiting soil excavation or use of groundwater below the site. Any institutional controls must be described in a restrictive covenant and recorded in the deed to the property.

Finally, MTCA regulations include, for some substances, higher Method A or C soil cleanup standards for industrial properties (WAC 173-340-745). No provision exists in the regulations for establishing Method B cleanup standards. The Method A or B cleanup levels are based on the expectation that only adult workers would be exposed to substances on industrial sites. For this reason, the property owner must evaluate the actual land use as well as the zoning designation, because local governments use a variety of zoning categories for industrial land uses. The following characteristics should be intrinsic to the usage of the property: there are no people living on the property; access to the property is not permitted or highly limited; food is not grown on the property; site operations are generally characterized by chemical use and storage, noise, odors, and truck traffic; the land surface is generally covered or paved; support facilities, such as offices or restaurants, may be present but are primarily devoted to the use of employees and do not serve the general public. The proximity of portions of the property to residential areas, schools, and streets may require the use of standard Method A or C cleanup levels in those areas. Ecology also requires institutional controls on these types of sites.

Selecting Cleanup Actions (WAC 173-340-360): Once one (or more) cleanup standard has been established for a site, the potentially liable party must then select the method or methods they will use to clean up the site. Ecology requires employing a permanent solution, whenever practical. MTCA regulations established a hierarchy of preferred cleanup solutions: reuse or recycling; destruction or detoxification; reduction of the amount of waste; on-site containment of waste; on-site or off-site disposal.

Ecology does allow cost considerations to determine points of compliance for an individual site. Points of compliance define where on a site the cleanup levels must be met. Most sites are required to meet the cleanup standard throughout the site. In some cases, Ecology will define conditional points of compliance to allow specific areas within the site to contain higher concentrations than the established standard. Continued monitoring of these specific areas is required to assure no migration of substances has occurred.

Once the cleanup at a site has been completed, conformational monitoring must be conducted to verify that the cleanup action worked and remains effective over time. If Method C was the cleanup standard selected, or if levels which remain at the site exceed Method A or B levels, Ecology will review the site every five years to ensure continued protection of human health and the environment.

Application of MTCA Cleanup Levels to the Lakepointe Site: Lakepointe is a large site, encompassing approximately 45 acres. The site is a former demolition debris landfill that comprises approximately 70 percent of the surface area of the property, and therefore meets the description of a complex site. Therefore, Method B cleanup levels will be selected for the site.

Although the demolition debris found at the Lakepointe site is relatively homogeneous compared to typical municipal landfill debris, potential sources of contamination may exist within the fill. Because it is not practicable to sort through landfill debris, potential sources of contamination at landfills are identified and characterized through sampling and analysis of the landfill leachate. At the site, leachate occurs both from storm water infiltrating vertically through the upper layer of the debris, and from the groundwater table within the debris layer. The groundwater elevation beneath the landfilled portion of the site roughly corresponds to the surface water elevation of the adjacent lake and river slough. As such, soil remediation is not an element of the EPA-accepted, presumptive remedy for landfills, which consists of an engineered cap. However, groundwater monitoring will be performed as an institutional control. As stated above, Method B cleanup levels will be selected as groundwater standards at the site.

MTCA cleanup standards have not been established for sediments. Sediments in the Kenmore Navigation Channel and in the Sammamish River Navigation Channel will be sampled and analyzed for contaminants under separate cleanup negotiations.

Implications of No Further Action Designation

A "No Further Action" (NFA) designation from Ecology may be granted following a satisfactory cleanup performed under the Independent Remedial Action Program (IRAP). The receipt of an NFA removes a property from Toxics Cleanup Program (TCP) listings, such as the Site Register and the Confirmed and Suspected Contaminated Sites (C&SCS) list. The receipt of an NFA provides assurance to lenders that the completed cleanup action meets current, applicable cleanup standards. A cleanup action must be fully completed to Ecology's satisfaction prior to the issuance of an NFA determination, and a lending institution may require an NFA determination prior to lending funds on the property. An NFA is subject to Ecology's review and reevaluation in the event that regulations change, or that new findings of fact are revealed. Therefore, an NFA does not protect the landowner or lender against future liability.

At the subject site, the proposed remedial action will be an engineered cap designed to prevent human contact with the landfilled debris, and to intercept runoff that infiltrates the debris. *An engineered cap consists of an impermeable layer of clay or concrete of sufficient thickness to prevent infiltration of water or contaminations.*

An NFA designation would not protect the owner or lender against future liability. A cleanup action plan negotiated with the state Attorney General and with Ecology establishes a legally binding, minimum scope of work and remedial timeline. The remedial action is then performed under Ecology's oversight. With *a negotiated cleanup such as a Agreed Order or Consent Decree,* a lending institution may fund development of a project prior to completion of a remedial action.

Public Notice Process

MTCA regulations require public involvement and participation in the process of remediating a site (WAC 173-340-600). Ecology's goal is "to provide the public with timely information and meaningful opportunities for participation which are commensurate with each site." The public participation process can take many forms, including public notices, public meetings or hearings, the site register, public participation plans, and the participation of regional citizens' advisory committees. In accordance with the Agreed Order negotiations in progress for the subject site, Ecology shall be responsible for providing public notice in accordance with the requirements of RCW 70.105D.030(2)(a).

Public notice of activities associated with a site cleanup must be made specifically to individuals who make a timely request, i.e., within the public comment period, or who reside with the potentially affected area, and to the general public via publication in the newspaper or other news media Ecology deems to be appropriate. The form of the public notice could include distribution of press releases, fact sheets, personal contact, or signs posted at the facility. Any public notice must indicate the dates of the public comment period, and the duration, generally 30 days. In addition, a public meeting must be held, if requested, within the comment period, by ten or more individuals.

Ecology regularly distributes a site register, which is often used to make a public notice. Some of the activities reported in the site register include determinations of "No Further Action", results of Ecology's site hazard ranking, issuance of enforcement orders, agreed orders or consent decrees, public meetings or hearings, changes in the status of a site, or reports received for sites undergoing independent cleanup actions. The register is published every two weeks and can be received by contacting Ecology's headquarters in Olympia by telephone (360-407-6000), mail (Department of Ecology, Toxics Cleanup Program, P.O. Box 47600, Olympia, WA, 98504-7600), or by e-mail (shan461@ecy.wa.gov).

A public participation plan attempts to provide a coordinated method for effective public interaction, through all the stages of the cleanup process. These plans normally include public notice requirements and how they will be met. This includes information on the timing for public notices, the lengths of comment periods, and an estimate of the potentially affect individuals. The plan must state at least one location where the public can review site information. The plan must specify how to identify the public's concerns and then how to address the concerns once they have been identified. The plans should outline a procedure to amend the plan, if necessary, and provide for coordination with other federal and state laws which may have separate or additional public notification requirements.

Ecology establishes regional citizen's advisory committees to advise Ecology on the concerns of citizens regarding remedial actions taking place, with emphasis on regional rather than site-specific issues. Each of the four regional offices of Ecology must have a regional citizen's advisory group. Individuals who may not serve on these committees include potentially liable parties for sites within each region, individuals closely associated with the potentially liable parties or Ecology employees. The committees meet twice each year and prepare a brief report to Ecology describing the concerns that have been brought to the committee's attention, recommendations for addressing these concerns, and the committees plans for the upcoming year.

3.2 Significant Impacts

3.2.1 Impacts Without Cleanup

The proposed cleanup action will consist of an engineered cap designed to prevent human contact with the fill debris. The cap will intercept all runoff, divert the runoff to storm treatment facilities, where the treated runoff may be returned to the groundwater or surface water resource. Without performing the proposed cleanup, surface runoff and transport of sediments to surrounding surface waters would continue. Infiltration of runoff through the debris fill would continue, resulting in additional formation of leachate beneath the filled portion of the site. Potential sources of contamination would remain on the surface, where they may be mobilized through the infiltration or runoff processes. Please refer to the EARTH section of this report for a discussion of estimated erosion and surface runoff volumes, for both current and proposed conditions.

3.2.2 MTCA Cleanup Standards

Achievement of MTCA Method B cleanup levels in the groundwater would be required by Ecology for residential, commercial, or industrial use of this property. Cleanup of the soil, or debris, would not necessarily be required, due to construction of an engineered cap as the presumptive remedy for a landfill. However, localized remediation of the soil or debris may be the most feasible remedial option for achievement of groundwater cleanup standards. *Localized remediation may consist of exploration for and extraction or immobilization of a suspected or anomalous contaminant, above and beyond those measures deemed sufficient for the remainder of the proposal.*

3.2.3 Site Conditions Which May Warrant Cleanup

Approximately three-fifths of the property is underlain by significant depths of wood debris fill. Rather than remediate the wood debris fill beneath the site, human contact with the wood debris fill will be prevented by the construction of an engineered cap. *The existing surficial soil layer will be disrupted during construction of the engineered cap.* The proposed development will be designed as a cap. The southern extent of the cap towards the river shoreline will be determined in the Engineering Design Report prepared under the negotiated cleanup.

Arsenic and lead concentrations in the groundwater are likely to warrant clean-up to meet MTCA standards for groundwater. The points of compliance and remedial approach will be determined in the Engineering Design Report prepared under the negotiated cleanup.

3.2.4 Discussion of Remedial Alternatives

As part of the project planning process, the following cleanup alternatives were considered, in order of preference as stated in MTCA:

- Reuse or recycling;
- Destruction or detoxification;
- Separation or volume reduction, followed by reuse, recycling, destruction or detoxification of the residual substances;
- Immobilization of hazardous substances;
- Disposal at an engineered facility designed to minimize the future release of hazardous substances and in accordance with applicable state and federal laws;
- Isolation or containment with attendant engineering controls; or,
- Institutional controls and monitoring.

In WAC 173-340-360, MTCA further states that cleanup actions shall meet the following requirements:

- Protect human health and the environment;
- Comply with cleanup standards;

- Comply with applicable state and federal laws;
- Provide for compliance monitoring;
- Use permanent solutions to the extent practicable (based on the criteria of overall protection of human health and the environment, long-term effectiveness, short-term effectiveness, permanent reduction of toxicity, mobility and volume, implementability, cleanup costs, and community concerns);
- Provide for reasonable restoration time frame; and,
- Make provisions for public participation.

Each of the cleanup alternatives was evaluated with respect to the requirements and attendant criteria listed above.

Reuse and Recycling

Implementation of reuse or recycling technology entails extraction of free product or metals from the soil and groundwater. The contaminants must be extracted in sufficient quantity and purity to reuse or recycle as a marketable product. None of the contaminants encountered at the Kenmore Industrial Park exist in sufficient concentration to enable the most-preferred cleanup technology of reuse and recycling.

Destruction or Detoxification

The site consists of a peninsula constructed on approximately 15 feet of fill to raise the elevation of the property above the surrounding surface of Lake Washington. The fill consists predominantly of wood debris. Removal and destruction of the wood debris fill as the medium of contamination would not result in destruction of inorganic contaminants such as lead and arsenic, and may result in the release of interstitial sediments to the surface waters of Lake Washington. Destruction of the wood debris would entail incineration, a cost-prohibitive technology. The closest permanent incineration facility is located in California, and transportation of contaminated material entails short-term risks to the environment. Alternatively, a mobile incinerator could be established on site, pending public approval and a demonstration of cost feasibility. However, replacement of approximately three-quarter million cubic yards of fill would be necessary in order to return site grades to original, and to an elevation above that of Lake Washington. Replacement of the fill would be cost prohibitive, may release sediment to the surface water, and temporarily eliminate the shoreline environment.

Detoxification technologies would entail groundwater treatment in the form of either pump and treatment, or biosparging. Hazardous substances at the site include diesel- and oil-range total petroleum hydrocarbons (TPH), lead and arsenic. Numerous uncertainties are associated with detoxification technologies, none of which would result in a permanent solution, but would require perpetual monitoring, operation and maintenance. For example, chemical treatment by modification of oxidation-reduction potential or pH conditions of the groundwater, in order to

transform lead and arsenic to less soluble and less mobile compounds, would need to be compatible with the adjacent surface water environments. Chemical treatment technologies may also result in the dissolution and mobilization of compounds that were previously not of concern.

Biotreatment of the groundwater may remediate heavier petroleum compounds over a significant period of time, but would be ineffective against inorganic contaminants such as lead and arsenic. Furthermore, biotreatment may have adverse effects on the adjacent surface water environments due to nutrient-loading and oxygenation activities. Because of the limited distinction between surface water, groundwater and landfill leachate, physical immobilization technologies such as cutoff trenches would technically constitute immobilization or containment technologies, which are discussed below.

Media transfer technologies were considered as a supplement to the destruction/detoxification process. These technologies include air sparging and/or vapor extraction to remove volatiles from the subsurface media, or thermal desorption to treat petroleum contaminated soils. Volatile contaminants are not encountered in the soil or groundwater at the site in significant quantities, and thermal desorption technology would involve removal and treatment of the debris fill. As stated previously, ex situ technologies involving removal of the fill material at the site pose significant concerns for surface water and shoreline environments.

Media transfer is a feasible application for the collection and venting of landfill gases generated by degradation of the wood debris as well as of the native organic soils underlying the site.

Separation or Volume Reduction

Separation and volume reduction would require sorting through approximately three-quarter million cubic yards of construction/demolition debris. The debris consists of an average of 70 percent wood waste by volume, 15 percent concrete and asphalt rubble, and 15 percent soil. The debris extends below the groundwater table, and may not be suitable for recycling as structural fill due to the high wood content, wet or saturated soil conditions or MTCA classification. Approximately three-quarter million cubic yards of fill material would be required to return the waterfront property to its previous elevation above lake level. Excavation of the debris would potentially release contaminated sediments to the surface waters of Lake Washington and the Sammamish River. As stated above, filling over an open body of water after removal of the debris is expected to generate community concern, temporarily eliminate the shoreline environment, and potentially impact the surface water environments.

These cleanup technologies require removal and sorting of the debris fill. The debris fill extends below the groundwater table, hence, this ex situ technology does not meet the criteria of short-term effectiveness or permanent reduction of toxicity and mobility, due to the

potential release of contaminants to the surface waters during construction/remediation and disruption of the shoreline environment.

Immobilization of Hazardous Substances

Immobilization technologies entail vitrification or solidification, both of which are principally applied to contaminated soils. Vitrification relies on the application of high temperatures, in excess of incineration temperatures, to solidify contaminated soil into a rock-like material. Such high temperatures would threaten the surface water environment and fisheries. Furthermore, the majority of the fill at the subject site consists of water-soaked wood debris, which would absorb significant energy during vaporization of water, as well result in significant volume reduction of the debris fill, both due to volatilization and incidental incineration of the wood debris. Incineration of the wood debris would also pose significant fire and air pollution hazards. Furthermore, it is unlikely that vitrification of wood debris would result in immobilization of contaminants. Vitrification technology does not address immobilization of water-borne contaminants in the debris leachate and groundwater. Based on the above, vitrification technology is not considered safe or effective for heterogeneous media with high organic content or shoreline application.

Solidification technology using cement or fly ash is technically possible for solidification of contaminated soils or wood debris at the site. Cement is mixed or injected with the contaminated material. Numerous uncertainties are associated with application of this technology to the subject site. It is not known if the pH of the cement additive would result in solution and mobilization of metals into the groundwater media and adjacent surface waters. It is not known whether the additive would further degrade the wood debris, resulting in volume losses, or whether it would have a preservative effect, or whether the effects would differ above and below the groundwater table.

Sealing the base of the debris fill layer to prevent contaminants from leaching vertically through the underlying native soils was considered. However, the debris layer extends below the groundwater table, and the underlying native soils consist of peats and organic silts, which are extremely porous, but poorly permeable. These native organic soils provide a natural physical barrier to the vertical migration of groundwater, as well as a chemical barrier in terms of their high capacity for adsorption and attenuation of organic and inorganic compounds.

On-site or Off-site Disposal at an Engineered Facility

Based on the analytical results obtained for the site soils, groundwater, and wood debris, the fill material is not classified as hazardous waste, and may be disposed at a RCRA Subtitle D permitted landfill. The closest facility would be the Klickitat County Regional Landfill (KCRLF) in Roosevelt, Washington. There is an intermodal transfer station to the landfill located in Seattle, Washington. Transportation of contaminated media poses short-term risk to the environment.

As with other ex situ technologies listed above, off-site disposal would pose short-term risks to the environment due to the potential release of contaminants to the surface waters surrounding the site. Furthermore, this technology does not meet the criteria for long-term effectiveness; neither toxicity nor volume are reduced by the permanent relocation of the landfill debris to a permitted facility. A significant volume of a permitted landfill would need to be dedicated to the disposal of approximately three-quarter million cubic yards of debris, limiting future capacity of a permitted landfill. Costs associated with disposal at an engineered facility would be prohibitive.

Due to the expanse of the debris fill underlying the waterfront site, on-site disposal at an engineered facility, or engineering the site to serve as a the disposal facility, would technically constitute containment technology, which is discussed in the next paragraph.

Isolation or Containment

Isolation and containment alternatives were considered as part of this proposal. Implementation of this technology would entail a liner, a cutoff wall to isolate groundwater from surface waters and/or an engineered cap to prevent human contact with the landfill debris and prevent surface runoff from infiltrating through the debris. Retrofitting the site with a liner would entail ex situ removal and replacement of the landfill debris. Depending on the positioning, or setback from the river, installation of a cutoff wall may disrupt the vegetation and/or allow reconfiguration of the shoreline environment. Alternatively, a cutoff wall may be setback from the shoreline to prevent disruption of established vegetation and shoreline; however, a setback would not provide the same degree of protection to surface waters.

An appropriately engineered and maintained cap would provide protection to human health and the environment without inordinate cost and is the presumptive remedy for landfills. Approximately 90 percent of the proposed development will consist of impervious building or pavement surfaces, with engineered storm water collection and treatment systems. As such, the additional cost of designing the proposed development to serve as an engineered cap for the existing landfill will be low, making the cap a cost-effective and implementable cleanup technology.

Installation of groundwater barriers may slow the rate of migration onto or through the site, but would not alter existing groundwater levels .

Institutional Controls and Monitoring

Institutional controls such as health and safety plans, fencing, and blood level monitoring are not compatible with the proposed residential and commercial uses of the site. Furthermore, these controls are likely to generate more community concerns than they resolve, do not afford protection to human health or to the environment, and do not provide for permanent reduction of toxicity, volume or mobility of contaminants.

Drinking water use restrictions would not apply at the subject site, as there are no known drinking water wells within a one mile radius of the site.

Long-term groundwater monitoring will be implemented to evaluate the effectiveness of the selected option before, during and after construction of the project.

Preferred Option

Due to the nature of the contaminants of concern, low concentrations and/or low toxicities, and to the apparent lack of significant groundwater contamination, full-scale, ex situ cleanup technologies involving excavation, removal and/or treatment of the wood debris fill do not meet the criteria for practicable, or cost-effective, permanent solutions at this former landfill site. Furthermore, in situ cleanup technologies such as pump and treatment of the groundwater are not practicable due to the low groundwater recharge rates within the landfill debris. These technologies are not practicable to reduce toxicity, mobility or volume of contaminants, under the conditions found at the Lakepointe site.

An appropriately engineered and maintained cap, however, would provide protection to human health and the environment without inordinate cost. An engineered cap is an accepted presumptive remedy for landfills as described in the U.S. Environmental Protection Agency's *Presumptive Remedy for CERCLA Municipal Landfill Sites* (Directive No. 9355.0-49FS, EAP 5440-F-93-035, dated September 1993). Approximately 90 percent of the proposed development will consist of impervious building or pavement surfaces, with engineered storm water collection and treatment systems. As such, the additional cost of designing the proposed development to serve as an engineered cap for the existing landfill will be low making the cap the most cost-effective and implementable cleanup technology available. Therefore, an engineered cap is proposed as the practicable, permanent and final remedial action for the Lakepointe site.

This technology may be implemented in conjunction with localized removal and landfilling of wood debris in areas where contaminants exceed cleanup standards at the point of compliance. Media transfer technologies may be employed to vent landfill gases from the subsurface. Depending on the composition, the vented gases may be treated thermally. Finally, groundwater monitoring will be implemented as an institutional control to document groundwater gradients and contaminant concentrations beneath the site before construction and during the period of phased construction.

The principal objectives of the proposed remedial action are the protection of human health and the environment. These objectives will be satisfactorily accomplished by capping the site:

- Overall protection of human health will be achieved by a cap design that prevents human contact with the debris. Protection of the environment will be

served by interception of storm and surface water that would otherwise infiltrate vertically through the debris to the groundwater table beneath the site.

- Areas outside the boundaries of the shoreline property are in compliance with surface water cleanup standards. Sediments are to be addressed in a separate consent decree.

- An engineered cap would comply with applicable state and federal laws and meet the requirements of the presumptive remedy as set forth by the EPA.

- Groundwater would be monitored before, during and after construction for compliance with cleanup standards at the points of compliance, the schedule of which will be addressed in a separate consent decree.

- Provide a practicable, long-term solution that maximizes implementability, minimizes cost, and addresses community concerns regarding the end use of the property and shoreline environment. A permanent reduction in toxicity and mobility would be achieved by the preferred alternative.

- The proposed cleanup alternative would be implemented over a period of approximately ten years during the phased construction of the proposed development.

- The proposal makes provisions for public participation.

The cap design will be coordinated with design of the development and will consist of a combination of buildings, paving, and other cover materials designed to meet the remedial action objectives (RAOs). Short-term effectiveness of the remedial action during phased construction of the project will be addressed in the remedial design, as will compliance monitoring. Long-term effectiveness of the remedial design will be an operation and maintenance issue to be addressed in the consent decree, in accordance with the requirements of WAC 173-340-400 (4)(c). Finally, design of the cleanup action will address community concerns raised during public comment. The precise design of the cap is the principal subject of the design work to be conducted under a negotiated cleanup and scope of work.

3.3 Mitigation Measures

A site cleanup will be negotiated and implemented to minimize exposure of humans and the environment to potential sources of contamination.

3.4 Significant Unavoidable Adverse Impacts

No significant, unavoidable adverse impacts are anticipated.

4.0 LIST OF REFERENCES

AGRA Earth & Environmental, Inc. (AEE). November 8, 1996. *Groundwater Analytical Results — August 1996.*

AEE. May 1996. *Phase II Environmental Site Assessment.*

Beak Consultants, Inc., 9 December 1996. *Draft Lakepointe Technical Report on Natural Resources.*

Callison Architects, Inc. 1996. Shoreline Permit Application Plans.

Chow, V.T. 1959. Open Channel Hydraulics, McGraw-Hill.

Geotech Consultants, Inc. July 1991. *Supplemental Sampling and Testing in the Proximity of Monitoring Well B-103.*

Geotech Consultants, Inc. January 1991. *Revised: Phase II Environmental Study–Kenmore Pre-Mix Site.*

Geotech Consultants, Inc. November 1990. *Phase II Environmental Assessment.*

National Research Council. 1988. *Probabilistic Seismic Hazard Analysis.* National Academy Press, Washington D.C., 97 pp.

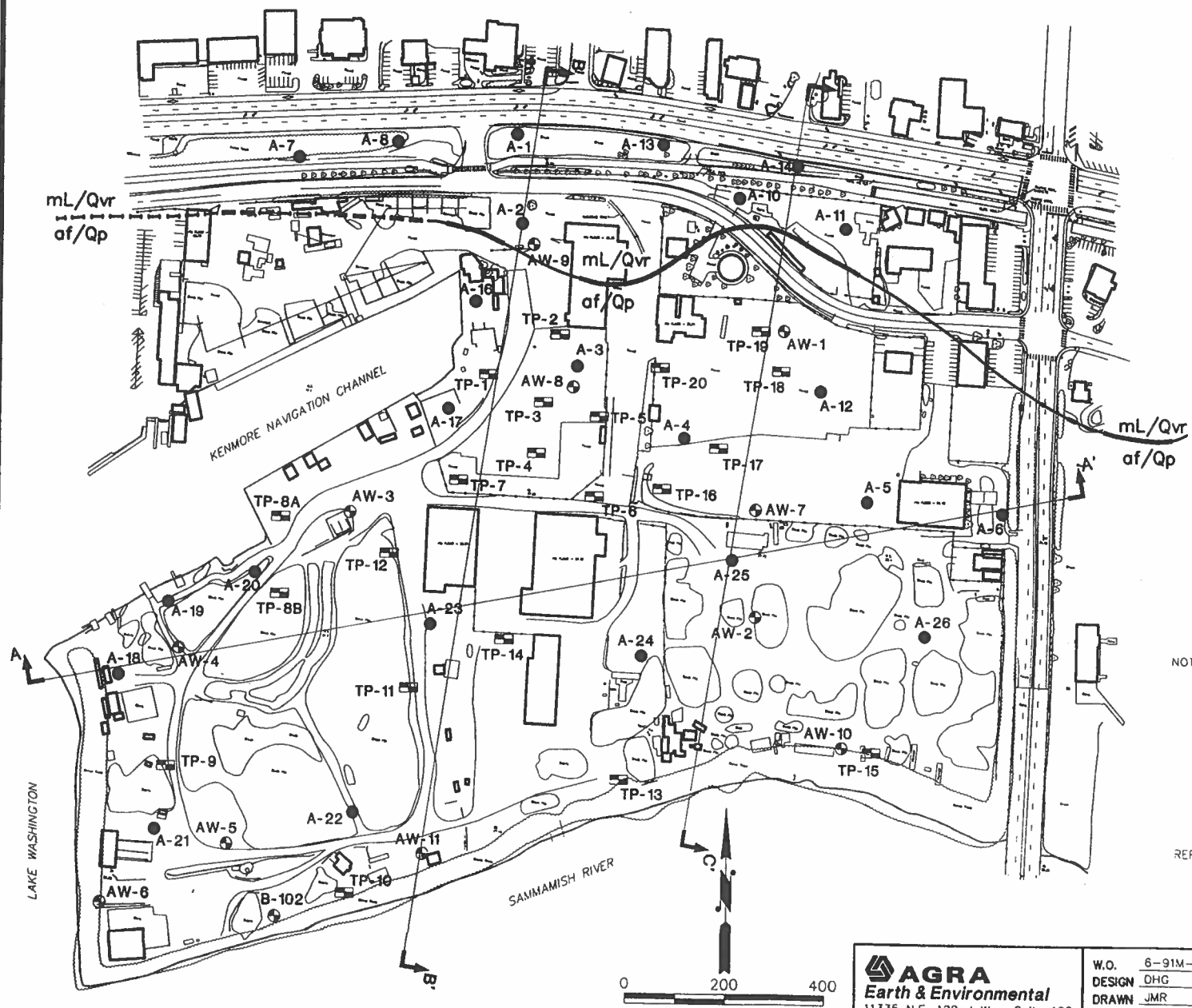
SEACOR. January 1992. *Groundwater Monitoring Report.*

Science Applications International Corporation (SAIC). May 1996. *PSDDA Sediment Characterization for the Kenmore Navigation Channel, Kenmore, Washington.*

USDA Soil Conservation Services. November 1973. *Soil Survey of King County Area, Washington.*

US Geological Survey. 1975. *A Study of Earthquake Losses in the Puget Sound, Washington Area.* USGS Open File Report 75-375, 298 pp.

Washington State Department of Ecology. February 1992. *Site Hazard Assessment.*



LEGEND

- **AW-11** — GROUNDWATER MONITORING WELL NUMBER AND LOCATION
- **A-26** — GEOTECHNICAL BORING NUMBER AND LOCATION
- **TP-20** — TEST PIT NUMBER AND LOCATION
- **A — A'** — ALIGNMENT OF GENERALIZED GEOLOGIC CROSS SECTION
- **mL/Qvr / af/Qp** — GEOLOGIC CONTACT (DASHED WHERE INFERRED)

mL — MODIFIED LAND

ORIGINAL TOPOGRAPHY DISTURBED BY REMOVAL OF SOME PLEISTOCENE DEPOSITS, GRADING AND ARTIFICIAL FILL OF UNKNOWN QUALITY.

af — ARTIFICIAL FILL

ORIGINAL TOPOGRAPHY MODIFIED BY PLACEMENT OF SIGNIFICANT THICKNESS OF ARTIFICIAL FILL. COMPRISES THE WOOD DEBRIS FILL DESCRIBED IN SUBSURFACE EXPLORATIONS.

af/Qp — PEAT

SIGNIFICANT THICKNESS OF ARTIFICIAL FILL OVER ACCUMULATIONS OF ORGANIC MATERIAL. MAY CONTAIN SMALL AMOUNTS OF SAND, SILT, CLAY AND VOLCANIC ASH DEPOSITED IN SWAMPS AND BAYS.

mL/Qvr — VASHON RECESSIONAL OUTWASH

ORIGINAL TOPOGRAPHY DISTURBED.
LIGHT BROWN, LOOSELY COMPACTED SAND AND GRAVEL, WELL-ROUNDED FROM STREAM TRANSPORTATION. SORTING VARIES; PARTICLE SIZE VARIES FROM MEDIUM SAND TO COBBLES.

NOTES: INFORMATION REGARDING THE EXTENT OF PEAT SOILS WAS SUPPLEMENTED BY PREVIOUS STUDIES PERFORMED FOR RIGHT-OF-WAYS AND FOR METRO SEWER STATION, AND BY REVIEW OF AERIAL PHOTOGRAPHS OF THE SITE AND VICINITY.

THE GEOLOGIC DEPOSITS SHOWN REPRESENT NATIVE SOIL CONDITIONS BELOW ARTIFICIAL FILLS.

MONITORING WELL B-102 WAS INSTALLED BY OTHERS. REFER TO REVISED: PHASE II ENVIRONMENTAL STUDY - KENMORE PRE-MIX SITE, BY GEOTECH CONSULTANTS, INC., DATED 24 JANUARY 1991.

REFERENCE:
U.S. GEOLOGICAL SURVEY (USGS) GEOLOGICAL MAP OM-14, "PRELIMINARY SURFICAL GEOLOGIC MAP OF THE EDMONDS EAST AND EDMONDS WEST QUADRANGLES, SNOHOMISH AND KING COUNTIES, WASHINGTON (1975).

FIGURE 2

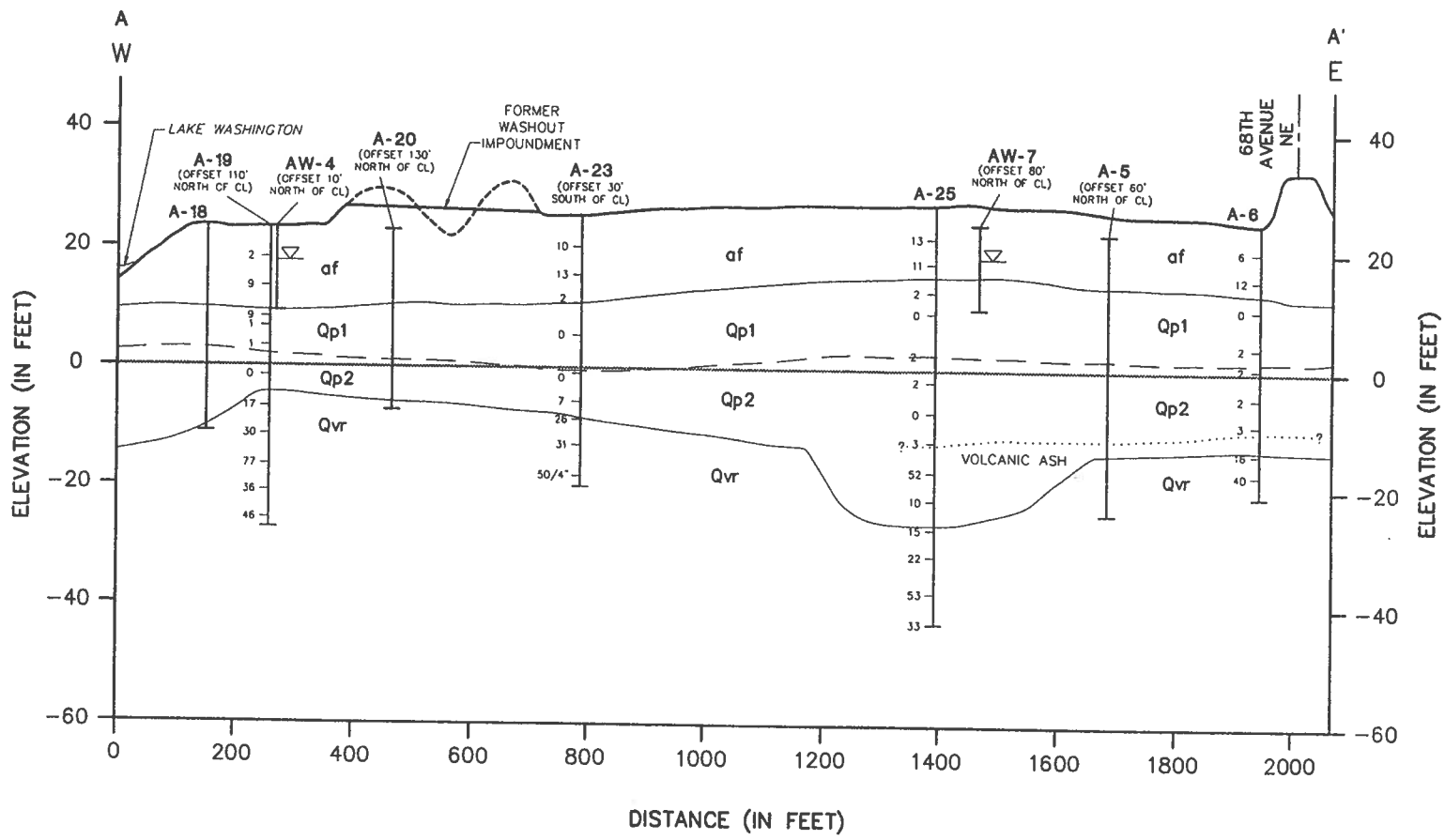
AGRA Earth & Environmental
11335 N.E. 122nd Way, Suite 100
Kirkland, WA. U.S.A. 98034-6918

W.O.	6-91M-10459-E
DESIGN	DHG
DRAWN	JMR
DATE	OCT 1996
SCALE	1"=200'

LAKEPOINTE DEVELOPMENT
KING COUNTY, WASHINGTON

SITE AND EXPLORATION PLAN

AGRA EARTH & ENVIRONMENTAL, INC. DRAWING NO. \91\10459-E\GEOLOGIC.DWG



mL – MODIFIED LAND

ORIGINAL TOPOGRAPHY DISTURBED BY REMOVAL OF SOME PLEISTOCENE DEPOSITS, GRADING AND ARTIFICIAL FILL OF UNKNOWN QUALITY.

af – ARTIFICIAL FILL

ORIGINAL TOPOGRAPHY MODIFIED BY PLACEMENT OF SIGNIFICANT THICKNESS OF ARTIFICIAL FILL. COMPRISES THE WOOD DEBRIS FILL DESCRIBED IN SUBSURFACE EXPLORATIONS.

Qp – PEAT

ACCUMULATION OF ORGANIC MATERIAL (Qp1) LOOSE ALLUVIUM.
MAY CONTAIN SMALL AMOUNTS OF SAND, SILT, CLAY AND VOLCANIC ASH DEPOSITED IN SWAMPS AND BOGS (Qp2)

Qvr – VASHON RECESSIONAL OUTWASH

LIGHT BROWN, LOOSELY COMPACTED SAND AND GRAVEL, WELL-ROUNDED FROM STREAM TRANSPORTATION. SORTING VARIES; PARTICLE SIZE VARIES FROM MEDIUM SAND TO COBBLES. NOT DIFFERENTIATED FROM MORE RECENT ALLUVIUM, WHICH MAY CONTAIN SILT, CLAY AND ORGANIC MATTER.

Qvt – VASHON TILL

POORLY SORTED, NONSTRATIFIED LODGMENT TILL DEPOSITED AS GROUND MORAINE. MIXTURE OF CLAY, SILT, SAND, PEBBLES AND COBBLES WITH OCCASIONAL LARGE BOULDERS. STONES ARE SUBANGULAR TO ROUNDED.

LEGEND

A-25 — SOIL BORING/MONITORING WELL NUMBER AND LOCATION

OBSERVED GROUNDWATER LEVEL

53 — BLOW COUNT (BLOWS/FOOT)

APPROXIMATE BOUNDARY OF GEOLOGIC UNIT

APPROXIMATE BOUNDARY BETWEEN ORGANIC PEATS (Qp1) AND ALLUVIUM (Qp2)

ELEVATION 0 (KING COUNTY BENCHMARK "KC-8-16")

BOTTOM OF HOLE

0 20 40
VERTICAL SCALE IN FEET

0 200 400
HORIZONTAL SCALE IN FEET

REFERENCE:
U.S. GEOLOGICAL SURVEY (USGS) GEOLOGICAL MAP OM-14, "PRELIMINARY SURFICAL GEOLOGIC MAP OF THE EDMONDS EAST AND EDMONDS WEST QUADRANGLES, SNOHOMISH AND KING COUNTIES, WASHINGTON (1975).

FIGURE 3

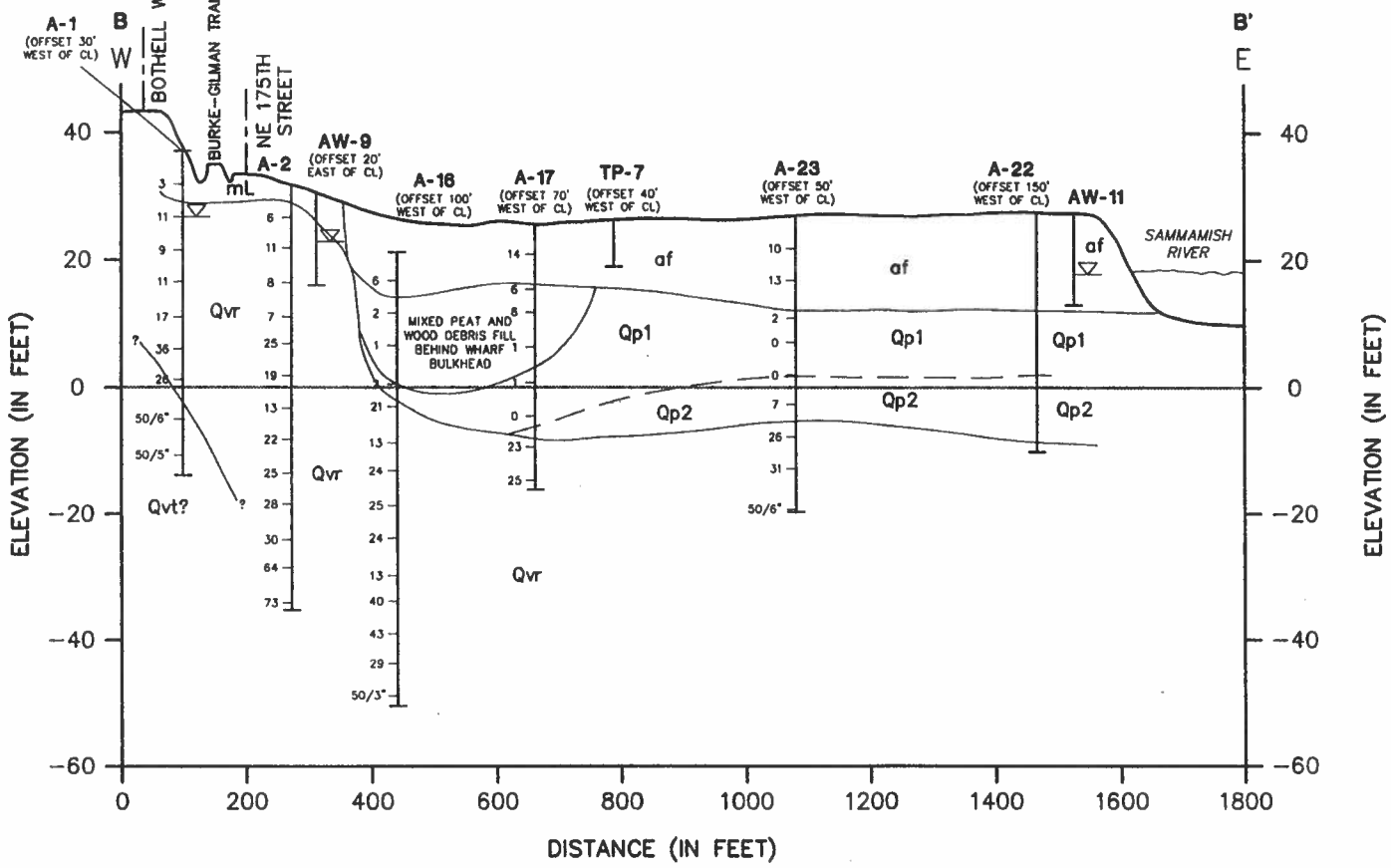
AGRA Earth & Environmental
11335 N.E. 122nd Way, Suite 100
Kirkland, WA, U.S.A. 98034-6918

W.O.	6-91M-10459-E
DESIGN	DHG
DRAWN	JMR
DATE	OCT 1996
SCALE	V:1-2D, H:1-200

LAKEPOINTE DEVELOPMENT
KING COUNTY, WASHINGTON

GENERALIZED GEOLOGIC CROSS SECTION
A - A'

AGRA EARTH & ENVIRONMENTAL, INC. DRAWING NO. \91\10459-E\X-S-A.DWG



LEGEND

A-25 — SOIL BORING/MONITORING WELL NUMBER AND LOCATION

OBSERVED GROUNDWATER LEVEL

53 — BLOW COUNT (BLOWS/FOOT)

APPROXIMATE BOUNDARY OF GEOLOGIC UNIT

APPROXIMATE BOUNDARY BETWEEN ORGANIC PEATS (Qp1) AND ALLUVIUM (Qp2)

ELEVATION 0 (KING COUNTY BENCHMARK "KC-B-16")

BOTTOM OF HOLE

0 20 40
VERTICAL SCALE IN FEET

0 200 400
HORIZONTAL SCALE IN FEET

mL – MODIFIED LAND

ORIGINAL TOPOGRAPHY DISTURBED BY REMOVAL OF SOME PLEISTOCENE DEPOSITS, GRADING AND ARTIFICIAL FILL OF UNKNOWN QUALITY.

af – ARTIFICIAL FILL

ORIGINAL TOPOGRAPHY MODIFIED BY PLACEMENT OF SIGNIFICANT THICKNESS OF ARTIFICIAL FILL. COMPRISES THE WOOD DEBRIS FILL DESCRIBED IN SUBSURFACE EXPLORATIONS.

Qp – PEAT

ACCUMULATION OF ORGANIC MATERIAL (Qp1)
LOOSE ALLUVIUM.
MAY CONTAIN SMALL AMOUNTS OF SAND, SILT, CLAY AND VOLCANIC ASH DEPOSITED IN SWAMPS AND BOGS (Qp2)

Qvr – VASHON RECESSIONAL OUTWASH

LIGHT BROWN, LOOSELY COMPACTED SAND AND GRAVEL. WELL-ROUNDED FROM STREAM TRANSPORTATION. SORTING VARIES; PARTICLE SIZE VARIES FROM MEDIUM SAND TO COBBLES. NOT DIFFERENTIATED FROM MORE RECENT ALLUVIUM, WHICH MAY CONTAIN SILT, CLAY AND ORGANIC MATTER.

Qvt – VASHON TILL

POORLY SORTED, NONSTRATIFIED LODGMENT TILL DEPOSITED AS GROUND MORAINE. MIXTURE OF CLAY, SILT, SAND, PEBBLES AND COBBLES WITH OCCASIONAL LARGE BOULDERS. STONES ARE SUBANGULAR TO ROUNDED.

REFERENCE:
U.S. GEOLOGICAL SURVEY (USGS) GEOLOGICAL MAP OM-14, "PRELIMINARY SURFICAL GEOLOGIC MAP OF THE EDMONDS EAST AND EDMONDS WEST QUADRANGLES, SNOHOMISH AND KING COUNTIES, WASHINGTON (1975).

FIGURE 4

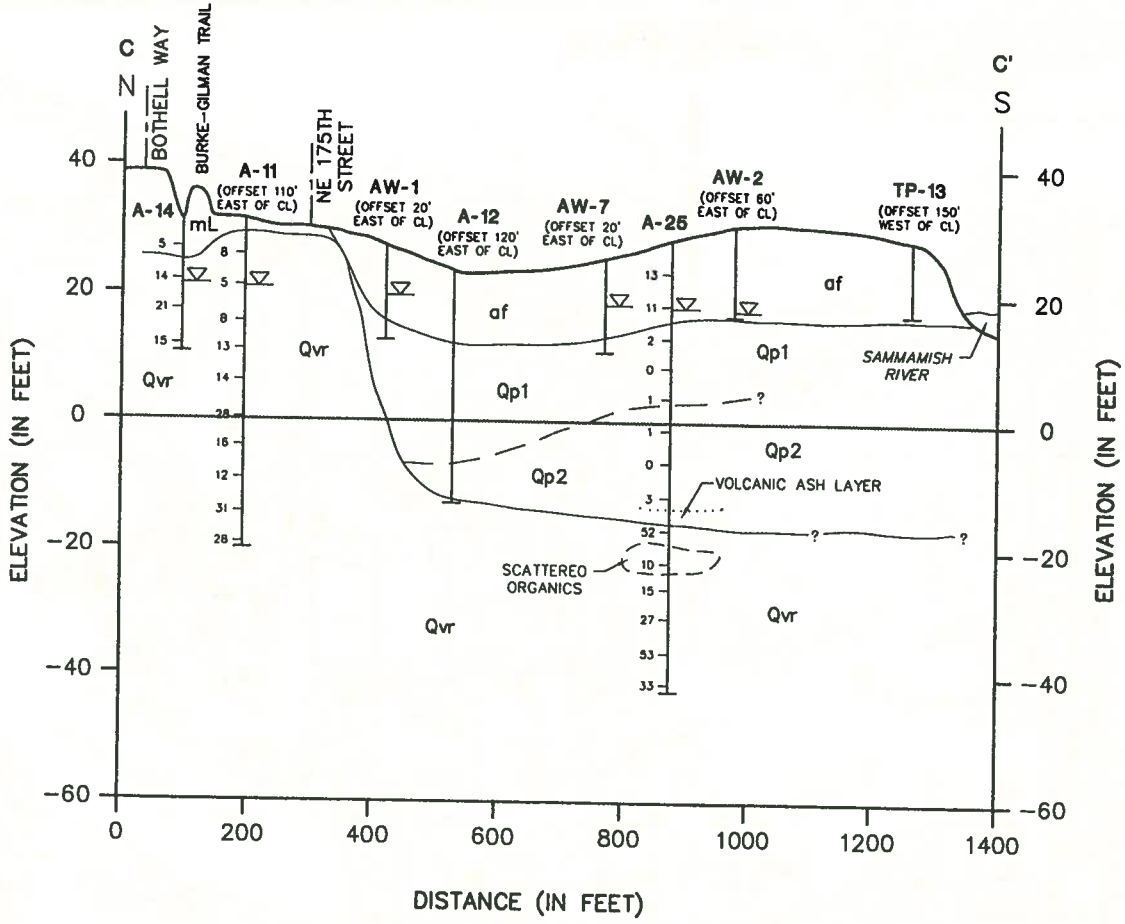
AGRA Earth & Environmental
11335 N.E. 122nd Way, Suite 100
Kirkland, WA, U.S.A. 98034-6918

W.O.	6-91M-10459-E
DESIGN	DHG
DRAWN	JMR
DATE	OCT 1996
SCALE	V:1-20, H:1-200

LAKEPOINTE DEVELOPMENT
KING COUNTY, WASHINGTON

GENERALIZED GEOLOGIC CROSS SECTION
B - B'

AGRA EARTH & ENVIRONMENTAL, INC. DRAWING NO. \91\10459-EVX-S-B.DWG



mL – MODIFIED LAND

ORIGINAL TOPOGRAPHY DISTURBED BY REMOVAL OF SOME PLEISTOCENE DEPOSITS, GRADING AND ARTIFICIAL FILL OF UNKNOWN QUALITY.

af – ARTIFICIAL FILL

ORIGINAL TOPOGRAPHY MODIFIED BY PLACEMENT OF SIGNIFICANT THICKNESS OF ARTIFICIAL FILL. COMPRISES THE WOOD DEBRIS FILL DESCRIBED IN SUBSURFACE EXPLORATIONS.

Qp – PEAT

ACCUMULATION OF ORGANIC MATERIAL (Qp1)
LOOSE ALLUVIUM.
MAY CONTAIN SMALL AMOUNTS OF SAND, SILT, CLAY AND VOLCANIC ASH DEPOSITED IN SWAMPS AND BOGS (Qp2)

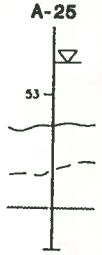
Qvr – VASHON RECESSIONAL OUTWASH

LIGHT BROWN, LOOSELY COMPACTED SAND AND GRAVEL, WELL-ROUNDED FROM STREAM TRANSPORTATION. SORTING VARIES; PARTICLE SIZE VARIES FROM MEDIUM SAND TO COBBLES. NOT DIFFERENTIATED FROM MORE RECENT ALLUVIUM, WHICH MAY CONTAIN SILT, CLAY AND ORGANIC MATTER.

Qvt – VASHON TILL

POORLY SORTED, NONSTRATIFIED LODGMENT TILL DEPOSITED AS GROUND MORAINE. MIXTURE OF CLAY, SILT, SAND, PEBBLES AND COBBLES WITH OCCASIONAL LARGE BOULDERS. STONES ARE SUBANGULAR TO ROUNDED.

LEGEND



- SOIL BORING/MONITORING WELL NUMBER AND LOCATION
- OBSERVED GROUNDWATER LEVEL
- BLOW COUNT (BLOWS/FOOT)
- APPROXIMATE BOUNDARY OF GEOLOGIC UNIT
- APPROXIMATE BOUNDARY BETWEEN ORGANIC PEATS (Qp1) AND ALLUVIUM (Qp2)
- ELEVATION 0 (KING COUNTY BENCHMARK "KC-8-16")
- BOTTOM OF HOLE

REFERENCE:
U.S. GEOLOGICAL SURVEY (USGS) GEOLOGICAL MAP OM-14, "PRELIMINARY SURFICAL GEOLOGIC MAP OF THE EDMONDS EAST AND EDMONDS WEST QUADRANGLES, SNOHOMISH AND KING COUNTIES, WASHINGTON (1975).

FIGURE 5

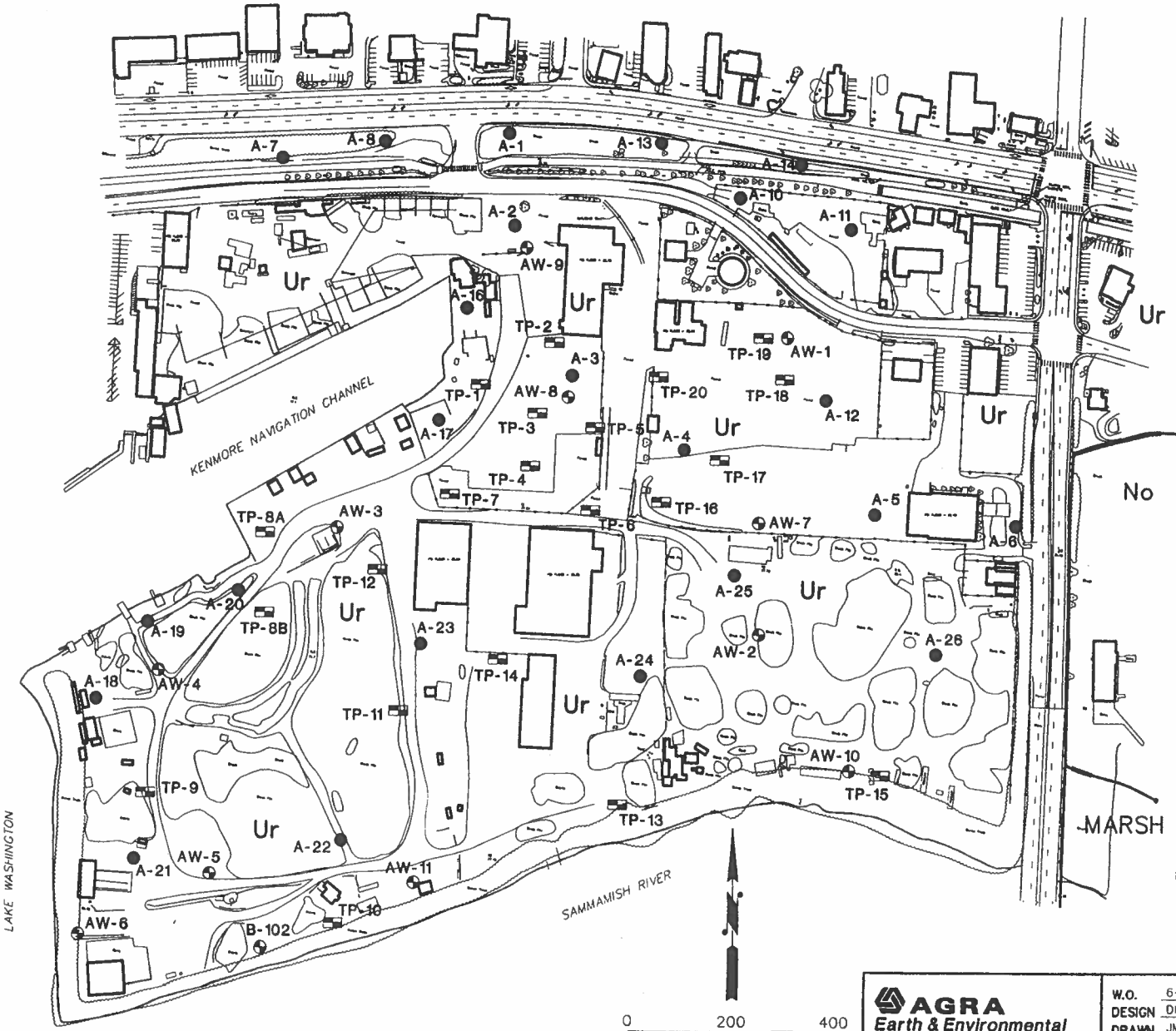
AGRA Earth & Environmental
11335 N.E. 122nd Way, Suite 100
Kirkland, WA, U.S.A. 98034-6918

W.O.	6-91M-10459-E
DESIGN	DHG
DRAWN	JMR
DATE	OCT 1996
SCALE	V:1-20, H:1-200

LAKEPOINTE DEVELOPMENT
KING COUNTY, WASHINGTON

GENERALIZED GEOLOGIC CROSS SECTION
C - C'

AGRA EARTH & ENVIRONMENTAL, INC. DRAWING NO. \91\10459-E\X-S-C.DWG



LEGEND

AW-11 — GROUNDWATER MONITORING WELL NUMBER AND LOCATION

A-26 — GEOTECHNICAL BORING NUMBER AND LOCATION

TP-20 — TEST PIT NUMBER AND LOCATION

SCS SOIL TYPES – CURRENT CONDITIONS

Ur – URBAN LAND

SOIL THAT HAS BEEN MODIFIED BY DISTURBANCE OF NATURAL LAYERS WITH ADDITIONS OF FILL MATERIALS SEVERAL FEET THICK TO ACCOMMODATE LARGE INDUSTRIAL AND HOUSING INSTALLATIONS. URBAN LAND DOES NOT CORRESPOND TO A GEOLOGIC UNIT, BUT IS CLASSIFIED AS ARTIFICIAL FILL (AF) OF MODIFIED LAND (ML) IN GEOLOGIC DISCUSSIONS AND ILLUSTRATIONS ACCOMPANYING THIS EIS.

No – NORMA SOILS

POORLY DRAINED SOIL THAT FORMED IN ALLUVIUM, UNDER SEDGES, GRASS, CONIFERS AND HARDWOODS. NORMA SOILS CONSIST OF BLACK, SANDY LOAM TO SILT LOAM. NORMA SOILS CORRESPOND TO QUATERNAY PEAT GEOLOGIC DEPOSITS (QP).

MARSH

AREAS DESIGNATED AS MARSH WERE NOT INCLUDED IN THE SCS SURVEY AND WERE INFERRED TO HAVE BEEN INUNDATED OR INACCESSIBLE. MARSH AREAS CORRESPOND TO QUATERNARY PEAT GEOLOGIC DEPOSITS (QP).

REFERENCE: U.S. DEPARTMENT OF AGRICULTURE (USDA) SOIL CONSERVATION SERVICE (SCS) SOIL SURVEY OF KING COUNTY AREA, WASHINGTON, DATED NOVEMBER 1973.

NOTE: MONITORING WELL B-102 WAS INSTALLED BY OTHERS. REFER TO REVISED: PHASE II ENVIRONMENTAL STUDY – KENMORE PRE-MIX SITE, BY GEOTECH CONSULTANTS, INC., DATED 24 JANUARY 1991.

FIGURE 6

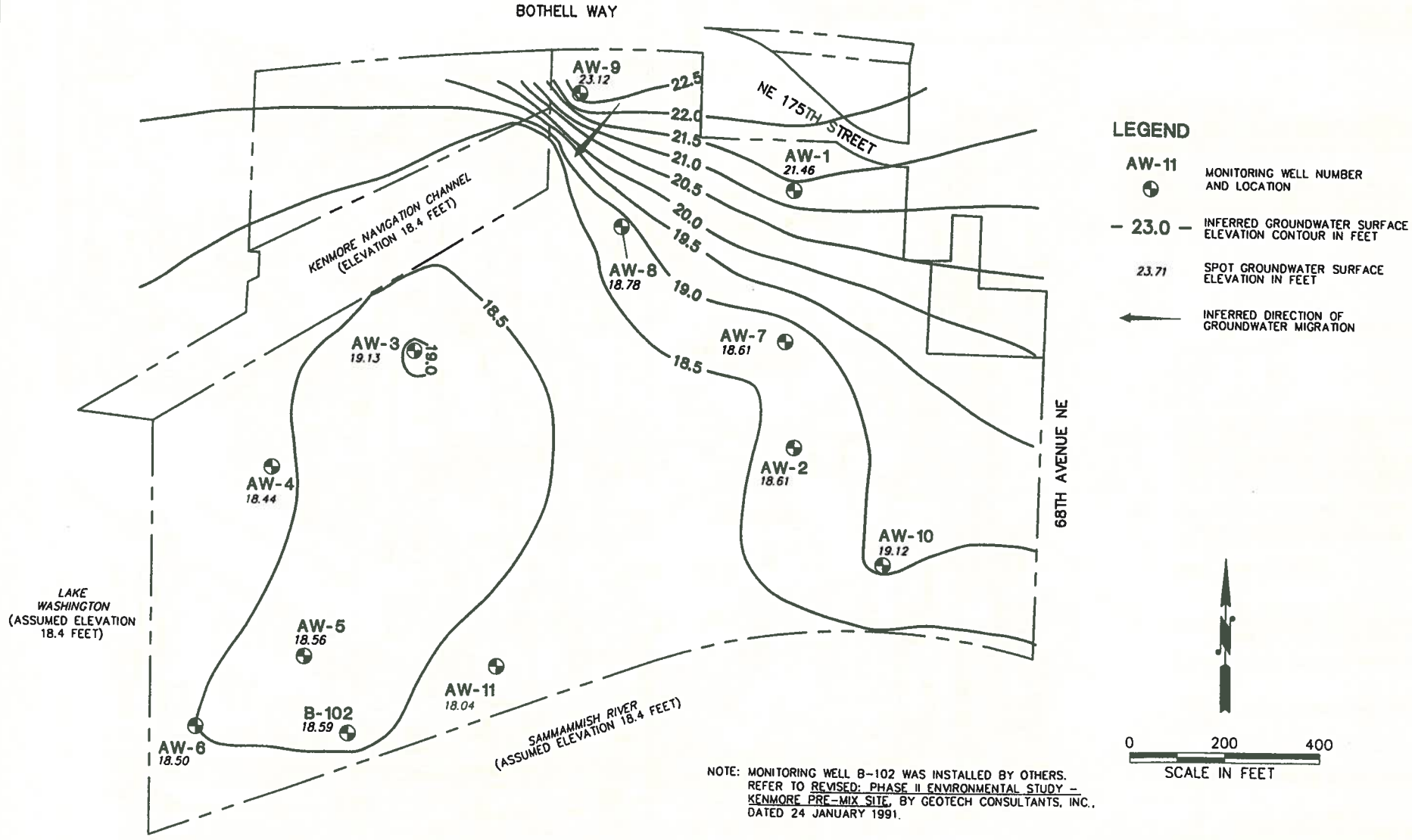
AGRA Earth & Environmental
11335 N.E. 122nd Way, Suite 100
Kirkland, WA, U.S.A. 98034-6918

W.O.	6-91M-10459-E
DESIGN	DHG
DRAWN	JMR
DATE	OCT 1996
SCALE	1"=200'

LAKEPOINTE DEVELOPMENT
KING COUNTY, WASHINGTON

DISTRIBUTION OF SCS SOIL TYPES - 1968

AGRA EARTH & ENVIRONMENTAL, INC. DRAWING NO. \91\10459-E\SCS-SOIL.DWG



NOTE: MONITORING WELL B-102 WAS INSTALLED BY OTHERS. REFER TO REVISED: PHASE II ENVIRONMENTAL STUDY – KENMORE PRE-MIX SITE, BY GEOTECH CONSULTANTS, INC., DATED 24 JANUARY 1991.

FIGURE 7

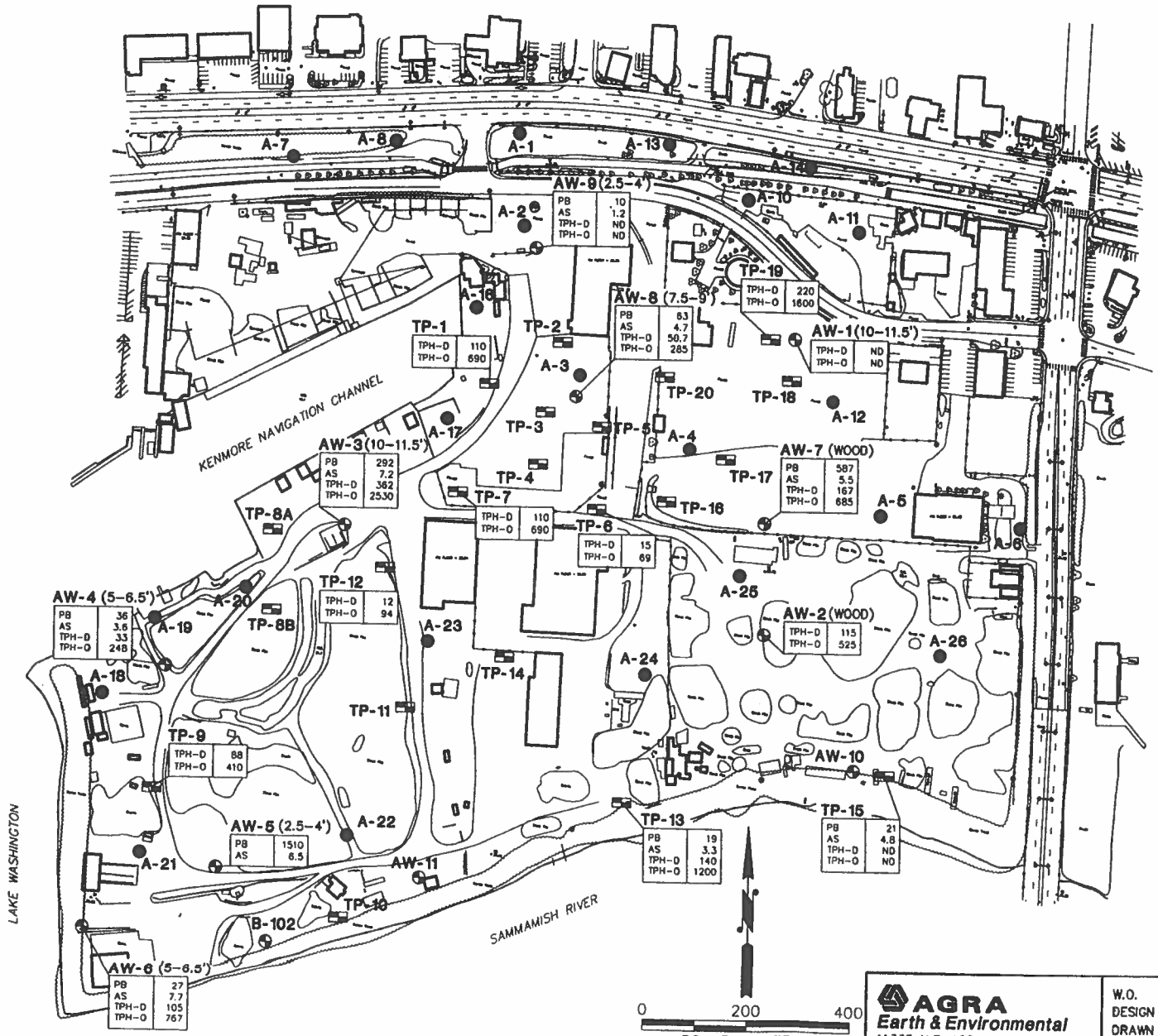
AGRA
Earth & Environmental
11335 N.E. 122nd Way, Suite 100
Kirkland, WA, U.S.A. 98034-6918

W.O.	6-91M-10459-E
DESIGN	DHG
DRAWN	JMR
DATE	OCT 1996
SCALE	1"=200'

LAKEPOINTE DEVELOPMENT
KING COUNTY, WASHINGTON

GROUNDWATER GRADIENT MAP
FOR 05 AUGUST 1996

AGRA EARTH & ENVIRONMENTAL, INC. DRAWING NO. \91\10459-E\DWG896.DWG



LEGEND

AW-11 ⊕ GROUNDWATER MONITORING WELL NUMBER AND LOCATION

A-26 ● GEOTECHNICAL BORING NUMBER AND LOCATION

TP-20 ▭ TEST PIT NUMBER AND LOCATION

(2.5-4') SAMPLE DEPTH COLLECTED (IN FEET)

(WOOD) NO SOIL SAMPLE OBTAINED DURING EXPLORATION. ANALYSES PERFORMED ON WOOD CUTTINGS.

SOIL TEST RESULTS

ALL CONCENTRATIONS ARE REPORTED IN PARTS PER MILLION (PPM)

ND NOT DETECTED, BELOW METHOD DETECTION LIMIT

PB TOTAL LEAD BY EPA METHOD 6010/7000

AS TOTAL ARSENIC BY EPA METHOD 6010/7000

TPH-D TOTAL PETROLEUM HYDROCARBONS - DIESEL RANGE BY ECOLOGY METHOD WTPH-D EXT.

TPH-O TOTAL PETROLEUM HYDROCARBONS - HEAVY OIL RANGE BY ECOLOGY METHOD WTPH-D EXT.

PB	ND
AS	ND
TPH-D	ND
TPH-O	ND

COMPOUNDS — CONCENTRATIONS IN PPM

NOTES: OTHER COMPOUNDS ARE PRESENT. PLEASE REFER TO TOXIC AND HAZARDOUS MATERIALS SECTION OF THIS REPORT, OR TO AEE'S PHASE II ENVIRONMENTAL ASSESSMENT DATED MAY 1996, FOR FURTHER DISCUSSION OF ANALYTICAL RESULTS.

MONITORING WELL B-102 WAS INSTALLED BY OTHERS. REFER TO REVISED: PHASE II ENVIRONMENTAL STUDY - KENMORE PRE-MIX SITE, BY GEOTECH CONSULTANTS, INC., DATED 24 JANUARY 1991.

FIGURE 8

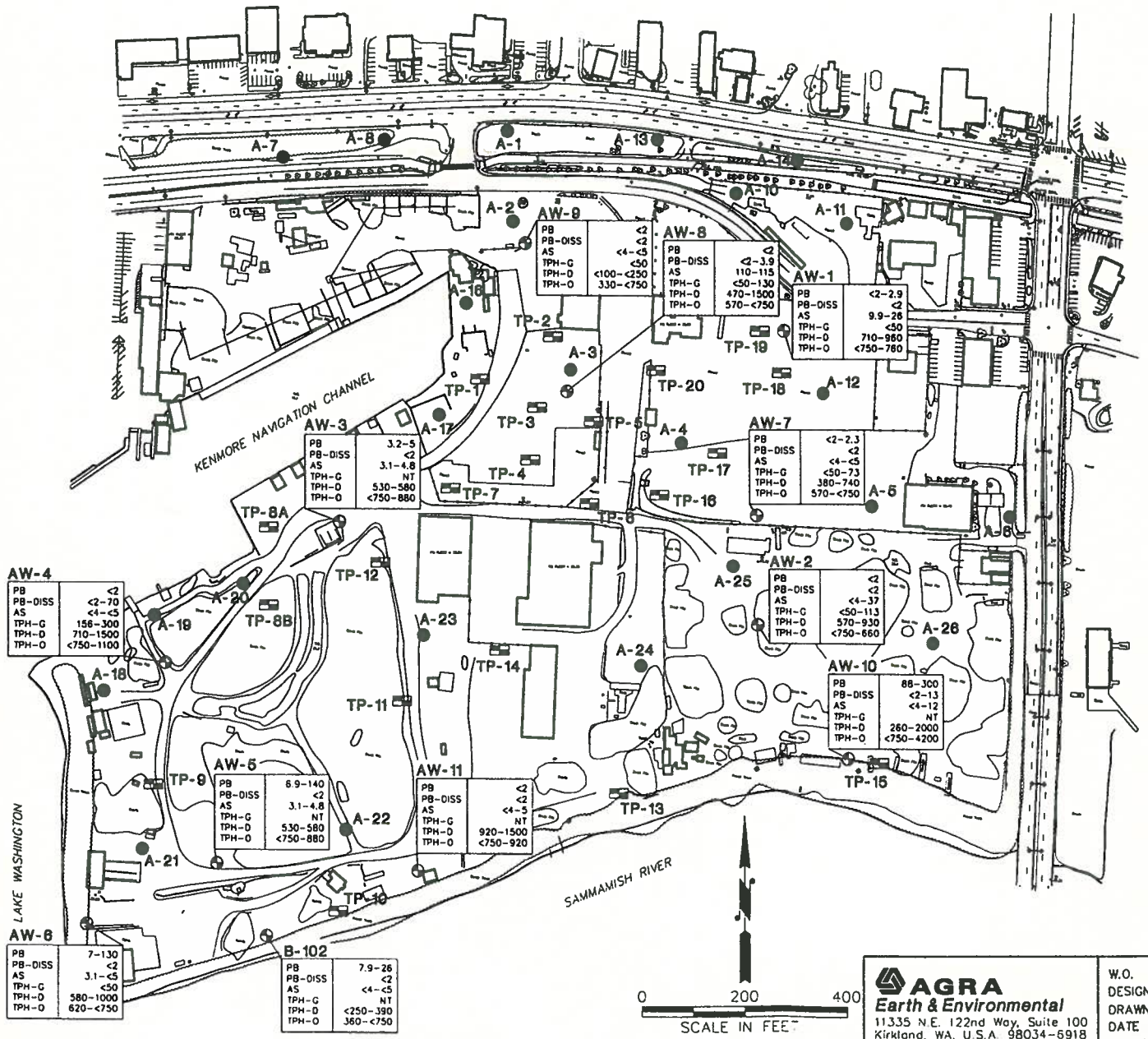
AGRA Earth & Environmental
11335 N.E. 122nd Way, Suite 100
Kirkland, WA, U.S.A. 98034-6918

W.O.	6-91M-10459-E
DESIGN	DHG
DRAWN	JMR
DATE	OCT 1996
SCALE	1"=200'

LAKEPOINTE DEVELOPMENT
KING COUNTY, WASHINGTON

SOIL CONTAMINANT CONCENTRATIONS

AGRA EARTH & ENVIRONMENTAL, INC. DRAWING NO. \91\10459-E\TPH_SOIL.DWG



LEGEND

AW-11 — GROUNDWATER MONITORING WELL NUMBER AND LOCATION

A-26 — GEOTECHNICAL BORING NUMBER AND LOCATION

TP-20 — TEST PIT NUMBER AND LOCATION

GROUNDWATER TEST RESULTS

CONCENTRATIONS IN PARTS PER BILLION (PPB)

ND — NOT DETECTED, BELOW METHOD DETECTION LIMIT

PB	TOTAL LEAD BY EPA METHOD 6010/7000
PB-DISS	DISSOLVED LEAD BY EPA METHOD 6010/7000
AS	TOTAL ARSENIC BY EPA METHOD 6010/7000
TPH-G	TOTAL PETROLEUM HYDROCARBONS – GASOLINE RANGE BY ECOLOGY METHOD WTPH-D EXT.
TPH-D	TOTAL PETROLEUM HYDROCARBONS – DIESEL RANGE BY ECOLOGY METHOD WTPH-D EXT.
TPH-O	TOTAL PETROLEUM HYDROCARBONS – HEAVY OIL RANGE BY ECOLOGY METHOD WTPH-D EXT.

PB	ND
PB-DISS	ND
AS	ND
TPH-G	ND
TPH-D	ND
TPH-O	ND

COMPOUNDS — CONCENTRATIONS IN PPB

NOTES:

1. EXCEPT FOR COLLECTION OF TPH-G SAMPLES, MICROPURGE TECHNIQUES WERE USED TO MINIMIZE TURBIDITY WHILE SAMPLING THE WELLS. CONCENTRATIONS ARE REPORTED AS A RANGE FROM TWO SAMPLING EVENTS.

2. TOTAL ARSENIC IS COMPARABLE TO DISSOLVED ARSENIC CONCENTRATIONS.

3. OTHER COMPOUNDS ARE PRESENT. PLEASE REFER TO TOXIC AND HAZARDOUS MATERIALS SECTION OF THIS REPORT, OR TO AEE'S PHASE II ENVIRONMENTAL ASSESSMENT DATED MAY 1996, FOR FURTHER DISCUSSION OF SAMPLING METHODOLOGY AND ANALYTICAL RESULTS. AUGUST 1996 SAMPLING RESULTS ARE PRESENTED IN AEE'S QUARTERLY GROUNDWATER MONITORING REPORT DATED 08 NOVEMBER 1996.

4. MONITORING WELL B-102 WAS INSTALLED BY OTHERS. REFER TO REVISED: PHASE II ENVIRONMENTAL STUDY – KENMORE PRE-MIX SITE, BY GEOTECH CONSULTANTS, INC., DATED 24 JANUARY 1991.

FIGURE 9

AGRA Earth & Environmental
11335 N.E. 122nd Way, Suite 100
Kirkland, WA, U.S.A. 98034-6918

W.O.	6-91M-10459-E
DESIGN	DHG
DRAWN	JMR
DATE	OCT 1996
SCALE	1"=200'

LAKEPOINTE DEVELOPMENT
KING COUNTY, WASHINGTON

GROUNDWATER
CONTAMINANT CONCENTRATIONS

AGRA EARTH & ENVIRONMENTAL, INC. DRAWING NO. \91\10459-E\BTEX_GW.DWG

APPENDIX A

PRELIMINARY GEOTECHNICAL ENGINEERING EVALUATION
PROPOSED KENMORE LAKEPOINTE DEVELOPMENT
KENMORE (KING COUNTY), WASHINGTON

PRELIMINARY GEOTECHNICAL ENGINEERING EVALUATION
PROPOSED KENMORE LAKEPOINTE DEVELOPMENT
N.E. BOTHELL WAY AND 68TH AVENUE N.E.
KING COUNTY, WASHINGTON

Submitted to:

Pacific Rim Equities
11 Crescent Key
Bellevue, Washington 98006

Submitted by:

AGRA Earth & Environmental, Inc.
11335 N.E. 122nd Way, Suite 100
Kirkland, Washington 98034-6918

November 1996

11-10459-00

AGRA
Earth & Environmental

AGRA
Earth & Environmental

AGRA Earth &
Environmental, Inc.
11335 NE 122nd Way
Suite 100
Kirkland, Washington
U.S.A. 98034-6918
Tel (206) 820-4669
Fax (206) 821-3914

8 November 1996
11-10459-00

Pacific Rim Equities
11 Crescent Key
Bellevue, Washington 98006

Attention: Mr. Michael Gleason

Subject: Preliminary Geotechnical Engineering Evaluation
Proposed Kenmore Lakepointe Development
N.E. Bothell Way and 68th Avenue N.E.
King County, Washington

Dear Mr. Gleason:

As requested by you, AGRA Earth & Environmental, Inc. (AEE) is pleased to submit this preliminary report describing our recent geotechnical engineering evaluation for the proposed Lakepointe Development. This report presents the results of our subsurface exploration program and geotechnical engineering evaluation relative to foundation design and construction considerations for the proposed project. This study has been completed in general accordance with our proposals dated 22 August 1995, 12 January 1996 and 8 April 1996, and was initiated after receiving written authorization for our services.

We appreciate this opportunity to be of service to you and would be pleased to discuss the contents of this report or other aspects of the project with you at your convenience.

Respectfully submitted,

AGRA Earth & Environmental, Inc.

James S. Dransfield, P.E.
Vice President

TABLE OF CONTENTS
11-10459-00

1.0 SUMMARY 1

2.0 SITE AND PROJECT DESCRIPTION 2

3.0 SITE CONDITIONS 3
- 3.1 Surface Conditions 3
- 3.2 Subsurface Conditions 4
- 3.3 Groundwater Conditions 6
- 3.4 Seismic Hazard Conditions 7

4.0 PRELIMINARY GEOTECHNICAL ENGINEERING CONSIDERATIONS 8
- 4.1 Central and South Portions of Site 8
  - 4.1.1 Site Filling 8
  - 4.1.2 General Foundation Considerations 9
  - 4.1.3 Pile Foundation Support 9
  - 4.1.4 Uplift Capacity 10
  - 4.1.5 Lateral Capacity 10
  - 4.1.6 Test Pile Program 11
  - 4.1.7 Site Utilities 12
  - 4.1.8 Considerations for Paved Areas 12
  - 4.1.9 Bulkhead Considerations 13
- 4.2 North Portion of Site 13
- 4.3 Dewatering 14
- 4.4 Bridge Considerations (Preliminary) 14

5.0 ADDITIONAL RECOMMENDATIONS 16

6.0 CLOSURE 17

Figure 1 — Location Map
Figure 2 — Site & Exploration Plan
Figure 3 — Generalized Geologic Cross-Section A-A'
Figure 4 — Generalized Geologic Cross-Section B-B'
Figure 5 — Generalized Geologic Cross-Section C-C'
Appendix A — Subsurface Exploration Procedures and Logs
Appendix B — Laboratory Testing Procedures and Results

PRELIMINARY GEOTECHNICAL ENGINEERING EVALUATION
PROPOSED KENMORE LAKEPOINTE DEVELOPMENT
N.E. BOTHELL WAY AND 68TH AVENUE N.E.
KING COUNTY, WASHINGTON

11-10459-00

1.0 SUMMARY

Construction of the proposed project is feasible, from a geotechnical standpoint, with respect to the subsurface conditions encountered at the site. Due to the nature of the near-surface conditions, geotechnical design aspects of the project will be controlled by the low strength, high compressibility, and long-term settlement characteristics of the materials. A brief summary of the project geotechnical considerations is presented below.

- In the central and south portions of the site, our explorations generally encountered significant thicknesses of wood waste fill soils (up to 23 feet) and compressible native peat and organic silt soils (up to 32 feet). This also included areas of the proposed Lakepointe Drive. In the northern portion of the site, in areas of the existing Bothell Way NE and NE 175th Street, sand and gravel fill soils are underlain by loose to medium dense sand and gravel soils. Glacially overconsolidated soils were encountered at depths ranging from 40 to 68 feet.

- In the central and south portions of the site, the proposed Lakepointe Drive construction and development is feasible, although the presence of very loose fill soils, degradable wood waste, and compressible peat soils beneath the site will necessitate special foundation systems and subgrade preparations to provide adequate support for buildings, utilities, and pavement sections.

- In the north portion of the site, subsurface conditions are generally more favorable than in the central and south portions of the site, although the presence of loose sands and gravels may necessitate special foundation systems for heavier structures planned for the area.

- Underground utilities will likely be founded above existing wood waste, soft, undocumented fill soils, and compressive native soils, which will require limited overexcavation and replacement to provide more uniform support. Light weight aggregates may be necessary as bedding and backfill to minimize surcharging of the compressive materials below. In extreme cases, settlement-sensitive utilities may require pile support. Gravity systems should be designed with maximum gradients to compensate for the effects of long-term settlement.

- Pavements and sidewalks will also likely experience settlement over the long term. Geogrid reinforcement beneath the pavement and sidewalk sections would reduce the magnitude of differential settlement between the elements. Long-term total settlement would still occur but would be more uniform with geogrid reinforcement.

- Methane gas was detected in the monitoring wells across the site, which may originate from the wood waste fill and/or the underlying peat. Provisions to manage methane within enclosed building spaces and underground utilities will need to be addressed in final design.

This summary is presented for introductory purposes only and should be used in conjunction with the full text of this report. The project description, site conditions, and detailed geotechnical recommendations are presented in the text of this report. The exploration procedures, and boring, electric cone, monitoring wells, and test pit logs are presented in Appendix A. Laboratory test procedures and results are presented in Appendix B and on the exploration logs, where appropriate.

2.0 SITE AND PROJECT DESCRIPTION

The project site is located southwest of the intersection of N.E. Bothell Way (State Route 522) and Juanita Drive N.E. at the north end of Lake Washington in the Kenmore area of King County, Washington, as presented on the attached Location Map (Figure 1). The 50-acre parcel of land to be developed is rectangular in shape and measures about 1600 feet by 1800 feet. It is bounded by N.E. Bothell Way on the north, a dredged barge channel in Lake Washington on the west, by Juanita Drive N.E. on the east, and by the Sammamish River slough on the south. The northern 200 to 300 feet of the site is separated from the main parcel by the existing east-west trending N.E. 175th Street. The attached Site and Exploration Plan (Figure 2) illustrates the project site and adjacent properties.

Plans for the proposed Kenmore Lakepointe project have not been finalized, but we understand it will include the following features:

- Construction of a new county street, Lakepointe Drive, will include a roughly 1,000-foot long bridge and elevated roadway linking N.E. Bothell Way and Juanita Drive N.E.

- Modification of the existing Burke-Gilman Trail and N.E. 175th Street to accommodate the proposed Lakepointe Drive bridge. The modifications would include approximately 1,400 feet of lowered grades with retaining walls to support cuts.

- The dredging of a portion of existing land along the south side of the barge channel to enlarge boat moorage and shoreline access.

- The construction of new and replacement bulkheads along the south side of the existing barge channel shoreline and new moorage facility.

- The design and development of commercial, retail, and residential structures, with associated parking facilities, and a marina.

- Widening of N.E. Bothell Way for a limited HOV/bus turnout lane which would include retaining wall construction, roadway widening, and parking.

The purpose of this evaluation was to interpret general surface and subsurface site conditions, from which we could determine the feasibility of the project and formulate preliminary recommendations concerning site preparation, road construction, excavations, foundations, floors, and other construction-related considerations. As described in our proposal letters dated 22 August 1995, 12 January 1996 and 8 April 1996, our scope of services consisted of a subsurface exploration programs, laboratory testing, geotechnical engineering analyses, and preparation of this report.

It should be emphasized that the conclusions and recommendations contained in this report are preliminary, and based on our understanding of the currently proposed utilization of the project site, as derived from verbal information and a conceptual layout plan supplied to us. Consequently, we will need to finalize our conclusions and recommendations once site grades, layout, building types, and foundation loads have been determined. This report has been prepared in accordance with generally accepted geotechnical engineering practice for the exclusive use of Pacific Rim Equities, and their agents, for specific application to this project.

3.0 SITE CONDITIONS

Site conditions for this study were evaluated in September and October 1995, and February and March 1996. The surface and subsurface conditions are described subsequently while the exploration procedures and interpretive logs of the explorations are presented in Appendix A. The laboratory procedures and test results are presented in Appendix B and on the exploration logs where appropriate. The approximate locations of the explorations are shown on the Site and Exploration Plan (Figure 2). Generalized Geologic Cross-Sections A-A', B-B', and C-C' of the site soil conditions are displayed in Figures 3, 4, and 5.

3.1 Surface Conditions

The project site is situated in a region characterized by gently to moderately sloping terrain, sparse native vegetation, and commercial/industrial development. The majority of the subject site has been graded flatter than 15 percent, lying between elevation 25 and 32 feet. Roadway and shoreline embankments often exceed grades of 40 percent, but steep slopes are less than 10 feet. Topographically, the lowest area of the site appears to be in the north-central portion with an elevation of about 22.8 feet. Numerous stockpiles varying from 5 to 20 feet high are situated on the south half of the site. The stockpiles vary from concrete and wood debris to sand and gravel. The south and west side of the site are bounded by the Sammamish River slough and Lake Washington, respectively. According to the U.S. Army Corps of Engineers, the water level in Lake Washington fluctuates seasonally between elevation 19.75 and 22.25, relative to a datum based on Mean Lower Low Water (MLLW), which is calculated as an 18.96 year average. The water level on 19 December 1995 was surveyed to be elevation 16.7 relative to King County Datum NAD 1933, and reported to equal elevation 20.00 on the same date, relative to the U.S. Army Corps of Engineers datum.

The site is currently developed as an industrial park with a few permanent commercial/office buildings, and numerous temporary structures, including storage sheds, a truck scale, mobile trailers, inverted dry docks, and shipping containers. Limited portions of the site are paved with asphalt or concrete surfacing. Existing facilities are serviced by underground sanitary sewer, water, natural gas, power, and telephone utilities. Power is also supplied by underground and overhead lines. Storm runoff is not intercepted across the majority of the subject site except for the north-central portion of the site.

3.2 Subsurface Conditions

The project site is located at the mouth of the Sammamish River, at the north end of Lake Washington, within the Puget Lowland basin. The native soils underlying the site consist of alluvial and fluvial sediments deposited during the Holocene Age, following the recessing of the Vashon glacier. Organic silts and peats were subsequently deposited as the river delta, at the mouth, continued to prograde into the lake reservoir. Following the lowering of Lake Washington in 1916, the Sammamish River was straightened and channelized in order to facilitate transportation and commercial uses. Between 1956 and 1969 approximately 10 to 20 feet of debris fill had been placed across a majority of the site and capped with gravelly sand fill.

The subsurface exploration program for the geotechnical phase consisted of advancing 16 hollow-stem auger borings to a depths of 21 to 71 feet across the site. Additionally, 8 electric cone penetrometer tests were advanced to depths ranging from 31 to 47 feet below the existing ground surface. Eleven additional borings were completed as monitoring wells and were supplemented with twenty test pits for our environmental evaluation; these supplemental explorations are included in this report for additional information. The deeper explorations were completed at the approximate location presented to you prior to beginning the evaluations. However, some minor modifications to the location of our explorations were necessitated by site constraints. Furthermore, locations A-9 and A-15 were not included in the final scope of work. Table 1 below summarizes the functional locations, approximate elevations and depths for our deeper explorations.

In general, our explorations suggest that the soils underlying the site can be segregated into four significant types: 1) wood debris fill; 2) peat and organic silt; 3) loose alluvium; and 4) dense sand and gravel. Specifically, we observed 2 to 23 feet of fill composed predominantly of wood debris with brick, wire, concrete washout products, and silty sand. The fill depth averaged 15 feet deep across the majority of the site, thinning to the north, and locally over 20 feet deep next to the dredged barge channel. The man-placed fill and native peat typically possess low density, low shear strength and high compressibility characteristics. Beneath the fill layer, native, soft to very soft peat and organic silt soils were encountered to depths of 25 to 44 feet deep across the south part of the site. Beneath the peats and silts, our explorations encountered loose to medium dense alluvial sands, gravels, and silty sands. Medium dense, sands and gravels suitable for supporting foundation loads were encountered at depths between 25 and 50 feet. Three boring explorations, Nos. A-1, A-2 and A-6, penetrated glacially

overconsolidated soils at depths of 40 feet, 60 feet and 68½ feet, respectively. The very dense bearing stratum present at the north end of the site slopes steeply downward towards the south beneath the subject site. Table 2, below, summarizes the approximate thicknesses, depths, and elevations of these soil layers encountered in our explorations.

TABLE 1
APPROXIMATE LOCATIONS, ELEVATIONS, AND DEPTHS OF EXPLORATIONS

Exploration	Type	Functional Location	Approximate Surface Elevation (feet)	Termination Depth (feet)
A-1	Boring	North bridge abutment, proposed Lakepointe Drive	36	50.0
A-2	Boring	South bridge abutment, proposed Lakepointe Drive	31	66.5
A-3	Boring	Proposed Lakepointe Drive	27	51.5
A-4	Probe	Proposed Lakepointe Drive	24	38.0
A-5	Probe	Proposed Lakepointe Drive	24	46.5
A-6	Boring	Proposed Lakepointe Drive	27	46.5
A-7	Boring	Bothell Way/Burke Gilman Trail	33	21.0
A-8	Boring	Bothell Way/Burke Gilman Trail	36	21.0
A-9*	--	--	--	--
A-10	Boring	Bothell Way/Burke Gilman Trail	31	21.5
A-11	Boring	Bothell Way/Burke Gilman Trail	31	51.5
A-12	Probe	North of Proposed Lakepointe Drive	23	39.0
A-13	Boring	Bothell Way/Burke Gilman Trail	38	21.5
A-14	Boring	Bothell Way/Burke Gilman Trail	36	21.5
A-15*	--	--	--	--
A-16	Boring	Proposed Bulkhead	21	71.0
A-17	Boring	Proposed Bulkhead	25	41.5
A-18	Probe	Channel Dredging Easement	25	39.0
A-19	Boring	Channel Dredging Easement	24	51.5
A-20	Probe	Channel Dredging Easement	26	31.5
A-21	Boring	Southwest Quadrant	27	66.5
A-22	Probe	Southwest Quadrant	27	37.0
A-23	Boring	Southwest Quadrant	27	46.5
A-24	Probe	Southeast Quadrant	28	38.0
A-25	Boring	Southeast Quadrant	29	71.5
A-26	Probe	Southeast Quadrant	29	37.5

Reference: Preliminary Site Topography by GeoDimensions, Inc. dated 7 June 1995

*NOTE: Locations A-9 and A-15 were not drilled.

TABLE 2
APPROXIMATE THICKNESSES, DEPTHS, AND ELEVATIONS
OF UPPER SOIL LAYERS OBSERVED IN BORINGS

Exploration	Thickness of Fill (ft)	Thickness of Peat (ft)	Thickness of Silt (ft)	Depth of Medium Dense Sands and Gravels (ft)
A-1	8	0	4½	20
A-2	2	0	4	22
A-3	23	7	0	35
A-4	13	12	10	35
A-5	9	11	17	37
A-6	12½	13	8	39
A-7	8½	0	0	8½
A-8	5	0	3½	12
A-9*	--	--	--	--
A-10	2	0	0	12
A-11	1½	0	0	18
A-12	11	15	7	36
A-13	7	0	0	17
A-14	7½	0	2½	9
A-15*	--	--	--	--
A-16	23	0	3	23
A-17	22	9½	2½	33
A-18	16	9	10	35
A-19	15	8	6	29
A-20	15	10½	6	31
A-21	16	12½	4	36½
A-22	15	10	11	36
A-23	14½	11	7½	34
A-24	14	7	14	35
A-25	12	13	19	51
A-26	13	10	14	37

*NOTE: Locations A-9 and A-15 were not drilled.

3.3 Groundwater Conditions

Groundwater measurements taken on 2 October 1995 from monitoring wells installed in our environmental borings revealed groundwater at depths of 6½ to 12½ feet below the ground surface or between approximately elevations 18 to 23 feet. These groundwater elevations appear to be influenced primarily by the level of Lake Washington. Groundwater appears to flow towards the south to southwest beneath the north end of the site, and appears to be relatively flat beneath the south end of the site, where the former lakebed was backfilled. The boring logs and monitoring well logs enclosed with this report contain groundwater levels noted at specific locations on the site. In all locations, however, groundwater levels should be

expected to fluctuate due to changes in season, precipitation patterns, adjacent lake levels, and other on- and off-site factors.

3.4 Seismic Hazard Conditions

Large earthquakes reported historically in Washington have most frequently occurred deep beneath the Puget Sound region. The most recent and best documented earthquakes in the Puget Sound area were the 1949 magnitude 7.1 Olympia earthquake and the 1965 magnitude 6.5 Seattle-Tacoma earthquake. Both of these earthquakes occurred within the subducting Juan de Fuca plate at depths of about 34 to 40 miles. One of the largest earthquakes in the state occurred in the northern Cascade Mountains in December 1872, with an estimated magnitude of 7.3. Most of the earthquakes documented in Washington have occurred in the Puget Sound region between Olympia and the Canadian border, in the Cascade Mountains, and along the Washington-Oregon border.

There are no reported faults in the vicinity of the subject site manifested by surface expression. The major cause of damage from an earthquake would be due to shaking from earthquake waves and potential liquefaction-induced settlement. Damage due to actual fault movement beneath the proposed structure would be highly unlikely. The U.S. Geological Survey (1975) proposed that the largest earthquake likely to occur in the Puget Sound region could have a magnitude as large as 7.5. It is believed that such an earthquake event could have a peak hard ground acceleration of about 20 percent of gravity (0.2g) and about 20 to 30 seconds of severe ground shaking. Due to amplification effects within the loose/soft site soils, peak accelerations ranging up to 0.25g to 0.3g could conceivably be experienced at the ground surface during such an event. It is estimated that an earthquake of magnitude 7.5 would have a 10 percent probability of exceedance in 50 years, or a return period of 475 years. A moderate earthquake event is generally considered to be associated with a magnitude 6.5 earthquake, which could conceivably have a peak horizontal ground acceleration of up to 0.2g at the subject site. This would be considered a higher probability event having a 40 percent probability of exceedance in 50 years (return period of 100 years). The risk of such earthquake events to impact the subject site would be similar to that of the City of Kenmore and the Puget Sound area as a whole. The effects of seismic shaking on the proposed structures would be minimized by the structural design and construction specifications deemed necessary under current building codes.

Based on the soil conditions encountered at the site and an examination of available geologic maps, we recommend that a Site Coefficient Type S_3 having an S Factor of 1.5, as defined in the 1991 Uniform Building Code Table No. 23-J, be utilized in the seismic design of the structure. A site coefficient Type S_3 is required by the UBC for sites with a soil profile 40 feet or more in depth and containing more than 20 feet of soft to medium stiff clay, but not more than 40 feet of soft clay. The 1991 UBC, Chapter 23, Figure No. 23-2, classifies the site as Seismic Zone 3.

Liquefaction potential has been found to be greatest where the groundwater level is shallow and loose fine sands occur within a depth of about 50 feet or less. Liquefaction potential decreases with increasing grain size and clay and gravel content, but increases as the ground acceleration and duration of shaking increases. As previously stated, groundwater at the site was observed at depths of about 6 to 13 feet. Since layers of loose sand soils were encountered within the upper 50 feet at the site, liquefaction was considered to be a potential concern for the proposed development.

Variable thicknesses of potentially liquefiable, loose, sand soils are present beneath the site. Where encountered, the loose sand horizons ranged from about 2 to 6 feet in thickness. These soils tend to be thicker at the southern portion of the site as indicated on the Generalized Geologic Cross-Sections, Figures 4 and 5. Total depth of these loose sand soils range from 9 to 40 feet below ground surface, based on the explorations advanced on site. Groundwater beneath the site ranges from 6 to 13 feet below ground surface. Due to the presence of non-liquefiable cohesive soils and peats separating liquefiable layers, the actual settlement experienced at the ground surface would be variable. Therefore, it is recommended that site-specific liquefaction analyses be performed for each proposed building once its location, size, and bearing capacity has been determined.

4.0 PRELIMINARY GEOTECHNICAL ENGINEERING CONSIDERATIONS

The site evaluation and this preliminary geotechnical engineering report are intended to provide generalized information which can be considered in site planning and feasibility studies for future development. The general opinions and recommendations presented in this report are intended to provide a basis for continued planning of future development.

4.1 Central and South Portions of Site

The central and south portions of the site include those areas south of NE 175th Street and west of Juanita Drive NE.

4.1.1 Site Filling

It appears that fill will be placed in the central and south portions of the site for the eastern portion of embankment of Lakepointe Drive linking Bothell/Lake City Way to Juanita Drive NE, and possibly for future development. Assuming a final ground surface elevation on the order of 20 feet, it appears that existing grades will be cut on the order of 2 to 10 feet in most other areas and, therefore, only minor fills are anticipated across a majority of the site.

Settlement associated with site filling will occur due to consolidation of the wood waste and underlying soft peat and silt, and is anticipated to reach relatively large magnitudes. As a preliminary estimate, the soft peat, silt, and wood waste fill present below the site is expected to compress on the order of 1 to 2 inches for each foot of new surficial fill. Because of the nature of the wood waste material, it is extremely difficult to predict the settlement magnitudes and rates, both short-term and long-term, and such information will probably not be known until

the fill is actually placed and settlement monitored. In addition, these settlements would tend to occur over long periods of time, (i.e., years). Significant quantities of "overbuilding" of site fills should therefore be anticipated in order to achieve the long-term desired grade through a preloading process.

4.1.2 General Foundation Considerations

Development in the central and south portions of the site will be complicated by the presence of significant thicknesses of highly compressible soft peat, silt, and wood waste. It appears that pile foundations extending to approximate embedment depths of 10 to 20 feet or deeper within the medium dense to dense sands and gravels would be necessary over much of the property for 40 ton capacity piles and 15 to 20 feet or deeper for 80 to 100 ton capacity piles. The dense bearing stratum was encountered at depths varying from 34 to 44 feet beneath the existing ground surface, which translates into piles on the order of 44 to 64 feet in length. The following report subsections discuss foundation considerations in greater detail.

4.1.3 Pile Foundation Support

Pile foundation support will be necessary for all buildings in the central and south portions of the site. Deep end-bearing piles founded in the dense sand and gravel soils encountered at depth could be used. End bearing piles in the relatively incompressible deep dense sand and gravels are considered appropriate in order to limit settlement of the structures which they would support. Given the required length of the piles anticipated at this site (on the order of 44 to 64 feet below existing grade), it is unlikely that lower capacity piles such as timber piles or augercast piles acting as friction piles supported in the soils above the dense bearing stratum would be suitable for most of the site except for possibly very light structures. In addition, it should be noted that augercast piles would not be appropriate for use where significant thicknesses of wood waste fills or peat are present. Due to the high pressures involved during injection of grout in an augercast pile we anticipate that grout bulbs would develop in the wood waste and soft peat which would increase the downdrag loads on the piling.

A relatively new method of pile installation termed a "driven grout pile," may be considered an appropriate alternative to conventional augercast piling at this site. A driven grout pile involves driving a steel casing in advance of grouting and then removing the casing while still applying grout pressure. This method of pile installation has several advantages in that less grout is typically used, there is less grout spread over the site, and the pile can develop a higher capacity resulting in higher factors of safety. In addition, driving the casing essentially close-ended will compact the loose to medium dense sands encountered in our borings, thus reducing liquefaction potential in these soils.

Appropriate pile types would include driven grout, precast concrete, steel pipe, or steel H-piles. Because of the potential corrosive effects of the wood waste fill and peat, a cast-in-place pile (closed-end steel pipe pile which is backfilled with concrete) may be most appropriate. Table 3

below summarizes typical allowable pile capacities for end-bearing in the medium dense to dense site soils.

TABLE 3
TYPICAL ALLOWABLE VERTICAL COMPRESSIVE PILE CAPACITY FOR VARIOUS PILE TYPES

Pile Type	Typical Allowable Vertical Pile Capacity in Tons
12" I.D. Concrete Filled Pipe Pile (⅜" wall)	50 - 75
14" O.D. Concrete Filled Pipe Pile (⅜" wall)	70 - 95
12" O.D. Driven grout	75 - 100

It should be noted that these pile capacities assume that sufficient embedment is achieved such that the structural strength of the pile governs the allowable load. Concrete-filled pipe piles should be driven with a closed-bottom plate, to attain sufficient end-bearing capacity at depth. A thinner wall may be feasible, however, with increased risk of driving damage to pipes encountering obstructions. Thinner pile walls would also limit the capacity to the lower end of the ranges listed. These values do not include the possibly limiting effects of combined axial and bending loads.

4.1.4 Uplift Capacity

Uplift pile capacity develops as a result of friction between the pile and adjacent soils. Uplift resistance can be provided by skin friction within the portion of the pile embedded within the dense sand, neglecting the upper site soils. Augercast or grout piles which are subjected to tension loading should be provided with adequate reinforcing steel through the full depth of the drilled pile. We estimate ultimate uplift capacities of 10 tons for a 12-inch diameter steel pipe pile, 15 tons for a 14-inch diameter pile, and 20 tons for 16-inch diameter piles.

4.1.5 Lateral Capacity

Lateral forces imparted as a result of wind and seismic loadings can be resisted by the pile foundation and embedded portion of the pile caps. The piles can be assumed to resist lateral loads by developing passive resistance in the soil surrounding the pile. Assuming a maximum allowable lateral displacement of ½ of an inch, at the pile top, individual piles should be designed for an ultimate lateral capacity of 4, 6 and 8 tons for a 12-, 14- and 16-inch diameter pile, respectively. A reinforcing steel cage should be included in accordance with structural design requirements, sized for appropriate lateral capacity.

It should be noted that pile interaction in a pile group can increase deflections. At the recommended minimum pile spacing of 3-piles diameter center to center, actual pile deflections in the pile group can be double those of an individual pile for the same load per pile. This effect of pile spacing is reduced with increasing pile spacing. Piles subjected to repetitive, cyclic loading may deflect a magnitude of up to twice that of piles subjected to a static load.

Passive pressure would also act against the buried portion of the pile caps and grade beams to resist lateral loads. We recommend an allowable passive equivalent fluid pressure of 150 pounds per cubic foot (pcf) be used for design. This value includes a factor of safety of approximately 1.5. The upper foot of embedment should be neglected. Deflections on the order of 5 percent of the vertical face height are necessary to fully mobilize passive resistance.

4.1.6 Test Pile Program

We recommend a pile load test program prior to production pile installation. Test pile installation data as well as load test data would be reviewed to develop the most cost-effective combination of pile length and capacity. We recommend a combination of compressive, lateral, and tensile load tests at a minimum of one location on the site. Test piles should be installed for the pile type selected for the project. Compressive, lateral and tensile load testing should be completed in accordance with procedures outlined in ASTM specifications D-1143, D-3966, and D-3689, respectively. We recommend that AEE be retained to observe and monitor test pile installation, supervise and perform the load tests, and analyze the data collected. A report would be issued following completion of the testing describing and documenting test pile installation methods and results, load test procedures and results, and other information as appropriate. Table 4 presents our recommended test pile program. Test and reaction piles should be installed in the same manner as the production piles. Provided the test and reaction piles are installed to the recommended depths, uplift capacity tests could be performed on the reaction piles. Driving tests should be completed prior to ordering production piles. Driving tests should be completed for each of the different pile types and capacities planned for the site.

TABLE 4
RECOMMENDED TEST PILE PROGRAM

Compressive:	1 to evaluate bearing capacity (possible reductions in design depths)
Lateral:	1 at any test location
Uplift:	1 at full depth if required by structural engineer
Drive Resistance:	1 test pile for each pile type, wall thickness, and pile capacity planned.

Please note that pile lengths will vary and should be determined by the geotechnical engineer at the time of installation.

4.1.7 Site Utilities

Performance of site utilities will be affected by the placement of large quantities of site fill and trench backfill with resultant settlements. As previously discussed, large magnitudes of settlement, on the order of 1 to 2 inches per foot of new fill, are anticipated where fill is placed over wood waste. Utilities installed in these areas could settle to similar magnitudes. Pile support of site utilities is generally not considered to be a cost effective approach. We recommend that utilities be designed, if possible, to accommodate relatively large settlements which are anticipated. Some abrupt differential settlements may be expected in areas where the utilities will be underlain by the existing wood waste fill and other existing uncontrolled fill. Some overexcavation and replacement of unsuitable fill soil beneath utilities would likely be required for utility placement. The extent of overexcavation would depend largely on the type and size of the utility and the sensitivity to settlement of the utility, but we anticipate that overexcavation depths on the order of 1½ to 2 feet would be necessary for utilities installed in the peat soils which underlie the near-surface fills. Overexcavation depths in the fills will vary considerably depending on the nature of the rubble or debris present at invert elevation. For preliminary planning, a typical 1-foot overexcavation below inverts, for placement of foundation ballast and 6 inches of bedding, can be assumed for utilities in the fill deposits. Gravity sewers should be designed to accommodate the large magnitudes of settlement anticipated. We anticipate that flexible connections would be required especially where the utilities connect to the project structures. Most important would be the need for flexible connections between the site utilities and connection to the essentially stationary pile-supported buildings.

We understand that the initial phases of development call for construction of new Lakepointe Drive connecting N.E. Bothell Way with Juanita Drive N.E. and would include its associated utilities. One alternative might be to completely over excavate all wood waste and other unsuitable fill below this roadway followed by backfilling and placement of the larger more critical and settlement sensitive utilities. Overexcavation and replacement for the successively smaller branch utilities stemming from these main lines could be accomplished until the individual lines become small enough and can be designed flexibly enough that complete overexcavation (or less partial overexcavation) could be accomplished. This alternative would tend to reduce the contribution to settlement provided by the wood waste and other unsuitable fill.

To reduce the amount of increased settlement resulting from replacement of relatively low density on-site soils with higher density backfill we recommend that an imported lightweight material be considered for trench backfill. The selection of trench backfill methods and materials should also be coordinated with environmental soil management planning.

4.1.8 Considerations for Paved Areas

Paved areas will include the new Lakepointe Drive connecting N.E. Bothell Way with Juanita Drive N.E. and other road and parking areas serving the proposed development. As discussed,

filled areas could be expected to settle to large magnitude in areas where existing wood waste and peat are present and/or large fill quantities are placed. In our opinion, it is likely that pavements constructed on fill over the wood waste and peat will require maintenance on a regular basis to account for large-scale, uneven settlements. Areas where existing granular fill is present over wood waste are expected to continue to settle (due to the long-term consolidation and decomposition of this organic material). However, settlement would probably not be to the magnitude of those areas receiving new fill. It is likely that a thickness of at least 3 to 4 feet of select fill (or perhaps somewhat lesser fill thickness in conjunction with stabilizing geotextiles) will be necessary over the wood waste to obtain a stable surface for pavement support. Geogrid reinforcement beneath the pavement and sidewalk sections would reduce the magnitude of differential settlement between the elements. Long-term total settlement would still occur but would be more uniform with geogrid reinforcement.

4.1.9 Bulkhead Considerations

Based on our understanding, plans call for the construction of a new bulkhead along the south side of the proposed marina area. Our explorations completed in this area encountered from about 15 feet of undocumented fill including variable amounts of wood waste and about 8 to 10 feet of peat and 6 feet of silt. We anticipate that driven steel sheet piling will be necessary in this construction. Such piling should be driven through the overlying fill material, peat, and silt to a depth sufficient to intercept the medium dense sand and gravel soils which we encountered in our borings at a depth of 23 to 37 feet below present grade. Bulkhead anchoring, if required, would also need to extend to the medium-dense sand and gravel layer.

4.2 North Portion of Site

The north portion of the site includes N.E. 175th Street, N.E. Bothell Way and adjacent areas. In the north part of the site, areas of fill placement would include bridge abutments, a section of elevated roadway linking N.E. Bothell Way and Juanita Drive N.E. and a widened section of the N.E. Bothell Way shoulder as a bus turnout and HOV lane. Fill may also be placed in adjacent areas of possible future development.

Subsurface conditions in the north portion of the site appear generally more favorable than those in the central and south portions of the site. In contrast to conditions to the south, deposits of wood waste, peats and silt were generally not encountered in the explorations. It appears that shallow foundation support for flexible, lightly loaded, single-story structures and pile support for more heavily loaded structures would be appropriate.

The explorations indicate the very dense sand and gravel layer is within about 16 feet of the existing ground surface on the west side of the north portion of the site (refer to boring A-7 for this study), and drops off to the east. Based on existing grades, it appears that new development may take place fairly close to existing grades, hence pile downdrag and large-scale settlements due to site filling do not appear to be a major concern. It therefore appears that for most development, shallow spread footings and slabs-on-grade could be a suitable site

development option for lightly loaded structures such as one-story wood frame. Multi-story structures or settlement sensitive structures may require pile foundations. Because the depth to bearing should be relatively shallow and because downdrag and associated reduction in working pile capacity are not anticipated, relatively low to moderate capacity piles such as driven timber or augercast piles would be appropriate alternatives to high capacity piles. Typical compressive capacities for 8-inch tip diameter timber piles are on the order of 25 to 30 tons. Typical compressive capacities for 12 to 16-inch diameter augercast piles are on the order of 40 to 70 tons (depending on diameter). Assuming approximately 10 feet of embedment into the dense to very dense, bearing layer, pile lengths could vary from about 25 to 40 feet or longer.

Site utilities are anticipated to settle to relatively minor extent. Site preparation for pavement is anticipated to consist mainly of compacting the existing fill soils in-place to a firm and non-yielding condition.

4.3 Dewatering

Based on monitoring well readings taken on 2 October 1995, we observed groundwater elevations on the order of 17 to 18.5 feet in the southern and central part of the site and 20.5 to 22 feet in the north part of the site. It should be noted that these groundwater levels were observed during the dry season and groundwater levels will likely rise during the wet season, and will also fluctuate due to precipitation patterns, adjacent lake levels and other factors. Based on planned finished floor elevations of 25 feet for buildings in the central and southern portions of the site, we anticipate that dewatering may be necessary for underground utilities and other underground construction. We recommend that groundwater levels be maintained so that they are no closer than 2 feet below such utilities and planned construction.

It is anticipated that significant amounts of water will be generated to provide the drawdown required for construction to proceed. Due to the large amounts of waste fills on the site, the possibility of contaminants should be considered when disposing of such water.

4.4 Bridge Considerations (Preliminary)

Current improvement plans call for constructing a new Lakepointe Drive connecting N.E. Bothell Way with Juanita Drive N.E. including a flyover bridge 1000 feet or greater in length. In our opinion, pile or drilled pier foundations would likely provide the most economical type of bridge foundation due to the depth of suitable bearing soils. We have considered the following pile types for use at the project site, based primarily on WSDOT 1994 Standard Specifications for Road, Bridge and Municipal Construction:

- Precast concrete piles (WSDOT Standard Specification 6-05.3(3)), which consist of either prestressed or reinforced concrete shafts, with load capacities of 55 or 70 tons;

- Cast-in-place concrete piles (WSDOT Standard Specification 6-05.3(4)), which consist of closed-end steel casing driven to capacity and then filled with concrete, with load capacities of 55, 70, or 100 tons;
- Prestressed hollow concrete piles (WSDOT Standard Specification 6-05.3(5)), with load capacities of 20 to 40 tons;
- Steel H-piles (WSDOT Standard Specification 6-05.3(6)), with load capacities of 70 or 100 tons;
- Drilled shafts (caissons or piers), installed with or without temporary casing and later filled with concrete, with load capacities dependent on the diameter; allowable end-bearing pressures of 20 tsf can usually be achieved for dense or hard soils;
- Augercast piles, with a load capacity of 55 tons.

Cast-in-place concrete piles, precast concrete piles, prestressed hollow concrete piles, drilled shafts, and augercast piles offer a fairly uniform moment of inertia, whereas steel H-piles have significantly different moment resistance in different directions. Cast-in-place concrete piles offer the advantage that the steel shells can be checked for damage prior to filling with concrete. This latter advantage is particularly important when driving into a very dense horizon. In addition, the close proximity of the existing Redi-Mix concrete plant may provide an economic advantage to cast-in-place piles. Precast concrete piles are suitable only where the appropriate tip depth is known in advance with a high degree of certainty, because they cannot readily be spliced or shortened in the field. The low-displacement cross-section of H-piles may be an advantage when driving through rocky embankment fills but may cause the piles to "run" excessively in clean granular soils or moderately stiff cohesive soils. Because drilled shafts and augercast piles create minimal vibrations during installation, they are preferable for locations where significant vibrations cannot be tolerated. However, augercast piles are not capable of resisting high lateral loads; as such, we understand that they are typically not used for bridges. We also understand that drilled shafts are relatively expensive for many sites.

For the pile types listed above, we estimate that properly installed piles may experience total post-construction settlements up to 3/4 inch, with less than ½ inch of differential settlement between adjacent piers. The majority of these settlements will likely occur rapidly as the loads are applied.

We recommend that the effects of pile-driving vibrations in proximity to any existing structures be evaluated prior to construction. Vibrations may potentially cause damage to these structures. In addition, if construction sequencing requires that vibrations be minimized, non-displacement piles such as H-piles, augercast piles, or drilled shafts should be used in lieu of displacement piles.

Soil conditions along the proposed bridge and embankment alignment were evaluated in borings A-2, A-3, and A-6, as well as, cone probes A-4 and A-5. The explorations revealed 2 to 23 feet

of loose to medium fill varying in composition and consisting of wood debris, concrete washout products (sand and gravel), silty sand and sandy gravel. These materials overlaid up to 13 feet of peat and up to 8 feet of organic silt. Our explorations encountered medium dense sands and gravels at depths of 22 to 39 feet. These soils became dense at 44 to 56 feet. Groundwater levels measured in monitor wells AW-7, AW-8, and AW-9 on 2 October 1995 revealed static water levels varying from elevation 18 to 22 feet along the alignment.

5.0 ADDITIONAL RECOMMENDATIONS

We recommend that additional field explorations, laboratory tests, and geotechnical engineering studies be accomplished for design of the buildings and facilities associated with eventual project development. This additional work is necessary to formulate structure-specific geotechnical criteria for suitable foundation types, site preparation, lateral and vertical pile capacities, and utility construction. For general site development, additional geotechnical study is necessary for specific aspects of the site development such as retaining walls, bulkheads, utility support, settlement due to site filling, pavement support for parking areas, and other aspects. The geotechnical criteria for final design should be based upon specific information such as building types, locations and structural loadings, pavement grades, utility types and grades, and other information which is not yet available. We recommend that we be retained to provide the design information prior to more detailed site development.

Methane gas has been detected in measurable quantities in the monitoring wells across the site. It will be necessary to address methane gas management in the design of ground level structures and buried utilities. For planning purposes, we recommend the following:

- Where utilities trenches enter the structures, a "plug" of low permeability backfill is recommended. Where driven piles attach to pile caps, we recommend constructing a low permeability seal around the outside of each pile, below the pile cap.

- We recommend the installation of the 10 mil vapor barrier and increased crawl space ventilation beneath the enclosed structures. The HVAC design should include active ventilation of all ground floor rooms (including broom closets, etc.), so that gas accumulation does not occur.

The details of a gas management system can be developed in final design when specific building layout information is available.

For preliminary site development work such as site preparation and overexcavation of unsuitable materials, fill placement, and utility installation, we should be consulted for additional field explorations and geotechnical engineering recommendations for planning and design of this work. If plans and specifications are developed for preliminary site development work it is recommended that AGRA Earth & Environmental, Inc be provided the opportunity for additional

studies and general review of their plans and specifications in order that the recommendations of this report may be properly interpreted and implemented.

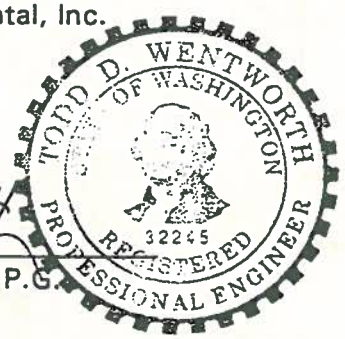
6.0 CLOSURE

The preliminary conclusions and recommendations presented in this report are based, in part, on the explorations accomplished for this study. The number, locations, and depths of our explorations were completed within the constraints of site access and budget considerations so as to yield the information utilized to formulate our recommendations. The future performance and integrity of the foundations and the success of the earthwork depend largely on proper initial site preparation, drainage, and construction procedures. We are available to provide supplemental geotechnical engineering analyses after site details have been determined, as well as monitoring services during earthwork and foundation construction phases of the project. If variations in the subgrade conditions are observed at that time, we would be able to provide additional geotechnical recommendations to minimize delays as the project develops.

We appreciate the opportunity to be of service on this project. Should you have any questions regarding this report or any aspects of the project, please do not hesitate to call.

Respectfully submitted,

AGRA Earth & Environmental, Inc.



Todd D. Wentworth, P.E., P.G.
Senior Project Engineer

EXPIRES 4/28/98

James S. Dransfield, P.E.
Vice President

EXPIRES 12/19/97

TDW/JSD/lad

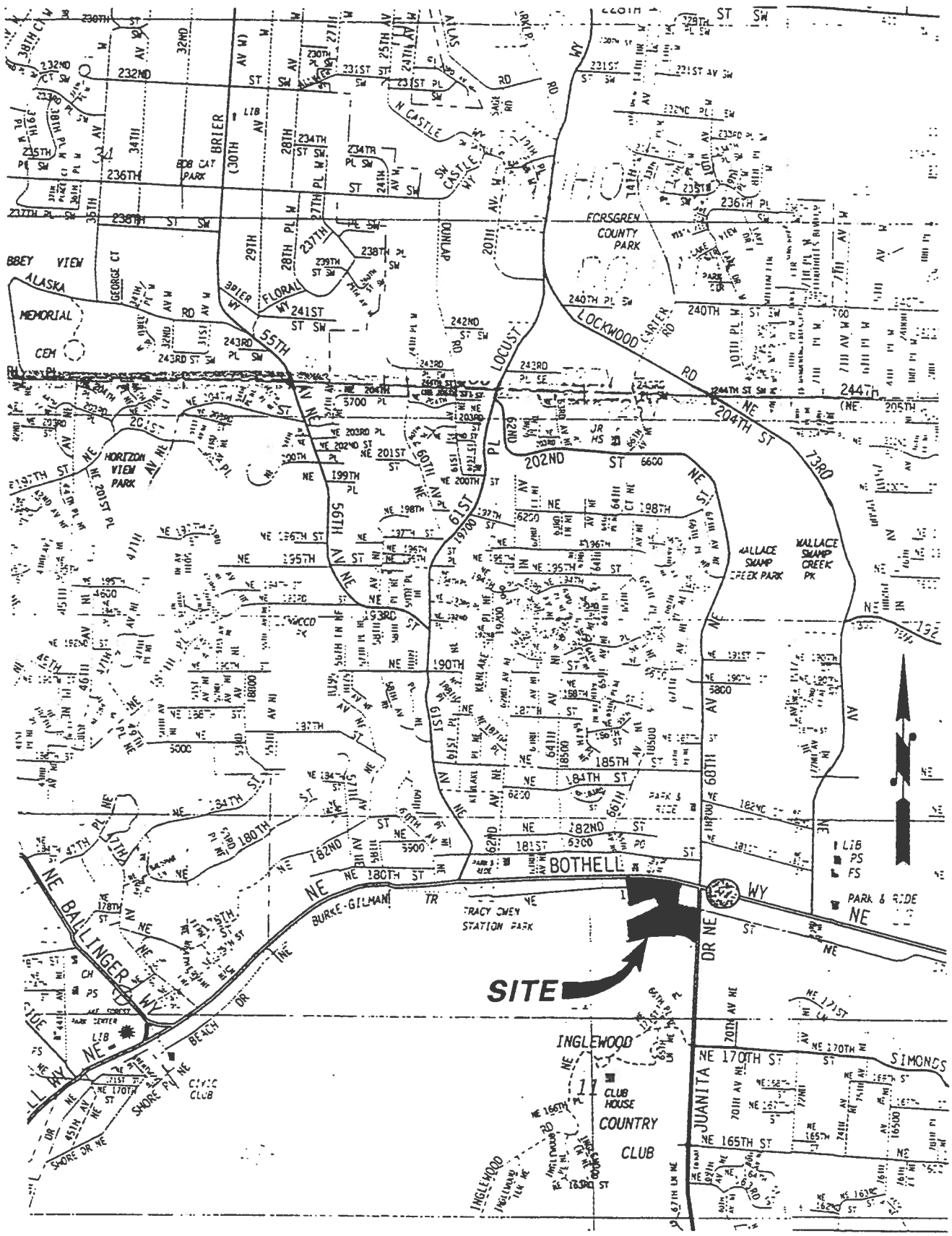


FIGURE 1

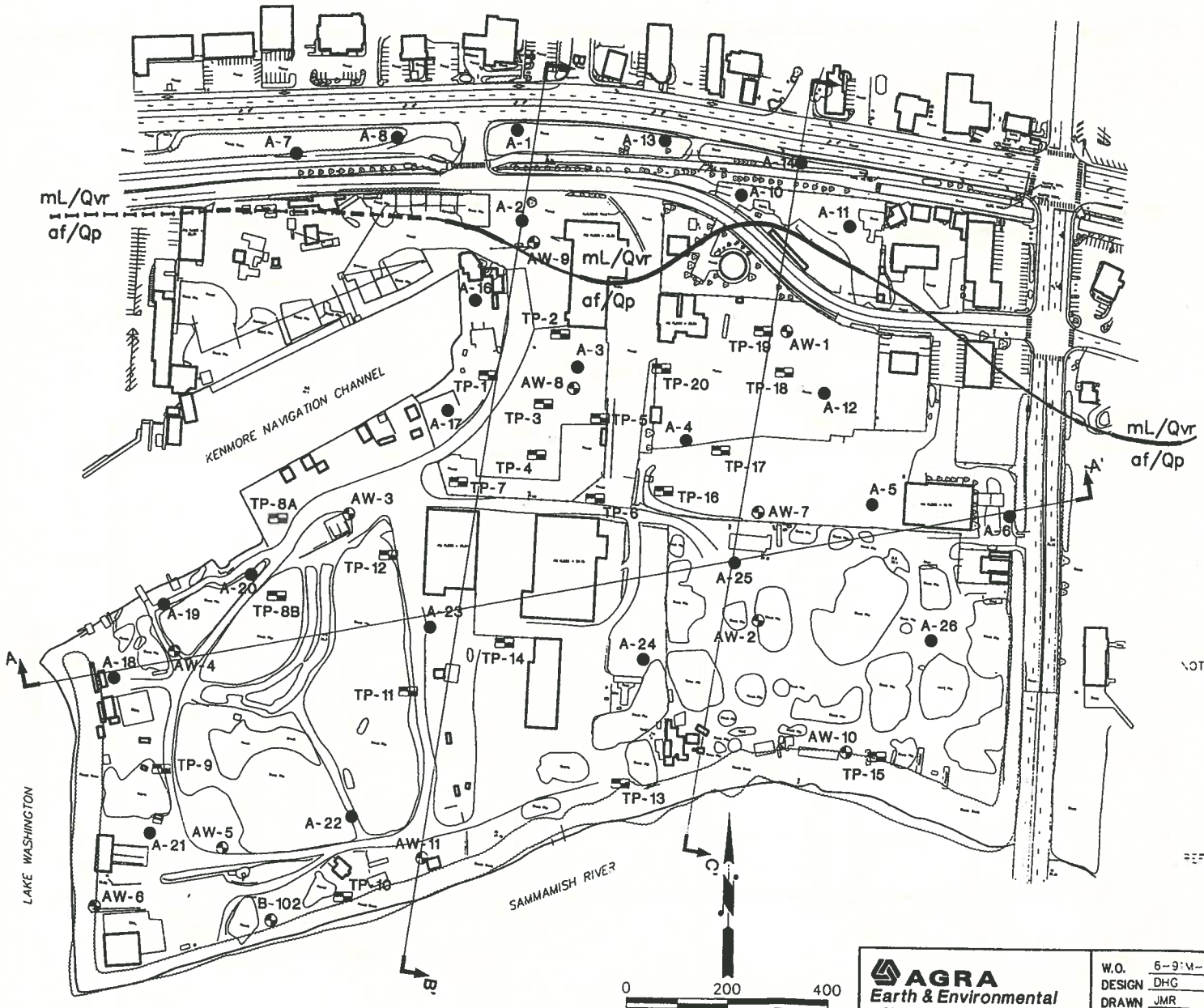
AGRA EARTH & ENVIRONMENTAL, INC. DRAWING NO. \91\10459-C\LOCATION.DWG

AGRA
Earth & Environmental
11335 N.E. 122nd Way, Suite 100
Kirkland, WA, U.S.A. 98034-6918

W.O.	6-91M-10459-C
DESIGN	DHG
DRAWN	JMR
DATE	NOV 1996
SCALE	N.T.S.

LAKEPOINTE DEVELOPMENT
KING COUNTY, WASHINGTON

LOCATION MAP



LEGEND

- AW-11 — GROUNDWATER MONITORING WELL NUMBER AND LOCATION
- A-26 — GEOTECHNICAL BORING NUMBER AND LOCATION
- TP-20 — TEST PIT NUMBER AND LOCATION
- A — A' — ALIGNMENT OF GENERALIZED GEOLOGIC CROSS SECTION
- mL/Qvr / af/Qp — GEOLOGIC CONTACT (DASHED WHERE INFERRED)

mL – MODIFIED LAND

ORIGINAL TOPOGRAPHY DISTURBED BY REMOVAL OF SOME PLEISTOCENE DEPOSITS. GRADING AND ARTIFICIAL FILL OF UNKNOWN QUALITY.

af – ARTIFICIAL FILL

ORIGINAL TOPOGRAPHY MODIFIED BY PLACEMENT OF SIGNIFICANT THICKNESS OF ARTIFICIAL FILL. COMPRISES THE WOOD DEBRIS FILL DESCRIBED IN SUBSURFACE EXPLORATIONS.

af/Qp – PEAT

SIGNIFICANT THICKNESS OF ARTIFICIAL FILL OVER ACCUMULATIONS OF ORGANIC MATERIAL MAY CONTAIN SMALL AMOUNTS OF SAND, SILT, CLAY AND VOLCANIC ASH DEPOSITED IN SWAMPS AND BAYS.

mL/Qvr – VASHON RECESSIONAL OUTWASH

ORIGINAL TOPOGRAPHY DISTURBED.
LIGHT BROWN, LOOSELY COMPACTED SAND AND GRAVEL. WELL-ROUNDED FROM STREAM TRANSPORTATION. SORTING VARIES; PARTICLE SIZE VARIES FROM MEDIUM SAND TO COBBLES.

NOTES: INFORMATION REGARDING THE EXTENT OF PEAT SOILS WAS SUPPLEMENTED BY PREVIOUS STUDIES PERFORMED FOR RIGHT-OF-WAYS AND FOR METRO SEWER STATION, AND BY REVIEW OF AERIAL PHOTOGRAPHS OF THE SITE AND VICINITY.

THE GEOLOGIC DEPOSITS SHOWN REPRESENT NATIVE SOIL CONDITIONS BELOW ARTIFICIAL FILLS.

MONITORING WELL B-102 WAS INSTALLED BY OTHERS. REFER TO REVISED: PHASE II ENVIRONMENTAL STUDY – KENMORE PRE-MIX SITE, BY GEOTECH CONSULTANTS, INC., DATED 24 JANUARY 1991

REFERENCE:

U.S. GEOLOGICAL SURVEY (USGS) GEOLOGICAL MAP OM-14, "PRELIMINARY SURFICAL GEOLOGIC MAP OF THE EDMONDS EAST AND EDMONDS WEST QUADRANGLES, SNOHOMISH AND KING COUNTIES, WASHINGTON (1975).

FIGURE 2

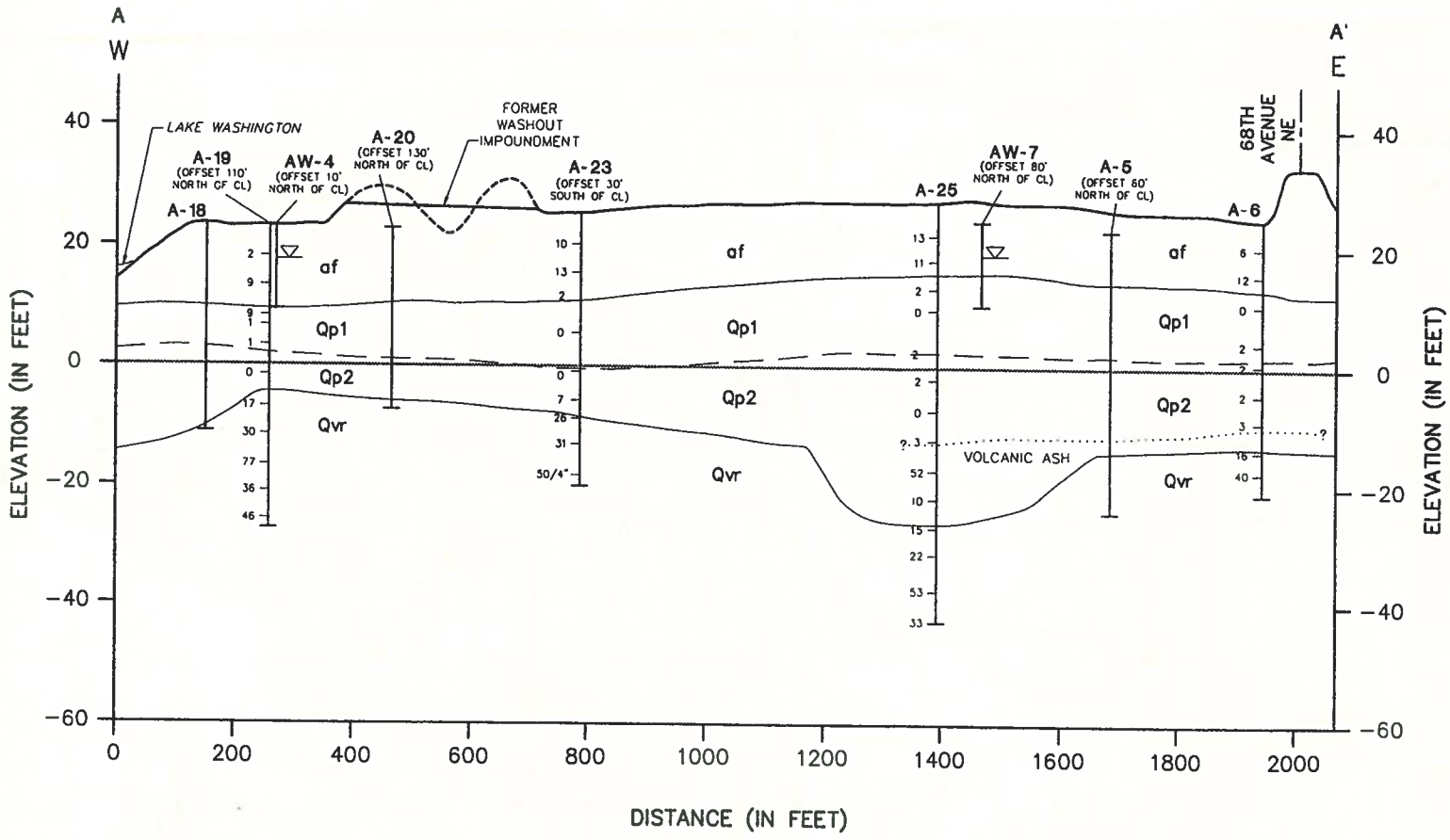
AGRA Earth & Environmental
11335 N.E. 122nd Way, Suite 100
Kirkland, WA, U.S.A. 98034-6918

W.O.	6-91M-10459-E
DESIGN	DHG
DRAWN	JMR
DATE	OCT 1996
SCALE	1"=200'

LAKEPOINTE DEVELOPMENT
KING COUNTY, WASHINGTON

SITE AND EXPLORATION PLAN

AGRA EARTH & ENVIRONMENTAL, INC. DRAWING NO. \91\10459-E\GEOLOGIC.DWG



mL – MODIFIED LAND

ORIGINAL TOPOGRAPHY DISTURBED BY REMOVAL OF SOME PLEISTOCENE DEPOSITS, GRADING AND ARTIFICIAL FILL OF UNKNOWN QUALITY.

af – ARTIFICIAL FILL

ORIGINAL TOPOGRAPHY MODIFIED BY PLACEMENT OF SIGNIFICANT THICKNESS OF ARTIFICIAL FILL. COMPRISES THE WOOD DEBRIS FILL DESCRIBED IN SUBSURFACE EXPLORATIONS.

Qp – PEAT

ACCUMULATION OF ORGANIC MATERIAL (Qp1) LOOSE ALLUVIUM.
MAY CONTAIN SMALL AMOUNTS OF SAND, SILT, CLAY AND VOLCANIC ASH DEPOSITED IN SWAMPS AND BOGS (Qp2)

Qvr – VASHON RECESSIONAL OUTWASH

LIGHT BROWN, LOOSELY COMPACTED SAND AND GRAVEL, WELL-ROUNDED FROM STREAM TRANSPORTATION. SORTING VARIES; PARTICLE SIZE VARIES FROM MEDIUM SAND TO COBBLES. NOT DIFFERENTIATED FROM MORE RECENT ALLUVIUM, WHICH MAY CONTAIN SILT, CLAY AND ORGANIC MATTER.

Qvt – VASHON TILL

POORLY SORTED, NONSTRATIFIED LODGMENT TILL DEPOSITED AS GROUND MORAINE. MIXTURE OF CLAY, SILT, SAND, PEBBLES AND COBBLES WITH OCCASIONAL LARGE BOULDERS. STONES ARE SUBANGULAR TO ROUNDED.

LEGEND

A-25 — SOIL BORING/MONITORING WELL NUMBER AND LOCATION

OBSERVED GROUNDWATER LEVEL

53 — BLOW COUNT (BLOWS/FOOT)

APPROXIMATE BOUNDARY OF GEOLOGIC UNIT

APPROXIMATE BOUNDARY BETWEEN ORGANIC PEATS (Qp1) AND ALLUVIUM (Qp2)

ELEVATION 0 (KING COUNTY BENCHMARK "KC-8-16")

BOTTOM OF HOLE

0 20 40
VERTICAL SCALE IN FEET

0 200 400
HORIZONTAL SCALE IN FEET

REFERENCE:
U.S. GEOLOGICAL SURVEY (USGS) GEOLOGICAL MAP OM-14, "PRELIMINARY SURFICAL GEOLOGIC MAP OF THE EDMONDS EAST AND EDMONDS WEST QUADRANGLES, SNOHOMISH AND KING COUNTIES, WASHINGTON (1975).

FIGURE 3

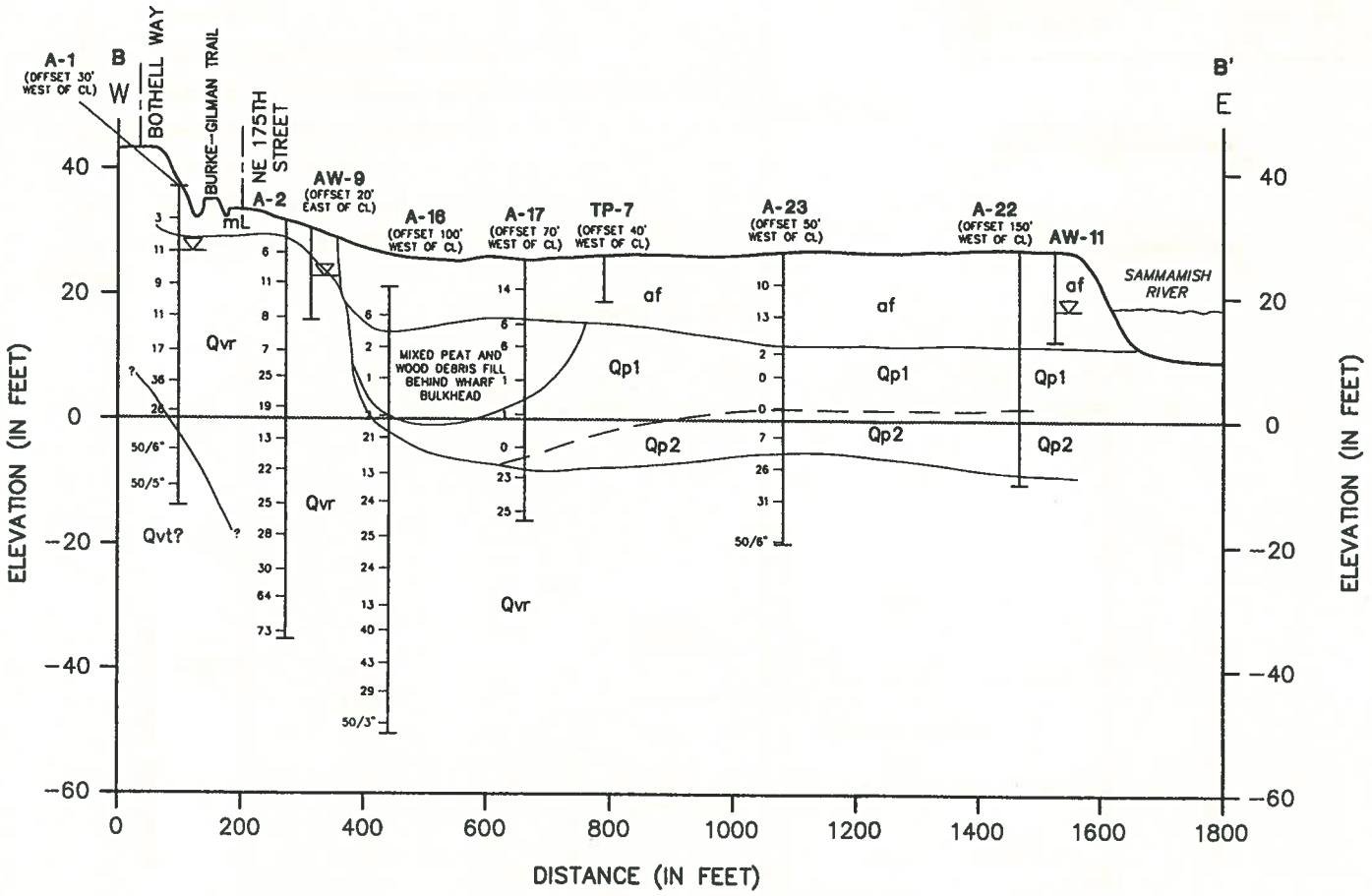
AGRA Earth & Environmental
11335 N.E. 122nd Way, Suite 100
Kirkland, WA, U.S.A. 98034-6918

W.O.	6-91M-10459-E
DESIGN	DHG
DRAWN	JMR
DATE	OCT 1996
SCALE	V:1-20, H:1-200

LAKEPOINTE DEVELOPMENT
KING COUNTY, WASHINGTON

GENERALIZED GEOLOGIC CROSS SECTION
A - A'

AGRA EARTH & ENVIRONMENTAL, INC. DRAWING NO. \91\10459-EX-S-A.DWG



LEGEND

A-25 — SOIL BORING/MONITORING WELL NUMBER AND LOCATION

OBSERVED GROUNDWATER LEVEL

53 — BLOW COUNT (BLOWS/FOOT)

APPROXIMATE BOUNDARY OF GEOLOGIC UNIT

APPROXIMATE BOUNDARY BETWEEN ORGANIC PEATS (Op1) AND ALLUVIUM (Qp2)

ELEVATION 0 (KING COUNTY BENCHMARK "KC-B-16")

BOTTOM OF HOLE

0 20 40
VERTICAL SCALE IN FEET

0 200 400
HORIZONTAL SCALE IN FEET

mL – MODIFIED LAND

ORIGINAL TOPOGRAPHY DISTURBED BY REMOVAL OF SOME PLEISTOCENE DEPOSITS, GRADING AND ARTIFICIAL FILL OF UNKNOWN QUALITY.

af – ARTIFICIAL FILL

ORIGINAL TOPOGRAPHY MODIFIED BY PLACEMENT OF SIGNIFICANT THICKNESS OF ARTIFICIAL FILL. COMPRISES THE WOOD DEBRIS FILL DESCRIBED IN SUBSURFACE EXPLORATIONS.

Qp – PEAT

ACCUMULATION OF ORGANIC MATERIAL (Op1)
LOOSE ALLUVIUM.
MAY CONTAIN SMALL AMOUNTS OF SAND, SILT, CLAY AND VOLCANIC ASH DEPOSITED IN SWAMPS AND BOGS (Op2)

Qvr – VASHON RECESSIONAL OUTWASH

LIGHT BROWN, LOOSELY COMPACTED SAND AND GRAVEL. WELL-ROUNDED FROM STREAM TRANSPORTATION. SORTING VARIES; PARTICLE SIZE VARIES FROM MEDIUM SAND TO COBBLES. NOT DIFFERENTIATED FROM MORE RECENT ALLUVIUM, WHICH MAY CONTAIN SILT, CLAY AND ORGANIC MATTER.

Qvt – VASHON TILL

POORLY SORTED, NONSTRATIFIED LODGMENT TILL DEPOSITED AS GROUND MORAINE. MIXTURE OF CLAY, SILT, SAND, PEBBLES AND COBBLES WITH OCCASIONAL LARGE BOULDERS. STONES ARE SUBANGULAR TO ROUNDED.

REFERENCE:
U.S. GEOLOGICAL SURVEY (USGS) GEOLOGICAL MAP OM-14, "PRELIMINARY SURFICAL GEOLOGIC MAP OF THE EDMONDS EAST AND EDMONDS WEST QUADRANGLES, SNOHOMISH AND KING COUNTIES, WASHINGTON (1975).

FIGURE 4

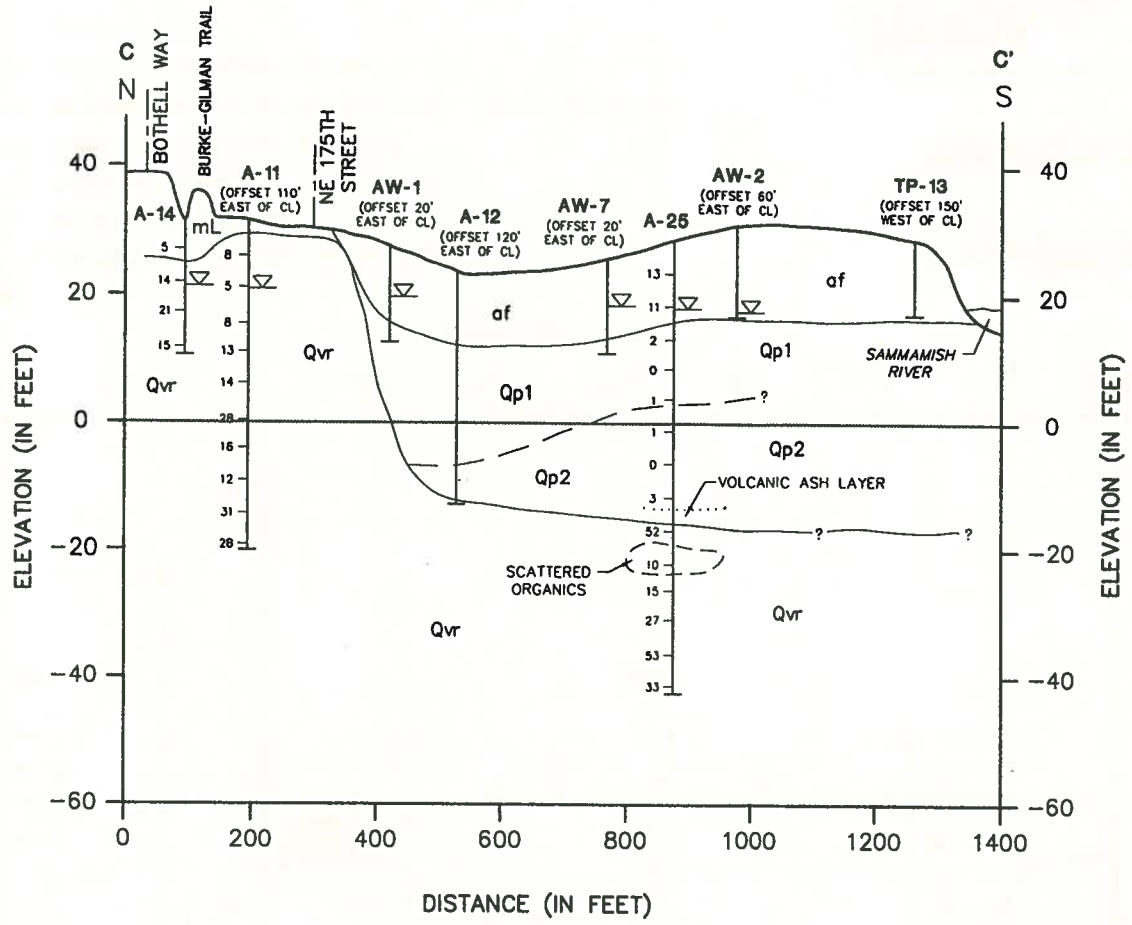
AGRA Earth & Environmental
11335 N.E. 122nd Way, Suite 100
Kirkland, WA, U.S.A. 98034--6918

W.O.	6-91M-10459-E
DESIGN	DHG
DRAWN	JMR
DATE	OCT 1996
SCALE	V:1-2D, H:1-200

LAKEPOINTE DEVELOPMENT
KING COUNTY, WASHINGTON

GENERALIZED GEOLOGIC CROSS SECTION
B - B'

AGRA EARTH & ENVIRONMENTAL, INC. DRAWING NO. \91\10459-E\X-S-B.DWG



mL – MODIFIED LAND

ORIGINAL TOPOGRAPHY DISTURBED BY REMOVAL OF SOME PLEISTOCENE DEPOSITS, GRADING AND ARTIFICIAL FILL OF UNKNOWN QUALITY.

af – ARTIFICIAL FILL

ORIGINAL TOPOGRAPHY MODIFIED BY PLACEMENT OF SIGNIFICANT THICKNESS OF ARTIFICIAL FILL. COMPRISES THE WOOD DEBRIS FILL DESCRIBED IN SUBSURFACE EXPLORATIONS.

Qp – PEAT

ACCUMULATION OF ORGANIC MATERIAL (Qp1)
LOOSE ALLUVIUM.
MAY CONTAIN SMALL AMOUNTS OF SAND, SILT, CLAY AND VOLCANIC ASH DEPOSITED IN SWAMPS AND BOGS (Qp2)

Qvr – VASHON RECESSIONAL OUTWASH

LIGHT BROWN, LOOSELY COMPACTED SAND AND GRAVEL, WELL-ROUNDED FROM STREAM TRANSPORTATION. SORTING VARIES; PARTICLE SIZE VARIES FROM MEDIUM SAND TO COBBLES. NOT DIFFERENTIATED FROM MORE RECENT ALLUVIUM, WHICH MAY CONTAIN SILT, CLAY AND ORGANIC MATTER.

Qvt – VASHON TILL

POORLY SORTED, NONSTRATIFIED LODGMENT TILL DEPOSITED AS GROUND MORAINE. MIXTURE OF CLAY, SILT, SAND, PEBBLES AND COBBLES WITH OCCASIONAL LARGE BOULDERS. STONES ARE SUBANGULAR TO ROUNDED.

LEGEND

- SOIL BORING/MONITORING WELL NUMBER AND LOCATION
- OBSERVED GROUNDWATER LEVEL
- BLOW COUNT (BLOWS/FOOT)
- APPROXIMATE BOUNDARY OF GEOLOGIC UNIT
- APPROXIMATE BOUNDARY BETWEEN ORGANIC PEATS (Qp1) AND ALLUVIUM (Qp2)
- ELEVATION 0 (KING COUNTY BENCHMARK "KC-B-16")
- BOTTOM OF HOLE

0 20 40
VERTICAL SCALE IN FEET

0 200 400
HORIZONTAL SCALE IN FEET

REFERENCE:
U.S. GEOLOGICAL SURVEY (USGS) GEOLOGICAL MAP OM-14, "PRELIMINARY SURFICAL GEOLOGIC MAP OF THE EDMONDS EAST AND EDMONDS WEST QUADRANGLES, SNOHOMISH AND KING COUNTIES, WASHINGTON (1975).

FIGURE 5

AGRA Earth & Environmental
11335 N.E. 122nd Way, Suite 100
Kirkland, WA, U.S.A. 98034-6918

W.O.	6-91M-10459-E
DESIGN	DHG
DRAWN	JMR
DATE	OCT 1996
SCALE	V: 1-20, H: 1-200

LAKEPOINTE DEVELOPMENT
KING COUNTY, WASHINGTON

GENERALIZED GEOLOGIC CROSS SECTION
C - C'

AGRA EARTH & ENVIRONMENTAL, INC. DRAWING NO. \91\10459-EX-5-C.DWG

APPENDIX A
SUBSURFACE EXPLORATION PROCEDURES AND LOGS
11-10459-00

APPENDIX A
SUBSURFACE EXPLORATION PROCEDURES AND LOGS
11-10459-00

FIELD EXPLORATION

The field exploration program conducted for this study was accomplished in generally two phases. The primary program consisted of advancing 16 test borings and 8 electric cone penetrometer tests to evaluate the subsurface soil conditions. This program was supplemented with the installation of 11 monitoring wells for environmental screening purposes. The second phase of the program consisted of excavating 20 test pit explorations on the west half of the site to explore the wood debris fill and characterize the fill constituents. The approximate locations of the explorations are indicated on the Site and Exploration Plan (Figure 2). The locations were obtained in the field by taping from site features shown on the plan provided by the client. The locations of the explorations should be considered accurate only to the degree implied by the method used. Elevations of the explorations are based upon a site topographic map by GeoDimensions dated 7 June 1995.

It should also be emphasized that our explorations reveal subsurface conditions only at discrete locations across the project site and that actual conditions could vary between these exploration locations. Furthermore, the nature and extent of any such variations would not become evident until additional explorations are performed or construction activities have begun. If significant variations are observed at that time, we may need to modify our conclusions and recommendations to reflect actual conditions.

The attached boring logs describe the various types of soils and materials encountered in each borehole, based primarily on interpretations made in the field and supported by our subsequent laboratory testing of selected samples. Our logs also indicate the approximate depth of the contacts between different soil types, although these contacts may be gradational or undulating. Where a change in soil type occurred between sampling intervals, we inferred the depth of contact. In addition, our logs indicate the depth of any groundwater observed in the boreholes, the Standard Penetration Resistance at each sample location, the test pit explorations, and any laboratory tests performed on the soil samples.

Hollow Stem Auger Borings

Sixteen borings were drilled in September and October 1995 by two local exploration drilling companies under subcontract to our firm. A summary of their depths and locations is given in Table 1 of the report text. Thirteen of the borings were drilled by Gregory Drilling advancing a 4¼-inch inside diameter hollow-stem auger with a truck-mounted CME 85 drill rig utilizing a bentonite slurry to prevent heaving conditions within the boring which would prevent obtaining undisturbed samples. The three remaining borings were drilled by Davies Drilling by advancing a 3¼-inch inside diameter hollow-stem auger with a track-mounted Mobil B-53 drill rig. During the drilling process, samples were generally obtained at 2½ or 5 foot depth intervals. The borings were continuously observed and logged by an engineering geologist from our firm.

Undisturbed samples were obtained by pushing a 3-inch outside diameter, seamless steel Shelby tube into the soil using the hydraulic system on the drill rig in accordance with ASTM:D-1587. Since the thin wall tube is pushed rather than driven, the sample obtained is considered relatively undisturbed. The samples were classified in the field by examining each end prior to sealing with plastic caps. The samples were then transported to our laboratory where they were extruded for further classification and laboratory testing.

Disturbed samples were obtained by using the Standard Penetration Test procedure as described in ASTM:D-1586. This test and sampling method consists of driving a standard 2-inch outside diameter, split barrel sampler a distance of 18-inches into the soil with a 140 pound hammer free falling a distance of 30 inches. The number of blows for each 6-inch interval is recorded. The number of blows required to drive the sampler the final 12 inches is considered the Standard Penetration Resistance ("N") or blow count. The blow count is presented graphically on the boring logs in this appendix. If a total of 50 blows is recorded within one 6-inch interval, the blow count is recorded as 50 blows for the number of inches of penetration. The resistance, or "N" value, provides a measure of the relative density of granular soils or the relative consistency of cohesive soils.

The soil samples obtained from the split-barrel sampler were classified in the field and representative portions were placed in plastic containers. The samples were then transported to our laboratory for further visual classification and laboratory testing. Samples are generally saved for a period of 30 days unless special arrangements are made. The boring logs are presented in this appendix and the soil descriptions are based on the inspection of samples secured, field logs and laboratory tests.

Groundwater conditions observed while advancing the test borings are indicated on the boring logs in this appendix by a triangular symbol and the designation "ATD" (At Time of Drilling). These subsurface water conditions were evaluated by observing the moisture condition of the samples or the wetted level on the drilling rods. That depth, shown on the boring logs, is generally indicative of the open water level in the borings at the time the borings were advanced, but do not necessarily represent the true regional groundwater table.

Cone Penetrometer Tests

The eight Cone Penetrometer Tests (CPTs) were performed to depths of approximately 31 to 47 feet below grade. The testing was performed for us by Northwest Cone Exploration during the period of 6 through 8 September 1995. A summary of the CPT probe numbers and locations is provided in Table 1 of the text and Figure 2.

The CPT consists of pushing a cone-tipped probe in a soil deposit and recording the resistance of the soil to that penetration. The test was conducted in general accordance with ASTM Test Designation D-3441. The test equipment consists of a cone assembly equipped with a piezometer at the tip, a series of hollow sounding rods, a hydraulic frame to push the cone and rods into the soil, and an electronic data processing unit. A drill truck was used to provide the needed thrust capacity.

The cone penetrometer consists of a conical tip with a 60 degree apex angle and a cylindrical friction sleeve. The interior of the device is instrumented with strain gauges allowing simultaneous measurements of cone and sleeve resistance during penetration. The pressure due to the head of groundwater above the tip of the cone and any excess pore water pressures generated due to penetration of the cone into the soils are measured by an electronic piezometer installed at the tip of the cone. Electric signals from the strain gauges and the piezometer are transmitted by cable to the data processing unit. The cone assembly used on this project has a cross-sectional area of 10 square centimeters, and a sleeve surface area of 150 square centimeters.

Output quantities for the cone tip penetration resistance and sleeve friction are simultaneously recorded in units of tons per square foot (tsf) versus depth in units of meters (m). The recording apparatus is also designed to calculate and record the ratio of friction resistance to tip resistance (known as the friction ratio). The cone tip resistance and friction ratio were evaluated using published literature in order to classify the subsurface soils. Plots of the tip resistance, sleeve resistance, and friction ratio, as well as the interpreted results of the tests are presented in this appendix.

Monitoring Well Installations

Groundwater monitoring wells were installed in nine test boring locations, Nos. AW-1 through AW-9, were drilled during the period of 14 through 22 September 1995. Two additional monitoring wells, Nos. AW-10 and AW-11, were installed within 75 feet of the shoreline 29 February 1996. All eleven wells were installed by Gregory Drilling under subcontract to our firm using a truck-mounted CME 85 drill rig with hollow-stem auger. They consisted of installing 10 feet of 2-inch inside diameter PVC, 0.020-inch slotted well screen in the bottom of each boring. A blank PVC pipe riser extended from the lower slotted section of pipe to the ground surface. A Colorado No. 10-20 sand pack was utilized to backfill around the slotted section to provide a good hydraulic communication between the well screen and formation. A bentonite seal was placed within 2 feet of the ground surface. A flush-mounted or stick-up steel monument (depending on location) was cemented in-place to protect the top of the monitoring well. The groundwater levels recorded after drilling were measured by lowering an electronic water probe into the monitoring wells. The groundwater level measured within each monitoring well is indicated by a triangle symbol on the appropriate boring log along with the date of the measurement. The monitoring well logs are presented in this appendix, and site soil descriptions are based on samples secured, field logs, and laboratory tests.

Groundwater measurements taken on 2 October 1995 from nine of the monitoring wells installed on site indicated static groundwater levels between approximately Elevation 18 and 23, roughly corresponding to the lake level. The groundwater gradient appears to flow towards the south beneath the north end of the site, and appears to be relatively flat beneath the south end of the site, where the former lakebed was filled in. These water levels represent depths of 6.5 to 12.5 feet below existing grades, within the surficial fill soils. The underlying peat soils are also saturated, but are less permeable than the surficial fill soils, based on our observations and previous experience.

Following the completion of a professional site survey performed by Summit Surveying of Kirkland, Washington, groundwater elevations measured on 2 October 1995, 26 February 1996 and 16 April 1996 were calculated and displayed in Table 1 to this appendix. One additional well, B-102, installed by Geotech Consultants in December 1990, was included in this study due to its location within 50 feet of the southern shoreline of the site. Groundwater levels measured in this monitoring well are also displayed in Table A-1 to this appendix.

Test Pits

The second phase of the program consisted of 20 test pit explorations (Nos. TP-1 through TP-20), excavated by a rubber-tired backhoe owned and operated by Fed-Ex Construction under subcontract to our firm on 29 February and 1 March 1996. These test pit excavations permitted a detailed evaluation of the subsurface conditions in areas of lower level basement cuts proposed at the time for the western half of the project site. Also, they are more representative indicators of true near-surface site character than soil exploration drilling since they allow continuous visual observation of the composition of the wood debris fills over a widespread area across the site.

Each test pit was continuously logged and observed by an experienced engineering geologist from our firm. In situ strength and quality attributes of materials encountered were estimated by our field observer based on experience with similar soils and the difficulty incurred during excavation. Representative samples of the soils in the test pits were retrieved, classified in the field, and transported to our laboratory for a detailed evaluation and classification. The test pit logs are presented in this appendix and the soil descriptions are based on the inspection of the samples secured, field logs, and laboratory tests.

Table A-1: Summary of Fluid Level Measurements
Kenmore Lakepointe Development
King County, Washington
AGRA Earth & Environmental, Inc., Project No. 11-10459-00

Well Number/ Top of Casing Elevation (feet)	Date Measured	Depth to Water (feet)	Groundwater Elevation (feet)
AW-1/ 26.76	2-Oct-95	6.22	20.54
	29-Feb-96	6.57	20.19
	16-Apr-96	6.90	19.86
AW-2/ 31.32	2-Oct-95	13.48	17.84
	29-Feb-96	13.86	17.46
	16-Apr-96	12.80	18.52
AW-3/ 28.23	2-Oct-95	9.42	18.81
	29-Feb-96	9.76	18.47
	16-Apr-96	9.30	18.93
AW-4/ 27.61	2-Oct-95	9.84	17.77
	29-Feb-96	10.26	17.35
	16-Apr-96	9.30	18.31
AW-5/ 29.71	2-Oct-95	9.40	20.31
	29-Feb-96	12.27	17.44
	16-Apr-96	10.30	19.41
AW-6/ 28.46	2-Oct-95	10.70	17.76
	29-Feb-96	11.08	17.38
	16-Apr-96	10.10	18.36
AW-7/ 25.18	2-Oct-95	7.32	17.86
	29-Feb-96	7.66	17.52
	16-Apr-96	6.80	18.38
AW-8/ 26.16	2-Oct-95	8.06	18.10
	29-Feb-96	8.42	17.74
	16-Apr-96	7.50	18.66
AW-9/ 30.22	2-Oct-95	8.18	22.04
	29-Feb-96	6.51	23.71
	16-Apr-96	7.00	23.22
AW-10/ 30.12	2-Oct-95	Not Applicable	Not Applicable
	29-Feb-96	12.48	17.64
	16-Apr-96	11.90	18.22
AW-11/ 29.59	2 October 1995	Not Applicable	Not Applicable
	29-Feb-96	12.11	17.48
	16-Apr-96	11.10	18.49
B-102/ 25.51	2-Oct-95	Not Applicable	Not Applicable
	29-Feb-96	Not Applicable	Not Applicable
	16 April 1996	7.10	18.41

Kenmore Lakepointe

PROJECT: Development W.O. 11-10459-00 BORING NO. A-1

Location: On Bench North of Detention Pond

Approximate ground surface elevation: 36.5 feet

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER
0	Sod over loose, damp to moist, dark tan, silty, fine SAND with some gravel and medium sand (Fill)			
5	Grading into moist, mixed brown-tan, gravelly, silty SAND with scattered cobbles (Fill)		S-1	
	Loose to medium dense, damp to moist, mottled orange in tan, silty, fine SAND			
10			S-2	P/ ATD
	Becoming wet to saturated			
	Medium stiff, moist to wet, orangish tan, fine sandy SILT interbedded with loose, wet, tan, silty, fine to medium SAND			
15			S-3	
	Fractured lenses of stiff, moist to wet, orangish yellow, SILT with some clay, 1/4-inch fracture filled with silty, fine SAND 16.5 to 17 feet			
20			S-4	ATD
	Medium dense, wet to saturated, tan, silty, fine to medium SAND			
	Grades to gravelly at 23 feet			
25			S-5	
	Lens of stiff, moist to wet, yellowish tan, very fine sandy SILT at 26.5 feet			
	(continued)			
30				

PENETRATION RESISTANCE

▲ Standard △ Other

Blows per foot: 0, 10, 20, 30, 40, 50

TESTING

MOISTURE CONTENT: 0, 20, 40, 60, 80, 100

Plastic limit — Natural — Liquid limit

LEGEND

- 2.00-inch OD split-spoon sample
- Sample not recovered
- ATD — Groundwater level at time of drilling
- P/ ATD — Perched groundwater level at time of drilling
- 3.00-inch OD Shelby tube sample

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

AGRA Earth and Environmental, Inc.

Drilling method: HSA Hammer type: Cathead Date drilled: 11, 12 September 1995 Logged by: HWB

PROJECT: Kenmore Lakepointe Development

W.O. 11-10459-00 BORING NO. A-1

Page 2 of 2

Location: On Bench North of Detention Pond

Approximate ground surface elevation: 36.5 feet

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER
30	Dense, saturated tan, silty, gravelly SAND	X	S-6	
	Medium dense, saturated, gray, silty, gravelly SAND/sandy GRAVEL	I	S-7	
	Very dense, wet, gray, gravelly, silty SAND	I	S-8	
40	Grades into a silty, gravelly SAND			
45		I	S-9	
50	Boring terminated at approximately 50 feet. No sample taken at 50 feet as the hole colapsed.			
55				
60				

PENETRATION RESISTANCE

▲ Standard △ Other

Blows per foot: 0, 10, 20, 30, 40, 50

Washed out heave 50/6"

Could not washed out all heave 50/5"

TESTING

MOISTURE CONTENT: 0, 20, 40, 60, 80, 100

Plastic limit — Natural — Liquid limit

LEGEND

- I — 2.00-inch OD split-spoon sample
- X — Sample not recovered
- ▼ ATD — Groundwater level at time of drilling
- P ATD — Perched groundwater level at time of drilling
- II — 3.00-inch OD Shelby tube sample

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling method: HSA Hammer type: Cathead Date drilled: 11, 12 October 1995 Logged by: HWB

AGRA Earth and Environmental, Inc.

PROJECT: Kenmore Lakepointe Development

W.O. 11-10459-00 BORING NO. A-2

Page 1 of 3

Location: 10' South & 10' West from SW corner of Entry Planter

Approximate ground surface elevation: 31.5 feet

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER
0	2" Asphalt over 2" of 1-1/2 inch angular Base Course over medium dense, damp, medium to dark brown, silty, sandy GRAVEL (Fill)			
	Loose to medium dense, damp, orangish-tan, fine SAND with some silt and trace gravel			
	Medium stiff, moist to wet, mottled yellow-tan-buff, very fine sandy SILT			
5	Loose, damp, yellowish tan, silty, fine SAND		S-1	
	Becoming moist, tan, fine to medium SAND with some silt			
10	Medium dense, wet to saturated, tan SAND with trace to some gravel and silt		S-2	ATD
	Loose, wet to saturated, yellowish tan, silty, fine SAND			
15	Medium stiff, wet, yellowish tan, very fine sandy SILT		S-3	
	Loose, saturated, gray, fine to medium SAND with some silt			
20	Stiff, moist to wet, yellowish tan, SILT with some clay		S-4	
	Medium dense, saturated, yellowish tan, silty, fine SAND to fine SAND with some silt and interbeds of stiff, wet, yellowish tan, very fine sandy SILT			
25			S-5	
30	(continued)			

PENETRATION RESISTANCE

▲ Standard △ Other

Blows per foot: 0, 10, 20, 30, 40, 50

TESTING

MOISTURE CONTENT: 0, 20, 40, 60, 80, 100

Plastic limit — Natural — Liquid limit

LEGEND

- 2.00-inch OD split-spoon sample
- Sample not recovered
- ATD Groundwater level at time of drilling
- Grain size analysis
- 3.00-inch OD Shelby tube sample

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling method: HSA/Mud Rotary Hammer type: Mechanical Date drilled: 12 September 1995 Logged by: HWB

AGRA Earth and Environmental, Inc.

Kenmore Lakepointe

PROJECT: Development W.O. 11-10459-00 BORING NO. A-2

Page 2 of 3

SOIL DESCRIPTION

Location: 10' South & 10' West from SW corner of Entry Planter

Approximate ground surface elevation: 31.5 feet

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER	PENETRATION RESISTANCE (▲ Standard, △ Other; Blows per foot: 0, 10, 20, 30, 40, 50)	TESTING
30	Medium dense, saturated, yellowish tan, silty, fine SAND to fine SAND with some silt and interbeds of stiff, wet, yellowish tan, very fine sandy SILT (As Above)		S-6			
35			S-7			▨
40			S-8			
45	Interbed of SILT with some clay		S-9			
	Medium dense, saturated, tannish gray, gravelly SAND/sandy GRAVEL with some silt					
50			S-10			
55			S-11			
60	(continued)					

MOISTURE CONTENT: 0, 20, 40, 60, 80, 100

Plastic limit — Natural — Liquid limit

LEGEND

- 2.00-inch OD split-spoon sample
- Sample not recovered
- ATD — Groundwater level at time of drilling
- Grain size analysis
- 3.00-inch OD Shelby tube sample

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling method: HSA/Mud Rotary Hammer type: Mechanical Date drilled: 12 September 1995 Logged by: HWB

AGRA Earth and Environmental, Inc.

PROJECT: Kenmore Lakepointe Development

W.O. 11-10459-00 BORING NO. A-2

Page 3 of 3

Location: 10' South & 10' West from SW corner of Entry Planter

Approximate ground surface elevation: 31.5 feet

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER	PENETRATION RESISTANCE (▲ Standard, △ Other; Blows per foot)	TESTING
60	Very dense, saturated, yellowish tan, gravelly SAND with some silt		S-12		64	
65	Lens of hard, wet, yellowish tan, SILT with some fine sand		S-13		73	
	Boring terminated at approximately 66.5 feet. Switched to mud rotary at 30 feet.					
70						
75						
80						
85						
90	(continued)					

Penetration resistance scale: 0, 10, 20, 30, 40, 50

MOISTURE CONTENT: 0, 20, 40, 60, 80, 100

Plastic limit — Natural — Liquid limit

LEGEND

- 2.00-inch OD split-spoon sample
- Sample not recovered
- ATD Groundwater level at time of drilling
- Grain size analysis
- 3.00-inch OD Shelby tube sample

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling method: HSA/Mud Rotary Hammer type: Mechanical Date drilled: 12 September 1995 Logged by: HWB

AGRA Earth and Environmental, Inc.

Kenmore Lakepointe

PROJECT: Development W.O. 11-10459-00 BORING NO. A-3

Location: 90' South & 20' East from SW corner of Building

Approximate ground surface elevation: 27 feet

Page 1 of 2

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER
0	2" Asphalt over 2" to 4" of Base Course over medium dense, moist to wet, tan, gravelly, silty SAND with some organics (Fill)			
	Very loose to loose, wet, blackish gray to tannish gray, silty SAND with some gravel, organics and debris (treated wood, brick, concrete, etc.) (creosote-like odor - 1ppm on OVM) (Wood Debris Fill)			
5			S-1	
	Interbeds of medium dense to dense, moist, gray, silty, gravelly SAND to silty, sandy GRAVEL (Concrete Washout)			
10			S-2	ATD
15	Very loose to loose, saturated, blackish gray to tannish gray, silty SAND with some gravel and wood debris (Fill)		S-3	
20			S-4	
	Very loose, wet to saturated, dark brown, fibrous to amorphous PEAT with interbeds of brown, organic silts		S-5	
25			S-6	
30	(continued)			

PENETRATION RESISTANCE

▲ Standard △ Other

Blows per foot: 0, 10, 20, 30, 40, 50

TESTING

MOISTURE CONTENT: 0, 20, 40, 60, 80, 100

Plastic limit — Natural — Liquid limit

LEGEND

- 2.00-inch OD split-spoon sample
- Sample not recovered
- ATD — Groundwater level at time of drilling
- 3.00-inch OD Shelby tube sample

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling method: HSA/Mud Rotary Hammer type: Mechanical Date drilled: 11 September 1995 Logged by: HWB

PROJECT: Kenmore Lakepointe Development

W.O. 11-10459-00 BORING NO. A-3

Page 2 of 2

Location: 90' South & 20' East from SW corner of Building

Approximate ground surface elevation: 27 feet

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER	PENETRATION RESISTANCE (Standard ▲, Other △; Blows per foot: 0, 10, 20, 30, 40, 50)	TESTING
30	Very loose, saturated, blackish-browish gray, gravelly, silty SAND with organics and PEAT interbeds		S-7			
35	Medium dense, saturated, gray, silty fine SAND with trace organics		S-8			
40			S-9			
45	Becoming very loose		S-10			
	Very soft, clayey SILT lens at 46.2 feet					
50	Dense, saturated, yellowish tan, fine to medium SAND with some silt		S-11			
55	Boring terminated at approximately 51.5 feet. Switched to mud rotary at 45 feet.					
60						

MOISTURE CONTENT: 0, 20, 40, 60, 80, 100

Plastic limit — Natural — Liquid limit

LEGEND

- 2.00-inch OD split-spoon sample
- Sample not recovered
- Groundwater level at time of drilling (ATD)
- 3.00-inch OD Shelby tube sample

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling method: HSA/Mud Rotary Hammer type: Mechanical Date drilled: 11 September 1995 Logged by: HWB

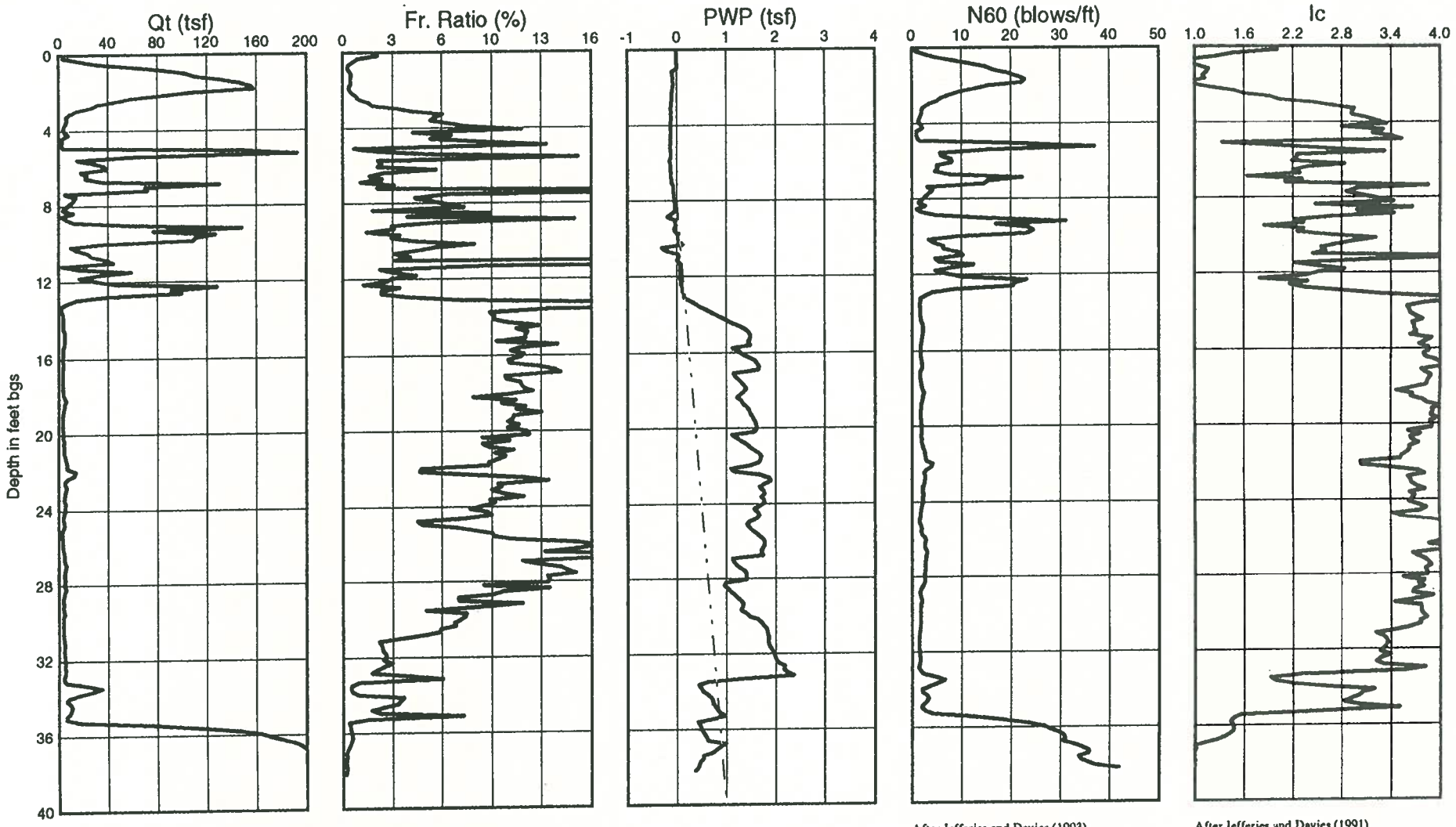
RA Eng Envirc il, Inc.

Cone Penetration Test - A4

Test Date : Sep 07, 1995
Location : Kenmore LakePointe Development

Operator : Northwest Cone Exploration

Ground Surf. Elev. : 24.50
Water Table Depth : 8.00



Qt normalized for
unequal end area effects

Fr Ratio = 100*F/(Qt-Sigmav)
Gamma = 120 pcf

After Jefferies and Davies (1993)

After Jefferies and Davies (1991)
Ic < 1.25 - Gravelly sands
1.25 <Ic < 1.90 - Clean to silty sand
1.90 <Ic < 2.54 - Silty sand to sandy silt
2.54 <Ic < 2.82 - Clayey silt to silt clay
2.82 <Ic < 3.22 - Clays

PROJECT NO. 11-10459-01 DATE: Sept. 8, 1995 DRAWN BY: Keith Brown

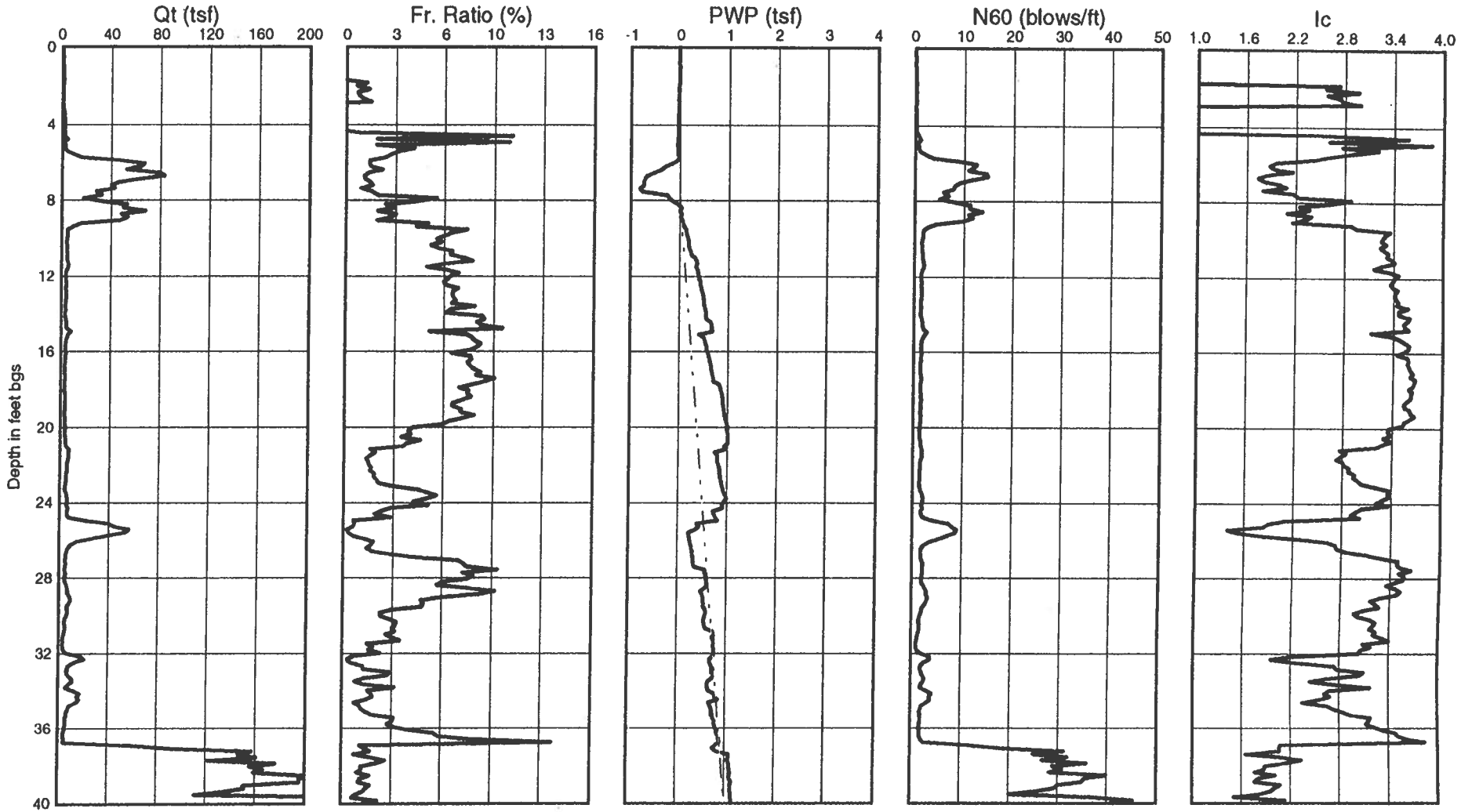
AGRA E & E, Inc.

Cone Penetration Test - A5

Test Date : Sept 07, 1995
Location : Kenmore LakePointe Development

Operator : Northwest Cone Exploration

Ground Surf. Elev. : 24.50
Water Table Depth : 8.00



Qt normalized for unequal end area effects

Fr Ratio = 100*F/(Qt-Sigmav)
Gamma = 120 pcf

After Jefferies and Davies (1993)

After Jefferies and Davies (1991)
Ic < 1.25 - Gravelly sands
1.25 <Ic < 1.90 - Clean to silty sand
1.90 <Ic < 2.54 - Silty sand to sandy silt
2.54 <Ic < 2.82 - Clayey silt to silt clay
2.82 <Ic < 3.22 - Clays

PROJECT NO. 11-10459-01 DATE: Sept. 8, 1995 DRAWN BY: Keith Brown

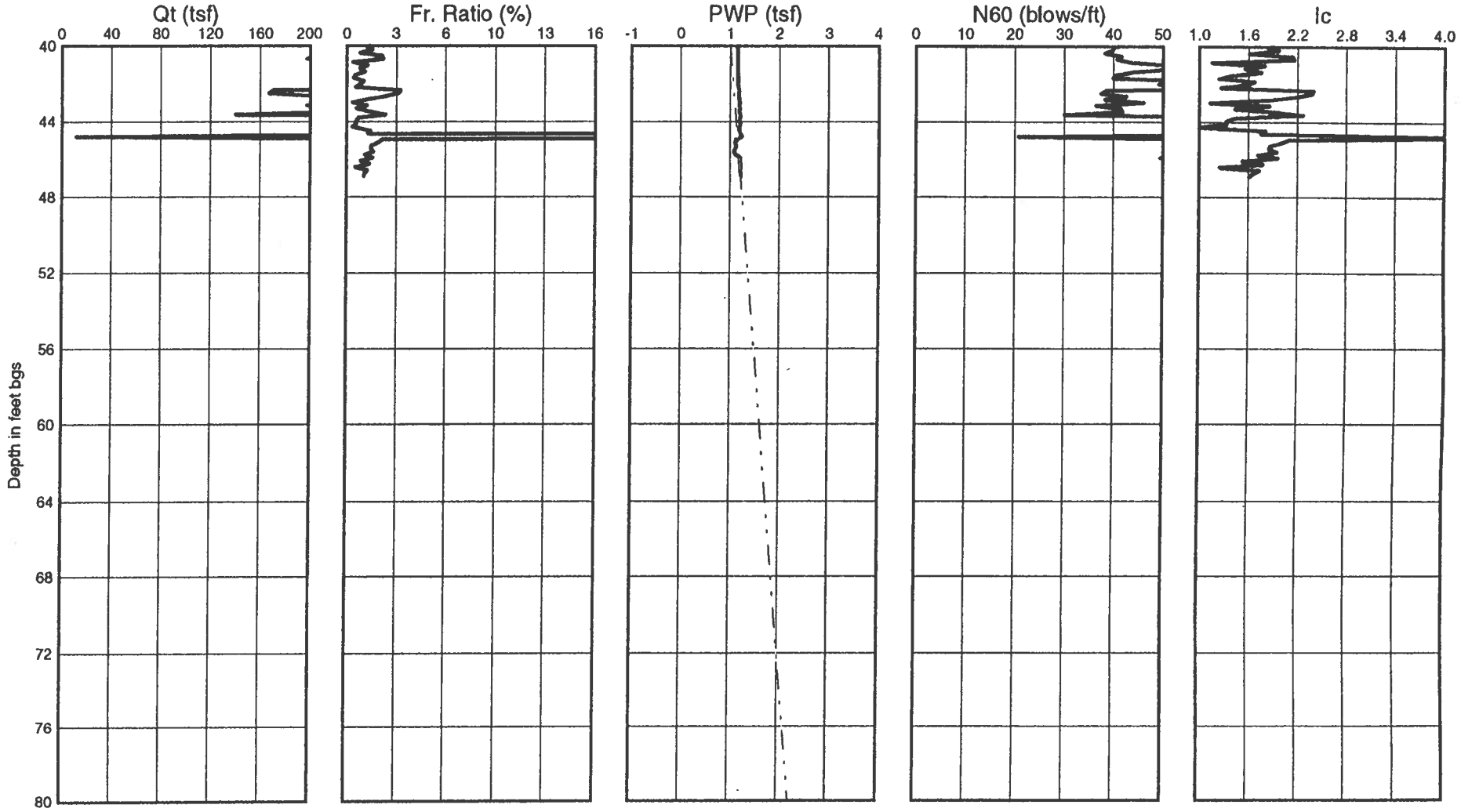
AGRA E & E, Inc.

Cone Penetration Test - A5

Test Date : Sept 07, 1995
Location : Kenmore LakePointe Development

Operator : Northwest Cone Exploration

Ground Surf. Elev. : 24.50
Water Table Depth : 8.00



Qt normalized for unequal end area effects

Fr Ratio = 100*F/(Qt-Sigmav)
Gamma = 120 pcf

After Jefferies and Davies (1993)

After Jefferies and Davies (1991)
Ic < 1.25 - Gravelly sands
1.25 <Ic < 1.90 - Clean to silty sand
1.90 <Ic < 2.54 - Silty sand to sandy silt
2.54 <Ic < 2.82 - Clayey silt to silt clay
2.82 <Ic < 3.22 - Clays

PROJECT NO. 11-10459-01 DATE: Sept. 8, 1995 DRAWN BY: Keith Brown

AGRA E & E, Inc.

PROJECT: Kenmore Lakepointe Development

W.O. 11-10459-00 BORING NO. A-6

Page 1 of 2

Location: 10' North & 30' East of South Lightpole

Approximate ground surface elevation: 27.5 feet

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER
0	2" of 1"-minus Base Course over medium dense, dry to damp, tan, silty, sandy GRAVEL (Fill)			
	Loose, moist, dark tan, silty, gravelly SAND matrix in debris (wood, brick, wire, metal, etc.) (Wood Debris Fill)		S-1	
5				
10	Medium dense, moist to wet, tan, gravelly, silty SAND (Till Fill)		S-2	
	Medium dense, wet, gray, silty SAND with trace to some gravel (Fill)			
	Very soft to soft, wet, brown, fibrous to amorphous PEAT with interbeds of organic SILT		S-3	
15				
20			S-4	ATD
			S-5	
	Very loose, saturated, bluish gray, silty, fine SAND to very fine sandy SILT			
25	Very soft to soft, wet, bluish gray, fine sandy SILT to SILT with some very fine sand and clay		S-6	
	Very loose, saturated, bluish gray, silty, very fine SAND with trace organics		S-7	
	(continued)			
30				

PENETRATION RESISTANCE

▲ Standard △ Other

Blows per foot: 0, 10, 20, 30, 40, 50

TESTING

264 — In-place density 80 pcf

MOISTURE CONTENT: 0, 20, 40, 60, 80, 100

Plastic limit — Natural — Liquid limit

LEGEND

- 2.00-inch OD split-spoon sample
- Sample not recovered
- ATD — Groundwater level at time of drilling
- Consolidation test
- 3.00-inch OD Shelby tube sample

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling method: HSA/Mud Rotary Hammer type: Mechanical Date drilled: 13 September 1995 Logged by: HWB

Kenmore Lakepointe

PROJECT: Development W.O. 11-10459-00 BORING NO. A-6

Page 2 of 2

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER
	Location: 10' North & 30' East of South Lightpole			
	Approximate ground surface elevation: 27.5 feet			
30	Interbedded very soft ot soft, wet to saturated, dark brown to brown, fibrous PEAT and organic SILT with some clay		S-8	
35	Volcanic ash layer at 35.8 feet		S-8	
	Very loose, saturated, bluish gray, silty, very fine SAND/very fine sandy SILT			
40	Medium dense, saturated, gray, sandy GRAVEL/ gravelly SAND with trace to some silt		S-10	
	Dense, saturated, gray, fine GRAVEL with trace sand and silt			
45			S-11	
	Boring terminated at approximately 46.5 feet. Switched to mud rotary at 40 feet.			
50				
55				
60				

PENETRATION RESISTANCE

▲ Standard Blows per foot △ Other

0 10 20 30 40 50

TESTING

0 20 40 60 80 100

MOISTURE CONTENT

Plastic limit Natural Liquid limit

LEGEND

- 2.00-inch OD split-spoon sample
- Sample not recovered
- ATD Groundwater level at time of drilling
- Consolidation test
- 3.00-inch OD Shelby tube sample

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling method: HSA/Mud Rotary Hammer type: Mechanical Date drilled: 11 September 1995 Logged by: HWB

RA Ea... Envir... ..., Inc.

PROJECT: Kenmore Lakepointe Development

W.O. 11-10459-00 BORING NO. A-7

Page 1 of 1

Location: 90' W & 9' N of Manhole

Approximate ground surface elevation: 33.5 feet

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER
0	Sod over loose, moist, brown, gravelly, silty SAND (Topsoil)			
	Loose to medium dense, moist, tan, gravelly SAND with some silt (Fill)			
5			S-1	
	Medium dense, wet to saturated, tan, gravelly, silty SAND			ATD
10			S-2	
	Grading to a silty, gravelly SAND			
	Very dense, saturated, tan, silty, gravelly SAND/ silty, sandy GRAVEL			
15			S-3	
20	Very dense, moist to wet, tan, silty, gravelly SAND		S-4	
	Boring terminated at approximately 21 feet			
25				
30				

PENETRATION RESISTANCE

▲ Standard Blows per foot △ Other

0 10 20 30 40 50

50/6" 50/4.5"

TESTING

0 20 40 60 80 100

MOISTURE CONTENT

Plastic limit Natural Liquid limit

LEGEND

- 2.00-inch OD split-spoon sample
- X Sample not recovered
- ATD Groundwater level at time of drilling
- 3.00-inch OD Shelby tube sample

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling method: HSA Hammer type: Mechanical Date drilled: 09 October 1995 Logged by: HWB

AGRA Earth and Environmental, Inc.

PROJECT: Kenmore Lakepointe Development W.O. 11-10459-00 BORING NO. A-8

Page 1 of 1

Location: 120' E of Manhole & 20' N of Path

Approximate ground surface elevation: 36 feet

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER
0	Grass over loose, moist, brown, silty, gravelly SAND (Fill)			
	Medium dense, moist, dark brown, gravelly, silty SAND (Fill)			
5	Medium dense, damp to moist, tan, silty, fine SAND		S-1	
10	Becomes wet to saturated			P/ ATD
	Medium stiff, moist, yellowish tan, laminated SILT with trace organics		S-2	
	Dense, wet to saturated, tan, gravelly SAND with some silt			ATD
15			S-3	
	Very dense, moist to wet, gravelly, silty SAND			
20			S-4	
	Boring terminated at approximately 21 feet			
25				
30				

PENETRATION RESISTANCE

▲ Standard △ Other

Blows per foot

0 10 20 30 40 50

50/4"

TESTING

0 20 40 60 80 100

MOISTURE CONTENT

Plastic limit — Natural — Liquid limit

LEGEND

- 2.00-inch OD split-spoon sample
- Sample not recovered
- ATD — Groundwater level at time of drilling
- P/ ATD — Perched groundwater level at time of drilling
- 3.00-inch OD Shelby tube sample

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

AGRA Earth & Environmental, Inc.

Drilling method: HSA Hammer type: Mechanical Date drilled: 09 October 1995 Logged by: HWB

PROJECT: Kenmore Lakepointe Development

W.O. 11-10459-00 BORING NO. A-10

Page 1 of 1

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER	TESTING
	Location: 9' N of Corner Fence Post Approximate ground surface elevation: 31.5 feet				
0	2" of 1 1/2-inch minus Crushed Rock over 4" of Asphalt over medium dense, moist, tan, sandy GRAVEL with some silt (Fill)				
	Loose, damp to moist, orangish tan, gravelly SAND/sandy GRAVEL with some silt (Recessional)				
5			S-1		
	Loose to medium dense, moist to wet, tan, SAND with some silt and trace gravel (by drilling action)				
10	Medium dense, saturated, tan, silty, fine SAND		S-2	ATD	
15			S-3		
20	Grading to silty, fine to medium SAND with trace gravel		S-4		
	Boring terminated at approximately 21.5 feet				
25					
30					

PENETRATION RESISTANCE

▲ Standard △ Other

Blows per foot: 0, 10, 20, 30, 40, 50

Blowcount Overstated gravel in shoe

MOISTURE CONTENT: 0, 20, 40, 60, 80, 100

Plastic limit — Natural — Liquid limit

LEGEND

- 2.00-inch OD split-spoon sample
- Sample not recovered
- ATD — Groundwater level at time of drilling
- 3.00-inch OD Shelby tube sample

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling method: HSA Hammer type: Mechanical Date drilled: 09 October 1995 Logged by: HWB

Kenmore Lakepointe

PROJECT: Development W.O. 11-10459-00 BORING NO. A-11

Location: Boat Yard
Approximate ground surface elevation: 31 feet

DEPTH (feet)	SOIL DESCRIPTION (20' South & 55' West from Catch Basin In Boat Yard)	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER
0	4" of 5/8 inch minus Gravel Fill over 1" Concrete over medium dense, damp, tan, sandy GRAVEL with some silt (Fill)			
	Loose, damp, orangish tan, sandy GRAVEL with some silt (Recessional)			
5			S-1	
	Becoming cobbly at 8.5 feet			
10	Loose, saturated, yellowish tan, silty, fine to medium SAND		S-2	ATD
	Loose, saturated, yellowish tan, silty, fine SAND			
15			S-3	
	Becoming mottled orange-tan-gray			
	Stiff, wet, yellowish tan, SILT with some clay and interbeds of silty, very fine SAND			
20			S-4	
	Medium dense, saturated, gray, silty, fine SAND			
	Interbedded medium stiff/medium dense, wet to saturated, tan, very fine sandy SILT with some clay to silty, very fine SAND			
25			S-5	
	Medium dense, saturated, gray, gravelly SAND with some silt			
	(continued)			
30				

PENETRATION RESISTANCE
▲ Standard △ Other
Blows per foot
0 10 20 30 40 50

Page 1 of 2

TESTING

0 20 40 60 80 100
MOISTURE CONTENT
Plastic limit Natural Liquid limit

LEGEND

- 2.00-inch OD split-spoon sample
- X Sample not recovered
- ATD Groundwater level at time of drilling
- 3.00-inch OD Shelby tube sample

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

AGRA Earth and Environmental, Inc.

Drilling method: HSA/Mud Rotary Hammer type: Mechanical Date drilled: 11 September 1995 Logged by: HWB

PROJECT: *Kenmore Lakepointe Development*

W.O. *11-10459-00*

BORING NO. *A-11*

Location: *20' South & 55' West from Catch Basin in Boat Yard*

Approximate ground surface elevation: *31 feet*

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER
30	*Medium dense, saturated, gray, silty, fine SAND with some medium sand*		S-6	
	Becoming gravelly at 32 to 33 feet			
	Medium dense, saturated, gray, silty, fine SAND with trace gravel			
35			S-7	
40			S-8	
	Becoming dense			
45			S-9	
50	*Becoming medium dense*		S-10	
	Boring terminated at approximately 51.5 feet. Switched to mud rotary at 30 feet.			
55				
60				

PENETRATION RESISTANCE

▲ Standard ▲ Blows per foot △ Other

0 10 20 30 40 50

TESTING

0 20 40 60 80 100

MOISTURE CONTENT

Plastic limit — Natural — Liquid limit

LEGEND

- 2.00-inch OD split-spoon sample
- Sample not recovered
- ATD Groundwater level at time of drilling
- 3.00-inch OD Shelby tube sample

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

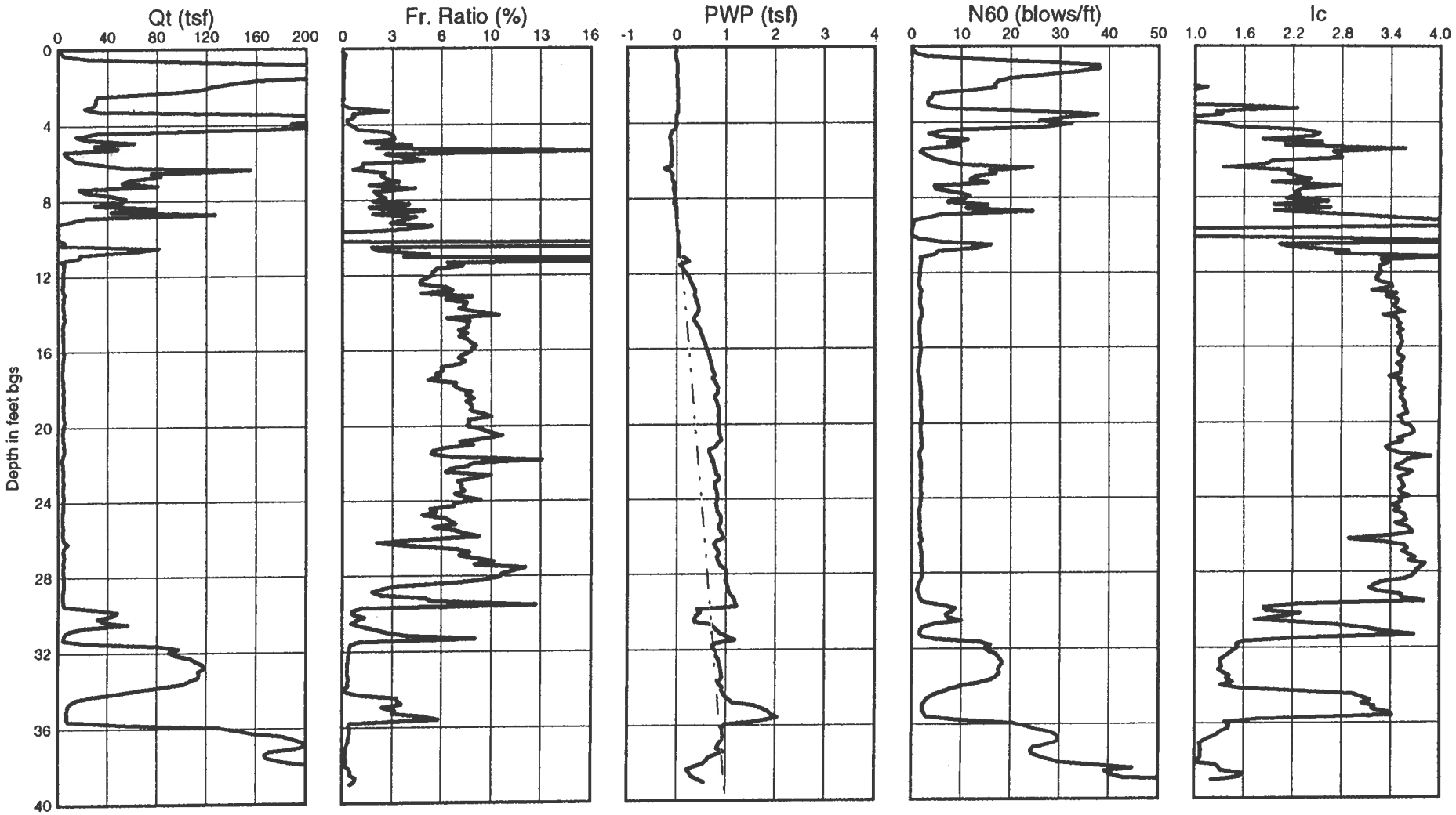
Drilling method: *HSA/Mud Rotary* Hammer type: *Mechanical* Date drilled: *11 September 1995* Logged by: *HWB*

Cone Penetration Test - A12

Test Date : Sept 07, 1995
Location : Kenmore LakePointe Development

Operator : Northwest Cone Exploration

Ground Surf. Elev. : 23.30
Water Table Depth : 8.00



Qt normalized for
unequal end area effects

Fr Ratio = 100*F/(Qt-Sigmav)
Gamma = 120 pcf

After Jefferies and Davies (1993)

After Jefferies and Davies (1991)
Ic < 1.25 - Gravelly sands
1.25 <Ic < 1.90 - Clean to silty sand
1.90 <Ic < 2.54 - Silty sand to sandy silt
2.54 <Ic < 2.82 - Clayey silt to silt clay
2.82 <Ic < 3.22 - Clays

PROJECT NO. 11-10459-01 DATE: Sept. 8, 1995 DRAWN BY: Keith Brown

AGRA E & E, Inc.

PROJECT: Kenmore Lakepointe Development

W.O. 11-10459-00 BORING NO. A-13

Page 1 of 1

Location: 55' West of Pole & 18' South of Curb

Approximate ground surface elevation: 38 feet

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER
0	Sod over loose, moist, dark tan, silty, gravelly SAND to gravelly SAND with some silt and trace organics (Fill)			
5	Becoming mixed tan-brown, silty, gravelly SAND with scattered cobbles (Fill)		S-1	
10	Medium dense, moist to wet, slight orange mottling in orangish tan, fine to medium SAND with some silt and trace gravel		S-2	ATD
15	Loose, saturated, slight orange mottling in orangish tan, silty, fine SAND		S-3	
20	Interbedded stiff, wet, some orange mottling in tan, fine sandy SILT/SILT with some silty, fine SAND and medium dense, saturated, tan, silty, fine SAND		S-4	
25	Boring terminated at approximately 21.5 feet			
30				

PENETRATION RESISTANCE

▲ Standard △ Other

Blows per foot: 0, 10, 20, 30, 40, 50

TESTING

MOISTURE CONTENT: 0, 20, 40, 60, 80, 100

Plastic limit — Natural — Liquid limit

LEGEND

- 2.00-inch OD split-spoon sample
- Sample not recovered
- ATD — Groundwater level at time of drilling
- 3.00-inch OD Shelby tube sample

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling method: HSA Hammer type: Cathead Date drilled: 18 October 1995 Logged by: HWB

AGRA Earth and Environmental, Inc.

PROJECT: *Kenmore Lakepointe Development*

W.O. *11-10459-00*

BORING NO. *A-14*

Page 1 of 1

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER
	Location: *45' East of Sanitary Sewer in Bottom of Ditch*			
	Approximate ground surface elevation: *32 feet*			
0	*Sod over loose, damp to moist, gray, PEA GRAVEL with trace sand and silt (Fill)*			
5	*Loose, moist, tan, gravelly, fine to medium SAND with some silt and scattered cobbles and orgainics (Fill)*		S-1	
10	*Medium dense, moist to wet, tan, silty, fine SAND with trace to some gravel and medium sand*		S-2	ATD
	Becoming wet to saturated			
15	*Slight orange mottling*		S-3	
20	*Stiff, wet, gray, SILT with interbeds of sandy SILT and medium dense, wet to saturated, silty, fine SAND*		S-4	
25	*Boring terminated at approximately 21.5 feet*			
30				

PENETRATION RESISTANCE

▲ Standard △ Other

Blows per foot: 0, 10, 20, 30, 40, 50

TESTING

MOISTURE CONTENT: 0, 20, 40, 60, 80, 100

Plastic limit — Natural — Liquid limit

LEGEND

- 2.00-inch OD split-spoon sample
- Sample not recovered
- ATD — Groundwater level at time of drilling
- 3.00-inch OD Shelby tube sample

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

AGRA Earth and Environmental, Inc.

Drilling method: *HSA* Hammer type: *Cathead* Date drilled: *18 October 1995* Logged by: *HWB*

PROJECT: Kenmore Lakepointe Development

W.O. 11-10459-00 BORING NO. A-16

Location: Halfway between Wharf and Storage Container

Approximate ground surface elevation: 21 feet

Page 1 of 3

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER
0	2" to 3" of Broken Concrete over 2" to 4" Angular Rock with a silty sand matrix			
	Medium dense, moist, greenish gray, silty, sandy GRAVEL (Fill)			
	Loose to medium dense, moist, dark brown, gravelly, silty SAND with organics (Fill)			
5			S-1	ATD
	Very soft to soft, wet to saturated, brown, fibrous to amorphous PEAT with debris (wood, brick, wire, metal, concrete, etc.) (Wood Debris Fill)			
10			S-2	
15			S-3	
20			S-4	
	Medium dense, saturated, tannish gray, silty, gravelly SAND to sandy GRAVEL with some silt			
25			S-5	
30	(continued)			

PENETRATION RESISTANCE

▲ Standard Blows per foot △ Other

0 10 20 30 40 50

TESTING

0 20 40 60 80 100

MOISTURE CONTENT

Plastic limit Natural Liquid limit

LEGEND

- 2.00-inch OD split-spoon sample
- Sample not recovered
- ATD Groundwater level at time of drilling
- 3.00-inch OD Shelby tube sample

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling method: HSA/Mud Rotary Hammer type: Mechanical Date drilled: 13 September 1995 Logged by: HWB

AGRA Earth and Environmental, Inc.

Kenmore Lakepointe

PROJECT: Development W.O. 11-10459-00 BORING NO. A-16

Page 2 of 3

Location: Halfway between Wharf and Storage Container

Approximate ground surface elevation: 24 feet

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER
30	Stiff, wet, mottled yellowish tan, SILT with trace to some very fine sands		S-6	
	Medium dense, wet to saturated, bluish gray, silty, very fine SAND			
35	Grading to very fine sandy SILT		S-7	
	Grading to silty, very fine SAND			
40			S-8	
45			S-9	
50	Interbedded stiff/medium dense, wet to saturated, mottled orange-tan, very fine sandy SILT/silty, very fine SAND		S-10	
	Medium dense, saturated, tannish gray, gravelly SAND with some silt			
55			S-11	
	Dense, saturated, gray, medium SAND with trace to some gravel and silt			
60	(continued)			

PENETRATION RESISTANCE

▲ Standard Blows per foot △ Other

0 10 20 30 40 50

TESTING

0 20 40 60 80 100

MOISTURE CONTENT

Plastic limit — Natural — Liquid limit

LEGEND

- 2.00-inch OD split-spoon sample
- Sample not recovered
- ATD Groundwater level at time of drilling
- 3.00-inch OD Shelby tube sample

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling method: HSA/Mud Rotary Hammer type: Mechanical Date drilled: 13 September 1995 Logged by: HWB

AGRA Earth and Environmental, Inc.

PROJECT: Kenmore Lakepointe Development W.O. 11-10459-00 BORING NO. A-16

Page 3 of 3

Location: Halfway between Wharf and Storage Container

Approximate ground surface elevation: 24 feet

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER	PENETRATION RESISTANCE (▲ Standard, △ Other; Blows per foot: 0, 10, 20, 30, 40, 50)	TESTING
60	Dense, saturated, bluish gray, silty SAND with trace gravel		S-12			
65	Medium dense, saturated, gray, GRAVEL with some sand and trace silt to sandy GRAVEL with trace silt		S-13			
70	Very dense, saturated, gray, sandy GRAVEL with some silt		S-14		50/3"	
	Boring terminated at approximately 71 feet. Switched to mud rotary at 55 feet.					
75						
80						
85						
90						

MOISTURE CONTENT: 0, 20, 40, 60, 80, 100

Plastic limit — Natural — Liquid limit

LEGEND

- 2.00-inch OD split-spoon sample
- X Sample not recovered
- ATD Groundwater level at time of drilling
- 3.00-inch OD Shelby tube sample

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling method: HSA/Mud Rotary Hammer type: Mechanical Date drilled: 13 September 1995 Logged by: HWB

AGRA Earth and Environmental, Inc.

PROJECT: Kenmore Lakepointe Development

W.O. 11-10459-00 BORING NO. A-17

Page 1 of 2

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER
	Location: 30' NE from Ecology Block Wall Approximate ground surface elevation: 25.5 feet			
0	4" Broken Concrete over medium dense, moist, silty, gravelly SAND with 2" to 4" Angular Rock and trace organics (Fill)			
	Loose to medium dense, wet, blackish gray, silty SAND with some gravel matrix and wood debris (brick, wire, concrete, etc.) (Wood Debris Fill)			
5			S-1	
10	Soft to medium stiff, wet, blackish brown -dark brown, fibrous to amorphous PEAT with wood debris (Fill)		S-2	
15			S-3	ATD
20			S-4	
25	Very soft, wet to saturated, blackish brown-brown, fibrous to amorphous PEAT		S-5	
30	(continued)			

PENETRATION RESISTANCE

▲ Standard △ Other

Blows per foot: 0, 10, 20, 30, 40, 50

TESTING

MOISTURE CONTENT: 0, 20, 40, 60, 80, 100

Plastic limit — Natural — Liquid limit

LEGEND

- 2.00-inch OD split-spoon sample
- Sample not recovered
- ATD — Groundwater level at time of drilling
- 3.00-inch OD Shelby tube sample

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling method: HSA/Mud Rotary Hammer type: Mechanical Date drilled: 08 September 1995 Logged by: HWB

AGRA Earth and Environmental, Inc.

PROJECT: Kenmore Lakepointe Development

W.O. 11-10459-00 BORING NO. A-17

Page 2 of 2

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER
	Location: 30' NE from Ecology Block Wall Approximate ground surface elevation: 25.5 feet			
30	Very soft, wet to saturated, blackish brown-brown, fibrous to amorphous PEAT (As Above)		S-6	
	Soft, wet, dark gray, sandy SILT with organics			
	Medium dense, saturated, greenish gray, silty, sandy GRAVEL to sandy GRAVEL with some silt			
35			S-7	
40	Very stiff, wet, greenish gray, SILT with some clay and silty sand lens at 41.1 to 41.3 feet		S-8	
	Boring terminated at approximately 41.5 feet			
45				
50				
55				
60				

PENETRATION RESISTANCE

▲ Standard △ Other

Blows per foot: 0, 10, 20, 30, 40, 50

TESTING

MOISTURE CONTENT: 0, 20, 40, 60, 80, 100

Plastic limit — Natural — Liquid limit

LEGEND

- 2.00-inch OD split-spoon sample
- Sample not recovered
- ATD — Groundwater level at time of drilling
- 3.00-inch OD Shelby tube sample

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

AGRA Earth and Environmental, Inc.

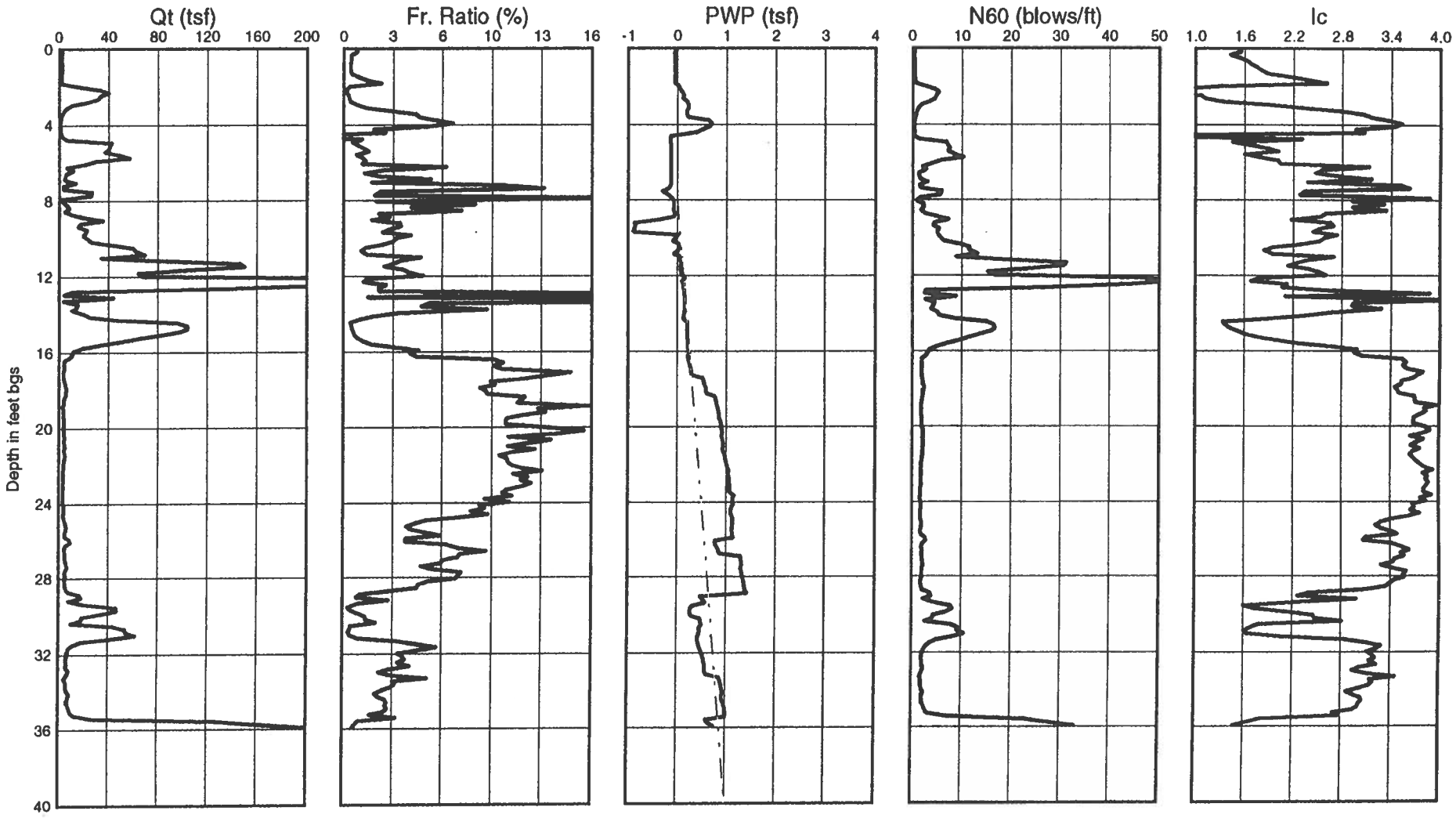
Drilling method: HSA/Mud Rotary Hammer type: Mechanical Date drilled: 08 September 1995 Logged by: HWB

Cone Penetration Test - A18

Test Date : Sept 08, 1995
Location : Kenmore LakePointe Development

Operator : Northwest Cone Exploration

Ground Surf. Elev. : 25.00
Water Table Depth : 8.00



Qt normalized for
unequal end area effects

Fr Ratio = 100*Ff/(Qt-Sigmav)
Gamma = 120 pcf

After Jefferies and Davies (1993)

After Jefferies and Davies (1991)
Ic < 1.25 - Gravelly sands
1.25 <Ic < 1.90 - Clean to silty sand
1.90 <Ic < 2.54 - Silty sand to sandy silt
2.54 <Ic < 2.82 - Clayey silt to silt clay
2.82 <Ic < 3.22 - Clays

PROJECT NO. 11-10459-01 DATE: Sept. 8, 1995 DRAWN BY: Keith Brown

AGRA E & E, Inc.

Kenmore Lakepointe

PROJECT: Development W.O. 11-10459-00 BORING NO. A-19

Page 1 of 2

Location: 5' N & 15' NE from Corner of Ecology Block Wall

Approximate ground surface elevation: 24 feet

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER
0	Loose, damp to moist, brown, silty SAND with some gravels, quarry spalls and organics (Fill)			
	Very loose to loose, moist to wet, blackish gray to blackish brown, silty SAND with some gravels and debris (wood, plastic, concrete, wire, etc.) (Wood Debris Fill)			
5			S-1	
				ATD
	Becoming wet to saturated			
10			S-2	
	Wood log 14 to 15 feet			
15	Very soft, wet to saturtaed, brown, fibrous to amorphous PEAT		S-3	
			S-4	
20			S-5	
	Very soft, wet, brown, organic SILT with some clay and interbeds of PEAT			
25			S-6	
	Very soft, wet to saturated, brown, fibrous to amorphous PEAT			
	Medium dense, saturated, tannish gray, sandy GRAVEL with some silt (continued)			
30				

PENETRATION RESISTANCE

▲ Standard △ Other

Blows per foot: 0, 10, 20, 30, 40, 50

Blowcount Overstated wood in shoe

TESTING

MOISTURE CONTENT

0, 20, 40, 60, 80, 100

Plastic limit — Natural — Liquid limit

LEGEND

- 2.00-inch OD split-spoon sample
- Sample not recovered
- ATD — Groundwater level at time of drilling
- 3.00-inch OD Shelby tube sample

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

AGRA Earth and Environmental, Inc.

Drilling method: HSA/Mud Rotary Hammer type: Mechanical Date drilled: 07 September 1995 Logged by: HWB

PROJECT: Kenmore Lakepointe Development

W.O. 11-10459-00 BORING NO. A-19

Page 2 of 2

SOIL DESCRIPTION

Location: 5' N & 15" NE from Corner of Ecology Block Wall

Approximate ground surface elevation: 24 feet

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER
30	Medium dense, saturated, tannish gray, sandy GRAVEL with some silt (As Above)		S-7	
35	Medium dense to dense, saturated, light gray, fine to medium SAND with some silt to silty, fine to medium SAND		S-8	
40	Very dense, saturated, greenish gray, silty, sandy GRAVEL		S-9	
45	Dense, saturated, tannish gray to gray, sandy GRAVEL to gravelly SAND with trace to some silt		S-10	
50			S-11	
55	Boring terminated at approximately 51.5 feet. Switched to mud rotary at 20 feet.			
60				

PENETRATION RESISTANCE

▲ Standard △ Other

Blows per foot: 0, 10, 20, 30, 40, 50

77

TESTING

MOISTURE CONTENT

0, 20, 40, 60, 80, 100

Plastic limit — Natural — Liquid limit

LEGEND

- 2.00-inch OD split-spoon sample
- Sample not recovered
- ATD — Groundwater level at time of drilling
- 3.00-inch OD Shelby tube sample

AGRA Earth & Environmental

11335 NE 122nd Way, Suite 100

Kirkland, Washington 98034-6918

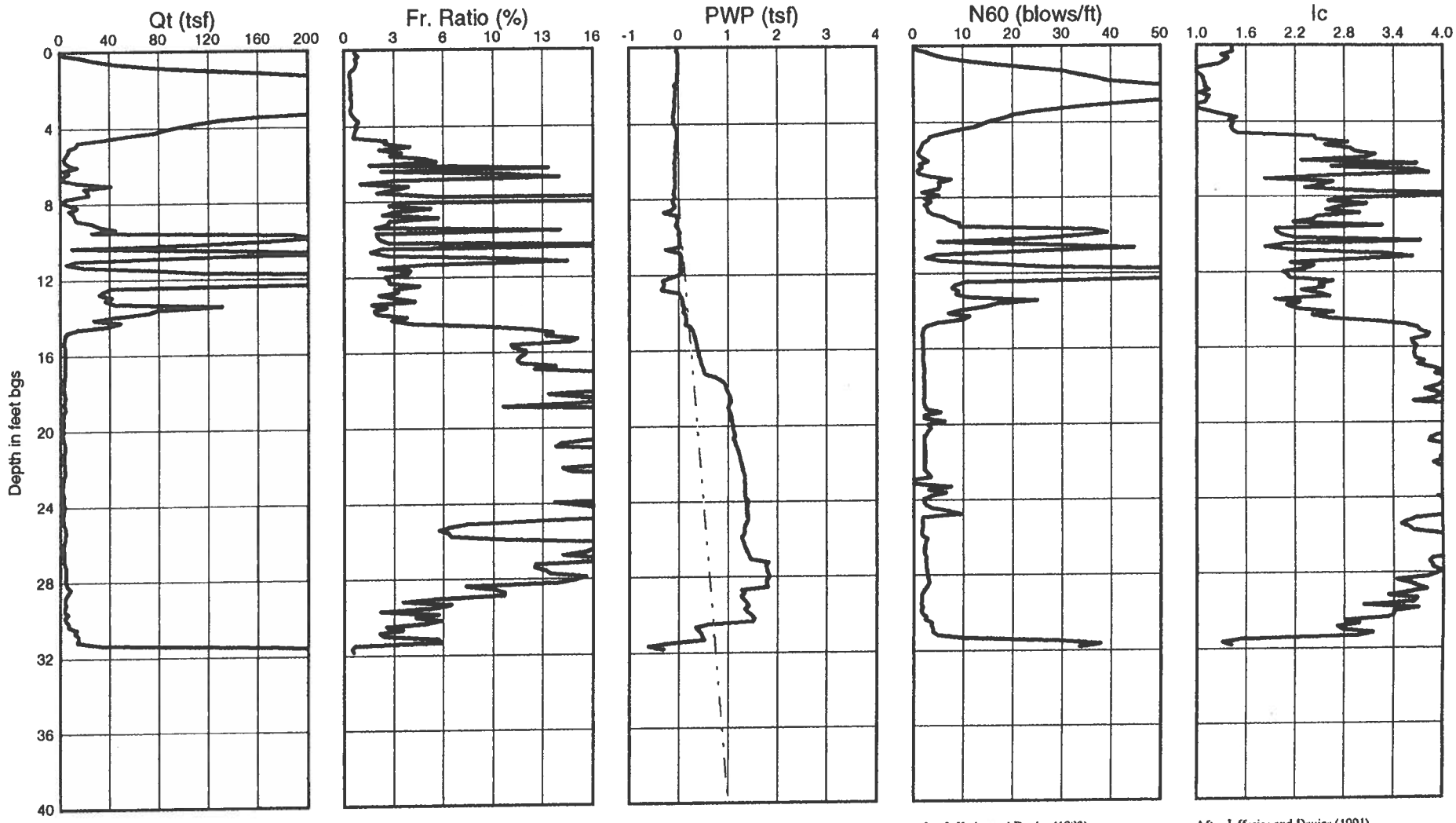
Drilling method: HSA/Mud Rotary Hammer type: Mechanical Date drilled: 07 September 1995 Logged by: HWB

Cone Penetration Test - A20

Test Date : Sept 07, 1995
Location : Kenmore LakePointe Development

Operator : Northwest Cone Exploration

Ground Surf. Elev. : 23.80
Water Table Depth : 8.00



Qt normalized for
unequal end area effects

Fr Ratio = 100*F/(Qt-Sigmav)
Gamma = 120 pcf

After Jefferies and Davies (1993)

After Jefferies and Davies (1991)
Ic < 1.25 - Gravelly sands
1.25 <Ic < 1.90 - Clean to silty sand
1.90 <Ic < 2.54 - Silty sand to sandy silt
2.54 <Ic < 2.82 - Clayey silt to silt clay
2.82 <Ic < 3.22 - Clays

PROJECT NO. 11-10459-01 DATE: Sept. 8, 1995 DRAWN BY: Keith Brown

AGRA E & E, Inc.

PROJECT: Kenmore Lakepointe Development W.O. 11-10459-00 BORING NO. A-21

Location: 75' SW of SW Corner of Asphalt Pad
Approximate ground surface elevation: 26.5 feet

Page 1 of 3

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER
0	Medium dense to dense, damp, tan, silty SAND matrix around 2" to 4" Angular Rock (Fill)			
	Loose to medium dense, moist to wet, blackish brown-brown-tan, silty, sandy matrix with some gravel in debris fill (wood, brick, metal, wire, concrete, etc.) (Wood Debris Fill)			
5			S-1	
10	Becoming wet to saturated		S-2	ATD
15			S-3	
	Very soft to soft, wet to saturated, brown, fibrous to amorphous PEAT			
20			S-4	
25			S-5	
	Very loose, saturated, gray, silty, very fine SAND			
	Soft, wet, gray, clayey SILT		S-6	
	(continued)			
30				

PENETRATION RESISTANCE
▲ Standard △ Other
Blows per foot
0 10 20 30 40 50

TESTING

MOISTURE CONTENT
0 20 40 60 80 100
Plastic limit Natural Liquid limit

LEGEND

- 2.00-inch OD split-spoon sample
- Sample not recovered
- ATD Groundwater level at time of drilling
- 3.00-inch OD Shelby tube sample

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling method: HSA/Mud Rotary Hammer type: Mechanical Date drilled: 08 September 1995 Logged by: HWB

PROJECT: Kenmore Lakepointe Development W.O. 11-10459-00 BORING NO. A-21

Page 2 of 3

Location: 75' SW of SW Corner of Asphalt Pad
Approximate ground surface elevation: 26.5 feet

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER
30	Very loose, saturated, gray, silty, fine to medium SAND		S-7	
35	Interbedded soft, wet, brown PEAT with soft to medium stiff, wet, clayey SILT, loose, saturated, gray, coarse SAND with trace silt and loose, saturated, blackish gray, silty, fine SAND with some medium and coarse sand and organics (Heave?)		S-8	
40	Dense, saturated, greenish gray, silty, sandy GRAVEL		S-9	
45	Grading to a gray, medium SAND with some gravel and silt		S-10	
50	Dense, saturated, gray, medium SAND with trace to some silt and trace gravel		S-11	
55			S-12	
60	(continued)			

PENETRATION RESISTANCE
Standard ▲ Other △
Blows per foot
0 10 20 30 40 50

TESTING

0 20 40 60 80 100
MOISTURE CONTENT
Plastic limit Natural Liquid limit

LEGEND

- 2.00-inch OD split-spoon sample
- Sample not recovered
- ATD Groundwater level at time of drilling
- 3.00-inch OD Shelby tube sample

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling method: HSA/Mud Rotary Hammer type: Mechanical Date drilled: 08 September 1995 Logged by: HWB

AGRA Earth and Environmental, Inc.

PROJECT: *Kenmore Lakepointe Development*

W.O. *11-10459-00*

BORING NO. *A-21*

SOIL DESCRIPTION

Location: *75' SW of SW Corner of Asphalt Pad*

Approximate ground surface elevation: *26.5 feet*

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER	PENETRATION RESISTANCE (▲ Standard, △ Other; Blows per foot: 0, 10, 20, 30, 40, 50)	TESTING
60	*Dense, saturated, gray, gravelly SAND/sandy GRAVEL with trace to some silt*		S-12			
65	*Silty lens in tip of sampler shoe*		S-13			
	Boring terminated at approximately 66.5 feet. Switched to mud rotary at 50 feet.					
70						
75						
80						
85						
90						

MOISTURE CONTENT: 0, 20, 40, 60, 80, 100

Plastic limit — Natural — Liquid limit

LEGEND

- 2.00-inch OD split-spoon sample
- Sample not recovered
- ATD — Groundwater level at time of drilling
- 3.00-inch OD Shelby tube sample

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling method: *HSA/Mud Rotary* Hammer type: *Mechanical* Date drilled: *08 September 1995* Logged by: *HWB*

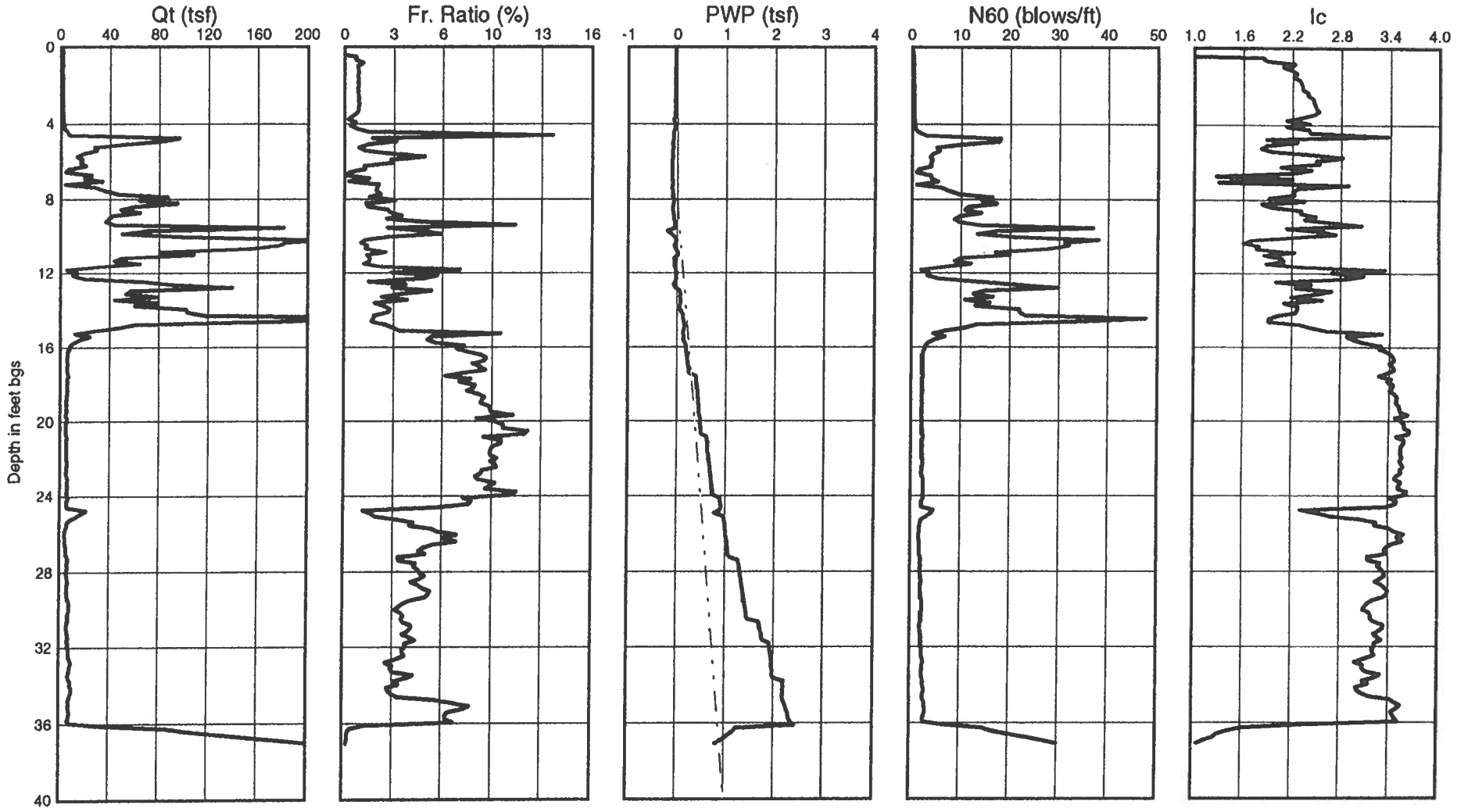
AGRA Earth and Environmental, Inc.

Cone Penetration Test - A22

Test Date : Sept 08, 1995
Location : Kenmore LakePointe Development

Operator : Northwest Cone Exploration

Ground Surf. Elev. : 27.30
Water Table Depth : 8.00



Qt normalized for unequal end area effects

Fr Ratio = 100*F/(Qt-Sigmav)
Gamma = 120 pcf

After Jefferies and Davies (1993)

After Jefferies and Davies (1991)
Ic < 1.25 - Gravelly sands
1.25 <Ic < 1.90 - Clean to silty sand
1.90 <Ic < 2.54 - Silty sand to sandy silt
2.54 <Ic < 2.82 - Clayey silt to silt clay
2.82 <Ic < 3.22 - Clays

PROJECT NO. 11-10459-01 DATE: Sept. 8, 1995 DRAWN BY: Keith Brown

AGRA E & E, Inc.

PROJECT: Kenmore Lakepointe Development

W.O. 11-10459-00 BORING NO. A-23

Page 1 of 2

Location: 7' N & 36' W from Fence Corner

Approximate ground surface elevation: 27 feet

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER
0	Medium dense, damp, tan, GRAVEL and ROCK with silty sand matrix			
	Loose to medium dense, moist to wet, blackish tan, brown, silty sand matrix with some gravel in debris fill (concrete, wood, brick, metal, wire, etc.) (Wood Debris Fill)			
5			S-1	
10	Becoming wet to saturated		S-2	ATD
15	Very soft, wet to saturated, brown with some blackish brown, fibrous to amorphous PEAT with some organic silt		S-3	
20			S-4	
25	Very soft, wet, gray, clayey SILT/SILT with some clay and trace organics		S-5	
			S-6	
30	(continued)			

PENETRATION RESISTANCE

▲ Standard △ Other

Blows per foot: 0, 10, 20, 30, 40, 50

TESTING

225 — In-place Density 53 pcf

MOISTURE CONTENT: 0, 20, 40, 60, 80, 100

Plastic limit — Natural — Liquid limit

LEGEND

- 2.00-inch OD split-spoon sample
- X — Sample not recovered
- ATD — Groundwater level at time of drilling
- 3.00-inch OD Shelby tube sample

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

AGRA Earth and Environmental, Inc.

Drilling method: HSA/Mud Rotary Hammer type: Mechanical Date drilled: 12 September 1995 Logged by: HWB

Kenmore Lakepointe

PROJECT: Development W.O. 11-10459-00 BORING NO. A-23

Page 2 of 2

Location: 7' N & 36' W from Fence Corner

Approximate ground surface elevation: 27 feet

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER
30	Soft to medium stiff, wet, gray, clayey SILT to SILT with some clay		S-7	
	Interbedded loose, saturated, gray, fine to medium SAND with some silt and medium stiff, wet, gray, SILT with some fine sand with a silty, fine sand lens		S-8	
35	Medium dense, saturated, gray, gravelly SAND with trace to some silt		S-9	
40	Dense, saturated, greenish gray, sandy GRAVEL with some silt to silty, sandy GRAVEL		S-10	
45	Very dense, saturated, greenish gray, cobbly GRAVELS with silty sand matrix		S-11	
	Boring terminated at approximately 46.5 feet. Switch to mud rotary at 40 feet.			
50				
55				
60				

PENETRATION RESISTANCE

▲ Standard △ Other

Blows per foot: 0, 10, 20, 30, 40, 50

50/6"

TESTING

MOISTURE CONTENT

0, 20, 40, 60, 80, 100

Plastic limit — Natural — Liquid limit

LEGEND

- 2.00-inch OD split-spoon sample
- Sample not recovered
- ATD Groundwater level at time of drilling
- 3.00-inch OD Shelby tube sample

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

AGRA Earth and Environmental, Inc.

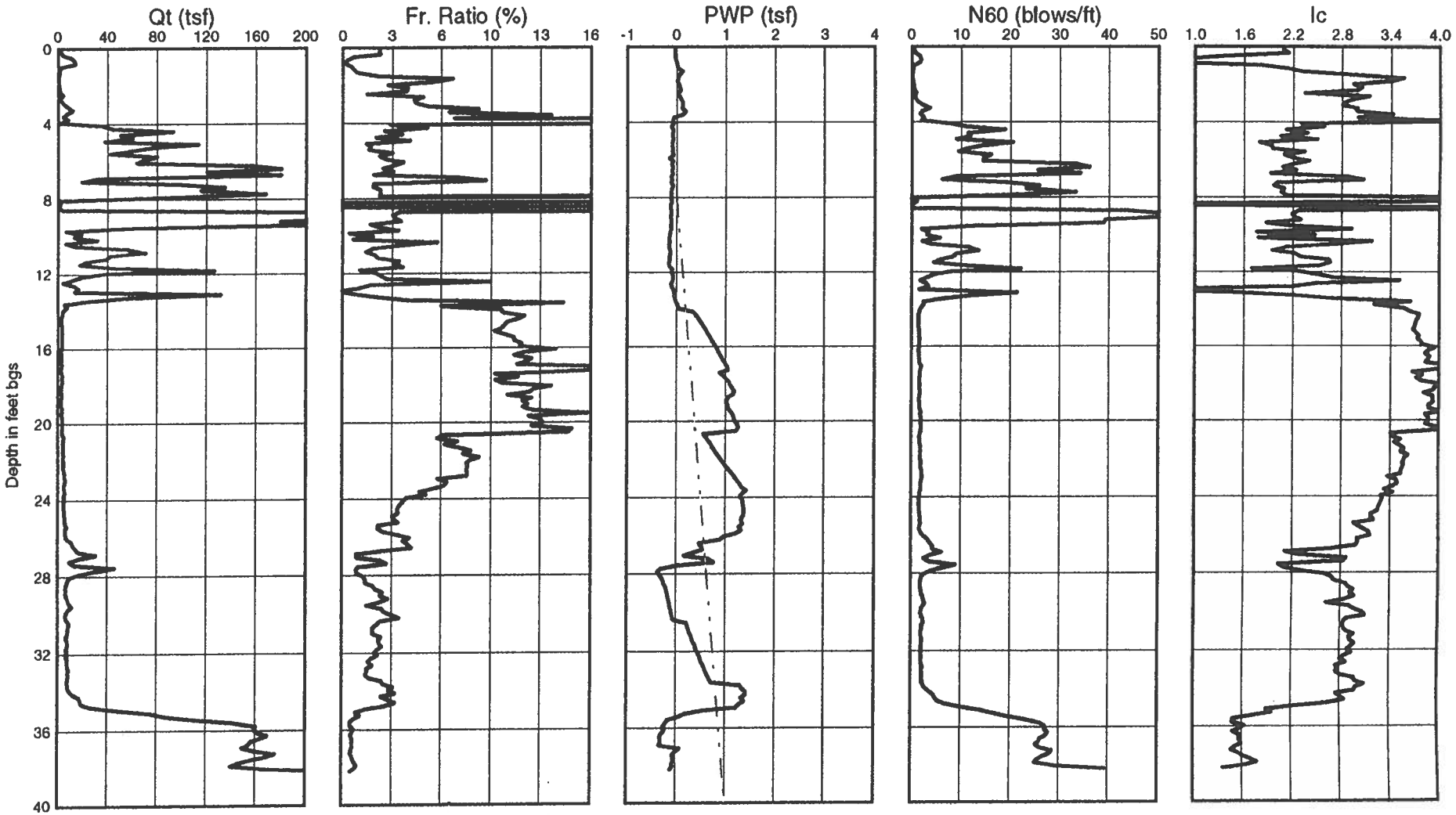
Drilling method: HSA/Mud Rotary Hammer type: Mechanical Date drilled: 12 September 1995 Logged by: HWB

Cone Penetration Test - A24

Test Date : Sep 06, 1995
Location : Kenmore LakePointe Development

Operator : Northwest Cone Exploration

Ground Surf. Elev. : 28.90
Water Table Depth : 8.00



Qt normalized for
unequal end area effects

Fr Ratio = 100*Fr/(Qt-Sigmav)
Gamma = 120 pcf

After Jefferies and Davies (1993)

After Jefferies and Davies (1991)
Ic < 1.25 - Gravelly sands
1.25 <Ic < 1.90 - Clean to silty sand
1.90 <Ic < 2.54 - Silty sand to sandy silt
2.54 <Ic < 2.82 - Clayey silt to silt clay
2.82 <Ic < 3.22 - Clays

PROJECT NO. 11-10459-01 DATE: Sept. 8, 1995 DRAWN BY: Keith Brown

AGRA E & E, Inc.

Kenmore Lakepointe

PROJECT: Development W.O. 11-10459-00 BORING NO. A-25

Page 2 of 3

Location: 35' S & 15' W of SW Corner of Structure

Approximate ground surface elevation: 29.5 feet

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER
30	Very soft to soft, wet to saturated, blackish brown, amorphous PEAT to fibrous PEAT		S-7	
	Interbeds of very loose, saturated, gray, silty, fine SAND at 31.5 feet			
	Very soft to soft, wet, bluish gray, clayey SILT/silty CLAY with trace very fine sand and organics			
35			S-8	
	Soft, wet, bluish gray, very fine sandy SILT with trace organics			
40	Volcanic ash layer at 40.5 feet		S-9	
	Dense to very dense, saturated, gray, sandy GRAVEL with trace to some silt			
45			S-10	
	Loose/stiff, wet to saturated, bluish gray, silty, fine SAND/very fine sandy SILT with scattered organics			
50			S-11	
	Grading into medium dense, saturated, gray, silty, fine SAND			
55			S-12	
	Medium dense, saturated, light gray, fine to medium SAND with some silt and trace gravel			
	(continued)			
60				

PENETRATION RESISTANCE

▲ Standard △ Other

Blows per foot: 0, 10, 20, 30, 40, 50

Blowcount may be Overstated due to gravels: 52

TESTING

MOISTURE CONTENT: 0, 20, 40, 60, 80, 100

Plastic limit — Natural — Liquid limit

LEGEND

- 2.00-inch OD split-spoon sample
- X Sample not recovered
- ATD Groundwater level at time of drilling
- 3.00-inch OD Shelby tube sample

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling method: HSA/Mud Rotary Hammer type: Mechanical Date drilled: 06 September 1995 Logged by: HWB

AGRA Earth and Environmental, Inc.

Kenmore Lakepointe

PROJECT: Development W.O. 11-10459-00 BORING NO. A-25

Page 3 of 3

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER	PENETRATION RESISTANCE (▲ Standard, △ Other; Blows per foot: 0, 10, 20, 30, 40, 50)	TESTING
60	Location: 35' S & 15' W of SW Corner of Structure Approximate ground surface elevation: 29.5 feet					
	Medium dense to dense, saturated, light gray, fine to medium SAND with some silt and trace gravel (As Above)		S-13			
	Hard, moist to wet, bluish gray, clayey SILT to SILT with some clay					
65			S-14		53	
	Very dense, wet to saturated, tan, gravelly SAND/sandy GRAVEL with some silt					
70	Grades to dense, sandy GRAVEL		S-15			
	Boring terminated at approximately 71.5 feet. Switched to mud rotary at 65 feet.					
75						
80						
85						
90						

0 20 40 60 80 100

MOISTURE CONTENT

Plastic limit — Natural — Liquid limit

LEGEND

- 2.00-inch OD split-spoon sample
- Sample not recovered
- ATD Groundwater level at time of drilling
- 3.00-inch OD Shelby tube sample

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling method: HSA/Mud Rotary Hammer type: Mechanical Date drilled: 06 September 1995 Logged by: HWB

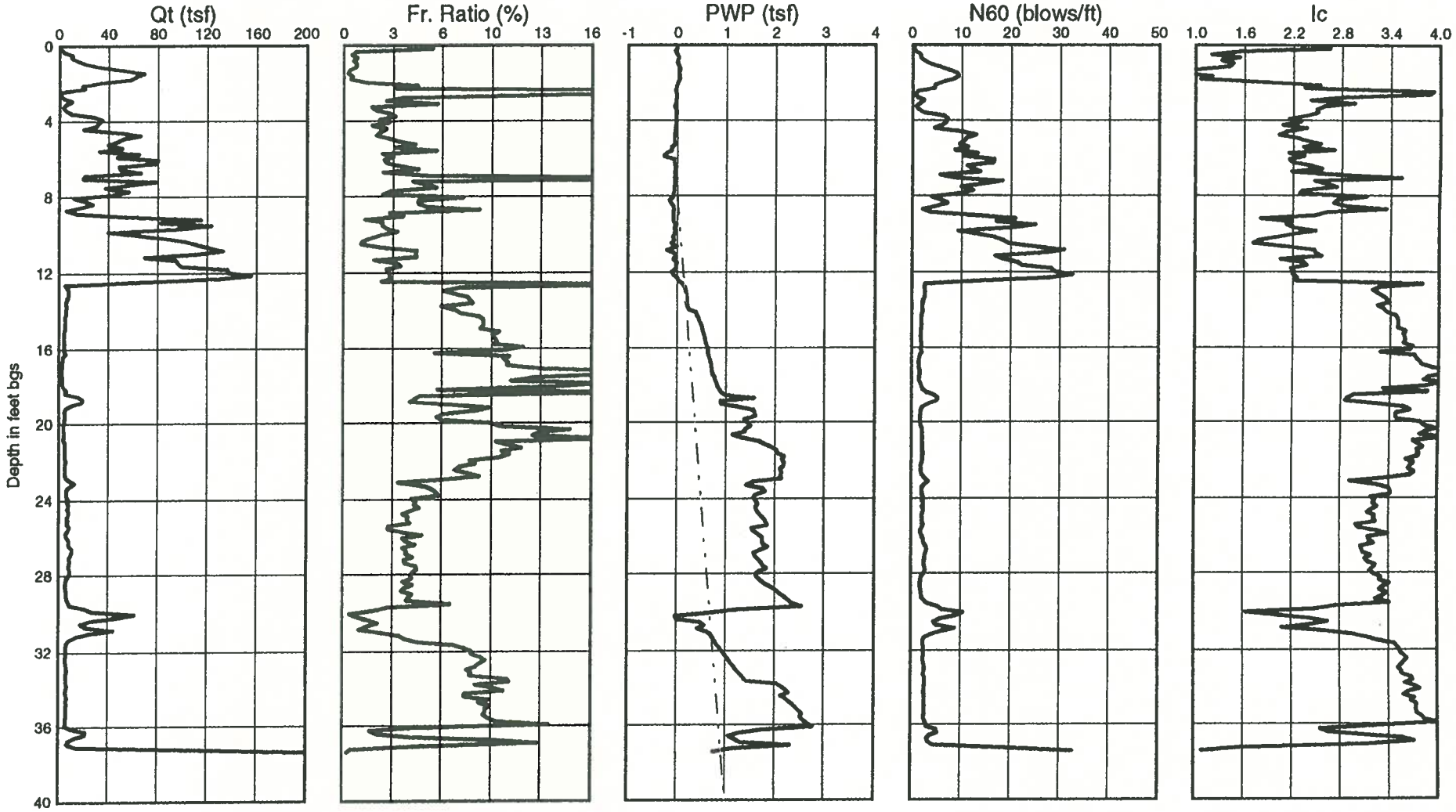
AGRA Earth and Environmental, Inc.

Cone Penetration Test - A26

Test Date : Sep 06, 1995
Location : Kenmore LakePointe Development

Operator : Northwest Cone Exploration

Ground Surf. Elev. : 28.00
Water Table Depth : 8.00



Qt normalized for
unequal end area effects

Fr Ratio = 100*F/(Qt-Sigmav)
Gamma = 120 pcf

After Jefferies and Davies (1993)

After Jefferies and Davies (1991)
Ic < 1.25 - Gravelly sands
1.25 <Ic < 1.90 - Clean to silty sand
1.90 <Ic < 2.54 - Silty sand to sandy silt
2.54 <Ic < 2.82 - Clayey silt to silt clay
2.82 <Ic < 3.22 - Clays

PROJECT NO. 11-10459-01 DATE: Sept. 8, 1995 DRAWN BY: Keith Brown

AGRA E & E, Inc.

PROJECT: Kenmore Lakepointe Development

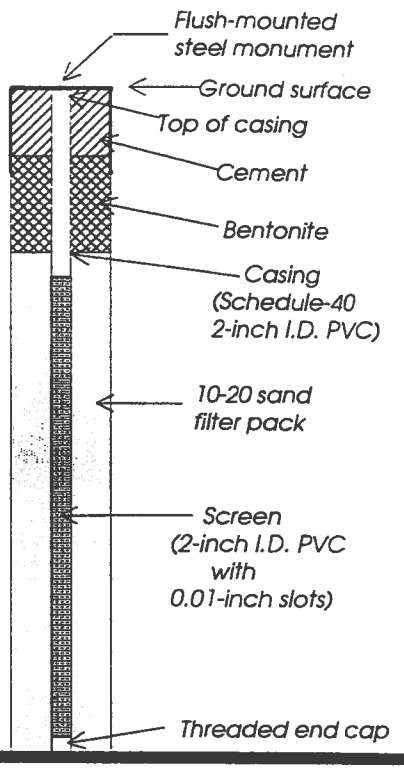
W.O. 11-10459-00 WELL NO. AW-1

Elevation reference: King County Datum NAD 1983
Ground surface elevation: 27 feet
Well completed: 22 September 1995
Casing elevation: 26.76 feet

AS-BUILT DESIGN

Page 1 of 1

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	OVM READING	GROUND WATER	TESTING
0	2" Asphalt over 2" Angular Base Course Loose, moist, dark brown, wood debris with 0-25% silty SAND (Wood Debris Fill)		S-1	5	0		
5	Soft to very soft, wet, dark gray, fine sandy, organic SILT with plant matter (no odor)		S-2	3	0	10/2/95	
			S-3	0	0		
10	Very stiff, wet, dark brown, peaty SILT with sand (no odor)		S-4	22	0		
	Very loose, moist, dark brown, peaty, fine SAND (no odor)		S-5	0	0		
15	Bottom of boring at 14 feet.						
20							
25							
30							



Unique Ecology Well No. ABN 249.

LEGEND

- 2-inch O.D. split-spoon sample
- Observed groundwater level 0/00/00 = date observed

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling started: 22 September 1995 Drilling completed: 22 September 1995 Logged by: DHG

AGRA Earth and Environmental, Inc.

Kenmore Lakepointe

PROJECT: Development

W.O. 11-10459-00 WELL NO. AW-2

Elevation reference: King County Datum NAD 1983

Ground surface elevation: 29 feet

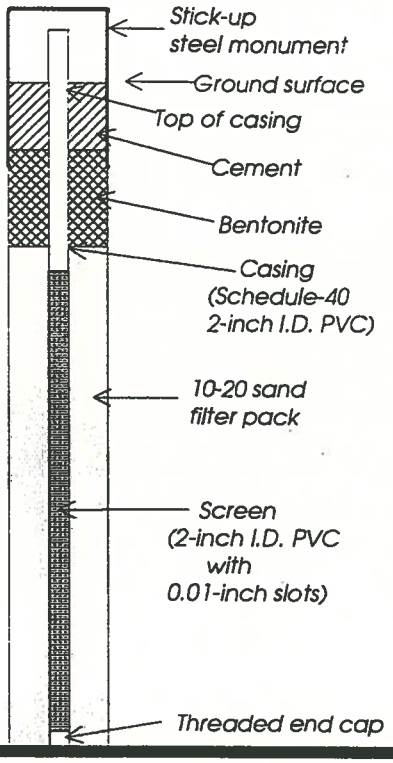
Well completed: 20 September 1995

Casing elevation: 31.32 feet

AS-BUILT DESIGN

Page 1 of 1

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	OVM READING	GROUND WATER
0	Very dense, damp to moist, gray, silty, sandy, angular GRAVEL (no odor) (Fill)		S-1	50/5"	0	
	Dense to very loose, wet to saturated, wood debris with 0-25% black, sandy, organic SILT (Wood Debris Fill)					
5			S-2	9	0	
	With brick fragments		S-3	32	0	
10			S-4	46	0	
	With angular gravel		S-5	4	0	10/2/95
15	Bottom of boring at 14 feet.					
20						
25						
30						



TESTING

Unique Ecology Well No. ABN 247.

LEGEND

2-inch O.D. split-spoon sample

Observed groundwater level 0/00/00 = date observed

AGRA Earth & Environmental

11335 NE 122nd Way, Suite 100

Kirkland, Washington 98034-6918

Drilling started: 20 September 1995

Drilling completed: 20 September 1995

Logged by: DHG

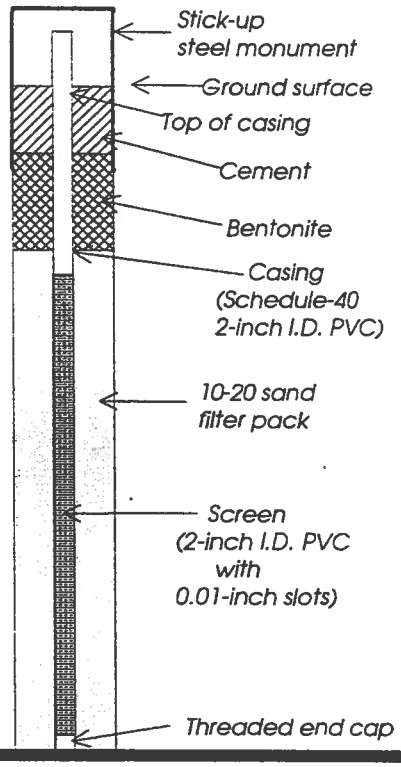
PROJECT: Kenmore Lakepointe Development

W.O. 11-10459-00 WELL NO. AW-3

Elevation reference: King County Datum NAD 1983
Ground surface elevation: 25.5 feet
Well completed: 19 September 1995
Casing elevation: 28.23 feet

AS-BUILT DESIGN

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	OVM READING	GROUND WATER
0	Medium dense, wet, white to gray, silty SAND with gravel, concrete wash (Fill)					
	Medium dense to very loose, wet to water-bearing, brown, wood debris with 0-50% gray, silty SAND with gravel (no odor) (Wood Debris Fill)		S-1	12	0	
5			S-2	3	0	
			S-3	1	0	
10						10/2/95
	Soft, wet, dark brown, amorphous PEAT (no odor)		S-4	10	0	
			S-5	2	0	
15	Bottom of boring at 14 feet.					
20						
25						
30						



Unique Ecology Well No. ABN 244.

TESTING

LEGEND

2-inch O.D. split-spoon sample

Observed groundwater level 0/00/00 = date observed

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling started: 19 September 1995 Drilling completed: 19 September 1995 Logged by: DHG

AGRA Earth and Environmental, Inc.

Kenmore Lakepointe

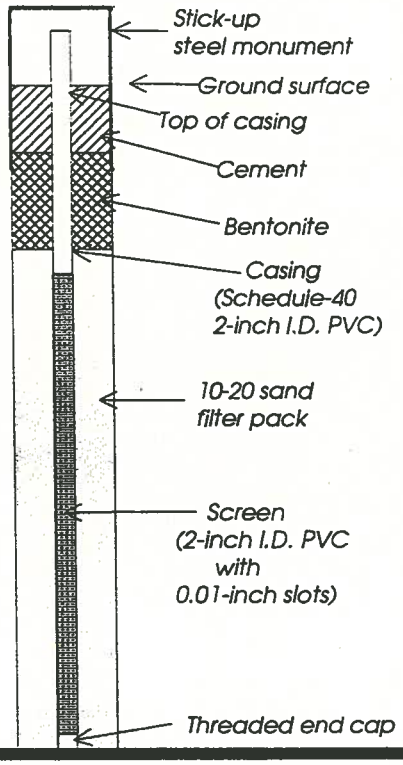
PROJECT: Development W.O. 11-10459-00 WELL NO. AW-4

Elevation reference: King County Datum NAD 1983
Ground surface elevation: 25 feet
Well completed: 19 September 1995
Casing elevation: 27.61 feet

Page 1 of 1

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	OVM READING	GROUND WATER
0	Medium dense, wet to damp, brown and gray mixed, silty, fine to medium SAND and fine GRAVEL with sand and silt (no odor) (Fill)		S-1	24	0	
5			S-2	10	0	
	Very loose to very dense, saturated, brown, wood debris with 0-25% silty SAND (no odor) (Wood Debris Fill)		S-3	1	0	
10			S-4	50/3"	0	10/2/95
			S-5	50/2"	0	
15	Bottom of boring at 14 feet.					
20						
25						
30						

AS-BUILT DESIGN



Unique Ecology Well No. ABN 243.

TESTING

LEGEND

2-inch O.D. split-spoon sample

Observed groundwater level 0/00/00 = date observed

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling started: 19 September 1995 Drilling completed: 19 September 1995 Logged by: DHG

AGRA Earth and Environmental, Inc.

Kenmore Lakepointe

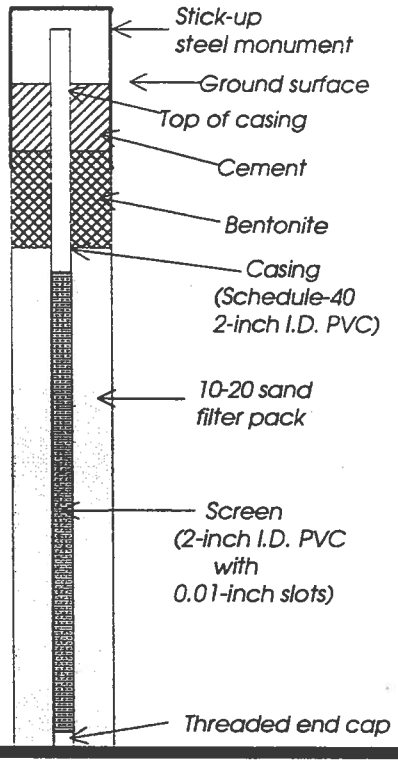
PROJECT: Development W.O. 11-10459-00 WELL NO. AW-5

Elevation reference: King County Datum NAD 1983
Ground surface elevation: 27 feet
Well completed: 19 September 1995
Casing elevation: 29.71 feet

AS-BUILT DESIGN

Page 1 of 1

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	OVM READING	GROUND WATER	TESTING
0	Very dense, moist, brown, silty, medium SAND with gravel and 50% wood debris (no odor) (Fill)		S-1	50/4"	0		
5	Loose to medium dense, wet to saturated, brown, wood debris with 0-25% silty SAND, brick and concrete fragments (creosote like odor) (Wood Debris Fill)		S-2	6	0		
			S-3	6	0		
10			S-4	16	0		
			S-5	6	0		
15	Bottom of boring at 14 feet.						
20							
25							
30							



Unique Ecology Well No. ABN 242.

LEGEND

2-inch O.D. split-spoon sample

Observed groundwater level 0/00/00 = date observed

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling started: 19 September 1995 Drilling completed: 19 September 1995 Logged by: DHG

AGRA Earth and Environmental, Inc.

Kenmore Lakepointe

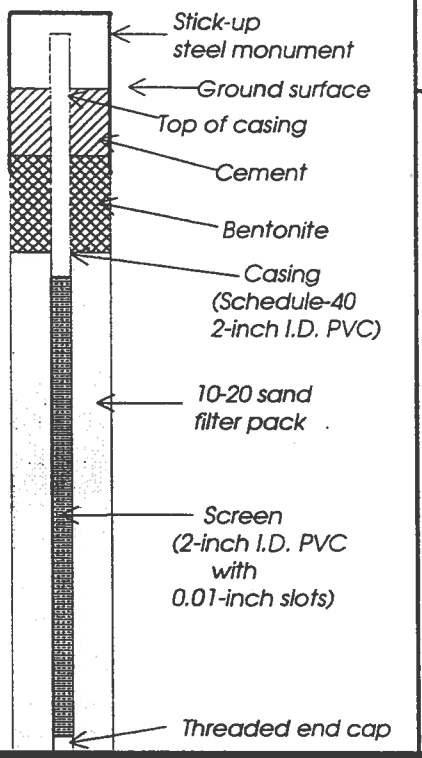
PROJECT: Development W.O. 11-10459-00 WELL NO. AW-6

Elevation reference: King County Datum NAD 1983 Well completed: 19 September 1995

Ground surface elevation: 26.5 feet Casing elevation: 28.46 feet

AS-BUILT DESIGN

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	OVM READING	GROUND WATER	TESTING
0	Loose, moist, tan, silty, gravelly SAND (Fill)						
	Loose, wet, brown, silty SAND with 50% wood debris (no odor) (Fill)		S-1	5	0		
5			S-2	3	0		
	Loose to very loose, saturated, brown, wood debris with 0-25% sandy SILT (no odor) (Wood Debris Fill)		S-3	0	0		
10			S-4	22	0	10/2/95	
			S-5	0	0		
15	Bottom of boring at 14 feet.						
20							
25							
30							



Unique Ecology Well No. ABN 241.

LEGEND

2-inch O.D. split-spoon sample

Observed groundwater level 0/00/00 = date observed

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling started: 19 September 1995 Drilling completed: 19 September 1995 Logged by: DHG

Kenmore Lakepointe

PROJECT: Development W.O. 11-10459-00 WELL NO. AW-7

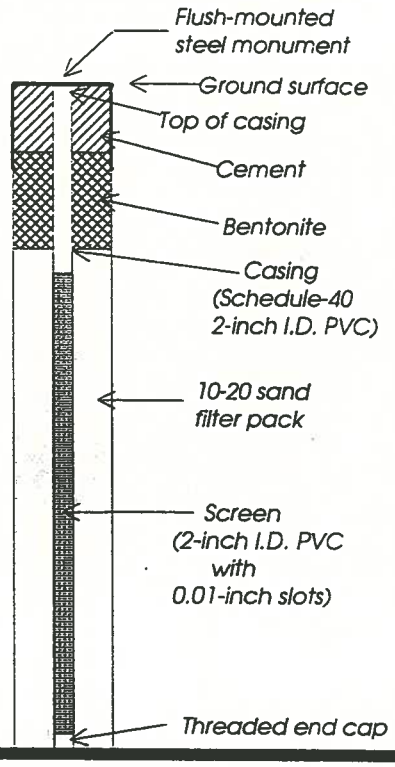
Elevation reference: King County Datum NAD 1983 | Well completed: 20 September 1995

Ground surface elevation: 25.5 feet | Casing elevation: 25.18 feet

Page 1 of 1

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	OVM READING	GROUND WATER
0	Medium dense, moist, tan, silty SAND with gravel (Fill)					
	Loose to very loose, wet to saturated, brown to black, wood debris with 0-25% black, silty SAND (no odor) (Wood Debris Fill)		S-1	8	0	
5			S-2	4	0	
						10/2/95
			S-3	6	0	
10			S-4	3	0	
	Very soft, wet, brown, amorphous PEAT (no odor)		S-5	0	0	
15	Bottom of boring at 14 feet.					
20						
25						
30						

AS-BUILT DESIGN



TESTING

Unique Ecology Well No. ABN 248.

LEGEND

2-inch O.D. split-spoon sample

Observed groundwater level 0/00/00 = date observed

AGRA Earth & Environmental

11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling started: 20 September 1995 Drilling completed: 20 September 1995 Logged by: DHG

AGRA Earth and Environmental, Inc.

Kenmore Lakepointe

PROJECT: Development

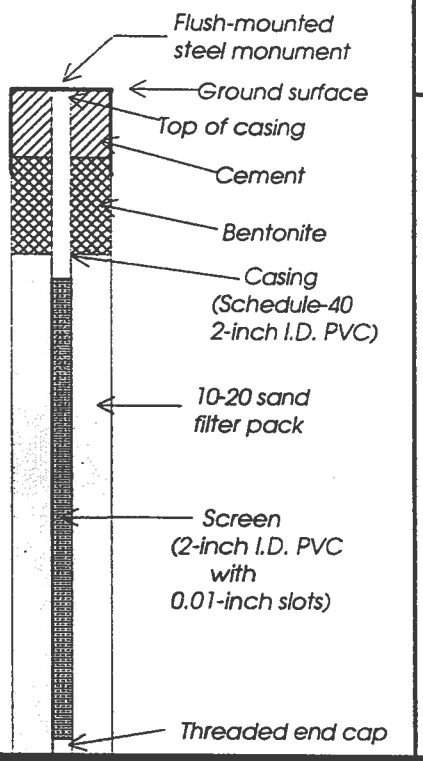
W.O. 11-10459-00 WELL NO. AW-8

Elevation reference: King County Datum NAD 1983
Ground surface elevation: 26 feet

Well completed: 20 September 1995
Casing elevation: 26.16 feet

AS-BUILT DESIGN

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	OVM READING	GROUND WATER
0	2" Asphalt over 2" Angular Base Course					
	Loose, moist, brown and gray, silty SAND with 50% wood debris (creosote like odor) (Fill)		S-1	7	0	
5	Loose to medium dense, wet to saturated, brown and black, wood debris with 25-50% silty GRAVEL and sandy, organic SILT (creosote like odor) (Wood Debris Fill)		S-2	10	0	
			S-3	12	0	10/2/95
10	With concrete washout		S-4	18	0	
			S-5	50/3"	0	
15	Bottom of boring at 14 feet.					
20						
25						
30						



Unique Ecology Well No. ABN 245.

TESTING

LEGEND

2-inch O.D. split-spoon sample

Observed groundwater level 0/00/00 = date observed

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling started: 20 September 1995 Drilling completed: 20 September 1995 Logged by: DHG

AGRA Earth and Environmental, Inc.

Kenmore Lakepointe

PROJECT: Development

W.O. 11-10459-00 WELL NO. AW-9

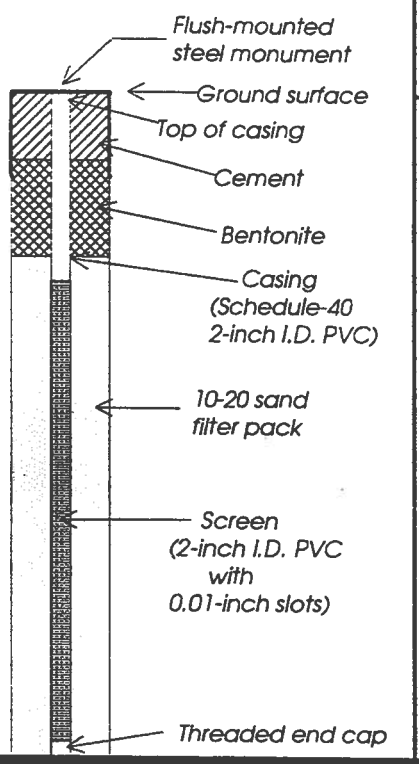
Elevation reference: King County Datum NAD 1983
Ground surface elevation: 30 feet

Well completed: 20 September 1995
Casing elevation: 30.22 feet

AS-BUILT DESIGN

Page 1 of 1

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	OVM READING	GROUND WATER
0	3" Asphalt over 2" Angular Base Course					
	Medium dense, damp, light brown, silty, medium SAND (no odor) (Fill)		S-1	15	0	
5	Loose to medium dense, wet to saturated, gravelly, fine to coarse SAND with some silt (no odor)		S-2	10	0	
			S-3	12	0	10/2/95
10			S-4	6	0	
	Very loose, saturated, red-tan, silty, fine SAND (no odor)		S-5	3	0	
15	Bottom of boring at 14 feet.					
20						
25						
30						



Unique Ecology Well No. ABN 246.

TESTING

LEGEND

2-inch O.D. split-spoon sample

Observed groundwater level
0/00/00 = date observed

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling started: 20 September 1995

Drilling completed: 20 September 1995

Logged by: DHG

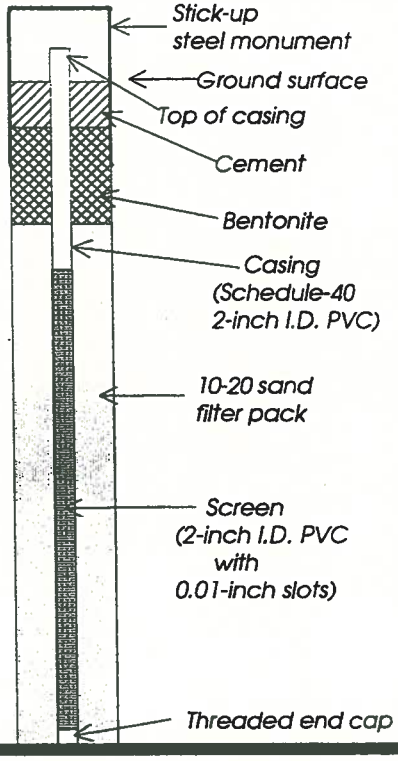
AGRA Earth and Environmental, Inc.

PROJECT: *Kenmore Lakepointe Development* W.O. *11-10459-00* WELL NO. *AW-10*

Elevation reference: *King County Datum NAD 1983*
Ground surface elevation: *27 feet*
Well completed: *27 February 1996*
Casing elevation: *31.12 feet*

AS-BUILT DESIGN

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	OVM READING	GROUND WATER	TESTING
0	*Very loose, wet, brown, silty, fine SAND with wood fragments (Fill)*						
			S-1	1	0		
5	*Loose to very loose, wet, brown to black, wood debris, 0-25% silty SAND with gravel (creosote-like odor) (Wood Debris Fill)*		S-2	9	0		
			S-3	22	0		
10			S-4	7	0		
			S-5	1	0	2/29/96	
15	*Bottom of boring at 14 feet.*						
20							
25							
30							



Unique Ecology Well No. ABN 297.

LEGEND

2-inch O.D. split-spoon sample

Observed groundwater level 0/00/00 = date observed

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling started: *27 February 1996* Drilling completed: *27 February 1996* Logged by: *DHG*

AGRA Earth and Environmental, Inc.

Kenmore Lakepointe

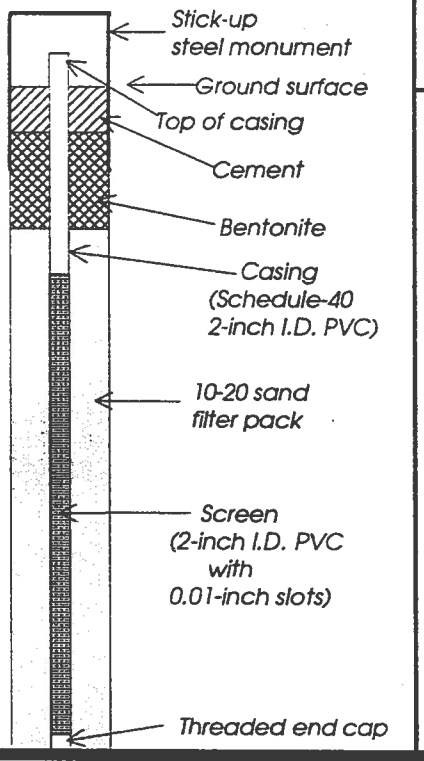
PROJECT: Development W.O. 11-10459-00 WELL NO. AW-11

Elevation reference: King County Datum NAD 1983
Ground surface elevation: 27 feet
Well completed: 27 February 1996
Casing elevation: 29.59 feet

Page 1 of 1

DEPTH (feet)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	OVM READING	GROUND WATER
0	Loose to very loose, wet, brown, silty SAND to sandy SILT with wood fragments (decomposition odor) (Fill)		S-1	4	0	
5	Loose to very loose, wet to saturated, brown to black, wood debris, 0-25% silty SAND with some brick and copper wire (no odor) (Wood Debris Fill)		S-2	4	0	
			S-3	2	0	
10			S-4	2	0	2/29/96
	(creosote-like odor)		S-5	7	0	
15	Bottom of boring at 14 feet.					
20						
25						
30						

AS-BUILT DESIGN



Unique Ecology Well No. ABN 269.

TESTING

LEGEND

2-inch O.D. split-spoon sample

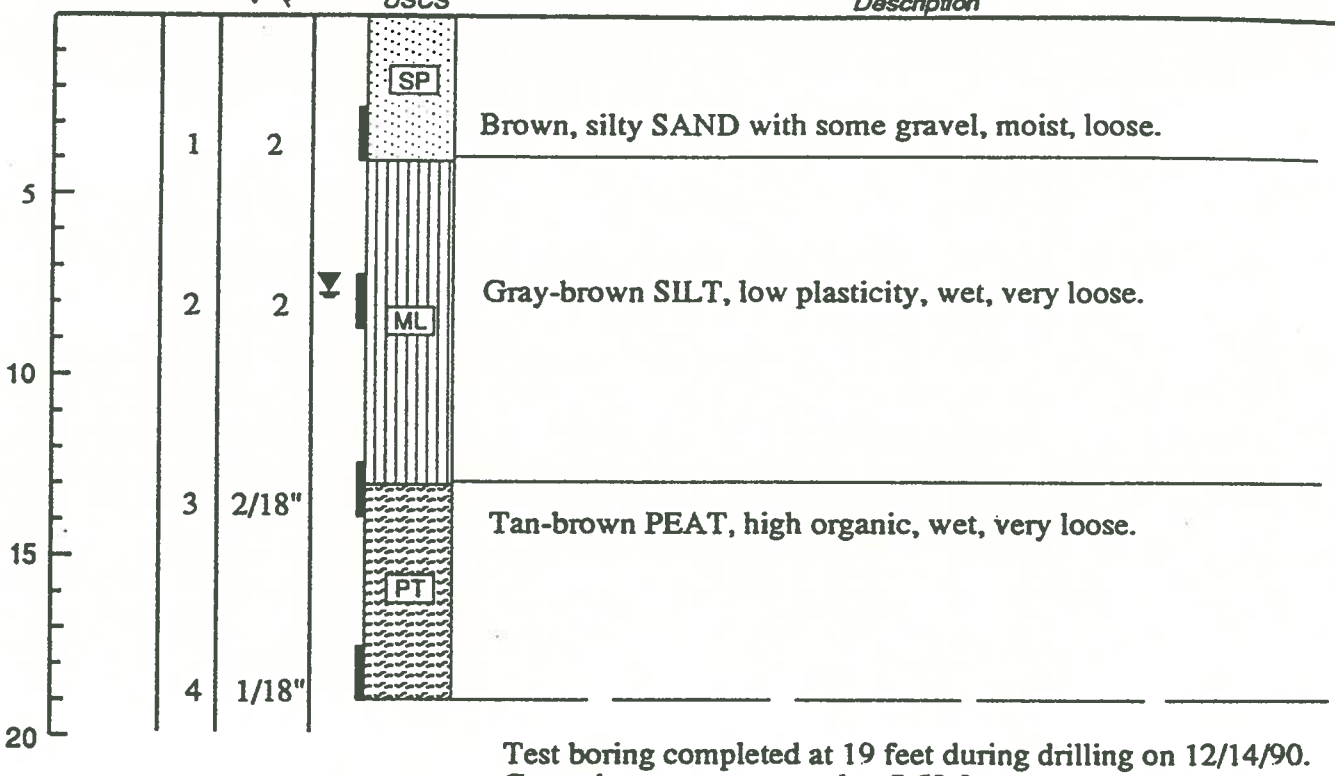
Observed groundwater level 0/00/00 = date observed

AGRA Earth & Environmental
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling started: 27 February 1996 Drilling completed: 27 February 1996 Logged by: DHG

AGRA Earth and Environmental, Inc.

BORING 102

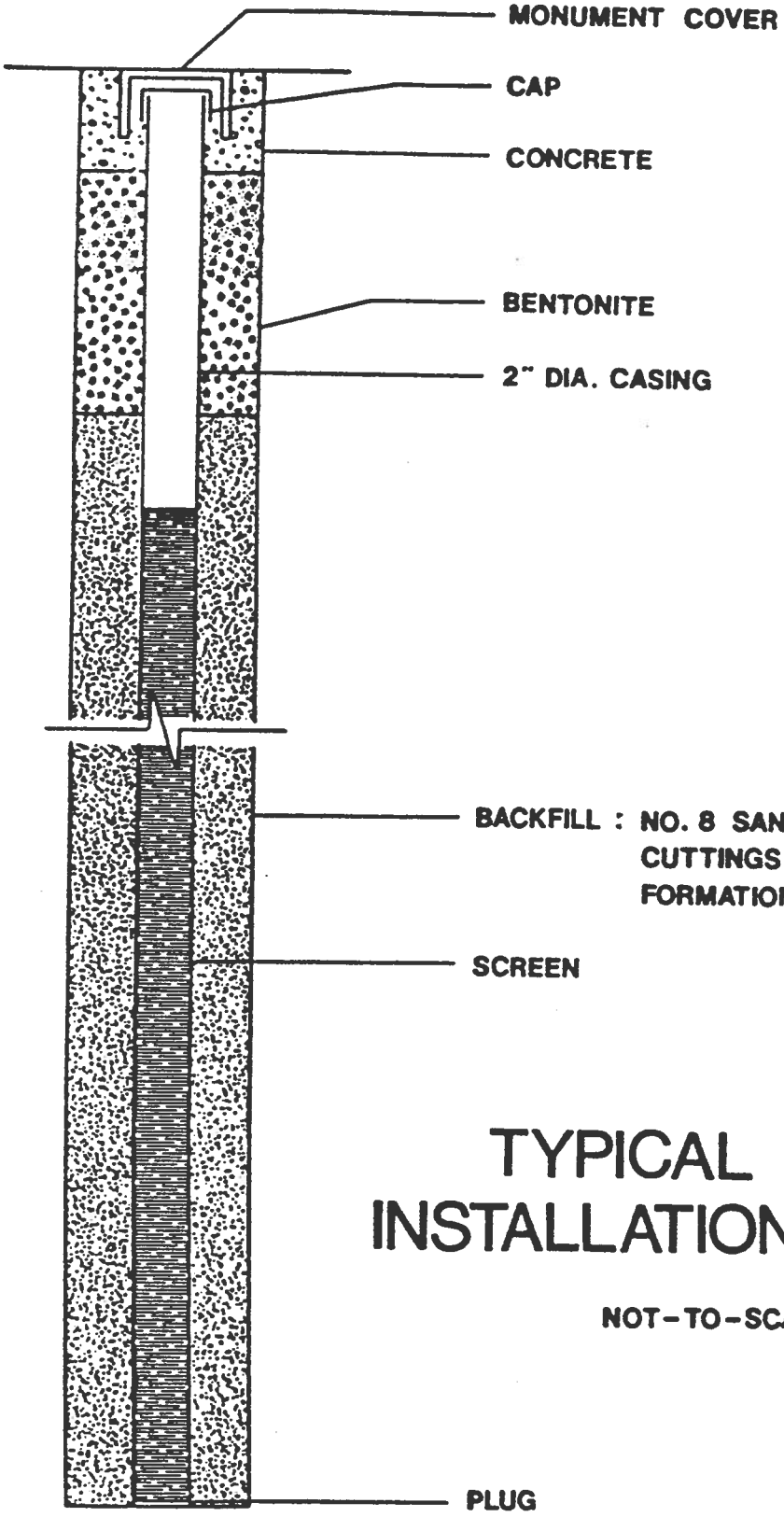


Test boring completed at 19 feet during drilling on 12/14/90.
Groundwater encountered at 7.52 feet.

GEOTECH
CONSULTANTS, INC.

TEST BORING LOG
38 ACRES
KENMORE, WASHINGTON

Job No:	Date:	Logged by:	Plate:
0260-3	DEC 1990	AMC	9



TYPICAL WELL INSTALLATION DESIGN

NOT-TO-SCALE

GEOTECH CONSULTANTS

38 ACRES
KENMORE, WASHINGTON

Job No.:	Date:		Plate:
0260-3	JAN 1991	N.T.S	11

TEST PIT LOGS/ 29 February and 1 March 1996 11-10459-00
Kenmore Lakepointe Development
King County, Washington

Test Pit No.	Approx. Elev.	Depth (ft)	Soil Description
TP-1	Elev. 25	0-1.5	Medium dense, moist, brown, silty, sandy angular GRAVEL. No odor. (Fill)
		1.5-1.8	**Asphalt Paving**
		1.8-2.5	Dense to very dense, moist, brown, silty, fine to medium SAND with gravel. No odor. (Fill)
		2.5-6	Dense, moist, brown, angular GRAVEL and boulders (1-12" quarry spalls) with concrete slabs, dimensioned wood, and matrix of silty fine sand. No odor. (Fill)
			Test Pit TP-1 terminated at 6 feet due to boulder obstructions. No groundwater seepage encountered. Minor caving of sidewalls below 3 feet. **Collected sample TP-1/4' (Gravel Fill Matrix)**

Test Pit No.	Approx. Elev.	Depth (ft)	Soil Description
TP-2	Elev. 28	0-1.7	Very dense, moist, brown and grey mixed, silty, sandy angular GRAVEL with asphalt chunks. Many wood fragments below depth of 1 foot. No odor. (Fill)
		1.7-6	**Wood Debris Fill** - Dense to loose, moist to wet, dark brown • 95% wood shards and dimensioned lumber with steel pipe, metal casting. Oily coating on debris, petroleum odor. • 5% silty SAND and pea gravel. Wet below 5.5'.
		6-6.2	**Concrete wash-out layer.**
			Test Pit TP-2 terminated at 6.2 feet due to concrete obstruction. No groundwater seepage encountered. Moderate caving of sidewalls below 4 feet.

TEST PIT LOGS/ 29 February and 1 March 1996 11-10459-00
Kenmore Lakepointe Development
King County, Washington

Test Pit No.	Approx. Elev.	Depth (ft)	Soil Description
TP-3	Elev. 25	0-0.2	**Asphalt Pavement**
		0.2-1.3	Medium dense to dense, wet, grey, silty, sandy angular GRAVEL. No odor. (Fill)
		1.3-7.6	**Wood Debris Fill** - Dense to loose, moist to wet, dark brown • 90% wood shards and dimensioned lumber with steel pipe, metal casting. Oily coating on debris, petroleum odor. • 5% asphalt roof shingles • 5% silty SAND and pea gravel. Wet below 5.5'. Increasing debris below 7 feet - plastic, glass, styrofoam, brick
		7.6-7.8	**Concrete wash-out layer.**
			Test Pit TP-3 terminated at 7.8 feet due to concrete obstruction. Light groundwater seepage encountered in gravel base beneath pavement. No caving of sidewalls while test pit remained open. **Collected sample TP-3/5' (Wood Debris Fill Matrix Soil)**

Test Pit No.	Approx. Elev.	Depth (ft)	Soil Description
TP-4	Elev. 26.5	0-0.2	**Asphalt Pavement**
		0.2-2.8	Dense, moist to wet, dark grey, silty, sandy angular GRAVEL, to silty, gravelly SAND. No odor. (Fill)
		1.3-7.6	**Wood Debris Fill** - Dense to loose, moist to wet, dark brown • 90% wood shards and dimensioned lumber with steel pipe, metal casting. Oily coating on debris, petroleum odor. • 5% asphalt roof shingles • 5% silty SAND and pea gravel. Wet below 5.5'. Increasing debris below 7 feet - plastic, glass, styrofoam, brick
		7.6-7.8	**Concrete wash-out layer.**
			Test Pit TP-4 terminated at 7.8 feet due to concrete obstruction. Light groundwater seepage encountered in gravel base beneath pavement. No caving of sidewalls while test pit remained open. **Collected sample TP-4/2' (Gravel Fill Matrix)**

TEST PIT LOGS/ 29 February and 1 March 1996 11-10459-00
Kenmore Lakepointe Development
King County, Washington

Test Pit No.	Approx. Elev.	Depth (ft)	Soil Description
TP-5	Elev. 25	0-0.2	Asphalt Pavement
		0.2-1.4	Dense, moist to wet, grey and brown mixed, silty, fine to medium SAND with gravel. No odor. (Fill)
		1.4-3.3	Very dense, damp, grey, angular GRAVEL with silt and sand over dense, moist to wet, brown, silty SAND with gravel, some asphalt fragments. No odor. (Fill)
		3.3-7.5	Wood Debris Fill - Dense, moist to wet, dark brown • 80% wood shards and dimensioned lumber • 15% silty SAND, loose, wet • 5% brick, gravel, concrete rubble, trace drywall and fiberglass
			Test Pit TP-5 terminated at 7.5 feet. Static groundwater level encountered at 7.3 feet. No caving of sidewalls while test pit remained open. **Collected sample TP-5/2.5' (Fill Soil)**

Test Pit No.	Approx. Elev.	Depth (ft)	Soil Description
TP-6	Elev. 27	0-0.3	Asphalt Pavement
		0.3-1.5	Medium dense to loose, wet, red-brown, silty SAND with gravel, rock spalls, brick and asphalt fragments over pea gravel layer. No odor. (Fill)
		1.5-7	Very dense, wet, black, silty, sandy, angular GRAVEL with concrete rubble (30%) and wood fragments (20%). Wood content increases to 40-50% below 3 feet. No odor. (Fill)
		7-7.4	Wood Debris Fill - Very dense, moist to wet, dark brown • 90% wood shards and dimensioned lumber • 10% silty SAND, loose, wet
			Test Pit TP-6 terminated at 7.4 feet due to bulk lumber. Light groundwater seepage encountered from 2.5 to 3 feet. No caving of sidewalls while test pit remained open. **Collected sample TP-6/6' (Gravel Fill Matrix)**

TEST PIT LOGS/ 29 February and 1 March 1996 11-10459-00
Kenmore Lakepointe Development
King County, Washington

Test Pit No.	Approx. Elev.	Depth (ft)	Soil Description
TP-7	Elev. 27	0-0.3	Asphalt Pavement
		0.3-2.3	Medium dense to very dense, moist to wet, brown, silty SAND with angular gravel, and some pea gravel. No odor. (Fill)
		2.3-7	**Wood Debris Fill** - Dense, moist to wet, dark brown • 90% wood shards, dimensioned lumber and beams, logs • 10% silty SAND, loose, wet, trace copper wiring, metal pipe, wire cables.
			Test Pit TP-7 terminated at 7 feet due to bulk lumber. No groundwater seepage encountered. No caving of sidewalls while test pit remained open. **Collected sample TP-7/2' (Fill Soil)**

Test Pit No.	Approx. Elev.	Depth (ft)	Soil Description
TP-8A	Elev. 27	0-0.8	Very dense, wet, grey, silty, sandy, angular GRAVEL. No odor. (Fill)
		0.8-1.0	Asphalt Pavement
			Test Pit TP-8A terminated at 1 foot due refusal on asphalt. No groundwater seepage encountered.

Test Pit No.	Approx. Elev.	Depth (ft)	Soil Description
TP-8B	Elev. 26	0-1.0	Concrete wash-out layer
		1.0-1.2	Asphalt Pavement
			Test Pit TP-8B terminated at 1.2 foot due refusal on asphalt. No groundwater seepage encountered.

TEST PIT LOGS/ 29 February and 1 March 1996 11-10459-00
Kenmore Lakepointe Development
King County, Washington

Test Pit No.	Approx. Elev.	Depth (ft)	Soil Description
TP-9	Elev. 27	0-1.2	Dense to very dense, wet, grey, silty, sandy, angular GRAVEL. No odor. (Fill)
		1.2-5	**Wood Debris Fill** - Dense, moist to wet, dark brown • 90% wood shards, dimensioned lumber • 10% silty SAND
		5-9.8	**Wood Debris Fill** - Dense, moist to wet, dark brown • 70% wood shards, dimensioned lumber • 20% auto body panels, steel I-beams, wire cables, tires, brick • 10% silty SAND with gravel
			Test Pit TP-9 terminated at 9.8 feet due to metal obstructions. No groundwater seepage encountered. No caving of sidewalls while test pit remained open. **Collected sample TP-9/6' (Wood Debris Fill Matrix Soil)**

Test Pit No.	Approx. Elev.	Depth (ft)	Soil Description
TP-10	Elev. 26	0-1.1	Dense, wet, brown, silty, sandy, angular GRAVEL. No odor. (Fill)
		1.1-9.5	**Wood Debris Fill** - Loose to medium dense, moist to wet, dark brown • 50% wood shards, dimensioned lumber • 50% silty SAND
			Test Pit TP-10 terminated at 9.5 feet. Static groundwater level encountered at 8.8 feet. Moderate caving of sidewalls. **Collected sample TP-10/5' (Wood Debris Fill Matrix)**

TEST PIT LOGS/ 29 February and 1 March 1996 11-10459-00
Kenmore Lakepointe Development
King County, Washington

Test Pit No.	Approx. Elev.	Depth (ft)	Soil Description
TP-11	Elev. 27	0-1	Very loose, wet, grey, silty SAND. No odor. (Concrete wash-out)
		1-3.5	Dense, moist, brown, silty, sandy, rounded GRAVEL. No odor. (Fill)
		3.5-4	Dense, moist, brown, silty, gravelly SAND with hay and clumps of roots.
		4.5-5	Concrete Obstruction
		5-6	Wood Debris Fill - Dense, moist to wet, dark brown • 80% wood shards, dimensioned lumber • 20% silty SAND
			Test Pit TP-11 terminated at 6 feet on wire cable obstruction. No groundwater seepage encountered. Moderate caving of upper 2 feet of sidewalls.

Test Pit No.	Approx. Elev.	Depth (ft)	Soil Description
TP-12	Elev. 25	0-1	Very loose, wet, grey, silty fine to medium SAND with rounded gravel. No odor. (Concrete wash-out)
		1-3.5	Wood Debris Fill - Medium dense, wet, brown • 90% wood shards • 5% silty SAND • 5% brick, gravel, concrete and asphalt rubble
		3.5-5.5	Asphalt
		5.5-6.5	Wood Debris Fill - Medium dense, wet, brown • 90% wood shards, dimensioned lumber, logs • 5% silty SAND with gravel • 5% concrete and asphalt rubble
		6.5-9.5	Loose, wet to waterbearing, grey, fine to coarse sandy, rounded GRAVEL with silt.
			Test Pit TP-12 terminated at 9.5 feet. Static groundwater level encountered at 9 feet. Moderate caving of sidewalls below 6 feet. **Collected sample TP-12/7' (Gravel Fill Matrix)**

TEST PIT LOGS/ 29 February and 1 March 1996 11-10459-00
Kenmore Lakepointe Development
King County, Washington

Test Pit No.	Approx. Elev.	Depth (ft)	Soil Description
TP-13	Elev. 26	0-2.3	Dense, moist, grey, sandy, rounded GRAVEL with silt, grading to wet, brown, silty, sandy, angular GRAVEL with rock spalls, wood shards (10%) . No odor. (Fill)
		2.3-5.5	Wood Debris Fill - Loose, wet, brown, decomposing • 50% shredded wood • 30% silty SAND with gravel • 15% concrete and brick rubble, some concrete slabs • 5% plastic hangers and sheeting
		5.5-8	Medium dense, wet, grey, silty, fine to medium SAND with gravel, concrete rubble (20%), wood fragments (10%).
		8-10.5	Wood Debris Fill - Loose, wet, brown • 70% wood shards • 30% silty SAND
			Test Pit TP-13 terminated at 10.5 feet. Static groundwater level encountered at 9.9 feet. Minor caving of sidewalls. **Collected sample TP-13/6.5' (Fill Soil)**

Test Pit No.	Approx. Elev.	Depth (ft)	Soil Description
TP-14	Elev. 28	0-0.5	**Asphalt Shingles**
		0.5-3.7	GP-GM-Very dense, moist, brown, sandy, angular GRAVEL with silt, with rock spalls, concrete rubble, wood fragments below 2 feet. No odor. (Fill)
		3.7-10.8	Wood Debris Fill - Loose, wet, brown • 60% wood shards • 20% silty SAND with gravel • 15% concrete rubble and slabs, brick • 5% sheet metal, auto body parts
			Test Pit TP-14 terminated at 10.8 feet. Light groundwater seepage from 0-1 and 7-8 feet. Minor caving of sidewalls. **Collected sample TP-14/8' (Wood Debris Fill Matrix)**

TEST PIT LOGS/ 29 February and 1 March 1996 11-10459-00
Kenmore Lakepointe Development
King County, Washington

Test Pit No.	Approx. Elev.	Depth (ft)	Soil Description
TP-15	Elev. 27	0-0.3	Dense, wet, grey, clean, fine to medium SAND with gravel. No odor. (Fill)
		0.3-2.7	Medium dense, wet, brown, fine to medium SAND with gravel, with wood fragments, concrete rubble. No odor. (Fill)
		2.7-9	**Wood Debris Fill** - Loose, wet, brown • 80% wood shards • 15% silty SAND with gravel • 5% concrete rubble, brick, wire cables
			Test Pit TP-15 terminated at 9 feet. Moderate groundwater seepage below 4 feet. Static groundwater level encountered at 8.5 feet. Moderate caving of sidewalls in upper 3 feet. Sheen visible on water table. **Collected sample TP-15/7' (Wood Debris Fill Matrix)**

Test Pit No.	Approx. Elev.	Depth (ft)	Soil Description
TP-16	Elev. 25	0-4.6	Dense, moist, grey, clean, fine to medium SAND with gravel, grading to silty, gravelly SAND. No odor. (Fill)
		4.6-9.5	**Wood Debris Fill** - Loose, wet, brown • 50% wood shards • 40% silty SAND with gravel • 10% carpeting and foampadding, glass, plastic
			Test Pit TP-16 terminated at 9.5 feet. Static groundwater level encountered at 8.5 feet. No caving of sidewalls while test pit remained open. Sheen visible on water table. **Collected sample TP-16/6' (Wood Debris Fill Matrix)**

TEST PIT LOGS/ 29 February and 1 March 1996 11-10459-00
Kenmore Lakepointe Development
King County, Washington

Test Pit No.	Approx. Elev.	Depth (ft)	Soil Description
TP-17	Elev. 23.5	0-3.0	Very dense, moist, grey, silty, sandy, angular GRAVEL, with concrete rubble (10%), trace wood fragments. No odor. (Fill)
		3.0-8.0	Debris Fill - Dense, wet, brown • 30% wood shards • 40% silty SAND with gravel • 20% tire retreads, rubber scraps • 5% concrete rubble, brick, steel rebar

Test Pit TP-17 terminated at 8.0 feet. Static groundwater level encountered at 7.2 feet. No caving of sidewalls while test pit remained open. Sheen visible on water table.

Collected sample TP-17/3' (Gravel Fill Matrix)

Test Pit No.	Approx. Elev.	Depth (ft)	Soil Description
TP-18	Elev. 24	0-1.5	Very dense, moist to wet, dark brown, silty, sandy, angular GRAVEL, with asphalt rubble. No odor. (Fill)
		1.5-3.0	Rock Mat-Quarry spalls (2-4") over rockery boulders
		3.0-4.5	Very dense, moist, grey mottled, silty, fine to medium SAND with gravel. No odor. (Fill)
		4.5-7.1	Wood Debris Fill - Loose, wet, black • 50% tree roots, dimensioned lumber • 40% silty SAND • 10% tires, wire hangers

Test Pit TP-18 terminated at 7.1 feet. Static groundwater level encountered at 6.7 feet. Moderate caving of sidewalls below 4.5 feet. Sheen visible on water table.

TEST PIT LOGS/ 29 February and 1 March 1996 11-10459-00
Kenmore Lakepointe Development
King County, Washington

Test Pit No.	Approx. Elev.	Depth (ft)	Soil Description
TP-19	Elev. 28	0-0.5	Asphalt Pavement
		0.5-1.3	Dense, moist, brown, silty, sandy, angular grading to rounded GRAVEL. No odor. (Fill)
		1.3-1.8	Concrete Slab
		1.8-4.3	Wood Debris Fill - Loose, wet, black • 90% dimensioned timbers • 10% silty SAND
		4.3-10.4	Medium dense, wet, grey, silty, fine SAND with gravel and trace organics, grading to medium stiff, clayey SILT with sand and gravel, scattered plant matter.

Test Pit TP-19 terminated at 10.4 feet. No groundwater seepage encountered while test pit remained open. No caving of sidewalls while test pit remained open.
Collected sample TP-19/2' (Wood Debris Fill Matrix)

TEST PIT LOGS/ 29 February and 1 March 1996 11-10459-00
Kenmore Lakepointe Development
King County, Washington

Test Pit No.	Approx. Elev.	Depth (ft)	Soil Description
TP-20	Elev. 28	0-0.3	**Asphalt Paving**
		0.3-1.4	Dense, moist to wet, brown, silty, sandy, angular GRAVEL, with rock spalls. No odor. (Fill)
		1.4-2.9	Dense, moist to wet, grey, fine to medium SAND with silt. No odor (Fill)
		2.9-6	**Wood Debris Fill** - Loose, wet, black • 60% dimensioned timbers • 30% silty SAND with gravel • 10% wire, pipe, scrap metal
		6-8.9	**Wood Debris Fill** - Loose, wet, black • 90% dimensioned timbers • 10% silty SAND with gravel

Test Pit TP-20 terminated at 8.9 feet. No groundwater seepage encountered while test pit remained open. No caving of sidewalls while test pit remained open. **Collected sample TP-20/8' (Wood Debris Fill Matrix)**

APPENDIX B
LABORATORY TESTING PROCEDURES AND RESULTS
11-10459-00

APPENDIX B
LABORATORY TESTING PROCEDURES AND RESULTS
11-10459-00

LABORATORY TESTING PROCEDURES

A series of laboratory tests were performed during the course of this study to evaluate the index and geotechnical engineering properties of the subsurface soils. Descriptions of the types of tests performed are given below.

Visual Classification

Samples recovered from the exploration locations were visually classified in the field during the exploration program. Representative portions of the samples were carefully packaged in watertight containers and transported to our laboratory where the field classifications were verified or modified as required. Visual classification was generally done in accordance with the Unified Soil Classification system. Visual soil classification includes evaluation of color, relative moisture content, soil type based on grain size, and accessory soil types included in the sample. Soil classifications are presented on the exploration logs in Appendix A.

Moisture Content Determinations

Moisture content determinations were performed on representative samples obtained from the explorations in order to aid in identification and correlation of soil types. The determinations were made in general accordance with the test procedures described in ASTM:D-2216. The results of the tests are shown on the exploration logs in Appendix A.

Atterberg Limits

Atterberg limits are used primarily for classification and indexing of cohesive soils. The liquid and plastic limits are two of the five Atterberg limits and are defined as the moisture content of a cohesive soil at arbitrarily established limits for liquid and plastic behavior, respectively. Liquid and plastic limits were established for selected samples in general accordance with ASTM:D-423 and ASTM:D-424, respectively. The results of the Atterberg limits are presented on a plasticity chart in this appendix where the plastic index (liquid limit minus plastic limit) is related to the liquid limit. The plastic limits and liquid limits are also presented adjacent to the appropriate samples on the exploration logs in Appendix A.

Grain Size Analysis

A grain size analysis indicates the range in diameter of soil particles included in a particular sample. Grain size analyses were performed on representative samples in general accordance with ASTM:D-422. The results of the grain size determinations for the samples were used in classification of the soils, and are presented in this appendix.

Consolidation Test

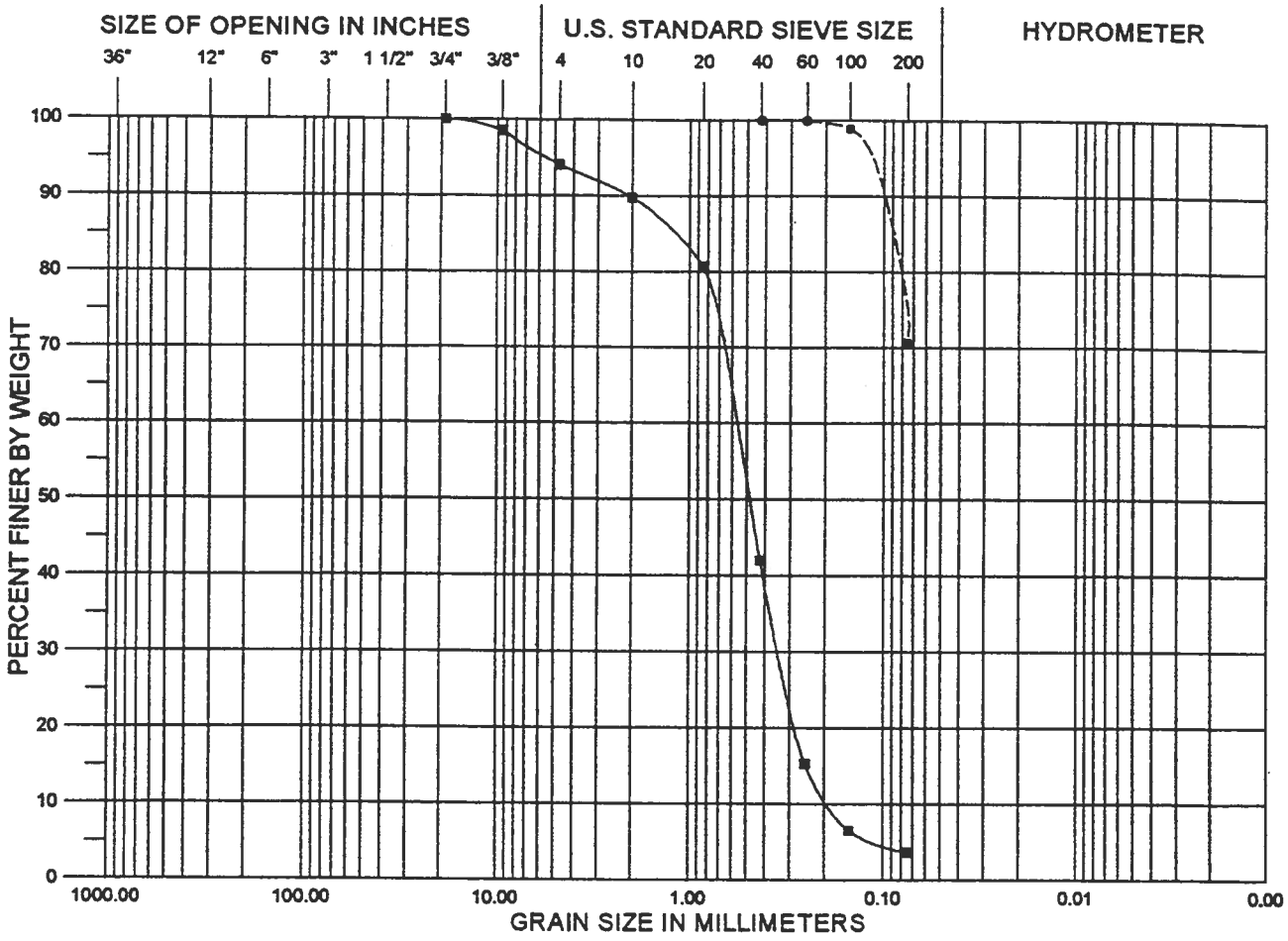
A one-dimensional consolidation test was performed in general accordance with ASTM:D-2435 on a selected sample of the site soils to provide data for developing settlement estimates. The undisturbed soil sample was carefully trimmed and fit into a rigid ring. Porous stones were

placed on both the top and bottom of the sample to allow drainage. Vertical loads were then applied to the sample incrementally in such a way that the sample was allowed to consolidate under each load increment. The rebound of the sample during unloading was also measured. The results of the consolidation test are presented in this appendix as a plot of percent consolidation (strain) versus applied load (stress).

In-Place Density

In-place density of some site soils was determined by computing the volume of a portion of the undisturbed samples obtained from the boring explorations then weighting the sample. The density computed for the sample is presented on the boring logs in Appendix A.

GRAIN SIZE DISTRIBUTION



		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
BOULDERS	COBBLES	GRAVEL		SAND			FINE GRAINED	

	Exploration	Sample	Depth	Moisture	Fines	Soil Description
■-■-■-■-■	A-2	S-2	10.0-11.5'	19%	4%	Coarse to Fine SAND, trace gravel and silt
●-●-●-●-●	A-2	S-7	35.0-36.5'	34%	71%	Fine Sandy SILT
✱-✱-✱-✱-✱						

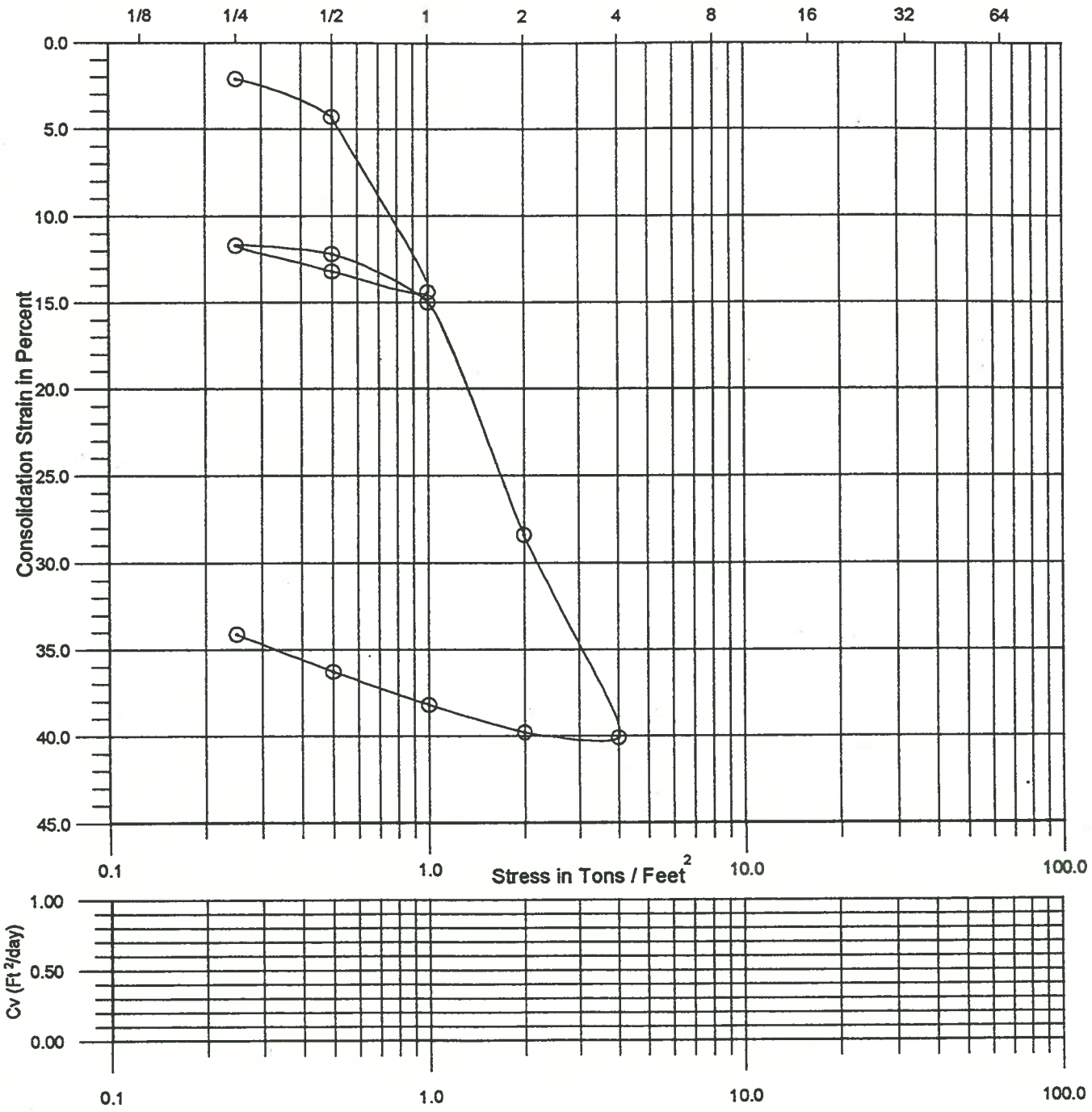
Project: Kenmore Lakepointe Development

Work Order: 11-10459-01

Date: 9-29-95

AGRA
Earth & Environmental
11335 NE 122nd Way
Suite 100
Kirkland, Washington 98034-6918

CONSOLIDATION ASTM: D2435



Project:	Kenmore Lakepointe Development		
Work Order:	11-10459-01		
Date:	10-5-95	Depth	21.0'
Exploration:	A-6	Sample:	S-4
Moisture:	264%	Density:	22 pcf
USCS:			

AGRA
Earth & Environmental
11335 N.E. 122nd Way
Suite 100
Kirkland, Washington 98034-6918