# Appendix B - GEOTECHNICAL/EARTH TECHNICAL REPORT ADDENDUM

## Earth Technical Report Addendum Yesler Terrace Redevelopment Project Seattle, Washington

April 11, 2011

Prepared for

CollinsWoerman 710 Second Avenue, Suite 1400 Seattle, Washington 98104



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#### 1.0 INTRODUCTION

Landau Associates previously prepared the *Earth Technical Report* (Landau Associates, 2010) to support preparation of the Earth elements of the Draft Environmental Impact Statement (DEIS) for the proposed Yesler Terrace Redevelopment project located on the southern slope of First Hill in Seattle, Washington (see Figure 1). The *Earth Technical Report* is included as Appendix D to the DEIS.

This *Earth Technical Report Addendum* provides additional information and analysis of the Preferred Alternative to support preparation of the Final Environmental Impact Statement (FEIS) for the project.

These documents have been prepared to support the environmental review process for the Yesler Terrace Redevelopment project. Additional site-specific subsurface investigations and geotechnical engineering analyses would need to be performed as part of the specific design and permitting of infrastructure and buildings associated with future site redevelopment.

#### 1.1 PROJECT DESCRIPTION

The Seattle Housing Authority (SHA) is proposing the redevelopment of Yesler Terrace, a public housing community located near the intersection of Yesler Way and Broadway in Seattle's First Hill neighborhood. Yesler Terrace currently contains 561 units, housing approximately 1,200 residents. Redevelopment is proposed to create a mixed-income, mixed-use community that is intended to better serve existing and future residents. The project would include a mix of housing, office, commercial, and community service uses, as well as parks and open space, and street and utility infrastructure improvements. It is anticipated that the redevelopment of Yesler Terrace would take approximately 15 to 20 years to complete.

#### 1.2 SITE DESCRIPTION

The Yesler Terrace site is generally bordered by I-5 on the west, Alder Street and E Fir Street on the north, 14<sup>th</sup> Avenue on the east, and S Main Street on the south (see Figures 2 and 3).

For descriptive purposes, the Yesler Terrace site has been divided into sectors. Descriptions of the NW, NE, SW, SE, and East of Boren Sectors are provided in the DEIS. The Preferred Alternative also includes three additional properties, located east of 12<sup>th</sup> Avenue and east of the East of Boren Sector, that make up the East of 12<sup>th</sup> Sector. The NW, NE, SW, and SE Sectors that make up the Planned Action area are also referred to as the West of Boren Sectors. The East of Boren and East of 12<sup>th</sup> Sectors are outside of the Planned Action area.

The East of 12<sup>th</sup> Sector comprises three individual properties: the King County Records property, the Baldwin Apartments property, and the Urban League property (see Figures 2 and 3). The East of 12<sup>th</sup> Sector is bound by E Fir Street to the north, 12<sup>th</sup> Avenue to the west, E Yesler Way to the south, and 14<sup>th</sup> Avenue to the east.

#### 1.3 PREFERRED ALTERNATIVE

The Preferred Alternative represents an assumed 5.47 million square feet of housing-based/mixed-use redevelopment built over the assumed 20-year horizon. Land uses under the Preferred Alternative are anticipated to include:

- 5,000 residential units, including 4,500 in the West of Boren Sectors, 250 in the East of Boren Sector, and 250 residential units in the East of 12<sup>th</sup> Sector
- 900,000 square feet of single-use office space (a portion of this could be hotel)
- Approximately 88,000 square feet of neighborhood commercial/retail space (including 9,000 square feet of neighborhood retail/office in the East of Boren Sector and 4,000 square feet of neighborhood commercial in the East of 12<sup>th</sup> Sector)
- Approximately 65,000 square feet of neighborhood service space (including the Yesler Community Center and Steam Plant)
- 6.4 acres of public open space (including the existing 1.4-acre Yesler Community Center parcel, and a 1.7-acre Common Park west of the Community Center) and 10.8 acres of semi-private open space
- 5,100 parking spaces within/under buildings.

The intensity of development under the Preferred Alternative would be highest in the NW Sector and lowest in the East of 12<sup>th</sup> Sector. It is assumed that four existing onsite buildings (the Steam Plant and the City-owned Yesler Community Center, Baldwin Apartments, and Urban League Building) would be retained. Street vacations and new street dedications are proposed to provide a more connected grid network internally and to/from the surrounding community.

For purposes of the EIS analysis, certain assumptions have been made related to the number of possible mid- and high-rise buildings and the distribution of such buildings across the site; however, the specific number, height, location, and general design parameters of onsite buildings would be determined as part of the Proposed Actions. In the Preferred Alternative, two 22-story high-rise office buildings are assumed to be located in the NW Sector adjacent to Alder Street to approximately match the adjacent height and density of the adjacent zoning at Harborview Hospital. It is assumed that housing would be composed of a combination of five-to seven-story mid-rise buildings and ten 15- to 22-story high-rise buildings proportionally placed in each of the NW, NE, SE, and SW sectors to accommodate the lower density land use and maximize spacing between the high-rise buildings. No new low-rise buildings (four stories or less) are assumed in this alternative.

In the Preferred Alternative, it is assumed that parking would be provided in below-grade structures under buildings, plazas, and open space. Typically, parking would be provided below individual buildings (with about 1 to 10 levels of underground parking), but in some cases parking could be combined and located below multiple buildings.

It is assumed that substantial transportation infrastructure improvements would be made. The existing street grid would be reconfigured to enhance the connections to surrounding neighborhoods and provide an internal circulation loop of secondary rights-of-way that would connect all of the site sectors without the need to travel on primary rights-of-way.

The southern portion of the alley north of Spruce Street between 9<sup>th</sup> Avenue and Terry Avenue (the northern portion of the alley was previously vacated) would be vacated. In addition, the following road segments would be vacated under the Preferred Alternative (see Figure 4):

- Terry Avenue
- Spruce Street
- A portion of 8<sup>th</sup> Avenue S between Yesler Way and Washington Street
- Service road around the Steam Plant (portion not within new 9<sup>th</sup> Avenue alignment)
- S Washington Street from 10<sup>th</sup> to 12<sup>th</sup> Avenue S
- S Main Street west of 10<sup>th</sup> Avenue S
- Stub of 9<sup>th</sup> Avenue S south of S Main Street.

The following streets would be dedicated as new rights-of-way under the Preferred Alternative (see Figure 5):

- E Fir Street would be dedicated from Broadway to 8<sup>th</sup> Avenue
- S Washington Street would be dedicated from 8<sup>th</sup> Avenue S to 10<sup>th</sup> Avenue S
- 10<sup>th</sup> Avenue S would be dedicated from S Washington Street to S Main Street
- Additional right-of-way adjacent to 10<sup>h</sup> Avenue and 10<sup>th</sup> Avenue S would be dedicated to widen the existing right-of-way
- Additional right-of-way adjacent to Yesler Way and E Yesler Way would be dedicated to widen the right-of-way.

It is assumed that substantial utility infrastructure improvements would be made. Water, sewer, and natural gas mains would be installed or replaced as necessary. The permanent stormwater control system would be similar to DEIS Alternative 1. Green Stormwater Infrastructure facilities under the Preferred Alternative could include permeable pavement access roads, courtyards, and private sidewalks, green roofs, bioretention planters and swales; stormwater vaults/tanks serving individual parcels could be used when necessary.

It is estimated that about 638,200 cubic yards (yd³) of cut and about 41,000 yd³ of fill would be associated with site grading and building construction activities for the Preferred Alternative (SvR Design Company, 2011). The existing steep slope/slide-prone areas along the southern portion of the SW Sector would be regraded and stabilized as part of site redevelopment and building construction under the Preferred Alternative.

#### 2.0 AFFECTED ENVIRONMENT

This section summarizes the existing site conditions and affected earth environment at and in the vicinity of the Yesler Terrace site.

#### 2.1 WEST OF BOREN AND EAST OF BOREN SECTORS

Existing site conditions (including topography, geologic and groundwater conditions, and geologic hazards) for the West of Boren and East of Boren Sectors are the same as those described in the DEIS.

#### 2.2 EAST OF 12<sup>TH</sup> SECTOR

The East of 12<sup>th</sup> Sector comprises three individual properties: the King County Records property, the Baldwin Apartments property, and the Urban League property (see Figures 2 and 3).

The King County Records property is developed with two warehouse buildings, and is bound by E Fir Street to the north, 13<sup>th</sup> Avenue to the east, E Yesler Way to the south, and by a parking lot, restaurants, and an automobile service station to the west. The Baldwin Apartments property is bound by E Fir Street to the north, the Urban League property to the east, residential development to the south, and 13<sup>th</sup> Avenue to the west. The Urban League property is bound by E Fir Street to the north, 14<sup>th</sup> Avenue to the east, E Yesler Way to the south, and residential development and the Baldwin Apartments property to the west.

The existing buildings in the East of 12<sup>th</sup> Sector are wood frame or masonry construction and likely supported by shallow foundations.

#### 2.2.1 Topography

The topography in the East of 12<sup>th</sup> Sector slopes downward generally to the south and southeast with a maximum of about 10 feet (ft) of elevation change between E Fir Street and E Yesler Way.

#### 2.2.2 Geology

The general geology, surficial geology, and geologic units at the East of 12<sup>th</sup> Sector are the same as those described for the rest of the Yesler Terrace site in the DEIS.

#### 2.2.3 Groundwater

Groundwater conditions in the East of 12<sup>th</sup> Sector are generally the same as those described in the DEIS; however, groundwater perched in surficial fill and/or recessional outwash materials may be encountered from about 5 to 15 ft below ground surface due to the presence of relatively shallow glacial till in certain portions of the area.

#### 2.2.4 Geologic Hazards

The potential geologic hazards at the East of  $12^{th}$  Sector are generally the same as those described in the DEIS, except that no steep slope or landslide hazards are known to be present in the East of  $12^{h}$  Sector.

Note that a small steep slope area is identified on City of Seattle Department of Planning and Development (DPD) Geographic Information System (GIS) maps on a portion of the offsite property located to the west-northwest of the King County Records property (see Figure 3-1 in Attachment 3 of the *Earth Technical Report*). However, a site reconnaissance confirmed that this is actually an area with a soil retaining structure and would not meet the definition of a steep slope area.

#### 3.0 IMPACTS

This section describes the potential impacts of the Preferred Alternatives that are associated with the existing earth environment at the Yesler Terrace site.

#### 3.1 WEST OF BOREN AND EAST OF BOREN SECTORS

The potential geologic hazard impacts and construction impacts for the West of Boren and East of Boren Sectors are the same as those described in the DEIS.

The Preferred Alternative would require grading for construction of building foundations, roads, utilities, and parking structures in the West of Boren and East of Boren Sectors. For purposes of this Preferred Alternative evaluation, a preliminary grading concept was formulated for these Sectors, with the resulting cut and fill volume estimates as summarized in Table 1.

Table 3.1-1
GRADING ACTIVITIES FOR THE PREFERRED ALTERNATIVE
(WEST OF BOREN AND EAST OF BOREN SECTORS)

Grading Activity	Sector					
	NW Sector	NE Sector	SE Sector	SW Sector	East of Boren	TOTAL
Cut (yd³)	303,000	91,600	65,200	136,200	18,200	614,200
Fill (yd <sup>3</sup> )	7,800	6,400	4,300	22,600	0	41,100

Source: SvR Design Company, 2011.

Under the Preferred Alternative, new building construction and substantial site grading and infrastructure improvements would occur in the existing steep slope/slide-prone areas along the southern portion of the SW and SE Sectors and in the area containing tiebacks for the northern wall of the Pacific Rim Center Building, similar to DEIS Alternatives 2 and 3. While there could be significant potential impacts on these steep slope/slide-prone areas and the existing drainage tunnels that would require substantial slope stabilization and drainage improvements, the mitigation measures described in the DEIS would address those potential impacts.

#### 3.2 EAST OF 12th SECTOR

The potential geologic hazard impacts and construction impacts for the East of 12<sup>th</sup> Sector are generally the same as those described in the DEIS, except that no potential steep slope or landsliding impacts would be present in the East of 12<sup>th</sup> Sector.

The Preferred Alternative would require grading for construction of building foundations, utilities, and parking structures in the East of 12<sup>th</sup> Sector. For purposes of this Preferred Alternative evaluation, a preliminary grading concept was formulated for this sector. It is estimated that approximately 24,000 yd³ of cut and no fill would be required to redevelop this sector. The grading activities would occur on the King County Records property in order to develop underground parking. Specific grading plans for redevelopment would be developed as part of the future design and permit process.

#### 3.3 OPERATION IMPACTS

No potential operation impacts that are associated with the existing earth environment at the Yesler Terrace site have been identified.

#### 4.0 MITIGATION MEASURES

This section describes the potential mitigation that would be evaluated and used as necessary and appropriate to address the earth-related impacts of site redevelopment under the Preferred Alternative.

#### 4.1 WEST OF BOREN AND EAST OF BOREN SECTORS

The potential mitigation measures associated with redevelopment of the West of Boren and East of Boren Sectors under the Preferred Alternative are the same as those described in the DEIS. The mitigation measures described in the DEIS would address the potential impacts associated with new building construction and substantial site grading and infrastructure improvements in the existing steep slope/slide-prone areas along the southern portion of the SW and SE Sectors.

#### 4.2 EAST OF 12<sup>th</sup> SECTOR

The potential mitigation measures associated with redevelopment of the East of 12<sup>th</sup> Sector are generally the same as those described in the DEIS, except that no mitigation measures to address potential steep slope or landsliding impacts would be needed in the East of 12<sup>th</sup> Sector.

#### 5.0 SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

With implementation of the mitigation measures summarized in the DEIS, no significant unavoidable adverse impacts are expected for the earth element of the Preferred Alternative.

#### 6.0 UPDATE OF THE EIS ANALYSIS

This section provides an update of the analysis of the earth element of the EIS.

#### 6.1 STEEP SLOPE DEVELOPMENT VARIANCE APPROVAL

As part of the environmental review process for the Yesler Terrace project, SHA submitted documentation (SHA, 2010) to the Seattle DPD to support a request for relief from the prohibition on steep slope development for the West of Boren Sector based on the identified Environmental Critical Area (ECA) steep slopes having been created through previous legal grading activities.

Seattle DPD subsequently granted SHA's request on October 19, 2010, and a copy of DPD's steep slope development decision is included in Attachment 1.

#### 6.2 ADDITIONAL GROUNDWATER OBSERVATIONS

Attachment 1 to the *Earth Technical Report* includes logs of eight exploratory borings advanced in May 2010 to better evaluate geotechnical conditions at the steep slope/slide-prone areas along the southern portion of the SW and SE Sectors. Additional groundwater level measurements were made in four borings completed as groundwater monitoring wells. A summary of groundwater observations made to date at these exploration locations is included in Attachment 2.

#### 7.0 ERRATA

No errata to the earth element of the DEIS or the Earth Technical Report have been identified.

#### 8.0 USE OF THIS REPORT

Landau Associates has prepared this addendum to the *Earth Technical Report* for the exclusive use of the Seattle Housing Authority and the CollinsWoerman project team for specific application to preparation of the Earth section of the Final Environmental Impact Statement for the proposed Yesler Terrace Redevelopment project in Seattle, Washington. No other party is entitled to rely on the information, conclusions, and recommendations included in this document without the express written consent of Landau Associates. Further, the reuse of information, conclusions, and recommendations provided herein for extensions of the project or for any other project, without review and authorization by Landau Associates, shall be at the user's sole risk. Landau Associates warrants that within the limitations of scope, schedule, and budget, our services have been provided in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions as this project. We make no other warranty, either express or implied.

This report has been prepared under the supervision and direction of the following key staff.

4/11/2011

LANDAU ASSOCIATES, INC.

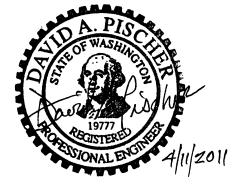
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David A. Pischer, P.E. Senior Associate

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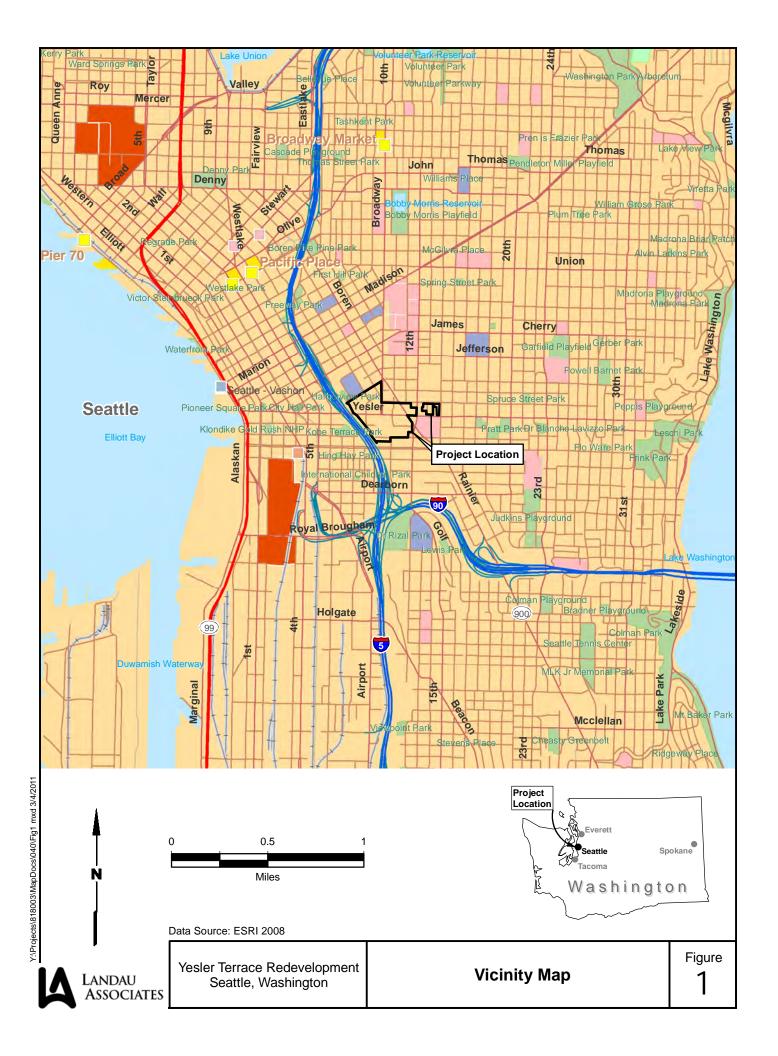


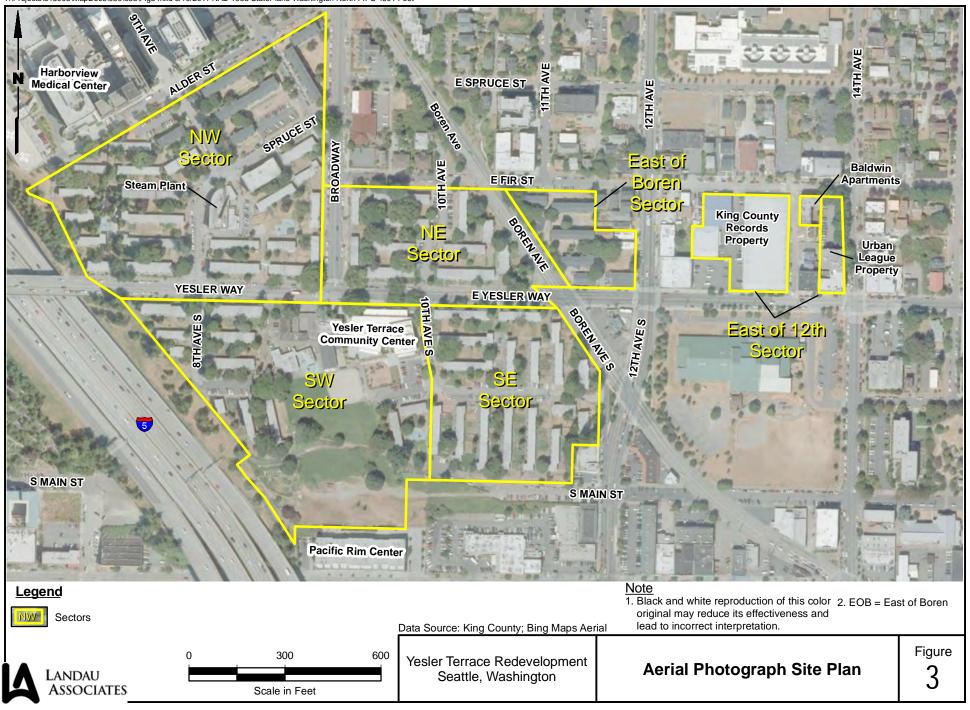
#### 9.0 REFERENCES

Landau Associates. 2010. Earth Technical Report, Yesler Terrace Redevelopment Project, Seattle, Washington. Prepared for CollinsWoerman. October 12.

SHA. 2010. Request for Relief from Prohibition on Steep Slope Development. DPD Project No. 3011305. Yesler Terrace Redevelopment Project, Seattle, Washington. Seattle Housing Authority. Submitted to City of Seattle Department of Planning and Development. October 4.

SvR Design Company. 2011. Memorandum: *FEIS Earthwork Data Analysis*, Yesler Terrace Development. Prepared for CollinsWoerman and Landau Associates. February 28.





Seattle, Washington

**Right-of-Way Vacations** 

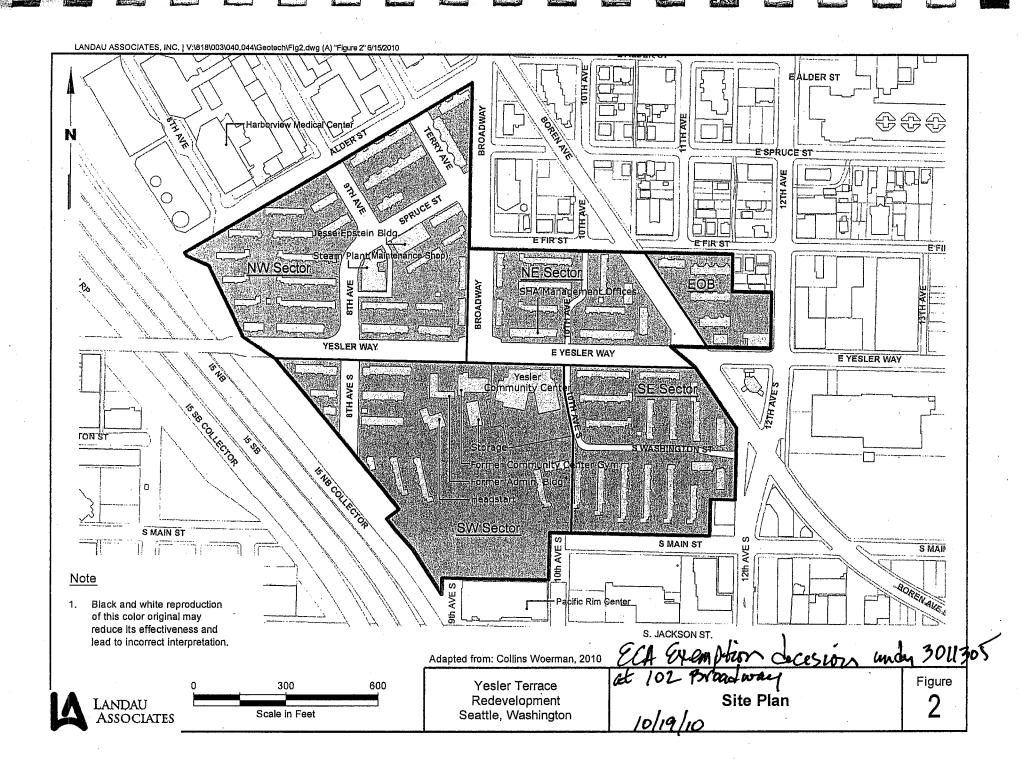
Seattle, Washington

**Right-of-Way Dedications** 

# **DPD Steep Slope Development Decision**

Harold Moniz 710 2<sup>nd</sup> Avenue, Suite 1400 Seattle, WA 98104

> 1. 3011305; 102 Broadway; ECA review is required. Based on a review of the submitted information and the City GIS system, DPD concluded that the Yesler Terrace Redevelopment project appears to qualify for the criteria established in the Critical Areas Regulations, SMC 25.09.180.B2b. Specifically, the City GIS system and the submitted information for the steep slope developmental allowance application demonstrated that steep slopes at the Yesler Terrace Redevelopment Site Plan (plan attached) appeared to have been created by previous grading activities associated with site development and street improvement. For this reason, DPD will waive the required ECA Steep Slope Variance associated with DPD Application No. 3011305. This approval is conditioned upon the following: (1) submittal of a geotechnical engineering report at the intake appointment for the building permit applications that include an evaluation of potential adverse impacts to steep slope stability relative to the proposed development and, (2) approval of building permits for a design that demonstrates the proposed development project will be completely stabilized in accordance with provisions of the ECA code. All other ECA Submittal, General, and Landslide-Hazard, and development standards still apply for this development. Note that this site is also designated as potential landslide due to geologic conditions and as a known landslide area. Building permit applications submitted under other addresses but within the Yesler Terrace Redevelopment Site Plan should be considered part of this exemption decision. October 19, 2010; JAM.



OCT 0 4 2010

DPD Project No. 3011305

### REQUEST FOR RELIEF FROM PROHIBITION ON STEEP **SLOPE DEVELOPMENT OR MODIFICATION TO ECA SUBMITTAL REQUIREMENTS**

TO BE COMPLETED BY APPLICANT

	ECAS A	ND/OR BUFFERS	MAPPED OR IDEN	ITIFIED ON SITE	_
Geologic	c Hazard Areas				
	Steep Slope Liquefaction-prone	Potential Slide du	ue to Geologic Conditions	x Known Slide	
Fish and	d Wildlife Habitat C	onservation Areas			
	Shoreline Habitat* Shoreline Hab <u>i</u> tat Bu		Corridor (includes Riparia h and Wildlife Habitat Ar	•	
v	Vetland	Wetland Buffer	Flood-prone	Abandoned landfill	
Relief fro (Not an l	<b>ECA exemption. F</b> Proposed dev	Steep Slope Develop roject subject to EC elopment is located w	A review**.)	ent is located, with no increase in	
	<u></u>		n steep slope areas crea	ated through previous legal grading	
	Proposed development and that are 3 occur [B2c]	elopment is located o O feet or more from ot	n steep slope areas that her steep slope areas, a	are less than 20 feet in vertical rise nd no adverse impacts on the ECA w	rill
	Application of area [B2d]	development standar	ds would prevent neces	sary stabilization of a landslide prone	)
Modificat		omittal requirements pe		<b>bject to ECA review**).</b> Request for f more than one ECA is mapped or uirements are requested.	
modificati	on the site, indicate		•	•	

<sup>\*</sup>For Shoreline Habitat and buffer, regulations in SMC 23.60 also apply. A Shoreline Substantial Development Permit (SSDP) or Exemption may be required. See CAM-209A for information about exemptions from SSDP.

#### SITE, PROJECT, AND OWNER/AGENT INFORMATION

Site Address: 102 Broadway, Suite 616, Seattle, Washington (On-site Seattle Housing Authority Management Office) Description of proposed project: The Seattle Housing Authority (SHA) is proposing redevelopment of Yesler Terrace, a public housing community located around the intersection of Yesler Way and Broadway on the south slope of First Hill. Additional information regarding the Yesler Terrace Redevelopment Project is provided in Attachment 1 and the Draft EIS. Please describe the reasons for your request: SHA requests relief from the prohibition on steep slope development. The steep slope areas identified on-site were created through previous legal grading activities associated with the Jackson Street regrade and construction of the Yesler Terrace development, including rockeries and retaining walls constructed as part of right-of-way improvements. See Attachments 1 and 2. Request must be part of a specific development proposal submitted for DPD review and apply only to that proposal. Please provide the assigned DPD project number for the proposal: 3011305 Property Owner's Name: Seattle Housing Authority, Attn: Ryan Moore Residence Address: 120 Sixth Avenue North P.O. Box 19028 City/State/Zip Code: Seattle, WA 98109-1028 Telephone: 206-615-3548 Agent's Name: Harold Moniz, CollinsWoerman Address: 710 2nd Avenue, Suite 1400 City/State/Zip Code: Seattle, WA 98104 206-245-2016 Telephone: Applicant's Signature: TO BE COMPLETED BY DPD STAFF Meets Criteria Does Not Meet Criteria Reviewer **Explanation or Conditions:** 

To obtain review of a decision on an application under SMC 25.09.180B, an interpretation must be requested under SMC 23.88.020.

## **Summary of Groundwater Observations**

Table 2-1							
Yesler Terrace Redevelopment Project							
Summary of Groundwater Observations at Exploration Locations							
(As of March 3, 2011)							
	Approximate		Approximate				
	Ground	Depth to	Water				
Exploration ID	Elevation (ft)	Water (ft)	Elevation (ft)	Date	Note		
LAI-1	190.5	8.5	182.0	6/24/2010			
LAI-1	190.5	10.9	179.6	5/18/2010			
	208	8.0	200.0	5/24/2010	ATD, perched		
LAI-2	208	11.3	196.7	12/30/2010			
	208	12.6	195.4	6/24/2010			
	236	17.1	218.9	12/30/2010			
LAI-3	236	19.7	216.3	6/24/2010			
	236	20.5	215.5	5/25/2010	ATD		
LAI-4	205		-	5/17/2010	GW not observed		
LAI-5	231	12.2	218.8	5/24/2010	ATD		
	208.5	6.4	202.1	12/30/2010			
LAI-6	208.5	9.8	198.7	6/24/2010			
	208.5	11.0	197.5	5/18/2010	ATD		
LAI-7	225			5/18/2010	GW not observed		
LAI-8	228.5	17.8	210.7	5/25/2010	ATD		
Notes:	Notes:						
ATD - approximate water level observed at time of drilling.							
Refer to Attachment 1 of the Earth Technical Report for the exploration locations.							