

Willamette River Trail

West Linn, Oregon

Request for
Class II Parks Design Review Approval
and
Flood Management Permit Approval

Prepared for
The City of West Linn Parks and Recreation Department

Prepared by



HanmiGlobal Partner

Otak Project No. 17219

March 11, 2015

APPLICATION SUMMARY

- REQUEST:** A request for approval of **Class II Park Design Review and Flood Management** approval to develop the Willamette River Trail eastward from Willamette Park's Bernert Landing boat launch parking area approximately 1.25 miles along the Willamette River. The proposed trail would be approximately 10- to 12-foot wide, and meander along the alignment to minimize tree removal and grading. The entire trail alignment is located within the 100-year floodplain of the Willamette River and within the Willamette River Greenway.
- DESCRIPTION:** The trail will be located on portions of Map 3 1E 02, tax lots 100 and 500, and Map 2 1E 36, tax lot 2000 within the City of West Linn, Clackamas County, Oregon.
- ZONING:** According to the City of West Linn Zoning Map, a portion of the property adjacent to the Bernert Landing Boat Ramp is designated R-10 and is shown as a Park. The larger portion of the properties that would include the trail east of that parcel is all zoned General Industrial. All of the subject properties are covered by the Willamette Greenway and Tualatin River Protection Area overlay district. All affected areas are designated as Habitat Conservation Areas by Metro mapping.
- APPLICANT:** City of West Linn Parks and Recreation Department
c/o Ken Worcester
22500 Salamo Road
West Linn, OR 97068
- APPLICANT'S REPRESENTATIVE:** Otak, Inc.
c/o Jerry Offer
808 SW Third Avenue, Suite 300
Portland, OR 97204

(503) 415-2330, jerry.offer@otak.com

PROPERTY OWNERS: Portland General Electric Co. (tax lots 500 and 2000)
PO Box 4404
Portland, OR 97208

Clackamas County – Tri City Service District (tax lot 100)
150 Beaver Creek Road
Oregon City, OR 97045
503-742-4567

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11/15/15

I. REQUEST

A request for **Class II Park Design Review and Flood Management Area** approval to allow the City of West Linn Parks and Recreation Department to develop a portion of the Willamette River public pedestrian and bicycle trail. The proposed trail segment would be located on the north side of the Willamette River east of Willamette Park. The trail segment will extend from the east side of the boat launch parking area at Bernert Landing for approximately 1.25-miles eastward along the Willamette River. A public art exhibit constructed with grindstones formerly used at the paper mill at the Willamette Falls downstream will be located near the trailhead at Bernert Landing.

The main portion of the trail will be located outside of the Willamette River Greenway setback area of 35-feet. However, the proposal includes potential future trail spurs from the main trail to viewing platforms located along the river bank. The proposed trail would be paved to approximately 10- to 12-feet in width. The trail will meander along the proposed trail alignment to avoid tree removal. A preliminary trail alignment has been field located, brush has been removed, and the preliminary trail alignment has been surveyed. Sheet L5 is a survey of that alignment. Although the trail is intended to generally follow this preliminary trail alignment, it is noted that field adjustments to the alignment will be made to minimize tree removal and earthwork to construct the trail.

The entire trail alignment is located within the 100-year floodplain of the Willamette River.

The current proposal is similar to an application which was approved by the Planning Commission in 2005 (File DR-05-12), with the exception that that application also included a further eastward extension of the trail than does the current application. No action was taken to implement the plans approved through the 2005 application within the approval period for that application. Therefore, that approval has expired.

Figure 6, Proposed Parks System Plan of the 2007 City of West Linn Parks, Recreation and Open Space Master Plan illustrates a trail in the same general location as is proposed through the current application. The trail in the Parks Master Plan is designated as a portion of trail T-2 which is shown as extending from the confluence of the Tualatin River and the Willamette River extending along the north and west riverbanks as the river flows to the northern city boundary with the City of Lake Oswego. A trailhead is also shown on Figure 6 of the Parks Master Plan in the general location of the proposed trail's trailhead adjacent to the Bernert Landing boat launch parking area. The City of West Linn Comprehensive Trails System Master Plan (2013) calls for development of a trail in the same location and designates this trail as a secondary trail. The City of West Linn Transportation Systems Plan (2008) also shows a trail in this general area, although it is mapped to be on the opposite side of Volpp Street. The Transportation System Plan, however, says that that trail's location will be based upon the Parks, Recreation and Open Space Master Plan.

II. COMPLIANCE WITH APPLICABLE APPROVAL CRITERIA

A pre-application meeting was held with the City of West Linn on March 6, 2014 to discuss the proposed trail. At the meeting, City staff determined that a Class II Parks Design Review, a Willamette Greenway Permit, Water Resource Area Permit, and Flood Management Permit would be required for the proposed development. It was subsequently determined that Willamette River Greenway approval was not necessary for the trail (See email correspondence between West Linn Planner Tom Soppe and Jerry Offer of Otak, Inc. in Appendix 2)

CHAPTER 27 Flood Management Areas

According to Community Panel 410024B of the FEMA maps, the Base Flood Elevation (BFE) at this location is between 70 and 72 feet. The majority of the trail would be constructed at an elevation of 70 feet or higher.

27.060 APPROVAL CRITERIA

The Planning Director shall make written findings with respect to the following criteria when approving, approving with conditions, or denying an application for development in flood management areas.

- A. *Development, excavation, and fill shall be performed in a manner to maintain or increase flood storage and conveyance capacity and not increase design flood elevations.*

Response: No work is proposed that will increase the flood storage and conveyance capacity or increase flood elevations. All trail construction work is proposed to occur on existing grades with minimal ground disturbance. Construction of the trail will be completed by removing the organic materials and soil to a depth of approximately 12-inches from the existing ground surface, placing a gravel base, and paving the trail at close to existing ground surface elevations.

- B. *No net fill increase in any floodplain is allowed. All fill placed in a floodplain shall be balanced with an equal amount of soil material removal. Excavation areas shall not exceed fill areas by more than 50 percent of the square footage. Any excavation below bankful stage shall not count toward compensating for fill.*

Response: The proposed improvements do not require the import of fill other than the gravel base and trail pavement. Top soil to be removed from the trail alignment will either be reused at another location for trail construction or will be taken offsite as excess. The native materials to be removed for trail construction will roughly balance the amount of non-native material (gravel base and pavement) that will be used to construct the trail.

There is no excavation proposed below the top of bank of the river.

- C. *Excavation to balance a fill shall be located on the same parcel as the fill unless it is not reasonable or practicable to do so. In such cases, the excavation shall be located in the same drainage basin and as close as possible to the fill site, so long as the proposed excavation and fill will not increase flood impacts for surrounding properties as determined through hydrologic and hydraulic analysis.*

Response: All necessary excavation and fill for the trail will be located within the area of work. The amount of excavation and fill will be minimal and will be limited to what is necessary to provide an appropriate foundation for the trail.

- D. *Minimum finished floor elevations must be at least one foot above the design flood height or highest flood of record, whichever is higher, for new habitable structures in the flood area.*

Response: No new habitable structures are proposed within the flood area.

- E. *Temporary fills permitted during construction shall be removed.*

Response: There are no temporary fills proposed with the trail construction.

- F. *Prohibit encroachments, including fill, new construction, substantial improvements, and other development in floodways unless certification by a professional civil engineer licensed to practice in the state of Oregon is provided demonstrating that encroachments shall not result in any increase in flood levels during the occurrence of the base flood discharge.*

Response: Some filling will be required at the trailhead to provide an ADA accessible trail towards the east until a point where the trail can be constructed at close to existing grade. The proposed amount of fill for this area has been more than compensated for with cutting elsewhere further east. Sheet L5 shows a profile of the trail illustrating that proposed cutting areas exceed filling areas both in extent and in volume. Preliminary calculations comparing cut and fill show 20 cubic yards more cut than fill for trail construction over the entire. The flood carrying capacity of the site would be improved by the net cut.

- G. *All proposed improvements to the floodplain or floodway which might impact the flood carrying capacity of the river shall be designed by a professional civil engineer licensed to practice in the state of Oregon.*

Response: Although portions of the trail will be located within the 100-year floodplain, no fill from offsite will be used to build the trail up. There is no evidence to suggest that the trail which will parallel the course of the river would impact the flood carrying capacity of the river. The proposed trail has been designed by Gary Alfson, P.E., a professional engineer licensed to practice in the State of Oregon.

If viewing platforms are constructed at a later date, those platforms will be designed by a professional engineer licensed in the state of Oregon to ensure that the improvements are constructed in compliance with accepted building practices within floodplains.

- H. *New culverts, stream crossings, and transportation projects shall be designed as balanced cut and fill projects or designed not to significantly raise the design flood elevation. Such projects shall be designed to minimize the area of fill in flood management areas and to minimize erosive velocities. Stream crossings shall be as close to perpendicular to the stream as practicable. Bridges shall be used instead of culverts wherever practicable.*

Response: No new culverts or other stream crossings are proposed as part of the trail construction. All proposed trail improvements are proposed to be made at roughly existing grade and to be designed for no net increase in fill materials as compared to materials to be removed so there is no reason to believe that trail construction will raise

the design flood elevation.

- I. *Excavation and fill required for the construction of detention facilities or structures, and other facilities, such as levees, specifically shall be designed to reduce or mitigate flood impacts and improve water quality. Levees shall not be used to create vacant buildable land.*

Response: No detention facilities or structures, levees, or similar flood controls are proposed with this application.

- J. *The applicant shall provide evidence that all necessary permits have been obtained from those federal, State, or local governmental agencies from which prior approval is required.*

The applicant and project team are not aware of any federal, state or other local government permits that will be necessary to build the trail other than the permits requested from the City of West Linn through this application.

27.070 *Construction Materials and Methods*

- A. *All new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage using methods and practices that minimize flood damage.*

Response: The trail will consist of pervious asphalt pavement over a gravel base. Asphalt pavement is a widely accepted material in floodplain construction because it does not wash away like uncovered gravel or other unconsolidated materials.

Viewing platforms, if constructed in the future, will be constructed with materials and equipment resistant to flood damage such as composite lumber-like material, wood, concrete and steel.

- B. *Electrical, heating, ventilation, plumbing, and air-conditioning equipment and other service facilities shall be designed and/or otherwise elevated or located so as to prevent water from entering or accumulating within the components during conditions of flooding.*

Response: No new electrical, heating, ventilation, plumbing, and air-conditioning equipment or other such service facilities are proposed with this development. Users of the trail are expected to use the existing restroom facilities located in nearby Willamette Park and at the Bernert Landing boat launch area. The proposed project is limited to trail development only.

- C. *New and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the system.*

Response: The proposed project is limited to trail development only. No new or replacement water supply systems are proposed as part of this project.

- D. *New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharge from the systems into flood waters.*

Response: The proposed project is limited to trail development only. No new or replacement sanitary sewage systems are proposed with this project.

- E. *On-site waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding.*

Response: The proposed project is limited to trail development only. There are no new on-site waste disposal systems proposed with this project

- F. *All new construction and substantial improvements shall be anchored to prevent flotation, collapse, or lateral movement of the structure.*

Response: Viewing platforms, if constructed in the future, will be anchored as prescribed to prevent flotation, collapse, or lateral movement of the structure.

CHAPTER 28 Willamette and Tualatin River protection

28.040 Exemptions/Uses Permitted Outright

Response: “Construction of a public pathway by dedication or easement accepted by the City” is listed at Section 28.040.BB as a use which is one of the types of development exempted from Willamette and Tualatin River Protection review. Therefore, no Willamette River Greenway review of the trail proposal is required under Chapter 28.

CHAPTER 56 Parks Design Review

56.015 Categories of Parks and Natural Resource Facilities

Section 56.015 discusses the eight categories of park and natural resource facilities as established in the Parks Master Plan, and discusses pathways and trails as follows:

Pathways and trails. Pathways and trails may be incorporated into park facilities, but may also be stand-alone facilities in open space. Communities provide urban paths and trails for their recreational value as well as their value as part of a community’s commitment to the TPR. Trails and paths should be developed to provide linkages between schools, parks, neighborhoods, and the community and even integrate with regional trail systems. An example would be the trails and paths that crisscross the Tanner Basin neighborhood of West Linn and make it possible for children to access school on foot or bicycle in relative safety. Rudimentary gravel foot trails can be three to six feet wide. Paths in high use areas should be in the four- to 10-foot width range and paved. In neighborhoods that are built up with limited space to accommodate the paths or trails, reduced widths and non-traditional designs are encouraged if the alternative is no trail or path at all. Emphasis on providing routes that follow the cognitive patterns of residents is important. Surveillance potential and defensible space are also important considerations.

The proposed trail is consistent with the description of pathways and trails above. The proposal seeks approval to develop an approximately 10- to 12-foot wide paved public trail along the north bank of the Willamette River. The trail would begin at the existing Bernert Landing boat launch parking area on the east side of Willamette Park. The trail would extend eastward from the park within public pedestrian easements across properties owned by Portland General Electric and the Tri-City Service District, and potentially across properties owned by West Linn Paper Company in the future if easements can be obtained.

Development of the trail is called for by the 2007 City of West Linn Parks, Recreation and Open Space Master Plan and by the City of West Linn Transportation Systems Plan. The proposed trail would serve both recreational and transportation purposes. In addition, development of the trail is called for in permitting documents filed by PGE with the Federal Energy Regulatory Commission for PGE's continued operation of the Thomas w. Sullivan Hydroelectric Power Plant at Willamette Falls.

The area located immediately east of the boat launch parking area is zoned R-10 but is also noted as "park" on the City's zoning map. Further to the east in the area of the old Blue Heron Paper Mill treatment pond, the trail would be located on lands zoned GI, General Industrial.

56.20 *Applicability*

D. *Class II design review. The following is a non-exclusive list of Class II parks design review activities or facilities:*

1. *Site preparation for and/ or development of a new park or natural area.*
2. *Outward expansion of an existing park or natural area.*
3. *Addition or reduction of more than 10 percent of total square footage of an existing building, including any dimensional change if it would result in encroachment towards a natural resource area.*
4. *Any program change that results in a change in the function and classification of the park or resource area (e.g., from active park with playing fields to passive park with no playing fields. Any change that puts park program at odds with, or in violation of, Parks Master Plan).*
5. *Any change or proposed development which, by its scale or scope of work, requires that a full and comprehensive review be undertaken in the public forum.*

Response: The proposal involves locating a new trail within the Willamette River Greenway and within the 100-year floodplain. Therefore, City Planning Department staff determined that the proposed trail would warrant a comprehensive review due primarily to the presence and location of natural resources along the proposed trail alignment and the necessary site preparation for that facility. The Planning Department staff presented the following analysis of the proposal in their pre-application conference notes:

Responding to 56.020(D)(1,2,4,5) Staff finds that these trails represent: (1.) the development of a natural area; (2.) the eastward expansion of Willamette Park; (3.) a change in the function of the natural area; and, (4.) that the scope of the work is not minor, as in a typical Class I Design Review. Based upon these findings plus the fact the 2005 application was also processed as a Class II Design Review application, staff concludes that Class II Design Review is required.

The applicant does not contest that determination, and has therefore submitted this application for Class II Park Design Review approval.

56.025 *Exemptions*

Response: Trail development, as is proposed, is not one of the types of development exempted from Parks Design Review by this section.

5. *The park shall be designed in such a way as to take advantage of scenic views and vistas from the park site, as long as such views can be obtained without eliminating significant trees or other natural vegetated areas.*

Response: The proposed trail will be constructed at close to the existing ground surface grade. The trail route will meander through the trees along the river. It is intended that the final trail alignment will be field fit to avoid impacts to existing trees. No designated significant or heritage trees will be removed to construct the trail. One designated heritage tree, a black walnut tree, is located along the alignment. Special care will be taken to not impact this tree and other significant trees during trail construction. The City arborist will be involved in final trail alignment and construction plan review for the area near this tree. An interpretive exhibit regarding the black walnut tree may be located along the trail.

The trail is a passive-oriented recreation facility for the City of West Linn, and although located within the 100-year floodplain, the trail will be designed so that it does not interfere with the natural systems onsite. The second phase of the trail that includes development of interpretive kiosks/signs and viewing platforms will help to insure that the public has access to the most scenic views and vistas along the trail.

D. *Facility design and relationship to the human environment*

1. *Architecture. Whereas most park buildings are small in size and compatible with existing structure(s) on site and on adjoining sites, the possibility of larger facilities exists. Larger buildings are defined as those over 1,000 square feet and under 10,000 square feet in size. In those cases, contextual design is required. Contextual design means respecting and incorporating prominent architectural styles, building lines, roof forms, rhythm of windows, building scale and massing, materials and colors of surrounding buildings in the proposed structure. Also important is breaking the larger building into smaller visual components so that the mass of the building is not so apparent. This is especially relevant when the building is near the perimeter of the park. However, certain uses, by virtue of their functional and spatial requirements, are large and can never be made visually equal or even compatible with nearby homes. Such uses shall not be prohibited from locating at active-oriented park facilities on architectural grounds so long as the applicant's architect has broken down the building's horizontal plane into smaller visual components and stepped down the building at the end closest to the offsite structure(s). "Smaller visual components" shall be defined as changes in the horizontal plane every 100 feet created by indentations or pop-outs at least three feet in depth. "Stepping down" shall be defined as bringing the park building's end section that is closest to off-site dwellings to half the distance between the highest ridgeline of the park structure and the highest ridgeline of the nearest off-site structure. In those cases where visual component breakdown or stepping down is not feasible, the applicant may rely on transitions in terms of distance as reasonable mitigation between on and off-site buildings. An appropriate minimum distance to achieve mitigation shall be either 150 feet or an existing public right-of-way.*
2. *Material. Park structures shall emphasize natural material: such as exposed timbers, wood with brick and stone detail. Colors are subdued earth tones: grays, brown, off-whites, black, slate, and greens.*

3. *Light fixtures shall be provided in areas having heavy pedestrian or vehicular traffic and in potentially dangerous areas such as large parking lots, stairs, ramps, and abrupt grade changes during hours of intended use or operation.*
4. *Fixtures shall be placed at a height so that light patterns overlap at a height of seven feet, which is sufficient to illuminate a person. All projects undergoing design review shall use low- or high-pressure sodium bulbs and be able to demonstrate effective shielding so that the light is directed downwards rather than omni-directional.*
5. *Playing fields and court areas shall not be illuminated unless they are separated from nearby homes by adequate distance and/or screening. Adequate distance shall be at least 150 feet. Adequate screening shall be on or off-site fences, walls, terrain variation or vegetation. (trees, etc.)*
6. *Lines of sight shall be reasonably established so that the park and its facilities are visible to police and nearby residents.*
7. *Large or visually inaccessible parks should ensure that at least some emergency vehicle access is provided to the park's interior.*
8. *Closure times may be posted and/or gates may be installed at city parks to discourage their use at night if necessary for crime prevention and/or public safety.*
9. *Park landscaping shall accommodate safety concerns with appropriate use of plant types and ease of maintenance.*

Response: No new buildings are proposed with this development. No lighting or new landscaping other than restoration of disturbed areas with native vegetative materials is proposed as part of trail development. It is the intent of the Parks and Recreation Department to maintain the area along the trail in as natural a state possible. It is noted that limited use of low levels of security lighting in the form of bollard lighting may be added if deemed necessary.

The trail will be lineal and should provide reasonable lines of sight for security. Some removal of invasive vegetation such as blackberries and English ivy is anticipated to occur with trail development, with additional removal of invasive vegetation to continue after the trail is completed and in use. Removal of these invasive vegetation types will improve sight lines between Volpp Street and the trail, which should enhance safety for trail users.

The 10- to 12-foot wide paved trail will be large enough for slow travel by Police Department cars and the Parks and Recreation Department's park ranger car and standard-size pick-ups. A turn-around area is provided at the eastern end of the trail. The turn-around area will be large enough to accommodate pickup trucks and police cars

The Parks and Recreation Department would like to monitor the use of the facility and impose hours of operation and/or add gates only if it is deemed necessary for purposes of crime prevention and public safety.

H. *Public facilities.*

1. *Streets. Sufficient right-of-way and slope easement shall be dedicated to accommodate all abutting streets to be improved to City's Improvement Standards and Specifications. In determining the appropriate sizing of the street, the street should be the minimum necessary to accommodate*

- anticipated traffic load and needs and should provide substantial accommodations for pedestrians and bicyclists and in keeping with the character of the neighborhood. Road and driveway alignment should consider and mitigate impacts on adjacent properties and in neighborhoods in terms of increased traffic loads, noise, vibrations, and glare. Streets shall be installed per chapter 85 standards. Sidewalks shall be installed per Sections 85.200(A)(16) and 92.010(H). Both chapters allow reduced sidewalk widths to accommodate topographic limitations or to preserve trees.*
2. *Parking lots. CDC Section 46.090 explains the parking requirements for the various categories of parks and open space areas. City squares, malls or plazas are exempt from the parking requirements of Chapter 46. Reduced parking requirements are explained in Section 56.170. Except for areas accommodating ADA disabled parking and ADA access, parking lots may be constructed with grasscrete.*

Response: Trailheads are required to provide four spaces, including one ADA accessible space by CDC Section 46.090B.15. Since there is already a grasscrete parking lot at Willamette Park's wetlands picnic shelter across Volpp Street near the western trailhead which can provide the required parking spaces, no new parking is proposed with this application. Disabled person accessible parking spaces are available near the restroom building at the western end of the Bernert Landing boat ramp parking lot.

- I. *Paths and trails. Paths and trails connect the various activity areas within the park. They can also serve as part of a greater system of connective trails from one neighborhood or destination to another. Just like streets, there is a hierarchy of paths and trails.*
 1. *Paths that connect the right-of-way and/or parking lot with the main activity area(s) of the park need to accommodate pedestrians, bicyclists, and persons with disabilities (as grades allow). The path shall be paved and 5 to 8 feet wide. Lesser dimensions are allowed where topography and trees limit width. The grade shall be kept to fewer than five percent where the terrain allows. The path may be illuminated if the facility is programmed for night use.*
 2. *Paths that provide a link through the park to neighborhoods on either side must be recognized for their value in addressing the TPR, particularly in those cases where connecting roads through the park or natural area are not provided per Section 56.100(C)(6). These trails or paths may be paved, 5-8 feet wide and may be illuminated. Narrower path sections are permitted in response to topography and to preserve trees. Illumination is especially important for this group if these paths are used by early morning and early evening bicycle and pedestrian commuters. Directional signs are needed for this type of trail and user group.*
 3. *Smaller or reduced width paths, within park boundaries, can be built to link lesser activity areas or areas of attraction. Walkers, cyclists, or runners who do multiple loops for exercise often use these paths. These paths may be crushed gravel or paved and at least six feet wide.*
 4. *Nature trails are typically three to six feet wide, gravel, hog fuel, or packed earth. These trails are especially attractive to persons seeking quieter parts of the park for natural interpretation or solitude. Other user groups often use them for exercise loops. Trails and footbridges in natural areas should be designed to minimize disturbance of significant resources. Limiting access to creek beds, potentially erosive slopes, or wetlands by humans and dogs is an important measure if habitat or resource protection is to be addressed. At least initially, the use of these trails by all user groups should be encouraged. Changes or restrictions to some user groups shall be based on empirical observations at that specific site.*

5. *Disabled access paths allow disabled persons to access specific activity areas in the park at grades that meet ADA standards. Many parks have special disabled access paths with interpretive areas and viewpoints to allow visual, if not physical, access to natural resource areas. Usually, these paths are 50-200 meters long, 8 feet wide, and clearly identified.*
6. *Paths or trails that link parks, schools, neighborhoods, and the community and even integrate with adjacent cities or regional trails may be paved, 5-10 feet wide. The paths or trails should follow easily identified cognitive routes with good surveillance and defensible space.*
7. *All paths and trails shall be clearly identified with signs. They shall be laid out to attract use and to discourage people from cutting across landscaped areas or impacting environmentally sensitive areas.*

Response: The proposed trail is one section of an integrated trail system that will eventually connect from West Linn's Willamette Park to Lake Oswego and, eventually to, Portland generally to be located along the Willamette River. This particular section of the trail is proposed to be paved to approximately 10- to 12-feet in width, limited in gradients less than 5 percent, and to be accessible and consistent with ADA standards as practical. The trail will include a variety of signs to identify access to roads and to call out interpretive facilities. A second phase of trail development may include the development of interpretive stops and viewing platforms for trail patrons.

- J. *Provisions for persons with disabilities. The needs of a person with a disability shall be provided for. Accessible routes shall be provided between parking lot(s) and principal buildings and site facilities. The accessible route shall be the most practical direct route between accessible building entries, accessible site facilities, and the accessible entry to the site. All facilities shall conform to, or exceed, the Americans with Disabilities Act (ADA) standards, including those included in the Uniform Building Code.*

Response: There are no new buildings or service facilities associated with the proposed development. The trail will be paved and has been designed to be ADA accessible as required.

- K. *Miscellaneous criteria. Selected elements of the following chapters shall be met. It is not necessary to respond to all the submittal standards or approval criteria contained in these chapters, only those elements that are found to be applicable by the Planning Director at the pre-application conference pursuant to CDC Chapter 99.030(B) and (C):*
1. *Chapter 33, Storm Water Quality and Detention.*
 2. *Chapter 34, Accessory Structures.*
 3. *Chapter 38, Additional Yard Area Required.*
 4. *Chapter 40, Building Height Limitations and Exceptions.*
 5. *Chapter 42, Clear Vision Areas.*
 6. *Chapter 44, Fences & Screening Outdoor Storage.*
 7. *Chapter 46, Off-Street Parking and Loading.*
 8. *Chapter 48, Access.*
 9. *Chapter 52, Signs.*
 10. *Chapter 54, Landscaping. In addition, landscape plans shall incorporate plants which minimize irrigation needs without compromising recreational facilities or an attractive park environment.*

Appendix A



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F. Construction of new sidewalks, paths, and trails that are less than 200 feet long and do not intrude into natural resource areas (NRAs). If they intrude in NRAs, then Class I parks design review is required.

So although the trail is over 200 feet long, it is in a natural resource area and therefore, at minimum, a Class I Design Review is required.

The argument for a Class II Design Review is found in the applicability language of that CDC 56.020(D)(1,2,4,5):

D. Class II design review. The following is a non-exclusive list of Class II parks design review activities or facilities:

- 1. Site preparation for and/or development of a new park or natural area.*
- 2. Outward expansion of an existing park or natural area.*
- 4. Any program change that results in a change in the function and classification of the park or resource area (e.g., from active park with playing fields to passive park with no playing fields. Any change that puts park program at odds with, or in violation of, Parks Master Plan).*
- 5. Any change or proposed development which, by its scale or scope of work, requires that a full and comprehensive review be undertaken in the public forum.*

Responding to 56.020(D)(1,2,4,5) Staff finds that these trails represent: (1.) the development of a natural area; (2.) the eastward expansion of Willamette Park; (3.) a change in the function of the natural area; and, (4.) that the scope of the work is not minor, as in a typical Class I Design Review. Based upon these findings plus the fact the 2005 application was also processed as a Class II Design Review application, staff concludes that Class II Design Review is required.

State of Oregon is provided demonstrating that encroachments shall not result in any increase in flood levels during the occurrence of the base flood discharge.

Willamette River Greenway . The Willamette River Greenway purpose statement: *Protect, preserve and expand legal public use and access to and along the shoreline and river, while recognizing and preserving private property rights.* offers clear support for this trail proposal which offers access to and along the shoreline.

Approval criterion is also supportive:

5. Legal access to, and along, the riverfront in single-family residential zoned areas shall be encouraged and pursued especially when there are reasonable expectations that a continuous trail system can be facilitated. The City recognizes the potential need for compensation where nexus and proportionality tests are not met. Fee simple ownership by the City shall be preferred. The trail should be dimensioned and designed appropriate to the terrain it traverses and the user group(s) it can reasonably expect to attract. The City shall be responsible for signing the trail and delineating the boundary between private and public lands or access easements.

Staff notes that criteria includes a requirement for water permeable materials unless the applicant can justify otherwise:

N. Water-permeable materials for hardscapes. The use of water-permeable materials for parking lots, driveways, patios, and paths as well as flow-through planters, box filters, bioswales and drought tolerant plants are strongly encouraged in all "a" and "b" land classifications and shall be required in all "c" and "d" land classifications. The only exception in the "c" and "d" classifications would be where it is demonstrated that water-permeable driveways/hardscapes could not structurally support the axle weight of vehicles or equipment/storage load using those areas. Flow through planters, box filters, bioswales, drought tolerant plants and other measures of treating and/or detaining runoff would still be required in these areas.

Water Resource Area . This chapter is also supportive of allowing, with mitigation and revegetation, trail alignments across creeks to facilitate planned alignments such as this trail along the river. 32.050(F) states in part "...passive use recreation facilities may be built in and across water resource areas when no other practical alternative exists... Construction shall minimize impacts. Construction to the minimum dimensional standards for roads is required. Full mitigation and revegetation is required, with the applicant to submit a mitigation plan pursuant to CDC 32.070 and a revegetation plan pursuant to CDC 32.080."

If there is more than 500 new square footage of impervious areas the applicant will have to provide storm water treatment to the satisfaction of public works standards.

Jerry Offer

From: Soppe, Tom <tsoppe@westlinnoregon.gov>
Sent: Wednesday, July 16, 2014 3:54 PM
To: Jerry Offer
Cc: Grant Evenhus; Worcester, Ken
Subject: RE: request from listed submittal requirements for Willamette Greenway trail application

Yes, those should all be fine to waive too. I only had issue with the one, so I forgot that I hadn't already approved the waiver for all of the others.

CITY OF
West Linn
100 Years
1913 - 2013

Tom Soppe
tsoppe@westlinnoregon.gov
Associate Planner
22500 Salamo Rd
West Linn, OR 97068
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From: Jerry Offer [mailto:jerry.offer@otak.com]
Sent: Wednesday, July 16, 2014 3:40 PM
To: Soppe, Tom
Cc: Grant Evenhus; Worcester, Ken
Subject: RE: request from listed submittal requirements for Willamette Greenway trail application

Sooooooooooooooooooooo, what about the other normally required items that we requested be waived?

From: Soppe, Tom [mailto:tsoppe@westlinnoregon.gov]
Sent: Wednesday, July 16, 2014 3:19 PM
To: Jerry Offer
Cc: Grant Evenhus; Worcester, Ken
Subject: RE: request from listed submittal requirements for Willamette Greenway trail application

That sounds fine then. If they can be shown on the site plan then it should be fine since they are the only utility.

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From: Jerry Offer [mailto:jerry.offer@otak.com]
Sent: Wednesday, July 16, 2014 2:32 PM
To: Soppe, Tom
Cc: Grant Evenhus; Worcester, Ken
Subject: FW: request from listed submittal requirements for Willamette Greenway trail application

Hi Tom,

I overlooked sending you this email from our project engineer, Grant, with regard to your response to me a couple of weeks ago regarding what we are going to do with regard to a "utility plan" for storm water disposal for the Willamette River trail project. Bottom line is that we will either be using pervious pavement and thus have no runoff to treat, or a swale on the uphill side of the trail. If we have the latter, it will be covered on the site plans and - in my opinion - should not require a "utility plan."

From: Grant Evenhus
Sent: Wednesday, July 09, 2014 11:16 AM
To: Jerry Offer
Subject: RE: request from listed submittal requirements for Willamette Greenway trail application

Usually if we have to do permeable pavement it puts us in a nexus for "added impervious" especially when you don't have "pollution generating" surfaces (bike trail, no cars). I've run the question up the line at the City Engineering department and will let you know, but it's been my hope that we will not need to have treatment. If we do, it will be a swale on the uphill side of the entire trail. Also, the geotech is evaluating the use of pervious pavement and will recommend a trail section when they're finished which will tell us more.

I'll let you know what I find out.

Thanks,
-Grant

Grant Evenhus, PE, ENV SP |Associate| Project Manager
P: 360-356-8466 | F: 360-737-9651

Please consider the environment before printing emails.

From: Jerry Offer
Sent: Tuesday, July 08, 2014 2:45 PM
To: Grant Evenhus
Subject: RE: request from listed submittal requirements for Willamette Greenway trail application

Grant,
In relation to my request in the preceding email, the pre-application conference notes say that "if there is more than 500 new square feet of impervious area, the applicant will have to provide stormwater treatment to the satisfaction of public work standards." Also, the pre-app notes comment that the Willamette greenway section of the Code requires the use of "water permeable materials for parking lots, driveways, patios, and paths as well as flow-through planters, box filters, bioswales and drought tolerant plants..." and that "the only exception is... where it is demonstrated that water-permeable driveways/hardscapes could not structurally support the axle weight of vehicles or equipment/storage load using those areas. Flow through planters, boxfilters, bioswales, drought tolerant plants and other means of treating and/or detaining runoff would still be required in these areas."

From: Jerry Offer
Sent: Tuesday, July 08, 2014 11:49 AM
To: Grant Evenhus
Subject: FW: request from listed submittal requirements for Willamette Greenway trail application

Grant,

Will we be providing some sort of stormwater treatment for the Willamette River Trail runoff? Will we have a typical x-section of a swale or something to that effect?

From: Soppe, Tom [<mailto:tsoppe@westlinnoregon.gov>]

Sent: Tuesday, July 08, 2014 11:34 AM

To: Jerry Offer

Subject: RE: request from listed submittal requirements for Willamette Greenway trail application

Jerry,

Thanks. Will you be providing something showing storm swales, etc., instead of (8)?

Tom



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Web: westlinnoregon.gov

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From: Jerry Offer [<mailto:jerry.offer@otak.com>]

Sent: Wednesday, July 02, 2014 4:47 PM

To: Soppe, Tom

Cc: Grant Evenhus; Worcester, Ken

Subject: request from listed submittal requirements for Willamette Greenway trail application

Hi Tom,

On behalf of the prospective applicant, the City of West Linn Parks and Recreation Department, I would like to request that the City of West Linn Planning Dept. waive the below highlighted submittal requirements applicable to a Class II Parks Design Review, Flood Management Area, and Water Resource Area application for the proposed Willamette River trail east of the Bernert Landing boat launch parking area to Bernert Creek. The reasons for requesting the waiver of these requirements is listed in red after the submittal requirement.

For Parks Development Review:

56.080 SUBMITTAL STANDARDS FOR CLASS II PARKS DESIGN REVIEW

A. The application for a Class II parks design review shall contain the following elements:

1. A site analysis (per CDC [56.110](#));
2. A site plan (per CDC [56.120](#));

H. If necessary, the applicant shall also submit a mitigation plan pursuant to CDC 32.070, and a revegetation plan pursuant to CDC 32.080. (Ord. 1545, 2007) The plans are not yet complete for this area. I am not sure that our disturbance area would necessitate a mitigation plan.

We are working on the application and intend on submitting it within the next few weeks. Therefore, a response to this request for a waiver of submitting the highlighted required materials would be appreciated. I apologize for my tardiness in making this request.

Thanks Tom.



Jerry Offer | Planner

808 SW 3rd Ave., Suite 300, Portland, OR 97204.
Main 503.287.OTAK (6825) | Fax 503.415.2304 | Direct 503.415.2330



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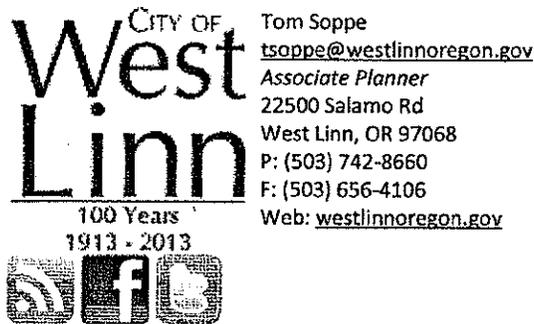
Jerry Offer

From: Soppe, Tom <tsoppe@westlinnoregon.gov>
Sent: Tuesday, May 13, 2014 1:50 PM
To: Jerry Offer
Cc: Worcester, Ken; Grant Evenhus
Subject: RE: Willamette River trail

Jerry,

Yes, it appears that public trails get an exception, as of the code in place now. So the project will need DR, WRA (if still heading east to Bernert), and FMA permits but not Will River Greenway permit.

Thanks
Tom



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From: Jerry Offer [<mailto:jerry.offer@otak.com>]
Sent: Monday, May 12, 2014 1:44 PM
To: Soppe, Tom
Cc: Worcester, Ken; Grant Evenhus
Subject: Willamette River trail

Tom,

In preparing to write the application for the WL Parks Department's application for the Willamette River Trail, I ran across the following in the Code:

Chapter 28
Willamette and Tualatin River Protection

28.040 EXEMPTIONS/USES PERMITTED OUTRIGHT
The following development activities do not require a permit under the provisions of this chapter. (Other permits may still be required.)

BB. Construction of a public pathway by dedication or easement accepted by the City. (Ord. 1576, 2008; Ord. 1590 § 1, 2009; Ord. 1604 §§ 22, 23, 24, 2011)

Doesn't this provision exempt the public pathway (trail) project from Willamette River greenway review? It would appear to to me because the Parks Dept. will be acquiring easements for the trail, and ultimately those easements will need to be accepted by the City on behalf of the public. This provision appears to have been adopted since the prior 2005 decision for the trail. That earlier decision included a Greenway permit.

This is not to say that the trail project would not still be subject to Parks Design Review or Flood Management Area review.

Please let us know as soon as you can. Thanks.



Museum/Orchestra Partner

Jerry Offer | Planner

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Appendix C



HanmiGlobal Partner



January 13, 2015

Otak, Inc.
700 Washington Street
Vancouver, WA 98660

Attention: Mr. Gary Alfson

Report of Geotechnical Engineering Services
Proposed Willamette River Trail
West Linn, Oregon
GeoDesign Project: WestLinn-9-01

INTRODUCTION

GeoDesign, Inc. is pleased to submit this geotechnical engineering report for the proposed Willamette River Trail in West Linn, Oregon. Otak, Inc. provided us with preliminary plans for this development. We understand that this phase of the project will include approximately ½ mile of trail construction from near Willamette Park to 4th Street, along the Willamette River. The trail will be paved with permeable asphalt. Future phases of work will include additional trail segments that extend east of 4th Street, foot bridges, overlook structures, and retaining walls, which are outside of our scope of work for this phase and is not addressed in this report.

This report provides a summary of GeoDesign's finding and recommendations for the first segment of the Willamette River Trail. Figure 1 shows the site relative to existing physical features. Figure 2 shows the proposed trail alignment.

PURPOSE AND SCOPE

The purposes of our services were to perform a reconnaissance along the proposed trail alignment from Willamette Park to 4th Street and provide general geotechnical engineering recommendations for trail development. Our scope of work included the following:

- Completed a site reconnaissance to document the vegetation and identify geotechnical-related concerns along the proposed trail.
- Completed shallow hand explorations to depths of up to 1 foot below ground surface (BGS) to observe subsurface conditions and estimate the depth of vegetation at select locations along the alignment.
- Evaluated subsurface conditions at the hand exploration locations using a steel foundation probe. Identified areas where very soft soil is encountered.

- Classified the materials encountered in the explorations.
- Developed preliminary pavement design recommendations.

DISCUSSION

FIELD EXPLORATION

A member of GeoDesign's geotechnical staff explored subsurface conditions along the trail alignment by advancing shallow excavations using a shovel and probing the soil with a hand probe. We performed this field work on July 23, 2014. Prior to our arrival, the trail had been partially cleared of vegetation and marked so that the trail could be easily identified and surveyed. The shovel excavations were generally 1 foot deep and were performed along the trail alignment at select locations to observe the near-surface soil and observe the root zone depth. The soil encountered in the excavations was observed and classified. Soil samples were not collected from the excavations and laboratory testing was not performed. The hand probe was periodically inserted into the ground to estimate the stiffness of the soil. A summary of the root zone depths and soil stiffness observed along the alignment is presented in "Stripping and Grubbing" section of this report. The explorations were performed at representative locations and with sufficient frequency to identify areas with similar soil conditions.

SITE CONDITIONS

The trail begins at Willamette Park, which is located southeast of the intersection of Volpp Street and 12th Street in West Linn, Oregon. This phase of the Willamette River Trail project is for the section of trail alignment that extends from Willamette Park to 4th Street. Figure 2 shows the proposed trail alignment that was evaluated for this project. The following sections describe the surface and subsurface conditions along this segment.

Surface Conditions

The trail is located near the top of the western bank of the Willamette River. The existing ground surface along the trail segment is generally covered with a variety of tree, shrub, and grass vegetation. Most of the alignment is covered with dense trees and shrubs, but there are also a few open areas that are primarily grass fields with only scattered trees. The project will limit the number of significant trees that need to be removed by constructing the trail so that it meanders around large trees that will be left in place. The trail alignment will generally be relatively flat to gently sloping. There will also be occasional small hills along the alignment.

Subsurface Conditions

The subsurface soil conditions along the trail alignment are relatively consistent. The soil encountered in our explorations consists of brown, medium stiff to stiff silt with fine-grained sand. The silt was generally moist at the time of exploration and exhibited low plasticity.

Standing surface water was not observed along the trail alignment and groundwater was not observed in the shallow explorations that were performed. Given the close proximity of the site to the adjacent Willamette River, groundwater at the site is anticipated to be at approximately the same elevation as the river. According to the plans for this project that were prepared by Otak, the mean water and mean high water elevations of the Willamette River at the site are 55 and 60 feet, respectively.

Infiltration testing was not performed as part of our field investigation. However, based on our experience working with similar silt soil on other nearby projects, we anticipate that infiltration rates in the silt will be relatively low.

GEOTECHNICAL HAZARDS

Significant geotechnical hazards were not identified along the section of trail alignment that was evaluated. Excessively soft soil was not encountered and potential slope stability issues were not observed. In our opinion, the proposed trail can be successfully constructed as long as our recommendations in the "Site Development Recommendations" section of this report are incorporated into design and construction.

SITE DEVELOPMENT RECOMMENDATIONS

The following sections present our recommendations for pavements, stripping and grubbing, demolition, subgrade evaluation, subgrade protection, excavation, structural fill, permanent slopes, erosion control, and drainage. Subgrade protection during construction will be a critical geotechnical consideration.

PAVEMENT DESIGN RECOMMENDATIONS

Trail pavements should be installed on subgrade prepared in conformance with the "Site Preparation" and "Structural Fill" sections of this report. Based on our explorations, the design pavement section of 3.0 inches of permeable asphalt concrete (AC) overlying 6 inches of aggregate base is appropriate for the proposed use. The porous asphalt concrete (PAC) should be ½-inch PAC according to Oregon Standard Specifications for Construction – 2015 (OSSC) 00743 (Porous Asphalt Concrete) and rolled until the entire surface has been compacted with at least four coverages by the breakdown and intermediate rollers and finished with additional coverages by the finish roller. Although OSSC 00743 (Porous Asphalt Concrete) indicates the minimum lift thickness is twice the maximum aggregate size, we recommend specifying a minimum lift thickness of 2 inches for ½-inch PAC. A polymer-modified asphalt binder is required in the wearing course. Asphalt binder should be performance graded and conform to PG 64-22ER or better.

These recommendations are based on the assumption that the only vehicle traffic that will occur on the trail is occasional access by maintenance personnel in pickup trucks. If larger trucks or heavy equipment will be using this trail, then we should be contacted so that we can revise our pavement design to accommodate the heavier vehicle loading.

SITE PREPARATION

Stripping and Grubbing

We observed thick vegetation along most of the trail alignment. Vegetation included dense blackberry growth, small to large trees, weeds, and grasses. Our field work was performed in July when vegetation is typically most prevalent. The vegetation will likely be sparser in the winter.

Trees or shrubs present within improvement areas, and for a 5-foot margin around such areas, should be removed. In addition, root balls should be grubbed out to the depth of the roots,

which could exceed 2.5 feet BGS. Depending on the methods used to remove the root balls, considerable disturbance and loosening of the subgrade could occur during site grubbing. We recommend that soil disturbed during grubbing operations be removed to expose firm, undisturbed subgrade. The resulting excavations should be backfilled with structural fill.

The existing topsoil zone should be stripped and removed from all proposed improvement areas. The stripping depth will vary along the alignment, and the actual stripping depth should be based on field observations at the time of construction. Table 1 provides an estimate of stripping depths along the alignment based on our field explorations. Stripped material should be transported off site for disposal or used in landscaped areas. Table 1 also summarizes the relative stiffness of the soil along each section of trail, as determined using a hand probe.

Table 1. Estimated Stripping Depths and Soil Stiffness

Approximate Station	Topsoil Depth (inches)	Relative Soil Stiffness
10+50 to 13+40	4 to 6	Stiff
13+40 to 15+30	2 to 4	Medium stiff
15+30 to 19+50	~2	Medium stiff
19+50 to 23+00	1 to 2	Stiff to medium stiff
23+00 to 24+00	2 to 4	Medium stiff
24+00 to 27+20	0 to 1	Stiff to medium stiff
27+20 to 30+00	0 to 2	Stiff to medium stiff
30+00 to 33+00	4 to 5	Stiff to medium stiff
33+00 to 35+90	~4	Stiff
35+90 to 40+30	~6	Stiff

Demolition

Demolition should include complete removal of existing structures and pavements within 5 feet of areas to receive new pavements or engineered fills. Voids resulting from removal of abandoned utility lines should be backfilled with compacted structural fill, as discussed in the "Structural Fill" section of this report. The bottom of such excavations should be excavated to expose a firm subgrade before filling and their sides sloped at 1.5 horizontal to 1 vertical (H:V) or flatter to allow for more uniform compaction at the edges of the excavations. In general, demolished material should be transported off site for disposal.

Subgrade Evaluation

We recommend that the geotechnical engineer of record, or their representative, observe the exposed subgrade after stripping and site cutting have been completed to determine if there are areas of unsuitable or unstable soil. Unsuitable subgrade should be removed and replaced with structural fill in accordance with the "Structural Fill" section of this report. Within saturated areas, we recommend that the structural fill consist of imported granular material. We do not anticipate over-excavation depths greater than 12 inches.

SUBGRADE PROTECTION

The subgrade generally consists of silt, which is moisture sensitive and easily disturbed during the wet season and when it is moist. If not carefully executed, site preparation, utility trench work, paving, and excavation can create extensive soft areas and will result in significant subgrade repair costs. If construction is planned when the surficial soil is wet of optimum moisture content or during wet weather, the construction methods and schedule should be carefully considered with respect to protecting the subgrade to reduce the need to over-excavate disturbed or softened soil.

The design pavement section for the trail consists of 3.0 inches of permeable AC overlying 6 inches of aggregate base and geotextile. While this section will provide an adequate section for the proposed foot and bicycle traffic of the trail, the most significant demands of the subgrade will likely occur during construction, especially the truck traffic and compaction equipment associated with the base aggregate and asphalt. If construction traffic will have to drive on the aggregate base section, the base thickness should be increased to protect the subgrade as described below.

The primary methods of protecting the subgrade are to schedule the work for the summer dry period and increasing the thickness of the aggregate base. The on-site silt subgrade is least susceptible to disturbance during the driest times of the year. We recommend scheduling the construction for the period of July through August when the weather is typically driest. Even if site preparation occurs during the summer months, the aggregate base and geotextile section alone may not provide adequate support for heavy construction traffic.

The thickness of the granular material for haul roads and staging areas will depend on the construction schedule and the amount and type of construction traffic. During the dry summer period, a 6- to 8-inch-thick mat of granular material underlain by a geotextile will likely be sufficient for light staging areas but is not expected to be adequate to support repeated heavy equipment or truck traffic. Over portions of the trail that will serve as haul roads subjected to repeated heavy equipment traffic, the granular mat typically needs to be increased to between 12 and 16 inches. The staging/haul road sections will need to be increased to 12 to 18 inches and 18 to 24 inches, respectively, if construction does not occur during the summer dry period.

The actual thickness of haul roads and staging areas should be selected by the contractor who has control over site development methods and the amount and type of construction traffic. The granular material should be placed in one lift over the prepared, undisturbed subgrade and compacted using a smooth-drum roller without the use of vibratory action. In addition, a geotextile fabric can be placed as a barrier between the subgrade and imported granular material in areas of repeated construction traffic.

EXCAVATION

General

Significant excavations are not expected for this project. Shallow excavations into the on-site soil should be readily accomplished with conventional earthwork equipment. It is possible that excavation will encounter shallow perched groundwater in isolated areas even during the dry season. Dewatering should be readily accomplished by pumping from sumps.

STRUCTURAL FILL

General

Fills should only be placed over a subgrade that has been prepared in conformance with the "Site Preparation" section of this report. All material used as structural fill should be free of organic matter or other unsuitable material. The material should meet the specifications provided in OSSC 00330 (Earthwork), depending on the application. All structural fill should have a maximum particle size of 4 inches. A brief characterization of some of the acceptable materials and our recommendations for their use as structural fill is provided below.

On-Site Soil

The near-surface material at the site should be suitable for use as general structural fill provided it is properly moisture conditioned, free of debris, organic material, and particles over 6 inches in diameter and meets the specifications provided in OSSC 00330.12 (Borrow Material). We anticipate that some moisture conditioning will be required to dry the soil to a moisture condition near optimum. This will require an extended period of dry weather, typically experienced between early July and mid-October. It will be difficult, if not impossible, to adequately compact on-site soil during the rainy season or during prolonged periods of rainfall.

When used as structural fill, on-site soil should be placed in lifts with a maximum uncompacted thickness of 6 to 8 inches and compacted to not less than 92 percent of the maximum dry density for fine-grained soil and 95 percent of the maximum dry density for granular soil, as determined by ASTM D 1557.

Imported Granular Material

Imported granular material used for structural fill should be pit- or quarry-run rock, crushed rock, or crushed gravel and sand and should meet the specifications provided in OSSC 00330.14 (Selected Granular Backfill) and OSSC 00330.15 (Selected Stone Backfill). Imported granular material should be fairly well graded between coarse and fine material and have less than 5 percent by dry weight passing the U.S. Standard No. 200 Sieve.

When used as structural fill, imported granular material should be placed in lifts with a maximum uncompacted thickness of 12 inches and compacted to not less than 95 percent of the maximum dry density, as determined by ASTM D 1557.

Aggregate Base Rock

Aggregate material used as base rock for the trail pavements should consist of ¾- or 1½-inch-minus material meeting the specifications provided in OSSC 00641 (Aggregate Subbase, Base, and Shoulders), with the exception that the aggregate should have less than 5 percent by dry weight passing the U.S. Standard No. 200 Sieve.

The aggregate base rock material should be placed in lifts with a maximum uncompacted thickness of 12 inches and compacted to not less than 95 percent of the maximum dry density, as determined by ASTM D 1557.

Trench Backfill

If used, trench backfill for the utility pipe base and pipe zone should consist of well-graded, granular material with a maximum particle size of 1 inch and less than 5 percent by dry weight passing the U.S. Standard No. 200 Sieve and should meet the specifications provided in OSSC 00405.14 (Trench Backfill, Class B). The material should be free of roots, organic matter, and other unsuitable material.

Within pavement areas, trench backfill placed above the pipe zone should consist of imported granular material meeting the specifications provided in OSSC 00405.14 (Trench Backfill, Class B). The backfill should be compacted to at least 92 percent of the maximum dry density, as determined by ASTM D 1557, at depths greater than 2 feet below the finished subgrade and 95 percent of the maximum dry density, as determined by ASTM D 1557, within 2 feet of finished subgrade. In all other areas, trench backfill above the pipe zone should be compacted to at least 92 percent of the maximum dry density, as determined by ASTM D 1557.

Stabilization Material

Stabilization material used for staging area/haul roads or for trench stabilization should consist of pit- or quarry-run rock, crushed rock, or crushed gravel and sand and should meet the specifications provided in OSSC 00330.14 (Selected Granular Backfill) and OSSC 00330.15 (Selected Stone Backfill), with a minimum particle size of 4 inches and less than 5 percent by dry weight passing the U.S. Standard No. 4 Sieve. The material should be free of organic matter and other deleterious material. Trench stabilization material should be compacted to a well-keyed, firm condition.

Drain Rock

Drain rock should consist of angular, granular material with a maximum particle size of 2 inches and should meet the specifications provided in OSSC 00430.11 (Granular Drain Backfill Material). The material should be free of roots, organic matter, and other unsuitable material and have less than 2 percent by dry weight passing the U.S. Standard No. 200 Sieve (washed analysis). Drain rock should have at least two fractured faces and be compacted to a well-keyed, firm condition.

PERMANENT SLOPES

Permanent cut and fill slopes may be built to a gradient as steep as 2H:1V. Slopes that will be maintained by mowing should not be constructed steeper than 3H:1V. Slopes should be planted with appropriate vegetation to provide protection against erosion as soon as possible after grading. Surface water runoff should be collected and directed away from slopes to prevent water from running down the face of the slope. Access roads and pavements should be located at least 5 feet from the top of slopes. This setback should be increased to 10 feet for buildings.

EROSION CONTROL

The soil at this site is susceptible to erosion. Erosion control measures should be planned carefully and put in place before construction begins. Measures that can be employed to reduce erosion include the use of silt fences, hay bales, buffer zones of natural growth, sedimentation ponds, and granular haul roads. These erosion control measures should be used in accordance with local and state ordinances. We recommend that any exposed slopes be covered with an appropriate erosion control product if construction occurs during periods of wet weather.

DRAINAGE

The proposed trail will be constructed out of permeable AC pavement that will allow water to flow into underlying aggregate base. Infiltration testing in the native soil was beyond the scope of our work. While some infiltration will likely occur in the on-site soil, we understand that pavement design will not rely on infiltration. Therefore, we recommend that drains be installed within the aggregate base, or that the subgrade be sloped to allow runoff water to drain out of the aggregate base.

OBSERVATION OF CONSTRUCTION

Satisfactory earthwork and paving performance depends to a large degree on quality of construction. Sufficient observation of the contractor's activities is a key part of determining that the work is completed in accordance with the construction drawings and specifications. Subsurface conditions observed during construction should be compared with those encountered during the subsurface field exploration. Recognition of changed conditions often requires experience; therefore, qualified personnel should visit the site with sufficient frequency to detect if subsurface conditions change significantly from those anticipated.

We recommend that GeoDesign be retained to observe earthwork activities, including stripping and grubbing, evaluation of the pavement subgrade and base rock, and repair of any soft areas.

LIMITATIONS

We have prepared this report for use by Otak, Inc. and members of the design and construction team for the proposed project. If grading or site plans change, we should be contacted to review our recommendations and conclusions. In addition, it should be understood that this geotechnical report does not address work that will occur in other project phases, such as the design and construction of trails in other areas, bridges, overlook structures, and retaining walls. The scope of our services does not include services related to construction safety precautions, and our recommendations are not intended to direct the contractor's methods, techniques, sequences, or procedures, except as specifically described in our report for consideration in design.

Within the limitations of scope, schedule, and budget, our services have been executed in accordance with generally accepted practices in this area at the time the report was prepared. No warranty, express or implied, should be understood.

◆ ◆ ◆

We appreciate the opportunity to be of continued service to you. Please call if you have questions concerning this report or if we can provide additional services.

Sincerely,

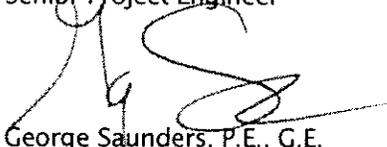
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RTL:SPM:GPS:kt

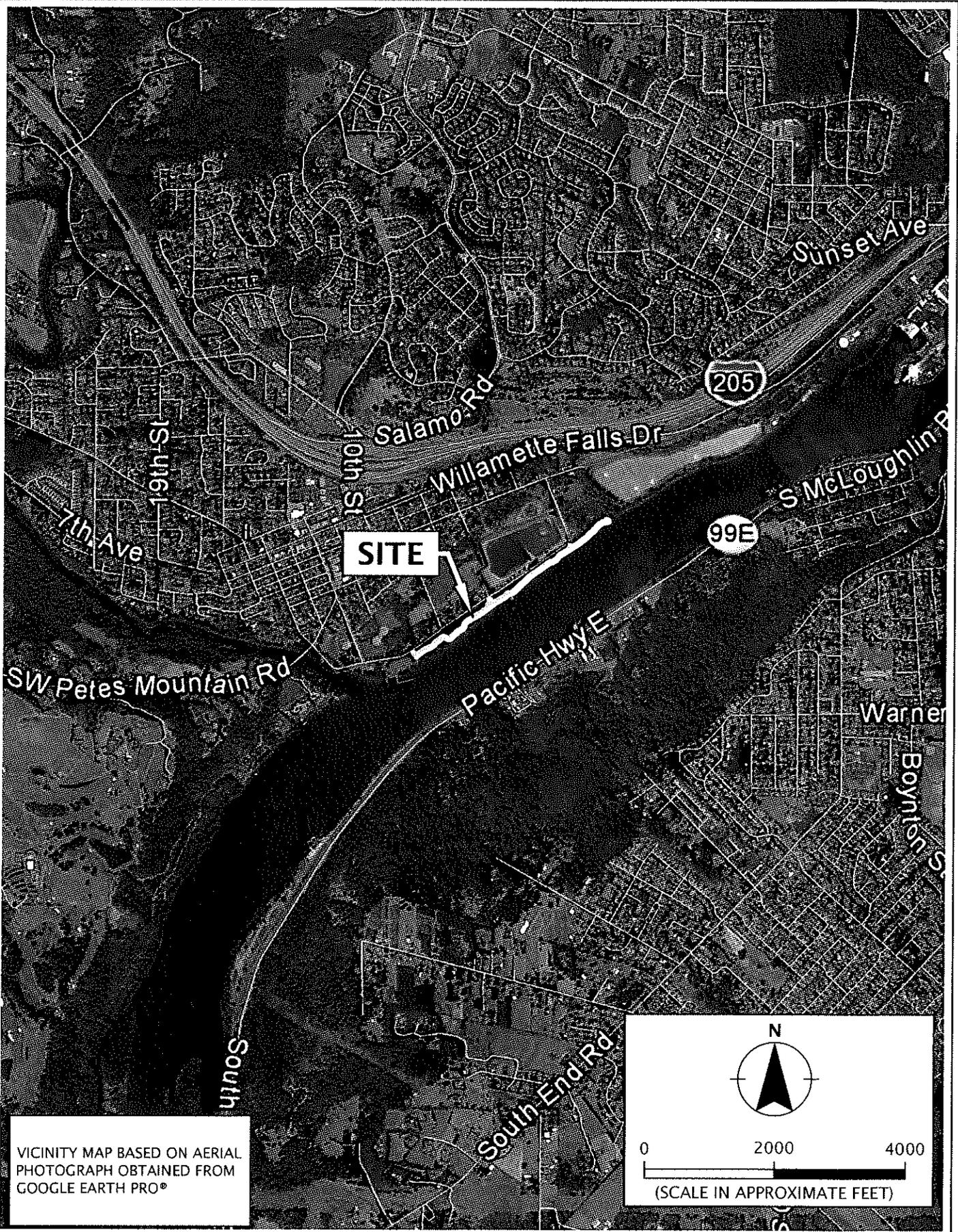
Attachments

One copy submitted (via email only)

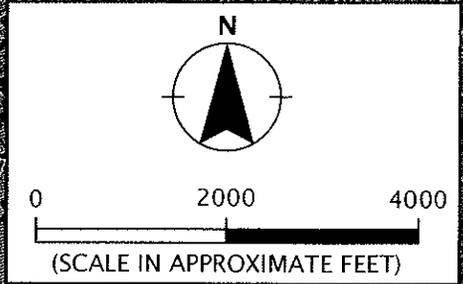
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FIGURES



VICINITY MAP BASED ON AERIAL PHOTOGRAPH OBTAINED FROM GOOGLE EARTH PRO®



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 File Name: J:\S:\WestLinn\WestLinn-9\WestLinn-9-01\Figures\CAD\WestLinn-9-01-VM01.dwg | Layout: FIGURE 1

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WESTLINN-9-01

JANUARY 2015

VICINITY MAP

PROPOSED WILLAMETTE RIVER TRAIL
 WEST LINN, OR

FIGURE 1