
Regional Industrial Lands

Utility Infrastructure and On-Site Development

Prepared: May 31, 2012
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SITE 2 TIME OIL COMPANY (PORTLAND), MAP 1

Public Water System

The site is in the City of Portland Water Bureau service area and is currently served by 24" mains located along the southern and eastern site frontages. Portland Water Bureau maintenance records were not reviewed, but no specific deficiencies are known for this system.

- Proposed improvements: extend service lateral directly to the site, assumed at the south side of the site.

Public Sewer System

The site is currently served by the City of Portland with a 12" CSP main located along the south frontage of the site and a 15" CSP main (Rivergate Interceptor) located along the east property line. Portland BES maintenance records indicate that both pipes are in good condition adjacent to the site boundaries.

- Proposed improvements: extend service lateral directly to the site, assumed at the south side of the site.

Public Storm System

The site is located along the Willamette River; however, private outfalls to the river are unlikely to be approved, particularly for new construction. Therefore, the site is required to discharge to a public storm main. The nearest storm facility is a City of Portland 24" main located in N Burgard Way, which discharges directly to the river.

- Proposed improvements: extend 1200' of 18" storm main from the south side of the site (existing tank farm area) to the N Burgard Way public main.
- It is anticipated that surface water quality facilities will be located in the floodplain cut zones, which will be approximately 5-6 feet below adjacent grades. Depending on the depth of the connection to the N Burgard Way public main, the onsite storm design may need to incorporate a pump system to reach the public gravity line.

Building Pad Surcharge

It is anticipated that the building pad areas on site will require surcharging to minimize the potential for total and differential settlement. The building pads cover approximately 580,000 square feet, which would be surcharged in 3 stages, with each stage covering approximately 193,000 square feet and about 8 feet thick. The surcharge process is expected to take approximately 21 months.

The surcharge process could be expedited by using a thicker soil berm or covering the entire surcharge area in one berm rather than in stages. However, the costs for importing and processing additional berm soil would significantly increase compared to the current staged proposal.

Steep Slope Mitigation

The site does not have steep slopes, so no slope mitigation is necessary.

Floodplain Cut/Fill Balance

The Time Oil site is located within both the 100-year and 1996 floodplain boundaries for the Willamette River (to the west) and Columbia Slough (to the east). Per City requirements, buildings within the Metro Flood Management Area need to be constructed at least 1 foot above flood elevation, which would require filling a substantial portion of the site. Fill materials placed within the flood zone need to be balanced with an equal volume of cut within the flood zone. No specific regulations refer to associated yard

storage and parking areas, but these areas should generally be raised to within 18” and 6” of the 1996 flood elevation. Based on GIS and historical data, the 1996 flood elevation is approximately 32.0 feet (NAVD 1988 datum). In order raise the building pad areas to elevation 33 ft, the yard areas to 30.5 ft, and the parking areas to 31.5 feet, the site requires approximately 74,500 cy of fill to be placed in the floodplain.

The balanced floodplain cut is proposed to be taken from the existing tank farm areas at the south and northwest edges of the site, as well as an area along the eastern edge of the property, which covers approximately 9 acres. In order to balance the expected 74,500 cy of fill, the cut zones should be lowered to approximate elevation 24.8 ft.

SITE 13
ICDC LLC (PORTLAND), MAP 3***Public Water System***

The site is currently served by the City of Portland with an existing 12” water main located at the southwest corner of the site in NE Cameron Blvd.

- Proposed improvements: Construct an approximate 100-ft 8-inch service lateral to directly serve the site.

Public Sewer System

The site is currently served by the City of Portland with an existing 15” sewer gravity main located at the southwest corner of the site in NE Cameron Blvd.

- Proposed improvements: Construct an approximate 100-ft 8-inch service lateral to directly serve the site.

Public Storm System

The site is currently served by the City of Portland by an existing 36” storm drain line located at the southwest corner of the site in NE Cameron Blvd.

- Proposed improvements: Construct an approximate 100-ft 15-inch service lateral to directly serve the site.

Building Pad Surcharge

It is anticipated that the building pad areas on site will require surcharging to minimize the potential for total and differential settlement. A substantial portion of the west half of the site (the ICDC-owned property) has already been surcharged through ongoing efforts by the property owner, but the east portion (owned by Entercom) has not been prepared. Approximately 475,000 sf of building pad area remains to be surcharged, which is proposed to be accomplished in 4 stages each 8 feet thick and covering approximately 118,750 sf. It is estimated that the surcharge process to prepare the east portion of the site will take approximately 24 months.

The surcharge process could be expedited by using a thicker soil berm or covering the entire surcharge area in one berm rather than in stages. However, the costs for importing and processing additional berm soil would significantly increase compared to the current staged proposal.

Steep Slope Mitigation

The site does not have steep slopes, so no slope mitigation is necessary.

Floodplain Cut/Fill Balance

The ICDC/Entercom site is located within the Multnomah County Drainage District managed floodplain and is protected from Columbia River floods by the Marine Drive levee along the north side of the site. Construction within the MCDD managed floodplain requires coordination with MCDD to verify that the proposed development will not exceed the capacity of the district’s facilities, but no additional floodplain requirements are expected to impact the site.

SITES 15/16**BT PROPERTY LLC (UPS)/MICHAEL CEREGHINO (GRESHAM), MAP 3*****Public Water System***

The site is currently served by the City of Gresham by an existing 10" water main located to the north in NE Riverside Pkwy, and a 15" water main located along the west property line.

- Proposed improvements: Construct an approximate 100-ft 12-inch lateral to directly serve the site.

Public Sewer System

The site is currently served by the City of Gresham by an existing 10" sewer gravity main located to the north in NE Riverside Pkwy, a 15" sewer main stubbed to the southwest corner of the site in NE Portal Way, and a 12" sewer main at the northeast corner in NE Interlachen Ln. Existing 30" to 48" trunk lines run south to north along the east edge of the site, but direct service to these sewers is not available.

- Proposed improvements: Construct an approximate 100-ft 12-inch lateral to directly serve the site.

Public Storm System

The site is currently served by City of Gresham storm drains located at the site boundary.

- Proposed improvements: No public storm system improvements are necessary.

Building Pad Surcharge

It is anticipated that the building pad areas on site will require surcharging to minimize the potential for total and differential settlement. Approximately 1,010,000 sf of building pad area requires surcharging, which is proposed to be accomplished in 5 stages each 8 feet thick and covering approximately 207,000 sf. It is estimated that the surcharge process to prepare the east portion of the site will take approximately 36 months.

The surcharge process could be expedited by using a thicker soil berm or covering the entire surcharge area in one berm rather than in stages. However, the costs for importing and processing additional berm soil would significantly increase compared to the current staged proposal.

Steep Slope Mitigation

The site does not have steep slopes, so no slope mitigation is necessary.

Floodplain Cut/Fill Balance

The ICDC/Entercom site is located within the Multnomah County Drainage District managed floodplain and is protected from Columbia River floods by the Marine Drive levee along the north side of the site. Construction within the MCDD managed floodplain requires coordination with MCDD to verify that the proposed development will not exceed the capacity of the district's facilities, but no additional floodplain requirements are expected to impact the site.

**SITE 19
TRIP PHASE 2 (TROUTDALE), MAP 3*****Public Water System***

The site is currently served by the City of Troutdale water system by a 12” main located within Swigert Way along the northern edge of the site.

- Proposed improvements: Construct an approximate 100-ft 8-inch lateral to directly serve the site.

Public Sewer System

The site is located within the City of Troutdale sewer service boundary, and the northern portion of the site could be served by an existing public lift station and force main located within Swigert Way. The southern portion of the site would require sewer service extension within Graham Road.

- Proposed improvements: Construct approximately 1500-ft of 8-inch diameter sewer main within Graham Road.
- Improvements Timeline: Sewer improvements are anticipated to take approximately 6 months for design and permitting, plus 6 months for construction.

Public Storm System

The site is located within the City of Troutdale drainage system and is expected to be served by municipal piped systems which drain to an existing drainage creek west of the site. The site is located within the Sandy Drainage Improvement Company managed floodplain. Therefore, it is anticipated that the site improvements will not require on-site detention facilities and that stormwater runoff will be directed to the SDIC-managed drainage system.

- Proposed improvements: Construct approximately 1,700 feet of 15” storm mains within Swigert Way and Graham Road.
- Improvements Timeline: Storm system improvements are anticipated to take approximately 8 months for design and permitting, plus 12 months for construction.

Building Pad Surcharge

It is anticipated that the building pad area on site will require surcharging to minimize the potential for total and differential settlement. Approximately 1,020,000 sf of building pad area requires surcharging, which is proposed to be accomplished in 6 stages each 8 feet thick and covering approximately 189,600 sf. It is estimated that the surcharge process to prepare the building pad area of the site will take approximately 39 months.

The surcharge process could be expedited by using a thicker soil berm or covering the entire surcharge area in one berm rather than in stages. However, the costs for importing and processing additional berm soil would significantly increase compared to the current staged proposal.

Wetland Fill

The site contains substantial areas of wetlands which would be filled to establish the building pad and parking areas across the site. Based on comments from Port of Portland staff, contaminated soils within the existing wetlands would need to be excavated and replaced before filling could occur. The costs associated with excavation and disposal of the contaminated soils are described and accounted for in the environmental clean-up portion of this study; however, the site fill earthwork is included in this section. Based

on information provided by the Port of Portland, the contaminated soil replacement is expected to cost approximately \$1.09 million.

Additionally, the site grades would need to be raised several feet in order to eliminate depressions and prevent site inundation from surrounding wetlands. According to Port of Portland cost estimates prepared in other site development studies, this fill is expected to cost approximately \$3.66 million to raise the site grades. The total cost associated with raising the site grades within the wetland areas is approximately \$4.75 million. This work is expected to take approximately 9 months for design and permitting, plus about 24 months for construction. The permitting timeline presented here is for a grading permit and does not include environmental remediation permitting, which is described separately in this study.

Floodplain Cut/Fill Balance

The ICDC/Entercom site is located within the Sandy Improvement Drainage Company managed floodplain and is protected from Columbia River floods by a US Army Corps of Engineers levee located north of the site. Construction within the SIDC managed floodplain requires coordination with SIDC to verify that the proposed development will not exceed the capacity of the drainage company's facilities, but no additional floodplain requirements are expected to impact the site.

**SITE 24
JEAN JOHNSON (GRESHAM), MAP 4*****Public Water System***

The site is within the City of Gresham service boundary but is not currently served by municipal water mains. Based on review of the Springwater Community Master Plan (2005) and comments received from City of Gresham staff, the site could be served by extending existing mains from the Southeast Service Level.

- Proposed improvements: Construct approximately 7,940 feet of 12" to 18" diameter water mains from the existing Southeast Service Level boundary to the site.
- Improvements Timeline: Water improvements are anticipated to take approximately 12 months for design and permitting, plus 24 months for construction.

Public Sewer System

The site is in the Gresham service district but is not currently served by municipal sewer mains. Based on review of the Springwater Community Master Plan (2005) and comments from City of Gresham staff, the site is expected to be served by extending the Telford Road Interceptor sewer system.

- Proposed improvements: Construct approximately 7,600 feet of 12" to 21" diameter gravity sewer pipes along Telford Road and crossing Hwy 26.
- Improvements Timeline: Sewer improvements are anticipated to take approximately 12 months for design and permitting, plus 24 months for construction.

Public Storm System

The site is located along the north edge of an unnamed tributary of Johnson Creek, and it is expected that the proposed site development would follow existing ground slopes and drain to the south edge of the site. Based on review of the Springwater Community Master Plan (2005) and comments from City of Gresham staff, the City anticipates the need for a regional detention pond facility to be located in the southwest corner of the site. It is expected that this facility would discharge directly to the creek.

- Proposed improvements: Construct an approximately 18.8-acre regional detention pond facility, as well as approximately 2,350 feet of water quality treatment swales located in the public frontage roadways.
- Improvements Timeline: Storm system improvements are anticipated to take approximately 12 months for design and permitting, plus 12 months for construction.

Utility Expansion Notes

The Springwater area of Gresham is generally not served by existing public utility services. Based on comments from City of Gresham staff, it is expected that services will be extended as development occurs within the Springwater area, which means that the first sites to develop in the area will bear a higher start-up cost than subsequent sites.

The Jean Johnson site is located relatively far from the edge of the Gresham utility service boundaries and would require significant infrastructure extensions in order to serve the site. While the costs to extend the public utilities would be high, service expansions of this nature would avail direct utility service to many acres of nearby developable land along the utility corridor(s). This report does not attempt to quantify this associated benefit, but it should be noted that the expansion of the public services to this proposed site could spur a substantial amount of local development.

Building Pad Surcharge

It is anticipated that this site will not require building pad surcharging.

Steep Slope Mitigation

The site slopes from approximate elevation 480 ft at the north edge to about elevation 430 ft at the south edge. The site will require grading to mitigate and flatten the slopes to accommodate building pads and truck maneuvering areas. It is assumed that up to about 2 percent slope can be accommodated around buildings, and up to 7 percent can be accommodated in vehicular areas. Approximately 28,500 cy of earthwork is expected to mitigate steeply sloped areas.

Floodplain Cut/Fill Balance

This site is not located within a 100-year floodplain.

SITE 29**CLACKAMAS COUNTY DEVELOPMENT (CLACKAMAS), MAP 5*****Public Water System***

The site is currently served by Clackamas County Service District #1 by an existing main located to the north in SE Capps Rd.

- Proposed improvements: Construct an approximate 100-ft 8-inch lateral to directly serve the site.

Public Sewer System

The site is currently served by the Clackamas County Service District #1 by an existing 10" main located to the north in SE Capps Rd, with an existing public pump station located on site.

- Proposed improvements: No sewer improvements are necessary for this site.

Public Storm System

The site currently has 2 detention ponds constructed at the southeast corner of the site which discharge directly to the Clackamas River and can be used for the proposed development.

Alternatively, the site is also served by Clackamas County Service District #1 by a 42" storm main located in SE Capps Rd; however, a pump station would be needed to utilize this system.

- Proposed improvements: No public storm system improvements are necessary to use the existing detention ponds and Clackamas River outfall.

Building Pad Surcharge

It is anticipated that this site will not require building pad surcharging.

Steep Slope Mitigation

The site is bordered to the north and east by steep cut slopes from prior mining/quarry uses on the site, which will require slope mitigation in order to establish the proposed building pads and associated site development. It is expected that about 28,300 cy of earthwork is required to mitigate the steep slopes on site.

Floodplain Cut/Fill Balance

This site is not located within a 100-year floodplain.

**SITE 33
COFFEE CREEK INDUSTRIAL AREA (WILSONVILLE), MAP 6*****Public Water System***

The site is within the City of Wilsonville service boundary and is served by existing 18” water mains along the west and north edges of the site. Based on review of the *Coffee Creek Industrial Area Infrastructure Analysis* (2011), the water system serving this site should be looped to provide sufficient flow and pressure to the site development.

- Proposed improvements: Construct approximately 2,600 feet of 12” diameter water mains through the site to develop a looped system.
- Improvements Timeline: Water improvements are anticipated to take approximately 6 months for design and permitting, plus 15 months for construction.

Public Sewer System

The site is within the City of Wilsonville service district, and an existing 18” sewer main is located near the southwest corner of the site. Based on review of the *Coffee Creek Industrial Area Infrastructure Analysis* (2011), the United Disposal Interceptor trunk line downstream of the site is generally sized to handle the expected capacity at build-out of the Coffee Creek area. However, there is a section of 14” pipe near the connection with the Edwards Trunk line that is expected to be under-sized for the fully developed build-out flows.

While the downstream deficiency is identified for full build-out of the Coffee Creek area, the downstream improvements may not be necessary to serve the study site depending on the relative development timing for this site. If the site develops early relative to the rest of the Coffee Creek area, then the sewer interceptor pipe upgrade may not be needed to provide sufficient service. However, if the majority of the Coffee Creek area is built up before this site, then the sewer line is likely to need the upgrade in order to provide adequate capacity. This study assumes that the site will be developed early in the regional build-out process, so the costs for the downstream sewer improvement are not included in this analysis.

- Proposed improvements: Construct approximately 2,600 feet of 15” diameter gravity sewer pipes through the site.
- Improvements Timeline: Sewer improvements are anticipated to take approximately 6 months for design and permitting, plus 15 months for construction.

Public Storm System

The site is located within the Basalt Creek watershed, which eventually discharges to the Coffee Creek Wetlands area located in the southwest portion of the Coffee Creek Plan Area. However, no public storm piping or conveyance systems currently serve the study site. Based on review of the *Coffee Creek Industrial Area Infrastructure Analysis* (2011), the proposed storm system for the Coffee Creek area includes a central regional detention facility which would be located along the eastern edge of the study site. The infrastructure analysis of this site suggests that about half of the detention facility described in the City’s master planning documents would be needed in order to adequately serve the site development.

- Proposed improvements: Construct approximately 5,200 feet of 15” to 18” storm drain piping within Garden Acres Road and Kinsman Road, and construct an approximate 3.5-acre regional detention facility along the east edge of Kinsman Road.

- Improvements Timeline: Storm system improvements are anticipated to take approximately 6 months for design and permitting, plus 15 months for construction.

Building Pad Surcharge

It is anticipated that this site will not require building pad surcharging.

Steep Slope Mitigation

The site does not have steep slopes, so no slope mitigation is necessary.

Floodplain Cut/Fill Balance

This site is not located within a 100-year floodplain.

**SITE 37
ORR FAMILY FARM LLC (SHERWOOD), MAP 6*****Public Water System***

The site is currently served by the City of Sherwood water system along Tualatin-Sherwood Road, but water service would need to be extended in SW 124th Street along the east side of the site.

- Proposed improvements: Construct approximately 1,150 feet of 12” water main to the southeast corner of the site boundary.
- Improvements Timeline: Water improvements are anticipated to take approximately 6 months for design and permitting, plus 12 months for construction.

Public Sewer System

The site is in the City of Sherwood service boundary but is not currently served by municipal service. Clean Water Services owns the public trunk mains that collect flows from the city’s system. Based on review of sanitary sewer master plans prepared by the City of Sherwood and Clean Water Services, the site and the surrounding Area 48 industrial lands could be served through extension of public service lines located west of the site along Tualatin-Sherwood Road.

The downstream trunk lines are currently under-sized to accommodate full build-out of Area 48. According to comments from city staff, these lines are currently in various stages of design and construction. The full scope of downstream improvements may not be needed to serve the Orr Family site, if the site development occurs early relative to the rest of the Area 48 build-out. However, if other Area 48 development occurs, the downstream improvements are likely to be required to handle the increased sewer flows.

- Service Extension Improvements: Construct approximately 3,500 feet of 15” sewer main from the Area 48 Trunk line in Tualatin-Sherwood Road.
- Extension Improvements Timeline: Sewer improvements are anticipated to take approximately 12 months for design and permitting, plus 24 months for construction.
- Downstream Service Upgrades:
 - Improve approximately 3,000 feet of existing Area 48 Trunk pipe, from 8”-10” pipe upgraded to 15” pipe.
 - Improve approximately 1,350 feet of existing Rock Creek Trunk pipe, from 18” pipe upgraded to 24” pipe.
 - Improve approximately 6,530 feet of existing Onion Flat Trunk pipe, from 18” pipe upgraded to 24” pipe.
- Downstream Upgrades Timeline: Sewer upgrades are anticipated to take approximately 24 months for design and permitting, plus 36 months for construction. A portion of this design and construction work is currently underway.

Public Storm System

The site is currently served by City of Sherwood storm mains located within Tualatin-Sherwood Road along the north side of the site. The proposed development will require stormwater detention to discharge to this public facility due to anticipated downstream capacity limitations in the Hedges Creek watershed.

- Proposed improvements: Construct approximately 1.7 acres of detention pond facilities along the north edge of the site.
- Improvements Timeline: Storm system improvements are anticipated to take

approximately 6 months for design and permitting, plus 9 months for construction.

Building Pad Surcharge

It is anticipated that this site will not require building pad surcharging.

Steep Slope Mitigation

The southern portion of the site would require earthwork to mitigate steeply sloped areas to establish building pads and parking areas. It is anticipated that the south and west boundaries in particular will require cut slopes and grading to mitigate steep areas. It is assumed that up to about 2 percent slope can be accommodated around buildings, and up to 7 percent can be accommodated in vehicular areas. Approximately 50,900 cy of earthwork is expected to mitigate steeply sloped areas.

Floodplain Cut/Fill Balance

This site is not located within a 100-year floodplain.

**SITE 37-A
ORR FAMILY FARM – SOUTH LOT (SHERWOOD), MAP 6*****Public Water System***

The site is currently served by the City of Sherwood water system along Tualatin-Sherwood Road, but water service would need to be extended to Blake Road at the southeast corner of the site, along the SW 124th Street alignment.

- Proposed improvements: Construct approximately 1,850 feet of 12” water main to Blake Road at the southeast corner of the site.
- Improvements Timeline: Water improvements are anticipated to take approximately 6 months for design and permitting, plus 12 months for construction.

Public Sewer System

The site is in the City of Sherwood service boundary but is not currently served by municipal service. Clean Water Services owns the public trunk mains that collect flows from the city’s system. Based on review of sanitary sewer master plans prepared by the City of Sherwood and Clean Water Services, the site and the surrounding Area 48 industrial lands could be served through extension of public service lines located west of the site along Tualatin-Sherwood Road.

The downstream trunk lines are currently under-sized to accommodate full build-out of Area 48. According to comments from city staff, these lines are currently in various stages of design and construction. The full scope of downstream improvements may not be needed to serve the Orr Family site, if the site development occurs early relative to the rest of the Area 48 build-out. However, if other Area 48 development occurs, the downstream improvements are likely to be required to handle the increased sewer flows.

- Service Extension Improvements: Construct approximately 5,600 feet of 15” sewer main from the Area 48 Trunk line in Tualatin-Sherwood Road through the north Orr Family site. Construct approximately 750 feet of 12” sewer main from the boundary of the south Orr Family site to the south edge of the power line easement.
- Extension Improvements Timeline: Sewer improvements are anticipated to take approximately 12 months for design and permitting, plus 24 months for construction.
- Downstream Service Upgrades:
 - Improve approximately 3,000 feet of existing Area 48 Trunk pipe, from 8”-10” pipe upgraded to 15” pipe.
 - Improve approximately 1,350 feet of existing Rock Creek Trunk pipe, from 18” pipe upgraded to 24” pipe.
 - Improve approximately 6,530 feet of existing Onion Flat Trunk pipe, from 18” pipe upgraded to 24” pipe.
- Downstream Upgrades Timeline: Sewer upgrades are anticipated to take approximately 24 months for design and permitting, plus 36 months for construction. A portion of this design and construction work is currently underway.

Public Storm System

The site is currently served by City of Sherwood storm mains located within Tualatin-Sherwood Road along the north side of the site. The proposed development will require stormwater detention to discharge to this public facility due to anticipated downstream capacity limitations in the Hedges Creek watershed.

- Proposed improvements: Construct approximately 2.0 acres of detention pond and

water quality facilities located near the existing wetlands.

- Improvements Timeline: Storm system improvements are anticipated to take approximately 6 months for design and permitting, plus 9 months for construction.

Building Pad Surcharge

It is anticipated that this site will not require building pad surcharging.

Steep Slope Mitigation

The site has several steep slopes, hills, and valleys that cross the site. The site has a low area around the existing wetland, but otherwise generally slopes down to the north. Due to the irregular hills and steep slopes, the site will require significant grading and retaining structures to establish building pads and truck maneuvering areas. It is expected that the final site configuration will involve cutting the building pads and parking lots in a series of benches following the existing slope. It is assumed that up to about 2 percent slope can be accommodated around buildings, and up to 7 percent can be accommodated in vehicular areas. Approximately 262,400 cy of earthwork grading, and about 6,000 sf of retaining walls are expected to mitigate the steeply sloped areas. Additionally, approximately 7,100 cf of embankment fill is required to construct Blake Road across the north edge of the existing wetland area.

Floodplain Cut/Fill Balance

This site is not located within a 100-year floodplain.

SITES 55/56**SPOKANE HUMANE SOCIETY/EAST EVERGREEN (HILLSBORO), MAP 7*****Public Water System***

The site is currently served by the City of Hillsboro water system by an 18" main within Evergreen Road, but water service would need to be extended to the east and west sides of the site within 253rd Ave and 264th Ave. It is not expected that the future water main loop is needed for the section of the future Huffman Road along the north edge of the site.

- Proposed improvements: Construct approximately 4,300 feet of 18" water main to the north extent of the site.
- Improvements Timeline: Water improvements are anticipated to take approximately 12 months for design and permitting, plus 15 months for construction.

Public Sewer System

The site is currently within the City of Hillsboro sewer service boundary, and an existing 10" main located within Evergreen Road along the south edge of the site. Due to the depth of the sewer pipe and site topography, gravity sewer service can only be extended to about the mid-point of the site.

Beyond this boundary, sewer service would need to be pumped to a nearby trunk line, or a gravity trunk line would need to be extended along the creek alignment to the north. Either sewer improvement option should be sized to accommodate future build-out of the nearby properties that would contribute to sewer flows draining to the new facility.

- Proposed improvements:
 - Construct approximately 2,100 feet of 18" diameter gravity main within 264th Avenue.
 - Construct an approximately 2.8-MGD public lift station located near the northeast corner of the site, sized to serve this site and future development at nearby properties within the sewershed.
 - Construct approximately 2,200 feet of 12" public force main within 253rd Avenue to the existing Clean Water Services main in Evergreen Road near the southeast corner of the site.
- Improvements Timeline: Sewer improvements are anticipated to take approximately 12 months for design and permitting, plus 15 months for construction.

Public Storm System

The site is not currently served by public storm mains, except by a City of Hillsboro located near the southeast corner of the site. This pipe is not anticipated to be deep enough nor have capacity for gravity drainage from the entire developed site. Except for a portion of the site near the southeast corner, the storm drainage from the site is expected to drain the north into the adjacent wetland and creek waterways. Public facilities associated with this site include storm mains located in 253rd Avenue and 264th Avenue.

- Proposed improvements: Construct approximately 6,250 feet of 12" to 15" diameter storm drain pipe within 253rd Avenue and 264th Avenue.
- Improvements Timeline: Storm system improvements are anticipated to take approximately 6 months for design and permitting, plus 12 months for construction.

Building Pad Surcharge

It is anticipated that this site will not require building pad surcharging.

Steep Slope Mitigation

The site is generally gentle-sloped, but a small area in the east portion of the site exceeds the suggested slope limits and would require earthwork grading to mitigate sloped areas in proposed building pads and parking areas. It is assumed that up to about 2 percent slope can be accommodated around buildings, and up to 7 percent can be accommodated in vehicular areas. Approximately 10,800 cy of earthwork is expected to mitigate steeply sloped areas.

Floodplain Cut/Fill Balance

This site is not located within a 100-year floodplain.

**SITE 62
ROCK CREEK (HAPPY VALLEY), MAP 5*****Public Water System***

The site is within the Sunrise Water Authority service boundary but is not currently served by public mains. Based on GIS information received from SWA, the site could be served by extending existing mains along Highway 212, southwest of the site.

- Proposed improvements: Construct approximately 500 feet of 24" water pipe along Highway 212 to the site, plus about 1,500 feet of 18" water pipe along 162nd Avenue to the northwest boundary of the site.
- Improvements Timeline: Water improvements are anticipated to take approximately 9 months for design and permitting, plus 9 months for construction.

Public Sewer System

The site is Clackamas County Service District No. 1 service boundary, within the Rock Creek drainage basin. Public sewer service is not currently available at the site. Based on the CCSD sanitary sewer master plan (2009), the site is expected to be served by extending service from the Clackamas Interceptor to the Rock Creek area.

The downstream Clackamas Interceptor is currently under-sized to accommodate full build-out of the Rock Creek area. The primary trigger for this project is development in the Rock Creek basin resulting in 5,700 EDUs added to the system (this site contributes approximately 30 EDUs). If this site is developed prior to the build-out of the Rock Creek area, the interceptor pipe may not need to be upgraded to serve this site. However, if this site is developed during or in conjunction with significant development within the Rock Creek sewer basin, then the Clackamas Interceptor upgrades would be necessary to serve the site.

- Service Extension Improvements:
 - Construct approximately 4,000 feet of 36" diameter Clackamas Interceptor pipe within Highway 212.
 - Construct approximately 2,500 feet of 15" to 18" diameter local service lines within Highway 212 and 162nd Avenue
- Extension Improvements Timeline: Sewer improvements are anticipated to take approximately 12 months for design and permitting, plus 18 months for construction.
- Downstream Service Upgrades:
 - Improve approximately 16,800 feet of 36" gravity sewer and 12,500 feet of 30" force main interceptor, with improvements to the Clackamas Pump Station.
- Downstream Upgrades Cost and Timeline: The Clackamas Interceptor upgrades are anticipated to cost approximately \$33.7 million and take approximately 5 to 10 years for design and construction.

Public Storm System

The site is not currently served by public storm facilities. It is expected that transportation improvements to 162nd Avenue and Highway 212 will trigger storm facility improvements, which would discharge into Rock Creek near the southwest corner of the site.

- Proposed improvements: Construct approximately 2,400 feet of 15" storm pipe within 162nd Avenue and Highway 212.
- Improvements Timeline: Storm system improvements are anticipated to take approximately 6 months for design and permitting, plus 6 months for construction.

Building Pad Surcharge

It is anticipated that this site will not require building pad surcharging.

Steep Slope Mitigation

The site generally slopes down toward the southwest corner of the site at grades from approximately 10 percent to 20 percent. The site will require significant grading and retaining structures to establish building pads and truck maneuvering areas. It is expected that the final site configuration will involve cutting the building pads and parking lots in a series of benches following the existing slope. It is assumed that up to about 2 percent slope can be accommodated around buildings, and up to 7 percent can be accommodated in vehicular areas. Approximately 273,800 cy of earthwork grading, and about 20,000 sf of retaining walls are expected to mitigate the steeply sloped areas.

Floodplain Cut/Fill Balance

This site is not located within a 100-year floodplain.

**SITE 104
HILLSBORO URBAN RESERVES (AGGREGATE) (HILLSBORO), MAP 7*****General Utility Service Note***

The site is currently not within a municipal utility service district since it resides outside the Metro urban growth boundary. It is expected that the UGB boundary will be moved to include this site, and that the site will be served by the City of Hillsboro at that time.

Public Water System

Based on information from City of Hillsboro water department staff, the site is expected to be served from the existing water transmission lines within Evergreen Road, with two legs of a looped system expected to be built along 253rd Avenue and 264th Avenue.

- Proposed improvements:
 - Construct approximately 5,800 feet of 18” water main within 253rd Avenue.
 - Construct approximately 6,100 feet of 18” water main within 264th Avenue.
 - Construct approximately 3,200 feet of 18” water main within Meek Road.
- Improvements Timeline: Water improvements are anticipated to take approximately 12 months for design and permitting, plus 24 months for construction.

Public Sewer System

The site is expected to be served by City of Hillsboro and Clean Water Services sewer facilities within Huffman Street east of the site. Since the site lies beyond the gravity service boundary for the Huffman trunk line, it is expected that the sewer flows would be conveyed through gravity lines to a new public lift station located south of the site. The flows would be pumped from the lift station to the existing sewer trunk lines.

- Proposed improvements:
 - Construct approximately 7,900 feet of 15” to 18” diameter gravity mains within 253rd Avenue, 264th Avenue, and Meek Road.
 - Construct an approximately 3.0-MGD public lift station located near the southwest corner of the site, sized to serve this site and future development at nearby properties within the sewershed.
 - Construct approximately 5,200 feet of 18” public force main within Huffman Street Clean Water Services trunk line at the intersection of Huffman Street and Brookwood Parkway east of the site.
- Improvements Timeline: Sewer improvements are anticipated to take approximately 12 months for design and permitting, plus 24 months for construction.

Public Storm System

The site is not currently served by public storm mains. There is a broad ridge running southwest-to-northeast through the middle of the site, which separates the drainage basins of Storey Creek to the north and Waible Creek to the south. It is expected that the storm drainage system at the site will include piping within the new roadways to direct runoff to these creeks, with regional detention facilities installed to meet Clean Water Services requirements.

- Proposed improvements:
 - Construct approximately 15,100 feet of 18” to 24” diameter storm piping within 253rd Avenue, 264th Avenue, and Meek Road.
 - Construct four regional detention ponds near the creek outfall locations, totaling approximately 48 ac-feet of storage.
- Improvements Timeline: Storm system improvements are anticipated to take approximately 12 months for design and permitting, plus 24 months for construction.

Building Pad Surcharge

It is anticipated that this site will not require building pad surcharging.

Steep Slope Mitigation

The site is generally gentle-sloped and is not expected to require slope mitigation to establish building pad and parking areas.

Floodplain Cut/Fill Balance

This site is not located within a 100-year floodplain.