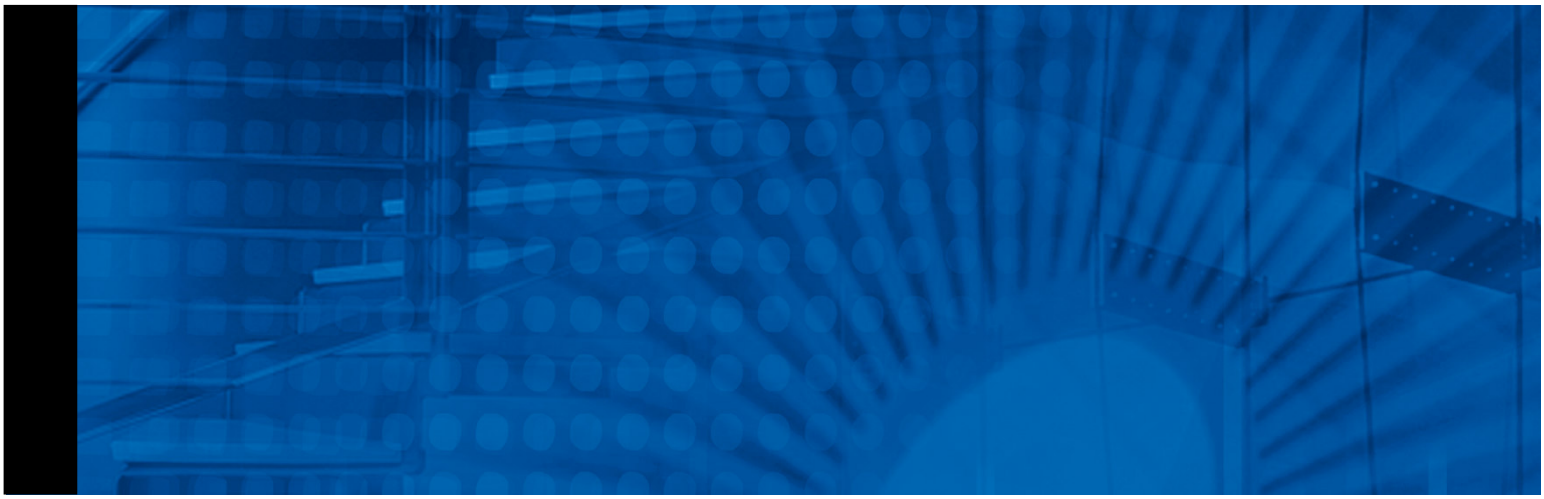
APPENDIX H

Stormwater Technical Report

New Whatcom Redevelopment Project

Storm Drainage Concept



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Storm Drainage Concept

September 2008

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Table of Contents

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1. Introduction

The New Whatcom Redevelopment Project, known as the Waterfront District, is a proposed redevelopment of an area that has been used for heavy industry. Proposed improvements, including demolition of existing structures, coordination with environmental mitigation, and new infrastructure, will transform the district into a mixed-use commercial and residential extension of downtown Bellingham. The Port of Bellingham currently owns the property and will continue as the property owner. The City of Bellingham will own and maintain the infrastructure of the waterfront district.

Construction of this district will be phased in such a way that the road infrastructure and utilities will be constructed while the proposed development parcels remain undeveloped or minimally developed in the interim. A stormwater system will be required to collect, convey, and treat stormwater runoff for the roadway, interim empty parcels, and the final development.

This report is meant to supplement information presented in the January 2008 Draft Environmental Impact Statement (DEIS) and support a Supplemental Draft EIS on the Port's Preferred Alternative. It analyzes the existing stormwater system and conditions, describes a proposed system for stormwater collection and treatment, and evaluates stormwater impacts from development. The proposed system has been developed based on ongoing coordination between the Port and the Department of Ecology, the City of Bellingham, and other interested parties and represents a revision to the system proposed in the DEIS. The proposed concept seeks to address concerns raised in the review of the DEIS and introduce LEED certified elements to the project. While the basic assumptions used in developing the DEIS are valid to this report, the specific differences between the stormwater system proposed in the DEIS and the currently proposed system are the following:

- Additional information regarding stormwater system actions already taken and actions required in the decommissioning of the Aerated Stabilization Basin.
- Required relocation of Laurel Street stormwater pipe that conveys offsite runoff through the site
- Revisions to expected sequencing of improvements: reflecting requirements set forth by the NPDES Phase II permit, ASB decommissioning status, and infrastructure construction to extend beyond 2016
- Reduction in the depth and type of environmental cap required from 2 feet to either a 6-inch to 2-foot soil cap or an existing or new pavement cap

- Revised proposed basin boundaries and revised Log Pond outfall location to coordinate with revised roadway layout
- Revised grading plan to coordinate with revised roadway layout
- Outfall elevations increased from 11 feet (assumed in the DEIS) to 15 feet to avoid potential conflicts with long-term sea level rise and storm surges
- Inclusion of an interim drainage system for undeveloped lots
- Treatment proposed to be via low-impact bioretention units or media filtration cartridges for the roadway network
- Two options for stormdrainage design are described

2. Existing Conditions

EXISTING STORM DRAINAGE SYSTEM

Section 2.6 of Appendix F in the DEIS describes in detail the existing onsite drainage facilities found within the project site, including drainage areas, routing and outfall locations. Significant changes to the information provided in the DEIS are not warranted. Upon further review of the site conditions, GIS data and as-built information, the following information expands on the information provided in the DEIS.

Aerated Stabilization Basin (ASB)

The ASB currently handles a large amount of stormwater flow from the site, as described in the DEIS. The ASB must be decommissioned prior to the planned remediation and redevelopment as a marina. The DEIS describes two necessary steps to be taken prior to development of the marina. First, industrial wastewater and industrial stormwater runoff currently routed to the ASB would need to be terminated, with Ecology concurrence that industrial discharge and need for industrial discharge coverage in the NPDES program are terminated. Second, an alternative routing of stormwater runoff from the site to an existing or new onsite stormwater treatment system would be required.

To expand on the first step detailed in the DEIS, termination of industrial discharge to the ASB from certain portions of the site is currently in process. The current industrial wastewater permit for the ASB expires in 2011 and termination of industrial wastewater discharge has begun. Discharge from the Encogen Plant has been rerouted to separate facilities for treatment and discharge.

In terms of the second step, the onsite storm drainage system will be capped and abandoned as buildings are demolished and new infrastructure is constructed. The stormwater runoff currently

collected and conveyed to the ASB will eventually be incorporated into the proposed stormwater system as it is constructed. In the interim, the stormwater will need to be treated by an alternate treatment facility. In areas south of the Whatcom Waterway, a stormwater vault, or vaults, with an appropriately sized cartridge system will be installed as necessary. One or more new outfalls would need to be designed, permitted and installed to handle stormwater from the site, at least on a temporary basis. In order to lessen added discharge at any individual outfall, a flow splitter and temporary piping system could be installed to route some of the discharge to other existing or newly permitted outfall locations. In the Marine Trades Area, the existing flow from a portion of the area is conveyed to the ASB via a gravity-flow conveyance system. A similar stormwater vault/filter system facility will be installed just upstream of the existing outfall to the ASB for discharge into the existing outfall. Once construction of the proposed stormwater system is complete, all existing onsite conveyance systems will have been capped and abandoned in place. The vaults identified above could then be either removed or incorporated into the proposed stormwater system.

Offsite Conveyance and Existing Outfalls

The DEIS identified nine existing outfall locations on the site and described the conveyance systems discharging to those outfalls. Also noted in the DEIS are two private outfalls conveying runoff from a portion of the Marine Trades Area; through further investigation of as-built plans, those two outfalls have been specifically located. See Figure 2.1 for depiction of the existing outfalls.

Further development planning for the roadway infrastructure subsequent to issuance of the DEIS has resulted in a revised roadway layout; the proposed layout would conflict with the existing City of Bellingham stormwater pipe in Laurel Street. As described in the DEIS, a 24-inch stormwater pipe conveys flow from an offsite 96-acre basin through the site to Outfall 4. City of Bellingham as-builts show this pipe at a depth of approximately 7 to 10 feet below existing grade. Location of the pipe would directly conflict with proposed redevelopment parcels; this would prevent access to the pipe for maintenance. The stormwater pipe would need to be relocated to align with the proposed roadway infrastructure in order to maintain access to the pipe. The pipe could be relocated along the new Bloedel Avenue and Commercial Street to its current outfall, see Figure 2.2. The pipe slope is currently approximately 0.5%. Relocating the pipe and maintaining the existing invert elevation at the outfall would result in a slope of approximately 0.3% to 0.4%.

The proposed roadway grid would not conflict with the location of the C Street storm main extending to Outfall 1. As stated in the DEIS, this outfall consists of a box culvert and acts as the combined sewer outfall for the City with a storm pipe extending northeast under C Street. The extent of the basin contributing to this outfall is unknown. The alignment of C Street is not changed in the proposed roadway grid; therefore the alignment of the pipe would not be affected.

As stated in the DEIS, offsite flow is conveyed through the project site at Outfalls 2, 3, and 9. Outfall 2 consists of a 22-inch diameter pipe conveying flow from the east side of the railroad tracks to the

outfall discharge to the Whatcom Waterway. Outfall 3 conveys runoff from the Roeder Avenue bridge through an 8-inch diameter storm pipe. Outfall 9, known as the Cedar Street Outfall, is a 30-inch storm pipe conveying City runoff from as far inland as the Western Washington University campus. The alignment of these three offsite conveyance systems will not be affected by the proposed development and will be maintained in place. Extended access risers will be installed for maintenance personnel if proposed grade warrants it.

BLUMEN CONSULTING GROUP, INC	Figure 2-1 Existing Outfall Locations & Basin Boundaries	New Whatcom Redevelopment EIS

BLUMEN CONSULTING GROUP, INC	Figure 2-2 Proposed Relocated Stormwater Pipe	New Whatcom Redevelopment EIS

3. Proposed Improvements

EXPECTED SEQUENCING OF IMPROVEMENTS

The following presents an anticipated step-by-step concept for the proposed stormwater system, summarizing and expanding on what was proposed in the DEIS. This expected sequencing differs from what was presented in the DEIS only in regards to the expected construction timeframe for proposed infrastructure and the depth and type of the anticipated environmental cap for remediation purposes.

Present - Preliminary improvements over the Near-term

- The ASB will be fully decommissioned with all existing connecting force mains and pumps removed or abandoned. The current permit for the ASB will expire in 2011. Industrial wastewater from the Georgia Pacific facilities, which makes up the majority of the flow to the ASB, and other smaller industrial wastewater flows are in the process of being terminated. Discharge from the Encogen Plant has been re-routed to alternate treatment facilities.
- The outfall from the ASB is in the process of being capped. The ASB will act as a stormwater collection facility for the near-term until the cleanup and development of the marina commences (subject to applicable permits). At that time, the pump to the ASB will be removed and temporary treatment facilities will be installed for the onsite flow that previously discharged to the ASB The treatment facilities will eventually be removed or incorporated into the proposed stormwater system once construction of that system is complete and existing onsite facilities are completely capped and abandoned.
- The current NPDES Phase II Municipal Stormwater Permit expires in 2012. All Phase II mapping requirements for existing stormwater outfalls will be completed prior to 2012 by the Port of Bellingham. All Phase II requirements for new stormwater outfalls, located in the vicinity of existing outfalls, will be completed prior to 2012 by the Port of Bellingham and the City of Bellingham.

Infrastructure construction to 2016

- In the DEIS, the assumption was that components of the infrastructure network would be complete by 2016. Through further design, a core street network has been identified and is planned to be built by 2016 with the balances completed by 2026. Similar to that concept, infrastructure will be constructed on a phased basis under the Preferred Alternative. The core network is defined in section 6.7 of *The Waterfront District Proposal* (CollinsWoerman, June

10, 2008). Additional infrastructure construction will continue after 2016 to complete the remainder of the street network by 2026.

- On the south side of the Whatcom Waterway, the proposed roadway infrastructure network will be constructed at an elevation that will be designed to accommodate planned environmental remediation and long-term sea level rise, provide an integrated slope between the waterfront and the existing downtown above the bluff and match the future finished first floor elevations of new buildings within these design objectives; this would result in a roadway grid that is graded 6 to 11 feet above development parcels that could be empty lots on an interim basis. Commercial Street, Bay Street, and Log Pond Drive will be graded to a higher elevation as the street approaches the grade separation over the railroad.
- On the north side of the Whatcom Waterway, the proposed roadway infrastructure network will be constructed closer to existing elevations to meet existing grade intersections at Roeder Avenue and to meet marine trades facility design objectives which require ground elevations closer to current tidal conditions. Hilton, F Street and C Street will be improved at their current elevation with development adjusted to accommodate actual sea level rise in build-out years.
- Stormwater conveyance and treatment facilities will be installed concurrently with the roadway construction to collect, treat, and convey runoff from the roadway prism, as well as from future redevelopment areas.
- Parcels that have not undergone development or have been minimally developed will be subject to all construction stormwater pollution prevention requirements. As stated in the DEIS, this includes development of a Construction Stormwater Pollution Prevention Plan and compliance with all mitigation measure listed in Section 3.1 of Appendix F in the DEIS.
- Levels of contamination are present in certain portions of the site. In order to avoid these soils, an environmental cap will be placed over these areas. In areas where the existing pavement is demolished or a building is removed, a soil and/or asphalt cap, ranging from 6 inches to 2 feet in depth, will be placed over the area. In other areas, the existing pavement (not to be removed) or a new pavement layer will act as the environmental cap. The DEIS assumed a minimum 2-foot depth for the environmental cap. The depth has been reduced in some areas based on further investigation of the contaminated soils in coordination with the Department of Ecology. It is expected that the proposed stormwater system will be installed above the environmental cap and will not encroach into contaminated soils. Otherwise the system may need to be installed in a utility corridor with clean fill and appropriate separation from adjacent and underlying contaminated soils.

- Where the existing pavement is disturbed, the site will be capped with either new pavement or soil and graded to an inlet into the conveyance system. In some cases, pumping may be required. In areas where the existing pavement remains in place, temporary pumps will be used to convey runoff to the stormwater system. Temporary pumps will likely be needed for those parcels to be located farthest from the shoreline and closest to the bluff, due to the invert elevation of the proposed conveyance system.
- At 2016, some of the existing stormwater systems on site may still be functioning in conjunction with the new proposed stormwater system. The exact extent of the existing systems still in use will be determined by development. Areas of the existing system will be abandoned and connected to the new system as development requires the existing systems to be capped.

Full Build-out to 2026

- Roadway infrastructure construction and improvements will be completed over time.
- Stormwater runoff from developed lots will be treated (if necessary) onsite and conveyed to the proposed stormwater system in the roadway where it will be directed to the appropriate outfall.

DRAINAGE REQUIREMENTS

As stated in the DEIS, the proposed project is subject to requirements set forth in the National Pollutant Discharge Elimination System (NPDES) and State Waste Discharge General Permit for stormwater discharges associated with industrial activities and construction activities as reviewed by the Washington State Department of Ecology. The proposed project is also subject to requirements of the City of Bellingham Municipal Code.

In the DEIS, the design criteria applicable to this site was described (see Appendix F of the DEIS). The DEIS refers to requirements included in the "WDOE Manual." It is important to note that the manual assumed for use is the Department of Ecology's 2005 *Stormwater Management Manual for Western Washington (SMMWW).* Annual requirements must be met by the responsible parties. For the roadway conveyance system and parks, the responsible party is assumed to be the City of Bellingham. For the stormwater facilities conveying runoff from undeveloped areas and developed lots, the responsible parties are assumed to be the Port of Bellingham and other private and public parties that either currently own, or buy or lease property within the site.

The City of Bellingham and the Port of Bellingham have obtained an NPDES Phase II Municipal Stormwater Permit. The City and the Port are responsible for assuring that all requirements set forth in that permit are met, including timelines for plan development and implementation and proper

documentation. The NPDES Phase II permit requires that all of the mapping and stormwater design for the Waterfront District be completed by 2012, or sooner. In order to meet this deadline, the final stormwater design will need to be completed and approved on a shorter timeline than the actual infrastructure construction. This affects the timeline for final design of the proposed stormwater system, but does not affect the proposed sequence of development nor the proposed stormwater system, as described previously in this report and the DEIS.

PROPOSED BASINS AND OUTFALLS

The Waterfront District has been delineated into drainage basins based on proposed grading, outfall locations, and anticipated roadway infrastructure construction and sequencing. These criteria, used in determining this basin layout, are the same as what was used in the DEIS. The proposed basins presented here differ to some degree from those presented in the DEIS due to revised grading and roadway layout plans under the Preferred Alternative. The size of the proposed basins presented here are similar to those proposed in the DEIS; therefore no substantial change to anticipated flows at each outfall would result as compared to the flows described and evaluated in the DEIS. The anticipated flows for the proposed basins are expected to be within the range modeled for Alternatives 1 and 3 (see Appendix F of the DEIS). Please see Figure 3.1 for proposed basin delineations and DEIS basin delineations.

Eight new outfalls were proposed in the DEIS. The number of outfalls has not changed. However, the outfall located in the Log Pond area is now located south of the outfall proposed in the DEIS. The new location is within the vicinity of existing outfall 6. As stated in the DEIS, outfalls would be designed to accommodate the design storm flow rates to prevent any conveyance problems, localized flooding or scouring of the Waterway and bay. The outfalls are located near existing outfalls in order to minimize the number of outfalls and impacts on aquatic life.

The following is a brief description of each proposed basin and outfalls as illustrated in Figure 3.1.

Marina Basin

The Marina Basin is bound on the northeast side by Roeder Avenue and bounded on all other sides by water. The basin consists of an area totaling approximately 51.3 acres, including 4.6 acres of new impervious roadway. The Marina Basin will be split into three sub-basins. Runoff from C Street and a portion of Chestnut Avenue will be directed to the Whatcom Waterway near existing outfall number 1 as depicted in the DEIS (at new outfall F). Runoff from Maple and Hilton Street will be directed to the Bay at a location extending from Hilton Street to new outfall H. Runoff from F Street and a portion of Chestnut Avenue will be directed to an existing outfall located in the Marina (ASB), extending from F Street (outfall G).

West Downtown Waterfront Basin

The West Downtown Basin is bounded by the new Bloedel Avenue and Log Pond Drive. This basin covers approximately 21.4 acres; approximately 2.5 acres of that area is estimated to be new roadway surface. The general grading of these roads will slope westward to the Whatcom Waterway. The location of the proposed outfall for this site (outfall B) will be within the vicinity of existing outfall number 4.

East Downtown Waterfront Basin

Bound by the railroad corridor, Roeder Avenue, Bloedel Avenue, and Log Pond Drive, this basin covers approximately 22.5 acres, including 5.1 acres of new roadway surface. Consistent with most of the site, proposed grading for the roadways will result in a gradual downslope toward the Whatcom Waterway. The outfall for this basin (outfall A) will be located near the existing outfall number 3.

West Log Pond Basin

The West Log Pond Basin covers approximately 16 acres, and includes approximately 3.8 acres of new roadway surface. This basin is bounded by the Shipping Terminal to the south, and the new Paper Avenue to the east. Roadway segments in this basin include Log Pond Drive, Ivy Street, and Oak Street. Ivy Street includes a green space, which could be used for potential LEED opportunities. The outfall for this basin (outfall C) differs from what was proposed in the DEIS; as it will be located in the vicinity of existing outfall number 6. The DEIS proposed this outfall to be located approximately 1,000 feet north within the Log Pond. As assumed in the DEIS, runoff directly from the shipping terminal area (15.5 acres), adjacent to this basin, will not include roadway conveyance, and will be directed to the Bay near the existing outfall along the northwest shoreline (outfall D).

East Log Pond Basin

Covering 35.1 acres and bounded by Paper Avenue and the railroad, East Log Pond Basin consists of approximately 9.6 acres of roadway surface. Included in this basin is a portion of Cornwall Avenue, which will remain as it is. New roadway surface includes Paper Avenue, Ivy Street, Oak Street and the new portions of Cornwall Avenue will be built. The storm main in Cornwall Avenue will be used as the outfall for this basin (new outfall E).

Cornwall Beach Basin

Encompassing the extension of Cornwall Avenue to the southwest and the beach area, this basin covers approximately 18.4 acres, with 2.3 acres of proposed roadway surface. Runoff from the roadway prism will be treated and conveyed to Bellingham Bay at outfall E. The City outfall (existing outfall 9) will remain in place. Unlike the other basins, non-roadway runoff will sheet-flow to the Bay, as was proposed in the DEIS.

PROPOSED ROADWAY DRAINAGE CONCEPT

The DEIS proposed different drainage concepts based on the three EIS Redevelopment Alternatives. The DEIS described the drainage concept based on the designated redevelopment areas and proposed land uses and density within those areas. The Port has now proposed a Preferred Alternative. The proposed grading plan has been revised to coordinate with the revised roadway layout. See Figure 3.2 for the proposed grading plan, which differs from the DEIS in that proposed roadway finished grades would be higher and the slopes of the proposed roadways would be greater than what was previously assumed. Also taken into account in the grading plan is the estimated long-term sea level rise and mean high water mark. All new outfalls are expected to be designed at an invert elevation of 13 to 15 feet south of the Whatcom Waterway and 12 to 13 feet in the Marine Trades Area in order to preclude any sea level rise impacts or storm surge problems; this would be up to 4 feet higher than the 11-foot invert elevations assumed in the DEIS.

The following descriptions illustrate the drainage and grading concept per onsite basin. The general concept is similar to that proposed in the DEIS; with a storm main extending from the outfall into the basin with lateral mains connecting into that main. The specific details of the layout are described below.

Marina Basin

As proposed in the DEIS, the proposed roadway conveyance system is a series of catchbasins and a storm main directing flow from the northern end of Hilton Avenue southwesterly to a new outfall located just north of the proposed marina, in the vicinity of an existing private outfall. Runoff from Maple Street will be directed to the system in Hilton Avenue.

Runoff collected in F Street and the northern portion of Chestnut Avenue will be directed through a similar system to a new outfall located in the Marina, in the vicinity of the existing outfall discharging to the ASB.

Runoff collected in C Street and a portion of Chestnut Avenue will be conveyed through a similar drainage system to a new outfall, located just south of the Marina in the vicinity of Outfall 1.

The new roads will be graded to match the existing grades of the inland infrastructure. Due to the proposed grades on the site, much of the system will need to be installed at minimum depths and minimum slopes.

West Downtown Waterfront Basin

Initial construction in this basin would consist of the new Bloedel Avenue. A conveyance system, consisting of catchbasins and stormdrain pipe, will be installed during the road construction. As additional road segments are constructed, the conveyance system will be extended to direct flow from

these segments into the Bloedel Avenue system. The conveyance system will direct flow to a new outfall near the intersection of Bloedel Avenue and Roeder Street, where the runoff will enter the Whatcom Waterway. Treatment will be provided for all roadway runoff prior to entering the Whatcom Waterway. This outfall location is similar to what was proposed in the DEIS, but the specific boundary of the area of runoff directed to it has changed due to the revised roadway layout and grading plan.

East Downtown Waterfront Basin

A conveyance system will be installed with the initial construction of Paper Avenue, Commercial Street, and the Commercial Green, and will be expanded to include subsequent road segments as construction continues. The final stormwater system will consist of a series of catchbasins and pipe flowing north on Bloedel Avenue to a new outfall. Runoff from Paper Avenue, Commercial Street and Commercial Green will be directed to Bloedel Avenue. Treated roadway runoff for this basin will be directed to the Whatcom Waterway. The proposed outfall location is similar to what was proposed in the DEIS, but the specific boundary of the area of runoff directed to it has changed due to the revised roadway layout and grading plan.

West Log Pond Basin

Runoff from Ivy Street and Oak Street will be collected and conveyed to a system directed southwesterly in Log Pond Drive. The conveyance system will consist of catchbasins, treatment facilities, and storm drain pipe. The proposed new outfall point will direct treated stormwater runoff into Bellingham Bay. This outfall serves essentially the same area that was proposed for Outfall C in the DEIS. The location of the outfall remains in the Log Pond area, as proposed in the DEIS, but has been shifted south to the vicinity of the existing outfall.

East Log Pond Basin

As stated in the DEIS, the existing storm drain in Cornwall Avenue has been deemed to have adequate capacity to convey runoff from new development as well as off-site flow in this basin. Runoff from the road segments will be directed to Cornwall Avenue through a series of catchbasins, treatment facilities, and storm pipe. This basin includes the new Ivy Street, which will have a green space, posing an opportunity for “green” stormwater treatment facilities, such as a biofiltration swale or stormwater wetland modified to accommodate the negligible infiltration rate. Biofiltration swales are typically used as an online treatment facility, meaning the treatment facility will be a link in the conveyance system. Biofiltration swales use native vegetation to filter debris and pollutants from the runoff. Stormwater wetlands are shallow man-made ponds, installed to treat stormwater runoff using biological processes associated with aquatic vegetation. As stated in the DEIS, infiltration is not an option due to the existing soil conditions on much of the site. Any swale or stormwater wetland to be installed may need

to be amended with a filter fabric layer and underdrain to convey runoff to the stormwater system or Bay.

Cornwall Beach Basin

Runoff from Cornwall Avenue will collected and conveyed in a system directed northwesterly to the existing outfall at the existing end of Cornwall Avenue. The conveyance system will consist of catchbasins, treatment facilities, and storm drain pipe. The proposed new outfall point will direct treated stormwater runoff into Bellingham Bay near existing outfall 9. Runoff for the remainder of this basin will be directed to the Bay via sheet-flow, as was proposed in the DEIS.

Treatment Options

The DEIS listed several options for stormwater treatment based on Basic Treatment criteria stated in the 2005 SMMWW. The water quality analysis performed for the DEIS was based on assumed use of (1) wet vaults, (2) bioretention facilities, or (3) a 50:50 combination of the two systems. Options for stormwater treatment presented in this report are bioretention facilities and media filter facilities, consistent with option 2.

Proposed treatment for this site could be achieved using low-impact bioretention units, such as Filterra or equivalent. This product is a concrete box containing engineered soil media beneath a 3-inch mulch layer. Stormwater enters the unit through a curb inlet and flows through the soil media where pollutants and debris are captured. Treated stormwater flows out of the structure into the proposed conveyance system via an underdrain. The unit is placed within the planter strip of the road right-of-way, with the opening to the unit placed along the curb line of the roadway immediately upstream of a catchbasin. The Department of Ecology has given a Conditional Use Level Designation for this product for basic treatment. Conditional use allows the continued use of the product through November 2009. The manufacturer will continue to monitor the performance through field testing during this time. A unit that has been installed will not be required to be removed should ongoing studies prove it is not effective.

If bioretention units are not used, a media filtration cartridge vault would be installed prior to discharge of treated runoff into the Bay or the Whatcom Waterway. A media filtration cartridge vault consists of a precast concrete vault with a specific number of cartridge filters sized to treat the required amount of flow. A benefit of this vault system is the ease of maintenance due to a localized system. Benefits of the bioretention units include aesthetic appeal and low-impact result.

Treatment facilities will be designed to treat a flow equivalent to the required flow rate in the 2005 SMMWW. When using a vault system, the treatment facility is installed at the downstream end of the conveyance system. The conveyance system at that point has collected all roadway, sidewalk and development runoff on a combined basis. This combined runoff flows through a flow-splitter which diverts the flow to the treatment facility up to the level of the required flow rate. In high flow situations,

the exceeding stormwater bypasses the facility and discharges directly into the receiving water body. In this situation, the untreated stormwater from the roadway is diluted by the development stormwater prior to entering the treatment facility, increasing the likelihood that untreated runoff could bypass the system while stormwater from non-pollution generating surfaces is directed to unnecessary treatment. The use of bioretention units would avoid this situation, as the runoff from pollution-generating surfaces (i.e., roadways) would be treated prior to entering the conveyance system, rather than after combining with runoff from non-pollution generating sources.

PRE-DEVELOPMENT LOT DRAINAGE CONCEPT

The DEIS did not describe a plan for runoff conveyance in the interim phase, during construction of the infrastructure and prior to full development of the site The proposed redevelopment of this site will result in a roadway grid raised to final grades ranging from 6 to 11 feet above the existing grade on average. The property between the roadway grid will become future building pads. The undeveloped parcels will either be graded to provide a gentle slope towards an interim drainage system or runoff will be pumped into the interim drainage system. In cases where the existing pavement is removed in the undeveloped lots, the environmental soil cap and roadway side slopes will be seeded with grass; therefore, all runoff from these areas will be essentially clean, and treatment will not likely be required. In the case that any interim parcel is used as a temporary parking facility, the runoff from the parcel will be treated via a modified biofiltration swale or media filtration cartridge catchbasin system prior to entering the drainage system.

POST-DEVELOPMENT DRAINAGE CONCEPT

Future development on the site will be comprised of a range of uses. The Port will be responsible for installing measures to meet Ecology and City standards for stormwater treatment prior to discharging to public waters.

PROPOSED DESIGN CONCEPT

Section 3.3 of the DEIS specified that a gravity system would be used with outfalls at the aforementioned locations. Water quality treatment would be provided for pollution-generating surfaces. The design would be in accordance with the City of Bellingham Stormwater management Ordinance which is based on the 2005 SMMWW. The following descriptions expand on the plan described in the DEIS.

Roadway Conveyance

Stormwater within the roadway prism will be contained and conveyed through a series of catchbasins and stormdrain pipe. Water quality treatment is required and will be provided using bioretention units in series with the catchbasins. Bioretention units are manufactured in a variety of sizes, the standard being the 6-foot by 6-foot unit which can treat a drainage area of 0.36 to 0.39 acres. By using these units, the stormwater treated will be the polluted stormwater from the roadway, rather than an equivalent flow as is common in most roadway designs. Treated stormwater will be routed to a new outfall located within the vicinity of an existing outfall. The use of a bioretention system was mentioned as a possible treatment system in the DEIS, however use of bioretention units was not specified in that report. Water quality analysis in the DEIS was performed assuming the potential use of bioretention treatment facilities.

Pre-Development Port Property Stormdrainage

Culverts with trash racks will be installed under the new roadways in order to allow undeveloped lots to drain to the roadway conveyance system and avoid areas of standing water. The undeveloped lots will be graded with a gentle slope directing stormwater to the culvert entrance. In some areas, grading the site to drain to a culvert will be cost-inefficient and a temporary pump will be used instead. See Figure 3.2 for the revised conceptual grading plan, as well as proposed inlet locations.

Post-Development Management of Stormdrainage

Treatment of stormwater on the developed lots will be the responsibility of the Port, and/or other current and future property owners, and/or tenants. The interim culverts will be used to convey the treated stormwater to the roadway conveyance system. Due to the difference between the finished grade of the roadway and the finished floor elevation of the basement floor of the proposed buildings, pumping may be required to get the stormwater to an elevation to discharge into the public storm sewer system (roadway conveyance system). The need for pumping would be determined by the developer and the Port during the final design and permit process for individual buildings. Construction within the site would not penetrate the environmental cap unless proper permitting is obtained.

Expected runoff from the developed properties would be primarily from non-pollution generating surfaces, such as roofs and pedestrian plazas. As a potential LEED opportunity, this stormwater could be reused on site as a water feature or as landscape irrigation, provided a Regional Rainwater Harvesting Permit from the Department of Ecology is obtained. Without that permit, runoff must be directed to the stormwater conveyance system. However, an aesthetic design utilizing rainwater could still be achieved. Rain chains could be used in lieu of downspouts to convey roof runoff to the stormwater conveyance system using an art piece instead of piping. Another option would be to incorporate roof runoff conveyance into the landscaping design using lined, gravel trenches graded

towards a catchbasin in lieu of piping. Both of these options could provide a way to convey rainwater to the stormwater system using non-traditional and aesthetically pleasing methods.

OPTION 1

As previously mentioned, further options for stormwater system design were researched and developed after the submittal of the DEIS. Option 1 was not included in the DEIS and represents a potential LEED opportunity by proposing the use of two parallel stormwater systems in order to separate non-pollution generating surface runoff from pollution generating surface runoff, as described below

Design Concept

With the construction of the roadways and roadway conveyance systems, a separate parallel stormdrainage system could be installed at a lower elevation (one system for pollution-generating roads and one for non pollution-generating roofs and plaza areas in developed parcels). Stormwater runoff from the developed parcels would be directed to the lower elevation, non-polluted system. Any treatment required of the developed runoff would be performed prior to entering the conveyance system.

Results

A parallel system would provide a separation between runoff from the developed parcels with primarily non-pollution generating surfaces and runoff from the pollution generating roadways. Treatment of the roadway conveyance system would be provided by media filtration cartridge vaults with the option to replace the vaults with bioretention units at the road grade for the untreated runoff in the roadway conveyance system. The bioretention unit option would allow more flexibility in the design of the grades and depths of the roadway conveyance system, but would make the dual pipe system somewhat redundant.

Stormwater in the parallel system would be treated if necessary within the developed parcels prior to entering the non-pollution generating conveyance system. Therefore, this stormwater would be essentially clean. With proper permitting this system could be used as a rainwater harvesting system, allowing for reuse of the stormwater for irrigation and other non-potable uses.

OPTION 2

Design Concept

The stormwater conveyance system could be installed with one main conveyance system collecting stormwater for both the roadway and developed lots. Using bioretention units at the roadway grade to filter pollution generating stormwater sources prior to entering the general conveyance system, in conjunction with treatment, if necessary, within the developed parcels prior to entering the general stormwater conveyance system behind the bioretention units provides a system not requiring use of

media filtration cartridge vaults. In lieu of using the bioretention units, water quality treatment would be provided using media filtration cartridge vaults located just upstream of the outfall location. A flow restrictor would be installed just upstream of the vault in order to direct only the design storm flow to the treatment facility. Treated stormwater will be routed to an outfall located within the vicinity of an existing outfall. The remaining runoff will be directed to the outfall, bypassing the treatment facility. This type of treatment is the typical system encouraged by the 2005 SMMWW. This system is similar to that assumed in the DEIS.

Results

The media filtration cartridge vault would meet all requirements for stormwater treatment and provide ease of maintenance due to the localized treatment facility.

4. Impacts and Mitigation Measures

CONSTRUCTION IMPACTS

Similar to the DEIS, construction runoff would be collected and routed to stormwater quality treatment facilities prior to discharge. Best management practices would be used to prevent impacts associated with erosion and sedimentation. In section 3.0 of DEIS Appendix F, the ten minimum requirements set forth by the City of Bellingham Stormwater Management Ordinance 2006-05-047 are described. The proposed project would comply with these requirements. No changes in construction stormwater impacts from those discussed in the DEIS would result.

OPERATIONAL IMPACTS

Proposed improvements for the redevelopment of the New Whatcom site (Waterfront District) include the demolition of existing structures, coordination with the ongoing onsite environmental remediation projects, new infrastructure and redevelopment of a mix of uses. The result of these improvements will transform the district from an industrial and manufacturing setting into a mixed-use extension of downtown Bellingham. The Port of Bellingham currently owns a majority of the property within the site, but there are other public and private property owners. The Port may sell, lease, or operate portions of its currently owned property. Institutional controls will be required to ensure proper clarification of responsibilities for stormwater management within specific parcels. It is anticipated that the City will eventually own and maintain certain basic infrastructure within the Waterfront District, but other developers and/or property owners may be responsible for maintaining infrastructure for private roads and properties.

Phased development would result in construction of road infrastructure prior to construction of certain development parcels. A stormwater system will be required to collect, convey, and treat stormwater runoff for the roadway, interim undeveloped parcels, and eventually the overall development. The stormwater system for the roadway will be owned and maintained by the City of Bellingham, and will convey treated roadway runoff for discharge to the Waterway or Bay. The Port of Bellingham and/or tenants and/or other property owners will be responsible for treating runoff (if necessary) from buildings and plaza areas prior to entering the public stormwater system. Five existing conveyance pipes route offsite flow through the site. Four of the pipes will not be relocated under the proposed improvements, but a portion of one of the pipes will be rerouted to coordinate with the new roadway layout. The end result will be a stormwater management system complying with all requirements set forth by Ecology and the City.

This report is meant to supplement the information provided in the DEIS. In most cases, the information provided here has expanded on information and concepts provided in the DEIS. In some cases, new concepts and information have been provided based on further research and ongoing coordination between all vested parties. Specific changes to the information provided in the DEIS are the following:

- Specific information regarding the process of decommissioning the ASB including identification of steps already taken
- Relocation of the City's Laurel Street stormwater pipe through a portion of the site
- Revisions to expected sequencing of improvements including identification of an interim concept for stormwater management of the roadway network and parcels yet to be developed.
- Revised proposed basin boundaries, grading plan and Log Pond outfall location to coordinate with revised roadway layout
- Outfall elevations raised to 13 - 15 feet to avoid conflicts with the long-term potential for sea level rise and storm surges
- Outfall elevations within the Marine Trades area may be located at current elevations of approximately 12 feet since those areas are not currently scheduled for additional fill at this time.
- Proposed treatment is proposed to be via bioretention units or media filtration cartridges.
- Two options for stormdrainage design components are described

These changes do not conflict with the basic concepts and assumptions used in the DEIS. Conclusions regarding potential impacts from construction and operation of the stormwater system indicated in the DEIS remain valid and no substantive changes in impacts or mitigation would result.

MITIGATION MEASURES

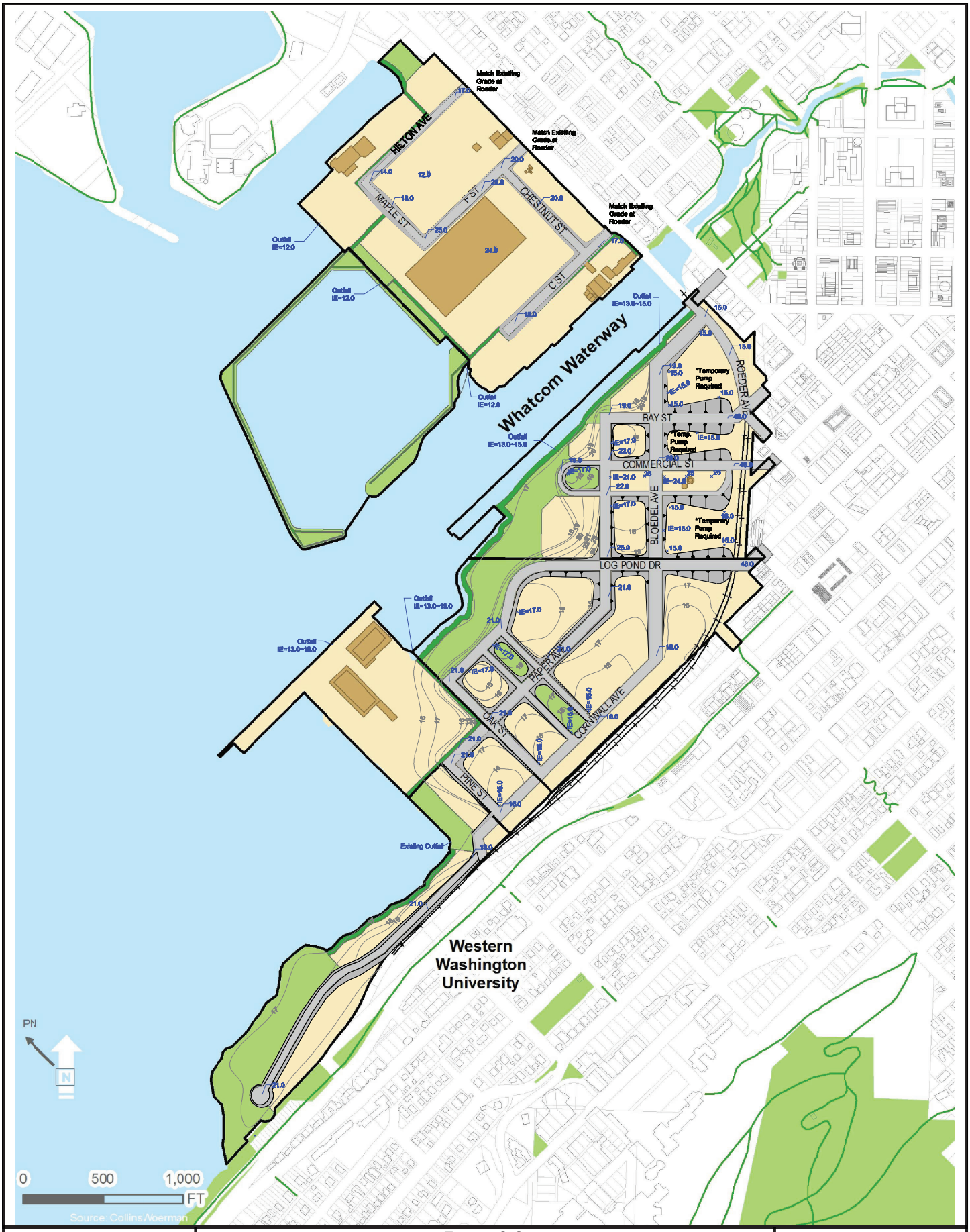
In addition to the list of construction and operational mitigation measures proposed in the DEIS, the following mitigation measures have been added at this time:

- Installation of a parallel stormwater system as described in Option 1 is a potential LEED opportunity for rainwater harvesting. Stormwater collected in that system could be used for non-potable uses such as landscape irrigation and lavatory flushing.
- Potential installation of modified stormwater wetlands or biofiltration swales in some areas would meet requirements for treatment while utilizing low-impact, natural processes for filtration and coordination with landscape design.

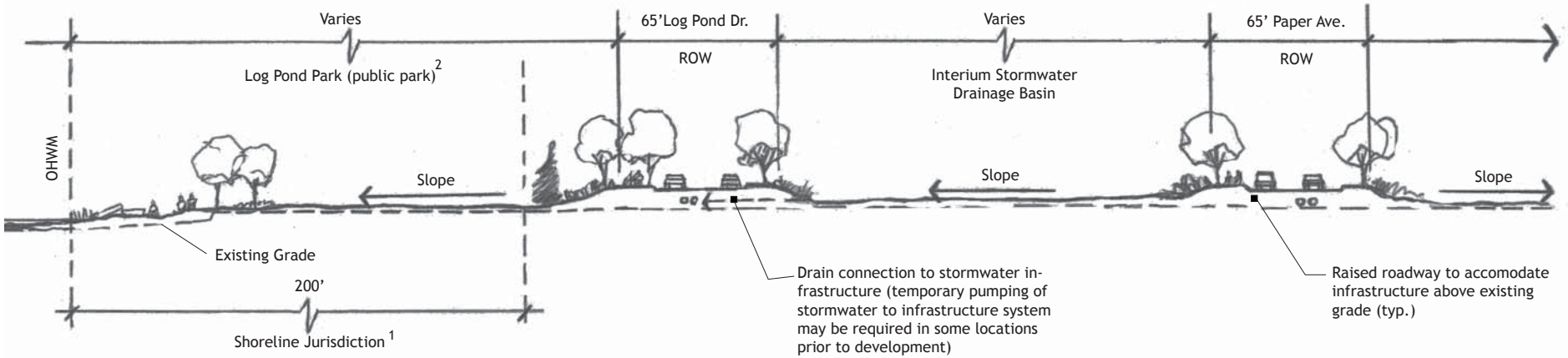
SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

As stated in the DEIS, no significant unavoidable adverse impacts are anticipated at this time.


H
G
F
A
B
Whatcom Waterway
ROEDER AVE
* DEIS Outfall
D
C
E
Western Washington University
PN
N
0
500
1,000
FT
Proposed Basin Boundary
Drainage Flow
Outfall Location



BLUMEN CONSULTING GROUP, INC	Figure 3.2 Grading Plan Preferred Alternative	New Whatcom Redevelopment EIS



Notes
1. The shoreline jurisdiction extends both landward and waterward of the OHWM.
2. A public park includes a combination of trees, plants & shrubs with grassy areas; hard surfaced walkways & bikeways with street furniture.

OHWM - Ordinary High Water Mark
MHHW - Mean High Water Mark
MLLW - Mean Low Water Mark
ROW - Right of Way

0' 15' 30'

Conceptual: For Illustriative Purposes Only

Source: CollinsWoerman/.KPFF Engineers

BLUMEN CONSULTING GROUP, INC

Figure 3.2b
Section G- Stormwater System (interium drainage)
Preferred Alternative: 2026

New Whatcom Redevelopment EIS

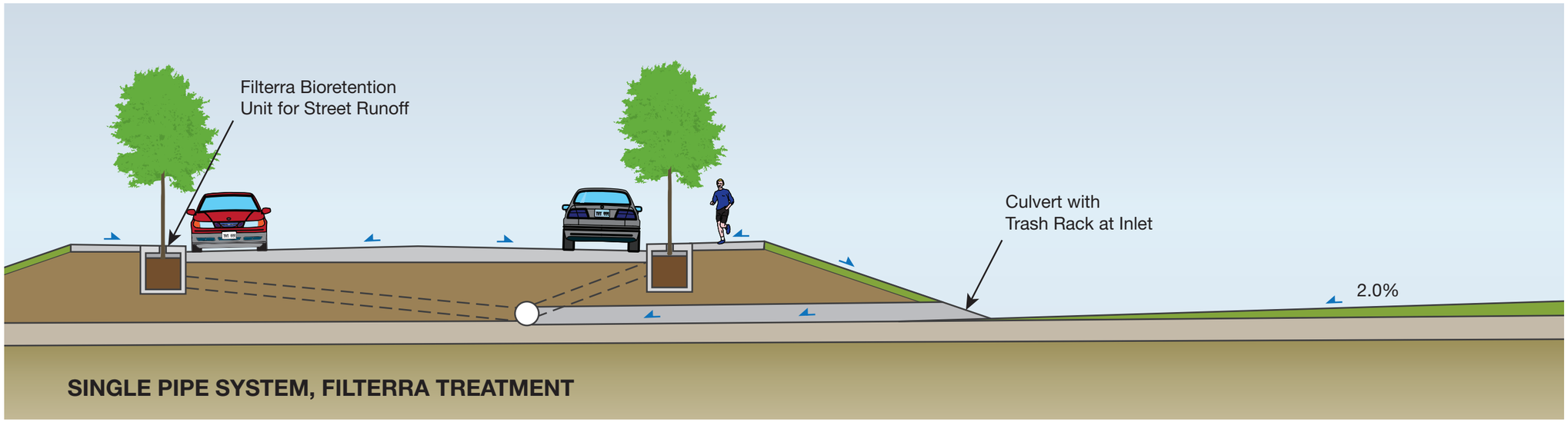


FIGURE 3.3 Drainage System Comparison

scale: 1”=10’