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STORMWATER SITE PLAN

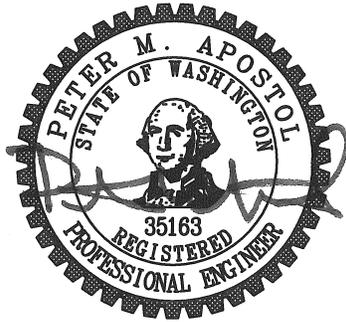
EVERETT SAFE STREETS SUPPORTIVE HOUSING

Project: Catholic Housing Services – Everett Safe Streets Supportive Housing
Everett, WA 98203

Prepared For: Catholic Housing Services of Western Washington
100 23rd Avenue South
Seattle, WA 98114

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Reviewed By: Peter Apostol, PE

Date: December 16, 2016



“I hereby certify that this Drainage and Temporary Erosion Control Plan for Everett Safe Streets Supportive Housing has been prepared by me or under my supervision and meets minimum standards of City of Everett and normal standards of engineering practice. I hereby acknowledge and agree that the jurisdiction does not and will not assume liability for the sufficiency, suitability, or performance of drainage facilities designed by me.”

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I. Project Description

The site for the future Catholic Housing Services' (CHS) Everett Safe Streets Supportive Housing (ESSSH) is located at 6107 Berkshire Drive, Everett, Washington 98203, Township 28 N, and Range 5 E, at approximately 47.9415 degrees North latitude, and 122.2165 degrees West longitude.

Multi-family housing is proposed in addition to parking, site and utility improvements within less than one (1) acre (42,725 square feet) of disturbance. In addition to the site improvements, off-site right-of-way (ROW) improvements will include new curb, gutter, sidewalk, a small rockery and associated drainage improvements for Berkshire Drive along the project frontage.

The property size is 53,575 sf, of which the proposed four (4) story, multi-family residential, 70-unit building will occupy an approximately 11,000 sf footprint. Proposed Parking for 21 vehicles will replace approximately 6,100 sf of existing pavement. An additional 11,700 sf of other impervious areas will be constructed as parking and sidewalks. The project follows the requirements set forth by the City of Everett (COE) in the Stormwater Management Manual of 2010.

II. Site Assessment

The ESSSH project site is currently partially occupied by an existing fire training facility that is situated in the middle of a large tarmac. A gravel lined area also resides adjacent to and west of the tarmac. Topographic relief, one (1)-ft contours, and other data was obtained through a land survey performed by Alpha Subdivision Pro's Inc. Land Surveying and Planning in October 2016 (Appendix B). Two (2)-ft contours for offsite areas surrounding the site, along with utility and building locations were obtained from the COE geographical information systems (GIS) department October 27, 2016.

A geotechnical investigation was performed on November 1, 2016 by Geotech Consultants, Inc for the project site (Appendix C). Multiple borings and test pits were dug with samples tested. The report showed that the site soils are loose to medium-dense un-engineered fill soil generally comprised of gravelly silty-sand, presumably from the excavation of the nearby reservoir site. These findings confirm the United States Geological Survey's (USGS) Soil Survey Geographical Database (SSURGO) that classifies the soil as having moderately low runoff potential when thoroughly wet, with unimpeded water transmission.

Stormwater runoff west of the tarmac sheet flows to the west and down the steep slope where it is collected by a series of catch basins at the toe of slope. Runoff from the existing tarmac, drains to one of two clusters-of-three catch basins located on the west and south edges of said pavement. This runoff is conveyed to the storm mains along Berkshire Dr. and Evergreen Way. These storm mains both empty to Pigeon Creek Number 1, and ultimately to Possession Sound.

The Site is located adjacent to a steep slope that is classified as a Landslide Hazard Area (COE, Critical Area) with "medium" slopes of 25% to 40% (COE, Class 2) on geologic unit Qg1t, Younger Glacial Drift, Pleistocene. The soil type for the entire project site and property is Alderwood-Urban Land Complex, hydrologic soil group (HSG) B, per the Natural Resources Conservation Service (NRCS). Pigeon Creek Number 1 runs to the north along the toe of this slope in an underground pipe and is classified as an "Ns" Stream (COE, Critical Area) before emerging on the west side of Evergreen way as an "F" Stream.

The COE describes “Ns” classified streams as seasonal in which surface flow is not present for at least some portion of a year of normal rainfall that are not located downstream from any Type “Np” stream segments. Care and consideration of these critical areas was held paramount during the design of the project site.

A 24-inch polyethylene (PE) storm drain currently runs along the east property line of the site, beneath the existing pavement, and serves the fire training site. This line reduces to a 6-inch diameter at the site entrance and conveys flow to the south to a combined sewer manhole on an 8-inch line beneath Berkshire Dr. Additionally, a 12-inch polyvinyl chloride (PVC) storm drain runs along the north side of Berkshire Dr., parallel to the south property line, but does not serve the site. Finally, a 36-inch Alderwood Water District transmission water main runs roughly parallel the 24-inch sewer pipe, mentioned above, on the east property line. Caution to not damage these lines during construction shall be taken.

III. Site Development Plan with On-Site Stormwater Management

The existing ground shown in the Grading Plan (Appendix A) as the “limits of disturbance” will be approximately 42,725 sf and will need to be stripped, cleared and grubbed of all vegetation, gravel and existing pavement. Grading will be performed that shall not alter existing drainage paths and outfall locations. The site shall continue to drain to Pigeon Creek to the west and south following construction. See Site Storm Drainage and Utility Plan (Appendix A).

The new multi-family residential building shall be constructed with a footing drain surrounding the entire perimeter of the building. The footing drain is to be constructed of 4-inch perforated pipe surrounded by 1-inch minus washed rock that is wrapped in a non-woven geotextile, and will empty to the existing 12-inch storm drain beneath Berkshire Dr.

The ground shall be graded to slope away from the base of the building. Surface drainage, not collected on the roof, will runoff as sheet flow on its historic path to the west and south. Non-roof surface drainage on the east side of the proposed building will sheet flow to the proposed parking lot drainage system.

Rainfall runoff from the roof and parking lot shall also be conveyed to the proposed detention tanks for water quality treatment and controlled discharge. The roof downspouts shall connect via tight-line directly to the detention system. Parking lot runoff shall be collected by catch basins around the perimeter of the lot and will enter under-drained, bio-retention cells for treatment prior to being collected in area drains to be detained in the tanks. By collecting the runoff from the roof and parking lot, the site will follow the COE Stormwater Management Manual for post development release rates. Moreover, the post development runoff for the 10-yr and 100-yr storm events will be less than pre-development runoff rates, and post will be less than half of the pre-development 2-yr runoff flow rate (COE, Vol I, Sec 2.2.7).

The detention tanks shall be constructed of three (3) parallel 60-inch pipes, each 58 feet long. They will be connected and equalized by 60-inch connections to form a manifold that will house the total volume required to properly mitigate flows. The detention tanks shall be constructed following COE standard drawing 416, Typical Closed Underground Detention System. The inlet and outlet structures shall each

be comprised of a 54-inch Type 2 catch basin, adhering to COE standard drawing 404. The detention system shall drain via controlled release to the existing 12-inch storm drain running along the north side of Berkshire Dr. Additionally, 6 inches of dead storage shall be provided for sediment removal.

Right of Way Development

The Right of Way (ROW) along Berkshire Dr on the southern property line is to be improved with a sidewalk curb and gutter. Improvements are shown in the Right of Way Improvement Plan in Appendix A. This area, measuring approximately 2,300 sf, is considered a separate threshold area for the purposes of water quality and flow control by the COE (Appendix E).

A standard (COE Detail 306) 4-in thick concrete sidewalk with standard (COE Detail 305A) Type A-1 curb and gutter shall be placed with the back of sidewalk parallel to the southern property line and offset 1.5 ft. A 3-ft rockery (COE Standard Detail 324) shall be placed from approximate Station 13+05 to 13+89 to stabilize the cut slope necessary to place the proposed sidewalk.

Runoff shall continue to flow along its historic flow path to the west along the north side of Berkshire Dr. Runoff shall continue to be collected by existing catch basins immediately west of proposed ROW improvements.

IV. Construction Stormwater Pollution Prevention Plan

All construction shall be performed under the site Construction Stormwater Pollution Prevention Plan (CSWPPP) (Temporary Erosion and Sediment Control Plan, TESC, Appendix A). The SWPPP was prepared under Section 2 of the COE's Design and Construction Standards and Specifications, since the limit of disturbance shall be less than one (1) acre.

Perimeter control for the Site shall be a compost berm or compost sock as noted on the TESC (Appendix A). The chosen perimeter control measure shall surround the site along the entire limits of disturbance shown on the TESC. A stabilized construction entrance shall be constructed as per COE standard drawing 201 and detail 3/3 from the drawings. This measure will help prevent tracking of soil and sediment off site.

The existing tarmac, gravel lot and road that are on the property shall be removed during clearing and grubbing. All loose soil, gravel, and broken pavement in stock piles shall be covered with plastic and surrounded by 8-inch compost socks at the base. This will help prevent sediment transport. The four existing catch basins and two existing manholes on site shall also be surrounded by 8-inch compost socks to protect them from sediment and clogging.

Periodic street cleaning shall be provided to remove any sediment that may have been tracked off site. Sediment should be removed by either shoveling or sweeping and carefully removed to a suitable disposal area where it will not be eroded. Additional street cleaning may be required as directed by the city public works inspector. The use of vacuum sweepers is encouraged by the COE.

All installed erosion and sediment control BMPs shall be inspected and maintained in good effective condition once per week and following any storm. Following the completion of construction, the compost berms or socks shall be removed from protected manholes and catch basins. The compost

berm or sock used for perimeter control shall be thoroughly raked and spread out, and may be left on the ground.

V. Source Control Plan

None of the activities listed in Figure 1.1, Chapter 2, Volume IV of the COE Stormwater Management Manual are expected to occur at the site. No source control BMPs discussed in Volume IV are planned. However, runoff from the proposed parking lot shall not be allowed to leave the site prior to conveyance through bio-retention prior to detention and controlled discharge.

VI. Special Reports or Studies

A site land survey was conducted for the purposes of site and building design and layout by Alpha Subdivision Pro's Inc. Land Surveying and Planning in October 2016. A geotechnical investigation was performed by Geotech Consultants, Inc on November 1, 2016. Both survey and geotechnical report can be found in Appendix B and C of this report, respectively.

VII. Other Permits

Permits needed for the ESSSH Site include Civil, Building and Land Use Permits through the COE. The Civil Permit is addressed by this Stormwater Site Plan, which has been prepared in accordance with the guidance provided in Volume I, Chapter 3 of the COE Stormwater Management Manual.

VIII. Permanent Stormwater Control Plan

A. Off-Site Analysis

The Site is located within the Pigeon Creek Number 1 watershed, and is located east across Evergreen Way from the headwaters. All runoff from the site ends up here where it flows to Possession Sound (Puget Sound). Approximately 28,900 square feet of hard surface is proposed for the site, and will increase the amount of runoff generated on-site. Due to soil conditions and the Landslide Hazard Area, immediately to the west, infiltration discharge of collected runoff will not be used. However, bio-retention and underground detention are proposed on site to mitigate any increased runoff to historic levels, before being discharged into the existing 12-inch storm drain along Berkshire Drive.

The proposed improvements are not expected to cause any conveyance system capacity problems. Detention is planned to mitigate the post-developed runoff to be less than pre-developed. No localized flooding is expected, as the site is to be graded to lead runoff away from proposed structures and into the water quality and flow control structures. Infiltration is not proposed as a means of discharging any collected runoff, which does not increase the risk of erosion or landslide hazards in the area. Runoff is to be discharged into the existing storm drain system along Berkshire Drive, thus creating no risk of erosion of stream banks or outfalls. The guidelines set forth in Volume I, Chapter 4 of the COE Stormwater Management Manual were followed to avoid any violations of surface water quality standards through use of bio-retention and detention of runoff.

B. Pre-Developed Hydrology

It its predeveloped condition, the site is mostly lawn, with a gravel storage yard. The general topographic relief is mild and to the west and slightly south. Surface runoff sheet flows down the steep slope to the west into the gutter along Evergreen Way. Some of the sheet flow is captured by two city-owned catch basins, behind Jiffy Lube (6209 Evergreen Way) and Janbo Café (6125 Evergreen Way), a detention vault behind Peking Duck (6211 Evergreen Way) and five private catch basins located in the parking lots for Jiffy Lube and Janbo Cafe. Any runoff captured by these catch basins flows in a pair of converging storm drain pipes to the north where they are discharged into the underground segment of Pigeon Creek Number 1, and sent west beneath Evergreen Way.

The Santa Barbara Urban Hydrograph Method was used to analyze both pre- and post-developed conditions. The COE Stormwater Runoff Manual stipulates (COE, Vol I, Table 5.4, Pg 5-4) the following rainfall depths for 24-hour design storms.

Return Frequency	Total Precipitation (inch)
6 month	1.12
2 year	1.55
10 year	2.25
25 year	2.60
100 year	3.25

Table 1: Rainfall Depths

Based on the USGS Soil Survey Geographical Database (SSURGO), the site soil is Alderwood-Urban Complex and has a Hydrologic Soil Group (HSG) of B. The HSG was further found to be appropriate based on the site geotechnical engineering study (App B), which found the soils to be loose to medium-dense, non-structural fill presumably from the Reservoir Number Three excavation.

Runoff Curve Numbers (CN) were determined based on the HSG and land use/cover, from table 5.6 (COE, Vol I, Pg 5-6). A CN of 98 for roofs and pavement impervious surfaces, a CN of 85 for the gravel lot, and a CN of 80 for the lawn were used. The Site is small and no distinct concentration points were identified. Therefore, a minimum time of concentration of six (6) minutes was used for runoff calculations. All parameters are summarized below in Table 2.

	HSG = B	CN	PRE (acre)	POST (acre)
Impervious	Roof	98	0.0	0.254
	Pavement	98	0.115	0.401
Pervious	Gravel	85	0.259	0.0
	Grass	80	0.623	0.320

Total Imperv		0.115	0.655
Total Perv		0.882	0.320
Total		0.998	0.998

Table 2: Sub-Basin Runoff Parameters

As per section 5.4.2 (COE Vol I, Pg 5-4), the pervious and impervious area hydrographs were computed separately and then combined for the design runoff hydrograph. The results of the SBUH model are presented in Section VIII, C below. The plans show both pre- and post-developed conditions.

C. Developed Hydrology

The post-development hydrologic model was parameterized following the same sections of the COE’s Stormwater Management Manual. The minimum time of concentration was again used, and the land use areas were updated to reflect the proposed building and parking lot. All parameters are summarized in Table 2, above. Along the eastern property line where the parking lot entrance and exit are proposed, the Site shall be graded in a manner to prevent offsite run-on from entering the property. This flow shall be diverted north to the existing catch basins for the fire practice facility.

As expected, generated runoff flow and volume were increased due to the addition of impervious surfaces, and were mitigated using underground detention in compliance with Vol I, Section 2.2.7. Results are presented below in Table 3.

	PRE (cfs)	POST (cfs)
2-year	0.074	0.033
10-year	0.188	0.056
100-year	0.387	0.153

Table 3: Runoff Flow Results

D. Stormwater Flow Control Plan

Post-developed runoff was mitigated to be less than pre-development conditions for the 10- and 100-year storms, and less than 50% of the pre-developed 2-year runoff as per Minimum Requirement #7 (COE Vol I, Sec 2.2.7, Pg 2-13). The proximity of the Landslide Hazard Critical Area does not allow for the application of most of the traditional best management practices (BMPs) (COE, Vol I, Chap 12, 2010) to be within a 200-foot buffer.

With 67% of the proposed site to be impervious surface, a correction factor of 0.38 was derived from figure 5.1 (COE Vol I, Section 5.4.6, pg 5-13), and applied to the detention volume. Underground detention tanks are proposed beneath the parking lot, as three (3) 60-inch diameter pipes, 58 feet long, each. This provides 3,416 (includes correction factor) cubic feet of storage, and receives runoff collected from the roof and proposed parking lot, after first being run through bio-retention cells located near the north and south parking lot edges. Any Emergency overflow of the detention will be directed to Berkshire Drive curb and gutter. The detention facility shall be constructed as shown in COE standard drawing 416, with catch basins at the upstream and downstream ends.

The storage tanks shall have a standard flow control outlet structure as shown in COE standard drawing 412. The restrictor assembly shall consist of a 6-inch vertical pipe, open at the top, and with a 0.7-inch diameter orifice at the bottom. Effluent will be discharged into the 12-inch storm drain pipe along Berkshire drive.

E. [Stormwater Treatment Plan](#)

Following the guidelines presented in the Stormwater Management Manual (COE, Vol I, Chap 4), Basic treatment for the Site runoff is needed. Two (2) bio-retention cells shall be constructed per Volume I, Chapter 10, near the proposed parking lot edges. Since, infiltration will not be used as a form of final dispersion, water shall infiltrate the bio-retention, and drain to the underground detention via an underdrain pipe (4-inch minimum diameter).

F. [Conveyance Analysis](#)

The proposed roof runoff shall be collected and directed to downspouts at the corners of the building, which shall connect directly to the existing storm drain along Berkshire Drive via tight-lines. Tight-lines shall be rigid 4-inch pipe.

Catch basins shall be placed in the proposed curbs at the locations shown on the Site Storm Drainage and Utility Plan (Appendix A). Runoff from the parking lot will be collected and diverted through bio-retention cells at these locations. Four (4)-inch underdrain pipes in the bio-retention will convey the captured runoff into the underground detention tanks for controlled discharge from the Site.

G. [Maintenance and Operation Plan](#)

The design life of common materials used for storm drain pipe (eg HDPE, PVC) is 50 to 100 years based on studies performed by the Plastic Pipe Institute. Assuming the 100-year event as the base flood for the Final Design Phase, the exceedance probability of the proposed system will be within the range of 39 to 63 percent.

Coterra recommends that the COE implements the Snohomish County Drainage Manual (2016) Volume V, Chapter 4, Section 4.6 for an operation and maintenance (O & M) plan of all existing and proposed drainage structures at the ESSSH Site. For each drainage structure or component Table 5.3 within Section 4.6 lists possible defects, conditions signifying when maintenance is needed, and the expected results once maintenance is performed. Snohomish County Code Chapter 7.54, and Chapter 30.63A.575 through 605 are other possible guidelines for an O & M plan.

More detail can be found in Appendix F.

IX. Summary and Conclusions

The City of Everett Minimum Requirements as laid out in Volume I, Chapter 2 of the Stormwater Management Manual (SMM) were used as guidelines for the design of the ESSSH Site, and have been met. The Stormwater Site Plans (1) were prepared adhering to the requirements and guidelines presented in Volume I, Chapter 3 of the SMM. The CSWPPP (2) was prepared in accordance with Volume II, Chapter 2 of the SMM. None of the activities listed in Figure 1.1, Chapter 2, Volume IV of the SMM are expected to occur at the site, and thus, no source control (3) BMPs discussed in Volume IV are planned. Natural Drainage Systems and Outfalls (4) have been preserved to the maximum extent practicable. The proposed site empties to the same combined and storm sewers as in the pre-developed condition, with runoff attenuation provided. On-site Stormwater Management (5) is provided through tightlines, drains, and underground detention as outlined in Volume III, Chapter 12. Basic treatment is required for the Runoff Treatment (6), in addition to two (2) bio-retention cells. Flow Control requirements (7) are met using the standard flow control outlet structure as shown in Standard Detail 412 (COE). As there are no Wetlands (8) within a quarter mile of the proposed site, no wetland protection is provided. An O & M plan (9) is provided in Appendix F of this report, and is consistent with the provisions of the SMM.

Appendix A

Civil Site Plan Set

SANITARY SEWER NOTES- CITY OF EVERETT

1. ALL WORK AND MATERIALS SHALL CONFORM TO THE CITY OF EVERETT STANDARDS AND WSDOT/APWA STANDARD SPECIFICATIONS.
2. NO PART OF THE SANITARY SEWER SYSTEM SHALL BE COVERED, CONCEALED OR PUT INTO USE UNTIL IT HAS BEEN TESTED, INSPECTED, AND APPROVED BY THE CITY INSPECTOR.
3. APPROXIMATE LOCATIONS OF EXISTING UTILITIES HAVE BEEN OBTAINED FROM AVAILABLE RECORDS AND ARE SHOWN FOR CONVENIENCE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF LOCATIONS AND TO AVOID DAMAGE TO ANY ADDITIONAL UTILITIES NOT SHOWN. IF CONFLICTS WITH EXISTING UTILITIES ARISE DURING CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY THE PUBLIC WORKS INSPECTOR AND ANY CHANGES REQUIRED SHALL BE APPROVED BY THE CITY ENGINEER PRIOR TO COMMENCEMENT OF RELATED CONSTRUCTION ON THE PROJECT.
4. ALL SEWER MAIN EXTENSIONS WITHIN THE PUBLIC RIGHT-OF-WAY OR IN EASEMENTS MUST BE STAKED BY SURVEY FOR LINE AND GRADE PRIOR TO STARTING CONSTRUCTION.

WATER NOTES- CITY OF EVERETT

1. NO CONNECTION TO THE EXISTING MAINS WILL BE ALLOWED EXCEPT BY MEANS OF AN APPROVED BACKFLOW PREVENTION DEVICE PRIOR TO SATISFACTORY FLUSHING, TESTING, DISINFECTION, AND RECEIPT OF SATISFACTORY BACTERIOLOGICAL TEST RESULTS.
2. CONNECTIONS TO AND TAPS ON EXISTING MAINS WILL BE MADE BY THE PUBLIC WORKS DEPARTMENT AT THE DEVELOPER'S EXPENSE. THE PUBLIC WORKS DEPARTMENT SHALL BE GIVEN AT LEAST 5 BUSINESS DAYS NOTICE FOR EACH CONNECTION. THE PUBLIC WORKS DEPARTMENT SHALL THEREAFTER DETERMINE THE DATE AND TIME AT WHICH THE CONNECTION SHALL BE MADE.
3. ALL WORK AND MATERIALS MUST CONFORM TO CITY OF EVERETT STANDARDS.
4. A PRE-CONSTRUCTION MEETING SHALL BE HELD WITH THE CITY PRIOR TO THE START OF CONSTRUCTION. THE CITY OF EVERETT PUBLIC WORKS CONSTRUCTION DIVISION MUST BE NOTIFIED AT LEAST 24 HOURS PRIOR TO COMMENCEMENT OF CONSTRUCTION.
5. THE DEVELOPER OR THE DEVELOPER'S AUTHORIZED AGENT SHALL NOTIFY THE PUBLIC WORKS DEPARTMENT OF A PERSON WHO CAN BE CONTACTED REGARDING PROBLEMS DURING CONSTRUCTION ON A 24 HOUR BASIS.
6. MAINTAIN A MINIMUM OF 10 FEET HORIZONTAL AND 18 INCHES VERTICAL SEPARATION BETWEEN POTABLE AND NON-POTABLE CONVEYANCE SYSTEMS.
7. ALL CITY OF EVERETT VALVES SHALL BE OPERATED BY PUBLIC WORKS DEPARTMENT PERSONNEL ONLY. ALL VALVES, NEW AND EXISTING, SHALL BE ACCESSIBLE AT ALL TIMES.

STORM DRAINAGE NOTES- CITY OF EVERETT

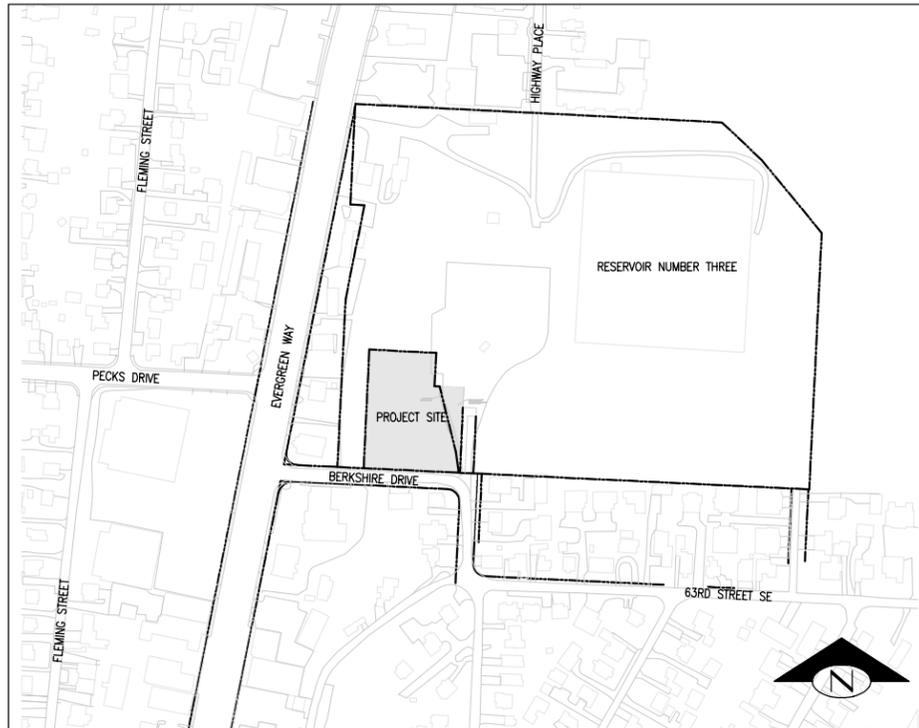
1. NO PART OF THE DRAINAGE SYSTEM SHALL BE COVERED, CONCEALED, OR PUT INTO USE UNTIL IT HAS BEEN INSPECTED, TESTED, AND ACCEPTED BY THE CITY OF EVERETT.
2. ALL WORK AND MATERIAL SHALL CONFORM TO THE CITY OF EVERETT STANDARDS AND STANDARD SPECIFICATIONS OF WSDOT/APWA.
3. APPROXIMATE LOCATIONS OF EXISTING UTILITIES HAVE BEEN OBTAINED FROM AVAILABLE RECORDS AND ARE SHOWN FOR CONVENIENCE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF LOCATIONS AND TO AVOID DAMAGE TO ANY ADDITIONAL UTILITIES SHOWN. IF CONFLICTS WITH EXISTING UTILITIES ARISE DURING CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY THE PUBLIC WORKS INSPECTOR AND ANY CHANGES REQUIRED SHALL BE APPROVED BY THE CITY ENGINEER PRIOR TO COMMENCEMENT OF RELATED CONSTRUCTION ON THE PROJECT.
4. ALL STORM SYSTEMS WITHIN THE PUBLIC RIGHT-OF-WAY OR IN EASEMENTS MUST BE STAKED BY SURVEY FOR LINE AND GRADE PRIOR TO STARTING CONSTRUCTION.
5. ALL CATCH BASIN GRATES MUST BE STENCILED OR STAMPED "DUMP NO WASTE, DRAINS TO STREAM, LAKE, RIVER, PUGET SOUND, OR WETLAND." CHOOSE APPROPRIATE FEATURE FOR THE PROJECT.

EROSION/SEDIMENTATION CONTROL (ESC) NOTES

1. APPROVAL OF THIS EROSION/SEDIMENTATION CONTROL (ESC) PLAN DOES NOT CONSTITUTE AN APPROVAL OF PERMANENT ROAD OR DRAINAGE DESIGN (E.G. SIZE AND LOCATION OF ROADS, PIPES, RESTRICTORS, CHANNELS, RETENTION FACILITIES, UTILITIES).
2. THE IMPLEMENTATION OF THESE ESC PLANS AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF THESE ESC FACILITIES IS THE RESPONSIBILITY OF THE APPLICANT/CONTRACTOR UNTIL ALL CONSTRUCTION IS COMPLETED AND APPROVED AND VEGETATION/LANDSCAPING IS ESTABLISHED.
3. THE BOUNDARIES OF THE CLEARING LIMITS SHOWN ON THIS PLAN SHALL BE CLEARLY FLAGGED IN THE FIELD PRIOR TO CONSTRUCTION. DURING THE CONSTRUCTION PERIOD, NO DISTURBANCE BEYOND THE FLAGGED CLEARING LIMITS SHALL BE PERMITTED. THE FLAGGING SHALL BE MAINTAINED BY THE APPLICANT/CONTRACTOR FOR THE DURATION OF CONSTRUCTION.
4. THE ESC FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED IN CONJUNCTION WITH ALL CLEARING AND GRADING ACTIVITIES, AND IN SUCH A MANNER AS TO INSURE THAT SEDIMENT AND SEDIMENT LADEN WATER DO NOT ENTER THE DRAINAGE SYSTEM, ROADWAYS, OR VIOLATE APPLICABLE WATER STANDARDS.
5. THE ESC FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE ESC FACILITIES SHALL BE UPGRADED AS NEEDED FOR UNEXPECTED STORM EVENTS AND TO ENSURE THAT SEDIMENT AND SEDIMENT-LADEN WATER DO NOT LEAVE THE SITE.
6. THE ESC FACILITIES SHALL BE INSPECTED DAILY BY THE APPLICANT/CONTRACTOR AND MAINTAINED AS NECESSARY TO ENSURE THEIR CONTINUED FUNCTIONING.
7. THE ESC FACILITIES ON INACTIVE SITES SHALL BE INSPECTED AND MAINTAINED A MINIMUM OF ONCE A MONTH OR WITHIN THE 48 HOURS FOLLOWING A MAJOR STORM EVENT.
8. AT NO TIME SHALL MORE THAN ONE FOOT OF SEDIMENT BE ALLOWED TO ACCUMULATE WITHIN A TRAPPED CATCH BASIN. ALL CATCH BASINS AND CONVEYANCE LINES SHALL BE CLEANED PRIOR TO PAVING. THE CLEANING OPERATION SHALL NOT FLUSH SEDIMENT LADEN WATER INTO THE DOWNSTREAM SYSTEM.
9. STABILIZED CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES MAY BE REQUIRED TO INSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.

GENERAL NOTES

1. ALL WORKMANSHIP AND MATERIALS WILL BE IN ACCORDANCE WITH CITY OF EVERETT STANDARDS AND THE MOST CURRENT EDITION OF THE STATE OF WASHINGTON STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND MUNICIPAL CONSTRUCTION.
2. ALL WORK PERTAINING TO THIS PROJECT SHALL BE SUBJECT TO INSPECTION BY CITY OF EVERETT, WSDOT, OR THEIR DESIGNATED REPRESENTATIVE(S). PRIOR TO ANY SITE WORK, THE CONTRACTOR SHALL THE CITY OF OLYMPIA TO SCHEDULE A PRE-CONSTRUCTION CONFERENCE. THE CONTRACTOR SHALL COORDINATE ALL REQUIRED INSPECTIONS AND APPROVALS WITH THE NECESSARY AHJ.
3. A COPY OF THE APPROVED PLANS MUST BE ON-SITE WHENEVER CONSTRUCTION IS IN PROGRESS. THE APPLICANT IS RESPONSIBLE FOR OBTAINING ANY OTHER REQUIRED OR RELATED PERMITS PRIOR TO BEGINNING CONSTRUCTION.
4. ALL LOCATIONS OF EXISTING UTILITIES AND FEATURES SHOWN ON THESE PLANS HAVE BEEN DERIVED FROM RECORD DRAWINGS AND FIELD APPROXIMATION AND SHOULD THEREFORE BE CONSIDERED APPROXIMATE ONLY AND NOT COMPLETE. ADDITIONAL SURFACE FEATURES AND IMPROVEMENTS BEYOND THOSE INDICATED ARE PRESENT AND IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO INDEPENDENTLY VERIFY THE ACCURACY OF ALL EXISTING INFORMATION AND TO FURTHER DISCOVER AND AVOID ANY OTHER UTILITIES AND SURFACE FEATURES NOT SHOWN HEREIN WHICH MAY BE AFFECTED BY THE IMPLEMENTATION OF THESE PLANS.
5. MAINTAIN 1" MINIMUM VERTICAL SEPARATION BETWEEN ADJACENT OR CROSSING UTILITIES.
6. THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL TRAFFIC CONTROL IN ACCORDANCE WITH U.S. DEPARTMENT OF TRANSPORTATION MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD). PRIOR TO DISRUPTION OF ANY TRAFFIC, TRAFFIC CONTROL PLANS WILL BE PREPARED AND SUBMITTED TO THE CITY OF APPROVAL. NO WORK WILL COMMENCE UNTIL ALL APPROVED TRAFFIC CONTROL IS IN PLACE.



VICINITY MAP

SCALE: 1" = 200'

CIVIL SHEET INDEX

SHEET C1	CIVIL COVER SHEET
SHEET C2	TESC PLAN
SHEET C3	GRADING AND PAVING PLAN
SHEET C4	RIGHT OF WAY IMPROVEMENT PLAN
SHEET C5	STORM DRAINAGE AND UTILITY PLAN
SHEET C6	CIVIL DETAILS

OWNER CONTACT INFORMATION

OWNER: CATHOLIC HOUSING SERVICES OF WESTERN WASHINGTON
100 23RD AVE SOUTH
SEATTLE, WA 98114

PROJECT MANAGER: JENNY WEINSTEIN

PHONE: (206) 328-5911

EMAIL: JennyW@ccsw.org

LOT NUMBER: CITY OF EVERETT RESERVOIR TRACT

PARCEL ID: 28050600400900

SITE ADDRESS: 6107 BERKSHIRE DRIVE
EVERETT, WA 98203

EARTHWORK VOLUMES

CUT	118	CY
FILL	339	CY
NET	221	CY FILL



402 15th Avenue East
Seattle, Washington 98112
206.329.8300
206.329.5494 fax

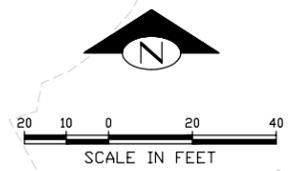
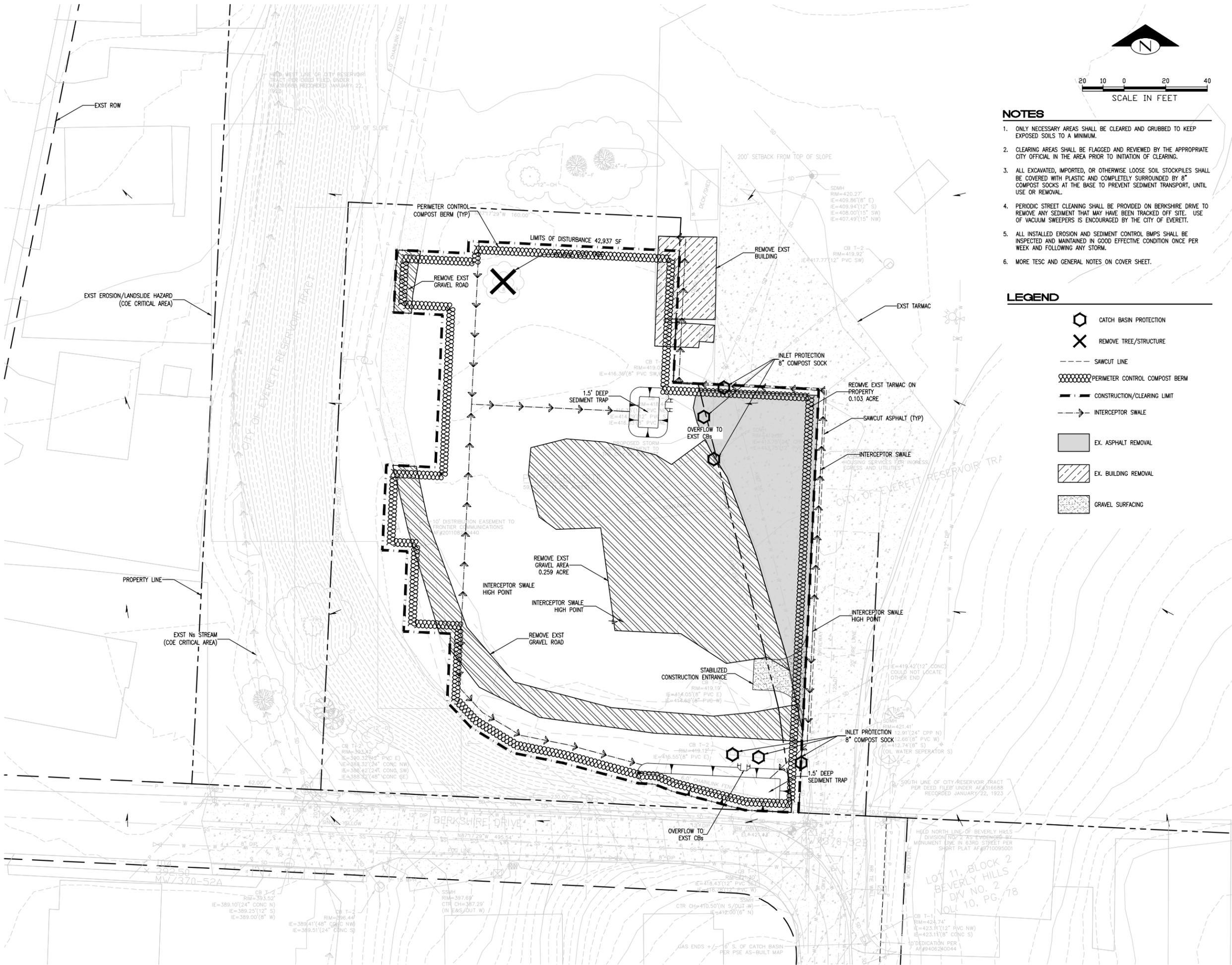
**Everett
Safe Streets
Supportive
Housing**

6107 Berkshire Dr
Everett, WA 98203

Civil Cover and Notes

Date
9 December 2016
Land Use Permit
Revisions

Drawn by:
IT
Checked by (P.M.):
PA
Checked by (Q.C.):
-
Project No.
16-029A



NOTES

1. ONLY NECESSARY AREAS SHALL BE CLEARED AND GRUBBED TO KEEP EXPOSED SOILS TO A MINIMUM.
2. CLEARING AREAS SHALL BE FLAGGED AND REVIEWED BY THE APPROPRIATE CITY OFFICIAL IN THE AREA PRIOR TO INITIATION OF CLEARING.
3. ALL EXCAVATED, IMPORTED, OR OTHERWISE LOOSE SOIL STOCKPILES SHALL BE COVERED WITH PLASTIC AND COMPLETELY SURROUNDED BY 8" COMPOST SOCKS AT THE BASE TO PREVENT SEDIMENT TRANSPORT, UNTIL USE OR REMOVAL.
4. PERIODIC STREET CLEANING SHALL BE PROVIDED ON BERKSHIRE DRIVE TO REMOVE ANY SEDIMENT THAT MAY HAVE BEEN TRACKED OFF SITE. USE OF VACUUM SWEEPERS IS ENCOURAGED BY THE CITY OF EVERETT.
5. ALL INSTALLED EROSION AND SEDIMENT CONTROL BMPs SHALL BE INSPECTED AND MAINTAINED IN GOOD EFFECTIVE CONDITION ONCE PER WEEK AND FOLLOWING ANY STORM.
6. MORE TESC AND GENERAL NOTES ON COVER SHEET.

LEGEND

- CATCH BASIN PROTECTION
- REMOVE TREE/STRUCTURE
- SAWCUT LINE
- PERIMETER CONTROL COMPOST BERM
- CONSTRUCTION/CLEARING LIMIT
- INTERCEPTOR SWALE
- EX. ASPHALT REMOVAL
- EX. BUILDING REMOVAL
- GRAVEL SURFACING

coterra
ENGINEERING PLLC
321 3rd Ave South, Suite 406
Seattle, Washington 98104
ph 206.396.7115
coterraengineering.com



402 15th Avenue East
Seattle, Washington 98112
206.329.8300
206.329.5404 fax

**Everett
Safe Streets
Supportive
Housing**

6107 Berkshire Dr
Everett, WA 98203

**Temporary Erosion and
Sediment Control Plan**

Date
9 December 2016
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Revisions

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PA
Checked by (Q.C.):
-
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16-029A



20 10 0 20 40
SCALE IN FEET

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coterraengineering.com



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Everett Safe Streets Supportive Housing

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Everett, WA 98203

Grading Plan

Date
9 December 2016
Land Use Permit
Revisions

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PA
Checked by (P.M.):
PA
Checked by (Q.C.):
IT
Project No.
16-029A

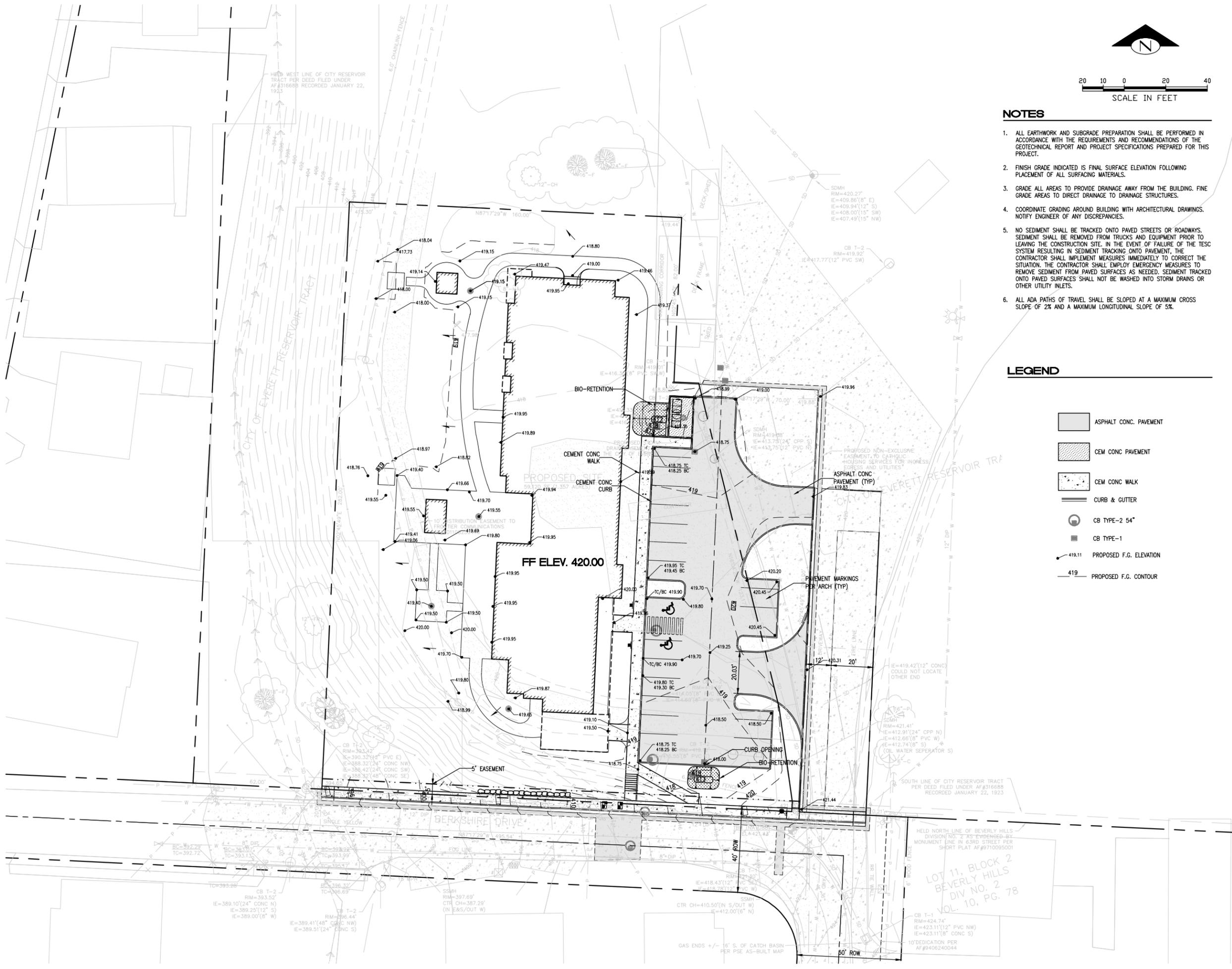
C3

NOTES

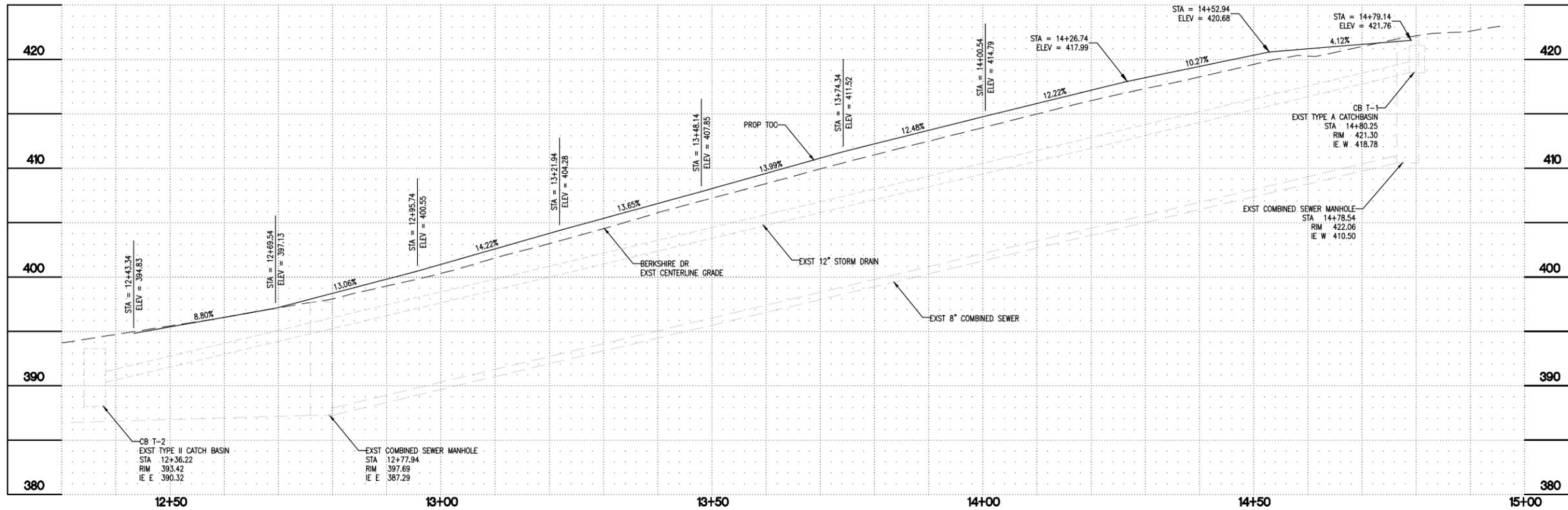
1. ALL EARTHWORK AND SUBGRADE PREPARATION SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS AND RECOMMENDATIONS OF THE GEOTECHNICAL REPORT AND PROJECT SPECIFICATIONS PREPARED FOR THIS PROJECT.
2. FINISH GRADE INDICATED IS FINAL SURFACE ELEVATION FOLLOWING PLACEMENT OF ALL SURFACING MATERIALS.
3. GRADE ALL AREAS TO PROVIDE DRAINAGE AWAY FROM THE BUILDING. FINE GRADE AREAS TO DIRECT DRAINAGE TO DRAINAGE STRUCTURES.
4. COORDINATE GRADING AROUND BUILDING WITH ARCHITECTURAL DRAWINGS. NOTIFY ENGINEER OF ANY DISCREPANCIES.
5. NO SEDIMENT SHALL BE TRACKED ONTO PAVED STREETS OR ROADWAYS. SEDIMENT SHALL BE REMOVED FROM TRUCKS AND EQUIPMENT PRIOR TO LEAVING THE CONSTRUCTION SITE. IN THE EVENT OF FAILURE OF THE TESC SYSTEM RESULTING IN SEDIMENT TRACKING ONTO PAVEMENT, THE CONTRACTOR SHALL IMPLEMENT MEASURES IMMEDIATELY TO CORRECT THE SITUATION. THE CONTRACTOR SHALL EMPLOY EMERGENCY MEASURES TO REMOVE SEDIMENT FROM PAVED SURFACES AS NEEDED. SEDIMENT TRACKED ONTO PAVED SURFACES SHALL NOT BE WASHED INTO STORM DRAINS OR OTHER UTILITY INLETS.
6. ALL ADA PATHS OF TRAVEL SHALL BE SLOPED AT A MAXIMUM CROSS SLOPE OF 2% AND A MAXIMUM LONGITUDINAL SLOPE OF 5%.

LEGEND

-  ASPHALT CONC. PAVEMENT
-  CEM CONC PAVEMENT
-  CEM CONC WALK
-  CURB & GUTTER
-  CB TYPE-2 54"
-  CB TYPE-1
-  PROPOSED F.G. ELEVATION
-  PROPOSED F.G. CONTOUR



LOT 11, BLOCK 2
BEVERLY HILLS
DIV NO. 2
VOL. 10, PG. 78



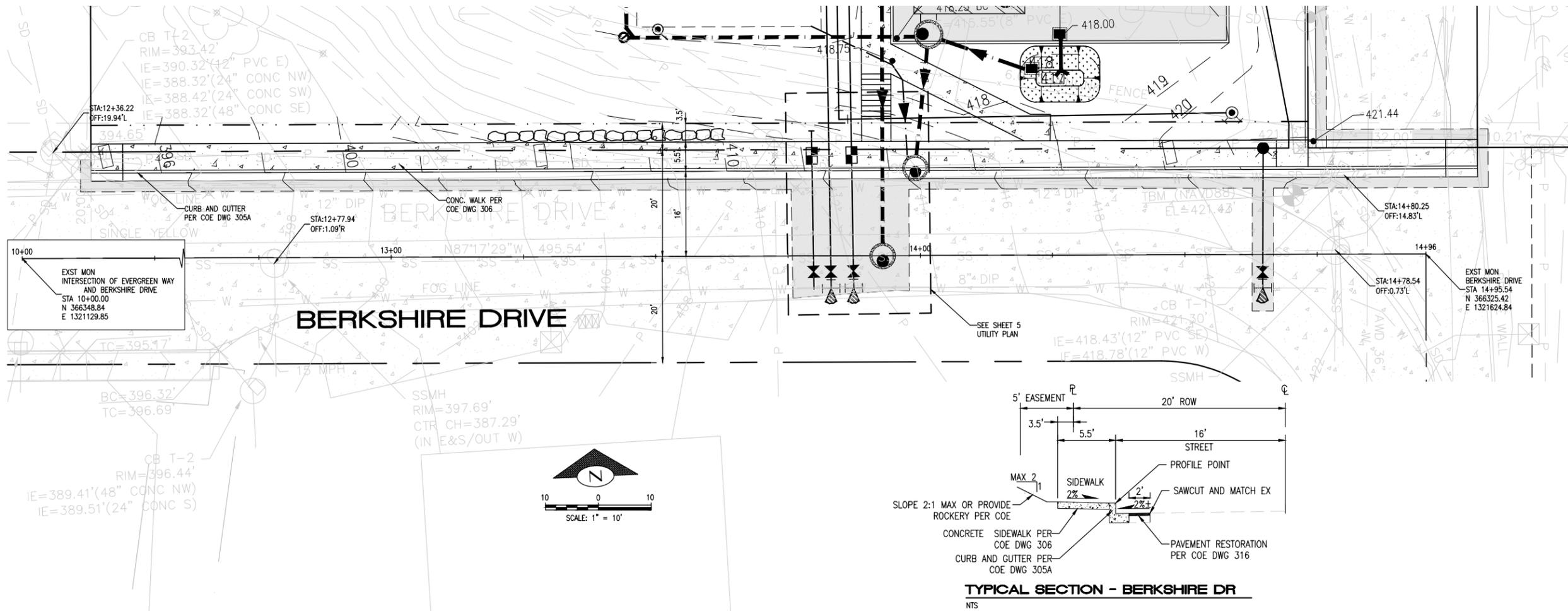
402 15th Avenue East
 Seattle, Washington 98112
 206.329.8300
 206.329.5404 fax

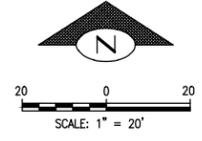
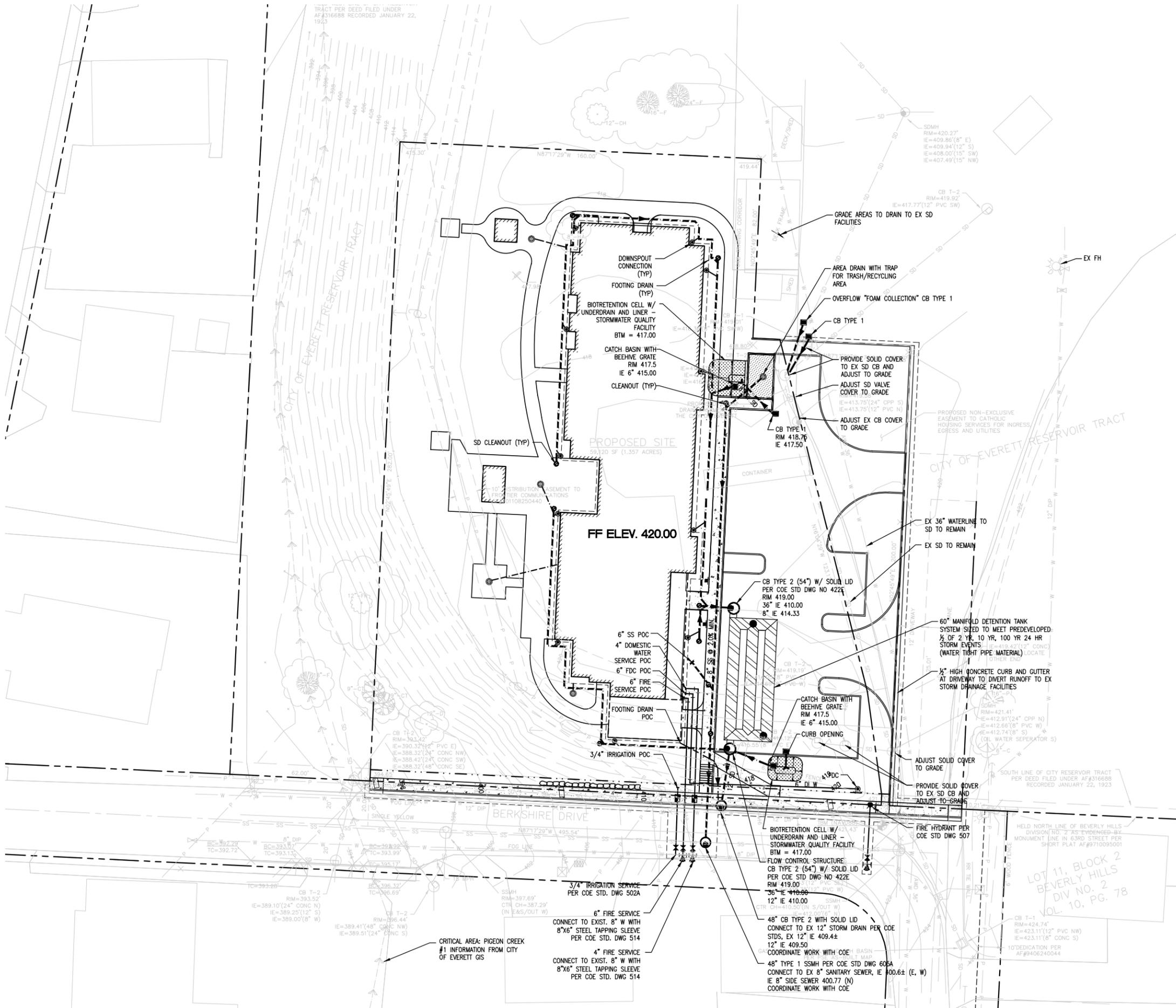
Everett Safe Streets Supportive Housing
 6107 Berkshire Dr
 Everett, WA 98203

Berkshire Drive Right of Way Improvement Plan

Date
9 December 2016
 Land Use Permit
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Drawn by:
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 Checked by (P.M.):
PA
 Checked by (Q.C.):
 Project No.
16-029A





- NOTES**
- SEE SHEET C1 FOR GENERAL NOTES AND GENERAL STORM, SANITARY SEWER AND WATER NOTES.
 - PROVIDE 3' MIN. COVER OVER WATER LINES, UNLESS OTHERWISE SHOWN TO BE DEEPER. PROVIDE 2' MIN COVER OVER WATER SERVICE LINES LESS THAN 3" IN DIAMETER.
 - COORDINATE BUILDING SYSTEM CONNECTION LOCATIONS AND INVERT ELEVATIONS WITH PLUMBING CONTRACTOR. VERIFY THAT THERE ARE NO CONFLICTS WITH PROPOSED SYSTEMS AND OTHER UTILITIES.
 - COORDINATE INSTALLATION OF NEW UTILITIES WITHIN RIGHT-OF-WAY WITH CITY OF EVERETT.
 - STATE OF WASHINGTON LEVEL III FIRE PROTECTION SPRINKLER CONTRACTOR SHALL DESIGN AND PREPARE THE UNDERGROUND SUBMITTAL DRAWINGS PER THE STATE OF WASHINGTON WAC 212-80-043(9).
 - A STATE OF WASHINGTON LEVEL U UNDERGROUND CONTRACTOR SHALL PERFORM THE INSTALLATION OF THE UNDERGROUND FIRE SERVICE PIPING PER THE STATE OF WASHINGTON WAC 212-80-043(2).

- LEGEND**
- CLEANOUT
 - SANITARY SEWER MANHOLE
 - 54" SDMH
 - AREA DRAIN
 - CB TYPE-1
 - 4" STORM DRAIN
 - STORM DRAIN MAIN
 - SANITARY SEWER MAIN
 - SANITARY SERVICE LINE
 - WATER SERVICE LINE
 - WATER/FIRE MAIN
 - PIPE OUTLET
 - DOWNSPOUT CONNECTION

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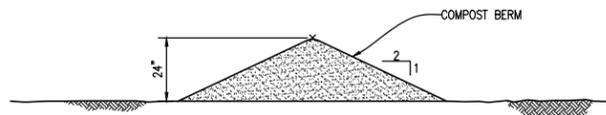
**Everett
Safe Streets
Supportive
Housing**

6107 Berkshire Dr
Everett, WA 98203

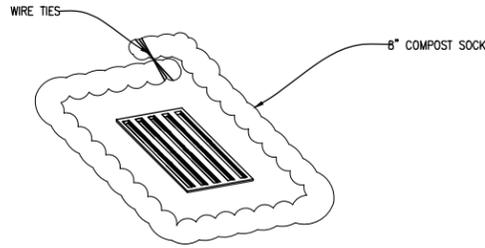
**Site Storm Drainage and
Utility Plan**

Date
9 December 2016
Land Use Permit
Revisions

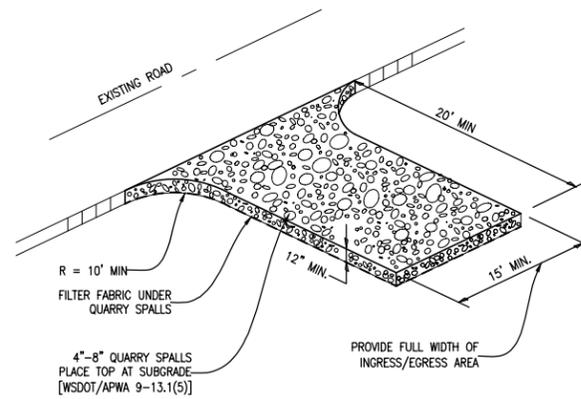
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PA
Checked by (P.M.):
PA
Checked by (Q.C.):
IT
Project No.
16-029A



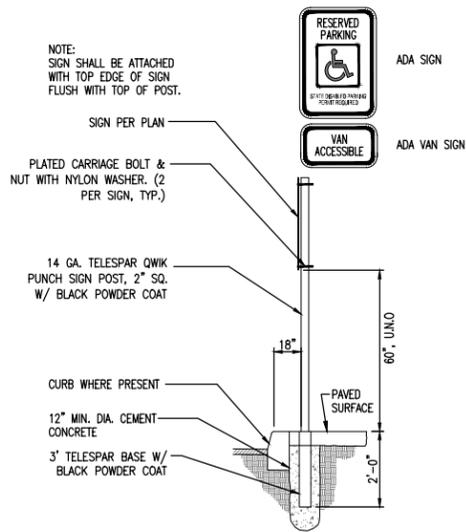
1 COMPOST BERM DETAIL
C6 NOT TO SCALE



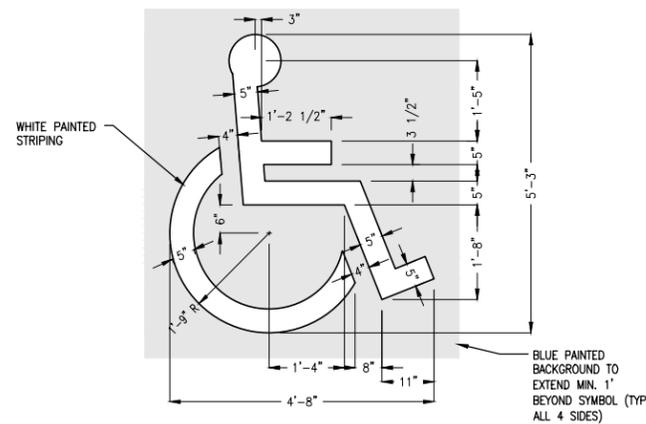
2 INLET PROTECTION DETAIL
C6 NOT TO SCALE



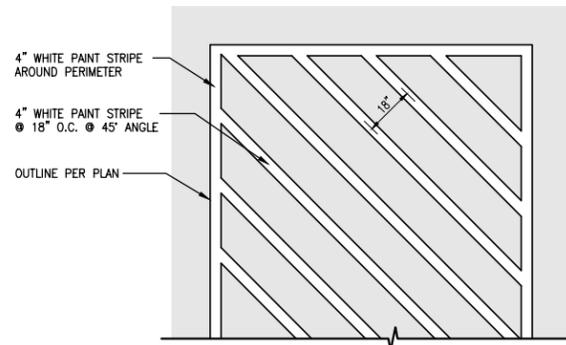
3 STABILIZED CONSTRUCTION ENTRANCE
C6 NOT TO SCALE



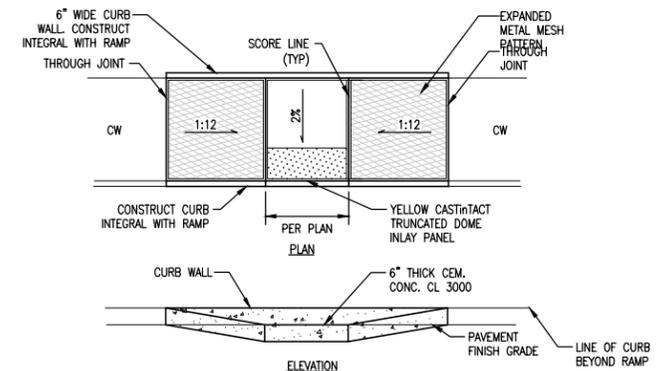
4 ADA SIGN
C6 NOT TO SCALE



5 ADA PAINTED SYMBOL
C6 NOT TO SCALE



6 ADA LOAD STRIPING
C6 NOT TO SCALE

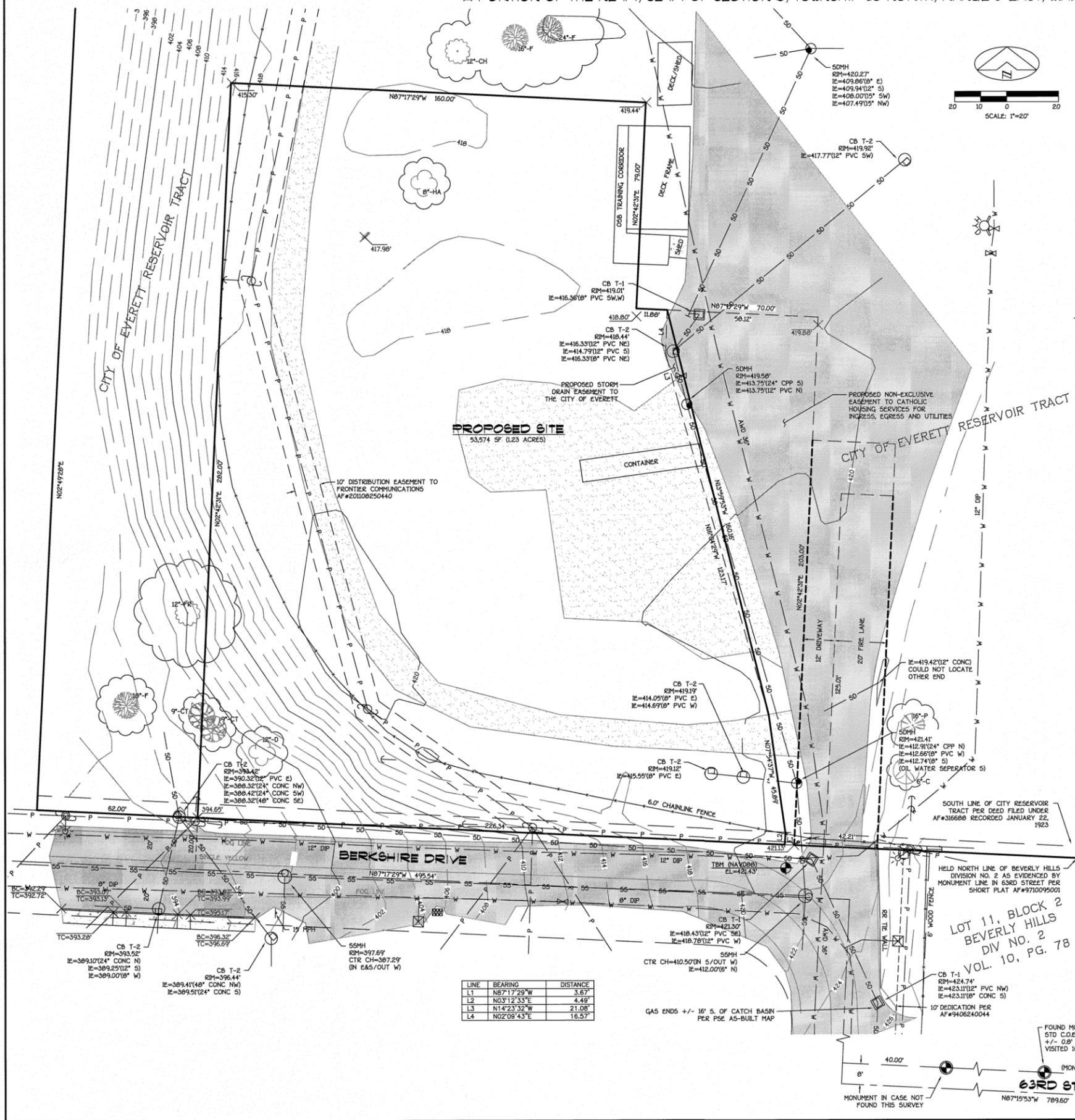


4 ADA RAMP - PARALLEL
C6 NOT TO SCALE

Appendix B

Site Land Survey by Alpha Subdivision Pro's Inc.

A PORTION OF THE NE 1/4, SE 1/4 OF SECTION 6, TOWNSHIP 28 NORTH, RANGE 5 EAST, W.M.



PROPOSED SITE DESCRIPTION

THAT PORTION OF THE NORTHWEST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 6, TOWNSHIP 28 NORTH, RANGE 5 EAST, W.M., DESCRIBED AS FOLLOWS:
 COMMENCING AT THE NORTHWEST CORNER OF LOT 11, BLOCK 2, BEVERLY HILLS DIVISION NO. 2, PER THE PLAT THEREOF RECORDED IN VOLUME 10 OF PLATS, PAGE 78, RECORDS OF SNOHOMISH COUNTY, WASHINGTON.
 THENCE NORTH 07°17'29" WEST ALONG THE NORTHERLY RIGHT OF WAY MARGIN OF BERKSHIRE DRIVE 45.88' TO THE POINT OF BEGINNING;
 THENCE CONTINUE NORTH 07°17'29" WEST ALONG SAID NORTHERLY RIGHT OF WAY MARGIN 226.34 FEET;
 THENCE AT RIGHT ANGLES NORTH 02°42'31" EAST 282.00 FEET;
 THENCE SOUTH 07°17'29" EAST PARALLEL WITH SAID NORTHERLY RIGHT OF WAY MARGIN 160.00 FEET;
 THENCE AT RIGHT ANGLES SOUTH 02°42'31" WEST 79.00 FEET;
 THENCE SOUTH 07°17'29" EAST PARALLEL WITH SAID NORTHERLY RIGHT OF WAY MARGIN 118.88 FEET;
 THENCE SOUTH 07°54'37" EAST 45.89 FEET;
 THENCE SOUTH 03°12'33" WEST 4.49 FEET TO THE POINT OF BEGINNING.

BASIS OF BEARING

NORTH 02°25'30" EAST ALONG THE EAST LINE OF THE SOUTHEAST QUARTER OF SECTION 6, TOWNSHIP 28 NORTH, RANGE 5 EAST W.M.
 ALL DISTANCES SHOWN ON THIS MAP ARE GROUND DISTANCES. TO CONVERT DISTANCES TO STATE PLANE MULTIPLY BY A SCALE FACTOR OF 0.999946995. BEARINGS ARE WASHINGTON STATE PLANE NORTH ZONE (NAD 83/2011 EPOCH 2010), BASED ON GPS OCCUPATIONS UTILIZING THE WASHINGTON STATE REFERENCE NETWORK.

DATUM BENCHMARK

NAVD 88
 PROJECT BENCHMARK: CITY OF EVERETT CONTROL POINT V020
 EL=425.61'
 SITE TBM: FOUND SPIKE AND WASHER STAMPED "SURVEY MARKER L5 31857 L5 36802 LOCATED 11.0' NORTH OF THE CENTERLINE OF BERKSHIRE DRIVE AND +/- 10.0' SOUTHWESTERLY OF A CATCH BASIN.
 EL=421.43'

SURVEY NOTES

EQUIPMENT: 3" OR LESS TOTAL STATION AND/OR GNSS NETWORK ROVER
 METHOD: FIELD TRAVERSE AND/OR WASHINGTON STATE REFERENCE NETWORK GNSS
 THE CLOSURES OF THIS FIELD TRAVERSE CONDUCTED DURING THIS SURVEY MEET OR EXCEED THE MINIMUM CLOSURE STANDARDS STATED IN WAC 332-130-090.

SURVEY REFERENCES

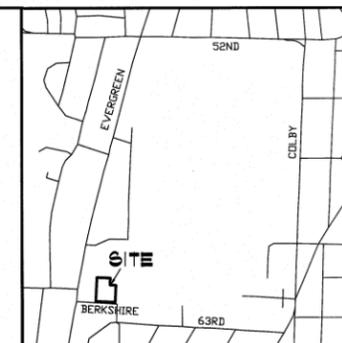
RECORD OF SURVEY AF#9008185005
 SHORT PLAT NO. 15-96 AF#9710095001
 PLAT OF BEVERLY HILLS DIV. NO. 2 VOL. 10, PG. 78
 SHORT PLAT NO. 14-92 AF#9405240044

UTILITY NOTES

UTILITY PROVIDERS:
 SEWER, WATER & STORM: CITY OF EVERETT PUBLIC WORKS DEPT. 3200 CEDAR STREET EVERETT, WA 98201 425-259-8800
 POWER: SNOHOMISH COUNTY PUBLIC UTILITY DISTRICT NO. 1 2320 CALIFORNIA STREET PO BOX 1107 EVERETT, WA 98206-1107 425-783-4391
 GAS: PUGET SOUND ENERGY PO BOX 90868 - MAIL STOP: 5KA SVC BELLEVUE, WA 98009-0868

LEGEND

- MONUMENT (AS NOTED)
- BENCHMARK
- SEWER MANHOLE
- STORMDRAIN MANHOLE
- TYPE 2 CATCH BASIN
- TYPE 1 CATCH BASIN
- UTILITY POLE
- LIGHT
- GUY ANCHOR
- POWER JUNCTION BOX
- FIRE HYDRANT
- WATER METER
- WATER VALVE
- FIR-F
- CEDAR-C
- PINE-P
- COTTONWOOD-CT
- FRUIT-FR/CHERRY-CH
- DECIDUOUS-D
- X- FENCE
- OHP- OVERHEAD UTILITY LINES
- W- WATER
- G- GAS
- SS- SEWER
- SD- STORMDRAIN
- ASPHALT
- GRAVEL
- CONCRETE



REVISIONS: BOUNDARY REVISION
 11/17/2016



AS.P.I.
 LAND SURVEYING AND PLANNING
 4833-B EVERGREEN WAY
 EVERETT, WA 98203
 (425) 252-1884

TOPOGRAPHIC SURVEY FOR CATHOLIC HOUSING
 NE 1/4, SE 1/4 OF SECTION 6, TOWNSHIP 28 NORTH, RANGE 5 EAST, W.M.
 CITY OF EVERETT
 SNOHOMISH COUNTY, WASHINGTON

DRAWN BY: AET
 DATE: 10/17/2016
 PROJECT NO. 216142
 SHEET NO. 1 OF 1

Appendix C

Geotechnical Report by Geotech Consultants, Inc.

November 1, 2016

JN 16298

Catholic Housing Services of Western Washington
100 – 23rd Avenue South
Seattle, Washington 98144

Attention: Jenny Weinstein
via email: jennyw@ccsww.org

Subject: **Transmittal Letter – Geotechnical Engineering Study**
Proposed Housing Project
6107 Berkshire Drive
Everett, Washington

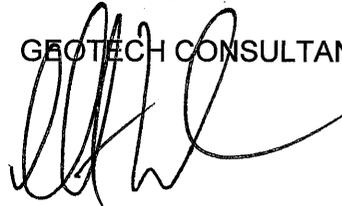
Dear Ms. Weinstein:

We are pleased to present this geotechnical engineering report for the proposed housing project to be constructed in Everett, Washington. The scope of our services consisted of exploring site surface and subsurface conditions, and then developing this report to provide recommendations for general earthwork and design criteria for foundations and retaining walls. This work was authorized by your acceptance of our proposal, P-9493, dated September 21, 2016.

The attached report contains a discussion of the study and our recommendations. Please contact us if there are any questions regarding this report, or for further assistance during the design and construction phases of this project.

Respectfully submitted,

GEOTECH CONSULTANTS, INC.



D. Robert Ward, P.E.
Principal

DRW:mw

GEOTECHNICAL ENGINEERING STUDY
Proposed Housing Project
6107 Berkshire Drive
Everett, Washington

This report presents the findings and recommendations of our geotechnical engineering study for the site of the proposed housing project to be located in Everett.

We have been provided with a site plan for the project that was prepared by Environmental Works dated October 11, 2016. Based on this plan, we understand that the housing building(s) will be located near the center of the property extending long in the north-south direction. Parking will be located along the eastern edge of the property. Some gardens, lawns, terraces, and play-space are proposed on the western side of the property. The site is relatively flat, and we anticipate that the lowest building floor and the other above-noted amenities will be at a grade that is near the existing grade.

If the scope of the project changes from what we have described above, we should be provided with revised plans in order to determine if modifications to the recommendations and conclusions of this report are warranted.

SITE CONDITIONS

SURFACE

The Vicinity Map, Plate 1, illustrates the general location of the site in the southern portion of Everett. The property is located just north of a right-angle corner of Berkshire Drive. The subject Catholic Housing property is the southwestern corner of a much larger property that is owned by the City of Everett. Much of this larger property, as well as the subject property, is nearly flat. However, there is a steep slope, inclined at approximately 45 percent and 25 feet tall, at the western edge of the subject. The eastern edge of the subject property, as well as most of the remainder of the larger property, is covered with pavement. The majority of the flat portion of the subject property is grass covered, although there is a driveway in this area around the southern and western edges of the flat portion of the subject property. The western slope of the subject property is covered with trees, mostly deciduous.

SUBSURFACE

The subsurface conditions were explored by excavating five test pits and three test borings at the approximate locations shown on the Site Exploration Plan, Plate 2. Our exploration program was based on the proposed construction, anticipated subsurface conditions and those encountered during exploration, and the scope of work outlined in our latest proposal.

The test pits were excavated on August 25, 2016 with a rubber-tired backhoe. A geotechnical engineer from our staff observed the excavation process, logged the test pits, and obtained representative samples of the soil encountered. "Grab" samples of selected subsurface soil were collected from the backhoe bucket. The Test Pit Logs are attached to this report as Plates 3 through 5.

The test borings were drilled on October 18, 2016 using a track-mounted, hollow-stem auger drill. Samples were taken at approximate 5-foot intervals with a standard penetration sampler. This split-spoon sampler, which has a 2-inch outside diameter, is driven into the soil with a 140-pound hammer falling 30 inches. The number of blows required to advance the sampler a given distance is an indication of the soil density or consistency. A geotechnical engineer from our staff observed the drilling process, logged the test borings, and obtained representative samples of the soil encountered. The Test Boring Logs are attached as Plates 6 through 8.

Soil Conditions

The upper soils revealed in the test pits and borings was very consistent, consisting of loose to medium-dense, unengineered fill soil that was generally comprised of gravelly silty sand. We suspect that this fill soil was imported to the site from a nearby reservoir site. The depth of the fill varied from approximately 10 to 27 feet. Native soils were revealed below the fill soils. The native soil consisted mostly of gravelly silty sand, but some layers of less silty sand were revealed. The native soil directly below the fill was generally in a loose to medium-dense condition. However, the soil became very dense at depth ranging from approximately 13 to 35 feet, with the greater depths located on the western side of the property. The test borings were the deeper explorations, and they extended to a maximum depth of approximately 41 feet.

Groundwater Conditions

No groundwater seepage was observed in the explorations, but were left open for only a short time period. Therefore, the seepage levels on the logs represent the location of transient water seepage and may not indicate the static groundwater level. Groundwater levels encountered during drilling can be deceptive, because seepage into the boring can be blocked or slowed by the auger itself.

It should be noted that groundwater levels vary seasonally with rainfall and other factors, with the highest and/or the most flow of groundwater generally occurring in the winter and early spring months. It is possible that groundwater could be found in more permeable soil perched on the very dense native soils during this time period.

The stratification lines on the logs represent the approximate boundaries between soil types at the exploration locations. The actual transition between soil types may be gradual, and subsurface conditions can vary between exploration locations. The logs provide specific subsurface information only at the locations tested. Where a transition in soil type occurred between samples in the borings, the depth of the transition was interpreted. The relative densities and moisture descriptions indicated on the test pit and boring logs are interpretive descriptions based on the conditions observed during excavation and drilling.

The compaction of test pit backfill was not in the scope of our services. Loose soil will therefore be found in the area of the test pits. If this presents a problem, the backfill will need to be removed and replaced with structural fill during construction.

CONCLUSIONS AND RECOMMENDATIONS

GENERAL

THIS SECTION CONTAINS A SUMMARY OF OUR STUDY AND FINDINGS FOR THE PURPOSES OF A GENERAL OVERVIEW ONLY. MORE SPECIFIC RECOMMENDATIONS AND CONCLUSIONS ARE CONTAINED IN THE REMAINDER OF THIS REPORT. ANY PARTY RELYING ON THIS REPORT SHOULD READ THE ENTIRE DOCUMENT.

The test pits and borings conducted for this study encountered approximately 13 to 35 feet of loose to medium-dense soil, mostly unengineered fill soils at the ground surface of the site. These soils are not suitable to support building loads without the likelihood of extensive settlement. Therefore, we recommend that the building loads be transferred through these non-competent soils down into the very dense underlying soils using deep foundations. It is our opinion that the deep foundations could consist of driven pipe piles or drilled concrete piles. Information regarding both are included with this report.

Another significant geotechnical engineering consideration for this project is the steep slope on the western side of the site that is approximately 25 feet in height. Although there are no indications of instability, there is no development near the slope at this time. Based on the condition of the existing fill soil, it is our opinion that any significant development or structures for the project should be held back a distance that equates to an imaginary 2.5:1 (Horizontal:Vertical) slope measured up (eastward) from the base of the steep slope; we believe that the site is very stable east of this line and has a safety factor that is suitable based on code. The area west of this line projection would not possess an adequate safety factor based on code, and has a potential for movement during events such as extreme precipitation or a large earthquake. Based on the information we have received, this line projection is about 10 feet east of the top of the slope.

Placing stormwater from the project is unsuitable from a geotechnical engineering standpoint because it would be discharged into the loose fill soil; because the fill is loose and variable, the stormwater could cause significant settlement of the fill or destabilize the western steep slope. Therefore, we recommend that the infiltration of stormwater not be done for this project. In addition, no stormwater should be discharged near or on the slope.

The erosion control measures needed during the site development will depend heavily on the weather conditions that are encountered. We anticipate that a silt fence will be needed around the downslope sides of any cleared areas. Existing pavements, ground cover, and landscaping should be left in place wherever possible to minimize the amount of exposed soil. Rocked staging areas and construction access roads should be provided to reduce the amount of soil or mud carried off the property by trucks and equipment. Wherever possible, the access roads should follow the alignment of planned pavements. Trucks should not be allowed to drive off of the rock-covered areas. Cut slopes and soil stockpiles should be covered with plastic during wet weather. Following clearing or rough grading, it may be necessary to mulch or hydroseed bare areas that will not be immediately covered with landscaping or an impervious surface. On most construction projects, it is necessary to periodically maintain or modify temporary erosion control measures to address specific site and weather conditions.

The drainage and/or waterproofing recommendations presented in this report are intended only to prevent active seepage from flowing through concrete walls or slabs. Even in the absence of active seepage into and beneath structures, water vapor can migrate through walls, slabs, and floors from the surrounding soil, and can even be transmitted from slabs and foundation walls due to the

concrete curing process. Water vapor also results from occupant uses, such as cooking and bathing. Excessive water vapor trapped within structures can result in a variety of undesirable conditions, including, but not limited to, moisture problems with flooring systems, excessively moist air within occupied areas, and the growth of molds, fungi, and other biological organisms that may be harmful to the health of the occupants. The designer or architect must consider the potential vapor sources and likely occupant uses, and provide sufficient ventilation, either passive or mechanical, to prevent a build up of excessive water vapor within the planned structure.

Geotech Consultants, Inc. should be allowed to review the final development plans to verify that the recommendations presented in this report are adequately addressed in the design. Such a plan review would be additional work beyond the current scope of work for this study, and it may include revisions to our recommendations to accommodate site, development, and geotechnical constraints that become more evident during the review process.

We recommend including this report, in its entirety, in the project contract documents. This report should also be provided to any future property owners so they will be aware of our findings and recommendations.

SEISMIC CONSIDERATIONS

In accordance with the International Building Code (IBC), the site soil profile within 100 feet of the ground surface is best represented by Site Class Type D (Stiff Site Class). As noted in the USGS website, the mapped spectral acceleration value for a 0.2 second (S_s) and 1.0 second period (S_1) equals 1.39g and 0.52g, respectively.

The site soils are not susceptible to seismic liquefaction because of their dense nature and/or the absence of near-surface groundwater.

DRIVEN PIPE PILES

Three-, 4-, or 6-inch-diameter pipe piles driven with a 850- or 1,100- or 2,000-pound hydraulic jackhammer to the following final penetration rates may be assigned the following compressive capacities.

INSIDE PILE DIAMETER	FINAL DRIVING RATE (850-pound hammer)	FINAL DRIVING RATE (1,100-pound hammer)	FINAL DRIVING RATE (2,000-pound hammer)	ALLOWABLE COMPRESSIVE CAPACITY
3 inches	10 sec/inch	6 sec/inch	2 sec/inch	6 tons
4 inches	16 sec/inch	10 sec/inch	4 sec/inch	10 tons
6 inches	n/a	n/a	10 sec/inch	20 tons

Note: The refusal criteria indicated in the above table are valid only for pipe piles that are installed using a hydraulic impact hammer carried on leads that allow the hammer to sit on the top of the pile during driving. If the piles are installed by alternative methods, such as a vibratory hammer or a hammer that is hard-mounted to the installation machine, numerous load tests to 200 percent of the design capacity would be necessary to substantiate the

allowable pile load. The appropriate number of load tests would need to be determined at the time the contractor and installation method are chosen.

As a minimum, Schedule 40 pipe should be used. The site soils are not highly organic, and are not located near salt water. As a result, they do not have an elevated corrosion potential. Considering this, it is our opinion that standard "black" pipe can be used, and corrosion protection, such as galvanizing, is not necessary for the pipe piles.

Pile caps and grade beams should be used to transmit loads to the piles. Isolated pile caps should include a minimum of two piles to reduce the potential for eccentric loads being applied to the piles. Subsequent sections of pipe can be connected with slip or threaded couplers, or they can be welded together. If slip couplers are used, they should fit snugly into the pipe sections. This may require that shims be used or that beads of welding flux be applied to the outside of the coupler.

Lateral loads due to wind or seismic forces may be resisted by passive earth pressure acting on the vertical, embedded portions of the foundation. For this condition, the foundation must be either poured directly against relatively level, undisturbed soil or be surrounded by level compacted fill. We recommend using a passive earth pressure of 300 pounds per cubic foot (pcf) for this resistance. If the ground in front of a foundation is loose or sloping, the passive earth pressure given above will not be appropriate. We recommend a safety factor of at least 1.5 for the foundation's resistance to lateral loading, when using the above ultimate passive value.

If lateral resistance from fill placed against the foundations is required for this project, the structural engineer should indicate this requirement on the plans for the general and earthwork contractor's information. Compacted fill placed against the foundations can consist of on-site soil that is tamped into place using the backhoe or is compacted using a jumping jack compactor. It is necessary for the fill to be compacted to a firm condition, but it does not need to reach even 90 percent relative compaction to develop the passive resistance recommended above. Due to their small diameter, the lateral capacity of vertical pipe piles is relatively small. However, if lateral resistance in addition to passive soil resistance is required, we recommend driving battered piles in the same direction as the applied lateral load. The lateral capacity of a battered pile is equal to one-half of the lateral component of the allowable compressive load, with a maximum allowable lateral capacity of 1,000 pounds. The allowable vertical capacity of battered piles does not need to be reduced if the piles are battered steeper than 1:5 (Horizontal:Vertical).

DRILLED CONCRETE PIERS

Drilled, concrete-filled piers may be used, if it is uneconomical to excavate to bearing soil. Based on our explorations, it appears that the piers can be constructed by open-hole methods. These piers should be drilled with conventional auger drills, but the drilling contractor should have access to casing, in case sloughing occurs in the near-surface soil. If water is in a hole at the time of pouring, the concrete should be tremied to the bottom of the hole.

A wide variety of depths and pier diameters are possible, but we recommend using a minimum pile diameter of 16 inches. For a minimum embedment of 5 feet into the very dense soil and a pile diameter of 16 inches, we recommend assuming an allowable compressive capacity of 30 tons per pier. Center-to-center pier spacing should be no less than three times the pile diameter.

We recommend reinforcing each pile its entire length. This typically consists of a cage of rebar extending a portion of the pile's length, with a full-length center bar. For design of the reinforcing,

we recommend that the piles be assumed to have a point of fixity (point of maximum bending moment) at a depth of 10 feet below the top of the pile. The lateral capacity of a pile is a function of both the soil that surrounds the pier and the composition of the pile itself. Passive earth pressures on the grade beams will also provide some lateral resistance. If structural fill is placed against the outside of the grade beams, the design passive earth pressure from the fill can be assumed to be equal to that pressure exerted by an equivalent fluid with a density of 300 pcf. This passive resistance is an ultimate value that does not include a safety factor.

FOUNDATION AND RETAINING WALLS

Retaining walls backfilled on only one side should be designed to resist the lateral earth pressures imposed by the soil they retain. The following recommended parameters are for walls that restrain level backfill:

PARAMETER	VALUE
Active Earth Pressure *	35 pcf
Passive Earth Pressure	300 pcf
Soil Unit Weight	130 pcf

Where: pcf is Pounds per Cubic Foot, and Active and Passive Earth Pressures are computed using the Equivalent Fluid Pressures.

* For a restrained wall that cannot deflect at least 0.002 times its height, a uniform lateral pressure equal to 10 psf times the height of the wall should be added to the above active equivalent fluid pressure.

The design values given above do not include the effects of any hydrostatic pressures behind the walls and assume that no surcharges, such as those caused by slopes, vehicles, or adjacent foundations will be exerted on the walls. If these conditions exist, those pressures should be added to the above lateral soil pressures. Where sloping backfill is desired behind the walls, we will need to be given the wall dimensions and the slope of the backfill in order to provide the appropriate design earth pressures. The surcharge due to traffic loads behind a wall can typically be accounted for by adding a uniform pressure equal to 2 feet multiplied by the above active fluid density. Heavy construction equipment should not be operated behind retaining and foundation walls within a distance equal to the height of a wall, unless the walls are designed for the additional lateral pressures resulting from the equipment.

The values given above are to be used to design only permanent foundation and retaining walls that are to be backfilled, such as conventional walls constructed of reinforced concrete or masonry. It is not appropriate to use the above earth pressures and soil unit weight to back-calculate soil strength parameters for design of other types of retaining walls, such as soldier pile, reinforced earth, modular or soil nail walls. We can assist with design of these types of walls, if desired. The values for friction and passive resistance are ultimate values and do not include a safety factor. Restrained wall soil parameters should be utilized for a distance of 1.5 times the wall height from corners or bends in the walls. This is intended to reduce the amount of cracking that can occur where a wall is restrained by a corner.

Wall Pressures Due to Seismic Forces

The surcharge wall loads that could be imposed by the design earthquake can be modeled by adding a uniform lateral pressure to the above-recommended active pressure. The recommended surcharge pressure is $8H$ pounds per square foot (psf), where H is the design retention height of the wall. Using this increased pressure, the safety factor against sliding and overturning can be reduced to 1.2 for the seismic analysis.

Retaining Wall Backfill and Waterproofing

Backfill placed behind retaining or foundation walls should be coarse, free-draining structural fill containing no organics. This backfill should contain no more than 5 percent silt or clay particles and have no gravel greater than 4 inches in diameter. The percentage of particles passing the No. 4 sieve should be between 25 and 70 percent. The later section entitled ***Drainage Considerations*** should also be reviewed for recommendations related to subsurface drainage behind foundation and retaining walls.

The purpose of these backfill requirements is to ensure that the design criteria for a retaining wall are not exceeded because of a build-up of hydrostatic pressure behind the wall. Also, subsurface drainage systems are not intended to handle large volumes of water from surface runoff. The top 12 to 18 inches of the backfill should consist of a compacted, relatively impermeable soil or topsoil, or the surface should be paved. The ground surface must also slope away from backfilled walls to reduce the potential for surface water to percolate into the backfill. Water percolating through pervious surfaces (pavers, gravel, permeable pavement, etc.) must also be prevented from flowing toward walls or into the backfill zone. The compacted subgrade below pervious surfaces and any associated drainage layer should therefore be sloped away. Alternatively, a membrane and subsurface collection system could be provided below a pervious surface.

It is critical that the wall backfill be placed in lifts and be properly compacted, in order for the above-recommended design earth pressures to be appropriate. The wall design criteria assume that the backfill will be well-compacted in lifts no thicker than 12 inches. The compaction of backfill near the walls should be accomplished with hand-operated equipment to prevent the walls from being overloaded by the higher soil forces that occur during compaction. The section entitled ***General Earthwork and Structural Fill*** contains additional recommendations regarding the placement and compaction of structural fill behind retaining and foundation walls.

The above recommendations are not intended to waterproof below-grade walls, or to prevent the formation of mold, mildew or fungi in interior spaces. Over time, the performance of subsurface drainage systems can degrade, subsurface groundwater flow patterns can change, and utilities can break or develop leaks. Therefore, waterproofing should be provided where future seepage through the walls is not acceptable. This typically includes limiting cold-joints and wall penetrations, and using bentonite panels or membranes on the outside of the walls. There are a variety of different waterproofing materials and systems, which should be installed by an experienced contractor familiar with the anticipated construction and subsurface conditions. Applying a thin coat of asphalt emulsion to the outside face of a wall is not considered waterproofing, and will only help to reduce moisture generated from water vapor or capillary action from seeping through the concrete. As with any project, adequate ventilation of basement and crawl space areas is important to prevent a build up of water vapor that is commonly transmitted through

concrete walls from the surrounding soil, even when seepage is not present. This is appropriate even when waterproofing is applied to the outside of foundation and retaining walls. We recommend that you contact an experienced envelope consultant if detailed recommendations or specifications related to waterproofing design, or minimizing the potential for infestations of mold and mildew are desired.

The **General**, **Slabs-On-Grade**, and **Drainage Considerations** sections should be reviewed for additional recommendations related to the control of groundwater and excess water vapor for the anticipated construction.

SLABS-ON-GRADE

The building floors can be constructed as slabs-on-grade atop firm, non-organic, existing soil that is compacted in-place, or on structural fill. The subgrade soil must be in a firm, non-yielding condition at the time of slab construction or underslab fill placement. Any soft areas encountered should be excavated and replaced with select, imported structural fill. We recommend that extra steel also be placed in the slab.

Even where the exposed soils appear dry, water vapor will tend to naturally migrate upward through the soil to the new constructed space above it. This can affect moisture-sensitive flooring, cause imperfections or damage to the slab, or simply allow excessive water vapor into the space above the slab. All interior slabs-on-grade should be underlain by a capillary break drainage layer consisting of a minimum 4-inch thickness of clean gravel or crushed rock that has a fines content (percent passing the No. 200 sieve) of less than 3 percent and a sand content (percent passing the No. 4 sieve) of no more than 10 percent. Pea gravel or crushed rock are typically used for this layer.

As noted by the American Concrete Institute (ACI) in the *Guides for Concrete Floor and Slab Structures*, proper moisture protection is desirable immediately below any on-grade slab that will be covered by tile, wood, carpet, impermeable floor coverings, or any moisture-sensitive equipment or products. ACI also notes that vapor *retarders* such as 6-mil plastic sheeting have been used in the past, but are now recommending a minimum 10-mil thickness for better durability and long term performance. A vapor retarder is defined as a material with a permeance of less than 0.3 perms, as determined by ASTM E 96. It is possible that concrete admixtures may meet this specification, although the manufacturers of the admixtures should be consulted. Where vapor retarders are used under slabs, their edges should overlap by at least 6 inches and be sealed with adhesive tape. The sheeting should extend to the foundation walls for maximum vapor protection. If no potential for vapor passage through the slab is desired, a vapor *barrier* should be used. A vapor barrier, as defined by ACI, is a product with a water transmission rate of 0.01 perms when tested in accordance with ASTM E 96. Reinforced membranes having sealed overlaps can meet this requirement.

In the recent past, ACI (Section 4.1.5) recommended that a minimum of 4 inches of well-graded compactable granular material, such as a 5/8-inch-minus crushed rock pavement base, be placed over the vapor retarder or barrier for their protection, and as a "blotter" to aid in the curing of the concrete slab. Sand was not recommended by ACI for this purpose. However, the use of material over the vapor retarder is controversial as noted in current ACI literature because of the potential that the protection/blotter material can become wet between the time of its placement and the installation of the slab. If the material is wet prior to slab placement, which is always possible in the Puget Sound area, it could cause vapor transmission to occur up through the slab in the future,

essentially destroying the purpose of the vapor barrier/retarder. Therefore, if there is a potential that the protection/blotter material will become wet before the slab is installed, ACI now recommends that no protection/blotter material be used. However, ACI then recommends that, because there is a potential for slab curl due to the loss of the blotter material, joint spacing in the slab be reduced, a low shrinkage concrete mixture be used, and "other measures" (steel reinforcing, etc.) be used. ASTM E-1643-98 "Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs" generally agrees with the recent ACI literature.

We recommend that the contractor, the project materials engineer, and the owner discuss these issues and review recent ACI literature and ASTM E-1643 for installation guidelines and guidance on the use of the protection/blotter material.

The **General, Permanent Foundation and Retaining Walls**, and **Drainage Considerations** sections should be reviewed for additional recommendations related to the control of groundwater and excess water vapor for the anticipated construction.

EXCAVATIONS AND SLOPES

No excavated slopes are anticipated other than for utility trenches. Excavation slopes should not exceed the limits specified in local, state, and national government safety regulations. Temporary cuts to a depth of about 4 feet may be attempted vertically in unsaturated soil, if there are no indications of slope instability. However, vertical cuts should not be made near property boundaries, or existing utilities and structures. Based upon Washington Administrative Code (WAC) 296, Part N, the soil at the subject site would generally be classified as Type B. Therefore, temporary cut slopes greater than 4 feet in height should not be excavated at an inclination steeper than 1:1 (Horizontal:Vertical), extending continuously between the top and the bottom of a cut.

The above-recommended temporary slope inclination is based on the conditions exposed in our explorations, and on what has been successful at other sites with similar soil conditions. It is possible that variations in soil and groundwater conditions will require modifications to the inclination at which temporary slopes can stand. Temporary cuts are those that will remain unsupported for a relatively short duration to allow for the construction of foundations, retaining walls, or utilities. Temporary cut slopes should be protected with plastic sheeting during wet weather. It is also important that surface runoff be directed away from the top of temporary slope cuts. Cut slopes should also be backfilled or retained as soon as possible to reduce the potential for instability. Please note that loose soil can cave suddenly and without warning. Excavation, foundation, and utility contractors should be made especially aware of this potential danger. These recommendations may need to be modified if the area near the potential cuts has been disturbed in the past by utility installation, or if settlement-sensitive utilities are located nearby.

Water should not be allowed to flow uncontrolled over the top of any temporary or permanent slope. All permanently exposed slopes should be seeded with an appropriate species of vegetation to reduce erosion and improve the stability of the surficial layer of soil.

Any disturbance to the existing slope outside of the building limits may reduce the stability of the western slope. Soil from the excavation should not be placed on the slope.

DRAINAGE CONSIDERATIONS

Footing drains should be used where: (1) Crawl spaces or basements will be below a structure; (2) A slab is below the outside grade; or, (3) The outside grade does not slope downward from a building. Drains should also be placed at the base of all earth-retaining walls. These drains should be surrounded by at least 6 inches of 1-inch-minus, washed rock that is encircled with non-woven, geotextile filter fabric (Mirafi 140N, Supac 4NP, or similar material). At its highest point, a perforated pipe invert should be at least 6 inches below the bottom of a slab floor or the level of a crawl space. The discharge pipe for subsurface drains should be sloped for flow to the outlet point. Roof and surface water drains must not discharge into the foundation drain system. A typical drain detail is attached to this report as Plate 9. For the best long-term performance, perforated PVC pipe is recommended for all subsurface drains.

If the structure includes an elevator, it may be necessary to provide special drainage or waterproofing measures for the elevator pit. If no seepage into the elevator pit is acceptable, it will be necessary to provide a footing drain and free-draining wall backfill, and the walls should be waterproofed. If the footing drain will be too low to connect to the storm drainage system, then it will likely be necessary to install a pumped sump to discharge the collected water. Alternatively, the elevator pit could be designed to be entirely waterproof; this would include designing the pit structure to resist hydrostatic uplift pressures.

As a minimum, a vapor retarder, as defined in the **Slabs-On-Grade** section, should be provided in any crawl space area to limit the transmission of water vapor from the underlying soils. Crawl space grades are sometimes left near the elevation of the bottom of the footings. As a result, an outlet drain is recommended for all crawl spaces to prevent an accumulation of any water that may bypass the footing drains. Providing even a few inches of free draining gravel underneath the vapor retarder limits the potential for seepage to build up on top of the vapor retarder.

The excavation and site should be graded so that surface water is directed off the site and away from the tops of slopes. Water should not be allowed to stand in any area where foundations, slabs, or pavements are to be constructed. Final site grading in areas adjacent to building(s) should slope away at least 2 percent, except where the area is paved. Surface drains should be provided where necessary to prevent ponding of water behind foundation or retaining walls. A discussion of grading and drainage related to pervious surfaces near walls and structures is contained in the **Foundation and Retaining Walls**.

GENERAL EARTHWORK AND STRUCTURAL FILL

All building and pavement areas should be stripped of surface vegetation, topsoil, organic soil, and other deleterious material. The stripped or removed materials should not be mixed with any materials to be used as structural fill, but they could be used in non-structural areas, such as landscape beds. We don't anticipate that any significant use of structural fill will be needed for this project except for possibly as utility line backfill.

Structural fill is defined as any fill, including utility backfill, placed under, or close to, a building, behind permanent retaining or foundation walls, or in other areas where the underlying soil needs to support loads. All structural fill should be placed in horizontal lifts with a moisture content at, or near, the optimum moisture content. The optimum moisture content is that moisture content that results in the greatest compacted dry density. The moisture content of fill is very important and must be closely controlled during the filling and compaction process.

The allowable thickness of the fill lift will depend on the material type selected, the compaction equipment used, and the number of passes made to compact the lift. The loose lift thickness should not exceed 12 inches. We recommend testing the fill as it is placed. If the fill is not sufficiently compacted, it can be recompacted before another lift is placed. This eliminates the need to remove the fill to achieve the required compaction. The following table presents recommended relative compactions for structural fill:

LOCATION OF FILL PLACEMENT	MINIMUM RELATIVE COMPACTION
Beneath footings, slabs or walkways	95%
Filled slopes and behind retaining walls	90%
Beneath pavements	95% for upper 12 inches of subgrade; 90% below that level

Where: Minimum Relative Compaction is the ratio, expressed in percentages, of the compacted dry density to the maximum dry density, as determined in accordance with ASTM Test Designation D 1557-91 (Modified Proctor).

Use of On-Site Soil

If grading activities take place during wet weather, or when the silty, on-site soil is wet, site preparation costs may be higher because of delays due to rain and the potential need to import granular fill. The moisture content of the silty, on-site soil must be at, or near, the optimum moisture content, as the soil cannot be consistently compacted to the required density when the moisture content is significantly greater than optimum. The moisture content of the on-site soil was generally at or above the estimated optimum moisture content at the time of our explorations, which was in drier time of the year, but could be wetter in the during the normally wet months of the year. The on-site soil is generally silty and therefore moisture sensitive. Grading operations will be difficult during wet weather, or when the moisture content of this soil exceeds the optimum moisture content. The on-site fill soil underlying the topsoil could be used as structural fill, if grading operations are conducted during hot, dry weather, when drying the wetter soil by aeration is possible. During excessively dry weather, however, it may be necessary to add water to achieve the optimum moisture content.

Moisture-sensitive soil may also be susceptible to excessive softening and "pumping" from construction equipment, or even foot traffic, when the moisture content is greater than the optimum moisture content. It may be beneficial to protect subgrades with a layer of imported sand or crushed rock to limit disturbance from traffic.

Structural fill that will be placed in wet weather should consist of a coarse, granular soil with a silt or clay content of no more than 5 percent. The percentage of particles passing the No. 200 sieve should be measured from that portion of soil passing the three-quarter-inch sieve.

LIMITATIONS

The conclusions and recommendations contained in this report are based on site conditions as they existed at the time of our exploration and assume that the soil and groundwater conditions encountered in the test pits or borings are representative of subsurface conditions on the site. If the subsurface conditions encountered during construction are significantly different from those observed in our explorations, we should be advised at once so that we can review these conditions and reconsider our recommendations where necessary. Unanticipated conditions are commonly encountered on construction sites and cannot be fully anticipated by merely taking samples in test pits or borings. Subsurface conditions can also vary between exploration locations. Such unexpected conditions frequently require making additional expenditures to attain a properly constructed project. It is recommended that the owner consider providing a contingency fund to accommodate such potential extra costs and risks. This is a standard recommendation for all projects.

The recommendations presented in this report are directed toward the protection of only proposed structures from damage due to slope movement. Predicting the future behavior of steep slopes and the potential effects of development on their stability is an inexact and imperfect science that is currently based mostly on the past behavior of slopes with similar characteristics. Landslides and soil movement can occur on steep slopes before, during, or after the development of property. However, as noted in the report, structures located outside the line of influence noted in the **General** section of this report should remain stable in our opinion.

This report has been prepared for the exclusive use of Catholic Housing Services of Western Washington and its representatives for specific application to this project and site. Our conclusions and recommendations are professional opinions derived in accordance with our understanding of current local standards of practice, and within the scope of our services. No warranty is expressed or implied. 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. Our services also do not include assessing or minimizing the potential for biological hazards, such as mold, bacteria, mildew and fungi in either the existing or proposed site development.

ADDITIONAL SERVICES

In addition to reviewing the final plans, Geotech Consultants, Inc. should be retained to provide geotechnical consultation, testing, and observation services during construction. This is to confirm that subsurface conditions are consistent with those indicated by our exploration, to evaluate whether earthwork and foundation construction activities comply with the general intent of the recommendations presented in this report, and to provide suggestions for design changes in the event subsurface conditions differ from those anticipated prior to the start of construction. However, our work would not include the supervision or direction of the actual work of the contractor and its employees or agents. Also, job and site safety, and dimensional measurements, will be the responsibility of the contractor.

During the construction phase, we will provide geotechnical observation and testing services when requested by you or your representatives. Please be aware that we can only document site work we actually observe. It is still the responsibility of your contractor or on-site construction team to verify that our recommendations are being followed, whether we are present at the site or not.

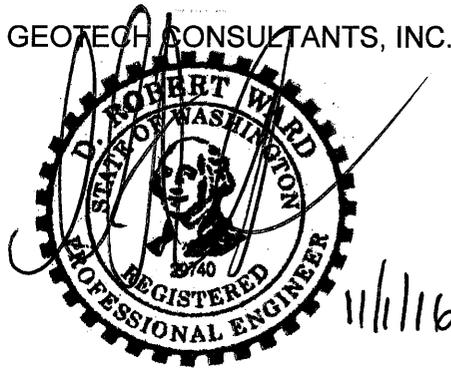
The following plates are attached to complete this report:

Plate 1	Vicinity Map
Plate 2	Site Exploration Plan
Plates 3 - 8	Test Pit and Boring Logs
Plate 9	Typical Footing Drain Detail

We appreciate the opportunity to be of service on this project. Please contact us if you have any questions, or if we can be of further assistance.

Respectfully submitted,

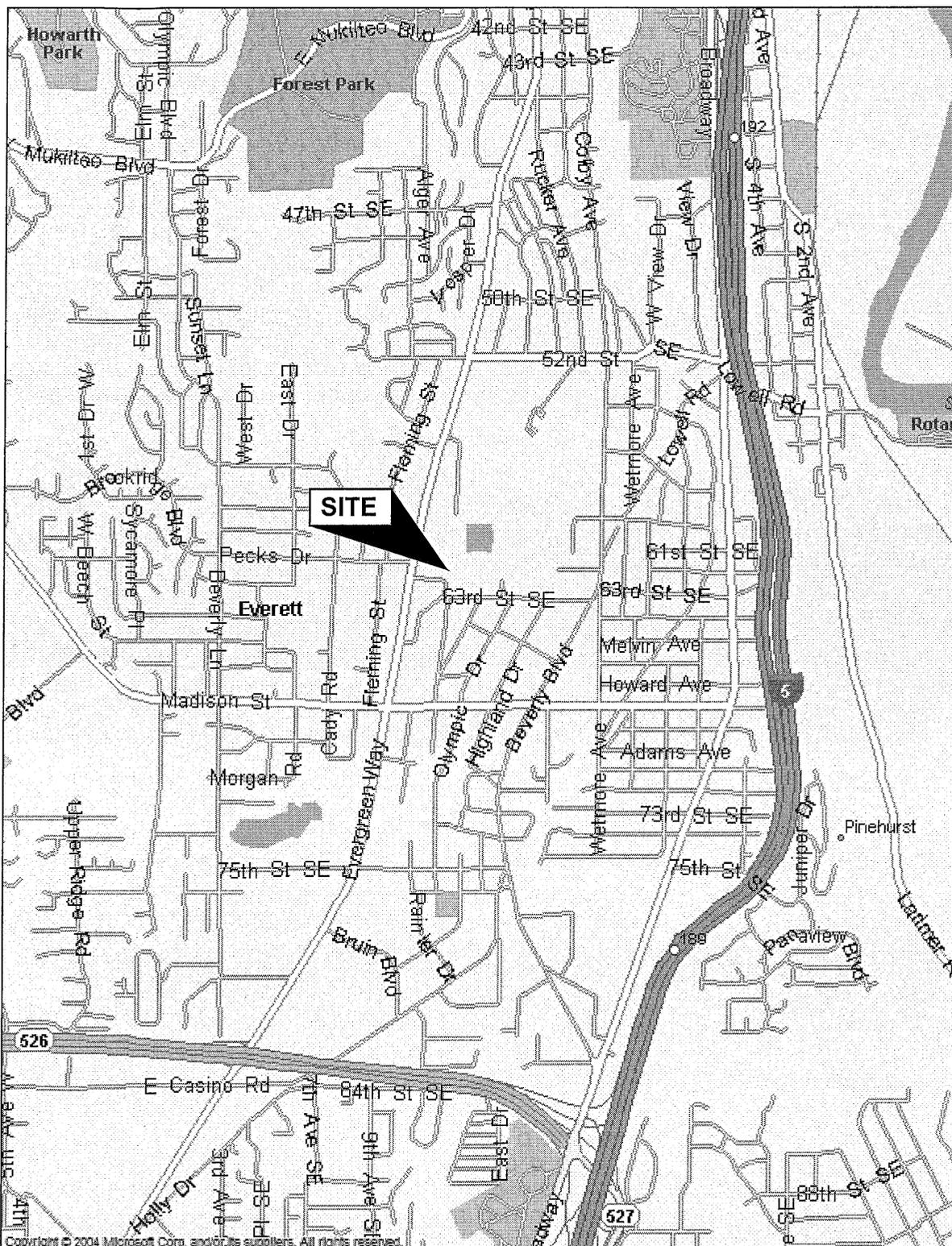
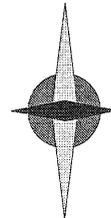
GEOTECH CONSULTANTS, INC.



D. Robert Ward, P.E.
Principal

DRW:mw

NORTH



(Source: Microsoft MapPoint, 2013)

VICINITY MAP

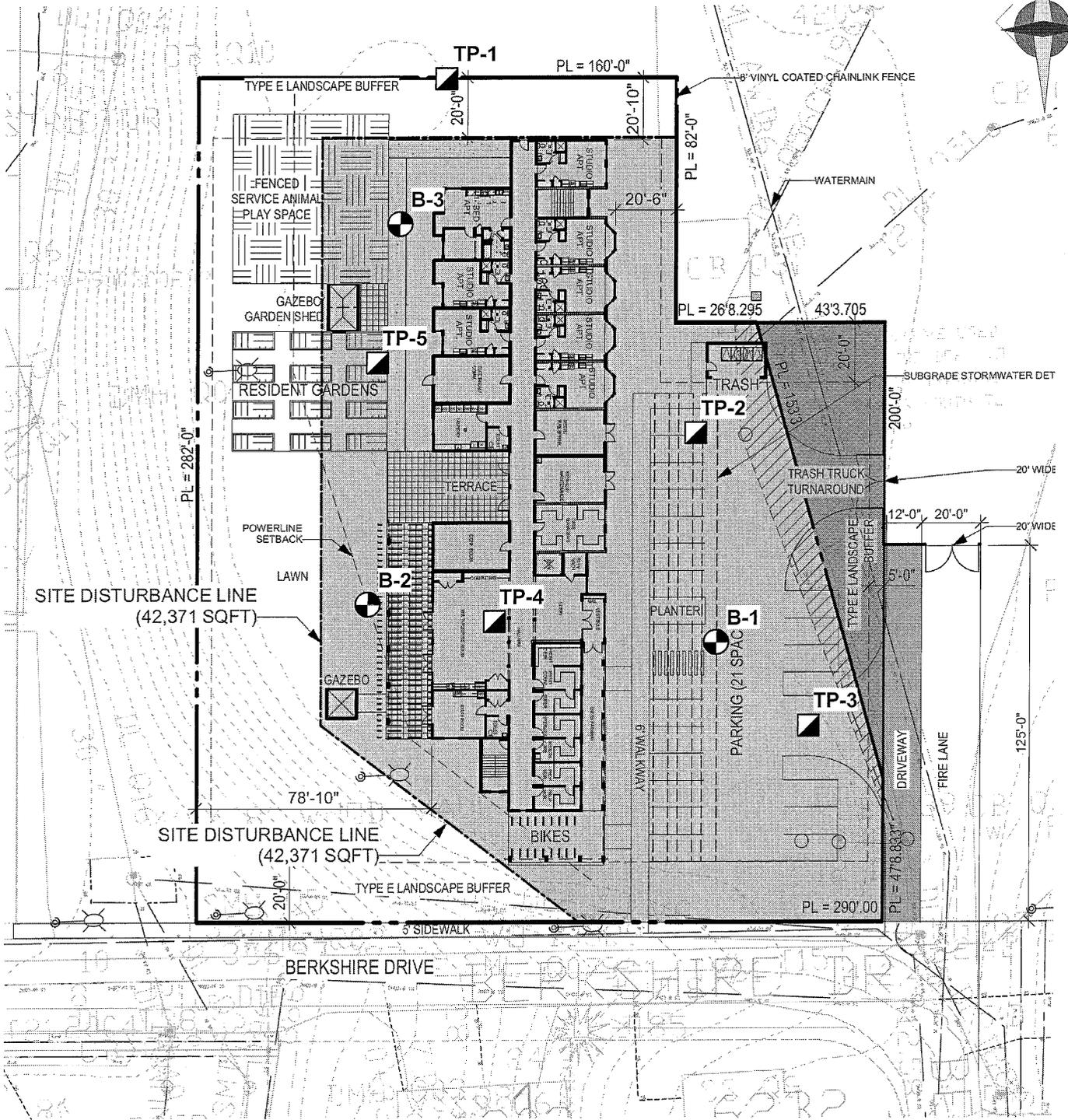
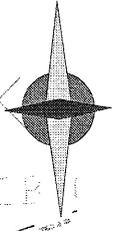
6107 Berkshire Drive
Everett, Washington



GEOTECH
CONSULTANTS, INC.

Job No: 16298	Date: Nov. 2016	Plate: 1
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NORTH



Legend:

-  Boring Location
-  Test Pit Location



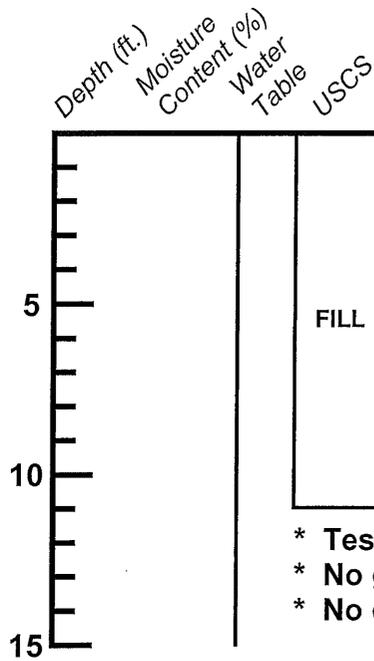
GEOTECH
CONSULTANTS, INC.

SITE EXPLORATION PLAN
6107 Berkshire Drive
Everett, Washington

Job No: 16298	Date: Nov. 2016	No Scale	Plate: 2
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TEST PIT 1

Description

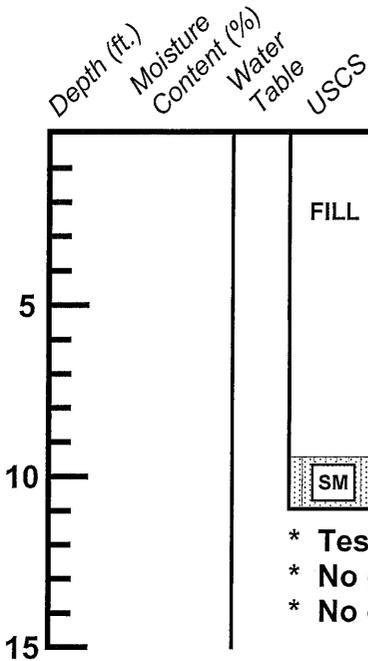


			Grass over: Gray gravelly silty SAND, some root matter, slightly moist, loose to medium-dense (FILL) -reduced gravel and silt content
		FILL	

- * Test Pit terminated at 11 feet on August 25, 2016.
- * No groundwater observed during excavation.
- * No caving observed during excavation.

TEST PIT 2

Description



			Grass over: Gray gravelly silty SAND, some root matter, slightly moist, loose to medium-dense (FILL) -becomes gray and rust-brown, reduced silt and root content
		FILL	
		SM	Rust-brown, mottled, gravelly silty SAND, moist, loose to medium-dense

- * Test Pit terminated at 11 feet on August 25, 2016.
- * No groundwater observed during excavation.
- * No caving observed during excavation.



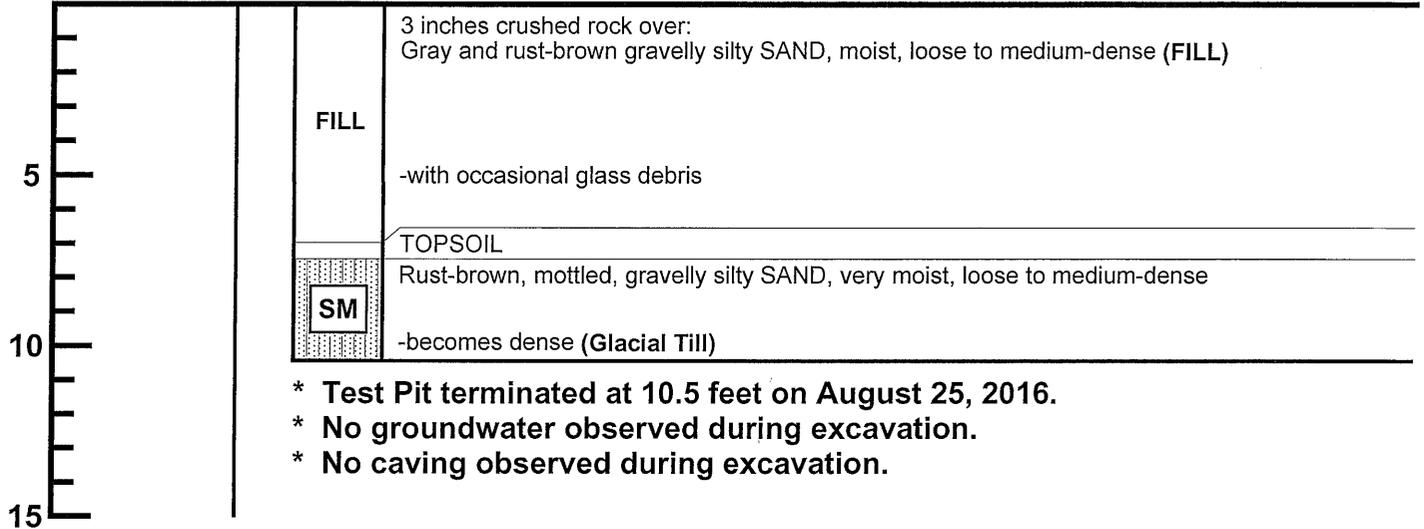
TEST PIT LOG
 6107 Berkshire Drive
 Everett, Washington

Job 16298	Date: Nov. 2016	Logged by: ASM	Plate: 3
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TEST PIT 3

Depth (ft.)
Moisture Content (%)
Water Table
USCS

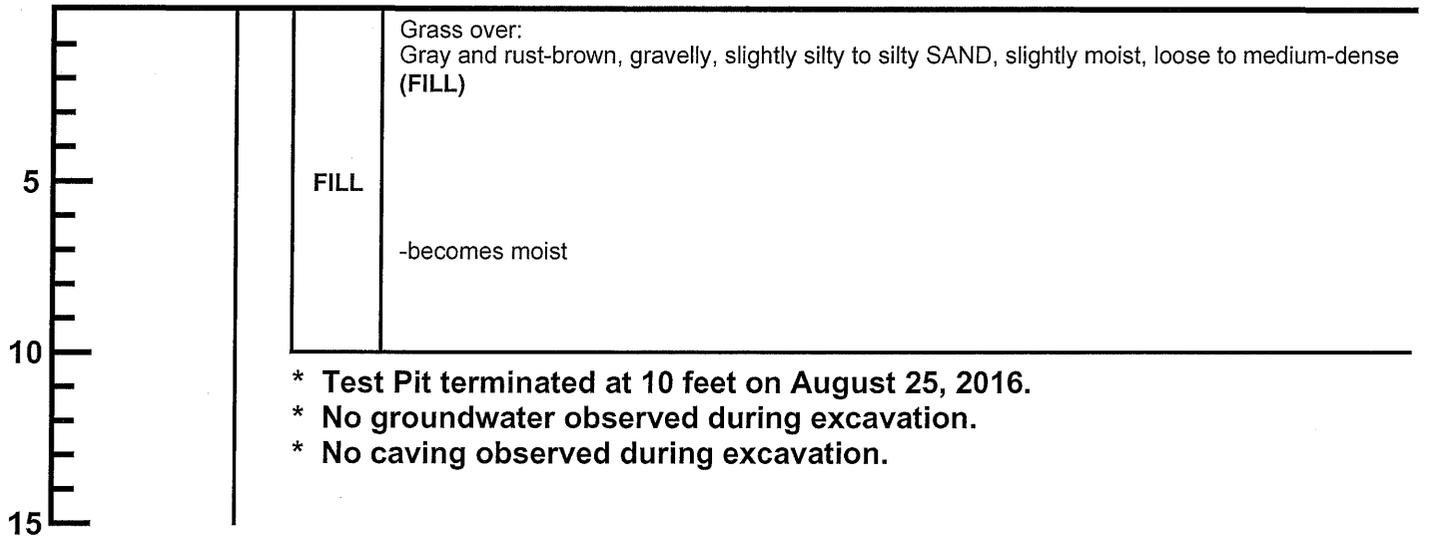
Description



TEST PIT 4

Depth (ft.)
Moisture Content (%)
Water Table
USCS

Description



TEST PIT LOG
6107 Berkshire Drive
Everett, Washington

Job 16298	Date: Nov. 2016	Logged by: ASM	Plate: 4
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TEST PIT 5

Depth (ft.)
Moisture
Content (%)
Water
Table
USCS

Description

5 10 15	FILL	Grass over: Gray gravelly silty SAND, some root matter, slightly moist, loose to medium-dense (FILL)
		-reduced gravel and silt content

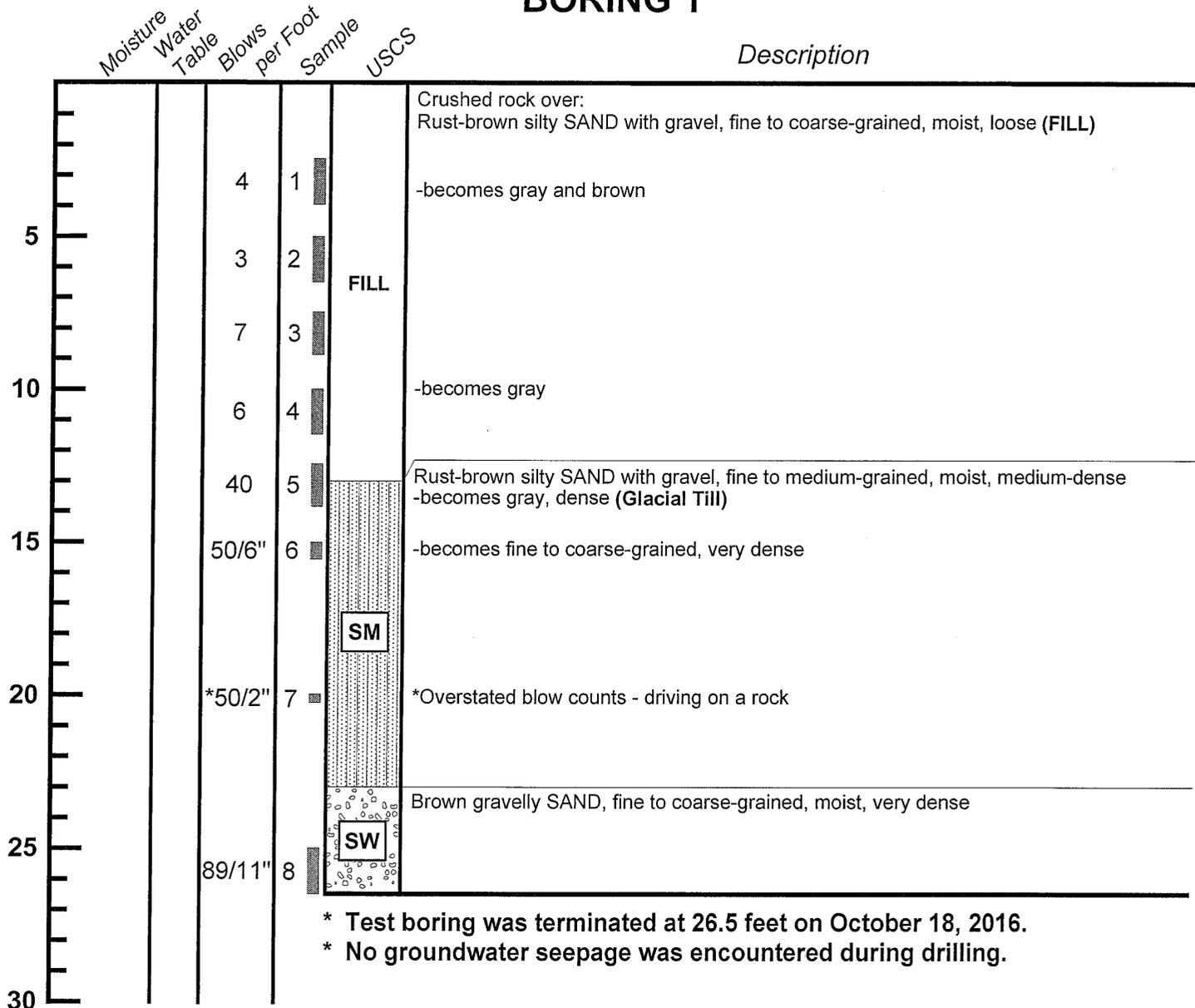
- * Test Pit terminated at 11 feet on August 25, 2016.
- * No groundwater observed during excavation.
- * No caving observed during excavation.



TEST PIT LOG
6107 Berkshire Drive
Everett, Washington

Job 16298	Date: Nov. 2016	Logged by: ASM	Plate: 5
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BORING 1



* Test boring was terminated at 26.5 feet on October 18, 2016.
 * No groundwater seepage was encountered during drilling.



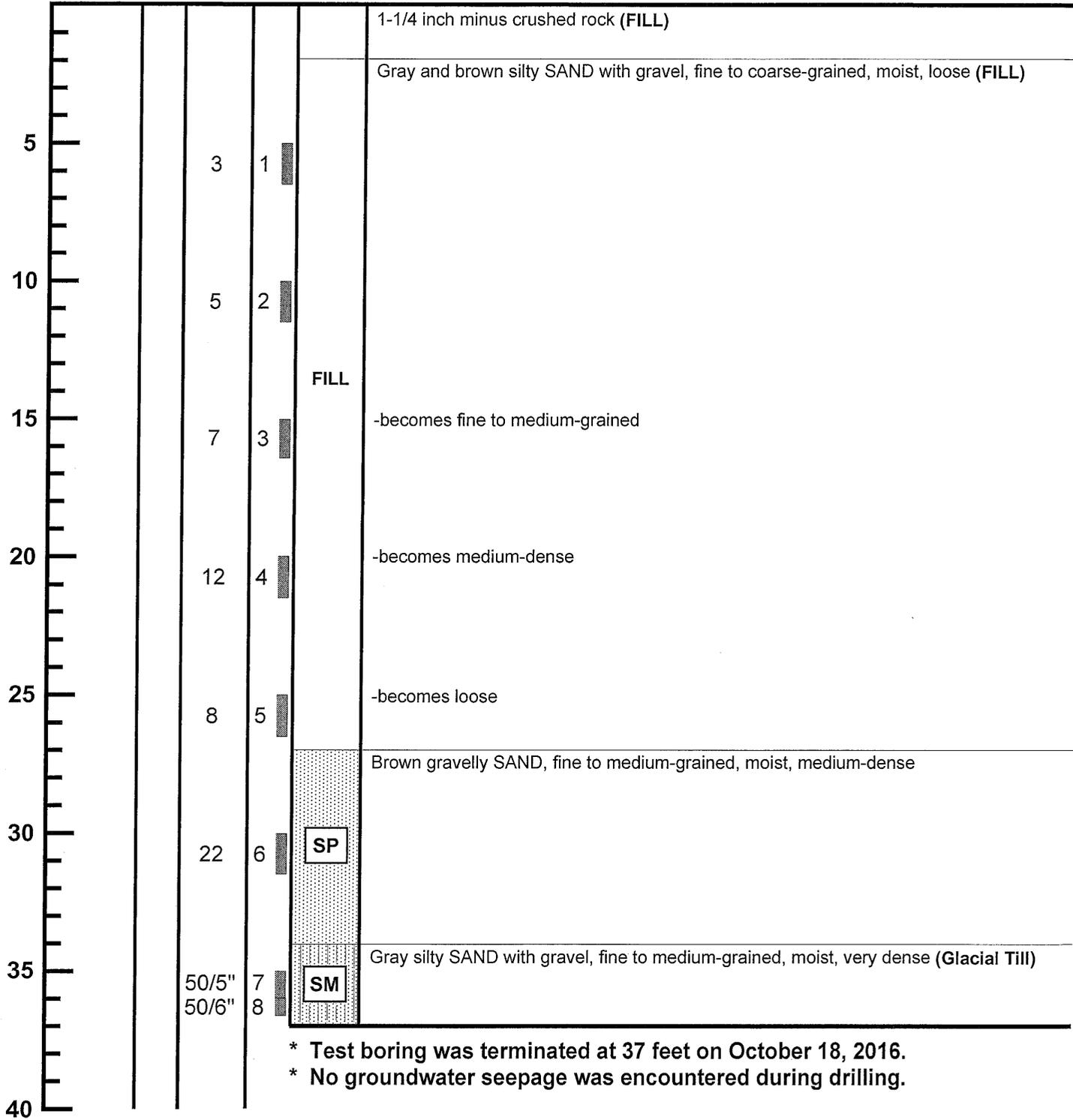
BORING LOG
 6107 Berkshire Drive
 Everett, Washington

Job 16298	Date: Nov. 2016	Logged by: ASM	Plate: 6
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BORING 2

Moisture
Water
Table
Blows
per Foot
Sample
USCS

Description



* Test boring was terminated at 37 feet on October 18, 2016.
* No groundwater seepage was encountered during drilling.



GEOTECH
CONSULTANTS, INC.

BORING LOG

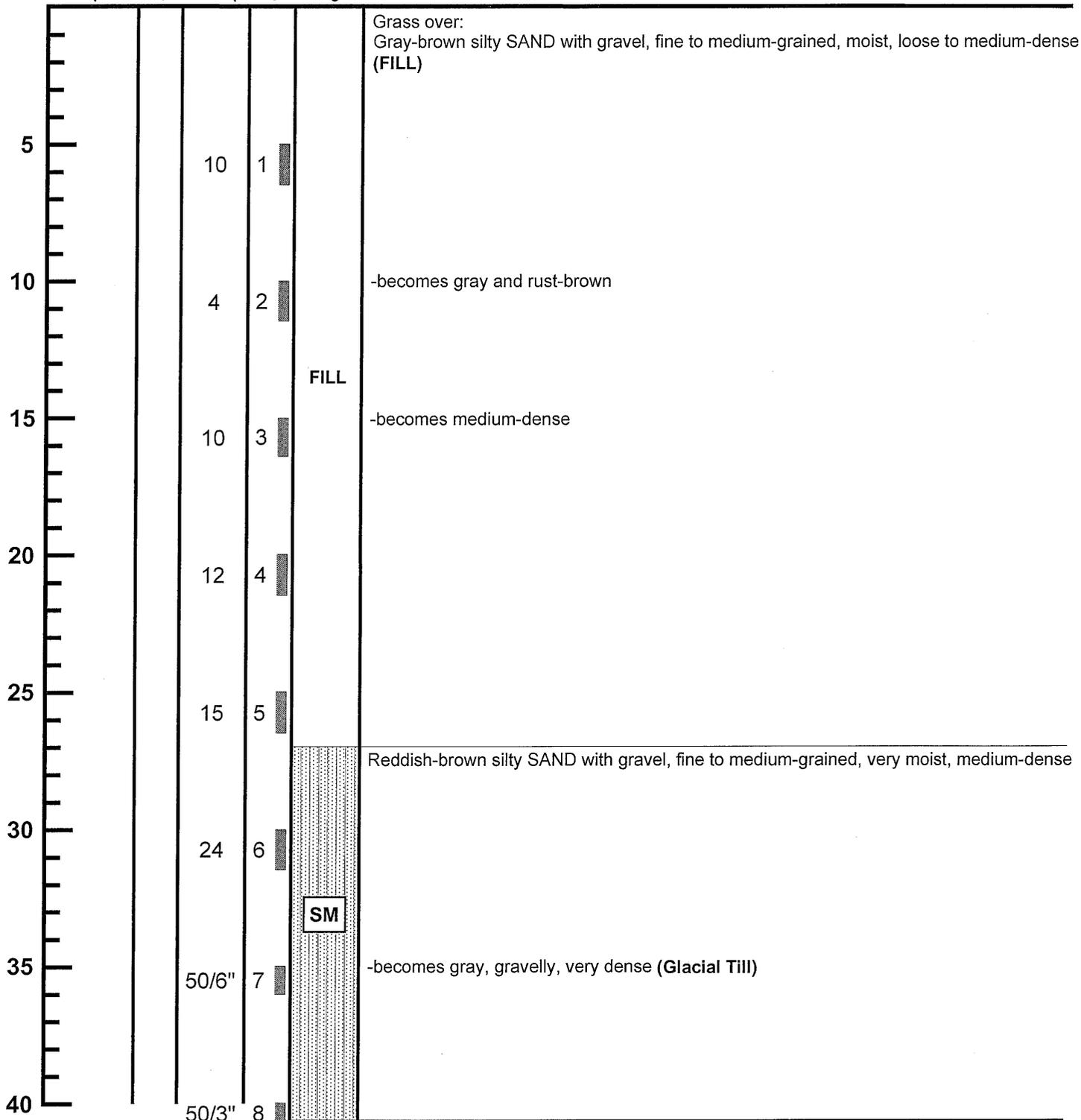
6107 Berkshire Drive
Everett, Washington

Job 16298	Date: Nov. 2016	Logged by: ASM	Plate: 7
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BORING 3

Moisture
Water
Table
Blows
per Foot
Sample
USCS

Description



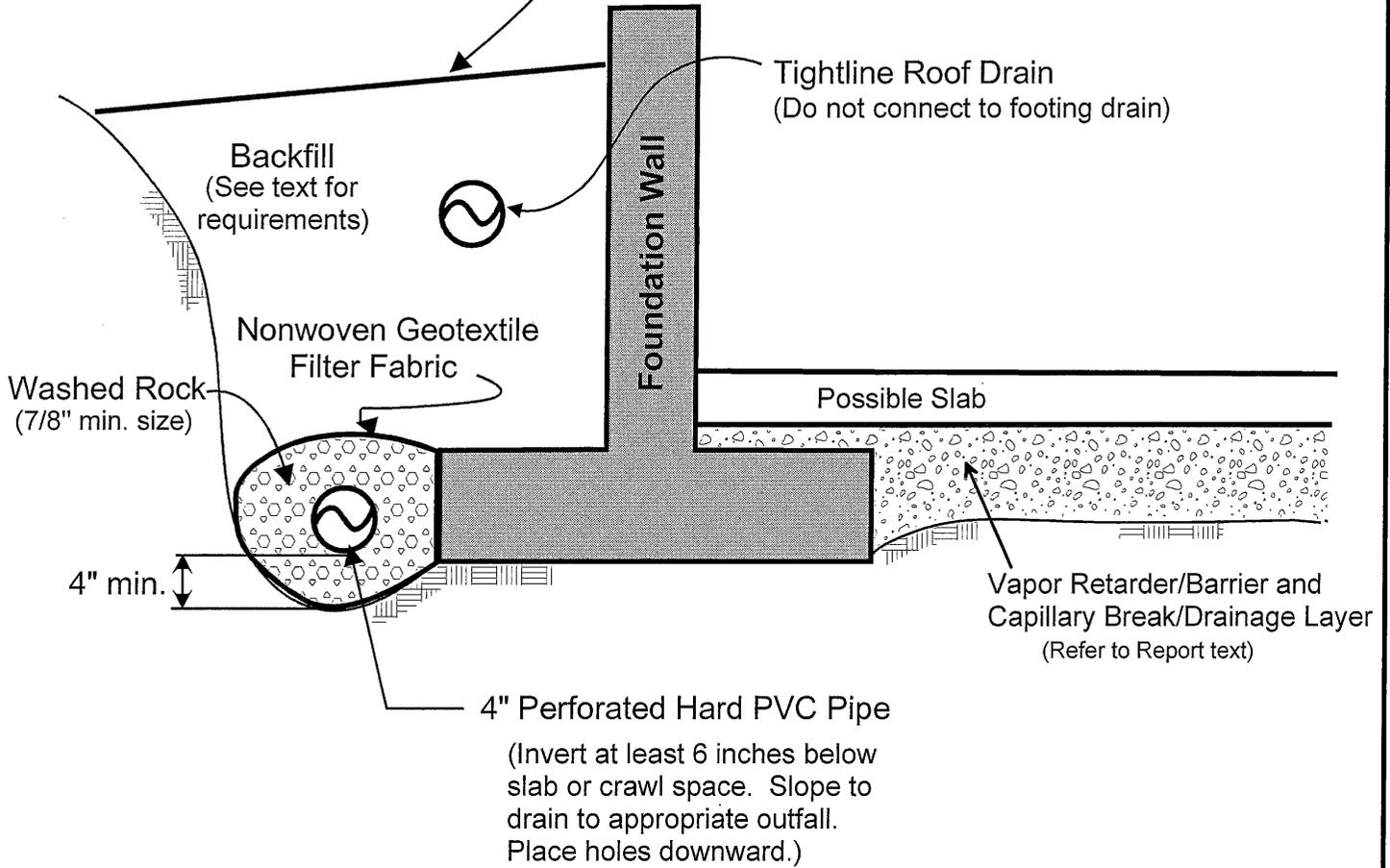
* Test boring was terminated at 40.8 feet on October 18, 2016.
* No groundwater seepage was encountered during drilling.



BORING LOG
6107 Berkshire Drive
Everett, Washington

Job	Date:	Logged by:	Plate:
16298	Nov. 2016	ASM	8

Slope backfill away from foundation. Provide surface drains where necessary.



NOTES:

- (1) In crawl spaces, provide an outlet drain to prevent buildup of water that bypasses the perimeter footing drains.
- (2) Refer to report text for additional drainage, waterproofing, and slab considerations.

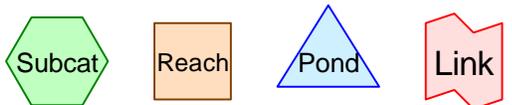
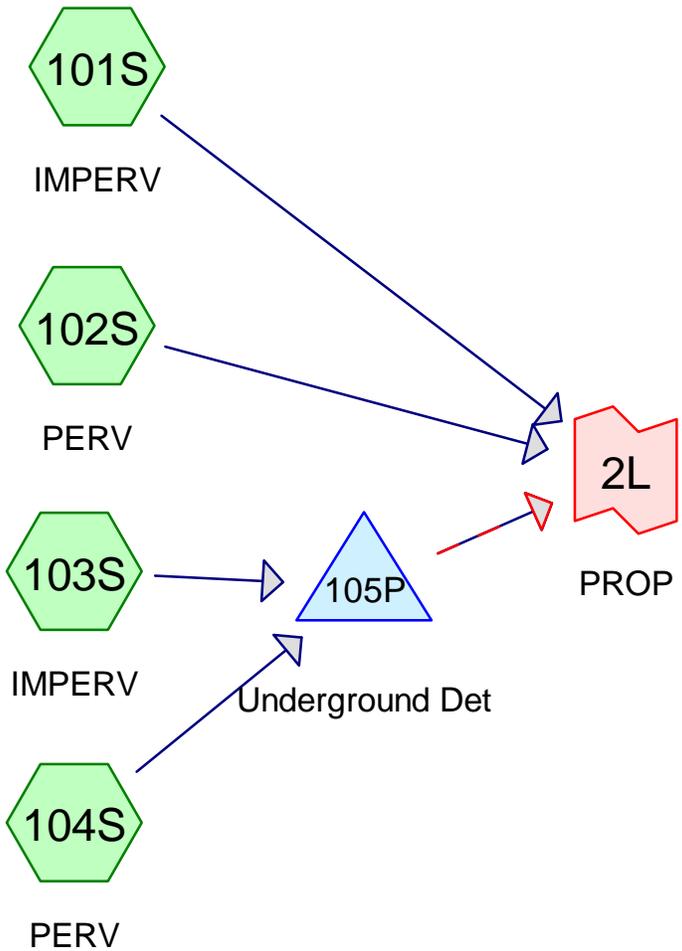
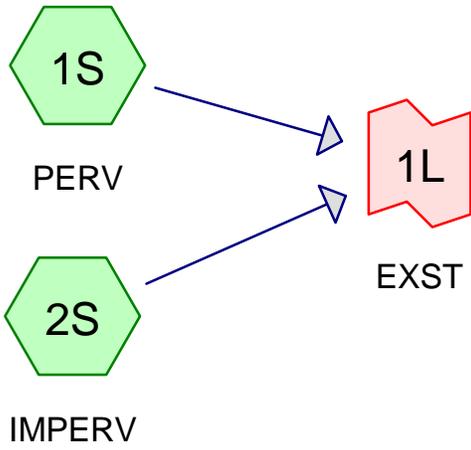


FOOTING DRAIN DETAIL
 6107 Berkshire Drive
 Everett, Washington

Job No: 16298	Date: Nov. 2016		Plate: 9
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Appendix D

HydroCAD and MGS Flood Output by Coterra Engineering



Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points

Runoff by SBUH method

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: PERV

Runoff Area=38,436 sf Runoff Depth=1.51"
Tc=6.0 min CN=81 Runoff=0.300 cfs 0.111 af

Subcatchment 2S: IMPERV

Runoff Area=5,017 sf Runoff Depth=3.02"
Tc=6.0 min CN=98 Runoff=0.087 cfs 0.029 af

Subcatchment 101S: IMPERV

Runoff Area=2,285 sf Runoff Depth=3.02"
Tc=6.0 min CN=98 Runoff=0.039 cfs 0.013 af

Subcatchment 102S: PERV

Runoff Area=4,055 sf Runoff Depth=1.44"
Tc=6.0 min CN=80 Runoff=0.030 cfs 0.011 af

Subcatchment 103S: IMPERV

Runoff Area=26,615 sf Runoff Depth=3.02"
Tc=6.0 min CN=98 Runoff=0.459 cfs 0.154 af

Subcatchment 104S: PERV

Runoff Area=10,490 sf Runoff Depth=1.44"
Tc=6.0 min CN=80 Runoff=0.077 cfs 0.029 af

Pond 105P: Underground Det

Peak Elev=414.19' Storage=0.079 af Inflow=0.534 cfs 0.183 af
Primary=0.027 cfs 0.065 af Secondary=0.107 cfs 0.063 af Outflow=0.134 cfs 0.127 af

Link 1L: EXST

Inflow=0.387 cfs 0.140 af
Primary=0.387 cfs 0.140 af

Link 2L: PROP

Inflow=0.153 cfs 0.152 af
Primary=0.153 cfs 0.152 af

Total Runoff Area = 1.995 ac Runoff Volume = 0.347 af Average Runoff Depth = 2.09"

Subcatchment 1S: PERV

Runoff = 0.300 cfs @ 7.98 hrs, Volume= 0.111 af, Depth= 1.51"

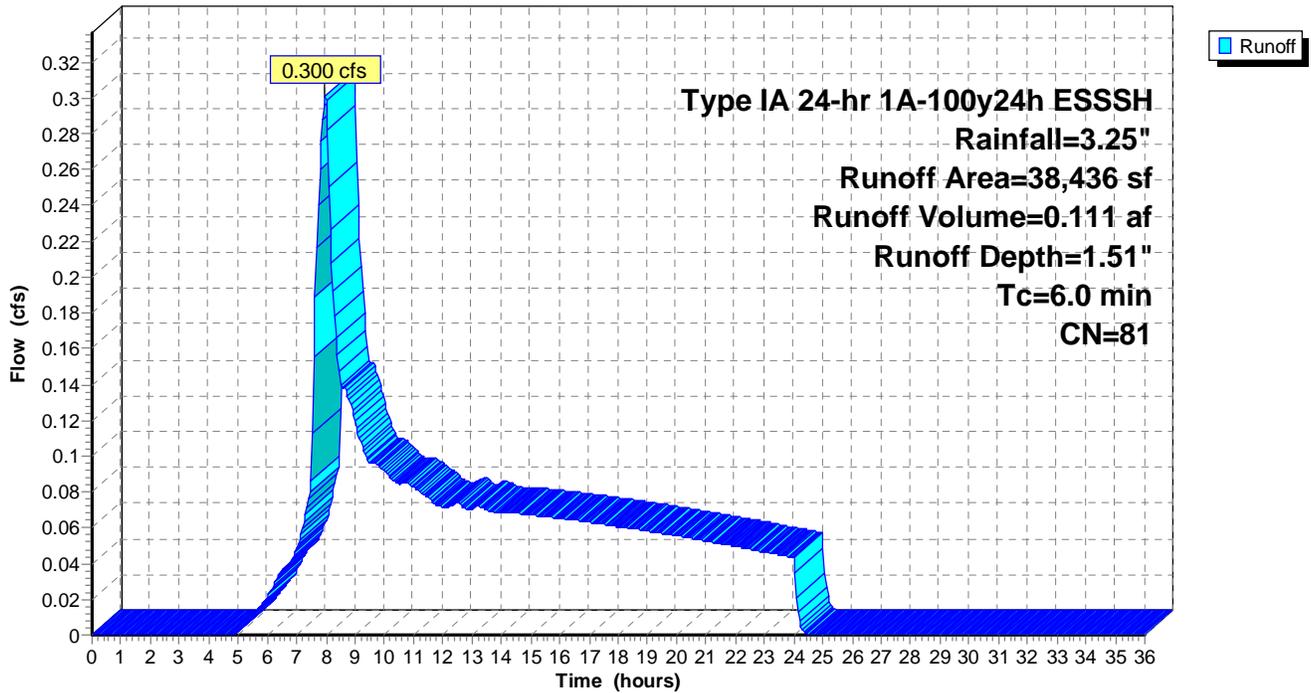
Runoff by SBUH method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 1A-100y24h ESSSH Rainfall=3.25"

Area (sf)	CN	Description
11,301	85	Gravel roads, HSG B
27,135	80	Open Space Good Condition
38,436	81	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S: PERV

Hydrograph



Hydrograph for Subcatchment 1S: PERV

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.000	14.75	2.47	0.92	0.068	29.50	3.25	1.51	0.000
0.25	0.02	0.00	0.000	15.00	2.50	0.94	0.067	29.75	3.25	1.51	0.000
0.50	0.03	0.00	0.000	15.25	2.53	0.96	0.067	30.00	3.25	1.51	0.000
0.75	0.05	0.00	0.000	15.50	2.55	0.98	0.066	30.25	3.25	1.51	0.000
1.00	0.06	0.00	0.000	15.75	2.58	1.00	0.066	30.50	3.25	1.51	0.000
1.25	0.09	0.00	0.000	16.00	2.60	1.02	0.065	30.75	3.25	1.51	0.000
1.50	0.11	0.00	0.000	16.25	2.63	1.03	0.065	31.00	3.25	1.51	0.000
1.75	0.14	0.00	0.000	16.50	2.65	1.05	0.064	31.25	3.25	1.51	0.000
2.00	0.16	0.00	0.000	16.75	2.68	1.07	0.064	31.50	3.25	1.51	0.000
2.25	0.19	0.00	0.000	17.00	2.70	1.09	0.063	31.75	3.25	1.51	0.000
2.50	0.21	0.00	0.000	17.25	2.73	1.11	0.062	32.00	3.25	1.51	0.000
2.75	0.24	0.00	0.000	17.50	2.75	1.12	0.062	32.25	3.25	1.51	0.000
3.00	0.27	0.00	0.000	17.75	2.77	1.14	0.061	32.50	3.25	1.51	0.000
3.25	0.29	0.00	0.000	18.00	2.79	1.16	0.061	32.75	3.25	1.51	0.000
3.50	0.32	0.00	0.000	18.25	2.82	1.17	0.060	33.00	3.25	1.51	0.000
3.75	0.35	0.00	0.000	18.50	2.84	1.19	0.059	33.25	3.25	1.51	0.000
4.00	0.38	0.00	0.000	18.75	2.86	1.21	0.059	33.50	3.25	1.51	0.000
4.25	0.41	0.00	0.000	19.00	2.88	1.22	0.058	33.75	3.25	1.51	0.000
4.50	0.44	0.00	0.000	19.25	2.90	1.24	0.057	34.00	3.25	1.51	0.000
4.75	0.47	0.00	0.000	19.50	2.93	1.26	0.057	34.25	3.25	1.51	0.000
5.00	0.51	0.00	0.002	19.75	2.95	1.27	0.056	34.50	3.25	1.51	0.000
5.25	0.54	0.00	0.006	20.00	2.97	1.29	0.055	34.75	3.25	1.51	0.000
5.50	0.59	0.01	0.011	20.25	2.99	1.30	0.055	35.00	3.25	1.51	0.000
5.75	0.63	0.01	0.016	20.50	3.01	1.32	0.054	35.25	3.25	1.51	0.000
6.00	0.67	0.02	0.021	20.75	3.03	1.33	0.053	35.50	3.25	1.51	0.000
6.25	0.72	0.02	0.029	21.00	3.04	1.35	0.053	35.75	3.25	1.51	0.000
6.50	0.77	0.03	0.036	21.25	3.06	1.36	0.052	36.00	3.25	1.51	0.000
6.75	0.82	0.05	0.040	21.50	3.08	1.38	0.051				
7.00	0.87	0.06	0.048	21.75	3.10	1.39	0.050				
7.25	0.93	0.08	0.063	22.00	3.12	1.40	0.050				
7.50	1.01	0.10	0.086	22.25	3.14	1.42	0.049				
7.75	1.19	0.17	0.241	22.50	3.15	1.43	0.048				
8.00	1.38	0.26	0.299	22.75	3.17	1.45	0.047				
8.25	1.49	0.31	0.192	23.00	3.19	1.46	0.047				
8.50	1.56	0.35	0.140	23.25	3.20	1.47	0.046				
8.75	1.63	0.38	0.134	23.50	3.22	1.48	0.045				
9.00	1.69	0.42	0.119	23.75	3.23	1.50	0.044				
9.25	1.74	0.45	0.105	24.00	3.25	1.51	0.043				
9.50	1.79	0.47	0.096	24.25	3.25	1.51	0.004				
9.75	1.83	0.50	0.095	24.50	3.25	1.51	0.000				
10.00	1.88	0.53	0.092	24.75	3.25	1.51	0.000				
10.25	1.92	0.55	0.087	25.00	3.25	1.51	0.000				
10.50	1.95	0.58	0.084	25.25	3.25	1.51	0.000				
10.75	1.99	0.60	0.085	25.50	3.25	1.51	0.000				
11.00	2.03	0.62	0.083	25.75	3.25	1.51	0.000				
11.25	2.06	0.64	0.080	26.00	3.25	1.51	0.000				
11.50	2.10	0.67	0.077	26.25	3.25	1.51	0.000				
11.75	2.13	0.69	0.073	26.50	3.25	1.51	0.000				
12.00	2.16	0.71	0.072	26.75	3.25	1.51	0.000				
12.25	2.19	0.73	0.072	27.00	3.25	1.51	0.000				
12.50	2.22	0.75	0.075	27.25	3.25	1.51	0.000				
12.75	2.25	0.77	0.071	27.50	3.25	1.51	0.000				
13.00	2.28	0.79	0.070	27.75	3.25	1.51	0.000				
13.25	2.31	0.81	0.072	28.00	3.25	1.51	0.000				
13.50	2.34	0.83	0.070	28.25	3.25	1.51	0.000				
13.75	2.36	0.85	0.069	28.50	3.25	1.51	0.000				
14.00	2.39	0.87	0.068	28.75	3.25	1.51	0.000				
14.25	2.42	0.89	0.068	29.00	3.25	1.51	0.000				
14.50	2.45	0.90	0.068	29.25	3.25	1.51	0.000				

Subcatchment 2S: IMPERV

Runoff = 0.087 cfs @ 7.92 hrs, Volume= 0.029 af, Depth= 3.02"

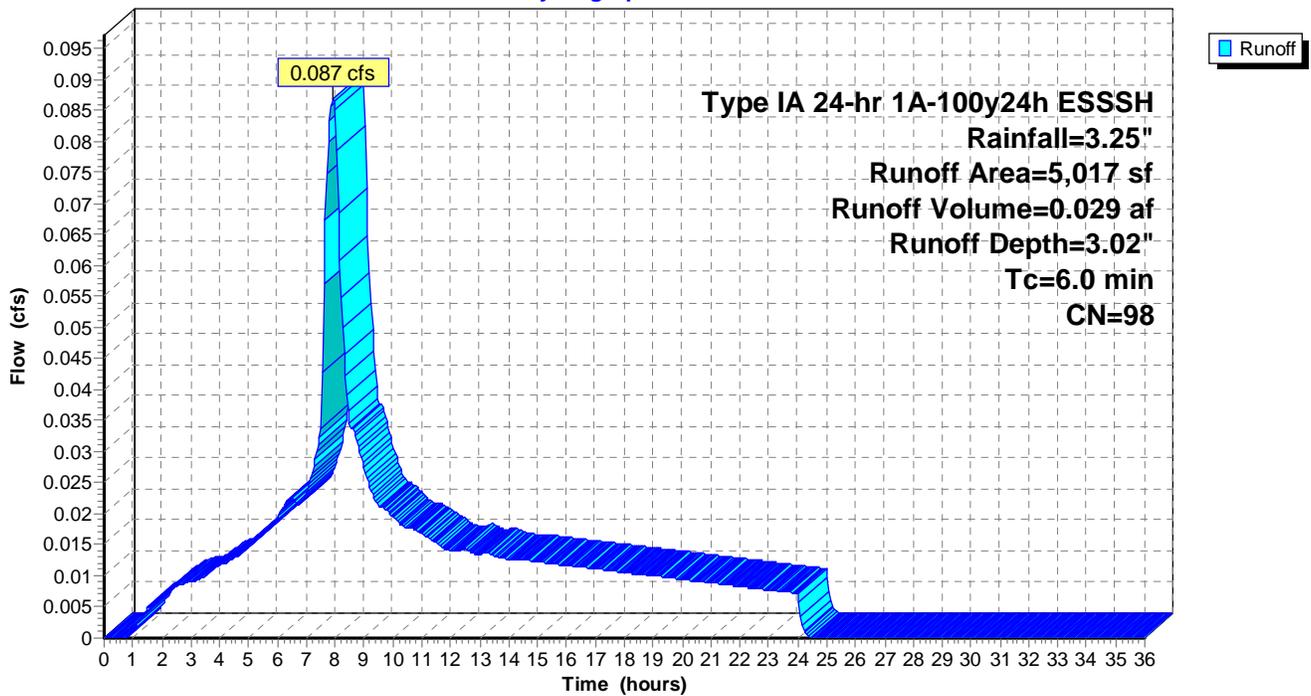
Runoff by SBUH method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 1A-100y24h ESSSH Rainfall=3.25"

Area (sf)	CN	Description
5,017	98	Paved parking & roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 2S: IMPERV

Hydrograph



Hydrograph for Subcatchment 2S: IMPERV

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.000	14.75	2.47	2.24	0.012	29.50	3.25	3.02	0.000
0.25	0.02	0.00	0.000	15.00	2.50	2.27	0.012	29.75	3.25	3.02	0.000
0.50	0.03	0.00	0.000	15.25	2.53	2.30	0.012	30.00	3.25	3.02	0.000
0.75	0.05	0.00	0.000	15.50	2.55	2.32	0.012	30.25	3.25	3.02	0.000
1.00	0.06	0.00	0.001	15.75	2.58	2.35	0.012	30.50	3.25	3.02	0.000
1.25	0.09	0.01	0.003	16.00	2.60	2.37	0.012	30.75	3.25	3.02	0.000
1.50	0.11	0.02	0.005	16.25	2.63	2.40	0.012	31.00	3.25	3.02	0.000
1.75	0.14	0.03	0.006	16.50	2.65	2.42	0.011	31.25	3.25	3.02	0.000
2.00	0.16	0.05	0.007	16.75	2.68	2.45	0.011	31.50	3.25	3.02	0.000
2.25	0.19	0.06	0.008	17.00	2.70	2.47	0.011	31.75	3.25	3.02	0.000
2.50	0.21	0.08	0.008	17.25	2.73	2.49	0.011	32.00	3.25	3.02	0.000
2.75	0.24	0.10	0.009	17.50	2.75	2.52	0.011	32.25	3.25	3.02	0.000
3.00	0.27	0.12	0.009	17.75	2.77	2.54	0.011	32.50	3.25	3.02	0.000
3.25	0.29	0.14	0.009	18.00	2.79	2.56	0.011	32.75	3.25	3.02	0.000
3.50	0.32	0.16	0.010	18.25	2.82	2.59	0.010	33.00	3.25	3.02	0.000
3.75	0.35	0.18	0.011	18.50	2.84	2.61	0.010	33.25	3.25	3.02	0.000
4.00	0.38	0.21	0.012	18.75	2.86	2.63	0.010	33.50	3.25	3.02	0.000
4.25	0.41	0.24	0.012	19.00	2.88	2.65	0.010	33.75	3.25	3.02	0.000
4.50	0.44	0.26	0.013	19.25	2.90	2.67	0.010	34.00	3.25	3.02	0.000
4.75	0.47	0.29	0.014	19.50	2.93	2.69	0.010	34.25	3.25	3.02	0.000
5.00	0.51	0.32	0.015	19.75	2.95	2.71	0.010	34.50	3.25	3.02	0.000
5.25	0.54	0.36	0.016	20.00	2.97	2.73	0.009	34.75	3.25	3.02	0.000
5.50	0.59	0.40	0.017	20.25	2.99	2.75	0.009	35.00	3.25	3.02	0.000
5.75	0.63	0.43	0.018	20.50	3.01	2.77	0.009	35.25	3.25	3.02	0.000
6.00	0.67	0.47	0.019	20.75	3.03	2.79	0.009	35.50	3.25	3.02	0.000
6.25	0.72	0.52	0.022	21.00	3.04	2.81	0.009	35.75	3.25	3.02	0.000
6.50	0.77	0.57	0.023	21.25	3.06	2.83	0.009	36.00	3.25	3.02	0.000
6.75	0.82	0.62	0.022	21.50	3.08	2.85	0.009				
7.00	0.87	0.67	0.024	21.75	3.10	2.87	0.008				
7.25	0.93	0.73	0.028	22.00	3.12	2.89	0.008				
7.50	1.01	0.80	0.034	22.25	3.14	2.90	0.008				
7.75	1.19	0.98	0.080	22.50	3.15	2.92	0.008				
8.00	1.38	1.16	0.085	22.75	3.17	2.94	0.008				
8.25	1.49	1.27	0.050	23.00	3.19	2.95	0.008				
8.50	1.56	1.34	0.034	23.25	3.20	2.97	0.008				
8.75	1.63	1.41	0.032	23.50	3.22	2.99	0.007				
9.00	1.69	1.47	0.027	23.75	3.23	3.00	0.007				
9.25	1.74	1.52	0.024	24.00	3.25	3.02	0.007				
9.50	1.79	1.56	0.021	24.25	3.25	3.02	0.001				
9.75	1.83	1.61	0.021	24.50	3.25	3.02	0.000				
10.00	1.88	1.65	0.020	24.75	3.25	3.02	0.000				
10.25	1.92	1.69	0.018	25.00	3.25	3.02	0.000				
10.50	1.95	1.73	0.018	25.25	3.25	3.02	0.000				
10.75	1.99	1.77	0.018	25.50	3.25	3.02	0.000				
11.00	2.03	1.80	0.017	25.75	3.25	3.02	0.000				
11.25	2.06	1.84	0.016	26.00	3.25	3.02	0.000				
11.50	2.10	1.87	0.015	26.25	3.25	3.02	0.000				
11.75	2.13	1.90	0.014	26.50	3.25	3.02	0.000				
12.00	2.16	1.93	0.014	26.75	3.25	3.02	0.000				
12.25	2.19	1.96	0.014	27.00	3.25	3.02	0.000				
12.50	2.22	1.99	0.014	27.25	3.25	3.02	0.000				
12.75	2.25	2.02	0.014	27.50	3.25	3.02	0.000				
13.00	2.28	2.05	0.013	27.75	3.25	3.02	0.000				
13.25	2.31	2.08	0.014	28.00	3.25	3.02	0.000				
13.50	2.34	2.11	0.013	28.25	3.25	3.02	0.000				
13.75	2.36	2.14	0.013	28.50	3.25	3.02	0.000				
14.00	2.39	2.16	0.013	28.75	3.25	3.02	0.000				
14.25	2.42	2.19	0.013	29.00	3.25	3.02	0.000				
14.50	2.45	2.22	0.013	29.25	3.25	3.02	0.000				

Subcatchment 101S: IMPERV

Runoff = 0.039 cfs @ 7.92 hrs, Volume= 0.013 af, Depth= 3.02"

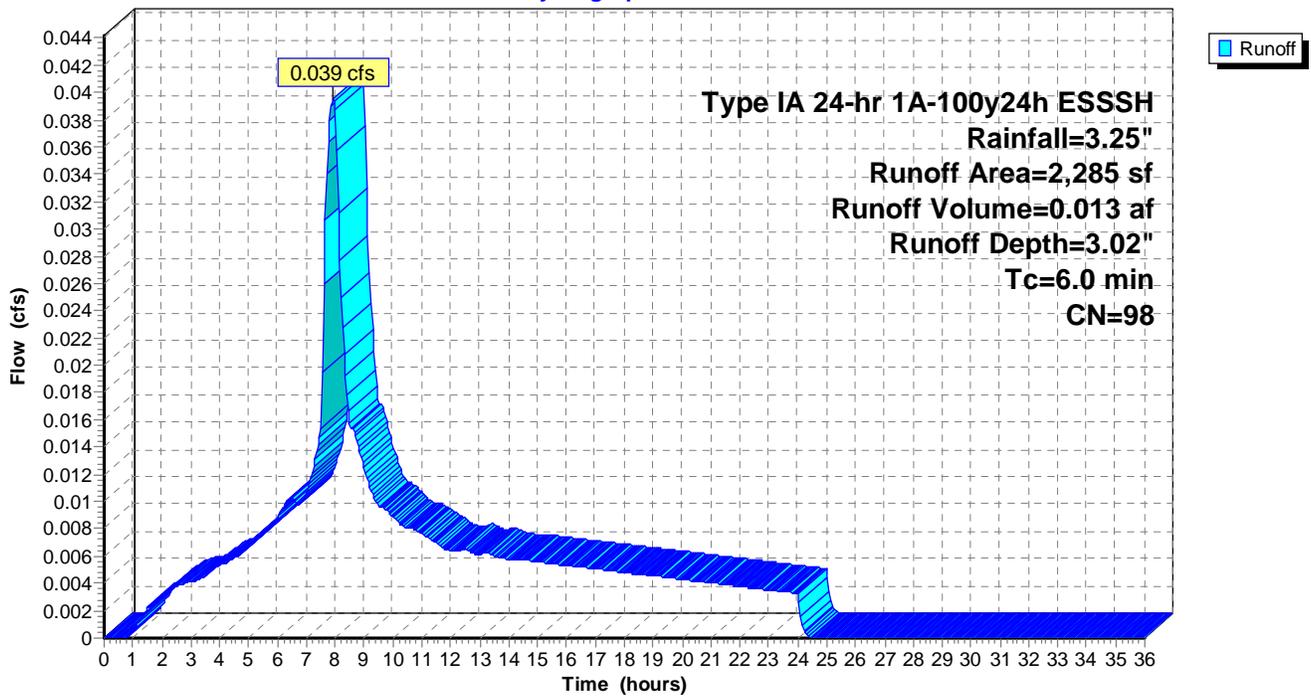
Runoff by SBUH method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 1A-100y24h ESSSH Rainfall=3.25"

Area (sf)	CN	Description
2,285	98	Paved parking & roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 101S: IMPERV

Hydrograph



Hydrograph for Subcatchment 101S: IMPERV

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.000	14.75	2.47	2.24	0.006	29.50	3.25	3.02	0.000
0.25	0.02	0.00	0.000	15.00	2.50	2.27	0.006	29.75	3.25	3.02	0.000
0.50	0.03	0.00	0.000	15.25	2.53	2.30	0.006	30.00	3.25	3.02	0.000
0.75	0.05	0.00	0.000	15.50	2.55	2.32	0.005	30.25	3.25	3.02	0.000
1.00	0.06	0.00	0.001	15.75	2.58	2.35	0.005	30.50	3.25	3.02	0.000
1.25	0.09	0.01	0.001	16.00	2.60	2.37	0.005	30.75	3.25	3.02	0.000
1.50	0.11	0.02	0.002	16.25	2.63	2.40	0.005	31.00	3.25	3.02	0.000
1.75	0.14	0.03	0.003	16.50	2.65	2.42	0.005	31.25	3.25	3.02	0.000
2.00	0.16	0.05	0.003	16.75	2.68	2.45	0.005	31.50	3.25	3.02	0.000
2.25	0.19	0.06	0.003	17.00	2.70	2.47	0.005	31.75	3.25	3.02	0.000
2.50	0.21	0.08	0.004	17.25	2.73	2.49	0.005	32.00	3.25	3.02	0.000
2.75	0.24	0.10	0.004	17.50	2.75	2.52	0.005	32.25	3.25	3.02	0.000
3.00	0.27	0.12	0.004	17.75	2.77	2.54	0.005	32.50	3.25	3.02	0.000
3.25	0.29	0.14	0.004	18.00	2.79	2.56	0.005	32.75	3.25	3.02	0.000
3.50	0.32	0.16	0.005	18.25	2.82	2.59	0.005	33.00	3.25	3.02	0.000
3.75	0.35	0.18	0.005	18.50	2.84	2.61	0.005	33.25	3.25	3.02	0.000
4.00	0.38	0.21	0.005	18.75	2.86	2.63	0.005	33.50	3.25	3.02	0.000
4.25	0.41	0.24	0.006	19.00	2.88	2.65	0.005	33.75	3.25	3.02	0.000
4.50	0.44	0.26	0.006	19.25	2.90	2.67	0.004	34.00	3.25	3.02	0.000
4.75	0.47	0.29	0.006	19.50	2.93	2.69	0.004	34.25	3.25	3.02	0.000
5.00	0.51	0.32	0.007	19.75	2.95	2.71	0.004	34.50	3.25	3.02	0.000
5.25	0.54	0.36	0.007	20.00	2.97	2.73	0.004	34.75	3.25	3.02	0.000
5.50	0.59	0.40	0.008	20.25	2.99	2.75	0.004	35.00	3.25	3.02	0.000
5.75	0.63	0.43	0.008	20.50	3.01	2.77	0.004	35.25	3.25	3.02	0.000
6.00	0.67	0.47	0.009	20.75	3.03	2.79	0.004	35.50	3.25	3.02	0.000
6.25	0.72	0.52	0.010	21.00	3.04	2.81	0.004	35.75	3.25	3.02	0.000
6.50	0.77	0.57	0.010	21.25	3.06	2.83	0.004	36.00	3.25	3.02	0.000
6.75	0.82	0.62	0.010	21.50	3.08	2.85	0.004				
7.00	0.87	0.67	0.011	21.75	3.10	2.87	0.004				
7.25	0.93	0.73	0.013	22.00	3.12	2.89	0.004				
7.50	1.01	0.80	0.015	22.25	3.14	2.90	0.004				
7.75	1.19	0.98	0.036	22.50	3.15	2.92	0.004				
8.00	1.38	1.16	0.039	22.75	3.17	2.94	0.004				
8.25	1.49	1.27	0.023	23.00	3.19	2.95	0.004				
8.50	1.56	1.34	0.016	23.25	3.20	2.97	0.003				
8.75	1.63	1.41	0.014	23.50	3.22	2.99	0.003				
9.00	1.69	1.47	0.013	23.75	3.23	3.00	0.003				
9.25	1.74	1.52	0.011	24.00	3.25	3.02	0.003				
9.50	1.79	1.56	0.010	24.25	3.25	3.02	0.000				
9.75	1.83	1.61	0.009	24.50	3.25	3.02	0.000				
10.00	1.88	1.65	0.009	24.75	3.25	3.02	0.000				
10.25	1.92	1.69	0.008	25.00	3.25	3.02	0.000				
10.50	1.95	1.73	0.008	25.25	3.25	3.02	0.000				
10.75	1.99	1.77	0.008	25.50	3.25	3.02	0.000				
11.00	2.03	1.80	0.008	25.75	3.25	3.02	0.000				
11.25	2.06	1.84	0.007	26.00	3.25	3.02	0.000				
11.50	2.10	1.87	0.007	26.25	3.25	3.02	0.000				
11.75	2.13	1.90	0.007	26.50	3.25	3.02	0.000				
12.00	2.16	1.93	0.006	26.75	3.25	3.02	0.000				
12.25	2.19	1.96	0.006	27.00	3.25	3.02	0.000				
12.50	2.22	1.99	0.007	27.25	3.25	3.02	0.000				
12.75	2.25	2.02	0.006	27.50	3.25	3.02	0.000				
13.00	2.28	2.05	0.006	27.75	3.25	3.02	0.000				
13.25	2.31	2.08	0.006	28.00	3.25	3.02	0.000				
13.50	2.34	2.11	0.006	28.25	3.25	3.02	0.000				
13.75	2.36	2.14	0.006	28.50	3.25	3.02	0.000				
14.00	2.39	2.16	0.006	28.75	3.25	3.02	0.000				
14.25	2.42	2.19	0.006	29.00	3.25	3.02	0.000				
14.50	2.45	2.22	0.006	29.25	3.25	3.02	0.000				

Subcatchment 102S: PERV

Runoff = 0.030 cfs @ 7.99 hrs, Volume= 0.011 af, Depth= 1.44"

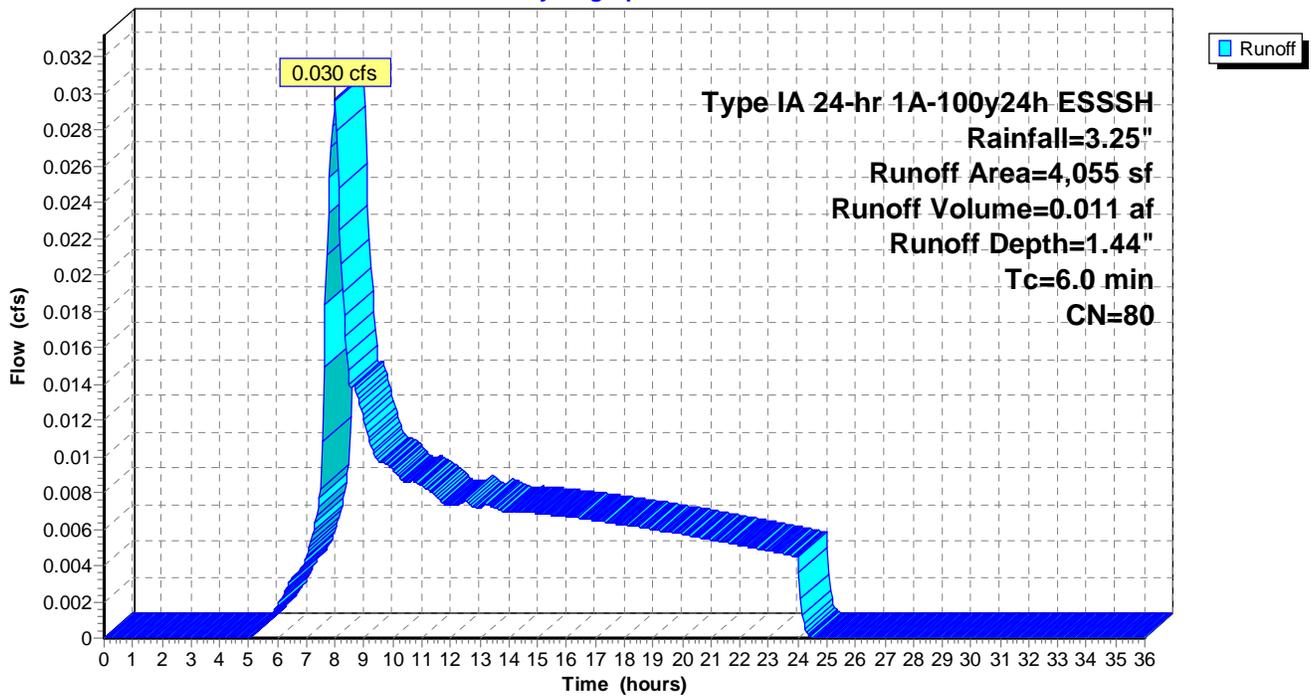
Runoff by SBUH method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 1A-100y24h ESSSH Rainfall=3.25"

Area (sf)	CN	Description
4,055	80	Open Space Good Condition

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 102S: PERV

Hydrograph



Hydrograph for Subcatchment 102S: PERV

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.000	14.75	2.47	0.87	0.007	29.50	3.25	1.44	0.000
0.25	0.02	0.00	0.000	15.00	2.50	0.89	0.007	29.75	3.25	1.44	0.000
0.50	0.03	0.00	0.000	15.25	2.53	0.91	0.007	30.00	3.25	1.44	0.000
0.75	0.05	0.00	0.000	15.50	2.55	0.93	0.007	30.25	3.25	1.44	0.000
1.00	0.06	0.00	0.000	15.75	2.58	0.94	0.007	30.50	3.25	1.44	0.000
1.25	0.09	0.00	0.000	16.00	2.60	0.96	0.007	30.75	3.25	1.44	0.000
1.50	0.11	0.00	0.000	16.25	2.63	0.98	0.007	31.00	3.25	1.44	0.000
1.75	0.14	0.00	0.000	16.50	2.65	1.00	0.007	31.25	3.25	1.44	0.000
2.00	0.16	0.00	0.000	16.75	2.68	1.01	0.007	31.50	3.25	1.44	0.000
2.25	0.19	0.00	0.000	17.00	2.70	1.03	0.006	31.75	3.25	1.44	0.000
2.50	0.21	0.00	0.000	17.25	2.73	1.05	0.006	32.00	3.25	1.44	0.000
2.75	0.24	0.00	0.000	17.50	2.75	1.06	0.006	32.25	3.25	1.44	0.000
3.00	0.27	0.00	0.000	17.75	2.77	1.08	0.006	32.50	3.25	1.44	0.000
3.25	0.29	0.00	0.000	18.00	2.79	1.10	0.006	32.75	3.25	1.44	0.000
3.50	0.32	0.00	0.000	18.25	2.82	1.11	0.006	33.00	3.25	1.44	0.000
3.75	0.35	0.00	0.000	18.50	2.84	1.13	0.006	33.25	3.25	1.44	0.000
4.00	0.38	0.00	0.000	18.75	2.86	1.15	0.006	33.50	3.25	1.44	0.000
4.25	0.41	0.00	0.000	19.00	2.88	1.16	0.006	33.75	3.25	1.44	0.000
4.50	0.44	0.00	0.000	19.25	2.90	1.18	0.006	34.00	3.25	1.44	0.000
4.75	0.47	0.00	0.000	19.50	2.93	1.19	0.006	34.25	3.25	1.44	0.000
5.00	0.51	0.00	0.000	19.75	2.95	1.21	0.006	34.50	3.25	1.44	0.000
5.25	0.54	0.00	0.000	20.00	2.97	1.22	0.006	34.75	3.25	1.44	0.000
5.50	0.59	0.00	0.001	20.25	2.99	1.24	0.006	35.00	3.25	1.44	0.000
5.75	0.63	0.01	0.001	20.50	3.01	1.25	0.006	35.25	3.25	1.44	0.000
6.00	0.67	0.01	0.002	20.75	3.03	1.27	0.005	35.50	3.25	1.44	0.000
6.25	0.72	0.02	0.003	21.00	3.04	1.28	0.005	35.75	3.25	1.44	0.000
6.50	0.77	0.03	0.003	21.25	3.06	1.30	0.005	36.00	3.25	1.44	0.000
6.75	0.82	0.04	0.004	21.50	3.08	1.31	0.005				
7.00	0.87	0.05	0.005	21.75	3.10	1.33	0.005				
7.25	0.93	0.06	0.006	22.00	3.12	1.34	0.005				
7.50	1.01	0.09	0.008	22.25	3.14	1.35	0.005				
7.75	1.19	0.15	0.023	22.50	3.15	1.37	0.005				
8.00	1.38	0.23	0.030	22.75	3.17	1.38	0.005				
8.25	1.49	0.28	0.019	23.00	3.19	1.39	0.005				
8.50	1.56	0.32	0.014	23.25	3.20	1.40	0.005				
8.75	1.63	0.35	0.013	23.50	3.22	1.42	0.005				
9.00	1.69	0.38	0.012	23.75	3.23	1.43	0.005				
9.25	1.74	0.41	0.011	24.00	3.25	1.44	0.004				
9.50	1.79	0.44	0.010	24.25	3.25	1.44	0.000				
9.75	1.83	0.46	0.010	24.50	3.25	1.44	0.000				
10.00	1.88	0.49	0.009	24.75	3.25	1.44	0.000				
10.25	1.92	0.51	0.009	25.00	3.25	1.44	0.000				
10.50	1.95	0.53	0.009	25.25	3.25	1.44	0.000				
10.75	1.99	0.56	0.009	25.50	3.25	1.44	0.000				
11.00	2.03	0.58	0.008	25.75	3.25	1.44	0.000				
11.25	2.06	0.60	0.008	26.00	3.25	1.44	0.000				
11.50	2.10	0.62	0.008	26.25	3.25	1.44	0.000				
11.75	2.13	0.64	0.007	26.50	3.25	1.44	0.000				
12.00	2.16	0.66	0.007	26.75	3.25	1.44	0.000				
12.25	2.19	0.68	0.007	27.00	3.25	1.44	0.000				
12.50	2.22	0.70	0.008	27.25	3.25	1.44	0.000				
12.75	2.25	0.72	0.007	27.50	3.25	1.44	0.000				
13.00	2.28	0.74	0.007	27.75	3.25	1.44	0.000				
13.25	2.31	0.76	0.007	28.00	3.25	1.44	0.000				
13.50	2.34	0.78	0.007	28.25	3.25	1.44	0.000				
13.75	2.36	0.80	0.007	28.50	3.25	1.44	0.000				
14.00	2.39	0.82	0.007	28.75	3.25	1.44	0.000				
14.25	2.42	0.83	0.007	29.00	3.25	1.44	0.000				
14.50	2.45	0.85	0.007	29.25	3.25	1.44	0.000				

Subcatchment 103S: IMPERV

Runoff = 0.459 cfs @ 7.92 hrs, Volume= 0.154 af, Depth= 3.02"

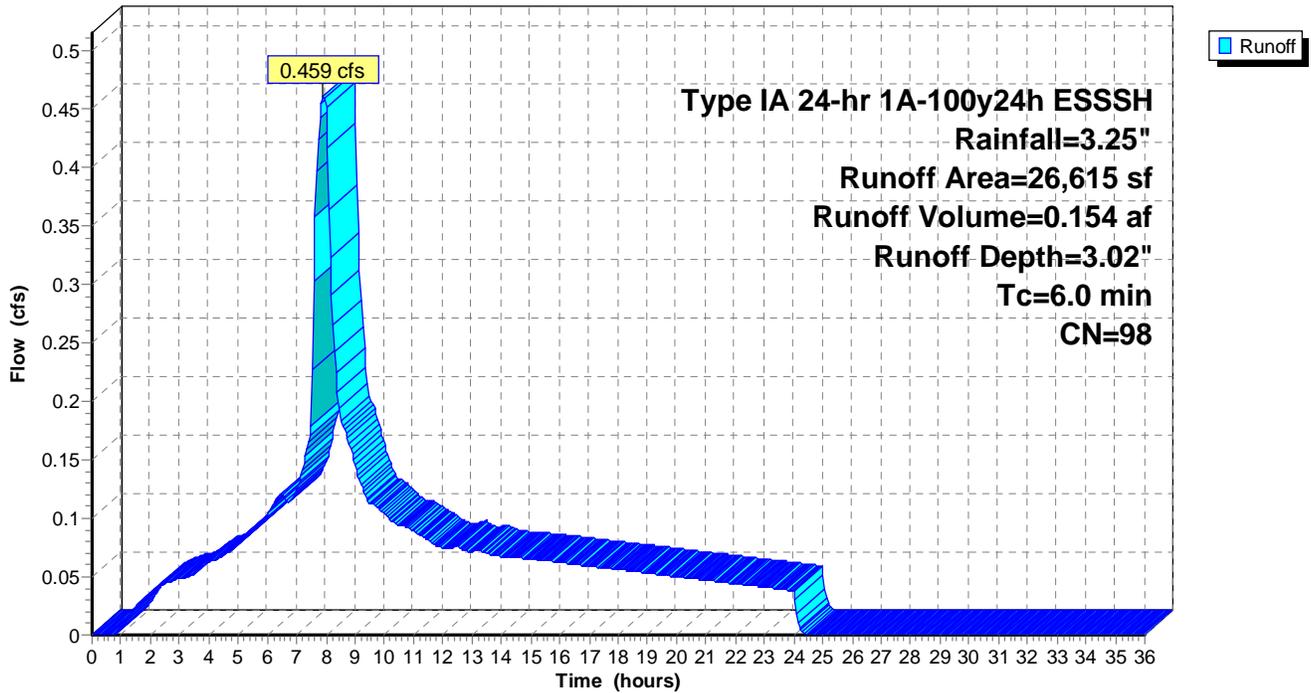
Runoff by SBUH method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 1A-100y24h ESSSH Rainfall=3.25"

Area (sf)	CN	Description
11,079	98	Roofs
15,536	98	Paved Parking
26,615	98	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 103S: IMPERV

Hydrograph



Hydrograph for Subcatchment 103S: IMPERV

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.000	14.75	2.47	2.24	0.066	29.50	3.25	3.02	0.000
0.25	0.02	0.00	0.000	15.00	2.50	2.27	0.065	29.75	3.25	3.02	0.000
0.50	0.03	0.00	0.000	15.25	2.53	2.30	0.064	30.00	3.25	3.02	0.000
0.75	0.05	0.00	0.001	15.50	2.55	2.32	0.064	30.25	3.25	3.02	0.000
1.00	0.06	0.00	0.006	15.75	2.58	2.35	0.063	30.50	3.25	3.02	0.000
1.25	0.09	0.01	0.016	16.00	2.60	2.37	0.062	30.75	3.25	3.02	0.000
1.50	0.11	0.02	0.025	16.25	2.63	2.40	0.061	31.00	3.25	3.02	0.000
1.75	0.14	0.03	0.030	16.50	2.65	2.42	0.061	31.25	3.25	3.02	0.000
2.00	0.16	0.05	0.035	16.75	2.68	2.45	0.060	31.50	3.25	3.02	0.000
2.25	0.19	0.06	0.040	17.00	2.70	2.47	0.059	31.75	3.25	3.02	0.000
2.50	0.21	0.08	0.044	17.25	2.73	2.49	0.058	32.00	3.25	3.02	0.000
2.75	0.24	0.10	0.047	17.50	2.75	2.52	0.058	32.25	3.25	3.02	0.000
3.00	0.27	0.12	0.049	17.75	2.77	2.54	0.057	32.50	3.25	3.02	0.000
3.25	0.29	0.14	0.050	18.00	2.79	2.56	0.056	32.75	3.25	3.02	0.000
3.50	0.32	0.16	0.053	18.25	2.82	2.59	0.055	33.00	3.25	3.02	0.000
3.75	0.35	0.18	0.058	18.50	2.84	2.61	0.055	33.25	3.25	3.02	0.000
4.00	0.38	0.21	0.062	18.75	2.86	2.63	0.054	33.50	3.25	3.02	0.000
4.25	0.41	0.24	0.065	19.00	2.88	2.65	0.053	33.75	3.25	3.02	0.000
4.50	0.44	0.26	0.068	19.25	2.90	2.67	0.052	34.00	3.25	3.02	0.000
4.75	0.47	0.29	0.073	19.50	2.93	2.69	0.051	34.25	3.25	3.02	0.000
5.00	0.51	0.32	0.078	19.75	2.95	2.71	0.051	34.50	3.25	3.02	0.000
5.25	0.54	0.36	0.085	20.00	2.97	2.73	0.050	34.75	3.25	3.02	0.000
5.50	0.59	0.40	0.091	20.25	2.99	2.75	0.049	35.00	3.25	3.02	0.000
5.75	0.63	0.43	0.094	20.50	3.01	2.77	0.048	35.25	3.25	3.02	0.000
6.00	0.67	0.47	0.101	20.75	3.03	2.79	0.048	35.50	3.25	3.02	0.000
6.25	0.72	0.52	0.114	21.00	3.04	2.81	0.047	35.75	3.25	3.02	0.000
6.50	0.77	0.57	0.120	21.25	3.06	2.83	0.046	36.00	3.25	3.02	0.000
6.75	0.82	0.62	0.114	21.50	3.08	2.85	0.045				
7.00	0.87	0.67	0.125	21.75	3.10	2.87	0.045				
7.25	0.93	0.73	0.147	22.00	3.12	2.89	0.044				
7.50	1.01	0.80	0.179	22.25	3.14	2.90	0.043				
7.75	1.19	0.98	0.424	22.50	3.15	2.92	0.042				
8.00	1.38	1.16	0.451	22.75	3.17	2.94	0.042				
8.25	1.49	1.27	0.264	23.00	3.19	2.95	0.041				
8.50	1.56	1.34	0.182	23.25	3.20	2.97	0.040				
8.75	1.63	1.41	0.169	23.50	3.22	2.99	0.039				
9.00	1.69	1.47	0.146	23.75	3.23	3.00	0.039				
9.25	1.74	1.52	0.126	24.00	3.25	3.02	0.038				
9.50	1.79	1.56	0.113	24.25	3.25	3.02	0.004				
9.75	1.83	1.61	0.110	24.50	3.25	3.02	0.000				
10.00	1.88	1.65	0.104	24.75	3.25	3.02	0.000				
10.25	1.92	1.69	0.097	25.00	3.25	3.02	0.000				
10.50	1.95	1.73	0.093	25.25	3.25	3.02	0.000				
10.75	1.99	1.77	0.093	25.50	3.25	3.02	0.000				
11.00	2.03	1.80	0.089	25.75	3.25	3.02	0.000				
11.25	2.06	1.84	0.085	26.00	3.25	3.02	0.000				
11.50	2.10	1.87	0.081	26.25	3.25	3.02	0.000				
11.75	2.13	1.90	0.077	26.50	3.25	3.02	0.000				
12.00	2.16	1.93	0.075	26.75	3.25	3.02	0.000				
12.25	2.19	1.96	0.075	27.00	3.25	3.02	0.000				
12.50	2.22	1.99	0.077	27.25	3.25	3.02	0.000				
12.75	2.25	2.02	0.072	27.50	3.25	3.02	0.000				
13.00	2.28	2.05	0.071	27.75	3.25	3.02	0.000				
13.25	2.31	2.08	0.073	28.00	3.25	3.02	0.000				
13.50	2.34	2.11	0.070	28.25	3.25	3.02	0.000				
13.75	2.36	2.14	0.068	28.50	3.25	3.02	0.000				
14.00	2.39	2.16	0.067	28.75	3.25	3.02	0.000				
14.25	2.42	2.19	0.067	29.00	3.25	3.02	0.000				
14.50	2.45	2.22	0.067	29.25	3.25	3.02	0.000				

Subcatchment 104S: PERV

Runoff = 0.077 cfs @ 7.99 hrs, Volume= 0.029 af, Depth= 1.44"

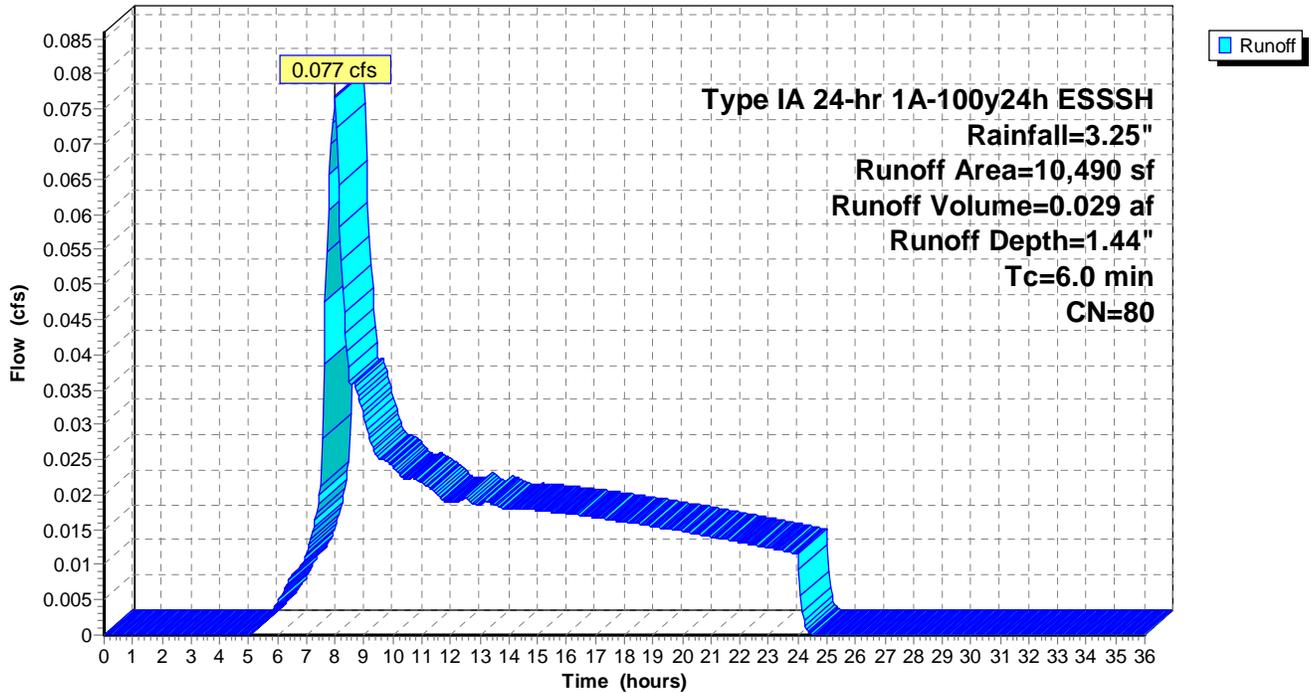
Runoff by SBUH method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 1A-100y24h ESSSH Rainfall=3.25"

Area (sf)	CN	Description
10,490	80	Open Space Good Condition

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 104S: PERV

Hydrograph



Hydrograph for Subcatchment 104S: PERV

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.000	14.75	2.47	0.87	0.018	29.50	3.25	1.44	0.000
0.25	0.02	0.00	0.000	15.00	2.50	0.89	0.018	29.75	3.25	1.44	0.000
0.50	0.03	0.00	0.000	15.25	2.53	0.91	0.018	30.00	3.25	1.44	0.000
0.75	0.05	0.00	0.000	15.50	2.55	0.93	0.018	30.25	3.25	1.44	0.000
1.00	0.06	0.00	0.000	15.75	2.58	0.94	0.017	30.50	3.25	1.44	0.000
1.25	0.09	0.00	0.000	16.00	2.60	0.96	0.017	30.75	3.25	1.44	0.000
1.50	0.11	0.00	0.000	16.25	2.63	0.98	0.017	31.00	3.25	1.44	0.000
1.75	0.14	0.00	0.000	16.50	2.65	1.00	0.017	31.25	3.25	1.44	0.000
2.00	0.16	0.00	0.000	16.75	2.68	1.01	0.017	31.50	3.25	1.44	0.000
2.25	0.19	0.00	0.000	17.00	2.70	1.03	0.017	31.75	3.25	1.44	0.000
2.50	0.21	0.00	0.000	17.25	2.73	1.05	0.017	32.00	3.25	1.44	0.000
2.75	0.24	0.00	0.000	17.50	2.75	1.06	0.016	32.25	3.25	1.44	0.000
3.00	0.27	0.00	0.000	17.75	2.77	1.08	0.016	32.50	3.25	1.44	0.000
3.25	0.29	0.00	0.000	18.00	2.79	1.10	0.016	32.75	3.25	1.44	0.000
3.50	0.32	0.00	0.000	18.25	2.82	1.11	0.016	33.00	3.25	1.44	0.000
3.75	0.35	0.00	0.000	18.50	2.84	1.13	0.016	33.25	3.25	1.44	0.000
4.00	0.38	0.00	0.000	18.75	2.86	1.15	0.016	33.50	3.25	1.44	0.000
4.25	0.41	0.00	0.000	19.00	2.88	1.16	0.015	33.75	3.25	1.44	0.000
4.50	0.44	0.00	0.000	19.25	2.90	1.18	0.015	34.00	3.25	1.44	0.000
4.75	0.47	0.00	0.000	19.50	2.93	1.19	0.015	34.25	3.25	1.44	0.000
5.00	0.51	0.00	0.000	19.75	2.95	1.21	0.015	34.50	3.25	1.44	0.000
5.25	0.54	0.00	0.001	20.00	2.97	1.22	0.015	34.75	3.25	1.44	0.000
5.50	0.59	0.00	0.002	20.25	2.99	1.24	0.015	35.00	3.25	1.44	0.000
5.75	0.63	0.01	0.003	20.50	3.01	1.25	0.014	35.25	3.25	1.44	0.000
6.00	0.67	0.01	0.005	20.75	3.03	1.27	0.014	35.50	3.25	1.44	0.000
6.25	0.72	0.02	0.007	21.00	3.04	1.28	0.014	35.75	3.25	1.44	0.000
6.50	0.77	0.03	0.008	21.25	3.06	1.30	0.014	36.00	3.25	1.44	0.000
6.75	0.82	0.04	0.009	21.50	3.08	1.31	0.014				
7.00	0.87	0.05	0.012	21.75	3.10	1.33	0.013				
7.25	0.93	0.06	0.015	22.00	3.12	1.34	0.013				
7.50	1.01	0.09	0.021	22.25	3.14	1.35	0.013				
7.75	1.19	0.15	0.061	22.50	3.15	1.37	0.013				
8.00	1.38	0.23	0.076	22.75	3.17	1.38	0.013				
8.25	1.49	0.28	0.049	23.00	3.19	1.39	0.012				
8.50	1.56	0.32	0.036	23.25	3.20	1.40	0.012				
8.75	1.63	0.35	0.035	23.50	3.22	1.42	0.012				
9.00	1.69	0.38	0.031	23.75	3.23	1.43	0.012				
9.25	1.74	0.41	0.027	24.00	3.25	1.44	0.012				
9.50	1.79	0.44	0.025	24.25	3.25	1.44	0.001				
9.75	1.83	0.46	0.025	24.50	3.25	1.44	0.000				
10.00	1.88	0.49	0.024	24.75	3.25	1.44	0.000				
10.25	1.92	0.51	0.023	25.00	3.25	1.44	0.000				
10.50	1.95	0.53	0.022	25.25	3.25	1.44	0.000				
10.75	1.99	0.56	0.022	25.50	3.25	1.44	0.000				
11.00	2.03	0.58	0.022	25.75	3.25	1.44	0.000				
11.25	2.06	0.60	0.021	26.00	3.25	1.44	0.000				
11.50	2.10	0.62	0.020	26.25	3.25	1.44	0.000				
11.75	2.13	0.64	0.019	26.50	3.25	1.44	0.000				
12.00	2.16	0.66	0.019	26.75	3.25	1.44	0.000				
12.25	2.19	0.68	0.019	27.00	3.25	1.44	0.000				
12.50	2.22	0.70	0.020	27.25	3.25	1.44	0.000				
12.75	2.25	0.72	0.019	27.50	3.25	1.44	0.000				
13.00	2.28	0.74	0.019	27.75	3.25	1.44	0.000				
13.25	2.31	0.76	0.019	28.00	3.25	1.44	0.000				
13.50	2.34	0.78	0.019	28.25	3.25	1.44	0.000				
13.75	2.36	0.80	0.018	28.50	3.25	1.44	0.000				
14.00	2.39	0.82	0.018	28.75	3.25	1.44	0.000				
14.25	2.42	0.83	0.018	29.00	3.25	1.44	0.000				
14.50	2.45	0.85	0.018	29.25	3.25	1.44	0.000				

Pond 105P: Underground Det

Inflow Area = 0.852 ac, Inflow Depth = 2.57" for 1A-100y24h ESSSH event
 Inflow = 0.534 cfs @ 7.93 hrs, Volume= 0.183 af
 Outflow = 0.134 cfs @ 9.77 hrs, Volume= 0.127 af, Atten= 75%, Lag= 110.3 min
 Primary = 0.027 cfs @ 9.77 hrs, Volume= 0.065 af
 Secondary = 0.107 cfs @ 9.77 hrs, Volume= 0.063 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Peak Elev= 414.19' @ 9.77 hrs Surf.Area= 0.010 ac Storage= 0.079 af
 Plug-Flow detention time= 567.0 min calculated for 0.127 af (70% of inflow)
 Center-of-Mass det. time= 380.7 min (1,072.1 - 691.4)

Volume	Invert	Avail.Storage	Storage Description
#1	410.00'	0.003 af	4.50'D x 9.00'H Vertical Cone/Cylinder North
#2	410.00'	0.003 af	4.50'D x 8.10'H Vertical Cone/Cylinder South
#3	409.50'	0.078 af	60.0"D x 58.00'L Horizontal Cylinder x 3
		0.085 af	Total Available Storage

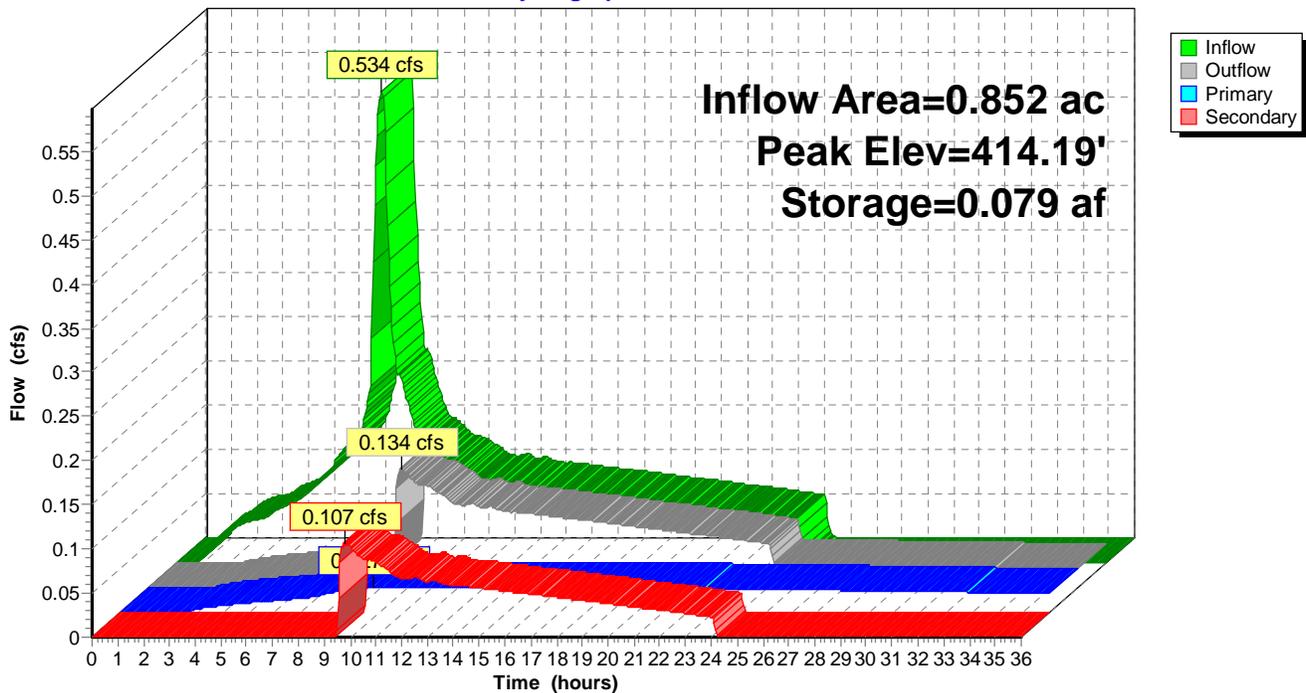
Device	Routing	Invert	Outlet Devices
#1	Secondary	414.12'	6.0" Horiz. Orifice/Grate Limited to weir flow C= 0.620
#2	Primary	410.00'	0.7" Horiz. Orifice C= 0.620

Primary OutFlow Max=0.027 cfs @ 9.77 hrs HW=414.19' (Free Discharge)
 ↳2=Orifice (Orifice Controls 0.027 cfs @ 10.1828 fps)

Secondary OutFlow Max=0.092 cfs @ 9.77 hrs HW=414.19' (Free Discharge)
 ↳1=Orifice/Grate (Weir Controls 0.092 cfs @ 0.8561 fps)

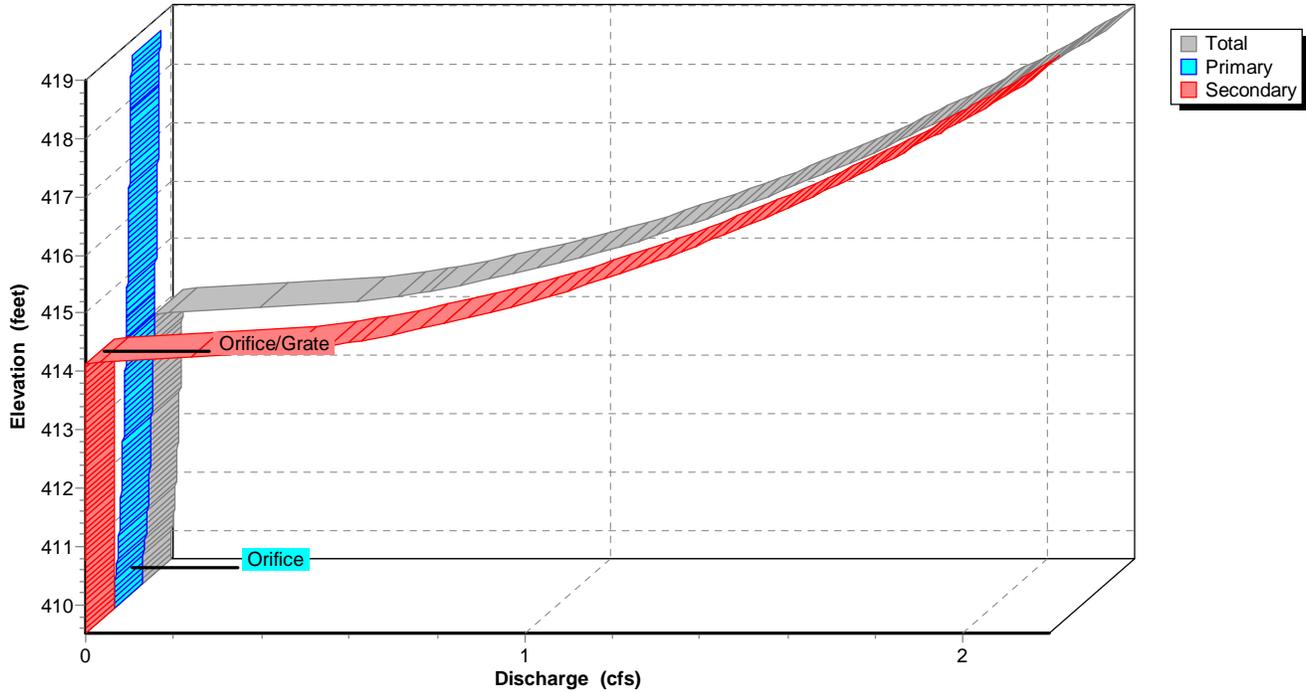
Pond 105P: Underground Det

Hydrograph



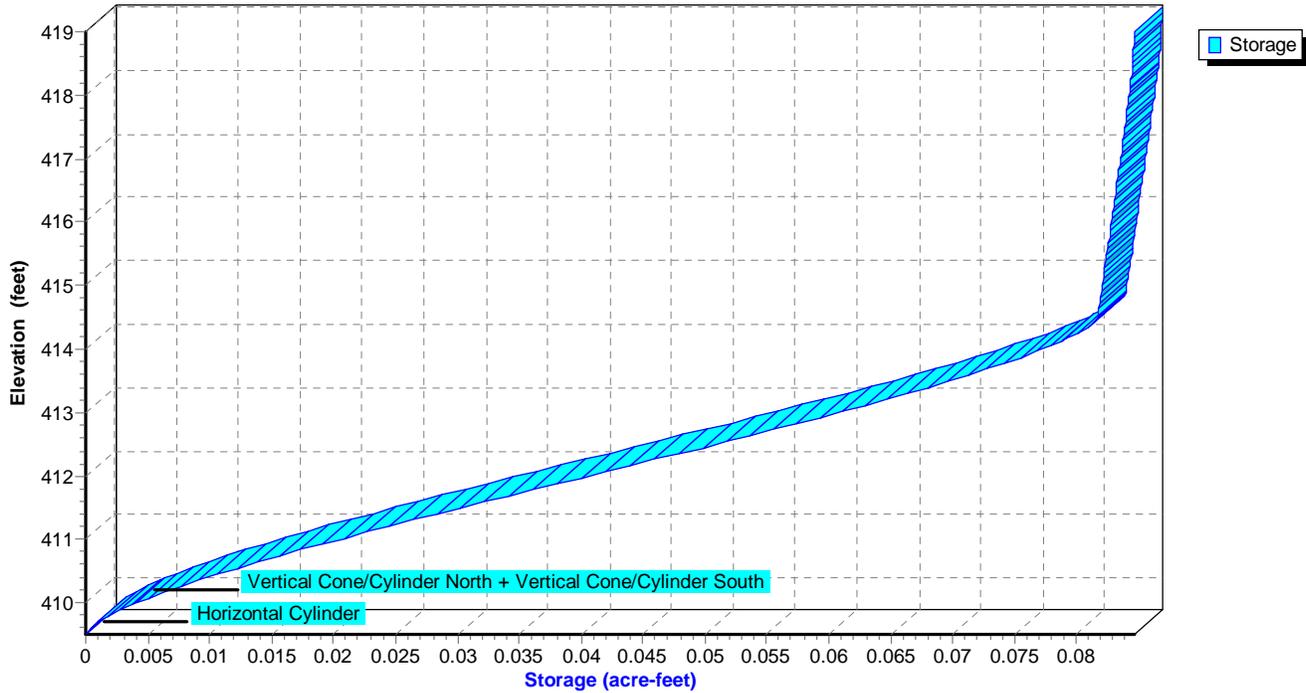
Pond 105P: Underground Det

Stage-Discharge



Pond 105P: Underground Det

Stage-Area-Storage



Hydrograph for Pond 105P: Underground Det

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.000	0.000	409.50	0.000	0.000	0.000
1.00	0.006	0.000	409.52	0.000	0.000	0.000
2.00	0.035	0.002	409.80	0.000	0.000	0.000
3.00	0.049	0.005	410.10	0.004	0.004	0.000
4.00	0.062	0.009	410.37	0.008	0.008	0.000
5.00	0.078	0.014	410.66	0.011	0.011	0.000
6.00	0.106	0.021	411.02	0.013	0.013	0.000
7.00	0.137	0.030	411.47	0.016	0.016	0.000
8.00	0.528	0.053	412.62	0.022	0.022	0.000
9.00	0.177	0.074	413.73	0.026	0.026	0.000
10.00	0.128	0.079	414.19	0.129	0.027	0.102
11.00	0.111	0.079	414.18	0.112	0.027	0.085
12.00	0.093	0.079	414.17	0.094	0.027	0.067
13.00	0.090	0.079	414.17	0.090	0.027	0.063
14.00	0.085	0.079	414.17	0.085	0.027	0.058
15.00	0.083	0.079	414.17	0.083	0.027	0.056
16.00	0.079	0.079	414.16	0.080	0.027	0.052
17.00	0.076	0.079	414.16	0.076	0.027	0.049
18.00	0.072	0.079	414.16	0.072	0.027	0.045
19.00	0.068	0.079	414.16	0.069	0.027	0.042
20.00	0.065	0.079	414.16	0.065	0.027	0.038
21.00	0.061	0.079	414.16	0.061	0.027	0.034
22.00	0.057	0.079	414.15	0.058	0.027	0.031
23.00	0.053	0.079	414.15	0.054	0.027	0.027
24.00	0.049	0.079	414.14	0.050	0.027	0.023
25.00	0.000	0.077	413.98	0.027	0.027	0.000
26.00	0.000	0.075	413.82	0.026	0.026	0.000
27.00	0.000	0.073	413.68	0.026	0.026	0.000
28.00	0.000	0.071	413.55	0.025	0.025	0.000
29.00	0.000	0.069	413.43	0.025	0.025	0.000
30.00	0.000	0.067	413.31	0.024	0.024	0.000
31.00	0.000	0.065	413.20	0.024	0.024	0.000
32.00	0.000	0.063	413.10	0.023	0.023	0.000
33.00	0.000	0.061	412.99	0.023	0.023	0.000
34.00	0.000	0.059	412.90	0.023	0.023	0.000
35.00	0.000	0.057	412.80	0.022	0.022	0.000
36.00	0.000	0.055	412.71	0.022	0.022	0.000

Stage-Discharge for Pond 105P: Underground Det

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)	Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
409.50	0.000	0.000	0.000	415.40	1.136	0.031	1.105
409.60	0.000	0.000	0.000	415.50	1.179	0.031	1.148
409.70	0.000	0.000	0.000	415.60	1.220	0.031	1.188
409.80	0.000	0.000	0.000	415.70	1.260	0.032	1.228
409.90	0.000	0.000	0.000	415.80	1.298	0.032	1.266
410.00	0.000	0.000	0.000	415.90	1.336	0.032	1.303
410.10	0.004	0.004	0.000	416.00	1.372	0.033	1.340
410.20	0.006	0.006	0.000	416.10	1.408	0.033	1.375
410.30	0.007	0.007	0.000	416.20	1.442	0.033	1.409
410.40	0.008	0.008	0.000	416.30	1.476	0.033	1.442
410.50	0.009	0.009	0.000	416.40	1.509	0.034	1.475
410.60	0.010	0.010	0.000	416.50	1.541	0.034	1.507
410.70	0.011	0.011	0.000	416.60	1.573	0.034	1.538
410.80	0.012	0.012	0.000	416.70	1.604	0.034	1.569
410.90	0.013	0.013	0.000	416.80	1.634	0.035	1.599
411.00	0.013	0.013	0.000	416.90	1.664	0.035	1.629
411.10	0.014	0.014	0.000	417.00	1.693	0.035	1.658
411.20	0.015	0.015	0.000	417.10	1.722	0.035	1.686
411.30	0.015	0.015	0.000	417.20	1.750	0.036	1.715
411.40	0.016	0.016	0.000	417.30	1.778	0.036	1.742
411.50	0.016	0.016	0.000	417.40	1.805	0.036	1.769
411.60	0.017	0.017	0.000	417.50	1.832	0.036	1.796
411.70	0.017	0.017	0.000	417.60	1.859	0.037	1.822
411.80	0.018	0.018	0.000	417.70	1.885	0.037	1.848
411.90	0.018	0.018	0.000	417.80	1.911	0.037	1.874
412.00	0.019	0.019	0.000	417.90	1.937	0.037	1.899
412.10	0.019	0.019	0.000	418.00	1.962	0.038	1.924
412.20	0.020	0.020	0.000	418.10	1.987	0.038	1.949
412.30	0.020	0.020	0.000	418.20	2.011	0.038	1.973
412.40	0.021	0.021	0.000	418.30	2.036	0.038	1.997
412.50	0.021	0.021	0.000	418.40	2.060	0.039	2.021
412.60	0.021	0.021	0.000	418.50	2.083	0.039	2.045
412.70	0.022	0.022	0.000	418.60	2.107	0.039	2.068
412.80	0.022	0.022	0.000	418.70	2.130	0.039	2.091
412.90	0.023	0.023	0.000	418.80	2.153	0.039	2.113
413.00	0.023	0.023	0.000	418.90	2.176	0.040	2.136
413.10	0.023	0.023	0.000	419.00	2.198	0.040	2.158
413.20	0.024	0.024	0.000				
413.30	0.024	0.024	0.000				
413.40	0.025	0.025	0.000				
413.50	0.025	0.025	0.000				
413.60	0.025	0.025	0.000				
413.70	0.026	0.026	0.000				
413.80	0.026	0.026	0.000				
413.90	0.026	0.026	0.000				
414.00	0.027	0.027	0.000				
414.10	0.027	0.027	0.000				
414.20	0.143	0.027	0.116				
414.30	0.420	0.028	0.392				
414.40	0.545	0.028	0.517				
414.50	0.630	0.028	0.602				
414.60	0.705	0.029	0.677				
414.70	0.773	0.029	0.744				
414.80	0.835	0.029	0.806				
414.90	0.892	0.029	0.863				
415.00	0.946	0.030	0.916				
415.10	0.997	0.030	0.967				
415.20	1.046	0.030	1.015				
415.30	1.092	0.031	1.061				

Stage-Area-Storage for Pond 105P: Underground Det

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
409.50	0.000	415.40	0.082
409.60	0.000	415.50	0.082
409.70	0.001	415.60	0.083
409.80	0.002	415.70	0.083
409.90	0.003	415.80	0.083
410.00	0.004	415.90	0.083
410.10	0.005	416.00	0.083
410.20	0.007	416.10	0.083
410.30	0.008	416.20	0.083
410.40	0.010	416.30	0.083
410.50	0.012	416.40	0.083
410.60	0.013	416.50	0.083
410.70	0.015	416.60	0.083
410.80	0.017	416.70	0.083
410.90	0.019	416.80	0.083
411.00	0.021	416.90	0.083
411.10	0.022	417.00	0.084
411.20	0.024	417.10	0.084
411.30	0.026	417.20	0.084
411.40	0.028	417.30	0.084
411.50	0.030	417.40	0.084
411.60	0.032	417.50	0.084
411.70	0.034	417.60	0.084
411.80	0.037	417.70	0.084
411.90	0.039	417.80	0.084
412.00	0.041	417.90	0.084
412.10	0.043	418.00	0.084
412.20	0.045	418.10	0.084
412.30	0.047	418.20	0.084
412.40	0.049	418.30	0.084
412.50	0.051	418.40	0.084
412.60	0.053	418.50	0.084
412.70	0.055	418.60	0.085
412.80	0.057	418.70	0.085
412.90	0.059	418.80	0.085
413.00	0.061	418.90	0.085
413.10	0.063	419.00	0.085
413.20	0.065		
413.30	0.066		
413.40	0.068		
413.50	0.070		
413.60	0.071		
413.70	0.073		
413.80	0.075		
413.90	0.076		
414.00	0.077		
414.10	0.078		
414.20	0.080		
414.30	0.081		
414.40	0.081		
414.50	0.082		
414.60	0.082		
414.70	0.082		
414.80	0.082		
414.90	0.082		
415.00	0.082		
415.10	0.082		
415.20	0.082		
415.30	0.082		

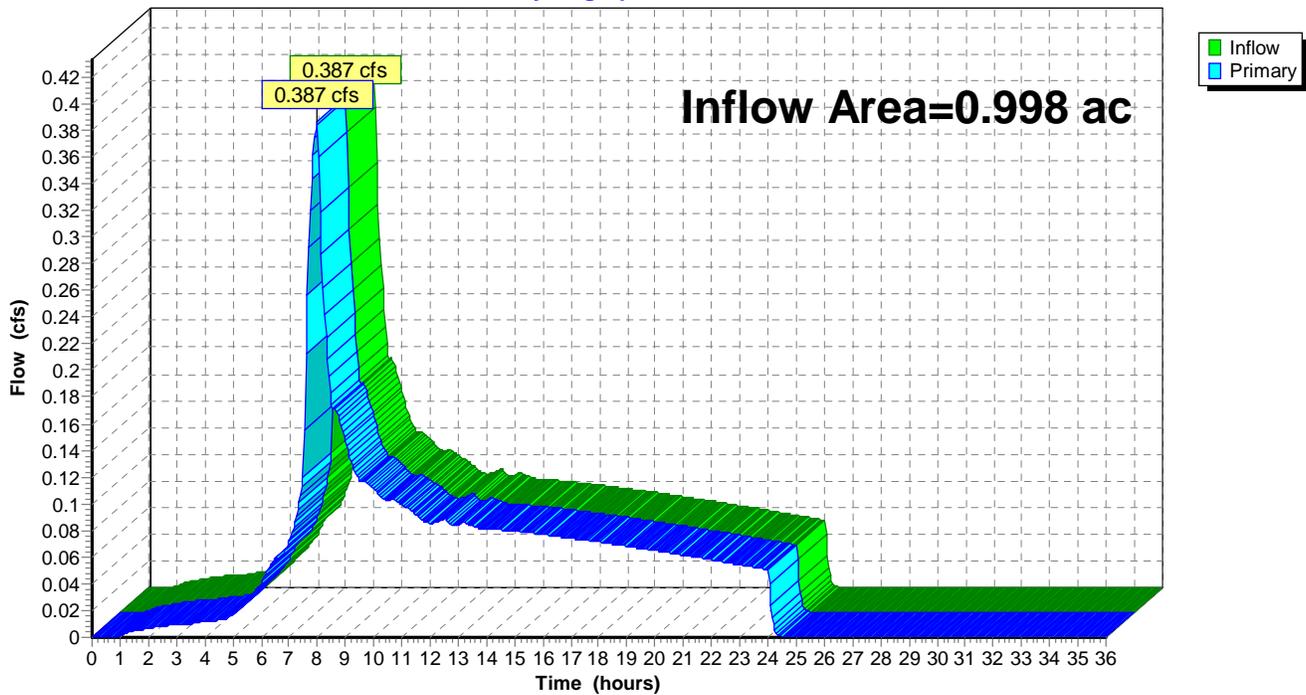
Link 1L: EXST

Inflow Area = 0.998 ac, Inflow Depth = 1.68" for 1A-100y24h ESSSH event
Inflow = 0.387 cfs @ 7.98 hrs, Volume= 0.140 af
Primary = 0.387 cfs @ 7.98 hrs, Volume= 0.140 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link 1L: EXST

Hydrograph



Hydrograph for Link 1L: EXST

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.000	0.00	0.000	29.50	0.000	0.00	0.000
0.50	0.000	0.00	0.000	30.00	0.000	0.00	0.000
1.00	0.001	0.00	0.001	30.50	0.000	0.00	0.000
1.50	0.005	0.00	0.005	31.00	0.000	0.00	0.000
2.00	0.007	0.00	0.007	31.50	0.000	0.00	0.000
2.50	0.008	0.00	0.008	32.00	0.000	0.00	0.000
3.00	0.009	0.00	0.009	32.50	0.000	0.00	0.000
3.50	0.010	0.00	0.010	33.00	0.000	0.00	0.000
4.00	0.012	0.00	0.012	33.50	0.000	0.00	0.000
4.50	0.013	0.00	0.013	34.00	0.000	0.00	0.000
5.00	0.017	0.00	0.017	34.50	0.000	0.00	0.000
5.50	0.028	0.00	0.028	35.00	0.000	0.00	0.000
6.00	0.040	0.00	0.040	35.50	0.000	0.00	0.000
6.50	0.059	0.00	0.059	36.00	0.000	0.00	0.000
7.00	0.072	0.00	0.072				
7.50	0.120	0.00	0.120				
8.00	0.384	0.00	0.384				
8.50	0.174	0.00	0.174				
9.00	0.147	0.00	0.147				
9.50	0.117	0.00	0.117				
10.00	0.111	0.00	0.111				
10.50	0.102	0.00	0.102				
11.00	0.100	0.00	0.100				
11.50	0.092	0.00	0.092				
12.00	0.086	0.00	0.086				
12.50	0.089	0.00	0.089				
13.00	0.084	0.00	0.084				
13.50	0.083	0.00	0.083				
14.00	0.081	0.00	0.081				
14.50	0.081	0.00	0.081				
15.00	0.079	0.00	0.079				
15.50	0.078	0.00	0.078				
16.00	0.077	0.00	0.077				
16.50	0.076	0.00	0.076				
17.00	0.074	0.00	0.074				
17.50	0.073	0.00	0.073				
18.00	0.071	0.00	0.071				
18.50	0.070	0.00	0.070				
19.00	0.068	0.00	0.068				
19.50	0.066	0.00	0.066				
20.00	0.065	0.00	0.065				
20.50	0.063	0.00	0.063				
21.00	0.061	0.00	0.061				
21.50	0.060	0.00	0.060				
22.00	0.058	0.00	0.058				
22.50	0.056	0.00	0.056				
23.00	0.054	0.00	0.054				
23.50	0.052	0.00	0.052				
24.00	0.051	0.00	0.051				
24.50	0.000	0.00	0.000				
25.00	0.000	0.00	0.000				
25.50	0.000	0.00	0.000				
26.00	0.000	0.00	0.000				
26.50	0.000	0.00	0.000				
27.00	0.000	0.00	0.000				
27.50	0.000	0.00	0.000				
28.00	0.000	0.00	0.000				
28.50	0.000	0.00	0.000				
29.00	0.000	0.00	0.000				

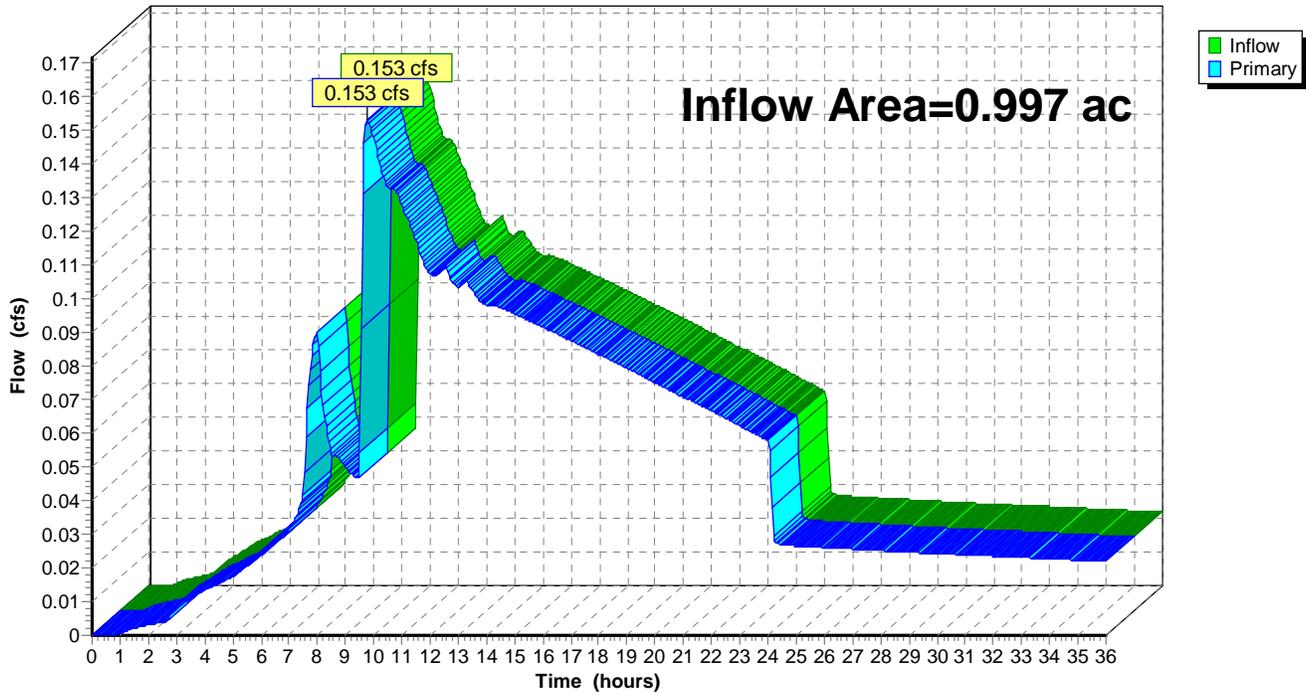
Link 2L: PROP

Inflow Area = 0.997 ac, Inflow Depth > 1.83" for 1A-100y24h ESSSH event
Inflow = 0.153 cfs @ 9.77 hrs, Volume= 0.152 af
Primary = 0.153 cfs @ 9.77 hrs, Volume= 0.152 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link 2L: PROP

Hydrograph



Hydrograph for Link 2L: PROP

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.000	0.00	0.000	29.50	0.024	0.00	0.024
0.50	0.000	0.00	0.000	30.00	0.024	0.00	0.024
1.00	0.001	0.00	0.001	30.50	0.024	0.00	0.024
1.50	0.002	0.00	0.002	31.00	0.024	0.00	0.024
2.00	0.003	0.00	0.003	31.50	0.024	0.00	0.024
2.50	0.004	0.00	0.004	32.00	0.023	0.00	0.023
3.00	0.008	0.00	0.008	32.50	0.023	0.00	0.023
3.50	0.011	0.00	0.011	33.00	0.023	0.00	0.023
4.00	0.013	0.00	0.013	33.50	0.023	0.00	0.023
4.50	0.015	0.00	0.015	34.00	0.023	0.00	0.023
5.00	0.018	0.00	0.018	34.50	0.022	0.00	0.022
5.50	0.021	0.00	0.021	35.00	0.022	0.00	0.022
6.00	0.024	0.00	0.024	35.50	0.022	0.00	0.022
6.50	0.028	0.00	0.028	36.00	0.022	0.00	0.022
7.00	0.031	0.00	0.031				
7.50	0.041	0.00	0.041				
8.00	0.090	0.00	0.090				
8.50	0.054	0.00	0.054				
9.00	0.050	0.00	0.050				
9.50	0.054	0.00	0.054				
10.00	0.148	0.00	0.148				
10.50	0.133	0.00	0.133				
11.00	0.128	0.00	0.128				
11.50	0.117	0.00	0.117				
12.00	0.107	0.00	0.107				
12.50	0.110	0.00	0.110				
13.00	0.103	0.00	0.103				
13.50	0.102	0.00	0.102				
14.00	0.098	0.00	0.098				
14.50	0.097	0.00	0.097				
15.00	0.095	0.00	0.095				
15.50	0.094	0.00	0.094				
16.00	0.092	0.00	0.092				
16.50	0.090	0.00	0.090				
17.00	0.088	0.00	0.088				
17.50	0.085	0.00	0.085				
18.00	0.083	0.00	0.083				
18.50	0.081	0.00	0.081				
19.00	0.079	0.00	0.079				
19.50	0.077	0.00	0.077				
20.00	0.075	0.00	0.075				
20.50	0.073	0.00	0.073				
21.00	0.071	0.00	0.071				
21.50	0.069	0.00	0.069				
22.00	0.067	0.00	0.067				
22.50	0.064	0.00	0.064				
23.00	0.062	0.00	0.062				
23.50	0.060	0.00	0.060				
24.00	0.058	0.00	0.058				
24.50	0.027	0.00	0.027				
25.00	0.027	0.00	0.027				
25.50	0.026	0.00	0.026				
26.00	0.026	0.00	0.026				
26.50	0.026	0.00	0.026				
27.00	0.026	0.00	0.026				
27.50	0.025	0.00	0.025				
28.00	0.025	0.00	0.025				
28.50	0.025	0.00	0.025				
29.00	0.025	0.00	0.025				

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points

Runoff by SBUH method

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: PERV

Runoff Area=38,436 sf Runoff Depth=0.77"
Tc=6.0 min CN=81 Runoff=0.130 cfs 0.057 af

Subcatchment 2S: IMPERV

Runoff Area=5,017 sf Runoff Depth=2.02"
Tc=6.0 min CN=98 Runoff=0.059 cfs 0.019 af

Subcatchment 101S: IMPERV

Runoff Area=2,285 sf Runoff Depth=2.02"
Tc=6.0 min CN=98 Runoff=0.027 cfs 0.009 af

Subcatchment 102S: PERV

Runoff Area=4,055 sf Runoff Depth=0.72"
Tc=6.0 min CN=80 Runoff=0.012 cfs 0.006 af

Subcatchment 103S: IMPERV

Runoff Area=26,615 sf Runoff Depth=2.02"
Tc=6.0 min CN=98 Runoff=0.312 cfs 0.103 af

Subcatchment 104S: PERV

Runoff Area=10,490 sf Runoff Depth=0.72"
Tc=6.0 min CN=80 Runoff=0.032 cfs 0.014 af

Pond 105P: Underground Det

Peak Elev=414.13' Storage=0.079 af Inflow=0.342 cfs 0.117 af
Primary=0.027 cfs 0.060 af Secondary=0.013 cfs 0.003 af Outflow=0.040 cfs 0.062 af

Link 1L: EXST

Inflow=0.188 cfs 0.076 af
Primary=0.188 cfs 0.076 af

Link 2L: PROP

Inflow=0.056 cfs 0.077 af
Primary=0.056 cfs 0.077 af

Total Runoff Area = 1.995 ac Runoff Volume = 0.208 af Average Runoff Depth = 1.25"

Subcatchment 1S: PERV

Runoff = 0.130 cfs @ 8.00 hrs, Volume= 0.057 af, Depth= 0.77"

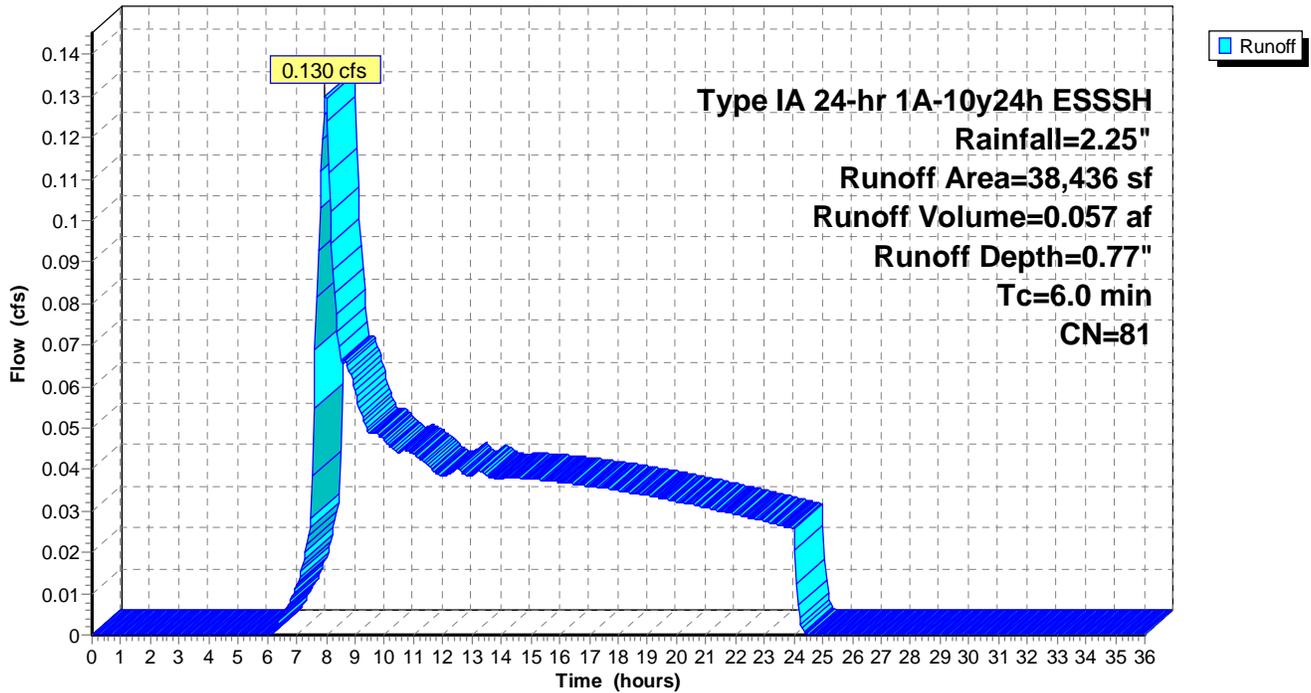
Runoff by SBUH method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 1A-10y24h ESSSH Rainfall=2.25"

Area (sf)	CN	Description
11,301	85	Gravel roads, HSG B
27,135	80	Open Space Good Condition
38,436	81	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S: PERV

Hydrograph



Hydrograph for Subcatchment 1S: PERV

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.000	14.75	1.71	0.43	0.038	29.50	2.25	0.77	0.000
0.25	0.01	0.00	0.000	15.00	1.73	0.44	0.038	29.75	2.25	0.77	0.000
0.50	0.02	0.00	0.000	15.25	1.75	0.45	0.037	30.00	2.25	0.77	0.000
0.75	0.03	0.00	0.000	15.50	1.77	0.46	0.037	30.25	2.25	0.77	0.000
1.00	0.04	0.00	0.000	15.75	1.78	0.47	0.037	30.50	2.25	0.77	0.000
1.25	0.06	0.00	0.000	16.00	1.80	0.48	0.037	30.75	2.25	0.77	0.000
1.50	0.08	0.00	0.000	16.25	1.82	0.49	0.037	31.00	2.25	0.77	0.000
1.75	0.10	0.00	0.000	16.50	1.84	0.50	0.036	31.25	2.25	0.77	0.000
2.00	0.11	0.00	0.000	16.75	1.85	0.51	0.036	31.50	2.25	0.77	0.000
2.25	0.13	0.00	0.000	17.00	1.87	0.52	0.036	31.75	2.25	0.77	0.000
2.50	0.15	0.00	0.000	17.25	1.89	0.53	0.036	32.00	2.25	0.77	0.000
2.75	0.17	0.00	0.000	17.50	1.90	0.54	0.035	32.25	2.25	0.77	0.000
3.00	0.18	0.00	0.000	17.75	1.92	0.55	0.035	32.50	2.25	0.77	0.000
3.25	0.20	0.00	0.000	18.00	1.93	0.56	0.035	32.75	2.25	0.77	0.000
3.50	0.22	0.00	0.000	18.25	1.95	0.57	0.035	33.00	2.25	0.77	0.000
3.75	0.24	0.00	0.000	18.50	1.97	0.58	0.034	33.25	2.25	0.77	0.000
4.00	0.26	0.00	0.000	18.75	1.98	0.59	0.034	33.50	2.25	0.77	0.000
4.25	0.28	0.00	0.000	19.00	2.00	0.60	0.034	33.75	2.25	0.77	0.000
4.50	0.30	0.00	0.000	19.25	2.01	0.61	0.033	34.00	2.25	0.77	0.000
4.75	0.33	0.00	0.000	19.50	2.03	0.62	0.033	34.25	2.25	0.77	0.000
5.00	0.35	0.00	0.000	19.75	2.04	0.63	0.033	34.50	2.25	0.77	0.000
5.25	0.38	0.00	0.000	20.00	2.05	0.64	0.032	34.75	2.25	0.77	0.000
5.50	0.41	0.00	0.000	20.25	2.07	0.65	0.032	35.00	2.25	0.77	0.000
5.75	0.43	0.00	0.000	20.50	2.08	0.66	0.032	35.25	2.25	0.77	0.000
6.00	0.46	0.00	0.000	20.75	2.09	0.67	0.031	35.50	2.25	0.77	0.000
6.25	0.50	0.00	0.001	21.00	2.11	0.67	0.031	35.75	2.25	0.77	0.000
6.50	0.53	0.00	0.005	21.25	2.12	0.68	0.030	36.00	2.25	0.77	0.000
6.75	0.57	0.00	0.008	21.50	2.13	0.69	0.030				
7.00	0.60	0.01	0.012	21.75	2.15	0.70	0.030				
7.25	0.65	0.01	0.018	22.00	2.16	0.71	0.029				
7.50	0.70	0.02	0.028	22.25	2.17	0.72	0.029				
7.75	0.83	0.05	0.093	22.50	2.18	0.72	0.028				
8.00	0.96	0.08	0.130	22.75	2.19	0.73	0.028				
8.25	1.03	0.11	0.088	23.00	2.21	0.74	0.027				
8.50	1.08	0.13	0.066	23.25	2.22	0.75	0.027				
8.75	1.13	0.14	0.065	23.50	2.23	0.75	0.027				
9.00	1.17	0.16	0.059	23.75	2.24	0.76	0.026				
9.25	1.21	0.18	0.053	24.00	2.25	0.77	0.026				
9.50	1.24	0.19	0.049	24.25	2.25	0.77	0.003				
9.75	1.27	0.20	0.049	24.50	2.25	0.77	0.000				
10.00	1.30	0.22	0.047	24.75	2.25	0.77	0.000				
10.25	1.33	0.23	0.045	25.00	2.25	0.77	0.000				
10.50	1.35	0.24	0.044	25.25	2.25	0.77	0.000				
10.75	1.38	0.25	0.045	25.50	2.25	0.77	0.000				
11.00	1.40	0.27	0.044	25.75	2.25	0.77	0.000				
11.25	1.43	0.28	0.042	26.00	2.25	0.77	0.000				
11.50	1.45	0.29	0.041	26.25	2.25	0.77	0.000				
11.75	1.47	0.30	0.039	26.50	2.25	0.77	0.000				
12.00	1.49	0.31	0.039	26.75	2.25	0.77	0.000				
12.25	1.52	0.32	0.039	27.00	2.25	0.77	0.000				
12.50	1.54	0.33	0.040	27.25	2.25	0.77	0.000				
12.75	1.56	0.34	0.039	27.50	2.25	0.77	0.000				
13.00	1.58	0.36	0.038	27.75	2.25	0.77	0.000				
13.25	1.60	0.37	0.040	28.00	2.25	0.77	0.000				
13.50	1.62	0.38	0.039	28.25	2.25	0.77	0.000				
13.75	1.64	0.39	0.038	28.50	2.25	0.77	0.000				
14.00	1.66	0.40	0.038	28.75	2.25	0.77	0.000				
14.25	1.68	0.41	0.038	29.00	2.25	0.77	0.000				
14.50	1.69	0.42	0.038	29.25	2.25	0.77	0.000				

Subcatchment 2S: IMPERV

Runoff = 0.059 cfs @ 7.92 hrs, Volume= 0.019 af, Depth= 2.02"

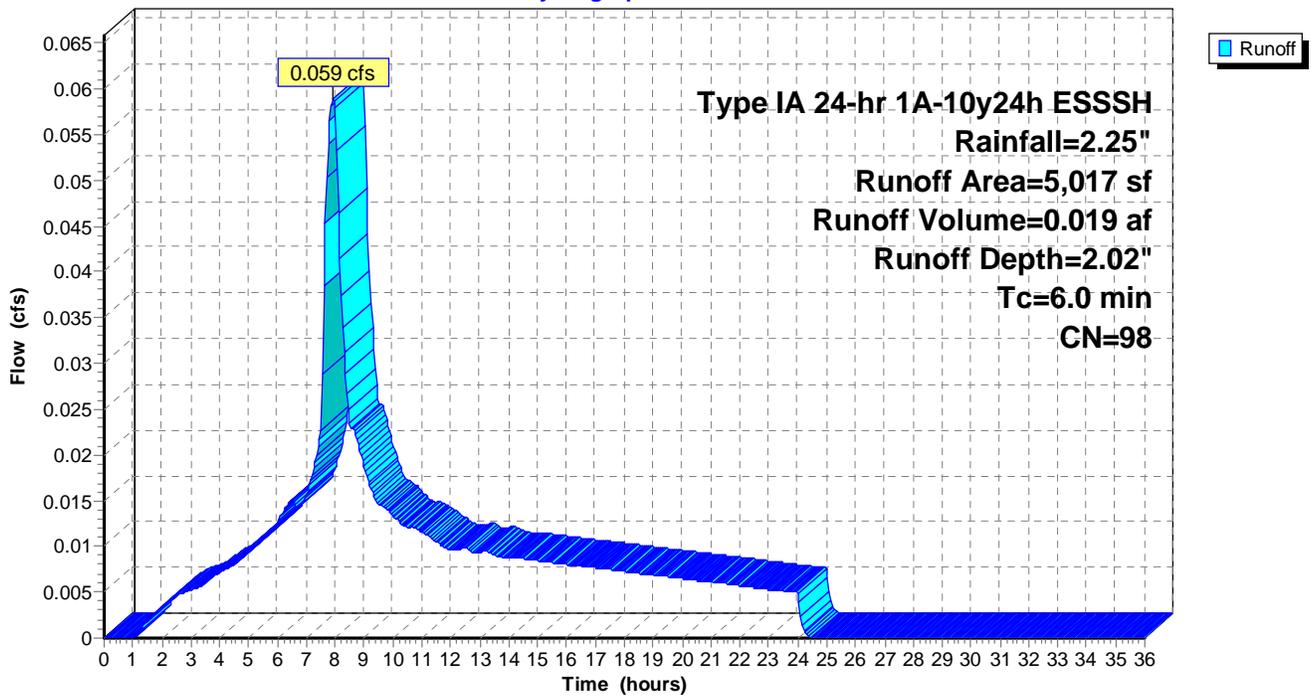
Runoff by SBUH method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 1A-10y24h ESSSH Rainfall=2.25"

Area (sf)	CN	Description
5,017	98	Paved parking & roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 2S: IMPERV

Hydrograph



Hydrograph for Subcatchment 2S: IMPERV

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.000	14.75	1.71	1.49	0.009	29.50	2.25	2.02	0.000
0.25	0.01	0.00	0.000	15.00	1.73	1.51	0.008	29.75	2.25	2.02	0.000
0.50	0.02	0.00	0.000	15.25	1.75	1.53	0.008	30.00	2.25	2.02	0.000
0.75	0.03	0.00	0.000	15.50	1.77	1.54	0.008	30.25	2.25	2.02	0.000
1.00	0.04	0.00	0.000	15.75	1.78	1.56	0.008	30.50	2.25	2.02	0.000
1.25	0.06	0.00	0.001	16.00	1.80	1.58	0.008	30.75	2.25	2.02	0.000
1.50	0.08	0.01	0.002	16.25	1.82	1.60	0.008	31.00	2.25	2.02	0.000
1.75	0.10	0.01	0.003	16.50	1.84	1.61	0.008	31.25	2.25	2.02	0.000
2.00	0.11	0.02	0.003	16.75	1.85	1.63	0.008	31.50	2.25	2.02	0.000
2.25	0.13	0.03	0.004	17.00	1.87	1.65	0.008	31.75	2.25	2.02	0.000
2.50	0.15	0.04	0.005	17.25	1.89	1.66	0.008	32.00	2.25	2.02	0.000
2.75	0.17	0.05	0.005	17.50	1.90	1.68	0.007	32.25	2.25	2.02	0.000
3.00	0.18	0.06	0.005	17.75	1.92	1.69	0.007	32.50	2.25	2.02	0.000
3.25	0.20	0.07	0.006	18.00	1.93	1.71	0.007	32.75	2.25	2.02	0.000
3.50	0.22	0.08	0.006	18.25	1.95	1.73	0.007	33.00	2.25	2.02	0.000
3.75	0.24	0.10	0.007	18.50	1.97	1.74	0.007	33.25	2.25	2.02	0.000
4.00	0.26	0.11	0.007	18.75	1.98	1.76	0.007	33.50	2.25	2.02	0.000
4.25	0.28	0.13	0.008	19.00	2.00	1.77	0.007	33.75	2.25	2.02	0.000
4.50	0.30	0.15	0.008	19.25	2.01	1.78	0.007	34.00	2.25	2.02	0.000
4.75	0.33	0.17	0.009	19.50	2.03	1.80	0.007	34.25	2.25	2.02	0.000
5.00	0.35	0.19	0.009	19.75	2.04	1.81	0.007	34.50	2.25	2.02	0.000
5.25	0.38	0.21	0.010	20.00	2.05	1.83	0.006	34.75	2.25	2.02	0.000
5.50	0.41	0.23	0.011	20.25	2.07	1.84	0.006	35.00	2.25	2.02	0.000
5.75	0.43	0.26	0.012	20.50	2.08	1.85	0.006	35.25	2.25	2.02	0.000
6.00	0.46	0.29	0.012	20.75	2.09	1.87	0.006	35.50	2.25	2.02	0.000
6.25	0.50	0.32	0.014	21.00	2.11	1.88	0.006	35.75	2.25	2.02	0.000
6.50	0.53	0.35	0.015	21.25	2.12	1.89	0.006	36.00	2.25	2.02	0.000
6.75	0.57	0.38	0.014	21.50	2.13	1.91	0.006				
7.00	0.60	0.41	0.016	21.75	2.15	1.92	0.006				
7.25	0.65	0.45	0.019	22.00	2.16	1.93	0.006				
7.50	0.70	0.50	0.023	22.25	2.17	1.94	0.006				
7.75	0.83	0.62	0.054	22.50	2.18	1.96	0.006				
8.00	0.96	0.75	0.058	22.75	2.19	1.97	0.005				
8.25	1.03	0.82	0.034	23.00	2.21	1.98	0.005				
8.50	1.08	0.87	0.023	23.25	2.22	1.99	0.005				
8.75	1.13	0.92	0.022	23.50	2.23	2.00	0.005				
9.00	1.17	0.96	0.019	23.75	2.24	2.01	0.005				
9.25	1.21	0.99	0.016	24.00	2.25	2.02	0.005				
9.50	1.24	1.02	0.015	24.25	2.25	2.02	0.001				
9.75	1.27	1.05	0.014	24.50	2.25	2.02	0.000				
10.00	1.30	1.08	0.013	24.75	2.25	2.02	0.000				
10.25	1.33	1.11	0.013	25.00	2.25	2.02	0.000				
10.50	1.35	1.13	0.012	25.25	2.25	2.02	0.000				
10.75	1.38	1.16	0.012	25.50	2.25	2.02	0.000				
11.00	1.40	1.19	0.012	25.75	2.25	2.02	0.000				
11.25	1.43	1.21	0.011	26.00	2.25	2.02	0.000				
11.50	1.45	1.23	0.011	26.25	2.25	2.02	0.000				
11.75	1.47	1.25	0.010	26.50	2.25	2.02	0.000				
12.00	1.49	1.27	0.010	26.75	2.25	2.02	0.000				
12.25	1.52	1.30	0.010	27.00	2.25	2.02	0.000				
12.50	1.54	1.32	0.010	27.25	2.25	2.02	0.000				
12.75	1.56	1.34	0.009	27.50	2.25	2.02	0.000				
13.00	1.58	1.36	0.009	27.75	2.25	2.02	0.000				
13.25	1.60	1.38	0.009	28.00	2.25	2.02	0.000				
13.50	1.62	1.40	0.009	28.25	2.25	2.02	0.000				
13.75	1.64	1.42	0.009	28.50	2.25	2.02	0.000				
14.00	1.66	1.43	0.009	28.75	2.25	2.02	0.000				
14.25	1.68	1.45	0.009	29.00	2.25	2.02	0.000				
14.50	1.69	1.47	0.009	29.25	2.25	2.02	0.000				

Subcatchment 101S: IMPERV

Runoff = 0.027 cfs @ 7.92 hrs, Volume= 0.009 af, Depth= 2.02"

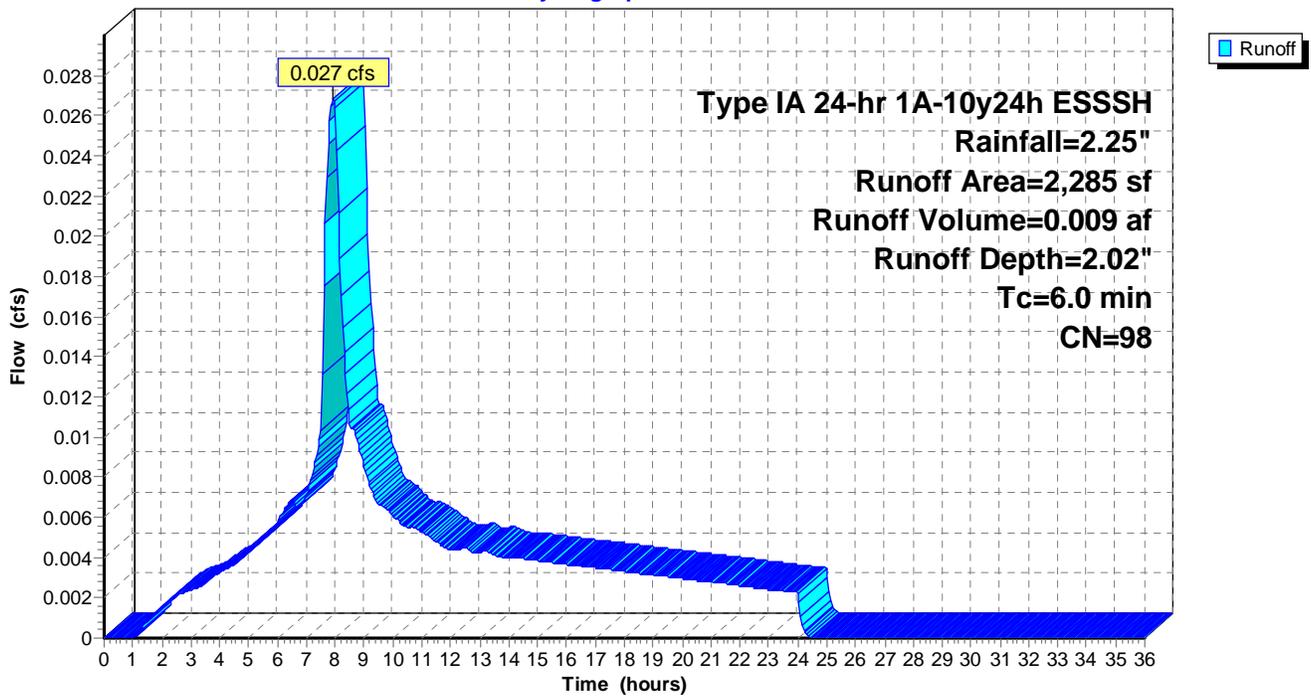
Runoff by SBUH method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 1A-10y24h ESSSH Rainfall=2.25"

Area (sf)	CN	Description
2,285	98	Paved parking & roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 101S: IMPERV

Hydrograph



Hydrograph for Subcatchment 101S: IMPERV

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.000	14.75	1.71	1.49	0.004	29.50	2.25	2.02	0.000
0.25	0.01	0.00	0.000	15.00	1.73	1.51	0.004	29.75	2.25	2.02	0.000
0.50	0.02	0.00	0.000	15.25	1.75	1.53	0.004	30.00	2.25	2.02	0.000
0.75	0.03	0.00	0.000	15.50	1.77	1.54	0.004	30.25	2.25	2.02	0.000
1.00	0.04	0.00	0.000	15.75	1.78	1.56	0.004	30.50	2.25	2.02	0.000
1.25	0.06	0.00	0.000	16.00	1.80	1.58	0.004	30.75	2.25	2.02	0.000
1.50	0.08	0.01	0.001	16.25	1.82	1.60	0.004	31.00	2.25	2.02	0.000
1.75	0.10	0.01	0.001	16.50	1.84	1.61	0.004	31.25	2.25	2.02	0.000
2.00	0.11	0.02	0.001	16.75	1.85	1.63	0.004	31.50	2.25	2.02	0.000
2.25	0.13	0.03	0.002	17.00	1.87	1.65	0.003	31.75	2.25	2.02	0.000
2.50	0.15	0.04	0.002	17.25	1.89	1.66	0.003	32.00	2.25	2.02	0.000
2.75	0.17	0.05	0.002	17.50	1.90	1.68	0.003	32.25	2.25	2.02	0.000
3.00	0.18	0.06	0.002	17.75	1.92	1.69	0.003	32.50	2.25	2.02	0.000
3.25	0.20	0.07	0.003	18.00	1.93	1.71	0.003	32.75	2.25	2.02	0.000
3.50	0.22	0.08	0.003	18.25	1.95	1.73	0.003	33.00	2.25	2.02	0.000
3.75	0.24	0.10	0.003	18.50	1.97	1.74	0.003	33.25	2.25	2.02	0.000
4.00	0.26	0.11	0.003	18.75	1.98	1.76	0.003	33.50	2.25	2.02	0.000
4.25	0.28	0.13	0.003	19.00	2.00	1.77	0.003	33.75	2.25	2.02	0.000
4.50	0.30	0.15	0.004	19.25	2.01	1.78	0.003	34.00	2.25	2.02	0.000
4.75	0.33	0.17	0.004	19.50	2.03	1.80	0.003	34.25	2.25	2.02	0.000
5.00	0.35	0.19	0.004	19.75	2.04	1.81	0.003	34.50	2.25	2.02	0.000
5.25	0.38	0.21	0.005	20.00	2.05	1.83	0.003	34.75	2.25	2.02	0.000
5.50	0.41	0.23	0.005	20.25	2.07	1.84	0.003	35.00	2.25	2.02	0.000
5.75	0.43	0.26	0.005	20.50	2.08	1.85	0.003	35.25	2.25	2.02	0.000
6.00	0.46	0.29	0.006	20.75	2.09	1.87	0.003	35.50	2.25	2.02	0.000
6.25	0.50	0.32	0.006	21.00	2.11	1.88	0.003	35.75	2.25	2.02	0.000
6.50	0.53	0.35	0.007	21.25	2.12	1.89	0.003	36.00	2.25	2.02	0.000
6.75	0.57	0.38	0.007	21.50	2.13	1.91	0.003				
7.00	0.60	0.41	0.007	21.75	2.15	1.92	0.003				
7.25	0.65	0.45	0.008	22.00	2.16	1.93	0.003				
7.50	0.70	0.50	0.010	22.25	2.17	1.94	0.003				
7.75	0.83	0.62	0.025	22.50	2.18	1.96	0.003				
8.00	0.96	0.75	0.026	22.75	2.19	1.97	0.002				
8.25	1.03	0.82	0.015	23.00	2.21	1.98	0.002				
8.50	1.08	0.87	0.011	23.25	2.22	1.99	0.002				
8.75	1.13	0.92	0.010	23.50	2.23	2.00	0.002				
9.00	1.17	0.96	0.009	23.75	2.24	2.01	0.002				
9.25	1.21	0.99	0.007	24.00	2.25	2.02	0.002				
9.50	1.24	1.02	0.007	24.25	2.25	2.02	0.000				
9.75	1.27	1.05	0.006	24.50	2.25	2.02	0.000				
10.00	1.30	1.08	0.006	24.75	2.25	2.02	0.000				
10.25	1.33	1.11	0.006	25.00	2.25	2.02	0.000				
10.50	1.35	1.13	0.005	25.25	2.25	2.02	0.000				
10.75	1.38	1.16	0.005	25.50	2.25	2.02	0.000				
11.00	1.40	1.19	0.005	25.75	2.25	2.02	0.000				
11.25	1.43	1.21	0.005	26.00	2.25	2.02	0.000				
11.50	1.45	1.23	0.005	26.25	2.25	2.02	0.000				
11.75	1.47	1.25	0.005	26.50	2.25	2.02	0.000				
12.00	1.49	1.27	0.004	26.75	2.25	2.02	0.000				
12.25	1.52	1.30	0.004	27.00	2.25	2.02	0.000				
12.50	1.54	1.32	0.005	27.25	2.25	2.02	0.000				
12.75	1.56	1.34	0.004	27.50	2.25	2.02	0.000				
13.00	1.58	1.36	0.004	27.75	2.25	2.02	0.000				
13.25	1.60	1.38	0.004	28.00	2.25	2.02	0.000				
13.50	1.62	1.40	0.004	28.25	2.25	2.02	0.000				
13.75	1.64	1.42	0.004	28.50	2.25	2.02	0.000				
14.00	1.66	1.43	0.004	28.75	2.25	2.02	0.000				
14.25	1.68	1.45	0.004	29.00	2.25	2.02	0.000				
14.50	1.69	1.47	0.004	29.25	2.25	2.02	0.000				

Subcatchment 102S: PERV

Runoff = 0.012 cfs @ 8.00 hrs, Volume= 0.006 af, Depth= 0.72"

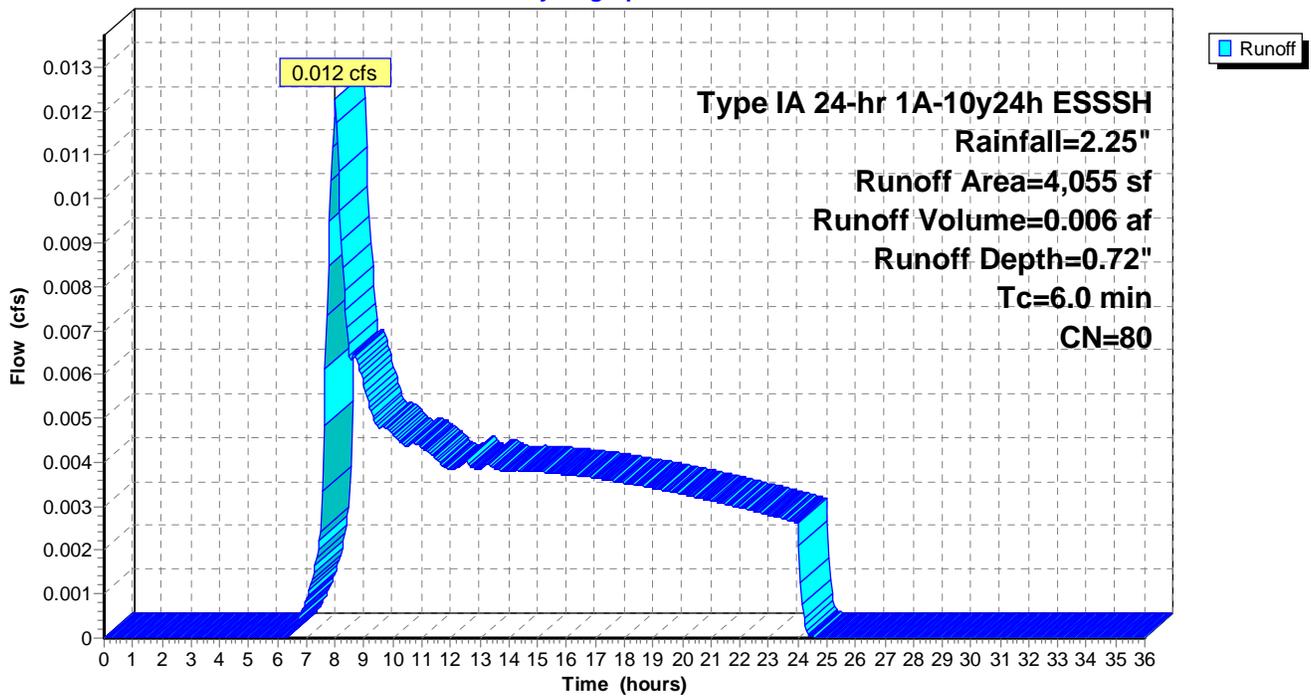
Runoff by SBUH method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 1A-10y24h ESSSH Rainfall=2.25"

Area (sf)	CN	Description
4,055	80	Open Space Good Condition

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 102S: PERV

Hydrograph



Hydrograph for Subcatchment 102S: PERV

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.000	14.75	1.71	0.40	0.004	29.50	2.25	0.72	0.000
0.25	0.01	0.00	0.000	15.00	1.73	0.41	0.004	29.75	2.25	0.72	0.000
0.50	0.02	0.00	0.000	15.25	1.75	0.42	0.004	30.00	2.25	0.72	0.000
0.75	0.03	0.00	0.000	15.50	1.77	0.43	0.004	30.25	2.25	0.72	0.000
1.00	0.04	0.00	0.000	15.75	1.78	0.44	0.004	30.50	2.25	0.72	0.000
1.25	0.06	0.00	0.000	16.00	1.80	0.45	0.004	30.75	2.25	0.72	0.000
1.50	0.08	0.00	0.000	16.25	1.82	0.46	0.004	31.00	2.25	0.72	0.000
1.75	0.10	0.00	0.000	16.50	1.84	0.47	0.004	31.25	2.25	0.72	0.000
2.00	0.11	0.00	0.000	16.75	1.85	0.48	0.004	31.50	2.25	0.72	0.000
2.25	0.13	0.00	0.000	17.00	1.87	0.49	0.004	31.75	2.25	0.72	0.000
2.50	0.15	0.00	0.000	17.25	1.89	0.49	0.004	32.00	2.25	0.72	0.000
2.75	0.17	0.00	0.000	17.50	1.90	0.50	0.004	32.25	2.25	0.72	0.000
3.00	0.18	0.00	0.000	17.75	1.92	0.51	0.004	32.50	2.25	0.72	0.000
3.25	0.20	0.00	0.000	18.00	1.93	0.52	0.004	32.75	2.25	0.72	0.000
3.50	0.22	0.00	0.000	18.25	1.95	0.53	0.004	33.00	2.25	0.72	0.000
3.75	0.24	0.00	0.000	18.50	1.97	0.54	0.003	33.25	2.25	0.72	0.000
4.00	0.26	0.00	0.000	18.75	1.98	0.55	0.003	33.50	2.25	0.72	0.000
4.25	0.28	0.00	0.000	19.00	2.00	0.56	0.003	33.75	2.25	0.72	0.000
4.50	0.30	0.00	0.000	19.25	2.01	0.57	0.003	34.00	2.25	0.72	0.000
4.75	0.33	0.00	0.000	19.50	2.03	0.58	0.003	34.25	2.25	0.72	0.000
5.00	0.35	0.00	0.000	19.75	2.04	0.59	0.003	34.50	2.25	0.72	0.000
5.25	0.38	0.00	0.000	20.00	2.05	0.60	0.003	34.75	2.25	0.72	0.000
5.50	0.41	0.00	0.000	20.25	2.07	0.60	0.003	35.00	2.25	0.72	0.000
5.75	0.43	0.00	0.000	20.50	2.08	0.61	0.003	35.25	2.25	0.72	0.000
6.00	0.46	0.00	0.000	20.75	2.09	0.62	0.003	35.50	2.25	0.72	0.000
6.25	0.50	0.00	0.000	21.00	2.11	0.63	0.003	35.75	2.25	0.72	0.000
6.50	0.53	0.00	0.000	21.25	2.12	0.64	0.003	36.00	2.25	0.72	0.000
6.75	0.57	0.00	0.000	21.50	2.13	0.65	0.003				
7.00	0.60	0.00	0.001	21.75	2.15	0.65	0.003				
7.25	0.65	0.01	0.001	22.00	2.16	0.66	0.003				
7.50	0.70	0.01	0.002	22.25	2.17	0.67	0.003				
7.75	0.83	0.04	0.008	22.50	2.18	0.68	0.003				
8.00	0.96	0.07	0.012	22.75	2.19	0.68	0.003				
8.25	1.03	0.09	0.008	23.00	2.21	0.69	0.003				
8.50	1.08	0.11	0.006	23.25	2.22	0.70	0.003				
8.75	1.13	0.13	0.006	23.50	2.23	0.71	0.003				
9.00	1.17	0.14	0.006	23.75	2.24	0.71	0.003				
9.25	1.21	0.16	0.005	24.00	2.25	0.72	0.003				
9.50	1.24	0.17	0.005	24.25	2.25	0.72	0.000				
9.75	1.27	0.18	0.005	24.50	2.25	0.72	0.000				
10.00	1.30	0.19	0.005	24.75	2.25	0.72	0.000				
10.25	1.33	0.21	0.004	25.00	2.25	0.72	0.000				
10.50	1.35	0.22	0.004	25.25	2.25	0.72	0.000				
10.75	1.38	0.23	0.004	25.50	2.25	0.72	0.000				
11.00	1.40	0.24	0.004	25.75	2.25	0.72	0.000				
11.25	1.43	0.25	0.004	26.00	2.25	0.72	0.000				
11.50	1.45	0.26	0.004	26.25	2.25	0.72	0.000				
11.75	1.47	0.27	0.004	26.50	2.25	0.72	0.000				
12.00	1.49	0.28	0.004	26.75	2.25	0.72	0.000				
12.25	1.52	0.29	0.004	27.00	2.25	0.72	0.000				
12.50	1.54	0.30	0.004	27.25	2.25	0.72	0.000				
12.75	1.56	0.31	0.004	27.50	2.25	0.72	0.000				
13.00	1.58	0.32	0.004	27.75	2.25	0.72	0.000				
13.25	1.60	0.34	0.004	28.00	2.25	0.72	0.000				
13.50	1.62	0.35	0.004	28.25	2.25	0.72	0.000				
13.75	1.64	0.36	0.004	28.50	2.25	0.72	0.000				
14.00	1.66	0.37	0.004	28.75	2.25	0.72	0.000				
14.25	1.68	0.38	0.004	29.00	2.25	0.72	0.000				
14.50	1.69	0.39	0.004	29.25	2.25	0.72	0.000				

Subcatchment 103S: IMPERV

Runoff = 0.312 cfs @ 7.92 hrs, Volume= 0.103 af, Depth= 2.02"

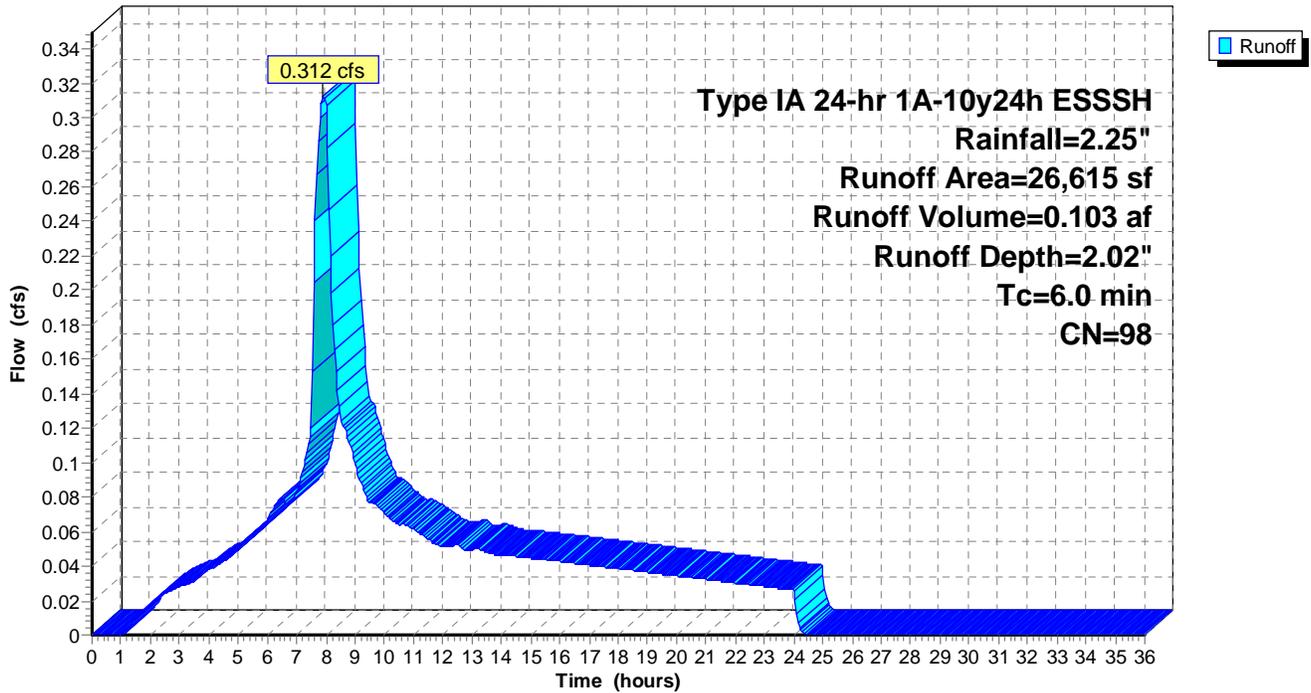
Runoff by SBUH method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 1A-10y24h ESSSH Rainfall=2.25"

Area (sf)	CN	Description
11,079	98	Roofs
15,536	98	Paved Parking
26,615	98	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 103S: IMPERV

Hydrograph



Hydrograph for Subcatchment 103S: IMPERV

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.000	14.75	1.71	1.49	0.045	29.50	2.25	2.02	0.000
0.25	0.01	0.00	0.000	15.00	1.73	1.51	0.045	29.75	2.25	2.02	0.000
0.50	0.02	0.00	0.000	15.25	1.75	1.53	0.044	30.00	2.25	2.02	0.000
0.75	0.03	0.00	0.000	15.50	1.77	1.54	0.044	30.25	2.25	2.02	0.000
1.00	0.04	0.00	0.000	15.75	1.78	1.56	0.043	30.50	2.25	2.02	0.000
1.25	0.06	0.00	0.004	16.00	1.80	1.58	0.043	30.75	2.25	2.02	0.000
1.50	0.08	0.01	0.010	16.25	1.82	1.60	0.042	31.00	2.25	2.02	0.000
1.75	0.10	0.01	0.014	16.50	1.84	1.61	0.042	31.25	2.25	2.02	0.000
2.00	0.11	0.02	0.017	16.75	1.85	1.63	0.041	31.50	2.25	2.02	0.000
2.25	0.13	0.03	0.021	17.00	1.87	1.65	0.041	31.75	2.25	2.02	0.000
2.50	0.15	0.04	0.024	17.25	1.89	1.66	0.040	32.00	2.25	2.02	0.000
2.75	0.17	0.05	0.026	17.50	1.90	1.68	0.040	32.25	2.25	2.02	0.000
3.00	0.18	0.06	0.028	17.75	1.92	1.69	0.039	32.50	2.25	2.02	0.000
3.25	0.20	0.07	0.029	18.00	1.93	1.71	0.039	32.75	2.25	2.02	0.000
3.50	0.22	0.08	0.032	18.25	1.95	1.73	0.038	33.00	2.25	2.02	0.000
3.75	0.24	0.10	0.036	18.50	1.97	1.74	0.038	33.25	2.25	2.02	0.000
4.00	0.26	0.11	0.039	18.75	1.98	1.76	0.037	33.50	2.25	2.02	0.000
4.25	0.28	0.13	0.040	19.00	2.00	1.77	0.037	33.75	2.25	2.02	0.000
4.50	0.30	0.15	0.043	19.25	2.01	1.78	0.036	34.00	2.25	2.02	0.000
4.75	0.33	0.17	0.046	19.50	2.03	1.80	0.035	34.25	2.25	2.02	0.000
5.00	0.35	0.19	0.050	19.75	2.04	1.81	0.035	34.50	2.25	2.02	0.000
5.25	0.38	0.21	0.055	20.00	2.05	1.83	0.034	34.75	2.25	2.02	0.000
5.50	0.41	0.23	0.059	20.25	2.07	1.84	0.034	35.00	2.25	2.02	0.000
5.75	0.43	0.26	0.061	20.50	2.08	1.85	0.033	35.25	2.25	2.02	0.000
6.00	0.46	0.29	0.066	20.75	2.09	1.87	0.033	35.50	2.25	2.02	0.000
6.25	0.50	0.32	0.075	21.00	2.11	1.88	0.032	35.75	2.25	2.02	0.000
6.50	0.53	0.35	0.080	21.25	2.12	1.89	0.032	36.00	2.25	2.02	0.000
6.75	0.57	0.38	0.076	21.50	2.13	1.91	0.031				
7.00	0.60	0.41	0.083	21.75	2.15	1.92	0.031				
7.25	0.65	0.45	0.098	22.00	2.16	1.93	0.030				
7.50	0.70	0.50	0.121	22.25	2.17	1.94	0.030				
7.75	0.83	0.62	0.286	22.50	2.18	1.96	0.029				
8.00	0.96	0.75	0.307	22.75	2.19	1.97	0.029				
8.25	1.03	0.82	0.180	23.00	2.21	1.98	0.028				
8.50	1.08	0.87	0.125	23.25	2.22	1.99	0.028				
8.75	1.13	0.92	0.115	23.50	2.23	2.00	0.027				
9.00	1.17	0.96	0.100	23.75	2.24	2.01	0.027				
9.25	1.21	0.99	0.086	24.00	2.25	2.02	0.026				
9.50	1.24	1.02	0.077	24.25	2.25	2.02	0.003				
9.75	1.27	1.05	0.075	24.50	2.25	2.02	0.000				
10.00	1.30	1.08	0.071	24.75	2.25	2.02	0.000				
10.25	1.33	1.11	0.067	25.00	2.25	2.02	0.000				
10.50	1.35	1.13	0.064	25.25	2.25	2.02	0.000				
10.75	1.38	1.16	0.064	25.50	2.25	2.02	0.000				
11.00	1.40	1.19	0.061	25.75	2.25	2.02	0.000				
11.25	1.43	1.21	0.059	26.00	2.25	2.02	0.000				
11.50	1.45	1.23	0.056	26.25	2.25	2.02	0.000				
11.75	1.47	1.25	0.053	26.50	2.25	2.02	0.000				
12.00	1.49	1.27	0.051	26.75	2.25	2.02	0.000				
12.25	1.52	1.30	0.051	27.00	2.25	2.02	0.000				
12.50	1.54	1.32	0.053	27.25	2.25	2.02	0.000				
12.75	1.56	1.34	0.050	27.50	2.25	2.02	0.000				
13.00	1.58	1.36	0.049	27.75	2.25	2.02	0.000				
13.25	1.60	1.38	0.050	28.00	2.25	2.02	0.000				
13.50	1.62	1.40	0.048	28.25	2.25	2.02	0.000				
13.75	1.64	1.42	0.047	28.50	2.25	2.02	0.000				
14.00	1.66	1.43	0.046	28.75	2.25	2.02	0.000				
14.25	1.68	1.45	0.046	29.00	2.25	2.02	0.000				
14.50	1.69	1.47	0.046	29.25	2.25	2.02	0.000				

Subcatchment 104S: PERV

Runoff = 0.032 cfs @ 8.00 hrs, Volume= 0.014 af, Depth= 0.72"

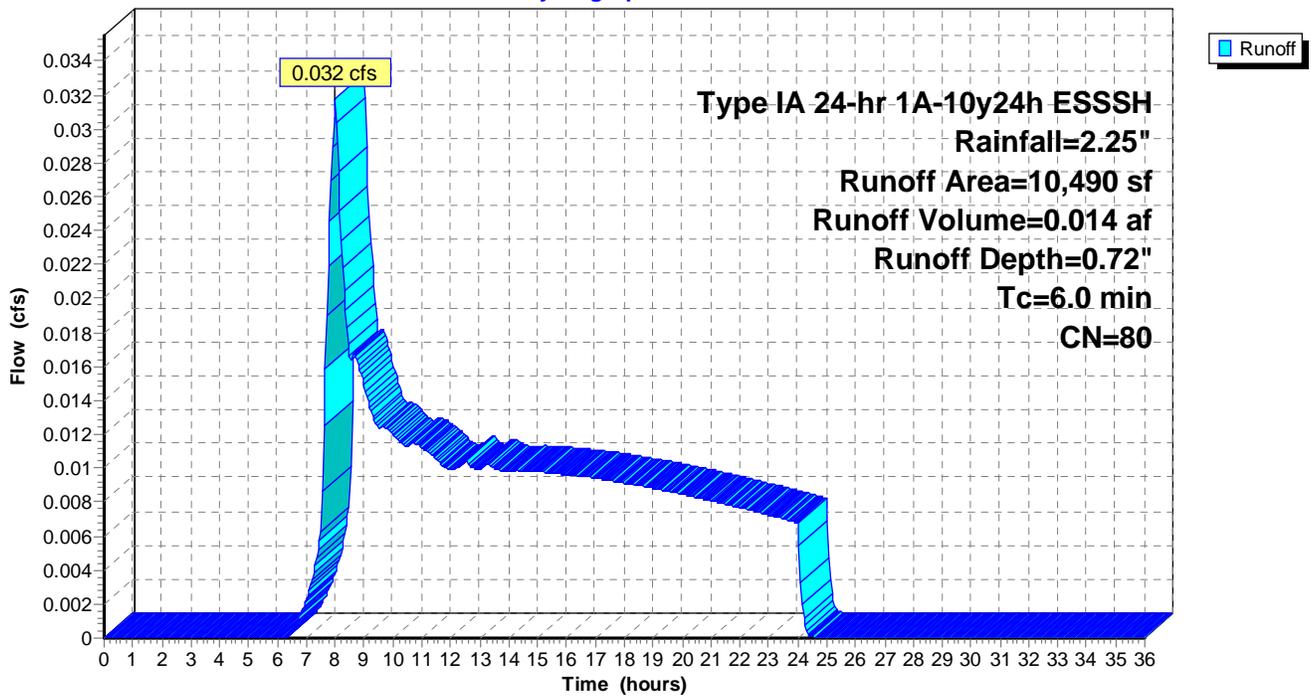
Runoff by SBUH method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 1A-10y24h ESSSH Rainfall=2.25"

Area (sf)	CN	Description
10,490	80	Open Space Good Condition

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 104S: PERV

Hydrograph



Hydrograph for Subcatchment 104S: PERV

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.000	14.75	1.71	0.40	0.010	29.50	2.25	0.72	0.000
0.25	0.01	0.00	0.000	15.00	1.73	0.41	0.010	29.75	2.25	0.72	0.000
0.50	0.02	0.00	0.000	15.25	1.75	0.42	0.010	30.00	2.25	0.72	0.000
0.75	0.03	0.00	0.000	15.50	1.77	0.43	0.010	30.25	2.25	0.72	0.000
1.00	0.04	0.00	0.000	15.75	1.78	0.44	0.010	30.50	2.25	0.72	0.000
1.25	0.06	0.00	0.000	16.00	1.80	0.45	0.010	30.75	2.25	0.72	0.000
1.50	0.08	0.00	0.000	16.25	1.82	0.46	0.010	31.00	2.25	0.72	0.000
1.75	0.10	0.00	0.000	16.50	1.84	0.47	0.010	31.25	2.25	0.72	0.000
2.00	0.11	0.00	0.000	16.75	1.85	0.48	0.009	31.50	2.25	0.72	0.000
2.25	0.13	0.00	0.000	17.00	1.87	0.49	0.009	31.75	2.25	0.72	0.000
2.50	0.15	0.00	0.000	17.25	1.89	0.49	0.009	32.00	2.25	0.72	0.000
2.75	0.17	0.00	0.000	17.50	1.90	0.50	0.009	32.25	2.25	0.72	0.000
3.00	0.18	0.00	0.000	17.75	1.92	0.51	0.009	32.50	2.25	0.72	0.000
3.25	0.20	0.00	0.000	18.00	1.93	0.52	0.009	32.75	2.25	0.72	0.000
3.50	0.22	0.00	0.000	18.25	1.95	0.53	0.009	33.00	2.25	0.72	0.000
3.75	0.24	0.00	0.000	18.50	1.97	0.54	0.009	33.25	2.25	0.72	0.000
4.00	0.26	0.00	0.000	18.75	1.98	0.55	0.009	33.50	2.25	0.72	0.000
4.25	0.28	0.00	0.000	19.00	2.00	0.56	0.009	33.75	2.25	0.72	0.000
4.50	0.30	0.00	0.000	19.25	2.01	0.57	0.009	34.00	2.25	0.72	0.000
4.75	0.33	0.00	0.000	19.50	2.03	0.58	0.009	34.25	2.25	0.72	0.000
5.00	0.35	0.00	0.000	19.75	2.04	0.59	0.009	34.50	2.25	0.72	0.000
5.25	0.38	0.00	0.000	20.00	2.05	0.60	0.008	34.75	2.25	0.72	0.000
5.50	0.41	0.00	0.000	20.25	2.07	0.60	0.008	35.00	2.25	0.72	0.000
5.75	0.43	0.00	0.000	20.50	2.08	0.61	0.008	35.25	2.25	0.72	0.000
6.00	0.46	0.00	0.000	20.75	2.09	0.62	0.008	35.50	2.25	0.72	0.000
6.25	0.50	0.00	0.000	21.00	2.11	0.63	0.008	35.75	2.25	0.72	0.000
6.50	0.53	0.00	0.000	21.25	2.12	0.64	0.008	36.00	2.25	0.72	0.000
6.75	0.57	0.00	0.001	21.50	2.13	0.65	0.008				
7.00	0.60	0.00	0.002	21.75	2.15	0.65	0.008				
7.25	0.65	0.01	0.004	22.00	2.16	0.66	0.008				
7.50	0.70	0.01	0.006	22.25	2.17	0.67	0.008				
7.75	0.83	0.04	0.022	22.50	2.18	0.68	0.007				
8.00	0.96	0.07	0.032	22.75	2.19	0.68	0.007				
8.25	1.03	0.09	0.022	23.00	2.21	0.69	0.007				
8.50	1.08	0.11	0.017	23.25	2.22	0.70	0.007				
8.75	1.13	0.13	0.016	23.50	2.23	0.71	0.007				
9.00	1.17	0.14	0.015	23.75	2.24	0.71	0.007				
9.25	1.21	0.16	0.013	24.00	2.25	0.72	0.007				
9.50	1.24	0.17	0.012	24.25	2.25	0.72	0.001				
9.75	1.27	0.18	0.012	24.50	2.25	0.72	0.000				
10.00	1.30	0.19	0.012	24.75	2.25	0.72	0.000				
10.25	1.33	0.21	0.012	25.00	2.25	0.72	0.000				
10.50	1.35	0.22	0.011	25.25	2.25	0.72	0.000				
10.75	1.38	0.23	0.011	25.50	2.25	0.72	0.000				
11.00	1.40	0.24	0.011	25.75	2.25	0.72	0.000				
11.25	1.43	0.25	0.011	26.00	2.25	0.72	0.000				
11.50	1.45	0.26	0.011	26.25	2.25	0.72	0.000				
11.75	1.47	0.27	0.010	26.50	2.25	0.72	0.000				
12.00	1.49	0.28	0.010	26.75	2.25	0.72	0.000				
12.25	1.52	0.29	0.010	27.00	2.25	0.72	0.000				
12.50	1.54	0.30	0.010	27.25	2.25	0.72	0.000				
12.75	1.56	0.31	0.010	27.50	2.25	0.72	0.000				
13.00	1.58	0.32	0.010	27.75	2.25	0.72	0.000				
13.25	1.60	0.34	0.010	28.00	2.25	0.72	0.000				
13.50	1.62	0.35	0.010	28.25	2.25	0.72	0.000				
13.75	1.64	0.36	0.010	28.50	2.25	0.72	0.000				
14.00	1.66	0.37	0.010	28.75	2.25	0.72	0.000				
14.25	1.68	0.38	0.010	29.00	2.25	0.72	0.000				
14.50	1.69	0.39	0.010	29.25	2.25	0.72	0.000				

Pond 105P: Underground Det

Inflow Area = 0.852 ac, Inflow Depth = 1.65" for 1A-10y24h ESSSH event
 Inflow = 0.342 cfs @ 7.94 hrs, Volume= 0.117 af
 Outflow = 0.040 cfs @ 21.26 hrs, Volume= 0.062 af, Atten= 88%, Lag= 799.1 min
 Primary = 0.027 cfs @ 21.26 hrs, Volume= 0.060 af
 Secondary = 0.013 cfs @ 21.26 hrs, Volume= 0.003 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Peak Elev= 414.13' @ 21.26 hrs Surf.Area= 0.011 ac Storage= 0.079 af
 Plug-Flow detention time= 835.3 min calculated for 0.062 af (53% of inflow)
 Center-of-Mass det. time= 576.6 min (1,278.2 - 701.6)

Volume	Invert	Avail.Storage	Storage Description
#1	410.00'	0.003 af	4.50'D x 9.00'H Vertical Cone/Cylinder North
#2	410.00'	0.003 af	4.50'D x 8.10'H Vertical Cone/Cylinder South
#3	409.50'	0.078 af	60.0'D x 58.00'L Horizontal Cylinder x 3
		0.085 af	Total Available Storage

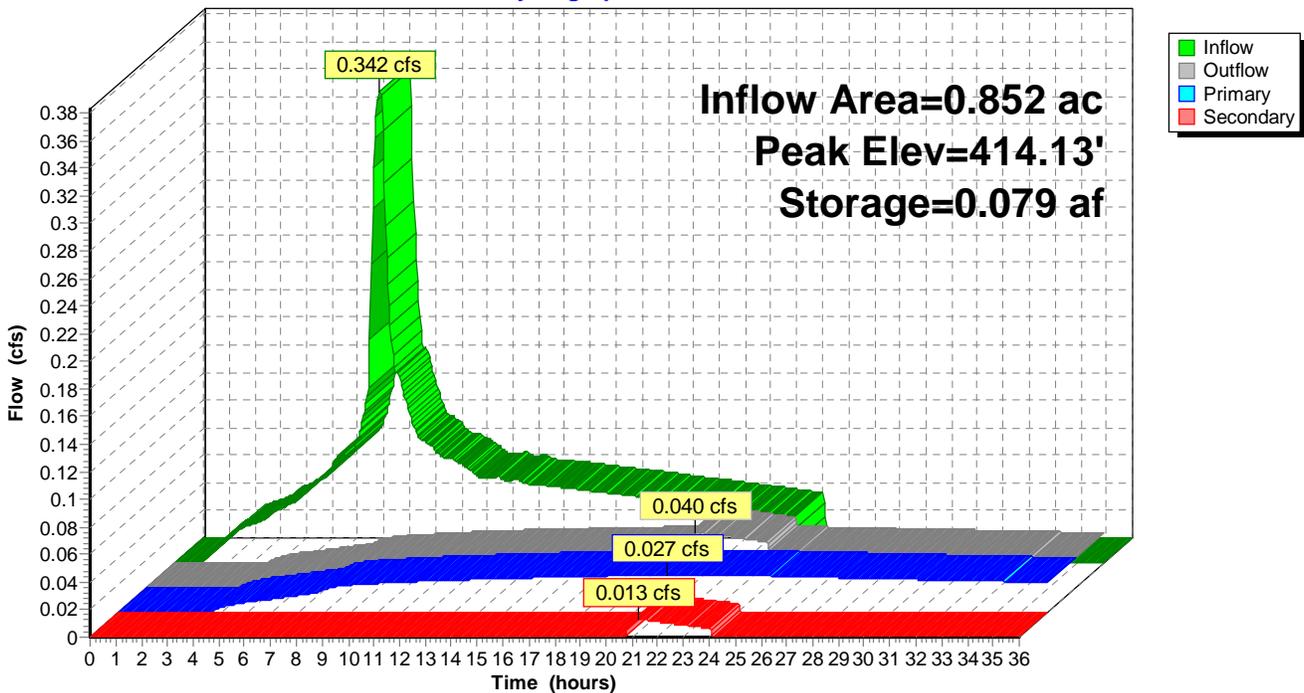
Device	Routing	Invert	Outlet Devices
#1	Secondary	414.12'	6.0" Horiz. Orifice/Grate Limited to weir flow C= 0.620
#2	Primary	410.00'	0.7" Horiz. Orifice C= 0.620

Primary OutFlow Max=0.027 cfs @ 21.26 hrs HW=414.13' (Free Discharge)
 ↳2=Orifice (Orifice Controls 0.027 cfs @ 10.1154 fps)

Secondary OutFlow Max=0.008 cfs @ 21.26 hrs HW=414.13' (Free Discharge)
 ↳1=Orifice/Grate (Weir Controls 0.008 cfs @ 0.3774 fps)

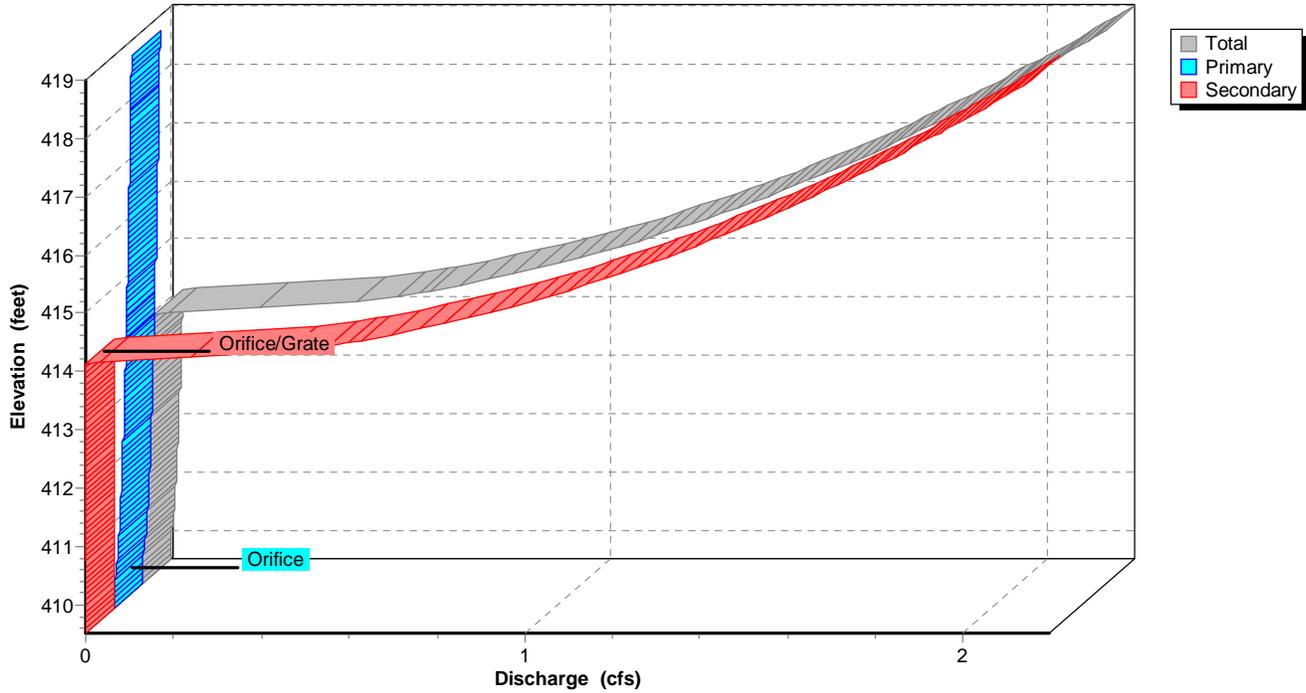
Pond 105P: Underground Det

Hydrograph



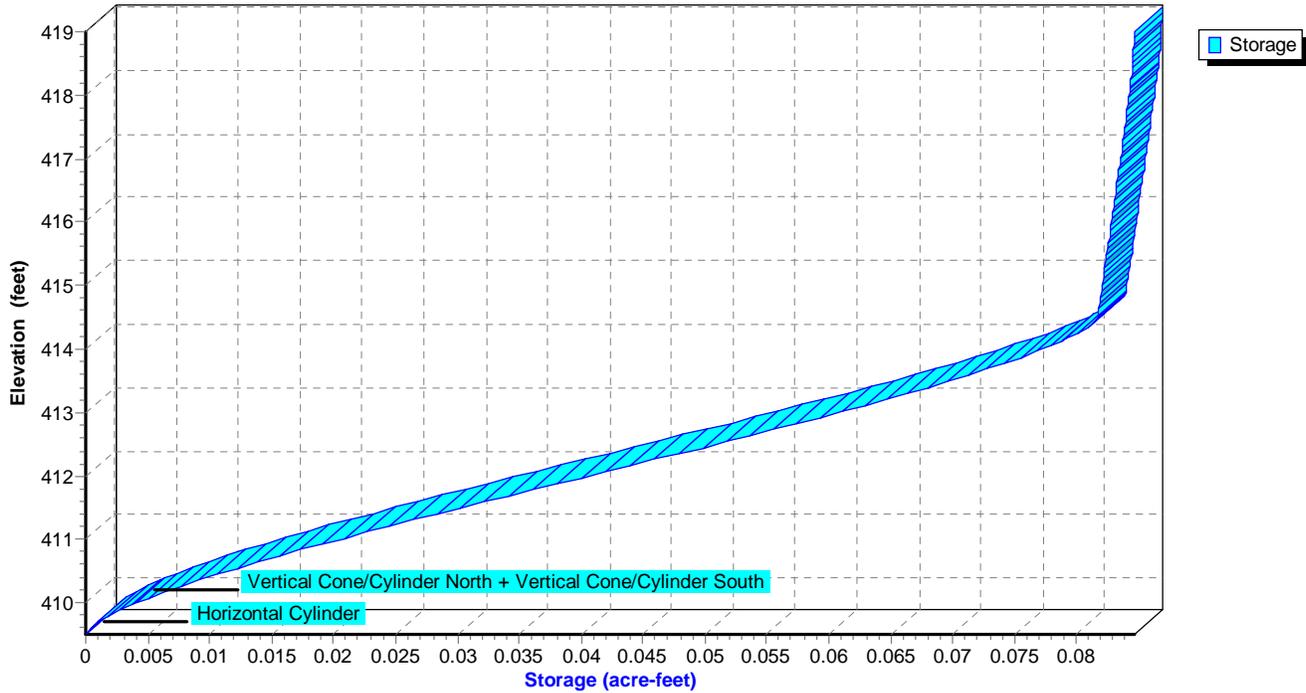
Pond 105P: Underground Det

Stage-Discharge



Pond 105P: Underground Det

Stage-Area-Storage



Hydrograph for Pond 105P: Underground Det

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.000	0.000	409.50	0.000	0.000	0.000
1.00	0.000	0.000	409.50	0.000	0.000	0.000
2.00	0.017	0.001	409.66	0.000	0.000	0.000
3.00	0.028	0.003	409.88	0.000	0.000	0.000
4.00	0.039	0.005	410.09	0.004	0.004	0.000
5.00	0.050	0.008	410.31	0.007	0.007	0.000
6.00	0.066	0.013	410.56	0.010	0.010	0.000
7.00	0.086	0.018	410.86	0.012	0.012	0.000
8.00	0.339	0.033	411.61	0.017	0.017	0.000
9.00	0.115	0.045	412.23	0.020	0.020	0.000
10.00	0.083	0.051	412.53	0.021	0.021	0.000
11.00	0.073	0.056	412.75	0.022	0.022	0.000
12.00	0.061	0.060	412.94	0.023	0.023	0.000
13.00	0.059	0.063	413.10	0.023	0.023	0.000
14.00	0.056	0.066	413.26	0.024	0.024	0.000
15.00	0.055	0.068	413.41	0.025	0.025	0.000
16.00	0.052	0.071	413.55	0.025	0.025	0.000
17.00	0.050	0.073	413.68	0.026	0.026	0.000
18.00	0.048	0.075	413.81	0.026	0.026	0.000
19.00	0.045	0.076	413.93	0.026	0.026	0.000
20.00	0.043	0.078	414.04	0.027	0.027	0.000
21.00	0.040	0.079	414.13	0.039	0.027	0.012
22.00	0.038	0.079	414.13	0.038	0.027	0.011
23.00	0.035	0.079	414.13	0.036	0.027	0.009
24.00	0.033	0.079	414.13	0.033	0.027	0.006
25.00	0.000	0.077	413.97	0.026	0.026	0.000
26.00	0.000	0.075	413.81	0.026	0.026	0.000
27.00	0.000	0.073	413.67	0.025	0.025	0.000
28.00	0.000	0.070	413.54	0.025	0.025	0.000
29.00	0.000	0.068	413.42	0.025	0.025	0.000
30.00	0.000	0.066	413.30	0.024	0.024	0.000
31.00	0.000	0.064	413.19	0.024	0.024	0.000
32.00	0.000	0.063	413.09	0.023	0.023	0.000
33.00	0.000	0.061	412.99	0.023	0.023	0.000
34.00	0.000	0.059	412.89	0.023	0.023	0.000
35.00	0.000	0.057	412.79	0.022	0.022	0.000
36.00	0.000	0.055	412.70	0.022	0.022	0.000

Stage-Discharge for Pond 105P: Underground Det

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)	Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
409.50	0.000	0.000	0.000	415.40	1.136	0.031	1.105
409.60	0.000	0.000	0.000	415.50	1.179	0.031	1.148
409.70	0.000	0.000	0.000	415.60	1.220	0.031	1.188
409.80	0.000	0.000	0.000	415.70	1.260	0.032	1.228
409.90	0.000	0.000	0.000	415.80	1.298	0.032	1.266
410.00	0.000	0.000	0.000	415.90	1.336	0.032	1.303
410.10	0.004	0.004	0.000	416.00	1.372	0.033	1.340
410.20	0.006	0.006	0.000	416.10	1.408	0.033	1.375
410.30	0.007	0.007	0.000	416.20	1.442	0.033	1.409
410.40	0.008	0.008	0.000	416.30	1.476	0.033	1.442
410.50	0.009	0.009	0.000	416.40	1.509	0.034	1.475
410.60	0.010	0.010	0.000	416.50	1.541	0.034	1.507
410.70	0.011	0.011	0.000	416.60	1.573	0.034	1.538
410.80	0.012	0.012	0.000	416.70	1.604	0.034	1.569
410.90	0.013	0.013	0.000	416.80	1.634	0.035	1.599
411.00	0.013	0.013	0.000	416.90	1.664	0.035	1.629
411.10	0.014	0.014	0.000	417.00	1.693	0.035	1.658
411.20	0.015	0.015	0.000	417.10	1.722	0.035	1.686
411.30	0.015	0.015	0.000	417.20	1.750	0.036	1.715
411.40	0.016	0.016	0.000	417.30	1.778	0.036	1.742
411.50	0.016	0.016	0.000	417.40	1.805	0.036	1.769
411.60	0.017	0.017	0.000	417.50	1.832	0.036	1.796
411.70	0.017	0.017	0.000	417.60	1.859	0.037	1.822
411.80	0.018	0.018	0.000	417.70	1.885	0.037	1.848
411.90	0.018	0.018	0.000	417.80	1.911	0.037	1.874
412.00	0.019	0.019	0.000	417.90	1.937	0.037	1.899
412.10	0.019	0.019	0.000	418.00	1.962	0.038	1.924
412.20	0.020	0.020	0.000	418.10	1.987	0.038	1.949
412.30	0.020	0.020	0.000	418.20	2.011	0.038	1.973
412.40	0.021	0.021	0.000	418.30	2.036	0.038	1.997
412.50	0.021	0.021	0.000	418.40	2.060	0.039	2.021
412.60	0.021	0.021	0.000	418.50	2.083	0.039	2.045
412.70	0.022	0.022	0.000	418.60	2.107	0.039	2.068
412.80	0.022	0.022	0.000	418.70	2.130	0.039	2.091
412.90	0.023	0.023	0.000	418.80	2.153	0.039	2.113
413.00	0.023	0.023	0.000	418.90	2.176	0.040	2.136
413.10	0.023	0.023	0.000	419.00	2.198	0.040	2.158
413.20	0.024	0.024	0.000				
413.30	0.024	0.024	0.000				
413.40	0.025	0.025	0.000				
413.50	0.025	0.025	0.000				
413.60	0.025	0.025	0.000				
413.70	0.026	0.026	0.000				
413.80	0.026	0.026	0.000				
413.90	0.026	0.026	0.000				
414.00	0.027	0.027	0.000				
414.10	0.027	0.027	0.000				
414.20	0.143	0.027	0.116				
414.30	0.420	0.028	0.392				
414.40	0.545	0.028	0.517				
414.50	0.630	0.028	0.602				
414.60	0.705	0.029	0.677				
414.70	0.773	0.029	0.744				
414.80	0.835	0.029	0.806				
414.90	0.892	0.029	0.863				
415.00	0.946	0.030	0.916				
415.10	0.997	0.030	0.967				
415.20	1.046	0.030	1.015				
415.30	1.092	0.031	1.061				

Stage-Area-Storage for Pond 105P: Underground Det

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
409.50	0.000	415.40	0.082
409.60	0.000	415.50	0.082
409.70	0.001	415.60	0.083
409.80	0.002	415.70	0.083
409.90	0.003	415.80	0.083
410.00	0.004	415.90	0.083
410.10	0.005	416.00	0.083
410.20	0.007	416.10	0.083
410.30	0.008	416.20	0.083
410.40	0.010	416.30	0.083
410.50	0.012	416.40	0.083
410.60	0.013	416.50	0.083
410.70	0.015	416.60	0.083
410.80	0.017	416.70	0.083
410.90	0.019	416.80	0.083
411.00	0.021	416.90	0.083
411.10	0.022	417.00	0.084
411.20	0.024	417.10	0.084
411.30	0.026	417.20	0.084
411.40	0.028	417.30	0.084
411.50	0.030	417.40	0.084
411.60	0.032	417.50	0.084
411.70	0.034	417.60	0.084
411.80	0.037	417.70	0.084
411.90	0.039	417.80	0.084
412.00	0.041	417.90	0.084
412.10	0.043	418.00	0.084
412.20	0.045	418.10	0.084
412.30	0.047	418.20	0.084
412.40	0.049	418.30	0.084
412.50	0.051	418.40	0.084
412.60	0.053	418.50	0.084
412.70	0.055	418.60	0.085
412.80	0.057	418.70	0.085
412.90	0.059	418.80	0.085
413.00	0.061	418.90	0.085
413.10	0.063	419.00	0.085
413.20	0.065		
413.30	0.066		
413.40	0.068		
413.50	0.070		
413.60	0.071		
413.70	0.073		
413.80	0.075		
413.90	0.076		
414.00	0.077		
414.10	0.078		
414.20	0.080		
414.30	0.081		
414.40	0.081		
414.50	0.082		
414.60	0.082		
414.70	0.082		
414.80	0.082		
414.90	0.082		
415.00	0.082		
415.10	0.082		
415.20	0.082		
415.30	0.082		

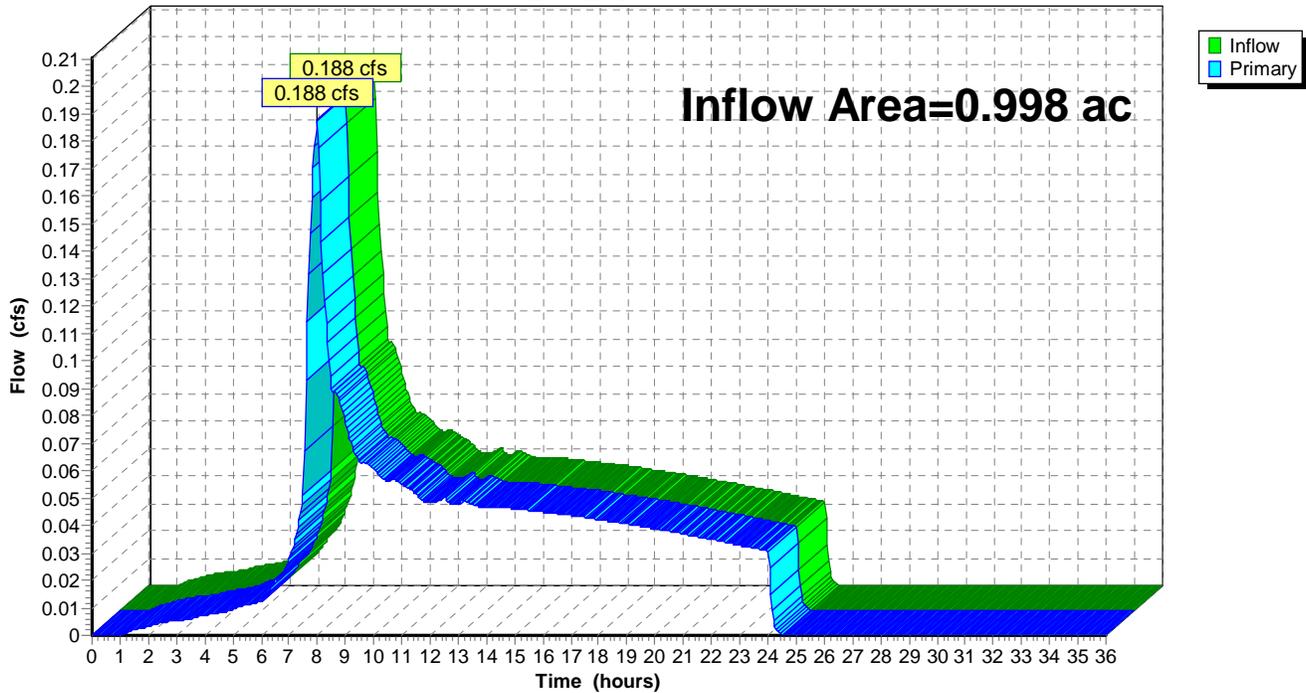
Link 1L: EXST

Inflow Area = 0.998 ac, Inflow Depth = 0.91" for 1A-10y24h ESSSH event
Inflow = 0.188 cfs @ 7.99 hrs, Volume= 0.076 af
Primary = 0.188 cfs @ 7.99 hrs, Volume= 0.076 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link 1L: EXST

Hydrograph



Hydrograph for Link 1L: EXST

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.000	0.00	0.000	29.50	0.000	0.00	0.000
0.50	0.000	0.00	0.000	30.00	0.000	0.00	0.000
1.00	0.000	0.00	0.000	30.50	0.000	0.00	0.000
1.50	0.002	0.00	0.002	31.00	0.000	0.00	0.000
2.00	0.003	0.00	0.003	31.50	0.000	0.00	0.000
2.50	0.005	0.00	0.005	32.00	0.000	0.00	0.000
3.00	0.005	0.00	0.005	32.50	0.000	0.00	0.000
3.50	0.006	0.00	0.006	33.00	0.000	0.00	0.000
4.00	0.007	0.00	0.007	33.50	0.000	0.00	0.000
4.50	0.008	0.00	0.008	34.00	0.000	0.00	0.000
5.00	0.009	0.00	0.009	34.50	0.000	0.00	0.000
5.50	0.011	0.00	0.011	35.00	0.000	0.00	0.000
6.00	0.012	0.00	0.012	35.50	0.000	0.00	0.000
6.50	0.020	0.00	0.020	36.00	0.000	0.00	0.000
7.00	0.028	0.00	0.028				
7.50	0.051	0.00	0.051				
8.00	0.188	0.00	0.188				
8.50	0.090	0.00	0.090				
9.00	0.078	0.00	0.078				
9.50	0.063	0.00	0.063				
10.00	0.061	0.00	0.061				
10.50	0.056	0.00	0.056				
11.00	0.055	0.00	0.055				
11.50	0.052	0.00	0.052				
12.00	0.048	0.00	0.048				
12.50	0.050	0.00	0.050				
13.00	0.048	0.00	0.048				
13.50	0.048	0.00	0.048				
14.00	0.046	0.00	0.046				
14.50	0.047	0.00	0.047				
15.00	0.046	0.00	0.046				
15.50	0.046	0.00	0.046				
16.00	0.045	0.00	0.045				
16.50	0.044	0.00	0.044				
17.00	0.044	0.00	0.044				
17.50	0.043	0.00	0.043				
18.00	0.042	0.00	0.042				
18.50	0.041	0.00	0.041				
19.00	0.041	0.00	0.041				
19.50	0.040	0.00	0.040				
20.00	0.039	0.00	0.039				
20.50	0.038	0.00	0.038				
21.00	0.037	0.00	0.037				
21.50	0.036	0.00	0.036				
22.00	0.035	0.00	0.035				
22.50	0.034	0.00	0.034				
23.00	0.033	0.00	0.033				
23.50	0.032	0.00	0.032				
24.00	0.031	0.00	0.031				
24.50	0.000	0.00	0.000				
25.00	0.000	0.00	0.000				
25.50	0.000	0.00	0.000				
26.00	0.000	0.00	0.000				
26.50	0.000	0.00	0.000				
27.00	0.000	0.00	0.000				
27.50	0.000	0.00	0.000				
28.00	0.000	0.00	0.000				
28.50	0.000	0.00	0.000				
29.00	0.000	0.00	0.000				

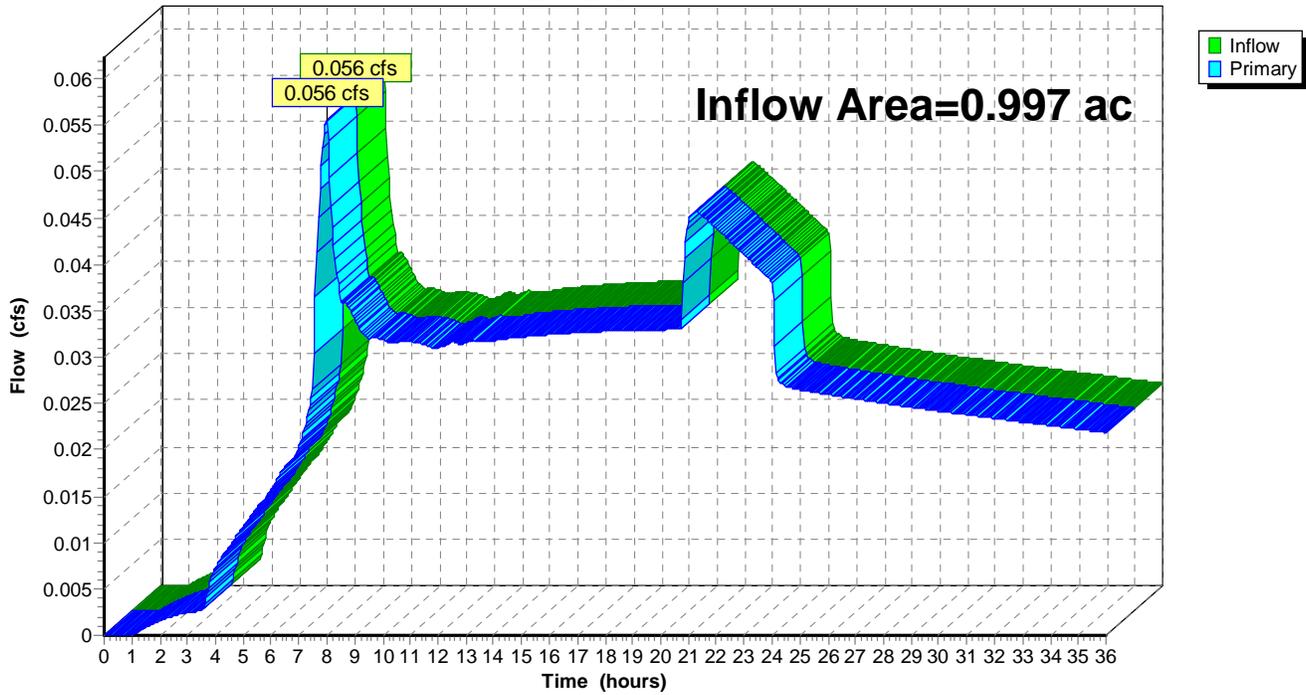
Link 2L: PROP

Inflow Area = 0.997 ac, Inflow Depth > 0.93" for 1A-10y24h ESSSH event
Inflow = 0.056 cfs @ 7.98 hrs, Volume= 0.077 af
Primary = 0.056 cfs @ 7.98 hrs, Volume= 0.077 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link 2L: PROP

Hydrograph



Hydrograph for Link 2L: PROP

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.000	0.00	0.000	29.50	0.024	0.00	0.024
0.50	0.000	0.00	0.000	30.00	0.024	0.00	0.024
1.00	0.000	0.00	0.000	30.50	0.024	0.00	0.024
1.50	0.001	0.00	0.001	31.00	0.024	0.00	0.024
2.00	0.001	0.00	0.001	31.50	0.024	0.00	0.024
2.50	0.002	0.00	0.002	32.00	0.023	0.00	0.023
3.00	0.002	0.00	0.002	32.50	0.023	0.00	0.023
3.50	0.003	0.00	0.003	33.00	0.023	0.00	0.023
4.00	0.007	0.00	0.007	33.50	0.023	0.00	0.023
4.50	0.010	0.00	0.010	34.00	0.023	0.00	0.023
5.00	0.012	0.00	0.012	34.50	0.022	0.00	0.022
5.50	0.014	0.00	0.014	35.00	0.022	0.00	0.022
6.00	0.016	0.00	0.016	35.50	0.022	0.00	0.022
6.50	0.018	0.00	0.018	36.00	0.022	0.00	0.022
7.00	0.020	0.00	0.020				
7.50	0.026	0.00	0.026				
8.00	0.055	0.00	0.055				
8.50	0.036	0.00	0.036				
9.00	0.034	0.00	0.034				
9.50	0.032	0.00	0.032				
10.00	0.032	0.00	0.032				
10.50	0.031	0.00	0.031				
11.00	0.032	0.00	0.032				
11.50	0.031	0.00	0.031				
12.00	0.031	0.00	0.031				
12.50	0.032	0.00	0.032				
13.00	0.031	0.00	0.031				
13.50	0.032	0.00	0.032				
14.00	0.032	0.00	0.032				
14.50	0.032	0.00	0.032				
15.00	0.032	0.00	0.032				
15.50	0.032	0.00	0.032				
16.00	0.032	0.00	0.032				
16.50	0.033	0.00	0.033				
17.00	0.033	0.00	0.033				
17.50	0.033	0.00	0.033				
18.00	0.033	0.00	0.033				
18.50	0.033	0.00	0.033				
19.00	0.033	0.00	0.033				
19.50	0.033	0.00	0.033				
20.00	0.033	0.00	0.033				
20.50	0.033	0.00	0.033				
21.00	0.045	0.00	0.045				
21.50	0.045	0.00	0.045				
22.00	0.044	0.00	0.044				
22.50	0.042	0.00	0.042				
23.00	0.041	0.00	0.041				
23.50	0.040	0.00	0.040				
24.00	0.038	0.00	0.038				
24.50	0.027	0.00	0.027				
25.00	0.026	0.00	0.026				
25.50	0.026	0.00	0.026				
26.00	0.026	0.00	0.026				
26.50	0.026	0.00	0.026				
27.00	0.025	0.00	0.025				
27.50	0.025	0.00	0.025				
28.00	0.025	0.00	0.025				
28.50	0.025	0.00	0.025				
29.00	0.025	0.00	0.025				

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points

Runoff by SBUH method

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: PERV

Runoff Area=38,436 sf Runoff Depth=0.34"
Tc=6.0 min CN=81 Runoff=0.036 cfs 0.025 af

Subcatchment 2S: IMPERV

Runoff Area=5,017 sf Runoff Depth=1.33"
Tc=6.0 min CN=98 Runoff=0.039 cfs 0.013 af

Subcatchment 101S: IMPERV

Runoff Area=2,285 sf Runoff Depth=1.33"
Tc=6.0 min CN=98 Runoff=0.018 cfs 0.006 af

Subcatchment 102S: PERV

Runoff Area=4,055 sf Runoff Depth=0.31"
Tc=6.0 min CN=80 Runoff=0.003 cfs 0.002 af

Subcatchment 103S: IMPERV

Runoff Area=26,615 sf Runoff Depth=1.33"
Tc=6.0 min CN=98 Runoff=0.207 cfs 0.068 af

Subcatchment 104S: PERV

Runoff Area=10,490 sf Runoff Depth=0.31"
Tc=6.0 min CN=80 Runoff=0.008 cfs 0.006 af

Pond 105P: Underground Det

Peak Elev=412.32' Storage=0.047 af Inflow=0.213 cfs 0.074 af
Primary=0.020 cfs 0.045 af Secondary=0.000 cfs 0.000 af Outflow=0.020 cfs 0.045 af

Link 1L: EXST

Inflow=0.074 cfs 0.038 af
Primary=0.074 cfs 0.038 af

Link 2L: PROP

Inflow=0.033 cfs 0.053 af
Primary=0.033 cfs 0.053 af

Total Runoff Area = 1.995 ac Runoff Volume = 0.120 af Average Runoff Depth = 0.72"

Subcatchment 1S: PERV

Runoff = 0.036 cfs @ 8.03 hrs, Volume= 0.025 af, Depth= 0.34"

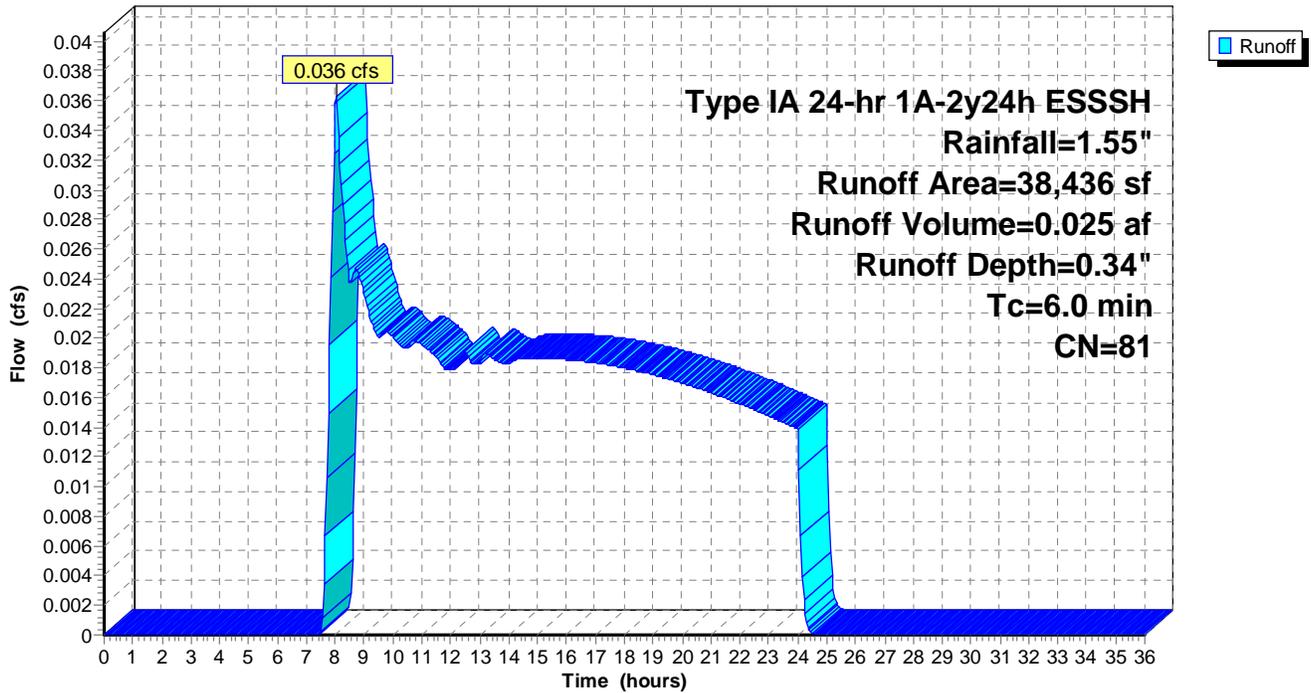
Runoff by SBUH method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 1A-2y24h ESSSH Rainfall=1.55"

Area (sf)	CN	Description
11,301	85	Gravel roads, HSG B
27,135	80	Open Space Good Condition
38,436	81	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S: PERV

Hydrograph



Hydrograph for Subcatchment 1S: PERV

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.000	14.75	1.18	0.17	0.019	29.50	1.55	0.34	0.000
0.25	0.01	0.00	0.000	15.00	1.19	0.17	0.019	29.75	1.55	0.34	0.000
0.50	0.02	0.00	0.000	15.25	1.20	0.18	0.019	30.00	1.55	0.34	0.000
0.75	0.02	0.00	0.000	15.50	1.22	0.18	0.019	30.25	1.55	0.34	0.000
1.00	0.03	0.00	0.000	15.75	1.23	0.19	0.019	30.50	1.55	0.34	0.000
1.25	0.04	0.00	0.000	16.00	1.24	0.19	0.019	30.75	1.55	0.34	0.000
1.50	0.05	0.00	0.000	16.25	1.25	0.20	0.019	31.00	1.55	0.34	0.000
1.75	0.07	0.00	0.000	16.50	1.27	0.20	0.018	31.25	1.55	0.34	0.000
2.00	0.08	0.00	0.000	16.75	1.28	0.21	0.018	31.50	1.55	0.34	0.000
2.25	0.09	0.00	0.000	17.00	1.29	0.21	0.018	31.75	1.55	0.34	0.000
2.50	0.10	0.00	0.000	17.25	1.30	0.22	0.018	32.00	1.55	0.34	0.000
2.75	0.11	0.00	0.000	17.50	1.31	0.22	0.018	32.25	1.55	0.34	0.000
3.00	0.13	0.00	0.000	17.75	1.32	0.23	0.018	32.50	1.55	0.34	0.000
3.25	0.14	0.00	0.000	18.00	1.33	0.23	0.018	32.75	1.55	0.34	0.000
3.50	0.15	0.00	0.000	18.25	1.34	0.24	0.018	33.00	1.55	0.34	0.000
3.75	0.17	0.00	0.000	18.50	1.35	0.24	0.018	33.25	1.55	0.34	0.000
4.00	0.18	0.00	0.000	18.75	1.36	0.25	0.018	33.50	1.55	0.34	0.000
4.25	0.19	0.00	0.000	19.00	1.37	0.25	0.018	33.75	1.55	0.34	0.000
4.50	0.21	0.00	0.000	19.25	1.39	0.26	0.017	34.00	1.55	0.34	0.000
4.75	0.23	0.00	0.000	19.50	1.40	0.26	0.017	34.25	1.55	0.34	0.000
5.00	0.24	0.00	0.000	19.75	1.40	0.27	0.017	34.50	1.55	0.34	0.000
5.25	0.26	0.00	0.000	20.00	1.41	0.27	0.017	34.75	1.55	0.34	0.000
5.50	0.28	0.00	0.000	20.25	1.42	0.28	0.017	35.00	1.55	0.34	0.000
5.75	0.30	0.00	0.000	20.50	1.43	0.28	0.017	35.25	1.55	0.34	0.000
6.00	0.32	0.00	0.000	20.75	1.44	0.29	0.016	35.50	1.55	0.34	0.000
6.25	0.34	0.00	0.000	21.00	1.45	0.29	0.016	35.75	1.55	0.34	0.000
6.50	0.37	0.00	0.000	21.25	1.46	0.29	0.016	36.00	1.55	0.34	0.000
6.75	0.39	0.00	0.000	21.50	1.47	0.30	0.016				
7.00	0.42	0.00	0.000	21.75	1.48	0.30	0.016				
7.25	0.44	0.00	0.000	22.00	1.49	0.31	0.016				
7.50	0.48	0.00	0.000	22.25	1.50	0.31	0.015				
7.75	0.57	0.00	0.015	22.50	1.50	0.32	0.015				
8.00	0.66	0.01	0.036	22.75	1.51	0.32	0.015				
8.25	0.71	0.02	0.029	23.00	1.52	0.32	0.015				
8.50	0.74	0.03	0.024	23.25	1.53	0.33	0.015				
8.75	0.78	0.04	0.025	23.50	1.54	0.33	0.014				
9.00	0.81	0.04	0.023	23.75	1.54	0.34	0.014				
9.25	0.83	0.05	0.021	24.00	1.55	0.34	0.014				
9.50	0.85	0.05	0.020	24.25	1.55	0.34	0.001				
9.75	0.87	0.06	0.020	24.50	1.55	0.34	0.000				
10.00	0.89	0.07	0.020	24.75	1.55	0.34	0.000				
10.25	0.91	0.07	0.020	25.00	1.55	0.34	0.000				
10.50	0.93	0.08	0.019	25.25	1.55	0.34	0.000				
10.75	0.95	0.08	0.020	25.50	1.55	0.34	0.000				
11.00	0.97	0.09	0.020	25.75	1.55	0.34	0.000				
11.25	0.98	0.09	0.019	26.00	1.55	0.34	0.000				
11.50	1.00	0.10	0.019	26.25	1.55	0.34	0.000				
11.75	1.01	0.10	0.018	26.50	1.55	0.34	0.000				
12.00	1.03	0.11	0.018	26.75	1.55	0.34	0.000				
12.25	1.04	0.11	0.018	27.00	1.55	0.34	0.000				
12.50	1.06	0.12	0.019	27.25	1.55	0.34	0.000				
12.75	1.07	0.12	0.018	27.50	1.55	0.34	0.000				
13.00	1.09	0.13	0.018	27.75	1.55	0.34	0.000				
13.25	1.10	0.13	0.019	28.00	1.55	0.34	0.000				
13.50	1.11	0.14	0.019	28.25	1.55	0.34	0.000				
13.75	1.13	0.14	0.018	28.50	1.55	0.34	0.000				
14.00	1.14	0.15	0.018	28.75	1.55	0.34	0.000				
14.25	1.15	0.15	0.019	29.00	1.55	0.34	0.000				
14.50	1.17	0.16	0.019	29.25	1.55	0.34	0.000				

Subcatchment 2S: IMPERV

Runoff = 0.039 cfs @ 7.93 hrs, Volume= 0.013 af, Depth= 1.33"

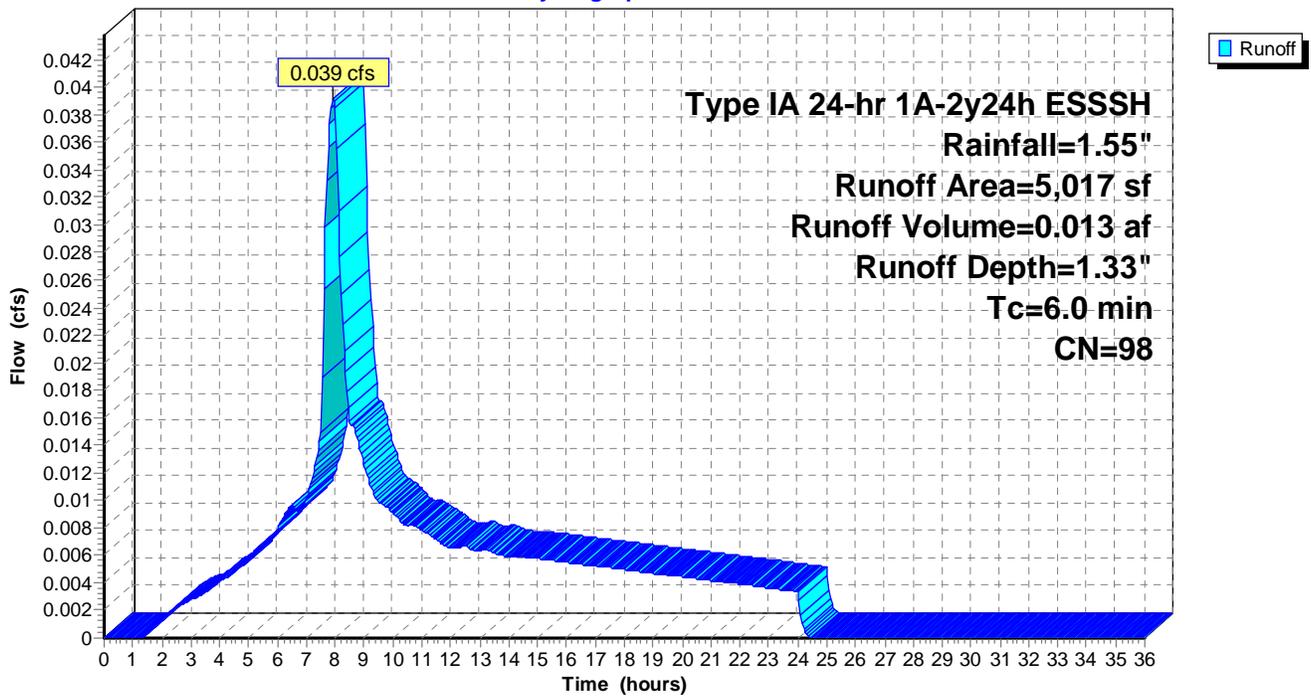
Runoff by SBUH method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 1A-2y24h ESSSH Rainfall=1.55"

Area (sf)	CN	Description
5,017	98	Paved parking & roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 2S: IMPERV

Hydrograph



Hydrograph for Subcatchment 2S: IMPERV

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.000	14.75	1.18	0.97	0.006	29.50	1.55	1.33	0.000
0.25	0.01	0.00	0.000	15.00	1.19	0.98	0.006	29.75	1.55	1.33	0.000
0.50	0.02	0.00	0.000	15.25	1.20	0.99	0.006	30.00	1.55	1.33	0.000
0.75	0.02	0.00	0.000	15.50	1.22	1.00	0.006	30.25	1.55	1.33	0.000
1.00	0.03	0.00	0.000	15.75	1.23	1.01	0.006	30.50	1.55	1.33	0.000
1.25	0.04	0.00	0.000	16.00	1.24	1.03	0.005	30.75	1.55	1.33	0.000
1.50	0.05	0.00	0.000	16.25	1.25	1.04	0.005	31.00	1.55	1.33	0.000
1.75	0.07	0.00	0.001	16.50	1.27	1.05	0.005	31.25	1.55	1.33	0.000
2.00	0.08	0.01	0.001	16.75	1.28	1.06	0.005	31.50	1.55	1.33	0.000
2.25	0.09	0.01	0.002	17.00	1.29	1.07	0.005	31.75	1.55	1.33	0.000
2.50	0.10	0.01	0.002	17.25	1.30	1.08	0.005	32.00	1.55	1.33	0.000
2.75	0.11	0.02	0.003	17.50	1.31	1.09	0.005	32.25	1.55	1.33	0.000
3.00	0.13	0.03	0.003	17.75	1.32	1.11	0.005	32.50	1.55	1.33	0.000
3.25	0.14	0.03	0.003	18.00	1.33	1.12	0.005	32.75	1.55	1.33	0.000
3.50	0.15	0.04	0.003	18.25	1.34	1.13	0.005	33.00	1.55	1.33	0.000
3.75	0.17	0.05	0.004	18.50	1.35	1.14	0.005	33.25	1.55	1.33	0.000
4.00	0.18	0.06	0.004	18.75	1.36	1.15	0.005	33.50	1.55	1.33	0.000
4.25	0.19	0.07	0.004	19.00	1.37	1.16	0.005	33.75	1.55	1.33	0.000
4.50	0.21	0.08	0.005	19.25	1.39	1.17	0.005	34.00	1.55	1.33	0.000
4.75	0.23	0.09	0.005	19.50	1.40	1.18	0.005	34.25	1.55	1.33	0.000
5.00	0.24	0.10	0.006	19.75	1.40	1.19	0.005	34.50	1.55	1.33	0.000
5.25	0.26	0.11	0.006	20.00	1.41	1.20	0.004	34.75	1.55	1.33	0.000
5.50	0.28	0.13	0.007	20.25	1.42	1.21	0.004	35.00	1.55	1.33	0.000
5.75	0.30	0.14	0.007	20.50	1.43	1.21	0.004	35.25	1.55	1.33	0.000
6.00	0.32	0.16	0.008	20.75	1.44	1.22	0.004	35.50	1.55	1.33	0.000
6.25	0.34	0.18	0.009	21.00	1.45	1.23	0.004	35.75	1.55	1.33	0.000
6.50	0.37	0.20	0.010	21.25	1.46	1.24	0.004	36.00	1.55	1.33	0.000
6.75	0.39	0.22	0.009	21.50	1.47	1.25	0.004				
7.00	0.42	0.24	0.010	21.75	1.48	1.26	0.004				
7.25	0.44	0.27	0.012	22.00	1.49	1.27	0.004				
7.50	0.48	0.30	0.015	22.25	1.50	1.28	0.004				
7.75	0.57	0.38	0.036	22.50	1.50	1.28	0.004				
8.00	0.66	0.46	0.039	22.75	1.51	1.29	0.004				
8.25	0.71	0.51	0.023	23.00	1.52	1.30	0.004				
8.50	0.74	0.55	0.016	23.25	1.53	1.31	0.004				
8.75	0.78	0.58	0.015	23.50	1.54	1.31	0.004				
9.00	0.81	0.60	0.013	23.75	1.54	1.32	0.003				
9.25	0.83	0.63	0.011	24.00	1.55	1.33	0.003				
9.50	0.85	0.65	0.010	24.25	1.55	1.33	0.000				
9.75	0.87	0.67	0.010	24.50	1.55	1.33	0.000				
10.00	0.89	0.69	0.009	24.75	1.55	1.33	0.000				
10.25	0.91	0.71	0.009	25.00	1.55	1.33	0.000				
10.50	0.93	0.72	0.008	25.25	1.55	1.33	0.000				
10.75	0.95	0.74	0.008	25.50	1.55	1.33	0.000				
11.00	0.97	0.76	0.008	25.75	1.55	1.33	0.000				
11.25	0.98	0.78	0.007	26.00	1.55	1.33	0.000				
11.50	1.00	0.79	0.007	26.25	1.55	1.33	0.000				
11.75	1.01	0.81	0.007	26.50	1.55	1.33	0.000				
12.00	1.03	0.82	0.007	26.75	1.55	1.33	0.000				
12.25	1.04	0.83	0.007	27.00	1.55	1.33	0.000				
12.50	1.06	0.85	0.007	27.25	1.55	1.33	0.000				
12.75	1.07	0.86	0.006	27.50	1.55	1.33	0.000				
13.00	1.09	0.87	0.006	27.75	1.55	1.33	0.000				
13.25	1.10	0.89	0.006	28.00	1.55	1.33	0.000				
13.50	1.11	0.90	0.006	28.25	1.55	1.33	0.000				
13.75	1.13	0.92	0.006	28.50	1.55	1.33	0.000				
14.00	1.14	0.93	0.006	28.75	1.55	1.33	0.000				
14.25	1.15	0.94	0.006	29.00	1.55	1.33	0.000				
14.50	1.17	0.95	0.006	29.25	1.55	1.33	0.000				

Subcatchment 101S: IMPERV

Runoff = 0.018 cfs @ 7.93 hrs, Volume= 0.006 af, Depth= 1.33"

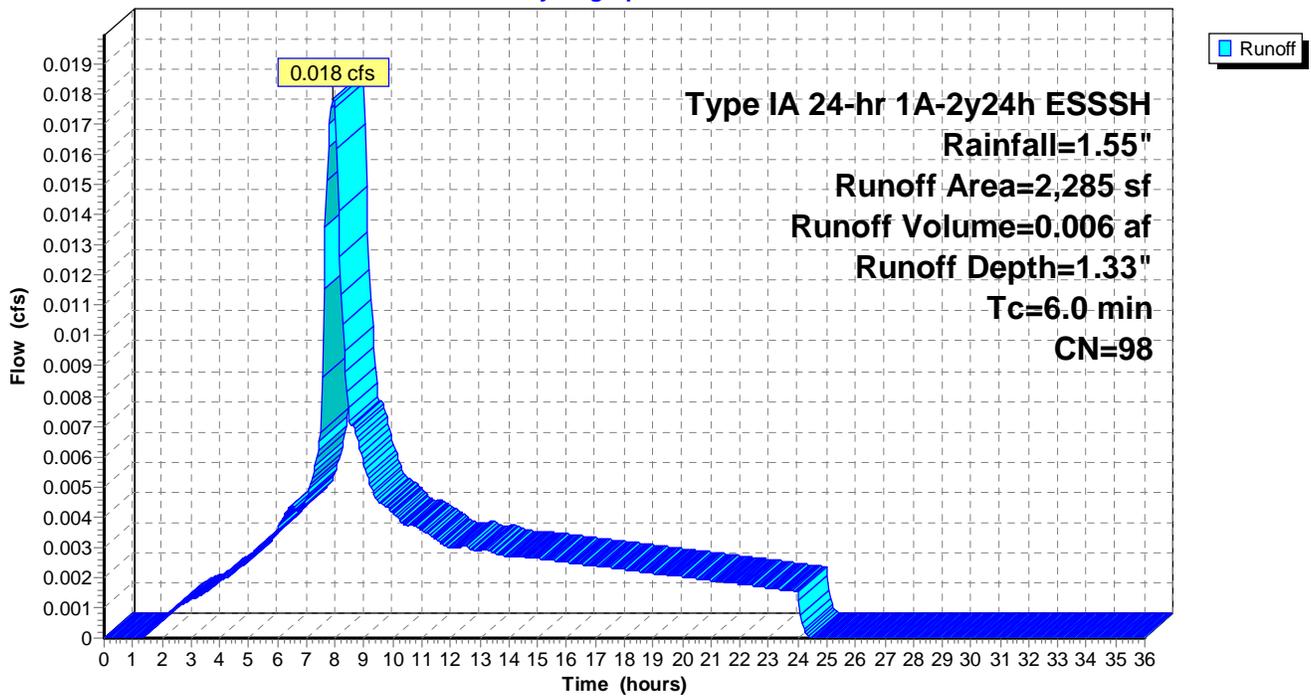
Runoff by SBUH method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 1A-2y24h ESSSH Rainfall=1.55"

Area (sf)	CN	Description
2,285	98	Paved parking & roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 101S: IMPERV

Hydrograph



Hydrograph for Subcatchment 101S: IMPERV

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.000	14.75	1.18	0.97	0.003	29.50	1.55	1.33	0.000
0.25	0.01	0.00	0.000	15.00	1.19	0.98	0.003	29.75	1.55	1.33	0.000
0.50	0.02	0.00	0.000	15.25	1.20	0.99	0.003	30.00	1.55	1.33	0.000
0.75	0.02	0.00	0.000	15.50	1.22	1.00	0.003	30.25	1.55	1.33	0.000
1.00	0.03	0.00	0.000	15.75	1.23	1.01	0.003	30.50	1.55	1.33	0.000
1.25	0.04	0.00	0.000	16.00	1.24	1.03	0.002	30.75	1.55	1.33	0.000
1.50	0.05	0.00	0.000	16.25	1.25	1.04	0.002	31.00	1.55	1.33	0.000
1.75	0.07	0.00	0.000	16.50	1.27	1.05	0.002	31.25	1.55	1.33	0.000
2.00	0.08	0.01	0.001	16.75	1.28	1.06	0.002	31.50	1.55	1.33	0.000
2.25	0.09	0.01	0.001	17.00	1.29	1.07	0.002	31.75	1.55	1.33	0.000
2.50	0.10	0.01	0.001	17.25	1.30	1.08	0.002	32.00	1.55	1.33	0.000
2.75	0.11	0.02	0.001	17.50	1.31	1.09	0.002	32.25	1.55	1.33	0.000
3.00	0.13	0.03	0.001	17.75	1.32	1.11	0.002	32.50	1.55	1.33	0.000
3.25	0.14	0.03	0.001	18.00	1.33	1.12	0.002	32.75	1.55	1.33	0.000
3.50	0.15	0.04	0.002	18.25	1.34	1.13	0.002	33.00	1.55	1.33	0.000
3.75	0.17	0.05	0.002	18.50	1.35	1.14	0.002	33.25	1.55	1.33	0.000
4.00	0.18	0.06	0.002	18.75	1.36	1.15	0.002	33.50	1.55	1.33	0.000
4.25	0.19	0.07	0.002	19.00	1.37	1.16	0.002	33.75	1.55	1.33	0.000
4.50	0.21	0.08	0.002	19.25	1.39	1.17	0.002	34.00	1.55	1.33	0.000
4.75	0.23	0.09	0.002	19.50	1.40	1.18	0.002	34.25	1.55	1.33	0.000
5.00	0.24	0.10	0.003	19.75	1.40	1.19	0.002	34.50	1.55	1.33	0.000
5.25	0.26	0.11	0.003	20.00	1.41	1.20	0.002	34.75	1.55	1.33	0.000
5.50	0.28	0.13	0.003	20.25	1.42	1.21	0.002	35.00	1.55	1.33	0.000
5.75	0.30	0.14	0.003	20.50	1.43	1.21	0.002	35.25	1.55	1.33	0.000
6.00	0.32	0.16	0.004	20.75	1.44	1.22	0.002	35.50	1.55	1.33	0.000
6.25	0.34	0.18	0.004	21.00	1.45	1.23	0.002	35.75	1.55	1.33	0.000
6.50	0.37	0.20	0.004	21.25	1.46	1.24	0.002	36.00	1.55	1.33	0.000
6.75	0.39	0.22	0.004	21.50	1.47	1.25	0.002				
7.00	0.42	0.24	0.005	21.75	1.48	1.26	0.002				
7.25	0.44	0.27	0.005	22.00	1.49	1.27	0.002				
7.50	0.48	0.30	0.007	22.25	1.50	1.28	0.002				
7.75	0.57	0.38	0.016	22.50	1.50	1.28	0.002				
8.00	0.66	0.46	0.018	22.75	1.51	1.29	0.002				
8.25	0.71	0.51	0.010	23.00	1.52	1.30	0.002				
8.50	0.74	0.55	0.007	23.25	1.53	1.31	0.002				
8.75	0.78	0.58	0.007	23.50	1.54	1.31	0.002				
9.00	0.81	0.60	0.006	23.75	1.54	1.32	0.002				
9.25	0.83	0.63	0.005	24.00	1.55	1.33	0.002				
9.50	0.85	0.65	0.004	24.25	1.55	1.33	0.000				
9.75	0.87	0.67	0.004	24.50	1.55	1.33	0.000				
10.00	0.89	0.69	0.004	24.75	1.55	1.33	0.000				
10.25	0.91	0.71	0.004	25.00	1.55	1.33	0.000				
10.50	0.93	0.72	0.004	25.25	1.55	1.33	0.000				
10.75	0.95	0.74	0.004	25.50	1.55	1.33	0.000				
11.00	0.97	0.76	0.004	25.75	1.55	1.33	0.000				
11.25	0.98	0.78	0.003	26.00	1.55	1.33	0.000				
11.50	1.00	0.79	0.003	26.25	1.55	1.33	0.000				
11.75	1.01	0.81	0.003	26.50	1.55	1.33	0.000				
12.00	1.03	0.82	0.003	26.75	1.55	1.33	0.000				
12.25	1.04	0.83	0.003	27.00	1.55	1.33	0.000				
12.50	1.06	0.85	0.003	27.25	1.55	1.33	0.000				
12.75	1.07	0.86	0.003	27.50	1.55	1.33	0.000				
13.00	1.09	0.87	0.003	27.75	1.55	1.33	0.000				
13.25	1.10	0.89	0.003	28.00	1.55	1.33	0.000				
13.50	1.11	0.90	0.003	28.25	1.55	1.33	0.000				
13.75	1.13	0.92	0.003	28.50	1.55	1.33	0.000				
14.00	1.14	0.93	0.003	28.75	1.55	1.33	0.000				
14.25	1.15	0.94	0.003	29.00	1.55	1.33	0.000				
14.50	1.17	0.95	0.003	29.25	1.55	1.33	0.000				

Subcatchment 102S: PERV

Runoff = 0.003 cfs @ 8.04 hrs, Volume= 0.002 af, Depth= 0.31"

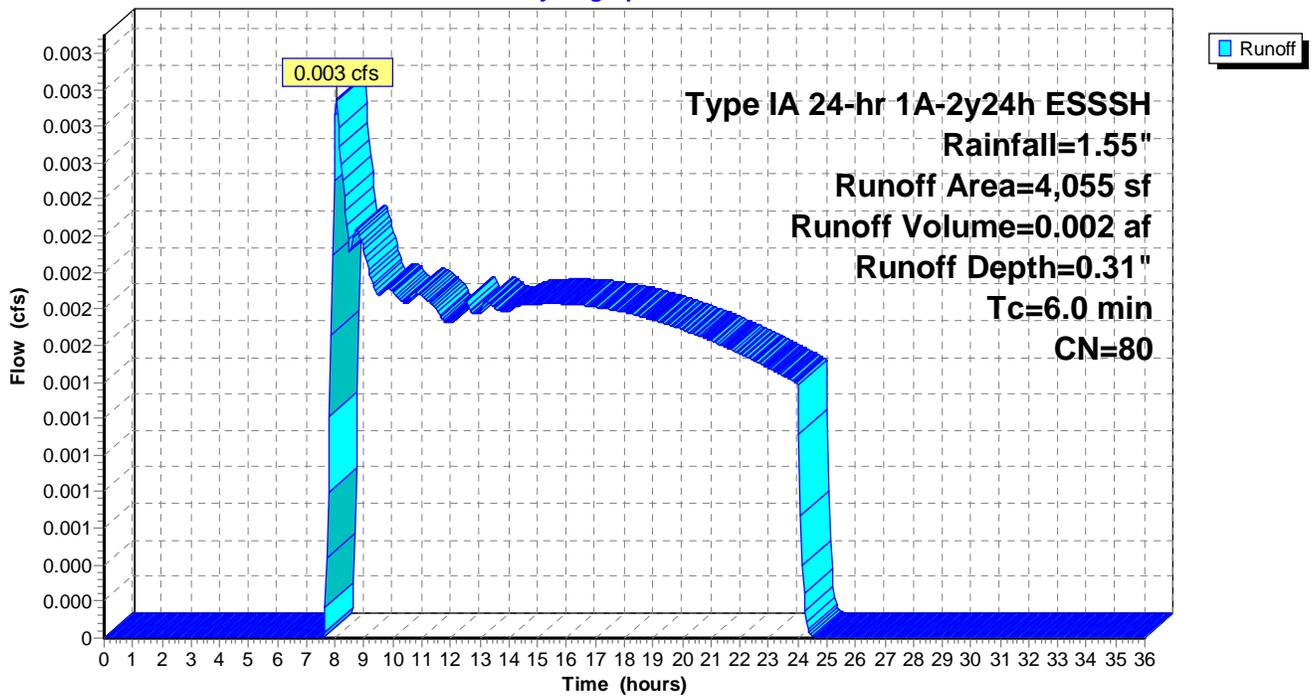
Runoff by SBUH method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 1A-2y24h ESSSH Rainfall=1.55"

Area (sf)	CN	Description
4,055	80	Open Space Good Condition

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 102S: PERV

Hydrograph



Hydrograph for Subcatchment 102S: PERV

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.000	14.75	1.18	0.15	0.002	29.50	1.55	0.31	0.000
0.25	0.01	0.00	0.000	15.00	1.19	0.15	0.002	29.75	1.55	0.31	0.000
0.50	0.02	0.00	0.000	15.25	1.20	0.16	0.002	30.00	1.55	0.31	0.000
0.75	0.02	0.00	0.000	15.50	1.22	0.16	0.002	30.25	1.55	0.31	0.000
1.00	0.03	0.00	0.000	15.75	1.23	0.16	0.002	30.50	1.55	0.31	0.000
1.25	0.04	0.00	0.000	16.00	1.24	0.17	0.002	30.75	1.55	0.31	0.000
1.50	0.05	0.00	0.000	16.25	1.25	0.17	0.002	31.00	1.55	0.31	0.000
1.75	0.07	0.00	0.000	16.50	1.27	0.18	0.002	31.25	1.55	0.31	0.000
2.00	0.08	0.00	0.000	16.75	1.28	0.18	0.002	31.50	1.55	0.31	0.000
2.25	0.09	0.00	0.000	17.00	1.29	0.19	0.002	31.75	1.55	0.31	0.000
2.50	0.10	0.00	0.000	17.25	1.30	0.19	0.002	32.00	1.55	0.31	0.000
2.75	0.11	0.00	0.000	17.50	1.31	0.20	0.002	32.25	1.55	0.31	0.000
3.00	0.13	0.00	0.000	17.75	1.32	0.20	0.002	32.50	1.55	0.31	0.000
3.25	0.14	0.00	0.000	18.00	1.33	0.21	0.002	32.75	1.55	0.31	0.000
3.50	0.15	0.00	0.000	18.25	1.34	0.21	0.002	33.00	1.55	0.31	0.000
3.75	0.17	0.00	0.000	18.50	1.35	0.22	0.002	33.25	1.55	0.31	0.000
4.00	0.18	0.00	0.000	18.75	1.36	0.22	0.002	33.50	1.55	0.31	0.000
4.25	0.19	0.00	0.000	19.00	1.37	0.23	0.002	33.75	1.55	0.31	0.000
4.50	0.21	0.00	0.000	19.25	1.39	0.23	0.002	34.00	1.55	0.31	0.000
4.75	0.23	0.00	0.000	19.50	1.40	0.24	0.002	34.25	1.55	0.31	0.000
5.00	0.24	0.00	0.000	19.75	1.40	0.24	0.002	34.50	1.55	0.31	0.000
5.25	0.26	0.00	0.000	20.00	1.41	0.24	0.002	34.75	1.55	0.31	0.000
5.50	0.28	0.00	0.000	20.25	1.42	0.25	0.002	35.00	1.55	0.31	0.000
5.75	0.30	0.00	0.000	20.50	1.43	0.25	0.002	35.25	1.55	0.31	0.000
6.00	0.32	0.00	0.000	20.75	1.44	0.26	0.002	35.50	1.55	0.31	0.000
6.25	0.34	0.00	0.000	21.00	1.45	0.26	0.002	35.75	1.55	0.31	0.000
6.50	0.37	0.00	0.000	21.25	1.46	0.27	0.002	36.00	1.55	0.31	0.000
6.75	0.39	0.00	0.000	21.50	1.47	0.27	0.002				
7.00	0.42	0.00	0.000	21.75	1.48	0.28	0.002				
7.25	0.44	0.00	0.000	22.00	1.49	0.28	0.002				
7.50	0.48	0.00	0.000	22.25	1.50	0.28	0.002				
7.75	0.57	0.00	0.001	22.50	1.50	0.29	0.002				
8.00	0.66	0.01	0.003	22.75	1.51	0.29	0.001				
8.25	0.71	0.02	0.003	23.00	1.52	0.30	0.001				
8.50	0.74	0.02	0.002	23.25	1.53	0.30	0.001				
8.75	0.78	0.03	0.002	23.50	1.54	0.30	0.001				
9.00	0.81	0.03	0.002	23.75	1.54	0.31	0.001				
9.25	0.83	0.04	0.002	24.00	1.55	0.31	0.001				
9.50	0.85	0.04	0.002	24.25	1.55	0.31	0.000				
9.75	0.87	0.05	0.002	24.50	1.55	0.31	0.000				
10.00	0.89	0.05	0.002	24.75	1.55	0.31	0.000				
10.25	0.91	0.06	0.002	25.00	1.55	0.31	0.000				
10.50	0.93	0.06	0.002	25.25	1.55	0.31	0.000				
10.75	0.95	0.07	0.002	25.50	1.55	0.31	0.000				
11.00	0.97	0.07	0.002	25.75	1.55	0.31	0.000				
11.25	0.98	0.08	0.002	26.00	1.55	0.31	0.000				
11.50	1.00	0.08	0.002	26.25	1.55	0.31	0.000				
11.75	1.01	0.09	0.002	26.50	1.55	0.31	0.000				
12.00	1.03	0.09	0.002	26.75	1.55	0.31	0.000				
12.25	1.04	0.10	0.002	27.00	1.55	0.31	0.000				
12.50	1.06	0.10	0.002	27.25	1.55	0.31	0.000				
12.75	1.07	0.11	0.002	27.50	1.55	0.31	0.000				
13.00	1.09	0.11	0.002	27.75	1.55	0.31	0.000				
13.25	1.10	0.12	0.002	28.00	1.55	0.31	0.000				
13.50	1.11	0.12	0.002	28.25	1.55	0.31	0.000				
13.75	1.13	0.13	0.002	28.50	1.55	0.31	0.000				
14.00	1.14	0.13	0.002	28.75	1.55	0.31	0.000				
14.25	1.15	0.14	0.002	29.00	1.55	0.31	0.000				
14.50	1.17	0.14	0.002	29.25	1.55	0.31	0.000				

Subcatchment 103S: IMPERV

Runoff = 0.207 cfs @ 7.93 hrs, Volume= 0.068 af, Depth= 1.33"

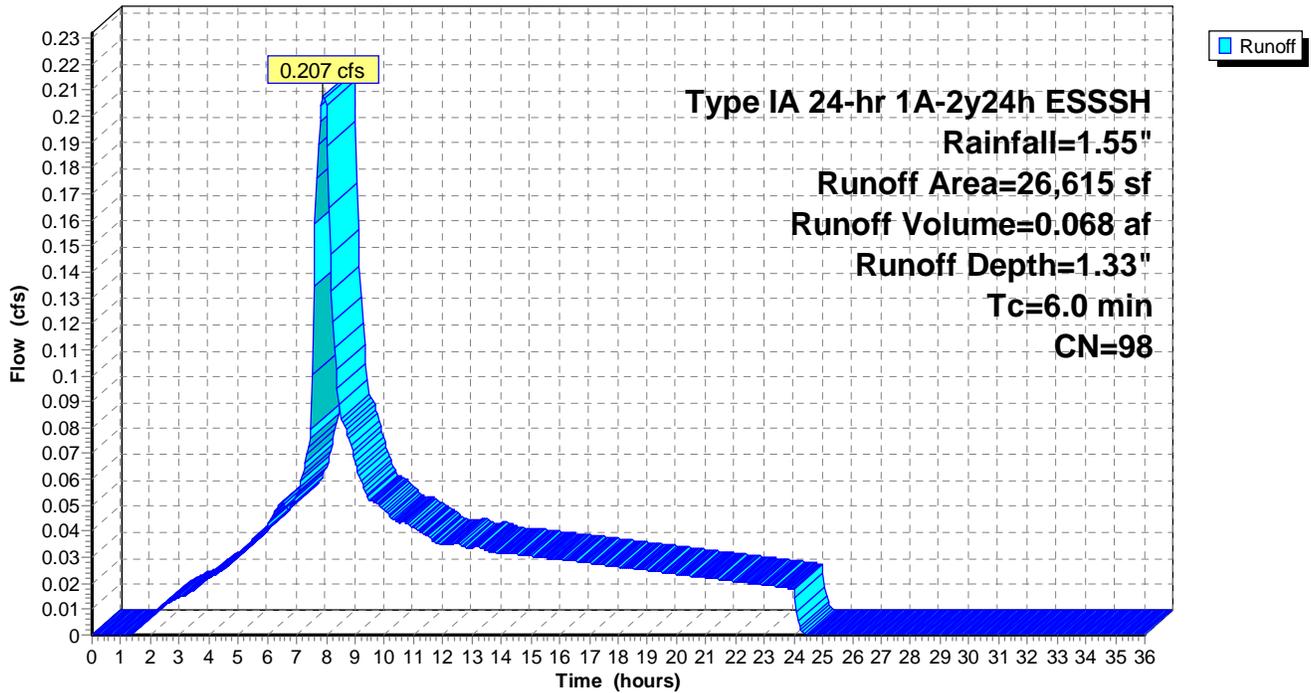
Runoff by SBUH method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 1A-2y24h ESSSH Rainfall=1.55"

Area (sf)	CN	Description
11,079	98	Roofs
15,536	98	Paved Parking
26,615	98	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 103S: IMPERV

Hydrograph



Hydrograph for Subcatchment 103S: IMPERV

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.000	14.75	1.18	0.97	0.031	29.50	1.55	1.33	0.000
0.25	0.01	0.00	0.000	15.00	1.19	0.98	0.030	29.75	1.55	1.33	0.000
0.50	0.02	0.00	0.000	15.25	1.20	0.99	0.030	30.00	1.55	1.33	0.000
0.75	0.02	0.00	0.000	15.50	1.22	1.00	0.030	30.25	1.55	1.33	0.000
1.00	0.03	0.00	0.000	15.75	1.23	1.01	0.029	30.50	1.55	1.33	0.000
1.25	0.04	0.00	0.000	16.00	1.24	1.03	0.029	30.75	1.55	1.33	0.000
1.50	0.05	0.00	0.002	16.25	1.25	1.04	0.029	31.00	1.55	1.33	0.000
1.75	0.07	0.00	0.005	16.50	1.27	1.05	0.028	31.25	1.55	1.33	0.000
2.00	0.08	0.01	0.007	16.75	1.28	1.06	0.028	31.50	1.55	1.33	0.000
2.25	0.09	0.01	0.010	17.00	1.29	1.07	0.028	31.75	1.55	1.33	0.000
2.50	0.10	0.01	0.012	17.25	1.30	1.08	0.027	32.00	1.55	1.33	0.000
2.75	0.11	0.02	0.013	17.50	1.31	1.09	0.027	32.25	1.55	1.33	0.000
3.00	0.13	0.03	0.015	17.75	1.32	1.11	0.027	32.50	1.55	1.33	0.000
3.25	0.14	0.03	0.016	18.00	1.33	1.12	0.026	32.75	1.55	1.33	0.000
3.50	0.15	0.04	0.018	18.25	1.34	1.13	0.026	33.00	1.55	1.33	0.000
3.75	0.17	0.05	0.020	18.50	1.35	1.14	0.026	33.25	1.55	1.33	0.000
4.00	0.18	0.06	0.022	18.75	1.36	1.15	0.025	33.50	1.55	1.33	0.000
4.25	0.19	0.07	0.024	19.00	1.37	1.16	0.025	33.75	1.55	1.33	0.000
4.50	0.21	0.08	0.025	19.25	1.39	1.17	0.025	34.00	1.55	1.33	0.000
4.75	0.23	0.09	0.028	19.50	1.40	1.18	0.024	34.25	1.55	1.33	0.000
5.00	0.24	0.10	0.030	19.75	1.40	1.19	0.024	34.50	1.55	1.33	0.000
5.25	0.26	0.11	0.034	20.00	1.41	1.20	0.024	34.75	1.55	1.33	0.000
5.50	0.28	0.13	0.037	20.25	1.42	1.21	0.023	35.00	1.55	1.33	0.000
5.75	0.30	0.14	0.038	20.50	1.43	1.21	0.023	35.25	1.55	1.33	0.000
6.00	0.32	0.16	0.042	20.75	1.44	1.22	0.022	35.50	1.55	1.33	0.000
6.25	0.34	0.18	0.048	21.00	1.45	1.23	0.022	35.75	1.55	1.33	0.000
6.50	0.37	0.20	0.051	21.25	1.46	1.24	0.022	36.00	1.55	1.33	0.000
6.75	0.39	0.22	0.049	21.50	1.47	1.25	0.021				
7.00	0.42	0.24	0.054	21.75	1.48	1.26	0.021				
7.25	0.44	0.27	0.064	22.00	1.49	1.27	0.021				
7.50	0.48	0.30	0.079	22.25	1.50	1.28	0.020				
7.75	0.57	0.38	0.189	22.50	1.50	1.28	0.020				
8.00	0.66	0.46	0.204	22.75	1.51	1.29	0.020				
8.25	0.71	0.51	0.121	23.00	1.52	1.30	0.019				
8.50	0.74	0.55	0.084	23.25	1.53	1.31	0.019				
8.75	0.78	0.58	0.077	23.50	1.54	1.31	0.019				
9.00	0.81	0.60	0.067	23.75	1.54	1.32	0.018				
9.25	0.83	0.63	0.058	24.00	1.55	1.33	0.018				
9.50	0.85	0.65	0.052	24.25	1.55	1.33	0.002				
9.75	0.87	0.67	0.051	24.50	1.55	1.33	0.000				
10.00	0.89	0.69	0.048	24.75	1.55	1.33	0.000				
10.25	0.91	0.71	0.045	25.00	1.55	1.33	0.000				
10.50	0.93	0.72	0.043	25.25	1.55	1.33	0.000				
10.75	0.95	0.74	0.043	25.50	1.55	1.33	0.000				
11.00	0.97	0.76	0.042	25.75	1.55	1.33	0.000				
11.25	0.98	0.78	0.040	26.00	1.55	1.33	0.000				
11.50	1.00	0.79	0.038	26.25	1.55	1.33	0.000				
11.75	1.01	0.81	0.036	26.50	1.55	1.33	0.000				
12.00	1.03	0.82	0.035	26.75	1.55	1.33	0.000				
12.25	1.04	0.83	0.035	27.00	1.55	1.33	0.000				
12.50	1.06	0.85	0.036	27.25	1.55	1.33	0.000				
12.75	1.07	0.86	0.034	27.50	1.55	1.33	0.000				
13.00	1.09	0.87	0.033	27.75	1.55	1.33	0.000				
13.25	1.10	0.89	0.034	28.00	1.55	1.33	0.000				
13.50	1.11	0.90	0.033	28.25	1.55	1.33	0.000				
13.75	1.13	0.92	0.032	28.50	1.55	1.33	0.000				
14.00	1.14	0.93	0.031	28.75	1.55	1.33	0.000				
14.25	1.15	0.94	0.031	29.00	1.55	1.33	0.000				
14.50	1.17	0.95	0.031	29.25	1.55	1.33	0.000				

Subcatchment 104S: PERV

Runoff = 0.008 cfs @ 8.04 hrs, Volume= 0.006 af, Depth= 0.31"

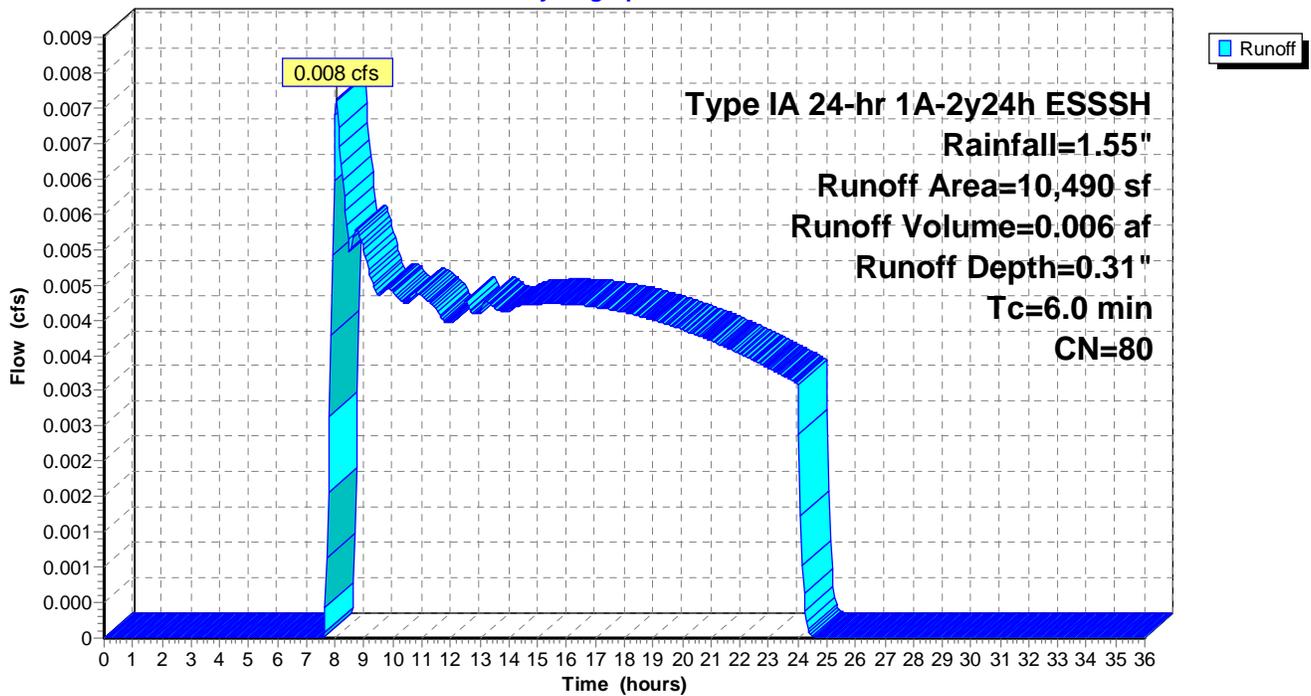
Runoff by SBUH method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 1A-2y24h ESSSH Rainfall=1.55"

Area (sf)	CN	Description
10,490	80	Open Space Good Condition

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 104S: PERV

Hydrograph



Hydrograph for Subcatchment 104S: PERV

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.000	14.75	1.18	0.15	0.005	29.50	1.55	0.31	0.000
0.25	0.01	0.00	0.000	15.00	1.19	0.15	0.005	29.75	1.55	0.31	0.000
0.50	0.02	0.00	0.000	15.25	1.20	0.16	0.005	30.00	1.55	0.31	0.000
0.75	0.02	0.00	0.000	15.50	1.22	0.16	0.005	30.25	1.55	0.31	0.000
1.00	0.03	0.00	0.000	15.75	1.23	0.16	0.005	30.50	1.55	0.31	0.000
1.25	0.04	0.00	0.000	16.00	1.24	0.17	0.005	30.75	1.55	0.31	0.000
1.50	0.05	0.00	0.000	16.25	1.25	0.17	0.005	31.00	1.55	0.31	0.000
1.75	0.07	0.00	0.000	16.50	1.27	0.18	0.005	31.25	1.55	0.31	0.000
2.00	0.08	0.00	0.000	16.75	1.28	0.18	0.005	31.50	1.55	0.31	0.000
2.25	0.09	0.00	0.000	17.00	1.29	0.19	0.005	31.75	1.55	0.31	0.000
2.50	0.10	0.00	0.000	17.25	1.30	0.19	0.005	32.00	1.55	0.31	0.000
2.75	0.11	0.00	0.000	17.50	1.31	0.20	0.005	32.25	1.55	0.31	0.000
3.00	0.13	0.00	0.000	17.75	1.32	0.20	0.005	32.50	1.55	0.31	0.000
3.25	0.14	0.00	0.000	18.00	1.33	0.21	0.005	32.75	1.55	0.31	0.000
3.50	0.15	0.00	0.000	18.25	1.34	0.21	0.005	33.00	1.55	0.31	0.000
3.75	0.17	0.00	0.000	18.50	1.35	0.22	0.005	33.25	1.55	0.31	0.000
4.00	0.18	0.00	0.000	18.75	1.36	0.22	0.005	33.50	1.55	0.31	0.000
4.25	0.19	0.00	0.000	19.00	1.37	0.23	0.004	33.75	1.55	0.31	0.000
4.50	0.21	0.00	0.000	19.25	1.39	0.23	0.004	34.00	1.55	0.31	0.000
4.75	0.23	0.00	0.000	19.50	1.40	0.24	0.004	34.25	1.55	0.31	0.000
5.00	0.24	0.00	0.000	19.75	1.40	0.24	0.004	34.50	1.55	0.31	0.000
5.25	0.26	0.00	0.000	20.00	1.41	0.24	0.004	34.75	1.55	0.31	0.000
5.50	0.28	0.00	0.000	20.25	1.42	0.25	0.004	35.00	1.55	0.31	0.000
5.75	0.30	0.00	0.000	20.50	1.43	0.25	0.004	35.25	1.55	0.31	0.000
6.00	0.32	0.00	0.000	20.75	1.44	0.26	0.004	35.50	1.55	0.31	0.000
6.25	0.34	0.00	0.000	21.00	1.45	0.26	0.004	35.75	1.55	0.31	0.000
6.50	0.37	0.00	0.000	21.25	1.46	0.27	0.004	36.00	1.55	0.31	0.000
6.75	0.39	0.00	0.000	21.50	1.47	0.27	0.004				
7.00	0.42	0.00	0.000	21.75	1.48	0.28	0.004				
7.25	0.44	0.00	0.000	22.00	1.49	0.28	0.004				
7.50	0.48	0.00	0.000	22.25	1.50	0.28	0.004				
7.75	0.57	0.00	0.002	22.50	1.50	0.29	0.004				
8.00	0.66	0.01	0.007	22.75	1.51	0.29	0.004				
8.25	0.71	0.02	0.006	23.00	1.52	0.30	0.004				
8.50	0.74	0.02	0.005	23.25	1.53	0.30	0.004				
8.75	0.78	0.03	0.006	23.50	1.54	0.30	0.004				
9.00	0.81	0.03	0.005	23.75	1.54	0.31	0.004				
9.25	0.83	0.04	0.005	24.00	1.55	0.31	0.004				
9.50	0.85	0.04	0.005	24.25	1.55	0.31	0.000				
9.75	0.87	0.05	0.005	24.50	1.55	0.31	0.000				
10.00	0.89	0.05	0.005	24.75	1.55	0.31	0.000				
10.25	0.91	0.06	0.005	25.00	1.55	0.31	0.000				
10.50	0.93	0.06	0.005	25.25	1.55	0.31	0.000				
10.75	0.95	0.07	0.005	25.50	1.55	0.31	0.000				
11.00	0.97	0.07	0.005	25.75	1.55	0.31	0.000				
11.25	0.98	0.08	0.005	26.00	1.55	0.31	0.000				
11.50	1.00	0.08	0.005	26.25	1.55	0.31	0.000				
11.75	1.01	0.09	0.004	26.50	1.55	0.31	0.000				
12.00	1.03	0.09	0.004	26.75	1.55	0.31	0.000				
12.25	1.04	0.10	0.005	27.00	1.55	0.31	0.000				
12.50	1.06	0.10	0.005	27.25	1.55	0.31	0.000				
12.75	1.07	0.11	0.005	27.50	1.55	0.31	0.000				
13.00	1.09	0.11	0.005	27.75	1.55	0.31	0.000				
13.25	1.10	0.12	0.005	28.00	1.55	0.31	0.000				
13.50	1.11	0.12	0.005	28.25	1.55	0.31	0.000				
13.75	1.13	0.13	0.005	28.50	1.55	0.31	0.000				
14.00	1.14	0.13	0.005	28.75	1.55	0.31	0.000				
14.25	1.15	0.14	0.005	29.00	1.55	0.31	0.000				
14.50	1.17	0.14	0.005	29.25	1.55	0.31	0.000				

Pond 105P: Underground Det

Inflow Area = 0.852 ac, Inflow Depth = 1.04" for 1A-2y24h ESSSH event
 Inflow = 0.213 cfs @ 7.95 hrs, Volume= 0.074 af
 Outflow = 0.020 cfs @ 24.00 hrs, Volume= 0.045 af, Atten= 91%, Lag= 963.5 min
 Primary = 0.020 cfs @ 24.00 hrs, Volume= 0.045 af
 Secondary = 0.000 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Peak Elev= 412.32' @ 24.00 hrs Surf.Area= 0.021 ac Storage= 0.047 af
 Plug-Flow detention time= 800.6 min calculated for 0.045 af (60% of inflow)
 Center-of-Mass det. time= 570.2 min (1,283.1 - 712.9)

Volume	Invert	Avail.Storage	Storage Description
#1	410.00'	0.003 af	4.50'D x 9.00'H Vertical Cone/Cylinder North
#2	410.00'	0.003 af	4.50'D x 8.10'H Vertical Cone/Cylinder South
#3	409.50'	0.078 af	60.0'D x 58.00'L Horizontal Cylinder x 3
		0.085 af	Total Available Storage

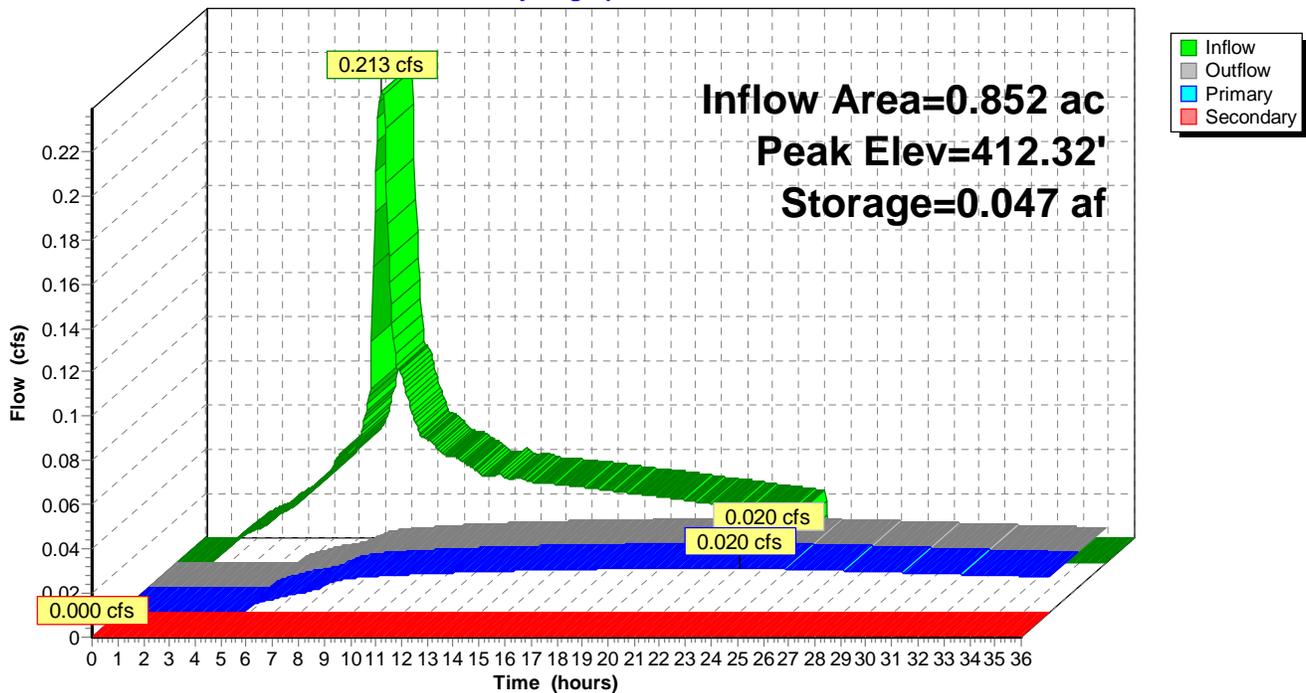
Device	Routing	Invert	Outlet Devices
#1	Secondary	414.12'	6.0" Horiz. Orifice/Grate Limited to weir flow C= 0.620
#2	Primary	410.00'	0.7" Horiz. Orifice C= 0.620

Primary OutFlow Max=0.020 cfs @ 24.00 hrs HW=412.32' (Free Discharge)
 ↳2=Orifice (Orifice Controls 0.020 cfs @ 7.5720 fps)

Secondary OutFlow Max=0.000 cfs @ 0.00 hrs HW=409.50' (Free Discharge)
 ↳1=Orifice/Grate (Controls 0.000 cfs)

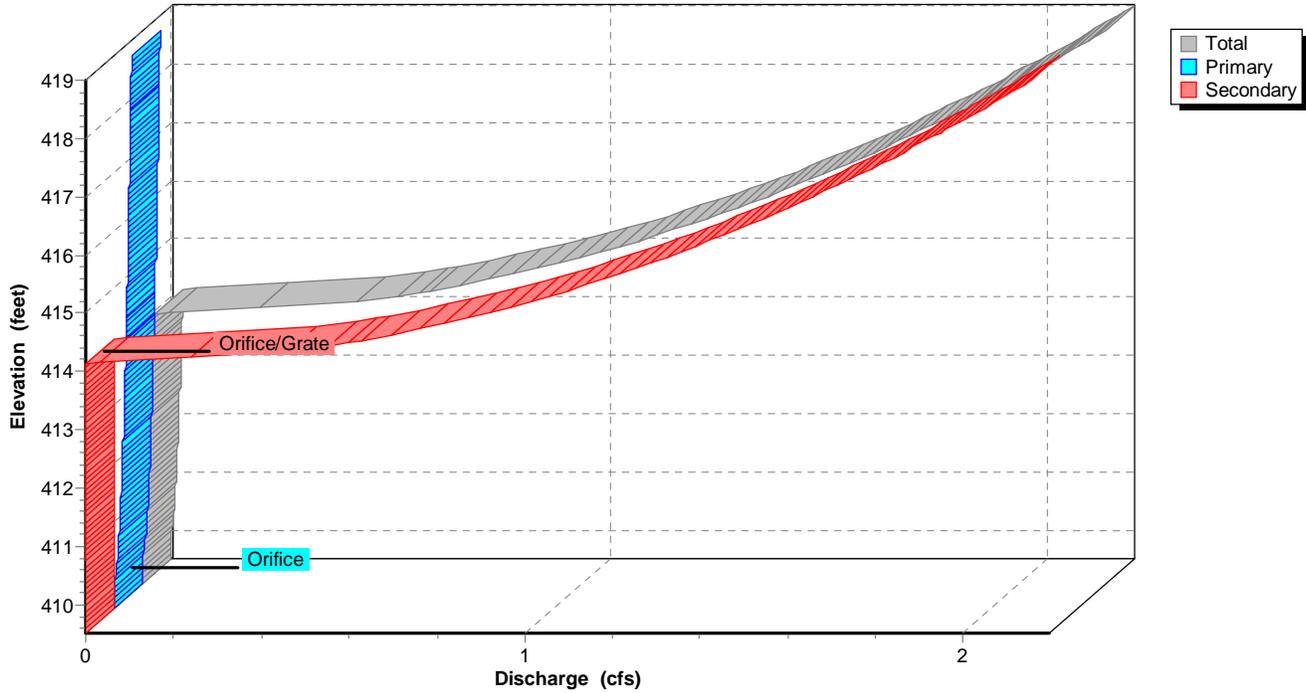
Pond 105P: Underground Det

Hydrograph



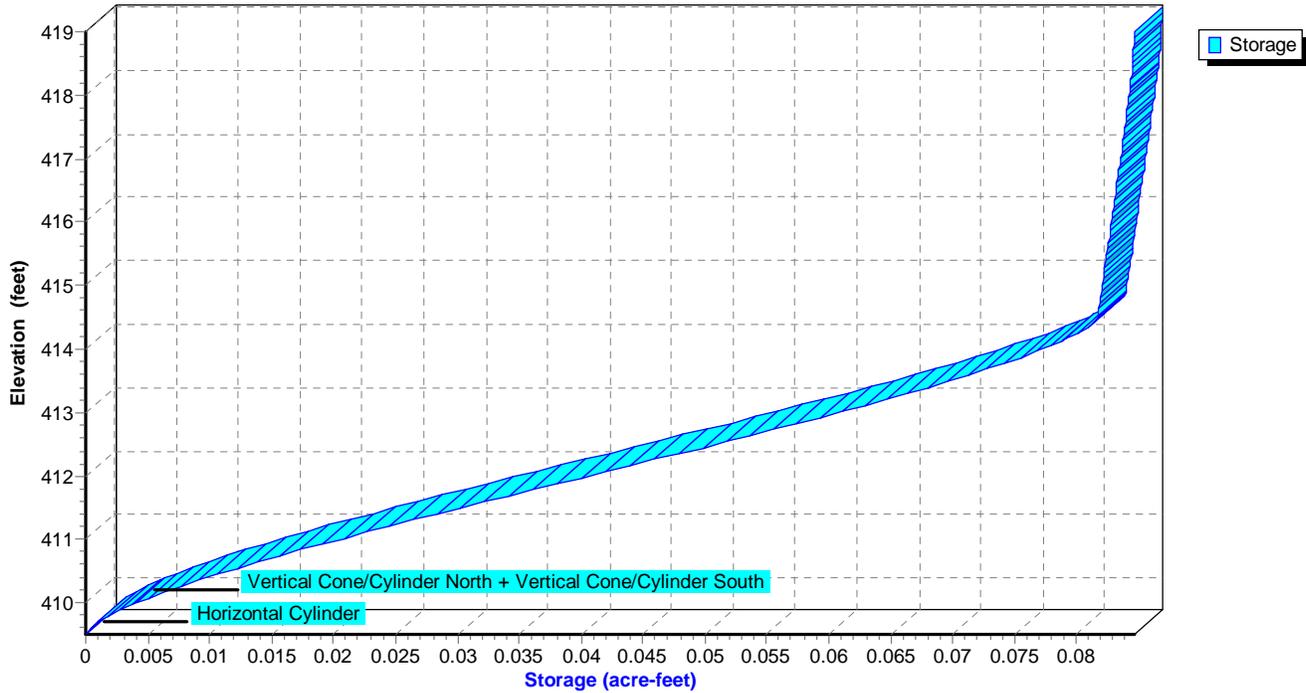
Pond 105P: Underground Det

Stage-Discharge



Pond 105P: Underground Det

Stage-Area-Storage



Hydrograph for Pond 105P: Underground Det

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.000	0.000	409.50	0.000	0.000	0.000
1.00	0.000	0.000	409.50	0.000	0.000	0.000
2.00	0.007	0.000	409.56	0.000	0.000	0.000
3.00	0.015	0.001	409.71	0.000	0.000	0.000
4.00	0.022	0.003	409.87	0.000	0.000	0.000
5.00	0.030	0.005	410.05	0.002	0.002	0.000
6.00	0.042	0.007	410.23	0.006	0.006	0.000
7.00	0.054	0.011	410.45	0.009	0.009	0.000
8.00	0.212	0.020	410.96	0.013	0.013	0.000
9.00	0.073	0.028	411.36	0.015	0.015	0.000
10.00	0.053	0.031	411.54	0.016	0.016	0.000
11.00	0.046	0.034	411.67	0.017	0.017	0.000
12.00	0.039	0.036	411.77	0.018	0.018	0.000
13.00	0.038	0.038	411.85	0.018	0.018	0.000
14.00	0.036	0.039	411.93	0.018	0.018	0.000
15.00	0.035	0.041	412.00	0.019	0.019	0.000
16.00	0.034	0.042	412.06	0.019	0.019	0.000
17.00	0.032	0.043	412.12	0.019	0.019	0.000
18.00	0.031	0.044	412.16	0.020	0.020	0.000
19.00	0.029	0.045	412.21	0.020	0.020	0.000
20.00	0.028	0.046	412.24	0.020	0.020	0.000
21.00	0.026	0.046	412.27	0.020	0.020	0.000
22.00	0.025	0.047	412.29	0.020	0.020	0.000
23.00	0.023	0.047	412.31	0.020	0.020	0.000
24.00	0.021	0.047	412.32	0.020	0.020	0.000
25.00	0.000	0.046	412.25	0.020	0.020	0.000
26.00	0.000	0.044	412.17	0.020	0.020	0.000
27.00	0.000	0.043	412.09	0.019	0.019	0.000
28.00	0.000	0.041	412.01	0.019	0.019	0.000
29.00	0.000	0.039	411.94	0.019	0.019	0.000
30.00	0.000	0.038	411.87	0.018	0.018	0.000
31.00	0.000	0.036	411.79	0.018	0.018	0.000
32.00	0.000	0.035	411.72	0.017	0.017	0.000
33.00	0.000	0.034	411.65	0.017	0.017	0.000
34.00	0.000	0.032	411.59	0.017	0.017	0.000
35.00	0.000	0.031	411.52	0.016	0.016	0.000
36.00	0.000	0.029	411.45	0.016	0.016	0.000

Stage-Discharge for Pond 105P: Underground Det

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)	Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
409.50	0.000	0.000	0.000	415.40	1.136	0.031	1.105
409.60	0.000	0.000	0.000	415.50	1.179	0.031	1.148
409.70	0.000	0.000	0.000	415.60	1.220	0.031	1.188
409.80	0.000	0.000	0.000	415.70	1.260	0.032	1.228
409.90	0.000	0.000	0.000	415.80	1.298	0.032	1.266
410.00	0.000	0.000	0.000	415.90	1.336	0.032	1.303
410.10	0.004	0.004	0.000	416.00	1.372	0.033	1.340
410.20	0.006	0.006	0.000	416.10	1.408	0.033	1.375
410.30	0.007	0.007	0.000	416.20	1.442	0.033	1.409
410.40	0.008	0.008	0.000	416.30	1.476	0.033	1.442
410.50	0.009	0.009	0.000	416.40	1.509	0.034	1.475
410.60	0.010	0.010	0.000	416.50	1.541	0.034	1.507
410.70	0.011	0.011	0.000	416.60	1.573	0.034	1.538
410.80	0.012	0.012	0.000	416.70	1.604	0.034	1.569
410.90	0.013	0.013	0.000	416.80	1.634	0.035	1.599
411.00	0.013	0.013	0.000	416.90	1.664	0.035	1.629
411.10	0.014	0.014	0.000	417.00	1.693	0.035	1.658
411.20	0.015	0.015	0.000	417.10	1.722	0.035	1.686
411.30	0.015	0.015	0.000	417.20	1.750	0.036	1.715
411.40	0.016	0.016	0.000	417.30	1.778	0.036	1.742
411.50	0.016	0.016	0.000	417.40	1.805	0.036	1.769
411.60	0.017	0.017	0.000	417.50	1.832	0.036	1.796
411.70	0.017	0.017	0.000	417.60	1.859	0.037	1.822
411.80	0.018	0.018	0.000	417.70	1.885	0.037	1.848
411.90	0.018	0.018	0.000	417.80	1.911	0.037	1.874
412.00	0.019	0.019	0.000	417.90	1.937	0.037	1.899
412.10	0.019	0.019	0.000	418.00	1.962	0.038	1.924
412.20	0.020	0.020	0.000	418.10	1.987	0.038	1.949
412.30	0.020	0.020	0.000	418.20	2.011	0.038	1.973
412.40	0.021	0.021	0.000	418.30	2.036	0.038	1.997
412.50	0.021	0.021	0.000	418.40	2.060	0.039	2.021
412.60	0.021	0.021	0.000	418.50	2.083	0.039	2.045
412.70	0.022	0.022	0.000	418.60	2.107	0.039	2.068
412.80	0.022	0.022	0.000	418.70	2.130	0.039	2.091
412.90	0.023	0.023	0.000	418.80	2.153	0.039	2.113
413.00	0.023	0.023	0.000	418.90	2.176	0.040	2.136
413.10	0.023	0.023	0.000	419.00	2.198	0.040	2.158
413.20	0.024	0.024	0.000				
413.30	0.024	0.024	0.000				
413.40	0.025	0.025	0.000				
413.50	0.025	0.025	0.000				
413.60	0.025	0.025	0.000				
413.70	0.026	0.026	0.000				
413.80	0.026	0.026	0.000				
413.90	0.026	0.026	0.000				
414.00	0.027	0.027	0.000				
414.10	0.027	0.027	0.000				
414.20	0.143	0.027	0.116				
414.30	0.420	0.028	0.392				
414.40	0.545	0.028	0.517				
414.50	0.630	0.028	0.602				
414.60	0.705	0.029	0.677				
414.70	0.773	0.029	0.744				
414.80	0.835	0.029	0.806				
414.90	0.892	0.029	0.863				
415.00	0.946	0.030	0.916				
415.10	0.997	0.030	0.967				
415.20	1.046	0.030	1.015				
415.30	1.092	0.031	1.061				

Stage-Area-Storage for Pond 105P: Underground Det

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
409.50	0.000	415.40	0.082
409.60	0.000	415.50	0.082
409.70	0.001	415.60	0.083
409.80	0.002	415.70	0.083
409.90	0.003	415.80	0.083
410.00	0.004	415.90	0.083
410.10	0.005	416.00	0.083
410.20	0.007	416.10	0.083
410.30	0.008	416.20	0.083
410.40	0.010	416.30	0.083
410.50	0.012	416.40	0.083
410.60	0.013	416.50	0.083
410.70	0.015	416.60	0.083
410.80	0.017	416.70	0.083
410.90	0.019	416.80	0.083
411.00	0.021	416.90	0.083
411.10	0.022	417.00	0.084
411.20	0.024	417.10	0.084
411.30	0.026	417.20	0.084
411.40	0.028	417.30	0.084
411.50	0.030	417.40	0.084
411.60	0.032	417.50	0.084
411.70	0.034	417.60	0.084
411.80	0.037	417.70	0.084
411.90	0.039	417.80	0.084
412.00	0.041	417.90	0.084
412.10	0.043	418.00	0.084
412.20	0.045	418.10	0.084
412.30	0.047	418.20	0.084
412.40	0.049	418.30	0.084
412.50	0.051	418.40	0.084
412.60	0.053	418.50	0.084
412.70	0.055	418.60	0.085
412.80	0.057	418.70	0.085
412.90	0.059	418.80	0.085
413.00	0.061	418.90	0.085
413.10	0.063	419.00	0.085
413.20	0.065		
413.30	0.066		
413.40	0.068		
413.50	0.070		
413.60	0.071		
413.70	0.073		
413.80	0.075		
413.90	0.076		
414.00	0.077		
414.10	0.078		
414.20	0.080		
414.30	0.081		
414.40	0.081		
414.50	0.082		
414.60	0.082		
414.70	0.082		
414.80	0.082		
414.90	0.082		
415.00	0.082		
415.10	0.082		
415.20	0.082		
415.30	0.082		

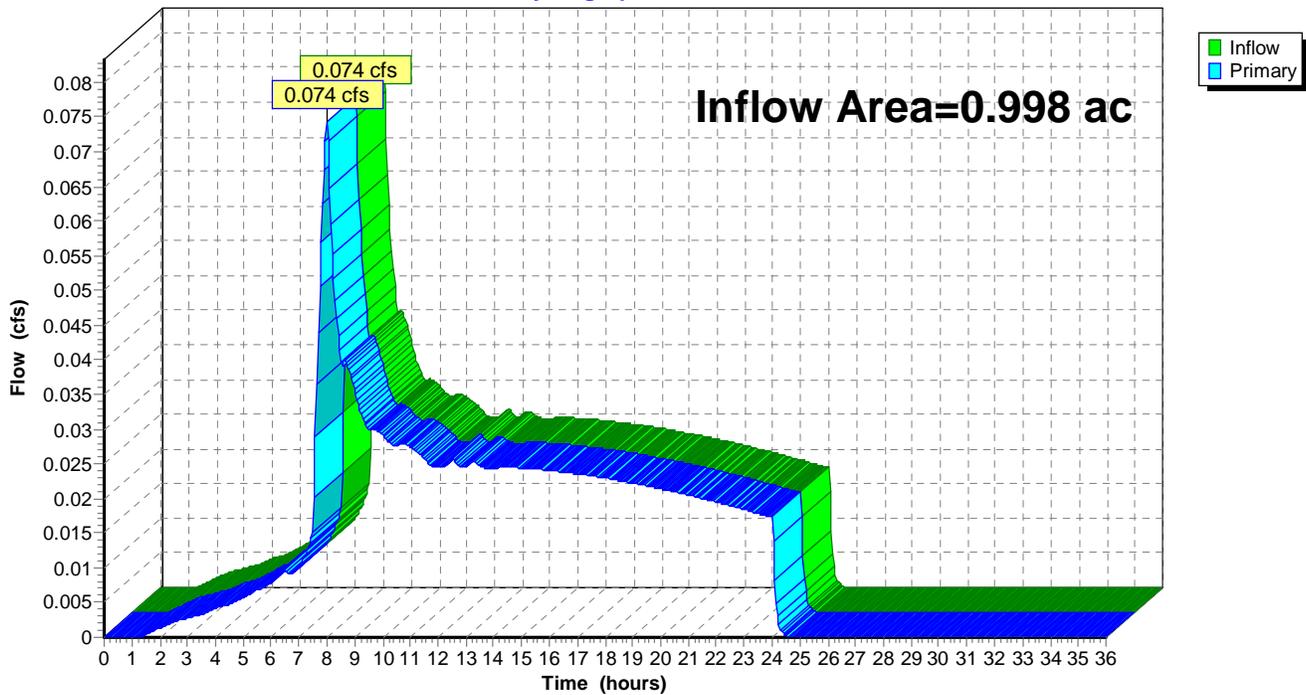
Link 1L: EXST

Inflow Area = 0.998 ac, Inflow Depth = 0.46" for 1A-2y24h ESSSH event
Inflow = 0.074 cfs @ 8.00 hrs, Volume= 0.038 af
Primary = 0.074 cfs @ 8.00 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link 1L: EXST

Hydrograph



Hydrograph for Link 1L: EXST

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.000	0.00	0.000	29.50	0.000	0.00	0.000
0.50	0.000	0.00	0.000	30.00	0.000	0.00	0.000
1.00	0.000	0.00	0.000	30.50	0.000	0.00	0.000
1.50	0.000	0.00	0.000	31.00	0.000	0.00	0.000
2.00	0.001	0.00	0.001	31.50	0.000	0.00	0.000
2.50	0.002	0.00	0.002	32.00	0.000	0.00	0.000
3.00	0.003	0.00	0.003	32.50	0.000	0.00	0.000
3.50	0.003	0.00	0.003	33.00	0.000	0.00	0.000
4.00	0.004	0.00	0.004	33.50	0.000	0.00	0.000
4.50	0.005	0.00	0.005	34.00	0.000	0.00	0.000
5.00	0.006	0.00	0.006	34.50	0.000	0.00	0.000
5.50	0.007	0.00	0.007	35.00	0.000	0.00	0.000
6.00	0.008	0.00	0.008	35.50	0.000	0.00	0.000
6.50	0.010	0.00	0.010	36.00	0.000	0.00	0.000
7.00	0.010	0.00	0.010				
7.50	0.015	0.00	0.015				
8.00	0.074	0.00	0.074				
8.50	0.039	0.00	0.039				
9.00	0.036	0.00	0.036				
9.50	0.030	0.00	0.030				
10.00	0.029	0.00	0.029				
10.50	0.027	0.00	0.027				
11.00	0.027	0.00	0.027				
11.50	0.026	0.00	0.026				
12.00	0.024	0.00	0.024				
12.50	0.026	0.00	0.026				
13.00	0.025	0.00	0.025				
13.50	0.025	0.00	0.025				
14.00	0.024	0.00	0.024				
14.50	0.024	0.00	0.024				
15.00	0.024	0.00	0.024				
15.50	0.024	0.00	0.024				
16.00	0.024	0.00	0.024				
16.50	0.024	0.00	0.024				
17.00	0.024	0.00	0.024				
17.50	0.023	0.00	0.023				
18.00	0.023	0.00	0.023				
18.50	0.023	0.00	0.023				
19.00	0.022	0.00	0.022				
19.50	0.022	0.00	0.022				
20.00	0.021	0.00	0.021				
20.50	0.021	0.00	0.021				
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22.50	0.019	0.00	0.019				
23.00	0.018	0.00	0.018				
23.50	0.018	0.00	0.018				
24.00	0.017	0.00	0.017				
24.50	0.000	0.00	0.000				
25.00	0.000	0.00	0.000				
25.50	0.000	0.00	0.000				
26.00	0.000	0.00	0.000				
26.50	0.000	0.00	0.000				
27.00	0.000	0.00	0.000				
27.50	0.000	0.00	0.000				
28.00	0.000	0.00	0.000				
28.50	0.000	0.00	0.000				
29.00	0.000	0.00	0.000				

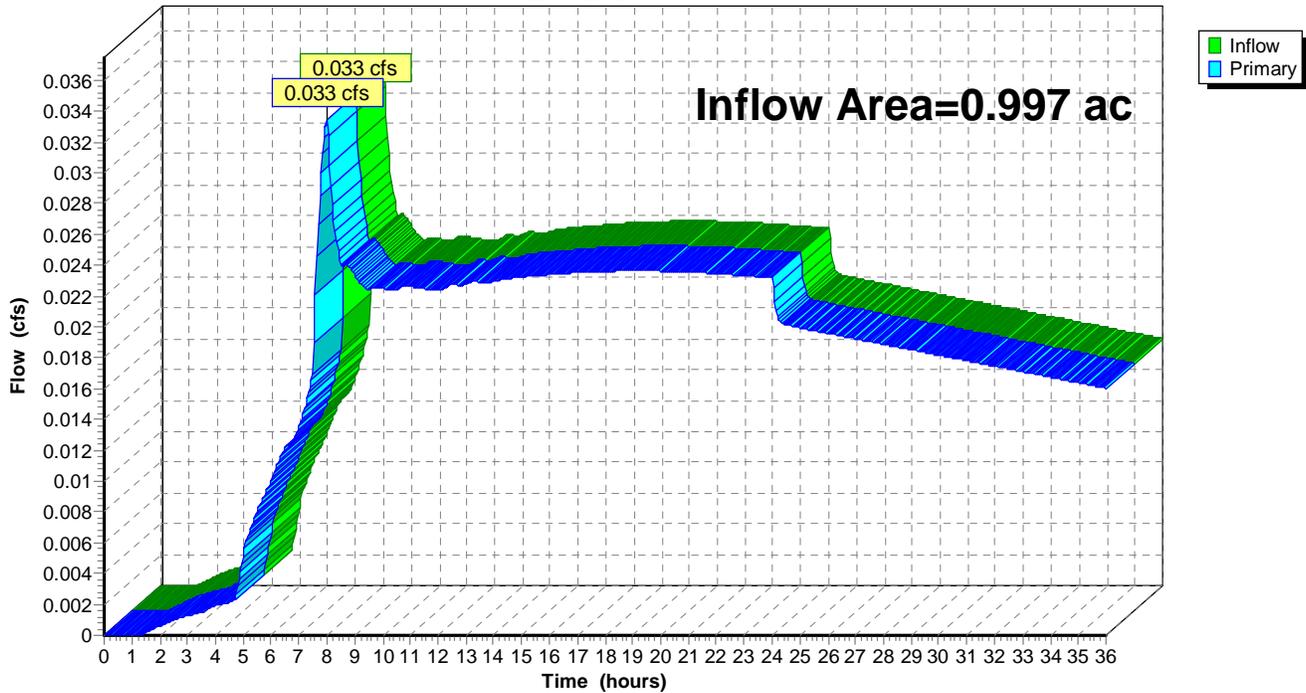
Link 2L: PROP

Inflow Area = 0.997 ac, Inflow Depth > 0.63" for 1A-2y24h ESSSH event
Inflow = 0.033 cfs @ 7.99 hrs, Volume= 0.053 af
Primary = 0.033 cfs @ 7.99 hrs, Volume= 0.053 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link 2L: PROP

Hydrograph



Hydrograph for Link 2L: PROP

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.000	0.00	0.000	29.50	0.018	0.00	0.018
0.50	0.000	0.00	0.000	30.00	0.018	0.00	0.018
1.00	0.000	0.00	0.000	30.50	0.018	0.00	0.018
1.50	0.000	0.00	0.000	31.00	0.018	0.00	0.018
2.00	0.001	0.00	0.001	31.50	0.018	0.00	0.018
2.50	0.001	0.00	0.001	32.00	0.017	0.00	0.017
3.00	0.001	0.00	0.001	32.50	0.017	0.00	0.017
3.50	0.002	0.00	0.002	33.00	0.017	0.00	0.017
4.00	0.002	0.00	0.002	33.50	0.017	0.00	0.017
4.50	0.002	0.00	0.002	34.00	0.017	0.00	0.017
5.00	0.005	0.00	0.005	34.50	0.017	0.00	0.017
5.50	0.008	0.00	0.008	35.00	0.016	0.00	0.016
6.00	0.010	0.00	0.010	35.50	0.016	0.00	0.016
6.50	0.012	0.00	0.012	36.00	0.016	0.00	0.016
7.00	0.014	0.00	0.014				
7.50	0.017	0.00	0.017				
8.00	0.033	0.00	0.033				
8.50	0.024	0.00	0.024				
9.00	0.023	0.00	0.023				
9.50	0.022	0.00	0.022				
10.00	0.023	0.00	0.023				
10.50	0.022	0.00	0.022				
11.00	0.023	0.00	0.023				
11.50	0.023	0.00	0.023				
12.00	0.022	0.00	0.022				
12.50	0.023	0.00	0.023				
13.00	0.023	0.00	0.023				
13.50	0.023	0.00	0.023				
14.00	0.023	0.00	0.023				
14.50	0.023	0.00	0.023				
15.00	0.023	0.00	0.023				
15.50	0.023	0.00	0.023				
16.00	0.023	0.00	0.023				
16.50	0.023	0.00	0.023				
17.00	0.024	0.00	0.024				
17.50	0.024	0.00	0.024				
18.00	0.024	0.00	0.024				
18.50	0.024	0.00	0.024				
19.00	0.024	0.00	0.024				
19.50	0.024	0.00	0.024				
20.00	0.024	0.00	0.024				
20.50	0.024	0.00	0.024				
21.00	0.024	0.00	0.024				
21.50	0.024	0.00	0.024				
22.00	0.023	0.00	0.023				
22.50	0.023	0.00	0.023				
23.00	0.023	0.00	0.023				
23.50	0.023	0.00	0.023				
24.00	0.023	0.00	0.023				
24.50	0.020	0.00	0.020				
25.00	0.020	0.00	0.020				
25.50	0.020	0.00	0.020				
26.00	0.020	0.00	0.020				
26.50	0.019	0.00	0.019				
27.00	0.019	0.00	0.019				
27.50	0.019	0.00	0.019				
28.00	0.019	0.00	0.019				
28.50	0.019	0.00	0.019				
29.00	0.019	0.00	0.019				

Appendix E

Other Supporting Documents

Isaac Thomas

From: Peter Apostol
Sent: Wednesday, October 26, 2016 1:08 PM
To: Isaac Thomas
Cc: Max Berde
Subject: FW: Vesting for Projects

Peter Apostol, P.E.
Principal
peter@coterraengineering.com

coterra

ENGINEERING PLLC

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Seattle, Washington 98104
206.596.7115
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From: Jane Zimmerman [mailto:JZimmerman@everettwa.gov]
Sent: Friday, October 14, 2016 6:40 AM
To: Peter Apostol <peter@coterraengineering.com>
Cc: Heather Griffin <HGriffin@everettwa.gov>; Jim Miller <JMiller@everettwa.gov>; Paul McKee <PMckee@everettwa.gov>; Bill Singer <BSinger@eworks.org>; Christina Congdon <CCongdon@eworks.org>
Subject: RE: Vesting for Projects

Hi Peter –

For this project, I would propose to consider the off-site right-of-way work as a separate project, with its own thresholds and stormwater management requirements.

Jane

*Jane Zimmerman, Sr. Engineer
City of Everett Public Works Department
phone: 425-257-8885 fax: 425-257-8882
e-mail: jzimmerman@everettwa.gov*

From: Peter Apostol [mailto:peter@coterraengineering.com]
Sent: Wednesday, October 12, 2016 6:03 PM
To: Jane Zimmerman

Cc: Heather Griffin; Jim Miller; Paul McKee; Bill Singer; Christina Congdon
Subject: RE: Vesting for Projects

Jane,

Thanks for the information. Talking with Bill, the project Architect, our goal will be to submit before the end of the year to get vested and try to maintain the clearing under an acre.

In talking with Bill, he indicated you would NOT include the off-site (Right-of-Way) work as part of that one acre threshold. Please confirm.

Also, would the off-site half street improvements along Berkshire (curb, gutter, sidewalk) be considered a separate threshold discharge area? Or would you consider this a part of the same threshold area and thus will have to address flow control and stormwater quality as well as on-site stormwater management?

Thanks.

Peter Apostol, P.E.
Principal
peter@coterraengineering.com

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From: Jane Zimmerman [<mailto:JZimmerman@everettwa.gov>]

Sent: Monday, October 10, 2016 10:06 AM

To: Peter Apostol <peter@coterraengineering.com>

Cc: Heather Griffin <HGriffin@everettwa.gov>; Jim Miller <JMiller@everettwa.gov>; Paul McKee <PMckee@everettwa.gov>

Subject: RE: Vesting for Projects

Hi Peter –

At this time, the Revised Code of Washington (RCW) addresses three specific points in time when vesting occurs for development regulations, and the submittal of a complete application for a division of land is one of those times. So are formal development agreements, such as exists on the City's Riverfront projects, and the submittal of a complete building permit application. In addition, the City previously determined that a complete stormwater site plan (e.g., drainage report) was required as part of the project's land use application – in order to show that the project could actually meet the current City stormwater management requirements – before granting the project a “vested” status with respect to stormwater standards.

I'm attaching PDI #09-02 to this message for your reference. Although the policy hasn't been updated to address the City's upcoming revision of our stormwater management requirements, I'm assuming the underlying argument that requires the submittal of a complete stormwater site plan for vesting will be retained. At least that's how I read the

RCWs, case law, and Planning Director Interpretation (PDI) #09-02 – and I haven't heard anything internally to oppose my read of the situation. In that situation, as long as there was a short plat approval still in effect, your project would be vested under the City's 2010 stormwater management requirements.

However, there's a case before the State Supreme Court that could change how the City has looked at this issue in the past. It's Case No. 92805-3, which is on their fall docket, and which involves vesting issues for stormwater standards... Regardless of the outcome of the court case, however, the City's new stormwater management requirements won't be effective until January 1, 2017. That means you'll have until 12/31/2016 to submit a complete land use application to the Planning Department before the new stormwater management standards would apply to your project.

If you have any more questions, please feel free to contact me.

Thank you,
Jane

*Jane Zimmerman, Sr. Engineer
City of Everett Public Works Department
phone: 425-257-8885 fax: 425-257-8882
e-mail: jzimmerman@everettwa.gov*

From: Peter Apostol [<mailto:peter@coterraengineering.com>]
Sent: Tuesday, October 04, 2016 4:27 PM
To: Jane Zimmerman
Subject: Vesting for Projects

Hi Jane,

I'm reviewing the requirements for the project located at Berkshire Drive next to the reservoir for CHS's Safe Streets Housing Project. I understand the project requires a shortplat and was wondering what are the requirements for vesting under the current stormwater code and when would we be required to design to the new stormwater code.

Peter Apostol, P.E.
Principal
peter@coterraengineering.com

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Appendix F

Operation and Maintenance Plan

4.6 Maintenance Standards for Drainage Facilities and Catch Basins

4.6.1 Purpose

The purpose of this chapter is to set forth maintenance standards for different components of drainage facilities and catch basins. These standards match specific facility components and features with approved uniform maintenance procedures.

The facility-specific maintenance standards contained in this section are intended to be conditions for determining if maintenance actions are required, as identified through inspection. The following definitions apply to maintenance described in this chapter.

"Drainage facility" means a catch basin or stormwater flow control or treatment facility described in Table 5.3 of this chapter.

"Maintenance" for this chapter shall be used to mean regular maintenance, repair or replacement actions. The maintenance standards are not intended to be measures of a facility's required condition at all times between inspections. In other words, if these conditions are exceeded at any time between inspections and/or maintenance, this does not automatically constitute a violation of these standards.

4.6.2 Applicability

This chapter applies to drainage facilities identified in Table 5.3 of this chapter that are owned or operated by Snohomish County, catch basins owned or operated by the County, and such drainage facilities and catch basins owned by other entities.

4.6.3 Enforcement

Chapter 7.54 Snohomish County Code (SCC) requires any owner or operator of a drainage facility described in this chapter to maintain the facility in accordance with the standards set forth in this chapter.

4.6.4 Tracking Maintenance and Repair Costs

Chapter 7.54 Snohomish County Code (SCC) requires property owners to keep records of their maintenance actions for their drainage facilities. In addition, Snohomish County requests that owners and operators of drainage facilities track the cost of maintenance and repairs and provide these costs to the County. The request for cost information is not a regulatory requirement. The information will be used by the County to estimate general maintenance and repair cost information and to provide that information to members of the public who may need to perform such work and estimate costs. The County does not intend to provide cost information that can be traced to a specific facility.

4.6.5 Drainage Facility Maintenance Schedule

A) Maintenance actions to be completed within thirty days of the date of notice

- 1) When a County-initiated inspection of a flow control structure finds that the hydraulic function of the structure is significantly impaired, the owner or operator shall have thirty days from the date of the notice issued by the County in which to complete maintenance actions required by the notice.
- 2) If, after thirty days, the required maintenance actions have not been completed, the owner or operator will be in violation of County code and will be subject to enforcement action by the County. In such cases, the County may, at its option, perform the necessary maintenance actions, in which case the owner or operator will be charged for all costs the County incurs for performing these maintenance actions.

B) Maintenance actions to be completed within one year of the date of notice

- 1) In addition to the requirements of section 4.6.5A, when a County-initiated inspection of a drainage facility identifies one or more conditions for any component listed in Table 5.3 for which maintenance is needed, and for which the necessary maintenance actions are estimated to cost less than \$25,000, the owner or operator has one year from the date of the notice issued by the County in which to complete maintenance actions required by the notice. If maintenance of a flow control structure is required under section 4.6.5A, the cost of those maintenance actions shall be considered part of the total maintenance cost for the entire drainage facility.
- 2) The owner or operator is responsible for obtaining all required permits and permissions before starting work.
- 3) If, after one year from the date of the notice, the required maintenance actions have not been completed, the owner or operator will be subject to enforcement action by the County. In such cases, the County may, at its option, perform the necessary maintenance actions, in which case the owner or operator will be charged for all costs the County incurs for performing these maintenance actions.
- 4) With the exception of work described in 4.6.5A and 4.6.5D, maintenance actions may not be allowed the period from October 1 to April 30 in order to ensure that downstream property and stream corridors will not be subject to flooding, habitat degradation, or pollutant contamination as a result of these actions.
- 5) Depending on the scope of work and seasonal conditions, the County reserves the right to require the owner or operator to complete necessary maintenance actions in the first year during the period from May 1 to September 30.

C) Maintenance actions to be completed within two years of the date of notice

- 1) In addition to the requirements of section 4.6.5A, when a County-initiated inspection of a drainage facility identifies one or more conditions for any component listed in Table 5.3 for which maintenance is needed, and for which the necessary maintenance actions are estimated to cost \$25,000 or more, the owner or operator has two years from the date of the notice issued by the County in which to complete maintenance actions required by the notice as well as any other actions needed to produce the expected results in Table 5.3. If maintenance of a flow control

structure is required under section 4.6.5A, the cost of those maintenance actions shall be considered part of the total maintenance cost for the entire drainage facility.

- 2) The owner or operator shall be responsible for acquiring all needed permits and permissions before commencing work.
- 3) If, after two years from the date of the notice, the required maintenance actions have not been completed, the owner or operator will be subject to enforcement action by the County. In such cases, the County may, at its option, perform the necessary maintenance actions, in which case the owner or operator will be charged for all costs the County incurs for performing these maintenance actions.
- 4) With the exception of work described in 4.6.5A and 4.6.5D, maintenance actions may not be allowed the period from October 1 to April 30 in order to ensure that downstream property and stream corridors will not be subject to flooding, habitat degradation, or pollutant contamination as a result of these actions.
- 5) Depending on the scope of work and seasonal conditions, the County reserves the right to require the owner or operator to complete necessary maintenance actions in the first year during the period from May 1 to September 30.
- 6) In order for the owner or operator of the drainage facility to receive two (2) years to perform the necessary maintenance actions, he/she must provide the County with a good faith estimate or bid for the total cost of these maintenance actions no later than the 60th day after the date of the notice.

D) Emergency orders

- 1) In addition to any requirements described above, and in accordance with the provisions of Chapter 30.85 SCC, if the County determines that a condition exists at a drainage facility that endangers public or private property, creates an immediate hazard, creates a violation of critical areas provisions or surface water protection, or threatens the health and safety of the occupants of any premises or members of the public, the County may issue an emergency order. Upon issuance of an emergency order, the owner or operator of the drainage facility shall remedy the condition immediately.

4.6.6 Maintenance Standards

Maintenance standards are set forth in Table 5.3.

No. 3 – Underground Detention Pipes/Tanks

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
Storage Area	Plugged Air Vents	One-half of the cross section of a vent is blocked at any point or the vent is damaged.	Vents open and functioning.
	Debris and Sediment	The average sediment depth measured at multiple locations exceeds 10% of the detention pipe diameter (or the depth of the storage area) or the sediment depth measured at any single point exceeds 15% of the pipe diameter. (Example: The sediment depth in a 60-inch diameter detention pipe is measured at three locations. The sediment would need to be removed if the average depth of the three measurements is at least 6 inches or if the depth of any single measurement is at least 9 inches.	All sediment, debris, and organic matter removed from storage area.
	Joints Between Tank/Pipe Section	Any openings or voids at section joint allowing material to seep into or water to leak out of facility. Note: This may need an engineering analysis to assess the structural stability.	All joints between tank/pipe sections are sealed.
	Tank or Pipe Bent Out of Shape	Any part of tank/pipe is bent out of shape more than 10% of its design shape. Note: This may need an engineering analysis to assess the structural stability.	Tank/pipe section is repaired or replaced to design.
	Tank/Pipe Material	Any visible holes or cracks wider than a quarter of an inch or evidence of material seeping into or water leaking out of pipe wall, or qualified maintenance or inspection personnel determine that tank/pipe is not structurally sound.	Tank/pipe is repaired or replaced to design specifications and is structurally sound.
Access Hole	Cover Not in Place	Cover is missing or only partially in place. Any open manhole requires maintenance.	Manhole is closed.
	Locking Mechanism Not Working	Locking mechanism cannot be opened or lock bolts cannot be removed by one maintenance person with proper hand tools.	Mechanism or lock bolts open with proper hand tools.
	Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure with proper hand tools. Intent is to keep cover from sealing off access to maintenance.	Cover can be removed and reinstalled by one maintenance person with proper hand tools.
	Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, cracked/broken rungs, misalignment, rungs not securely attached to structure wall, rust, or cracks.	Ladder meets design standards and allows maintenance person safe access.
Catch Basins	See "Catch Basins" (No. 5)	See "Catch Basins" (No. 5).	See "Catch Basins" (No. 5).
Standpipe, Cleanout Gate, Orifice Plate	Obstructions, Damaged, or Missing	See "Control Structure/Flow Restrictors" (No. 4)	See "Control Structure/Flow Restrictors" (No. 4)

No. 4 – Control Structure/Flow Restrictors

Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
Standpipe	Obstructions	Any material blocking (or having the potential of blocking) the pipe overflow.	Pipe is free of all obstructions and works as designed.
	Structural Damage	Structure is not securely attached to manhole wall.	Structure is securely attached to wall and outlet pipe.
		Structure is not in upright position (allow up to 10% from plumb).	Structure is in correct position.
		Connections to outlet pipe are not watertight and show signs of rust.	Connections to outlet pipe are water tight; structure repaired or replaced and works as designed.
		Any holes other than designed holes in the structure.	Structure has no holes other than designed holes.
Cleanout Gate	Damaged or Missing	Cleanout gate is not watertight or is missing.	Gate is watertight and works as designed.
		Gate cannot be moved up and down by one maintenance person.	Gate moves up and down easily and is watertight.
		Chain/rod leading to gate is missing or damaged.	Chain is in place and works as designed.
		Gate is rusted over 50% of its surface area.	Gate is repaired or replaced to meet design standards.
Orifice Plate	Damaged or Missing	Control device is not working properly due to missing, out of place, or bent orifice plate.	Plate is in place and works as designed.
	Obstructions	Any trash, debris, sediment, or vegetation blocking the plate.	Plate is free of all obstructions and works as designed.
Overflow Pipe	Obstructions	Any trash or debris blocking (or having the potential of blocking) the overflow pipe.	Pipe is free of all obstructions and works as designed.
Access Hole	Cover Not in Place	Cover is missing or only partially in place. Any open manhole requires maintenance.	Manhole is closed.
	Locking Mechanism Not Working	Locking mechanism cannot be opened or lock bolts cannot be removed by one maintenance person with proper hand tools.	Mechanism or lock bolts open with proper hand tools.
	Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure with proper hand tools. Intent is to keep cover from sealing off access to maintenance.	Cover can be removed and reinstalled by one maintenance person with proper hand tools.
	Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, cracked/broken rungs, misalignment, rungs not securely attached to structure wall, rust, or cracks.	Ladder meets design standards and allows maintenance person safe access.

No. 4 – Control Structure/Flow Restrictors

Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
Catch Basin	See "Catch Basins" (No. 5).	See "Catch Basins" (No. 5).	See "Catch Basins" (No. 5).
	Sediment & Debris	Sediment, trash, vegetation, and/or other debris material exceeds 25% of the catch basin sump depth or is 1 foot below the orifice plate.	Control structure orifice is not blocked. All sediment and debris removed.

No. 5 – Catch Basins

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is performed
General	Sediment & Debris	Sediment, trash, and/or other debris material is located immediately in front of the catch basin opening or is blocking inletting capacity of the basin by more than 10%.	No sediment or debris is located immediately in front of catch basin or on grate opening.
		Sediment, trash, and/or other debris material (located in the catch basin) exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of six inches clearance from the debris surface to the invert of the lowest pipe.	No sediment or debris is in the catch basin.
		Sediment, trash, and/or other debris material located in any inlet or outlet pipe is blocking more than 1/3 of its height.	Inlet and outlet pipes are free of sediment and debris.
		Dead animals or vegetation that impair catch basin function or that could generate odors that could cause complaints or dangerous gases (e.g., methane).	No dead animals or vegetation are present within the catch basin.
	Structure Damage to Frame and/or Top Slab	Top slab has holes larger than 2 square inches or cracks wider than 1/4 inch (Intent is to make sure no material is seeping into the catch basin).	Top slab is free of holes and cracks. No water and/or soil is seeping into the catch basin
		Frame not sitting flush on top slab, i.e., separation of more than 3/4 inch of the frame from the top slab. Frame not securely attached	Frame is sitting flush on the riser rings or top slab and firmly attached.
	Fractures or Cracks in Basin Walls/ Bottom	Cracks wider than 1/2 inch or evidence of soil particles entering the structure through the cracks, or qualified maintenance or inspection personnel determine that the vault is not structurally sound.	Catch basin is replaced or repaired to design standards.
		Grout fillet has separated or cracked wider than 1/2 inch and longer than 1 foot at the joint of any inlet/outlet pipe or any evidence of soil particles entering catch basin through cracks.	Pipe is regouted and secure at basin wall.
	Settlement/ Misalignment	Settlement of misalignment of the catch basin causes a safety, function, or design problem.	Catch basin is replaced or repaired to design standards.
		Contaminants and Pollution	Any evidence of oil, gasoline, contaminants or other pollutants Note: Coordinate removal/cleanup with local and/or state water quality response agency.
Access Hole Cover	Cover Not in Place	Cover is missing or only partially in place. Any open catch basin requires maintenance.	Catch basin cover is fully in place
	Locking Mechanism Not Working	Locking mechanism cannot be opened or lock bolts cannot be removed by one maintenance person with proper hand tools.	Mechanism or lock bolts open with proper hand tools.
	Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure with proper hand tools. Intent is keep cover from sealing off access to maintenance.	Cover can be removed and reinstalled by one maintenance person with proper hand tools.

No. 5 – Catch Basins

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is performed
Ladder	Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, cracked/broken rungs, rungs not securely attached to basin wall, misalignment, rust, cracks, or sharp edges.	Ladder meets design standards and allows maintenance person safe access.
Metal Grates (If Applicable)	Trash and Debris	Trash and debris that is blocking more than 20% of grate surface inletting capacity.	Grate free of trash and debris.
	Damaged or Missing.	Grate missing or broken member(s) of the grate.	Grate is in place and meets design standards.

No. 6 – Debris Barriers (e.g., Trash Racks)

Maintenance Components	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
General	Trash and Debris	Trash or debris that is plugging more than 20% of the openings in the barrier.	Barrier cleared to design flow capacity.
Metal	Damaged/ Missing Bars.	Bars are bent out of shape more than 3 inches.	Bars in place with no bends more than 3/4 inch.
		Bars are missing or entire barrier missing.	Bars in place according to design.
		Bars are loose and rust is causing 50% deterioration to any part of barrier.	Barrier replaced or repaired to design standards.
	Inlet/Outlet Pipe	Debris barrier missing or not attached to pipe	Barrier firmly attached to pipe

No. 18 – Catchbasin Inserts

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
General	Sediment Accumulation	When sediment forms a cap over the insert media of the insert and/or unit.	No sediment cap on the insert media and its unit.
	Trash and Debris Accumulation	Trash and debris accumulates on insert unit creating a blockage/restriction.	Trash and debris removed from insert unit. Runoff freely flows into catch basin.
	Media Insert Not Removing Oil	Effluent water from media insert has a visible sheen.	Effluent water from media insert is free of oils and has no visible sheen.
	Media Insert Water Saturated	Catch basin insert is saturated with water and no longer has the capacity to absorb.	Remove and replace media insert
	Media Insert-Oil Saturated	Media oil saturated due to petroleum spill that drains into catch basin.	Remove and replace media insert.
	Media Insert Use Beyond Normal Product Life	Media has been used beyond the typical average life of media insert product.	Remove and replace media at regular intervals, depending on insert product.

No. 21 – Bioretention Facilities

Component	Defect	Condition When Maintenance is Needed	Maintenance Action and Expected Results
Inlet	Energy dissipaters are damaged	Visible soil, missing rock, or other evidence of damage	Replace or rebuild energy dissipaters to design specifications
	Inlet is blocked	Flow into bioretention bed is impeded	Remove blockage to restore flow
Bioretention bed / plants	Sediment accumulation	Sediment depth exceeds 1 inch	Remove sediment to restore permeability
	Trash or debris accumulation	Trash or debris are accumulated on bed	Remove trash and debris
	Excessive drawdown time	Drawdown time > 48 hours	Remove and replace mulch or bioretention soil mix to restore permeability, and/or clean underdrain
	Uneven ponding	Water does not pond evenly on bed	Remove, replace, or reposition mulch to restore even ponding
	Bioretention plants	Bioretention plants are missing, diseased, or dead	Replace plants with healthy bioretention plants selected per the planting plan
	Weeds or invasive plants	Weeds or invasive plants growing in bioretention facility	Remove weeds and invasive plants, replace with bioretention plants or cover affected areas with mulch, as appropriate
	Mulch is inadequate	Mulch is missing	Replace mulch to maintain 2-3 inch depth in mulched areas of bioretention system
	Bed compaction	Bed is compacted due to foot or vehicle traffic or other reason	Loosen compacted bed material, or replace as needed, to restore permeability
Sidewalls, check dams, weirs	Visible damage or erosion	Sidewalls, check dams, or weirs have visible erosion or other structural damage	Repair to bring into conformance with facility design
	Flow over check dams or weirs is blocked	Flow is blocked so that design ponding depth is exceeded	Clear blockage to restore design ponding depth
	Flow around check dams or weirs	Flow is going around check dams or weirs so that design ponding depth is not attained	Repair check dams, weirs, and sidewalls to restore design ponding depth
	Grade board or weir top not level	Uneven flow over check dams or weirs so that design ponding depth is not attained	Repair check dams and weirs to restore design ponding depth
Overflow	Energy dissipaters are damaged	Visible soil, missing rock, or other evidence of damage	Replace or rebuild energy dissipaters to design specifications
	Overflow is blocked	Flow is blocked so that standing pool depth is above design depth	Clear overflow structure to restore design ponding depth
Underdrain system	Underdrain is blocked or damaged	Flow does not pass as designed through underdrain system	Clean or repair underdrain system to restore design flow capacity

No. 21 - Conveyance Storm Pipes

Drainage System Feature	Potential Defect	Conditions When Maintenance Is Needed	Results Expected When Maintenance Is Performed Or Not Needed
General	Obstructions, Including Roots	Root enters or deforms pipe, reducing flow.	Use mechanical methods to remove root if possible. Use of chemicals to remove roots shall be done in accordance with applicable regulations. If necessary, remove the vegetation over the line.
	Pipe Dented or Broken	Inlet/outlet piping damaged or broken and in need of repair.	Pipe repaired and/or replaced.
	Pipe Rusted or Deteriorated	Any part of the piping that is crushed or deformed more than 20% or any other failure to the piping.	Pipe repaired and/or replaced.
	Sediment & Debris	Sediment depth is greater than 20% of pipe diameter.	Install upstream debris traps (where applicable) then clean pipe and remove material.
	Debris barrier or Trash Rack Missing	A debris barrier or trash rack that had been installed on the end of a drainage pipe is missing	Debris barrier or trash rack is replaced.
	Joint/Seal Problems	The joint between pipe sections is separated and/or the seal at the joint is cracked or broken.	The joint and/or seal is repaired so that joint is not separated and is properly sealed.

No. 22 - Facility Discharge Points

Drainage System Feature	Potential Defect	Conditions When Maintenance Is Needed	Results Expected When Maintenance Is Performed Or Not Needed
Monitoring	Inspection of Discharge Water for Obvious Signs of Poor Water Quality.	Sheen, obvious oil or other contaminants present.	Identify and eliminate pollution source AND report discharge to Snohomish County Surface Water Management Division. Effluent discharge from facility should be clear.
	Receiving Area Saturated	Water in receiving area is causing substrate to become saturated and unstable.	Receiving area sound.
General	Rock Pad - Missing or Moved Rock	Only one layer of rock exists above native soil in area five square feet or larger, or any exposure of native soil where pad was originally installed.	Rock pad replaced to design standards.
	Rock Pad - Erosion	Soil erosion in or adjacent to rock pad.	Rock pad replaced to design standards.
	Obstructions, Including Roots	Roots or debris enters pipe or deforms pipe, reducing flow	Use mechanical methods to remove root if possible. Use of chemicals to remove roots shall be done in accordance with applicable regulations. If necessary, remove the vegetation over the line
	Pipe Rusted or Deteriorated	Any part of the pipe that is broken, crushed or deformed more than 20% or any other failure to the piping	Pipe repaired or replaced.

Appendix G

Construction Stormwater Pollution Prevention Plan



321 3rd Avenue South, Suite 406
Seattle, Washington 98104
206.596.7115

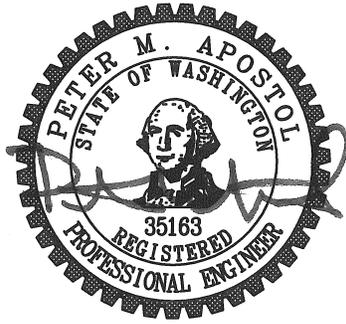
CONSTRUCTION STORMWATER POLLUTION PREVENTION PLAN

Project: Catholic Housing Services – Everett Safe Streets Supportive Housing
Everett, WA 98203

Prepared For: Catholic Housing Services of Western Washington
100 23rd Avenue South
Seattle, WA 98114

Prepared By: Isaac Thomas, PE, CFM
Reviewed By: Peter Apostol, PE

Date: December 16, 2016



“I hereby certify that this Drainage and Temporary Erosion Control Plan for Everett Safe Streets Supportive Housing has been prepared by me or under my supervision and meets minimum standards of City of Everett and normal standards of engineering practice. I hereby acknowledge and agree that the jurisdiction does not and will not assume liability for the sufficiency, suitability, or performance of drainage facilities designed by me.”

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I. Project Description

The site for the future Catholic Housing Services' (CHS) Everett Safe Streets Supportive Housing (ESSSH) is located at 6107 Berkshire Drive, Everett, Washington 98203, Township 28 N, and Range 5 E, at approximately 47.9415 degrees North latitude, and 122.2165 degrees West longitude.

Multi-family housing is proposed in addition to parking, site and utility improvements within less than one (1) acre (42,725 square feet) of disturbance. In addition to the site improvements, off-site right-of-way (ROW) improvements will include new curb, gutter, sidewalk, a small rockery and associated drainage improvements for Berkshire Drive along the project frontage.

The property size is 53,575 sf, of which the proposed four (4) story, multi-family residential, 70-unit building will occupy an approximately 11,000 sf footprint. Proposed Parking for 21 vehicles will replace approximately 6,100 sf of existing pavement. An additional 11,700 sf of other impervious areas will be constructed as parking and sidewalks. The project follows the requirements set forth by the City of Everett (COE) in the Stormwater Management Manual of 2010.

II. Erosion Control Specialist

The project has not been bid and no contractor has been selected to perform the work. A Certified Erosion and Sediment Control Lead will be required to be identified prior to the start of construction.

III. Existing Conditions

The ESSSH project site is currently partially occupied by an existing fire training facility that is situated in the middle of a large tarmac. A gravel lined area also resides adjacent to and west of the tarmac. Topographic relief, one (1)-ft contours, and other data was obtained through a land survey performed by Alpha Subdivision Pro's Inc. Land Surveying and Planning in October 2016 (Appendix B). Two (2)-ft contours for offsite areas surrounding the site, along with utility and building locations were obtained from the COE geographical information systems (GIS) department October 27, 2016.

Stormwater runoff west of the tarmac sheet flows to the west and down the steep slope where it is collected by a series of catch basins at the toe of slope. Runoff from the existing tarmac, drains to one of two clusters-of-three catch basins located on the west and south edges of said pavement. This runoff is conveyed to the storm mains along Berkshire Dr. and Evergreen Way. These storm mains both empty to Pigeon Creek Number 1, and ultimately to Possession Sound.

A 24-inch polyethylene (PE) storm drain currently runs along the east property line of the site, beneath the existing pavement, and serves the fire training site. This line reduces to a 6-inch diameter at the site entrance and conveys flow to the south to a combined sewer manhole on an 8-inch line beneath Berkshire Dr. Additionally, a 12-inch polyvinyl chloride (PVC) storm drain runs along the north side of Berkshire Dr., parallel to the south property line, but does not serve the site. Finally, a 36-inch Alderwood Water District transmission water main runs roughly parallel the 24-inch sewer pipe, mentioned above, on the east property line. Caution to not damage these lines during construction shall be taken.

IV. Adjacent Areas

The site is located on the southeast corner of a City of Everett Reservoir Tract. The property was allocated from this tract. Immediately to the east is a fire department training facility, and a water distribution reservoir. To the west and down the hill are three (3) businesses that are located along Evergreen Way. The businesses (and addresses) are Peking Duck (6211 Evergreen Way), Jiffy Lube (6209), and Janbo Café (6125).

V. Critical Areas

Proposed construction disturbance does not overlap with any environmentally critical areas. However, there is an "Ns" Stream at the toe of the adjacent Steep Slope to the west. The proposed project is outside of the 50-ft buffer for "Ns" Streams (COE 19.37.170) recommended setback from the hill side from a licensed geotechnical engineer (COE 19.37.080). The setback is a 2.5:1 imaginary line from the toe of slope. Furthermore, proposed stormwater discharge shall not be by means of infiltration.

VI. Soil

A geotechnical investigation was performed on November 1, 2016 by Geotech Consultants, Inc for the project site (Appendix C). Multiple borings and test pits were dug with samples tested. The report showed that the site soils are loose to medium-dense un-engineered fill soil generally comprised of gravelly silty-sand, presumably from the excavation of the nearby reservoir site. These findings confirm the United States Geological Survey's (USGS) Soil Survey Geographical Database (SSURGO) that classifies the soil as having moderately low runoff potential when thoroughly wet, with unimpeded water transmission.

VII. Potential Erosion Problem Areas

There are no specific potential erosion problem areas within the project area, however all areas in which clearing and grading work will occur have the potential for erosion. This potential will be reduced and mitigated through the application of the BMP's indicated on the TESC Plans included in Appendix A of the Stormwater Site Plan.

VIII. Twelve Elements

TESC Measures are being addressed as follows:

1. Mark Clearing Limits: Clearing limits shall be delineated by perimeter compost berms.
2. Establish Construction Access: Construction vehicle access and exit will be limited to one route, as shown on the TESC plan sheet. Stabilized construction entrance will consist of quarry spall or crushed rock to minimize the tracking of sediment onto public roads. Where access over non-paved surfaces is created, stabilized construction entrances will be installed.
3. Control Flow Rates: Stormwater detention/sediment traps will be constructed as one of the first steps in grading, functional prior to construction of site improvements.

4. Install Sediment Controls: Stormwater runoff will pass through a sediment trap, located at the southern and northeastern point of the proposed construction site. Bioswales will intercept and convey runoff to the sediment trap.

5. Stabilize Soils: From October 15 through April 1, no soils shall remain exposed and unworked for more than 2 days. From April 2 to September October 14, no soils shall remain exposed and unworked for more than 7 days. This condition applies to all onsite soils, whether at final grade or not. The local permitting authority (COE) may adjust these time limits if it can be shown that a development site's erosion or runoff potential justifies a different standard. Dust control, if required, shall be provided through the limited use of water trucks.

6. Protect Slopes: Cut and fill slopes will be designed and constructed that minimizes erosion. Runoff velocities shall be reduced by minimizing the continuous length of slopes.

7. Protect Drain Inlets: All storm drain inlets made operable during construction shall be protected so that stormwater runoff shall not enter the conveyance system without first being filtered or treated to remove sediment. Inlets shall be inspected weekly and cleaned when sediment has filled one-third of the available storage. See TESC plan sheet for additional notes regarding drain inlet protection.

8. Stabilize Channels and Outlets: Stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent streambanks, slopes and downstream reaches shall be provided at the outlets of all conveyance systems.

9. Control Pollutants: All pollutants, including waste materials and demolition debris that occur onsite shall be handled and disposed of in a manner that does not cause contamination of stormwater.

10. Control De-Watering: All foundation, vault, and trench de-watering water, which has similar characteristics to stormwater runoff at the site, shall be discharged into a controlled conveyance system, prior to discharge to a sediment trap or sediment pond.

11. Maintain BMPs: All temporary and permanent erosion and sediment control BMPs shall be maintained and repaired as needed to assure performance of their intended function. All maintenance and repair shall be conducted in accordance with BMPs. All temporary erosion and sediment control BMPs shall be removed within 30 days after final site stabilization is achieved or after the temporary BMPs are no longer needed.

12. Manage the Project: All BMPs shall be inspected, maintained, and repaired as needed to assure continued performance of their intended function. Site inspection shall be conducted by a person who is knowledgeable in the principles and practices of erosion and sediment control.