



## COMMUNITY DEVELOPMENT DEPARTMENT

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### STAFF REPORT

#### Site Plan Review (SP-12-16)

#### New Two-Story Office Building and Parking Expansion – W.R. Grace

#### EXECUTIVE SUMMARY

The proposed project is a Site Plan Review (Planning File SP-12-16) for new construction of a two-story 16,000-square foot office building, a new parking lot containing 107 spaces, storm water facilities, and landscaping. A new crosswalk on Industrial Way, which will link the site to an existing production facility, will be considered separately and will not be added to the scope of this project. The subject property is located at 1437 Industrial Way SW in an area zoned Light Industrial. The applicant is Shawn Conway, W.R. Grace Plant Manager, and the applicant's representative is Jeff Schott of Pillar Consulting. Site plans show sight-obscuring fencing and landscaping to screen the use from adjacent properties. Site Plan Review criteria contained in Albany Development Code (ADC) 2.450 will be addressed for the proposed development. These criteria must be satisfied in order to grant approval for this application.

#### APPLICATION INFORMATION

DATE OF REPORT:	October 4, 2016
REVIEW BODY:	Staff
STAFF REPORT PREPARED BY:	David Martineau, Project Planner
PROPERTY OWNER:	Mark A. Shelnitz, Secretary; W.R. Grace & Co.- Conn; 7500 Grace Drive; Columbia, MD 21044
APPLICANT:	Shawn Conway, Plant Manager; W.R. Grace & Co.; 1437 Industrial Way SW; Albany, OR 97322
APPLICANT REP.:	Jeff Schott, P.E.; Pillar Inc.; 835 NW 23 <sup>rd</sup> Street; Corvallis, OR 97330
PROJECT MANAGER:	Vic Forchette; W.R. Grace & Co.; 1437 Industrial Way SW; Albany, OR 97322
ADDRESS/LOCATION:	1437 Industrial Way SW
MAP/TAX LOT:	Linn County Assessor's Map No. 11S-03W-07CB; Tax Lot 2626
ZONING:	Light Industrial (LI) District
TOTAL LAND AREA:	2.34 acres
EXISTING LAND USE:	Single-story office building, warehouse, and a parking lot containing about 15 spaces together with outside storage

NEIGHBORHOOD: Jackson Hill

SURROUNDING ZONING: Northeast: Light Industrial (LI)  
Southeast: LI  
Southwest: LI  
Northwest: LI

SURROUNDING USES: Northeast: Detached single family residences  
Southeast: Industrial tenant spaces, auto parts distributor  
Southwest: Recycling depot operated by Republic Services  
Northwest: Industrial Way, W.R. Grace & Co. manufacturing and production facility

PRIOR HISTORY: A Site Plan Review for a change of use from a heating and cooling installation and repair facility to offices and a warehouse was approved in 2002 (SP-35-02). A Site Plan Review for new construction of a 4,280-square foot building for an office and sheet metal shop was approved in 1993 (SP-66-93). A partition affecting the subject property was approved in 1991 (PA-05-91).

### **NEIGHBORHOOD MEETING**

The proposed development will abut existing residences zoned Light Industrial (LI) located to the northeast of the subject property. Therefore, the Community Development Director required the applicant to hold a neighborhood meeting. The neighborhood meeting was held on Thursday, May 12, 2016 at the W.R. Grace office at 1437 Industrial Way. Four W.R. Grace representatives, three neighbors, and a city planner attended the meeting. A summary of the meeting is attached (Attachment B.1 – B.4). In brief, neighbor concerns centered on noise from the development, especially at night, glare from site lighting, and drainage from a ditch along the fence between the industrial property and the abutting residences. The applicant plans to mitigate noise concerns by locating a significant amount of the parking lot towards the south side of the property. Landscaping and an 8-foot chain link fence with privacy slats will also be installed. A pedestrian walkway linking Building #9 to Industrial Way will be located on the southern side of the property to minimize disruption to the neighbors to the north. Lighting from the site will be arranged so that there will be minimal light casting offsite. The privacy slats along the fence, together with landscaping, will also help mitigate impacts from site lighting. Finally, the applicant acknowledged neighbors' long-standing concerns over naturally occurring drainage. Neighbors were assured that the new development would need to accommodate any drainage that results from it, but a portion of the "swamp" near the fence line was actually a delineated wetland regulated by the Department of State Lands and the Corps of Engineers fed by drainage from an abutting property to the east of the site. This wetland will be preserved in place along the fence on the subject property.

### **NOTICE INFORMATION**

Notices were mailed to surrounding property owners within 300 feet of the development, including neighborhood meeting attendees, on August 23, 2016. At the time the comment period ended on September 6, 2016, the Albany Planning Division had received no written comments.

### **STAFF ANALYSIS**

The Albany Development Code (ADC) includes the following review criteria, which must be met for this application to be approved. Code criteria are written in *bold italics* and are followed by findings, conclusions, and conditions of approval where conditions are necessary to meet the review criteria.

*Criterion (1) Public utilities can accommodate the proposed development.*

FINDINGS OF FACT

Sanitary Sewer

- 1.1 City utility maps show an eight-inch public sanitary sewer main in Industrial Way, an eight-inch main along the north/east boundary of the site, and a 30-inch main running through the site. The existing building on the site is connected to the public sewer system.
- 1.2 All property with buildings or structures normally used or inhabited by people, where the property is located within 300 feet of a public sanitary sewer main will be required to have or make a connection to the public sewer system (AMC 10.01.100 (1)).

Water

- 1.3 City utility maps show a 12-inch public water main in Industrial Way. The existing building on the site is connected to the public water system.
- 1.4 ADC 12.420 requires all new commercial and industrial development to connect to the public water system.

Storm Drainage

- 1.5 City utility maps show an 18-inch public storm drainage main in Industrial Way, and a 54-inch main running through the site.
- 1.6 ADC 12.530 states that a development will be approved only where adequate provisions for storm and flood water run-off have been made, as determined by the City Engineer.
- 1.7 AMC 12.45 requires storm water quality facilities to be constructed for this development.
- 1.8 The applicant is required to submit a drainage plan, including support calculations, as defined in the City's Engineering Standards. The applicant is responsible for making provisions to control and/or convey storm drainage runoff originating from, and/or draining to, any proposed development in accordance with all City standards and policies as described in the City's Engineering Standards. In most circumstances, detention will be required unless it can be satisfactorily demonstrated by the applicant that there is no adverse impact.
- 1.9 The applicant submitted a storm drainage plan that includes detention facilities for this development proposal. The Public Works Department reviewed the plans and determined that they are acceptable.

CONCLUSIONS

- 1.1 Public utilities (sanitary sewer, water, and storm drainage) can accommodate the proposed development.
- 1.2 The new development must connect to public utilities.

CONDITION

- 1.1 Prior to issuance of a Certificate of Occupancy for the proposed development, the applicant must connect to the public sanitary sewer, water, and storm drainage systems.

***Criterion (2) The proposed post-construction stormwater quality facilities (private and/or public) can accommodate the proposed development, consistent with Title 12 of the Albany Municipal Code.***

FINDINGS OF FACT

- 2.1 Section 12.45.030 of the Albany Municipal Code states that a post-construction stormwater quality permit shall be obtained for all new development and/or redevelopment projects on a parcel(s) equal to or greater than one acre, including all phases of the development (Ord. 5841 § 3, 2014).
- 2.2 The applicant submitted a storm drainage plan that includes storm water quality facilities for this development proposal. The Public Works Department reviewed the plans and determined that they are acceptable.

CONCLUSIONS

- 2.1 The new development must provide storm water quality facilities consistent with Title 12 of the Albany Municipal Code and the City's Engineering Standards.
- 2.2 This criterion can be satisfied with the following condition of approval.

CONDITION

- 2.1 Prior to issuance of a Certificate of Occupancy for the proposed development, the applicant must obtain a storm water quality permit from the City's Public Works Department and construct all required storm water quality facilities to serve the site.

***Criterion (3) The transportation system can safely and adequately accommodate the proposed development.***

FINDINGS OF FACT

- 3.1 The project is located on the east side of the street at 1437 Industrial Way. The project will construct a new 16,000 square foot office building and 107-space parking lot for W.R. Grace and Company.
- 3.2 Industrial Way is classified as a local street and is, with the exception of sidewalk, improved to city standards. Improvements include curb, gutter, a vehicle travel in each direction; and on-street parking.
- 3.3 ADC 12.290 requires that all new development include public sidewalk along public street frontages.
- 3.4 The applicant provided a trip generation report with the application that included both this project and a future development planned for the W.R. Grace property on the opposite side of the street. The report was prepared by Access Engineering and is dated May 2, 2016.
- 3.5 The Access Engineering report based its trip generation estimate for the project on a trip rate for a manufacturing use and an estimate of "20 new employees." The project was estimated to generate 43 trips per day, of which 17 would occur during the peak PM traffic hour.

- 3.6 Staff believes that use of an office trip rate based on building area would provide a more accurate trip generation estimate for the development. The proposed building will function as an office building and will house transferred and new employees. The proposed development will construct a stand-alone office building on a separate parcel and across the street from the W.R. Grace manufacturing facility. The new building can accommodate employees with responsibilities that go beyond managing the nearby manufacturing facility, and the possibility exists that the new office building could at some point be sold and operated independently of the W.R. Grace facility. Based on ITE trip generation rates for an office use, the development would generate 176 vehicle trips per day, of which 24 would occur during the peak PM traffic hour.
- 3.7 Albany's 2010 Transportation System Plan (TSP) does not identify any existing capacity deficiencies adjacent to this site.

### CONCLUSIONS

- 3.1 With the exception of sidewalk, the public street system adjoining the site is improved to city standards. ADC 12.290 requires that public sidewalk be installed along the public street frontage of all new development.
- 3.2 The development is projected to generate 176 vehicle trips per day, of which 24 would occur during the peak PM traffic hour.
- 3.3 Albany's TSP does not identify any existing capacity deficiencies adjacent to this site.
- 3.4 This criterion can be satisfied with the following condition of approval.

### CONDITION

- 3.1 Prior to issuance of an occupancy permit, the applicant shall install public sidewalk to city standards across the frontage of the site on Industrial Way.

***Criterion (4) Parking areas and entrance-exit points are designed to facilitate traffic and pedestrian safety and avoid congestion.***

### FINDINGS OF FACT

- 4.1 The site has an existing driveway approach to Industrial Way. No new driveways are proposed with the development.
- 4.2 The size and location of the site's existing driveway complies with ADC 12.100 in terms of size, location, and spacing.
- 4.3 The applicant's site plan shows an enhanced pedestrian crossing of Industrial Way between this site and the W.R. Grace manufacturing facility on the opposite side of the road, and notes that approval for that improvement will be subject to a future SI permit. While not a part of this application, an enhanced pedestrian crossing would help to facilitate pedestrian movements between W.R. Grace's manufacturing and office facilities. The design and construction of public improvements under the SI process are reviewed and approved City Engineer.

- 4.4 Vehicle Parking – Required Number of Spaces. The proposed parking lot will provide parking for several uses and sites of W.R. Grace. ADC 9.020, Table 1, shows that industrial offices require one parking space per 500 square feet. Manufacturing and production uses require one parking space per two employees at the maximum shift; and one space per company vehicle. As shown below, Table 1 summarizes parking requirements for the W.R. Grace complex:

**Table 1: Parking Requirements**

Use	Required Parking	Planned Parking Spaces at 1437 Industrial Way
Manufacturing and Production	1 space per two employees at largest shift (70 employees)	35 spaces
Company Vehicle Parking	1 space per company vehicle	3 spaces
Industrial Offices (Building #5)	1 space per 500 sq. ft. (4,200 sq. ft.)	8 spaces
Industrial Offices (Building #9)	1 space per 500 sq. ft. (16,000 sq. ft.)	32 spaces
Replacement Parking due to new flammable storage cover		19 spaces
<b>TOTAL REQUIRED</b>		<b>97 spaces</b>
<b>TOTAL PROVIDED</b>		<b>122 spaces</b>

The total number of spaces provided exceeds the minimum parking requirement. ADC 9.120(12) states that all parking areas must provide accessible parking spaces in conformance with the Oregon Structural Specialty Code. According to the site plan, one ADA-compliant parking space will remain at Building #5, and four new ADA-compliant parking spaces are proposed with the Building #9 project.

- 4.5 Parking Lot Design and Construction. Parking lots must be paved, landscaped, and provided with approved drainage. ADC 9.120(3) states that all areas of a parking lot shall have a durable, dust-free surface of asphalt, cement concrete, or other materials approved by the Director of Public Works. ADC 9.120(8) states that lots containing more than two parking spaces must have all the required spaces permanently and clearly striped. Stripes must be at least four inches wide. A site plan showing existing conditions illustrates the location of the existing parking area. These 15 existing spaces will remain. The applicant will develop an additional 107 spaces on-site east of the existing parking, bringing the total number of spaces to 122. All proposed on-site parking meets dimensional standards in ADC 9.130, as shown on the plans.
- 4.6 Loading Standards. Loading spaces are required for all uses except for office and residential use (ADC 4.260). No loading zone is proposed for this office use.
- 4.7 Bicycle Parking. ADC 9.120(13)(b) requires industrial developments to provide at least one bicycle parking space for every ten automobile parking spaces required. ADC 9.120(13)(h) requires at least one-half of required bicycle parking spaces to be sheltered. The project requires 97 vehicle parking spaces; therefore, the project requires ten bicycle parking spaces. According to the site plan, eight to ten covered bicycle parking spaces are shown near an entrance on the west side of the building (Attachment C.3). ADC 9.120(13)(e) states that required spaces should be visible and not hidden and must be located as near as possible to building entrances used by automobile occupants. Staff finds that the location of bicycle parking on the west side of the building, as proposed, meets this standard. A condition of approval (Condition 4.2, below) will require a revised detail drawing showing ten bicycle parking spaces, at least half covered, all meeting required clearance standards, to be submitted to the Planning Division for review and approval prior to issuance of a building permit. All required bicycle parking must be installed prior to occupancy.

- 4.8 Pedestrian Access. ADC 9.120(15) states that walkways and access ways shall be provided in all new off-street parking lots and additions to connect sidewalks adjacent to the development to the entrance of new buildings. Pedestrian access is separated from vehicular access to the site. A new ADA-compliant sidewalk five (5) feet in width is proposed on the south side of Building #9 providing a direct connection to Industrial Way. A crosswalk is planned to provide safe pedestrian crossing of Industrial Way to access Grace's production facility, but it is not included in the scope of this land use application. (See Attachment C.3). The existing building, Building #5, is located outside the secure parking perimeter that will serve Building #9. No changes are being proposed to Building #5 or its existing pedestrian and vehicular access to Industrial Way. The applicant may choose to add a secured gate for pedestrian access south of Building #5 to the new pedestrian path that will be developed along with Building #9.

## CONCLUSIONS

- 4.1 No new driveways are proposed with the development.
- 4.2 The site's existing driveway to Industrial Way complies with the design standards contained in ADC 12.100.
- 4.3 If the applicant chooses to construct an enhanced pedestrian crossing on Industrial Way the design will need to be reviewed and approved by the City Engineer as part of a SI permit.
- 4.4 A total of 97 vehicle parking spaces are required for this development. The applicant proposes to install 107 spaces in addition to 15 existing spaces for a total of 122 spaces.
- 4.5 Bicycle parking is shown on the site plan near the proposed building entrance; however, a detail drawing showing ten bicycle parking spaces, at least half covered, meeting required clearance standards must be submitted for review and approval.

## CONDITIONS

- 4.1 Prior to issuance of a final occupancy permit, a minimum of 97 vehicle parking spaces shall be provided.
- 4.2 A detail drawing showing the new location of the bicycle parking spaces, at least half covered and all meeting required clearance standards, shall be submitted to the Planning Division for review and approval prior to issuance of a building permit. All required bicycle parking shall be installed prior to occupancy.

***Criterion (5) The design and operating characteristics of the proposed development are reasonably compatible with surrounding development and land uses, and any negative impacts have been sufficiently minimized.***

## FINDINGS OF FACT

- 5.1 Site Plan Review is intended to promote functional, safe, and attractive developments that maximize compatibility with surrounding developments and uses and with the natural environment. Site Plan Review is not intended to evaluate the proposed use or structural design of the proposal. Rather, the review focuses on the layout of a proposed development, including building placement, setbacks, parking areas, external storage areas, open areas, and landscaping. Where conflicts are identified, mitigation can be required through conditions of approval.

- 5.2 Design and Operating Characteristics. The proposed use is a two-story 16,000-square foot industrial office building, a new parking lot containing 107 spaces, storm water facilities, and landscaping. These uses are allowed through Site Plan Review approval in the Light Industrial (LI) district. The main development on site will be the two-story office building, which will have a relatively low impact in terms of noise outside of normal business hours. However, the expanded parking lot will be used for all shifts at the production facility across Industrial Way from the site.
- 5.3 The operating characteristics of this neighborhood include industrial and light industrial development, storage operations, a recycling center operated by Republic Services, located south and west of the site, and abutting single family residences, built between 1940 and 1951, to the northeast on Howard Drive within the LI district. Properties to the east of Howard Drive are typically single family dwellings and are zoned Medium Density Residential (RM). There are two triplexes located on 14<sup>th</sup> Avenue, just east of Howard.
- 5.4 Allowable uses in the LI district include manufacturing and production, railroad yards, waste and recycling businesses, storage facilities, vehicle repair, and kennels. According to special status regulations in ADC 4.075, single family residences built before January 1, 2002 on commercial or industrially-zoned properties are deemed conforming to the base zoning district. The applicant states that site development will have lighting designed to minimize direct light cast offsite, and the parking lot and office should not generate emissions that would be objectionable to the neighbors. Screening is proposed along the property line abutting the residences that will further shield them from the proposed use.
- 5.5 Building and Parking Lot Setbacks. ADC 4.090, Table 1, shows that in the LI zoning district, the minimum setback from a front property line is 15 feet. There is an interior setback of 40 feet if the development abuts a residential district; otherwise, there are no interior setbacks. This property is surrounded by light industrial zoning on all four sides. Setbacks for the proposed parking lot are ten feet from the north property line, abutting existing residences, 35 feet from the east property line, ten feet from the property line to the south, which borders a recycling depot, and about 160 feet from the west property line located at the edge of the right-of-way line along Industrial Way. There is a sanitary sewer easement ten feet wide located between the edge of the proposed parking lot and the property line. Although technically not required, the applicant proposes screening from the abutting LI zoned single family residences in the form of a ten-foot buffer containing nine trees at least ten feet tall, spaced every 15 feet apart, at least 24 one-gallon shrubs, ground cover, and an eight-foot tall sight-obscuring fence. (See Attachments C.3 and C.11). Setbacks for the new two-story office building (Building #9) are ten feet to the south, 20 feet to the east, 62 feet to the north, and 357 feet to the west.
- 5.6 Lot Coverage. The total site is about 101,930 square feet (2.34 acres). There is no maximum lot coverage requirement for the LI district. Virtually all of the property will be used for office, parking, and storage space for the W.R. Grace Company. According to the applicant's representative, the site will have 71% impervious and 29% pervious surface post-development. When the yard adjacent to a street of an industrially zoned property is across a right-of-way from other industrially zoned property, only 30% of such setback area is required to be landscaped (ADC 9.140(2)(d)). The 15-foot front yard setback will remain fully landscaped, as shown on their landscape plan (Attachment C.11).
- 5.7 Landscaping. The applicant is proposing to remove 12 trees out of 21 trees that are presently on site, specifically, two cherry, three crabapple, two cottonwood, and four plum trees will be removed. According to ADC 9.208(1), the Director, in consultation with the City Arborist, may grant an exception to any of the tree felling standards for industrial development on industrially zoned land. The Director may require the applicant to provide a Certified Arborist's report. A

planner accompanied City Arborist, Rick Barnett, on a site visit to the proposed W.R. Grace office site on August 8, 2016. It was the Arborist's opinion that none of the trees slated for removal were noteworthy in terms of size or species. Additionally, he did not believe a Certified Arborist's report was warranted. Landscape and parking lot standards may require some of the trees being removed to be replaced where Development Code standards apply. This information was conveyed to the applicant.

5.8 Landscaping within Parking Lot. (ADC 9.150). The purpose of landscaping in parking lots is to provide shade, reduce stormwater runoff, and direct traffic. Parking lots must be landscaped in accordance with the following minimum standards:

- (1) Planter Bays. Parking areas shall be divided into bays of not more than 12 parking spaces. At both ends of each parking bay there shall be curbed planters at least five (5) feet wide, excluding the curb. Each planter shall contain one canopy tree at least ten feet high and decorative groundcover containing at least two (2) shrubs for every 100 square feet of landscape area. Neither planter bays nor their contents may impede access on required public sidewalks or paths, or handicapped-accessible parking spaces.
- (2) Entryway Landscaping. Both sides of a parking lot entrance shall be bordered by a minimum five-foot wide landscape planter strip meeting the same landscaping provisions as planter bays, except that no sight-obscuring trees or shrubs are permitted.
- (3) Parking Space Buffers. Parking areas shall be separated from the exterior wall of a structure by pedestrian walkways or loading areas or by a five-foot strip of landscaping materials.

The applicant's site layout shows the placement of 107 parking spaces that will serve as parking for all manufacturing and office functions of the W.R. Grace facility. All parking lot rows and spaces conform to Development Code requirements. Entryway landscaping either already exists or will be provided. There are pedestrian walkways that wrap around the new building that will serve as parking space buffers. The landscape plan (see Attachment C.11) lists species that will be planted and indicates general conformance with landscape standards for parking lots. Proposed trees (American hornbeam, elm hybrid, and crabapple) will be at least ten feet tall, and ground cover and accent plants will be provided.

5.9 Irrigation System. ADC 9.160 requires that all required landscape areas be provided with a piped underground irrigation system, unless a licensed landscape architect or certified nurseryman submits written verification that the proposed plant materials do not require irrigation. The applicant's landscaping plan (Attachment C.11) does not show whether irrigation will be provided; however, the applicant confirmed in a telephone conversation on September 15, 2016, that it was their intention to provide landscaping with irrigation. Otherwise, the applicant will need to provide written certification for drought tolerant species in places where irrigation may not be provided.

5.10 Screening. In order to reduce the impacts on adjacent uses of a different type, buffering and screening is required in accordance with the matrix that follows ADC 9.270. The subject property is zoned Light Industrial and is surrounded on all four sides by light industrial zoning. As mentioned previously, the site borders single family residences on the north and a recycling depot to the south. Property to the east has industrial tenant spaces and areas of undeveloped property, and west of the site is the W.R. Grace manufacturing and production facility. No screening is required between the subject property and abutting industrial uses. The applicant will provide buffer and screening ten feet wide between the new development and the houses to the north. As addressed in Finding 5.5 above, buffer and screening will consist of trees, shrubs,

ground cover, and fencing with privacy slats. Where privacy slats are used, the Development Code requires opacity of at least 75% when viewed from any angle at a point 25 feet from the fence or wall (ADC 9.385(1)). This will be made a condition of approval (Condition 5.3 below).

- 5.11 Signs. If any new signage is proposed, it will be reviewed separately from this Site Plan Review application. Planning will review applications for sign permits when they are submitted to the Building Division. See ADC 13.421-13.425 for regulations regarding sign size and number allowances in the LI zoning district.
- 5.12 Environmental Standards. ADC 9.440 - 9.500 include environmental standards related to noise, visible emissions, vibrations, odors, glare, heat, insects, rodents, and hazardous waste. No adverse environmental impacts are expected from this office development.
- 5.13 Lighting and Glare. ADC 9.120(14) requires that any lights provided to illuminate any public or private parking area must be arranged to reflect the light away from any abutting or adjacent residential district. (See ADC 9.480 for glare and heat regulations). The applicant submitted an illumination plan that shows negligible impact of parking lot and building lighting on abutting residences to the north. According to the applicant, "Site lighting is designed to minimize the direct light cast off-site."
- 5.14 Outside Storage. ADC 4.290(4) states that outside storage is allowed in the LI zone in front and interior yards outside of the required setback. Outside storage in the front yard must be screened from public rights-of-way with a sight-obscuring fence, wall, hedge, or berm made of non-combustible material. ADC 4.300 requires that any refuse container or disposal area that would otherwise be visible from a public street, customer, resident parking area, public facility, or any residential area must be screened from view by placement of a sight-obscuring fence, wall, or hedge at least six feet tall. All refuse materials must be contained within the screened area. A new area of outdoor storage is planned near the northwest corner of the property behind the 15-foot front yard setback that abuts Industrial Way. (See Attachment C.3). The outdoor storage area will be screened by a six-foot sight-obscuring fence.

## CONCLUSIONS

- 5.1 The proposed use is an industrial office, which is allowed through Site Plan Review approval in the Light Industrial (LI) district.
- 5.2 The proposal shows that the project will meet the standards for building height, lot coverage, setbacks, parking, and environmental standards.
- 5.3 The neighborhood contains industrial and light industrial development, storage operations, auto repair, and industrial tenant spaces. Properties to the north of the subject property are zoned Light Industrial (LI), but are characterized by residential dwelling units that were built between 1940 and 1951.
- 5.4 Any adverse impacts associated with the use of the property can be mitigated through such means as shielded lighting, buffering and screening, and landscaping. Required landscaping and irrigation (if landscape materials are not drought-tolerant) will be installed prior to issuance of an occupancy permit.
- 5.5 Based on the observations above, the proposed development will be compatible with existing or anticipated uses in terms of size, building style, intensity, setbacks and landscaping when the following conditions are met:

## CONDITIONS

- 5.1 Prior to issuance of a certificate of occupancy, the applicant shall install landscaping, buffering, and screening in the locations and in the amounts shown on the submitted landscape plans. Any changes to approved plans must be reviewed and approved by the Albany Planning Division and be in compliance with ADC landscaping standards. ADC 9.190 allows occupancy of a development prior to the complete installation of all required landscaping and irrigation only if occupancy is requested between December 1 and March 1 and all other requirements are met.
- 5.2 The applicant shall submit a landscape irrigation plan to the Planning Division for review and approval prior to installing landscaping, unless a licensed landscape architect or certified nurseryman submits written verification that the proposed plant materials do not require irrigation.
- 5.3 The outdoor storage area shall be screened by a six-foot sight-obscuring fence. If privacy slats are used, the Development Code requires opacity of at least 75% when viewed from any angle at a point 25 feet from the fence.
- 5.4 The applicant shall ensure that lighting used to illuminate the parking area is arranged to reflect light away from any abutting residences. All exterior light fixtures shall be of a shielded, full-cut off design.

***Criterion (6) Activities and developments within special purpose districts must comply with the regulations described in Articles 4 (Airport Approach), 6 (Natural Resources), and 7 (Historic), as applicable.***

## FINDINGS OF FACT

- 6.1 Article 4: Airport Approach. The subject property is not located within the City's Airport Approach Overlay District. Site elevation in the vicinity of the proposed office building is 215.5 feet, based on the National Geodetic Vertical Datum of 1929 (NGVD 1929), according to the grading plan submitted with the application (Attachment C.5).
- 6.2 Article 6: Floodplains. Comprehensive Plan Plate 5: Floodplains, does not show a 100-year floodplain on this property. FEMA/FIRM Community Panel No. 41043C-0213G, dated September 29, 2010, shows that this property is in Zone X, an area determined to be outside the 500-year floodplain.
- 6.3 Article 6: Wetlands. Comprehensive Plan Plate 6 does not show any wetlands on the subject site; the National Wetlands Inventory does not show any wetlands on the property. However, according to the applicant's plans, there are three areas of wetlands located roughly on the north, northeast, and southeast portions of the property. A wetland delineation was done, and the Department of State Lands sent a letter of concurrence to the applicant on May 11, 2015 (Attachment G.1 – G.2). The applicant has submitted a Joint Permit Application for review by the U.S. Army Corps of Engineers and the Oregon Department of State Lands. Most wetlands impacted by this development will be mitigated offsite; however, one small area of wetland will be mitigated on-site near the northern property line.
- 6.4 Historic and Archaeological Resources. Comprehensive Plan, Plate 9: Historic Districts, shows the property is not located in a Historic District. There are no known archaeological sites on the property.

## CONCLUSION

- 6.1 The subject property is not included in any special purpose district. This review criterion is not applicable to this proposal.

***Criterion (7) The site is in compliance with prior land use approvals.***

## FINDINGS OF FACT

- 7.1 The use of a 4,200 square-foot office building (Building #5) was approved in 2002 (file SP-35-02). This followed an application for new construction of a 4,280-square foot building for an office and sheet metal shop that was approved in 1993 (file SP-66-93). A partition affecting the subject property was approved in 1991 (file PA-05-91).
- 7.2 There are no known outstanding conditions of approval from previous land use approvals.

## CONCLUSIONS

- 7.1 There are no known outstanding conditions of approval.
- 7.2 This criterion is satisfied without conditions.

***Criterion (8) Sites that have lost their nonconforming status must be brought into compliance, and may be brought into compliance incrementally in accordance with Section 2.370.***

## FINDINGS OF FACT

- 8.1 Section 2.370 of the ADC states, “Sites that are nonconforming with the current development standards and that have lost their nonconforming status are required to bring the site into compliance with current Code standards. Incremental improvements are allowed in accordance with Subsection (1).”
- 8.2 The site has not lost its nonconforming status.

## CONCLUSION

- 8.1 This criterion is not applicable.

## OVERALL CONCLUSION

This report reviews and evaluates a Site Plan Review application submitted by Jeff Schott, of Pillar consulting, on behalf of W.R. Grace & Co. for conformance with the Albany Development Code (ADC). As proposed and conditioned, the application for a Site Plan Review to develop a new two-story 16,000-square foot office building, parking, and related infrastructure satisfies all of the applicable review criteria as outlined in this report.

## STAFF DECISION

APPROVAL with CONDITIONS of the Site Plan Review application referenced above. The approval is subject to the conditions listed below in this staff report.

## General

- Development shall occur consistent with the plans and narrative submitted by the applicant, or as modified by conditions of approval and shall comply with all applicable state, federal and local laws.

## Public Utilities

- 1.1 Prior to issuance of a Certificate of Occupancy for the proposed development, the applicant must connect to the public sanitary sewer, water, and storm drainage systems.

## Stormwater

- 2.1 Prior to issuance of a Certificate of Occupancy for the proposed development, the applicant must obtain a storm water quality permit from the City's Public Works Department and construct all required storm water quality facilities to serve the site.

## Transportation

- 3.1 Prior to issuance of an occupancy permit, the applicant shall install public sidewalk to city standards across the frontage of the site on Industrial Way.

## Parking

- 4.1 Prior to issuance of a final occupancy permit, a minimum of 97 vehicle parking spaces shall be provided.
- 4.2 A detail drawing showing the new location of the bicycle parking spaces, at least half covered and all meeting required clearance standards, shall be submitted to the Planning Division for review and approval prior to issuance of a building permit. All required bicycle parking shall be installed prior to occupancy.

## Landscaping and Screening

- 5.1 Prior to issuance of a certificate of occupancy, the applicant shall install landscaping, buffering, and screening in the locations and in the amounts shown on the submitted landscape plans. Any changes to approved plans must be reviewed and approved by the Albany Planning Division and be in compliance with ADC landscaping standards. ADC 9.190 allows occupancy of a development prior to the complete installation of all required landscaping and irrigation only if occupancy is requested between December 1 and March 1 and all other requirements are met.
- 5.2 The applicant shall submit a landscape irrigation plan to the Planning Division for review and approval prior to installing landscaping, unless a licensed landscape architect or certified nurseryman submits written verification that the proposed plant materials do not require irrigation.
- 5.3 The outdoor storage area shall be screened by a six-foot sight-obscuring fence. If privacy slats are used, the Development Code requires opacity of at least 75% when viewed from any angle at a point 25 feet from the fence.
- 5.4 The applicant shall ensure that lighting used to illuminate the parking area is arranged to reflect light away from any abutting residences. All exterior light fixtures shall be of a shielded, full-cut off design.

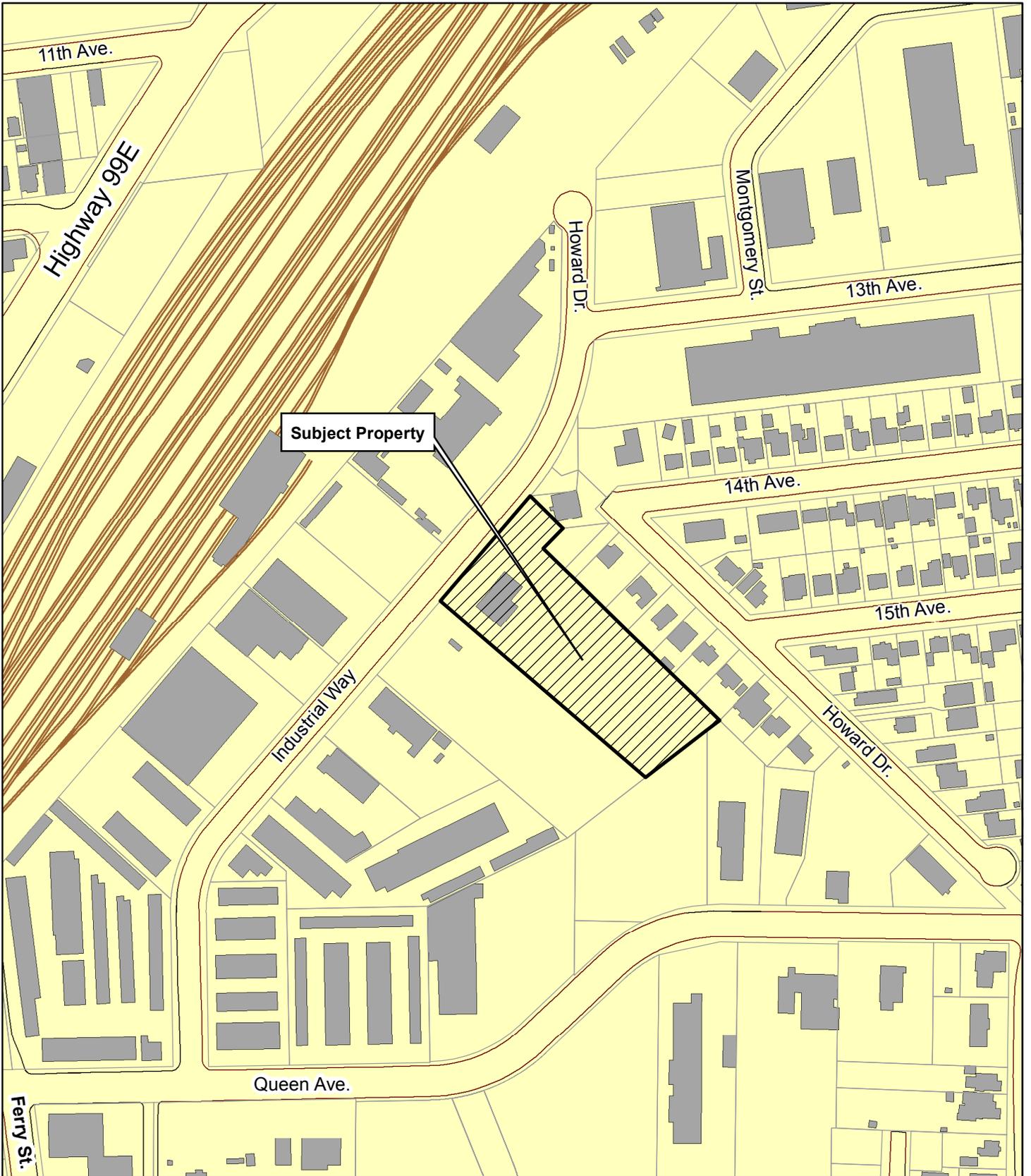
## **ATTACHMENTS**

- A Location Map
- B Neighborhood Meeting
  - B.1 – B.3 Meeting Summary
  - B.4 Sign-In Sheet
- C Applicant's Site Plans
  - C.1 Cover Sheet (Sheet 1)
  - C.2 Existing Survey (Sheet 2)
  - C.3 Site Layout Revised 8/15/16 (Sheet 3)
  - C.4 Existing Drainage Plan (Sheet 4)
  - C.5 Grading Plan Revised 8/15/16 (Sheet 5)
  - C.6 Utility Plan (Sheet 6)
  - C.7 Cross-Section Profiles (Sheet 7)
  - C.8 Natural Features Plan (Sheet 8)
  - C.9 Preliminary Illumination Plan (Sheet 9)
  - C.10 Adjacent Property Map (Sheet 10)
  - C.11 Preliminary Landscape Plan (Sheet 11)
  - C.12 Office Building Floor Plan (Sheet 12)
  - C.13 Building Elevations Drawing (Sheet 13)
  - C.14 Overview Site Plan (Sheet 14)
- D Applicant's Narrative
  - D.1 – D5 Project Description and Findings of Fact
- E Trip Generation Report
  - E.1 – E.22 Trip Generation Report from Access Engineering LLC, dated May 6, 2016
- F Stormwater Report
  - F.1 – F.60 Stormwater Report from Pillar Consulting Group, dated May 27, 2016
- G Correspondence
  - G.1 – G.2 Concurrence Letter from Lauren Brown, DSL, dated May 11, 2015

## **ACRONYMS**

ADC	Albany Development Code
AMC	Albany Municipal Code
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
ITE	Institute of Transportation Engineers
LI	Light Industrial Zoning District
NAVD 88	North American Vertical Datum of 1988*
NGVD 29	National Geodetic Vertical Datum of 1929*
PA	Partition File Designation
RM	Residential Medium Density Zoning District
SP	Site Plan Review
TSP	Transportation System Plan

\*The conversion factor from NGVD 1929 to NAVD 1988 in Albany is +3.38 feet.



## Location Map: 1437 Industrial Way SW



The City of Albany's infrastructure records, drawings and other documents have been gathered over many decades, using differing standards for quality control, documentation, and verification. All of the data provided represents current information in a readily available format. While the data provided is generally believed to be accurate, occasionally it proves to be incorrect, thus its accuracy is not warranted. Prior to making any property purchases or other investments based in full or in part upon the material provided, it is specifically advised that you independently field verify the

N



0 55 110 220 330 440 Feet

June 30, 2016

Planning Division

City of Albany - 333 Broadalbin St. SW, Albany, Oregon 97321 (541) 917- 7550

**EXHIBIT D**

NEIGHBORHOOD MEETING SUMMARY





Professional Engineering and Project Management

# ENGINEERING MEMORANDUM

<b>TO</b>	Application				
<b>FROM</b>	Jeff Schott, P.E.				
<b>PROJECT</b>	W.R. Grace Expansion				
<b>SUBJECT</b>	Neighborhood meeting summary				
<b>DATE</b>	5/25/2016	<b>PROJECT #</b>	2015-064	<b>MEMO #</b>	EM-10

A neighborhood meeting for the C9 Site development was held at 6 pm on Thursday, May 12, 2016, at the Grace Office at 1437 Industrial Way. A meeting attendance record is attached. Four Grace representatives, David Martineau with the City of Albany, and three neighbors attended the meeting. The neighbors all represented the residences on the north side of the development. These are existing residences in the what is now an LI zone.

The meeting notice was sent out on April 29, 2016 to the list of adjacent property owners provided by the City of Albany.

There were three major concerns from the neighbors:

- 1) Noise from the development, especially at night.
- 2) Artificial light from the development.
- 3) Drainage from the ditch along the fence.

Addressing the neighbors' concerns:

- 1) Noise from the development: The development is an office, which is a relatively low-impact development with respect to noise. The parking lot will be used for all shifts. Specific measures to mitigate the concern:
  - a. The parking spaces have been pushed to the south side of the development (opposite the houses).
  - b. The pedestrian walkway is on the south side of the property (opposite the houses).
  - c. The office is set towards the south side of the property.
  - d. A fence is shown along the north edge of the property with vision slats. This fence is shown as 8' tall, which is the limit set forth in the Albany Development Code.
  - e. There is some landscaping along the north edge of the parking lot.
- 2) Light from the development:
  - a. The parking spaces have been pushed to the south side of the development (opposite the houses). The parking lot lights are concentrated over this area.
  - b. The pedestrian walkway is on the south side of the property (opposite the houses).



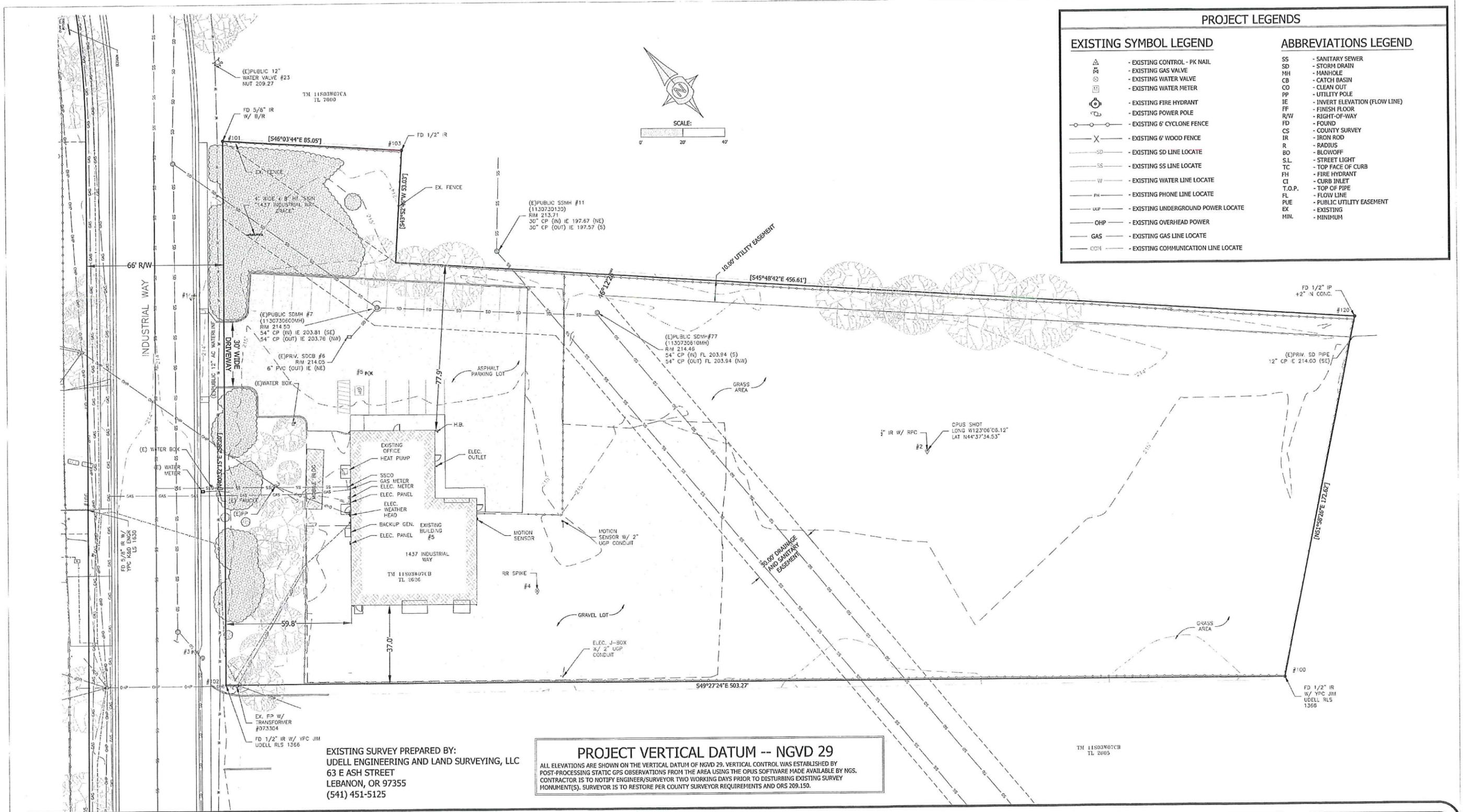
*Professional Engineering and Project Management*

- c. The office is set towards the south side of the property, and we currently do not show any lights on the north side of the building casting outwards.
  - d. A fence is shown along the north edge of the property with vision slats. This is to help limit car headlights from casting across the property line.
  - e. A preliminary lighting plan has been developed, showing minimal light casting off-site on the neighbor property.
- 3) Drainage from the ditch along the fence on the north side of the property. The area along the north fence is a swamp much of the year. This was reported to be a constant nuisance, and the neighbors asked if we were going to provide additional drainage for this area.
- a. Unfortunately, the existing "swamp" along the fence is part of a delineated wetland regulated by Department of State Lands and the Army Corps of Engineers. Grace is mitigating the majority of wetland's on-site, but we are limiting the amount of wetland impact to less than 0.50 acre. Under the current wetland mitigation plan, we cannot eliminate, and in fact must preserve, the wetland(s) along the north fence.
  - b. The mitigation of the 0.48 acres of wetlands on-site should reduce the amount of water feeding to the ditch from the south, however, there are other remaining wetlands to the south and east of the Grace property, and on the east end of the Grace property, that also feed this wetland. So the proposed development will not eliminate the wetlands along the fence.
  - c. We have ensured that a drainage path is preserved between the edge of the new parking lot fill and the property line, so that water can maintain its existing flow path from east to west. There is not a well-defined ditch, but rather a low area that appears to allow for the slow migration of water. There is no clear, normal discharge point for water in this wetland.

# Grace Neighborhood Meeting Sign-in

Name	Address	Phone / email
Jeff Schott Pillar	Corton, OR	541-993-2480 / jeffepillar- inc.com
ERIC SOOLARD	CHEVY CHASE, MD CITY OF ALBANY	410-530-9154 / eric.soolard@grace.com davis-martinez@cityofalbany.net
David Martineau	PO Box 490 Albany 3823 FIRWOOD DR SE	541-917-7561
Judith Bumgardner	1310 HOWARD DR	541-928-1196
Lori Bumgardner-Burnett	2115 FERRY ST. SW	541-223-3133
MATTHEW FITZETT	1282 HOWARD DR, SE	541-990-5191 matthew@3lifestyle homes.com
SHAWN CONWAY	CORVALLIS, OR	541-753-4794
Vic Forchette	Columbia, MD	708-541-9353 vic.forchette@grace.com





PROJECT LEGENDS	
EXISTING SYMBOL LEGEND	ABBREVIATIONS LEGEND
	SS - SANITARY SEWER
	SD - STORM DRAIN
	MH - MANHOLE
	CB - CATCH BASIN
	CO - CLEAN OUT
	IP - UTILITY POLE
	IE - INVERT ELEVATION (FLOW LINE)
	FF - FINISH FLOOR
	R/W - RIGHT-OF-WAY
	FD - FOUND
	CS - COUNTY SURVEY
	IR - IRON ROD
	R - RADIUS
	BO - BLOWOFF
	S.L. - STREET LIGHT
	TC - TOP FACE OF CURB
	FH - FIRE HYDRANT
	CI - CURB INLET
	T.O.P. - TOP OF PIPE
	FL - FLOW LINE
	PU/E - PUBLIC UTILITY EASEMENT
	EX - EXISTING
	MIN. - MINIMUM

EXISTING SURVEY PREPARED BY:  
 UDELL ENGINEERING AND LAND SURVEYING, LLC  
 63 E ASH STREET  
 LEBANON, OR 97355  
 (541) 451-5125

**PROJECT VERTICAL DATUM -- NGVD 29**  
 ALL ELEVATIONS ARE SHOWN ON THE VERTICAL DATUM OF NGVD 29. VERTICAL CONTROL WAS ESTABLISHED BY POST-PROCESSING STATIC GPS OBSERVATIONS FROM THE AREA USING THE OPUS SOFTWARE MADE AVAILABLE BY NGS. CONTRACTOR IS TO NOTIFY ENGINEER/SURVEYOR TWO WORKING DAYS PRIOR TO DISTURBING EXISTING SURVEY MONUMENT(S). SURVEYOR IS TO RESTORE PER COUNTY SURVEYOR REQUIREMENTS AND ORS 209.150.

KEYED NOTES

**PILLAR CONSULTING GROUP, INC.**  
 835 NW 23rd ST.  
 CORVALLIS, OREGON 97330  
 PHONE: 541-752-9202  
 WWW.PILLAR-INC.COM

REGISTERED PROFESSIONAL LAND SURVEYOR  
  
 OREGON  
 JUNE 12, 2013  
 KYLE W. LATIMER  
 #80442  
 EXPIRES 12-31-2016  
 SIGNED:

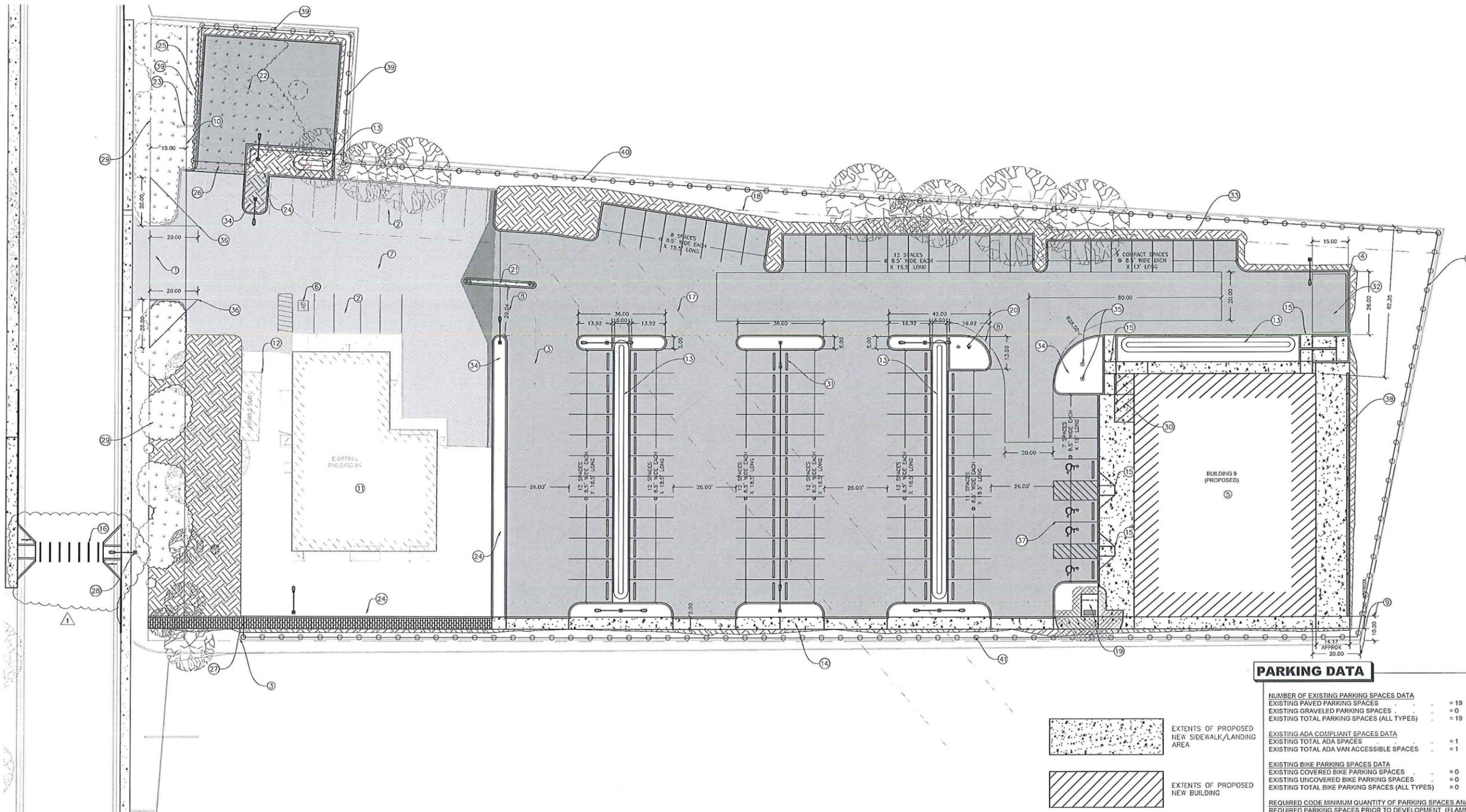
No.	Revision/Issue	Date

Project Name and Address  
**EXISTING SURVEY**  
 SITE PLAN APPLICATION  
 W.R. GRACE  
 ALBANY, OREGON

Project #: 2015064      Sheet  
 Date 04/27/2016  
 Scale As Noted

2

- 39 PROPOSED SIGN LOCATION.
- 35 PROPOSED FLAG POLE LOCATIONS.
- 36 CLEAR VISION AREA. LANDSCAPING MAY NEED MODIFIED.
- 37 (4) NEW ADA PARKING STALLS IN FRONT OF OFFICE.
- 38 TRENCH DRAIN ZURN Z886 HDPE W/ HEEL-PROOF BRONZE SLOTTED GRADE
- 39 (N) 6' TALL FENCE ALONG THIS EDGE. OPTION FOR BARBED WIRE ABOVE.
- 40 (N) 6' TALL OBSCURING FENCE ALONG PROPERTY LINE.
- 41 REPLACE (E) FENCE ALONG THIS EDGE W/ 6' TALL OBSCURING FENCE, BARBED WIRE OPTION ON TOP.



NOTE  
NOT FOR CONSTRUCTION  
SITE PLAN APPLICATION ONLY

1 SITE LAYOUT  
C1.3

SCALE 1" = 20'

PARKING DATA	
<b>NUMBER OF EXISTING PARKING SPACES DATA</b>	
EXISTING PAVED PARKING SPACES	= 19
EXISTING GRAVELED PARKING SPACES	= 0
EXISTING TOTAL PARKING SPACES (ALL TYPES)	= 19
<b>EXISTING ADA COMPLIANT SPACES DATA</b>	
EXISTING TOTAL ADA SPACES	= 1
EXISTING TOTAL ADA VAN ACCESSIBLE SPACES	= 1
<b>EXISTING BIKE PARKING SPACES DATA</b>	
EXISTING COVERED BIKE PARKING SPACES	= 0
EXISTING UNCOVERED BIKE PARKING SPACES	= 0
EXISTING TOTAL BIKE PARKING SPACES (ALL TYPES)	= 0
<b>REQUIRED CODE MINIMUM QUANTITY OF PARKING SPACES ANALYSIS</b>	
REQUIRED PARKING SPACES PRIOR TO DEVELOPMENT (FLAMMABLE STORAGE COVER PROJECT)	= 19
MAXIMUM TOTAL MANUFACTURING EMPLOYEES PER SHIFT AFTER DEVELOPMENT	= 70
NUMBER OF PARKING SPACES REQUIRED FOR BUILDING #9 (16,000 SF/500 SF)	= 32
NUMBER OF PARKING SPACES REQUIRED FOR BUILDING #5 (4,200 SF/500 SF)	= 9
TOTAL NUMBER OF COMPANY OWNED VEHICLES	= 3
TOTAL REQUIRED PARKING SPACES WITH COMPLETION OF PROPOSED DEVELOPMENT	= 76
MAXIMUM NUMBER OF 8' x 16' COMPACT SPACES (40% MAX PER DEVELOPMENT CODE) SPACES PROVIDED:	= 30
	= 123 (9 COMPACT)
<b>REQUIRED QUANTITY OF ADA COMPLIANT SPACES DATA (ORS 447.233(2) SUMMARY)</b>	
LOTS HAVING A TOTAL OF 101 TO 150 SPACES	= 5 ADA SPACES, WITH 1 "WHEEL CHAIR ONLY" SPACE
<b>REQUIRED CODE MINIMUM QUANTITY OF BICYCLE PARKING SPACES ANALYSIS</b>	
TOTAL BICYCLE PARKING SPACES REQUIRED (DEV. CODE, ARTICLE 9, 9.120(13)(b)): 1 PER 10 SPACES	= 8

- EXTENTS OF PROPOSED NEW SIDEWALK/LANDING AREA
- EXTENTS OF PROPOSED NEW BUILDING
- EXTENTS OF PROPOSED CONCRETE RE-GRADING
- EXTENTS OF PROPOSED LANDSCAPING
- (E) LOADING RAMP AND AREAS
- (E) STRUCTURE TO BE DEMOLISHED

KEYED NOTES

- 1 (E) DRIVEWAY, CONCRETE APRON W/ AC PAVING BEYOND, TO REMAIN.
- 2 (E) 15 PARKING SPOTS TO REMAIN.
- 3 (E) FENCE TO BE MOVED TO ACCOMMODATE GRADE CHANGE FOR PROPOSED NEW BUILDING.
- 4 PROPOSED EXTENTS OF PROJECT AREA.
- 5 PROPOSED INDUSTRIAL OFFICE BUILDING, 2 STORY, 7000-8000 SF PLAN AREA, 14000-16000 SF TOTAL FLOOR AREA.
- 6 (E) ADA PARKING STALL TO REMAIN.
- 7 DRAINAGE OF EXISTING BUILDING AND PAVED AREA TO REMAIN UNCHANGED.
- 8 EXTENT OF FIRE DEPARTMENT HAMMERHEAD TURN AROUND.
- 9 APPROXIMATE DISTANCE FROM PROPERTY LINE TO EXTENTS OF PROPOSED (N) BUILDING. (ACTUAL DISTANCE TO BE VERIFIED BY A LICENSED OREGON SURVEYOR)
- 10 MINIMUM FRONT SETBACK TO PUBLIC ROW PER ALBANY DEVELOPMENT CODE.
- 11 (E) BUILDING #5 TO REMAIN. TO BE USED FOR MAINTENANCE AND MAINTENANCE STORAGE.
- 12 (E) MODULAR TRAILER TO REMAIN
- 13 WATER QUALITY TREATMENT PLANTER.
- 14 (N) ACCESSIBLE SIDEWALK TO CONNECT BUILDING 9 TO PUBLIC WAY
- 15 ADA RAMP
- 16 FUTURE CROSS WALK BY SI PERMIT. NOT PART OF LAND USE APPLICATION.
- 17 (E) EASEMENT FOR PUBLIC SANITARY SEWER AND STORM WATER SEWER, 30' WIDE.
- 18 (E) EASEMENT FOR SANITARY SEWER, 10' WIDE.
- 19 PROPOSED TRANSFORMER LOCATION.
- 20 PROPOSED FIRE HYDRANT AND FDC FOR BUILDING 9.
- 21 ACCESS CONTROL GATE TO PARKING LOT.
- 22 (N) OUTDOOR STORAGE AREA.
- 23 (E) SIGN TO REMAIN.
- 24 (N) FENCE AROUND PARKING AND STORAGE AREA
- 25 (N) SITE OBSCURING FENCE.
- 26 (N) ACCESS CONTROL GATE TO STORAGE AREA
- 27 (N) ACCESS CONTROL GATE FOR SIDEWALK, ALWAYS OPEN FOR EGRESS. ACCESS CONTROL TO ENTIRE SITE.
- 28 STREET LIGHT FOR FUTURE CROSS WALK BY SI PERMIT. NOT PART OF LAND USE APPLICATION.
- 29 FRONT YARD LANDSCAPING TO REMAIN
- 30 BIKE PARKING AREA FOR 8-10 BICYCLES.
- 31 WHEEL BUMPER STOP, TYP.
- 32 REFUSE STORAGE ENCLOSURE FENCE, 6' TALL CHAIN LINK WITH VISION OBSCURING SLATS ALL SIDES OR CMU W/ CHAIN-LINK SITE OBSCURING GATES.
- 33 6" TALL PERIMETER CURB AROUND NEW PARKING AREA TYP.

3 - SITE PLAN.dwg

3/19/2007

**PILLAR CONSULTING GROUP, INC.**  
835 NW 23rd ST.  
CORVALLIS, OREGON 97330  
PHONE: 541-752-9202  
WWW.PILLAR-INC.COM

THE BAR ABOVE IS 1-INCH LONG WHEN DRAWING IS PLOTTED TO SCALE

**REGISTERED PROFESSIONAL ENGINEER**  
DIGITAL SIGNATURE  
OREGON  
JERRY T. SEBERT  
RENEWAL 09/30/16

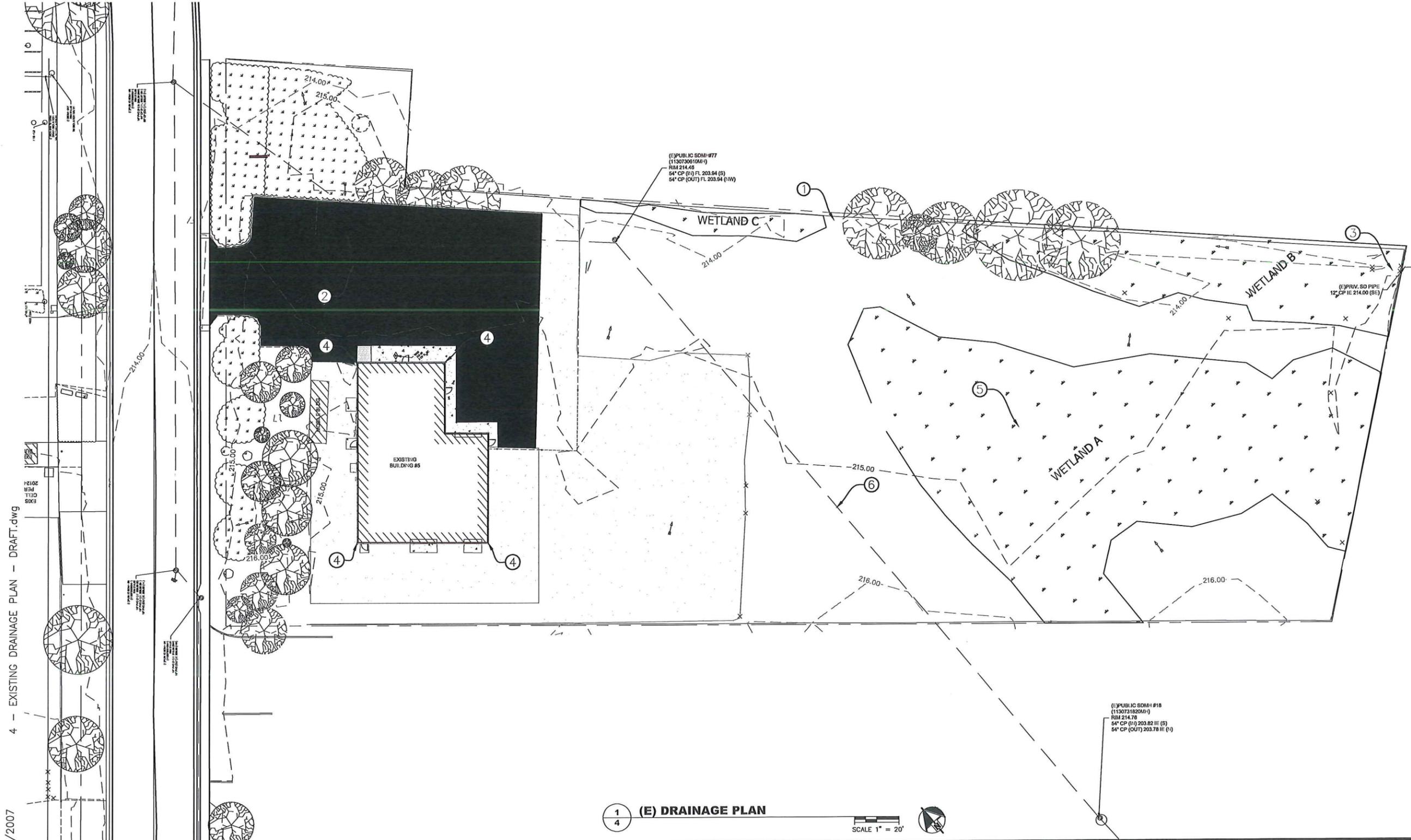
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Project Name and Address  
**SITE LAYOUT**  
BLDG 9 SITE PLAN APPLICATION  
W.R. GRACE  
ALBANY, OREGON

Project #: 2015064  
Date 06/03/2016  
Scale 1" = 20'

Sheet **3**

No.	Revision/Issue	Date



KEYED NOTES

- ① (E) SWALE ALONG N.E. EDGE OF SITE. DRAINS GENERALLY RIGHT TO LEFT.
- ② (E) CATCH BASIN FOR PARKING LOT. CONNECTS TO (E) PUBLIC STORM SEWER.
- ③ (E) STORM OUTLET FROM ADJACENT PROPERTY TO REMAIN.
- ④ (E) DOWNSPOUTS FROM BUILDING #5. SURFACE DRAIN.
- ⑤ (E) GRASS LAND DRAINS GENERALLY TO NORTH TO SWALE. (SEE NOTE #1)
- ⑥ (E) 54" PUBLIC STORM SEWER.

**PILLAR CONSULTING GROUP, INC.**  
 835 NW 23rd ST.  
 CORVALLIS, OREGON 97330  
 PHONE: 541-752-9202  
 WWW.PILLAR-INC.COM

THE BAR ABOVE IS 1-INCH LONG WHEN DRAWING IS PLOTTED TO SCALE

REGISTERED PROFESSIONAL ENGINEER  
 #61660028  
 OREGON  
 JEFFREY T. SEBASTIAN  
 GENERAL 05/30/15

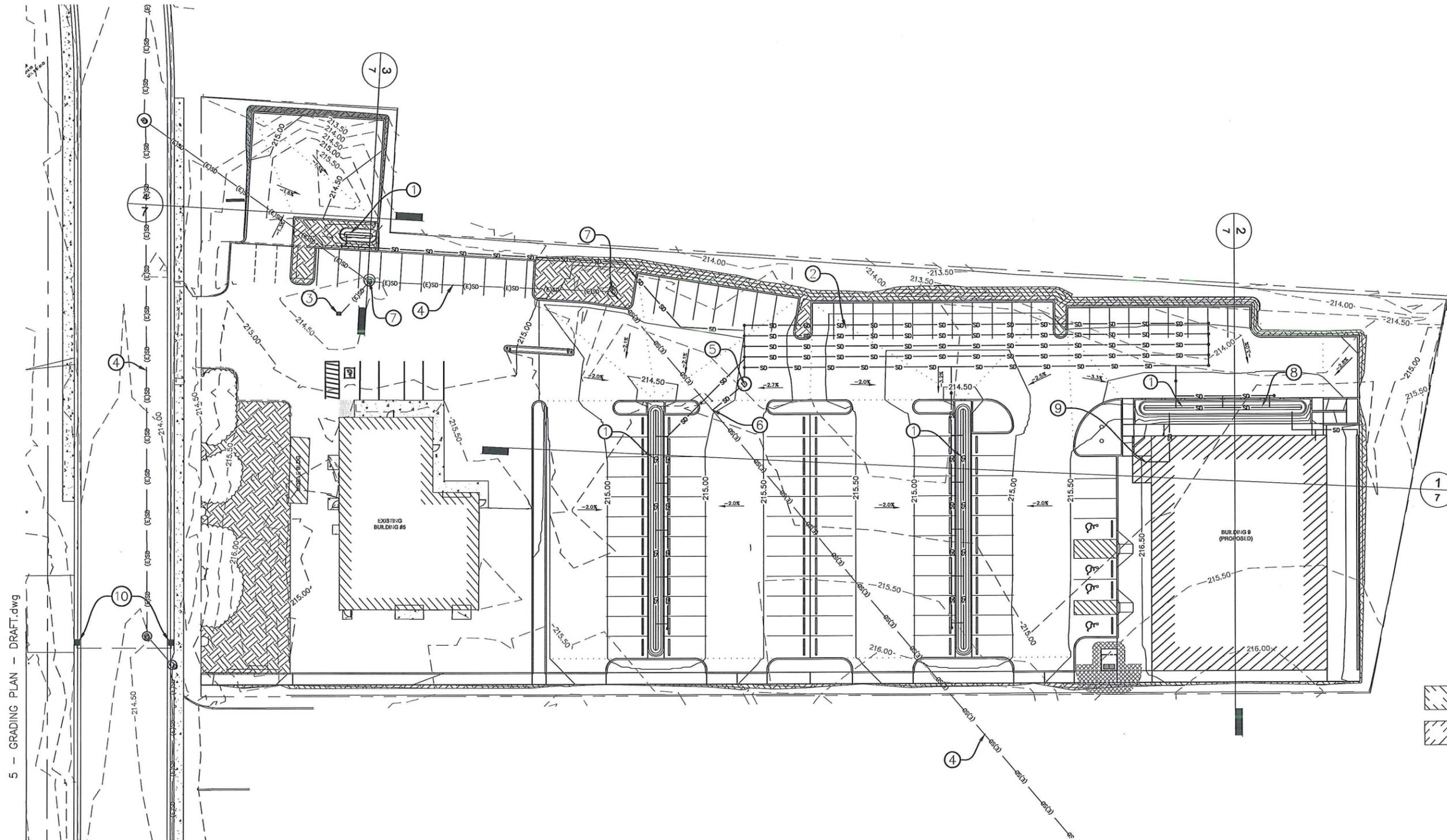
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No.	Revision/Issue	Date

Project Name and Address  
**(E) DRAINAGE PLAN**  
 BLDG. 9 SITE PLAN APPLICATION  
 W.R. GRACE  
 ALBANY, OREGON

Project #: 2015064  
 Date 06/03/2016  
 Scale As Noted

Sheet  
**4**



(E) ROOFS / BUILDINGS  
 (N) ROOFS / BUILDINGS

1 GRADING PLAN  
 5

SCALE 1" = 20'

NOTE  
 NOT FOR CONSTRUCTION  
 SITE PLAN APPLICATION ONLY

5 - GRADING PLAN - DRAFT.dwg

3/19/2007

**PILLAR CONSULTING GROUP, INC.**  
 835 NW 23rd ST.  
 CORVALLIS, OREGON 97330  
 PHONE: 541-752-9202  
 WWW.PILLAR-INC.COM

REGISTERED PROFESSIONAL ENGINEER  
 #01000028  
 DIGITAL SIGNATURE  
 OREGON  
 12.18.00  
 JEFFREY T. SCHWARTZ  
 EXPIRES 04/30/16

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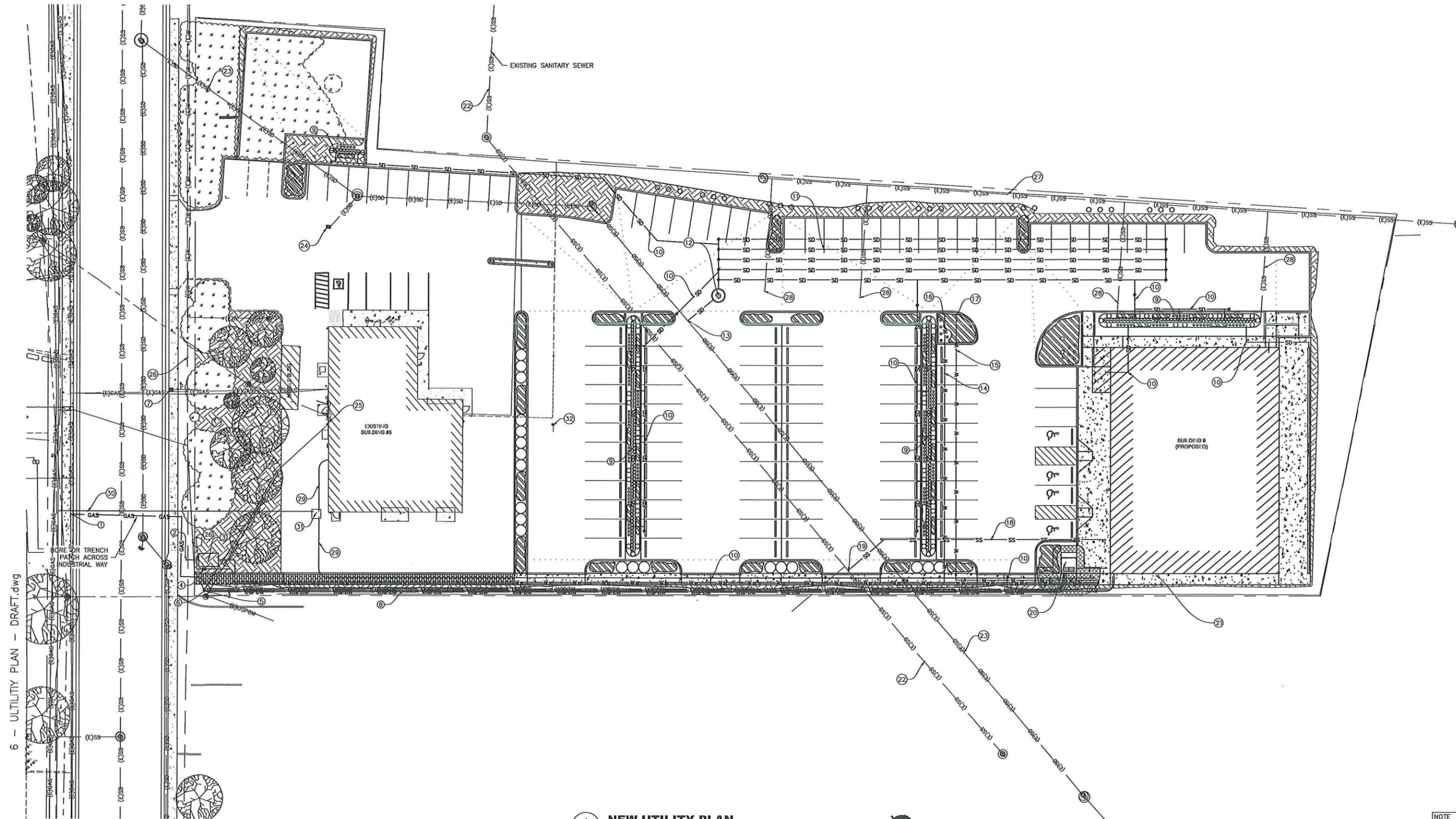
- KEYED NOTES
- 1 STORM WATER QUALITY AND COLLECTION PLANTER
  - 2 PROPOSED STORM WATER DETENTION SYSTEM. SUB SURFACE PIPE GALLERY.
  - 3 (E) CATCH BASIN TO REMAIN.
  - 4 (E) PUBLIC STORM SEWER.
  - 5 (E) STORM WATER DETENTION CONTROL STRUCTURE.
  - 6 CONNECTION TO (E) PUBLIC STORM SEWER.
  - 7 (E) STORM SEWER MANHOLE.
  - 8 DOWNSPOUT TO COLLECT IN STORM WATER PLANTER NORTH OF BUILDING.
  - 9 BIKE COVER, DOWNSPOUT TO TRENCH DRAIN.
  - 10 (N) CURB INLETS FOR CROSS WALK BUMP-OUT DRAINAGE.

No.	Revision/Issue	Date

Project Name and Address  
**GRADING PLAN**  
 BLDG. 9 SITE PLAN APPLICATION  
 W.R. GRACE  
 ALBANY, OREGON

Project #: 2015064  
 Date 06/03/2016  
 Scale As Noted

Sheet  
**5**



6 - UTILITY PLAN - DRAFT.dwg

**1**  
**6** NEW UTILITY PLAN

SCALE 1" = 20'



NOTE  
NOT FOR CONSTRUCTION  
SITE PLAN APPLICATION ONLY

3/19/2007

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**REGISTERED PROFESSIONAL ENGINEER**  
 DIGITAL SIGNATURE  
 OREGON  
 JERRY T. SCHWARTZ  
 LICENSE NO. 1888  
 EXPIRES 03/30/17

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- ① PROPOSED CONNECTION FOR (N) GAS SERVICES
- ② (N) CONNECTION TO (E) 12" WATER PIPE 12X6 HOT TAP W/6" GATE VALVE.
- ③ (N) DOUBLE CHECK VALVE FOR PRIVATE FIRE WATER DISTRIBUTION SYSTEM. 6" VALVE AND PIPE.
- ④ (N) 2" CITY WATER METER.
- ⑤ PROPOSED CONNECTION POINT FOR UNDERGROUND POWER SERVICES.
- ⑥ PROPOSED CONNECTION FOR (N) DATA CONNECTION.
- ⑦ (E) WATER METER.
- ⑧ UTILITY CORRIDOR TO PROPOSED BUILDING 9, 10' WIDE: 6" WATER, 2" WATER, 3X3" POWER, 8 X 2" DATA, 1 GAS.

- ⑨ STORM WATER QUALITY AND COLLECTION PLANTER PER CITY OF ALBANY STORM WATER DESIGN GUIDE.
- ⑩ PRIVATE STORM WATER PIPING.
- ⑪ PROPOSED STORM WATER DETENTION GALLERY UNDER PAVEMENT.
- ⑫ PROPOSED STORM WATER DETENTION CONTROL STRUCTURE.
- ⑬ PRIVATE STORM SEWER CONNECTION TO (E) 54" PUBLIC STORM SEWER.
- ⑭ (N) 6" LATERAL TO (N) FIRE HYDRANT.
- ⑮ (N) 4" FDC PIPE TO FIRE SPRINKLER SYSTEM.
- ⑯ (N) PRIVATE FIRE HYDRANT.

KEYED NOTES

- ⑰ FDC CONNECTION
- ⑱ (N) 6" PRIVATE SANITARY SEWER.
- ⑲ (N) CONNECTION OF PRIVATE SANITARY SEWER TO 30" PUBLIC SANITARY SEWER.
- ⑳ PROPOSED POWER TRANSFORMER LOCATION.
- ㉑ UTILITY CONNECTION ON SIDE OF BUILDING. FINAL LOCATION TBD.
- ㉒ (E) 30" PUBLIC SANITARY SEWER.
- ㉓ (E) 54" CATCH BASIN TO REMAIN.
- ㉔ (E) CATCH BASIN TO REMAIN

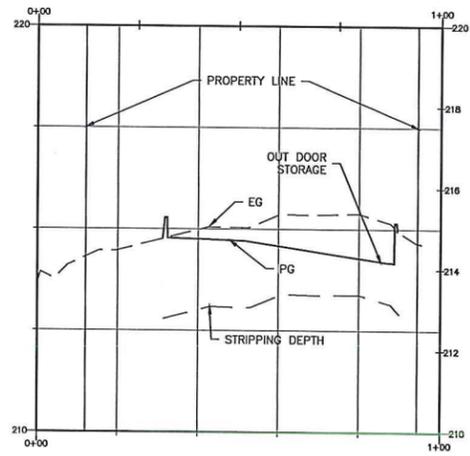
- ㉕ (E) UTILITY CONNECTIONS TO BUILDING #5 TO REMAIN.
- ㉖ (N) 2" WATER METER CONNECTION TO (N) 6" WATER.
- ㉗ (E) SANITARY SEWER
- ㉘ (E) SS LINE SHOWN ON CITY GIS. UNLOCATED. TO BE VERIFIED AND ABANDONED.
- ㉙ (2) (N) 2" DATA CONDUITS BETWEEN BLDG. 5 & 9.
- ㉚ (3) (N) 2" PRIVATE DATA CONDUITS UNDER STREET.
- ㉛ (N) PULL BOX, SIZE TBD.
- ㉜ (E) MOTION SENSOR TO BE REMOVED.

No.	Revision/Issue	Date

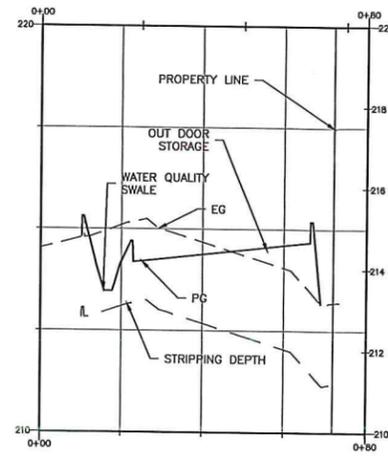
Project Name and Address  
**UTILITY PLAN**  
 BLDG. 9 SITE PLAN APPLICATION  
 W.R. GRACE  
 ALBANY, OREGON

Project #: 2015064  
 Date: 06/03/2016  
 Scale: As Noted

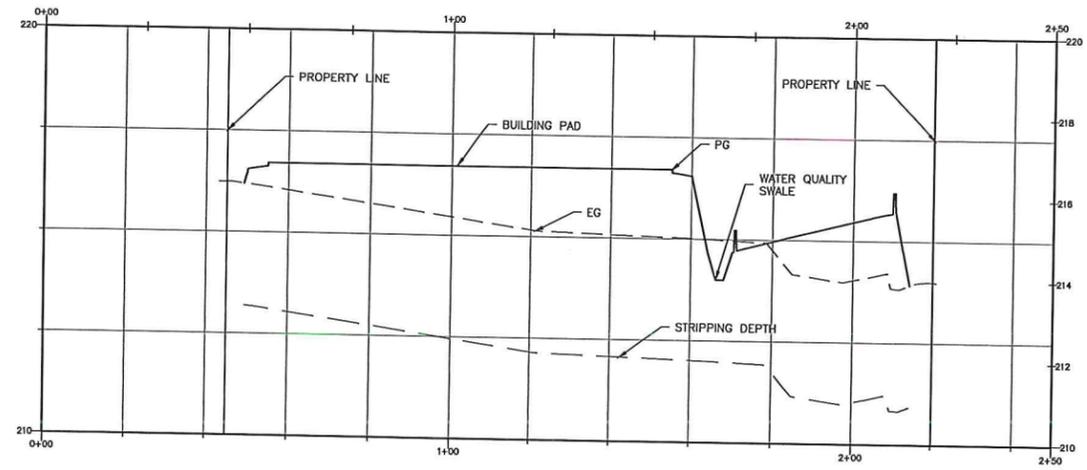
Sheet  
**6**



4  
7 **STORAGE LONGITUDINAL-SECTION**  
SCALE 1" = 20'



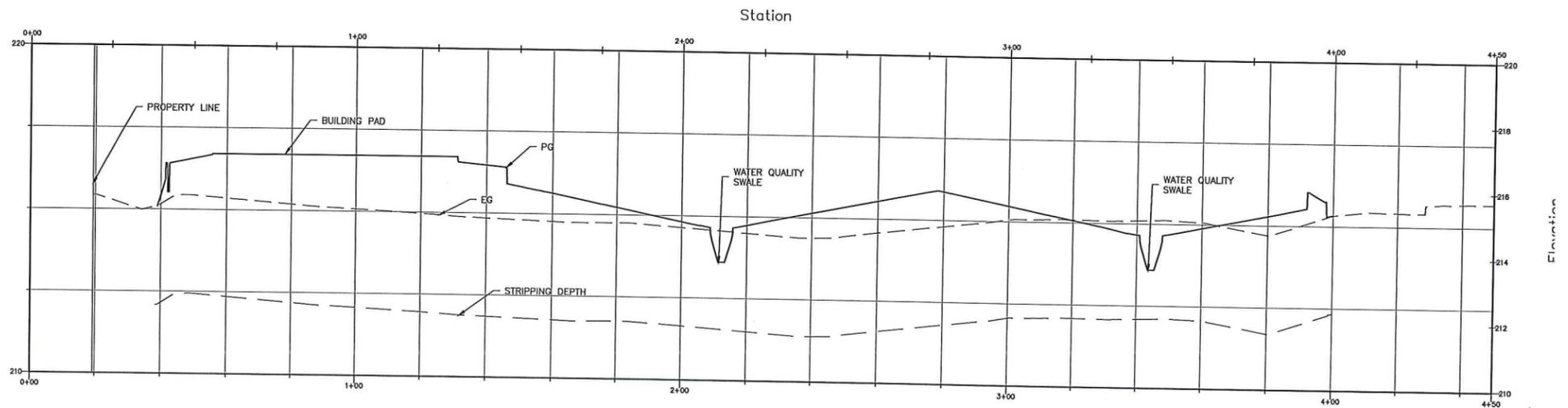
3  
7 **SITE X-SECTION**  
SCALE 1" = 20'



2  
7 **C9 PARKING X-SECTION**  
SCALE 1" = 20'

NOTE: STRIPPING DEPTH SUBJECT TO CHANGE PER GEOTECHNICAL REPORT AND SITE CONDITIONS.

ALL PROPERTY LINES ARE APPROXIMATELY LOCATED



1  
7 **C9 PARKING LONGITUDINAL-SECTION**  
SCALE 1" = 20'

NOTE  
NOT FOR CONSTRUCTION  
SITE PLAN APPLICATION ONLY

KEYED NOTES



835 NW 23rd ST.  
CORVALLIS, OREGON 97330  
PHONE: 541-752-9202  
WWW.PILLAR-INC.COM

THE BAR ABOVE IS 1-INCH LONG WHEN DRAWING IS PLOTTED TO SCALE



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Project Name and Address  
**SITE X-SECTION**  
BLDG 9 SITE PLAN APPLICATION  
W.R. GRACE  
ALBANY, OREGON

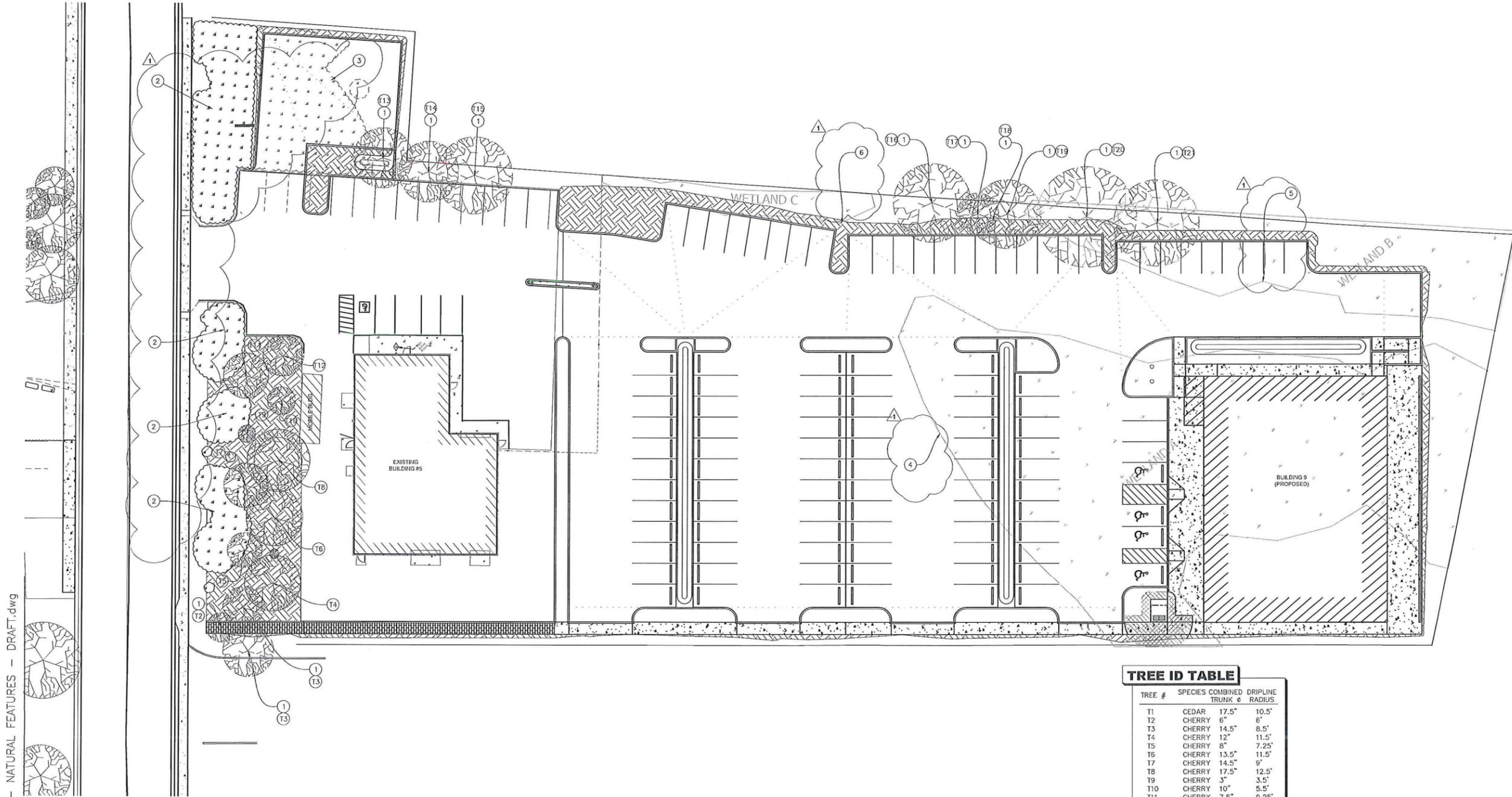
Project #: 2015064  
Date 06/03/2016  
Scale As Noted

Sheet  
**7**

No.	Revision/Issue	Date

7 - SITE X-SECTIONS - DRAFT.dwg

3/19/2007



8 - NATURAL FEATURES - DRAFT.dwg

**TREE ID TABLE**

TREE #	SPECIES	COMBINED TRUNK Ø	DRIPLINE RADIUS
T1	CEDAR	17.5"	10.5'
T2	CHERRY	6"	6'
T3	CHERRY	14.5"	8.5'
T4	CHERRY	12"	11.5'
T5	CHERRY	8"	7.25'
T6	CHERRY	13.5"	11.5'
T7	CHERRY	14.5"	9'
T8	CHERRY	17.5"	12.5'
T9	CHERRY	3"	3.5'
T10	CHERRY	10"	5.5'
T11	CHERRY	7.5"	9.25'
T12	CHERRY	15"	8.25'
T13	CRAB APPLE	31"	12.25'
T14	CRAB APPLE	13"	12.5'
T15	CRAB APPLE	27"	15.5'
T16	COTTONWOOD	13"	16'
T17	PLUM	23"	8.5'
T18	PLUM	22.5"	9'
T19	PLUM	18"	14'
T20	PLUM	9"	20.5'
T21	COTTONWOOD	18.5"	17.5'

**1 8 NATURAL FEATURES PLAN**

SCALE 1" = 20'

NOTE: NOT FOR CONSTRUCTION SITE PLAN APPLICATION ONLY

3/19/2007

KEYED NOTES

- ① (E) TREE TO BE DEMO'D.
- ② (E) SHRUB/HEDGE - TO REMAIN.
- ③ (E) SHRUB/HEDGE - TO BE DEMO'D.
- ④ APPROXIMATE BOUNDARY OF WETLAND A AS IDENTIFIED BY PHS.
- ⑤ APPROXIMATE BOUNDARY OF WETLAND B AS IDENTIFIED BY PHS.
- ⑥ APPROXIMATE BOUNDARY OF WETLAND C AS IDENTIFIED BY PHS.

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 WWW.PILLAR-INC.COM

REGISTERED PROFESSIONAL ENGINEER  
 #51600PE  
 DIGITAL SIGNATURE  
 OREGON  
 JAN 18, 2004  
 JEFFREY T. SCHEIDT  
 RENEWAL 05/30/10  
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No.	KEY NOTE REVISION	Date
1	8/1	

Project Name and Address  
**NATURAL FEATURES**  
 BLDG 9 SITE PLAN APPLICATION  
 W.R. GRACE  
 ALBANY, OREGON

Project #: 2015064  
 Date: 06/03/2016  
 Scale: As Noted

Sheet: **8**



10 - ADJACENT PROPERTY PLAN - DRAFT.dwg

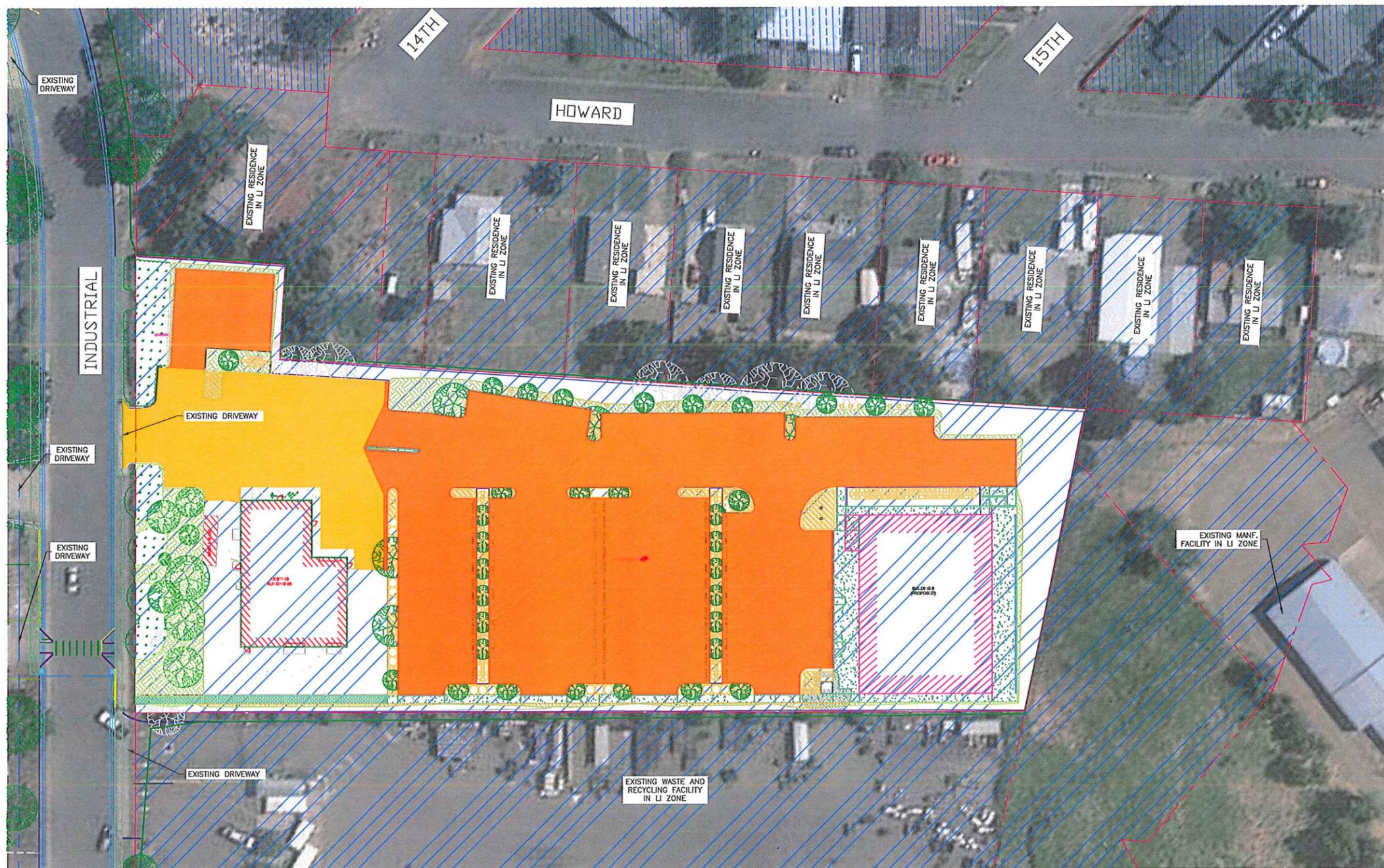
3/19/2007

**LEGEND**

-  APPROXIMATE PROPERTY LINE
-  RM ZONING
-  LI ZONING

**NOTE:**  
ZONING PER CITY OF ALBANY GIS.

**NOTE:**  
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**1**  
**10** ADJACENT PROPERTY PLAN

SCALE 1" = 30'

KEYED NOTES

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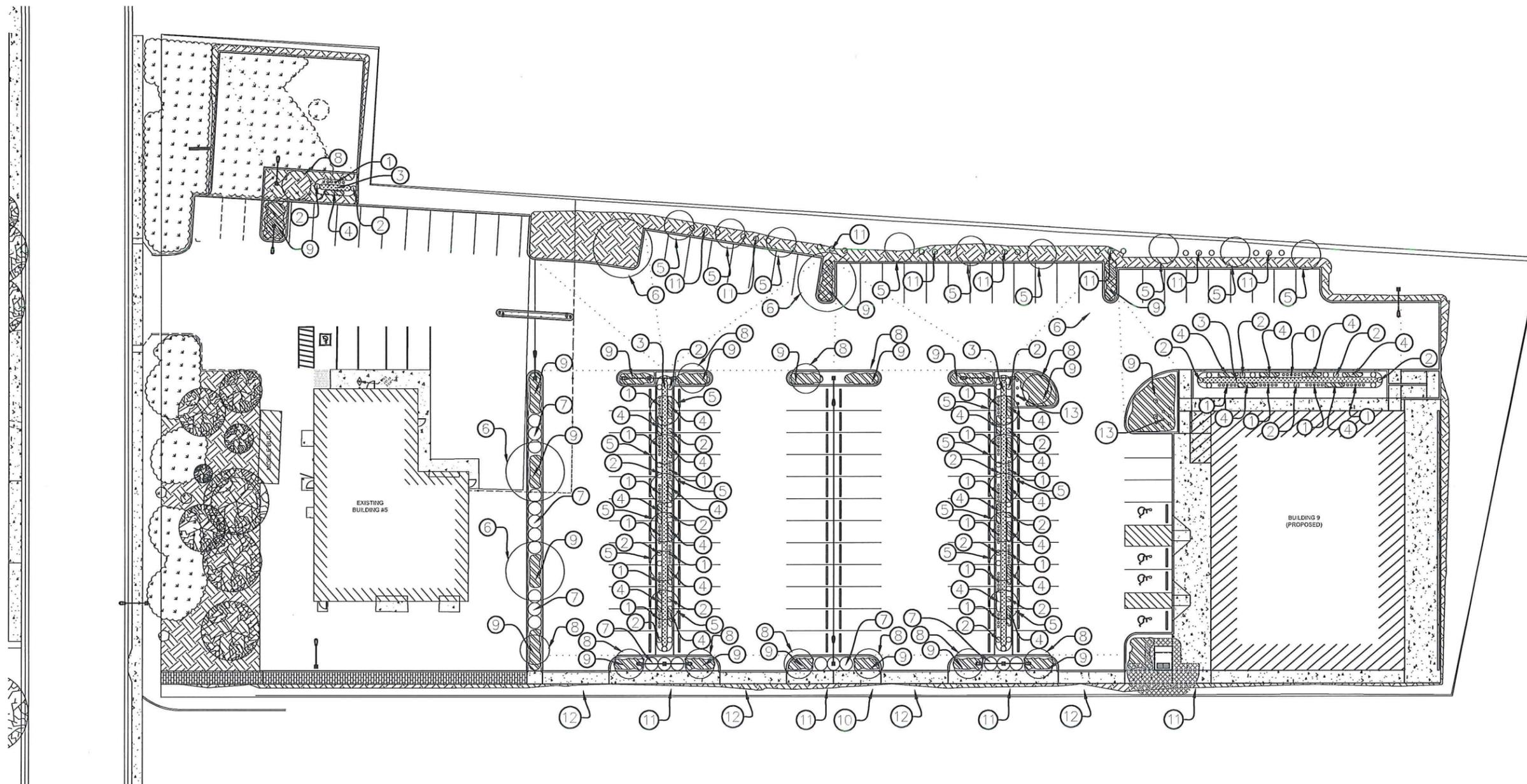
No.	Revision/Issue	Date

Project Name and Address  
**ADJ. PROPERTY PLAN**  
BLDG. 9 SITE PLAN APPLICATION  
W.R. GRACE  
ALBANY, OREGON

Project #: 2015064  
Date 06/03/2016  
Scale As Noted

Sheet  
**10**

11 - CONCEPTUAL LANDSCAPE PLAN - DRAFT.dwg



1  
11 CONCEPTUAL LANDSCAPE PLAN

SCALE 1" = 20'

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**PRELIMINARY**

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KEYED NOTES		
① SPIRAEA BETULIFOLIA 18" O.C. 1 GALLON SIZE, SMALL SHRUB.	⑦ CORNUS STOLONIFERA 'ARCTIC FIRE' 5 GALLON SIZE 5" O.C.	⑬ SPIRAEA THUNBERGII 'MAGIC CARPET' 2 GALLON SIZE 3" O.C.
② RIBES SANGUINEUM 4" O.C. 5 GALLON SIZE, LARGE SHRUB.	⑧ MALUS TRANSITORIA 'SCHMIDTUTLEAF' GOLDEN RAINDROPS 10' TALL MIN. TREE.	
③ JUNCUS PATENS 'ELK BLUE' 4" POT 12" O.C. HERBACEOUS PLANT.	⑨ COTONEASTER DAMMERI 'CORAL BEAUTY' 1 GALLON SIZE 3" O.C.	
④ RUBUS CALYCINOIDES 4" POT 12" O.C. GROUNDCOVER.	⑩ NO TREES AS THEY WOULD CONFLICT WITH TREES ON ADJACENT LOT THAT OVERHANG THIS PROPERTY.	
⑤ CARPINUS CAROLINIANA 10' TALL MIN. 15" O.C. TREE.	⑪ PRUNUS LAUROCERASUS 'OTTO LUYKEN' 1 GALLON SIZE 5" O.C.	
⑥ ULMUS 'FRONTIER' 10' TALL MIN. TREE.	⑫ POTENTILLA FRUTICOSA 'GOLDENFINGER' 1 GALLON SIZE 4" O.C.	

No.	Revision/Issue	Date

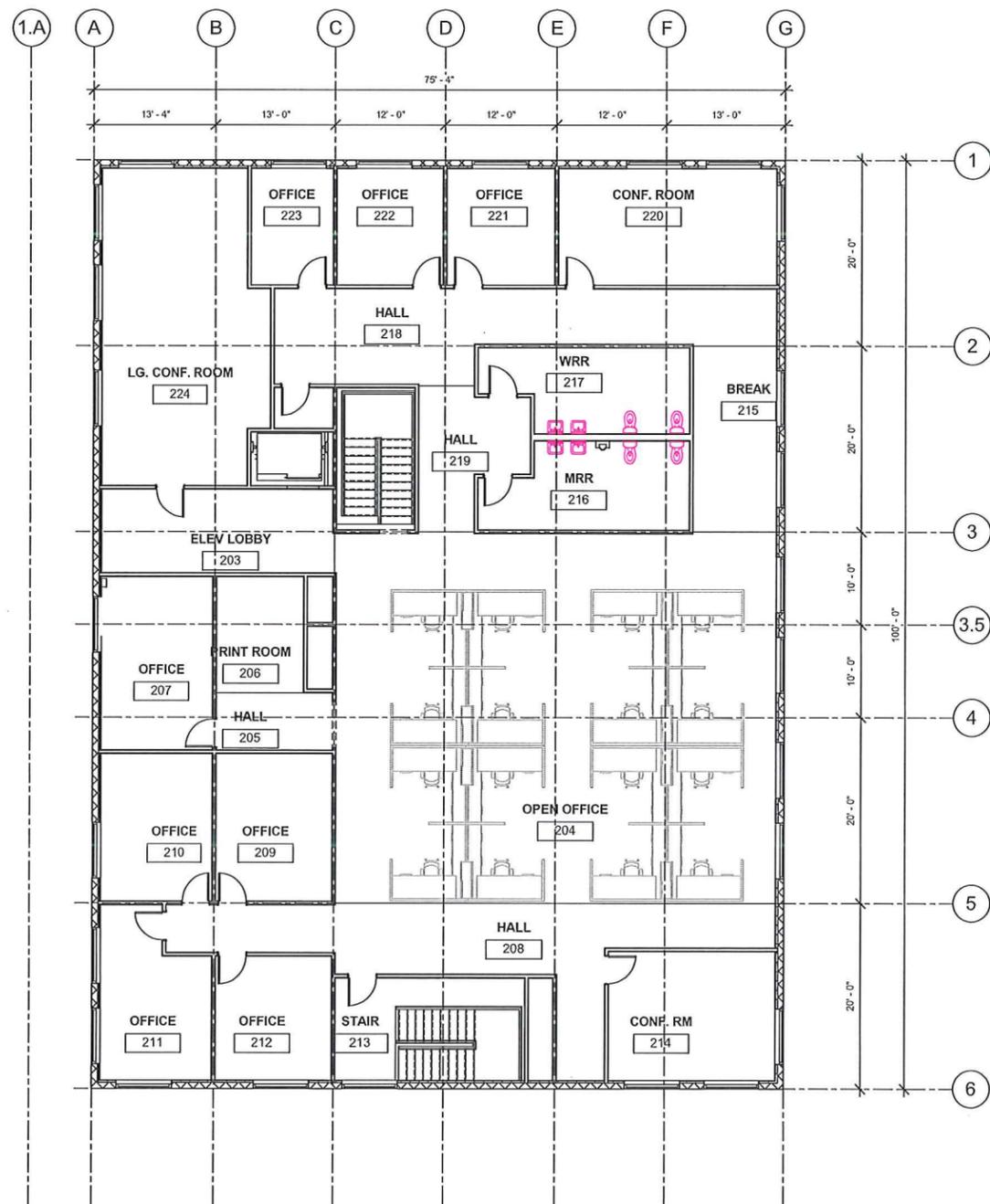
Project Name and Address  
**LANDSCAPE PLAN**  
BLDG 9 SITE PLAN APPLICATION  
W.R. GRACE  
ALBANY, OREGON

Project # 2015064  
Date 06/03/2016  
Scale As Noted

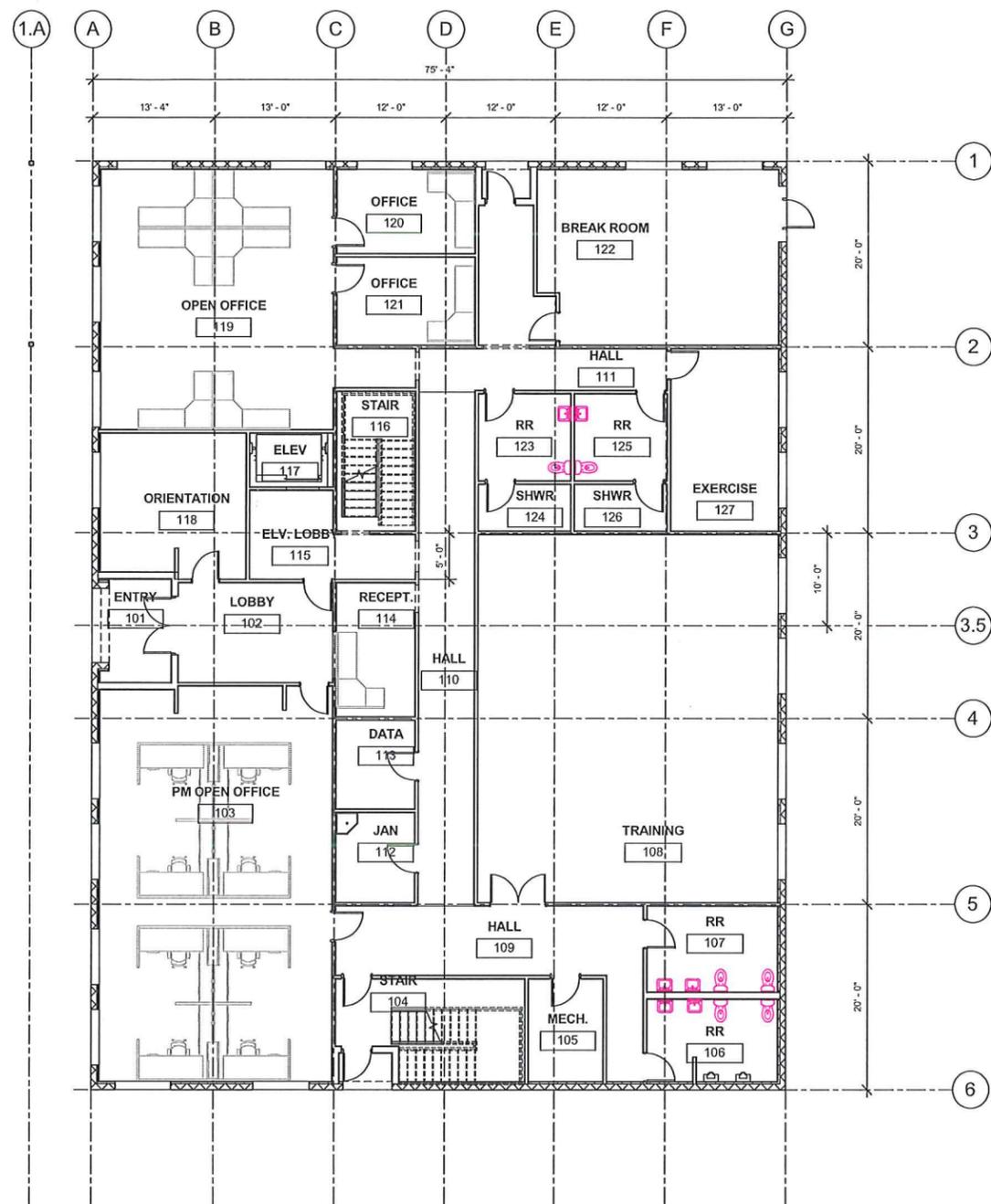
Sheet  
**11**



PRELIMINARY



2 2nd FLOOR PLAN- PLANNING  
 12 1/8" = 1'-0"



1 FINISHED FLOOR  
 12 1/8" = 1'-0"

KEYED NOTES

No.	Description	Date

OFFICE PLAN

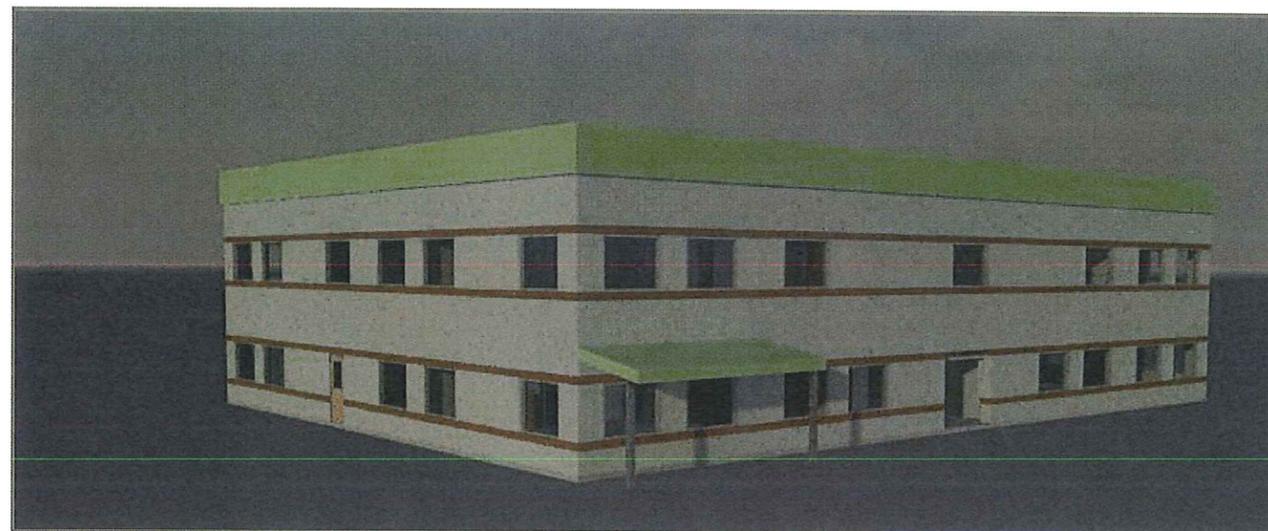
BLDG. 9 OFFICE  
 W.R. GRACE, ALBANY, OR

PROJECT # 2015064 SHEET  
 DATE 06/03/16  
 SCALE 1/8" = 1'-0"

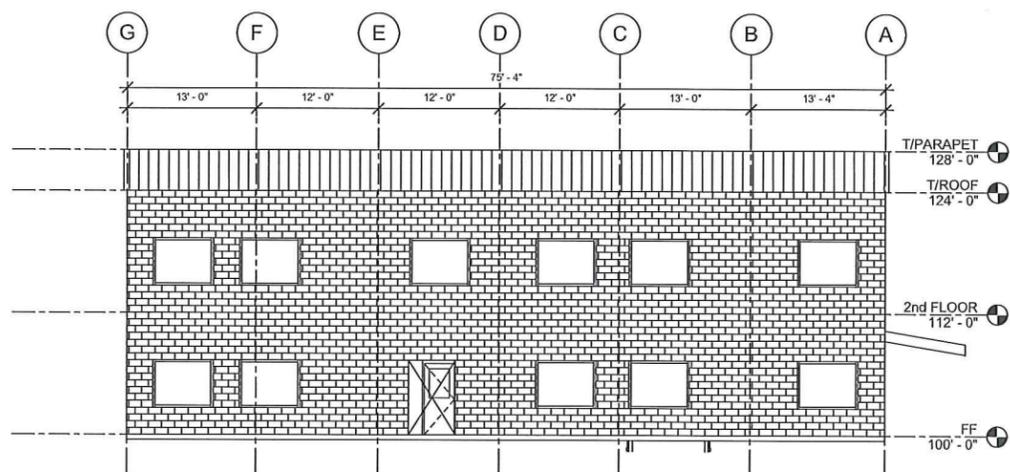
12

PRELIMINARY

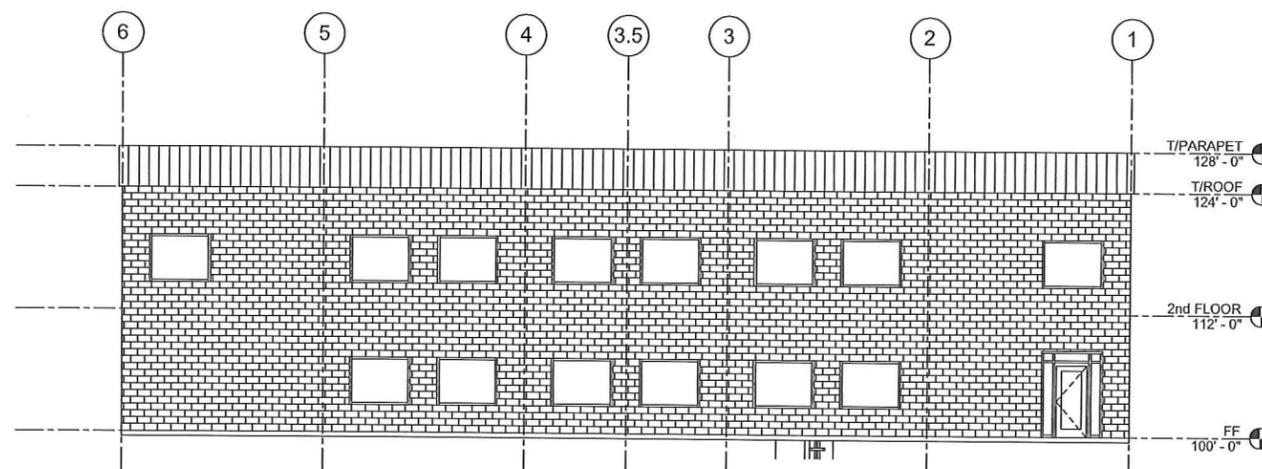
KEYED NOTES



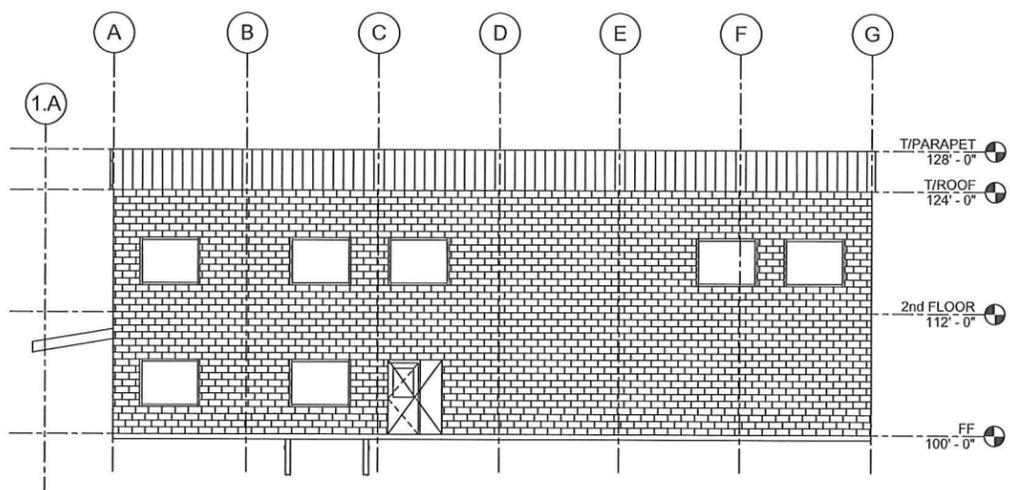
5 NORTH PERSPECTIVE  
 12" = 1'-0"



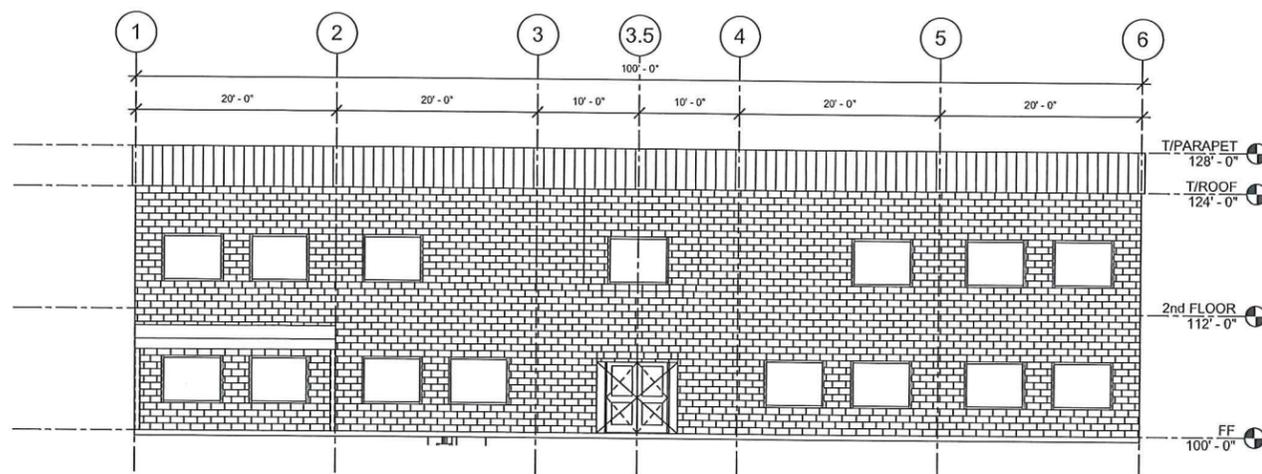
4 NORTH ELEVATION  
 1/8" = 1'-0"



2 EAST ELEVATION  
 1/8" = 1'-0"



3 SOUTH ELEVATION  
 1/8" = 1'-0"



1 WEST ELEVATION  
 1/8" = 1'-0"

No.	Description	Date

ELEVATIONS

BLDG. 9 OFFICE  
 W.R. GRACE, ALBANY, OR

PROJECT #	2015064	SHEET
DATE	06/03/16	
SCALE	As indicated	

13

12 - OVERVIEW PLAN - DRAFT.dwg

3/19/2007



1  
14 SITE LOCATION PLAN

SCALE 1" = 60'

NOTE  
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KEYED NOTES

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 WWW.PILLAR-INC.COM

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REGISTERED PROFESSIONAL ENGINEER  
 01000727  
 DIGITAL SIGNATURE  
 OREGON  
 EXPIRES 12/31/16  
 CHRISTOPHER T. SORBY  
 GENERAL 09/20/16

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No.	Revision/Issue	Date

Project Name and Address  
**OVERVIEW SITE PLAN**  
 SITE PLAN APPLICATION  
 W.R. GRACE  
 ALBANY, OREGON

Project #: 2015064  
 Date: 06/03/2016  
 Scale: As Noted

Sheet  
**14**

**EXHIBIT C**

**SITE PLAN NARRATIVE & FINDINGS OF FACT**





Professional Engineering and Project Management

## ENGINEERING MEMORANDUM

<b>TO</b>	City of Albany Planning				
<b>FROM</b>	Jeff Schott, P.E.				
<b>PROJECT</b>	W.R. Grace Expansion				
<b>SUBJECT</b>	Exhibit C: Project Description and Finding of Fact				
<b>DATE</b>	5/10/2016	<b>PROJECT #</b>	2015-064	<b>MEMO #</b>	EM-08

### Project Description:

The proposed W.R. Grace development of the site at 1437 Industrial Way is the first portion of a development that includes the subject site, but also the properties immediately across the street at 1400 and 1454 Industrial Way. This land-use proposal only includes the 1437 site because it is a stand-alone property, and the details of the development across the street are not sufficiently developed to prepare a land-use application. However, the development of this site does include parking for the future development across the street.

The 1437 Industrial Way development includes the following major elements:

- 1) Construction of a new 2 story Industrial Office building with a total plan area of up to 16,000 SF. This is known as "Building #9".
- 2) Construction of a new parking lot with approximately 104 additional parking spaces. This parking lot provides parking for the existing and proposed Grace facilities across the street as well as for the new and existing offices on the 1437 Industrial Way property.
- 3) Installation of storm water detention and storm water quality features associated with the new parking lot and office.
- 4) Installation of a marked cross-walk on Industrial Way to facilitate pedestrian traffic between sites.

The existing office and storage building located at 1437 Industrial Way, known as "Building 5" will remain, and will eventually be converted into the maintenance and maintenance storage facility.

The parking lot will likely be constructed prior to construction of the office to facilitate construction and operational parking while Building #9 is being constructed. The parking will also provide staging area and some construction parking for the future developments across the street.



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### Finding of Fact:

#### 1. Public utilities can accommodate the proposed development.

##### Fact:

- 1) Water:
  - a. The proposed Building #9 office is projected to have a demand of approximately 100 GPM (peak) of domestic water.
  - b. The proposed landscaping irrigation system is anticipated to have a demand of approximately 10 GPM (peak) of water.
  - c. The fire sprinkler demand for the building is projected to be about 300 GPM
  - d. The fire-flow demand (hydrant) for Building 9 is anticipated to be 1,500 GPM
  - e. There is an existing 12" water main in Industrial Way that has a reported capacity of 10,000 GPM of water with a residual pressure of 35.9 psig, per the City of Albany.
- 2) Sanitary Sewer:
  - a. Building #9 is projected to have a demand of 80 drainage fixture units. This can be serviced with a 4" pipe per the Oregon Plumbing Specialty Code.
  - b. The proposed sanitary sewer service pipe will be connected to the existing 30" public sewer pipe crossing the property.
- 3) Storm water:
  - a. The storm water from the proposed development will be detained per the City of Albany Storm Water Management Engineering Standards.
  - b. The storm water from the proposed development will be treated per the City of Albany Storm Water Management Engineering Standards, using the prescriptive storm water quality planters and swales.
  - c. The new site storm water discharge control structures will connect to the existing 54" diameter storm sewer that passes through the property.

##### Conclusion:

The existing public utilities have adequate capacity for the proposed development.

#### 2. The proposed post-construction stormwater quality facilities (private and/or public) can accommodate the proposed development, consistent with Title 12 of the Albany Municipal Code.

##### Fact:

The storm water from the proposed development will be treated per the City of Albany Storm Water Management Engineering Standards, using the prescriptive storm water quality planters and swales. The storm water quality system will be a private facility sized for the proposed development. The existing site storm water system will not be altered.

##### Conclusion:

Storm water from the proposed development will be treated through approved storm water quality features consistent with Title 12 of the Albany Municipal Code.



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*3. The transportation system can safely and adequately accommodate the proposed development.*

**Fact:**

The proposed developments will increase the amount of traffic entering and leaving the site. At the pre-application meeting, the City of Albany did not anticipate that this development will increase the demand beyond the existing system capacity. A Trip Generation Study has been performed by Access Engineering. See Exhibit E. This study concludes that the proposed developments, this development and the proposed future development across the street, should not significantly impact the existing transportation system in the area.

A new crosswalk is proposed to provide a safe crossing location for pedestrians (employees, visitors, and general traffic) crossing the street between the facilities on either side of the street. See Exhibit F for the proposed crosswalk design criteria.

**Conclusion:**

The existing transportation system along with the proposed cross walk have adequate capacity for the proposed development.

*4. Parking areas and entrance-exit points are designed to facilitate traffic and pedestrian safety and avoid congestion.*

**Fact:**

The proposed development uses the existing site entrance to minimize congestion during construction.

There is adequate queuing capacity for traffic into and out of the site.

Pedestrian access is separated from vehicular access to the site. A new crosswalk is proposed to facilitate safe pedestrian traffic across the street.

**Conclusion:**

The parking area and entrance-exit points are design to facilitate traffic and pedestrian safety and avoid congestion.

*5. The design and operating characteristics of the proposed development are reasonably compatible with surrounding development and land uses, and any negative impacts have been sufficiently minimized.*

**Fact:**

The proposed development is adjacent or abutting LI zoning districts on all sides. No side-yard setbacks are required adjacent to non-residential zoning. There are single-family residential homes in the LI zone (existing, non-conforming) on the northeast side of the development. Site lighting is designed to minimize the direct-light cast off-site, and the type of development, parking and office, should not generate emissions that would normally be objectionable to neighbors.



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**Conclusion:**

The development is compatible with the surrounding developments and land uses.

*6. Activities and developments within special purpose districts must comply with the regulations described in Articles 4(Airport Approach), 6 (Natural Resources), and 7 (Historic), as applicable.*

**Fact:**

The proposed development is not in a special purpose district. The delineated wetlands on the site require mitigation, but they do not appear on the City of Albany wetland inventory. The development is beyond the 100-year flood plain or flood way.

**Conclusion:**

The development is not required to comply with the provisions of a special purpose district.

*7. The site is in compliance with prior land use approvals.*

**Fact:**

The existing site is not known to be in violation of existing land-use approvals. The existing developments appear to be generally consistent with the specific provisions associated with the LI zone.

**Conclusion:**

The existing site appears to be in compliance with prior land use approvals.

*8. Sites that have lost their nonconforming status must be brought into compliance, and may be brought into compliance incrementally in accordance with Section 2.370*

**Fact:**

To the best of our knowledge the existing developments on this site has been legally developed and the site has not lost its non-conforming status. The site appears to have been continuously occupied since developed.

**Conclusion:**

This provision does not apply because the site is in compliance with LI zoning

*9. The proposed development project meets the development standards of Article 4 for LI zoning.*

**Fact:**

Per the attached site plans and documents, the proposed development appears to be in compliance with the development standards for the LI Zone.

**Conclusion:**

The proposed development appears to be in compliance with provisions of the LI Zone.

**EXHIBIT E**

TRIP GENERATION REPORT BY ACCESS ENGINEERING



**Access Engineering LLC**

**134 E. 13<sup>th</sup> Ave. Suite 2**

**Eugene, Oregon 97401**

**Phone & Fax**

**541-485-3215**

**[info@accesseng.com](mailto:info@accesseng.com)**

# **W R Grace Plant Expansion Trip Generation Report**

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**Albany, Oregon**

**Transportation Engineering**

**Traffic Design**

**Trip Generation**

**Access Management**

**Traffic Counts**

**Street Lighting**

**May 2, 2016**

# W R Grace Plant Expansion Trip Generation Report

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Albany, Oregon



RENEWS 6/30/16

May 2, 2016

# W R Grace Plant Expansion Trip Generation Report

## I. Introduction

The applicant, W R Grace and Company, is planning a major expansion of their facilities currently located at 1290 Industrial Way SW, Albany, Oregon . The purpose of this report is to calculate the trip generation of the proposed expansion in order to determine the level of analysis required to satisfy the requirements of the City's Minimum Transportation Standards for roadway capacity and safety.

## II. Proposed Development

### 1. Description and Vicinity Map

Figure 1 in Appendix A, shows the location of the site in the industrial area southeast of the Albany rail yard in central Albany, Oregon. The site consists of tax lots 2618, 2603, 2623, and 2622 on Map 110307CB which total 4.46 acres on the west side of Industrial Way and tax lot 2605, 2.0 acres, on the east side.

### 2. Site Plan, Proposed Land Use, Intensity, and Timing

Figure 2 in Appendix A shows the overall site plan. All of the existing facilities are located on north half of the site west of Industrial Way except for a small office and storage building with 18 parking spaces on the east side. The expansion plan is to construct a large addition to their plant on the west side of Industrial Way and a new office and parking on the east side. No change is proposed for the existing LI - Light Industrial zoning on the site. The expansion is planned in two phases:

- First, the new 16,000 square foot office building and 112 new parking spaces are planned to be completed in 2017 on the east side of Industrial Way. A total of 20 new employees are expected to be added to the office staff. At the completion of this phase almost all parking for the facility will be located on this parcel.
- Second, a new production and storage building south of their existing production buildings on the west side of Industrial Way to be completed by 2018. That building is planned to have 30,000 square feet devoted to production and 10,000 square feet for storage A total of 40 new employees are expected to be added by this expansion. A new waste water treatment building will replace the existing waste water treatment building.

## III. Existing Conditions

### 1. Study Area

- a. **Limits of Traffic Study.** Initially the study area will include the site access on Industrial Way, local street, and the intersections of leading to the nearest arterial streets. Industrial Way SW intersects SW Queen Avenue, a minor arterial, at its south end. To the north, the nearest arterial, Highway 20 is reached via SE 13<sup>th</sup> Avenue, SE Jackson Street, and SE 9<sup>th</sup> Avenue.

**b. Existing Zoning and Land Uses.** The area between the Albany Rail Yard and SW Queen Avenue including the subject site and parcels to the north of SE 13<sup>th</sup> Avenue between the Rail Yard and east of SE Jackson Street are all zoned LI, Light Industrial. That area is almost fully developed. There is a small triangular area of RM, Residential Medium Density zoning, 100% developed with single-family detached housing, southeast of the site in the area bounded by SE 14<sup>th</sup> Avenue, SE Howard Street , and SE Marion Street.

**2. Site Accessibility**

**a. Area Roadway System.** Table 1 below shows the characteristics of the existing streets in the initial study area.

**Table 1: Existing Study Area Street Conditions**

Street Segment	Jurisdiction	Classification	Posted Speed	Pavement Width - Curb/Shoulders	Travel Lanes*	Bike Lanes	On-Street Parking	Sidewalks Sides
Industrial Way Queen to 13 <sup>th</sup>	City	Local	25**	40' - Curbs Both	2	None	Both Sides	Partial
Queen Avenue Hwy. 99E to Ferry Ferry to Marion	City	Minor Arterial	35	56' - Curbs Both	4 2	Yes	None	Both
13 <sup>th</sup> Avenue Industrial Way to Jackson	City	Local	25**	40' - Curbs Both	2	None	Both Sides	Both
Jackson Street 13 <sup>th</sup> Avenue to 9 <sup>th</sup> Avenue	City	Major Collector	25**	46' - Curbs Both	2	Yes	Both Sides	Both
9 <sup>th</sup> Avenue Jackson to Hwy 20	City	Major Collector	25**	46' - Curbs Both	2	Yes	Both Sides	Both

\* - Through lanes only, see Figure 3 for intersection approach lanes. \*\* - Basic Rule

The T-intersection of Industrial Way with Queen Avenue is controlled by a Stop sign for Industrial Way.

The T-intersection of 13<sup>th</sup> Avenue with Industrial Way is controlled by a Stop sign for southbound Industrial Way.

The T-intersection of 13<sup>th</sup> Avenue with Jackson Street is controlled by a Stop sign for 13<sup>th</sup> Avenue.

The T-intersection of Jackson Street with 9<sup>th</sup> Avenue is controlled by a Stop sign for 9<sup>th</sup> Avenue.

The T-intersection of 9<sup>th</sup> Avenue with Highway 20 is controlled by a Stop sign for 9<sup>th</sup> Avenue.

Queen Avenue is classified as a higher safety risk street in the Albany Transportation System Plan (TSP). Among the locations listed for link and intersection improvement projects in the TSP are the intersection of Queen Avenue at Pacific Highway (99E), Just west of the study area, where additional lanes are proposed by the 2030 planning horizon year.

- b. Transit Service.** The nearest bus stops provided by the Albany Transit Service, Route 2, are along Jackson Street north of 13<sup>th</sup> Avenue and Marion Street North of Queen Avenue. The TSP notes that there are deficiencies within the City of Albany transit system in four areas: service frequency, service hours, availability of information, and service availability. In addition there are also demand responsive services within the City of Albany provided by Albany Call A Ride and Benton County Dial A Bus. The Albany Transit Plan adopted in 2011 proposes significant changes to the Albany Transit Service, but eliminated the route on Queen Avenue west of Marion Street.
- c. Pedestrian and Bicycle Facilities.** Only Industrial Way of the study area streets does not have continuous sidewalks. W R Grace intends to provide sidewalks along the west side of Industrial Way adjacent to their property. There are on-street striped bicycle lanes on the arterial and collector streets in the study area; Queen Avenue and Marion and Jackson Streets.
- d. Study Area Crashes.** Crash data for the 5-year period January 2011 through December 2015 was obtained from the ODOT's Crash Analysis and Reporting Unit for Industrial Way and the study area intersections of the streets listed in Table 2. No crashes were found on Industrial Way or the intersections of Industrial Way at Queen Avenue, Jackson Street at 13<sup>th</sup> Avenue, or Jackson Street at 9<sup>th</sup> Avenue during that time period.

The only reported crashes were at Queen Avenue at Marion Street and are tabulated below. Table 2 reports the collision types by year. The data show no predominant type of collision. The pedestrian was in a crosswalk and struck by a left-turning vehicle. The head-on collision occurred as one vehicle swerved to avoid a stopped vehicle. The detailed crash reports are in Appendix B.

**Table 2: Queen Avenue at Marion Street Collisions by Type and Year**

Collision	Year	2011	2012	2013	2014	2015	Total	Injury
Rear-End		0	1	0	1	0	2	1
Angle		1	0	0	0	0	1	1
Turning		1	0	1	0	0	2	1
Head On		1	0	0	0	0	1	1
Pedestrian		0	1	0	0	0	1	1
<b>Total</b>		<b>3</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>7</b>	<b>5</b>

#### IV. Projected Traffic

##### 1. Background Traffic

Hourly traffic volumes on Industrial Way were collected by a mechanical hose counter set out to record traffic on Tuesday and Wednesday, March 29th and 30th just south of the driveway to the new parking area on Industrial Way. The average daily traffic recorded for Tuesday and Wednesday was 962 vehicles a day (see Appendix B). The peak hour of traffic on Tuesday was 89 vehicles from 4 to 5 PM. The peak on Wednesday was 90 vehicles from 2 -3 PM. Speed data was also collected. The 85th percentile speed was 31 MPH, speeds as high as 45 MPH were recorded however.

Industrial Way is a local industrial street that will be essentially built out at the completion of the proposed expansion. This report will estimate the new trips that will be generated by the expansion. There are no other known proposed developments on Industrial Way.

The transportation model in the Albany TSP provides two-way PM peak hour traffic 2004 existing and volume projections for the following major streets near the study area the horizon year of the plan, 2030:

Street	2004 PM Peak	2030 PM Peak
Queen Avenue, west of Marion Street	1170	1167
Marion /Jackson Street, north of Queen Avenue	350	546

##### 2. Site Traffic

- a. **Trip Generation.** The first step in the analysis is to determine the category(ies) in the ITE Trip Generation Manual that best describe the proposed development. W R Grace and Company is best described as a manufacturing facility turning raw materials into specialty chemicals and materials. The Ninth Edition of the Trip Generation Manual states that manufacturing facilities generally also have office, warehouse, research and associated functions. This is true of W R Grace and Company.

Trip generation estimates for the manufacturing facility expansion are made using the Ninth Edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual land use code 140 - Manufacturing. There are two possible methods of estimating new trips from the proposed expansion; by additional square footage or by additional employees. Table 3 on the following page shows the trip generation of the expansion by phase using each method.

**Table 3: Trip Generation**

Land Use (ITE Code)	Size Unit	Daily Trips		PM Peak Hour			
		Rate	Total	Rate	Total	In	Out
<b>Trip Generation by Added Square Footage</b>							
Phase 1 - Manufacturing (140)	16 1000 SF GFA	2.59*	41	0.73	12	4	7
Phase 2 - Manufacturing (140)	40 1000 SF GFA	3.36*	134	0.73	29	11	19
<b>Total New Trips by Square Footage</b>			<b>176</b>		<b>41</b>	<b>15</b>	<b>26</b>
<b>Trip Generation by New Employees</b>							
Phase 1 - Manufacturing (140)	20 Employees	2.13	43	0.84*	17	7	9
Phase 2 - Manufacturing (140)	40 Employees	2.13	85	0.73*	29	13	16
<b>Total New Trips by Employees</b>			<b>128</b>		<b>46</b>	<b>20</b>	<b>26</b>

\* - Trip rate is based on fitted curve equation.

The City of Albany uses the PM peak hour for analysis of traffic impacts. The trips generated by new employees will be used since that method produces the higher number of trips.

**b. Trip Distribution.** PM peak hour trips from this site are predominantly work to home type trips. The new trips to and from the site will be distributed based on the site’s location in relation to the distribution of households in the Albany urban area. The W R Grace Facility is centrally located in the Albany. Household data from the U.S. Census Bureau’s “American Fact Finder” website was collected by census tract for the urban area. The trips were then assigned to the study area streets based on the percentage of households by direction from the site (see Appendix B). Figure 3 in the Appendix shows the PM peak hour distribution of the new trips for the proposed manufacturing expansion development and their assignment to the study area.

**3. Recommendation**

As Table 3 and Figure 3 show, the 46 new trips generated by the proposed expansion of the W R Grace and Company plant are below the City’s requirement of 50 additional trips to trigger a Level I Trip Generation and Distribution Study. Based on this analysis, we find that the proposed plant expansion will not significantly affect the transportation system in the study area through the planning horizon, 2030. We recommend that the proposed expansion be approved without further traffic analysis.

W R Grace Plant Expansion  
Traffic Impact Analysis

---

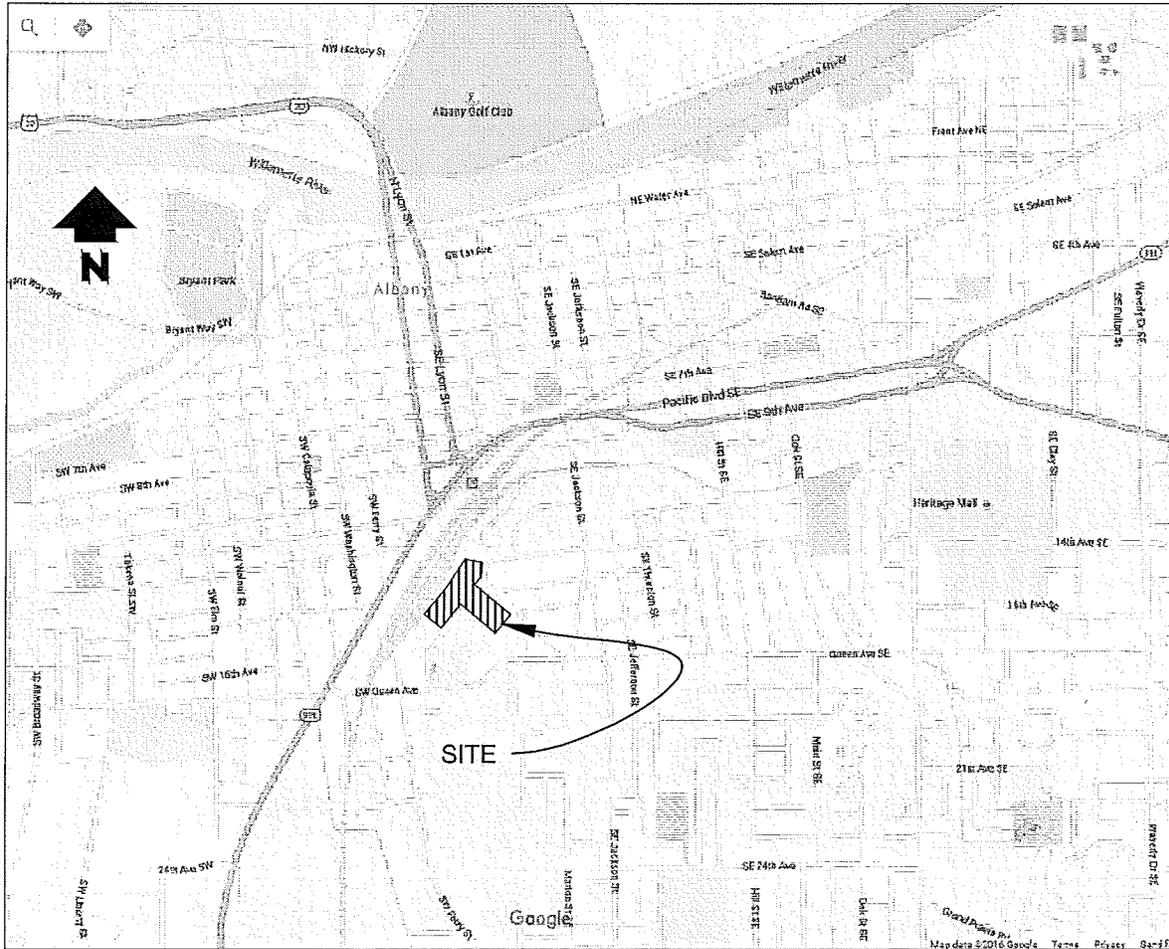
# Appendix A

## Figures

# Figure 1

## W R Grace Plant Expansion Trip Generation Report

### Vicinity Map



# Figure 2

## WR Grace Plant Expansion Trip Generation Report

### Site Plan

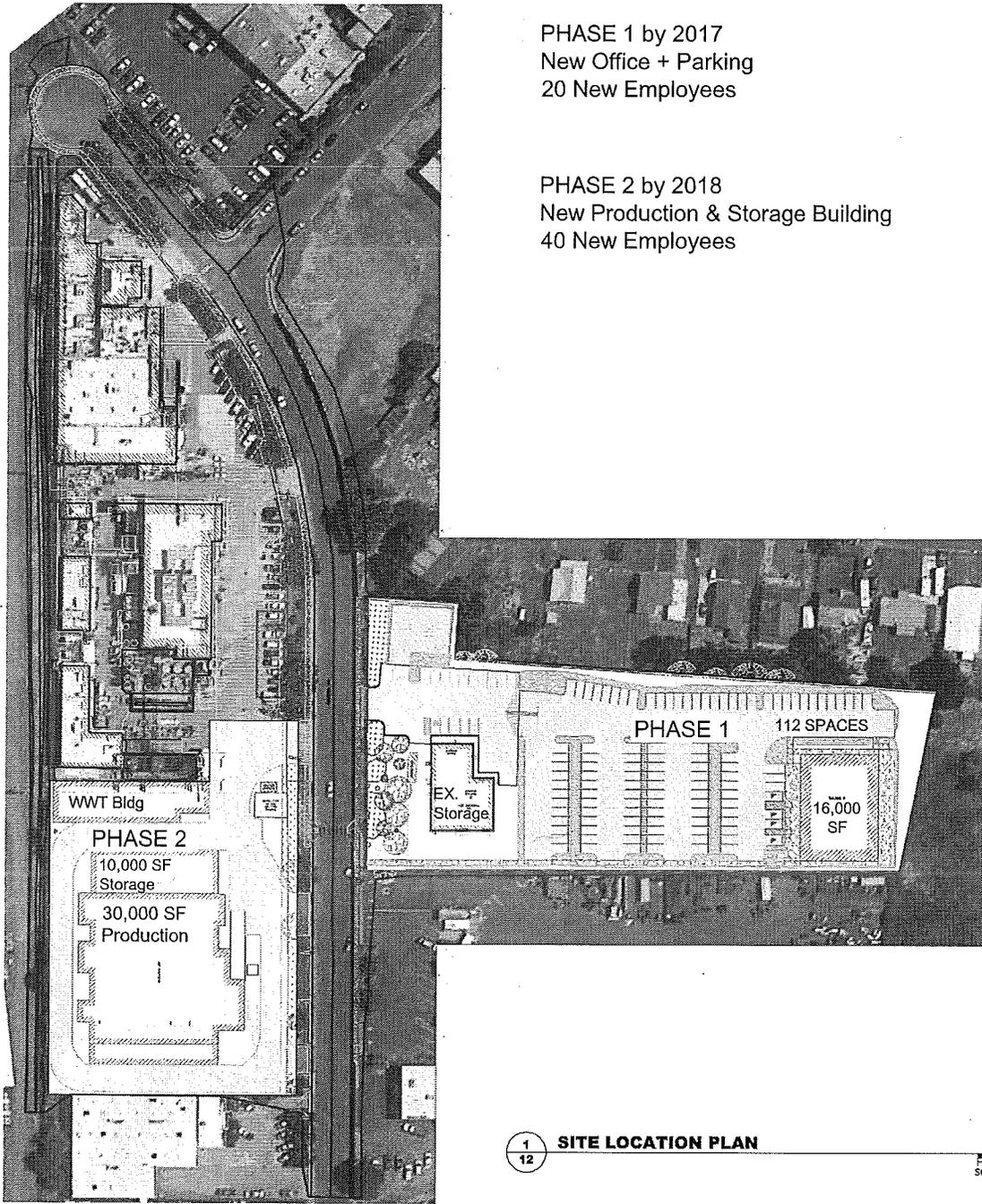
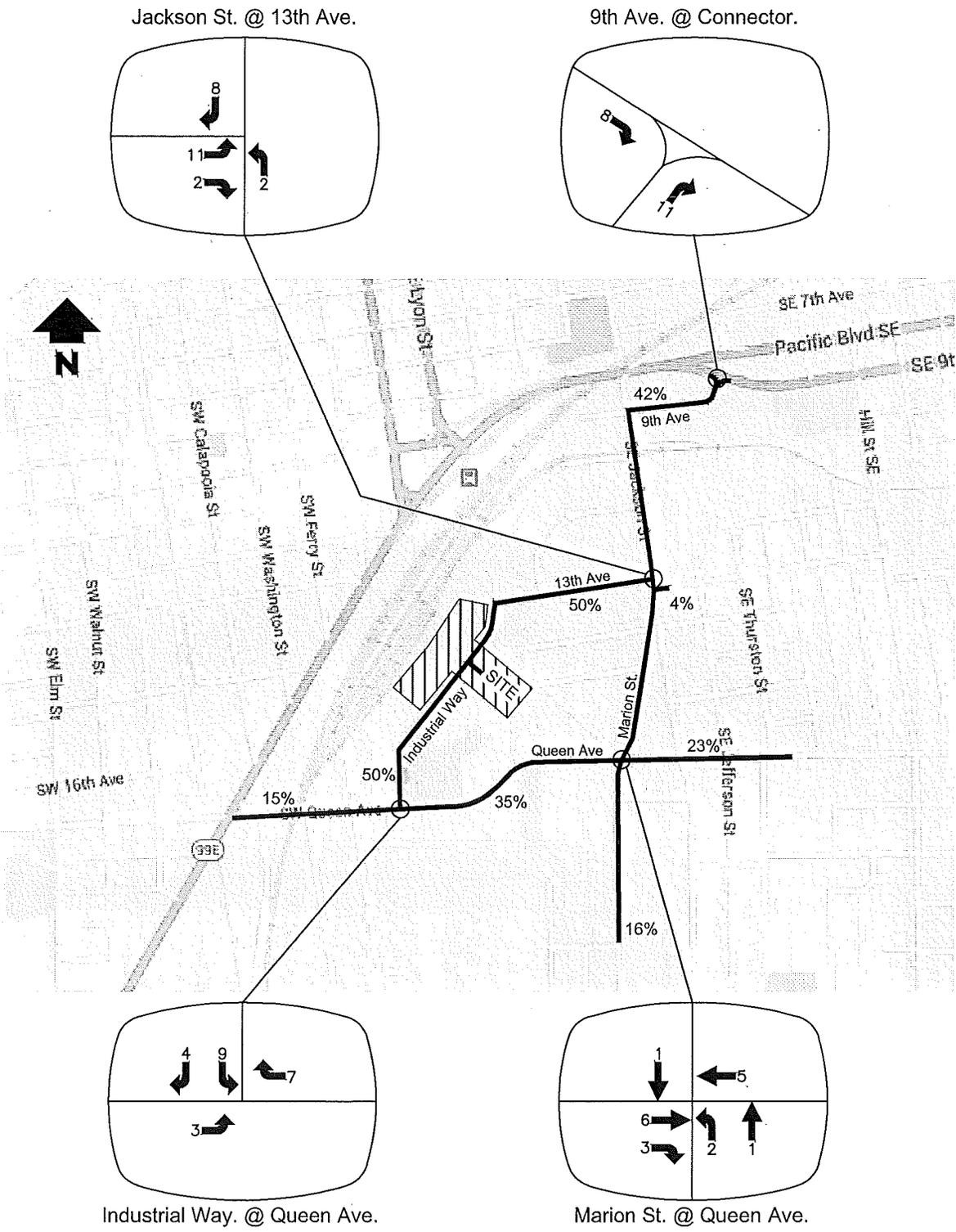


Figure 3

W R Grace Plant Expansion Trip Generation Report  
PM Peak Hour Trip Distribution & Assignment



W R Grace Plant Expansion  
Traffic Impact Analysis

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# **Appendix B**

## **Traffic & Crash Data**

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION  
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT  
 URBAN NON-SYSTEM CRASH LISTING  
 QUEEN AVE at MARION ST, City of Albany, Linn County, 01/01/2011 to 12/31/2015  
 Total crash records: 7

CDS380  
 04/28/2016  
 CITY OF ALBANY, LINN COUNTY

SR	TH	DAY	TIME	CLASS	CITY STREET	RD CHAR	INT-TYPE	INT-REL	OFFRD	WHTR	CRASH	SPCL USE	TRFLR QTY	MOVE	PRTC	INJ	A S	LICNS	PED	ERRORS	ACT EVENT	CAUSE	
NO	REF			FROM	FIRST STREET	LOC	(MEDIAN)	TRAF-	DRY	DRY	COLL	VA TYPE	OWNER	FROM	TYPE	SVRTY	E X	RSS	LOC				
01019		N	N	16	MARION ST	INTER	CROSS	N	N	CLR	S-1STOP	01 NONE	0	STRGHT	01	DRVR	NONE	26	M	OR-Y	026	000	07
		N	N	0	QUEEN AVE	E	0	TRF SIGNAL	N	DRY	REAR	PRVTE	PSNGR CAR	E -W							000	00	07
		3P							N	DAY	FOO	PSNGR CAR									000	00	
									N			02 NONE	0	STOP	01	DRVR	NONE	20	F	OR-Y	000	011	00
									N			PSNGR CAR									000	00	
01059		N	N	16	MARION ST	INTER	CROSS	N	N	CLR	PED	01 NONE	0	TURN-L	01	DRVR	NONE	61	M	OR-Y	029	000	02
		N	N	0	QUEEN AVE	S	0	TRF SIGNAL	N	DRY	PED	PRVTE	PSNGR CAR	E -S							000	00	
		5A							N	DAMN	INJ	PSNGR CAR									000	00	
									N			02 NONE	0	STOP	01	DRVR	NONE	20	F	OR-Y	000	011	00
									N			PSNGR CAR									000	00	
01380		N	N	16	MARION ST	INTER	CROSS	N	N	CLR	O-1STOP	01 NONE	0	STRGHT	01	DRVR	NONE	41	M	OR-Y	080,026	007	26
		N	N	0	QUEEN AVE	W	0	UNKNOWN	N	DRY	HEAD	PRVTE	PSNGR CAR	E -W							000	00	
		SA							N	DAY	INJ	PSNGR CAR									000	00	
		IP							N			02 NONE	0	STOP	01	DRVR	NONE	61	M	OR-Y	000	012	00
									N			PSNGR CAR									000	00	
00721		N	N	16	MARION ST	INTER	CROSS	N	N	CLR	ANGL-OTH	01 NONE	0	STRGHT	01	DRVR	NONE	21	F	OR-Y	016,020	000	04
		N	N	0	QUEEN AVE	CN	0	TRF SIGNAL	N	DRY	TURN	PRVTE	PSNGR CAR	E -W							000	00	
		SU							N	DLIT	INJ	PSNGR CAR									000	00	
		9P							N			02 NONE	0	TURN-L	01	DRVR	NONE	22	F	OR-Y	000	000	00
									N			PSNGR CAR									000	00	
01137		N	N	16	MARION ST	INTER	CROSS	N	N	CLR	ANGL-OTH	01 NONE	0	STRGHT	01	DRVR	NONE	83	F	OR-Y	020	000	04
		N	N	0	QUEEN AVE	CN	0	TRF SIGNAL	N	DRY	ANGL	PRVTE	PSNGR CAR	E -W							000	00	
		TH							N	DAY	INJ	PSNGR CAR									000	00	
		3P							N			02 NONE	0	STRGHT	01	DRVR	NONE	24	F	OR-Y	000	000	00
									N			PSNGR CAR									000	00	
									N			02 NONE	0	STOP	02	PSNG	NO<5	02	F	OR-Y	000	000	00
									N			PSNGR CAR									000	00	
01601		N	N	16	MARION ST	INTER	CROSS	N	N	CLR	ANGL-OTH	01 NONE	0	TURN-L	01	DRVR	NONE	34	M	OR-Y	016,020	000	04
		N	N	0	QUEEN AVE	CN	0	TRF SIGNAL	N	DRY	TURN	PRVTE	PSNGR CAR	E -W							000	00	
		MO							N	DLIT	FOO	PSNGR CAR									000	00	
		8P							N			02 NONE	0	TURN-L	01	DRVR	NONE	27	M	SUSP	000	000	00
									N			PSNGR CAR									000	00	
									N			02 NONE	0	TURN-L	01	DRVR	NONE	34	M	OR-Y	016,020	000	04
									N			PSNGR CAR									000	00	

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.



Access Engineering LLC  
 134 E. 13th Avenue Suite 2  
 Eugene, Oregon 97401  
 541-485-3215

Site Code: 000000408501  
 Industrial Way  
 50" South of Driveway to new parking

W R Grace Plant Expansion  
 Crosswalk Study  
 Speed Study

Start Time	28-Mar-16 Mon	29-Mar-16 Tue	30-Mar-16 Wed	31-Mar-16 Thu	01-Apr-16 Fri	Weekday Average	02-Apr-16 Sat	03-Apr-16 Sun
12:00 AM	*	4	1	*	*	2	*	*
01:00	*	8	10	*	*	9	*	*
02:00	*	1	2	*	*	2	*	*
03:00	*	6	5	*	*	6	*	*
04:00	*	15	13	*	*	14	*	*
05:00	*	28	29	*	*	28	*	*
06:00	*	48	54	*	*	51	*	*
07:00	*	56	56	*	*	56	*	*
08:00	*	61	51	*	*	56	*	*
09:00	*	54	71	*	*	62	*	*
10:00	*	78	45	*	*	62	*	*
11:00	*	80	82	*	*	81	*	*
12:00 PM	*	71	79	*	*	75	*	*
01:00	*	61	79	*	*	70	*	*
02:00	*	69	90	*	*	80	*	*
03:00	*	72	80	*	*	76	*	*
04:00	*	89	86	*	*	88	*	*
05:00	*	61	59	*	*	60	*	*
06:00	*	21	22	*	*	22	*	*
07:00	*	12	31	*	*	22	*	*
08:00	*	16	7	*	*	12	*	*
09:00	*	11	8	*	*	10	*	*
10:00	*	17	7	*	*	12	*	*
11:00	*	11	6	*	*	8	*	*
Total	0	950	973	0	0		0	0
Percentage	0.0%	98.5%	100.9%	0.0%	0.0%		0.0%	0.0%
AM Peak		11:00	11:00					
Volume		80	82					
PM Peak		16:00	14:00					
Volume		89	90					
Total		950	973					

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Direction 1, Direction 2		21	23	25	27	29	31	33	35	37	39	41	43	45	Total												
Start Time	20	21	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	999	Total
03/28/16	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	33	9	10	9	5	7	10	4	9	8	3	2	2	1	0	1	1	0	0	0	0	0	0	0	0	0	82
12 PM	23	8	8	8	7	7	4	4	8	8	2	2	1	1	0	0	1	0	0	0	0	0	0	0	0	0	62
13:00	37	8	5	5	20	20	10	10	4	4	1	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	87
14:00	15	13	9	9	9	9	9	9	10	6	6	6	5	5	1	1	0	0	0	0	0	0	0	0	0	0	77
15:00	25	3	9	9	15	15	8	8	6	6	2	2	0	0	2	2	0	0	0	0	0	0	0	0	0	0	70
16:00	15	17	12	12	17	17	12	12	7	7	8	8	2	2	1	1	0	0	0	0	0	0	0	0	0	0	91
17:00	9	5	9	9	7	7	14	10	9	9	3	3	4	4	0	0	0	0	0	0	0	0	0	0	0	0	60
18:00	6	2	2	2	3	3	10	2	6	6	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	34
19:00	6	2	1	1	2	2	2	2	3	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17
20:00	0	0	0	0	2	2	2	2	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	6
21:00	1	1	0	0	1	1	1	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
22:00	6	0	0	0	2	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
23:00	14	0	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
Total	190	68	65	65	91	91	82	82	66	66	28	28	18	18	5	5	3	3	0	0	1	1	0	0	0	0	618

W R Grace Plant Expansion  
 Crosswalk Study  
 Speed Report

Access Engineering LLC  
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 Eugene, Oregon 97401  
 541-485-3215

Site Code: 000000408501  
 Industrial Way  
 50" South of Driveway to new parking

Direction 1, Direction 2		21	22	23	24	25	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	Total
Start	Time	0	0	0	0	0	1	0	2	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	4
03/29/16	01:00	3	1	1	0	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	8
	02:00	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	03:00	3	0	0	0	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
	04:00	6	2	0	0	0	2	2	2	3	4	4	5	1	1	1	0	0	1	0	1	0	0	0	0	15
	05:00	5	2	1	1	3	2	2	3	5	4	4	0	0	0	0	0	0	1	1	0	0	0	0	1	28
	06:00	11	6	11	6	8	3	3	6	7	6	6	2	2	2	2	0	0	0	0	0	0	0	0	0	48
	07:00	8	4	6	4	10	12	10	7	7	7	7	3	3	3	3	1	1	0	0	0	0	0	0	1	56
	08:00	14	4	5	4	6	10	10	4	4	3	3	1	1	1	1	0	0	0	0	0	0	0	0	0	61
	09:00	10	10	4	4	6	15	7	6	6	7	7	2	2	1	1	0	0	0	0	0	0	0	0	0	54
	10:00	24	8	10	12	12	7	7	6	6	7	7	4	4	1	1	1	1	0	0	0	0	0	0	0	78
	11:00	22	8	14	14	9	8	8	6	6	7	7	4	4	1	1	1	1	0	0	0	0	0	0	0	80
	12 PM	26	8	13	10	10	7	7	4	4	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	71
	13:00	14	5	9	9	9	9	9	7	7	5	5	3	3	0	0	0	0	0	0	0	0	0	0	0	61
	14:00	20	3	11	16	16	6	6	6	6	5	5	2	2	0	0	0	0	0	0	0	0	0	0	0	69
	15:00	19	9	12	9	9	12	12	4	4	2	2	3	3	0	0	0	0	2	2	0	0	0	0	0	72
	16:00	23	8	6	13	13	12	12	8	8	6	6	9	9	4	4	0	0	0	0	0	0	0	0	0	89
	17:00	8	8	7	8	8	16	16	8	8	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0	61
	18:00	4	0	4	3	3	6	6	1	1	0	0	2	2	0	0	0	0	0	0	0	0	1	1	0	21
	19:00	1	0	0	1	1	2	2	4	4	1	1	2	2	1	1	0	0	0	0	0	0	0	0	0	12
	20:00	2	6	3	1	1	1	1	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
	21:00	1	1	2	0	0	4	4	2	2	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	11
	22:00	13	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17
	23:00	5	0	0	2	2	1	1	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	11
Total		243	95	120	130	130	138	138	90	90	63	63	44	44	16	16	4	4	3	3	1	1	1	1	2	950

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Direction 1, Direction 2		21	23	25	27	29	31	33	35	37	39	41	43	45	Total
Start Time	20	22	24	26	28	30	32	34	36	38	40	42	44	999	
03/30/16	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
01:00	3	3	2	0	0	1	0	1	0	0	0	0	0	0	10
02:00	1	0	0	0	0	1	0	0	0	0	0	0	0	0	2
03:00	1	1	1	1	0	0	1	0	0	0	0	0	0	0	5
04:00	6	0	1	1	0	2	0	2	1	0	0	0	0	0	13
05:00	5	1	2	5	5	4	2	1	3	1	0	0	0	0	29
06:00	13	7	8	2	7	10	5	1	1	0	0	0	0	0	54
07:00	15	6	5	13	6	5	2	1	2	1	0	0	0	0	56
08:00	11	4	1	6	3	10	8	3	5	0	0	0	0	0	51
09:00	8	6	12	13	6	9	9	3	3	1	1	0	0	0	71
10:00	9	4	6	5	6	10	2	2	1	0	0	0	0	0	45
11:00	16	6	13	13	9	9	8	3	3	2	0	0	0	0	82
12 PM	18	6	6	15	12	11	8	1	0	2	0	0	0	0	79
13:00	18	3	14	10	8	12	10	1	2	0	0	0	0	1	79
14:00	24	13	6	10	11	11	7	5	1	1	0	1	0	0	90
15:00	19	5	10	11	14	11	4	1	2	0	1	1	0	1	80
16:00	11	4	8	15	9	16	12	4	3	2	1	1	0	0	86
17:00	9	6	4	7	8	5	11	4	4	0	1	0	0	0	59
18:00	7	4	0	3	3	1	0	1	1	2	0	0	0	0	22
19:00	2	1	1	2	3	8	3	3	2	3	1	1	0	1	31
20:00	1	0	2	0	1	0	1	1	1	0	0	0	0	0	7
21:00	2	2	3	0	1	0	0	0	0	0	0	0	0	0	8
22:00	5	0	1	0	0	1	0	0	0	0	0	0	0	0	7
23:00	3	0	1	0	0	0	1	0	1	0	0	0	0	0	6
Total	207	83	107	132	112	137	94	38	36	15	5	4	0	3	973

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 Industrial Way  
 50" South of Driveway to new parking

Direction 1, Direction 2		21	23	25	27	29	31	33	35	37	39	41	43	45	Total
Start Time	1	2	1	1	2	1	0	0	0	0	0	0	0	0	
03/31/16	1	2	1	1	2	1	0	0	0	0	0	0	0	0	8
01:00	3	1	0	0	1	0	0	0	0	0	0	0	0	0	5
02:00	1	0	0	0	1	0	0	0	0	0	0	0	0	0	2
03:00	2	1	0	0	2	1	0	1	0	0	0	0	0	0	7
04:00	10	2	0	1	0	0	1	0	2	0	0	0	0	0	16
05:00	4	3	3	4	5	2	2	1	1	2	0	1	0	1	29
06:00	9	4	8	6	7	8	5	2	0	0	0	0	0	0	49
07:00	13	6	11	12	8	4	5	2	1	1	2	0	0	0	65
08:00	19	4	5	9	7	7	2	1	3	3	0	0	1	0	61
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
14:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
16:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
17:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
18:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
19:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
21:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
22:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
23:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Total	62	23	28	33	33	23	15	7	7	6	2	1	1	1	242
Grand Total	702	269	320	386	365	316	200	107	64	28	10	7	2	7	2783

Statistics  
 Mean Speed(Average) : 23 MPH  
 10 MPH Pace Speed : 21-30 MPH  
 Number in Pace : 1656  
 Percent in Pace : 59.5%  
 Number of Vehicles > 45 MPH : 7  
 Percent of Vehicles > 45 MPH : 0.3%



## W R Grace Plant Expansion Trip Distribution

<b>Census Tract</b>	<b>Block Group</b>	<b>Households</b>	<b>Percent of Total</b>
203	All	2916	14%
204	All	1931	10%
205	All	1762	9%
206	All	3593	18%
207	All	2225	11%
208.01	All	1027	5%
208.02	All	2400	12%
201	2	1705	8%
101*	1,2,3,&5	2592	13%
		20151	1.00

**EXHIBIT G**  
STORMWATER REPORT



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# ENGINEERING DESIGN REPORT

<b>TO</b>	Grace				
<b>FROM</b>	Joe McCormick, PE, SE				
<b>PROJECT</b>	Grace C9 Site (Office)				
<b>SUBJECT</b>	Stormwater Report				
<b>DATE</b>	5/27/2016	<b>PROJECT #</b>	2015064	<b>MEMO #</b>	ER-001



RENEWS: 12/31/16

This stormwater report has been prepared for the proposed Grace Office Site Expansion in Albany, Oregon, also referred to as the "C9 site". The expansion project entails the development of one new site sub-basin which is currently an open grass field, and the addition of a pedestrian walkway along the rear of the existing, developed office site, extending to the public way located on the east side of Industrial Way. Analysis is presented in the following sections:

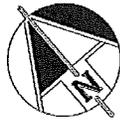
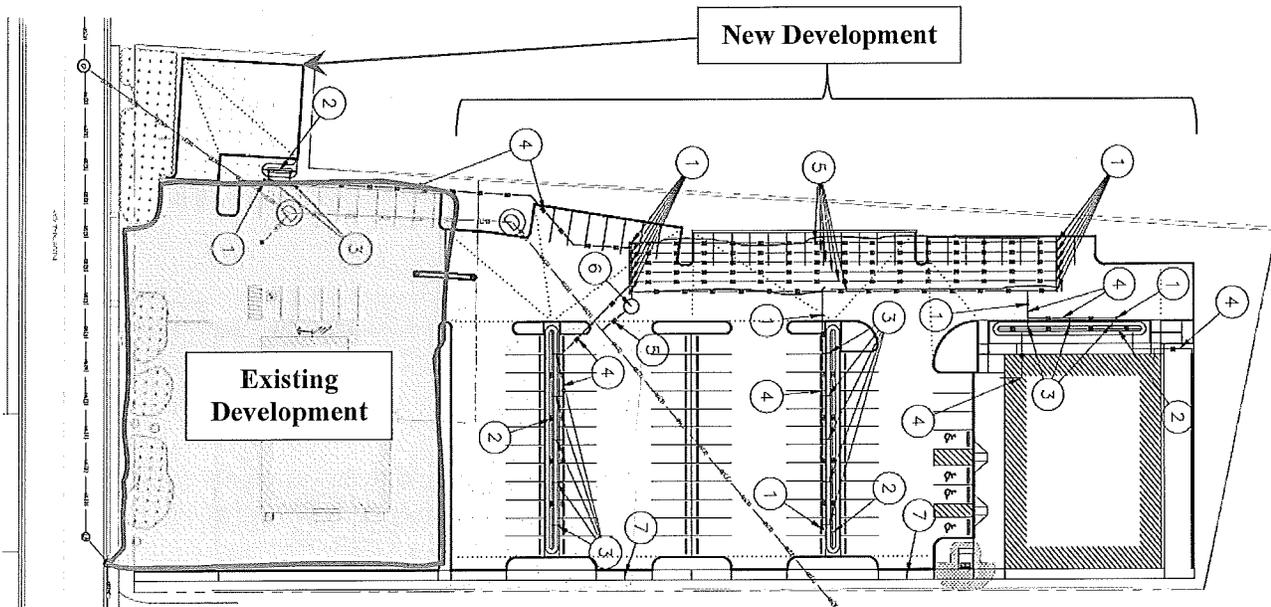
Section 1: Stormwater Design Summary	page 1
Section 2: Pre-Developed Hydrology	page 4
Section 3: Post-Developed Hydrology	page 11
Section 4: Stormwater Quality Design, BMPs and LID Methods	page 39
Section 5: Stormwater Quantity Design	page 44
Section 6: Stormwater Conveyance Design	page 56

## SECTION 1: STORMWATER DESIGN SUMMARY

The development includes one 1.49 acre total area basin which currently drains to an indistinct ditch along the NE property boundary. A portion of this area has been delineated as wetlands. Disturbed wetland areas will be mitigated off site. Post-developed drainage will be collected through roof downspouts and pavements sheet draining to shallow storm water quality swales. Post-construction runoff from all impervious areas for storm events up to 50% of the 2-year, SCS 24-hour, Type 1A distribution storm are treated in the water quality swales. Water quality swales have been designed in accordance with the "Division E Stormwater Management Engineering Standards" prepared by City of Albany Public Works Department. Discharge from the water quality swales is routed to an underground pipe gallery for stormwater detention for the 50% of the 2-year, SCS 24-hour, Type 1A event up to the 25-year, SCS 24-hour, Type 1A event. Underground detention discharge rates are controlled through orifices and weirs inside a control structure manhole to limit discharges to pre-developed conditions for storm events from 50% of the 2 year event up to the 25-year event for SCC 24-hour, Type 1A distribution storms for a pre-developed basin of identical size to the new development size. Existing soils are categorized as Hydrologic Soil Group D according to NRCS soil survey information, and the pre-developed basin was assumed to be covered by good condition grasses. Stormwater conveyance piping has been sized for peak flows using the Rational Method for the 10-year rainfall intensity and 5-minute time of concentration based on ODOT IDF curves for Zone 7. The sketch shown on the next page provides a summary overview of the stormwater quality, quantity and conveyance features proposed for this development.



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- ① 10" CLEAN OUT
- ② 4" PERFORATED PIPE
- ③ 4" PVC PIPE
- ④ 10" PVC PIPE
- ⑤ 36" HDPE PIPE
- ⑥ FLOW CONTROL MAN HOLE
- ⑦ 3" PVC SIDEWALK WEEP

**(E) ROOFS / BUILDINGS**
**(E) GRAVEL**
**(N) ROOFS / BUILDINGS**

- The area highlighted in gray in the figure above is the existing office building, parking lot and gravel storage yard currently in use on the site. No stormwater modifications are being made to the existing development sub-basin.
- Water quality swales are shown in the diagram above, highlighted in yellow. Each water quality swale provides treatment for a tributary impervious area of 20,000 square feet or less.
- The underground stormwater detention pipe gallery is shown outlined in red in the sketch above. The flow control manhole (keyed note 6 in the sketch), connects to the public storm water main which traverses the site within an easement.
- Stormwater is conveyed from water quality swales to the detention structure via underground piping.



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## Stormwater Design Summary Information

### Hydrology

- Latitude, longitude location of site: 44.626280°, -123.101917°
- Pre-developed curve number = 80 (Hydrologic Soil Group D; Good Condition Grass)
- NOAA Atlas 2 used for 2 through 100 year, 24-hour total storm rainfalls
  - 50% of 2-year event used for water quality design (designated "1 year" for calcs organization)

### Precipitation Data

Return Period (Yrs)	1	2	3	5	10	25	50	100
Active	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SCS 24-hr Precip (in)	1.21	2.42		2.86	3.32	3.93	4.40	4.86

- SCS TR-55 methods used for time of concentration calculations and hydrograph construction
- Hydrologic modeling performed by Hydraflow Hydrographs Extension for Civil 3D 2016

SCS 24-Hour Type 1A Storm Event	GRACE OFFICE EXPANSION (SITE C9)			
	Pre-Developed	Post-Developed (prior to Detention)	Post-Developed with Detention	Post-Developed with Detention, assuming lowest orifice is plugged & non-functional
WQ (1-yr)	0.018 cfs	0.292 cfs	0.018 cfs	0.080 cfs
2-yr	0.191 cfs	0.732 cfs	0.130 cfs	0.191 cfs
5-yr	0.274 cfs	0.873 cfs	0.169 cfs	0.220 cfs
10-yr	0.393 cfs	1.056 cfs	0.217 cfs	0.259 cfs
25-yr	0.536 cfs	1.259 cfs	0.268 cfs	0.529 cfs
100-yr	0.772 cfs	1.575 cfs	0.642 cfs	1.422 cfs

### Stormwater Quality:

- Onsite Swales, designed using the City of Albany, Oregon 2015 Engineering Standards, , Division E Stormwater Management, Chapter 6, Section E.3.01 through E3.04. Specific design provisions are found in Section E3.03.B.1 "Vegetated Facilities" on page 8.
- Water quality design storm: 50% of 2-year, 24-hour event using NOAA Atlas 2 data for a Type 1A rainfall distribution, using TR-55 methodology.

### Stormwater Quantity Design:

- Detention provided to limit post-developed flows to less than or equal to pre-developed flows for 50% of 2-year, 2-year, 5-year, 10-year, and 25-year SCS 24-hour, Type 1A distribution storms.
- Underground detention provided by five, 36-inch diameter pipes, 200' long, with headers at either end of the pipe gallery.
- Total underground pipe gallery storage volume = 8,484 cubic feet

### Stormwater Conveyance Design

- Rational method, 10-year rainfall intensity, ODOT curve Zone 7 used for pipe sizing
- SCS 100-year, 24-hour, Type 1A storm used to check overflow weir in control structure MH



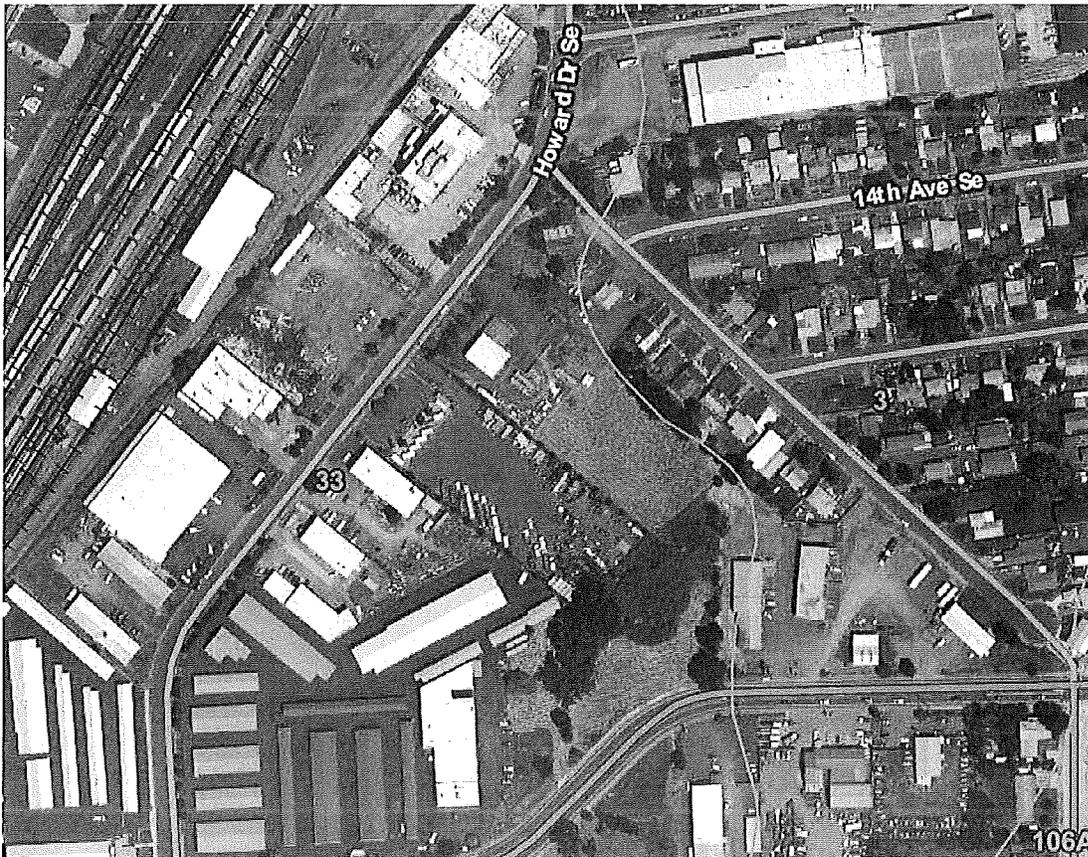
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CONSULTING  
GROUP, INC.**

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## SECTION 2: PRE-DEVELOPED HYDROLOGY

### Pre-Developed Hydrology

Site soils are Dayton silt loam (33). Adjacent parcels to the NE of the site are Amity silt loam (3). The Oregon Engineering Handbook Hydrology Guide, Appendix A (USDA and SCC, 1987) reports both Dayton silt loam and Amity silt loam to be a Hydrologic Soil Group D soils. Curve numbers used for our pre-developed hydrology analysis assume HSG D.



Linn County Area, Oregon (OR639)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
3	Amity silt loam	0.4	0.7%
33	Dayton silt loam	26.8	40.9%
106A	Woodburn silt loam, 0 to 3 percent slopes	38.4	58.5%
<b>Totals for Area of Interest</b>		<b>65.6</b>	<b>100.0%</b>



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**Site Pre-Developed Condition**

The existing parcel size is 2.33 acres, of which 0.90 acres is currently developed with an office building, parking lot and gravel storage yard. Pre-developed hydrological conditions for the development area are based on a completely undeveloped site consisting of good condition open space. See **figure 1** below for an illustration of the pre-developed site basin boundary and time of concentration flow path used for calculations. Pre-developed time of concentration was calculated using the TR-55 method as 48.2 minutes (see TR-55 Time of Concentration Worksheet below), and pre-versus-post developed analysis for this basin have been calculated for flows calculated at the labeled "point of analysis" based on equivalent area. Two paths were analyzed. Path 1 shown below controlled. The pre-developed flow path is assumed to consist of 295 feet of sheet flow over short grass (Manning n=0.15) on a variable slope. Runoff from the pre-developed site has been calculated using SCS TR-55 methods for a Type 1A rainfall distribution for NOAA Atlas 2 rainfall quantities for 50% of the 2 year (referred to as "1 year" in computer analysis output, 2-year, 5-year, 10-year, 25-year and 100-year, 24-hours storms.

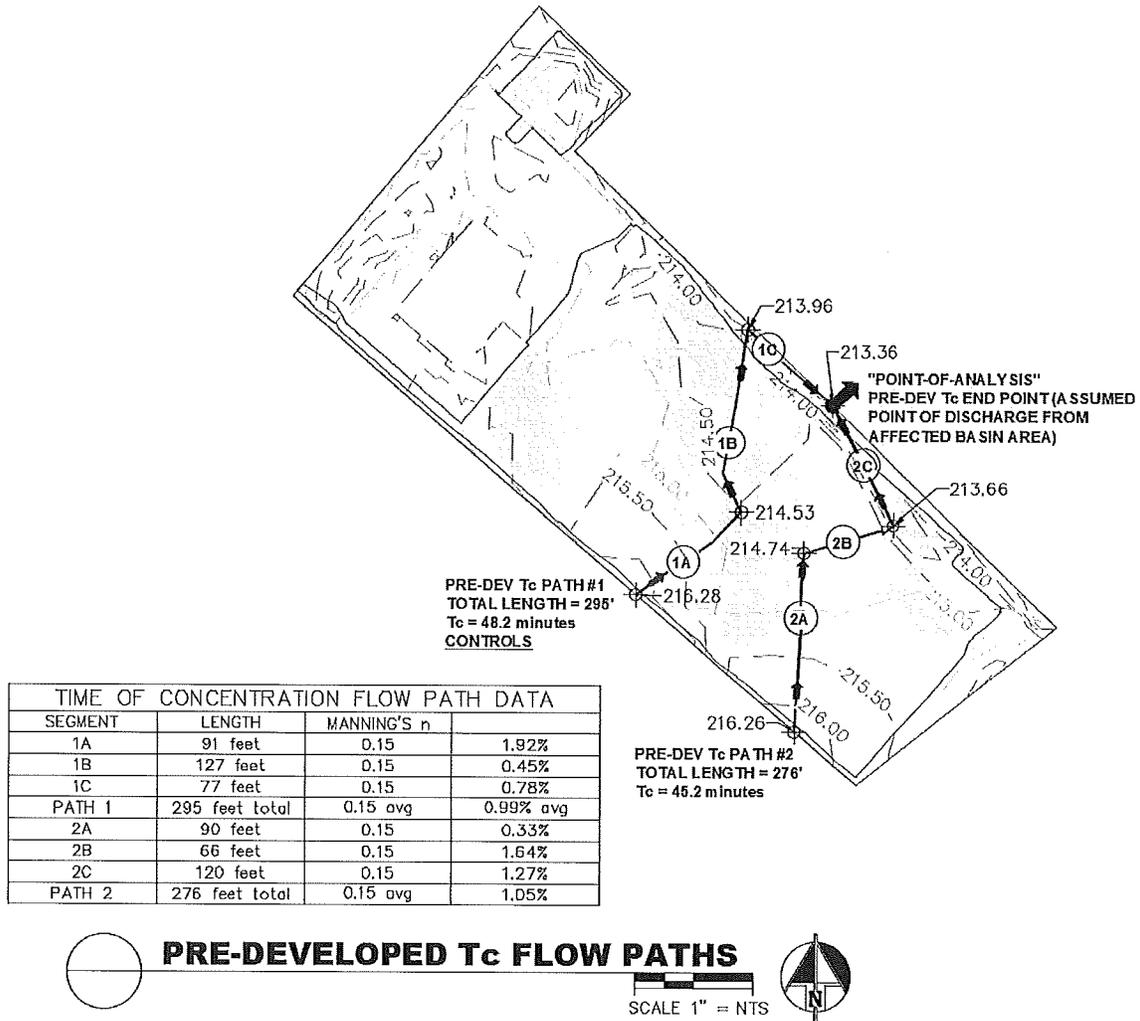


Figure 1



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## TR55 Tc Worksheet

HydraflowHydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5

### Hyd. No. 3

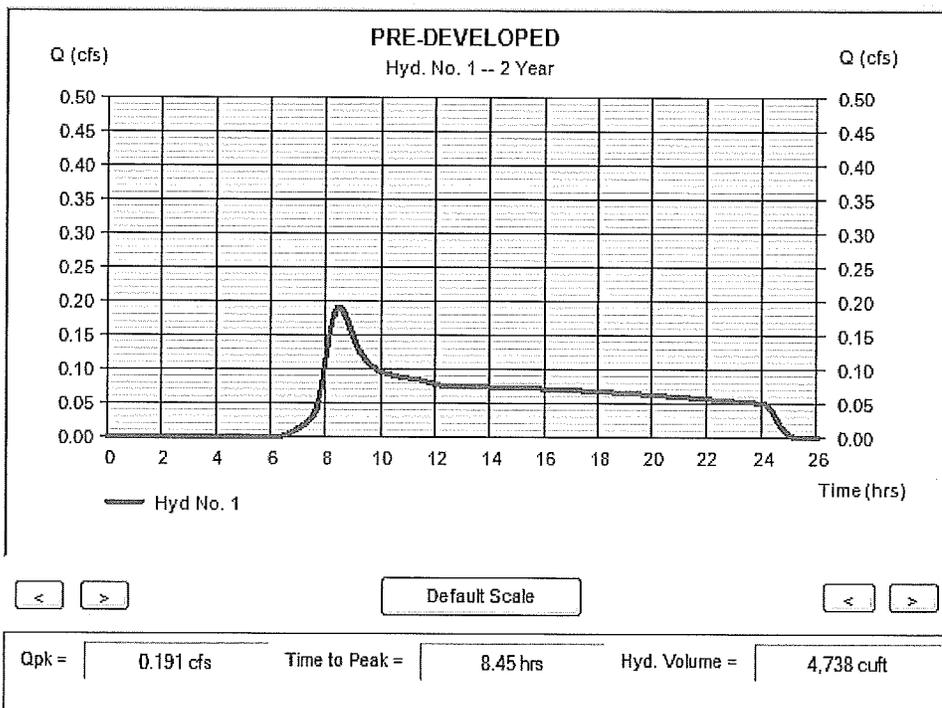
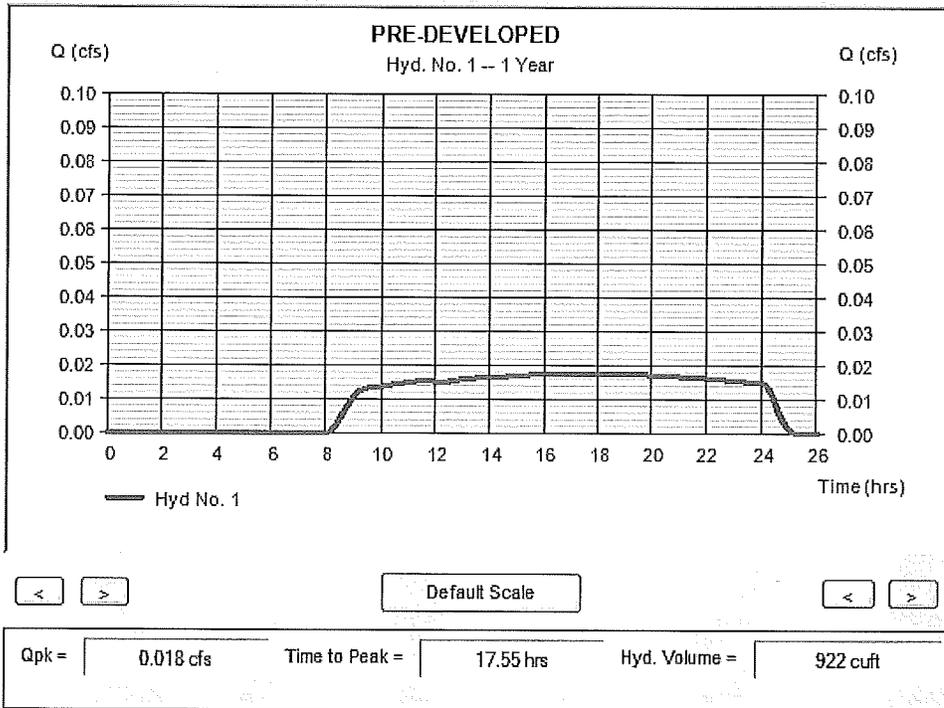
PRE-DEVELOPED

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
<b>Sheet Flow</b>				
Manning's n-value	= 0.150	0.150	0.150	
Flow length (ft)	= 91.0	127.0	77.0	
Two-year 24-hr precip. (in)	= 2.47	2.47	2.47	
Land slope (%)	= 1.92	0.45	0.78	
<b>Travel Time (min)</b>	<b>= 10.51</b>	<b>+ 24.52</b>	<b>+ 13.19</b>	<b>= 48.22</b>
<b>Shallow Concentrated Flow</b>				
Flow length (ft)	= 0.00	0.00	0.00	
Watercourse slope (%)	= 0.00	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	=0.00	0.00	0.00	
<b>Travel Time (min)</b>	<b>= 0.00</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 0.00</b>
<b>Channel Flow</b>				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	=0.00	0.00	0.00	
Flow length (ft)	{{0}}0.0	0.0	0.0	
<b>Travel Time (min)</b>	<b>= 0.00</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 0.00</b>
<b>Total Travel Time, Tc</b> .....				<b>48.22 min</b>



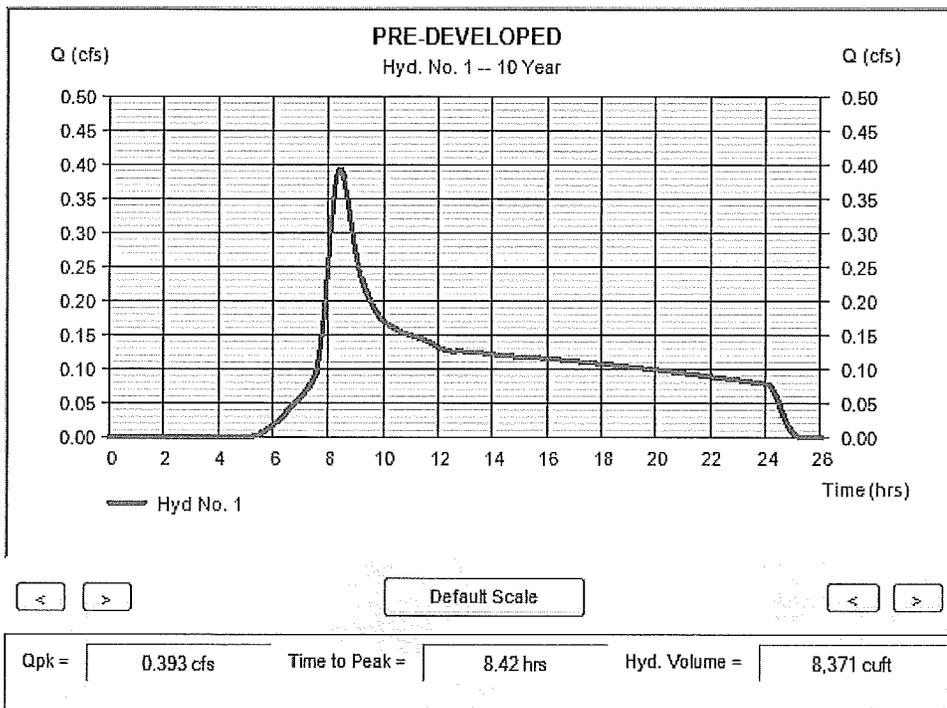
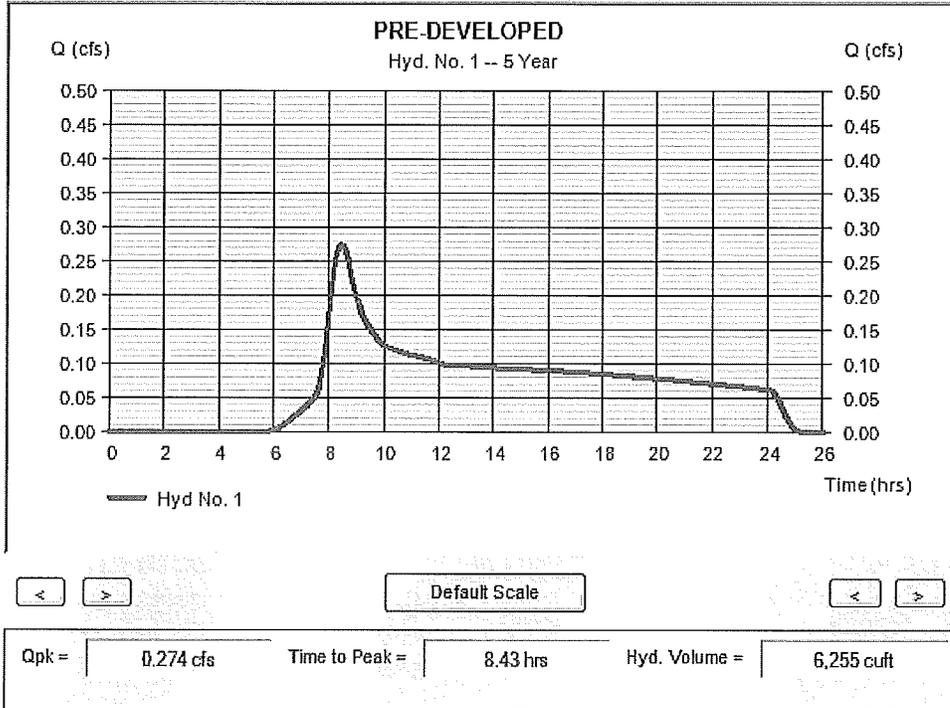
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Pre-Developed Metals Finishing Building Site Hydrographs



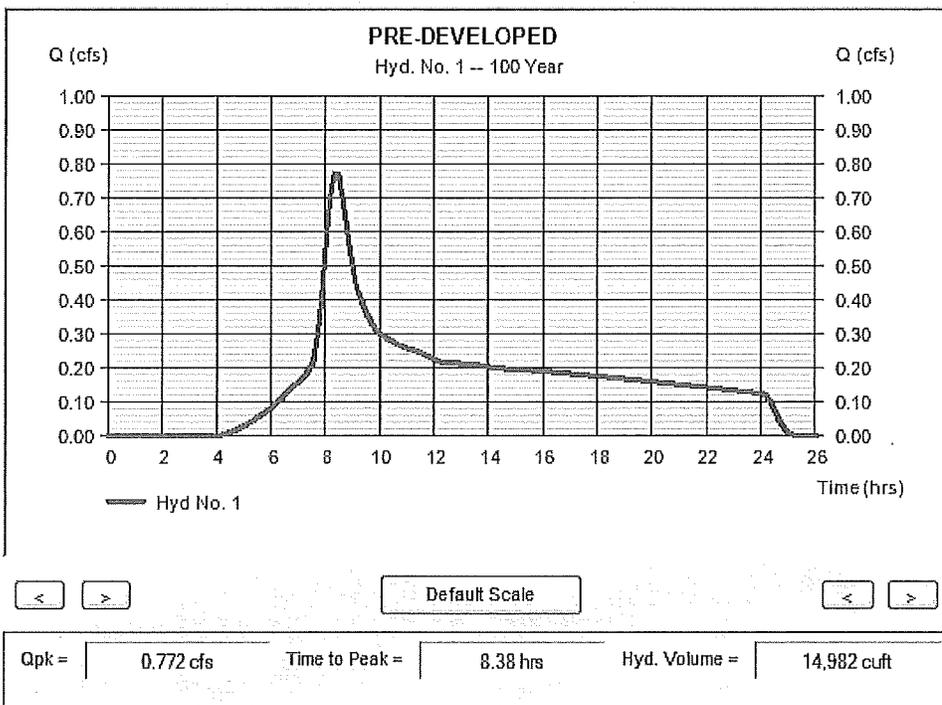
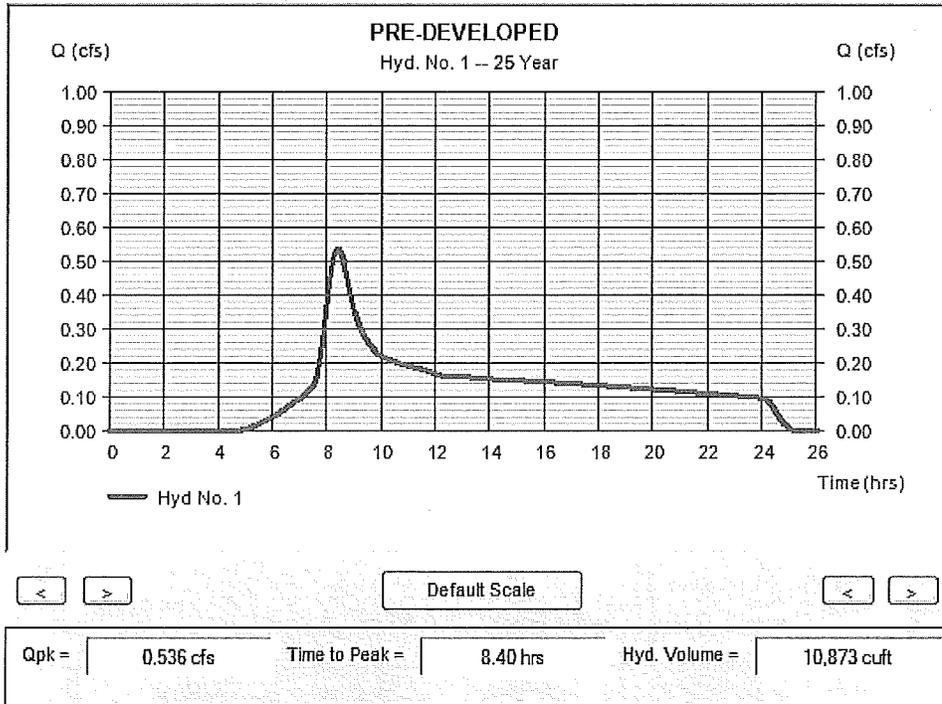


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**Summary of Pre-Developed, 24-Hour Storm Peak Flows**

SCS 24-Hour Type 1A Distribution Storm Event	Pre-Developed C9 Site
WQ (1-yr)	0.018 cfs
2-yr	0.191 cfs
5-yr	0.274 cfs
10-yr	0.393cfs
25-yr	0.536 cfs
100-yr	0.772 cfs

**SCS Runoff Hydrograph** ☒

---

Description = PRE-DEVELOPED

**Basin Data**

Drainage Area (ac) ..... = 1.51

Curve Number (CN) .. = 80 % ☒

**Time of Concentration**

Lag  Kirpich  User  TR55 TR55

Basin Slope (%) ..... =

Hydraulic Length (ft) =

Time of Conc. (Min) .. = 48.2

**Hydrologic Data**

Time Interval (Min) .... = 1 ▼

Storm Distribution ..... = Type IA ▼ ☒

Storm Duration (Hrs) . = 24

**Hydrograph No. = 1** ☁

**Unit Hydrograph**

Q (cfs) Unit Hydrograph

Qpu = 2.36cfs      Tpu = 29 min

**Options**

Shape Factor ..... = 484

Return Period/Precip = ☒ Event Mgr.

Ok
Results...
Exit



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## SECTION 3: POST-DEVELOPED HYDROLOGY

### Post-Developed Hydrology

Post developed hydrology utilizes a Curve Number of 98 for all new roofs and paved areas, and a Curve Number equal to 80 for landscaped areas.

### C9 Site Post-Developed Condition

The post-developed C9 Site area matches the pre-developed considered site area. The post-developed site has been modeled using Hydraflow Hydrographs Extension for Civil 3D 2016 as a five sub-basins basins. Four of the sub-basins represent the areas tributary to each of the four water quality swales on the newly developed portion of the site, with the fifth sub-basin representing the sidewalk improvement area along SW boundary of the existing developed area of the site. Sub-basins 1 through 4 are routed through the water quality swales which are modeled as storage ponds with outlets controlled by infiltration, which is then routed through a reach representing the underground pipe collection system from the water quality swales to the underground pipe detention facility. Sub-basin 5 (sidewalk) is not routed through the detention facility, as that stormwater will not be captured by the new development stormwater system. The discharge from the underground pipe detention facility (sub-basins 1 through 4) are combined with the discharge from sub-basin 5 for determination of the post-developed stormwater discharge rate. The post developed stormwater routing model is shown in the *figure 2* below.

See *figure 3* below for an illustration of the post-developed site basin boundaries and times of concentration for flow paths for SB-1 through SB-4. Total impervious area for each basin has been conservatively estimated by ignoring some of the smaller landscaped areas and assuming that water quality facilities may be partially full at the start of the storm, and will behave as impervious area for purposes of calculating run-off from the site. A time of concentration of 1.6 minutes was assumed for SB-5 (sidewalk). Post-developed times of concentration for SB-1 through SB-4 were calculated using the TR-55 method (see TR-55 Time of Concentration Worksheets below). The post-developed flow paths for SB-2, SB-3 and SB-4 consists of sheet flow over pavement (Manning  $n=0.016$  for asphalt) followed by a very short length of sheet flow into the water quality swale, assumed to be tall grass ( $n=0.24$ ). Channel flow from the water quality swale to the detention system was ignored for SB-2 through SB-4, as the time in pipe will be minimal. The post-developed flow path for SB-1 consists of sheet flow across the concrete patio pavement on at the rear of the new office building ( $n=0.013$  for concrete) followed by channel flow through a trench drain, followed by piped underground conveyance. Flow time through water quality swales are determined by routing the shallow storage ponds assuming an infiltration rate of 6 in/hour for the small facility serving SB-4 and 3 in/hour for the facilities serving more than 10,000 square feet of impervious area (SB-1 through SB-3).

Runoff from the post-developed site has been calculated using SCS TR-55 methods for a Type 1A rainfall distribution for NOAA Atlas 2 rainfall quantities for 50% of the 2 year (referred to as "1 year" in computer analysis output, 2-year, 5-year, 10-year, 25-year and 100-year, 24-hours storms. See Section 4 of this report for detailed information and calculations for the water quality "onsite swales" used for this site.



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A control structure has been configured for the detention pond outfall to limit flows to pre-developed conditions or less for the 50% of the 2-year, 2-year, 5-year and 10-year, and 25-year, 24-hour storm events. Flows exceeding the 25-year, 24-hour event are allowed to bypass the control structure through a riser weir inside the control structure manhole. Calculations indicate that the riser weir is sufficient to pass the 100-year, 24-hour storm event without overtopping the rim elevation of the control manhole or backwatering the water quality swale facilities. The underground pipe detention facility is provided with a 12 foot wide broad crested weir at the outlet end adjacent to the control structure for flows exceeding the designed conveyance capacity through the control structure. See Section 5 of this report for detailed information and calculations for the detention pond and flow control structure for this site.

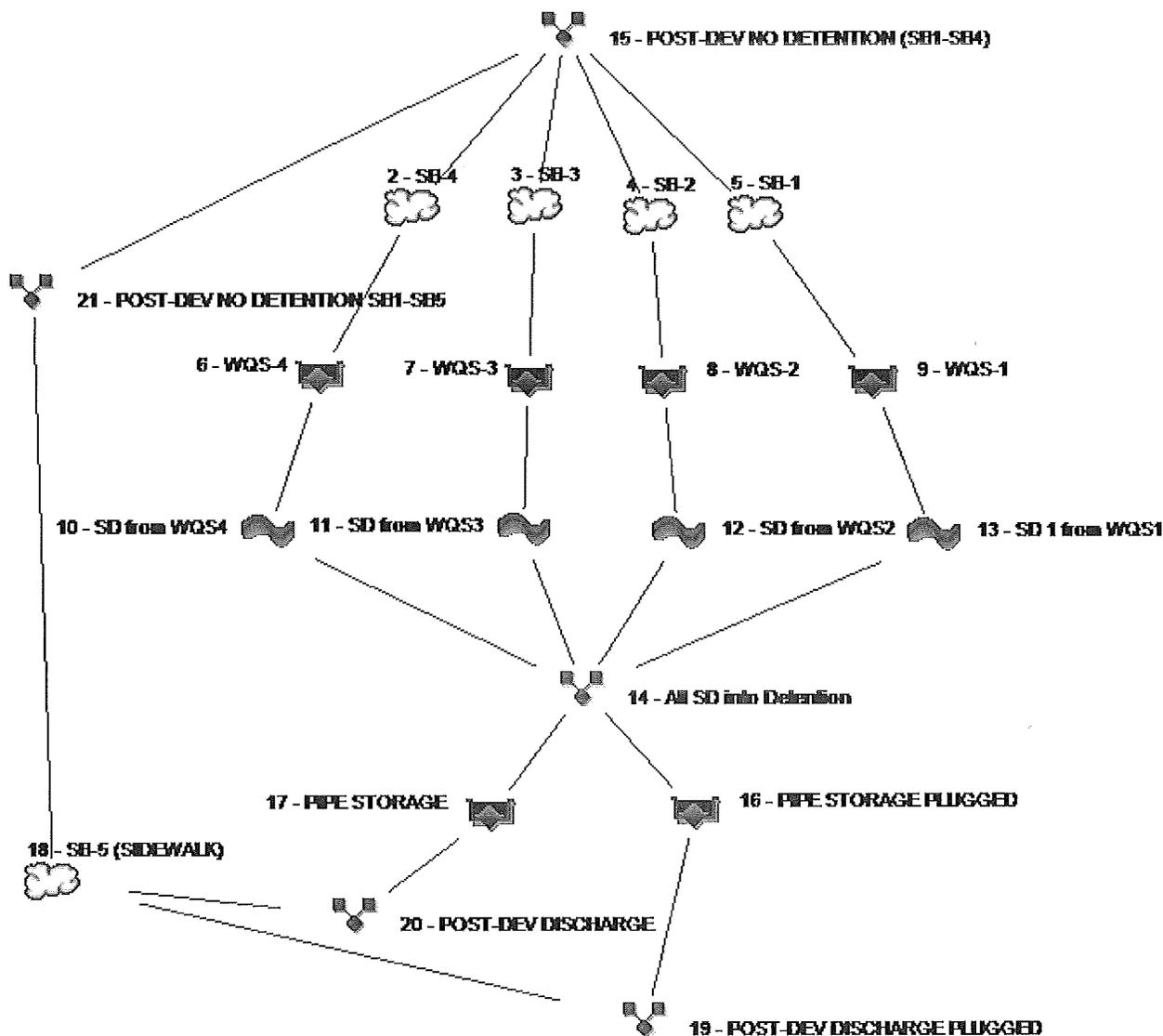


Figure 2: Hydrograph and Routing Model Diagram



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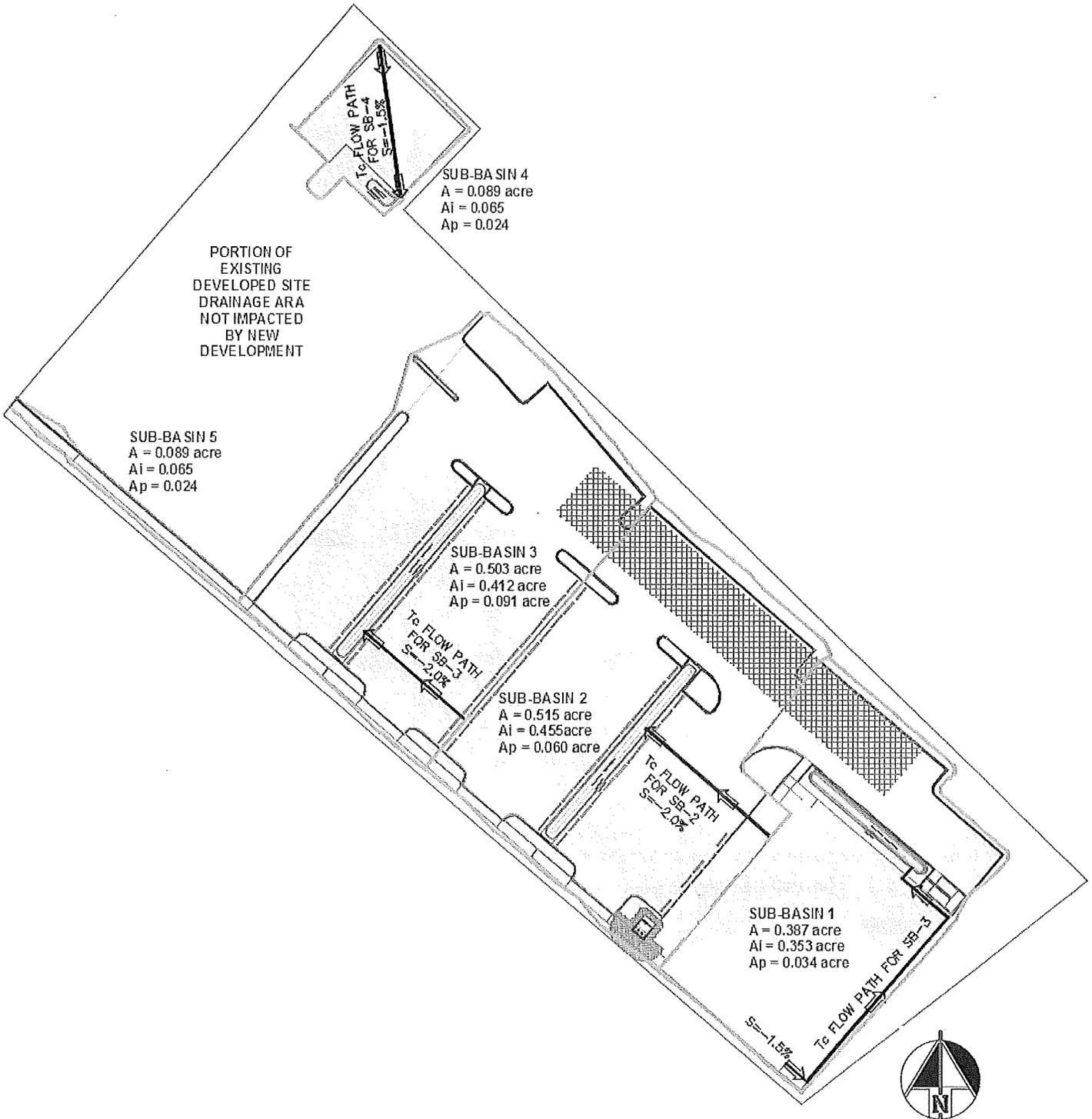


Figure 3: Post-Developed Sub-Basins and Times of Concentration Flow Paths



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## TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5

Hyd. No. 5

SB-1

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
<b>Sheet Flow</b>				
Manning's n-value	= 0.013	0.240	0.011	
Flow length (ft)	= 12.9	2.0	0.0	
Two-year 24-hr precip. (in)	= 2.47	2.47	0.00	
Land slope (%)	= 1.50	33.00	0.00	
<b>Travel Time (min)</b>	<b>= 0.34</b>	<b>+</b> <b>0.23</b>	<b>+</b> <b>0.00</b>	<b>= 0.58</b>
<b>Shallow Concentrated Flow</b>				
Flow length (ft)	= 0.00	0.00	0.00	
Watercourse slope (%)	= 0.00	0.00	0.00	
Surface description	= Paved	Paved	Paved	
Average velocity (ft/s)	=0.00	0.00	0.00	
<b>Travel Time (min)</b>	<b>= 0.00</b>	<b>+</b> <b>0.00</b>	<b>+</b> <b>0.00</b>	<b>= 0.00</b>
<b>Channel Flow</b>				
X sectional flow area (sqft)	= 0.16	0.09	0.20	
Wetted perimeter (ft)	= 1.33	1.05	1.57	
Channel slope (%)	= 0.75	2.00	2.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	=2.08	2.65	3.48	
Flow length (ft)	((0))100.0	18.0	16.0	
<b>Travel Time (min)</b>	<b>= 0.80</b>	<b>+</b> <b>0.11</b>	<b>+</b> <b>0.08</b>	<b>= 0.99</b>
<b>Total Travel Time, Tc</b> .....				<b>1.57 min</b>



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## TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v10.5

Hyd. No. 4

SB-2

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
<b>Sheet Flow</b>				
Manning's n-value	= 0.013	0.016	0.240	
Flow length (ft)	= 15.0	62.4	0.5	
Two-year 24-hr precip. (in)	= 2.47	2.47	2.47	
Land slope (%)	= 2.00	2.00	33.30	
<b>Travel Time (min)</b>	<b>= 0.35</b>	<b>+ 1.28</b>	<b>+ 0.08</b>	<b>= 1.70</b>
<b>Shallow Concentrated Flow</b>				
Flow length (ft)	= 0.00	0.00	0.00	
Watercourse slope (%)	= 0.00	0.00	0.00	
Surface description	= Paved	Paved	Paved	
Average velocity (ft/s)	=0.00	0.00	0.00	
<b>Travel Time (min)</b>	<b>= 0.00</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 0.00</b>
<b>Channel Flow</b>				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	=0.00	0.00	0.00	
Flow length (ft)	{{0}}0.0	0.0	0.0	
<b>Travel Time (min)</b>	<b>= 0.00</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 0.00</b>
<b>Total Travel Time, Tc</b> .....				<b>1.70 min</b>



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## TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5

Hyd. No. 3

SB-3

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
<b>Sheet Flow</b>				
Manning's n-value	= 0.016	0.240	0.011	
Flow length (ft)	= 66.0	0.5	0.0	
Two-year 24-hr precip. (in)	= 2.47	2.47	2.47	
Land slope (%)	= 1.10	33.30	0.00	
<b>Travel Time (min)</b>	<b>= 1.70</b>	<b>+ 0.08</b>	<b>+ 0.00</b>	<b>= 1.77</b>
<b>Shallow Concentrated Flow</b>				
Flow length (ft)	= 0.00	0.00	0.00	
Watercourse slope (%)	= 0.00	0.00	0.00	
Surface description	= Paved	Paved	Paved	
Average velocity (ft/s)	=0.00	0.00	0.00	
<b>Travel Time (min)</b>	<b>= 0.00</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 0.00</b>
<b>Channel Flow</b>				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	=0.00	0.00	0.00	
Flow length (ft)	0.0	0.0	0.0	
<b>Travel Time (min)</b>	<b>= 0.00</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 0.00</b>
<b>Total Travel Time, Tc</b> .....				<b>1.77 min</b>



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## TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5

### Hyd. No. 2

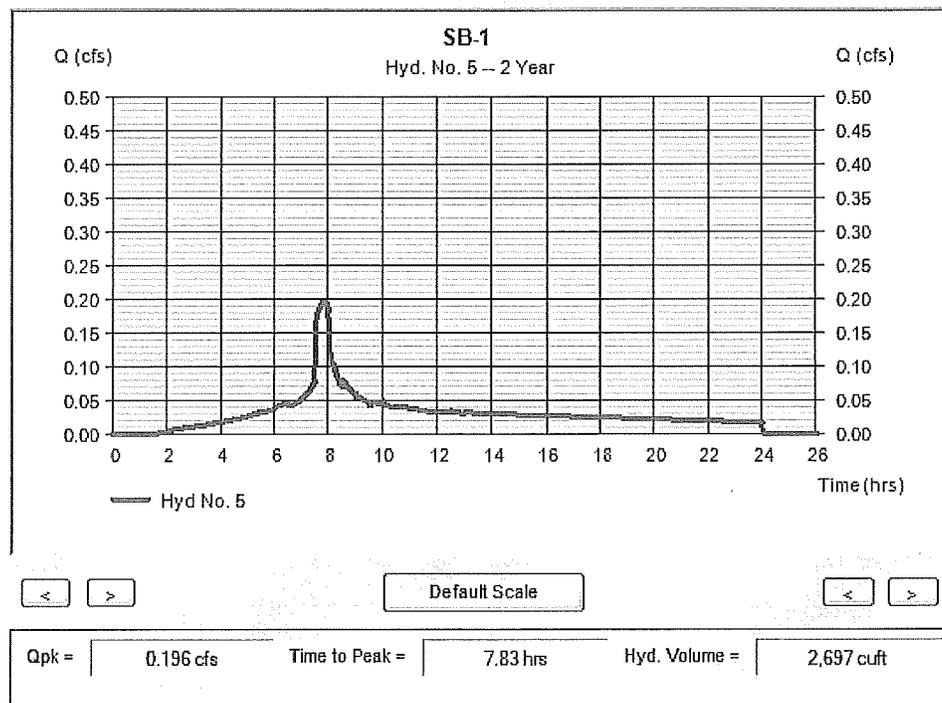
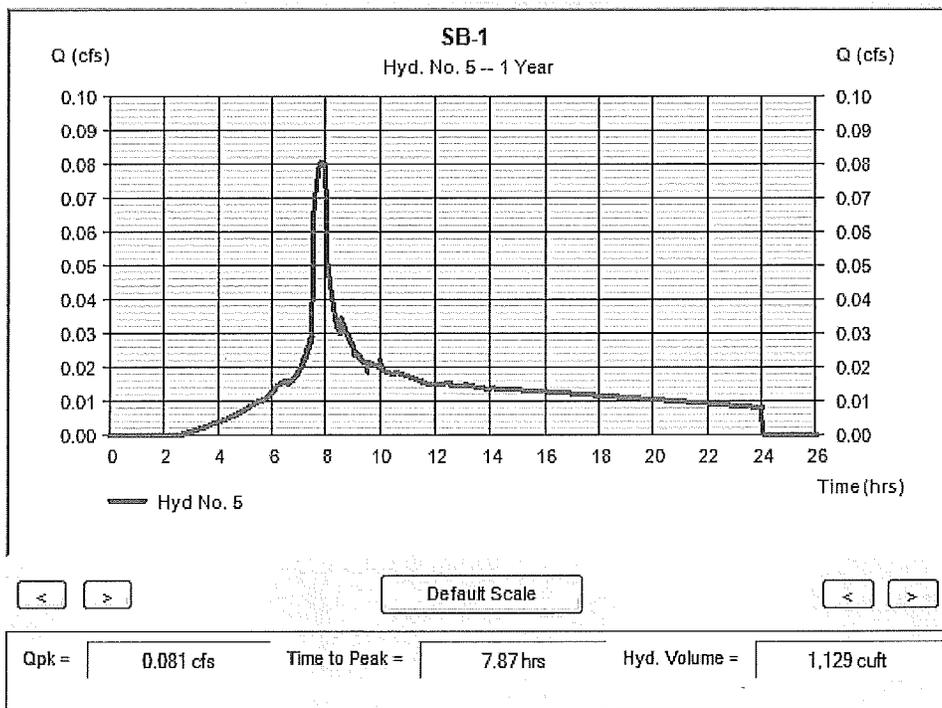
SB-4

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
<b>Sheet Flow</b>				
Manning's n-value	= 0.016	0.240	0.011	
Flow length (ft)	= 72.0	0.5	0.0	
Two-year 24-hr precip. (in)	= 2.47	2.47	0.00	
Land slope (%)	= 1.50	33.00	0.00	
<b>Travel Time (min)</b>	<b>= 1.61</b>	<b>+ 0.08</b>	<b>+ 0.00</b>	<b>= 1.68</b>
<b>Shallow Concentrated Flow</b>				
Flow length (ft)	= 0.00	0.00	0.00	
Watercourse slope (%)	= 0.00	0.00	0.00	
Surface description	= Paved	Paved	Paved	
Average velocity (ft/s)	=0.00	0.00	0.00	
<b>Travel Time (min)</b>	<b>= 0.00</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 0.00</b>
<b>Channel Flow</b>				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	=0.00	0.00	0.00	
Flow length (ft)	{{0}}0.0	0.0	0.0	
<b>Travel Time (min)</b>	<b>= 0.00</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 0.00</b>
<b>Total Travel Time, Tc .....</b>				<b>1.68 min</b>



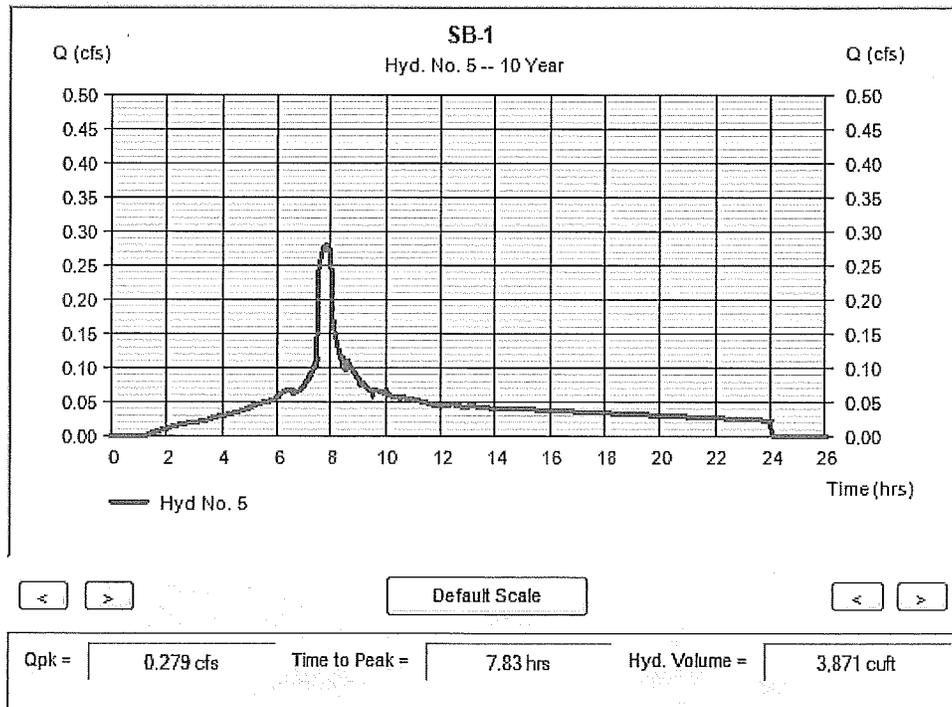
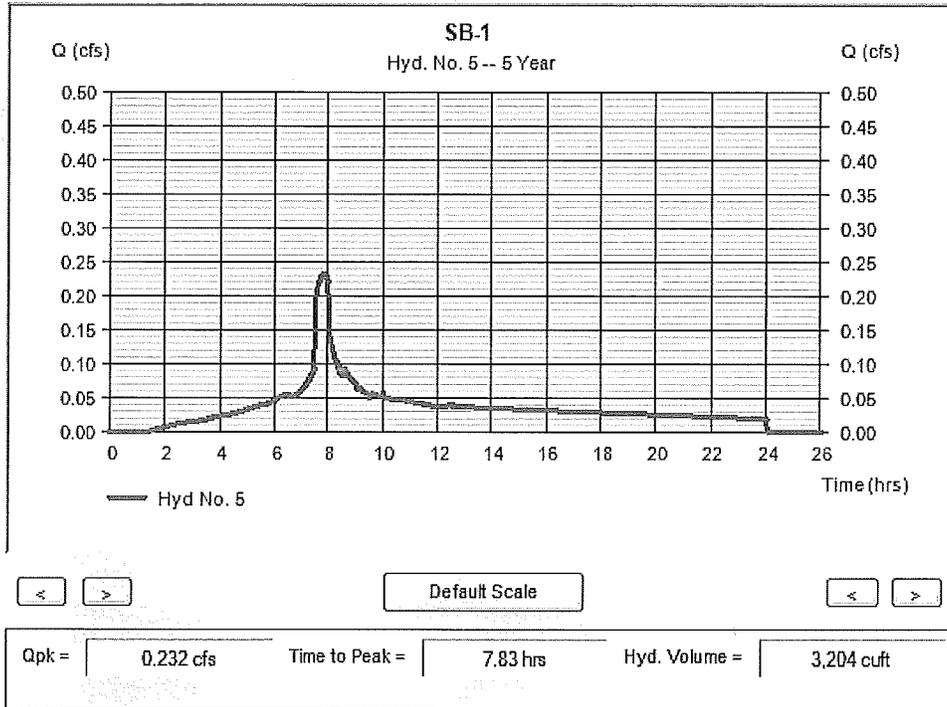
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Post-Developed C9 Site Hydrographs (prior to detention pond routing)



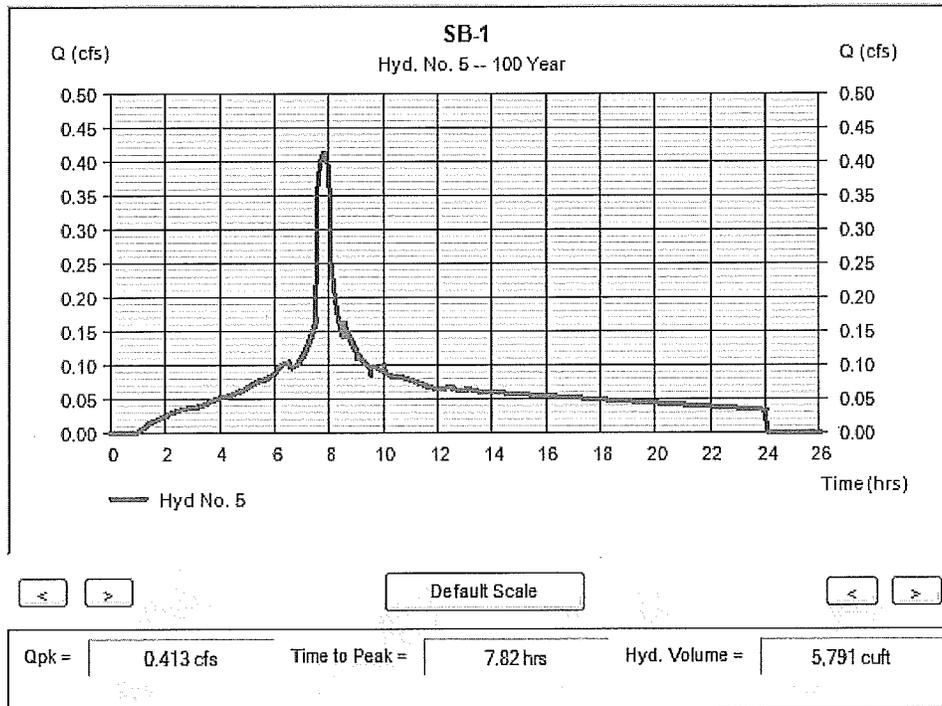
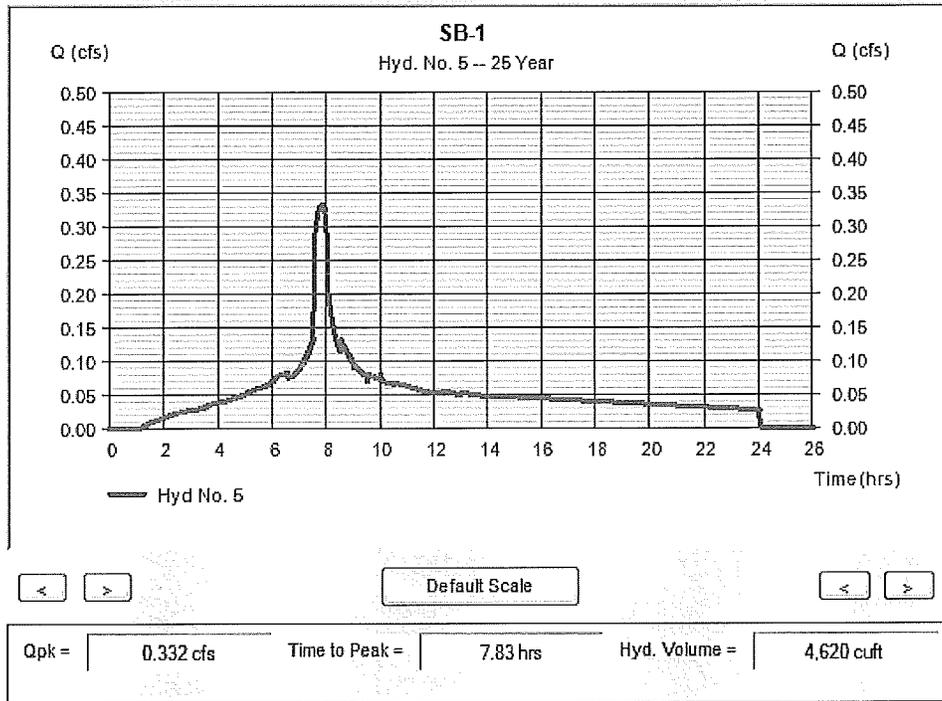


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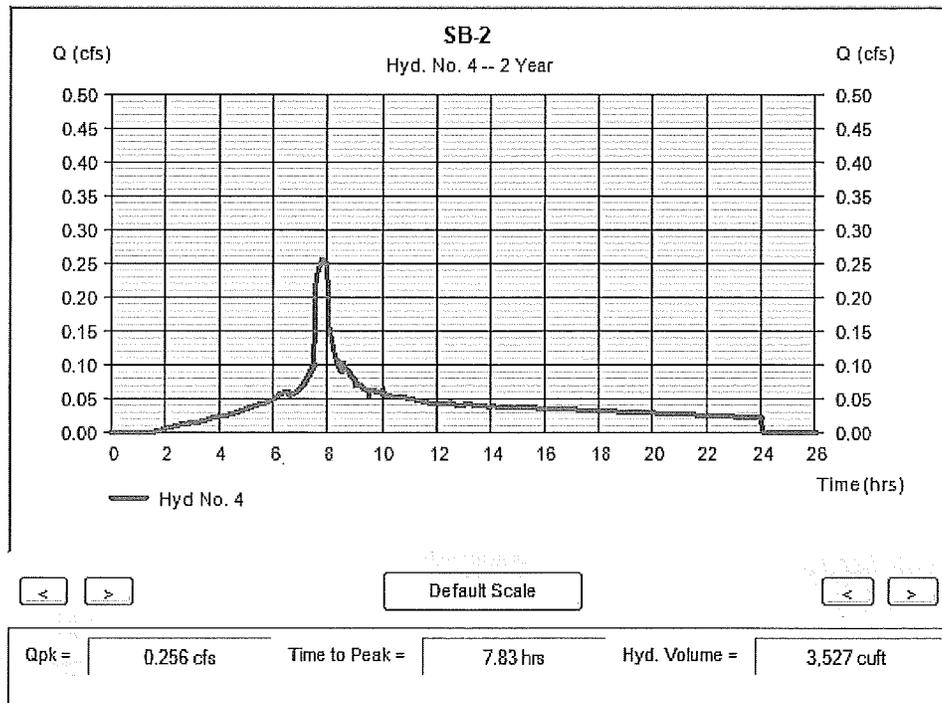
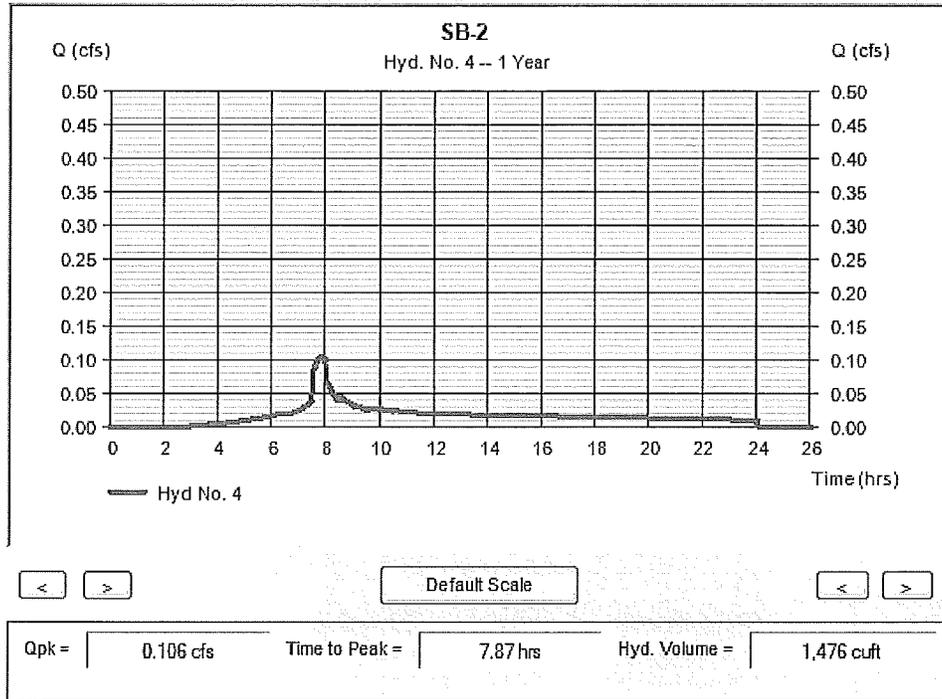


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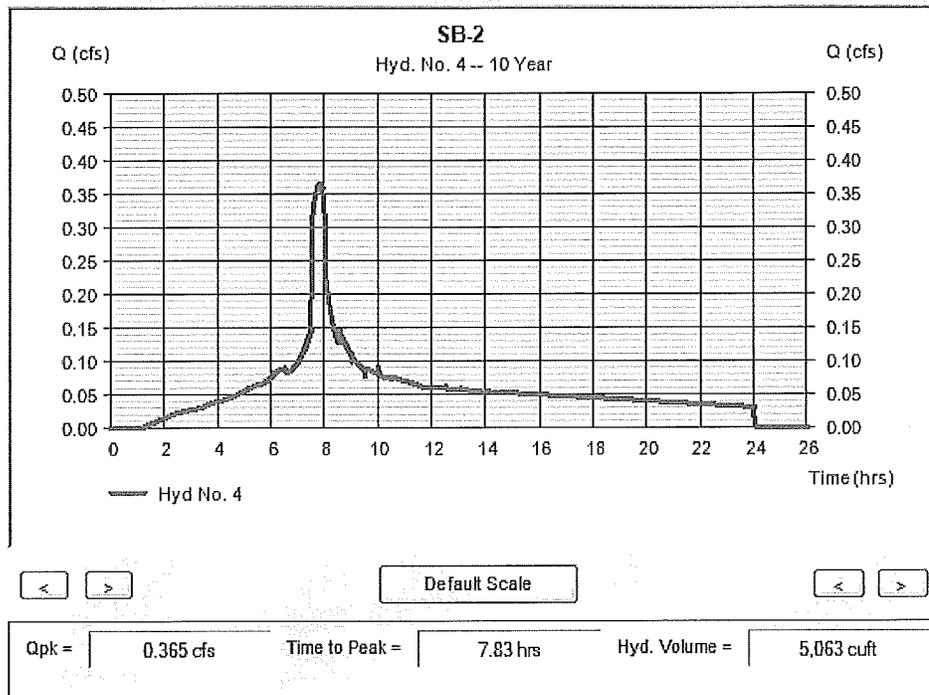
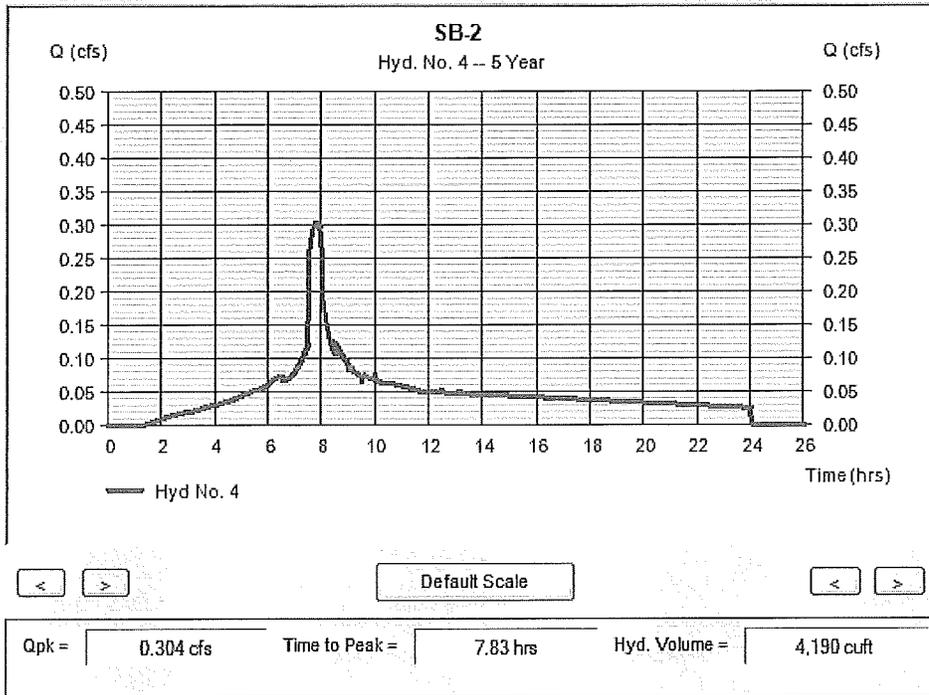


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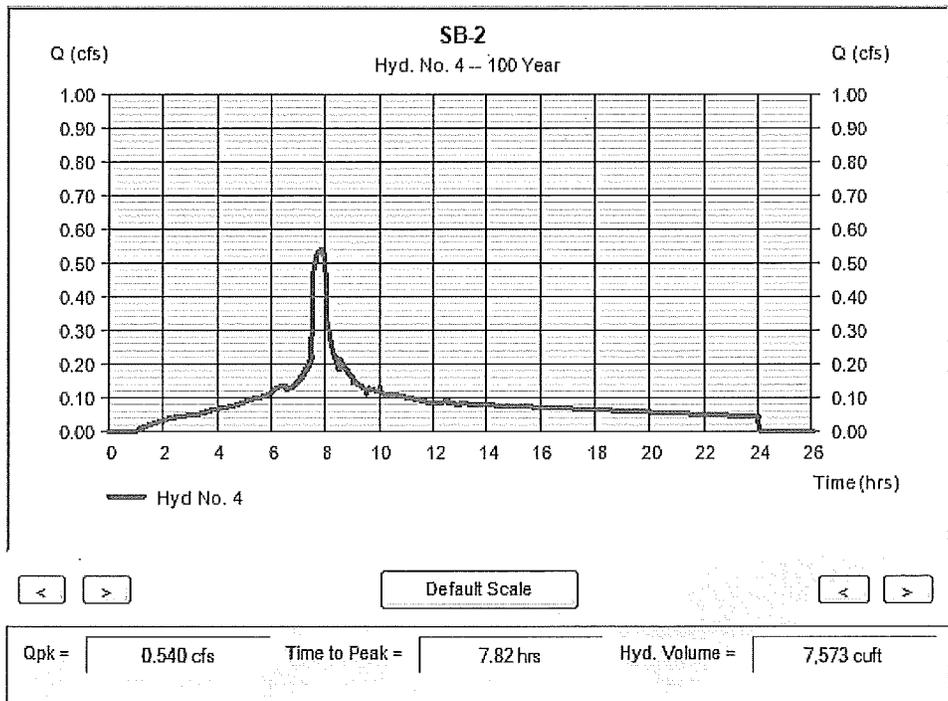
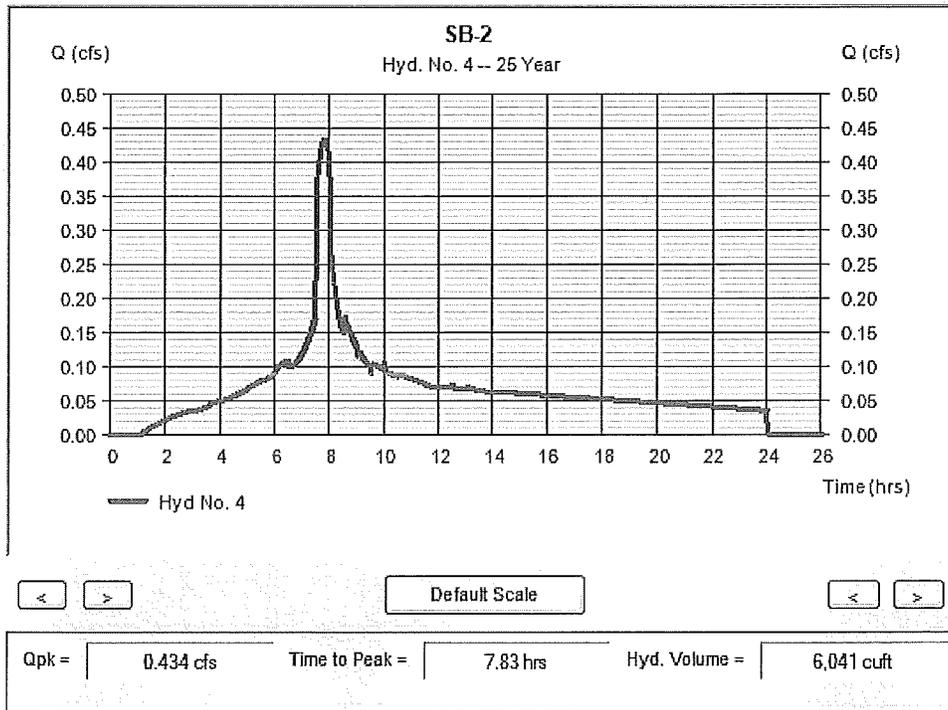


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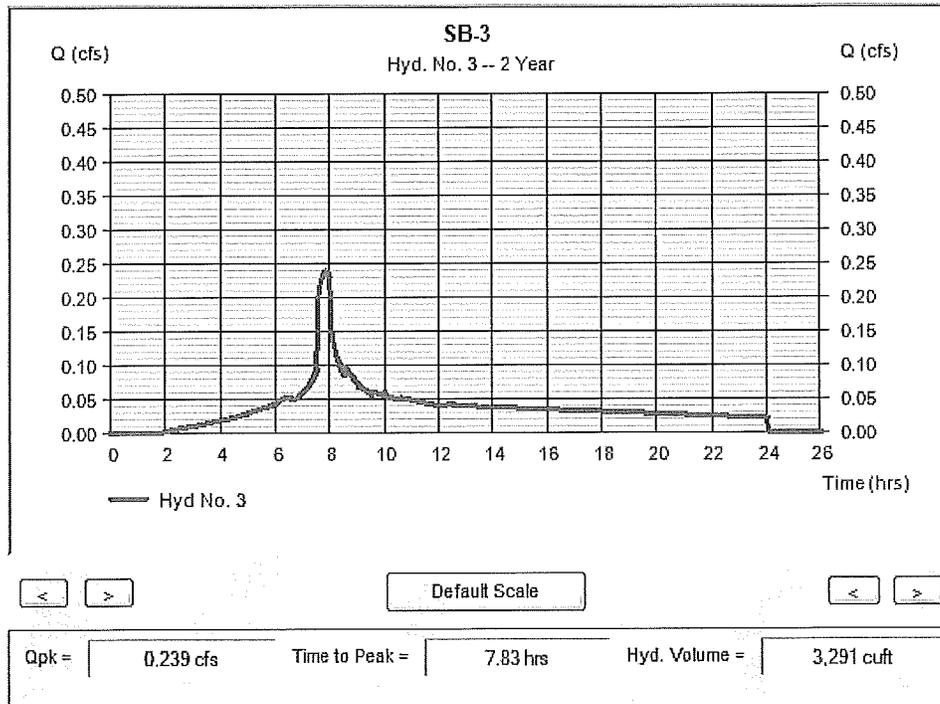
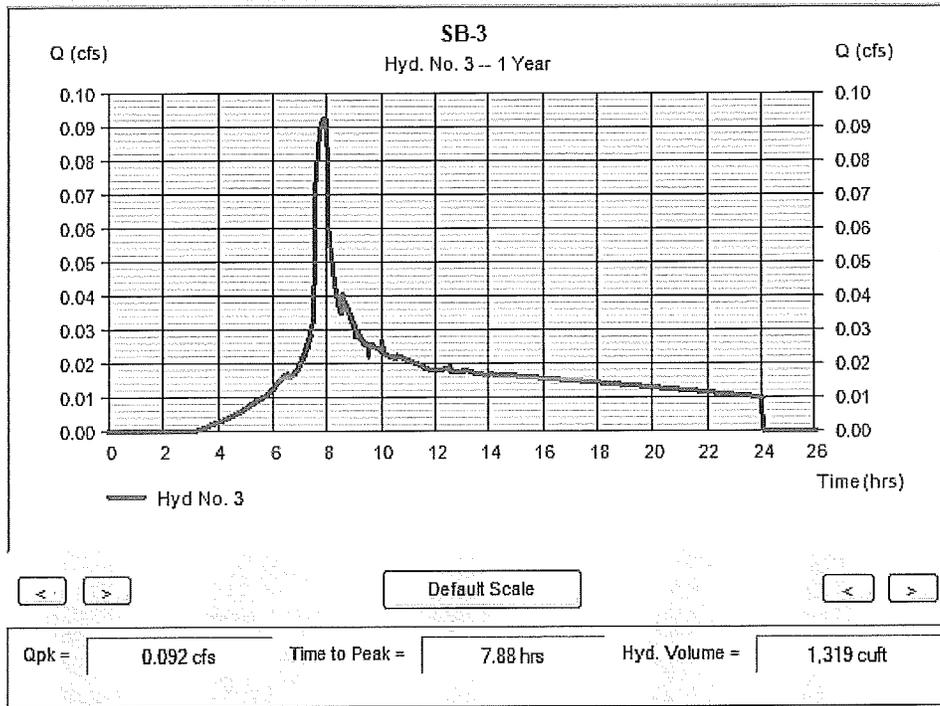


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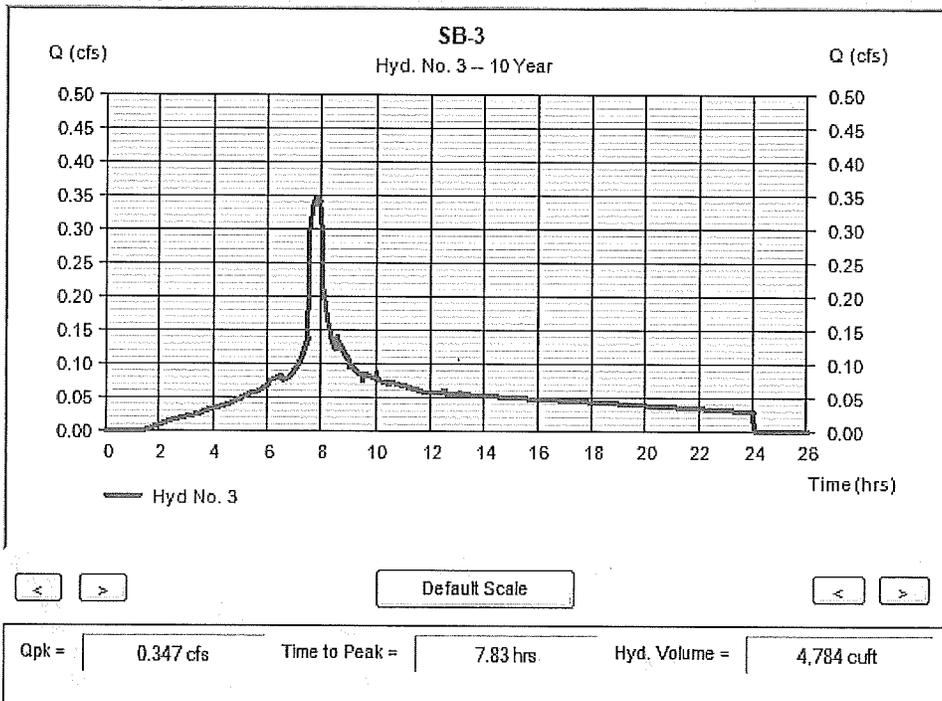
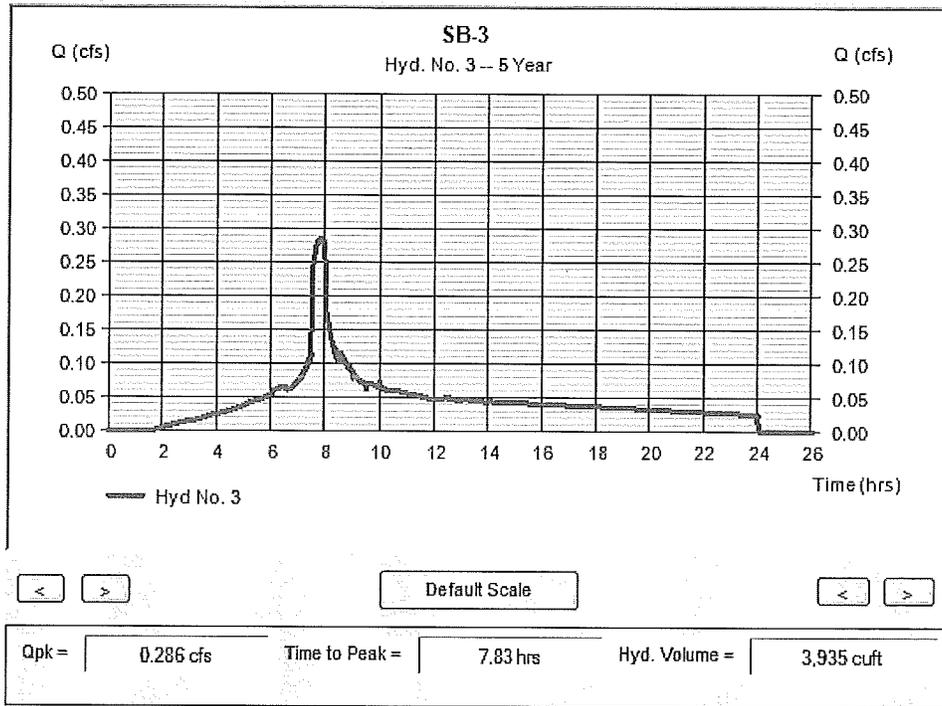


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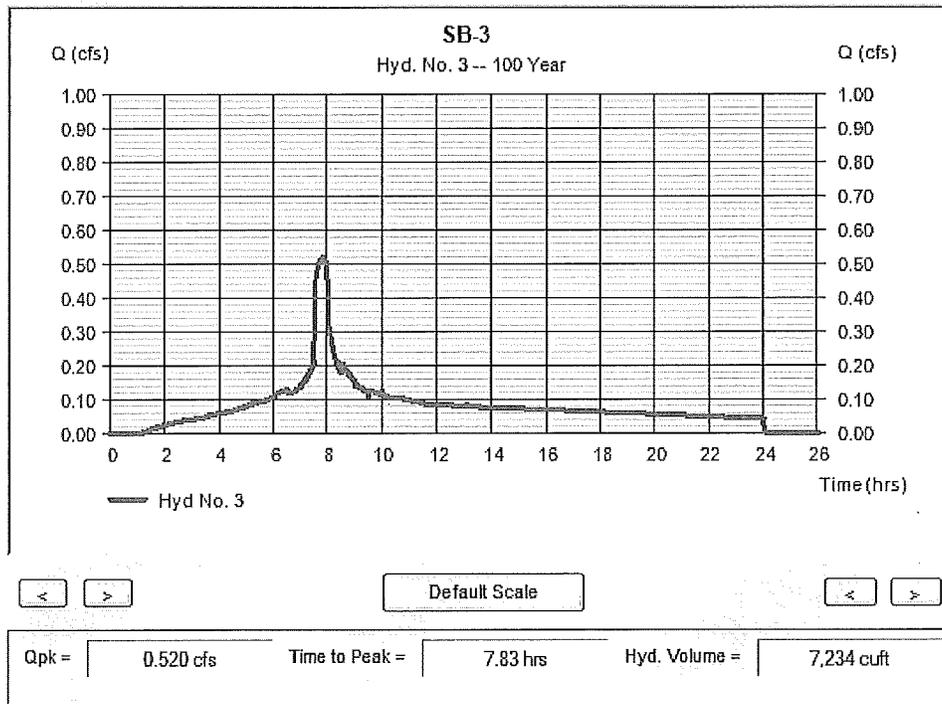
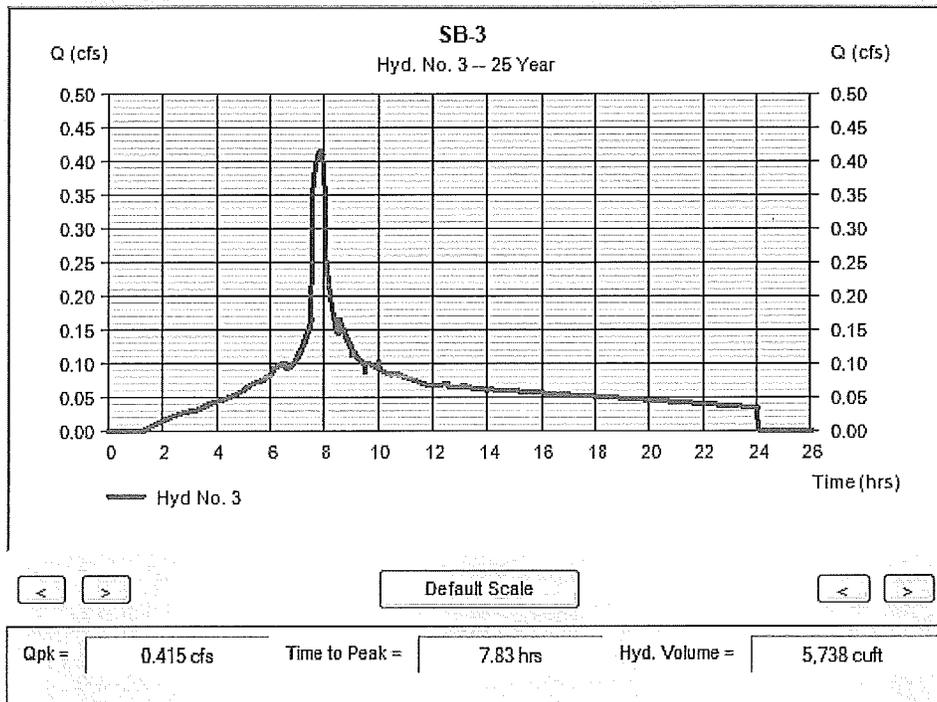


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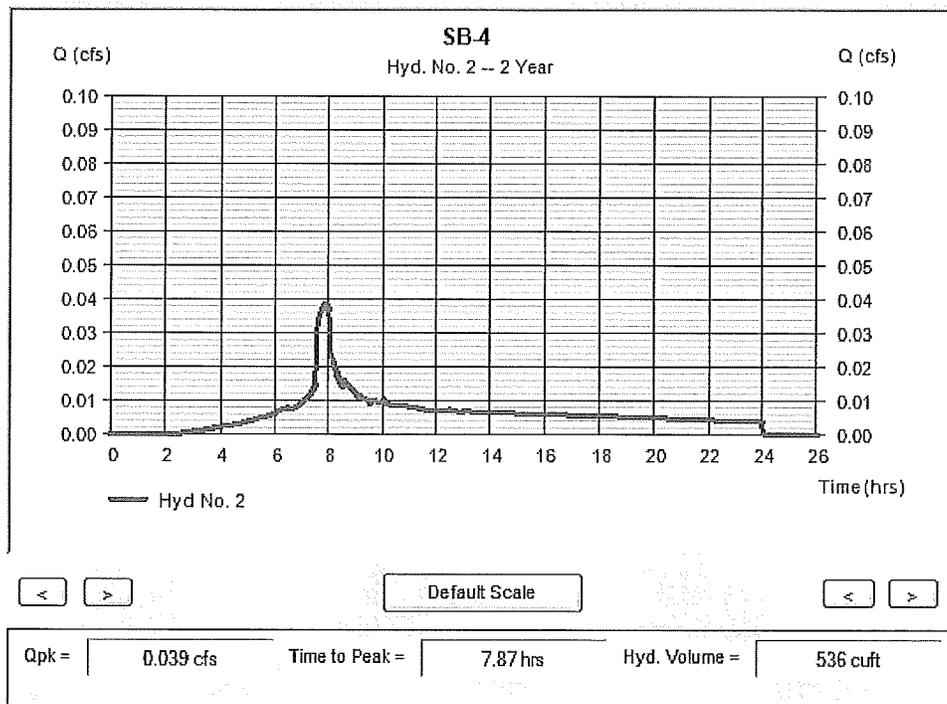
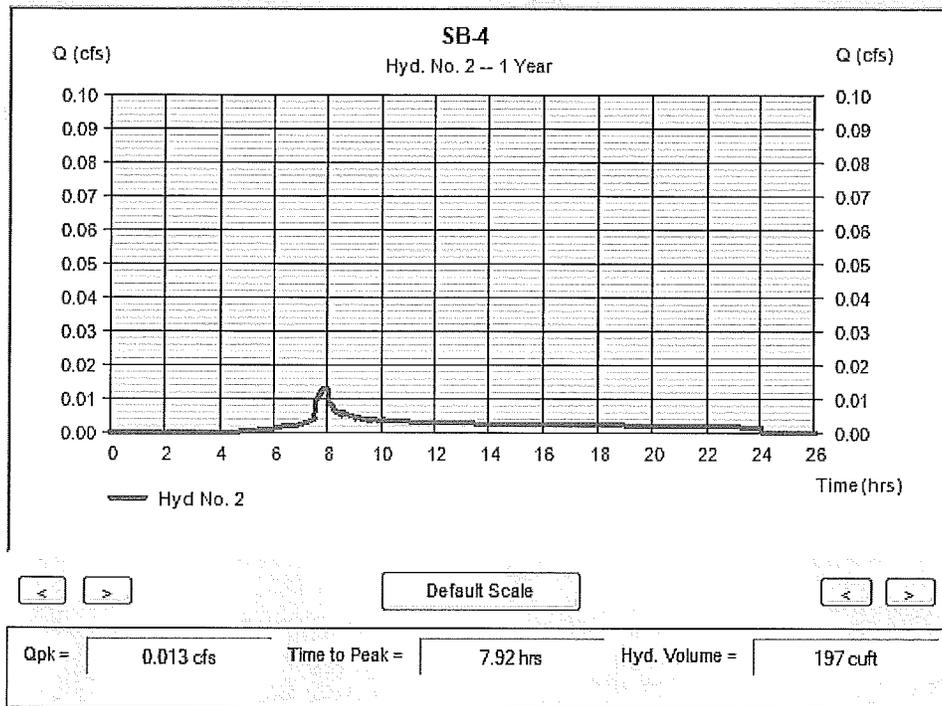


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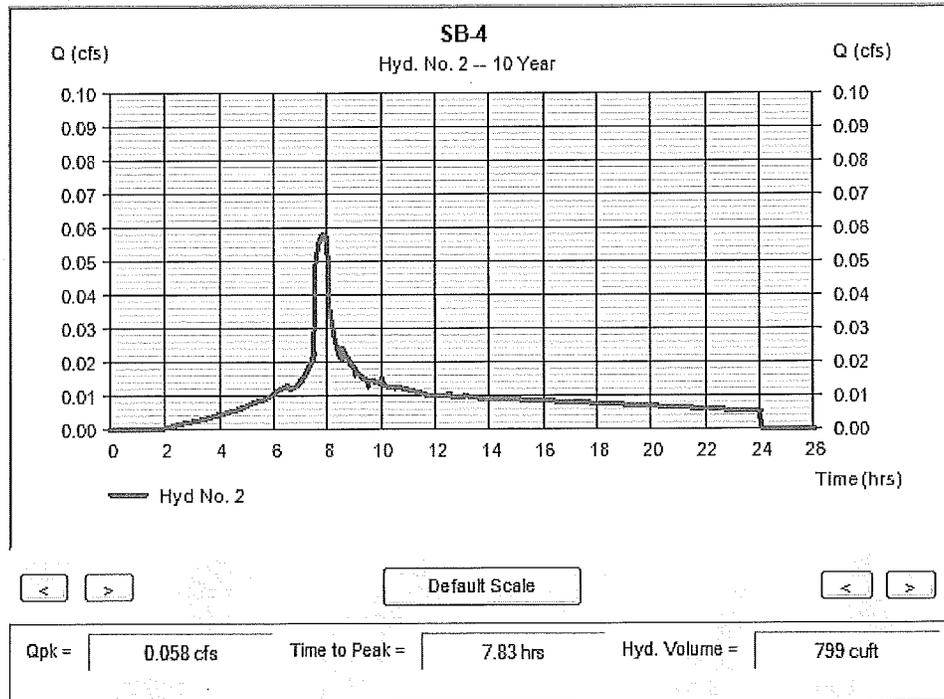
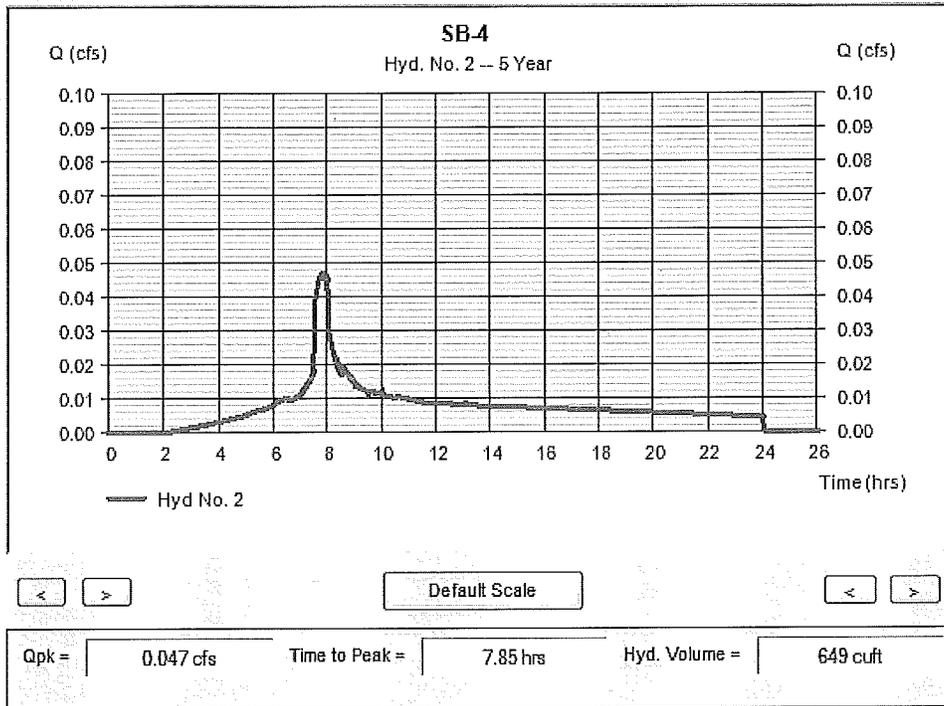


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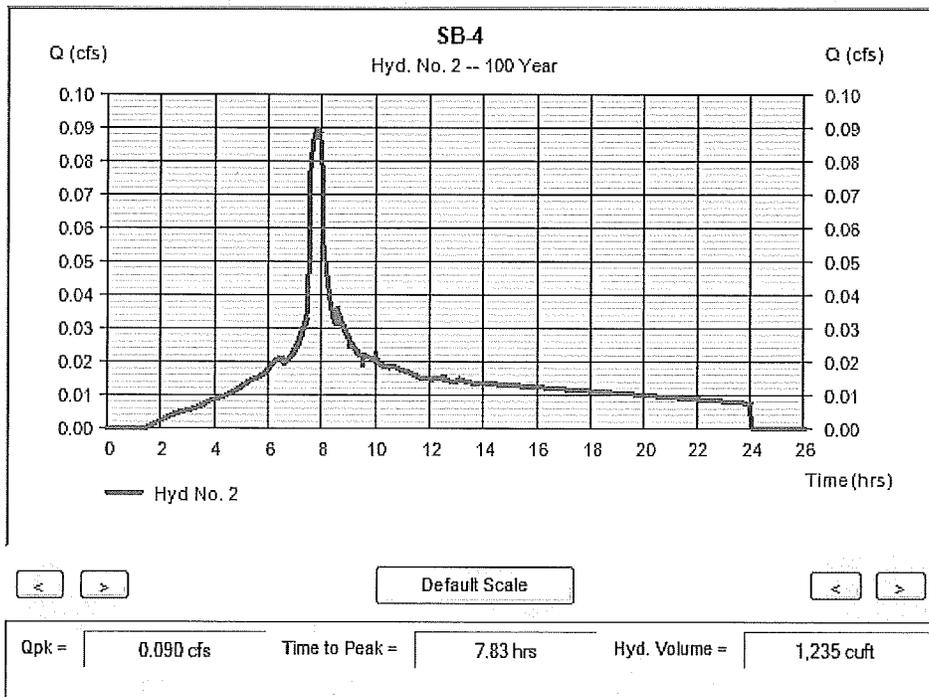
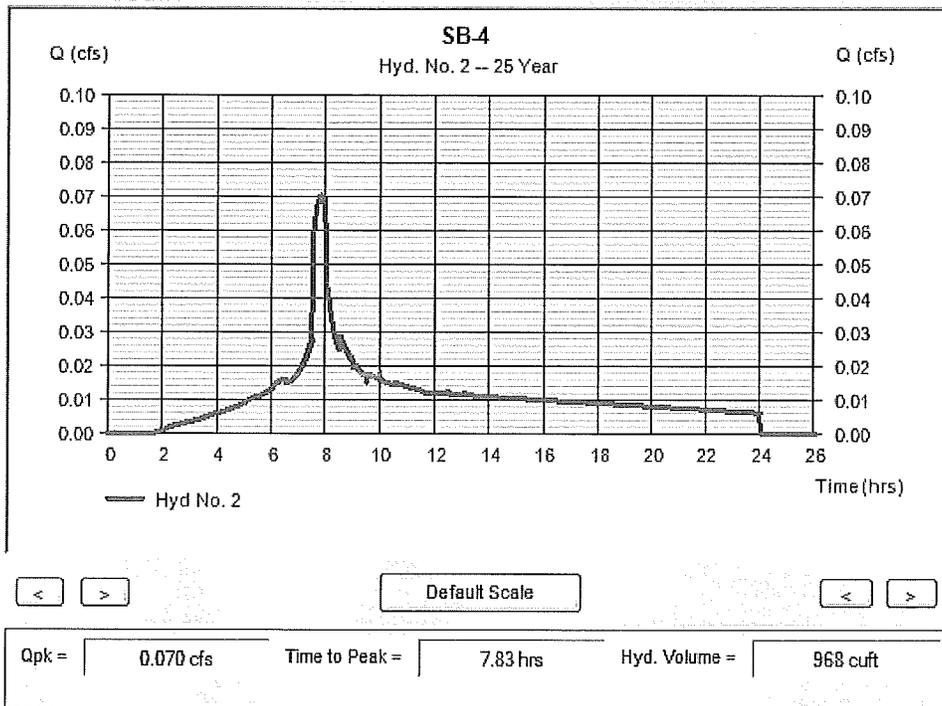


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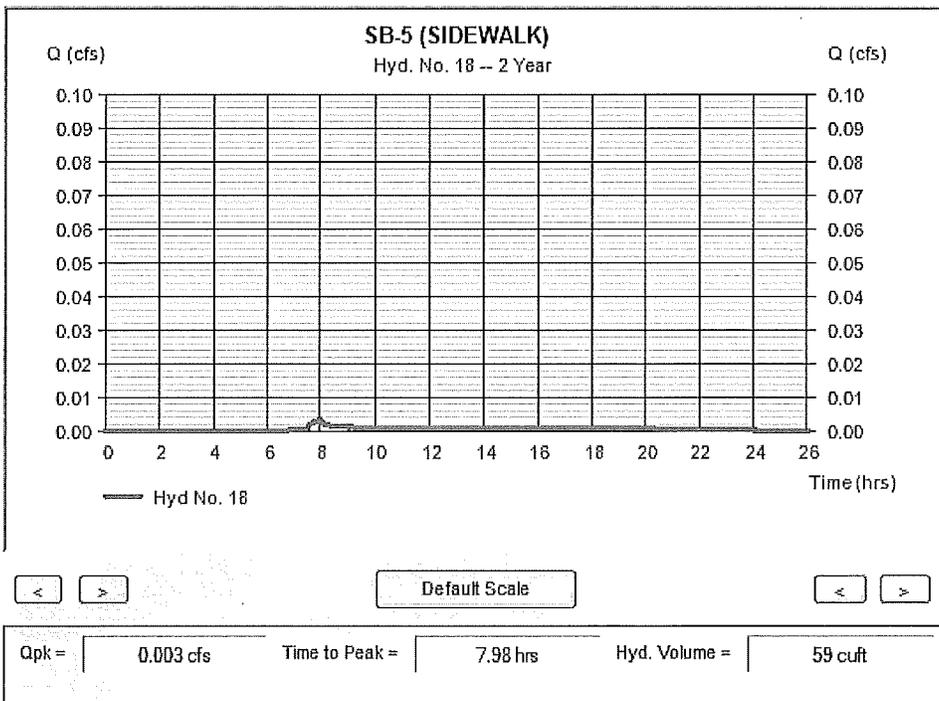
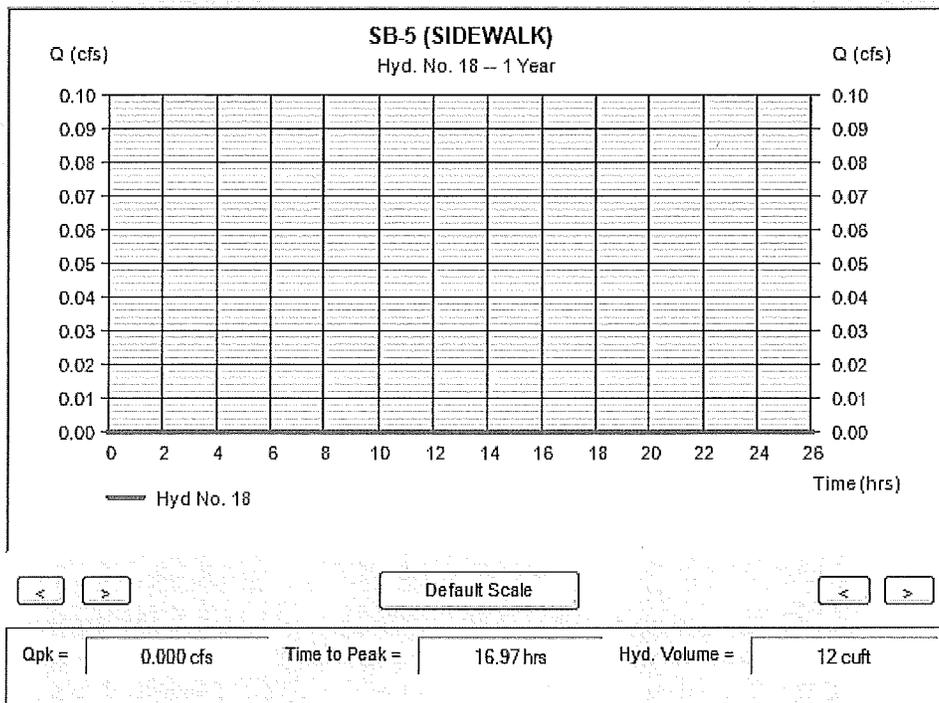


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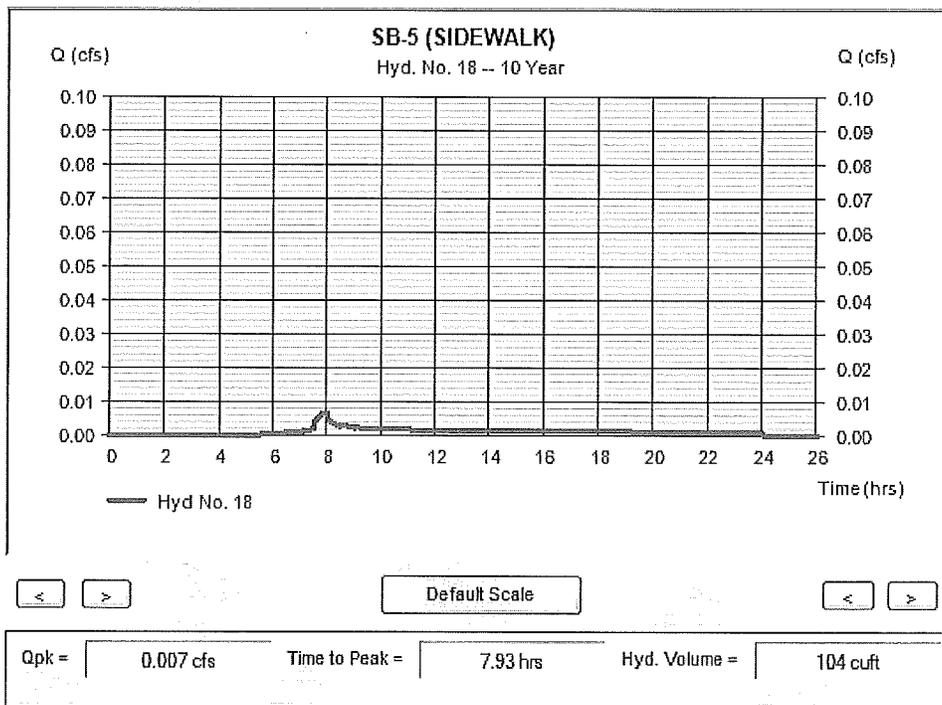
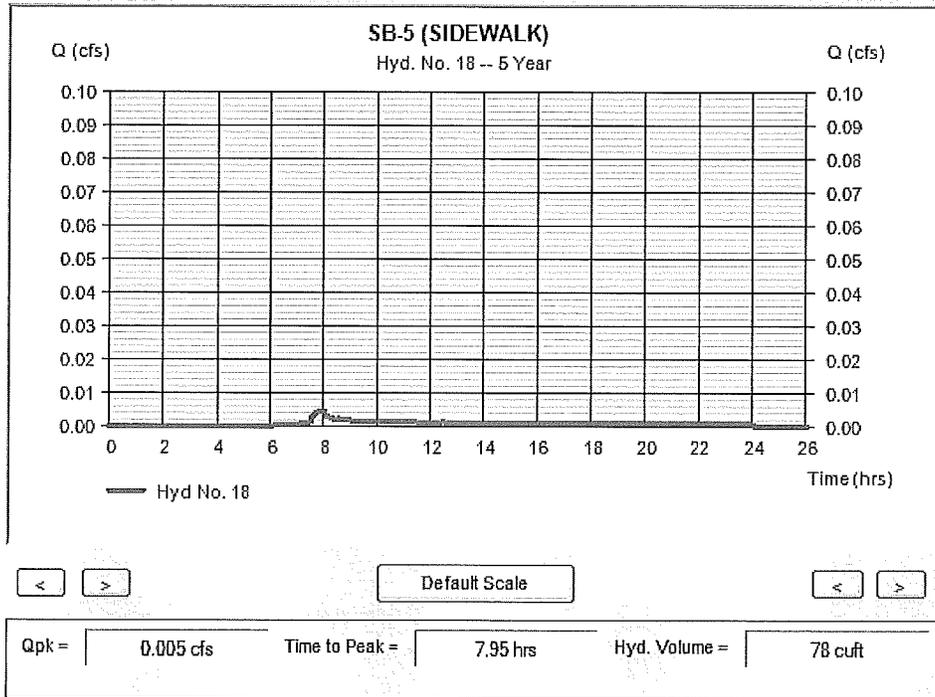


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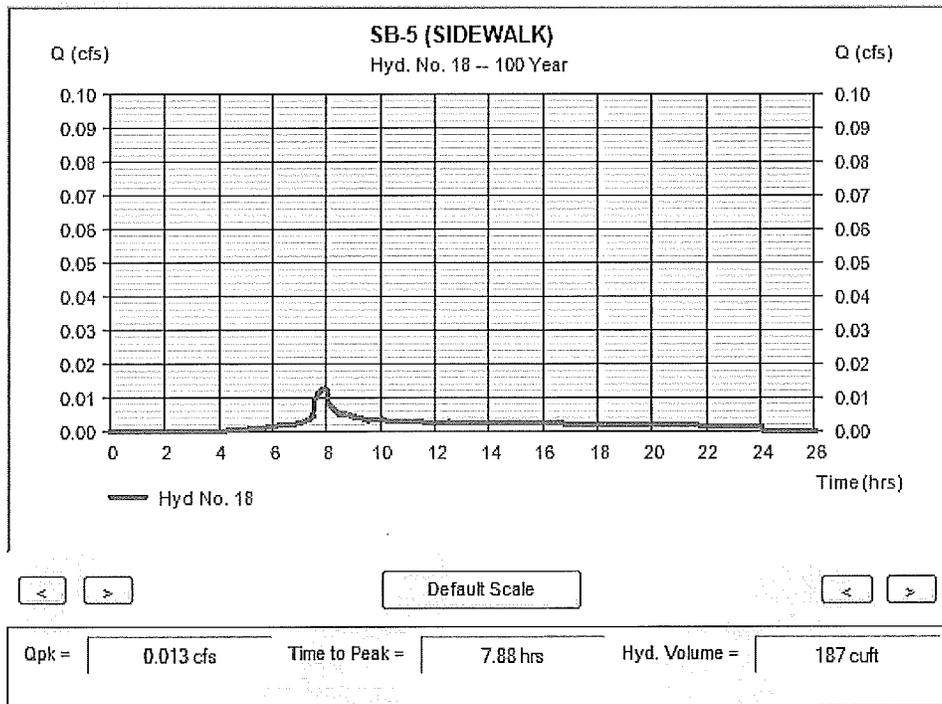
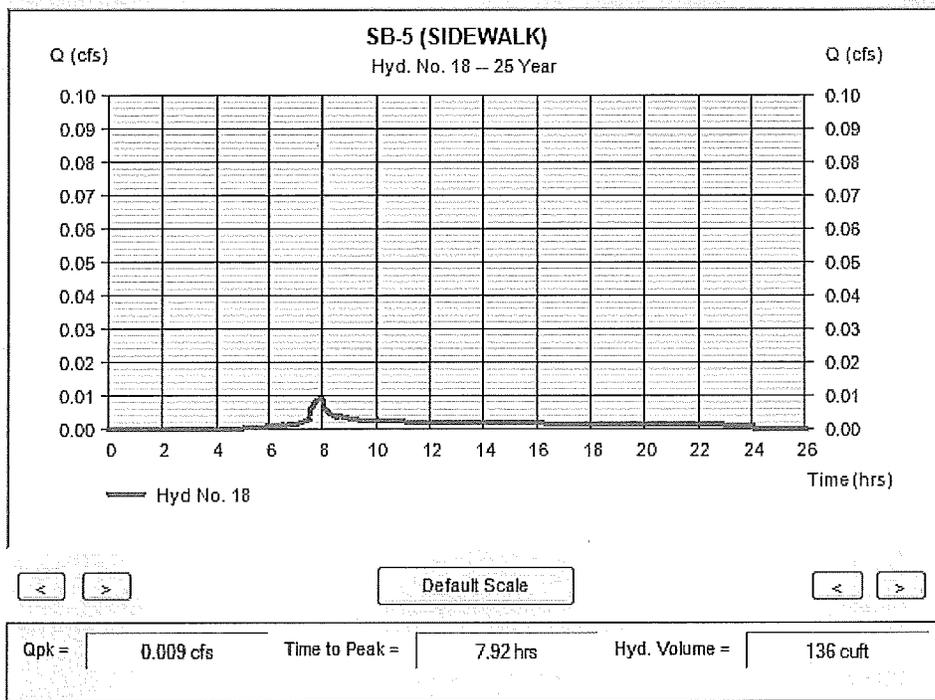


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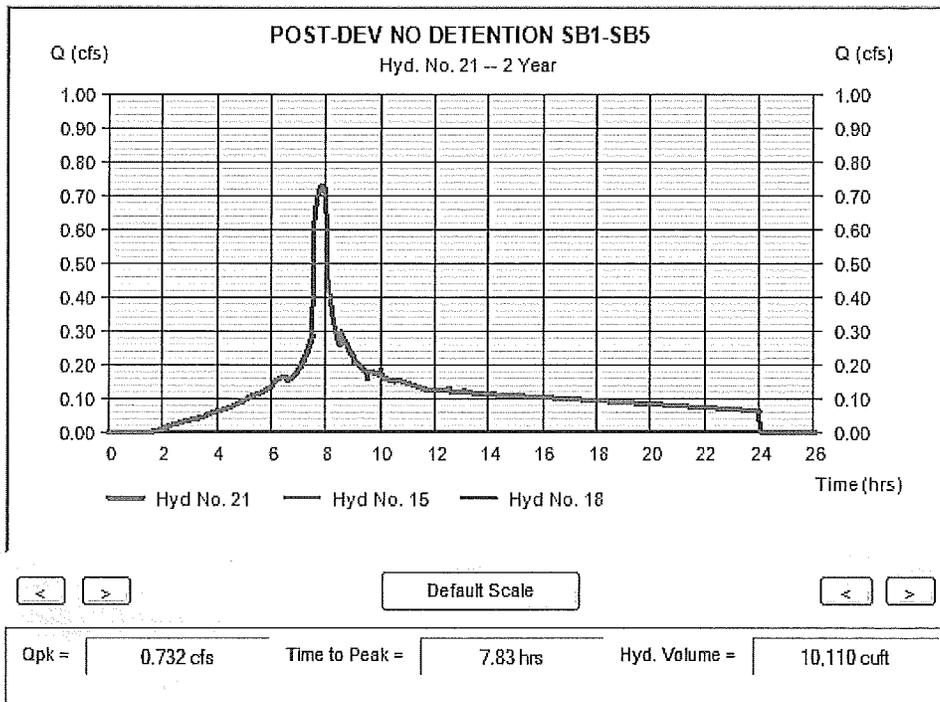
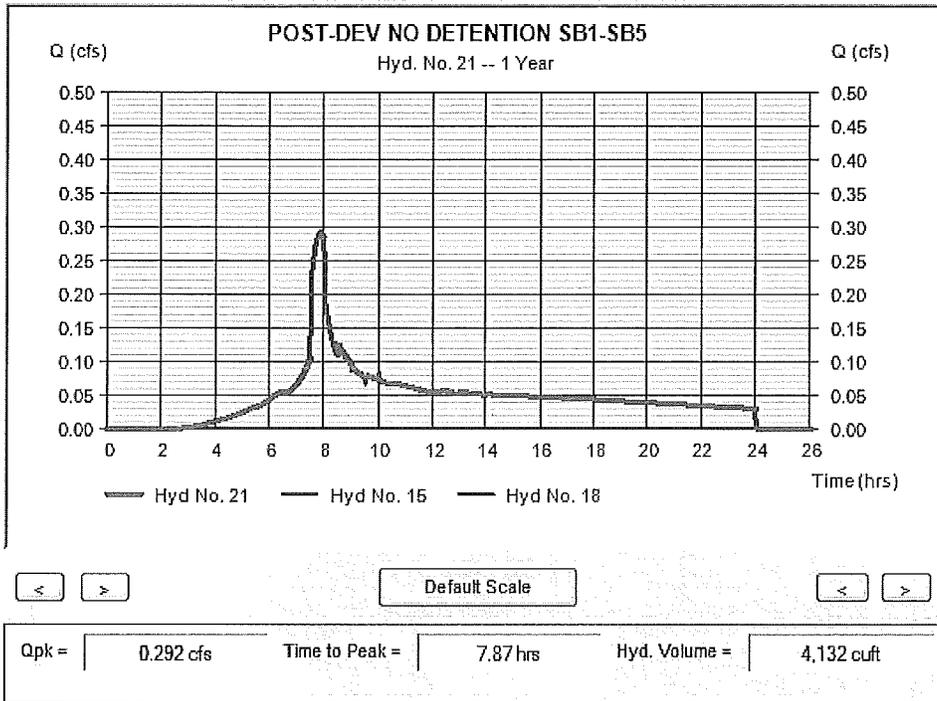


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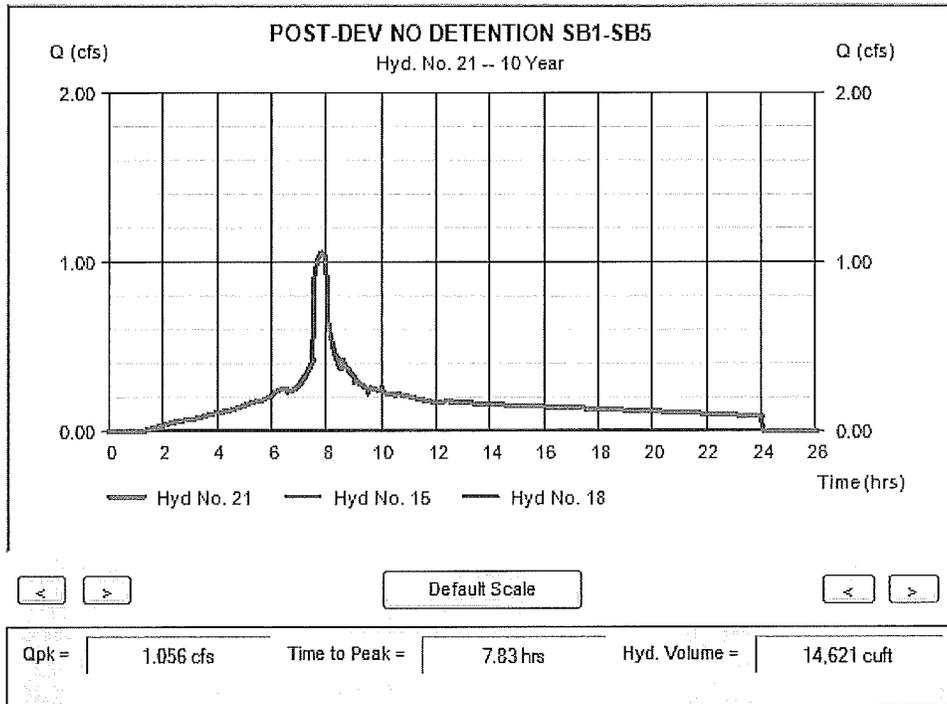
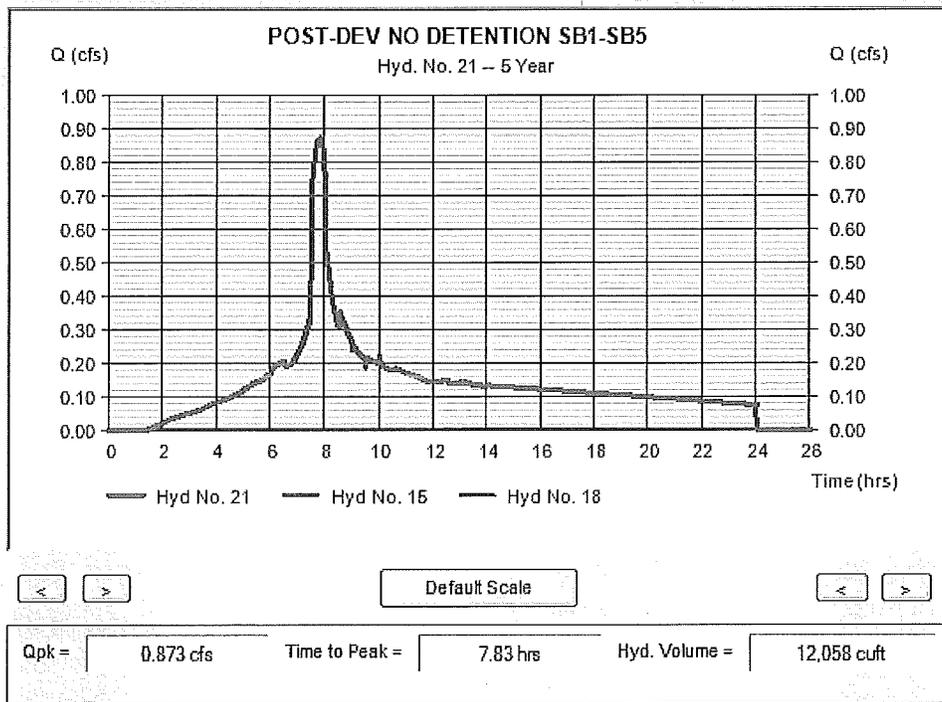


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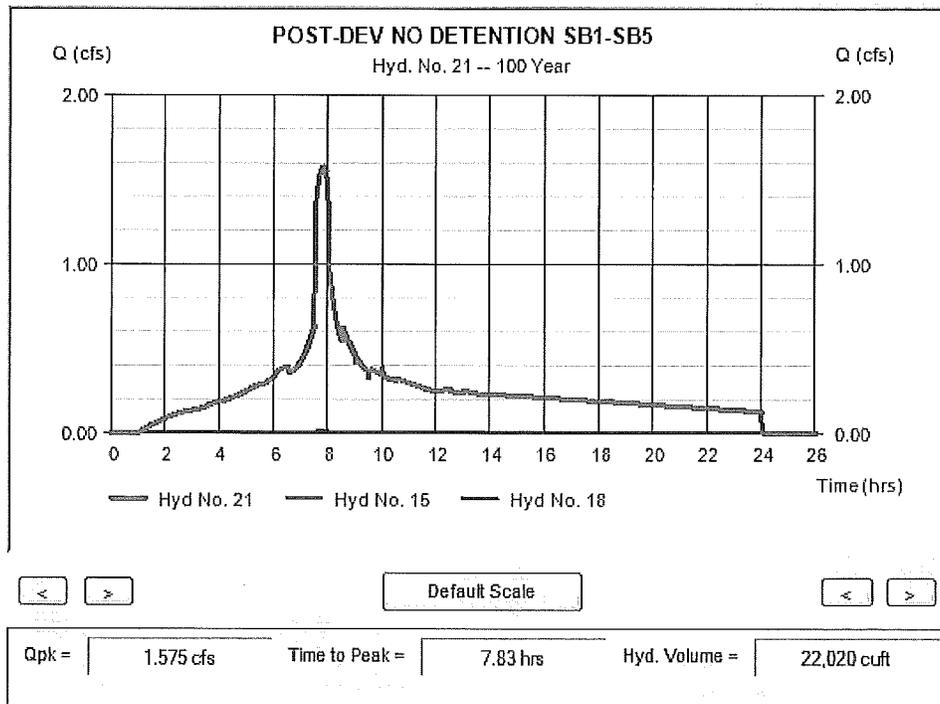
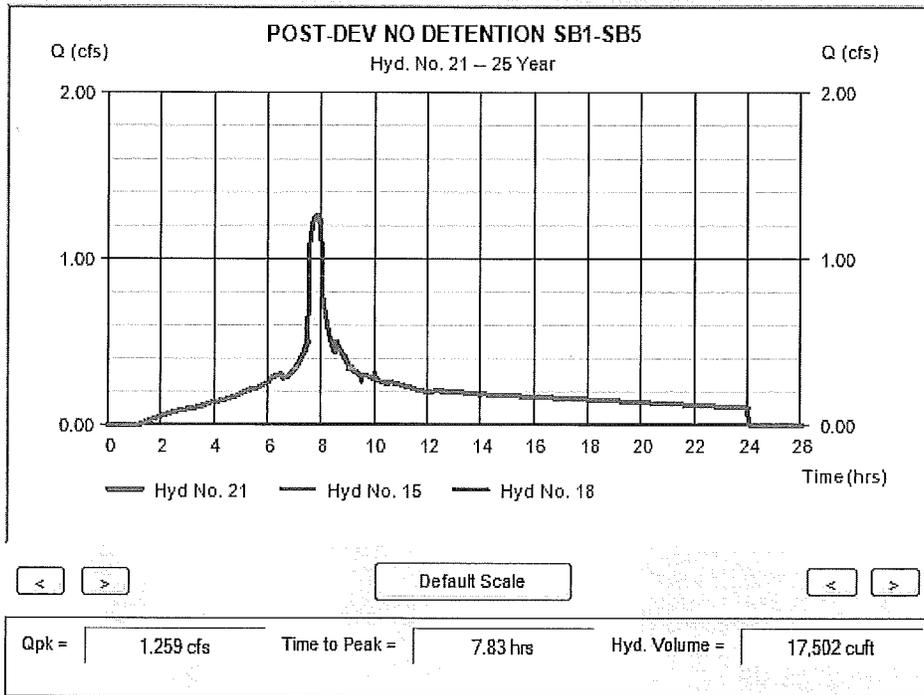


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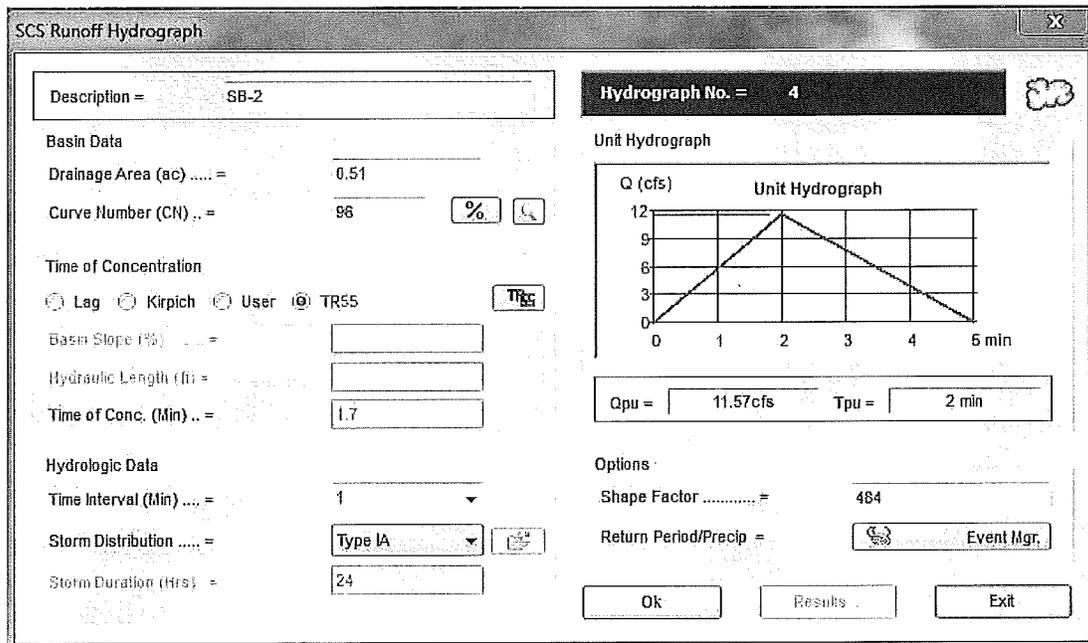
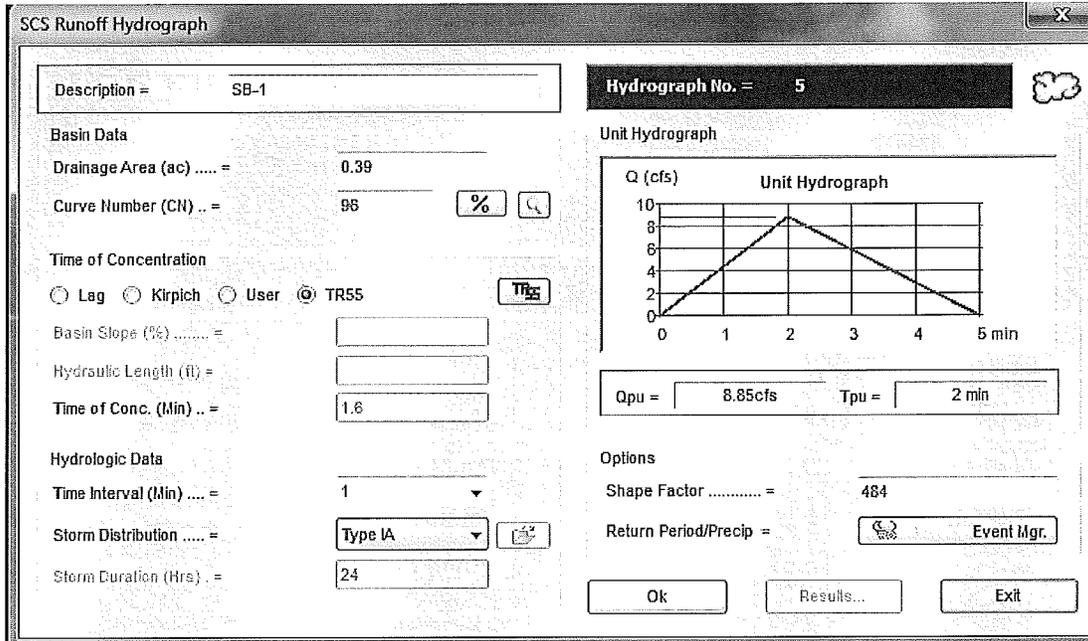


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**SCS Runoff Hydrograph**

Description = SB-3

Hydrograph No. = 3

**Basin Data**

Drainage Area (ac) ..... = 0.5

Curve Number (CN) .. = 95 %

**Time of Concentration**

Lag  Kirpich  User  TR55

Basin Slope (%) ..... =

Hydraulic Length (ft) =

Time of Conc. (Min) .. = 1.8

**Hydrologic Data**

Time Interval (Min) .... = 1

Storm Distribution ..... = Type IA

Storm Duration (Hrs) = 24

**Unit Hydrograph**

Q (cfs)

Qpu = 11.34cfs Tpu = 2 min

**Options**

Shape Factor ..... = 484

Return Period/Precip = Event Mgr.

Ok Results... Exit

**SCS Runoff Hydrograph**

Description = SB-4

Hydrograph No. = 2

**Basin Data**

Drainage Area (ac) ..... = 0.09

Curve Number (CN) .. = 93 %

**Time of Concentration**

Lag  Kirpich  User  TR55

Basin Slope (%) ..... =

Hydraulic Length (ft) =

Time of Conc. (Min) .. = 1.7

**Hydrologic Data**

Time Interval (Min) .... = 1

Storm Distribution ..... = Type IA

Storm Duration (Hrs) = 24

**Unit Hydrograph**

Q (cfs)

Qpu = 2.04cfs Tpu = 2 min

**Options**

Shape Factor ..... = 484

Return Period/Precip = Event Mgr.

Ok Results... Exit



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SCS Runoff Hydrograph

Description = SB-5 (SIDEWALK) Hydrograph No. = 18

Basin Data  
 Drainage Area (ac) = 0.02  
 Curve Number (CN) = 80  
 Time of Concentration  
 Lag  Kirpich  User  TR55  
 Basin Slope (%) =  
 Hydraulic Length (ft) =  
 Time of Conc. (Min) = 1.6  
 Hydrologic Data  
 Time Interval (Min) = 1  
 Storm Distribution = Type IA  
 Storm Duration (Hrs) = 24

Unit Hydrograph  
 Q (cfs) vs Time (min) graph showing a triangular peak at 2 minutes.  
 Qpu = 0.45cfs Tpu = 2 min

Options  
 Shape Factor = 484  
 Return Period/Precip = Event Mgr.

Buttons: Ok, Results..., Exit

Summary of Post-Developed, 24-Hour Storm Peak Flows (prior to detention)

SCS 24-Hour Type 1A Distribution Storm Event	POST-DEVELOPED (without detention)					
	Combined All Sub-Basins	SB-1	SB-2	SB-3	SB-4	SB-5
WQ (1-yr)	0.292 cfs	0.081 cfs	0.106 cfs	0.092 cfs	0.013 cfs	0.000 cfs
2-yr	0.732 cfs	0.196 cfs	0.256 cfs	0.239 cfs	0.039 cfs	0.003 cfs
5-yr	0.873 cfs	0.232 cfs	0.304 cfs	0.286 cfs	0.047 cfs	0.005 cfs
10-yr	1.056 cfs	0.279 cfs	0.365 cfs	0.347 cfs	0.058 cfs	0.007 cfs
25-yr	1.259 cfs	0.332 cfs	0.434 cfs	0.415 cfs	0.070 cfs	0.009 cfs
100-yr	1.575 cfs	0.413 cfs	0.540 cfs	0.520 cfs	0.090 cfs	0.013 cfs



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## SECTION 4: STORMWATER QUALITY DESIGN, BMPs AND LID METHODS

Post-construction run-off from the impervious surfaces of the new development site is routed through four, vegetated water quality swales. The vegetated water quality swales have been designed in accordance with the City of Albany, Oregon 2015 Engineering Standards, Division E Stormwater Management, Chapter 6, Section E.3.01 through E3.04. Specific design provisions are found in Section E3.03.B.1 "Vegetated Facilities" on page 8. The stormwater quality flows have been determined for the site using the TR-55 method for 50% of the 2-year, 24-hour Type 1A storm event. The City of Albany design standard uses sizing factors related to the amount of impervious area that is to be treated by the facility. Sizing factors are shown in Table 3.03-A: Stormwater Quality Sizing Factors, on page 8 of the Engineering Standard. A sizing factor of 0.025 is specified for vegetated "onsite swales", and swales are limited to a maximum impervious area of 20,000 square feet. A diagram of the site's Contributing Impervious Areas (CIA) and the location of each water quality facility is shown in **Figure 4** below. The City's stormwater quality design criteria are summarized in the reference Engineering Standard in Section E3.03.A on page 8, and may be summarized as follows:

1. Capture and treat 80% of the average annual runoff volume (corresponds to 1-inch in 24 hour rain event).
2. Treatment goal is 70% TSS removal. TSS removal is a surrogate for water quality treatment for various pollutants.
3. Vegetated stormwater quality facilities listed in the Engineering Standard have been established to meet the stormwater quality design criteria listed in items 1 and 2 above.

### Water Quality Flows Summary:

- Contributing Impervious Area (CIA) = 1.28 acres
- Design Storm (50% of 2-year, 24-hr) Rain = 1.21 inches
- Treated Post-Construction Runoff = 5,622 cubic feet
- Entire Site, Peak Treatment Flow,  $Q_{WQ}$  = 0.292 cfs
- Entire Site, 100-year Peak Flow,  $Q_{100}$  = 1.575 cfs (undetained)

AutoCAD hatching and closed polyline boundaries were used to calculate the Contributing Impervious Areas assumed for sizing of the Onsite Swales. A summary of areas and sizing is shown in the table below. Facility locations are shown in **Figure 4** below, and the standard facility detail is shown in **Figure 5**.

WATER QUALITY FACILITY SIZING TABLE					
ITEM	Sub-Basin				
	SB-1	SB-2	SB-3	SB-4	SB-5
Contributing Impervious Area (CIA)	14,620 sf	19,979 sf	17,952 sf	2,821 sf	0 sf
WQ Facility Type <sup>1</sup>	Onsite Swale #1	Onsite Swale #2	Onsite Swale #3	Onsite Swale #4	n/a <sup>3</sup>
Sizing Factor	0.025	0.025	0.025	0.025	n/a
WQ Area Required	395 sf	499 sf	449 sf	71 sf	0 sf
WQ Area Provided <sup>2</sup>	424 sf	631 sf	631 sf	94 sf	0 sf

Footnotes:

1. WQ facility type per City of Albany, Oregon Engineering Standards, Division E, January 2015
2. WQ area provided is calculated as the surface area of the swale water surface with an 8-inch ponding depth
3. Sub-basin 5 (sidewalk) is to be constructed of pervious pavers, and therefore has no contributing impervious area



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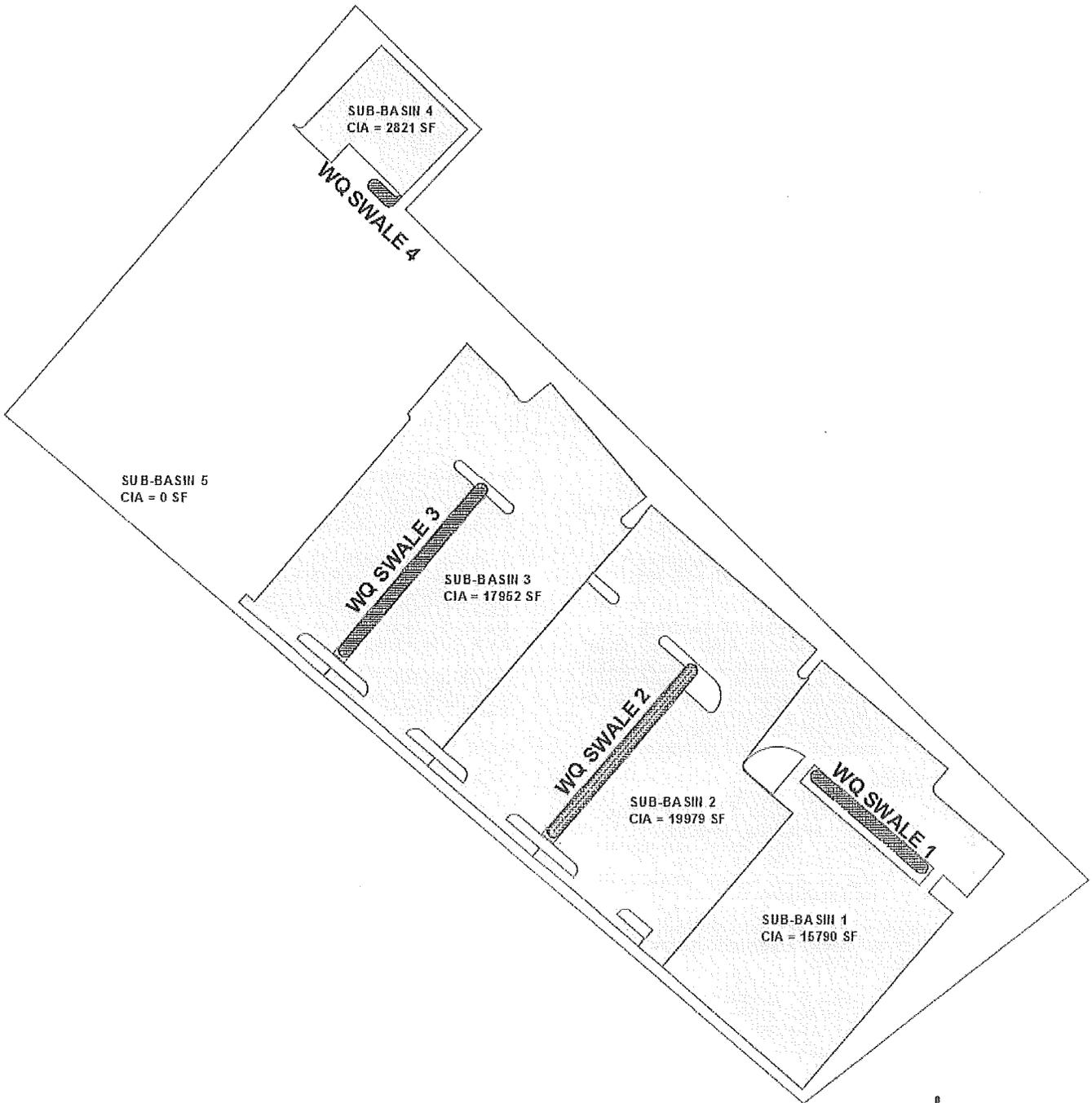
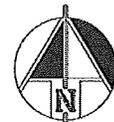


Figure 4: Water Quality Facilities and Contributing Impervious Areas





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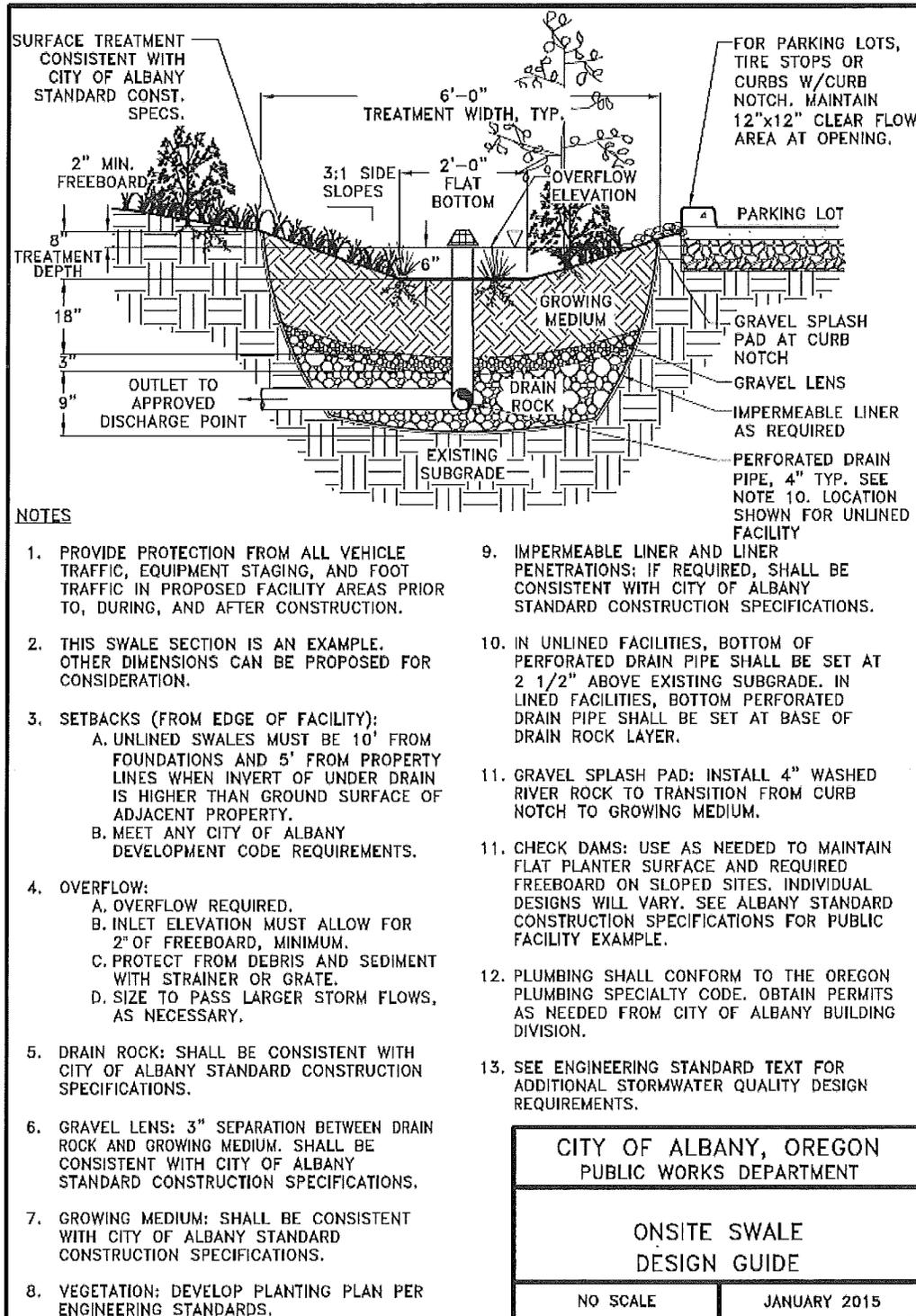


Figure 5: Typical Water Quality Swale Detail (City of Albany Engineering Standards, App. E10.05, January 2015)



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## **STORMWATER QUALITY BEST MANAGEMENT PRACTICES**

The following BMPs are incorporated into the stormwater design for the proposed C9 Site:

### **Metal or Membrane Roof**

The new office buildings on the C9 site area will be constructed using painted or powder coated metal roofing or a membrane roofing to minimize or eliminate zinc and iron pollution to stormwater runoff.

### **Oil and Sediment Trap in Control Manhole**

Post-construction runoff from the new and portions of existing roofs and paved areas of the C9 Site are routed through a control manhole with a submerged outlet trap. This will reduce oil and grease levels in stormwater discharge.

### **Paved Parking Lots and Yards**

Paved parking on the C9 site will minimize attachment of metals, oils, and other pollutants to the underlying soils on the site, and help to convey post-construction run-off to treatment facilities.

### **Vegetated Swales**

Stormwater from underground conveyance piping has been routed through grassy swales prior to discharge into the public storm drain system. Grassy swales have been designed to pool water and discharge water quality storm event by infiltration through controlled soil and rock layers in accordance with the City of Albany Engineering Standards. The swales will provide treatment to stormwater from impervious areas on the C9 site.

### **Stormwater Detention**

All post-construction runoff from the site is routed through detention storage provided by an underground pipe gallery. The detention pond volume will minimize TSS in the stormwater runoff during storm events exceeding the design water quality event, and the control structures will provide additional floatables reduction in runoff, including oils and grease. Underground detention reduces the potential for water temperature increases of stored surface stormwater, compared to surface storage facilities.



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### LOW IMPACT DEVELOPMENT METHODS

Low Impact Development has not been explicitly incorporated into the design of this project. Site constraints, shallow groundwater levels and low infiltration rates are significant restrictions toward realization of complete LID design. Geotechnical consultation and exploration on the site at the proposed site provides some guidance on the suitability of existing soils for stormwater systems which rely upon infiltration (OGD Consulting, Geotechnical Investigation, Project 527-16-01, sealed by Oregon Registered Engineer 50451PE; and email correspondence dated February 29, 2016):

*"...upper soils are predominately clay, so infiltration rates are expected to be very low."*

*"The site includes upper soils consisting of high plasticity clay. Therefore, we anticipate that a perched water condition will develop at the site during wet portions of the year."*

Low impact development best management practices based on controlling stormwater at the source by the use of microscale controls distributed throughout the site are challenging on sites with high groundwater levels, poor infiltration rates, limited elevation drop to the waterway and highly plastic clays. However, the stormwater facilities utilized will contribute to some of the objectives of LID in a limited fashion as described below:

#### Vegetated Water Quality Swales

The stormwater quality swales have flat bottoms and piped outlets are set six inches above the bottom of swales. The swales are expected to be filled with water quality compatible vegetation in accordance with City of Albany Engineering Standards, which help to create a hydrologically rough landscape. Use of flatter slopes for swales is a core LID design principle. Stormwater contact time with soils is maximized in the swales. While infiltration is not a primary objective of the swales (stormwater is designed to be collected by a perforated pipe connected to a tight lined underground stormwater conveyance system), the opportunity for infiltration prior to discharge exists. However, as stated above, the high groundwater level likely provides only limited opportunity for infiltration.



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## SECTION 5: STORMWATER QUANTITY DESIGN

The proposed C9 site is provided with an underground stormwater detention facility and control structure which is designed to limit post-developed peak flows to less than or equal to pre-developed peak flows for the 50% of the 2-year, 2-year, 5-year, 10-year and 25-year, 24-hour storm events. The control structure is shown in **Figure 7** below. It should be noted that the control structure and storage pipes have been designed to limit flows for the 50% of the 2-year, 24-hour storm to pre-developed flow rates for compliance with SLOPES V criteria as part of the site wetland mitigation plan. The City of Albany Engineering Standards do not require detention for storm events more frequent than the 2-year event, and also limit the smallest size orifice to 2-inches. It is not feasible to detain the 50% of the 2-year event with a minimum orifice size of 2 inches. Therefore, the control structure has been designed with two orifices, a 0.75" diameter lower orifice, and a 3.00" diameter orifice placed higher on the riser weir barrel. The system has been sized to allow the control structure to continue to limit flows for the 2-year through 25-year storms to pre-developed rates assuming the lower 0.75" diameter orifice is non-functional, due to plugging. The 0.75" diameter orifice is therefore only necessary for storms having a frequency of less than 2-years and greater than or equal to the 50% of the 2-year event. Detention storage is provided by five, 200 foot long, 36-inch diameter pipes with manifold headers at either end. **Figure 6** below shows the location of the underground pipe gallery detention facility. The facility is outside of the public storm easement. Flows exceeding the 25-year, 24-hour event are allowed to bypass the control orifices through a riser weir inside the control structure manhole. The riser weir is capable of safely passing the 100-year, 24-hour event. Flows exceeding the designed conveyance capacity of the control structure, or in the event that the control structure or public underground line is plugged or overwhelmed to provide the required capacity, overflows are conveyed off-site via an overland route shown in **Figure 8** below. See Sections 2 and 3 of this report for pre-developed and post-developed hydrology.

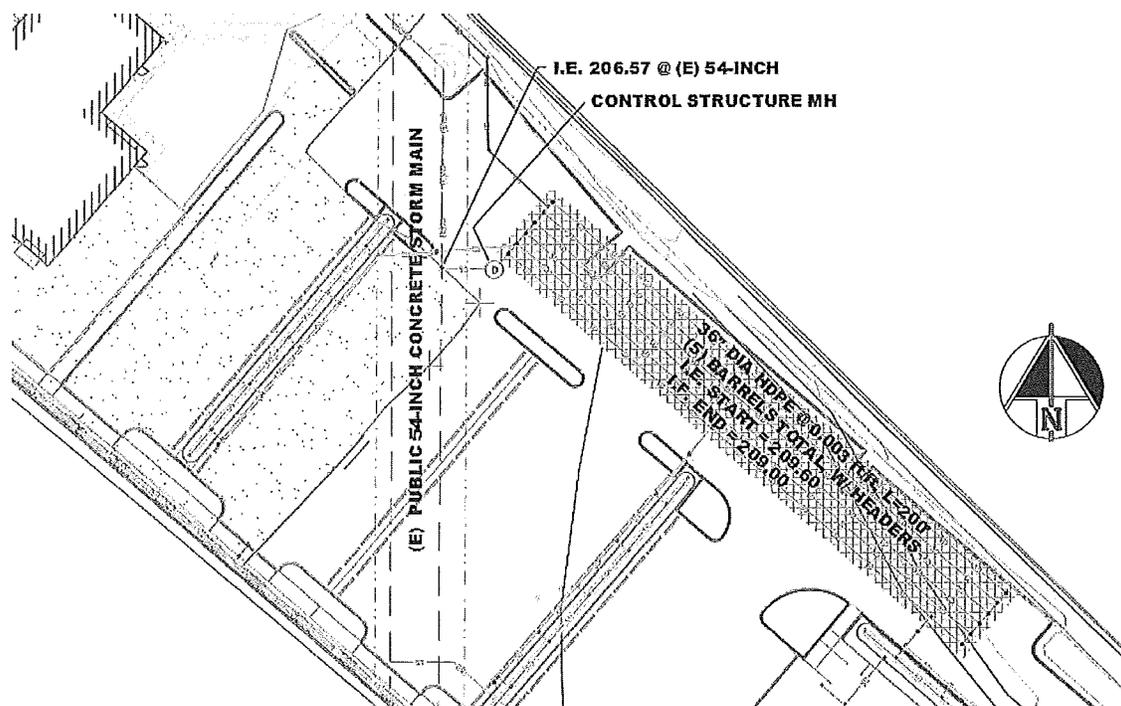


Figure 6: Underground Detention Facility Schematic



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**Detention Pond Design Information**

HydraflowHydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5

Monday, 05 / 23 / 2016

**Pond No. 10 - PIPE STORAGE R3**

**Pond Data**

UG Chambers -Invert elev. = 209.00 ft, Rise x Span = 3.00 x 3.00 ft, Barrel Len = 200.00 ft, No. Barrels = 5, Slope = 0.30%, Headers = Yes

**Stage / Storage Table**

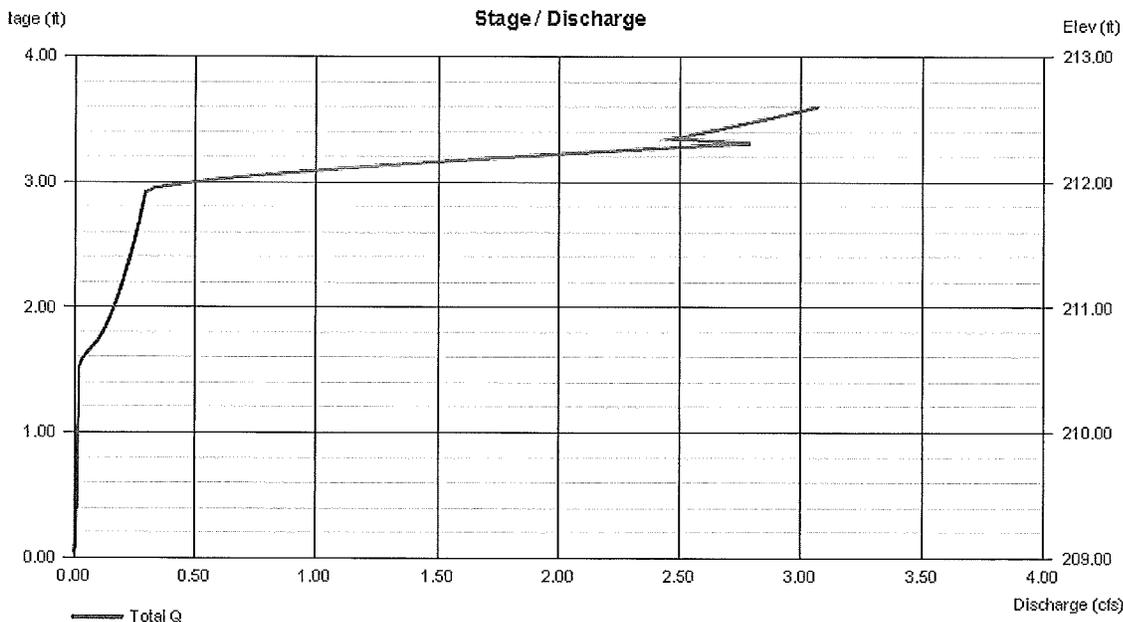
Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	209.00	n/a	0	0
0.36	209.36	n/a	113	113
0.72	209.72	n/a	551	664
1.08	210.08	n/a	878	1,542
1.44	210.44	n/a	1,036	2,578
1.80	210.80	n/a	1,107	3,684
2.16	211.16	n/a	1,106	4,791
2.52	211.52	n/a	1,037	5,828
2.88	211.88	n/a	876	6,704
3.24	212.24	n/a	551	7,254
3.60	212.60	n/a	113	7,367

**Culvert / Orifice Structures**

**Weir Structures**

	[A]	[B]	[C]	[PrfRsr]		[A]	[B]	[C]	[D]
Rise (in)	= 12.00	0.75	3.00	Inactive	Crest Len (ft)	= 3.14	0.00	0.00	0.00
Span (in)	= 12.00	0.75	3.00	2.00	Crest El. (ft)	= 211.93	0.00	0.00	0.00
No. Barrels	= 1	1	1	1	Weir Coeff.	= 3.33	3.33	3.33	3.33
Invert El. (ft)	= 209.00	209.00	210.50	210.40	Weir Type	= 1	---	---	---
Length (ft)	= 80.00	0.00	0.00	2.00	Multi-Stage	= Yes	No	No	No
Slope (%)	= 20.00	0.00	0.00	n/a					
N-Value	= .013	.013	.013	n/a	Exfil. (in/hr)	= 0.000 (by Wet area)			
Orifice Coeff.	= 0.60	0.60	0.60	0.60	TW Elev. (ft)	= 0.00			
Multi-Stage	= n/a	Yes	Yes	Yes					

Note: Culvert/Orifice structures are analyzed under inlet (a) and outlet (b) control. Weir flows checked for free conditions (c) and submerged toe (d).





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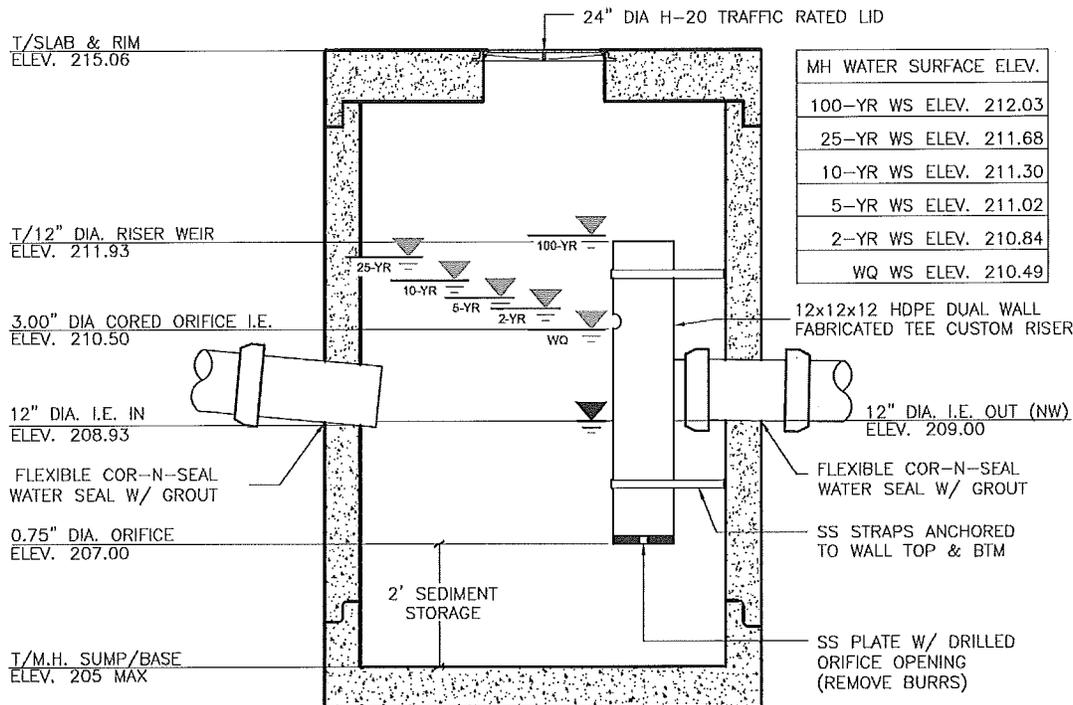


Figure 7: Control Structure Manhole Detail

### Control Structure Outfall and Overflow Route

The control structure outfalls to an existing, public 54-inch concrete pipe with a slope of approximately 0.019 ft/ft, flowing north. The estimated flow capacity of the 54-inch pipe flowing at a depth of 3.93' (water surface at proposed outfall connection point) is 90 CFS. No upstream or downstream analysis of the public storm system has been performed. We recommend the City of Albany Public Works department verify that this line has adequate conveyance capacity for this new site development, or require a basin analysis to verify the capacity. Should the control structure become plugged or the outfall is unable to convey large flows, the overland overflow route is shown in **Figure 6** below. The narrowest portion of the overland flow path was analyzed as for gutter flow spread for the 100-year, 24-hour peak flow using Hydraflow Express Extensions for AutoCAD Civil 3D. Results indicate that a spread width of 12.5 feet, with a depth of 0.13 feet is required to convey the 1.58 CFS 100-year, 24-hour peak flow. This flow is well below the top of curb at this location.

### Detention Pond Discharge Hydrographs

Discharge hydrographs from the underground detention facility are shown below for two scenarios:

- 1) Hydrograph 17: Underground pipe storage empty at the start of all storm events, and all control orifices fully functional (i.e. – normal operating conditions for facility)
- 2) Hydrograph 16: Underground pipe storage facility partially full to elevation 210.50 at start of all storm events. The control structure and underground storage pipes are assumed to be partially full to the invert elevation of the 3-inch orifice (elevation 210.50), assuming the lowest orifice is either non-functional (plugged), or the tailwater elevation public storm has reached approximately 87% of the depth of the public pipe.



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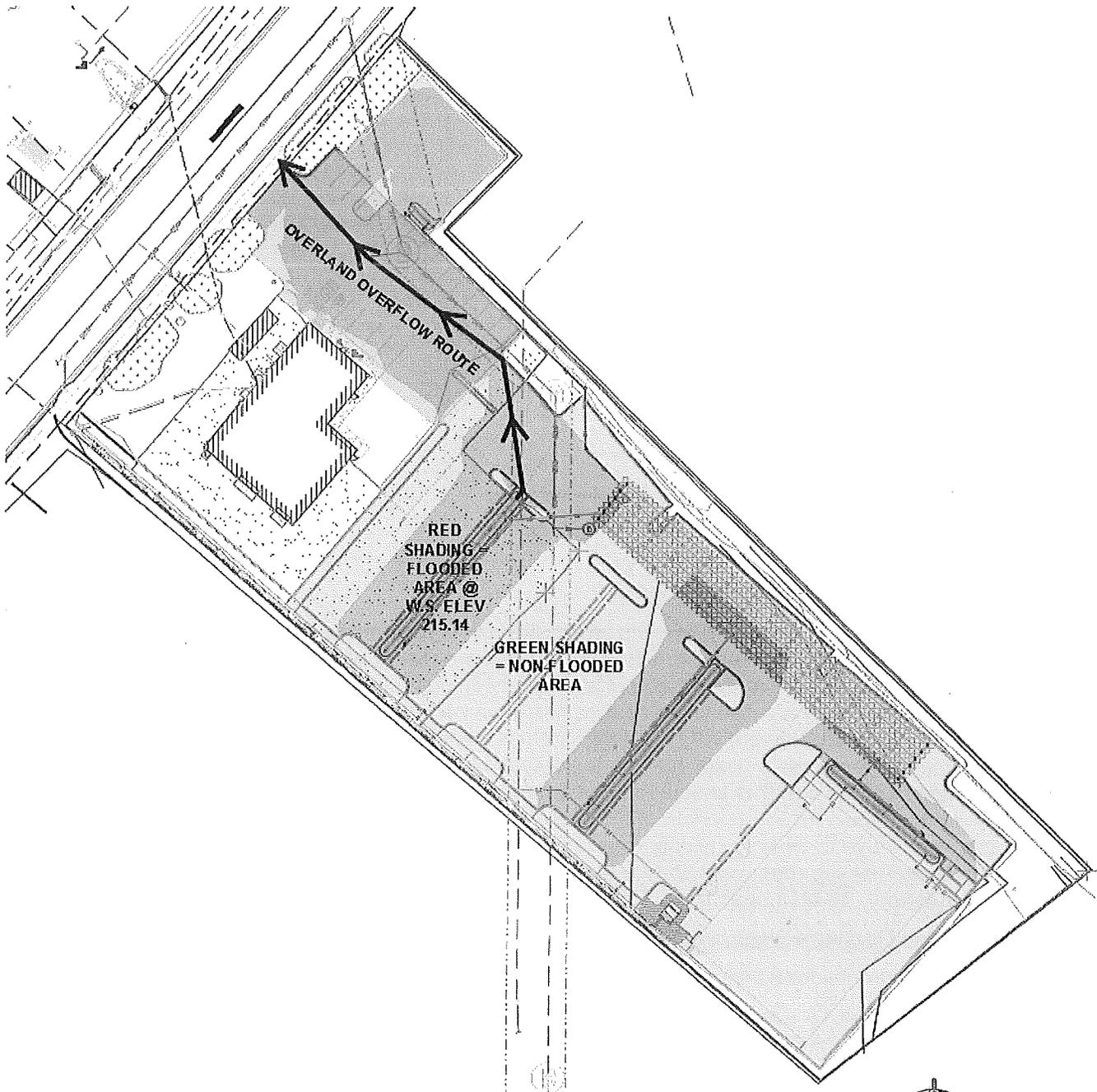
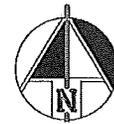


Figure 8: Overland Overflow Route





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## Overland Overflow Route – Gutter Flow Conveyance at Narrowest Section

### Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc.

Monday, May 23 2016

#### Overland Overflow Route (Narrowest Cross Section)

##### Gutter

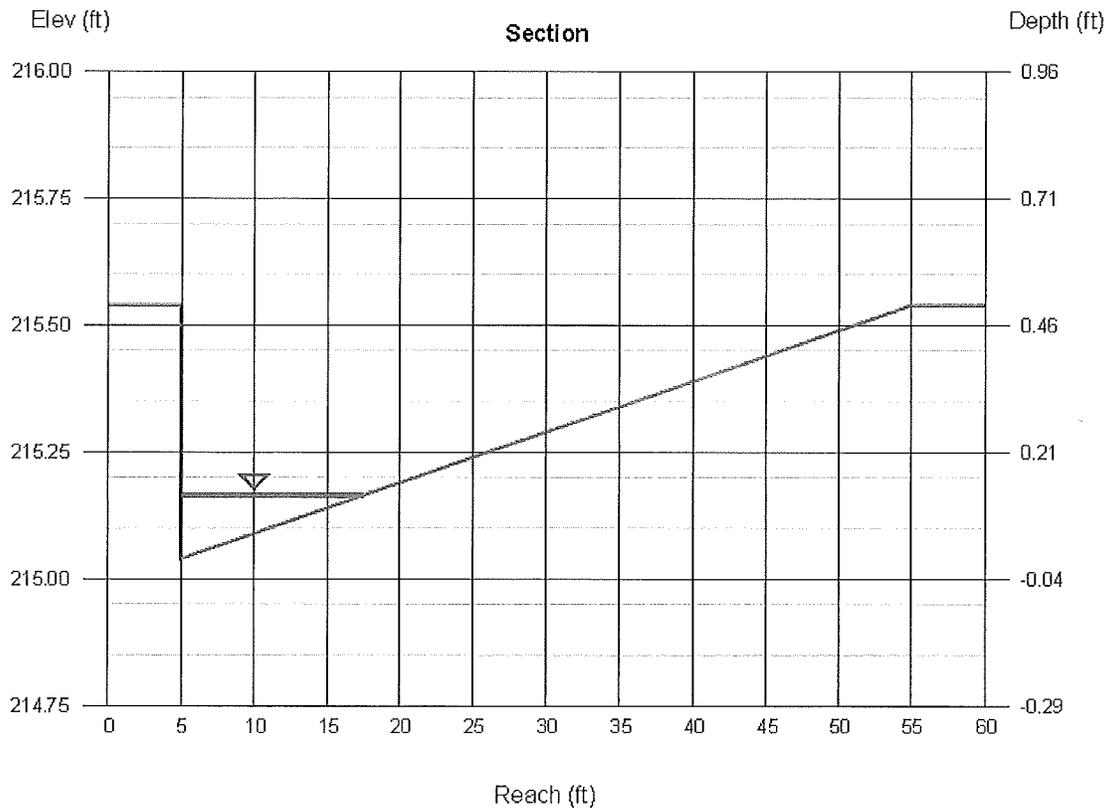
Cross Sl, S<sub>x</sub> (ft/ft) = 0.010  
 Cross Sl, S<sub>w</sub> (ft/ft) = 0.010  
 Gutter Width (ft) = 20.00  
 Invert Elev (ft) = 215.04  
 Slope (%) = 1.40  
 N-Value = 0.016

##### Calculations

Compute by: Known Q  
 Known Q (cfs) = 1.58

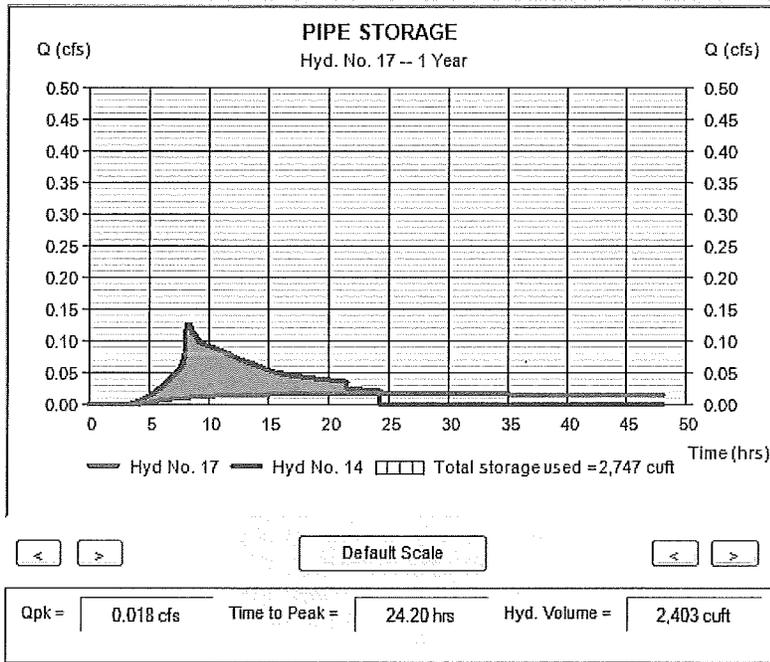
##### Highlighted

Depth (ft) = 0.13  
 Q (cfs) = 1.580  
 Area (sqft) = 0.78  
 Velocity (ft/s) = 2.02  
 Wetted Perim (ft) = 12.63  
 Crit Depth, Y<sub>c</sub> (ft) = 0.15  
 Spread Width (ft) = 12.50  
 EGL (ft) = 0.19

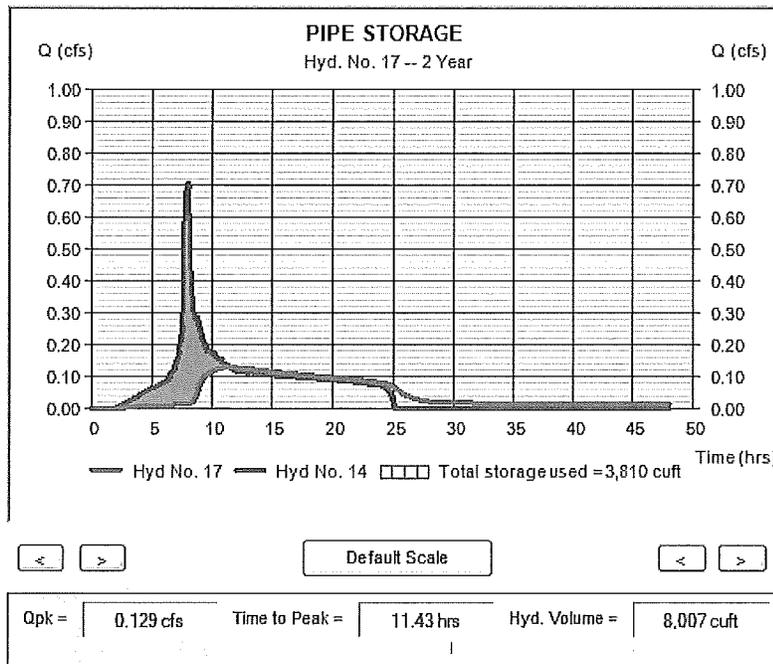




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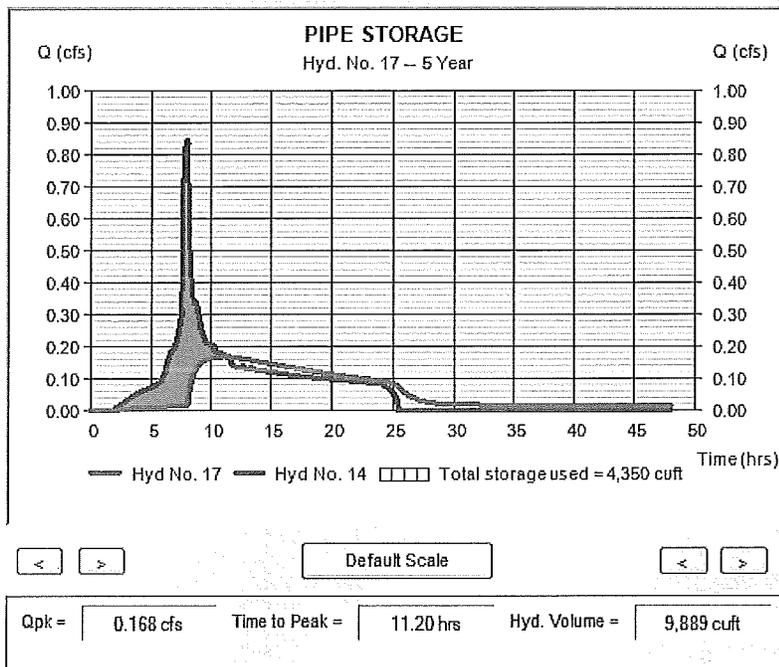
**Site C9 Detention**  
**for 50% of 2-yr Storm**  
**(normal functioning)**  
Tailwater Elev. = 209.00  
Storage WS Elev. = 210.49  
Pre-Dev Q<sub>1</sub> = 0.018 cfs  
Post-Dev Q<sub>1</sub> = 0.018 cfs  
50% of 2-Year Storm  
Flow Control OK



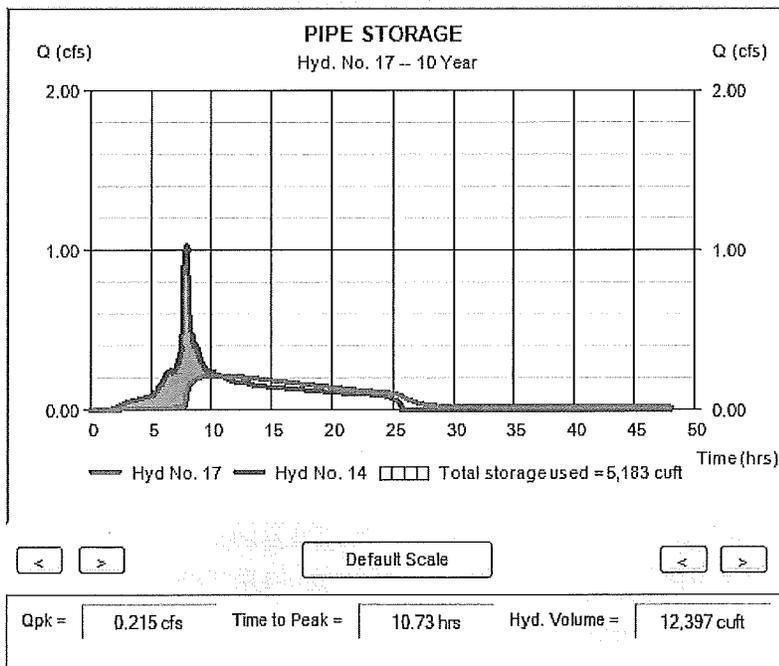
**Site C9 Detention**  
**for 2-yr Storm**  
**(normal functioning)**  
Tailwater Elev. = 209.00  
Storage WS Elev. = 210.84  
Pre-Dev Q<sub>2</sub> = 0.191 cfs  
Post-Dev Q<sub>2</sub> = 0.129 cfs  
2-Year Storm  
Flow Control OK



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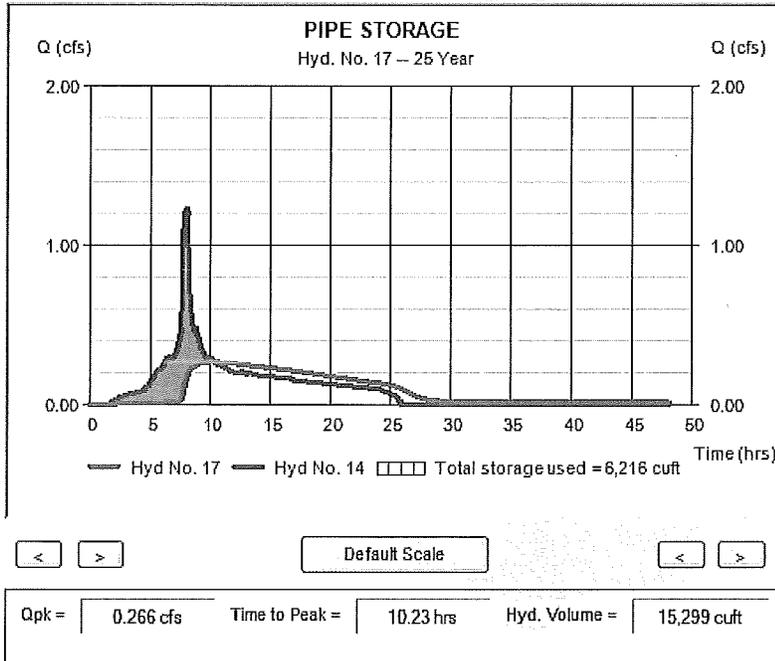
**Site C9 Detention  
for 5-yr Storm  
(normal functioning)**  
 Tailwater Elev. = 209.00  
 Storage WS Elev. = 211.02  
 Pre-Dev Q<sub>5</sub> = 0.274 cfs  
 Post-Dev Q<sub>5</sub> = 0.168 cfs  
5-Year Storm  
Flow Control OK



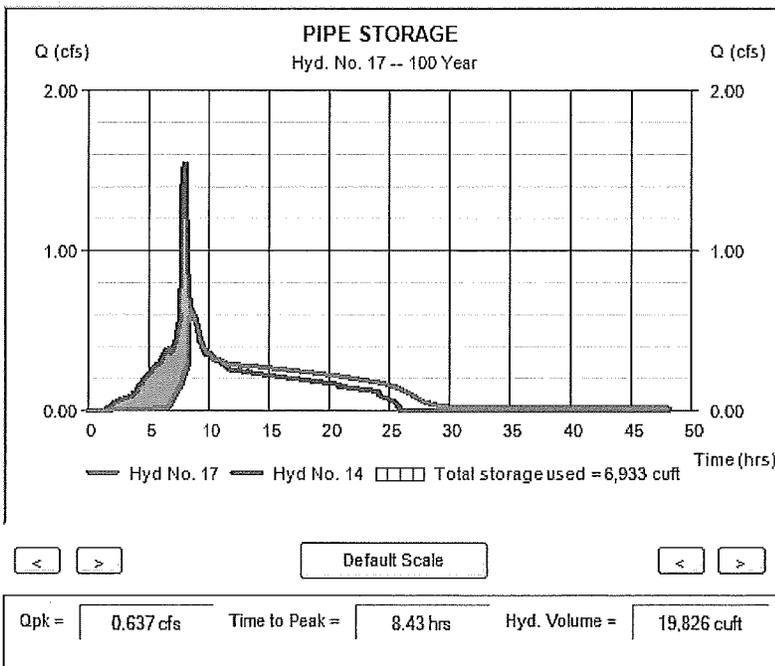
**Site C9 Detention  
for 10-yr Storm  
(normal functioning)**  
 Tailwater Elev. = 209.00  
 Storage WS Elev. = 211.30  
 Pre-Dev Q<sub>10</sub> = 0.393 cfs  
 Post-Dev Q<sub>10</sub> = 0.215 cfs  
10-Year Storm  
Flow Control OK



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**Site C9 Detention  
for 25-yr Storm  
(normal functioning)**  
 Tailwater Elev. = 209.00  
 Storage WS Elev. = 211.68  
 Pre-Dev Q<sub>25</sub> = 0.536 cfs  
 Post-Dev Q<sub>25</sub> = 0.266 cfs  
25-Year Storm  
Flow Control OK



**North Expansion Detention  
for 100-yr Storm  
(normal functioning)**  
 Tailwater Elev. = 209.00  
 Storage WS Elev. 212.03  
 Pre-Dev Q<sub>100</sub> = 0.722 cfs  
 Post-Dev Q<sub>100</sub> = 0.637 cfs  
100-Year Storm  
OK, no requirement for full  
flow control for 100-year event and  
peak flow is reasonable to prevent  
downstream damage by inspection



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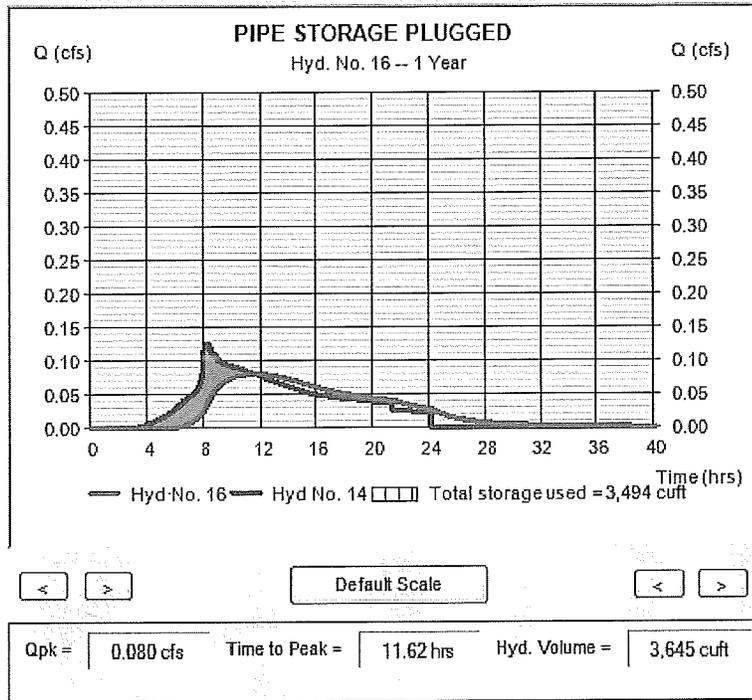
**Site C9 Detention  
for 50% of 2-yr Storm  
(control structure plugged)**

Tailwater Elev. = 210.48  
Storage WS Elev. = 210.74  
Pre-Dev  $Q_1 = 0.018$  cfs  
Post-Dev  $Q_1 = 0.080$  cfs

50% of 2-Year Storm  
Flow Control Not Required  
for this scenario. Show for  
reference purposes only.

Plugged control structure  
hydrographs are intended to  
demonstrate compliance with

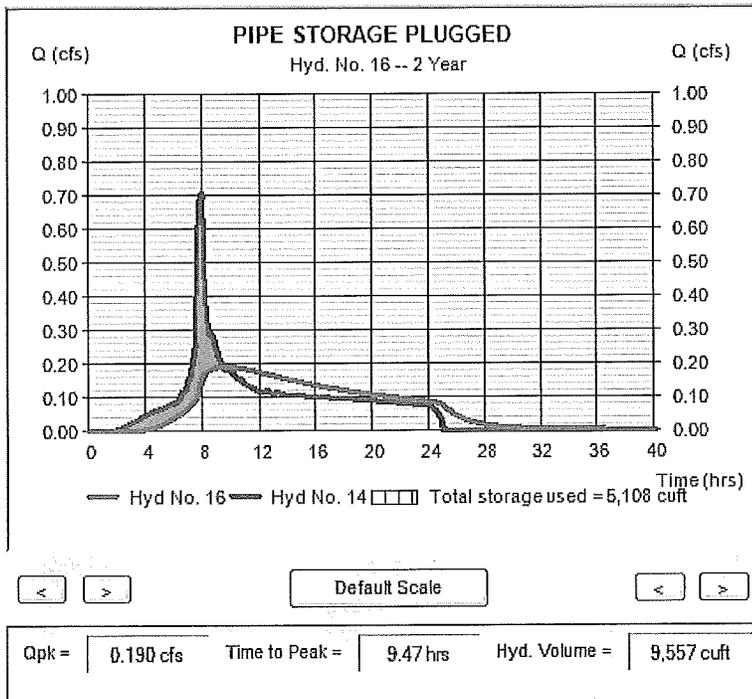
City of Albany detention  
requirements for min.  
orifice size for 2-year through  
25-year events only.



**Site C9 Detention  
for 2-yr Storm  
(control structure plugged)**

Tailwater Elev. = 210.48  
Storage WS Elev. = 211.27  
Pre-Dev  $Q_2 = 0.191$  cfs  
Post-Dev  $Q_2 = 0.190$  cfs

2-Year Storm  
Flow Control OK  
w/o 0.75" dia. orifice





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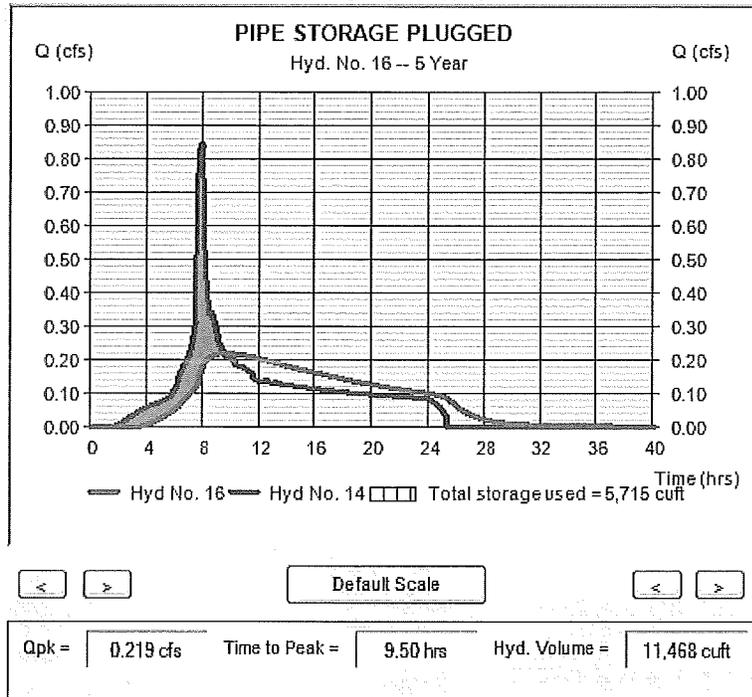
**Site C9 Detention  
for 5-yr Storm  
(control structure plugged)**

Tailwater Elev. = 210.48  
Storage WS Elev. = 211.48  
Pre-Dev  $Q_5 = 0.274$  cfs  
Post-Dev  $Q_5 = 0.219$  cfs

5-Year Storm

Flow Control OK

w/o 0.75" dia. orifice



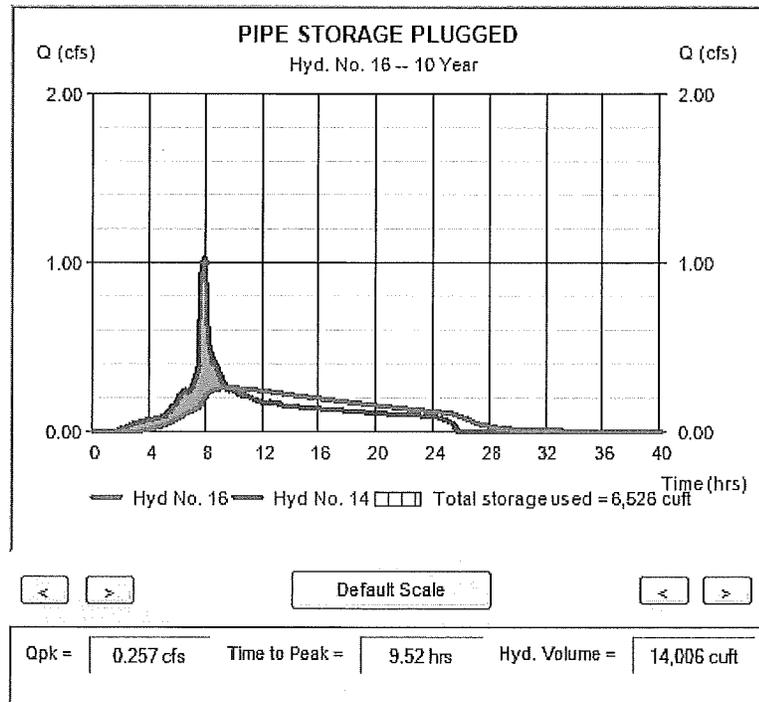
**Site C9 Detention  
for 10-yr Storm  
(control structure plugged)**

Tailwater Elev. = 210.48  
Storage WS Elev. = 211.81  
Pre-Dev  $Q_{10} = 0.393$  cfs  
Post-Dev  $Q_{10} = 0.257$  cfs

10-Year Storm

Flow Control OK

w/o 0.75" dia. orifice



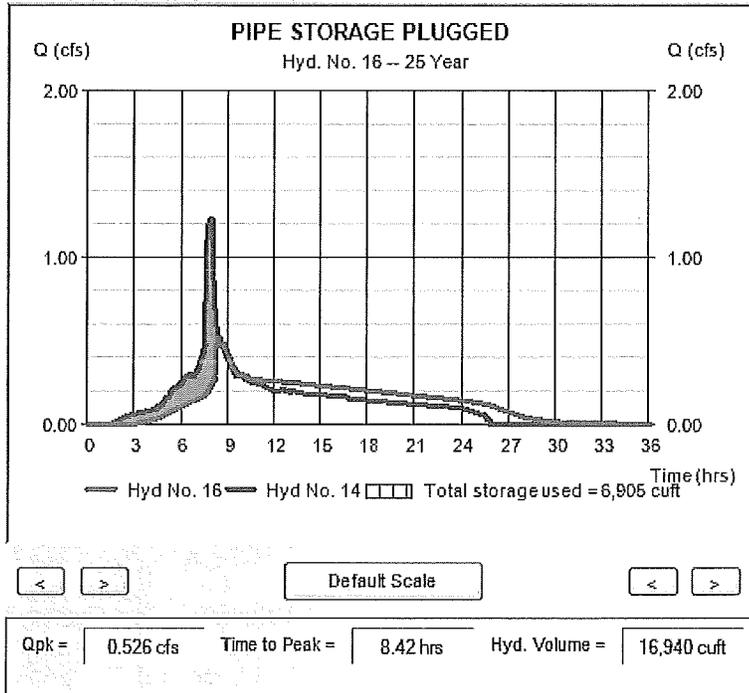


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**Site C9 Detention  
for 25-yr Storm  
(control structure plugged)**

Tailwater Elev. = 210.48  
Storage WS Elev. = 212.01  
Pre-Dev Q<sub>25</sub> = 0.536 cfs  
Post-Dev Q<sub>25</sub> = 0.526 cfs

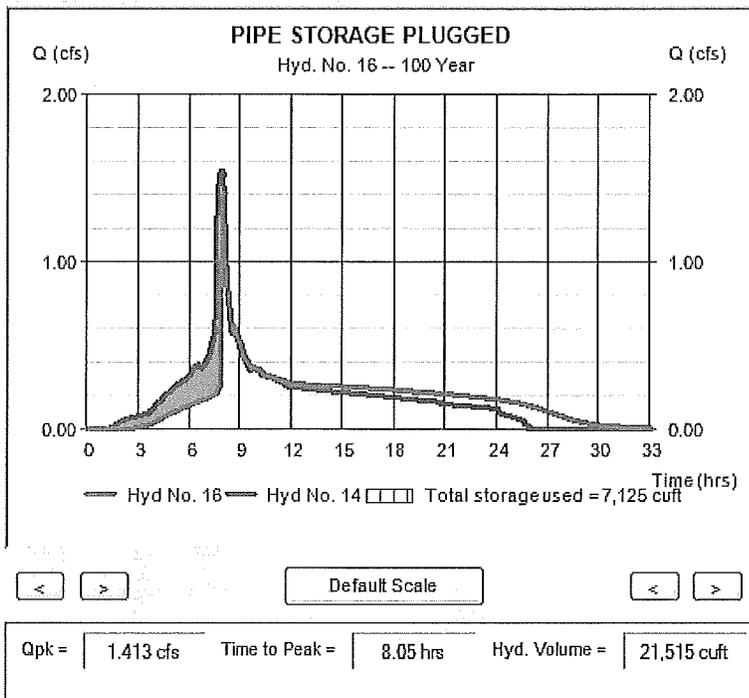
25-Year Storm  
Flow Control OK  
w/o 0.75" dia. orifice



**Site C9 Detention  
for 100-yr Storm  
(control structure plugged)**

Tailwater Elev. = 210.48  
Storage WS Elev. 212.16  
Pre-Dev Q<sub>100</sub> = 0.722 cfs  
Post-Dev Q<sub>100</sub> = 1.413 cfs

100-Year Storm  
OK, no requirement for full  
flow control for 100-year event





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### Summary of Pre vs. Post-Developed, 24-Hour Storm Peak Flows

Stormwater detention for the C9 Site is provided to limit post-developed peak discharges to levels not exceeding those of the pre-developed site, assuming good grass conditions and HSG D soils throughout for all considered SCS 24-hour storm events from the 50% of the 2-year event to the 100-year event, assuming normal function of the control structure (i.e. all orifices and riser weir free from plugging and not limited by tailwater elevation in the public storm main). The table below summarizes pre and post-developed flows from the development site for a normally functioning control structure that is not tailwater limited by the public stormwater main.

SCS 24-Hour Storm Event	Detention for Normal Function of Control Structure (Hydrograph 17 "Pipe Storage", Initial WS Elev. 209.00)			
	Pre-Developed	Post-Developed	Storage WS Elevation	Outfall Flow Routing
WQ (1-yr)	0.018 cfs	0.018 cfs	210.49	control structure 0.75" dia. orifice only
2-yr	0.191 cfs	0.129 cfs	210.84	control structure both 0.75" & 3" orifices
5-yr	0.274 cfs	0.168 cfs	211.02	control structure both 0.75" & 3" orifices
10-yr	0.393 cfs	0.215 cfs	211.30	control structure both 0.75" & 3" orifices
25-yr	0.536 cfs	0.266 cfs	211.68	control structure both 0.75" & 3" orifices
100-yr	0.772 cfs	0.637 cfs	212.03	control structure 12" dia. riser weir & both 0.75" & 3" orifices

The table below summarizes pre and post-developed flows from the development site for a partially filled storage facility condition at the start of the storm event, and a non-functional 0.75" diameter orifice (the lowest orifice on the control structure).

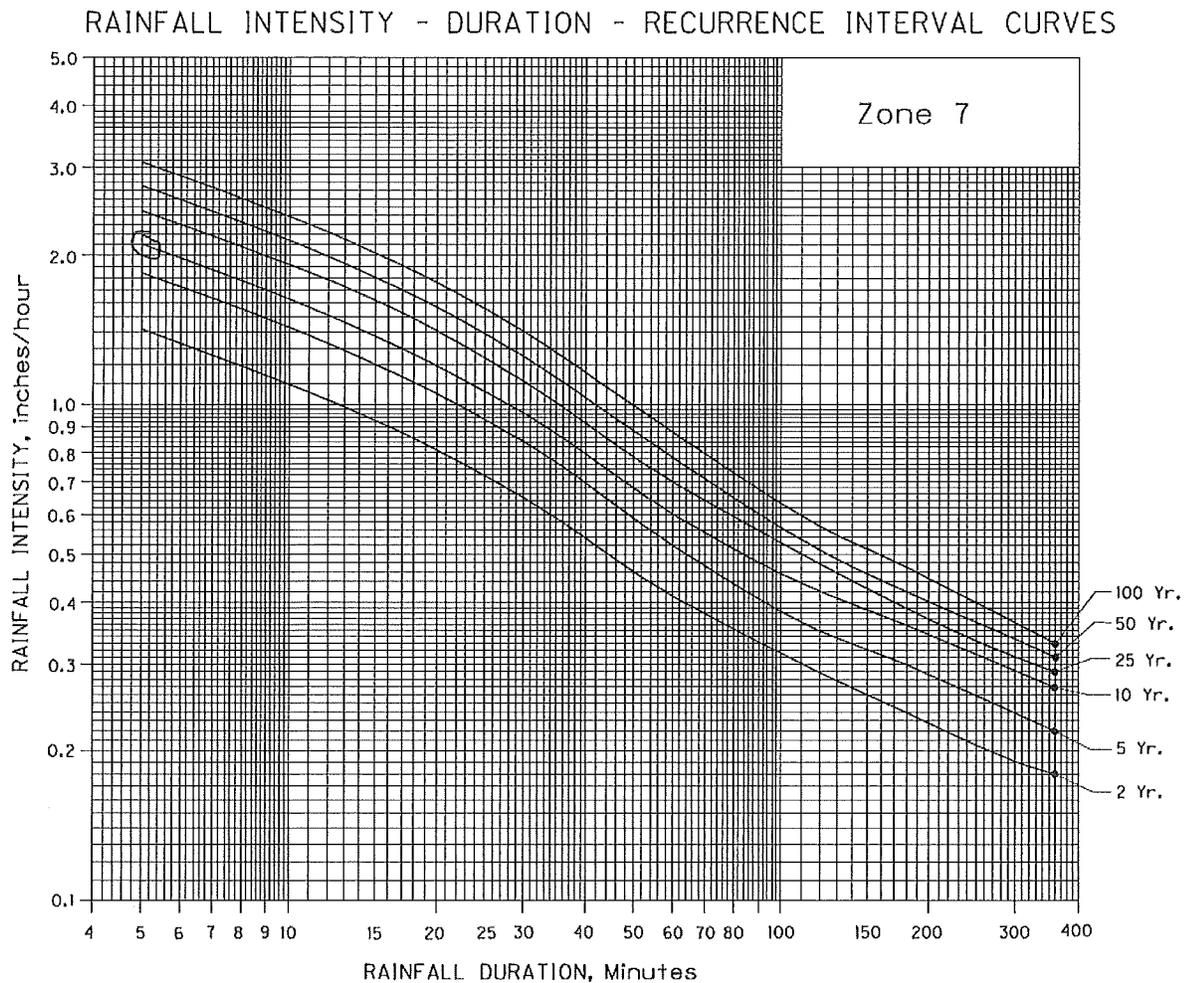
SCS 24-Hour Storm Event	Detention for Partially Filled Storage and Plugged 0.75" Orifice (Hydrograph 16 "Pipe Storage Plugged", Initial WS Elev. 210.48)			
	Pre-Developed	Post-Developed	Storage WS Elevation	Outfall Flow Routing
2-yr	0.191 cfs	0.191 cfs	211.27	control structure both 0.75" & 3" orifices
5-yr	0.274 cfs	0.219 cfs	211.48	control structure both 0.75" & 3" orifices
10-yr	0.393 cfs	0.257 cfs	211.81	control structure both 0.75" & 3" orifices
25-yr	0.536 cfs	0.526 cfs	212.01	control structure 12" dia. riser weir & both 0.75" & 3" orifices
100-yr	0.772 cfs	1.413 cfs	212.16	control structure 12" dia. riser weir & both 0.75" & 3" orifices



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**SECTION 6: STORMWATER CONVEYANCE DESIGN**

The rational method is used for sizing stormwater conveyance piping for the 10-year rainfall intensity using the ODOT Zone 7 IDF curve and a time of concentration of 5 minutes by inspection. Pipes sizes are checked using Manning’s equation for full-flow condition for conveyance capacity and minimum velocity criteria, assuming  $n=0.013$  for all pipes. Pipe sized based on the entire impervious area within each basin (reference Figure 4), using a run-off coefficient of 0.90.



Pipe 10-Year Peak Design Flows =  $Q_{10\text{rational}} = CiA = (0.9)(2.1 \text{ in/hr})(A) = 1.89(A)$

Stormwater Conveyance – Rational Method 10-Yr Peak Flows				
	SB-1	SB-2	SB-3	SB-4
Area, A	0.36 acre	0.46 acre	0.41 acre	0.065 acre
Peak Flow, Q10	0.68 CFS	0.87 CFS	0.77 CFS	0.12 CFS



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Pipe Sizing Diagram for New C9 Site Stormwater Conveyance Piping

A summary view of the stormwater conveyance pipe is shown in **Figure 9** below. Surface water is collected in each of the four water quality swales on the site, and either infiltrates into the rock layer and is intercepted by the perforated pipe, or fills the swales sufficiently to flow into 4-inch riser drains with inlet rim elevations set 6 inches above the bottom of the water quality swales. There 4" collection pipes from the swales connect into 10-inch underground conveyance pipes, which route stormwater to the underground pipe detention facility.

- |  |   |
|--|---|
| <p><b>SHEET NOTES:</b></p> <p>A) STORMWATER QUALITY SWALES ARE "ONSITE SWALES" DESIGNED IN ACCORDANCE WITH CITY OF ALBANY ENGINEERING STANDARDS. SEE SHEET SK-11B FOR STANDARD DETAIL. 4" DRAINS CONNECT TO 10 DIA. UNDERGROUND STORM PIPES AND CONVEY ALL COLLECTED WATER TO THE UNDERGROUND DETENTION PIPES.</p> <p>B) SEE SHEET SK-11C FOR STORMWATER CONTROL STRUCTURE MANHOLE DETAIL.</p> <p>C) SEE SHEET SK-11D &amp; SK-11E FOR TABULATED STORMWATER PIPE DESIGN DATA.</p> <p>D) CLEAN OUT INSTALLED EVERY 100' MAXIMUM</p> | <ul style="list-style-type: none"> <li>① STORMWATER CONTROL STRUCTURE MH</li> <li>② DETENTION GALLERY</li> <li>③ STORMWATER QUALITY SWALE #1</li> <li>④ STORMWATER QUALITY SWALE #2</li> <li>⑤ STORMWATER QUALITY SWALE #3</li> <li>⑥ STORMWATER QUALITY SWALE #4</li> <li>⑦ TRENCH DRAIN</li> <li>⑧ 4" PVC PIPE</li> <li>⑨ 3" PVC SIDEWALK WEEP</li> <li>⑩ (E) B5 STORMWATER BASIN TO REMAIN UNMODIFIED</li> </ul> |
|--|---|

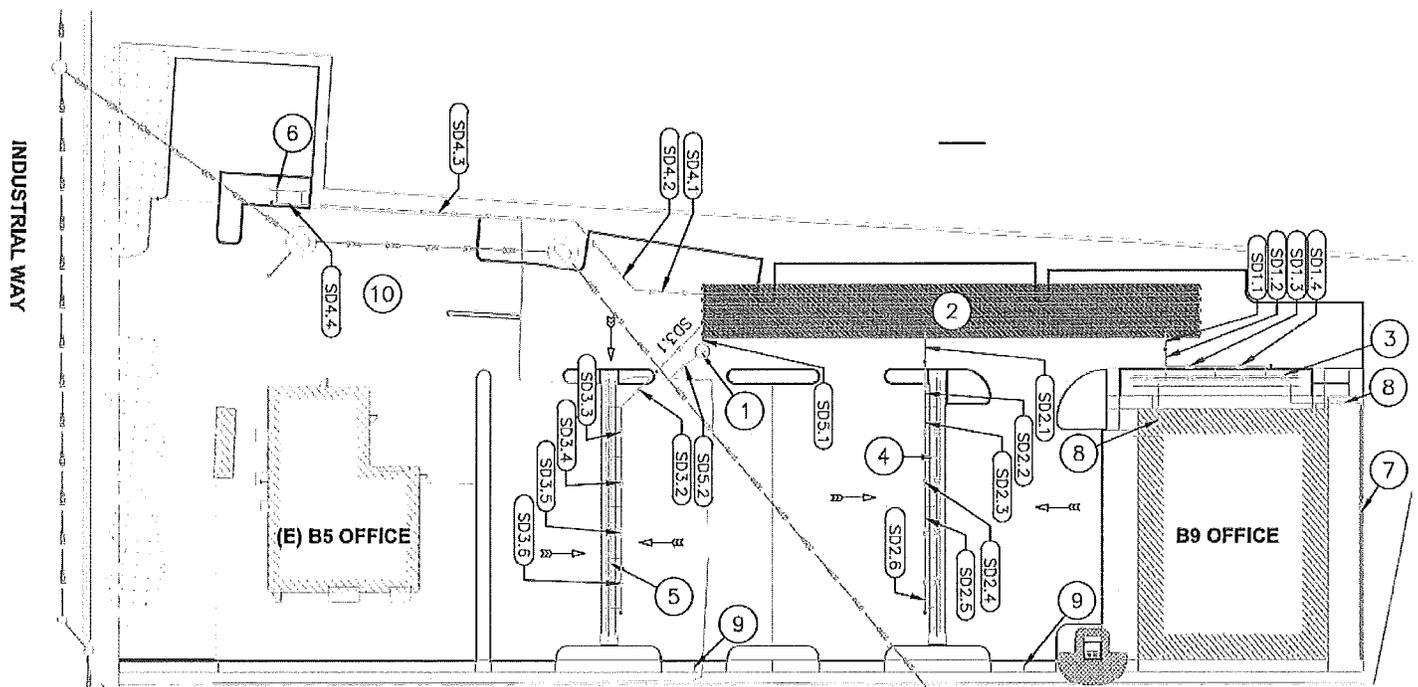


Figure 9: Stormwater Conveyance Summary Plan



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STORMWATER PIPE DATA TABLE							
NAME	SIZE	LENGTH	SLOPE	I.E. START/END	Q10	Q(full)	V(full)
SD1.1	10"	6.50'	0.50%	I.E.(SDC1.1)=210.68 I.E.(DET 1)=210.64	0.680 cfs	1.553 cfs (n=0.013)	2.848 fps
SD1.2	10"	6.50'	0.50%	I.E.(SDF1.2)=210.71 I.E.(SDC1.1)=210.67	0.680 cfs	1.553 cfs (n=0.013)	2.848 fps
SD1.3	10"	20.00'	0.50%	I.E.(SDF 1.3)=210.80 I.E.(SDF1.2)=210.70	0.680 cfs	1.553 cfs (n=0.013)	2.848 fps
SD1.4	10"	20.00'	0.50%	I.E.(SDF1.4)=210.90 I.E.(SDF 1.3)=210.80	0.680 cfs	1.553 cfs (n=0.013)	2.848 fps
SD2.1	10"	11.25'	0.50%	I.E.(SDC2.1)=210.42 I.E.(DET 2)=210.36	0.870 cfs	1.553 cfs (n=0.013)	2.848 fps
SD2.2	10"	18.00'	0.50%	I.E.(SDF2.2)=210.51 I.E.(SDC2.1)=210.42	0.870 cfs	1.553 cfs (n=0.013)	2.848 fps
SD2.3	10"	20.00'	0.50%	I.E.(SDF2.3)=210.61 I.E.(SDF2.2)=210.51	0.870 cfs	1.553 cfs (n=0.013)	2.848 fps
SD2.4	10"	20.00'	0.50%	I.E.(SDF2.4)=210.71 I.E.(SDF2.3)=210.61	0.870 cfs	1.553 cfs (n=0.013)	2.848 fps
SD2.5	10"	20.00'	0.50%	I.E.(SDF2.5)=210.81 I.E.(SDF2.4)=210.71	0.870 cfs	1.553 cfs (n=0.013)	2.848 fps
SD2.6	10"	20.00'	0.50%	I.E.(SDF2.6)=210.81 I.E.(SDF2.5)=210.81	0.870 cfs	1.553 cfs (n=0.013)	2.848 fps
SD3.1	10"	26.32'	0.50%	I.E.(SDC3.1)=210.21 I.E.(DET 3)=210.08	0.770 cfs	1.553 cfs (n=0.013)	2.848 fps
SD3.2	10"	20.00'	0.50%	I.E.(SDF3.2)=210.31 I.E.(SDC3.1)=210.21	0.770 cfs	1.553 cfs (n=0.013)	2.848 fps
SD3.3	10"	20.00'	0.50%	I.E.(SDF3.3)=210.41 I.E.(SDF3.2)=210.31	0.770 cfs	1.553 cfs (n=0.013)	2.848 fps
SD3.4	10"	20.00'	0.50%	I.E.(SDF3.4)=210.51 I.E.(SDF3.3)=210.41	0.770 cfs	1.553 cfs (n=0.013)	2.848 fps
SD3.5	10"	20.00'	0.50%	I.E.(SDF3.5)=210.61 I.E.(SDF3.4)=210.51	0.770 cfs	1.553 cfs (n=0.013)	2.848 fps
SD3.6	10"	20.00'	0.50%	I.E.(SDF3.6)=210.71 I.E.(SDF3.5)=210.61	0.770 cfs	1.553 cfs (n=0.013)	2.848 fps
SD4.1	10"	27.27'	0.50%	I.E.(SDF4.1)=210.11 I.E.(DET 4)=209.98	0.120 cfs	1.553 cfs (n=0.013)	2.848 fps
SD4.2	10"	36.86'	0.50%	I.E.(SDF4.2)=210.29 I.E.(SDF4.1)=210.11	0.120 cfs	1.553 cfs (n=0.013)	2.848 fps
SD4.3	10"	109.88'	0.50%	I.E.(SDF4.3)=210.84 I.E.(SDF4.2)=210.29	0.120 cfs	1.553 cfs (n=0.013)	2.848 fps
SD4.4	10"	10.00'	0.50%	I.E.(SDF4.4)=210.89 I.E.(SDF4.3)=210.84	0.120 cfs	1.553 cfs (n=0.013)	2.848 fps
SD5.1	12"	7.00'	1.00%	I.E.(FL CTRL MH)=208.93 I.E.(DET 5)=209.00	2.820 cfs	3.572 cfs (n=0.013)	4.548 fps
SD5.2	12"	17.69'	1.02%	I.E.(PUBMAIN)=208.82 I.E.(FL CTRL MH)=209.00	2.820 cfs	3.604 cfs (n=0.013)	4.588 fps

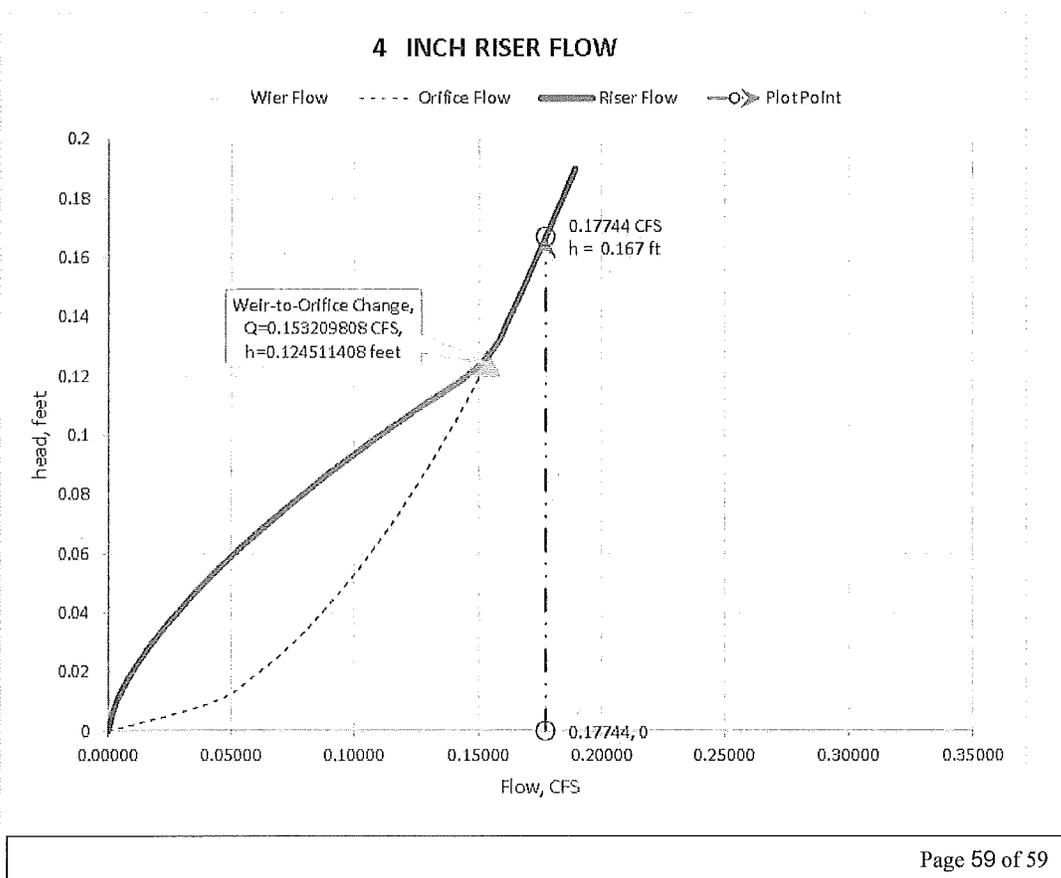


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### Stormwater Quality Swale Riser Drain Conveyance Capacity Check

Four-inch riser overflow drains are used to convey flows exceeding the infiltration capacity of the stormwater quality swales. The number of risers required has been selected based on peak flows predicted by the larger of the flows calculated using the Rational Method 10-year peak flow or the SCS Method, 24-hour, 100-year peak flows from each basin prior to detention, assuming that none of the stormwater is conveyed to the horizontal subdrain leaders by infiltration, and 2 inches of head. The flow capacity of a single riser drain is shown in the chart below as 0.17744 CFS with a 2-inch head. The larger of the two total design flows considered is divided by this number to determine the number of overflow drains required in each swale. The minimum slope for a horizontal lateral to carry the maximum riser flow is 0.8%. All laterals from the water quality swales meet this minimum slope, and in most cases greatly exceed it.

Water Quality Swale Overflow Riser Flows (assuming no infiltration)				
	SB-1	SB-2	SB-3	SB-4
<b>Area, A</b>	0.36 acre	0.46 acre	0.41 acre	0.065 acre
<b>Rational Method 10-Year Peak Flow, Q10</b>	0.680 CFS	0.870 CFS	0.770 CFS	0.120 CFS
<b>SCS Method 100-Year Peak Flow w/o Detention</b>	0.413 cfs	0.540 cfs	0.520 cfs	0.090 cfs
<b># of 4-Inch Overflow Risers Required</b>	3.8 req'd USE 4	4.9 req'd USE 5	4.3 req'd USE 5	0.7 req'd USE 2





# Oregon

Kate Brown, Governor

## Department of State Lands

775 Summer Street NE, Suite 100

Salem, OR 97301-1279

(503) 986-5200

FAX (503) 378-4844

[www.oregon.gov/dsl](http://www.oregon.gov/dsl)

May 11, 2015

State Land Board

W.R Grace and Co.  
Attn: Shawn Conway  
1290 Industrial Way  
Albany, OR 97322

Kate Brown  
Governor

Re: WD #2015-0039 Wetland Delineation Report for  
W.R. Grace and Co.  
Linn County; T 11S R 3W S 7 TL 2626  
Albany Oak Creek/Calapooia Area Local Wetland Inventory

Jeanne P. Atkins  
Secretary of State

Ted Wheeler  
State Treasurer

Dear Mr. Conway:

The Department of State Lands has reviewed the wetland delineation report prepared by Pacific Habitat Services Inc. for the site referenced above. Based upon the information presented in the report, we concur with the wetland boundaries as mapped in Figure 6 of the report. Please replace all copies of the preliminary wetland map with this final Department-approved map. Within the study area, three wetlands, totaling approximately 0.59 acres were identified.

The wetlands are subject to the permit requirements of the state Removal-Fill Law. Under current regulations, a state permit is required for cumulative fill or annual excavation of 50 cubic yards or more in the wetlands or below the ordinary high water line (OHWL) of a waterway (or the 2 year recurrence interval flood elevation if OHWL cannot be determined).

This concurrence is for purposes of the state Removal-Fill Law only. Federal or local permit requirements may apply as well. The Army Corps of Engineers will review the report and make a determination of jurisdiction for purposes of the Clean Water Act at the time that a permit application is submitted. We recommend that you attach a copy of this concurrence letter to both copies of any subsequent joint permit application to speed application review.

Please be advised that state law establishes a preference for avoidance of wetland impacts. Because measures to avoid and minimize wetland impacts may include reconfiguring parcel layout and size or development design, we recommend that you work with Department staff on appropriate site design before completing the city or county land use approval process.

This concurrence is based on information provided to the agency. The jurisdictional determination is valid for five years from the date of this letter unless new information necessitates a revision. Circumstances under which the Department may change a determination are found in OAR 141-090-0045 (available on our web site or upon request). In addition, laws enacted by the legislature and/or rules adopted by the Department may result in a change in jurisdiction; individuals and applicants are subject to the regulations that are in effect at the time of the removal-fill activity or complete permit application. The applicant, landowner, or agent may submit a request for reconsideration of this determination in writing within six months of the date of this letter.

Thank you for having the site evaluated. Please phone me at 503-986-5218 if you have any questions.

Sincerely,



Lauren Brown  
Jurisdiction Coordinator

Approved by



Kathy Verble, CPSS  
Aquatic Resource Specialist

Enclosures

ec: Amy Hawkins, Pacific Habitat Services Inc  
Albany Planning Department (Maps enclosed for updating LWI)  
Andrea Wagner, Corps of Engineers  
Charles Redon, DSL