City of West Linn
Planning & Development • 22500 Salamo Rd #1000 • West Linn, Oregon 97068
Telephone 503.656.4211 • Fax 503.656.4106 • westlinnoregon.gov

DEVELOPMENT REVIEW APPLICATION

For Office Use Only		
STAFF CONTACT	PROJECT NO(S).	
NON-REFUNDABLE FEE(S)	REFUNDABLE DEPOSIT(S)	TOTAL

Type of Review (Please check all that apply):

- ☐ Annexation (ANX)
- ☐ Appeal and Review (AP) *
- ☐ Conditional Use (CUP)
- ☒ Design Review (DR)
- ☐ Easement Vacation
- ☐ Extraterritorial Ext. of Utilities
- ☐ Final Plat or Plan (FP)
- ☐ Flood Management Area
- ☐ Hillside Protection & Erosion Control
- ☐ Historic Review
- ☐ Legislative Plan or Change
- ☐ Lot Line Adjustment (LLA) */**
- ☐ Minor Partition (MIP) (Preliminary Plat or Plan)
- ☐ Non-Conforming Lots, Uses & Structures
- ☐ Planned Unit Development (PUD)
- ☐ Pre-Application Conference (PA) */**
- ☐ Street Vacation
- ☐ Subdivision (SUB)
- ☐ Temporary Uses *
- ☐ Time Extension *
- ☐ Variance (VAR)
- ☐ Water Resource Area Protection/Single Lot (WAP)
- ☐ Water Resource Area Protection/Wetland (WAP)
- ☐ Willamette & Tualatin River Greenway (WRG)
- ☐ Zone Change

Home Occupation, Pre-Application, Sidewalk Use, Sign Review Permit, and Temporary Sign Permit applications require different or additional application forms, available on the City website or at City Hall.

Site Location/Address:
19080 WILLAMETTE DRIVE, WEST LINN, OR

Assessor's Map No.: **21 E 23 AA**
Tax Lot(s): **00360656 & 674**
Total Land Area: **+/- 0.87 Acres**

Brief Description of Proposal: **DEMOLISH EXISTING KASCH'S NURSERY. CONSTRUCT +/- 4,335 SF, ONE-STORY CHASE BANK BRANCH WITH REMOTE 3-LANE DRIVE-THRU (2 VAT & 1 ATM) TOGETHER WITH ASSOCIATED SITE IMPROVEMENTS, LANDSCAPING, AND REQUIRED FRONTAGE IMPROVEMENTS.**

Applicant Name: (please print) **JP MORGAN CHASE, N/A (STEPHEN CARY)** Phone: **253-305-5034**
Address: **10011 GRAVELLY LAKE DR. SW – 2ND FLOOR** Email: **stephen.cary@chase.com**
City State Zip: **LAKEWOOD, WA 98499**

Owner Name (required): (please print) Florence Ellen Ethington Phone: 208-398-7716
Address: 3777 LA AVE Email:
City State Zip: Emmett, Idaho 83617

Consultant Name: (please print) **CALLISON ARCHITECTS, P.C.(HANS CHRISTIANSEN)** Phone: **206-623-4646**
Address: **1420 FIFTH AVENUE, SUITE 2400** Email:
City State Zip: **SEATTLE, WA 98101** **hans.christiansen@callison.com**

1. All application fees are non-refundable (excluding deposit). Any overruns to deposit will result in additional billing.
2. The owner/applicant or their representative should be present at all public hearings.
3. A denial or approval may be reversed on appeal. No permit will be in effect until the appeal period has expired.
4. Three (3) complete hard-copy sets (single sided) of application materials must be submitted with this application. One (1) complete set of digital application materials must also be submitted on CD in PDF format. If large sets of plans are required in application please submit only two sets.

* No CD required / ** Only one hard-copy set needed

The undersigned property owner(s) hereby authorizes the filing of this application, and authorizes on site review by authorized staff. I hereby agree to comply with all code requirements applicable to my application. Acceptance of this application does not infer a complete submittal. All amendments to the Community Development Code and to other regulations adopted after the application is approved shall be enforced where applicable. Approved applications and subsequent development is not vested under the provisions in place at the time of the initial application.

Applicant's signature 2-16-12 Date Florence Ellen Ethington Owner's signature *(required)* February 7, 2012 Date 2012

CALLISON

February 23, 2012

Mr. Peter Spir
Associate Planner
City of West Linn
22500 Salamo Rd.
West Linn, OR 97068

Re: Chase – Cedar Oak & Willamette, 19080 Willamette Drive, West Linn, OR
210461.89
Class II Design Review Application & Transparency Exception Request

Dear Mr. Peter Spir:

On behalf of JPMorgan Chase, N.A. we are submitting the attached Class II Design Review Application & Variance Request for the proposed Chase – Cedar Oak & Willamette project located at 19080 Willamette Drive, West Linn, OR. Below we have provided a list of our submittal materials and the Narrative for the Class II Design Review Application followed by the Narrative for our Transparency Exception Request.

CLASS II DESIGN REVIEW APPLICATION:

Application materials included with this submittal are as follows:

3-copies	Architectural Drawings (Site Plan, A0.1; Floor Plan, A1.1; & Elevations, A4.1, A4.2, & A4.3
3-copies	Color Building Elevations
3-copies	Preliminary Development Plan (Civil, Utilities & Grading), 1 of 1
3-copies	ALTA Survey (Existing Conditions), 1 of 1, dated 8/22/11
3-copies	Landscape Plan (L-1) & Irrigation Plan (L-2)
3-copies	Site Electrical Plan (Lighting), SE1.0
3-copies	Site Photometric Plan (Lighting), SP1.0
1-set	Exterior Building Material Samples with colors included
3-copies	Preliminary Sign Plan (**to follow under separate cover**)
1-copy	Preliminary Drainage Analysis, 2/13/12
3-copies	Traffic Impact Analysis (**to follow under separate cover**)
3-copies	Noise Study, 2/22/12
3-copies	Neighborhood Meeting Minutes (Robinwood Neighborhood Association- **to follow under separate cover**) 2/14/12
1-CD	Neighborhood Meeting Audio Recording
1-copy	Copy of Letter to officers of association w/copies of return receipt (President & VP).
1-copy	Mailing Label List (and supporting documentation from First American Title)
1-copy	Letter to Neighborhood Association

1420 FIFTH AVENUE #2400 SEATTLE, WASHINGTON 98101-2343
T 206 623 4646 F 206 623 4625 www.callison.com

1-copy	Notice of Proposed Development (required posted notice)
1-copy	Affidavit of Posting

All drawings are dated 2/23/12 unless noted above. Drawings submitted include full size and 11" x 17" as required.

CLASS II DESIGN REVIEW NARRATIVE:

Basic Project Description:

Overview: The proposed project site is zoned GC – General Commercial. The proposal is as follows: Demolish former Kasch's nursery building and site improvements. Construct a 4,335 SF, 1-story Chase Bank Branch with remote 3-lane drive-thru. The Drive-thru will consist of 2 VAT (Vacuum Assisted Tellers) and 1-ATM. The project will also include construction of site improvements including but not limited to, on-site parking for 14-vehilces, onsite pedestrian walkway, trash enclosure, landscaping, and site lighting. As required by the City of West Linn the project proposes to replace the existing curb and sidewalk along the project frontage on Willamette Drive, with new curb and 12' sidewalk. Three tree wells are also provided along the project frontage.

Site Access: Primary vehicle access will be via an existing shared driveway with the 7-11 (along SE Boundary of Site); however the project will also have access via the retail project to the northeast of the site, as required by the City of West Linn. Parking will be at the rear of the building. The project will also be providing bicycle parking at the storefront, as well as additional plaza area between the sidewalk and building to enhance bicycle and pedestrian accessibility.

Hours of Operation: Bank hours of operation are Monday –Friday 9AM-6PM, Saturday 9AM-1PM. ATM's at the building and Drive-thru ATM are operational 24hrs, all days of the week.

Building Design: The Chase building incorporates cast stone veneer, brick, and stucco as the primary exterior building materials. A hipped roof tower element emphasizes the primary building entrance on Willamette Drive and provides additional interest to the building design. The building includes modulation and changes in materials to provide architectural interest. As required by code the building incorporates flat canopies along the length of the storefront. Additionally, blue metal canopies are provided over widows on the side and rear elevations. And a flat canopy, matching the storefront canopy is provided over the rear entry. The drive-thru canopy structure is finished with similar materials to the Bank branch to provide uniformity in design.

CDC 55.100 Approval Standards – Class II Design Review

A. Provisions for the following chapters shall be met:

1. Chapter 33 CDC. A Preliminary Drainage Analysis was included with this application. In addition, the preliminary stormdrainage configuration is reflected on the Preliminary Development Plan, 1 of 1 included with this application.

2. Chapter 34 CDC. The property is commercially zoned. While we believe that Chapter 34 CDC is not applicable to this project because of the zoning of the property, the remote drive-through canopy could be considered an accessory structure and it should therefore be noted that the drive-through canopy complies with section *34.060 Setback Provisions For Accessory Structures (Non-Dwelling)* by meeting all of the applicable requirements for the principal use.

3. Chapter 38 CDC. We have reviewed Chapter 38 CDC and do not believe any of the sections of this chapter to be applicable to the project.

4. Chapter 40 CDC. The proposed Chase Bank Branch building's maximum height is 26'-6" above finished grade. The proposed drive-thru canopy's maximum height above finished grade is 14'-10". Neither structure exceeds the 45' maximum height allowed by the GC zone for structures located 50' or more from a low or medium density residential zone.

5. Chapter 42 CDC. The project site has been configured so that the site's primary access from Willamette Drive meets the 30' clear vision area required under section 42.040.

6. Chapter 44 CDC. There are currently no new fences proposed in conjunction with the proposed project. The proposed Trash Enclosure will be screened with a CMU walls and metal frame gates clad with wood pickets, which will meet the requirements of section 44.030.

7. Chapter 46 CDC. As required by Chapter 46, off-street parking is located at the rear of the site. Based on the building square footage (4,335 SF) 12 parking spaces are allowed by code. The project will provide 14 parking stalls, which falls within the 10% maximum increase allowed by this Chapter. 7-standard stalls (2 will be accessible, one of which is van accessible) and 7-compact stalls will be provided. Compact stalls are identified on the Site Plan, A0.1. and Preliminary Development Plan, 1of 1.

   4 stacking spaces per drive-through lane are provided, which exceeds the requirements of this chapter for *Drive-in banks*.

   Off-street loading requirements are not applicable to this project, nor does the bank require loading spaces.

   2 covered bicycle parking spaces are provided within 50 of the primary building entrance which meets and exceeds the bicycle parking requirements of this chapter. Bicycle parking cover is provided for by the storefront canopies.

   We have reviewed the remainder of Chapter 46 CDC and believe the project meets all of the remaining, applicable, requirements of the code.

8. Chapter 48 CDC. The proposed project proposes to retain the existing point of access as the primary access to the site; which is a shared drive way with the 7-11 development located southeasterly of the site.

It is important to note that the proposed drive-through will exit at the point where the shared access turns northwesterly onto the project site. To eliminate potential vehicular conflicts a "STOP" marking with stop bar is indicated at the exit of the drive-thru with "EXIT ONLY" marking indicated on the opposite side of the stop bar. Additionally, directional arrows are provided along the drive aisles and parking lot to indicate acceptable flow of traffic.

It is our understanding that the development to the northwest of the site was required to provide provision for access to and from the Chase project site. As a result, the proposed site configuration reflects cross access with the commercial development to the northwest of the site. Because the connection shown to the development to the northwest connects to an existing parking area, the connection point is shown as 23' wide, which meets the parking lot drive-aisle dimensional minimum width.

The project is built as close to the Willamette Drive right-of-way as possible to facilitate pedestrian and bicycle access. As discussed previously, the project will also be providing bicycle parking at the storefront, as well as additional plaza area between the sidewalk and building to enhance bicycle and pedestrian accessibility.

9. Chapter 52 CDC. Signage will be submitted under separate cover to follow. Chase's signage consultant will respond to the applicable sections of this Chapter when the signage plans are submitted.

10. Chapter 54 CDC. More than 20% of the gross site area will be landscaped. More than 5% of the interior parking lot area is landscaped. A combined 5' wide landscape area is provided adjacent to the 7-11site beyond where the shared access terminates. A combined landscape area greater than 5' in width is provided adjacent to the commercial development to the northwest of the site. A large 50' or greater landscape area is provided at the rear of the site, adjacent to the multi-family development to the northeast. We have reviewed the remainder of Chapter 54 CDC and believe the project meets all of the remaining, applicable, requirements of the code.

B. Relationship to the natural and physical environment

1.& 2.

As discussed in the City's June 2, 2011 Revised Summary Notes for the project's Pre-Application Conference Meeting, The site extends back or northeasterly +/- 260 feet from the Willamette Drive ROW. The front two-thirds of the lot are flat. The land them drops down about 10 feet to a lower flat area at the rear of the existing Kasch's building.

There are no drainageways, riparian zones, wetlands or other natural features as defined by the CDC on the property. The trees are few and limited to the area along the rear property line. They appear to be three cottonwoods about 30-40 feet tall. These trees provide some screening between the site and the apartments to the rear of the site. Although the tree locations were not surveyed, the trees are known to be located beyond the existing, rear wood fence line.

These three existing cottonwood trees are proposed to remain and proposed site grading will not impact the area where the trees are located. While these trees are proposed to remain, it should

be noted that besides providing screening, cottonwood is not considered a high priority tree species for preservation and in our opinion these trees would not qualify as heritage trees. Therefore there are no plans to provide further protection for these trees via dedication or conservation easements.

3. Site grading will not significantly alter natural drainage patterns. Refer to the Preliminary Development Plan, 1 of 1 included with this application for additional information.

4. Site indicated to be in type 13 C soils classification per NRCS *Soil Survey of Clackamas County Area. Oregon – Sheet Number 6*, additional information included in Appendix B of Preliminary Drainage Analysis also portion of map included on Preliminary Development Plan, 1 of 1.

5. Project meets requirements of section 5.

6. Architecture

a. b. c. & e *Design*: The proposed building is a single story structure. As seen from Willamette Drive, the front elevation is broken into three parts with a central entry way section that is capped with a hipped roof. The hipped roof tower element over the entry helps to emphasize the primary building entry and also provides for an element of contextual design, having a similar design to the Starbucks up the street. Additionally, flat storefront awnings have been incorporated into the design Exterior building materials incorporate cast stone veneer, brick , and stucco and the primary building materials. Materials and colors of materials are primarily earth tones.

Overall, building lines, roof form and rhythm of windows, scale and massing, materials and colors are similar to newer buildings in the vicinity and in line with the vision for the neighborhood. Human scale is provided the buildings horizontal and vertical modulation, use of windows along the majority of the front façade and by flat awnings that extend the length of the building. The building will be within approximately 13' 6" of the required 12-foot sidewalk along Willamette Drive. The additional area will be hardscaped, providing additional plaza area for a more pedestrian friendly environment at the storefront.

d. Contrasting architecture is not proposed and therefore this section is not applicable to the project.

f. *Windows/Transparency*: The transparency provided for the front elevation exceeds the 60% transparency requirement for the project. The side elevations are both within view of Willamette Drive and therefore both elevations are required to provide 30% transparency. Transparency required for the side elevations is provided by excess transparency provided at the front elevation as allowed by exception in Section 55.100.B.6.f. of the code. Because the windows provided on the side elevations would not be considered to be at "pedestrian level" per our assumptions, we are requesting the percentage transparency exception be applied to the side elevations. Please see the *EXCEPTION REQUEST NARRATIVE*, provided following the *DESIGN REVIEW NARRATIVE* for full discussion.

g. Variation in depth and rooflines is provided along all elevations including the rear elevation, which to a great extent mirrors the front elevation, with the exception of the hipped roof.

h. Flat canopies are provided along the front elevation facing Willamette Drive. Flat canopies over the primary entry portion of the building extend 6' from the building. Flat canopies over the portions of the front façade flanking the entry extend from 3'-0" to 4'-4" from the face of the building. These canopies provide pedestrian scale as well as whether protection. Please note: Because the building is not located immediately adjacent to the public sidewalk, extending the canopies further from the front façade will not have additional benefit to pedestrians passing by on the public sidewalk.

i. We believe the building's design & location, as well as the configuration of the streetscape area in front of the building, will enhance and contribute to the development of a safe and attractive pedestrian environment along the project's frontage on Willamette Drive.

j. We have reviewed this section of the code and believe the project meets the requirements outlined.

7. Transportation Planning Rule (TPR) compliance

a. The project site has approximately 150-feet of street frontage along Willamette Drive. The building has been oriented to the street, with the primary building entrance facing Willamette Drive. The building itself occupies approximately 102-feet of the street frontage which equates to 68% of the building being adjacent to the right-of-way. Only one, existing driveway entrance (shared with 7-11) is proposed to be maintained off of Willamette Drive. Parking has been placed at the rear of the site.
b. Not applicable to Commercial projects.
c. The building is proposed to be built as close as is feasibly possible to the Willamette Drive right-of-way. The building is set back 20' from the right of way, which is the maximum setback allowed by code. CC & R's in affect for the property prohibit the building from being located any closer to the edge of the right of way. Title companies will not provide title insurance if the building is not set back as required per the CC & R's. Chase's legal council has diligently worked with the title companies to work around the CC & R requirement but has not been successful in convincing the title companies to look beyond the requirement of the CC & R's. Because the building can be located in such a manner as to meet the maximum setback allowed by code while also meeting the CC & R's, Chase has ultimately elected to locate the building in the location proposed
d. We have reviewed this section of the code and believe the project meets the requirements outlined.
e. We have reviewed this section of the code and believe the project meets the requirements outlined.
f. We have reviewed this section of the code and believe the project meets the requirements outlined.
g. We have reviewed this section of the code and believe the project meets the requirements outlined.

h. We have reviewed this section of the code and believe the project meets the requirements outlined.
i. Not applicable to commercial projects
j. Note applicable to commercial projects.

C. Compatibility between adjoining uses, buffering, and screening.

1. We have reviewed this section of the code and believe the project meets the requirements outlined. It is important to note that the buffer provided from site improvements at the rear of the project site is 49-feet or greater from the apartment parcel to the rear of the site. Landscaping with trees, shrubs, and ground cover, as well as retention of existing trees at the rear property line will provide for generous screening of the project site.
2. The onsite trash enclosure will be screened by a CMU walls and metal framed gates with wood slats. Additionally landscape screening is provided around 3 sides of the trash enclosure. There are no other areas that we believe require screening from adjoining properties.
3. Rooftop mechanical equipment is screened by raised parapets.

D. Privacy and noise.

1. Residential dwelling units are not proposed for this project and therefore this section does not apply to the project
2. Residential dwelling units are not proposed for this project and therefore this section does not apply to the project
3. The drive-through area will be screened from the adjacent apartments located to the rear of the site. Screening will be provided by landscaping with trees, shrubs, and ground cover, as well as retention of existing trees at the rear property line.
4. A noise study is included with this application. The noise study concludes that the business and its activities do not exceed the noise standards contained in the West Linn Municipal Code.

E. Private Outdoor Area – Not applicable to commercial projects

F. Shared Outdoor Recreation – Not applicable to commercial projects

G. Demarcation of public, semi-public, and private spaces.

The 12-foot wide public sidewalk along Willamette Drive will be paved per City of West Linn public works standards. The additional 13' 6" of hardscaped plaza area between the front of the building and public sidewalk will be paved with concrete, but will use an alternate scoring pattern to differentiate the plaza area from the public sidewalk. The parking area located at the rear of the site is separated from the front of the building and public sidewalks by landscaping, demarcating the difference between the public and semi-public space at the rear of the site.

H. Public Transit

1. The project is immediately adjacent to Willamette Drive. There is a bus stop approximately 60-feet west of the site on Willamette Drive. Public sidewalks currently extend across the project

site's frontage to the bus stop. Sidewalks will be replaced along the project frontage and built to a width of 12-feet providing improved access to the adjacent public transit stop.

2. No additional facilities are proposed at this time
3. We have reviewed this section of the code and believe the project meets the requirements outlined.
4. This section is not applicable to this project. The project is not part of a larger commercial business center (greater than 3 acres in size). Additionally there is a transit stop within 400 yards of the site.

I. Public Facilities

1. *Streets*: No requirements for additional right-of-way dedication have been noted by the City. The project will be providing new curb and 12-foot wide public sidewalk along the project frontage along Willamette Drive. Street trees will also be provided along the project frontage. Code required trees be placed in 5' x 5' tree wells at 35-feet on center. Due to design limitations street tree spacing proposed does not meet the standard exactly, but is designed in the spirit of the 35' on center spacing requirement. The center of the first tree well is located 30' westerly of the driveway opening in order to meet the 30' clear site triangle requirement. The second street tree is placed 35' from the first tree, and the third tree is located 40' from the second tree. The 40' spacing was is necessary to avoid utility conflicts that would result if the third tree was placed 35' from the second tree.
2. *Drainage*: The proposed project is required to meet storm drainage requirements. A Preliminary Drainage Analysis is included with the application. The stormwater collection and management system proposed to serve the project site is shown on the Preliminary Development Plan, 1 of 1.

J. Crime Prevention and Safety/Defensible Space

We have reviewed the requirements of this section and believe the project is designed to meet all the criteria of this section. Being a bank, security is of the highest importance. Lines of site into the developed areas of the site, allow for the site to be visible from the roadway, and adjacent commercial properties. Additionally, Chase's security requirements exceed the security lighting levels required by the City.

K. Provisions for Persons with Disabilities

The front building entry, facing Willamette Drive, will be designed to be accessible from to building to the adjacent public sidewalk. The public sidewalk connects to the bus stop located easterly of the site in front of the 7-11 on Willamette Drive. The secondary, rear entry will be accessible from the accessible parking stalls located at the rear of the site.

L. Signs

1. The project will have addressing sized to adequately identify the premises as required by the local fire department.

2. Signage on the building and site will be specific to Chase and will be of similar or better quality than the newer commercial development located northwesterly of the site. Chase's signage consultant, Signtech, will be responsible designing and permitting of all building and site signage, including but not limited to building signage, monument/pylon signage, directional signage, and accessible parking signage.
3. Directional signage will be provided on site to clearly inform customers and those passing through the site of the specific designations of areas on the site, including the entry and exit of the drive-through as well as the functions of the drive-thru lanes. Directional arrows and other pavement markings will be used to clearly direct vehicle traffic on site.
4. Signs will be located as to not obscure vehicle diver's site distance.
5. Not applicable to commercial projects.
6. Due to the scale of the project there are no pedestrian or bicycle routes running through the parking areas.

M. Utilities

Utilities to serve the project will be coordinated during the design and development of the site. Utilities serving the bank and exterior portions of the site, such as the drive-through canopy and parking lot lighting will be placed underground.

N. Wireless Communication Facilities

No wireless communication facilities are proposed to serve the project, with the possible exception of a small rooftop mounted satellite dish. If installed for this project the satellite dish will be screened by parapets that extend above the rooftop and will not be visible from street level.

O. Refuse and Recycling

We have reviewed the requirements of this section and believe the project is designed to meet all the criteria of this section. For privacy and security reasons Chase banks are serviced by a third party provider for paper shredding and recycling. The service is conducted after business hours. The bank therefore only generates a relatively small amount of waste. An onsite trash enclosure is provided for as indicated on the Site Plan. The trash enclosure will be constructed of CMU painted to match the bank building and metal gates with wood slats. The trash enclosure will also be screened on three sides as indicated on the Landscape Plan, L-1.

Other design considerations:

Front Building Setback: CC & R's require that building be set back 60-feet measured from the centerline of Willamette Drive. The current half street right-of-way width is 40', as a result the effective building setback from the edge of right-of-way is 20'. The 20' setback, although not desired by the City, is allowed per CDC 19.070(A)(7), which allows for a maximum building setback of 20'.

Front Setback Landscaping: Code stipulates that *"the front setback area between the street and the building line shall consist of landscaping or a combination of non-vehicular hardscape areas (covered with impervious surfaces) and landscaped areas, with at least 25 percent of the front setback area*

consisting of landscaped areas." The City indicated they would support a variance to reduce landscaping requirement to allow for a zero foot setback. However, due to the effective 20' right of way setback required by the CC & R's and permitted by code the building will not be able to be built with the building immediately adjacent to the street.

Our current position is that a variance is not required. Approximately 132.5' of the approximately 150' of project frontage on Willamette Drive is unencumbered by vehicular access areas. Of that frontage (area between driveway and northwesterly property line) 1,917 SF of area is located between the building setback line and sidewalk. Of that area 374 SF is landscaped, which equates to 19.5% of the frontage area. We believe the minor deviation from the 25% standard does not justify requesting a variance and therefore request that as part of the Class II Design Review the City make a determination that the proposed landscaping is adequate to meet the intent of the code and that the additional hardscaping is in the interest of the City's desire to create a dynamic, more social space along Willamette Drive.

EXCEPTION REQUEST NARRATIVE:

Section 55.100.B.6.f. reads as follows:

> *The main front elevation of commercial and office buildings shall provide at least 60 percent windows or transparency at the pedestrian level to create more interesting streetscape and window shopping opportunities. One side elevation shall provide at least 30 percent transparency. Any additional side or rear elevation, which is visible from a collector road or greater classification, shall also have at least 30 percent transparency. Transparency on other elevations is optional. The transparency is measured in lineal fashion. For example, a 100-foot-long building elevation shall have at least 60 feet (60 percent of 100 feet) in length of windows. The window height shall be, at minimum, three feet tall. The exception to transparency would be cases where demonstrated functional constraints or topography restrict that elevation from being used. When this exemption is applied to the main front elevation, the square footage of transparency that would ordinarily be required by the above formula shall be installed on the remaining elevations at pedestrian level in addition to any transparency required by a side elevation, and vice versa. The rear of the building is not required to include transparency. The transparency must be flush with the building elevation.*

Transparency Calculation Assumptions: The above referenced code section states that *"Transparency is measured in lineal fashion"* but then goes on to state that *"The window height shall be, at minimum, three feet tall."* Furthermore, when exception to transparency is discussed, the above referenced code section states that *"the square footage of transparency that would ordinarily be required by the above formula shall be installed on the remaining elevations at pedestrian level in addition to any transparency required..."* Based on the above, it is our interpretation that transparency transfer is based on square footage of required transparency area. Therefore we will apply the following formula for the purposes of calculating the minimum required transparency:

Building Length x Percent Transparency Required x 3-feet (min. window height) = Minimum Transparency Area Required

"Pedestrian level" transparency is not defined; however, based on our experience with similar projects, "pedestrian level" transparency from will include transparency provided from ground level to 9-feet in height. Windows with a bottom sill greater than 5' above the ground level will not be counted as "pedestrian level" transparency (as an example the two clerestory windows located at each end of the front elevation would not be counted. Neither would the two clerestory windows on either of the side elevations.) We will assume these parameters for the purposes of calculating "pedestrian level" transparency provided.

Based on the above parameters the following formula will be used for the purposes of calculating transparency provided.

"Pedestrian Level" Transparency Length x "Pedestrian Level" Transparency Height = Transparency Provided

Overview: Interior bank functions preclude use of windows for security and or privacy purposes. Please see Floor Plan, A1.1 included with this application; specifically at the ends of the building.

Front Elevation Transparency: Where possible, pedestrian level windows are provided along the front elevation. The front elevation is 102' in length. 61'-2" of transparency length would be required to meet the 60% transparency requirement. Based on the formula above, Minimum Transparency Area Required is 183.6 SF.

The front elevation includes 4 large pedestrian level windows (34 SF each) and the entry storefront (174 SF). The Transparency Provided at the storefront is 310 SF, which exceeds the Minimum Required Transparency Area by 126.4 SF

Side Elevations Transparency: Because both side elevations are visible from an arterial the 30 percent transparency requirement applies to each elevation. The side elevations of the building are identical. The opportunity for transparency along the side elevations is severely limited due to the interior bank functions; however two clerestory windows are added to each elevation. The side elevations also include horizontal and vertical modulation which helps to break up the facades and create more visual interest. The side elevations are each 43' long. 12' 10" of transparency length for each side elevation would be required to meet the 30% transparency requirement. Based on the formula above, Minimum Transparency Area Required for each side is 38.7 SF. Combined 77.4 SF of transparency is required along the side elevations.

Due to functional constraints outlined above in the *Overview* above, pedestrian level windows cannot be provided at the side elevations. We therefore request an exception to allow the extra 126.4 SF of transparency provided at the front elevation be credited toward meeting the required 77.4 SF of transparency area required for the side elevations.

Based on our interpretation of the code above and the application of exception allowed by the code for the side elevations, the project meets and exceeds the overall transparency required by 46 SF.

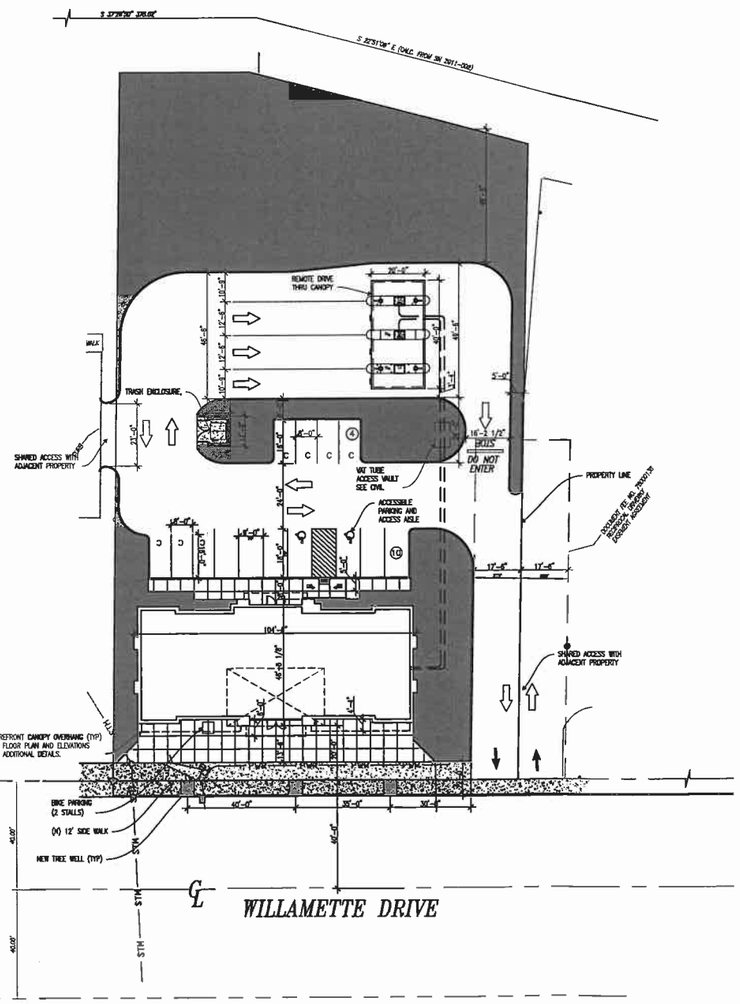
CLOSING:

Please note the additional materials to follow under separate cover as noted at the beginning of this letter. If any additional materials or information are required for the review of this application please do not hesitate to let me know.

Sincerely,

Hans Christiansen
Associate

Enclosure

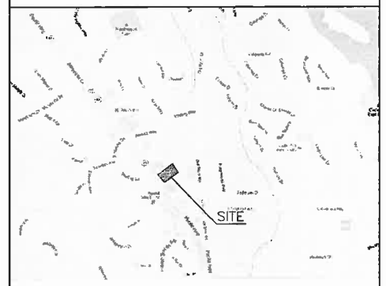


1 SITE PLAN

TRUE NORTH

SITE PLAN SCALE 1"=20' 1

VICINITY PARCEL MAP



GENERAL PROJECT INFORMATION

APPLICANT
CALLISON ARCHITECTS, P C
1420 5TH AVE, SUITE 2400
SEATTLE, WA 98101
CONTACT: HANS CHRISTIANSEN
EMAIL: HANS.CHRISTIANSEN@CALLISON.COM

TAX IDENTIFICATION NO.
00360556 & 00360574

ZONING CLASSIFICATION
GC - GENERAL COMMERCIAL

ENTIRE SITE AREA
38,056 SF

BUILDING AREA
4,335 SF (11.4%)

IMPERMOUS AREA
18,079 SF (50.1%)

LANDSCAPE AREA
14,643 SF (38.5 %)

TOTAL # PARKING STALLS
14 PARKING STALLS 7 STANDARD, 7 COMPACT
(INCLUDES 1 VAN ACCESSIBLE AND 1 STANDARD ACCESSIBLE STALL)
REQ = 12, MAX = 14

BUILDING HEIGHT
26'-9"/ONE STORY

ESTIMATED PROJECT VALUATION
$865,000

PRE-APPLICATION MEETING DATE
JUNE 2, 2011

LANDSCAPING

PLAN NORTH

CHASE

CALLISON

CALLISON ARCHITECTS, P.C.
www.callison.com

SIGNED: XX/XX/XX

CHASE
NEW BUILD
CEDAR OAK & WILLAMETTE
19080 Willamette Dr
West Linn, OR 97068

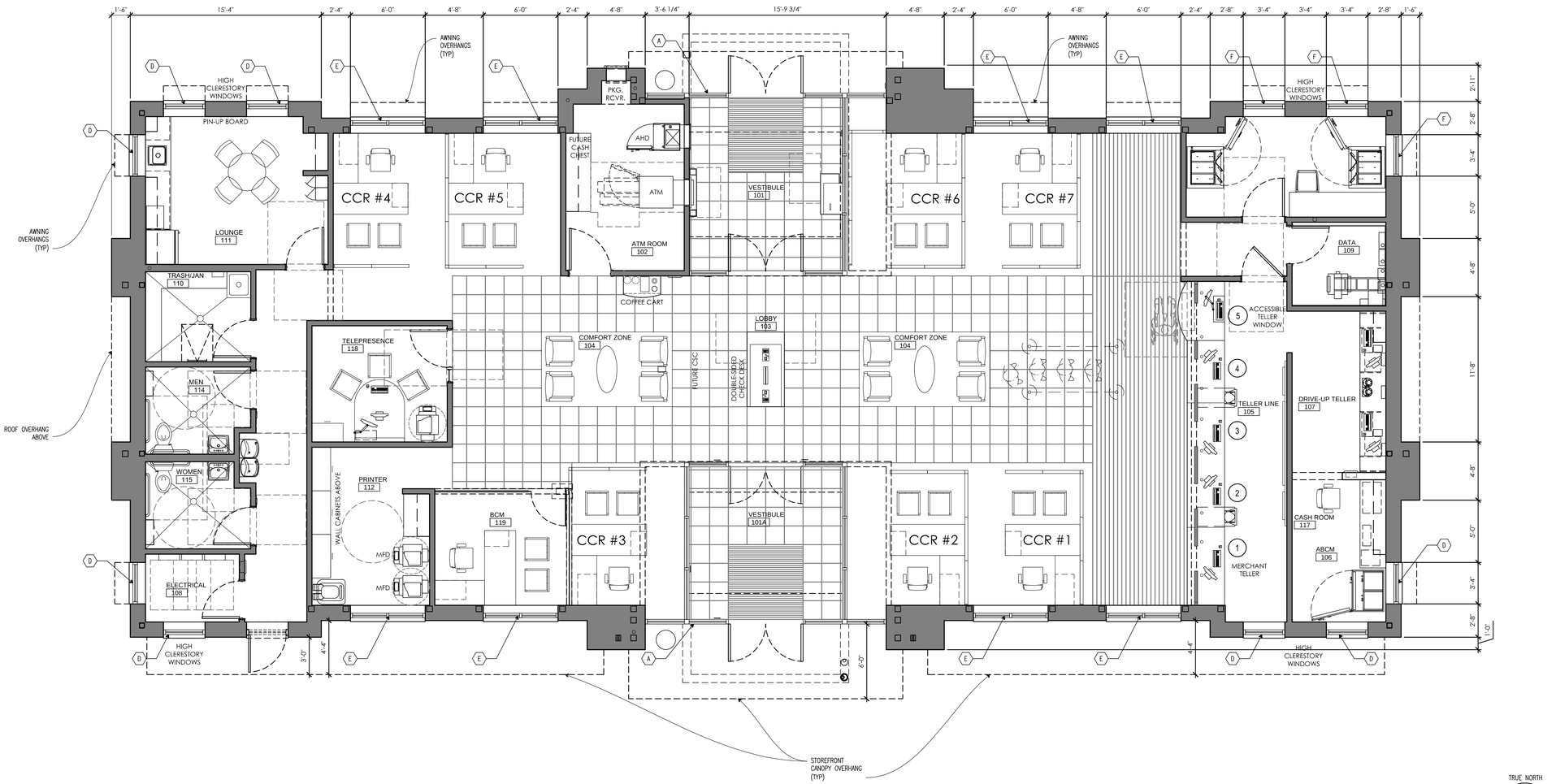
PROJECT #210451.00

ISSUED / REVISED	DATE
PLANNING SUBMITTAL	02/23/12

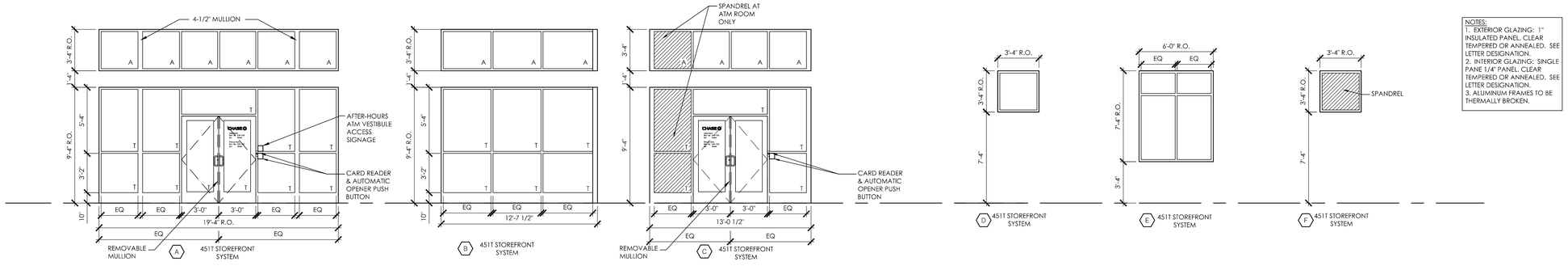
SITE PLAN

A0.1

Plot date: February 24, 2012 U:\Projects\Chase\New Build\Oregon\Cedar Oak & Willamette-RiteAid\Construction\phase_x-up0001.dwg



1 FLOOR PLAN
1/4"=1'-0"



2 WINDOW TYPE
1/4"=1'-0"

SHEET NOTES

SHEET SYMBOLS

FEC — LOCATE TOP OF CABINET AT 4'-6" AFF (FEC HANDLE TO BE AT 48" AFF MAX) PROVIDE 2A-10BC EXTINGUISHER
FIRE EXTINGUISHER CABINET

5' CLEAR TURN AROUND

TRUE NORTH

PLAN NORTH

SCALE: 1/4" = 1'-0"

CHASE

CALLISON

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www.callison.com

SIGNED: XX/XX/XX

CHASE
NEW BUILD
CEDAR OAK & WILLAMETTE
19080 Willamette Dr
West Linn, OR 97068

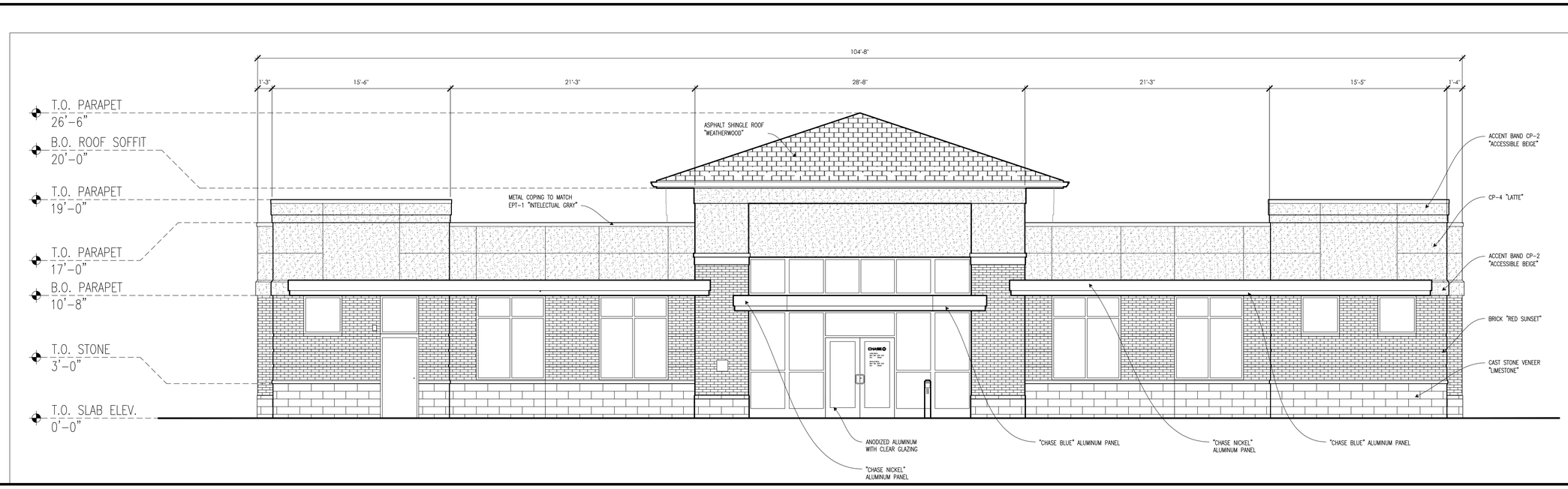
PROJECT #210461.89

ISSUED / REVISED	DATE
PLANNING SUBMITTAL	02/23/12

Floor Plan

A1.1

Plot date: February 9, 2012 \\SEANAS4\Program Mgmt\Projects\Chase\New Build\Oregon\Cedar Oak & Willamette-WestLinn\Caddchase\chcow_a_fp0001.dwg



SOUTH ELEVATION | SCALE 1/4"=1'-0" | 1

EXTERIOR FINISH LEGEND

PAINTS:

EPT-1 APPLICATION: EXTERIOR ALUMINUM / GALVANIZED METAL SURFACES
MANUFACTURER: SHERWIN WILLIAMS
PRODUCT: METALATEX ACRYLIC SEMI-GLOSS
PRODUCT NO.: B42 SERIES
COLOR: SW 7045 (INTELLECTUAL GRAY)
FINISH: SEMI-GLOSS

EPT-2 APPLICATION: EXTERIOR ALUMINUM / GALVANIZED METAL SURFACES (CORRESPONDS W/EIFS-2)
MANUFACTURER: SHERWIN WILLIAMS
PRODUCT: METALATEX ACRYLIC SEMI-GLOSS
PRODUCT NO.: B42 SERIES
COLOR: SW 7036 (ACCESSIBLE BEIGE)
FINISH: SEMI-GLOSS

EPT-3 APPLICATION: EXTERIOR ALUMINUM / GALVANIZED METAL SURFACES (CORRESPONDS W/EIFS-4)
MANUFACTURER: SHERWIN WILLIAMS
PRODUCT: METALATEX ACRYLIC SEMI-GLOSS
PRODUCT NO.: B42 SERIES
COLOR: SW 6108 (LATTE)
FINISH: SEMI-GLOSS

EPT-4 APPLICATION: EXTERIOR ACCENTS
MANUFACTURER: MATTHEWS PAINT
PRODUCT:
PRODUCT NO.:
COLOR: MP 00366 (CHASE BLUE)
FINISH: SEMI-GLOSS

EPT-5 APPLICATION: EXTERIOR ACCENTS
MANUFACTURER: MATTHEWS PAINT
PRODUCT:
PRODUCT NO.:
COLOR: MP 19891 (CHASE NICKEL)
FINISH: SEMI-GLOSS

EPT-6 APPLICATION: EXTERIOR ACCENTS
MANUFACTURER: MATTHEWS PAINT
PRODUCT:
PRODUCT NO.:
COLOR: MP 18248 (CHASE DARK NICKEL)
FINISH: SEMI-GLOSS

CEMENT PLASTER:

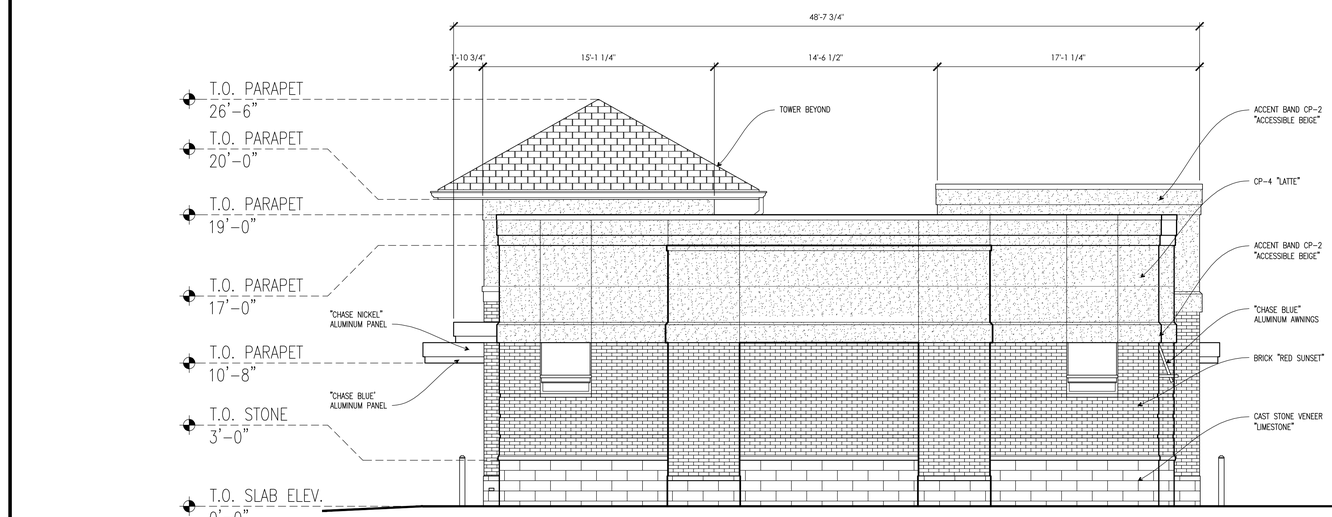
CP-1 CEMENT PLASTER: EXTERIOR CEMENT PLASTER SURFACES (REAR WALLS & SOFFIT SURFACES OF ENTRY TOWER)
MANUFACTURER: REFER TO SPECIFICATIONS
PRODUCT: REFER TO SPECIFICATIONS
COLOR: TO MATCH SHERWIN WILLIAMS #SW 7045 (INTELLECTUAL GRAY)
FINISH: STO SILICO LIT 1.0 (FINE)

CP-2 CEMENT PLASTER: EXTERIOR CEMENT PLASTER SURFACES (EIFS ACCENT BANDS)
MANUFACTURER: REFER TO SPECIFICATIONS
PRODUCT: REFER TO SPECIFICATIONS
COLOR: TO MATCH SHERWIN WILLIAMS #SW 7036 (ACCESSIBLE BEIGE)
FINISH: STO SILICO LIT 1.0 (FINE)

CP-3 CEMENT PLASTER: EXTERIOR CEMENT PLASTER SURFACES (EIFS PARAPET)
MANUFACTURER: REFER TO SPECIFICATIONS
PRODUCT: REFER TO SPECIFICATIONS
COLOR: TO MATCH SHERWIN WILLIAMS #SW 6108 (LATTE)
FINISH: STO SILICO LIT 1.0 (FINE)

METAL:

MT-1 ALUMINUM: FLASHING, COPING, GUTTERS, DOWNSPOUTS
MANUFACTURER: AEP SPAN OR EQUAL
PRODUCT: REFER TO SPECIFICATIONS
COLOR: COOL PARCHMENT



EAST ELEVATION | SCALE 1/4"=1'-0" | 2

ELEVATION KEYNOTES

E1 CONCRETE FOOTINGS/FOUNDATIONS: REFER TO STRUCT DWGS FOR ADDL INFO

E2 CONCRETE CURB & ISLANDS

E3 CAST STONE STARTER COURSE: AS MANUFACTURED BY SAVANNA STONE (OR APPROVED EQUAL). NOMINAL SIZE: 24" WIDE x 4" HIGH x 4" DEEP (U.N.O.) TEXTURE: SMOOTH COLOR: "LIMESTONE #3"

E4 CAST STONE VENEER: AS MANUFACTURED BY SAVANNA STONE (OR APPROVED EQUAL). NOMINAL SIZE: 24" WIDE x 8" HIGH x 4" DEEP (U.N.O.) TEXTURE: ROCKFACE COLOR: "LIMESTONE #3"

E5 CAST STONE TRIM: AS MANUFACTURED BY SAVANNA STONE (OR APPROVED EQUAL). SEE REFERENCED DETAILS FOR PROFILES AND DIMENSIONS TEXTURE: SMOOTH COLOR: "LIMESTONE #3"

E6 BRICK VENEER: DENTON 150, "RED SUNSET" AS MANUFACTURED BY ACME BRICK COMPANY (OR APPROVED EQUAL). MORTAR COLOR TO BE NATURAL (NO COLOR ADDED).

E7 BRICK REVEAL: 3/4" DEEP REVEAL. REVEAL TO STOP 4" FROM TELLER WINDOW AND BANK EQUIPMENT OPENINGS (SEE DETAIL 5/A6.6). FIELD CUT BRICK TO MAINTAIN AIRSPACE.

E8 "V"-GROOVE: 3/4" METAL PLASTER CONTROL JOINT

E9 EXPANSION JOINT: CONTINUOUS VERTICAL CONTROL JOINT. REFER TO DETAIL 4/A6.6 FOR ADDL INFO

E10 COPING: PRE-FINISHED METAL COPING. FINISH: MT-1

E11 ROOFING SHINGLES: ARCHITECTURAL ASPHALT ROOF SHINGLES. "INDEPENDENCE SHANGLE" AS MANUFACTURED BY CERTAINTEED. COLOR: "WEATHERWOOD"

E12 GUTTERS & DOWNSPOUTS: 6" WIDE x 4 3/4" DEEP PRE-FINISHED ALUMINUM "K-STYLE" GUTTERS w/ 4" WIDE x 2 1/4" DEEP CORRUGATED RECTANGULAR DOWNSPOUTS. FINISH: MT-1

E13 SCUPPER: PREFINISHED ALUMINUM OVERFLOW SCUPPER, MT-2. REFER TO DETAIL 13/A6.5 FOR ADDL INFO

E14 CANOPY FLASHING: PRE-FINISHED ALUMINUM FLASHING TO SPAN GAP BETWEEN CANOPY AND BUILDING. REFER TO DETAIL 19/A6.5 FOR ADDL INFO. FINISH: MT-2. VERIFY FINAL FLASHING LENGTH AND CONFIGURATION WITH APPROVED CANOPY SHOP DWGS

E15 FASCIA PANEL - "LATTE": PRE-FINISHED ALUMINUM FASCIA PANEL TO MATCH EPT-3 (SUBMIT SHOP DRAWINGS AND COLOR SAMPLES FOR APPROVAL)

E16 FASCIA PANEL - "CHASE NICKEL": PRE-FINISHED ALUMINUM FASCIA PANEL TO MATCH EPT-5 (SUBMIT SHOP DRAWINGS AND COLOR SAMPLES FOR APPROVAL)

E17 FASCIA PANEL - "CHASE BLUE": PRE-FINISHED ALUMINUM FASCIA PANEL TO MATCH EPT-4 (SUBMIT SHOP DRAWINGS AND COLOR SAMPLES FOR APPROVAL)

E18 CANOPY SUPPORT COLUMN: PAINT EPT-6.

E19 GUARDRAIL: 1 1/2" DIAMETER PRE-FINISHED ALUMINUM RAIL TO MATCH EPT-1. CORE DRILL & EPOXY GROUT INTO CONCRETE MIN. 8" DEPTH.

E20 STOREFRONT SYSTEM: CLEAR ANODIZED ALUMINUM FRAMES. SEE SHEET A8.1 FOR ADDL INFO

E21 HOLLOW METAL DOOR & FRAME: PAINT TO EPT-1. SEE DOOR SCHEDULE FOR ADDL INFO

E22 PROVIDE WEATHER TIGHT SHEET ALUM BOX OVER CONDUIT STUB OPENING IN ISLAND.

E23 BOLLARD: PROVIDED AND INSTALLED BY G.C. REFER TO DETAILS ON SHEET A5 FOR ADDL INFO

E24 KNOX BOX: MOUNTED FLUSH WITH SURROUNDING WALL SURFACE. INSTALL AT FRONT ENTRY OR REAR EXTI (ONE LOACTION ONLY) VERIFY LOCATION WITH LOCAL MUNICIPALITY TO INSURE COMPLIANCE.

E25 BANK EQUIPMENT: TO BE PROVIDED AND INSTALLED BY OWNER'S EQUIPMENT VENDOR. G.C. TO PROVIDE OPENINGS AND ELECTRICAL REQUIREMENTS IN ACCORDANCE WITH FINAL APPROVED BANK EQUIPMENT SHOP DRAWINGS.

E26 ELECTRICAL SERVICE EQUIPMENT. PAINT COLOR EPT-3, LATTE

E27 HOSE BIB

E28 SIGNAGE BACKING: G.C. TO PROVIDE 5/8" THICK 'EXPOSURE 1' PLYWOOD SHEATHING FOR SIGN MOUNTING.

E29 ADDRESS NUMBER: 6" TALL WHITE VINYL ADDRESS NUMBER WITH 1/2" THICK STROKE MOUNTED ON INTERIOR FACE OF GLASS TRANSOM

E30 LIGHT FIXTURE: REFER TO ELEC DWGS FOR ADDL INFO

E31 CARD READER & OVERRIDE SWITCH: REFER TO SECURITY DWGS FOR ADDL INFO

E32 VAT TUBE OPENINGS, SEE DETAIL 17/A6.5.

E33 CAST ALUMINUM DUCT VENT, PRE-FINISHED TO MATCH ADJACENT WALL

E34 OFF-RIDGE ROOF VENT PREFINISHED TO MATCH ROOFING

E36 MECHANICAL EQUIPMENT BEYOND IN ROOF WELL, SCREENED BEHIND PARAPET.

E37 LINE OF ROOF SURFACE BEYOND.

E38 PROVIDE RECESSED FIRE KNOX BOXES AS REQUIRED.

CHASE

SIGNED: XX/XX/XX

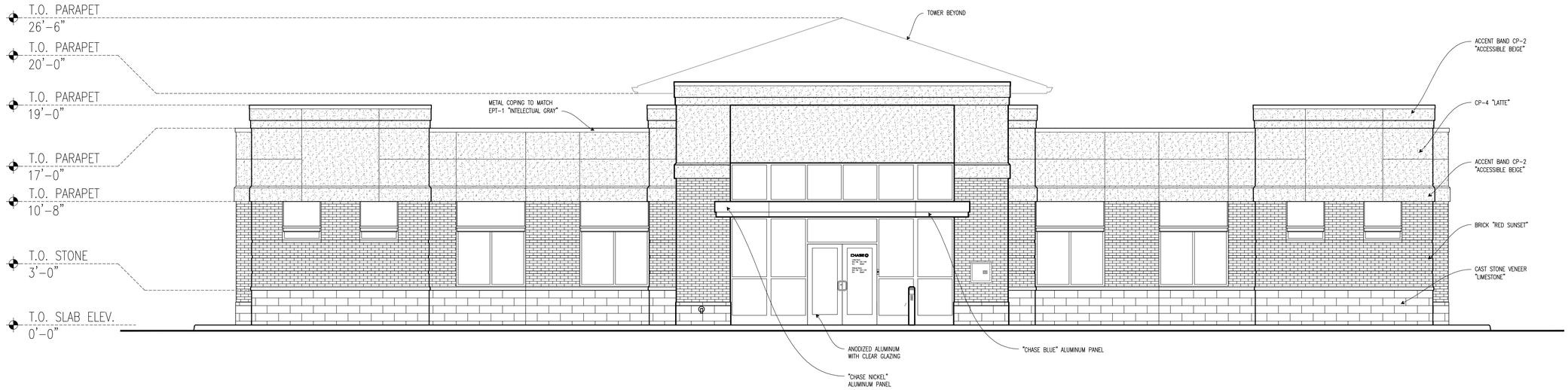
CALLISON ARCHITECTS, P.C.
CALLISON
www.callison.com

CHASE
NEW BUILD
CEDAR OAK & WILLAMETTE
19080 Willamette Dr
West Linn, OR 97068
PROJECT #210461.89

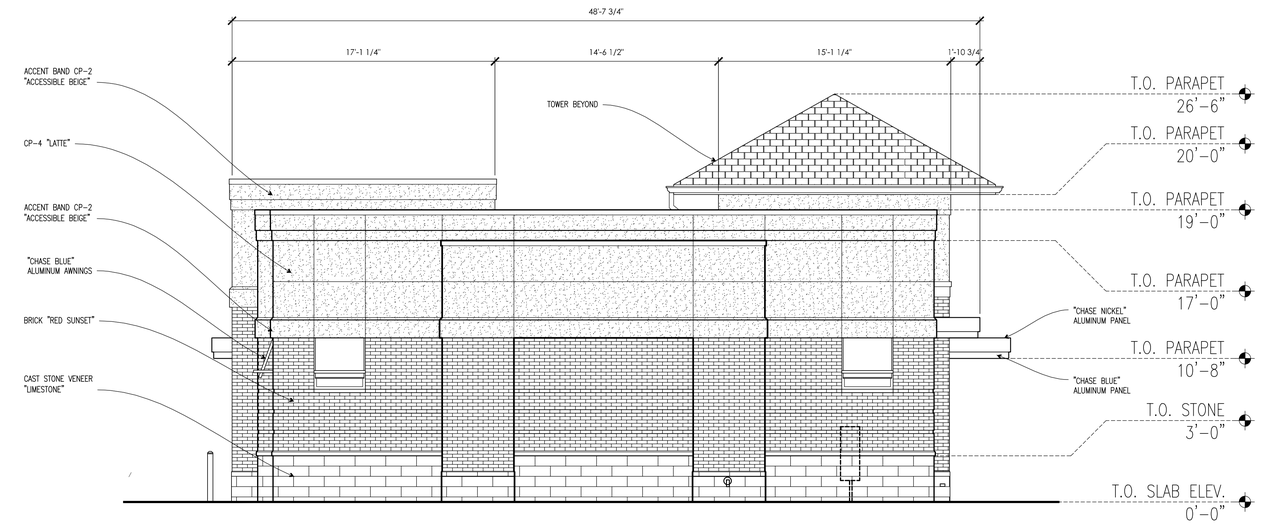
ISSUED / REVISED	DATE
PLANNING SUBMITTAL	02/23/12

Exterior Elevations

A4.1



NORTH ELEVATION | SCALE 1/4" = 1'-0" | 1



WEST ELEVATION | SCALE 1/4" = 1'-0" | 2

ELEVATION KEYNOTES

E1 CONCRETE FOOTINGS/FOUNDATIONS:
REFER TO STRUCT DWGS FOR ADDL INFO

E2 CONCRETE CURB & ISLANDS

E3 CAST STONE STARTER COURSE:
AS MANUFACTURED BY SAVANNA STONE (OR APPROVED EQUAL).
NOMINAL SIZE: 24" WIDE x 4" HIGH x 4" DEEP (U.N.O.)
TEXTURE: SMOOTH
COLOR: "LIMESTONE #3"

E4 CAST STONE VENEER:
AS MANUFACTURED BY SAVANNA STONE (OR APPROVED EQUAL).
NOMINAL SIZE: 24" WIDE x 8" HIGH x 4" DEEP (U.N.O.)
TEXTURE: ROCKFACE
COLOR: "LIMESTONE #3"

E5 CAST STONE TRIM:
AS MANUFACTURED BY SAVANNA STONE (OR APPROVED EQUAL).
SEE REFERENCED DETAILS FOR PROFILES AND DIMENSIONS
TEXTURE: SMOOTH
COLOR: "LIMESTONE #3"

E6 BRICK VENEER:
DENTON 150, "RED SUNSET" AS MANUFACTURED BY ACME BRICK COMPANY (OR APPROVED EQUAL). MORTAR COLOR TO BE NATURAL (NO COLOR ADDED).

E7 BRICK REVEAL:
3/4" DEEP REVEAL. REVEAL TO STOP 4" FROM TELLER WINDOW AND BANK EQUIPMENT OPENINGS (SEE DETAIL 5/A6.6). FIELD CUT BRICK TO MAINTAIN AIRSPACE.

E8 "V"-GROOVE:
3/4" METAL PLASTER CONTROL JOINT

E9 EXPANSION JOINT:
CONTINUOUS VERTICAL CONTROL JOINT. REFER TO DETAIL 4/A6.6 FOR ADDL INFO

E10 COPING:
PRE-FINISHED METAL COPING. FINISH: MT-1

E11 ROOFING SHINGLES:
ARCHITECTURAL ASPHALT ROOF SHINGLES. "INDEPENDENCE SHANGLE" AS MANUFACTURED BY CERTAINTEED. COLOR: "WEATHERWOOD"

E12 GUTTERS & DOWNSPOUTS:
6" WIDE x 4 3/4" DEEP PRE-FINISHED ALUMINUM "K-STYLE" GUTTERS w/ 4" WIDE x 2 1/4" DEEP CORRUGATED RECTANGULAR DOWNSPOUTS. FINISH: MT-1

E13 SCUPPER:
PREFINISHED ALUMINUM OVERFLOW SCUPPER, MT-2. REFER TO DETAIL 13/A6.5 FOR ADDL INFO

E14 CANOPY FLASHING:
PRE-FINISHED ALUMINUM FLASHING TO SPAN GAP BETWEEN CANOPY AND BUILDING. REFER TO DETAIL 19/A6.5 FOR ADDL INFO. FINISH: MT-2. VERIFY FINAL FLASHING LENGTH AND CONFIGURATION WITH APPROVED CANOPY SHOP DWGS

E15 FASCIA PANEL - 'LATTE':
PRE-FINISHED ALUMINUM FASCIA PANEL TO MATCH EPT-3 (SUBMIT SHOP DRAWINGS AND COLOR SAMPLES FOR APPROVAL)

E16 FASCIA PANEL - 'CHASE NICKEL':
PRE-FINISHED ALUMINUM FASCIA PANEL TO MATCH EPT-5 (SUBMIT SHOP DRAWINGS AND COLOR SAMPLES FOR APPROVAL)

E17 FASCIA PANEL - 'CHASE BLUE':
PRE-FINISHED ALUMINUM FASCIA PANEL TO MATCH EPT-4 (SUBMIT SHOP DRAWINGS AND COLOR SAMPLES FOR APPROVAL)

E18 CANOPY SUPPORT COLUMN:
PAINT EPT-6.

E19 GUARDRAIL:
1 1/2" DIAMETER PRE-FINISHED ALUMINUM RAIL TO MATCH EPT-1. CORE DRILL & EPOXY GROUT INTO CONCRETE MIN. 8" DEPTH.

E20 STOREFRONT SYSTEM:
CLEAR ANODIZED ALUMINUM FRAMES. SEE SHEET A8.1 FOR ADDL INFO

E21 HOLLOW METAL DOOR & FRAME:
PAINT TO EPT-1. SEE DOOR SCHEDULE FOR ADDL INFO

E22 PROVIDE WEATHER TIGHT SHEET ALUM BOX OVER CONDUIT STUB OPENING IN ISLAND.

E23 BOLLARD:
PROVIDED AND INSTALLED BY G.C. REFER TO DETAILS ON SHEET A5 FOR ADDL INFO

E24 KNOX BOX:
MOUNTED FLUSH WITH SURROUNDING WALL SURFACE. INSTALL AT FRONT ENTRY OR REAR EXTI (ONE LOACTION ONLY) VERIFY LOCATION WITH LOCAL MUNICIPALITY TO INSURE COMPLIANCE.

E25 BANK EQUIPMENT:
TO BE PROVIDED AND INSTALLED BY OWNER'S EQUIPMENT VENDOR. G.C. TO PROVIDE OPENINGS AND ELECTRICAL REQUIREMENTS IN ACCORDANCE WITH FINAL APPROVED BANK EQUIPMENT SHOP DRAWINGS.

E26 ELECTRICAL SERVICE EQUIPMENT. PAINT COLOR EPT-3, LATTE

E27 HOSE BIB

E28 SIGNAGE BACKING:
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E29 ADDRESS NUMBER:
6" TALL WHITE VINYL ADDRESS NUMBER WITH 1/2" THICK STROKE MOUNTED ON INTERIOR FACE OF GLASS TRANSOM

E30 LIGHT FIXTURE:
REFER TO ELEC DWGS FOR ADDL INFO

E31 CARD READER & OVERRIDE SWITCH:
REFER TO SECURITY DWGS FOR ADDL INFO

E32 VAT TUBE OPENINGS, SEE DETAIL 17/A6.5.

E33 CAST ALUMINUM DUCT VENT, PRE-FINISHED TO MATCH ADJACENT WALL

E34 OFF-RIDGE ROOF VENT PREFINISHED TO MATCH ROOFING

E36 MECHANICAL EQUIPMENT BEYOND IN ROOF WELL, SCREENED BEHIND PARAPET.

E37 LINE OF ROOF SURFACE BEYOND.

E38 PROVIDE RECESSED FIRE KNOX BOXES AS REQUIRED.

CHASE

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19080 Willamette Dr
West Linn, OR 97068

PROJECT #210461.89

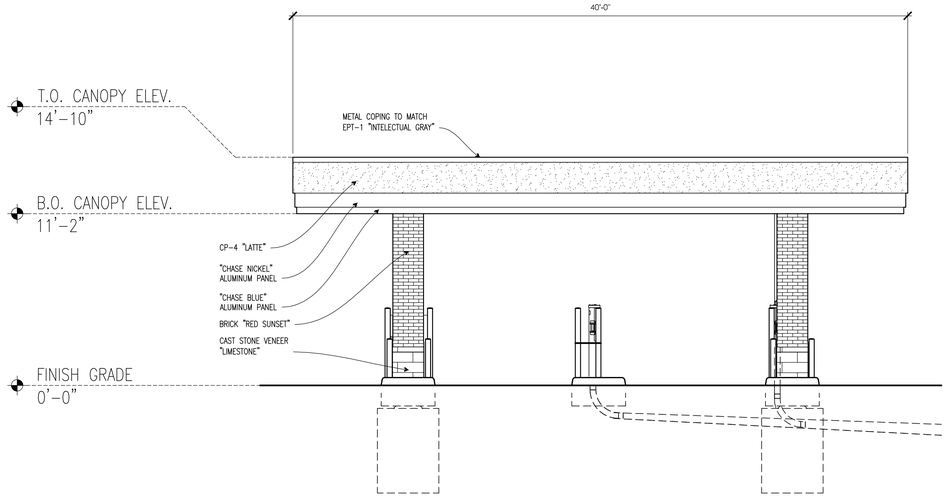
SIGNED: XX/XX/XX

ISSUED / REVISED	DATE
PLANNING SUBMITTAL	02/23/12

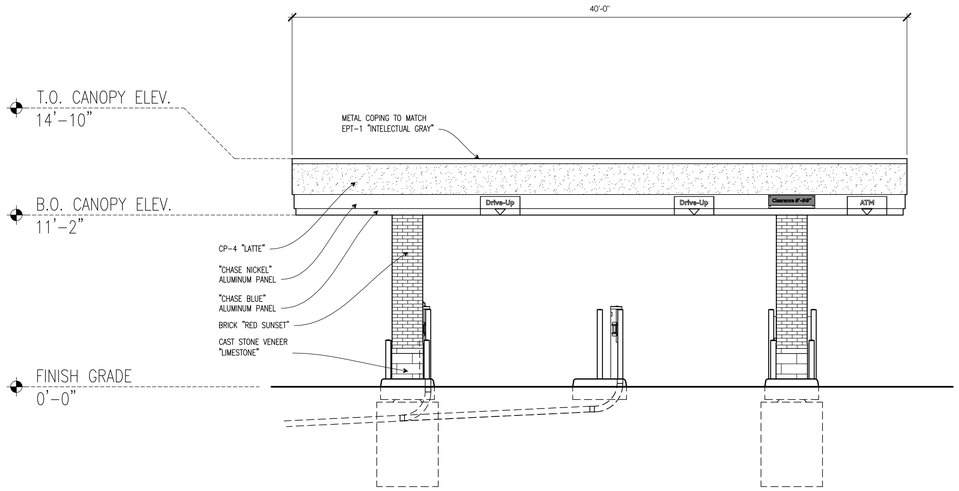
Exterior Elevations

A4.2

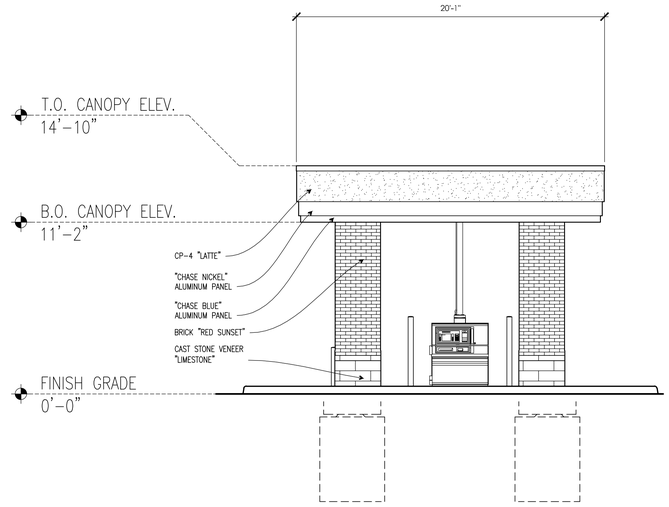
Plot date: February 23, 2012 \\SEANAS4\Program Mgmt\Projects\Chase\New Build\Oregon\Cedar Oak & Willamette-WestLinn\Caddchcow\A 4.2 022312.dwg



1 EAST ELEVATION
1/4"=1'-0"



2 WEST ELEVATION
1/4"=1'-0"



4 BACK OF TOWER ELEVATION
SCALE: 1/4"=1'-0"

ELEVATION KEYNOTES

E1 CONCRETE FOOTINGS/FOUNDATIONS:
REFER TO STRUCT DWGS FOR ADDL INFO

E2 CONCRETE CURB & ISLANDS

E3 CAST STONE STARTER COURSE:
AS MANUFACTURED BY SAVANNA STONE (OR APPROVED EQUAL).
NOMINAL SIZE: 24" WIDE x 4" HIGH x 4" DEEP (U.N.O.)
TEXTURE: SMOOTH
COLOR: "LIMESTONE #3"

E4 CAST STONE VENEER:
AS MANUFACTURED BY SAVANNA STONE (OR APPROVED EQUAL).
NOMINAL SIZE: 24" WIDE x 8" HIGH x 4" DEEP (U.N.O.)
TEXTURE: ROCKFACE
COLOR: "LIMESTONE #3"

E5 CAST STONE TRIM:
AS MANUFACTURED BY SAVANNA STONE (OR APPROVED EQUAL).
SEE REFERENCED DETAILS FOR PROFILES AND DIMENSIONS
TEXTURE: SMOOTH
COLOR: "LIMESTONE #3"

E6 BRICK VENEER:
DENTON 150, "RED SUNSET" AS MANUFACTURED BY ACME BRICK COMPANY (OR APPROVED EQUAL). MORTAR COLOR TO BE NATURAL (NO COLOR ADDED).

E7 BRICK REVEAL:
3/4" DEEP REVEAL. REVEAL TO STOP 4" FROM TELLER WINDOW AND BANK EQUIPMENT OPENINGS (SEE DETAIL 5/A6.6). FIELD CUT BRICK TO MAINTAIN AIRSPACE.

E8 "V"-GROOVE:
3/4" METAL PLASTER CONTROL JOINT

E9 EXPANSION JOINT:
CONTINUOUS VERTICAL CONTROL JOINT. REFER TO DETAIL 4/A6.6 FOR ADDL INFO

E10 COPING:
PRE-FINISHED METAL COPING. FINISH: MT-1

E11 ROOFING SHINGLES:
ARCHITECTURAL ASPHALT ROOF SHINGLES. "INDEPENDENCE SHANGLE" AS MANUFACTURED BY CERTAINTEED. COLOR: "WEATHERWOOD"

E12 GUTTERS & DOWNSPOUTS:
6" WIDE x 4 3/4" DEEP PRE-FINISHED ALUMINUM "K-STYLE" GUTTERS w/ 4" WIDE x 2 1/4" DEEP CORRUGATED RECTANGULAR DOWNSPOUTS. FINISH: MT-1

E13 SCUPPER:
PREFINISHED ALUMINUM OVERFLOW SCUPPER, MT-2. REFER TO DETAIL 13/A6.5 FOR ADDL INFO

E14 CANOPY FLASHING:
PRE-FINISHED ALUMINUM FLASHING TO SPAN GAP BETWEEN CANOPY AND BUILDING. REFER TO DETAIL 19/A6.5 FOR ADDL INFO. FINISH: MT-2. VERIFY FINAL FLASHING LENGTH AND CONFIGURATION WITH APPROVED CANOPY SHOP DWGS

E15 FASCIA PANEL - 'LATTE':
PRE-FINISHED ALUMINUM FASCIA PANEL TO MATCH EPT-3 (SUBMIT SHOP DRAWINGS AND COLOR SAMPLES FOR APPROVAL)

E16 FASCIA PANEL - 'CHASE NICKEL':
PRE-FINISHED ALUMINUM FASCIA PANEL TO MATCH EPT-5 (SUBMIT SHOP DRAWINGS AND COLOR SAMPLES FOR APPROVAL)

E17 FASCIA PANEL - 'CHASE BLUE':
PRE-FINISHED ALUMINUM FASCIA PANEL TO MATCH EPT-4 (SUBMIT SHOP DRAWINGS AND COLOR SAMPLES FOR APPROVAL)

E18 CANOPY SUPPORT COLUMN:
PAINT EPT-6.

E19 GUARDRAIL:
1 1/2" DIAMETER PRE-FINISHED ALUMINUM RAIL TO MATCH EPT-1. CORE DRILL & EPOXY GROUT INTO CONCRETE MIN. 8" DEPTH.

E20 STOREFRONT SYSTEM:
CLEAR ANODIZED ALUMINUM FRAMES. SEE SHEET A8.1 FOR ADDL INFO

E21 HOLLOW METAL DOOR & FRAME:
PAINT TO EPT-1. SEE DOOR SCHEDULE FOR ADDL INFO

E22 PROVIDE WEATHER TIGHT SHEET ALUM BOX OVER CONDUIT STUB OPENING IN ISLAND.

E23 BOLLARD:
PROVIDED AND INSTALLED BY G.C. REFER TO DETAILS ON SHEET A5 FOR ADDL INFO

E24 KNOX BOX:
MOUNTED FLUSH WITH SURROUNDING WALL SURFACE. INSTALL AT FRONT ENTRY OR REAR EXTI (ONE LOACTION ONLY) VERIFY LOCATION WITH LOCAL MUNICIPALITY TO INSURE COMPLIANCE.

E25 BANK EQUIPMENT:
TO BE PROVIDED AND INSTALLED BY OWNER'S EQUIPMENT VENDOR. G.C. TO PROVIDE OPENINGS AND ELECTRICAL REQUIREMENTS IN ACCORDANCE WITH FINAL APPROVED BANK EQUIPMENT SHOP DRAWINGS.

E26 ELECTRICAL SERVICE EQUIPMENT. PAINT COLOR EPT-3, LATTE

E27 HOSE BIB

E28 SIGNAGE BACKING:
G.C. TO PROVIDE 5/8" THICK 'EXPOSURE 1' PLYWOOD SHEATHING FOR SIGN MOUNTING.

E29 ADDRESS NUMBER:
6" TALL WHITE VINYL ADDRESS NUMBER WITH 1/2" THICK STROKE MOUNTED ON INTERIOR FACE OF GLASS TRANSOM

E30 LIGHT FIXTURE:
REFER TO ELEC DWGS FOR ADDL INFO

E31 CARD READER & OVERRIDE SWITCH:
REFER TO SECURITY DWGS FOR ADDL INFO

E32 VAT TUBE OPENINGS, SEE DETAIL 17/A6.5.

E33 CAST ALUMINUM DUCT VENT, PRE-FINISHED TO MATCH ADJACENT WALL

E34 OFF-RIDGE ROOF VENT PREFINISHED TO MATCH ROOFING

E36 MECHANICAL EQUIPMENT BEYOND IN ROOF WELL, SCREENED BEHIND PARAPET.

E37 LINE OF ROOF SURFACE BEYOND.

E38 PROVIDE RECESSED FIRE KNOX BOXES AS REQUIRED.

CHASE

CALLISON
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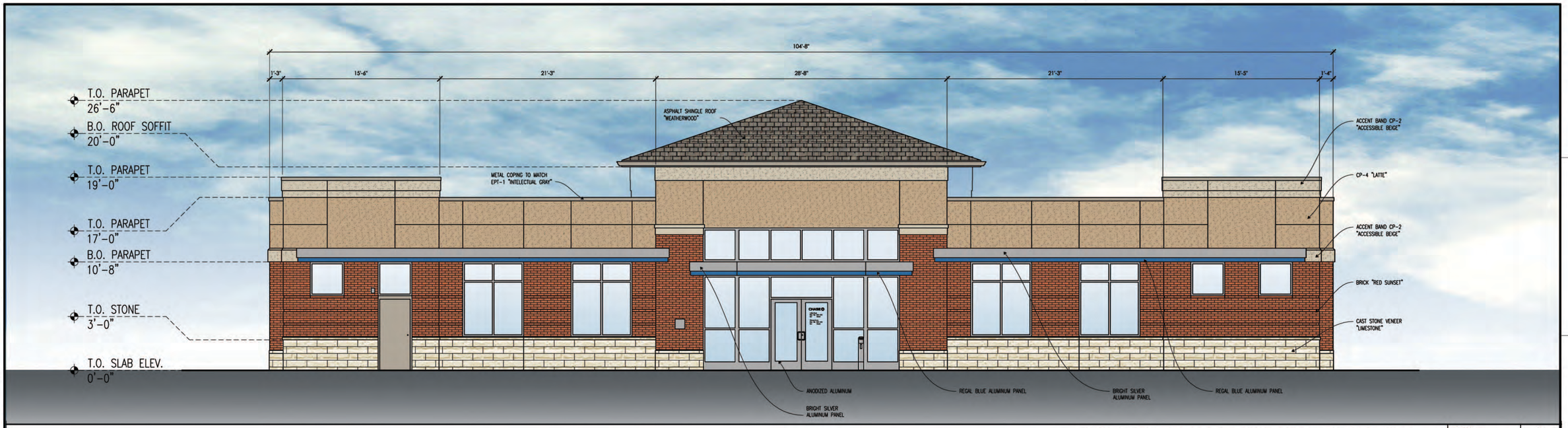
CHASE
NEW BUILD
CEDAR OAK & WILLAMETTE
19080 Willamette Dr
West Linn, OR 97068
PROJECT #210461.89

SIGNED: XX/XX/XX

ISSUED / REVISED	DATE
PLANNING SUBMITTAL	02/23/12

Exterior Elevations

A4.3



SOUTH EXTERIOR BUILDING ELEVATION

SCALE 1/4" = 1'-0" | 1

EXTERIOR FINISH LEGEND

PAINTS:

EPT-1 APPLICATION: EXTERIOR ALUMINUM / GALVANIZED METAL SURFACES
MANUFACTURER: SHERWIN WILLIAMS
PRODUCT: METALATEX ACRYLIC SEMI-GLOSS
PRODUCT NO.: B42 SERIES
COLOR: SW 7045 (INTELLECTUAL GRAY)
FINISH: SEMI-GLOSS

EPT-2 APPLICATION: EXTERIOR ALUMINUM / GALVANIZED METAL SURFACES (CORRESPONDS W/EIFS-2)
MANUFACTURER: SHERWIN WILLIAMS
PRODUCT: METALATEX ACRYLIC SEMI-GLOSS
PRODUCT NO.: B42 SERIES
COLOR: SW 7036 (ACCESSIBLE BEIGE)
FINISH: SEMI-GLOSS

EPT-3 APPLICATION: EXTERIOR ALUMINUM / GALVANIZED METAL SURFACES (CORRESPONDS W/EIFS-4)
MANUFACTURER: SHERWIN WILLIAMS
PRODUCT: METALATEX ACRYLIC SEMI-GLOSS
PRODUCT NO.: B42 SERIES
COLOR: SW 6108 (LATTE)
FINISH: SEMI-GLOSS

EPT-4 APPLICATION: EXTERIOR ACCENTS
MANUFACTURER: MATTHEWS PAINT
PRODUCT:
PRODUCT NO.:
COLOR: MP 00366 (CHASE BLUE)
FINISH: SEMI-GLOSS

EPT-5 APPLICATION: EXTERIOR ACCENTS
MANUFACTURER: MATTHEWS PAINT
PRODUCT:
PRODUCT NO.:
COLOR: MP 19891 (CHASE NICKEL)
FINISH: SEMI-GLOSS

EPT-6 APPLICATION: EXTERIOR ACCENTS
MANUFACTURER: MATTHEWS PAINT
PRODUCT:
PRODUCT NO.:
COLOR: MP 18248 (CHASE DARK NICKEL)
FINISH: SEMI-GLOSS

CEMENT PLASTER:

CP-1 CEMENT PLASTER: EXTERIOR CEMENT PLASTER SURFACES (REAR WALLS & SOFFIT SURFACES OF ENTRY TOWER)
MANUFACTURER: REFER TO SPECIFICATIONS
PRODUCT: REFER TO SPECIFICATIONS
COLOR: TO MATCH SHERWIN WILLIAMS #SW 7045 (INTELLECTUAL GRAY)
FINISH: STO SILICO LIT 1.0 (FINE)

CP-2 CEMENT PLASTER: EXTERIOR CEMENT PLASTER SURFACES (EIFS ACCENT BANDS)
MANUFACTURER: REFER TO SPECIFICATIONS
PRODUCT: REFER TO SPECIFICATIONS
COLOR: TO MATCH SHERWIN WILLIAMS #SW 7036 (ACCESSIBLE BEIGE)
FINISH: STO SILICO LIT 1.0 (FINE)

CP-3 CEMENT PLASTER: EXTERIOR CEMENT PLASTER SURFACES (EIFS PARAPET)
MANUFACTURER: REFER TO SPECIFICATIONS
PRODUCT: REFER TO SPECIFICATIONS
COLOR: TO MATCH SHERWIN WILLIAMS #SW 6108 (LATTE)
FINISH: STO SILICO LIT 1.0 (FINE)

METAL:

MT-1 ALUMINUM: FLASHING, COPING, GUTTERS, DOWNSPOUTS
MANUFACTURER: AEP SPAN OR EQUAL
PRODUCT: REFER TO SPECIFICATIONS
COLOR: COOL PARCHMENT

EAST EXTERIOR BUILDING ELEVATION

SCALE 1/4" = 1'-0" | 2

ELEVATION KEYNOTES

E1 CONCRETE FOOTINGS/FOUNDATIONS: REFER TO STRUCT DWGS FOR ADDL INFO

E2 CONCRETE CURB & ISLANDS

E3 CAST STONE STARTER COURSE: AS MANUFACTURED BY SAVANNA STONE (OR APPROVED EQUAL). NOMINAL SIZE: 24" WIDE x 4" HIGH x 4" DEEP (U.N.O.) TEXTURE: SMOOTH COLOR: "LIMESTONE #3"

E4 CAST STONE VENEER: AS MANUFACTURED BY SAVANNA STONE (OR APPROVED EQUAL). NOMINAL SIZE: 24" WIDE x 8" HIGH x 4" DEEP (U.N.O.) TEXTURE: ROCKFACE COLOR: "LIMESTONE #3"

E5 CAST STONE TRIM: AS MANUFACTURED BY SAVANNA STONE (OR APPROVED EQUAL). SEE REFERENCED DETAILS FOR PROFILES AND DIMENSIONS TEXTURE: SMOOTH COLOR: "LIMESTONE #3"

E6 BRICK VENEER: DENTON 150, "RED SUNSET" AS MANUFACTURED BY ACME BRICK COMPANY (OR APPROVED EQUAL). MORTAR COLOR TO BE NATURAL (NO COLOR ADDED).

E7 BRICK REVEAL: 3/4" DEEP REVEAL. REVEAL TO STOP 4" FROM TELLER WINDOW AND BANK EQUIPMENT OPENINGS (SEE DETAIL 5/A6.6). FIELD CUT BRICK TO MAINTAIN AIRSPACE.

E8 "V"-GROOVE: 3/4" METAL PLASTER CONTROL JOINT

E9 EXPANSION JOINT: CONTINUOUS VERTICAL CONTROL JOINT. REFER TO DETAIL 4/A6.6 FOR ADDL INFO

E10 COPING: PRE-FINISHED METAL COPING. FINISH: MT-1

E11 ROOFING SHINGLES: ARCHITECTURAL ASPHALT ROOF SHINGLES. "INDEPENDENCE SHANGLE" AS MANUFACTURED BY CERTAINTEED. COLOR: "WEATHERWOOD"

E12 GUTTERS & DOWNSPOUTS: 6" WIDE x 4 3/4" DEEP PRE-FINISHED ALUMINUM "K-STYLE" GUTTERS w/ 4" WIDE x 2 1/4" DEEP CORRUGATED RECTANGULAR DOWNSPOUTS. FINISH: MT-1

E13 SCUPPER: PREFINISHED ALUMINUM OVERFLOW SCUPPER, MT-2. REFER TO DETAIL 13/A6.5 FOR ADDL INFO

E14 CANOPY FLASHING: PRE-FINISHED ALUMINUM FLASHING TO SPAN GAP BETWEEN CANOPY AND BUILDING. REFER TO DETAIL 19/A6.5 FOR ADDL INFO. FINISH: MT-2. VERIFY FINAL FLASHING LENGTH AND CONFIGURATION WITH APPROVED CANOPY SHOP DWGS

E15 FASCIA PANEL - 'LATTE': PRE-FINISHED ALUMINUM FASCIA PANEL TO MATCH EPT-3 (SUBMIT SHOP DRAWINGS AND COLOR SAMPLES FOR APPROVAL)

E16 FASCIA PANEL - "CHASE NICKEL": PRE-FINISHED ALUMINUM FASCIA PANEL TO MATCH EPT-5 (SUBMIT SHOP DRAWINGS AND COLOR SAMPLES FOR APPROVAL)

E17 FASCIA PANEL - 'CHASE BLUE': PRE-FINISHED ALUMINUM FASCIA PANEL TO MATCH EPT-4 (SUBMIT SHOP DRAWINGS AND COLOR SAMPLES FOR APPROVAL)

E18 CANOPY SUPPORT COLUMN: PAINT EPT-6.

E19 GUARDRAIL: 1 1/2" DIAMETER PRE-FINISHED ALUMINUM RAIL TO MATCH EPT-1. CORE DRILL & EPOXY GROUT INTO CONCRETE MIN. 8" DEPTH.

E20 STOREFRONT SYSTEM: CLEAR ANODIZED ALUMINUM FRAMES. SEE SHEET A8.1 FOR ADDL INFO

E21 HOLLOW METAL DOOR & FRAME: PAINT TO EPT-1. SEE DOOR SCHEDULE FOR ADDL INFO

E22 PROVIDE WEATHER TIGHT SHEET ALUM BOX OVER CONDUIT STUB OPENING IN ISLAND.

E23 BOLLARD: PROVIDED AND INSTALLED BY G.C. REFER TO DETAILS ON SHEET A5 FOR ADDL INFO

E24 KNOX BOX: MOUNTED FLUSH WITH SURROUNDING WALL SURFACE. INSTALL AT FRONT ENTRY OR REAR EXTI (ONE LOACTION ONLY) VERIFY LOCATION WITH LOCAL MUNICIPALITY TO INSURE COMPLIANCE.

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E31 CARD READER & OVERRIDE SWITCH: REFER TO SECURITY DWGS FOR ADDL INFO

E32 VAT TUBE OPENINGS, SEE DETAIL 17/A6.5.

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E36 MECHANICAL EQUIPMENT BEYOND IN ROOF WELL, SCREENED BEHIND PARAPET.

E37 LINE OF ROOF SURFACE BEYOND.

E38 PROVIDE RECESSED FIRE KNOX BOXES AS REQUIRED.

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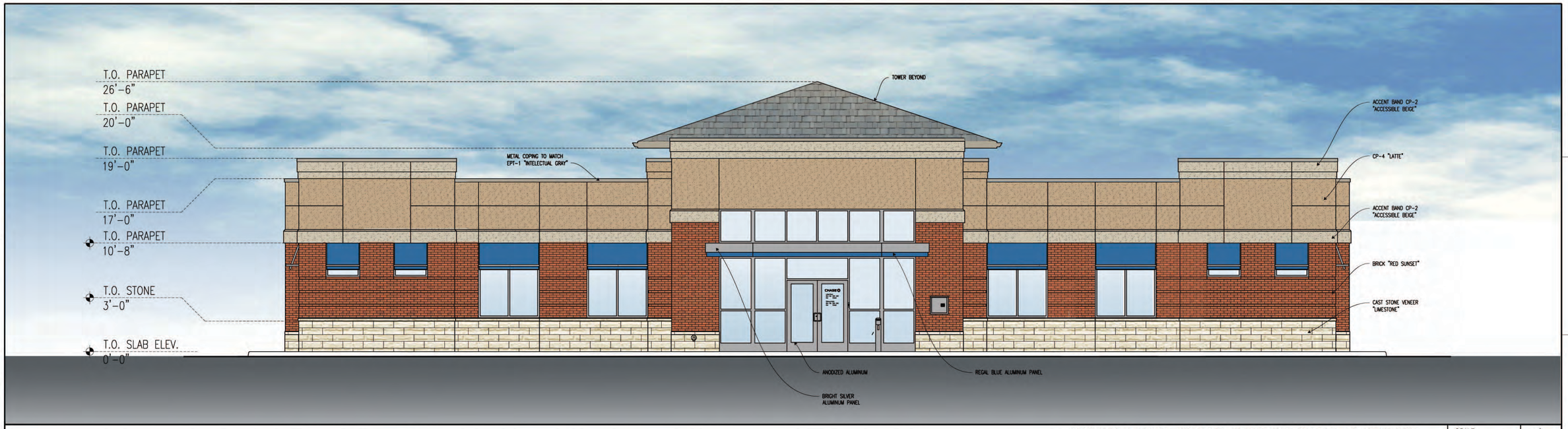
ISSUED / REVISED	DATE
PERMIT SET	XX/XX/XX

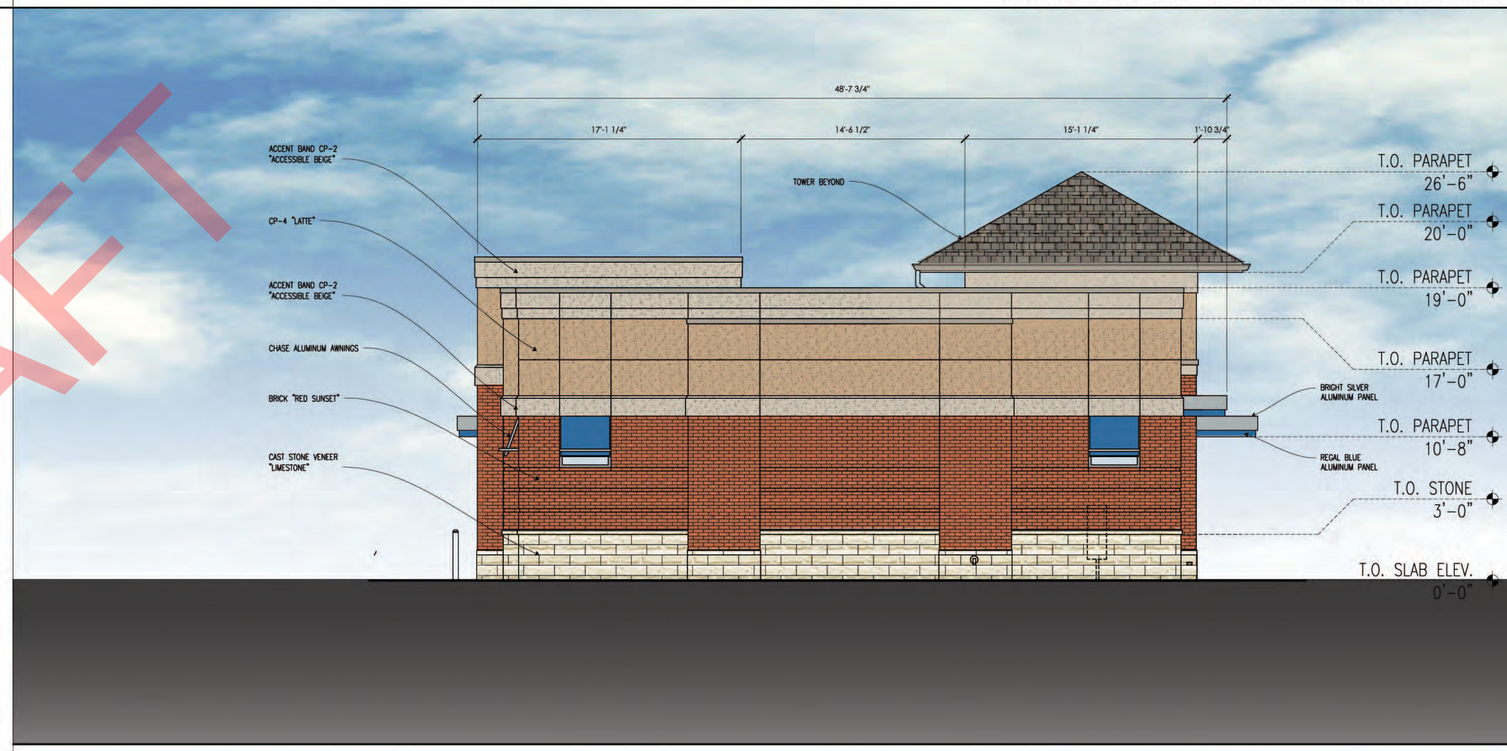
Exterior Elevations

A4.1

Plot date: February 7, 2012 D:\Projects\Chase\Projects\Oregon\Cedar Oak & Willamette\Caddchcow\A 4.1 081011.dwg



NORTH EXTERIOR BUILDING ELEVATION | SCALE 1/4" = 1'-0" | 1



WEST EXTERIOR BUILDING ELEVATION | SCALE 1/4" = 1'-0" | 2

ELEVATION KEYNOTES

E1 CONCRETE FOOTINGS/FOUNDATIONS:
REFER TO STRUCT DWGS FOR ADDL INFO

E2 CONCRETE CURB & ISLANDS

E3 CAST STONE STARTER COURSE:
AS MANUFACTURED BY SAVANNA STONE (OR APPROVED EQUAL).
NOMINAL SIZE: 24" WIDE x 4" HIGH x 4" DEEP (U.N.O.)
TEXTURE: SMOOTH
COLOR: "LIMESTONE #3"

E4 CAST STONE VENEER:
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NOMINAL SIZE: 24" WIDE x 8" HIGH x 4" DEEP (U.N.O.)
TEXTURE: ROCKFACE
COLOR: "LIMESTONE #3"

E5 CAST STONE TRIM:
AS MANUFACTURED BY SAVANNA STONE (OR APPROVED EQUAL).
SEE REFERENCED DETAILS FOR PROFILES AND DIMENSIONS
TEXTURE: SMOOTH
COLOR: "LIMESTONE #3"

E6 BRICK VENEER:
DENTON 150, "RED SUNSET" AS MANUFACTURED BY ACME BRICK COMPANY (OR APPROVED EQUAL). MORTAR COLOR TO BE NATURAL (NO COLOR ADDED).

E7 BRICK REVEAL:
3/4" DEEP REVEAL. REVEAL TO STOP 4" FROM TELLER WINDOW AND BANK EQUIPMENT OPENINGS (SEE DETAIL 5/A6.6). FIELD CUT BRICK TO MAINTAIN AIRSPACE.

E8 "V"-GROOVE:
3/4" METAL PLASTER CONTROL JOINT

E9 EXPANSION JOINT:
CONTINUOUS VERTICAL CONTROL JOINT. REFER TO DETAIL 4/A6.6 FOR ADDL INFO

E10 COPING:
PRE-FINISHED METAL COPING. FINISH: MT-1

E11 ROOFING SHINGLES:
ARCHITECTURAL ASPHALT ROOF SHINGLES. 'INDEPENDENCE SHANGLE' AS MANUFACTURED BY CERTAINTEED. COLOR: "WEATHERWOOD"

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6" WIDE x 4 3/4" DEEP PRE-FINISHED ALUMINUM 'K-STYLE' GUTTERS w/ 4" WIDE x 2 1/4" DEEP CORRUGATED RECTANGULAR DOWNSPOUTS. FINISH: MT-1

E13 SCUPPER:
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E14 CANOPY FLASHING:
PRE-FINISHED ALUMINUM FLASHING TO SPAN GAP BETWEEN CANOPY AND BUILDING. REFER TO DETAIL 19/A6.5 FOR ADDL INFO. FINISH: MT-2. VERIFY FINAL FLASHING LENGTH AND CONFIGURATION WITH APPROVED CANOPY SHOP DWGS

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E18 CANOPY SUPPORT COLUMN:
PAINT EPT-6.

E19 GUARDRAIL:
1 1/2" DIAMETER PRE-FINISHED ALUMINUM RAIL TO MATCH EPT-1. CORE DRILL & EPOXY GROUT INTO CONCRETE MIN. 8" DEPTH.

E20 STOREFRONT SYSTEM:
CLEAR ANODIZED ALUMINUM FRAMES. SEE SHEET A8.1 FOR ADDL INFO

E21 HOLLOW METAL DOOR & FRAME:
PAINT TO EPT-1. SEE DOOR SCHEDULE FOR ADDL INFO

E22 PROVIDE WEATHER TIGHT SHEET ALUM BOX OVER CONDUIT STUB OPENING IN ISLAND.

E23 BOLLARD:
PROVIDED AND INSTALLED BY G.C. REFER TO DETAILS ON SHEET A5 FOR ADDL INFO

E24 KNOX BOX:
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E26 ELECTRICAL SERVICE EQUIPMENT; PAINT COLOR EPT-3, LATTE

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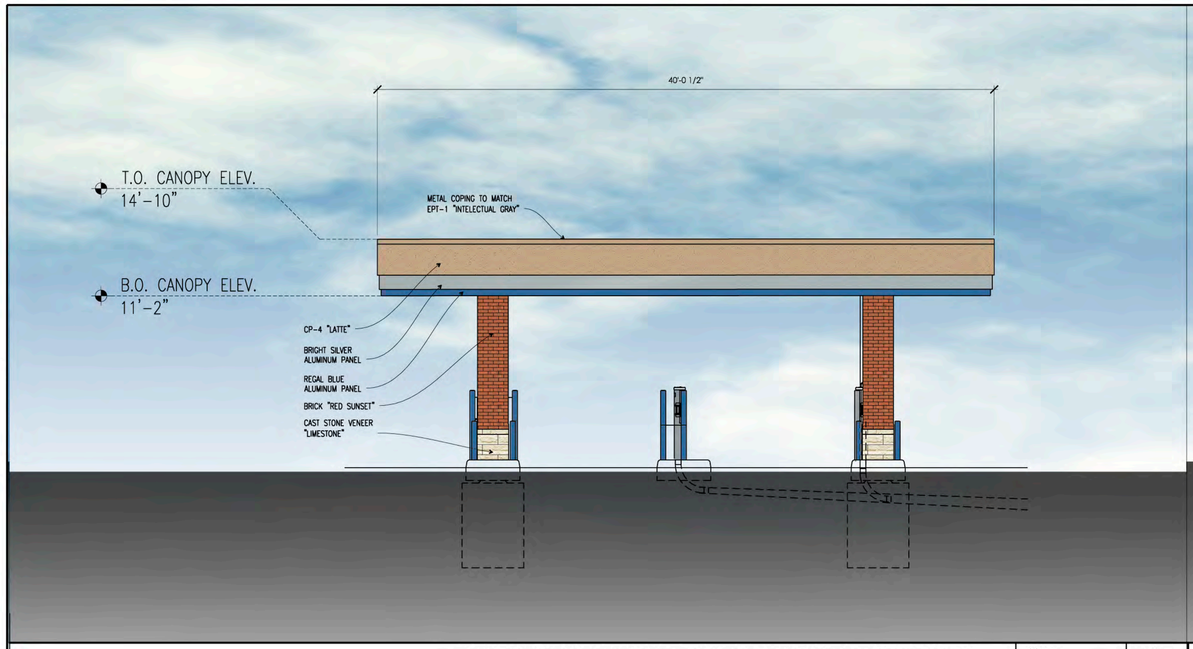
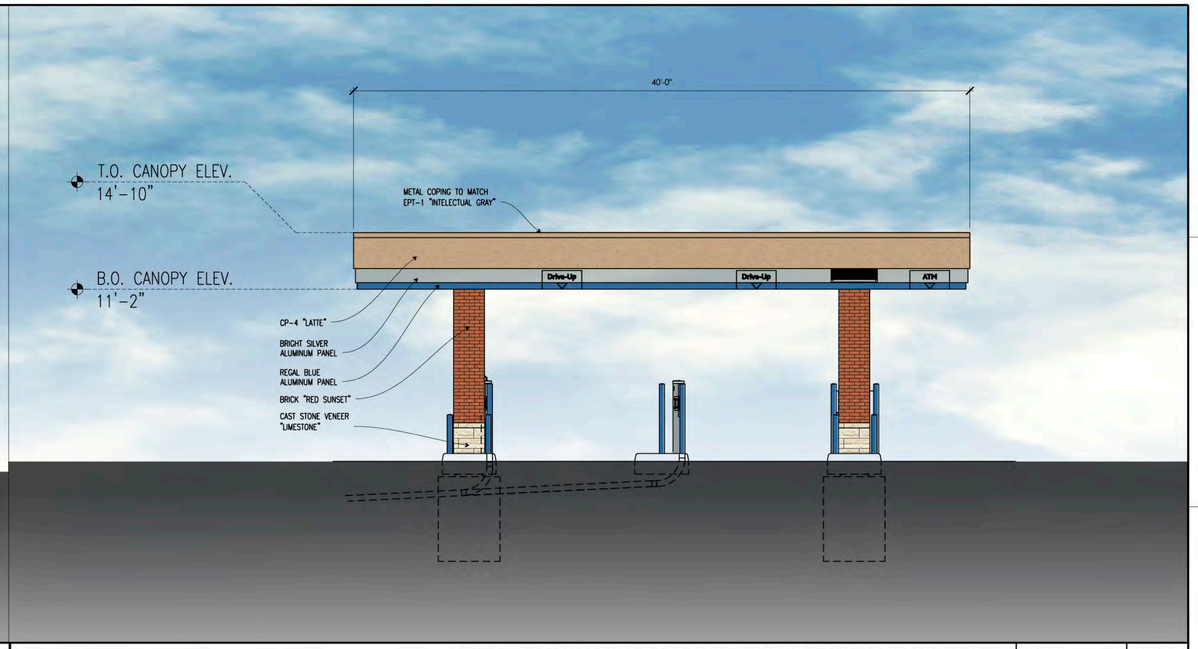
PERMIT SET	XX/XX/XX

Exterior Elevations

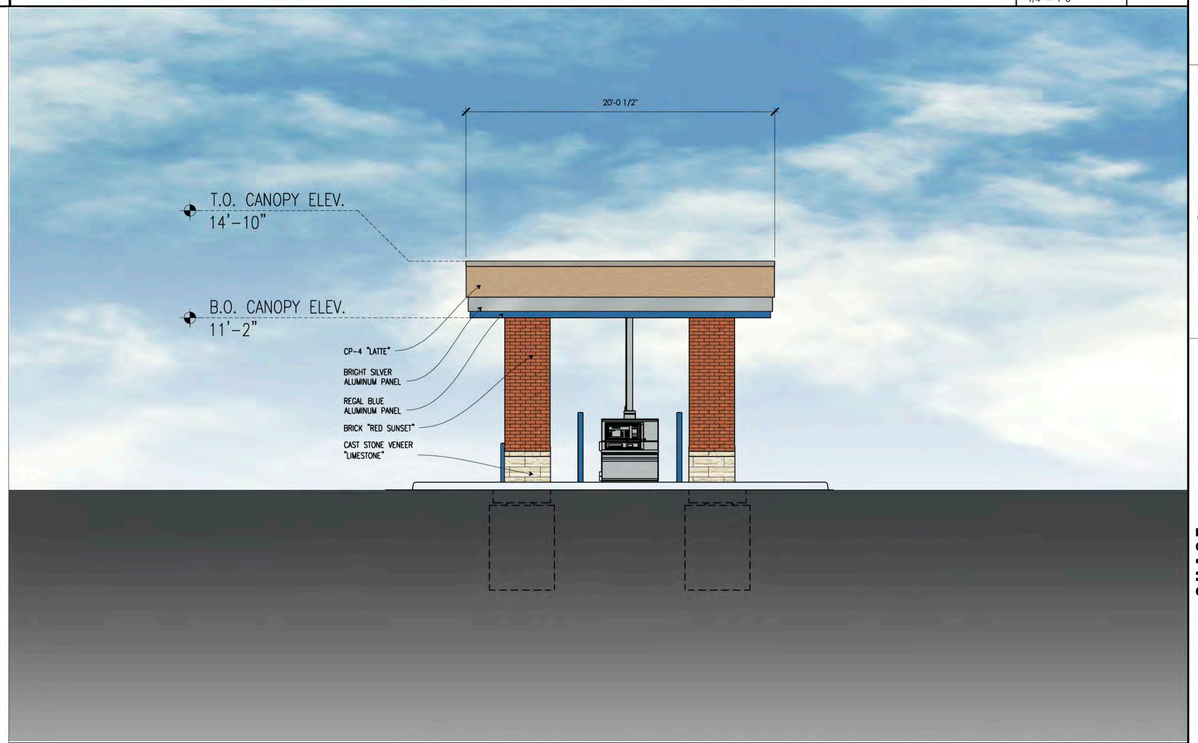
A4.2



EAST EXTERIOR BUILDING ELEVATION | SCALE 1/4" = 1'-0" | 1



WEST EXTERIOR BUILDING ELEVATION | SCALE 1/4" = 1'-0" | 2



SOUTH EXTERIOR BUILDING ELEVATION | SCALE 1/4" = 1'-0" | 4

ELEVATION KEYNOTES

E1 CONCRETE FOOTINGS/FOUNDATIONS:
REFER TO STRUCT DWGS FOR ADDL INFO

E2 CONCRETE CURB & ISLANDS

E3 CAST STONE STARTER COURSE:
AS MANUFACTURED BY SAVANNA STONE (OR APPROVED EQUAL).
NOMINAL SIZE: 24" WIDE x 4" HIGH x 4" DEEP (U.N.O.)
TEXTURE: SMOOTH
COLOR: "LIMESTONE #3"

E4 CAST STONE VENEER:
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NOMINAL SIZE: 24" WIDE x 8" HIGH x 4" DEEP (U.N.O.)
TEXTURE: ROCKFACE
COLOR: 'LIMESTONE #3'

E5 CAST STONE TRIM:
AS MANUFACTURED BY SAVANNA STONE (OR APPROVED EQUAL).
SEE REFERENCED DETAILS FOR PROFILES AND DIMENSIONS
TEXTURE: SMOOTH
COLOR: 'LIMESTONE #3'

E6 BRICK VENEER:
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3/4" DEEP REVEAL. REVEAL TO STOP 4" FROM TELLER WINDOW AND BANK EQUIPMENT OPENINGS (SEE DETAIL 5/A6.6). FIELD CUT BRICK TO MAINTAIN AIRSPACE.

E8 "V"-GROOVE:
3/4" METAL PLASTER CONTROL JOINT

E9 EXPANSION JOINT:
CONTINUOUS VERTICAL CONTROL JOINT. REFER TO DETAIL 4/A6.6 FOR ADDL INFO

E10 COPING:
PRE-FINISHED METAL COPING. FINISH: MT-1

E11 ROOFING SHINGLES:
ARCHITECTURAL ASPHALT ROOF SHINGLES. 'INDEPENDENCE SHANGLE' AS MANUFACTURED BY CERTAINTEED. COLOR: 'WEATHERWOOD'

E12 GUTTERS & DOWNSPOUTS:
6" WIDE x 4 3/4" DEEP PRE-FINISHED ALUMINUM 'K-STYLE' GUTTERS w/ 4" WIDE x 2 1/4" DEEP CORRUGATED RECTANGULAR DOWNSPOUTS. FINISH: MT-1

E13 SCUPPER:
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PRE-FINISHED ALUMINUM FASCIA PANEL TO MATCH EPT-4 (SUBMIT SHOP DRAWINGS AND COLOR SAMPLES FOR APPROVAL)

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1 1/2" DIAMETER PRE-FINISHED ALUMINUM RAIL TO MATCH EPT-1. CORE DRILL & EPOXY GROUT INTO CONCRETE MIN. 8" DEPTH.

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CLEAR ANODIZED ALUMINUM FRAMES. SEE SHEET A8.1 FOR ADDL INFO

E21 HOLLOW METAL DOOR & FRAME:
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E22 PROVIDE WEATHER TIGHT SHEET ALUM BOX OVER CONDUIT STUB OPENING IN ISLAND.

E23 BOLLARD:
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ISSUED / REVISED	DATE
PERMIT SET	XX/XX/XX

Exterior Elevations

A4.3

Plot date: February 3, 2012 O:\Projects\Chase\Projects\Oregon\Cedar Oak & Willamette\Caddchow\A 4.3 081011.dwg

STORM SEWER NOTES:

1) *STORMWATER FROM THE PROPOSED DEVELOPMENT WILL BE CAPTURED BY CATCH BASINS, TREATED IN A CARTRIDGE FILTER MANHOLE, DETAINED IN THE 60" CMP DETENTION PIPE, RELEASED AT PREDEVELOPED RATES VIA A FLOW CONTROL MANHOLE, AND THEN CONVEYED VIA PIPE TO THE EXISTING STORM SYSTEM LOCATED AT THE NORTHWEST CORNER OF THE SITE.*

2) *STORMWATER TREATMENT IS PROVIDED BY A 48" STORMFILTER MANHOLE WITH 3 CARTRIDGE FILTERS.*

3) *STORMWATER DETENTION IS PROVIDED BY 160 LF OF 60" CMP PIPE WITH A FLOW CONTROL MANHOLE TO RESTRICT FLOWS TO PREDEVELOPED RATES.*

4) *EXISTING CATCH BASINS AND SERVICE LATERALS NOT BEING UTILIZED AS PART OF THE NEW DEVELOPMENT WILL BE COMPLETELY REMOVED.*

SANITARY SEWER NOTES:

1) *SANITARY SEWER SERVICE FOR THE PROPOSED DEVELOPMENT WILL BE PROVIDED BY CONNECTING TO AN EXISTING SANITARY LATERAL LOCATED NEAR THE EAST END OF THE SITE AND EXTENDING A NEW SANITARY LATERAL TO THE PROPOSED BUILDING.*

2) *EXISTING SERVICE LATERALS AND CLEANOUTS NOT BEING UTILIZED AS PART OF THE NEW DEVELOPMENT WILL BE COMPLETELY REMOVED.*

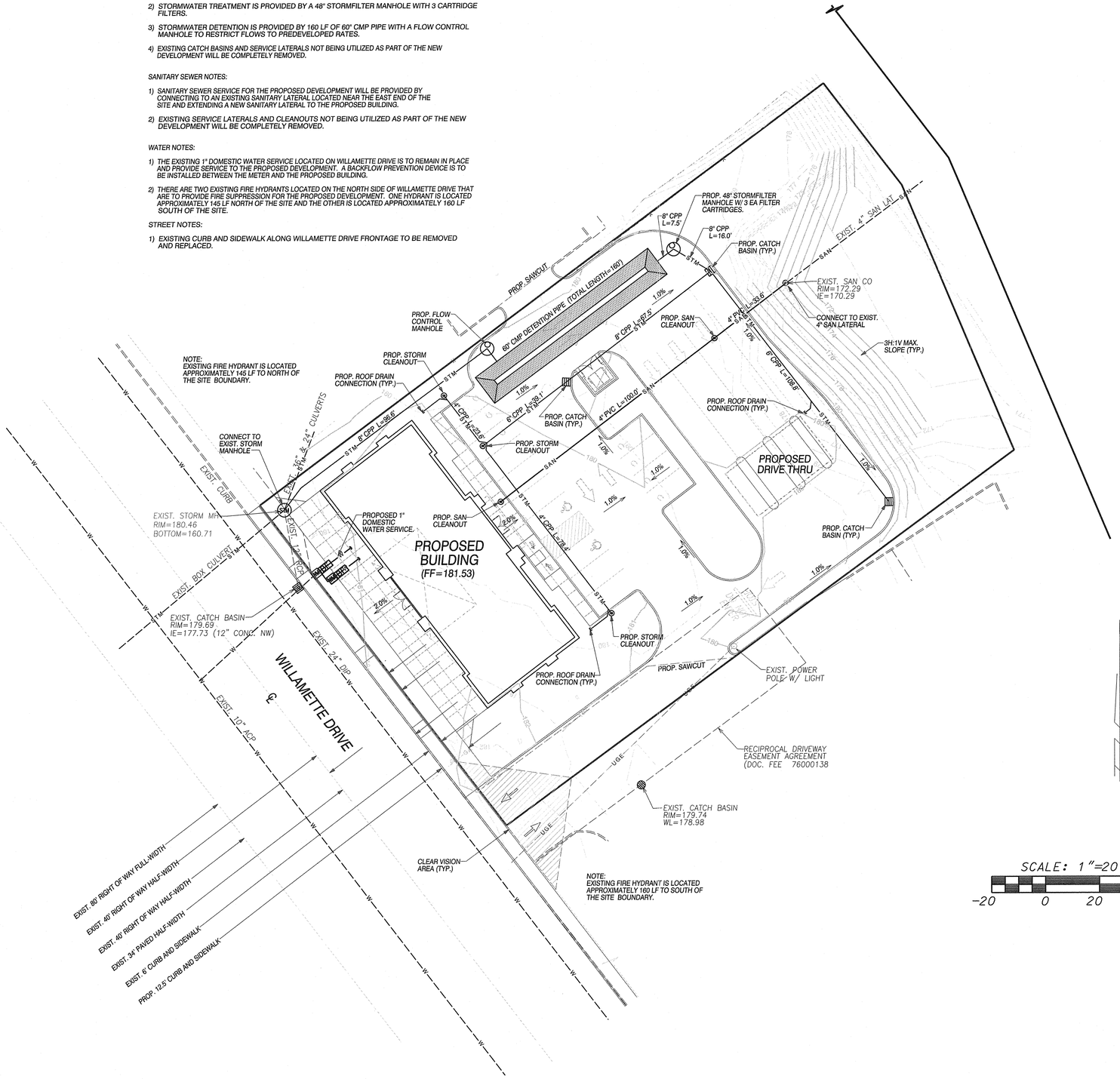
WATER NOTES:

1) *THE EXISTING 1" DOMESTIC WATER SERVICE LOCATED ON WILLAMETTE DRIVE IS TO REMAIN IN PLACE AND PROVIDE SERVICE TO THE PROPOSED DEVELOPMENT. A BACKFLOW PREVENTION DEVICE IS TO BE INSTALLED BETWEEN THE METER AND THE PROPOSED BUILDING.*

2) *THERE ARE TWO EXISTING FIRE HYDRANTS LOCATED ON THE NORTH SIDE OF WILLAMETTE DRIVE THAT ARE TO PROVIDE FIRE SUPPRESSION FOR THE PROPOSED DEVELOPMENT. ONE HYDRANT IS LOCATED APPROXIMATELY 145 LF NORTH OF THE SITE AND THE OTHER IS LOCATED APPROXIMATELY 160 LF SOUTH OF THE SITE.*

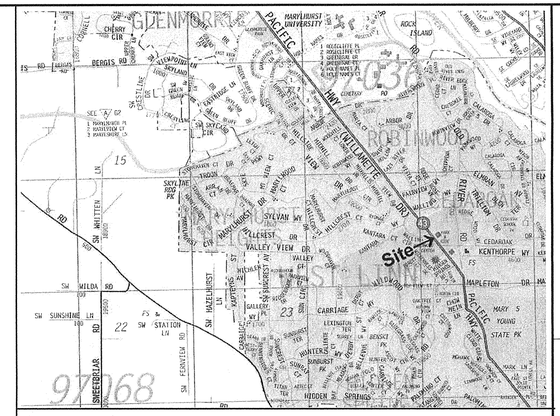
STREET NOTES:

1) *EXISTING CURB AND SIDEWALK ALONG WILLAMETTE DRIVE FRONTAGE TO BE REMOVED AND REPLACED.*



SCALE: 1"=20'

-20 0 20 40



VICINITY MAP

SOILS MAP

LEGEND

- PERIMETER OF SITE
- RIGHT-OF-WAY LINE
- CENTERLINE OF ROAD
- FACE OF CURB
- LOT LINE
- EASEMENT LINE
- STM — STORM SEWER LINE
- STM — EXIST STORM SEWER
- SAN — SANITARY SEWER LINE
- SAN — EXIST SANITARY SEWER
- W — WATER SERVICE LINE
- W — EXIST WATER LINE
- 123 — GRADED CONTOUR LINE
- 123 — EXIST CONTOUR LINE
- MANHOLE
- CLEAN OUT
- CATCH BASIN
- FIRE HYDRANT ASSEMBLY
- WATER VALVE AND BOX
- BLOWOFF ASSEMBLY
- THRUST BLOCK
- WATER SERVICE METER
- TELEPHONE RISER
- GAS RISER
- ELECTRIC RISER
- UTILITY POLE
- UTILITY POLE W/ LIGHT
- SIGN POST

CHASE

CEDAR OAK & WILLAMETTE RETAIL BANKING CENTER

19080 WILLAMETTE DRIVE
WEST LINN, OR 97068
PROJECT #: 210461.89

ARCHITECT OF RECORD
CALLISON
CALLISON ARCHITECTS, P.C.
www.callison.com

ENGINEER OF RECORD
OLSON ENGINEERING INC. LAND SURVEYORS ENGINEERS
1111 BROADWAY, VANCOUVER, WA 98660

SEAL
REGISTERED PROFESSIONAL ENGINEER 60784PE OREGON MAY 17, 1977 CHRIS R. WONDERLY
EXPIRES: 6/30/12
2/17/12

ISSUE	DATE	DESCRIPTION
	2/23/2012	DESIGN REVIEW APPLICATION

SHEET TITLE

PRELIMINARY DEVELOPMENT PLAN

SHEET NUMBER

1 OF 1

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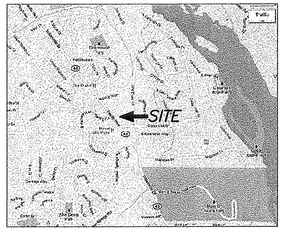
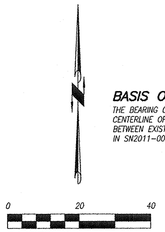
M:\MicroStation V8\pen tables\OCE table setup\oce utilities.tbl



VICINITY MAP
NO SCALE



0 20 40
SCALE: 1" = 20'

BASIS OF BEARINGS:

THE BEARING OF N37°26'50"W ALONG THE CENTERLINE OF WILLAMETTE DRIVE ORIENTED BETWEEN EXISTING SURVEY MONUMENTS AS SHOWN IN SN2011-002.

TITLE EXCEPTIONS

1-2. TAXES (NOT SHOWN)

3. CITY LIENS (NOT SHOWN)

4. COVENANTS, CONDITIONS, RESTRICTIONS AND EASEMENTS RECORDED IN BOOK. 411, PAGE 392, MODIFIED IN BOOK 488, PAGE 467 AND MODIFIED IN BOOK 528, PAGE 595. (NOT SHOWN)

5. RECIPROCAL DRIVEWAY EASEMENT AGREEMENT DOCUMENT FEE NO. 76000138 (SHOWN)

6. UNRECORDED LEASES (NOT SHOWN)

LEGEND

- DECIDUOUS TREE AS NOTED
- BOLLARD
- STREET LIGHT
- CABLE TV BOX
- SIGN AS NOTED
- GATE POST
- STORM MANHOLE
- STORM CURB INLET
- STORM CATCH BASIN
- SANITARY MANHOLE
- CLEANOUT
- WATER VALVE
- GAS VALVE
- GAS METER
- ADA PARKING SPACE
- TELEPHONE PEDESTAL
- WATER METER
- WATER STANDPIPE
- TRAFFIC SIGNAL J-BOX
- POWER TRANSFORMER
- FOUND SURVEY MONUMENT AS NOTED
- SITE BENCHMARK AS NOTED
- ACCESS TO AND FROM A PUBLIC WAY
- SAN —— SAN —— SANITARY SEWER LINE
- STM —— STM —— STORM SEWER LINE
- GAS —— GAS —— UNDERGROUND GAS LINE
- TEL —— TEL —— UNDERGROUND TELEPHONE LINE
- PWR —— PWR —— UNDERGROUND POWER LINE
- W —— W —— UNDERGROUND WATER LINE
- BUILDING OVERHANG
- —o—o— FENCE (AS NOTED)
- SF SQUARE FEET
- CONCRETE PAVING
- ASPHALT PAVING
- NO PARKING STRIPES
- BORING HOLE

LEGAL DESCRIPTION

PARCEL I:

LOT 18 AND THE SOUTHEASTERLY 20 FEET OF LOT 17, CEDAR OAK PARK (PLAT BOOK 404, PAGE 0230), IN THE CITY OF WEST LINN, COUNTY OF CLACKAMAS AND STATE OF OREGON.

EXCEPT THE EASTERLY 20 FEEF THEREOF AS CUT OFF BY A LINE DRAWN PARALLEL WITH THE NORTHEASTERLY LINES OF SAID LOTS 17 AND 18.

ALSO EXCEPTING THEREFROM THAT PORTION LYING WITHIN THE BOUNDARIES OF WILLAMETTE DRIVE.

THE LEGAL DESCRIPTION WAS CREATED PRIOR TO JANUARY 01, 2008.

PARCEL II:

PART OF LOT 17, CEDAR OAK PARK (PLAT BOOK 404, PAGE 0230), IN THE CITY OF WEST LINN, COUNTY OF CLACKAMAS AND STATE OF OREGON, DESCRIBED AS FOLLOWS:

BEGINNING AT THE MOST SOUTHERLY CORNER OF SAID LOT 17;

THENCE NORTHEASTERLY ALONG THE SOUTHEASTERLY LINE OF SAID LOT TO THE NORTHEASTERLY LINE OF PACIFIC HIGHWAY;

THENCE NORTHWESTERLY ALONG THE NORTHEASTERLY LINE OF SAID HIGHWAY 20 FEET TO THE NORTHWESTERLY CORNER OF THAT TRACT CONVEYED TO REGIS RAUJOL, ET UX, BY DEED RECORDED MAY 23, 1977 AS FEE NO. 77019608, CLACKAMAS COUNTY RECORDS, AND THE TRUE POINT OF BEGINNING;

THENCE NORTHEASTERLY ALONG THE NORTHWESTERLY LINE OF SAID RAUJOL TRACT 261.6 FEET TO THE MOST NORTHERLY CORNER THEREOF;

THENCE NORTHWESTERLY PARALLEL TO THE NORTHEASTERLY LINE OF SAID LOT 17, A DISTANCE OF 30 FEET;

THENCE SOUTHWESTERLY PARALLEL TO THE SOUTHEASTERLY LINE OF SAID LOT 17, A DISTANCE OF 261.6 FEET TO THE NORTHEASTERLY LINE AFORESAID PACIFIC HIGHWAY;

THENCE SOUTHEASTERLY ALONG THE NORTHEASTERLY LINE OF SAID HIGHWAY, 30 FEET TO THE TRUE POINT OF BEGINNING.

EXCEPTING THEREFROM THAT PORTION LYING WITHIN THE BOUNDARIES OF WILLAMETTE DRIVE.

THE LEGAL DESCRIPTION WAS CREATED PRIOR TO JANUARY 01, 2008.

ZONING

THIS SITE IS ZONED GENERAL COMMERCIAL (CG).

ACCORDING TO WEST LINN DEVELOPMENT CODE DEFINITIONS, BUILDING SETBACKS FOR THE CG ZONE ARE AS FOLLOWS:

MINIMUM STREET FRONTAGE: 35 FEET

FRONT YARD SETBACK: 0 FEET

REAR YARD SETBACK: 25 FEET

INTERIOR SIDE YARD SETBACK: 7.5 FEET

STREET SIDE YARD SETBACK: 15 FEET

MAXIMUM BUILDING HEIGHT: 35 FEET TO 45 FEET DEPENDING ON LOCATION OF BUILDING TYPE.

MAXIMUM LOT COVERAGE: 50%

AVERAGE LOT DIMENSIONS: 50 FOOT WIDTH AND 90 FOOT DEPTH

NOTES:

THE LOCATION OF EXISTING UTILITY FACILITIES HAS NOT BEEN RESEARCHED. UNDERGROUND UTILITIES SHOWN HEREON ARE FROM TIES TO UTILITY PAINT MARKS MADE IN RESPONSE TO "ONE-CALL CONCEPTS" UTILITY NOTIFICATION TICKET NO. 110793677. THE SURVEYOR ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE DELINEATION OF SUCH UNDERGROUND UTILITIES BY THE RESPECTIVE UTILITY OWNERS, NOR THE EXISTENCE OF BURIED OBJECTS WHICH ARE NOT SHOWN ON THIS PLAN.

THE FOLLOWING UTILITY COMPANIES WERE CONTACTED TO LOCATE THEIR UNDERGROUND SERVICES: COMCAST CABLE, CITY OF BEAVERTON, FRONTIER COMMUNICATIONS, NW NATURAL GAS, PORTLAND GENERAL ELECTRIC, TUALATIN VALLEY WATER DISTRICT, CLEANWATER SERVICES, WASHINGTON COUNTY L.I.D.T. UTILITIES ARE SHOWN AS MARKED BY THE ABOVE UTILITY COMPANIES. OTHER ON SITE UNDERGROUND UTILITIES, IF ANY, HAVE NOT BEEN SHOWN.

ELEVATIONS FOR THIS SURVEY ARE NGVD 29 BASED ON TIES TO LAKE OSWEGO BENCHMARK 21Q-1, A BRASS DISC IN THE TOP OF CURB ON THE EAST SIDE OF WILLAMETTE DRIVE (HWY 43) 80 FEET SOUTHEAST OF THE CENTERLINE OF FAIRVIEW WAY, AT #18740 HWY 43, WEST LINN. ELEVATION OF THE DISK IS 178.817.

THE SUBJECT PARCEL HAS ACCESS TO AND FROM A PUBLIC WAY AS SHOWN HEREON.

THERE ARE BUILDINGS LOCATED WITHIN THE PROJECT LIMITS.

THE FIELD WORK FOR THIS SURVEY WAS PERFORMED IN MAY 2011.

AT THE TIME OF OUR FIELDWORK, THERE WAS NO OBSERVABLE EVIDENCE OF EARTH MOVING WORK, BUILDING CONSTRUCTION OR BUILDING ADDITIONS STILL IN PROGRESS.

AT THE TIME OF OUR FIELDWORK, THERE WAS NO OBSERVABLE EVIDENCE OF STREET OR SIDEWALK CONSTRUCTION OR REPAIRS, AND NO CHANGES IN STREET RIGHT OF WAY LINES WERE MADE AVAILABLE BY THE CONTROLLING JURISDICTIONS.

AT THE TIME OF OUR FIELDWORK, THERE WAS NO OBSERVABLE EVIDENCE OF THIS SITE BEING USED AS A SOLID WASTE DUMP, SUMP OR SANITARY LANDFILL.

A GROSS LAND AREA IS 0.87 ACRES (38059 SQ. FT).

THE MAPPED SITE CONTAINS NO STRIPED PARKING SPACES.

THE SITE ADDRESS IS 19080 WILLAMETTE DRIVE, WEST LINN, OREGON 97068.

THIS SURVEY REFLECTS INFORMATION SHOWN ON PRELIMINARY TITLE INSURANCE ISSUED BY FIRST AMERICAN TITLE INSURANCE COMPANY, ORDER NO. NCS-487602-WA1, DATED MAY 5, 2011 AT 7:30 A.M.

CERTIFICATION

TO JPMORGAN CHASE BANK, NATIONAL ASSOCIATION AND FIRST AMERICAN TITLE INSURANCE COMPANY:

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2011 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/ACSM LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 3, 4, 5, 6(b), 7(a) & (b-1) & (c), 8, 9, 11(b), 13, 14, 16, 17, 18 OF TABLE A THEREOF. THE FIELD WORK WAS COMPLETED ON MAY 24, 2011.

8/22/11

BRUCE TOWLE, PLS 2030 DATE

FILE: J:\DATA\8000\8700\8700\8701\SURVEY\8701.ALTA.DWG

CLIENT:

CALLISON
1420 FIFTH AVENUE #220
SEATTLE, WA 98101
(206) 623-4646

ALTA / ACSM LAND TITLE SURVEY FOR:

CHASE - WILLAMETTE & CEDAROAK

OLSON ENGINEERING INC.
LAND SURVEYORS
ENGINEERS
360-695-1385
503-639-3739
1111 BROADWAY, VANCOUVER, WA 98660

REGISTERED PROFESSIONAL LAND SURVEYOR
OREGON
FEBRUARY 3, 1983
BRUCE D. TOWLE
2030

RENEWAL DATE: 6/30/12

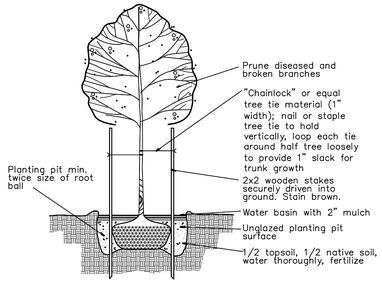
8/22/11

CHANGES / REVISIONS	
DESCRIPTION	DATE
ADDED PARCEL LINE	6/16/11
CERTIFICATION EDITS	8/22/11

DESIGNED:	
DRAWN:	B.D.T.
CHECKED:	B.D.T.
DATE	MAY 2011
SCALE:	1" = 20'

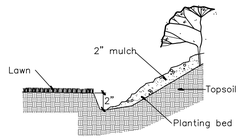
JOB NO. 8703.01.01

SHEET
1 of 1



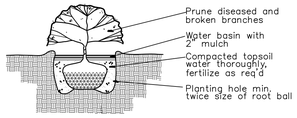
DECIDUOUS TREE PLANTING DETAIL

No Scale



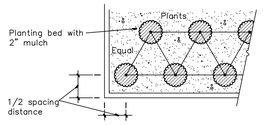
LAWN / PLANTING BED DETAIL

No Scale



SHRUB PLANTING DETAIL

No Scale



GROUND COVER SPACING DETAIL

No Scale– Triangular Spacing

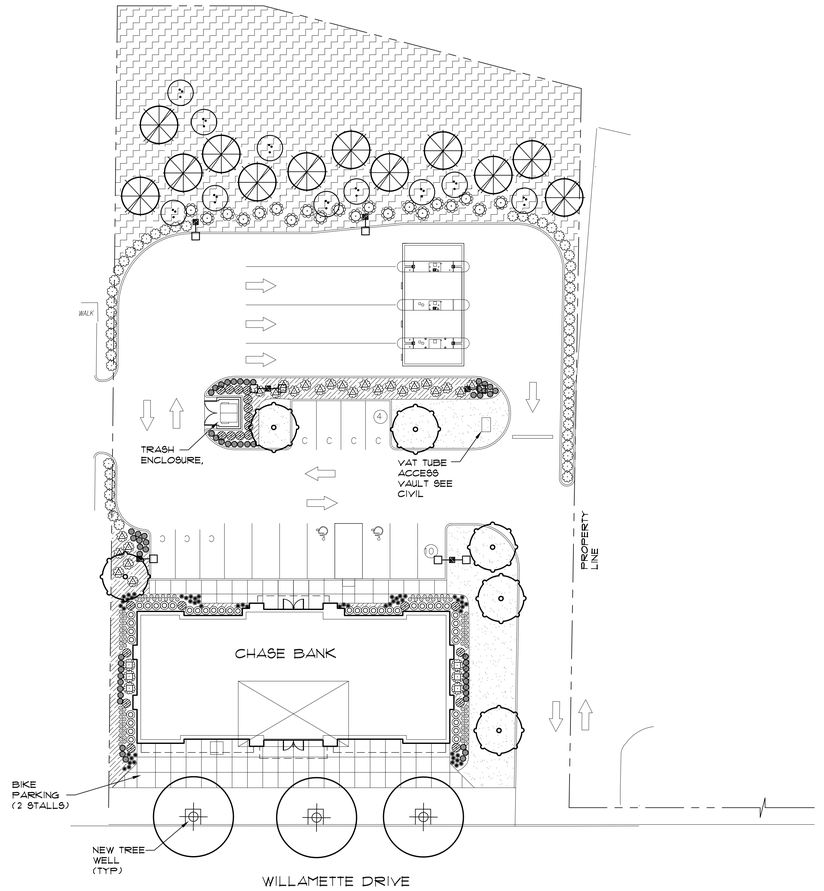
NOTES

1. Subgrades, including berms, to within 1 1/10th foot provided by General Contractor unless otherwise noted.
2. Subgrade shall be scarified or rototilled if conditions require.
3. 6" depth 3-way topsoil or equal in all planting areas.
4. 2" depth shredded cedar bark mulch in all planting beds.
5. All plant material shall be healthy, full and conform to USA standard nursery stock, latest edition.
6. Plant material or size or kind not available may be substituted only with approval of Landscape Architect or Owner.
7. All mass plantings shall have triangular spacing.
8. All tree pits shall be inspected to insure proper drainage.
9. Positive drainage shall be maintained. Mound planting areas minimum 6".
10. Landscape Contractor shall maintain site until final inspection and acceptance by Owner. Irrigation system shall be fully operational and turned on.

PLANT LIST

SYMBOL	BOTANICAL / COMMON	QUANTITY*	SIZE	SPACING	CONDITION
	Acer rubrum 'Scarsen'/ Scarlet Sentinel Maple,	3	2" Caliper	35' o.c.	B&B
	Pyrus calleryana 'Chanticleer' / Chanticleer Pear	6	2" Caliper	per plan	B&B
	Thuja plicata 'Excelsa' / Excelsa Red Cedar	12	6'-7'	per plan	B&B
	Acer circinatum / Vine Maple	10	6'-7'	per plan	B&B
	Euonymus alata 'Compacta' / Compact Burning Bush	20	5 gallon	per plan	full & bushy
	Berberis thunbergii atro. / Red Barberry	25	5 gallon	per plan	full & bushy
	Rhododendron Unique / Unique Rhododendron	6	5 gallon	per plan	full & bushy
	Viburnum tinus'Spring Bouquet'/ Spring Bouquet Viburnum	55	5 gallon	4' o.c.	full & bushy
	Thuja O. 'Emerald Green' / Emerald green arborvitae	22	6'	3' o.c.	B&B
	Prunus L. 'Otto Luyken' / Otto Luyken Laurel	39	2l"	3' o.c.	full & bushy
	Erica Carnea 'Kramers Red' / Heather	54	2 gallon	2.5'	B&B
	Hemerocallis 'Stella de Oro' / Daylily,	57	1 gallon	per plan	full
	Festuca cinerea 'Blausilber' / Blue-Silver Fescue	98	1 gallon	per plan	full
	Galtheria shallon / Salal		1 gallon	36"	full
	Arctostaphylos uva-ursi / kinnickinnik		4" pots	18"	full
	Sodded lawn - locally grown				

* CONFIRM ALL QUANTITIES



NORTH

LANDSCAPE PLAN

SCALE: 1"=20'

0 10' 20' 40'

CHASE

CEDAR OAK & WILLAMETTE
RETAIL BANKING CENTER
19080 WILLAMETTE DRIVE
WEST LINN, OR 97068
PROJECT #: 210461.89

ARCHITECT OF RECORD

CALLISON

CALLISON ARCHITECTS, P.C.
www.callison.com

ENGINEER OF RECORD

MAIN STREET DESIGN
LANDSCAPE ARCHITECTURE
9402 Tidal Court (206) 842-7886
Bainbridge Is., WA 98110

SEAL

REGISTERED 744 Kenneth E. Loney OREGON LANDSCAPE ARCHITECT

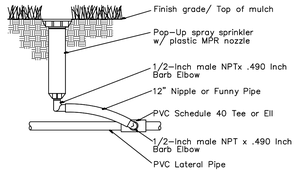
ISSUE	DATE	DESCRIPTION
	2/23/2012	DESIGN REVIEW APPLICATION

SHEET TITLE

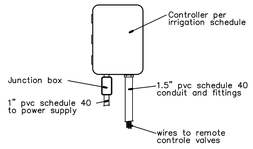
LANDSCAPE PLAN

SHEET NUMBER

L-1



POP-UP SPRAY SPRINKLER
No Scale



WALL MOUNT CONTROLLER
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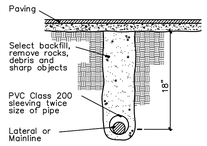
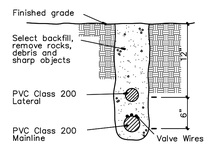


SLEEVING DETAIL
No Scale



TRENCHING DETAIL
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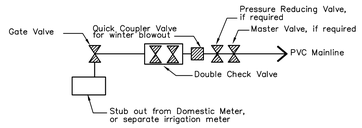


POINT OF CONNECTION
No Scale

IRRIGATION SCHEDULE

SYMBOL F SQ H Q	DESCRIPTION	RADIUS	GPM	PSI
	RAINBIRD 3500 SERIES POP-UP, 2.0 NOZZLE	27'	1.69H	35
	RAINBIRD 1800 MPR 15' SERIES POP-UP, 4" LAWN, 6" G.C.	15'	1.85H	30
	RAINBIRD 1800 MPR 12' SERIES POP-UP, 4" LAWN, 6" G.C.	12'	1.30H	30
	RAINBIRD 1800 MPR 10' SERIES POP-UP, 4" LAWN, 6" G.C.	10'	0.79H	30
	RAINBIRD 1800 MPR 8' SERIES POP-UP, 4" LAWN, 6" G.C.	8'	0.52H	30
	RAINBIRD 1800 MPR 5' SERIES POP-UP, 4" LAWN, 6" G.C.	5'	0.2H	30
	RAINBIRD 1800 MPR SIDE STRIP POP-UP, 4" LAWN, 6" G.C.	9'X18'	1.73	30
	RAINBIRD 1800 MPR SIDE STRIP POP-UP, 4" LAWN, 6" G.C.	4'X30'	1.21	30
	RAINBIRD 1800 MPR END STRIP POP-UP, 4" LAWN, 6" G.C.	4'X15'	0.61	30
	RAINBIRD PEB SERIES PLASTIC VALVES			
C	RAINBIRD ESP-LX MODULAR SERIES 12 STATION CONTROLLER			
	POINT OF CONNECTION: 3/4" IRRIGATION METER 3/4" FEBCO 850 DOUBLE CHECK VALVE 1" QUICK COUPLER VALVE			

1 STATION
27 GPM

1-1/4" MAINLINE, PVC SCHEDULE 40
LATERAL LINE, PVC CLASS 200
SLEEVING, PVC CLASS 200

IRRIGATION SCHEDULE—DRIP

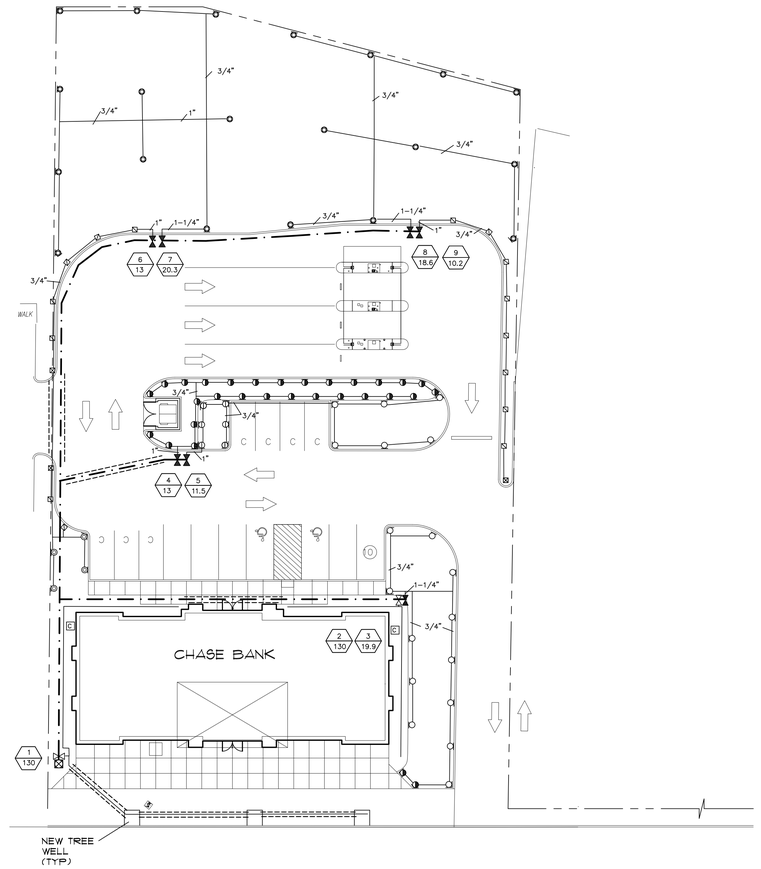
RAINBIRD LOW FLOW VALVE 1", VALVE #2
INLINE WYE FILTER & INLINE PRESSURE REGULATOR.

RAINBIRD BLACK STRIP TUBING - COIL LENGTH AS NEEDED.
TIE DOWN STAKES EVERY 24"

XERI-BUG EMITTERS - XB-10PC BARB INLET, 1.0 GPH
ONE PER SMALL SHRUB, TWO PER LARGE SHRUB, 8 PER TREE
NUMBER MAY BE ADJUSTED IN FIELD.

1 STATION
27 GPH

- CONFIRM EXACT LOCATION OF P.O.C., CONTROLLER, AND WATER PRESSURE AT P.O.C.
- ALL VALVES IN 'AMETEK', OR 'CARSON', BOXE, OR EQUAL, SET AT FINISHED GRADE.
- ALL WORK PER PLANS, LOCAL CODES AND MANUFACTURER'S SPECS.
- PRESSURE TEST BEFORE BACKFILLING.
- PLAN IS DIAGRAMMATIC. ADJUST LINE AND HEAD LOCATIONS AS NECESSARY TO ASSURE PROPER COVERAGE AND CONFORM WITH ACCEPTED CONSTRUCTION PRACTICES.



NORTH

IRRIGATION PLAN
SCALE: 1"= 20'

0 10' 20' 40'

CHASE

CEDAR OAK & WILLAMETTE
RETAIL BANKING CENTER
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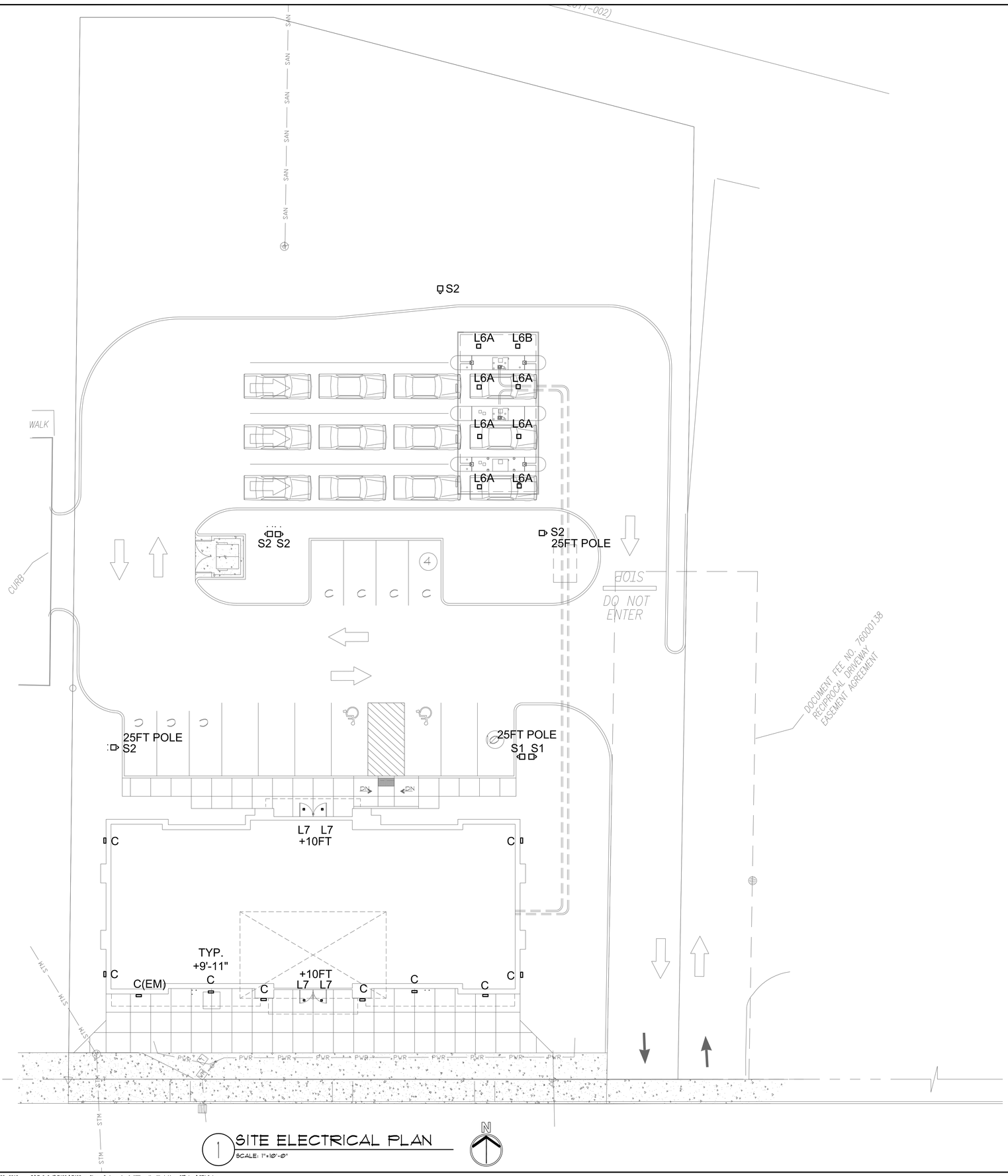
MAIN STREET DESIGN
LANDSCAPE ARCHITECTURE
9402 Tidal Court
Bainbridge Is., WA 98110
(206) 842-7886

SEAL
REGISTERED
744
Kenneth E. Loney
OREGON
LANDSCAPE ARCHITECT

ISSUE	DATE	DESCRIPTION
	2/23/2012	DESIGN REVIEW APPLICATION

SHEET TITLE
IRRIGATION PLAN

SHEET NUMBER
L-2



1 SITE ELECTRICAL PLAN
SCALE: 1"=10'-0"

PLAN NOTES

1. ELECTRICAL CONTRACTOR TO COORDINATE UTILITY SERVICE (FROM UTILITY TRANSFORMER) IN ACCORDANCE WITH THE UTILITY COMPANY SPECIFICATIONS.
2. PROVIDE CONDUIT/ FEEDER FROM UTILITY SERVICE BOX TO SERVICE METER. COORDINATE AND PROVIDE AS REQUIRED BY UTILITY.
3. (1) 4" CONDUITS, EACH WITH 4#600MCM FROM UTILITY SERVICE BOX TO 400AMP 120/208V, 3 PH, 4 W C/T CABINET ON EXTERIOR WALL.
4. 400AMP C/T, AND METER CABINET MOUNTED ON FACE OF BUILDING. REFER TO ELECTRICAL SERVICE DIAGRAM ON SHEET #E5.0 FOR ADDITIONAL INFORMATION.
5. SITE SIGN: FIELD VERIFY EXACT LOCATION. PROVIDE DISCONNECT AS REQUIRED AND ROUTE THROUGH CONTACTOR C1-(B).
6. PROVIDE 2-4"C.O. WITH PULL WIRE FOR TELEPHONE /COMMUNICATION UTILITY SERVICE. COORDINATE WITH UTILITY AND PROVIDE REQUIREMENTS PER UTILITY STANDARDS.

SITE LIGHTING FIXTURE SCHEDULE

S1 (S1-HS)	(1) SPAULDING #NK2-A-P25-H4-F-Q-DB-ARM-S-6-S-DB, 250 WATT PULSE START METAL HALIDE LUMINAIRES, WITH FLAT GLASS & HORIZONTAL TYPE IV DISTRIBUTION OPTICS, FIXTURES MOUNTED AT 90' ON A 22'-6" HIGH, 5" SQUARE STRAIGHT STEEL POLE #SSS-22.5-50-3-BX-DB WITH 6" RIGID ARM, FINISH TO BE DARK BRONZE, VERIFY COLOR SELECTION W/ARCHITECT PRIOR TO ORDERING. LUMINAIRES TO HAVE MULTI-TAP BALLAST WIRED FOR 208V. PROVIDE POLE BASE COVER. (NOTE: S1-HS = WITH HOUSE SHIELD.)
S2 (S2-HS)	(1) SPAULDING #NK2-A-P40-H4-F-Q-DB-ARM-S-6-S-DB, 400 WATT PULSE START METAL HALIDE LUMINAIRE, WITH FLAT GLASS AND HORIZONTAL TYPE IV DISTRIBUTION OPTICS, FIXTURES MOUNTED AT 90' ON A 22'-6" HIGH, 5" SQUARE STRAIGHT STEEL POLE #SSS-22.5-50-3-BX-DB WITH 6" RIGID ARM, FINISH TO BE DARK BRONZE, VERIFY COLOR SELECTION W/ARCHITECT PRIOR TO ORDERING. LUMINAIRES TO HAVE MULTI-TAP BALLAST WIRED FOR 208V. PROVIDE POLE BASE COVER. (NOTE: S1-HS = WITH HOUSE SHIELD.)
A	KIM LIGHTING #WD18 WALL DIRECTOR, DIE CAST ALUMINUM AND LENS FRAME FABRICATED ALZAK REFLECTOR, WALL MOUNTED, 250 WATT, MH BT-28. MOUNT AT 16.5' CENTERLINE OF FIXTURE.
B	KIM LIGHTING #WD18 WALL DIRECTOR, DIE CAST ALUMINUM AND LENS FRAME FABRICATED ALZAK REFLECTOR, WALL MOUNTED, 400 WATT, SMH ED-28. MOUNT AT 16.5' CENTERLINE OF FIXTURE.
C	LITHONIA LIGHTING #WSR-2/42-MD-120-ELDWR-LP1 FULL CUTOFF WALL MOUNTED FIXTURE W/(2)42W CFL LAMP. PROVIDE FIXTURE WITH BODINE B30 BATTERY PACK.
L6A	#CRO2-S-LED-50-CW-UE, FABRICATED WHITE PAINTED METAL HOUSING,ONE CIRCUIT BOARD WITH 50 LEDS, FORMED WHITE PAINTED METAL PLATE BETWEEN REFLECTOR AND CIRCUIT BOARD, FORMED PREMIUM SPECULAR METAL REFLECTOR WITH OEN CONICAL APERTURE BELOW EACH LED, CLEAR FLAT GLASS LENS IN FABRICATED WHITE PAINTED METAL LENS FRAME.
L6B	SIMILAR TO "L6A" CRO-FO-LED-30-CW-UE. CROSSOVER FOCUS, NICHIA.
L7	LIGTHOLIER C4X4L10DL-CL-*-EM LED WITH LENS FIXTURE, INTEGRAL EMERGENCY BATTERY (90 MIN.) PACK.

NOTE: POLE AND POLE BASES ARE TO BE FINISHED WITH NON- REFLECTIVE, BLACK POWDER COATING.

CHASE LIGHTING STANDARDS

STANDARDS FOR CHASE ATM AND ND LOCATIONS ARE DETAILED IN THE CHASE CORPORATION PHYSICAL SECURITY STANDARDS, WHICH HAVE BEEN ADOPTED BY EACH STATE'S BOARD OF DIRECTORS.

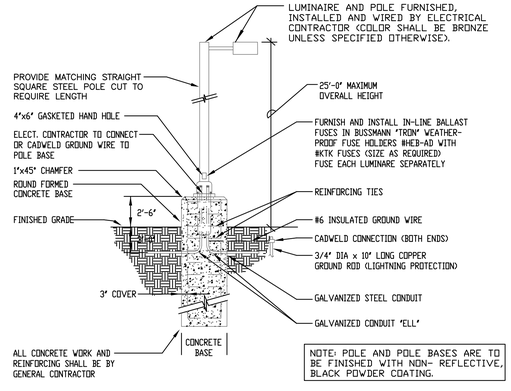
LIGHTING STANDARDS ARE SUMMARIZED AS FOLLOWS:

- CHASE WILL MEET ALL COUNTY/PARISH, CITY AND STATE REGULATIONS FOR ATM AND ND LOCATIONS.
- IN THOSE LOCATIONS WHERE STANDARDS ARE NOT MANDATED BY LOCAL OR STATE LEGISLATION, CHASE HAS ESTABLISHED THE FOLLOWING LIGHTING STANDARDS DURING THE HOURS OF DARKNESS (30 MINUTES AFTER SUNSET AND 30 MINUTES BEFORE SUNRISE):

SITE LOCATION	REQUIRED LIGHTING (IN FOOT-CANDLES)
AT THE FACE OF THE ATM AND ND, EXTENDING OUTWARD 5 FEET	10
WITHIN 50 FEET OF THE ATM AND ND	2
WITHIN THE ACCESS AREA	1
ALL PARKING AREAS WITHIN 50 FEET OF THE WALK-UP ATM AND THE WALK-UP ND	1
ALONG THE FIRST 40 UNOBSTRUCTTED FEET OF THE ADJACENT SIDE OF THE BUILDING (IF THE ATM OR ND IS WITHIN 10 FEET OF THE CORNER OF THE BUILDING AND THE ATM OR ND IS GENERALLY ACCESSIBLE FROM THE ADJACENT SIDE)	1

VISIBILITY AND ACCESS STANDARDS ARE SUMMARIZED AS FOLLOWS:

- CHASE WILL MEET ALL COUNTY/PARISH, CITY AND STATE REGULATIONS FOR ATM AND ND LOCATIONS.
- IN THOSE LOCATIONS WHERE STANDARDS ARE NOT MANDATED BY LOCAL OR STATE LEGISLATION, CHASE HAS ESTABLISHED THE FOLLOWING STANDARDS AS THEY PERTAIN TO VISIBILITY AND ACCESS:
  - ATMS AND NDS MUST BE LOCATED IN AREAS WITH HIGH VISIBILITY.
  - LANDSCAPING, LIGHTING, VEGETATION, AND OTHER OBSTRUCTIONS MUST BE CONSIDERED.



2 POLE DETAIL
SCALE: 1"=10'-0"

CHASE
ENCON
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4040 El Camino Real
Los Altos, California, 94022
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fax # (650) 964-3754
email info@encon.com

ENCON Project #: CE7244.00

DATE:
Mar 05, 2012

REGISTERED PROFESSIONAL ENGINEER
10663
OREGON
MECHANICAL
ROBERT P. TRIFUNOVIC
EXP. DATE: 06/30/12

CALLISON
CALLISON ARCHITECTS, P.C.
www.callison.com

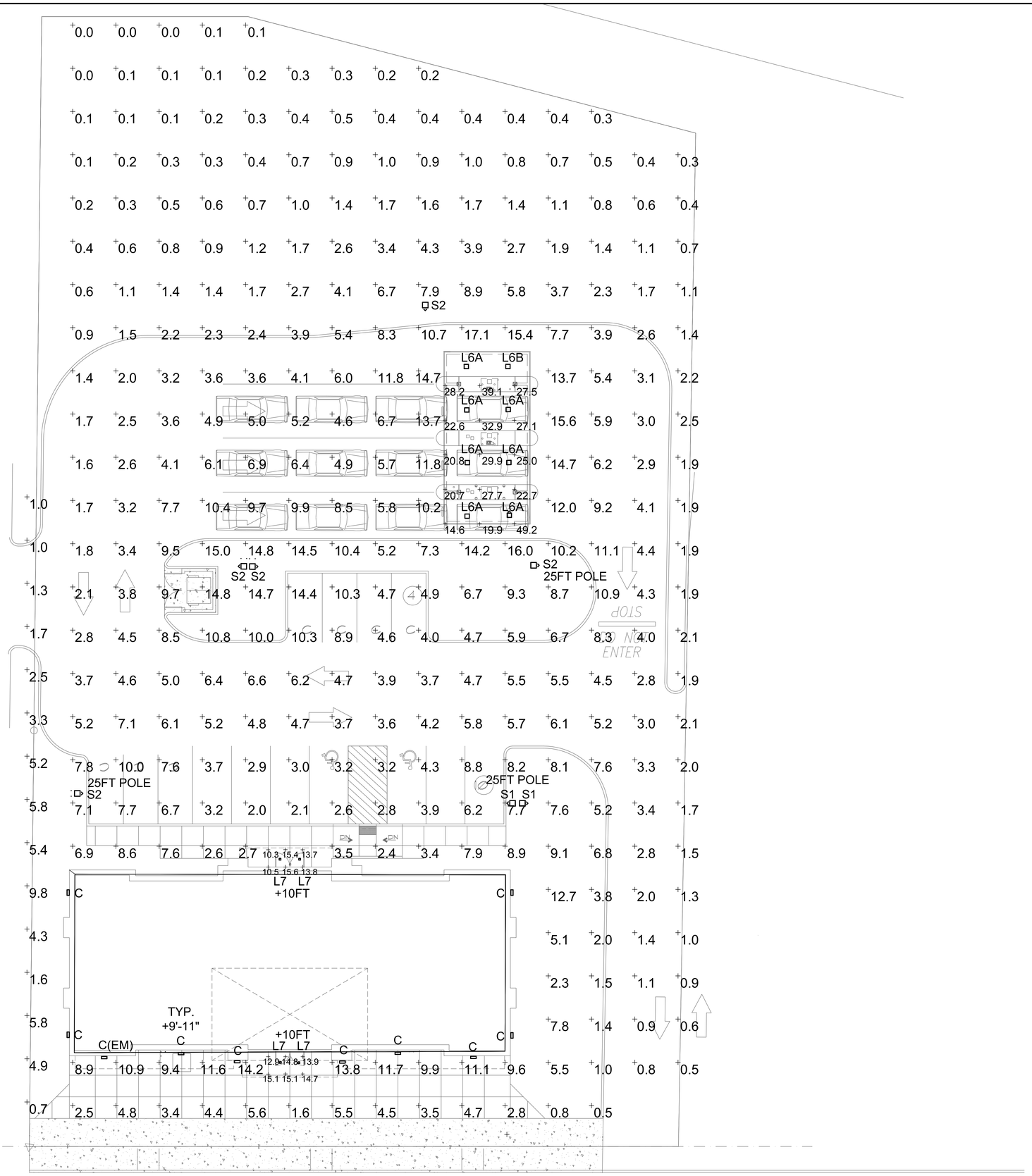
CHASE
NEW BUILD
CEDAR OAK & WILLAMETTE
19080 Willamette Dr
West Linn, OR 97068
PROJECT #210461.89

ISSUED / REVISED	DATE
PLANNING SUBMITTAL	02/23/12

SITE ELECTRICAL PLAN

SE1.0

Plot date: February 22, 2012 P:\7 0 0 0\7400a\7408 - Chase Cedar oake & Willamette-West Linn, OR\dwgs\SE1.0.dwg



1 SITE PHOTOMETRIC PLAN

SCALE: 1"=10'-0"

N

STATISTICS						
Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min
ATM Drive-Thru	+	27.2 fc	49.2 fc	14.6 fc	3.4:1	1.9:1
Entry Canopy Lighting	+	14.4 fc	15.1 fc	12.9 fc	1.2:1	1.1:1
North Entry CAnopy	+	13.2 fc	15.6 fc	10.3 fc	1.5:1	1.3:1
Site Lighting	+	4.6 fc	17.1 fc	0.5 fc	34.2:1	9.2:1

LUMINAIRE SCHEDULE

Symbol	Label	Catalog Number	Description	Lamp	File	Lumens	LLF	Watts
	A	WD18x3/250MHxx x/xx	WALL DIRECTOR 18 WALL MOUNTED LUMINAIRE DIE-CAST ALUM HOUSING & LENS FRAME FABRICATED ALZAK REFLECTOR	250 WATT MH BT-28 CLEAR MOG. BASE HORZ.	W83-250M.ies	23000	0.75	250
	B	WD18x3/400MHxx x/xx	WALL DIRECTOR 18 WALL MOUNTED LUMINAIRE DIE-CAST ALUM HOUSING & LENS FRAME FABRICATED ALZAK REFLECTOR	400 WATT SMH ED-28 CLEAR MOG. BASE HORZ.	W83-400M.ies	40000	0.75	400
	C	WSR 42TRT MD	ARCHITECTURAL SCONCE WITH MEDIUM THROW DISTRIBUTION WITH CLEAR, FLAT GLASS LENS.	TWO 42-WATT TRIPLE TUBE COMPACT FLUORESCENT, HORIZONTAL POSITION.	Lti11979.ies	6400	0.95	96
	L7	C4X4L10DL30KCLW	LED 20 W DOWNLIGHT 4.5" SQUARE 3000K CL FINISH	LED LUMEN RATING = 1049 LMS	C4X4Lt10DL30KCLW.IES	1049	1.00	19.6
	L6A	CRO2-S-LED-50-CW-UE	**FABRICATED WHITE PAINTED METAL HOUSING, ONE WHITE CIRCUIT BOARD WITH 50 LEDS, FORMED WHITE PAINTED METAL PLATE BETWEEN REFLECTOR AND CIRCUIT BOARD. FORMED PREMIUM SPECULAR METAL REFLECTOR WITH ONE CONICAL APERTURE BELOW EACH LED, CLEAR FLAT GLASS LENS IN FABRICATED WHITE PAINTED METAL LENS FRAME.**	FIFTY WHITE MULTI-CHIP LIGHT EMITTING DIODES (LEDS), VERTICAL BASE--UP POSITION.	CRO2-S-LED-50-CW-UE.IES	4957	0.95	60
	L6B	CRO-FO-LED-30-CW-UE	CROSSOVER FOCUS	NICHIA	CRO-FO-LED-30-CW-UE.IES	2400	0.95	50
	S1	NK2-CM-H25-H3-F	NEWARK 2 SQUARE SURFACE LIGHT TYPE III REFLECTOR CLEAR FLAT GLASS LENS	250W CLEAR ED28 METAL HALIDE, HORIZONTAL POSITION	L4903NKC.ies	23000	0.75	250
	S2	NK2-CM-H40-H3-F	NEWARK 2 SQUARE SURFACE LIGHT TYPE III REFLECTOR CLEAR FLAT GLASS LENS	400W CLEAR ED28 METAL HALIDE, HORIZONTAL POSITION	L4890NKC.ies	41000	0.75	400

CHASE

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ISSUED / REVISED	DATE
PLANNING SUBMITTAL	02/23/12

SITE PHOTOMETRIC PLAN

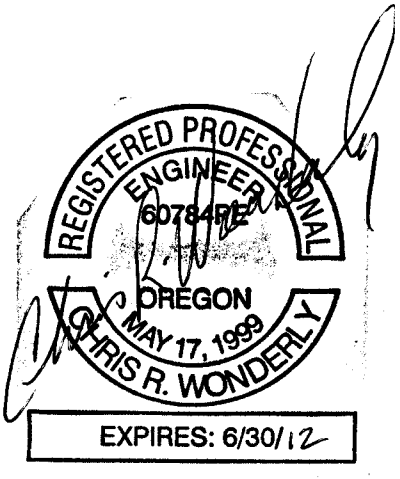
SP1.0

Plot date: February 22, 2012 P:\7 0 0 0\7400a\7408 - Chase Cedar oaks & Willamette-West Linn, OR\dwgs\SP1.0.dwg

Chase Bank –
Cedar Oak & Willamette,
Retail Banking Center

Callison Architects

Project No. 8701.01.01



February 13, 2012

Olson Engineering, Inc.
1111 Broadway
Vancouver, WA 98660
(360) 695-1385

REVISION	BY	DATE	COMMENTS

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Narrative

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NARRATIVE

Chase Bank Drainage Analysis

Project Overview:

The proposed Chase Bank development consists of a 4,120 SF commercial building, associated concrete sidewalk, paved parking area, and landscape. Frontage improvements are proposed along Willamette Drive (Highway 43). These improvements include new concrete vertical curb with a 12' wide attached concrete sidewalk. The site is approximately 0.873 acres in size and located in West Linn, OR at 19080 Willamette Drive (NE quarter of Section 23, Township 2 South, Range 1 East of the Willamette Meridian). The site is bounded on the west by Willamette Drive (Highway 43), on the north by tax parcels #700 and 702, on the south by tax parcel #704, and on the east by the Cedar Oak Apartment Complex.

All stormwater runoff from Willamette Drive and the associated sidewalk area will continue to drain to the existing storm sewer system located within that road. Stormwater runoff from the new building roof, parking lot, and sidewalks is to be collected and treated in a StormFilter manhole and then detained in a subsurface detention structure prior to being conveyed via pipe to the existing storm sewer system located at the northwest corner of the site. The existing storm system currently conveys stormwater runoff in the northeast direction from Willamette Drive to an existing stream located north of the commercial site on tax parcel #700. This existing storm sewer system is comprised of a 5' x 5' box culvert located under Willamette Drive which transitions into 24" and 36" culverts beneath the existing commercial site on tax parcel #700. This transition is made at an existing vault located at the northwest corner of the Chase Bank site. It is proposed that the connection to the existing storm sewer system be made at this vault. The proposed storm sewer system has been designed per the requirements set forth in the 2010 City of West Linn Public Works Design Standards and the 2008 City of Portland Stormwater Management Manual.

Existing Conditions:

The site was previously occupied by Kasch's Nursery which included a 5,630 SF building, a 14,630 SF parking lot, grass landscape areas, and an existing retaining wall, which are all to be completely removed as part of the proposed development. The existing topography falls generally from southwest to northeast with slopes ranging from 1% to 20%. Stormwater runoff from the site either drains to the existing storm system or flows overland off the site in the northeast direction.

For purposes of the stormwater calculations, the site was assumed to be in its undeveloped condition (forested), as required in Section 1.3.2 in the 2008 City of Portland Stormwater Management Manual.

The following table is a summary of the pre-developed catchment area:

Pre-developed Catchment Area:

Catchment	Area (AC)	CN*	Description	Type of Flow	Length (Ft.)	Slope (%)
1SP	0.573	70	Woods, Good, HSG "C"	Sheet Flow Shallow Conc. Flow	167 30	1.1 11.0

Table 1: Hydrologic parameters used in stormwater analysis.

- **See Appendix A for Table C-2 Runoff Curve Numbers from C.O.P. Stormwater Management Manual.**
- **See Appendix L for the Pre-developed Catchment Plan.**

Proposed Land Use:

With Hydrologic Group "C", the following CN values were used:

Description	Group "C"
Roofs	CN=98
Paved parking	CN=98
Sidewalk	CN=98
>75% Grass cover, Good, HSG C	CN=74

Approximately 0.573 AC of the 0.873 AC site is to be disturbed for construction of the proposed building, parking area, sidewalks, and landscape areas. This development will result in a total of 0.523 AC of new impervious surface. This includes 0.101 AC of new building roof area, 0.351 AC of new pavement, and 0.071 AC of new sidewalk. In addition, there is 0.113 AC of new grass/landscape. The following table is a summary of the developed catchments:

Developed Catchment Areas:

Catchment	Area (AC)	CN*	Description	Type of Flow	Length (Ft.)	Slope (%)
1SD	0.127 0.022	98 74	Paved parking >75% Grass cover, Good, HSG C	Direct entry (5.0 Min.)	-	-
2SD	0.105 0.058	98 74	Paved parking >75% Grass cover, Good, HSG C	Direct entry (5.0 Min.)	-	-
3SD	0.110 0.016 0.034	98 98 74	Paved parking Sidewalk >75% Grass cover, Good, HSG C	Direct entry (5.0 Min.)	-	-
4SD	0.101	98	Roof	Direct entry (5.0 Min.)	- -	- -

Table 2: Hydrologic parameters used in stormwater analysis.

- **See Appendix A for Table C-2 Runoff Curve Numbers from City of Portland Stormwater Management Manual.**
- **See Appendix L for Developed Catchment Plan.**

Stormwater Design:

All stormwater runoff from Willamette Drive and the associated sidewalk area will continue to drain to the existing storm sewer system located within that road. Stormwater runoff from the new building roof, parking lot, and sidewalks is to be collected and treated in a StormFilter manhole and then detained in a subsurface detention structure prior to being conveyed via pipe to the existing storm sewer system located at the northwest corner of the site. The proposed storm sewer system has been designed per the requirements set forth in the 2010 City of West Linn Public Works Design Standards and the 2008 City of Portland Stormwater Management Manual.

According to the USDA Soil Survey of Clackamas County, the soil within the proposed development area is classified as:

1. Cascade Silt Loam (13C).

2. Permeability (from Table 12):

   Cascade Silt Loam (13C) –
   0-11 inch depth 0.6-2.0 inches/hour
   11-21 inch depth 0.6-2.0 inches/hour
   21-60 inch depth 0.06-0.2 inches/hour

3. Soil hydrologic groups:

   Cascade Silt Loam (13C) –
   Soil group C

- **See Appendix B for Soils Map and associated data.**
- **See Appendix C for Geotechnical Engineering Report by Terracon.**

The water quality design storm for this project was determined per Section 1.3.3 of the 2008 City of Portland Stormwater Management Manual. The 2-year through 100-year design storms were taken from the 24-Hour Rainfall Depths Table provided Appendix A of this report. The design storms are tabulated as follows:

Water Quality	0.83 in / 24 hrs
2-year	2.40 in / 24 hrs
5-year	2.90 in / 24 hrs
10-year	3.40 in / 24 hrs
25-year	3.90 in / 24 hrs
100-year	4.40 in / 24 hrs

- **See Appendix A for Table C-1 Design Storms from City of Portland Stormwater Management Manual.**

Quantity Control:

Section 2.0013 of the 2010 City of West Linn Public Works Design Standards and Section 1.3.2 of the 2008 City of Portland Stormwater Management Manual both specify that release rates for the developed sites shall not exceed the respective runoff rates from the pre-developed site in the 2-year, 5-year, 10-year, and 25-year storms. In addition, the stormwater facility must provide safe overflow conveyance for the 100-year storm if it exceeds the pre-developed 100-year rate. A subsurface detention facility with flow control manhole is proposed to provide sufficient detention storage for the development and maintain the allowed developed discharge rates. More specifically, the detention facility is to be comprised of 160 LF of 60" diameter corrugated metal pipe. For the purpose of the calculations, the base elevation of the detention facility is assumed to be at 0 FT elevation and, therefore, the top of the storage facility is at an elevation of 5 FT. The following table summarizes the pre-developed and developed flows from the Chase Bank site:

Design Storms	Pre-developed Flow From Site (Reach 1SP) (CFS)	Allowable Flow From Site (CFS)	Developed Flow From Site (Reach 1RD) (CFS)
2-yr (2.40")	0.02	0.02	0.04
5-yr (2.90")	0.03	0.03	0.05
10-yr (3.40")	0.05	0.05	0.05
25-yr (3.90")	0.07	0.07	0.07
100-yr (4.40")	0.10	0.10	0.09

Table 3: Pre-developed and developed flows from the site.

It can be seen from the table above that the developed flows for each of the design storms meets the specified requirements, with the exception of the 2-year and 5-year storms. The developed flows for these two storms slightly exceed the pre-developed flows from the site because Section 2.0013 of the 2010 City of West Linn Public Works Design Standards prohibits the use of any flow control orifice smaller than 1 inch in diameter and states that the allowable rate provided by a 1 inch orifice will be considered adequate as approved by the City Engineer. A summary of the developed flows and stormwater facility storage volumes and stage elevations is shown in the following table:

Design Storms	Developed Flow From The Site (Reach 1RD) (CFS)	Detention Volume (Pond 1P) (CF)	Detention Stage Elevation (Pond 1P) (CF)
2-yr (2.40")	0.04	1,425	2.32
5-yr (2.90")	0.05	1,963	2.99
10-yr (3.40")	0.05	2,541	3.77
25-yr (3.90")	0.07	2,755	4.10
100-yr (4.40")	0.09	3,018	4.59

Table 4: Developed flows and stormwater facility storage volumes.

It can be seen from the table above that the detention facility has sufficient detention volume to meet the specified quantity control requirements.

- **See Appendices F, G, H, I, & J for a detailed analysis for the 2, 5, 10, 25, and 100-year design storms.**

Water Quality:

Water quality treatment for stormwater runoff from the proposed site is to be provided by a 48 inch diameter StormFilter manhole with 3 replaceable filter cartridges. The StormFilter manhole was sized to treat the water quality storm which was determined to be 0.83 inches per Section 1.3.3 of the 2008 City of Portland Stormwater Management Manual. The StormFilter manhole was sized according to Stormwater Management specifications using the following equation:

$$\text{Number of Cartridges} = \frac{\text{Qtreat X 449 gpm/cfs}}{\text{15gpm/cartridge}}$$

The following table summarizes the flow that will be treated by the stormwater treatment facility for the water quality design storm of 0.83 inches. It also indicates the number of cartridge filters that are required to treat the flow and the model of StormFilter required:

Design Storm	Node Number	Flow to Stormfilter (CFS)	Filter Cartridges Required (EA)	Stormfilter Model Required
WQ (0.83")	2RD	0.07	3	48" StormFilter manhole-3 Cart.

Table 5: Stormwater treatment facility sizing.

From the table above, it can be seen that 3 filter cartridges are required to treat the water quality flow from the proposed development. Maintenance for the Stormfilter manhole will be performed by the property owner.

- **See Appendix D for stormwater facility details, specifications, and operations and maintenance guidelines.**
- **See Appendix E for a detailed analysis of the water quality storm.**

Conveyance System Analysis:

The behavior of the conveyance system was analyzed using HydroCAD to verify capacity requirements. The capacities of the pipes were determined using nomographs provided by the manufacturer. The table below summarizes the characteristics of the conveyance system for the 100-year design storm:

Reach	Description	Diameter (in.)	Length (ft.)	Slope (%)	Capacity (cfs)	Peak Q (cfs)	Peak Depth (ft.)	Peak Velocity (fps)
1RD	Pipe (CPP)	8	96.6	1.00	1.21	0.09	0.13	2.06
2RD	StormFilter	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3RD	Pipe (CPP)	8	16.0	1.00	1.21	0.53	0.31	3.33
4RD	Pipe (CPP)	6	108.2	1.00	0.56	0.13	0.17	2.33
5RD	Pipe (CPP)	8	67.5	1.00	1.21	0.25	0.20	2.73
6RD	Pipe (CPP)	6	39.1	1.00	0.56	0.10	0.15	2.18

Table 6: Characteristics of the conveyance system for the 100-year design storm.

- **See Appendix J for a detailed analysis of the 100-year design storm.**

Downstream Capacity Analysis:

All developed stormwater flows from the site will be less than or equal to the pre-developed rates and, therefore, a downstream analysis should not be required.

APPENDIX

APPENDIX

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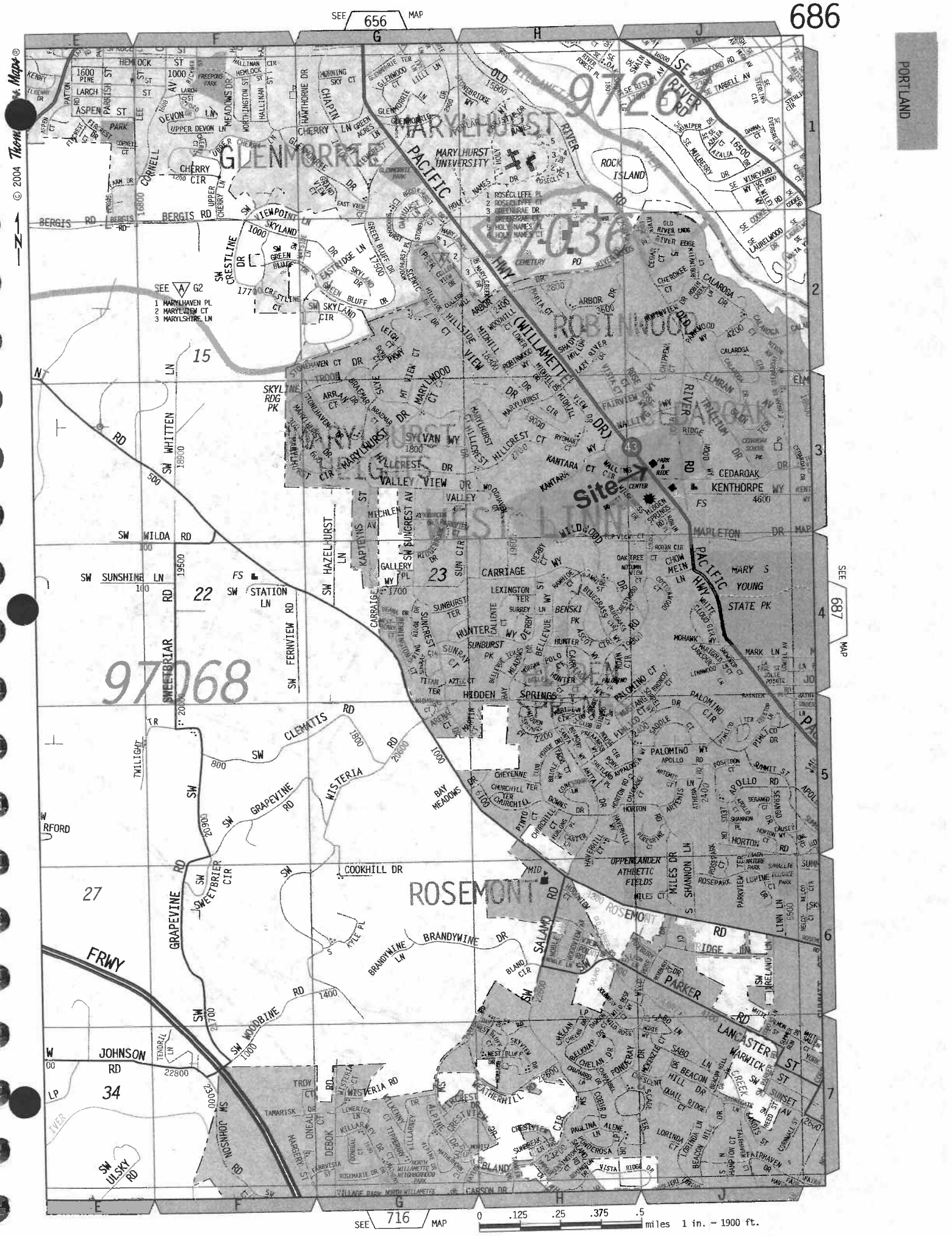
A



Design Storm

The SBUH method also requires a design storm to perform the runoff calculations. For flow control calculations, BES uses a NRCS Type 1A 24-hour storm distribution. This storm is shown in Figure C-1 and Table C-4. The depth of rainfall for the 2 through 100-year storm events is shown below in Table C-1.

Table C-1
24-HOUR RAINFALL DEPTHS AT PORTLAND AIRPORT

Recurrence Interval, Years	2	5	10	25	100
24-Hour Depths, Inches	2.4	2.9	3.4	3.9	4.4

Table C-2
RUNOFF CURVE NUMBERS

Runoff curve numbers for urban areas*

Cover description		Curve numbers for hydrologic soil group			
Cover type and hydrologic condition	Average percent impervious area	A	B	C	D
Open space (lawns, parks, golf courses, cemeteries, etc.):					
Poor condition (grass cover <50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82

Runoff curve numbers for other agricultural lands*

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range-continuous forage for grazing					
<50% ground cover or heavily grazed with no mulch	Poor	68	79	86	89
50 to 75% ground cover and not heavily grazed	Fair	49	69	79	84
>75% ground cover and lightly or only occasionally grazed	Good	39	61	74	80
Meadow-continuous grass, protected from grazing and generally mowed for hay	-	30	58	71	78
Brush--weed-grass mixture with brush as the major element					
<50% ground cover	Poor	48	67	77	83
50 to 75% ground cover	Fair	35	56	70	77
>75% ground cover	Good	30	48	65	73
Woods-grass combination (orchard or tree farm)	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79

Runoff curve numbers for other agricultural lands*

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition	A	B	C	D
Woods					
Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.	Poor	45	66	77	83
Woods are grazed but not burned, and some forest litter covers the soil.	Fair	36	60	73	79
Woods are protected from grazing, and litter and brush adequately cover the soil.	Good	30	55	70	77

Runoff curve numbers for Simplified Approaches**

Cover description		Curve numbers for hydrologic soil group			
Simplified Approaches	Hydrologic condition	A	B	C	D
Eco-roof	Good	n/a	61	n/a	n/a
Roof Garden	Good	n/a	48	n/a	n/a
Contained Planter Box	Good	n/a	48	n/a	n/a
Infiltration & Flow-Through Planter Box	Good	n/a	48	n/a	n/a
Pervious Pavement	-	76	85	89	n/a
Trees					
New and/or Existing Evergreen	-	36	60	73	79
New and/or Existing Deciduous	-	36	60	73	79

n/a - Does not apply, as design criteria for the relevant mitigation measures do not include the use of this soil type.
*Soil Conservation Service, *Urban Hydrology for Small Watersheds*, Technical Release 55, pp. 2.5-2.8, June 1986.
**CNs of various cover types were assigned to the Proposed Simplified Approaches with similar cover types as follows:
Eco-roof – assumed grass in good condition with soil type B.
Roof Garden – assumed brush-weed-grass mixture with >75% ground cover and soil type B.
Contained Planter Box – assumed brush-weed-grass mixture with >75% ground cover and soil type B.
Infiltration & Flow-Through Planter Box – assumed brush-weed-grass mixture with >75% ground cover and soil type B.
Pervious Pavement – assumed gravel.
Trees – assumed woods with fair hydrologic conditions.

Note: To determine hydrologic soil type, consult local USDA Soil Conservation Service Soil Survey.

B

SOIL SURVEY OF CLACKAMAS COUNTY AREA, OREGON — SHEET NUMBER 6

TABLE C-3
NRCS HYDROLOGIC SOIL GROUP DESCRIPTIONS

NRCS Hydrologic Soil Group	Description
Group A	Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist chiefly of deep, well drained to excessively drained sands or gravels. These soils have a high rate of water transmission.
Group B	Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.
Group C	Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils that have a layer that impedes the downward movement of water or soils that have moderately fine texture or fine texture. These soils have a slow rate of water transmission.
Group D	Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clay soils that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a fragipan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

TABLE 12.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
12A, 12B--------- Canderly	0-7	Sandy loam--------	SM	A-2, A-4	0	100	100	60-80	30-40	20-25	NP-5
	7-46	Sandy loam, fine sandy loam.	SM	A-2, A-4	0	100	100	60-80	30-40	20-25	NP-5
	46-60	Loamy sand, coarse sandy loam, gravelly loamy sand.	SM	A-2, A-1	0	75-100	70-100	35-75	15-30	---	NP
13B, 13C, 13D, 13E---------- Cascade	0-11	Silt loam---------	ML	A-4	0	85-100	80-100	80-100	70-90	25-35	NP-10
	11-21	Silt loam, silty clay loam.	ML	A-4, A-6	0	95-100	95-100	95-100	80-90	25-40	NP-15
	21-60	Silt loam, silty clay loam.	ML	A-4	0	100	100	95-100	85-95	25-35	NP-10
14C, 14D, 14E---- Cascade	0-24	Silt loam---------	ML	A-4	0	90-100	90-100	90-100	80-90	25-35	NP-10
	24-32	Silt loam, silty clay loam.	ML	A-4, A-6	0	100	100	95-100	85-95	25-40	NP-15
	32-60	Very stony silty clay loam, very stony clay loam.	CL	A-6, A-7	45-55	65-95	60-90	55-90	50-85	35-45	15-25
15B, 15C, 15D---- Cazadero	0-21	Silty clay loam	ML	A-6	0	90-100	80-100	75-100	70-90	35-40	10-15
	21-60	Clay, silty clay	MH	A-7	0	100	100	95-100	85-100	50-65	15-25
16---------- Chehalis	0-7	Silt loam---------	ML	A-4	0	100	100	95-100	80-90	25-35	NP-10
	7-44	Silt loam, silty clay loam.	ML	A-4, A-6, A-7	0	100	100	95-100	85-95	35-45	5-15
	44-60	Stratified fine sandy loam to silty clay loam.	ML	A-4, A-6, A-7	0	100	75-100	70-90	50-85	30-45	NP-15
17---------- Clackamas	0-7	Silt loam---------	ML	A-4	0	80-100	75-100	70-100	50-90	25-35	NP-5
	7-36	Gravelly clay loam, gravelly silty clay loam, silty clay loam.	CL, GC	A-6	0-5	60-85	60-85	45-80	40-75	35-40	15-20
	36-60	Extremely gravelly clay loam, extremely gravelly silty clay loam, extremely grav.	GC	A-2	5-15	20-35	15-30	10-30	10-30	35-40	15-20
18---------- Clackamas	0-7	Gravelly loam-----	GM, ML, SM	A-4, A-2	0-5	55-80	50-75	40-70	30-55	25-35	NP-5
	7-20	Gravelly clay loam, gravelly silty clay loam, silty clay loam.	CL, GC	A-6	0-5	60-85	60-85	45-80	40-75	35-40	15-20
	20-60	Extremely gravelly clay loam, extremely gravelly silty clay loam, extremely grav.	GC	A-2	5-15	20-35	15-30	10-30	10-30	35-40	15-20
19---------- Cloquato	0-15	Silt loam---------	ML	A-4	0	100	100	95-100	80-95	20-30	NP-5
	15-42	Silt loam---------	ML	A-4	0	100	100	95-100	75-90	20-30	NP-5
	42-60	Sandy loam--------	SM	A-2, A-1	0	100	100	45-75	20-35	---	NP
20---------- Coburg	0-20	Silty clay loam	CL	A-6	0	95-100	90-100	85-100	80-95	30-40	10-15
	20-60	Silty clay loam, silty clay.	CL	A-7	0	95-100	90-100	85-100	80-95	40-50	15-25
21---------- Concord	0-6	Silt loam---------	ML	A-4	0	100	100	95-100	85-95	30-40	5-10
	6-60	Silty clay, silty clay loam, clay.	CL	A-7	0	100	100	95-100	80-90	40-50	15-25

See footnote at end of table.

TABLE 13.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm³	In/hr	In/in	pH				Pct
1A, 1B----------	0-8	15-20	1.35-1.55	0.6-2.0	0.19-0.21	5.6-6.0	Low----------	0.43	5	2-3
Aloha	8-35	18-27	1.40-1.55	0.2-0.6	0.19-0.21	5.6-6.5	Low----------	0.55		
	35-60	10-25	1.45-1.60	0.2-0.6	0.16-0.21	5.6-6.5	Low----------	0.55		
2B, 2C, 2D, 2E---	0-14	27-35	1.00-1.20	0.6-2.0	0.16-0.21	5.6-6.0	Moderate-----	0.24	5	5-7
Alspaugh	14-43	35-45	1.20-1.40	0.2-0.6	0.08-0.16	4.5-5.5	Moderate-----	0.24		
	43-60	35-45	1.10-1.30	0.2-0.6	0.06-0.10	4.5-5.5	Moderate-----	0.10		
3----------	0-22	15-25	1.20-1.45	0.6-2.0	0.19-0.21	5.6-6.0	Low----------	0.32	5	3-5
Amity	22-60	27-35	1.20-1.40	0.2-0.6	0.19-0.21	5.6-6.5	Moderate-----	0.49		
4E, 4F.										
Andic Cryaquepts										
5D, 5E----------	0-17	7-10	0.85-0.95	0.6-2.0	0.07-0.10	5.1-6.5	Low----------	0.10	5	7-12
Aschoff	17-60	10-18	0.85-0.95	0.6-2.0	0.07-0.10	5.6-6.5	Low----------	0.10		
6F*:										
Aschoff---------	0-17	7-10	0.85-0.95	0.6-2.0	0.07-0.10	5.1-6.5	Low----------	0.10	5	7-12
	17-60	10-18	0.85-0.95	0.6-2.0	0.07-0.10	5.6-6.5	Low----------	0.10		
Brightwood------	0-4	10-18	1.00-1.20	2.0-6.0	0.06-0.12	5.6-6.5	Low----------	0.10	2	4-8
	4-34	10-15	1.00-1.20	2.0-6.0	0.04-0.12	5.6-6.5	Low----------	0.10		
	34	---	---	---	---	---	----------	-----		
7B----------	0-18	27-35	1.20-1.40	0.2-0.6	0.19-0.21	5.1-6.0	Moderate-----	0.32	5	2-4
Borges	18-45	45-60	1.20-1.40	<0.06	0.15-0.17	5.6-6.0	High---------	0.32		
	45-60	27-45	1.30-1.40	0.2-0.6	0.12-0.21	5.6-6.0	Moderate-----	0.32		
8B, 8C, 8D-------	0-8	20-27	1.30-1.50	0.6-2.0	0.15-0.17	5.1-6.0	Low----------	0.32	5	3-4
Bornstedt	8-33	27-35	1.40-1.60	0.6-2.0	0.13-0.17	5.1-6.0	Low----------	0.37		
	33-60	40-50	1.30-1.50	0.06-0.2	0.12-0.15	4.5-5.5	Low----------	0.32		
9B, 9D, 9E-------	0-19	12-20	0.70-0.75	0.6-2.0	0.18-0.24	5.1-6.0	Low----------	0.32	5	6-10
Bull Run	19-60	12-18	0.70-0.85	0.6-2.0	0.24-0.26	5.1-6.0	Low----------	0.49		
10C---------	0-14	10-20	0.70-0.85	0.6-2.0	0.18-0.24	5.1-6.0	Low----------	0.28	5	6-8
Bull Run Variant	14-48	10-20	0.75-0.85	0.6-2.0	0.20-0.24	5.1-6.0	Low----------	0.43		
	48-60	30-45	1.00-1.40	0.2-0.6	0.19-0.21	5.1-6.0	Moderate-----	0.37		
11----------	0-17	5-10	1.30-1.50	2.0-6.0	0.07-0.09	5.6-7.3	Low----------	0.10	2	1-3
Camas	17-60	0-5	1.40-1.60	>20	0.03-0.05	5.6-6.5	Low----------	0.10		
12A, 12B---------	0-7	10-18	1.00-1.20	2.0-6.0	0.11-0.13	5.6-6.5	Low----------	0.10	5	4-6
Canderly	7-46	10-18	1.00-1.20	2.0-6.0	0.11-0.13	5.6-6.5	Low----------	0.10		
	46-60	5-10	1.10-1.30	2.0-6.0	0.04-0.08	5.6-6.5	Low----------	0.17		
13B, 13C, 13D,										
13E----------	0-11	15-19	1.10-1.20	0.6-2.0	0.17-0.21	5.1-6.0	Low----------	0.24	5	4-7
Cascade	11-21	18-30	1.30-1.40	0.6-2.0	0.17-0.21	5.1-6.0	Low----------	0.28		
	21-60	17-28	1.40-1.55	0.06-0.2	0.03-0.05	5.1-6.0	Low----------	0.20		
14C, 14D, 14E----	0-24	18-25	1.20-1.30	0.6-2.0	0.17-0.21	5.1-6.0	Low----------	0.24	5	4-6
Cascade	24-32	20-30	1.60-1.85	0.06-0.2	0.03-0.05	5.1-6.0	Low----------	0.20		
	32-60	27-40	1.20-1.40	0.2-0.6	0.11-0.15	5.1-6.0	Moderate-----	0.10		
15B, 15C, 15D----	0-21	25-40	1.20-1.40	0.6-2.0	0.15-0.17	5.1-6.0	Low----------	0.24	5	3-4
Cazadero	21-60	45-60	1.30-1.50	0.2-0.6	0.11-0.13	5.1-6.0	Moderate-----	0.28		
16----------	0-7	15-25	1.10-1.30	0.6-2.0	0.19-0.21	5.6-6.5	Low----------	0.32	5	5-10
Che[illegible]s	7-44	25-35	1.20-1.30	0.6-2.0	0.17-0.21	5.6-7.3	Moderate-----	0.28		
	44-60	15-35	1.10-1.30	0.6-2.0	0.17-0.21	5.6-7.3	Moderate-----	0.28		

See footnote at end of table.

TABLE 14.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
1A, 1B---- Aloha	C	None	---	---	1.0-2.0	Perched	Dec-Apr	>60	---	Moderate	Moderate
2B, 2C, 2D, 2E---- Alspaugh	C	None	---	---	>6.0	---	---	>60	---	High	High.
3---- Amity	D	None	---	---	0.5-1.5	Apparent	Nov-May	>60	---	Moderate	Moderate
4E, 4F. Andic Cryaquepts											
5D, 5E---- Aschoff	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate
6F*:											
Aschoff----	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate
Brightwood----	B	None	---	---	>6.0	---	---	20-40	Hard	Moderate	Moderate
7B---- Borges	D	None	---	---	0-0.5	Perched	Dec-Apr	>60	---	Moderate	Moderate
8B, 8C, 8D---- Bornstedt	C	None	---	---	2.0-3.0	Perched	Dec-Apr	>60	---	High	High.
9B, 9D, 9E---- Bull Run	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate
10C---- Bull Run Variant	D	None	---	---	0.5-1.5	Perched	Nov-May	>60	---	Moderate	Moderate
11---- Camas	A	Frequent	Brief	Nov-May	>6.0	---	---	>60	---	Moderate	Moderate
12A, 12B---- Canderly	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate
13B, 13C, 13D, 13E, 14C, 14D, 14E---- Cascade	C	None	---	---	1.5-2.5	Perched	Dec-Apr	>60	---	High	Moderate
15B, 15C, 15D---- Cazadero	C	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate
16---- Chehalis	B	Occasional	Brief	Nov-Mar	>6.0	---	---	>60	---	Moderate	Moderate
17, 18---- Clackamas	D	None	---	---	0.5-1.5	Perched	Nov-May	>60	---	Moderate	Moderate
19---- Cloquato	B	Occasional	Very brief	Nov-Mar	>6.0	---	---	>60	---	Moderate	Moderate
20---- Coburg	C	None	---	---	1.5-2.5	Apparent	Nov-May	>60	---	Moderate	Moderate
21---- Concord	D	None	---	---	+.5-0.5	Apparent	Nov-May	>60	---	Moderate	Moderate
22---- Conser	D	Rare	---	---	+1-1.5	Apparent	Nov-May	>60	---	Moderate	Moderate
23B, 23C, 23D---- Cornelius	C	None	---	---	2.5-4.0	Perched	Dec-Apr	>60	---	Moderate	Moderate

See footnote at end of table.

contamination of water supplies as a result of seepage from onsite sewage disposal systems.

This map unit is in capability subclass IIe.

13B—Cascade silt loam, 3 to 8 percent slopes. This deep, somewhat poorly drained soil is on rolling uplands. It formed in silty material. The vegetation in areas not cultivated is mainly Douglas-fir, bigleaf maple, western redcedar, vine maple, salal, swordfern, grasses, and forbs. Elevation is 250 to 1,400 feet. The average annual precipitation is about 50 to 60 inches, the average annual air temperature is 50 to 54 degrees F, and the average frost-free period is 165 to 210 days.

Typically, the surface layer is very dark grayish brown and dark brown silt loam about 11 inches thick. The subsoil is dark yellowish brown silt loam about 10 inches thick. Below this to a depth of 60 inches or more is a dark yellowish brown, mottled silt loam and silty clay loam hardpan. Depth to the hardpan ranges from 20 to 30 inches.

Included in this unit are small areas of Powell, Kinton, Cornelius, Delena, and Laurelwood soils. Included areas make up about 20 percent of the total acreage.

Permeability of this Cascade soil is moderate to a depth of 21 inches and slow below this depth. Available water capacity is about 5.0 to 7.5 inches. Effective rooting depth is restricted by the hardpan. Runoff is slow, and the hazard of water erosion is slight. The water table is at a depth of 18 to 30 inches in winter and early in spring. This soil is droughty in summer.

This unit is used mainly for pasture, hay, and small grain. It is also used for timber production, homesites, wildlife habitat, and recreation. This unit is subject to increased use as homesites. Where the unit has been used as homesites, as much as 50 percent of the area not covered by buildings or other impervious material has been disturbed. The disturbed areas have been covered by as much as 20 inches of fill material or have had as much as 30 inches of the original profile removed by cutting and grading. The fill material is most commonly from adjacent areas of Cascade soils that have been cut or graded.

If this unit is used for pasture, hay, and small grain, the main limitations are wetness, restricted rooting depth, and droughtiness. Wetness generally limits the suitability of this unit for deep-rooted crops. Tile drainage systems are difficult to install because of the depth to the hardpan. They should be installed across the slope. In summer, irrigation is required for maximum production of most crops. Sprinkler irrigation is a suitable method of applying water. Applications of irrigation water should be adjusted to the available water capacity and the water intake rate; overirrigating and leaching of plant nutrients should be avoided.

Excessive cultivation of the soil in this unit can result in the formation of a tillage pan, which can be broken by subsoiling when the soil is dry. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth. If the soil in this unit is plowed in fall, runoff and erosion can be reduced by fertilizing and seeding to a cover crop. Diversions and grassed waterways may be needed. Grain and grasses respond to nitrogen, and legumes respond to phosphorus, boron, sulfur, and lime. When the soil is wet, grazing and other activities that cause trampling result in compaction of the surface layer, poor tilth, and excessive runoff.

This unit is suited to the production of Douglas-fir. The site index for Douglas fir ranges from 150 to 160. On the basis of a site index of 155, the potential production per acre of merchantable timber is 9,840 cubic feet from an even-aged, fully stocked stand of trees 60 years old or 91,040 board feet (International rule, one-eighth-inch kerf) from an even-aged, fully stocked stand of trees 80 years old.

The main concerns in producing and harvesting timber on this unit are wetness and restricted rooting depth. Conventional methods of harvesting timber generally are suitable, but the soil may become compacted if heavy equipment is used when the soil is wet. Trees are subject to windthrow because of the restricted rooting depth. Roads need heavy base rock for year-round use. Roads and landings can be protected from erosion by constructing water bars and by seeding cuts and fills. Brushy plants such as vine maple and salal limit natural regeneration of Douglas-fir.

If this unit is used for homesite development, the main limitations are wetness and low soil strength. Drainage should be provided if buildings with basements and crawl spaces are constructed. Wetness is reduced by installing drain tile around footings. The hardpan in this soil is rippable and therefore is not a serious limitation for most engineering uses. Onsite sewage disposal systems often fail or do not function properly during periods of high rainfall because of the hardpan.

Preserving the existing plant cover on this unit during construction helps to control erosion. In summer, irrigation is required for lawn grasses, shrubs, vines, shade trees, and ornamental trees. It is difficult to establish these plants in areas that have had the surface layer and subsoil removed, exposing the hardpan. Mulch and fertilizer help to establish plants in cut areas. Plants that tolerate wetness and droughtiness should be selected if drainage and irrigation are not provided.

This map unit is in capability subclass IIIw.

13C—Cascade silt loam, 8 to 15 percent slopes. This deep, somewhat poorly drained soil is on rolling uplands. It formed in silty material. The vegetation in areas not cultivated is mainly Douglas-fir, bigleaf maple, western redcedar, vine maple, salal, swordfern, grasses, and forbs. Elevation is 250 to 1,400 feet. The average annual precipitation is about 50 to 60 inches, the

average annual air temperature is 50 to 54 degrees F, and the average frost-free period is 165 to 210 days.

Typically, the surface layer is very dark grayish brown and dark brown silt loam about 11 inches thick. The subsoil is dark yellowish brown silt loam about 10 inches thick. Below this to a depth of 60 inches or more is a dark yellowish brown, mottled silt loam and silty clay loam hardpan. Depth to the hardpan ranges from 20 to 30 inches.

Included in this unit are small areas of Powell, Kinton, Cornelius, and Laurelwood soils. Included areas make up about 20 percent of the total acreage.

Permeability of this Cascade soil is moderate to a depth of 21 inches and slow below this depth. Available water capacity is about 5.0 to 7.5 inches. Effective rooting depth is restricted by the hardpan. Runoff is medium, and the hazard of water erosion is moderate. The water table is at a depth of 18 to 30 inches in winter and early in spring. This soil is droughty in summer.

This unit is used mainly for pasture, hay, and small grain. It is also used for timber production, homesites, wildlife habitat, and recreation. This unit is subject to increased use as homesites. Where the unit has been used as homesites, as much as 50 percent of the area not covered by buildings or other impervious material has been disturbed. The disturbed areas have been covered by as much as 24 inches of fill material or have had as much as 36 inches of the original profile removed by cutting and grading. The fill material is most commonly from adjacent areas of Cascade soils that have been cut or graded.

If this unit is used for pasture, hay, and small grain, the main limitations are slope, wetness, restricted rooting depth, and droughtiness. Wetness generally limits the suitability of this unit for deep-rooted crops. Tile drainage systems are difficult to install because of the depth to the hardpan. They should be installed across the slope.

In summer, irrigation is required for maximum production of most crops. Sprinkler irrigation is a suitable method of applying water. Use of this method permits the even, controlled application of water, reduces runoff, and minimizes the risk of erosion.

Excessive cultivation of the soil in this unit can result in the formation of a tillage pan, which can be broken by subsoiling when the soil is dry. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth. Grain and grasses respond to nitrogen, and legumes respond to phosphorus, boron, sulfur, and lime.

If the soil in this unit is plowed in fall, runoff and erosion can be reduced by fertilizing and seeding to a cover crop. All tillage should be on the contour or across the slope. When the soil is wet, grazing and other activities that cause trampling result in compaction of the surface layer, poor tilth, and excessive runoff.

This unit is suited to the production of Douglas-fir. The site index for Douglas-fir ranges from 150 to 160. On the basis of a site index of 155, the potential production per acre of merchantable timber is 9,840 cubic feet from an even-aged, fully stocked stand of trees 60 years old or 91,040 board feet (International rule, one-eighth-inch kerf) from an even-aged, fully stocked stand of trees 80 years old.

The main concerns in producing and harvesting timber are wetness and the restricted rooting depth. Conventional methods of harvesting timber generally are suitable, but the soil may become compacted if heavy equipment is used when the soil is wet. Trees are subject to windthrow because of the restricted rooting depth. Roads for year-round use need heavy base rock. Roads and landings can be protected from erosion by constructing water bars and by seeding cuts and fills. Brushy plants such as vine maple and salal limit natural regeneration of Douglas-fir.

If this unit is used for homesite development, the main limitations are wetness, low soil strength, and steepness of slope. Drainage should be provided if buildings with basements and crawl spaces are constructed. Wetness is reduced by installing drain tile around footings.

Onsite sewage disposal systems often fail or do not function properly during periods of high rainfall because of the hardpan. The steepness of slope is a concern in installing septic tank absorption fields.

Preserving the existing plant cover during construction helps to control erosion. In summer, irrigation is required for lawn grasses, shrubs, vines, shade trees, and ornamental trees. It is difficult to establish these plants in areas that have had the surface layer and subsoil removed, exposing the hardpan. Mulch and fertilizer help to establish plants in cut areas. Plants that tolerate wetness and droughtiness should be selected if drainage and irrigation are not provided.

This map unit is in capability subclass IIIe.

13D—Cascade silt loam, 15 to 30 percent slopes. This deep, somewhat poorly drained soil is on rolling uplands. It formed in silty material. The vegetation in areas not cultivated is mainly Douglas-fir, bigleaf maple, western redcedar, vine maple, salal, swordfern, grasses, and forbs. Elevation is 250 to 1,400 feet. The average annual precipitation is about 50 to 60 inches, the average annual air temperature is 50 to 54 degrees F, and the average frost-free period is 165 to 210 days.

Typically, the surface layer is very dark grayish brown and dark brown silt loam about 11 inches thick. The subsoil is dark yellowish brown silt loam about 10 inches thick. Below this to a depth of 60 inches or more is a dark yellowish brown, mottled silt loam and clay loam hardpan. Depth to the hardpan ranges from 20 to 30 inches.

C

Geotechnical Engineering Report

Proposed Chase Bank Branch
West Linn, Oregon
June 7, 2011
Terracon Project No. 82115014

Prepared for:
Callison Architects, Inc.
Seattle, Washington

Prepared by:
Terracon Consultants, Inc.
Portland, Oregon

June 7, 2011

Terracon

Callison Architects, Inc.
1420 Fifth Avenue, Suite 200
Seattle, Washington 98101

Attn: Mr. Jon McAuley

Re: Geotechnical Engineering Report
Proposed Chase Bank
19080 Willamette Drive
West Linn, Oregon
Terracon Project Number: 82115014

Dear Mr. McAuley:

Terracon Consultants, Inc. (Terracon) has completed the geotechnical engineering services for the above referenced project. These services were performed in general accordance with our proposal number P82110070 dated May 12, 2011 and authorized per our Master Service Agreement with Callison Architects, Inc by an email dated May 14, 2011..

This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork and the design and construction of foundations, floor slabs, and pavements.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, or if we may be of further service, please contact us.

Sincerely,
Terracon Consultants, Inc.

REGISTERED PROFESSIONAL ENGINEER
78373PE
OREGON
JULY 11, 2006
KRISTOPHER T. HAUCK
6/7/11
EXPIRES: 6/30/2011

Brent H. Sullivan, EIT
Staff Engineer

Kristopher T. Hauck, PE
Office Manager

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GEOTECHNICAL ENGINEERING REPORT
PROPOSED CHASE BANK
WEST LINN, OREGON

Terracon Project No. 82115014

June 7, 2011

1.0 INTRODUCTION

This geotechnical engineering report has been completed for the proposed Chase Bank to be located at 19080 Willamette Drive in West Linn, Oregon. Seven (7) borings, designated B-1 through B-7 were completed to depths of approximately 11½ to 50 feet below the existing ground surface (bgs). Boring logs of the borings along with a Boring Location Plan (Exhibit A-1) are included in Appendix A of this report.

The purpose of our evaluation is to provide geotechnical recommendations and considerations for the following with respect to the proposed development:

- subsurface soil conditions
- groundwater conditions
- earthwork
- seismic considerations
- foundation design and construction
- floor slab design and construction
- lateral earth pressures
- pavement design and construction

2.0 PROJECT INFORMATION

2.1 Project Description

ITEM	DESCRIPTION
Site layout	See Exhibit A-1: Boring Location Plan. We understand that the existing building will be demolished and a new building will be constructed at the site.
Structures	The proposed building is about 4,120 square feet in size. The building is presumed to be a single-story with a concrete slab on-grade.
Building construction	Wood and/or steel framed structure typically supported on conventional spread and continuous footings (assumed).
Maximum loads	**Column Footings:** 50 kips (assumed) **Wall Footings:** 2 to 3 klf (assumed) **Floor Slabs:** 125 ksf (assumed)

ITEM	DESCRIPTION
Maximum allowable settlement	**Total Static:** 1 inch (assumed) **Differential:** ¾ inch in 40 feet (assumed) **Seismic Related Settlement:** We have prepared this report with the assumption that up to 2 inches of seismic related settlement is acceptable to the owner during a Design Level Earthquake and will be accommodated in the structural design of the building.
Grading	Cuts and fills on the order of 2 to 4 feet for site grading, mainly on the northeastern end of the site where the existing building is located and the drive-through planned. Excavation and backfill of new footings expected to be on the order of 2 to 3 feet with little to no (less than about 2 feet) net elevation change from existing grade to finished floor elevation (assumed).
Cut and fill slopes	Approximate 3% slope final grading across site from assumed finish floor elevation to the northeastern drive-through (assumed).
Free-standing retaining walls	None expected if site is graded.

2.2 Site Location and Description

ITEM	DESCRIPTION
Location	The project site is located northwest of the intersection of Willamette Drive and Cedar Oak Drive. The current physical address is 19080 Willamette Drive in West Linn, Oregon.
Existing Site Features	The site is currently developed with a two story building, including a daylight basement, wood framed building. The building is a vacated commercial retail building with an apparent concrete slab-on-grade in the daylight basement.
Surroundings	**Northwest**: Fence bordered by grass/weeds and a small single-story commercial retail development. **Southeast**: Asphalt paved drives and small single story commercial retail development. **Northeast**: Trees/shrubs and residential neighborhood. **Southwest**: Asphalt paved parking area, landscape islands and Willamette Drive.
Current ground cover	Predominately covered with a mixture of asphalt pavements and gravel on all sides of the existing building.
Existing topography	Based on elevations determined with survey level and rod during site visit, there is approximately one to one and a half feet of relief across the western majority of the site, dropping from the southwest to southeast. The east side of the site drops in grade approximately eight feet through the existing building to the eastern edge of the property, with the grade continuing to drop heading east/northeast towards the Willamette River.

3.0 SUBSURFACE CONDITIONS

3.1 Geology

We reviewed the following geologic publications:

- *Oregon Geologic Data Standard (OGDS) v. 2.1,* a geologic map database published by the Oregon Department of Geology and Mineral Industries (2009, DOGAMI).
- *Soil Survey of Clackamas County, Oregon,* Soil Conservation Service (SCS), U.S. Department of Agriculture, 2010 (data accessed via http://websoilsurvey.nrcs.usda.gov/).
- *Geologic map of the Lake Oswego Quadrangle, Clackamas, Multnomah, and Washington Counties, Oregon: United States Geological Survey (USGS)* (GMS-59) 1989.
- *Relative Earthquake Hazard Map of the Lake Oswego Quadrangle, Clackamas, Multnomah, and Washington Counties, Oregon: DOGAMI (GMS-91) 1995.*

The site is mapped in the *OGDS* and GMS-59 as consisting of near surface deposits of fine-grained facies (Qff) deposited in Pleistocene. This unit is described as coarse sand to silt deposited by the catastrophic Missoula floods. This deposit is often referred to as a rhythmically deposited sand, silt, and clay deposit. The "rhythmic" reference is to describe the layering sequence often observed within the deposit with depth. The SCS mapped the site as 13C—Cascade Silt Loam, 8 to 15 percent slopes. This soil has the following characteristics according to the SCS:

Soil Type	USCS Classification	Liquid Limits	Plasticity Index	Corrosion of Concrete	Corrosion of Steel	pH	Hydrologic Group
Cascade Silt Loam (13C)	ML (>21 in bgs)	25-35	NP - 10	Moderate	Moderate	5.1-6.0	C

The *Relative Earthquake Hazard Map (GMS-91)* indicates the site is mapped as:

Relative Hazard	Category	Scale	Explanation of Category
Ground Motion Amplification	3	1 to 3, with 3 being greatest	Category 3 corresponds to areas with amplification greater than 1.5.
Liquefaction	3	0 to 3, with 3 being greatest	Category 3 corresponds to areas with a thickness of liquefiable material greater than 20 ft. where the water table is 15-30 ft. deep or areas with liquefiable material where the water table is less than 15 ft. deep.
Slope Instability	0	0 to 3, with 3 being greatest	Category 0 corresponds to areas with slope instability only in unusual localized conditions.
Overall Earthquake Hazard	A	A to D, with A being the greatest hazard	The degree of relative hazard was based on the factors of ground motion amplification, liquefaction, and slope instability.

3.2 Typical Profile

Based on the results of the borings, subsurface conditions on the project site can be generalized as follows:

Stratum	Approximate Depth to Bottom of Stratum (feet)	Material Description	Consistency/Density
Stratum 1 (FILL)	½ to 1	Variable: 3 inches of asphalt pavement over 5 to 6 inches gravel base course in borings (B-1, B-2, B-4, and B-7) and silt, gravel with silt in borings (B-3, B-5) and 3 inches topsoil over 3 inches gravel in boring B-6	Variable pavement and ground surface conditions
Stratum 2 (FILL)	1 to 6	Gravel with silt, gravel, silt, silt with gravel, silt with sand	Loose granular soils / soft to very stiff fine grained soils

Stratum	Approximate Depth to Bottom of Stratum (feet)	Material Description	Consistency/Density
Stratum 3 (SILT and SAND)	20 feet to Undetermined: Borings B-5, B-6, and B-7 were terminated within this stratum at the planned depth of 11½ feet bgs.	Interbedded layers of silt with variable amounts of sand and fine sand with variable amounts of silt (approximately 1½ to 6½ feet in thickness). Fines vary from low plasticity to non-plastic	Soft to stiff fine grained soils / loose to medium dense granular soils
Stratum 4 (SAND)	25 feet to Undetermined: Borings B-1 was terminated within this stratum at the planned depth of 26½ feet bgs.	Silty sand, trace to with gravels generally 1 to 6 feet in thickness where encountered	Medium dense
Stratum 5 (B-3, B-4) (LEAN CLAY and SILT)	Undetermined to 50: Boring (B-3) shallower than 50 feet terminated within this stratum	Lean Clay, interbedded layers of silt with sand (approximately 5 feet in thickness)	Stiff to very stiff

The soils encountered in the borings generally confirm the presence of the silt and sand soils consistent with those described within the publications we reviewed. Conditions encountered at each boring location are indicated on the individual boring logs found in Appendix A of this report. Stratification boundaries on the boring logs represent the approximate location of changes in soil types; in-situ, the transition between materials may be gradual.

Laboratory test results are presented on the boring logs in Appendix A and/or in Appendix B.

Based on the moderate risk of corrosion as mapped in the SCS, resistivity testing was completed. Results of the resistivity testing are presented below in the following table:

Electrical Resistivity Test Results – ASTM G57-06	
Sample ID	**Result**
B-4 (2½ feet)	5,000 ohm-cm

3.2.1 Corrosion Considerations

Based on the laboratory test result, the resistivity value for the near surface fill soil sample was 5,000 ohm-cm. Soils with resistivity values below 2,000 ohm-cm are generally associated with

soils classified as "very to very severely corrosive" towards buried metal objects while soils with resistivity values between 2,000 and 5,000 ohm-cm are generally associated with soils classified as "corrosive". Soils with resistivity values between 5,000 and 10,000 ohm-cm are generally associated with soils classified as "moderately corrosive". Due to the electrical resistivity values at the low end of the corrosive range for buried metal objects, we recommend specifying non-metallic pipes where possible. With respect to the need for protection of buried metal pipes, we recommend that the pipe manufacturers review the above soil parameters and provide a suitable level of corrosion protection.

3.3 Groundwater

Groundwater was observed in the borings at the time of drilling. Groundwater was encountered at approximately 11 to 16 feet below ground surface (bgs) while drilling and 13 to 18 feet bgs after the borings were completed. The groundwater conditions within the site soils observed appeared to be variable based on moisture condition of the samples obtained. Perched and intermittent groundwater conditions appear to be prevalent within the explorations and should be expected to be variable across the site.

Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the borings were completed. Therefore, groundwater levels during construction or at other times may be higher or lower than the levels indicated on the boring logs. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project.

4.0 RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION

4.1 Geotechnical Considerations

The subsurface conditions at the site were evaluated to develop geotechnical related design and construction recommendations for site development. In our opinion, the site is feasible for the proposed development provided the recommendations in this report are followed. Based on the subsurface conditions and our understanding of the proposed construction, the primary geotechnical considerations associated with the proposed development is summarized below.

Support of footings, floor slabs, and pavements on or above existing fill soils is discussed in this report. However, even with the recommended improvements, there is an inherent risk for the owner that compressible fill or unsuitable material within or buried by the fill will not be discovered. This risk of unforeseen conditions cannot be eliminated without completely removing the existing fill. Therefore, complete removal of existing fill soils within the building pad limits are recommended in this report.

- **Site Specific Seismic Liquefaction:** The geologic conditions at the site are considered to be marginal for support of foundations. The site is generally underlain by 15 to 20 feet of interbedded layers of soft to very stiff silt and loose to medium dense silty sand. At depths of about 20 to 26½ feet bgs, very stiff clay and silt with sand were encountered to the bottom of the boring (B-4). These soil conditions, a shallow groundwater level, and the high risk of seismic activity in the site vicinity provides the setting for a moderate risk of intermittent layers of liquefaction of the site soils during a design level earthquake to a depth of about 16 to 20 feet bgs as encountered in Borings B-3 and B-4. However, the estimated settlements appear to be within tolerance of the building to protect life-safety, provided the recommendations for continuous footings and granular fill pads are incorporated in the construction of the building.

- **Continuous Footings with Structural Fill:** Based on the subsurface conditions, our seismic analyses, and experience with small, lightly loaded structures, we recommend that the footings for the structure be continuous (no isolated spread footings) like grade beams throughout the structure and the footings be supported on a minimum of 3 feet of structural fill. The goal of the recommendations within this report is to protect life-safety.according to the 2009 International Building Code. Therefore, we would still expect up to about 1½ to 2 inches of total settlement due to a design level seismic event.

- **Site Grading:** Due to the steeper grades on the eastern third of the site we estimate 2 to 4 feet of site grading will be necessary to make final grades for the drive-through and fill excavation from planned demolition of existing building structure onsite. If planned slope grades at site are steeper than 5H:1V, benching and keying of new fill soils will be necessary, refer to the **Earthwork** section of this report. .

- **Moisture Sensitive Native Soils:** The native soils underlying the surface coverings at the site consist of silts that are very moisture sensitive. These soils are prone to disturbance when they contain elevated moisture contents and are very difficult to compact to the project requirements. Due to the plasticity and moisture content of these soils, they should not be planned to be reused at the site for fill or backfill.

This summary should be used in conjunction with the entire report for design purposes. It should be recognized that details were not included or fully developed in this section, and the report must be read in its entirety for a comprehensive understanding of the items contained herein.

4.2 Seismic Considerations

DESCRIPTION	VALUE
2009 International Building Code Site Classification (IBC) [1]	F[2]
Site Latitude	N 45.387565
Site Longitude	W 122.641585
S_s Spectral Acceleration for a Short Period	0.938
S_1 Spectral Acceleration for a 1-Second Period	0.332

1. In general accordance with the *2009 International Building Code,* Table 1613.5.2. IBC Site Class is based on the average characteristics of the upper 100 feet of the subsurface profile.
2. The 2009 International Building Code (IBC) requires a site soil profile determination extending to a depth of 100 feet for seismic site classification. The current scope does not include the required 100 foot soil profile determination. Borings extended to a maximum depth of about 50 feet, and this seismic site class definition considers that stiff soil as noted on the published geologic mapping continues below the maximum depth of the subsurface exploration. Additional exploration to deeper depths would be required to confirm the conditions below the current depth of exploration. Therefore, we would interpret that site soils encountered at the site are representative of the soils to a depth of 100 feet.

As discussed below and in the **Geology** section of this report, the site soils have a high risk of liquefaction. Consequently, we have classified the Soil Site Class as F and site specific response analysis may be required to determine spectral accelerations. However, Section 20.3.1 of ASCE 7-05 allows site coefficients F_a and F_v to be determined from Tables 11.4-1 and 11.4-2 for structures with fundamental periods of vibration equal to or less than 0.5 second. We understand, based on our experience with structures similar to the proposed development, that the fundamental period of the structure is less than 0.5 seconds. Therefore, Site Class D was used to determine the values of F_a and F_v in the table below.

Site Class D Spectral Response Accelerations	
F_a site coefficient	1.125
F_v site coefficient	1.737

4.2.1 Liquefaction Analysis

Liquefaction is the phenomenon where saturated soils develop high pore-water pressures during seismic shaking and lose their strength characteristics. This phenomenon generally occurs in areas of high seismicity, where groundwater is shallow and loose granular soils or relatively non-plastic fine-grained soils are present. Wet to saturated, low plasticity and non-plastic, soft to very stiff silts/sandy silt and loose to medium dense, sands were encountered in the borings to depths of about 26½ feet bgs.

As part of this geotechnical evaluation, we performed a site-specific liquefaction analysis using the methods based on empirical methods originally developed by Seed and Idriss and subsequently modified by others. The latest recommended procedures were presented by Idriss and Boulanger (2008). The peak ground acceleration and moment magnitude used in the analysis were based on IBC derived ground motions for the design earthquake.

Using the 2009 IBC seismic parameters, we computed safety factors against liquefaction for the various soil layers below the water table encountered at the time of our exploration. For the groundwater at approximately 11 to 13 feet bgs, as encountered in our borings, the potential for liquefaction of the non-plastic to low plasticity silt with sand and the loose silty sand from about 11 to 20 feet bgs is considered to be moderate to high. We estimate that intermittent layers of soils within these depths would liquefy during a design level earthquake as described in the 2009 IBC and liquefaction-induced settlements of about 1½ up to 2 inches at the ground surface.

4.2.2 Seismic Settlement Discussion

Due to the potential seismic liquefaction settlements indicated by our analysis, we recommend that all footings for the structure be connected together with grade beams and supported on a minimum of 3 feet of granular structural fill. No isolated footing pads should be planned or constructed. In addition, the footings should be designed such that they would be able to span about 8 feet without subgrade support. The intent of these recommendations is driven by life-safety as required by the IBC and to help limit differential settlements for the building, not prevent total seismic settlements. In addition this recommendation is not intended to mitigate potential liquefaction settlements occurring due to the design level earthquake.

The 2009 IBC requires that liquefaction analyses be completed assuming a substantial earthquake with associated ground accelerations that are provided in the IBC. It is not the intent of the IBC to require a building to be in an operable condition after such event. Rather the IBC philosophy for seismic design is based on life safety with the intent of preventing building collapse as a result of such a design earthquake. Owners should understand that buildings may not be in an operational condition even with mitigation measures after such a design earthquake and significant repair or even demolition and reconstruction might be required. It therefore seems reasonable that designing a building for the potential impacts of liquefaction resulting from an IBC design earthquake event should be based on the premise of preventing building collapse.

The owner must become involved with the decision making process when it is determined that a building can tolerate predicted liquefaction settlements without collapse. Based on our experience with buildings of similar size and construction, we anticipate that the above mentioned settlements with connected footing (i.e. grade beams) are within the range of tolerance for preventing collapse and we have made design recommendations based on this

assumption. Should the settlements not be within tolerance or damage during a design level earthquake not be acceptable to the owner, liquefaction mitigation measures such as ground improvements would be necessary.

4.3 Earthwork

The following sections present recommendations for site preparation, excavation, subgrade preparation, placement and compaction of structural fill, and grading, The recommendations presented for design and construction of earth supported elements are contingent upon following the recommendations outlined in this section.

4.3.1 Site Preparation

Site preparation and initial construction activities should be planned to reduce disturbance to the existing ground surface. Construction traffic should be restricted to dedicated driveway and laydown areas. Preparation should begin with procedures intended to drain ponded water and control surface water runoff. It will be difficult to maintain stable subgrades if accumulated water is not controlled during construction. Attempting to grade the site without adequate drainage control measures will reduce the amount of on-site soil effectively available for use, increase the amount of import fill materials required, and ultimately increase the cost of the earthwork and foundation construction phases of the project.

Where fill is placed on existing slopes steeper than 5H:1V, benches should be cut into the existing slopes prior to fill placement. The benches should have a minimum vertical face height of 1 foot and a maximum vertical face height of 3 feet and should be cut wide enough to accommodate the compaction equipment, minimum of 5 feet. This benching will help provide a positive bond between the fill and natural soils and reduce the possibility of failure along the fill/natural soil interface. Furthermore, we recommend that fill slopes be over filled and then cut back to develop an adequately compacted slope face.

Although evidence of underground facilities (other than the daylight basement) such as tanks, or vaults was not observed during our fieldwork, such features could be encountered during construction. Where existing utility lines are within the building pad limits, they should be abandoned by complete removal of the utility and fill soils within the trench. The trenches should be backfilled in accordance with structural fill recommendations presented in the **Fill Material Types** and **Compaction Requirements** sections of this report. If unexpected fills or underground facilities are encountered, such features should be removed and the excavation thoroughly cleaned prior to backfill placement and/or construction.

Site preparation will require removing surface pavements and all existing fill soils within the building pad limits to a minimum depth of 1-foot below the finished floor elevation (to accommodate import granular fill for the capillary break and floor slab support). In areas of

borings B-1 through B-3, fill soils were encountered to depths of 2 to 2½ feet bgs and should be planned to be completely removed from within the building pad limits.

The near surface fill soils encountered in the borings for this project consist of fine-grained silt materials and were in a moisture condition much greater than about 2 percent over an estimated optimum moisture content. Therefore, the site soils are considered to be moisture sensitive and will be difficult or impossible to compact as structural fill. Accordingly, the fill soils from site excavations are not considered suitable as structural fill in building areas, their use in non building areas will depend on their moisture content at the time of earthwork, the prevailing weather conditions when site grading activities take place, and the proposed location for reuse.

At the time of our study, moisture contents of the surface and near-surface native soils ranged from about 24 percent to as much as 33 percent. Based on our experience with similar site soils, we estimate the native silts would have optimum moisture content less than 20 percent. Therefore, it is likely that over-optimum soils will be encountered during construction and in order to use soils that are wet of the optimum moisture content, the soils will need to be dried by aeration during dry weather conditions, or an additive, such as cement or kiln dust, may be needed to stabilize the soil. More importantly, in order to maintain a stable subgrade of the exposed soils, traffic must be limited to areas outside of the site preparation work. This may require a rock protective mat covering of exposed subgrades in order to limit disturbance of the site soils as well as provide a stable base for the ground improvement contractor's equipment.

In our opinion, earthwork should be completed during periods of the year when the moisture content can be controlled by aeration and drying. If earthwork or construction activities take place during extended periods of wet weather, or if the in-situ moisture conditions are elevated above the optimum moisture content, the soils could become unstable or not be compactable. In the event the exposed subgrade becomes unstable, yielding, or unable to be compacted due to high moisture conditions, we recommend that the materials be removed to a sufficient depth in order to develop stable subgrade soils that can be compacted to the minimum recommended levels. Successful drainage of wet to saturated soils may be relatively slow due to the fines content of the fill materials. The severity of construction problems will be dependent, in part, on the precautions that are taken by the contractor to protect the subgrade soils.

4.3.2 Subgrade Preparation

Strip and remove existing pavement, foundations, slabs, vegetation (if encountered), and other deleterious materials from the proposed foundation areas. Stripping depths to remove unsuitable materials are anticipated to be an average of about 2 to 2½ feet or less within the building pad limits due to the existing fill depths. Isolated areas requiring additional stripping could be necessary. Areas where loose or soft surface soils exist should be compacted or removed and replaced to the depth of the disturbance as subsequently recommended for

structural fill. Pavements in other areas should be left in place as long as possible to reduce erosion and prevent disturbance of the surface soils from construction traffic.

After cutting to design subgrade elevation, and prior to placement of new fill or in areas below final grades, we recommend that the exposed subgrades be observed and evaluated for the presence of soft, loose or unsuitable materials (unless the slab area will also be supported on ground improvements). We recommend testing include proofrolling and hand probing to help locate weak or unstable areas at or just below the exposed subgrade level. Proofrolling should be performed using heavy rubber-tired equipment, such as a fully-loaded dump truck, having a minimum gross weight of about 20 tons. Unsuitable areas observed at this time by the owner's representative should be excavated and replaced with structural fill. Those soils which are soft, yielding, or unable to be compacted to the specified criteria should be overexcavated and replaced with satisfactory fill material later described in the **Fill Material Types** section of this report.

Based on the outcome of the proofrolling operations, some undercutting or subgrade stabilization should be expected, especially during wet periods of the year as described in the previous section. Methods of stabilization, which are outlined below, could include scarification and recompaction and/or removal of unstable materials and replacement with granular fill (with or without geotextiles). The most suitable method of stabilization, if required, will be dependent upon factors such as schedule, weather, size of area to be stabilized and the nature of the instability.

- **Scarification and Recompaction** - It may be feasible to scarify, dry, and recompact the exposed soils only during the extended dry season. Very limited use of this method should be considered feasible for the site. The success of this procedure would depend primarily upon favorable weather and sufficient time to dry the soils. Even with adequate time and weather, stable subgrades may not be achievable if the thickness of the soft soil is greater than about 1 to 1½ feet.

- **Granular Fill** - The use of crushed stone or gravel could be considered to improve subgrade stability. Typical undercut depths would range from about ½ foot to 2 feet. The use of high modulus geotextiles i.e., engineering fabric, should be limited to outside of the Building Ground Improvements area. The maximum particle size of granular material placed immediately over geotextile fabric or geogrid should not exceed 2 inches.

- **Chemical Stabilization** - Improvement of subgrades with portland cement, lime kiln dust, or Class C fly ash could be considered for unstable and plastic soils. Chemical modification should be performed by a pre-qualified contractor having experience with

successfully stabilizing subgrades in the project area on similar sized projects with similar soil conditions.

Overexcavations should be backfilled with structural fill material placed and compacted in accordance with the **Fill Material Types** and **Compaction Requirements** sections of this report. Subgrade preparation and selection, placement, and compaction of structural fill should be performed under engineering controlled conditions in accordance with the project specifications.

4.3.3 Fill Material Types

Engineered or structural fill should meet the following material property requirements:

Fill Type [1]	Specification	Acceptable for Placement
Common Fill	Oregon Standard Specification for Construction (OSSC) 00330.13 Selected General Backfill	All locations across the site, with the exception of within the building pad limits, Dry Weather only.
Select Fill	OSSC 00330.14 Selected Granular Backfill with exception of no more than 5% passing the No. 200 sieve by weight	All locations across the site, Wet Weather and Dry Weather acceptable.
Crushed Rock Base Course (CRBC)	OSSC 02630.10 Dense Graded Aggregate (2"-0 to ¾"-0)	All locations across the site. Recommended for finished base course materials for floor slabs and pavements. Wet Weather and Dry Weather acceptable.

1. Controlled, compacted fill should consist of approved materials that are free (free = less than 3% by weight) of organic matter and debris (i.e. wood sticks greater than ¾-inch in diameter). Frozen material should not be used, and fill should not be placed on a frozen subgrade. A sample of each material type should be submitted to the geotechnical engineer for evaluation.

If open-graded materials with large void spaces, such as quarry spalls, are used over the fine-grained soils, we recommend that the materials be placed over a geotextile fabric separator to prevent fines migration as well as to stabilize the subgrade. The geotextile fabric should be a woven product (Mirafi 500XT or equivalent).

4.3.4 Compaction Requirements

The following compaction requirements are recommended for the prepared subgrade and structural fill expected to be placed for this site:

Item	Description
Fill Lift Thickness	**Common Fill, Select Fill and CRBC:** 8 inches or less in loose thickness when heavy, compaction equipment is used. 4 inches or less in loose thickness when compacted with light walk-behind equipment.
Compaction Requirements [1]	**Common Fill, Select Fill & CRBC:** 95% of the material's maximum Proctor dry density (ASTM D 1557) within the building pad limits and upper 2 feet below site pavements and 92% of the materials maximum Proctor dry density (ASTM D 1557) elsewhere.
Moisture Content	**Common Fill, Select Fill and CRBC:** Within ±2 percent of optimum moisture content as determined by ASTM D 1557.

1. We recommend that fill be tested for moisture content and compaction during placement. Should the results of the in-place density tests indicate the specified moisture or compaction limits have not been met, the area represented by the test should be reworked and retested as required until the specified moisture and compaction requirements are achieved.

4.3.5 Grading and Drainage

Positive drainage should be provided during construction and maintained throughout the life of the development. Infiltration of water into utility trenches or foundation excavations should be prevented during construction. Backfill against footings, exterior walls, and in utility and sprinkler line trenches should be well compacted and free of all construction debris to reduce the possibility of moisture infiltration.

Downspouts, roof drains or scuppers should discharge into splash blocks or extensions when the ground surface is not protected by exterior slabs or paving. Roof drains should not connect to footing drains. Sprinkler systems should not be installed within five feet of foundation elements. Landscaped irrigation adjacent to the foundation systems should be minimized or eliminated.

4.3.6 Earthwork Construction Considerations

The near surface native soils encountered in the borings for this project consist of fine grained silts, clayey silt, and sandy silt materials. Accordingly, the native soils from site excavations are not considered suitable as structural fill in building areas. Their suitability for reuse as common fill in non-building areas will depend on their moisture content at the time of earthwork, the prevailing weather conditions when site grading activities take place, and the proposed location for reuse.

Although the exposed subgrades are anticipated to be relatively stable upon initial exposure, unstable subgrade conditions could develop during general construction operations, particularly if the soils are wetted and/or subjected to repetitive construction traffic. The use of light construction equipment would aid in reducing subgrade disturbance. Should unstable subgrade conditions develop stabilization measures will need to be employed.

Upon completion of filling and grading, care should be taken to maintain the subgrade moisture content prior to construction of floor slabs and pavements. Construction traffic over the completed subgrade should be avoided to the extent practical. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. If the subgrade should become frozen, desiccated, saturated, or disturbed, the affected material should be removed or these materials should be scarified, moisture conditioned, and recompacted prior to floor slab and pavement construction.

The contractor is responsible for designing and constructing stable, temporary excavations (including utility trenches) as required to maintain stability of both the excavation sides and bottom. Excavations should be sloped or shored in the interest of safety following local and federal regulations, including current OSHA excavation and trench safety standards.

The geotechnical engineer should be retained during the construction phase of the project to observe earthwork and to perform necessary tests and observations during subgrade preparation; proof-rolling; placement and compaction of controlled compacted fills; backfilling of excavations to the completed subgrade.

4.4 Foundations

We recommend that the building pad be prepared as recommended in the **Error! Reference source not found.** section to reduce the liquefaction settlement risk. The ground improvement would reinforce the liquefiable non-plastic soils, thereby increasing the safety factor against liquefaction. Conventional shallow foundations and slab-on-grade floors could then be used in the design of the building. Design recommendations for foundations for the proposed structures and related structural elements are presented in the following paragraphs.

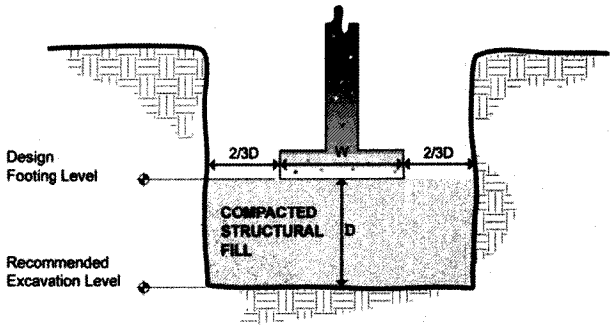
4.4.1 Shallow Foundation Design Recommendations

Due to the potential seismic liquefaction settlements indicated by our analysis, we recommend that all footings for the structure be connected together and supported on a minimum of 3 feet of granular structural fill. No isolated footing pads should be planned or constructed. In addition, the footings should be designed such that they would be able to span about 8 feet without subgrade support (similar to grade-beams). The intent of these recommendations is driven by life-safety as required by the IBC and to help limit differential settlements for the building, not

prevent total seismic settlements. In addition this recommendation is not intended to mitigate potential liquefaction settlements occurring due to the design level earthquake.

We recommend that foundations be supported on a minimum 3 feet of Select Fill placed over undisturbed, native soils. Foundations should not be supported on soft or loose soils or existing fill soils that do not meet the minimum recommended compaction levels. Overexcavation for compacted backfill placement below footings should extend laterally beyond all edges of the footings at least 8 inches per foot of overexcavation depth below footing base elevation for excavations backfilled with soils.

Should the soils at bearing level become excessively wet, disturbed or saturated, or frozen, the affected soil should be removed prior to placing concrete. If unsuitable bearing soils are encountered in footing excavations, the excavations should be extended deeper to suitable soils. The overexcavation should then be backfilled up to the footing base elevation with the **Fill Material Types** and **Compaction Requirements** sections of this report. The overexcavation and backfill procedures are described in the adjacent figure. The base of all foundation excavations should be free of water and disturbed soil and rock prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing soil disturbance.



Overexcavation / Backfill

NOTE: Excavations in sketches shown vertical for convenience. Excavations should be sloped as necessary for safety.

DESCRIPTION	Continuous / Grade-Beam Footings
Net allowable bearing pressure [1] **Structurally Connected Footings supported on a minimum of 3 feet of structural fill material placed directly on undisturbed native soil**	2,000 psf
Minimum dimensions	18 inches
Minimum embedment below finished grade for frost protection [2]	18 inches
Approximate total static settlement [3]	<1 inch
Estimated differential settlement [3]	<¾ inch over 40 feet
Allowable passive pressure [4]	250 psf/ft
Allowable coefficient of sliding friction [4]	0.33

1. The recommended net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. Assumes any unsuitable fill or soft soils, if encountered, will be undercut and replaced with structural fill. Assumes that ground improvement as discussed within this report is adequately constructed.
2. And to reduce the effects of seasonal moisture variations in the subgrade soils. For perimeter footing and footings beneath unheated areas.
3. Assumes that footing subgrades and structural connections as discussed within this report is adequately constructed. The foundation settlement will depend upon the variations within the subsurface soil profile, the structural loading conditions, the embedment depth of the footings, the thickness of compacted fill, and the quality of the earthwork operations. The above settlement estimates have assumed that the maximum footing size is 1½ feet for continuous footings.
4. The value presented is an equivalent fluid pressure. The sides of the excavation for the spread footing foundation must be nearly vertical and the concrete should be placed neat against these vertical faces for the passive earth pressure values to be valid. Passive resistance in the upper 18 inches of the soil profile should be neglected.

The net allowable bearing pressures presented in the table above may be increased by one-third to resist transient, dynamic loads such as wind or seismic forces. Please note that lateral resistance to footings should be ignored in the upper 18 inches from finish grade.

Perimeter Footing Drains: We recommend that footing drains be installed around the perimeter of the proposed building at the base of the foundations. Drains are also recommended behind all retaining and loading dock walls. Alternatively, retaining walls could be drained with weep holes on maximum 8-foot spacing. Footing drains should consist of a minimum 4-inch diameter, Schedule 40, rigid, perforated PVC pipe placed at the base of the heel of the footing with the perforations facing down. The pipe should be surrounded by a minimum of 4 inches of clean free-draining granular material. Drain rock material should conform to Section 00430.11, Granular Drain Backfill Material, as presented in the *2008 ODOT Standard Specifications for Construction.* We recommend placing a non-woven geotextile, such as Mirafi 140N, or equivalent, above the free draining backfill and below the overlying fill material. Footing drains should be directed toward appropriate storm water drainage facilities. Water from downspouts and surface water should be independently collected and routed to a suitable discharge location.

4.4.2 Shallow Foundation Construction Considerations

The base of all foundation excavations should be free of water and loose soil and rock prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing soil disturbance. Should the soils at bearing level become excessively dry, disturbed or saturated, or frozen, the affected soil should be removed prior to placing concrete. Concrete shall not be placed on frozen subgrade soils. It is recommended that the geotechnical engineer be retained to observe and test the soil foundation bearing materials.

Where disturbed or otherwise unsuitable materials are exposed within the footing subgrade excavations following aggregate pier installation, the subgrades should be prepared in accordance with subgrade preparation of this report. If overexcavation and replacement is necessary, overexcavation for compacted backfill placement below footings should extend laterally beyond all edges of the footings at least 8 inches per foot of overexcavation depth below footing base elevation. The overexcavation should then be backfilled up to the footing base elevation in accordance with structural fill recommendations presented in the **Fill Material Types** and **Compaction Requirements** sections of this report.

4.4.3 Geotechnical Review

Design of a grade-beam type footing system requires a thorough understanding of site subsurface conditions. Furthermore, seismic related design concerns are somewhat approximate and often involves an evaluation of project risks and benefits relative to the extent of the improvement. We strongly recommend that Terracon be retained to review the plans, calculations and specifications once they have been prepared to confirm that the recommendations within this report are incorporated into the project design and construction as intended by Terracon.

4.5 Floor Slab

4.5.1 Floor Slab Design Recommendations

ITEM	DESCRIPTION
Interior floor system	Concrete slab-on-grade.
Base Material	6-inchs of CRBC material (¾"-0)
Capillary Break	6-inches of Capillary Break Material[2]
Modulus of subgrade reaction	125 pci for point load conditions

1. Floor slabs should be structurally independent of any building footings or walls to reduce the possibility of floor slab cracking caused by differential movements between the slab and foundation.
2. Due to shallow groundwater conditions and the fine grained nature of the site soils, capillary rise within the subsurface soils has the potential of reaching the planned floor slab elevation. The floor slab design should include a capillary break, comprised of free-draining, compacted, granular material, at least 6 inches thick. Free-draining granular material should have less than 5 percent fines (material passing the #200 sieve).

The use of a vapor retarder should be considered beneath concrete slabs on grade that will be covered with wood, tile, carpet, or other moisture sensitive or impervious coverings, or when the slab will support equipment sensitive to moisture. The slab designer and slab contractor should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder. If conditions warrant the use of a vapor retarder, we recommend using a puncture-resistant product that is classified as a Class A vapor retarder in accordance with

ASTM E 1745. To avoid puncturing of the vapor retarder, construction equipment should not be allowed to drive over any vapor retarder material.

4.5.2 Floor Slab Construction Considerations

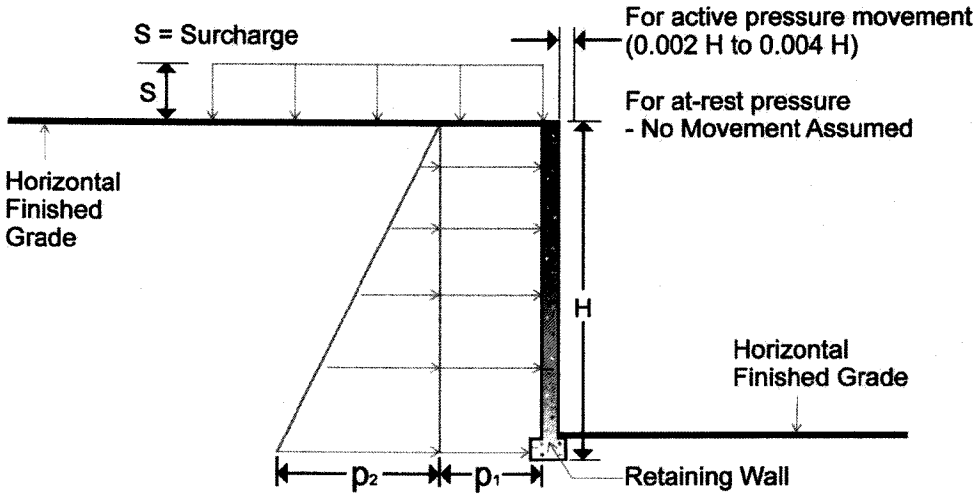
On most project sites, the site grading is generally accomplished early in the construction phase. However as construction proceeds, the subgrade may be disturbed due to utility excavations, construction traffic, desiccation, rainfall, etc. As a result, the floor slab subgrade may not be suitable for placement of base rock and concrete and corrective action will be required.

We recommend the area underlying the floor slab be rough graded and then thoroughly proofrolled with a loaded tandem axle dump truck prior to final grading and placement of base rock. Particular attention should be paid to high traffic areas that were rutted and disturbed earlier and to areas where backfilled trenches are located. Areas where unsuitable conditions are located should be repaired by removing and replacing the affected material with properly compacted fill. All floor slab subgrade areas should be moisture conditioned and properly compacted to the recommendations in this report immediately prior to placement of the base rock and concrete.

4.6 Lateral Earth Pressures

Reinforced concrete walls with unbalanced backfill levels on opposite sides should be designed for earth pressures at least equal to those indicated in the following table. Even though we do not anticipate the need for significant retaining walls on this project, we have provided the design recommendations for walls less than 4 feet in height.

Earth pressures will be influenced by structural design of the walls, conditions of wall restraint, methods of construction and/or compaction and the strength of the materials being restrained. Two wall restraint conditions are shown. Active earth pressure is commonly used for design of free-standing cantilever retaining walls and assumes wall movement. The "at-rest" condition assumes no wall movement. The recommended design lateral earth pressures do not include a factor of safety and do not provide for possible hydrostatic pressure on the walls.



Earth Pressure Coefficients

Earth Pressure Conditions	Coefficient for Backfill Type	Equivalent Fluid Density (pcf)	Surcharge Pressure, p_1 (psf)	Earth Pressure, p_2 (psf)
Active (Ka)	Granular - 0.33	40	(0.4)S	(40)H
At-Rest (Ko)	Granular - 0.46	55	(0.46)S	(55)H
Passive (Kp)	Granular - 3.0	360	---	---

Applicable conditions to the above include:

- For active earth pressure, wall must rotate about base, with top lateral movements of about 0.002 **H** to 0.004 **H**, where **H** is wall height
- For passive earth pressure to develop, wall must move horizontally to mobilize resistance
- Uniform surcharge, where **S** is surcharge pressure
- In-situ soil backfill weight a maximum of 125 pcf
- Horizontal backfill, compacted between 92 and 95 percent of modified Proctor maximum dry density
- Loading from heavy compaction equipment not included
- No hydrostatic pressures acting on wall
- No dynamic loading
- No safety factor included in soil parameters
- Ignore passive pressure in frost zone

Backfill placed against structures should consist of granular soils. For the granular values to be valid, the granular backfill must extend out from the base of the wall at an angle of at least 45 and 60 degrees from vertical for the active and passive cases, respectively. To calculate the resistance to sliding, a value of 0.33 should be used as the ultimate coefficient of friction between the footing and the underlying soil.

To control hydrostatic pressure behind the wall we recommend that a drain be installed at the foundation wall with a collection pipe leading to a reliable discharge. If this is not possible, then combined hydrostatic and lateral earth pressures should be calculated for granular backfill using an equivalent fluid weighing 85 and 90 pcf should be used for active and at-rest, respectively. These pressures do not include the influence of surcharge, equipment or floor loading, which should be added. Heavy equipment should not operate within a distance closer than the exposed height of retaining walls to prevent lateral pressures more than those provided.

4.7 Pavements

4.7.1 Pavement Design Recommendations

Traffic patterns and anticipated loading conditions were not available at the time this report was prepared. We anticipate that traffic loads will be produced primarily by automobile traffic and occasional delivery trucks. The thickness of pavements subjected to heavy truck traffic should be determined using expected traffic volumes, vehicle types, and vehicle loads and should be in accordance with local, city or county ordinances.

Pavement thickness can be determined using AASHTO, Asphalt Institute and/or other methods if specific wheel loads, axle configurations, frequencies, and desired pavement life are provided. Terracon can provide thickness recommendations for pavements for loads other than personal vehicles and occasional delivery truck if provided.

Listed below are pavement component thicknesses, which may be used as a guide for pavement systems at the site for typical commercial building traffic patterns. It should be noted that these systems were derived based on general characterization of the subgrade as predominantly fine-grained. No specific testing (such as CBR, resilient modulus test, etc.) was performed for this project to evaluate the support characteristics of the subgrade.

MINIMUM PAVEMENT THICKNESSES

COMPONENT	Material Thickness, Inches	
	Automobile Parking Areas	Drive Lanes
Asphalt Concrete	4	4
Crushed Rock Base Course (CRBC)	7	8

Prior to placement of the CRBC the pavement subgrades should be prepared as per the recommendations in the **Earthwork** section of this report. Long term pavement performance will be dependent upon several factors, including maintaining subgrade moisture levels and

providing for preventive maintenance. The following recommendations should be considered the minimum:

- The subgrade and the pavement surface have a minimum ¼ inch per foot slope to promote proper surface drainage;
- Consider appropriate edge drainage and pavement under drain systems;
- Install joint sealant and seal cracks immediately;
- Seal all landscaped areas in, or adjacent to pavements to minimize or prevent moisture migration to subgrade soils;
- Placing compacted, low permeability backfill against the exterior side of curb and gutter.

Preventive maintenance should be planned and provided for through an on-going pavement management program. Preventive maintenance activities are intended to slow the rate of pavement deterioration, and to preserve the pavement investment. Preventive maintenance consists of both localized maintenance (e.g. crack and joint sealing and patching) and global maintenance (e.g. surface sealing). Preventive maintenance is usually the first priority when implementing a planned pavement maintenance program and provides the highest return on investment for pavements. Prior to implementing any maintenance, additional engineering observation is recommended to determine the type and extent of preventive maintenance.

4.7.2 Asphalt, Base Course, and Subbase Materials

Specifications for manufacturing and placement of pavements and crushed base course should conform to specifications presented in Section 00745 of the 2008 OSSC. All subbase and base course materials should be compacted to at least 95 percent of the maximum dry density determined in accordance with ASTM D 1557. We recommend that all base courses be proofrolled with a loaded dump truck prior to placing the following lift of material. We recommend that asphalt be compacted to a minimum of 92 percent of the Rice (theoretical maximum) density.

4.7.3 Pavement Construction Considerations

On most project sites, the site grading is accomplished relatively early in the construction phase. Fills are placed and compacted in a uniform manner. However, as construction proceeds, excavations are made into these areas, rainfall and surface water saturates some areas, heavy traffic from concrete trucks and other delivery vehicles disturbs the subgrade and many surface irregularities are filled in with loose soils to improve trafficability temporarily. As a result, the pavement subgrades, initially prepared early in the project, should be carefully evaluated as the time for pavement construction approaches.

We recommend the moisture content and density of the top 9 inches of the subgrade be evaluated and the pavement subgrades be proofrolled prior to commencement of actual paving operations. Areas not in compliance with the required ranges of moisture or density should be

moisture conditioned and recompacted. Particular attention should be paid to high traffic areas that were rutted and disturbed earlier and to areas where backfilled trenches are located. Areas where unsuitable conditions are located should be repaired by removing and replacing the materials with properly compacted fills.

After proofrolling and repairing deep subgrade deficiencies, the entire subgrade should be scarified and developed as recommended in the **Earthwork** section of this report to provide a uniform subgrade for pavement construction. Areas that appear severely desiccated following site stripping may require further undercutting and moisture conditioning. If a significant precipitation event occurs after the evaluation or if the surface becomes disturbed, the subgrade should be reviewed by qualified personnel immediately prior to paving. The subgrade should be in its finished form at the time of the final review.

5.0 GENERAL COMMENTS

Terracon should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. Terracon also should be retained to provide observation and testing services during grading, excavation, foundation construction and other earth-related construction phases of the project.

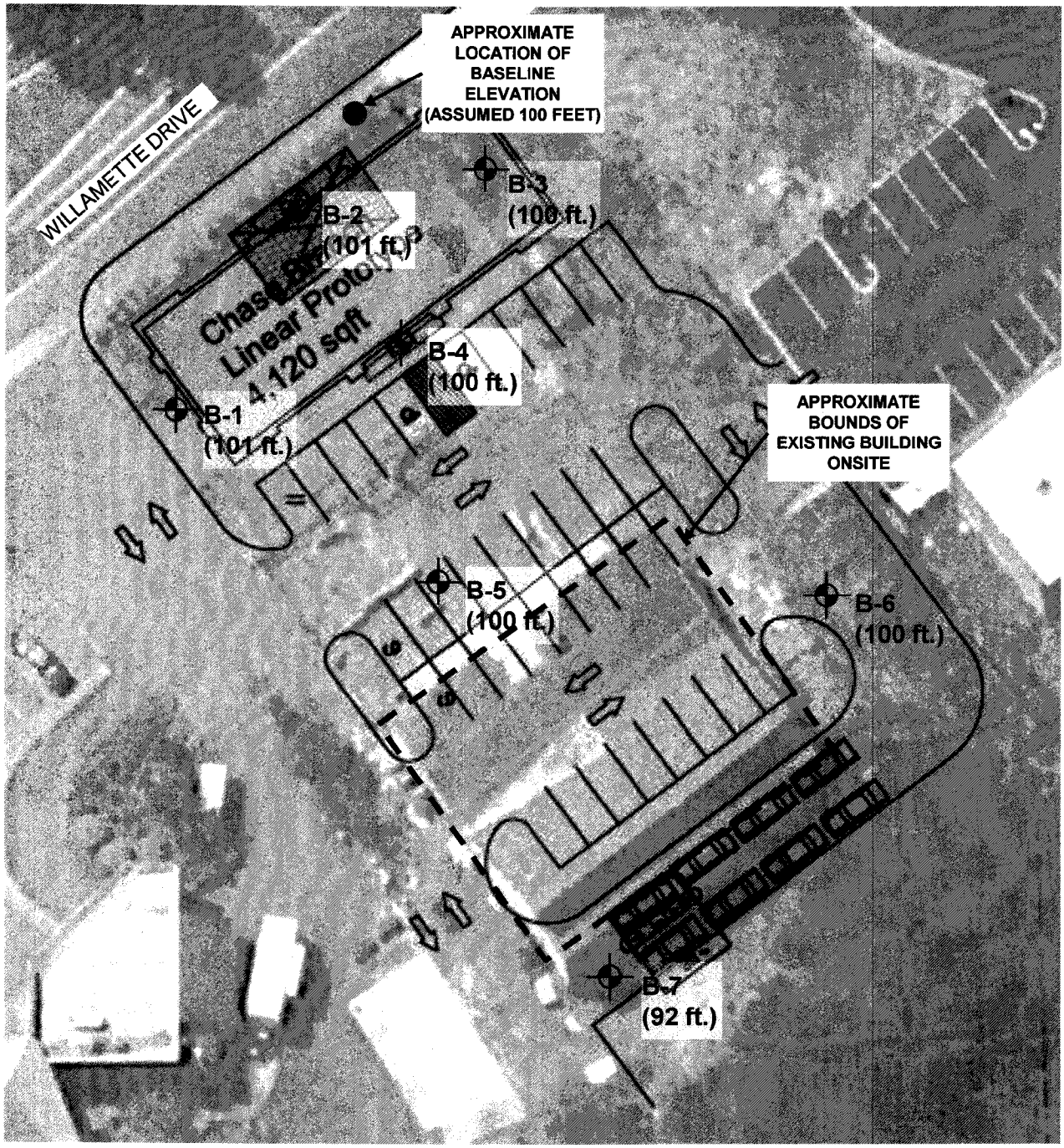
The analysis and recommendations presented in this report are based upon the data obtained from the borings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations that may occur between borings, across the site, or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. If variations appear, we should be immediately notified so that further evaluation and supplemental recommendations can be provided.

The scope of services for this project does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either express or implied, are intended or made. Site safety, excavation support, and dewatering requirements are the responsibility of others. In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered

valid unless Terracon reviews the changes and either verifies or modifies the conclusions of this report in writing.

APPENDIX A
FIELD EXPLORATION



LEGEND: B-1 (101 ft.) APPROXIMATE BORING LOCATION, ELEVATION, AND NUMBER

N

Drawing Reference: Proposed Site Plan – Chase, Cedar Oak & Hwy 43, Dated 3 March, 2011 by Callison Architects

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Elevation note: Boring elevations were determined in the field using a survey level and rod based on an assumed site elevation of the base location shown. The elevations should be considered accurate only to the degree implied by the means and methods used to define them and not more accurate than the nearest ½ foot.

Project Manager: KTH	Project No. 82115014	Terracon Consulting Engineers & Scientists	BORING LOCATION PLAN
Drawn by: BHS	Scale: N.T.S	4103 SE International Way, Suite 300 Portland, OR 97222	PROPOSED CHASE BANK
Checked by: KTH	File Name: 82115014EXA1	PH. (503) 659-3281 FAX. (503) 659-1287	19080 WILLAMETTE DRIVE
Approved by: KTH	Date: 6/1/2011		WEST LINN, OREGON

Exhibit A-1

Field Exploration Description

The boring locations were located in the field by Terracon personnel based on estimated dimension from site features and the provided site plan by Callison Architects. Terracon personnel estimated ground surface elevations of the borings (based on a site specific assumed elevation of 100 feet at a catch basin on the shoulder of Willamette Drive) by using a survey level and rod. The locations and elevations of the borings should be considered accurate only to the degree implied by the means and methods used to define them and the ground surface elevations reported on the logs have been rounded to the nearest ½ foot.

The borings were drilled with a truck-mounted drill rig under subcontract to Terracon using hollow-stem auger and mud rotary drilling methods. An engineer from our firm continuously observed the boring excavations, logged the subsurface conditions, and obtained representative soil samples. Samples of the soil encountered in the borings were obtained using the split barrel and thin-walled tube sampling procedures. The samples were stored in moisture tight containers and transported to our laboratory for further visual classification and testing. After we logged each boring, the operator backfilled each boring in general conformance of local regulations and patched the surface with concrete.

In the split-barrel sampling procedure, the number of blows required to advance a standard 2-inch O.D. split-barrel sampler the last 12 inches of the typical total 18-inch penetration by means of a 140-pound auto-hammer with a free fall of 30 inches, is the standard penetration resistance value (SPT-N). This value is used to estimate the in-situ relative density of cohesionless soils and consistency of cohesive soils. An automatic SPT hammer was used to advance the split-barrel sampler in the borings performed on this site. A significantly greater efficiency is achieved with the automatic hammer compared to the conventional safety hammer operated with a cathead and rope. This higher efficiency has an appreciable effect on the SPT-N value. The effect of the automatic hammer's efficiency has been considered in the interpretation and analysis of the subsurface information for this report.

In the thin-walled tube sampling procedure, a thin-walled, seamless steel tube with a sharp cutting edge is pushed hydraulically into the soil to obtain a relatively undisturbed sample. The samples were tagged for identification, sealed to reduce moisture loss, and taken to our laboratory for further examination, testing, and classification. Information provided on the boring logs attached to this report includes soil descriptions, consistency evaluations, boring depths, sampling intervals, and groundwater conditions.

A field log of each boring was prepared by the field engineer. These logs included visual classifications of the materials encountered during drilling as well as the field engineer's interpretation of the subsurface conditions between samples. Final boring logs included with this report represent the engineer's interpretation of the field logs and include modifications based on laboratory observation and tests of the samples.

BORING LOG NO. B-1

CLIENT: **Callison Architecture Inc**

SITE: **19080 Willamette Drive, West Linn, OR 97068**

PROJECT: **Cedar Oak and Willamette Chase**

Approx. Surface Elev.: 101 ft

DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N ** BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf	ATTERBURG LIMITS (%)	DESCRIPTION
		1	BS							1 — 3 inches Asphalt over 6 inches of round GRAVEL, with silt, brown — 101 / 100
		2	SS	11	7			3500*		2.5 — **PROBABLE FILL: SILT**, trace clay, brown with gray mottling, stiff, low plasticity — 98.5
	ML	3	SS	15	9	24		2000*		**SILT**, trace sand, light brown, gray mottling and rust striations, stiff, low plasticity
5	ML	4	ST	21		33	90	4500*	LL = 34 PI = 4	7 — 94
	ML	5	SS	18	5			1000*		**SILT**, with sand, brown, medium stiff
10	ML	6	SS	10	3	34		1000*		-brown-gray, soft -1-inch black organic silt layer at 10 feet. ▽ ▼
15	ML	7	SS	14	9	32				15 — 86 **SANDY SILT**, brown-gray, stiff -2-inch gray silt seam
20	SM	8	SS	8	8	25				20 — 81 **SILTY SAND**, brown-gray, loose -drill encountered isolated gravels from 20 to 25 ft. -2-inch brown clay seam with weathered rock, low plasticity
25	SM	9	SS	0	23					-medium dense 26.5 — 74.5
										BOTTOM OF BORING Boring advanced using hollow-stem auger methods.

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

**CME 140H SPT automatic hammer
*Calibrated Hand Penetrometer

WATER LEVEL OBSERVATIONS, ft				
WL	▽ 12	WD	▼ 13	AB
WL	▼		▼	
WL				

Terracon

BORING STARTED	5-16-11		
BORING COMPLETED	5-16-11		
RIG	D-50 Truck	DRILLER	STI
LOGGED	BHS	JOB #	82115014

BOREHOLE 99 82115014.GPJ TERRACON.GDT 6/7/11

BORING LOG NO. B-2

CLIENT: **Callison Architecture Inc**

SITE: **19080 Willamette Drive, West Linn, OR 97068**

PROJECT: **Cedar Oak and Willamette Chase**

Approx. Surface Elev.: 101 ft

GRAPHIC LOG	DESCRIPTION		DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N ** BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf	ATTERBURG LIMITS (%)
	1	3 inches Asphalt over 5 inches of crushed GRAVEL (1-inch minus Base Course), gray	101		1	BS						
	2		100		2	SS	12	19			8000*	
		FILL: SILT, with gravel, gray, very stiff	99	ML	3	SS	10	12	30		3500*	
		SILT, gray-brown, very stiff, low plasticity										
		-stiff	5	ML	4	SS	11	7	27		2500*	
		-Non-plastic		ML	5	ST	20		33	86	8000*	LL = NP PI = NP
	9		92									
	10.5	**SANDY SILT**, brown-gray with rust mottling, stiff	90.5	ML	6	SS	14	8			2000*	
		SAND, trace silt, brown-gray, loose	10									
		▽										
	15		86									
		FINE SANDY SILT, trace gravel, gray-brown, medium stiff	15	ML	7	SS	15	5	29		2000*	
		-isolated gravels from 18 feet to 19½ ft.										
	20		81									
		SILT, with sand and gravel, blue-gray, hard	20	ML	8	SS	18	50				
			25	ML	9	SS	0	19				
	26.5		74.5									
		BOTTOM OF BORING										
		Boring advanced using hollow-stem auger methods.										

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

**CME 140H SPT automatic hammer
*Calibrated Hand Penetrometer

WATER LEVEL OBSERVATIONS, ft				
WL	▽ 13	WD	▼ WCI 13	AB
WL	▼		▼	
WL				

Terracon

BORING STARTED	5-16-11		
BORING COMPLETED	5-16-11		
RIG	D-50 Truck	DRILLER	STI
LOGGED	BHS	JOB #	82115014

BOREHOLE 99 82115014.GPJ TERRACON.GDT 6/7/11

BORING LOG NO. B-3

CLIENT: **Callison Architecture Inc**

SITE: **19080 Willamette Drive, West Linn, OR 97068**

PROJECT: **Cedar Oak and Willamette Chase**

Approx. Surface Elev.: 100 ft

DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N ** BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf	DESCRIPTION
		1	BS						Grass and weeds at surface over (100)
2	ML	2A	SS	17	14			5500*	**FILL: SILT**, trace gravel, trace root hairs, brown (98)
	ML	2B							
	ML	3	SS	8	6			2500*	**SILT**, trace sand, brown-gray, very stiff, low plasticity
5									-trace organic wood fibers, medium stiff, low plasticity (95)
5	ML	4	SS	14	3			1000*	**CLAYEY SILT**, trace organics, brown with gray mottling, soft, low plasticity
		5	SS	0	7				-stiff
11									-medium stiff (89)
10	ML	6A	SS	14	6			2000*	**FINE SAND**, with silt, brown, loose
	SP	6B							
15	SM								(85)
15	ML	7	SS	16	2			1500*	**SILT**, with sand, gray with brown mottling, soft, low plasticity ▽ ▼
20.5									-**SANDY SILT**, very stiff (79.5)
20	CL	8A 8B	SS	18	17			4500*	**LEAN CLAY**, gray, very stiff, medium plasticity
26.5									(73.5)
25	CL	9	SS	18	10			4500*	**BOTTOM OF BORING**
									Boring advanced using hollow-stem auger methods.

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

**CME 140H SPT automatic hammer
*Calibrated Hand Penetrometer

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 16	WD	▼ 18 AB
WL	▼		▼
WL			

Terracon

BORING STARTED	5-16-11
BORING COMPLETED	5-16-11
RIG D-50 Truck	DRILLER STI
LOGGED BHS	JOB # 82115014

BOREHOLE 99 82115014.GPJ TERRACON.GDT 6/7/11

BORING LOG NO. B-4

CLIENT: **Callison Architecture Inc**

SITE: **19080 Willamette Drive, West Linn, OR 97068**

PROJECT: **Cedar Oak and Willamette Chase**

Approx. Surface Elev.: 100 ft

DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N ** BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf	ATTERBURG LIMITS (%)	DESCRIPTION
1										3 inches Asphalt over 6 inches of crushed GRAVEL (1-inch minus Base Course), gray
	ML	1	SS	16	10			2000*		**SILT**, gray-brown, stiff
5	ML	2	SS	18	12	32		2000*	LL = 30 PI = 5	-trace clay, brown, low plasticity
8.5	ML SP	3	SS	18	7			2000*		**SAND**, trace silt, gray, loose
10	ML	4	SS	11	4	35				**SANDY SILT**, gray, medium stiff -2 inch silt seam, brown at 10½ and 11 ft. ▽
15	ML	5	SS	13	14					-brown, very stiff -medium grained sand
20	SM	6	SS	15	24	27				**SILTY MEDIUM SAND**, trace gravel, brown, medium dense -encountered gravels 21 to 23½ ft.
25	CL	7	SS	18	17			4500*		**LEAN CLAY**, gray, very stiff, medium plasticity
30	CL	8	SS	18	28			7000*		-hard

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

**CME 140H SPT automatic hammer
*Calibrated Hand Penetrometer

WATER LEVEL OBSERVATIONS, ft				
WL	▽ 11	WD	▼ N/E	AB
WL	▼		▼	
WL				

Terracon

BORING STARTED	5-17-11		
BORING COMPLETED	5-17-11		
RIG	D-50 Truck	DRILLER	STI
LOGGED	BHS	JOB #	82115014

BORING LOG NO. B-4

CLIENT: **Callison Architecture Inc**

SITE: **19080 Willamette Drive, West Linn, OR 97068**

PROJECT: **Cedar Oak and Willamette Chase**

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N ** BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf	ATTERBURG LIMITS (%)
	LEAN CLAY, gray, very stiff, medium plasticity	35									
	35 65										
	SILT, with sand, brown, very stiff	35	ML	9	SS	18	24	33		2000*	
	40 60	40									
	LEAN CLAY, light brown with rust mottling, stiff, medium plasticity	40	CL	10	SS	18	10	41		2000*	LL = 38 PI = 18
	-½ inch sand/weathered rock seam, rust brown										
	-rust striations, very stiff, medium plasticity	45	CL	11	SS	18	19	41		3000*	
	-3 inch zone of highly weathered rock										
	-trace sand, light brown with rust mottling	50	CL	12	SS	18	22	29		3500*	
	50 50										
	BOTTOM OF BORING										
	Boring advanced using mud rotary drilling methods.										

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

**CME 140H SPT automatic hammer
*Calibrated Hand Penetrometer

WATER LEVEL OBSERVATIONS, ft				
WL	▽ 11	WD	▼ N/E	AB
WL	▼		▼	
WL				

Terracon

BORING STARTED	5-17-11		
BORING COMPLETED	5-17-11		
RIG	D-50 Truck	DRILLER	STI
LOGGED	BHS	JOB #	82115014

BOREHOLE 99 82115014.GPJ TERRACON.GDT 6/7/11

BORING LOG NO. B-5

CLIENT **Callison Architecture Inc**

SITE **19080 Willamette Drive, West Linn, OR 97068**

PROJECT **Cedar Oak and Willamette Chase**

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N ** BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf
	Approx. Surface Elev.: 100 ft									
	1 **FILL: GRAVEL** (1-inch minus Base Course), gray — 99			1	BS					
	2.5 **FILL: GRAVEL**, with silt, gray, loose, (round gravels) — 97.5			2	SS	6	7			
	CLAYEY SILT, trace sand, blue-gray, medium stiff, low plasticity		ML	3	SS	17	6			2500*
	- trace organics, brown	5	ML	4	SS	17	5			2500*
	-gray									
	-gray with rust mottling		ML	5	SS	4	16			1500*
	10 — 90	10								
	11.5 **SILT**, gray with brown mottling, stiff, low plasticity — 88.5		ML	6	SS	18	7			3500*
	BOTTOM OF BORING									
	Boring advanced using hollow-stem auger methods.									
	Water not observed during or after drilling with the exception of wet augers and cuttings upon hole abandoning.									

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

**CME 140H SPT automatic hammer
*Calibrated Hand Penetrometer

WATER LEVEL OBSERVATIONS, ft				
WL	▽ N/E	WD	▼ DCI 7	AB
WL	▼		▼	
WL				

Terracon

BORING STARTED	5-16-11		
BORING COMPLETED	5-16-11		
RIG	D-50 Truck	DRILLER	STI
LOGGED	BHS	JOB #	82115014

BOREHOLE 99 82115014.GPJ TERRACON.GDT 6/7/11

BORING LOG NO. B-6

CLIENT: **Callison Architecture Inc**

SITE: **19080 Willamette Drive, West Linn, OR 97068**

PROJECT: **Cedar Oak and Willamette Chase**

GRAPHIC LOG	DESCRIPTION		DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N ** BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf
	Approx. Surface Elev.: 100 ft										
	1 3 inches **TOPSOIL**, over weed barrier fabric over 3 inches of crushed GRAVEL (5/8-inch minus Base Course)	99			1	BS					
	2.5 **FILL: GRAVEL**, (5/8-inch minus Base Course), with silt, gray, loose	97.5			2	SS	5	9			
	PROBABLE FILL: SILT, with sand, gray-brown, medium stiff				3	SS	8	6			1000*
	5.5 **SILT**, trace organics, gray, stiff	94.5	5								
	-trace gravel			ML	4	SS	16	11			3500*
	10	90		ML	5	SS	8	10			5500*
	11.5 **CLAYEY SILT**, trace root hairs, gray-brown, stiff, low plasticity	88.5	10	ML	6	SS	12	7			2500*
	BOTTOM OF BORING										
	Boring advanced using hollow-stem auger methods.										

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

**CME 140H SPT automatic hammer
*Calibrated Hand Penetrometer

WATER LEVEL OBSERVATIONS, ft				
WL	▽ N/E	WD	▼ DCI 6	AB
WL	▼		▼	
WL				

Terracon

BORING STARTED	5-16-11		
BORING COMPLETED	5-16-11		
RIG	D-50 Truck	DRILLER	STI
LOGGED	BHS	JOB #	82115014

BOREHOLE 99 82115014.GPJ TERRACON.GDT 6/7/11

BORING LOG NO. B-7

CLIENT: **Callison Architecture Inc**

SITE: **19080 Willamette Drive, West Linn, OR 97068**

PROJECT: **Cedar Oak and Willamette Chase**

Approx. Surface Elev.: 92 ft

GRAPHIC LOG	DESCRIPTION		DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N ** BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf
	0.6 3 inches Asphalt over 6 inches of crushed GRAVEL (1-inch minus Base Course), gray	92 / 91.5			1	BS					
	2.5 **FILL: WOOD DEBRIS**, with silt and gravel	89.5			2	SS	10	22			
	PROBABLE FILL: SILT, trace gravel, gray, soft, low plasticity				3	SS	4	3			1000*
	6	86	5		4	ST	8				500*
	CLAYEY SILT, trace root hairs, gray with brown mottling, soft to medium stiff, low plasticity			ML							
				ML	5	SS	17	4			1500*
	-gray-brown, low plasticity		10	ML	6	SS	18	5			3000*
	11.5	80.5									
	BOTTOM OF BORING										
	Boring advanced using hollow-stem auger methods.										

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

**CME 140H SPT automatic hammer
*Calibrated Hand Penetrometer

WATER LEVEL OBSERVATIONS, ft				
WL	▽ N/E	WD	▼ DCI 7	AB
WL	▼		▼	
WL				

Terracon

BORING STARTED	5-16-11		
BORING COMPLETED	5-16-11		
RIG	D-50 Truck	DRILLER	STI
LOGGED	BHS	JOB #	82115014

BOREHOLE 99 82115014.GPJ TERRACON.GDT 6/7/11

APPENDIX B
LABORATORY TESTING

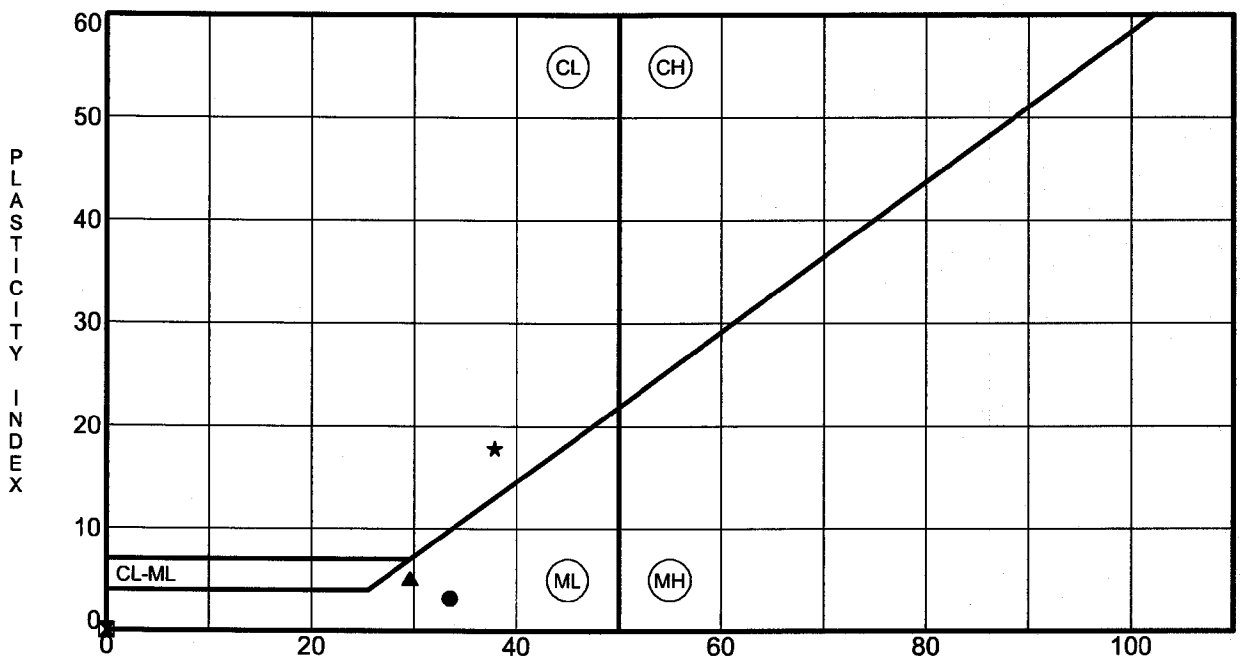
Laboratory Testing

Samples retrieved during the field exploration were taken to the laboratory for further observation by the project geotechnical engineer and were classified in general accordance with the Unified Soil Classification System (USCS) as shown in Appendix C. At that time, the field descriptions were confirmed or modified as necessary and an applicable laboratory testing program was formulated to determine engineering properties of the subsurface materials.

Laboratory tests were conducted on selected soil samples and the test results are presented in this appendix. The laboratory test results were used for the geotechnical engineering analyses, and the development of foundation and earthwork recommendations. Laboratory tests were performed in general accordance with the applicable ASTM, local or other accepted standards.

Selected soil samples obtained from the site were tested for the following engineering properties:

- In-situ Water Content
- Grain Size Analysis
- Unconfined Compressive Strength
- Atterberg Limits
- Electrical Resistivity



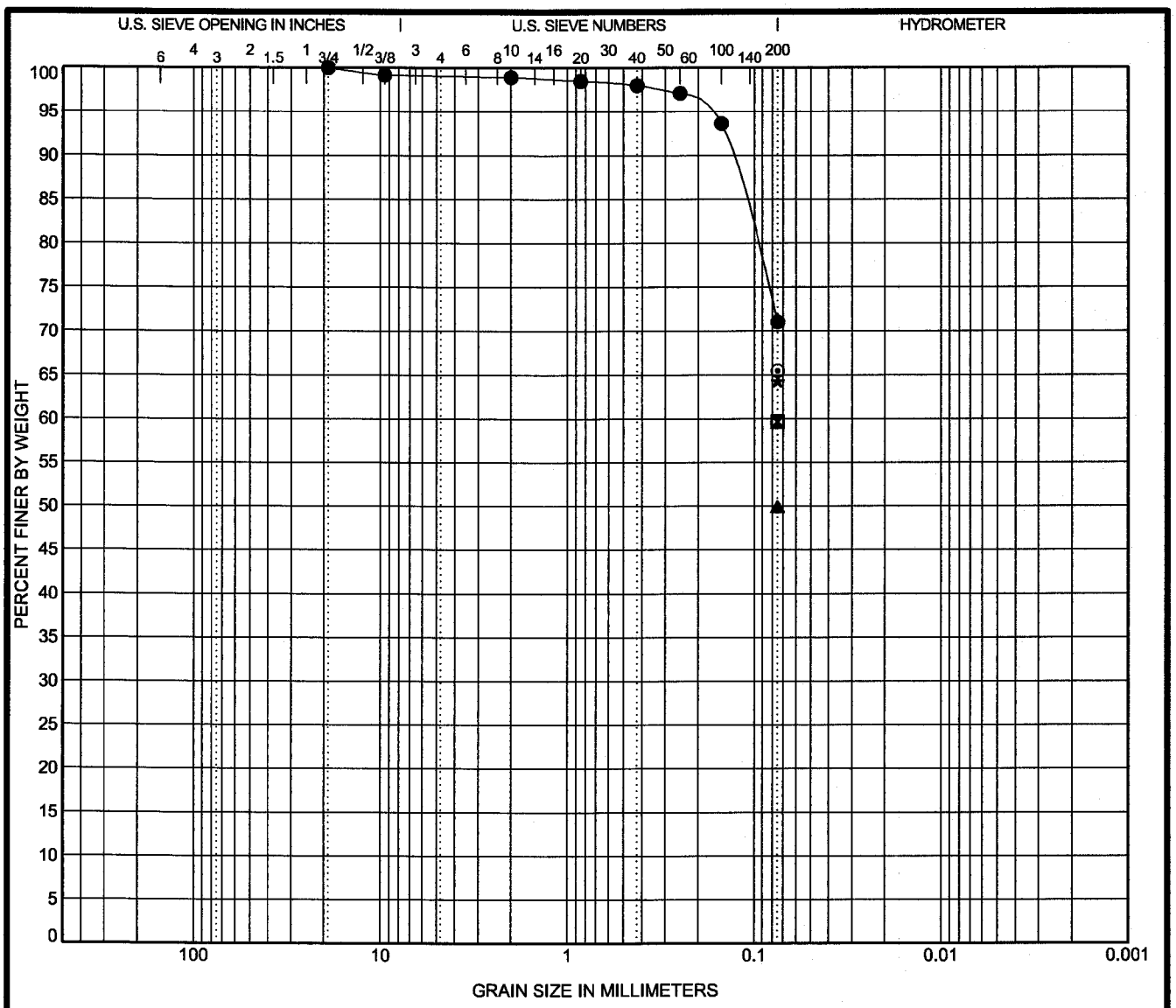
	Specimen Identification		LL	PL	PI	%Fines	Classification
●	B-1	6.0ft	34	30	4		SILT, trace sand (ML)
⊠	B-2	7.5ft	NP	NP	NP		SILT (ML)
▲	B-4	5.0ft	30	25	5		SILT (ML)
★	B-4	40.0ft	38	20	18	90	LEAN CLAY (CL)

Terracon

ATTERBERG LIMITS RESULTS

Project: Cedar Oak and Willamette Chase
Site: 19080 Willamette Drive West Linn, OR 97068
Job #: 82115014
Date: 6-7-11

TC ATTERBERG LIMITS 82115014.GPJ TERRACON.GDT 6/7/11



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-1	10.0ft	SILT with sand (ML)					
⊠	B-1	15.0ft	SANDY SILT (ML)					
▲	B-1	20.0ft	SILTY SAND (SM)					
★	B-2	15.0ft	FINE SANDY SILT, trace gravel (ML)					
⊙	B-4	10.0ft	SANDY SILT (ML)					

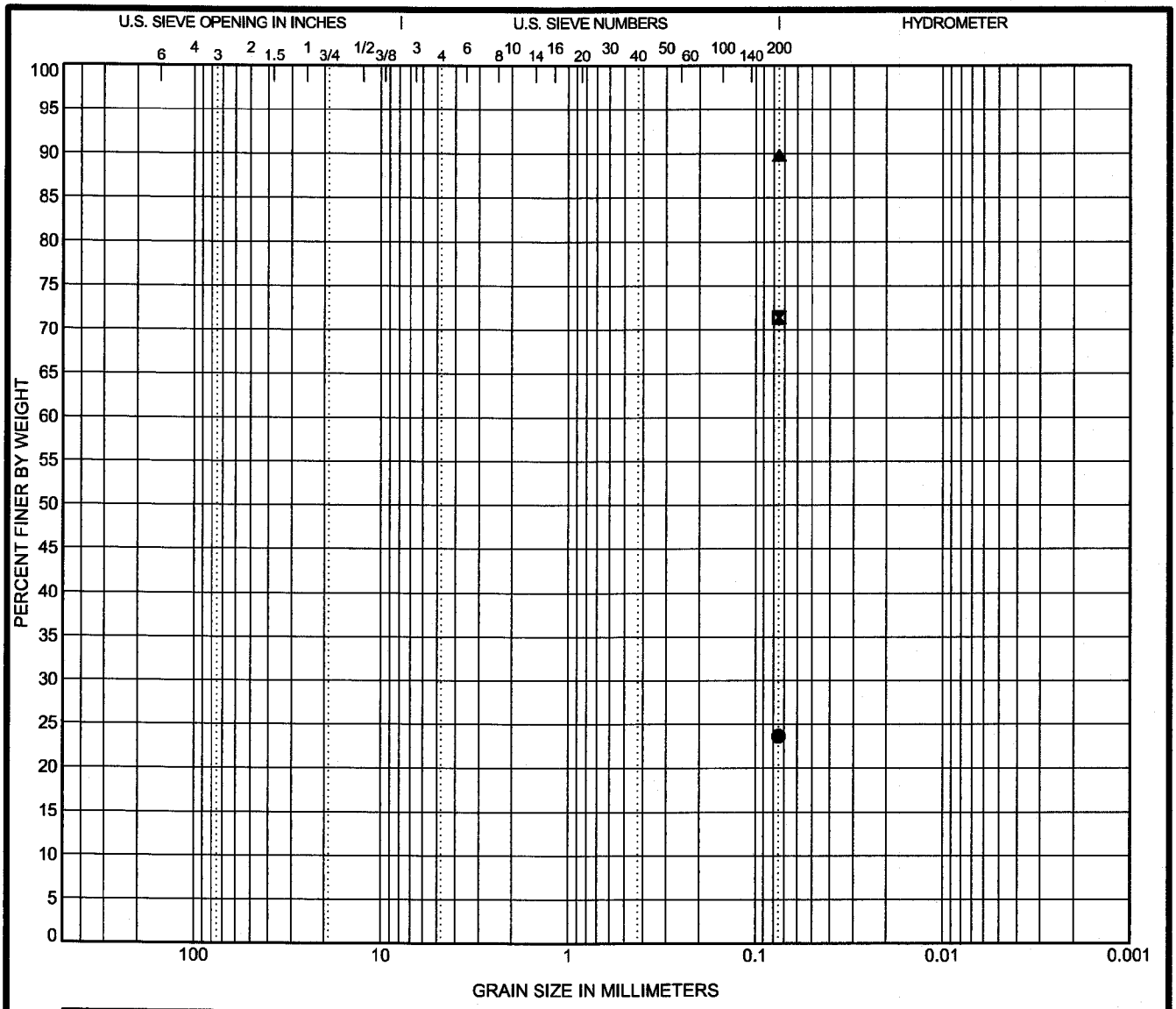
	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-1	10.0ft	19				1.0	28.0	71.1	
⊠	B-1	15.0ft	0.075				0.0	0.0	59.7	
▲	B-1	20.0ft	0.075				0.0	0.0	49.9	
★	B-2	15.0ft	0.075				0.0	0.0	64.3	
⊙	B-4	10.0ft	0.075				0.0	0.0	65.5	

Terracon

GRAIN SIZE DISTRIBUTION

Project: Cedar Oak and Willamette Chase
Site: 19080 Willamette Drive West Linn, OR 97068
Job #: 82115014
Date: 6-7-11

TC_GRAIN_SIZE_82115014.GPJ_TERRACON.GDT 6/7/11



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-4	20.0ft	SILTY SAND, trace gravel (SM)					
⊠	B-4	35.0ft	SILT with sand (ML)					
▲	B-4	40.0ft	LEAN CLAY (CL)	38	20	18		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-4	20.0ft	0.075				0.0	0.0	23.7	
⊠	B-4	35.0ft	0.075				0.0	0.0	71.4	
▲	B-4	40.0ft	0.075				0.0	0.0	89.8	

Terracon

GRAIN SIZE DISTRIBUTION

Project: Cedar Oak and Willamette Chase
Site: 19080 Willamette Drive West Linn, OR 97068
Job #: 82115014
Date: 6-7-11

TC_GRAIN_SIZE_82115014.GPJ_TERRACON.GDT 6/7/11

APPENDIX C
SUPPORTING DOCUMENTS

GENERAL NOTES

DRILLING & SAMPLING SYMBOLS:

SS:	Split Spoon - 1-3/8" I.D., 2" O.D., unless otherwise noted	HS:	Hollow Stem Auger
ST:	Thin-Walled Tube – 2" O.D., 3" O.D., unless otherwise noted	PA:	Power Auger (Solid Stem)
RS:	Ring Sampler - 2.42" I.D., 3" O.D., unless otherwise noted	HA:	Hand Auger
DB:	Diamond Bit Coring - 4", N, B	RB:	Rock Bit
BS:	Bulk Sample or Auger Sample	WB	Wash Boring or Mud Rotary

The number of blows required to advance a standard 2-inch O.D. split-spoon sampler (SS) the last 12 inches of the total 18-inch penetration with a 140-pound hammer falling 30 inches is considered the "Standard Penetration" or "N-value".

WATER LEVEL MEASUREMENT SYMBOLS:

WL:	Water Level	WS:	While Sampling	BCR:	Before Casing Removal
WCI:	Wet Cave in	WD:	While Drilling	ACR:	After Casing Removal
DCI:	Dry Cave in	AB:	After Boring	N/E:	Not Encountered

Water levels indicated on the boring logs are the levels measured in the borings at the times indicated. Groundwater levels at other times and other locations across the site could vary. In pervious soils, the indicated levels may reflect the location of groundwater. In low permeability soils, the accurate determination of groundwater levels may not be possible with only short-term observations.

DESCRIPTIVE SOIL CLASSIFICATION: Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

CONSISTENCY OF FINE-GRAINED SOILS

Unconfined Compressive Strength, Qu, psf	Standard Penetration or N-value (SS) Blows/Ft.	Consistency
< 500	0 – 1	Very Soft
500 – 1,000	2 – 3	Soft
1,000 – 2,000	4 – 6	Medium Stiff
2,000 – 4,000	7 – 12	Stiff
4,000 – 8,000	13 – 26	Very Stiff
8,000+	26+	Hard

RELATIVE DENSITY OF COARSE-GRAINED SOILS

Standard Penetration or N-value (SS) Blows/Ft.	Relative Density
0 – 3	Very Loose
4 – 9	Loose
10 – 29	Medium Dense
30 – 49	Dense
50+	Very Dense

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	0 – 14
With	15 – 29
Modifier	30+

GRAIN SIZE TERMINOLOGY

Major Component of Sample	Particle Size
Boulders	Over 12 in. (300mm)
Cobbles	12 in. to 3 in. (300mm to 75mm)
Gravel	3 in. to #4 sieve (75mm to 4.75mm)
Sand	#4 to #200 sieve (4.75 to 0.075mm)
Silt or Clay	Passing #200 Sieve (0.075mm)

RELATIVE PROPORTIONS OF FINES

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	0 – 4
With	5 – 12
Modifier	12+

PLASTICITY DESCRIPTION

Term	Plasticity Index
Non-plastic	0
Low	1 – 10
Medium	11 – 30
High	30+

UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]				Soil Classification	
				Group Symbol	Group Name [B]
Coarse Grained Soils: More than 50% retained on No. 4 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$ [E]	GW	Well-graded gravel [F]
			$Cu < 4$ and/or $1 > Cc > 3$ [E]	GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH	GM	Silty gravel [F,G,H]
			Fines classify as CL or CH	GC	Clayey gravel [F,G,H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$ [E]	SW	Well-graded sand [I]
			$Cu < 6$ and/or $1 > Cc > 3$ [E]	SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH	SM	Silty sand [G,H,I]
			Fines classify as CL or CH	SC	Clayey sand [G,H,I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots on or above "A" line [J]	CL	Lean clay [K,L,M]
			PI < 4 or plots below "A" line [J]	ML	Silt [K,L,M]
		Organic:	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OL	Organic clay [K,L,M,N] / Organic silt [K,L,M,O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above "A" line	CH	Fat clay [K,L,M]
			PI plots below "A" line	MH	Elastic Silt [K,L,M]
		Organic:	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OH	Organic clay [K,L,M,P] / Organic silt [K,L,M,Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor			PT	Peat

[A] Based on the material passing the 3-in. (75-mm) sieve

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.

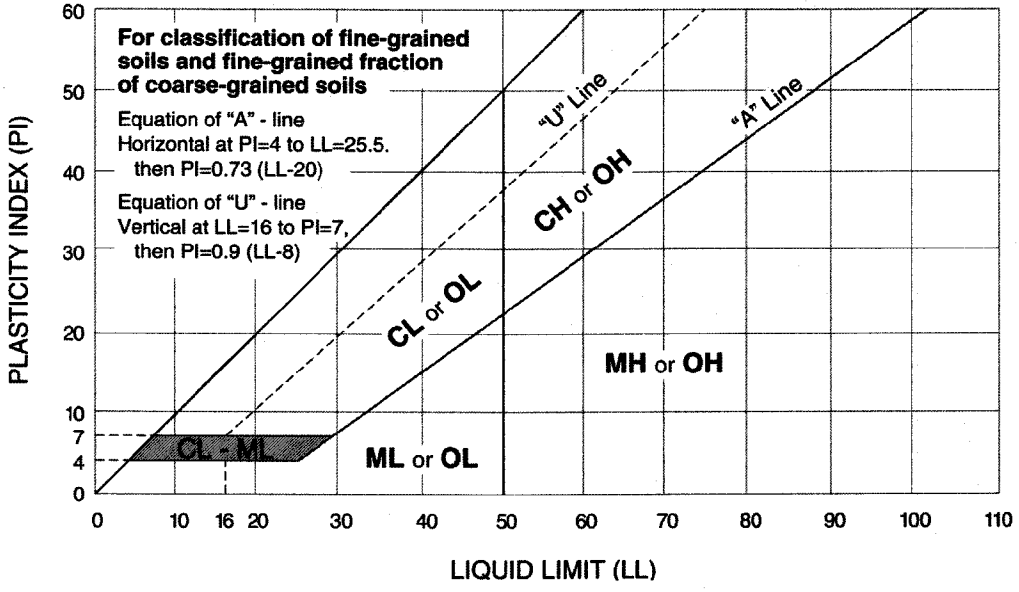
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N] PI ≥ 4 and plots on or above "A" line.

[O] PI < 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.



D

Determining the number of cartridges for a highly impervious site

To determine the number of StormFilter cartridges needed for a highly impervious site (≥70% impervious):

1. Calculate the peak flow rate from the water quality storm (Q_{treat}) for your site using the approved hydrologic models established by your local agency. If there are no agency guidelines, we recommend using the Santa Barbara Urban Hydrograph Method.
2. Calculate the number of cartridges required to treat the peak water quality flow rate (N_{flow}) for your site.
   - ➡ $N_{flow} = Q_{treat}$ (449 gpm/cfs / Q_{cart} gpm/cart)

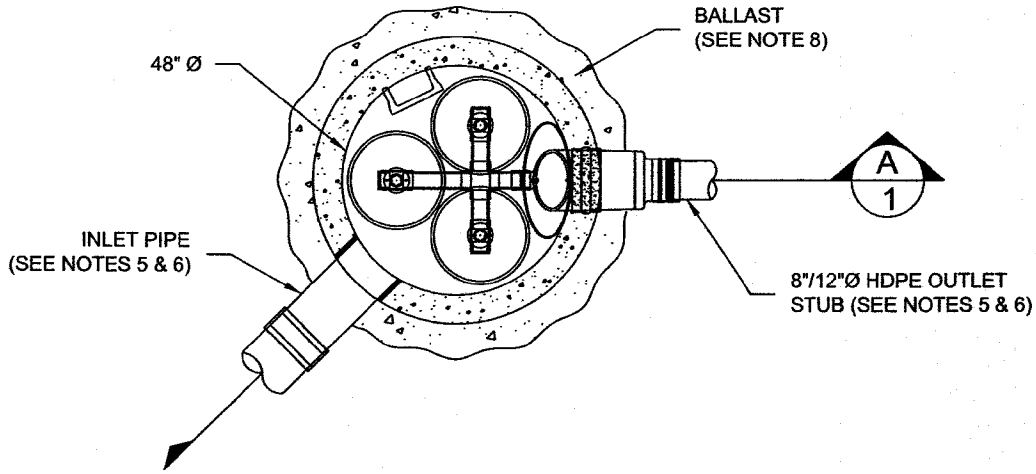
Notes:

- Assume Q_{cart} = 15 gpm/cart, which is the maximum flow rate that an individual cartridge can treat. In some areas or situations, cartridges with a flow rate other than 15 gpm may be required, resulting in a different Q_{cart} value.
- If the number of cartridges is not a whole number, round the number of cartridges up to the next whole number.

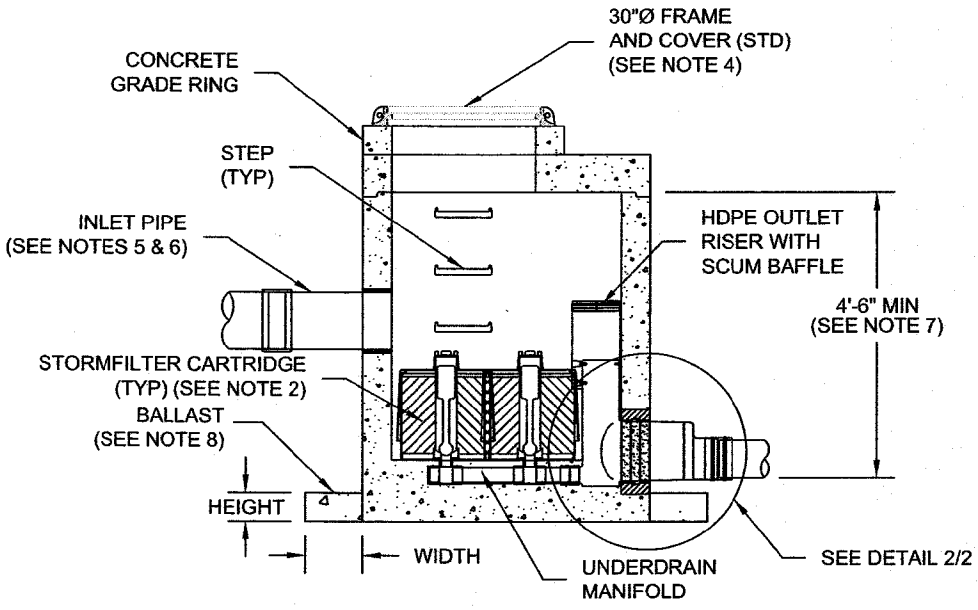
Example of cartridge number sizing for a highly impervious site:

1. Assume that a site has a peak flow rate of 0.44 cfs.
2. Determine the number of cartridges required to treat this flow rate.
   - ➡ N_{flow} = (0.44 cfs)(449 gpm/cfs / 15 gpm/cart) = 13.2 cartridges

Answer: Rounding up to the next whole number, the number of required cartridges is 14.



MANHOLE STORMFILTER - PLAN VIEW 1/1



MANHOLE STORMFILTER - SECTION VIEW A/1

THE STORMWATER MANAGEMENT StormFilter® U.S. PATENT No. 5,322,629, No. 5,707,527, No. 6,027,639 No. 6,649,048, No. 5,624,576, AND OTHER U.S. AND FOREIGN PATENTS PENDING

CONTECH® STORMWATER SOLUTIONS™
contechstormwater.com

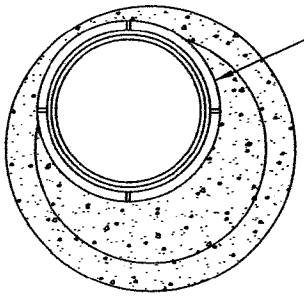
PRECAST 48" MANHOLE STORMFILTER PLAN AND SECTION VIEWS STANDARD DETAIL

DRAWING 1 1/2

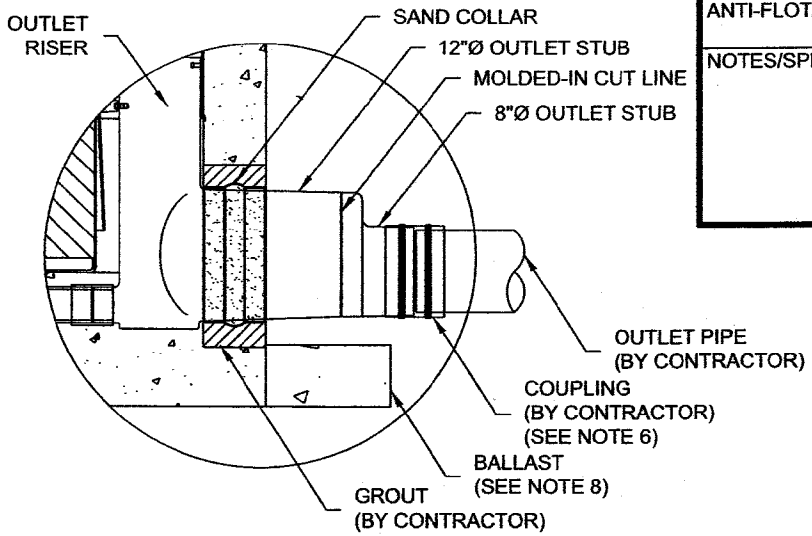
DATE: 09/26/05	SCALE: NONE	FILE NAME: MHSF3-48PC-DTL	DRAWN: MJW	CHECKED: ARG

GENERAL NOTES

1) STORMFILTER BY CONTECH STORMWATER SOLUTIONS; PORTLAND, OR (800) 548-4667; SCARBOROUGH, ME (877) 907-8676; ELKRIDGE, MD (866) 740-3318.
2) FILTER CARTRIDGE(S) TO BE SIPHON-ACTUATED AND SELF-CLEANING. STANDARD DETAIL SHOWS MAXIMUM NUMBER OF CARTRIDGES. ACTUAL NUMBER REQUIRED TO BE SPECIFIED ON SITE PLANS OR IN DATA TABLE BELOW.
3) PRECAST MANHOLE STRUCTURE TO BE CONSTRUCTED IN ACCORDANCE WITH ASTM C478. DETAIL REFLECTS DESIGN INTENT ONLY. ACTUAL DIMENSIONS AND CONFIGURATION OF STRUCTURE WILL BE SHOWN ON PRODUCTION SHOP DRAWING.
4) STRUCTURE AND ACCESS COVERS TO MEET AASHTO H-20 LOAD RATING.
5) STORMFILTER REQUIRES 2.3 FEET OF DROP FROM INLET TO OUTLET. IF LESS DROP IS AVAILABLE, CONTACT CONTECH STORMWATER SOLUTIONS. MINIMUM ANGLE BETWEEN INLET AND OUTLET IS 45°.
6) INLET PIPING TO BE SPECIFIED BY ENGINEER AND PROVIDED BY CONTRACTOR. PRECAST MANHOLE STORMFILTER EQUIPPED WITH A DUAL DIAMETER HDPE OUTLET STUB AND SAND COLLAR. EIGHT INCH DIAMETER OUTLET SECTION MAY BE SEPARATED FROM OUTLET STUB AT MOLDED-IN CUT LINE TO ACCOMMODATE A 12 INCH OUTLET PIPE. CONNECTION TO DOWNSTREAM PIPING TO BE MADE USING A FLEXIBLE COUPLING OR ECCENTRIC REDUCER, AS REQUIRED. COUPLING BY FERNCO OR EQUAL AND PROVIDED BY CONTRACTOR.
7) PROVIDE MINIMUM CLEARANCE FOR MAINTENANCE ACCESS. IF A SHALLOWER SYSTEM IS REQUIRED, CONTACT CONTECH STORMWATER SOLUTIONS FOR OTHER OPTIONS.
8) ANTI-FLOTATION BALLAST TO BE SPECIFIED BY ENGINEER AND PROVIDED BY CONTRACTOR, IF REQUIRED. BALLAST TO BE SET AROUND THE PERIMETER OF THE STRUCTURE.
9) ALL STORMFILTERS REQUIRE REGULAR MAINTENANCE. REFER TO OPERATION AND MAINTENANCE GUIDELINES FOR MORE INFORMATION.



MANHOLE STORMFILTER - TOP VIEW (1/2)



MANHOLE STORMFILTER - OUTLET DETAIL (2/2)

PRECAST MANHOLE STORMFILTER DATA

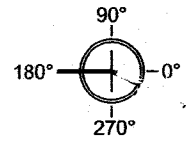
STRUCTURE ID	
WATER QUALITY FLOW RATE (cfs)	
PEAK FLOW RATE (<1 cfs)	
RETURN PERIOD OF PEAK FLOW (yrs)	
# OF CARTRIDGES REQUIRED	
CARTRIDGE FLOW RATE (15 or 7.5 gpm)	
MEDIA TYPE (CSF, PERLITE, ZPG)	
RIM ELEVATION	

PIPE DATA:	I.E.	ORIENTATION	MATERIAL	DIAMETER
INLET PIPE #1				
INLET PIPE #2				
OUTLET STUB				

	YES\NO	SIZE
ECCENTRIC REDUCER (BY CONTRACTOR)		
ANTI-FLOTATION BALLAST	WIDTH	HEIGHT

NOTES/SPECIAL REQUIREMENTS:

PIPE ORIENTATION KEY:



THE STORMWATER MANAGEMENT StormFilter® U.S. PATENT No. 5,322,629, No. 5,707,527, No. 6,027,639 No. 6,649,048, No. 5,624,576, AND OTHER U.S. AND FOREIGN PATENTS PENDING

CONTECH® STORMWATER SOLUTIONS™
contechstormwater.com

PRECAST 48" MANHOLE STORMFILTER TOP AND SECTION VIEWS, NOTES AND DATA STANDARD DETAIL

DRAWING 2 2/2

DATE: 09/26/05 | SCALE: NONE | FILE NAME: MHSF3-48PC-DTL | DRAWN: MJW | CHECKED: ARG

The Stormwater Management StormFilter®

Vault, Cast-In-Place, and Linear Units

Important: These guidelines should be used as a part of your site stormwater management plan.

Description

The Stormwater Management StormFilter® (StormFilter) is a passive, flow-through, stormwater filtration system. The system is comprised of one or more vaults that house rechargeable, media-filled, filter cartridges. The StormFilter works by passing stormwater through the media-filled cartridges, which trap particulates and adsorb materials such as dissolved metals and hydrocarbons. Once filtered through the media, the treated stormwater is directed to a collection pipe or discharged into an open channel drainage way.

The StormFilter is offered in multiple configurations, including vault, linear, catch basin, manhole, and cast-in-place. The vault, linear, manhole, and catch basin models utilize pre-manufactured units to ease the design and installation processes. The cast-in-place units are customized for larger flows and may be either covered or uncovered underground units.

Purpose

The StormFilter is a passive, flow-through, stormwater filtration system designed to improve the quality of stormwater runoff from the urban environment before it enters receiving waterways. It is intended to function as a Best Management Practice (BMP) to meet federal, state, and local requirements for treating runoff in compliance with the Clean Water Act.

Through independent third party studies, it has been demonstrated that the StormFilter is highly effective for treatment of first flush flows and for treatment of flow-paced flows during the latter part of a storm. In general, the StormFilter's efficiency is highest when pollutant concentrations are highest. The primary non-point source pollutants targeted for removal by the StormFilter are: suspended solids (TSS), oil and grease, soluble metals, nutrients, organics, and trash and debris.

Sizing

The StormFilter is sized to treat the peak flow of a water quality design storm. The peak flow is determined from calculations based on the contributing watershed hydrology and from a design storm magnitude set by the local stormwater management agency. The particular size of a StormFilter unit is determined by the number of filter cartridges (see Figure 1) required to treat this peak flow.

The flow rate through each filter cartridge is adjustable, allowing control over the amount of contact time between the influent and the filter media. The maximum flow rate through each cartridge can be adjusted to between 5 and 15 gpm using a calibrated restrictor disc at the base of each filter cartridge. Adjustments to the cartridge flow rate will affect the number of cartridges required to treat the peak flow.

Basic Function

The StormFilter is designed to siphon stormwater runoff through a filter cartridge containing media. A variety of filter media is available and can be customized for each site to target and remove the desired levels of sediments, dissolved phosphorus, dissolved metals, organics, and oil and grease. In many cases, a combination of media is recommended to maximize the effectiveness of the stormwater pollutant removal.

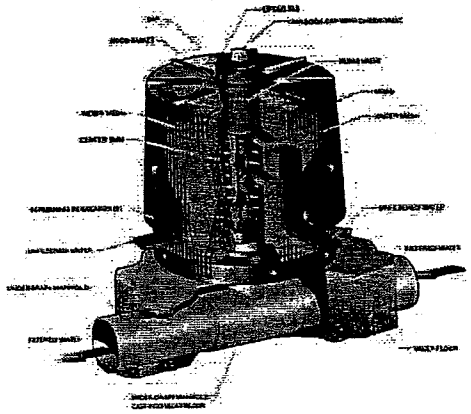


Figure 1. The StormFilter Cartridge

Priming System Function

When stormwater in the StormFilter unit enters a StormFilter cartridge, it percolates horizontally through the cartridge's filter media and collects in the center tube of the cartridge, where the float in the cartridge is in a closed (downward) position.

Water continues to pass through the filter media and into the cartridge's center tube. The air in the cartridge is displaced by the water and purged from beneath the filter hood through the one-way check valve located in the cap. Once the center tube is filled with water (approximately 18 inches deep), there is enough buoyant force on the float to open the float valve and allow the treated water in the center tube to flow into the under-drain manifold. This causes the check valve to close, initiating a siphon that draws polluted water throughout the full surface area and volume of the filter. Thus, the entire filter cartridge is used to filter water throughout the duration of the storm, regardless of the water surface elevation in the unit. This siphon continues until the water surface elevation drops to the elevation of the hood's scrubbing regulators.

The cartridges are connected to the under-drain manifold with a plastic connector. Since some media used is potentially buoyant, a threaded connector affixed to the under-drain manifold (with glue or other adhesive) is necessary to ensure that the cartridge isn't lifted out of place. For the heavier compost media, a slip connector is used.

The StormFilter is also equipped with flow spreaders that trap floating debris and surface films, even during overflow conditions. Depending on individual site characteristics, some systems are equipped with high and/or base flow bypasses. High flow bypasses are installed when the calculated peak storm event generates a flow that overcomes the overflow capacity of the system. This is especially important for precast systems. Base flow bypasses are sometimes installed to bypass continuous inflows caused by ground water seepage, which usually do not require treatment. All StormFilter units are designed with an overflow. The overflow operates when the inflow rate is greater than the treatment capacity of the filter cartridges.

Maintenance Guidelines

The primary purpose of the StormFilter is to filter out and prevent pollutants from entering our waterways. Like any effective filtration system, periodically these pollutants must be removed to restore the StormFilter to its full efficiency and effectiveness.

Maintenance requirements and frequency are dependent on the pollutant load characteristics of each site.

Maintenance activities may be required in the event of a chemical spill or due to excessive sediment loading from site erosion or extreme storms. It is also good practice to inspect the system after severe storm events.

Types of Maintenance

Presently, procedures have been developed for two levels of maintenance:

- Inspection/minor maintenance
- Major maintenance.

Inspection/minor maintenance activities are combined since minor maintenance does not require special equipment and typically little or no materials are in need of disposal.

Inspection/minor maintenance typically involves:

- Inspection of the vault itself
- Removal of vegetation and trash and debris.

Major maintenance typically includes:

- Cartridge replacement
- Sediment removal

Important: Applicable safety (OSHA) and disposal regulations should be followed during all maintenance activities.

Maintenance Activity Timing

Two scheduled inspections/maintenance activities should take place during the year.

First, an inspection/minor maintenance activity should be done. During the minor maintenance activity (routine inspection, debris removal), the need for major maintenance should be determined and, if disposal during major maintenance will be required, samples of the sediments and media should be obtained.

Second, if required, a major maintenance activity (replacement of the filter cartridges and associated sediment removal) should be performed.

In addition to these two scheduled activities, it is important to check the condition of the StormFilter unit after major storms for damage caused by high flows and for high sediment accumulation that may be caused by localized erosion in the drainage area. It may be necessary to adjust the maintenance activity schedule depending on the actual operating conditions encountered by the system.

In general, minor maintenance activities will occur late in the rainy season, and major maintenance will occur in late summer to early fall when flows into the system are not likely to be present.

Maintenance Activity Frequency

The primary factor controlling timing of maintenance for the StormFilter is sedimentation.

A properly functioning system will remove solids from water by trapping particulates in the porous structure of the filter media. The flow through the system will naturally decrease as more and more solids are trapped. Eventually the flow through the system will be low enough to require replacement of the cartridges. It may be possible to extend the usable span of the cartridges by removing sediment from upstream trapping devices on an as-needed basis in order to prevent material from being re-suspended and discharged to the system.

Site conditions greatly influence maintenance requirements. StormFilter units located in areas with erosion or active construction should be inspected and maintained more often than those in fully stabilized areas.

The maintenance frequency may be adjusted as additional monitoring information becomes available during the inspection program. Areas that develop known problems should be inspected more frequently than areas that demonstrate no problems, particularly after large storms.

Ultimately, inspection and maintenance activities should be scheduled based on the historic records and characteristics of an individual StormFilter system. It is recommended that the maintenance agency develop a database to properly manage StormFilter maintenance programs.

Prior to the development of the maintenance database, the following maintenance frequencies should be followed:

Inspection/minor maintenance
- One time per year
- After Major Storms

Major maintenance
- One time per year
- In the event of a chemical spill

Frequencies should be updated as required.

The recommended initial frequency for inspection/minor maintenance is two times per year for precast units. StormFilter units should be inspected after all major storms. Sediment removal and cartridge replacement on an annual basis is recommended until further knowledge is gained about a particular system.

Once an understanding of site characteristics has been established, maintenance may not be needed for one to two years, but inspection is warranted.

Maintenance Methods

Inspection/Minor Maintenance

The primary goal of a maintenance inspection is to assess the condition of the cartridges relative to the level of sediment loading. It may be desirable to conduct this inspection during a storm to observe the relative flow through the filter cartridges. If the submerged cartridges are severely plugged, large amounts of sediments will be present and very little flow will be discharged from the drainage pipes. If this is the case, it is likely that the cartridges need to be replaced.

Warning: In the case of a spill, the worker should abort maintenance activities until the proper guidance is obtained. Notify the local hazard control agency and CONTECH Stormwater Solutions immediately.

To conduct an inspection and/or minor maintenance:

Important: Maintenance must be performed by a utility worker familiar with StormFilter units.

1. If applicable, set up safety equipment to protect pedestrians from fall hazards due to open vault doors or when work is being done near walkways or roadways.
2. Visually inspect the external condition of the unit and take notes concerning defects/problems.

3. Open the doors to the vault and allow the system to air out for 5-10 minutes.

4. Without entering the vault, inspect the inside of the unit, including components.

5. Take notes about the external and internal condition of the vault.

   Be sure to record the level of sediment build-up on the floor of the vault, in the forebay, and on top of the cartridges. If flow is occurring, note the level of water and estimate the flow rate per drainage pipe. Record all observations.

6. Remove large loose debris and trash using a pole with a grapple or net on the end.

7. Close and fasten the door.

8. Remove safety equipment.

9. Make notes about the local drainage area relative to ongoing construction, erosion problems, or high loading of other materials to the system.

10. Finally, review the condition reports from the previous minor and major maintenance visits, and schedule cartridge replacement if needed.

Major Maintenance

Depending on the configuration of the particular system, a worker may be required to enter the vault to perform some tasks.

Important: If vault entry is required, OSHA rules for confined space entry must be followed.

Filter cartridge replacement should occur during dry weather. It may be necessary to plug the filter inlet pipe if base flows exist. Standing water present in the vault should be regarded as polluted and should be contained during this operation by temporarily capping the manifold connectors.

Replacement cartridges will be delivered to the site. Information concerning how to obtain the replacement cartridges is available from CONTECH Stormwater Solutions.

Warning: In the case of a spill, the worker should abort maintenance activities until the proper guidance is obtained. Notify the local hazard control agency and CONTECH Stormwater Solutions immediately.

To conduct cartridge replacement and sediment removal maintenance:

1. If applicable, set up safety equipment to protect pedestrians from fall hazards due to open vault doors or when work is being done near walkways or roadways.

2. Visually inspect the external condition of the unit and take notes concerning defects/problems.

3. Open the doors to the vault and allow the system to air out for 5-10 minutes.

4. Without entering the vault, give the inside of the unit, including components, a general condition inspection.

5. Make notes about the external and internal condition of the vault.

   Give particular attention to recording the level of sediment build-up on the floor of the vault, in the forebay, and on top of the internal components.

6. Remove large loose debris and trash using a pole with a grapple or net on the end.

7. Using a boom, crane, or other device (dolly and ramp), offload the replacement cartridges (up to 150 lbs. each) and set aside.

8. Remove used cartridges from the vault using one of the following methods:

Important: This activity will require that workers enter the vault to remove the cartridges from the drainage system.

Method 1:

a. Using an appropriate sling, attach the cable from the boom, crane, or tripod to the cartridge being removed. Contact CONTECH Stormwater Solutions for specifications on appropriate attachment devices.

This activity will require that workers enter the vault to remove the cartridges from the drainage system and place them under the vault opening for lifting.

Important: Note that cartridges containing media other than the leaf media require unscrewing from their threaded connectors. Take care not to damage the manifold connectors. This connector should remain installed in the manifold and capped if necessary.

b. Remove the used cartridges (250 lbs. each) from the vault.

Important: Care must be used to avoid damaging the cartridges during removal and installation. The cost of repairing components damaged during maintenance will be the responsibility of the owner unless CONTECH Stormwater Solutions performs the maintenance activities and damage is not related to discharges to the system.

c. Set the used cartridge aside or load onto the hauling truck.

d. Continue steps a through c until all cartridges have been removed.

Method 2:

a. Unscrew the cartridge cap.

b. Remove the cartridge hood.

c. Tip the cartridge on its side.

Important: Note that cartridges containing media other than the leaf media require unscrewing from their threaded connectors. Take care not to damage the manifold connectors. This connector should remain installed in the manifold and capped if necessary.

d. Empty the cartridge onto the vault floor.

e. Set the empty, used cartridge aside or load onto the hauling truck.

f. Continue steps a through e until all cartridges have been removed.

9. Remove deposited sediment from the floor of the vault and, if large amounts are present, from the forebay. This can usually be accomplished by shoveling the sediment into containers, which, once full, are lifted mechanically from the vault and placed onto the hauling truck. If Method 2 in Step 8 is used to empty the cartridges, or in cases of extreme sediment loading, a vactor truck may be required.

10. Once the sediments are removed, assess the condition of the vault and the condition of the manifold and connectors. The connectors are short sections of 2-inch schedule 40 PVC, or threaded schedule 80 PVC that should protrude above the floor of the vault.
    a. If required, apply a light coating of FDA approved silicon grease to the outside of the exposed portion of the connectors. This ensures a watertight connection between the cartridge and the drainage pipe.
    b. Replace any damaged connectors.
11. Using the boom, crane, or tripod, lower and install the new cartridges. Once

again, take care not to damage connections.

12. Close and fasten the door.

13. Remove safety equipment.

14. Make notes about the local drainage area relative to ongoing construction, erosion problems, or high loadings of other materials to the system.

15. Finally, dispose of the residual materials in accordance with applicable regulations. Make arrangements to return the used cartridges to CONTECH Stormwater Solutions.

Related Maintenance Activities

(Performed on an as-needed basis)

StormFilter units are often just one of many components in a more comprehensive stormwater drainage and treatment system. The entire system may include catch basins, detention vaults, sedimentation vaults and manholes, detention/retention ponds, swales, artificial wetlands, and other miscellaneous components.
In order for maintenance of the StormFilter to be successful, it is imperative that all other components be properly maintained. The maintenance/repair of upstream facilities should be carried out prior to StormFilter maintenance activities.

In addition to considering upstream facilities, it is also important to correct any problems identified in the drainage area. Drainage area concerns may include: erosion problems, heavy oil and grease loading, and discharges of inappropriate materials.

Material Disposal

The accumulated sediment found in stormwater treatment and conveyance systems must be handled and disposed of in a manner that will not allow the material to affect surface or ground water. It is possible for sediments to contain measurable concentrations of heavy metals and organic chemicals (such as pesticides and petroleum products). Areas with the greatest potential for high pollutant loading include industrial areas and heavily traveled roads.

Sediments and water must be disposed of in accordance with all applicable waste disposal regulations. It is not appropriate to discharge untreated materials back to the stormwater drainage system.

Part of arranging for maintenance to occur should include coordination of disposal of solids (landfill coordination) and liquids (municipal vacuum truck decant facility, local wastewater treatment plant, on-site treatment and discharge).

Owners should contact the local public works department and inquire about how the department disposes of their street waste residuals. CONTECH Stormwater Solutions will determine disposal methods or reuse of the media contained in the cartridges. If the material has been contaminated with any unusual substance, the cost of special handling and disposal will be the responsibility of the owner.

StormFilter Minor Maintenance and Inspection Data Sheet

Date: _____ **Personnel:** _____

Location: _____ **System Size:** _____

System Type: Vault Cast-In-Place Linear

System Observations

Media Months in Service: _____

Oil and Grease in Forebay: **Yes** **No** _____

Sediment Depth in Forebay: _____

Sediment Depth on Vault Floor: _____

Structural Damage: _____

Estimated Flow from Drainage Pipes (if available): _____

Cartridges Submerged: **Yes** **No** How Deep: _____

StormFilter Minor Maintenance Activities (check off if done and give description)

Trash and Debris Removal: _____

Minor Structural Repairs: _____

Drainage Area Report

Excessive Oil and Grease Loading: **Yes** **No** Source: _____

Sediment Accumulation on Pavement: **Yes** **No** Source: _____

Erosion of Landscaped Areas: **Yes** **No** Source: _____

Items Needing Further Work: _____

Other Comments: _____

Review the condition reports from the previous minor and major maintenance visits.

StormFilter Major Maintenance/Cartridge Replacement Data Sheet

Date: _____ **Personnel:** _____

Location: _____ **System Size:** _____

System Type: Vault Cast-In-Place Linear

List Safety Procedures and Equipment Used: _____

_____

_____

System Observations

Media Months in Service: _____

Oil and Grease in Forebay: **Yes** **No** _____

Sediment Depth in Forebay: _____

Sediment Depth on Vault Floor: _____

Structural Damage: _____

Drainage Area Report

Excessive Oil and Grease Loading: **Yes** **No** Source: _____

Sediment Accumulation on Pavement: **Yes** **No** Source: _____

Erosion of Landscaped Areas: **Yes** **No** Source: _____

StormFilter Cartridge Replacement Maintenance Activities

Remove Trash and Debris: **Yes** **No** Details: _____

Replace Cartridges: **Yes** **No** Details: _____

Sediment Removed: **Yes** **No** Details: _____

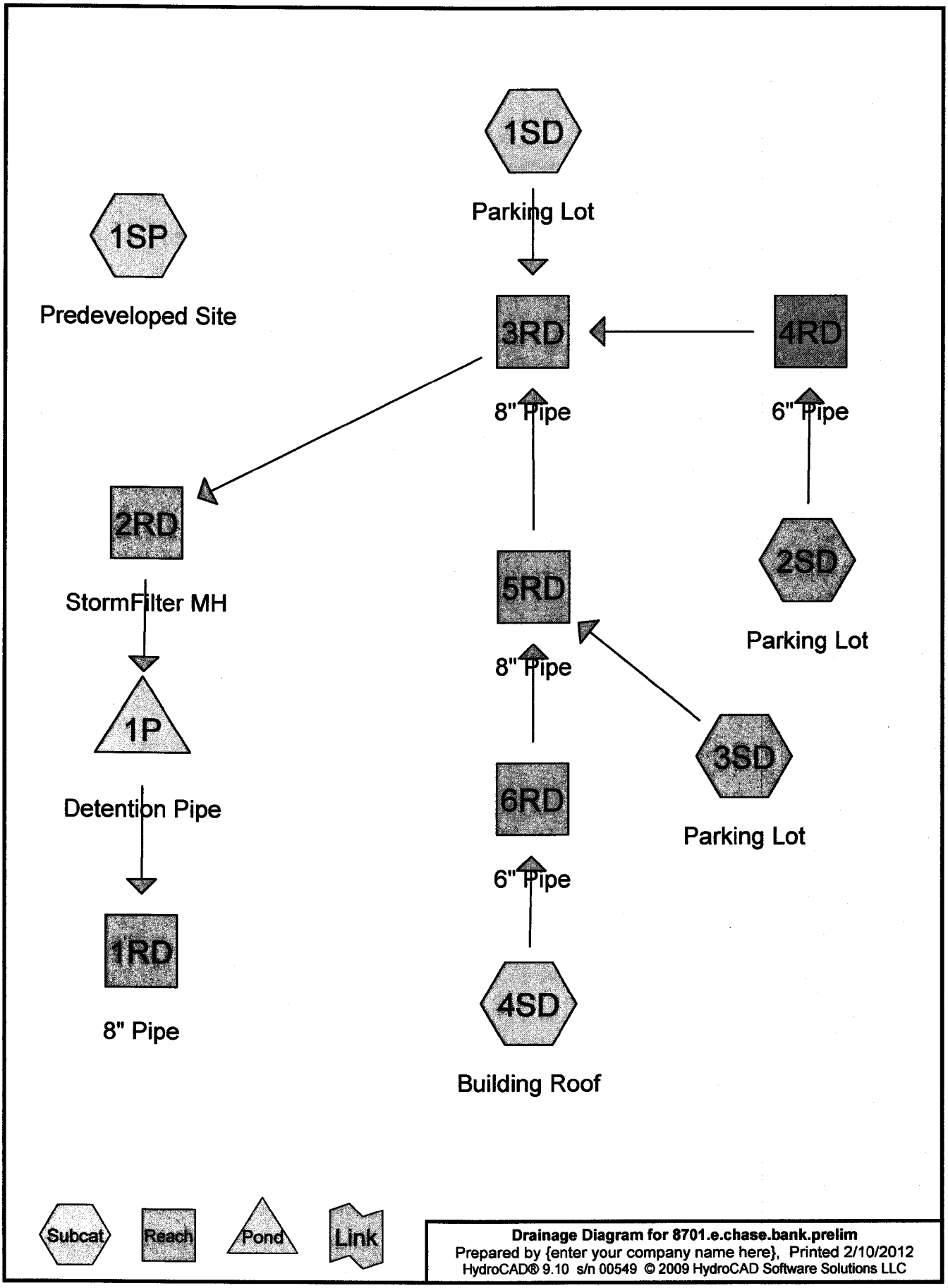
Quantity of Sediment Removed (estimate?): _____

Minor Structural Repairs: **Yes** **No** Details: _____

Residuals (debris, sediment) Disposal Methods: _____

Notes: _____

E



WATER QUALITY STORM (0.83")

Summary for Subcatchment 1SP: Predeveloped Site

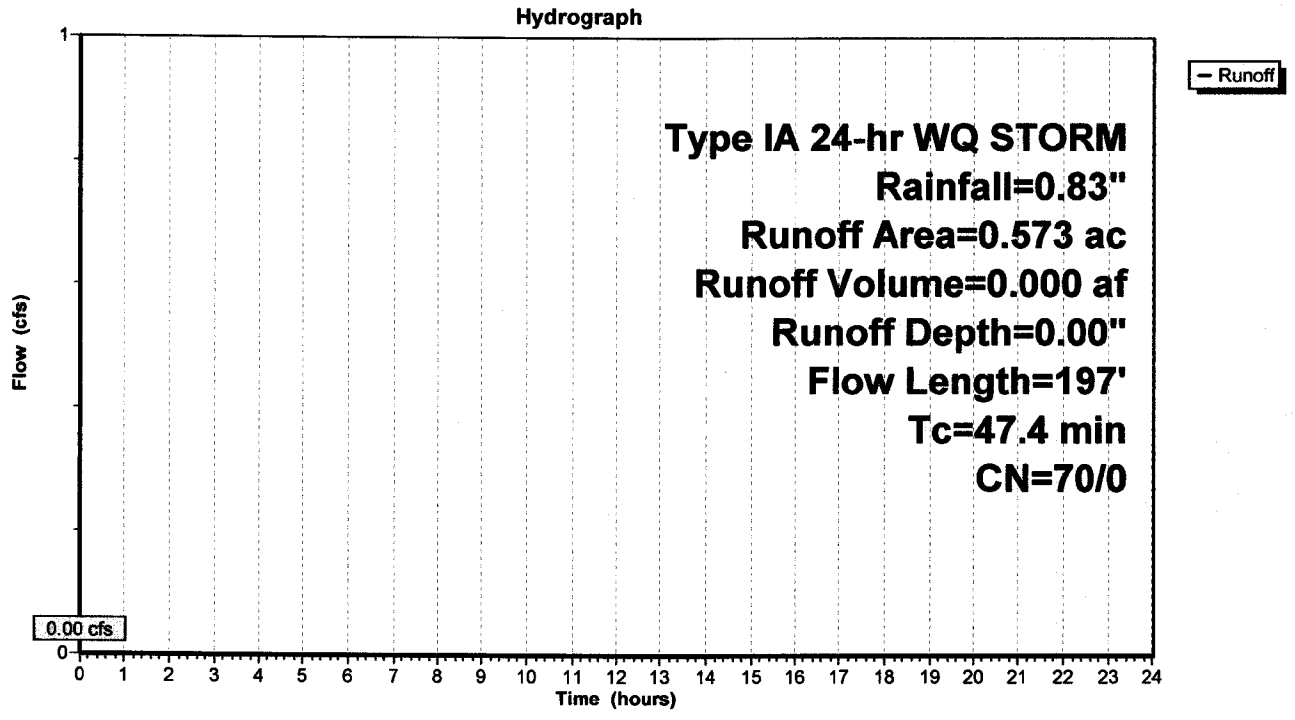
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type IA 24-hr WQ STORM Rainfall=0.83"

Area (ac)	CN	Description
0.573	70	Woods, Good, HSG C
0.573	70	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
47.1	167	0.0112	0.06		**Sheet Flow, Sheet Flow (Woods)** Woods: Light underbrush n= 0.400 P2= 2.40"
0.3	30	0.1122	1.67		**Shallow Concentrated Flow, Shallow Conc. Flow** Woodland Kv= 5.0 fps
47.4	197	Total			

Subcatchment 1SP: Predeveloped Site



Summary for Subcatchment 1SD: Parking Lot

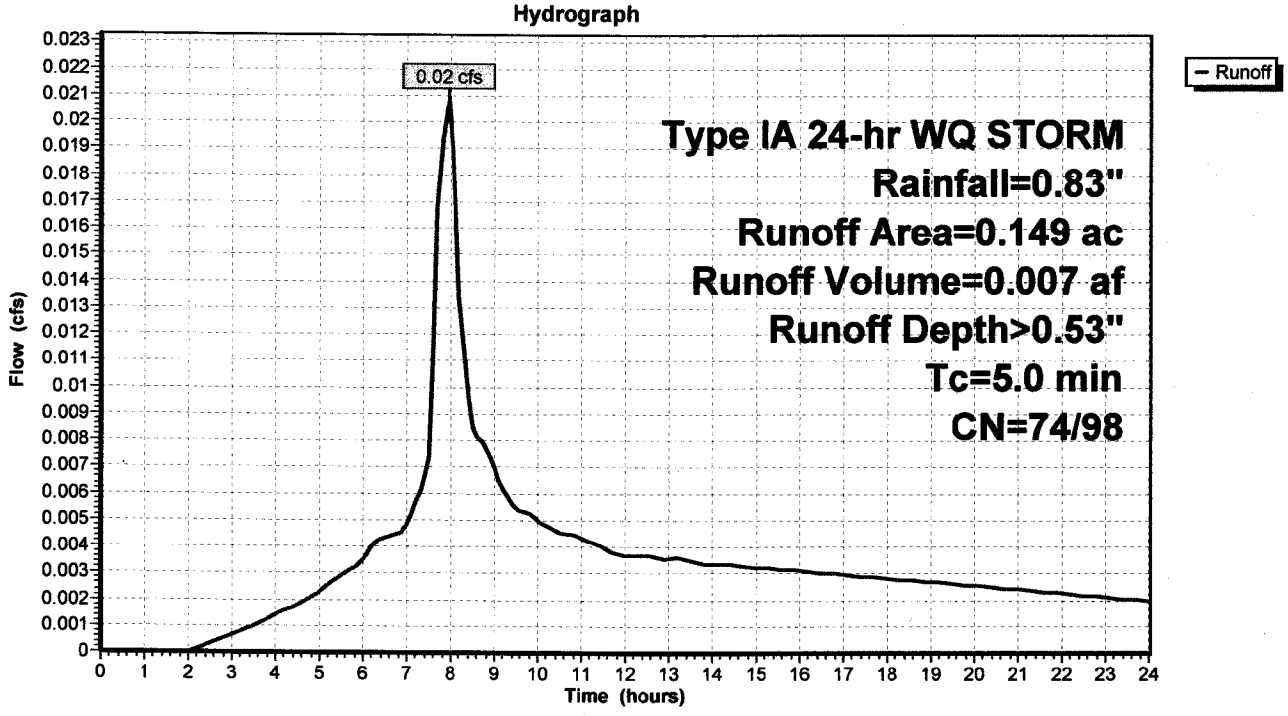
Runoff = 0.02 cfs @ 7.95 hrs, Volume= 0.007 af, Depth> 0.53"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type IA 24-hr WQ STORM Rainfall=0.83"

Area (ac)	CN	Description
0.127	98	Paved parking, HSG C
0.022	74	>75% Grass cover, Good, HSG C
0.149	94	Weighted Average
0.022	74	14.77% Pervious Area
0.127	98	85.23% Impervious Area

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

Subcatchment 1SD: Parking Lot



Summary for Subcatchment 2SD: Parking Lot

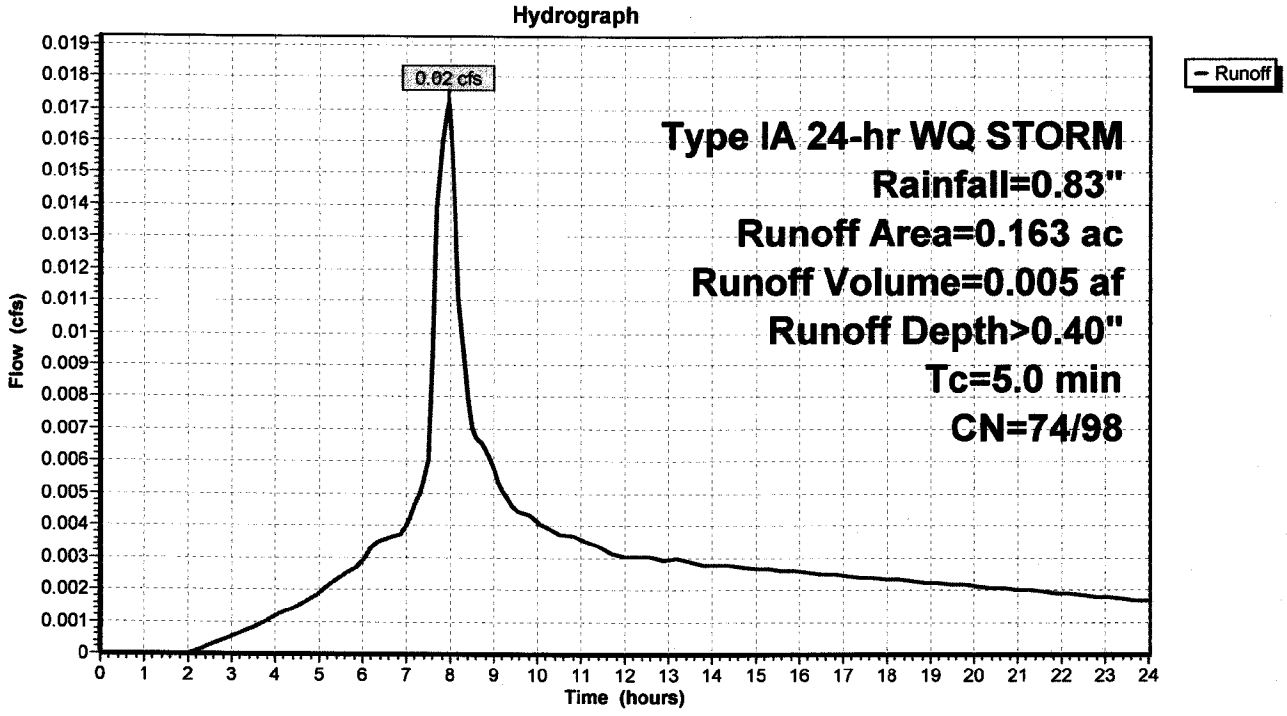
Runoff = 0.02 cfs @ 7.95 hrs, Volume= 0.005 af, Depth> 0.40"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type IA 24-hr WQ STORM Rainfall=0.83"

Area (ac)	CN	Description
0.105	98	Paved parking, HSG C
0.058	74	>75% Grass cover, Good, HSG C
0.163	89	Weighted Average
0.058	74	35.58% Pervious Area
0.105	98	64.42% Impervious Area

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

Subcatchment 2SD: Parking Lot



Summary for Subcatchment 3SD: Parking Lot

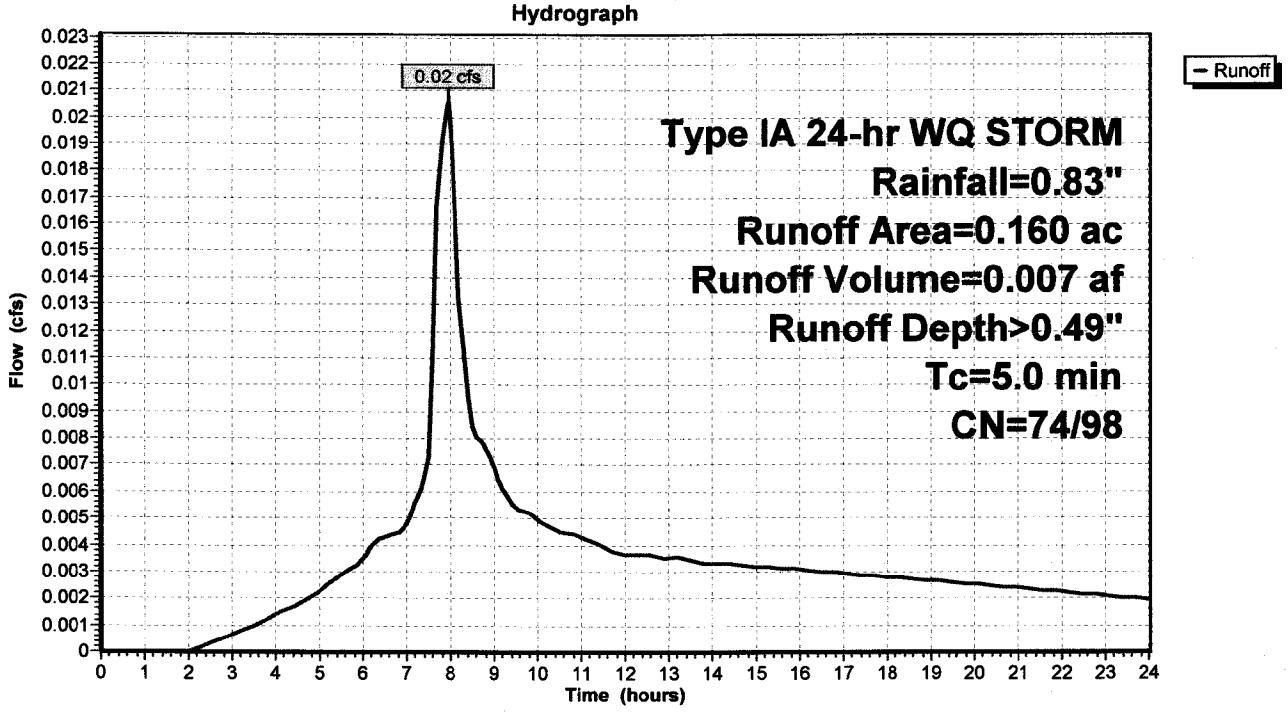
Runoff = 0.02 cfs @ 7.95 hrs, Volume= 0.007 af, Depth> 0.49"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type IA 24-hr WQ STORM Rainfall=0.83"

	Area (ac)	CN	Description
	0.110	98	Paved parking, HSG C
*	0.016	98	Sidewalk, HSG C
	0.034	74	>75% Grass cover, Good, HSG C
	0.160	93	Weighted Average
	0.034	74	21.25% Pervious Area
	0.126	98	78.75% Impervious Area

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

Subcatchment 3SD: Parking Lot



Summary for Subcatchment 4SD: Building Roof

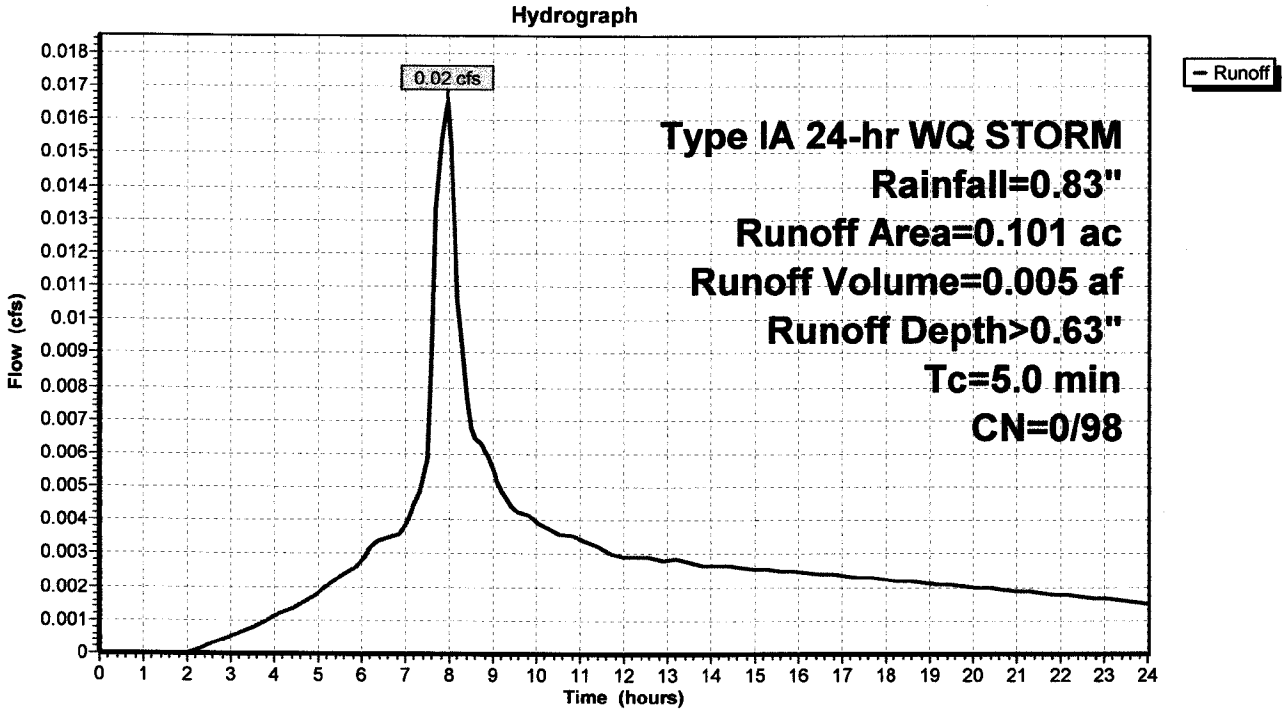
Runoff = 0.02 cfs @ 7.95 hrs, Volume= 0.005 af, Depth> 0.63"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type IA 24-hr WQ STORM Rainfall=0.83"

Area (ac)	CN	Description
0.101	98	Roofs, HSG C
0.101	98	100.00% Impervious Area

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

Subcatchment 4SD: Building Roof



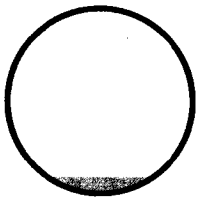
Summary for Reach 1RD: 8" Pipe

Inflow Area = 0.573 ac, 80.10% Impervious, Inflow Depth > 0.49" for WQ STORM event
Inflow = 0.02 cfs @ 9.51 hrs, Volume= 0.023 af
Outflow = 0.02 cfs @ 9.54 hrs, Volume= 0.023 af, Atten= 0%, Lag= 2.2 min

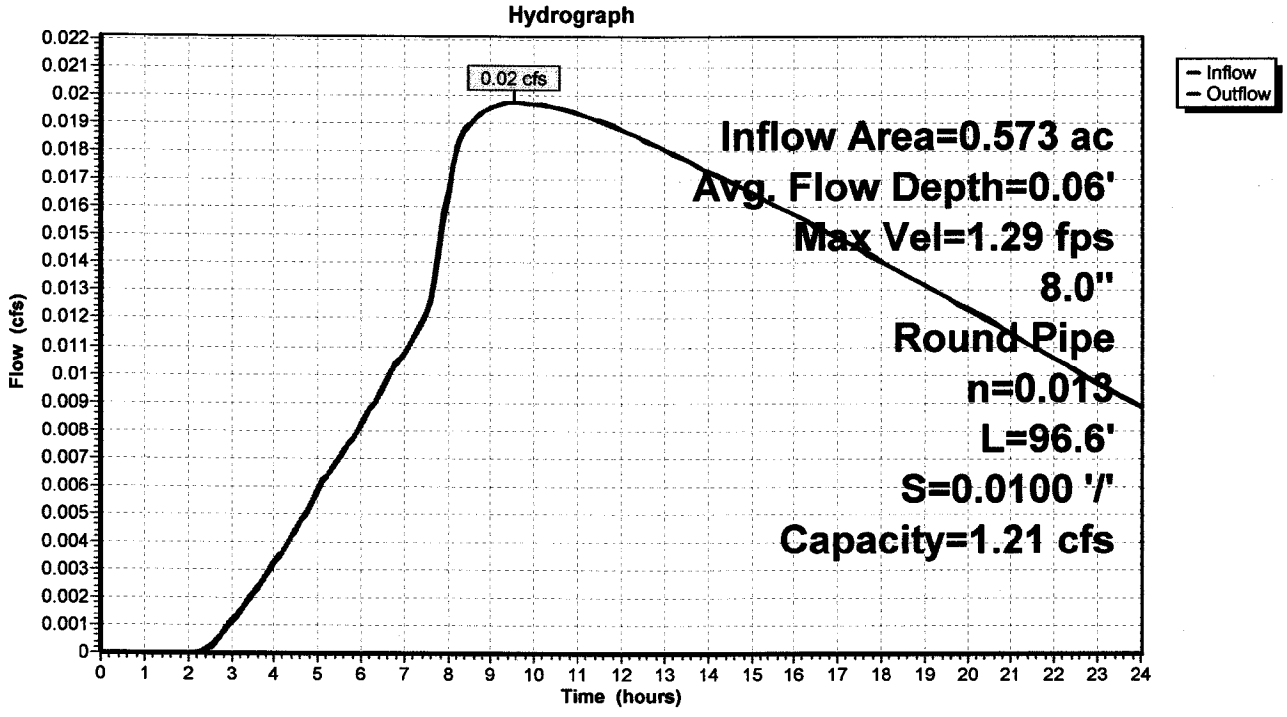
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.29 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 1.10 fps, Avg. Travel Time= 1.5 min

Peak Storage= 1 cf @ 9.52 hrs
Average Depth at Peak Storage= 0.06'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 1.21 cfs

8.0" Round Pipe
n= 0.013
Length= 96.6' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.97'



Reach 1RD: 8" Pipe

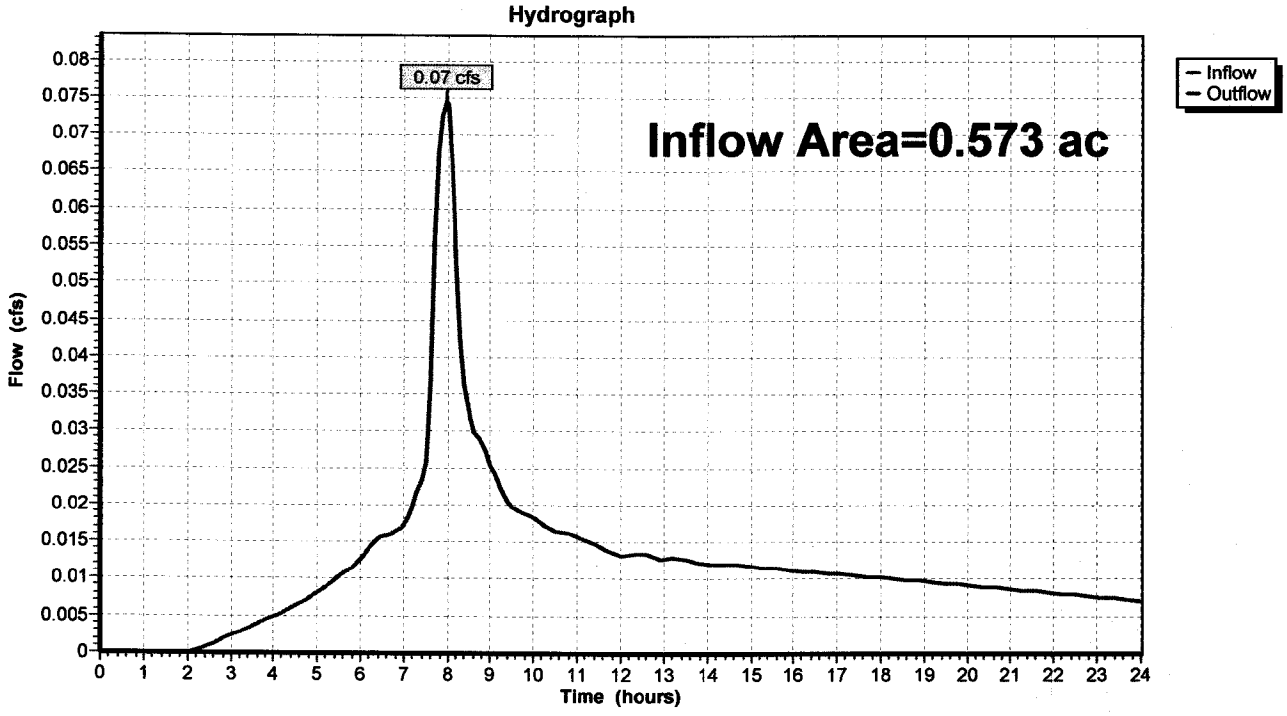


Summary for Reach 2RD: StormFilter MH

Inflow Area = 0.573 ac, 80.10% Impervious, Inflow Depth > 0.50" for WQ STORM event
Inflow = 0.07 cfs @ 7.96 hrs, Volume= 0.024 af
Outflow = 0.07 cfs @ 7.96 hrs, Volume= 0.024 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach 2RD: StormFilter MH



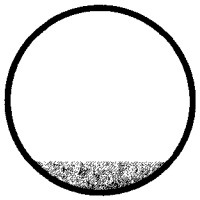
Summary for Reach 3RD: 8" Pipe

Inflow Area = 0.573 ac, 80.10% Impervious, Inflow Depth > 0.50" for WQ STORM event
Inflow = 0.07 cfs @ 7.96 hrs, Volume= 0.024 af
Outflow = 0.07 cfs @ 7.96 hrs, Volume= 0.024 af, Atten= 0%, Lag= 0.1 min

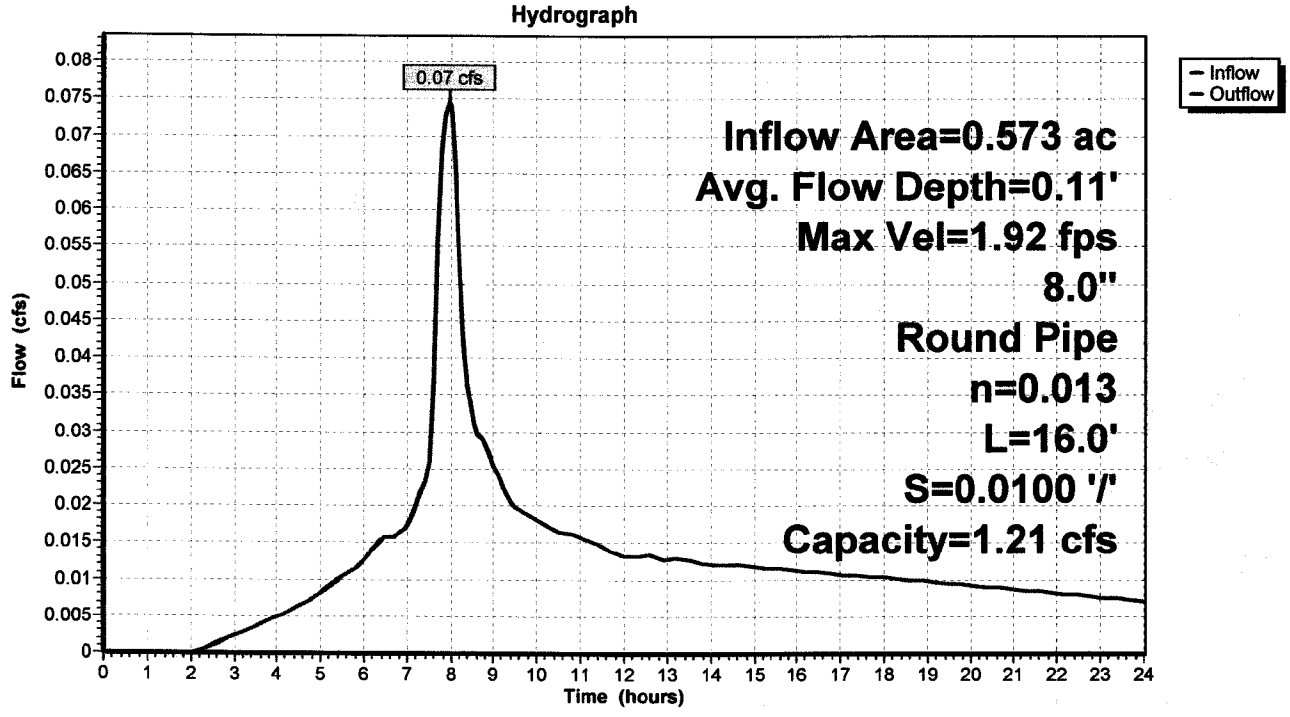
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.92 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.09 fps, Avg. Travel Time= 0.2 min

Peak Storage= 1 cf @ 7.96 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 1.21 cfs

8.0" Round Pipe
n= 0.013
Length= 16.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.16'



Reach 3RD: 8" Pipe



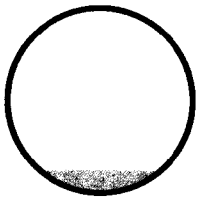
Summary for Reach 4RD: 6" Pipe

Inflow Area = 0.163 ac, 64.42% Impervious, Inflow Depth > 0.40" for WQ STORM event
Inflow = 0.02 cfs @ 7.95 hrs, Volume= 0.005 af
Outflow = 0.02 cfs @ 7.97 hrs, Volume= 0.005 af, Atten= 1%, Lag= 1.3 min

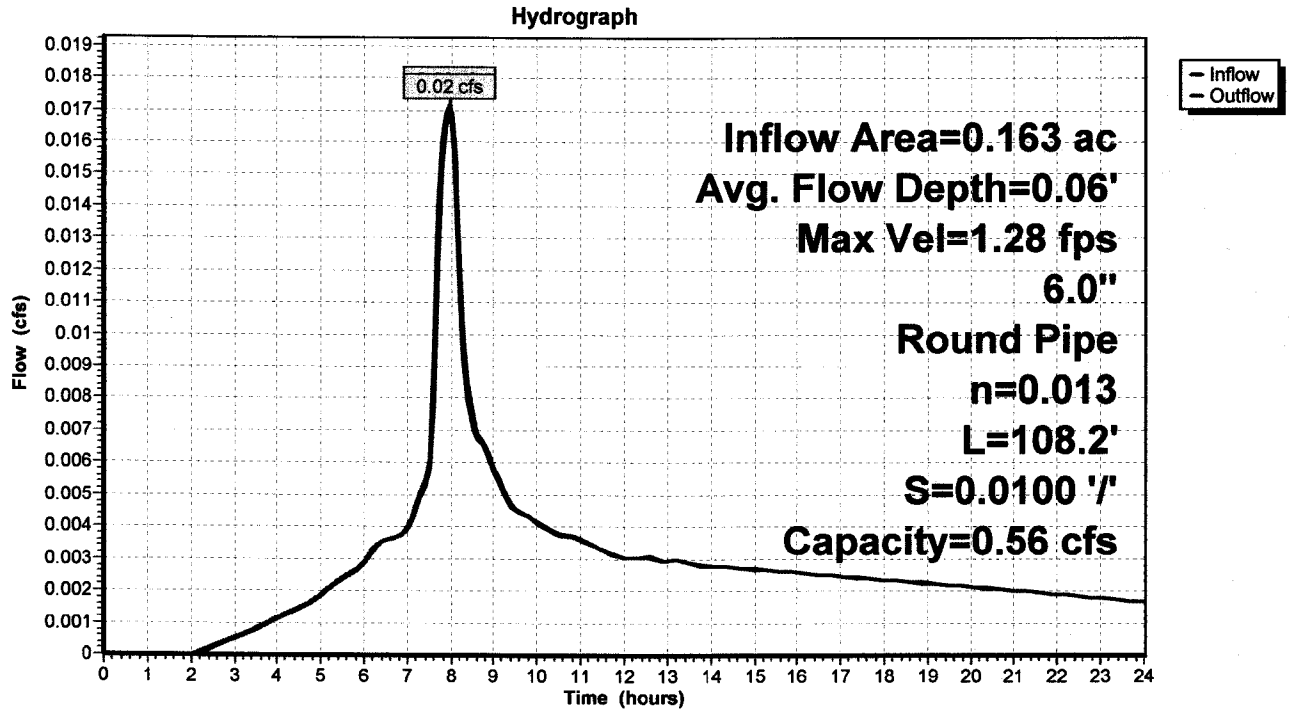
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.28 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 0.73 fps, Avg. Travel Time= 2.5 min

Peak Storage= 1 cf @ 7.96 hrs
Average Depth at Peak Storage= 0.06'
Bank-Full Depth= 0.50', Capacity at Bank-Full= 0.56 cfs

6.0" Round Pipe
n= 0.013
Length= 108.2' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -1.08'



Reach 4RD: 6" Pipe



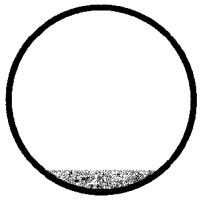
Summary for Reach 5RD: 8" Pipe

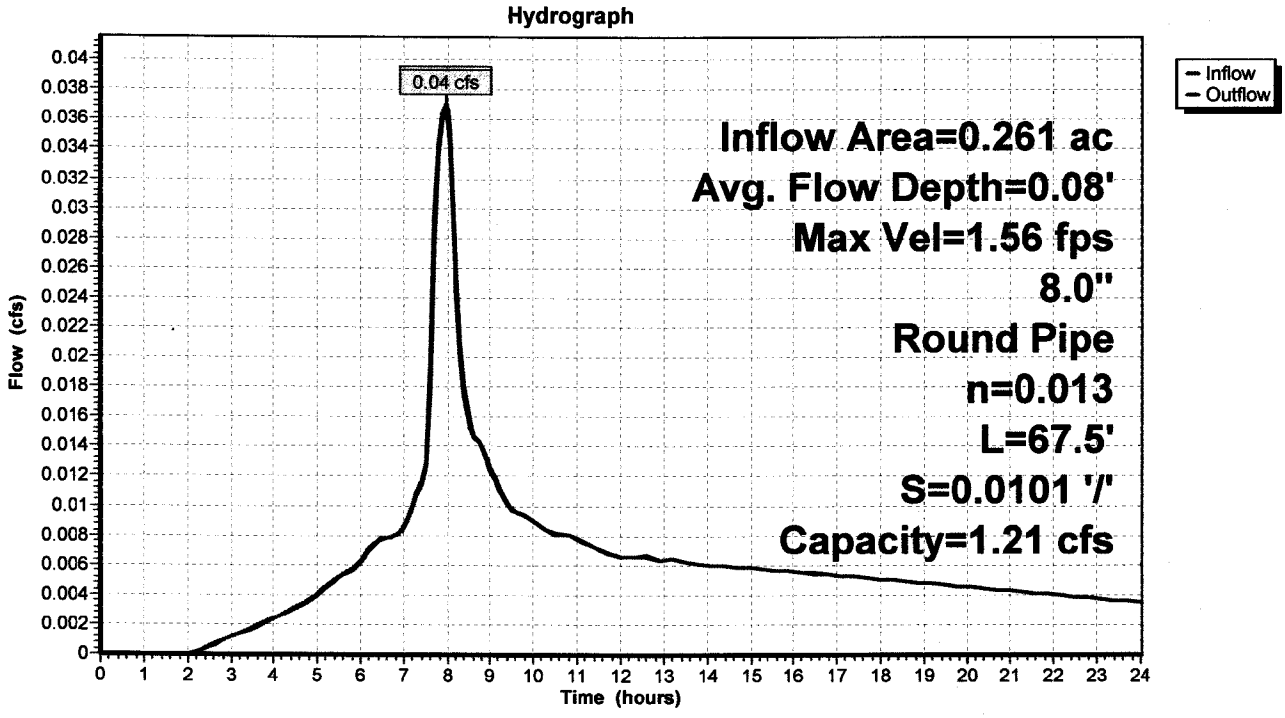
Inflow Area = 0.261 ac, 86.97% Impervious, Inflow Depth > 0.54" for WQ STORM event
Inflow = 0.04 cfs @ 7.95 hrs, Volume= 0.012 af
Outflow = 0.04 cfs @ 7.96 hrs, Volume= 0.012 af, Atten= 1%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.56 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 0.89 fps, Avg. Travel Time= 1.3 min

Peak Storage= 2 cf @ 7.96 hrs
Average Depth at Peak Storage= 0.08'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 1.21 cfs

8.0" Round Pipe
n= 0.013
Length= 67.5' Slope= 0.0101 '/'
Inlet Invert= 0.00', Outlet Invert= -0.68'





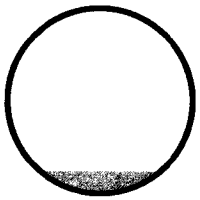
Summary for Reach 6RD: 6" Pipe

Inflow Area = 0.101 ac,100.00% Impervious, Inflow Depth > 0.63" for WQ STORM event
Inflow = 0.02 cfs @ 7.95 hrs, Volume= 0.005 af
Outflow = 0.02 cfs @ 7.96 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.4 min

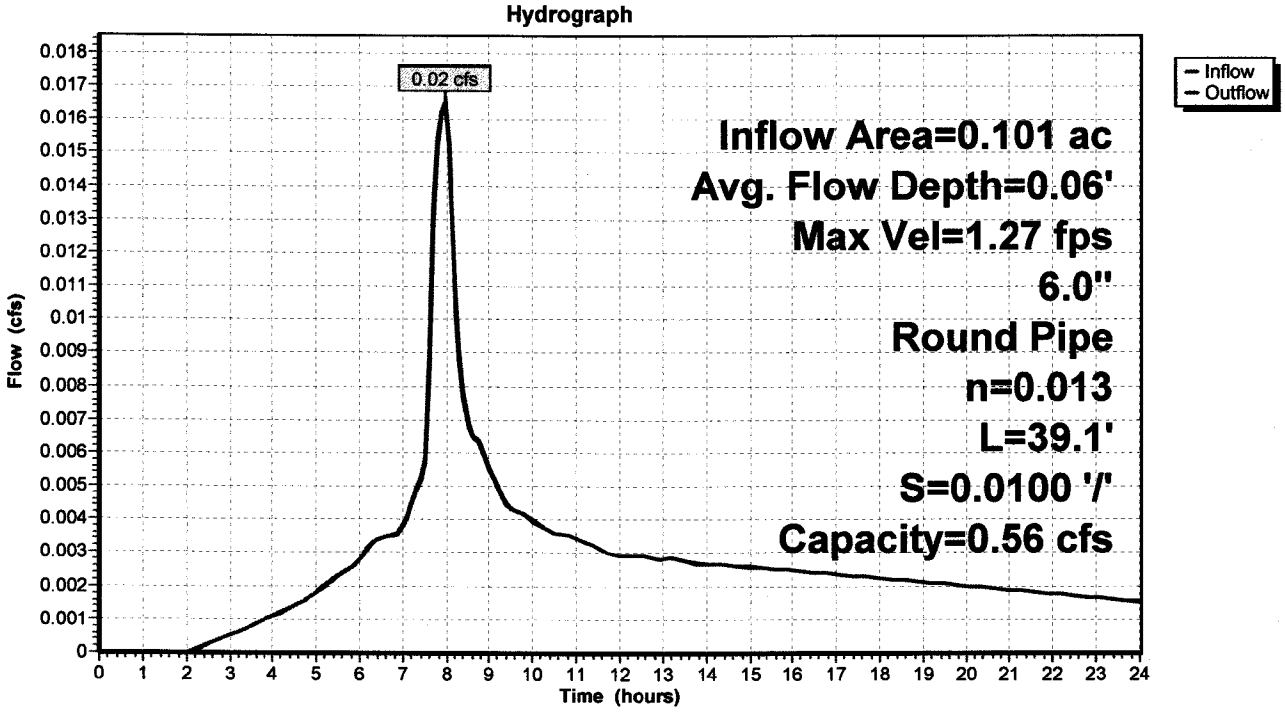
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.27 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 0.72 fps, Avg. Travel Time= 0.9 min

Peak Storage= 1 cf @ 7.95 hrs
Average Depth at Peak Storage= 0.06'
Bank-Full Depth= 0.50', Capacity at Bank-Full= 0.56 cfs

6.0" Round Pipe
n= 0.013
Length= 39.1' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.39'



Reach 6RD: 6" Pipe



Summary for Pond 1P: Detention Pipe

Inflow Area = 0.573 ac, 80.10% Impervious, Inflow Depth > 0.50" for WQ STORM event
Inflow = 0.07 cfs @ 7.96 hrs, Volume= 0.024 af
Outflow = 0.02 cfs @ 9.51 hrs, Volume= 0.023 af, Atten= 73%, Lag= 92.5 min
Primary = 0.02 cfs @ 9.51 hrs, Volume= 0.023 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 0.61' @ 9.51 hrs Surf.Area= 523 sf Storage= 218 cf

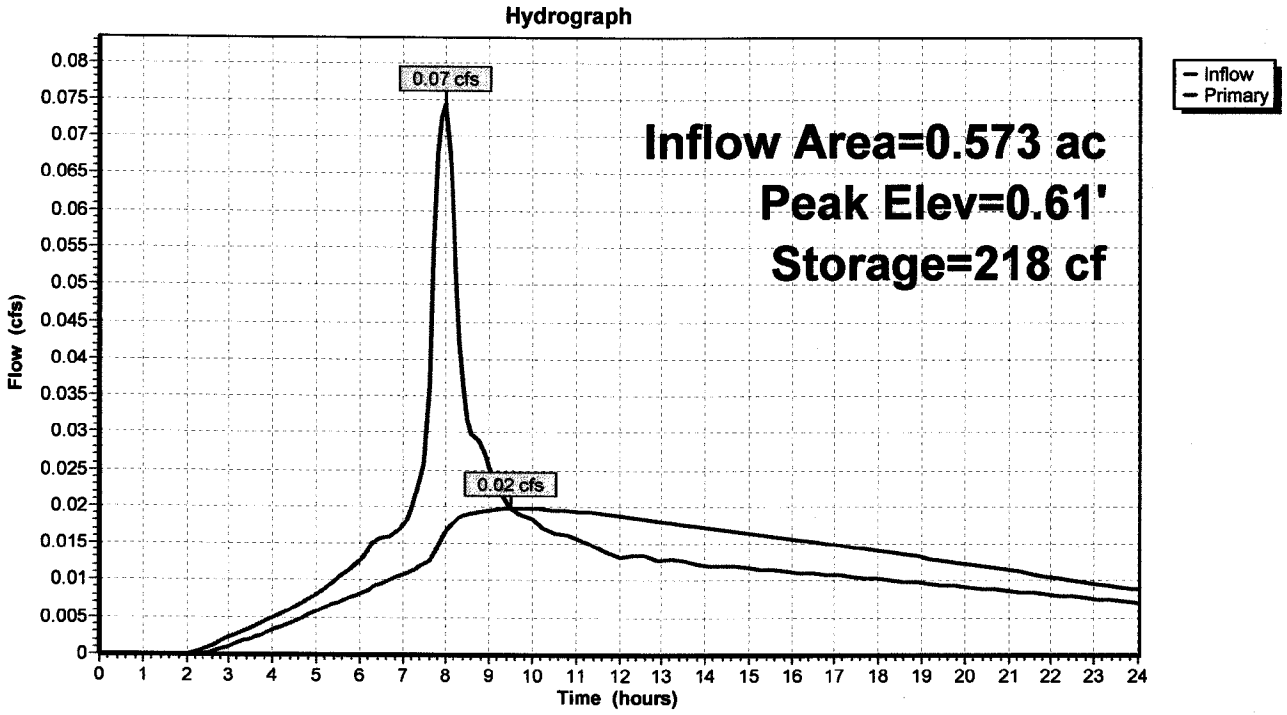
Plug-Flow detention time= 123.8 min calculated for 0.023 af (97% of inflow)
Center-of-Mass det. time= 104.2 min (831.7 - 727.5)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	3,142 cf	**60.0" D x 160.0'L Pipe Storage**

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**1.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	3.80'	**1.3" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.02 cfs @ 9.51 hrs HW=0.61' (Free Discharge)
1=Orifice/Grate (Orifice Controls 0.02 cfs @ 3.62 fps)
2=Orifice/Grate (Controls 0.00 cfs)

Pond 1P: Detention Pipe



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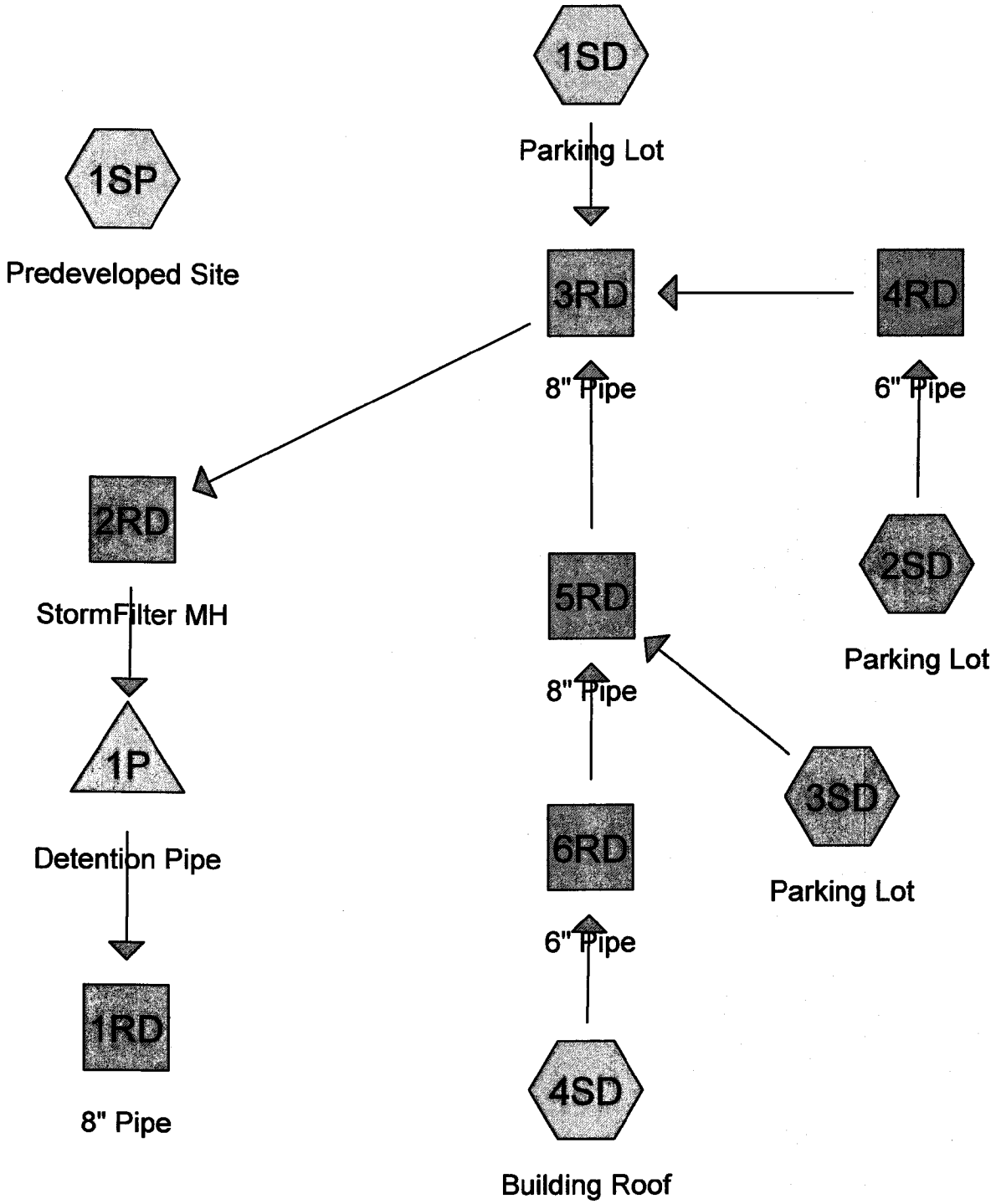


Subcat Reach Pond Link

Drainage Diagram for 8701.e.chase.bank.prelim
Prepared by {enter your company name here}, Printed 2/10/2012
HydroCAD® 9.10 s/n 00549 © 2009 HydroCAD Software Solutions LLC

2-YEAR STORM (2.40")

Summary for Subcatchment 1SP: Predeveloped Site

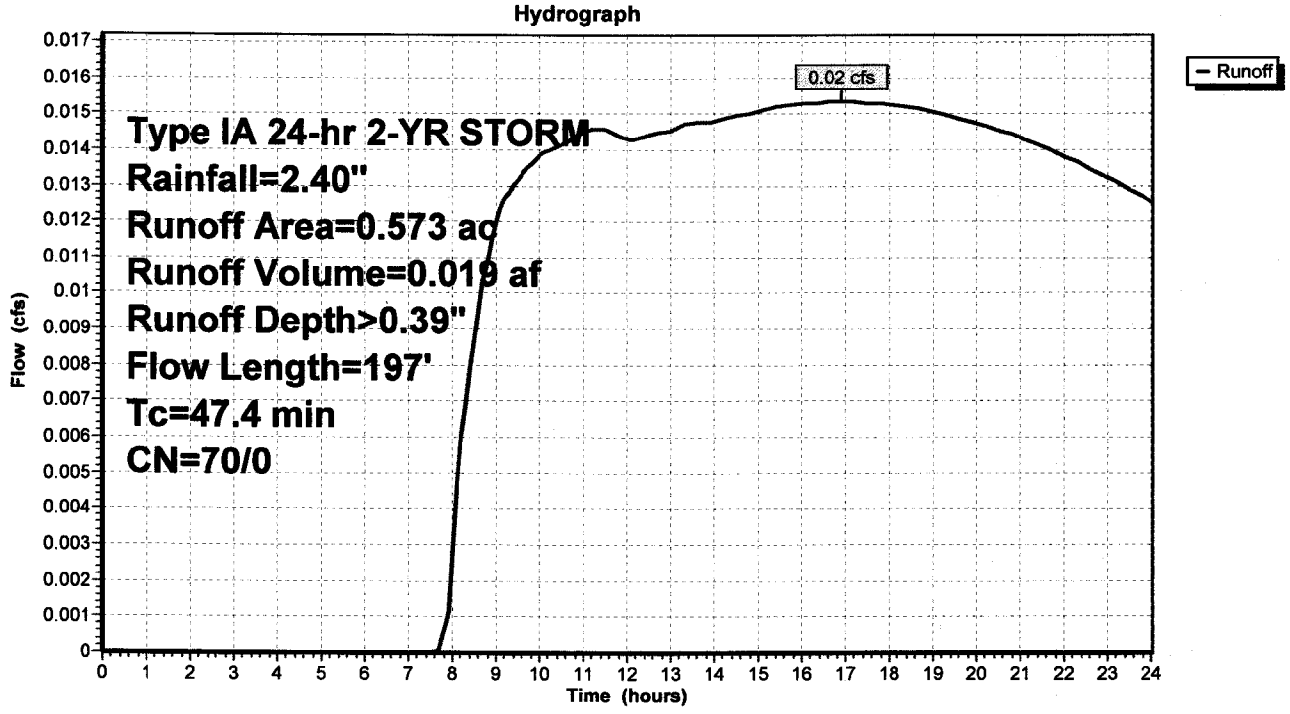
Runoff = 0.02 cfs @ 16.91 hrs, Volume= 0.019 af, Depth> 0.39"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type IA 24-hr 2-YR STORM Rainfall=2.40"

Area (ac)	CN	Description
0.573	70	Woods, Good, HSG C
0.573	70	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
47.1	167	0.0112	0.06		**Sheet Flow, Sheet Flow (Woods)** Woods: Light underbrush n= 0.400 P2= 2.40"
0.3	30	0.1122	1.67		**Shallow Concentrated Flow, Shallow Conc. Flow** Woodland Kv= 5.0 fps
47.4	197	Total			

Subcatchment 1SP: Predeveloped Site



Summary for Subcatchment 1SD: Parking Lot

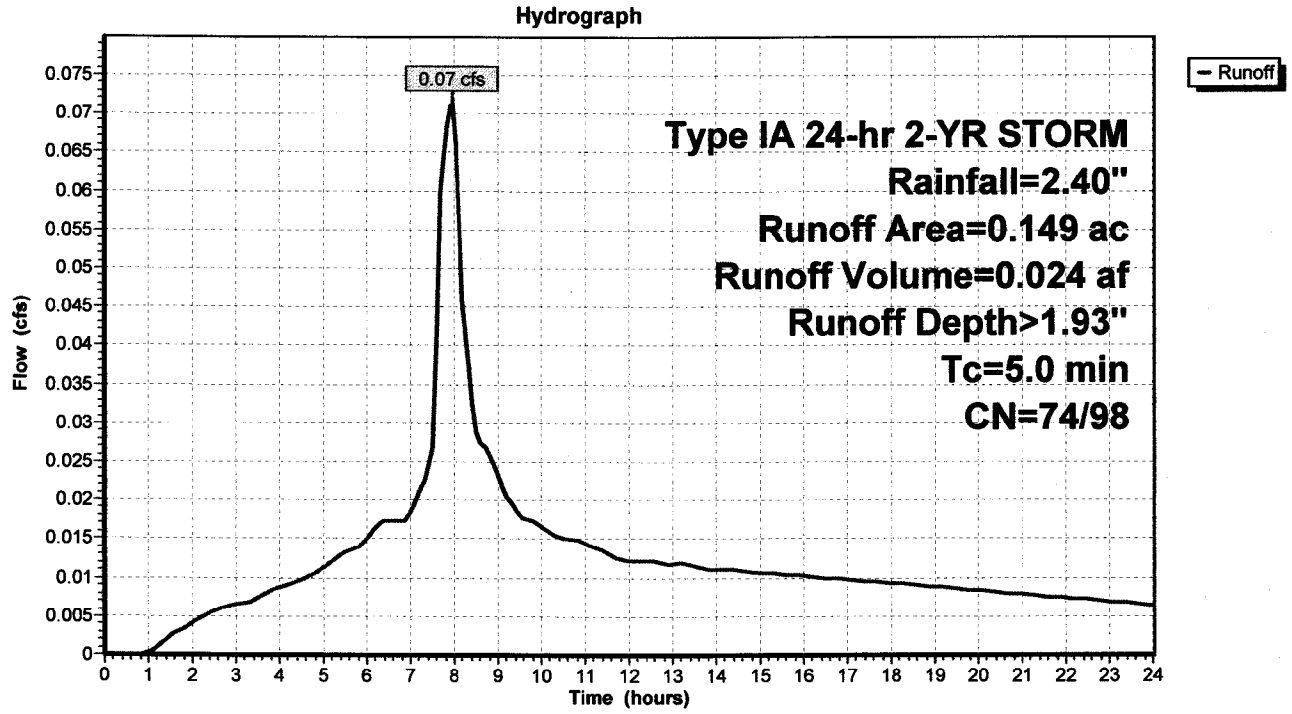
Runoff = 0.07 cfs @ 7.93 hrs, Volume= 0.024 af, Depth> 1.93"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type IA 24-hr 2-YR STORM Rainfall=2.40"

Area (ac)	CN	Description
0.127	98	Paved parking, HSG C
0.022	74	>75% Grass cover, Good, HSG C
0.149	94	Weighted Average
0.022	74	14.77% Pervious Area
0.127	98	85.23% Impervious Area

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

Subcatchment 1SD: Parking Lot



Summary for Subcatchment 2SD: Parking Lot

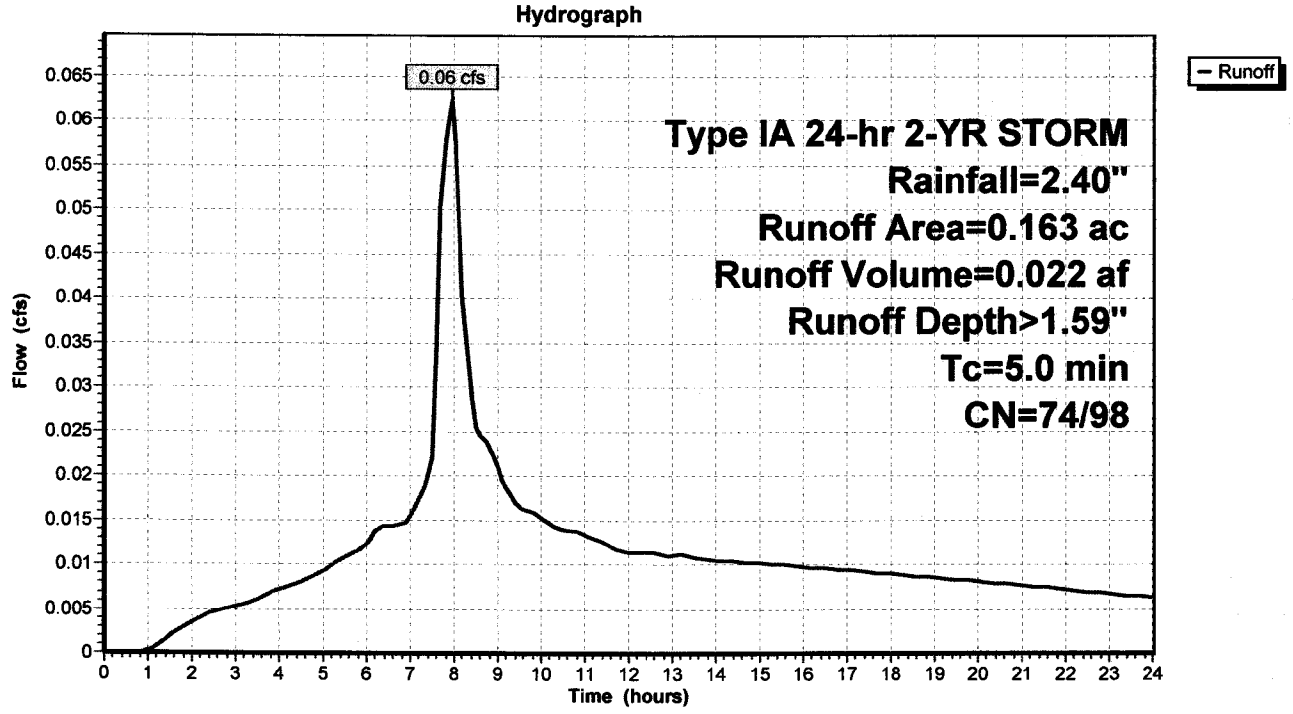
Runoff = 0.06 cfs @ 7.95 hrs, Volume= 0.022 af, Depth> 1.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type IA 24-hr 2-YR STORM Rainfall=2.40"

Area (ac)	CN	Description
0.105	98	Paved parking, HSG C
0.058	74	>75% Grass cover, Good, HSG C
0.163	89	Weighted Average
0.058	74	35.58% Pervious Area
0.105	98	64.42% Impervious Area

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

Subcatchment 2SD: Parking Lot



Summary for Subcatchment 3SD: Parking Lot

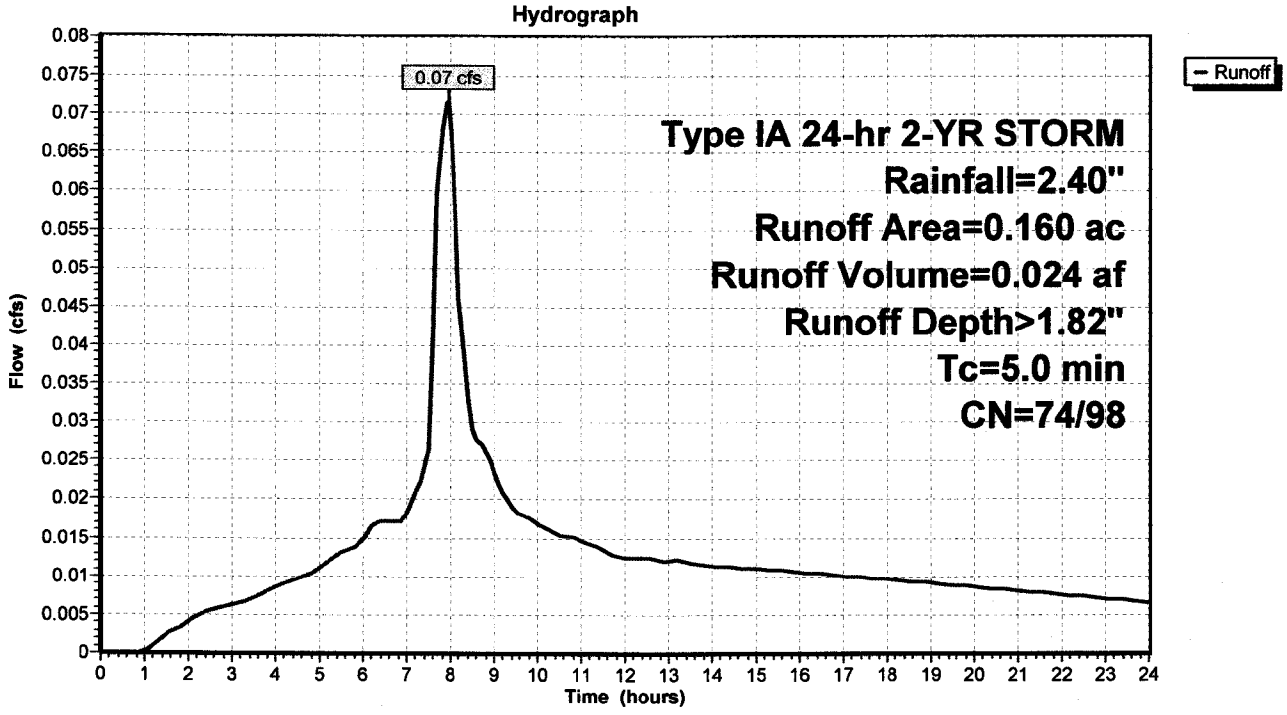
Runoff = 0.07 cfs @ 7.94 hrs, Volume= 0.024 af, Depth> 1.82"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type IA 24-hr 2-YR STORM Rainfall=2.40"

	Area (ac)	CN	Description
	0.110	98	Paved parking, HSG C
*	0.016	98	Sidewalk, HSG C
	0.034	74	>75% Grass cover, Good, HSG C
	0.160	93	Weighted Average
	0.034	74	21.25% Pervious Area
	0.126	98	78.75% Impervious Area

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

Subcatchment 3SD: Parking Lot



Summary for Subcatchment 4SD: Building Roof

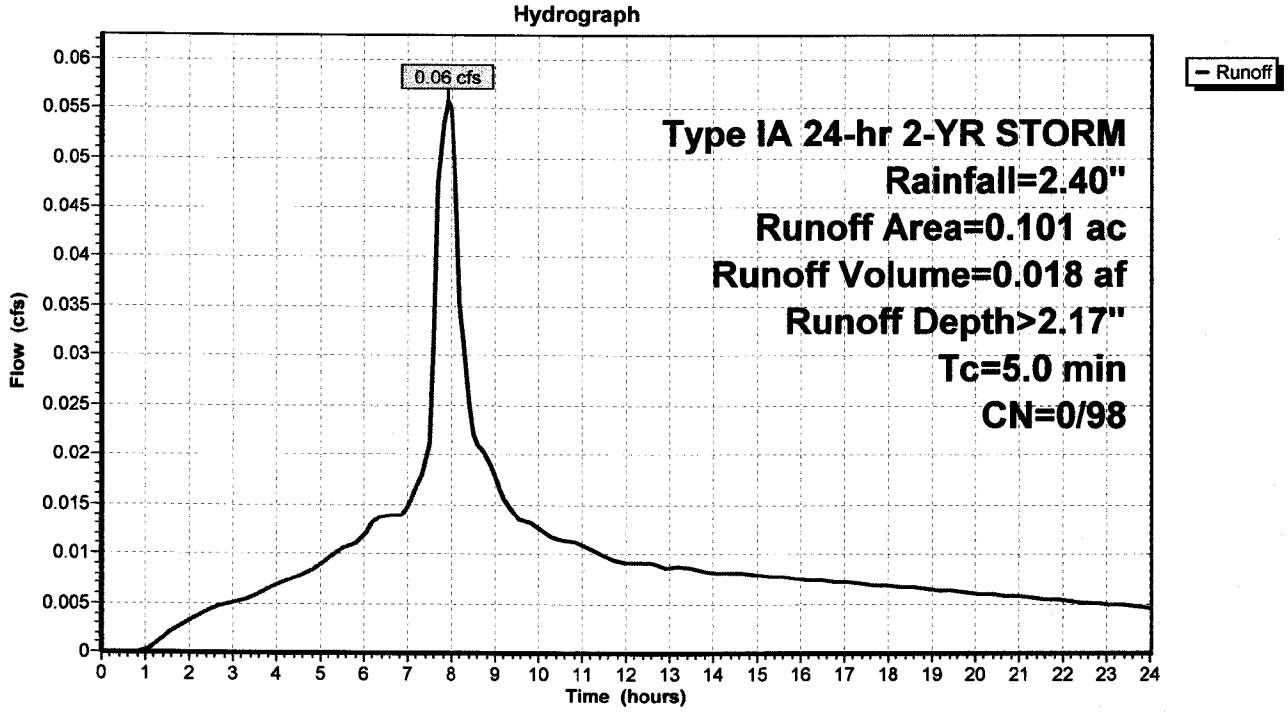
Runoff = 0.06 cfs @ 7.93 hrs, Volume= 0.018 af, Depth> 2.17"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type IA 24-hr 2-YR STORM Rainfall=2.40"

Area (ac)	CN	Description
0.101	98	Roofs, HSG C
0.101	98	100.00% Impervious Area

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

Subcatchment 4SD: Building Roof



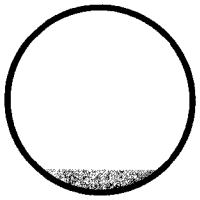
Summary for Reach 1RD: 8" Pipe

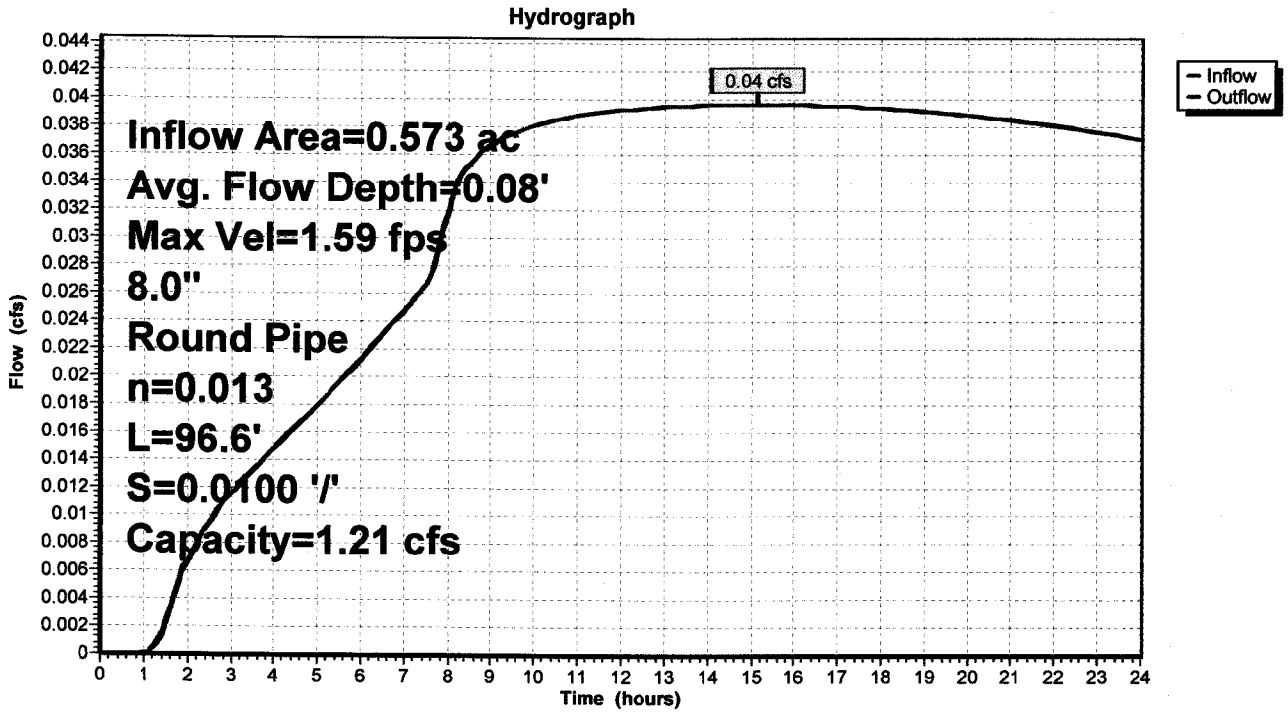
Inflow Area = 0.573 ac, 80.10% Impervious, Inflow Depth > 1.27" for 2-YR STORM event
Inflow = 0.04 cfs @ 15.13 hrs, Volume= 0.060 af
Outflow = 0.04 cfs @ 15.16 hrs, Volume= 0.060 af, Atten= 0%, Lag= 1.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.59 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.45 fps, Avg. Travel Time= 1.1 min

Peak Storage= 2 cf @ 15.14 hrs
Average Depth at Peak Storage= 0.08'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 1.21 cfs

8.0" Round Pipe
n= 0.013
Length= 96.6' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.97'



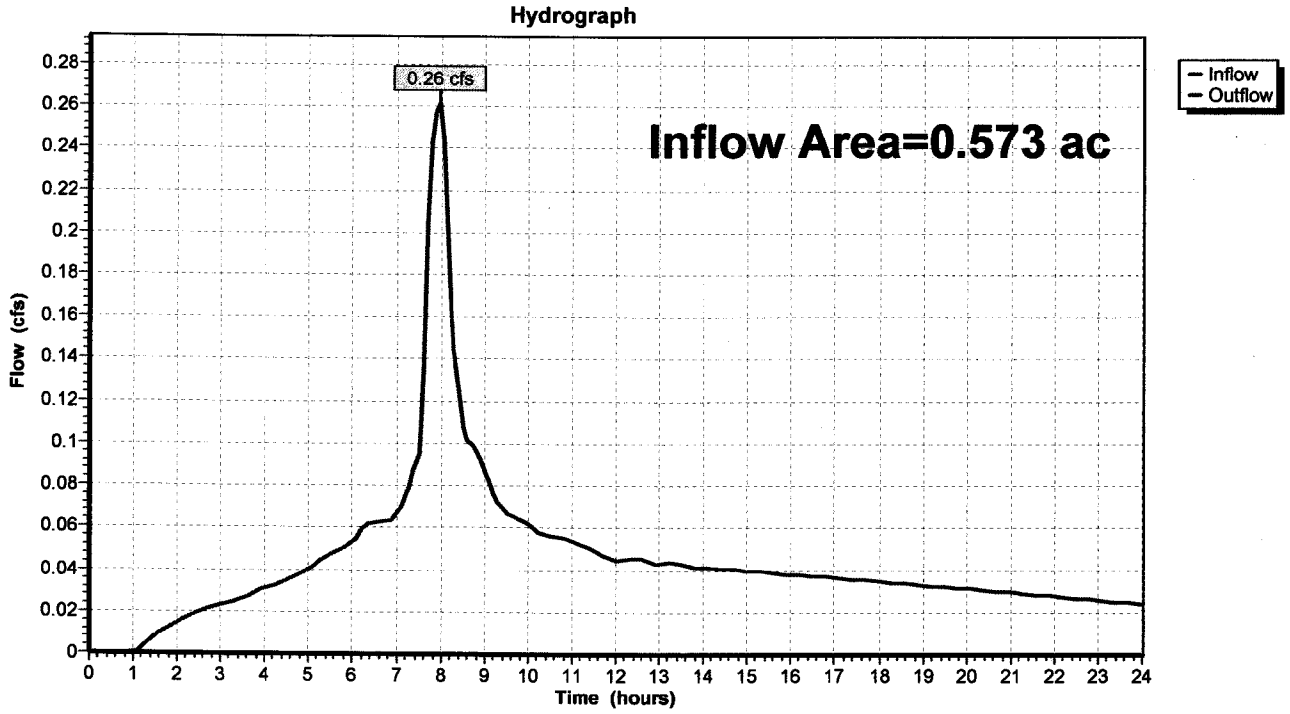


Summary for Reach 2RD: StormFilter MH

Inflow Area = 0.573 ac, 80.10% Impervious, Inflow Depth > 1.84" for 2-YR STORM event
Inflow = 0.26 cfs @ 7.95 hrs, Volume= 0.088 af
Outflow = 0.26 cfs @ 7.95 hrs, Volume= 0.088 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach 2RD: StormFilter MH



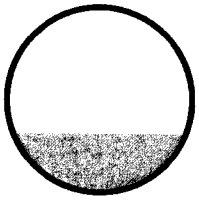
Summary for Reach 3RD: 8" Pipe

Inflow Area = 0.573 ac, 80.10% Impervious, Inflow Depth > 1.84" for 2-YR STORM event
Inflow = 0.26 cfs @ 7.95 hrs, Volume= 0.088 af
Outflow = 0.26 cfs @ 7.95 hrs, Volume= 0.088 af, Atten= 0%, Lag= 0.1 min

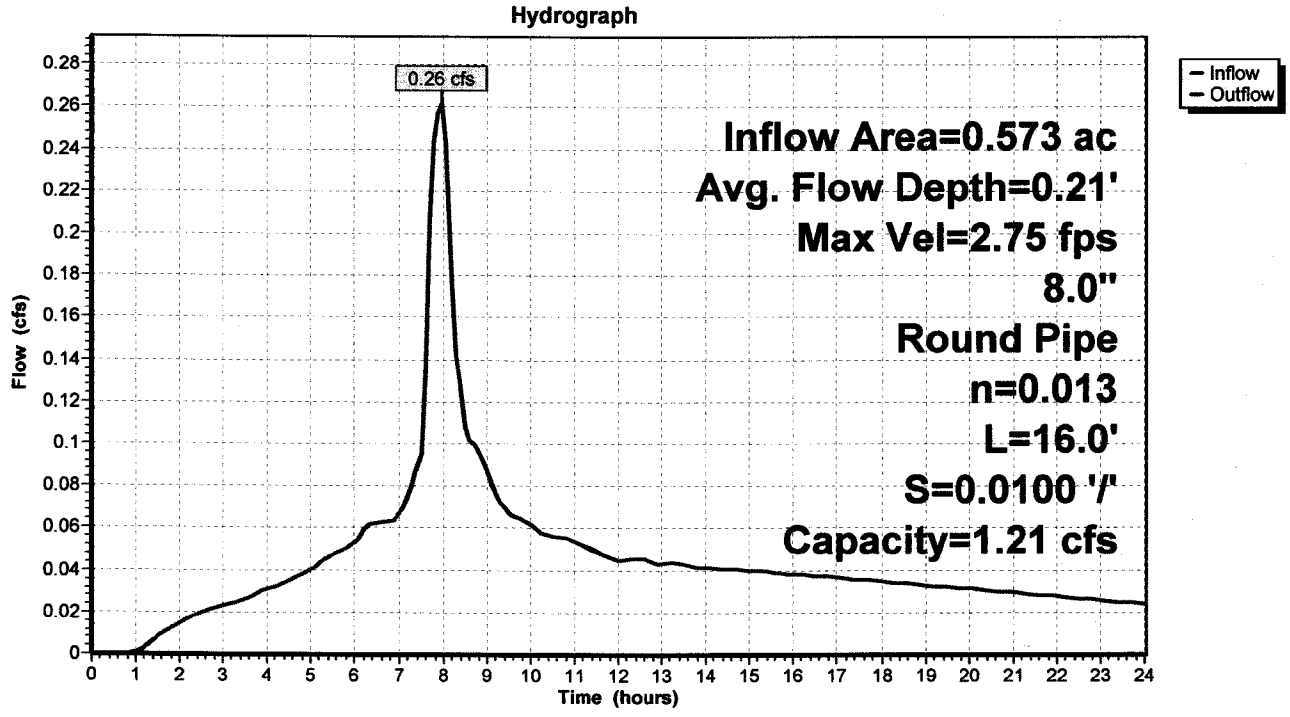
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.75 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.60 fps, Avg. Travel Time= 0.2 min

Peak Storage= 2 cf @ 7.95 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 1.21 cfs

8.0" Round Pipe
n= 0.013
Length= 16.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.16'



Reach 3RD: 8" Pipe



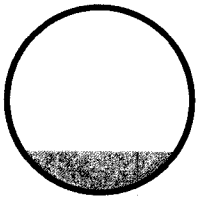
Summary for Reach 4RD: 6" Pipe

Inflow Area = 0.163 ac, 64.42% Impervious, Inflow Depth > 1.59" for 2-YR STORM event
Inflow = 0.06 cfs @ 7.95 hrs, Volume= 0.022 af
Outflow = 0.06 cfs @ 7.96 hrs, Volume= 0.022 af, Atten= 1%, Lag= 0.9 min

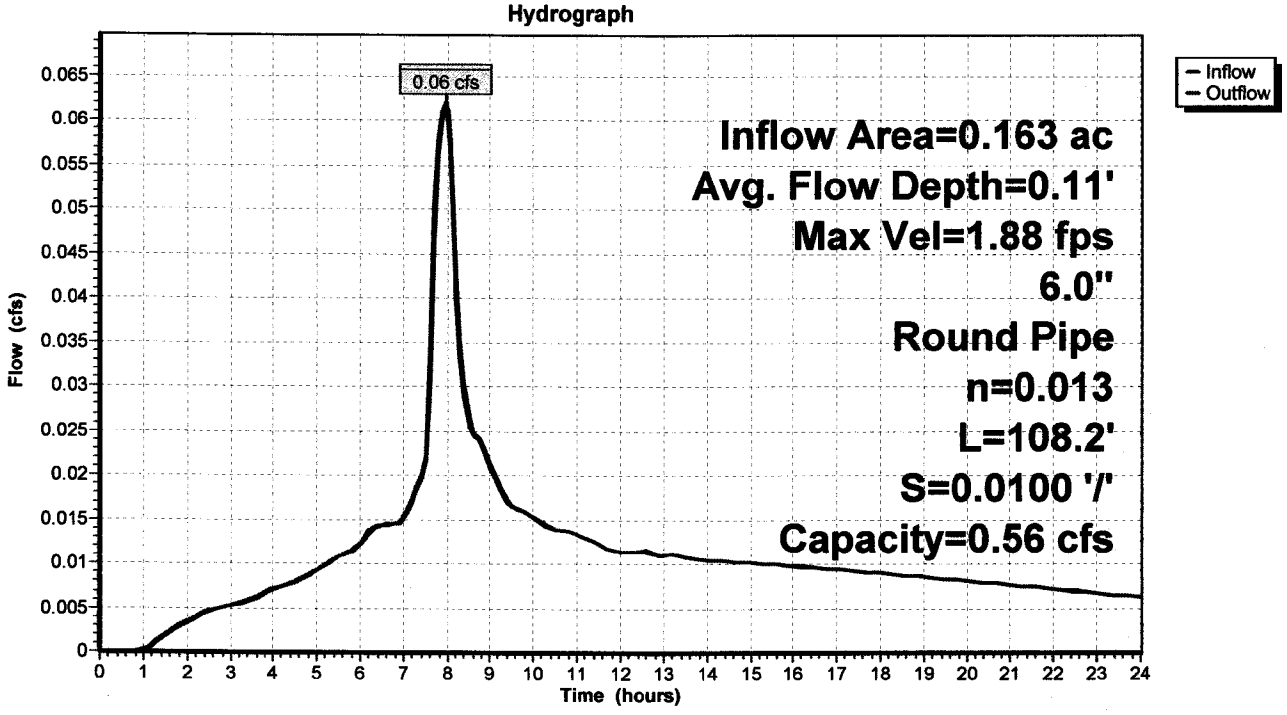
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.88 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.09 fps, Avg. Travel Time= 1.7 min

Peak Storage= 4 cf @ 7.96 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 0.50', Capacity at Bank-Full= 0.56 cfs

6.0" Round Pipe
n= 0.013
Length= 108.2' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -1.08'



Reach 4RD: 6" Pipe



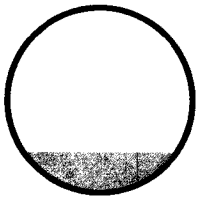
Summary for Reach 5RD: 8" Pipe

Inflow Area = 0.261 ac, 86.97% Impervious, Inflow Depth > 1.96" for 2-YR STORM event
Inflow = 0.13 cfs @ 7.94 hrs, Volume= 0.043 af
Outflow = 0.13 cfs @ 7.95 hrs, Volume= 0.043 af, Atten= 0%, Lag= 0.9 min

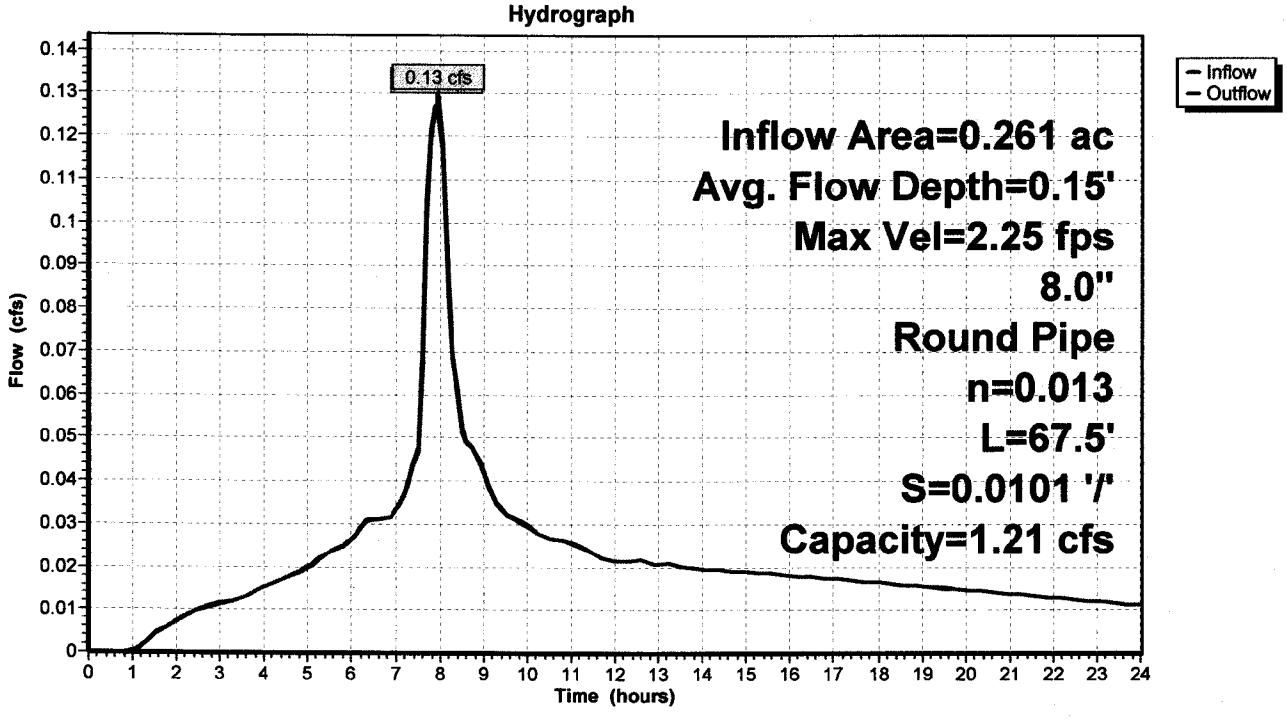
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.25 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.29 fps, Avg. Travel Time= 0.9 min

Peak Storage= 4 cf @ 7.95 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 1.21 cfs

8.0" Round Pipe
n= 0.013
Length= 67.5' Slope= 0.0101 '/'
Inlet Invert= 0.00', Outlet Invert= -0.68'



Reach 5RD: 8" Pipe



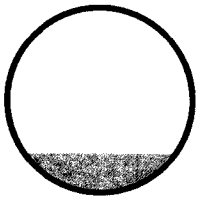
Summary for Reach 6RD: 6" Pipe

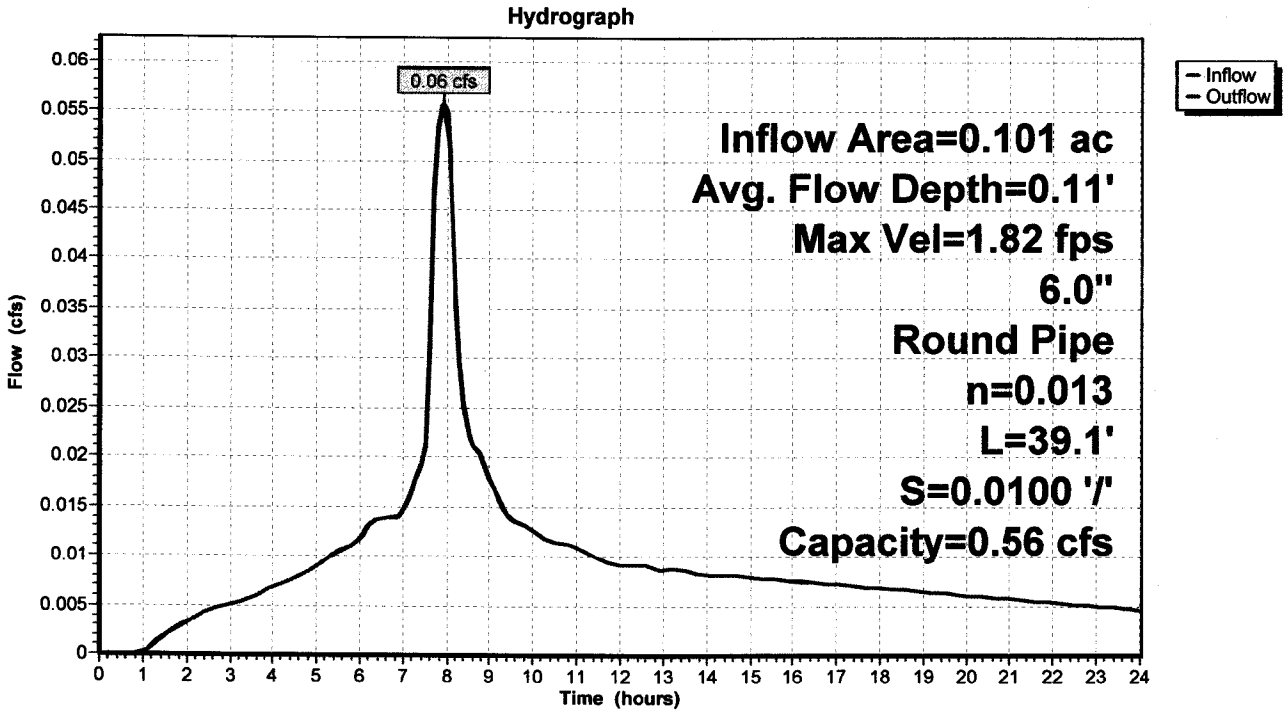
Inflow Area = 0.101 ac,100.00% Impervious, Inflow Depth > 2.17" for 2-YR STORM event
Inflow = 0.06 cfs @ 7.93 hrs, Volume= 0.018 af
Outflow = 0.06 cfs @ 7.94 hrs, Volume= 0.018 af, Atten= 0%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.82 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.03 fps, Avg. Travel Time= 0.6 min

Peak Storage= 1 cf @ 7.93 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 0.50', Capacity at Bank-Full= 0.56 cfs

6.0" Round Pipe
n= 0.013
Length= 39.1' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.39'





Summary for Pond 1P: Detention Pipe

Inflow Area = 0.573 ac, 80.10% Impervious, Inflow Depth > 1.84" for 2-YR STORM event
Inflow = 0.26 cfs @ 7.95 hrs, Volume= 0.088 af
Outflow = 0.04 cfs @ 15.13 hrs, Volume= 0.060 af, Atten= 85%, Lag= 430.5 min
Primary = 0.04 cfs @ 15.13 hrs, Volume= 0.060 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 2.32' @ 15.13 hrs Surf.Area= 798 sf Storage= 1,425 cf

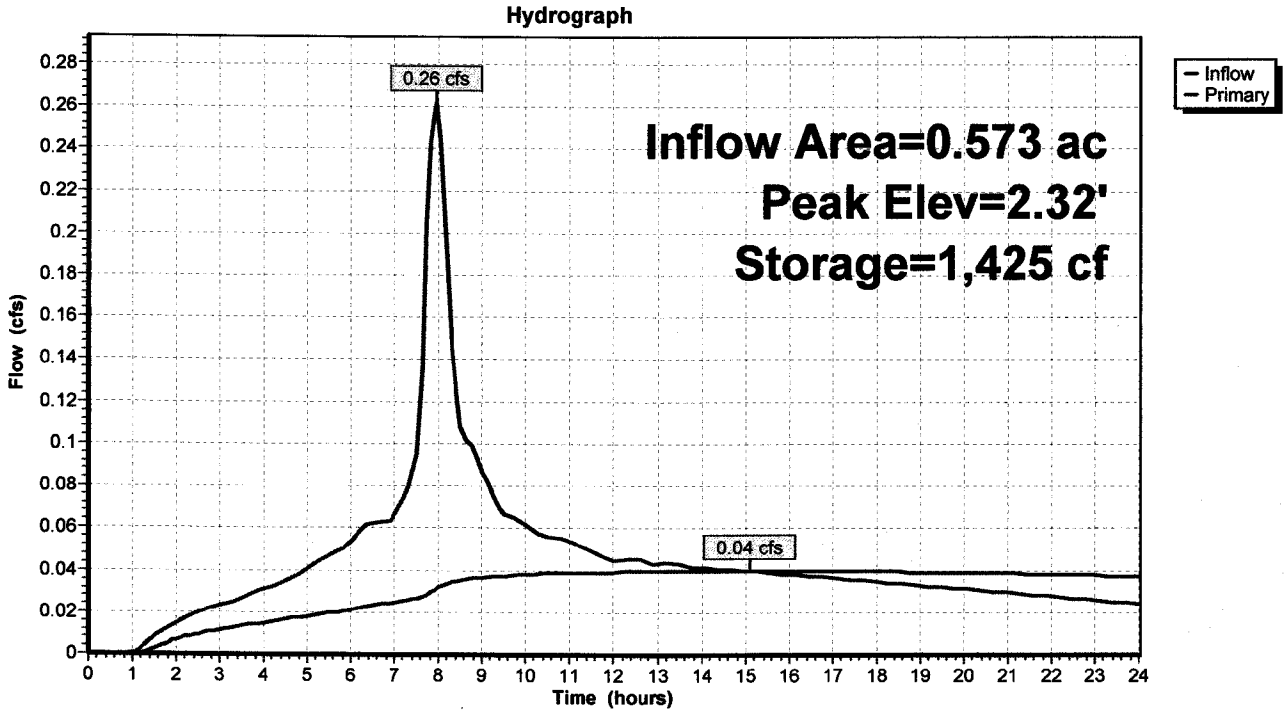
Plug-Flow detention time= 367.4 min calculated for 0.060 af (69% of inflow)
Center-of-Mass det. time= 175.4 min (865.8 - 690.3)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	3,142 cf	**60.0" D x 160.0'L Pipe Storage**

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**1.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	3.80'	**1.3" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.04 cfs @ 15.13 hrs HW=2.32' (Free Discharge)
1=Orifice/Grate (Orifice Controls 0.04 cfs @ 7.26 fps)
2=Orifice/Grate (Controls 0.00 cfs)

Pond 1P: Detention Pipe



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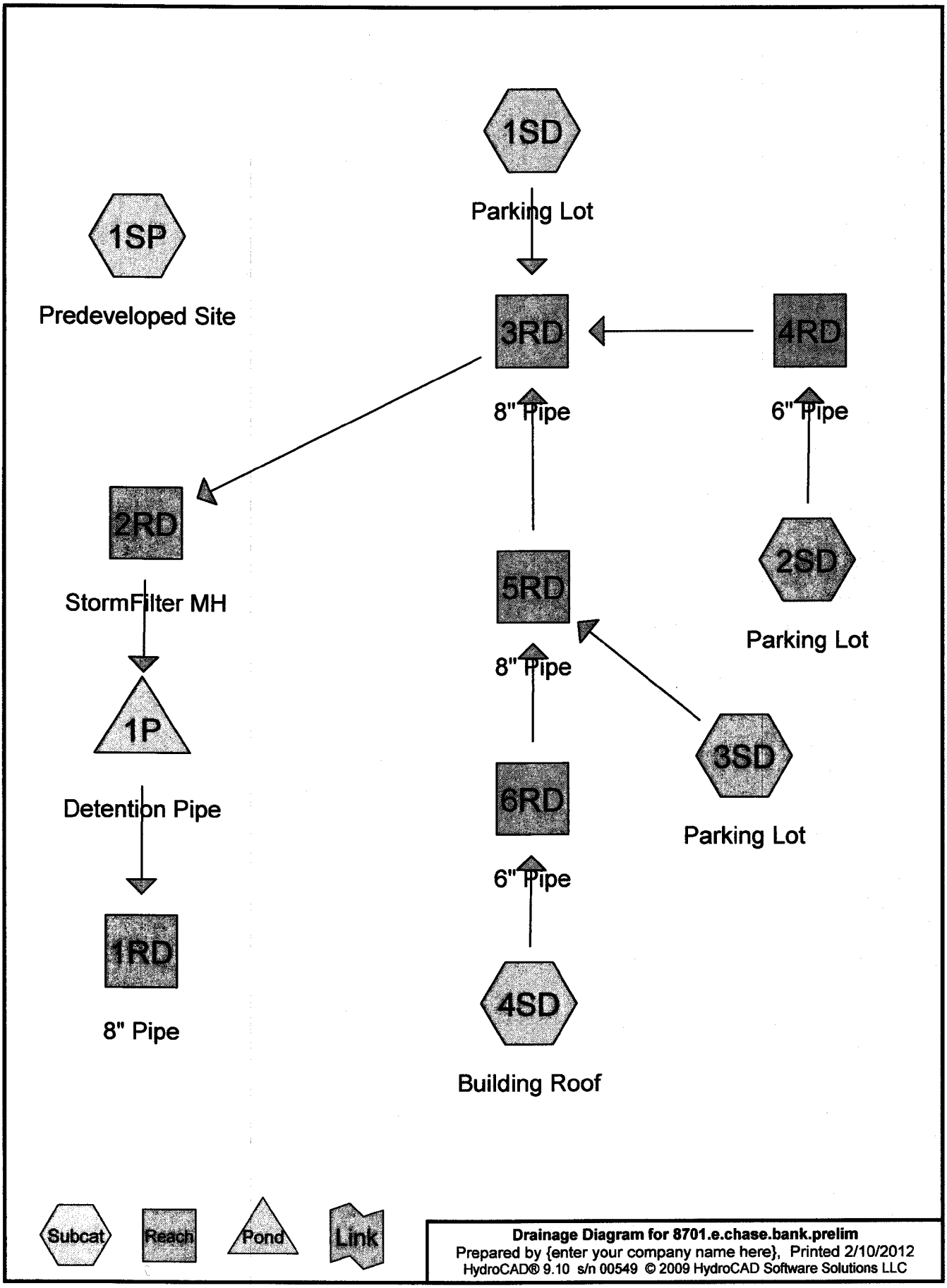


Drainage Diagram for 8701.e.chase.bank.prelim
Prepared by {enter your company name here}, Printed 2/10/2012
HydroCAD® 9.10 s/n 00549 © 2009 HydroCAD Software Solutions LLC

5-YEAR STORM (2.90")

Summary for Subcatchment 1SP: Predeveloped Site

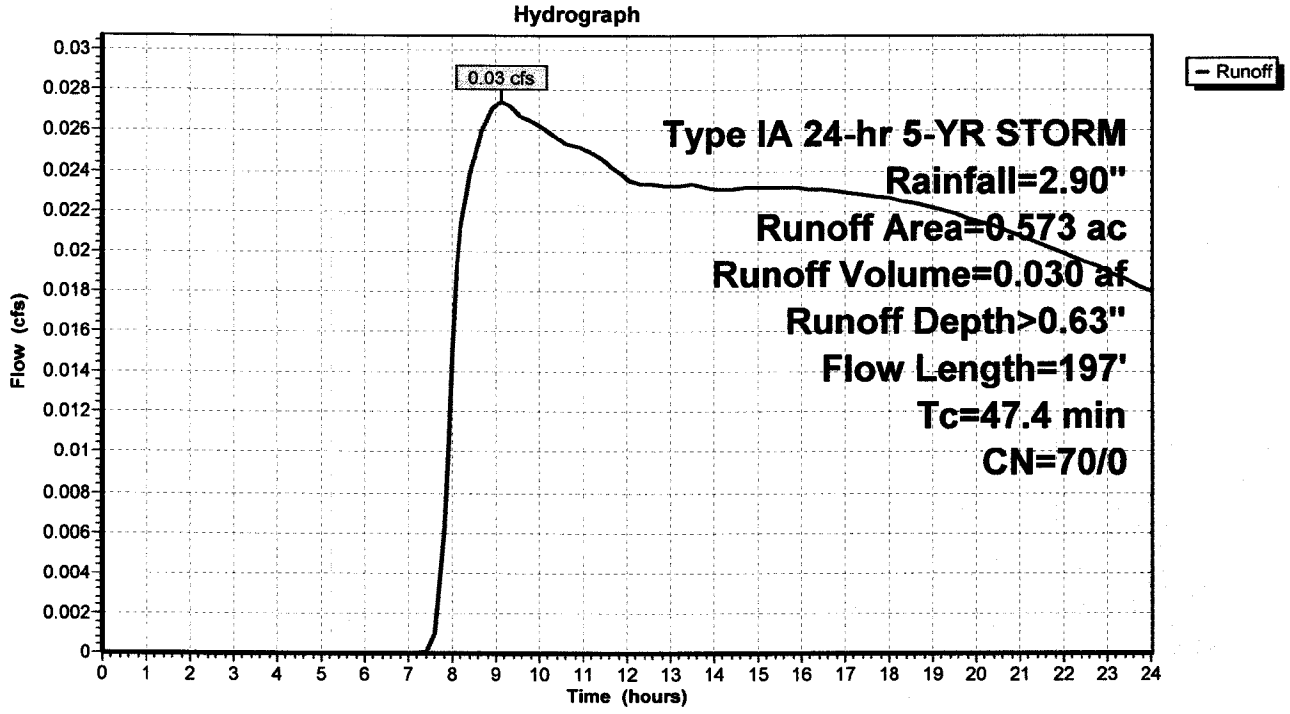
Runoff = 0.03 cfs @ 9.12 hrs, Volume= 0.030 af, Depth> 0.63"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type IA 24-hr 5-YR STORM Rainfall=2.90"

Area (ac)	CN	Description
0.573	70	Woods, Good, HSG C
0.573	70	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
47.1	167	0.0112	0.06		**Sheet Flow, Sheet Flow (Woods)** Woods: Light underbrush n= 0.400 P2= 2.40"
0.3	30	0.1122	1.67		**Shallow Concentrated Flow, Shallow Conc. Flow** Woodland Kv= 5.0 fps
47.4	197	Total			

Subcatchment 1SP: Predeveloped Site



Summary for Subcatchment 1SD: Parking Lot

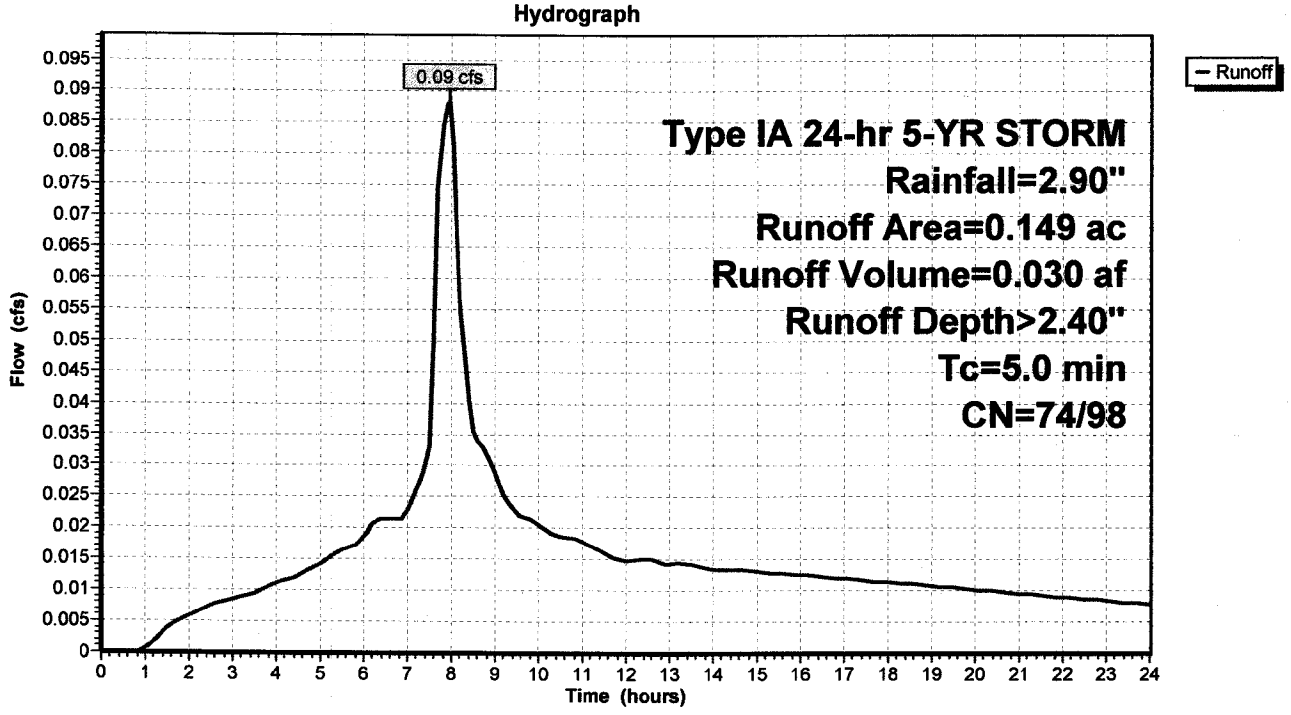
Runoff = 0.09 cfs @ 7.93 hrs, Volume= 0.030 af, Depth> 2.40"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type IA 24-hr 5-YR STORM Rainfall=2.90"

Area (ac)	CN	Description
0.127	98	Paved parking, HSG C
0.022	74	>75% Grass cover, Good, HSG C
0.149	94	Weighted Average
0.022	74	14.77% Pervious Area
0.127	98	85.23% Impervious Area

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

Subcatchment 1SD: Parking Lot



Summary for Subcatchment 2SD: Parking Lot

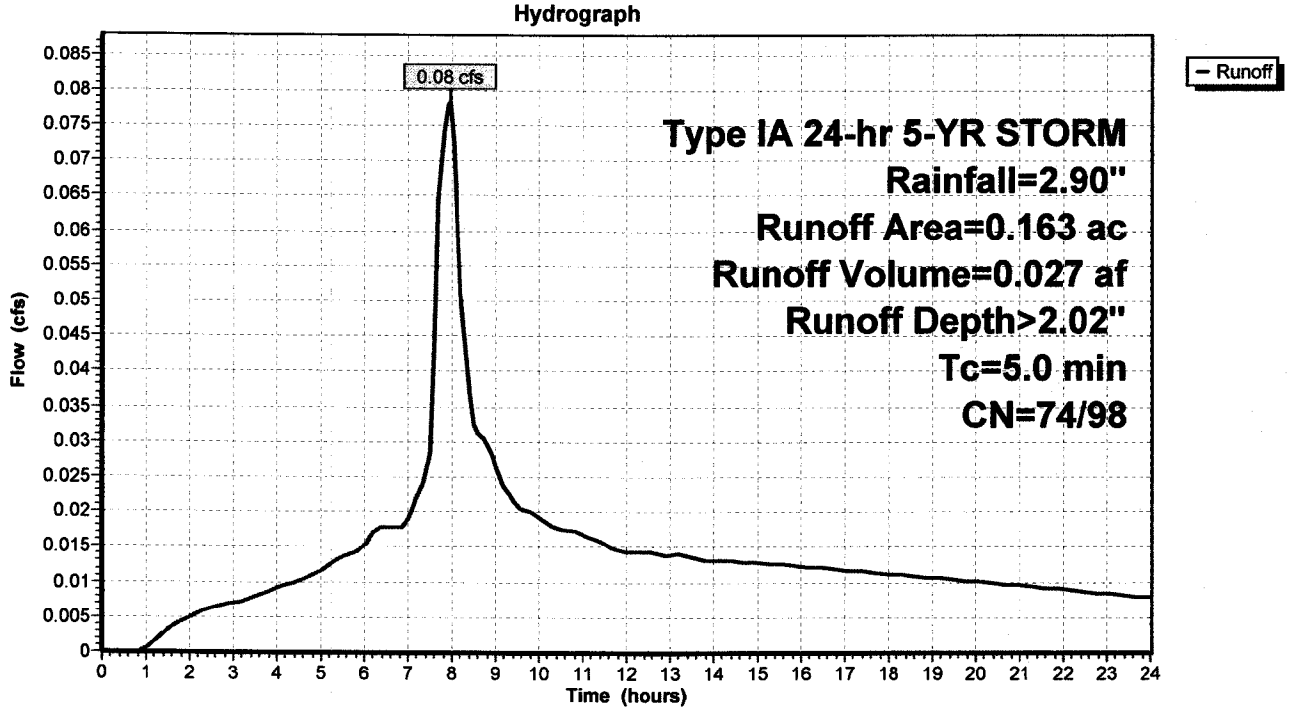
Runoff = 0.08 cfs @ 7.95 hrs, Volume= 0.027 af, Depth> 2.02"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type IA 24-hr 5-YR STORM Rainfall=2.90"

Area (ac)	CN	Description
0.105	98	Paved parking, HSG C
0.058	74	>75% Grass cover, Good, HSG C
0.163	89	Weighted Average
0.058	74	35.58% Pervious Area
0.105	98	64.42% Impervious Area

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

Subcatchment 2SD: Parking Lot



Summary for Subcatchment 3SD: Parking Lot

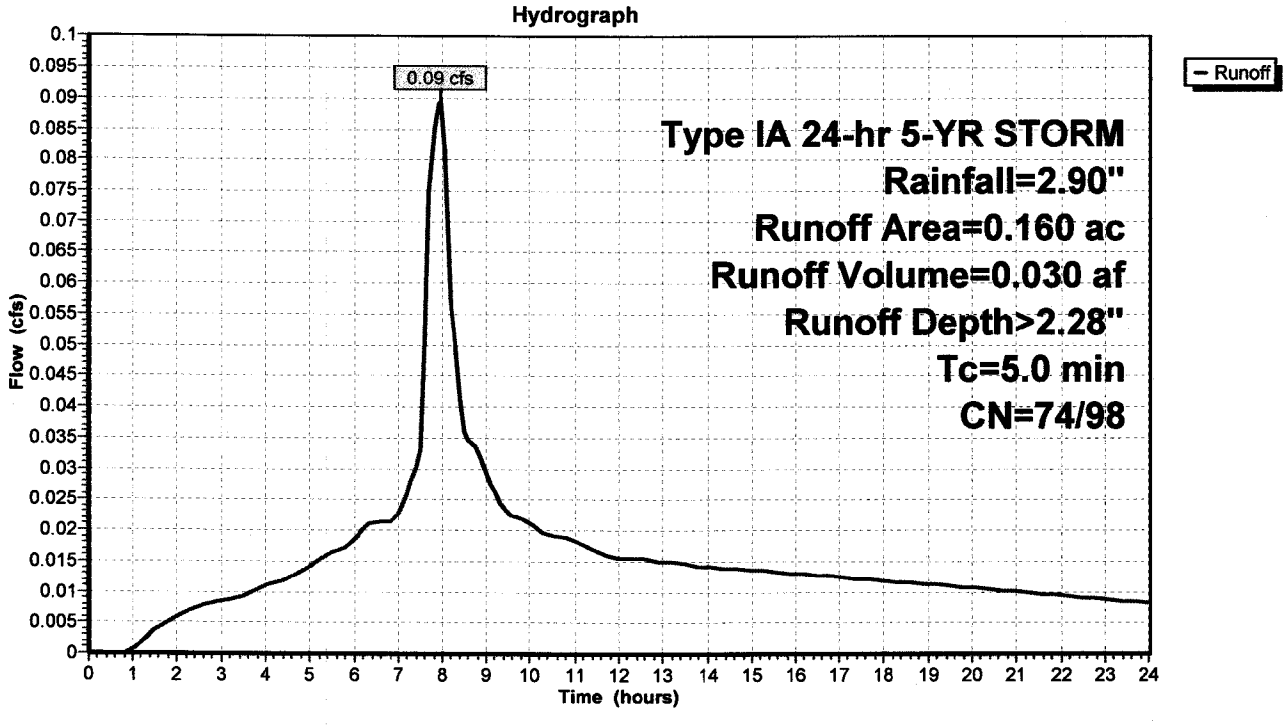
Runoff = 0.09 cfs @ 7.94 hrs, Volume= 0.030 af, Depth> 2.28"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type IA 24-hr 5-YR STORM Rainfall=2.90"

	Area (ac)	CN	Description
	0.110	98	Paved parking, HSG C
*	0.016	98	Sidewalk, HSG C
	0.034	74	>75% Grass cover, Good, HSG C
	0.160	93	Weighted Average
	0.034	74	21.25% Pervious Area
	0.126	98	78.75% Impervious Area

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

Subcatchment 3SD: Parking Lot



Summary for Subcatchment 4SD: Building Roof

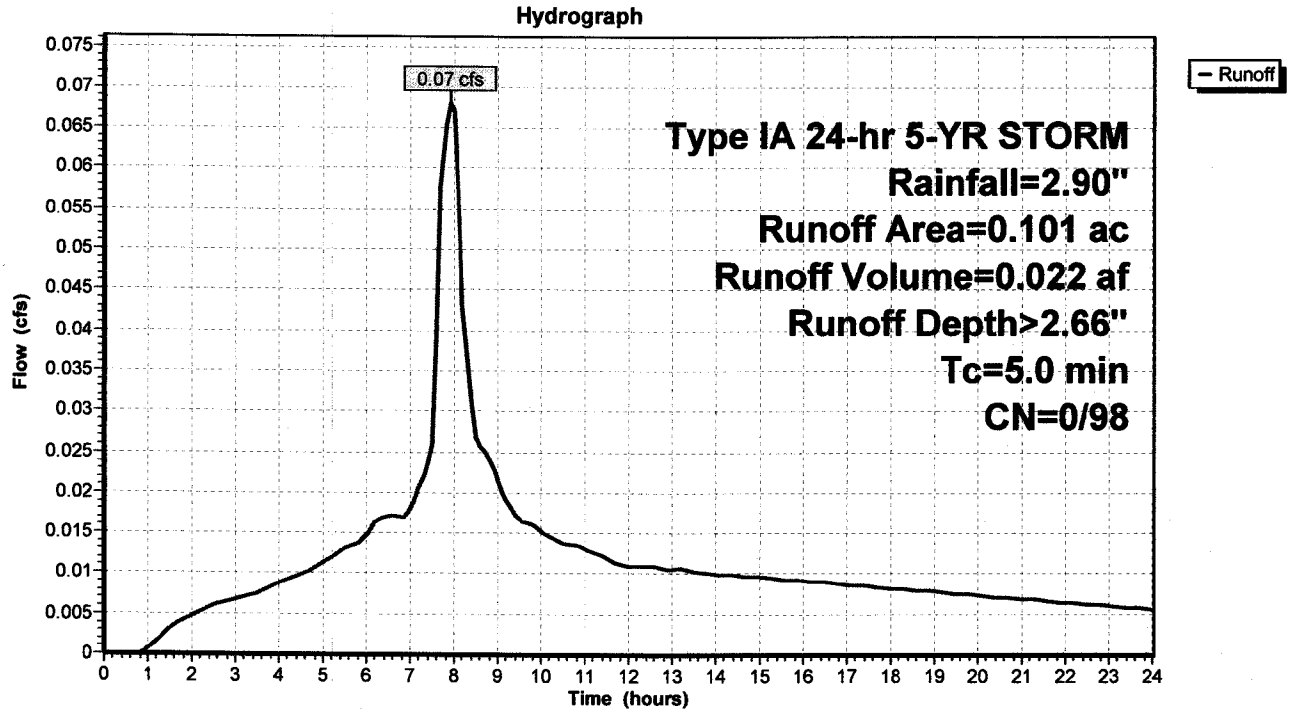
Runoff = 0.07 cfs @ 7.92 hrs, Volume= 0.022 af, Depth> 2.66"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type IA 24-hr 5-YR STORM Rainfall=2.90"

Area (ac)	CN	Description
0.101	98	Roofs, HSG C
0.101	98	100.00% Impervious Area

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

Subcatchment 4SD: Building Roof



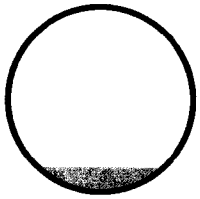
Summary for Reach 1RD: 8" Pipe

Inflow Area = 0.573 ac, 80.10% Impervious, Inflow Depth > 1.45" for 5-YR STORM event
Inflow = 0.05 cfs @ 16.93 hrs, Volume= 0.069 af
Outflow = 0.05 cfs @ 16.96 hrs, Volume= 0.069 af, Atten= 0%, Lag= 1.6 min

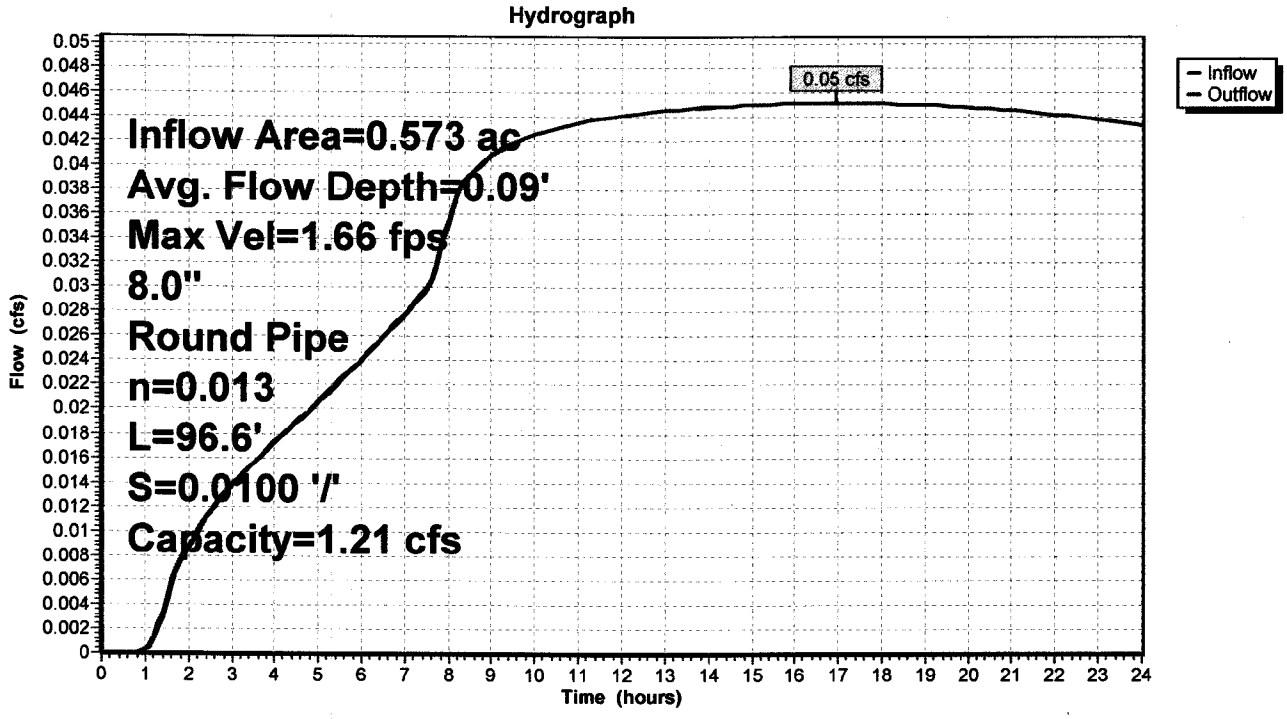
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.66 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.51 fps, Avg. Travel Time= 1.1 min

Peak Storage= 3 cf @ 16.94 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 1.21 cfs

8.0" Round Pipe
n= 0.013
Length= 96.6' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.97'



Reach 1RD: 8" Pipe

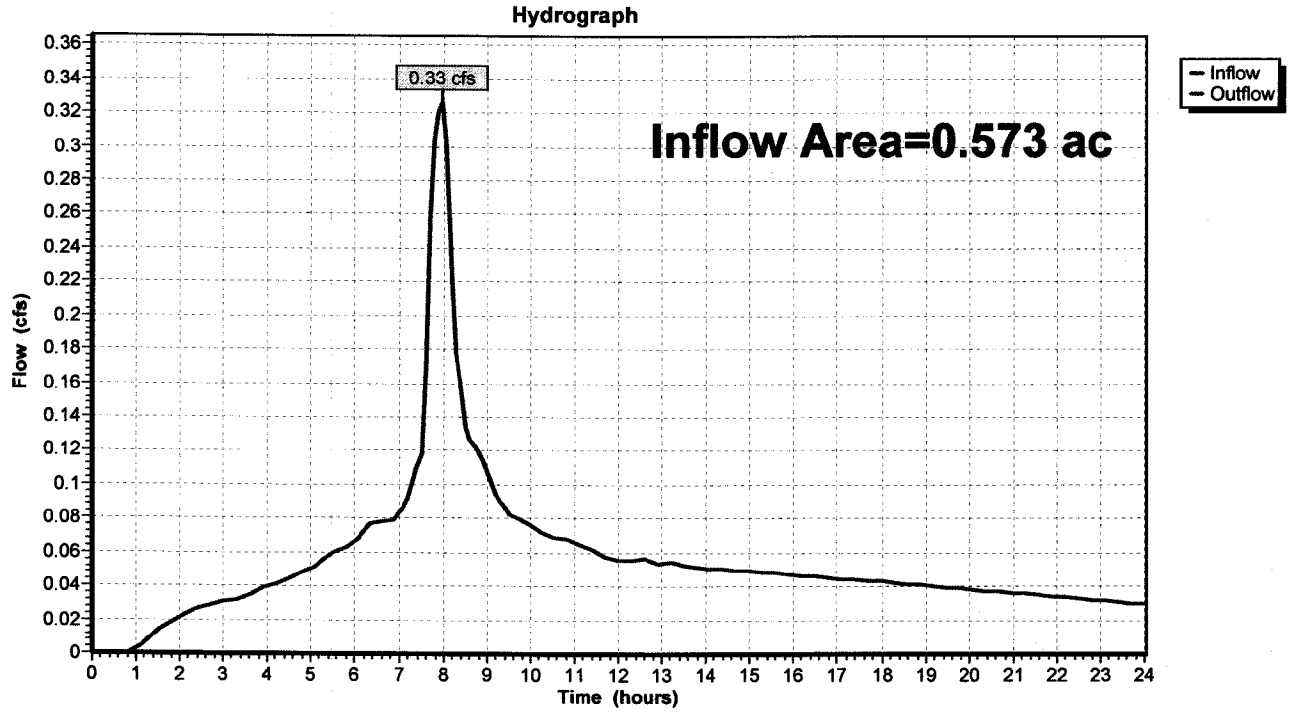


Summary for Reach 2RD: StormFilter MH

Inflow Area = 0.573 ac, 80.10% Impervious, Inflow Depth > 2.30" for 5-YR STORM event
Inflow = 0.33 cfs @ 7.95 hrs, Volume= 0.110 af
Outflow = 0.33 cfs @ 7.95 hrs, Volume= 0.110 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach 2RD: StormFilter MH



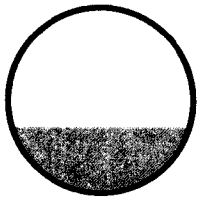
Summary for Reach 3RD: 8" Pipe

Inflow Area = 0.573 ac, 80.10% Impervious, Inflow Depth > 2.30" for 5-YR STORM event
Inflow = 0.33 cfs @ 7.95 hrs, Volume= 0.110 af
Outflow = 0.33 cfs @ 7.95 hrs, Volume= 0.110 af, Atten= 0%, Lag= 0.1 min

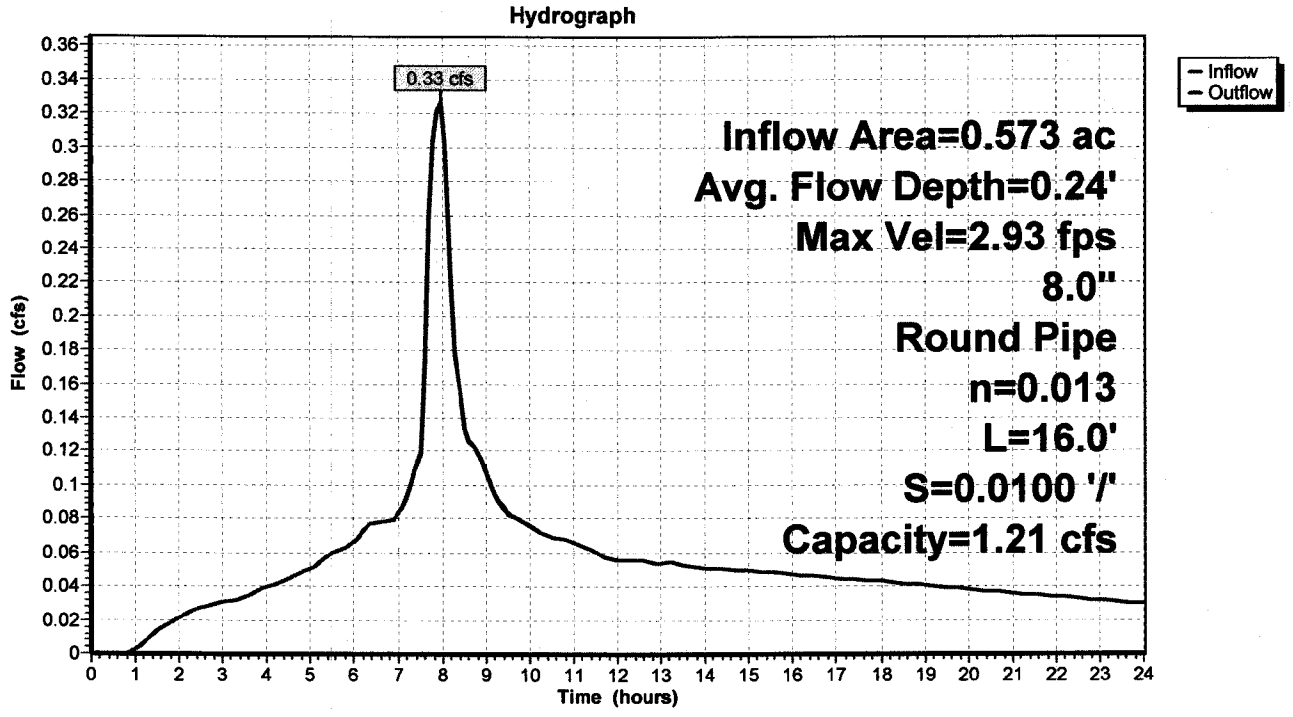
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.93 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.70 fps, Avg. Travel Time= 0.2 min

Peak Storage= 2 cf @ 7.95 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 1.21 cfs

8.0" Round Pipe
n= 0.013
Length= 16.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.16'



Reach 3RD: 8" Pipe



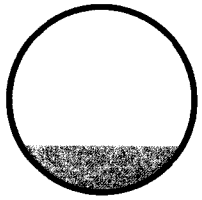
Summary for Reach 4RD: 6" Pipe

Inflow Area = 0.163 ac, 64.42% Impervious, Inflow Depth > 2.02" for 5-YR STORM event
Inflow = 0.08 cfs @ 7.95 hrs, Volume= 0.027 af
Outflow = 0.08 cfs @ 7.96 hrs, Volume= 0.027 af, Atten= 0%, Lag= 0.8 min

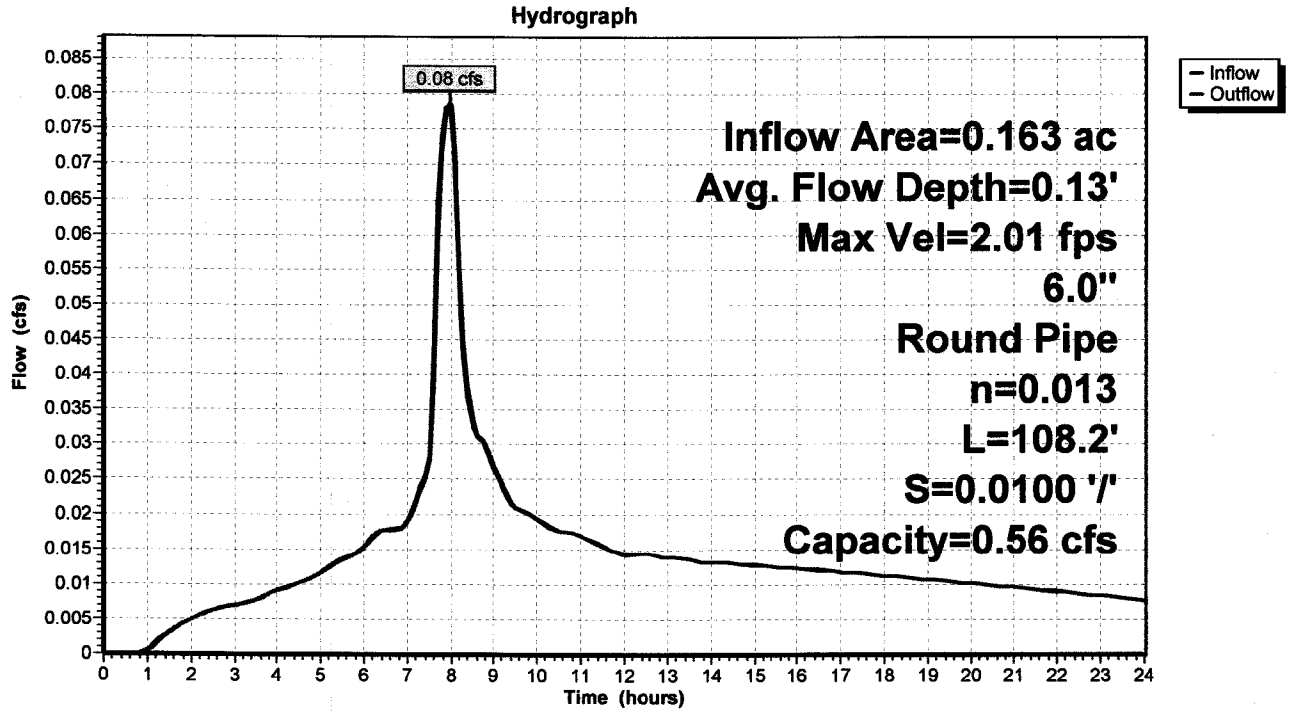
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.01 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.17 fps, Avg. Travel Time= 1.5 min

Peak Storage= 4 cf @ 7.96 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 0.50', Capacity at Bank-Full= 0.56 cfs

6.0" Round Pipe
n= 0.013
Length= 108.2' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -1.08'



Reach 4RD: 6" Pipe



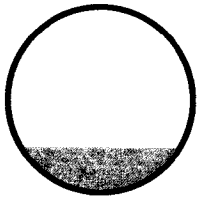
Summary for Reach 5RD: 8" Pipe

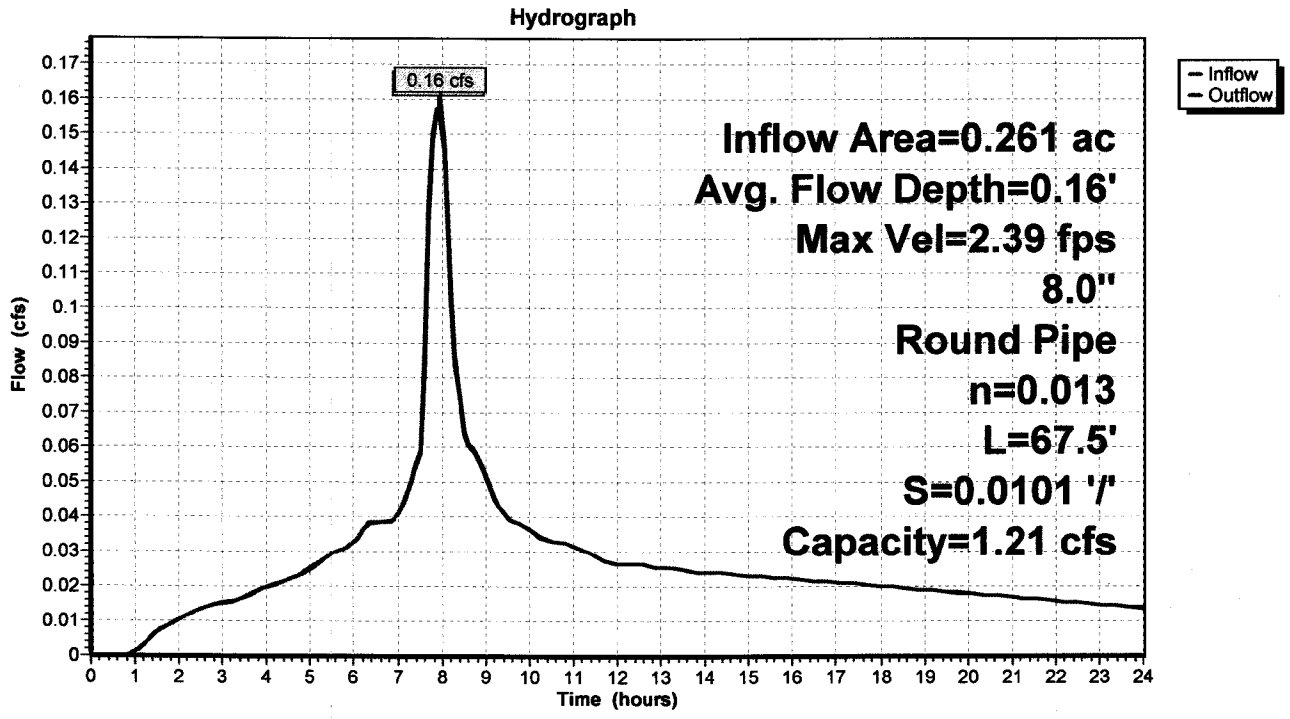
Inflow Area = 0.261 ac, 86.97% Impervious, Inflow Depth > 2.43" for 5-YR STORM event
Inflow = 0.16 cfs @ 7.94 hrs, Volume= 0.053 af
Outflow = 0.16 cfs @ 7.95 hrs, Volume= 0.053 af, Atten= 0%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.39 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.37 fps, Avg. Travel Time= 0.8 min

Peak Storage= 4 cf @ 7.95 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 1.21 cfs

8.0" Round Pipe
n= 0.013
Length= 67.5' Slope= 0.0101 '/'
Inlet Invert= 0.00', Outlet Invert= -0.68'





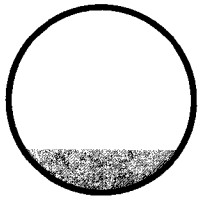
Summary for Reach 6RD: 6" Pipe

Inflow Area = 0.101 ac,100.00% Impervious, Inflow Depth > 2.66" for 5-YR STORM event
Inflow = 0.07 cfs @ 7.92 hrs, Volume= 0.022 af
Outflow = 0.07 cfs @ 7.93 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.6 min

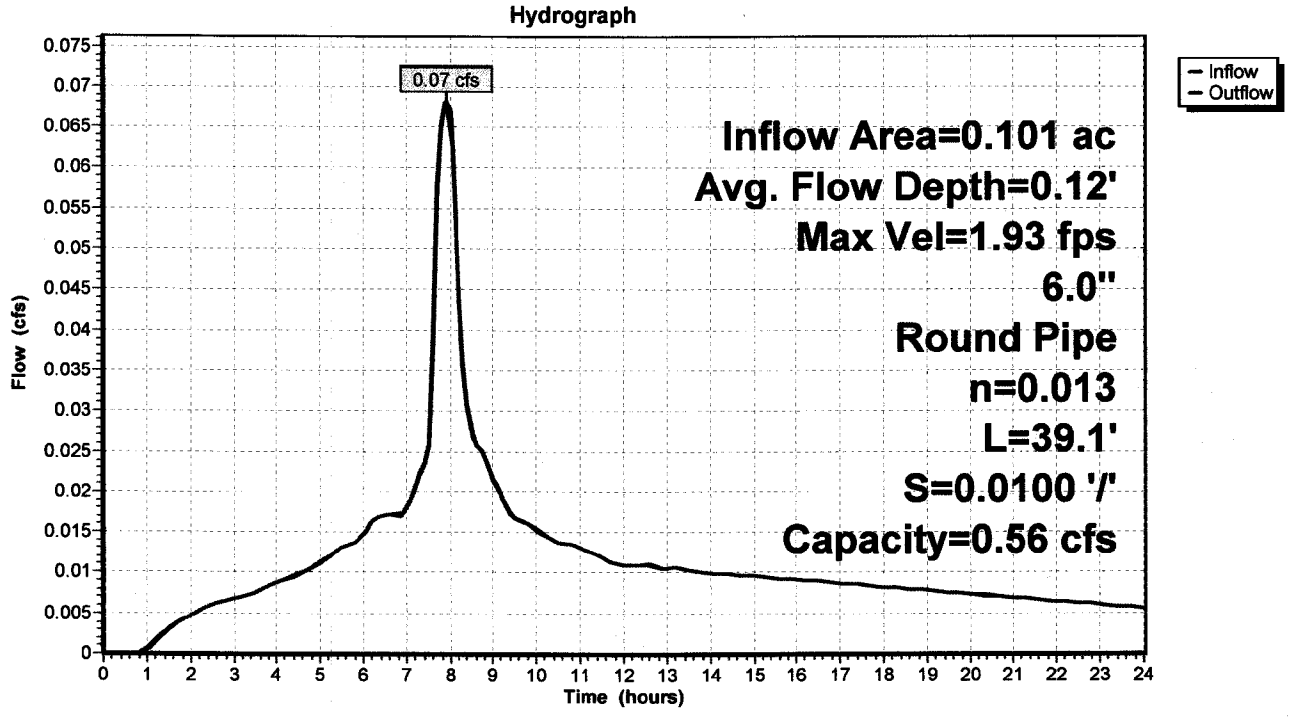
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.93 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.10 fps, Avg. Travel Time= 0.6 min

Peak Storage= 1 cf @ 7.93 hrs
Average Depth at Peak Storage= 0.12'
Bank-Full Depth= 0.50', Capacity at Bank-Full= 0.56 cfs

6.0" Round Pipe
n= 0.013
Length= 39.1' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.39'



Reach 6RD: 6" Pipe



Summary for Pond 1P: Detention Pipe

Inflow Area = 0.573 ac, 80.10% Impervious, Inflow Depth > 2.30" for 5-YR STORM event
Inflow = 0.33 cfs @ 7.95 hrs, Volume= 0.110 af
Outflow = 0.05 cfs @ 16.93 hrs, Volume= 0.069 af, Atten= 86%, Lag= 538.7 min
Primary = 0.05 cfs @ 16.93 hrs, Volume= 0.069 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 2.99' @ 16.93 hrs Surf.Area= 784 sf Storage= 1,963 cf

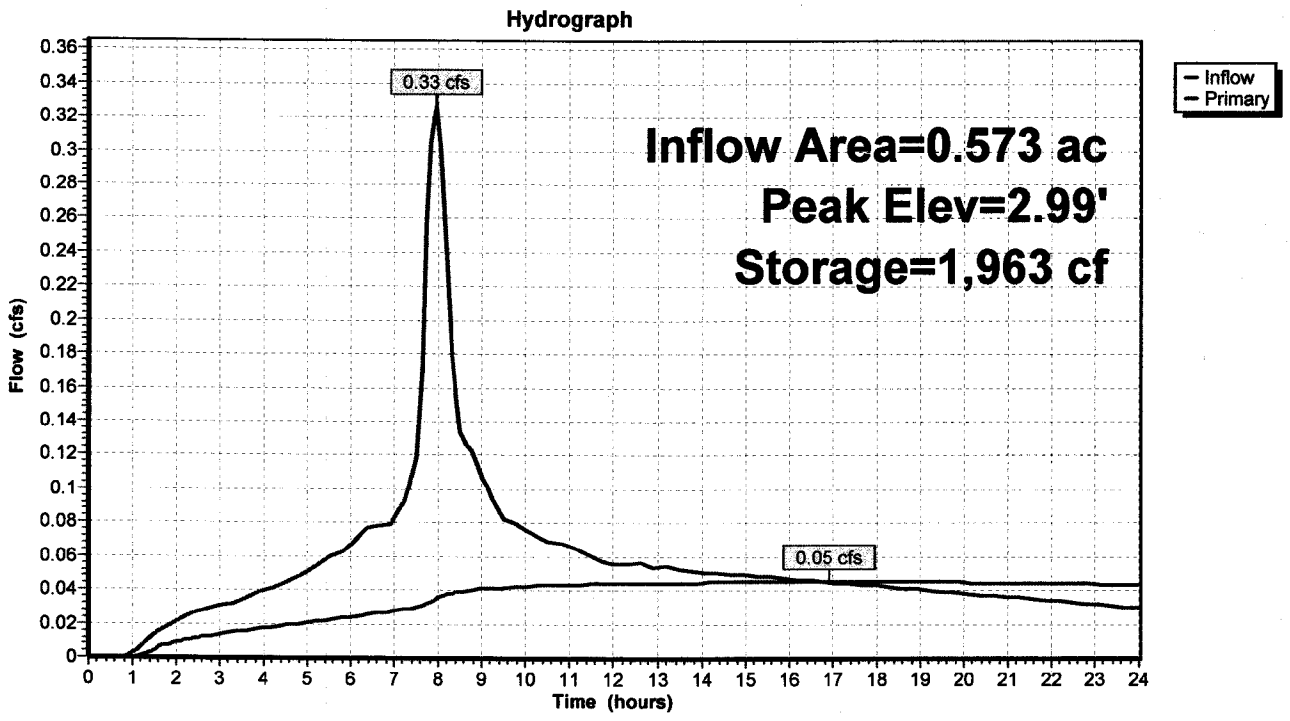
Plug-Flow detention time= 400.8 min calculated for 0.069 af (63% of inflow)
Center-of-Mass det. time= 181.3 min (866.9 - 685.7)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	3,142 cf	**60.0" D x 160.0'L Pipe Storage**

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**1.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	3.80'	**1.3" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.05 cfs @ 16.93 hrs HW=2.99' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.05 cfs @ 8.27 fps)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: Detention Pipe



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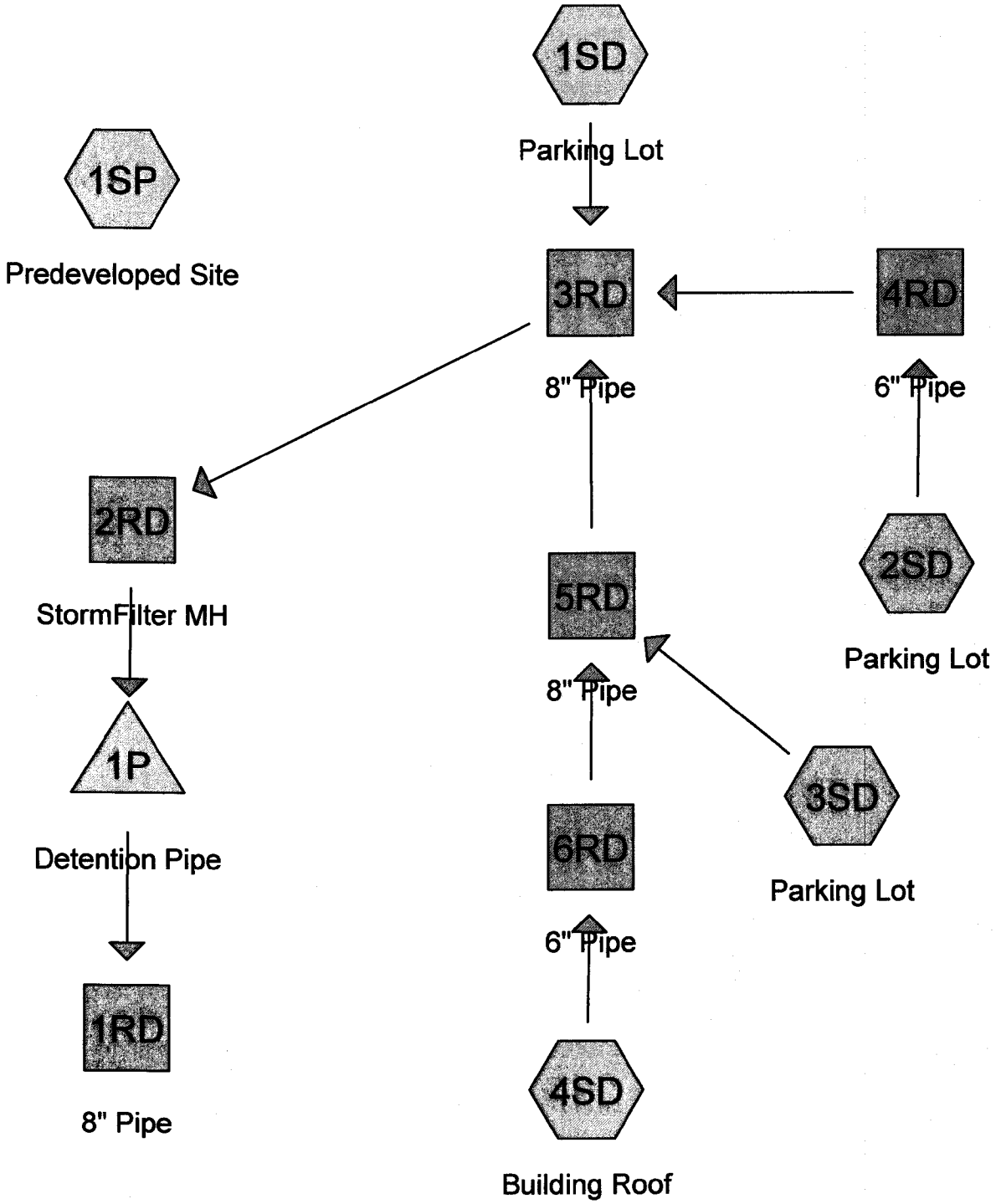


Subcat Reach Pond Link

Drainage Diagram for 8701.e.chase.bank.prelim
Prepared by {enter your company name here}, Printed 2/10/2012
HydroCAD® 9.10 s/n 00549 © 2009 HydroCAD Software Solutions LLC

10-YEAR STORM (3.40")

Summary for Subcatchment 1SP: Predeveloped Site

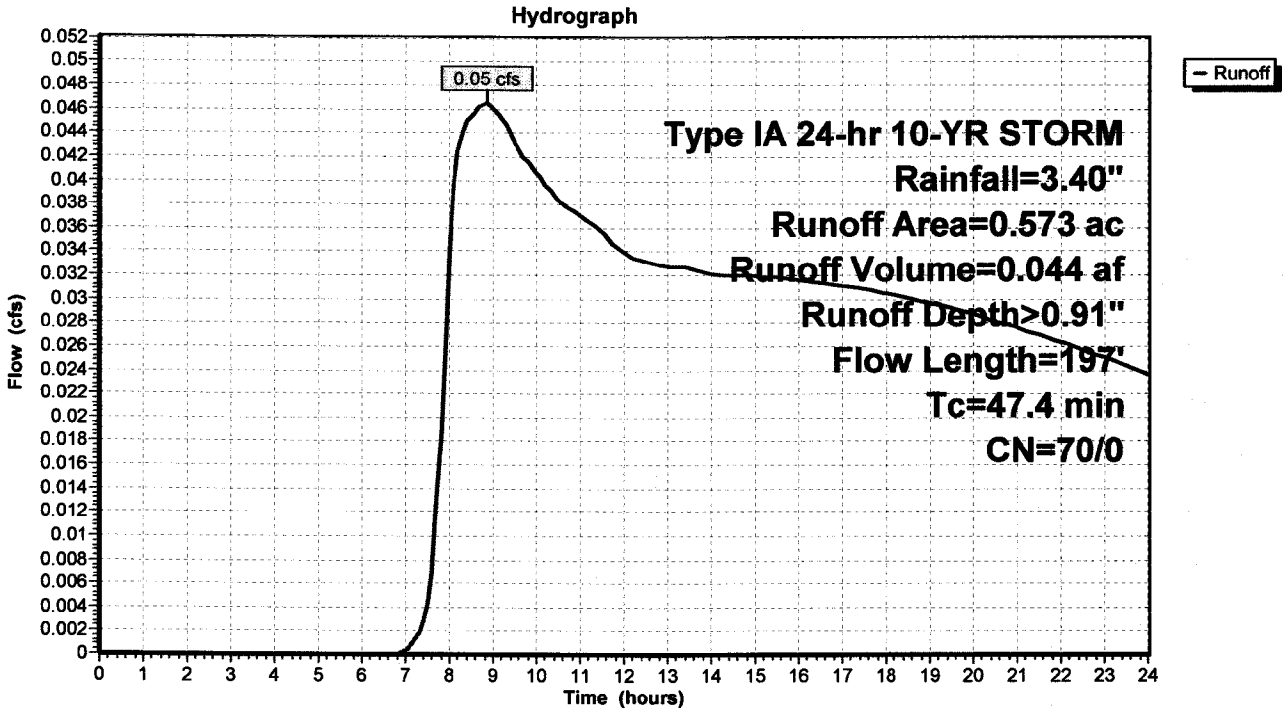
Runoff = 0.05 cfs @ 8.85 hrs, Volume= 0.044 af, Depth> 0.91"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type IA 24-hr 10-YR STORM Rainfall=3.40"

Area (ac)	CN	Description
0.573	70	Woods, Good, HSG C
0.573	70	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
47.1	167	0.0112	0.06		**Sheet Flow, Sheet Flow (Woods)** Woods: Light underbrush n= 0.400 P2= 2.40"
0.3	30	0.1122	1.67		**Shallow Concentrated Flow, Shallow Conc. Flow** Woodland Kv= 5.0 fps
47.4	197	Total			

Subcatchment 1SP: Predeveloped Site



Summary for Subcatchment 1SD: Parking Lot

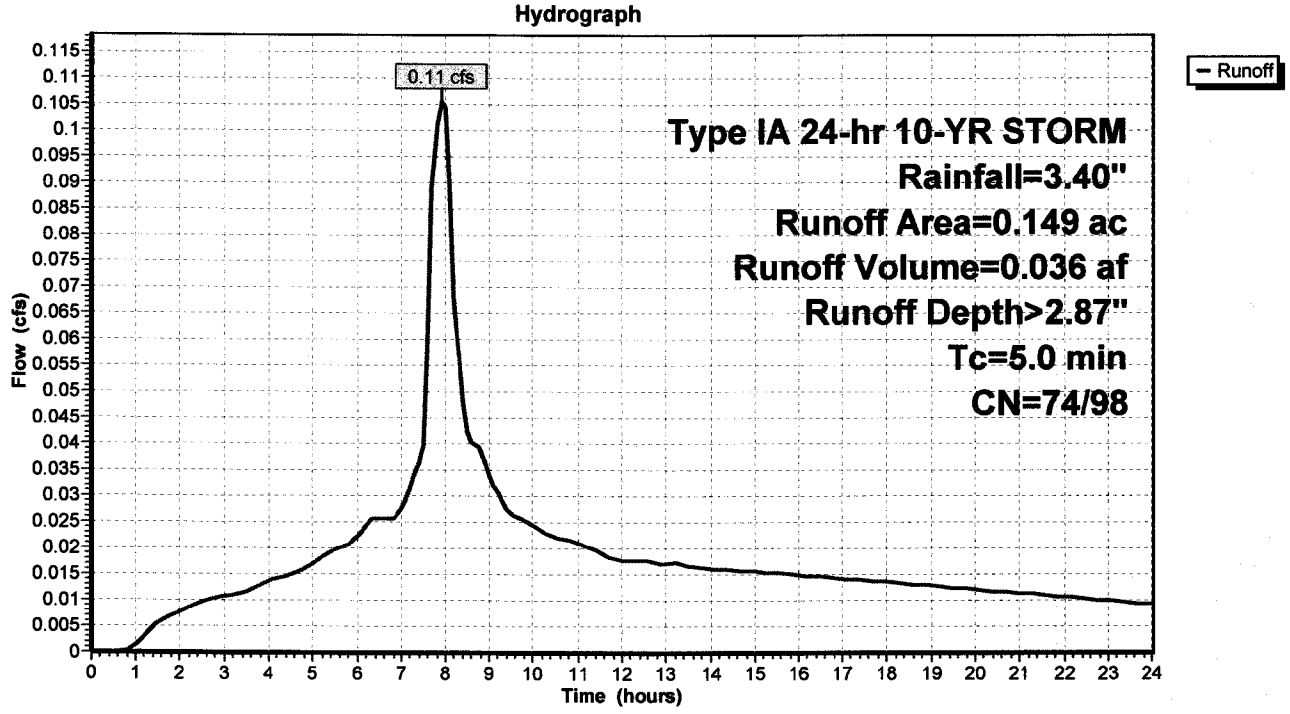
Runoff = 0.11 cfs @ 7.93 hrs, Volume= 0.036 af, Depth> 2.87"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type IA 24-hr 10-YR STORM Rainfall=3.40"

Area (ac)	CN	Description
0.127	98	Paved parking, HSG C
0.022	74	>75% Grass cover, Good, HSG C
0.149	94	Weighted Average
0.022	74	14.77% Pervious Area
0.127	98	85.23% Impervious Area

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

Subcatchment 1SD: Parking Lot



Summary for Subcatchment 2SD: Parking Lot

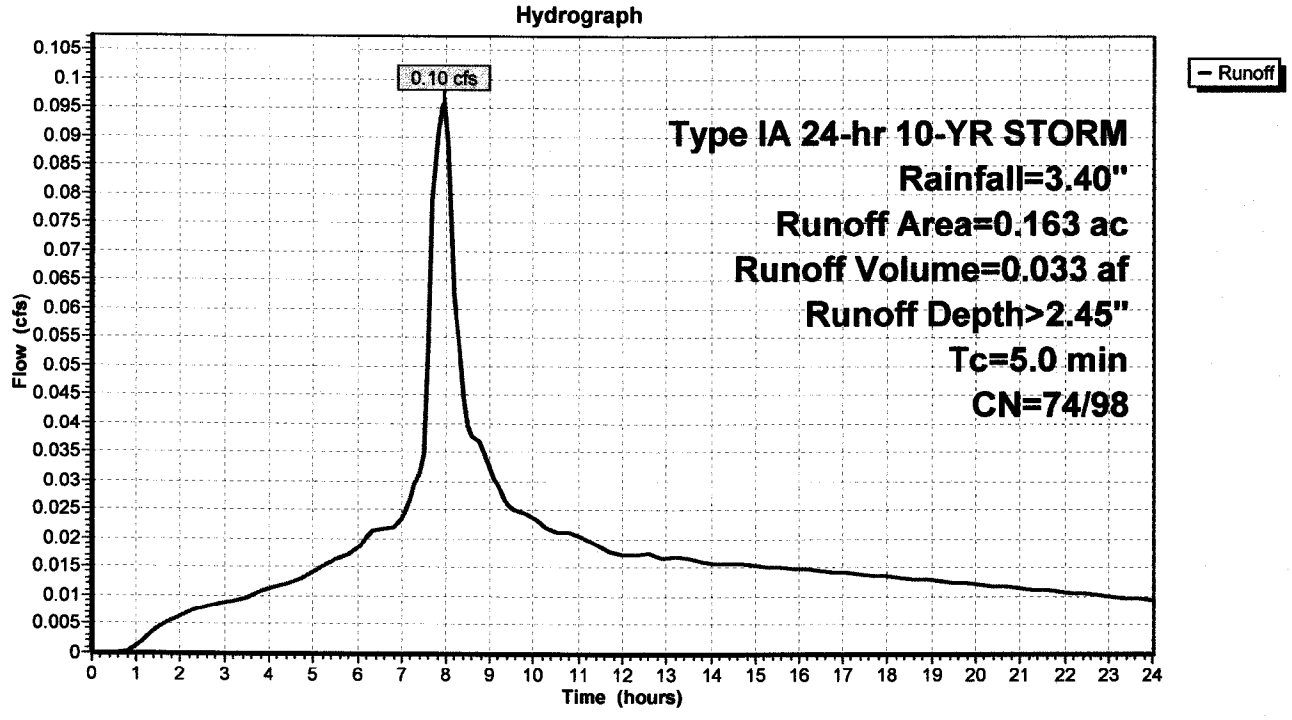
Runoff = 0.10 cfs @ 7.95 hrs, Volume= 0.033 af, Depth> 2.45"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type IA 24-hr 10-YR STORM Rainfall=3.40"

Area (ac)	CN	Description
0.105	98	Paved parking, HSG C
0.058	74	>75% Grass cover, Good, HSG C
0.163	89	Weighted Average
0.058	74	35.58% Pervious Area
0.105	98	64.42% Impervious Area

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

Subcatchment 2SD: Parking Lot



Summary for Subcatchment 3SD: Parking Lot

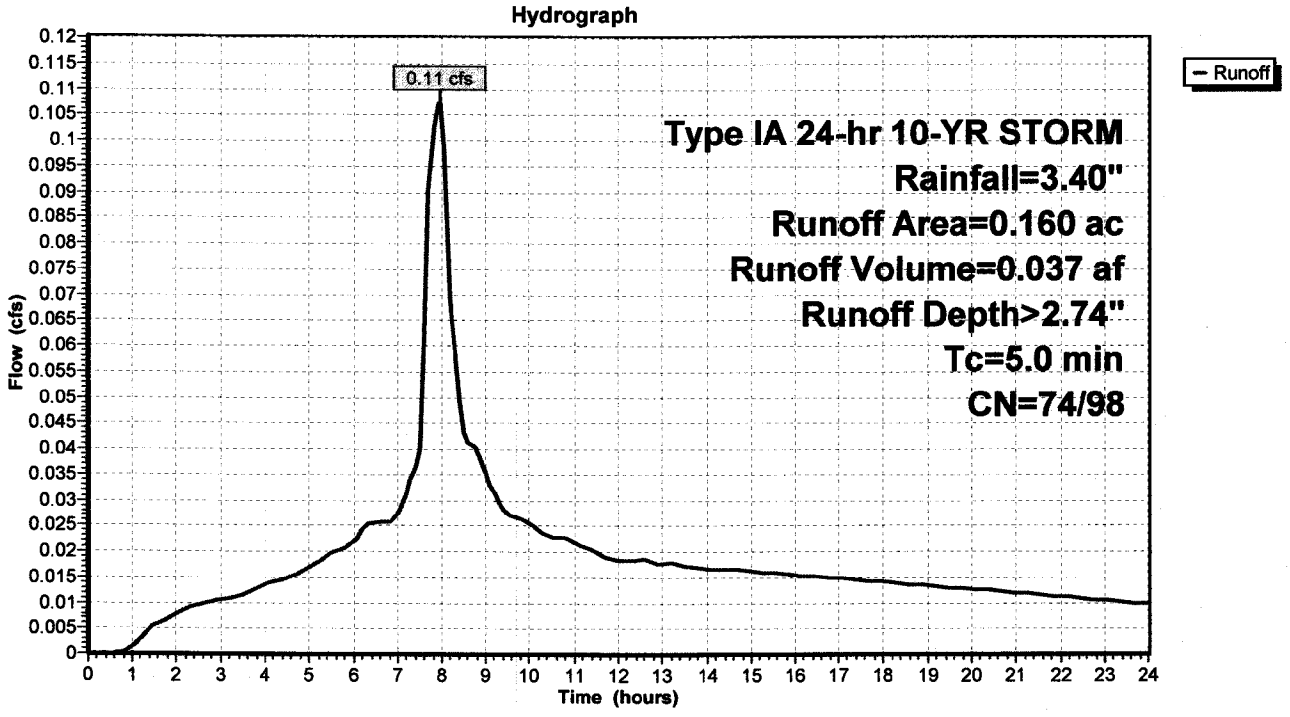
Runoff = 0.11 cfs @ 7.94 hrs, Volume= 0.037 af, Depth> 2.74"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type IA 24-hr 10-YR STORM Rainfall=3.40"

	Area (ac)	CN	Description
	0.110	98	Paved parking, HSG C
*	0.016	98	Sidewalk, HSG C
	0.034	74	>75% Grass cover, Good, HSG C
	0.160	93	Weighted Average
	0.034	74	21.25% Pervious Area
	0.126	98	78.75% Impervious Area

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

Subcatchment 3SD: Parking Lot



Summary for Subcatchment 4SD: Building Roof

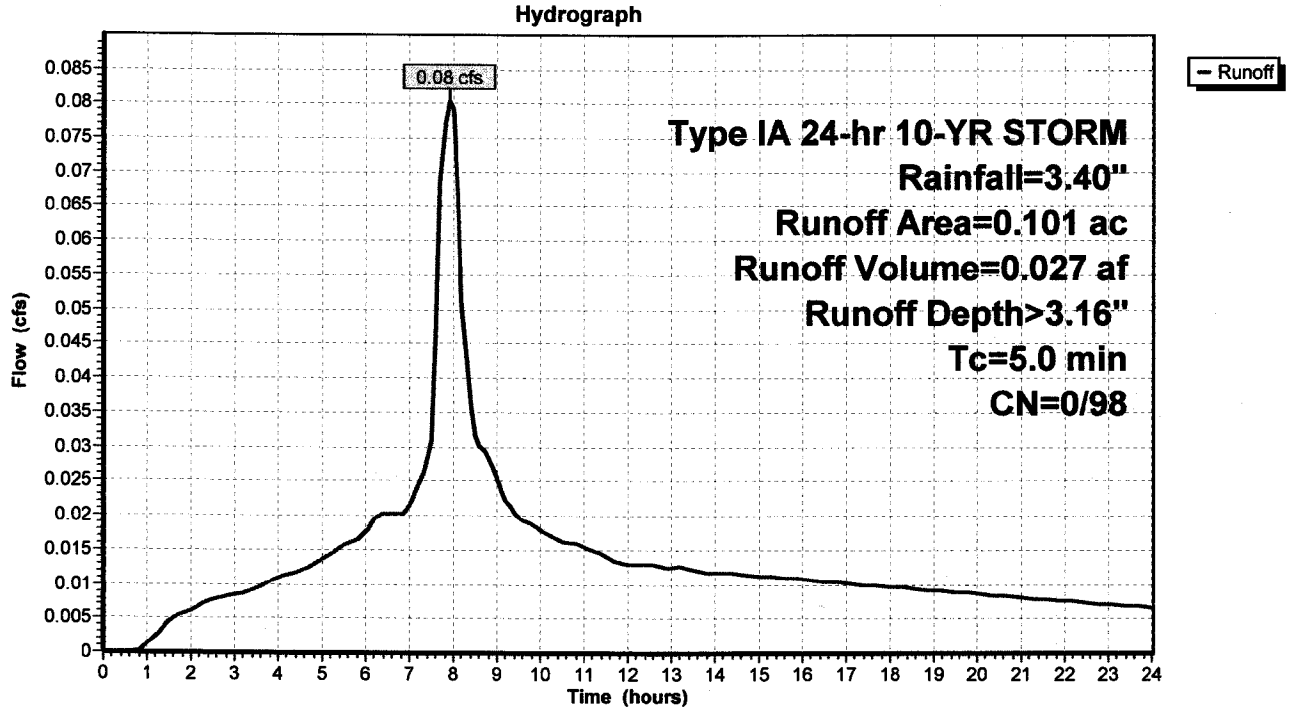
Runoff = 0.08 cfs @ 7.92 hrs, Volume= 0.027 af, Depth> 3.16"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type IA 24-hr 10-YR STORM Rainfall=3.40"

Area (ac)	CN	Description
0.101	98	Roofs, HSG C
0.101	98	100.00% Impervious Area

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

Subcatchment 4SD: Building Roof



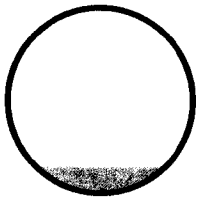
Summary for Reach 1RD: 8" Pipe

Inflow Area = 0.573 ac, 80.10% Impervious, Inflow Depth > 1.62" for 10-YR STORM event
Inflow = 0.05 cfs @ 18.10 hrs, Volume= 0.077 af
Outflow = 0.05 cfs @ 18.12 hrs, Volume= 0.077 af, Atten= 0%, Lag= 1.6 min

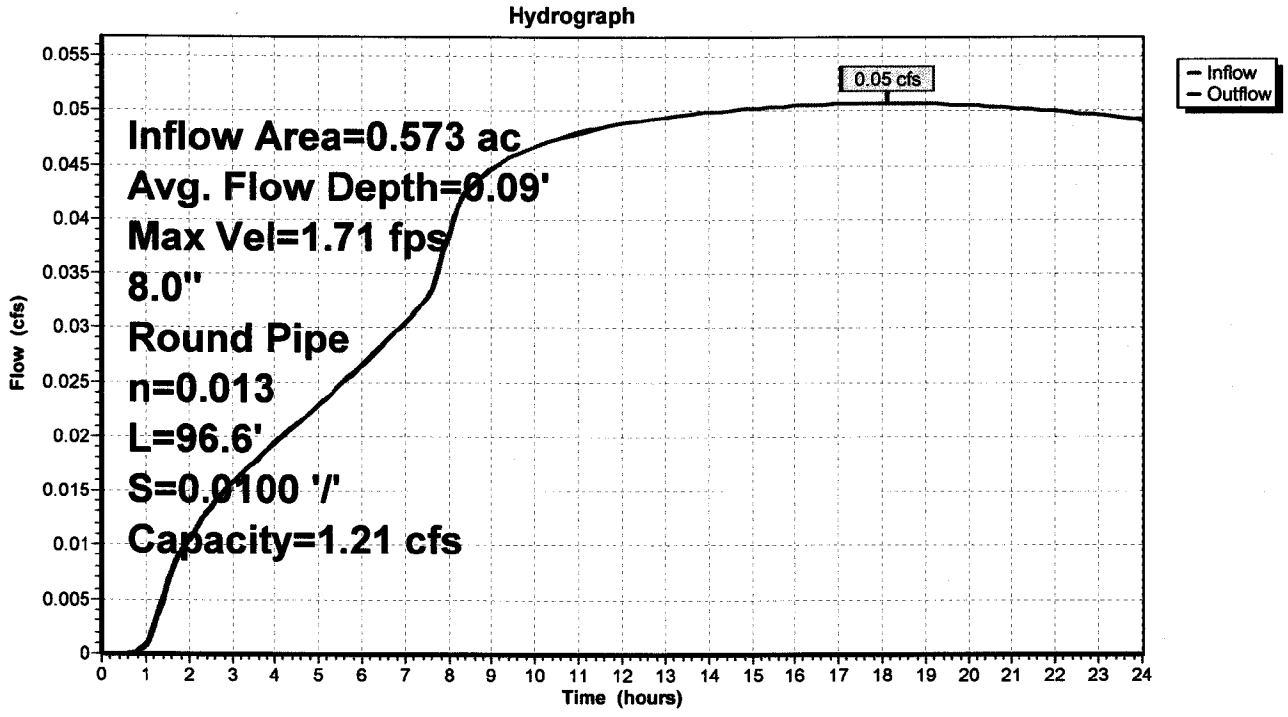
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.71 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.56 fps, Avg. Travel Time= 1.0 min

Peak Storage= 3 cf @ 18.11 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 1.21 cfs

8.0" Round Pipe
n= 0.013
Length= 96.6' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.97'



Reach 1RD: 8" Pipe

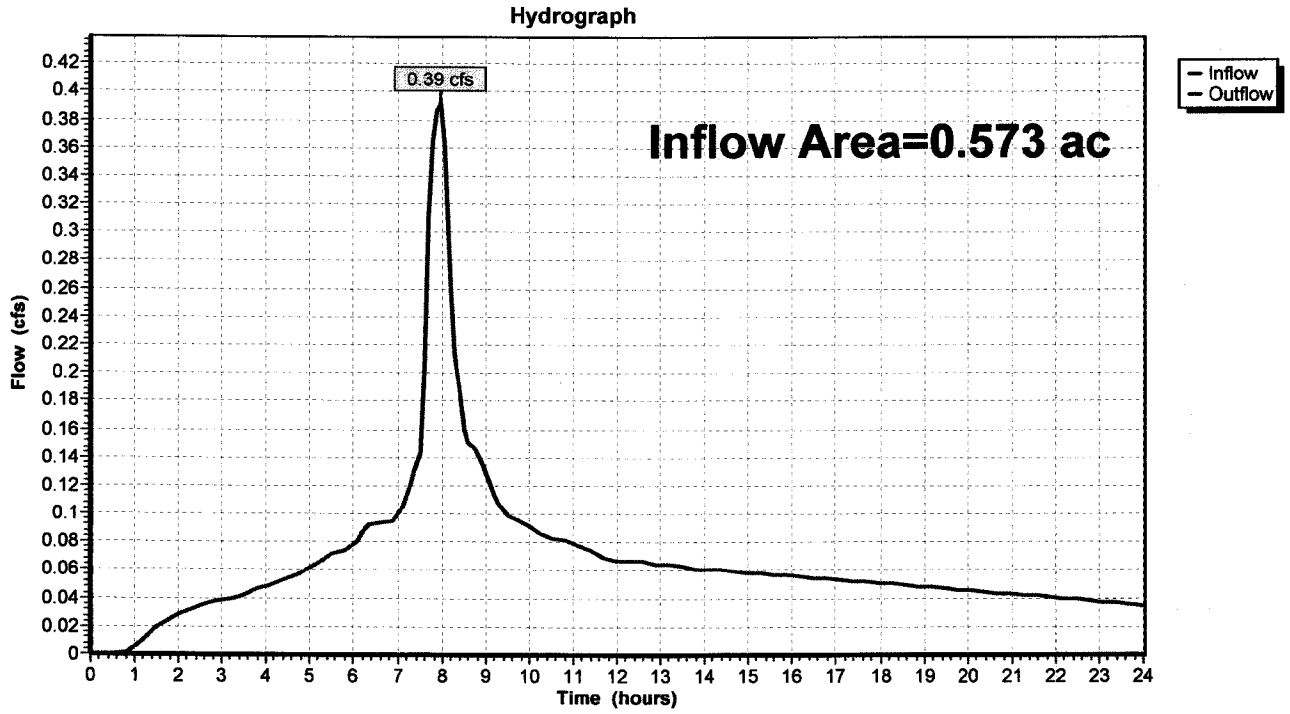


Summary for Reach 2RD: StormFilter MH

Inflow Area = 0.573 ac, 80.10% Impervious, Inflow Depth > 2.76" for 10-YR STORM event
Inflow = 0.39 cfs @ 7.95 hrs, Volume= 0.132 af
Outflow = 0.39 cfs @ 7.95 hrs, Volume= 0.132 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach 2RD: StormFilter MH



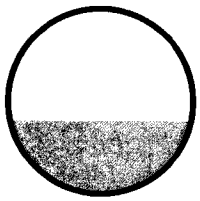
Summary for Reach 3RD: 8" Pipe

Inflow Area = 0.573 ac, 80.10% Impervious, Inflow Depth > 2.76" for 10-YR STORM event
Inflow = 0.39 cfs @ 7.95 hrs, Volume= 0.132 af
Outflow = 0.39 cfs @ 7.95 hrs, Volume= 0.132 af, Atten= 0%, Lag= 0.1 min

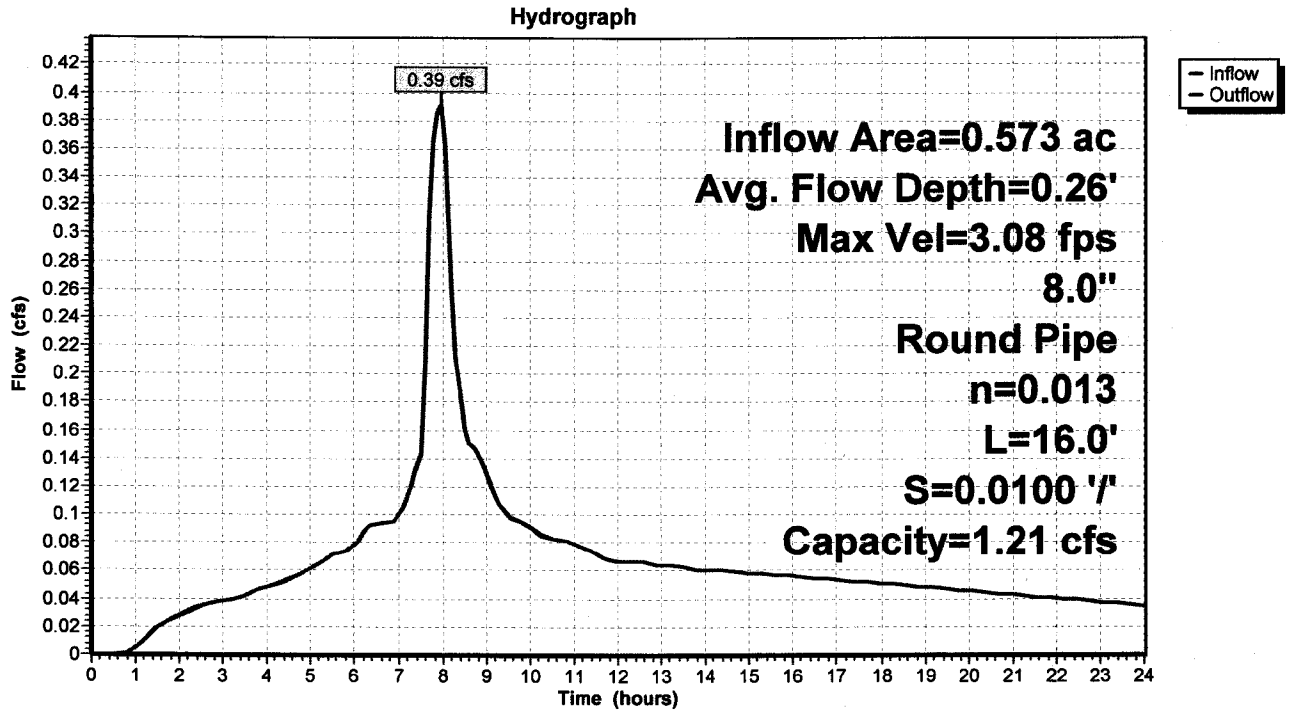
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 3.08 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.79 fps, Avg. Travel Time= 0.1 min

Peak Storage= 2 cf @ 7.95 hrs
Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 1.21 cfs

8.0" Round Pipe
n= 0.013
Length= 16.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.16'



Reach 3RD: 8" Pipe



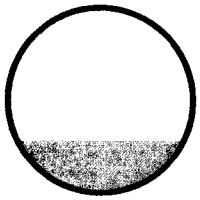
Summary for Reach 4RD: 6" Pipe

Inflow Area = 0.163 ac, 64.42% Impervious, Inflow Depth > 2.45" for 10-YR STORM event
Inflow = 0.10 cfs @ 7.95 hrs, Volume= 0.033 af
Outflow = 0.10 cfs @ 7.96 hrs, Volume= 0.033 af, Atten= 0%, Lag= 0.9 min

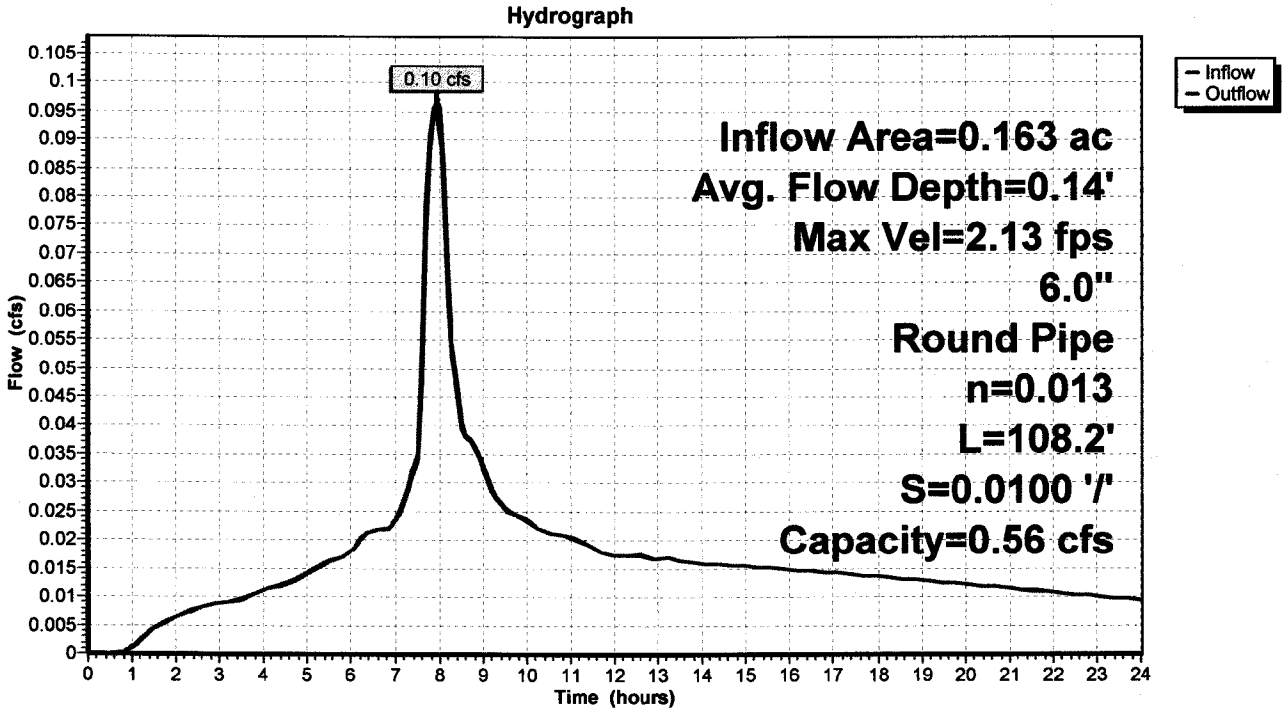
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.13 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.24 fps, Avg. Travel Time= 1.5 min

Peak Storage= 5 cf @ 7.96 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 0.50', Capacity at Bank-Full= 0.56 cfs

6.0" Round Pipe
n= 0.013
Length= 108.2' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -1.08'



Reach 4RD: 6" Pipe



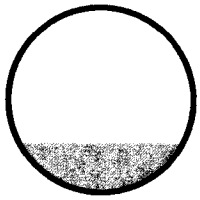
Summary for Reach 5RD: 8" Pipe

Inflow Area = 0.261 ac, 86.97% Impervious, Inflow Depth > 2.90" for 10-YR STORM event
Inflow = 0.19 cfs @ 7.93 hrs, Volume= 0.063 af
Outflow = 0.19 cfs @ 7.95 hrs, Volume= 0.063 af, Atten= 0%, Lag= 1.0 min

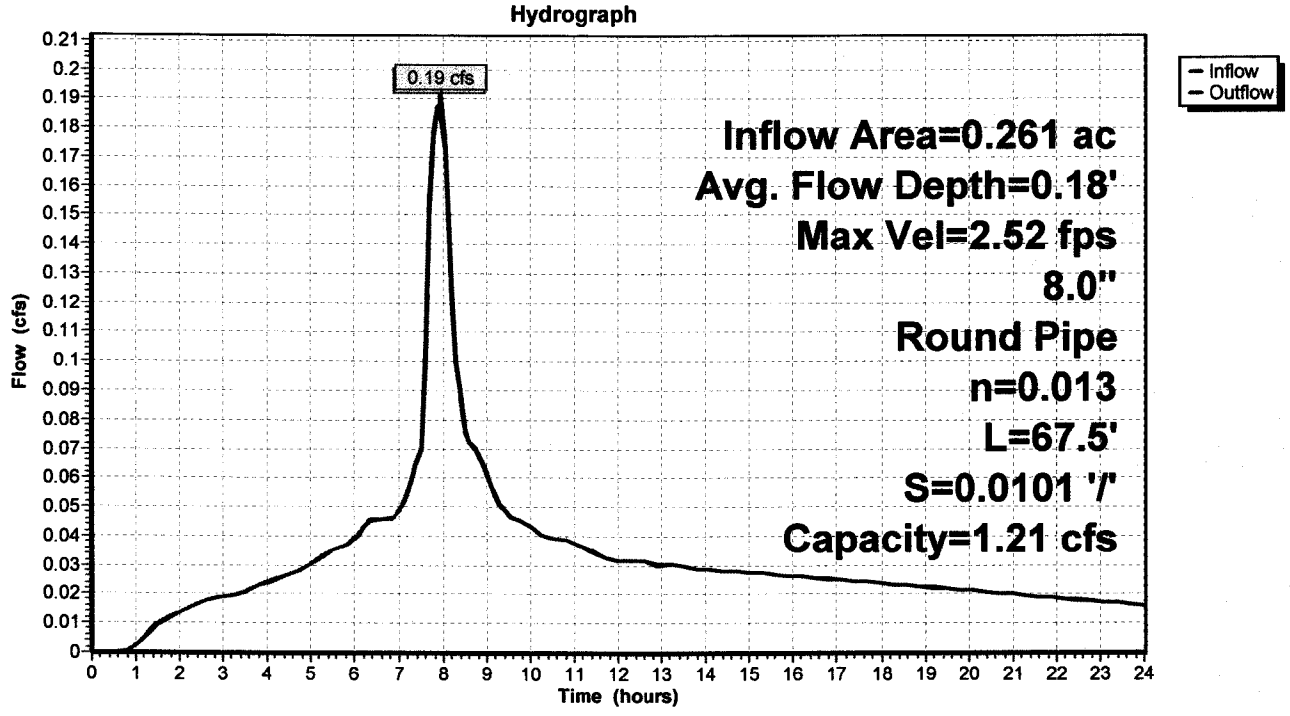
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.52 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.44 fps, Avg. Travel Time= 0.8 min

Peak Storage= 5 cf @ 7.94 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 1.21 cfs

8.0" Round Pipe
n= 0.013
Length= 67.5' Slope= 0.0101 '/'
Inlet Invert= 0.00', Outlet Invert= -0.68'



Reach 5RD: 8" Pipe



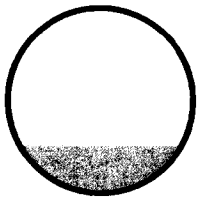
Summary for Reach 6RD: 6" Pipe

Inflow Area = 0.101 ac,100.00% Impervious, Inflow Depth > 3.16" for 10-YR STORM event
Inflow = 0.08 cfs @ 7.92 hrs, Volume= 0.027 af
Outflow = 0.08 cfs @ 7.93 hrs, Volume= 0.027 af, Atten= 0%, Lag= 0.6 min

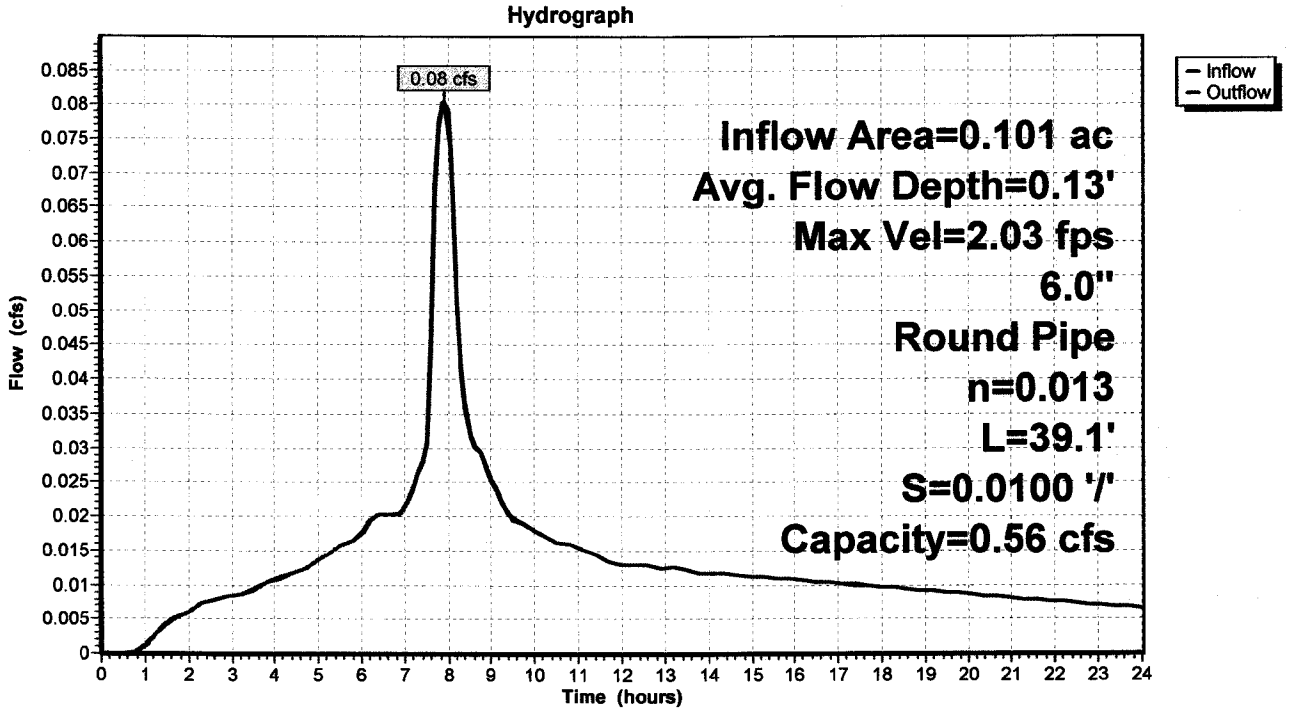
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.03 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.15 fps, Avg. Travel Time= 0.6 min

Peak Storage= 2 cf @ 7.93 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 0.50', Capacity at Bank-Full= 0.56 cfs

6.0" Round Pipe
n= 0.013
Length= 39.1' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.39'



Reach 6RD: 6" Pipe



Summary for Pond 1P: Detention Pipe

Inflow Area = 0.573 ac, 80.10% Impervious, Inflow Depth > 2.76" for 10-YR STORM event
Inflow = 0.39 cfs @ 7.95 hrs, Volume= 0.132 af
Outflow = 0.05 cfs @ 18.10 hrs, Volume= 0.077 af, Atten= 87%, Lag= 608.8 min
Primary = 0.05 cfs @ 18.10 hrs, Volume= 0.077 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 3.77' @ 18.10 hrs Surf.Area= 689 sf Storage= 2,541 cf

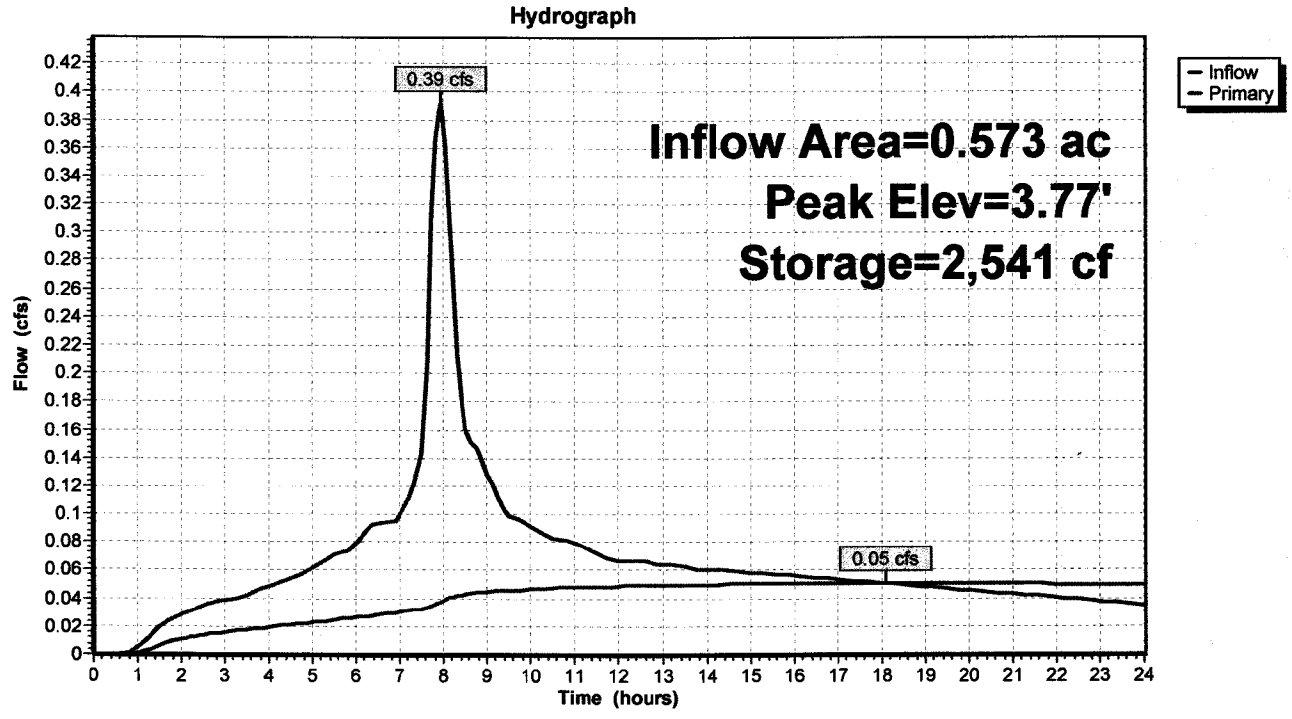
Plug-Flow detention time= 423.2 min calculated for 0.077 af (58% of inflow)
Center-of-Mass det. time= 186.6 min (868.6 - 682.0)

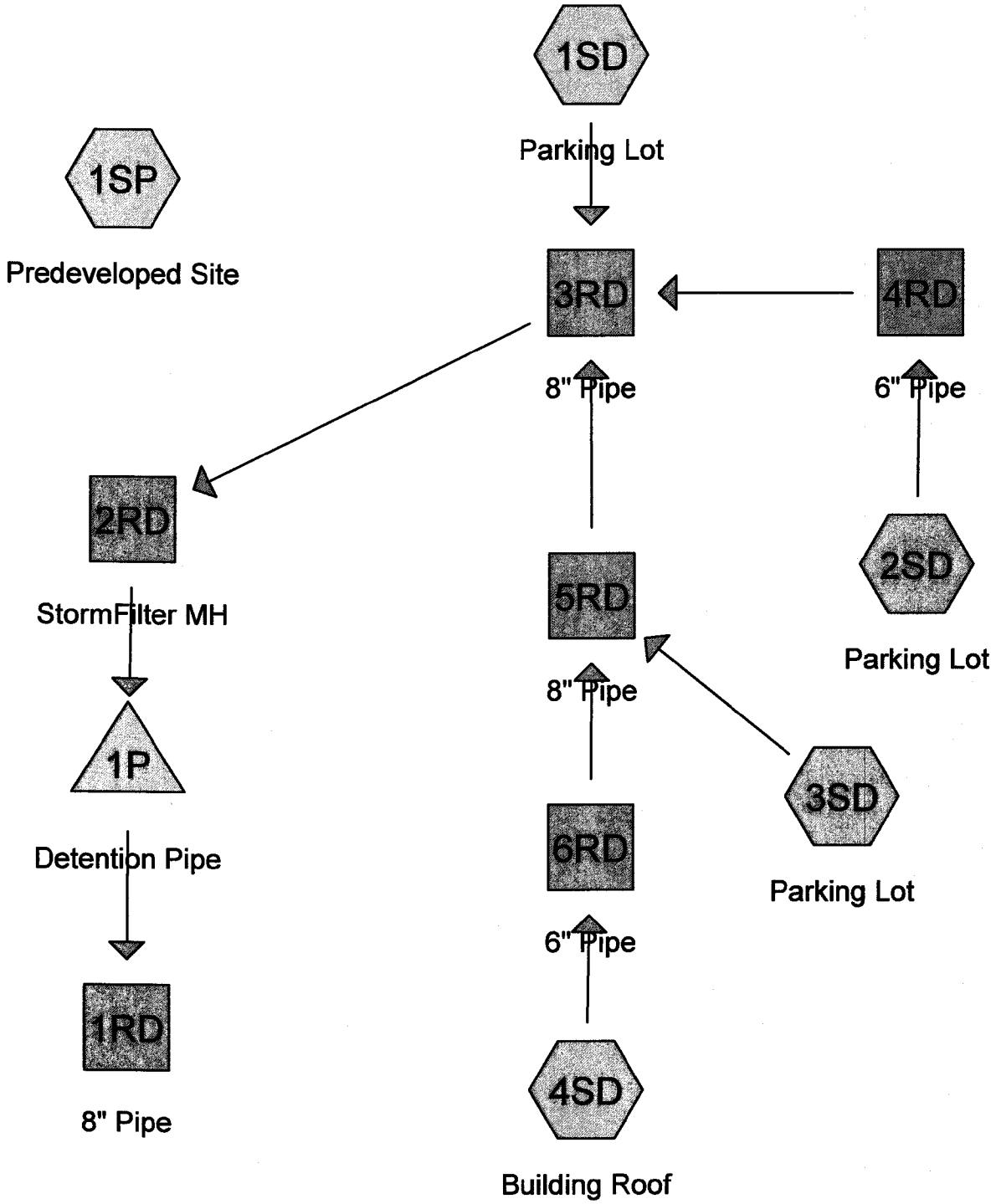
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	3,142 cf	**60.0" D x 160.0'L Pipe Storage**

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**1.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	3.80'	**1.3" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.05 cfs @ 18.10 hrs HW=3.77' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 0.05 cfs @ 9.30 fps)
└—**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: Detention Pipe





Drainage Diagram for 8701.e.chase.bank.prelim
Prepared by {enter your company name here}, Printed 2/10/2012
HydroCAD® 9.10 s/n 00549 © 2009 HydroCAD Software Solutions LLC

25-YEAR STORM (3.90")

Summary for Subcatchment 1SP: Predeveloped Site

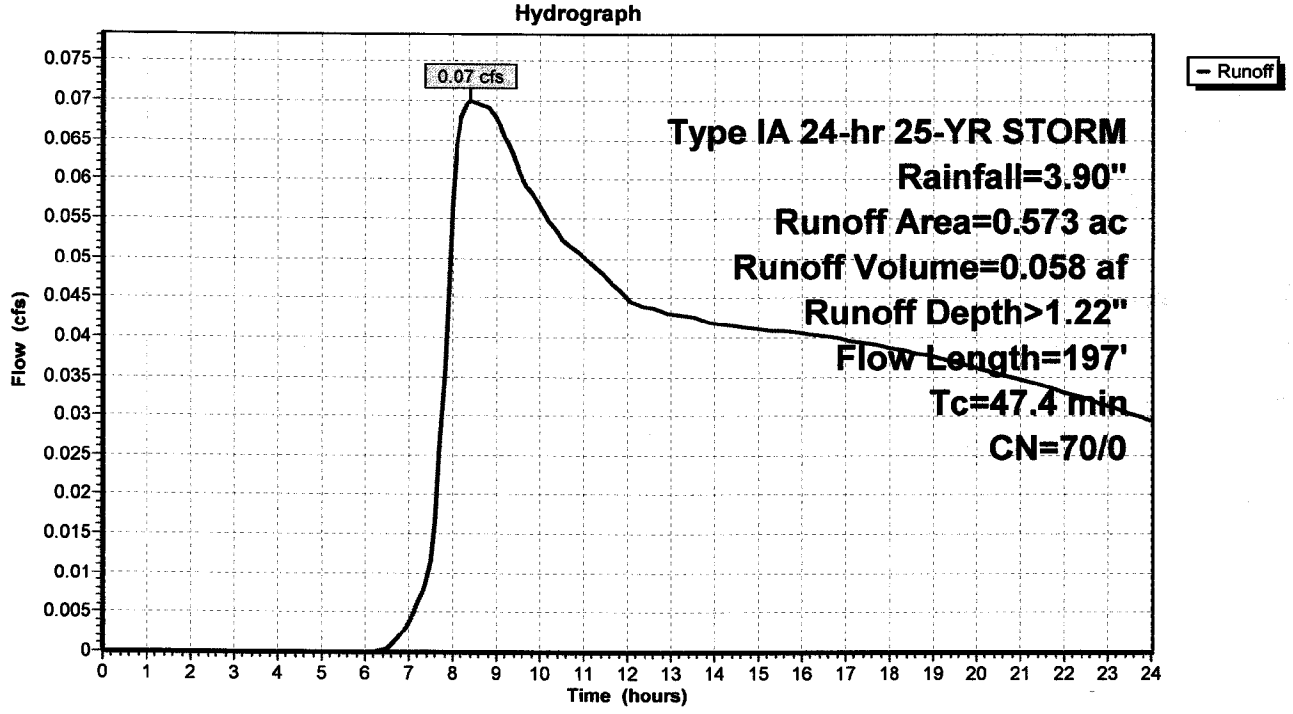
Runoff = 0.07 cfs @ 8.41 hrs, Volume= 0.058 af, Depth> 1.22"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type IA 24-hr 25-YR STORM Rainfall=3.90"

Area (ac)	CN	Description
0.573	70	Woods, Good, HSG C
0.573	70	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
47.1	167	0.0112	0.06		**Sheet Flow, Sheet Flow (Woods)** Woods: Light underbrush n= 0.400 P2= 2.40"
0.3	30	0.1122	1.67		**Shallow Concentrated Flow, Shallow Conc. Flow** Woodland Kv= 5.0 fps
47.4	197	Total			

Subcatchment 1SP: Predeveloped Site



Summary for Subcatchment 1SD: Parking Lot

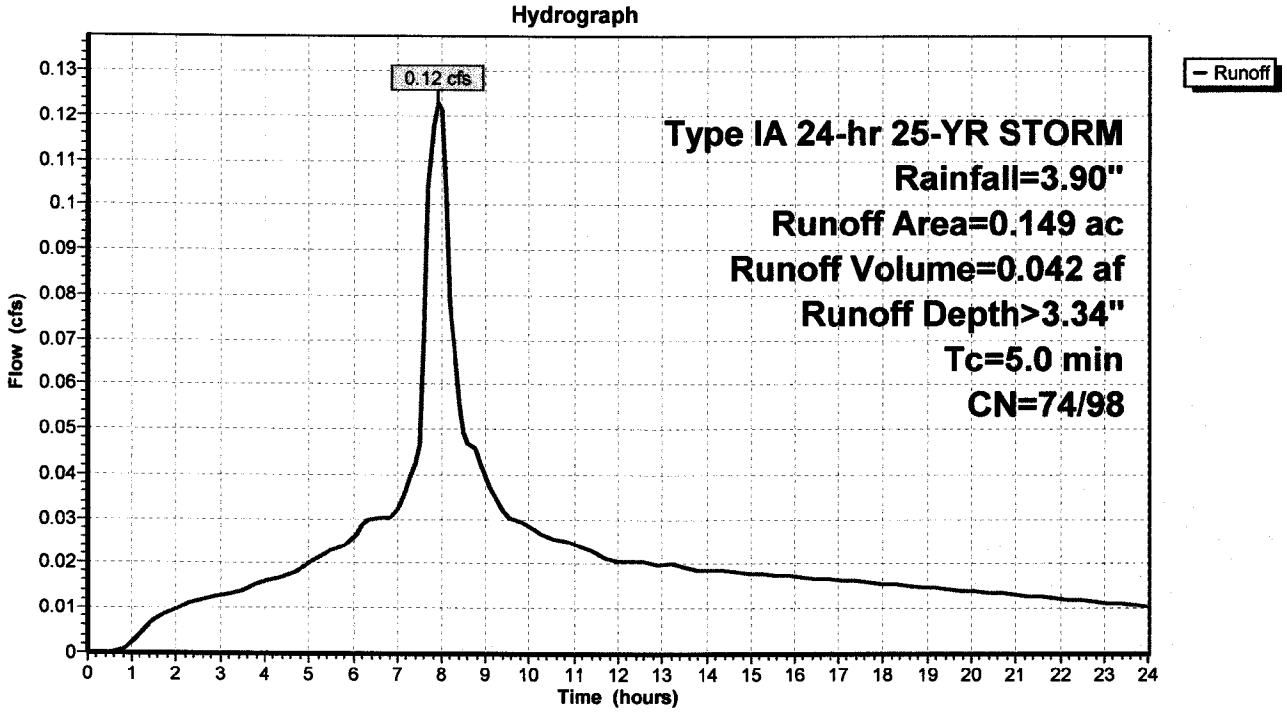
Runoff = 0.12 cfs @ 7.93 hrs, Volume= 0.042 af, Depth> 3.34"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type IA 24-hr 25-YR STORM Rainfall=3.90"

Area (ac)	CN	Description
0.127	98	Paved parking, HSG C
0.022	74	>75% Grass cover, Good, HSG C
0.149	94	Weighted Average
0.022	74	14.77% Pervious Area
0.127	98	85.23% Impervious Area

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

Subcatchment 1SD: Parking Lot



Summary for Subcatchment 2SD: Parking Lot

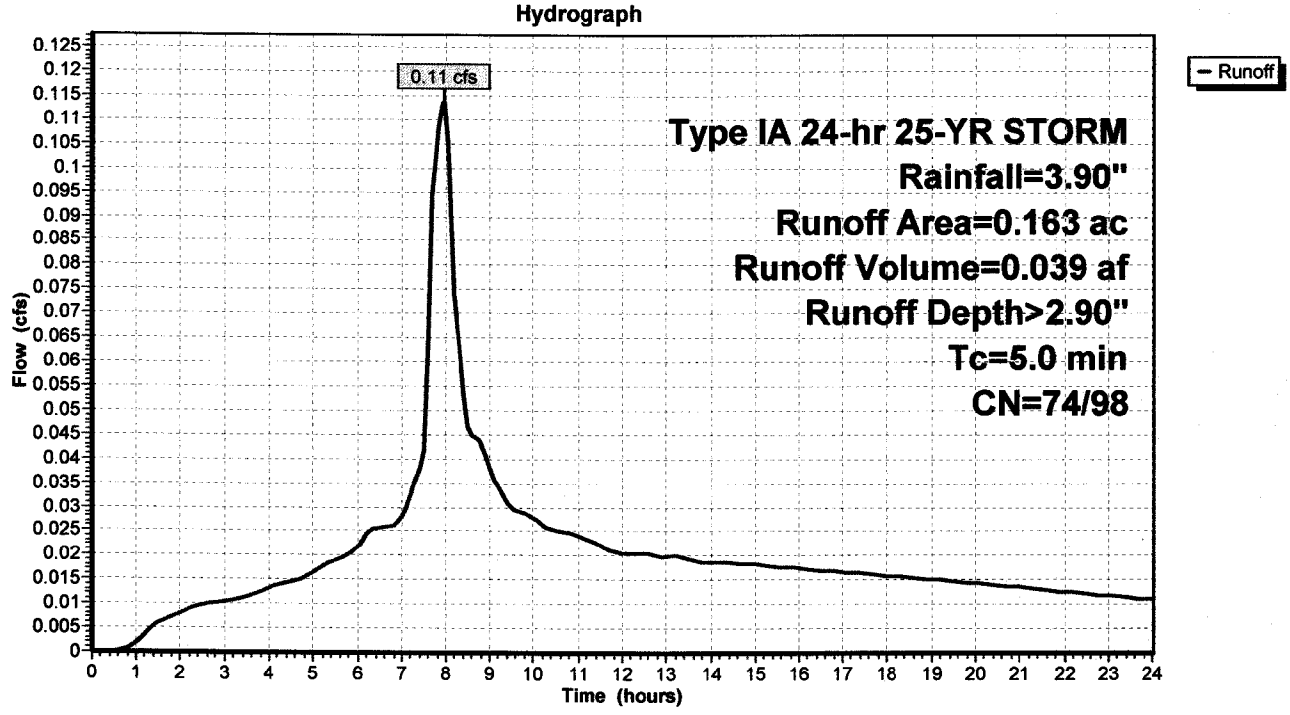
Runoff = 0.11 cfs @ 7.95 hrs, Volume= 0.039 af, Depth> 2.90"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type IA 24-hr 25-YR STORM Rainfall=3.90"

Area (ac)	CN	Description
0.105	98	Paved parking, HSG C
0.058	74	>75% Grass cover, Good, HSG C
0.163	89	Weighted Average
0.058	74	35.58% Pervious Area
0.105	98	64.42% Impervious Area

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

Subcatchment 2SD: Parking Lot



Summary for Subcatchment 3SD: Parking Lot

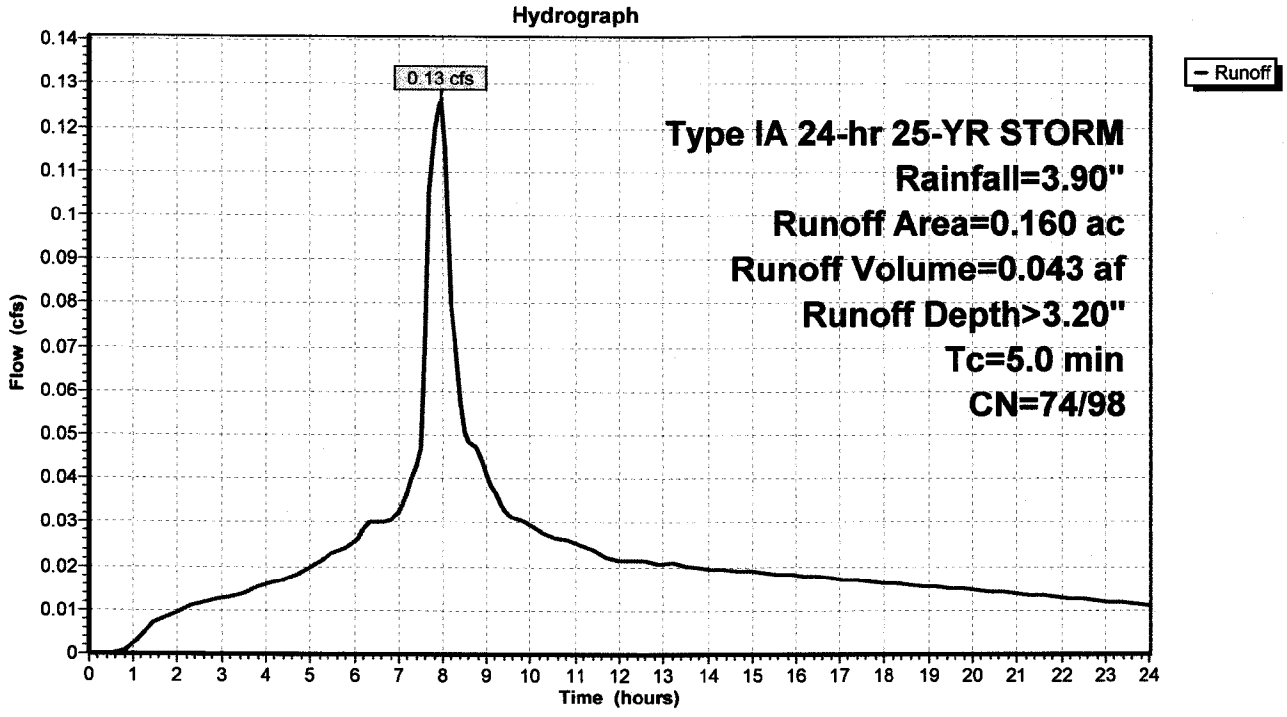
Runoff = 0.13 cfs @ 7.93 hrs, Volume= 0.043 af, Depth> 3.20"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type IA 24-hr 25-YR STORM Rainfall=3.90"

	Area (ac)	CN	Description
	0.110	98	Paved parking, HSG C
*	0.016	98	Sidewalk, HSG C
	0.034	74	>75% Grass cover, Good, HSG C
	0.160	93	Weighted Average
	0.034	74	21.25% Pervious Area
	0.126	98	78.75% Impervious Area

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

Subcatchment 3SD: Parking Lot



Summary for Subcatchment 4SD: Building Roof

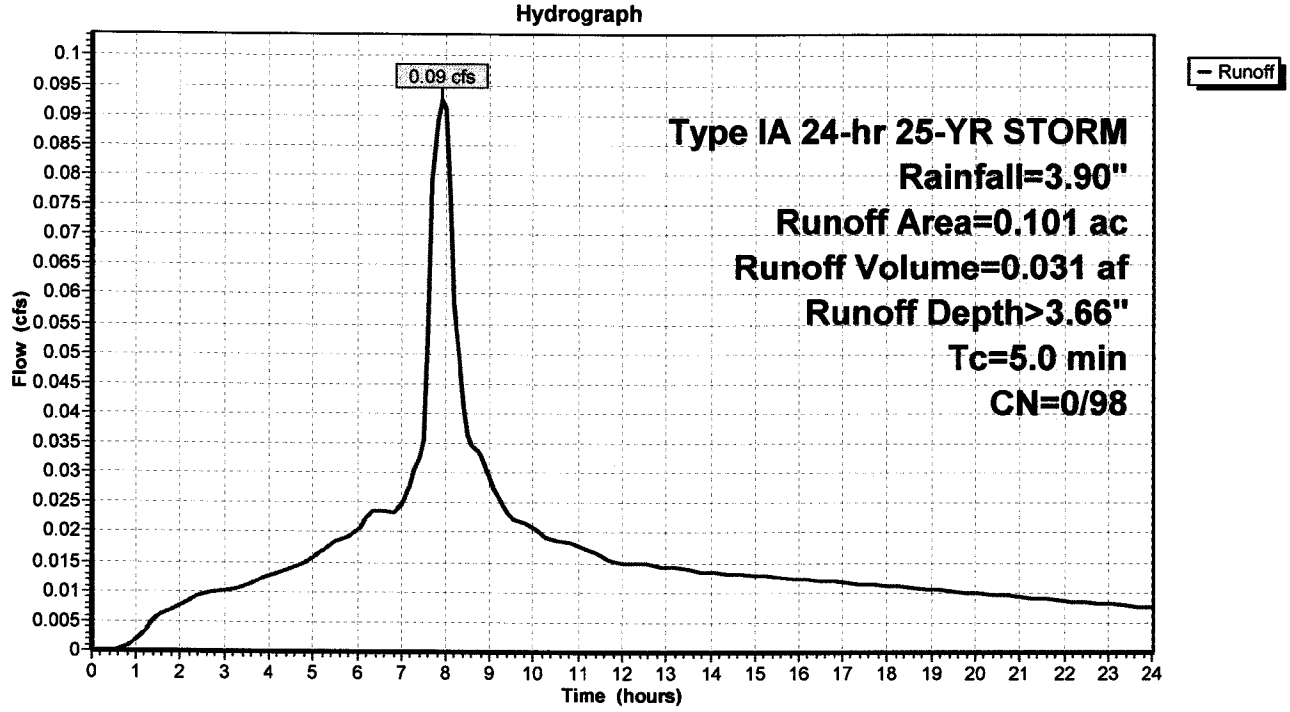
Runoff = 0.09 cfs @ 7.92 hrs, Volume= 0.031 af, Depth> 3.66"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type IA 24-hr 25-YR STORM Rainfall=3.90"

Area (ac)	CN	Description
0.101	98	Roofs, HSG C
0.101	98	100.00% Impervious Area

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

Subcatchment 4SD: Building Roof



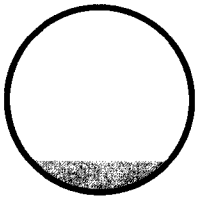
Summary for Reach 1RD: 8" Pipe

Inflow Area = 0.573 ac, 80.10% Impervious, Inflow Depth > 2.02" for 25-YR STORM event
Inflow = 0.07 cfs @ 13.36 hrs, Volume= 0.096 af
Outflow = 0.07 cfs @ 13.38 hrs, Volume= 0.096 af, Atten= 0%, Lag= 1.2 min

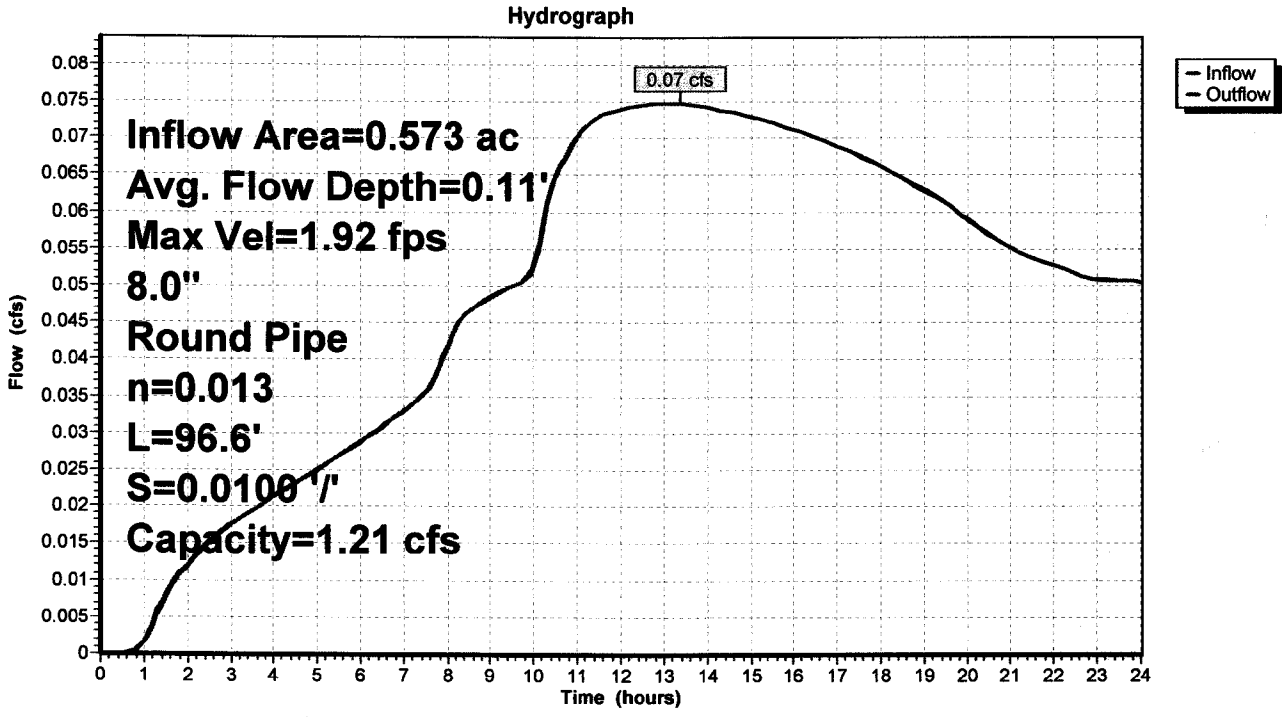
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.92 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.66 fps, Avg. Travel Time= 1.0 min

Peak Storage= 4 cf @ 13.37 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 1.21 cfs

8.0" Round Pipe
n= 0.013
Length= 96.6' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.97'



Reach 1RD: 8" Pipe

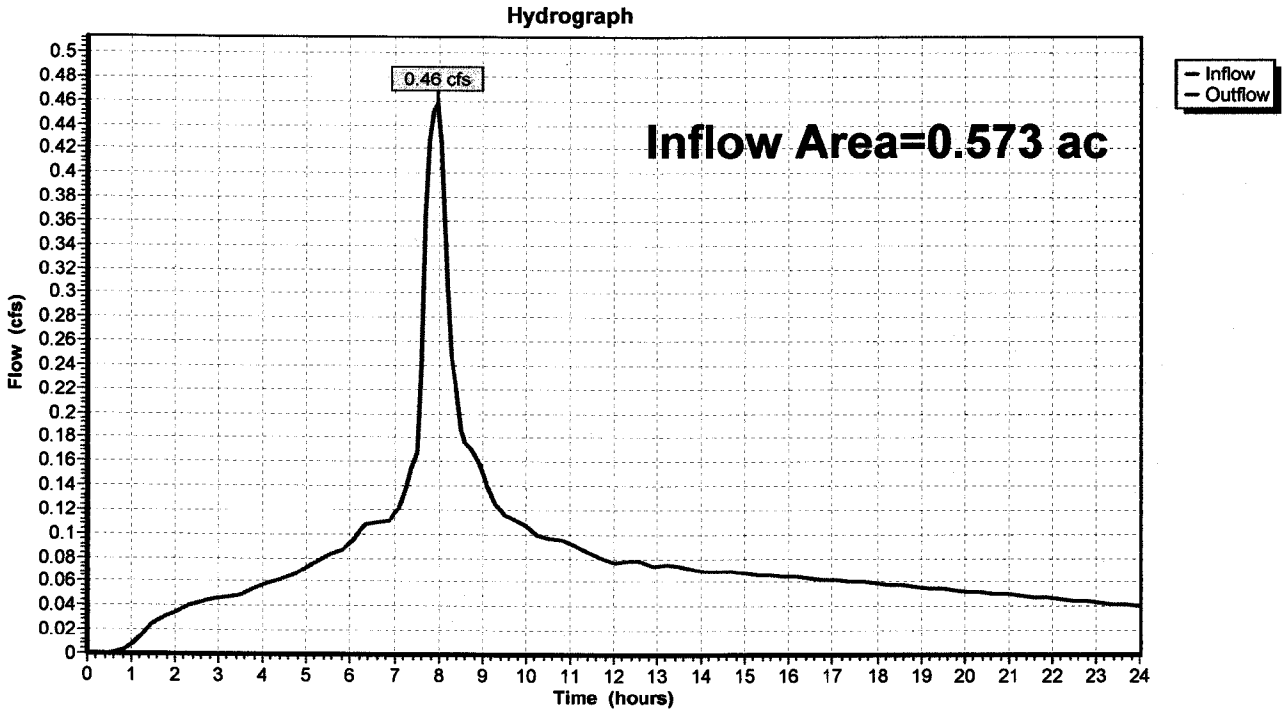


Summary for Reach 2RD: StormFilter MH

Inflow Area = 0.573 ac, 80.10% Impervious, Inflow Depth > 3.23" for 25-YR STORM event
Inflow = 0.46 cfs @ 7.95 hrs, Volume= 0.154 af
Outflow = 0.46 cfs @ 7.95 hrs, Volume= 0.154 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach 2RD: StormFilter MH



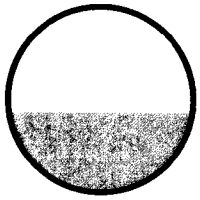
Summary for Reach 3RD: 8" Pipe

Inflow Area = 0.573 ac, 80.10% Impervious, Inflow Depth > 3.23" for 25-YR STORM event
Inflow = 0.45 cfs @ 7.95 hrs, Volume= 0.154 af
Outflow = 0.46 cfs @ 7.95 hrs, Volume= 0.154 af, Atten= 0%, Lag= 0.1 min

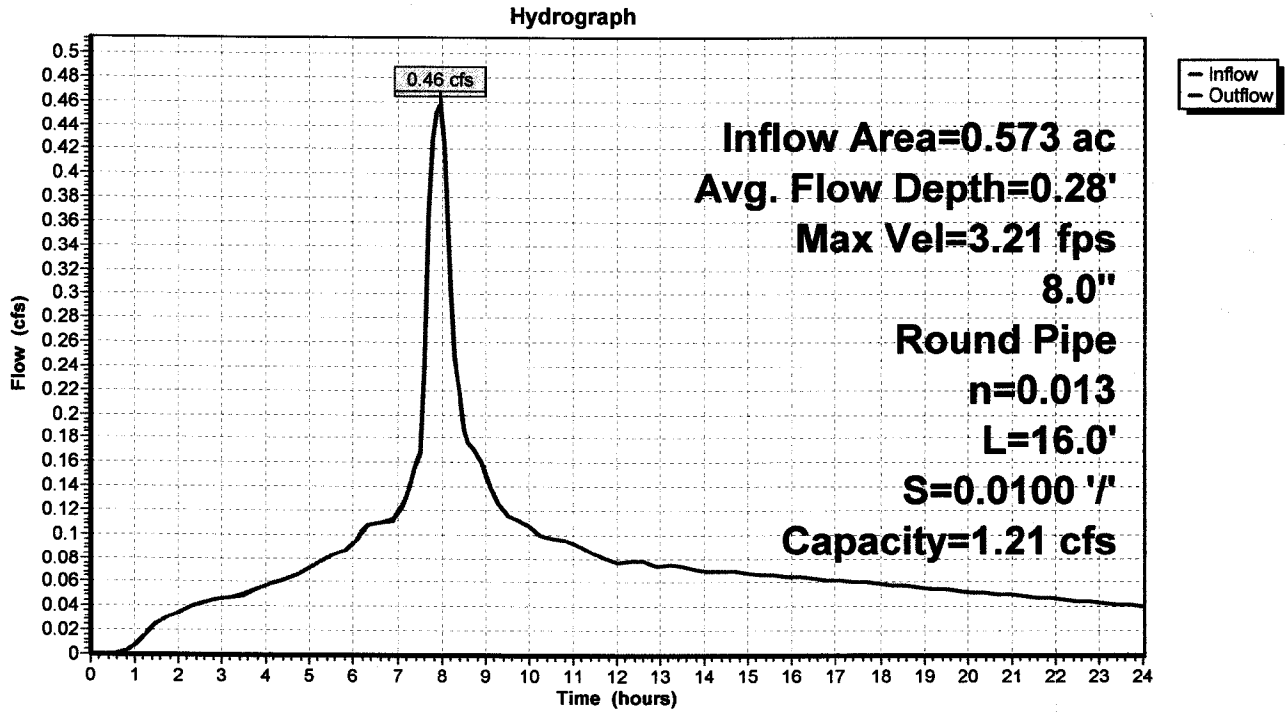
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 3.21 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.87 fps, Avg. Travel Time= 0.1 min

Peak Storage= 2 cf @ 7.95 hrs
Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 1.21 cfs

8.0" Round Pipe
n= 0.013
Length= 16.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.16'



Reach 3RD: 8" Pipe



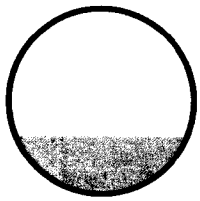
Summary for Reach 4RD: 6" Pipe

Inflow Area = 0.163 ac, 64.42% Impervious, Inflow Depth > 2.90" for 25-YR STORM event
Inflow = 0.11 cfs @ 7.95 hrs, Volume= 0.039 af
Outflow = 0.11 cfs @ 7.96 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.9 min

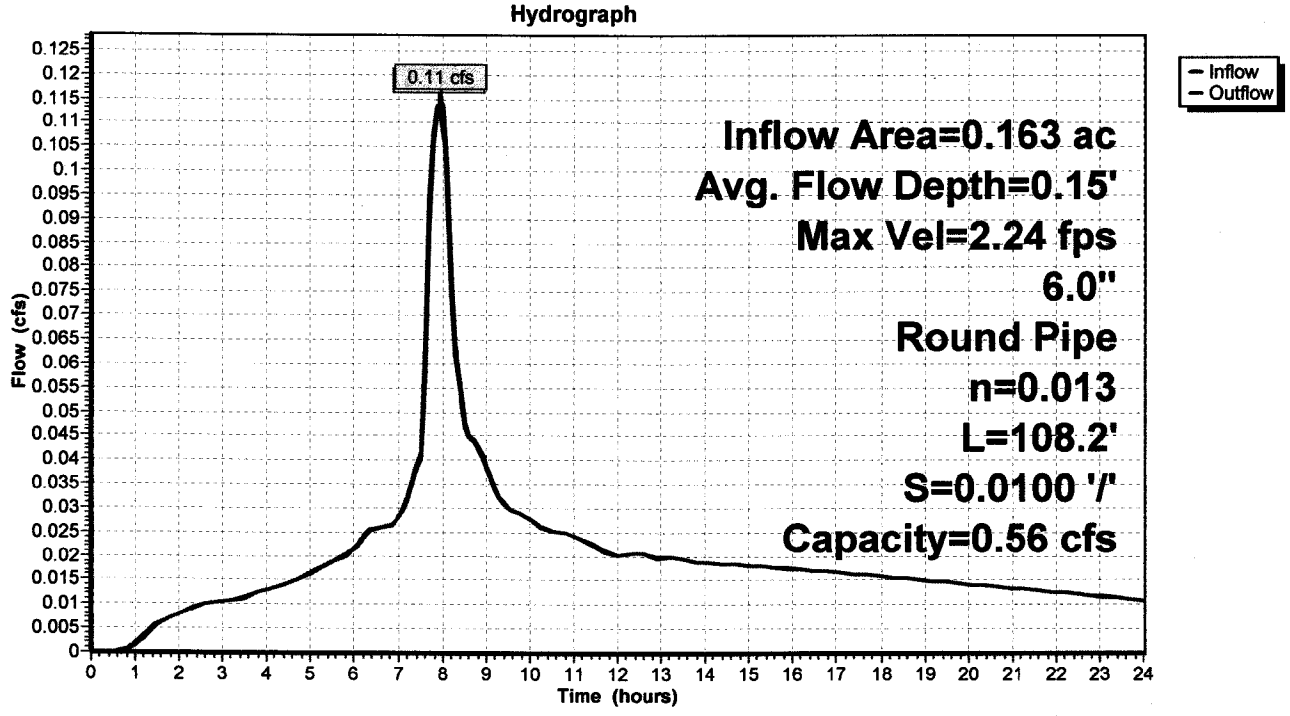
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.24 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.30 fps, Avg. Travel Time= 1.4 min

Peak Storage= 6 cf @ 7.95 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 0.50', Capacity at Bank-Full= 0.56 cfs

6.0" Round Pipe
n= 0.013
Length= 108.2' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -1.08'



Reach 4RD: 6" Pipe



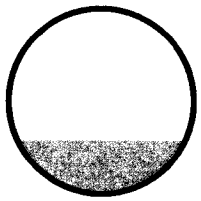
Summary for Reach 5RD: 8" Pipe

Inflow Area = 0.261 ac, 86.97% Impervious, Inflow Depth > 3.38" for 25-YR STORM event
Inflow = 0.22 cfs @ 7.93 hrs, Volume= 0.074 af
Outflow = 0.22 cfs @ 7.95 hrs, Volume= 0.073 af, Atten= 0%, Lag= 0.9 min

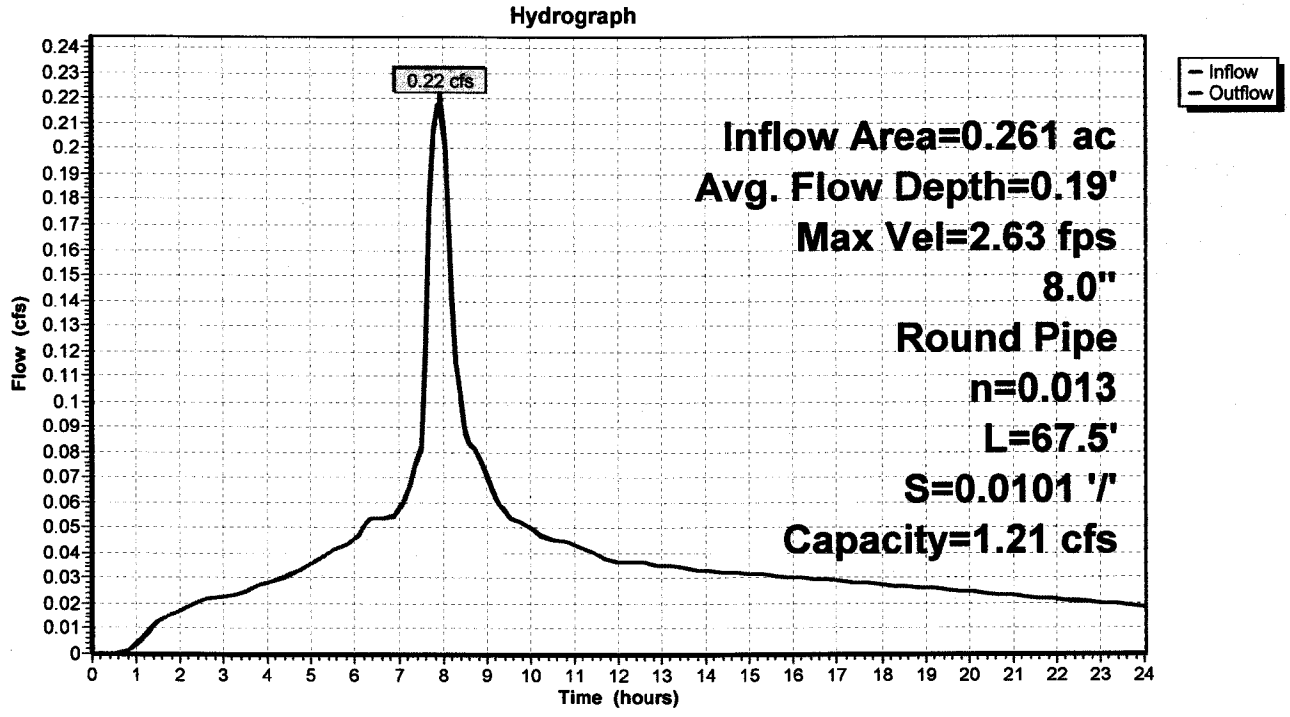
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.63 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.51 fps, Avg. Travel Time= 0.7 min

Peak Storage= 6 cf @ 7.94 hrs
Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 1.21 cfs

8.0" Round Pipe
n= 0.013
Length= 67.5' Slope= 0.0101 '/'
Inlet Invert= 0.00', Outlet Invert= -0.68'



Reach 5RD: 8" Pipe



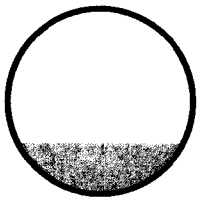
Summary for Reach 6RD: 6" Pipe

Inflow Area = 0.101 ac,100.00% Impervious, Inflow Depth > 3.66" for 25-YR STORM event
Inflow = 0.09 cfs @ 7.92 hrs, Volume= 0.031 af
Outflow = 0.09 cfs @ 7.93 hrs, Volume= 0.031 af, Atten= 0%, Lag= 0.6 min

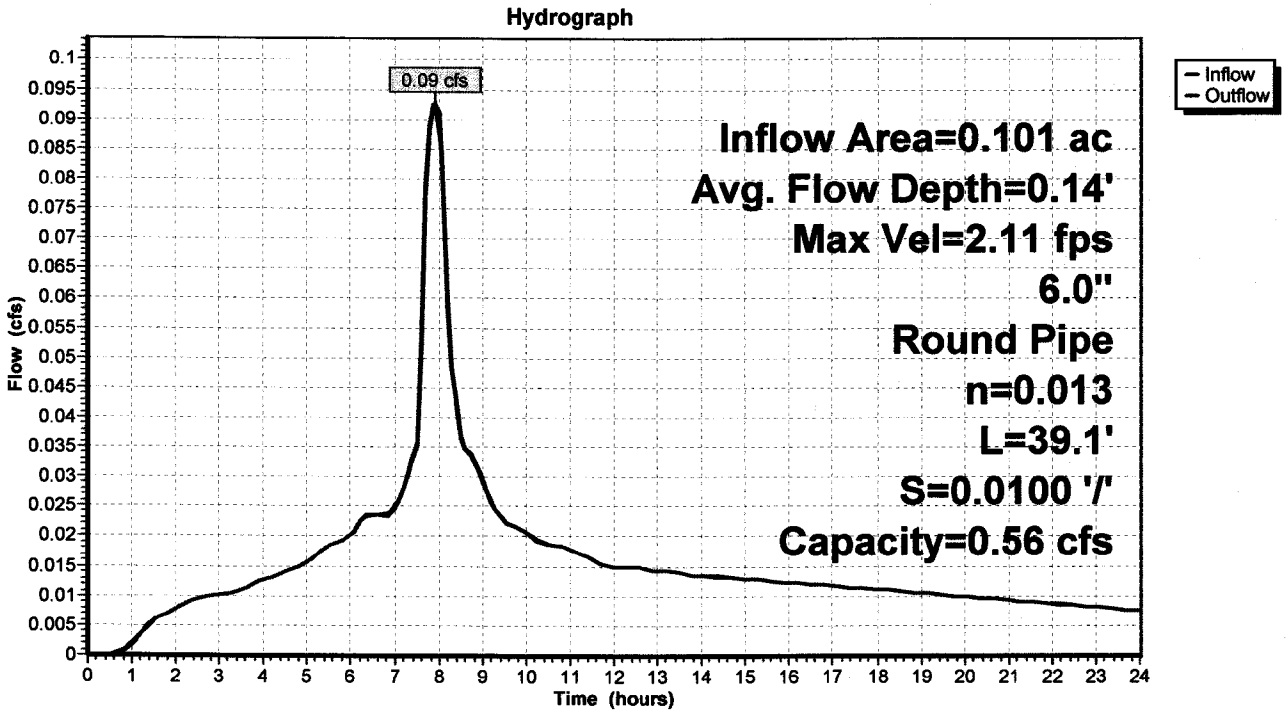
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.11 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.20 fps, Avg. Travel Time= 0.5 min

Peak Storage= 2 cf @ 7.93 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 0.50', Capacity at Bank-Full= 0.56 cfs

6.0" Round Pipe
n= 0.013
Length= 39.1' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.39'



Reach 6RD: 6" Pipe



Summary for Pond 1P: Detention Pipe

Inflow Area = 0.573 ac, 80.10% Impervious, Inflow Depth > 3.23" for 25-YR STORM event
Inflow = 0.46 cfs @ 7.95 hrs, Volume= 0.154 af
Outflow = 0.07 cfs @ 13.36 hrs, Volume= 0.096 af, Atten= 84%, Lag= 324.3 min
Primary = 0.07 cfs @ 13.36 hrs, Volume= 0.096 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 4.10' @ 13.36 hrs Surf.Area= 616 sf Storage= 2,755 cf

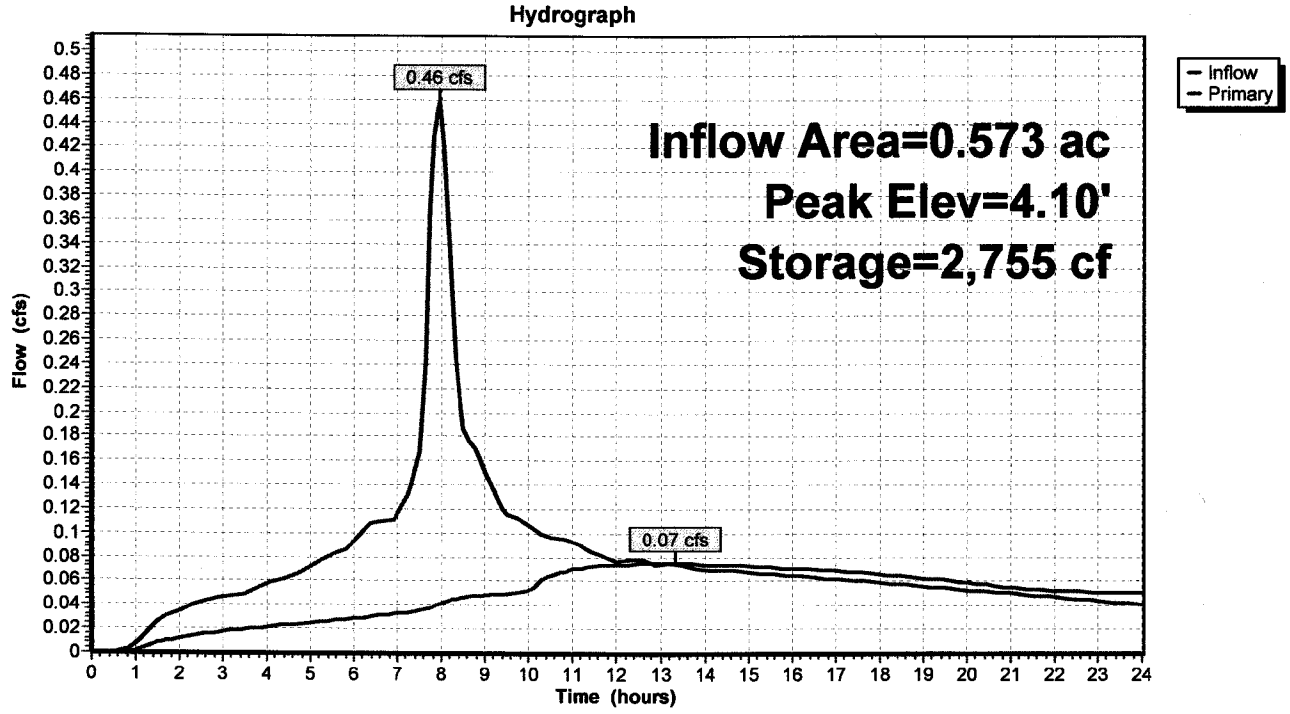
Plug-Flow detention time= 407.3 min calculated for 0.096 af (62% of inflow)
Center-of-Mass det. time= 185.4 min (864.5 - 679.0)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	3,142 cf	**60.0" D x 160.0'L Pipe Storage**

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**1.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	3.80'	**1.3" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.07 cfs @ 13.36 hrs HW=4.10' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.05 cfs @ 9.70 fps)
└**2=Orifice/Grate** (Orifice Controls 0.02 cfs @ 2.37 fps)

Pond 1P: Detention Pipe



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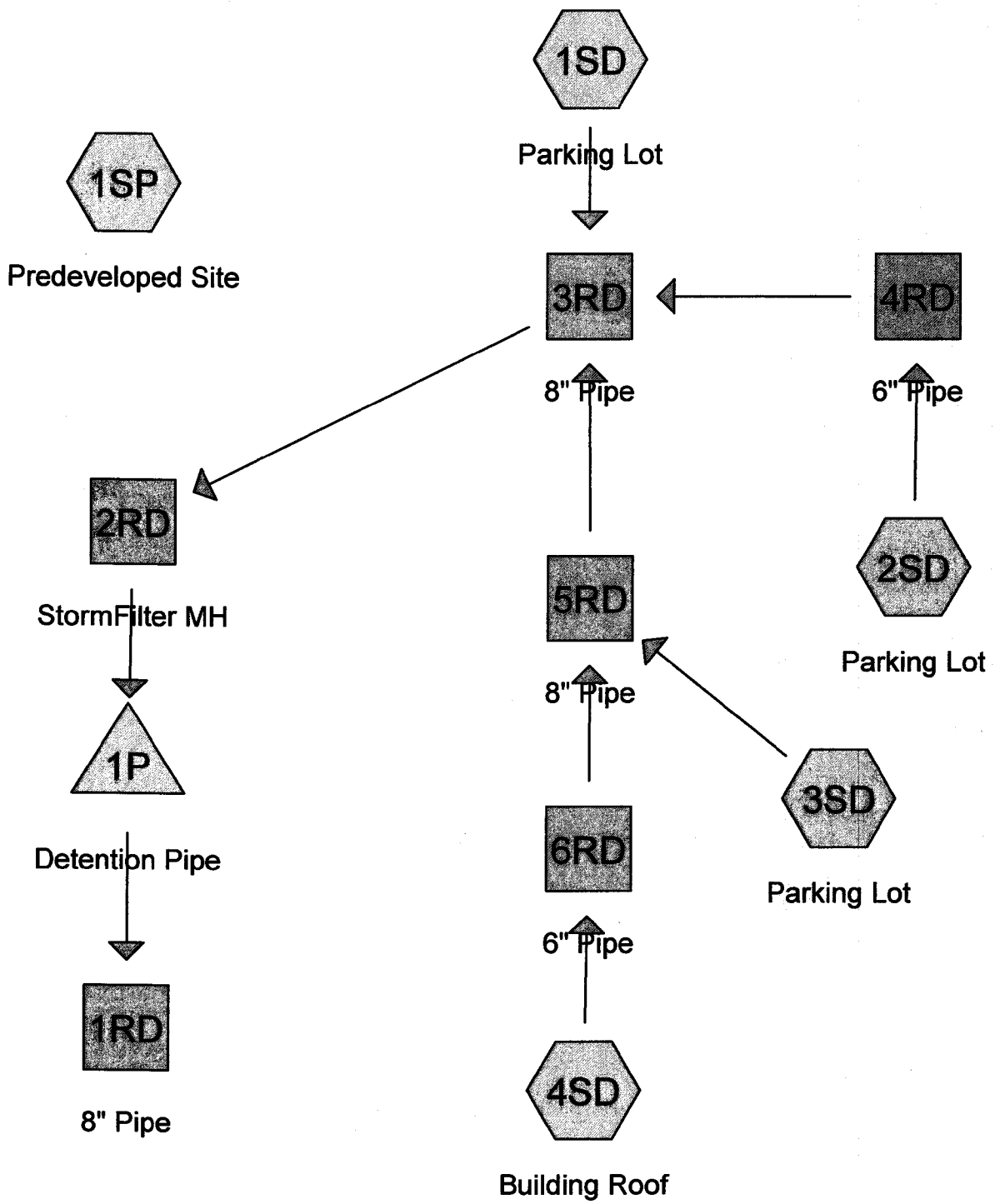


Subcat Reach Pond Link

Drainage Diagram for 8701.e.chase.bank.prelim
Prepared by {enter your company name here}, Printed 2/10/2012
HydroCAD® 9.10 s/n 00549 © 2009 HydroCAD Software Solutions LLC

100-YEAR STORM (4.40")

Summary for Subcatchment 1SP: Predeveloped Site

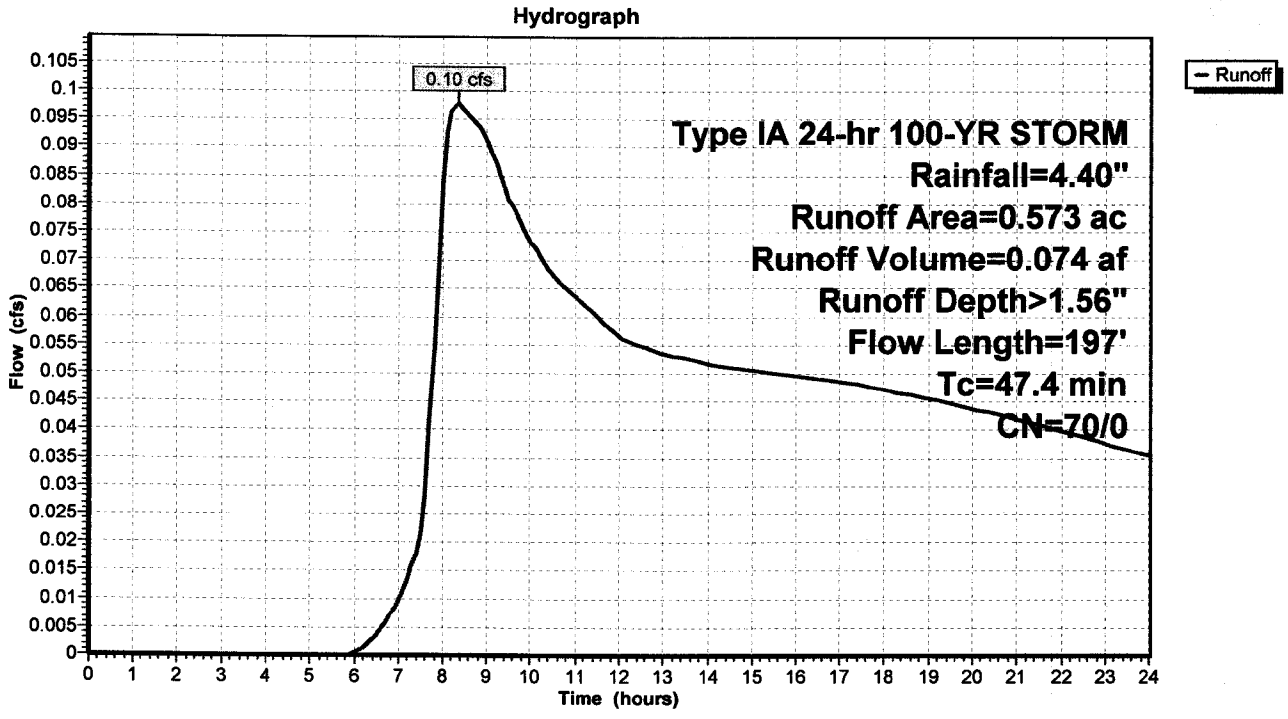
Runoff = 0.10 cfs @ 8.35 hrs, Volume= 0.074 af, Depth> 1.56"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type IA 24-hr 100-YR STORM Rainfall=4.40"

Area (ac)	CN	Description
0.573	70	Woods, Good, HSG C
0.573	70	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
47.1	167	0.0112	0.06		**Sheet Flow, Sheet Flow (Woods)** Woods: Light underbrush n= 0.400 P2= 2.40"
0.3	30	0.1122	1.67		**Shallow Concentrated Flow, Shallow Conc. Flow** Woodland Kv= 5.0 fps
47.4	197	Total			

Subcatchment 1SP: Predeveloped Site



Summary for Subcatchment 1SD: Parking Lot

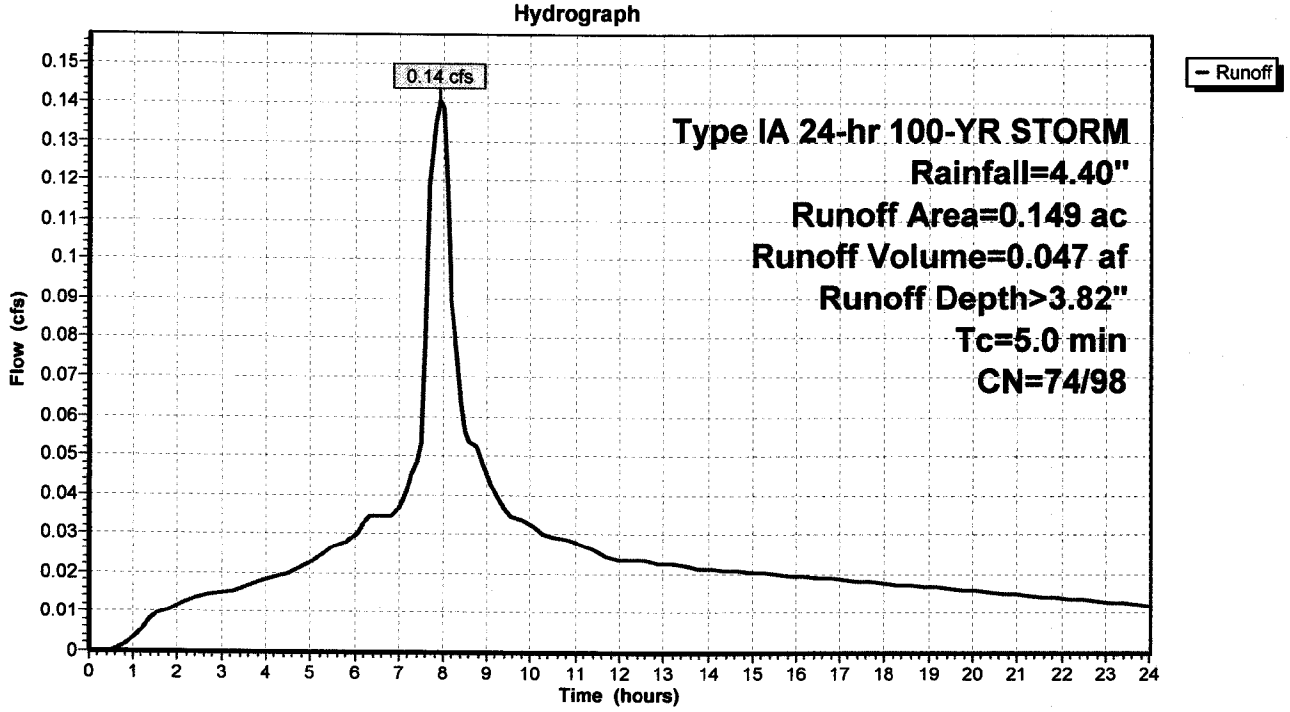
Runoff = 0.14 cfs @ 7.93 hrs, Volume= 0.047 af, Depth> 3.82"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type IA 24-hr 100-YR STORM Rainfall=4.40"

Area (ac)	CN	Description
0.127	98	Paved parking, HSG C
0.022	74	>75% Grass cover, Good, HSG C
0.149	94	Weighted Average
0.022	74	14.77% Pervious Area
0.127	98	85.23% Impervious Area

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

Subcatchment 1SD: Parking Lot



Summary for Subcatchment 2SD: Parking Lot

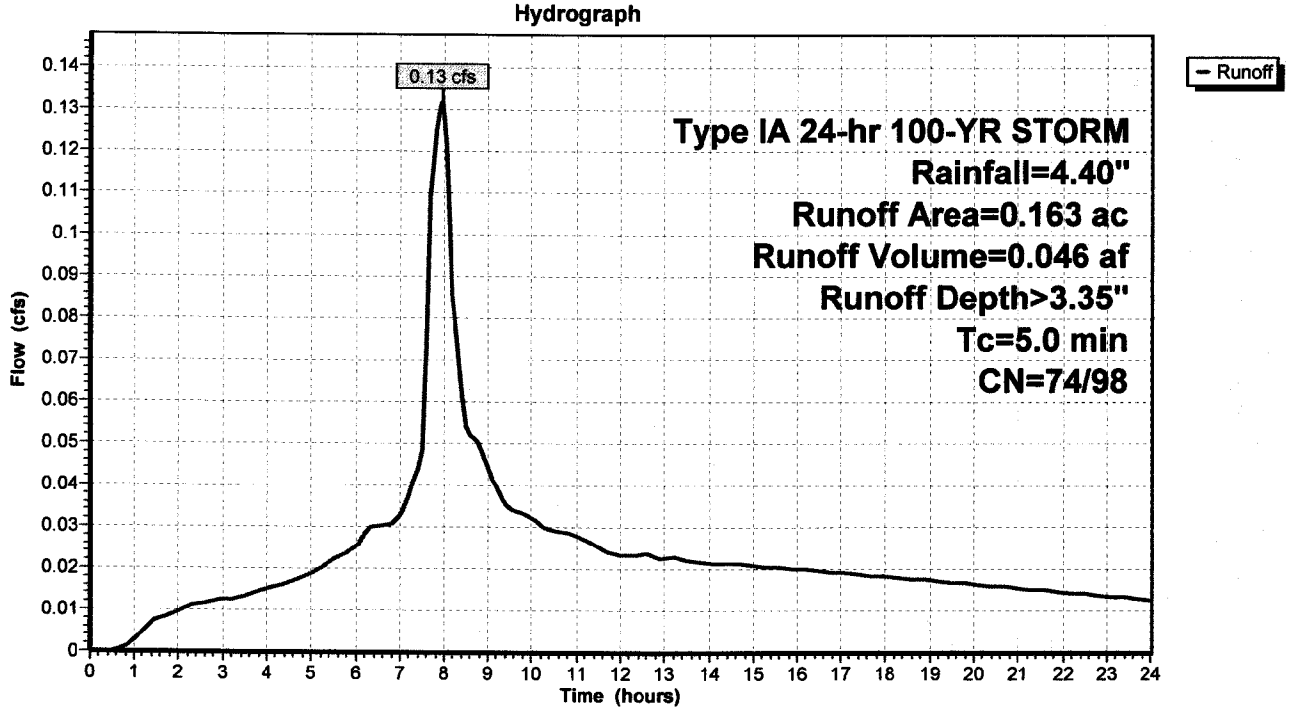
Runoff = 0.13 cfs @ 7.94 hrs, Volume= 0.046 af, Depth> 3.35"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type IA 24-hr 100-YR STORM Rainfall=4.40"

Area (ac)	CN	Description
0.105	98	Paved parking, HSG C
0.058	74	>75% Grass cover, Good, HSG C
0.163	89	Weighted Average
0.058	74	35.58% Pervious Area
0.105	98	64.42% Impervious Area

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

Subcatchment 2SD: Parking Lot



Summary for Subcatchment 3SD: Parking Lot

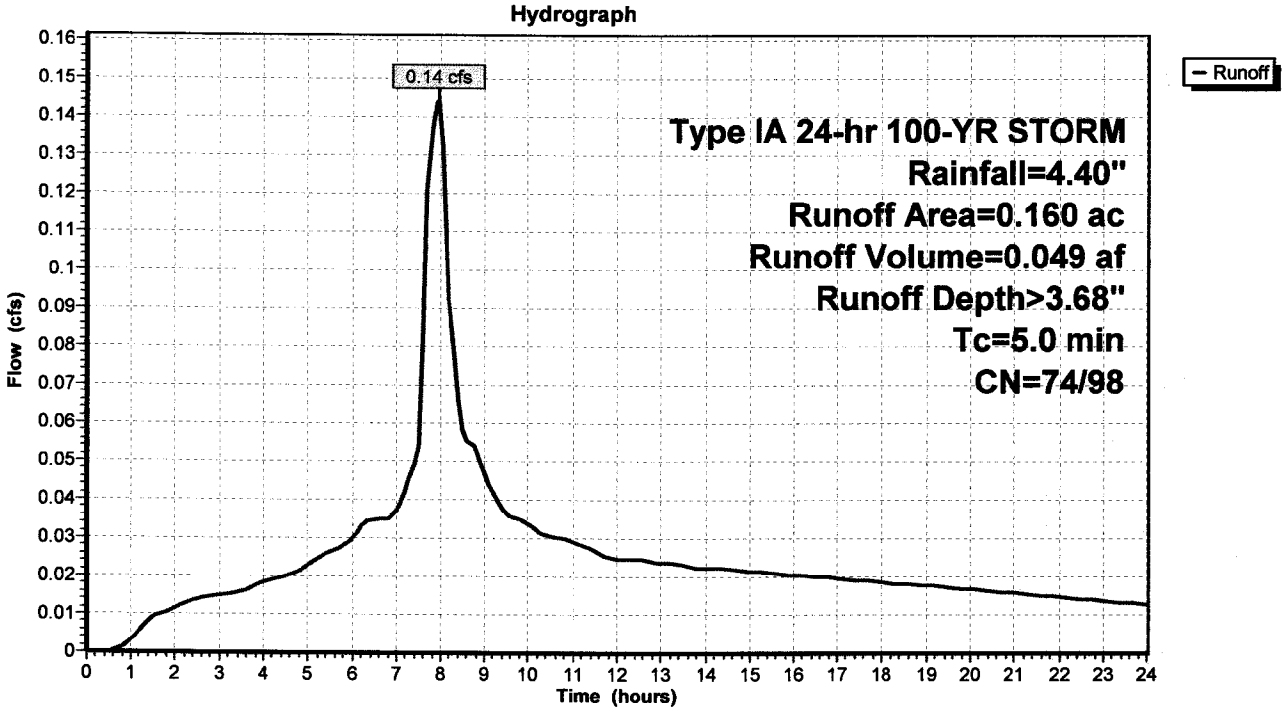
Runoff = 0.14 cfs @ 7.93 hrs, Volume= 0.049 af, Depth> 3.68"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type IA 24-hr 100-YR STORM Rainfall=4.40"

	Area (ac)	CN	Description
	0.110	98	Paved parking, HSG C
*	0.016	98	Sidewalk, HSG C
	0.034	74	>75% Grass cover, Good, HSG C
	0.160	93	Weighted Average
	0.034	74	21.25% Pervious Area
	0.126	98	78.75% Impervious Area

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

Subcatchment 3SD: Parking Lot



Summary for Subcatchment 4SD: Building Roof

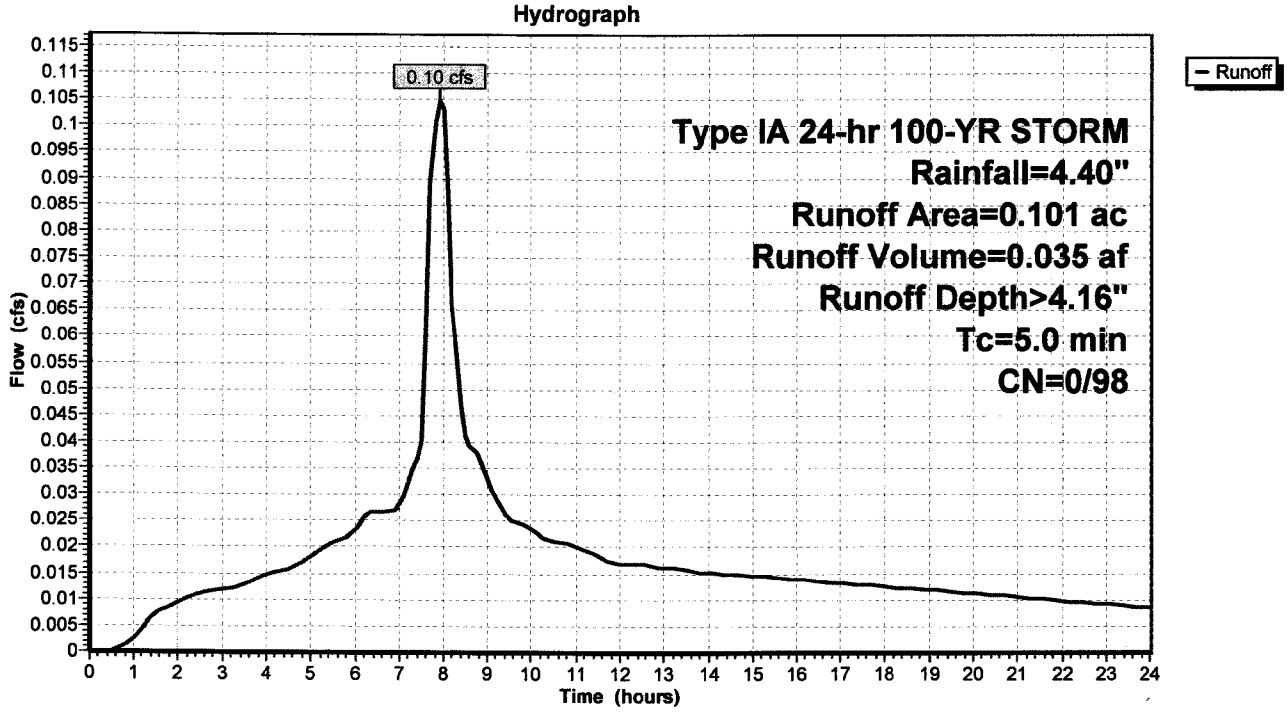
Runoff = 0.10 cfs @ 7.92 hrs, Volume= 0.035 af, Depth> 4.16"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type IA 24-hr 100-YR STORM Rainfall=4.40"

Area (ac)	CN	Description
0.101	98	Roofs, HSG C
0.101	98	100.00% Impervious Area

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

Subcatchment 4SD: Building Roof



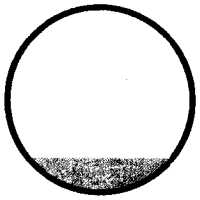
Summary for Reach 1RD: 8" Pipe

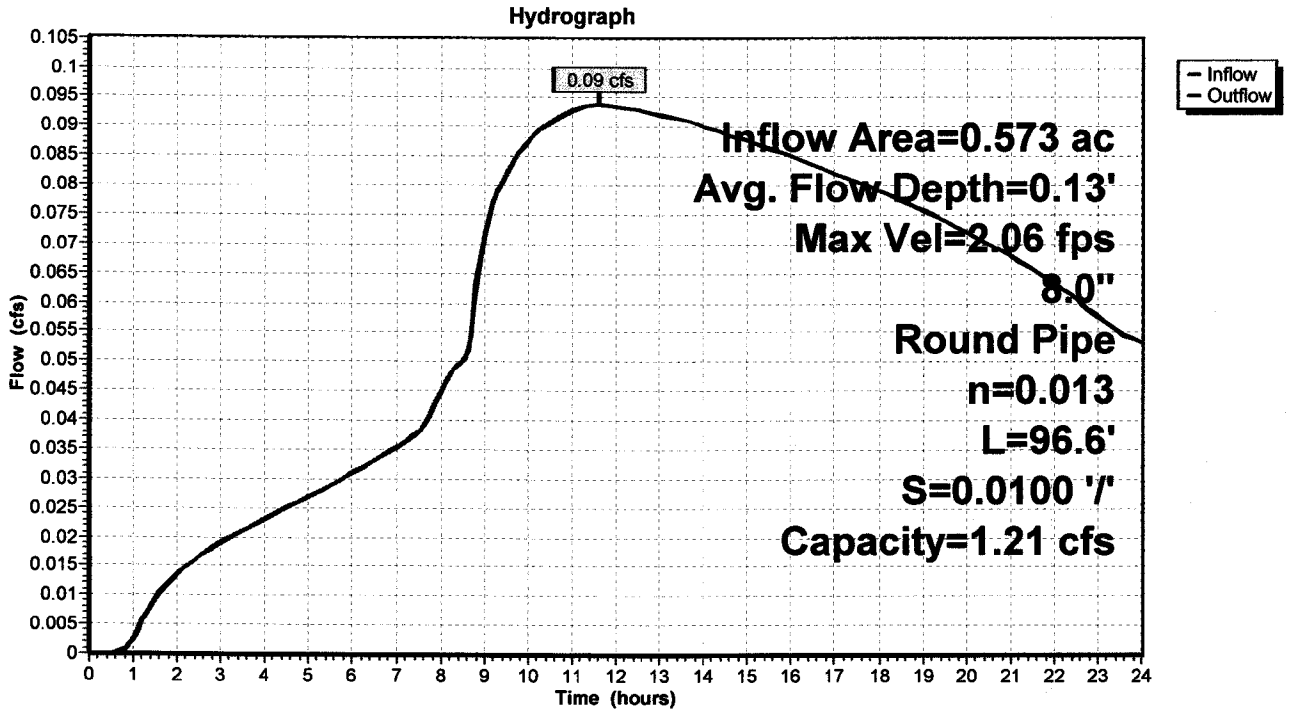
Inflow Area = 0.573 ac, 80.10% Impervious, Inflow Depth > 2.46" for 100-YR STORM event
Inflow = 0.09 cfs @ 11.60 hrs, Volume= 0.118 af
Outflow = 0.09 cfs @ 11.62 hrs, Volume= 0.117 af, Atten= 0%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.06 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.74 fps, Avg. Travel Time= 0.9 min

Peak Storage= 4 cf @ 11.61 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 1.21 cfs

8.0" Round Pipe
n= 0.013
Length= 96.6' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.97'



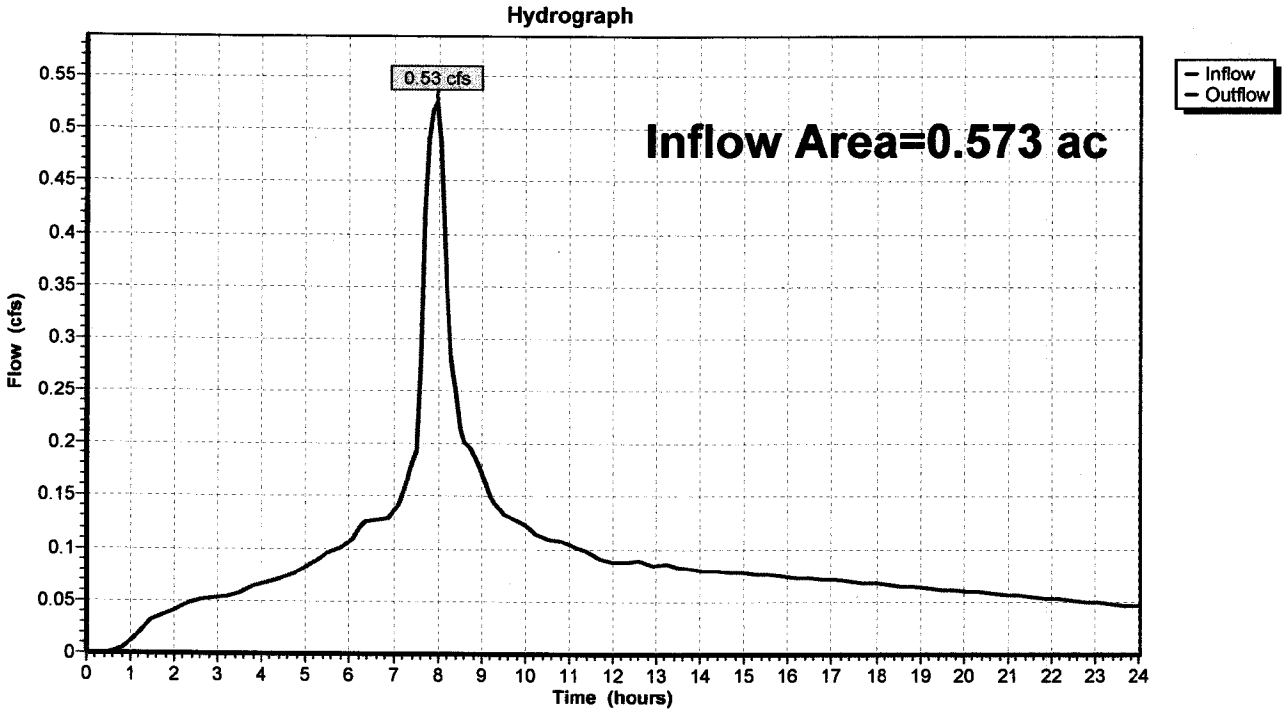


Summary for Reach 2RD: StormFilter MH

Inflow Area = 0.573 ac, 80.10% Impervious, Inflow Depth > 3.70" for 100-YR STORM event
Inflow = 0.53 cfs @ 7.95 hrs, Volume= 0.177 af
Outflow = 0.53 cfs @ 7.95 hrs, Volume= 0.177 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach 2RD: StormFilter MH



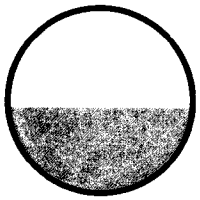
Summary for Reach 3RD: 8" Pipe

Inflow Area = 0.573 ac, 80.10% Impervious, Inflow Depth > 3.70" for 100-YR STORM event
Inflow = 0.52 cfs @ 7.95 hrs, Volume= 0.177 af
Outflow = 0.53 cfs @ 7.95 hrs, Volume= 0.177 af, Atten= 0%, Lag= 0.1 min

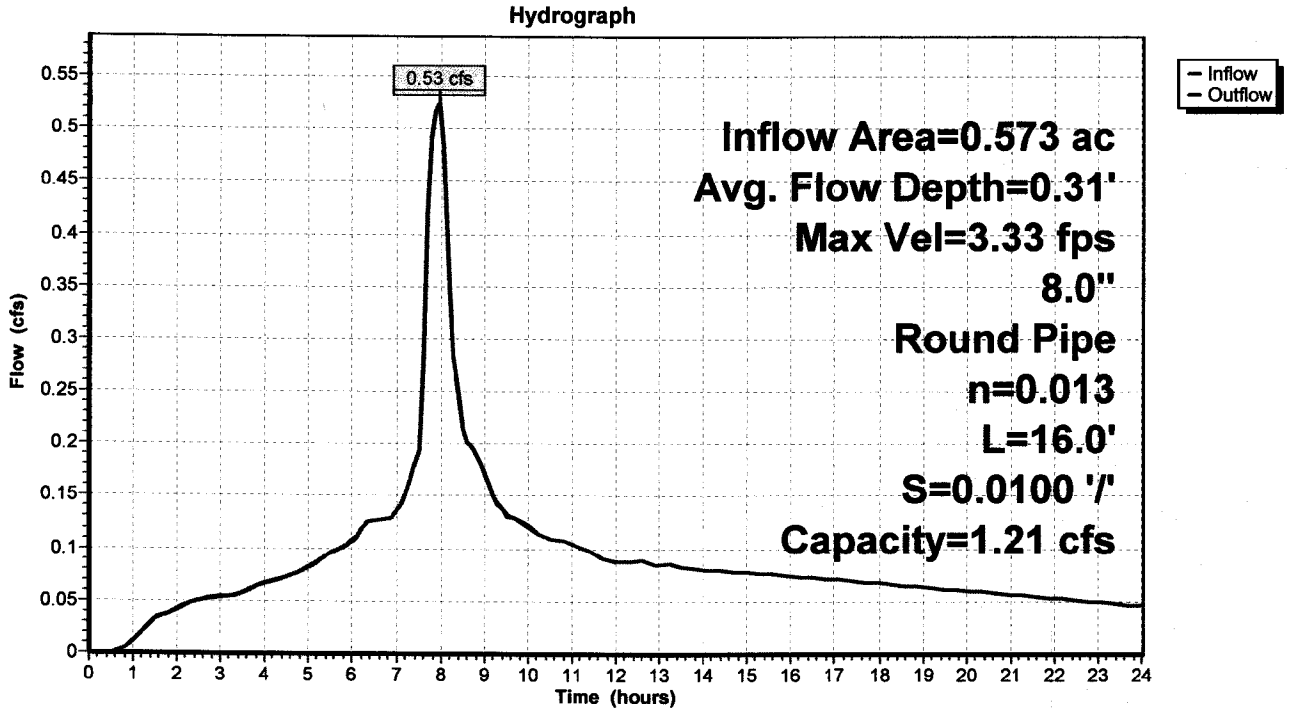
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 3.33 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.94 fps, Avg. Travel Time= 0.1 min

Peak Storage= 2 cf @ 7.95 hrs
Average Depth at Peak Storage= 0.31'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 1.21 cfs

8.0" Round Pipe
n= 0.013
Length= 16.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.16'



Reach 3RD: 8" Pipe



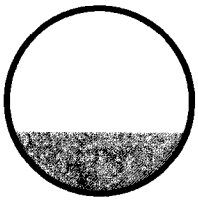
Summary for Reach 4RD: 6" Pipe

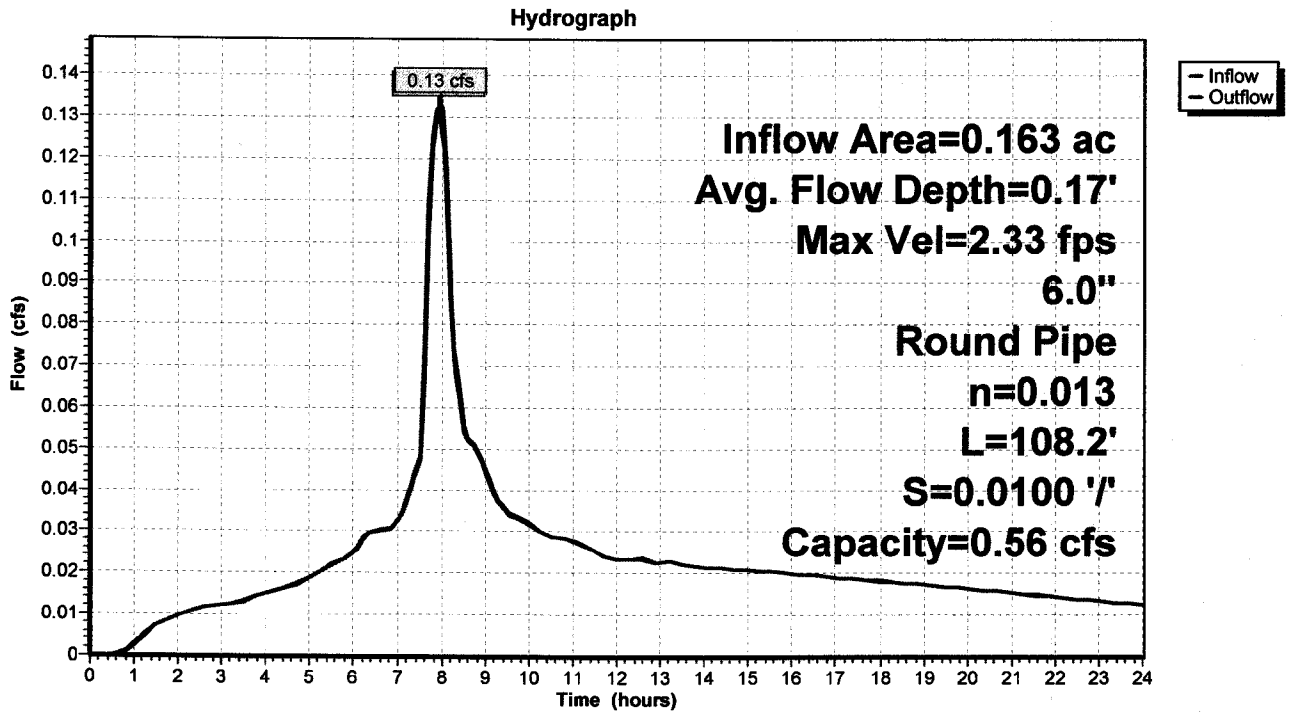
Inflow Area = 0.163 ac, 64.42% Impervious, Inflow Depth > 3.35" for 100-YR STORM event
Inflow = 0.13 cfs @ 7.94 hrs, Volume= 0.046 af
Outflow = 0.13 cfs @ 7.96 hrs, Volume= 0.045 af, Atten= 0%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.33 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.35 fps, Avg. Travel Time= 1.3 min

Peak Storage= 6 cf @ 7.95 hrs
Average Depth at Peak Storage= 0.17'
Bank-Full Depth= 0.50', Capacity at Bank-Full= 0.56 cfs

6.0" Round Pipe
n= 0.013
Length= 108.2' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -1.08'





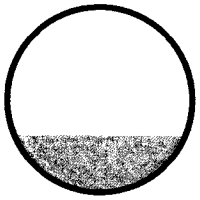
Summary for Reach 5RD: 8" Pipe

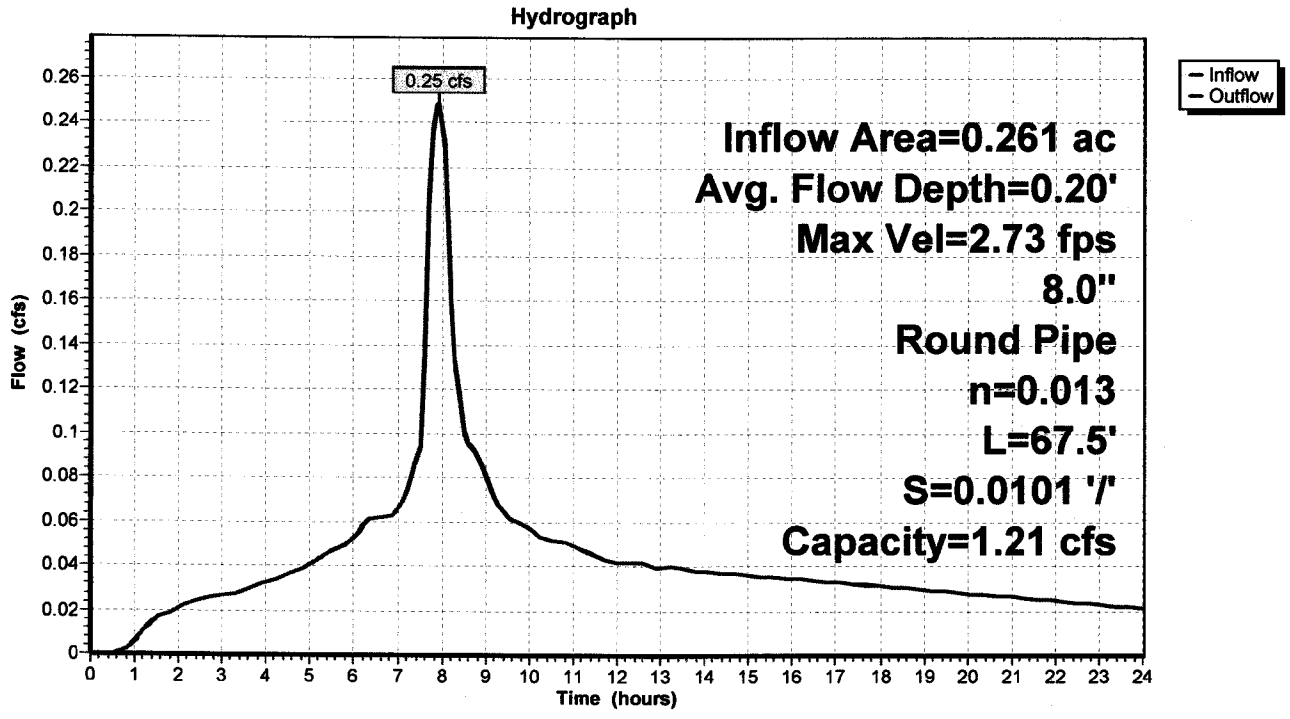
Inflow Area = 0.261 ac, 86.97% Impervious, Inflow Depth > 3.86" for 100-YR STORM event
Inflow = 0.25 cfs @ 7.93 hrs, Volume= 0.084 af
Outflow = 0.25 cfs @ 7.95 hrs, Volume= 0.084 af, Atten= 0%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.73 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.57 fps, Avg. Travel Time= 0.7 min

Peak Storage= 6 cf @ 7.94 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 1.21 cfs

8.0" Round Pipe
n= 0.013
Length= 67.5' Slope= 0.0101 '/'
Inlet Invert= 0.00', Outlet Invert= -0.68'





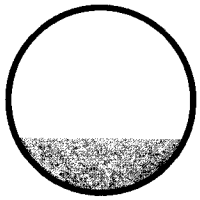
Summary for Reach 6RD: 6" Pipe

Inflow Area = 0.101 ac,100.00% Impervious, Inflow Depth > 4.16" for 100-YR STORM event
Inflow = 0.10 cfs @ 7.92 hrs, Volume= 0.035 af
Outflow = 0.10 cfs @ 7.93 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.6 min

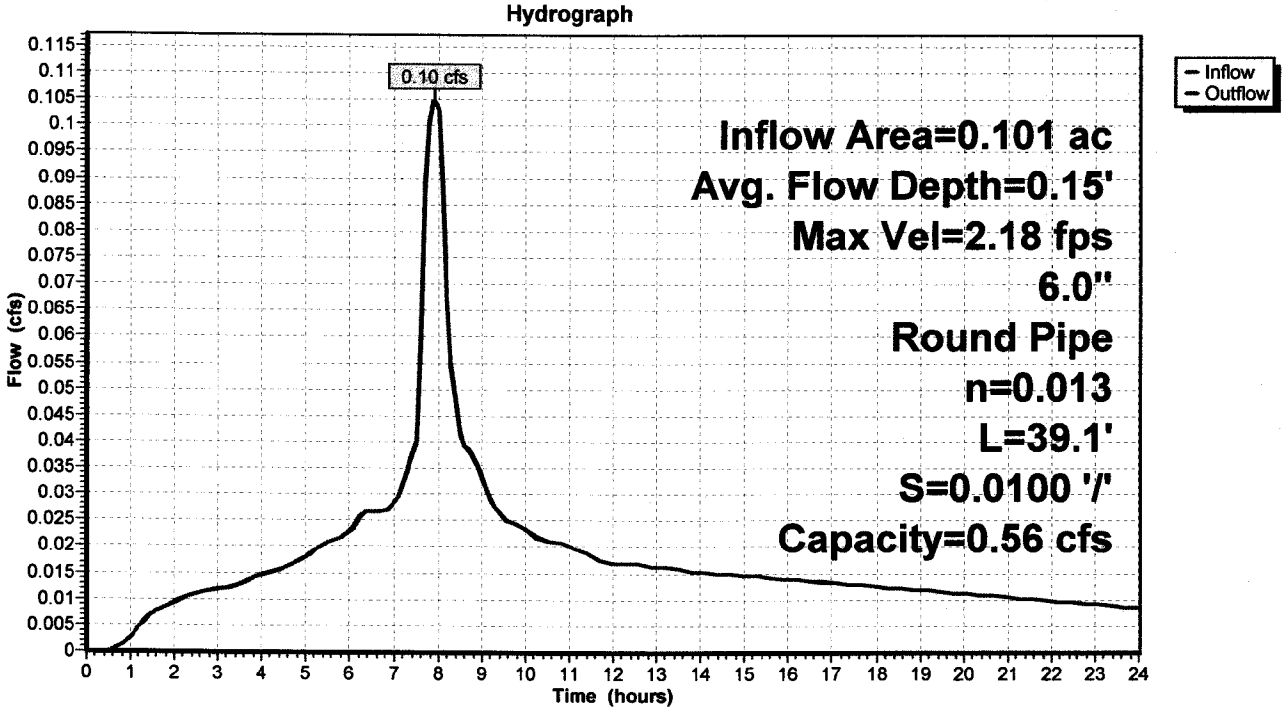
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.18 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.25 fps, Avg. Travel Time= 0.5 min

Peak Storage= 2 cf @ 7.92 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 0.50', Capacity at Bank-Full= 0.56 cfs

6.0" Round Pipe
n= 0.013
Length= 39.1' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.39'



Reach 6RD: 6" Pipe



Summary for Pond 1P: Detention Pipe

Inflow Area = 0.573 ac, 80.10% Impervious, Inflow Depth > 3.70" for 100-YR STORM event
Inflow = 0.53 cfs @ 7.95 hrs, Volume= 0.177 af
Outflow = 0.09 cfs @ 11.60 hrs, Volume= 0.118 af, Atten= 82%, Lag= 219.0 min
Primary = 0.09 cfs @ 11.60 hrs, Volume= 0.118 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 4.59' @ 11.60 hrs Surf.Area= 441 sf Storage= 3,018 cf

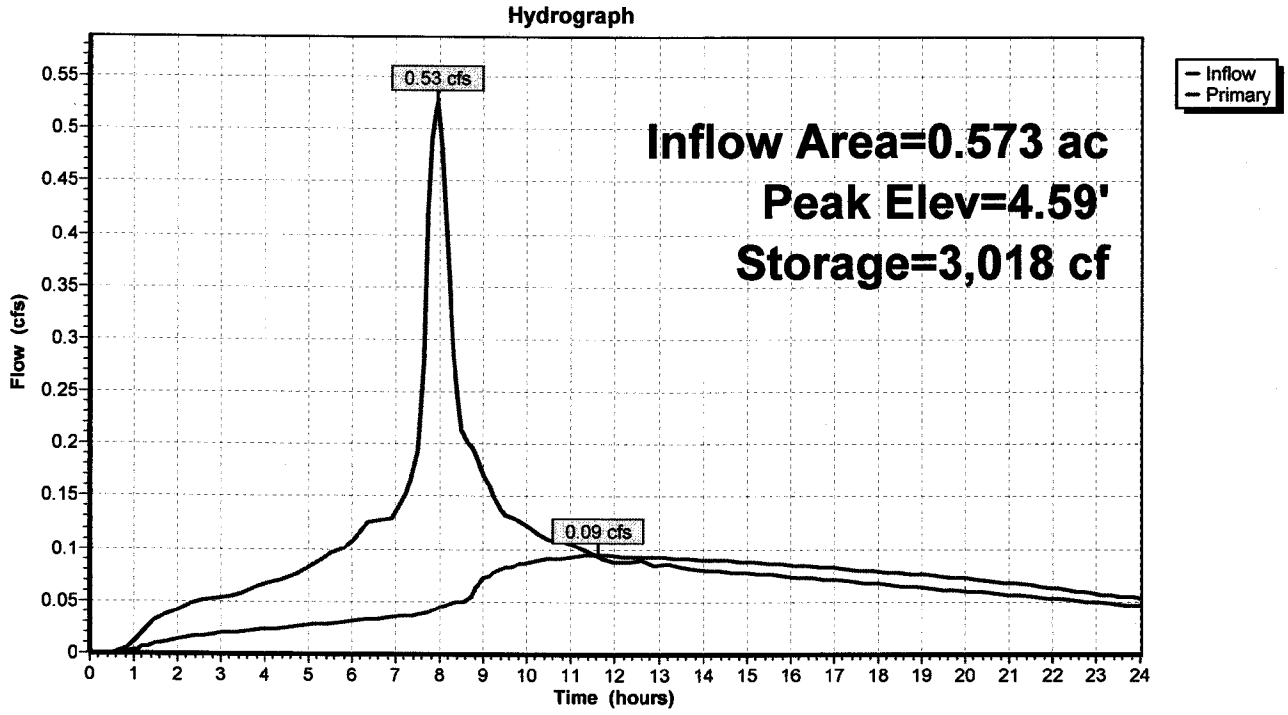
Plug-Flow detention time= 388.3 min calculated for 0.117 af (66% of inflow)
Center-of-Mass det. time= 185.4 min (861.9 - 676.5)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	3,142 cf	**60.0" D x 160.0'L Pipe Storage**

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**1.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	3.80'	**1.3" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.09 cfs @ 11.60 hrs HW=4.59' (Free Discharge)
1=Orifice/Grate (Orifice Controls 0.06 cfs @ 10.26 fps)
2=Orifice/Grate (Orifice Controls 0.04 cfs @ 4.12 fps)

Pond 1P: Detention Pipe



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City of West Linn
PRE-APPLICATION CONFERENCE MEETING
REVISED SUMMARY NOTES
June 2, 2011

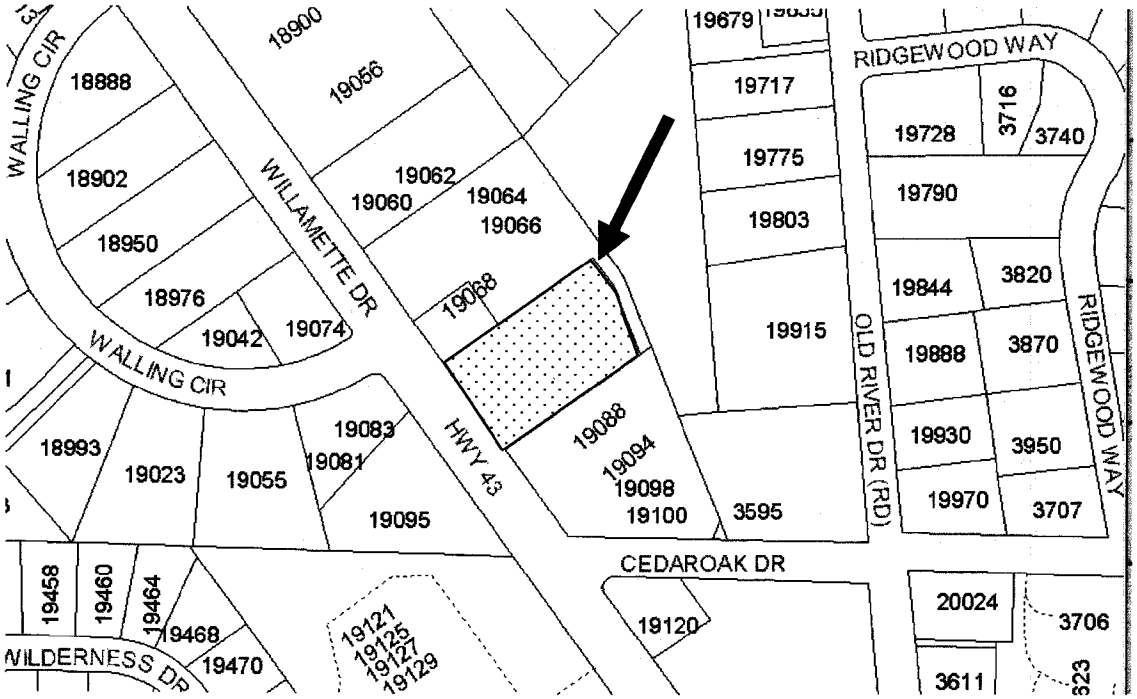
SUBJECT: Chase Bank at 19080 Willamette Drive

ATTENDEES: Applicants: Jon McAuley, Christopher Lind, Jeff Olson, Lisa Brevard, Chris Wonderly
Staff: Khoi Le (Engineering), Peter Spir (Planning) David Davies (Building)

The following is a summary of the meeting discussion provided to you from staff meeting notes. Additional information may be provided to address any "follow-up" items identified during the meeting. These comments are PRELIMINARY in nature. Please contact the Planning Department with any questions regarding approval criteria, submittal requirements, or any other planning-related items. Please note disclaimer statement below.

Project Details

The proposal would create a one story 4,120 square foot Chase Bank at 19080 Willamette Drive also known as the former Kasch's nursery site. The site includes two tax lots (703 and 705) comprising 38,294 square feet.



Proposed Chase Bank site

The bank building would extend along the edge of the Willamette Drive right of way (ROW). In addition to the bank, a smaller structure with two drive through lanes accommodating one 24-hour ATM and one voice automated teller (VAT) would be located at the rear or eastern portion of the site. Most of the site would be occupied by parking and driveways. One of the driveways will connect with Doug Seeley's Willamette Village commercial development to the north.

The property is zoned "General Commercial" (GC). Banks are "permitted outright" in the GC zone so long as Class II Design Review is addressed.

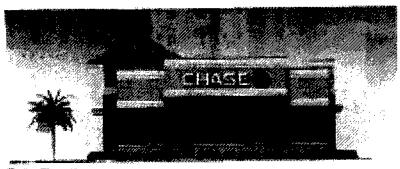
The site extends back or east 260 feet from the Willamette Drive ROW. The front two-thirds of the lot are flat. The land then drops down about 10 feet to a lower flat area at the rear of the existing Kasch's building.

There are no drainageways, riparian zones, wetlands or other natural features as defined by the CDC on the property. The trees are few and limited to the rear property line. They appear to be three cottonwoods about 30-40 feet tall. These trees provide some screening between the site and the apartments to the rear of the site. (A survey is needed to determine if the trees are in fact on the applicant's property.)

L-Series Prototype - Brick

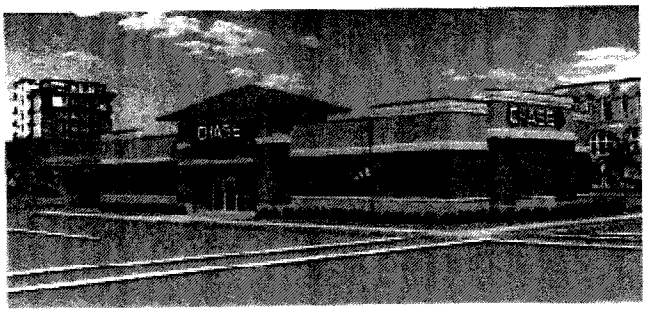
Left Elevation

Front Elevation

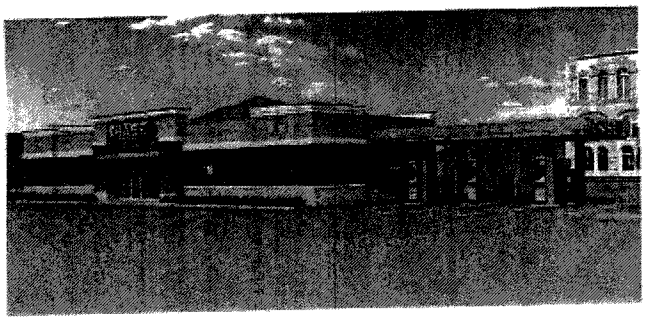


Right Elevation

Back Elevation



Front View



Back View

Architecture

Design

By the notation on the plans (L-Series Prototype –Brick) it seems that the design is one of a number that could have been chosen. Be that as it may, this design is a single story structure. As seen from Willamette Drive the front elevation is broken into three parts with the central entry way section capped with a hipped/pyramidal roof. (The roof positively mirrors the design

of the Starbucks up the street (see photo below)) The entry way makes good use of glass with a flat protective awning and transom windows above the awning as well. Above the transom windows is an area for the main sign. The brick clad columns that are on each side of the entryway section breaks up the horizontal plane effectively. The vertical plane is broken into three elements by using different building materials including brick cladding at eye level. The Community Development Code (CDC) offers the following comments and standards:

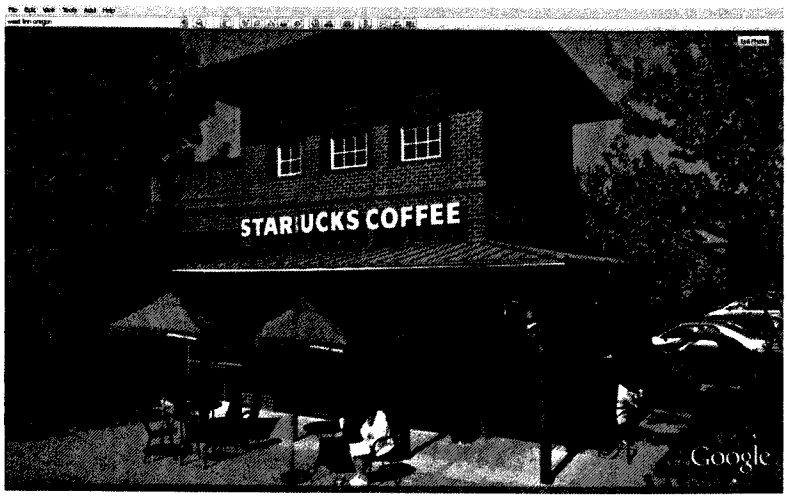
CDC 55.100(B)6. Architecture.

a. The predominant architecture of West Linn identified in the West Linn vision process was contemporary vernacular residential designs emphasizing natural materials: wood with brick and stone detail. Colors are subdued earth tones: grays, brown, off-whites, slate, and greens. Pitched roofs with overhanging eaves, decks, and details like generous multi-light windows with oversized trim are common. Also in evidence are the 1890s Queen Anne style homes of the Willamette neighborhood. Neo-traditional homes of the newer subdivisions feature large front porches with detailed porch supports, dormers, bracketed overhanging eaves, and rear parking for cars. Many of these design elements have already been incorporated in commercial and office architecture.

b. The proposed structure(s) scale shall be compatible with the existing structure(s) on site and on adjoining sites. Contextual design is required. Contextual design means respecting and incorporating prominent architectural styles, building lines, roof forms, rhythm of windows, building scale and massing, materials and colors of surrounding buildings in the proposed structure.

In addition to the CDC, the Robinwood Neighborhood Plan calls for developing "a common architectural and design theme for commercial development along Willamette Drive." It also requires primary use of quality building materials such as stone, terra cotta and wood for frontage facades.

Regarding compatibility the following two photographs of nearby buildings are offered as examples that meet the CDC:



Entryway

CDC 55.100(B)(7) requires that all businesses have at least one main entry onto the street side. The front large well defined entryway on Willamette Drive meets the criterion. The transom looks good. Extending the awning to provide more rain protection (6-8 feet) is needed.

Transparency

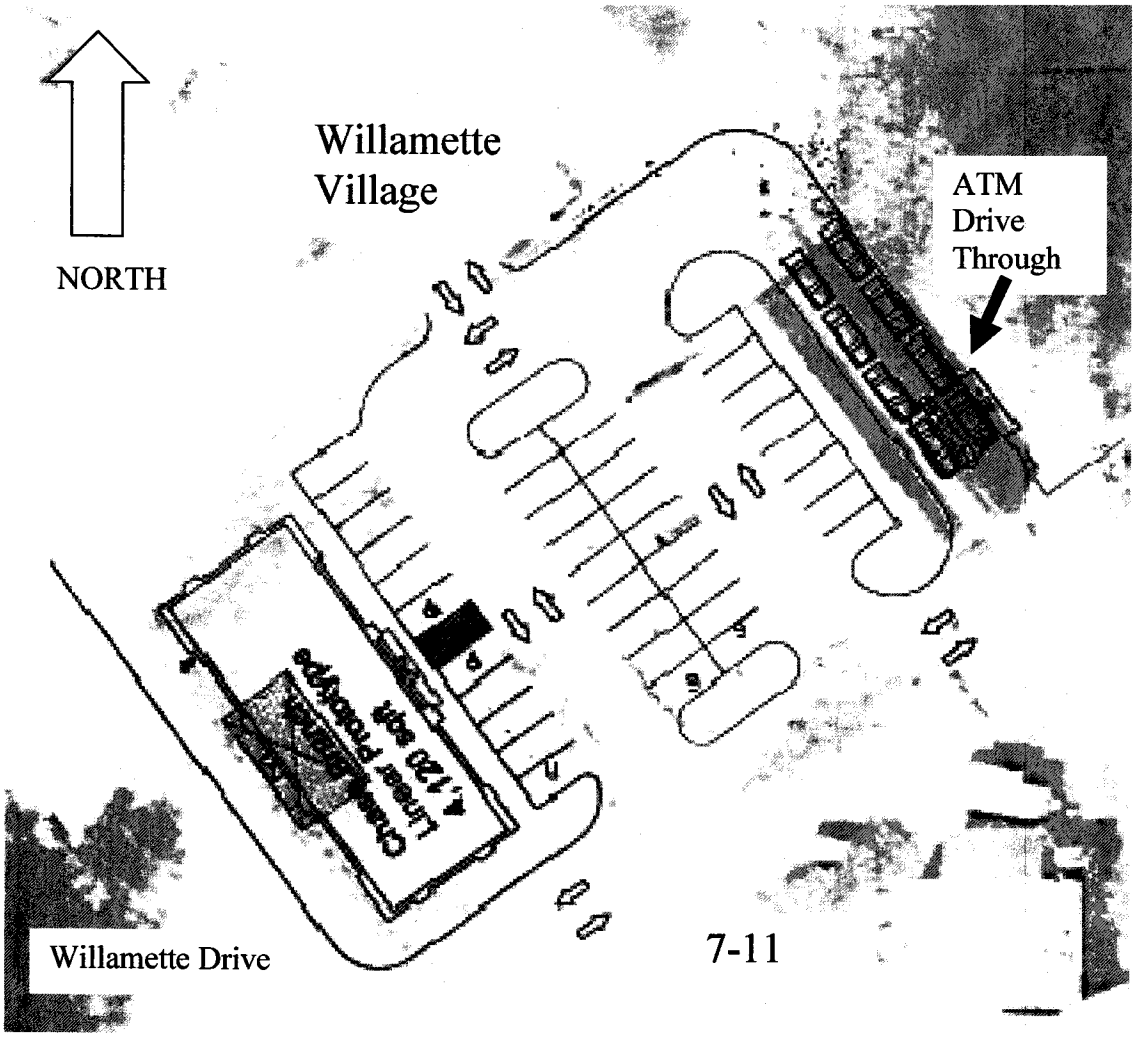
The transparency requirements of CDC 55.100(B)(6)(f) must be met. Sixty percent of the lineal frontage of the Willamette Drive elevation must have windows. At least one of the north or south facing elevations needs 30 percent transparency too. Glass must be clear and cannot be mirrored or smoked etc. The west facing or main elevation on Willamette Drive has about 53% transparency. That's good but it needs to be increased to meet the 60% standard. Both north and south facing elevation are blank. This is a problem.

The CDC allows for "transferring" window square footage. Thus it would be possible for the applicant to get credit for any surplus transparency on a re-designed front or side elevation. The applicant could apply for a variance: requesting that transparency on the rear elevation be "transferred" or credited to the front or side elevations. The applicant could strengthen the variance request by adding some acceptable kind of wall decoration, bas relief, art work etc. on those blank elevations. The applicant mentioned using a faux window with a poster inside. Staff is agreeable to looking at a drawing or photograph of how that would look but it sounds like that would still have to be attached to a variance request.

Building Materials

The single story building looks to be clad in drivet from grade to two feet above grade (bulkhead), then brick from about two feet to nine feet followed by more drivet which is capped by a contrasting colored cornice. The use of smaller cornices that barely project from the building (or no cornices at all) is preferred rather than using the exaggerated cornices

common on so many retail or office buildings. Flat /horizontal rooflines are preferred over the dated false front/parapets and peaks.



Sidewalk

A 12-foot wide sidewalk with cut outs for trees along the curb edge was called for in the CDC. It was noted that the West Linn OR 43 Conceptual Design Plan calls for a 15-foot sidewalk combining 10 feet for pedestrians and five feet for tree cut outs, utilities and street furniture; but as staff noted, although that document has been adopted by City Council it has not been incorporated in the CDC so the 12-foot dimension would prevail. Still, if the applicant wants to improve the product, they could go with the 15-foot configuration.

Awnings

Awnings should extend perpendicular from the face of the building rather than slope down at a 45 degree angle. The awnings should extend out 6-8 feet with 8 feet of vertical clearance. The awnings should also extend continuously across the entire front building elevation to provide meaningful protection from rain and sun. The awnings should be permanent material (metal) and not fabric. The applicant proposed that the valence area of the awning be blue. Staff is agreeable to looking at a drawing or photograph of how that will look. But the preference is that it be left black, metal or natural earth tones. Gail Curtis of ODOT is supportive of the awning extending into the ROW but a permit is needed from them.

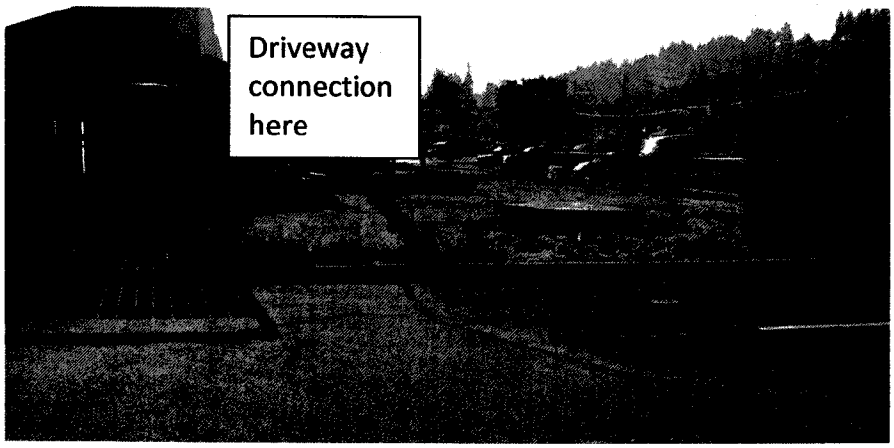
Awnings
In an earlier pre-application meeting for this site, both staff and Tom Boes (RNA) wanted to see the awnings extend perpendicular from the face of the building rather than slope down at a 45 degree angle. The awnings should extend out 6-8 feet with 8 feet of vertical clearance. The awnings should also extend continuously across the entire front building elevation to provide meaningful protection from rain and sun.

Shared Driveway

The applicant's site plan shows the connection to the adjacent property to the north. The developer of that property (to the north) is required to provide a 24-foot wide driveway and

access easement for the benefit of this property (Kasch's). The condition of approval for that application (DR-06-43) is as follows:

> *"At such time that the commercially zoned property to the south (Assessor's Map 21E 23AA tax lot 703) currently known as Kasch's, applies for a design review application, this applicant shall provide and construct a 24 foot wide driveway along the south property line to connect the two parcels. Further, the applicant shall prepare and sign a waiver of remonstrance to the connection, construction and use of a driveway from the tax lot 703 (Kasch's property) onto the applicant's property. Further, the applicant shall sign and record a reciprocal and mutual access easement that would allow traffic from the tax lot 703 (Kasch's property) to exit via the applicant's parking lot and driveway and vice versa. These documents shall be reviewed and approved by the City Attorney."*



The intent also is that the traffic from each property could, by mutual access easement, traverse each other's site to their points of ingress/egress. The City and ODOT endorse this.

The use of different colors, textures or materials to encourage use of pedestrian routes through the parking and driveway areas is required per 55.100(B)(7)(d)(e) and 46.150(A)(20).
A pedestrian link needs to be provided on the north or south side of the common driveway.

Color

The neural colors and brick cladding around the middle of the building are good. The blue fabric awnings should be replaced with flat metal awnings. If the applicant has any local examples of how these colors and the blue lighting look, they are encouraged to let staff know so we can visit those sites.

Parking

Placing the parking at the rear of the building is correct per code. It is noted that the parking is based on the land use category in CDC Chapter 46 of "Professional offices, banks, savings and loans...." Parking is calculated at one space per 350 square feet of gross floor area. Half of the spaces must be compact (8X16) and half standard (9X18). One ADA space (van accessible) is

required per 46.150(B). Three stacking spaces (20 feet each) are required for each drive through aisle.

The 4,120 square foot building requires 11.77 spaces which then are rounded up to 12 spaces.

Drive through lanes: Design and Sustainability (not related to approval criterion)
Drive-through lanes are shown at the rear of the building.
The City has concerns with drive throughs in terms of sustainability and pollution. Review of industry literature produced the following positive solution:

"Cars idling for more than 10 seconds use more gas and create more global warming pollution than simply restarting the engine. Surprised? It's true - the 10-second rule has been proven empirically. The 10-second rule was originally published on the Canadian Office of Energy Efficiency's Idle-Free Zone webpage. Their results were replicated by the American Society of Mechanical Engineers, which found that restarting uses the same amount of fuel as idling with the air conditioner on for 6 seconds.

Zions Bank in Utah is asking its customers to turn the key on air pollution.
In a voluntary effort to help clean up Utah's smog, all Zions locations are asking their customers to cut their engines when waiting in line at the drive-through.
Bank patrons who use the pneumatic tubes are greeted by large stickers reading, "Turn your key, be idle free. By turning your engine off when waiting, you will breathe easier and save gas."
The statewide campaign originated in Salt Lake City, where the city was partnering with businesses "to identify ways to educate the public on ways to improve our air quality," said Rob Brough, executive vice president for Zions Bank. "The drive-through seemed like the logical way."
Only time will tell if the campaign has a measurable effect, he said. In the meantime, the campaign has garnered positive comments from customers. "We are a community bank and we live in this community with our families as well, and we all benefit by having cleaner air," he said.

Joe Thomas of the Utah Division of Air Quality said the program is such a good idea that he himself cuts his engine anytime he's at any bank drive-through. If a car is going to be running on idle for several minutes, cutting the engine is a simple and easy way to improve gas mileage, he said. There is a nationwide program to encourage school bus drivers to reduce idle time as well.
"Definitely when the car is idling, you just wasted energy," Thomas said. "You aren't doing anything."
Cutting the engine in a bank drive-through is an especially good idea because in between filling out paperwork and having a conversation with the teller, the transaction could take several minutes, he said."

Staff counted 37 spaces including two ADA spaces. This far exceeds the amount allowed by the CDC. The CDC only allows the minimum 12 spaces to be exceeded by 10% or two spaces for a maximum of 14 spaces. Thirteen spaces must be eliminated. There is no basis to support a Variance.

Access/ODOT

Access from Willamette Drive would utilize an existing driveway that is shared with the 7-11 development next door. The applicant proposes a 30-foot wide driveway width. The maximum curb cut width on Highway 43 is 40 feet but it requires ODOT approval. An ODOT approach permit would have to be obtained. According to a telephone message from Gail Curtis no traffic study is needed for ODOT but the City still requires one. Gail Curtis was also supportive of the joint driveway access to the adjacent property to the north. (Please also refer to Gail Curtis' letter from ODOT attached relating to a previous development proposal.)

Landscaping

Landscaping is explained in 54.020(E)(2)(3) and 54.070. There is ample room at the rear of the site to meet the total overall 20% landscaping requirement. There is also the requirement that five percent of the rear parking lot comprise landscaping. (This assumes that the applicant will reduce the parking spaces to the maximum of 14 allowed by the CDC.) Landscaping is explained in 54.020(E)(2)(3) and 54.070. Street trees along Willamette Drive at 35 feet on center are required in cutouts adjacent to the curb.

A landscaped strip at least five feet wide is required between this site and the properties on all sides and rear per CDC 54.020(E)(3)(b)(d).

Noise

The sound of cars using the drive through, the noise of the loudspeaker at the drive through plus general traffic noise in the parking lot are anticipated. Because Kasch's garden store operated at this site for decades the noise study would not be per the "previously unused commercial property" standards. See CDC 55.100(D). The recommendations of the noise study would be an important part of the noise mitigation plan.

Screening the rear of the site and parking lot, from adjacent residential uses, with a six foot tall solid masonry wall would mitigate glare but more importantly, the noise from the 24-hour drive through area.

Bike Parking

CDC 46.150(D) requires two bike parking spaces (based on stated building size). At least one shall be covered. Both shall be located near the front entrance where they can be easily observed.

Signs

One freestanding sign at 32 sq ft. is allowed. The maximum height is eight feet and it must be mounted per CDC 52.210(G). A maximum of three wall signs are allowed. Signs shall not exceed 10% of the square footage of the wall they are mounted on either individually or collectively. (See CDC Chapter 52.300.) The applicant proposes a sign on the ATM. Only three wall mounted signs per business are permitted. Given the desire to have three on the bank there would not be additional signage available for the ATM. A variance would be the only

option. Given that drive through windows at fast food restaurants get extra signage, a case could be made.

Refuse and Recycling Containment
Refuse and recycling facilities are required and are detailed in CDC section 55.100(O). Landscaped screening and buffering is required.

Setbacks
CDC 19.070(A)(7) states: "*For lot lines that abut an arterial, there shall be no minimum yard dimensions or minimum building setback area, and the maximum building setback shall be 20 feet.* ***The front setback area between the street and the building line shall consist of landscaping or a combination of non-vehicular hardscape areas (covered with impervious surfaces) and landscaped areas, with at least 25 percent of the front setback area consisting of landscaped areas.*** *If there are not street trees within the public right-of-way, the front setback area shall include such trees per the requirements of the City Arborist.*"

That code section runs counter to design concepts for that street which require that all buildings have a zero foot setback for 100% of their (building) frontage. Staff and the City do not want to back away from the zero foot setback and the desire to create a more dynamic social space along Willamette Drive. Therefore the applicant needs to apply for, with full staff support, a Class II Variance from the 25% landscape standard.

Setbacks on the side lot lines is zero feet. At the rear the setback is 20 feet for buildings. Additional buffering may be required at the rear to mitigate impacts.

Lighting
Site lighting is allowed but no off site glare is permitted.
Lighting should be designed to enhance defensible space.
Blue uplighting may be permitted so long as it focuses on the building and signs.

ENGINEERING COMMENTS
Khoi Le
Kle@westlinnoregon.gov

TRAFFIC

The property is currently located in the corridor where the City Transportation System Plan has developed a specific conceptual plan for this particular corridor.

At the current conditions, the City TSP identifies that the intersection between Hwy 43 and Pimlico Drive has been operating at a deficient level of service.

TSP recommends a traffic signal to be installed when warranted. Thus traffic impact shall be required for this intersection to determine whether or not the signal is required.

By 2030, there will be several intersections along Hwy 43 that will be operating at deficient level of service. The two nearest intersections to the project site are Hwy 43/Cedaroak Drive and Hwy 43/Hidden Springs Road. Therefore a traffic impact analysis shall be required.

TRAFFIC IMPACT ANALYSIS SCOPE OF WORKS

Traffic Impact Study shall be required on either option. Traffic Impact Study shall provide following information and analysis:

- Executive Summary
- Introduction
- Location Description
- Trip Generation
- Trip Distribution
- Operational Analysis
- Safety Analysis

Analysis shall also be done for the following intersections.

- Hwy 43 and Cedaroak Drive
- Hwy 43 and Hidden Springs Road

Traffic Impact Study shall also include any scopes and analysis that are required by ODOT.

Per City of West Linn Transportation Master Plan, following is classification for those streets.

- Hwy 43 – Major Arterial
- Cedaroak Drive – Neighborhood Route
- Hidden Springs Road – Minor Arterial

Engineering must scope the applicant's traffic report in addition to ODOT.

DRIVEWAY

Many existing driveway along Hwy 43 do not meet the current spacing requirement.

TSP – 300 feet spacing is required.

The current shared driveway between the proposed development and 7Eleven and the adjacent development to the North is approximately 200 feet apart. It does not meet the

spacing requirement therefore any additional driveway between these two driveways shall not be allowed.

There is an access agreement in placed when the adjacent property to the North came in for developing. Please exam the option of sharing driveway access with this property.

If access agreement with 7-11 has not been established, an established agreement will be required.

STREET IMPROVEMENT

Street improvement shall be required. Street improvement shall consist of street pavement replacement with new curb as well as new sidewalk.

New sidewalk shall be as wide as the existing sidewalk along the adjacent property located on the North. Existing sidewalk may need improvement so sidewalk width will be consistence along all properties.

Dedication or public easement may require keeping public pedestrian walk way inside public right of way or public easement.

Street improvement shall meet both City of West Linn and ODOT requirements.

Development shall require obtaining all permits necessary from ODOT for the development.

Development shall require providing proof of approval from ODOT before City construction permit being released for construction.

Provide a photometric analysis for existing street lights along the project frontage along Highway 43 to ensure whether or not additional street light shall be required.

Check with ODOT on the height clearance for street light mast arm if additional street light is needed.

STORM DRAINAGE IMPROVEMENT

Since the previous development has never provided storm treatment water treatment and detention, new development is required to provide storm water treatment and detention meeting the City of West Linn Standards.
If the development is required obtaining DEQ approval, development shall require providing proof of approval from DEQ before City construction permit being released for construction.

Storm Drainage Report shall be required.

SANITARY SEWER

There is existing public sanitary sewer main line in the back of the property available for connection.

WATER IMPROVEMENT

This property is currently located in the Robin Wood Pressure Zone. The Robin Wood Water Pressure Zone is currently deficient under emergency conditions however there is not any improvements along or nearby the proposed development listed in the City Water Master Plan. Therefore the proposed development shall require paying water SDC for the additional water demand.

When water demand occurs, a hydraulic analysis shall be required. The developer shall require paying Murray & Smith Associates for the analysis making sure the increased demand will not make the current water system worsen.

Development shall require providing proof of approval from the Fire Department before City construction permit being released for construction.

The applicant should contact Joel Komarek (jkomarek@ci.oswego.or.us) of Lake Oswego regarding the Lake Oswego water line running along the project frontage on Willamette Drive.

OTHER UTILIY IMPROVEMENTS

No overhead utilities and utility poles with the exception of street lights shall be allowed along the project frontage. All existing overhead utilities along the project frontage shall be placed underground. All existing utility poles along the project frontage shall be removed. Development shall be responsible for expenses removing existing poles and placing existing overhead utilities underground.

STREET SDC

Applicant must pay Street SDC. Street SDC calculations are based on the Total Trip Generation from the Development during PM Peak Hour.

Applicant can use Total Trip Generation for a Drive-Through Bank from the ITE 8th Edition or use Total Trip Generation from the Traffic Impact Study prepared by an Oregon License Professional Traffic Engineer.

Applicant shall receive credit from Trip Generation from the former Kasch's Nursery.

BUILDING DEPARTMENT COMMENTS

The system development charges (SDCs) including the Road SDC's which could be a significant amount. The applicant would get credit for trip generation produced by Kasch's. The applicant's traffic study will be used as the basis for projecting the Chase bank trip generation which in turn will be used to compute the SDC's. This SDC charge does not include other utility related SDC's, building permits, etc. (Contact David Davies at ddavies@westlinnoregon.gov or Jim Clark who prepares the SDC calculations at jclark@westlinnoregon.gov).

CONCLUSION

Staff could support this application contingent upon, but not exclusively:

1. Extending a permanent flat or modest sloped metal canopy/awning across front elevation.
2. Meeting permitted noise standards.
3. Adequate transparency requirements on three building elevations (north, south and west) per code.
4. Reduce parking spaces to a maximum of 14 including ADA space.
5. Construct driveway to property to the north with mutual access easement.
6. Use minimal cornices, limit roof variations to hipped/pyramidal roof over main entry.

PROCESS

Schedule and conduct a neighborhood meeting pursuant to CDC Section 99.038. Follow the requirements exactly. The Robinwood Neighborhood Association (RNA) meets on the second Tuesday of the month. Contact Tom Boes, President, at 699-6112 or e-mail at TCBOES@gmail.com. For this meeting the applicant shall provide all available plans, architectural drawings and explanatory narrative to the RNA at least ten days prior to the meeting.

Required permit: Class II Design Review with Class II Variances (front setback/landscaping, transparency, signs, etc.)

Complete the Class II Design Review application form and submit it to the Planning Department with deposit/fees based upon the fee schedule. (The deposit/fee for design review is 4,000 dollars plus four percent of the construction value as determined by the Building Department (20,000 dollar minimum). Staff will bill hours against these deposits. Surplus deposit money will be returned on completion of the land use permit process. Cost overruns could result in payment of additional deposit/fees.

Accompanying the application and deposit/fees will be a full and complete submittal and full response to the approval criteria per the requirements of CDC Chapters 55. Other applicable chapters include 46, 48, 52 and 54. If you submit signs for review at this time you can avoid additional delays of up to a month to obtain the sign permit later. Sign permit fee is 250 dollars. In the event that a Class II Variance(s) is needed, the deposit fee is 1,800 dollars and

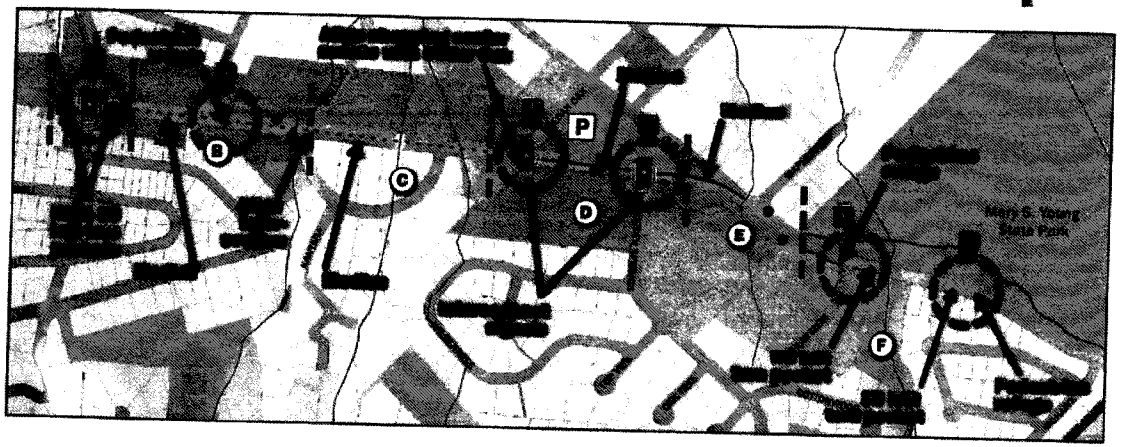
the submittal and approval criteria of CDC Chapter 75 must be addressed. If multiple variances are needed, each additional application deposit fee is 900 dollars.

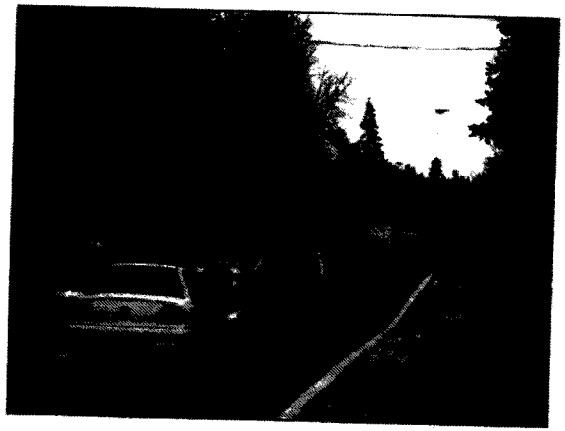
The City has 30 days to determine if the application is complete or not. Most applications are incomplete, usually due to inadequate responses to approval criteria or stating "NA" in response to submittal requirements or approval criteria. Statutorily, the applicant has 180 days to make it complete, although usually it is complete within three to four months of the original submittal date. Once complete, the burden shifts to the City and the City has 120 days to exhaust all local review (hearings) and appeals.
Once complete, the application will be noticed to property owners within 500 feet of the site perimeter. There will be Planning Commission hearing about four weeks after the determination of completeness. Appeals are heard by City Council.

Typical land use applications can take 6-10 months from beginning to end.

DISCLAIMER: This summary discussion covers issues identified to date. It does not imply that these are the only issues. The burden of proof is on the applicant to demonstrate that all approval criteria have been met. These notes do not constitute an endorsement of the proposed application. Staff responses are based on limited material presented at this pre-application meeting. New issues, requirements, etc. could emerge as the application is developed. These pre-application notes shall be invalid 18 months from the date of the pre-app. After that date, another pre-app would be required. Also, new state laws and development code amendments can impact the feasibility of a project.

West Linn OR 43
Conceptual Design Plan





Final Report

January 4, 2008

APPROVED BY THE WEST LINN CITY COUNCIL

RESOLUTION 07-26

Segment D / Intersections 4 & 5

Segment D is generally an 80' right-of-way, with the Robinwood Shopping Center on one side, and the TriMet shared use park & ride on the other. The cross section responds to the greater amount of pedestrian traffic associated with these land uses, and provides 10' sidewalks on both sides of the street, separated from the bike path and roadway by a planting strip with tree wells. A median is planned for the entire length of Segment D. This median is not expected to negatively impact access along the segment, as the Park & Ride and the commercial use at the northwest corner of OR 43 and Cedar Oak both maintain access drives to side streets.

Furthermore, the plan recommends shifting the existing access drive to the Robinwood Shopping Center from its current midblock location to more closely align with Cedar Oak. This alignment will create a true, 4-leg intersection, and is expected to dramatically improve functionality and safety. It should be noted that the shopping center's parking lot configuration would have to change in order to accommodate this new access drive at the northern boundary of the property. Final determinations regarding specific designs for the new driveway, and the effect of driveway queuing on the existing parking lot's functionality are to be studied and determined during preliminary engineering.

As stated in the previous section, some issues associated with this realignment will need to be addressed during preliminary engineering, however. These issues include examining the effect of the "skew" angle of Cedar Oak on the proposed improvement, as well as examining any right-of-way takes which may be associated with the improvement. Signage issues associated with proposed new right turn and right through lanes on OR 43 at Cedar Oak will also requie ODOT examination. If these issues cannot be satisfactorily resolved, status quo conditions will prevail.

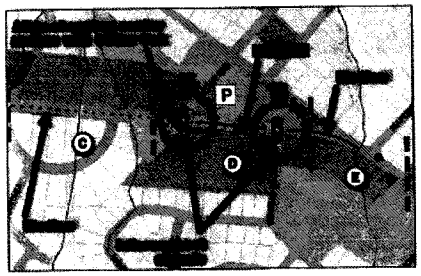
The current property owner has expressed a wish to maintain the existing entrance along HWY 43 as a "right-in / right-out" access drive. However, the recommended driveway realignment is recommended as a safety improvement. Therefore, any decision to keep the current driveway open will depend upon future studies analyzing the safety of maintaining this driveway. It should be noted that the current driveway location and its width negatively impact the pedestrian environment. Furthermore, TriMet has voiced a preference for closing the driveway, based on rider input, as it creates conflicts between automobiles and pedestrians, and endangers transit riders walking to and from nearby bus stops and the park and ride. These moves may also allow TriMet to adjust the current bus stops to better meet the needs of transit riders.

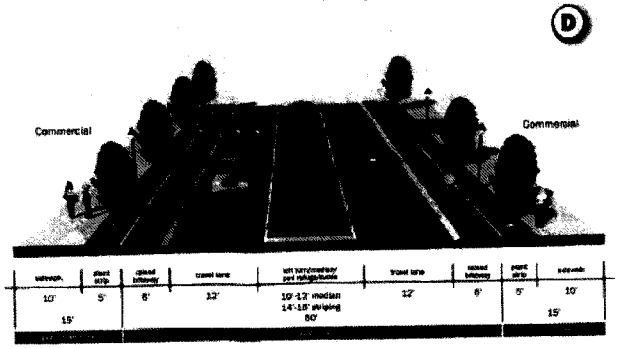
In addition to this realignment, the plan recommends installing a central median along Hidden Springs at the approach to OR 43. This median is designed to prevent left turn maneuvers from the shopping center onto Hidden Springs, and from Hidden Springs into the shopping center. The driveway's proximity to the signal and the volume of traffic flowing through the Hidden Springs intersection makes this maneuver unsafe. The driveway will remain open as a "right-in / right-out" access point. Drivers wishing to make left turns into and out of the shopping center would be encouraged to do so at the access drive located at the rear side of the site (at the property's southern edge).

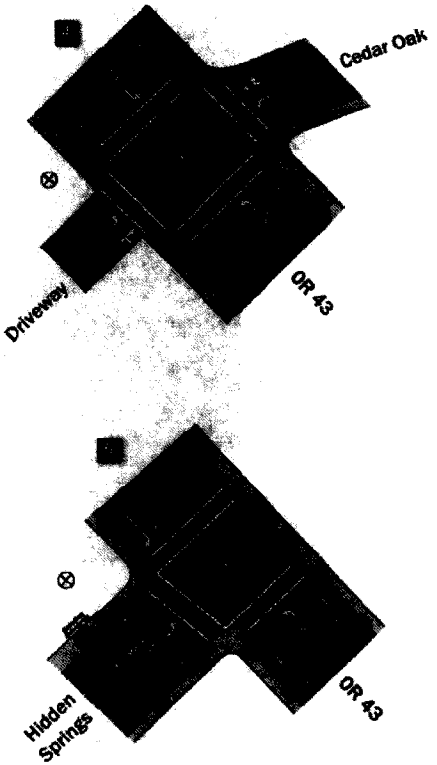
To further maximize vehicular mobility in this area, the plan recommends interconnecting the traffic signals at Cedar Oak and Hidden Springs.

The summary of impacts related to this intersection improvement at Cedar Oak Drive and Hidden Springs Road are as follows:

- Existing ROW on Highway 43 is approximately 75 to 78 feet. To accommodate turn lanes and minimize ROW takes, the proposed cross section with 15-foot planter/sidewalk on each side would be narrowed by approximately 9 feet on the west side, requiring additional ROW of 5 to 8 feet total width.
- Relocation of the existing commercial driveway between Cedar Oak and Hidden Springs will eliminate one driveway conflict. One driveway north of Cedar Oak Drive will conflict with the proposed left turn lane on Highway 43, but it is already a shared driveway and other access alternatives do not exist. One driveway south of Hidden Springs Road conflicts with the proposed turn lanes, but may be closed because it is one of three driveways that access a single parking lot. It is currently channelized as right-in, right-out.







* Raised bikeway subject to ODOT review and approval
* Landscaping/swales subject to ODOT approval and maintenance agreement

LETTER FROM ODOT relating to an earlier pre-application conference for the same site:

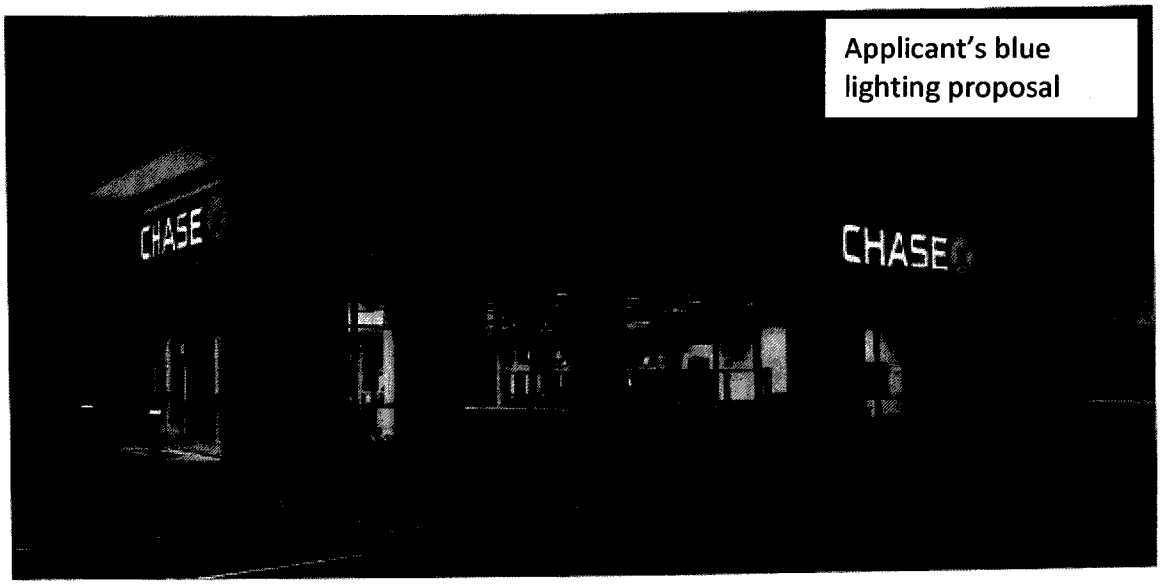
April 15, 2010
City of West Linn
Attention: Peter Spir
22500 Salamo Road, #1000
West Linn, OR 97068

SUBJECT: Key Bank Highway 43 Pre-Application

Dear Mr. Spir,
As you know, ODOT owns and operates the Highway 43 and has an interest in ensuring that area land use is compatible with its safe and efficient operation. We have not received a preliminary site plan so are at a disadvantage to respond but wish to address a couple of potential issues.
The development of the scope for the traffic impact analysis should include our participation to ensure the correct standards are applied. Please have Key Bank's traffic engineer contact Avi Tayar, PE with ODOT at 503-731-8221 or Abraham.tayar@odot.state.or.us to coordinate.
We also wish to raise concern about locating the building along the Highway 43 right of way, as we understand is being considered. While we developing an inviting pedestrian environment with no parking between the building and the street, we want to make sure the driveway sight distance is not limited. Are there applicable city standards to address this?
Regarding placing awnings in the Highway 43 right of way, we need more information to determine if awnings would be allowed and a permit would be required. We consider such requests on a case by case basis. Our primary concern is safety and liability. We want to make sure the awnings are placed to allow full sight distance at the driveway(s). If it would be helpful, I can provide an example of the permit conditions that applied to a similar situation which include provisions to eliminate ODOT liability. Steve Schalk with District 2A is the ODOT Permit Specialist. He can be reached at 503-229-5002 or Steven.B.Schalk@odot.state.or.us
Please provide me with a copy of the applicant's formal submittal. If you or the applicants have any questions regarding the above comments, I can be reached at 503.731.8206.
Sincerely,
Gail Curtis, AICP
Senior Transportation Planner
C: Avi Tayar, PE, ODOT Region 1 Traffic
Steve Schalk, ODOT District 2A

Oregon Department of Transportation
ODOT Region 1
123 NW Flanders St
Portland, OR 97209
Telephone (503)731-8200

FAX (503)731-8259



Preap-PA-11-16-Chase Bank

CITY OF West Linn

Memorandum

Date: June 7, 2011

To: Peter Spir
Planning Department

From: Khoi Le, PE
Public Works – Engineering Division

Subject:	Pre-Application Conference Review
Project:	19080 Willamette Drive – Chase Bank
Project Number:	PA-11-16

Peter,

TRAFFIC

The property is currently located in the corridor where the City Transportation System Plan has developed a specific conceptual plan for this particular corridor.

At the current conditions, the City TSP identifies that the intersection between Hwy 43 and Pimlico Drive has been operating at a deficient level of service.

TSP recommends a traffic signal to be installed when warranted. Thus traffic impact shall be required for this intersection to determine whether or not the signal is required.

By 2030, there will be several intersections along Hwy 43 that will be operating at deficient level of service. The two nearest intersections to the project site are Hwy 43/Cedaroak Drive and Hwy 43/Hidden Springs Road. Therefore a traffic impact analysis shall be required.

TRAFFIC IMPACT ANALYSIS SCOPE OF WORKS

Traffic Impact Study shall be required on either option. Traffic Impact Study shall provide following information and analysis.

- Executive Summary
- Introduction
- Location Description
- Trip Generation
- Trip Distribution
- Operational Analysis
- Safety Analysis

Analysis shall also be done for the following intersections.

- Hwy 43 and Cedaroak Drive
- Hwy 43 and Hidden Springs Road

Traffic Impact Study shall also include any scopes and analysis that are required by ODOT.

Per City of West Linn Transportation Master Plan, following is classification for those streets.

- Hwy 43 – Major Arterial
- Cedaroak Drive – Neighborhood Route
- Hidden Springs Road – Minor Arterial

Engineering must scope the applicant's traffic report in addition to ODOT.

DRIVEWAY

Many existing driveway along Hwy 43 do not meet the current spacing requirement.

TSP – 300 feet spacing is required.

The current shared driveway between the proposed development and 7Eleven and the adjacent development to the North is approximately 200 feet apart. It does not meet the spacing requirement therefore any additional driveway between these two driveways shall not be allowed.

There is an access agreement in placed when the adjacent property to the North came in for developing. Please exam the option of sharing driveway access with this property.

If access agreement with 7Elevent has not been established, an established agreement will be required.

STREET IMPROVEMENT

Street improvement shall be required. Street improvement shall consist of street pavement replacement with new curb as well as new sidewalk.

New sidewalk shall be as wide as the existing sidewalk along the adjacent property located on the North. Existing sidewalk may need improvement so sidewalk width will be consistence along all properties.

Dedication or public easement may require keeping public pedestrian walk way inside public right of way or public easement.

Street improvement shall meet both City of West Linn and ODOT requirements.

Development shall require obtaining all permits necessary from ODOT for the development.

Development shall require providing proof of approval from ODOT before City construction permit being released for construction.

Provide a photometric analysis for existing street lights along the project frontage along Highway 43 to ensure whether or not additional street light shall be required.

Check with ODOT on the height clearance for street light mast arm if additional street light is needed.

STORM DRAINAGE IMPROVEMENT

Since the previous development has never provided storm treatment water treatment and detention, new development is required to provide storm water treatment and detention meeting the City of West Linn Standards.
If the development is required obtaining DEQ approval, development shall require providing proof of approval from DEQ before City construction permit being released for construction.

Storm Drainage Report shall be required.

SANITARY SEWER

There is existing public sanitary sewer main line in the back of the property available for connection.

WATER IMPROVEMENT

This property is currently located in the Robin Wood Pressure Zone. The Robin Wood Water Pressure Zone is currently deficient under emergency conditions however there is not any improvements along or nearby the proposed development listed in the City Water Master Plan. Therefore the proposed development shall require paying water SDC for the additional water demand.

When water demand occurs, a hydraulic analysis shall be required. The developer shall require paying Murray & Smith Associates for the analysis making sure the increased demand will not make the current water system worsen.

Development shall require providing proof of approval from the Fire Department before City construction permit being released for construction.

OTHER UTILIY IMPROVEMENTS

No overhead utilities and utility poles with the exception of street lights shall be allowed along the project frontage. All existing overhead utilities along the project frontage shall be placed underground. All existing utility poles along the project frontage shall be removed. Development shall be responsible for expenses removing existing poles and placing existing overhead utilities underground.

STREET SDC

Applicant must pay Street SDC. Street SDC calculations are based on the Total Trip Generation from the Development during PM Peak Hour.

Applicant can use Total Trip Generation for a Drive-Through Bank from the ITE 8th Edition or use Total Trip Generation from the Traffic Impact Study prepared by an Oregon License Professional Traffic Engineer.

Applicant shall receive credit from Trip Generation from the former Kasch's Nursery.

STORM SEWER NOTES:

1) STORMWATER FROM THE PROPOSED DEVELOPMENT WILL BE CAPTURED BY CATCH BASINS, TREATED IN A CARTRIDGE FILTER MANHOLE, DETAINED IN THE 60' CMP DETENTION PIPE, RELEASED AT PREDEVELOPED RATES VIA A FLOW CONTROL MANHOLE, AND THEN CONVEYED VIA PIPE TO THE EXISTING STORM SYSTEM LOCATED AT THE NORTHWEST CORNER OF THE SITE.

2) STORMWATER TREATMENT IS PROVIDED BY A 48" STORMFILTER MANHOLE WITH 3 CARTRIDGE FILTERS.

3) STORMWATER DETENTION IS PROVIDED BY 160 LF OF 60" CMP PIPE WITH A FLOW CONTROL MANHOLE TO RESTRICT FLOWS TO PREDEVELOPED RATES.

4) EXISTING CATCH BASINS AND SERVICE LATERALS NOT BEING UTILIZED AS PART OF THE NEW DEVELOPMENT WILL BE COMPLETELY REMOVED.

SANITARY SEWER NOTES:

1) SANITARY SEWER SERVICE FOR THE PROPOSED DEVELOPMENT WILL BE PROVIDED BY CONNECTING TO AN EXISTING SANITARY LATERAL LOCATED NEAR THE EAST END OF THE SITE AND EXTENDING A NEW SANITARY LATERAL TO THE PROPOSED BUILDING.

2) EXISTING SERVICE LATERALS AND CLEANOUTS NOT BEING UTILIZED AS PART OF THE NEW DEVELOPMENT WILL BE COMPLETELY REMOVED.

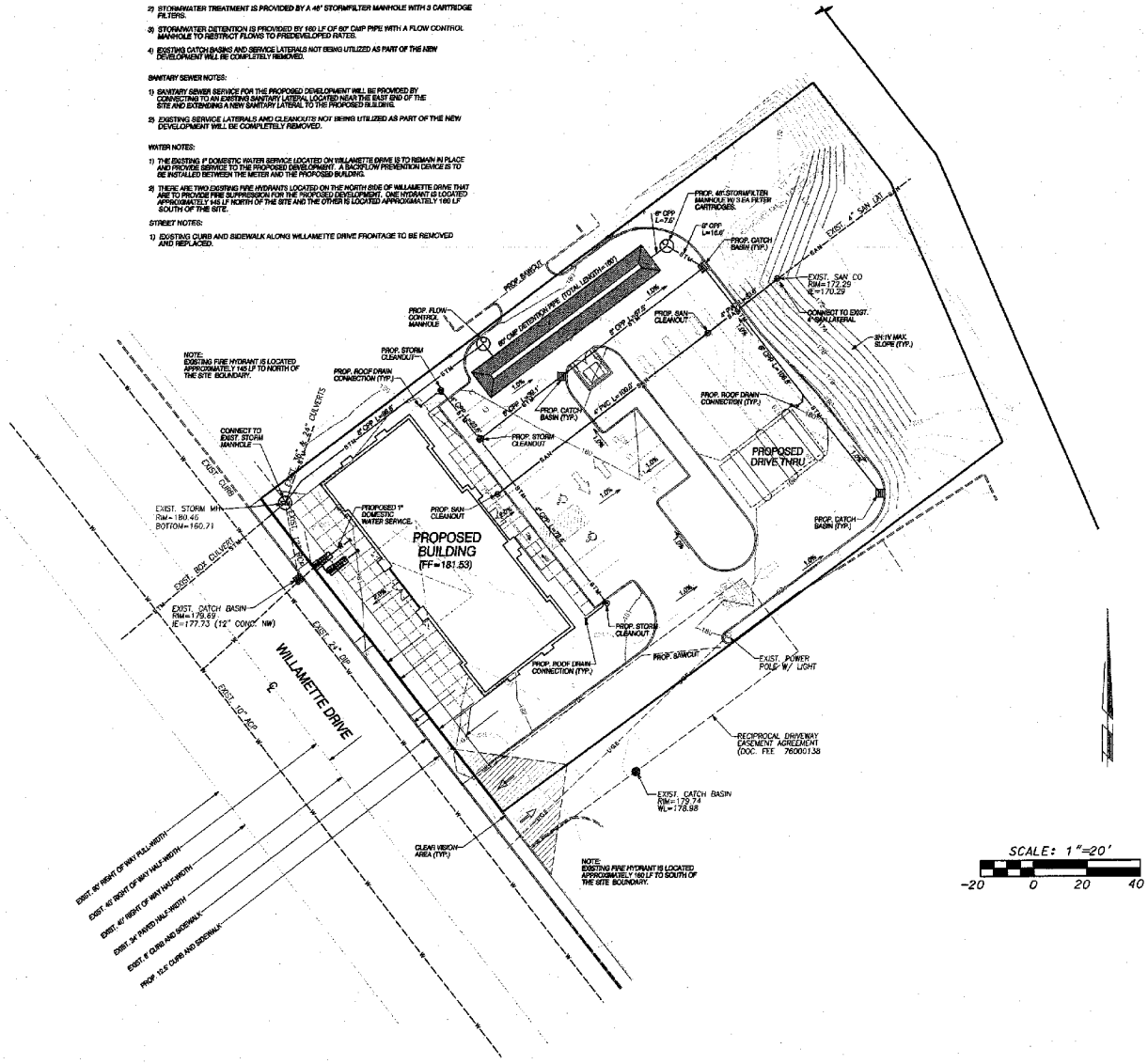
WATER NOTES:

1) THE EXISTING 1" DOMESTIC WATER SERVICE LOCATED ON WILLAMETTE DRIVE IS TO REMAIN IN PLACE AND PROVIDE SERVICE TO THE PROPOSED DEVELOPMENT. A BACKFLOW PREVENTION DEVICE IS TO BE INSTALLED BETWEEN THE METER AND THE PROPOSED BUILDING.

2) THERE ARE TWO EXISTING FIRE HYDRANTS LOCATED ON THE NORTH SIDE OF WILLAMETTE DRIVE THAT ARE TO PROVIDE FIRE SUPPRESSION FOR THE PROPOSED DEVELOPMENT. ONE HYDRANT IS LOCATED APPROXIMATELY 145 LF NORTH OF THE SITE AND THE OTHER IS LOCATED APPROXIMATELY 160 LF SOUTH OF THE SITE.

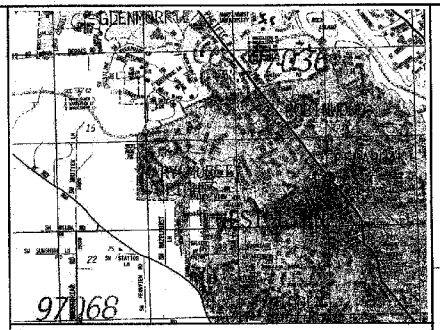
STREET NOTES:

1) EXISTING CURB AND SIDEWALK ALONG WILLAMETTE DRIVE FRONTAGE TO BE REMOVED AND REPLACED.



SCALE: 1"=20'

-20 0 20 40



VICINITY MAP

SOILS MAP

LEGEND

- PERIMETER OF SITE
- RIGHT-OF-WAY LINE
- CENTERLINE OF ROAD
- FACE OF CURB
- LOT LINE
- EASEMENT LINE
- STM — STORM SEWER LINE
- STM — EXIST STORM SEWER
- SAN — SANITARY SEWER LINE
- SAN — EXIST SANITARY SEWER
- W — WATER SERVICE LINE
- W — EXIST WATER LINE
- 123 — GRADED CONTOUR LINE
- 123 — EXIST CONTOUR LINE
- MANHOLE
- CLEAN OUT
- CATCH BASIN
- FIRE HYDRANT ASSEMBLY
- WATER VALVE AND BOX
- BLOWOFF ASSEMBLY
- THRUST BLOCK
- WATER SERVICE METER
- TELEPHONE RISER
- GAS RISER
- ELECTRIC RISER
- UTILITY POLE
- UTILITY POLE W/ LIGHT
- SIGN POST

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CHASE

CEDAR OAK & WILLAMETTE
RETAIL BANKING CENTER
19080 WILLAMETTE DRIVE
WEST LINN, OR 97068
PROJECT #: 210461.89

ARCHITECT OF RECORD
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www.callison.com

ENGINEER OF RECORD
GIBSON LAND SURVEYORS ENGINEERS

SEAL
REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 11, 1997
CHRISTOPHER R. WOOLPERT
EXPIRES: 6/30/13
2/17/12

ISSUE	DATE	DESCRIPTION
	2/20/2012	DESIGN REVIEW APPLICATION

SHEET TITLE
PRELIMINARY DEVELOPMENT PLAN

SHEET NUMBER
1 OF 1

VICINITY MAP
NO SCALE

LEGEND

- DECIDUOUS TREE AS NOTED
- BOLLARD
- STREET LIGHT
- CABLE TV BOX
- SIGN AS NOTED
- GATE POST
- STORM MANHOLE
- STORM CURB INLET
- STORM CATCH BASIN
- SANITARY MANHOLE
- CLEANOUT
- WATER VALVE
- GAS VALVE
- GAS METER
- ADA PARKING SPACE
- TELEPHONE PEDESTAL
- WATER METER
- WATER STANDPIPE
- TRAFFIC SIGNAL J-BOX
- POWER TRANSFORMER
- FOUND SURVEY MONUMENT AS NOTED
- SITE BENCHMARK AS NOTED
- ACCESS TO AND FROM A PUBLIC WAY
- SAN — SANITARY SEWER LINE
- STM — STORM SEWER LINE
- GAS — UNDERGROUND GAS LINE
- TEL — UNDERGROUND TELEPHONE LINE
- PWR — UNDERGROUND POWER LINE
- W — UNDERGROUND WATER LINE
- BUILDING OVERHANG
- FENCE (AS NOTED)
- SF — SQUARE FEET
- CONCRETE PAVING
- ASPHALT PAVING
- NO PARKING STRIPES
- BORING HOLE

LEGAL DESCRIPTION

PARCEL I:

LOT 18 AND THE SOUTHEASTERLY 20 FEET OF LOT 17, CEDAR OAK PARK (PLAT BOOK 404, PAGE 0230), IN THE CITY OF WEST LINN, COUNTY OF CLACKAMAS AND STATE OF OREGON.

EXCEPT THE EASTERLY 20 FEET THEREOF AS CUT OFF BY A LINE RANGING PARALLEL WITH THE NORTHEASTERLY LINES OF SAID LOTS 17 AND 18.

ALSO EXCEPTING THEREFROM THAT PORTION LYING WITHIN THE BOUNDARIES OF WILLAMETTE DRIVE.

THE LEGAL DESCRIPTION WAS CREATED PRIOR TO JANUARY 01, 2008.

PARCEL II:

PART OF LOT 17, CEDAR OAK PARK (PLAT BOOK 404, PAGE 0230), IN THE CITY OF WEST LINN, COUNTY OF CLACKAMAS AND STATE OF OREGON, DESCRIBED AS FOLLOWS:

BEGINNING AT THE MOST SOUTHERLY CORNER OF SAID LOT 17;

THENCE NORTHEASTERLY ALONG THE SOUTHEASTERLY LINE OF SAID LOT TO THE NORTHEASTERLY LINE OF PACIFIC HIGHWAY;

THENCE NORTHWESTERLY ALONG THE NORTHEASTERLY LINE OF SAID HIGHWAY 20 FEET TO THE NORTHWESTERLY CORNER OF THAT TRACT CONVEYED TO PETER PAULS, ET UX, BY DEED RECORDED MAY 23, 1977 AS FEE NO. 7701890B, CLACKAMAS COUNTY RECORDS, AND THE TRUE POINT OF BEGINNING;

THENCE NORTHEASTERLY ALONG THE NORTHWESTERLY LINE OF SAID PAULS TRACT 261.6 FEET TO THE MOST NORTHERLY CORNER THEREOF;

THENCE NORTHWESTERLY PARALLEL TO THE NORTHEASTERLY LINE OF SAID LOT 17, A DISTANCE OF 30 FEET;

THENCE SOUTHWESTERLY PARALLEL TO THE SOUTHEASTERLY LINE OF SAID LOT 17, A DISTANCE OF 261.6 FEET TO THE NORTHEASTERLY LINE WORESAID PACIFIC HIGHWAY;

THENCE SOUTHEASTERLY ALONG THE NORTHEASTERLY LINE OF SAID HIGHWAY, 30 FEET TO THE TRUE POINT OF BEGINNING;

EXCEPTING THEREFROM THAT PORTION LYING WITHIN THE BOUNDARIES OF WILLAMETTE DRIVE.

THE LEGAL DESCRIPTION WAS CREATED PRIOR TO JANUARY 01, 2008.

BASIS OF BEARINGS:

THE BEARING OF N37°25'59"W ALONG THE CENTERLINE OF WILLAMETTE DRIVE, OBSERVED BETWEEN EXISTING SURVEY MONUMENTS AS SHOWN IN SNC011-002.

SCALE: 1" = 20'

TITLE EXCEPTIONS

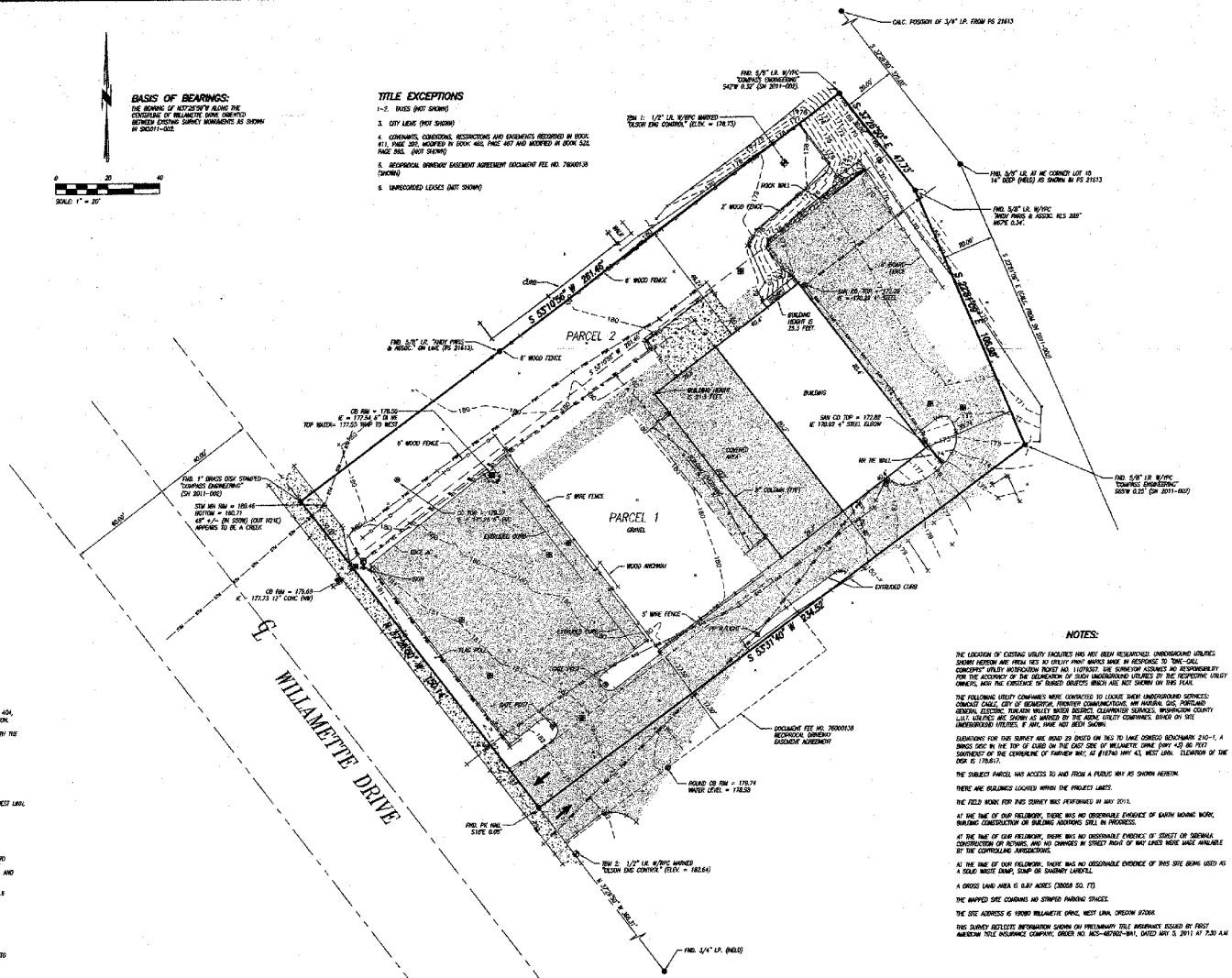
1-2. TAXES (NOT SHOWN)

3. CITY LIENS (NOT SHOWN)

4. COVENANTS, CONDITIONS, RESTRICTIONS AND EASEMENTS RECORDED IN BOOK 411, PAGE 320, MODIFIED IN BOOK 465, PAGE 467 AND MODIFIED IN BOOK 526, PAGE 865. (NOT SHOWN)

5. RECIPROCAL DRIVEWAY EASEMENT AGREEMENT DOCUMENT FEE NO. 76000138 (SHOWN)

6. UNRECORDED LEASES (NOT SHOWN)



NOTES:

THE LOCATION OF EXISTING UTILITY FACILITIES HAS NOT BEEN RESEARCHED. UNDERGROUND UTILITIES SHOWN HEREON ARE FROM TIES AT UTILITY PAINT MARKS MADE IN RESPONSE TO "ONE-CALL CONCEPTS" UTILITY NOTIFICATION TICKET NO. 1107027. THE SURVEYOR ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE DELINEATION OF SUCH UNDERGROUND UTILITIES BY THE RESPECTIVE UTILITY OWNERS, NOR THE EXISTENCE OF BURIED OBJECTS WHICH ARE NOT SHOWN ON THIS PLAT.

THE FOLLOWING UTILITY COMPANIES WERE CONTACTED TO LOCATE THEIR UNDERGROUND SERVICES: COMCAST CABLE, CITY OF BEAVERTON, FRONTIER COMMUNICATIONS, NW NATURAL GAS, PORTLAND GENERAL ELECTRIC, TUALATIN VALLEY WATER DISTRICT, CLEARWATER SERVICES, WASHINGTON COUNTY. UTILITIES ARE SHOWN AS MARKED BY THE ABOVE UTILITY COMPANIES. BEARD ON SITE UNDERGROUND UTILITIES, IF ANY, HAVE NOT BEEN SHOWN.

ELEVATIONS FOR THIS SURVEY ARE BASED ON TIES TO LAKE OSWEGO BENCHMARK 210-1, A BRASS DISC IN THE TOP OF CURB ON THE EAST SIDE OF WILLAMETTE DRIVE (MAY 43) 86 FEET SOUTHEAST OF THE CENTERLINE OF FAIRVIEW WAY, AT §167A0 (MAY 43, WEST LINN. ELEVATION OF THE DISK IS 175.617.

THE SUBJECT PARCEL HAS ACCESS TO AND FROM A PUBLIC WAY AS SHOWN HEREON.

THERE ARE BUILDINGS LOCATED WITHIN THE PROJECT LIMITS.

THE FIELD WORK FOR THIS SURVEY WAS PERFORMED IN MAY 2011.

AT THE TIME OF OUR FIELDWORK, THERE WAS NO OBSERVABLE EVIDENCE OF EARTH MOVING WORK, BUILDING CONSTRUCTION OR BUILDING ADDITIONS STILL IN PROGRESS.

AT THE TIME OF OUR FIELDWORK, THERE WAS NO OBSERVABLE EVIDENCE OF STREET OR SIDEWALK CONSTRUCTION OR REPAIRS, AND NO CHANGES IN STREET RIGHT OF WAY LINES WERE MADE AVAILABLE BY THE CONTROLLING JURISDICTIONS.

AT THE TIME OF OUR FIELDWORK, THERE WAS NO OBSERVABLE EVIDENCE OF THIS SITE BEING USED AS A SOLID WASTE DUMP, SUMP OR SANITARY LANDFILL.

A GROSS LAND AREA IS 0.87 ACRES (38068 SQ. FT).

THE MAPPED SITE CONTAINS NO STRIPED PARKING SPACES.

THE SITE ADDRESS IS 19080 WILLAMETTE DRIVE, WEST LINN, OREGON 97068.

THIS SURVEY DEPICTS INFORMATION SHOWN ON PRELIMINARY TITLE INSURANCE ISSUED BY FIRST AMERICAN TITLE INSURANCE COMPANY, ORDER NO. NCS-487602-WA1, DATED MAY 3, 2011 AT 7:30 A.M.

ZONING

THIS SITE IS ZONED GENERAL COMMERCIAL (GC).

ACCORDING TO WEST LINN DEVELOPMENT CODE DEFINITIONS, BUILDING SETBACKS FOR THE GC ZONE ARE AS FOLLOWS:

MINIMUM STREET FRONTAGE: 35 FEET

FRONT YARD SETBACK: 0 FEET

REAR YARD SETBACK: 25 FEET

INTERIOR SIDE YARD SETBACK: 7.5 FEET

STREET SIDE YARD SETBACK: 10 FEET

MAXIMUM BUILDING HEIGHT: 35 FEET TO 45 FEET DEPENDING ON LOCATION OF BUILDING TYPE.

MAXIMUM LOT COVERAGE: 50%

AVERAGE LOT DIMENSIONS: 50 FOOT WIDTH AND 90 FOOT DEPTH

CERTIFICATION

TO: JPMORGAN CHASE BANK, NATIONAL ASSOCIATION AND FIRST AMERICAN TITLE INSURANCE COMPANY:

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2011 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/ACSM LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 2, 4, 6, 8(a), 7(a) & (b-1) & (c), 9, 8, 11(b), 13, 14, 16, 17, 18 OF TABLE A THEREOF. THE FIELD WORK WAS COMPLETED ON MAY 24, 2011.

BRUCE TOWLE, PLS 2030 — DATE

FILE: z:\data\3000\3700\3703\3701\survey\3701.ACD.DWG

CLIENT:
CALLISON
1420 FIFTH AVENUE #220
SEATTLE, WA 98101
(206) 623-4646

ALTA / ACSM LAND TITLE SURVEY FOR:
CHASE - WILLAMETTE & CEDAROAK

OLSON ENGINEERING, INC.
LAND SURVEYORS
1111 BROADWAY, VANCOUVER, WA 98660
360-695-1385
503-397-4651

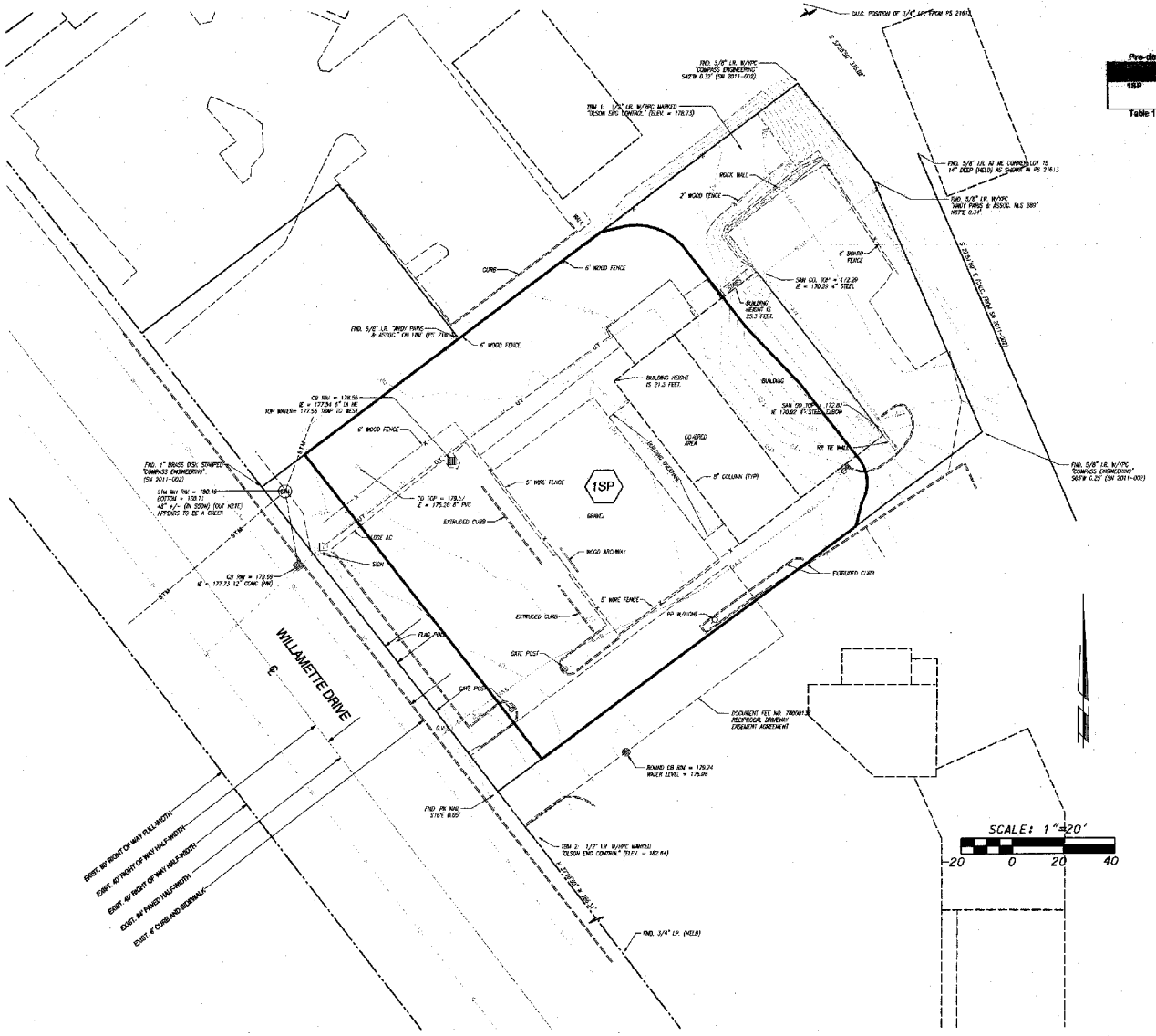
REGISTERED PROFESSIONAL LAND SURVEYOR
OREGON
FEBRUARY 5, 1985
BRUCE D. TOWLE
2030
RENEWAL DATE: 6/30/12

CHANGES / REVISIONS	
DESCRIPTION	DATE
ADDED PARCEL LINE	6/16/11
CERTIFICATION DATE	6/22/11

DESIGNED:
DRAWN: B.D.T.
CHECKED: B.D.T.
DATE: MAY 2011
SCALE: 1" = 20'

JOB NO. 8703.01.01

SHEET
1 of 1



Pre-developed Catchment Area:

1SP	0.573	70	Woods, Good, HSG "C"	Sheet Flow	167	1.1
				Shallow Conc. Flow	30	11.0

Table 1: Hydrologic parameters used in stormwater analysis.

CHASE

CEDAR OAK & WILLAMETTE
RETAIL BANKING CENTER
19080 WILLAMETTE DRIVE
WEST LINN, OR 97068
PROJECT #: 21046189

ARCHITECT OF RECORD
CALLISON
CALLISON ARCHITECTS, P.C.
www.callison.com

ENGINEER OF RECORD
OLSON LAND SURVEYORS ENGINEERING

SEAL
OREGON JEFFREY R. WOMACK
EXPIRES: 6/30/12
2/9/12

ISSUE	DATE	DESCRIPTION
	2/20/2012	DESIGN REVIEW APPLICATION

SHEET TITLE
PRELIMINARY
PRE-DEVELOPED
CATCHMENT PLAN

SHEET NUMBER
1 OF 2

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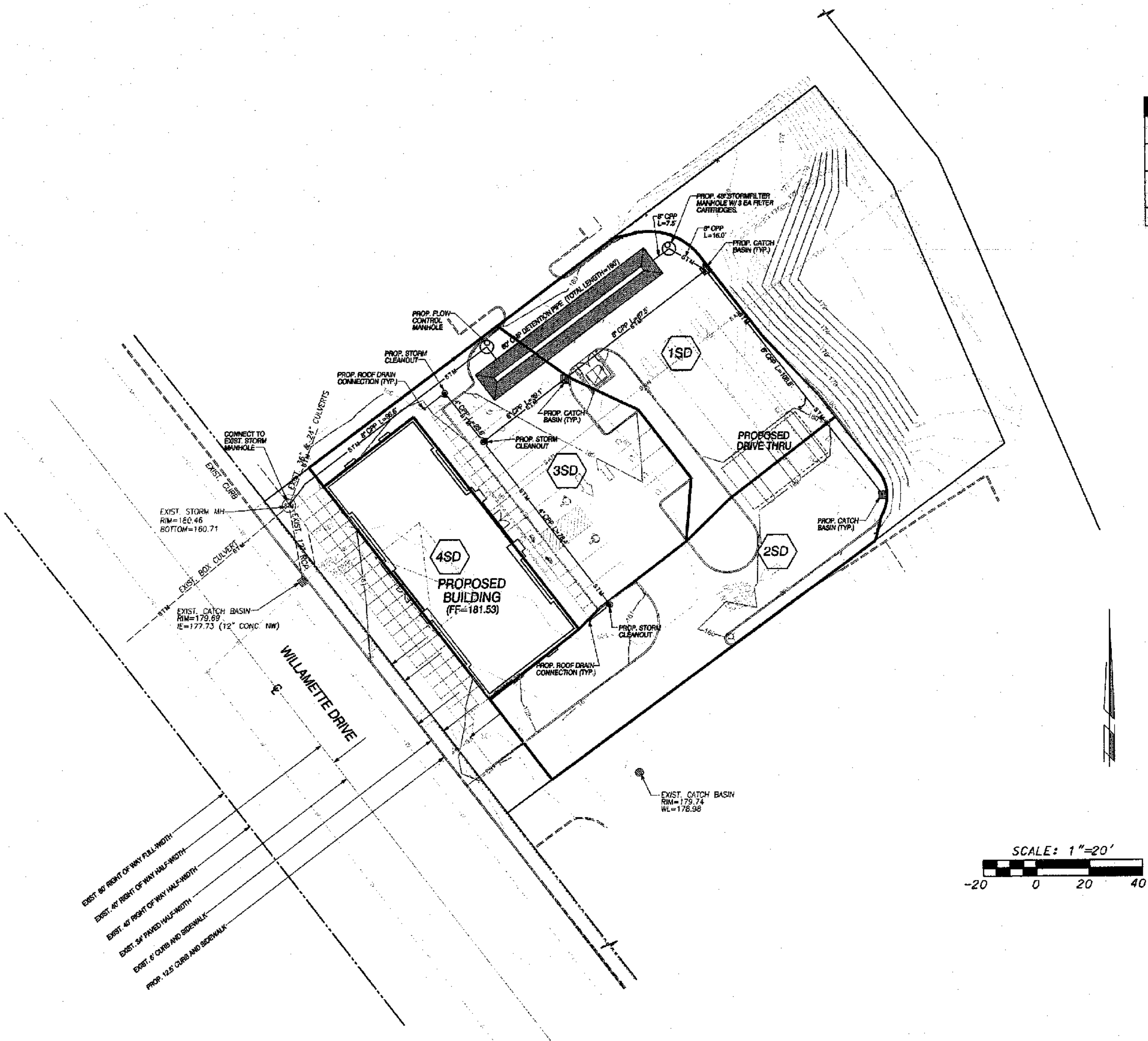


Developed Catchment Areas:

1SD	0.127 0.022	98 74	Paved parking >75% Grass cover, Good, HSG C	Direct entry (5.0 Min.)	-	-
2SD	0.105 0.058	98 74	Paved parking >75% Grass cover, Good, HSG C	Direct entry (5.0 Min.)	-	-
3SD	0.110 0.016 0.034	98 98 74	Paved parking Sidewalk >75% Grass cover, Good, HSG C	Direct entry (5.0 Min.)	-	-
4SD	0.101	98	Roof	Direct entry (5.0 Min.)	- -	- -

Table 2: Hydrologic parameters used in stormwater analysis.

CHASE

CEDAR OAK & WILLAMETTE
RETAIL BANKING CENTER
19080 WILLAMETTE DRIVE
WEST LINN, OR 97068
PROJECT #: 210461.89

ARCHITECT OF RECORD

CALLISON

CALLISON ARCHITECTS, P.C.
www.callison.com

ENGINEER OF RECORD

OLSON ENGINEERING INC. LAND SURVEYORS ENGINEERS

SEAL

EXPIRES 6/30/
2/13/12

ISSUE	DATE	DESCRIPTION
	2/23/2012	DESIGN REVIEW APPLICATION

SHEET TITLE

PRELIMINARY DEVELOPED CATCHMENT PLAN

SHEET NUMBER

2 OF 2

Michael Minor & Associates
Sound . Vibration . Air
2535 NE 22nd Avenue
Portland, Oregon 97212
503.220.0495 ~ fax 503.284.0583

Prepared for:	Hans Christiansen,
Prepared by:	Michael A. Minor
Date:	February 21, 2012
Subject:	Noise Analysis
Project:	Chase Bank: Cedar Oak and Willamette

Introduction

This technical noise memorandum was produced as part of the permit requirements for a land use change at 19080 Willamette Drive, West Linn Oregon. The zone change involves allowing a commercial bank use of the former Kasch's nursery site. The existing development consists of a single story building, which will be removed and replaced with a new bank building and 2 lane drive through for ATM and general banking.

Project Description

The proposal would create a one story 4,335 square foot Chase Bank at 19080 Willamette Drive also known as the former Kasch's nursery site. The site includes two tax lots (703 and 705) comprising 38,294 square feet. The bank building would extend along the edge of the Willamette Drive right of way (ROW). In addition to the bank, a smaller structure with three drive through lanes accommodating one 24-hour ATM and two voice automated teller (VAT) would be located at the rear or eastern portion of the site. A second ATM is located in the entry vestibule at the rear of the main bank building. Hours of operation for the main building are 9:00 am to 6:00 pm, Monday through Friday and from 9:00 am to 1:00 pm on Saturdays, with the drive-up and walk up ATM's available 24hours per day, seven day per week.

Most of the site would be occupied by parking and driveways. One of the driveways will connect with Doug Seeley's Willamette Village commercial development to the north. The property is zoned "General Commercial" (GC). Banks are "permitted outright" in the GC zone so long as Class II Design Review is addressed. The site extends back or east 260 feet from the Willamette Drive ROW. The front two-thirds of the lot are flat. The land then drops down about 10 feet to a lower flat area at the rear of the existing Kasch's building.

Land Use

The site is located in an established commercial area along Willamette Drive, between Cedar Oaks Drive and Walling Way. Land use in the area included residential and commercial. Directly south and north of the site, the land use is primarily commercial, and includes grocery stores, dry cleaners, restaurants, other banks and miscellaneous commercial and retail outlets. To the rear of the site, south east of the proposed site, there are several multi-family residential units and the New Life Church. There are also several single family residences located farther east along Old River Road. Figure 1 is an aerial overview of the area with land uses identified.

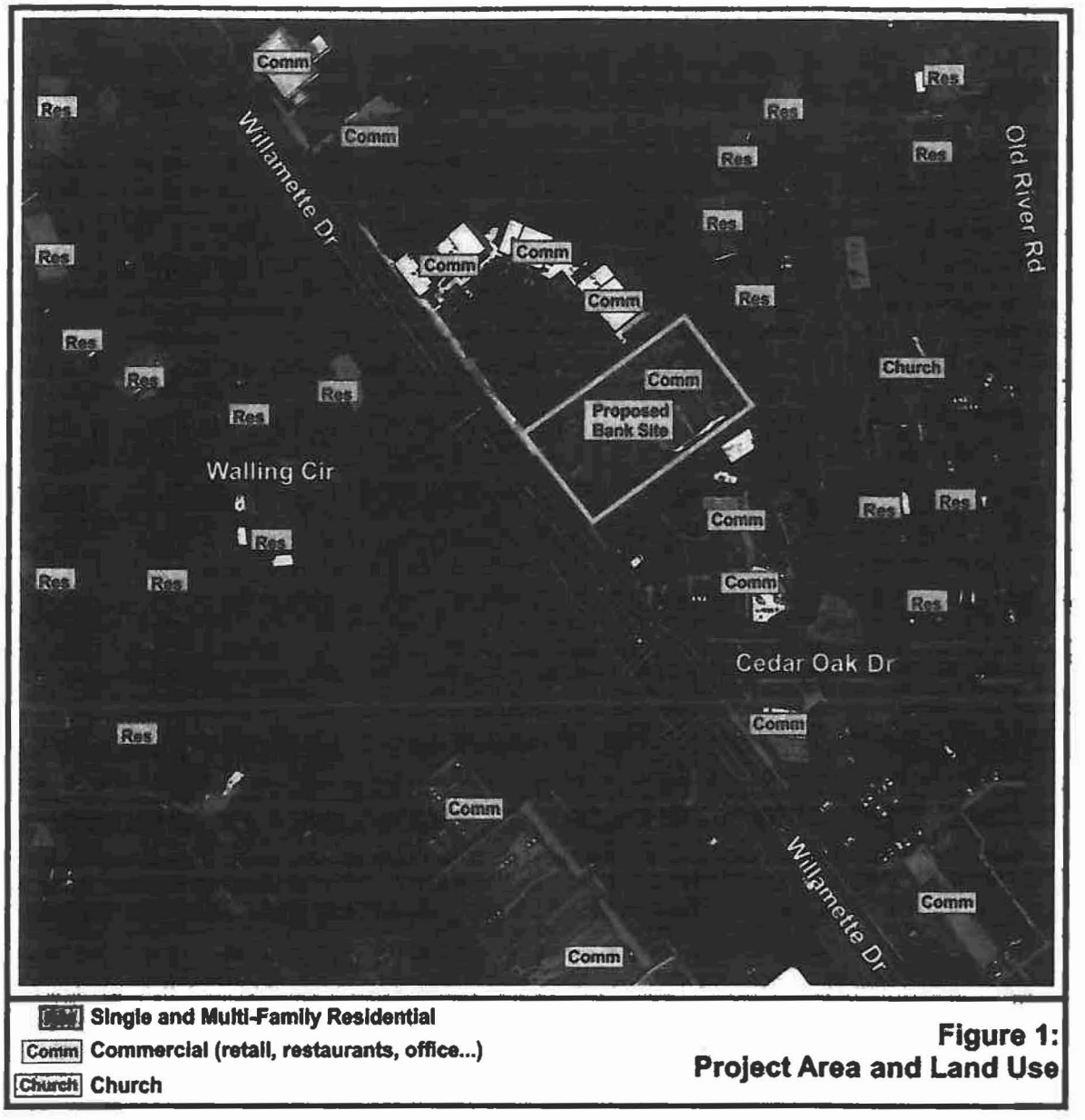


Figure 1: Project Area and Land Use

Introduction to Acoustics

Noise is generally defined as unwanted sound. Noise is measured in terms of sound pressure level. It is expressed in decibels (dB), which are defined as 10 log P^2/P^2ref, where P is the root-mean-square (rms) sound pressure and P_{ref} is the reference rms sound pressure of 2×10^{-5} Newtons per square meter.

The number of fluctuation cycles or pressure waves per second of a particular sound is the frequency of the sound. The human ear is less sensitive to higher and lower frequencies than to mid-range frequencies. Therefore, sound level meters used to measure environmental noise generally incorporate a weighing system that filters out higher and lower frequencies in a manner similar to the human ear. This system produces noise measurements that approximate the normal human perception of noise. Measurements made with this weighing system are termed "A-weighted" and are specified as "dBA" readings.

Several noise descriptors are used that take into account the variability of noise over time. The equivalent sound level (L_{eq}) is the level of a constant sound for a specified period of time that has the same sound energy as an actual fluctuating noise over the same period of time. It is an energy average sound level. The statistical sound level is the sound level that is equaled or exceeded for a specified percentage of a given measurement period. For example, L_{90} is the notation for the noise level within a measurement interval that is equaled or exceeded 90 percent of the time.

The minimum noise level during a measurement period is denoted L_{min}. The maximum noise levels (L_{max}) that occur during an event, such as the passing of a heavy truck or the flyover of an airplane, can be useful indicators of interference with speech or sleep.

In summary, the noise level descriptors are defined as follows:

Symbol	Description
L_{eq}	The average noise level (energy basis)
L_{min}	The minimum noise level
L_{max}	The maximum noise level
L_{dn}	The 24-hour average noise level with a 10-dBA penalty added to nighttime (10 p.m. to 7 a.m.) levels
L_x	The noise level that is equaled or exceeded for "x" percent of the time

Noise levels decrease with distance from a noise source. For each doubling of the distance from a point source (such as an engine), noise levels decrease by 6 dBA due to the geometric divergence of the sound waves. Excess noise reduction (attenuation) can be provided by vegetation, terrain, and atmospheric effects that block or absorb noise. The L_{eq} noise level from a line source (such as a road) will decrease by 3 dBA for each doubling of distance (3 dB/DD) because of geometric divergence alone. However, the L_{max} from individual vehicles on the road will decrease by 6 dBA/DD. Therefore, the maximum noise levels (L_{max}) decrease more rapidly with distance from the road than do the average noise levels (L_{eq}).

Subjectively, a 10-dBA change in noise level is judged by most people to be approximately a twofold change in loudness (e.g., an increase from 50 dBA to 60 dBA causes the loudness to double). A 3-dBA increase is a barely perceptible increase.

Methods

City of West Linn Noise Control Ordinance

West Linn has a noise ordinance that is based on the statistical sound level descriptor described above. The ordinance is given in the City Municipal Code, Chapter 5, Section 487. The criteria is based on maximum allowable sound level as measured at the property line of the noise sensitive land use, and is summarized in Table 1.

Table 1: City of West Linn Noise Source Standards		
Statistical Descriptor	Time of Noise	
	7am – 7pm	7pm – 7am
L_{50}	50	45
L_{10}	60	50
L_{01}	70	55

Noise Analysis

The project was reviewed for any potential noise producing sources. Although there are several potential noise sources, none are projected to result in any notable increase in noise levels or exceed any noise impact criteria. The following section provided information on noise producing sources associated with this project and any potential noise level changes that may result from the project.

Noise Sources

This section describes the noise sources associated with the operation of the proposed Chase Bank. Noise sources are divided in three main categories: General Bank Operation; Site Access and Drive-Up Banking; and Ancillary Facilities, such as air conditioning and heating systems. Each of the sources was evaluated individually, followed by a cumulative noise analysis for the two residential land uses nearest the proposed site.

General Operation

General office operation at the site would include those tasks necessary to operate the business. Because this is a banking office, the majority of noise would occur inside the existing structure, and therefore not have any noticeable effect on the existing noise environment. Noise levels from normal operation are projected to remain below 40 dBA L_{eq} at the property line. No noise impacts are projected from office operations.

Site Access and Drive-Up Banking

The primary site access will be associated with parking for employees and access for banking clients. Parking for banking clients and staff would be located between the bank building and the drive up banking area. The site plan allows for parking for 14 vehicles. In addition to the parking area, the drive up banking area would support three lanes of traffic, and could accommodate 12 vehicles simultaneously, although it unlikely that 12 vehicles would access the drive up banking area at the same time.

Ancillary Facilities

Ancillary facilities include any other noise source that may be associated with operation of the proposed bank. Main sources of noise includes mechanical devices, such as ventilation fans, air conditioning units, and any other exterior noise producing source required for operation of the office. The only identified noise source includes two air conditioning unit (A/C). The A/C unit would be located in the northwest area on the roof of the building. The nearest noise sensitive land uses to the location of the A/C unit would be the apartments and the resident located approximately 110 feet northwest of the project site. The A/C unit will be partially shielded from the nearby residential land uses by walls of the building and is not projected to exceed the criteria or result in any noticeable increase over the existing noise levels.

Cumulative Noise Analysis

The West Linn noise control ordinance is for all noise produced on one site, at the property line of the other site. Therefore, it is not the individual noise sources, but the combined noise from the banking site at any nearby noise sensitive property that must meet the maximum allowable levels in Table 1. Because the bank is only in operation between the hours of 9:00 am and 6:00 pm, the daytime noise levels in Table 1 are the major concern, however, nighttime use of the drive through ATM could also result in increased noise levels during evening and nighttime hours. Therefore, a nighttime analysis is included following the cumulative analysis.

The cumulative analysis was performed for the nearest two noise sensitive properties, a multi-family apartment building and a single-family residence. The two sites, denoted R1 and R2 are shown on Figure 2 along with the traffic flow pattern, ATM locations, drive up banking area, and location of the A/C units. The distances from each of the noise sources to the receiver were measured and normal acoustical formulas were used to predict the typical hourly noise levels. Minimal shielding was taken to assure a conservative analysis.

Table 2 provides the results of the cumulative analysis. The following assumptions were used in the analysis:

- Both roof mounted AC units are in operation
- 26 vehicles accessing the site for L50 calculations, and 52 vehicles accessing the site for the L10 calculations
- No noise reduction for physical shielding of the traffic by the bank building, ATM building or other vehicles
- The L_{01} was compared to the maximum allowable noise levels for a passenger vehicle based on the Oregon DEQ regulations of 97 dBA at 20 inches from the tail pipe.

Table 1. Cumulative Noise Impact Analysis

Receiver[1]	AC Units[2]	Parking Area[3]	Drive Through[4]	Total Noise[5]	Criteria[6]	Impact[7]
L_{50} Noise Analysis (Typical hourly bank access)						
R1	33	42	45	47	50	No
R2	26	41	42	44	50	No
L_{10} Noise Analysis (Peak hour bank access)						
R1	33	45	48	50	60	No
R2	26	44	45	47	60	No
L_{01} Noise Analysis (Short-term noise analysis using L_{max})						
R1	33	53	54	54	70	No
R2	26	47	44	47	70	No

1. Receivers shown on Figure 1
2. Assumes AC units in operation using manufactures sound power level of 74 dBA at 1 meter
3. Assumes 14 vehicles in operation in the parking areas for L_{50}, and 28 cars for L_{10}
4. Assumes 12 vehicles in drive through for L_{50} and 24 cars for L_{10}
5. Total noise: AC units + Parking area + Drive through for L_{50} and L_{10}, and maximum noise level for L_{01}
6. West Linn noise ordinance from Table 1
7. Operational noise levels meet, or exceed the noise control ordinance

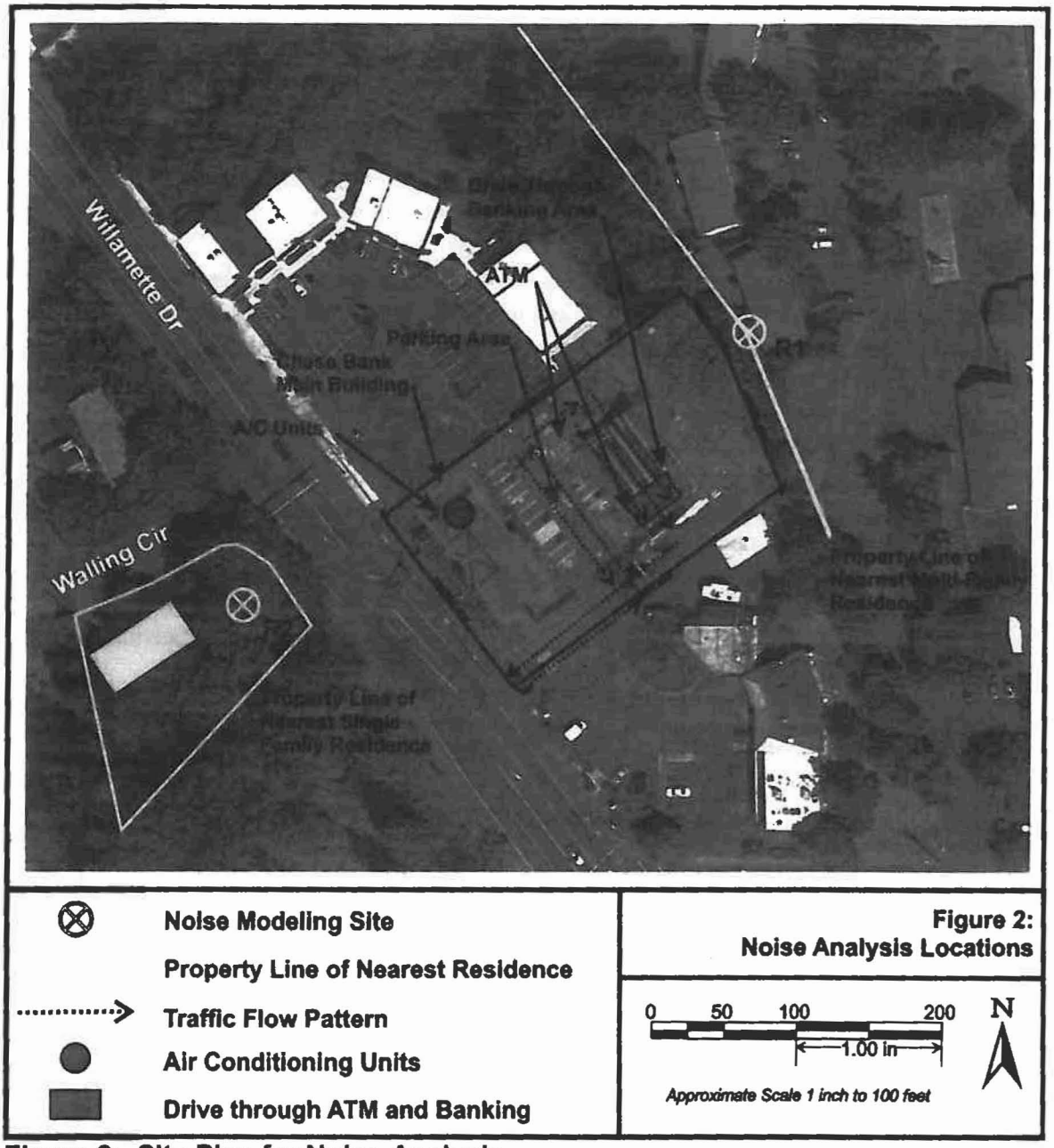


Figure 2: Site Plan for Noise Analysis

Nighttime Noise Analysis

During the hours of 7:00 pm to 7:00 am, the maximum allowable noise levels are reduced by 5 to 15 dBA. The number of vehicles accessing the site is expected to be much lower during these hours, with typically around 4 to 8 vehicles per hour accessing the site to use the ATM's. The typical maximum L_{50} and L_{10} noise levels (assuming 8 cars) at receiver R1 are predicted to be 42 and 45 dBA respectively, which is below the criteria of 45 and 50 dBA. For the L_{01} analysis, the L_{max} analysis provided in Table 2 of 54 dBA L_{max} at R1is also below the L_{01} nighttime criteria of 55 dBA. Although the levels are close to the criteria, the fact

that only minimal shielding was assumed and the analysis assumes more traffic then would be typically expected, there are no exceedance of the West Linn noise control ordinance predicted.

Noise Mitigation Measures

Because the project is not projected to exceed any noise criteria, or increase study area noise levels, no noise mitigation is recommended. However, there are several operational recommendations that will help to insure that noise coming from the site remains within the City of West Linn noise ordinance, including:

- Limit or restrict outside activities after 7:00 pm and before 7:00 am
- Install signs that discourage idling vehicles
- Have exterior landscaping and other outdoor maintenance performed between the hours of 7:00 am and 7:00 pm.

Summary

Operation of the proposed Chase Bank at 19080 Willamette Drive, West Linn Oregon is not projected to result in any noticeable increase in noise levels. No noise mitigation is being recommended for this project. Operational recommendations given above are typical noise reducing measures given in the City of West Linn Noise Control Ordinance (see section 5.487, iii (h), (i) for more information). There is no exceedance of the West Linn noise control ordinance predicted.

CALLISON

January 25, 2012

Mr. Anthony Bracco
President
Robinwood Neighborhood Association
2716 Robinwood Way
West Linn, OR 97068

Re: Chase – Cedar Oak & Willamette
210461.89
Notice of Proposed Development
February 14, 2012 - Robinwood Neighborhood Association neighborhood meeting

Dear Mr. Bracco:

Thank you for the phone conversation on Tuesday, January 24, 2012. I have copied your neighborhood association's Vice President, David Newell on this correspondence. On behalf of JP Morgan Chase, N.A. this letter serves to confirm our place on the agenda of the Robinwood Neighborhood Association monthly neighborhood meeting scheduled for Tuesday, February 14, 2012.

We look forward to presenting the Chase – Cedar Oak & Willamette project, proposed to be located at the former Kasch's Nursery property at 19080 Willamette Drive, West Linn, OR.

I have enclosed a copy of the Notice of Proposed Development which was mailed to surrounding property owners within 500-feet of the site boundary. On the notice you will find a general project description. Neighbors have been encouraged to contact you with any questions or comments they would like relayed to the applicant. Please note that we are acting as the Applicant Representative for Chase.

Per our e-mail correspondence we will provide you with a copy of our site plan and building elevations a week prior to the meeting. In the lead up to the meeting please do not hesitate to call or e-mail me with any questions.

Sincerely,

Hans Christiansen
Associate

Enclosure

c: Mr. David Newell, 19635 Old River Drive, West Linn OR 97068

1420 FIFTH AVENUE #2400 SEATTLE, WASHINGTON 98101-2343
T 206 623 4646 F 206 623 4625 www.callison.com

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

ANTHONY BRACCO
PRESIDENT, RNA
2716 ROBINWOOD WAY
WEST LINN, OR 97068

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☒ Addressee

B. Received by (Printed Name) ANTHONY BRACCO
C. Date of Delivery 2-3-12

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label) 7011 2970 0002 2693 4850

PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-1540

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

DAVID NEWELL
VICE PRESIDENT, RNA
19635 OLD RIVER DR.
WEST LINN, OR 97068

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by (Printed Name) David Newell
C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

FEB 28 2012

3. Service Type
☐ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label) 7011 2970 0002 2693 4843

PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-1540

January 25, 2012

Notice of Proposed Development

To whom it may concern:

This letter serves to notify you that JPMorgan Chase, N.A. intends to present its proposed project to the Robinwood Neighborhood Association (RNA) at its regularly scheduled February 14, 2012 neighborhood association meeting at the Robinwood Station community center, at: 3706 Cedar Oak Drive, West Linn, Oregon 97068.

The proposed project site is located at the former Kasch's Nursery property at 19080 Willamette Dr., West Linn, OR. Chase is proposing to construct a new +/- 4,300 SF single-story Chase Bank branch with remote 3-lane drive-thru. The drive-thru will consist of 2 VAT (vacuum assisted tellers) and 1 ATM. Additional site improvements, including but not limited to onsite parking and landscaping will be constructed in association with the project. In addition, the City of West Linn is requesting the project provide frontage improvements along the project site's Willamette Drive frontage, including new curb and 12' sidewalk with street trees placed in cut outs, located roughly 35-feet on center. The project is subject to Class II Design Review and other permit approvals by the City of West Linn.

You are invited to attend the February 14, 2012 meeting to discuss the proposal in more detail. Please note: The proposed Chase – Cedar Oak & Willamette bank branch project may not be the only subject of discussion at the neighborhood meeting.

You are also encouraged to contact the RNA President, Anthony Bracco; Vice President, David Newell; or any of the other RNA board members with any questions or comments you would like to have relayed to the applicant.

Sincerely,

Hans Christiansen
Associate

CALLISON
1420 FIFTH AVENUE #2400
SEATTLE, WASHINGTON 98101-2343
T 1 206 623 4646 **F** 1 206 623 4625
Applicant Representative/Architect

AFFIDAVIT OF POSTING

STATE OF WASHINGTON)
)SS
COUNTY OF CLARK)

I, Gina Finstad, being first duly sworn, depose and say:

As the applicant for the proposed Chase bank project, I hereby certify that I posted a sign for the early neighborhood meeting in accordance with the requirements of the City of West Linn on the 25th day of January, 2012.

Dated this 25th day of January, 2012.

Signature

SUBSCRIBED AND SWORN to before me on this 25th day of January, 2012.

SALLY J. McELLRATH
NOTARY PUBLIC
STATE OF WASHINGTON
COMMISSION EXPIRES
JANUARY 05, 2016

Notary Public for Washington
My commission expires:

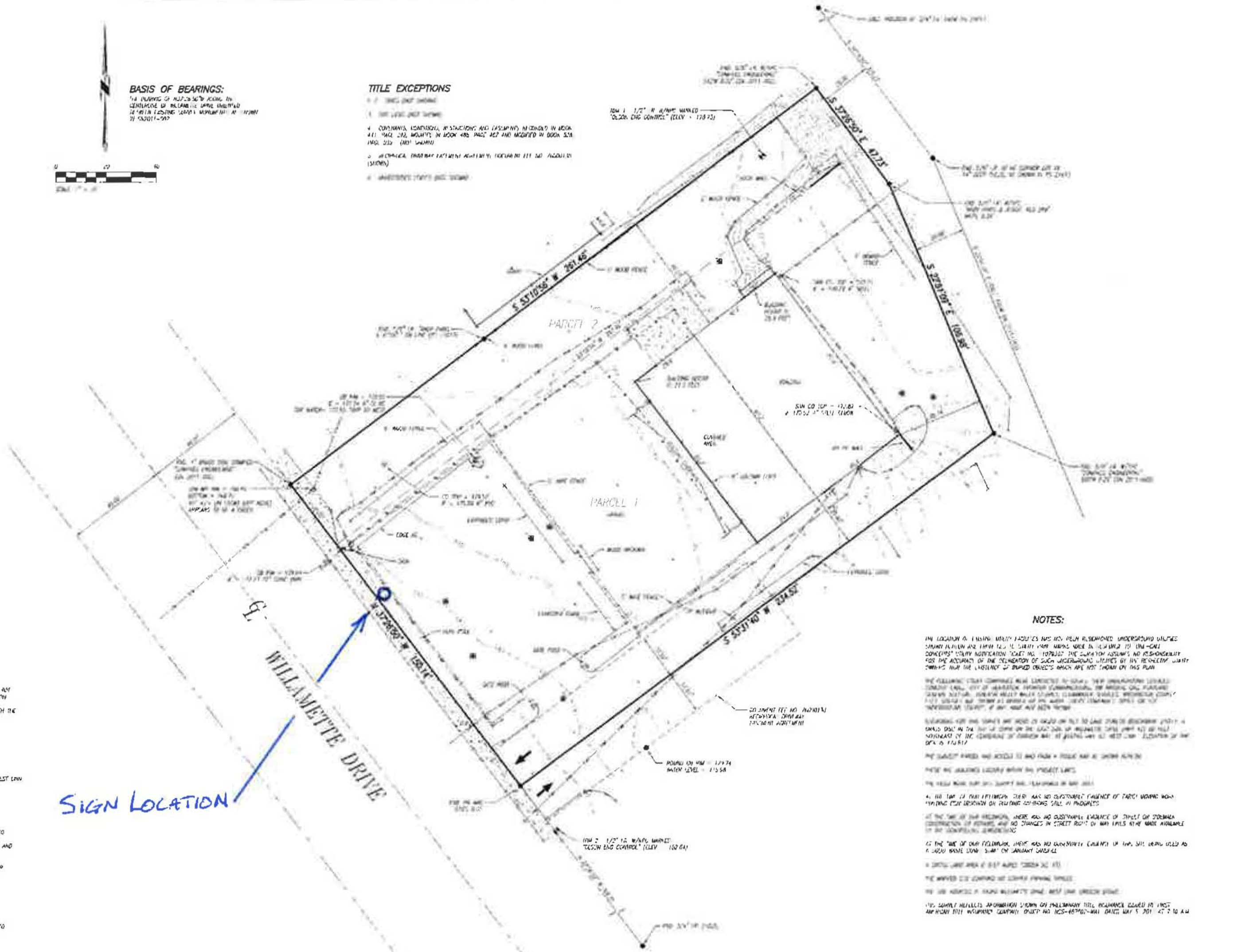
Re: Notice of early neighborhood meeting on proposed land use application.

VICINITY MAP

BASIS OF BEARINGS:

TITLE EXCEPTIONS

LEGEND



LEGAL DESCRIPTION

ZONING

NOTES:

CERTIFICATION

CLIENT:

CALLISON
1420 FIFTH AVENUE #220
SEATTLE, WA 98101
(206) 623-4646

ALTA / ACSM LAND TITLE SURVEY FOR:
CHASE - WILLAMETTE & CEDAROAK

OLSON ENGINEERING INC.
ENGINEERS
LAND SURVEYORS

REGISTERED PROFESSIONAL LAND SURVEYOR
OREGON
FEBRUARY 3, 1993
BRUCE G. TOWLE
2856

RENEWAL DATE 5/30/13

CHANGES / REVISIONS	
DESCRIPTION	DATE
ADDED PARCEL LINE	6/16/11
CERTIFICATION EDITS	6/22/11

DESIGNED	
DRAWN	B.G.T.
CHECKED	B.G.T.
DATE	MAY 2011
SCALE	1" = 20'

COPYRIGHT 2011, OLSON ENGINEERING, INC.

JOB NO. 8703.01.01

SHEET

1 of 1

NOTICE OF PROPOSED DEVELOPMENT

Project Name: Chase – Cedar Oak & Willamette

Project Site Address: 19080 Willamette Drive, West Linn, OR

Applicant: JPMorgan Chase, N.A.

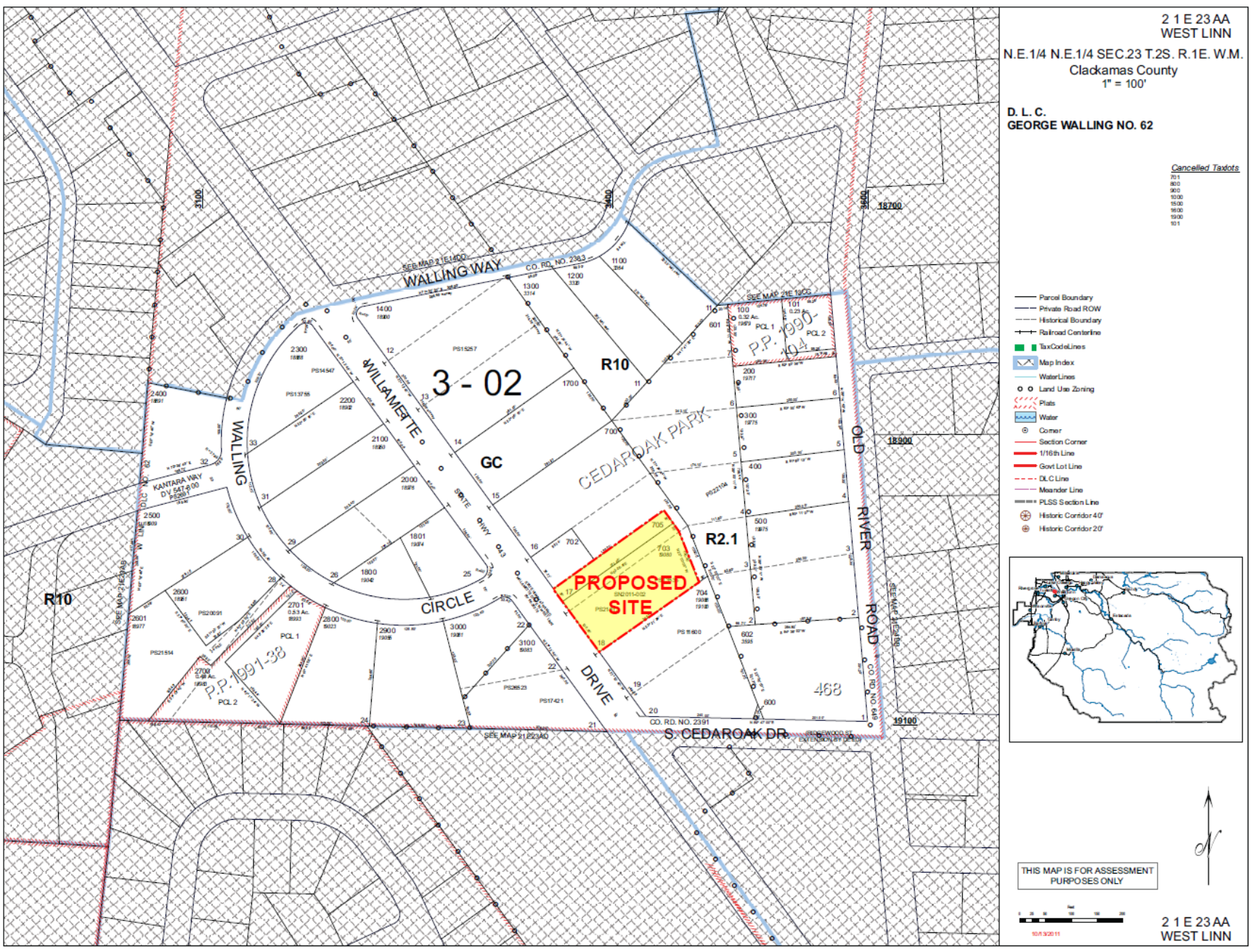
Applicant Representative: Hans Christiansen, Callison Architects, P.C. (206) 623-4646

Project Proposal:

The above listed site may be subject to a commercial development, subject to Class II Design Review and other permit approvals by the City of West Linn. The proposed development will include construction of a new one-story +/- 4,300 SF Chase Bank branch with remote 3-lane drive-thru (two VAT (vacuum assisted tellers) and 1 ATM), as well as associated site improvements.

For additional information regarding the project please contact the applicant representative at (206) 623-4646.

Date of Posting: January 25, 2012



21E13CC05600
Daniel & Nancy Rowinski
3424 Walling Way
West Linn, OR 97068-1535

21E13CC05700
Faridoon Khosravi
Po Box 157
West Linn, OR 97068-0157

21E13CC05800
William David & Amy Swartz
3611 Ridgewood Way
West Linn, OR 97068-1647

21E23AA00100
Paul Knudsen
19679 Old River Dr
West Linn, OR 97068-1639

21E23AA00101
David Newell
19635 Old River Dr
West Linn, OR 97068-1639

21E23AA00200
Robert Mercier
19717 Old River Dr
West Linn, OR 97068-1641

21E23AA00300
Michael & Elizabeth Hayes
19775 Old River Dr
West Linn, OR 97068-1641

21E23AA00400
New Life Church Robinwood
Po Box 5
West Linn, OR 97068-0005

21E23AA00500
New Life Church Robinwood
Po Box 5
West Linn, OR 97068-0005

21E23AA00600
Tribbett & Son
1942 Westlake Loop
Newberg, OR 97132-1504

21E23AA00601
Cedar Linn LLC
7831 SE Lake Rd #200
Milwaukie, OR 97267-2193

21E23AA00602
Tribbett Ltd Prtnshp
1942 Westlake Loop
Newberg, OR 97132-1504

21E23AA00700
Douglas & Ruthann Seely
1780 SW Advance Rd
West Linn, OR 97068-9677

21E23AA00702
Wayne Jordan
12612 NE Rose Pkwy
Portland, OR 97230-1519

21E23AA00704
West Linn Properties
10250 SW North Dakota St
Tigard, OR 97223-4237

21E23AA01100
Marilyn Frankel
3364 Walling Way
West Linn, OR 97068-1555

21E23AA01200
Durward & Yvonne Bennett
3320 Walling Way
West Linn, OR 97068-1555

21E23AA01300
Hermena Murray
19620 Kalal Ct
Oregon City, OR 97045-8914

21E23AA01400
West Linn Investors LLC
1136 NW Hoyt St #200
Portland, OR 97209-3097

21E23AA01700
Douglas & Ruthann Seely
1780 SW Advance Rd
West Linn, OR 97068-9677

21E23AA01800
Gerardo & Gail Bezmertney
19042 Walling Cir
West Linn, OR 97068-1716

21E23AA01801
Wen Zhao
1701 Aspen Ct
Lake Oswego, OR 97034-6031

21E23AA02000
Mary Grace McDermott
18976 Walling Cir
West Linn, OR 97068-1714

21E23AA02100
Leroy Keeney
18950 Walling Cir
West Linn, OR 97068-1714

21E23AA02200
Masano Furui
18902 Walling Cir
West Linn, OR 97068-1714

21E23AA02700
Wallace Co-E Pond
18983 Walling Cir
West Linn, OR 97068-1706

21E23AA02701
Laura Matchak Quinn
18993 Walling Cir
West Linn, OR 97068-1706

21E23AA02800
Susan Russell
19023 Walling Cir
West Linn, OR 97068-1720

21E23AA02900
William Craig
19055 Walling Cir
West Linn, OR 97068-1720

21E23AA03000
Theodore Lachman
16984 Alder Cir
Lake Oswego, OR 97034-5606

21E23AA03100
City Of West Linn
22500 Salamo Rd #600
West Linn, OR 97068-8306

21E23AD00300
Wendy Watson
19476 Wilderness Dr
West Linn, OR 97068-2026

21E23AD00400
Jeffrey & Toni Laster
19472 Wilderness Dr
West Linn, OR 97068-2024

21E23AD00500
Julie Hackney
19470 Wilderness Dr
West Linn, OR 97068-2024

21E23AD00600
Patricia & Michael Nuttbrock
19468 Wilderness Dr
West Linn, OR 97068-2024

21E23AD00700
Kent & Debbie Blair
19464 Wilderness Dr
West Linn, OR 97068-2024

21E23AD06101
William More
222 N Rampart St
New Orleans, LA 70112-3104

21E24BB01500
Edward & Helen Montpart
19728 Old River Dr
West Linn, OR 97068-1628

21E24BB01600
David Ehlinger
19790 Old River Dr
West Linn, OR 97068-1628

21E24BB01700
Ann Stepto
19844 Old River Dr
West Linn, OR 97068-1643

21E24BB01800
Patricia Buffington
3820 Ridgewood Way
West Linn, OR 97068-1632

21E24BB01900
William & Doris Allen
3870 Ridgewood Way
West Linn, OR 97068-1632

21E24BB02000
William & Kelsey Belden
Po Box 388
West Linn, OR 97068-0388

21E24BB02100
Brent Carlson
19930 Old River Dr
West Linn, OR 97068-1645

21E24BB02200
Jack Michael Smith
3950 Ridgewood Way
West Linn, OR 97068-1634

21E24BB02400
Frank Gorgone Jr.
19970 Old River Dr
West Linn, OR 97068-1645

21E24BB02500
John Micetic
20024 Old River Dr
West Linn, OR 97068-2152

21E24BB04800
Presbytery Of Portland
19200 Willamette Dr
West Linn, OR 97068-2009

21E24BB04900
Erfan Inc
1143 SE 213th Ave
Gresham, OR 97030-3450

First American Title Insurance Company
NATIONAL COMMERCIAL SERVICES

Date of Production: Tuesday, January 24, 2012

The ownership information enclosed is time sensitive and should be utilized as soon as possible.

This mailing list was produced with the use of tax assessor maps available online from OR Maps (www.ormap.org/maps/index.cfm) as well as data purchased from the Portland Metro regional government and Real Estate Solutions Inc.

We assume no liability in connection with this service.

Thank you for your business and for using First American Title.

First American Title Insurance Company of Oregon

Clackamas (OR)

Prepared For:

Prepared By: **Lyndsey Doran**
Property Information Division
222 SW Columbia St, Suite 400 - Portland, Oregon 97201
Phone: (503) 219-TRIO Fax: (503) 790-7872

OWNERSHIP INFORMATION

Owner	: Ethington Elden Floyd Co-Trustee	*Ref Parcel Number*	: 21E23AA00703
CoOwner	:	*T*: 02S *R*: 01E *S*: 23 *Q*: 253	
Site Address	: 19080 Willamette Dr West Linn 97068	*Parcel Number*	: 00360656
Mail Address	: 3777 Ua Ave Emmett Id 83617	*Map Number*	:
Telephone	*: Owner*: *Tenant*:	*County*	: **Clackamas (OR)**

SALES AND LOAN INFORMATION

Transferred	: 03/19/2004	*Loan Amount*	:
Document #	: 04-033721	*Lender*	:
Sale Price	:	*Loan Type*	:
Deed Type	:	*Interest Rate*	:
% Owned	: 100	*Vesting Type*	:

PROPERTY DESCRIPTION

Map Page & Grid	: 686 J3
Census	*: Tract*: 205.05 *Block*: 2
Subdivision/Plat	: Cedaroak Park
Neighborhood Cd	:
Land Use	: 201 Com,Commercial Land,Improved
Legal	: 468 CEDAROAK PK PT LT 17&18
	:
	:

ASSESSMENT AND TAX INFORMATION

MktLand	: $249,153
MktStructure	: $127,940
MktOther	:
MktTotal	: $377,093
M50 Assd Total	: $308,590
% Improved	: 34
11-12 Taxes	: $5,349.08
Exempt Amount	:
Exempt Type	:
Levy Code	: 003002
Millage Rate	: 18.5007

PROPERTY CHARACTERISTICS

Bedrooms	:	*Lot Acres*	: .70	*Year Built*	: 1977
Bathrooms	:	*Lot SqFt*	: 30,399	*EffYearBlt*	:
Heat Method	:	*Bsm Fin SqFt*	:	*Floor Cover*	:
Pool	:	*Bsm Unfin SqFt*	:	*Foundation*	:
Appliances	:	*Bsm Low SqFt*	:	*Roof Shape*	:
Dishwasher	:	*Bldg SqFt*	:	*Roof Matl*	:
Hood Fan	:	*1st Flr SqFt*	:	*InteriorMat*	:
Deck	:	*Upper Flr SqFt*	:	*Paving Matl*	:
Garage Type	:	*Porch SqFt*	:	*Const Type*	:
Garage SF	:	*Attic SqFt*	:	*Ext Finish*	:
		Deck SqFt	:		

First American Title Insurance Company of Oregon

Clackamas (OR)

Prepared For:

Prepared By: **Lyndsey Doran**
Property Information Division
222 SW Columbia St, Suite 400 - Portland, Oregon 97201
Phone: (503) 219-TRIO Fax: (503) 790-7872

OWNERSHIP INFORMATION

Owner	: Ethington Elden Floyd Co-Trustee	*Ref Parcel Number*	: 21E23AA00705
CoOwner	:	*T*: 02S *R*: 01E	*S*: 23 *Q*: 253
Site Address	: *no Site Address*	*Parcel Number*	: 00360674
Mail Address	: 3777 Ua Ave Emmett Id 83617	*Map Number*	:
Telephone	*: Owner*: *Tenant*:	*County*	: **Clackamas (OR)**

SALES AND LOAN INFORMATION

Transferred	: 03/19/2004	*Loan Amount*	:
Document #	: 04-033721	*Lender*	:
Sale Price	:	*Loan Type*	:
Deed Type	:	*Interest Rate*	:
% Owned	: 100	*Vesting Type*	:

PROPERTY DESCRIPTION

Map Page & Grid	:
Census	*: Tract*: 205.05 *Block*: 2
Subdivision/Plat	: Cedaroak Park
Neighborhood Cd	:
Land Use	: 201 Com,Commercial Land,Improved
Legal	: 468 CEDAROAK PK PT LT 17
	:
	:

ASSESSMENT AND TAX INFORMATION

MktLand	: $63,758
MktStructure	:
MktOther	:
MktTotal	: $63,758
M50 Assd Total	: $48,488
% Improved	:
11-12 Taxes	: $863.02
Exempt Amount	:
Exempt Type	:
Levy Code	: 003002
Millage Rate	: 18.5007

PROPERTY CHARACTERISTICS

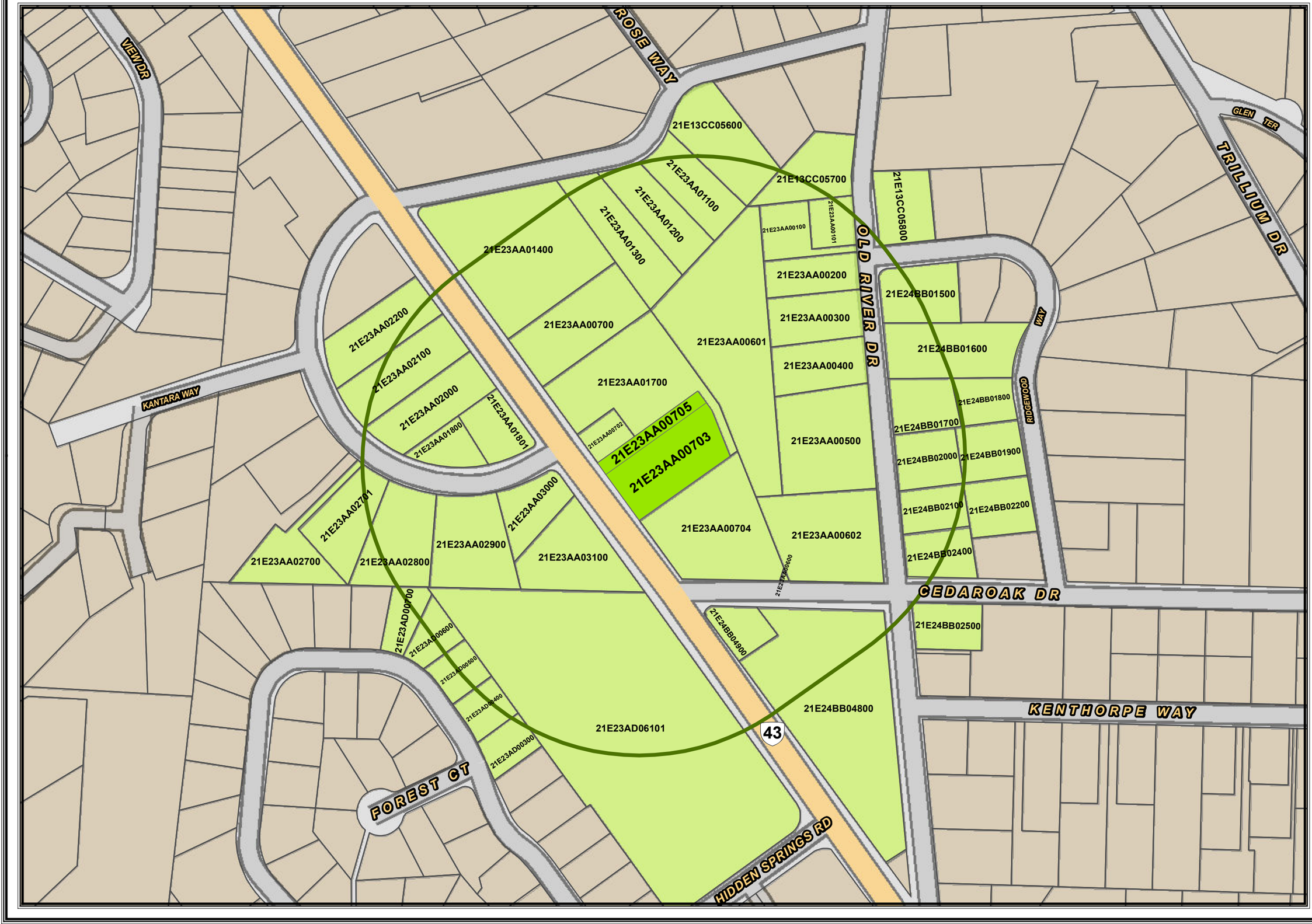
Bedrooms	:	*Lot Acres*	: .18	*Year Built*	:
Bathrooms	:	*Lot SqFt*	: 7,856	*EffYearBlt*	:
Heat Method	:	*Bsm Fin SqFt*	:	*Floor Cover*	:
Pool	:	*Bsm Unfin SqFt*	:	*Foundation*	:
Appliances	:	*Bsm Low SqFt*	:	*Roof Shape*	:
Dishwasher	:	*Bldg SqFt*	:	*Roof Matl*	:
Hood Fan	:	*1st Flr SqFt*	:	*InteriorMat*	:
Deck	:	*Upper Flr SqFt*	:	*Paving Matl*	:
Garage Type	:	*Porch SqFt*	:	*Const Type*	:
Garage SF	:	*Attic SqFt*	:	*Ext Finish*	:
		Deck SqFt	:		

Prepared By:

First American Title Insurance Company

NATIONAL COMMERCIAL SERVICES

Date: 01/24/2012



N

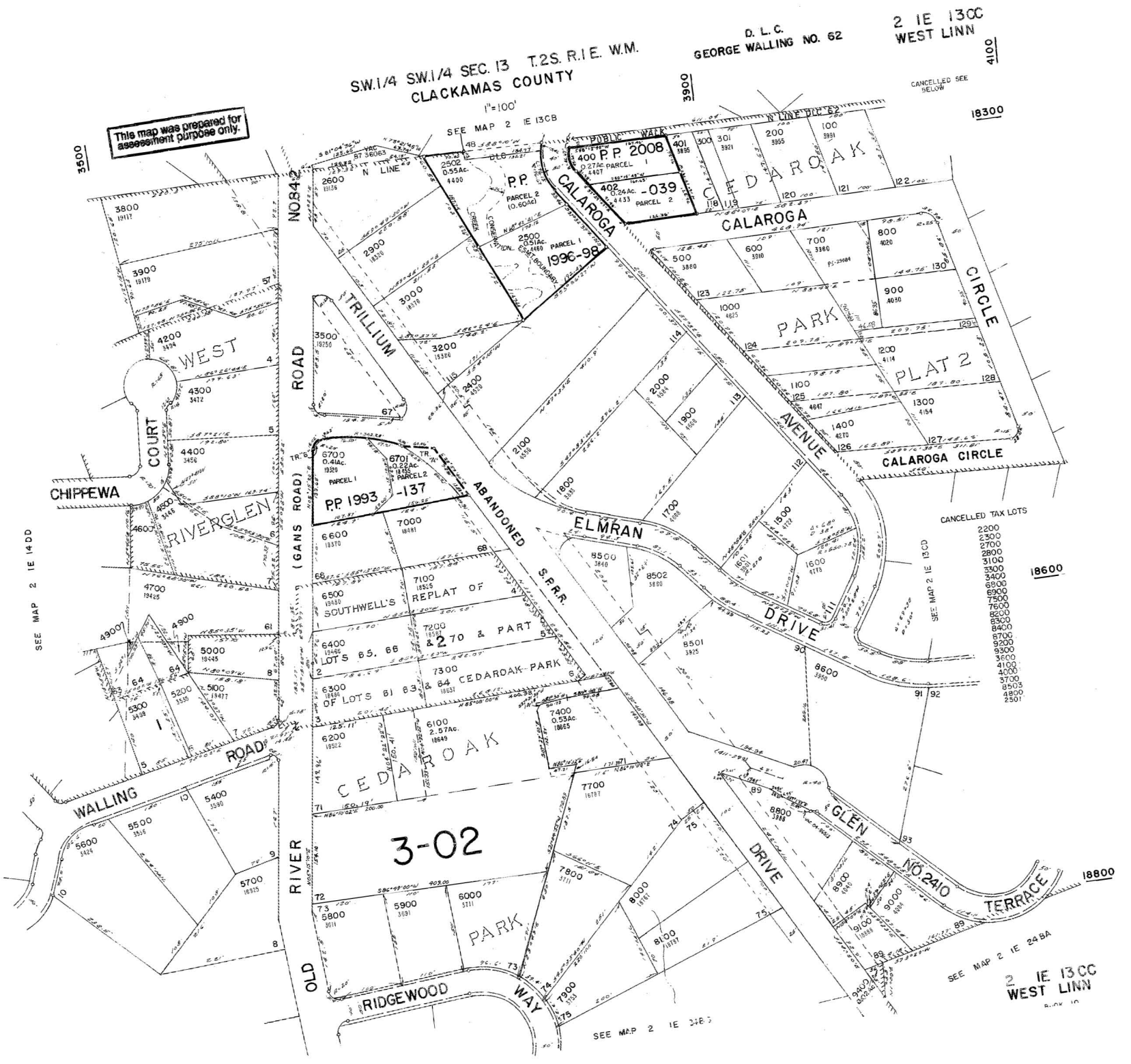
0 200

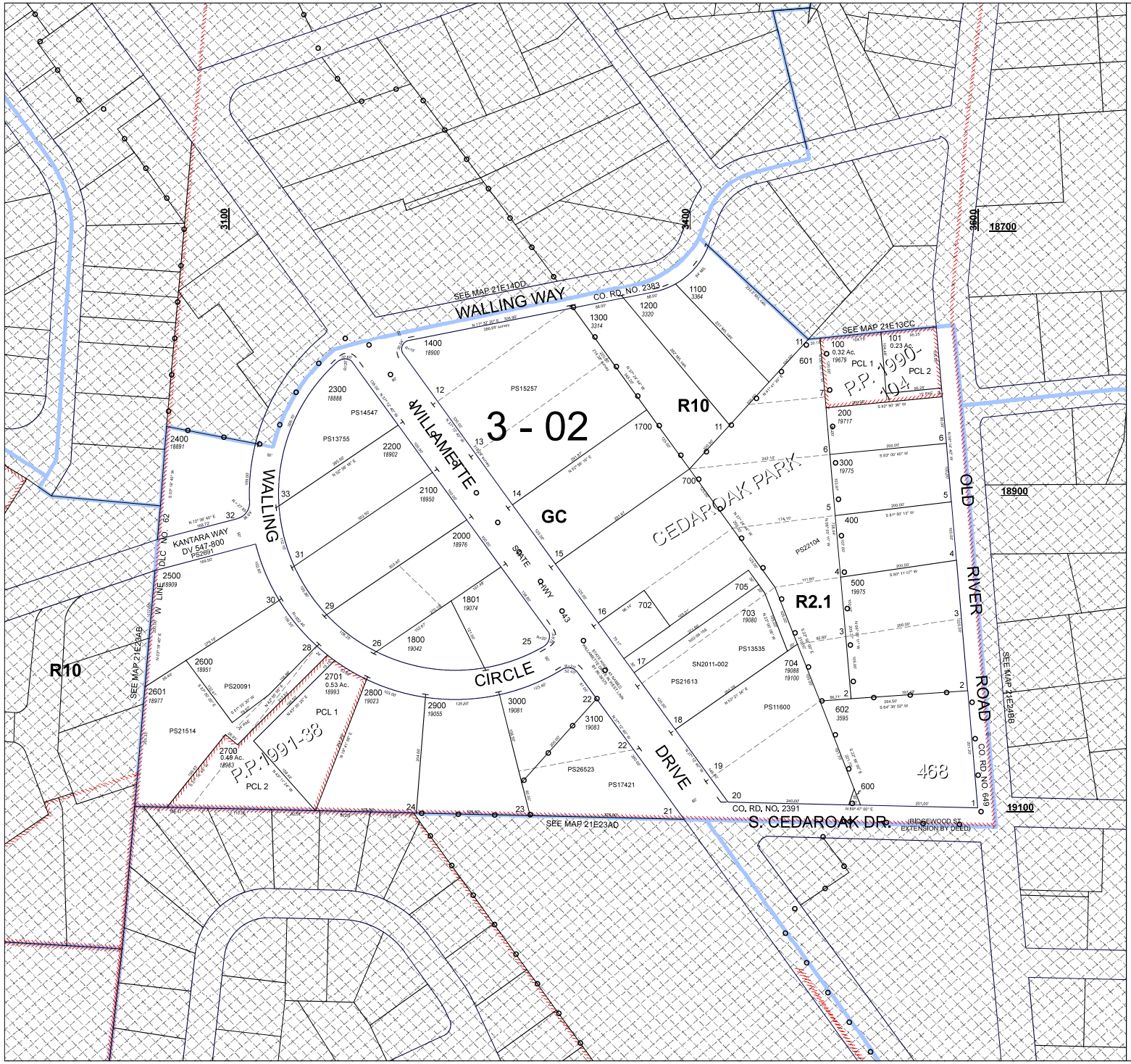
feet

500 Foot Radius
19080 Willamette Dr

- Subject Parcels
- Notification Area
- Radius
- Taxlots

This information is deemed reliable but is not guaranteed.


S.W.1/4 S.W.1/4 SEC. 13 T.2S. R.1E. W.M.
CLACKAMAS COUNTY
1"=100'
D. L. C.
GEORGE WALLING NO. 62
2 1E 13CC
WEST LINN
This map was prepared for assessment purpose only.
SEE MAP 2 1E 13CB
N LINE D.L.C. 62
CANCELLED SEE BELOW
PUBLIC WALK
P.P. 2008
PARCEL 1
PARCEL 2
P.P. 1996-98
PARCEL 1
PARCEL 2
P.P. 1993-137
PARCEL 1
PARCEL 2
CEDAR OAK
CALAROGA
CIRCLE
PARK PLAT 2
CALAROGA CIRCLE
TRILLIUM
ROAD
ABANDONED
S.P.R.R.
AVENUE
ELMRAN
DRIVE
CANCELLED TAX LOTS
2200
2300
2700
2800
3100
3300
3400
6800
6900
7500
7600
8200
8300
8400
8700
9200
9300
3600
4100
4000
3700
8503
4800
2501
SEE MAP 2 1E 13CD
CHIPPEWA
COURT
WEST
RIVERGLEN
SEE MAP 2 1E 14DD
(GANS ROAD)
WALLING
ROAD
CEDAR OAK
PARK
3-02
RIVER
OLD
RIDGEWOOD
WAY
GLEN
NO. 2410
TERRACE
SEE MAP 2 1E 24BA
SEE MAP 2 1E 24B
2 1E 13CC
WEST LINN
3500
3900
4100
18300
18600
18800



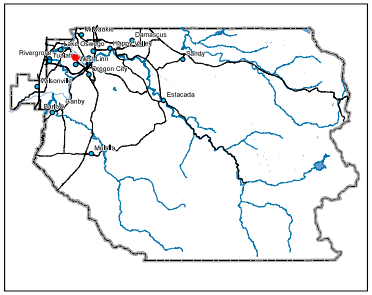
2 1 E 23 AA
WEST LINN

N.E.1/4 N.E.1/4 SEC.23 T.2S. R.1E. W.M.
Clackamas County
1" = 100'

D. L. C.
GEORGE WALLING NO. 62

Cancelled Taxlots
701
800
900
1000
1500
1600
1900
101

- Parcel Boundary
- Private Road ROW
- Historical Boundary
- Railroad Centerline
- TaxCodeLines
- Map Index
- WaterLines
- Land Use Zoning
- Plats
- Water
- Corner
- Section Corner
- 1/16th Line
- Govt Lot Line
- DLC Line
- Meander Line
- PLSS Section Line
- Historic Corridor 40'
- Historic Corridor 20'



THIS MAP IS FOR ASSESSMENT PURPOSES ONLY

Feet
0 25 50 100 150 200

10/13/2011

2 1 E 23 AA
WEST LINN

This map was prepared for assessment purpose only.

SE 1/4 NE 1/4 SECTION 23 T. 2S R. IE. W.M.

2 IE 23AD

CLACKAMAS COUNTY

D.L.C.

1" = 100'

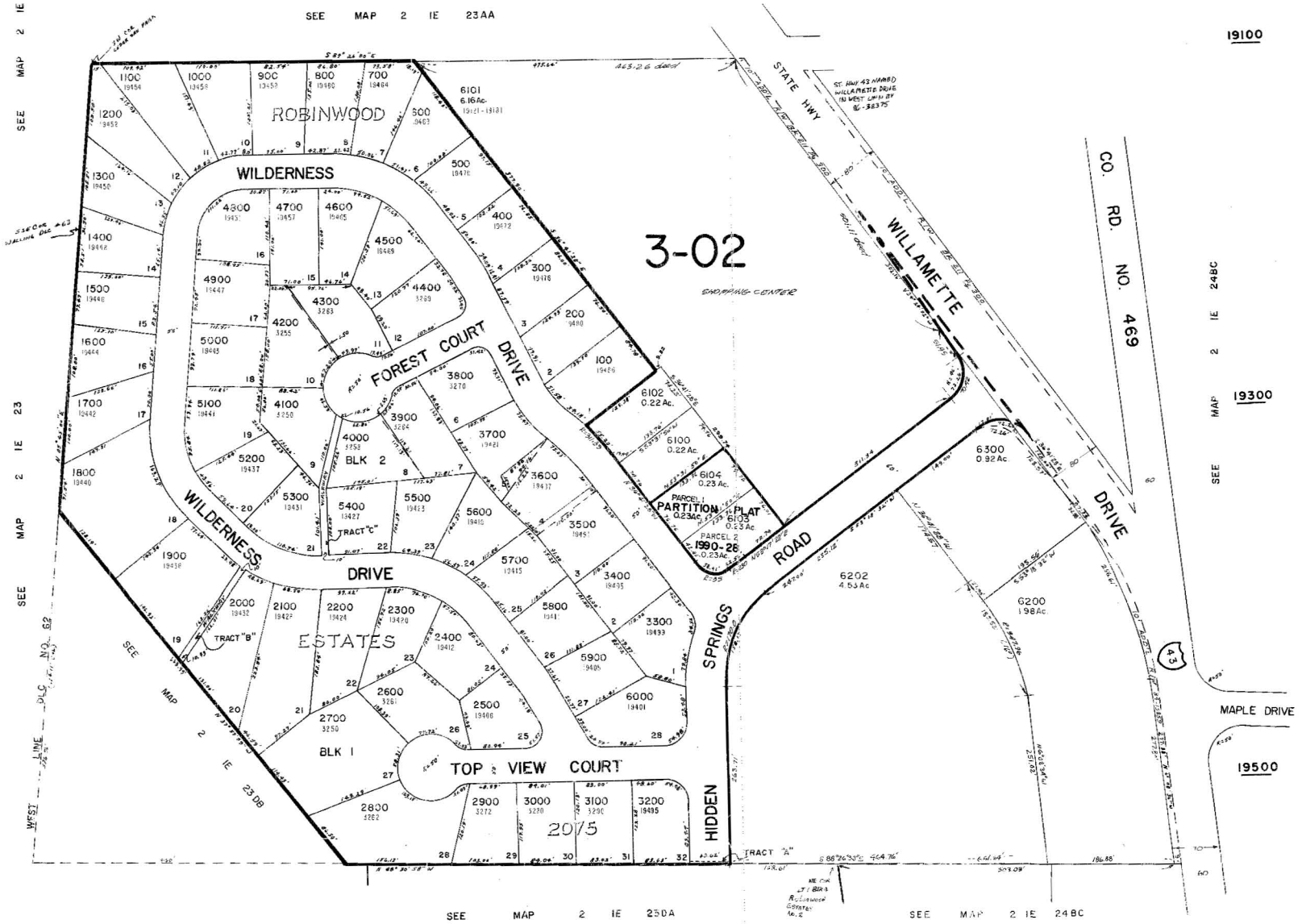
GEORGE WALLING NO. 62

3100

3400

3700

CANCELLED TAX LOTS
6301
6201



2 IE 23AD

BOOK 12

This map was prepared for assessment purpose only.

N.W. 1/4 N.W. 1/4 SEC. 24 T. 2 S. R. 1E. W.M.
CLACKAMAS COUNTY

D. L. C.
GEORGE WALLING NO. 62

2 1E 24BB
WEST LINN

1"=100'

CALLISON

Robinwood Neighborhood Association – Meeting – February 14, 2012

(Please Note: Per City of West Linn requirements, an audio recording of this meeting will be made and submitted with the project's Class II Design Review application)

Chase– Cedar Oak & Willamette:

JPMorgan Chase intends to submit a Class II Design Review Application to the City of West Linn for their project proposed for the former Kasch's Nursery site at 19080 Willamette Drive, West Linn, OR.

As a requirement for submittal, Chase has sent a *Notice of Proposed Project* to neighbors/property owners within 500-feet of the site. Additionally, Chase is required to present the project to the Robinwood Neighborhood at an open meeting. This evening's presentation serves to meet the neighborhood meeting requirement.

Project Representatives:

Greta Pass; JPMorgan Chase, Applicant
Hans Christiansen, Grant J. Seaman, AIA; Callison, Architect for Chase

Project Description:

Overview: Demolish existing Kasch's nursery building and site improvements. Construct a 4,335 SF, 1-story Chase Bank Branch with remote 3-lane drive-thru. The Drive-thru will consist of 2 VAT (Vacuum Assisted Tellers) and 1-ATM. The project will also include construction of site improvements including but not limited to, on-site parking for 14-vehilces, onsite pedestrian walkway, trash enclosure, and landscaping. Additionally, the City requires that the project replace the existing curb and sidewalk along the project frontage, with new curb and 12' sidewalk. Tree wells are required to be provided at 35' on center along the project frontage.

Site Access: The project will primarily be accessed via a shared driveway with the 7-11 (along SE Boundary of Site); however the project will also have access via the retail project to the northeast of the site as required by the City of West Linn. Parking will be at the rear of the building. The project will also be providing bicycle parking at the storefront as well as additional plaza area between the sidewalk and building to enhance bicycle and pedestrian accessibility.

Hours of Operation: Bank hours of operation are Monday –Friday 9AM-6PM, Saturday 9AM-1PM. ATM's at the building and Drive-thru ATM are operational 24hrs, all days of the week.

Building Design: The Chase building incorporates cast stone veneer, brick, and stucco as the primary exterior building materials. A hipped roof tower element emphasizes the primary building entrance on Willamette Drive and provides additional interest to the building design. The building includes modulation and changes in materials to provide architectural interest.

1420 FIFTH AVENUE #2400 SEATTLE, WASHINGTON 98101-2343
T 206 623 4646 F 206 623 4625 www.callison.com