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.

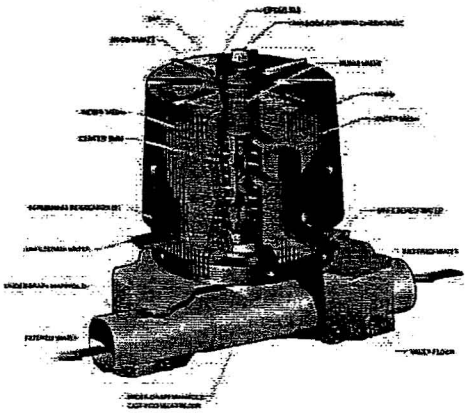


Figure 1. The StormFilter Cartridge

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: _____

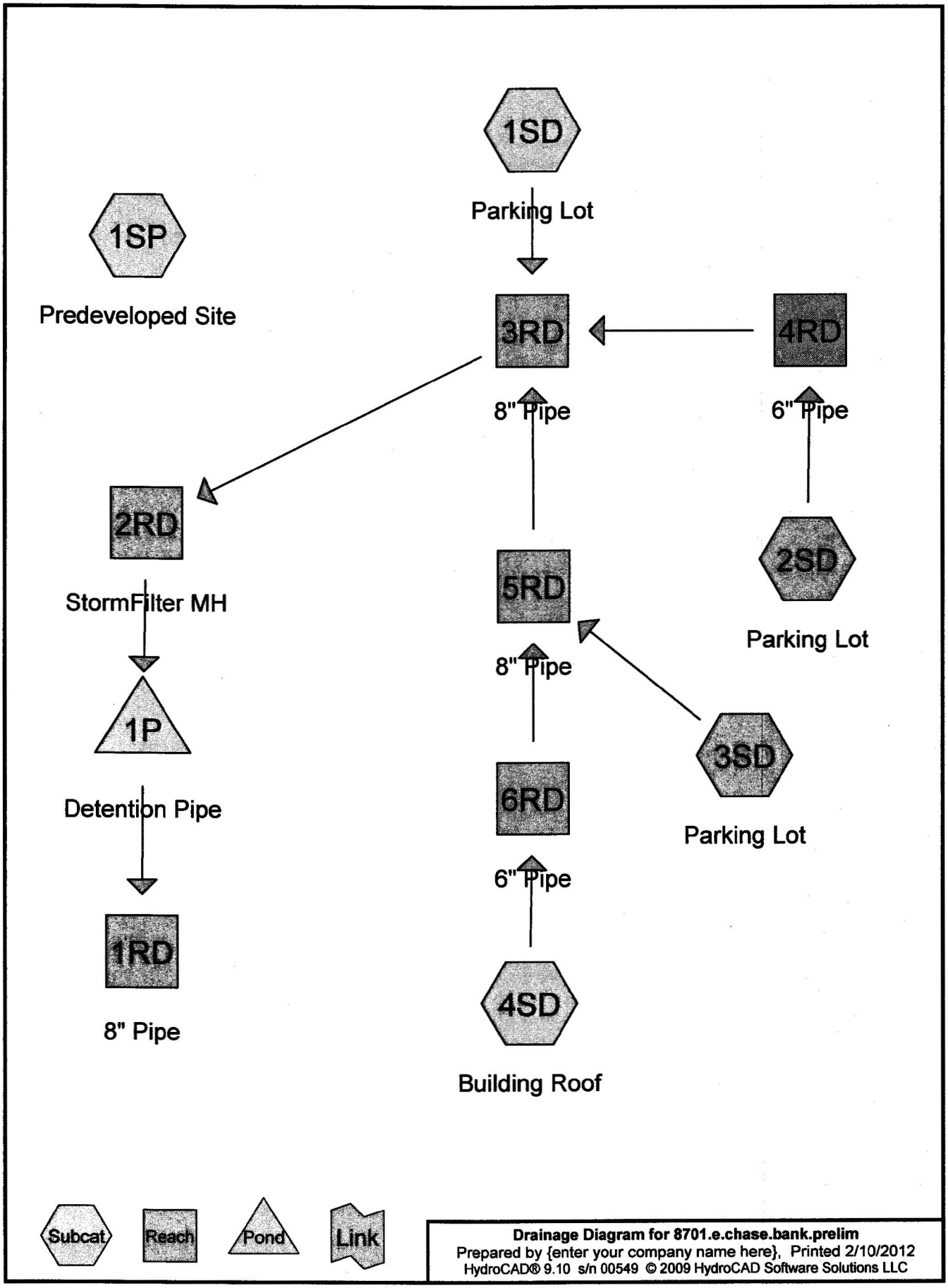
Quantity of Sediment Removed (estimate?): _____

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

Residuals (debris, sediment) Disposal Methods: _____

Notes: _____

E



WATER QUALITY STORM (0.83")

Summary for Subcatchment 1SP: Predeveloped Site

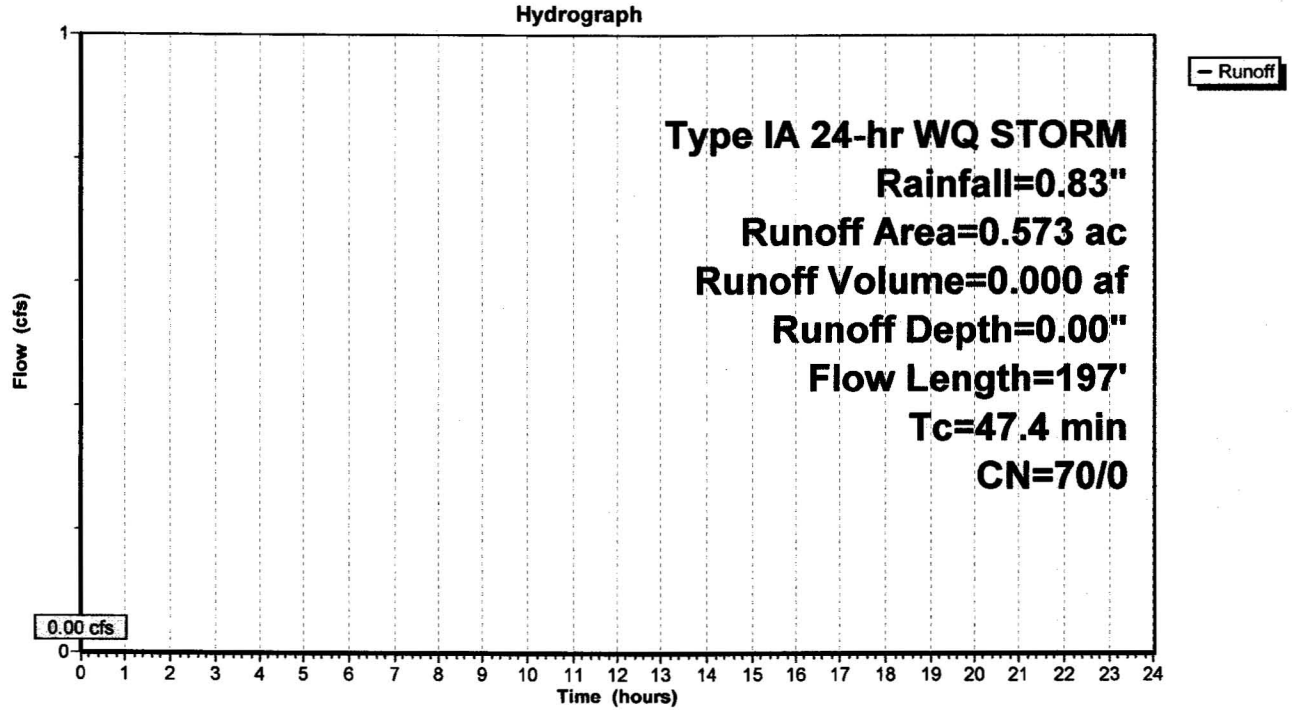
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

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

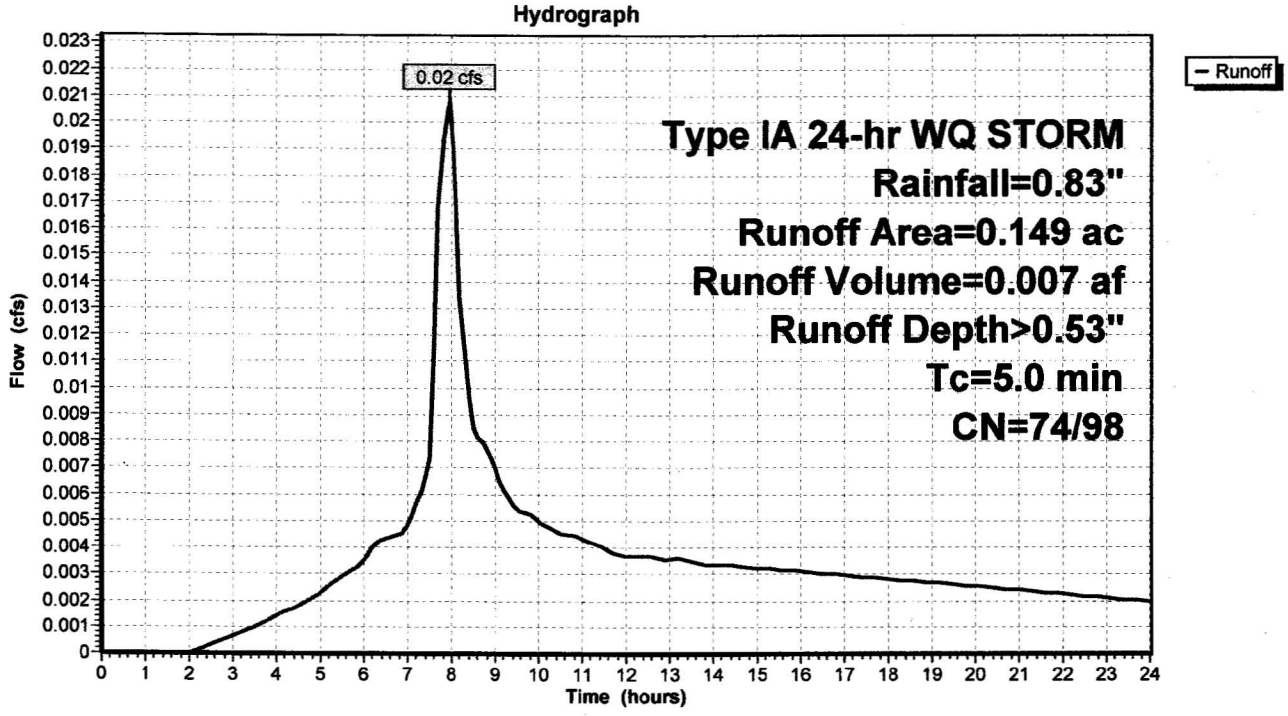
Runoff = 0.02 cfs @ 7.95 hrs, Volume= 0.007 af, Depth> 0.53"

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

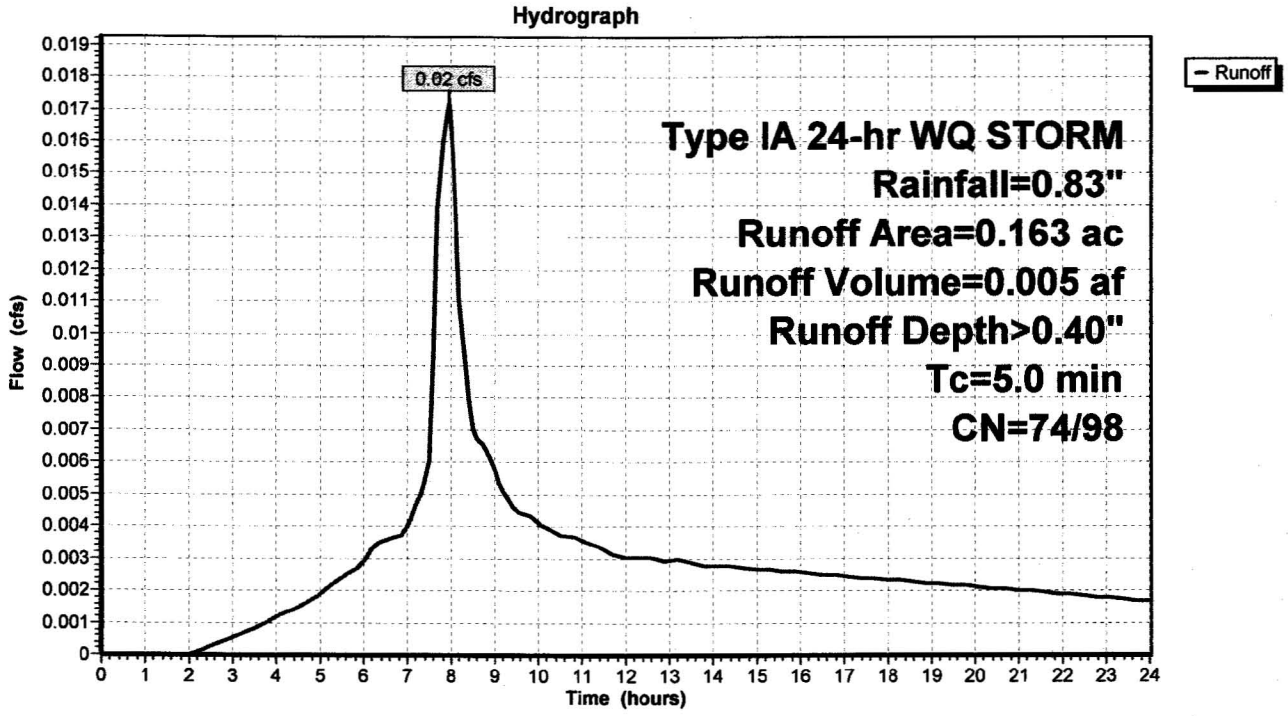
Runoff = 0.02 cfs @ 7.95 hrs, Volume= 0.005 af, Depth> 0.40"

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

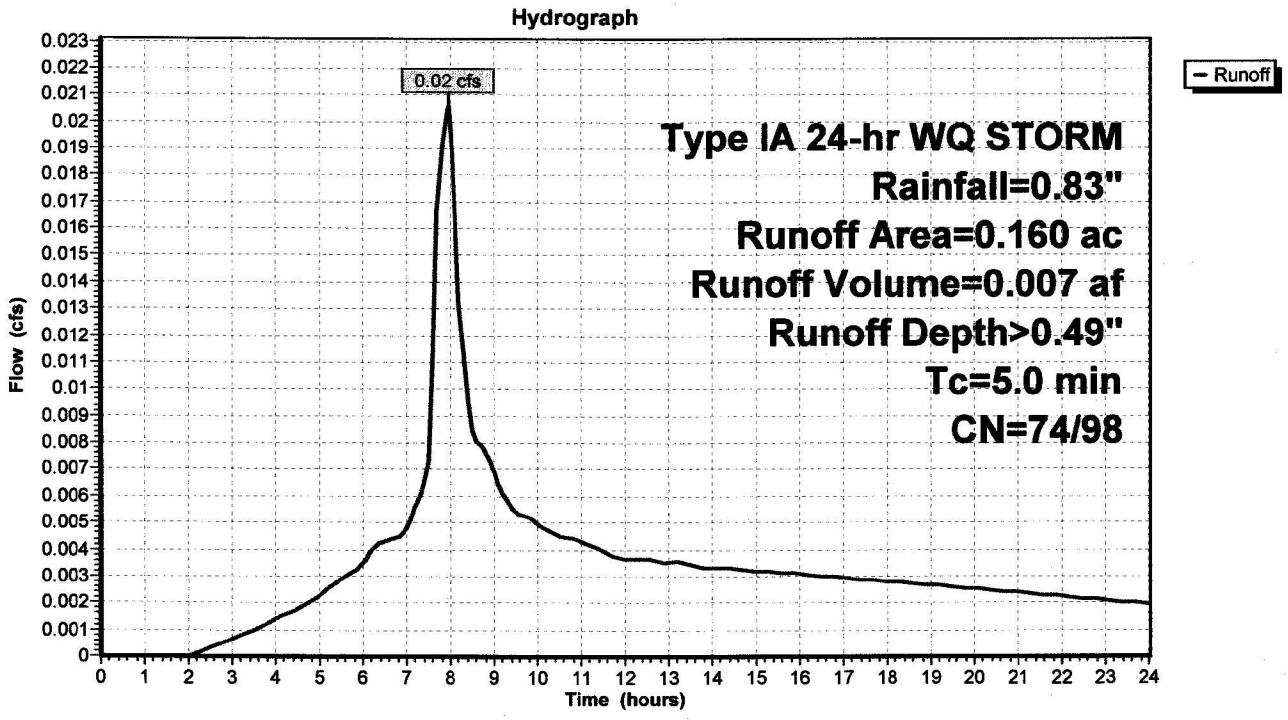
Runoff = 0.02 cfs @ 7.95 hrs, Volume= 0.007 af, Depth> 0.49"

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

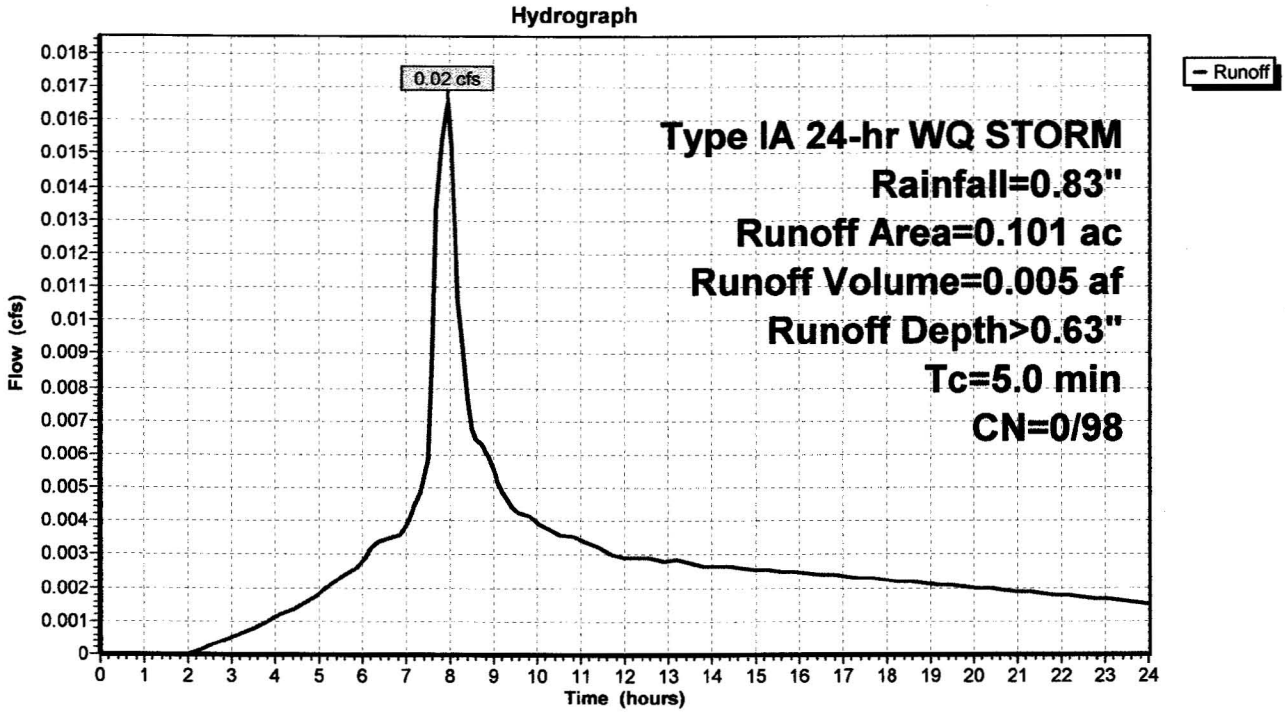
Runoff = 0.02 cfs @ 7.95 hrs, Volume= 0.005 af, Depth> 0.63"

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



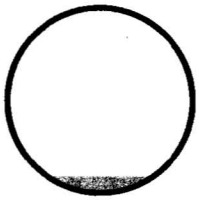
Summary for Reach 1RD: 8" Pipe

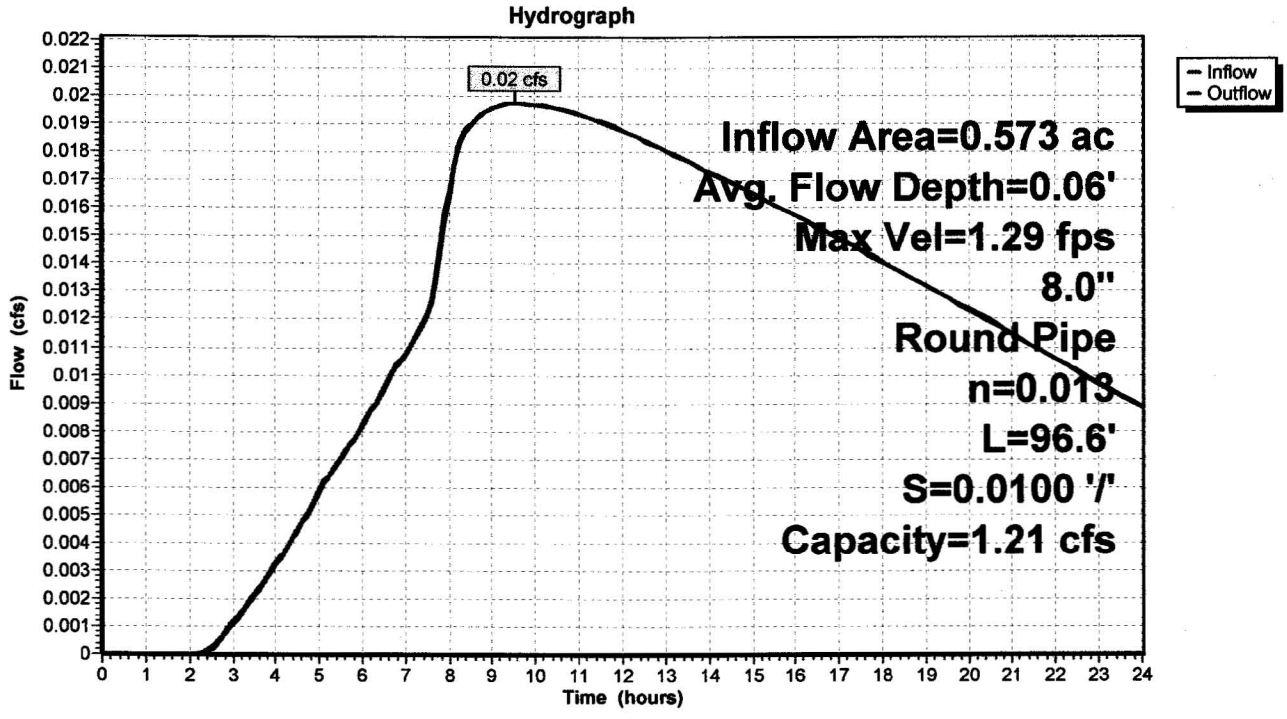
Inflow Area = 0.573 ac, 80.10% Impervious, Inflow Depth > 0.49" for WQ STORM event
Inflow = 0.02 cfs @ 9.51 hrs, Volume= 0.023 af
Outflow = 0.02 cfs @ 9.54 hrs, Volume= 0.023 af, Atten= 0%, Lag= 2.2 min

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'



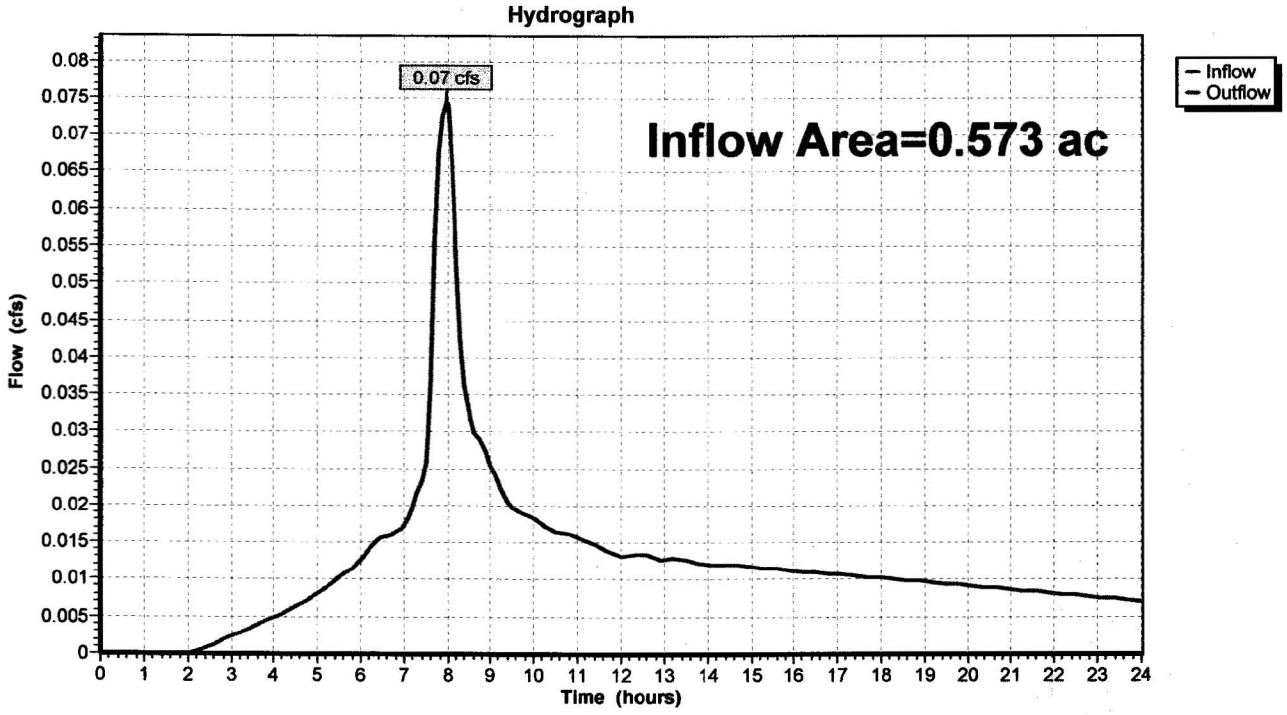


Summary for Reach 2RD: StormFilter MH

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



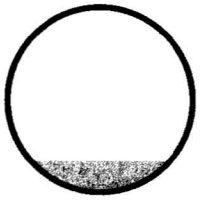
Summary for Reach 3RD: 8" Pipe

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

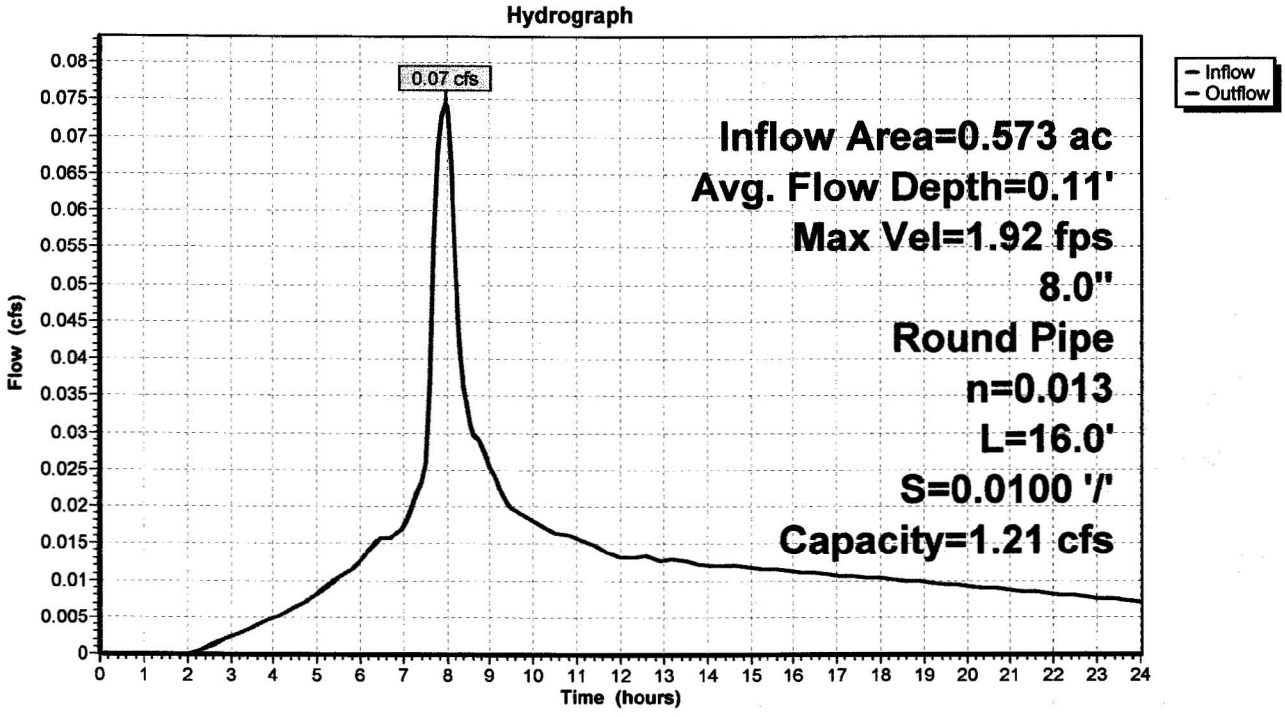
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.92 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.09 fps, Avg. Travel Time= 0.2 min

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



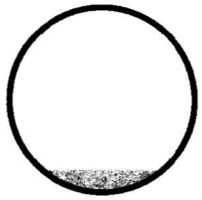
Summary for Reach 4RD: 6" Pipe

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

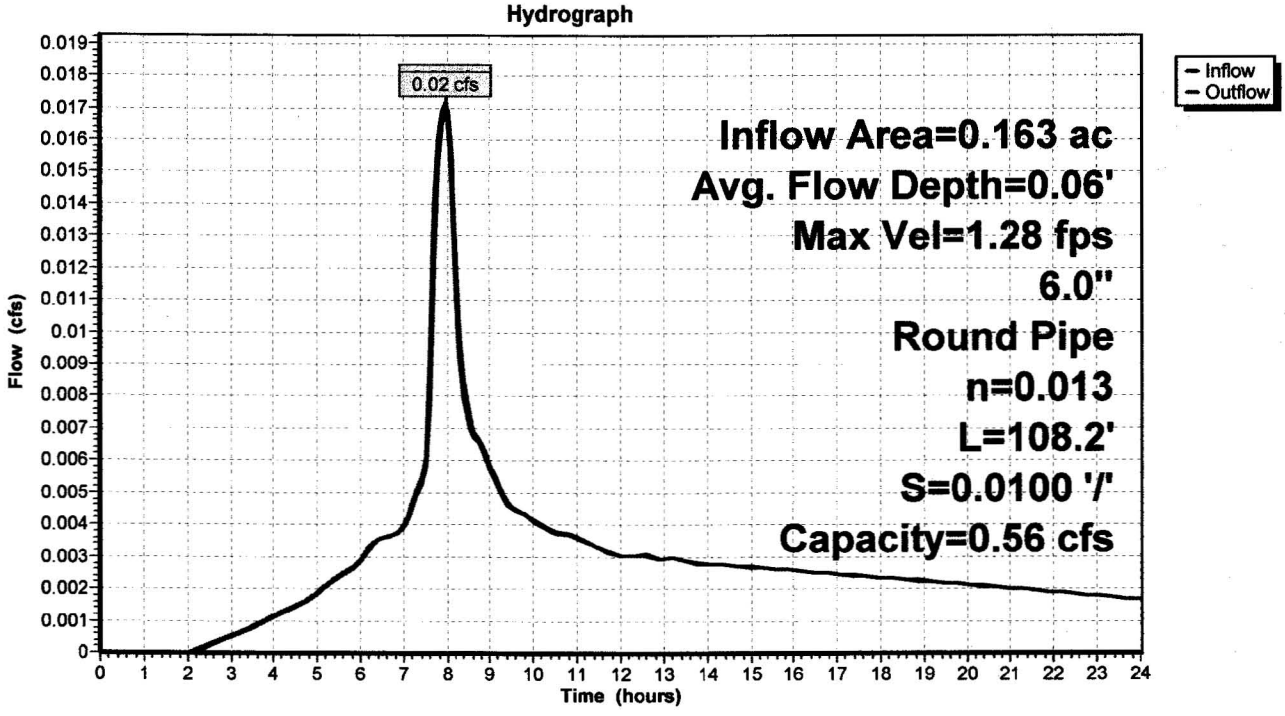
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.28 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 0.73 fps, Avg. Travel Time= 2.5 min

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

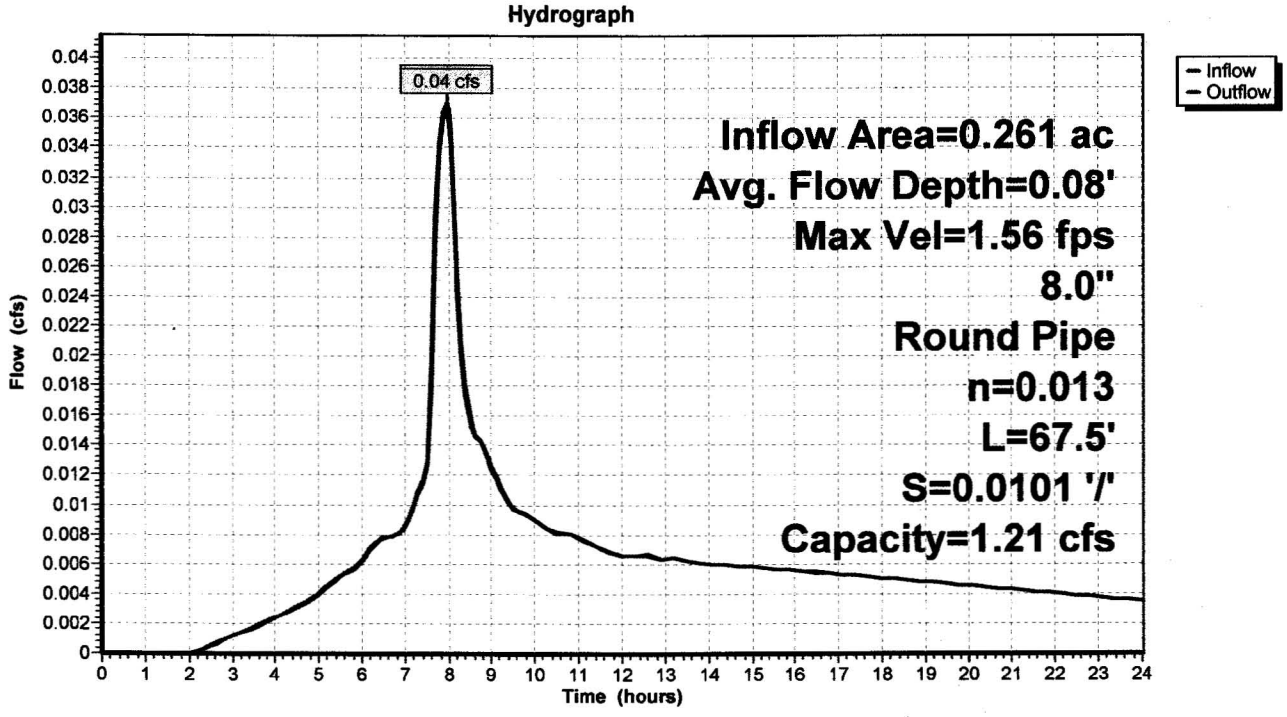
Inflow Area = 0.261 ac, 86.97% Impervious, Inflow Depth > 0.54" for WQ STORM event
Inflow = 0.04 cfs @ 7.95 hrs, Volume= 0.012 af
Outflow = 0.04 cfs @ 7.96 hrs, Volume= 0.012 af, Atten= 1%, Lag= 0.7 min

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'

Reach 5RD: 8" Pipe



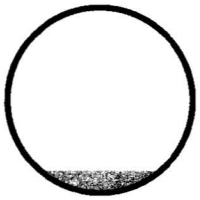
Summary for Reach 6RD: 6" Pipe

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

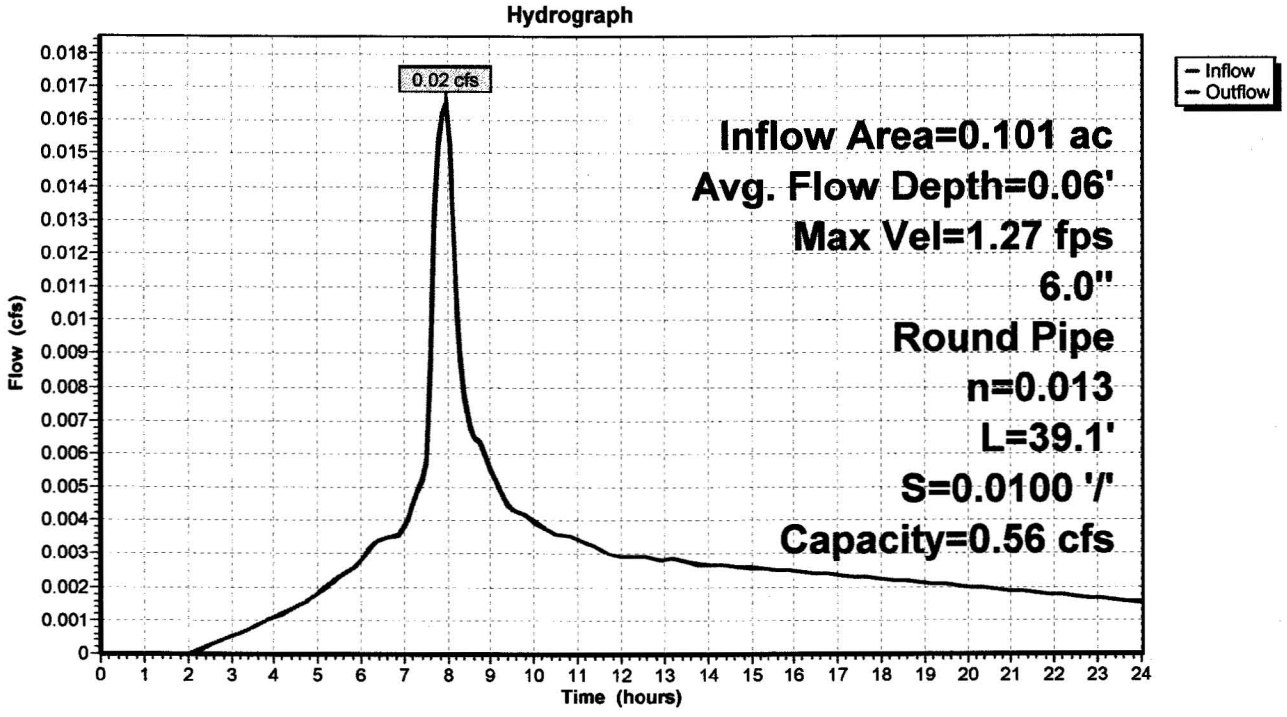
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.27 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 0.72 fps, Avg. Travel Time= 0.9 min

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

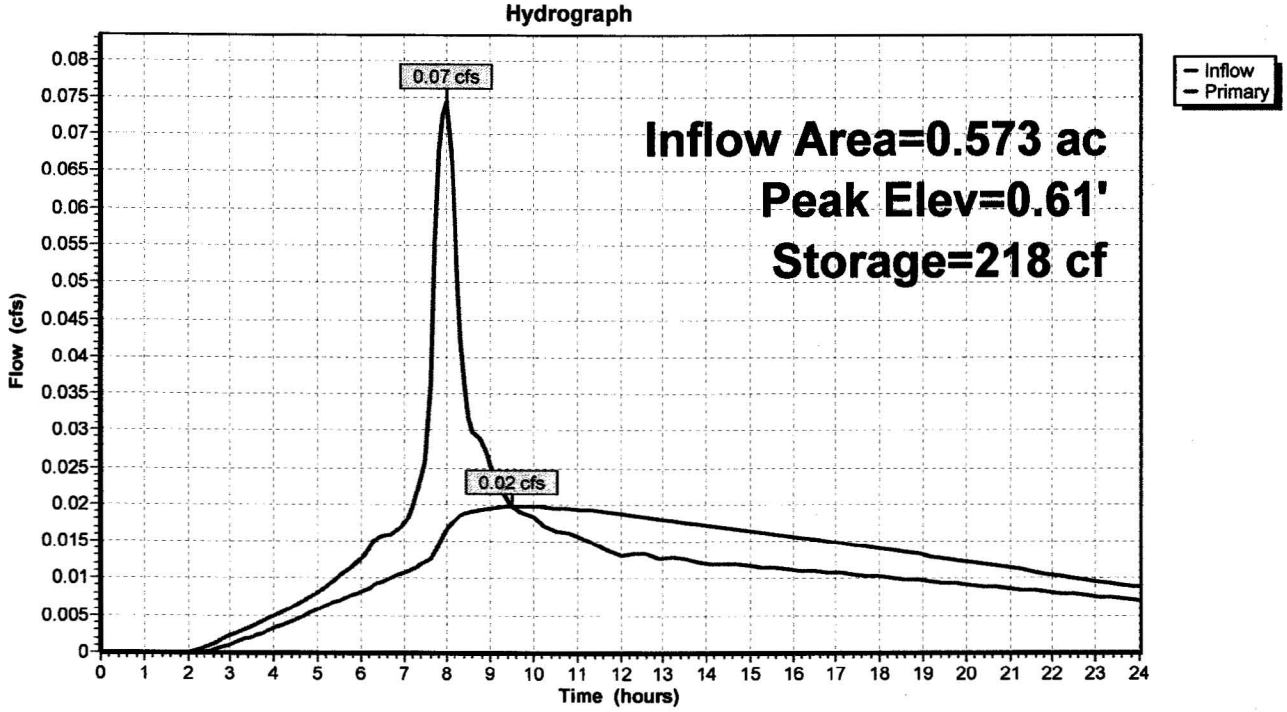
Plug-Flow detention time= 123.8 min calculated for 0.023 af (97% of inflow)
Center-of-Mass det. time= 104.2 min (831.7 - 727.5)

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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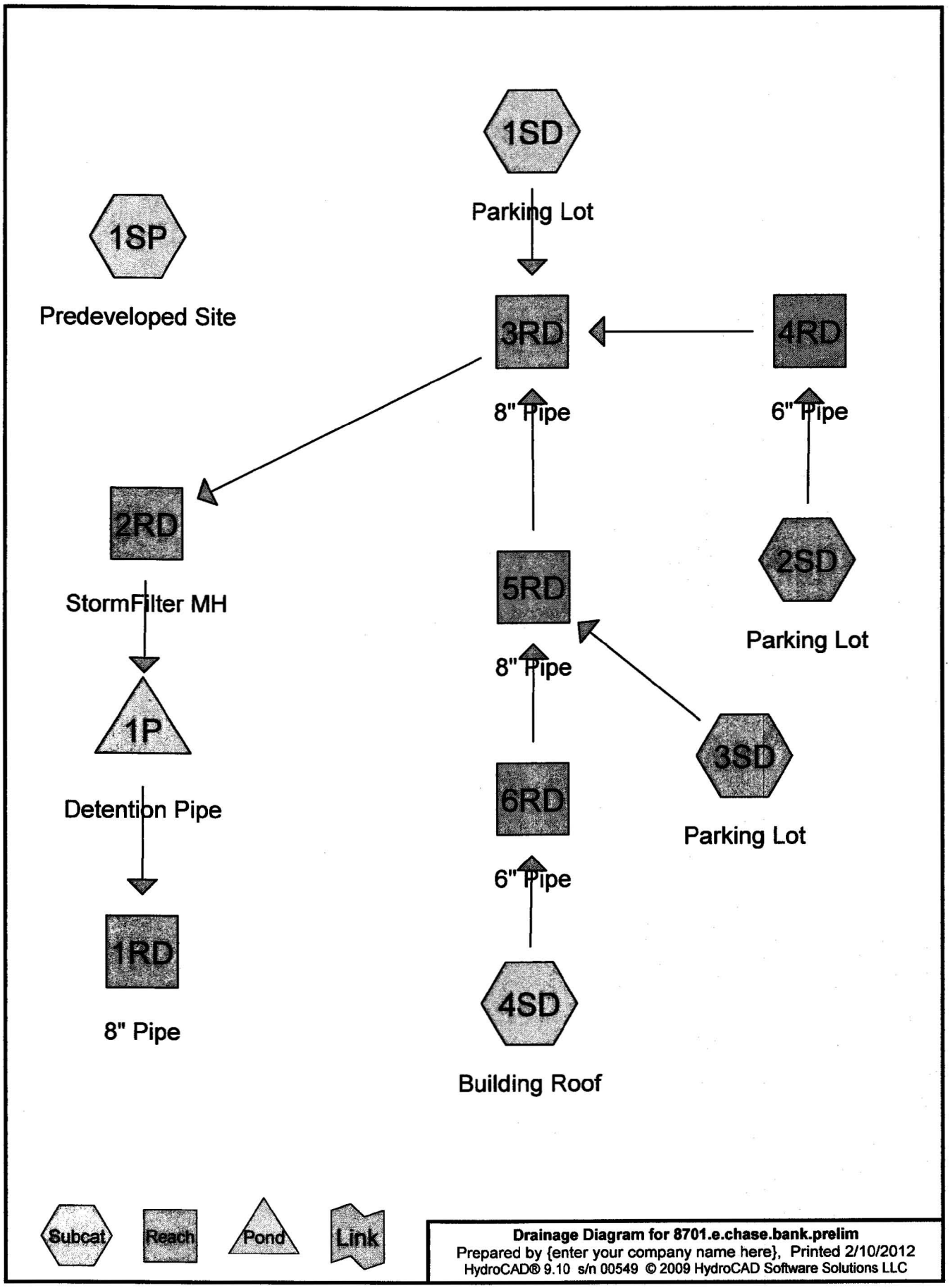


2-YEAR STORM (2.40")

Summary for Subcatchment 1SP: Predeveloped Site

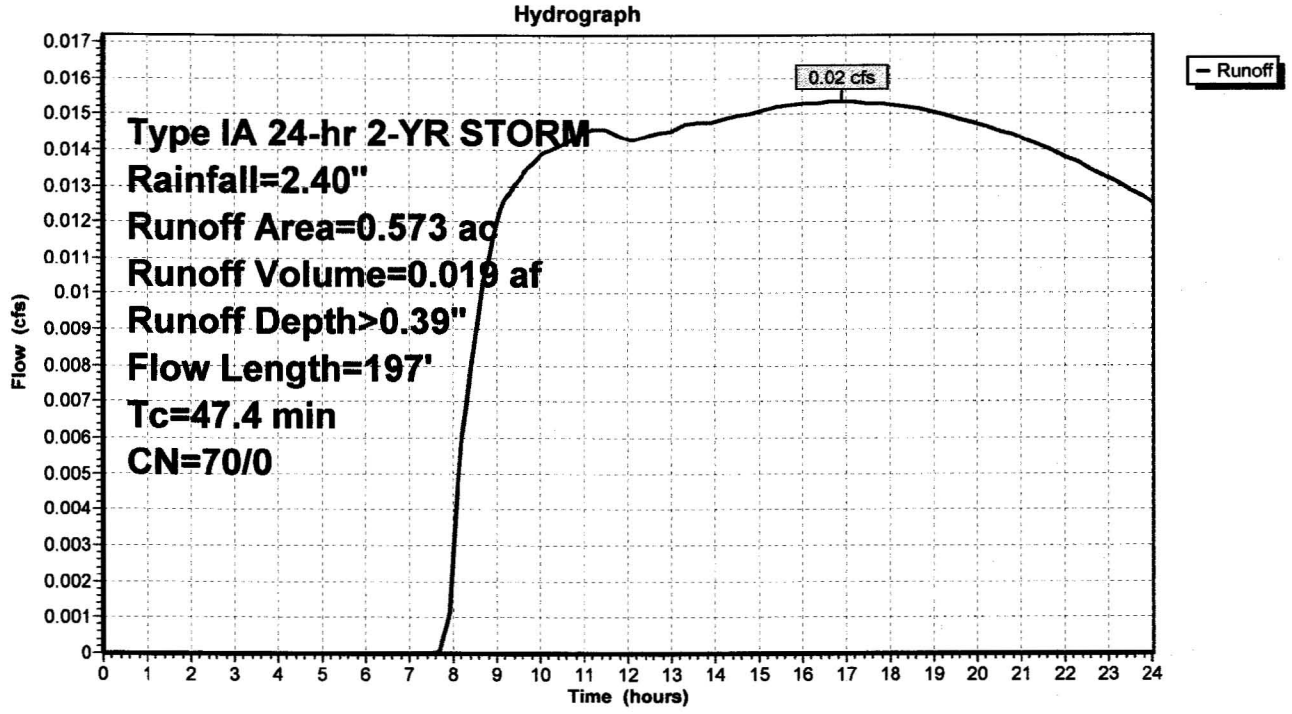
Runoff = 0.02 cfs @ 16.91 hrs, Volume= 0.019 af, Depth> 0.39"

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

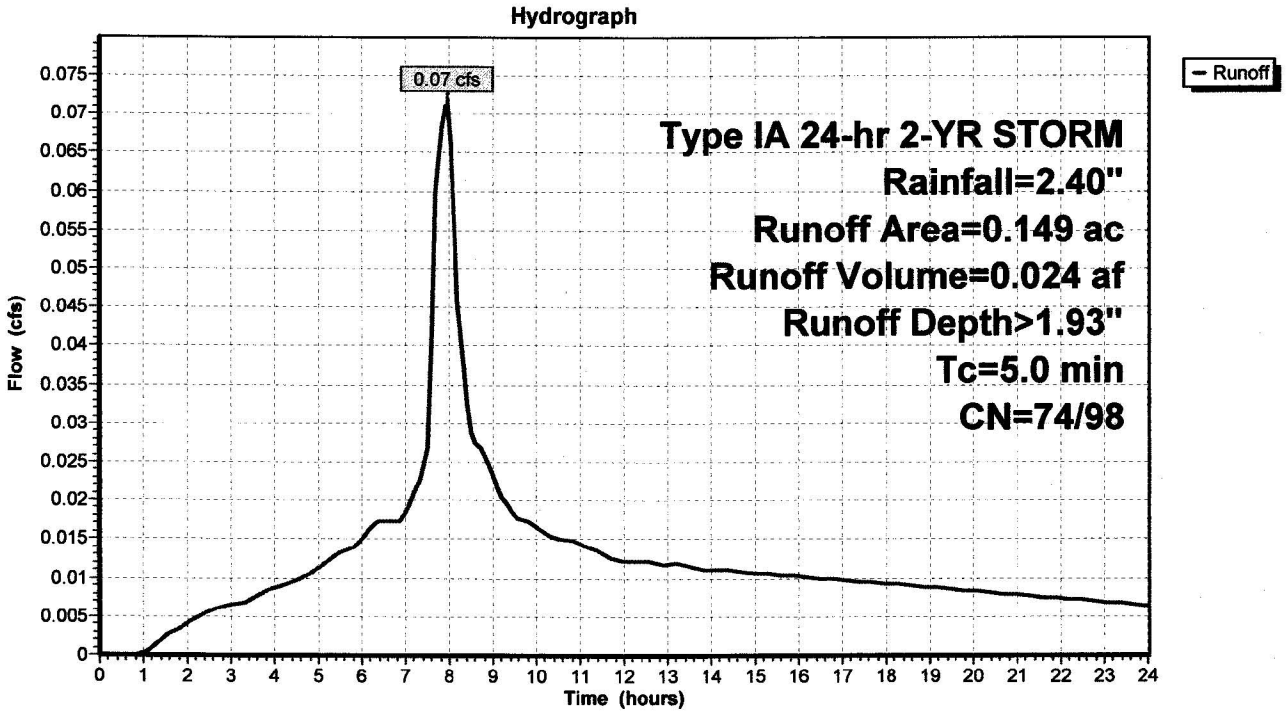
Runoff = 0.07 cfs @ 7.93 hrs, Volume= 0.024 af, Depth> 1.93"

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

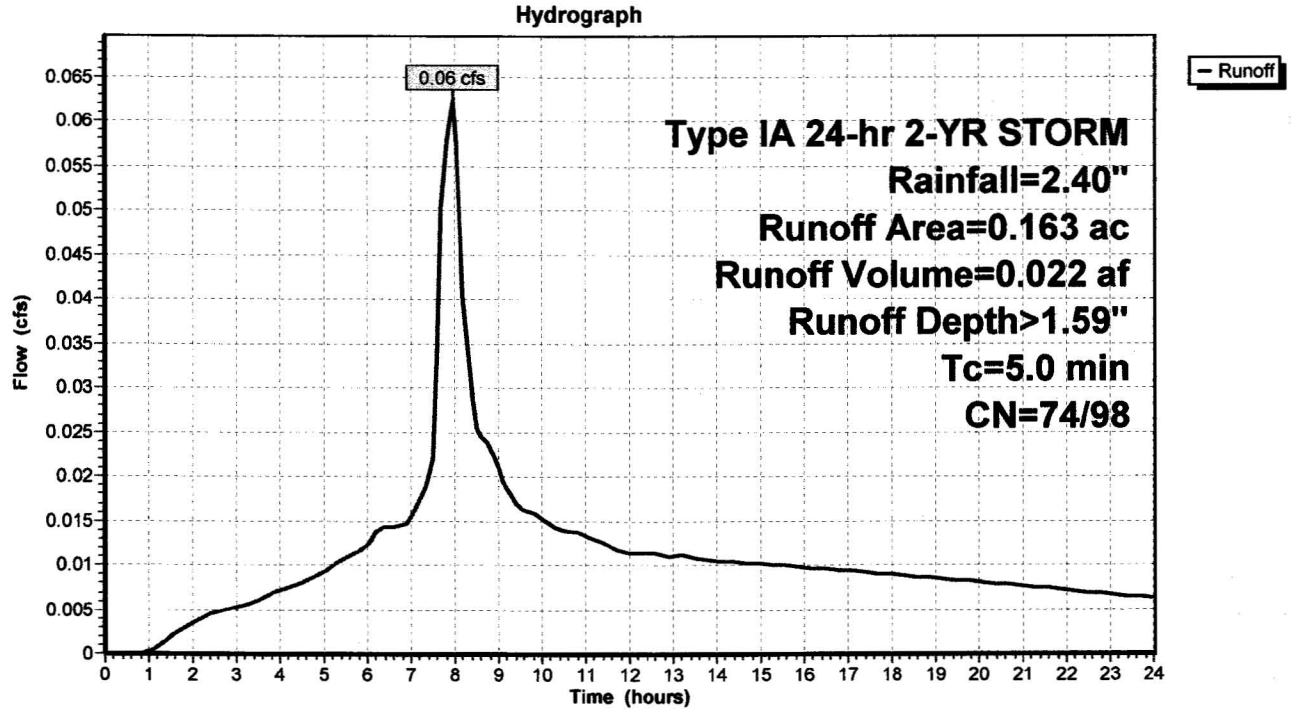
Runoff = 0.06 cfs @ 7.95 hrs, Volume= 0.022 af, Depth> 1.59"

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

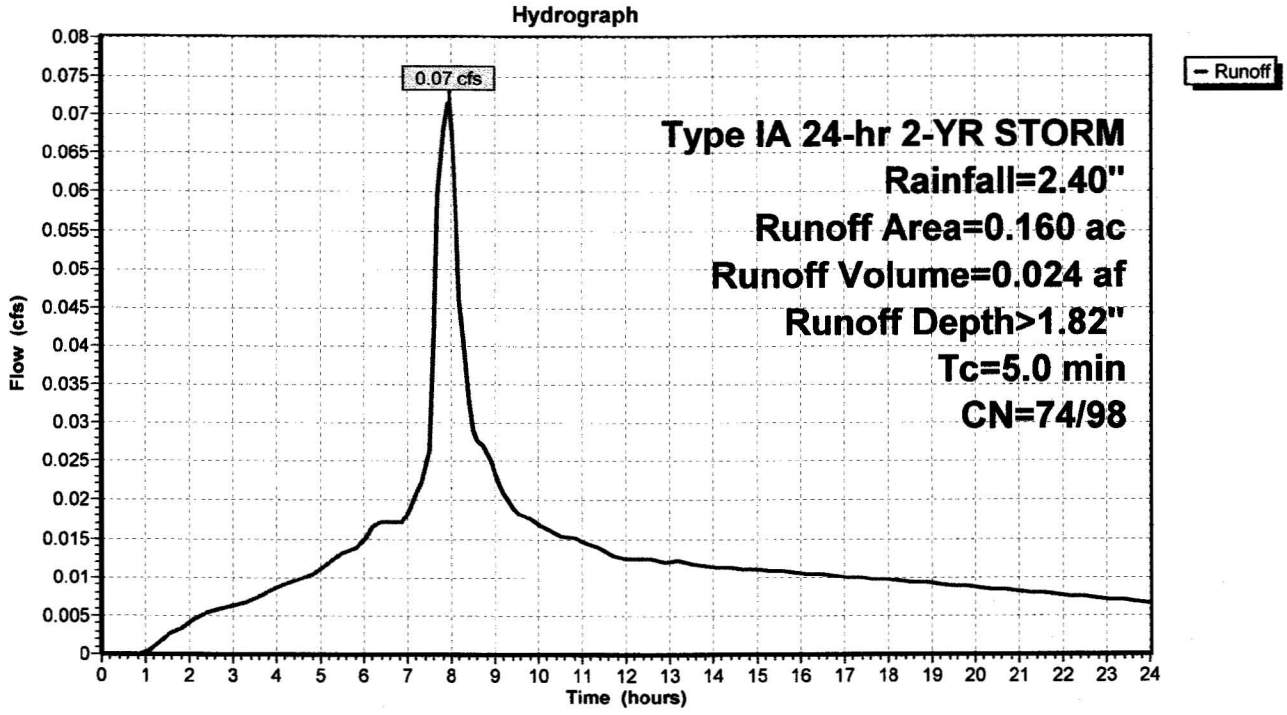
Runoff = 0.07 cfs @ 7.94 hrs, Volume= 0.024 af, Depth> 1.82"

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

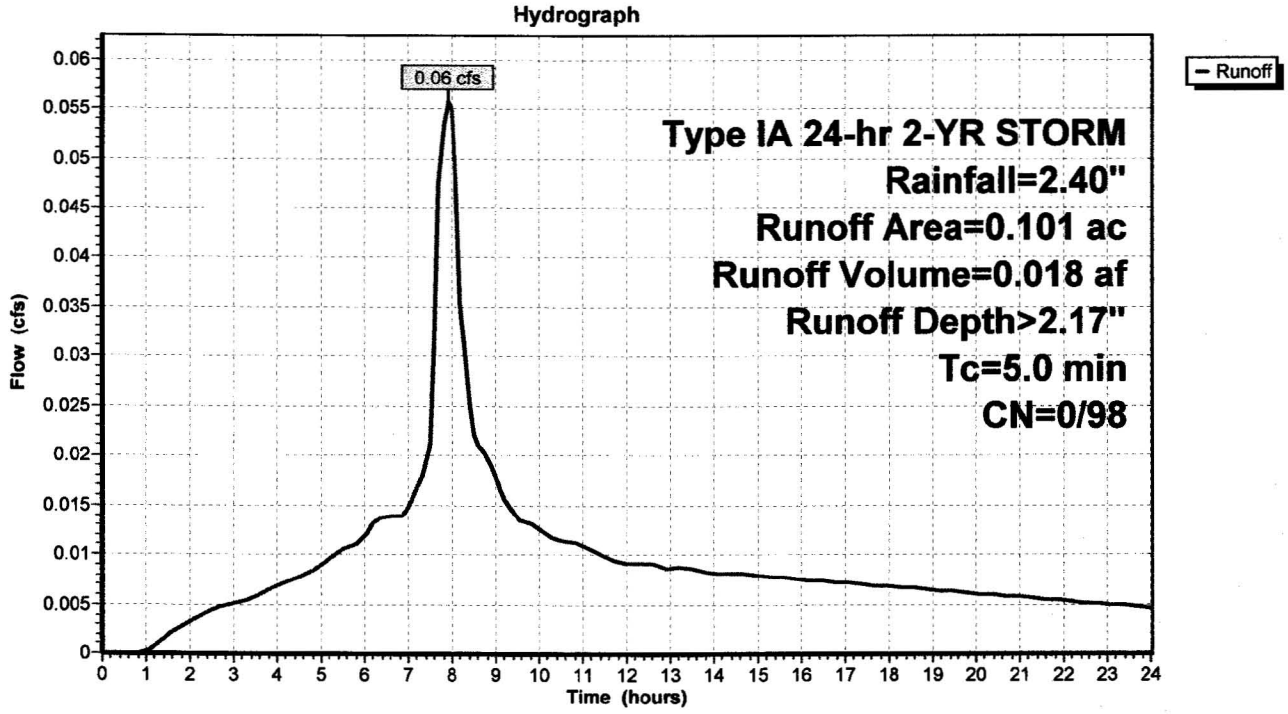
Runoff = 0.06 cfs @ 7.93 hrs, Volume= 0.018 af, Depth> 2.17"

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



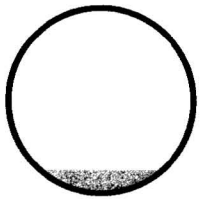
Summary for Reach 1RD: 8" Pipe

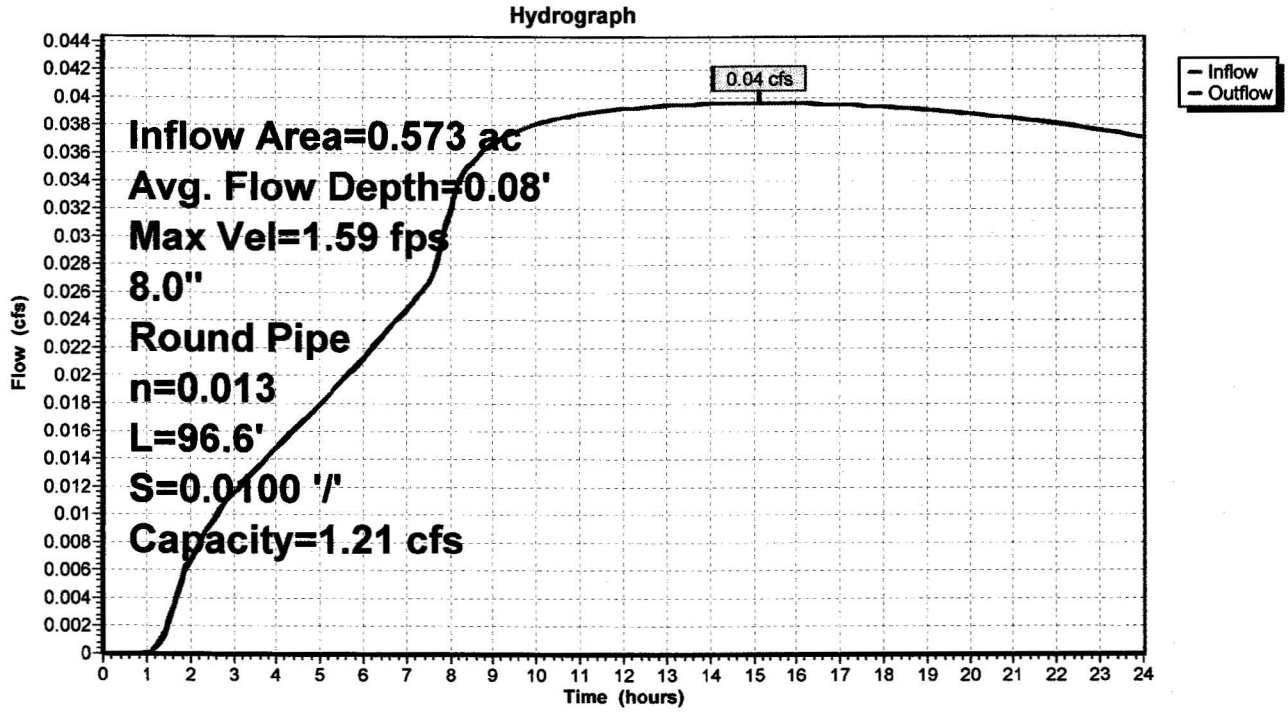
Inflow Area = 0.573 ac, 80.10% Impervious, Inflow Depth > 1.27" for 2-YR STORM event
Inflow = 0.04 cfs @ 15.13 hrs, Volume= 0.060 af
Outflow = 0.04 cfs @ 15.16 hrs, Volume= 0.060 af, Atten= 0%, Lag= 1.7 min

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'



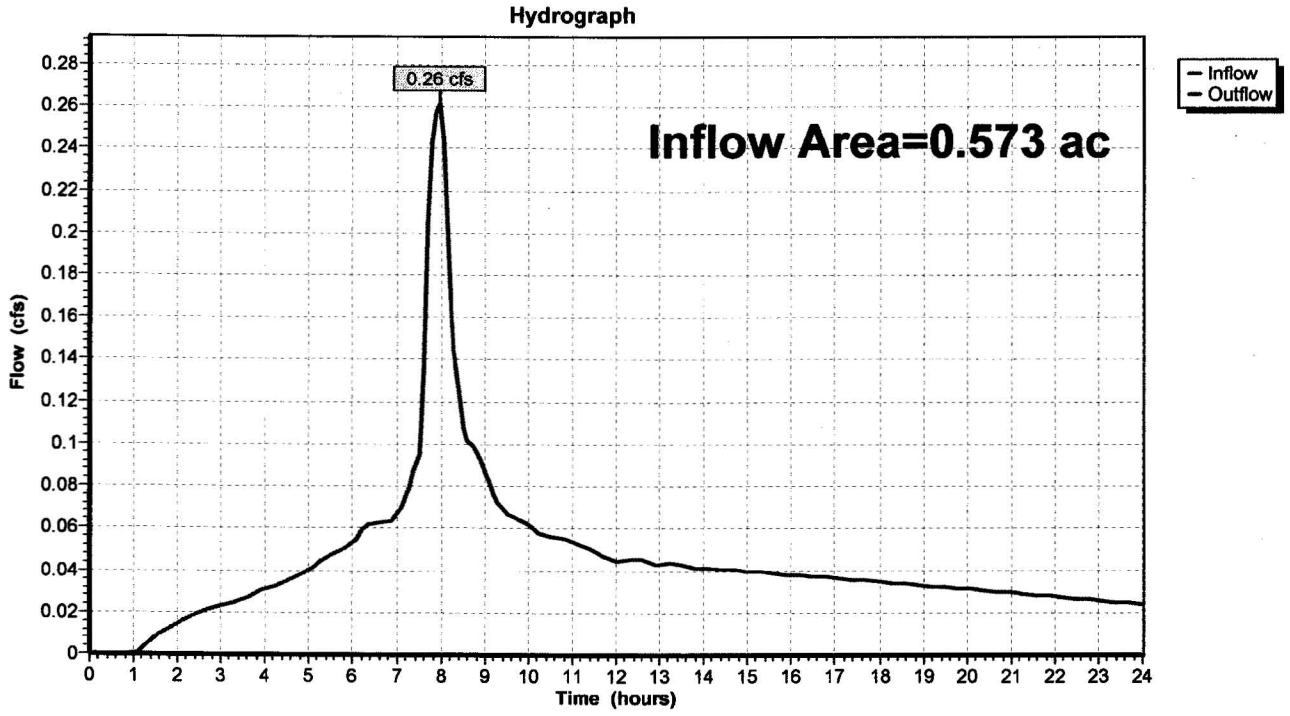


Summary for Reach 2RD: StormFilter MH

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



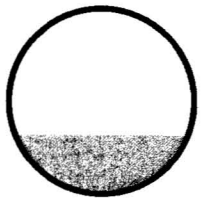
Summary for Reach 3RD: 8" Pipe

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

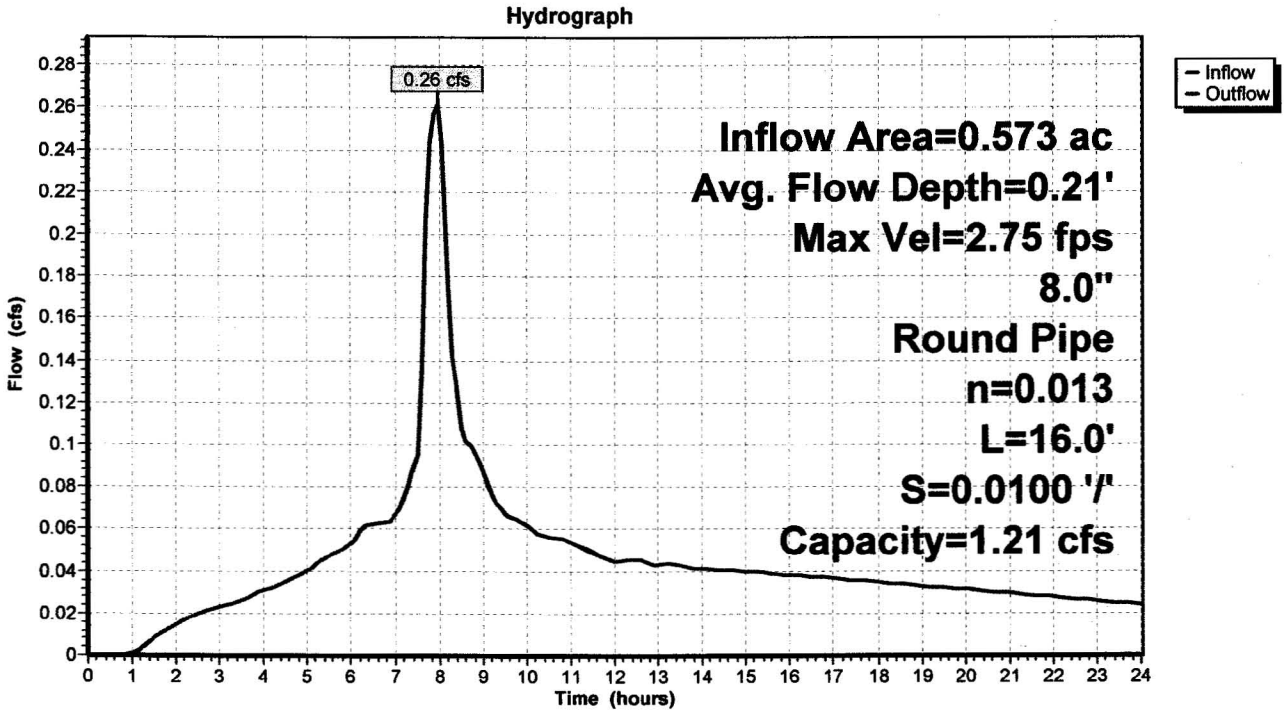
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.75 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.60 fps, Avg. Travel Time= 0.2 min

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



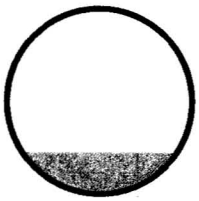
Summary for Reach 4RD: 6" Pipe

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

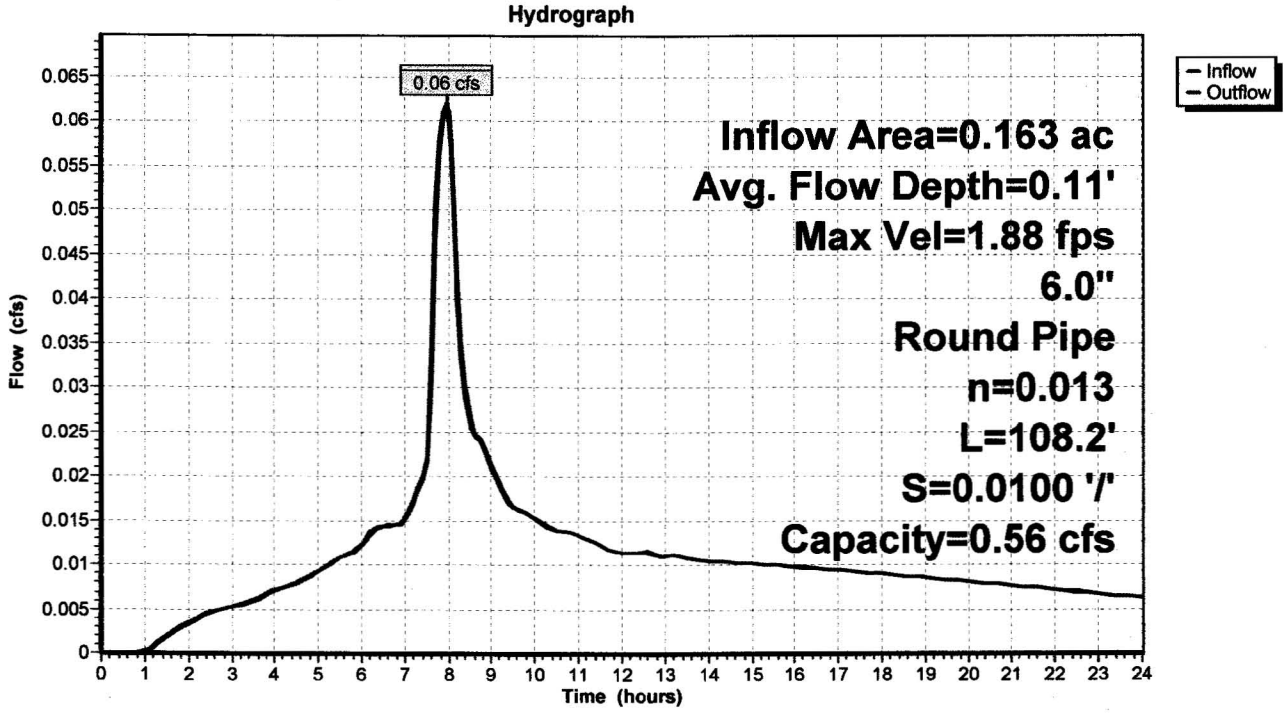
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.88 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.09 fps, Avg. Travel Time= 1.7 min

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



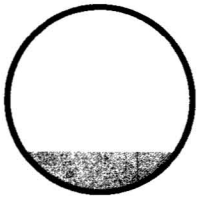
Summary for Reach 5RD: 8" Pipe

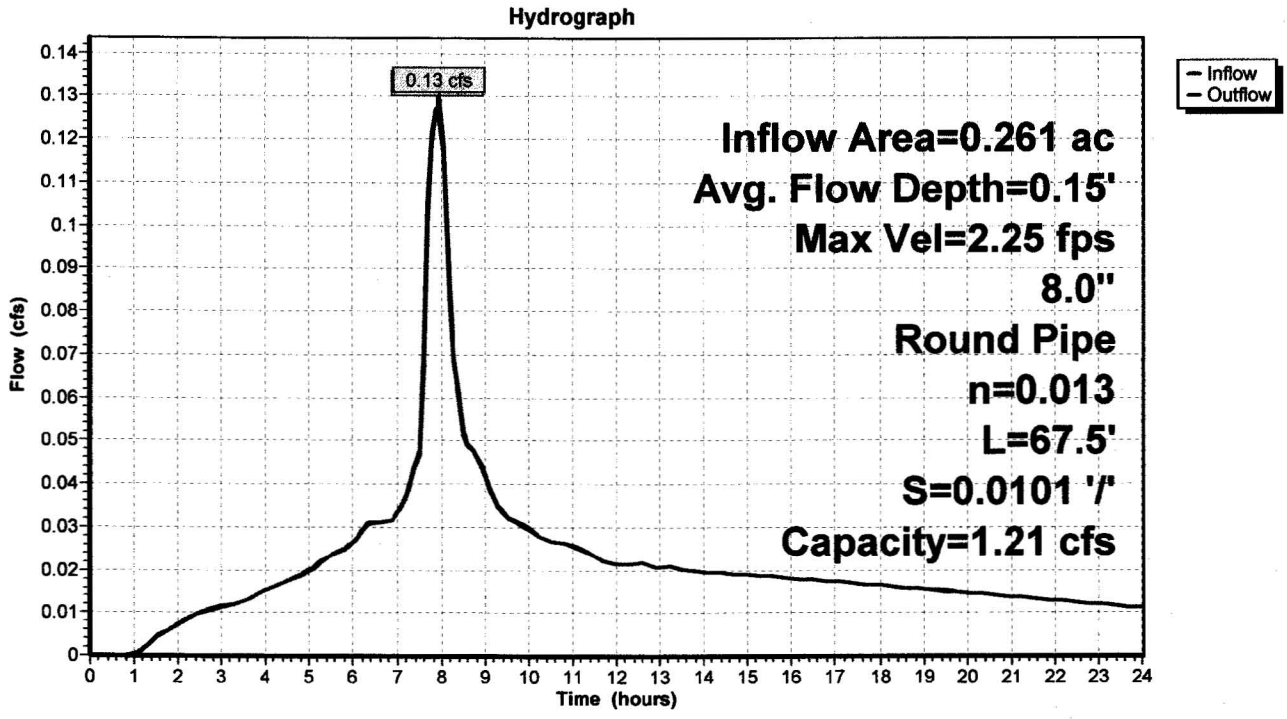
Inflow Area = 0.261 ac, 86.97% Impervious, Inflow Depth > 1.96" for 2-YR STORM event
Inflow = 0.13 cfs @ 7.94 hrs, Volume= 0.043 af
Outflow = 0.13 cfs @ 7.95 hrs, Volume= 0.043 af, Atten= 0%, Lag= 0.9 min

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'





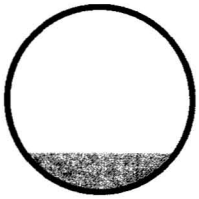
Summary for Reach 6RD: 6" Pipe

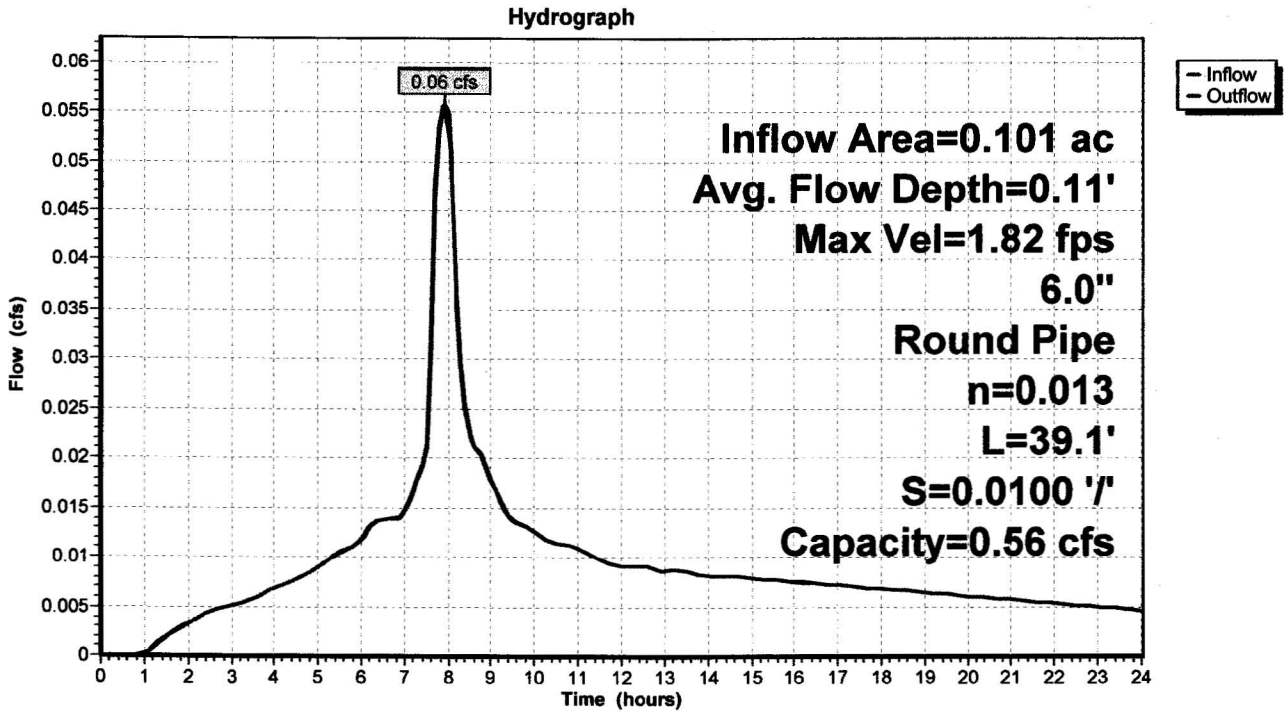
Inflow Area = 0.101 ac,100.00% Impervious, Inflow Depth > 2.17" for 2-YR STORM event
Inflow = 0.06 cfs @ 7.93 hrs, Volume= 0.018 af
Outflow = 0.06 cfs @ 7.94 hrs, Volume= 0.018 af, Atten= 0%, Lag= 0.7 min

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

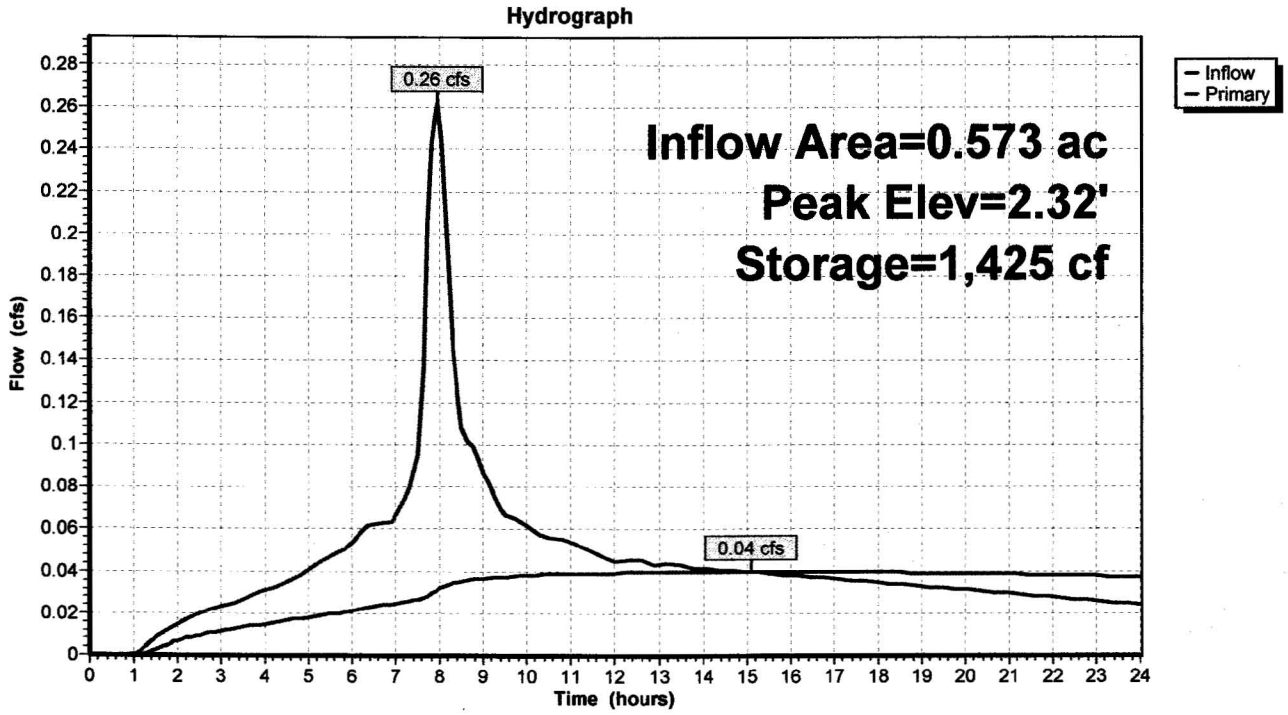
Plug-Flow detention time= 367.4 min calculated for 0.060 af (69% of inflow)
Center-of-Mass det. time= 175.4 min (865.8 - 690.3)

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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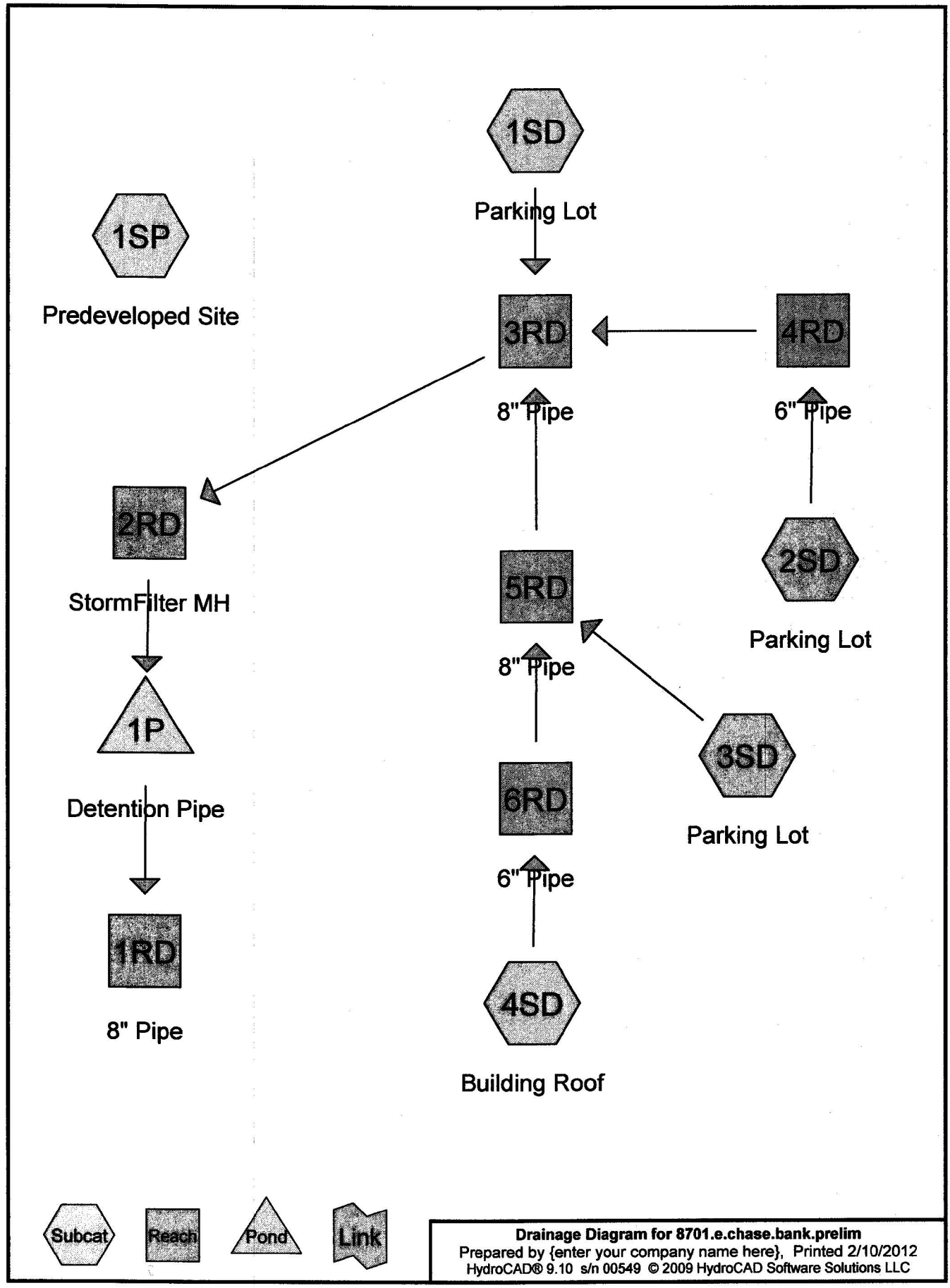


5-YEAR STORM (2.90")

Summary for Subcatchment 1SP: Predeveloped Site

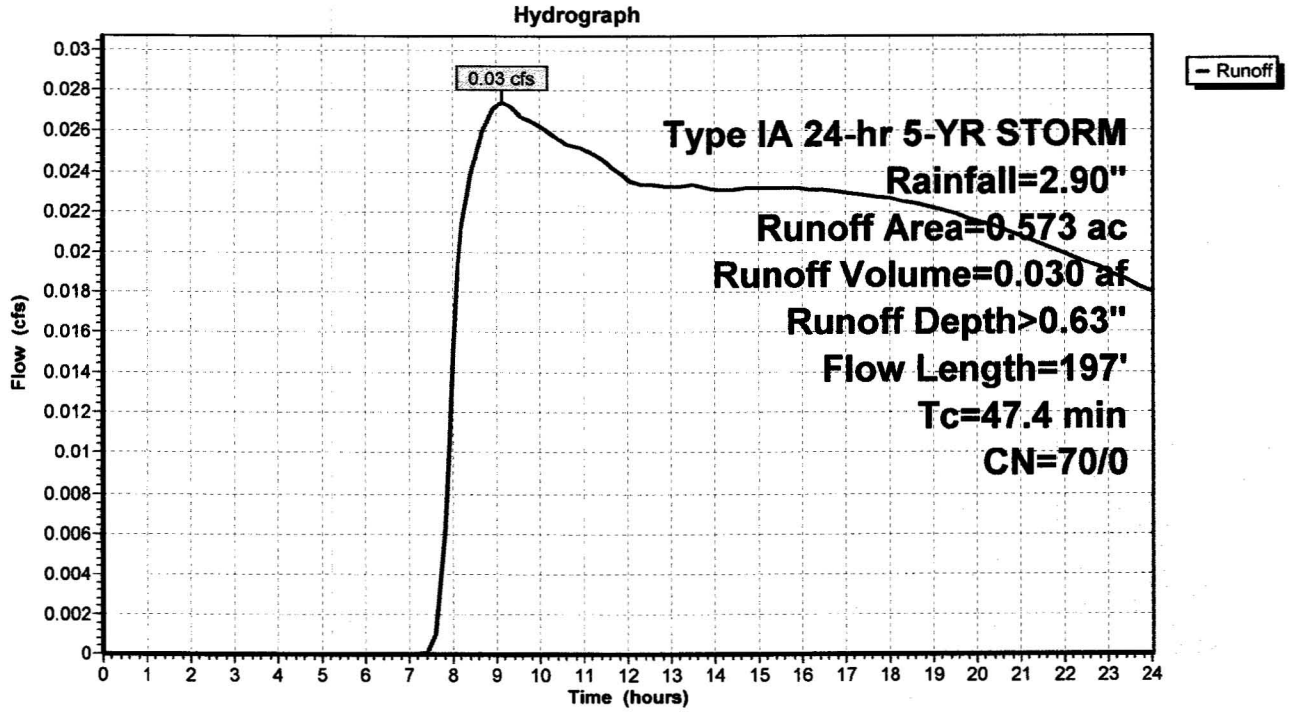
Runoff = 0.03 cfs @ 9.12 hrs, Volume= 0.030 af, Depth> 0.63"

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

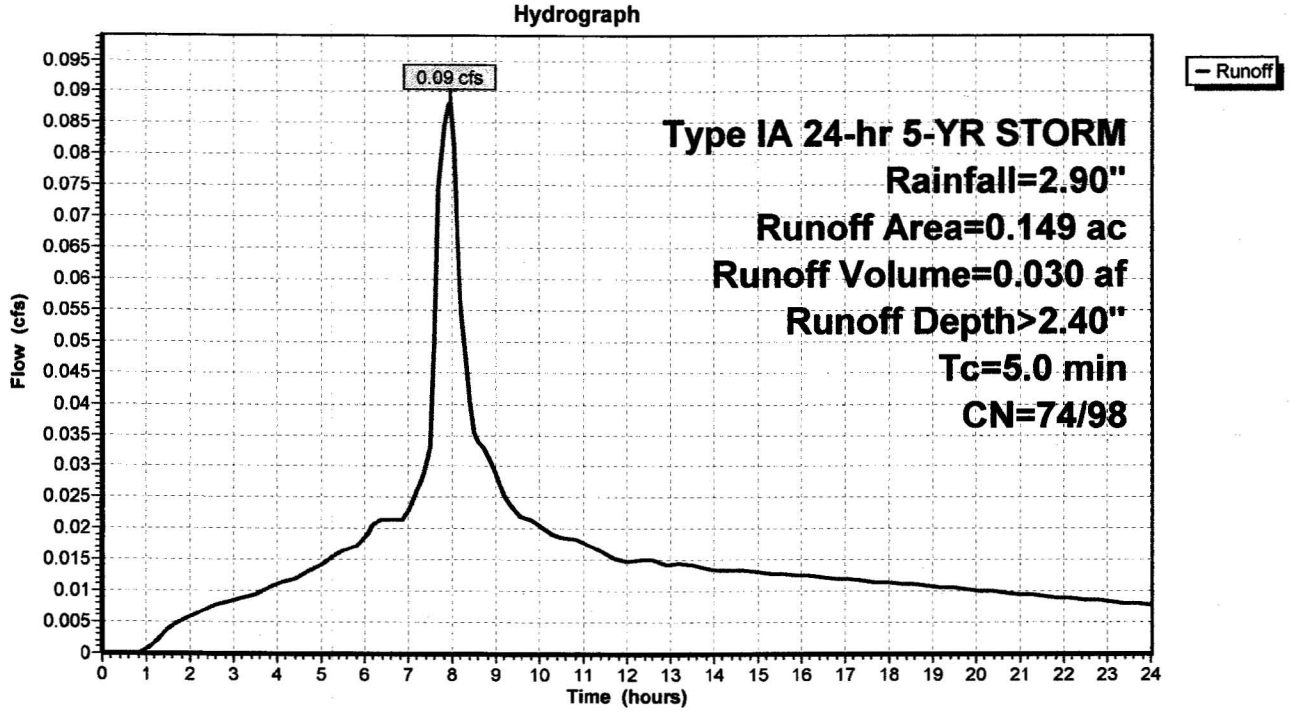
Runoff = 0.09 cfs @ 7.93 hrs, Volume= 0.030 af, Depth> 2.40"

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

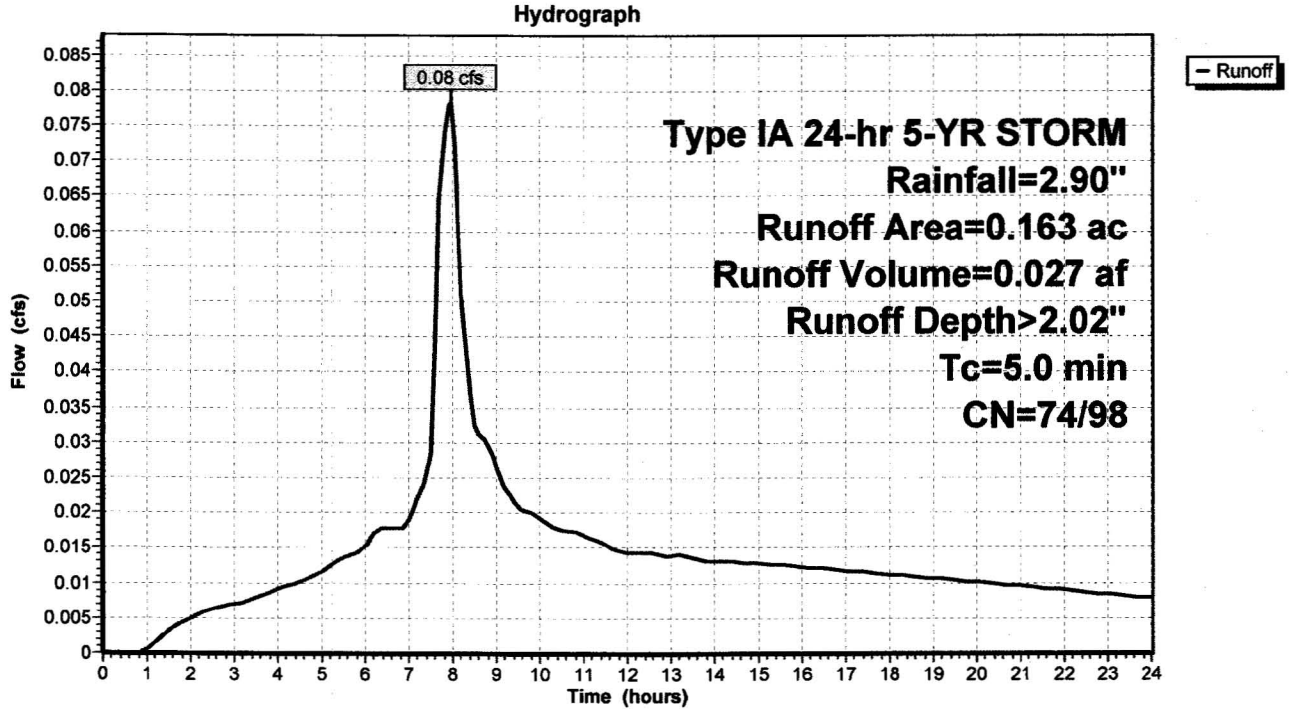
Runoff = 0.08 cfs @ 7.95 hrs, Volume= 0.027 af, Depth> 2.02"

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

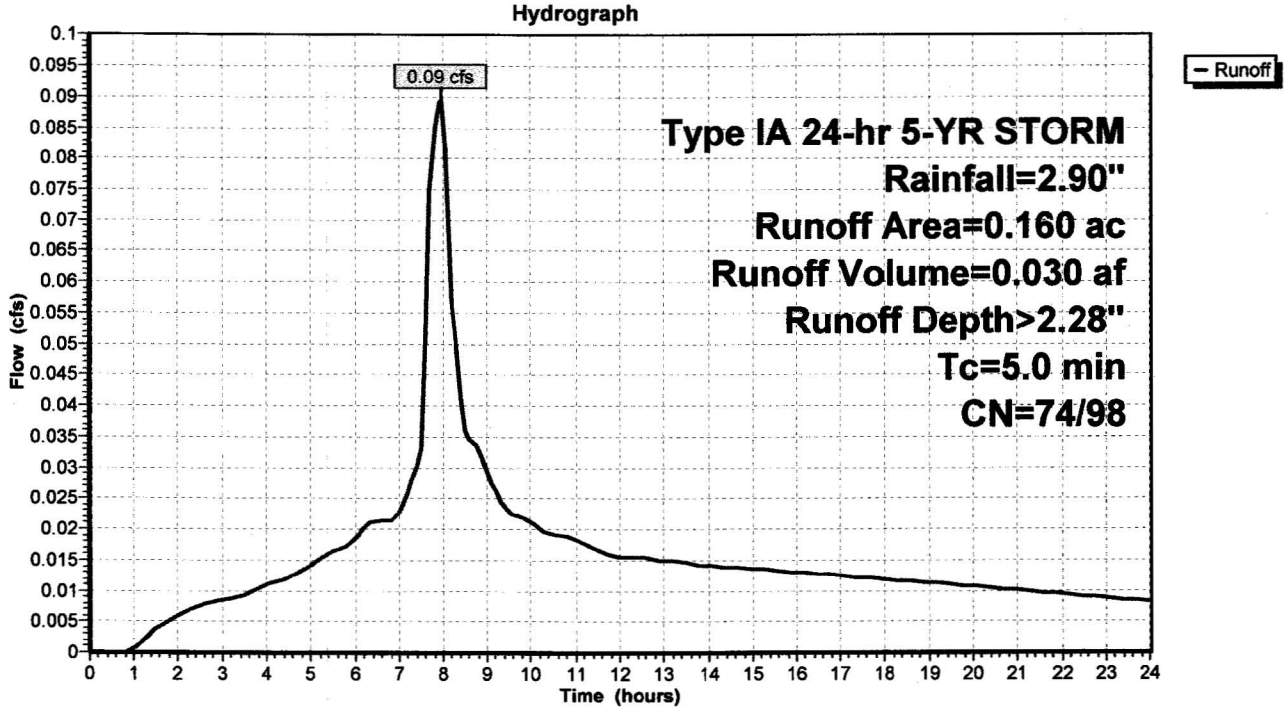
Runoff = 0.09 cfs @ 7.94 hrs, Volume= 0.030 af, Depth> 2.28"

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

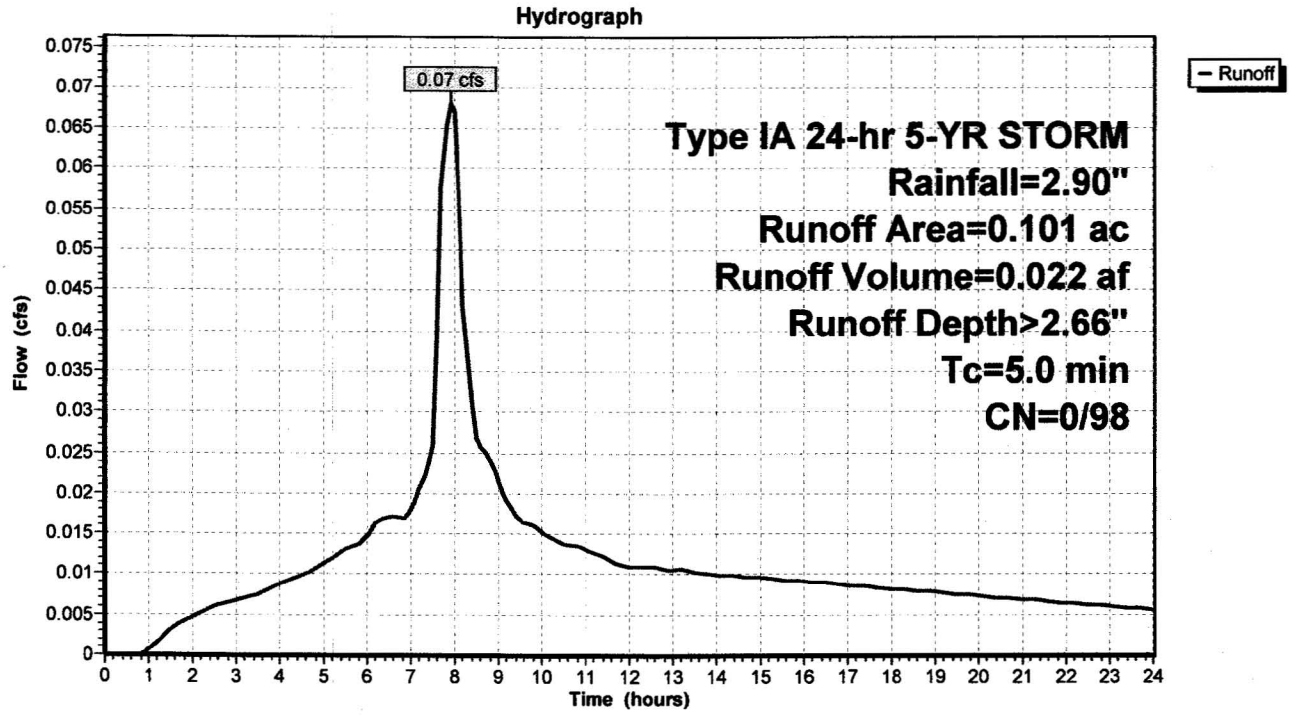
Runoff = 0.07 cfs @ 7.92 hrs, Volume= 0.022 af, Depth> 2.66"

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



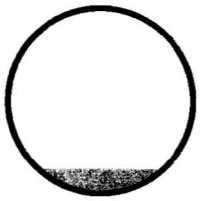
Summary for Reach 1RD: 8" Pipe

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

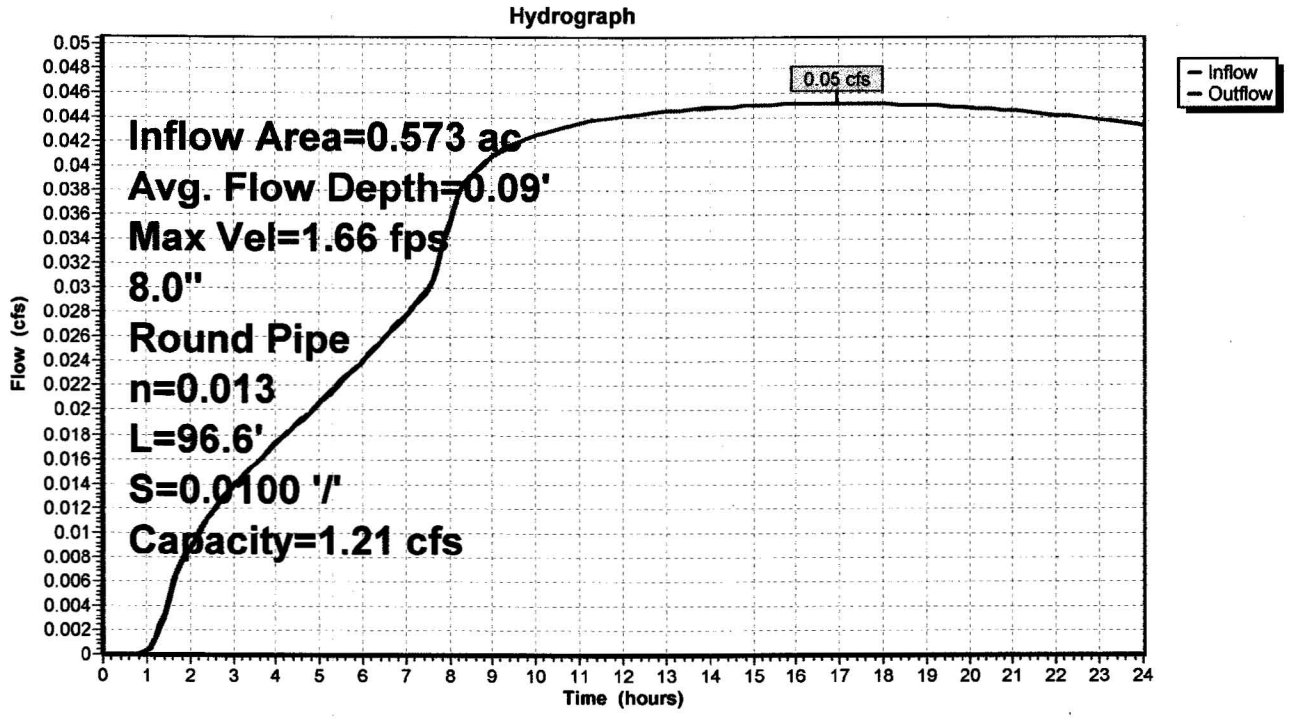
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.66 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.51 fps, Avg. Travel Time= 1.1 min

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

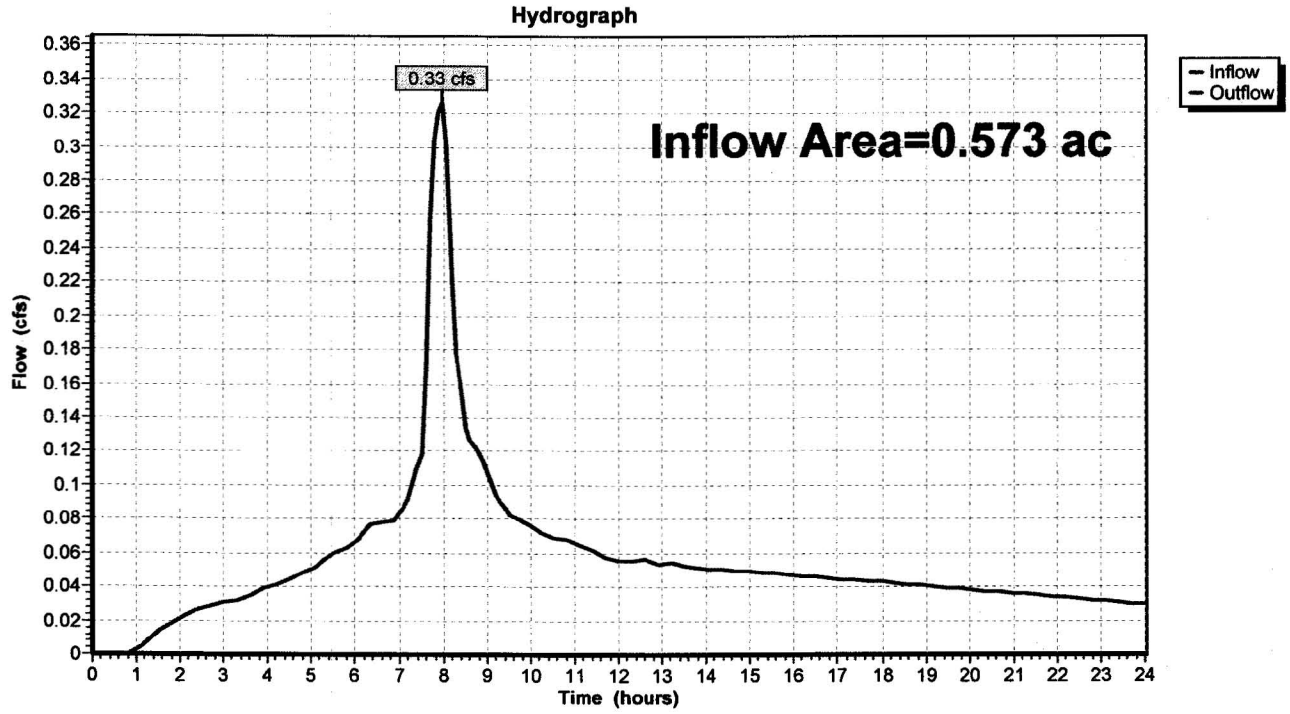


Summary for Reach 2RD: StormFilter MH

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



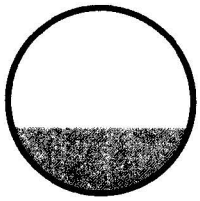
Summary for Reach 3RD: 8" Pipe

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

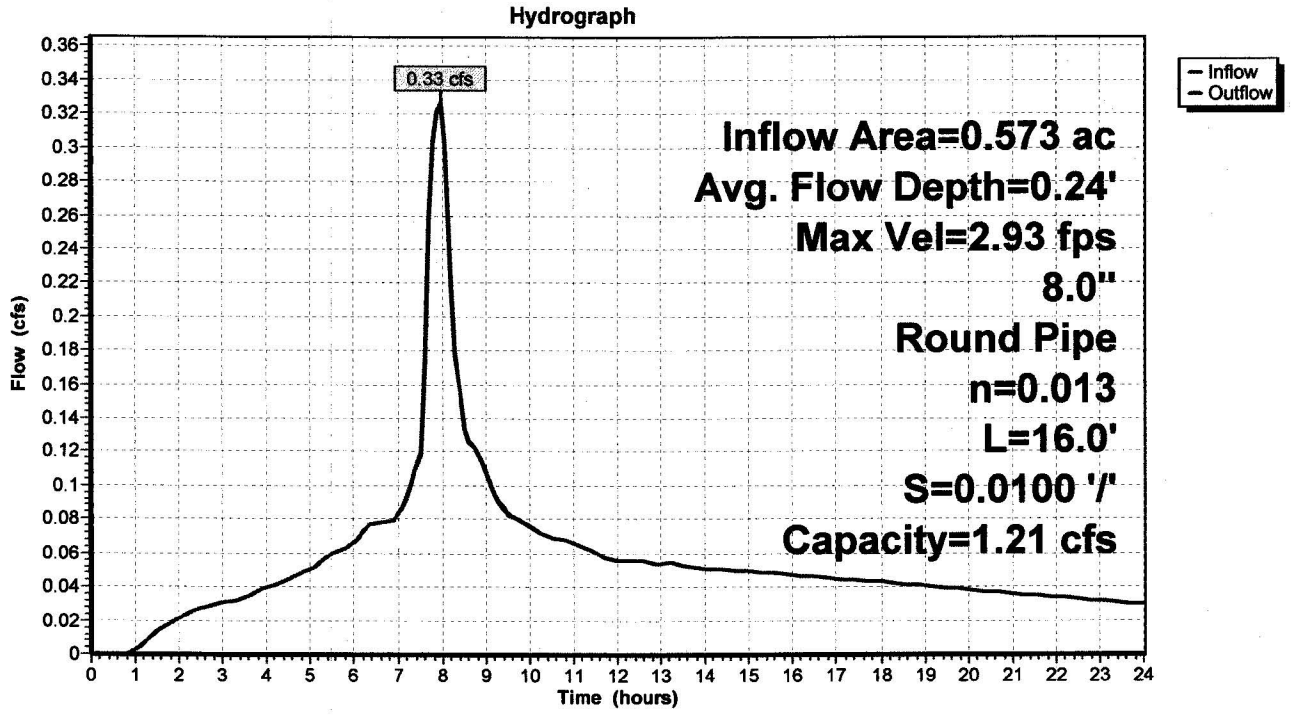
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.93 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.70 fps, Avg. Travel Time= 0.2 min

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



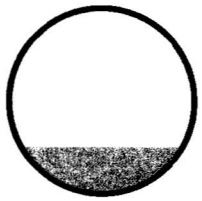
Summary for Reach 4RD: 6" Pipe

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

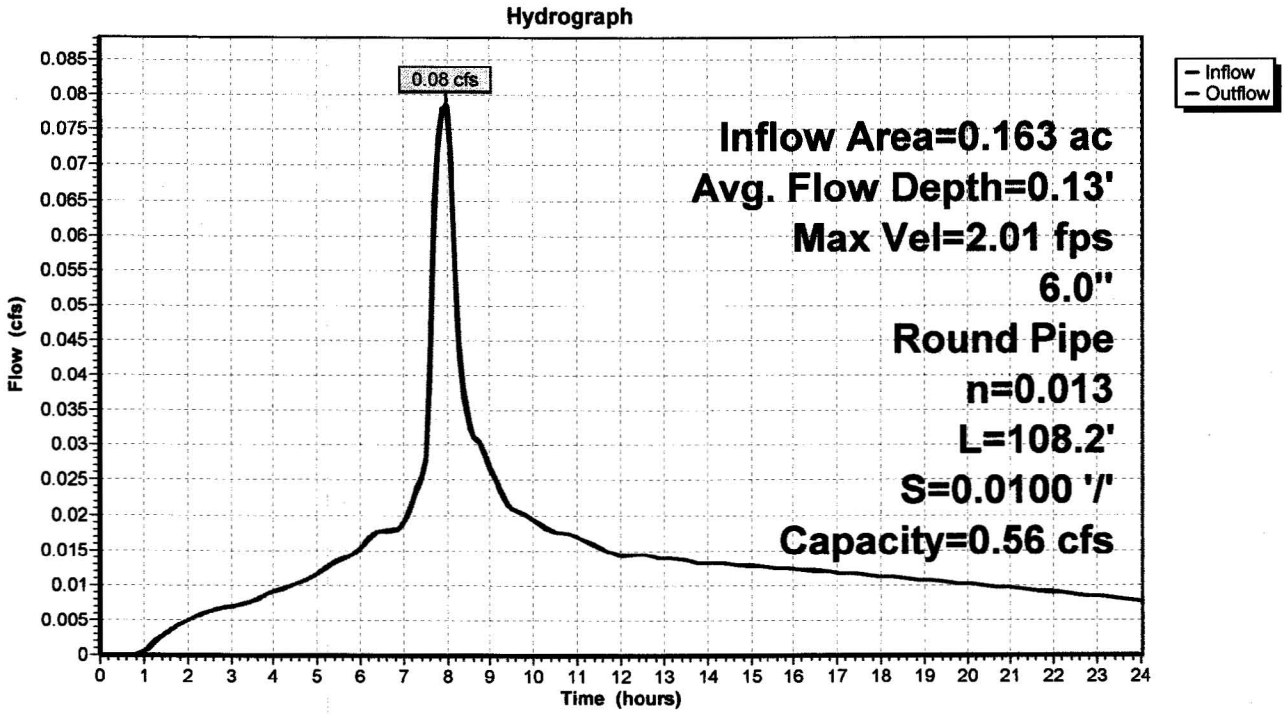
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.01 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.17 fps, Avg. Travel Time= 1.5 min

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



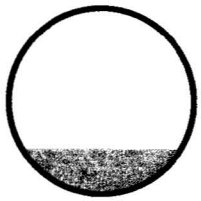
Summary for Reach 5RD: 8" Pipe

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

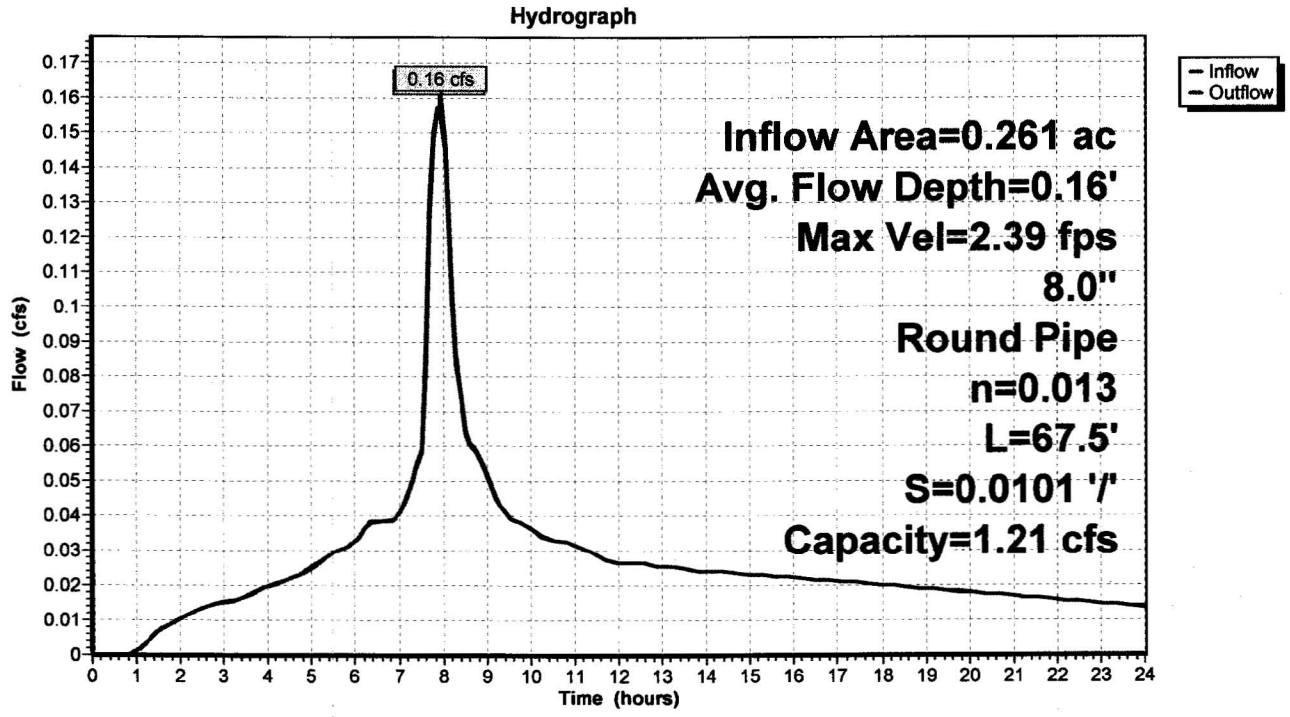
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.39 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.37 fps, Avg. Travel Time= 0.8 min

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'



Reach 5RD: 8" Pipe



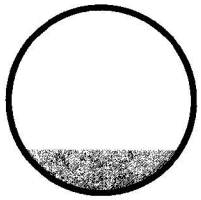
Summary for Reach 6RD: 6" Pipe

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

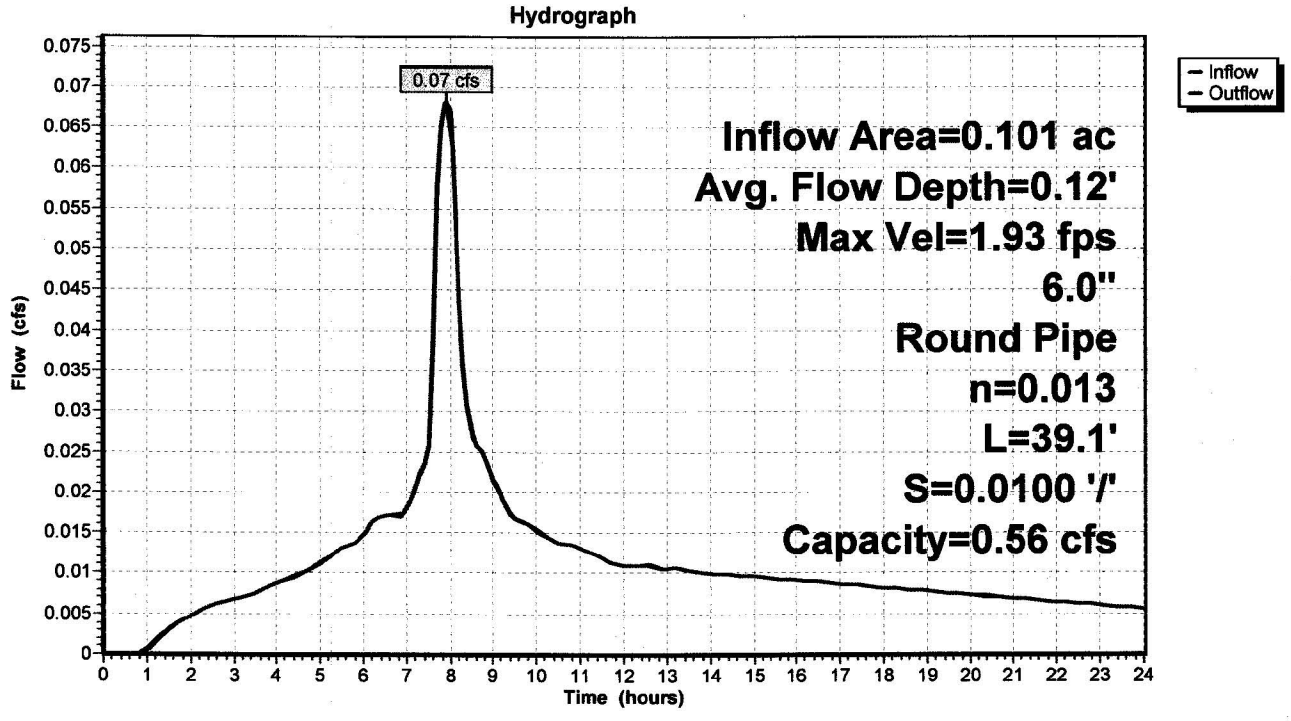
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.93 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.10 fps, Avg. Travel Time= 0.6 min

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

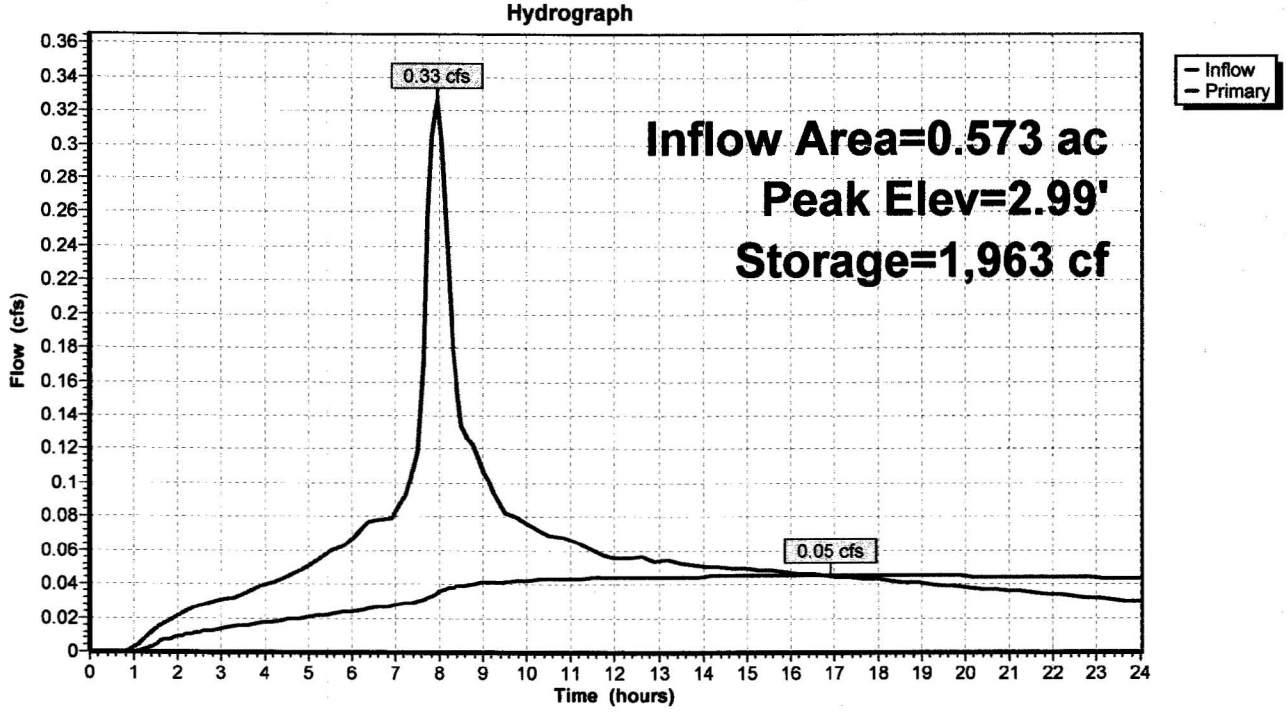
Plug-Flow detention time= 400.8 min calculated for 0.069 af (63% of inflow)
Center-of-Mass det. time= 181.3 min (866.9 - 685.7)

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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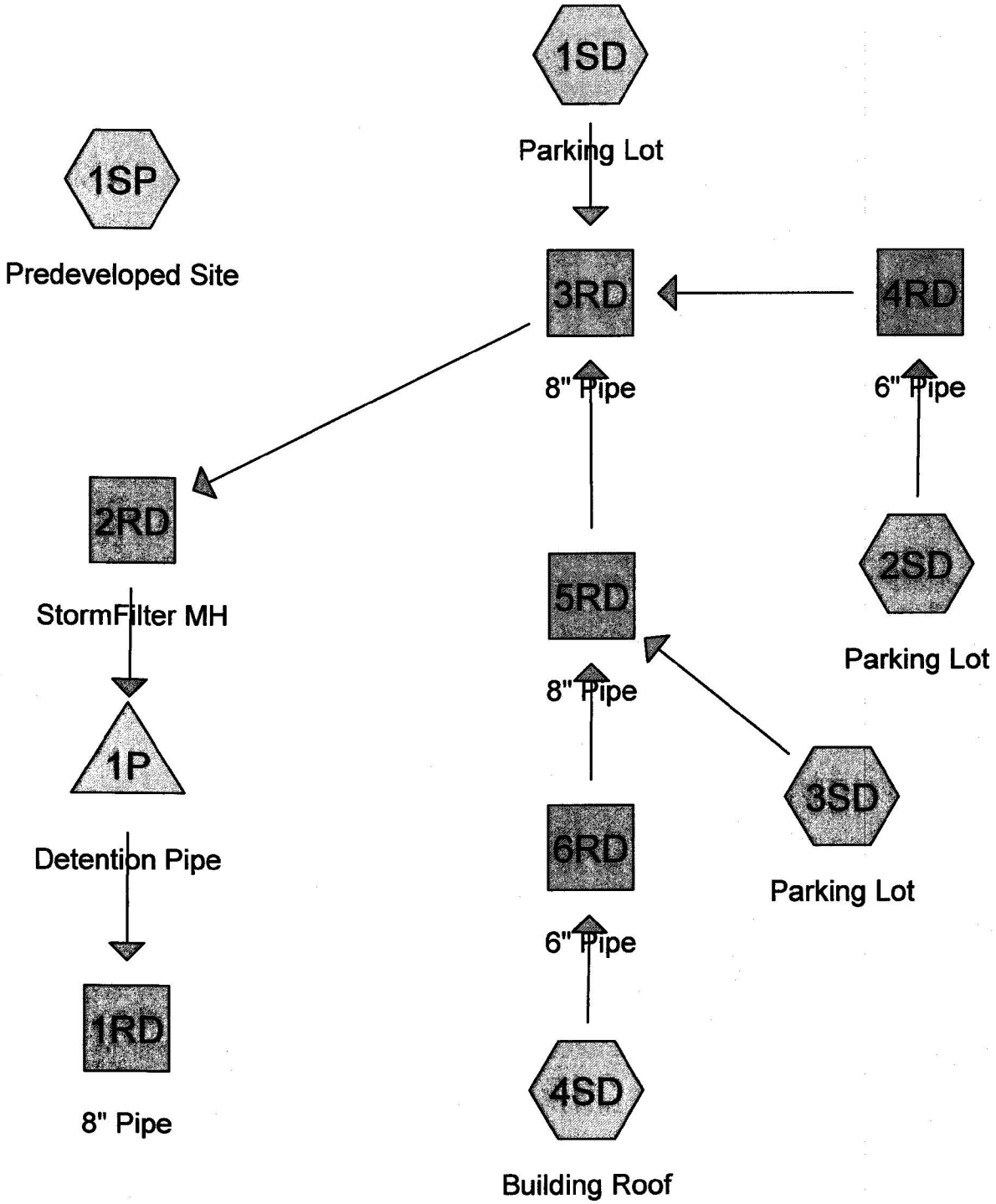


10-YEAR STORM (3.40")

Summary for Subcatchment 1SP: Predeveloped Site

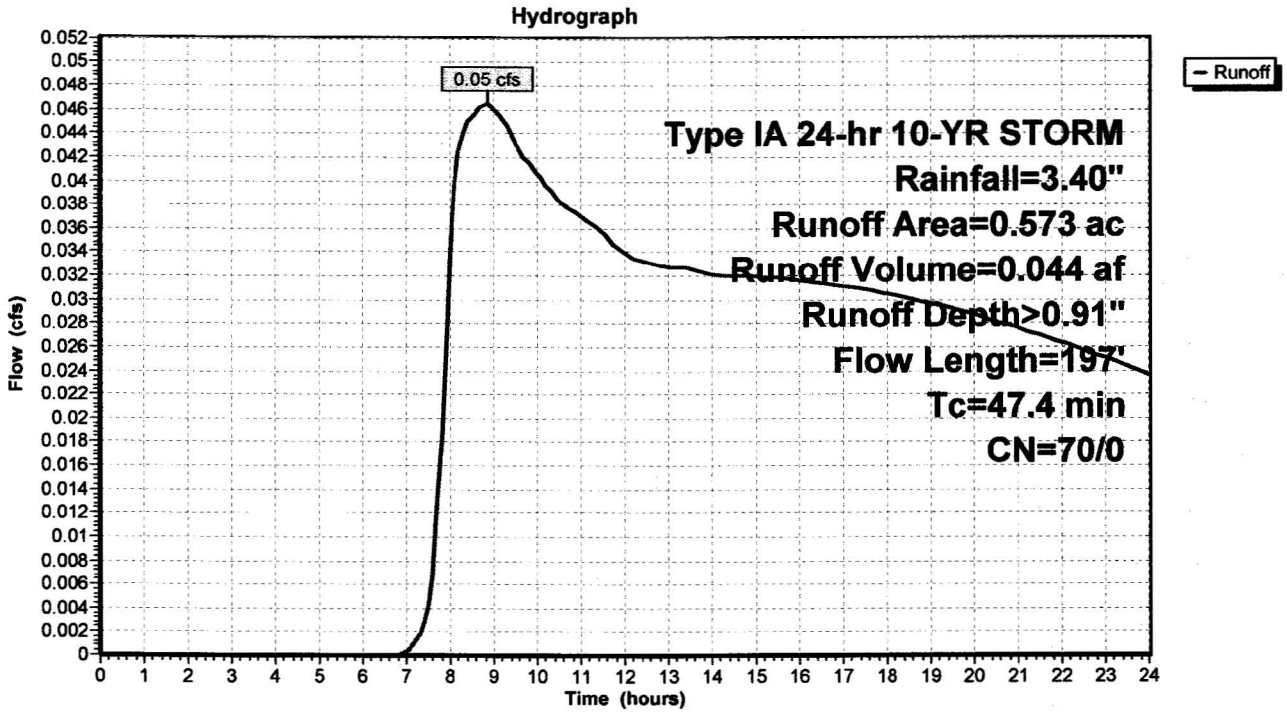
Runoff = 0.05 cfs @ 8.85 hrs, Volume= 0.044 af, Depth> 0.91"

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

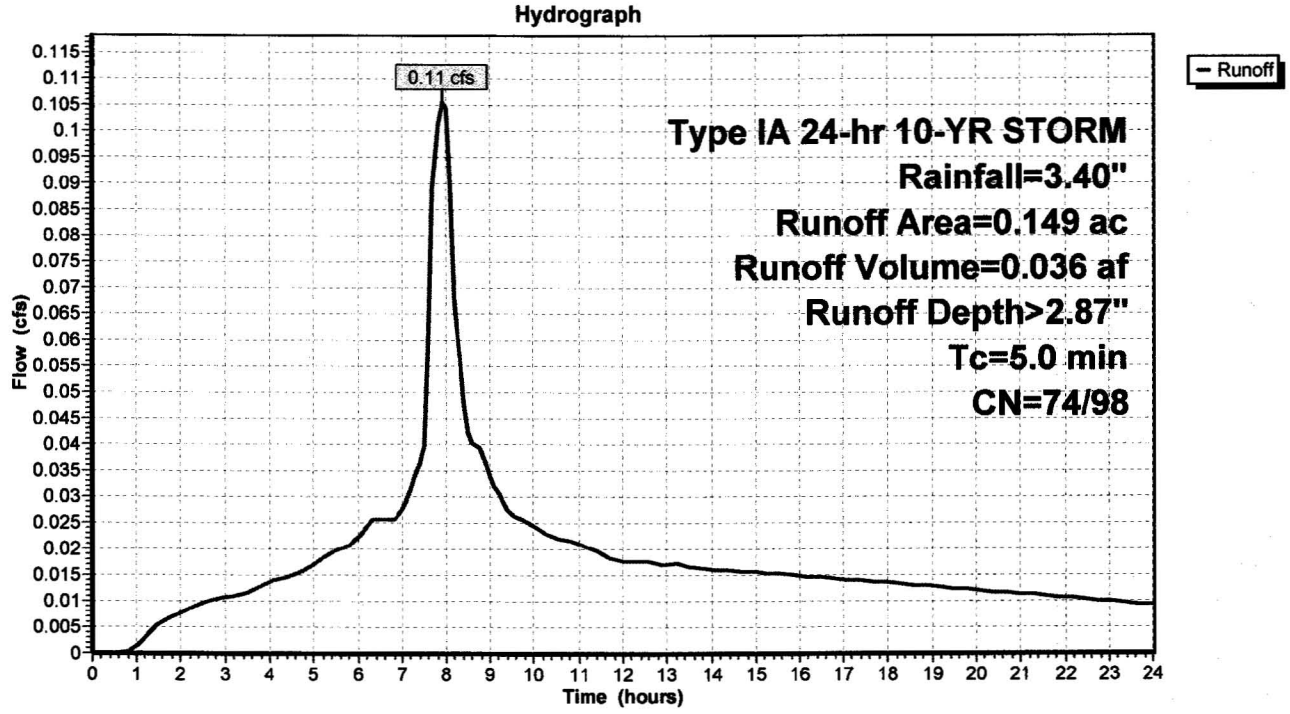
Runoff = 0.11 cfs @ 7.93 hrs, Volume= 0.036 af, Depth> 2.87"

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

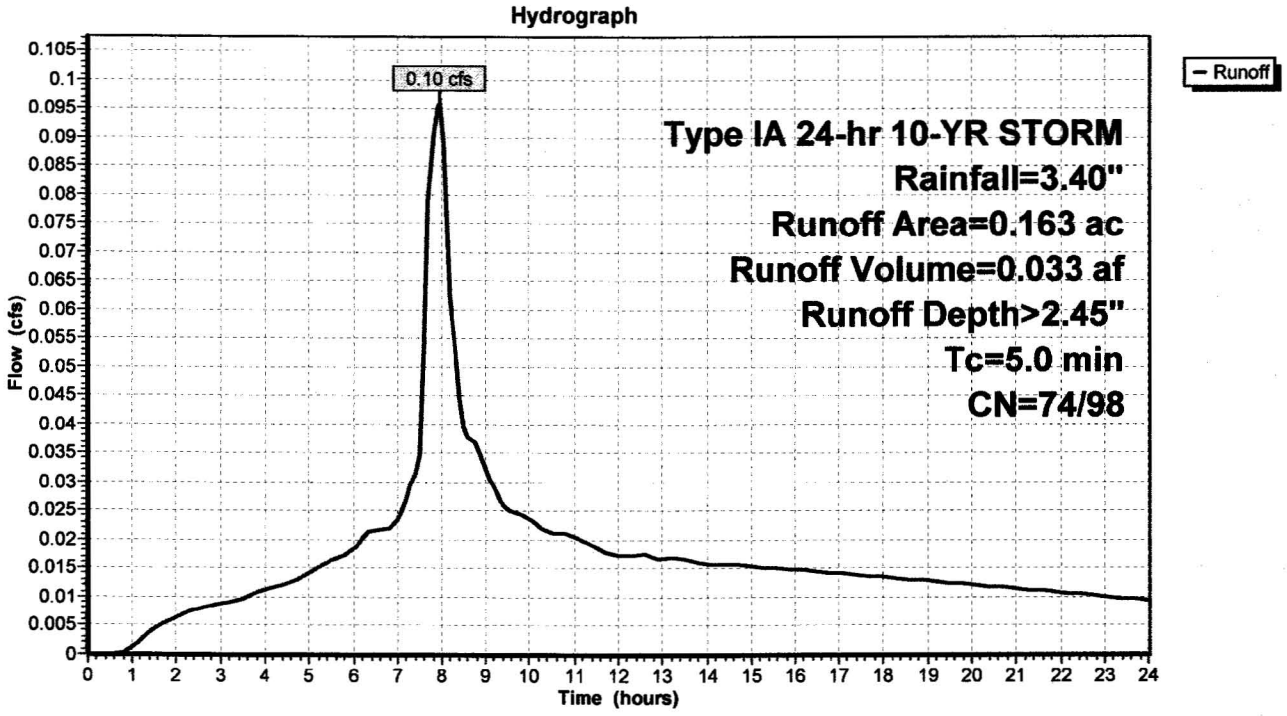
Runoff = 0.10 cfs @ 7.95 hrs, Volume= 0.033 af, Depth> 2.45"

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

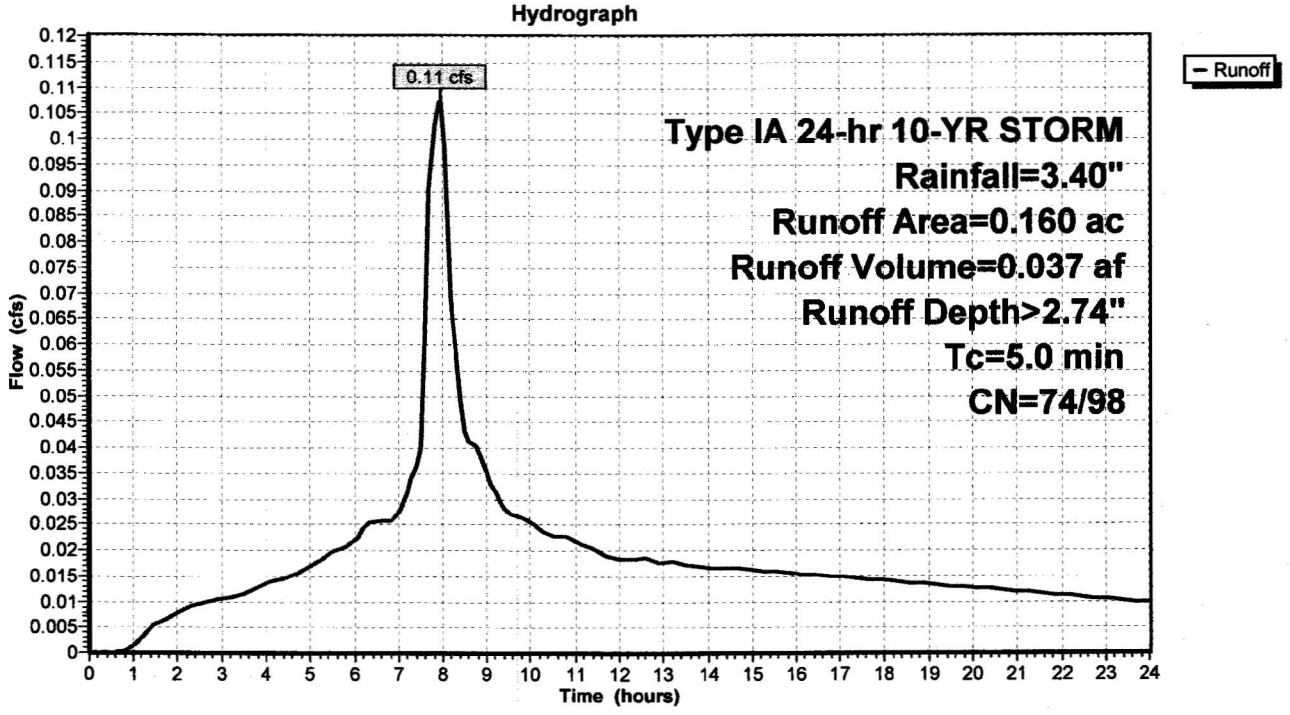
Runoff = 0.11 cfs @ 7.94 hrs, Volume= 0.037 af, Depth> 2.74"

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

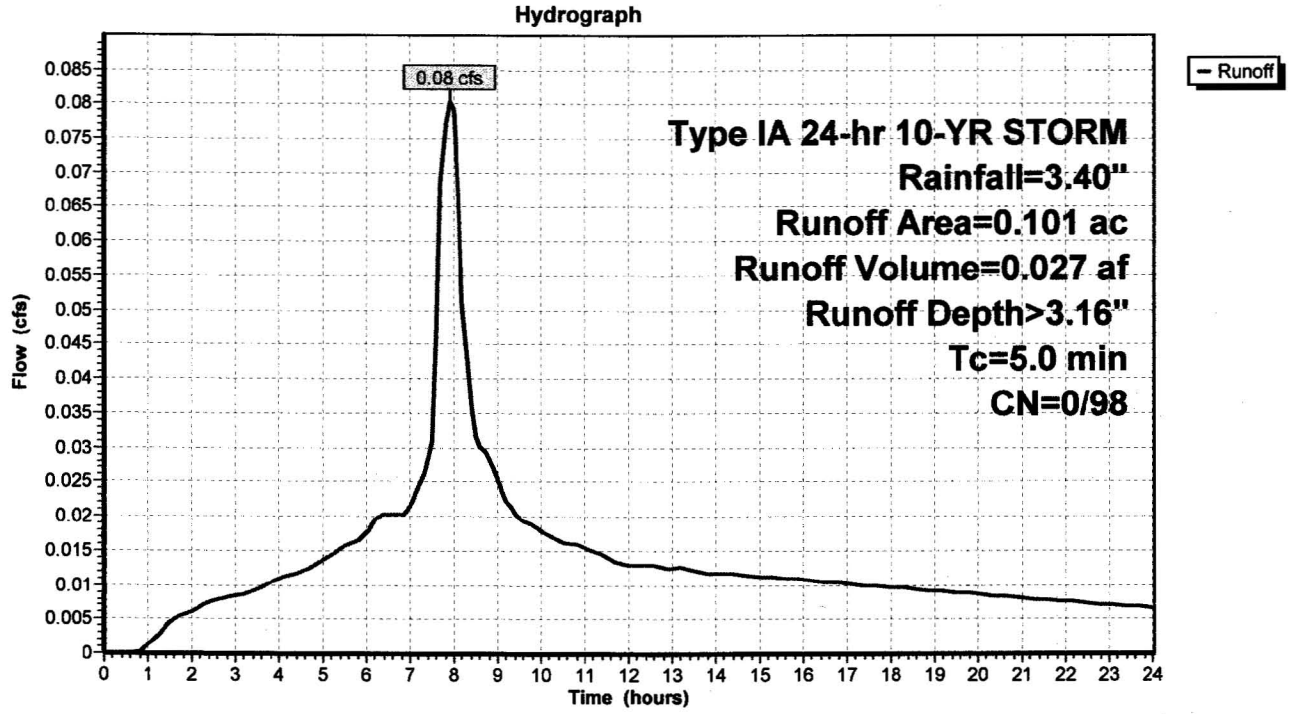
Runoff = 0.08 cfs @ 7.92 hrs, Volume= 0.027 af, Depth> 3.16"

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



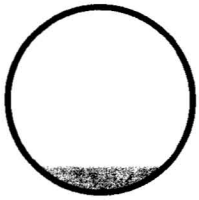
Summary for Reach 1RD: 8" Pipe

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

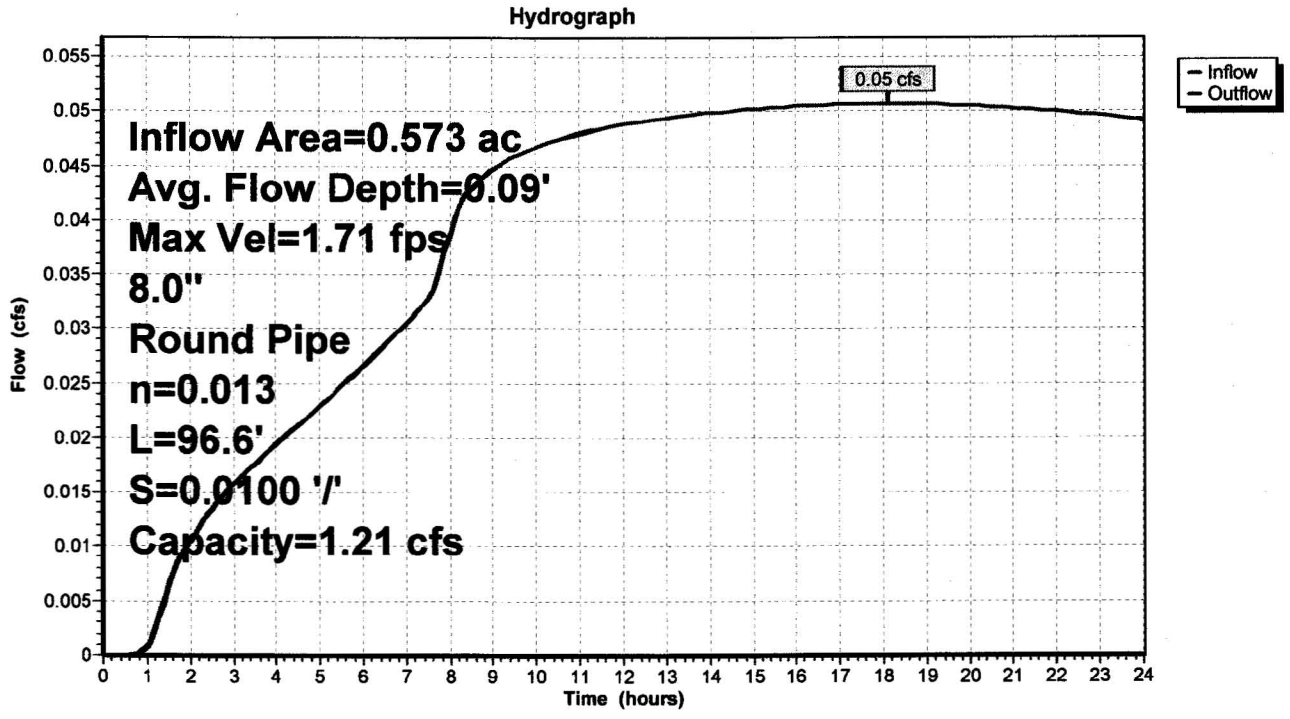
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.71 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.56 fps, Avg. Travel Time= 1.0 min

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

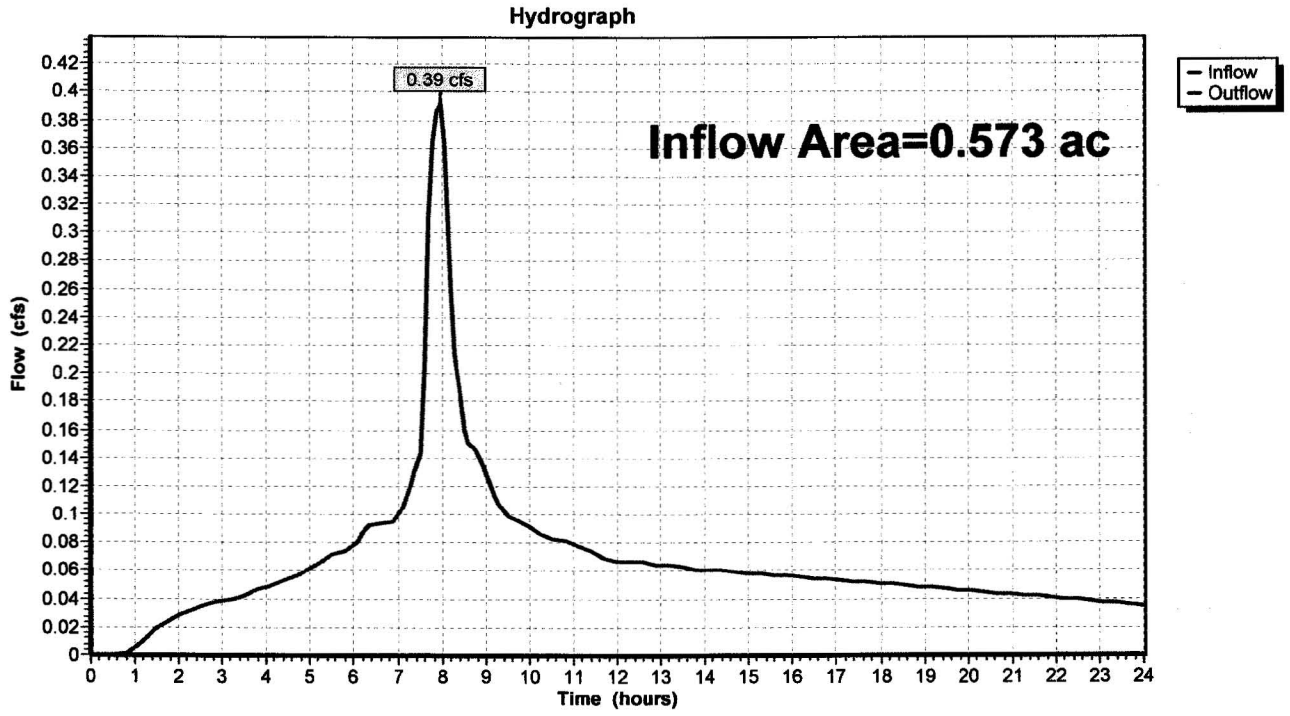


Summary for Reach 2RD: StormFilter MH

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



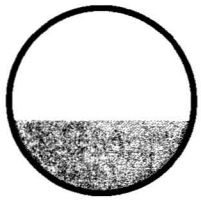
Summary for Reach 3RD: 8" Pipe

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

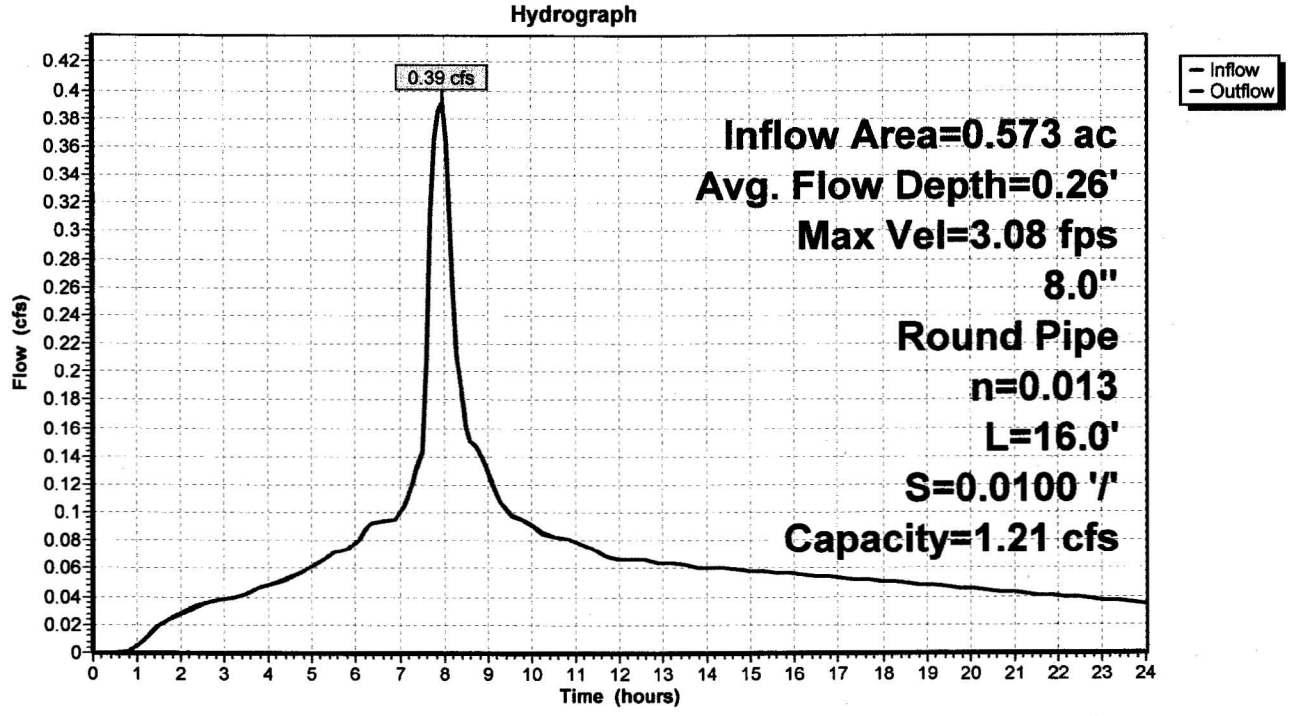
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 3.08 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.79 fps, Avg. Travel Time= 0.1 min

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



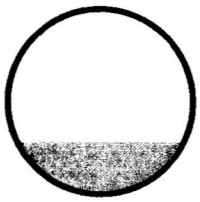
Summary for Reach 4RD: 6" Pipe

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

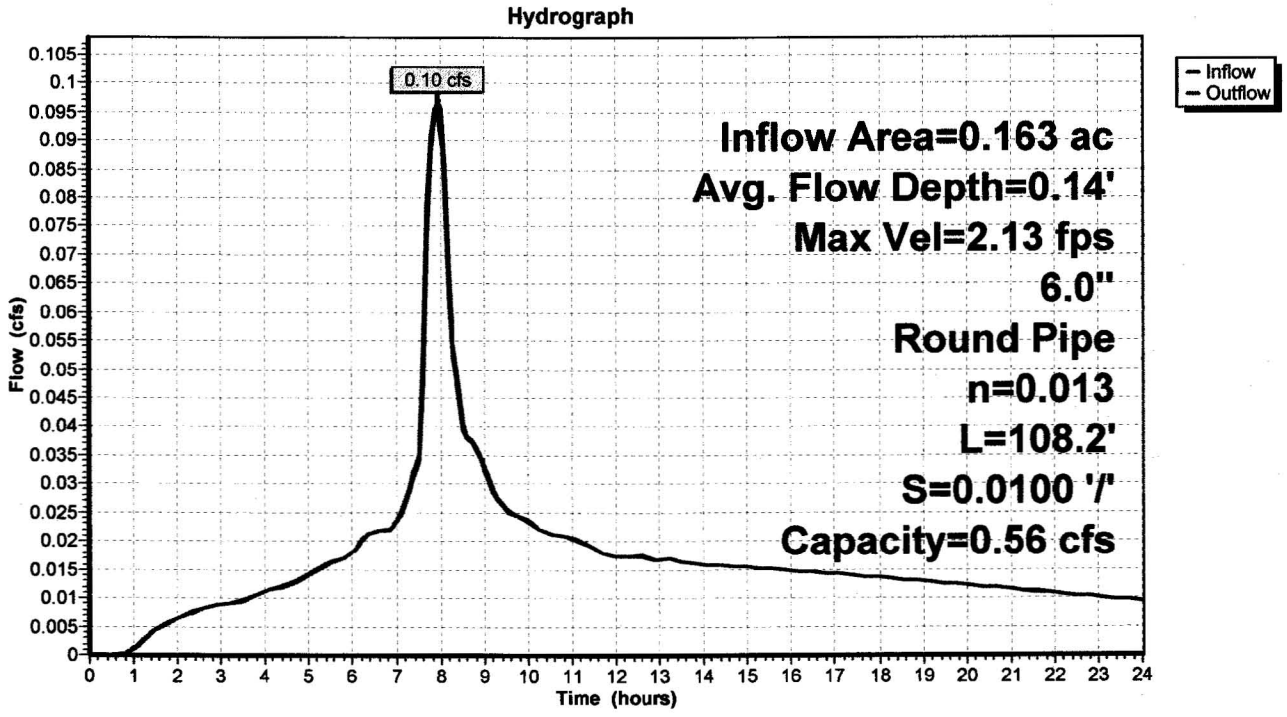
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.13 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.24 fps, Avg. Travel Time= 1.5 min

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



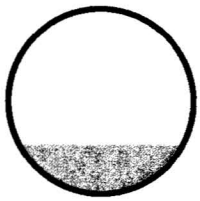
Summary for Reach 5RD: 8" Pipe

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

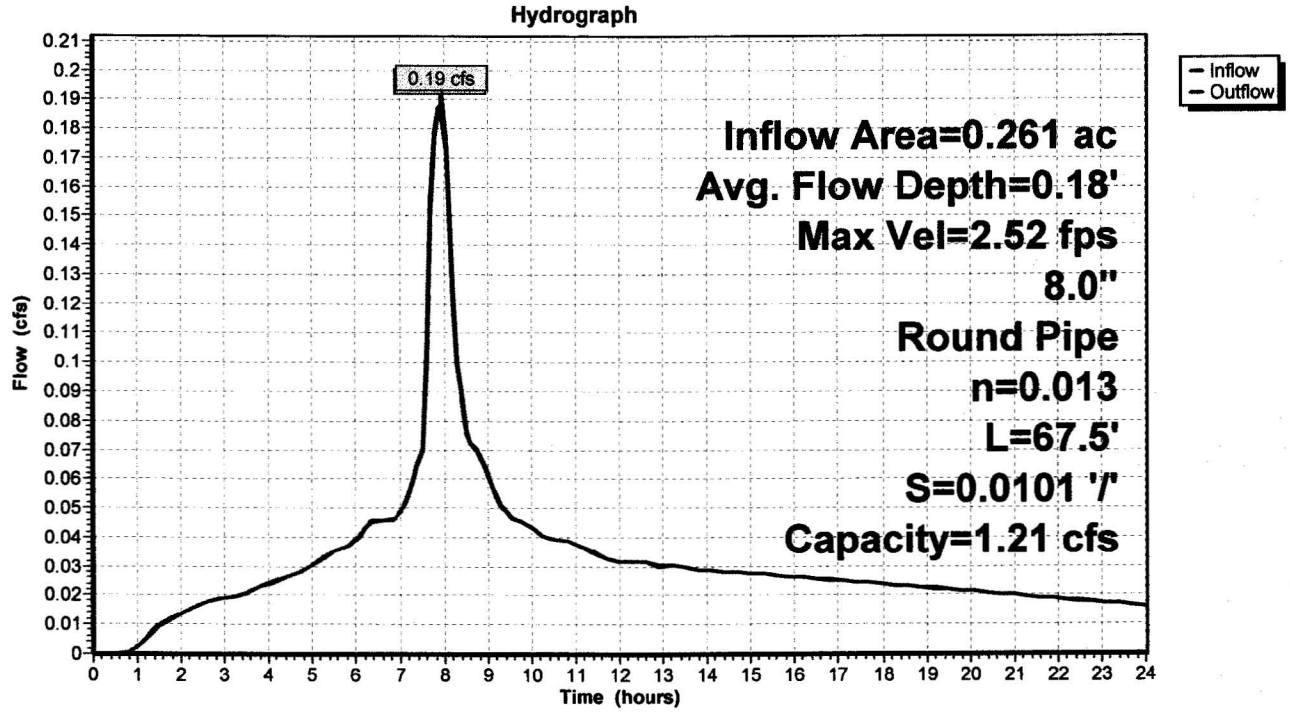
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.52 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.44 fps, Avg. Travel Time= 0.8 min

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



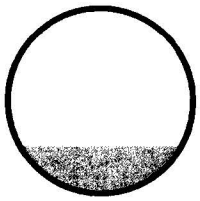
Summary for Reach 6RD: 6" Pipe

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

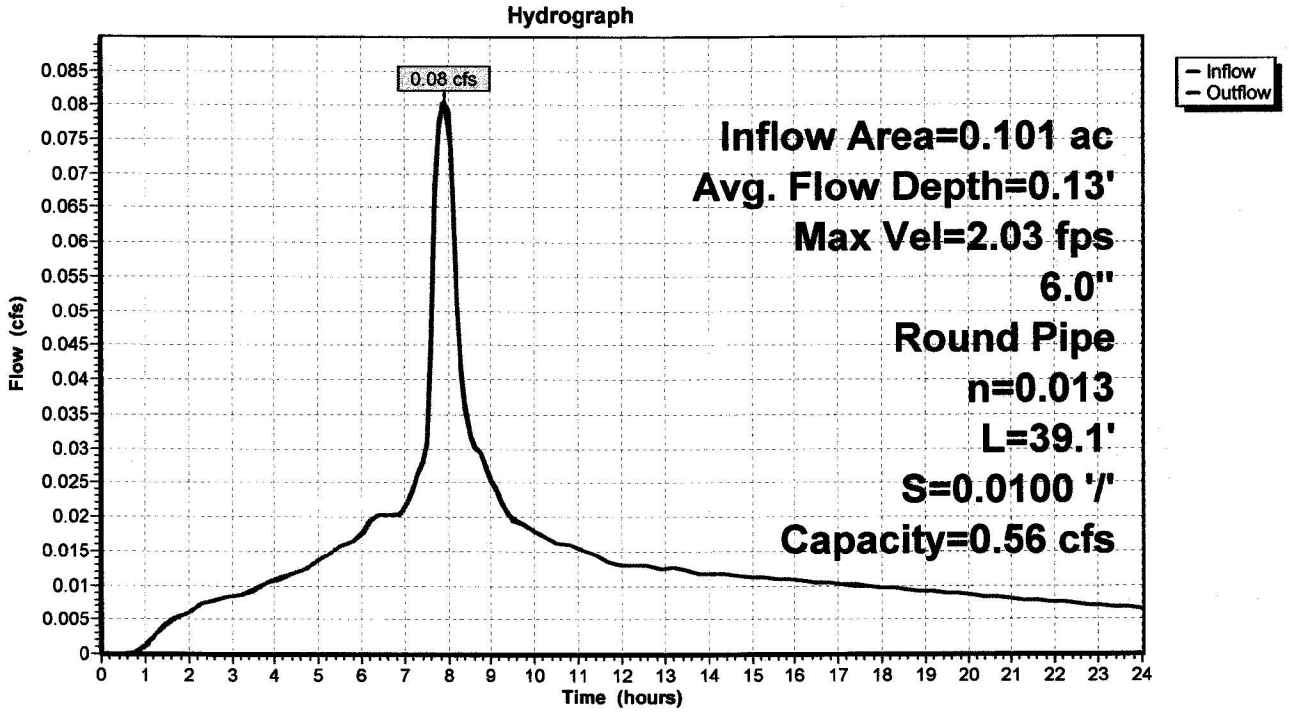
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.03 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.15 fps, Avg. Travel Time= 0.6 min

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

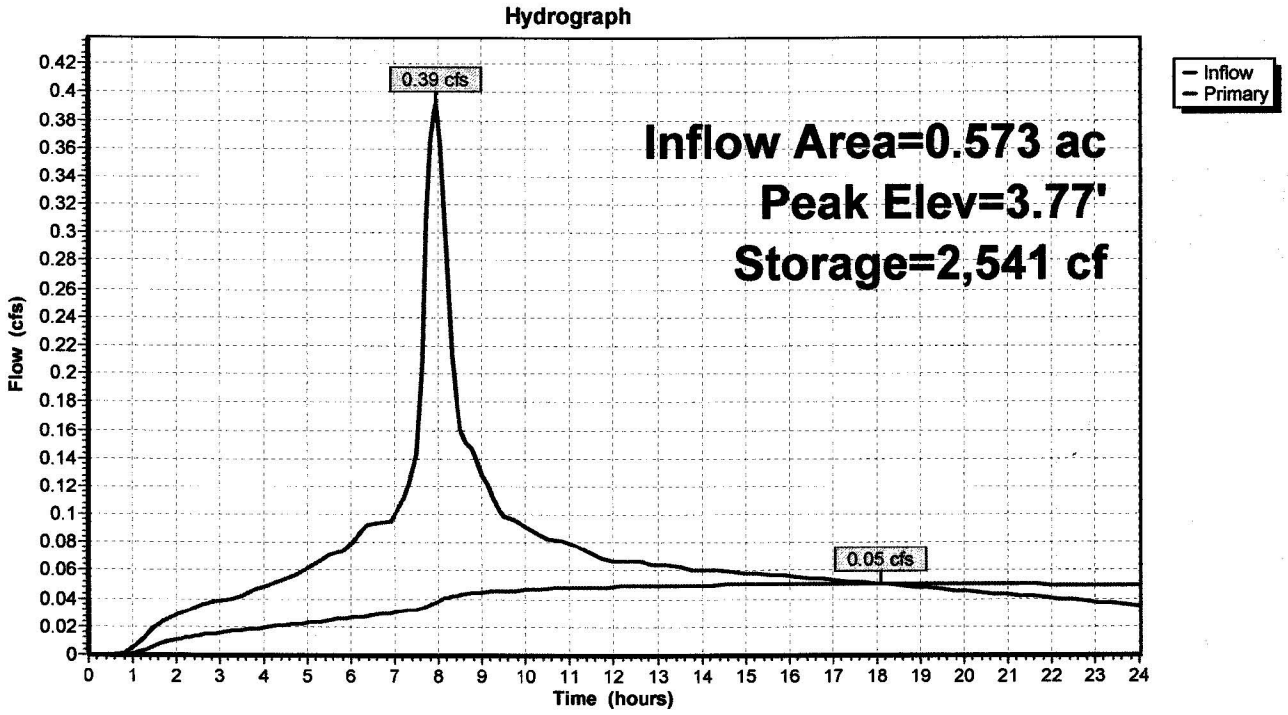
Plug-Flow detention time= 423.2 min calculated for 0.077 af (58% of inflow)
Center-of-Mass det. time= 186.6 min (868.6 - 682.0)

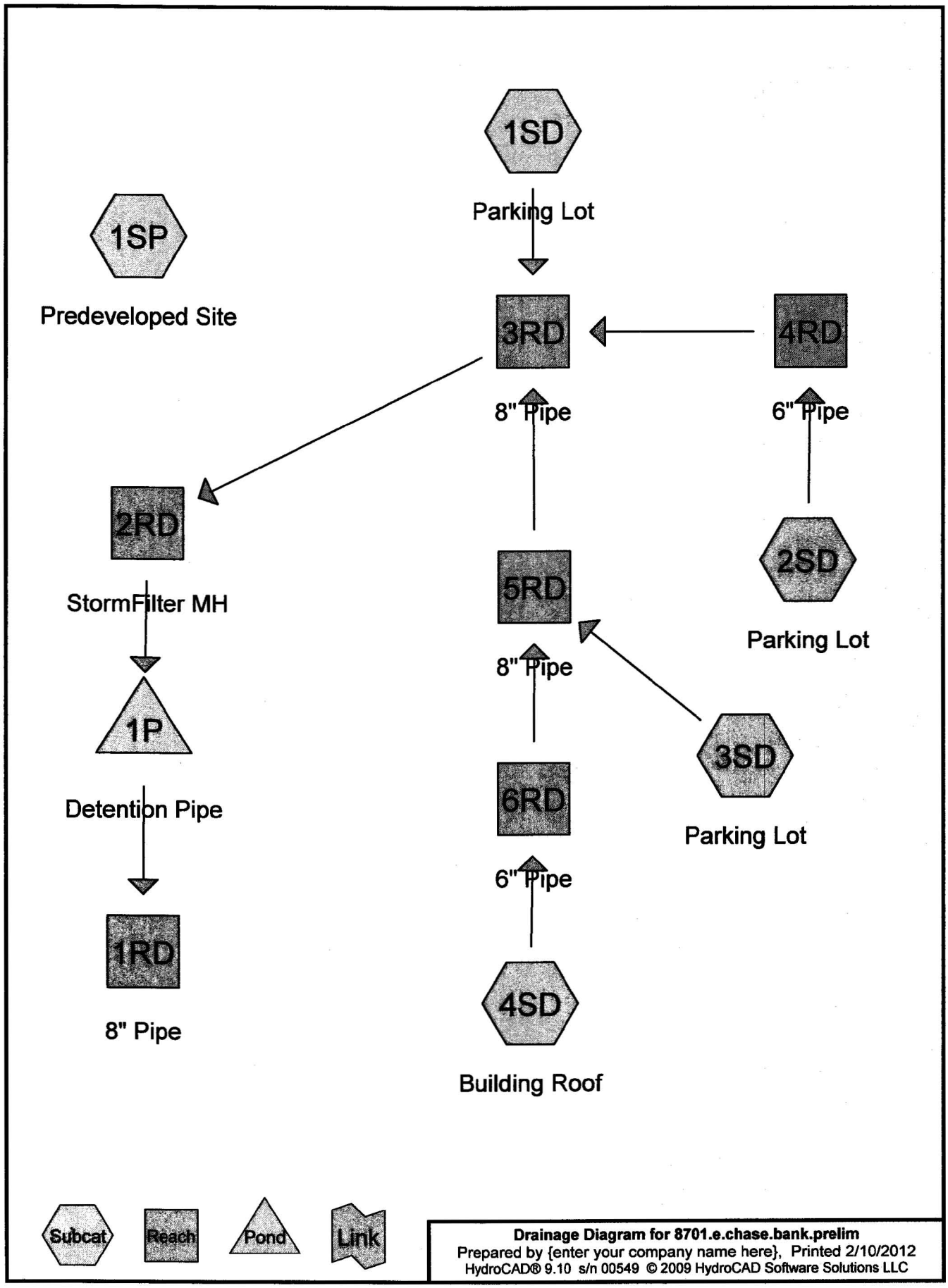
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	3,142 cf	**60.0" D x 160.0'L Pipe Storage**

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





25-YEAR STORM (3.90")

Summary for Subcatchment 1SP: Predeveloped Site

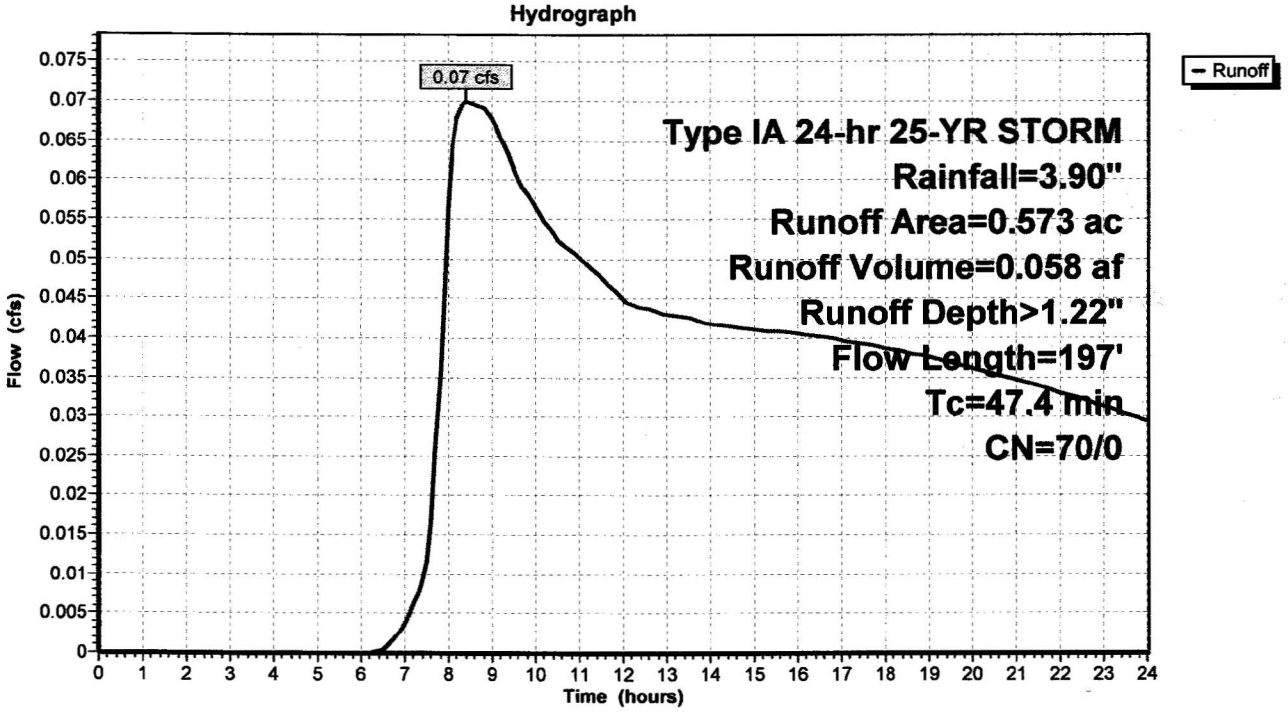
Runoff = 0.07 cfs @ 8.41 hrs, Volume= 0.058 af, Depth> 1.22"

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

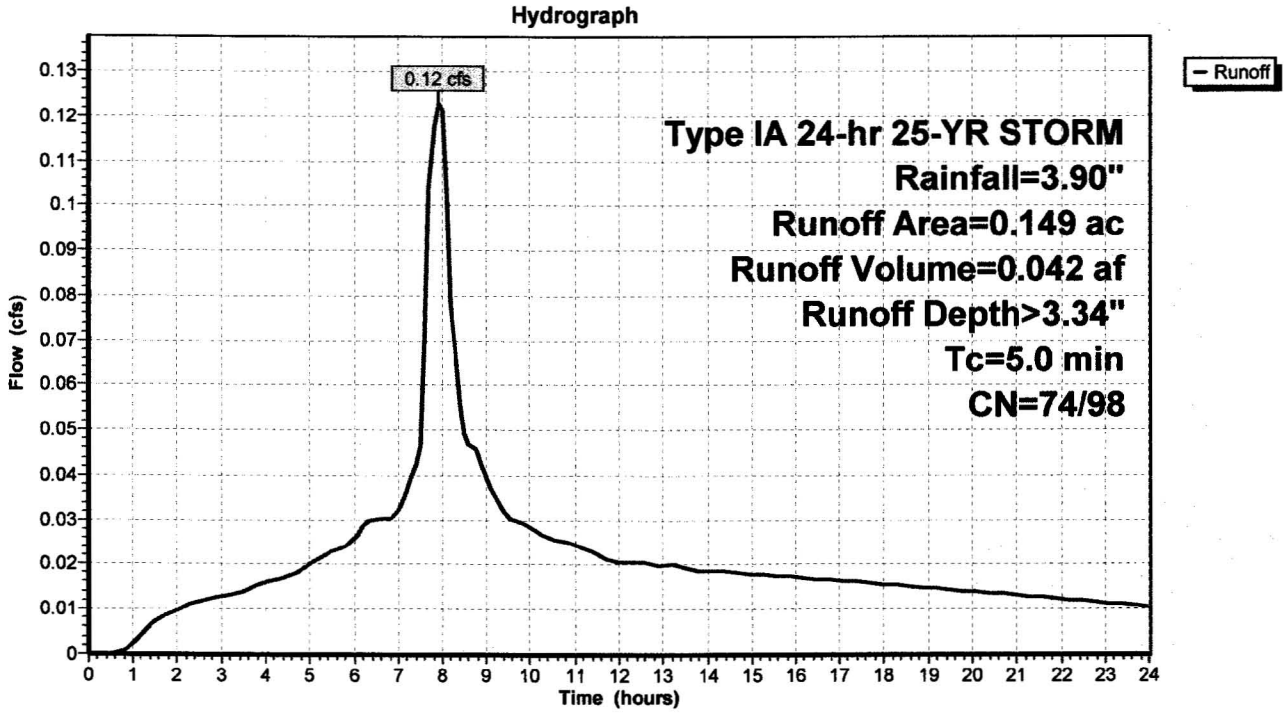
Runoff = 0.12 cfs @ 7.93 hrs, Volume= 0.042 af, Depth> 3.34"

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

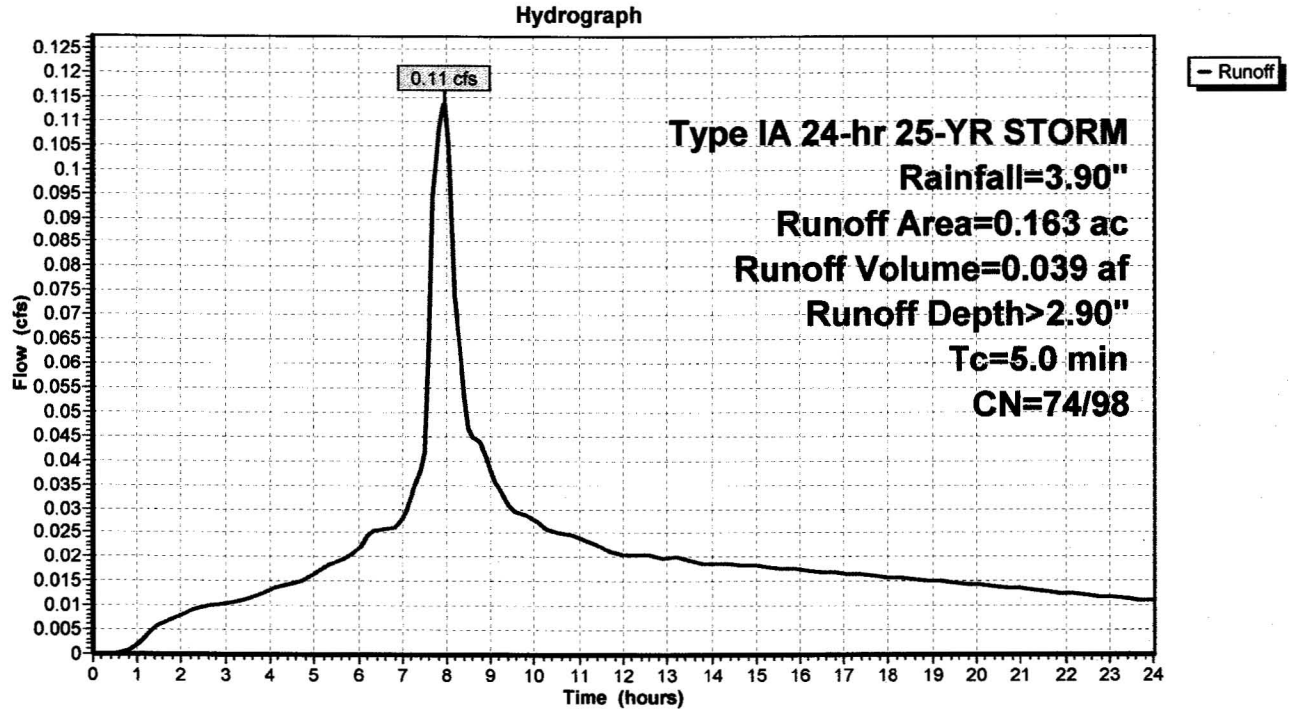
Runoff = 0.11 cfs @ 7.95 hrs, Volume= 0.039 af, Depth> 2.90"

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

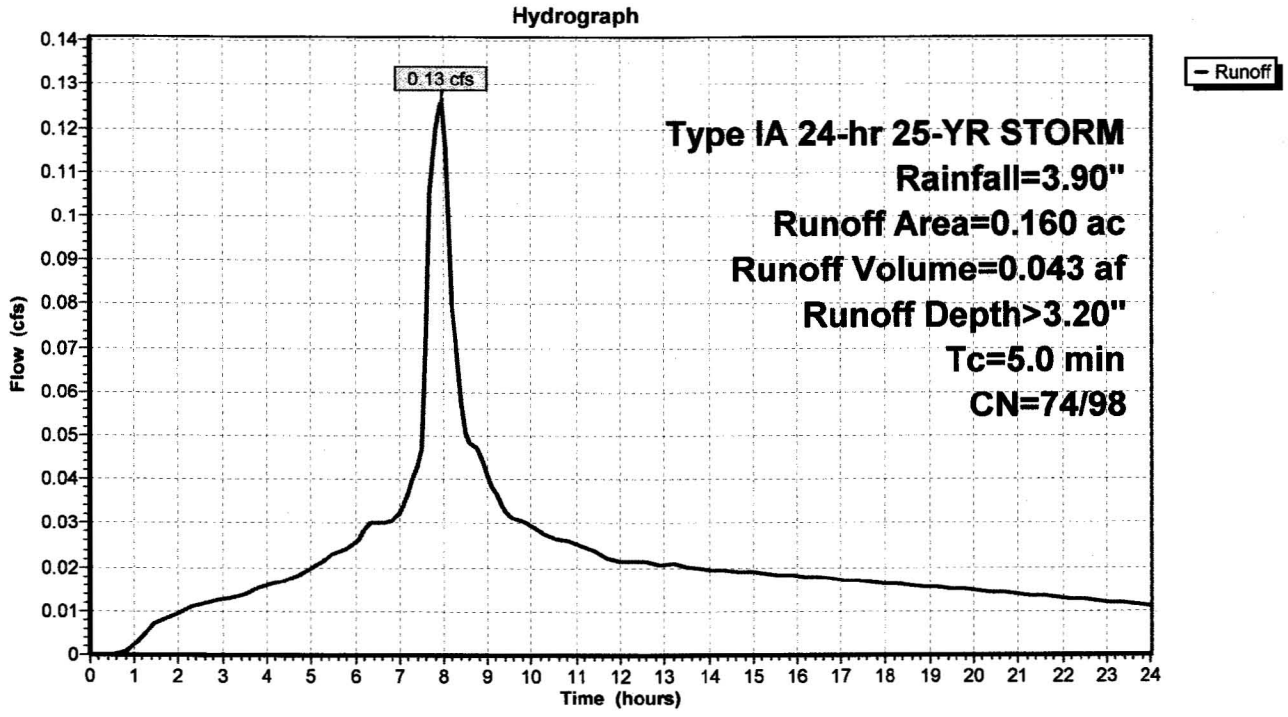
Runoff = 0.13 cfs @ 7.93 hrs, Volume= 0.043 af, Depth> 3.20"

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

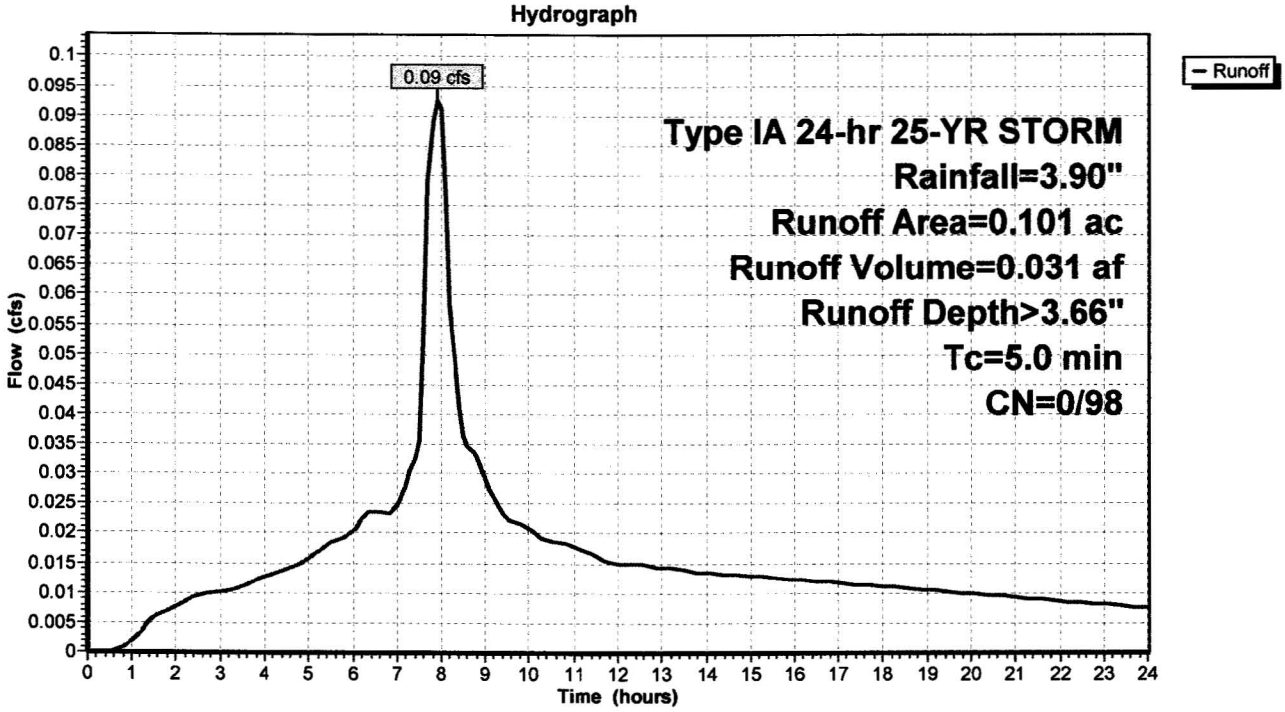
Runoff = 0.09 cfs @ 7.92 hrs, Volume= 0.031 af, Depth> 3.66"

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



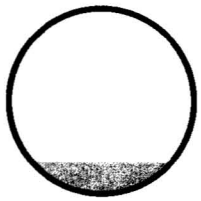
Summary for Reach 1RD: 8" Pipe

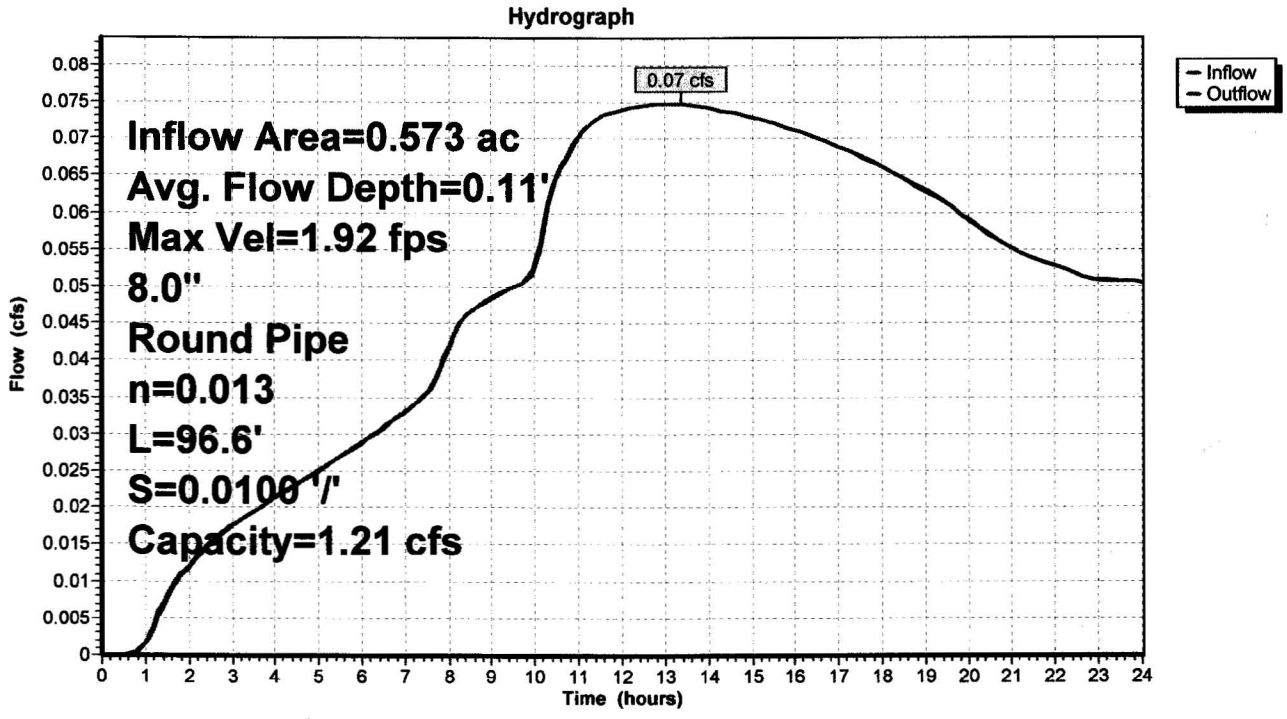
Inflow Area = 0.573 ac, 80.10% Impervious, Inflow Depth > 2.02" for 25-YR STORM event
Inflow = 0.07 cfs @ 13.36 hrs, Volume= 0.096 af
Outflow = 0.07 cfs @ 13.38 hrs, Volume= 0.096 af, Atten= 0%, Lag= 1.2 min

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'



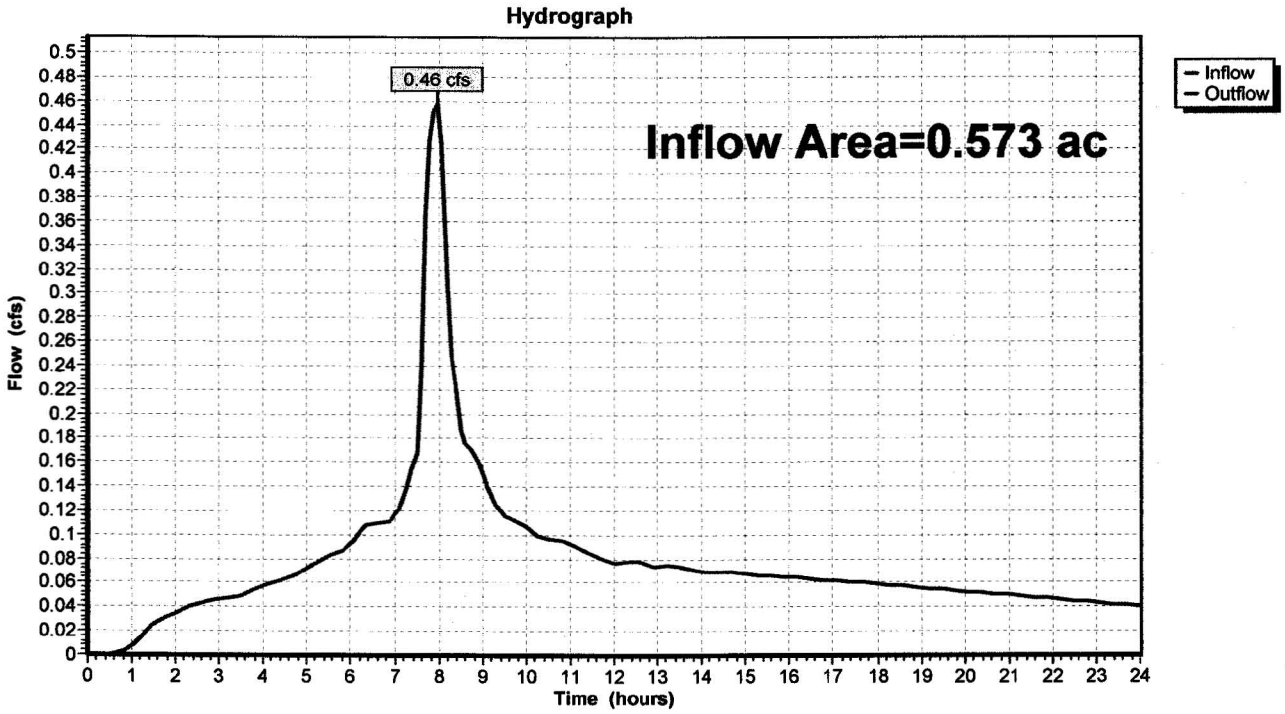


Summary for Reach 2RD: StormFilter MH

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



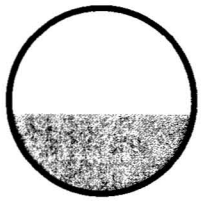
Summary for Reach 3RD: 8" Pipe

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

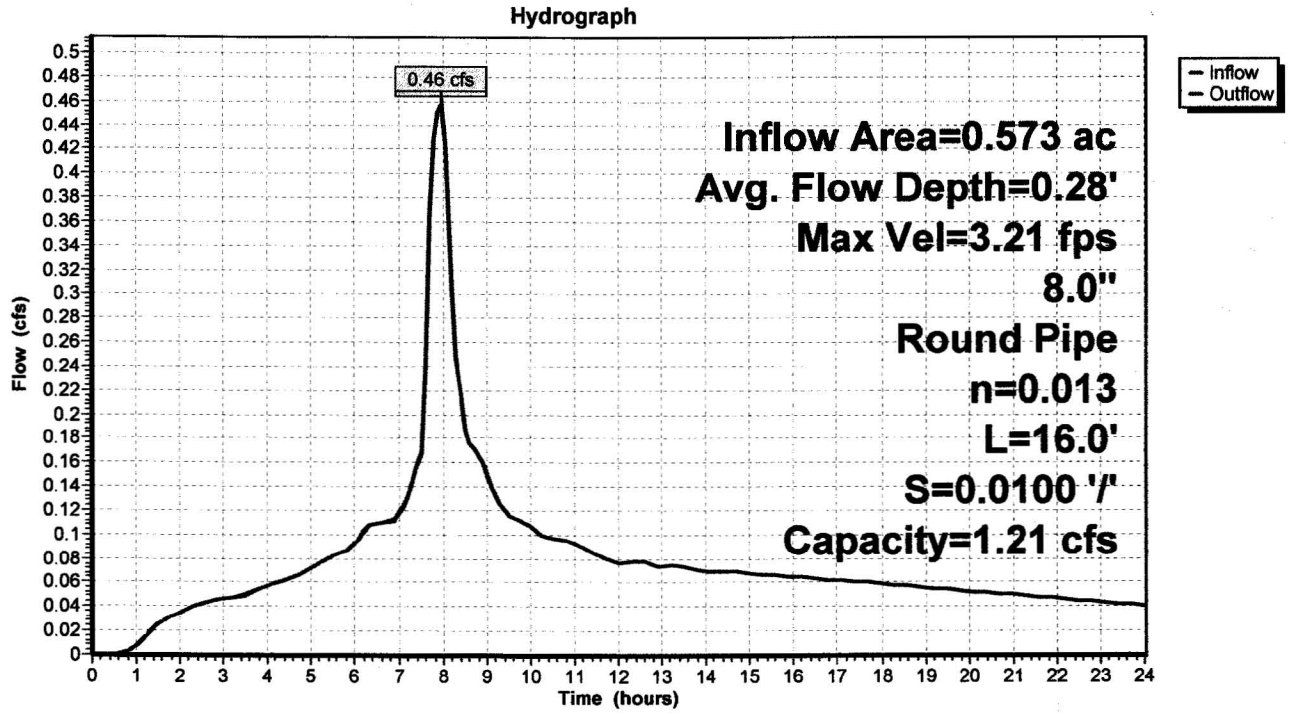
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 3.21 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.87 fps, Avg. Travel Time= 0.1 min

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



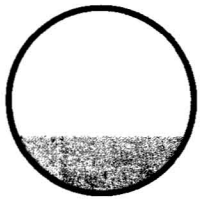
Summary for Reach 4RD: 6" Pipe

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

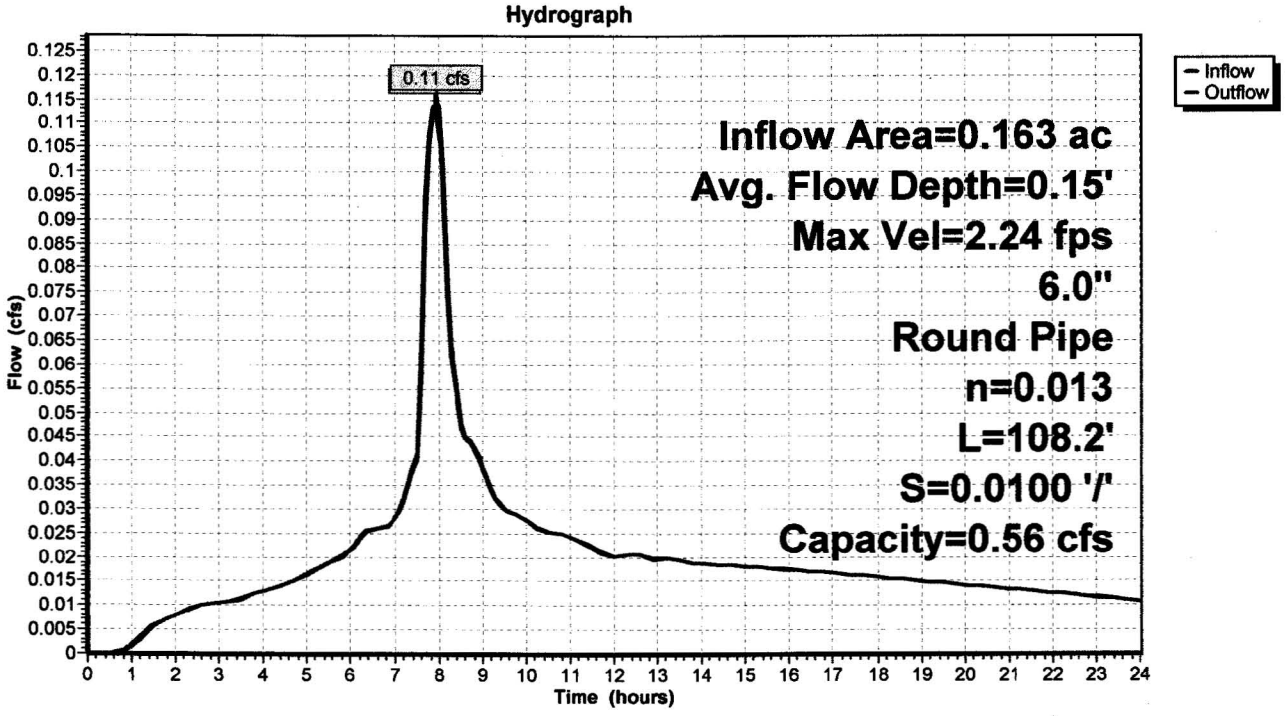
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.24 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.30 fps, Avg. Travel Time= 1.4 min

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



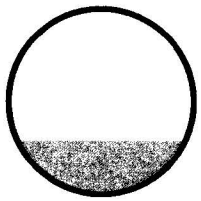
Summary for Reach 5RD: 8" Pipe

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

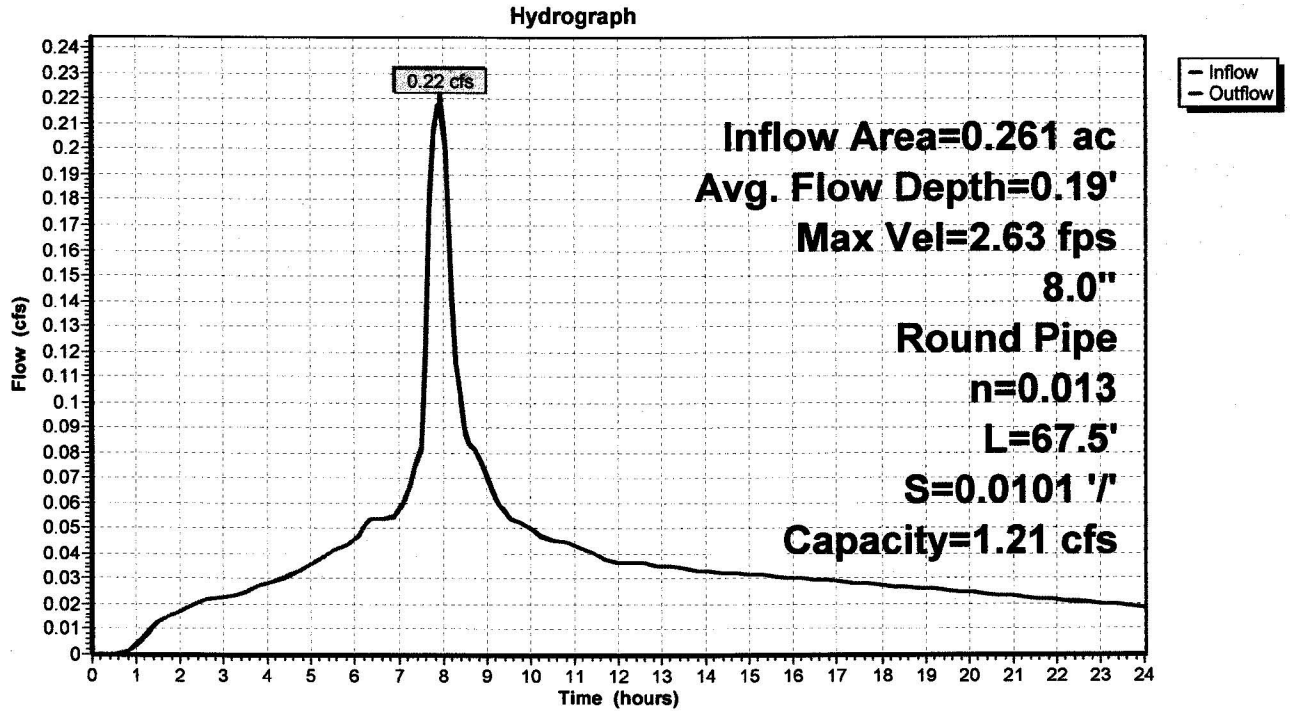
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.63 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.51 fps, Avg. Travel Time= 0.7 min

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



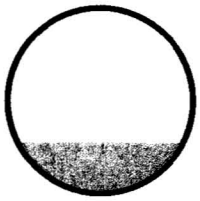
Summary for Reach 6RD: 6" Pipe

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

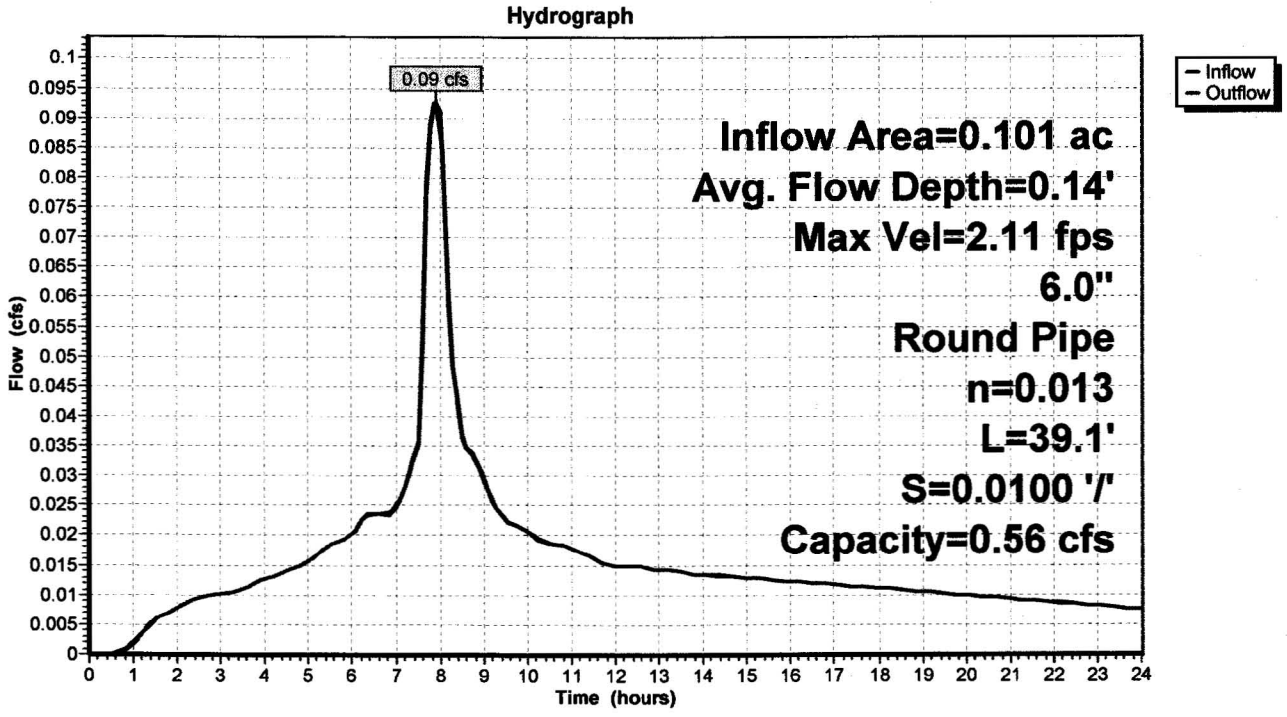
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.11 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.20 fps, Avg. Travel Time= 0.5 min

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

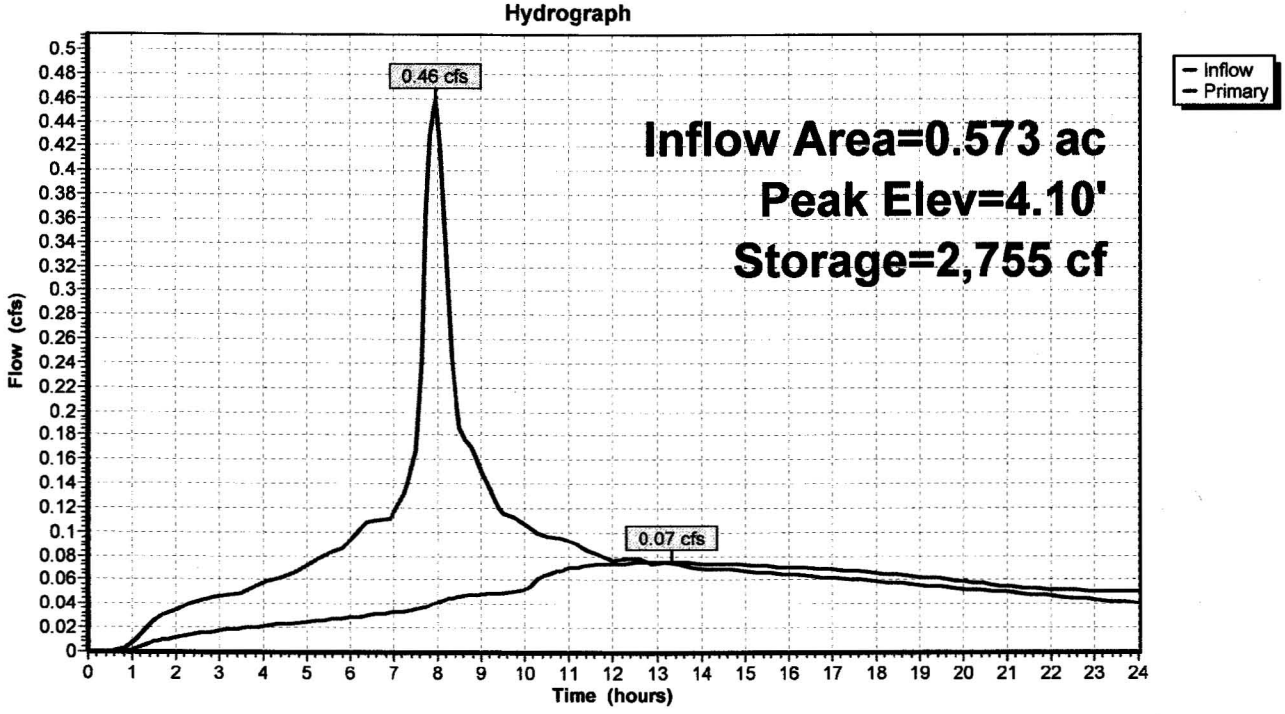
Plug-Flow detention time= 407.3 min calculated for 0.096 af (62% of inflow)
Center-of-Mass det. time= 185.4 min (864.5 - 679.0)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	3,142 cf	**60.0" D x 160.0'L Pipe Storage**

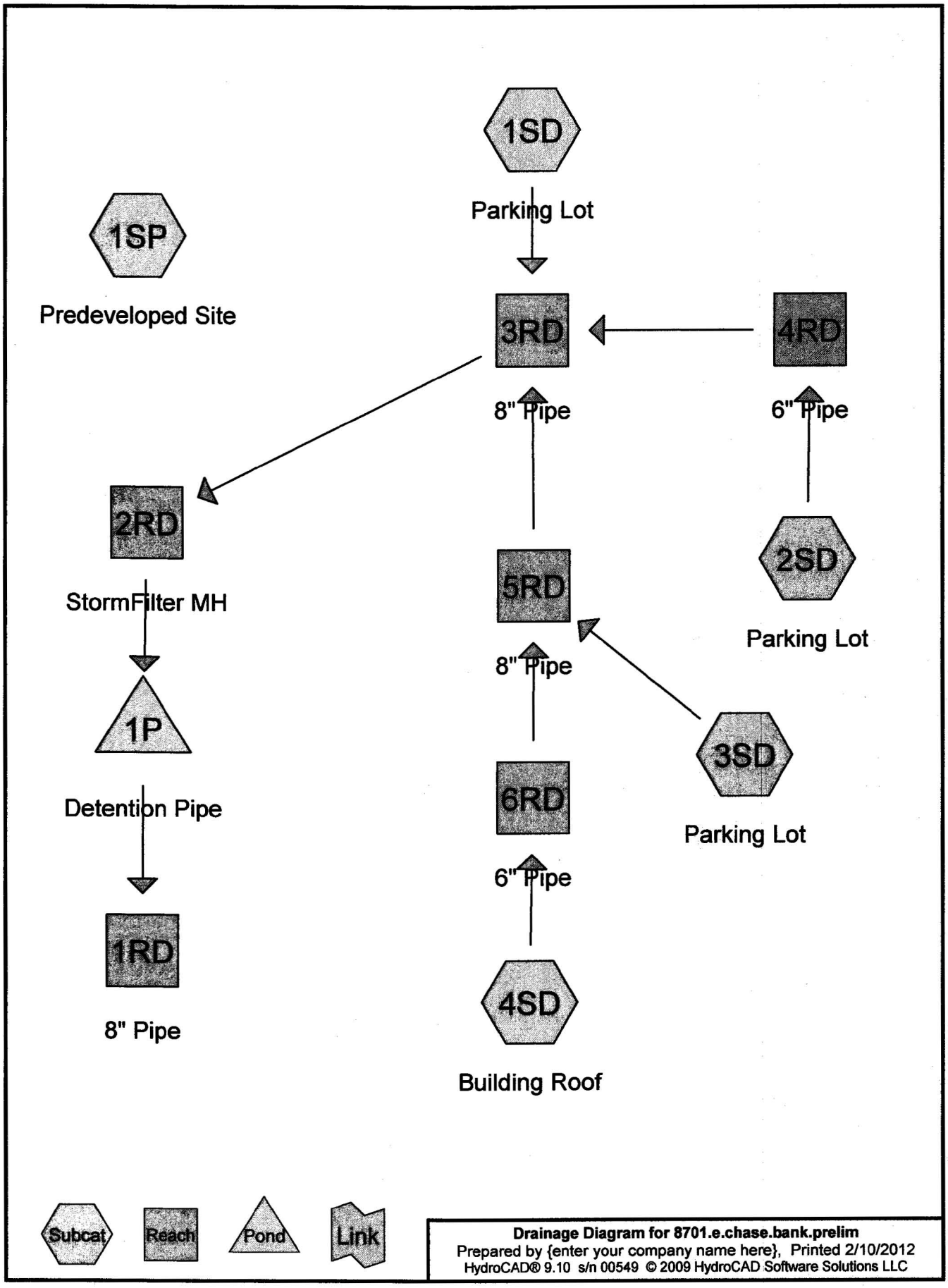
Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**1.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	3.80'	**1.3" Vert. Orifice/Grate** C= 0.600

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



J



100-YEAR STORM (4.40")

Summary for Subcatchment 1SP: Predeveloped Site

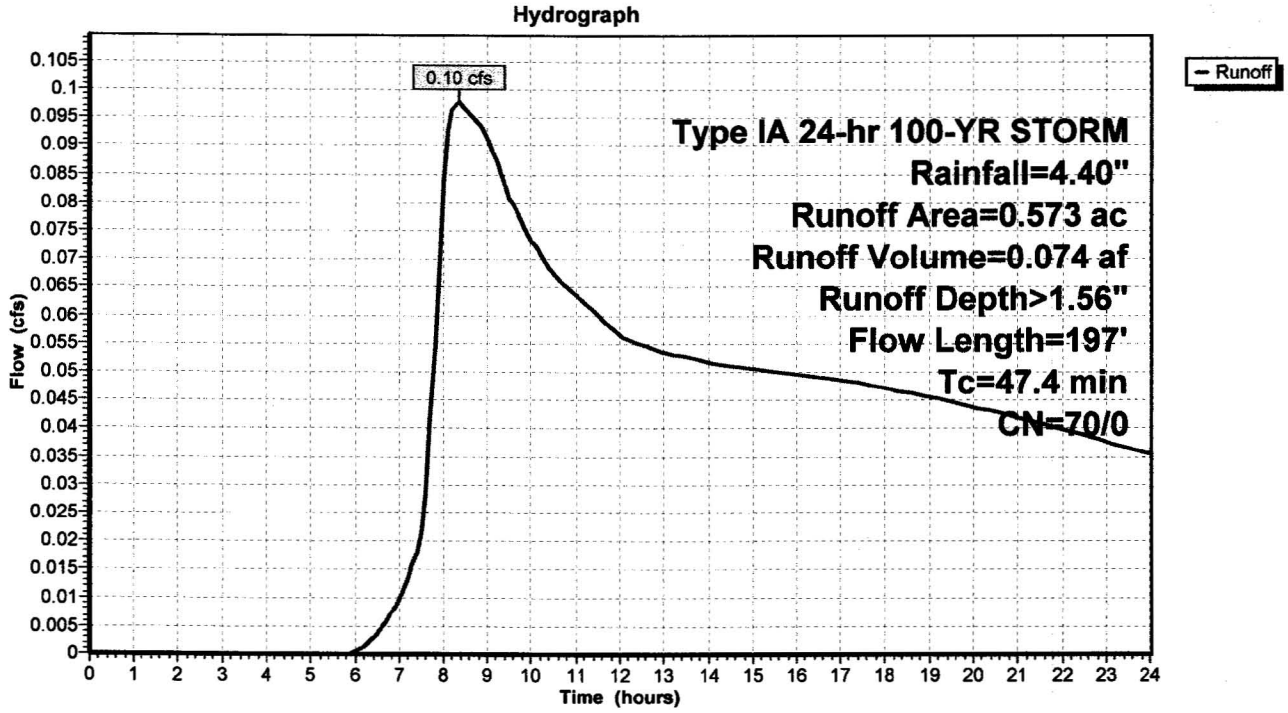
Runoff = 0.10 cfs @ 8.35 hrs, Volume= 0.074 af, Depth> 1.56"

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

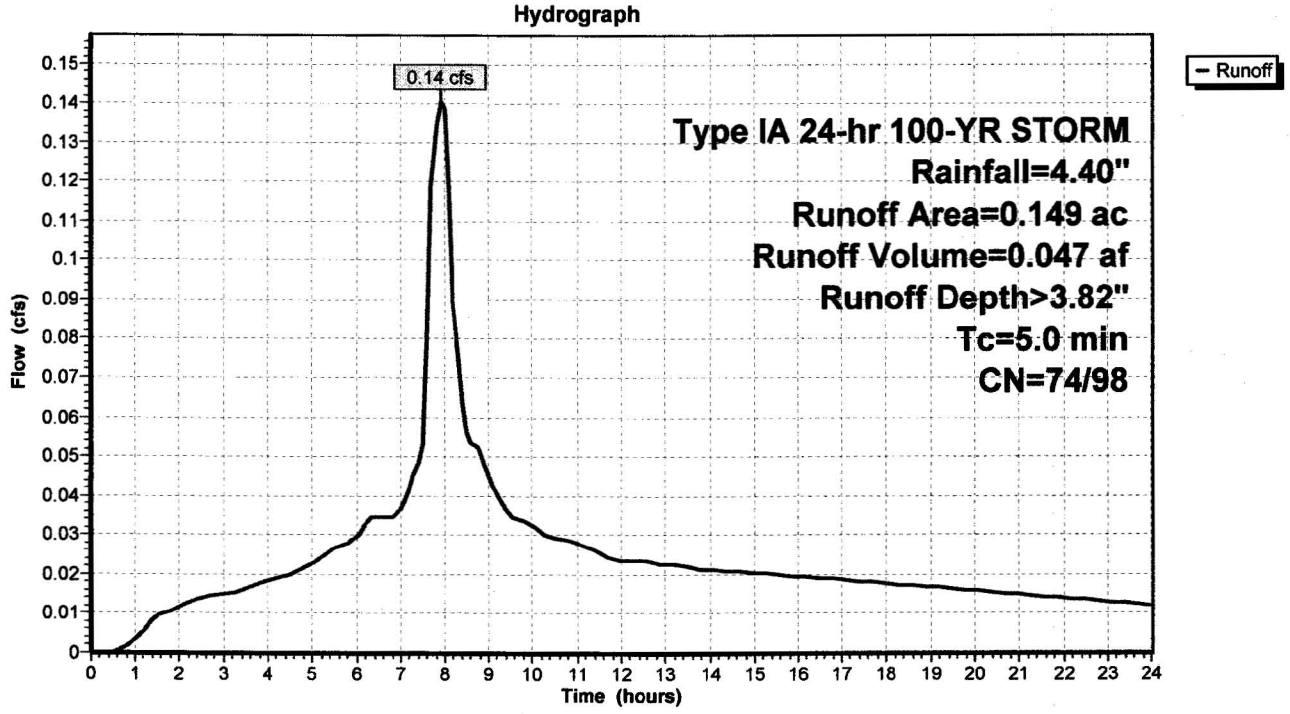
Runoff = 0.14 cfs @ 7.93 hrs, Volume= 0.047 af, Depth> 3.82"

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

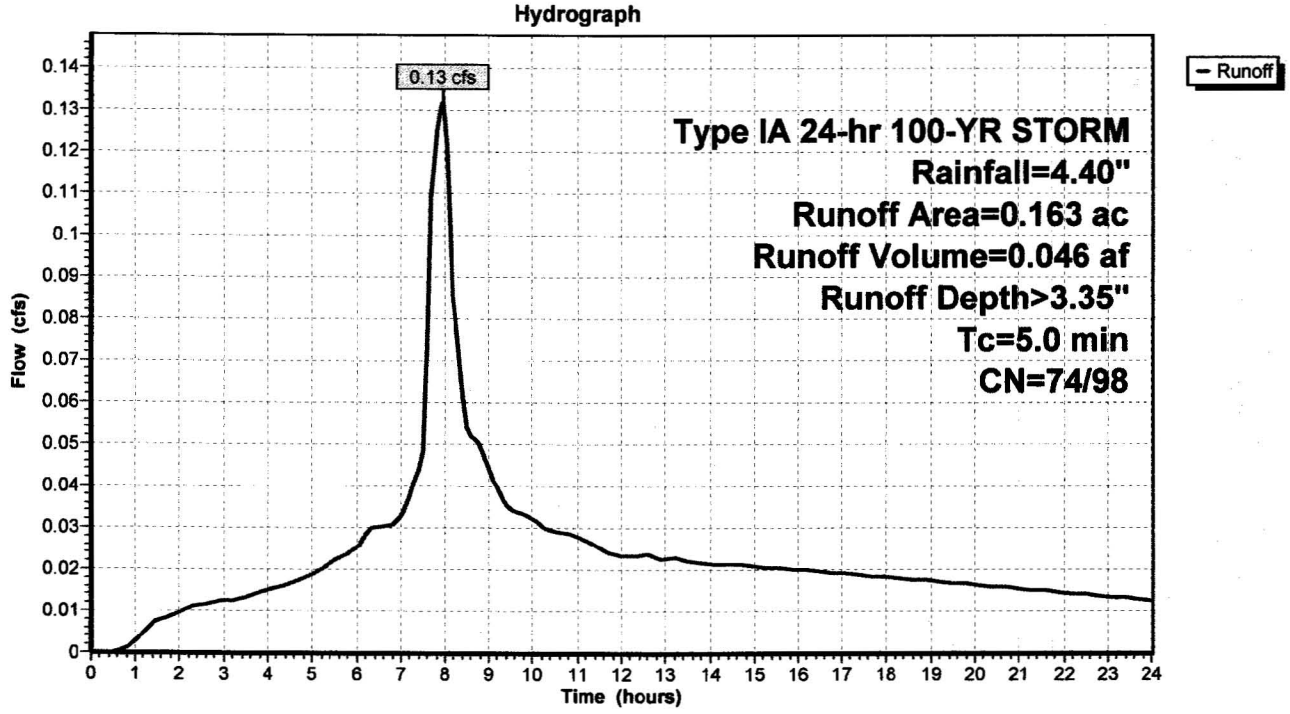
Runoff = 0.13 cfs @ 7.94 hrs, Volume= 0.046 af, Depth> 3.35"

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

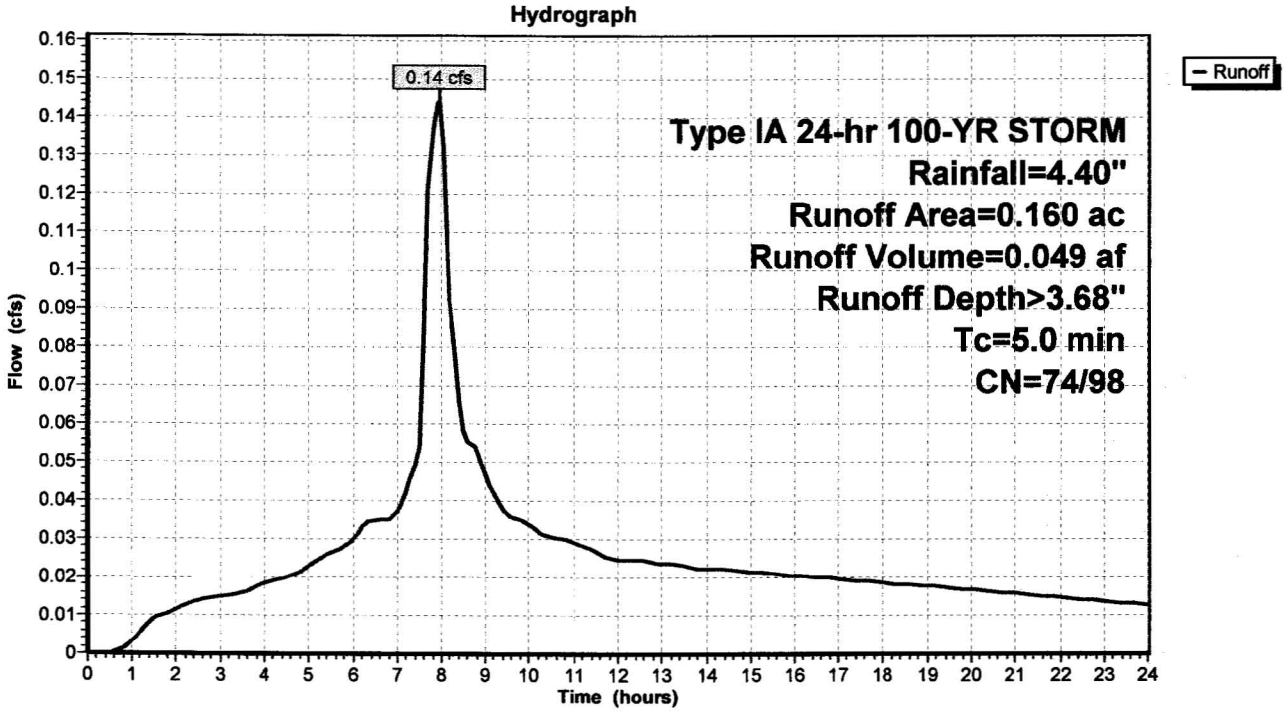
Runoff = 0.14 cfs @ 7.93 hrs, Volume= 0.049 af, Depth> 3.68"

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

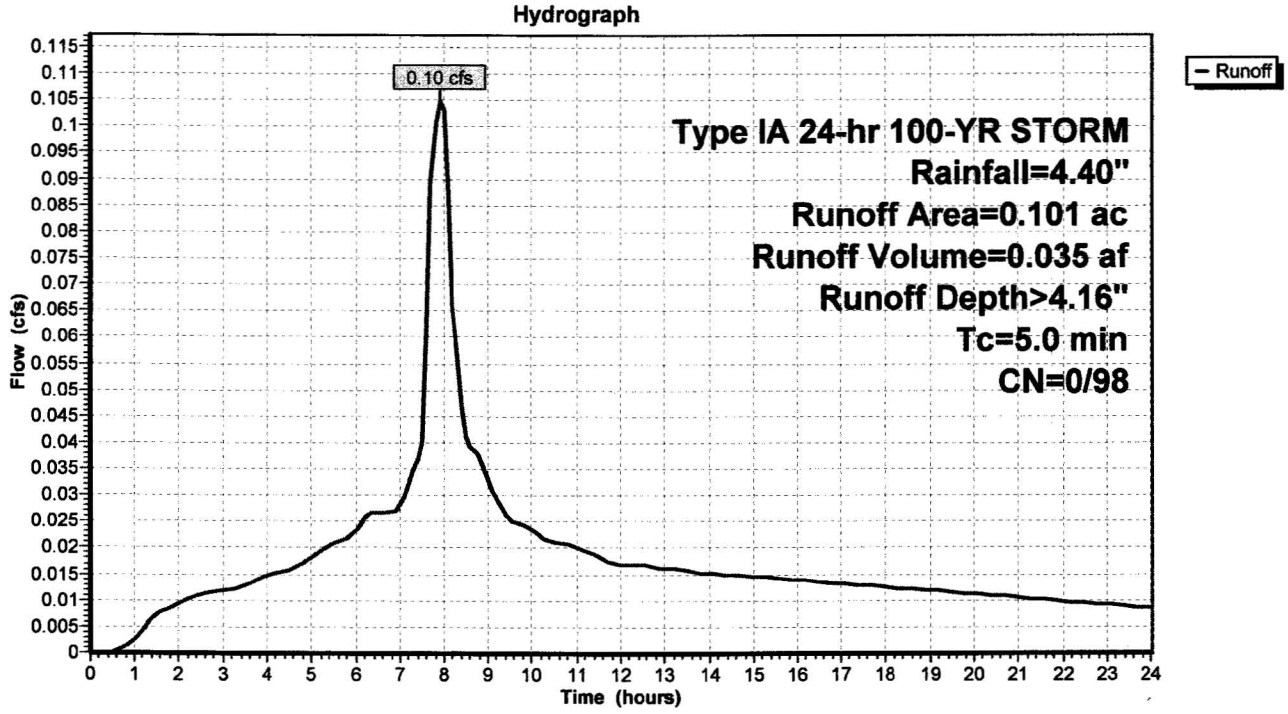
Runoff = 0.10 cfs @ 7.92 hrs, Volume= 0.035 af, Depth> 4.16"

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



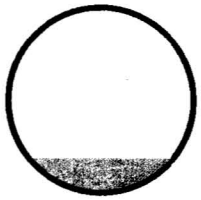
Summary for Reach 1RD: 8" Pipe

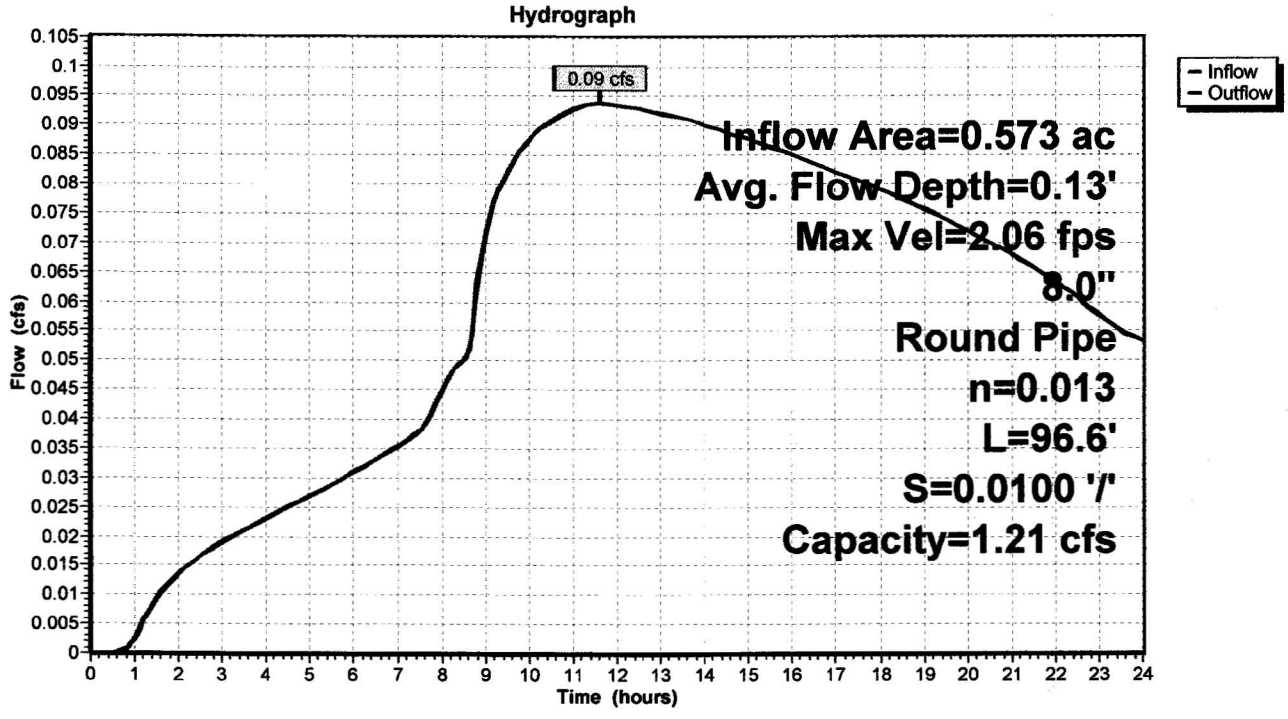
Inflow Area = 0.573 ac, 80.10% Impervious, Inflow Depth > 2.46" for 100-YR STORM event
Inflow = 0.09 cfs @ 11.60 hrs, Volume= 0.118 af
Outflow = 0.09 cfs @ 11.62 hrs, Volume= 0.117 af, Atten= 0%, Lag= 1.3 min

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'



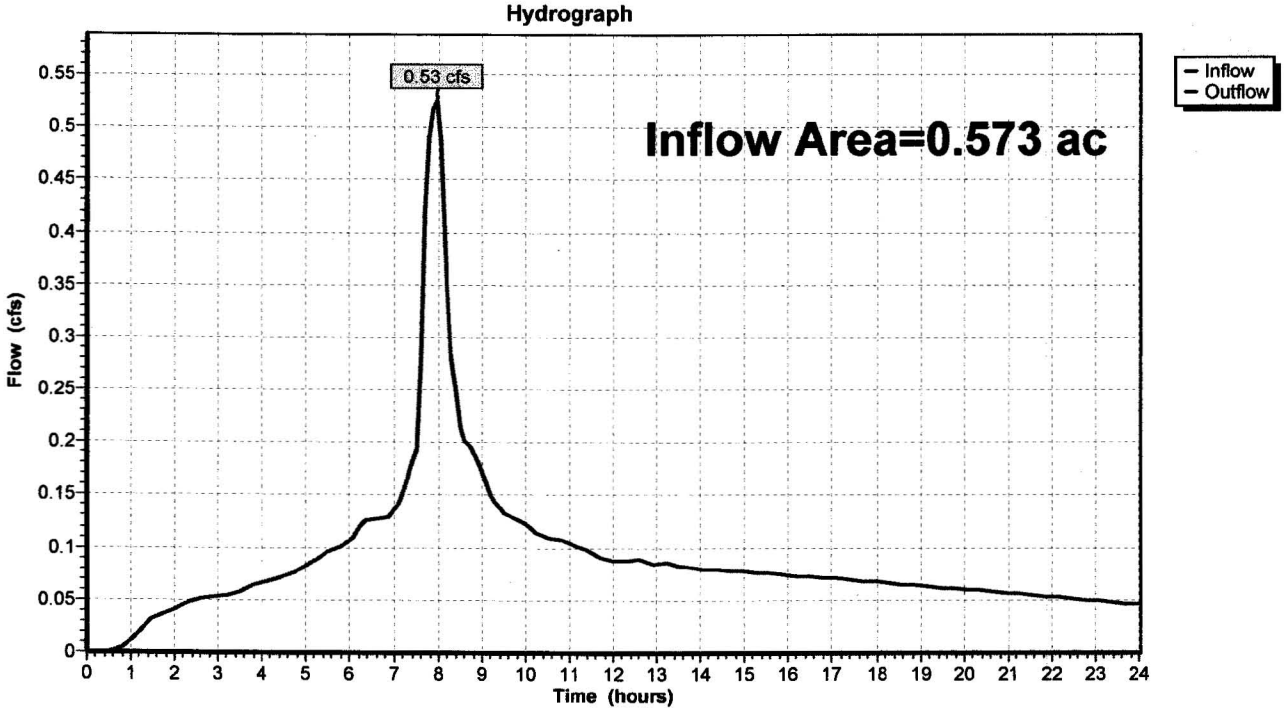


Summary for Reach 2RD: StormFilter MH

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



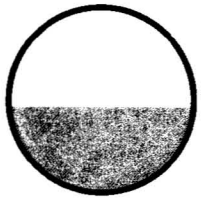
Summary for Reach 3RD: 8" Pipe

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

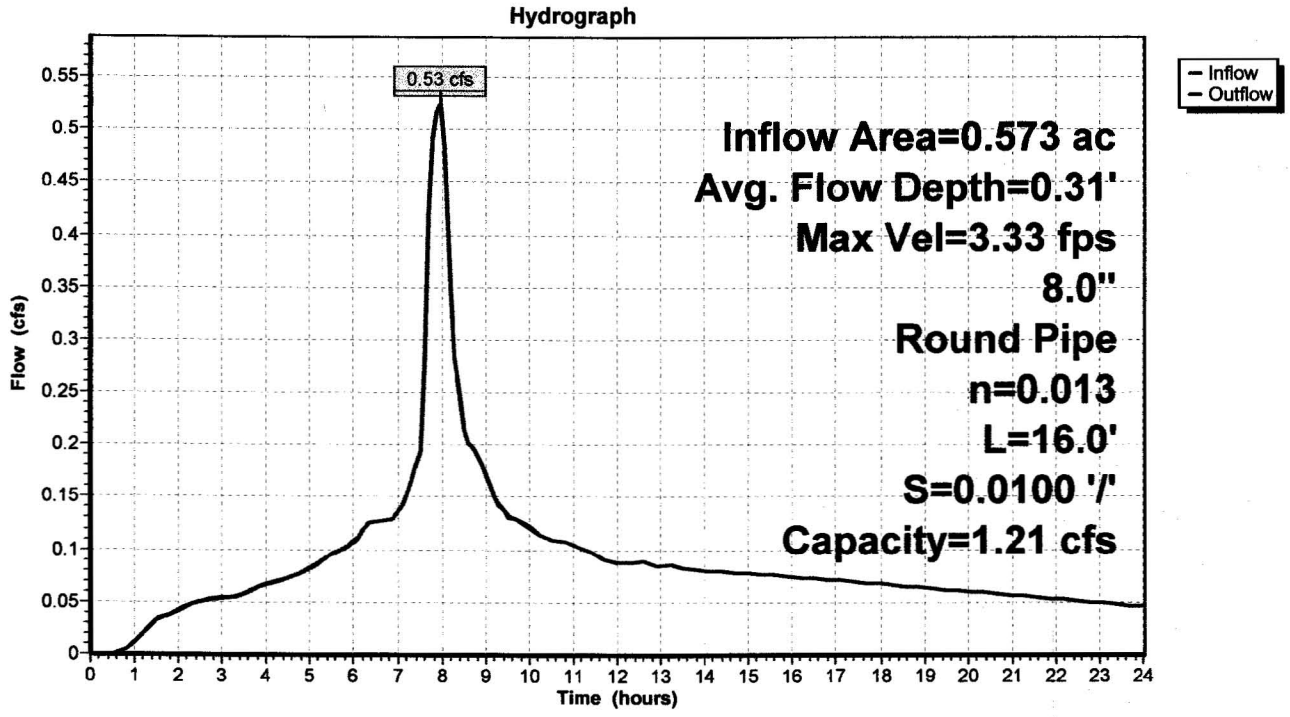
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 3.33 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.94 fps, Avg. Travel Time= 0.1 min

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



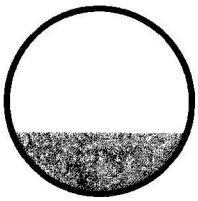
Summary for Reach 4RD: 6" Pipe

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

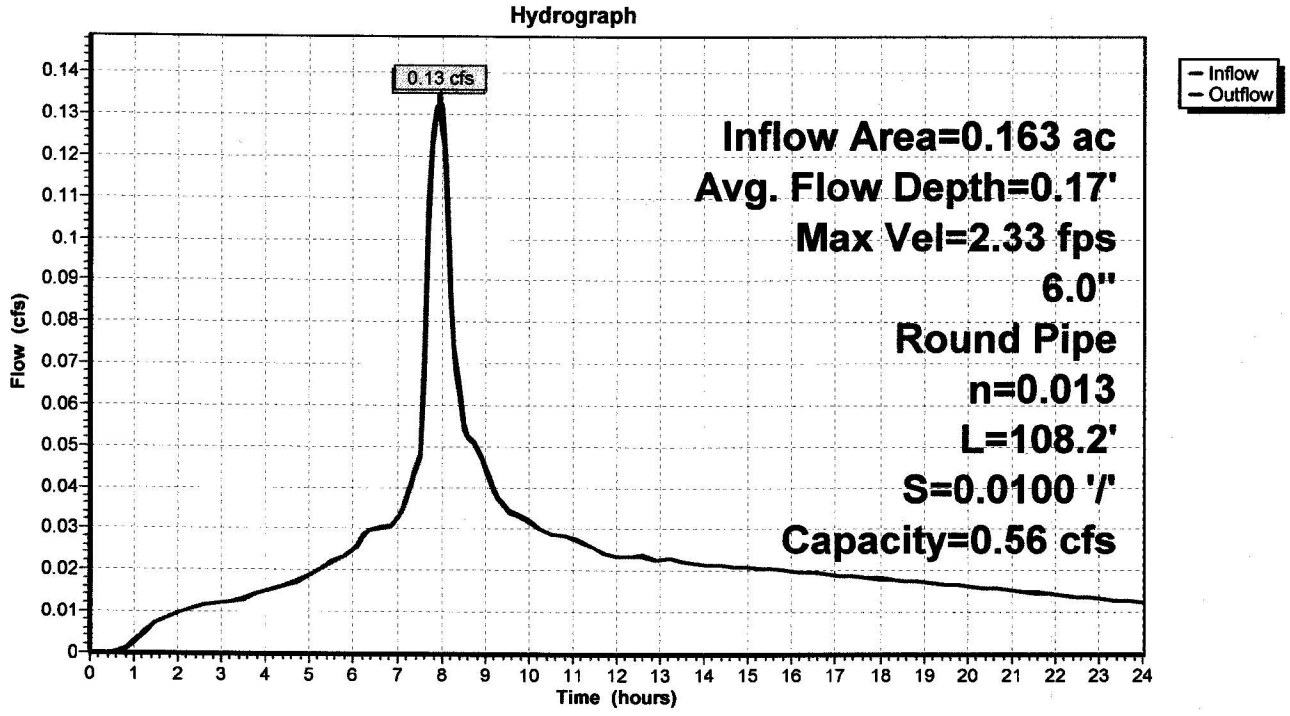
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.33 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.35 fps, Avg. Travel Time= 1.3 min

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'



Reach 4RD: 6" Pipe



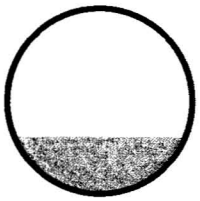
Summary for Reach 5RD: 8" Pipe

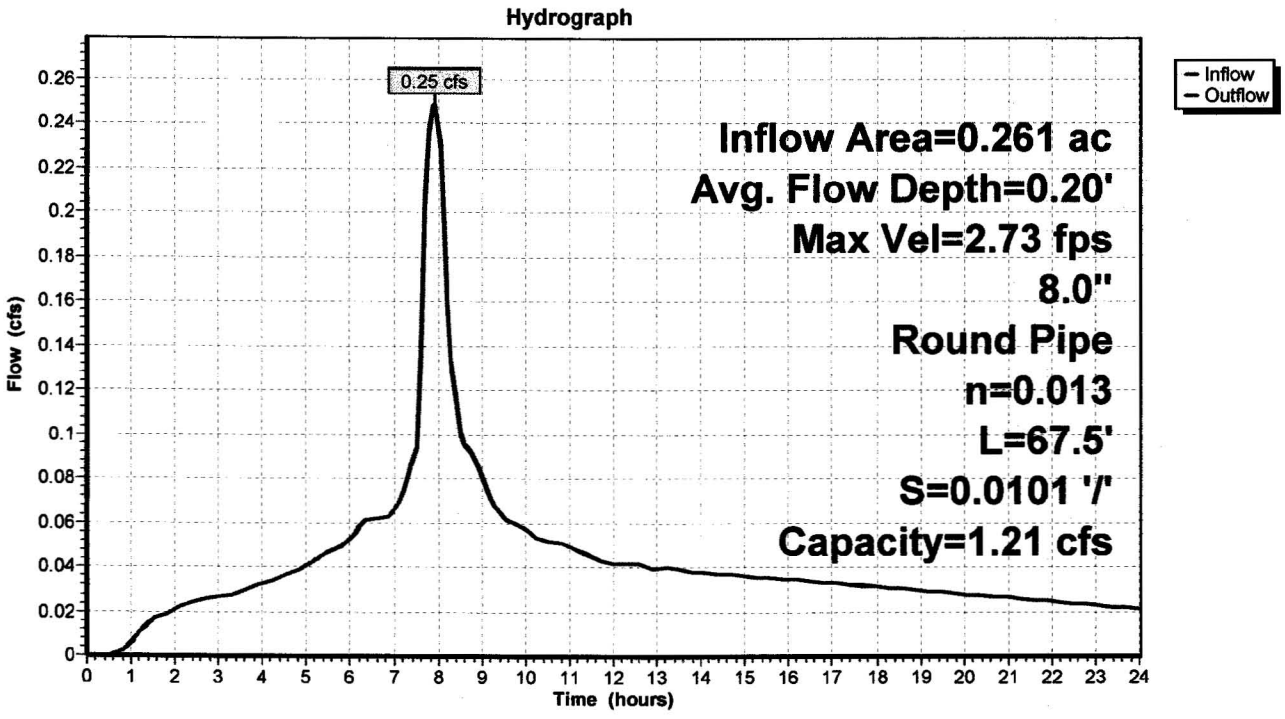
Inflow Area = 0.261 ac, 86.97% Impervious, Inflow Depth > 3.86" for 100-YR STORM event
Inflow = 0.25 cfs @ 7.93 hrs, Volume= 0.084 af
Outflow = 0.25 cfs @ 7.95 hrs, Volume= 0.084 af, Atten= 0%, Lag= 0.9 min

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'





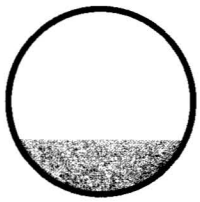
Summary for Reach 6RD: 6" Pipe

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

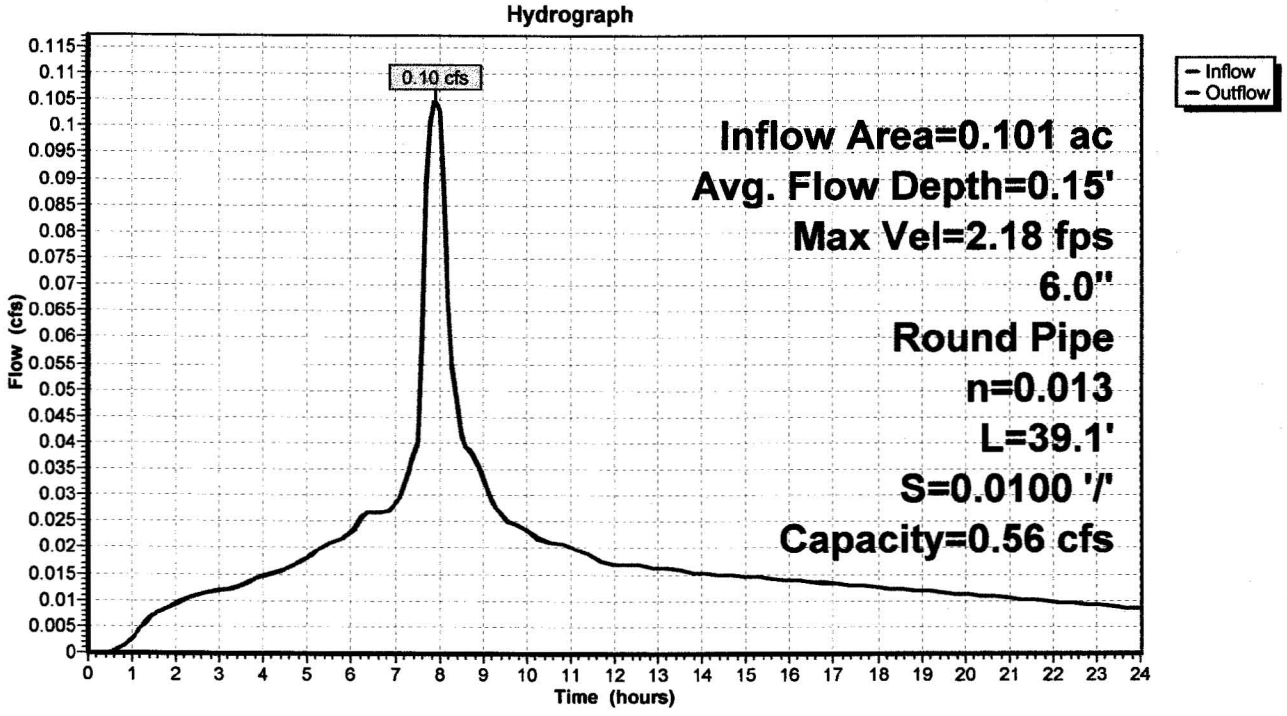
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.18 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.25 fps, Avg. Travel Time= 0.5 min

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

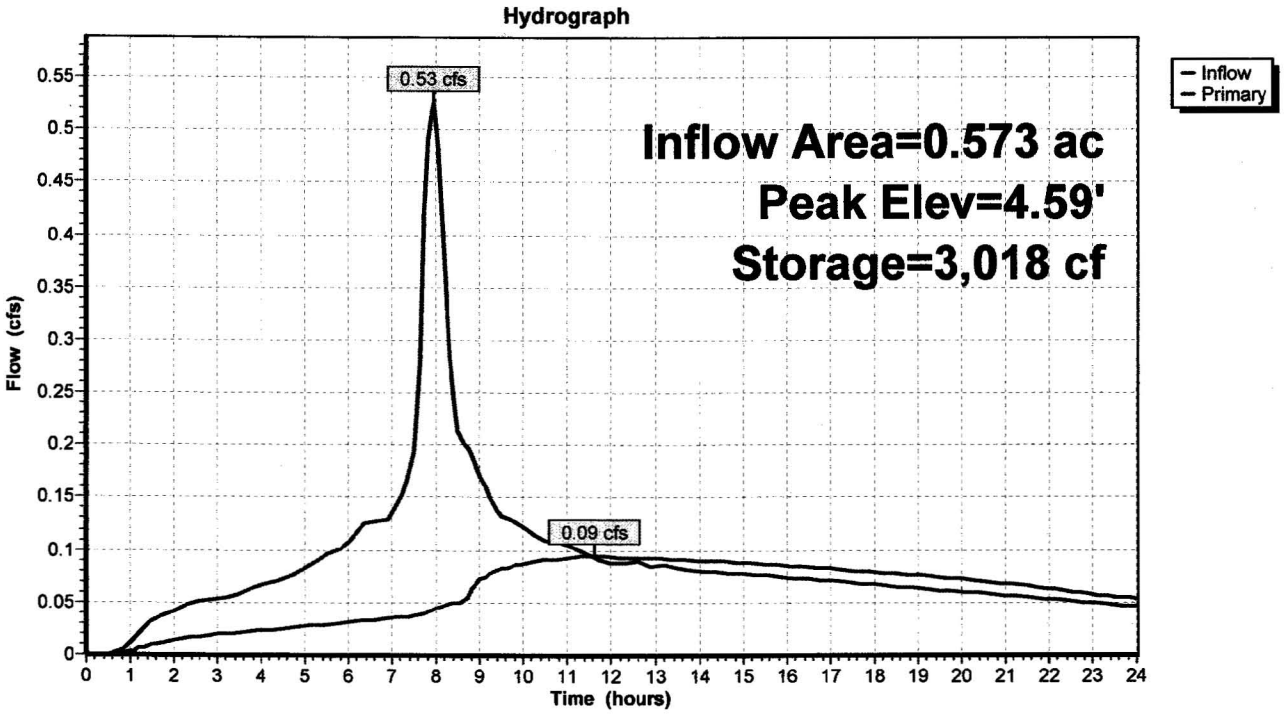
Plug-Flow detention time= 388.3 min calculated for 0.117 af (66% of inflow)
Center-of-Mass det. time= 185.4 min (861.9 - 676.5)

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

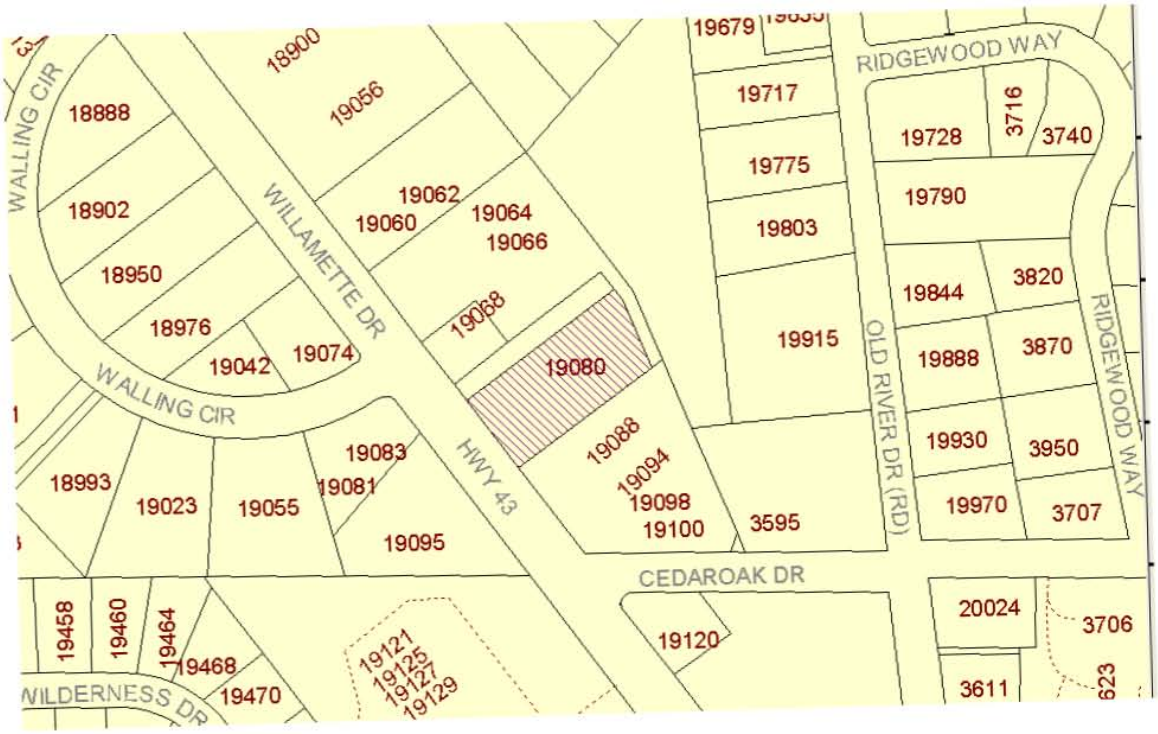
SUBJECT: Chase Bank at 19080 Willamette Drive

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:

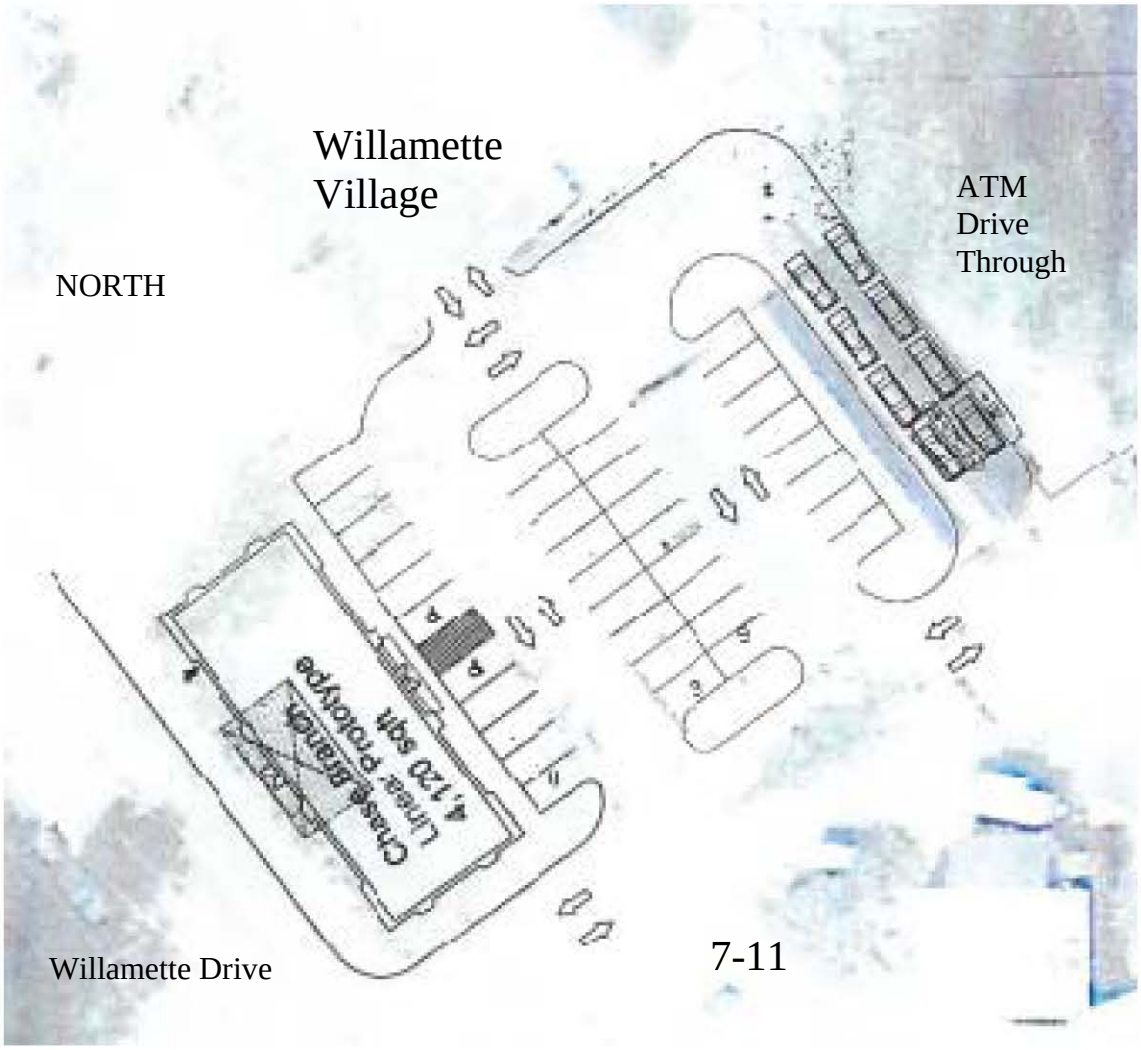
Entryway
CDC 55.100(B)(7) requires that all businesses have at least one main entry onto the street side. The front large well defined entryway on Willamette Drive meets the criterion. The transom looks good. Extending the awning to provide more rain protection (6-8 feet) is needed.

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.

<u>Drive through lanes: Design and Sustainability (not related to approval criterion)</u>
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

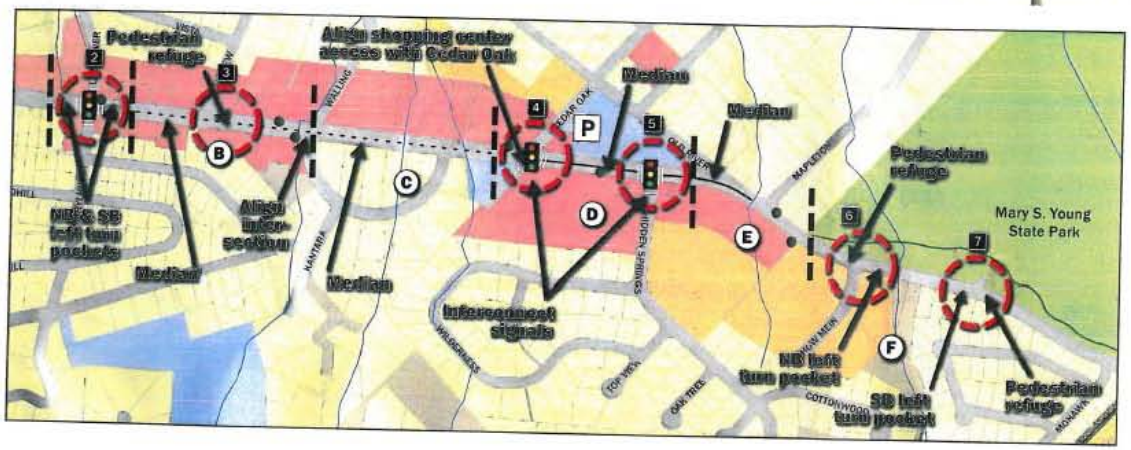
the submittal and approval criteria of CDC Chapter 75 must be addressed. If multiple variances are needed, each additional application deposit fee is 900 dollars.

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.

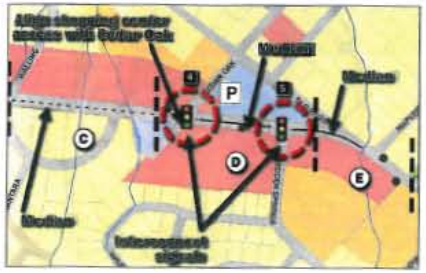
The current property owner has expressed a wish to maintain the existing entrance along HWY 43 as a "right-in / right-out" access drive. However, the recommended driveway realignment is recommended as a safety improvement. Therefore, any decision to keep the current driveway open will depend upon future 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.

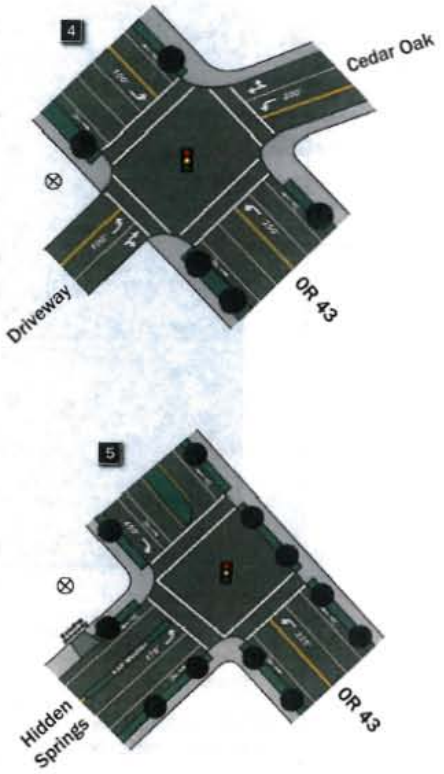
In addition to this realignment, the plan recommends installing a central median along Hidden Springs at the approach to OR 43. This median is designed to prevent left turn maneuvers from the shopping center onto Hidden Springs, and from Hidden Springs into the shopping center. The driveway's proximity 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 maintenence 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,

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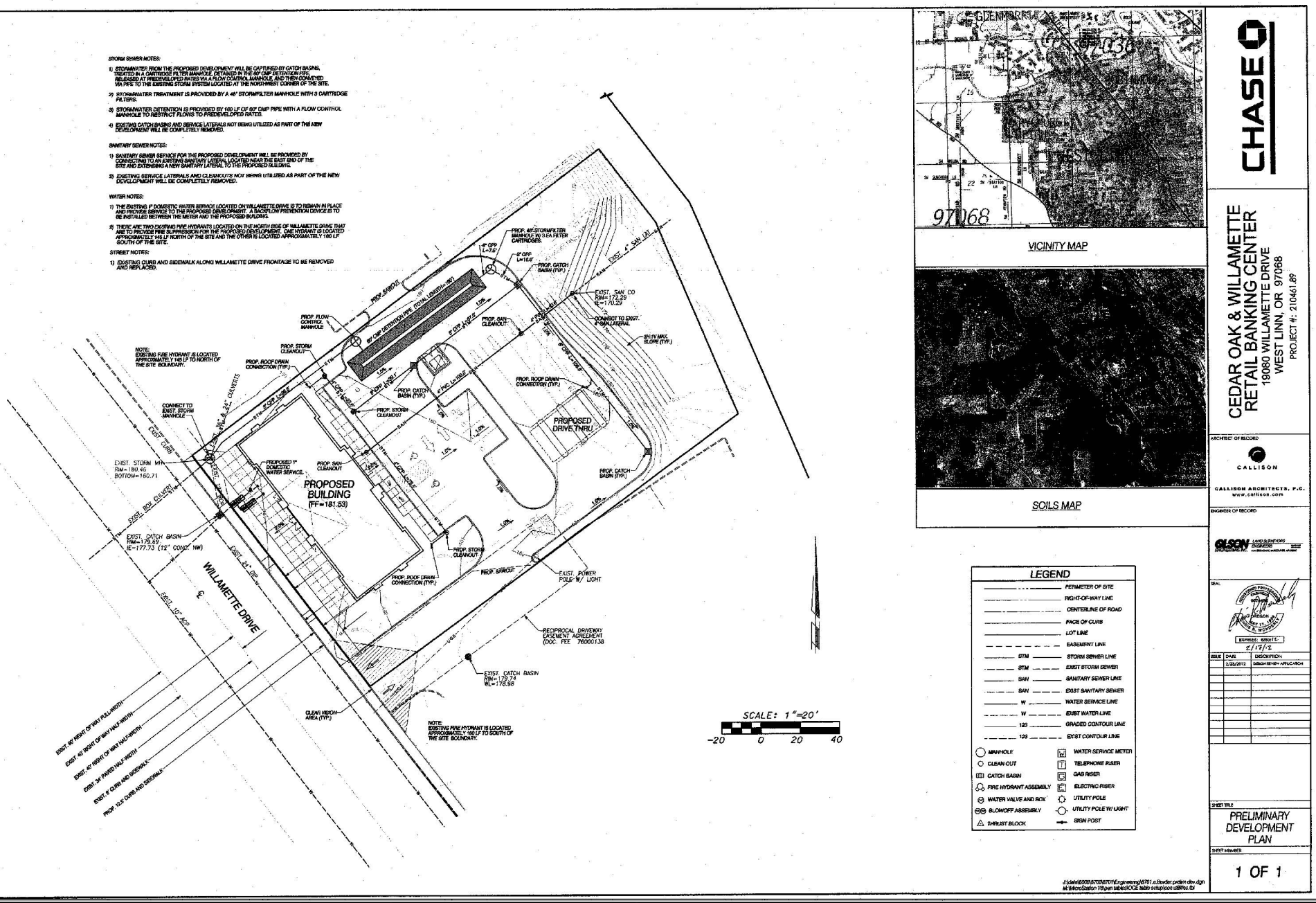

STORM SEWER NOTES:
1) STORMWATER FROM THE PROPOSED DEVELOPMENT WILL BE CAPTURED BY CATCH BASINS, TREATED IN A CARTRIDGE FILTER MANHOLE, DETAINED IN THE 69" CMP DETENTION PIPE, RELEASED AT PREDEVELOPED RATES VIA A FLOW CONTROL MANHOLE, AND THEN CONVEYED VIA PIPE TO THE EXISTING STORM SYSTEM LOCATED AT 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 69" 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.
PROPOSED BUILDING (FF=181.53)
PROPOSED DRIVE THRU
PROP. 48" STORMFILTER MANHOLE W/ 3 EA PERF CARTRIDGES.
PROP. 69" CMP DETENTION PIPE (TOTAL LENGTH=160')
PROP. FLOW CONTROL MANHOLE
PROP. CATCH BASIN (TYP.)
PROP. SAN CLEANOUT
PROP. STORM CLEANOUT
PROP. ROOF DRAIN CONNECTION (TYP.)
CONNECT TO EXIST. STORM MANHOLE
PROPOSED 1" DOMESTIC WATER SERVICE.
EXIST. STORM MH RIM=180.46 BOTTOM=160.71
EXIST. CATCH BASIN RIM=179.69 IE=177.73 (12" CONC. NW)
EXIST. BOX CULVERT
EXIST. CURB
WILLAMETTE DRIVE
EXIST. 24'-0" ±
EXIST. 10' AGR
EXIST. 30' RIGHT OF WAY FULL-WIDTH
EXIST. 40' RIGHT OF WAY HALF-WIDTH
EXIST. 34' PAVED HALF-WIDTH
EXIST. 6" CURB AND SIDEWALK
PROP. 12.5' CURB AND SIDEWALK
EXIST. POWER POLE W/ LIGHT
RECIPROCAL DRIVEWAY EASEMENT AGREEMENT (DOC. FEE 76000138)
EXIST. CATCH BASIN RIM=179.74 IE=178.98
CLEAR VISION AREA (TYP.)
NOTE: EXISTING FIRE HYDRANT IS LOCATED APPROXIMATELY 145 LF TO NORTH OF THE SITE BOUNDARY.
NOTE: EXISTING FIRE HYDRANT IS LOCATED APPROXIMATELY 160 LF TO SOUTH OF THE SITE BOUNDARY.
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
STORM SEWER LINE
EXIST STORM SEWER
SANITARY SEWER LINE
EXIST SANITARY SEWER
WATER SERVICE LINE
EXIST WATER LINE
GRADED CONTOUR LINE
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
GLSON LAND SURVEYORS ENGINEERS
SEAL
EXPIRES: 6/30/12
2/17/12
ISSUE DATE DESCRIPTION
2/29/2012 DESIGN REVIEW APPLICATION
SHEET TITLE
PRELIMINARY DEVELOPMENT PLAN
SHEET NUMBER
1 OF 1

VICINITY MAP
NO SCALE

BASIS OF BEARINGS:
THE BEARING OF N57°28'56"W ALONG THE CENTERLINE OF WILLAMETTE DRIVE OBTAINED BETWEEN EXISTING SURVEY MONUMENTS AS SHOWN IN SIC011-002.

SCALE: 1" = 20'

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
- SANITARY SEWER LINE
- STORM SEWER LINE
- UNDERGROUND GAS LINE
- UNDERGROUND TELEPHONE LINE
- UNDERGROUND POWER LINE
- UNDERGROUND WATER LINE
- BUILDING OVERHANG
- FENCE (AS NOTED)
- SQUARE FEET
- CONCRETE PAVING
- ASPHALT PAVING
- NO PARKING STRIPES
- BORING HOLE

LEGAL DESCRIPTION

PARCEL I:

LOT 18 AND THE SOUTHWESTERLY 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 DRAWN PARALLEL WITH THE NORTHWESTERLY 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 REEDS RANGES, ET UX, BY DEED RECORDED MAY 23, 1977 AS FEE NO. 7701900, CLACKAMAS COUNTY RECORDS, AND THE TRUE POINT OF BEGINNING;

THENCE NORTHEASTERLY ALONG THE NORTHWESTERLY LINE OF SAID GRANTEE TRACT 261.8 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.

TITLE EXCEPTIONS

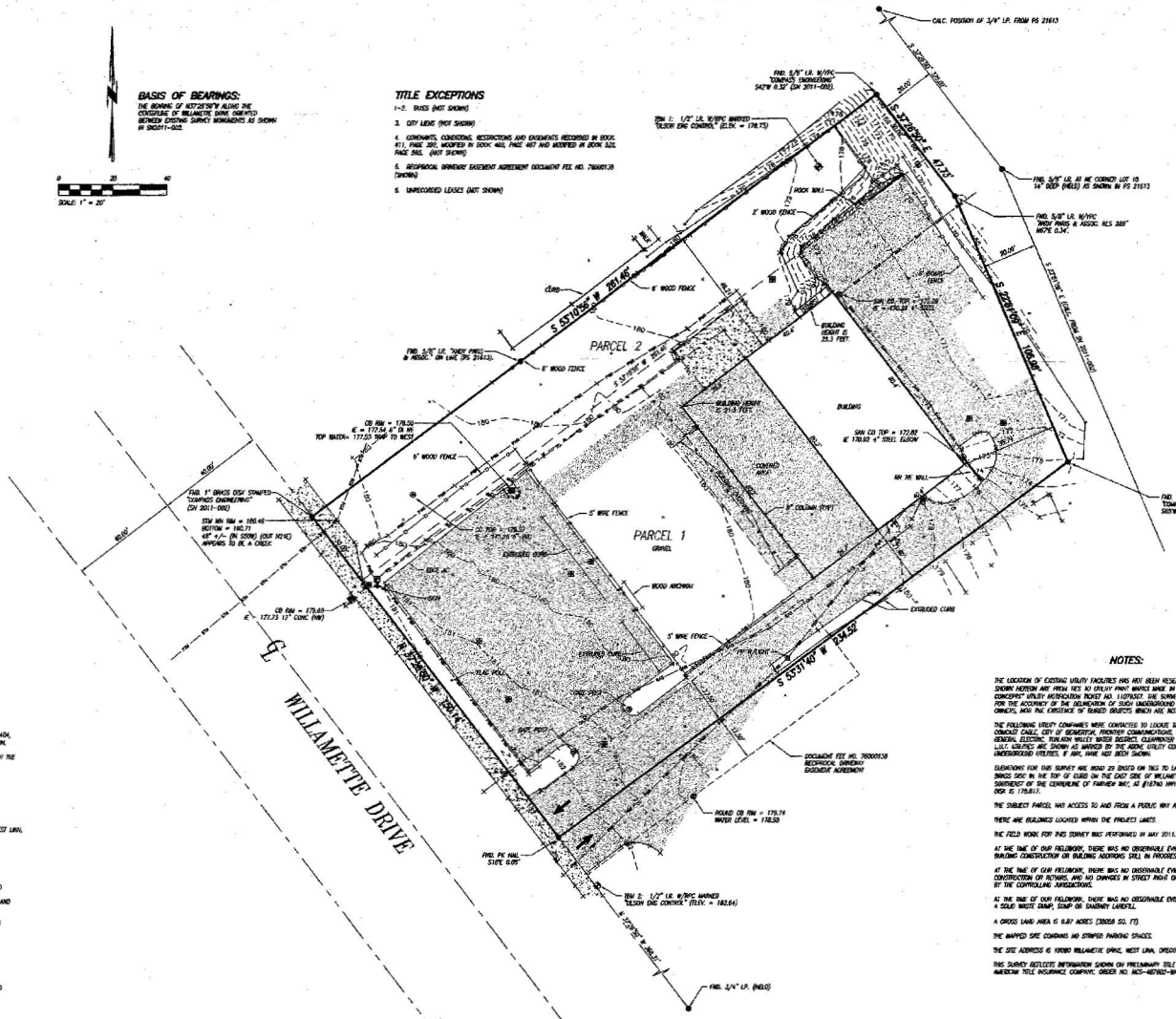
1-2. TAXES (NOT SHOWN)

3. CITY LIENS (NOT SHOWN)

4. COVENANTS, CONDITIONS, RESTRICTIONS AND EASEMENTS RECORDED IN BOOK 411, PAGE 389, MODIFIED IN BOOK 465, PAGE 487 AND MODIFIED IN BOOK 521, PAGE 595. (NOT SHOWN)

5. RECIPROCAL DRIVEWAY EASEMENT AGREEMENT DOCUMENT FEE NO. 7806013B (SHOWN)

6. UNRECORDED LEASES (NOT SHOWN)



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: 15 FEET

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

MINIMUM LOT COVERAGE: 50%

AVERAGE LOT DIMENSIONS: 50 FOOT WIDTH AND 80 FOOT DEPTH

NOTES:

THE LOCATION OF EXISTING UTILITY FACILITIES HAS NOT BEEN RESEARCHED. UNDERGROUND UTILITIES SHOWN HEREON ARE FROM SITE NO UTILITY MARKS MADE IN RESPONSE TO "ONE-CALL CONCERN" UTILITY NOTIFICATION TICKET NO. 11079307. 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 MAP.

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, CLEARWOOD SERVICES, WASHINGTON COUNTY U.S.T. UTILITIES ARE SHOWN AS MARKED BY THE ABOVE UTILITY COMPANIES, BASED ON SITE UNDERGROUND UTILITIES, IF ANY, WERE NOT BEEN SHOWN.

ELEVATIONS FOR THIS SURVEY WERE BASED ON TIES TO LAKE OSWEGO BENCHMARK 210-1, A BRASS DISC IN THE TOP OF CURB ON THE EAST SIDE OF WILLAMETTE DRIVE (HWY 43) 86 FEET SOUTHEAST OF THE CENTERLINE OF FAIRVIEW WAY, AT §187+01 HWY 43, WEST LINN. ELEVATION OF THE DISC IS 178.81.

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 (38058 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-467802-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/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 3, 4, 6, 8(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.

Blair

BRUCE TOWLE, PLS 2090 — DATE

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

REGISTERED PROFESSIONAL LAND SURVEYOR
OREGON
FEBRUARY 3, 1983
BRUCE D. TOWLE
2090
RENEWAL DATE: 6/30/12
Blair

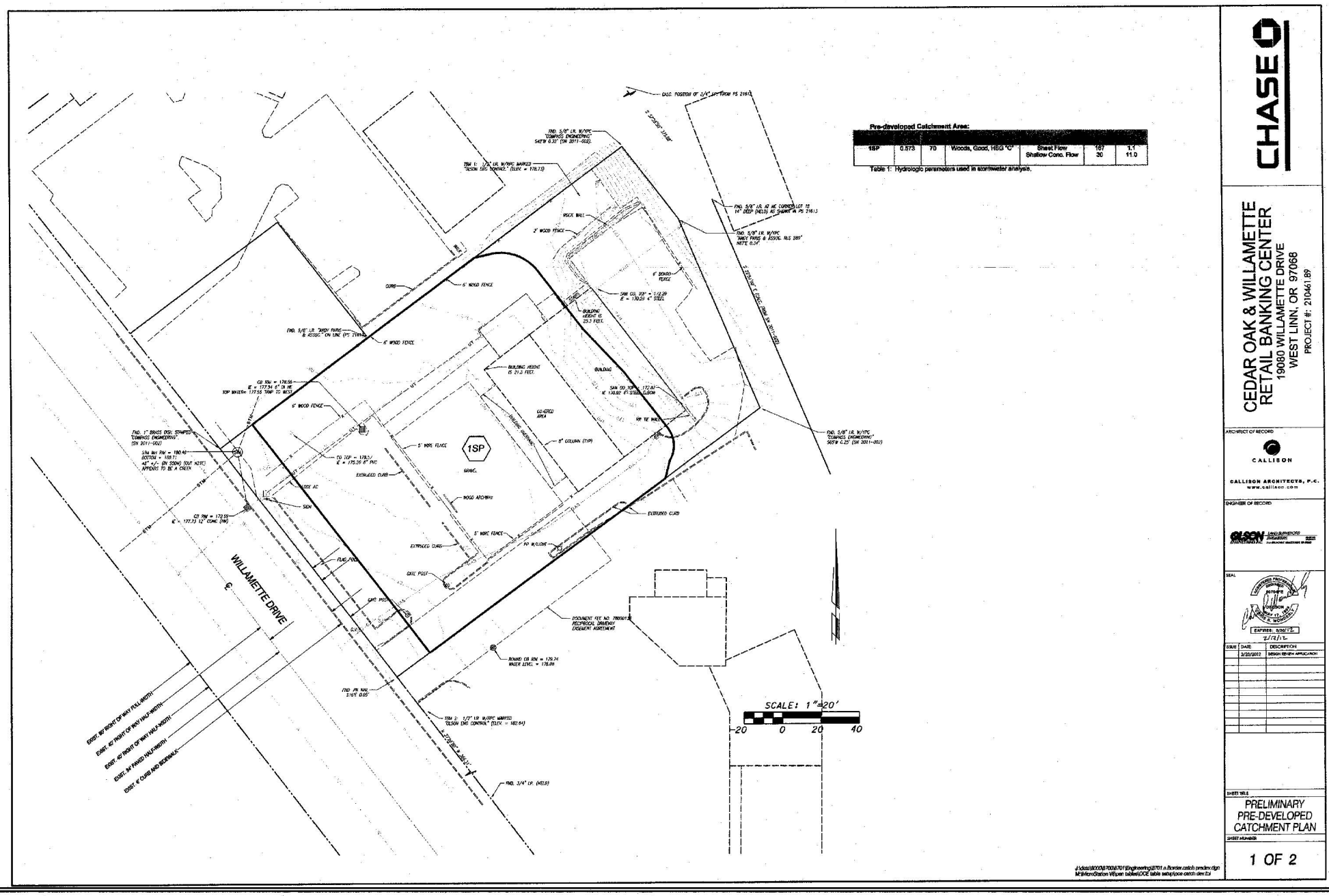
CHANGES / REVISIONS	
DESCRIPTION	DATE
ADDED PARCEL LINE	6/16/11
CERTIFICATION EDITS	8/22/11

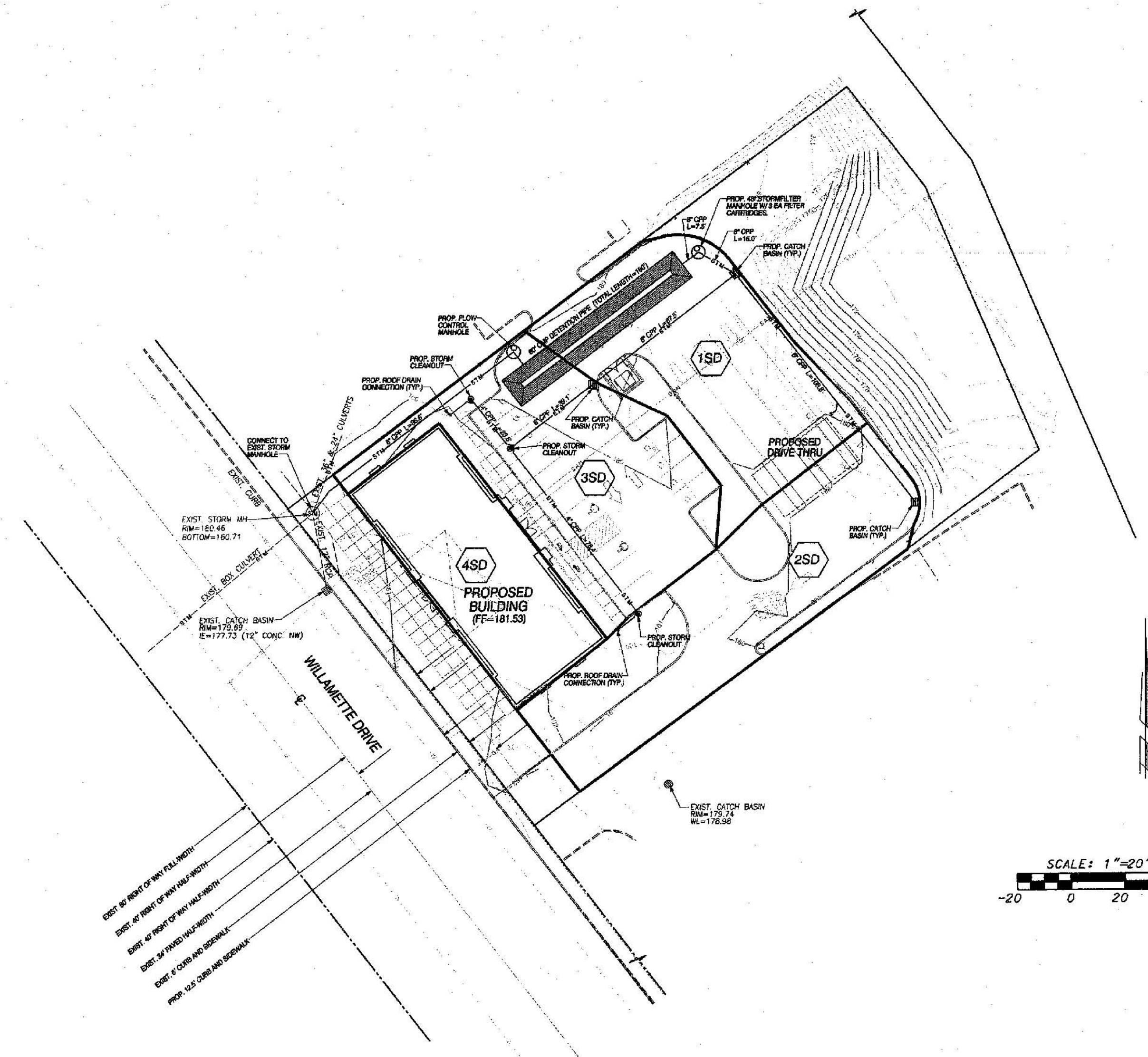
DESIGNED:
DRAWN: B.D.T.
CHECKED: B.D.T.
DATE: MAY 2011
SCALE: 1" = 20'

JOB NO. 8703.01.01

SHEET
1 of 1

FILE: J:\OLSON\JOBS\8700\8703\01\SURVEY\8701.ALTA.DWG


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.
1SP
WILLAMETTE DRIVE
SCALE: 1"=20'
-20 0 20 40
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
GILSON
SEAL
EXPIRES: 6/30/12
2/1/12
ISSUE | DATE | DESCRIPTION
3/23/2012 | DESIGN REVIEW APPLICATION
PRELIMINARY
PRE-DEVELOPED
CATCHMENT PLAN
1 OF 2



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.

SEAL

ISSUE	DATE	DESCRIPTION
	2/20/2012	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.

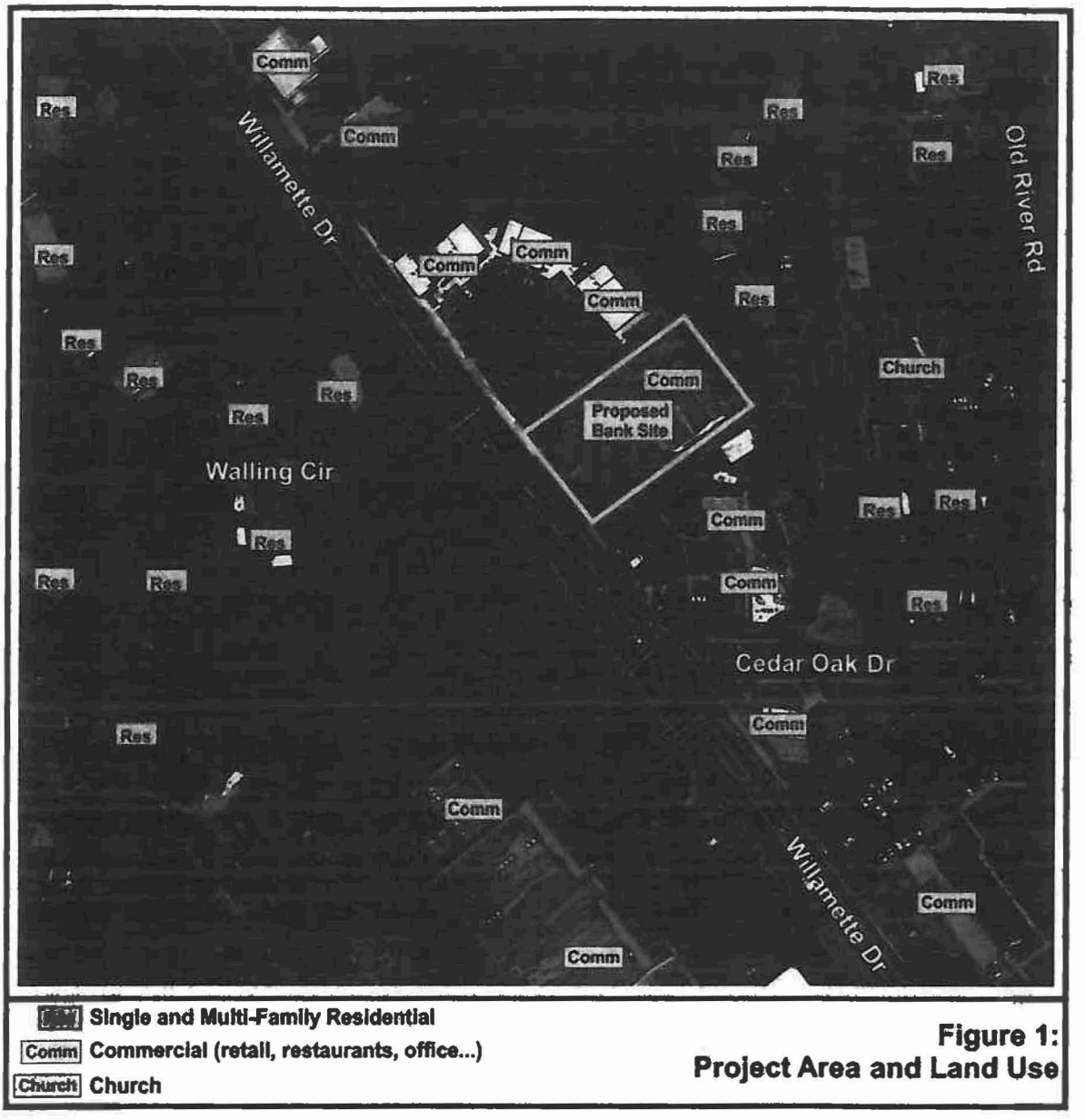


Figure 1: Project Area and Land Use

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

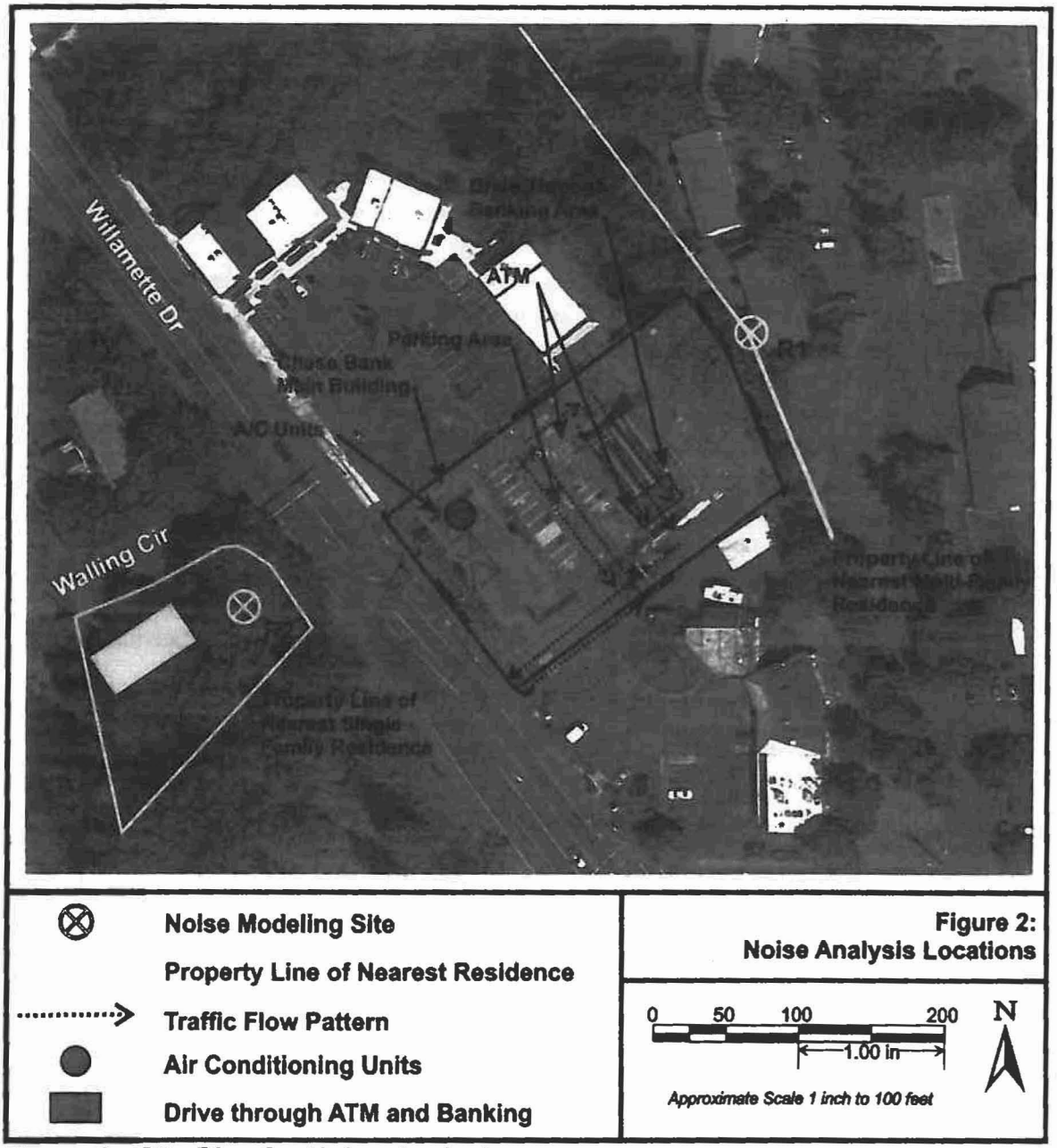


Figure 2: Site Plan for Noise Analysis

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

MAY 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.

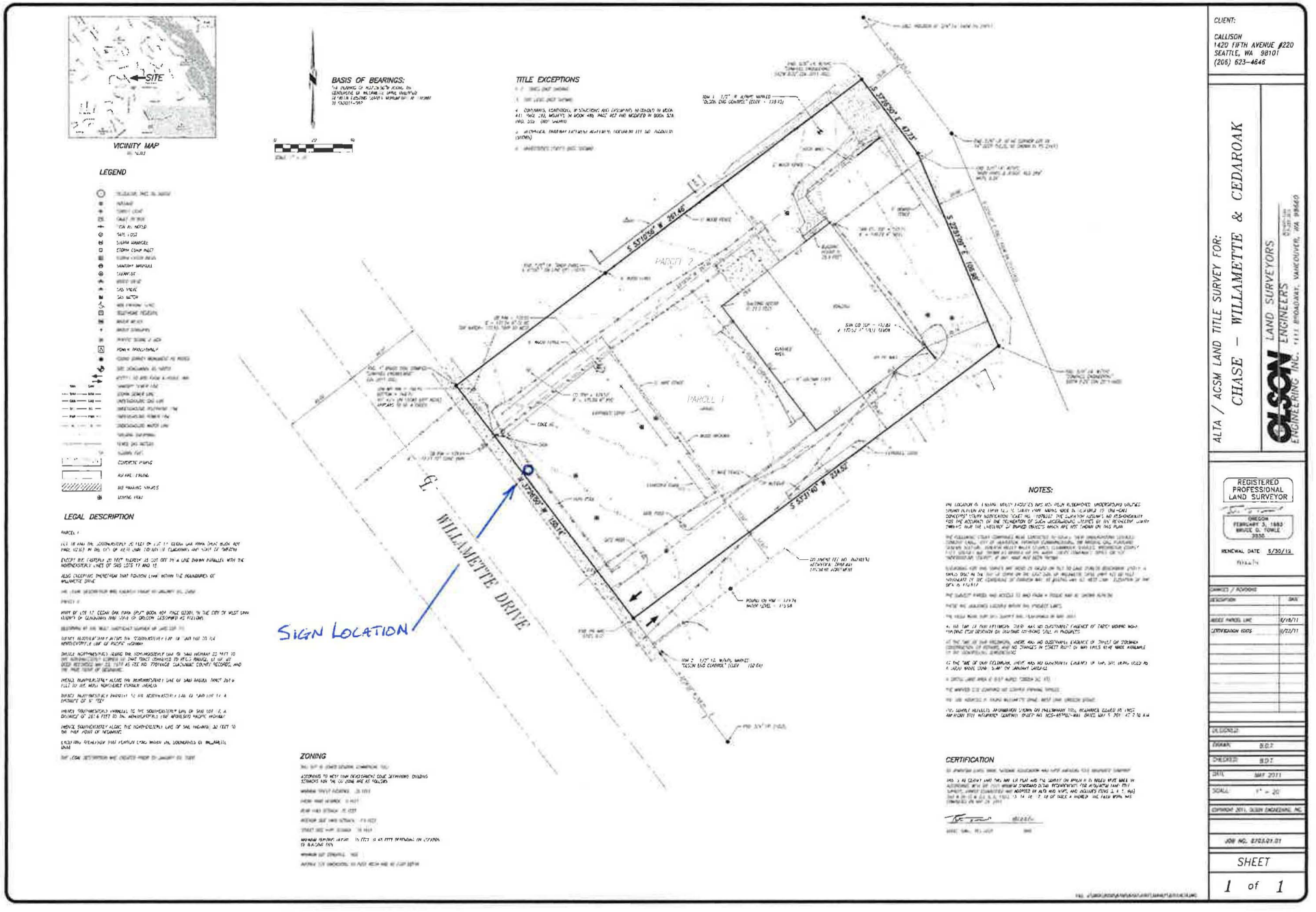
Signature

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.



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
1111 BROADWAY, VANCOUVER, WA 98660

REGISTERED PROFESSIONAL LAND SURVEYOR
OREGON
FEBRUARY 3, 1983
BRUCE D. TOWLE
2930
RENEWAL DATE 6/30/13

CHANGES / REVISIONS	
DESCRIPTION	DATE
ADDED PARCEL LINE	8/18/11
CERTIFICATION DATES	9/22/11

DESIGNED	
DRAWN	BDT
CHECKED	BDT
DATE	MAY 2011
SCALE	1" = 20'

JOB NO. 2702.01.01

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.

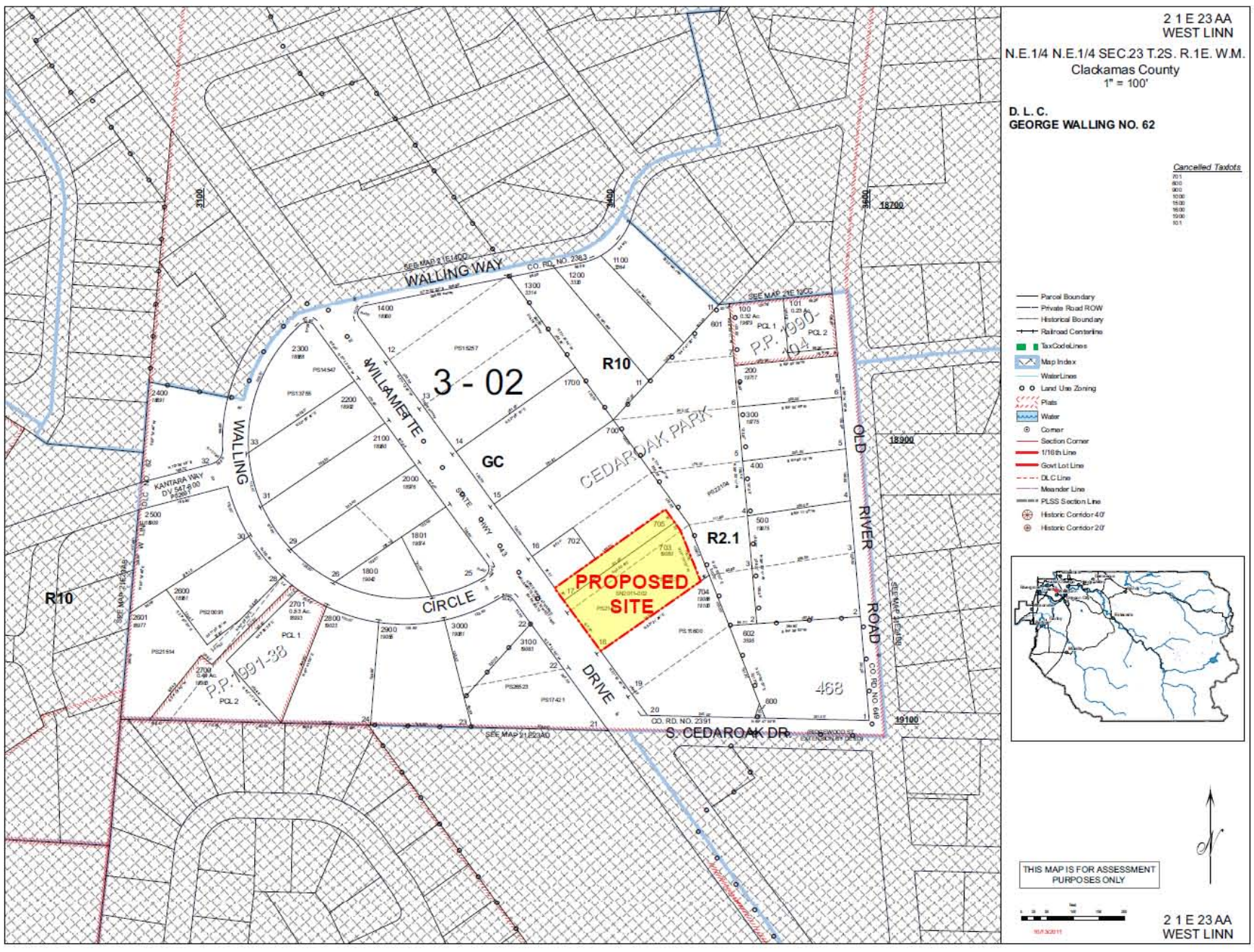
Applicant Representative: Hans Christiansen, Callison Architects, P.C. (206) 623-4646

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

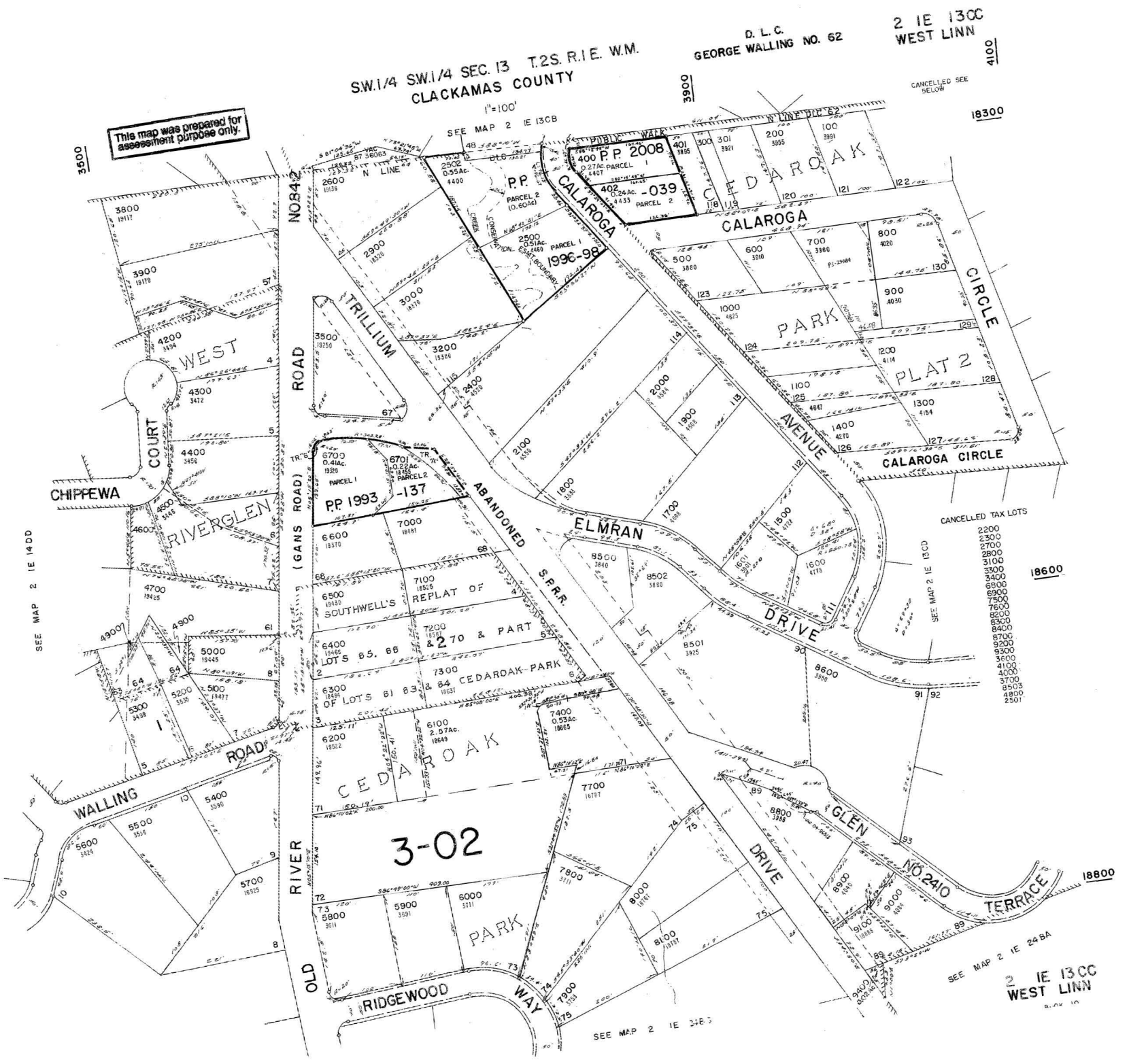
Subject Parcels

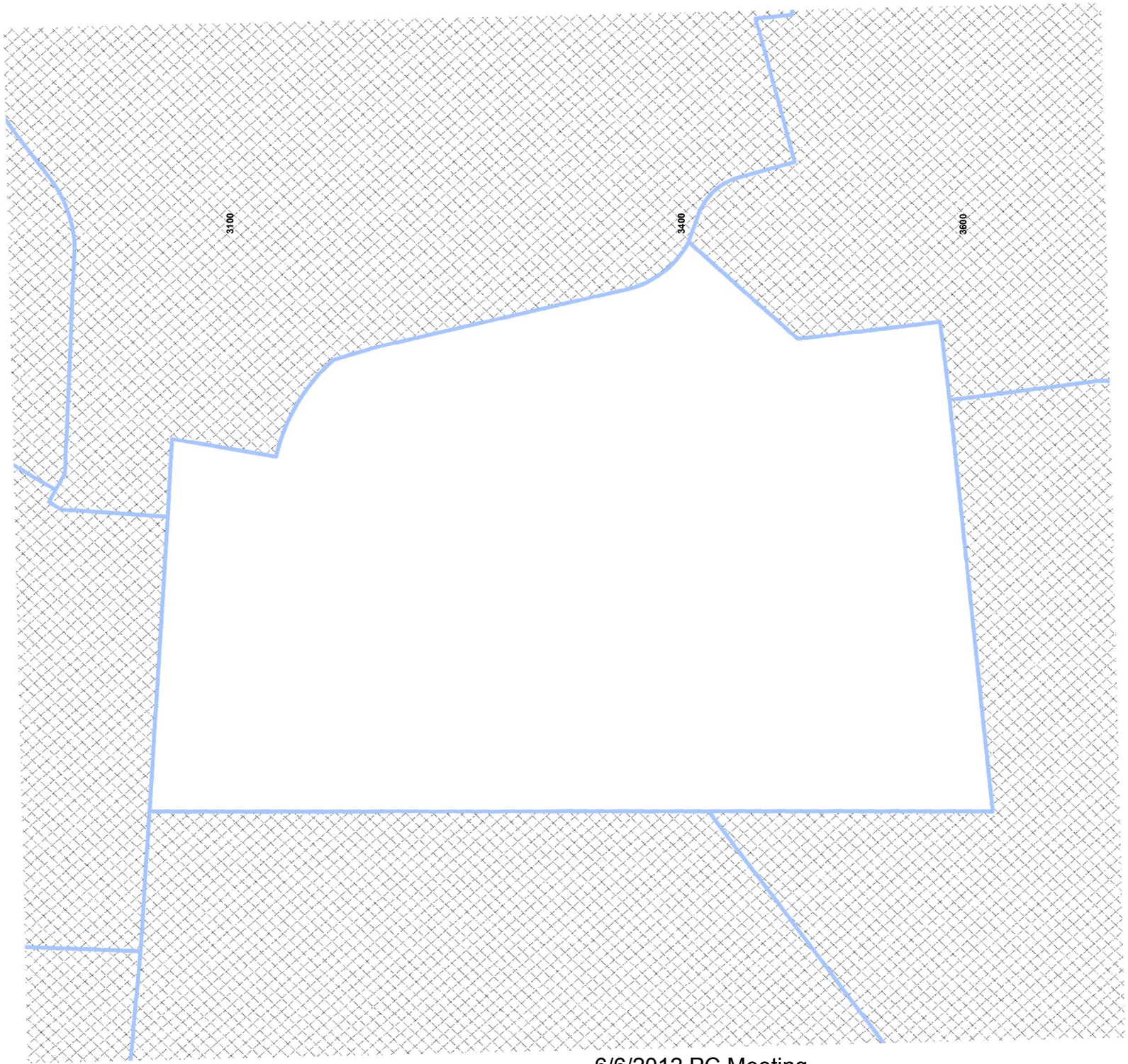
Notification Area

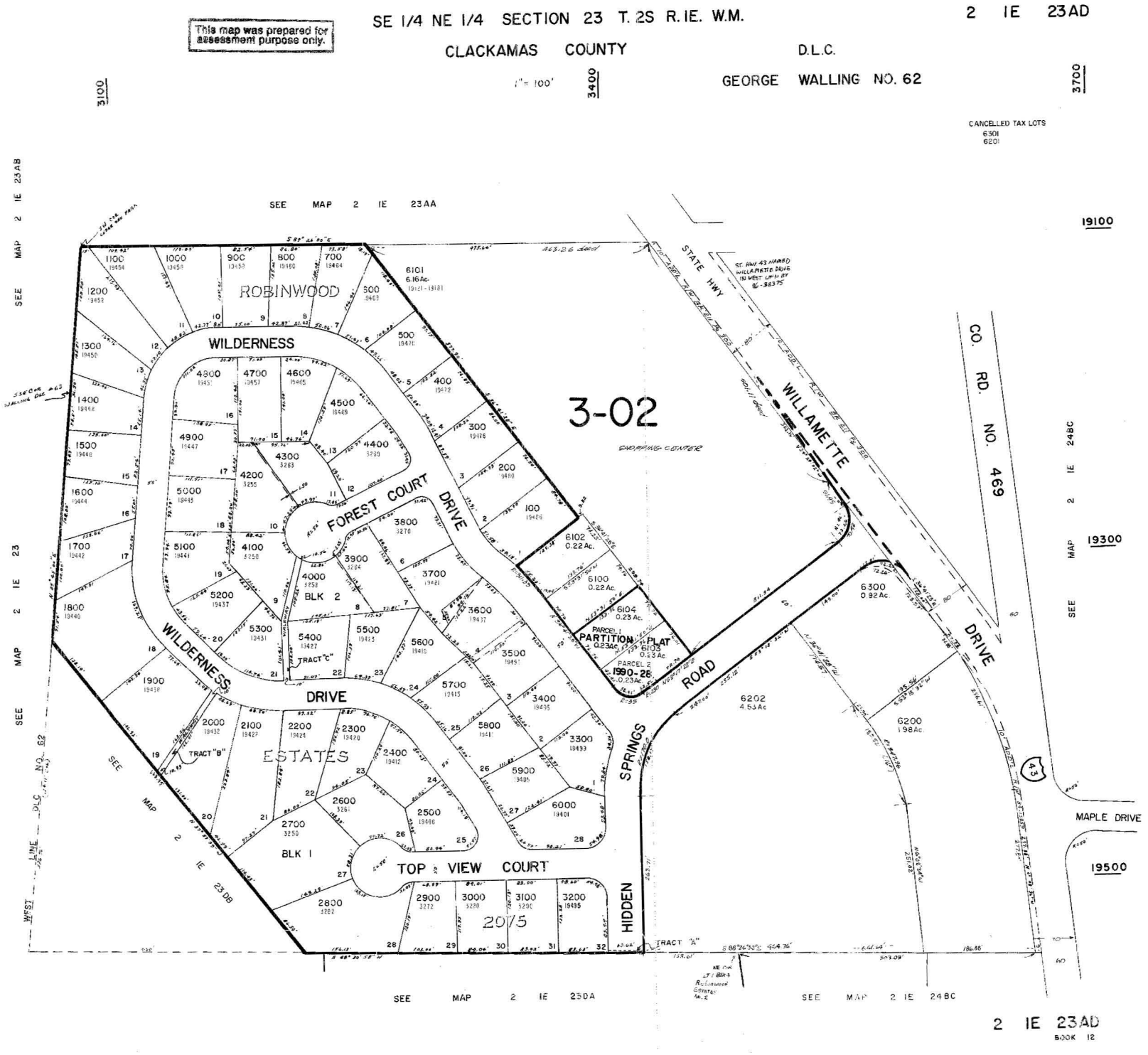
Radius

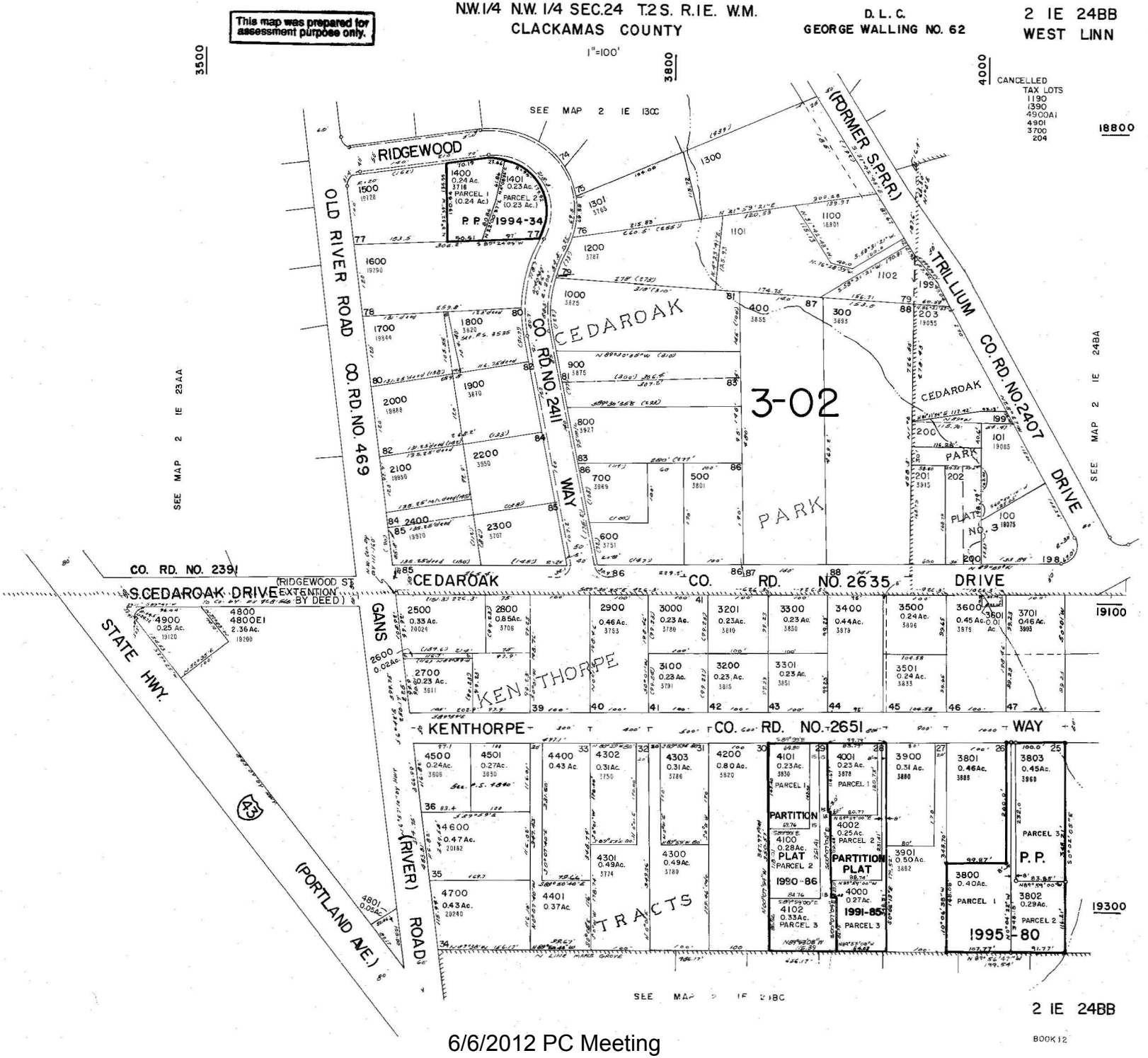
Taxlots

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
CANCELLED SEE BELOW
N LINE D.L.C. 62
PUBLIC WALK
P.P. 2008
0.27Ac. PARCEL 1
-039
0.24Ac. PARCEL 2
P.P. PARCEL 2 (0.60Ac)
CONSERVATION EASEMENT BOUNDARY
PARCEL 1
1996-98
CREEK
CEDAR OAK
CALAROGA
CIRCLE
PARK
PLAT 2
AVENUE
TRILLIUM
ROAD
NO84
WEST
COURT
CHIPPEWA
RIVERGLEN
ABANDONED
S.P.R.R.
ELMRAN
DRIVE
CALAROGA CIRCLE
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
P.P. 1993
-137
PARCEL 1
PARCEL 2
(GANS ROAD)
SOUTHWELL'S REPLAT OF
LOTS 65. 66 & 270 & PART
OF LOTS 61 63 & 64 CEDAROAK PARK
CEDAR OAK
3-02
PARK
RIVER
OLD
RIDGEWOOD
WAY
WALLING
ROAD
GLEN
NO.2410
TERRACE
SEE MAP 2 1E 24BA
2 1E 13CC
WEST LINN
SEE MAP 2 1E 14DD
SEE MAP 2 1E 13CD
SEE MAP 2 1E 24BD
3500
3900
4100
18300
18600
18800


3100
3400
3600


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
SEE MAP 2 IE 23AA
SEE MAP 2 IE 23AB
SEE MAP 2 IE 23
SEE MAP 2 IE 23DA
SEE MAP 2 IE 24BC
19100
19300
19500
ROBINWOOD
WILDERNESS
FOREST COURT
DRIVE
WILDERNESS DRIVE
ESTATES
TOP VIEW COURT
BLK 1
BLK 2
TRACT "B"
TRACT "C"
TRACT "A"
3-02
SHOPPING CENTER
STATE HWY
WILLAMETTE
CO. RD. NO. 469
PARTITION PLAT 1990-26
PARCEL 1
PARCEL 2
SPRINGS ROAD
HIDDEN
MAPLE DRIVE
2075
6101 6.16 Ac.
6102 0.22 Ac.
6103 0.23 Ac.
6104 0.23 Ac.
6202 4.53 Ac.
6200 1.98 Ac.
6300 0.92 Ac.
WEST LINE DLC NO. 62
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'
CANCELLED TAX LOTS 1190 1390 4900A1 4901 3700 204
SEE MAP 2 1E 13CC
RIDGEWOOD
OLD RIVER ROAD CO. RD. NO. 469
CO. RD. NO. 2411
WAY
CEDAROAK
PARK
3-02
TRILLIUM CO. RD. NO. 2407 DRIVE
(FORMER S.P.R.R.)
SEE MAP 2 1E 23AA
SEE MAP 2 1E 24BA
CO. RD. NO. 2391
S. CEDAROAK DRIVE
(RIDGEWOOD ST. EXTENTION BY DEED)
CO. RD. NO. 2635
DRIVE
GANS
KENTHORPE
CO. RD. NO. 2651
WAY
STATE HWY.
(43)
(PORTLAND AVE)
(RIVER) ROAD
TRACTS
PARTITION PLAT 1990-86
PARTITION PLAT 1991-85
P. P. 1994-34
P. P. 1995-80
PARCEL 1
PARCEL 2
PARCEL 3
18800
19100
19300
SEE MAP 2 1E 23BC
2 1E 24BB
BOOK 12

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.

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