

July 18, 2016

Mr. Justin Wood, P.E.
City Engineer
Rom 305, City Hall
Watertown, NY 13601

**Re: *Response to Comments for Site Plan Approval - 218 Stone Street
and 123 Massey Street South***

Dear Mr. Lumbis:

Bergmann Associates, on behalf of the applicant COR Arsenal Street Company, LLC, (COR) is submitting the following material and written responses to a Memorandum prepared by Michael Lumbis dated June 2, 2016 with respect to the Site Plan Approval - 218 Stone Street and 123 Massey Street South.

Submitted materials:

(3) Collated full scale copies and (20) 11 x 17 collated copies of the following are included:

1. C000 – Cover Sheet
2. 1- Site Plan and Property Survey Map
3. C080 – Demolition Plan
4. C100 – Site Plan
5. C110 – Utility Plan
6. C120 – Grading Plan
7. C130 – Landscaping Plan
8. C160 – Lighting Plan
9. C300 – Sanitary Profile Sheet
10. C500 – Sediment and erosion Control Details
11. C501 - Miscellaneous Details
12. C502 - Miscellaneous Details
13. C503 - Miscellaneous Details
14. FR-1 - Fire truck Access Plan
15. GP-1 – Garbage Truck Access Plan
16. Storm Water Pollution Prevention Plan (3 copies)
17. Check for \$50.00



Responses to specific comments are below:

1. The applicant shall provide a letter from St. Patrick's Parish authorizing the applicant to apply for Site Plan Approval on behalf of the Parish for all work to be performed on Parish property and which communicates the Parish's commitment to the proposed land swaps.
Response: Kate Johnson at COR submitted the letter during previous correspondence.
2. The applicant shall apply for Subdivision Approval at a future Planning Board meeting and, if granted approval, file deeds for the subsequent assemblages by way of metes and bounds descriptions with the County Clerk.
Response: The subdivision application is being submitted by Kate Johnson at COR under separate cover on or before July 19th deadline.
3. The applicant shall remove the three parking spaces shown north of the church from the plan and provide a 15-foot landscaped buffer between this section of the parking lot and Massey Street South.
Response: The three parking spaces have been removed as requested.
4. The applicant shall perform a traffic impact analysis that examines the proposed development's impact on surrounding streets and submit the analysis to the City Engineering Department and to NYSDOT.
Responses: The traffic Impact Analysis has been completed by Amy Dake at SRF and Associates and will be mailed to you under separate cover.
5. The applicant shall provide the City Engineering Department with a copy of NYSDOT's response to the traffic impact analysis, indicating NYSDOT's approval of the proposed project or their conclusion that a review was not necessary.
Response: Amy Dake at SRF will send the traffic Impact Analysis to NYSDOT for review. All correspondence with the NYSDOT will be shared with the City of Watertown.
6. The applicant shall provide a Vehicle and Pedestrian Circulation Plan that shows the movements of a delivery or refuse vehicle as well as a City fire truck.
Response: Drawings FP-1 and GP-1 have been provided in the plan set for review.
7. The applicant shall add traffic arrows to each existing and proposed driveway to indicate traffic flow.
Response: The arrows have been added to the Site Plan.
8. The applicant shall revise the north entrance into the site from Massey Street South to either a Right-in/Right-out, or Right-out only,
Response: The Traffic Impact Analysis has indicated a that sufficient gaps in traffic exist to allow for full access at all driveways.



9. The applicant shall address all SEQR issues identified above.
Response: All SEQR issues were addressed and a revised Long SEQR Form was handed out to the Planning Staff during the Planning Board Meeting on June 7, 2016.
10. The applicant shall revise the lighting plan to keep spillage onto adjacent properties below 0.5-foot candles.
Response: The plan has been revised and shows all spillage to be below 0.5 foot candles.
11. The applicant shall submit a copy of the Stormwater Pollution Prevention Plan (SWPPP) to the City Engineering Department.
Response: The SWPPP has been included in this submission.
12. The applicant shall provide the City Engineering Department with correspondence from the DEC that either approves the proposed sanitary sewer design or indicates that the DEC determined that a review was not necessary.
Response: Bergmann is currently working with David Rarick on the review of the sanitary sewer.
13. The applicant shall provide the City Engineering Department with correspondence from the DOH that either approves the proposed water system design or indicates that DOH determined that a review was not necessary.
Response: Bergmann is currently working with David Rarick on the review of the water system.
14. The applicant shall coordinate with the City Fire Department and the City Water Department to determine where to relocate the existing fire hydrant on Stone Street.
Response: The existing hydrant has been located to the west of the proposed Stone Street driveway.
15. The applicant shall perform a hydrant flow test and submit updated hydraulic calculations to the City Engineering Department.
Response: Hydrant flow test data has been added to the plans. We are currently working with the City Water Department on the water service design.
16. The applicant shall clarify the discrepancy regard the locations of the proposed drainage areas.
Response: The discrepancy has been revised.
17. The applicant must address all concerns listed in the "Other Engineering Comments" section of the June 2, 2016 Planning Office memorandum to the satisfaction of the City Engineering Department prior to the issuance of any permits.
Response: See responses to "Other Engineering Comments" below.



18. The applicant must obtain the following permits, minimally, prior to demolition and construction: Building Permit, Fence Permit and General City Permit and a Sanitary/Storm Sewer Connection Permit.

Response: Applicant understands the permit process.

Other Engineering Comments

1. The applicant must use a minimum of 8-inch PVC piping for all sewer mains. The City considers a sewer main to be anything after a manhole and/or where more than one lateral combines. In addition, water services shall include a shutoff at the street margin.
Response: The plan has been revised to show 8" pvc piping for sewer mains and all water services have a valve at the street margin.
2. The applicant should coordinate with the Fire Department for the installation of Knox Boxes where required.
Response: The applicant will coordinate with the fire department during the building design phase.
3. The applicant must construct all existing and proposed curb ramps and sidewalks within the City Margin fronting the properties to meet the requirements of Public Right of Way Accessibility Guidelines (PROWAG).
Response: All sidewalk and curb ramps will meet PROWAG guidelines.
4. The applicant should submit a Notice of Intent (NOI) to the DEC and forward the DEC's acknowledgement letter to the City upon receipt.
Response: An NOI will be submitted.
5. The applicant should submit cutsheets on the proposed water quality units, as well as a maintenance schedule and an agreement for the upkeep of the water quality unit and underground Stormwater detention systems, to the City prior to the issuance of a Building Permit.
Response: The cut sheet for the water quality unit has beaded to sheet C500. The cut sheets for the underground storm water detention system are located in the SWPPP.
6. The applicant should add a note to the plans stating that existing laterals that are to be abandoned shall be capped and anchored.
Response: Utility Note #15 on sheet C110 has been added to indicate laterals to be abandoned shall be capped and anchored.
7. The applicant only depicts two proposed snow storage areas on the site. This is insufficient to accommodate major snowfalls on a site of this size. The applicant should clarify how snow removal procedures and snow storage will be sufficient to keep the entire site clear in the winter months.
Response: Excessive snow which can't be stored on site in the areas indicated will be removed from the site.



8. The applicant should add the following details to the plans:

- Sanitary sewer manhole connection detail
- Storm sewer manhole connection detail
- City sidewalk replacement detail
- City asphalt road replacement detail
- City road with concrete base replacement detail (for Arsenal Street and Stone Street)

Response: These details were added to the plans.

Please feel free to contact me if you have any questions or concerns regarding the above responses or attached materials.

Sincerely,
Bergmann Associates

Andrew M. Hart, RLA, ASLA
Regional Business Segment Manager

Cc; Kate Johnson COR



our **people** and our **passion** in every **project**



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CITY OF WATERTOWN SITE PLAN APPLICATION

** Provide responses for all sections. INCOMPLETE APPLICATIONS WILL NOT BE PROCESSED. Failure to submit required information by the submittal deadline will result in **not** making the agenda for the upcoming Planning Board meeting.

PROPERTY LOCATION

Proposed Project Name: Mercy Heights

Tax Parcel Number: 10-02-101, 10-02-116, and 10-02-118

Property Address: 218 Stone St., 271 Arsenal St., 123 Massey St., and 253 Arsenal St.

Existing Zoning Classification: Commercial

OWNER OF PROPERTY

Name: COR Arsenal Street Company LLC

Address: 540 Towne Drive
Fayetteville, NY 13066

Telephone Number: 315-663-2100

Fax Number: 315-663-2107

APPLICANT

Name: COR Arsenal Street Company LLC

Address: 540 Towne Drive
Fayetteville, NY 13066

Telephone Number: 315-663-2100

Fax Number: 315-663-2107

Email Address: cjohnson@corcompanies.com

ENGINEER/ARCHITECT/SURVEYOR

Name: Bergmann Associates

Address: 28 East Main St., 200 First Federal Plaza
Rochester, NY 14614

Telephone Number: 585-232-5135

Fax Number: 585-232-4652

Email Address: ahart@bergmannpc.com

OPTIONAL MATERIALS:

- PROVIDE AN ELECTRONIC (.DWG) COPY OF THE SITE PLAN WITH AS-BUILT REVISIONS. This will assist the City in keeping our GIS mapping up-to-date.**

REQUIRED MATERIALS:

** The following drawings with the listed information **ARE REQUIRED, NOT OPTIONAL**. If the required information is not included and/or addressed, the Site Plan Application will **not** be processed.

- COMPLETED ENVIRONMENTAL ASSESSMENT FORM** (Contact us if you need help choosing between the Short EAF and the Full EAF). The Complete EAF is available online at: <http://www.dec.ny.gov/permits/6191.html>
- ELECTRONIC COPY OF ENTIRE SUBMISSION (PDF)** A single, combined PDF of the entire application, including cover letter, plans, reports, and all submitted material.
- BOUNDARY and TOPOGRAPHIC SURVEY**
(Depict existing features as of the date of the Site Plan Application. This Survey and Map must be performed and created by a Professional Land Surveyor licensed and currently registered to practice in the State of New York. This Survey and Map must be stamped and signed with an original seal and signature on at least one copy, the rest may be copies thereof.
- All elevations are National Geodetic Vertical Datum of 1929 (NGVD29).
- 1' contours are shown and labeled with appropriate spot elevations.
- All existing features on and within 50 feet of the subject property are shown and labeled.
- All existing utilities on and within 50 feet of the subject property are shown and labeled.
- All existing easements and/or right-of-ways are shown and labeled.
- Existing property lines (bearings and distances), margins, acreage, zoning, existing land use, reputed owner, adjacent reputed owners and tax parcel numbers are shown and labeled.
- The north arrow and graphic scale are shown.

DEMOLITION PLAN (If Applicable)

- All existing features on and within 50 feet of the subject property are shown and labeled.
- All items to be removed are labeled in darker text.

SITE PLAN

- Include a reference to the coordinate system used(NYS NAD83-CF preferred).
- All proposed above ground features are depicted and clearly labeled.
- All proposed features are clearly labeled “proposed”.
- All proposed easements and right-of-ways are shown and labeled.
- Land use, zoning, and tax parcel number are shown.
- The Plan is adequately dimensioned including radii.
- The line work and text for all proposed features is shown darker than existing features.
- All vehicular and pedestrian traffic circulation is shown including a delivery or refuse vehicle entering and exiting the property.
- Proposed parking and loading spaces including ADA accessible spaces are shown and labeled.
- Sidewalks within the City Right-of-Way meet Public-Right-of-Way (PROWAG) standards.
- Refuse Enclosure Area (Dumpster), if applicable, is shown. Section 161-19.1 of the Zoning Ordinance states, “No refuse vehicle or refuse container shall be parked or placed within 15 feet of a party line without the written consent of the adjoining owner, if the owner occupies any part of the adjoining property”.
- Proposed snow storage areas are shown on the plans.
- The north arrow and graphic scale are shown.

GRADING PLAN

- All proposed below ground features including elevations and inverts are shown and labeled.
- All proposed above ground features are shown and labeled.

- The line work and text for all proposed features is shown darker than existing features.
- All proposed easements and right-of-ways are shown and labeled.
- 1' existing contours are shown dashed and labeled with appropriate spot elevations.
- 1' proposed contours are shown and labeled with appropriate spot elevations.
- All elevations are North American Vertical Datum of 1988 (NAVD88).
- Sediment and Erosion control are shown and labeled on the grading plan unless separate drawings have been provided as part of a Stormwater Pollution Prevention Plan (SWPPP).

UTILITY PLAN

- All proposed above and below ground features are shown and labeled.
- All existing above and below ground utilities including sanitary, storm water, water, electric, gas, telephone, cable, fiber optic, etc. are shown and labeled.
- All proposed easements and right-of-ways are shown and labeled.
- The Plan is adequately dimensioned including radii.
- The line work and text for all proposed features is shown darker than existing features.
- The following note has been added to the drawings stating, "All water main and service work must be coordinated with the City of Watertown Water Department. The Water Department requirements supersede all other plans and specifications provided."

LANDSCAPING PLAN

- All proposed above ground features are shown and labeled.
- All proposed trees, shrubs, and other plantings are shown and labeled.
- All proposed landscaping and text are shown darker than existing features.
- All proposed landscaping is clearly depicted, labeled and keyed to a plant schedule that includes the scientific name, common name, size, quantity, etc.

For additional landscaping requirements where nonresidential districts and land uses abut land in any residential district, please refer to Section 310-59, Landscaping of the City's Zoning Ordinance.

Site Plan complies with and meets acceptable guidelines set forth in Appendix A - Landscaping and Buffer Zone Guidelines (August 7, 2007).

PHOTOMETRIC PLAN (If Applicable)

All proposed above ground features are shown.

Photometric spot elevations or labeled photometric contours of the property are clearly depicted. Light spillage across all property lines shall not exceed 0.5 foot-candles.

CONSTRUCTION DETAILS and NOTES

All details and notes necessary to adequately complete the project including, but not limited to, landscaping, curbing, catch basins, manholes, water line, pavement, sidewalks, trench, lighting, trash enclosure, etc. are provided.

Maintenance and protection and traffic plans and notes for all required work within City streets including driveways, water laterals, sanitary laterals, storm connections, etc. are provided.

The following note must be added to the drawings stating:
"All work to be performed within the City of Watertown margin will require sign-off from a Professional Engineer, licensed and currently registered to practice in the State of New York, that the work was built according to the approved site plan and applicable City of Watertown standards. Compaction testing will be required for all work to be performed within the City of Watertown margin and must be submitted to the City of Watertown Codes Department."

PRELIMINARY ARCHITECTURAL PLANS (If Applicable)

Floor plan drawings, including finished floor elevations, for all buildings to be constructed are provided.

Exterior elevations including exterior materials and colors for all buildings to be constructed are provided.

Roof outline depicting shape, slope and direction is provided.

ENGINEERING REPORT

**** The engineering report at a minimum includes the following:**

- Project location
- Project description
- Existing and proposed sanitary sewer flows and summary
- Water flows and pressure
- Storm Water Pre and Post Construction calculations and summary
- Traffic impacts
- Lighting summary
- Landscaping summary

GENERAL INFORMATION

ALL ITEMS ARE STAMPED AND SIGNED WITH AN ORIGINAL SIGNATURE BY A PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR SURVEYOR LICENSED AND CURRENTLY REGISTERED TO PRACTICE IN THE STATE OF NEW YORK.

If required, a copy of the Stormwater Pollution Prevention Plan (SWPPP) submitted to the NYSDEC will also be sent to the City of Watertown Engineering Department.

** If required, a copy of all submittals sent to the New York State Department of Environmental Conservation (NYSDEC) for the sanitary sewer extension permit will also be sent to the City of Watertown Engineering Department.

** If required, a copy of all submittals sent to the New York State Department of Health (NYSDOH) will also be sent to the City of Watertown Engineering Department.

** When NYSDEC or NYSDOH permitting is required, the property owner/applicant shall retain a licensed Professional Engineer to perform inspections of the proposed utility work and to certify the completed works were constructed in substantial conformance with the approved plans and specifications.

Signage will not be approved as part of this submission. It requires a sign permit from the City Code Enforcement Bureau. See Section 310-52.2 of the Zoning Ordinance.

Plans have been collated and properly folded.

- If an applicant proposes a site plan with multiple buildings and any of those buildings front on a private drive, the City Council will name the private drive by resolution and the building(s) will be given an address number on that private drive by City staff. The applicant may propose a name for the private drive for the City Council's consideration.

Proposed Street Name: _____

- For non-residential uses, the proposed Hours of Operation shall be indicated.
- Signature Authorization form or letter signed by the owner is submitted allowing the applicant to apply on behalf of the owner if the applicant is not the property owner.
- Explanation for any item not checked in the Site Plan Checklist.

SWPPP to follow.

Full Environmental Assessment Form
Part 1 - Project and Setting

Instructions for Completing Part 1

Part 1 is to be completed by the applicant or project sponsor. Responses become part of the application for approval or funding, are subject to public review, and may be subject to further verification.

Complete Part 1 based on information currently available. If additional research or investigation would be needed to fully respond to any item, please answer as thoroughly as possible based on current information; indicate whether missing information does not exist, or is not reasonably available to the sponsor; and, when possible, generally describe work or studies which would be necessary to update or fully develop that information.

Applicants/sponsors must complete all items in Sections A & B. In Sections C, D & E, most items contain an initial question that must be answered either "Yes" or "No". If the answer to the initial question is "Yes", complete the sub-questions that follow. If the answer to the initial question is "No", proceed to the next question. Section F allows the project sponsor to identify and attach any additional information. Section G requires the name and signature of the project sponsor to verify that the information contained in Part 1 is accurate and complete.

A. Project and Sponsor Information.

Name of Action or Project: Mercy Heights		
Project Location (describe, and attach a general location map): Former Mercy Hospital site		
Brief Description of Proposed Action (include purpose or need): The applicant would like to construct a multi-use development on the former Mercy Hospital site. The project will consist of three multi-family residential buildings of 35,402 SF each, a 5,600 SF community center building, and two office buildings of 18,000 SF each. The applicant will also provide site improvements to St. Patrick's Church parcel to consolidate their parcel and re-organize their parking. 3 Multi-family residential buildings = 109,206 SF and 108 units 1 Community center building = 5,600 SF 2 Office buildings = 36,000 SF		
Name of Applicant/Sponsor: COR Arsenal Street Company LLC		Telephone: 315-663-2100
		E-Mail: cjohnson@corcompanies.com
Address: 540 Towne Drive		
City/PO: Fayetteville	State: NY	Zip Code: 13066
Project Contact (if not same as sponsor; give name and title/role):		Telephone:
		E-Mail:
Address:		
City/PO:	State:	Zip Code:
Property Owner (if not same as sponsor): COR Arsenal Street Company LLC		Telephone:
		E-Mail:
Address: 540 Towne Drive		
City/PO: Fayetteville	State: NY	Zip Code: 13066

B. Government Approvals

B. Government Approvals, Funding, or Sponsorship. ("Funding" includes grants, loans, tax relief, and any other forms of financial assistance.)

Government Entity	If Yes: Identify Agency and Approval(s) Required	Application Date (Actual or projected)
a. City Council, Town Board, or Village Board of Trustees <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Site Plan approval	
b. City, Town or Village Planning Board or Commission <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Site Plan recommendation to City Council	
c. City Council, Town or Village Zoning Board of Appeals <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Variances to reduce front building setback along Arsenal St., S. Massey St., and Stone St.	
d. Other local agencies <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	City water	
e. County agencies <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Jefferson County Planning, DANC (Funding)	
f. Regional agencies <input type="checkbox"/> Yes <input type="checkbox"/> No		
g. State agencies <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	NYS Dept. of Health, (Water), NYSDOT (Traffic)	NYSDEC (Sanitary and Storm Sewers)
h. Federal agencies <input type="checkbox"/> Yes <input type="checkbox"/> No		
i. Coastal Resources. <ul style="list-style-type: none"> i. Is the project site within a Coastal Area, or the waterfront area of a Designated Inland Waterway? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No ii. Is the project site located in a community with an approved Local Waterfront Revitalization Program? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No iii. Is the project site within a Coastal Erosion Hazard Area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No 		

C. Planning and Zoning

C.1. Planning and zoning actions.

Will administrative or legislative adoption, or amendment of a plan, local law, ordinance, rule or regulation be the only approval(s) which must be granted to enable the proposed action to proceed? Yes No

- If Yes, complete sections C, F and G.
- If No, proceed to question C.2 and complete all remaining sections and questions in Part 1

C.2. Adopted land use plans.

a. Do any municipally- adopted (city, town, village or county) comprehensive land use plan(s) include the site where the proposed action would be located? Yes No

If Yes, does the comprehensive plan include specific recommendations for the site where the proposed action would be located? Yes No

b. Is the site of the proposed action within any local or regional special planning district (for example: Greenway Brownfield Opportunity Area (BOA); designated State or Federal heritage area; watershed management plan; or other?) Yes No

If Yes, identify the plan(s):

c. Is the proposed action located wholly or partially within an area listed in an adopted municipal open space plan, or an adopted municipal farmland protection plan? Yes No

If Yes, identify the plan(s):

C.3. Zoning

a. Is the site of the proposed action located in a municipality with an adopted zoning law or ordinance. Yes No
 If Yes, what is the zoning classification(s) including any applicable overlay district?
Commercial

b. Is the use permitted or allowed by a special or conditional use permit? Yes No

c. Is a zoning change requested as part of the proposed action? Yes No
 If Yes,
 i. What is the proposed new zoning for the site? _____

C.4. Existing community services.

a. In what school district is the project site located? Watertown City School District

b. What police or other public protection forces serve the project site?
City of Watertown Police Department

c. Which fire protection and emergency medical services serve the project site?
City of Watertown Fire Department

d. What parks serve the project site?
Thompson Park, Jefferson County Fairgrounds, Veterans Memorial Riverwalk, and Whitewater Park

D. Project Details

D.1. Proposed and Potential Development

a. What is the general nature of the proposed action (e.g., residential, industrial, commercial, recreational; if mixed, include all components)? Multi-family residential and office

b. a. Total acreage of the site of the proposed action? _____ 7.498 acres
 b. Total acreage to be physically disturbed? _____ 6.75 acres
 c. Total acreage (project site and any contiguous properties) owned or controlled by the applicant or project sponsor? _____ 7.498 acres

c. Is the proposed action an expansion of an existing project or use? Yes No
 i. If Yes, what is the approximate percentage of the proposed expansion and identify the units (e.g., acres, miles, housing units, square feet)? % _____ Units: _____

d. Is the proposed action a subdivision, or does it include a subdivision? Yes No
 If Yes,
 i. Purpose or type of subdivision? (e.g., residential, industrial, commercial; if mixed, specify types)
To consolidate two COR parcels and reconfigure church parcel.
 ii. Is a cluster/conservation layout proposed? Yes No
 iii. Number of lots proposed? 2
 iv. Minimum and maximum proposed lot sizes? Minimum 1.791 Maximum 5.707

e. Will proposed action be constructed in multiple phases? Yes No
 i. If No, anticipated period of construction: _____ 18-24 months
 ii. If Yes:
 • Total number of phases anticipated _____
 • Anticipated commencement date of phase 1 (including demolition) _____ month _____ year
 • Anticipated completion date of final phase _____ month _____ year
 • Generally describe connections or relationships among phases, including any contingencies where progress of one phase may determine timing or duration of future phases: _____

f. Does the project include new residential uses? Yes No

If Yes, show numbers of units proposed.

	<u>One Family</u>	<u>Two Family</u>	<u>Three Family</u>	<u>Multiple Family (four or more)</u>
Initial Phase	_____	_____	_____	108
At completion of all phases	_____	_____	_____	108

g. Does the proposed action include new non-residential construction (including expansions)? Yes No

If Yes,

- i. Total number of structures 2
- ii. Dimensions (in feet) of largest proposed structure: 40 height; 69 width; and 193 length
- iii. Approximate extent of building space to be heated or cooled: 36,000 square feet

h. Does the proposed action include construction or other activities that will result in the impoundment of any liquids, such as creation of a water supply, reservoir, pond, lake, waste lagoon or other storage? Yes No

If Yes,

- i. Purpose of the impoundment: _____
- ii. If a water impoundment, the principal source of the water: Ground water Surface water streams Other specify: _____
- iii. If other than water, identify the type of impounded/contained liquids and their source. _____

- iv. Approximate size of the proposed impoundment. Volume: _____ million gallons; surface area: _____ acres
- v. Dimensions of the proposed dam or impounding structure: _____ height; _____ length
- vi. Construction method/materials for the proposed dam or impounding structure (e.g., earth fill, rock, wood, concrete): _____

D.2. Project Operations

a. Does the proposed action include any excavation, mining, or dredging, during construction, operations, or both? (Not including general site preparation, grading or installation of utilities or foundations where all excavated materials will remain onsite) Yes No

If Yes:

- i. What is the purpose of the excavation or dredging? _____
- ii. How much material (including rock, earth, sediments, etc.) is proposed to be removed from the site?
 - Volume (specify tons or cubic yards): _____
 - Over what duration of time? _____
- iii. Describe nature and characteristics of materials to be excavated or dredged, and plans to use, manage or dispose of them. _____

iv. Will there be onsite dewatering or processing of excavated materials? Yes No
If yes, describe. _____

v. What is the total area to be dredged or excavated? _____ acres

vi. What is the maximum area to be worked at any one time? _____ acres

vii. What would be the maximum depth of excavation or dredging? _____ feet

viii. Will the excavation require blasting? Yes No

ix. Summarize site reclamation goals and plan: _____

b. Would the proposed action cause or result in alteration of, increase or decrease in size of, or encroachment into any existing wetland, waterbody, shoreline, beach or adjacent area? Yes No

If Yes:

i. Identify the wetland or waterbody which would be affected (by name, water index number, wetland map number or geographic description): _____

ii. Describe how the proposed action would affect that waterbody or wetland, e.g. excavation, fill, placement of structures, or alteration of channels, banks and shorelines. Indicate extent of activities, alterations and additions in square feet or acres:

iii. Will proposed action cause or result in disturbance to bottom sediments? Yes No

If Yes, describe: _____

iv. Will proposed action cause or result in the destruction or removal of aquatic vegetation? Yes No

If Yes:

- acres of aquatic vegetation proposed to be removed: _____
- expected acreage of aquatic vegetation remaining after project completion: _____
- purpose of proposed removal (e.g. beach clearing, invasive species control, boat access): _____

- proposed method of plant removal: _____
- if chemical/herbicide treatment will be used, specify product(s): _____

v. Describe any proposed reclamation/mitigation following disturbance: _____

c. Will the proposed action use, or create a new demand for water? Yes No

If Yes:

i. Total anticipated water usage/demand per day: _____ 15,880 gallons/day

ii. Will the proposed action obtain water from an existing public water supply? Yes No

If Yes:

- Name of district or service area: _____
- Does the existing public water supply have capacity to serve the proposal? Yes No
- Is the project site in the existing district? Yes No
- Is expansion of the district needed? Yes No
- Do existing lines serve the project site? Yes No

iii. Will line extension within an existing district be necessary to supply the project? Yes No

If Yes:

• Describe extensions or capacity expansions proposed to serve this project: _____

• Source(s) of supply for the district: City of Watertown

iv. Is a new water supply district or service area proposed to be formed to serve the project site? Yes No

If Yes:

- Applicant/sponsor for new district: _____
- Date application submitted or anticipated: _____
- Proposed source(s) of supply for new district: _____

v. If a public water supply will not be used, describe plans to provide water supply for the project: _____

vi. If water supply will be from wells (public or private), maximum pumping capacity: _____ gallons/minute.

d. Will the proposed action generate liquid wastes? Yes No

If Yes:

i. Total anticipated liquid waste generation per day: _____ 15,880 gallons/day

ii. Nature of liquid wastes to be generated (e.g., sanitary wastewater, industrial; if combination, describe all components and approximate volumes or proportions of each): sanitary wastewater

iii. Will the proposed action use any existing public wastewater treatment facilities? Yes No

If Yes:

- Name of wastewater treatment plant to be used: Watertown Pollution Control Plant
- Name of district: _____
- Does the existing wastewater treatment plant have capacity to serve the project? Yes No
- Is the project site in the existing district? Yes No
- Is expansion of the district needed? Yes No

• Do existing sewer lines serve the project site? Yes No
 • Will line extension within an existing district be necessary to serve the project? Yes No
 If Yes:
 • Describe extensions or capacity expansions proposed to serve this project: _____

iv. Will a new wastewater (sewage) treatment district be formed to serve the project site? Yes No
 If Yes:
 • Applicant/sponsor for new district: _____
 • Date application submitted or anticipated: _____
 • What is the receiving water for the wastewater discharge? _____
 v. If public facilities will not be used, describe plans to provide wastewater treatment for the project, including specifying proposed receiving water (name and classification if surface discharge, or describe subsurface disposal plans):

vi. Describe any plans or designs to capture, recycle or reuse liquid waste: _____

e. Will the proposed action disturb more than one acre and create stormwater runoff, either from new point sources (i.e. ditches, pipes, swales, curbs, gutters or other concentrated flows of stormwater) or non-point source (i.e. sheet flow) during construction or post construction? Yes No
 If Yes:
 i. How much impervious surface will the project create in relation to total size of project parcel?
 _____ Square feet or 6.117 acres (impervious surface)
 _____ Square feet or 7.498 acres (parcel size)
 ii. Describe types of new point sources. Buildings and pavement

 iii. Where will the stormwater runoff be directed (i.e. on-site stormwater management facility/structures, adjacent properties, groundwater, on-site surface water or off-site surface waters)?
Below grade stormwater management facility.

 • If to surface waters, identify receiving water bodies or wetlands: _____

 • Will stormwater runoff flow to adjacent properties? Yes No

iv. Does proposed plan minimize impervious surfaces, use pervious materials or collect and re-use stormwater? Yes No

f. Does the proposed action include, or will it use on-site, one or more sources of air emissions, including fuel combustion, waste incineration, or other processes or operations? Yes No
 If Yes, identify:
 i. Mobile sources during project operations (e.g., heavy equipment, fleet or delivery vehicles)
Minor delivery vehicles

 ii. Stationary sources during construction (e.g., power generation, structural heating, batch plant, crushers)
HVAC units for heating & cooling

 iii. Stationary sources during operations (e.g., process emissions, large boilers, electric generation)
None

g. Will any air emission sources named in D.2.f (above), require a NY State Air Registration, Air Facility Permit, or Federal Clean Air Act Title IV or Title V Permit? Yes No
 If Yes:
 i. Is the project site located in an Air quality non-attainment area? (Area routinely or periodically fails to meet ambient air quality standards for all or some parts of the year) Yes No
 ii. In addition to emissions as calculated in the application, the project will generate:
 • _____ Tons/year (short tons) of Carbon Dioxide (CO₂)
 • _____ Tons/year (short tons) of Nitrous Oxide (N₂O)
 • _____ Tons/year (short tons) of Perfluorocarbons (PFCs)
 • _____ Tons/year (short tons) of Sulfur Hexafluoride (SF₆)
 • _____ Tons/year (short tons) of Carbon Dioxide equivalent of Hydroflouorocarbons (HFCs)
 • _____ Tons/year (short tons) of Hazardous Air Pollutants (HAPs)

h. Will the proposed action generate or emit methane (including, but not limited to, sewage treatment plants, landfills, composting facilities)? Yes No

If Yes:

i. Estimate methane generation in tons/year (metric): _____

ii. Describe any methane capture, control or elimination measures included in project design (e.g., combustion to generate heat or electricity, flaring): _____

i. Will the proposed action result in the release of air pollutants from open-air operations or processes, such as quarry or landfill operations? Yes No

If Yes: Describe operations and nature of emissions (e.g., diesel exhaust, rock particulates/dust): _____

j. Will the proposed action result in a substantial increase in traffic above present levels or generate substantial new demand for transportation facilities or services? Yes No

If Yes:

i. When is the peak traffic expected (Check all that apply): Morning Evening Weekend
 Randomly between hours of _____ to _____.

ii. For commercial activities only, projected number of semi-trailer truck trips/day: _____

iii. Parking spaces: Existing 156 Proposed 440 Net increase/decrease 284 increase

iv. Does the proposed action include any shared use parking? Yes No

v. If the proposed action includes any modification of existing roads, creation of new roads or change in existing access, describe: _____

vi. Are public/private transportation service(s) or facilities available within ½ mile of the proposed site? Yes No

vii. Will the proposed action include access to public transportation or accommodations for use of hybrid, electric or other alternative fueled vehicles? Yes No

viii. Will the proposed action include plans for pedestrian or bicycle accommodations for connections to existing pedestrian or bicycle routes? Yes No

k. Will the proposed action (for commercial or industrial projects only) generate new or additional demand for energy? Yes No

If Yes:

i. Estimate annual electricity demand during operation of the proposed action: _____

ii. Anticipated sources/suppliers of electricity for the project (e.g., on-site combustion, on-site renewable, via grid/local utility, or other): _____

iii. Will the proposed action require a new, or an upgrade to, an existing substation? Yes No

l. Hours of operation. Answer all items which apply.

i. During Construction:

- Monday - Friday: 7AM - 4PM
- Saturday: TBD
- Sunday: TBD
- Holidays: TBD

ii. During Operations:

- Monday - Friday: Office 7:30AM- 5PM
- Saturday: TBD
- Sunday: TBD
- Holidays: TBD

m. Will the proposed action produce noise that will exceed existing ambient noise levels during construction, operation, or both? Yes No
 If yes:
 i. Provide details including sources, time of day and duration: _____ X

ii. Will proposed action remove existing natural barriers that could act as a noise barrier or screen? Yes No
 Describe: _____

n.. Will the proposed action have outdoor lighting? Yes No
 If yes:
 i. Describe source(s), location(s), height of fixture(s), direction/aim, and proximity to nearest occupied structures:
Site lighting will be LED lights with a downward projection with a mix of mounted heights 12', 15' and 28'.

ii. Will proposed action remove existing natural barriers that could act as a light barrier or screen? Yes No
 Describe: _____

o. Does the proposed action have the potential to produce odors for more than one hour per day? Yes No
 If Yes, describe possible sources, potential frequency and duration of odor emissions, and proximity to nearest occupied structures: _____

p. Will the proposed action include any bulk storage of petroleum (combined capacity of over 1,100 gallons) or chemical products 185 gallons in above ground storage or any amount in underground storage? Yes No
 If Yes:
 i. Product(s) to be stored _____
 ii. Volume(s) _____ per unit time _____ (e.g., month, year)
 iii. Generally describe proposed storage facilities: _____

q. Will the proposed action (commercial, industrial and recreational projects only) use pesticides (i.e., herbicides, insecticides) during construction or operation? Yes No
 If Yes:
 i. Describe proposed treatment(s): _____

ii. Will the proposed action use Integrated Pest Management Practices? Yes No

r. Will the proposed action (commercial or industrial projects only) involve or require the management or disposal of solid waste (excluding hazardous materials)? Yes No
 If Yes:
 i. Describe any solid waste(s) to be generated during construction or operation of the facility:
 • Construction: _____ 100 tons per _____ 18 (unit of time)
 • Operation : _____ 10 tons per _____ months (unit of time)
 ii. Describe any proposals for on-site minimization, recycling or reuse of materials to avoid disposal as solid waste:
 • Construction: Material that can be recycled will be collected.

 • Operation: Typical trash recycling program per County.

 iii. Proposed disposal methods/facilities for solid waste generated on-site:
 • Construction: Collected and take off site as needed.

 • Operation: Collected in enclosed dumpster on site and then taken off twice a week.

s. Does the proposed action include construction or modification of a solid waste management facility? Yes No
 If Yes:
 i. Type of management or handling of waste proposed for the site (e.g., recycling or transfer station, composting, landfill, or other disposal activities): _____
 ii. Anticipated rate of disposal/processing:
 • _____ Tons/month, if transfer or other non-combustion/thermal treatment, or
 • _____ Tons/hour, if combustion or thermal treatment
 iii. If landfill, anticipated site life: _____ years

t. Will proposed action at the site involve the commercial generation, treatment, storage, or disposal of hazardous waste? Yes No
 If Yes:
 i. Name(s) of all hazardous wastes or constituents to be generated, handled or managed at facility: _____

 ii. Generally describe processes or activities involving hazardous wastes or constituents: _____

 iii. Specify amount to be handled or generated _____ tons/month
 iv. Describe any proposals for on-site minimization, recycling or reuse of hazardous constituents: _____

 v. Will any hazardous wastes be disposed at an existing offsite hazardous waste facility? Yes No
 If Yes: provide name and location of facility: _____

 If No: describe proposed management of any hazardous wastes which will not be sent to a hazardous waste facility:

E. Site and Setting of Proposed Action

E.1. Land uses on and surrounding the project site

a. Existing land uses.
 i. Check all uses that occur on, adjoining and near the project site.
 Urban Industrial Commercial Residential (suburban) Rural (non-farm)
 Forest Agriculture Aquatic Other (specify): _____
 ii. If mix of uses, generally describe:

b. Land uses and covertypes on the project site.

Land use or Covertype	Current Acreage	Acreage After Project Completion	Change (Acres +/-)
• Roads, buildings, and other paved or impervious surfaces	6.109	6.117	.008
• Forested	0	0	
• Meadows, grasslands or brushlands (non-agricultural, including abandoned agricultural)	0	0	
• Agricultural (includes active orchards, field, greenhouse etc.)	0	0	
• Surface water features (lakes, ponds, streams, rivers, etc.)	0	0	
• Wetlands (freshwater or tidal)	0	0	
• Non-vegetated (bare rock, earth or fill)	0	0	
• Other Describe: <u>Lawn</u>	1.389	1.381	.008

c. Is the project site presently used by members of the community for public recreation? Yes No
i. If Yes: explain: _____

d. Are there any facilities serving children, the elderly, people with disabilities (e.g., schools, hospitals, licensed day care centers, or group homes) within 1500 feet of the project site? Yes No
If Yes,
i. Identify Facilities:
Jefferson County Human Services on Arsenal Street, the Northern Regional Center for Independent Living on Court Street, and a licensed Day Care Center located within the Dulles State Office Building.

e. Does the project site contain an existing dam? Yes No
If Yes:
i. Dimensions of the dam and impoundment:
• Dam height: _____ feet
• Dam length: _____ feet
• Surface area: _____ acres
• Volume impounded: _____ gallons OR acre-feet
ii. Dam's existing hazard classification: _____
iii. Provide date and summarize results of last inspection:

f. Has the project site ever been used as a municipal, commercial or industrial solid waste management facility, or does the project site adjoin property which is now, or was at one time, used as a solid waste management facility? Yes No
If Yes:
i. Has the facility been formally closed? Yes No
• If yes, cite sources/documentation: _____
ii. Describe the location of the project site relative to the boundaries of the solid waste management facility:

iii. Describe any development constraints due to the prior solid waste activities: _____

g. Have hazardous wastes been generated, treated and/or disposed of at the site, or does the project site adjoin property which is now or was at one time used to commercially treat, store and/or dispose of hazardous waste? Yes No
If Yes:
i. Describe waste(s) handled and waste management activities, including approximate time when activities occurred:

h. Potential contamination history. Has there been a reported spill at the proposed project site, or have any remedial actions been conducted at or adjacent to the proposed site? Yes No
If Yes:
i. Is any portion of the site listed on the NYSDEC Spills Incidents database or Environmental Site Remediation database? Check all that apply: Yes No
 Yes – Spills Incidents database Provide DEC ID number(s): _____
 Yes – Environmental Site Remediation database Provide DEC ID number(s): _____
 Neither database Removed existing 5,000 Gal. diesel tank underground.
ii. If site has been subject of RCRA corrective activities, describe control measures: _____

iii. Is the project within 2000 feet of any site in the NYSDEC Environmental Site Remediation database? Yes No
If yes, provide DEC ID number(s): V00473
iv. If yes to (i), (ii) or (iii) above, describe current status of site(s):

v. Is the project site subject to an institutional control limiting property uses? Yes No

- If yes, DEC site ID number: _____
- Describe the type of institutional control (e.g., deed restriction or easement): _____
- Describe any use limitations: _____
- Describe any engineering controls: _____
- Will the project affect the institutional or engineering controls in place? Yes No
- Explain: _____

E.2. Natural Resources On or Near Project Site

a. What is the average depth to bedrock on the project site? _____ 10 feet

b. Are there bedrock outcroppings on the project site? Yes No
 If Yes, what proportion of the site is comprised of bedrock outcroppings? _____ %

c. Predominant soil type(s) present on project site: Urban _____ 100 %
 _____ %
 _____ %

d. What is the average depth to the water table on the project site? Average: 1.5 - 2 feet

e. Drainage status of project site soils: Well Drained: _____ % of site
 Moderately Well Drained: 100 % of site
 Poorly Drained _____ % of site

f. Approximate proportion of proposed action site with slopes: 0-10%: 100 % of site
 10-15%: _____ % of site
 15% or greater: _____ % of site

g. Are there any unique geologic features on the project site? Yes No
 If Yes, describe: _____

h. Surface water features.

i. Does any portion of the project site contain wetlands or other waterbodies (including streams, rivers, ponds or lakes)? Yes No

ii. Do any wetlands or other waterbodies adjoin the project site? Yes No

If Yes to either *i* or *ii*, continue. If No, skip to E.2.i.

iii. Are any of the wetlands or waterbodies within or adjoining the project site regulated by any federal, state or local agency? Yes No

iv. For each identified regulated wetland and waterbody on the project site, provide the following information:

- Streams: Name _____ Classification _____
- Lakes or Ponds: Name _____ Classification _____
- Wetlands: Name _____ Approximate Size _____
- Wetland No. (if regulated by DEC) _____

v. Are any of the above water bodies listed in the most recent compilation of NYS water quality-impaired waterbodies? Yes No
 If yes, name of impaired water body/bodies and basis for listing as impaired: _____

i. Is the project site in a designated Floodway? Yes No

j. Is the project site in the 100 year Floodplain? Yes No

k. Is the project site in the 500 year Floodplain? Yes No

l. Is the project site located over, or immediately adjoining, a primary, principal or sole source aquifer? Yes No
 If Yes:
 i. Name of aquifer: _____

m. Identify the predominant wildlife species that occupy or use the project site: _____

n. Does the project site contain a designated significant natural community? Yes No
If Yes:

i. Describe the habitat/community (composition, function, and basis for designation): _____

ii. Source(s) of description or evaluation: _____

iii. Extent of community/habitat:

- Currently: _____ acres
- Following completion of project as proposed: _____ acres
- Gain or loss (indicate + or -): _____ acres

o. Does project site contain any species of plant or animal that is listed by the federal government or NYS as endangered or threatened, or does it contain any areas identified as habitat for an endangered or threatened species? Yes No

p. Does the project site contain any species of plant or animal that is listed by NYS as rare, or as a species of special concern? Yes No

q. Is the project site or adjoining area currently used for hunting, trapping, fishing or shell fishing? Yes No
If yes, give a brief description of how the proposed action may affect that use: _____

E.3. Designated Public Resources On or Near Project Site

a. Is the project site, or any portion of it, located in a designated agricultural district certified pursuant to Agriculture and Markets Law, Article 25-AA, Section 303 and 304? Yes No

If Yes, provide county plus district name/number: _____

b. Are agricultural lands consisting of highly productive soils present? Yes No

- i. If Yes: acreage(s) on project site? _____
- ii. Source(s) of soil rating(s): _____

c. Does the project site contain all or part of, or is it substantially contiguous to, a registered National Natural Landmark? Yes No

If Yes:

- i. Nature of the natural landmark: Biological Community Geological Feature
- ii. Provide brief description of landmark, including values behind designation and approximate size/extent: _____

d. Is the project site located in or does it adjoin a state listed Critical Environmental Area? Yes No

If Yes:

- i. CEA name: _____
- ii. Basis for designation: _____
- iii. Designating agency and date: _____

e. Does the project site contain, or is it substantially contiguous to, a building, archaeological site, or district which is listed on, or has been nominated by the NYS Board of Historic Preservation for inclusion on, the State or National Register of Historic Places?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
If Yes:	
i. Nature of historic/archaeological resource: <input type="checkbox"/> Archaeological Site <input type="checkbox"/> Historic Building or District	
ii. Name: <u>Jefferson County Courthouse Complex, Trinity Episcopal Church and Parish House</u>	
iii. Brief description of attributes on which listing is based: _____	
f. Is the project site, or any portion of it, located in or adjacent to an area designated as sensitive for archaeological sites on the NY State Historic Preservation Office (SHPO) archaeological site inventory?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
g. Have additional archaeological or historic site(s) or resources been identified on the project site?	
If Yes:	
i. Describe possible resource(s): _____	
ii. Basis for identification: _____	
h. Is the project site within five miles of any officially designated and publicly accessible federal, state, or local scenic or aesthetic resource?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
If Yes:	
i. Identify resource: <u>Olympic Trail NYS Scenic By-Way and Black River Trail</u>	
ii. Nature of, or basis for, designation (e.g., established highway overlook, state or local park, state historic trail or scenic byway, etc.): <u>Scenic By-Way</u>	
iii. Distance between project and resource: _____ 1/4 miles.	
i. Is the project site located within a designated river corridor under the Wild, Scenic and Recreational Rivers Program 6 NYCRR 666?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
If Yes:	
i. Identify the name of the river and its designation: _____	
ii. Is the activity consistent with development restrictions contained in 6NYCRR Part 666?	
<input type="checkbox"/> Yes <input type="checkbox"/> No	

F. Additional Information

Attach any additional information which may be needed to clarify your project.

If you have identified any adverse impacts which could be associated with your proposal, please describe those impacts plus any measures which you propose to avoid or minimize them.

G. Verification

I certify that the information provided is true to the best of my knowledge.

Applicant/Sponsor Name Andrew M. Hart, RLA, ASLA (as agent) Date Revised June 6, 2016

Signature  Title Regional Business Segment Manager

MERCY HEIGHTS

City of Watertown
Jefferson County
State of New York

CONTACTS

APPLICANT

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540 TOWNE DRIVE
FAYETTEVILLE, NY 13066
MS. CATHERINE JOHNSON
(315) 663-2100; FAX (315) 663-2109

CONSULTANTS

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JAMES FAHY DESIGN
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ROCHESTER, NEW YORK 14623
MR. JAMES FAHY
(585) 272-1650

OFFICE ARCHITECT
BERGMANN ASSOCIATES
200 FIRST FEDERAL PLAZA
28 EAST MAIN STREET
ROCHESTER, NY 14614
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WATERTOWN, NY 13601
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CIVIL ENGINEER
BERGMANN ASSOCIATES
200 FIRST FEDERAL PLAZA
28 EAST MAIN STREET
ROCHESTER, NY 14614
MR. ANDREW HART, RLA
(585) 232-5135; FAX (585) 232-8306

UTILITY COMPANIES

WATER
CITY OF WATERTOWN
245 WASHINGTON STREET
ROOM 202
WATERTOWN, NY 13601
MICHAEL SLIGAR, WATER SUPERINTENDENT
(315) 785-7757

STORM & SANITARY SEWER
CITY OF WATERTOWN
245 WASHINGTON STREET
WATERTOWN, NY 13601
(315) 785-7845

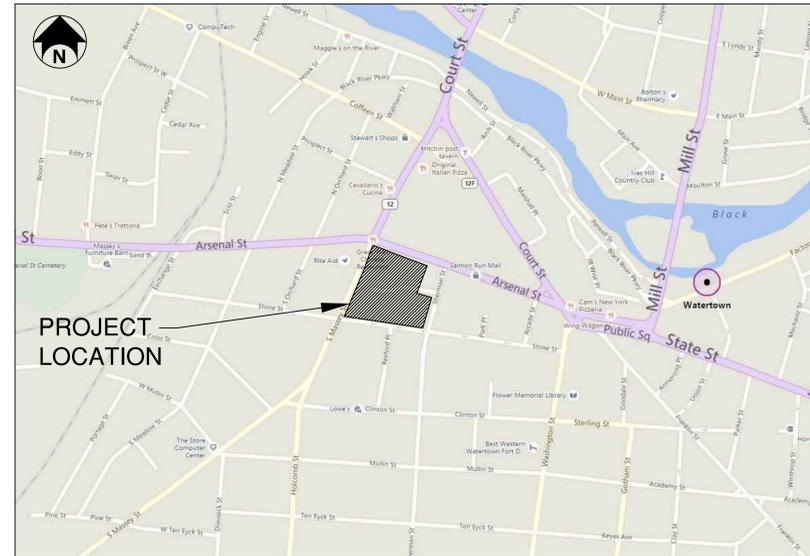
ELECTRIC & GAS
NATIONAL GRID
21265 STATE ROUTE 232
WATERTOWN, NY 13601-5306
(315)-785-7225

TELEPHONE
VERIZON
610 COFFEEN STREET
WATERTOWN, NY 13601
(315)-785-7563

GOVERNMENTAL APPROVAL AGENCIES

WATERTOWN REGIONAL OFFICE OF THE
NEW YORK STATE DEPARTMENT OF
HEALTH
STATE OFFICE BUILDING
317 WASHINGTON STREET
WATERTOWN, NY 13601
SHERI PALMER
(315)-785-2277

NEW YORK STATE DEPT. OF
ENVIRONMENTAL CONSERVATION
NYSDEC DIVISION OF WATER
REGION 6
STATE OFFICE BUILDING
317 WASHINGTON STREET
WATERTOWN, NY 13601
TARA BLUM
(315)-785-2245



LOCATION MAP

NOT TO SCALE

PREPARED FOR
**COR Arsenal Street
Company, LLC**
540 Towne Drive
Fayetteville, New York
13066

DATE ISSUED
MAY 24, 2016

DATE REVISED
JULY 14, 2016

PREPARED BY

**Bergmann
associates**
architects // engineers // planners

28 East Main Street
200 First Federal Plaza
Rochester, New York 14614-1909

office: 585.232.5135
fax: 585.232.4652

www.bergmannpc.com

DRAWING INDEX

DRAWING NO.	TITLE	SHEET NO.
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SURVEY	SITE PLAN & PROPERTY SURVEY MAP	2
C080	DEMOLITION PLAN	3
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C110	UTILITY PLAN	5
C120	GRADING PLAN	6
C130	LANDSCAPE PLAN	7
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C501	MISCELLANEOUS DETAILS	11
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C503	MISCELLANEOUS DETAILS	13
FP-1	FIRE TRUCK ACCESS PLAN	14
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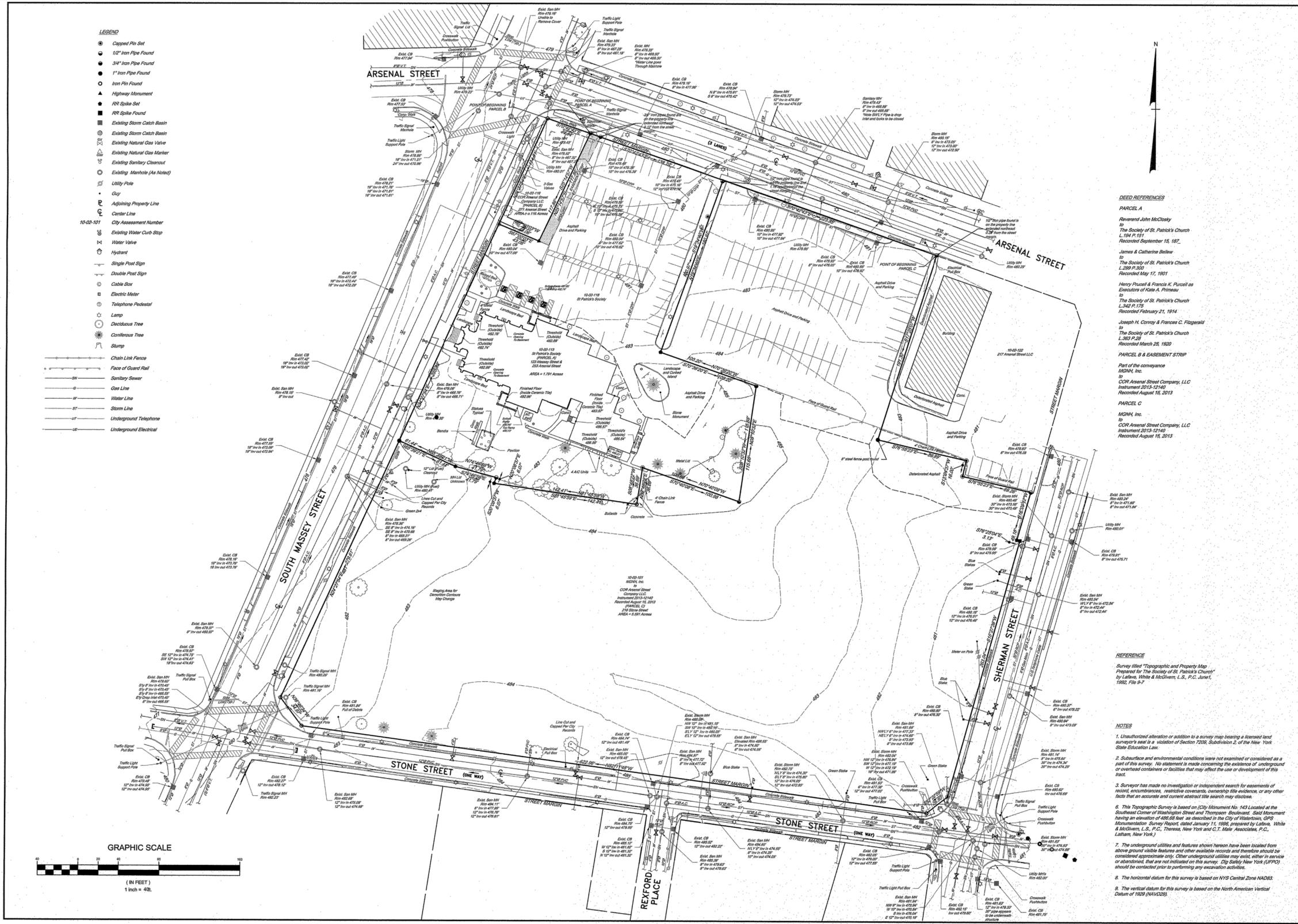
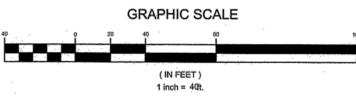
PRELIMINARY
NOT FOR
CONSTRUCTION



C000

- LEGEND**
- Capped Pin Set
 - 1/2" Iron Pipe Found
 - 3/4" Iron Pipe Found
 - 1" Iron Pipe Found
 - Iron Pin Found
 - Highway Monument
 - RR Spike Set
 - RR Spike Found
 - Existing Storm Catch Basin
 - Existing Storm Catch Basin
 - Existing Natural Gas Valve
 - Existing Natural Gas Marker
 - Existing Sanitary Cleanout
 - Existing Manhole (As Noted)
 - Utility Pole
 - Guy
 - Adjusting Property Line
 - Center Line
 - City Assessment Number
 - Existing Water Curb Stop
 - Water Valve
 - Hydrant
 - Single Post Sign
 - Double Post Sign
 - Cable Box
 - Electric Meter
 - Telephone Pedestal
 - Lamp
 - Deciduous Tree
 - Coniferous Tree
 - Slump

- Chain Link Fence
- Face of Guard Rail
- Sanitary Sewer
- Gas Line
- Water Line
- Storm Line
- Underground Telephone
- Underground Electrical



DEED REFERENCES

PARCEL A
 Reverend John McClosky
 to
 The Society of St. Patrick's Church
 L. 204 P. 151
 Recorded September 15, 1872
 James & Catherine Bellin
 to
 The Society of St. Patrick's Church
 L. 209 P. 350
 Recorded May 17, 1901
 Henry Prussel & Francis K. Purcell as
 Executors of John A. Prineas
 to
 The Society of St. Patrick's Church
 L. 342 P. 175
 Recorded February 21, 1914
 Joseph H. Conroy & Frances C. Fitzgerald
 to
 The Society of St. Patrick's Church
 L. 360 P. 28
 Recorded March 25, 1920
PARCEL B & EASEMENT STRIP
 Part of the conveyance
 MGNH, Inc.
 to
 COR Arsenal Street Company, LLC
 Instrument 2013-12140
 Recorded August 15, 2013
PARCEL C
 MGNH, Inc.
 to
 COR Arsenal Street Company, LLC
 Instrument 2013-12140
 Recorded August 15, 2013

REFERENCE

Survey titled "Topographic and Property Map
 Prepared for The Society of St. Patrick's Church"
 by Lattie, White & McQuinn, L.S., P.C. June 1,
 1982. File # 2

NOTES

1. Unauthorized alteration or addition to a survey map bearing a licensed land surveyor's seal is a violation of Section 7209, Subdivision 2, of the New York State Education Law.
2. Subsurface and environmental conditions were not examined or considered as a part of this survey. No statement is made concerning the existence of underground or overhead containers or facilities that may affect the use or development of this tract.
3. Surveyor has made no investigation or independent search for encumbrances of record, encumbrances, restrictive covenants, ownership title evidence, or any other facts that an accurate and current abstract title search may disclose.
4. This Topographic Survey is based on City Monument No. 143 Located at the Southeast Corner of Washington Street and Thompson Boulevard. Said Monument having an elevation of 486.65 feet as described in the City of Watertown, GPS Monumentation Survey Report, dated January 11, 1995, prepared by Lattie, White & McQuinn, L.S., P.C., Watertown, New York and C.T. Maly Associates, P.C., Latham, New York.
5. The underground utilities and features shown herein have been located from above ground visible features and other available records and therefore should be considered approximate only. Other underground utilities may exist, either in service or abandoned, that are not indicated on this survey. Dig Safely New York (DFSD) should be contacted prior to performing any excavation activities.
6. The horizontal datum for this survey is based on NYS Central Zone NAD83.
7. The vertical datum for this survey is based on the North American Vertical Datum of 1985 (NAVD85).

BERNIER CARR & ASSOCIATES
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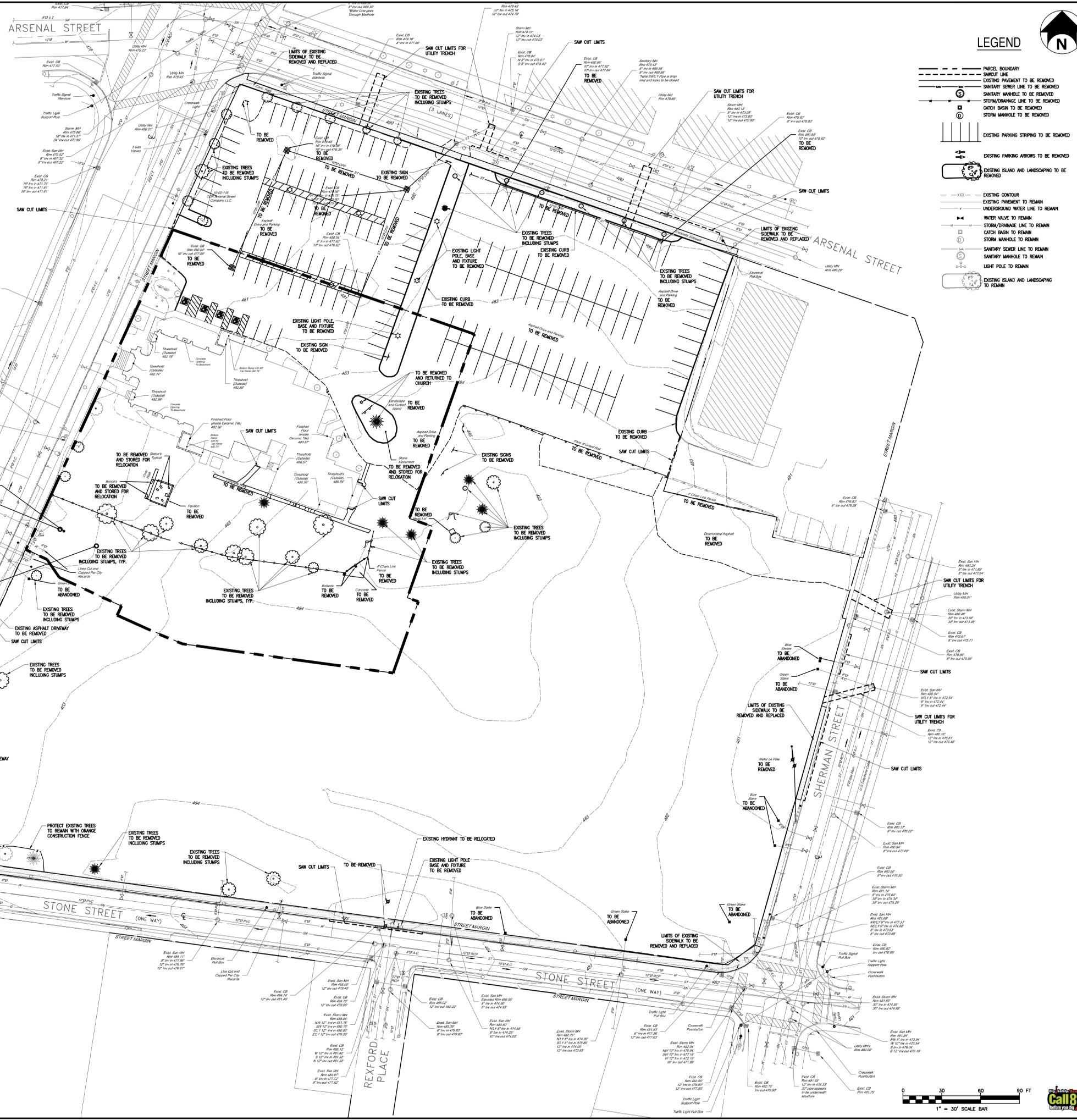


SITE PLAN & PROPERTY SURVEY MAP
 SURVEY OF THE LAND OF COR ARSENAL STREET COMPANY, LLC
 & THE SOCIETY OF ST. PATRICK'S CHURCH
 ARSENAL, SHERMAN, S. MASSEY AND STONE STREETS
 CITY OF WATERTOWN COUNTY OF JEFFERSON STATE OF NEW YORK

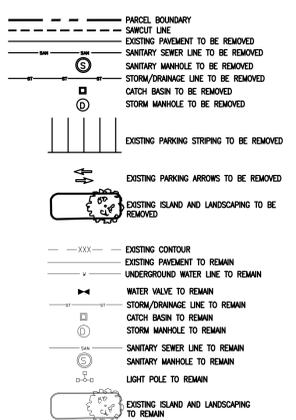
Revised:	5/19/2016 G.A.K.
	5/20/2016 G.A.K.
Drawn By:	MJM
Checked By:	GAK
Scale:	1"=40'
Date:	5/18/2016
File No.:	2001-200
Sheet No.:	1

DEMOLITION NOTES:

1. ALL REQUIRED DEMOLITION PERMITS MUST BE OBTAINED FROM ALL REQUIRED AGENCIES PRIOR TO COMMENCEMENT OF WORK.
2. ALL UTILITY COMPANIES MUST BE NOTIFIED A MINIMUM OF 48 HOURS IN ADVANCE OF DEMOLITION.
3. PROPER FENCING OR PUBLIC PROTECTION DEVICES MUST BE CONSTRUCTED AND MAINTAINED AROUND THE PERIMETER OF THE SITE AT ALL TIMES DURING DEMOLITION PHASE.
4. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONTROL DUST, DIRT, AND DEBRIS DURING DEMOLITION AND CONSTRUCTION PHASES.
5. THE CONTRACTOR SHALL MAINTAIN VEHICULAR AND PEDESTRIAN ACCESS AT ALL TIMES. ANY DRIVE LANE CLOSURES SHALL BE COORDINATED WITH ST. PATRICK'S CHURCH.
6. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DISPOSE OF ALL DEMOLITION DEBRIS IN A LEGAL MANNER.
7. THE CONTRACTOR SHALL REMOVE ASPHALT PAVEMENT TO THE LIMITS SHOWN ON THE PLAN.
8. THE UNDERGROUND STRUCTURES AND UTILITIES SHOWN ON THIS MAP HAVE BEEN PLOTTED FROM AVAILABLE SURVEYS AND RECORD MAPS; THEY ARE NOT CERTIFIED TO THE ACCURACY OF THEIR LOCATION AND/OR COMPLETENESS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE LOCATION AND EXTENT OF ALL UNDERGROUND STRUCTURES AND UTILITIES PRIOR TO ANY DIGGING OR CONSTRUCTION ACTIVITIES IN THEIR VICINITY. THE CONTRACTOR SHALL HAVE ALL EXISTING UTILITIES FIELD STAKED BEFORE STARTING WORK BY CALLING 1-800-452-7962.
9. BOLD ELEMENTS SHOWN ON THE DEMOLITION PLANS ARE TO BE REMOVED OR RELOCATED AS NOTED.
10. ANY UTILITIES ABANDONED IN PLACE TO RECEIVE FLOWABLE FILL.
11. PRIOR TO ANY DEMOLITION ACTIVITIES ON THE SANITARY SEWER, THE CONTRACTOR SHALL SUBMIT A PLAN TO THE DEPARTMENT OF PUBLIC WORKS THAT WILL INCLUDE THE BY-PASS PUMPING AND MAINTAIN VEHICULAR AND PEDESTRIAN TRAVEL.
12. PROVIDE BY-PASS PIPING AND/OR SWALES AS NECESSARY IN CASE OF RAIN DURING THE DEMOLITION OF CONSTRUCTION DEBRIS.
13. EXISTING TEMPORARY CONSTRUCTION AROUND SITE TO REMAIN DURING CONSTRUCTION.



LEGEND



MERCY HEIGHTS

City of Watertown
Jefferson County
State of New York

COR Arsenal Street Company, LLC

540 Towne Drive
Fayetteville, NY 13066

Bergmann associates
architects // engineers // planners

Bergmann Associates, Architects, Engineers,
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26 East Main Street
200 First Federal Plaza
Rochester, NY 14614
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www.bergmannpc.com

REVISIONS		
NO.	DATE	DESCRIPTION
1	7/14/16	CITY COMMENTS

PRELIMINARY NOT FOR CONSTRUCTION

PROFESSIONAL CERTIFICATION: I CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF NEW YORK. LICENSE NO. 62412 EXPIRATION DATE: 05/2017

TO THE BEST OF MY KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGEMENT, THE PLANS AND SPECIFICATIONS ARE IN COMPLIANCE WITH THE 2015 ENERGY CONSTRUCTION CONSERVATION CODE OF THE STATE OF NEW YORK.

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Note: Unauthorized alteration or addition to this drawing is a violation of the New York State Education Law Article 145, Section 7209.
Project Number: 010487.00

DEMOLITION PLAN

Scale: 1" = 30'
Scale Bar: 0, 30, 60, 90 FT
Call 811 before you dig
C080
3 of 15

City of Watertown
Jefferson County
State of New York

**COR Arsenal Street
Company, LLC**

540 TOWNE DRIVE
FAYETTEVILLE, NY 13066



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NO.	DATE	DESCRIPTION	REV.	CKD.
1	7/14/16	CITY COMMENTS	JB	JB

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PROFESSIONAL CERTIFICATION: I CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF NEW YORK.
LICENSE NO. 69472
EXPIRATION DATE: 05/2017
TO THE BEST OF MY KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGMENT, THE PLANS AND SPECIFICATIONS ARE IN COMPLIANCE WITH THE 2015 ENERGY CONSTRUCTION CONSERVATION CODE OF THE STATE OF NEW YORK.

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Project Engineer: **A. HART, RLA**
City Engineer: **J. BUSH**
Date: **MAY 23, 2016**
Scale: **1" = 30'**
Project Number: **010487.00**

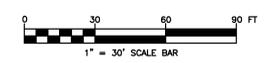
SITE PLAN

SITE PLAN NOTES:

- CONTRACTOR IS RESPONSIBLE FOR PROTECTION OF ALL PROPERTY CORNERS AND MONUMENTS.
- CONTRACTOR SHALL MATCH PROPOSED CURB, CONCRETE, AND PAVEMENT TO EXISTING IN GRADE AND ALIGNMENT.
- CONTRACTOR SHALL REMOVE PAVEMENT & CONCRETE IN ACCORDANCE WITH SPECIFICATIONS OF THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION.
- THE EARTHWORK FOR ALL BUILDING FOUNDATIONS AND SLABS SHALL BE IN ACCORDANCE WITH ARCHITECTURAL BUILDING PLANS AND SPECIFICATIONS.
- CONTRACTOR SHALL REFER TO ARCHITECTURAL PLANS FOR ACTUAL DIMENSIONS, PORCH AND RAMP LOCATIONS.
- GENERAL CONTRACTOR IS TO COORDINATE WITH APPROPRIATE UTILITY COMPANIES PRIOR TO CONSTRUCTION, ALIGNMENT, OR RELOCATION OF EXISTING UTILITIES AS DESIGNATED ON PLANS.
- SEE COVER SHEET FOR LIST OF UTILITY COMPANIES.
- CONTRACTOR SHALL PROVIDE PIPE BELLARS FOR PROTECTION OF ALL ABOVE GROUND UTILITIES AND APPURTENANCES IN DRIVE AREA, AS WELL AS, TO PROTECT ALL ACCESSIBLE SIGNS.
- CONTRACTOR SHALL REFER TO ARCHITECTURAL PLANS AND SPECS FOR ACTUAL LOCATION OF ALL UTILITY ENTRANCES, TO INCLUDE SANITARY SEWER, LATERALS, DOMESTIC AND FIRE PROTECTION WATER SERVICE, GAS, ELECTRICAL, AND TELEPHONE SERVICE. CONTRACTOR SHALL COORDINATE INSTALLATION OF UTILITIES IN SUCH A MANNER AS TO AVOID CONFLICTS AND ASSURE PROPER DEPTHS ARE ACHIEVED, AS WELL AS, COORDINATE WITH ANY UTILITY COMPANIES FOR APPROVED LOCATIONS AND SCHEDULING OF TIE-IN/ CONNECTIONS TO THEIR FACILITIES.
- ALL WORK AND MATERIALS SHALL COMPLY WITH ALL CITY/COUNTY REGULATIONS AND CODES AND O.S.H.A. STANDARDS.
- CONTRACTOR IS RESPONSIBLE FOR REPAIRING THE DAMAGE DONE TO ANY EXISTING ITEM DURING CONSTRUCTION SUCH AS, BUT NOT LIMITED TO, DRAINAGE, UTILITIES, STRUCTURES, PAVEMENT, STRIPING, CURB, ETC. REPAIRS SHALL BE EQUAL TO, OR BETTER THAN, EXISTING CONDITIONS. CONTRACTOR IS RESPONSIBLE TO DOCUMENT ALL EXISTING DAMAGE AND NOTIFY CONSTRUCTION MANAGER PRIOR TO CONSTRUCTION START.
- ALL RADI ARE 5' TO FACE OF CURB, UNLESS OTHERWISE NOTED.
- CONTRACTOR TO REMOVE OR RELOCATE, WHEN APPLICABLE, ALL EXISTING BUILDINGS, FOUNDATIONS, BASEMENTS, CONNECTING IMPROVEMENTS, DRAIN PIPES, SANITARY SEWER PIPES, POWER POLES, AND GUY WIRES, WATER METERS AND WATER LINES, WELLS, SIDEWALKS, SIGN POLES, UTILITIES AND ASPHALT, SHOWN AND NOT SHOWN, WITHIN CONSTRUCTION LIMITS AND WHERE NEEDED, TO ALLOW FOR NEW CONSTRUCTION AS SHOWN.
- CONTRACTOR SHALL FOLLOW ALL LOCAL, STATE, AND FEDERAL REGULATIONS IN DISPOSING OF DEMOLISHED MATERIALS REMOVED FROM THIS SITE.
- ALL DIMENSIONS AND RADI ARE TO THE FACE OF CURB UNLESS OTHERWISE NOTED.
- CONTRACTOR IS RESPONSIBLE FOR RELOCATING AND/OR PLACING PEDESTRIAN CROSSING SIGNS IN NEW LOCATION AS INDICATED ON PLANS. CONTRACTOR TO VERIFY EXACT NUMBER OF SIGNS REQUIRED.
- ALL NECESSARY INSPECTIONS AND/OR CERTIFICATIONS REQUIRED BY CODES AND/OR UTILITY SERVICE COMPANIES SHALL BE PERFORMED PRIOR TO ANNOUNCED BUILDING POSSESSION AND FINAL CONNECTION OF SERVICES.
- SEE ARCHITECTURAL PLANS FOR EXACT BUILDING DIMENSIONS.
- ALL WORK TO BE PERFORMED WITHIN THE CITY OF WATERTOWN MARGIN WILL REQUIRE SIGN-OFF FROM A PROFESSIONAL ENGINEER, LICENSED AND CURRENTLY REGISTERED TO PRACTICE IN THE STATE OF NEW YORK. THAT THE WORK WAS BUILT ACCORDING TO THE APPROVED SITE PLAN AND APPLICABLE CITY OF WATERTOWN STANDARDS. COMPACTION TESTING WILL BE REQUIRED FOR ALL WORK TO BE PERFORMED WITHIN THE CITY OF WATERTOWN MARGIN AND MUST BE SUBMITTED TO THE CITY OF WATERTOWN CODES DEPARTMENT.
- THE HORIZONTAL DATUM IS BASED ON NYS CENTRAL ZONE NAD83.
- ALL SIDEWALK WORK WITHIN THE CITY RIGHT-OF-WAY IS TO MEET PUBLIC-RIGHT-OF-WAY (PROWAG) STANDARDS. SEE NYS DOT STAND SHEETS 808-01.

SITE PLAN LEGEND

- EXISTING PROPERTY LINE
- PROPOSED BUILDING
- PROPOSED CURB
- PROPOSED PARKING SPACES
- PROPOSED CONCRETE PAVEMENT
- PROPOSED LIGHT POLE AND BASE
- CHAIN LINK FENCE



PROJECT DATA:
APPLICANT:
1. COR ARSENAL STREET COMPANY, LLC
540 TOWNE DRIVE
FAYETTEVILLE, NEW YORK 13066
2. TAX MAP No.: 10-02-101, 10-02-116 & 10-02-113
3. EXISTING ZONING: COMMERCIAL
4. TOTAL LOT AREA: 5.71± ACRES
ST. PATRICK'S LOT AREA 1.79 ± ACRES

ZONING REQUIREMENTS	REQUIRED	PROVIDED
MIN. LOT AREA:	1,000 SF	5.71± ACRES
FRONT SETBACK:	20'	---
SIDE SETBACK:	5'	8.9'
REAR SETBACK:	25'	N/A
PARKING STALL SIZE:	9'x18'	9'x18'

NOTE: FRONT YARD EXCEPTIONS
IN CASES OTHER THAN CORNER LOTS, OTHER PROVISIONS OF THIS CHAPTER NOTWITHSTANDING, NO BUILDING IN ANY DISTRICT NEED HAVE A FRONT YARD GREATER IN DEPTH THAN THE AVERAGE DEPTH OF THE FRONT YARDS OF THE LOTS NEXT THEREON ON EITHER SIDE. A VACANT LOT OR LOT WITH A FRONT YARD GREATER THAN THE MINIMUM DEPTH BEING COUNTED AS IF IT WERE THE MINIMUM FRONT YARD FOR THE DISTRICT IN WHICH IT IS LOCATED, BUT IN NO CASE SHALL THE FRONT YARD IN ANY RESIDENCE DISTRICT BE LESS THAN 10 FEET IN DEPTH.

BUILDING	SQUARE FEET	TOTAL NO. OF UNITS	PARKING SPACES REQUIRED	PARKING RATIO	PARKING SPACES PROVIDED	PARKING RATIO PROVIDED
C1	36,402	36	40	1.0/UNIT+10%	40	1.0/UNIT+10%
C2	36,402	36	40	1.0/UNIT+10%	40	1.0/UNIT+10%
C3	36,402	36	40	1.0/UNIT+10%	40	1.0/UNIT+10%
CLUB HOUSE	5,588	N/A	28	5.0/1,000	43	7.7/1,000
TOTAL			148		163	

BUILDING	SQUARE FEET	TOTAL NO. OF UNITS	PARKING SPACES REQUIRED	PARKING RATIO	PARKING SPACES PROVIDED	PARKING RATIO PROVIDED
OFFICE 1	17,000	N/A	85	5.0/1,000	85	5.0/1,000
OFFICE 2	17,000	N/A	85	5.0/1,000	85	5.0/1,000
TOTAL	34,000		170		170	

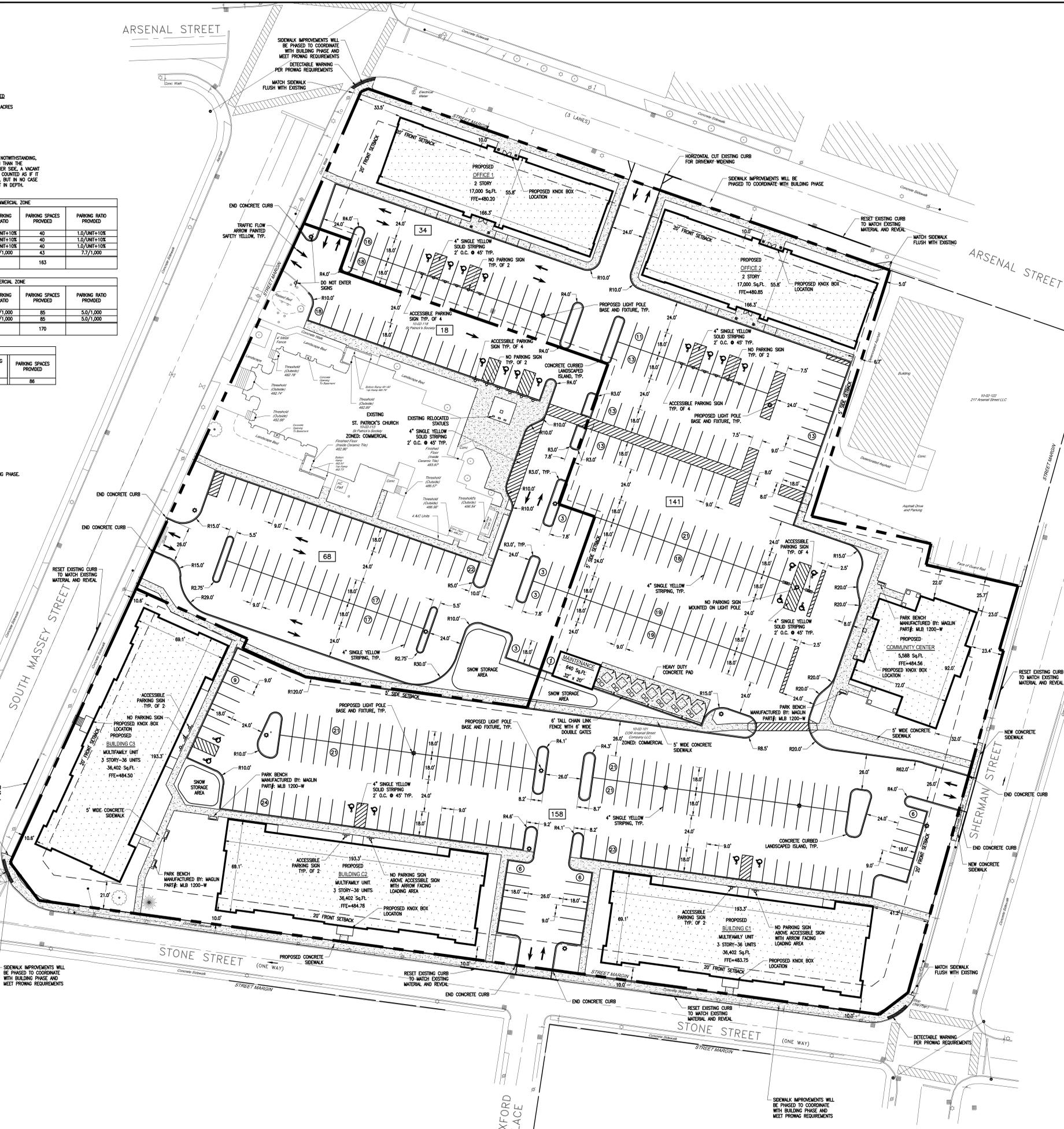
BUILDING	TOTAL # OF OCCUPANTS	PARKING SPACES REQUIRED	EXISTING PARKING ON CHURCH PROPERTY	PARKING SPACES PROVIDED
ST. PATRICK'S CHURCH	359	67	81	86

- * NOTE:**
- TOTAL PARKING REQUIRED: 395 SPACES
TOTAL PARKING PROVIDED: 419 SPACES
 - FOR PLACES OF ASSEMBLY:
399 SEATS/4 = 100
100 x 200 SF PARKING AREA = 20,000 SF PARKING AREA
20,000/200 SF PER PARKING SPACE = 67 SPACES
 - PROPOSED CHURCH PROPERTY AREA: 1.79 AC
EXISTING CHURCH PROPERTY AREA: 1.79 AC
 - SIDEWALK IMPROVEMENTS WILL BE PHASED TO COORDINATE WITH BUILDING PHASE.

VARIANCES REQUIRED:

- FRONT BUILDING SETBACK:
OFFICE 1 FROM 20' TO 10' FROM ARSENAL STREET
OFFICE 2 FROM 20' TO 10' FROM ARSENAL STREET
BUILDING C1 FROM 20' TO 10' FROM STONE STREET
BUILDING C2 FROM 20' TO 10' FROM STONE STREET
BUILDING C3 FROM 20' TO 10.6' FROM SOUTH MASSEY STREET

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WATER MAIN INSTALLATION:

- 1. WATER SERVICE LINE (LATERALS) SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE REGULATIONS AND SPECIFICATIONS OF HIS HEALTH DEPARTMENT, AND THE LOCAL WATER AUTHORITY.
2. ALL EROSION CONTROL MEASURES SHALL BE EMPLOYED DURING ALL PHASES OF CONSTRUCTION IN ACCORDANCE WITH ALL APPLICABLE STANDARDS AND REQUIREMENTS. BEST MANAGEMENT PRACTICES ARE TO BE FOLLOWED.
3. WATER MAINS AND ALL WATER SERVICE LINES SHALL HAVE A MINIMUM OF 5 FEET OF COVER FROM FINISH GRADE TO TOP OF PIPE.
4. THE MINIMUM VERTICAL SEPARATION BETWEEN WATER MAINS AND SEWER MAINS SHALL BE 18" MEASURED FROM THE OUTSIDE OF THE PIPES AT THE POINT OF CROSSING. THE MINIMUM HORIZONTAL SEPARATION BETWEEN WATER MAINS AND SEWER MAINS SHALL BE 10 FEET MEASURED FROM THE OUTSIDE OF THE PIPES. ONE FULL LENGTH OF WATER MAIN SHALL BE CENTERED UNDER OR OVER THE SEWER SO THAT BOTH JOINTS WILL BE AS FAR FROM THE SEWER AS POSSIBLE. WHERE WATER MAINS CROSS UNDER A SEWER, ADEQUATE STRUCTURAL SUPPORT (COMPACTED SELECTED FILL) SHALL BE PROVIDED FOR THE SEWERS TO PREVENT EXCESSIVE DEFLECTION OF JOINTS AND SETTLING OR BREAKING OF THE WATER MAINS.
5. HYDRANT TAP SHALL BE AS NOTED ON THE PLANS OR AS REQUIRED BY THE APPLICANT. GUARD VALVES SHALL BE USED AND ALL HYDRANT STUB PIPING SHALL BE MECHANICAL JOINT. FIRE HYDRANT WEEP HOLES (ORANS) SHALL BE PLUGGED WHEN GROUND WATER IS ENCOUNTERED WITHIN 7 FEET OF THE FINISHED GRADE. ALL PLUGS SHALL BE MECHANICAL METAL PLUGS. ALL HYDRANTS WITH PLUGGED WEEP HOLES SHALL BE APPROPRIATELY TAGGED.
6. ALL MECHANICAL JOINTS, FITTINGS, BENDS, PLEGS, ETC. SHALL BE BACKED WITH 3000 P.S.I. CONCRETE TROUSLED BLOCKS OR APPROVED MECHANICAL RESTRAINTS.
7. ALL VALVES TO BE TIED DIRECTLY TO ANCHOR TEST UNLESS OTHERWISE SPECIFIED ON PLANS.
8. WHERE PIPING IS TO BE PLACED WITHIN FILL AREAS, THE FILL SHALL BE PLACED AND COMPACTED TO AT LEAST THE PROCTOR PROCTOR PRIOR TO TRENCH CONSTRUCTION.
9. SHUTDOWN OF EXISTING WATER MAINS SHALL BE IN ACCORDANCE WITH THE LOCAL WATER DEPARTMENT. THE WATER DEPARTMENT MUST BE NOTIFIED IN ADVANCE OF ALL PROPOSED SHUTDOWNS IN ACCORDANCE WITH THEIR DIRECTION. WATER MUST BE TURNED BACK ON AS SOON AS POSSIBLE. ALL EXISTING WATER MAINS MUST BE PROVIDED WITH ACCURATE PLUG, BLOCK, AND BLOW-OFF AS INDICATED ON THE PLANS.
10. WATER METER(S) TO BE LOCATED ON THE INTERIOR OF EXTERIOR WALL(S) IMMEDIATELY UPON SERVICE ENTRANCE INTO THE BUILDING(S).
11. WATER SERVICE LINES SHALL BE SEPARATED AT LEAST 10 FEET, MEASURED FROM OUTSIDE OF THE PIPES, FROM SEWER MAINS OR SEPTIC SYSTEMS.

WATER SYSTEM TESTS:

- 1. SOIL TEST: THE CONTRACTOR SHALL PROVIDE A SOIL TEST EVALUATION TO DETERMINE THE NEED FOR POLYETHYLENE ENCASUREMENT PER ANS/AWWA C105/ASTM 1542 PRIOR TO WATER MAIN INSTALLATION. SOIL TESTING SHALL BE CONDUCTED BY AN APPROVED SOIL TESTING LABORATORY IN ACCORDANCE WITH LOCAL WATER DISTRICT STANDARDS.
2. WATER PIPING SHALL BE FLUSHED AND TESTED IN CONFORMANCE WITH THE LATEST REVISION OF ANS/AWWA C900 STANDARD FOR DUCTILE IRON PIPE, C905 FOR PVC PIPE, OR EQUIVALENT OF C900 AND/OR C905 FOR PE PIPE.
3. THE PROPOSED WORKS MUST CONFORM TO THE LATEST REVISION OF ANS/AWWA C511 STANDARD, TABLET METHOD EXCEPTED. FOLLOWING FLUSHING AND TESTING, THE ENGINEER SHALL OBTAIN COLLECTION OF APPROPRIATE NUMBERS OF BACTERIOLOGICAL SAMPLES FOR THE TOTAL AND FECAL COLIFORM AND FOR STANDARD BACTERIAL PLATE COUNT AFTER THE FIELD TEST CHARGING RESIDUAL IS LESS THAN 1.5 PPM AND THE SAMPLING POINTS HAVE BEEN DECONTAMINATED. PRIOR TO SAMPLING, THE ENGINEER SHALL COORDINATE THE APPROPRIATE NUMBER AND LOCATION OF SAMPLES TO BE COLLECTED WITH THE COUNTY OR STATE HEALTH DEPT/ HAVING JURISDICTION.
4. THE COMPLETED WORKS SHALL NOT BE PLACED INTO SERVICE UNTIL THE APPROVAL OF COMPLETED WORKS FORM IS ISSUED BY THE COUNTY OR STATE HEALTH DEPT. HAVING JURISDICTION. PRIOR TO ISSUANCE, A NYC-LICENSED PROFESSIONAL ENGINEER MUST SUBMIT CERTIFICATION TO THAT HEALTH DEPARTMENT THAT THEY OR THEIR DESIGNATED REPRESENTATIVE WITNESSED THAT CONSTRUCTION WAS IN CONFORMANCE WITH THE PLANS AS APPROVED, FLUSHING, TESTING, AND DISINFECTION PROCEDURES NOTED HEREIN HAD BEEN PROPERLY PERFORMED, AND MICROBIOLOGICAL SAMPLE RESULTS FROM THE COMPLETED WORKS WERE ACCEPTABLE. COPIES OF THE OFFICIAL LABORATORY RESULTS ARE TO BE INCLUDED WITH THE CERTIFICATION.
5. FIRE HYDRANTS ARE NOT ACCEPTABLE TESTING/SAMPLING POINTS.
6. WATER SERVICE LINES SIZED 4-INCHES OR GREATER SHALL BE:
- PRESSURE TESTED IN ACCORDANCE WITH THE LATEST SPECIFICATIONS OF THE LOCAL WATER AUTHORITY. THE PRESSURE TEST SHALL BE WITNESSED BY A REPRESENTATIVE FROM THE LOCAL WATER AUTHORITY.
- DISINFECTION BY USING THE CONTINUOUS FEED METHOD ACCORDING TO ANNA STANDARD SPECIFICATIONS. AFTER FLUSHING AND DISINFECTION OF THE SERVICE LINE, WATER SAMPLES SHALL BE COLLECTED BY THE COUNTY DEPARTMENT OF HEALTH. APPROVAL AND NOTIFICATION BY THE HEALTH DEPARTMENT MUST BE RECEIVED BEFORE THE LATERAL IS PLACED IN SERVICE.
- HYDRANT FLOW TEST DATA PROVIDED BY THE CITY OF WATERBURY WATER DEPARTMENT ON MAY 2016. FLOW HYDRANT LOCATED EAST OF SHERMAN, AT THE CORNER OF STONE STREET IS AS FOLLOWS:
STATIC - 63 PSI
RESIDUAL - 59 PSI @
GPM @ 20 PSI - 1,550 GPM (CALCULATED)
FLOW HYD. FLOW 898 GPM
PILOT TIP SIZE 2.50"

WATER MAIN MATERIALS:

- 1. POLYVINYL CHLORIDE (PVC) PIPE MUST BE WITH INTERNAL BELL AND SPIGOT JOINTS, CLASS 150, DR 15, CONFORMING WITH THE LATEST REVISION OF ANS/AWWA C900 FOR 4" - 18" PIPES OR C905 (FOR LARGER PIPE) STANDARD. INSTALLATION TO INCLUDE TRACER TAPE AS PER MANUFACTURER'S INSTRUCTIONS.
2. DUCTILE-IRON (DI) PIPE MUST BE CLASS 52 MINIMUM CONFORMING WITH THE LATEST REVISION OF ANS/AWWA C151 STANDARD. IF REQUIRED BY WATER SUPPLIER THE PIPE SHALL BE ENCASED WITH A MINIMUM 8 MIL. POLYETHYLENE WRAP AS PER LATEST REVISION OF ANS/AWWA C105 STANDARD.
3. POLYETHYLENE (PE) PIPE MUST BE PE 3408 MATERIAL MINIMUM, CONFORMING TO THE LATEST REVISION OF ANNA C901 AND C906.

12" TAPPING SLEEVE AND VALVE. CONTRACTOR TO PROVIDE EXCAVATION, SUPPLY AND INSTALL ALL MATERIAL INCLUDING DISINFECTION AND SAMPLING TAP. CITY OF WATERBURY TO PERFORM TAP FOR A SET FEE.

6" DIP CL 51 MM COMBINED SERVICE. 6" GATE VALVE.

BACKFLOW AND METERING FOR COMBINED SERVICE TO BE PROVIDED IN FIRST FLOOR UTILITY ROOM. PROPOSED OFFICE 1, 2 STORY. FFE=480.20.

BACKFLOW AND METERING FOR COMBINED SERVICE TO BE PROVIDED IN FIRST FLOOR UTILITY ROOM. PROPOSED OFFICE 2, 2 STORY. FFE=480.85.

BACKFLOW AND METERING FOR COMBINED SERVICE TO BE PROVIDED IN FIRST FLOOR UTILITY ROOM. PROPOSED OFFICE 3, 3 STORY-36 UNITS. FFE=484.78.

BACKFLOW AND METERING FOR COMBINED SERVICE TO BE PROVIDED IN FIRST FLOOR UTILITY ROOM. PROPOSED OFFICE 4, 4 DA SOLID COVER. FFE=483.75.

BACKFLOW AND METERING FOR COMBINED SERVICE TO BE PROVIDED IN FIRST FLOOR UTILITY ROOM. PROPOSED OFFICE 5, 5 DA SOLID COVER. FFE=484.50.

BACKFLOW AND METERING FOR COMBINED SERVICE TO BE PROVIDED IN FIRST FLOOR UTILITY ROOM. PROPOSED OFFICE 6, 6 DA SOLID COVER. FFE=485.25.

UTILITY NOTES:

- 1. ALL WATER, STORM AND SANITARY UTILITIES ARE TO BE CONSTRUCTED AND TESTED WITH APPROVED MATERIALS IN ACCORDANCE WITH THE CITY OF WATERBURY SPECIFICATIONS AND REGULATIONS AS AMENDED OR AS OTHERWISE APPROVED.
2. SEE ARCHITECTURAL DRAWINGS FOR EXACT LOCATIONS OF BUILDING ELECTRIC, TELEPHONE, GAS, STORM AND SANITARY LATERALS AND WATER SERVICES.
3. THE CONTRACTOR SHALL PERFORM ALL WORK IN COMPLIANCE WITH TITLE 29 OF FEDERAL REGULATIONS, PART 1926, SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION (OSHA).
4. IN ALL TRENCH EXCAVATIONS, CONTRACTOR MUST LAY THE TRENCH SIDE SLOPES BACK TO A SAFE SLOPE. USE A TRENCH SHIELD OR PROVIDE SHEETING AND BRACING.
5. IF SUSPICIOUS AND/OR HAZARDOUS MATERIAL IS ENCOUNTERED DURING CONSTRUCTION, ALL WORK SHALL STOP AND THE DEPARTMENT OF HEALTH AND THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION SHALL BE NOTIFIED IMMEDIATELY. WORK SHALL NOT RESUME UNTIL THE DEVELOPER HAS OBTAINED APPROPRIATE ACTION FOR DEALING WITH THE WATER MATERIAL, AND THE DEVELOPMENT PLANS ARE MODIFIED AS MAY BE NECESSARY.
6. EXCAVATED WASTE MATERIAL REMOVED FROM THE SITE SHALL BE PLACED AT A LOCATION ACCEPTABLE TO THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION. DOCUMENTATION OF DISPOSAL TO BE SUBMITTED TO OWNER.
7. CONTRACTOR SHALL USE SPECIAL CARE TO MAINTAIN A MINIMUM OF ONE FOOT OF COVER ABOVE ALL EXISTING AND PROPOSED PIPES AT ALL TIMES DURING ALL CONSTRUCTION STAGES.
8. THE CONTRACTOR SHALL CONSULT WITH THE DESIGN ENGINEER BEFORE DEVIATING FROM THESE PLANS.
9. ALL HOPE STORM SEWER PIPES SHALL BE SMOOTH FLOW INTERIOR.
10. ALL CATCH BASINS AND STORM MANHOLES WITHIN PAVEMENT TO BE CONSTRUCTED TO WITHSTAND H-20 LOADING.
11. ANY PROPOSED FOOD/RESTAURANT SERVICES WILL REQUIRE A MINIMUM 1000 GALLON GREASE INTERCEPTOR.
12. CLEANOUTS SHALL BE PROVIDED ON ALL LATERALS AT THE BUILDING AND ALL BENDS.
13. ALL WATER MAIN AND SERVICE WORK MUST BE COORDINATED WITH THE CITY OF WATERBURY WATER DEPARTMENT. THE WATER DEPARTMENT REQUIREMENTS SUPERSEDE ALL OTHER PLANS AND SPECIFICATIONS PROVIDED.
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15. EXISTING LATERALS THAT ARE TO BE ABANDONED SHALL BE CAPPED AND ANCHORED.

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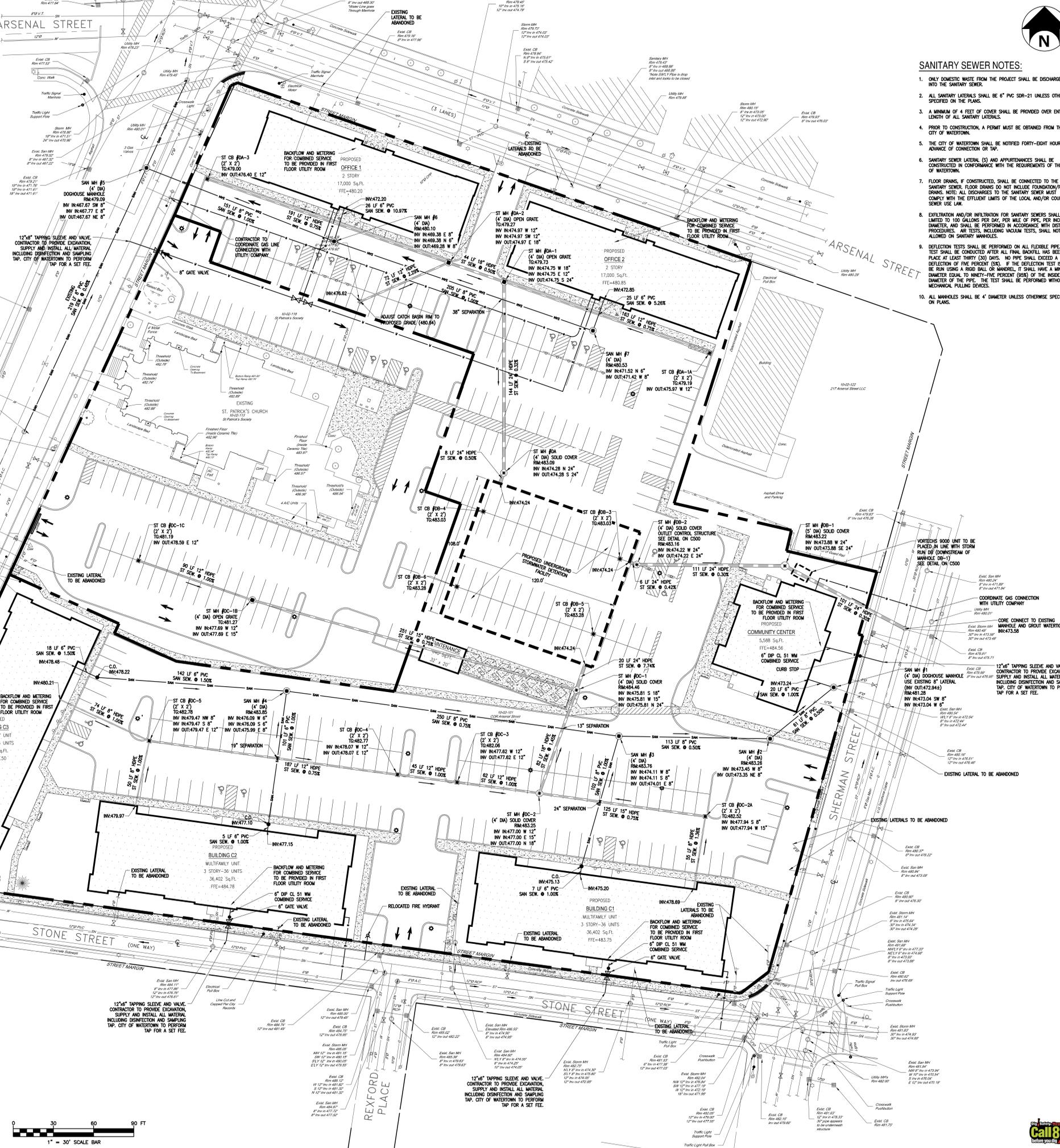
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State of New York

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Table with 3 columns: NO., DATE, DESCRIPTION, REV. CKD. Row 1: 1, 7/14/16, CITY COMMENTS, JB, JOB.

REVISIONS
NO. DATE DESCRIPTION REV. CKD
1 7/14/16 CITY COMMENTS JB JOB

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PROFESSIONAL CERTIFICATION I CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF NEW YORK. LICENSE NO. 62942 EXPIRATION DATE: 05/01/17

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Project Number: 010487.00

UTILITY PLAN

Project Number: 010487.00

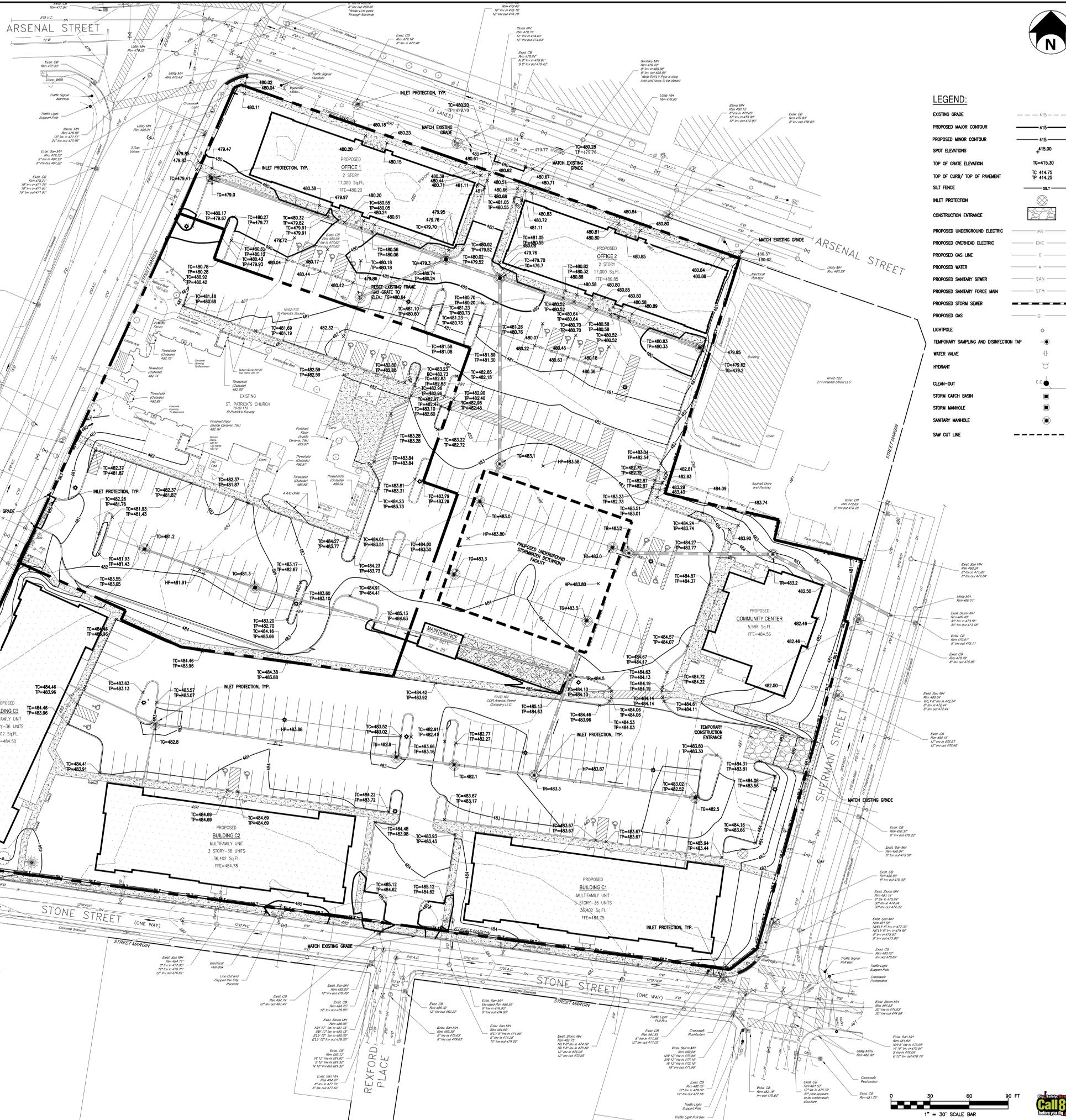
C110

GRADING PLAN NOTES:

- REFER EROSION AND SEDIMENT CONTROL PLANS FOR LOCATION OF ALL EROSION AND SEDIMENT CONTROL DEVICES.
- THE EARTHWORK FOR ALL BUILDING FOUNDATIONS AND SLABS SHALL BE IN ACCORDANCE WITH ARCHITECTURAL BUILDING PLANS AND SPECIFICATIONS.
- THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES, AND WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANIES AT LEAST 72 HOURS BEFORE ANY OCCUPATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.
- EXISTING DRAINAGE STRUCTURES TO BE INSPECTED AND REPAIRED AS NEEDED, AND EXISTING PIPES TO BE CLEANED OUT TO REMOVE ALL SILT AND DEBRIS.
- EXISTING GRADE CONTOUR INTERVALS SHOWN AT 1 FOOT INTERVALS.
- PROPOSED GRADE CONTOUR INTERVALS SHOWN AT 1 FOOT INTERVALS.
- IF ANY EXISTING STRUCTURES TO REMAIN ARE DAMAGED DURING CONSTRUCTION IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REPAIR AND/OR REPLACE THE EXISTING STRUCTURE AS NECESSARY TO RETURN IT TO EXISTING CONDITIONS OR BETTER.
- ALL STORM PIPE ENTERING STRUCTURES SHALL BE GROUTED TO ASSURE CONNECTION AT STRUCTURE IS WATER-TIGHT.
- ALL STORM SEWER MANHOLES IN PAVED AREAS SHALL BE FLUSH WITH PAVEMENT, AND SHALL HAVE TRAFFIC BEARING LIDS. MANHOLES IN UNPAVED AREAS SHALL BE 6" ABOVE FINISH GRADE. LIDS SHALL BE LABELED "STORM SEWER".
- THE CONTRACTOR SHALL ADHERE TO ALL TERMS & CONDITIONS AS OUTLINED IN THE GENERAL PERMIT FOR STORMWATER DISCHARGE ASSOCIATED WITH CONSTRUCTION ACTIVITIES.
- CONTRACTOR SHALL ADJUST AND/OR CUT EXISTING PAVEMENT AS NECESSARY TO ASSURE A SMOOTH FIT AND CONTINUOUS GRADE.
- CONTRACTOR SHALL ASSURE POSITIVE DRAINAGE AWAY FROM BUILDINGS FOR ALL NATURAL AND PAVED AREAS.
- TOPOGRAPHIC INFORMATION PROVIDED BY BERNIERI CARR & ASSOCIATES, IF CONTRACTOR DOES NOT EXISTING TOPOGRAPHY AS SHOWN ON THE PLANS, WITHOUT EXCEPTION, HE SHALL HAVE MADE, AT HIS EXPENSE, A TOPOGRAPHIC SURVEY BY A REGISTERED LAND SURVEYOR AND SUBMIT IT TO THE OWNER FOR REVIEW.
- ALL UNSURFACED AREAS DISTURBED BY GRADING OPERATION SHALL RECEIVE 4 INCHES OF TOPSOIL. CONTRACTOR SHALL APPLY STABILIZATION FABRIC TO ALL SLOPES 1:2 OR STEEPER. CONTRACTOR SHALL SEED DISTURBED AREAS IN ACCORDANCE WITH THE LANDSCAPE PLAN AND THE SPDES PERMIT FOR CONSTRUCTION ACTIVITIES.
- CONSTRUCTION SHALL COMPLY WITH ALL APPLICABLE GOVERNING CODES AND BE CONSTRUCTED TO SAME.
- ALL STORM STRUCTURES SHALL HAVE A SMOOTH UNIFORM POURED MORTAR INVERT FROM INVERT TO INVERT OUT.
- CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL UTILITIES AND NOTIFYING THE APPROPRIATE UTILITY COMPANY PRIOR TO BEGINNING CONSTRUCTION.
- CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING STORM SEWER STRUCTURES, PIPES, AND ALL UTILITIES PRIOR TO CONSTRUCTION.
- ALL CONCRETE TO HAVE A MINIMUM 28 DAY COMPRESSION STRENGTH OF 3000 PSI, UNLESS OTHERWISE SPECIFIED ON THE DRAWINGS.
- REFER TO UTILITY PLAN FOR STORM SEWER INFORMATION.
- IT IS THE INTENT OF THIS DESIGN THAT ALL PAVEMENT SHALL HAVE A MINIMUM SLOPE OF 1.00%.
- ALL NECESSARY INSPECTIONS AND/OR CERTIFICATIONS REQUIRED BY CODES AND/OR UTILITY SERVICE COMPANIES SHALL BE PERFORMED PRIOR TO ANNOUNCED BUILDING POSSESSION AND THE FINAL CONNECTION OF SERVICES.
- THE VERTICAL DATUM IS BASED ON NORTH AMERICAN VERTICAL DATUM OF 1929 (NAVOD29).

SEQUENCE OF CONSTRUCTION:

- PRE-CONSTRUCTION MEETING HELD BY PROJECT MANAGER AND THE OPERATOR'S ENGINEER PRIOR TO LAND DISTURBING ACTIVITIES.
- HAVE A QUALIFIED PROFESSIONAL CONDUCT AN ASSESSMENT OF THE SITE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION AND CEED IN AN INSPECTION REPORT THAT THE APPROPRIATE EROSION AND SEDIMENT CONTROLS DESCRIBED IN THE SHIPPI ARE REQUIRED BY PART OF THE GP-0-15-002 HAVE BEEN ADEQUATELY INSTALLED OR IMPLEMENTED TO ENSURE OVERALL PREPAREDNESS OF THE SITE FOR THE COMMENCEMENT OF CONSTRUCTION.
- CONSTRUCT TEMPORARY CONSTRUCTION DITS AT LOCATIONS SHOWN ON DRAWING C140.
- INSTALL PERIMETER SILT FENCES AND TEMPORARY SEDIMENT BASIN IN THE LOCATIONS SHOWN ON DRAWING C140.
- BEGIN CLEARING AND GRUBBING OPERATIONS. CLEARING AND GRUBBING SHALL BE DONE ONLY IN AREAS WHERE EARTHWORK WILL BE PERFORMED AND ONLY IN AREAS WHERE BUILDING IS PLANNED TO COMMENCE WITHIN 14 DAYS AFTER CLEARING AND GRUBBING.
- COMMENCE SITE GRADING.
- INSTALL EROSION CONTROL BLANKETS ON ALL SLOPES GREATER THAN 3:1.
- DISTURBED AREAS OF THE SITE WHERE CONSTRUCTION ACTIVITY HAS CEASED FOR MORE THAN 14 DAYS SHALL BE TEMPORARILY SEEDDED AND WATERED.
- INSTALL INLET/OUTLET PROTECTION AT THE LOCATIONS OF ALL GREAT INLETS, CURB INLETS, AND AT THE ENDS OF ALL EXPOSED STORM SEWER PIPES.
- CONTRACTOR SHALL CURB, GUTTER INLETS, AREA INLETS, AND STORM SEWER MANHOLES AS SHOWN ON THE PLANS. INLET PROTECTION MAY BE REMOVED TEMPORARILY FOR THIS CONSTRUCTION.
- REMOVE INLET PROTECTION AROUND INLETS AND MANHOLES NO MORE THAN 48 HOURS PRIOR TO PLACING STABILIZED BASE COURSE.
- INSTALL BASE MATERIAL AS REQUIRED FOR PAVEMENT.
- CARRY OUT FINAL GRADING AND SEEDING AND PLANTING.
- REMOVE SILT FENCING ONLY AFTER ALL PAVING IS COMPLETE AND EXPOSED SURFACES ARE STABILIZED.
- REMOVE TEMPORARY CONSTRUCTION DITS ONLY PRIOR TO PAVEMENT CONSTRUCTION IN THESE AREAS (THESE AREAS ARE TO BE PAVED LAST).



LEGEND:

EXISTING GRADE	---
PROPOSED MAJOR CONTOUR	---
PROPOSED MINOR CONTOUR	---
SPOT ELEVATIONS	---
TOP OF GRATE ELEVATION	---
TOP OF CURB/ TOP OF PAVEMENT	---
SILT FENCE	---
INLET PROTECTION	---
CONSTRUCTION ENTRANCE	---
PROPOSED UNDERGROUND ELECTRIC	---
PROPOSED OVERHEAD ELECTRIC	---
PROPOSED GAS LINE	---
PROPOSED WATER	---
PROPOSED SANITARY SEWER	---
PROPOSED SANITARY FORCE MAIN	---
PROPOSED STORM SEWER	---
PROPOSED GAS	---
LIGHTPOLE	---
TEMPORARY SAMPLING AND DISINFECTION TAP	---
WATER VALVE	---
HYDRANT	---
CLEAN-OUT	---
STORM CATCH BASIN	---
STORM MANHOLE	---
SANITARY MANHOLE	---
SAW OUT LINE	---

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Project Manager: **A. HART, RLA**
 Designer: **J. BUSH**
 Date: **MAY 23, 2016**
 Project Number: **010487.00**

Client: **J. BASILE, PE**
 Title: **J. BUSH**
 Date: **MAY 23, 2016**
 Project Number: **010487.00**

GRADING PLAN

Scale: 1" = 30' SCALE BAR

Call 811 before you dig

C120

LANDSCAPE NOTES:

1. ALL PLANTS MUST BE HEALTHY, WOODRUS, AND FREE OF PESTS AND DISEASE.
2. STANDARDS SET FORTH IN AMERICAN STANDARD FOR NURSERY STOCK, ANSI, Z60.1 (LATEST EDITION), REPRESENT GUIDELINE SPECIFICATIONS ONLY AND SHALL CONSTITUTE MINIMUM QUALITY REQUIREMENTS FOR PLANT MATERIAL.
3. ALL PLANTS MUST BE HARDY UNDER CLIMATE CONDITIONS THAT EXIST AT THE PROJECT SITE AND GROWN AT A NURSERY AT THE SAME HARDNESS ZONE AS THE PROJECT LOCATION.
4. NO SUBSTITUTIONS SHALL BE PERMITTED WITHOUT PRIOR WRITTEN APPROVAL OF THE OWNER OR OWNER'S REPRESENTATIVE.
5. ALL TREES MUST BE STRAIGHT TRUNKED, INJURY FREE, AND FULL HEADED.
6. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL QUANTITIES SHOWN ON THESE PLANS BEFORE PRICING THE WORK.
7. ANY DISCREPANCY WITH QUANTITIES, LOCATIONS AND / OR FIELD CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.
8. MULCH ALL ISLANDS AND PLANTINGS IN LAWN AREAS WITH SHREDED HARDWOOD MULCH TO A MINIMUM DEPTH OF THREE (3) INCHES UNLESS OTHERWISE DIRECTED.
9. ANY PLANT WHICH DIES, TURNS BROWN, OR DEFOLIATES (PRIOR TO TOTAL ACCEPTANCE OF THE WORK) SHALL BE PROMPTLY REMOVED FROM THE SITE AND REPLACED WITH MATERIAL OF THE SAME SPECIES, QUANTITY AND SIZE MEETING ALL PLANT LIST SPECIFICATIONS.
10. THE CONTRACTOR IS RESPONSIBLE FOR FULLY MAINTAINING ALL PLANT MATERIALS (INCLUDING, BUT NOT LIMITED TO, WATERING, SPRINKLING, MULCHING, FERTILIZING, AND REMOVAL OF STAVES AND CUTS) AND LAWN AREAS UNTIL THE WORK IS ACCEPTED IN TOTAL BY THE OWNER.
11. THE CONTRACTOR SHALL COMPLETELY GUARANTEE ALL PLANT MATERIAL FOR A PERIOD OF ONE (1) YEAR, BEGINNING ON THE DATE OF TOTAL ACCEPTANCE. THE CONTRACTOR SHALL PROMPTLY MAKE ALL REPLACEMENTS BEFORE THE END OF THE GUARANTEE PERIOD.
12. ALL AREAS DISTURBED BY UTILITY INSTALLATION AND SITE GRADING ACTIVITY SHALL RECEIVE APPROVED TOPSOIL TO A COMPACTED DEPTH OF FOUR (4) INCHES, UNLESS OTHERWISE SPECIFIED BY THE GOVERNING MUNICIPALITY, BE FINE GRADED, SEEDED, MULCHED AND WATERED UNTIL A HEALTHY STRAND OF GRASS IS OBTAINED.
13. ALL TOPSOIL SHALL BE SCREENED LOAM SURFACE SOIL, FREE OF STONES AND SHALL HAVE THE FOLLOWING MINIMUM REQUIREMENTS:
 - a) AN ORGANIC CONTENT OF 6-12%
 - b) SOIL ACIDITY RANGE OF pH 6.0 TO pH 6.8
 - c) SOLUBLE SALTS OF 1000 PPM OR LESS
 - d) MAXIMUM CLAY CONTENT OF 15-20
14. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING, AT THEIR EXPENSE, A CERTIFIED SOIL TEST ANALYSIS OF ON SITE AND / OR IMPORTED TOPSOIL. TOPSOIL ANALYSIS TO INCLUDE THE FOLLOWING DATA:
 - a) pH FACTOR.
 - b) MECHANICAL ANALYSIS, INCLUDING SIEVE ANALYSIS PROVIDING SEPARATE SAND, SILT AND CLAY PERCENTAGES.
 - c) PERCENTAGE OF ORGANIC CONTENT BY WEIGHT
 - d) NUTRIENT LEVELS INCLUDING NITROGEN, PHOSPHORUS AND POTASSIUM.
15. SHOULD TESTS AND ANALYSIS INDICATE THAT SOIL PROPOSED FOR USE IS DEFICIENT IN ANY OF THE ABOVE REQUIREMENTS, A SYSTEM OF AMELIORATING MAY BE PROPOSED FOR APPROVAL. ANY SYSTEM PROPOSED SHALL PROVIDE FOR AN ACIDITY RANGE OF PH 6.0 TO 6.8 INCLUDING:
 - a) ORGANIC CONTENT OF 35-60% (DRY WEIGHT BASIS)
 - b) LOOSE AND FRAGILE WITH MOISTURE CONTENT OF 35-60% (WET WEIGHT BASIS)
 - c) PARTICLE SIZE SHALL BE <1/2" INCH (100K PASSING)
 - d) SOLUBLE SALTS CONCENTRATION SHALL BE <4.0 MMHOS/CM (DS/M), MAXIMUM
 - e) pH RANGE OF 6.0-6.5
16. COMPOST SHALL MEET THE FOLLOWING MINIMUM REQUIREMENTS:
 - a) ORGANIC CONTENT OF 35-60% (DRY WEIGHT BASIS)
 - b) LOOSE AND FRAGILE WITH MOISTURE CONTENT OF 35-60% (WET WEIGHT BASIS)
 - c) PARTICLE SIZE SHALL BE <1/2" INCH (100K PASSING)
 - d) SOLUBLE SALTS CONCENTRATION SHALL BE <4.0 MMHOS/CM (DS/M), MAXIMUM
 - e) pH RANGE OF 6.0-6.5
17. PLANTING MIX FOR PLANT PITS SHALL BE COMPOSED OF 2 PARTS IMPORTED OR ON-SITE SCREENED TOPSOIL AND 1 PART COMPOST. THE RATIO OF TOPSOIL TO COMPOST IS SUBJECT TO CHANGE BASED ON THE TESTING RESULTS FOR TOPSOIL.
18. LOCATIONS OF EXISTING BURIED UTILITIES SHOWN ON THE PLAN ARE BASED UPON BEST AVAILABLE INFORMATION AND ARE TO BE CONSIDERED APPROXIMATE. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE LOCATIONS OF ALL UNDERGROUND UTILITY LINES ADJACENT TO THE WORK AREA. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING ANY AND ALL DAMAGE TO UTILITIES, STRUCTURES AND SITE APPURTENANCES, ETC., WHICH OCCURS AS A RESULT OF THE LANDSCAPE INSTALLATION.
19. THE CONTRACTOR IS RESPONSIBLE FOR INSTALLING ALL PLANT MATERIAL PER DETAILS. ANY DEVIATIONS FROM THE DETAIL MUST BE APPROVED BY THE OWNER'S REPRESENTATIVE OR LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.
20. SEE SHEET C503 FOR LANDSCAPE DETAILS.
21. UPON FINAL ACCEPTANCE OF THE LANDSCAPE INSTALLATION, THE OWNER WILL ASSUME MAINTENANCE OF THE LANDSCAPED AREAS.
22. EXISTING TREES TO REMAIN SHALL BE PROTECTED BY INSTALLING A TEMPORARY FENCE AT THE OUTER LIMITS OF THE TREE CANOPY.

ARSENAL STREET



LEGEND

- (+) PROPOSED TREES (SEE PLANT LIST)
- (o) PROPOSED SHRUB (SEE PLANT LIST)
- (o) PROPOSED PERENNIAL (SEE PLANT LIST)
- (o) EXISTING TREES TO REMAIN
- SR 1/2 TWO LETTER KEY (SEE PLANT LIST)
- QUANTITY

SEED SCHEDULE 'A' (GENERAL LAWN AREAS)

- 5 lbs./1,000 s.f.
- 30% CRYSTAL LOU CREEPING RED FESCUE
- 50% PERENNIAL Ryegrass (Mn. 3 VARIETIES)
- 20% KENTUCKY BLUEGRASS (Mn. 2 VARIETIES)

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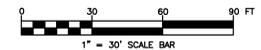
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Project Manager A. HART, RLA	Checked By A. HART, RLA
Designer T. LIDDELL, RLA	Reviewed By T. LIDDELL, RLA
Date MAY 23, 2016	Scale 1" = 30'
Project Number 010487.00	

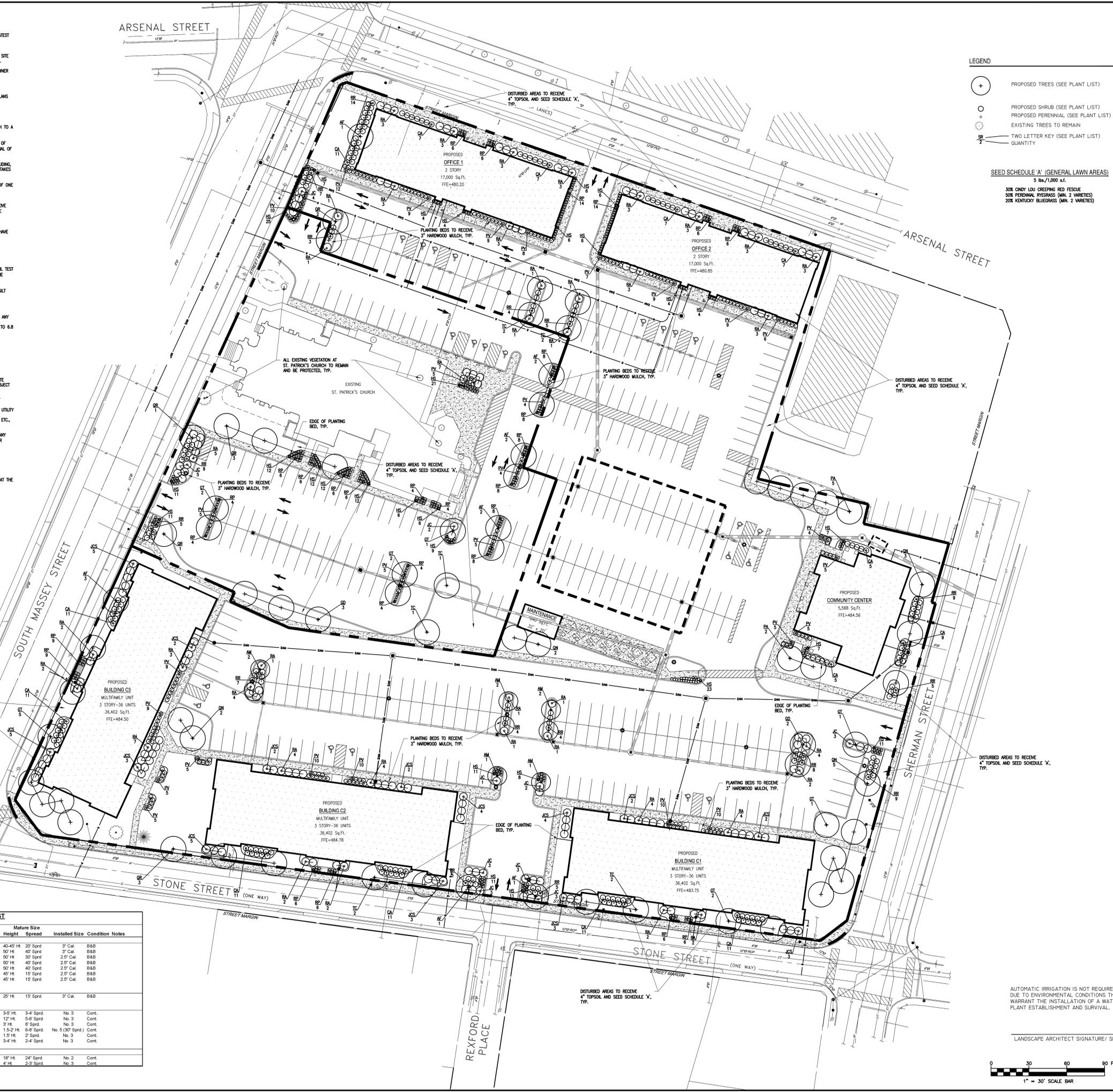
LANDSCAPE PLAN

AUTOMATIC IRRIGATION IS NOT REQUIRED ON THIS PROJECT DUE TO ENVIRONMENTAL CONDITIONS THAT DO NOT WARRANT THE INSTALLATION OF A WATERING SYSTEM FOR PLANT ESTABLISHMENT AND SURVIVAL.

LANDSCAPE ARCHITECT SIGNATURE/ SEAL



C130



PLANT LIST

Key Botanical Name	Common Name	Mature Size Height Spread	Installed Size	Condition Notes
Shade Trees				
AF Acer fraxinifolium 'Celebration'	Celebration Maple	40-45' Ht 20' Sprd	3' Cal	B&B
GD Gymnocladia dioica	Kentucky Coffee Tree	50' Ht 40' Sprd	3' Cal	B&B
GT Gleditsia triacanthos inermis 'Skycole'	Skyline Honeylocust	50' Ht 30' Sprd	2.5' Cal	B&B
PA Platanus acerifolia 'Bloodgood'	Bloodgood London Planetree	50' Ht 40' Sprd	2.5' Cal	B&B
QN Quercus rubra	Northern Red Oak	50' Ht 40' Sprd	2.5' Cal	B&B
QR Quercus robur fastigiata	Pyramidal English Oak	45' Ht 15' Sprd	2.5' Cal	B&B
TC Tilia cordata 'Corzani' Corinthian	Corinthian Little Leaf Linden	45' Ht 15' Sprd	2.5' Cal	B&B
Flowering Trees				
AM Amelanchier canadensis 'Tradition'	Tradition Serviceberry	25' Ht 15' Sprd	3' Cal	B&B
Deciduous / Evergreen Shrubs				
CA Celiastris anthifolia 'Hummingbird'	Hummingbird Summersweet	3-5' Ht 3-4' Sprd	No. 3	Cont.
JC Juniperus conferta 'Blue Pacific'	Blue Pacific Shrub Juniper	12' Ht 5-6' Sprd	No. 3	Cont.
JCS Juniperus chinensis 'Sea Green'	Sea Green Juniper	3' Ht 6' Sprd	No. 3	Cont.
RA Rhus aromatica 'Gro-Low'	Gro-Low Fragrant Sumac	1.5-2' Ht 6-8' Sprd	No. 5 (30' Sprd)	Cont.
RP Rosa 'Maggal'	Peach Drift Rose	1.5' Ht 2' Sprd	No. 3	Cont.
RR Rosa 'Radlet'	Double Knockout Rose	3-4' Ht 2-4' Sprd	No. 3	Cont.
Perennials / Ornamental Grasses				
HS Hemerocallis 'Stella D'oro'	Stella D'oro Daylily	18" Ht 3-4' Sprd	No. 2	Cont.
SHV Panicum virgatum 'Shenandoah'	Shenandoah Red Switch Grass	4' Ht 2-3' Sprd	No. 3	Cont.

11/11/2015 3:43:50 PM I:\Cor Development\010487.00 COR - MERCY REDEVELOPMENT\4.0 Design\4.1 CML\C130.dwg



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Author: R. GARCIA - OLS	Checker: T. BURKE
Date: MAY 23, 2016	Scale: 1" = 30'
Project Number: 010487.00	

SITE LIGHTING PLAN

ARSENAL STREET

ARSENAL STREET

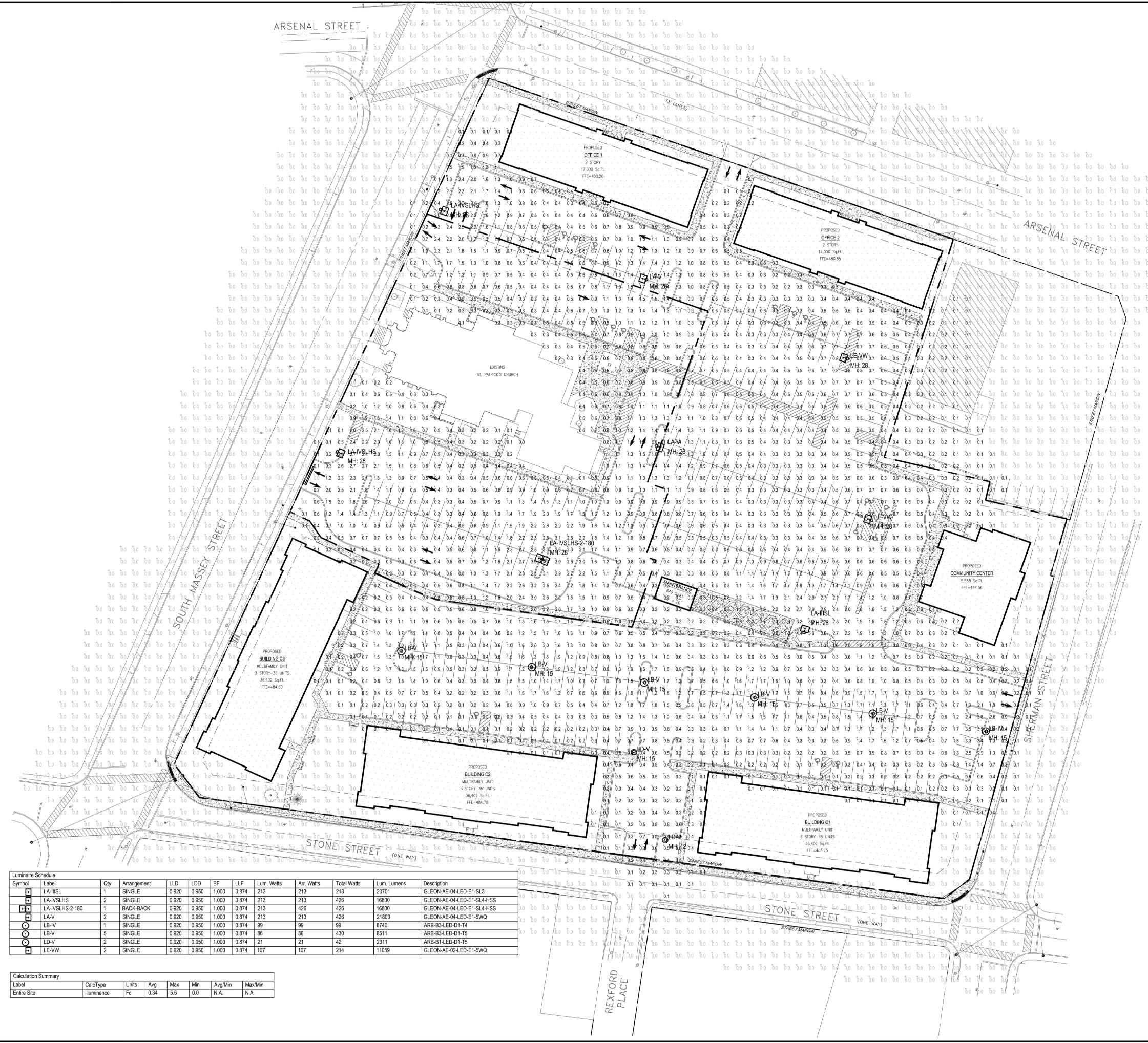
SOUTH MASSEY STREET

SHERMAN STREET

STONE STREET

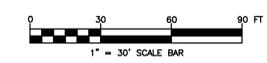
STONE STREET

REXFORD PLACE

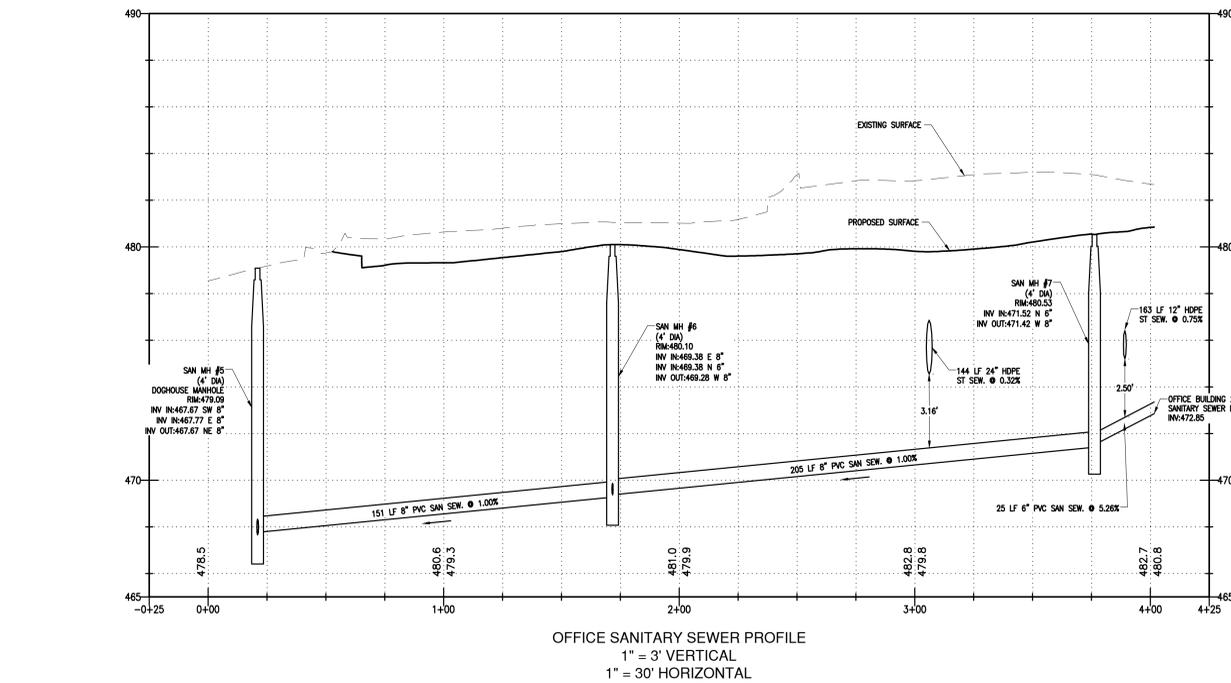
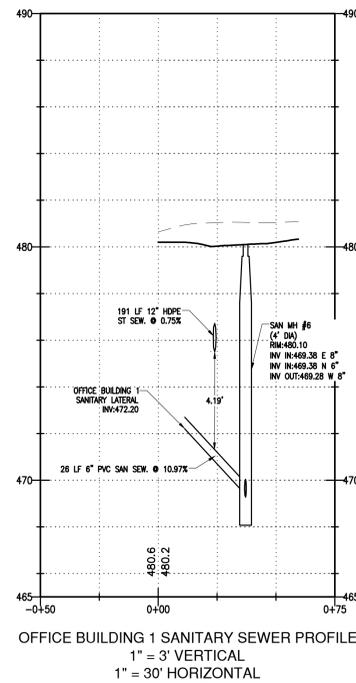
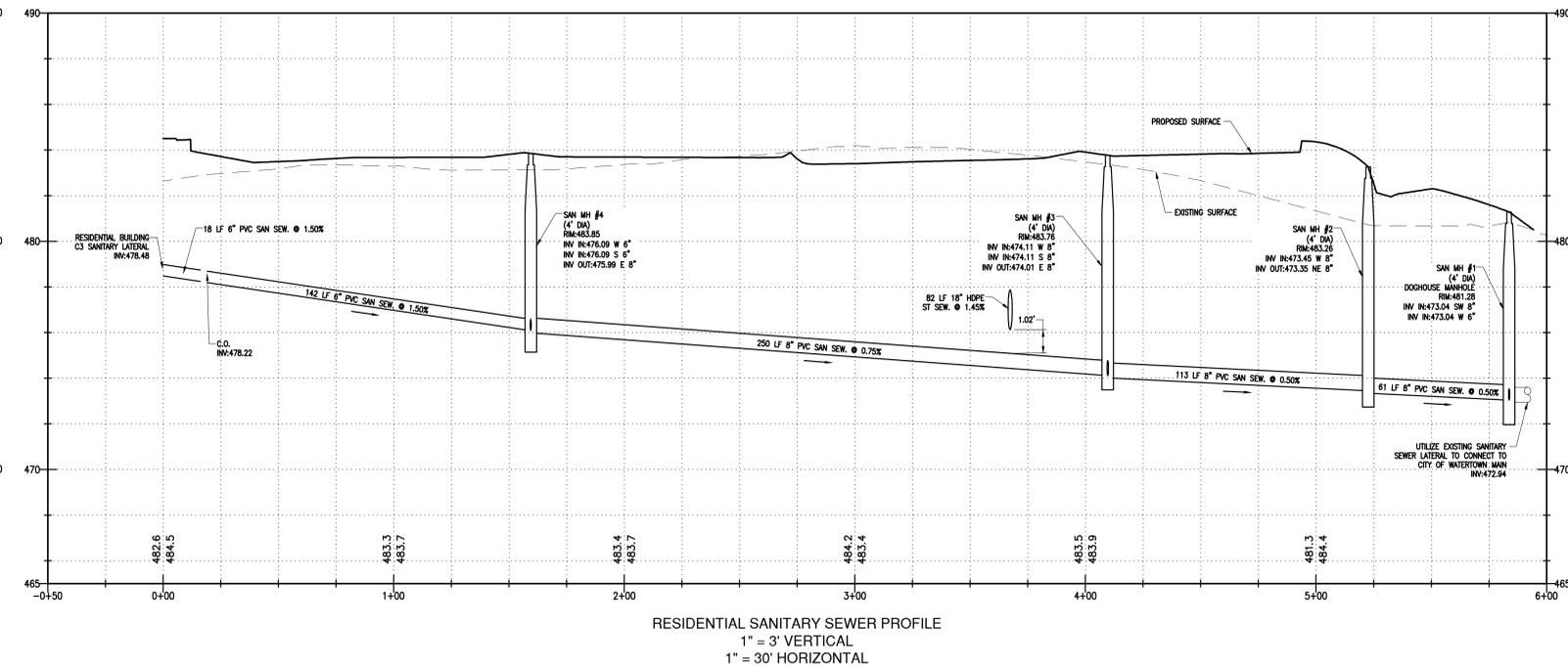
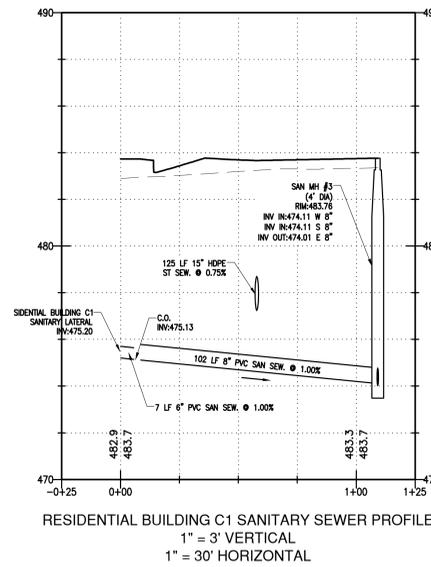
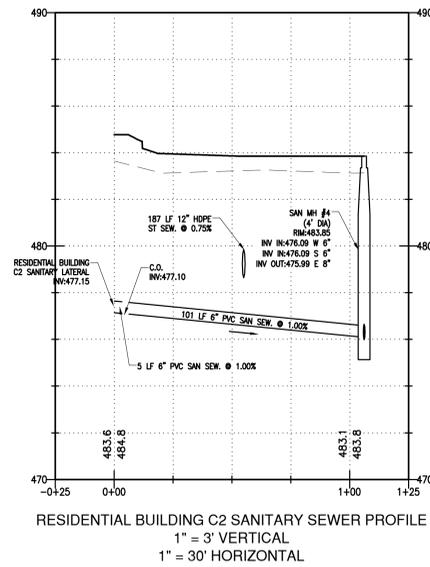


Symbol	Label	Qty	Arrangement	LLD	LDD	BF	LLF	Lum. Watts	Arr. Watts	Total Watts	Lum. Lumens	Description
□	LA-HISL	1	SINGLE	0.920	0.950	1.000	0.874	213	213	20701	20701	GLEON-AE-04-LED-E1-SL3
□	LA-IVSLHS	2	SINGLE	0.920	0.950	1.000	0.874	213	213	426	16800	GLEON-AE-04-LED-E1-SL4-HSS
□	LA-IVSLHS-2-180	1	BACK-BACK	0.920	0.950	1.000	0.874	213	426	426	16800	GLEON-AE-04-LED-E1-SL4-HSS
□	LA-V	2	SINGLE	0.920	0.950	1.000	0.874	213	213	426	21803	GLEON-AE-04-LED-E1-SWQ
○	LB-IV	1	SINGLE	0.920	0.950	1.000	0.874	99	99	99	8740	ARB-B3-LED-D1-T4
○	LB-V	5	SINGLE	0.920	0.950	1.000	0.874	86	86	430	8511	ARB-B3-LED-D1-T5
○	LD-V	2	SINGLE	0.920	0.950	1.000	0.874	21	21	42	2311	ARB-B1-LED-D1-T5
□	LE-VW	2	SINGLE	0.920	0.950	1.000	0.874	107	107	214	11059	GLEON-AE-02-LED-E1-SWQ

Calculation Summary						
Label	CalcType	Units	Avg	Max	Min	Avg/Min
Entire Site	ILLUMINANCE	Fc	0.34	5.6	0.0	N.A.



REVISIONS			
NO.	DATE	DESCRIPTION	REV. CK'D
1	7/14/16	CITY COMMENTS	JB JCB



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NOT FOR
CONSTRUCTION**

PROFESSIONAL CERTIFICATION: I CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF NEW YORK. LICENSE NO. 62472 EXPIRATION DATE: 05/2017

TO THE BEST OF MY KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGEMENT, THE PLANS AND SPECIFICATIONS ARE IN COMPLIANCE WITH THE 2015 ENERGY CONSTRUCTION CONSERVATION CODE OF THE STATE OF NEW YORK.

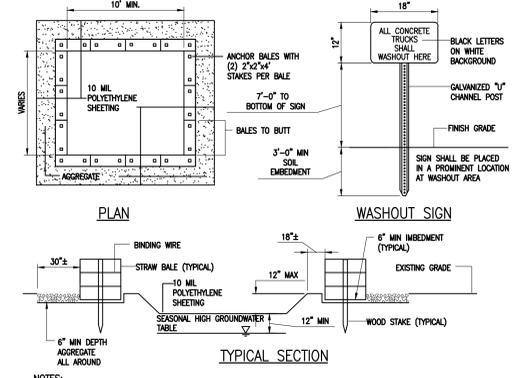
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Note: Unauthorized alteration or addition to this drawing is a violation of the New York State Education Law Article 145, Section 7209.
Project Name: **A. HART, RLA** / **J. BASILE, PE**
Drawn by: **T. BURKE** / **T. BURKE**
Date: **MAY 23, 2016** / **AS SHOWN**
Project Number: **010487.00**

**SANITARY PROFILE
SHEET**

REVISIONS		
NO.	DATE	DESCRIPTION
1	7/14/16	CITY COMMENTS

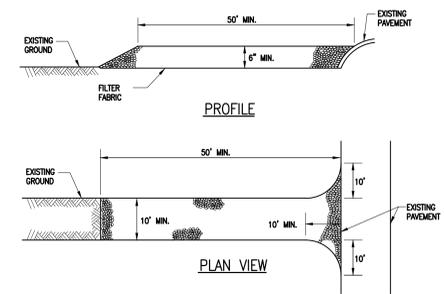
NOTE:

1. ALL WORK TO BE PERFORMED WITHIN THE CITY OF WATERTOWN MARGIN WILL REQUIRE SIGN-OFF FROM A PROFESSIONAL ENGINEER, LICENSED AND CURRENTLY REGISTERED TO PRACTICE IN THE STATE OF NEW YORK. THAT THE WORK WAS BUILT ACCORDING TO THE APPROVED SITE PLAN AND APPLICABLE CITY OF WATERTOWN STANDARDS. COMPACTION TESTING WILL BE REQUIRED FOR ALL WORK TO BE PERFORMED WITHIN THE CITY OF WATERTOWN MARGIN AND MUST BE SUBMITTED TO THE CITY OF WATERTOWN CODES DEPARTMENT.



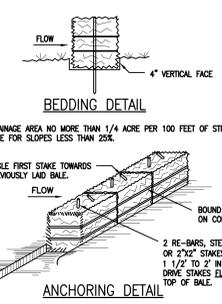
- NOTES:**
1. CONTAINMENT MUST BE STRUCTURALLY SOUND AND LEAK FREE AND CONTAIN ALL LIQUID WASTES.
 2. CONTAINMENT DEVICES MUST BE OF SUFFICIENT QUANTITY OR VOLUME TO COMPLETELY CONTAIN THE LIQUID WASTES GENERATED AT CONSTRUCTION PROCESSES.
 3. WASHOUT MUST BE CLEANED OR NEW FACILITIES CONSTRUCTED AND READY TO USE ONCE WASHOUT IS 75% FULL.
 4. WASHOUT AREAS SHALL BE INSTALLED IN A LOCATION EASILY ACCESSIBLE BY CONCRETE TRUCKS.
 5. ONE OR MORE AREAS MAY BE INSTALLED ON THE CONSTRUCTION SITE AND MAY BE RELOCATED AS CONSTRUCTION PROGRESSES.
 6. AT LEAST WEEKLY REMOVE ACCUMULATION OF SAND AND AGGREGATE AND DISPOSE OF PROPERLY.

CONCRETE WASHOUT AREA
NO SCALE

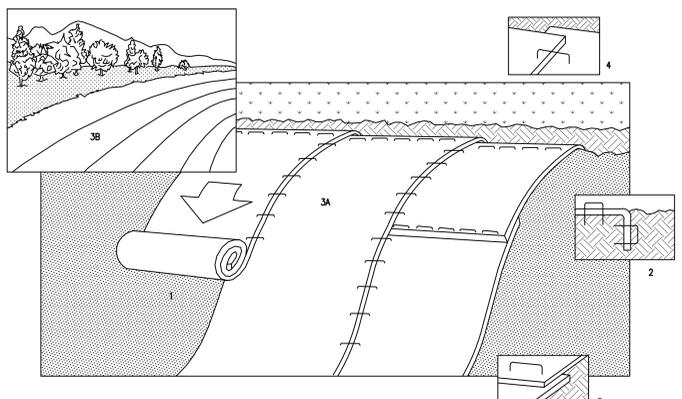


- CONSTRUCTION SPECIFICATIONS**
1. STONE SIZE - USE 2" STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
 2. LENGTH - NOT LESS THAN 50 FEET (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30 FOOT MINIMUM LENGTH WOULD APPLY).
 3. THICKNESS - NOT LESS THAN SIX (6) INCHES.
 4. WIDTH - TEN (10) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.
 5. FILTER CLOTH - WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE. FILTER WILL NOT BE REQUIRED ON A SINGLE FAMILY RESIDENCE LOT.
 6. SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARDS CONSTRUCTION ENTRANCE SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
 7. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, TRAPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
 8. WASHING - WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHTS-OF-WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
 9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

TEMPORARY STABILIZED CONSTRUCTION ENTRANCE DETAIL
NO SCALE

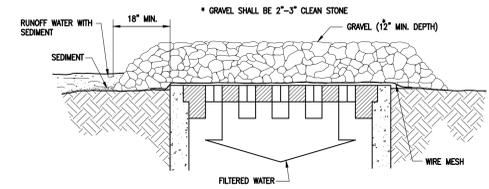


STRAW BALE DIKE DETAIL
NO SCALE



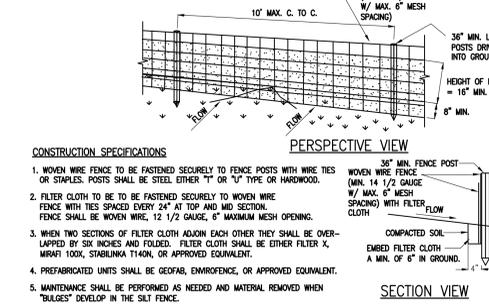
- NOTE:** REFER TO GENERAL STAPLE PATTERN GUIDE FOR CORRECT STAPLE PATTERN RECOMMENDATIONS FOR SLOPE INSTALLATIONS.
1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING APPLICATION OF LIME, FERTILIZER, AND SEED. NOTE: WHEN USING CELL-O-SEED DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
 2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE BLANKET IN 6" DEEP X 6" WIDE TRENCH BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
 3. ROLL THE BLANKETS (A) DOWN OR (B) HORIZONTALLY ACROSS THE SLOPE.
 4. THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH APPROXIMATELY 2" OVERLAP.
 5. WHEN BLANKETS MUST BE SPLICED DOWN THE SLOPE, PLACE BLANKETS END OVER END (SINGLE STYLE) WITH APPROXIMATELY 4" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART.
 6. MANUFACTURERS INSTALLATION INSTRUCTIONS SHALL SUPERCEDE THIS DETAIL.
- INSTALLATION OF GEOSYNTHETICS EROSION CONTROL MATS**
1. EROSION CONTROL MATS SHALL BE UTILIZED ON ALL SLOPES GREATER THAN 1:3 REQUIRING PERMANENT STABILIZATION.
 2. SLOPES SHALL BE PREPARED AND EROSION CONTROL MATS SHALL BE INSTALLED, ANCHORED AND SOIL FILLED IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS AND INSTALLATION PROCEDURES.
 3. SEEDING SHALL BE COMPLETED IN ACCORDANCE WITH THE PERMANENT SEEDING SPECIFICATIONS ABOVE PRIOR TO PLACEMENT OF THE EROSION CONTROL MAT. A SECOND APPLICATION OF PERMANENT SEEDING SHALL BE APPLIED AFTER THE MAT IS IN PLACE, PRIOR TO SOIL FILLING THE MAT.
 4. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTENANCE, RESEEDING AND REPAIR OF MATS AND SLOPES UNTIL PERMANENT STABILIZATION IS ACHIEVED.

EROSION CONTROL MAT INSTALLATION
NO SCALE

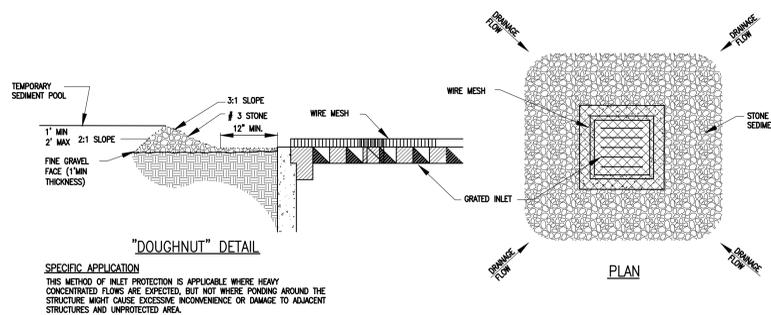


- SPECIFIC APPLICATION**
THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE HEAVY CONCENTRATED FLOWS ARE EXPECTED, BUT NOT WHERE PONDING AROUND THE STRUCTURE MIGHT CAUSE EXCESSIVE INCONVENIENCE OR DAMAGE TO ADJACENT STRUCTURES AND UNPROTECTED AREAS.

GRAVEL AND WIRE MESH INLET SEDIMENT FILTER
NO SCALE



SILT FENCE INSTALLATION DETAIL
NO SCALE



STONE DROP INLET PROTECTION STRUCTURE
NO SCALE

- SPECIFIC APPLICATION**
THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE HEAVY CONCENTRATED FLOWS ARE EXPECTED, BUT NOT WHERE PONDING AROUND THE STRUCTURE MIGHT CAUSE EXCESSIVE INCONVENIENCE OR DAMAGE TO ADJACENT STRUCTURES AND UNPROTECTED AREA.

SITE SPECIFIC DATA REQUIREMENTS			
STRUCTURE ID	V9000		
WATER QUALITY FLOW RATE (CFS)	4.81		
PEAK FLOW RATE (CFS)	8.86		
RETURN PERIOD OF PEAK FLOW (YRS)	100		
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	473.880	HDPE	24"
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE	473.880	HDPE	24"
RIM ELEVATION	483.20		
ANTI-FLOTATION BALLAST	WIDTH	HEIGHT	
	N/A	N/A	
NOTES/SPECIAL REQUIREMENTS:			

GENERAL NOTES

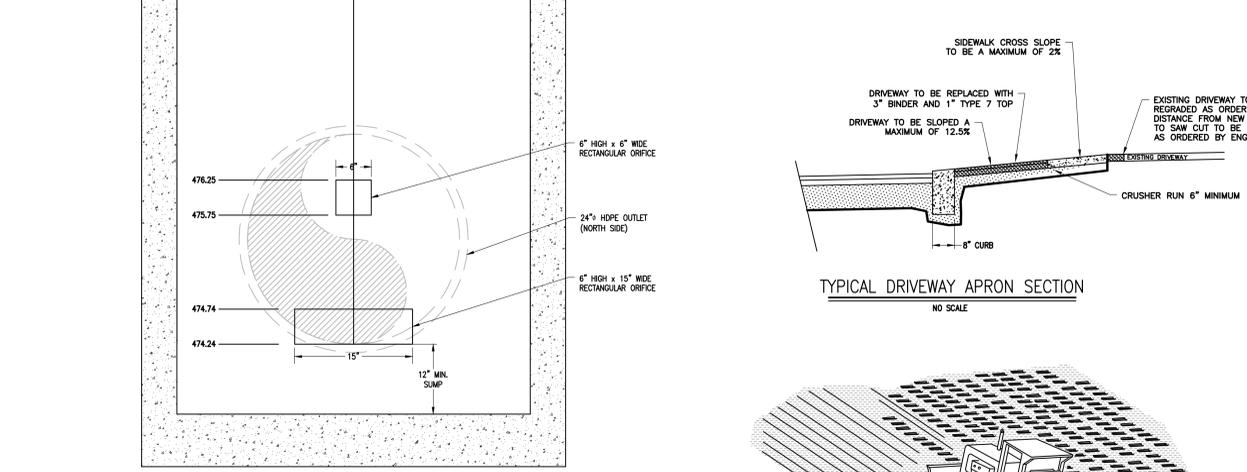
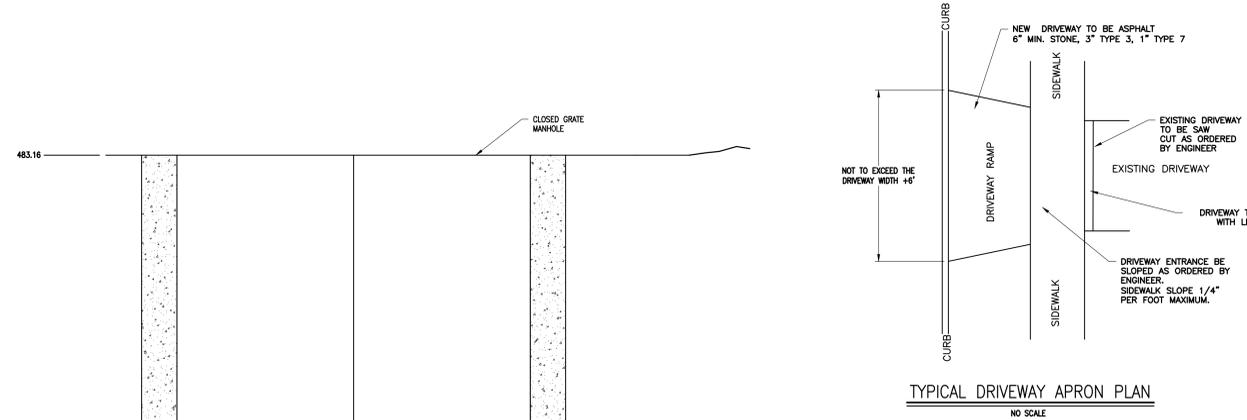
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH () ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH REPRESENTATIVE. www.contech-es.com
4. VORTEXES WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO H20 AND CASTINGS SHALL MEET AASHTO M306 LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. INLET PIPES MUST BE PERPENDICULAR TO THE VAULT AND AT THE CORNER TO INTRODUCE THE FLOW TANGENTIALLY TO THE SWIRL CHAMBER. DUAL INLETS NOT TO HAVE OPPOSING TANGENTIAL FLOW DIRECTIONS.
7. OUTLET PIPES MUST BE DOWN STREAM OF THE FLOW CONTROL Baffle AND MAY BE LOCATED ON THE SIDE OR END OF THE VAULT. THE FLOW CONTROL WALL MAY BE TURNED TO ACCOMMODATE OUTLET PIPE KNOCKOUTS ON THE SIDE OF THE VAULT.

INSTALLATION NOTES

- A. ANY SUB-BASE, BACKFILL, DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
- B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE VORTEXES STRUCTURE, LIFTING CLUTCHES PROVIDED.
- C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
- D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
- E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE WATERS TO BE WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

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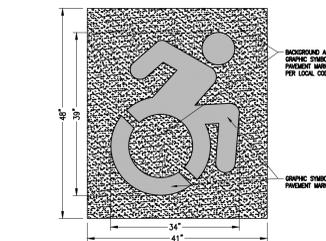
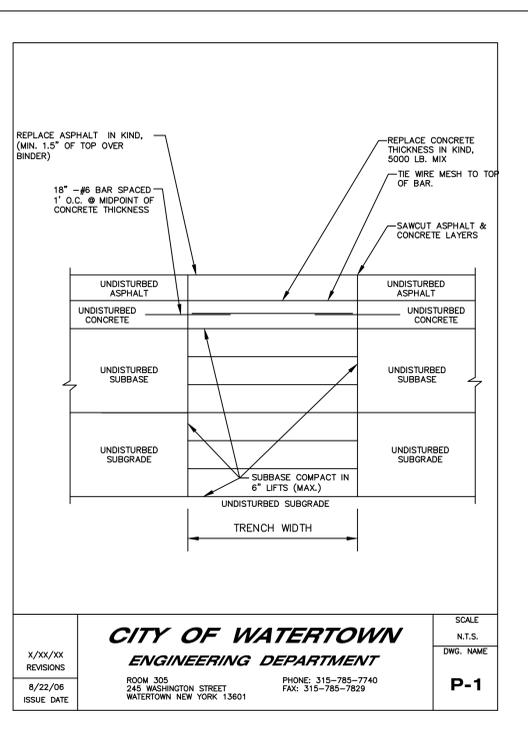
Note: Unauthorized alteration or addition to this drawing is a violation of the New York State Education Law Article 145, Section 7209.

Project Engineer A. HART, RLA	Checker J. BASILE, PE
Designer T. BURKE	Planner T. BURKE
Date MAY 23, 2016	Scale N.T.S.
Project Number 010487.00	

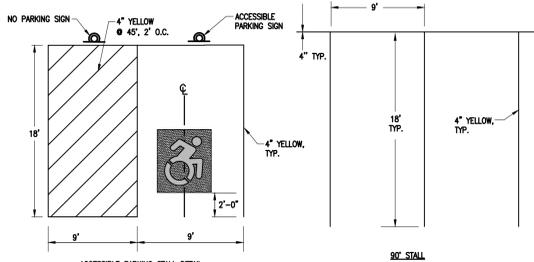
**EROSION AND
SEDIMENT CONTROL
DETAILS**

NOTE:

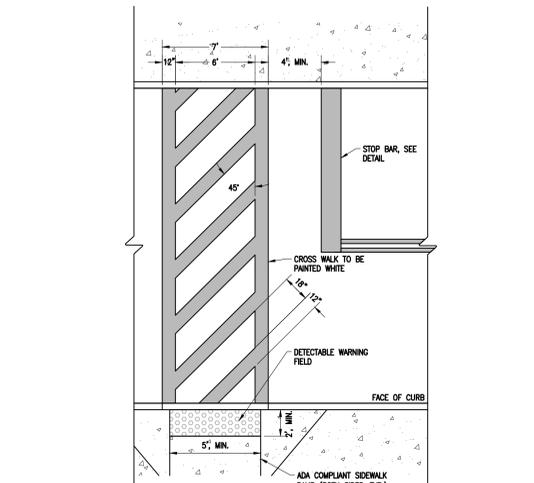
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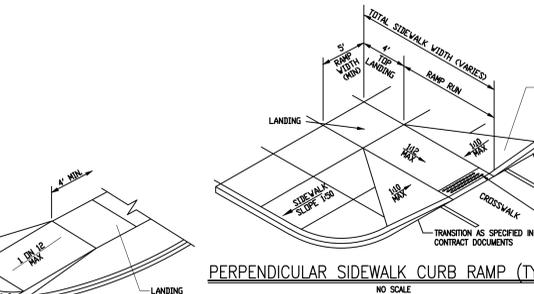
ACCESSIBLE PARKING PAVEMENT SYMBOL
N.T.S.



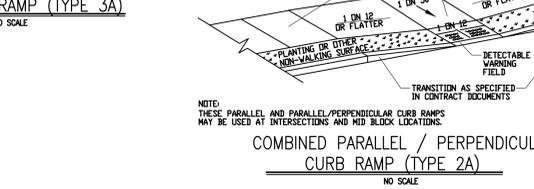
ACCESSIBLE PARKING STALL DETAIL
9' STALL



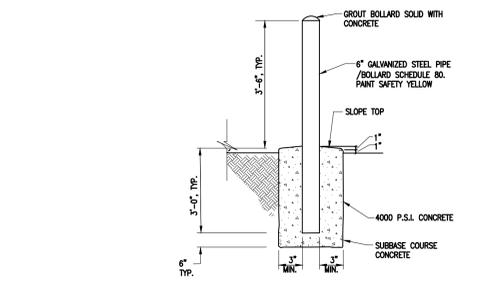
TYPICAL STRIPING DETAILS
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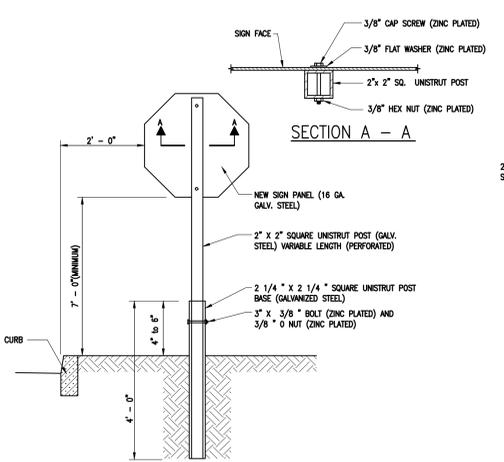
PAINTED CROSSWALK DETAIL
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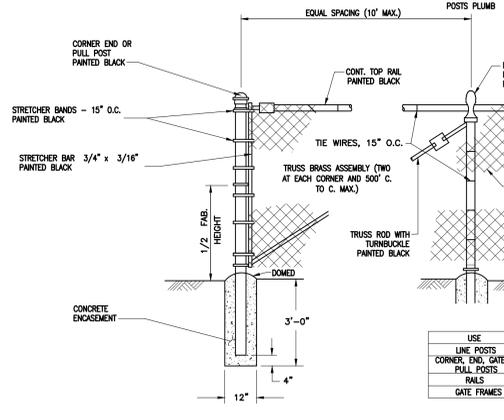
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NO SCALE



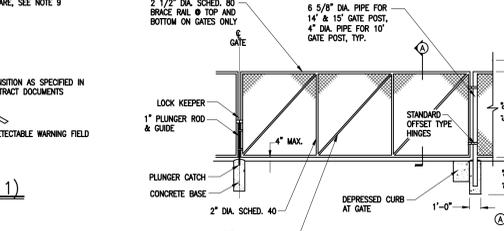
6\"/> GALV. STEEL PIPE BOLLARD DETAIL
NO SCALE



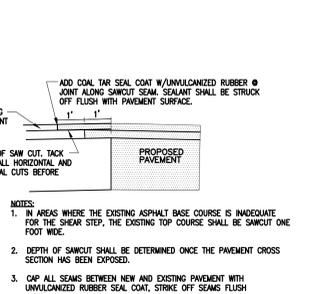
POST MOUNT SIGN INSTALLATION IN SOIL AND CONCRETE WALK
NO SCALE



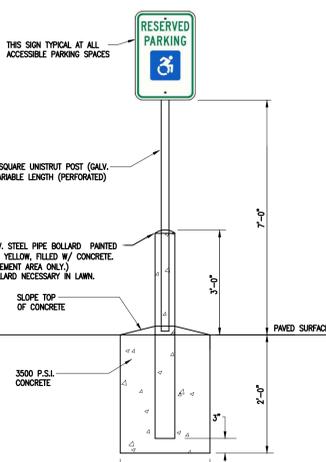
CHAIN-LINK FENCE (6' HEIGHT) DETAIL
NO SCALE



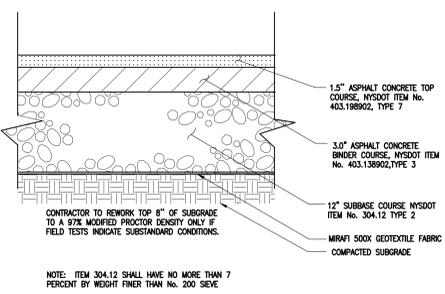
CHAIN-LINK FENCE (6' HEIGHT) SWING GATE DETAIL
NO SCALE



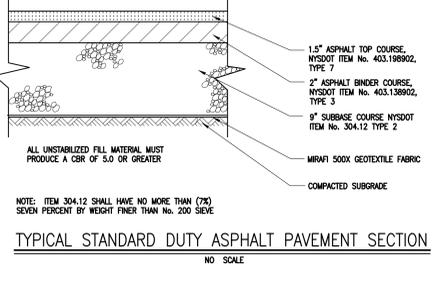
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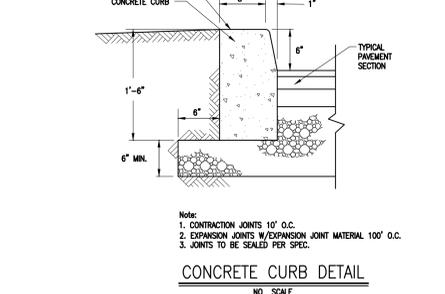
ACCESSIBLE PARKING SIGN DETAIL
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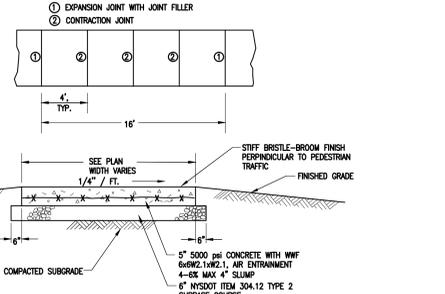
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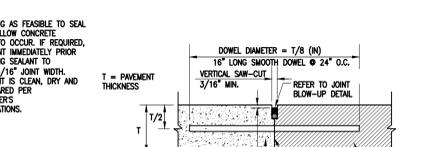
TYPICAL STANDARD DUTY ASPHALT PAVEMENT SECTION
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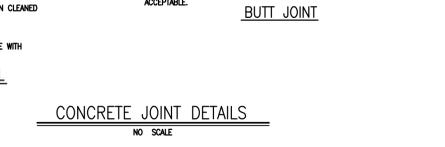
CONCRETE CURB DETAIL
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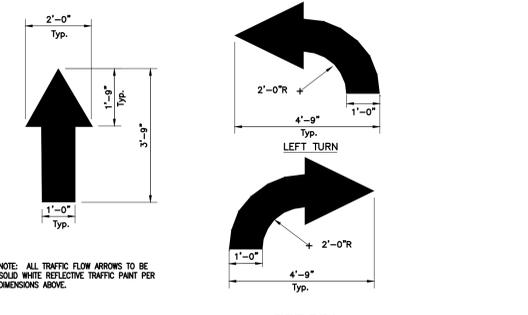
CONCRETE SIDEWALK SECTION
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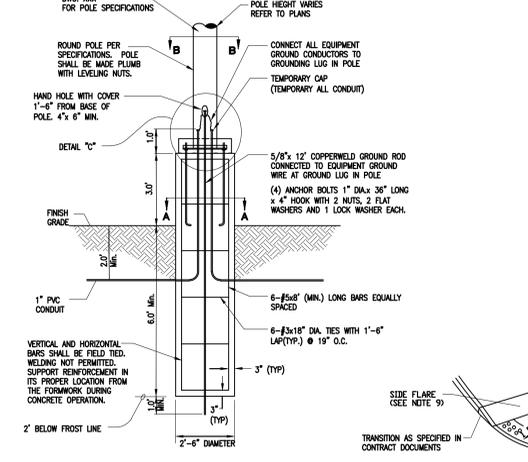
JOINT BLOW-UP DETAIL
NO SCALE



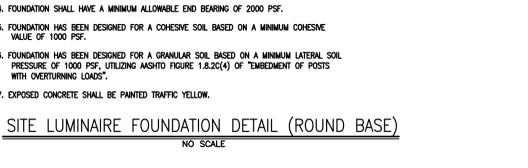
CONCRETE JOINT DETAILS
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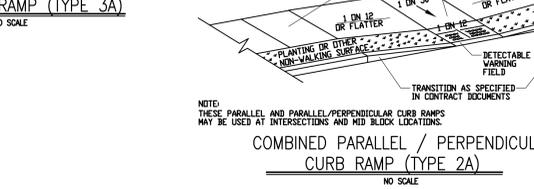
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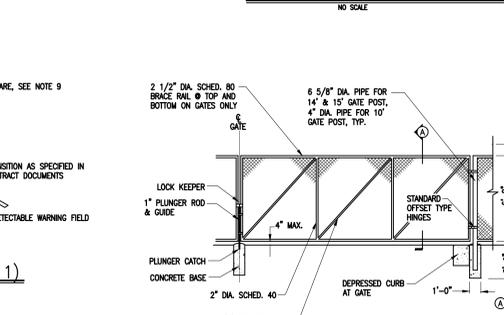
SITE LUMINAIRE FOUNDATION DETAIL (ROUND BASE)
NO SCALE



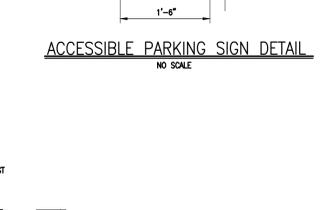
PERPENDICULAR SIDEWALK CURB RAMP (TYPE 1)
NO SCALE



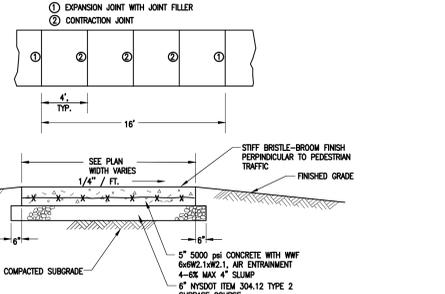
COMBINED PARALLEL / PERPENDICULAR CURB RAMP (TYPE 2A)
NO SCALE



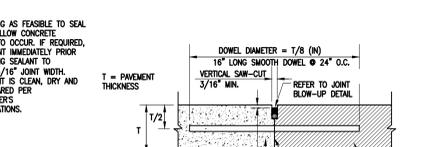
CHAIN-LINK FENCE (6' HEIGHT) SWING GATE DETAIL
NO SCALE



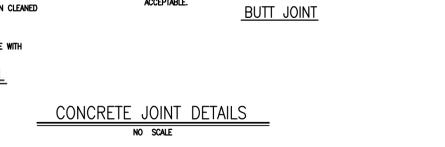
ACCESSIBLE PARKING SIGN DETAIL
NO SCALE



CONCRETE SIDEWALK SECTION
NO SCALE



JOINT BLOW-UP DETAIL
NO SCALE



CONCRETE JOINT DETAILS
NO SCALE

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28 East Main Street
200 First Federal Plaza
Rochester, NY 14614
office: 585.232.5135
fax: 585.232.4652
www.bergmannpc.com

REVISIONS		
NO.	DATE	DESCRIPTION
1	7/14/16	CITY COMMENTS

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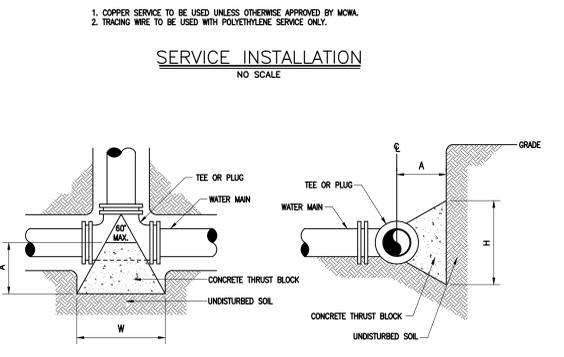
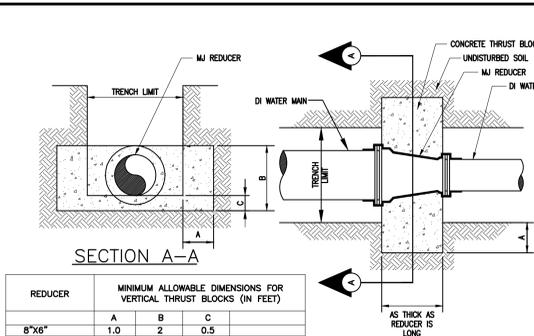
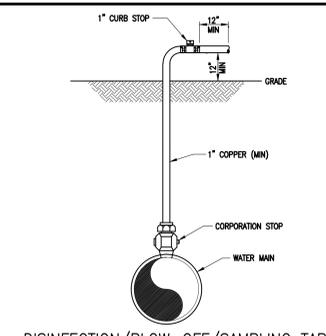
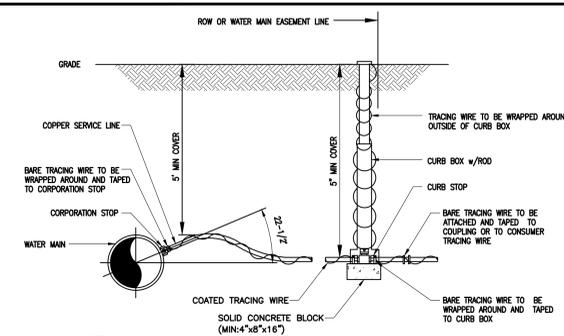
Project Engineer		Check Engineer	
A. HART, RLA	J. BASILE, PE	T. BURKE	N.T.S.
MAY 23, 2016			

MISCELLANEOUS DETAILS

C501

11/11/2015 3:43:50 PM I:\Cor Development\016457_00_COR - MERCY HEIGHTS DEVELOPMENT\4-D Drawings\1 - CIVIL\C501.dwg

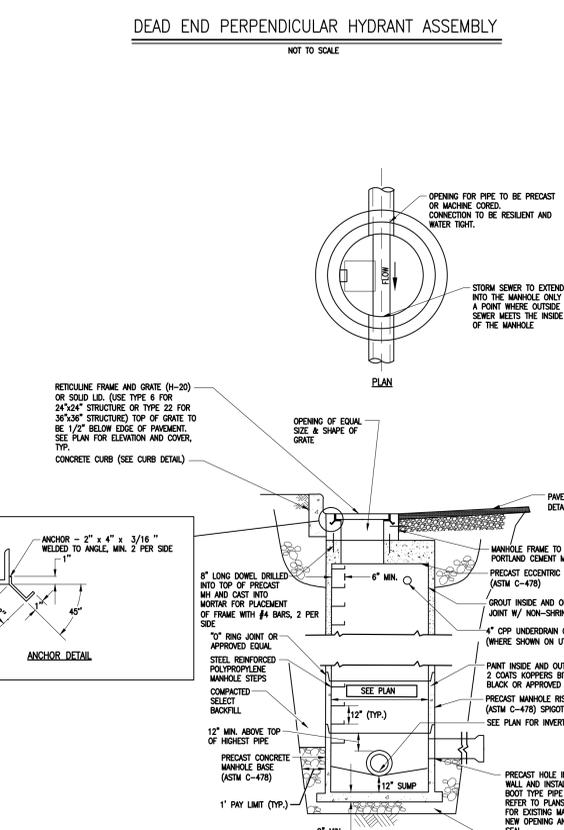
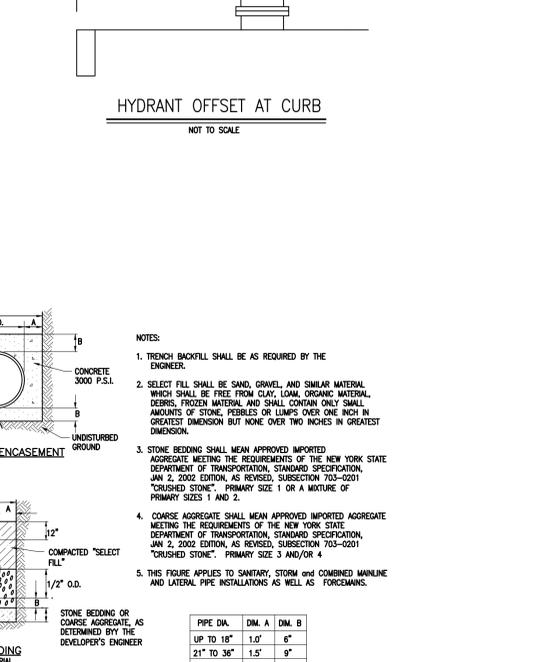
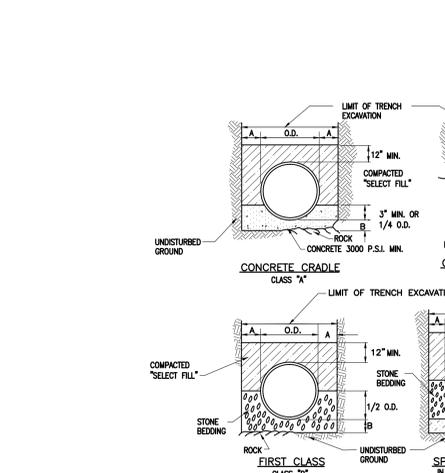
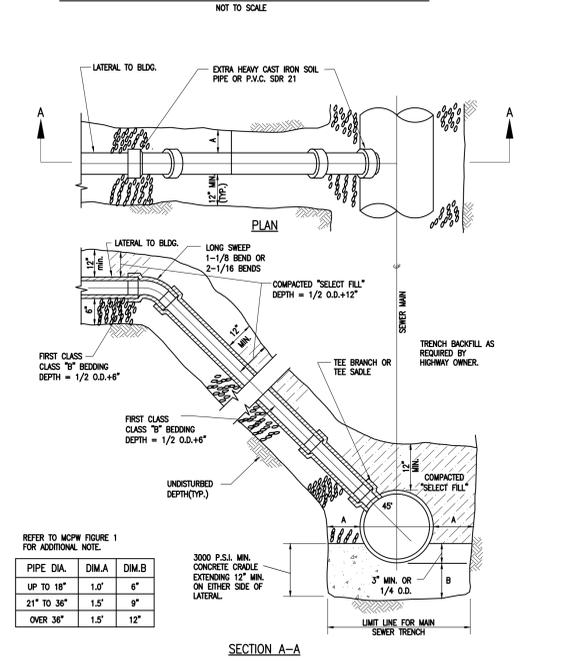
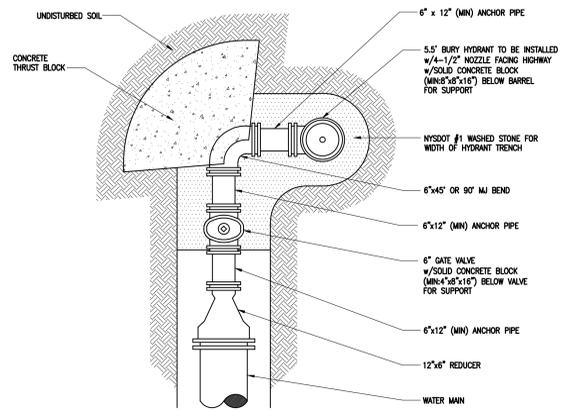
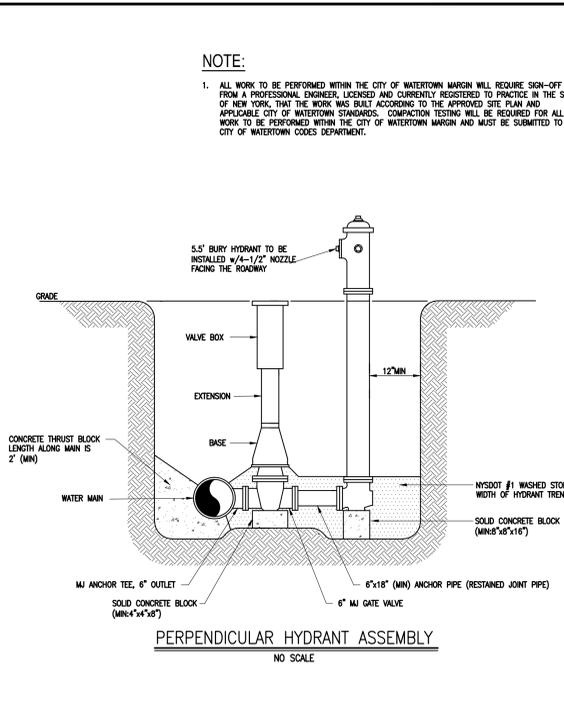
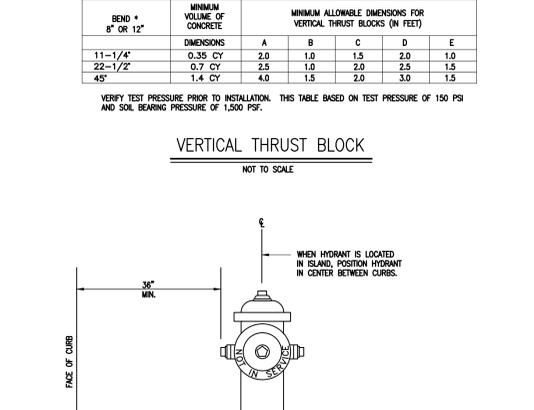
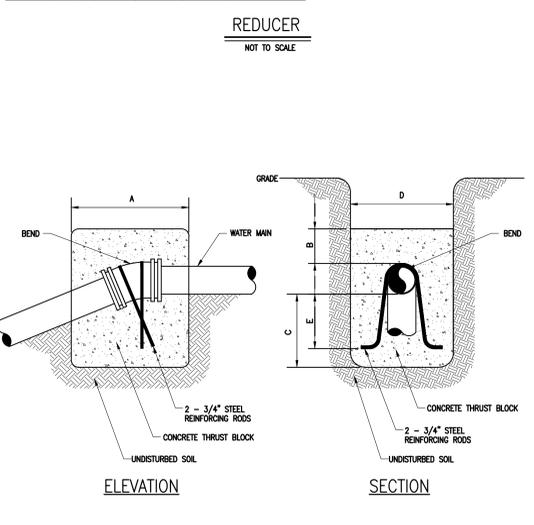
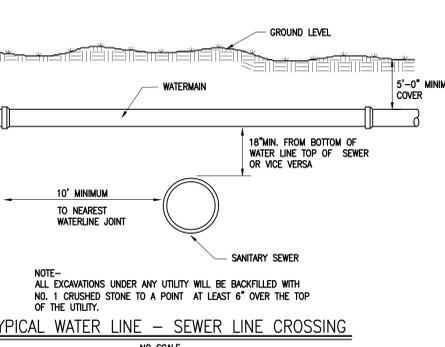
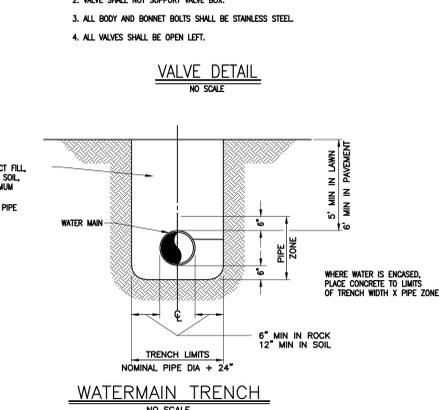
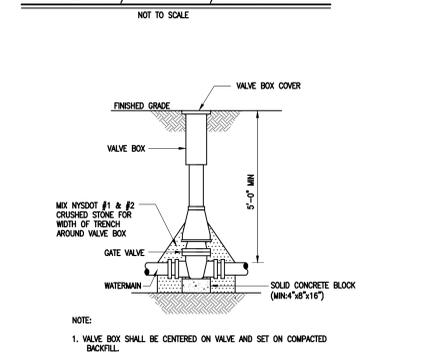
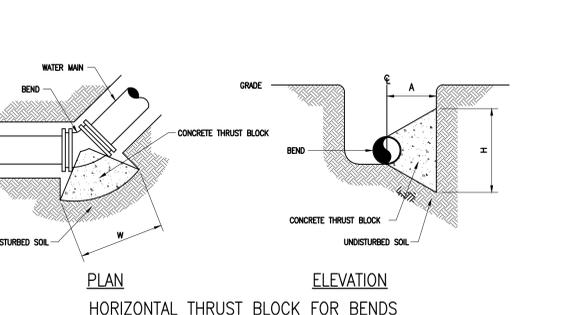
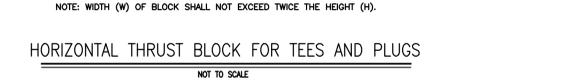
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VERIFY TEST PRESSURE PRIOR TO INSTALLATION. THIS TABLE BASED ON TEST PRESSURE OF 150 PSI AND SOIL BEARING PRESSURE OF 1,500 PSF, PER THE GEOTECH REPORT.

MINIMUM HORIZONTAL THRUST BLOCK DIMENSIONS, IN FEET, TO BE POURED AGAINST UNDISTURBED SOIL			
FITTING	H	W	A
8" OR 12"	1.5	2.0	2.0
11-1/4" BEND	1.5	3.0	2.0
22-1/2" BEND	2.0	4.0	3.0
45° BEND	2.5	5.0	2.0
90° BEND	2.0	4.0	2.0
TEE OR PLUG	2.0	4.0	2.0

NOTE: WIDTH (W) OF BLOCK SHALL NOT EXCEED TWICE THE HEIGHT (H).



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Project Engineer: **A. HART, RLA**
Checked by: **J. BASILE, PE**
Drawn by: **T. BURKE**
Scale: **N.T.S.**
Date: **MAY 23, 2016**
Project Number: **010487.00**

**MISCELLANEOUS
DETAILS**

C502

NO.	DATE	DESCRIPTION	REV.	CKD
1	7/14/16	CITY COMMENTS	JB	JB

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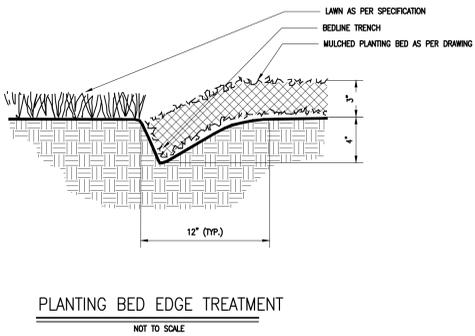
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Designer: **T. BURKE**
Date: **MAY 23, 2016**
Project Number: **010487.00**
Client: **J. BASILE, PE**
Title: **T. BURKE**
Date: **N.T.S.**

**MISCELLANEOUS
DETAILS**

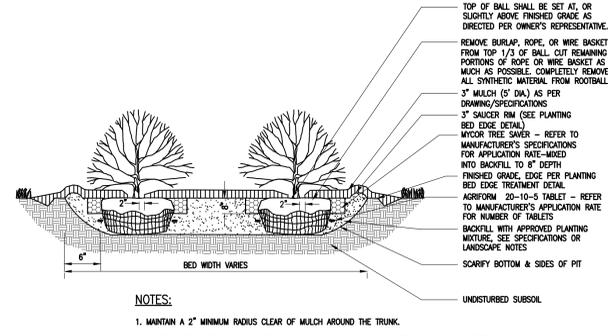
C503

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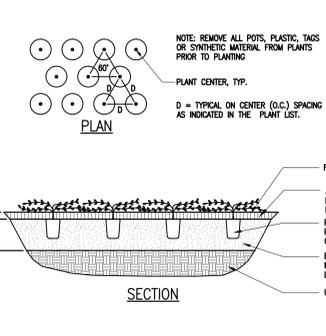


PLANTING BED EDGE TREATMENT
NOT TO SCALE

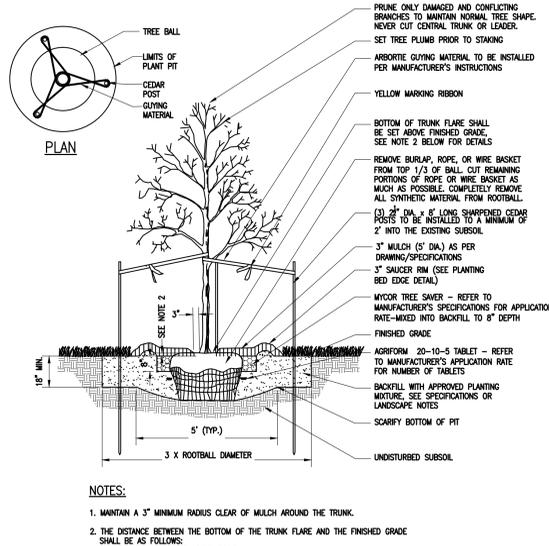


- NOTES:**
- MAINTAIN A 2" MINIMUM RADIUS CLEAR OF MULCH AROUND THE TRUNK.
 - PLANTING BED DEPTH IN LAWN AREAS SHALL BE A MINIMUM OF 18" DEEP AND/OR AS DIRECTED BY THE OWNER'S REPRESENTATIVE.
 - ALL PLANTING BEDS SHALL BE FREE OF CONSTRUCTION DEBRIS.

SHRUB PLANTING
NOT TO SCALE

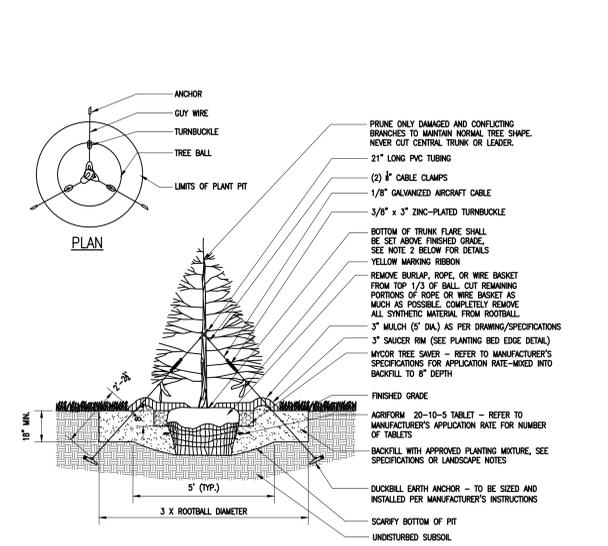


GROUNDCOVER/PERENNIAL/BULB PLANTING
NOT TO SCALE



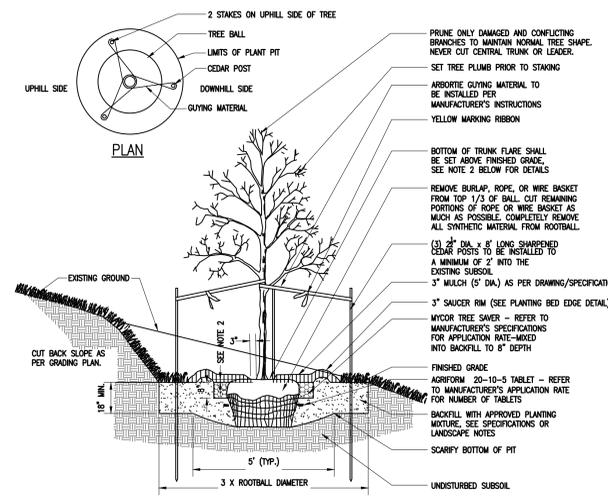
- NOTES:**
- MAINTAIN A 3" MINIMUM RADIUS CLEAR OF MULCH AROUND THE TRUNK.
 - THE DISTANCE BETWEEN THE BOTTOM OF THE TRUNK FLARE AND THE FINISHED GRADE SHALL BE AS FOLLOWS:
FOR SANDY OR LOAMY SOILS: 1"
FOR CLAY OR POORLY DRAINED SOILS: 3"
 - WHEN TAGGING TREES AT THE NURSERY, MARK THE NORTH SIDE OF THE TREE IN THE FIELD AND WHEN INSTALLING, ROTATE TREE TO FACE NORTH WHENEVER POSSIBLE.

DECIDUOUS TREE PLANTING LESS THAN 4" CAL.
NOT TO SCALE



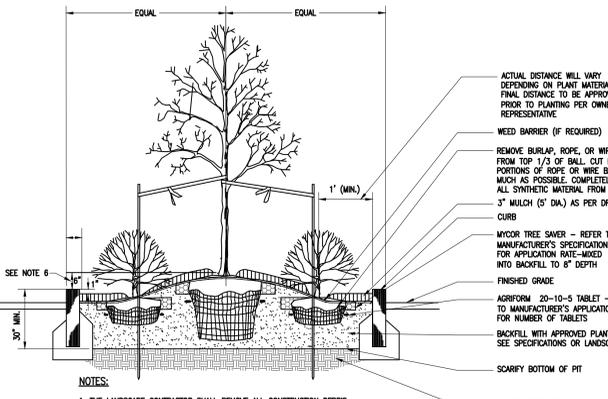
- NOTES:**
- MAINTAIN A 2" MINIMUM RADIUS CLEAR OF MULCH AROUND THE TRUNK.
 - THE DISTANCE BETWEEN THE BOTTOM OF THE TRUNK FLARE AND THE FINISHED GRADE SHALL BE AS FOLLOWS:
FOR SANDY OR LOAMY SOILS: 1"
FOR CLAY OR POORLY DRAINED SOILS: 3"
 - WHEN TAGGING TREES AT THE NURSERY, MARK THE NORTH SIDE OF THE TREE IN THE FIELD AND WHEN INSTALLING, ROTATE TREE TO FACE NORTH WHENEVER POSSIBLE.

EVERGREEN TREE PLANTING
NOT TO SCALE



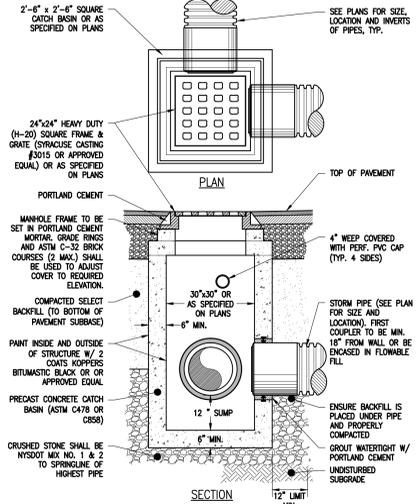
- NOTES:**
- MAINTAIN A 3" MINIMUM RADIUS CLEAR OF MULCH AROUND THE TRUNK.
 - THE DISTANCE BETWEEN THE BOTTOM OF THE TRUNK FLARE AND THE FINISHED GRADE SHALL BE AS FOLLOWS:
FOR SANDY OR LOAMY SOILS: 1"
FOR CLAY OR POORLY DRAINED SOILS: 3"
 - WHEN TAGGING TREES AT THE NURSERY, MARK THE NORTH SIDE OF THE TREE IN THE FIELD AND WHEN INSTALLING, ROTATE TREE TO FACE NORTH WHENEVER POSSIBLE.
 - FOR TREES 4" CAL OR GREATER, INSTALL GUY AS PER DECIDUOUS TREE PLANTING GREATER THAN 4" CAL DETAIL IN THE SAME CONFIGURATION AS SHOWN ABOVE.

DECIDUOUS TREE PLANTING ON SLOPE (LESS THAN 4" CAL.)
NOT TO SCALE

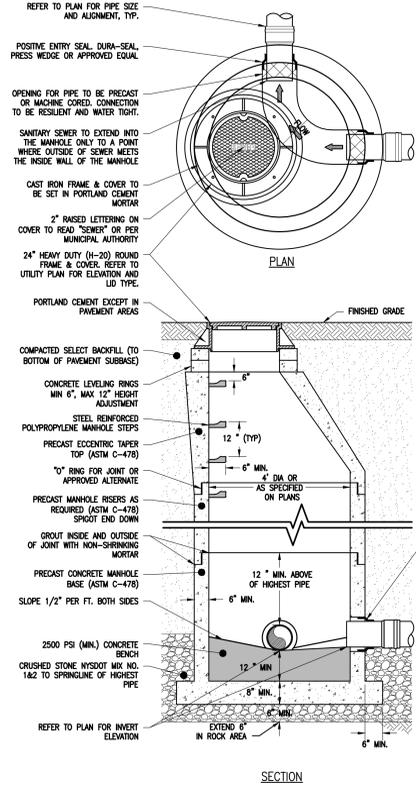


- NOTES:**
- THE LANDSCAPE CONTRACTOR SHALL REMOVE ALL CONSTRUCTION DEBRIS, INCLUDING MATERIAL AND LARGE STONES WITHIN THE CURBED ISLAND AND RECEIVE APPROVAL FROM THE OWNER'S REPRESENTATIVE PRIOR TO FILLING WITH APPROVED PLANTING MIX TO A MINIMUM DEPTH OF 30".
 - TREES AND SHRUBS WITHIN THE CURBED ISLAND SHALL BE INSTALLED AS PER SPECIFIC PLANT DETAIL.
 - WEED BARRIER, IF REQUIRED, WILL BE AS PER THE SPECIFICATIONS.
 - FOR TREES LESS THAN 4" CAL., INSTALL STAKING AS PER DECIDUOUS TREE PLANTING LESS THAN 4" CAL DETAIL.
 - FOR TREES GREATER THAN 4" CAL., INSTALL GUYING AS PER DECIDUOUS TREE PLANTING GREATER THAN 4" CAL DETAIL.
 - BERM HEIGHT SHALL BE 6" MIN. UNLESS OTHERWISE NOTED ON GRADING PLAN.

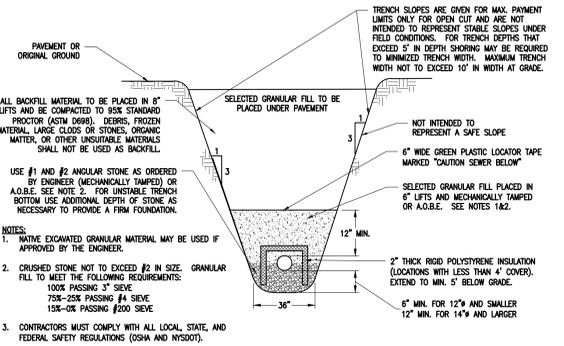
TYPICAL PARKING LOT ISLAND SECTION
NOT TO SCALE



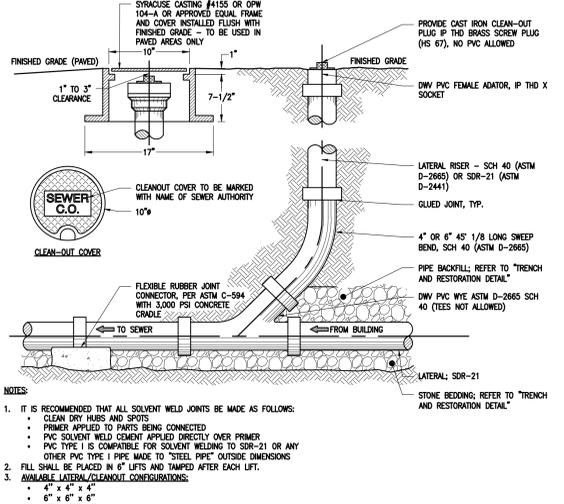
STORM CATCH BASIN DETAIL
N.T.S.



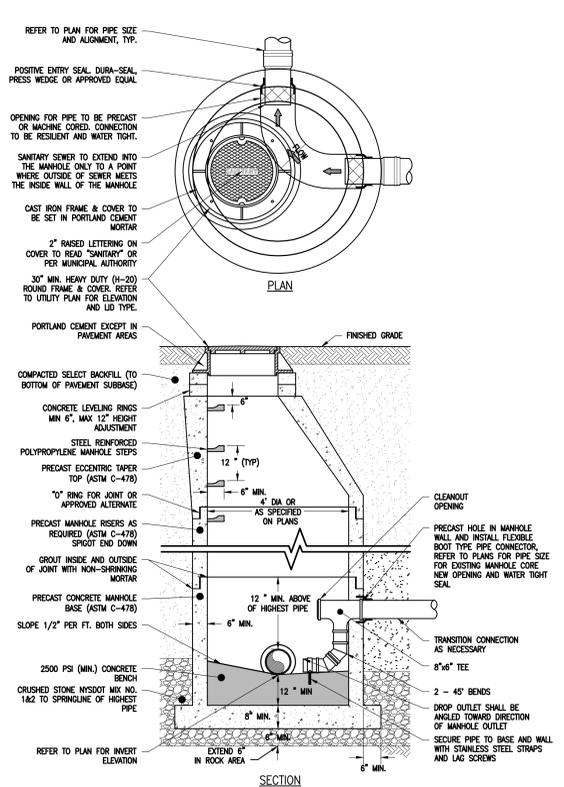
SANITARY SEWER MANHOLE MANHOLE DETAIL
N.T.S.



SANITARY SEWER BEDDING
N.T.S.



SANITARY SEWER LATERAL CLEAN-OUT
N.T.S.



DROP INLET MANHOLE DETAIL
N.T.S.



City of Watertown
Jefferson County
State of New York

**COR Arsenal Street
Company, LLC**

540 Towne Drive
Fayetteville, NY 13066

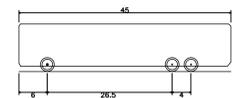


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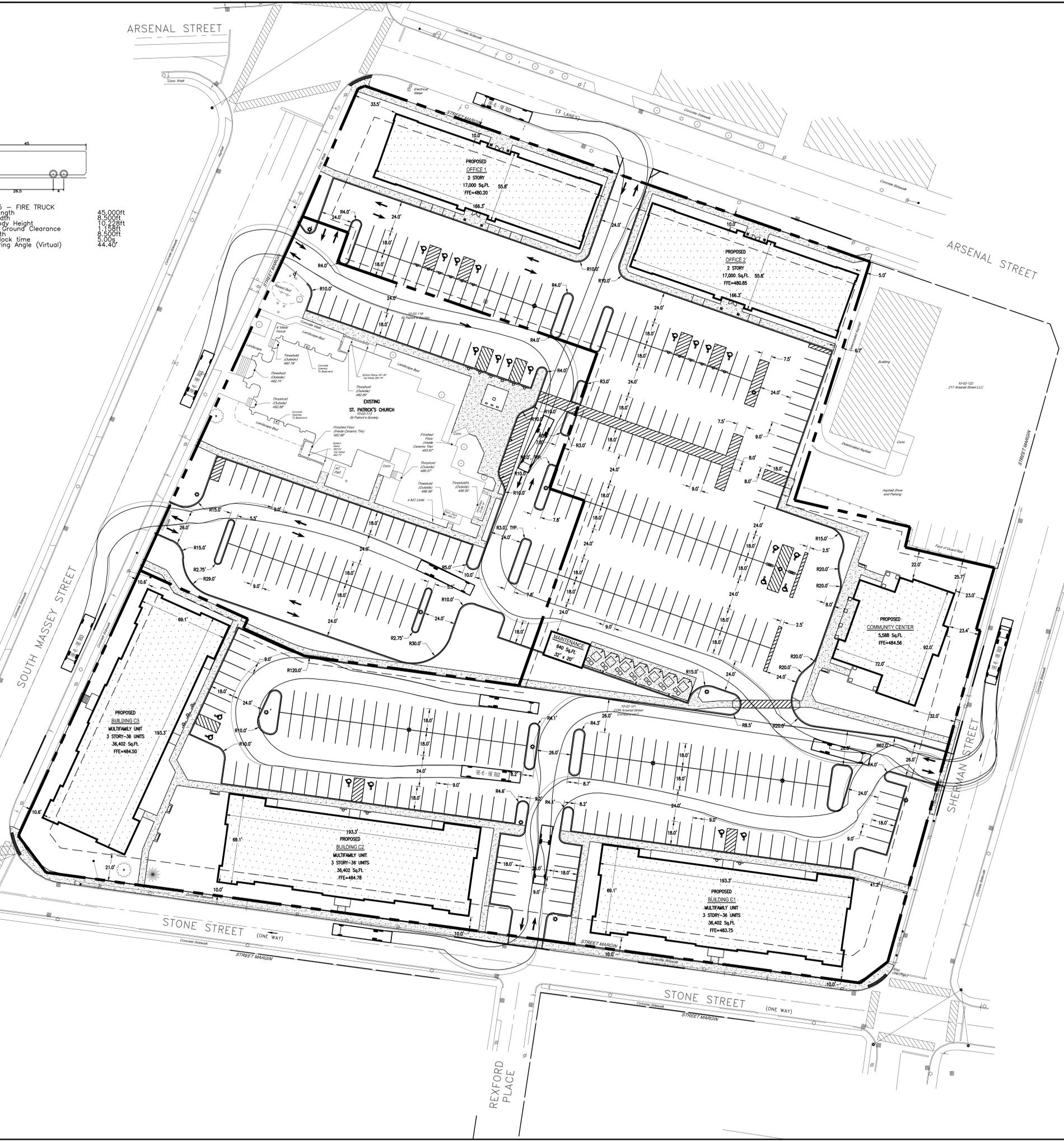
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1	7/14/16	CITY COMMENTS	JB JCB



TRUCK-45 - FIRE TRUCK
Overall Length 45
Overall Width 8.5
Overall Body Height 10.25
Min. Body Ground Clearance 1.55
Track Width 8.5
Lock-to-lock time 3.05
Max Steering Angle (Virtual) 44.40

45.000ft
8.500ft
10.250ft
1.550ft
8.500ft
3.050
44.40°



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SITE PLAN LEGEND

- EXISTING PROPERTY LINE
- PROPOSED BUILDING
- PROPOSED CURB
- PROPOSED PARKING SPACES
- PROPOSED CONCRETE PAVEMENT
- PROPOSED LIGHT POLE AND BASE
- CHAIN LINK FENCE



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Project Manager: A. HART, RLA	City Engineer: J. BASILE, PE
Designer: J. BUSH	Checker: J. BUSH
Date: MAY 23, 2016	Scale: 1" = 30'
Project Number: 010487.00	

**FIRE TRUCK ACCESS
PLAN**

Drawing Number



City of Watertown
Jefferson County
State of New York

**COR Arsenal Street
Company, LLC**

540 Towne Drive
Fayetteville, NY 13066

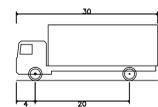


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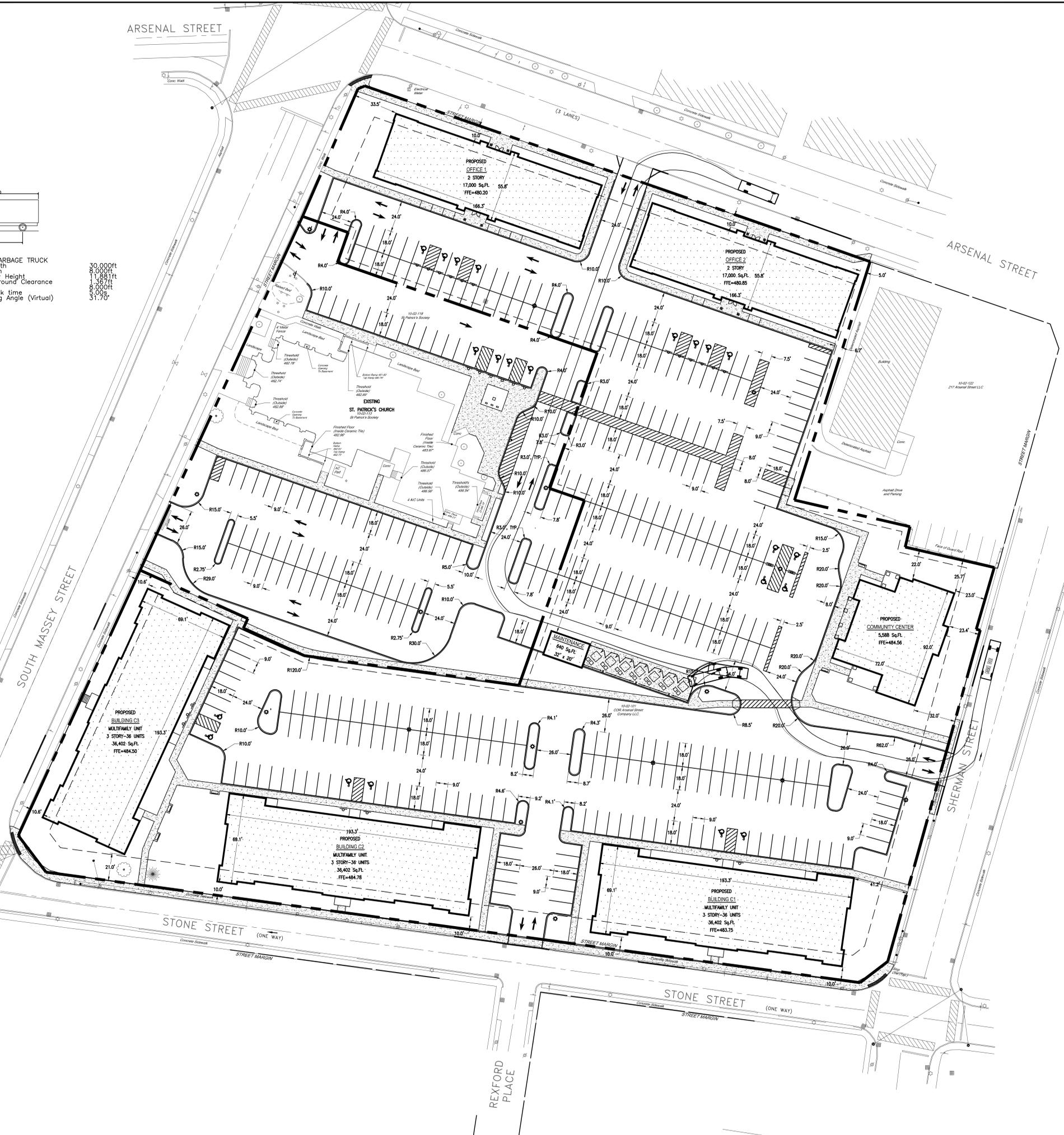
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REVISIONS			
NO.	DATE	DESCRIPTION	REV. CKD.
1	7/14/16	CITY COMMENTS	JB JCB



TRUCK - GARBAGE TRUCK
Overall Length 30
Overall Width 8
Overall Body Height 11.85
Min. Body Ground Clearance 1.36
Track Width 8
Lock-to-lock time 9.09
Max Steering Angle (Virtual) 31.70

30.000ft
8.000ft
11.851ft
1.367ft
8.000ft
9.095
31.70°



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SITE PLAN LEGEND

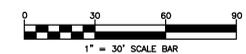
- EXISTING PROPERTY LINE
- PROPOSED BUILDING
- PROPOSED CURB
- PROPOSED PARKING SPACES
- PROPOSED CONCRETE PAVEMENT
- PROPOSED LIGHT POLE AND BASE
- CHAIN LINK FENCE

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Designer: J. BUSH	Checker: J. BUSH
Date: MAY 23, 2016	Scale: 1" = 30'
Drawing Number: 010487.00	

**GARBAGE TRUCK
ACCESS PLAN**



GP-1

11/11/2015 3:43:50 PM I:\Cor Development\010487.00 COR - MERCY REDEVELOPMENT.rvt Dwg\04.1 Civil\010487.dwg

MERCY HEIGHTS ENGINEER'S REPORT



City of Watertown, NY
May 2016

PREPARED FOR:

COR Arsenal Street Company, LLC
540 Towne Drive
Fayetteville, NY 13066

PREPARED BY:

Bergmann Associates
200 First Federal Plaza
28 East Main Street
Rochester, NY 14614



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Section I: Project Location and Description

A. Project Location

The project is located on the city block in Watertown, NY that is bounded on the North by Arsenal Street, the east by Sherman Street, the south by Stone Street, and the West by South Massey Street. A location map has been included on the cover of this report.

B. Project Description

The proposed re-development project is a multi-use project and will include construction of three multi-family residential buildings, a community center, and two office buildings as well as associated utilities, parking, lighting and landscaping. The applicant has also been working closely with the St. Patrick's Society to include improvements to their parcel as part of the overall project which would not only enhance the church lot but also reconfigure their 1.791 acre parcel to augment the entire project.

Three multi-family residential buildings, located along Stone and South Massey Streets, are each three stories in height with 36 units at 36,402 square feet. This provides a total of 108 units and 109,206 square feet. The 5,588 square foot community center building is a single story structure and will house the support programs for the three multi-family buildings. These programs includes; a fitness center, locker rooms, multi-purpose room, party room, and the leasing office.

The two office buildings, located along Arsenal Street, are two story structures with 18,000 square feet each for a total of 36,000 of office space.



Section II: Sanitary Sewer System

A. Existing Conditions

The City Sewer Department maintains sanitary service along the each of the streets that surround the site. The existing system is presumed to have ample capacity to accept flows for the proposed improvements based the previous use as a hospital/ nursing home. From the available historic data (bed count) and the NYS DEC Design Standards, the following was used to determine the prior flows to the pubic sanitary sewer.

Existing Average Daily Flows

Description	Number of Units	Loading Rate (gpd/ unit)	Total Flow (gpd)
Hospital Beds	224	175	39,200
Residence Beds	132	150	19,800
Total			59,000

B. Proposed Conditions

The proposed sanitary sewer system consists of a new of 6-inch diameter sewer main 4-foot diameter precast concrete manholes that will connect to the existing sewers on Arsenal and Sherman Streets. The proposed sanitary sewer will be constructed at a minimum slope of 1.0%. The following is a summary of the estimated average flows contributing to the connection points.

Anticipated Average Daily Flows

Description	Number of Units	Loading Rate (gpd/ unit)	Total Flow (gpd)
(3) Multifamily Units	108 (Bedrooms)	110	11,880
Community Bldg.	5000 (SF)	*0.20	1,000
(2) Office Bldg.	200 (employees)	15	3000
Total			15,880

* Assumed Flow rate



Section III: Water Distribution System

A. Description of Water System

The site has access to water from each adjacent street. There is an existing 12-inch diameter water main located beneath South Massey St., Sherman St. and Arsenal St. There is a 6-inch diameter water main beneath Stone St. Available pressures and flows will be determined from hydrant flow test data taken on the adjacent hydrants and provided by the City.

The proposed buildings will connect to the existing water main located in the street that fronts each building. Combined fire and domestic services will be metered, and backflow protection will be provided inside each building. The existing system is assumed to have adequate pressure and volume to supply the proposed improvements based on the existing hospital use.

Section IV: Stormwater System

A. Project Description

Stormwater practices within the development area will consist of a network of pipes, inlets, manholes, Stormwater Quality treatment filters, and an underground infiltration basin. The proposed storm sewer system will be privately owned and maintained. Storm water from the developed area will discharge to either the Sherman Street system or the Arsenal Street system after treatment. The proposed underground detention basin will also collect the discharge from the water quality filter structure onsite and a majority of the site (4.418 Ac of 7.512 total) to provide the required quantity control.

The proposed design and mitigation measures are intended to address the water quality and quantity requirements of the New York State Department of Environmental Conservation. Refer to the Stormwater Management Report for more details and calculations (see Appendix A).



B. Soil Classification

According to the Natural Resources Conservation Service website (NRCS), there is one (1) mapped soil unit identified on the project property (see Appendix A). Urban Land is the dominant soil type and is located on approximately 99.9 percent of the project area. This soil type slopes at approximately 0 to 5 percent. These soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission. The complete list of soils found on the project site is identified in the table below (see Appendix E for soils map).

Table I- Jefferson County Soils Summary

Symbol	Soil Name	Hydrologic Soil Group
Ur	Urban Land	-

C. Hydrology

Methodology

Stormwater runoff rates discharged from the site under the existing conditions provide the basis on which to compare the impacts of the proposed site improvements. Analysis points are established where runoff exits the site to provide a fixed location at which existing and proposed stormwater quantities can be compared. The areas draining to each analysis point are delineated using topographic survey maps, grading plans and utility plans. HydroCAD 10.00-12 by HydroCAD Software Solutions, LLC was used to model the existing and proposed conditions. This program simulates the USDA Soil Conservation Service’s TR-20 hydrologic model to analyze discharges from drainage areas and retention basins.

The parameters required to calculate stormwater runoff are area, curve number, and time of concentration. Each drainage area is evaluated using the guidelines described in USDA Soil Conservation Service’s TR-55 to determine the curve number and time of concentration.

The runoff curve number (CN) is based on a weighted average of ground cover and soil type. The underlying soil types are described in county soil maps. Site and grading plans and survey maps outline existing and proposed ground cover. CN values for specific locations are determined from the tables presented in TR-55.

Time of concentration (Tc) represents the amount of time it takes for runoff to travel from the hydraulically most distant point of the watershed to the point of analysis. Surface



roughness, slope, channel shape and flow patterns are the factors that affect the time of concentration. Stormwater runoff flows through the drainage area as sheet flow, shallow concentrated flow, open channel flow, or concentrated flow (such as in storm sewers). For this report sheet flow will become shallow concentrated flow after a maximum of 150 feet for the existing condition and 100 feet for the proposed condition. The sum of the travel times over the various surfaces within the assumed flow path for a specific drainage area determines that area's time of concentration. The figures and formulas in TR-55 are employed to compute travel times for sheet flow and shallow concentrated flow. Manning's equation is used to determine flow velocities through pipes.

The stage-storage-discharge relationship for the proposed detention area is determined from topographical data and outlet structure characteristics. Discharge rates and storage volumes at various elevations (stage) are represented by this relationship. The underground storage capacity is calculated by determined by the known volumes of the Stormtech chambers at specified elevations.

Existing Conditions

The existing drainage area comprises a total of 7.512 acres. The parcel to be re-developed consists of a large hospital complex (formerly Mercy Hospital), small grass areas surrounding the hospital complex, and two parking lots on the northwest corner of the site.

The overall drainage area was divided into four sub areas for analysis purposes, labeled DR-1 through DR-4 as shown on DR-PRE, the Existing Conditions Drainage Map in Appendix A.

Drainage Area DR-1, consisting of 2.441 acres, includes the two parking lots on the north side of the site, as well as St. Patrick's church. This area consists of mostly impervious parking area and building, with some associated yard areas. This area drains to the north via sheet and concentrated flow to the Arsenal Street storm system (POI#1).

Drainage Area DR-2, consisting of 1.495 acres, includes the northeast corner of the hospital complex and surrounding parking and lawn areas. This area consists of mostly impervious building area and parking, with some associated yard areas. This area drains to the east via sheet flow and storm laterals to the Sherman Street storm system (POI #2).

Drainage Area DR-3, consisting of 1.014 acres, includes the southeast corner of the hospital complex and surrounding areas. This area consists of mostly impervious building area and parking, with some associated yard areas. This area drains to the south via sheet flow and storm laterals to the Stone Street storm system (POI #3).



Drainage Area DR-4, consisting of 2.562 acres, includes the south/west side of the hospital complex and surrounding areas. This area consists of mostly impervious building area and parking, with some associated yard areas. This area drains to the west via sheet flow and storm lateral to the South Massey Street storm system (POI #4).

Table II summarizes the hydrologic characteristics of the drainage areas described above. See Appendix A for computations for the existing drainage conditions.

**Table II
Existing Conditions Summary**

Drainage Area	Description	Size (ac)	Composite Cn	Tc (min)
Area DR-1	Includes the two parking lots on the north side of the site, as well as St. Patrick’s church. This area consists of mostly impervious parking area and building, with some associated yard areas.	2.441	93	6.0 minimum
Area DR-2	Includes the northeast corner of the hospital complex and surrounding parking and lawn areas. This area consists of mostly impervious building area and parking, with some associated yard areas.	1.495	95	10.0 assumed
Area DR-3	Includes the southeast corner of the hospital complex and surrounding areas. This area consists of mostly impervious building area and parking, with some associated yard areas.	1.014	93	10.0 assumed
Area DR-4	Includes the south/west side of the hospital complex and surrounding areas. This area consists of mostly impervious building area and parking, with some associated yard areas.	2.562	90	10.0 assumed

Proposed Conditions

The Proposed drainage area comprises a total of 37.261 acres. Proposed impervious area will drain via storm sewer and sheet flow to the proposed Underground Basin.

The overall drainage area was divided into four sub areas for analysis purposes, labeled DR-1, DR-2, DR-4, as shown on DR-POST, the Proposed Conditions Drainage Map in Appendix A.

Drainage Area DR-1, consisting of 2.366 acres, includes the two office buildings on the north side of the site, St. Patrick’s Church, and the associated parking areas in between.



This area consists of mostly impervious parking area and building, with some associated landscaped islands. This area drains to the north via sheet and new storm system to the Arsenal Street storm system (POI#1).

Drainage Area DR-2, consisting of 4.418 acres, includes the three residential buildings, the Community Center, and the parking areas south of St. Patrick’s Church. This area consists of mostly impervious building area and parking, with some associated landscaped islands and yard areas. This area drains to the east via sheet flow and new storm system to the proposed Underground basin, and then the Sherman Street storm system (POI #2).

Drainage Area DR-3 is not included in proposed analysis. The existing area associated with DR-3 will be re-routed away from POI-3 into the proposed storm system and Underground Basin that treats most of the site, and then enters the Sherman Street system (POI #2).

Drainage Area DR-4, consisting of 0.727 acres, includes lawn areas south and west of the proposed residential buildings. This area consists of mostly pervious lawn areas and some sidewalks. This area drains to the west/south via sheet flow and existing storm system to the South Massey Street storm system (POI #4).

Table III summarizes the hydrologic characteristics of the drainage areas described above. See Appendix A for computations for the existing drainage conditions.

**Table III
Proposed Conditions Summary**

Drainage Area	Description	Size (ac)	Composite Cn	Tc (min)
Area DR-1	Includes the two office buildings on the north side of the site, St. Patrick’s Church, and the associated parking areas in between. This area consists of mostly impervious parking area and building, with some associated landscaped islands	2.441	94	15
Area DR-2	Includes the three residential buildings, the Community Center, and the parking areas south of St. Patrick’s Church. This area consists of mostly impervious building area and parking, with some associated landscaped islands and yard areas	1.495	93	8.7
Area DR-4	Includes lawn areas south and west of the proposed residential buildings. This area consists of mostly pervious lawn areas and some sidewalks.	2.562	73	6.0 minimum



D. Stormwater Management & SPDES Phase II Requirements

State Pollutant Discharge Elimination System (SPDES)

Since the subject site will have land disturbance of more than 1-acre a State Pollutant Discharge Elimination System (SPDES) permit will be completed as part of the project. A Storm Water Pollution Prevention Plan (SWPPP) will be developed in accordance with the EPA Phase II regulations. The SWPPP will be modeled on the New York State DEC Guidelines and will meet the following criteria as the principle objectives contained in an approved SWPPP.

- 1) Reduction or elimination of erosion and sediment loading to water-bodies during construction activities.
- 2) Control the impact of storm water runoff on the water quality of the receiving waters.
- 3) Control the increase volume and peak runoff rate of runoff during and after construction.
- 4) Maintenance of storm water controls during and after completion of construction.

The aforementioned objectives will be accomplish by incorporating the several of the design criteria outlined within the Technical Guidelines provided by New York State Department of Environmental Conservation, Stormwater Management Design Manual and summarized below.

A. WATER QUALITY VOLUME

The New York State Department of Environmental Conservation, Stormwater Management Design Manual was used to determine the water quality criteria. Specifically the unified storm water sizing criteria was followed for water quality to meet the State of New York pollutant goals. The water quantity volume is intended to improve water quality by capturing and treating 90% of the average annual storm water runoff volume. As detailed in section 9.2 of the Design Manual, 75% of the WQv will be treated by alternative practices – for the areas with increased or similar amounts of impervious area. The net increase in impervious area for this site is 0.271 Ac. We have proposed a proprietary filter unit to treat this increase in impervious area (see Jellyfish filter specifications in Appendix A). Online Vortechs units have been proposed for DR-1 and DR-2, in order to provide water quality filtration.

Storm water quality calculations are provided within the Appendix A and are summarized in the Table below.



Water Quality Flows for Alternate Practices			
Drainage Area	Practice	WQ Peak Discharge (cfs) - required	Max. Treatment Flow (cfs)
DR-1	Vortechs 7000	1.77	2.50
DR-2	Vortechs 7000	3.84	4.50
DR-2	WQv Filter (Jellyfish)	0.30	0.45

B. CHANNEL PROTECTION VOLUME

The New York State Department of Environmental Conservation, Stormwater Management Design Manual was used to determine the water quantity criteria. As required by section 9.2, “if the hydrology and hydraulic analysis for the project site shows that the post-construction 1-year 24 hour discharge rate and velocity are less than or equal to the pre-construction discharge rate, providing 24 hour detention of the 1-year storm to meet the channel protection criteria is not required.” This requirement is satisfied in all of the proposed drainage areas, as seen in Table IV.

C. OVERBANK FLOOD

Overbank Flood protection is provided by controlling the peak discharge from the 10-year storm to 10-year predevelopment rates. This requirement is being satisfied as the proposed development is reducing the peak discharge from the 10-year storm below pre-development rates. Refer to Table IV for details.

D. EXTREME STORM

Extreme Storm protection is provided by controlling the peak discharge from the 100-year storm to 100-year predevelopment rates. This requirement is being satisfied as the proposed development is reducing the peak discharge from the 100-year storm below pre-development rates. Refer to Table IV for details.



Summary of Results

Table IV and Table V depicts the peak discharges from the site for each of the design storms for the existing and proposed conditions. Table V depicts the peak elevation of the Underground Detention Basin during the design storm events.

Table IV - Existing and Proposed Peak Discharge for the Type-II Storm Events (cfs)

	Drainage Area	DR-1		DR-2		DR-3		DR-4	
		Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
Type II Storm Event	1-YR	5.81	4.49	3.46	2.43	2.52	0	4.63	0.42
	2-YR	7.07	5.42	4.14	3.01	3.06	0	5.78	0.66
	5-YR	9.15	6.97	5.27	3.72	3.96	0	7.73	1.10
	10-YR	10.86	8.25	6.20	4.23	4.70	0	9.34	1.51
	25-YR	13.20	9.99	7.47	4.89	5.71	0	11.56	2.11
	50-YR	14.96	11.31	8.42	5.41	6.47	0	13.24	2.58
	100-YR	16.76	12.64	9.96	6.46	7.24	0	14.95	3.06

Table V - Peak Underground Basin Elevations

Design Storm	Infiltration Basin U
10 Year	478.53
100 Year	481.14

As depicted in the above tables, the peak discharge from the site for each of the design storms will be decreased after this project is constructed and the stormwater management plan is implemented.

Conclusion

Based on the calculations attached in the appendices of this report, the proposed Stormwater Management Facility will decrease peak discharge rates from the site for all of the design storms under proposed conditions. The proposed facility also includes an Underground Detention Basin for water quantity storage. Alternative Practices have also been included to provide water quality treatment. As a result, this project has provided sufficient mitigation to minimize effect to stream systems and properties.



Section V: Traffic Impacts

A. General

The traffic study “Mercy Heights Trip Generation Letter” – prepared by SRF & Associates – can be found in Appendix B.

Section VI: Lighting Summary

A. General Summary

A photometric analysis was performed by Quality Lighting Systems of Liverpool, NY. The Site Lighting has been proposed as a mix of Office/Commercial and Residential Lighting, with special care taken in transitions between land uses. The average site illuminance is shown at 0.36 foot-candles, with a maximum on-site illuminance of 5.4 foot-candles. The proposed site lighting fixtures are LED and are a combination of three mounted heights: 12, 15, and 28 feet. See Drawing C160 (Site Lighting Plan) and Appendix C (Site Lighting Specification Sheets) for further detail.

Section VII: Landscaping Summary

A. General Summary

A Landscape Plan was completed for the Mercy Heights project using the guidelines set forth in Appendix A – Landscape and Buffer Zone Guidelines adopted by the City of Watertown Planning Board, August 7, 2007, including the following items:

- Landscape strips along street rights-of-way and exterior parking lot landscaping was provided on all roadways surrounding the site. These landscape strips are made up of shade trees from the Recommended Tree Species list, and a variety of shrub and perennial plant materials.
- Interior parking lot islands contain shade trees where possible and understory plant material.
- All planting beds will be mulched with 3” hardwood mulch.
- All disturbed areas, not a planting bed, will receive 4” topsoil and will be seeded with a lawn seed mix.
- All existing plant materials around St. Patrick’s Church will be retained where possible.



APPENDIX A – Stormwater Calculations





MERCY HEIGHTS

City of Watertown
Jefferson County
State of New York

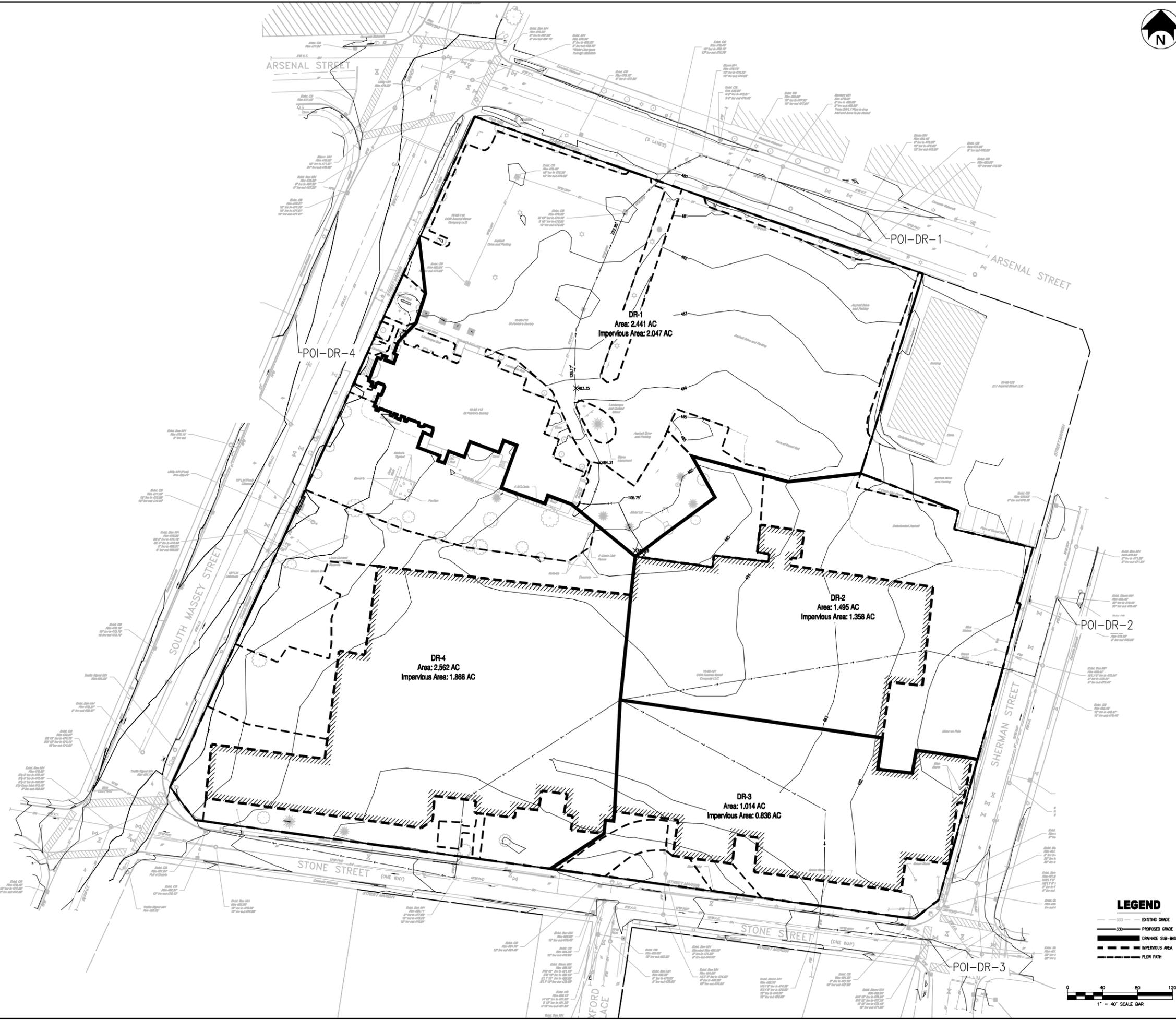
COR Arsenal Street Company, LLC

540 Towne Drive
Fayetteville, NY 13066



Bergmann Associates, Architects, Engineers,
Landscape Architects & Surveyors, D.P.C.
26 East Main Street
200 First Federal Plaza
Rochester, NY 14614
office: 585-232-5135
fax: 585-232-4652
www.bergmannpc.com

REVISIONS				
NO.	DATE	DESCRIPTION	REV.	CKD.



DR-1
Area: 2.441 AC
Impervious Area: 2.047 AC

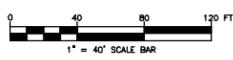
DR-2
Area: 1.495 AC
Impervious Area: 1.358 AC

DR-4
Area: 2.562 AC
Impervious Area: 1.868 AC

DR-3
Area: 1.014 AC
Impervious Area: 0.836 AC

LEGEND

- EXISTING GRADE
- PROPOSED GRADE
- DRAINAGE SUB-BASIN
- IMPERVIOUS AREA
- FLOW PATH



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CONSTRUCTION**

PROFESSIONAL CERTIFICATION: I CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF NEW YORK. LICENSE NO. 80472. EXPIRATION DATE: 05/31/17

TO THE BEST OF MY KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGMENT, THE PLANS AND SPECIFICATIONS ARE IN COMPLIANCE WITH THE 2015 ENERGY CONSTRUCTION CONSERVATION CODE OF THE STATE OF NEW YORK.

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Note: Unauthorized alteration or addition to this drawing is a violation of the New York State Education Law Article 140, Section 7209.

Author: A. BARR, M.S.A.	Checked: J. BARR, P.E.
Drawn: T. BURKE	Reviewed: T. BURKE
Date: MAY 26, 2016	Scale: 1" = 40'
Project Number: 016087-00	

EXISTING CONDITIONS DRAINAGE MAP

DD-PRE

I:\2015\15-04-20-15\15-04-20-15\DD-PRE\DD-PRE.dwg

City of Watertown
Jefferson County
State of New York

**COR Arsenal Street
Company, LLC**

540 Towne Drive
Fayetteville, NY 13066



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TO THE BEST OF MY KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGMENT, THE PLANS AND SPECIFICATIONS ARE IN COMPLIANCE WITH THE 2015 EMERGENCY CONSTRUCTION CONSERVATION CODE OF THE STATE OF NEW YORK.

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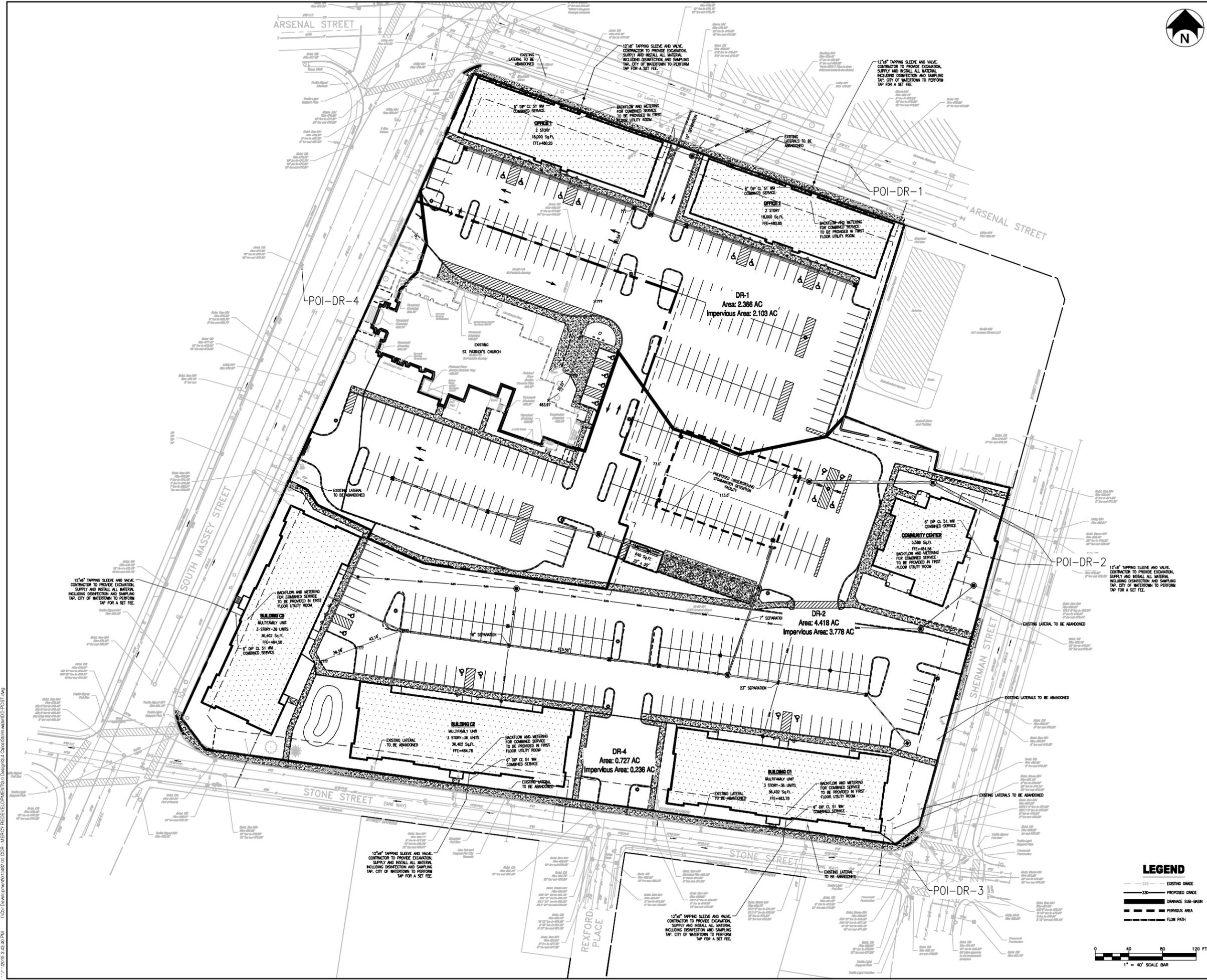
Note: Unauthorized alteration or addition to this drawing is a violation of the New York State Education Law Article 148, Section 7209.

A. BARRI, M.S.A. A. BARRI, P.E.
T. BURKE T. BURKE
MAY 26, 2016 11:46 AM

016-027-00

**PROPOSED CONDITIONS
DRAINAGE MAP**

DD-POST



LEGEND

- EXISTING GRADE
- PROPOSED GRADE
- DRAINAGE SUB-BASE
- IMPERVIOUS AREA
- FLOW PATH

0 40 80 120 FT
1" = 40' SCALE BAR

I:\2015\15-03-45-40 PM\15-03-45-40 PM\COR - MERCY HEIGHTS DEVELOPMENTS\03-01-Design\15-03-45-40-Cor-Arsenal-Street-DD-POST.dwg

Soil Map—Jefferson County, New York
(COR Mercy Redevelopment)



Map Scale: 1:3,000 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Jefferson County, New York
Survey Area Data: Version 12, Sep 21, 2015

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 11, 2011—Jul 2, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Jefferson County, New York (NY045)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CnB	Collamer silt loam, 3 to 8 percent slopes	0.0	0.1%
Ur	Urban land	9.8	99.9%
Totals for Area of Interest		9.8	100.0%

Map Unit Description

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Additional information about the map units described in this report is available in other soil reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the soil reports define some of the properties included in the map unit descriptions.

Report—Map Unit Description

Jefferson County, New York

CnB—Collamer silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9smx

Mean annual precipitation: 33 to 50 inches

Mean annual air temperature: 45 to 46 degrees F

Frost-free period: 110 to 170 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Collamer and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Collamer

Setting

Landform: Lake plains

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Tread

Down-slope shape: Concave

Across-slope shape: Convex

Parent material: Silty and clayey glaciolacustrine deposits

Typical profile

H1 - 0 to 8 inches: silt loam

H2 - 8 to 18 inches: silt loam

H3 - 18 to 32 inches: silty clay loam

H4 - 32 to 60 inches: stratified silt loam to very fine sand to clay

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat):

Moderately low to moderately high (0.06 to 0.57 in/hr)

Depth to water table: About 18 to 24 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 15 percent

Available water storage in profile: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: C/D

Minor Components

Unnamed soils, clayey surface texture and sandy areas

Percent of map unit: 10 percent

Niagara

Percent of map unit: 8 percent

Canandaigua

Percent of map unit: 2 percent

Landform: Depressions

Ur—Urban land

Map Unit Setting

National map unit symbol: 9srz
Mean annual precipitation: 33 to 50 inches
Mean annual air temperature: 45 to 46 degrees F
Frost-free period: 110 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Minor Components

Udorthents, smoothed

Percent of map unit: 10 percent
Landform: Depressions

Data Source Information

Soil Survey Area: Jefferson County, New York
Survey Area Data: Version 12, Sep 21, 2015



NOAA Atlas 14, Volume 10, Version 2
 Location name: Watertown, New York, US*
 Latitude: 43.9761°, Longitude: -75.8753°
 Elevation: 476 ft*
 * source: Google Maps



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aerials](#)

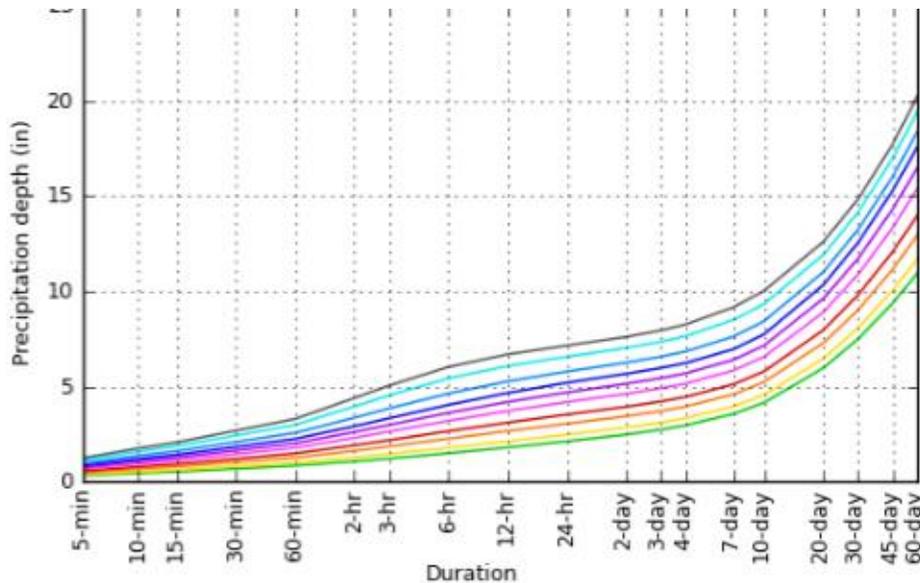
PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.317 (0.260-0.385)	0.378 (0.310-0.459)	0.477 (0.390-0.582)	0.560 (0.455-0.685)	0.674 (0.526-0.848)	0.762 (0.580-0.972)	0.850 (0.625-1.11)	0.967 (0.665-1.27)	1.12 (0.737-1.51)	1.24 (0.792-1.69)
10-min	0.449 (0.369-0.545)	0.535 (0.439-0.651)	0.676 (0.553-0.824)	0.794 (0.644-0.970)	0.955 (0.746-1.20)	1.08 (0.822-1.38)	1.20 (0.886-1.58)	1.37 (0.942-1.80)	1.59 (1.05-2.14)	1.76 (1.12-2.39)
15-min	0.528 (0.434-0.642)	0.630 (0.517-0.765)	0.796 (0.650-0.969)	0.934 (0.758-1.14)	1.12 (0.877-1.41)	1.27 (0.967-1.62)	1.42 (1.04-1.86)	1.61 (1.11-2.12)	1.87 (1.23-2.51)	2.07 (1.32-2.81)
30-min	0.686 (0.564-0.834)	0.817 (0.671-0.994)	1.03 (0.843-1.26)	1.21 (0.982-1.48)	1.46 (1.14-1.83)	1.65 (1.25-2.10)	1.83 (1.35-2.40)	2.09 (1.44-2.75)	2.43 (1.59-3.26)	2.68 (1.71-3.65)
60-min	0.844 (0.694-1.03)	1.01 (0.825-1.22)	1.27 (1.04-1.55)	1.49 (1.21-1.82)	1.79 (1.40-2.25)	2.02 (1.54-2.58)	2.25 (1.66-2.95)	2.57 (1.77-3.38)	2.98 (1.96-4.01)	3.30 (2.11-4.49)
2-hr	1.07 (0.884-1.29)	1.28 (1.06-1.55)	1.63 (1.34-1.97)	1.91 (1.56-2.32)	2.31 (1.82-2.89)	2.61 (2.01-3.32)	2.92 (2.18-3.82)	3.36 (2.34-4.39)	3.95 (2.62-5.27)	4.40 (2.84-5.93)
3-hr	1.22 (1.01-1.47)	1.46 (1.21-1.76)	1.86 (1.53-2.24)	2.18 (1.79-2.64)	2.64 (2.09-3.29)	2.98 (2.31-3.79)	3.33 (2.51-4.35)	3.85 (2.69-5.01)	4.53 (3.03-6.02)	5.05 (3.29-6.79)
6-hr	1.50 (1.25-1.79)	1.79 (1.49-2.14)	2.26 (1.88-2.71)	2.66 (2.19-3.19)	3.20 (2.55-3.96)	3.62 (2.82-4.55)	4.04 (3.06-5.22)	4.64 (3.28-5.98)	5.43 (3.68-7.15)	6.03 (3.98-8.04)
12-hr	1.80 (1.51-2.14)	2.13 (1.79-2.53)	2.66 (2.23-3.17)	3.11 (2.58-3.71)	3.72 (2.99-4.56)	4.19 (3.29-5.21)	4.66 (3.55-5.94)	5.27 (3.77-6.75)	6.08 (4.17-7.95)	6.69 (4.47-8.85)
24-hr	2.12 (1.80-2.50)	2.47 (2.09-2.92)	3.05 (2.57-3.60)	3.53 (2.95-4.18)	4.19 (3.38-5.08)	4.69 (3.71-5.76)	5.20 (3.97-6.52)	5.79 (4.20-7.35)	6.56 (4.57-8.51)	7.15 (4.85-9.39)
2-day	2.48 (2.11-2.90)	2.84 (2.42-3.33)	3.44 (2.92-4.04)	3.94 (3.32-4.63)	4.62 (3.76-5.56)	5.15 (4.10-6.26)	5.67 (4.36-7.04)	6.25 (4.59-7.88)	7.02 (4.95-9.04)	7.61 (5.22-9.91)
3-day	2.74 (2.34-3.19)	3.11 (2.66-3.63)	3.71 (3.16-4.34)	4.22 (3.57-4.94)	4.91 (4.02-5.88)	5.44 (4.36-6.59)	5.97 (4.63-7.38)	6.57 (4.85-8.24)	7.35 (5.22-9.41)	7.94 (5.50-10.3)
4-day	2.96 (2.54-3.45)	3.34 (2.86-3.88)	3.95 (3.37-4.60)	4.46 (3.78-5.21)	5.15 (4.24-6.16)	5.69 (4.58-6.88)	6.23 (4.85-7.68)	6.84 (5.08-8.56)	7.65 (5.46-9.76)	8.26 (5.75-10.7)
7-day	3.57 (3.07-4.12)	3.95 (3.41-4.57)	4.59 (3.94-5.32)	5.12 (4.37-5.95)	5.84 (4.84-6.94)	6.40 (5.19-7.70)	6.96 (5.47-8.55)	7.62 (5.72-9.48)	8.50 (6.13-10.8)	9.16 (6.45-11.8)
10-day	4.15 (3.59-4.78)	4.56 (3.95-5.26)	5.24 (4.51-6.05)	5.79 (4.97-6.71)	6.56 (5.45-7.76)	7.15 (5.82-8.56)	7.74 (6.12-9.45)	8.43 (6.36-10.4)	9.34 (6.78-11.8)	10.0 (7.11-12.8)
20-day	5.97 (5.20-6.83)	6.47 (5.63-7.41)	7.29 (6.32-8.36)	7.96 (6.87-9.16)	8.90 (7.44-10.4)	9.61 (7.88-11.4)	10.3 (8.19-12.4)	11.0 (8.42-13.5)	11.9 (8.79-14.9)	12.6 (9.06-16.0)
30-day	7.49 (6.56-8.54)	8.07 (7.06-9.20)	9.02 (7.86-10.3)	9.80 (8.50-11.2)	10.9 (9.14-12.7)	11.7 (9.63-13.8)	12.5 (9.97-14.9)	13.2 (10.2-16.2)	14.1 (10.5-17.6)	14.8 (10.8-18.7)
45-day	9.38 (8.24-10.6)	10.1 (8.82-11.4)	11.2 (9.76-12.7)	12.1 (10.5-13.8)	13.3 (11.3-15.5)	14.3 (11.8-16.7)	15.3 (12.2-18.1)	16.0 (12.4-19.5)	17.0 (12.7-21.1)	17.7 (13.0-22.3)
60-day	10.9 (9.64-12.4)	11.7 (10.3-13.2)	12.9 (11.4-14.7)	14.0 (12.2-15.9)	15.4 (13.0-17.8)	16.5 (13.7-19.2)	17.6 (14.1-20.7)	18.4 (14.3-22.3)	19.4 (14.7-24.0)	20.2 (14.9-25.3)

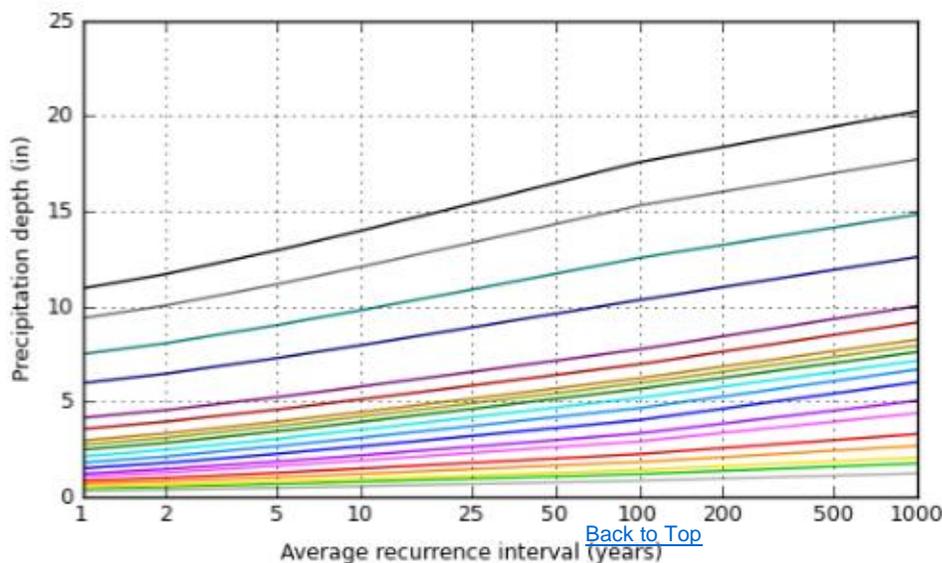
¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

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PF graphical



Average recurrence interval (years)
1
2
5
10
25
50
100
200
500
1000



Duration
5-min
10-min
15-min
30-min
60-min
2-hr
3-hr
6-hr
12-hr
24-hr
2-day
3-day
4-day
7-day
10-day
20-day
30-day
45-day
60-day

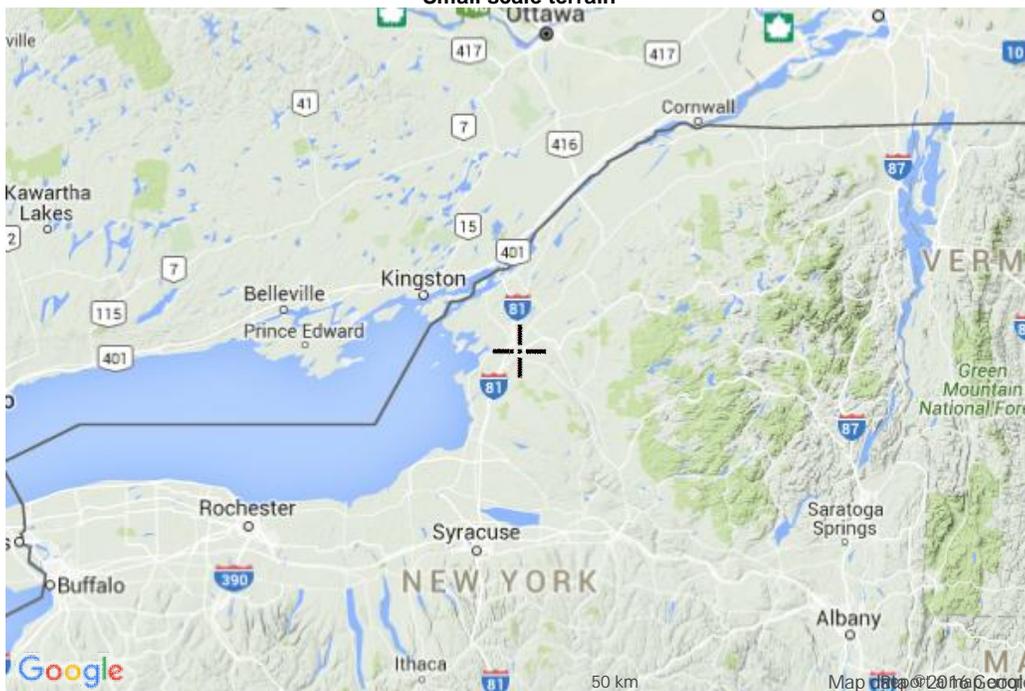
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Maps & aerials

Created (GMT): Tue Mar 15 12:00:35 2016

NOAA Atlas 14, Volume 10, Version 2

Small scale terrain



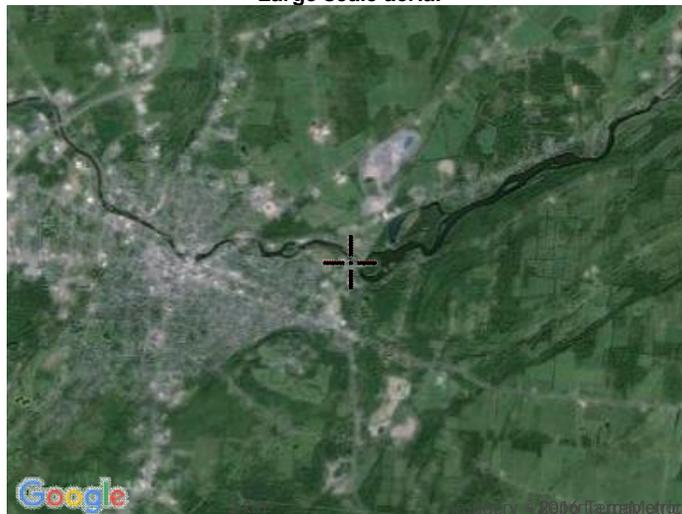
Large scale terrain



Large scale map

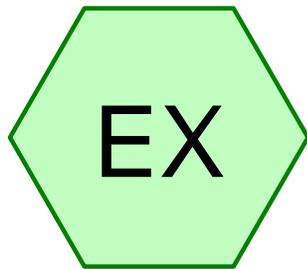


Large scale aerial

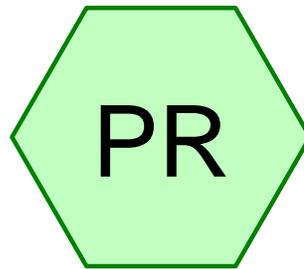


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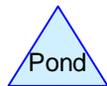
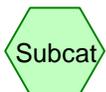
[US Department of Commerce](#)
[National Oceanic and Atmospheric Administration](#)
[National Weather Service](#)
[National Water Center](#)
1325 East West Highway
Silver Spring, MD 20910



DR-1 PRE



DR-1 POST



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Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.394	69	50-75% Grass cover, Fair, HSG B (EX)
0.263	61	>75% Grass cover, Good, HSG B (PR)
4.150	98	Paved parking, HSG B (EX, PR)
4.807	94	TOTAL AREA

Pre&Post-DR1

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Page 3

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
4.807	HSG B	EX, PR
0.000	HSG C	
0.000	HSG D	
0.000	Other	
4.807		TOTAL AREA

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Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.394	0.000	0.000	0.000	0.394	50-75% Grass cover, Fair	EX
0.000	0.263	0.000	0.000	0.000	0.263	>75% Grass cover, Good	PR
0.000	4.150	0.000	0.000	0.000	4.150	Paved parking	EX, PR
0.000	4.807	0.000	0.000	0.000	4.807	TOTAL AREA	

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Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	PR	0.00	0.00	265.0	0.0089	0.013	12.0	0.0	0.0

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Type II 24-hr 1 YR Rainfall=2.12"

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Time span=1.00-48.00 hrs, dt=0.05 hrs, 941 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX: DR-1 PRE

Runoff Area=2.441 ac 83.86% Impervious Runoff Depth=1.42"
Tc=6.0 min CN=93 Runoff=5.81 cfs 0.290 af

Subcatchment PR: DR-1 POST

Runoff Area=2.366 ac 88.88% Impervious Runoff Depth=1.51"
Flow Length=456' Tc=15.0 min CN=94 Runoff=4.49 cfs 0.298 af

Total Runoff Area = 4.807 ac Runoff Volume = 0.587 af Average Runoff Depth = 1.47"
13.67% Pervious = 0.657 ac 86.33% Impervious = 4.150 ac

Pre&Post-DR1

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Type II 24-hr 1 YR Rainfall=2.12"

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Summary for Subcatchment EX: DR-1 PRE

Runoff = 5.81 cfs @ 11.97 hrs, Volume= 0.290 af, Depth= 1.42"

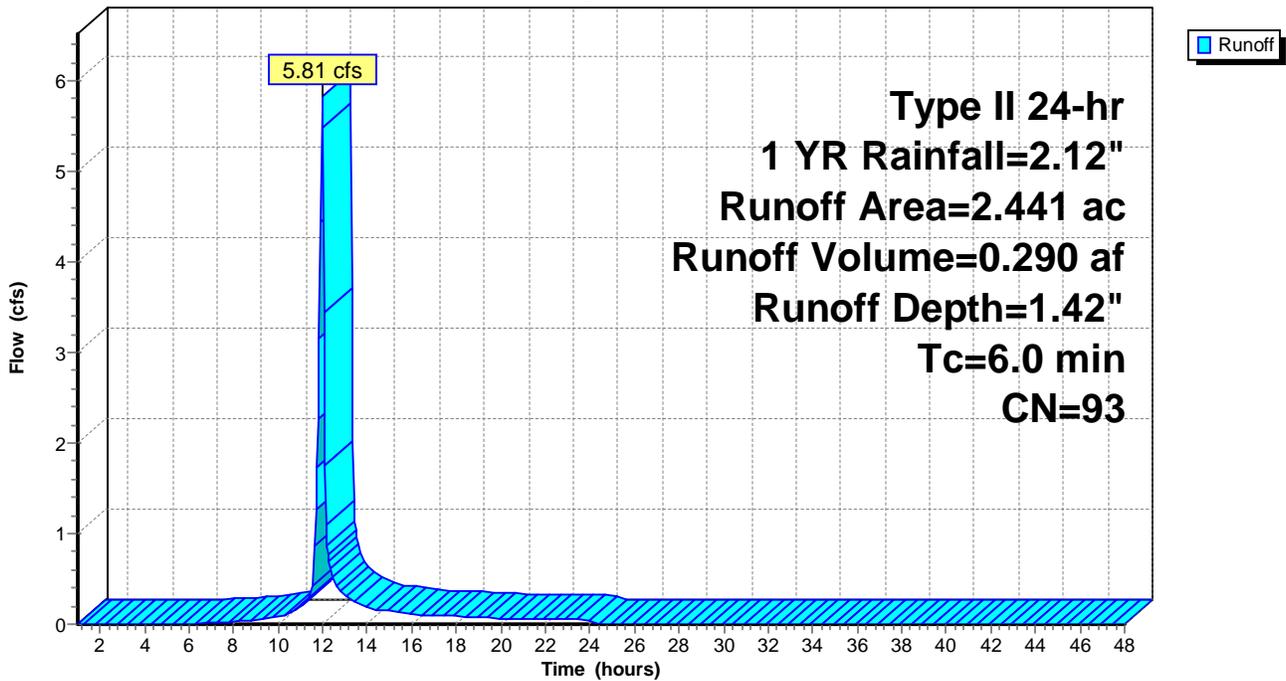
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.12"

Area (ac)	CN	Description
2.047	98	Paved parking, HSG B
0.394	69	50-75% Grass cover, Fair, HSG B
2.441	93	Weighted Average
0.394		16.14% Pervious Area
2.047		83.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Calculated Tc=4.9, 6 assumed

Subcatchment EX: DR-1 PRE

Hydrograph



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Type II 24-hr 1 YR Rainfall=2.12"

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Summary for Subcatchment PR: DR-1 POST

Runoff = 4.49 cfs @ 12.07 hrs, Volume= 0.298 af, Depth= 1.51"

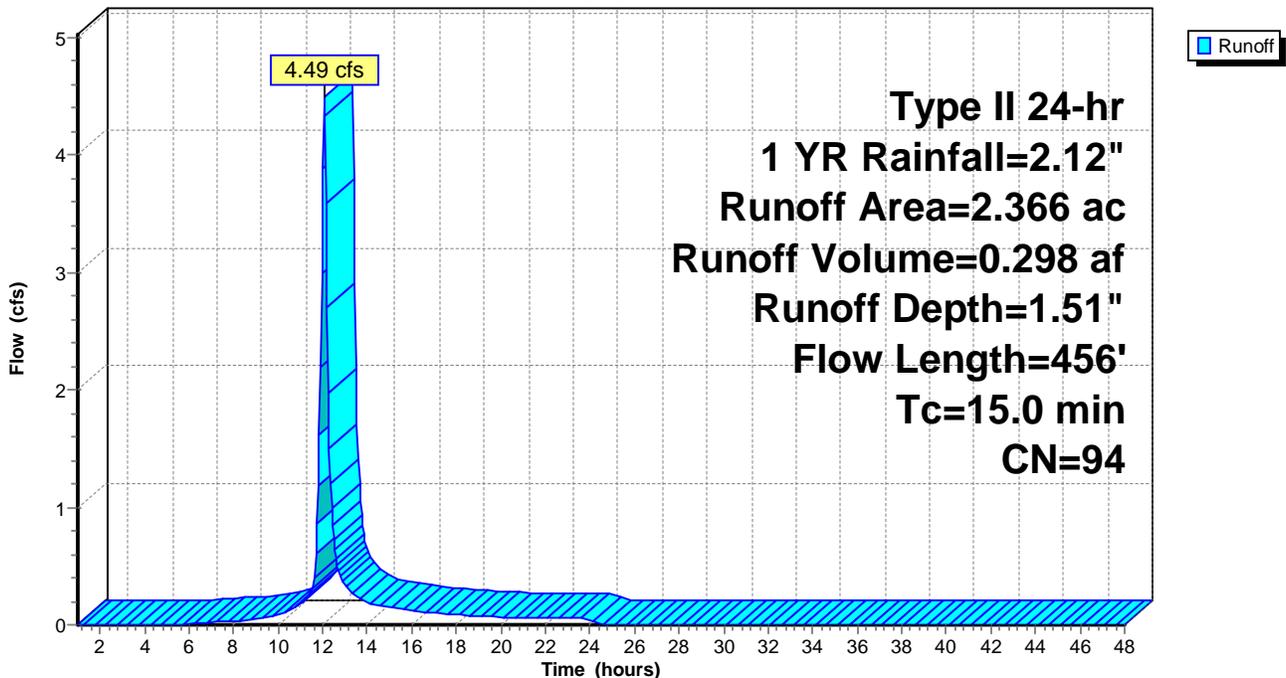
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.12"

Area (ac)	CN	Description
2.103	98	Paved parking, HSG B
0.263	61	>75% Grass cover, Good, HSG B
2.366	94	Weighted Average
0.263		11.12% Pervious Area
2.103		88.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	30	0.0036	0.04		Sheet Flow, Grass: Dense n= 0.240 P2= 2.31"
0.9	70	0.0351	1.36		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.31"
0.4	91	0.0285	3.43		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.0	265	0.0089	4.28	3.36	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
15.0	456	Total			

Subcatchment PR: DR-1 POST

Hydrograph



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Type II 24-hr 2 YR Rainfall=2.47"

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Time span=1.00-48.00 hrs, dt=0.05 hrs, 941 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX: DR-1 PRE

Runoff Area=2.441 ac 83.86% Impervious Runoff Depth=1.75"
Tc=6.0 min CN=93 Runoff=7.07 cfs 0.356 af

Subcatchment PR: DR-1 POST

Runoff Area=2.366 ac 88.88% Impervious Runoff Depth=1.84"
Flow Length=456' Tc=15.0 min CN=94 Runoff=5.42 cfs 0.363 af

Total Runoff Area = 4.807 ac Runoff Volume = 0.719 af Average Runoff Depth = 1.80"
13.67% Pervious = 0.657 ac 86.33% Impervious = 4.150 ac

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Type II 24-hr 2 YR Rainfall=2.47"

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Summary for Subcatchment EX: DR-1 PRE

Runoff = 7.07 cfs @ 11.97 hrs, Volume= 0.356 af, Depth= 1.75"

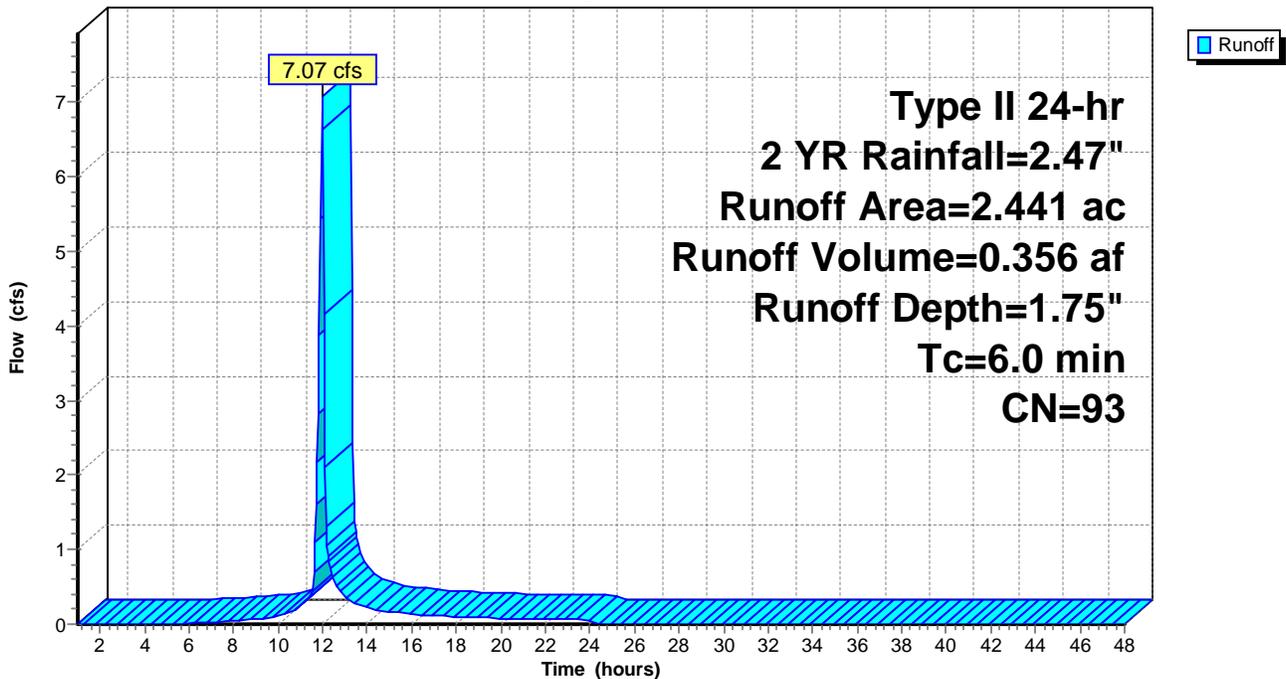
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 YR Rainfall=2.47"

Area (ac)	CN	Description
2.047	98	Paved parking, HSG B
0.394	69	50-75% Grass cover, Fair, HSG B
2.441	93	Weighted Average
0.394		16.14% Pervious Area
2.047		83.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Calculated Tc=4.9, 6 assumed

Subcatchment EX: DR-1 PRE

Hydrograph



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Type II 24-hr 2 YR Rainfall=2.47"

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Summary for Subcatchment PR: DR-1 POST

Runoff = 5.42 cfs @ 12.06 hrs, Volume= 0.363 af, Depth= 1.84"

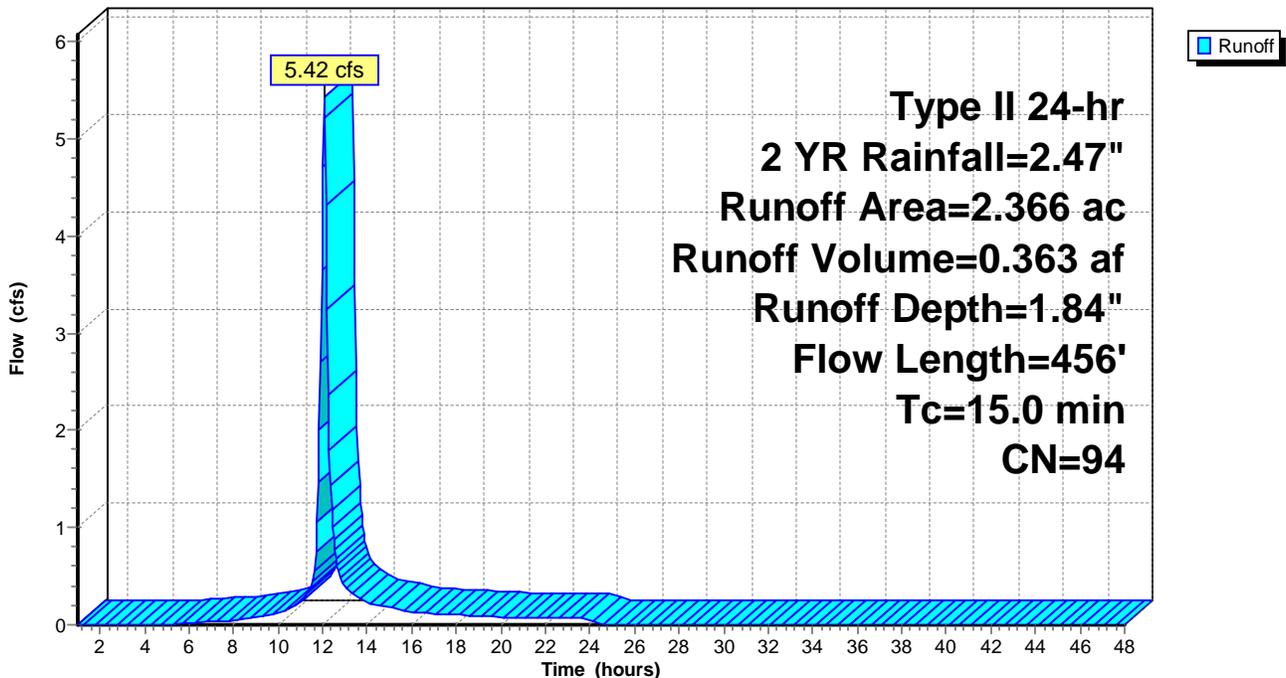
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 YR Rainfall=2.47"

Area (ac)	CN	Description
2.103	98	Paved parking, HSG B
0.263	61	>75% Grass cover, Good, HSG B
2.366	94	Weighted Average
0.263		11.12% Pervious Area
2.103		88.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	30	0.0036	0.04		Sheet Flow, Grass: Dense n= 0.240 P2= 2.31"
0.9	70	0.0351	1.36		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.31"
0.4	91	0.0285	3.43		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.0	265	0.0089	4.28	3.36	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
15.0	456	Total			

Subcatchment PR: DR-1 POST

Hydrograph



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Type II 24-hr 5 YR Rainfall=3.05"

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Time span=1.00-48.00 hrs, dt=0.05 hrs, 941 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX: DR-1 PRE

Runoff Area=2.441 ac 83.86% Impervious Runoff Depth=2.30"
Tc=6.0 min CN=93 Runoff=9.15 cfs 0.468 af

Subcatchment PR: DR-1 POST

Runoff Area=2.366 ac 88.88% Impervious Runoff Depth=2.40"
Flow Length=456' Tc=15.0 min CN=94 Runoff=6.97 cfs 0.473 af

Total Runoff Area = 4.807 ac Runoff Volume = 0.941 af Average Runoff Depth = 2.35"
13.67% Pervious = 0.657 ac 86.33% Impervious = 4.150 ac

Pre&Post-DR1

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Type II 24-hr 5 YR Rainfall=3.05"

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Summary for Subcatchment EX: DR-1 PRE

Runoff = 9.15 cfs @ 11.96 hrs, Volume= 0.468 af, Depth= 2.30"

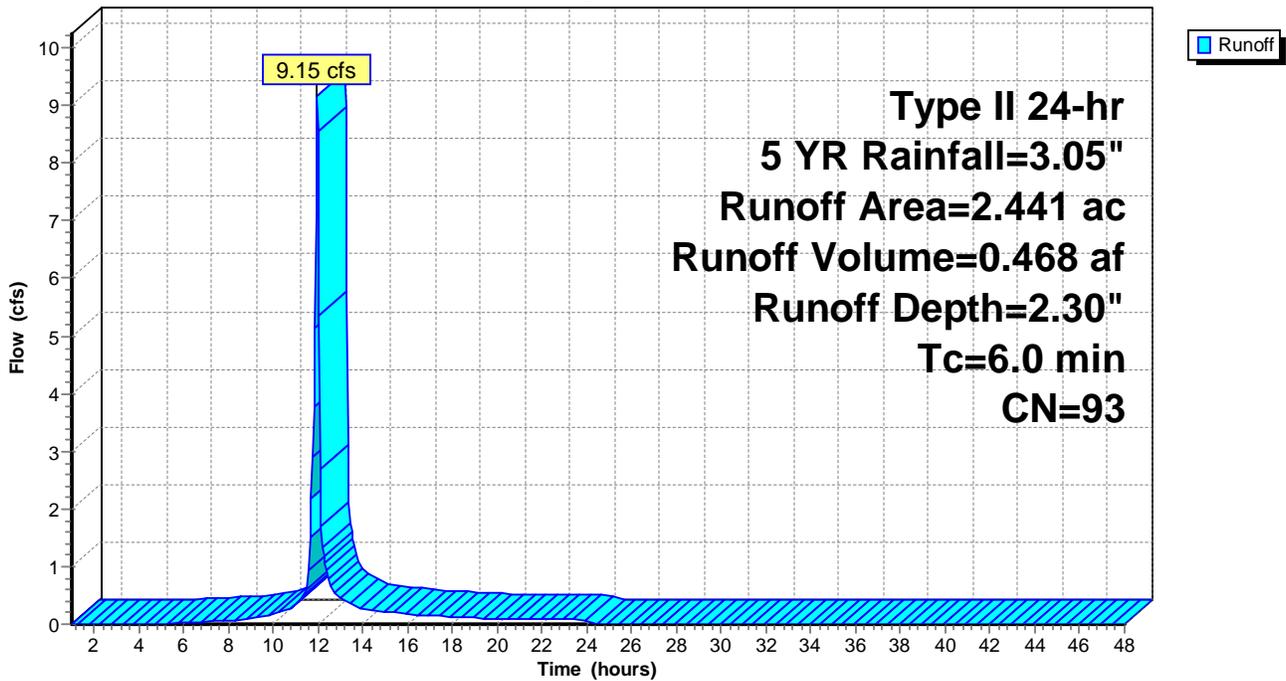
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 5 YR Rainfall=3.05"

Area (ac)	CN	Description
2.047	98	Paved parking, HSG B
0.394	69	50-75% Grass cover, Fair, HSG B
2.441	93	Weighted Average
0.394		16.14% Pervious Area
2.047		83.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Calculated Tc=4.9, 6 assumed

Subcatchment EX: DR-1 PRE

Hydrograph



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Type II 24-hr 5 YR Rainfall=3.05"

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Summary for Subcatchment PR: DR-1 POST

Runoff = 6.97 cfs @ 12.06 hrs, Volume= 0.473 af, Depth= 2.40"

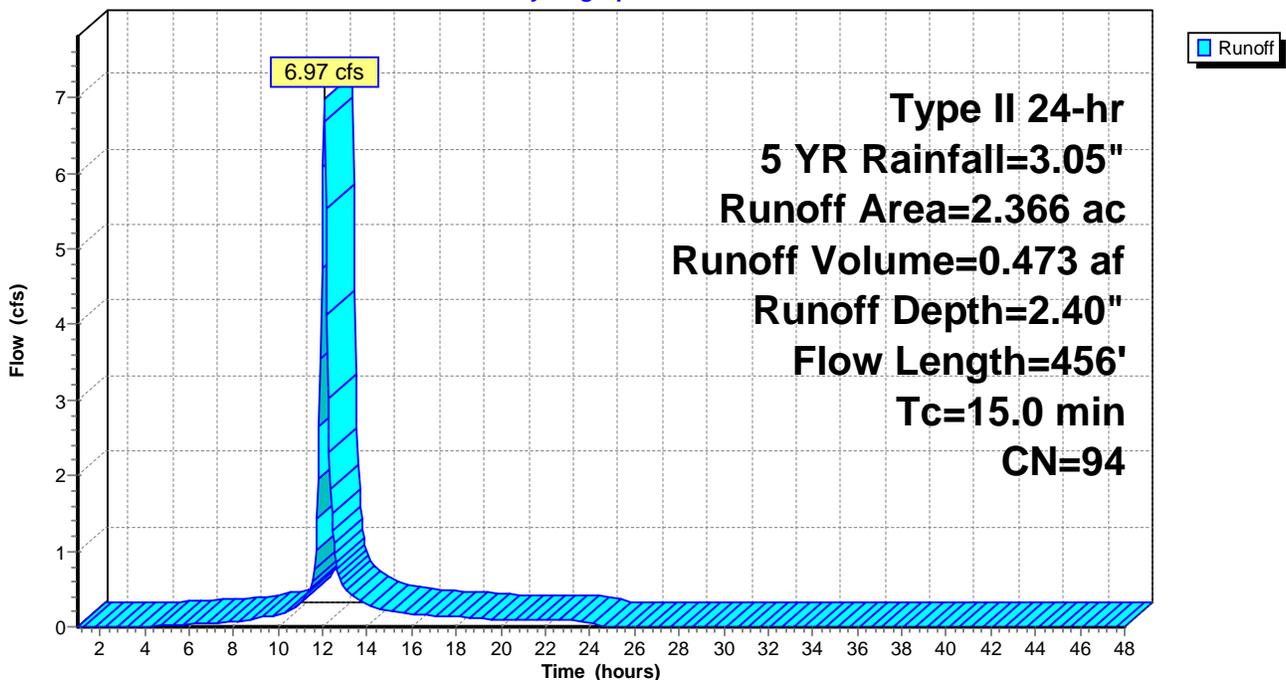
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Type II 24-hr 5 YR Rainfall=3.05"

Area (ac)	CN	Description
2.103	98	Paved parking, HSG B
0.263	61	>75% Grass cover, Good, HSG B
2.366	94	Weighted Average
0.263		11.12% Pervious Area
2.103		88.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	30	0.0036	0.04		Sheet Flow, Grass: Dense n= 0.240 P2= 2.31"
0.9	70	0.0351	1.36		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.31"
0.4	91	0.0285	3.43		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.0	265	0.0089	4.28	3.36	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
15.0	456	Total			

Subcatchment PR: DR-1 POST

Hydrograph



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Type II 24-hr 10 YR Rainfall=3.53"

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Time span=1.00-48.00 hrs, dt=0.05 hrs, 941 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX: DR-1 PRE

Runoff Area=2.441 ac 83.86% Impervious Runoff Depth=2.76"
Tc=6.0 min CN=93 Runoff=10.86 cfs 0.562 af

Subcatchment PR: DR-1 POST

Runoff Area=2.366 ac 88.88% Impervious Runoff Depth=2.86"
Flow Length=456' Tc=15.0 min CN=94 Runoff=8.25 cfs 0.565 af

Total Runoff Area = 4.807 ac Runoff Volume = 1.127 af Average Runoff Depth = 2.81"
13.67% Pervious = 0.657 ac 86.33% Impervious = 4.150 ac

Pre&Post-DR1

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Type II 24-hr 10 YR Rainfall=3.53"

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Summary for Subcatchment EX: DR-1 PRE

Runoff = 10.86 cfs @ 11.96 hrs, Volume= 0.562 af, Depth= 2.76"

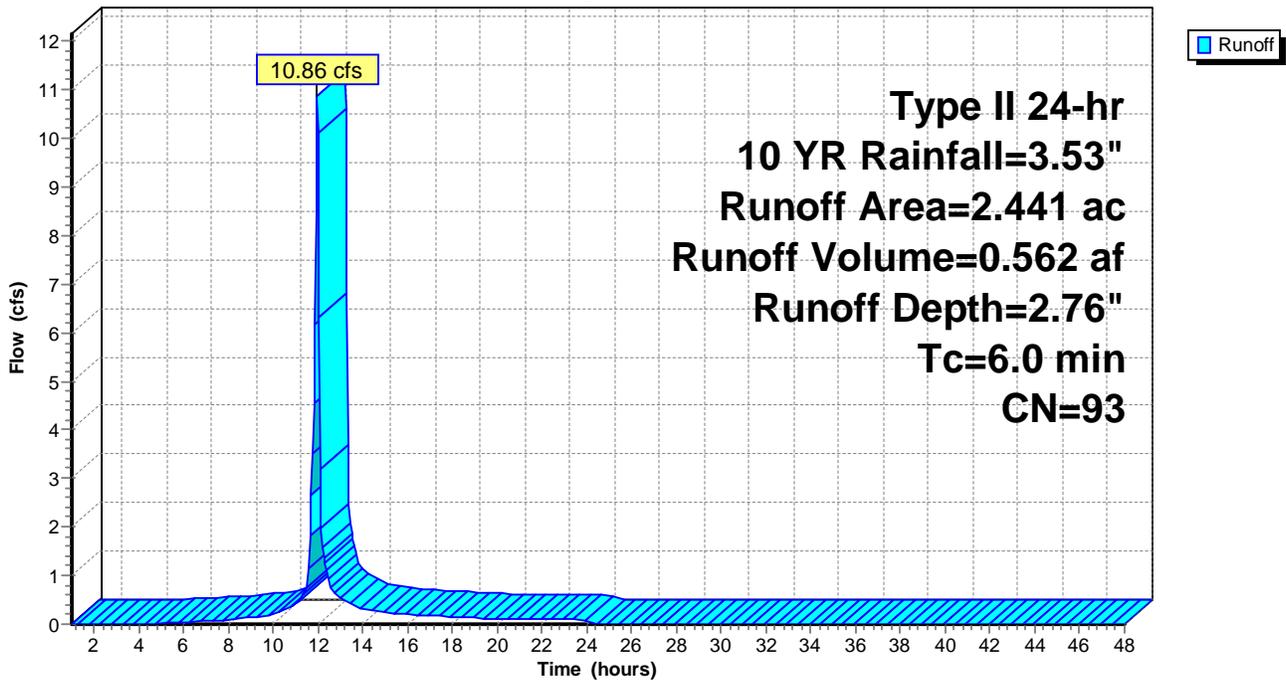
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.53"

Area (ac)	CN	Description
2.047	98	Paved parking, HSG B
0.394	69	50-75% Grass cover, Fair, HSG B
2.441	93	Weighted Average
0.394		16.14% Pervious Area
2.047		83.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Calculated Tc=4.9, 6 assumed

Subcatchment EX: DR-1 PRE

Hydrograph



Pre&Post-DR1

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Type II 24-hr 10 YR Rainfall=3.53"

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Summary for Subcatchment PR: DR-1 POST

Runoff = 8.25 cfs @ 12.06 hrs, Volume= 0.565 af, Depth= 2.86"

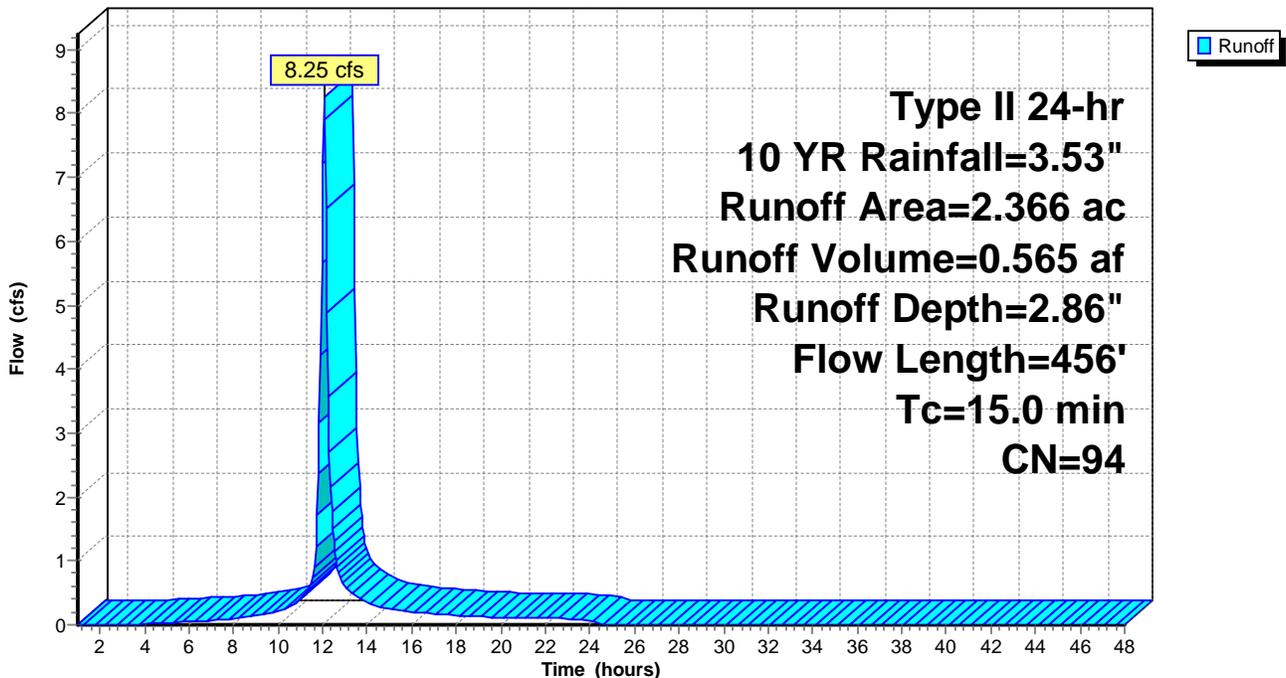
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.53"

Area (ac)	CN	Description
2.103	98	Paved parking, HSG B
0.263	61	>75% Grass cover, Good, HSG B
2.366	94	Weighted Average
0.263		11.12% Pervious Area
2.103		88.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	30	0.0036	0.04		Sheet Flow, Grass: Dense n= 0.240 P2= 2.31"
0.9	70	0.0351	1.36		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.31"
0.4	91	0.0285	3.43		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.0	265	0.0089	4.28	3.36	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
15.0	456	Total			

Subcatchment PR: DR-1 POST

Hydrograph



Pre&Post-DR1

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Type II 24-hr 25 YR Rainfall=4.19"

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Time span=1.00-48.00 hrs, dt=0.05 hrs, 941 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX: DR-1 PRE

Runoff Area=2.441 ac 83.86% Impervious Runoff Depth=3.40"
Tc=6.0 min CN=93 Runoff=13.20 cfs 0.693 af

Subcatchment PR: DR-1 POST

Runoff Area=2.366 ac 88.88% Impervious Runoff Depth=3.51"
Flow Length=456' Tc=15.0 min CN=94 Runoff=9.99 cfs 0.692 af

Total Runoff Area = 4.807 ac Runoff Volume = 1.385 af Average Runoff Depth = 3.46"
13.67% Pervious = 0.657 ac 86.33% Impervious = 4.150 ac

Pre&Post-DR1

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Type II 24-hr 25 YR Rainfall=4.19"

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Summary for Subcatchment EX: DR-1 PRE

Runoff = 13.20 cfs @ 11.96 hrs, Volume= 0.693 af, Depth= 3.40"

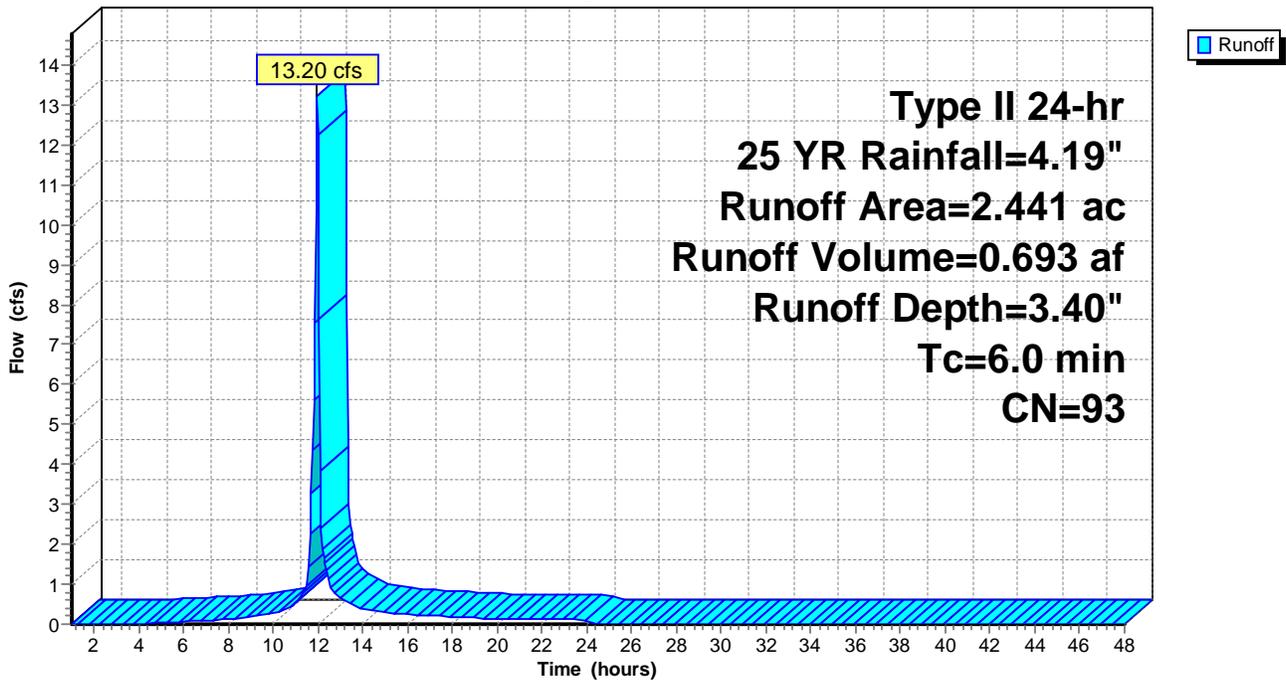
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 YR Rainfall=4.19"

Area (ac)	CN	Description
2.047	98	Paved parking, HSG B
0.394	69	50-75% Grass cover, Fair, HSG B
2.441	93	Weighted Average
0.394		16.14% Pervious Area
2.047		83.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Calculated Tc=4.9, 6 assumed

Subcatchment EX: DR-1 PRE

Hydrograph



Pre&Post-DR1

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Type II 24-hr 25 YR Rainfall=4.19"

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Summary for Subcatchment PR: DR-1 POST

Runoff = 9.99 cfs @ 12.06 hrs, Volume= 0.692 af, Depth= 3.51"

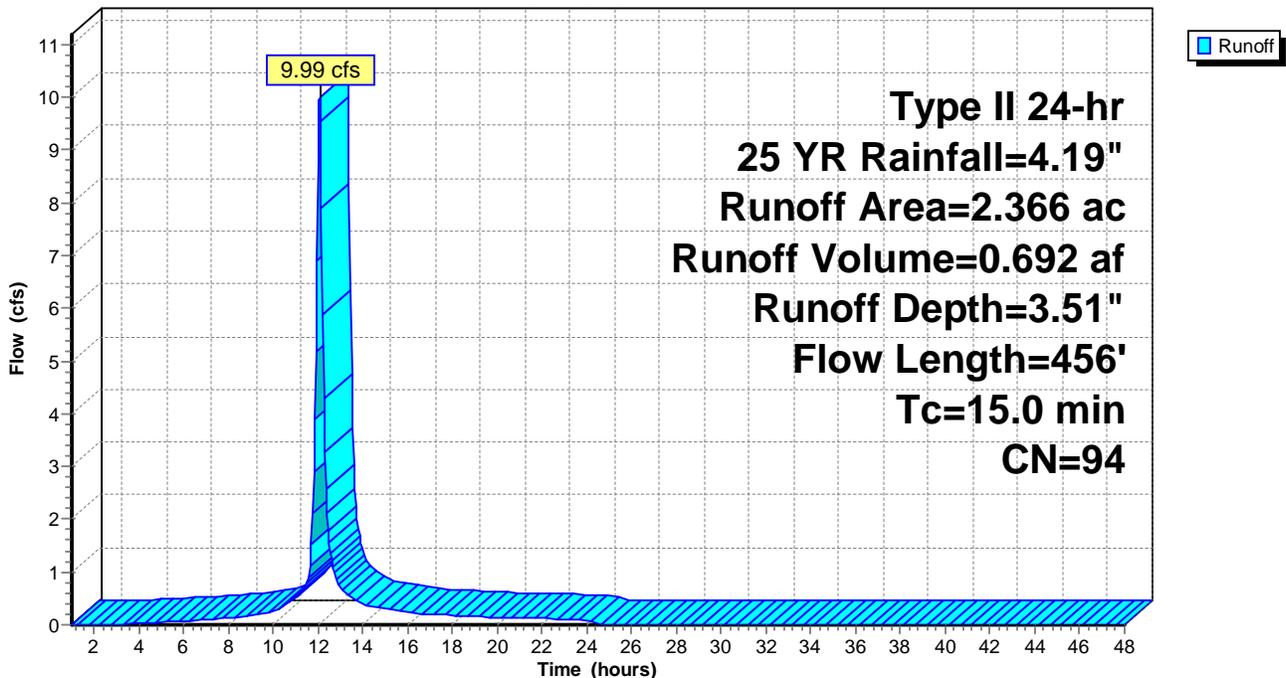
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 YR Rainfall=4.19"

Area (ac)	CN	Description
2.103	98	Paved parking, HSG B
0.263	61	>75% Grass cover, Good, HSG B
2.366	94	Weighted Average
0.263		11.12% Pervious Area
2.103		88.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	30	0.0036	0.04		Sheet Flow, Grass: Dense n= 0.240 P2= 2.31"
0.9	70	0.0351	1.36		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.31"
0.4	91	0.0285	3.43		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.0	265	0.0089	4.28	3.36	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
15.0	456	Total			

Subcatchment PR: DR-1 POST

Hydrograph



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Type II 24-hr 50 YR Rainfall=4.69"

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Time span=1.00-48.00 hrs, dt=0.05 hrs, 941 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX: DR-1 PRE

Runoff Area=2.441 ac 83.86% Impervious Runoff Depth=3.89"
Tc=6.0 min CN=93 Runoff=14.96 cfs 0.792 af

Subcatchment PR: DR-1 POST

Runoff Area=2.366 ac 88.88% Impervious Runoff Depth=4.00"
Flow Length=456' Tc=15.0 min CN=94 Runoff=11.31 cfs 0.789 af

Total Runoff Area = 4.807 ac Runoff Volume = 1.581 af Average Runoff Depth = 3.95"
13.67% Pervious = 0.657 ac 86.33% Impervious = 4.150 ac

Pre&Post-DR1

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Type II 24-hr 50 YR Rainfall=4.69"

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Summary for Subcatchment EX: DR-1 PRE

Runoff = 14.96 cfs @ 11.96 hrs, Volume= 0.792 af, Depth= 3.89"

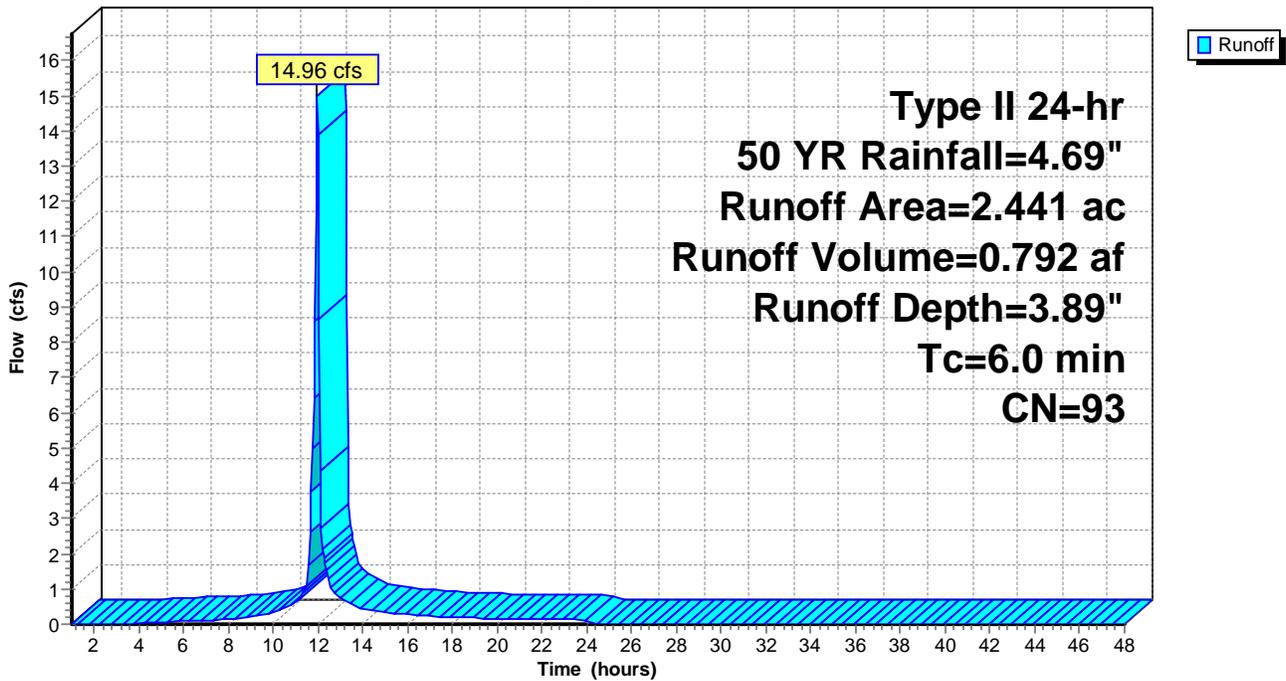
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 50 YR Rainfall=4.69"

Area (ac)	CN	Description
2.047	98	Paved parking, HSG B
0.394	69	50-75% Grass cover, Fair, HSG B
2.441	93	Weighted Average
0.394		16.14% Pervious Area
2.047		83.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Calculated Tc=4.9, 6 assumed

Subcatchment EX: DR-1 PRE

Hydrograph



Pre&Post-DR1

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Type II 24-hr 50 YR Rainfall=4.69"

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Summary for Subcatchment PR: DR-1 POST

Runoff = 11.31 cfs @ 12.06 hrs, Volume= 0.789 af, Depth= 4.00"

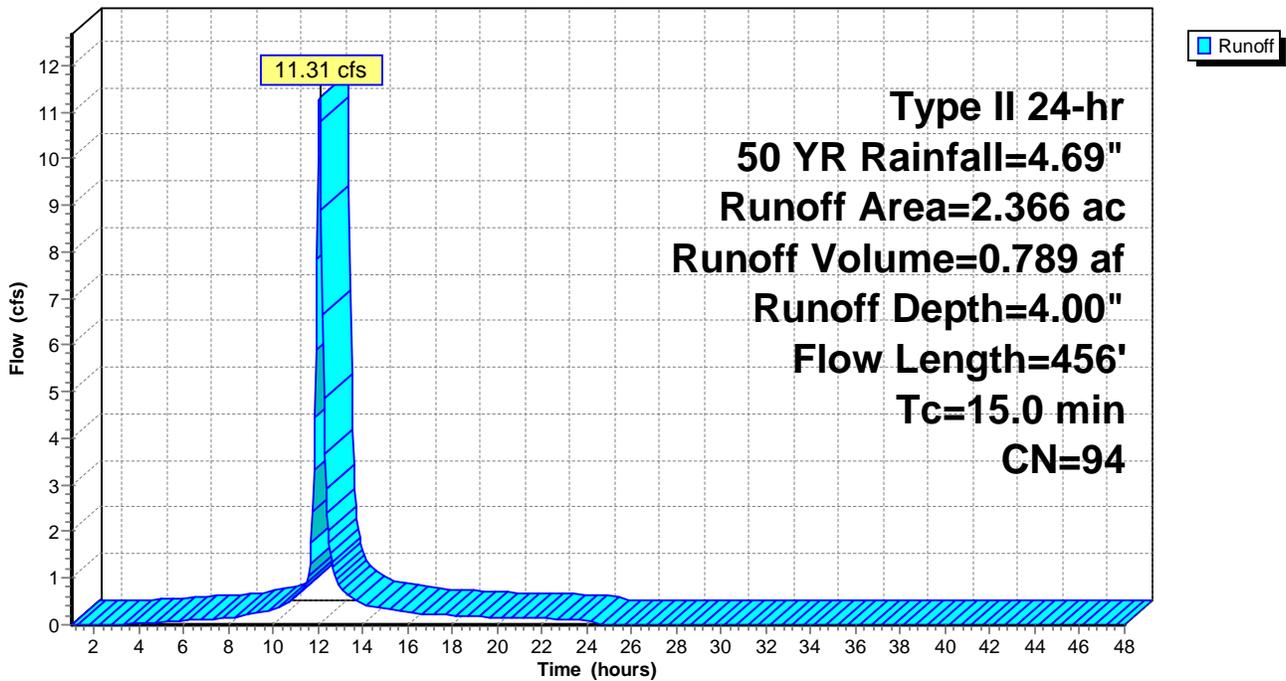
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 50 YR Rainfall=4.69"

Area (ac)	CN	Description
2.103	98	Paved parking, HSG B
0.263	61	>75% Grass cover, Good, HSG B
2.366	94	Weighted Average
0.263		11.12% Pervious Area
2.103		88.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	30	0.0036	0.04		Sheet Flow, Grass: Dense n= 0.240 P2= 2.31"
0.9	70	0.0351	1.36		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.31"
0.4	91	0.0285	3.43		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.0	265	0.0089	4.28	3.36	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
15.0	456	Total			

Subcatchment PR: DR-1 POST

Hydrograph



Pre&Post-DR1

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Type II 24-hr 100 YR Rainfall=5.20"

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Time span=1.00-48.00 hrs, dt=0.05 hrs, 941 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX: DR-1 PRE

Runoff Area=2.441 ac 83.86% Impervious Runoff Depth=4.39"
Tc=6.0 min CN=93 Runoff=16.76 cfs 0.894 af

Subcatchment PR: DR-1 POST

Runoff Area=2.366 ac 88.88% Impervious Runoff Depth=4.51"
Flow Length=456' Tc=15.0 min CN=94 Runoff=12.64 cfs 0.888 af

Total Runoff Area = 4.807 ac Runoff Volume = 1.782 af Average Runoff Depth = 4.45"
13.67% Pervious = 0.657 ac 86.33% Impervious = 4.150 ac

Pre&Post-DR1

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Type II 24-hr 100 YR Rainfall=5.20"

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Summary for Subcatchment EX: DR-1 PRE

Runoff = 16.76 cfs @ 11.96 hrs, Volume= 0.894 af, Depth= 4.39"

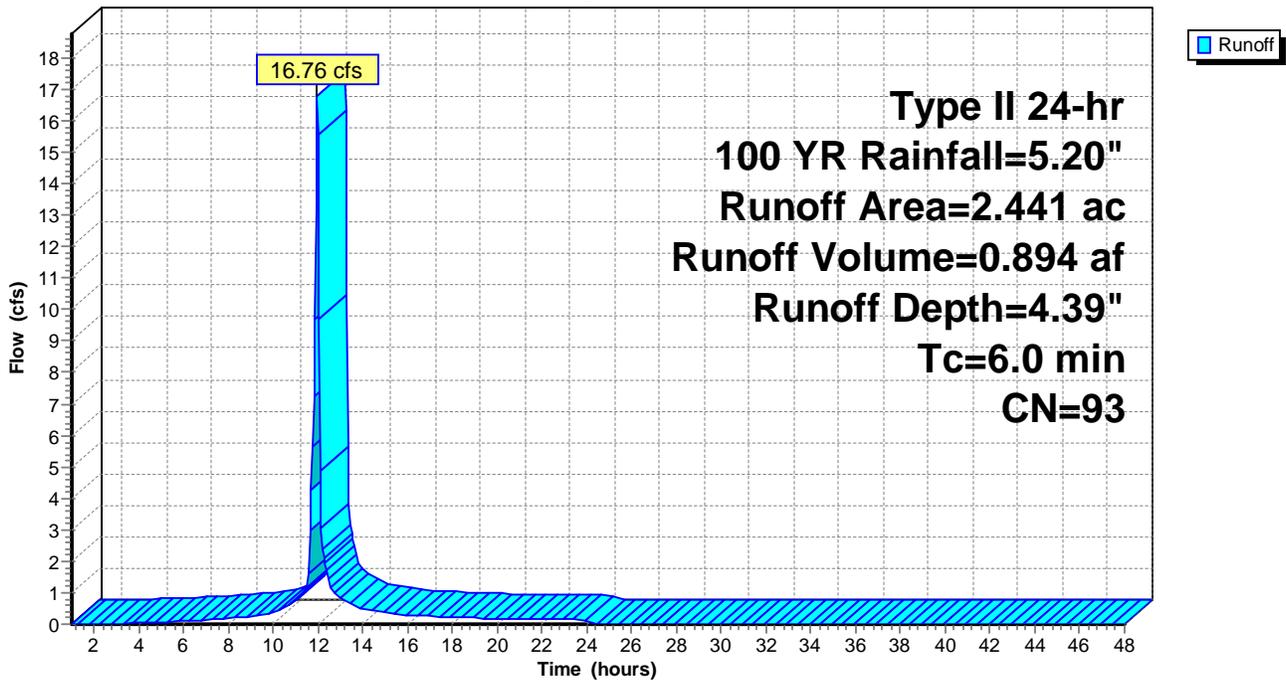
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=5.20"

Area (ac)	CN	Description
2.047	98	Paved parking, HSG B
0.394	69	50-75% Grass cover, Fair, HSG B
2.441	93	Weighted Average
0.394		16.14% Pervious Area
2.047		83.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Calculated Tc=4.9, 6 assumed

Subcatchment EX: DR-1 PRE

Hydrograph



Pre&Post-DR1

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Type II 24-hr 100 YR Rainfall=5.20"

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Summary for Subcatchment PR: DR-1 POST

Runoff = 12.64 cfs @ 12.06 hrs, Volume= 0.888 af, Depth= 4.51"

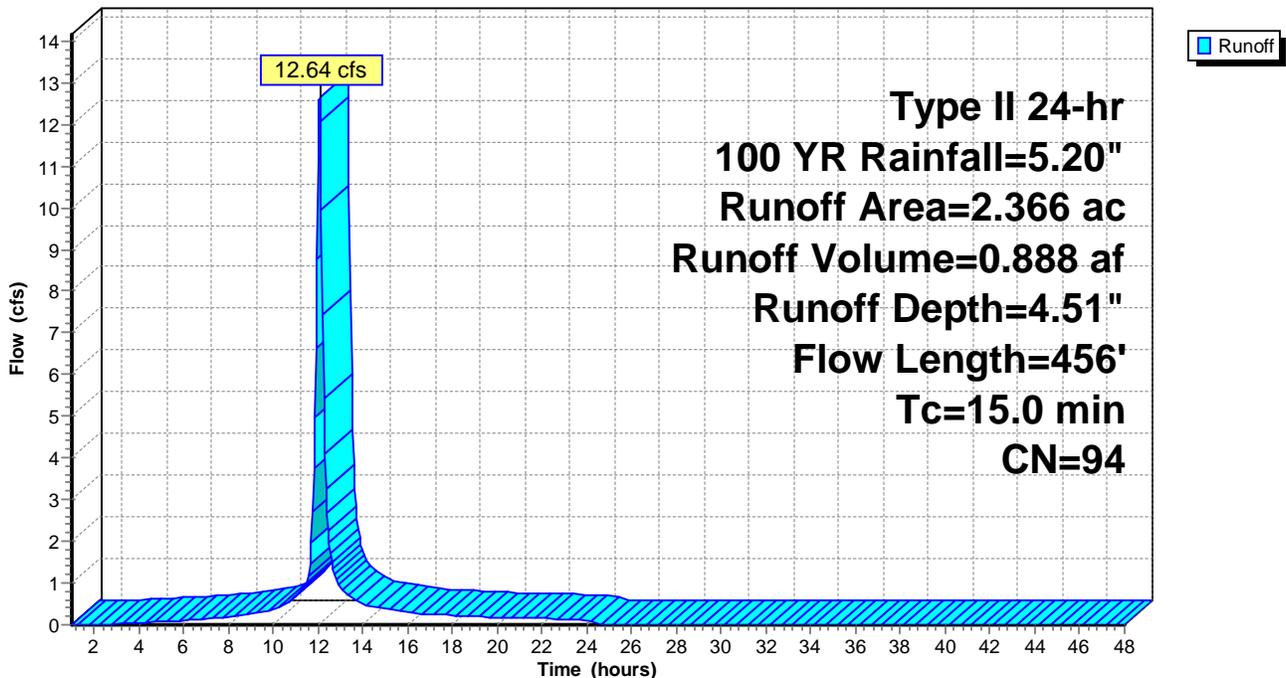
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=5.20"

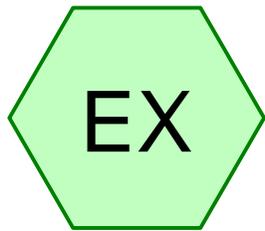
Area (ac)	CN	Description
2.103	98	Paved parking, HSG B
0.263	61	>75% Grass cover, Good, HSG B
2.366	94	Weighted Average
0.263		11.12% Pervious Area
2.103		88.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	30	0.0036	0.04		Sheet Flow, Grass: Dense n= 0.240 P2= 2.31"
0.9	70	0.0351	1.36		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.31"
0.4	91	0.0285	3.43		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.0	265	0.0089	4.28	3.36	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
15.0	456	Total			

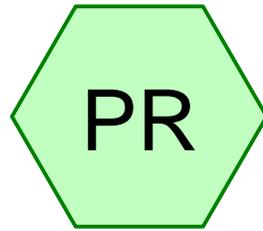
Subcatchment PR: DR-1 POST

Hydrograph

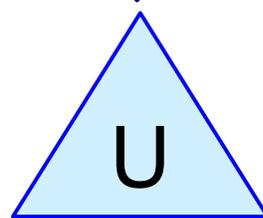




DR-2 PRE



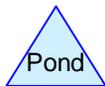
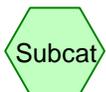
DR-2 POST



Underground Basin



POI-2



Pre&Post-DR2

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Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.137	69	50-75% Grass cover, Fair, HSG B (EX)
0.640	61	>75% Grass cover, Good, HSG B (PR)
5.136	98	Paved parking, HSG B (EX, PR)
5.913	93	TOTAL AREA

Pre&Post-DR2

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Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
5.913	HSG B	EX, PR
0.000	HSG C	
0.000	HSG D	
0.000	Other	
5.913		TOTAL AREA

Pre&Post-DR2

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Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.137	0.000	0.000	0.000	0.137	50-75% Grass cover, Fair	EX
0.000	0.640	0.000	0.000	0.000	0.640	>75% Grass cover, Good	PR
0.000	5.136	0.000	0.000	0.000	5.136	Paved parking	EX, PR
0.000	5.913	0.000	0.000	0.000	5.913	TOTAL AREA	

Pre&Post-DR2

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Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	PR	0.00	0.00	415.0	0.0088	0.013	12.0	0.0	0.0
2	U	475.78	473.58	220.0	0.0100	0.013	24.0	0.0	0.0

Pre&Post-DR2

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Type II 24-hr 1 YR Rainfall=2.12"

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Time span=1.00-48.00 hrs, dt=0.05 hrs, 941 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX: DR-2 PRE

Runoff Area=1.495 ac 90.84% Impervious Runoff Depth=1.60"
Tc=10.0 min CN=95 Runoff=3.46 cfs 0.199 af

Subcatchment PR: DR-2 POST

Runoff Area=4.418 ac 85.51% Impervious Runoff Depth=1.42"
Flow Length=492' Tc=8.7 min CN=93 Runoff=9.79 cfs 0.525 af

Pond U: Underground Basin

Peak Elev=477.34' Storage=0.187 af Inflow=9.79 cfs 0.525 af
Outflow=2.43 cfs 0.524 af

Link 2L: POI-2

Inflow=2.43 cfs 0.524 af
Primary=2.43 cfs 0.524 af

Total Runoff Area = 5.913 ac Runoff Volume = 0.724 af Average Runoff Depth = 1.47"
13.14% Pervious = 0.777 ac 86.86% Impervious = 5.136 ac

Pre&Post-DR2

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Type II 24-hr 1 YR Rainfall=2.12"

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Summary for Subcatchment EX: DR-2 PRE

Runoff = 3.46 cfs @ 12.01 hrs, Volume= 0.199 af, Depth= 1.60"

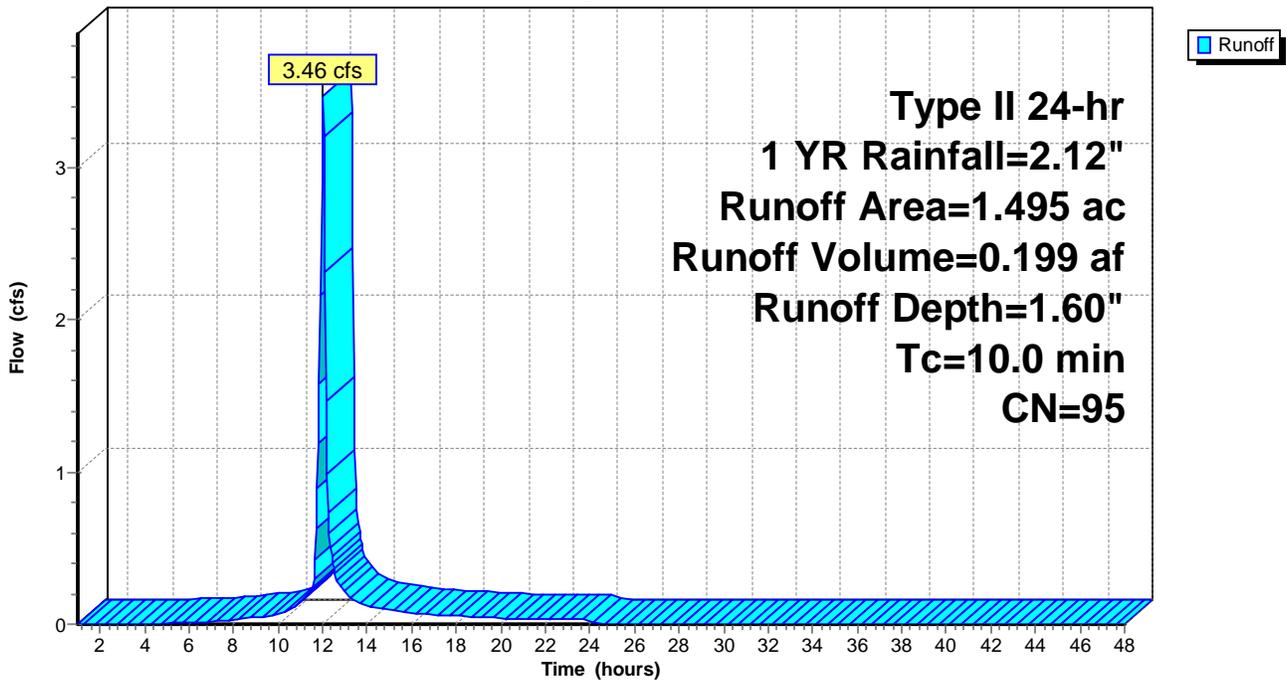
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.12"

Area (ac)	CN	Description
1.358	98	Paved parking, HSG B
0.137	69	50-75% Grass cover, Fair, HSG B
1.495	95	Weighted Average
0.137		9.16% Pervious Area
1.358		90.84% Impervious Area

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

Subcatchment EX: DR-2 PRE

Hydrograph



Pre&Post-DR2

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Type II 24-hr 1 YR Rainfall=2.12"

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Summary for Subcatchment PR: DR-2 POST

Runoff = 9.79 cfs @ 12.00 hrs, Volume= 0.525 af, Depth= 1.42"

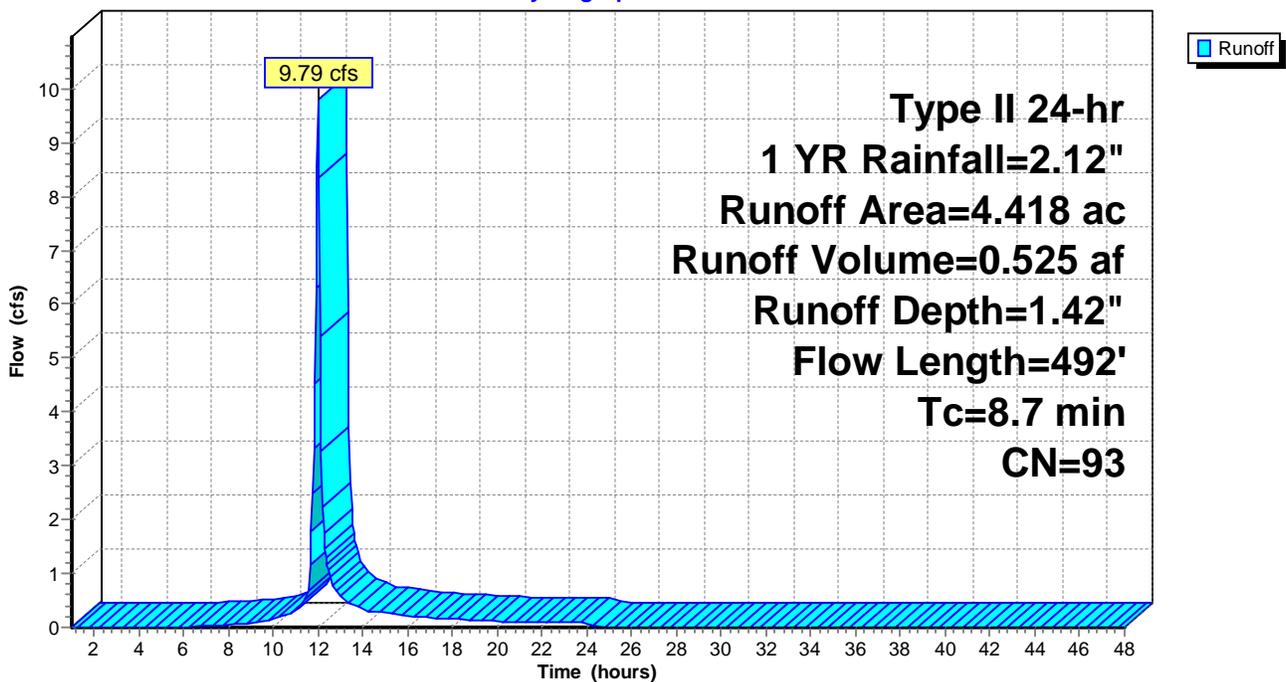
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
 Type II 24-hr 1 YR Rainfall=2.12"

Area (ac)	CN	Description
3.778	98	Paved parking, HSG B
0.640	61	>75% Grass cover, Good, HSG B
4.418	93	Weighted Average
0.640		14.49% Pervious Area
3.778		85.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	34	0.0261	0.09		Sheet Flow, Grass: Dense n= 0.240 P2= 2.31"
0.7	43	0.0220	1.03		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.31"
1.6	415	0.0088	4.26	3.34	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
8.7	492	Total			

Subcatchment PR: DR-2 POST

Hydrograph



Summary for Pond U: Underground Basin

Inflow Area = 4.418 ac, 85.51% Impervious, Inflow Depth = 1.42" for 1 YR event
 Inflow = 9.79 cfs @ 12.00 hrs, Volume= 0.525 af
 Outflow = 2.43 cfs @ 12.20 hrs, Volume= 0.524 af, Atten= 75%, Lag= 11.9 min
 Primary = 2.43 cfs @ 12.20 hrs, Volume= 0.524 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 477.34' @ 12.20 hrs Surf.Area= 0.190 ac Storage= 0.187 af

Plug-Flow detention time= 52.1 min calculated for 0.523 af (100% of inflow)
 Center-of-Mass det. time= 52.3 min (859.5 - 807.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	475.78'	0.263 af	72.92'W x 113.25'L x 5.50'H Field A 1.043 af Overall - 0.385 af Embedded = 0.657 af x 40.0% Voids
#2A	476.53'	0.385 af	ADS_StormTech MC-3500 d +Cap x 150 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 10 Rows of 15 Chambers Cap Storage= +14.9 cf x 2 x 10 rows = 298.0 cf
		0.648 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	475.78'	24.0" Round Culvert L= 220.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 475.78' / 473.58' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	475.78'	9.0" W x 6.0" H Vert. 1-YR C= 0.600
#3	Device 1	477.10'	12.0" W x 3.0" H Vert. 2-YR C= 0.600

Primary OutFlow Max=2.43 cfs @ 12.20 hrs HW=477.34' TW=0.00' (Dynamic Tailwater)

- ↑ **1=Culvert** (Passes 2.43 cfs of 11.15 cfs potential flow)
- ↑ **2=1-YR** (Orifice Controls 2.06 cfs @ 5.50 fps)
- ↑ **3=2-YR** (Orifice Controls 0.37 cfs @ 1.56 fps)

Pond U: Underground Basin - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap storage)

Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf

Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap

Cap Storage= +14.9 cf x 2 x 10 rows = 298.0 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

15 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 111.25' Row Length +12.0" End Stone x 2 = 113.25' Base Length

10 Rows x 77.0" Wide + 9.0" Spacing x 9 + 12.0" Side Stone x 2 = 72.92' Base Width

9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

150 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 10 Rows = 16,790.8 cf Chamber Storage

45,418.0 cf Field - 16,790.8 cf Chambers = 28,627.2 cf Stone x 40.0% Voids = 11,450.9 cf Stone Storage

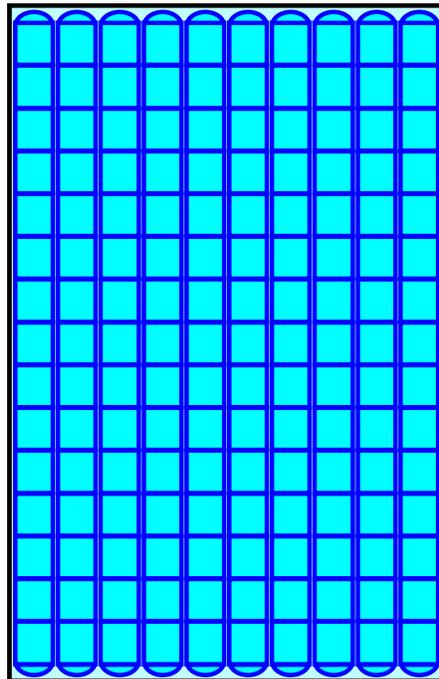
Chamber Storage + Stone Storage = 28,241.7 cf = 0.648 af

Overall Storage Efficiency = 62.2%

150 Chambers

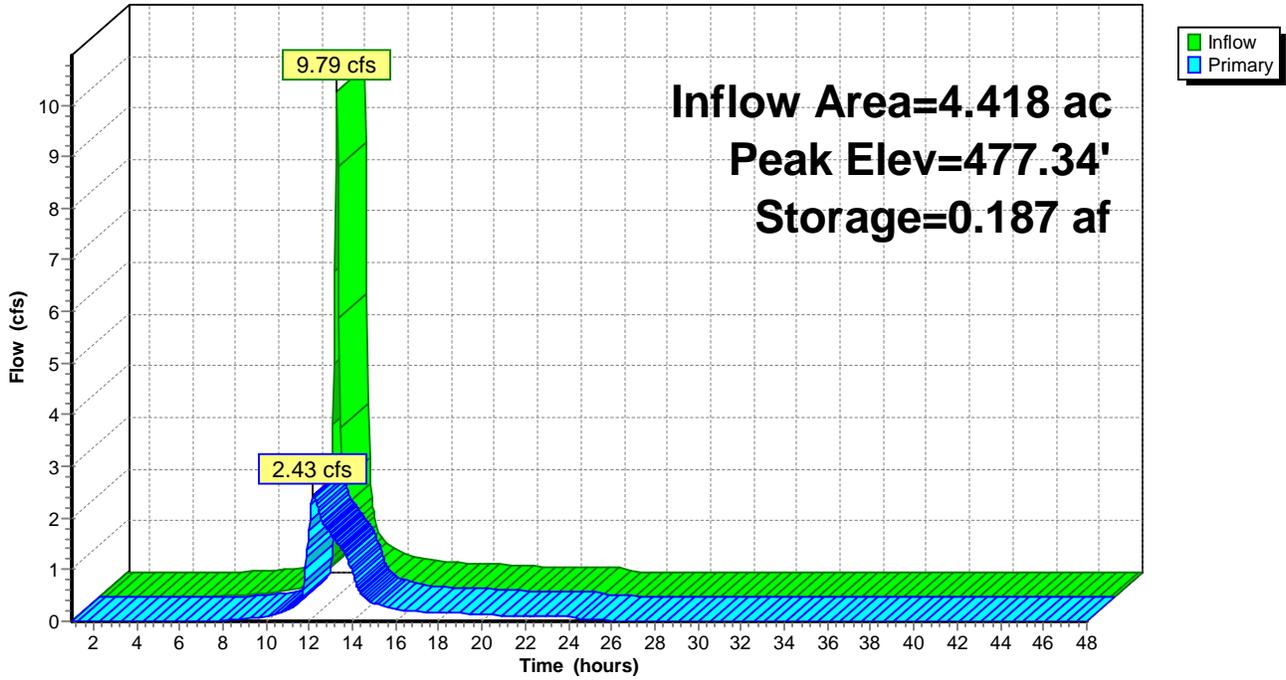
1,682.1 cy Field

1,060.3 cy Stone



Pond U: Underground Basin

Hydrograph



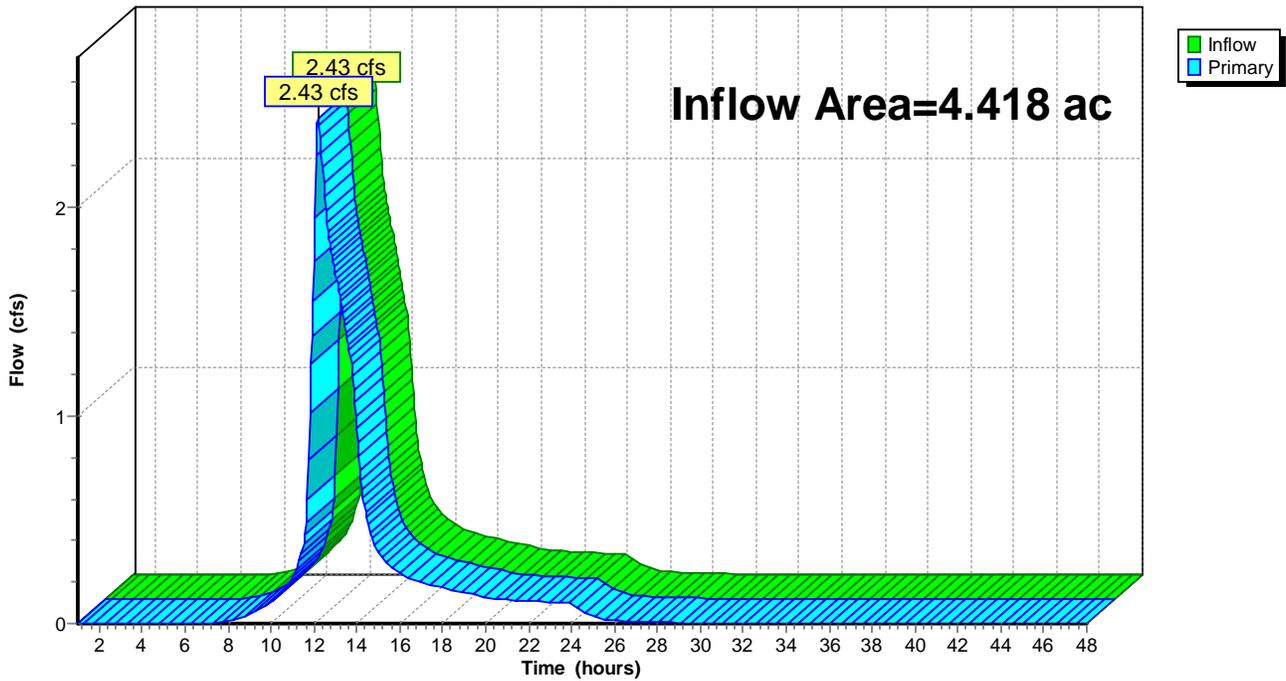
Summary for Link 2L: POI-2

Inflow Area = 4.418 ac, 85.51% Impervious, Inflow Depth > 1.42" for 1 YR event
Inflow = 2.43 cfs @ 12.20 hrs, Volume= 0.524 af
Primary = 2.43 cfs @ 12.20 hrs, Volume= 0.524 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs

Link 2L: POI-2

Hydrograph



Pre&Post-DR2

Prepared by VRTHOR2012

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Type II 24-hr 2 YR Rainfall=2.47"

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Time span=1.00-48.00 hrs, dt=0.05 hrs, 941 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX: DR-2 PRE

Runoff Area=1.495 ac 90.84% Impervious Runoff Depth=1.93"
Tc=10.0 min CN=95 Runoff=4.14 cfs 0.241 af

Subcatchment PR: DR-2 POST

Runoff Area=4.418 ac 85.51% Impervious Runoff Depth=1.75"
Flow Length=492' Tc=8.7 min CN=93 Runoff=11.91 cfs 0.645 af

Pond U: Underground Basin

Peak Elev=477.61' Storage=0.230 af Inflow=11.91 cfs 0.645 af
Outflow=3.01 cfs 0.644 af

Link 2L: POI-2

Inflow=3.01 cfs 0.644 af
Primary=3.01 cfs 0.644 af

Total Runoff Area = 5.913 ac Runoff Volume = 0.886 af Average Runoff Depth = 1.80"
13.14% Pervious = 0.777 ac 86.86% Impervious = 5.136 ac

Pre&Post-DR2

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Type II 24-hr 2 YR Rainfall=2.47"

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Summary for Subcatchment EX: DR-2 PRE

Runoff = 4.14 cfs @ 12.01 hrs, Volume= 0.241 af, Depth= 1.93"

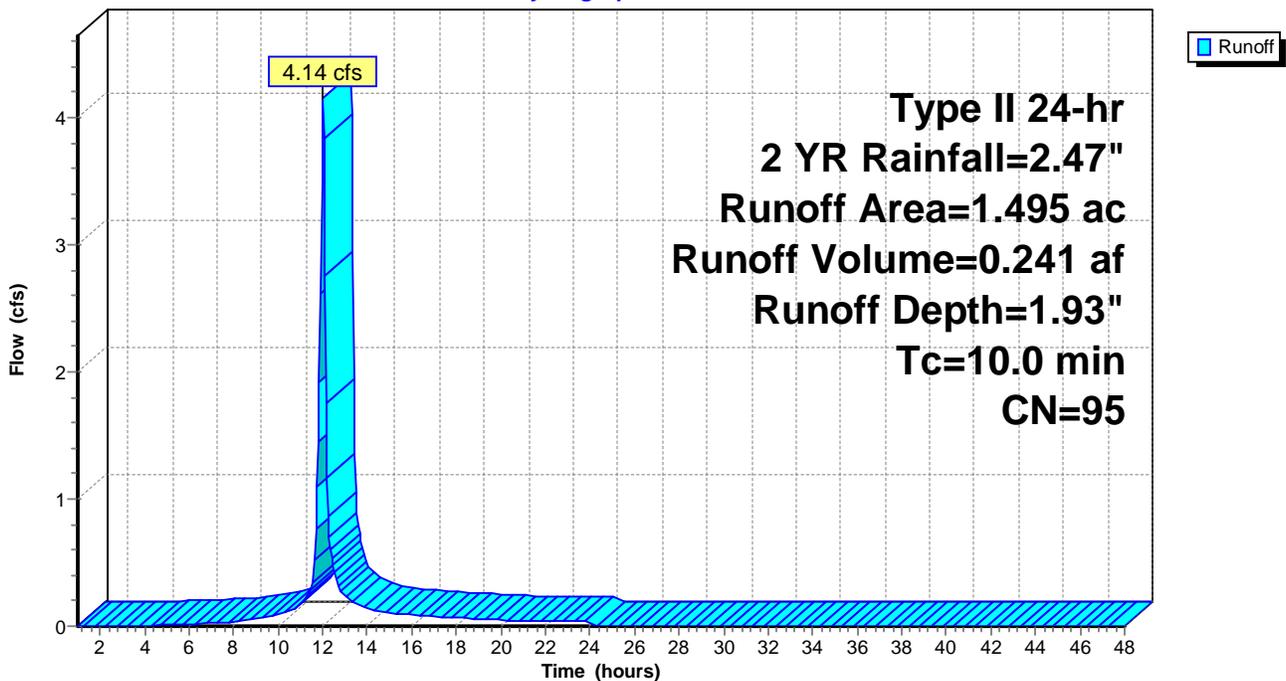
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 YR Rainfall=2.47"

Area (ac)	CN	Description
1.358	98	Paved parking, HSG B
0.137	69	50-75% Grass cover, Fair, HSG B
1.495	95	Weighted Average
0.137		9.16% Pervious Area
1.358		90.84% Impervious Area

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

Subcatchment EX: DR-2 PRE

Hydrograph



Pre&Post-DR2

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Type II 24-hr 2 YR Rainfall=2.47"

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Summary for Subcatchment PR: DR-2 POST

Runoff = 11.91 cfs @ 12.00 hrs, Volume= 0.645 af, Depth= 1.75"

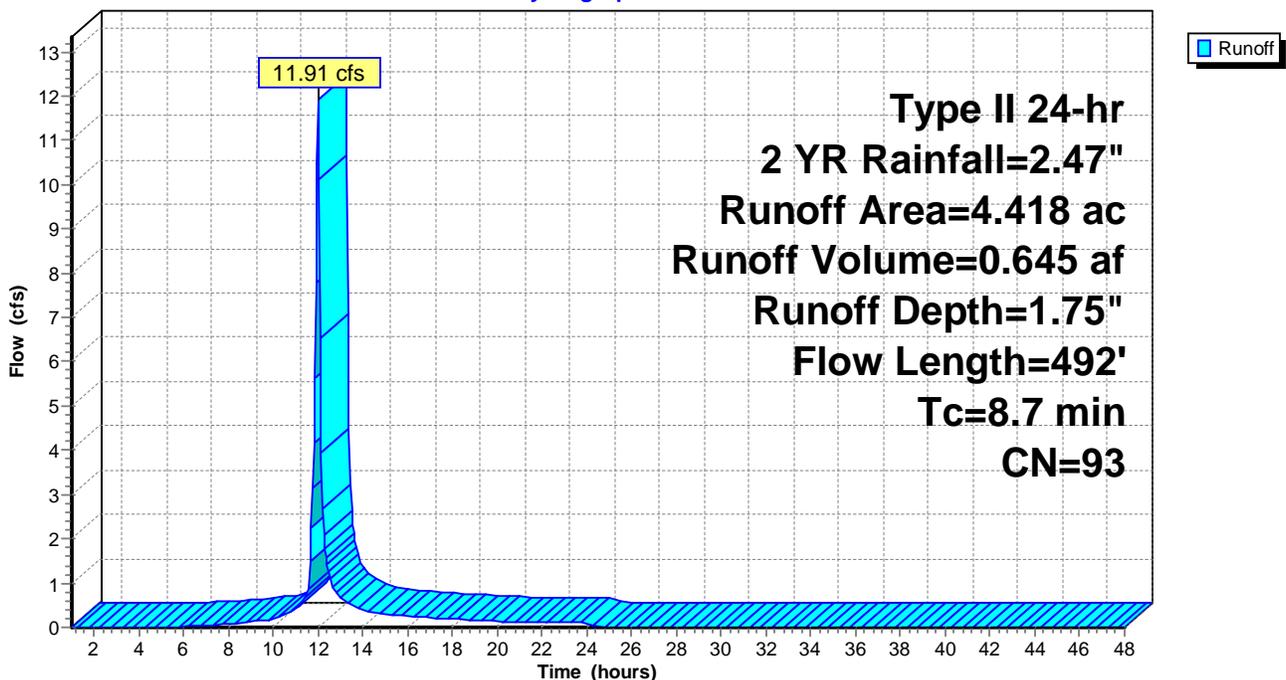
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 YR Rainfall=2.47"

Area (ac)	CN	Description
3.778	98	Paved parking, HSG B
0.640	61	>75% Grass cover, Good, HSG B
4.418	93	Weighted Average
0.640		14.49% Pervious Area
3.778		85.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	34	0.0261	0.09		Sheet Flow, Grass: Dense n= 0.240 P2= 2.31"
0.7	43	0.0220	1.03		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.31"
1.6	415	0.0088	4.26	3.34	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
8.7	492	Total			

Subcatchment PR: DR-2 POST

Hydrograph



Summary for Pond U: Underground Basin

Inflow Area = 4.418 ac, 85.51% Impervious, Inflow Depth = 1.75" for 2 YR event
 Inflow = 11.91 cfs @ 12.00 hrs, Volume= 0.645 af
 Outflow = 3.01 cfs @ 12.19 hrs, Volume= 0.644 af, Atten= 75%, Lag= 11.7 min
 Primary = 3.01 cfs @ 12.19 hrs, Volume= 0.644 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 477.61' @ 12.19 hrs Surf.Area= 0.190 ac Storage= 0.230 af

Plug-Flow detention time= 52.4 min calculated for 0.644 af (100% of inflow)
 Center-of-Mass det. time= 51.7 min (853.0 - 801.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	475.78'	0.263 af	72.92'W x 113.25'L x 5.50'H Field A 1.043 af Overall - 0.385 af Embedded = 0.657 af x 40.0% Voids
#2A	476.53'	0.385 af	ADS_StormTech MC-3500 d +Cap x 150 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 10 Rows of 15 Chambers Cap Storage= +14.9 cf x 2 x 10 rows = 298.0 cf
		0.648 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	475.78'	24.0" Round Culvert L= 220.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 475.78' / 473.58' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	475.78'	9.0" W x 6.0" H Vert. 1-YR C= 0.600
#3	Device 1	477.10'	12.0" W x 3.0" H Vert. 2-YR C= 0.600

Primary OutFlow Max=3.01 cfs @ 12.19 hrs HW=477.61' TW=0.00' (Dynamic Tailwater)

↑ **1=Culvert** (Passes 3.01 cfs of 13.86 cfs potential flow)

↑ **2=1-YR** (Orifice Controls 2.27 cfs @ 6.04 fps)

↑ **3=2-YR** (Orifice Controls 0.74 cfs @ 2.97 fps)

Pond U: Underground Basin - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap storage)

Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf

Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap

Cap Storage= +14.9 cf x 2 x 10 rows = 298.0 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

15 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 111.25' Row Length +12.0" End Stone x 2 = 113.25' Base Length

10 Rows x 77.0" Wide + 9.0" Spacing x 9 + 12.0" Side Stone x 2 = 72.92' Base Width

9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

150 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 10 Rows = 16,790.8 cf Chamber Storage

45,418.0 cf Field - 16,790.8 cf Chambers = 28,627.2 cf Stone x 40.0% Voids = 11,450.9 cf Stone Storage

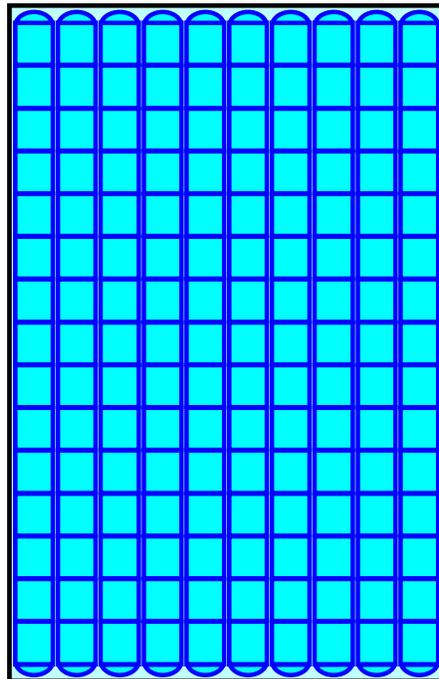
Chamber Storage + Stone Storage = 28,241.7 cf = 0.648 af

Overall Storage Efficiency = 62.2%

150 Chambers

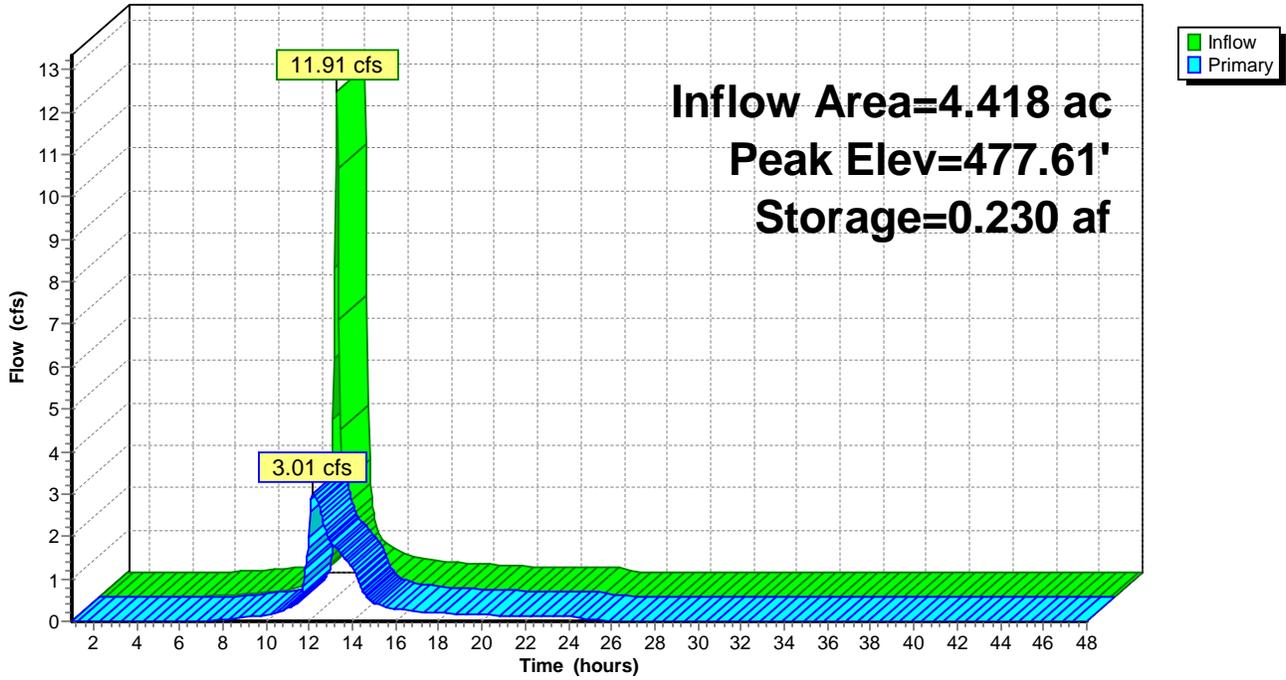
1,682.1 cy Field

1,060.3 cy Stone



Pond U: Underground Basin

Hydrograph



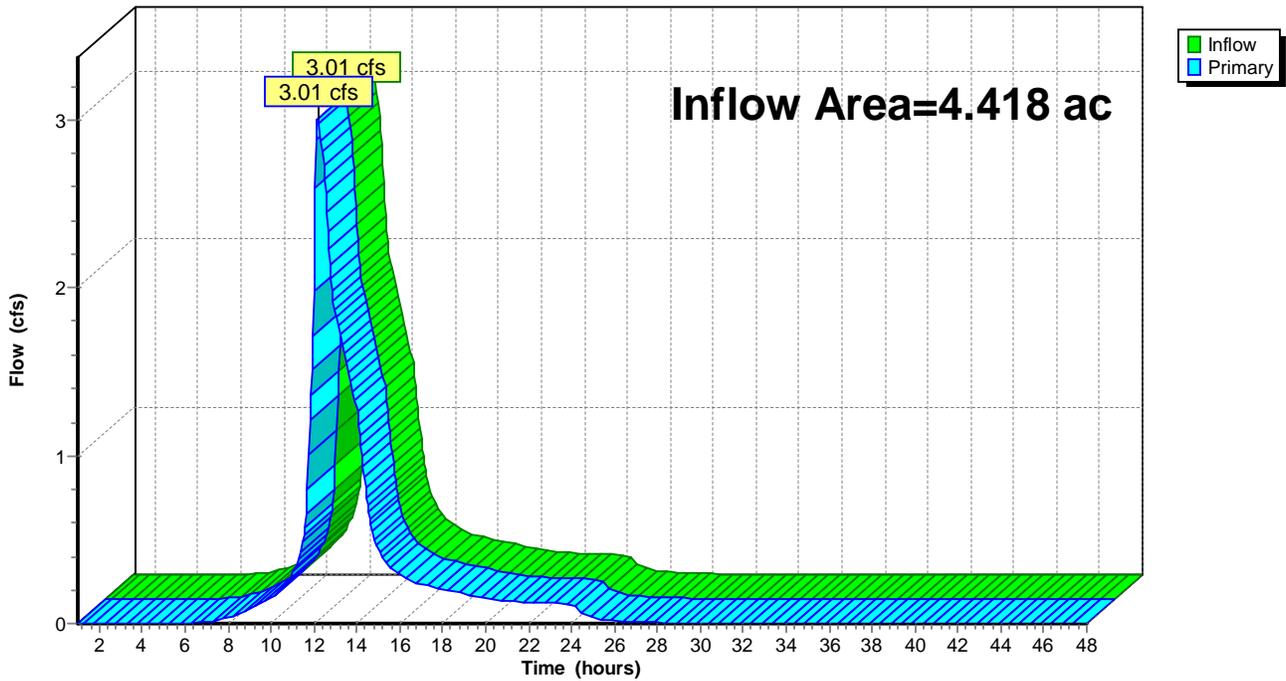
Summary for Link 2L: POI-2

Inflow Area = 4.418 ac, 85.51% Impervious, Inflow Depth = 1.75" for 2 YR event
Inflow = 3.01 cfs @ 12.19 hrs, Volume= 0.644 af
Primary = 3.01 cfs @ 12.19 hrs, Volume= 0.644 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs

Link 2L: POI-2

Hydrograph



Pre&Post-DR2

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Type II 24-hr 5 YR Rainfall=3.05"

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Time span=1.00-48.00 hrs, dt=0.05 hrs, 941 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX: DR-2 PRE

Runoff Area=1.495 ac 90.84% Impervious Runoff Depth=2.50"
Tc=10.0 min CN=95 Runoff=5.27 cfs 0.311 af

Subcatchment PR: DR-2 POST

Runoff Area=4.418 ac 85.51% Impervious Runoff Depth=2.30"
Flow Length=492' Tc=8.7 min CN=93 Runoff=15.42 cfs 0.847 af

Pond U: Underground Basin

Peak Elev=478.10' Storage=0.305 af Inflow=15.42 cfs 0.847 af
Outflow=3.72 cfs 0.847 af

Link 2L: POI-2

Inflow=3.72 cfs 0.847 af
Primary=3.72 cfs 0.847 af

Total Runoff Area = 5.913 ac Runoff Volume = 1.159 af Average Runoff Depth = 2.35"
13.14% Pervious = 0.777 ac 86.86% Impervious = 5.136 ac

Pre&Post-DR2

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Type II 24-hr 5 YR Rainfall=3.05"

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Summary for Subcatchment EX: DR-2 PRE

Runoff = 5.27 cfs @ 12.01 hrs, Volume= 0.311 af, Depth= 2.50"

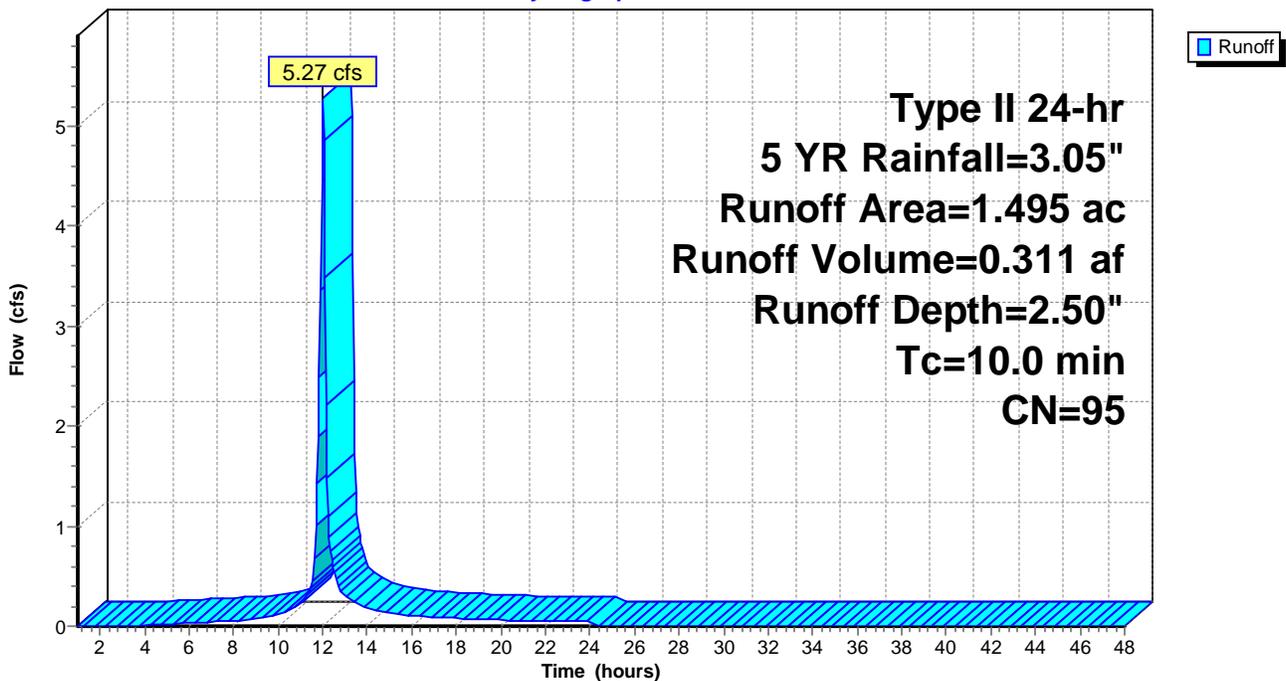
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 5 YR Rainfall=3.05"

Area (ac)	CN	Description
1.358	98	Paved parking, HSG B
0.137	69	50-75% Grass cover, Fair, HSG B
1.495	95	Weighted Average
0.137		9.16% Pervious Area
1.358		90.84% Impervious Area

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

Subcatchment EX: DR-2 PRE

Hydrograph



Pre&Post-DR2

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Type II 24-hr 5 YR Rainfall=3.05"

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Summary for Subcatchment PR: DR-2 POST

Runoff = 15.42 cfs @ 12.00 hrs, Volume= 0.847 af, Depth= 2.30"

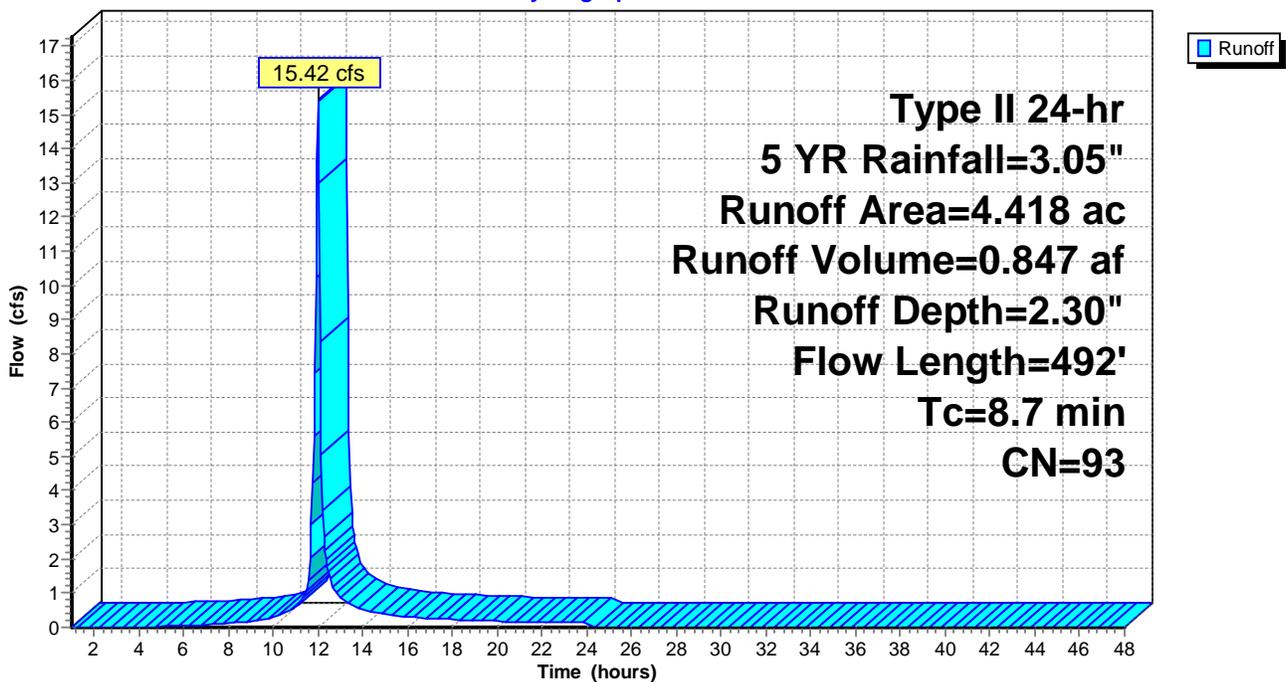
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 5 YR Rainfall=3.05"

Area (ac)	CN	Description
3.778	98	Paved parking, HSG B
0.640	61	>75% Grass cover, Good, HSG B
4.418	93	Weighted Average
0.640		14.49% Pervious Area
3.778		85.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	34	0.0261	0.09		Sheet Flow, Grass: Dense n= 0.240 P2= 2.31"
0.7	43	0.0220	1.03		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.31"
1.6	415	0.0088	4.26	3.34	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
8.7	492	Total			

Subcatchment PR: DR-2 POST

Hydrograph



Summary for Pond U: Underground Basin

Inflow Area = 4.418 ac, 85.51% Impervious, Inflow Depth = 2.30" for 5 YR event
 Inflow = 15.42 cfs @ 12.00 hrs, Volume= 0.847 af
 Outflow = 3.72 cfs @ 12.20 hrs, Volume= 0.847 af, Atten= 76%, Lag= 12.1 min
 Primary = 3.72 cfs @ 12.20 hrs, Volume= 0.847 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 478.10' @ 12.20 hrs Surf.Area= 0.190 ac Storage= 0.305 af

Plug-Flow detention time= 52.4 min calculated for 0.847 af (100% of inflow)
 Center-of-Mass det. time= 51.8 min (845.4 - 793.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	475.78'	0.263 af	72.92'W x 113.25'L x 5.50'H Field A 1.043 af Overall - 0.385 af Embedded = 0.657 af x 40.0% Voids
#2A	476.53'	0.385 af	ADS_StormTech MC-3500 d +Cap x 150 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 10 Rows of 15 Chambers Cap Storage= +14.9 cf x 2 x 10 rows = 298.0 cf
		0.648 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	475.78'	24.0" Round Culvert L= 220.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 475.78' / 473.58' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	475.78'	9.0" W x 6.0" H Vert. 1-YR C= 0.600
#3	Device 1	477.10'	12.0" W x 3.0" H Vert. 2-YR C= 0.600

Primary OutFlow Max=3.71 cfs @ 12.20 hrs HW=478.09' TW=0.00' (Dynamic Tailwater)

- ↑ **1=Culvert** (Passes 3.71 cfs of 17.35 cfs potential flow)
- ↑ **2=1-YR** (Orifice Controls 2.59 cfs @ 6.91 fps)
- ↑ **3=2-YR** (Orifice Controls 1.12 cfs @ 4.49 fps)

Pre&Post-DR2

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Type II 24-hr 5 YR Rainfall=3.05"

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Pond U: Underground Basin - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap storage)

Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf

Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap

Cap Storage= +14.9 cf x 2 x 10 rows = 298.0 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

15 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 111.25' Row Length +12.0" End Stone x 2 = 113.25' Base Length

10 Rows x 77.0" Wide + 9.0" Spacing x 9 + 12.0" Side Stone x 2 = 72.92' Base Width

9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

150 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 10 Rows = 16,790.8 cf Chamber Storage

45,418.0 cf Field - 16,790.8 cf Chambers = 28,627.2 cf Stone x 40.0% Voids = 11,450.9 cf Stone Storage

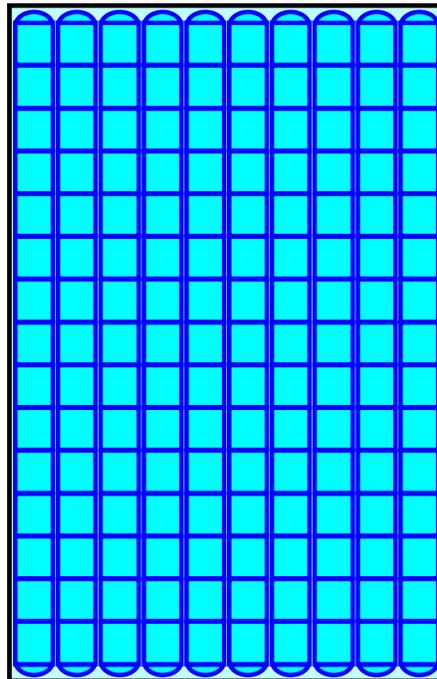
Chamber Storage + Stone Storage = 28,241.7 cf = 0.648 af

Overall Storage Efficiency = 62.2%

150 Chambers

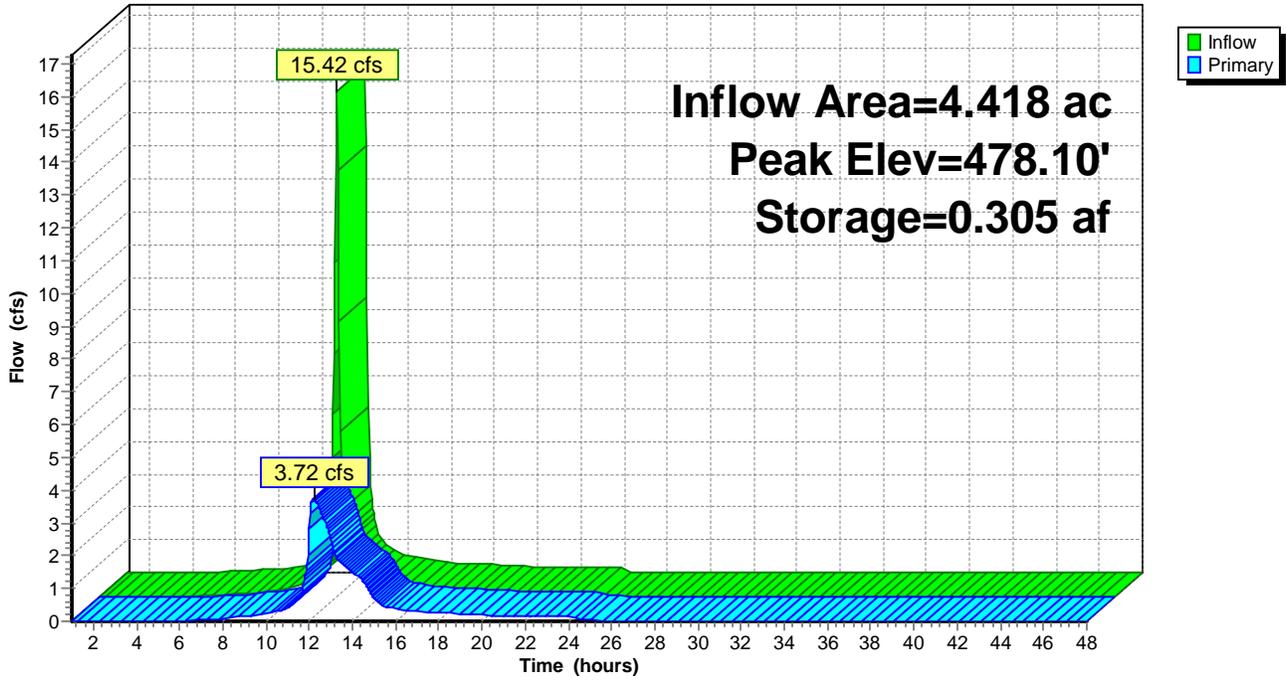
1,682.1 cy Field

1,060.3 cy Stone



Pond U: Underground Basin

Hydrograph



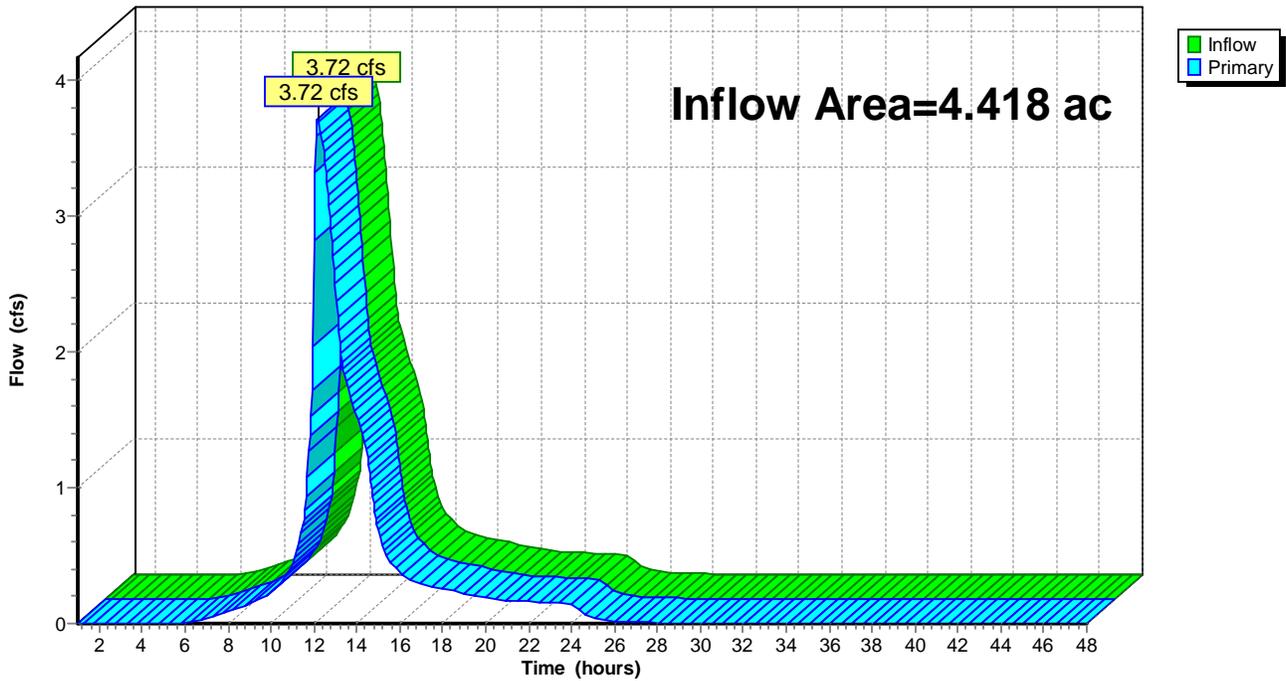
Summary for Link 2L: POI-2

Inflow Area = 4.418 ac, 85.51% Impervious, Inflow Depth = 2.30" for 5 YR event
Inflow = 3.72 cfs @ 12.20 hrs, Volume= 0.847 af
Primary = 3.72 cfs @ 12.20 hrs, Volume= 0.847 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs

Link 2L: POI-2

Hydrograph



Pre&Post-DR2

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Type II 24-hr 10 YR Rainfall=3.53"

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Time span=1.00-48.00 hrs, dt=0.05 hrs, 941 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX: DR-2 PRE

Runoff Area=1.495 ac 90.84% Impervious Runoff Depth=2.97"
Tc=10.0 min CN=95 Runoff=6.20 cfs 0.370 af

Subcatchment PR: DR-2 POST

Runoff Area=4.418 ac 85.51% Impervious Runoff Depth=2.76"
Flow Length=492' Tc=8.7 min CN=93 Runoff=18.31 cfs 1.018 af

Pond U: Underground Basin

Peak Elev=478.53' Storage=0.369 af Inflow=18.31 cfs 1.018 af
Outflow=4.23 cfs 1.017 af

Link 2L: POI-2

Inflow=4.23 cfs 1.017 af
Primary=4.23 cfs 1.017 af

Total Runoff Area = 5.913 ac Runoff Volume = 1.387 af Average Runoff Depth = 2.82"
13.14% Pervious = 0.777 ac 86.86% Impervious = 5.136 ac

Pre&Post-DR2

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Type II 24-hr 10 YR Rainfall=3.53"

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Summary for Subcatchment EX: DR-2 PRE

Runoff = 6.20 cfs @ 12.01 hrs, Volume= 0.370 af, Depth= 2.97"

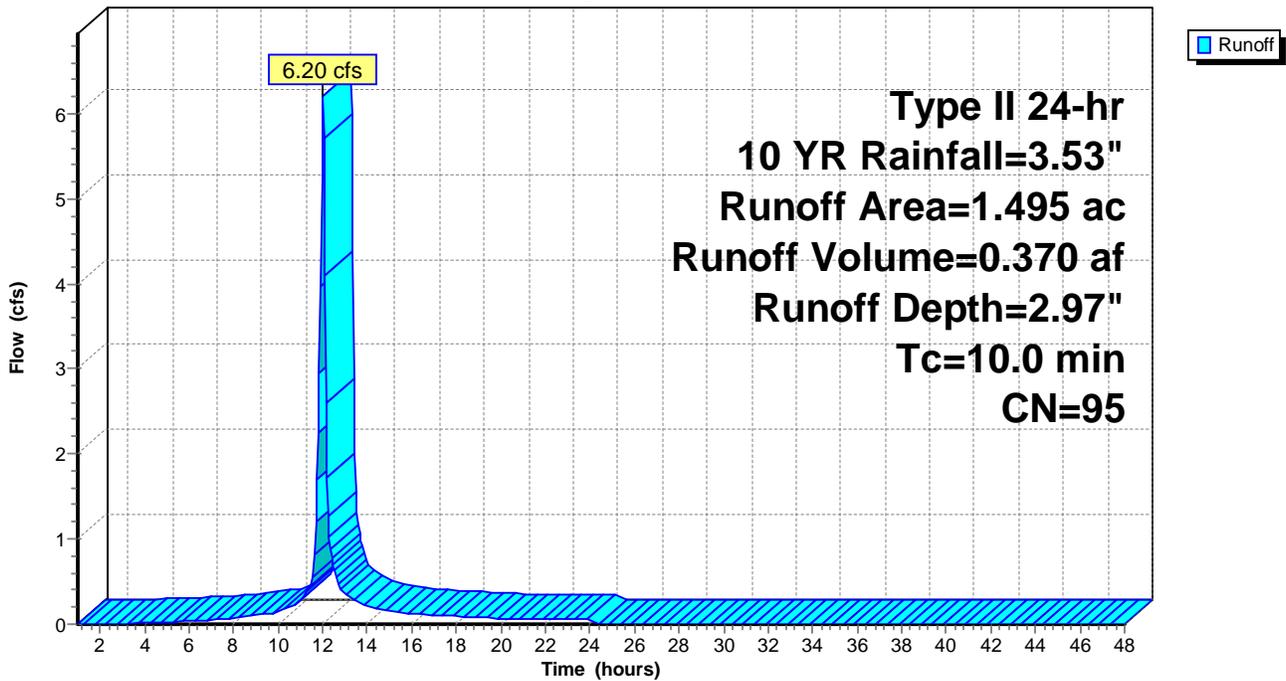
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.53"

Area (ac)	CN	Description
1.358	98	Paved parking, HSG B
0.137	69	50-75% Grass cover, Fair, HSG B
1.495	95	Weighted Average
0.137		9.16% Pervious Area
1.358		90.84% Impervious Area

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

Subcatchment EX: DR-2 PRE

Hydrograph



Pre&Post-DR2

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Type II 24-hr 10 YR Rainfall=3.53"

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Summary for Subcatchment PR: DR-2 POST

Runoff = 18.31 cfs @ 12.00 hrs, Volume= 1.018 af, Depth= 2.76"

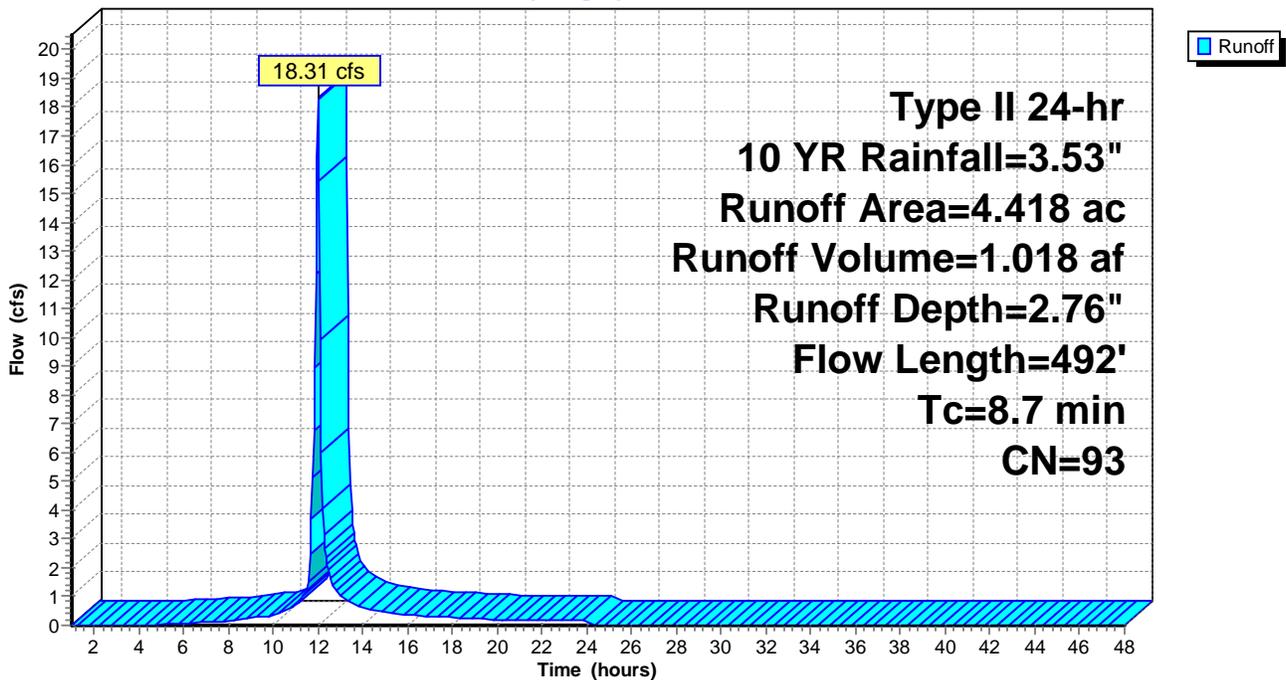
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.53"

Area (ac)	CN	Description
3.778	98	Paved parking, HSG B
0.640	61	>75% Grass cover, Good, HSG B
4.418	93	Weighted Average
0.640		14.49% Pervious Area
3.778		85.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	34	0.0261	0.09		Sheet Flow, Grass: Dense n= 0.240 P2= 2.31"
0.7	43	0.0220	1.03		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.31"
1.6	415	0.0088	4.26	3.34	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
8.7	492	Total			

Subcatchment PR: DR-2 POST

Hydrograph



Summary for Pond U: Underground Basin

Inflow Area = 4.418 ac, 85.51% Impervious, Inflow Depth = 2.76" for 10 YR event
 Inflow = 18.31 cfs @ 12.00 hrs, Volume= 1.018 af
 Outflow = 4.23 cfs @ 12.20 hrs, Volume= 1.017 af, Atten= 77%, Lag= 12.4 min
 Primary = 4.23 cfs @ 12.20 hrs, Volume= 1.017 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 478.53' @ 12.20 hrs Surf.Area= 0.190 ac Storage= 0.369 af

Plug-Flow detention time= 52.9 min calculated for 1.017 af (100% of inflow)
 Center-of-Mass det. time= 52.3 min (840.9 - 788.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	475.78'	0.263 af	72.92'W x 113.25'L x 5.50'H Field A 1.043 af Overall - 0.385 af Embedded = 0.657 af x 40.0% Voids
#2A	476.53'	0.385 af	ADS_StormTech MC-3500 d +Cap x 150 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 10 Rows of 15 Chambers Cap Storage= +14.9 cf x 2 x 10 rows = 298.0 cf
		0.648 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	475.78'	24.0" Round Culvert L= 220.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 475.78' / 473.58' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	475.78'	9.0" W x 6.0" H Vert. 1-YR C= 0.600
#3	Device 1	477.10'	12.0" W x 3.0" H Vert. 2-YR C= 0.600

Primary OutFlow Max=4.22 cfs @ 12.20 hrs HW=478.53' TW=0.00' (Dynamic Tailwater)

- ↑ **1=Culvert** (Passes 4.22 cfs of 19.99 cfs potential flow)
- ↑ **2=1-YR** (Orifice Controls 2.85 cfs @ 7.61 fps)
- ↑ **3=2-YR** (Orifice Controls 1.37 cfs @ 5.49 fps)

Pond U: Underground Basin - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap storage)

Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf

Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap

Cap Storage= +14.9 cf x 2 x 10 rows = 298.0 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

15 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 111.25' Row Length +12.0" End Stone x 2 = 113.25' Base Length

10 Rows x 77.0" Wide + 9.0" Spacing x 9 + 12.0" Side Stone x 2 = 72.92' Base Width

9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

150 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 10 Rows = 16,790.8 cf Chamber Storage

45,418.0 cf Field - 16,790.8 cf Chambers = 28,627.2 cf Stone x 40.0% Voids = 11,450.9 cf Stone Storage

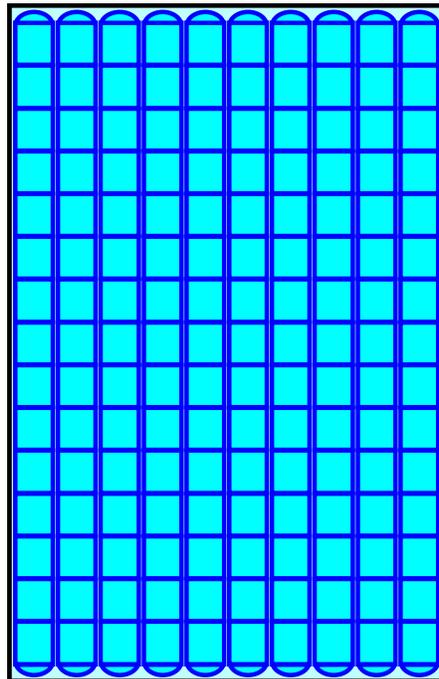
Chamber Storage + Stone Storage = 28,241.7 cf = 0.648 af

Overall Storage Efficiency = 62.2%

150 Chambers

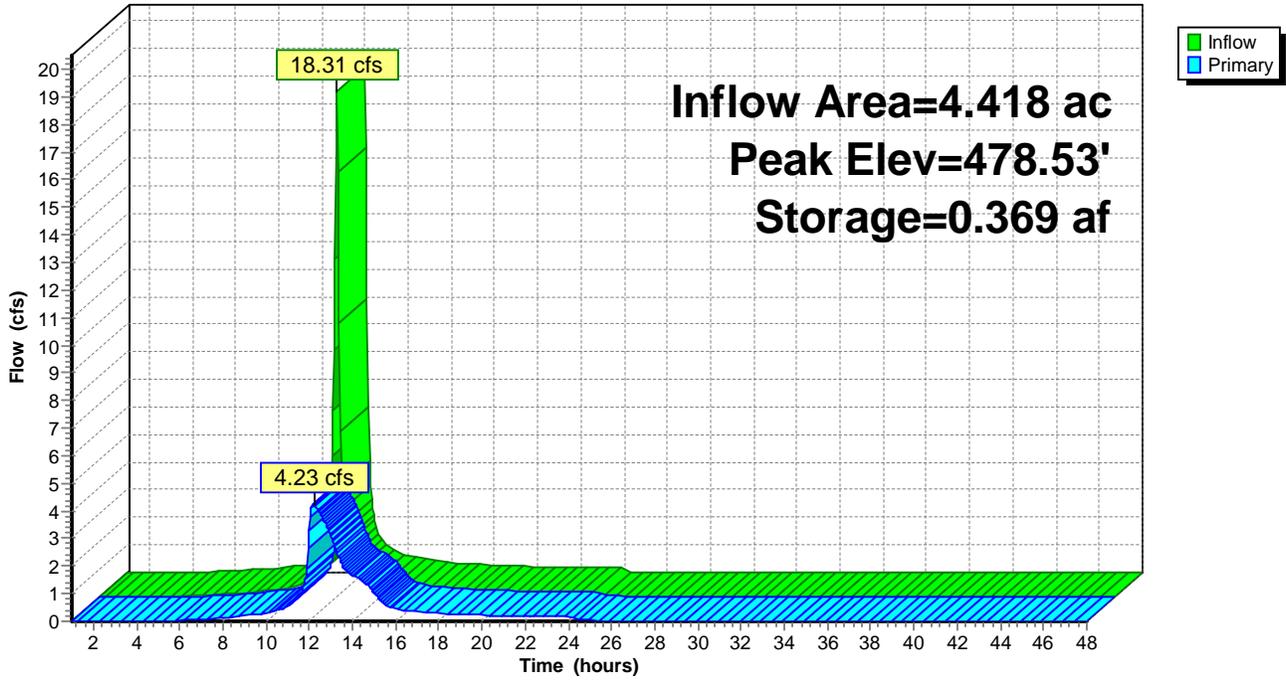
1,682.1 cy Field

1,060.3 cy Stone



Pond U: Underground Basin

Hydrograph



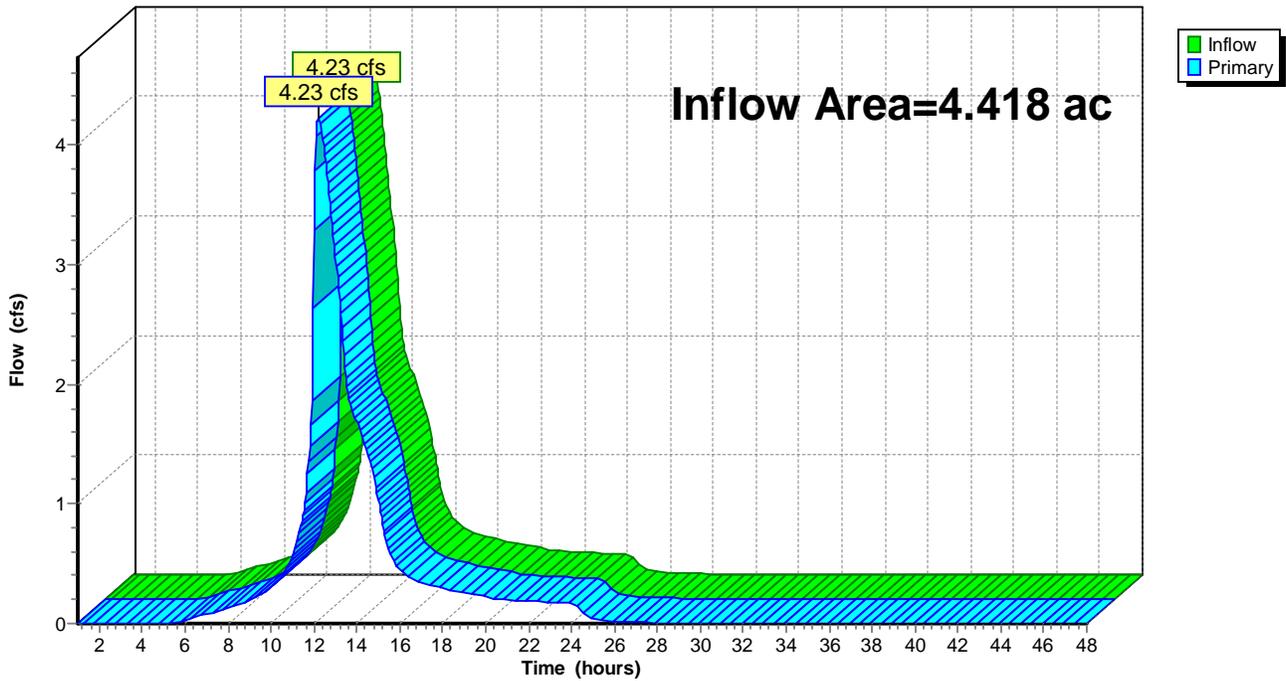
Summary for Link 2L: POI-2

Inflow Area = 4.418 ac, 85.51% Impervious, Inflow Depth = 2.76" for 10 YR event
Inflow = 4.23 cfs @ 12.20 hrs, Volume= 1.017 af
Primary = 4.23 cfs @ 12.20 hrs, Volume= 1.017 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs

Link 2L: POI-2

Hydrograph



Pre&Post-DR2

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Type II 24-hr 25 YR Rainfall=4.19"

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Time span=1.00-48.00 hrs, dt=0.05 hrs, 941 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX: DR-2 PRE

Runoff Area=1.495 ac 90.84% Impervious Runoff Depth=3.62"
Tc=10.0 min CN=95 Runoff=7.47 cfs 0.451 af

Subcatchment PR: DR-2 POST

Runoff Area=4.418 ac 85.51% Impervious Runoff Depth=3.40"
Flow Length=492' Tc=8.7 min CN=93 Runoff=22.27 cfs 1.254 af

Pond U: Underground Basin

Peak Elev=479.18' Storage=0.458 af Inflow=22.27 cfs 1.254 af
Outflow=4.89 cfs 1.253 af

Link 2L: POI-2

Inflow=4.89 cfs 1.253 af
Primary=4.89 cfs 1.253 af

Total Runoff Area = 5.913 ac Runoff Volume = 1.704 af Average Runoff Depth = 3.46"
13.14% Pervious = 0.777 ac 86.86% Impervious = 5.136 ac

Pre&Post-DR2

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Type II 24-hr 25 YR Rainfall=4.19"

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Summary for Subcatchment EX: DR-2 PRE

Runoff = 7.47 cfs @ 12.01 hrs, Volume= 0.451 af, Depth= 3.62"

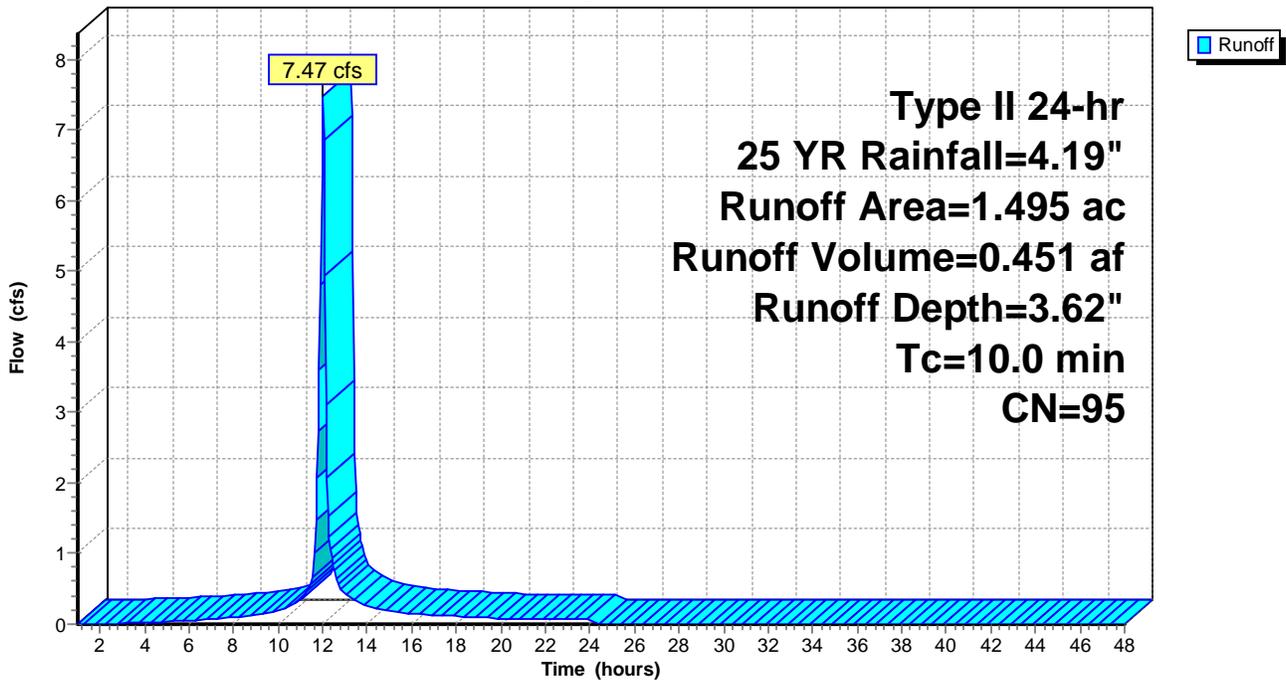
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
 Type II 24-hr 25 YR Rainfall=4.19"

Area (ac)	CN	Description
1.358	98	Paved parking, HSG B
0.137	69	50-75% Grass cover, Fair, HSG B
1.495	95	Weighted Average
0.137		9.16% Pervious Area
1.358		90.84% Impervious Area

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

Subcatchment EX: DR-2 PRE

Hydrograph



Pre&Post-DR2

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Type II 24-hr 25 YR Rainfall=4.19"

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Summary for Subcatchment PR: DR-2 POST

Runoff = 22.27 cfs @ 12.00 hrs, Volume= 1.254 af, Depth= 3.40"

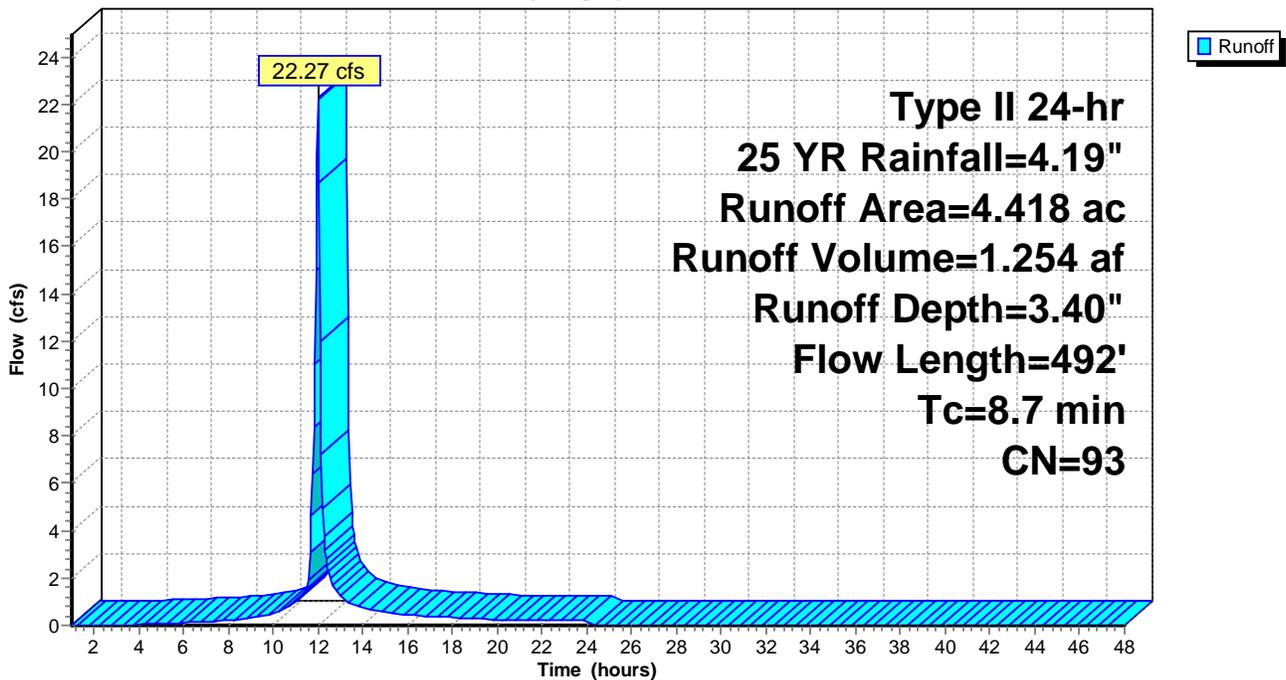
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
 Type II 24-hr 25 YR Rainfall=4.19"

Area (ac)	CN	Description
3.778	98	Paved parking, HSG B
0.640	61	>75% Grass cover, Good, HSG B
4.418	93	Weighted Average
0.640		14.49% Pervious Area
3.778		85.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	34	0.0261	0.09		Sheet Flow, Grass: Dense n= 0.240 P2= 2.31"
0.7	43	0.0220	1.03		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.31"
1.6	415	0.0088	4.26	3.34	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
8.7	492	Total			

Subcatchment PR: DR-2 POST

Hydrograph



Summary for Pond U: Underground Basin

Inflow Area = 4.418 ac, 85.51% Impervious, Inflow Depth = 3.40" for 25 YR event
 Inflow = 22.27 cfs @ 12.00 hrs, Volume= 1.254 af
 Outflow = 4.89 cfs @ 12.21 hrs, Volume= 1.253 af, Atten= 78%, Lag= 12.8 min
 Primary = 4.89 cfs @ 12.21 hrs, Volume= 1.253 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 479.18' @ 12.21 hrs Surf.Area= 0.190 ac Storage= 0.458 af

Plug-Flow detention time= 53.1 min calculated for 1.252 af (100% of inflow)
 Center-of-Mass det. time= 53.5 min (836.4 - 782.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	475.78'	0.263 af	72.92'W x 113.25'L x 5.50'H Field A 1.043 af Overall - 0.385 af Embedded = 0.657 af x 40.0% Voids
#2A	476.53'	0.385 af	ADS_StormTech MC-3500 d +Cap x 150 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 10 Rows of 15 Chambers Cap Storage= +14.9 cf x 2 x 10 rows = 298.0 cf
		0.648 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	475.78'	24.0" Round Culvert L= 220.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 475.78' / 473.58' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	475.78'	9.0" W x 6.0" H Vert. 1-YR C= 0.600
#3	Device 1	477.10'	12.0" W x 3.0" H Vert. 2-YR C= 0.600

Primary OutFlow Max=4.88 cfs @ 12.21 hrs HW=479.18' TW=0.00' (Dynamic Tailwater)

- ↑ **1=Culvert** (Passes 4.88 cfs of 23.22 cfs potential flow)
- ↑ **2=1-YR** (Orifice Controls 3.20 cfs @ 8.54 fps)
- ↑ **3=2-YR** (Orifice Controls 1.68 cfs @ 6.73 fps)

Pond U: Underground Basin - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap storage)

Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf

Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap

Cap Storage= +14.9 cf x 2 x 10 rows = 298.0 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

15 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 111.25' Row Length +12.0" End Stone x 2 = 113.25' Base Length

10 Rows x 77.0" Wide + 9.0" Spacing x 9 + 12.0" Side Stone x 2 = 72.92' Base Width

9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

150 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 10 Rows = 16,790.8 cf Chamber Storage

45,418.0 cf Field - 16,790.8 cf Chambers = 28,627.2 cf Stone x 40.0% Voids = 11,450.9 cf Stone Storage

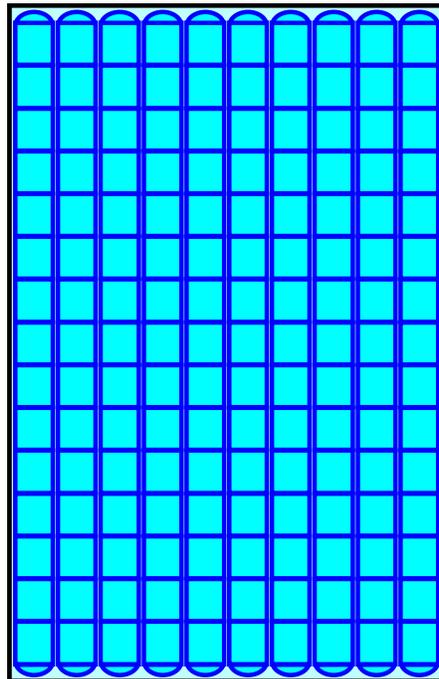
Chamber Storage + Stone Storage = 28,241.7 cf = 0.648 af

Overall Storage Efficiency = 62.2%

150 Chambers

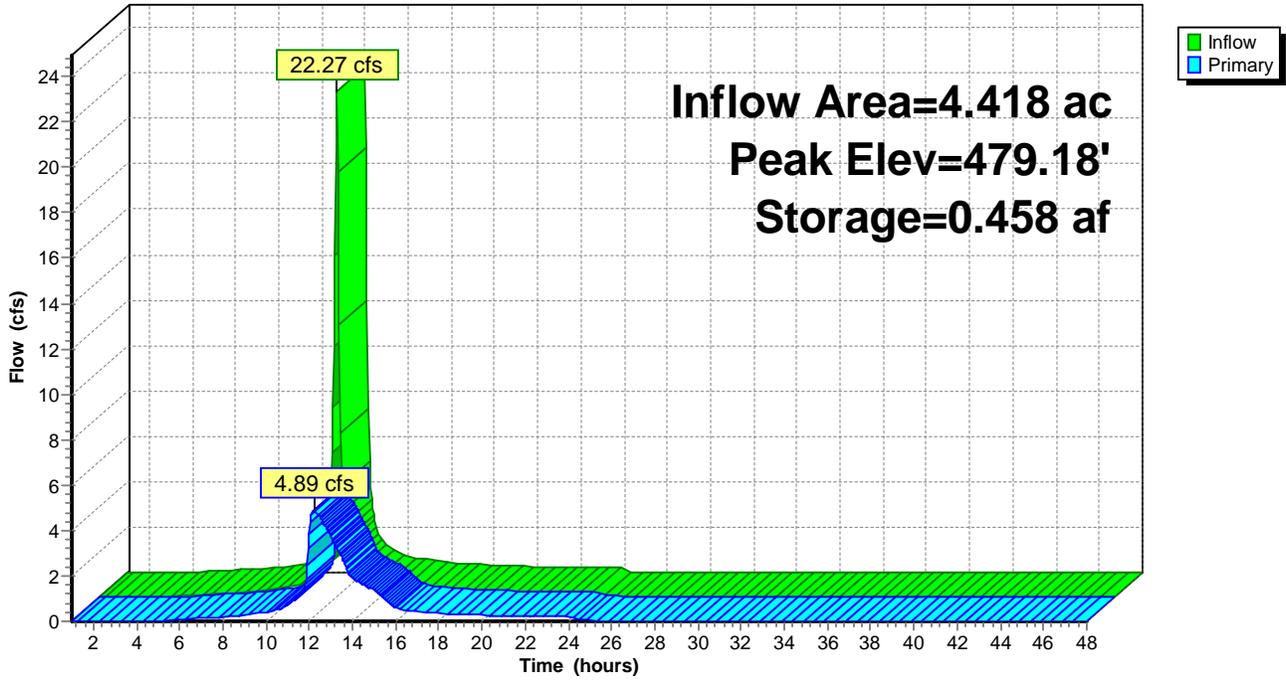
1,682.1 cy Field

1,060.3 cy Stone



Pond U: Underground Basin

Hydrograph



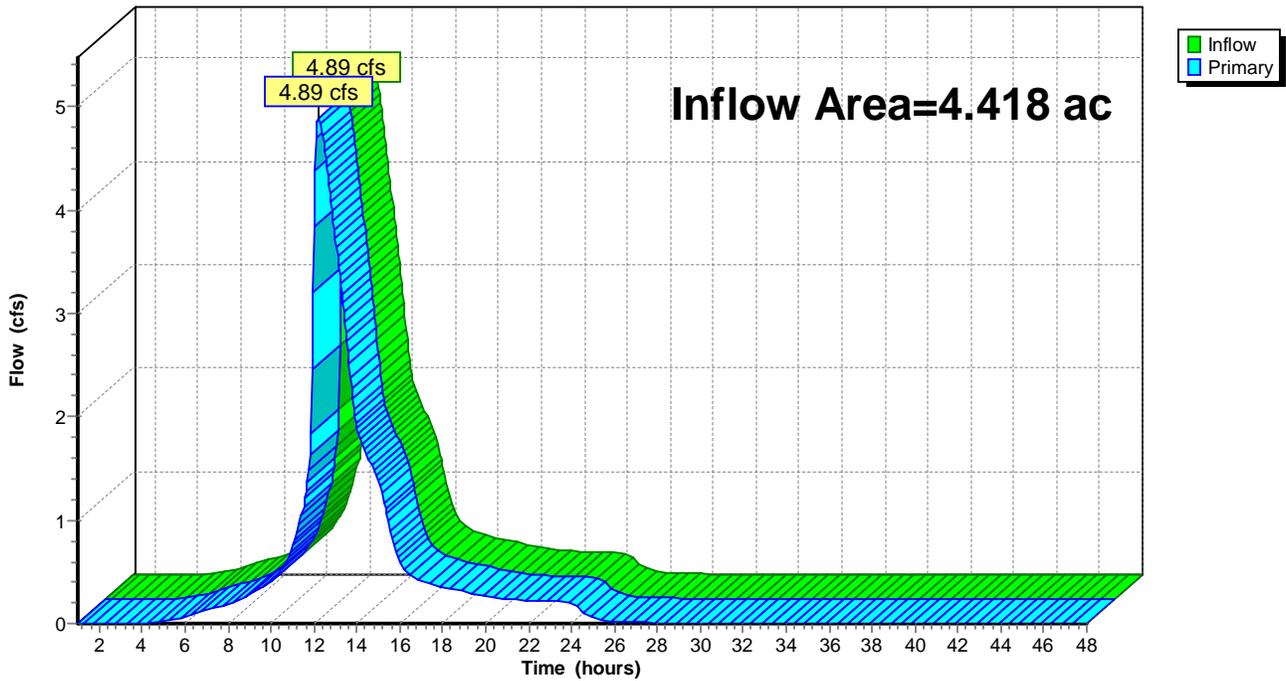
Summary for Link 2L: POI-2

Inflow Area = 4.418 ac, 85.51% Impervious, Inflow Depth = 3.40" for 25 YR event
Inflow = 4.89 cfs @ 12.21 hrs, Volume= 1.253 af
Primary = 4.89 cfs @ 12.21 hrs, Volume= 1.253 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs

Link 2L: POI-2

Hydrograph



Pre&Post-DR2

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Type II 24-hr 50 YR Rainfall=4.69"

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Time span=1.00-48.00 hrs, dt=0.05 hrs, 941 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX: DR-2 PRE

Runoff Area=1.495 ac 90.84% Impervious Runoff Depth=4.11"
Tc=10.0 min CN=95 Runoff=8.42 cfs 0.512 af

Subcatchment PR: DR-2 POST

Runoff Area=4.418 ac 85.51% Impervious Runoff Depth=3.89"
Flow Length=492' Tc=8.7 min CN=93 Runoff=25.25 cfs 1.434 af

Pond U: Underground Basin

Peak Elev=479.76' Storage=0.527 af Inflow=25.25 cfs 1.434 af
Outflow=5.41 cfs 1.433 af

Link 2L: POI-2

Inflow=5.41 cfs 1.433 af
Primary=5.41 cfs 1.433 af

Total Runoff Area = 5.913 ac Runoff Volume = 1.946 af Average Runoff Depth = 3.95"
13.14% Pervious = 0.777 ac 86.86% Impervious = 5.136 ac

Pre&Post-DR2

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Type II 24-hr 50 YR Rainfall=4.69"

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Summary for Subcatchment EX: DR-2 PRE

Runoff = 8.42 cfs @ 12.01 hrs, Volume= 0.512 af, Depth= 4.11"

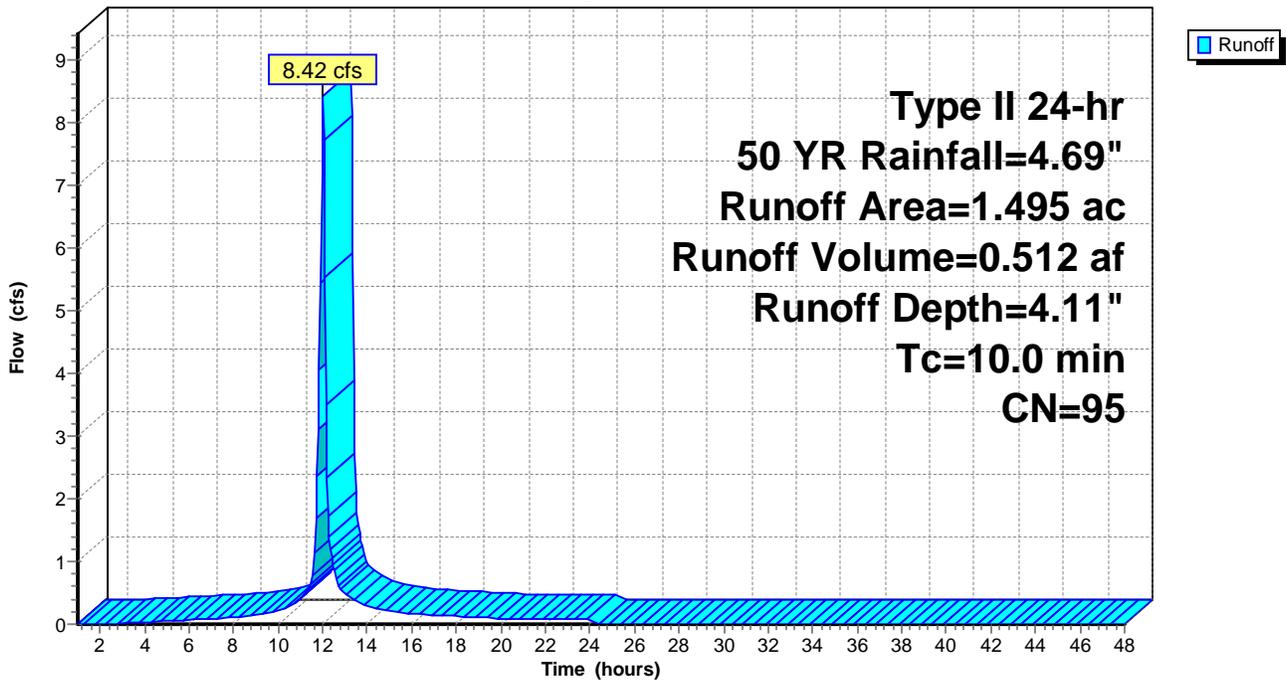
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 50 YR Rainfall=4.69"

Area (ac)	CN	Description
1.358	98	Paved parking, HSG B
0.137	69	50-75% Grass cover, Fair, HSG B
1.495	95	Weighted Average
0.137		9.16% Pervious Area
1.358		90.84% Impervious Area

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

Subcatchment EX: DR-2 PRE

Hydrograph



Pre&Post-DR2

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Type II 24-hr 50 YR Rainfall=4.69"

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Summary for Subcatchment PR: DR-2 POST

Runoff = 25.25 cfs @ 12.00 hrs, Volume= 1.434 af, Depth= 3.89"

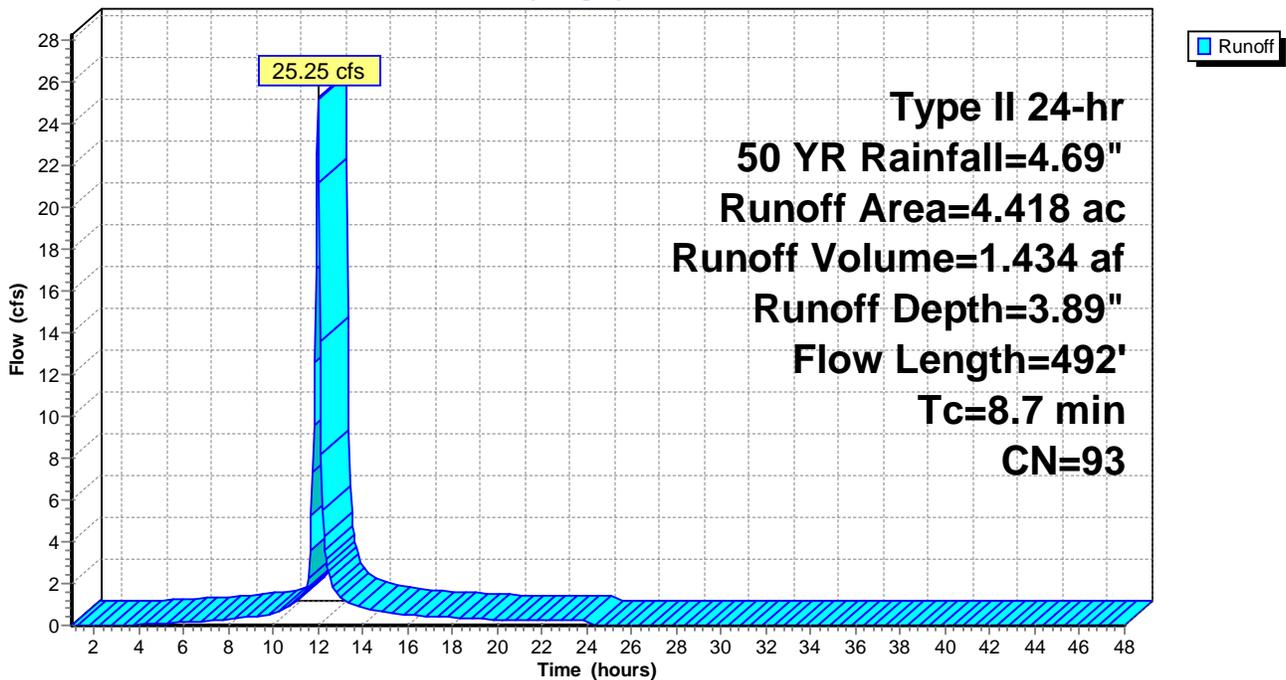
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 50 YR Rainfall=4.69"

Area (ac)	CN	Description
3.778	98	Paved parking, HSG B
0.640	61	>75% Grass cover, Good, HSG B
4.418	93	Weighted Average
0.640		14.49% Pervious Area
3.778		85.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	34	0.0261	0.09		Sheet Flow, Grass: Dense n= 0.240 P2= 2.31"
0.7	43	0.0220	1.03		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.31"
1.6	415	0.0088	4.26	3.34	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
8.7	492	Total			

Subcatchment PR: DR-2 POST

Hydrograph



Summary for Pond U: Underground Basin

Inflow Area = 4.418 ac, 85.51% Impervious, Inflow Depth = 3.89" for 50 YR event
 Inflow = 25.25 cfs @ 12.00 hrs, Volume= 1.434 af
 Outflow = 5.41 cfs @ 12.21 hrs, Volume= 1.433 af, Atten= 79%, Lag= 13.0 min
 Primary = 5.41 cfs @ 12.21 hrs, Volume= 1.433 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 479.76' @ 12.21 hrs Surf.Area= 0.190 ac Storage= 0.527 af

Plug-Flow detention time= 54.1 min calculated for 1.431 af (100% of inflow)
 Center-of-Mass det. time= 54.4 min (833.8 - 779.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	475.78'	0.263 af	72.92'W x 113.25'L x 5.50'H Field A 1.043 af Overall - 0.385 af Embedded = 0.657 af x 40.0% Voids
#2A	476.53'	0.385 af	ADS_StormTech MC-3500 d +Cap x 150 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 10 Rows of 15 Chambers Cap Storage= +14.9 cf x 2 x 10 rows = 298.0 cf
		0.648 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	475.78'	24.0" Round Culvert L= 220.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 475.78' / 473.58' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	475.78'	9.0" W x 6.0" H Vert. 1-YR C= 0.600
#3	Device 1	477.10'	12.0" W x 3.0" H Vert. 2-YR C= 0.600

Primary OutFlow Max=5.40 cfs @ 12.21 hrs HW=479.76' TW=0.00' (Dynamic Tailwater)

- ↑ **1=Culvert** (Passes 5.40 cfs of 25.01 cfs potential flow)
- ↑ **2=1-YR** (Orifice Controls 3.48 cfs @ 9.29 fps)
- ↑ **3=2-YR** (Orifice Controls 1.91 cfs @ 7.66 fps)

Pond U: Underground Basin - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap storage)

Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf

Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap

Cap Storage= +14.9 cf x 2 x 10 rows = 298.0 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

15 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 111.25' Row Length +12.0" End Stone x 2 = 113.25' Base Length

10 Rows x 77.0" Wide + 9.0" Spacing x 9 + 12.0" Side Stone x 2 = 72.92' Base Width

9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

150 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 10 Rows = 16,790.8 cf Chamber Storage

45,418.0 cf Field - 16,790.8 cf Chambers = 28,627.2 cf Stone x 40.0% Voids = 11,450.9 cf Stone Storage

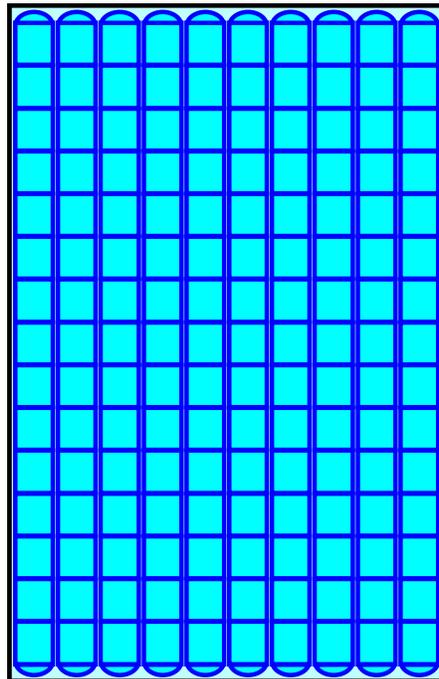
Chamber Storage + Stone Storage = 28,241.7 cf = 0.648 af

Overall Storage Efficiency = 62.2%

150 Chambers

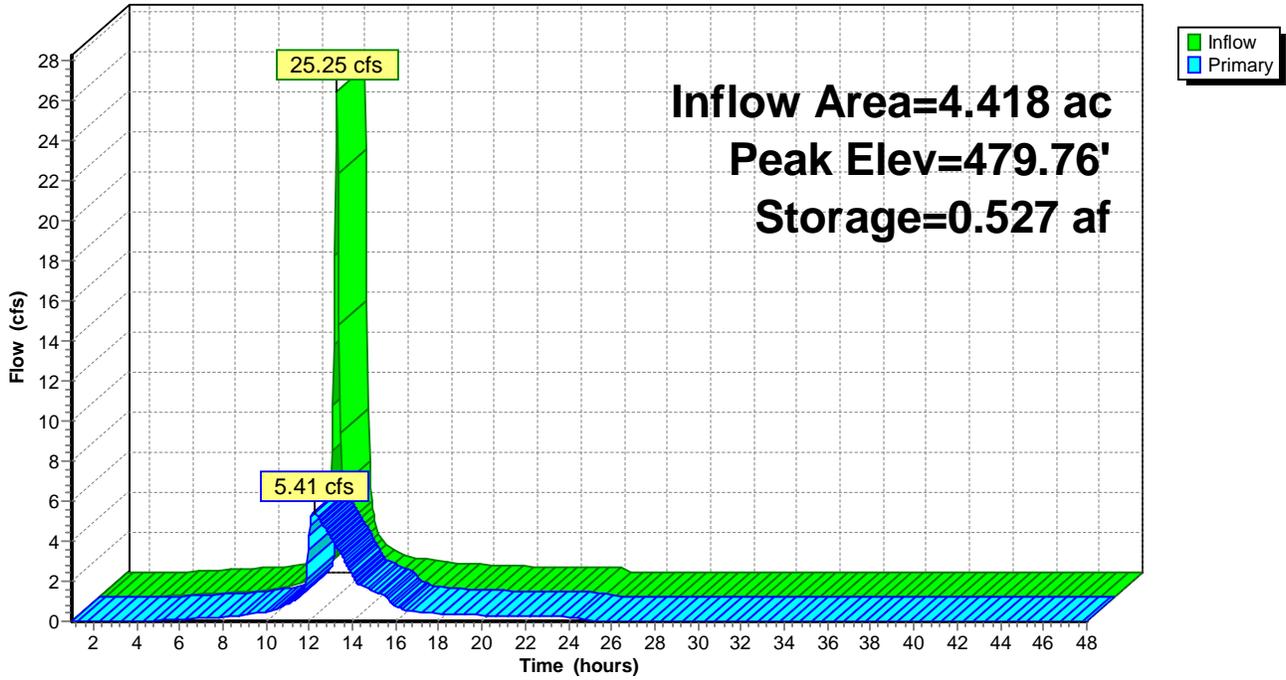
1,682.1 cy Field

1,060.3 cy Stone



Pond U: Underground Basin

Hydrograph



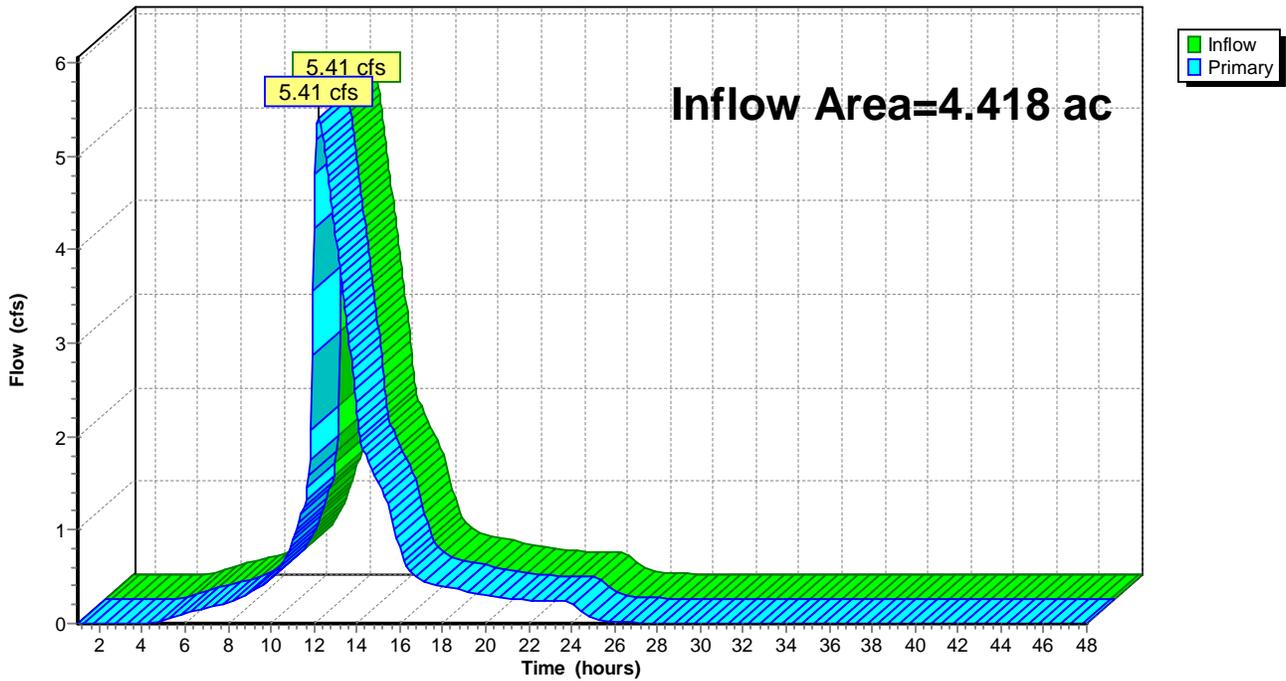
Summary for Link 2L: POI-2

Inflow Area = 4.418 ac, 85.51% Impervious, Inflow Depth = 3.89" for 50 YR event
Inflow = 5.41 cfs @ 12.21 hrs, Volume= 1.433 af
Primary = 5.41 cfs @ 12.21 hrs, Volume= 1.433 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs

Link 2L: POI-2

Hydrograph



Pre&Post-DR2

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Type II 24-hr 100 YR Rainfall=5.50"

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Time span=1.00-48.00 hrs, dt=0.05 hrs, 941 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX: DR-2 PRE

Runoff Area=1.495 ac 90.84% Impervious Runoff Depth=4.92"
Tc=10.0 min CN=95 Runoff=9.96 cfs 0.612 af

Subcatchment PR: DR-2 POST

Runoff Area=4.418 ac 85.51% Impervious Runoff Depth=4.69"
Flow Length=492' Tc=8.7 min CN=93 Runoff=30.05 cfs 1.727 af

Pond U: Underground Basin

Peak Elev=481.14' Storage=0.638 af Inflow=30.05 cfs 1.727 af
Outflow=6.46 cfs 1.726 af

Link 2L: POI-2

Inflow=6.46 cfs 1.726 af
Primary=6.46 cfs 1.726 af

Total Runoff Area = 5.913 ac Runoff Volume = 2.339 af Average Runoff Depth = 4.75"
13.14% Pervious = 0.777 ac 86.86% Impervious = 5.136 ac

Pre&Post-DR2

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Type II 24-hr 100 YR Rainfall=5.50"

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Summary for Subcatchment EX: DR-2 PRE

Runoff = 9.96 cfs @ 12.01 hrs, Volume= 0.612 af, Depth= 4.92"

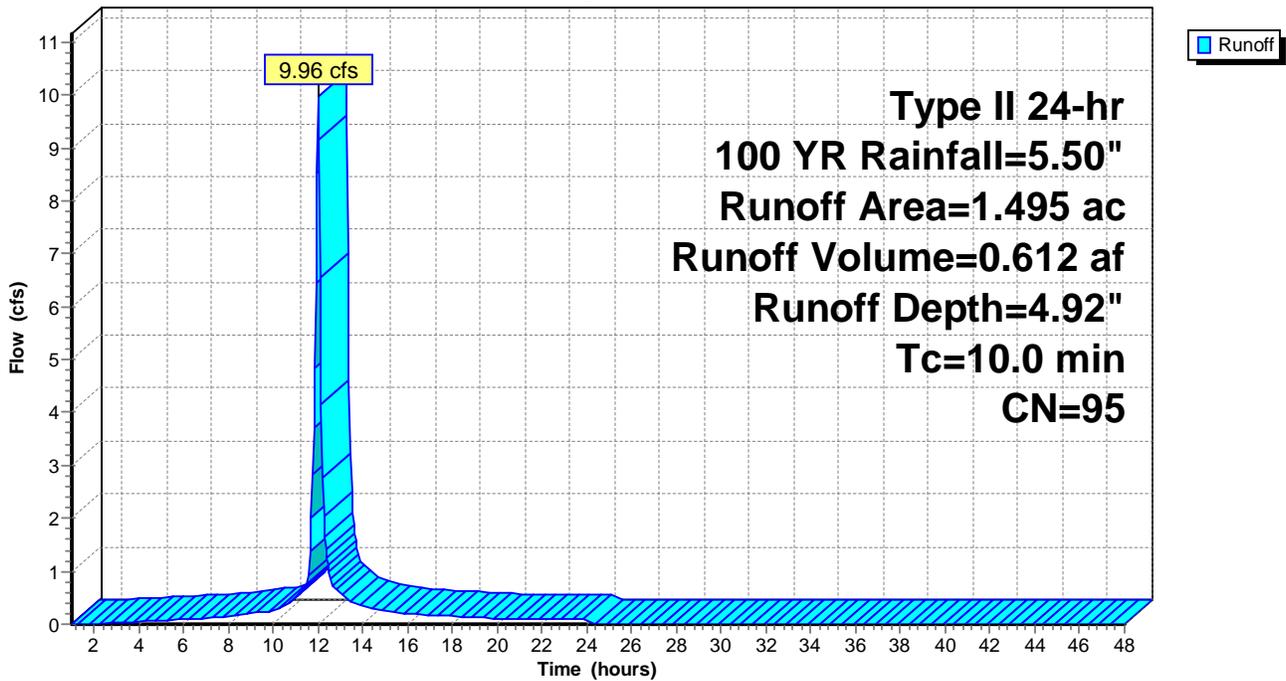
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=5.50"

Area (ac)	CN	Description
1.358	98	Paved parking, HSG B
0.137	69	50-75% Grass cover, Fair, HSG B
1.495	95	Weighted Average
0.137		9.16% Pervious Area
1.358		90.84% Impervious Area

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

Subcatchment EX: DR-2 PRE

Hydrograph



Pre&Post-DR2

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Type II 24-hr 100 YR Rainfall=5.50"

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Summary for Subcatchment PR: DR-2 POST

Runoff = 30.05 cfs @ 11.99 hrs, Volume= 1.727 af, Depth= 4.69"

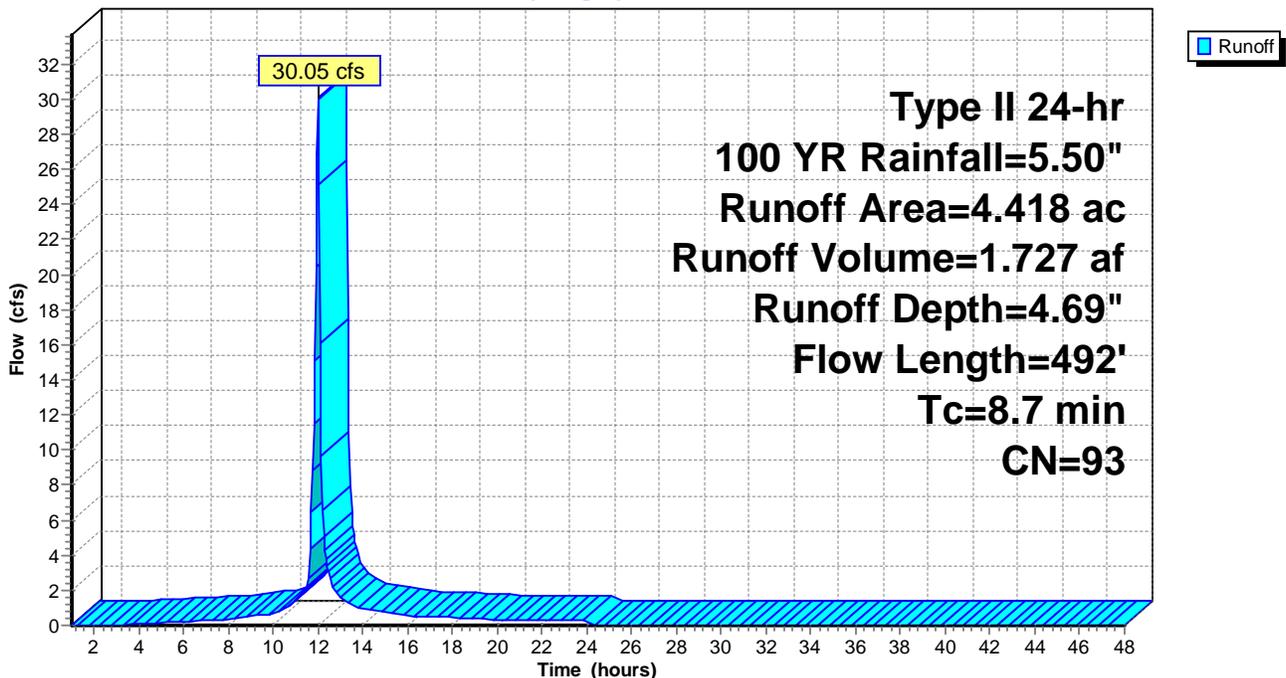
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=5.50"

Area (ac)	CN	Description
3.778	98	Paved parking, HSG B
0.640	61	>75% Grass cover, Good, HSG B
4.418	93	Weighted Average
0.640		14.49% Pervious Area
3.778		85.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	34	0.0261	0.09		Sheet Flow, Grass: Dense n= 0.240 P2= 2.31"
0.7	43	0.0220	1.03		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.31"
1.6	415	0.0088	4.26	3.34	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
8.7	492	Total			

Subcatchment PR: DR-2 POST

Hydrograph



Pre&Post-DR2

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Type II 24-hr 100 YR Rainfall=5.50"

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Summary for Pond U: Underground Basin

Inflow Area = 4.418 ac, 85.51% Impervious, Inflow Depth = 4.69" for 100 YR event
 Inflow = 30.05 cfs @ 11.99 hrs, Volume= 1.727 af
 Outflow = 6.46 cfs @ 12.21 hrs, Volume= 1.726 af, Atten= 78%, Lag= 13.0 min
 Primary = 6.46 cfs @ 12.21 hrs, Volume= 1.726 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 481.14' @ 12.21 hrs Surf.Area= 0.190 ac Storage= 0.638 af

Plug-Flow detention time= 56.2 min calculated for 1.726 af (100% of inflow)
 Center-of-Mass det. time= 55.6 min (830.1 - 774.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	475.78'	0.263 af	72.92'W x 113.25'L x 5.50'H Field A 1.043 af Overall - 0.385 af Embedded = 0.657 af x 40.0% Voids
#2A	476.53'	0.385 af	ADS_StormTech MC-3500 d +Cap x 150 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 10 Rows of 15 Chambers Cap Storage= +14.9 cf x 2 x 10 rows = 298.0 cf
		0.648 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	475.78'	24.0" Round Culvert L= 220.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 475.78' / 473.58' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	475.78'	9.0" W x 6.0" H Vert. 1-YR C= 0.600
#3	Device 1	477.10'	12.0" W x 3.0" H Vert. 2-YR C= 0.600

Primary OutFlow Max=6.46 cfs @ 12.21 hrs HW=481.13' TW=0.00' (Dynamic Tailwater)

- ↑ **1=Culvert** (Passes 6.46 cfs of 28.84 cfs potential flow)
- ↑ **2=1-YR** (Orifice Controls 4.08 cfs @ 10.87 fps)
- ↑ **3=2-YR** (Orifice Controls 2.38 cfs @ 9.52 fps)

Pond U: Underground Basin - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap storage)

Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf

Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap

Cap Storage= +14.9 cf x 2 x 10 rows = 298.0 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

15 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 111.25' Row Length +12.0" End Stone x 2 = 113.25' Base Length

10 Rows x 77.0" Wide + 9.0" Spacing x 9 + 12.0" Side Stone x 2 = 72.92' Base Width

9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

150 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 10 Rows = 16,790.8 cf Chamber Storage

45,418.0 cf Field - 16,790.8 cf Chambers = 28,627.2 cf Stone x 40.0% Voids = 11,450.9 cf Stone Storage

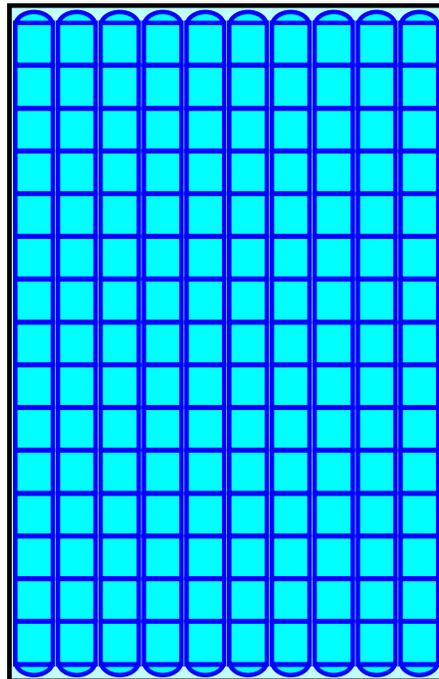
Chamber Storage + Stone Storage = 28,241.7 cf = 0.648 af

Overall Storage Efficiency = 62.2%

150 Chambers

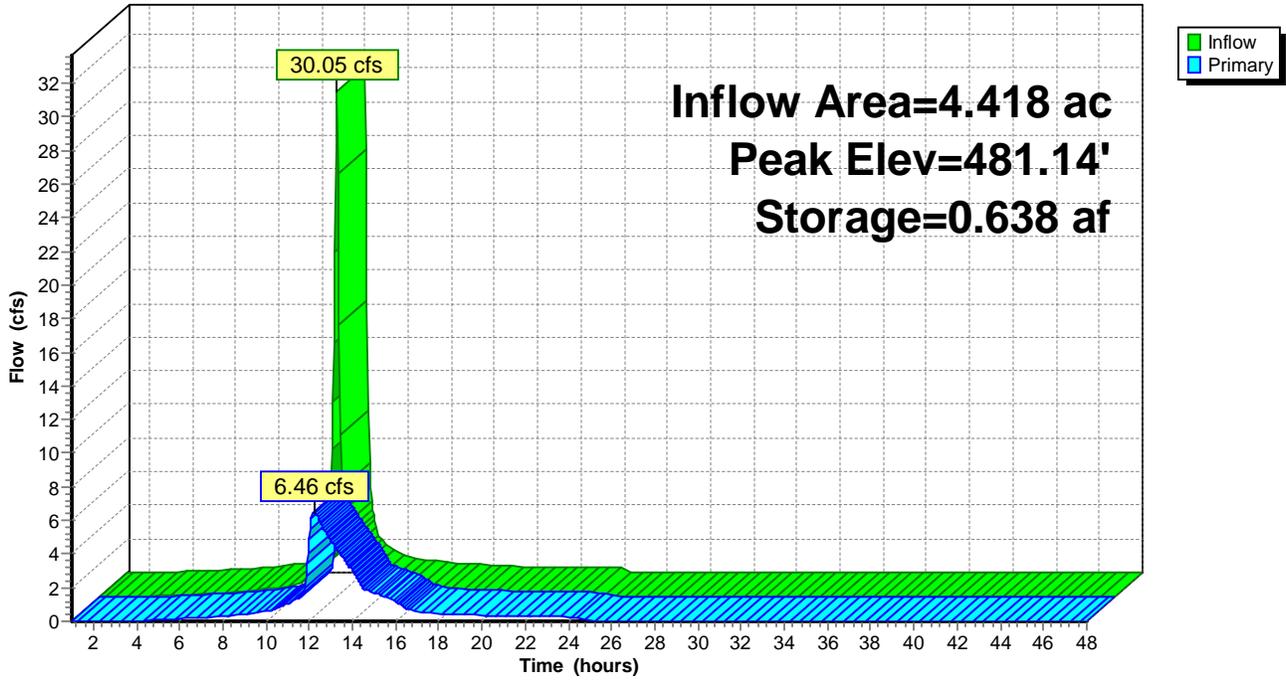
1,682.1 cy Field

1,060.3 cy Stone



Pond U: Underground Basin

Hydrograph



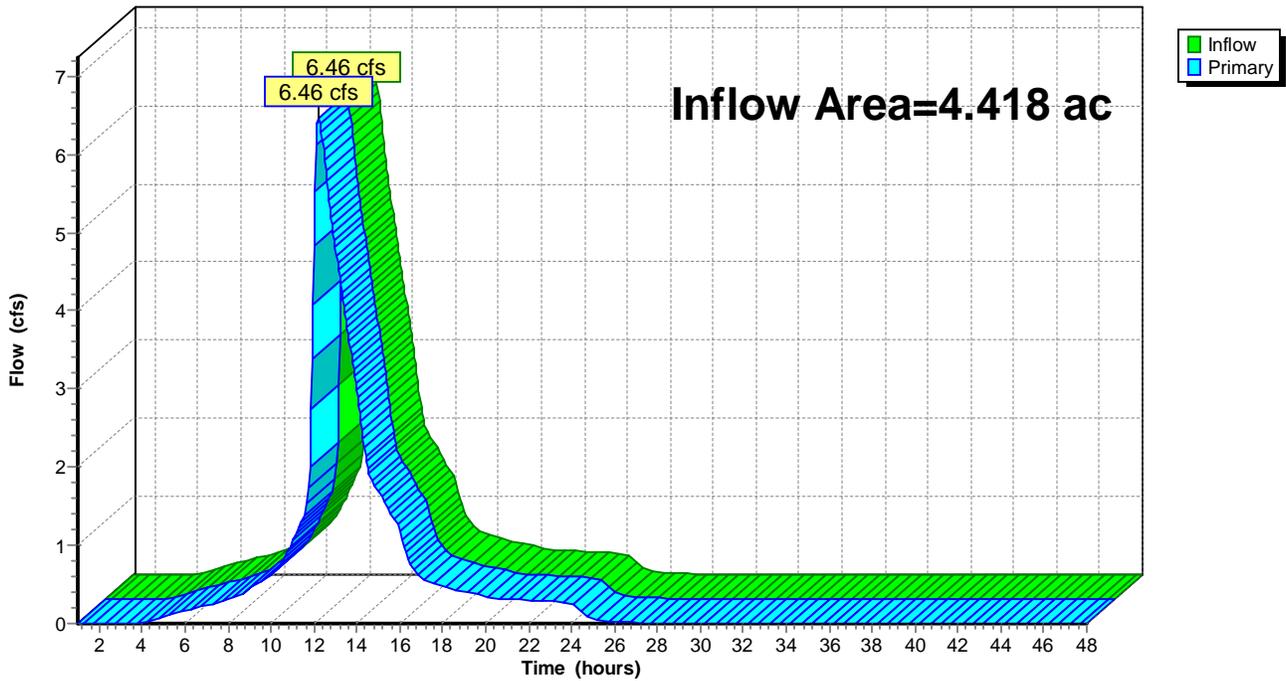
Summary for Link 2L: POI-2

Inflow Area = 4.418 ac, 85.51% Impervious, Inflow Depth = 4.69" for 100 YR event
Inflow = 6.46 cfs @ 12.21 hrs, Volume= 1.726 af
Primary = 6.46 cfs @ 12.21 hrs, Volume= 1.726 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs

Link 2L: POI-2

Hydrograph



Pre&Post-DR3

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Type II 24-hr 1 YR Rainfall=2.12"

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Page 1

Summary for Subcatchment EX: DR-3 PRE

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 2.52 cfs @ 11.95 hrs, Volume= 0.120 af, Depth= 1.42"

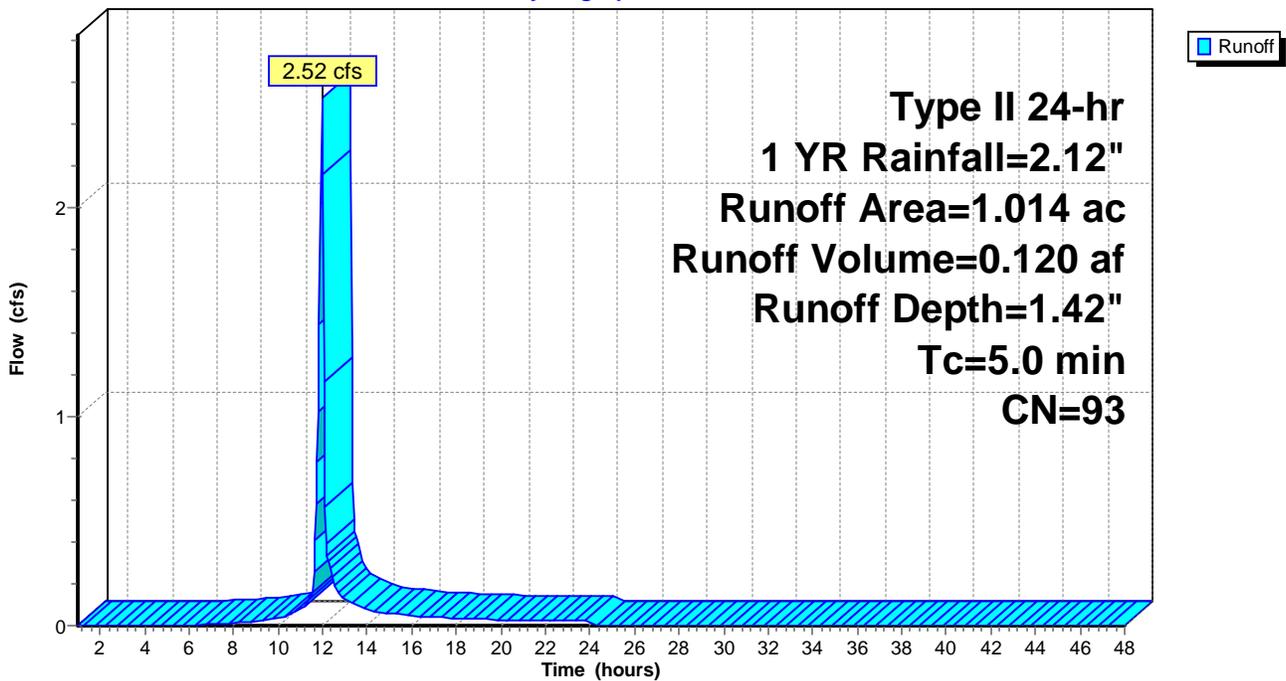
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.12"

Area (ac)	CN	Description
0.836	98	Paved parking, HSG B
0.178	69	50-75% Grass cover, Fair, HSG B
1.014	93	Weighted Average
0.178		17.55% Pervious Area
0.836		82.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 10

Subcatchment EX: DR-3 PRE

Hydrograph



Pre&Post-DR3

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Type II 24-hr 2 YR Rainfall=2.47"

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Summary for Subcatchment EX: DR-3 PRE

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 3.06 cfs @ 11.95 hrs, Volume= 0.148 af, Depth= 1.75"

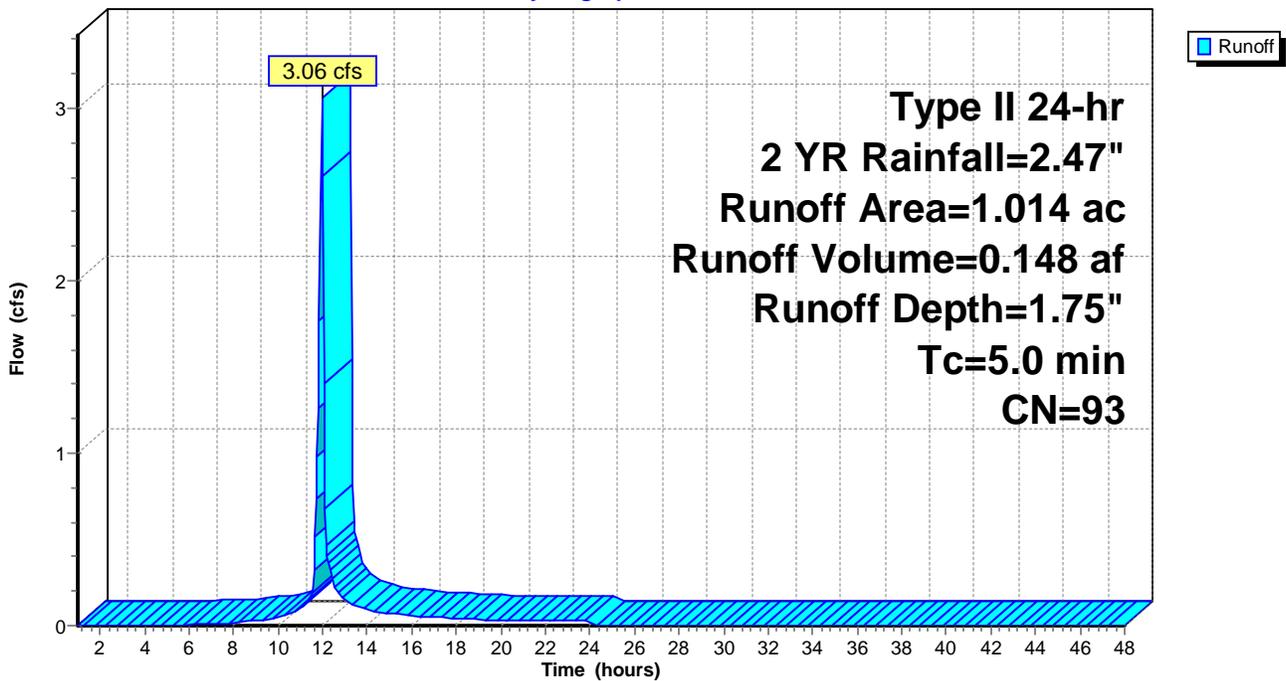
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 YR Rainfall=2.47"

Area (ac)	CN	Description
0.836	98	Paved parking, HSG B
0.178	69	50-75% Grass cover, Fair, HSG B
1.014	93	Weighted Average
0.178		17.55% Pervious Area
0.836		82.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 10

Subcatchment EX: DR-3 PRE

Hydrograph



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Type II 24-hr 5 YR Rainfall=3.05"

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Summary for Subcatchment EX: DR-3 PRE

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 3.96 cfs @ 11.95 hrs, Volume= 0.195 af, Depth= 2.30"

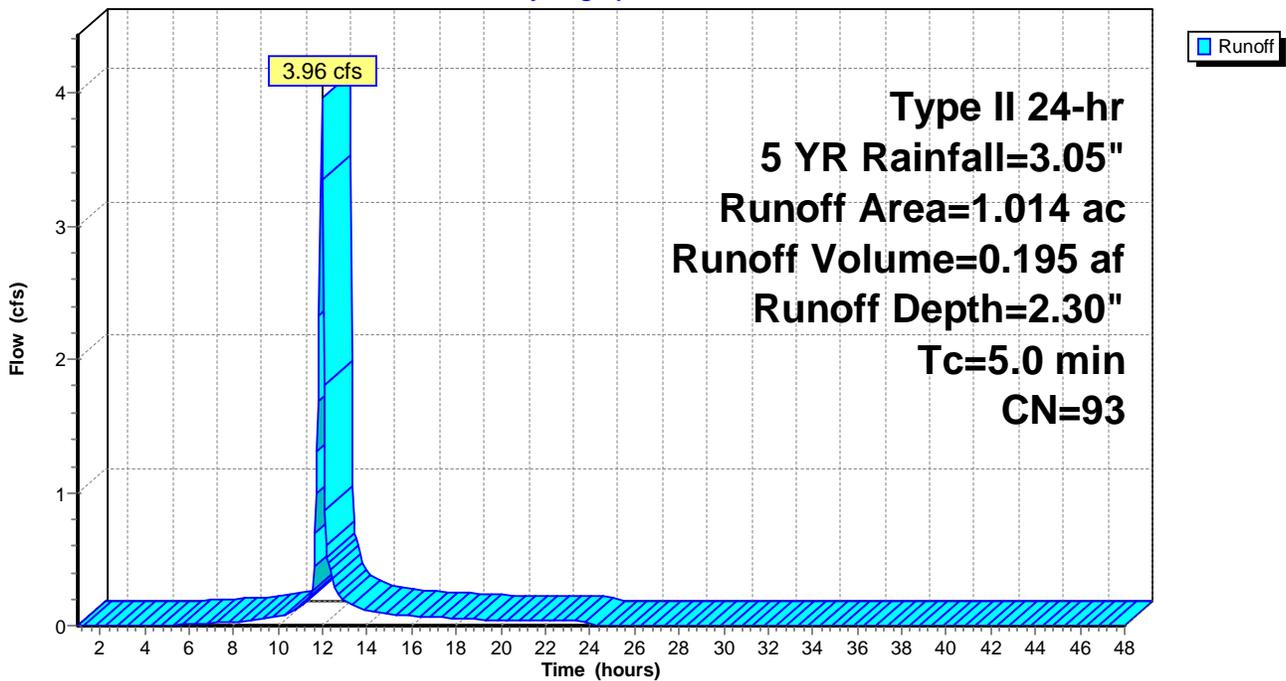
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 5 YR Rainfall=3.05"

Area (ac)	CN	Description
0.836	98	Paved parking, HSG B
0.178	69	50-75% Grass cover, Fair, HSG B
1.014	93	Weighted Average
0.178		17.55% Pervious Area
0.836		82.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 10

Subcatchment EX: DR-3 PRE

Hydrograph



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Type II 24-hr 10 YR Rainfall=3.53"

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Summary for Subcatchment EX: DR-3 PRE

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 4.70 cfs @ 11.95 hrs, Volume= 0.234 af, Depth= 2.76"

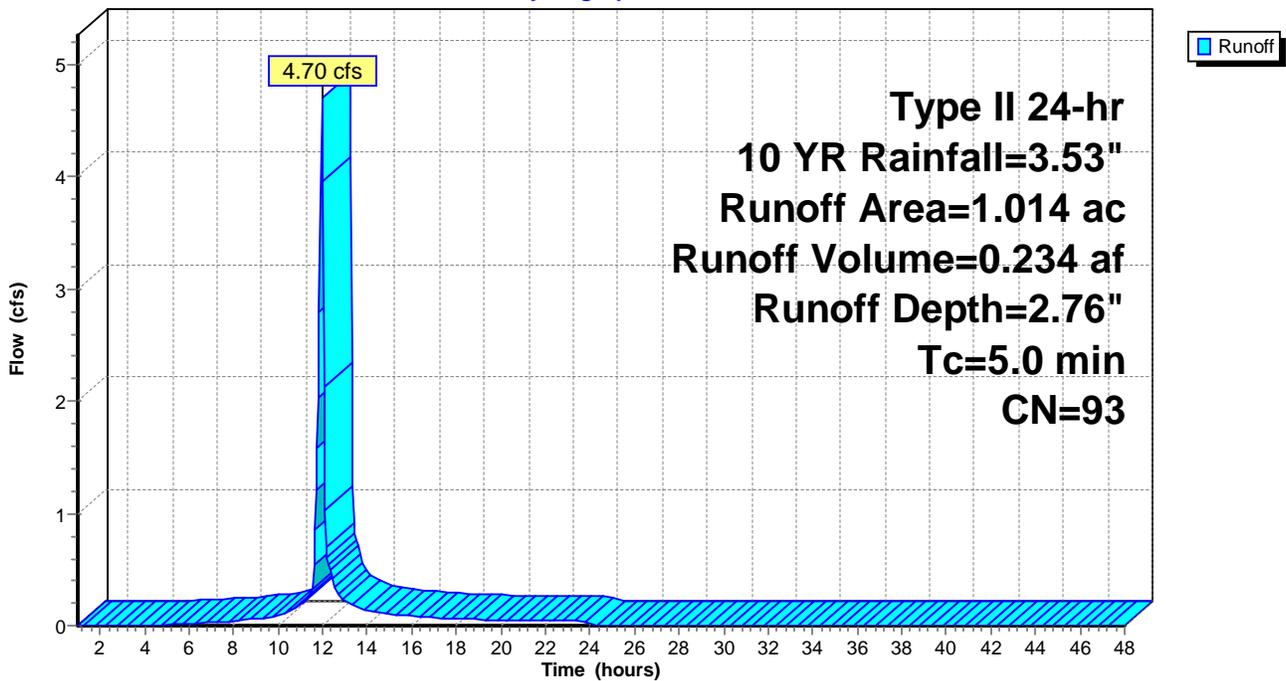
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.53"

Area (ac)	CN	Description
0.836	98	Paved parking, HSG B
0.178	69	50-75% Grass cover, Fair, HSG B
1.014	93	Weighted Average
0.178		17.55% Pervious Area
0.836		82.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 10

Subcatchment EX: DR-3 PRE

Hydrograph



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Type II 24-hr 25 YR Rainfall=4.19"

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Summary for Subcatchment EX: DR-3 PRE

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 5.71 cfs @ 11.95 hrs, Volume= 0.288 af, Depth= 3.40"

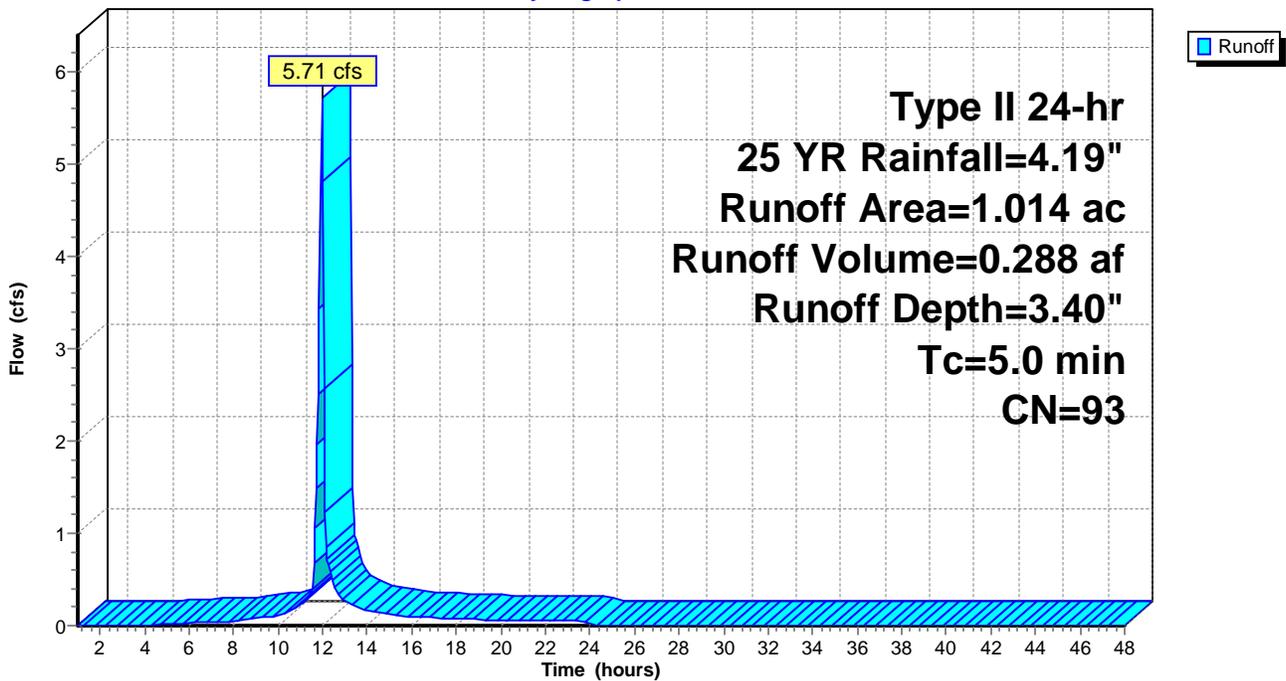
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 YR Rainfall=4.19"

Area (ac)	CN	Description
0.836	98	Paved parking, HSG B
0.178	69	50-75% Grass cover, Fair, HSG B
1.014	93	Weighted Average
0.178		17.55% Pervious Area
0.836		82.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 10

Subcatchment EX: DR-3 PRE

Hydrograph



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Type II 24-hr 50 YR Rainfall=4.69"

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Summary for Subcatchment EX: DR-3 PRE

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 6.47 cfs @ 11.95 hrs, Volume= 0.329 af, Depth= 3.89"

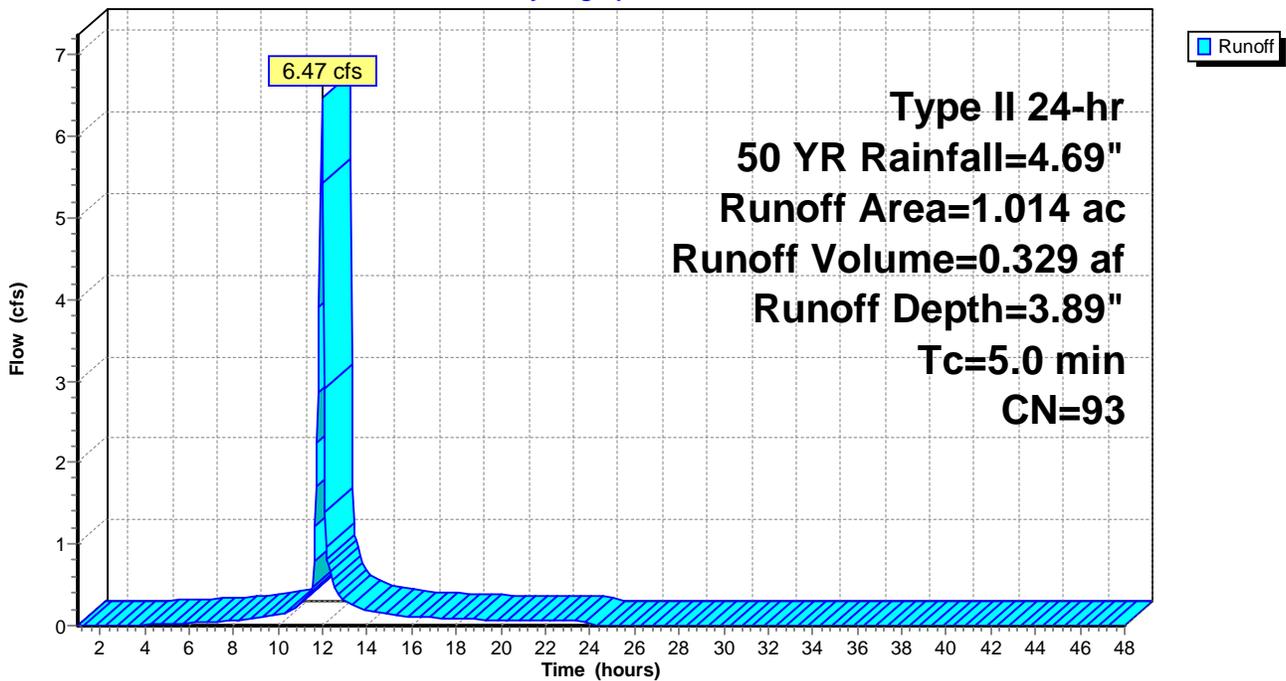
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
 Type II 24-hr 50 YR Rainfall=4.69"

Area (ac)	CN	Description
0.836	98	Paved parking, HSG B
0.178	69	50-75% Grass cover, Fair, HSG B
1.014	93	Weighted Average
0.178		17.55% Pervious Area
0.836		82.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 10

Subcatchment EX: DR-3 PRE

Hydrograph



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Type II 24-hr 100 YR Rainfall=5.20"

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Summary for Subcatchment EX: DR-3 PRE

[49] Hint: Tc<2dt may require smaller dt

Runoff = 7.24 cfs @ 11.95 hrs, Volume= 0.371 af, Depth= 4.39"

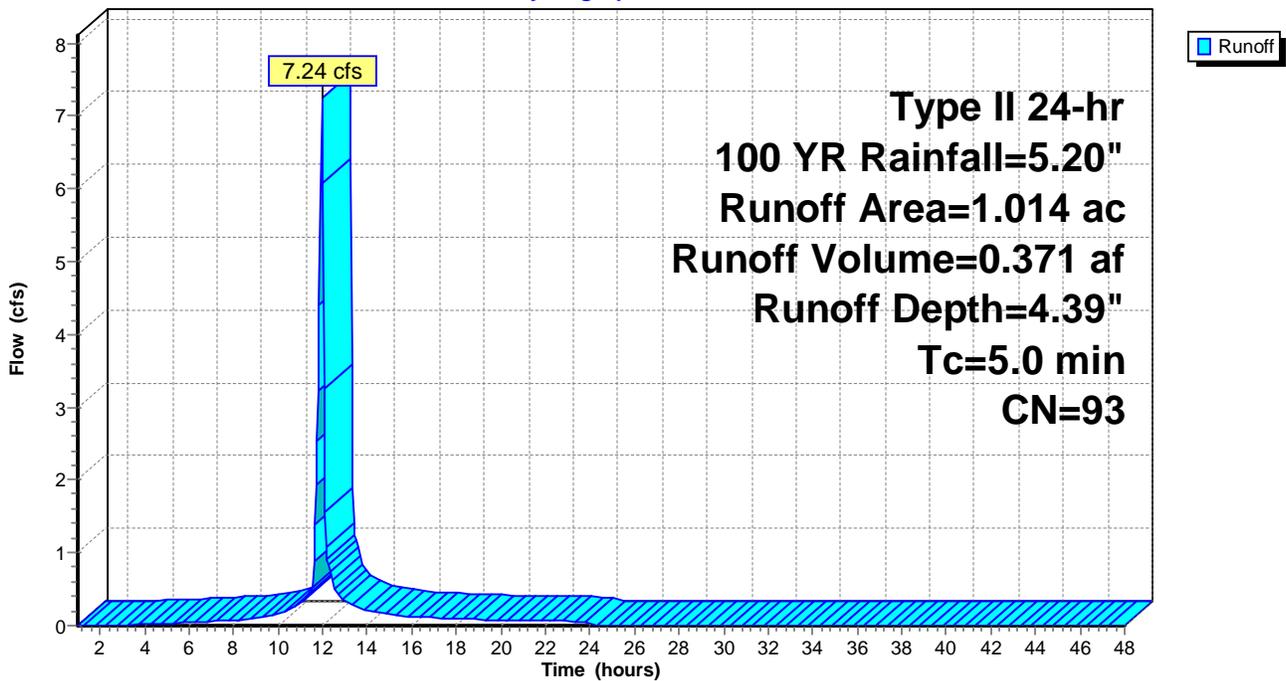
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=5.20"

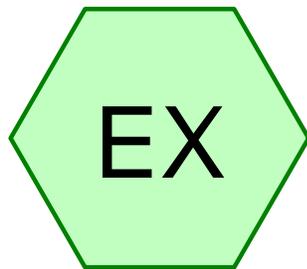
Area (ac)	CN	Description
0.836	98	Paved parking, HSG B
0.178	69	50-75% Grass cover, Fair, HSG B
1.014	93	Weighted Average
0.178		17.55% Pervious Area
0.836		82.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 10

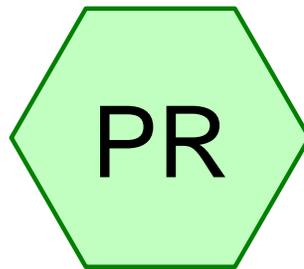
Subcatchment EX: DR-3 PRE

Hydrograph

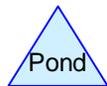
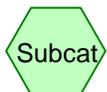




DR-4 PRE



DR-4 POST



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Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.694	69	50-75% Grass cover, Fair, HSG B (EX)
0.491	61	>75% Grass cover, Good, HSG B (PR)
2.104	98	Paved parking, HSG B (EX, PR)
3.289	86	TOTAL AREA

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Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
3.289	HSG B	EX, PR
0.000	HSG C	
0.000	HSG D	
0.000	Other	
3.289		TOTAL AREA

Pre&Post-DR4

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Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.694	0.000	0.000	0.000	0.694	50-75% Grass cover, Fair	EX
0.000	0.491	0.000	0.000	0.000	0.491	>75% Grass cover, Good	PR
0.000	2.104	0.000	0.000	0.000	2.104	Paved parking	EX, PR
0.000	3.289	0.000	0.000	0.000	3.289	TOTAL AREA	

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Type II 24-hr 1 YR Rainfall=2.12"

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Time span=1.00-48.00 hrs, dt=0.05 hrs, 941 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX: DR-4 PRE

Runoff Area=2.562 ac 72.91% Impervious Runoff Depth=1.20"
Tc=10.0 min CN=90 Runoff=4.63 cfs 0.256 af

Subcatchment PR: DR-4 POST

Runoff Area=0.727 ac 32.46% Impervious Runoff Depth=0.38"
Tc=6.0 min CN=73 Runoff=0.42 cfs 0.023 af

Total Runoff Area = 3.289 ac Runoff Volume = 0.278 af Average Runoff Depth = 1.02"
36.03% Pervious = 1.185 ac 63.97% Impervious = 2.104 ac

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Type II 24-hr 1 YR Rainfall=2.12"

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Summary for Subcatchment EX: DR-4 PRE

Runoff = 4.63 cfs @ 12.01 hrs, Volume= 0.256 af, Depth= 1.20"

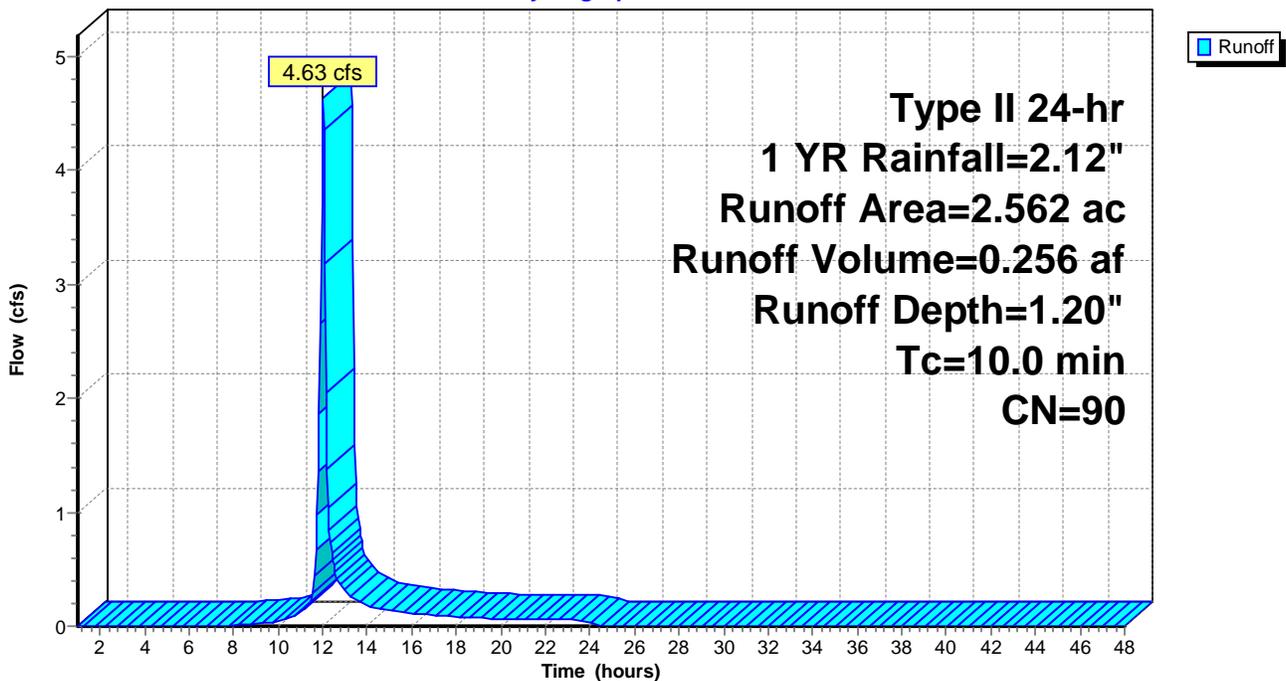
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.12"

Area (ac)	CN	Description
1.868	98	Paved parking, HSG B
0.694	69	50-75% Grass cover, Fair, HSG B
2.562	90	Weighted Average
0.694		27.09% Pervious Area
1.868		72.91% Impervious Area

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

Subcatchment EX: DR-4 PRE

Hydrograph



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Type II 24-hr 1 YR Rainfall=2.12"

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Summary for Subcatchment PR: DR-4 POST

Runoff = 0.42 cfs @ 11.99 hrs, Volume= 0.023 af, Depth= 0.38"

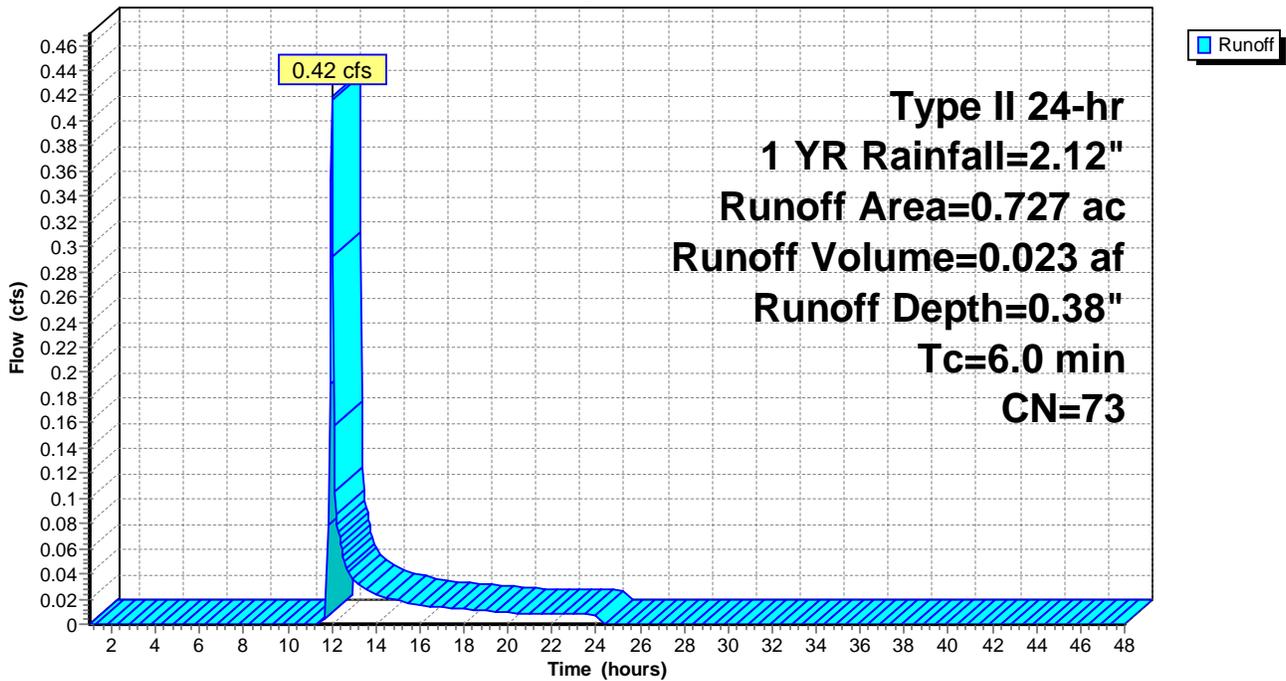
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.12"

Area (ac)	CN	Description
0.236	98	Paved parking, HSG B
0.491	61	>75% Grass cover, Good, HSG B
0.727	73	Weighted Average
0.491		67.54% Pervious Area
0.236		32.46% Impervious Area

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

Subcatchment PR: DR-4 POST

Hydrograph



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Type II 24-hr 2 YR Rainfall=2.47"

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Time span=1.00-48.00 hrs, dt=0.05 hrs, 941 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX: DR-4 PRE

Runoff Area=2.562 ac 72.91% Impervious Runoff Depth=1.50"
Tc=10.0 min CN=90 Runoff=5.78 cfs 0.321 af

Subcatchment PR: DR-4 POST

Runoff Area=0.727 ac 32.46% Impervious Runoff Depth=0.55"
Tc=6.0 min CN=73 Runoff=0.66 cfs 0.033 af

Total Runoff Area = 3.289 ac Runoff Volume = 0.355 af Average Runoff Depth = 1.29"
36.03% Pervious = 1.185 ac 63.97% Impervious = 2.104 ac

Pre&Post-DR4

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Type II 24-hr 2 YR Rainfall=2.47"

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Summary for Subcatchment EX: DR-4 PRE

Runoff = 5.78 cfs @ 12.01 hrs, Volume= 0.321 af, Depth= 1.50"

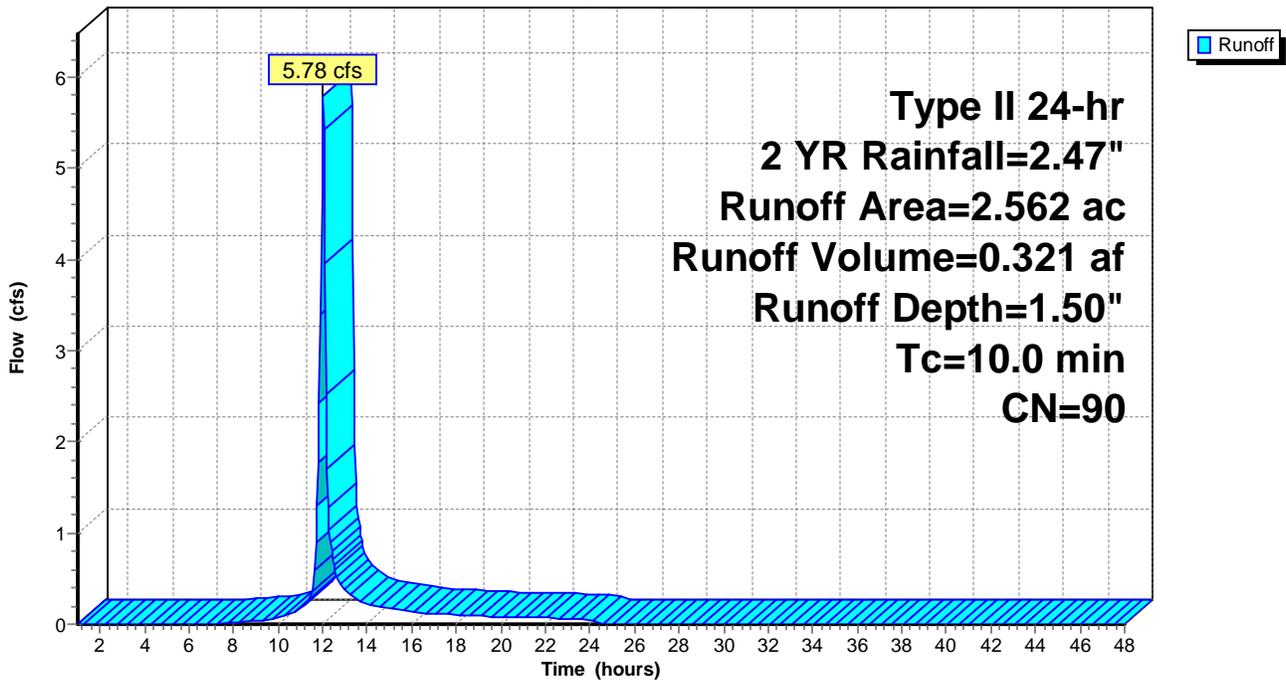
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 YR Rainfall=2.47"

Area (ac)	CN	Description
1.868	98	Paved parking, HSG B
0.694	69	50-75% Grass cover, Fair, HSG B
2.562	90	Weighted Average
0.694		27.09% Pervious Area
1.868		72.91% Impervious Area

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

Subcatchment EX: DR-4 PRE

Hydrograph



Pre&Post-DR4

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Type II 24-hr 2 YR Rainfall=2.47"

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Summary for Subcatchment PR: DR-4 POST

Runoff = 0.66 cfs @ 11.99 hrs, Volume= 0.033 af, Depth= 0.55"

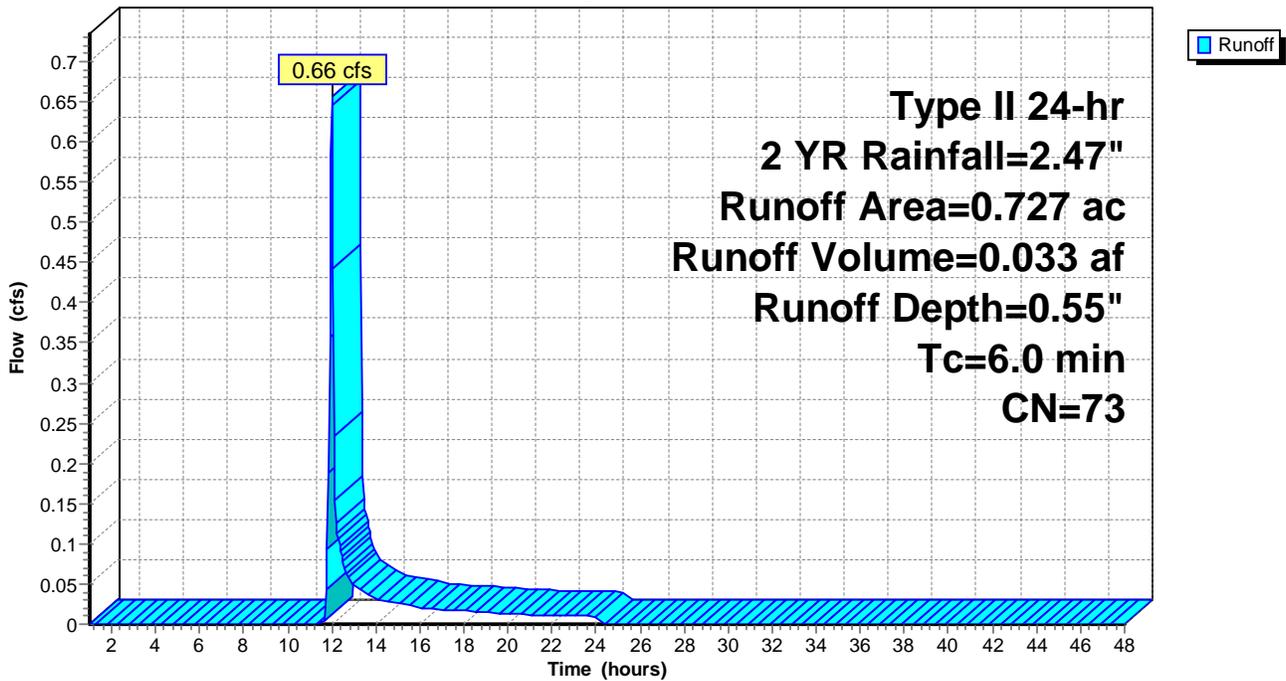
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 2 YR Rainfall=2.47"

Area (ac)	CN	Description
0.236	98	Paved parking, HSG B
0.491	61	>75% Grass cover, Good, HSG B
0.727	73	Weighted Average
0.491		67.54% Pervious Area
0.236		32.46% Impervious Area

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

Subcatchment PR: DR-4 POST

Hydrograph



Pre&Post-DR4

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Type II 24-hr 5 YR Rainfall=3.05"

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Time span=1.00-48.00 hrs, dt=0.05 hrs, 941 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX: DR-4 PRE

Runoff Area=2.562 ac 72.91% Impervious Runoff Depth=2.03"
Tc=10.0 min CN=90 Runoff=7.73 cfs 0.433 af

Subcatchment PR: DR-4 POST

Runoff Area=0.727 ac 32.46% Impervious Runoff Depth=0.89"
Tc=6.0 min CN=73 Runoff=1.10 cfs 0.054 af

Total Runoff Area = 3.289 ac Runoff Volume = 0.487 af Average Runoff Depth = 1.78"
36.03% Pervious = 1.185 ac 63.97% Impervious = 2.104 ac

Pre&Post-DR4

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Type II 24-hr 5 YR Rainfall=3.05"

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Summary for Subcatchment EX: DR-4 PRE

Runoff = 7.73 cfs @ 12.01 hrs, Volume= 0.433 af, Depth= 2.03"

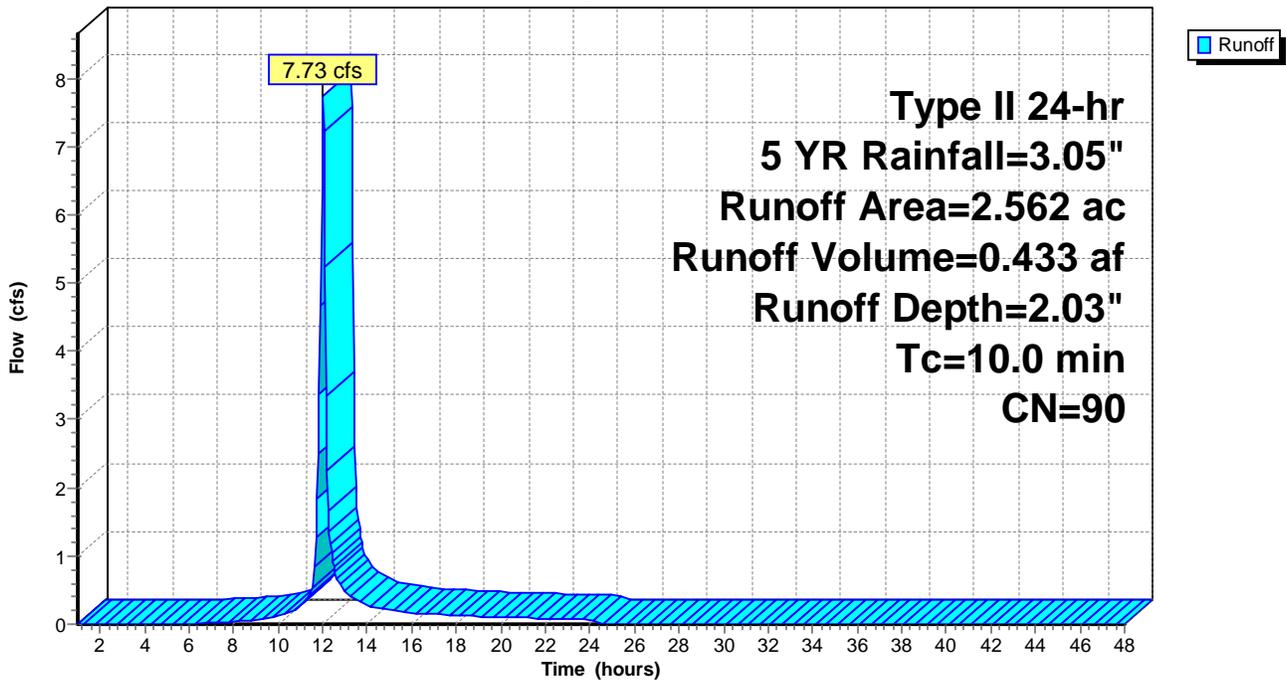
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 5 YR Rainfall=3.05"

Area (ac)	CN	Description
1.868	98	Paved parking, HSG B
0.694	69	50-75% Grass cover, Fair, HSG B
2.562	90	Weighted Average
0.694		27.09% Pervious Area
1.868		72.91% Impervious Area

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

Subcatchment EX: DR-4 PRE

Hydrograph



Pre&Post-DR4

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Type II 24-hr 5 YR Rainfall=3.05"

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Summary for Subcatchment PR: DR-4 POST

Runoff = 1.10 cfs @ 11.98 hrs, Volume= 0.054 af, Depth= 0.89"

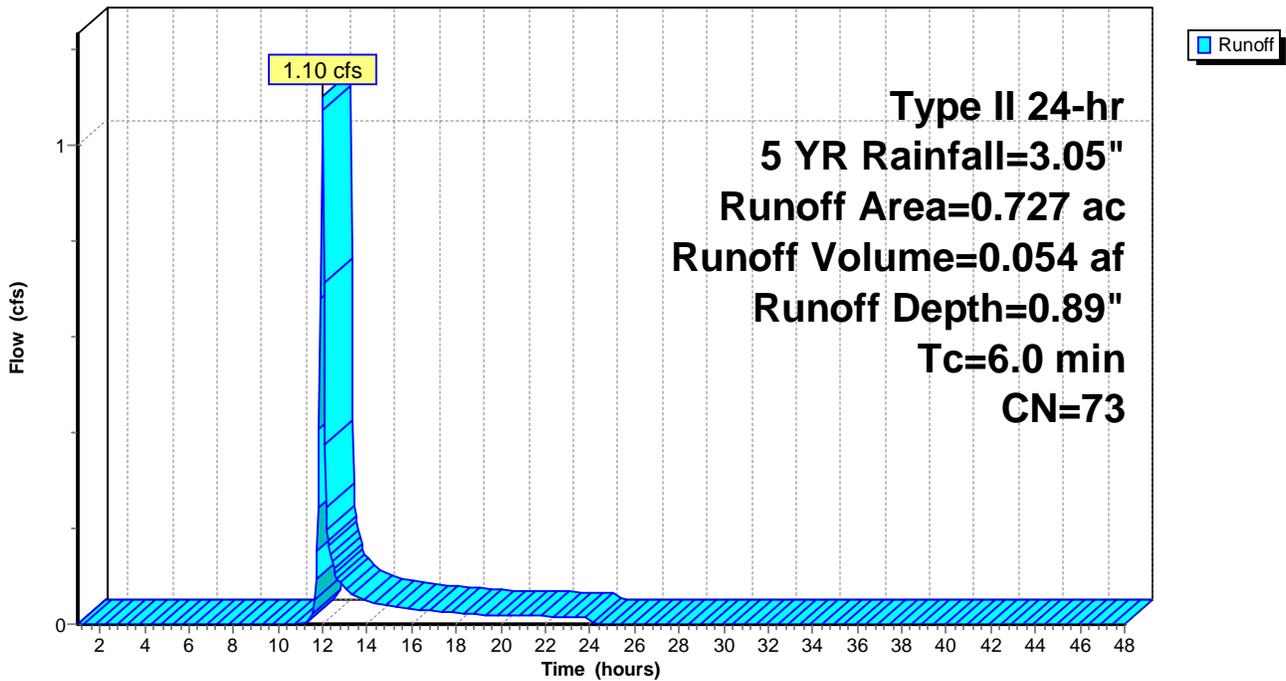
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 5 YR Rainfall=3.05"

Area (ac)	CN	Description
0.236	98	Paved parking, HSG B
0.491	61	>75% Grass cover, Good, HSG B
0.727	73	Weighted Average
0.491		67.54% Pervious Area
0.236		32.46% Impervious Area

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

Subcatchment PR: DR-4 POST

Hydrograph



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Type II 24-hr 10 YR Rainfall=3.53"

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Time span=1.00-48.00 hrs, dt=0.05 hrs, 941 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX: DR-4 PRE

Runoff Area=2.562 ac 72.91% Impervious Runoff Depth=2.48"
Tc=10.0 min CN=90 Runoff=9.34 cfs 0.529 af

Subcatchment PR: DR-4 POST

Runoff Area=0.727 ac 32.46% Impervious Runoff Depth=1.20"
Tc=6.0 min CN=73 Runoff=1.51 cfs 0.073 af

Total Runoff Area = 3.289 ac Runoff Volume = 0.601 af Average Runoff Depth = 2.19"
36.03% Pervious = 1.185 ac 63.97% Impervious = 2.104 ac

Pre&Post-DR4

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Type II 24-hr 10 YR Rainfall=3.53"

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Summary for Subcatchment EX: DR-4 PRE

Runoff = 9.34 cfs @ 12.01 hrs, Volume= 0.529 af, Depth= 2.48"

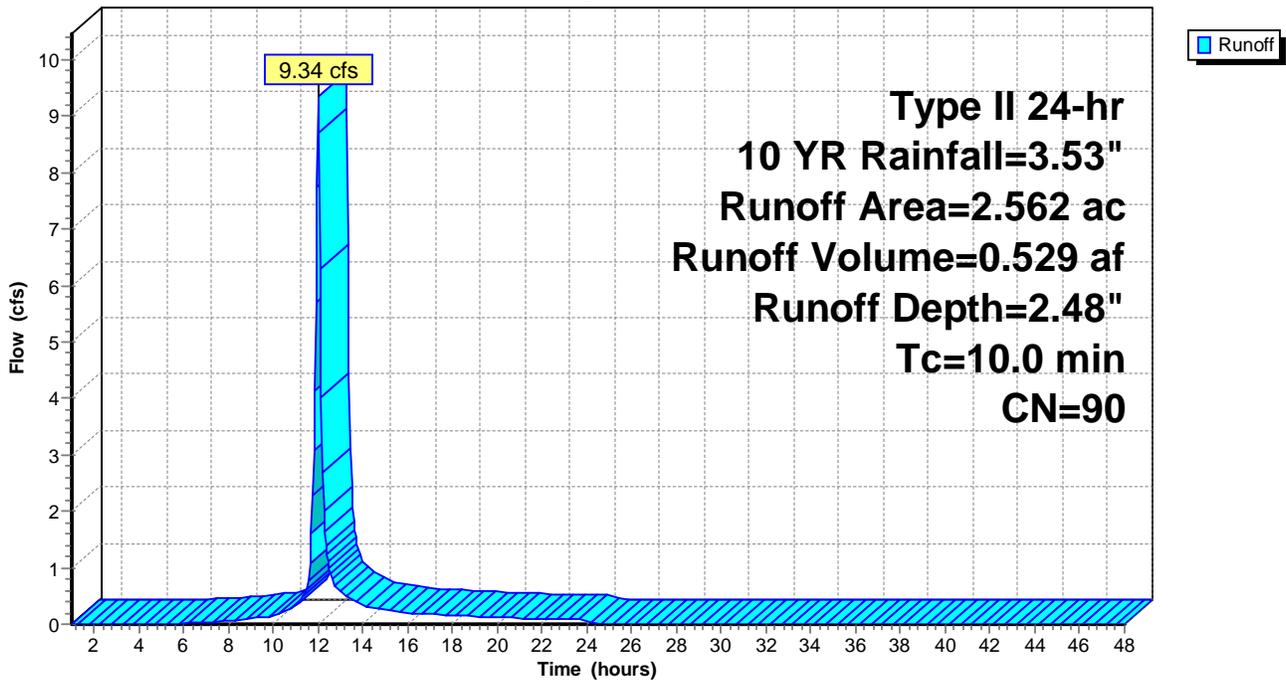
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.53"

Area (ac)	CN	Description
1.868	98	Paved parking, HSG B
0.694	69	50-75% Grass cover, Fair, HSG B
2.562	90	Weighted Average
0.694		27.09% Pervious Area
1.868		72.91% Impervious Area

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

Subcatchment EX: DR-4 PRE

Hydrograph



Pre&Post-DR4

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Type II 24-hr 10 YR Rainfall=3.53"

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Summary for Subcatchment PR: DR-4 POST

Runoff = 1.51 cfs @ 11.98 hrs, Volume= 0.073 af, Depth= 1.20"

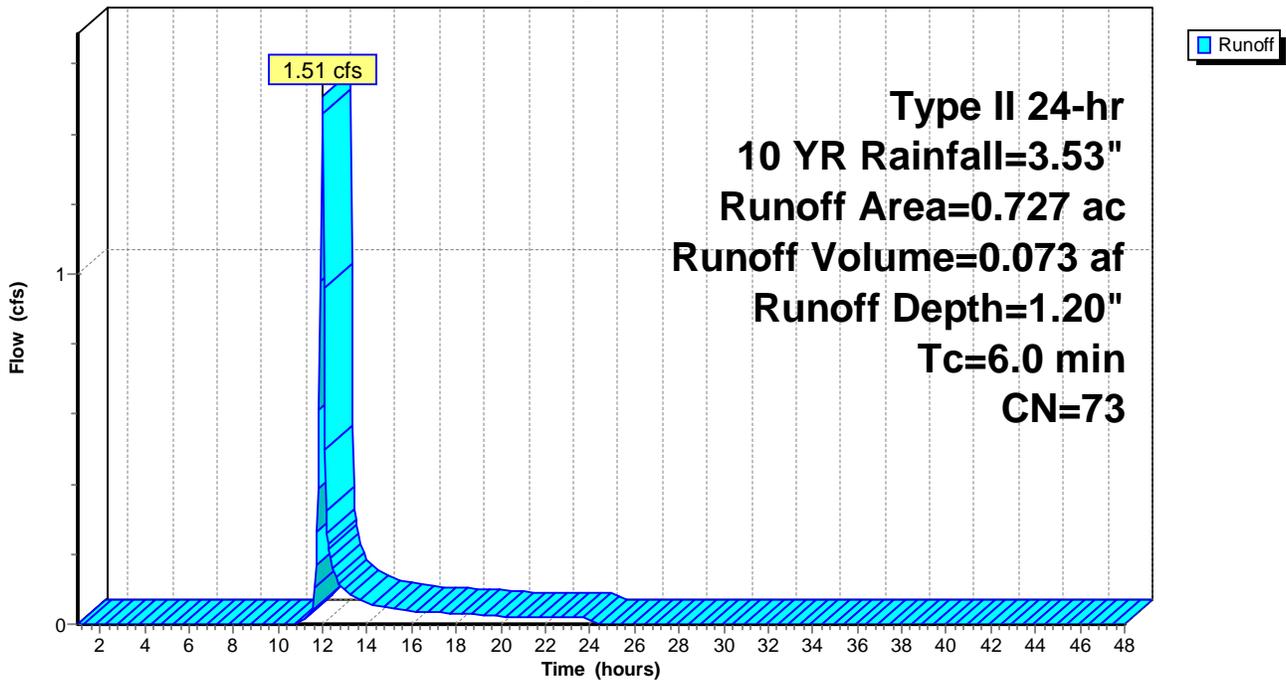
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.53"

Area (ac)	CN	Description
0.236	98	Paved parking, HSG B
0.491	61	>75% Grass cover, Good, HSG B
0.727	73	Weighted Average
0.491		67.54% Pervious Area
0.236		32.46% Impervious Area

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

Subcatchment PR: DR-4 POST

Hydrograph



Pre&Post-DR4

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Type II 24-hr 25 YR Rainfall=4.19"

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Time span=1.00-48.00 hrs, dt=0.05 hrs, 941 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX: DR-4 PRE

Runoff Area=2.562 ac 72.91% Impervious Runoff Depth=3.10"
Tc=10.0 min CN=90 Runoff=11.56 cfs 0.662 af

Subcatchment PR: DR-4 POST

Runoff Area=0.727 ac 32.46% Impervious Runoff Depth=1.67"
Tc=6.0 min CN=73 Runoff=2.11 cfs 0.101 af

Total Runoff Area = 3.289 ac Runoff Volume = 0.763 af Average Runoff Depth = 2.78"
36.03% Pervious = 1.185 ac 63.97% Impervious = 2.104 ac

Pre&Post-DR4

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Type II 24-hr 25 YR Rainfall=4.19"

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Summary for Subcatchment EX: DR-4 PRE

Runoff = 11.56 cfs @ 12.01 hrs, Volume= 0.662 af, Depth= 3.10"

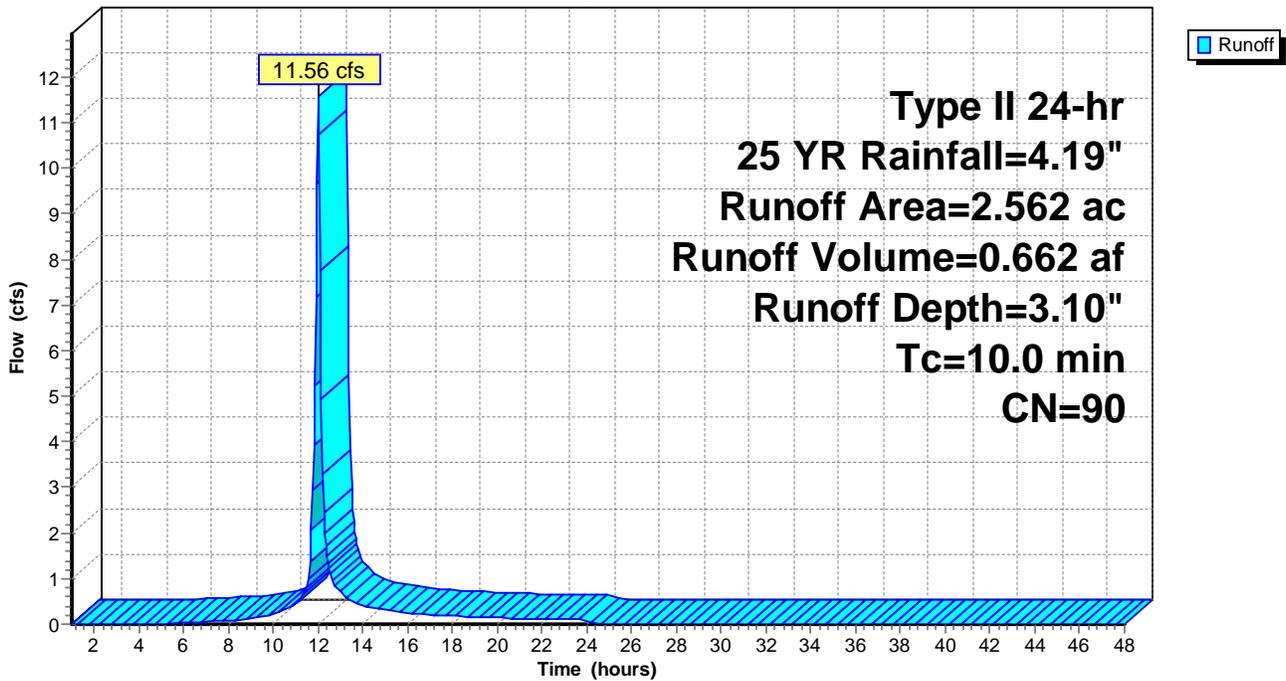
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 YR Rainfall=4.19"

Area (ac)	CN	Description
1.868	98	Paved parking, HSG B
0.694	69	50-75% Grass cover, Fair, HSG B
2.562	90	Weighted Average
0.694		27.09% Pervious Area
1.868		72.91% Impervious Area

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

Subcatchment EX: DR-4 PRE

Hydrograph



Pre&Post-DR4

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Type II 24-hr 25 YR Rainfall=4.19"

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Summary for Subcatchment PR: DR-4 POST

Runoff = 2.11 cfs @ 11.98 hrs, Volume= 0.101 af, Depth= 1.67"

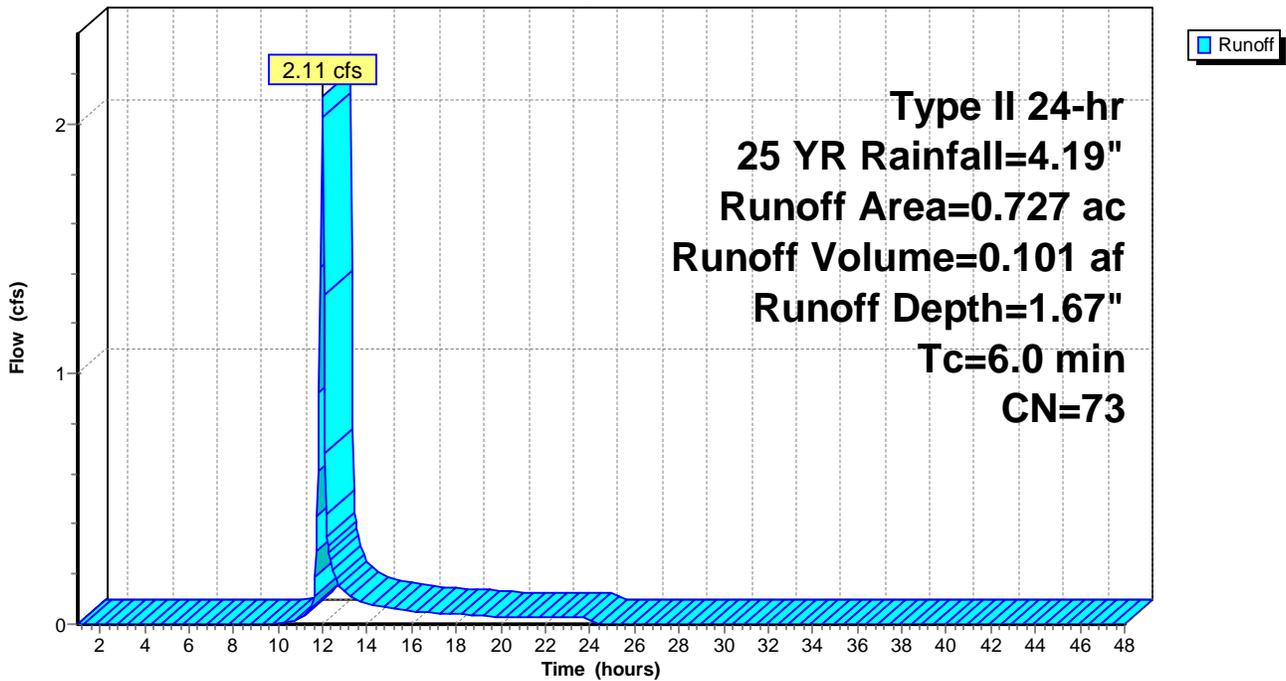
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 YR Rainfall=4.19"

Area (ac)	CN	Description
0.236	98	Paved parking, HSG B
0.491	61	>75% Grass cover, Good, HSG B
0.727	73	Weighted Average
0.491		67.54% Pervious Area
0.236		32.46% Impervious Area

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

Subcatchment PR: DR-4 POST

Hydrograph



Pre&Post-DR4

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Type II 24-hr 50 YR Rainfall=4.69"

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Time span=1.00-48.00 hrs, dt=0.05 hrs, 941 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX: DR-4 PRE

Runoff Area=2.562 ac 72.91% Impervious Runoff Depth=3.58"
Tc=10.0 min CN=90 Runoff=13.24 cfs 0.764 af

Subcatchment PR: DR-4 POST

Runoff Area=0.727 ac 32.46% Impervious Runoff Depth=2.04"
Tc=6.0 min CN=73 Runoff=2.58 cfs 0.124 af

Total Runoff Area = 3.289 ac Runoff Volume = 0.887 af Average Runoff Depth = 3.24"
36.03% Pervious = 1.185 ac 63.97% Impervious = 2.104 ac

Pre&Post-DR4

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Type II 24-hr 50 YR Rainfall=4.69"

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Summary for Subcatchment EX: DR-4 PRE

Runoff = 13.24 cfs @ 12.01 hrs, Volume= 0.764 af, Depth= 3.58"

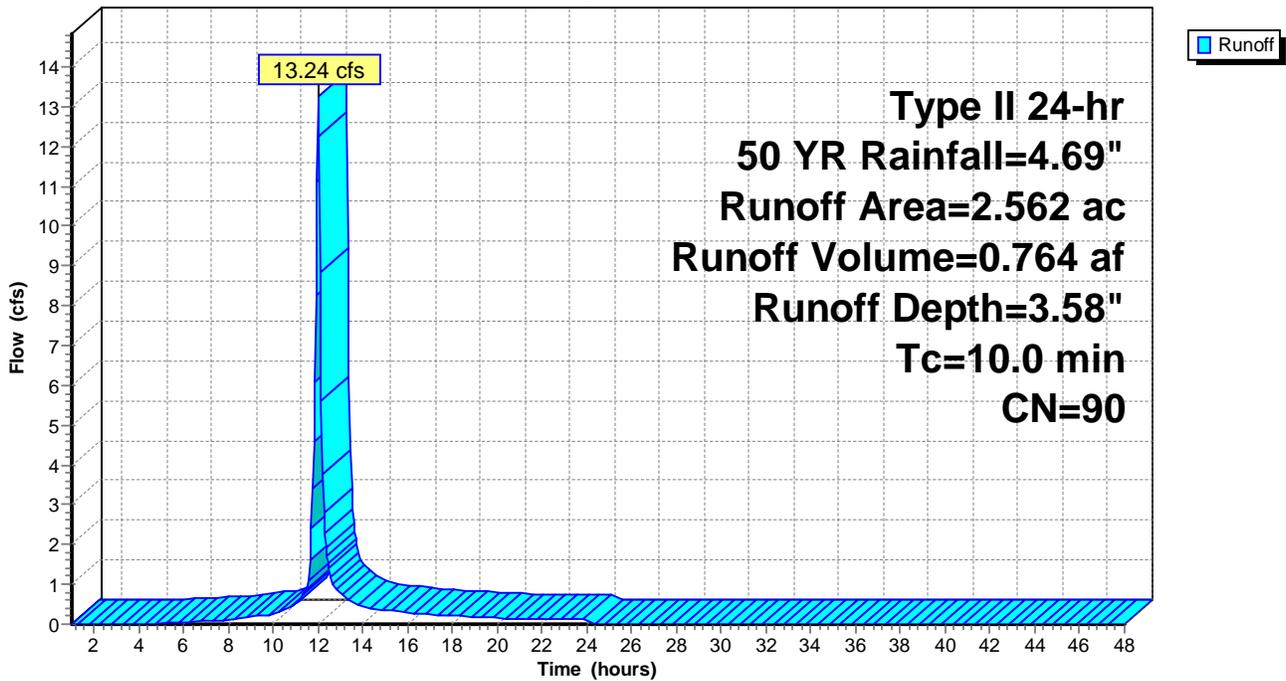
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 50 YR Rainfall=4.69"

Area (ac)	CN	Description
1.868	98	Paved parking, HSG B
0.694	69	50-75% Grass cover, Fair, HSG B
2.562	90	Weighted Average
0.694		27.09% Pervious Area
1.868		72.91% Impervious Area

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

Subcatchment EX: DR-4 PRE

Hydrograph



Pre&Post-DR4

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Type II 24-hr 50 YR Rainfall=4.69"

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Summary for Subcatchment PR: DR-4 POST

Runoff = 2.58 cfs @ 11.98 hrs, Volume= 0.124 af, Depth= 2.04"

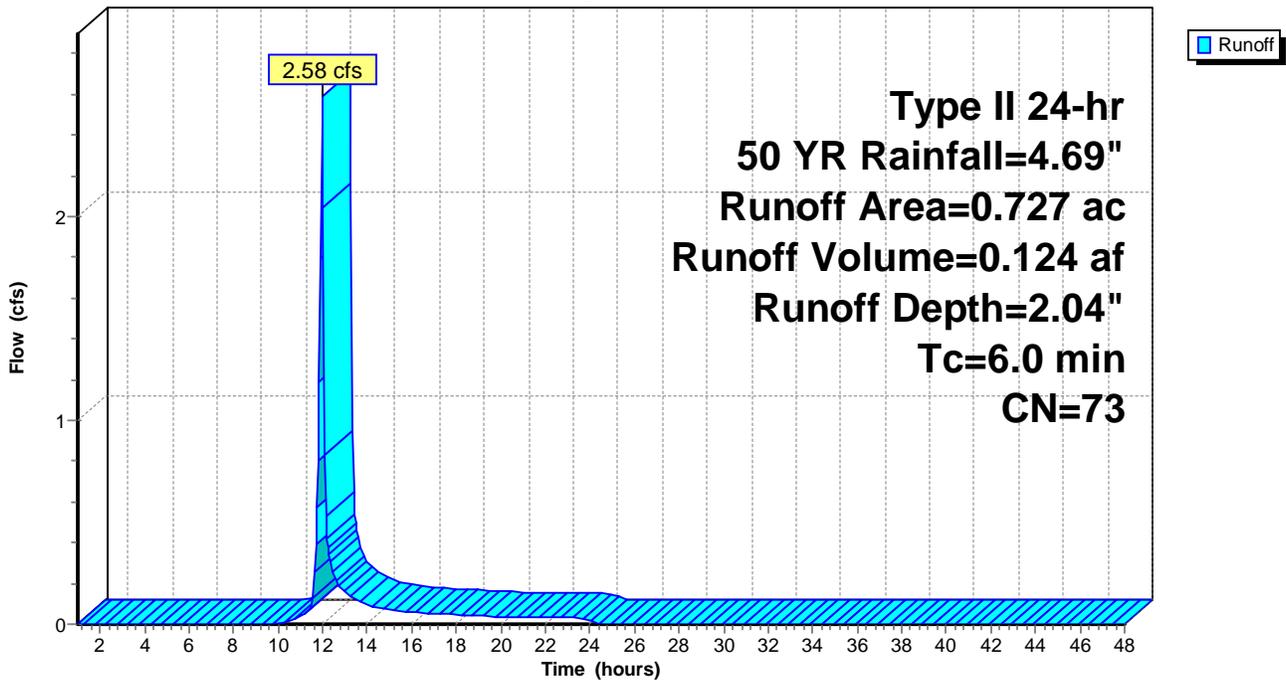
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
 Type II 24-hr 50 YR Rainfall=4.69"

Area (ac)	CN	Description
0.236	98	Paved parking, HSG B
0.491	61	>75% Grass cover, Good, HSG B
0.727	73	Weighted Average
0.491		67.54% Pervious Area
0.236		32.46% Impervious Area

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

Subcatchment PR: DR-4 POST

Hydrograph



Pre&Post-DR4

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Type II 24-hr 100 YR Rainfall=5.20"

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Time span=1.00-48.00 hrs, dt=0.05 hrs, 941 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX: DR-4 PRE

Runoff Area=2.562 ac 72.91% Impervious Runoff Depth=4.07"
Tc=10.0 min CN=90 Runoff=14.95 cfs 0.869 af

Subcatchment PR: DR-4 POST

Runoff Area=0.727 ac 32.46% Impervious Runoff Depth=2.44"
Tc=6.0 min CN=73 Runoff=3.06 cfs 0.148 af

Total Runoff Area = 3.289 ac Runoff Volume = 1.017 af Average Runoff Depth = 3.71"
36.03% Pervious = 1.185 ac 63.97% Impervious = 2.104 ac

Pre&Post-DR4

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Type II 24-hr 100 YR Rainfall=5.20"

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Summary for Subcatchment EX: DR-4 PRE

Runoff = 14.95 cfs @ 12.01 hrs, Volume= 0.869 af, Depth= 4.07"

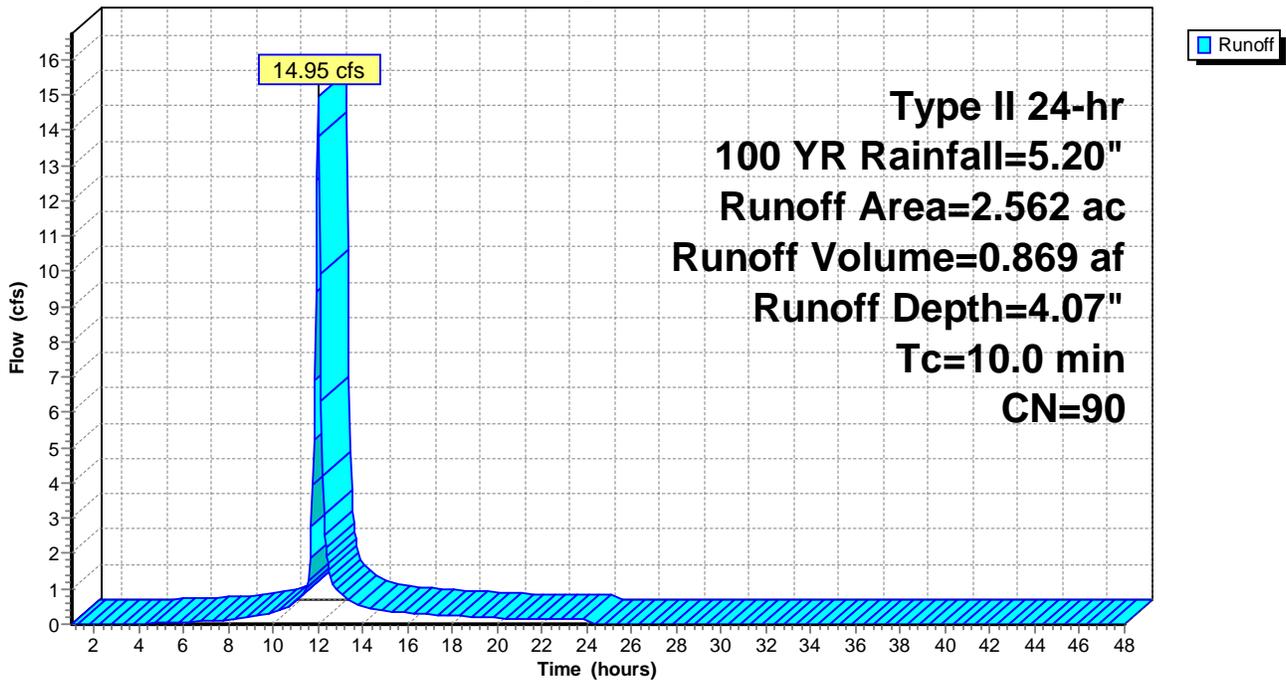
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=5.20"

Area (ac)	CN	Description
1.868	98	Paved parking, HSG B
0.694	69	50-75% Grass cover, Fair, HSG B
2.562	90	Weighted Average
0.694		27.09% Pervious Area
1.868		72.91% Impervious Area

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

Subcatchment EX: DR-4 PRE

Hydrograph



Pre&Post-DR4

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Type II 24-hr 100 YR Rainfall=5.20"

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Summary for Subcatchment PR: DR-4 POST

Runoff = 3.06 cfs @ 11.97 hrs, Volume= 0.148 af, Depth= 2.44"

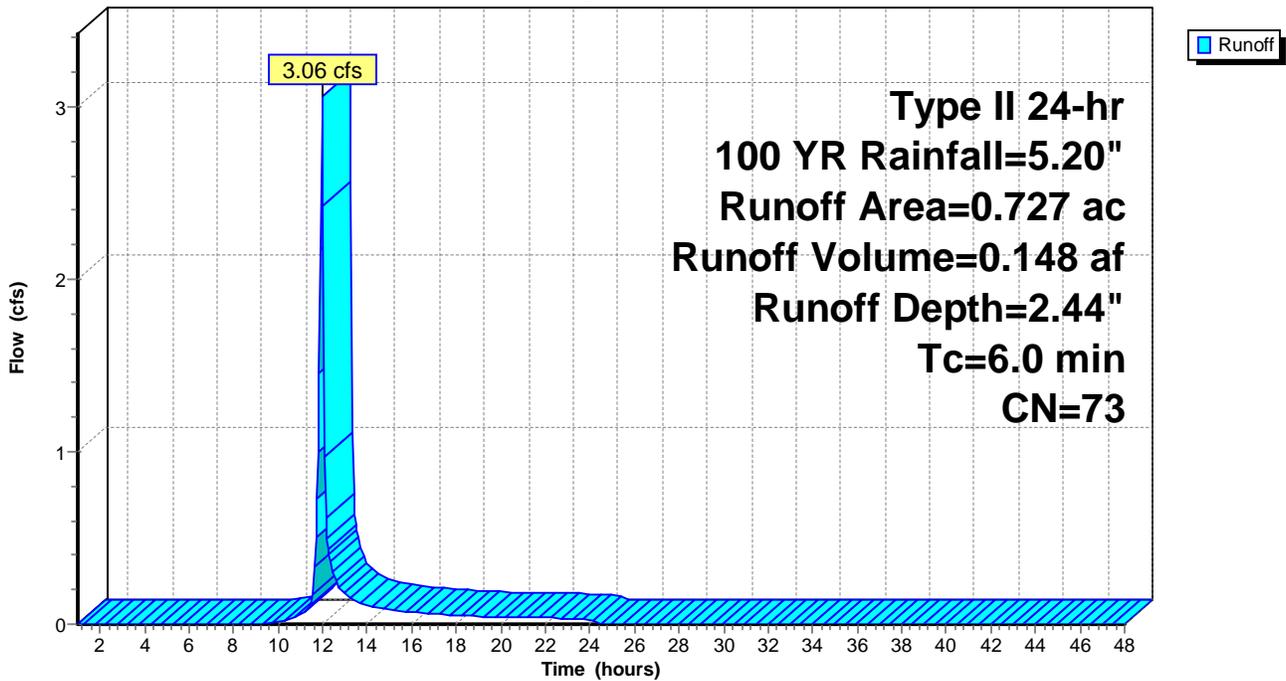
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=5.20"

Area (ac)	CN	Description
0.236	98	Paved parking, HSG B
0.491	61	>75% Grass cover, Good, HSG B
0.727	73	Weighted Average
0.491		67.54% Pervious Area
0.236		32.46% Impervious Area

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

Subcatchment PR: DR-4 POST

Hydrograph



StormTech MC-3500 Chamber

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots thus maximizing land usage for commercial and municipal applications.



StormTech MC-3500 Chamber (not to scale)

Nominal Chamber Specifications

Size (L x W x H)	90" (2286 mm) x 77" (1956 mm) x 45" (1143 mm)
Chamber Storage	109.9 ft ³ (3.11 m ³)
Min. Installed Storage*	178.9 ft ³ (5.06 m ³)
Weight	134 lbs (60.8 kg)

* This assumes a minimum of 12" (305 mm) of stone above, 9" (229 mm) of stone below chambers, 9" (229 mm) of row spacing, and 40% stone porosity.

StormTech MC-3500 End Cap (not to scale)

Nominal End Cap Specifications

Size (L x W x H)	25.7" (653 mm) x 75" (1905 mm) x 45" (1143 mm)
End Cap Storage	14.9 ft ³ (0.42 m ³)
Min. Installed Storage*	46.0 ft ³ (1.30 m ³)
Weight	49 lbs (22.2 kg)

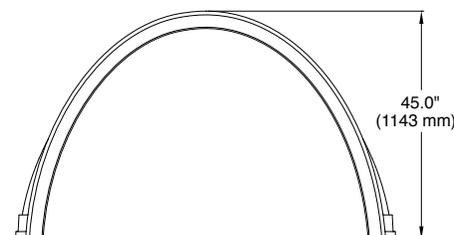
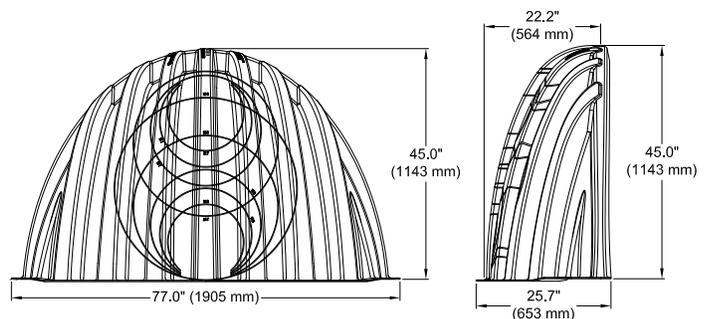
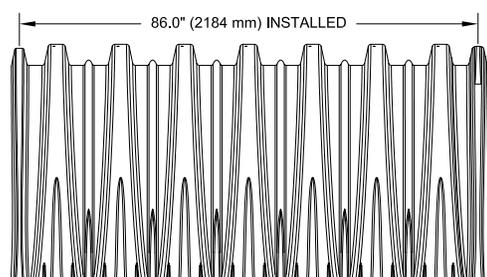
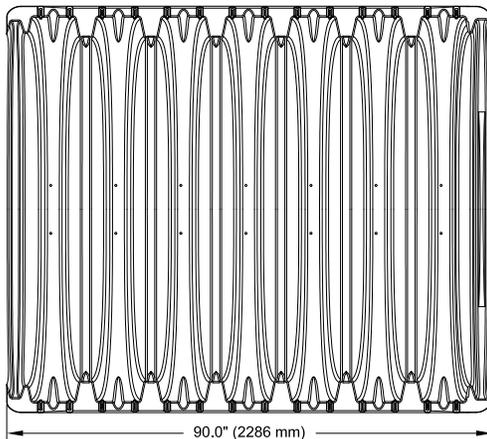
* This assumes a minimum of 12" (305mm) of stone above, 9" (229 mm) of stone below, 9" (229 mm) row spacing, 6" (152 mm) of stone perimeter, and 40% stone porosity.

Shipping

15 chambers/pallet

7 end caps/pallet

7 pallets/truck



Storage Volume Per Chamber/End Cap ft³ (m³)

	Bare Unit Storage ft ³ (m ³)	Chamber/End Cap and Stone Volume — Stone Foundation Depth in. (mm)			
		9 (229)	12 (305)	15 (381)	18 (457)
MC-3500 Chamber	109.9 (3.11)	178.9 (5.06)	184.0 (5.21)	189.2 (5.36)	194.3 (5.5)
MC-3500 End Cap	14.9 (0.42)	46.0 (1.33)	47.7 (1.35)	49.4 (1.40)	51.1 (1.45)

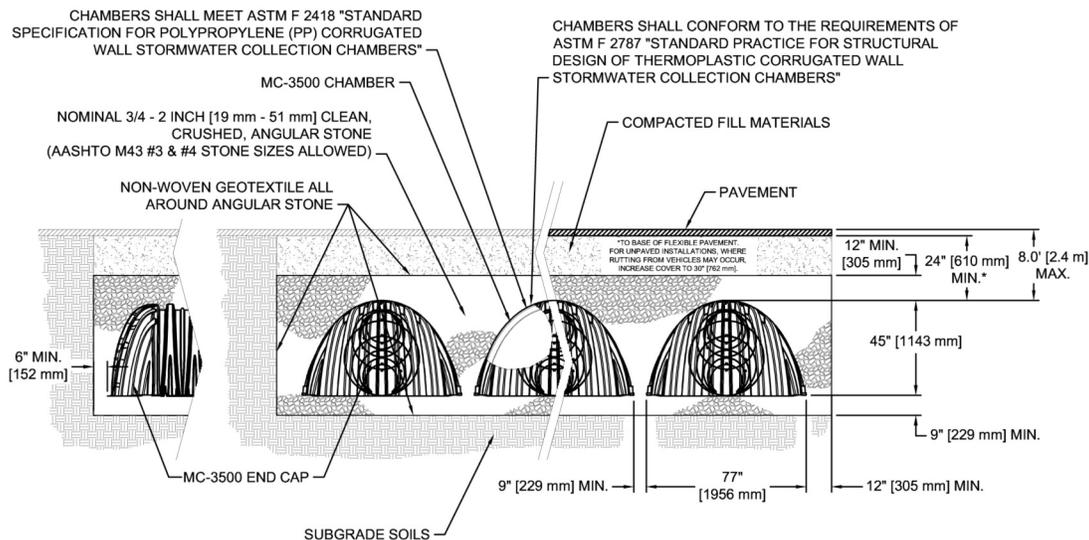
NOTE: Assumes 40% porosity for the stone plus the chamber/end cap volume. End Cap volume assumes 6" (152mm) stone perimeter.

Volume of Excavation Per Chamber/End Cap in yd³ (m³)

	Stone Foundation Depth in. (mm)			
	9 (229)	12 (305)	15 (381)	18 (457)
MC-3500	12.4 (9.5)	12.8 (9.8)	13.3 (10.2)	13.8 (10.5)
End Cap	4.1 (3.1)	4.2 (3.2)	4.4 (3.3)	4.5 (3.5)

NOTE: Assumes 9" (229 mm) of separation between chamber rows, 6" (152 mm) of perimeter in front of end caps, and 24" (610 mm) of cover. The volume of excavation will vary as depth of cover increases.

General Cross Section



NOTES:

1. THIS CROSS SECTION PROVIDES GENERAL INFORMATION FOR THE MC-3500 CHAMBER. STORMTECH MC-3500 CHAMBERS MUST BE DESIGNED AND INSTALLED IN ACCORDANCE WITH THE MC-3500 DESIGN MANUAL AND MC-3500 CONSTRUCTION GUIDE.
2. PROPERLY INSTALLED MC-3500 CHAMBERS PROVIDE THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR EARTH AND LIVE LOADS WITH CONSIDERATION FOR IMPACT AND MULTIPLE PRESENCES.
3. PERIMETER STONE MUST ALWAYS BE BROUGHT UP EVENLY WITH BACKFILL OF BED. PERIMETER STONE MUST EXTEND HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH STRAIGHT OR SLOPED SIDEWALLS.

Amount of Stone Per Chamber

ENGLISH tons (yd ³)	Stone Foundation Depth			
	9 in.	12 in.	15 in.	18 in.
MC-3500	9.1 (6.4)	9.7 (6.9)	10.4 (7.3)	11.1 (7.8)
End Cap	4.1 (2.9)	4.3 (3.0)	4.5 (3.2)	4.7 (3.3)
METRIC kg (m ³)	229 mm	305 mm	381 mm	457 mm
MC-3500	8220 (4.9)	8831 (5.3)	9443 (5.6)	10054 (6.0)
End Cap	3699 (2.2)	3900 (2.3)	4100 (2.4)	4301 (2.6)

NOTE: Assumes 12" (305 mm) of stone above, and 9" (229 mm) row spacing, and 6" (152mm) of perimeter stone in front of end caps.



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S150909 03/2014





Project: COR Mercy Redevelopment
Drainage Area DR-1

Project No. 10487.00
Date: 5/20/2016
By: TCB
Checked: JWL
Sheet: 1 of 1

TITLE: WATER QUALITY STORAGE VOLUME
Vortechs Unit - TBD

Water Quality Volume

DESCRIPTION:

Total Water Quality Volume Required

Formula for calculating the Water Quality storage volume (WQv) = $\frac{(P)(Rv)(A)}{12}$

P = 90% Rainfall Event = 1.00

I = percent Impervious Cover = 89

Rv = 0.05 + 0.009(I) = 0.85

A = Acres = 2.366

Water Quality Storage Volume (acre-feet) = **0.17**

7,309 **Cubic-Feet**

Alternative Practice: **5,482** **Cubic-Feet** 75% of WQv

Note:

Water Quality Volume is based on the formula in Section 9.2 of the New York State Stormwater Management Design Manual page 9-5. See Below for Calculation of the formula.

Existing impervious = - ac Proposed Impervious = - ac IC Reduction = 0% (25 -
(% IC reduction + % WQv treatment by Standard practice + %RRV)) * 3 = %WQv by Alt Practice
(25-(0+0+0))*3=0 -----> 0% IC reduction, 0% Standard Practice, 75% Alternative practice

PEAK WATER QUALITY DISCHARGE

Area contributing =	2.37	acres
WQv =	5,482	cf
P =	0.85	inch
I =	89.0	%
Rv =	0.85	

Peak Water Quality Discharge

$$CN = 1000 / [10 + 5P + 10Qa - 10(Qa^2 + 1.25 * Qa * P)^2]$$

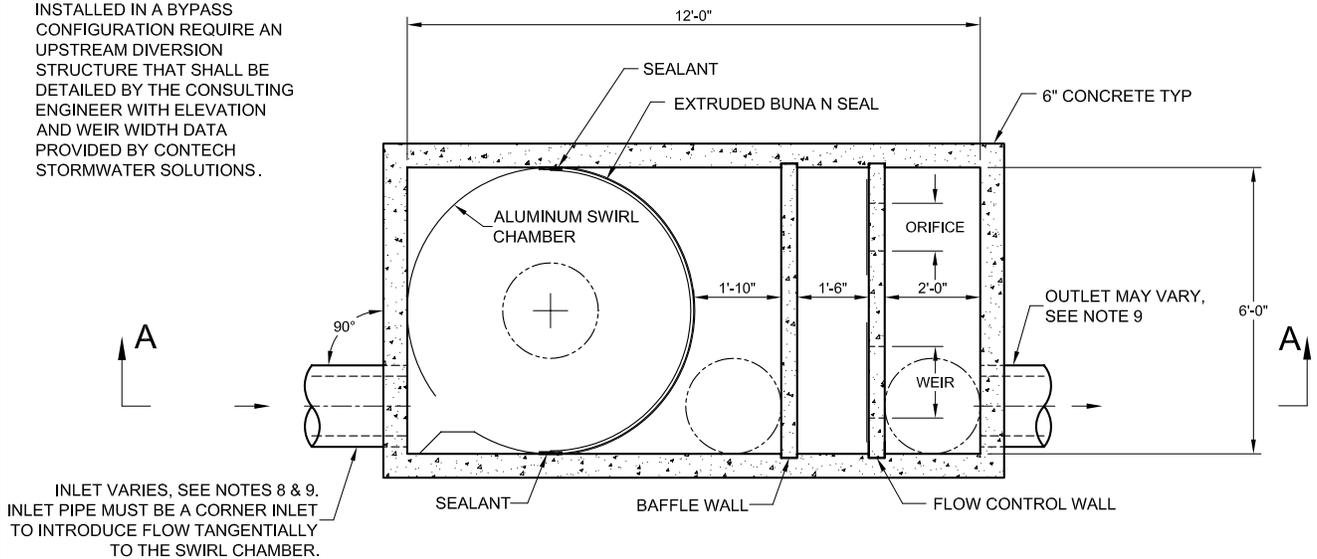
Qa = 0.64 inches
Cn = 97.9

From TR-55

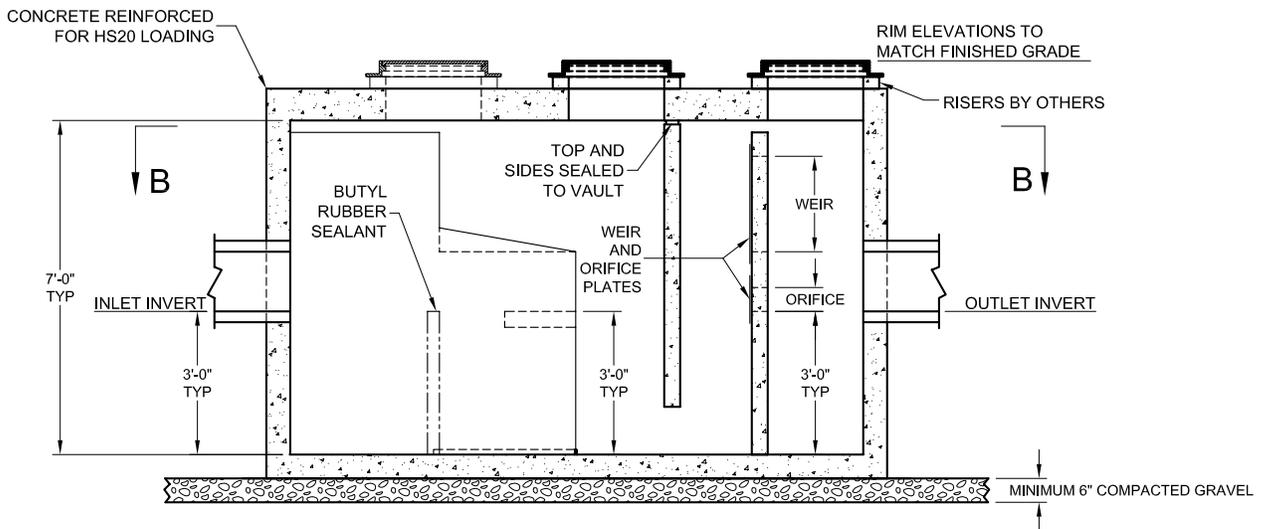
la = 0.041
la/P = 0.048
qu = 750.00
Tc = 0.25 hrs

Peak Qwq =	1.77	cfs
(qu * A * Qa)		

NOTE:
 VORTECHS SYSTEMS
 INSTALLED IN A BYPASS
 CONFIGURATION REQUIRE AN
 UPSTREAM DIVERSION
 STRUCTURE THAT SHALL BE
 DETAILED BY THE CONSULTING
 ENGINEER WITH ELEVATION
 AND WEIR WIDTH DATA
 PROVIDED BY CONTECH
 STORMWATER SOLUTIONS.



PLAN VIEW B - B



SECTION A - A

NOTES:

1. STORMWATER TREATMENT SYSTEM (SWTS) SHALL HAVE:
 PEAK TREATMENT CAPACITY: 6 CFS
 SEDIMENT STORAGE: 2.4 CU YD
 SEDIMENT CHAMBER DIA: 6' MIN
2. SWTS SHALL BE CONTAINED IN ONE RECTANGULAR STRUCTURE
3. SWTS REMOVAL EFFICIENCY SHALL BE DOCUMENTED BASED ON PARTICLE SIZE
4. SWTS SHALL RETAIN FLOATABLES AND TRAPPED SEDIMENT UP TO AND INCLUDING PEAK TREATMENT CAPACITY
5. SWTS INVERTS IN AND OUT ARE TYPICALLY AT THE SAME ELEVATION
6. SWTS SHALL NOT BE COMPROMISED BY EFFECTS OF DOWNSTREAM TAILWATER
7. SWTS SHALL HAVE NO INTERNAL COMPONENTS THAT OBSTRUCT MAINTENANCE ACCESS
8. INLET PIPE MUST BE PERPENDICULAR TO THE STRUCTURE
9. PIPE ORIENTATION MAY VARY; SEE SITE PLAN FOR SIZE AND LOCATION
10. PURCHASER SHALL NOT BE RESPONSIBLE FOR ASSEMBLY OF UNIT
11. MANHOLE FRAMES AND PERFORATED COVERS SUPPLIED WITH SYSTEM, NOT INSTALLED
12. PURCHASER TO PREPARE EXCAVATION AND PROVIDE CRANE FOR OFF-LOADING AND SETTING AT TIME OF DELIVERY
13. VORTECHS SYSTEMS BY CONTECH STORMWATER SOLUTIONS; PORTLAND, OR (800)548-4667; SCARBOROUGH, ME (877) 907-8676; ELK RIDGE, MD (866) 740-3318.

PROPRIETARY INFORMATION - NOT TO BE USED FOR CONSTRUCTION PURPOSES

This CADD file is for the purpose of specifying stormwater treatment equipment to be furnished by CONTECH Stormwater Solutions and may only be transferred to other documents exactly as provided by CONTECH Stormwater Solutions. Title block information, excluding the CONTECH Stormwater Solutions logo and the Vortechs Stormwater Treatment System designation and patent number, may be deleted if necessary. Revisions to any part of this CADD file without prior coordination with CONTECH Stormwater Solutions shall be considered unauthorized use of proprietary information.



STANDARD DETAIL
 STORMWATER TREATMENT SYSTEM
 VORTECHS® MODEL 4000

U.S. PATENT No. 5,759,415

DATE: 4/4/06

SCALE: NONE

FILE NAME: STD4K

DRAWN: GMC

CHECKED: NDG

3. A hydrodynamic separator, such as the Vortechs Stormwater Treatment System, cannot be used in series with another hydrodynamic separator to achieve an enhanced removal rate for total suspended solids (TSS) removal under N.J.A.C. 7:8-5.5.
4. The maintenance plan for the sites using this device shall incorporate at a minimum, the maintenance requirements for the Vortechs Stormwater Treatment System, attached.

Table 1

Vortechs System Model	Grit Chamber Radius (ft)	Grit Chamber Area (ft ²)	Design Flow Rate (cfs)
1000	1.5	7.1	0.63
2000	2.0	12.6	1.12
3000	2.5	19.6	1.75
4000	3.0	28.3	2.5
5000	3.5	38.5	3.4
7000	4.0	50.3	4.5
9000	4.5	63.6	5.7
11000	5.0	78.5	7.0
16000	6.0	113.1	10.1

In addition to the attached, any project with a Stormwater BMP subject to the Stormwater Management Rules, N.J.A.C. 7:8, must include a detailed maintenance plan. The detailed maintenance plan must include all of the items identified in Stormwater Management Rules, N.J.A.C. 7:8-5.8. Such items include, but are not limited to, the list of inspection and maintenance equipment and tools, specific corrective and preventative maintenance tasks, indication of problems in the system, and training of maintenance personnel. Additional information can be found in Chapter 8: Maintenance of the New Jersey Stormwater Best Management Manual.

NJDEP anticipates proposing further adjustments to this process through the readoption of the Stormwater Management Rules. Additional information regarding the implementation of the Stormwater Management Rules N.J.A.C. 7:8 are available at www.njstormwater.org. If you have any questions regarding the above information, please contact Ms. Sandra Blick of my office at (609) 633-7021.

Sincerely,



Ed Frankel, P.P., Acting Bureau Chief
Bureau of Nonpoint Pollution Control

C: Richard S. Magee, NJCAT
Chron file



Project: COR Mercy Redevelopment
Drainage Area DR-2

Project No. 10487.00
Date: 5/20/2016
By: TCB
Checked: JWL
Sheet: 1 of 1

TITLE: **WATER QUALITY STORAGE VOLUME**
Vortechs Unit - TBD

Water Quality Volume

DESCRIPTION:

Total Water Quality Volume Required

Formula for calculating the Water Quality storage volume (WQv) = $\frac{(P)(Rv)(A)}{12}$

P = 90% Rainfall Event = 1.00

I = percent Impervious Cover = 86

Rv = 0.05 + 0.009(I) = 0.82

A = Acres = 4.418

Water Quality Storage Volume (acre-feet) = 0.30

13,215 Cubic-Feet

Alternative Practice: 9,911 Cubic-Feet 75% of WQv

Note:

Water Quality Volume is based on the formula in Section 9.2 of the New York State Stormwater Management Design Manual page 9-5. See Below for Calculation of the formula.

Existing impervious = - ac Proposed Impervious = - ac IC Reduction = 0% (25 -
(% IC reduction + % WQv treatment by Standard practice + %RRV)) * 3 = %WQv by Alt Practice
(25-(0+0+0))*3=0 -----> 0% IC reduction, 0% Standard Practice, 75% Alternative practice

PEAK WATER QUALITY DISCHARGE

Area contributing =	4.42	acres
WQv =	9,911	cf
P =	0.85	inch
I =	86.0	%
Rv =	0.82	

Peak Water Quality Discharge

$$CN = 1000 / [10 + 5P + 10Qa - 10(Qa^2 + 1.25 * Qa * P)^2]$$

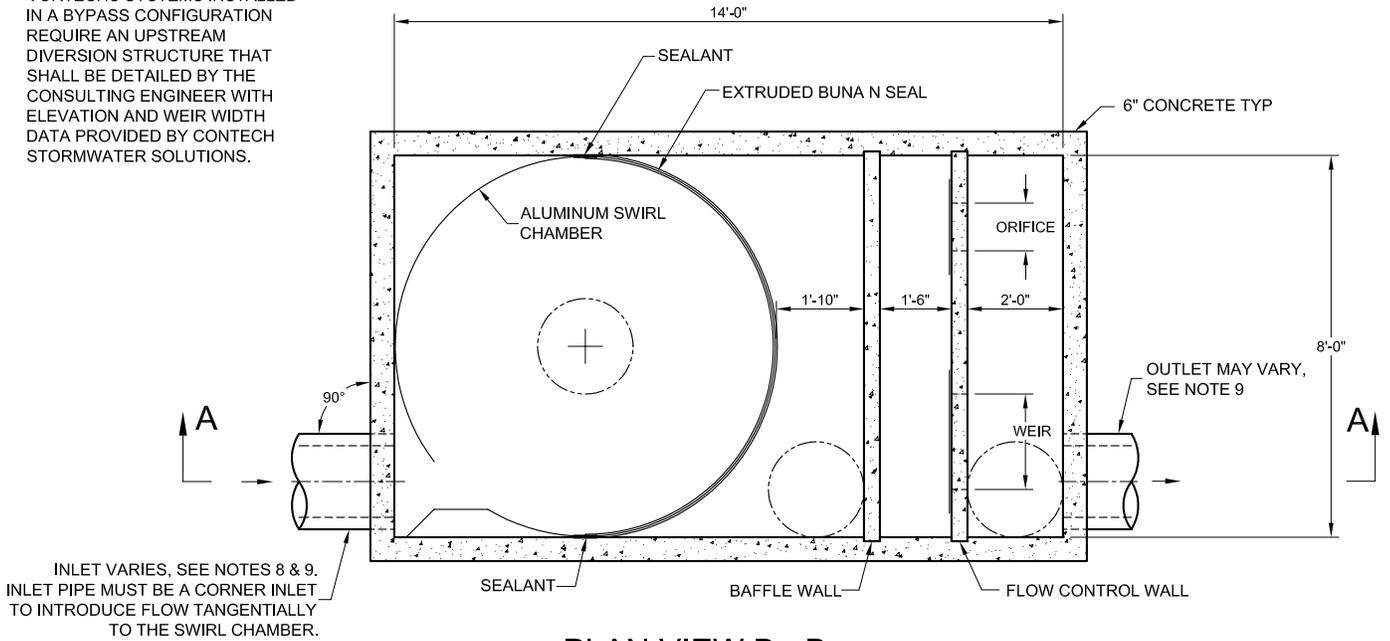
Qa = 0.62 inches
Cn = 97.7

From TR-55

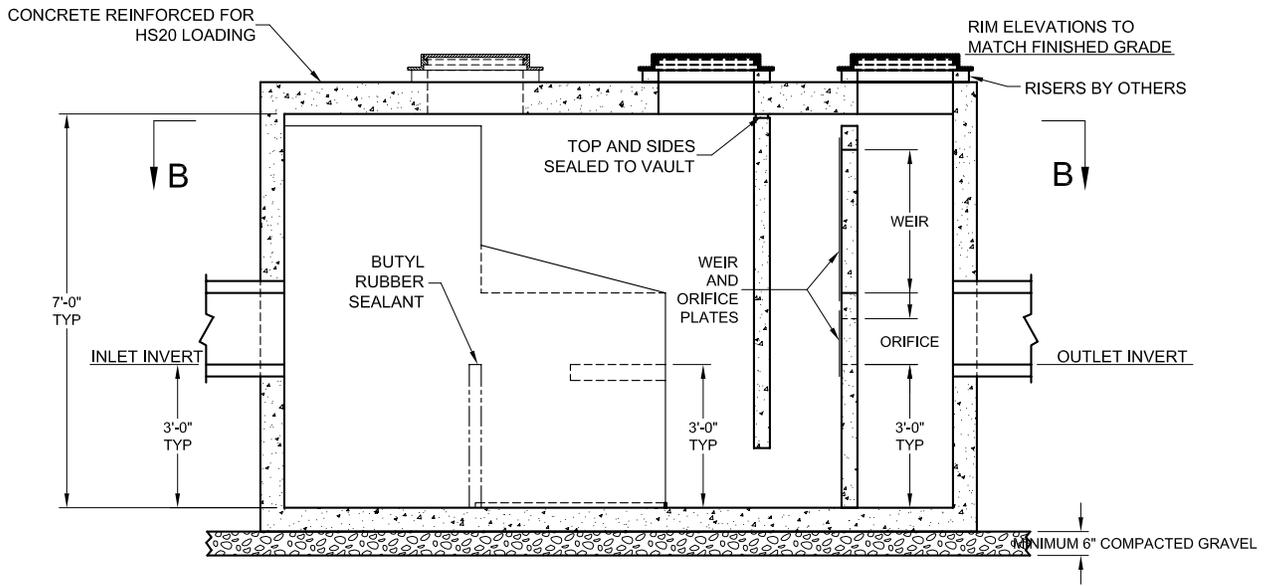
la = 0.041
la/P = 0.048
qu = 900.00
Tc = 0.15 hrs

Peak Qwq =	3.84	cfs
(qu * A * Qa)		

NOTE:
 VORTECHS SYSTEMS INSTALLED
 IN A BYPASS CONFIGURATION
 REQUIRE AN UPSTREAM
 DIVERSION STRUCTURE THAT
 SHALL BE DETAILED BY THE
 CONSULTING ENGINEER WITH
 ELEVATION AND WEIR WIDTH
 DATA PROVIDED BY CONTECH
 STORMWATER SOLUTIONS.



PLAN VIEW B - B



SECTION A - A

NOTES:

1. STORMWATER TREATMENT SYSTEM (SWTS) SHALL HAVE:
 PEAK TREATMENT CAPACITY: 11 CFS
 SEDIMENT STORAGE: 4 CU YD
 SEDIMENT CHAMBER DIA: 8' MIN
2. SWTS SHALL BE CONTAINED IN ONE RECTANGULAR STRUCTURE
3. SWTS REMOVAL EFFICIENCY SHALL BE DOCUMENTED BASED ON PARTICLE SIZE
4. SWTS SHALL RETAIN FLOATABLES AND TRAPPED SEDIMENT UP TO AND INCLUDING PEAK TREATMENT CAPACITY
5. SWTS INVERTS IN AND OUT ARE TYPICALLY AT THE SAME ELEVATION
6. SWTS SHALL NOT BE COMPROMISED BY EFFECTS OF DOWNSTREAM TAILWATER
7. SWTS SHALL HAVE NO INTERNAL COMPONENTS THAT OBSTRUCT MAINTENANCE ACCESS
8. INLET PIPE MUST BE PERPENDICULAR TO THE STRUCTURE
9. PIPE ORIENTATION MAY VARY; SEE SITE PLAN FOR SIZE AND LOCATION
10. PURCHASER SHALL NOT BE RESPONSIBLE FOR ASSEMBLY OF UNIT
11. MANHOLE FRAMES AND PERFORATED COVERS SUPPLIED WITH SYSTEM, NOT INSTALLED
12. PURCHASER TO PREPARE EXCAVATION AND PROVIDE CRANE FOR OFF-LOADING AND SETTING AT TIME OF DELIVERY
13. VORTECHS SYSTEMS BY CONTECH STORMWATER SOLUTIONS; PORTLAND, OR (800)548-4667; SCARBOROUGH, ME (877) 907-8676; ELK RIDGE, MD (866) 740-3318.

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STANDARD DETAIL
 STORMWATER TREATMENT SYSTEM
 VORTECHS® MODEL 7000

U.S. PATENT No. 5,759,415

DATE: 4/5/06

SCALE: NONE

FILE NAME: STD7k

DRAWN: GMC

CHECKED: NDG

3. A hydrodynamic separator, such as the Vortechs Stormwater Treatment System, cannot be used in series with another hydrodynamic separator to achieve an enhanced removal rate for total suspended solids (TSS) removal under N.J.A.C. 7:8-5.5.
4. The maintenance plan for the sites using this device shall incorporate at a minimum, the maintenance requirements for the Vortechs Stormwater Treatment System, attached.

Table 1

Vortechs System Model	Grit Chamber Radius (ft)	Grit Chamber Area (ft ²)	Design Flow Rate (cfs)
1000	1.5	7.1	0.63
2000	2.0	12.6	1.12
3000	2.5	19.6	1.75
4000	3.0	28.3	2.5
5000	3.5	38.5	3.4
7000	4.0	50.3	4.5
9000	4.5	63.6	5.7
11000	5.0	78.5	7.0
16000	6.0	113.1	10.1

In addition to the attached, any project with a Stormwater BMP subject to the Stormwater Management Rules, N.J.A.C. 7:8, must include a detailed maintenance plan. The detailed maintenance plan must include all of the items identified in Stormwater Management Rules, N.J.A.C. 7:8-5.8. Such items include, but are not limited to, the list of inspection and maintenance equipment and tools, specific corrective and preventative maintenance tasks, indication of problems in the system, and training of maintenance personnel. Additional information can be found in Chapter 8: Maintenance of the New Jersey Stormwater Best Management Manual.

NJDEP anticipates proposing further adjustments to this process through the readoption of the Stormwater Management Rules. Additional information regarding the implementation of the Stormwater Management Rules N.J.A.C. 7:8 are available at www.njstormwater.org. If you have any questions regarding the above information, please contact Ms. Sandra Blick of my office at (609) 633-7021.

Sincerely,



Ed Frankel, P.P., Acting Bureau Chief
Bureau of Nonpoint Pollution Control

C: Richard S. Magee, NJCAT
Chron file



Project: COR Mercy Redevelopment
0.271 Ac Impervious Area Required

Project No. 10487.00
Date: 5/23/2016
By: TCB
Checked: JWL
Sheet: 1 of 1

TITLE: **WATER QUALITY STORAGE VOLUME**
Vortechs Unit - TBD

Water Quality Volume

DESCRIPTION:

Total Water Quality Volume Required

Formula for calculating the Water Quality storage volume (WQv) = $\frac{(P)(Rv)(A)}{12}$

P = 90% Rainfall Event =

I = percent Impervious Cover =

Rv = 0.05 + 0.009(I) =

A = Acres =

Water Quality Storage Volume (acre-feet) =

Cubic-Feet

Alternative Practice: Cubic-Feet 75% of WQv

Note:

Water Quality Volume is based on the formula in Section 9.2 of the New York State Stormwater Management Design Manual page 9-5. See Below for Calculation of the formula.

Existing impervious = - ac Proposed Impervious = - ac IC Reduction = 0% (25 -
(% IC reduction + % WQv treatment by Standard practice + %RRV)) * 3 = %WQv by Alt Practice
(25-(0+0+0))*3=0 -----> 0% IC reduction, 0% Standard Practice, 75% Alternative practice

PEAK WATER QUALITY DISCHARGE

Area contributing =	0.27	acres
WQv =	701	cf
P =	0.85	inch
l =	100.0	%
Rv =	0.95	

Peak Water Quality Discharge

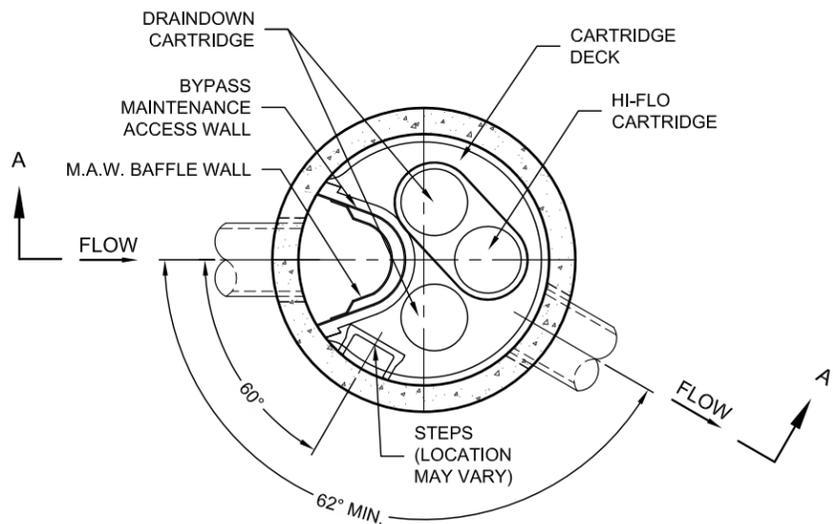
$$CN = 1000 / [10 + 5P + 10Qa - 10(Qa^2 + 1.25 * Qa * P)^2]$$

Qa = 0.71 inches
Cn = 98.7

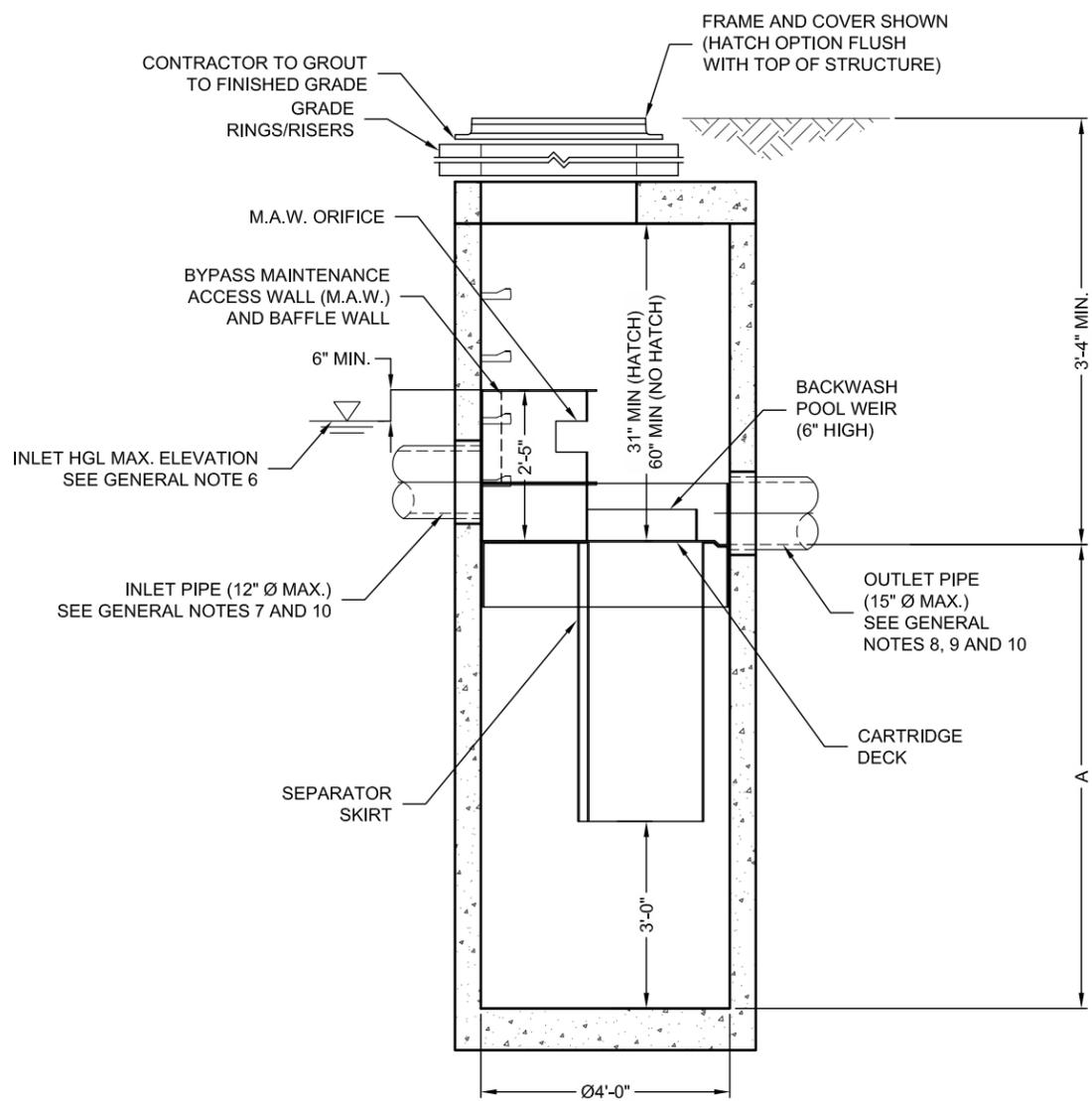
From TR-55

la = 0.062
la/P = 0.073
qu = 1000.00
Tc = 0.10 hrs

Peak Qwq = (qu * A * Qa)	0.30	cfs
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PLAN VIEW



SECTION A-A

JELLYFISH DESIGN NOTES

JELLYFISH TREATMENT CAPACITY IS A FUNCTION OF THE CARTRIDGE SELECTION AND THE NUMBER OF CARTRIDGES. THE STANDARD MANHOLE STYLE IS SHOWN. Ø48" MANHOLE JELLYFISH PEAK TREATMENT CAPACITY IS 0.45 CFS, AND MAXIMUM BYPASS CAPACITY IS 2.50 CFS. IF THE SITE CONDITIONS EXCEED TOTAL CAPACITY, AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.

CARTRIDGE SELECTION

CARTRIDGE DEPTH	54"	40"	27"	15"
OUTLET INVERT TO STRUCTURE INVERT (A)	7'-5"	6'-3"	5'-2"	4'-2"
FLOW RATE HIGH-FLO / DRAINDOWN (cfs) (per cart)	0.18 / 0.09	0.13 / 0.065	0.09 / 0.045	0.05 / 0.025
MAX. CARTS HIGH-FLO/DRAINDOWN	2 / 1			
MAX. BYPASS (cfs)	2.5			
MAX. TREATMENT (cfs)	0.45	0.33	0.22	0.12
MAX. TREATMENT AND BYPASS (cfs) (TOTAL CAPACITY)	2.95	2.83	2.72	2.62

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	*
WATER QUALITY FLOW RATE (cfs)	*
BYPASS FLOW RATE (cfs)	*
PEAK FLOW RATE (cfs)	*
RETURN PERIOD OF PEAK FLOW (yrs)	*
# OF CARTRIDGES REQUIRED (HF / DD)	*/*
CARTRIDGE SIZE	*

PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	*	*	*	*	*
INLET #2	*	*	*	*	*
OUTLET	*	*	*	*	*

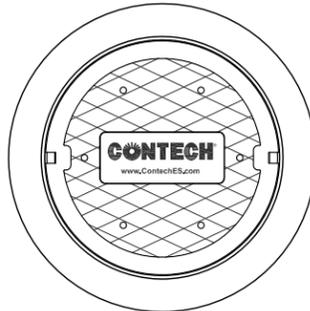
SEE GENERAL NOTES 6-10 FOR INLET AND OUTLET HYDRAULIC AND SIZING REQUIREMENTS.

RIM ELEVATION *

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

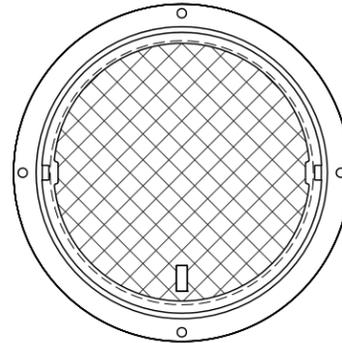
NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD



FRAME AND COVER

(DIAMETER VARIES)
N.T.S.



HATCH

(Ø36" CAST INTO SLAB)
N.T.S.

GENERAL NOTES:

- CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
- FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS REPRESENTATIVE. www.ContechES.com
- JELLYFISH WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
- STRUCTURE SHALL MEET AASHTO HS-20 OR PER APPROVING JURISDICTION REQUIREMENTS, WHICHEVER IS MORE STRINGENT, ASSUMING EARTH COVER OF 0' - 3', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 LOAD RATING AND BE CAST WITH THE CONTECH LOGO.
- STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.
- INLET HGL NOT TO EXCEED 6" BELOW THE TOP OF THE M.A.W. DURING THE PEAK DESIGN STORM, OR 10-YEAR STORM (WHICHEVER IS GREATER).
- INLET PIPE INVERT ELEVATION VARIES FROM 0" TO 6" MAXIMUM ABOVE THE OUTLET PIPE INVERT.
- OUTLET PIPE INVERT IS EQUAL TO THE CARTRIDGE DECK ELEVATION.
- THE OUTLET PIPE DIAMETER FOR NEW INSTALLATIONS IS TO BE ONE PIPE SIZE LARGER THAN THE INLET PIPE AT EQUAL OR GREATER SLOPE.
- THE DIFFERENCE IN THE INLET AND OUTLET PIPE ELEVATIONS FOR RETROFIT INSTALLATIONS TO EXISTING STORM DRAIN PIPES SHALL BE EQUAL TO THE SLOPE OVER THE DIAMETER OF THE MANHOLE; NOT TO EXCEED 6" IN VERTICAL DIFFERENTIAL BETWEEN INLET AND OUTLET PIPES.
- NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

INSTALLATION NOTES

- ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
- CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING CLUTCHES PROVIDED)
- CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT)
- CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.
- CARTRIDGE INSTALLATION, BY CONTECH, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE JELLYFISH UNIT IS CLEAN AND FREE OF DEBRIS. CONTACT CONTECH TO COORDINATE CARTRIDGE INSTALLATION WITH SITE STABILIZATION AT (866) 740-3318.

Jellyfish® Filter

THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENT NO. 8,287,726, 8,221,618 & US 8,123,935; OTHER INTERNATIONAL PATENTS PENDING



www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

**JELLYFISH JF4
STANDARD DETAIL
ONLINE CONFIGURATION**

Table 1
Maximum Treatment Flow Rates for
Standard (54" Cartridge Length) Jellyfish® Filter Models

Manhole Diameter (ft)	Model No.	Hi-Flo Cartridges (54" Length)	Draindown Cartridges (54" Length)	Maximum Treatment Flow Rate (gpm / cfs)
Catch Basin		varies	varies	varies
4	JF4-2-1	2	1	200 / 0.45
6	JF6-3-1	3	1	280 / 0.62
	JF6-4-1	4	1	360 / 0.80
	JF6-5-1	5	1	440 / 0.98
	JF6-6-1	6	1	520 / 1.16
8	JF8-6-2	6	2	560 / 1.25
	JF8-7-2	7	2	640 / 1.43
	JF8-8-2	8	2	720 / 1.60
	JF8-9-2	9	2	800 / 1.78
10 ¹	JF8-10-2	10	2	880 / 1.96
	JF10-11-3	11	3	1000 / 2.23
	JF10-12-3	12	3	1080 / 2.41
	JF10-13-3	13	3	1160 / 2.58
	JF10-14-3	14	3	1240 / 2.76
12 ²	JF10-15-3	15	3	1320 / 2.94
	JF10-16-3	16	3	1400 / 3.12
	JF12-17-4	17	4	1520 / 3.39
	JF12-18-4	18	4	1600 / 3.57
	JF12-19-4	19	4	1680 / 3.74
	JF12-20-4	20	4	1760 / 3.92
	JF12-21-4	21	4	1840 / 4.10
	JF12-22-4	22	4	1920 / 4.28
JF12-23-4	23	4	2000 / 4.46	
Vault	JF12-24-4	24	4	2080 / 4.63
		varies	varies	varies

¹ The MTFR for a 10-ft diameter unit occurs with Model JF10-16-3. Since this leaves 4 unoccupied cartridge receptacles in the 10-ft diameter deck, the design engineer has the option to add up to 4 additional cartridges to increase the sediment capacity of the system, however may not increase the MTFR above that of the JF10-16-3.

² The MTFR for a 12-ft diameter unit occurs with Model JF12-24-4. Since this leaves 4 unoccupied cartridge receptacles in the 12-ft diameter deck, the design engineer has the option to add up to 4 additional cartridges to increase the sediment capacity of the system, however may not increase the MTFR above that of the JF12-24-4.

APPENDIX B – Mercy Heights Trip Generation Letter





3495 Winton Place
Building E, Suite 110
Rochester, NY 14623

phone 585.272.4660
fax 585.272.4662

May 23, 2016

COR Development Company
540 Towne Drive
Fayetteville, NY 13066
Attn: Kate Johnson

RE: Mercy Heights, City of Watertown, NY
Trip Generation Letter

Dear Ms. Johnson:

The purpose of this letter is to provide a trip generation assessment and comparison related to the proposed Mercy Heights Re-development location on the site of the former Mercy Hospital located between Arsenal Street, Stone Street, South Massey Street and Sherman Street, in the City of Watertown, Jefferson County, New York. This letter compares projected trip generation volume estimates generated by proposed mixed use development to the former hospital use, and discusses the thresholds for completing a Traffic Impact Study (TIS). The following outlines the results of the study.

Proposed Development

This Trip Generation Letter provides a comparison of site generated traffic volumes from the former Mercy Hospital (117,090 s.f.) to the proposed Mercy Heights Re-development which includes 108 units of apartments and 36,000 s.f. of office space. Data contained in Trip Generation, 9th Edition, published by the Institute of Transportation Engineers (ITE) in 2012 was used to project the volume of traffic generated by the former Mercy Hospital and proposed re-development project. Data published by the ITE is the nationally accepted standard for generating trips for new uses.

The proposed project will have access via driveways along Arsenal Street, South Massey Street, Stone Street, and Sherman Street. There are currently three driveways servicing the property along Arsenal Street. The proposed development will close two of these driveways; the remaining driveway will be located approximately 225 ft east of South Massey Street. The proposed plan will eliminate two existing curb cuts on South Massey Street and create an entrance only driveway north of St. Patrick's Church and an exit only driveway located south of St. Patrick's Church. A single driveway will be provided along Stone Street replacing the existing drop off loop for the former hospital. Finally, along Sherman Street, where the former hospital utilized four curb cuts, the proposed development will provide one well defined driveway. These consolidations of access points will improve safety along these streets for motorists, pedestrians and bicyclists.

Table I summarizes the volume of site trips during the weekday AM and PM peak hours for each of the site uses. All trip generation calculations are included in the attachment to this letter.

TABLE I: SITE GENERATED DRIVEWAY VOLUMES

LAND USE	UNITS	AM PEAK HOUR		PM PEAK HOUR	
		ENTER	EXIT	ENTER	EXIT
Former Mercy Hospital	117,090 s.f.	70	41	41	68
Proposed Office Space	36,000 s.f.	75	10	20	99
Proposed Apartments	108 units	11	46	50	27
Total Proposed Trips		86	56	70	126
Difference in Trips Generated		+16	+15	+29	+58

The former hospital is estimated to have been generating 70 entering/41 exiting vehicle trips during the AM peak hour and 41 entering/68 exiting vehicle trips during the PM peak hour. The proposed Mercy Heights development is expected to generate 86 entering/56 exiting vehicle trips during the AM peak hour and 70 entering/126 exiting vehicle trips during the PM peak hour. Based on total site generated volumes during the peak hours, the proposed Mercy Heights development will generate approximately 31 vehicles more than the former hospital during the AM peak hour and 87 vehicles more during the PM peak hour.

Thresholds for the Requirement of a Traffic Impact Study

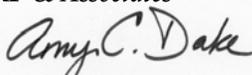
Reviewing agencies – including the New York State Department of Transportation – use a guideline in determining whether a project warrants the preparation of a traffic assessment report. The applicable guideline is that if a proposed project is projected to add 100 vehicles per hour (vph) or more per approach to an intersection, then that intersection should be studied for potential traffic impacts. Given that the proposed development is anticipated to generate 126 vph or less entering and exiting the project site during both peak hours using four possible driveways on Arsenal Street, South Massey Street, Stone Street, and Sherman Street, the adjacent intersections and surrounding roadway network are unlikely to experience any significant adverse traffic impacts; therefore, no further study is required.

Conclusions

Given the low volume of projected site generated traffic (126 vph or less entering and exiting the project site during both peak hours), it is our firm’s professional opinion that the proposed project will not have any potentially significant adverse impact on traffic operations within the study area. No further study is necessary or recommended.

If you have any questions or are in need of additional information, please do not hesitate to contact our office.

Very truly yours,
SRF & Associates



Amy C. Dake, P.E., PTOE
 Senior Traffic Engineer

S:\Projects\2016\36031 Mercy Re-Development\Corresp\Mercy Heights Trip Gen 052316.docx

ATTACHMENT

May 23, 2016

Letter to Ms. Kate Johnson
COR Development Company

Proposed Mercy Heights Re-Development

City of Watertown
Jefferson County, New York



3495 Winton Place
Building E, Suite 110
Rochester, NY 14623

Project Information

Project Name: Mercy Re-Development
No: 36031
Date: 5/16/2016
City:
State/Province: NY
Zip/Postal Code:
Country:
Client Name: ACD
Analyst's Name: ITE-TGM 9th Edition
Edition:

Land Use	Size	Weekday		Weekday, A.M. Peak		Weekday, P.M. Peak	
		Entry	Exit	Entry	Exit	Entry	Exit
220 - Apartment	108 Dwelling Units	389	389	11	46	50	27
710 - General Office Building	36 1000 Sq. Feet Gross Floor Area	302	302	75	10	20	99
Total		691	691	86	56	70	126
610 - Hospital	117.09 1000 Sq. Feet Gross Floor Area	774	774	70	41	41	68
Difference in Trips Former Hospital vs proposed Site		-83	-83	16	15	29	58

APPENDIX C – Site Lighting Specification Sheets



DESCRIPTION

The Invue Arbor post top brings architectural style to area/site and pedestrian scale applications. Its dayform appearance brings a desired organic look into the urban environment. WaveStream™ LED Optics provide a uniform pixelation free image, managing glare while providing high levels of visibility.

Catalog #		Type	
Project			
Comments		Date	
Prepared by			

SPECIFICATION FEATURES

Construction

Two-piece IP66 rated housing is cast from low copper content corrosion resistant aluminum, maintaining strength and precision to sustain long term dayform appearance. ANSI C136.31 testing compliance prevents damage from installation generated vibration. External hardware and casting seams are minimized to enhance appearance.

Optics

Specifically designed for pedestrian applications, WaveStream LED optical waveguide technology produces both symmetric NEMA type V and asymmetric NEMA II, III, IV distributions. The waveguide is manufactured from precision injection molded acrylic resulting in a pixelation free optical image for improved glare control and visual comfort. Luminaire efficacy's measure up to 100 lm/w for 4000K (+/- 275K) CCT at 70 CRI (min), optional 3000K CCT at 80 CRI is also available.

Electrical

LED driver(s) are directly mounted to upper housing thermal pad for optimal thermal performance. Standard 0-10V dimming drivers and Eaton's proprietary surge protection module are designed to withstand 10kV of transient line surge. Drivers operate at 120-

277V 50/60Hz with 347V/60Hz or 480V/60Hz operation optional. Suitable for ambient temperature applications from -30°C (-22°F) to 40°C (104°F). Limited high ambient options allow for 50°C operation.

Controls

The Arbor LED luminaire control options are designed to be simple and cost-effective ASHRAE and California Title 24 compliant solutions. The ANSI C136.41 compliant NEMA 7-PIN receptacle enables wireless dimming when used with compatible photocontrol. An integrated dimming and occupancy sensor is a standalone control option available in on/off (MS) and bi-level dimming (MS/DIM) operation. The optional LumaWatt™ system is best described as a peer-to-peer wireless network of luminaire-integral sensors that operate in accordance with programmable profiles. Each sensor is capable of motion and photo sensing, metering power consumption and wireless communication.

Mounting

Fitter assembly mounts over 2-3/8" O.D. tenon and is secured via six concealed stainless steel set screws. Design of fitter provides seamless transition to 3" O.D. round pole top. Additional mounting accessories include a

single fixture arm mount, twin fixture arm mount and wall mount arm. Additional pole mount accessories mount to a 3" x 4" long tenon for 4" - 5" O.D. poles tops. For existing 2-3/8" tenons an adapter is shipped standard.

Finish

Eaton utilizes premium ultra-weatherable TGIC based polyester powder coatings that are specifically formulated to withstand extended outdoor exposure. The powders are formulated exclusively for Eaton to serve functionally as well as decorative. Good film appearance combined with excellent mechanical an exterior exposure qualities display greater than twice as much gloss retention. RAL and custom color matches available. Finish is compliant with ASTM B117 3000hr salt spray standard.

Warranty

Five-year warranty.



ARB ARBOR POST TOP

DECORATIVE LUMINAIRE



CERTIFICATION DATA

UL/cUL Listed
IP66 Housing
ANSI C136.31
1.5G Vibration Tested
RoHS
ISO 9001
DesignLights Consortium™ Qualified*

ENERGY DATA

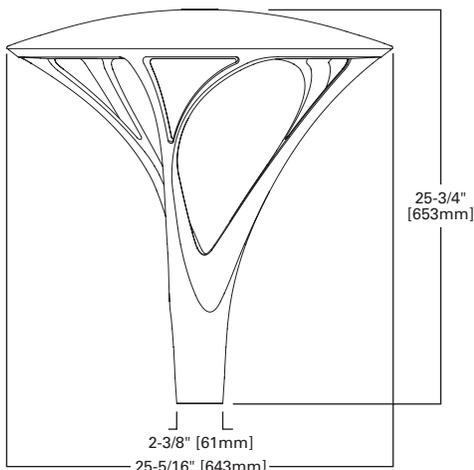
Electronic LED Driver
>0.9 Power Factor
<20% Total Harmonic Distortion
120-277V 50/60Hz, 347V/60Hz,
480V/60Hz
-30°C Minimum Temperature
40°C Ambient Temperature Rating

EPA

Effective Projected Area: (Sq. Ft.) 0.9

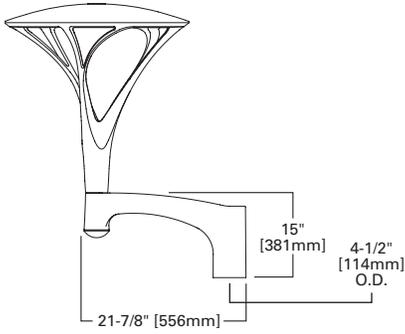
Approximate Net Weight:
37 lbs. [16.8 kgs.]

DIMENSIONS

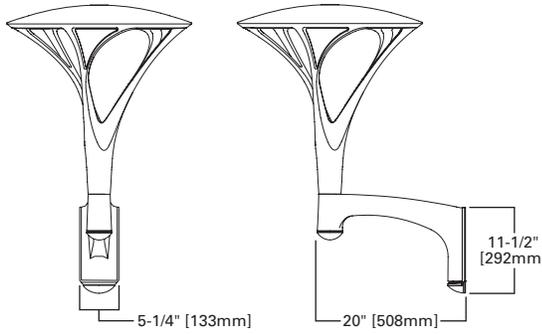


MOUNTING CONFIGURATIONS (WEIGHT AND EPAS INCLUDES FIXTURE)

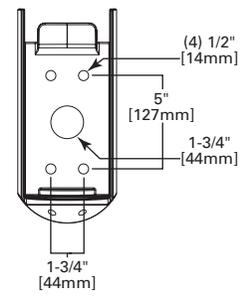
Single Arm Mount
 Weight: 56 lbs. [25.45 kgs.]
 EPA: 1.7 sq/ft



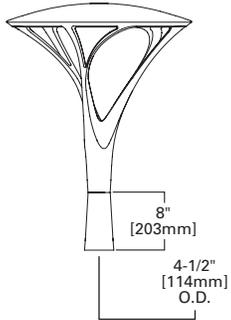
Wall Mount Arm
 Weight: 57 lbs. [25.91 kgs.]
 EPA: 1.8 sq/ft



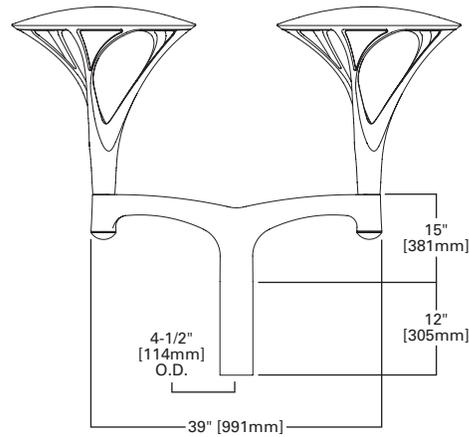
Wall Mount Arm Drill Pattern



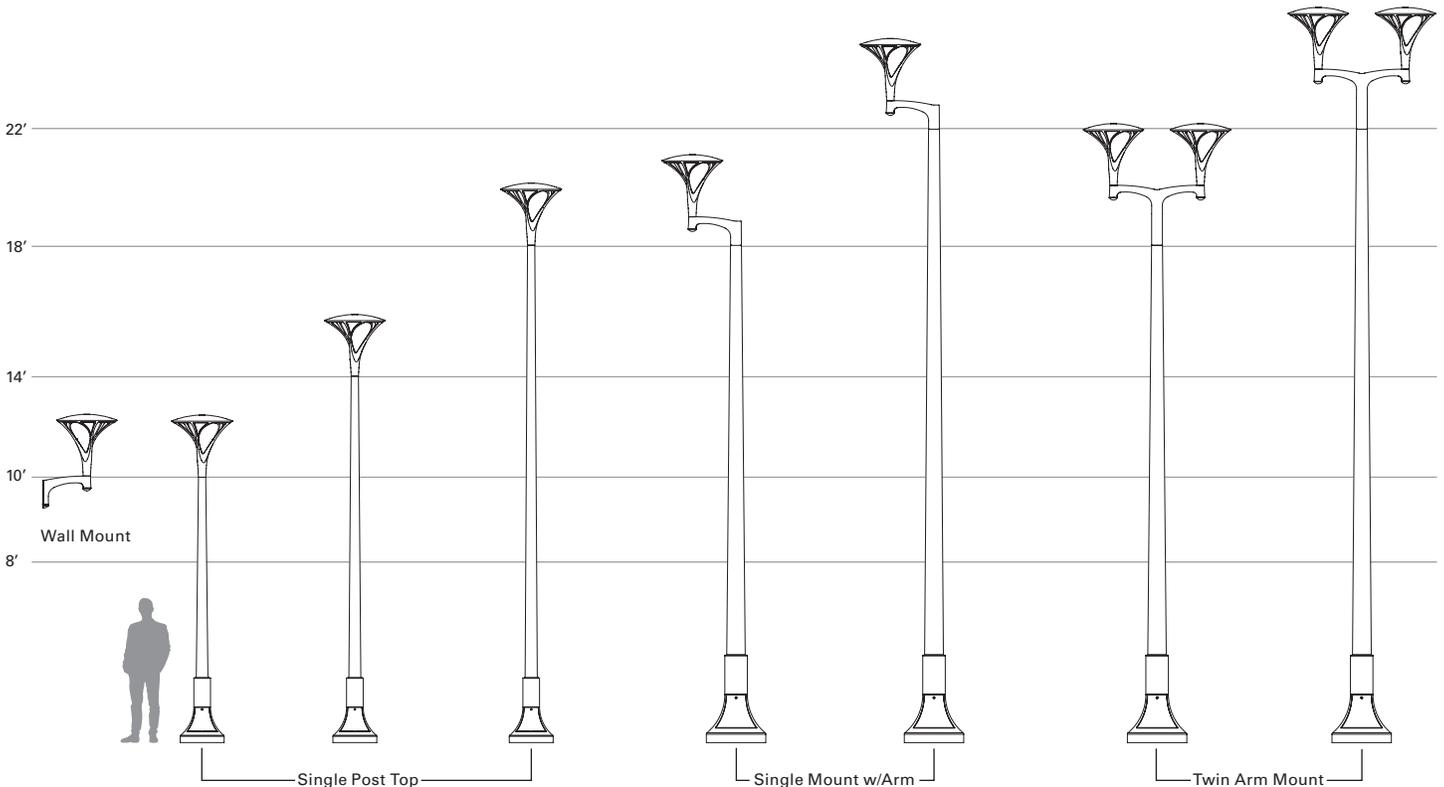
Post Top Adapter
 Weight: 41 lbs. [18.63 kgs.]
 EPA: 1.2 sq/ft



Twin Arm Mount - 1.5G
 Weight: 114 lbs. [51.81 kgs.]
 EPA: 3.45 sq/ft



POLE CONFIGURATIONS



POWER AND LUMENS

Lumen Package	B1	B2	B3	B4	
Drive Current					
Power Wattage (Watts)	24W	48W	96W	99W	
Input Current (mA) @ 120V	200	400	800	830	
Input Current (mA) @ 208V	120	240	470	480	
Input Current (mA) @ 240V	100	200	400	420	
Input Current (mA) @ 277V	90	180	350	360	
Power Wattage (Watts)	26W	53W	107W	108W	
Input Current (mA) @ 347V	79	161	325	328	
Input Current (mA) @ 480V	58	117	235	237	
Optics					
Type II	Lumens	2,045	3,994	7,362	--
	BUG Rating	B1-U1-G1	B1-U2-G2	B3-U2-G3	--
Type III	Lumens	2,324	4,534	8,451	-
	BUG Rating	B1-U1-G1	B1-U2-G2	B2-U2-G3	--
Type IV	Lumens	2,408	4,691	8,740	--
	BUG Rating	B1-U1-G1	B1-U2-G2	B2-U2-G3	-
Type V	Lumens	2,311	4,529	8,511	9,464
	BUG Rating	B2-U1-G1	B3-U2-G2	B3-U2-G3	B3-U2-G3

COLOR TEMPERATURE

Color Temperature (CCT)	CRI (Nominal)	Multiplier (Hours)
4000	70	1.00
3000	80	0.91

LUMEN MAINTENANCE

Ambient Temperature	TM-21 Lumen Maintenance (60,000 Hours)	Calculated L70 (Hours)
25°C	>91%	>230,000
40°C	>88%	>172,000
50°C	>86%	>142,000

NOTE: Maintenance data applies to the highest drive current and represents the worst case at the highest wattage.

LUMEN MULTIPLIER

Ambient Temperature	Lumen Multiplier
0°C	1.02
10°C	1.01
25°C	1.00
40°C	0.99
50°C	0.97

ORDERING INFORMATION

Sample Number: ARB-B2-LED-D1-T2-GM

Product Family ^{1,2,3}	Lumens ⁴	Lamp Type ⁶	Voltage	Distribution	Color
ARB=Arbor Post Top	B1=Nominal 2,300 Lumens B2=Nominal 4,500 Lumens B3=Nominal 8,500 Lumens B4=Nominal 9,500 Lumens ⁵	LED=Solid State Light Emitting Diodes	D1=Dimming Driver (120-277V) 347=347V ⁷ 480=480V ^{7,8}	T2=Type II T3=Type III T4=Type IV T5=Type V	AP=Grey BZ=Bronze BK=Black DP=Dark Platinum GM=Graphite Metallic WH=White CC=Custom Color ⁹
Options (Add as Suffix)			Accessories (Order Separately) ¹⁹		
7030=70 CRI / 3000K CCT ¹⁰ 8030=80 CRI / 3000K CCT ¹⁰ PC=Button Type Photocontrol ¹¹ PER=Standard 3-PIN Photocontrol Receptacle ¹¹ PER7=NEMA 7-PIN Twistlock Photocontrol Receptacle ^{11,12} HA=50°C High Ambient ¹³ MS-LXX=Photo/Motion Sensor for On/Off Operation ^{14,15} MS/DIM-LXX=Programmable Photo/Motion Sensor ^{14,15,16} DIMRF-LX=LumaWatt Wireless Sensor ^{7,14} 5LTD=Fifth Light Dali Driver ¹⁷ DIM=0-10V External Dimming Leads ¹⁸ VS=Tempered Glass Vandal Shield			ARSA-XX=Single Pole Mount Arm ARWM-XX=Wall Mount Arm ARTA15-XX=Twin Mount Bracket - 1.5G ^{20,21} ARPA4-XX=Pole Adapter 4" FSIR-100=Wireless Configuration Tool for Occupancy Sensor ¹⁶		

- NOTES:**
- Customer is responsible for engineering analysis to confirm pole and fixture compatibility for all applications. Refer to our white paper WP513001EN for additional information.
 - DesignLights Consortium™ Qualified. Refer to www.designlights.org Qualified Products List under Family Models for details.
 - Fixture slipfits over standard 2-3/8" or 3" O.D. tenon.
 - Lumens are nominal. See lumen table for more information.
 - B4 only available with Type V distribution.
 - Standard 4000K CCT, nominal 70 CRI.
 - Requires the use of a step down transformer.
 - Only for use with 480V Wye systems. Per NEC, not for use with ungrounded systems, impedance grounded systems or corner grounded systems (commonly known as Three Phase Three Wire Delta, Three Phase High Leg Delta and Three Phase Corner Grounded Delta systems).
 - Cutsom and RAL color matching available upon request. Consult your lighting representative at Eaton for more information.
 - Extended lead times apply. Use dedicated IES files when performing layouts. These files are published on the Arbor luminaire product page on the website.
 - Not available with MS, MSDIM or DIMRF options.
 - Compatible with standard 3-PIN photocontrols and 5-PIN or 7-PIN ANSI controls.
 - Not available with Type II, III and IV B3 optics.
 - Not available with HA option.
 - Replace XX with mounting height in feet for proper lens selection, L8, L20 and L40 are available options.
 - This tool enables adjustment of parameters including high and low modes, sensitivity, time delay, cutoff and more. Consult your lighting representative at Eaton for more information.
 - Only available with B1 and B2 lumen packages.
 - Low voltage control leads brought out 18" outside fixture. Not available with control options.
 - Replace XX with color designation.
 - Fits on 3" O.D. x 4" long tenon only.

DESCRIPTION

The Galleon™ LED luminaire delivers exceptional performance in a highly scalable, low-profile design. Patented, high-efficiency AccuLED Optics™ system provides uniform and energy conscious illumination to walkways, parking lots, roadways, building areas and security lighting applications. IP66 rated and UL/cUL Listed for wet locations.

Catalog #		Type
Project		
Comments		Date
Prepared by		

SPECIFICATION FEATURES

Construction

Extruded aluminum driver enclosure thermally isolated from Light Squares for optimal thermal performance. Heavy-wall, die-cast aluminum end caps enclose housing and die-cast aluminum heat sinks. A unique, patent pending interlocking housing and heat sink provides scalability with superior structural rigidity. 3G vibration tested. Optional tool-less hardware available for ease of entry into electrical chamber. Housing is IP66 rated.

Optics

Patented, high-efficiency injection-molded AccuLED Optics technology. Optics are precisely designed to shape the distribution maximizing efficiency and application spacing. AccuLED Optics create consistent distributions with the scalability to meet customized application requirements. Offered standard in 4000K (+/- 275K) CCT 70 CRI. Optional 6000K CCT and 3000K CCT.

Electrical

LED drivers are mounted to removable tray assembly for ease of maintenance. 120-277V 50/60Hz, 347V 60Hz or 480V 60Hz operation. 480V is compatible for use with 480V Wye systems only. Standard with 0-10V dimming. Shipped standard with Eaton proprietary circuit module designed to withstand 10kV of transient line surge. The Galleon LED luminaire is suitable for operation in -40°C to 40°C ambient environments. For applications with ambient temperatures exceeding 40°C, specify the HA (High Ambient) option. Light Squares are IP66 rated. Greater than 90% lumen maintenance expected at 60,000 hours. Available in standard 1A drive current and optional 530mA and 700mA drive currents.

Mounting

STANDARD ARM MOUNT: Extruded aluminum arm includes internal bolt guides allowing for easy positioning of fixture during assembly. When mounting two or more luminaires at 90° and 120° apart, the EA extended arm may be required. Refer to the arm mounting requirement table.

Round pole adapter included.

For wall mounting, specify wall mount bracket option. 3G vibration rated. **QUICK MOUNT ARM:** Arm is bolted directly to the pole and the fixture slides onto the quick mount arm and is secured via a single fastener, facilitating quick and easy installation. The versatile, patent pending, quick mount arm accommodates multiple drill patterns ranging from 1-1/2" to 4-7/8". Removal of the door on the quick mount arm enables wiring of the fixture without having to access the driver compartment. A knock-out enables round pole mounting.

Finish

Housing finished in super durable TGIC polyester powder coat paint, 2.5 mil nominal thickness for superior protection against fade and wear. Heat sink is powder coated black. Standard colors include black, bronze, grey, white, dark platinum and graphite metallic. RAL and custom color matches available.

Warranty

Five-year warranty.

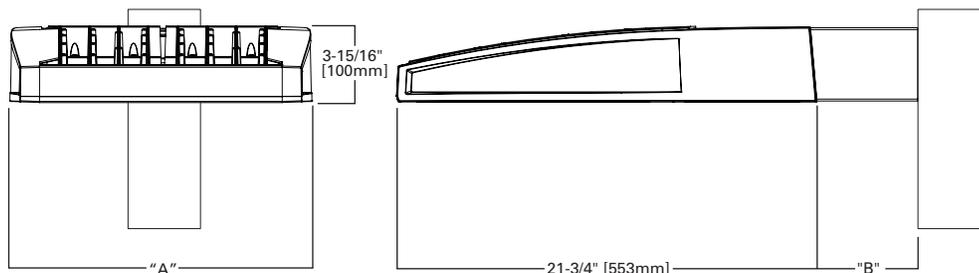


GLEON GALLEON LED

1-10 Light Squares
Solid State LED

AREA/SITE LUMINAIRE

DIMENSIONS

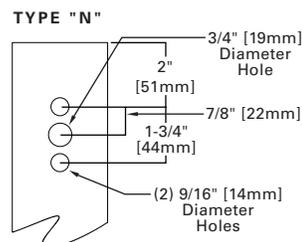


DIMENSION DATA

Number of Light Squares	"A" Width	"B" Standard Arm Length	"B" Optional Arm Length ¹	Weight with Arm (lbs.)	EPA with Arm ² (Sq. Ft.)
1-4	15-1/2" (394mm)	7" (178mm)	10" (254mm)	33 (15.0 kgs.)	0.96
5-6	21-5/8" (549mm)	7" (178mm)	10" (254mm)	44 (20.0 kgs.)	1.00
7-8	27-5/8" (702mm)	7" (178mm)	13" (330mm)	54 (24.5 kgs.)	1.07
9-10	33-3/4" (857mm)	7" (178mm)	16" (406mm)	63 (28.6 kgs.)	1.12

NOTES: 1. Optional arm length to be used when mounting two fixtures at 90° on a single pole. 2. EPA calculated with optional arm length.

DRILLING PATTERN



CERTIFICATION DATA

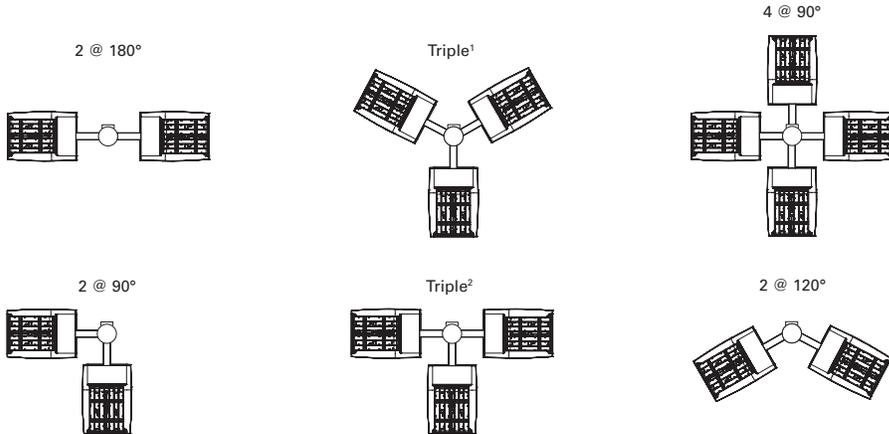
UL/cUL Wet Location Listed
ISO 9001
LM79 / LM80 Compliant
3G Vibration Rated
IP66 Rated
DesignLights Consortium™ Qualified*

ENERGY DATA

Electronic LED Driver
>0.9 Power Factor
<20% Total Harmonic Distortion
120V-277V 50/60Hz
347V & 480V 60Hz
-40°C Min. Temperature
40°C Max. Temperature
50°C Max. Temperature (HA Option)

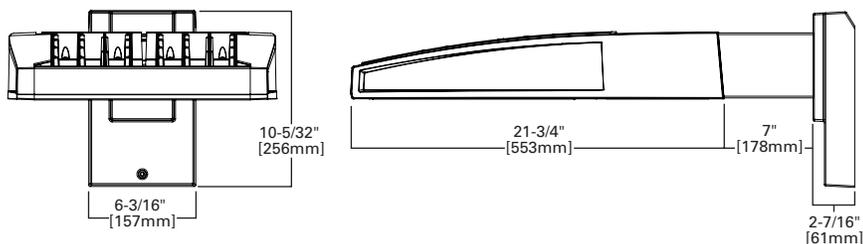
ARM MOUNTING REQUIREMENTS

Configuration	90° Apart	120° Apart
GLEON-AE-01	7" Arm (Standard)	7" Arm (Standard)
GLEON-AE-02	7" Arm (Standard)	7" Arm (Standard)
GLEON-AE-03	7" Arm (Standard)	7" Arm (Standard)
GLEON-AE-04	7" Arm (Standard)	7" Arm (Standard)
GLEON-AE-05	10" Extended Arm (Required)	7" Arm (Standard)
GLEON-AE-06	10" Extended Arm (Required)	7" Arm (Standard)
GLEON-AE-07	13" Extended Arm (Required)	13" Extended Arm (Required)
GLEON-AE-08	13" Extended Arm (Required)	13" Extended Arm (Required)
GLEON-AE-09	16" Extended Arm (Required)	16" Extended Arm (Required)
GLEON-AE-10	16" Extended Arm (Required)	16" Extended Arm (Required)

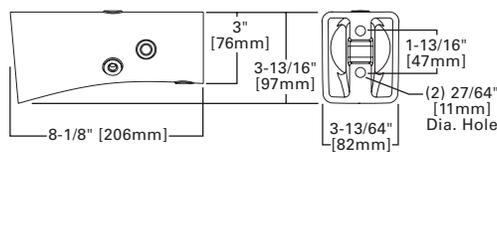


NOTES: 1 Round poles are 3 @ 120°. Square poles are 3 @ 90°. 2 Round poles are 3 @ 90°.

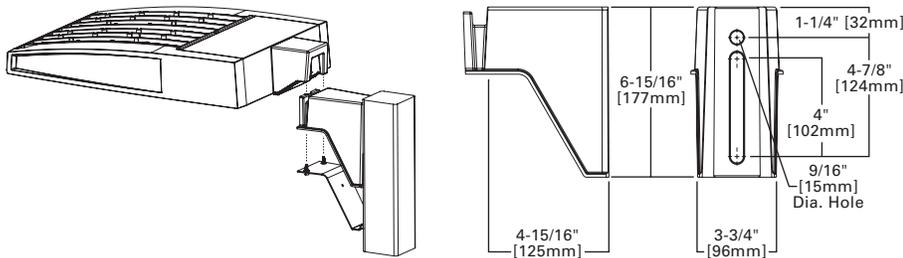
STANDARD WALL MOUNT



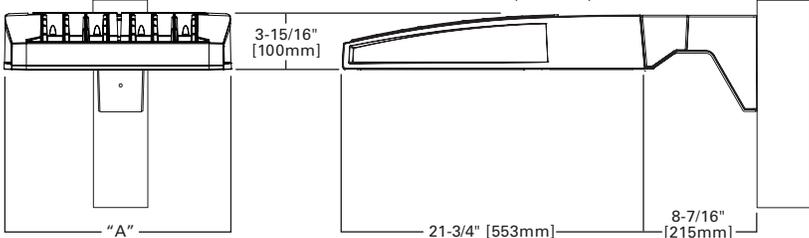
MAST ARM MOUNT



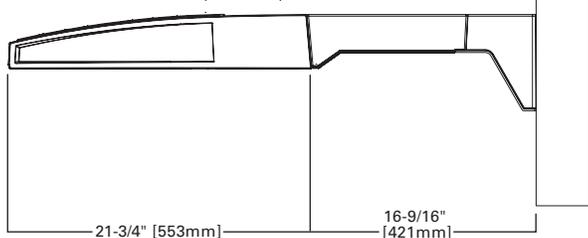
QUICK MOUNT ARM (INCLUDES FIXTURE ADAPTER)



QM Quick Mount Arm (Standard)



QMEA Quick Mount Arm (Extended)

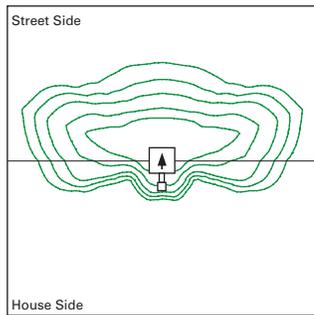


QUICK MOUNT ARM DATA

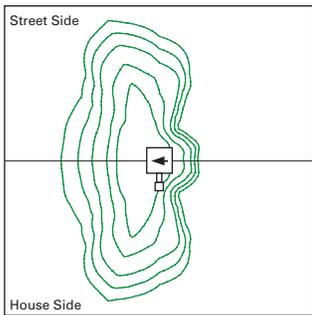
Number of Light Squares ^{1,2}	"A" Width	Weight with QM Arm (lbs.)	Weight with QMEA Arm (lbs.)	EPA (Sq. Ft.)
1-4	15-1/2" (394mm)	35 (15.91 kgs.)	38 (17.27 kgs.)	1.11
5-6 ³	21-5/8" (549mm)	46 (20.91 kgs.)	49 (22.27 kgs.)	
7-8	27-5/8" (702mm)	56 (25.45 kgs.)	59 (26.82 kgs.)	

NOTES: 1 QM option available with 1-8 light square configurations. 2 QMEA option available with 1-6 light square configurations. 3 QMEA arm to be used when mounting two fixtures at 90° on a single pole.

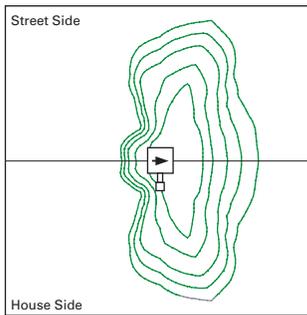
OPTIC ORIENTATION



Standard



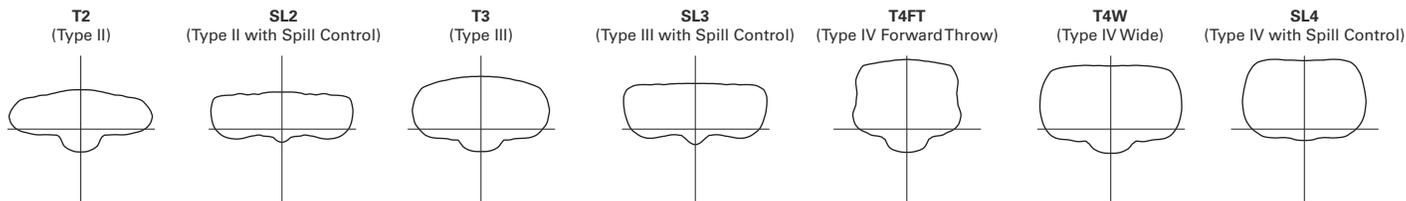
Optics Rotated Left @ 90° [L90]



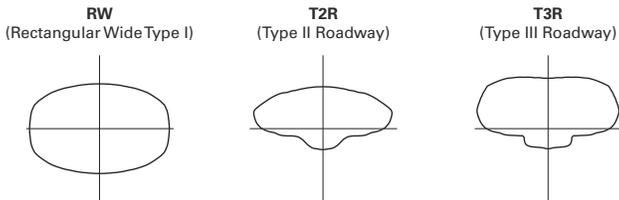
Optics Rotated Right @ 90° [R90]

OPTICAL DISTRIBUTIONS

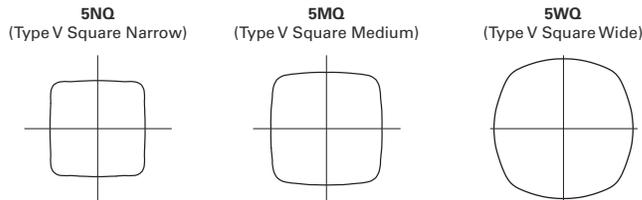
Asymmetric Area Distributions



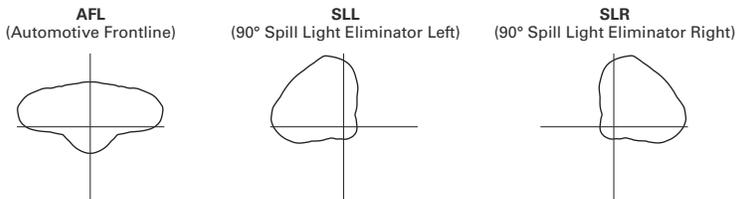
Asymmetric Roadway Distributions



Symmetric Distributions



Specialized Distributions



NOMINAL POWER AND LUMENS (1A)

Number of Light Squares	1	2	3	4	5	6	7	8	9	10	
Drive Current	1A	1A	1A	1A	1A	1A	1A	1A	1A	1A	
Nominal Power (Watts)	56	107	157	213	264	315	370	421	475	528	
Input Current @ 120V (A)	0.47	0.90	1.31	1.79	2.21	2.64	3.09	3.51	3.96	4.41	
Input Current @ 208V (A)	0.28	0.51	0.74	1.02	1.25	1.48	1.76	1.99	2.22	2.50	
Input Current @ 240V (A)	0.25	0.45	0.65	0.90	1.10	1.30	1.55	1.75	1.95	2.20	
Input Current @ 277V (A)	0.23	0.41	0.59	0.82	1.00	1.18	1.41	1.59	1.77	2.00	
Optics											
T2	Lumens	5,272	10,303	15,373	20,313	25,168	30,118	35,618	40,357	45,018	49,842
	BUG Rating	B1-U0-G1	B2-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5	B4-U0-G5	B4-U0-G5
T2R	Lumens	5,597	10,938	16,321	21,565	26,719	31,974	37,813	42,844	47,792	52,914
	BUG Rating	B1-U0-G1	B2-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B4-U0-G4	B4-U0-G5
T3	Lumens	5,374	10,501	15,669	20,704	25,652	30,697	36,303	41,134	45,884	50,802
	BUG Rating	B1-U0-G2	B2-U0-G2	B2-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B4-U0-G5	B4-U0-G5
T3R	Lumens	5,493	10,735	16,017	21,164	26,222	31,379	37,110	42,048	46,904	51,930
	BUG Rating	B1-U0-G2	B1-U0-G2	B2-U0-G3	B2-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B3-U0-G5	B3-U0-G5
T4FT	Lumens	5,405	10,562	15,760	20,824	25,801	30,875	36,514	41,372	46,150	51,096
	BUG Rating	B1-U0-G2	B2-U0-G2	B2-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B3-U0-G5	B3-U0-G5	B3-U0-G5
T4W	Lumens	5,335	10,426	15,556	20,555	25,468	30,476	36,042	40,838	45,554	50,436
	BUG Rating	B1-U0-G2	B2-U0-G2	B2-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B4-U0-G5	B4-U0-G5	B4-U0-G5
SL2	Lumens	5,263	10,285	15,347	20,278	25,124	30,066	35,556	40,288	44,940	49,756
	BUG Rating	B1-U0-G2	B2-U0-G2	B2-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B4-U0-G5	B4-U0-G5
SL3	Lumens	5,373	10,500	15,667	20,701	25,649	30,693	36,298	41,128	45,878	50,794
	BUG Rating	B1-U0-G2	B2-U0-G3	B2-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B3-U0-G5	B3-U0-G5
SL4	Lumens	5,105	9,976	14,886	19,669	24,370	29,163	34,488	39,078	43,591	48,262
	BUG Rating	B1-U0-G2	B1-U0-G3	B1-U0-G3	B2-U0-G4	B2-U0-G4	B2-U0-G5	B3-U0-G5	B3-U0-G5	B3-U0-G5	B3-U0-G5
5NQ	Lumens	5,542	10,830	16,160	21,352	26,455	31,658	37,439	42,421	47,320	52,392
	BUG Rating	B2-U0-G1	B3-U0-G1	B3-U0-G2	B4-U0-G2	B4-U0-G2	B5-U0-G2	B5-U0-G3	B5-U0-G3	B5-U0-G3	B5-U0-G4
5MQ	Lumens	5,644	11,029	16,457	21,745	26,942	32,241	38,128	43,202	48,191	53,356
	BUG Rating	B3-U0-G1	B4-U0-G2	B4-U0-G2	B5-U0-G3	B5-U0-G3	B5-U0-G4	B5-U0-G4	B5-U0-G4	B5-U0-G4	B5-U0-G5
5WQ	Lumens	5,659	11,059	16,501	21,803	27,014	32,327	38,230	43,317	48,320	53,498
	BUG Rating	B3-U0-G1	B4-U0-G2	B4-U0-G2	B5-U0-G3	B5-U0-G4	B5-U0-G4	B5-U0-G4	B5-U0-G5	B5-U0-G5	B5-U0-G5
SLL/SLR	Lumens	4,722	9,227	13,767	18,191	22,539	26,971	31,897	36,141	40,315	44,635
	BUG Rating	B1-U0-G2	B1-U0-G3	B2-U0-G3	B2-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B3-U0-G5	B3-U0-G5
RW	Lumens	5,492	10,732	16,014	21,159	26,216	31,372	37,101	42,038	46,893	51,918
	BUG Rating	B2-U0-G1	B3-U0-G1	B4-U0-G2	B4-U0-G2	B4-U0-G2	B5-U0-G3	B5-U0-G3	B5-U0-G3	B5-U0-G4	B5-U0-G4
AFL	Lumens	5,512	10,771	16,072	21,236	26,311	31,486	37,236	42,191	47,063	52,107
	BUG Rating	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G4

* Nominal data for 4000K CCT.

LUMEN MULTIPLIER

Ambient Temperature	Lumen Multiplier
0°C	1.02
10°C	1.01
25°C	1.00
40°C	0.99
50°C	0.97

LUMEN MAINTENANCE

Ambient Temperature	TM-21 Lumen Maintenance (60,000 Hours)	Theoretical L70 (Hours)
25°C	> 94%	> 350,000
40°C	> 93%	> 250,000
50°C*	> 90%	> 170,000

* 50°C lumen maintenance data applies to 530mA and 700mA drive currents.

NOMINAL POWER AND LUMENS (700MA)

Number of Light Squares	1	2	3	4	5	6	7	8	9	10	
Drive Current	700mA	700mA	700mA	700mA	700mA	700mA	700mA	700mA	700mA	700mA	
Nominal Power (Watts)	38	72	105	138	176	210	243	276	314	348	
Input Current @ 120V (A)	0.32	0.59	0.86	1.14	1.45	1.72	2	2.28	2.58	2.86	
Input Current @ 208V (A)	0.21	0.36	0.51	0.67	0.87	1.02	1.18	1.34	1.53	1.69	
Input Current @ 240V (A)	0.19	0.32	0.45	0.59	0.77	0.90	1.04	1.18	1.35	1.49	
Input Current @ 277V (A)	0.20	0.29	0.40	0.51	0.69	0.80	0.91	1.02	1.20	1.31	
Optics											
T2	Lumens	3,854	7,531	11,237	14,847	18,395	22,013	26,033	29,497	32,904	36,430
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G4
T2R	Lumens	4,091	7,995	11,929	15,762	19,529	23,370	27,638	31,316	34,932	38,676
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4
T3	Lumens	3,928	7,676	11,453	15,133	18,750	22,437	26,534	30,065	33,537	37,132
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5
T3R	Lumens	4,015	7,846	11,707	15,469	19,166	22,936	27,124	30,733	34,283	37,957
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G3	B2-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5
T4FT	Lumens	3,951	7,720	11,519	15,221	18,858	22,567	26,688	30,240	33,732	37,347
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G3	B2-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B3-U0-G5
T4W	Lumens	3,900	7,620	11,370	15,024	18,615	22,276	26,343	29,849	33,296	36,864
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5	B3-U0-G5
SL2	Lumens	3,847	7,518	11,217	14,821	18,364	21,975	25,988	29,447	32,847	36,368
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G3	B2-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5
SL3	Lumens	3,927	7,675	11,451	15,131	18,747	22,434	26,531	30,061	33,533	37,126
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G3	B2-U0-G3	B2-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5
SL4	Lumens	3,731	7,292	10,880	14,376	17,812	21,315	25,208	28,562	31,861	35,275
	BUG Rating	B1-U0-G2	B1-U0-G2	B1-U0-G3	B1-U0-G3	B2-U0-G4	B2-U0-G4	B2-U0-G4	B2-U0-G5	B2-U0-G5	B3-U0-G5
5NQ	Lumens	4,051	7,916	11,811	15,606	19,336	23,139	27,365	31,006	34,587	38,294
	BUG Rating	B2-U0-G1	B3-U0-G1	B3-U0-G1	B3-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2	B5-U0-G2	B5-U0-G3	B5-U0-G3
5MQ	Lumens	4,125	8,062	12,029	15,894	19,692	23,565	27,869	31,577	35,224	38,999
	BUG Rating	B2-U0-G1	B3-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2	B5-U0-G3	B5-U0-G3	B5-U0-G3	B5-U0-G4	B5-U0-G4
5WQ	Lumens	4,136	8,083	12,061	15,936	19,745	23,628	27,943	31,661	35,318	39,103
	BUG Rating	B3-U0-G1	B3-U0-G2	B4-U0-G2	B4-U0-G2	B5-U0-G3	B5-U0-G3	B5-U0-G4	B5-U0-G4	B5-U0-G4	B5-U0-G4
SLL/SLR	Lumens	3,451	6,744	10,063	13,296	16,474	19,714	23,314	26,416	29,467	32,625
	BUG Rating	B1-U0-G1	B1-U0-G2	B1-U0-G3	B2-U0-G3	B2-U0-G3	B2-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5	B3-U0-G5
RW	Lumens	4,014	7,844	11,704	15,465	19,162	22,930	27,118	30,726	34,274	37,948
	BUG Rating	B2-U0-G1	B3-U0-G1	B3-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2	B5-U0-G3	B5-U0-G3	B5-U0-G3
AFL	Lumens	4,029	7,873	11,747	15,522	19,231	23,014	27,216	30,838	34,399	38,086
	BUG Rating	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G2	B3-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G3

* Nominal data for 4000K CCT.

LUMEN MULTIPLIER

Ambient Temperature	Lumen Multiplier
0°C	1.02
10°C	1.01
25°C	1.00
40°C	0.99
50°C	0.97

LUMEN MAINTENANCE

Ambient Temperature	TM-21 Lumen Maintenance (60,000 Hours)	Theoretical L70 (Hours)
25°C	> 94%	> 350,000
40°C	> 93%	> 250,000
50°C*	> 90%	> 170,000

* 50°C lumen maintenance data applies to 530mA and 700mA drive currents.

NOMINAL POWER AND LUMENS (530MA)

Number of Light Squares	1	2	3	4	5	6	7	8	9	10	
Drive Current	530mA	530mA	530mA	530mA	530mA	530mA	530mA	530mA	530mA	530mA	
Nominal Power (Watts)	30	54	80	105	130	159	184	209	234	259	
Input Current @ 120V (A)	0.25	0.45	0.66	0.86	1.07	1.32	1.52	1.72	1.93	2.14	
Input Current @ 208V (A)	0.17	0.28	0.39	0.51	0.63	0.78	0.9	1.02	1.14	1.26	
Input Current @ 240V (A)	0.17	0.25	0.35	0.45	0.55	0.70	0.80	0.90	1.00	1.10	
Input Current @ 277V (A)	0.19	0.24	0.32	0.40	0.49	0.64	0.72	0.80	0.89	0.98	
Optics											
T2	Lumens	3,079	6,017	8,978	11,862	14,697	17,588	20,800	23,567	26,289	29,106
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4
T2R	Lumens	3,269	6,388	9,531	12,593	15,603	18,672	22,082	25,020	27,909	30,900
	BUG Rating	B1-U0-G1	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G4
T3	Lumens	3,138	6,133	9,150	12,091	14,980	17,926	21,200	24,021	26,795	29,667
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G2	B2-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4
T3R	Lumens	3,208	6,269	9,354	12,359	15,313	18,325	21,671	24,555	27,390	30,326
	BUG Rating	B1-U0-G1	B1-U0-G2	B1-U0-G2	B2-U0-G2	B2-U0-G3	B2-U0-G3	B2-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G4
T4FT	Lumens	3,156	6,168	9,203	12,161	15,067	18,030	21,323	24,160	26,950	29,839
	BUG Rating	B1-U0-G1	B1-U0-G2	B1-U0-G2	B2-U0-G2	B2-U0-G3	B2-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5
T4W	Lumens	3,116	6,088	9,084	12,004	14,872	17,797	21,047	23,848	26,602	29,453
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G2	B2-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G5
SL2	Lumens	3,074	6,006	8,962	11,842	14,672	17,558	20,764	23,527	26,244	29,056
	BUG Rating	B1-U0-G1	B1-U0-G2	B2-U0-G2	B2-U0-G3	B2-U0-G3	B3-U0-G3	B3-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4
SL3	Lumens	3,138	6,132	9,149	12,089	14,978	17,924	21,197	24,018	26,791	29,662
	BUG Rating	B1-U0-G1	B1-U0-G2	B1-U0-G2	B2-U0-G3	B2-U0-G3	B2-U0-G3	B3-U0-G4	B3-U0-G4	B3-U0-G4	B3-U0-G4
SL4	Lumens	2,981	5,826	8,693	11,486	14,231	17,030	20,140	22,820	25,456	28,184
	BUG Rating	B0-U0-G1	B1-U0-G2	B1-U0-G3	B1-U0-G3	B1-U0-G3	B2-U0-G3	B2-U0-G4	B2-U0-G4	B2-U0-G4	B2-U0-G5
5NQ	Lumens	3,236	6,324	9,437	12,469	15,449	18,487	21,863	24,773	27,634	30,595
	BUG Rating	B1-U0-G0	B2-U0-G1	B3-U0-G1	B3-U0-G2	B3-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2	B5-U0-G2
5MQ	Lumens	3,296	6,441	9,610	12,698	15,733	18,828	22,266	25,229	28,142	31,158
	BUG Rating	B2-U0-G1	B3-U0-G1	B3-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2	B5-U0-G3	B5-U0-G3	B5-U0-G3	B5-U0-G3
5WQ	Lumens	3,305	6,458	9,636	12,732	15,775	18,878	22,325	25,296	28,217	31,241
	BUG Rating	B2-U0-G1	B3-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2	B5-U0-G3	B5-U0-G3	B5-U0-G3	B5-U0-G4	B5-U0-G4
SLL/SLR	Lumens	2,757	5,388	8,040	10,623	13,162	15,751	18,627	21,105	23,543	26,066
	BUG Rating	B1-U0-G1	B1-U0-G2	B1-U0-G2	B1-U0-G3	B2-U0-G3	B2-U0-G3	B2-U0-G3	B2-U0-G4	B3-U0-G4	B3-U0-G4
RW	Lumens	3,207	6,267	9,351	12,356	15,309	18,320	21,666	24,549	27,384	30,319
	BUG Rating	B2-U0-G1	B3-U0-G1	B3-U0-G1	B3-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2	B5-U0-G3
AFL	Lumens	3,219	6,290	9,385	12,401	15,365	18,387	21,745	24,638	27,484	30,429
	BUG Rating	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G2	B3-U0-G3	B3-U0-G3

* Nominal data for 4000K CCT.

LUMEN MULTIPLIER

Ambient Temperature	Lumen Multiplier
0°C	1.02
10°C	1.01
25°C	1.00
40°C	0.99
50°C	0.97

LUMEN MAINTENANCE

Ambient Temperature	TM-21 Lumen Maintenance (60,000 Hours)	Theoretical L70 (Hours)
25°C	> 94%	> 350,000
40°C	> 93%	> 250,000
50°C*	> 90%	> 170,000

* 50°C lumen maintenance data applies to 530mA and 700mA drive currents.

ORDERING INFORMATION

Sample Number: GLEON-AE-04-LED-E1-T3-GM-700

Product Family ^{1,2}	Light Engine	Number of Light Squares ³	Lamp Type	Voltage	Distribution	Color	Mounting
GLEON=Galleon	AE=1A Drive Current	01=1 02=2 03=3 04=4 05=5 06=6 07=7 ⁴ 08=8 ⁴ 09=9 ⁵ 10=10 ⁵	LED=Solid State Light Emitting Diodes	E1=(120-277V) 347=347V ⁶ 480=480V ^{6,7}	T2=Type II T2R=Type II Roadway T3=Type III T3R=Type III Roadway T4FT=Type IV Forward Throw T4W=Type IV Wide 5N0=Type V Narrow 5MQ=Type V Square Medium 5WQ=Type V Square Wide SL2=Type II w/Spill Control SL3=Type III w/Spill Control SL4=Type IV w/Spill Control SLL=90° Spill Light Eliminator Left SLR=90° Spill Light Eliminator Right RW=Rectangular Wide Type I AFL=Automotive Frontline	AP=Grey BZ=Bronze BK=Black DP=Dark Platinum GM=Graphite Metallic WH=White	[Blank]=Arm for Round or Square Pole EA=Extended Arm ⁸ MA=Mast Arm Adapter ⁹ WM=Wall Mount QM=Quick Mount Arm (Standard Length) ¹⁰ QMEA=Quick Mount Arm (Extended Length) ¹¹
Options (Add as Suffix)					Accessories (Order Separately)		
2L=Two Circuits ^{12,13} 7030=70 CRI / 3000K ¹⁴ 8030=80 CRI / 3000K ¹⁵ 7050=70 CRI / 5000K ¹⁵ 7060=70 CRI / 6000K ¹⁴ 530=Drive Current Factory Set to 530mA ¹⁶ 700=Drive Current Factory Set to 700mA ¹⁶ P=Button Type Photocontrol (120, 208, 240 or 277V) PER7=NEMA 7-PIN Twistlock Photocontrol Receptacle R=NEMA Twistlock Photocontrol Receptacle HA=50°C High Ambient ^{13,17} MS/DIM-L08=Motion Sensor for Dimming Operation, Maximum 8' Mounting Height ^{18,19,20,21,22} MS/DIM-L20=Motion Sensor for Dimming Operation, 9' - 20' Mounting Height ^{18,19,20,21,22} MS/DIM-L40=Motion Sensor for Dimming Operation, 21' - 40' Mounting Height ^{18,19,20,21} MS/DIM-L40W=Motion Sensor for Dimming Operation, 21' - 40' Mounting Height (Wide Range) ^{18,19,20,21,25} MS/X-L08=Bi-Level Motion Sensor, Maximum 8' Mounting Height ^{18,19,20,21,22,26} MS/X-L20=Bi-Level Motion Sensor, 9' - 20' Mounting Height ^{18,19,20,21,23,26} MS/X-L40=Bi-Level Motion Sensor, 21' - 40' Mounting Height ^{18,19,20,21,24,26} MS/X-L40W=Bi-Level Motion Sensor, 21' - 40' Mounting Height (Wide Range) ^{18,19,20,21,25,26} MS-L08=Motion Sensor for ON/OFF Operation, Maximum 8' Mounting Height ^{18,19,20,21,22} MS-L20=Motion Sensor for ON/OFF Operation, 9' - 20' Mounting Height ^{18,19,20,21,23} MS-L40=Motion Sensor for ON/OFF Operation, 21' - 40' Mounting Height ^{18,19,20,21,24} MS-L40W=Motion Sensor for ON/OFF Operation, 21' - 40' Mounting Height (Wide Range) ^{18,19,20,25} DIMRF-LW=LumaWatt Wireless Sensor, Wide Lens for 8' - 16' Mounting Height ²⁷ DIMRF-LN=LumaWatt Wireless Sensor, Narrow Lens for 16' - 40' Mounting Height ²⁷ L90=Optics Rotated 90° Left R90=Optics Rotated 90° Right MT=Factory Installed Mesh Top TH=Tool-less Door Hardware LCF=Light Square Trim Plate Painted to Match Housing ²⁸ HSS=Factory Installed House Side Shield ²⁹ CE=CE Marking ³⁰					OA/RA1016=NEMA Photocontrol Multi-Tap - 105-285V OA/RA1027=NEMA Photocontrol - 480V OA/RA1201=NEMA Photocontrol - 347V OA/RA1013=NEMA Photocontrol Shorting Cap OA/RA1014=120V Photocontrol MA1252=10kV Surge Module Replacement MA1036-XX=Single Tenon Adapter for 2-3/8" O.D. Tenon MA1037-XX=2 @ 180° Tenon Adapter for 2-3/8" O.D. Tenon MA1197-XX=3 @ 120° Tenon Adapter for 2-3/8" O.D. Tenon MA1188-XX=4 @ 90° Tenon Adapter for 2-3/8" O.D. Tenon MA1189-XX=2 @ 90° Tenon Adapter for 2-3/8" O.D. Tenon MA1190-XX=3 @ 90° Tenon Adapter for 2-3/8" O.D. Tenon MA1191-XX=2 @ 120° Tenon Adapter for 2-3/8" O.D. Tenon MA1038-XX=Single Tenon Adapter for 3-1/2" O.D. Tenon MA1039-XX=2 @ 180° Tenon Adapter for 3-1/2" O.D. Tenon MA1192-XX=3 @ 120° Tenon Adapter for 3-1/2" O.D. Tenon MA1193-XX=4 @ 90° Tenon Adapter for 3-1/2" O.D. Tenon MA1194-XX=2 @ 90° Tenon Adapter for 3-1/2" O.D. Tenon MA1195-XX=3 @ 90° Tenon Adapter for 3-1/2" O.D. Tenon FSIR-100=Wireless Configuration Tool for Occupancy Sensor ³¹ GLEON-MT1=Field Installed Mesh Top for 1-4 Light Squares GLEON-MT2=Field Installed Mesh Top for 5-6 Light Squares GLEON-MT3=Field Installed Mesh Top for 7-8 Light Squares GLEON-MT4=Field Installed Mesh Top for 9-10 Light Squares GLEON-QM=Quick Mount Arm Kit ¹⁰ GLEON-QM-EA=Quick Mount Extended Length Arm Kit ¹¹ LS/HSS=Field Installed House Side Shield ^{29,32}		

NOTES:

- Customer is responsible for engineering analysis to confirm pole and fixture compatibility for all applications. Refer to our white paper WP513001EN for additional support information.
- DesignLights Consortium™ Qualified. Refer to www.designlights.org Qualified Products List under Family Models for details.
- Standard 4000K CCT and minimum 70 CRI.
- Not compatible with extended quick mount arm (QMEA).
- Not compatible with standard quick mount arm (QM) or extended quick mount arm (QMEA).
- Requires the use of a step down transformer when combined with MS/DIM, MS/X or DIMRF.
- Only for use with 480V Wye systems. Per NEC, not for use with ungrounded systems, impedance grounded systems or corner grounded systems (commonly known as Three Phase Three Wire Delta, Three Phase High Leg Delta and Three Phase Corner Grounded Delta systems).
- May be required when two or more luminaires are oriented on a 90° or 120° drilling pattern. Refer to arm mounting requirement table.
- Factory installed.
- Maximum 8 light squares.
- Maximum 6 light squares.
- 2L is not available with MS/X or MS/DIM at 347V or 480V. 2L in AE-02 through AE-04 requires a larger housing, normally used for AE-05 or AE-06. Extended arm option may be required when mounting two or more fixtures per pole at 90° or 120°. Refer to arm mounting requirement table.
- Not available with LumaWatt wireless sensors.
- Extended lead times apply. Use dedicated IES files for 3000K and 6000K when performing layouts. These files are published on the Galleon luminaire product page on the website.
- Extended lead times apply. For 8030, factor 7030 IES files x .92 (8% lumen loss). For 7050, use 7060 IES files.
- 1 Amp standard. Use dedicated IES files for 530mA and 700mA when performing layouts. These files are published on the Galleon luminaire product page on the website.
- 50°C lumen maintenance data applies to 530mA and 700mA drive currents.
- Consult factory for more information.
- Utilizes internal step-down transformer when 347V or 480V is selected.
- The FSIR-100 accessory is required to adjust parameters including high and low modes, sensitivity, time delay, cutoff and more. Consult your lighting representative at Eaton for more information.
- Not available with HA option.
- Approximately 22" detection diameter at 8' mounting height.
- Approximately 40" detection diameter at 20' mounting height.
- Approximately 60" detection diameter at 40' mounting height.
- Approximately 100" detection diameter at 40' mounting height.
- Replace X with number of light squares operating in low output mode.
- LumaWatt wireless sensors are factory installed only requiring network components RF-EM-1, RF-GW-1 and RF-ROUT-1 in appropriate quantities. See www.eaton.com/lighting for LumaWatt application information.
- Not available with house side shield (HSS).
- Only for use with SL2, SL3, SL4 and AFL distributions. The Light Square trim plate is painted black when the HSS option is selected.
- CE is not available with the DIMRF, MS, MS/X, MS/DIM, P, R or PER7 options. Available in 120-277V only.
- This tool enables adjustment of parameters including high and low modes, sensitivity, time delay, cutoff and more. Consult your lighting representative at Eaton for more information.
- One required for each Light Square.

Traffic Impact Study

for the proposed

Mercy Heights Redevelopment

City of Watertown,
Jefferson County, New York

Project No. 36031

July 2016

Prepared For:



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LIST OF REFERENCES

1. Highway Capacity Manual, Fifth Edition. Transportation Research Board. National Research Council, Washington, DC. 2010.
2. New York State Department of Transportation (NYSDOT) Traffic Data Viewer. 2014. Retrieved from <https://www.dot.ny.gov/tdv>.
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EXECUTIVE SUMMARY

OVERVIEW

The purpose of this report is to identify the potential traffic impacts associated with the proposed Mercy Heights Redevelopment in the City of Watertown, Jefferson County, New York. The operating characteristics of the proposed access points and impacts to the adjacent roadway network are identified and mitigating measures, if any, are provided to minimize capacity or safety concerns.

In an effort to define traffic impact, this analysis establishes existing traffic conditions, projects background traffic flow including area growth and/or additional traffic resulting from new development in the area, and determines the traffic operations that would result from the proposed development.

The proposed development is located at the former Mercy Hospital site bordered by Arsenal Street to the north, Stone street to the south, Sherman Street to the east, and South Massey Street to the west, in the City of Watertown, Jefferson County, New York. The site is currently shared with St. Patrick's Parish, which will remain in operation. Land uses in the vicinity of the project site include gas stations, residential, and commercial uses. The study area consists of the following intersections:

- Arsenal Street/Massey Street
- Arsenal Street/Proposed-Existing Entrance
- Arsenal Street/Sherman Street
- Sherman Street/Proposed Entrance
- Sherman Street/Stone Street
- Stone Street/Proposed Entrance
- South Massey Street/Stone Street
- South Massey Street/Proposed South Entrance
- South Massey Street/Proposed North Entrance

The proposed project includes three (3) three-story, 36,402 square-foot residential apartment buildings, two (2) two-story, 18,000 square-foot office buildings, a 5,588 square-foot community center for the residential portion of the development, and an interior parking lot at the site of the demolished Mercy Hospital. Under full development conditions, the three proposed residential buildings will front on Stone Street and South Massey Street, respectively. The two proposed office buildings will front on Arsenal Street. The proposed community center will front on Sherman Street. Access to the site is proposed through the interior parking lot with five vehicular access points, one from each of the surrounding streets, except for South Massey Street, where two access points are proposed. The parking lot would essentially function as one large, collective parking lot for all of the uses on both the project site and St. Patrick's church parcel, although different clusters of parking spaces would be on different parcels.

City of Watertown officials were contacted to discuss projects within the study area that are under construction and/or approved. Additional traffic specifically generated by job growth at Convergys, as well any unanticipated background growth in the area aside from this specific development, has been added to the existing traffic volumes at the study area intersections using a 0.25% per year growth rate for the two-year build-out period based upon a review of historical traffic data along North Massey, Arsenal and Sherman Streets collected by the NYSDOT.

CONCLUSIONS & RECOMMENDATIONS

This study evaluates the potential traffic impacts resulting from the proposed Mercy Heights Development in Watertown, NY. Based upon the collective analyses and field observations, the results indicate that the proposed development will not have significant adverse traffic impacts on the existing roadway network. The following sets forth conclusions and recommendations based upon the results of the analyses:

1. The proposed development is expected to generate approximately 86 entering/56 exiting vehicle trips during the weekday AM peak hour and 70 entering/126 exiting vehicle trips during the PM peak hour.
2. It is noted that the northbound left turn movement on South Massey Street currently operates at LOS "F" as a result of the heavy southbound left turn and through movements that require significant green time. The southbound left turn movement is currently 409(266) vph during the AM(PM) peak hours. NYSDOT typically considers a dual left turn lane when left turn volumes reach 300 vph. Providing dual left turn lanes would allow for a reduction in green time for this movement thereby improving the northbound levels of service. The signal would operate in a split phased mode with separate northbound and southbound phases. Levels of service would improve to "C" or better on all approaches. This improvement is not required as mitigation for this development, however it should be considered as an improvement whether or not the proposed Mercy Heights development moves forward.
3. The Gap Analysis shows that there will be sufficient gaps for all movements entering and exiting both the Arsenal Street and South Massey Street driveways. No turn restrictions are warranted to recommended at this time.
4. The proposed development will not result in any potentially significant adverse traffic impacts to the study area intersections with the recommended mitigation in place.

I. INTRODUCTION

The purpose of this report is to identify the potential traffic impacts associated with the proposed Mercy Heights Re-Development in the City of Watertown, Jefferson County, New York. The operating characteristics of the proposed access points and impacts to the adjacent roadway network are identified and mitigating measures, if any, are provided to minimize capacity or safety concerns.

In an effort to define traffic impact, this analysis establishes existing traffic conditions, projects background traffic flow including area growth and/or additional traffic resulting from new development in the area, and determines the traffic operations that would result from the proposed development.

II. LOCATION

The proposed development is located at the former Mercy Hospital site bordered by Arsenal Street to the north, Stone street to the south, Sherman Street to the east, and South Massey Street to the west, in the City of Watertown, Jefferson County, New York. The site is currently shared with St. Patrick's Parish, which will remain in operation. Land uses in the vicinity of the project site include gas stations, residential, and commercial uses. The study area consists of the intersections of:

- Arsenal Street/Massey Street
- Arsenal Street/Proposed-Existing Entrance
- Arsenal Street/Sherman Street
- Sherman Street/Proposed Entrance
- Sherman Street/Stone Street
- Stone Street/Proposed Entrance
- South Massey Street/Stone Street
- South Massey Street/Proposed South Entrance
- South Massey Street/Proposed North Entrance

The site location and study area are shown in **Figure 1** (all figures are included at the end of the report).

III. EXISTING HIGHWAY SYSTEM

Arsenal Street (also known as NYS Route 3) is generally an east/west urban principal arterial roadway. NYS Route 3 provides service from the Fulton NY area to the west and terminates in Plattsburgh to the northeast. The segment on NYS Route 3/Arsenal Street within the study area is labeled NYS Route 3 and is under the jurisdiction and maintained by the City of Watertown. In the vicinity of the site, Arsenal Street consists of three travel lanes; one in the westbound direction and two in the eastbound direction. The posted speed limit in the vicinity of the site is 30 mph. According to the most recent traffic volume data collected by the New York State Department of Transportation (NYSDOT) in 2009, the annual average daily traffic (AADT) along Arsenal Street, east of Sherman Street is 11,682 vehicles per day (vpd).

South Massey Street (US Route 11) is owned and maintained by the City of Watertown within the vicinity of the project. The highway is functionally classified as a north/south urban principal arterial highway with two travel lanes in each direction with a posted speed limit of 30 mph in the

vicinity of the site. South Massey Street, at its intersection with Arsenal Street, also includes separate northbound and southbound left-turn lanes. According to the most recent traffic volume data collected by NYSDOT in 2014, the AADT along South Massey Street north of Arsenal Street is approximately 16,102 vpd.

Sherman Street is a City street that generally consists of one travel lane in each direction with an additional a northbound right turn lane at Arsenal Street, and a southbound right turn lane and northbound left turn lane at Stone Street. According to the most recent traffic volume data collected by NYSDOT in 2013, the AADT along Sherman Street south of Stone Street is approximately 3,763 vpd.

Stone Street is a City street that is one-way in the westbound direction between Washington Street and South Massey Street. In front of the site, Stone Street provides two westbound travel lanes. Based on recent turning movement counts at Stone Street and South Massey Street, the westbound ADT on Stone Street is approximately 2,400 vpd.

Figure 2 illustrates the lane geometry at each of the study intersections and the AADT/ADT volumes on the study roadways.

IV. EXISTING TRAFFIC CONDITIONS

A. Peak Intervals for Analysis

Given the functional characteristics of the land uses proposed for the site (residential and offices), the peak hours selected for analysis are the weekday commuter AM and PM peaks. The combination of site traffic and adjacent through traffic produces the greatest demand during these time periods.

B. Existing Traffic Volume Data

Weekday commuter AM (7:00-9:00AM) and PM (4:00-6:00PM) peak hour volumes were collected at the study area intersections, as noted in *Section II*, on Tuesday, June 14, and Wednesday June 15, 2016. The peak hour traffic periods generally occurred between 7:30-8:30 AM and 4:30-5:30 PM at the study intersections.

All turning movement count data was collected on a typical weekday while local schools were in session. The traffic volumes were reviewed to confirm the accuracy and relative balance of the collective traffic counts. The actual differences in traffic volumes can be attributed to temporal variations in traffic volumes as well as activity related to driveways located in the segments between the study intersections. The weekday AM and PM peak hour volumes are reflected in **Figure 3**.

C. Field Observations

The study intersections were observed during both peak intervals to assess current traffic operations. Signal timing information for intersections within the study area was utilized to determine peak hour phasing plans and phase durations during each interval. This information was used to support and/or calibrate capacity analysis models described in detail later in this report.

V. FUTURE AREA DEVELOPMENT AND LOCAL GROWTH

Construction of the proposed Mercy Heights Development is anticipated to be completed within five years. City of Watertown officials were contacted to discuss projects within the study area that are under construction and/or approved. Several developments were identified including: Samaritan Medical Center expansion, 300 new jobs at Convergys, Northern New York Community Foundation office relocation to 131 Washington Street, Roth Industries building addition at 268 Bellew Avenue South, Washington Street Properties building rehabilitation at 505 Washington Street, and the Clueless Bar re-opening as Club #9 at 545 Arsenal Street.

Given the proximity potential impact of the additional Convergys jobs, additional traffic related to this development, has been added to the existing traffic volumes at the study area intersections. The other developments noted will add minimally to traffic volumes in the study area during the peak hours studied. Therefore, an additional growth rate of 0.25% per year has been added to the study area intersections for the five-year build-out period. This growth rate was determined based upon a review of historical traffic data along North Massey, Arsenal and Sherman Streets collected by the NYSDOT and in consideration of the noted area developments. The background traffic volumes are depicted in **Figure 4**.

VI. PROPOSED DEVELOPMENT

A. Description

The proposed project includes three (3) three-story, 36,402 square-foot residential apartment buildings, two (2) two-story, 18,000 square-foot office buildings, a 5,588 square-foot community center for the residential portion of the development, and an interior parking lot at the site of the demolished Mercy Hospital. Under full development conditions, the three proposed residential buildings will front on Stone Street and South Massey Street, respectively. The two proposed office buildings will front on Arsenal Street. The proposed community center will front on Sherman Street. Access to the site is proposed through the interior parking lot with five vehicular access points, one from each of the surrounding streets, except for South Massey Street, where two access points are proposed. The parking lot would essentially function as one large, collective parking lot for all of the uses on both the project site and St. Patrick's church parcel, although different clusters of parking spaces would be on different parcels. **Figure 5** illustrates the proposed concept plan.

B. Site Traffic Generation

The volume of traffic generated by a site is dependent on the intended land use and size of the development. Trip generation is an estimate of the number of trips generated by a specific building or land use. These trips represent the volume of traffic entering and exiting the development. Trip Generation, 9th Edition is used as a reference for this information. The trip rate for the peak hour of the generator may or may not coincide in time or volume with the trip rate for the peak hour of adjacent street traffic. Volumes generated during the peak hour of adjacent street traffic, in this case, the weekday AM and PM peaks, represent a more critical volume when analyzing the capacity of the system; those intervals will provide the basis of this analysis. All trip generation information has been included in the appendix.

Table I shows the total site generated trips for the weekday AM and PM peak hours for full build out of the proposed project.

TABLE I
SITE GENERATED TRIPS

DESCRIPTION	SIZE/ UNITS	AM PEAK		PM PEAK	
		ENTER	EXIT	ENTER	EXIT
Apartments	108 Units	11	46	50	27
Office	36,000 SF	75	10	20	99
Total Site Generated Trips		86	56	70	126

C. *Site Traffic Distribution*

The cumulative effect of site traffic on the transportation network is dependent on the origins and destinations of that traffic and the location of the access drive serving the site.

The proposed arrival/departure distribution of traffic to be generated at this site is considered a function of several parameters, including the following:

- Employment centers in the local area and region;
- Population centers in the local area and region;
- Proximity and access to I-81;
- Site access drive locations and internal roadway circulation;
- Existing highway network;
- Existing traffic patterns; and
- Existing traffic conditions and controls

Figures 6A and 6B show the anticipated trip distribution pattern percentages for the proposed office and residential components of the development respectively. **Figure 7** shows the resulting total site generated traffic as assigned to the study area intersections for the weekday commuter AM and PM peak hour periods for Full Development of the proposed project.

VII. FULL DEVELOPMENT VOLUMES

The projected design hour traffic volumes were developed for the weekday AM and PM peak hours by combining the future background traffic conditions (Figure 4), and projected site generated volumes for full build out of the proposed development (Figure 7). **Figure 8** illustrates the total weekday AM and PM hour volumes anticipated for the proposed development under full development conditions.

VIII. CAPACITY ANALYSIS

Capacity analysis is a technique used for determining a measure of effectiveness for a section of roadway and/or intersection based on the number of vehicles during a specific time period. The measure of effectiveness used for the capacity analysis is referred to as a Level of Service (LOS). Levels of Service are calculated to provide an indication of the amount of delay that a motorist experiences while traveling along a roadway or through an intersection. Since the most amount of delay to motorists usually occurs at intersections, capacity analysis typically focuses on intersections, as opposed to highway segments.

Six Levels of Service are defined for analysis purposes. They are assigned letter designations, from "A" to "F", with LOS "A" representing the best conditions and LOS "F" the worst. Suggested ranges of service capacity and an explanation of Levels of Service are included in the Appendix.

The standard procedure for capacity analysis of signalized and un-signalized intersections is outlined in the Highway Capacity Manual (HCM 2010) published by the Transportation Research Board. Traffic analysis software, Synchro 9, which is based on procedures and methodologies contained in the HCM, was used to analyze operating conditions at study area intersections. The procedure yields a Level of Service (LOS) based on the HCM 2010 as an indicator of how well intersections operate.

Existing and background operating conditions during the peak study periods are evaluated to determine a basis for comparison with the projected future conditions. The future traffic conditions generated by the proposed development under full build out were analyzed to assess the operations of the intersections in the study area. Capacity results for existing, background, and full development conditions are listed in **Table II**. The discussion following the table summarizes capacity conditions. All capacity analysis calculations are included in the Appendices.

TABLE II: CAPACITY ANALYSIS RESULTS

INTERSECTION	2016 EXISTING CONDITIONS		2021 BACKGROUND CONDITIONS		FULL ACCESS DEVELOPMENT CONDITIONS	
	AM	PM	AM	PM	AM	PM
Arsenal Street/Massey Street (S)						
Eastbound Left/Thru – Arsenal St	C(32.0)	C(26.4)	C(21.1)	C(36.7)	C(21.4)	C(27.6)
Eastbound Right – Arsenal St	B(11.4)	B(19.8)	B(19.6)	B(19.7)	B(19.8)	C(20.1)
Westbound Thru/Right – Arsenal St	D(36.3)	C(25.2)	D(48.6)	C(25.7)	D(49.3)	C(26.7)
Northbound Left – South Massey St	F(100.5)	F(*)	F(*)	F(*)	F(*)	F(*)
Northbound Thru/Right – South Massey St	C(29.3)	D(36.6)	D(44.0)	D(39.5)	D(45.3)	D(41.7)
Southbound Left – North Massey Street	C(10.3)	C(25.6)	C(24.6)	C(28.1)	C(26.0)	C(29.7)
Southbound Thru/Right – North Massey Street	A(6.8)	B(15.6)	B(15.7)	B(16.9)	B(16.0)	B(17.3)
Overall LOS	C(23.7)	D(45.3)	D(36.6)	D(52.0)	D(40.0)	E(62.2)
Arsenal Street/ Parking Lot & Gas station (Proposed Entrance) (U)						
Eastbound Left – Arsenal Street	A(7.9)	A(8.3)	A(7.9)	A(8.4)	A(7.9)	A(8.4)
Westbound Left – Arsenal Street	A(9.4)	A(8.9)	A(9.6)	A(9.0)	A(9.7)	A(9.0)
Northbound Left/Thru/Right - Entrance	B(11.1)	B(12.2)	B(11.3)	B(12.4)	C(17.6)	D(28.4)
Southbound Left/Thru/Right – Gas Station etc	C(15.3)	C(17.9)	C(15.7)	C(18.8)	C(16.1)	C(19.5)
Sherman Street/ Commercial Lots Driveway/ Arsenal Street (S)						
Eastbound Left/Thru/Right – Arsenal Street	B(12.0)	B(13.2)	B(12.2)	B(13.4)	B(12.3)	B(13.5)
Westbound Thru – Arsenal Street	B(10.2)	B(12.8)	A(9.8)	B(12.6)	A(9.9)	B(12.6)
Westbound Right – Arsenal Street	A(3.1)	A(0.1)	A(2.8)	A(0.7)	A(2.7)	A(0.7)
Northbound Left/Thru – Sherman Street	B(13.0)	B(14.5)	B(14.1)	B(16.1)	B(14.4)	B(16.6)
Northbound Right – Sherman Street	A(5.9)	A(4.9)	A(6.3)	A(5.1)	A(5.7)	A(5.2)
Southbound L/T/R – Commercial Driveway	A(10.0)	A(9.1)	A(9.2)	B(11.5)	A(9.4)	B(11.7)
Overall LOS	B(11.2)	B(12.6)	B(11.4)	B(13.2)	B(11.4)	B(13.3)
Sherman Street/ Proposed Entrance (U)						
Eastbound Left/Right – Proposed Entrance	NA		NA		B(10.6)	B(11.3)
Northbound Left – Sherman Street	NA		NA		A(7.5)	A(7.7)

INTERSECTION	2016 EXISTING CONDITIONS		2021 BACKGROUND CONDITIONS		FULL ACCESS DEVELOPMENT CONDITIONS	
	AM	PM	AM	PM	AM	PM
Sherman Street/ Stone Street						
Westbound Left/Thru – Stone Street	A(4.6)	B(10.5)	A(6.3)	B(10.8)	A(6.4)	B(10.8)
Westbound Right – Stone Street	A(2.3)	A(3.8)	A(2.9)	A(3.9)	A(3.2)	A(4.0)
Northbound Left – Sherman Street	A(3.3)	A(9.6)	A(4.7)	A(9.5)	A(4.8)	A(9.6)
Northbound Thru – Sherman Street	A(3.3)	A(8.9)	A(4.6)	A(9.2)	A(4.9)	A(9.2)
Southbound Thru – Sherman Street	A(3.3)	A(9.0)	A(4.8)	A(9.1)	A(4.8)	A(9.2)
Southbound Right – Sherman Street	A(0.0)	A(1.3)	A(0.0)	A(1.4)	A(0.0)	A(1.4)
Overall LOS	A(3.4)	A(8.7)	A(4.7)	A(8.8)	A(4.8)	A(8.8)
Stone Street/ Rexford Place/ Proposed Entrance						
Southbound Right – Proposed Entrance	NA		NA		A(8.7)	A(9.5)
South Massey Street/ Stone Street (S)						
Eastbound L/T/R – Stone Street	A(5.7)	A(5.9)	A(5.7)	A(5.9)	A(6.8)	A(6.2)
Westbound Left – Stone Street	B(13.0)	B(19.2)	B(13.0)	B(19.3)	B(14.2)	B(19.9)
Westbound Thru/Right – Stone Street	A(9.7)	C(20.5)	A(9.8)	C(21.0)	B(10.2)	C(21.4)
Northbound Left/Thru – S Massey Street	A(6.8)	B(11.7)	A(6.9)	B(11.9)	A(8.7)	B(12.7)
Southbound Thru/Right – S Massey Street	A(5.6)	A(7.4)	A(5.6)	A(7.4)	A(6.6)	A(7.6)
Overall LOS	A(6.3)	B(11.1)	A(6.3)	B(11.2)	A(7.6)	B(11.7)
South Massey Street/ Proposed South Driveway						
Westbound – Proposed South Driveway	NA		NA		B(12.6)	C(24.7)
Southbound Left – South Massey Street					A(8.3)	A(9.3)
South Massey Street/ Proposed North Driveway						
Westbound – Proposed South Driveway	NA		NA		B(12.0)	B(11.9)
Southbound Left – South Massey Street					B(10.2)	B(14.8)

Notes:

C(15.6) = Level of Service(Delay in seconds per vehicle)

(S) = Signalized; (U) = Un-signalized

NA = Approach does not exist and/or was not analyzed during this condition

Table II summarizes the capacity analysis results of the existing, 2021 background, and full development conditions. The results indicate that no significant changes in levels of service are anticipated as a result of the proposed of development at any of the study area intersections during the three peak hours studied. It is noted that the northbound left turn movement on South Massey Street currently operates at LOS “F” as a result of the heavy southbound left turn and through movements that require significant green time. The southbound left turn movement is currently 409(266) vph during the AM(PM) peak hours. NYSDOT typically considers a dual left turn lane when left turn volumes reach 300 vph. Providing dual left turn lanes would allow for a reduction in green time for this movement thereby improving the northbound levels of service. The signal would operate in a split phased mode with separate northbound and southbound phases. Levels of service would improve to “C” or better on all approaches. This improvement is not required as mitigation for this development and is not included in any of the following analyses, however it should be considered as an improvement whether or not the proposed Mercy Heights development moves forward.

Minor changes in levels of service will occur at the Arsenal Street/South Massey Street intersection and at South Massey Street/Stone Street. The eastbound right turn movement during the PM peak

hour will change from LOS “B” to “C” at Arsenal Street/South Massey Street intersection between background and full development conditions. In addition, the overall intersection LOS changes from “D” to “E”. The change in LOS from “B” to “C” is the result of a borderline condition and is the result of an increase in delay of 0.4 seconds per vehicle. The overall LOS can be improved to “D” with minor signal timing changes that would be produced by the controller as traffic volumes change at this intersection during the peak hours. No mitigation is warranted or recommended at this location.

At the South Massey Street/Stone Street intersection the westbound thru/right turn lane is projected to change from LOS “A” to “B” with a corresponding increase in delay of 0.4 seconds during the AM peak hour between background and full development conditions. Again this is the result of a borderline condition. All levels of service remain at acceptable levels and no mitigation is warranted or recommended.

IX. GAP ANALYSIS

A Gap Analysis was performed along both Arsenal Street and South Massey Street at the proposed driveway locations to determine the availability of gaps for traffic to enter (left-turns) and exit (left and right turns) the proposed driveways. For un-signalized intersections such as these, gap availability can be used as a surrogate methodology for evaluating the ability of side road traffic to enter and exit the fronting traffic stream.

The availability of gaps within the traffic stream primarily determines the side road driver behavior and delay for both entering and exiting motorists. A gap study counts the actual gaps in existing traffic available for a vehicle to enter or exit the side road. The difference between the actual number of gaps and the projected demand for a particular traffic movement can then be calculated as a reserve or deficit capacity.

The 2010 Highway Capacity Manual provides data relative to gap sizes that motorists find acceptable to execute the required maneuver. SRF & Associates performed a gap analysis at the proposed driveway location along Arsenal Street as well as the proposed north driveway along South Massey Street on Tuesday, June 14th, Wednesday June 15th and Tuesday, June 21st, 2016 during the AM and PM peak hours to evaluate potential future operating conditions. **Table III** indicates the acceptable gap duration, the number of existing gaps based on the duration, the projected traffic volume for the movement, and the resulting reserve (or deficit) capacity during the AM and PM peak hours.

**TABLE III
PEAK HOUR GAP ANALYSIS RESULTS**

INTERSECTION	MOVEMENT	ACCEPTABLE GAP DURATION	EXISTING GAPS BASED ON COLLECTED DATA (VPH)	PROJECTED VOLUME (VPH)	RESERVE CAPACITY (VPH)
Arsenal St/Proposed Driveway	Right turns exiting site	6.9 sec	228(365)	2(18)	226(347)
	Left turns exiting site	7.5 sec	155(36)	1(14)	154(22)
	Left turns entering site	4.1 sec	260(218)	8(4)	252(214)

South Massey St/Proposed Driveway	Right turns exiting site	6.9 sec	359(92)	3(31)	356(61)
	Left turns exiting site	7.5 sec	210(88)	1(9)	209(79)
	Left turns entering site	4.1 sec	570(139)	16(7)	554(132)

Note:

00(00) = AM(PM) Peak Hour

Based on the field observations, gap study, the operation and phasing of the traffic signal at Arsenal St/South Massey Street, and the projected site generated traffic volumes, it is anticipated that there will be sufficient gaps to accommodate all of the turns in and out of the site at both the Arsenal Street and South Massey Street driveways. No turn restrictions are warranted to recommended at this time.

X. CONCLUSIONS & RECOMMENDATIONS

This study evaluates the potential traffic impacts resulting from the proposed Mercy Heights Development in Watertown, NY. Based upon the collective analyses and field observations, the results indicate that the proposed development will not have significant adverse traffic impacts on the existing roadway network. The following sets forth conclusions and recommendations based upon the results of the analyses:

1. The proposed development is expected to generate approximately 86 entering/56 exiting vehicle trips during the weekday AM peak hour and 70 entering/126 exiting vehicle trips during the PM peak hour.
2. It is noted that the northbound left turn movement on South Massey Street currently operates at LOS “F” as a result of the heavy southbound left turn and through movements that require significant green time. The southbound left turn movement is currently 409(266) vph during the AM(PM) peak hours. NYSDOT typically considers a dual left turn lane when left turn volumes reach 300 vph. Providing dual left turn lanes would allow for a reduction in green time for this movement thereby improving the northbound levels of service. The signal would operate in a split phased mode with separate northbound and southbound phases. Levels of service would improve to “C” or better on all approaches. This improvement is not required as mitigation for this development, however it should be considered as an improvement whether or not the proposed Mercy Heights development moves forward.
3. The Gap Analysis shows that there will be sufficient gaps for all movements entering and exiting both the Arsenal Street and South Massey Street driveways. No turn restrictions are warranted to recommended at this time.
4. The proposed development will not result in any potentially significant adverse traffic impacts to the study area intersections with the recommended mitigation in place.

XI. FIGURES

Figures 1 through 8 are included on the following pages.

FIGURE 1 - SITE LOCATION AND STUDY AREA



**PROPOSED
MERCY REDEVELOPMENT**

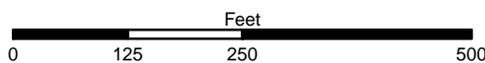
Legend

Intersection Type

- Study
- Study/Proposed
- Proposed

- Site Location
- Study Area

PROPOSED MERCY REDEVELOPMENT CITY OF WATERTOWN, NY



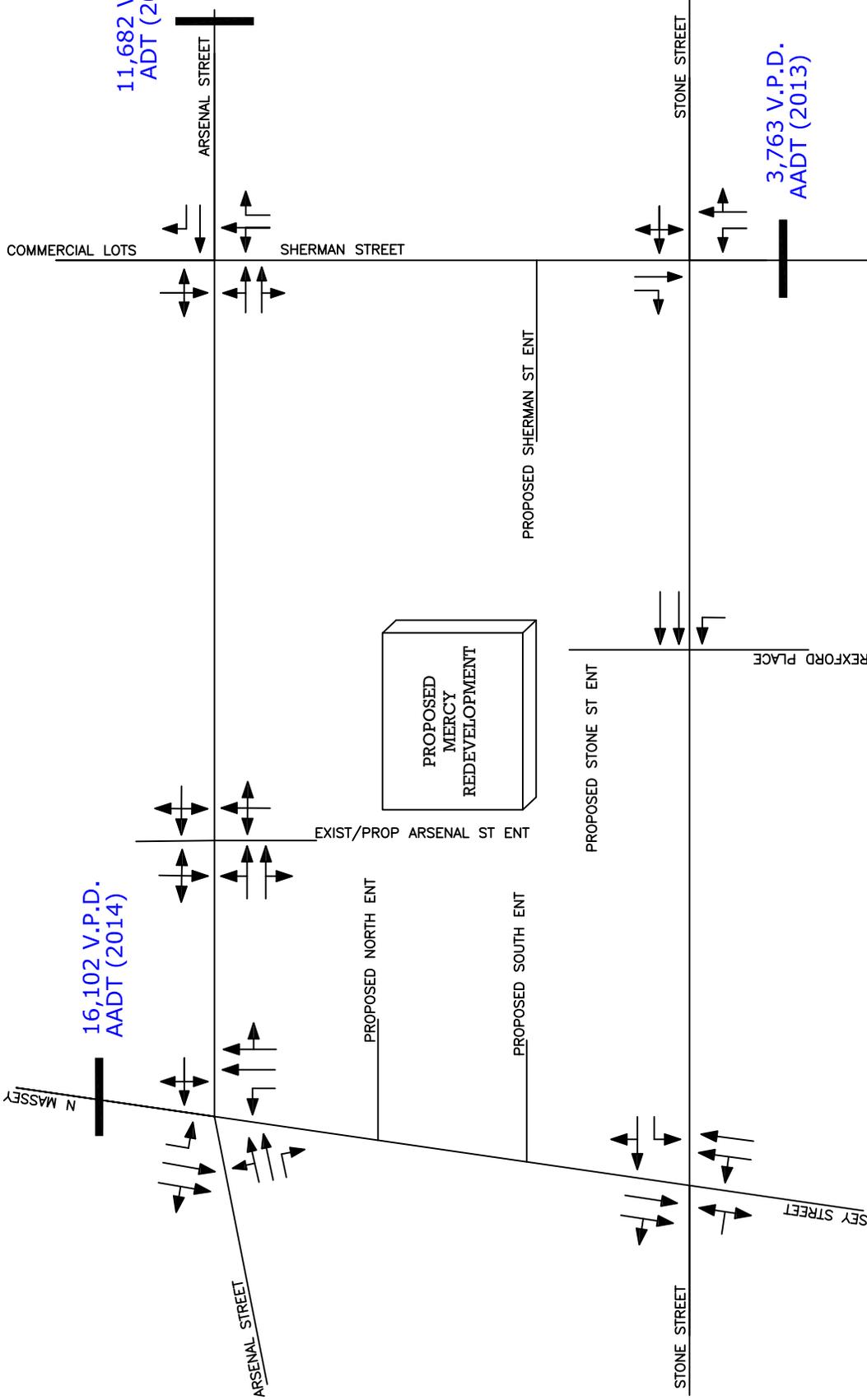
NOTES:

All counts by the NYS Department of Transportation
V.P.D. = Vehicles per Day

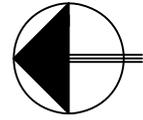
16,102 V.P.D.
AADT (2014)

11,682 V.P.D.
AADT (2009)

3,763 V.P.D.
AADT (2013)



PROJECT NO: 36031



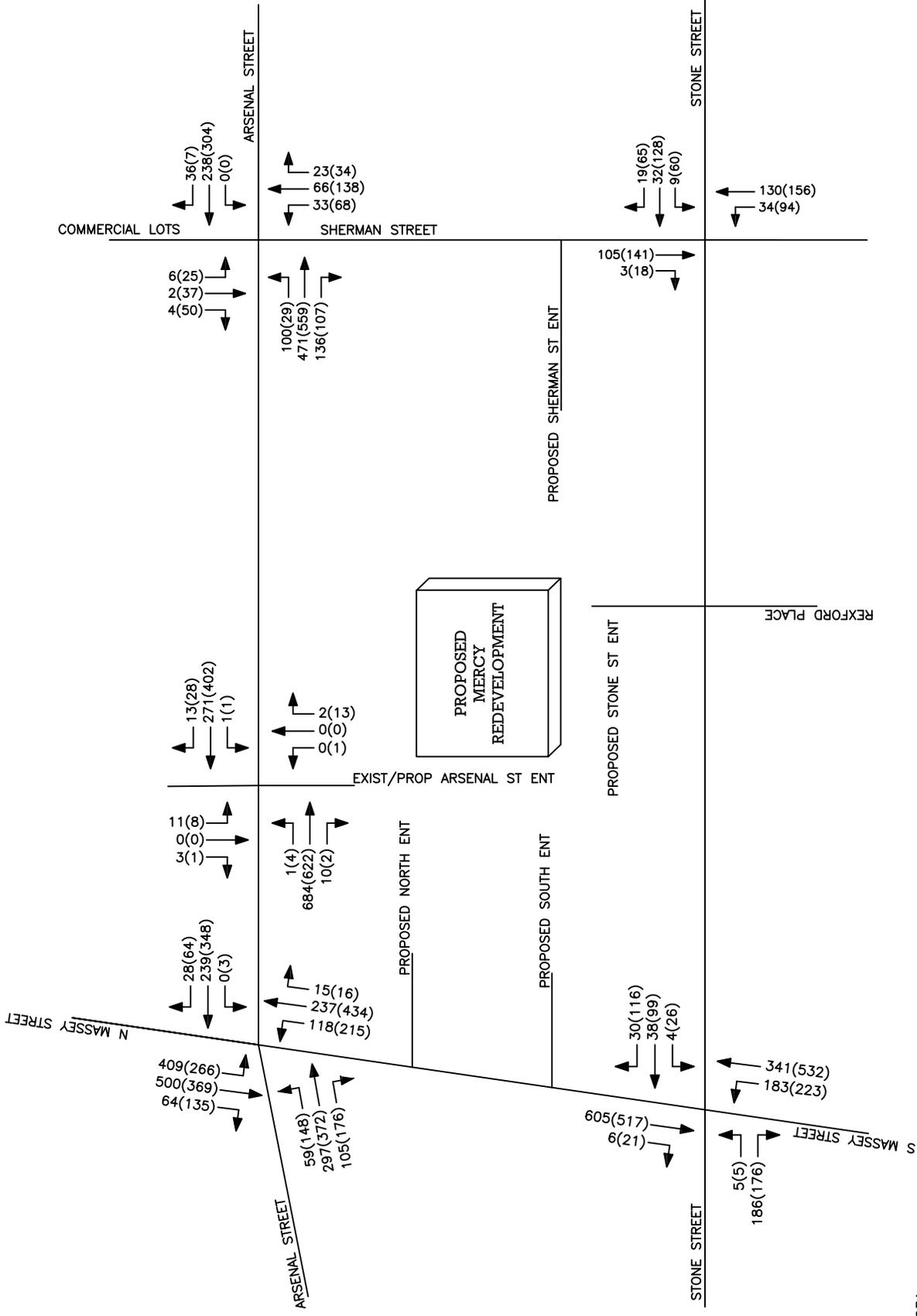
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NOT TO SCALE

FIGURE 2

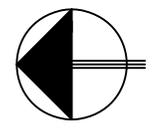
LANE GEOMETRY &
AVERAGE DAILY TRAFFIC

MERCY HEIGHTS,
CITY OF WATERTOWN, NY

KEY



PROJECT NO: 36031



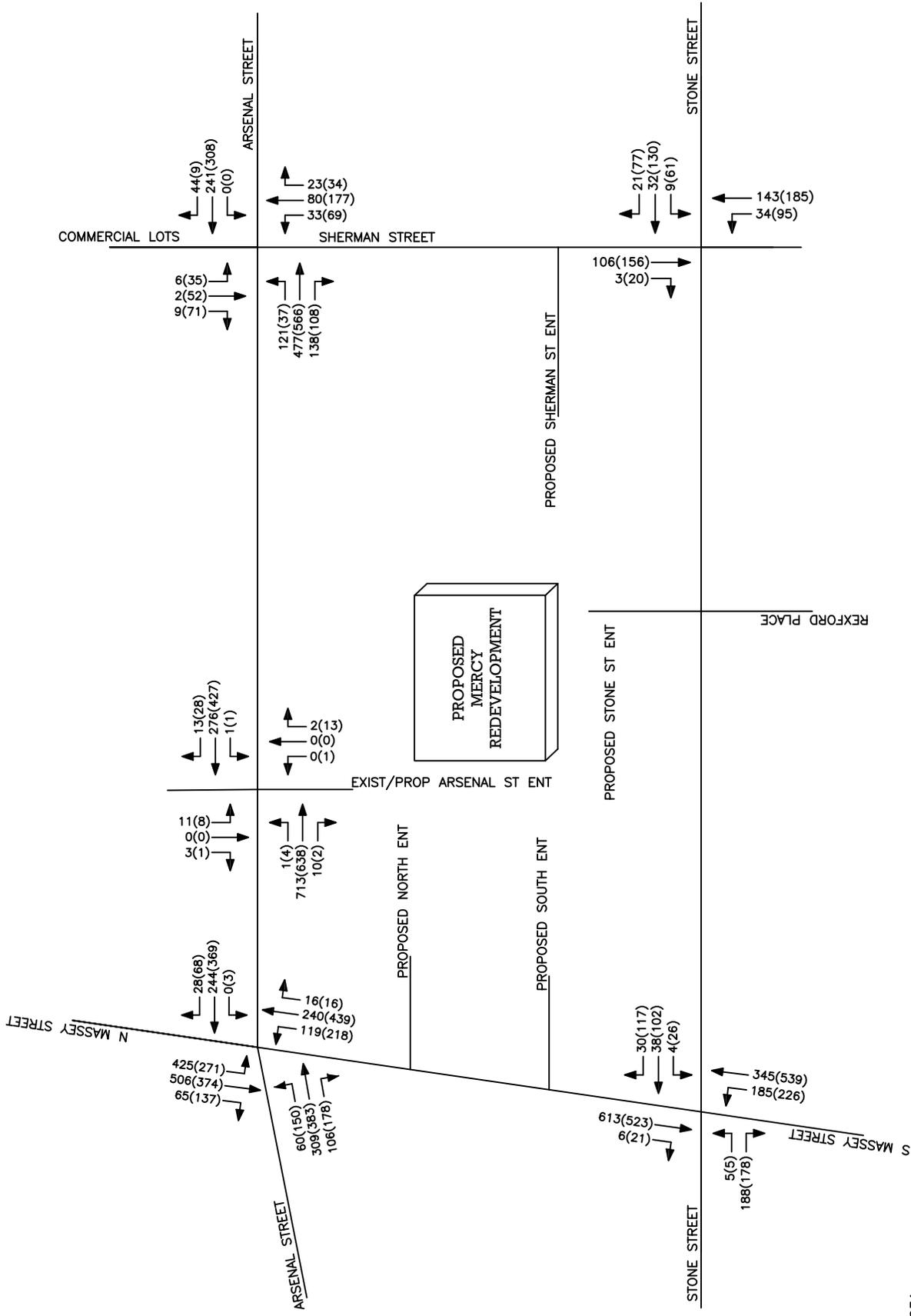
NOT TO SCALE

FIGURE 3

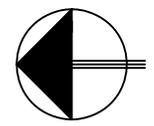
PEAK HOUR VOLUMES
2016 EXISTING CONDITIONS
MERCY HEIGHTS,
CITY OF WATERTOWN, NY

KEY

00(00) = AM(PM)



PROJECT NO: 36031



N
 NOT TO SCALE

FIGURE 4

PEAK HOUR VOLUMES
 2021 BACKGROUND CONDITIONS
 MERCY HEIGHTS,
 CITY OF WATERTOWN, NY

KEY

00(00) = AM(PM)

City of Watertown
Jefferson County
State of New York

**COR Arsenal Street
Company, LLC**

540 Towne Drive
Fayetteville, NY 13066



Bergmann Associates, Architects, Engineers,
Landscape Architects & Surveyors, D.P.C.
200 First Federal Plaza
Rochester, NY 14614
office: 585.232.5155
fax: 585.232.4652
www.bergmannppc.com

NO.	DATE	DESCRIPTION	REV.	CMD

**PRELIMINARY
NOT FOR
CONSTRUCTION**

PROFESSIONAL CERTIFICATION: I CERTIFY THAT THESE PLANS AND SPECIFICATIONS ARE MY OWN WORK AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF NEW YORK.
EXPIRATION DATE: 05/20/21

TO THE BEST OF MY KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGMENT, THE PLANS AND SPECIFICATIONS ARE IN ACCORDANCE WITH THE CITY OF WATERTOWN CONSERVATION CODE OF THE STATE OF NEW YORK.

Copyright © Bergmann Associates, Architects, Engineers, Landscape Architects & Surveyors, D.P.C.
Unauthorized alteration or addition to this drawing is a violation of the New York State Education Law Article 145, Section 1220.
Project No. 19-02-101
A. HART, P.E.
J. BUSH
MAY 23, 2018
1" = 30'
010407.00

SITE PLAN

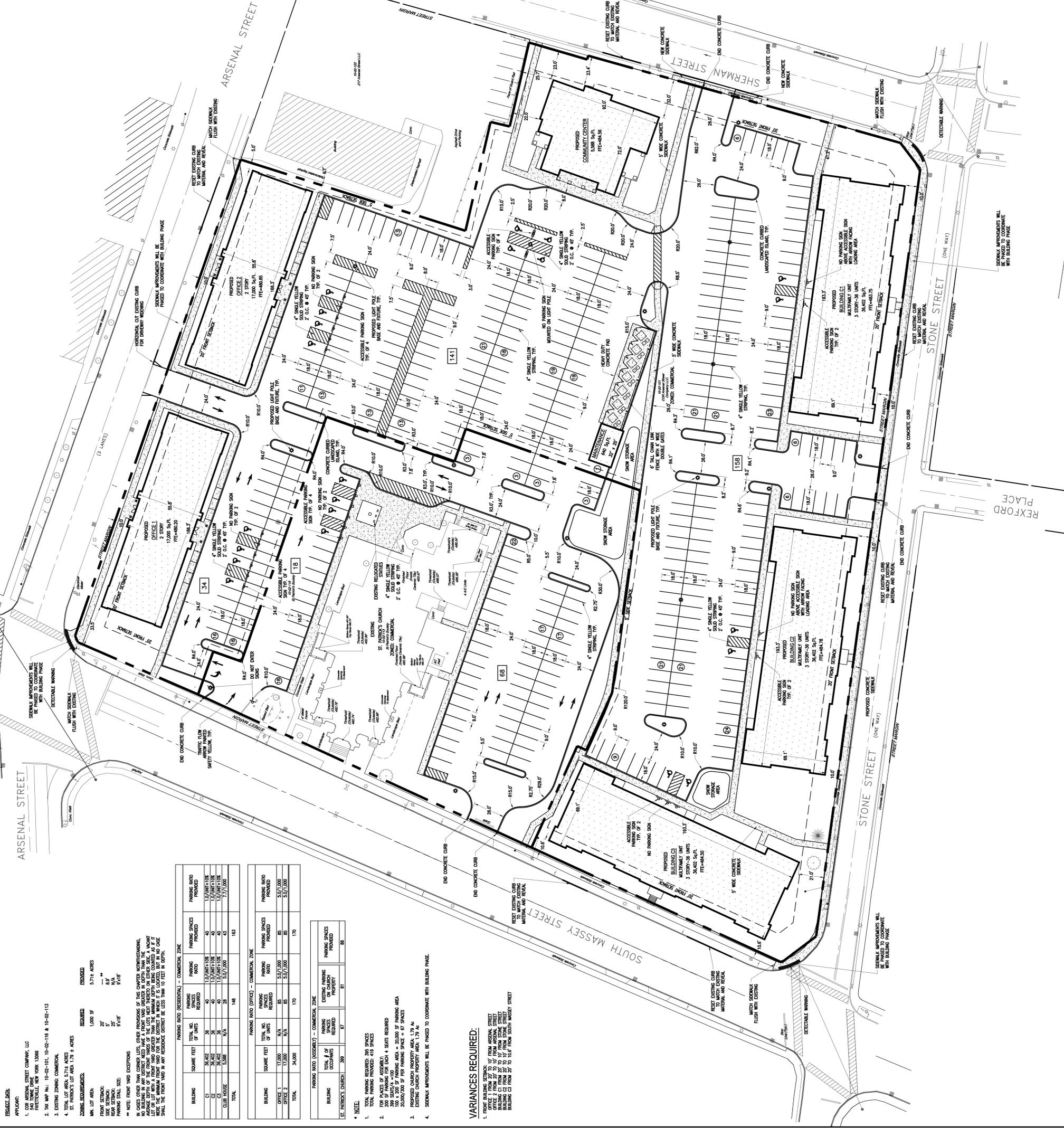
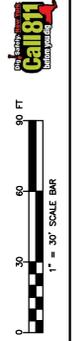


SITE PLAN NOTES:

- CONTRACTOR IS RESPONSIBLE FOR PROTECTION OF ALL PROPERTY CORNERS AND MONUMENTS.
- CONTRACTOR SHALL PROTECT EXISTING CURB, CONCRETE, AND PAVEMENT TO EXISTING IN GRADE AND ADJACENT.
- CONTRACTOR SHALL REMOVE EXISTING CURB AND CONCRETE IN ACCORDANCE WITH SPECIFICATIONS OF THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION.
- THE EARTHWORK FOR ALL BUILDING FOUNDATIONS AND SLABS SHALL BE IN ACCORDANCE WITH ARCHITECTURAL BUILDING PLANS AND SPECIFICATIONS.
- CONTRACTOR SHALL REFER TO ARCHITECTURAL PLANS FOR ACTUAL DIMENSIONS, PERCH AND NAME LOCATIONS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING UTILITY COMPANES, PERCHES TO CONSTRUCTION, MAINTENANCE OR RELOCATION OF EXISTING UTILITIES AS DESIGNATED ON PLANS.
- SEE COVER SHEET FOR LIST OF UTILITY COMPANES.
- CONTRACTOR SHALL PROTECT THE BALANCE PER PERMITS OF ALL EXISTING UTILITIES AND APPURTENANCES IN WORK AREA, AS WELL AS, TO PROTECT ALL ACCESSIBLE SINKS.
- CONTRACTOR SHALL REFER TO ARCHITECTURAL PLANS AND SPECS FOR ACTUAL LOCATION OF ALL UTILITY ENTRANCES TO INCLUDE SANITARY SEWER, LATERALS, DOMESTIC AND FIRE. COORDINATE INSTALLATION OF UTILITIES IN SUCH A MANNER AS TO AVOID CONFLICTS AND COORDINATE WITH ALL APPLICABLE CITY OF WATERTOWN STANDARDS. COMPACTED TESTING CHAMBERS FOR EXISTING UTILITIES AS WELL AS, COORDINATE WITH ALL UTILITY COMPANES FOR APPROVED LOCATION AND DEPTH OF THE UTILITY CONNECTIONS TO THEIR FACILITIES.
- ALL WORK AND MATERIALS SHALL COMPLY WITH ALL CITY/COUNTY REGULATIONS AND CODES AND O.S.H.A. STANDARDS.
- CONTRACTOR IS RESPONSIBLE FOR REPAIRING THE DAMAGE DONE TO ANY EXISTING ITEM (PAVEMENT, CURB, CONCRETE, ETC.) REPAIRS SHALL BE EQUAL TO OR BETTER THAN EXISTING CONDITIONS. MAINTENANCE SHALL BE PERFORMED FROM TO ANNOUNCED BUILDING POSSESSION AND FINAL CONNECTION OF SERVICES.
- SEE ARCHITECTURAL PLANS FOR EXACT BUILDING DIMENSIONS.
- ALL WORK TO BE PERFORMED WITHIN THE CITY OF WATERTOWN MASON WALL REQUIRE PROTECT THE CITY OF WATERTOWN MASON WALLS. CONTRACTOR SHALL BE RESPONSIBLE TO APPROVED SITE PLAN AND APPLICABLE CITY OF WATERTOWN STANDARDS. COMPACTED TESTING CHAMBERS FOR EXISTING UTILITIES AS WELL AS, COORDINATE WITH ALL UTILITY COMPANES AND MUST BE SUBMITTED TO THE CITY OF WATERTOWN CODES DEPARTMENT.
- THE HORIZONTAL DATUM IS BASED ON NYS CENTRAL ZONE INDEX.
- ALL SEWERLAK WORK WITHIN THE CITY RIGHT-OF-WAY IS TO MEET PUBLIC-RIGHT-OF-WAY (PRWO) STANDARDS. SEE WESTOY STAND SHEETS 808-01.

SITE PLAN LEGEND

- EXISTING PROPERTY LINE
- PROPOSED BUILDING
- PROPOSED CURB
- PROPOSED PARKING SPACES
- PROPOSED CONCRETE PAVEMENT
- PROPOSED LIGHT POLE AND BASE
- CHAIN LINK FENCE



PARKING RATIO (RESIDENTIAL) - COMMERCIAL ZONE			
BUILDING	SQUARE FEET	SPACES REQUIRED	PARKING RATIO
CT	34,002	38	1.0/UNIT/10K
SI	34,002	40	1.2/UNIT/10K
CS	34,002	40	1.2/UNIT/10K
CLUB HOUSE	5,588	N/A	4.5
TOTAL	117,000	148	5.0/1,000

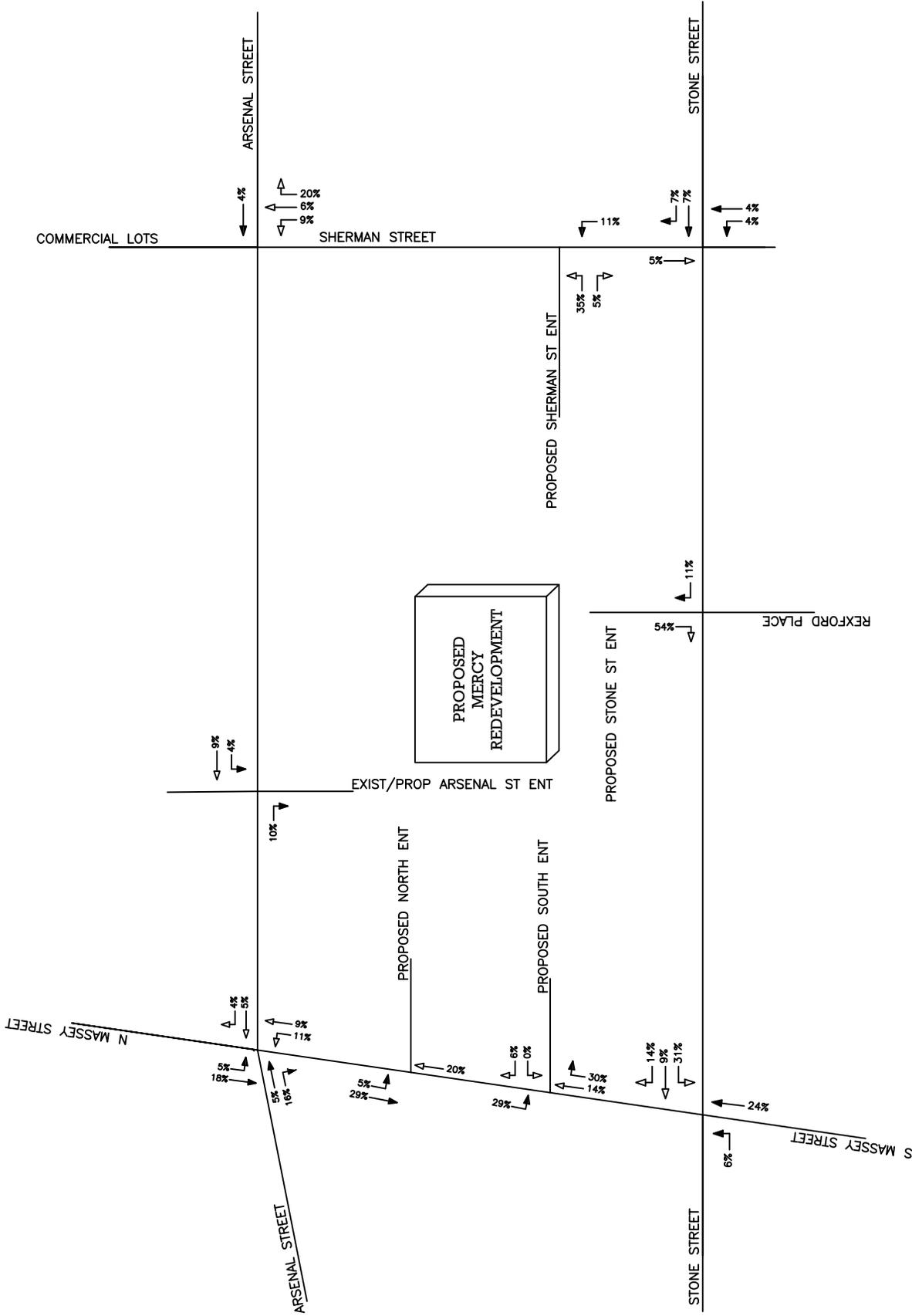
PARKING RATIO (OFFICE) - COMMERCIAL ZONE			
BUILDING	SQUARE FEET	SPACES REQUIRED	PARKING RATIO
OFFICE 1	117,000	N/A	85
OFFICE 2	117,000	N/A	85
TOTAL	234,000	170	5.0/1,000

PARKING RATIO (RESIDENTIAL) - COMMERCIAL ZONE			
BUILDING	TOTAL # OF SPACES REQUIRED	EXISTING PARKING ON ADJACENT PROPERTY	PARKING SPACES PROVIDED
ST. PATRICK'S CHURCH	399	87	85

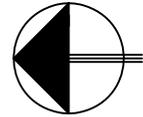
- * NOTE:**
- TOTAL PARKING REQUIRED: 395 SPACES
 - FOR EACH OF OFFICES 1 & 2, 170 SPACES
 - FOR EACH OF OFFICES 1 & 2, 200 SPACES REQUIRED
 - 399 SPACES = 170 (EXISTING) + 200 (REQUIRED) = 370 SPACES
 - 20,000/500 SF PER PARKING SPACE = 67 SPACES
 - PROPOSED CHURCH PROPERTY AREA: 1.79 AC
 - EXISTING CHURCH PROPERTY AREA: 1.79 AC
 - SEWERLAK IMPROVEMENTS WILL BE PHASED TO COORDINATE WITH BUILDING PHASE.

VARIANCES REQUIRED:

- FRONT BUILDING SETBACK: 10' FROM ARSENAL STREET
- OFFICE 2 FROM 20' TO 10' FROM ARSENAL STREET
- FRONT BUILDING SETBACK: 10' FROM SOUTH MASSIE STREET
- BUILDING C3 FROM 20' TO 10' FROM SOUTH MASSIE STREET
- BUILDING C3 FROM 20' TO 10' FROM SOUTH MASSIE STREET



PROJECT NO: 36031



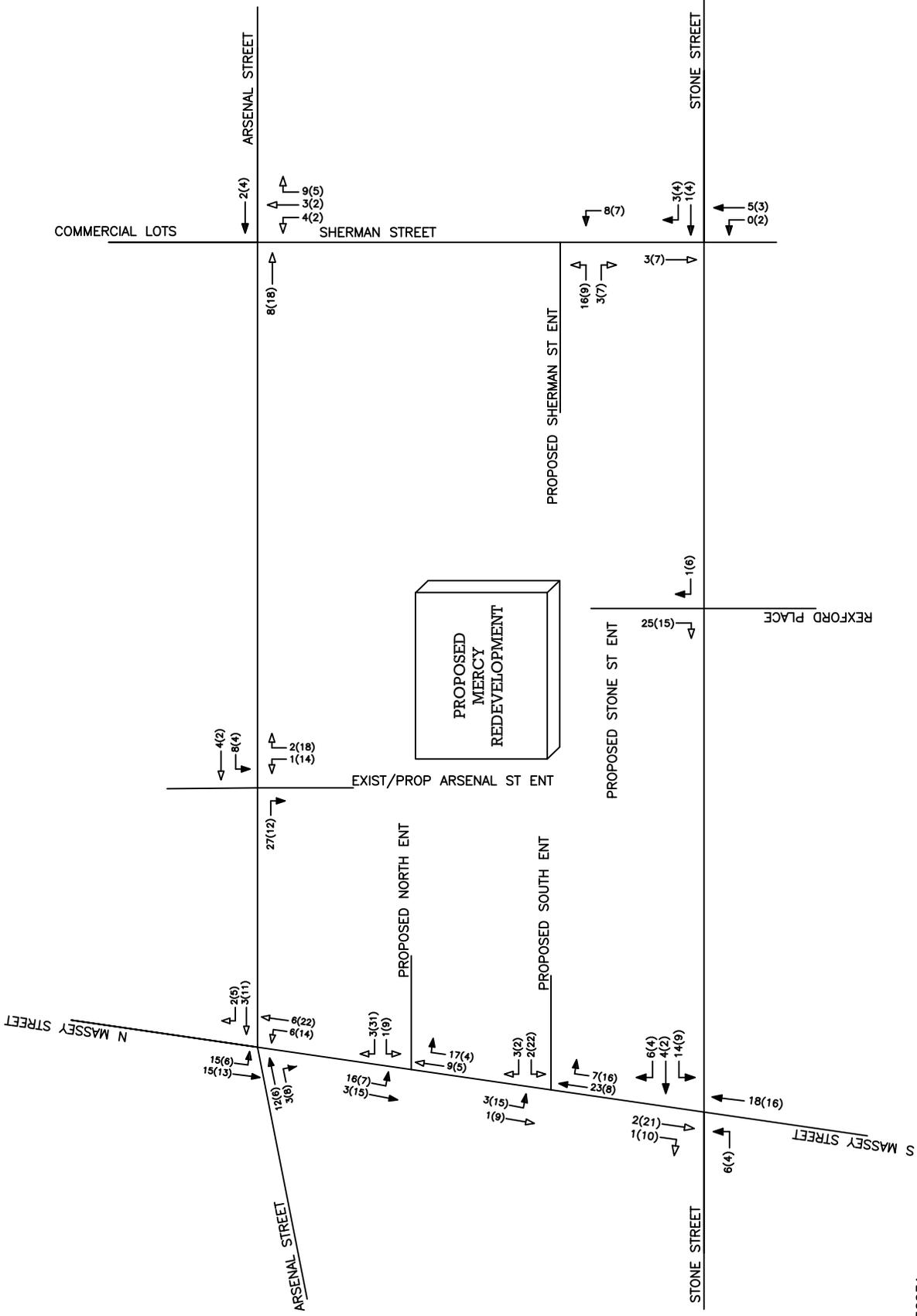
N
 NOT TO SCALE

FIGURE 6-B

TRIP DISTRIBUTION
 RESIDENTIAL FULL ACCESS
 MERCY HEIGHTS,
 CITY OF WATERTOWN, NY

KEY

00(00) = AM(PM)
 ↑ = ENTERING TRIPS
 ↓ = EXITING TRIPS

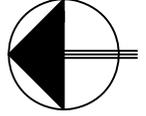


KEY

- 00(00) = AM(PM)
- ↑ = ENTERING TRIPS
- ↓ = EXITING TRIPS

FIGURE 7

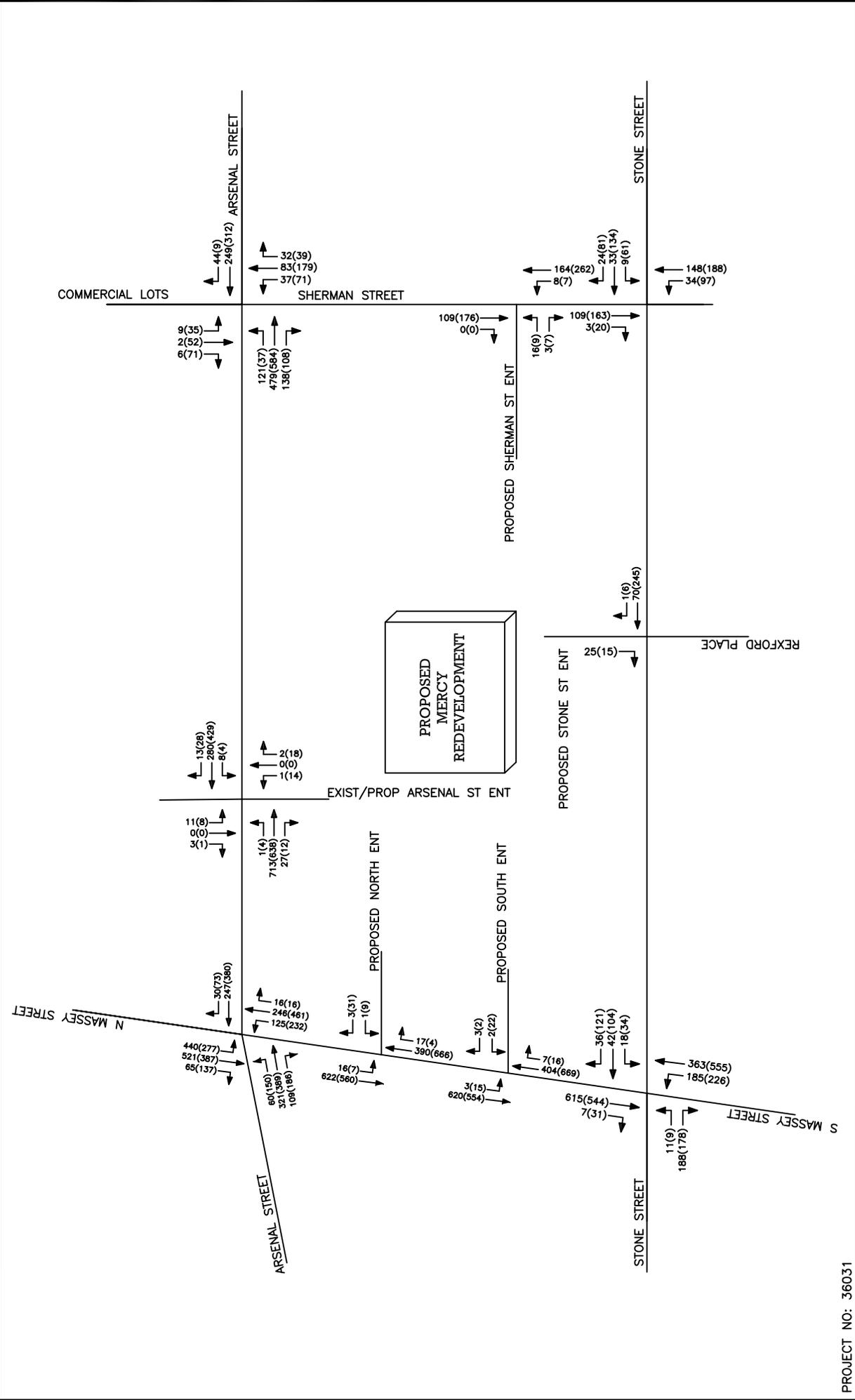
SITE GENERATED TRIPS
 MERCY HEIGHTS,
 CITY OF WATERTOWN, NY



NOT TO SCALE

SRF ASSOCIATES
 WWW.SRFA.NET
 Transportation Engineering & Planning Consultants

PROJECT NO: 36031

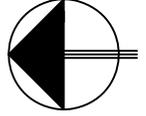


KEY

FIGURE 8

PEAK HOUR VOLUMES
FULL DEVELOPMENT CONDITIONS
MERCY HEIGHTS,
CITY OF WATERTOWN, NY

00(00) = AM(PM)



N
NOT TO SCALE



PROJECT NO: 36031

APPENDICES

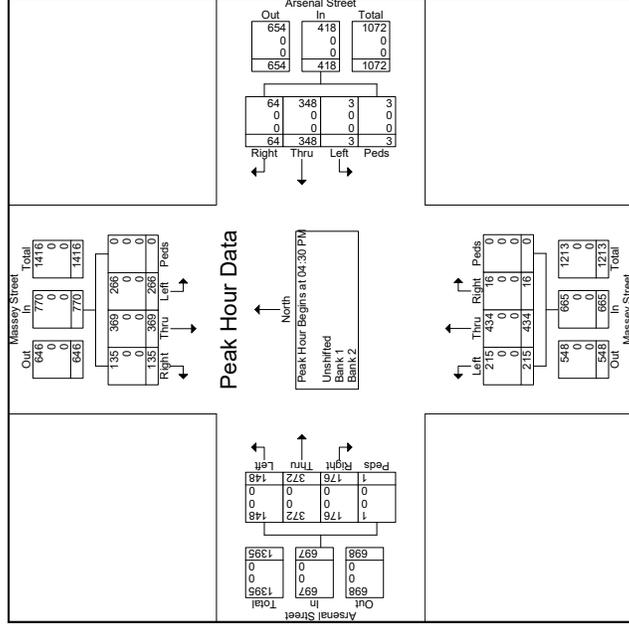
A1

Collected Traffic Volume Data

Groups Printed- Unshifted - Bank 1 - Bank 2

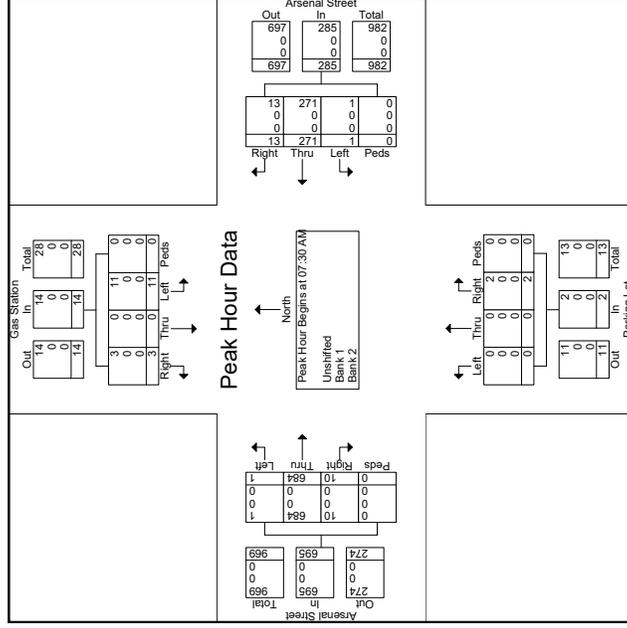
Start Time	Massey Street Southbound			Arsenal Street Westbound			Massey Street Northbound			Arsenal Street Eastbound			Int. Total		
	Right	Thru	Left												
04:00 PM	52	63	61	0	16	96	0	0	0	5	101	57	0	630	
04:15 PM	28	53	68	0	16	77	0	0	0	14	111	50	0	633	
04:30 PM	28	113	72	0	23	77	0	3	1	134	47	0	3	649	
04:45 PM	25	80	61	0	13	96	0	0	0	0	63	61	0	599	
Total	114	351	252	0	67	362	0	3	7	400	191	0	167	2437	
05:00 PM	49	80	64	0	12	98	1	0	1	106	57	0	54	102	35
05:15 PM	33	86	69	0	16	77	2	0	14	111	50	0	54	91	30
05:30 PM	31	69	42	0	17	83	0	0	5	61	32	0	32	95	29
05:45 PM	31	63	39	0	15	75	0	0	1	73	35	0	38	82	30
Total	144	308	214	0	60	333	3	0	21	351	174	0	178	370	124
Grand Total	258	659	466	0	127	695	3	3	28	751	365	0	345	723	293
Approch %	18.7	47.7	33.7	0	15.3	83.9	0.4	0.4	2.4	65.6	31.9	0	25.3	53.1	21.5
Total %	5.5	14	9.9	0	2.7	14.7	0.1	0.1	0.6	15.9	7.7	0	7.3	15.3	6.2
Unshifted	258	659	466	0	127	695	3	3	28	751	365	0	345	723	293
% Unshifted	100	100	100	0	100	100	100	100	100	100	100	0	100	100	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Start Time	Massey Street Southbound			Arsenal Street Westbound			Massey Street Northbound			Arsenal Street Eastbound			Int. Total
	Right	Thru	Left										
04:00 PM	28	113	72	213	23	77	0	3	103	1	124	0	170
04:15 PM	28	113	72	213	23	77	0	3	103	1	124	0	170
04:30 PM	28	113	72	213	23	77	0	3	103	1	124	0	170
04:45 PM	28	113	72	213	23	77	0	3	103	1	124	0	170
Total	114	351	252	840	76	284	0	12	412	4	496	0	680
05:00 PM	49	80	64	418	14	106	57	0	14	111	50	0	633
05:15 PM	33	86	69	418	14	106	57	0	14	111	50	0	633
05:30 PM	31	69	42	418	14	106	57	0	14	111	50	0	633
05:45 PM	31	63	39	418	14	106	57	0	14	111	50	0	633
Total	144	308	214	1664	56	428	241	0	56	448	200	0	2550
Grand Total	258	659	466	1664	56	428	241	0	56	448	200	0	2550
Approch %	18.7	47.7	33.7	15.3	83.9	0.4	0.4	2.4	65.6	31.9	7.7	0	25.3
Total %	5.5	14	9.9	65.6	14.7	100	100	100	100	100	100	0	100
Unshifted	258	659	466	1664	56	428	241	0	56	448	200	0	2550
% Unshifted	100	100	100	100	100	100	100	0	100	100	100	0	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0
Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0



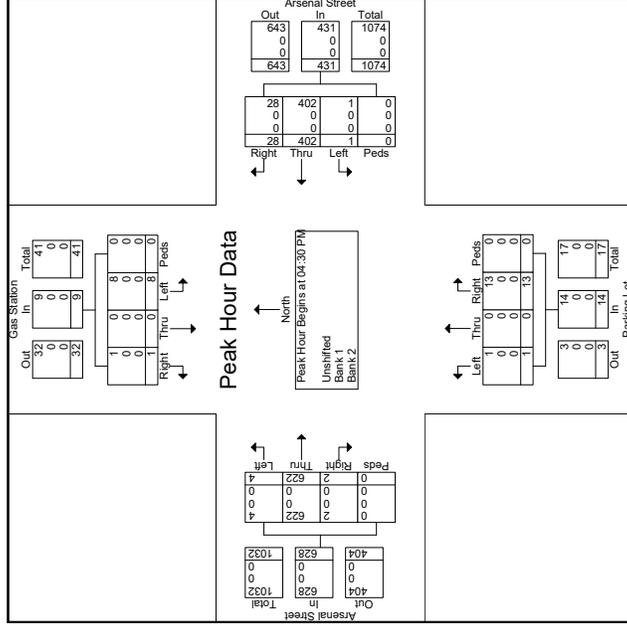
Start Time	Gas Station Southbound			Arsenal Street Westbound			Parking Lot Northbound			Arsenal Street Eastbound			Int. Total	
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left		
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	1	0	0	3	23	0	0	0	0	0	0	0	0	197
07:30 AM	1	0	0	3	67	0	0	0	0	0	0	0	0	245
07:45 AM	0	0	0	3	61	0	0	0	0	0	0	0	0	272
Total	2	0	0	13	186	1	0	2	0	0	2	0	0	625
08:00 AM	0	0	0	3	70	0	0	0	0	0	0	0	0	220
08:15 AM	2	0	0	5	75	0	0	0	0	0	0	0	0	259
08:30 AM	0	0	0	2	66	0	0	0	0	0	0	0	0	213
08:45 AM	1	0	0	2	63	0	0	3	0	0	0	0	0	230
Total	3	0	0	12	274	0	0	3	0	0	0	0	0	922
Grand Total	5	0	0	25	460	1	0	5	0	1	0	0	0	1747
Approch %	17.2	0	0	5.1	94.7	0.2	0	83.3	0	16.7	0	0	0	2.9
Total %	0.3	0	0	1.4	26.3	0.1	0	0.3	0	0.1	0	0	0	2.1
Unshifted	5	0	0	25	460	1	0	5	0	1	0	0	0	1747
% Unshifted	100	0	0	100	100	100	0	100	0	100	0	0	0	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Start Time	Gas Station Southbound			Arsenal Street Westbound			Parking Lot Northbound			Arsenal Street Eastbound			Int. Total	
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left		
07:30 AM	1	0	0	3	2	0	0	0	0	0	0	0	0	203
07:45 AM	0	0	0	3	2	0	0	0	0	0	0	0	0	174
08:00 AM	0	0	0	3	70	0	0	0	0	0	0	0	0	259
08:15 AM	2	0	0	5	75	0	0	0	0	0	0	0	0	272
Total	3	0	0	14	153	0	0	0	0	0	0	0	0	922
Total Volume	21.4	0	0	78.6	0	0	0	0	0	0	0	0	0	285
% Approach	37.5	0.00	0.00	37.00	65.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	250
% Unshifted	3	0	0	14	153	0	0	0	0	0	0	0	0	285
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0



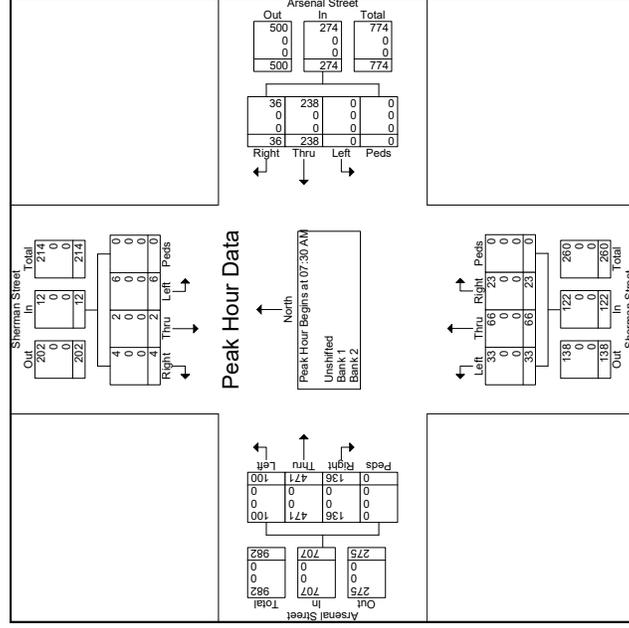
Start Time	Gas Station Southbound			Arsenal Street Westbound			Parking Lot Northbound			Arsenal Street Eastbound			Int. Total	
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left		
04:00 PM	1	0	0	6	108	0	0	0	0	1	162	0	0	283
04:15 PM	1	0	0	8	106	0	0	0	0	1	196	0	0	287
04:30 PM	0	0	0	9	106	0	0	0	0	1	166	0	0	282
04:45 PM	0	0	0	10	106	0	0	0	0	1	142	0	0	261
Total	2	0	0	33	422	0	0	0	0	4	607	0	0	1083
05:00 PM	1	0	0	4	99	0	0	0	0	0	158	0	0	276
05:15 PM	0	0	0	5	95	0	0	0	0	0	157	0	0	263
05:30 PM	0	0	0	2	106	0	0	0	0	0	143	0	0	260
05:45 PM	0	0	0	5	91	0	0	0	0	0	127	0	0	224
Total	1	0	0	16	391	0	0	0	0	0	585	0	0	1023
Grand Total	3	0	0	49	813	0	0	0	0	4	1192	0	0	2106
Approch %	13	0	0	5.7	94.2	0	0	0	0	0.3	99	0	0	0
Total %	0.1	0	0	2.3	38.6	0	0	0	0	0.2	56.6	0	0	0
Unshifted	3	0	0	48	813	0	0	0	0	4	1192	0	0	2106
% Unshifted	100	0	0	100	100	0	0	0	0	100	100	0	0	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Start Time	Gas Station Southbound			Arsenal Street Westbound			Parking Lot Northbound			Arsenal Street Eastbound			Int. Total	
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left		
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour for Entire Intersection Begins at 04:30 PM	0	0	0	3	9	102	1	116	0	0	1	0	1	165
04:30 PM	0	0	0	3	9	102	1	116	0	0	1	0	1	165
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	3	5	95	0	100	13	0	0	0	13	143
05:15 PM	0	0	0	8	9	28	402	0	431	0	0	0	14	427
Total Volume	11	0	0	88	65	93	0	2	7	0	0	0	0	143
% Approach	11.1	0	0	88.9	6.5	93.3	0.2	2.0	7.1	0	0	0	0	100
PHF	0.250	0.000	0.000	0.750	0.000	0.000	0.000	0.929	0.000	0.000	0.250	0.000	0.000	0.269
Unshifted	1	0	0	8	9	28	402	1	431	0	1	0	14	457
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0



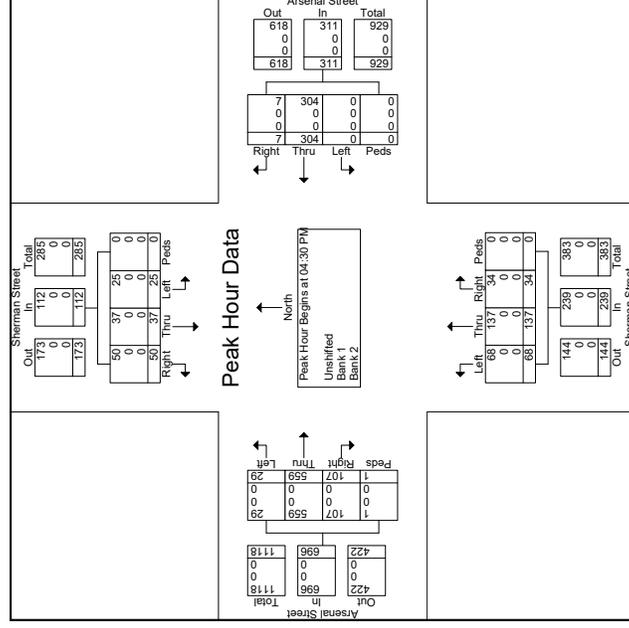
Start Time	Sherman Street Southbound			Arsenal Street Westbound			Sherman Street Northbound			Arsenal Street Eastbound			Int. Total	
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left		
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	4	0	0	36	0	0	17	4	0	19	7	0	140
07:30 AM	1	0	0	0	13	0	0	3	16	5	32	89	22	196
07:45 AM	1	0	4	0	15	68	0	6	21	3	27	121	49	286
Total	4	4	4	0	32	175	0	15	54	18	117	403	108	834
08:00 AM	1	1	1	0	3	62	0	7	11	9	30	112	11	248
08:15 AM	0	1	0	0	5	56	0	7	18	16	40	116	12	271
08:30 AM	1	0	1	0	11	57	0	6	11	17	26	95	18	243
08:45 AM	1	1	4	0	14	79	1	13	22	14	26	108	28	311
Total	3	2	7	0	33	254	1	33	62	56	122	431	69	1073
Grand Total	7	6	11	0	65	429	1	48	116	74	239	834	177	2007
Approch %	29.2	25	45.8	0	13.1	86.7	0.2	20.2	48.7	31.1	19.1	66.7	14.2	0
Total %	0.3	0.3	0.5	0	3.2	21.4	0	2.4	5.8	3.7	11.9	41.6	8.8	0
Unshifted	7	6	11	0	65	429	1	48	116	74	239	834	177	2007
% Unshifted	100	100	100	0	100	100	0	100	100	100	100	100	100	0
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Start Time	Sherman Street Southbound			Arsenal Street Westbound			Sherman Street Northbound			Arsenal Street Eastbound			Int. Total	
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left		
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	1	0	0	0	3	13	52	0	0	65	3	16	5	24
07:30 AM	2	1	0	0	5	15	68	0	0	83	9	21	7	41
07:45 AM	1	0	1	0	1	2	56	0	0	57	7	18	16	41
Total	4	1	1	0	9	33	236	0	0	274	23	66	38	122
08:00 AM	4	0	1	0	12	36	236	0	0	51	7	18	16	41
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	4	0	1	0	12	36	236	0	0	51	7	18	16	41
Total Volume	33.3	16.7	50	0	274	821	821	0	0	825	821	786	516	0
% Approach	500	500	375	0	600	1600	875	0	0	1000	1000	1000	1000	0
% Unshifted	100	100	100	0	100	100	100	0	0	100	100	100	100	0
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Start Time	Sherman Street Southbound			Arsenal Street Westbound			Sherman Street Northbound			Arsenal Street Eastbound			Int. Total				
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left					
04:00 PM	2	8	0	5	84	0	0	12	32	17	0	21	146	11	0	304	
04:15 PM	7	3	0	8	89	0	0	12	32	22	0	19	133	13	0	306	
04:30 PM	22	15	0	1	75	0	0	14	48	13	0	22	133	9	0	385	
04:45 PM	8	5	4	0	85	0	0	5	21	16	0	22	124	9	0	299	
Total	43	25	24	0	333	0	0	30	133	68	0	84	521	42	0	1314	
05:00 PM	10	10	7	0	76	0	0	10	47	20	0	40	153	9	0	385	
05:15 PM	10	7	3	0	68	0	0	8	21	19	0	23	144	2	1	309	
05:30 PM	7	3	7	0	73	0	0	7	19	18	0	14	128	3	0	281	
05:45 PM	2	3	1	0	74	1	0	4	14	12	0	11	111	0	0	237	
Total	29	23	18	0	291	1	0	29	101	69	0	88	536	14	1	1212	
Grand Total	72	48	42	0	23	624	1	0	59	234	137	0	172	1057	56	1	2526
Approach %	44.4	29.6	25.9	0	3.5	96.3	0.2	0	13.7	54.4	31.9	0	13.4	82.2	4.4	0.1	
Total %	2.9	1.9	1.7	0	0.9	24.7	0	0	2.3	9.3	5.4	0	6.8	41.8	2.2	0	
Unshifted	72	48	42	0	23	624	1	0	59	234	137	0	172	1057	56	1	2526
% Unshifted	100	100	100	0	100	100	100	0	100	100	100	0	100	100	100	100	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

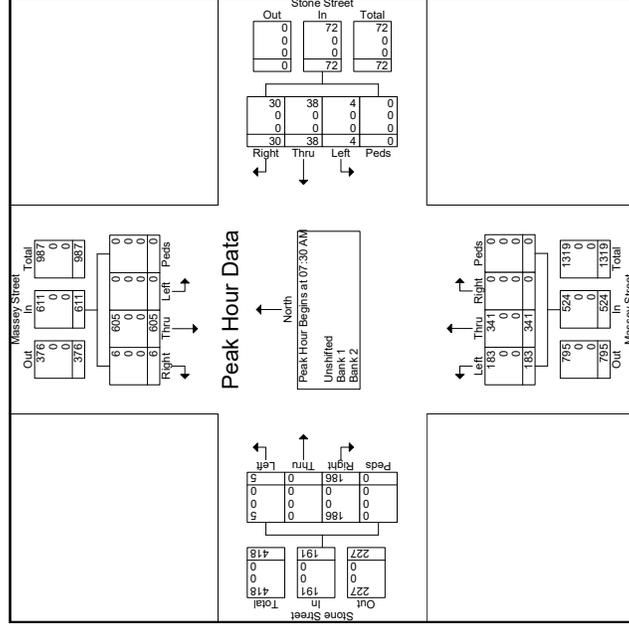
Start Time	Sherman Street Southbound			Arsenal Street Westbound			Sherman Street Northbound			Arsenal Street Eastbound			Int. Total				
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left					
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	22	16	11	75	0	0	48	1	75	0	0	42	22	124	9	0	155
04:45 PM	8	5	4	0	77	0	16	0	85	5	21	20	40	133	9	0	202
05:00 PM	10	7	3	0	77	0	19	0	79	10	0	14	27	136	9	0	202
05:15 PM	10	7	3	0	77	0	19	0	79	10	0	14	27	136	9	0	202
Total Volume	50	37	25	0	311	0	34	137	285	0	239	107	559	29	0	696	
% Unshifted	50	37	25	0	311	0	34	137	285	0	239	107	559	29	0	696	
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Groups Printed- Unshifted - Bank 1 - Bank 2

Start Time	Massey Street Southbound			Stone Street Westbound			Massey Street Northbound			Stone Street Eastbound			Int. Total	
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left		
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	2	148	0	4	3	0	87	23	0	40	0	0	0	273
07:45 AM	1	184	0	6	10	1	98	47	0	61	0	0	0	411
Total	3	574	0	23	23	4	287	135	0	157	0	0	0	1213
08:00 AM	2	148	0	7	11	1	0	71	48	39	0	1	0	328
08:15 AM	1	125	0	8	10	2	0	85	59	46	0	1	0	337
08:30 AM	3	129	0	12	10	0	0	88	40	27	0	0	0	309
08:45 AM	0	127	0	12	11	0	0	83	35	35	0	0	0	303
Total	6	529	0	39	42	3	0	327	182	147	0	2	0	1277
Grand Total	9	1103	0	64	65	7	0	614	317	304	0	7	0	2490
Approch %	0.8	99.2	0	47.1	47.8	5.1	0	66	34	97.7	0	2.3	0	12.2
Total %	0.4	44.3	0	2.6	2.6	0.3	0	24.7	12.7	12.2	0	0.3	0	7
% Unshifted	9	1103	0	64	65	7	0	614	317	304	0	7	0	2490
% Bank 1	100	100	0	100	100	100	0	100	100	100	0	100	0	100
% Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0

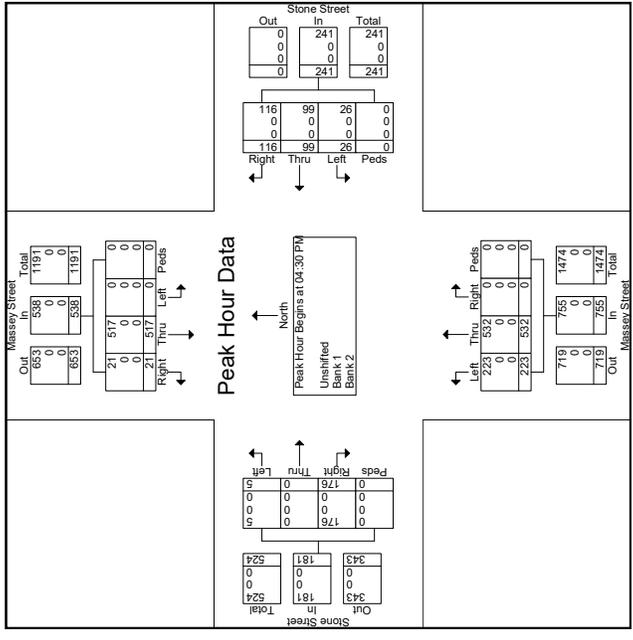
Start Time	Massey Street Southbound			Stone Street Westbound			Massey Street Northbound			Stone Street Eastbound			Int. Total	
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left		
07:30 AM	2	184	0	7	0	0	16	0	87	29	0	0	0	322
08:00 AM	2	148	0	10	1	0	20	0	85	59	0	144	46	337
08:15 AM	6	126	0	10	2	0	72	0	343	193	0	524	196	1386
Total Volume	10	458	0	27	3	0	108	0	651	349	0	1048	266	1501
% Approach	1	99	0	0	0	0	0	0	65	34	0	2	6	191
% Unshifted	6	605	0	30	36	4	72	0	344	183	0	524	186	850
Bank 1	100	100	0	100	100	100	0	100	100	100	0	100	100	100
Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Groups Printed- Unshifted - Bank 1 - Bank 2

Start Time	Massey Street Southbound			Stone Street Westbound			Massey Street Northbound			Stone Street Eastbound			Int. Total	
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left		
04:00 PM	3	157	0	0	0	0	0	14	70	0	64	0	0	456
04:15 PM	1	126	0	0	0	0	0	9	70	0	57	0	0	388
04:30 PM	9	144	0	0	0	0	0	135	53	0	57	0	0	478
04:45 PM	2	124	0	0	0	0	0	117	47	0	35	0	0	375
Total	15	533	0	0	0	0	0	457	219	0	217	0	0	1697
05:00 PM	6	123	0	0	0	0	0	138	59	0	44	0	1	439
05:15 PM	4	126	0	0	0	0	0	142	64	0	40	0	0	423
05:30 PM	1	109	0	0	0	0	0	82	60	0	34	0	3	316
05:45 PM	0	95	0	0	0	0	0	99	40	0	46	0	0	309
Total	11	453	0	0	0	0	0	461	223	0	164	0	5	1487
Grand Total	26	986	0	0	0	0	0	918	442	0	381	0	12	3184
Approch %	2.6	97.4	0	0	0	0	0	67.5	32.5	0	96.9	0	3.1	0
Total %	0.8	3.1	0	0	0	0	0	28.8	13.9	0	12	0	0.4	0
Unshifted	26	986	0	0	0	0	0	918	442	0	381	0	12	3184
% Unshifted	100	100	0	0	0	0	0	100	100	0	100	0	100	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0

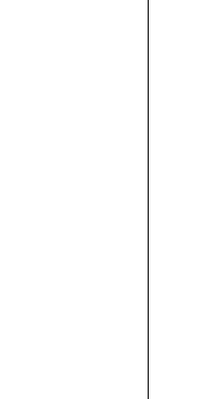
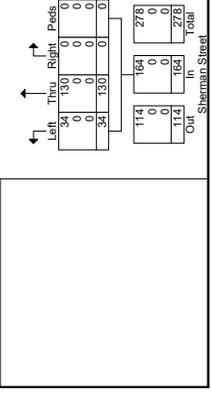
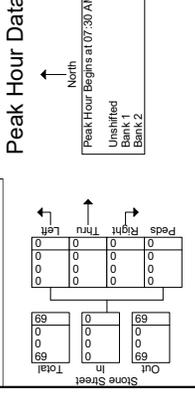
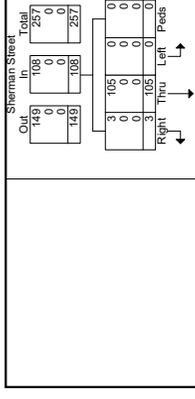
Start Time	Massey Street Southbound			Stone Street Westbound			Massey Street Northbound			Stone Street Eastbound			Int. Total	
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left		
04:00 PM	9	144	0	0	153	41	27	10	78	0	135	53	0	188
04:15 PM	2	124	0	0	126	24	19	6	49	0	117	47	0	164
04:30 PM	6	123	0	0	139	41	23	4	46	0	142	64	0	205
04:45 PM	1	109	0	0	126	24	19	6	49	0	117	47	0	164
Total	18	530	0	0	538	118	73	26	124	0	532	233	0	755
Total Volume	21	517	0	0	538	118	73	26	124	0	532	233	0	755
% Approach	3.9	96.1	0	0	538	118	73	26	124	0	70.5	29.5	0	91.6
% Unshifted	21	517	0	0	538	118	73	26	124	0	532	233	0	755
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Groups Printed- Unshifted - Bank 1 - Bank 2

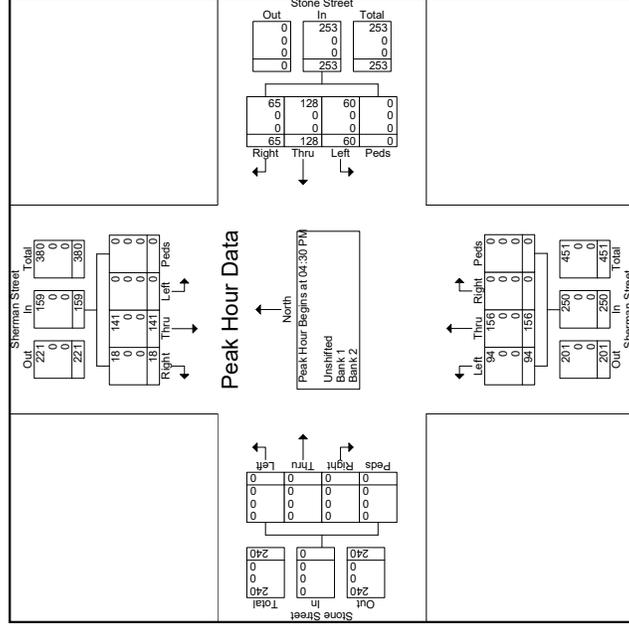
Start Time	Sherman Street Southbound			Stone Street Westbound			Sherman Street Northbound			Stone Street Eastbound			Int. Total	
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left		
07:00 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	44
07:15 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	50
07:30 AM	0	51	0	0	0	0	0	0	0	0	0	0	0	80
07:45 AM	1	34	0	0	3	10	2	0	34	6	0	0	0	90
Total	3	110	0	0	12	25	3	0	90	21	0	0	0	264
08:00 AM	1	22	0	0	5	8	3	0	0	28	12	0	0	79
08:15 AM	1	18	0	0	6	7	4	0	0	40	7	0	0	83
08:30 AM	1	17	0	0	10	12	4	0	0	40	11	0	0	95
08:45 AM	0	17	0	0	7	10	5	0	0	44	13	0	0	96
Total	3	74	0	0	28	37	16	0	0	152	43	0	0	353
Grand Total	6	184	0	0	40	62	19	0	0	242	64	0	0	617
Approch %	3.2	96.8	0	0	33.1	51.2	15.7	0	0	79.1	20.9	0	0	0
Total %	1	29.8	0	0	6.5	10	3.1	0	0	39.2	10.4	0	0	0
% Unshifted	6	184	0	0	40	62	19	0	0	242	64	0	0	617
Bank 1	100	100	0	0	100	100	100	0	0	100	100	0	0	100
Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Start Time	Sherman Street Southbound			Stone Street Westbound			Sherman Street Northbound			Stone Street Eastbound			Int. Total	
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left		
07:30 AM	0	31	0	0	0	0	0	0	0	0	0	0	0	80
07:45 AM	1	34	0	0	0	0	0	0	0	0	0	0	0	90
08:00 AM	1	42	0	0	0	0	0	0	0	0	0	0	0	83
08:15 AM	1	16	0	0	0	0	0	0	0	0	0	0	0	332
Total	3	105	0	0	0	0	0	0	0	0	0	0	0	922
Total Volume	2.8	97.2	0	0	0	0	0	0	0	0	0	0	0	332
% Approach	750	772	0	0	0	0	0	0	0	0	0	0	0	0
% Unshifted	3	105	0	0	0	0	0	0	0	0	0	0	0	0
Bank 1	100	100	0	0	0	0	0	0	0	0	0	0	0	100
Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Start Time	Sherman Street Southbound			Stone Street Westbound			Sherman Street Northbound			Stone Street Eastbound			Int. Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
04:00 PM	47	0	0	16	0	0	30	23	0	0	0	0	172
04:15 PM	2	0	0	9	0	0	34	20	0	0	0	0	129
04:30 PM	3	36	0	24	5	0	41	22	0	0	0	0	129
04:45 PM	2	32	0	13	29	5	27	21	0	0	0	0	129
Total	11	112	0	66	146	50	152	66	0	0	0	0	623
05:00 PM	9	43	0	22	33	28	0	44	27	0	0	0	206
05:15 PM	4	30	0	6	16	6	0	44	24	0	0	0	130
05:30 PM	3	18	0	7	15	2	0	33	9	0	0	0	87
05:45 PM	0	13	0	3	18	2	0	27	11	0	0	0	74
Total	16	104	0	38	82	38	0	148	71	0	0	0	497
Grand Total	27	216	0	104	228	88	0	300	157	0	0	0	1120
Approch %	11.1	88.9	0	24.8	54.3	21	0	65.6	34.4	0	0	0	0
Total %	2.4	19.3	0	9.3	20.4	7.9	0	26.8	14	0	0	0	0
Unshifted	27	216	0	104	228	88	0	300	157	0	0	0	1120
% Unshifted	100	100	0	100	100	100	0	100	100	0	0	0	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0
Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0

Start Time	Sherman Street Southbound			Stone Street Westbound			Sherman Street Northbound			Stone Street Eastbound			Int. Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:30 PM													
04:30 PM	3	36	0	39	24	50	95	41	22	0	63	0	197
04:45 PM	2	32	0	34	13	29	5	27	21	0	46	0	129
05:00 PM	4	30	0	32	22	33	28	27	21	0	41	0	206
05:15 PM	3	18	0	34	16	36	0	28	11	0	68	0	130
05:30 PM	2	13	0	15	16	17	0	253	94	0	250	0	87
05:45 PM	0	13	0	0	159	65	128	156	94	0	880	0	662
Total Volume	18	141	0	159	128	160	253	156	94	0	250	0	803
% Approach	500	820	0	764	677	640	536	666	624	0	880	0	2500
% Unshifted	18	141	0	159	128	160	253	156	94	0	250	0	803
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0
Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0



Directions Printed: Combined

Start Time	Volume	2 - 3	4 - 5	6 - 7	8 - 9	10 - 11	12 - 13	14 - 15	16 - 17	18 - 19	20 - 21	22 - 23	24 - 25	26 - 27	28 - 29	>29	Int. Total	Average
7:30:00 AM	0	9	5	1	5	2	0	3	0	1	0	1	1	2	0	2	32	8 - 9
7:45:00 AM	0	24	7	6	8	1	2	2	3	1	1	0	0	0	0	0	55	4 - 5
8:00:00 AM	1	13	10	1	5	2	2	2	3	2	0	2	0	1	1	2	46	6 - 7
8:15:00 AM	0	2	0	1	1	2	0	0	1	0	0	0	0	0	0	0	7	8 - 9
Grand Total	1	48	22	9	19	7	4	7	7	4	1	3	1	3	1	4	140	6 - 7
Total %		34.3	15.7	6.4	13.6	5.0	2.9	5.0	5.0	2.9	0.7	2.1	0.7	2.1	0.7	2.9		

Directions Printed: Combined

Start Time	Volume	2 - 3	4 - 5	6 - 7	8 - 9	10 - 11	12 - 13	14 - 15	16 - 17	18 - 19	20 - 21	22 - 23	24 - 25	26 - 27	28 - 29	>29	Int. Total	Average
04:30 PM	0	43	7	5	0	2	1	0	1	0	0	1	0	0	0	0	60	2 - 3
04:45 PM	0	44	8	2	2	0	0	0	0	0	0	0	0	0	0	1	57	2 - 3
Total	0	87	15	7	2	2	1	0	1	0	0	1	0	0	0	1	117	2 - 3
05:00 PM	0	22	11	1	0	1	0	0	0	0	0	0	0	0	0	0	35	2 - 3
05:15 PM	0	13	3	0	2	1	0	0	1	1	0	0	0	0	0	0	21	2 - 3
Grand Total	0	122	29	8	4	4	1	0	2	1	0	1	0	0	0	1	173	2 - 3
Total %		70.5	16.8	4.6	2.3	2.3	0.6	0.0	1.2	0.6	0.0	0.6	0.0	0.0	0.0	0.6		

Directions Printed: Direction 1 - Eastbound

Start Time	Volume	2 - 3	4 - 5	6 - 7	8 - 9	10 - 11	12 - 13	14 - 15	16 - 17	18 - 19	20 - 21	22 - 23	24 - 25	26 - 27	28 - 29	>29	Int. Total	Average
7:30:00 AM	0	5	4	1	4	3	2	2	2	2	1	2	0	1	0	2	31	10 - 11
7:45:00 AM	0	5	1	5	4	2	4	1	2	2	3	1	0	0	0	2	32	10 - 11
8:00:00 AM	1	1	4	2	1	2	4	1	1	3	2	0	0	3	0	3	27	12 - 13
8:15:00 AM	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	1	4	20 - 21
Grand Total	1	12	9	8	9	8	10	4	5	7	7	3	0	4	0	8	94	12 - 13
Total %		12.8	9.6	8.5	9.6	8.5	10.6	4.3	5.3	7.4	7.4	3.2	0.0	4.3	0.0	8.5		

Directions Printed: Direction 1 - Eastbound

Start Time	Volume	2 - 3	4 - 5	6 - 7	8 - 9	10 - 11	12 - 13	14 - 15	16 - 17	18 - 19	20 - 21	22 - 23	24 - 25	26 - 27	28 - 29	>29	Int. Total	Average
04:30 PM	0	45	10	4	6	1	0	2	0	1	2	0	1	1	1	7	81	2 - 3
04:45 PM	0	27	10	3	1	1	0	0	1	0	0	1	0	2	0	10	56	4 - 5
Total	0	72	20	7	7	2	0	2	1	1	2	1	1	3	1	17	137	2 - 3
05:00 PM	0	16	10	5	2	0	0	0	0	2	1	1	1	1	1	7	47	4 - 5
05:15 PM	0	17	5	2	6	4	3	2	1	1	2	2	1	0	0	4	50	8 - 9
Grand Total	0	105	35	14	15	6	3	4	2	4	5	4	3	4	2	28	234	4 - 5
Total %		44.9	15.0	6.0	6.4	2.6	1.3	1.7	0.9	1.7	2.1	1.7	1.3	1.7	0.9	12.0		

Directions Printed: Combined

Start Time	Volume	2 - 3	4 - 5	6 - 7	8 - 9	10 - 11	12 - 13	14 - 15	16 - 17	18 - 19	20 - 21	22 - 23	24 - 25	26 - 27	28 - 29	>29	Int. Total	Average
7:30:00 AM	0	9	15	5	10	2	3	3	2	1	0	1	0	0	1	1	53	6 - 7
7:45:00 AM	0	8	8	8	5	1	1	1	0	1	1	0	0	0	1	2	37	6 - 7
8:00:00 AM	0	16	9	8	2	4	3	2	0	3	2	0	1	1	2	0	53	6 - 7
8:15:00 AM	0	18	14	6	3	3	6	1	2	1	1	0	0	0	1	2	58	4 - 5
Grand Total	0	51	46	27	20	10	13	7	4	6	4	1	1	1	5	5	201	6 - 7
Total %		25.4	22.9	13.4	10.0	5.0	6.5	3.5	2.0	3.0	2.0	0.5	0.5	0.5	2.5	2.5		

Directions Printed: Combined

Start Time	Volume	2 - 3	4 - 5	6 - 7	8 - 9	10 - 11	12 - 13	14 - 15	16 - 17	18 - 19	20 - 21	22 - 23	24 - 25	26 - 27	28 - 29	>29	Int. Total	Average
4:29:00 PM	0	11	6	4	3	1	0	0	0	0	1	0	1	0	0	0	27	4 - 5
4:44:00 PM	0	20	7	5	2	2	3	0	0	0	1	0	1	0	1	1	43	4 - 5
4:59:00 PM	0	15	12	2	1	1	1	0	1	1	0	0	0	1	0	0	35	4 - 5
Total	0	46	25	11	6	4	4	0	1	1	2	0	2	1	1	1	105	4 - 5
5:14:00 PM	0	18	12	6	3	2	2	1	1	0	1	1	0	0	0	1	48	4 - 5
Grand Total	0	64	37	17	9	6	6	1	2	1	3	1	2	1	1	2	153	4 - 5
Total %		41.8	24.2	11.1	5.9	3.9	3.9	0.7	1.3	0.7	2.0	0.7	1.3	0.7	0.7	1.3		

File Name : Massey.Driveway6.AM
 Site Code : 11111111
 Start Date : 6/15/2016
 Page No : 1

Directions Printed: Direction 1 - Northbound

Start Time	Volume	2 - 3	4 - 5	6 - 7	8 - 9	10 - 11	12 - 13	14 - 15	16 - 17	18 - 19	20 - 21	22 - 23	24 - 25	26 - 27	28 - 29	>29	Int. Total	Average
7:30:00 AM	0	5	9	4	7	1	4	5	2	1	1	2	1	0	1	3	46	8-9
7:45:00 AM	0	5	5	7	3	1	1	1	1	0	1	2	1	0	0	5	33	6-7
8:00:00 AM	0	11	6	8	3	3	2	0	2	1	1	0	2	2	3	3	47	6-7
8:15:00 AM	0	10	12	1	3	0	5	2	3	4	1	0	0	0	2	4	47	8-9
Grand Total	0	31	32	20	16	5	12	8	8	6	4	4	4	2	6	15	173	8-9
Total %		17.9	18.5	11.6	9.2	2.9	6.9	4.6	4.6	3.5	2.3	2.3	2.3	1.2	3.5	8.7		

Directions Printed: Direction 1 - Northbound

Start Time	Volume	2 - 3	4 - 5	6 - 7	8 - 9	10 - 11	12 - 13	14 - 15	16 - 17	18 - 19	20 - 21	22 - 23	24 - 25	26 - 27	28 - 29	>29	Int. Total	Average
4:29:00 PM	0	10	6	3	1	1	1	0	0	0	0	1	1	0	0	1	25	4 - 5
4:44:00 PM	0	24	6	2	1	3	2	0	2	0	1	0	1	0	0	1	43	2 - 3
4:59:00 PM	0	12	9	2	1	2	2	0	2	0	0	0	0	1	0	0	31	4 - 5
Total	0	46	21	7	3	6	5	0	4	0	1	1	2	1	0	2	99	4 - 5
5:14:00 PM	0	8	16	3	1	2	1	1	3	0	1	1	0	0	0	0	37	4 - 5
Grand Total	0	54	37	10	4	8	6	1	7	0	2	2	2	1	0	2	136	4 - 5
Total %		39.7	27.2	7.4	2.9	5.9	4.4	0.7	5.1	0.0	1.5	1.5	1.5	0.7	0.0	1.5		

A2

**Miscellaneous Traffic Data
and Calculations**



Proposed Mercy Re-development, City of Watertown, NY

Documentation of Ambient Traffic Volume Growth

Roadway	Segment	Placement	2009	2014	2016	Annual Growth
North Massey Street	Arsenal to Coffeen	30' south of Prospect		16,102	14,160	-6.22%
Arsenal Street	Massey to Rt 11 Junction	.2 E of N Massey St	11,682		9,340	-3.15%

Project Information

Project Name: Mercy Re-Development
No: 36031
Date: 5/16/2016
City:
State/Province: NY
Zip/Postal Code:
Country:
Client Name: ACD
Analyst's Name: ITE-TGM 9th Edition
Edition:

Land Use	Size	Weekday		Weekday, A.M. Peak		Weekday, P.M. Peak	
		Entry	Exit	Entry	Exit	Entry	Exit
220 - Apartment	108 Dwelling Units	389	389	11	46	50	27
710 - General Office Building	36 1000 Sq. Feet Gross Floor Area	302	302	75	10	20	99
Total		691	691	86	56	70	126
610 - Hospital	117.09 1000 Sq. Feet Gross Floor Area	774	774	70	41	41	68
Difference in Trips Former Hospital vs proposed Site		-83	-83	16	15	29	58

**PROPOSED MERCY HEIGHTS DEVELOPMENT of FORMER MERCY HOSPITAL
CITY OF WATERTOWN, NEW YORK
AM PEAK**

LOCATION NUMBER	INTERSECTION DESCRIPTION	2016 Existing Volume	Convergys New Traffic	Num of yrs		Adj Vol for Parking Redistr	Office				Residential				Full Build Volumes	
				5	0.25%		Enter	Exit	Trips IN	Trips OUT	Enter	Exit	Trips IN	Trips OUT		Total
							Dist. %	Dist. %	75	10	Dist. %	Dist. %	11	46		Site Trips
1	Arsenal Street/Massey Street															
	SR	64		65				0	0			0	0	0	65	
	ST	500	11	506		18%		14	0	18%		2	0	15	521	
	SL	409		425		19%		14	0	5%		1	0	15	440	
	WR	28	2	28			4%	0	0		4%	0	2	2	30	
	WT	239		244		10%	0	1	0	5%	0	2	3	247		
	WL	0		0			0	0	0		0	0	0	0		
	NR	15	1	16				0	0			0	0	0	16	
	NT	237		240		20%	0	2	0	9%	0	4	6	246		
	NL	118		119		11%	0	1	0	11%	0	5	6	125		
	ER	105	8	106		2%		2	0	16%		2	0	3	109	
	ET	297		309		15%		11	0	5%		1	0	12	321	
EL	59	60					0	0			0	0	0	60		
2/3	Arsenal Street/ Parking Lot & Gas station (Proposed Entrance)															
	SR	3		3				0	0			0	0	0	3	
	ST	0		0				0	0			0	0	0	0	
	SL	11		11				0	0			0	0	0	11	
	WR	13	2	13				0	0			0	0	0	13	
	WT	271		276			0	0	9%	0	4	4	280			
	WL	1		1		10%	8	0	4%	0	0	8	8			
	NR	2		2		-1	10%	0	2	18%	0	0	2	2		
	NT	0		0			0	0			0	0	0			
	NL	0		0			0	1	14%	0	0	1	1			
	ER	10	20	10		-10	34%	26	0	10%		1	0	27	27	
	ET	684		713			0	0	0		0	0	0	713		
EL	1	1				0	0	0		0	0	0	1			
4	Sherman Street/ Commercial Lots Driveway/ Arsenal Street															
	SR	4	2	6				0	0			0	0	0	6	
	ST	2		2				0	0			0	0	0	2	
	SL	6	3	9				0	0			0	0	0	9	
	WR	36	8	44				0	0			0	0	0	44	
	WT	238		241		10%	8	0	4%	0	0	8	249			
	WL	0		0			0	0			0	0	0			
	NR	23	13	23				0	0			0	9	9	32	
	NT	66		80			0	0		20%	0	3	3	83		
	NL	33		33			0	0		9%	0	4	4	37		
	ER	136	20	138				0	0			0	0	0	138	
	ET	471		477		18%	0	2			0	0	2	479		
EL	100	121				0	0			0	0	0	121			
5	Sherman Street/ Proposed Entrance															
	SR	0		0				0	0			0	0	0	0	
	ST	108		109				0	0			0	0	0	109	
	SL	0		0				0	0			0	0	0	0	
	WR	0		0				0	0			0	0	0	0	
	WT	0		0				0	0			0	0	0	0	
	WL	0		0				0	0			0	0	0	0	
	NR	0	13	0				0	0			0	0	0	0	
	NT	149		164			0	0			0	0	0	164		
	NL	0		0		9%	7	0	11%	1	0	8	8			
	ER	0		0				0	1		5%	0	2	3	3	
	ET	0		0			0	0			0	0	0	0		
EL	0	0				0	0		35%	0	16	16	16			

**PROPOSED MERCY HEIGHTS DEVELOPMENT of FORMER MERCY HOSPITAL
CITY OF WATERTOWN, NEW YORK
AM PEAK**

Num of yrs

5

LOCATION NUMBER	INTERSECTION DESCRIPTION	2016 Existing Volume	Convergys New Traffic	2021 Bkgd Vol 0.25%	Adj Vol for Parking Redistr	Office				Residential				Total Site Trips	Full Build Volumes	
						Enter	Exit	Trips IN	Trips OUT	Enter	Exit	Trips IN	Trips OUT			
						Dist. %	Dist. %	75	10	Dist. %	Dist. %	11	46			
6	Sherman Street/ Stone Street															
	SR	3		3												3
	ST	105		106			6%	0	0		5%	0	0	0	3	
	SL	0		0				0	1			0	2	0	109	
	WR	19	2	21		3%		2	0		7%	1	0	3	24	
	WT	32		32				0	0		7%	1	0	1	33	
	WL	9		9				0	0			0	0	0	9	
	NR	0		0				0	0			0	0	0	0	
	NT	130	11	143		6%		5	0		4%	0	0	5	148	
	NL	34		34				0	0		4%	0	0	0	34	
ER	0		0				0	0			0	0	0	0		
ET	0		0				0	0			0	0	0	0		
EL	0		0				0	0			0	0	0	0		
7	Stone Street Proposed Entrance															
	SR	0		0				0	0		54%	0	25	25	25	
	ST	0		0				0	0			0	0	0	0	
	SL	0		0				0	0			0	0	0	0	
	WR	0		0				0	0		11%	1	0	1	1	
	WT	69		70				0	0			0	0	0	70	
	WL	0		0				0	0			0	0	0	0	
	NR	0		0				0	0			0	0	0	0	
	NT	0		0				0	0			0	0	0	0	
	NL	0		0				0	0			0	0	0	0	
ER	0		0				0	0			0	0	0	0		
ET	0		0				0	0			0	0	0	0		
EL	0		0				0	0			0	0	0	0		
8	South Massey Street/ Stone Street															
	SR	6		6			10%	0	1			0	0	1	7	
	ST	605		613			21%	0	2			0	0	2	615	
	SL	0		0				0	0			0	0	0	0	
	WR	30		30				0	0		14%	0	6	6	36	
	WT	38		38				0	0		9%	0	4	4	42	
	WL	4		4				0	0		31%	0	14	14	18	
	NR	0		0				0	0			0	0	0	0	
	NT	341		345		20%		15	0		24%	3	0	18	363	
	NL	183		185				0	0			0	0	0	185	
ER	186		188				0	0			0	0	0	188		
ET	0		0				0	0			0	0	0	0		
EL	5		5		7%		5	0		6%	1	0	6	11		
9	South Massey Street/ Proposed South Entrance															
	SR	0		0				0	0			0	0	0	0	
	ST	611		619			9%	0	1			0	0	1	620	
	SL	0		0				0	0		29%	3	0	3	3	
	WR	0		0				0	0		6%	0	3	3	3	
	WT	0		0				0	0			0	0	0	0	
	WL	0		0			22%	0	2			0	0	2	2	
	NR	0		0				4	0		30%	3	0	7	7	
	NT	376		381		5%		17	0		14%	0	6	23	404	
	NL	0		0		22%		0	0			0	0	0	0	
ER	0		0				0	0			0	0	0	0		
ET	0		0				0	0			0	0	0	0		
EL	0		0				0	0			0	0	0	0		
10	South Massey Street/ Proposed North Entrance															
	SR	0		0				0	0			0	0	0	0	
	ST	611		619				0	0		29%	3	0	3	622	
	SL	0		0		20%		15	0		5%	1	0	16	16	
	WR	0		0				0	3			0	0	3	3	
	WT	0		0				0	0			0	0	0	0	
	WL	0		0			9%	0	1			0	0	1	1	
	NR	0		0				17	0			0	0	17	17	
	NT	376		381		22%		0	0		20%	0	9	9	390	
	NL	0		0				0	0			0	0	0	0	
ER	0		0				0	0			0	0	0	0		
ET	0		0				0	0			0	0	0	0		
EL	0		0				0	0			0	0	0	0		

**PROPOSED MERCY HEIGHTS DEVELOPMENT of FORMER MERCY HOSPITAL
CITY OF WATERTOWN, NEW YORK
PM PEAK**

LOCATION NUMBER	INTERSECTION DESCRIPTION	2016 Existing Volume	Convergys New Traffic	Num of yrs		Adj Vol for Parking Redistr	Office				Residential				Full Build Volumes	
				5	0.25%		Enter Dist. %	Exit Dist. %	Trips IN 20	Trips OUT 99	Enter Dist. %	Exit Dist. %	Trips IN 50	Trips OUT 27		Total Site Trips
				2021 Bkgd Vol	2021 Bkgd Vol											
1	Arsenal Street/Massey Street															
	SR	135		137				0	0			0	0	0	137	
	ST	369		374		18%		4	0	18%		9	0	13	387	
	SL	266	2	271		19%		4	0	5%		3	0	6	277	
	WR	64	3	68			4%	0	4		4%	0	1	5	73	
	WT	348	17	369			10%	0	10		5%	0	1	11	380	
	WL	3		3				0	0			0	0	0	3	
	NR	16		16				0	0			0	0	0	16	
	NT	434		439			20%	0	20		9%	0	2	22	461	
	NL	215		218			11%	0	11		11%	0	3	14	232	
ER	176	6	178		2%		0	0	16%		8	0	8	186		
ET	372		383		15%		3	0	5%		3	0	6	389		
EL	148		150				0	0			0	0	0	150		
2/3	Arsenal Street/ Parking Lot & Gas station (Proposed Entrance)															
	SR	1		1				0	0			0	0	0	1	
	ST	0		0				0	0			0	0	0	0	
	SL	8		8				0	0			0	0	0	8	
	WR	28		28				0	0			0	0	0	28	
	WT	402	20	427				0	0		9%	0	2	2	429	
	WL	1		1		10%		2	0	4%		2	0	4	4	
	NR	13		13	-13		18%	0	18			0	0	18	18	
	NT	0		0				0	0			0	0	0	0	
	NL	1		1	-1		14%	0	14			0	0	14	14	
ER	2		2	-2	34%		7	0	10%		5	0	12	12		
ET	622	8	638				0	0			0	0	0	638		
EL	4		4				0	0			0	0	0	4		
4	Sherman Street/ Commercial Lots Driveway/ Arsenal Street															
	SR	50	20	71				0	0			0	0	0	71	
	ST	37	15	52				0	0			0	0	0	52	
	SL	25	10	35				0	0			0	0	0	35	
	WR	7	2	9				0	0			0	0	0	9	
	WT	304		308		10%		2	0	4%		2	0	4	312	
	WL	0		0				0	0			0	0	0	0	
	NR	34		34				0	0		20%	0	5	5	39	
	NT	137	38	177				0	0		6%	0	2	2	179	
	NL	68		69				0	0		9%	0	2	2	71	
ER	107		108				0	0			0	0	0	108		
ET	559		566			18%	0	18			0	0	18	584		
EL	29	8	37				0	0			0	0	0	37		
5	Sherman Street/ Proposed Entrance															
	SR	0		0				0	0			0	0	0	0	
	ST	159	15	176				0	0			0	0	0	176	
	SL	0		0				0	0			0	0	0	0	
	WR	0		0				0	0			0	0	0	0	
	WT	0		0				0	0			0	0	0	0	
	WL	0		0				0	0			0	0	0	0	
	NR	0		0				0	0			0	0	0	0	
	NT	221	38	262				0	0			0	0	0	262	
	NL	0		0		9%		2	0	11%		6	0	7	7	
ER	0		0			6%	0	6		5%	0	1	7	7		
ET	0		0				0	0			0	0	0	0		
EL	0		0				0	0		35%	0	9	9	9		

**PROPOSED MERCY HEIGHTS DEVELOPMENT of FORMER MERCY HOSPITAL
CITY OF WATERTOWN, NEW YORK
PM PEAK**

LOCATION NUMBER	INTERSECTION DESCRIPTION	2016 Existing Volume	Convergys New Traffic	Num of yrs		Adj Vol for Parking Redistr	Office				Residential				Full Build Volumes	
				5	0.25%		Enter	Exit	Trips IN	Trips OUT	Enter	Exit	Trips IN	Trips OUT		Total
				Dist. %	Dist. %		20	99	Dist. %	Dist. %	50	27	Site Trips			
6	Sherman Street/ Stone Street															
	SR	18	2	20					0	0			0	0	0	20
	ST	141	13	156			6%		0	6		5%	0	1	7	163
	SL	0		0					0	0			0	0	0	0
	WR	65	11	77			3%		1	0		7%	4	0	4	81
	WT	128		130					0	0		7%	4	0	4	134
	WL	60		61					0	0			0	0	0	61
	NR	0		0					0	0			0	0	0	0
	NT	156	27	185			6%		1	0		4%	2	0	3	188
	NL	94		95					0	0		4%	2	0	2	97
ER	0		0					0	0			0	0	0	0	
ET	0		0					0	0			0	0	0	0	
EL	0		0					0	0			0	0	0	0	
7	Stone Street Proposed Entrance															
	SR	0		0					0	0		54%	0	15	15	15
	ST	0		0					0	0			0	0	0	0
	SL	0		0					0	0			0	0	0	0
	WR	0		0					0	0		11%	6	0	6	6
	WT	240	2	245					0	0			0	0	0	245
	WL	0		0					0	0			0	0	0	0
	NR	0		0					0	0			0	0	0	0
	NT	0		0					0	0			0	0	0	0
	NL	0		0					0	0			0	0	0	0
ER	0		0					0	0			0	0	0	0	
ET	0		0					0	0			0	0	0	0	
EL	0		0					0	0			0	0	0	0	
8	South Massey Street/ Stone Street															
	SR	21		21			10%		0	10			0	0	10	31
	ST	517		523			21%		0	21			0	0	21	544
	SL			#VALUE!					0	0			0	0	0	#VALUE!
	WR	116		117					0	0		14%	0	4	4	121
	WT	99	2	102					0	0		9%	0	2	2	104
	WL	26		26					0	0		31%	0	8	8	34
	NR			#VALUE!					0	0			0	0	0	#VALUE!
	NT	532		539		20%			4	0		24%	12	0	16	555
	NL	223		226					0	0			0	0	0	226
ER	176		178					0	0			0	0	0	178	
ET			#VALUE!					0	0			0	0	0	#VALUE!	
EL	5		5		7%			1	0		6%	3	0	4	9	
9	South Massey Street/ Proposed South Entrance															
	SR	0		0					0	0			0	0	0	0
	ST	538		545			9%		0	9			0	0	9	554
	SL	0		0					0	0		29%	15	0	15	15
	WR	0		0					0	0		6%	0	2	2	2
	WT	0		0					0	0			0	0	0	0
	WL	0		0			22%		0	22			0	0	22	22
	NR	0		0			5%		1	0		30%	15	0	16	16
	NT	653		661		22%			4	0		14%	0	4	8	669
	NL	0		0					0	0			0	0	0	0
ER	0		0					0	0			0	0	0	0	
ET	0		0					0	0			0	0	0	0	
EL	0		0					0	0			0	0	0	0	
10	South Massey Street/ Proposed North Entrance															
	SR	0		0					0	0			0	0	0	0
	ST	538		545					0	0		29%	15	0	15	560
	SL	0		0			20%		4	0		5%	3	0	7	7
	WR	0		0					0	31			0	0	31	31
	WT	0		0					0	0			0	0	0	0
	WL	0		0				9%	0	9			0	0	9	9
	NR	0		0			22%		4	0			0	0	4	4
	NT	653		661					0	0		20%	0	5	5	666
	NL	0		0					0	0			0	0	0	0
ER	0		0					0	0			0	0	0	0	
ET	0		0					0	0			0	0	0	0	
EL	0		0					0	0			0	0	0	0	

A3

Level of Service: Criteria and Definitions

Level of Service Criteria

Highway Capacity Manual 2010

SIGNALIZED INTERSECTIONS

Level of Service is a qualitative measure describing operational conditions within a traffic stream, based on service measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort, and convenience. Level of Service for signalized intersections is defined in terms of delay specifically, average total delay per vehicle for a 15 minute analysis period. The ranges are as follows:

Level of Service	Control Delay per vehicle (seconds)
A	< 10
B	10 – 20
C	20 – 35
D	35 – 55
E	55 – 80
F	>80

UNSIGNALIZED INTERSECTIONS

Level of Service for unsignalized intersections is also defined in terms of delay. However, the delay criteria are different from a signalized intersection. The primary reason for this is driver expectation that a signalized intersection is designed to carry higher volumes than an unsignalized intersection. The total delay threshold for any given Level of Service is less for an unsignalized intersection than for a signalized intersection. The ranges are as follows:

Level of Service	Control Delay per vehicle (seconds)
A	< 10
B	10 – 15
C	15 – 25
D	25 – 35
E	35 - 50
F	>50

A4

Level of Service Calculations: Existing Conditions

Lanes, Volumes, Timings
1: South Massey Street/North Massey Street & Arsenal Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	59	297	105	0	239	28	118	237	15	409	500
Traffic Volume (vph)	59	297	105	0	239	28	118	237	15	409	500
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	170	0	0	0	250	0	515	0	0	515	0
Storage Length (ft)	1	1	1	0	0	1	0	1	0	1	0
Storage Lanes	60	25	25	100	100	130	130	130	130	130	130
Taper Length (ft)	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Lane Util. Factor	0.850	0.850	0.986	0.986	0.986	0.991	0.991	0.991	0.991	0.983	0.983
Flt Protected	0	3511	1583	0	1837	0	1770	3507	0	1770	3479
Satd. Flow (proof)	0.710	0.710	0.400	0.400	0.415	0.415	0.415	0.415	0.415	0.415	0.415
Flt Permitted	0	2513	1583	0	1837	0	745	3507	0	773	3479
Satd. Flow (perm)	0	2513	1583	0	1837	0	745	3507	0	773	3479
Right Turn on Red											
Satd. Flow (RTOR)	30	30	30	30	30	30	30	30	30	30	30
Link Speed (mph)	403	403	250	250	720	720	720	720	720	474	474
Link Distance (ft)	9.2	9.2	5.7	5.7	16.4	16.4	16.4	16.4	16.4	10.8	10.8
Travel Time (s)	0.92	0.92	0.90	0.90	0.87	0.87	0.87	0.87	0.85	0.85	0.85
Peak Hour Factor	64	323	114	0	266	31	136	272	17	481	588
Adj. Flow (vph)	0	387	114	0	297	0	136	289	0	481	663
Shared Lane Traffic (%)	No	No	No	No	No	No	No	No	No	No	No
Lane Group Flow (vph)	0	No	No	No	No	No	No	No	No	No	No
Enter Blocked Intersection	0	0	0	0	0	0	0	0	0	0	0
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Right	Right
Median Width (ft)	0	0	0	0	0	0	12	12	12	12	12
Link Offset (ft)	16	16	16	16	16	16	16	16	16	16	16
Crosswalk Width (ft)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Two way Left Turn Lane	15	9	15	2	9	15	1	2	9	15	9
Headway Factor	1	2	1	2	1	2	1	2	1	2	1
Turning Speed (mph)	Left	Thru	Right	Thru	Left	Thru	Left	Thru	Left	Thru	Left
Number of Detectors	20	100	20	100	20	100	20	100	20	100	20
Detector Template	0	0	0	0	0	0	0	0	0	0	0
Leading Detector (ft)	0	0	0	0	0	0	0	0	0	0	0
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position (ft)	20	6	20	6	20	6	20	6	20	6	20
Detector 1 Size (ft)	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex
Detector 1 Type	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	94	94	94	94	94	94	94	94	94	94	94
Detector 2 Position (ft)	6	6	6	6	6	6	6	6	6	6	6
Detector 2 Size (ft)	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex
Detector 2 Type	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Extend (s)	pm+pt	NA	custom	NA	Perm	NA	pm+pt	NA	NA	NA	NA
Turn Type	5	2	81	6	8	7	41	7	41	7	41
Protected Phases	2	2	2	2	2	2	2	2	2	2	2
Permitted Phases											

Lanes, Volumes, Timings
1: South Massey Street/North Massey Street & Arsenal Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Detector Phase	5	2	8	6	6	8	8	8	8	7	4
Switch Phase	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Initial (s)	10.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Minimum Split (s)	23.0	56.0	18.0	33.0	33.0	18.0	18.0	18.0	36.0	36.0	54.0
Total Split (s)	20.9%	50.9%	16.4%	30.0%	30.0%	16.4%	16.4%	16.4%	32.7%	32.7%	49.1%
Maximum Green (s)	18.0	51.0	13.0	28.0	28.0	13.0	13.0	13.0	31.0	31.0	49.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	Lead	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead-Lag	Lead	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	None	None	None	None
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	15.5	33.9	15.5	15.5	15.5	13.3	13.3	13.3	43.3	43.3	43.3
Actuated g/C Ratio	0.22	0.49	0.22	0.22	0.22	0.19	0.19	0.19	0.63	0.63	0.63
v/c Ratio	0.69	0.15	0.72	0.72	0.72	0.95	0.43	0.43	0.57	0.30	0.30
Control Delay	32.0	11.4	36.3	36.3	36.3	100.5	29.3	29.3	10.3	6.8	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.0	11.4	36.3	36.3	36.3	100.5	29.3	29.3	10.3	6.8	6.8
LOS	C	C	B	D	D	F	C	C	B	B	A
Approach Delay	27.3	27.3	36.3	36.3	36.3	52.1	52.1	52.1	8.3	8.3	8.3
Approach LOS	C	C	D	D	D	D	D	D	A	A	A
Intersection Summary	Other										
Area Type	Other										
Cycle Length	110										
Actuated Cycle Length	69										
Natural Cycle	75										
Control Type	Actuated-Uncoordinated										
Maximum v/c Ratio	0.95										
Intersection Signal Delay	23.7										
Intersection Capacity Utilization	70.6%										
Analysis Period (min)	15										
ICU Level of Service C	Phase conflict between lane groups.										
Spills and Phases:	1: South Massey Street/North Massey Street & Arsenal Street										

Lanes, Volumes, Timings
 2: Parking Lot/Gas Station & Arsenal Street

HCM 2010 TWSC
 2: Parking Lot/Gas Station & Arsenal Street

Proposed Mercy Heights
 2016 Existing Conditions - AM Peak Hour

Proposed Mercy Heights
 2016 Existing Conditions - AM Peak Hour

EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	1	684	10	1	271	13	0	0	2	11	0
Future Volume (vph)	1	684	10	1	271	13	0	0	2	11	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0	0.998		0.994			0.865			0.973	
Satd. Flow (prot)	0	3532	0	0	1852	0	0	1611	0	1744	0
Flt Permitted										0.962	
Satd. Flow (perm)	0	3532	0	0	1852	0	0	1611	0	1744	0
Link Speed (mph)		30		30			10			10	
Link Distance (ft)		250		378		125		125		123	
Travel Time (s)		5.7		8.6		8.5		8.5		8.4	
Peak Hour Factor	0.86	0.86	0.86	0.89	0.89	0.89	0.25	0.25	0.25	0.70	0.70
Adj. Flow (vph)	1	795	12	1	304	15	0	0	8	16	0
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	808	0	0	320	0	0	8	0	20	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)	0	0	0	0	0	0	0	0	0	0	0
Link Offset(ft)	0	0	0	0	0	0	0	0	0	0	0
Crosswalk Width(ft)	16	16	16	16	16	16	16	16	16	16	16
Two way Left Turn Lane											
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15	15	9	15	15	9	15	15	9
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop

Intersection	0.3											
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	1	684	10	1	271	13	0	0	2	11	0	3
Future Vol, veh/h	1	684	10	1	271	13	0	0	2	11	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	None	None	None	None	None	None
RT Channelized	-	-	None	-	-	None	-	-	-	-	-	-
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	-	-	-	-	-	-	-	-	-	-	-
Grade, %	-	-	-	-	-	-	-	-	-	-	-	-
Peak Hour Factor	86	86	86	89	89	89	25	25	25	70	70	70
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	795	12	1	304	15	0	0	8	16	0	4
Major/Minor	Major1	Major1	Major2	Major2	Minor1	Minor2						
Conflicting Flow All	319	0	0	807	0	0	1119	1124	403	714	1123	312
Stage 1	-	-	-	-	-	-	-	803	803	-	314	314
Stage 2	-	-	-	-	-	-	-	316	321	-	400	809
Critical Hdwy	4.13	-	-	4.13	-	-	-	7.33	6.53	6.93	7.33	6.53
Critical Hdwy Sig 1	-	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53
Critical Hdwy Sig 2	-	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53
Follow-up Hdwy	2.219	-	-	2.219	-	-	-	3.519	4.019	3.319	3.519	4.019
Pot Cap-1 Maneuver	1239	-	-	816	-	-	-	172	205	598	332	205
Stage 1	-	-	-	-	-	-	-	344	395	-	696	656
Stage 2	-	-	-	-	-	-	-	694	651	-	598	393
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1239	-	-	816	-	-	-	171	205	598	327	205
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	171	205	-	327	205
Stage 1	-	-	-	-	-	-	-	344	395	-	695	655
Stage 2	-	-	-	-	-	-	-	689	650	-	589	393
Approach	EB	EB	WB	WB	NB	NB	SB	SB	SB	SB	SB	SB
HCM Control Delay, s	0	0	0	0	11.1	11.1	15.3	15.3	15.3	15.3	15.3	15.3
HCM LOS					B	B	C	C	C	C	C	C
Minor Lane/Major Mvmt	NBLn1	EBL	EBR	WBL	WBT	WBR	SBLn1	SBLn1	SBLn1	SBLn1	SBLn1	SBLn1
Capacity (veh/h)	598	1239	-	-	816	-	-	-	-	371	-	-
HCM Lane V/C Ratio	0.013	0.001	-	-	0.001	-	-	-	-	0.054	-	-
HCM Control Delay (s)	11.1	7.9	0	-	9.4	0	-	-	-	15.3	-	-
HCM Lane LOS	B	A	A	-	A	-	-	-	-	C	-	-
HCM 95th %ile Q(veh)	0	0	-	-	0	-	-	-	-	0.2	-	-

Lanes, Volumes, Timings
3: Sherman Street/Commercial Lots Driveway & Arsenal Street

2016 Existing Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	100	471	136	0	238	36	33	66	23	6	2
Traffic Volume (vph)	100	471	136	0	238	36	33	66	23	6	2
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	0	0	0	0	100	0	0	120	0	0	0
Storage Length (ft)	0	0	0	0	0	0	0	0	1	0	0
Storage Lanes	25	0	0	0	25	0	0	0	1	0	0
Taper Length (ft)	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.971	0.971	0.971	0.850	0.850	0.850	0.850	0.850	0.850	0.953	0.953
Flt Protected	0	0.993	0	0	1863	1583	0	1831	1583	0	1733
Satd. Flow (perm)	0	3413	0	0	1863	1583	0	1831	1583	0	1733
Flt Permitted	0.852	0.852	0	0	1863	1583	0	1693	1583	0	1567
Satd. Flow (perm)	0	2928	0	0	1863	1583	0	1693	1583	0	1567
Right Turn on Red	80	Yes	Yes	43	Yes						
Satd. Flow (RTOR)	30	30	30	30	30	30	30	30	31	31	7
Link Distance (ft)	378	378	378	397	397	580	580	580	580	249	249
Travel Time (s)	8.6	8.6	8.6	9.0	9.0	13.2	13.2	13.2	13.2	17.0	17.0
Peak Hour Factor	0.85	0.85	0.85	0.83	0.83	0.74	0.74	0.74	0.74	0.60	0.60
Adj. Flow (vph)	118	554	160	0	287	43	45	89	31	10	3
Shared Lane Traffic (%)	0	832	0	0	287	43	0	134	31	0	20
Lane Group Flow (vph)	No										
Enter Blocked Intersection	Left	Left	Right	Left	Left	Left	Left	Right	Left	Left	Right
Lane Alignment	Left	Left	Right	Left	Left	Left	Left	Right	Left	Left	Right
Median Width (ft)	0	0	0	0	0	0	0	0	0	0	0
Link Offset (ft)	0	0	0	0	0	0	0	0	0	0	0
Crosswalk Width (ft)	16	16	16	16	16	16	16	16	16	16	16
Two way Left Turn Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Headway Factor	15	9	15	9	15	9	15	9	15	9	15
Turning Speed (mph)	1	2	1	1	1	2	1	1	1	1	2
Number of Detectors	Left	Thru	Left	Thru	Right	Thru	Right	Left	Left	Thru	Right
Detector Template	20	100	20	100	20	100	20	100	20	20	100
Leading Detector (ft)	0	0	0	0	0	0	0	0	0	0	0
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position (ft)	20	6	20	6	20	6	20	6	20	6	20
Detector 1 Size (ft)	Ch+Ex										
Detector 1 Type	Detector 1 Channel										
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position (ft)	94	6	94	6	94	6	94	6	94	6	94
Detector 2 Size (ft)	Ch+Ex										
Detector 2 Type	Detector 2 Channel										
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Perm	NA	NA	Perm	Perm	NA	Perm	Perm	Perm	Perm	NA
Protected Phases	4	4	4	8	8	2	2	2	2	6	6
Permitted Phases	4	4	4	8	8	2	2	2	2	6	6

Lanes, Volumes, Timings
3: Sherman Street/Commercial Lots Driveway & Arsenal Street

2016 Existing Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Detector Phase	4	4	4	8	8	8	2	2	2	2	6
Switch Phase	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Initial (s)	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Minimum Split (s)	64.0	64.0	64.0	64.0	64.0	64.0	21.0	21.0	21.0	21.0	21.0
Total Split (%)	75.3%	75.3%	75.3%	75.3%	75.3%	75.3%	24.7%	24.7%	24.7%	24.7%	24.7%
Total Split (s)	59.0	59.0	59.0	59.0	59.0	59.0	16.0	16.0	16.0	16.0	16.0
Maximum Green (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Yellow Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead-Lag	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lead-Lag Optimize?	None	None	None	None	None	None	None	None	None	None	None
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Flash Dont Walk (s)	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Calls (#/hr)	18.7	18.7	18.7	18.7	18.7	18.7	16.2	16.2	16.2	16.2	16.2
Act Effct Green (s)	0.42	0.42	0.42	0.42	0.42	0.42	0.36	0.36	0.36	0.36	0.36
Actuated g/C Ratio	0.66	0.66	0.66	0.37	0.06	0.22	0.05	0.04	0.04	0.04	0.04
v/c Ratio	12.0	12.0	12.0	10.2	3.1	13.0	5.9	10.0	10.0	10.0	10.0
Control Delay	12.0	12.0	12.0	10.2	3.1	13.0	5.9	10.0	10.0	10.0	10.0
Queue Delay	12.0	12.0	12.0	10.2	3.1	13.0	5.9	10.0	10.0	10.0	10.0
Total Delay	12.0	12.0	12.0	10.2	3.1	13.0	5.9	10.0	10.0	10.0	10.0
LOS	B	B	B	A	A	B	A	B	A	A	A
Approach Delay	12.0	12.0	12.0	9.3	11.7	11.7	11.7	11.7	11.7	11.7	11.7
Approach LOS	B	B	B	A	A	B	A	B	A	A	A
Intersection Summary	Other										
Area Type	Other										
Cycle Length: 65	Actuated Cycle Length: 45										
Natural Cycle: 45	Control Type: Actuated-Uncoordinated										
Maximum v/c Ratio: 0.66	Intersection Signal Delay: 11.2										
Intersection Capacity Utilization 51.3%	ICU Level of Service A										
Analysis Period (min) 15											



Lanes, Volumes, Timings
5: Sherman Street & Stone Street

Lanes, Volumes, Timings
5: Sherman Street & Stone Street

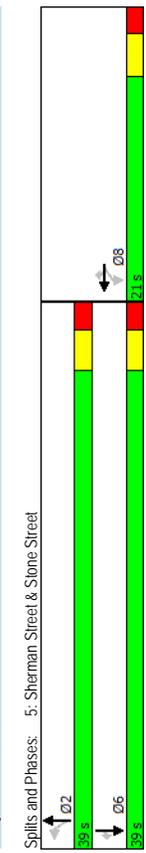
Lanes, Volumes, Timings
5: Sherman Street & Stone Street

2016 Existing Conditions - AM Peak Hour

2016 Existing Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	0	0	0	9	32	19	34	130	0	0	105	3
Traffic Volume (vph)	0	0	0	9	32	19	34	130	0	0	105	3
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	0	0	0	0	0	25	200	0	0	0	150	0
Storage Length (ft)	0	0	0	0	0	1	1	1	0	0	0	1
Storage Lanes	25	0	0	25	0	25	25	25	0	25	0	25
Taper Length (ft)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor				0.850								0.850
Flt Protected	0	0	0	0.989		0.950			0	0	0	1.583
Satd. Flow (prot)	0	0	0	1842	1583	1770	1863	0	0	0	1863	1583
Flt Permitted	0	0	0	0.989		0.800						
Satd. Flow (perm)	0	0	0	1842	1583	1490	1863	0	0	0	1863	1583
Right Turn on Red	Yes			Yes		Yes	Yes	Yes			Yes	Yes
Right Turn on Red	36			36		36					36	
Satd. Flow (RTOR)	30			30		30					30	
Link Distance (mph)	740			406		301					580	
Link Distance (ft)	16.8			9.2		6.8					13.2	
Travel Time (s)	0.92	0.92	0.92	0.88	0.88	0.87	0.87	0.87	0.87	0.77	0.77	0.77
Peak Hour Factor	0	0	0	10	36	22	39	149	0	0	136	4
Adj. Flow (vph)	0	0	0	0	0	46	22	39	149	0	136	4
Shared Lane Traffic (%)	No											
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Enter Blocked Intersection	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	Right
Lane Alignment	0	0	0	0	0	0	12	0	0	0	12	0
Median Width (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Link Offset (ft)	16			16		16					16	
Crosswalk Width (ft)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Two way Left Turn Lane	15			9		9		15		9		15
Headway Factor	1	2	1	1	1	1	1	2		2		1
Turning Speed (mph)	Left	Thru	Right									
Number of Detectors	20	100	20	20	20	100	20	100	20	20	100	20
Detector Template	0	0	0	0	0	0	0	0	0	0	0	0
Leading Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Trailing Detector (ft)	20	6	20	20	6	20	6	20	6	20	6	20
Detector 1 Position (ft)	Ch+Ex											
Detector 1 Size (ft)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	94	94	94	94	94	94	94	94	94	94	94	94
Detector 2 Position (ft)	6			6		6		6		6		6
Detector 2 Size (ft)	Ch+Ex											
Detector 2 Type	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Channel	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Detector 2 Extend (s)	8	8	8	8	8	8	8	8	8	8	8	8
Turn Type	8	8	8	8	8	8	8	8	8	8	8	8
Protected Phases	2			2		2		2		2		2
Permitted Phases	6			6		6		6		6		6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	8			8		8	2		2		6	6
Switch Phase	4.0			4.0		4.0	4.0		4.0		4.0	4.0
Minimum Initial (s)	21.0			21.0		21.0	21.0		21.0		21.0	21.0
Minimum Split (s)	21.0			21.0		21.0	39.0		39.0		39.0	39.0
Total Split (s)	35.0%			35.0%		35.0%	65.0%		65.0%		65.0%	65.0%
Total Split (%)	16.0			16.0		16.0	34.0		34.0		34.0	34.0
Maximum Green (s)	3.0			3.0		3.0	3.0		3.0		3.0	3.0
Yellow Time (s)	2.0			2.0		2.0	2.0		2.0		2.0	2.0
All-Red Time (s)	0.0			0.0		0.0	0.0		0.0		0.0	0.0
Lost Time Adjust (s)	5.0			5.0		5.0	5.0		5.0		5.0	5.0
Total Lost Time (s)	3.0			3.0		3.0	3.0		3.0		3.0	3.0
Lead-Lag	3.0			3.0		3.0	3.0		3.0		3.0	3.0
Lead-Lag Optimize?	None			None		None	None		None		None	None
Vehicle Extension (s)	5.0			5.0		5.0	5.0		5.0		5.0	5.0
Recall Mode	11.0			11.0		11.0	11.0		11.0		11.0	11.0
Flash Dont Walk (s)	0			0		0	0		0		0	0
Pedestrian Calls (#/hr)	6.6			6.6		6.6	8.9		8.9		8.9	8.9
Act Effct Green (s)	0.41			0.41		0.41	0.55		0.55		0.55	0.55
Actuated g/C Ratio	0.06			0.06		0.06	0.05		0.15		0.13	0.00
v/c Ratio	4.6			2.3		3.3	3.3		3.3		3.3	3.3
Control Delay	0.0			0.0		0.0	0.0		0.0		0.0	0.0
Queue Delay	4.6			2.3		3.3	3.3		3.3		3.3	3.3
Total Delay	A			A		A	A		A		A	A
LOS	3.9			3.9		3.9	3.3		3.3		3.2	3.2
Approach Delay	A			A		A	A		A		A	A
Approach LOS	A			A		A	A		A		A	A
Intersection Summary	Other											
Area Type	Other											
Cycle Length: 60												
Actuated Cycle Length: 16.2												
Natural Cycle: 45												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.15												
Intersection Signal Delay: 3.4												
Intersection Capacity Utilization 22.5%												
Analysis Period (min) 15												



Lanes, Volumes, Timings
7: South Massey Street & Stone Street

2016 Existing Conditions - AM Peak Hour

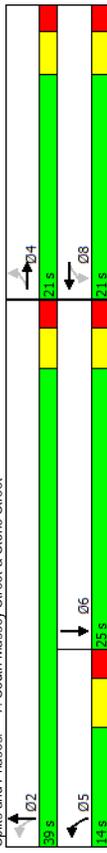
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	5	0	186	4	38	30	183	341	0	0	605
Traffic Volume (vph)	5	0	186	4	38	30	183	341	0	0	605
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	0	0	0	0	0	0	300	0	0	0	0
Storage Length (ft)	0	0	0	1	0	0	0	0	0	0	0
Storage Lanes	25	0	0	1	0	0	0	0	0	0	0
Taper Length (ft)	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95
Lane Util. Factor	0.869	0.999	0.950	0.934	0.934	0.934	0.95	0.95	1.00	1.00	0.999
Flt Protected	0	1617	0	1770	1740	0	0	3479	0	0	3536
Satd. Flow (prot)	0	0.987	0.755	0.755	0.755	0.755	0.628	0.628	0	0	3536
Flt Permitted	0	1598	0	1406	1740	0	0	2223	0	0	3536
Satd. Flow (perm)	0	0.987	0.755	0.755	0.755	0.755	0.628	0.628	0	0	3536
Right Turn on Red	248	0	0	0	0	0	0	0	0	0	0
Satd. Flow (RTOR)	30	0	0	0	0	0	30	0	0	0	0
Link Speed (mph)	316	7.2	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.83	0.83
Link Distance (ft)	7.2	0.248	0.248	0.42	0.42	0.42	0.33	0.379	0	0	0.729
Travel Time (s)	0.255	0	0	0	0	0	0	0	0	0	0
Peak Hour Factor	No										
Adj. Flow (vph)	7	0	248	4	42	33	203	379	0	0	729
Shared Lane Traffic (%)	0	255	0	4	75	0	0	582	0	0	736
Lane Group Flow (vph)	No										
Enter Blocked Intersection	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Right
Lane Alignment	0	0	0	0	0	0	0	0	0	0	0
Median Width (ft)	-10	12	12	12	12	12	12	12	12	12	12
Link Offset (ft)	16	16	16	16	16	16	16	16	16	16	16
Crosswalk Width (ft)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Two way Left Turn Lane	15	9	15	9	15	9	15	9	15	9	15
Headway Factor	1	2	1	2	1	2	1	2	1	2	1
Turning Speed (mph)	Left	Thru	Left								
Number of Detectors	20	100	20	100	20	100	20	100	20	100	20
Detector Template	0	0	0	0	0	0	0	0	0	0	0
Leading Detector (ft)	0	0	0	0	0	0	0	0	0	0	0
Trailing Detector (ft)	20	6	20	6	20	6	20	6	20	6	20
Detector 1 Position (ft)	Ch+Ex										
Detector 1 Size (ft)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	94	6	94	6	94	6	94	6	94	6	94
Detector 2 Position (ft)	Ch+Ex										
Detector 2 Size (ft)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Extend (s)	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA	NA	NA	NA
Turn Type	4	4	4	8	8	8	5	2	2	2	6
Protected Phases	4	4	4	8	8	8	5	2	2	2	6
Permitted Phases	4	4	4	8	8	8	5	2	2	2	6

Lanes, Volumes, Timings
7: South Massey Street & Stone Street

2016 Existing Conditions - AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	4	4	4	8	8	8	5	2	2	6	6
Switch Phase	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Initial (s)	21.0	21.0	21.0	21.0	21.0	21.0	9.5	21.0	21.0	21.0	21.0
Minimum Split (s)	21.0	21.0	21.0	21.0	21.0	21.0	14.0	39.0	39.0	25.0	25.0
Total Split (s)	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	23.3%	65.0%	65.0%	41.7%	41.7%
Total Green (s)	16.0	16.0	16.0	16.0	16.0	16.0	8.5	34.0	34.0	20.0	20.0
Maximum Green (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.0	3.0	3.0	3.0
Yellow Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Total Lost Time (s)	Lead Lag	Lead Lag	Lead Lag	Lead Lag	Lead Lag	Lead Lag	Lead Lag	Lead Lag	Lead Lag	Lead Lag	Lead Lag
Lead-Lag Optimize?	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	None	None	None	None	None	None	None	None	None	None	None
Recall Mode	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	7.7	7.7	7.7	7.7	7.7	7.7	18.8	18.8	18.8	18.8	18.8
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.25	0.25	0.60	0.60	0.60	0.60	0.60
v/c Ratio	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44
Control Delay	5.7	5.7	5.7	13.0	9.7	6.8	6.8	6.8	6.8	5.6	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.7	5.7	5.7	13.0	9.7	6.8	6.8	6.8	6.8	5.6	5.6
LOS	A	A	A	B	A	A	A	A	A	A	A
Approach Delay	5.7	5.7	5.7	9.9	6.8	6.8	6.8	6.8	6.8	5.6	5.6
Approach LOS	A	A	A	A	A	A	A	A	A	A	A
Intersection Summary	Other										
Area Type	Other										
Cycle Length	60										
Actuated Cycle Length	31.4										
Natural Cycle	55										
Control Type	Actuated-Uncoordinated										
Maximum v/c Ratio	0.44										
Intersection Signal Delay	6.3										
Intersection Capacity Utilization	60.3%										
Analysis Period (min)	15										

Spills and Phases: 7: South Massey Street & Stone Street

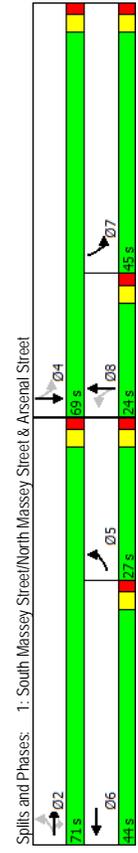


Lanes, Volumes, Timings
1: South Massey Street/North Massey Street & Arsenal Street

Lanes, Volumes, Timings
1: South Massey Street/North Massey Street & Arsenal Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	148	372	176	0	348	64	215	434	16	266	369
Traffic Volume (vph)	148	372	176	0	348	64	215	434	16	266	369
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	170	0	0	0	0	0	250	0	0	515	0
Storage Length (ft)	1	1	1	0	0	1	1	0	0	1	0
Storage Lanes	60	25	0	0	0	100	0	0	0	130	0
Taper Length (ft)	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95
Lane Util. Factor	0.850	0.850	0.979	0.979	0.979	1.00	0.995	0.995	1.00	0.960	0.960
Flt Protected	0	0.986	0	0	0.950	0	0.950	0	0.950	0	0.950
Satd. Flow (prot)	0	3490	1583	0	1824	0	1770	3522	0	1770	3398
Flt Permitted	0.609	0.609	0	0.363	0.363	0	0.371	0.371	0	0.371	0.371
Satd. Flow (perm)	0	2155	1583	0	1824	0	676	3522	0	691	3398
Right Turn on Red	0	0	No	0	No						
Satd. Flow (RTOR)	30	30	30	30	30	30	30	30	30	30	30
Link Speed (mph)	403	720	250	5.7	720	16.4	16.4	10.8	10.8	10.8	10.8
Travel Time (s)	9.2	0.91	0.91	0.94	0.94	0.95	0.95	0.90	0.90	0.90	0.90
Peak Hour Factor	163	409	193	0	370	68	226	457	17	296	410
Adj. Flow (vph)	0	572	193	0	438	0	226	474	0	296	560
Shared Lane Traffic (%)	No										
Lane Group Flow (vph)	0	No									
Enter Blocked Intersection	0	0	0	0	0	0	0	0	0	0	0
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Right
Median Width (ft)	0	0	0	0	0	0	12	12	12	12	12
Link Offset (ft)	16	16	16	16	16	16	16	16	16	16	16
Crosswalk Width (ft)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Two way Left Turn Lane	15	9	15	2	9	15	1	2	9	15	9
Headway Factor	1	2	1	2	1	2	1	2	1	2	1
Turning Speed (mph)	Left	Thru	Right	Thru	Left	Thru	Left	Thru	Left	Thru	Left
Number of Detectors	20	100	20	100	20	100	20	100	20	100	20
Detector Template	0	0	0	0	0	0	0	0	0	0	0
Leading Detector (ft)	0	0	0	0	0	0	0	0	0	0	0
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position (ft)	20	6	20	6	20	6	20	6	20	6	20
Detector 1 Size (ft)	Ch+Ex										
Detector 1 Type	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position (ft)	94	94	94	94	94	94	94	94	94	94	94
Detector 2 Size (ft)	6	6	6	6	6	6	6	6	6	6	6
Detector 2 Type	Ch+Ex										
Detector 2 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Extend (s)	pm+pt	NA	Perm	NA	NA	Perm	NA	NA	pm+pt	NA	NA
Turn Type	5	2	2	6	6	8	7	4	7	4	4
Protected Phases	2	2	2	2	2	8	8	8	8	8	8
Permitted Phases											

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Detector Phase	5	2	2	6	6	6	8	8	8	7	4
Switch Phase	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Initial (s)	10.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Minimum Split (s)	27.0	71.0	71.0	44.0	44.0	24.0	24.0	24.0	45.0	69.0	69.0
Total Split (%)	19.3%	50.7%	50.7%	31.4%	31.4%	17.1%	17.1%	17.1%	32.1%	49.3%	49.3%
Maximum Green (s)	22.0	66.0	66.0	39.0	39.0	19.0	19.0	19.0	40.0	64.0	64.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	Lag	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead-Lag	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	None	None	None	None
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	33.6	33.6	33.6	33.6	33.6	19.7	19.7	19.7	42.2	42.2	42.2
Actuated g/C Ratio	0.39	0.39	0.39	0.23	0.23	0.23	0.23	0.23	0.49	0.49	0.49
v/c Ratio	0.68	0.31	0.62	0.62	0.62	1.47	0.59	0.59	0.53	0.34	0.34
Control Delay	26.4	19.8	25.2	272.1	272.1	36.6	36.6	36.6	25.6	15.6	15.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.4	19.8	25.2	272.1	272.1	36.6	36.6	36.6	25.6	15.6	15.6
LOS	C	B	B	C	C	F	D	D	C	C	B
Approach Delay	24.7	24.7	24.7	25.2	25.2	112.6	112.6	112.6	19.1	19.1	19.1
Approach LOS	C	C	C	C	C	F	F	F	B	B	B
Intersection Summary	Other										
Area Type:	Other										
Cycle Length:	140										
Actuated Cycle Length:	86.2										
Natural Cycle:	90										
Control Type:	Actuated-Uncoordinated										
Maximum v/c Ratio:	1.47										
Intersection Signal Delay:	45.3										
Intersection Capacity Utilization:	80.7%										
Analysis Period (min):	15										



Lanes, Volumes, Timings
 2: Parking Lot/Gas Station & Arsenal Street

HCM 2010 TWSC
 2: Parking Lot/Gas Station & Arsenal Street

Proposed Mercy Heights
 2016 Existing Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	622	2	1	402	28	1	0	13	8	0	1
Future Volume (vph)	4	622	2	1	402	28	1	0	13	8	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected					0.991			0.875			0.989	
Satd. Flow (prot)	0	3539	0	0	1846	0	0	1623	0	0	1761	0
Flt Permitted								0.996			0.956	
Satd. Flow (perm)	0	3539	0	0	1846	0	0	1623	0	0	1761	0
Link Speed (mph)					30			10			10	
Link Distance (ft)					378			125			123	
Travel Time (s)					5.7			8.5			8.4	
Peak Hour Factor	0.94	0.94	0.94	0.93	0.93	0.93	0.27	0.27	0.27	0.75	0.75	0.75
Adj. Flow (vph)	4	662	2	1	432	30	4	0	48	11	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	668	0	0	463	0	0	52	0	0	12	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right	Right
Median Width(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Link Offset(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Crosswalk Width(ft)	16	16	16	16	16	16	16	16	16	16	16	16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15	9	15	9	15	9	15	9	15	9
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop

Intersection Summary	Area Type:	Other
Control Type:	Unsignalized	
Intersection Capacity Utilization	33.7%	ICU Level of Service A
Analysis Period (min)	15	

Intersection	0.8											
Int Delay, s/veh												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol. veh/h	4	622	2	1	402	28	1	0	13	8	0	1
Future Vol. veh/h	4	622	2	1	402	28	1	0	13	8	0	1
Conflicting Peds. #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	None	None	None	None	None	None
RT Channelized	-	-	-	-	-	-	-	-	-	-	-	-
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	-	-	-	-	-	-	-	-	-	-	-
Grade, %	-	-	-	-	-	-	-	-	-	-	-	-
Peak Hour Factor	94	94	94	93	93	93	27	27	27	75	75	75
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	662	2	1	432	30	4	0	48	11	0	1

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	462	0	0	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.13	-	-	-
Critical Hdwy Sig 1	-	-	-	-
Critical Hdwy Sig 2	-	-	-	-
Follow-up Hdwy	2.219	-	-	-
Pot Cap-1 Maneuver	1097	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1097	-	-	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	12.2	17.9
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBR	WBL	WBR	SBLn1	WBR	SBLn1
Capacity (veh/h)	551	1097	-	-	923	-	-	290
HCM Lane V/C Ratio	0.094	0.004	-	-	0.001	-	-	0.041
HCM Control Delay (s)	12.2	8.3	0	-	8.9	0	-	17.9
HCM Lane LOS	B	A	A	-	A	A	-	C
HCM 95th %ile Q(veh)	0.3	0	-	-	0	-	-	0.1

Lanes, Volumes, Timings
3: Sherman Street/Commercial Lots Driveway & Arsenal Street

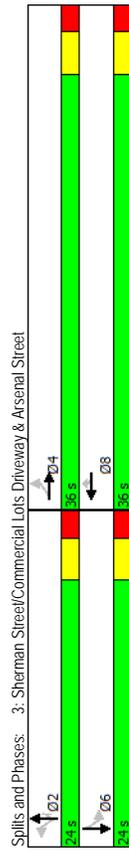
2016 Existing Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	29	559	107	0	304	7	68	137	34	25	37
Traffic Volume (vph)	29	559	107	0	304	7	68	137	34	25	37
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	0	0	0	0	0	0	0	0	0	0	0
Storage Length (ft)	0	0	0	0	0	0	0	0	0	0	0
Storage Lanes	0	0	0	0	0	0	0	0	0	0	0
Taper Length (ft)	25	0	0	25	0	0	0	0	0	0	0
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.977	0	0	0.850	0	0	0.850	0	0.850	0.940	0.989
Flt Protected	0	0.998	0	0	0.984	0	0.984	0	0.984	0.989	0.989
Satd. Flow (prot)	0	3451	0	0	1863	1583	0	1833	1583	0	1732
Flt Permitted	0.930	0	0	0	0.839	0	0.839	0	0.839	0.891	0.891
Satd. Flow (perm)	0	3216	0	0	1863	1583	0	1563	1583	0	1560
Right Turn on Red	Yes										
Right Turn on Red	51	0	0	0	0	0	0	0	0	0	0
Satd. Flow (RTOR)	30	0	0	30	0	0	30	0	0	0	0
Link Distance (ft)	378	0	0	397	0	0	580	0	0	0	249
Link Speed (mph)	8.6	0	0	9.0	0	0	13.2	0	0	0	17.0
Travel Time (s)	0.86	0.86	0.86	0.92	0.92	0.78	0.78	0.78	0.78	0.58	0.58
Peak Hour Factor	34	650	124	0	330	8	87	176	44	43	64
Adj. Flow (vph)	0	808	0	0	330	8	0	263	44	0	193
Shared Lane Traffic (%)	No										
Lane Group Flow (vph)	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Right
Enter Blocked Intersection	0	0	0	0	0	0	0	0	0	0	0
Lane Alignment	0	0	0	0	0	0	0	0	0	0	0
Median Width (ft)	0	0	0	0	0	0	0	0	0	0	0
Link Offset (ft)	16	0	0	16	0	0	16	0	0	0	16
Crosswalk Width (ft)	16	0	0	16	0	0	16	0	0	0	16
Two way Left Turn Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Headway Factor	15	9	15	9	15	9	15	9	15	9	15
Turning Speed (mph)	1	2	1	1	1	2	1	1	1	1	2
Number of Detectors	Left	Thru	Right	Thru	Left	Thru	Right	Left	Thru	Right	Thru
Detector Template	20	100	20	100	20	100	20	100	20	100	20
Leading Detector (ft)	0	0	0	0	0	0	0	0	0	0	0
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position (ft)	20	6	20	6	20	6	20	6	20	6	20
Detector 1 Size (ft)	Ch+Ex										
Detector 1 Type	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position (ft)	94	6	94	6	94	6	94	6	94	6	94
Detector 2 Size (ft)	Ch+Ex										
Detector 2 Type	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Channel	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA
Detector 2 Extend (s)	4	0.0	4	0.0	4	0.0	4	0.0	4	0.0	4
Turn Type	4	0.0	4	0.0	4	0.0	4	0.0	4	0.0	4
Protected Phases	8	0.0	8	0.0	8	0.0	8	0.0	8	0.0	8
Permitted Phases	4	0.0	4	0.0	4	0.0	4	0.0	4	0.0	4

Lanes, Volumes, Timings
3: Sherman Street/Commercial Lots Driveway & Arsenal Street

2016 Existing Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Group	4	4	4	8	8	8	2	2	2	2	6
Detector Phase	4	4	4	8	8	8	2	2	2	2	6
Switch Phase	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Initial (s)	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Minimum Split (s)	36.0	36.0	36.0	36.0	36.0	36.0	24.0	24.0	24.0	24.0	24.0
Total Split (%)	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Total Split (s)	31.0	31.0	31.0	31.0	31.0	31.0	3.0	3.0	3.0	3.0	3.0
Maximum Green (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Yellow Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lead-Lag	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lead-Lag Optimize?	None	None	None	None	None	None	None	None	None	None	None
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Walk Time (s)	0	0	0	0	0	0	0	0	0	0	0
Flash Dont Walk (s)	18.5	18.5	18.5	18.5	18.5	18.5	19.2	19.2	19.2	19.2	19.2
Pedestrian Calls (#/hr)	0.39	0.39	0.39	0.39	0.39	0.39	0.40	0.40	0.40	0.40	0.40
Act Effct Green (s)	0.63	0.63	0.63	0.46	0.46	0.46	0.42	0.42	0.42	0.42	0.29
Actuated g/C Ratio	13.2	13.2	13.2	12.8	12.8	12.8	14.5	14.5	14.5	14.5	9.1
v/c Ratio	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay	13.2	13.2	13.2	12.8	12.8	12.8	14.5	14.5	14.5	14.5	9.1
Queue Delay	B	B	B	A	A	A	B	B	B	B	A
Total Delay	13.2	13.2	13.2	12.5	12.5	12.5	13.1	13.1	13.1	13.1	9.1
LOS	B	B	B	B	B	B	B	B	B	B	A
Approach Delay	B	B	B	B	B	B	B	B	B	B	A
Approach LOS	B	B	B	B	B	B	B	B	B	B	A
Intersection Summary	Other										
Area Type	Other										
Cycle Length: 60	Actuated Cycle Length: 47.8										
Natural Cycle: 45	Control Type: Actuated-Uncoordinated										
Maximum v/c Ratio: 0.63	Intersection Signal Delay: 12.6										
Intersection Signal Delay: 12.6	Intersection LOS: B										
Intersection Capacity Utilization 69.7%	ICU Level of Service C										
Analysis Period (min) 15											



Lanes, Volumes, Timings
5: Sherman Street & Stone Street

Proposed Mercy Heights
2016 Existing Conditions - PM Peak Hour

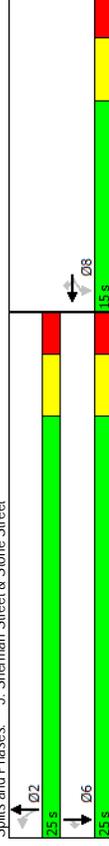
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	0	0	0	60	128	65	94	156	0	0	141	18
Traffic Volume (vph)	0	0	0	60	128	65	94	156	0	0	141	18
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	0	0	0	0	0	25	200	0	0	0	150	0
Storage Length (ft)	0	0	0	0	0	1	1	1	0	0	0	1
Storage Lanes	25	0	0	25	0	25	0	25	0	25	0	0
Tap Length (ft)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor				0.850								0.850
Flt Protected				0.984			0.950					
Satd. Flow (prot)	0	0	0	1833	1583	1770	1863	0	0	1863	1583	
Flt Permitted				0.984			0.640					
Satd. Flow (perm)	0	0	0	1833	1583	1192	1863	0	0	1863	1583	
Right Turn on Red			Yes				Yes	Yes			Yes	
Satd. Flow (RTOR)				83								55
Satd. Flow (vph)	30	30	30	30	30	30	30	30	30	30	30	30
Link Distance (ft)	740	740	740	406	406	301	301	580	580	580	580	580
Travel Time (s)	16.8	16.8	16.8	9.2	9.2	6.8	6.8	13.2	13.2	13.2	13.2	13.2
Peak Hour Factor	0.92	0.92	0.92	0.66	0.66	0.66	0.88	0.88	0.88	0.76	0.76	0.76
Adj. Flow (vph)	0	0	0	91	194	98	107	177	0	0	186	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	285	98	107	177	0	0	186	24	24
Enter Blocked Intersection	No											
Lane Alignment	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	Right
Median Width (ft)	0	0	0	0	0	0	12	0	0	12	0	0
Link Offset (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Crosswalk Width (ft)	16	16	16	16	16	16	16	16	16	16	16	16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15	9	15	9	15	9	15	9	15	9
Number of Detectors	1	2	1	1	1	2	1	2	1	2	1	1
Detector Template	Left	Thru	Right									
Leading Detector (ft)	20	100	20	20	100	20	100	20	100	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size (ft)	20	6	20	20	6	20	6	20	6	20	6	20
Detector 1 Type	Ch+Ex											
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position (ft)	94	94	94	94	94	94	94	94	94	94	94	94
Detector 2 Size (ft)	6	6	6	6	6	6	6	6	6	6	6	6
Detector 2 Type	Ch+Ex											
Detector 2 Channel												
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases												
Permitted Phases	8	8	8	8	8	2	2	2	2	2	2	6

Lanes, Volumes, Timings
5: Sherman Street & Stone Street

Proposed Mercy Heights
2016 Existing Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase												
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Total Split (s)	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Total Split (%)	37.5%	37.5%	37.5%	37.5%	37.5%	37.5%	37.5%	37.5%	37.5%	37.5%	37.5%	37.5%
Maximum Green (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead-Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effect Green (s)	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
v/c Ratio	0.46	0.17	0.29	0.30	0.32	0.05						
Control Delay	10.5	3.8	9.6	8.9	9.0	1.3						
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0						
Total Delay	10.5	3.8	9.6	8.9	9.0	1.3						
LOS	B	A	A	A	A	A						
Approach Delay	8.7											
Approach LOS	A											
Intersection Summary												
Area Type:	Other											
Cycle Length:	40											
Actuated Cycle Length:	26.2											
Natural Cycle:	45											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.46											
Intersection Signal Delay:	8.7											
Intersection Capacity Utilization:	35.2%											
Analysis Period (min):	15											

Spills and Phases: 5: Sherman Street & Stone Street



Lanes, Volumes, Timings
7: South Massey Street & Stone Street

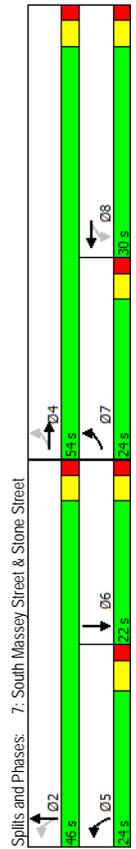
2016 Existing Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	5	0	176	26	99	116	223	532	0	0	517
Traffic Volume (vph)	5	0	176	26	99	116	223	532	0	0	517
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	0	0	0	0	0	0	300	0	0	0	0
Storage Length (ft)	0	0	0	1	0	0	0	0	0	0	0
Storage Lanes	25	0	0	1	0	0	0	0	0	0	0
Taper Length (ft)	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95
Lane Util. Factor	0.868	0.999	0.950	0.919	0.919	0.919	0.95	0.95	1.00	1.00	0.994
Flt Protected	0	1615	0	1770	1712	0	0	3486	0	0	3518
Satd. Flow (proof)	0	0.989	0.575	0.660	0.660	0.660	0.660	0.660	0.660	0.660	0.660
Flt Permitted	0	1599	0	1071	1712	0	0	2336	0	0	3518
Satd. Flow (perm)	0	229	Yes	56	56	56	56	56	Yes	Yes	3
Right Turn on Red	0	235	0	34	280	0	0	820	0	0	612
Satd. Flow (RTOR)	0	No									
Enter Blocked Intersection	0	No									
Lane Group Flow (vph)	0.77	0.77	0.77	0.77	0.77	0.77	0.92	0.92	0.92	0.88	0.88
Adj. Flow (vph)	6	0	229	34	129	151	242	578	0	0	588
Travel Time (s)	7.2	7.2	7.2	7.2	7.2	7.2	9.6	9.6	9.6	16.4	16.4
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.92	0.92	0.92	0.88	0.88
Shared Lane Traffic (%)	6	0	229	34	129	151	242	578	0	0	588
Lane Group Flow (vph)	0	235	0	34	280	0	0	820	0	0	612
Enter Blocked Intersection	No										
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Right	Right
Median Width (ft)	0	0	0	12	12	12	12	12	12	12	12
Link Offset (ft)	-10	16	16	16	16	16	16	16	16	16	16
Crosswalk Width (ft)	16	16	16	16	16	16	16	16	16	16	16
Two way Left Turn Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Headway Factor	15	9	15	15	15	15	15	15	15	15	15
Turning Speed (mph)	1	2	1	2	1	2	1	2	1	2	2
Number of Detectors	Left	Thru	Thru								
Detector Template	20	100	20	100	20	100	20	100	20	100	100
Leading Detector (ft)	0	0	0	0	0	0	0	0	0	0	0
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position (ft)	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size (ft)	20	6	20	6	20	6	20	6	20	6	6
Detector 1 Type	Ch+Ex										
Detector 1 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position (ft)	94	94	94	94	94	94	94	94	94	94	94
Detector 2 Size (ft)	6	6	6	6	6	6	6	6	6	6	6
Detector 2 Type	Ch+Ex										
Detector 2 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	NA	pm+pt	NA	pm+pt	NA	NA	NA	NA
Protected Phases	7	4	8	8	8	8	5	2	2	2	6
Permitted Phases	4										

Lanes, Volumes, Timings
7: South Massey Street & Stone Street

2016 Existing Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Group	7	4	8	8	8	8	5	2	2	6	6
Detector Phase	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Switch Phase	9.0	21.0	21.0	21.0	21.0	21.0	9.5	21.0	21.0	21.0	21.0
Minimum Initial (s)	24.0	54.0	30.0	30.0	30.0	30.0	24.0	46.0	46.0	22.0	22.0
Minimum Split (s)	24.0%	54.0%	30.0%	30.0%	30.0%	30.0%	24.0%	46.0%	46.0%	22.0%	22.0%
Total Split (%)	19.0	49.0	25.0	25.0	25.0	25.0	18.5	41.0	41.0	17.0	17.0
Maximum Green (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.0	3.0	3.0	3.0
Yellow Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Total Lost Time (s)	Lead	Lead	Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag
Lead-Lag	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lead-Lag Optimize?	None	None	None	None	None	None	None	None	None	None	None
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Walk Time (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Flash Dont Walk (s)	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Calls (#/hr)	14.0	14.0	14.0	14.0	14.0	14.0	28.9	28.9	28.9	28.9	28.9
Act Effct Green (s)	0.26	0.26	0.26	0.26	0.26	0.26	0.54	0.54	0.54	0.54	0.54
Actuated g/C Ratio	0.40	0.40	0.12	0.57	0.57	0.57	0.65	0.65	0.65	0.32	0.32
v/c Ratio	5.9	19.2	20.5	20.5	20.5	20.5	11.7	11.7	11.7	7.4	7.4
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	5.9	19.2	20.5	20.5	20.5	20.5	11.7	11.7	11.7	7.4	7.4
Total Delay	A	B	C	C	C	C	B	B	B	A	A
LOS	5.9	20.4	20.4	20.4	20.4	20.4	11.7	11.7	11.7	7.4	7.4
Approach Delay	A	A	A	C	C	C	B	B	B	A	A
Approach LOS	Intersection Summary										
Area Type:	Other										
Cycle Length:	100										
Actuated Cycle Length:	53.6										
Natural Cycle:	65										
Control Type:	Actuated-Uncoordinated										
Maximum v/c Ratio:	0.65										
Intersection Signal Delay:	11.1										
Intersection Capacity Utilization:	64.2%										
Analysis Period (min):	15										



A5

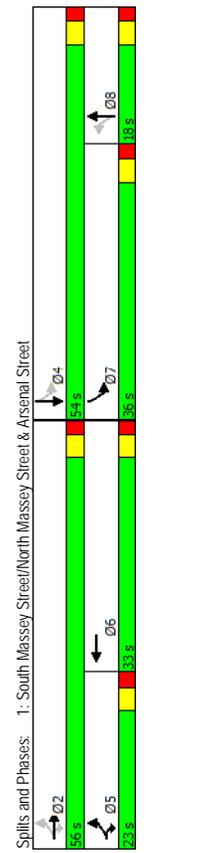
**Level of Service Calculations:
Background Conditions**

Lanes, Volumes, Timings
1: South Massey Street/North Massey Street & Arsenal Street 2021 Background Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	60	309	106	0	244	28	119	240	16	425	506
Traffic Volume (vph)	60	309	106	0	244	28	119	240	16	425	506
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	170	0	0	0	250	0	515	0	0	515	0
Total Split (%)	1	1	1	0	1	0	1	0	0	1	0
Storage Length (ft)	60	25	100	0	100	0	130	0	0	130	0
Taper Length (ft)	0.95	0.95	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	0.850	0.986	0.986	0.986	0.986	0.986	0.991	0.991	0.986	0.986	0.983
Fit Protected	0	0.992	0	0.950	0.950	0	0.950	0.950	0	0.950	0
Satd. Flow (prot)	0	3511	1583	0	1837	0	1770	3507	0	1770	3479
Fit Permitted	0.695	0	0.397	0.397	0.397	0	0.351	0.351	0	0.351	0
Satd. Flow (perm)	0	2460	1583	0	1837	0	740	3507	0	654	3479
Right Turn on Red	0	No	No	No	No	No	No	No	No	No	No
Satd. Flow (RTOR)	30	30	30	30	30	30	30	30	30	30	30
Link Speed (mph)	403	250	720	720	720	720	474	474	720	474	720
Link Distance (ft)	9.2	0.92	0.92	0.90	0.90	0.87	0.87	0.87	0.87	0.85	0.85
Travel Time (s)	65	336	115	0	271	31	137	276	18	500	595
Peak Hour Factor	0	401	115	0	302	0	137	294	0	500	671
Adj. Flow (vph)	No	No	No	No	No	No	No	No	No	No	No
Shared Lane Traffic (%)	0	No	No	No	No	No	No	No	No	No	No
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0
Enter Blocked Intersection	0	0	0	0	0	0	0	0	0	0	0
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Right	Right
Median Width(ft)	0	0	0	0	0	0	12	12	0	12	12
Link Offset(ft)	16	16	16	16	16	16	16	16	16	16	16
Crosswalk Width(ft)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Two way Left Turn Lane	15	9	15	2	9	15	1	2	9	15	9
Headway Factor	1	2	1	2	1	2	1	2	1	2	1
Turning Speed (mph)	Left	Thru	Right	Thru	Left	Thru	Left	Thru	Left	Thru	Left
Number of Detectors	20	100	20	100	20	100	20	100	20	100	20
Detector Template	0	0	0	0	0	0	0	0	0	0	0
Leading Detector (ft)	0	0	0	0	0	0	0	0	0	0	0
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	20	6	20	6	20	6	20	6	20	6	20
Detector 1 Size(ft)	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex
Detector 1 Type	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94	94	94	94	94	94	94	94	94	94	94
Detector 2 Size(ft)	6	6	6	6	6	6	6	6	6	6	6
Detector 2 Type	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex
Detector 2 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	custom	NA	NA	NA	Perm	NA	NA	pm+pt	NA
Protected Phases	5	2	5	6	6	8	7	4	7	4	4
Permitted Phases	2	2	2	8	8	8	8	8	8	8	8

Lanes, Volumes, Timings
1: South Massey Street/North Massey Street & Arsenal Street 2021 Background Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Detector Phase	5	2	5	6	6	8	8	8	8	7	4
Switch Phase	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Initial (s)	10.0	21.0	10.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Minimum Split (s)	23.0	56.0	23.0	33.0	33.0	18.0	18.0	18.0	18.0	36.0	54.0
Total Split (%)	20.9%	50.9%	20.9%	30.0%	30.0%	16.4%	16.4%	16.4%	16.4%	32.7%	49.1%
Maximum Green (s)	18.0	51.0	18.0	28.0	28.0	13.0	13.0	13.0	13.0	31.0	49.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead-Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	None	None	None	None
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	32.5	32.5	32.5	19.4	19.4	13.6	13.6	13.6	13.6	47.3	47.3
Actuated g/C Ratio	0.36	0.36	0.36	0.21	0.21	0.15	0.15	0.15	0.15	0.52	0.52
v/c Ratio	0.40	0.20	0.77	1.23	0.77	1.23	0.56	0.56	0.56	0.72	0.37
Control Delay	21.1	19.6	48.6	200.3	48.6	200.3	44.0	44.0	44.0	24.6	15.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.1	19.6	48.6	200.3	48.6	200.3	44.0	44.0	44.0	24.6	15.7
LOS	C	C	B	D	D	F	D	D	D	C	B
Approach Delay	20.8	20.8	20.8	48.6	48.6	93.7	19.5	19.5	19.5	19.5	19.5
Approach LOS	C	C	C	D	D	F	D	D	D	C	B
Intersection Summary	Other										
Area Type:	Other										
Cycle Length:	110										
Actuated Cycle Length:	90.3										
Natural Cycle:	75										
Control Type:	Actuated-Uncoordinated										
Maximum v/c Ratio:	1.23										
Intersection Signal Delay:	36.6										
Intersection Capacity Utilization:	72.2%										
Analysis Period (min):	15										



Lanes, Volumes, Timings
 2: Parking Lot/Gas Station & Arsenal Street

HCM 2010 TWSC
 2: Parking Lot/Gas Station & Arsenal Street

2021 Background Conditions - AM Peak Hour

2021 Background Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	713	10	1	276	13	0	0	2	11	0	3
Future Volume (vph)	1	713	10	1	276	13	0	0	2	11	0	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0	0.998		0.994				0.865			0.973	
Satd. Flow (prot)	0	3532	0	0	1852	0	0	1611	0	0	1744	0
Flt Permitted											0.962	
Satd. Flow (perm)	0	3532	0	0	1852	0	0	1611	0	0	1744	0
Link Speed (mph)		30		30			10				10	
Link Distance (ft)		250		378			125				123	
Travel Time (s)		5.7		8.6			8.5				8.4	
Peak Hour Factor	0.86	0.86	0.86	0.89	0.89	0.89	0.25	0.25	0.25	0.25	0.70	0.70
Adj. Flow (vph)	1	829	12	1	310	15	0	0	8	16	0	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	842	0	0	326	0	0	8	0	0	20	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right	Right
Median Width(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Link Offset(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Crosswalk Width(ft)	16	16	16	16	16	16	16	16	16	16	16	16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15	15	9	15	15	9	15	15	9	15
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop

Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Int Delay, s/veh	0.3											
Movement												
Lane Configurations												
Traffic Vol, veh/h	1	713	10	1	276	13	0	0	2	11	0	3
Future Vol, veh/h	1	713	10	1	276	13	0	0	2	11	0	3
Conflicting Peds. #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	0
Grade, %	-	0	-	-	0	-	-	-	0	-	-	0
Peak Hour Factor	86	86	86	89	89	89	25	25	25	70	70	70
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	829	12	1	310	15	0	0	8	16	0	4

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	325	0	0	1159
Stage 1	-	-	-	837
Stage 2	-	-	-	322
Critical Hdwy	4.13	-	-	7.33
Critical Hdwy Sig 1	-	-	-	6.53
Critical Hdwy Sig 2	-	-	-	6.13
Follow-up Hdwy	2.219	-	-	3.519
Pot Cap-1 Maneuver	1233	-	-	161
Stage 1	-	-	-	328
Stage 2	-	-	-	689
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1233	-	-	160
Mov Cap-2 Maneuver	-	-	-	160
Stage 1	-	-	-	327
Stage 2	-	-	-	684

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	11.3	15.7
HCM LOS			B	C

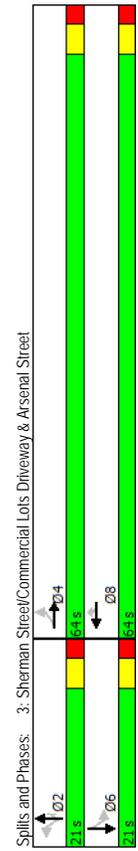
Minor Lane/Major Mvmt	NBLn1	EBL	EBR	WBL	WBR	SBLn1
Capacity (veh/h)	583	1233	-	-	-	358
HCM Lane V/C Ratio	0.014	0.001	-	0.001	-	0.056
HCM Control Delay (s)	11.3	7.9	0	9.6	0	15.7
HCM Lane LOS	B	A	A	A	A	C
HCM 95th %ile Q(veh)	0	0	-	0	-	0.2

Lanes, Volumes, Timings
3: Sherman Street/Commercial Lots Driveway & Arsenal Street 2021 Background Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	121	477	138	0	241	44	33	80	23	6	2
Traffic Volume (vph)	121	477	138	0	241	44	33	80	23	6	2
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	0	0	0	0	100	0	0	120	0	0	0
Storage Length (ft)	0	0	0	0	0	0	0	0	0	0	0
Storage Lanes	25	0	0	0	25	0	0	0	0	0	0
Taper Length (ft)	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.972	0.992	0.992	0.850	0.850	0.850	0.850	0.850	0.850	0.928	0.928
Flt Protected	0	3413	0	0	1863	1583	0	1837	1583	0	1698
Satd. Flow (perm)	0.832	0.832	0.832	0.916	0.916	0.916	0.916	0.916	0.916	0.906	0.906
Flt Permitted	0	2862	0	0	1863	1583	0	1706	1583	0	1566
Satd. Flow (perm)	77	0	0	0	53	0	0	31	0	0	15
Right Turn on Red	30	0	0	0	30	0	0	30	0	0	10
Satd. Flow (RTOR)	378	0	0	0	397	0	0	580	0	0	249
Link Distance (ft)	8.6	0	0	0	9.0	0	0	13.2	0	0	17.0
Travel Time (s)	0.85	0.85	0.85	0.83	0.83	0.74	0.74	0.74	0.74	0.60	0.60
Peak Hour Factor	142	561	162	0	290	53	45	108	31	10	3
Adj. Flow (vph)	0	865	0	0	290	53	0	153	31	0	28
Shared Lane Traffic (%)	No										
Lane Group Flow (vph)	Left	Left	Right	Left	Left	Left	Left	Left	Right	Left	Right
Enter Blocked Intersection	0	0	0	0	0	0	0	0	0	0	0
Lane Alignment	0	0	0	0	0	0	0	0	0	0	0
Median Width (ft)	16	16	16	16	16	16	16	16	16	16	16
Link Offset (ft)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Crosswalk Width (ft)	15	9	15	15	15	15	15	15	15	15	15
Two way Left Turn Lane	1	2	1	1	2	1	2	1	1	1	2
Headway Factor	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru
Turning Speed (mph)	20	100	20	20	100	20	20	100	20	20	100
Number of Detectors	0	0	0	0	0	0	0	0	0	0	0
Detector Template	0	0	0	0	0	0	0	0	0	0	0
Leading Detector (ft)	20	6	20	20	6	20	6	20	20	6	20
Trailing Detector (ft)	Ch+Ex										
Detector 1 Position (ft)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size (ft)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Type	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	94	6	94	94	6	94	94	6	94	6	94
Detector 2 Position (ft)	6	6	6	6	6	6	6	6	6	6	6
Detector 2 Size (ft)	Ch+Ex										
Detector 2 Type	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Channel	Perm	NA	NA	Perm	Perm	NA	Perm	Perm	Perm	NA	NA
Detector 2 Extend (s)	4	4	4	8	8	2	2	2	2	6	6
Protected Phases											
Permitted Phases											

Lanes, Volumes, Timings
3: Sherman Street/Commercial Lots Driveway & Arsenal Street 2021 Background Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Detector Phase	4	4	4	8	8	8	2	2	2	2	6
Switch Phase	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Initial (s)	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Minimum Split (s)	64.0	64.0	64.0	64.0	64.0	64.0	21.0	21.0	21.0	21.0	21.0
Total Split (%)	75.3%	75.3%	75.3%	75.3%	75.3%	75.3%	24.7%	24.7%	24.7%	24.7%	24.7%
Total Split (s)	59.0	59.0	59.0	59.0	59.0	59.0	16.0	16.0	16.0	16.0	16.0
Maximum Green (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Yellow Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lead-Lag	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lead-Lag Optimize?	None	None	None	None	None	None	None	None	None	None	None
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Walk Time (s)	0	0	0	0	0	0	0	0	0	0	0
Flash Dont Walk (s)	20.0	20.0	20.0	20.0	20.0	20.0	16.2	16.2	16.2	16.2	16.2
Pedestrian Calls (#/hr)	0.43	0.43	0.43	0.43	0.43	0.43	0.35	0.35	0.35	0.35	0.35
Act Effct Green (s)	0.68	0.68	0.68	0.36	0.07	0.26	0.05	0.05	0.05	0.05	0.05
Actuated g/C Ratio	12.2	12.2	12.2	9.8	2.8	14.1	6.3	6.3	6.3	6.3	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay	12.2	12.2	12.2	9.8	2.8	14.1	6.3	6.3	6.3	6.3	9.2
Queue Delay	B	B	B	A	A	A	B	B	B	B	A
Total Delay	12.2	12.2	12.2	8.7	2.8	12.8	9.2	9.2	9.2	9.2	9.2
Approach Delay	B	B	B	A	A	A	B	B	B	B	A
Approach LOS	B	B	B	A	A	A	B	B	B	B	A
Intersection Summary	Other										
Area Type	Other										
Cycle Length: 65	Actuated Cycle Length: 46.3										
Natural Cycle: 45	Control Type: Actuated-Uncoordinated										
Maximum v/c Ratio: 0.68	Intersection Signal Delay: 11.4										
Intersection LOS: B	Intersection Capacity Utilization 53.7%										
ICU Level of Service A	Analysis Period (min) 15										



Lanes, Volumes, Timings
5: Sherman Street & Stone Street

Lanes, Volumes, Timings
5: Sherman Street & Stone Street

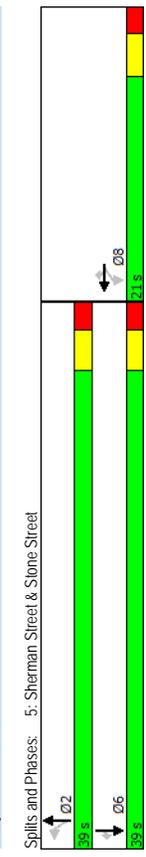
Lanes, Volumes, Timings
5: Sherman Street & Stone Street

2021 Background Conditions - AM Peak Hour

2021 Background Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	0	0	0	9	32	21	34	143	0	0	0	106
Traffic Volume (vph)	0	0	0	9	32	21	34	143	0	0	0	106
Future Volume (vph)	0	0	0	9	32	21	34	143	0	0	0	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	0	25	200	0	0	0	0	150
Storage Lanes	0	0	0	0	0	1	1	0	0	0	0	1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit				0.850			0.950			0.850		0.850
Flt Protected	0	0	0	0.989			0.989			0.989		0.989
Satd. Flow (proof)	0	0	0	1842	1583	1770	1863	0	0	1863	1583	1583
Flt Permitted	0	0	0	0.989			0.851			0.989		0.851
Satd. Flow (perm)	0	0	0	1842	1583	1583	1863	0	0	1863	1583	1583
Right Turn on Red	Yes			Yes			Yes			Yes		Yes
Satd. Flow (RTOR)	36			36			36			36		36
Satd. Flow (vph)	30			30			30			30		30
Link Distance (mph)	740			406			301			580		580
Travel Time (s)	16.8			9.2			6.8			13.2		13.2
Peak Hour Factor	0.92	0.92	0.92	0.88	0.88	0.88	0.87	0.87	0.87	0.77	0.77	0.77
Adj. Flow (vph)	0	0	0	10	36	24	39	164	0	0	138	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	46	24	39	164	0	0	138	4	4
Enter Blocked Intersection	No											
Lane Alignment	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	Right
Median Width (ft)	0	0	0	0	0	0	12	0	0	12	0	0
Link Offset (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Crosswalk Width (ft)	16			16			16			16		16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15		9	15		9	15	9
Number of Detectors	1	2	1	1	1	1	2	1	2	1	2	1
Detector Template	Left	Thru	Right									
Leading Detector (ft)	20	100	20	20	100	20	100	20	100	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size (ft)	20	6	20	20	6	20	6	20	6	20	6	20
Detector 1 Type	Ch+Ex											
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position (ft)	94			94			94			94		94
Detector 2 Size (ft)	6			6			6			6		6
Detector 2 Type	Ch+Ex			Ch+Ex			Ch+Ex			Ch+Ex		Ch+Ex
Detector 2 Channel												
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		0.0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	8			8			8			8		8
Permitted Phases	8			8			8			8		8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	8	8	8	8	8	8	2	2	2	2	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Total Split (s)	21.0	21.0	21.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0
Total Split (%)	35.0%	35.0%	35.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%	65.0%
Maximum Green (s)	16.0	16.0	16.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead-Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	6.7	6.7	6.7	11.1	11.1	11.1	11.1	11.1	11.1	11.1	9.4	9.4
Actuated g/C Ratio	0.36	0.36	0.36	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.51	0.51
v/c Ratio	0.07	0.04	0.04	0.04	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.00
Control Delay	6.3	2.9	4.7	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.3	2.9	4.7	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.8	0.0
LOS	A	A	A	A	A	A	A	A	A	A	A	A
Approach Delay	5.1			4.7			4.7			4.7		4.7
Approach LOS	A			A			A			A		A
Intersection Summary												
Area Type:	Other											
Cycle Length:	60											
Actuated Cycle Length:	18.5											
Natural Cycle:	45											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.15											
Intersection Signal Delay:	4.7											
Intersection Capacity Utilization:	22.5%											
Analysis Period (min):	15											



Lanes, Volumes, Timings
7: South Massey Street & Stone Street

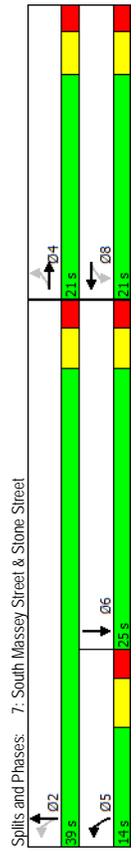
2021 Background Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	5	0	188	4	38	30	185	345	0	0	613
Traffic Volume (vph)	5	0	188	4	38	30	185	345	0	0	613
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	0	0	0	0	0	0	300	0	0	0	0
Storage Length (ft)	0	0	0	1	0	0	0	0	0	0	0
Storage Lanes	25	0	0	1	0	0	0	0	0	0	0
Traper Length (ft)	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95
Lane Util. Factor	0.869	0.999	0.950	0.934	0.934	0.934	0.95	0.95	1.00	1.00	0.999
Flt Protected	0	1617	0	1770	1740	0	0	3479	0	0	3536
Satd. Flow (proof)	0	0.987	0.755	0.755	0.755	0.625	0.625	0.625	0.625	0.625	0.625
Flt Permitted	0	1598	0	1406	1740	0	0	2212	0	0	3536
Satd. Flow (perm)	0	1598	0	1406	1740	0	0	2212	0	0	3536
Right Turn on Red	Yes										
Satd. Flow (RTOR)	251	0	0	33	33	0	0	0	0	0	2
Link Speed (mph)	30	30	30	30	30	30	30	30	30	30	30
Link Distance (ft)	316	740	740	422	740	422	740	422	740	422	720
Travel Time (s)	7.2	16.8	16.8	9.6	16.8	9.6	16.8	9.6	16.8	9.6	16.4
Peak Hour Factor	0.75	0.75	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.83	0.83
Adj. Flow (vph)	7	0	251	4	42	33	206	383	0	0	739
Shared Lane Traffic (%)	0	258	0	4	75	0	0	589	0	0	746
Lane Group Flow (vph)	No										
Enter Blocked Intersection	Left	Left	Right	Left	Right	Left	Left	Right	Left	Right	Right
Lane Alignment	0	0	0	12	12	0	12	12	0	12	12
Median Width (ft)	-10	16	16	16	16	16	16	16	16	16	16
Link Offset (ft)	16	16	16	16	16	16	16	16	16	16	16
Crosswalk Width (ft)	16	16	16	16	16	16	16	16	16	16	16
Two way Left Turn Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Headway Factor	15	9	15	9	15	9	15	9	15	9	15
Turning Speed (mph)	1	2	1	2	1	2	1	2	1	2	1
Number of Detectors	Left	Thru	Thru								
Detector Template	20	100	20	100	20	100	20	100	20	100	100
Leading Detector (ft)	0	0	0	0	0	0	0	0	0	0	0
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position (ft)	20	6	20	6	20	6	20	6	20	6	6
Detector 1 Size (ft)	Ch+Ex										
Detector 1 Type	Detector 1 Channel										
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position (ft)	94	6	94	6	94	6	94	6	94	6	94
Detector 2 Size (ft)	Ch+Ex										
Detector 2 Type	Detector 2 Channel										
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA	NA	NA	NA
Protected Phases	4	4	4	8	8	8	5	2	2	2	6
Permitted Phases	4	4	4	8	8	8	5	2	2	2	6

Lanes, Volumes, Timings
7: South Massey Street & Stone Street

2021 Background Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Detector Phase	4	4	4	8	8	8	5	2	2	6	6
Switch Phase	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Initial (s)	21.0	21.0	21.0	21.0	21.0	21.0	9.5	21.0	21.0	21.0	21.0
Minimum Split (s)	21.0	21.0	21.0	21.0	21.0	21.0	14.0	39.0	39.0	25.0	25.0
Total Split (%)	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	23.3%	65.0%	65.0%	41.7%	41.7%
Maximum Green (s)	16.0	16.0	16.0	16.0	16.0	16.0	8.5	34.0	34.0	20.0	20.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag								
Lead-Lag Optimize?	Yes										
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None										
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	7.7	7.7	7.7	7.7	7.7	7.7	19.0	19.0	19.0	19.0	19.0
Actuated g/C Ratio	0.24	0.24	0.24	0.24	0.24	0.24	0.60	0.60	0.60	0.60	0.60
v/c Ratio	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44
Control Delay	5.7	5.7	5.7	5.7	5.7	5.7	6.9	6.9	6.9	6.9	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.7	5.7	5.7	5.7	5.7	5.7	6.9	6.9	6.9	6.9	6.9
LOS	A	A	A	B	A	A	A	A	A	A	A
Approach Delay	5.7	5.7	5.7	10.0	10.0	10.0	6.9	6.9	6.9	6.9	6.9
Approach LOS	A	A	A	A	A	A	A	A	A	A	A



Lanes, Volumes, Timings
1: Massey Street & Arsenal Street

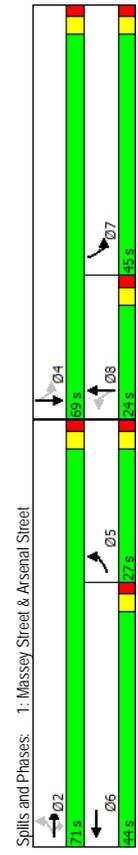
2021 Background Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	150	383	178	0	369	68	218	439	16	271	374
Traffic Volume (vph)	150	383	178	0	369	68	218	439	16	271	374
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	170	0	0	0	0	250	0	515	0	515	0
Storage Length (ft)	1	1	1	0	0	1	0	1	0	1	0
Storage Lanes	60	25	100	0	100	0	130	0	0	130	0
Taper Length (ft)	0.95	0.95	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	0.850	0.979	0.979	0.979	0.979	0.979	0.995	0.995	0.995	0.995	0.960
Flt Protected	0	0.986	0	0	0.950	0	0.950	0	0.950	0	0.950
Satd. Flow (proof)	0	3490	1583	0	1824	0	1770	3522	0	1770	3398
Flt Permitted	0.597	0	0.345	0	0.345	0	0.355	0	0.355	0	0.355
Satd. Flow (perm)	0	2113	1583	0	1824	0	643	3522	0	661	3398
Right Turn on Red	0	No									
Satd. Flow (RTOR)	30	30	30	30	30	30	30	30	30	30	30
Link Speed (mph)	403	250	720	250	720	250	720	3522	16	720	474
Link Distance (ft)	9.2	5.7	16.4	5.7	16.4	5.7	16.4	16.4	16.4	16.4	10.8
Travel Time (s)	0.91	0.91	0.94	0.94	0.94	0.95	0.95	0.95	0.95	0.90	0.90
Peak Hour Factor	1.65	421	196	0	393	72	229	462	17	301	416
Adj. Flow (vph)	0	586	196	0	465	0	229	479	0	301	568
Shared Lane Traffic (%)	No										
Lane Group Flow (vph)	0	No									
Enter Blocked Intersection	0	0	0	0	0	0	0	0	0	0	0
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Right	Right
Median Width (ft)	0	0	0	0	0	0	12	12	0	12	12
Link Offset (ft)	16	16	16	16	16	16	16	16	16	16	16
Crosswalk Width (ft)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Two way Left Turn Lane	15	9	15	2	9	15	1	2	9	15	9
Headway Factor	1	2	1	2	1	2	1	2	1	2	1
Turning Speed (mph)	Left	Thru	Right	Thru	Left	Thru	Left	Thru	Left	Thru	Left
Number of Detectors	20	100	20	100	20	100	20	100	20	100	20
Detector Template	0	0	0	0	0	0	0	0	0	0	0
Leading Detector (ft)	0	0	0	0	0	0	0	0	0	0	0
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position (ft)	20	6	20	6	20	6	20	6	20	6	20
Detector 1 Size (ft)	Ch+Ex										
Detector 1 Type	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position (ft)	94	94	94	94	94	94	94	94	94	94	94
Detector 2 Size (ft)	6	6	6	6	6	6	6	6	6	6	6
Detector 2 Type	Ch+Ex										
Detector 2 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA	NA
Protected Phases	5	2	2	6	6	8	7	4	7	4	4
Permitted Phases	2	2	2	8	8	8	8	8	8	8	8

Lanes, Volumes, Timings
1: Massey Street & Arsenal Street

2021 Background Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Phase	5	2	2	6	6	6	8	8	8	7	4
Switch Phase	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Initial (s)	10.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Minimum Split (s)	27.0	71.0	71.0	44.0	44.0	24.0	24.0	24.0	45.0	45.0	69.0
Total Split (%)	19.3%	50.7%	50.7%	31.4%	31.4%	17.1%	17.1%	17.1%	32.1%	49.3%	49.3%
Maximum Green (s)	22.0	66.0	66.0	39.0	39.0	19.0	19.0	19.0	40.0	40.0	64.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	Lag	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead-Lag	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	None	None	None	None
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	36.4	36.4	36.4	36.4	36.4	36.4	36.4	36.4	43.3	43.3	43.3
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	0.40	0.22	0.22	0.48	0.48	0.48
v/c Ratio	0.69	0.31	0.63	0.63	0.63	1.64	0.62	0.62	0.55	0.35	0.35
Control Delay	26.7	19.7	25.7	342.2	39.5	342.2	39.5	39.5	28.1	16.9	16.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.7	19.7	25.7	342.2	39.5	342.2	39.5	39.5	28.1	16.9	16.9
LOS	C	B	C	F	D	F	D	D	C	B	B
Approach Delay	24.9	C	C	25.7	C	C	F	F	C	C	20.8
Approach LOS	C	C	C	C	C	C	F	F	C	C	C
Intersection Summary	Other										
Area Type:	Other										
Cycle Length:	140										
Actuated Cycle Length:	90.1										
Natural Cycle:	90										
Control Type:	Actuated-Uncoordinated										
Maximum v/c Ratio:	1.64										
Intersection Signal Delay:	52.0										
Intersection Capacity Utilization:	82.8%										
Analysis Period (min):	15										



Lanes, Volumes, Timings
 2: Parking Lot/Gas Station & Arsenal Street

HCM 2010 TWSC
 2: Parking Lot/Gas Station & Arsenal Street

2021 Background Conditions - PM Peak Hour

Proposed Mercy Heights
 2021 Background Conditions - PM Peak Hour

Proposed Mercy Heights
 2021 Background Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	4	638	2	1	427	28	1	0	13	8	0
Traffic Volume (vph)	4	638	2	1	427	28	1	0	13	8	0
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor				0.992			0.875		0.989		0.989
Flt Protected	0	3539	0	0	1848	0	0	1623	0	0	1761
Satd. Flow (prot)	0	3539	0	0	1848	0	0	1623	0	0	1761
Flt Permitted	30			30			10		10		10
Link Speed (mph)	250			378			125		123		123
Link Distance (ft)	5.7			8.6			8.5		8.4		8.4
Travel Time (s)	0.94	0.94	0.94	0.93	0.93	0.93	0.27	0.27	0.27	0.75	0.75
Peak Hour Factor	4	679	2	1	459	30	4	0	48	11	0
Adj. Flow (vph)											
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	685	0	0	490	0	0	52	0	0	12
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)	0			0			0		0		0
Link Offset(ft)	0			0			0		0		0
Crosswalk Width(ft)	16			16			16		16		16
Two way Left Turn Lane											
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15	9	15	9	15	9	15	9	15
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop

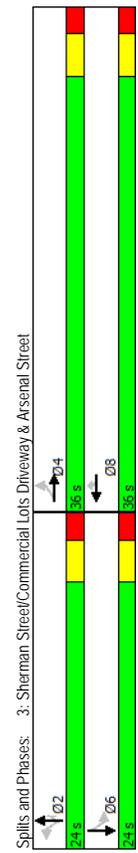
Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Int Delay, s/veh	0.8										
Movement	4	638	2	1	427	28	1	0	13	8	0
Lane Configurations	4	638	2	1	427	28	1	0	13	8	0
Traffic Vol, veh/h	4	638	2	1	427	28	1	0	13	8	0
Future Vol, veh/h	0	0	0	0	0	0	0	0	0	0	0
Conflicting Peds. #/hr	Free	Free	Free	Free	Free	Free	None	None	None	None	None
Sign Control	Free	Free	Free	Free	Free	Free	None	None	None	None	None
RT Channelized	-	-	-	-	-	-	-	-	-	-	-
Storage Length	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	-	-	-	-	-	-	-	-	-	-
Grade, %	-	-	-	-	-	-	-	-	-	-	-
Peak Hour Factor	94	94	94	93	93	93	27	27	27	75	75
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	679	2	1	459	30	4	0	48	11	0
Major/Minor	Major1	Major1	Major2	Minor1	Minor1	Minor2					
Conflicting Flow All	489	0	0	681	0	0	1165	1179	340	824	1165
Stage 1	-	-	-	-	-	-	688	688	-	476	476
Stage 2	-	-	-	-	-	-	477	491	-	348	689
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53
Critical Hdwy Sig 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53
Critical Hdwy Sig 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019
Pot Cap-1 Maneuver	1072	-	-	910	-	-	160	190	657	278	193
Stage 1	-	-	-	-	-	-	403	446	-	569	556
Stage 2	-	-	-	-	-	-	568	547	-	642	446
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1072	-	-	910	-	-	159	188	657	256	191
Mov Cap-2 Maneuver	-	-	-	-	-	-	159	188	-	256	191
Stage 1	-	-	-	-	-	-	401	443	-	566	555
Stage 2	-	-	-	-	-	-	566	546	-	591	443
Approach	EB	EB	WB	WB	NB	NB	SB	SB			
HCM Control Delay, s	0.1		0		12.4		18.8				
HCM LOS					B		C				
Minor Lane/Major Mvmt	NBLn1	EBL	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	537	1072	-	910	-	-	273				
HCM Lane V/C Ratio	0.097	0.004	-	0.001	-	-	0.044				
HCM Control Delay (s)	12.4	8.4	0	9	0	0	18.8				
HCM Lane LOS	B	A	A	A	A	A	C				
HCM 95th %ile Q(veh)	0.3	0	-	0	-	-	0.1				

Lanes, Volumes, Timings
3: Sherman Street/Commercial Lots Driveway & Arsenal Street 2021 Background Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	37	566	108	0	308	9	69	177	34	35	52
Traffic Volume (vph)	37	566	108	0	308	9	69	177	34	35	52
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	0	0	0	0	0	100	0	120	0	0	0
Storage Length (ft)	0	0	0	0	0	1	0	1	0	0	0
Storage Lanes	25	0	0	25	0	25	0	0	0	25	0
Taper Length (ft)	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.977	0.977	0.977	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.939
Flt Protected	0	0.997	0	0	1863	1583	0	1837	1583	0	1730
Satd. Flow (perm)	0.921	0.921	0.921	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.868
Flt Permitted	0	3185	0	0	1863	1583	0	1572	1583	0	1518
Satd. Flow (perm)	51	51	51	36	36	36	36	36	36	36	71
Right Turn on Red	30	30	30	30	30	30	30	30	30	30	10
Satd. Flow (RTOR)	378	378	378	397	397	397	397	397	397	397	249
Link Distance (ft)	8.6	8.6	8.6	9.0	9.0	9.0	13.2	13.2	13.2	13.2	17.0
Travel Time (s)	0.86	0.86	0.86	0.92	0.92	0.92	0.78	0.78	0.78	0.78	0.58
Peak Hour Factor	43	658	126	0	335	10	88	227	44	60	90
Adj. Flow (vph)	0	827	0	0	335	10	0	315	44	0	272
Shared Lane Traffic (%)	No										
Lane Group Flow (vph)	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Right
Enter Blocked Intersection	0	0	0	0	0	0	0	0	0	0	0
Lane Alignment	0	0	0	0	0	0	0	0	0	0	0
Median Width (ft)	16	16	16	16	16	16	16	16	16	16	16
Link Offset (ft)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Crosswalk Width (ft)	15	9	15	15	15	15	15	15	15	15	9
Two way Left Turn Lane	1	2	1	1	1	2	1	1	1	1	2
Headway Factor	Left	Thru	Thru	Right	Left	Thru	Right	Left	Thru	Left	Thru
Turning Speed (mph)	20	100	20	20	100	20	100	20	20	100	100
Number of Detectors	0	0	0	0	0	0	0	0	0	0	0
Detector Template	0	0	0	0	0	0	0	0	0	0	0
Leading Detector (ft)	20	6	6	20	20	6	20	20	6	20	6
Trailing Detector (ft)	Ch+Ex										
Detector 1 Position (ft)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size (ft)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Type	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	94	6	6	94	6	6	94	6	6	94	6
Detector 2 Position (ft)	Ch+Ex										
Detector 2 Size (ft)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Type	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Extend (s)	Perm	NA	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Turn Type	4	4	4	8	8	2	2	2	2	6	6
Protected Phases											
Permitted Phases											

Lanes, Volumes, Timings
3: Sherman Street/Commercial Lots Driveway & Arsenal Street 2021 Background Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Detector Phase	4	4	4	8	8	8	2	2	2	2	6
Switch Phase	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Initial (s)	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Minimum Split (s)	36.0	36.0	36.0	36.0	36.0	36.0	24.0	24.0	24.0	24.0	24.0
Total Split (%)	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Total Split (s)	31.0	31.0	31.0	31.0	31.0	31.0	3.0	3.0	3.0	3.0	3.0
Maximum Green (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Yellow Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lead-Lag	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lead-Lag Optimize?	None	None	None	None	None	None	None	None	None	None	None
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Flash Dont Walk (s)	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Calls (#/hr)	19.0	19.0	19.0	19.0	19.0	19.0	19.2	19.2	19.2	19.2	19.2
Act Effct Green (s)	0.39	0.39	0.39	0.39	0.39	0.39	0.40	0.40	0.40	0.40	0.40
Actuated g/C Ratio	0.65	0.65	0.65	0.46	0.46	0.46	0.50	0.50	0.07	0.42	0.42
v/c Ratio	13.4	13.4	13.4	12.6	12.6	12.6	0.7	0.7	16.1	5.1	11.5
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	13.4	13.4	13.4	12.6	12.6	12.6	0.7	0.7	16.1	5.1	11.5
Total Delay	B	B	B	A	A	A	B	B	A	B	B
LOS	13.4	13.4	13.4	12.3	12.3	12.3	14.8	14.8	11.5	11.5	11.5
Approach Delay	B	B	B	B	B	B	B	B	B	B	B
Approach LOS											
Intersection Summary	Other										
Area Type	Other										
Cycle Length: 60	Other										
Actuated Cycle Length: 48.3	Other										
Natural Cycle: 45	Other										
Control Type: Actuated-Uncoordinated	Other										
Maximum v/c Ratio: 0.65	Other										
Intersection Signal Delay: 13.2	Intersection LOS: B										
Intersection Capacity Utilization 75.2%	ICU Level of Service D										
Analysis Period (min) 15	Other										



Spills and Phases: 3: Sherman Street/Commercial Lots Driveway & Arsenal Street

Lanes, Volumes, Timings
5: Sherman Street & Stone Street

2021 Background Conditions - PM Peak Hour

Lanes, Volumes, Timings
5: Sherman Street & Stone Street

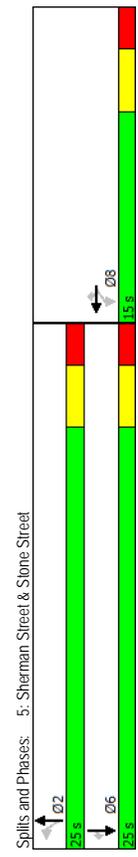
2021 Background Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	61	130	77	95	185	0	0	156	20
Future Volume (vph)	0	0	0	61	130	77	95	185	0	0	156	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	0	25	200	0	0	0	150	0
Storage Lanes	0	0	0	0	0	1	1	0	0	0	1	0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit				0.850			0.950			0.850		
Flt Protected	0	0	0	0.984			0.984			0.984		
Satd. Flow (proof)	0	0	0	1833	1583	1770	1863	0	0	1863	1583	0
Flt Permitted	0	0	0	0.984			0.629			0.984		
Satd. Flow (perm)	0	0	0	1833	1583	1172	1863	0	0	1863	1583	0
Right Turn on Red			Yes			Yes		Yes			Yes	
Satd. Flow (RTOR)			97									55
Satd. Flow (vph)	30			30			30			30		30
Link Distance (mft)	740			406			301			580		580
Travel Time (s)	16.8			9.2			6.8			13.2		13.2
Peak Hour Factor	0.92	0.92	0.92	0.66	0.66	0.66	0.88	0.88	0.88	0.76	0.76	0.76
Adj. Flow (vph)	0	0	0	92	197	117	108	210	0	0	205	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	289	117	108	210	0	0	205	26	26
Enter Blocked Intersection	No											
Lane Alignment	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	Right
Median Width (ft)	0	0	0	0	0	0	12	0	0	12	0	12
Link Offset (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Crosswalk Width (ft)	16			16			16			16		16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9			9			15		9
Number of Detectors	1	2	1	1	1	2	1	2	1	2	1	1
Detector Template	Left	Thru	Right									
Leading Detector (ft)	20	100	20	20	20	100	20	100	20	100	20	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size (ft)	20	6	20	20	6	20	6	20	6	20	6	20
Detector 1 Type	Cl+Ex											
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position (ft)	94			94			94			94		94
Detector 2 Size (ft)	6			6			6			6		6
Detector 2 Type	Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		0.0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases				8			8			8		8
Permitted Phases				8			8			8		8

Lanes, Volumes, Timings
5: Sherman Street & Stone Street

2021 Background Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase												
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Total Split (s)	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Total Split (%)	37.5%	37.5%	37.5%	37.5%	37.5%	37.5%	37.5%	37.5%	37.5%	37.5%	37.5%	37.5%
Maximum Green (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead-Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effect Green (s)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
v/c Ratio	0.47	0.20	0.29	0.35								
Control Delay	10.8	3.9	9.5	9.2								
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.8	3.9	9.5	9.2								
LOS	B	A	A	A	A	A	A	A	A	A	A	A
Approach Delay												
Approach LOS	A											
Intersection Summary												
Area Type:	Other											
Cycle Length:	40											
Actuated Cycle Length:	26.5											
Natural Cycle:	45											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.47											
Intersection Signal Delay:	8.8											
Intersection Capacity Utilization:	36.2%											
Analysis Period (min):	15											



Lanes, Volumes, Timings
7: Massey Street & Stone Street

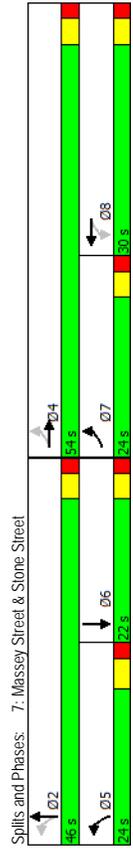
2021 Background Conditions - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	5	0	178	26	102	117	226	539	0	0	523
Traffic Volume (vph)	5	0	178	26	102	117	226	539	0	0	523
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	0	0	0	0	0	0	300	0	0	0	0
Storage Length (ft)	0	0	0	1	0	0	0	0	0	0	0
Storage Lanes	25	0	0	25	0	0	25	0	0	25	0
Taper Length (ft)	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Lane Util. Factor	0.868	0.999	0.950	0.920	0.920	0.920	0.95	0.95	1.00	1.00	0.994
Flt Protected	0	1615	0	1770	1714	0	0	3486	0	0	3518
Satd. Flow (prot)	0	0.989	0.567	0.567	0.567	0.567	0.657	0.657	0	0	3518
Flt Permitted	0	1599	0	1056	1714	Yes	0	2325	0	0	3518
Satd. Flow (perm)	0	231	Yes	55	55	55	Yes	Yes	Yes	Yes	Yes
Right Turn on Red	0	0	0	0	0	0	0	0	0	0	0
Satd. Flow (RTOR)	30	30	30	30	30	30	30	30	30	30	30
Link Speed (mph)	316	740	740	740	740	740	422	422	96	16.4	720
Link Distance (ft)	7.2	16.8	16.8	16.8	16.8	16.8	0.92	0.92	0.92	0.88	0.88
Travel Time (s)	0.77	0.77	0.77	0.77	0.77	0.77	152	246	586	0	594
Peak Hour Factor	6	0	231	34	132	152	246	586	0	0	594
Adj. Flow (vph)	0	237	0	34	284	0	0	832	0	0	618
Shared Lane Traffic (%)	No										
Lane Group Flow (vph)	Left	Left	Right	Left	Right	Left	Left	Left	Right	Left	Right
Enter Blocked Intersection	0	0	0	0	0	0	0	0	0	0	0
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Left	Right	Left	Right
Median Width (ft)	0	12	12	12	12	12	12	12	12	12	12
Link Offset (ft)	-10	0	0	0	0	0	0	0	0	0	0
Crosswalk Width (ft)	16	16	16	16	16	16	16	16	16	16	16
Two way Left Turn Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Headway Factor	15	9	15	15	15	15	15	15	9	15	15
Turning Speed (mph)	1	2	1	2	1	2	1	2	1	2	2
Number of Detectors	Left	Thru	Thru								
Detector Template	20	100	20	100	20	100	20	100	20	100	100
Leading Detector (ft)	0	0	0	0	0	0	0	0	0	0	0
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position (ft)	20	6	20	6	20	6	20	6	20	6	6
Detector 1 Size (ft)	Ch+Ex										
Detector 1 Type	Detector 1 Channel										
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position (ft)	94	94	94	94	94	94	94	94	94	94	94
Detector 2 Size (ft)	6	6	6	6	6	6	6	6	6	6	6
Detector 2 Type	Ch+Ex										
Detector 2 Channel	Detector 2 Channel	Detector 2 Channel	Detector 2 Channel	Detector 2 Channel	Detector 2 Channel	Detector 2 Channel	Detector 2 Channel	Detector 2 Channel	Detector 2 Channel	Detector 2 Channel	Detector 2 Channel
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	NA	pm+pt	NA	pm+pt	NA	NA	NA	NA
Protected Phases	7	4	8	8	8	8	5	2	2	6	6
Permitted Phases	4	8	8	8	8	8	2	2	2	2	2

Lanes, Volumes, Timings
7: Massey Street & Stone Street

2021 Background Conditions - PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	7	4	8	8	8	8	5	2	2	6	6
Switch Phase	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Initial (s)	9.0	21.0	21.0	21.0	21.0	21.0	9.5	21.0	21.0	21.0	21.0
Minimum Split (s)	24.0	54.0	30.0	30.0	30.0	30.0	24.0	46.0	46.0	22.0	22.0
Total Split (%)	24.0%	54.0%	30.0%	30.0%	30.0%	30.0%	24.0%	46.0%	46.0%	22.0%	22.0%
Maximum Green (s)	19.0	49.0	25.0	25.0	25.0	25.0	18.5	41.0	41.0	17.0	17.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	None	None	None	None
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	14.2	14.2	14.2	14.2	14.2	14.2	29.5	29.5	29.5	29.5	29.5
Actuated g/C Ratio	0.26	0.26	0.26	0.26	0.26	0.26	0.54	0.54	0.54	0.54	0.54
v/c Ratio	0.40	0.40	0.12	0.58	0.12	0.58	0.66	0.66	0.66	0.32	0.32
Control Delay	5.8	19.3	21.0	21.0	21.0	21.0	12.0	12.0	12.0	7.4	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.8	19.3	21.0	21.0	21.0	21.0	12.0	12.0	12.0	7.4	7.4
LOS	A	B	B	C	C	C	B	B	B	A	A
Approach Delay	5.8	20.8	20.8	20.8	20.8	20.8	12.0	12.0	12.0	7.4	7.4
Approach LOS	A	C	C	C	C	C	B	B	B	A	A
Intersection Summary	Other										
Area Type	Other										
Cycle Length	100										
Actuated Cycle Length	54.3										
Natural Cycle	65										
Control Type	Actuated-Uncoordinated										
Maximum v/c Ratio	0.66										
Intersection Signal Delay	11.2										
Intersection Capacity Utilization	64.8%										
Analysis Period (min)	15										



A6

**Level of Service Calculations:
Full Development Conditions**

Lanes, Volumes, Timings
1: South Massey Street/North Massey Street & Arsenal Street

Lanes, Volumes, Timings
1: South Massey Street/North Massey Street & Arsenal Street

Proposed Mercy Heights
Full Build Conditions - AM Peak Hour

Proposed Mercy Heights
Full Build Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	60	321	109	0	247	30	125	246	16	440	521
Traffic Volume (vph)	60	321	109	0	247	30	125	246	16	440	521
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	170	0	0	0	250	0	515	0	0	515	0
Total Split (%)	1	1	1	0	1	0	1	0	1	1	0
Storage Length (ft)	60	25	100	0	100	0	130	0	0	130	0
Taper Length (ft)	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Lane Util. Factor	0.850	0.850	0.985	0.985	0.985	0.985	0.991	0.991	0.985	0.983	0.983
Flt Protected	0	0.992	0	0.950	0.950	0	0.950	0.950	0	0.950	0
Satd. Flow (proof)	0	3511	1583	0	1835	0	1770	3507	0	1770	3479
Flt Permitted	0.692	0	0.390	0.390	0.390	0	0.337	0.337	0	0.337	0
Satd. Flow (perm)	0	2449	1583	0	1835	0	1726	3507	0	1726	3479
Right Turn on Red	0	No	No	No	No	No	No	No	No	No	No
Satd. Flow (RTOR)	30	30	30	30	30	30	30	30	30	30	30
Link Speed (mph)	403	250	152	152	152	152	152	152	152	152	152
Link Distance (ft)	9.2	5.7	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Travel Time (s)	0.92	0.92	0.92	0.90	0.90	0.87	0.87	0.87	0.85	0.85	0.85
Peak Hour Factor	65	349	118	0	274	33	144	283	18	518	613
Adj. Flow (vph)	0	414	118	0	307	0	144	301	0	518	689
Shared Lane Traffic (%)	No	No	No	No	No	No	No	No	No	No	No
Lane Group Flow (vph)	0	No	No	No	No	No	No	No	No	No	No
Enter Blocked Intersection	0	0	0	0	0	0	0	0	0	0	0
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Right	Right
Median Width(ft)	0	0	0	0	0	0	12	12	0	12	12
Link Offset(ft)	16	16	16	16	16	16	16	16	16	16	16
Crosswalk Width(ft)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Two way Left Turn Lane	15	9	15	2	9	15	1	2	9	15	9
Headway Factor	1	2	1	2	1	2	1	2	1	2	1
Turning Speed (mph)	20	100	20	100	20	100	20	100	20	100	20
Number of Detectors	0	0	0	0	0	0	0	0	0	0	0
Detector Template	0	0	0	0	0	0	0	0	0	0	0
Leading Detector (ft)	20	6	20	6	20	6	20	6	20	6	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Type	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex
Detector 1 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94	94	94	94	94	94	94	94	94	94	94
Detector 2 Size(ft)	6	6	6	6	6	6	6	6	6	6	6
Detector 2 Type	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex
Detector 2 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	custom	NA	NA	NA	NA	NA	NA	pm+pt	NA
Protected Phases	5	2	5	6	6	6	8	8	7	7	4
Permitted Phases	2	2	2	8	8	8	8	8	4	4	4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Detector Phase	5	2	5	6	6	6	8	8	8	7	4
Switch Phase	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Initial (s)	10.0	21.0	10.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Minimum Split (s)	23.0	56.0	23.0	33.0	33.0	33.0	18.0	18.0	18.0	36.0	54.0
Total Split (%)	20.9%	50.9%	20.9%	30.0%	30.0%	30.0%	16.4%	16.4%	16.4%	32.7%	49.1%
Maximum Green (s)	18.0	51.0	18.0	28.0	28.0	28.0	13.0	13.0	13.0	31.0	49.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead-Lag	Lead	Yes	Yes	Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	None	None	None	None
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	33.2	33.2	33.2	19.9	19.9	19.9	13.5	13.5	13.5	48.2	48.2
Actuated g/C Ratio	0.36	0.36	0.36	0.22	0.22	0.22	0.15	0.15	0.15	0.53	0.53
v/c Ratio	0.42	0.21	0.21	0.77	0.77	0.77	1.36	0.58	0.74	0.38	0.38
Control Delay	21.4	19.8	19.8	49.3	49.3	49.3	244.6	45.3	26.0	16.0	16.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.4	19.8	19.8	49.3	49.3	49.3	244.6	45.3	26.0	16.0	16.0
LOS	C	C	B	D	D	D	F	D	C	C	B
Approach Delay	21.0	21.0	21.0	49.3	49.3	49.3	109.8	20.3	20.3	20.3	20.3
Approach LOS	C	C	C	D	D	D	F	C	C	C	C
Intersection Summary	Other										
Area Type:	Other										
Cycle Length:	110										
Actuated Cycle Length:	91.8										
Natural Cycle:	75										
Control Type:	Actuated-Uncoordinated										
Maximum v/c Ratio:	1.36										
Intersection Signal Delay:	40.0										
Intersection Capacity Utilization:	73.8%										
Analysis Period (min):	15										

Lanes, Volumes, Timings
 2: Parking Lot/Gas Station & Arsenal Street

HCM 2010 TWSC
 2: Parking Lot/Gas Station & Arsenal Street

Proposed Mercy Heights
 Full Build Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	713	27	8	280	13	1	0	2	11	0	3
Traffic Volume (vph)	1	713	27	8	280	13	1	0	2	11	0	3
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.995	0.995	0.995	0.994	0.994	0.994	0.910	0.984	0.984	0.984	0.973	0.962
Flt Protected	0	3522	0	0	1850	0	0	1668	0	0	1744	0
Satd. Flow (prot)	0	3522	0	0	1850	0	0	1668	0	0	1744	0
Flt Permitted	0	30	0	0	30	0	0	10	0	0	10	0
Link Speed (mph)	250	378	125	8.6	8.6	8.5	8.4	8.4	8.4	8.4	8.4	8.4
Link Distance (ft)	0.86	0.86	0.86	0.89	0.89	0.89	0.25	0.25	0.25	0.25	0.70	0.70
Travel Time (s)	1	829	31	9	315	15	4	0	8	16	0	4
Peak Hour Factor	0	861	0	0	339	0	0	12	0	0	20	0
Adj. Flow (vph)	No											
Shared Lane Traffic (%)	Left	Right										
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Enter Blocked Intersection	0	0	0	0	0	0	0	0	0	0	0	0
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Right	Left	Right
Median Width(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Link Offset(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Crosswalk Width(ft)	16	16	16	16	16	16	16	16	16	16	16	16
Two way Left Turn Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Headway Factor	15	9	15	15	9	15	15	9	15	15	9	15
Turning Speed (mph)	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop

Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Int Delay, s/veh	0.5											
Movement	1	713	27	8	280	13	1	0	2	11	0	3
Lane Configurations	1	713	27	8	280	13	1	0	2	11	0	3
Traffic Vol, veh/h	1	713	27	8	280	13	1	0	2	11	0	3
Future Vol, veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Conflicting Peds. #/hr	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	-	-	-	-	-	-	-	-	-	-
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	-	-	-	-	-	-	-	-	-	-	-
Grade, %	-	-	-	-	-	-	-	-	-	-	-	-
Peak Hour Factor	86	86	86	89	89	89	25	25	25	70	70	70
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	829	31	9	315	15	4	0	8	16	0	4

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	329	860	1189	1194
Stage 1	-	-	847	847
Stage 2	-	-	342	347
Critical Hdwy	4.13	4.13	7.33	6.53
Critical Hdwy Sig 1	-	-	6.53	5.53
Critical Hdwy Sig 2	-	-	6.13	5.53
Follow-up Hdwy	2.219	2.219	3.519	4.019
Pot Cap-1 Maneuver	1229	779	154	186
Stage 1	-	-	324	377
Stage 2	-	-	672	634
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1229	779	151	183
Mov Cap-2 Maneuver	-	-	151	183
Stage 1	-	-	323	376
Stage 2	-	-	659	625

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.3	17.6	16.1
HCM LOS			C	C

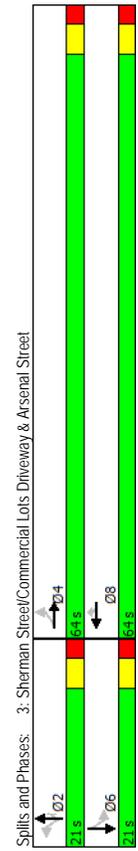
Minor Lane/Major Mvmt	NBLn1	EBL	EBR	WBL	WBR	SBLn1
Capacity (veh/h)	297	1229	-	779	-	345
HCM Lane V/C Ratio	0.04	0.001	-	0.012	-	0.058
HCM Control Delay (s)	17.6	7.9	0	9.7	0	16.1
HCM Lane LOS	C	A	A	A	A	C
HCM 95th %ile Q(veh)	0.1	0	-	0	-	0.2

Lanes, Volumes, Timings
3: Sherman Street/Commercial Lots Driveway & Arsenal Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	121	479	138	0	249	44	37	83	32	6	2
Traffic Volume (vph)	121	479	138	0	249	44	37	83	32	6	2
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	0	0	0	0	0	100	0	120	0	0	0
Storage Length (ft)	0	0	0	0	0	0	0	0	0	0	0
Storage Lanes	25	0	0	0	25	0	0	0	1	0	0
Taper Length (ft)	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.972	0.992	0.992	0	0.850	0.850	0.850	0.850	0.850	0.928	0.928
Flt Protected	0	3413	0	0	1863	1583	0	1835	1583	0	1698
Satd. Flow (perm)	0.828	0.828	0.828	0	0.910	0.910	0.910	0.910	0.910	0.904	0.904
Flt Permitted	0	2848	0	0	1863	1583	0	1695	1583	0	1563
Satd. Flow (perm)	76	Yes	Yes	53	53	53	30	30	43	15	15
Satd. Flow (RTOR)	30	30	30	30	30	30	30	30	30	10	10
Link Distance (ft)	378	378	378	397	397	397	368	368	249	249	249
Travel Time (s)	8.6	8.6	8.6	9.0	9.0	9.0	8.4	8.4	17.0	17.0	17.0
Peak Hour Factor	0.85	0.85	0.85	0.83	0.83	0.83	0.74	0.74	0.74	0.60	0.60
Adj. Flow (vph)	142	564	162	0	300	53	50	112	43	10	3
Shared Lane Traffic (%)	0	868	0	0	300	53	0	162	43	0	28
Lane Group Flow (vph)	No										
Enter Blocked Intersection	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right
Median Width (ft)	0	0	0	0	0	0	0	0	0	0	0
Link Offset (ft)	0	16	16	16	16	16	16	16	16	16	16
Crosswalk Width (ft)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Two way Left Turn Lane	15	9	15	15	15	15	15	15	15	15	15
Headway Factor	1	2	1	1	1	1	2	1	1	1	2
Turning Speed (mph)	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru
Number of Detectors	20	100	20	0	0	0	100	20	20	20	100
Detector Template	0	0	0	0	0	0	0	0	0	0	0
Leading Detector (ft)	0	0	0	0	0	0	0	0	0	0	0
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position (ft)	20	6	6	20	20	6	20	6	20	20	6
Detector 1 Size (ft)	Ch+Ex										
Detector 1 Type	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position (ft)	94	94	94	94	94	94	94	94	94	94	94
Detector 2 Size (ft)	6	6	6	6	6	6	6	6	6	6	6
Detector 2 Type	Ch+Ex										
Detector 2 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Extend (s)	Perm	NA	NA	Perm	Perm	NA	Perm	Perm	Perm	Perm	NA
Turn Type	4	4	4	8	8	2	2	2	2	6	6
Protected Phases											
Permitted Phases											

Lanes, Volumes, Timings
3: Sherman Street/Commercial Lots Driveway & Arsenal Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Detector Phase	4	4	4	8	8	8	2	2	2	2	6
Switch Phase	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Initial (s)	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Minimum Split (s)	64.0	64.0	64.0	64.0	64.0	64.0	21.0	21.0	21.0	21.0	21.0
Total Split (%)	75.3%	75.3%	75.3%	75.3%	75.3%	75.3%	24.7%	24.7%	24.7%	24.7%	24.7%
Total Split (s)	59.0	59.0	59.0	59.0	59.0	59.0	16.0	16.0	16.0	16.0	16.0
Maximum Green (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Yellow Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lead-Lag	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lead-Lag Optimize?	None	None	None	None	None	None	Max	Max	Max	Max	Max
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Flash Dont Walk (s)	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Calls (#/hr)	20.1	20.1	20.1	20.1	20.1	20.1	16.2	16.2	16.2	16.2	16.2
Act Effct Green (s)	0.43	0.43	0.43	0.43	0.43	0.43	0.35	0.35	0.35	0.35	0.35
Actuated g/C Ratio	0.68	0.68	0.68	0.37	0.37	0.37	0.27	0.27	0.27	0.07	0.05
v/c Ratio	12.3	12.3	12.3	9.9	9.9	9.9	2.7	2.7	2.7	14.4	5.7
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	12.3	12.3	12.3	9.9	9.9	9.9	2.7	2.7	2.7	14.4	5.7
Total Delay	B	B	B	A	A	A	B	B	B	A	A
LOS	12.3	12.3	12.3	8.8	8.8	8.8	12.6	12.6	12.6	9.4	9.4
Approach Delay	B	B	B	A	A	A	B	B	B	A	A
Approach LOS	B	B	B	A	A	A	B	B	B	A	A
Intersection Summary	Other										
Area Type	Other										
Cycle Length: 65	Actuated Cycle Length: 46.4										
Natural Cycle: 45	Control Type: Actuated-Uncoordinated										
Maximum v/c Ratio: 0.68	Intersection Signal Delay: 11.4										
Intersection Capacity Utilization 54.8%	Intersection LOS: B										
Analysis Period (min) 15	ICU Level of Service A										



Lanes, Volumes, Timings
5: Sherman Street & Stone Street

Lanes, Volumes, Timings
5: Sherman Street & Stone Street

Full Build Conditions - AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	0	0	0	9	33	24	34	148	0	0	109
Traffic Volume (vph)	0	0	0	9	33	24	34	148	0	0	109
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	0	0	0	0	0	25	200	0	0	0	150
Storage Length (ft)	0	0	0	0	0	1	1	0	0	0	1
Storage Lanes	25	0	0	25	0	25	25	0	0	25	0
Taper Length (ft)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor				0.850							0.850
Flt Protected	0	0	0	0.990		0.950					
Satd. Flow (proof)	0	0	0	1844	1583	1770	1863	0	0	1863	1583
Flt Permitted	0	0	0	0.990		0.833					
Satd. Flow (perm)	0	0	0	1844	1583	1552	1863	0	0	1863	1583
Right Turn on Red			Yes			Yes	Yes	Yes			Yes
Satd. Flow (RTOR)			36			36					36
Satd. Flow (vph)	30		30	30		30	30				30
Link Distance (mft)	305		406	301		212					212
Travel Time (s)	6.9		9.2	6.8		4.8					4.8
Peak Hour Factor	0.92	0.92	0.88	0.88	0.88	0.87	0.87	0.87	0.87	0.77	0.77
Adj. Flow (vph)	0	0	0	10	38	27	39	170	0	0	142
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	0	0	48	27	39	170	0	0	142	4
Enter Blocked Intersection	No										
Lane Alignment	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width (ft)	0	0	0	0	0	0	12	0	0	12	0
Link Offset (ft)	0	0	0	0	0	0	0	0	0	0	0
Crosswalk Width (ft)	16		16			16					16
Two way Left Turn Lane											
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15	9
Number of Detectors	1	2	1	1	1	2	1	2	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Right
Leading Detector (ft)	20	100	20	20	100	20	100	20	100	20	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position (ft)	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size (ft)	20	6	20	20	6	20	6	20	6	20	6
Detector 1 Type	Cl+Ex										
Detector 1 Channel											
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position (ft)	94		94		94		94		94		94
Detector 2 Size (ft)	6		6		6		6		6		6
Detector 2 Type	Cl+Ex		Cl+Ex								
Detector 2 Channel											
Detector 2 Extend (s)	0.0		0.0		0.0		0.0		0.0		0.0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm	Perm
Protected Phases			8		8		8		8		2
Permitted Phases			8		8		2		8		6

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Lanes, Volumes, Timings
5: Sherman Street & Stone Street

Full Build Conditions - AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Detector Phase				8		8	2		2		6
Switch Phase				4.0		4.0	4.0		4.0		4.0
Minimum Initial (s)	21.0		21.0	21.0		21.0	21.0		21.0		21.0
Minimum Split (s)	21.0		21.0	39.0		39.0	39.0		39.0		39.0
Total Split (%)	35.0%		35.0%	65.0%		65.0%	65.0%		65.0%		65.0%
Total Split (s)	16.0		16.0	34.0		34.0	34.0		34.0		34.0
Maximum Green (s)	3.0		3.0	3.0		3.0	3.0		3.0		3.0
Yellow Time (s)	2.0		2.0	2.0		2.0	2.0		2.0		2.0
All-Red Time (s)	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Lost Time Adjust (s)	5.0		5.0	5.0		5.0	5.0		5.0		5.0
Total Lost Time (s)											
Lead-Lag											
Lead-Lag Optimize?	3.0		3.0	3.0		3.0	3.0		3.0		3.0
Vehicle Extension (s)	None		None	None		None	None		None		None
Recall Mode	5.0		5.0	5.0		5.0	5.0		5.0		5.0
Walk Time (s)	11.0		11.0	11.0		11.0	11.0		11.0		11.0
Flash Dont Walk (s)	0		0	0		0	0		0		0
Pedestrian Calls (#/hr)	6.8		6.8	9.5		9.5	9.4		9.4		9.4
Act Effct Green (s)	0.37		0.37	0.52		0.52	0.51		0.51		0.51
Actuated g/C Ratio	0.07		0.04	0.05		0.18	0.15		0.15		0.00
v/c Ratio	6.4		3.2	4.8		4.9	4.8		4.8		0.0
Control Delay	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Queue Delay	6.4		3.2	4.8		4.9	4.8		4.8		0.0
Total Delay	A		A	A		A	A		A		A
Approach Delay	5.2		5.2	4.8		4.8	4.6		4.6		4.6
Approach LOS	A		A	A		A	A		A		A
Intersection Summary											
Area Type:	Other										
Cycle Length:	60										
Actuated Cycle Length:	18.4										
Natural Cycle:	45										
Control Type:	Actuated-Uncoordinated										
Maximum v/c Ratio:	0.18										
Intersection Signal Delay:	4.8										
Intersection Capacity Utilization:	22.5%										
Analysis Period (min):	15										

Spills and Phases: 5: Sherman Street & Stone Street



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Lanes, Volumes, Timings
7: South Massey Street & Stone Street

Lanes, Volumes, Timings
7: South Massey Street & Stone Street

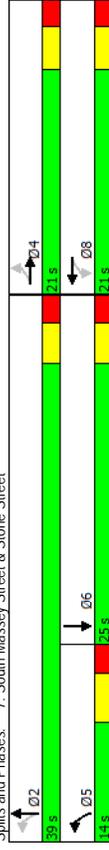
Proposed Mercy Heights
Full Build Conditions - AM Peak Hour

Proposed Mercy Heights
Full Build Conditions - AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	11	0	188	18	42	36	185	363	0	0	615
Traffic Volume (vph)	11	0	188	18	42	36	185	363	0	0	615
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	0	0	0	0	0	0	300	0	0	0	0
Storage Length (ft)	0	0	0	1	0	0	0	0	0	0	0
Storage Lanes	25	0	0	1	0	0	0	0	0	0	0
Taper Length (ft)	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Lane Util. Factor	0.873	0.997	0.950	0.931	0.983	0.983	0.983	0.983	0.983	0.983	0.983
Flt Protected	0	1621	0	1770	1734	0	0	3479	0	0	3532
Satd. Flow (proof)	0.975	0.650	0.650	0.629	0.629	0.629	0.629	0.629	0.629	0.629	0.629
Flt Permitted	0	1586	0	1211	1734	0	0	2226	0	0	3532
Satd. Flow (perm)	0	1586	0	1211	1734	0	0	2226	0	0	3532
Right Turn on Red	251	Yes									
Satd. Flow (RTOR)	30	30	30	30	30	30	30	30	30	30	30
Link Speed (mph)	316	422	422	422	422	422	422	422	422	422	422
Link Distance (ft)	7.2	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9
Travel Time (s)	0.75	0.75	0.75	0.90	0.90	0.90	0.90	0.90	0.90	0.83	0.83
Peak Hour Factor	15	0	251	20	47	40	206	403	0	0	741
Adj. Flow (vph)	0	266	0	20	87	0	0	609	0	0	749
Shared Lane Traffic (%)	No										
Lane Group Flow (vph)	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Right
Enter Blocked Intersection	0	-10	0	12	0	0	0	0	0	0	0
Lane Alignment	16	16	16	16	16	16	16	16	16	16	16
Median Width(ft)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Offset(ft)	15	9	15	1	2	9	15	1	2	9	15
Crosswalk Width(ft)	1	2	1	2	1	2	1	2	1	2	1
Two way Left Turn Lane	Left	Thru	Thru								
Headway Factor	20	100	20	100	20	100	20	100	20	100	100
Turning Speed (mph)	0	0	0	0	0	0	0	0	0	0	0
Number of Detectors	0	0	0	0	0	0	0	0	0	0	0
Detector Template	0	0	0	0	0	0	0	0	0	0	0
Leading Detector (ft)	20	6	20	6	20	6	20	6	20	6	6
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Type	Ch+Ex										
Detector 1 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94	94	94	94	94	94	94	94	94	94	94
Detector 2 Size(ft)	6	6	6	6	6	6	6	6	6	6	6
Detector 2 Type	Ch+Ex										
Detector 2 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Perm	NA	NA								
Protected Phases	4	4	4	8	8	8	5	2	5	2	6
Permitted Phases	4	4	4	8	8	8	2	2	2	2	6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Phase	4	4	4	8	8	8	5	2	2	2	6
Switch Phase	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Initial (s)	21.0	21.0	21.0	21.0	21.0	21.0	9.5	21.0	21.0	21.0	21.0
Minimum Split (s)	21.0	21.0	21.0	21.0	21.0	21.0	14.0	39.0	39.0	39.0	25.0
Total Split (s)	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	23.3%	65.0%	65.0%	65.0%	41.7%
Maximum Green (s)	16.0	16.0	16.0	16.0	16.0	16.0	8.5	34.0	34.0	34.0	20.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	None	None	None	None
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0
Act Effect Green (s)	7.4	7.4	7.4	7.4	7.4	7.4	16.7	16.7	16.7	16.7	16.7
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.21	0.21	0.48	0.48	0.48	0.48	0.48
v/c Ratio	0.50	0.50	0.50	0.08	0.22	0.57	0.57	0.57	0.57	0.57	0.44
Control Delay	6.8	6.8	6.8	14.2	10.2	8.7	8.7	8.7	8.7	8.7	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.8	6.8	6.8	14.2	10.2	8.7	8.7	8.7	8.7	8.7	6.6
LOS	A	A	A	B	B	B	A	A	A	A	A
Approach Delay	6.8	6.8	6.8	10.9	8.7	6.6	6.6	6.6	6.6	6.6	6.6
Approach LOS	A	A	A	B	B	B	A	A	A	A	A
Intersection Summary											
Area Type:	Other										
Cycle Length:	60										
Actuated Cycle Length:	34.6										
Natural Cycle:	55										
Control Type:	Actuated-Uncoordinated										
Maximum v/c Ratio:	0.57										
Intersection Signal Delay:	7.6										
Intersection Capacity Utilization:	64.0%										
Analysis Period (min):	15										

Spills and Phases: 7: South Massey Street & Stone Street



Lanes, Volumes, Timings
 16: South Massey Street & South Driveway

HCM 2010 TWSC
 16: South Massey Street & South Driveway

Proposed Mercy Heights
 Full Build Conditions - AM Peak Hour

Proposed Mercy Heights
 Full Build Conditions - AM Peak Hour

Intersection	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	R	T	T	T	T
Traffic Volume (vph)	2	3	404	7	3	620
Future Volume (vph)	2	3	404	7	3	620
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Flt Protected	0.923		0.997			
Flt Permitted	0.979					
Satd. Flow (prot)	1683	0	3529	0	0	3539
Satd. Flow (perm)	1683	0	3529	0	0	3539
Link Speed (mph)	30		30			30
Link Distance (ft)	187		304			264
Travel Time (s)	4.3		6.9			6.0
Peak Hour Factor	0.75	0.75	0.90	0.90	0.83	0.83
Adj. Flow (vph)	3	4	449	8	4	747
Shared Lane Traffic (%)						
Lane Group Flow (vph)	7	0	457	0	0	751
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	Free	9	15	Free
Sign Control	Stop	Free	Free	Free	Free	Free
Intersection Summary	Other					
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	29.2%					
Analysis Period (min)	15					

Intersection	WBL	WBR	NBT	NBR	SBL	SBT
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	R	T	T	T	T
Traffic Vol. veh/h	2	3	404	7	3	620
Future Vol. veh/h	2	3	404	7	3	620
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Chameleized	-	None	-	None	-	None
Storage Length	0					
Veh in Median Storage, #	0		0			0
Grade, %	0		0			0
Peak Hour Factor	75	75	90	90	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	4	449	8	4	747
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	834	228	0	0	457	0
Stage 1	453					
Stage 2	381					
Critical Hdwy	6.84	6.94			4.14	
Critical Hdwy Sig 1	5.84					
Critical Hdwy Sig 2	5.84					
Follow-up Hdwy	3.52	3.32			2.22	
Pot Cap-1 Maneuver	307	775			1100	
Stage 1	607					
Stage 2	660					
Platoon blocked, %						
Mov Cap-1 Maneuver	305	775			1100	
Mov Cap-2 Maneuver	305					
Stage 1	607					
Stage 2	656					
Approach	WB		NB		SB	
HCM Control Delay, s	12.6		0		0	
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR	WBL	SBL	SBT	
Capacity (veh/h)	-	-	479	1100	-	
HCM Lane V/C Ratio	-	-	0.014	0.003	-	
HCM Control Delay (s)	-	-	12.6	8.3	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %ile Q(veh)	-	-	0	0	-	

Lanes, Volumes, Timings
 18: South Massey Street & North Driveway

HCM 2010 TWSC
 18: South Massey Street & North Driveway

Proposed Mercy Heights
 Full Build Conditions - AM Peak Hour

Intersection	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	1	3	390	17	16	622
Traffic Volume (vph)	1	3	390	17	16	622
Future Volume (vph)	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	1.00	1.00	0.91	0.91	0.95	0.95
Lane Util. Factor	0.892	0.994				
Flt Protected	0.990					0.999
Satd. Flow (prot)	1645	0	5055	0	0	3536
Flt Permitted	0.990					0.999
Satd. Flow (perm)	1645	0	5055	0	0	3536
Link Speed (mph)	30					30
Link Distance (ft)	182	264				152
Travel Time (s)	4.1	6.0				3.5
Peak Hour Factor	0.75	0.75	0.90	0.90	0.83	0.83
Adj. Flow (vph)	1	4	433	19	19	749
Shared Lane Traffic (%)						
Lane Group Flow (vph)	5	0	452	0	0	768
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12		12	12
Link Offset(ft)	0		0		0	0
Crosswalk Width(ft)	16		16		16	16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	15
Sign Control	Stop	Free	Free	Free	Free	Free
Intersection Summary	Other					
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	38.7%					
Analysis Period (min)	15					

Intersection	WBL	WBR	NBT	NBR	SBL	SBT
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	1	3	390	17	16	622
Traffic Vol, veh/h	1	3	390	17	16	622
Future Vol, veh/h	1	3	390	17	16	622
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Chameleized	-	None	-	None	-	None
Storage Length	0					
Veh in Median Storage, #	0					0
Grade, %	0					0
Peak Hour Factor	75	75	90	90	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	4	433	19	19	749
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	856	226	0	0	452	0
Stage 1	443					
Stage 2	413					
Critical Hdwy	6.29	7.14			5.34	
Critical Hdwy Sig 1	6.64					
Critical Hdwy Sig 2	5.84					
Follow-up Hdwy	3.67	3.92			3.12	
Pot Cap-1 Maneuver	330	662			713	
Stage 1	538					
Stage 2	615					
Platoon blocked, %						
Mov Cap-1 Maneuver	315	662			713	
Mov Cap-2 Maneuver	315					
Stage 1	538					
Stage 2	587					
Approach	WB	NB	SB			
HCM Control Delay, s	12	0	0.5			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR/WBLn1	SBL	SBT		
Capacity (veh/h)	-	-	519	713	-	-
HCM Lane V/C Ratio	-	-	0.01	0.027	-	-
HCM Control Delay (s)	-	-	12	10.2	0.2	-
HCM Lane LOS	-	-	B	B	A	-
HCM 95th %ile Q(veh)	-	-	0	0.1	-	-

Lanes, Volumes, Timings
20: Sherman Street & Driveway

HCM 2010 TWSC
20: Sherman Street & Driveway

Proposed Mercy Heights
Full Build Conditions - AM Peak Hour

Intersection	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			4	1	
Traffic Volume (vph)	16	3	8	164	109	0
Future Volume (vph)	16	3	8	164	109	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.980			0.998		
Flt Protected	0.959			0.998		
Satd. Flow (prot)	1751	0	0	1859	1863	0
Flt Permitted	0.959			0.998		
Satd. Flow (perm)	1751	0	0	1859	1863	0
Link Speed (mph)	30			30		
Link Distance (ft)	158			212		368
Travel Time (s)	3.6			4.8		8.4
Peak Hour Factor	0.70	0.70	0.87	0.87	0.77	0.77
Adj. Flow (vph)	23	4	9	189	142	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	27	0	0	198	142	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Right	Right
Median Width(ft)	12			0		0
Link Offset(ft)	0			0		0
Crosswalk Width(ft)	16			16		16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	
Intersection Summary	Other					
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	25.1%					
Analysis Period (min)	15					
ICU Level of Service	A					

Intersection	EBL	EBR	NBL	NBT	SBT	SBR
Int Delay, s/veh	0.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			4	1	
Traffic Vol, veh/h	16	3	8	164	109	0
Future Vol, veh/h	16	3	8	164	109	0
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0					
Veh in Median Storage, #	0			0		0
Grade, %	0			0		0
Peak Hour Factor	70	70	87	87	77	77
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	4	9	189	142	0
Major/Minor	Minor2	Major1	Major1	Major2	Major2	
Conflicting Flow All	349	142	142	0	0	0
Stage 1	142	-	-	-	-	-
Stage 2	207	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Sig 1	5.42	-	-	-	-	-
Critical Hdwy Sig 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	648	906	1441	-	-	-
Stage 1	885	-	-	-	-	-
Stage 2	828	-	-	-	-	-
Platoon blocked, %						
Mov Cap-1 Maneuver	643	906	1441	-	-	-
Mov Cap-2 Maneuver	643	-	-	-	-	-
Stage 1	885	-	-	-	-	-
Stage 2	822	-	-	-	-	-
Approach	EB	NB	NB	SB	SB	
HCM Control Delay, s	10.6	0.3	0.3	0	0	
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBL	EBR	SBR	SBL
Capacity (veh/h)	1441	-	674	-	-	-
HCM Lane V/C Ratio	0.006	-	0.04	-	-	-
HCM Control Delay (s)	7.5	0	10.6	-	-	-
HCM Lane LOS	A	A	B	-	-	-
HCM 95th %ile Q(veh)	0	-	0.1	-	-	-

Lanes, Volumes, Timings
 22: Stone Street & Driveway

HCM 2010 TWSC
 22: Stone Street & Driveway

Proposed Mercy Heights
 Full Build Conditions - AM Peak Hour

Intersection	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	0	0	70	1	0	25
Traffic Volume (vph)	0	0	70	1	0	25
Future Volume (vph)	0	0	70	1	0	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00
Frt		0.998				0.865
Flt Protected	0	0	3532	0	0	1611
Satd. Flow (prot)						
Flt Permitted	0	0	3532	0	0	1611
Satd. Flow (perm)	0	0	3532	0	0	1611
Link Speed (mph)	30	30	30	30	30	30
Link Distance (ft)	435	305	141			
Travel Time (s)	9.9	6.9	3.2			
Peak Hour Factor	0.92	0.92	0.88	0.88	0.70	0.70
Adj. Flow (vph)	0	0	80	1	0	36
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	81	0	0	36
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Right
Median Width(ft)	0	0	0	0	0	0
Link Offset(ft)	0	0	0	0	0	0
Crosswalk Width(ft)	16	16	16	16	16	16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	Free	9	15	9	9
Sign Control	Free	Free	Free	Stop	Stop	Stop
Intersection Summary	Other					
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	13.3%					
Analysis Period (min)	15					
ICU Level of Service	A					

Intersection	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	0	0	70	1	0	25
Traffic Vol. veh/h	0	0	70	1	0	25
Future Vol. veh/h	0	0	70	1	0	25
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	-	0	-	0	-
Grade, %	-	0	-	-	0	-
Peak Hour Factor	92	92	88	88	70	70
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	80	1	0	36
Major/Minor	Major2			Minor2		
Conflicting Flow All	-	-	0	-	-	40
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Sig 1	-	-	-	-	-	-
Critical Hdwy Sig 2	-	-	-	-	-	3.32
Follow-up Hdwy	-	-	-	-	-	-
Pot Cap-1 Maneuver	-	-	-	-	0	1022
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	-	1022
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	WB		WB		SB	SB
HCM Control Delay, s	0		0		8.7	8.7
HCM LOS	A		A		A	A
Minor Lane/Major Mvmt	WBT	WBR	SBLn1			
Capacity (veh/h)	-	-	1022			
HCM Lane V/C Ratio	-	-	0.035			
HCM Control Delay (s)	-	-	8.7			
HCM Lane LOS	-	-	A			
HCM 95th %ile Q(veh)	-	-	0.1			

Lanes, Volumes, Timings
1: Massey Street & Arsenal Street

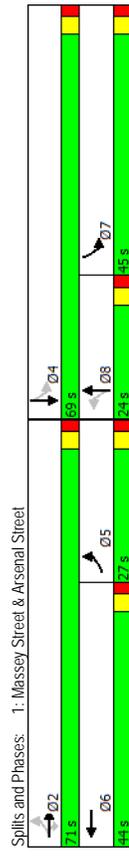
Lanes, Volumes, Timings
1: Massey Street & Arsenal Street

Proposed Mercy Heights
Full Build Conditions - PM Peak Hour

Proposed Mercy Heights
Full Build Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	150	389	186	0	380	73	232	461	16	277	387
Traffic Volume (vph)	150	389	186	0	380	73	232	461	16	277	387
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	170	0	0	0	0	250	0	515	0	515	0
Storage Length (ft)	1	1	1	0	0	1	1	0	0	1	0
Storage Lanes	60	25	100							130	
Taper Length (ft)	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Lane Util. Factor	0.850				0.978		0.995				
Flt Protected	0	0.986			0.950		0.950		0.950		
Satd. Flow (proof)	0	3490	1583	0	1822	0	1770	3522	0	1770	3401
Flt Permitted	0.588				0.329		0.328			0.328	
Satd. Flow (perm)	0	2081	1583	0	1822	0	613	3522	0	611	3401
Right Turn on Red			No								
Satd. Flow (RTOR)	30			30			30			30	
Link Speed (mph)	403			250			166			474	
Link Distance (ft)	9.2			5.7			3.8			10.8	
Travel Time (s)	0.91	0.91	0.91	0.94	0.94	0.94	0.95	0.95	0.95	0.90	0.90
Peak Hour Factor	165	427	204	0	404	78	244	485	17	308	430
Adj. Flow (vph)	0	592	204	0	482	0	244	502	0	308	582
Shared Lane Traffic (%)	No										
Lane Group Flow (vph)	0	No	No	0	No	0	0	0	0	0	0
Enter Blocked Intersection	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Right
Lane Alignment	0	0	0	0	0	0	12	0	0	12	0
Median Width (ft)	0	0	0	0	0	0	0	0	0	0	0
Link Offset (ft)	16			16			16			16	
Crosswalk Width (ft)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Two way Left Turn Lane	15	9	15	2	9	15	1	2	9	15	9
Headway Factor	1	2	1	2	1	2	1	2	1	2	2
Turning Speed (mph)	Left	Thru	Right	Thru	Left	Thru	Left	Thru	Left	Thru	Left
Number of Detectors	20	100	20	100	20	100	20	100	20	100	20
Detector Template	0	0	0	0	0	0	0	0	0	0	0
Leading Detector (ft)	0	0	0	0	0	0	0	0	0	0	0
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position (ft)	20	6	20	6	20	6	20	6	20	6	20
Detector 1 Size (ft)	Ch+Ex										
Detector 1 Type	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	94	94	94	94	94	94	94	94	94	94	94
Detector 2 Position (ft)	6	6	6	6	6	6	6	6	6	6	6
Detector 2 Size (ft)	Ch+Ex										
Detector 2 Type	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Channel	pm+pt	NA	Perm	NA	NA	Perm	NA	NA	pm+pt	NA	NA
Detector 2 Extend (s)	5	2	2	6	6	6	8	8	7	4	4
Turn Type	2										
Protected Phases											
Permitted Phases											

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Detector Phase	5	2	2	6	6	6	8	8	8	7	4
Switch Phase	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Initial (s)	10.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Minimum Split (s)	27.0	71.0	71.0	44.0	44.0	24.0	24.0	24.0	45.0	45.0	69.0
Total Split (s)	19.3%	50.7%	50.7%	31.4%	31.4%	17.1%	17.1%	17.1%	32.1%	49.3%	
Total Split (%)	22.0	66.0	66.0	39.0	39.0	19.0	19.0	19.0	40.0	64.0	
Maximum Green (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Yellow Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	Lag	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Total Lost Time (s)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lead-Lag Optimize?	None	None	None	None	None	None	None	None	None	None	None
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	None	None	None	None
Walk Time (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Flash Dont Walk (s)	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Calls (#/hr)	37.5	37.5	37.5	37.5	37.5	19.8	19.8	19.8	44.3	44.3	44.3
Act Effct Green (s)	0.41	0.41	0.41	0.41	0.41	0.21	0.21	0.21	0.48	0.48	0.48
Actuated g/C Ratio	0.70	0.32	0.32	0.65	0.65	1.86	0.67	0.67	0.57	0.36	
v/c Ratio	27.6	20.1	20.1	26.7	26.7	441.5	41.7	41.7	29.7	17.3	
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	27.6	20.1	20.1	26.7	26.7	441.5	41.7	41.7	29.7	17.3	
Total Delay	C	C	C	C	C	F	D	D	C	B	
LOS	25.7	C	C	26.7	26.7	172.4	F	F	21.6	C	
Approach Delay	C	C	C	C	C	C	C	C	C	C	
Approach LOS	Intersection Summary										
Area Type:	Other										
Cycle Length:	140										
Actuated Cycle Length:	92.2										
Natural Cycle:	100										
Control Type:	Actuated-Uncoordinated										
Maximum v/c Ratio:	1.86										
Intersection Signal Delay:	62.2										
Intersection Capacity Utilization:	84.8%										
Analysis Period (min):	15										



Lanes, Volumes, Timings
 2: Parking Lot/Gas Station & Arsenal Street

HCM 2010 TWSC
 2: Parking Lot/Gas Station & Arsenal Street

Proposed Mercy Heights
 Full Build Conditions - PM Peak Hour

Proposed Mercy Heights
 Full Build Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	638	12	4	429	28	14	0	18	8	0	1
Future Volume (vph)	4	638	12	4	429	28	14	0	18	8	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0	0.997		0.992			0.924		0.989		0.956	
Satd. Flow (prot)	0	3529	0	0	1848	0	0	1685	0	0	1761	0
Flt Permitted	0	3529	0	0	1848	0	0	1685	0	0	1761	0
Link Speed (mph)	30			30			10		10		10	
Link Distance (ft)	250			378			125		123		123	
Travel Time (s)	5.7			8.6			8.5		8.4		8.4	
Peak Hour Factor	0.94	0.94	0.94	0.93	0.93	0.93	0.27	0.27	0.27	0.75	0.75	0.75
Adj. Flow (vph)	4	679	13	4	461	30	52	0	67	11	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	696	0	0	495	0	0	119	0	0	12	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right	Right
Median Width(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Link Offset(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Crosswalk Width(ft)	16			16			16		16		16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15	9	15	9	15	9	15	9	15	9
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop

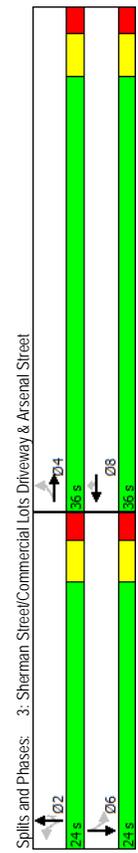
Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Int Delay, s/veh	2.8											
Movement												
Lane Configurations												
Traffic Vol, veh/h	4	638	12	4	429	28	14	0	18	8	0	1
Future Vol, veh/h	4	638	12	4	429	28	14	0	18	8	0	1
Conflicting Peds. #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	93	93	93	27	27	27	75	75	75
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	679	13	4	461	30	52	0	67	11	0	1
Major/Minor	Major1	Major1	Major2	Major2	Minor1	Minor2	Minor1	Minor2	Minor1	Minor2	Minor1	Minor2
Conflicting Flow All	491	0	0	691	0	0	1180	1194	346	833	1185	476
Stage 1	-	-	-	-	-	-	-	694	694	-	485	485
Stage 2	-	-	-	-	-	-	-	486	500	-	348	700
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Sig 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Sig 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1070	-	-	902	-	-	156	186	651	274	188	588
Stage 1	-	-	-	-	-	-	-	400	443	-	562	551
Stage 2	-	-	-	-	-	-	-	562	542	-	642	440
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1070	-	-	902	-	-	154	184	651	244	186	588
Mov Cap-2 Maneuver	-	-	-	-	-	-	154	184	-	244	186	-
Stage 1	-	-	-	-	-	-	-	398	440	-	559	548
Stage 2	-	-	-	-	-	-	-	557	539	-	573	437
Approach	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB	SB	SB
HCM Control Delay, s	0.1	0.1	0.1	0.1	28.4	28.4	19.5	19.5	19.5	19.5	19.5	19.5
HCM LOS	D	D	D	D	D	D	C	C	C	C	C	C
Minor Lane/Major Mvmt	NBLn1	EBL	EBR	WBL	WBT	WBR	SBLn1	SBLn1	SBLn1	SBLn1	SBLn1	SBLn1
Capacity (veh/h)	270	1070	-	-	902	-	-	261	-	-	-	-
HCM Lane V/C Ratio	0.439	0.004	-	-	0.005	-	-	0.046	-	-	-	-
HCM Control Delay (s)	28.4	8.4	0	0	9	0	0	19.5	0	0	0	0
HCM Lane LOS	D	A	A	A	A	A	A	C	A	A	A	C
HCM 95th %ile Q(veh)	2.1	0	-	-	0	-	-	0.1	-	-	-	0.1

Lanes, Volumes, Timings
3: Sherman Street/Commercial Lots Driveway & Arsenal Street

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Group	4	4	4	8	8	8	2	2	2	2	6
Lane Configurations	4	4	4	8	8	8	2	2	2	2	6
Traffic Volume (vph)	37	584	108	0	312	9	71	179	34	35	52
Future Volume (vph)	37	584	108	0	312	9	71	179	34	35	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	100	0	0	120	0	0	0
Storage Lanes	0	0	0	0	1	0	0	1	0	0	0
Taper Length (ft)	25	0	0	25	0	0	0	0	0	0	0
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	0.978	0.997	0.997	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.939
Flt Protected	0	3451	0	0	1863	1583	0	1837	1583	0	1730
Satd. Flow (perm)	0.922	0.922	0.922	0.844	0.844	0.844	0.844	0.844	0.844	0.844	0.867
Right Turn on Red	0	3191	0	0	1863	1583	0	1572	1583	0	1516
Satd. Flow (RTOR)	49	49	49	36	36	36	30	30	30	44	71
Link Distance (ft)	30	378	378	30	30	30	380	380	380	249	249
Travel Time (s)	8.6	8.6	8.6	9.0	9.0	9.0	8.6	8.6	8.6	17.0	17.0
Peak Hour Factor	0.86	0.86	0.86	0.92	0.92	0.92	0.78	0.78	0.78	0.58	0.58
Adj. Flow (vph)	43	679	126	0	339	10	91	229	44	60	90
Shared Lane Traffic (%)	0	848	0	0	339	10	0	320	44	0	272
Lane Group Flow (vph)	No										
Enter Blocked Intersection	Left	Left	Right	Left	Left	Left	Left	Left	Right	Left	Right
Lane Alignment	Left	Left	Right	Left	Left	Left	Left	Left	Right	Left	Right
Median Width (ft)	0	0	0	0	0	0	0	0	0	0	0
Link Offset (ft)	0	16	16	0	0	0	0	0	0	0	0
Crosswalk Width (ft)	16	16	16	16	16	16	16	16	16	16	16
Two way Left Turn Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Headway Factor	15	9	15	15	15	15	15	15	15	15	9
Turning Speed (mph)	1	2	1	1	1	1	2	1	1	1	2
Number of Detectors	Left	Thru	Left	Right	Thru	Left	Thru	Right	Left	Thru	Right
Detector Template	20	100	20	100	20	100	20	100	20	100	20
Leading Detector (ft)	0	0	0	0	0	0	0	0	0	0	0
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position (ft)	20	6	6	20	20	6	20	20	6	20	6
Detector 1 Size (ft)	Ch+Ex										
Detector 1 Type	Detector 1 Channel										
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position (ft)	94	6	6	94	94	6	94	94	6	94	6
Detector 2 Size (ft)	Ch+Ex										
Detector 2 Type	Detector 2 Channel										
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Perm	NA	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases	4	4	4	8	8	2	2	2	2	6	6
Permitted Phases	4	4	4	8	8	2	2	2	2	6	6

Lanes, Volumes, Timings
3: Sherman Street/Commercial Lots Driveway & Arsenal Street

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Group	4	4	4	8	8	8	2	2	2	2	6
Lane Configurations	4	4	4	8	8	8	2	2	2	2	6
Detector Phase	4	4	4	8	8	8	2	2	2	2	6
Switch Phase	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Initial (s)	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Minimum Split (s)	36.0	36.0	36.0	36.0	36.0	36.0	24.0	24.0	24.0	24.0	24.0
Total Split (%)	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Total Split (s)	31.0	31.0	31.0	31.0	31.0	31.0	3.0	3.0	3.0	3.0	3.0
Maximum Green (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Yellow Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lead-Lag	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lead-Lag Optimize?	None	None	None	None	None	None	None	None	None	None	None
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Flash Dont Walk (s)	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Calls (#/hr)	19.3	19.3	19.3	19.3	19.3	19.3	19.2	19.2	19.2	19.2	19.2
Act Effct Green (s)	0.40	0.40	0.40	0.40	0.40	0.40	0.39	0.39	0.39	0.39	0.39
Actuated g/C Ratio	0.65	0.65	0.65	0.46	0.46	0.46	0.52	0.52	0.52	0.52	0.42
v/c Ratio	13.5	13.5	13.5	12.6	12.6	12.6	0.7	16.6	5.2	11.7	11.7
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	13.5	13.5	13.5	12.6	12.6	12.6	0.7	16.6	5.2	11.7	11.7
Total Delay	13.5	13.5	13.5	12.6	12.6	12.6	0.7	16.6	5.2	11.7	11.7
LOS	B	B	B	A	A	A	B	B	A	B	B
Approach Delay	13.5	13.5	13.5	12.2	12.2	12.2	15.2	15.2	11.7	11.7	11.7
Approach LOS	B	B	B	B	B	B	B	B	B	B	B
Intersection Summary	Other										
Area Type	Other										
Cycle Length: 60	Actuated Cycle Length: 48.7										
Natural Cycle: 45	Control Type: Actuated-Uncoordinated										
Maximum v/c Ratio: 0.65	Intersection LOS: B										
Intersection Signal Delay: 13.3	ICU Level of Service D										
Intersection Capacity Utilization 76.1%	Analysis Period (min) 15										



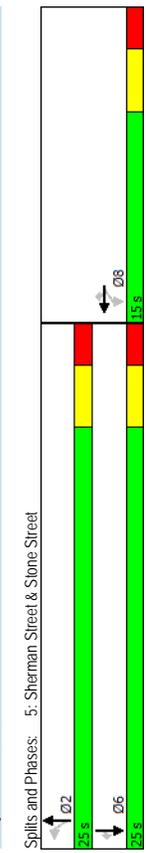
Lanes, Volumes, Timings
5: Sherman Street & Stone Street

Lanes, Volumes, Timings
5: Sherman Street & Stone Street

Lanes, Volumes, Timings
5: Sherman Street & Stone Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	0	0	0	61	134	81	97	188	0	0	163
Traffic Volume (vph)	0	0	0	61	134	81	97	188	0	0	163
Future Volume (vph)	0	0	0	61	134	81	97	188	0	0	163
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	0	25	200	0	0	0	150
Storage Lanes	0	0	0	0	0	1	1	0	0	0	1
Taper Length (ft)	25	0	0	25	0	25	0	0	0	25	0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit				0.850		0.850					0.850
Flt Protected	0	0	0	0.985	0.985	0.950					
Satd. Flow (proof)	0	0	0	1835	1583	1770	1863	0	0	0	1863
Flt Permitted	0	0	0	0.985	0.624						1583
Satd. Flow (perm)	0	0	0	1835	1583	1162	1863	0	0	0	1863
Right Turn on Red	Yes										
Satd. Flow (RTOR)	30	30	30	30	30	30	30	30	30	30	30
Link Distance (ft)	305	305	305	406	301	200	200	4.5	4.5	4.5	4.5
Travel Time (s)	6.9	6.9	6.9	9.2	6.8	6.8	6.8	0.88	0.88	0.76	0.76
Peak Hour Factor	0.92	0.92	0.92	0.66	0.66	0.66	0.88	0.88	0.88	0.76	0.76
Adj. Flow (vph)	0	0	0	92	203	123	110	214	0	0	214
Shared Lane Traffic (%)	0	0	0	0	295	123	110	214	0	0	214
Lane Group Flow (vph)	No										
Enter Blocked Intersection	No										
Lane Alignment	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width (ft)	0	0	0	0	0	12	12	12	12	12	12
Link Offset (ft)	0	0	0	0	0	0	0	0	0	0	0
Crosswalk Width (ft)	16	16	16	16	16	16	16	16	16	16	16
Two way Left Turn Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Headway Factor	15	15	15	15	15	15	15	15	15	15	15
Turning Speed (mph)	9	9	9	9	9	9	9	9	9	9	9
Number of Detectors	1	2	1	1	1	2	2	1	2	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Thru	Right	Thru	Right	Right
Leading Detector (ft)	20	100	20	20	20	100	100	20	100	20	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position (ft)	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size (ft)	20	6	20	20	6	6	6	6	6	6	20
Detector 1 Type	Cl+Ex										
Detector 1 Channel											
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position (ft)	94	94	94	94	94	94	94	94	94	94	94
Detector 2 Size (ft)	6	6	6	6	6	6	6	6	6	6	6
Detector 2 Type	Cl+Ex										
Detector 2 Channel											
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm	Perm
Protected Phases	8	8	8	8	8	2	2	2	2	2	6
Permitted Phases											

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Detector Phase				8	8	8	2	2			6
Switch Phase				4	4	4	4	4			6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0
Minimum Split (s)	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0			21.0
Total Split (s)	15.0	15.0	15.0	15.0	15.0	15.0	25.0	25.0			25.0
Total Split (%)	37.5%	37.5%	37.5%	37.5%	37.5%	37.5%	62.5%	62.5%			62.5%
Maximum Green (s)	10.0	10.0	10.0	10.0	10.0	10.0	20.0	20.0			20.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0			2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0			5.0
Lead-Lag											
Lead-Lag Optimize?											
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0
Recall Mode	None	None	None	None	None	None	None	None			None
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0			5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0			11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0			0
Act Effect Green (s)	9.1	9.1	9.1	9.1	9.1	9.1	8.7	8.7			8.7
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.33	0.33			0.33
v/c Ratio	0.47	0.20	0.29	0.35	0.35	0.35	0.35	0.35			0.35
Control Delay	10.8	4.0	9.6	9.2	9.2	9.2	1.4	1.4			1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0
Total Delay	10.8	4.0	9.6	9.2	9.2	9.2	1.4	1.4			1.4
LOS	B	A	A	A	A	A	A	A			A
Approach Delay	8.8						9.3	8.4			8.4
Approach LOS	A						A	A			A
Intersection Summary											
Area Type:	Other										
Cycle Length:	40										
Actuated Cycle Length:	26.4										
Natural Cycle:	45										
Control Type:	Actuated-Uncoordinated										
Maximum v/c Ratio:	0.47										
Intersection Signal Delay:	8.8										
Intersection Capacity Utilization:	36.9%										
Analysis Period (min):	15										



Lanes, Volumes, Timings
7: Massey Street & Stone Street

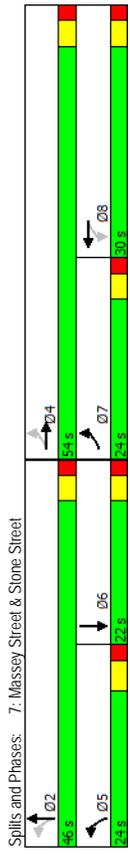
Lanes, Volumes, Timings
7: Massey Street & Stone Street

Proposed Mercy Heights
Full Build Conditions - PM Peak Hour

Proposed Mercy Heights
Full Build Conditions - PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	9	0	178	34	104	121	226	555	0	0	544
Traffic Volume (vph)	9	0	178	34	104	121	226	555	0	0	544
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	0	0	0	0	0	0	300	0	0	0	0
Storage Length (ft)	0	0	0	1	0	0	0	0	0	0	0
Storage Lanes	25	0	0	25	0	0	25	0	0	25	0
Taper Length (ft)	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Lane Util. Factor	0.872			0.919							0.992
Flt Protected	0	0.998		0.950			0.986				
Satd. Flow (proof)	0	1621	0	1770	1712	0	0	3490	0	0	3511
Flt Permitted	0.975			0.557			0.646				
Satd. Flow (perm)	0	1584	0	1038	1712	0	0	2286	0	0	3511
Right Turn on Red		Yes		Yes			Yes		Yes		Yes
Satd. Flow (RTOR)	231			56							5
Link Speed (mph)	30			30			30				30
Link Distance (ft)	316			435			422				304
Travel Time (s)	7.2			9.9			9.6				6.9
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.92	0.92	0.92	0.88	0.88
Adj. Flow (vph)	12	0	231	44	135	157	246	603	0	0	618
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	243	0	44	292	0	0	849	0	0	653
Enter Blocked Intersection	No										
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right
Median Width (ft)	0			12			0				0
Link Offset (ft)	-10			0			0				0
Crosswalk Width (ft)	16			16			16				16
Two way Left Turn Lane											
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15	15	9	15	15	9	15	15	9
Number of Detectors	1	2	1	2	1	2	1	2	1	2	2
Detector Template	Left	Thru	Thru								
Leading Detector (ft)	20	100	20	100	20	100	20	100	20	100	100
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position (ft)	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size (ft)	20	6	20	6	20	6	20	6	20	6	6
Detector 1 Type	Ch+Ex										
Detector 1 Channel											
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position (ft)	94			94			94				94
Detector 2 Size (ft)	6			6			6				6
Detector 2 Type	Ch+Ex			Ch+Ex			Ch+Ex				Ch+Ex
Detector 2 Channel											
Detector 2 Extend (s)	0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		NA	NA
Protected Phases	7	4		8			5		2		6
Permitted Phases	4			8			2				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Group	7	4		8			5	2			6
Detector Phase											
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0
Minimum Split (s)	9.0	21.0		21.0	21.0		9.5	21.0			21.0
Total Split (s)	24.0	54.0		30.0	30.0		24.0	46.0			22.0
Total Split (%)	24.0%	54.0%		30.0%	30.0%		24.0%	46.0%			22.0%
Maximum Green (s)	19.0	49.0		25.0	25.0		18.5	41.0			17.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.5	3.0			3.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0			2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0
Lead-Lag	Lead	Lag		Lag	Lag		Lead	Lag			Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes			Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0
Recall Mode	None	None		None	None		None	None			None
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0			11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0
Act Effect Green (s)	14.5	14.5		14.5	14.5		30.0	30.0			30.0
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.54	0.54			0.54
v/c Ratio	0.41	0.41		0.16	0.59		0.68	0.68			0.34
Control Delay	6.2	19.9		21.4	21.4		12.7	12.7			7.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0
Total Delay	6.2	19.9		21.4	21.4		12.7	12.7			7.6
LOS	A	B		C	C		B	B			A
Approach Delay	6.2			21.2			12.7				7.6
Approach LOS	A			C			B				A
Intersection Summary											
Area Type	Other										
Cycle Length	100										
Actuated Cycle Length	55.2										
Natural Cycle	65										
Control Type	Actuated-Uncoordinated										
Maximum v/c Ratio	0.68										
Intersection Signal Delay	11.7										
Intersection Capacity Utilization	69.9%										
Analysis Period (min)	15										



Lanes, Volumes, Timings
16: Sherman Street & Driveway

HCM 2010 TWSC
16: Sherman Street & Driveway

Proposed Mercy Heights
Full Build Conditions - PM Peak Hour

Intersection	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			4	1	1
Traffic Volume (vph)	9	7	7	262	176	0
Future Volume (vph)	9	7	7	262	176	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.941			0.999		
Flt Protected	0.973			0.999		
Satd. Flow (prot)	1706	0	0	1861	1863	0
Flt Permitted	0.973			0.999		
Satd. Flow (perm)	1706	0	0	1861	1863	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	154			200	380	
Travel Time (s)	3.5			4.5	8.6	
Peak Hour Factor	0.70	0.70	0.88	0.88	0.76	0.76
Adj. Flow (vph)	13	10	8	298	232	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	23	0	0	306	232	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Right	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	Free
Intersection Summary	Other					
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	29.4%					
Analysis Period (min)	15					
ICU Level of Service	A					

Intersection	EBL	EBR	NBL	NBT	SBT	SBR
Int Delay, s/veh	0.6					
Movement	W			4	1	1
Lane Configurations	W			4	1	1
Traffic Vol. veh/h	9	7	7	262	176	0
Future Vol. veh/h	9	7	7	262	176	0
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Stop			Free	Free	Free
RT Chameleized	-	None	-	None	-	None
Storage Length	0					
Veh in Median Storage, #	0			0	0	0
Grade, %	0			0	0	0
Peak Hour Factor	70	70	88	88	76	76
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	10	8	298	232	0
Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	546	232	232	0	0	0
Stage 1	232	-	-	-	-	-
Stage 2	314	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Sig 1	5.42	-	-	-	-	-
Critical Hdwy Sig 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	499	807	1336	-	-	-
Stage 1	807	-	-	-	-	-
Stage 2	741	-	-	-	-	-
Platoon blocked, %						
Mov Cap-1 Maneuver	496	807	1336	-	-	-
Mov Cap-2 Maneuver	496	-	-	-	-	-
Stage 1	807	-	-	-	-	-
Stage 2	736	-	-	-	-	-
Approach	EB	NB	NB	SB	SB	
HCM Control Delay, s	11.3	0.2	0.2	0	0	
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBL	EBR	SBL	SBR
Capacity (veh/h)	1336	-	597	-	-	-
HCM Lane V/C Ratio	0.006	-	0.038	-	-	-
HCM Control Delay (s)	7.7	0	11.3	-	-	-
HCM Lane LOS	A	A	B	-	-	-
HCM 95th %ile Q(veh)	0	-	0.1	-	-	-

Lanes, Volumes, Timings
18: Stone Street & Driveway

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18: Stone Street & Driveway

Proposed Mercy Heights
Full Build Conditions - PM Peak Hour

Intersection	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	0	0	245	6	0	15
Traffic Volume (vph)	0	0	245	6	0	15
Future Volume (vph)	0	0	245	6	0	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00
Frt			0.996			0.865
Flt Protected	0	0	3525	0	0	1611
Satd. Flow (prot)						
Flt Permitted	0	0	3525	0	0	1611
Satd. Flow (perm)						
Link Speed (mph)	30	30	30	30	30	30
Link Distance (ft)	435	305	178			
Travel Time (s)	9.9	6.9	4.0			
Peak Hour Factor	0.92	0.92	0.66	0.66	0.70	0.70
Adj. Flow (vph)	0	0	371	9	0	21
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	380	0	0	21
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Right
Median Width(ft)	0	0	0	0	0	0
Link Offset(ft)	0	0	0	0	0	0
Crosswalk Width(ft)	16	16	16	16	16	16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	15	9	15	9	9
Sign Control	Free	Free	Free	Stop	Stop	Stop
Intersection Summary	Other					
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	17.0%					
Analysis Period (min)	15					
ICU Level of Service	A					

Intersection	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	0	0	245	6	0	15
Traffic Vol. veh/h	0	0	245	6	0	15
Future Vol. veh/h	0	0	245	6	0	15
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	-	-	-	-
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	-	-	-	-	-	-
Grade, %	-	-	-	-	-	-
Peak Hour Factor	92	92	66	66	70	70
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	371	9	0	21
Major/Minor	Major2			Minor2		
Conflicting Flow All	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Sig 1	-	-	-	-	-	-
Critical Hdwy Sig 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	-	-	0	820
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	-	820
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	WB		WB		SB	SB
HCM Control Delay, s	0		0		9.5	9.5
HCM LOS	A		A		A	A
Minor Lane/Major Mvmt	WBT	WBR	SBLn1	WBR	SBLn1	
Capacity (veh/h)	-	-	820	-	-	820
HCM Lane V/C Ratio	-	-	0.026	-	-	0.026
HCM Control Delay (s)	-	-	9.5	-	-	9.5
HCM Lane LOS	-	-	A	-	-	A
HCM 95th %tile Q(veh)	-	-	0.1	-	-	0.1

Lanes, Volumes, Timings
20: Massey Street & South Driveway

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20: Massey Street & South Driveway

Proposed Mercy Heights
Full Build Conditions - PM Peak Hour

Proposed Mercy Heights
Full Build Conditions - PM Peak Hour

Intersection	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	22	2	669	16	15	554
Traffic Volume (vph)	22	2	669	16	15	554
Future Volume (vph)	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	1.00	1.00	0.95	0.95	0.95	0.95
Lane Util. Factor	0.988	0.997				
Flt Protected	0.956					0.999
Satd. Flow (prot)	1759	0	3529	0	0	3536
Flt Permitted	0.956					0.999
Satd. Flow (perm)	1759	0	3529	0	0	3536
Link Speed (mph)	30	30				30
Link Distance (ft)	195	304				250
Travel Time (s)	4.4	6.9				5.7
Peak Hour Factor	0.70	0.70	0.92	0.92	0.88	0.88
Adj. Flow (vph)	31	3	727	17	17	630
Shared Lane Traffic (%)						
Lane Group Flow (vph)	34	0	744	0	0	647
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12	0				0
Link Offset(ft)	0	0				0
Crosswalk Width(ft)	16	16				16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9				15
Sign Control	Stop	Free	Free	Free	Free	Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	36.1%					
Analysis Period (min)	15					

Intersection	WBL	WBR	NBT	NBR	SBL	SBT
Int Delay, s/veh	0.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	22	2	669	16	15	554
Traffic Vol. veh/h	22	2	669	16	15	554
Future Vol. veh/h	22	2	669	16	15	554
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Chameleized	-	None	-	None	-	None
Storage Length	0					
Veh in Median Storage, #	0					
Grade, %	0					
Peak Hour Factor	70	70	92	92	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	31	3	727	17	17	630
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1085	372	0	0	745	0
Stage 1	736					
Stage 2	349					
Critical Hdwy	6.84	6.94			4.14	
Critical Hdwy Sig 1	5.84					
Critical Hdwy Sig 2	5.84					
Follow-up Hdwy	3.52	3.32			2.22	
Pot Cap-1 Maneuver	211	625			859	
Stage 1	435					
Stage 2	685					
Platoon blocked, %						
Mov Cap-1 Maneuver	205	625			859	
Mov Cap-2 Maneuver	205					
Stage 1	435					
Stage 2	664					
Approach	WB		NB		SB	
HCM Control Delay, s	24.7		0		0.3	
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBR/WBLn1	SBL	SBT		
Capacity (veh/h)	-	-	217	859	-	-
HCM Lane V/C Ratio	-	-	0.158	0.02	-	-
HCM Control Delay (s)	-	-	24.7	9.3	0.1	-
HCM Lane LOS	-	-	C	A	A	-
HCM 95th %ile Q(veh)	-	-	0.6	0.1	-	-

Lanes, Volumes, Timings
22: Massey Street

HCM 2010 TWSC
22: Massey Street

Proposed Mercy Heights
Full Build Conditions - PM Peak Hour

Intersection	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	9	31	666	4	7	560
Traffic Volume (vph)	9	31	666	4	7	560
Future Volume (vph)	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	1.00	1.00	0.91	0.91	0.95	0.95
Lane Util. Factor	0.896	0.989	0.999			0.999
Flt Protected	0.989					0.999
Satd. Flow (prot)	1651	0	5080	0	0	3536
Flt Permitted	0.989					0.999
Satd. Flow (perm)	1651	0	5080	0	0	3536
Link Speed (mph)	30	30	30	30	30	30
Link Distance (ft)	129	250	166			166
Travel Time (s)	2.9	5.7	3.8			3.8
Peak Hour Factor	0.70	0.70	0.92	0.92	0.88	0.88
Adj. Flow (vph)	13	44	724	4	8	636
Shared Lane Traffic (%)						
Lane Group Flow (vph)	57	0	728	0	0	644
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12	12	12	12	12	12
Link Offset(ft)	0	0	0	0	0	0
Crosswalk Width(ft)	16	16	16	16	16	16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15	9	15	15
Sign Control	Stop	Free	Free	Free	Free	Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	30.4%					
Analysis Period (min)	15					

Intersection	WBL	WBR	NBT	NBR	SBL	SBT
Int Delay, s/veh	0.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	9	31	666	4	7	560
Traffic Vol. veh/h	9	31	666	4	7	560
Future Vol. veh/h	9	31	666	4	7	560
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	0	-
Grade, %	0	-	0	-	0	-
Peak Hour Factor	70	70	92	92	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	44	724	4	8	636
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1060	364	0	0	728	0
Stage 1	726	-	-	-	-	-
Stage 2	334	-	-	-	-	-
Critical Hdwy	6.29	7.14	-	-	5.34	-
Critical Hdwy Sig 1	6.64	-	-	-	-	-
Critical Hdwy Sig 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.67	3.92	-	-	3.12	-
Pot Cap-1 Maneuver	252	540	-	-	528	-
Stage 1	364	-	-	-	-	-
Stage 2	673	-	-	-	-	-
Platoon blocked, %						
Mov Cap-1 Maneuver	246	540	-	-	528	-
Mov Cap-2 Maneuver	246	-	-	-	-	-
Stage 1	364	-	-	-	-	-
Stage 2	658	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	14.8		0		0.2	
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR/WBLn1	SBL	SBT		
Capacity (veh/h)	-	-	426	528	-	-
HCM Lane V/C Ratio	-	-	0.134	0.015	-	-
HCM Control Delay (s)	-	-	14.8	11.9	0.1	-
HCM Lane LOS	-	-	B	B	A	-
HCM 95th %ile Q(veh)	-	-	0.5	0	-	-

MERCY HEIGHTS STORMWATER MANAGEMENT REPORT



City of Watertown, NY
May 2016

PREPARED FOR:

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Section I: Project Location and Description

A. Project Location

The project is located on the city block in Watertown, NY that is bounded on the North by Arsenal Street, the east by Sherman Street, the south by Stone Street, and the West by South Massey Street. A location map has been included on the cover of this report.

B. Project Description

The proposed re-development project is a multi-use project and will include construction of three multi-family residential buildings, a community center, and two office buildings as well as associated utilities, parking, lighting and landscaping. The applicant has also been working closely with the St. Patrick's Society to include improvements to their parcel as part of the overall project which would not only enhance the church lot but also reconfigure their 1.791 acre parcel to augment the entire project.

Three multi-family residential buildings, located along Stone and South Massey Streets, are each three stories in height with 36 units at 36,402 square feet. This provides a total of 108 units and 109,206 square feet. The 5,588 square foot community center building is a single story structure and will house the support programs for the three multi-family buildings.

These programs includes; a fitness center, locker rooms, multi-purpose room, party room, and the leasing office.

The two office buildings, located along Arsenal Street, are two story structures with 18,000 square feet each for a total of 36,000 of office space.



Section II: Stormwater System

A. Project Description

Stormwater practices within the development area will consist of a network of pipes, inlets, manholes, Stormwater Quality treatment filters, and an underground infiltration basin. The proposed storm sewer system will be privately owned and maintained. Storm water from the developed area will discharge to either the Sherman Street system or the Arsenal Street system after treatment. The proposed underground detention basin will also collect the discharge from the water quality filter structure onsite and a majority of the site (6.784 Ac of 7.512 total) to provide the required quantity control.

The proposed design and mitigation measures are intended to address the water quality and quantity requirements of the New York State Department of Environmental Conservation. Refer to the Stormwater Management Report for more details and calculations (see Appendix A).

B. Soil Classification

According to the Natural Resources Conservation Service website (NRCS), there is one (1) mapped soil unit identified on the project property (see Appendix A). Urban Land is the dominant soil type and is located on approximately 99.9 percent of the project area. This soil type slopes at approximately 0 to 5 percent. These soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission. The complete list of soils found on the project site is identified in the table below (see Appendix E for soils map).

Table I- Jefferson County Soils Summary

Symbol	Soil Name	Hydrologic Soil Group
Ur	Urban Land	-



C. Hydrology

Methodology

Stormwater runoff rates discharged from the site under the existing conditions provide the basis on which to compare the impacts of the proposed site improvements. Analysis points are established where runoff exits the site to provide a fixed location at which existing and proposed stormwater quantities can be compared. The areas draining to each analysis point are delineated using topographic survey maps, grading plans and utility plans. HydroCAD 10.00-12 by HydroCAD Software Solutions, LLC was used to model the existing and proposed conditions. This program simulates the USDA Soil Conservation Service's TR-20 hydrologic model to analyze discharges from drainage areas and retention basins.

The parameters required to calculate stormwater runoff are area, curve number, and time of concentration. Each drainage area is evaluated using the guidelines described in USDA Soil Conservation Service's TR-55 to determine the curve number and time of concentration.

The runoff curve number (CN) is based on a weighted average of ground cover and soil type. The underlying soil types are described in county soil maps. Site and grading plans and survey maps outline existing and proposed ground cover. CN values for specific locations are determined from the tables presented in TR-55.

Time of concentration (Tc) represents the amount of time it takes for runoff to travel from the hydraulically most distant point of the watershed to the point of analysis. Surface roughness, slope, channel shape and flow patterns are the factors that affect the time of concentration. Stormwater runoff flows through the drainage area as sheet flow, shallow concentrated flow, open channel flow, or concentrated flow (such as in storm sewers). For this report sheet flow will become shallow concentrated flow after a maximum of 150 feet for the existing condition and 100 feet for the proposed condition. The sum of the travel times over the various surfaces within the assumed flow path for a specific drainage area determines that area's time of concentration. The figures and formulas in TR-55 are employed to compute travel times for sheet flow and shallow concentrated flow. Manning's equation is used to determine flow velocities through pipes.

The stage-storage-discharge relationship for the proposed detention area is determined from topographical data and outlet structure characteristics. Discharge rates and storage volumes at various elevations (stage) are represented by this relationship. The underground storage capacity is calculated by determined by the known volumes of the Stormtech chambers at specified elevations.



Existing Conditions

The existing drainage area comprises a total of 7.512 acres. The parcel to be re-developed consists of a large hospital complex (formerly Mercy Hospital), small grass areas surrounding the hospital complex, and two parking lots on the northwest corner of the site.

The overall drainage area was divided into four sub areas for analysis purposes, labeled DR-1 through DR-4 as shown on DR-PRE, the Existing Conditions Drainage Map in Appendix A.

Drainage Area DR-1, consisting of 2.441 acres, includes the two parking lots on the north side of the site, as well as St. Patrick's church. This area consists of mostly impervious parking area and building, with some associated yard areas. This area drains to the north via sheet and concentrated flow to the Arsenal Street storm system (POI#1).

Drainage Area DR-2, consisting of 1.495 acres, includes the northeast corner of the hospital complex and surrounding parking and lawn areas. This area consists of mostly impervious building area and parking, with some associated yard areas. This area drains to the east via sheet flow and storm laterals to the Sherman Street storm system (POI #2).

Drainage Area DR-3, consisting of 1.014 acres, includes the southeast corner of the hospital complex and surrounding areas. This area consists of mostly impervious building area and parking, with some associated yard areas. This area drains to the south via sheet flow and storm laterals to the Stone Street storm system (POI #3).

Drainage Area DR-4, consisting of 2.562 acres, includes the south/west side of the hospital complex and surrounding areas. This area consists of mostly impervious building area and parking, with some associated yard areas. This area drains to the west via sheet flow and storm lateral to the South Massey Street storm system (POI #4).

Table II summarizes the hydrologic characteristics of the drainage areas described above. See Appendix A for computations for the existing drainage conditions.



**Table II
Existing Conditions Summary**

Drainage Area	Description	Size (ac)	Composite Cn	Tc (min)
Area DR-1	Includes the two parking lots on the north side of the site, as well as St. Patrick's church. This area consists of mostly impervious parking area and building, with some associated yard areas.	2.441	93	6.0 minimum
Area DR-2	Includes the northeast corner of the hospital complex and surrounding parking and lawn areas. This area consists of mostly impervious building area and parking, with some associated yard areas.	1.495	95	10.0 assumed
Area DR-3	Includes the southeast corner of the hospital complex and surrounding areas. This area consists of mostly impervious building area and parking, with some associated yard areas.	1.014	93	10.0 assumed
Area DR-4	Includes the south/west side of the hospital complex and surrounding areas. This area consists of mostly impervious building area and parking, with some associated yard areas.	2.562	90	10.0 assumed

Proposed Conditions

The Proposed drainage area comprises a total of 7.512 acres. Proposed impervious area will drain via storm sewer and sheet flow to the proposed Underground Basin.

The overall drainage area was divided into four sub areas for analysis purposes, labeled DR-1, DR-2, DR-4, as shown on DR-POST, the Proposed Conditions Drainage Map in Appendix A.

Drainage Area DR-2A, consisting of 2.366 acres, includes the two office buildings on the north side of the site, St. Patrick's Church, and the associated parking areas in between. This area consists of mostly impervious parking area and building, with some associated landscaped islands. This area will be redirected away from the current northerly flow. This area will flow via storm sewer to the proposed underground basin, and exit via the Sherman Street storm system (POI#2).

Drainage Area DR-2, consisting of 4.418 acres, includes the three residential buildings, the Community Center, and the parking areas south of St. Patrick's Church. This area consists of mostly impervious building area and parking, with some associated landscaped islands and yard areas. This area drains to the east via sheet flow and new storm system to the proposed Underground basin, and then the Sherman Street storm system (POI #2).



Drainage Area DR-3 is not included in proposed analysis. The existing area associated with DR-3 will be re-routed away from POI-3 into the proposed storm system and Underground Basin that treats most of the site, and then enters the Sherman Street system (POI #2).

Drainage Area DR-4, consisting of 0.728 acres, includes lawn areas south and west of the proposed residential buildings. This area consists of mostly pervious lawn areas and some sidewalks. This area drains to the west/south via sheet flow and existing storm system to the South Massey Street storm system (POI #4).

Table III summarizes the hydrologic characteristics of the drainage areas described above. See Appendix A for computations for the existing drainage conditions.

**Table III
Proposed Conditions Summary**

Drainage Area	Description	Size (ac)	Composite Cn	Tc (min)
Area DR-2A	Includes the two office buildings on the north side of the site, St. Patrick’s Church, and the associated parking areas in between. This area consists of mostly impervious parking area and building, with some associated landscaped islands	2.366	94	6.0 minimum
Area DR-2	Includes the three residential buildings, the Community Center, and the parking areas south of St. Patrick’s Church. This area consists of mostly impervious building area and parking, with some associated landscaped islands and yard areas	4.418	93	8.7
Area DR-4	Includes lawn areas south and west of the proposed residential buildings. This area consists of mostly pervious lawn areas and some sidewalks.	0.728	73	6.0 minimum

D. Stormwater Management & SPDES Phase II Requirements

State Pollutant Discharge Elimination System (SPDES)

Since the subject site will have land disturbance of more than 1-acre a State Pollutant Discharge Elimination System (SPDES) permit will be completed as part of the project. A Storm Water Pollution Prevention Plan (SWPPP) will be developed in accordance with the



EPA Phase II regulations. The SWPPP will be modeled on the New York State DEC Guidelines and will meet the following criteria as the principle objectives contained in an approved SWPPP.

- 1) Reduction or elimination of erosion and sediment loading to water-bodies during construction activities.
- 2) Control the impact of storm water runoff on the water quality of the receiving waters.
- 3) Control the increase volume and peak runoff rate of runoff during and after construction.
- 4) Maintenance of storm water controls during and after completion of construction.

The aforementioned objectives will be accomplish by incorporating the several of the design criteria outlined within the Technical Guidelines provided by New York State Department of Environmental Conservation, Stormwater Management Design Manual and summarized below.

A. WATER QUALITY VOLUME

The New York State Department of Environmental Conservation, Stormwater Management Design Manual was used to determine the water quality criteria. Specifically the unified storm water sizing criteria was followed for water quality to meet the State of New York pollutant goals. The water quantity volume is intended to improve water quality by capturing and treating 90% of the average annual storm water runoff volume. As detailed in section 9.2 of the Design Manual, 75% of the WQv will be treated by alternative practices – for the areas with increased or similar amounts of impervious area. An online Vortechs units have been proposed for DR-2, in order to provide water quality filtration.

Storm water quality calculations are provided within the Appendix A and are summarized in the Table below.

Water Quality Flows for Alternate Practices			
Drainage Area	Practice	WQ Peak Discharge (cfs) - required	Max. Treatment Flow (cfs)
DR-2	Vortechs 9000	4.91	5.70



B. CHANNEL PROTECTION VOLUME

The New York State Department of Environmental Conservation, Stormwater Management Design Manual was used to determine the water quantity criteria. As required by section 9.2, “if the hydrology and hydraulic analysis for the project site shows that the post-construction 1-year 24 hour discharge rate and velocity are less than or equal to the pre-construction discharge rate, providing 24 hour detention of the 1-year storm to meet the channel protection criteria is not required.” This requirement is satisfied in all of the proposed drainage areas, as seen in Table IV.

C. OVERBANK FLOOD

Overbank Flood protection is provided by controlling the peak discharge from the 10-year storm to 10-year predevelopment rates. This requirement is being satisfied as the proposed development is reducing the peak discharge from the 10-year storm below pre-development rates. Refer to Table IV for details.

D. EXTREME STORM

Extreme Storm protection is provided by controlling the peak discharge from the 100-year storm to 100-year predevelopment rates. This requirement is being satisfied as the proposed development is reducing the peak discharge from the 100-year storm below pre-development rates. Refer to Table IV for details.

Summary of Results

Table IV and Table V depicts the peak discharges from the site for each of the design storms for the existing and proposed conditions. Table V depicts the peak elevation of the Underground Detention Basin during the design storm events.

Table IV - Existing and Proposed Peak Discharge for the Type-II Storm Events (cfs)

	Drainage Area	POI-1		POI-2		POI-3		POI-4	
		Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
Type II Storm Event	1-YR	5.81	0	3.46	3.41	2.52	0	4.63	0.42
	10-YR	10.86	0	6.20	5.90	4.70	0	9.34	1.51
	100-YR	16.76	0	9.96	8.96	7.24	0	14.95	3.06



Table V - Peak Underground Basin Elevations

Design Storm	Infiltration Basin U
10 Year	476.96
100 Year	479.47

As depicted in the above tables, the peak discharge from the site for each of the design storms will be decreased after this project is constructed and the stormwater management plan is implemented.

Conclusion

Based on the calculations attached in the appendices of this report, the proposed Stormwater Management Facility will decrease peak discharge rates from the site for all of the design storms under proposed conditions. The proposed facility also includes an Underground Detention Basin for water quantity storage. Alternative Practices have also been included to provide water quality treatment. As a result, this project has provided sufficient mitigation to minimize effect to stream systems and properties.



APPENDIX A – Stormwater Calculations



City of Watertown
Jefferson County
State of New York

**COR Arsenal Street
Company, LLC**

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Fayetteville, NY 13066



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REVISIONS		
NO.	DATE	DESCRIPTION
REV. <td>CKD <td></td> </td>	CKD <td></td>	

**PRELIMINARY
NOT FOR
CONSTRUCTION**

PROFESSIONAL CERTIFICATION: I CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF NEW YORK. LICENSE NO. 80472 EXPIRATION DATE: 05/31/17

TO THE BEST OF MY KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGMENT, THE PLANS AND SPECIFICATIONS ARE IN COMPLIANCE WITH THE 2015 ENERGY CONSTRUCTION CONSERVATION CODE OF THE STATE OF NEW YORK.

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Note: Unauthorized alteration or addition to this drawing is a violation of the New York State Education Law Article 140, Section 7209.

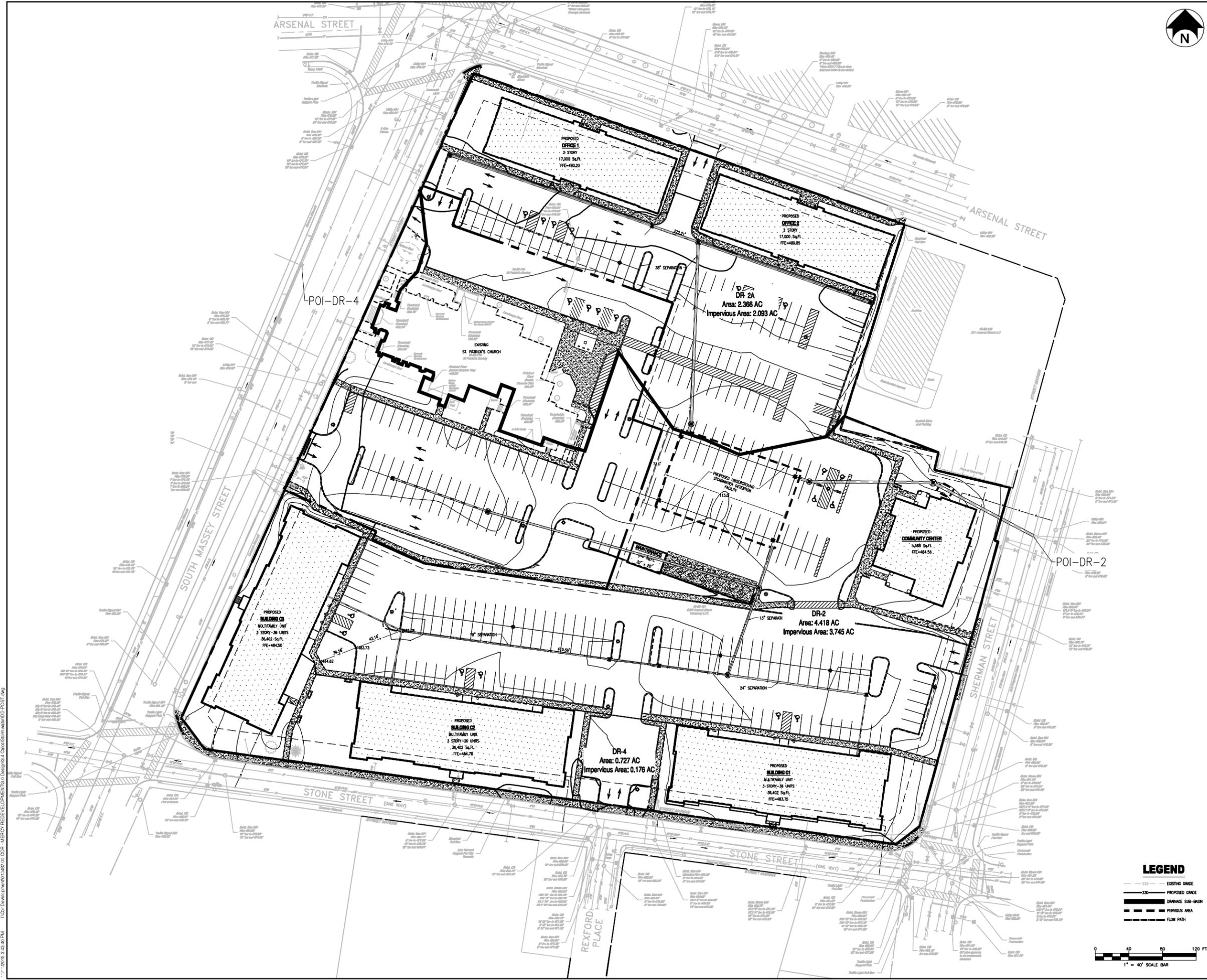
Author: A. BARRI, M.S.A.	Checker: A. BARRI, P.E.
Designer: T. BURKE	Reviewer: T. BURKE
Date: MAY 26, 2016	Scale: 1" = 40'
Drawing Number: 016-027-00	

**PROPOSED CONDITIONS
DRAINAGE MAP**

LEGEND

- EXISTING GRADE
- PROPOSED GRADE
- DRAINAGE SUB-BASE
- PERVIOUS AREA
- FLOW PATH

0 40 80 120 FT
1" = 40' SCALE BAR



I:\2015\2015-05-26\DD-POST.dwg 1:2015 3:45:40 PM I:\2015\2015-05-26\DD-POST.dwg 1:2015 3:45:40 PM

Soil Map—Jefferson County, New York
(COR Mercy Redevelopment)



Map Scale: 1:3,000 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Jefferson County, New York
Survey Area Data: Version 12, Sep 21, 2015

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 11, 2011—Jul 2, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Jefferson County, New York (NY045)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CnB	Collamer silt loam, 3 to 8 percent slopes	0.0	0.1%
Ur	Urban land	9.8	99.9%
Totals for Area of Interest		9.8	100.0%

Map Unit Description

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Additional information about the map units described in this report is available in other soil reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the soil reports define some of the properties included in the map unit descriptions.

Report—Map Unit Description

Jefferson County, New York

CnB—Collamer silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9smx

Mean annual precipitation: 33 to 50 inches

Mean annual air temperature: 45 to 46 degrees F

Frost-free period: 110 to 170 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Collamer and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Collamer

Setting

Landform: Lake plains

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Tread

Down-slope shape: Concave

Across-slope shape: Convex

Parent material: Silty and clayey glaciolacustrine deposits

Typical profile

H1 - 0 to 8 inches: silt loam

H2 - 8 to 18 inches: silt loam

H3 - 18 to 32 inches: silty clay loam

H4 - 32 to 60 inches: stratified silt loam to very fine sand to clay

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat):

Moderately low to moderately high (0.06 to 0.57 in/hr)

Depth to water table: About 18 to 24 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 15 percent

Available water storage in profile: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: C/D

Minor Components

Unnamed soils, clayey surface texture and sandy areas

Percent of map unit: 10 percent

Niagara

Percent of map unit: 8 percent

Canandaigua

Percent of map unit: 2 percent

Landform: Depressions

Ur—Urban land

Map Unit Setting

National map unit symbol: 9srz
Mean annual precipitation: 33 to 50 inches
Mean annual air temperature: 45 to 46 degrees F
Frost-free period: 110 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Minor Components

Udorthents, smoothed

Percent of map unit: 10 percent
Landform: Depressions

Data Source Information

Soil Survey Area: Jefferson County, New York
Survey Area Data: Version 12, Sep 21, 2015



NOAA Atlas 14, Volume 10, Version 2
 Location name: Watertown, New York, US*
 Latitude: 43.9761°, Longitude: -75.8753°
 Elevation: 476 ft*
 * source: Google Maps



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aerials](#)

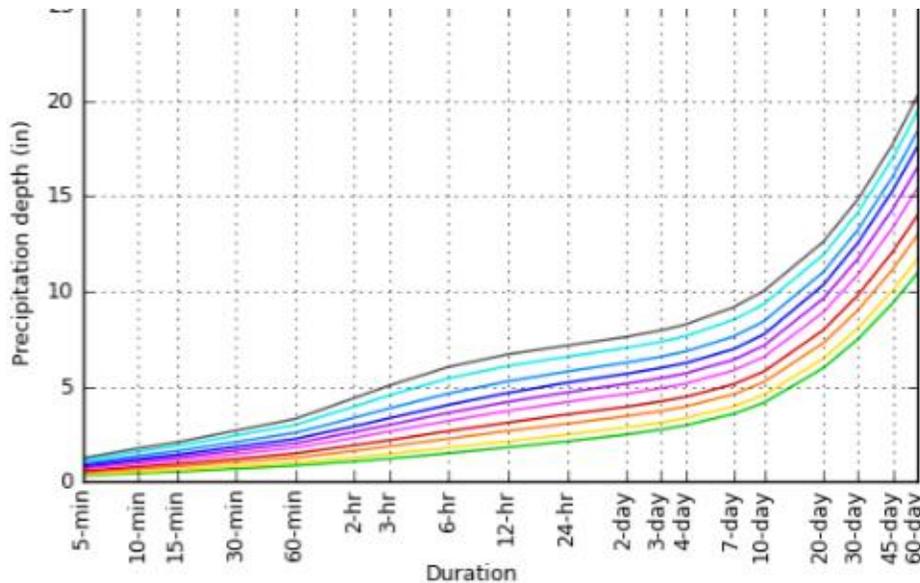
PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.317 (0.260-0.385)	0.378 (0.310-0.459)	0.477 (0.390-0.582)	0.560 (0.455-0.685)	0.674 (0.526-0.848)	0.762 (0.580-0.972)	0.850 (0.625-1.11)	0.967 (0.665-1.27)	1.12 (0.737-1.51)	1.24 (0.792-1.69)
10-min	0.449 (0.369-0.545)	0.535 (0.439-0.651)	0.676 (0.553-0.824)	0.794 (0.644-0.970)	0.955 (0.746-1.20)	1.08 (0.822-1.38)	1.20 (0.886-1.58)	1.37 (0.942-1.80)	1.59 (1.05-2.14)	1.76 (1.12-2.39)
15-min	0.528 (0.434-0.642)	0.630 (0.517-0.765)	0.796 (0.650-0.969)	0.934 (0.758-1.14)	1.12 (0.877-1.41)	1.27 (0.967-1.62)	1.42 (1.04-1.86)	1.61 (1.11-2.12)	1.87 (1.23-2.51)	2.07 (1.32-2.81)
30-min	0.686 (0.564-0.834)	0.817 (0.671-0.994)	1.03 (0.843-1.26)	1.21 (0.982-1.48)	1.46 (1.14-1.83)	1.65 (1.25-2.10)	1.83 (1.35-2.40)	2.09 (1.44-2.75)	2.43 (1.59-3.26)	2.68 (1.71-3.65)
60-min	0.844 (0.694-1.03)	1.01 (0.825-1.22)	1.27 (1.04-1.55)	1.49 (1.21-1.82)	1.79 (1.40-2.25)	2.02 (1.54-2.58)	2.25 (1.66-2.95)	2.57 (1.77-3.38)	2.98 (1.96-4.01)	3.30 (2.11-4.49)
2-hr	1.07 (0.884-1.29)	1.28 (1.06-1.55)	1.63 (1.34-1.97)	1.91 (1.56-2.32)	2.31 (1.82-2.89)	2.61 (2.01-3.32)	2.92 (2.18-3.82)	3.36 (2.34-4.39)	3.95 (2.62-5.27)	4.40 (2.84-5.93)
3-hr	1.22 (1.01-1.47)	1.46 (1.21-1.76)	1.86 (1.53-2.24)	2.18 (1.79-2.64)	2.64 (2.09-3.29)	2.98 (2.31-3.79)	3.33 (2.51-4.35)	3.85 (2.69-5.01)	4.53 (3.03-6.02)	5.05 (3.29-6.79)
6-hr	1.50 (1.25-1.79)	1.79 (1.49-2.14)	2.26 (1.88-2.71)	2.66 (2.19-3.19)	3.20 (2.55-3.96)	3.62 (2.82-4.55)	4.04 (3.06-5.22)	4.64 (3.28-5.98)	5.43 (3.68-7.15)	6.03 (3.98-8.04)
12-hr	1.80 (1.51-2.14)	2.13 (1.79-2.53)	2.66 (2.23-3.17)	3.11 (2.58-3.71)	3.72 (2.99-4.56)	4.19 (3.29-5.21)	4.66 (3.55-5.94)	5.27 (3.77-6.75)	6.08 (4.17-7.95)	6.69 (4.47-8.85)
24-hr	2.12 (1.80-2.50)	2.47 (2.09-2.92)	3.05 (2.57-3.60)	3.53 (2.95-4.18)	4.19 (3.38-5.08)	4.69 (3.71-5.76)	5.20 (3.97-6.52)	5.79 (4.20-7.35)	6.56 (4.57-8.51)	7.15 (4.85-9.39)
2-day	2.48 (2.11-2.90)	2.84 (2.42-3.33)	3.44 (2.92-4.04)	3.94 (3.32-4.63)	4.62 (3.76-5.56)	5.15 (4.10-6.26)	5.67 (4.36-7.04)	6.25 (4.59-7.88)	7.02 (4.95-9.04)	7.61 (5.22-9.91)
3-day	2.74 (2.34-3.19)	3.11 (2.66-3.63)	3.71 (3.16-4.34)	4.22 (3.57-4.94)	4.91 (4.02-5.88)	5.44 (4.36-6.59)	5.97 (4.63-7.38)	6.57 (4.85-8.24)	7.35 (5.22-9.41)	7.94 (5.50-10.3)
4-day	2.96 (2.54-3.45)	3.34 (2.86-3.88)	3.95 (3.37-4.60)	4.46 (3.78-5.21)	5.15 (4.24-6.16)	5.69 (4.58-6.88)	6.23 (4.85-7.68)	6.84 (5.08-8.56)	7.65 (5.46-9.76)	8.26 (5.75-10.7)
7-day	3.57 (3.07-4.12)	3.95 (3.41-4.57)	4.59 (3.94-5.32)	5.12 (4.37-5.95)	5.84 (4.84-6.94)	6.40 (5.19-7.70)	6.96 (5.47-8.55)	7.62 (5.72-9.48)	8.50 (6.13-10.8)	9.16 (6.45-11.8)
10-day	4.15 (3.59-4.78)	4.56 (3.95-5.26)	5.24 (4.51-6.05)	5.79 (4.97-6.71)	6.56 (5.45-7.76)	7.15 (5.82-8.56)	7.74 (6.12-9.45)	8.43 (6.36-10.4)	9.34 (6.78-11.8)	10.0 (7.11-12.8)
20-day	5.97 (5.20-6.83)	6.47 (5.63-7.41)	7.29 (6.32-8.36)	7.96 (6.87-9.16)	8.90 (7.44-10.4)	9.61 (7.88-11.4)	10.3 (8.19-12.4)	11.0 (8.42-13.5)	11.9 (8.79-14.9)	12.6 (9.06-16.0)
30-day	7.49 (6.56-8.54)	8.07 (7.06-9.20)	9.02 (7.86-10.3)	9.80 (8.50-11.2)	10.9 (9.14-12.7)	11.7 (9.63-13.8)	12.5 (9.97-14.9)	13.2 (10.2-16.2)	14.1 (10.5-17.6)	14.8 (10.8-18.7)
45-day	9.38 (8.24-10.6)	10.1 (8.82-11.4)	11.2 (9.76-12.7)	12.1 (10.5-13.8)	13.3 (11.3-15.5)	14.3 (11.8-16.7)	15.3 (12.2-18.1)	16.0 (12.4-19.5)	17.0 (12.7-21.1)	17.7 (13.0-22.3)
60-day	10.9 (9.64-12.4)	11.7 (10.3-13.2)	12.9 (11.4-14.7)	14.0 (12.2-15.9)	15.4 (13.0-17.8)	16.5 (13.7-19.2)	17.6 (14.1-20.7)	18.4 (14.3-22.3)	19.4 (14.7-24.0)	20.2 (14.9-25.3)

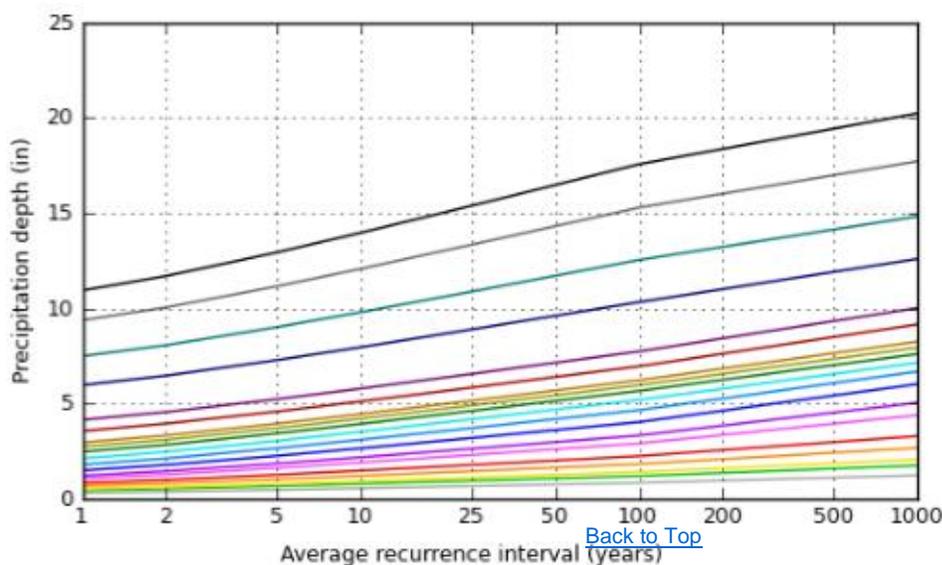
¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

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PF graphical



Average recurrence interval (years)
1
2
5
10
25
50
100
200
500
1000



Duration
5-min
10-min
15-min
30-min
60-min
2-hr
3-hr
6-hr
12-hr
24-hr
2-day
3-day
4-day
7-day
10-day
20-day
30-day
45-day
60-day

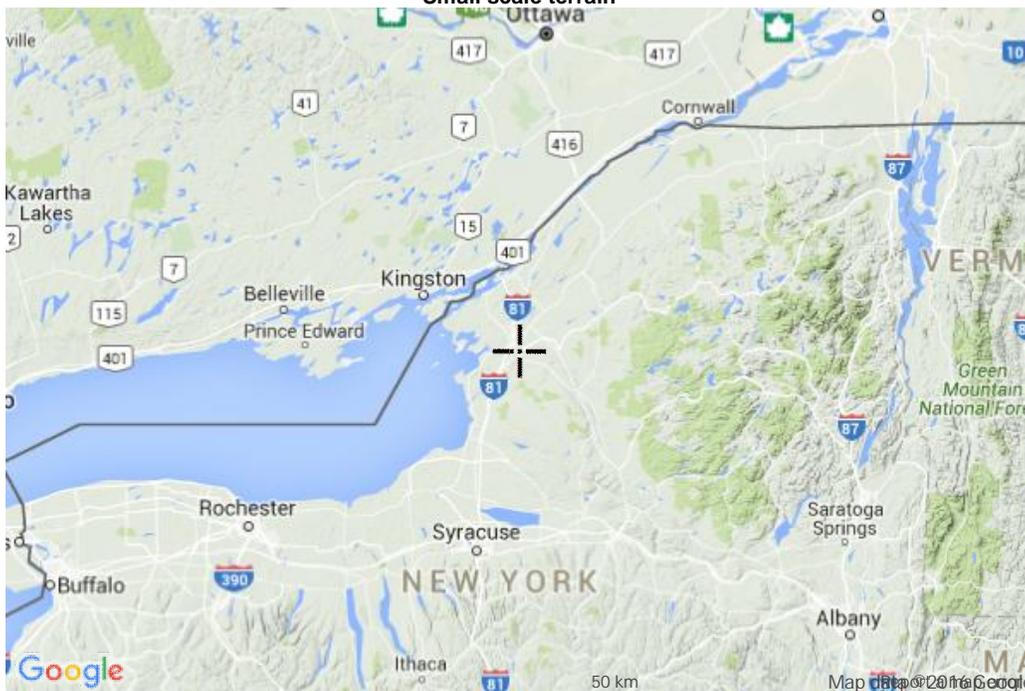
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Maps & aerials

Created (GMT): Tue Mar 15 12:00:35 2016

NOAA Atlas 14, Volume 10, Version 2

Small scale terrain



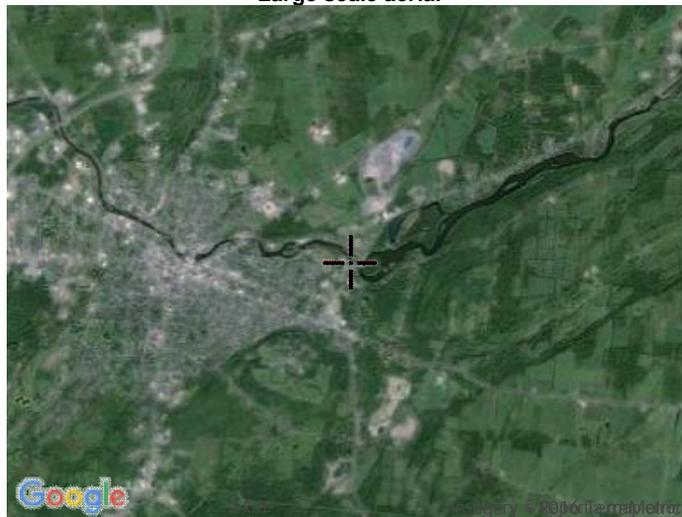
Large scale terrain



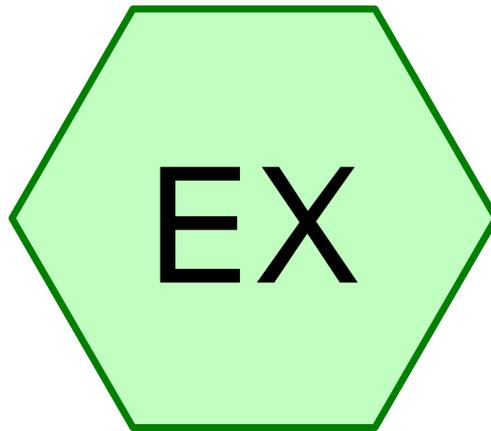
Large scale map



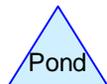
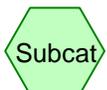
Large scale aerial



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DR-1 PRE



Pre&Post-DR1

Prepared by Bergmann Associates

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Page 2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.394	69	50-75% Grass cover, Fair, HSG B (EX)
2.047	98	Paved parking, HSG B (EX)
2.441	93	TOTAL AREA

Pre&Post-DR1

Prepared by Bergmann Associates

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Type II 24-hr 1 YR Rainfall=2.12"

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Summary for Subcatchment EX: DR-1 PRE

Runoff = 5.81 cfs @ 11.97 hrs, Volume= 0.290 af, Depth= 1.42"

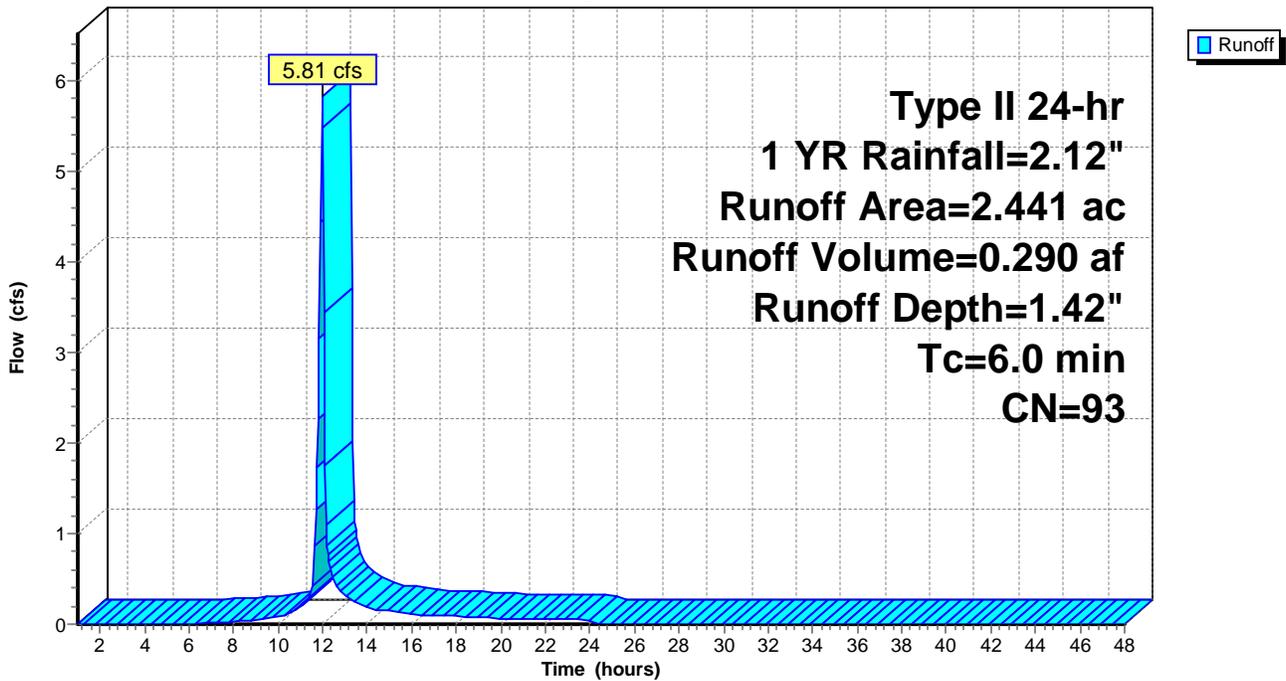
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.12"

Area (ac)	CN	Description
2.047	98	Paved parking, HSG B
0.394	69	50-75% Grass cover, Fair, HSG B
2.441	93	Weighted Average
0.394		16.14% Pervious Area
2.047		83.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Calculated Tc=4.9, 6 assumed

Subcatchment EX: DR-1 PRE

Hydrograph



Pre&Post-DR1

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Type II 24-hr 10 YR Rainfall=3.53"

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Summary for Subcatchment EX: DR-1 PRE

Runoff = 10.86 cfs @ 11.96 hrs, Volume= 0.562 af, Depth= 2.76"

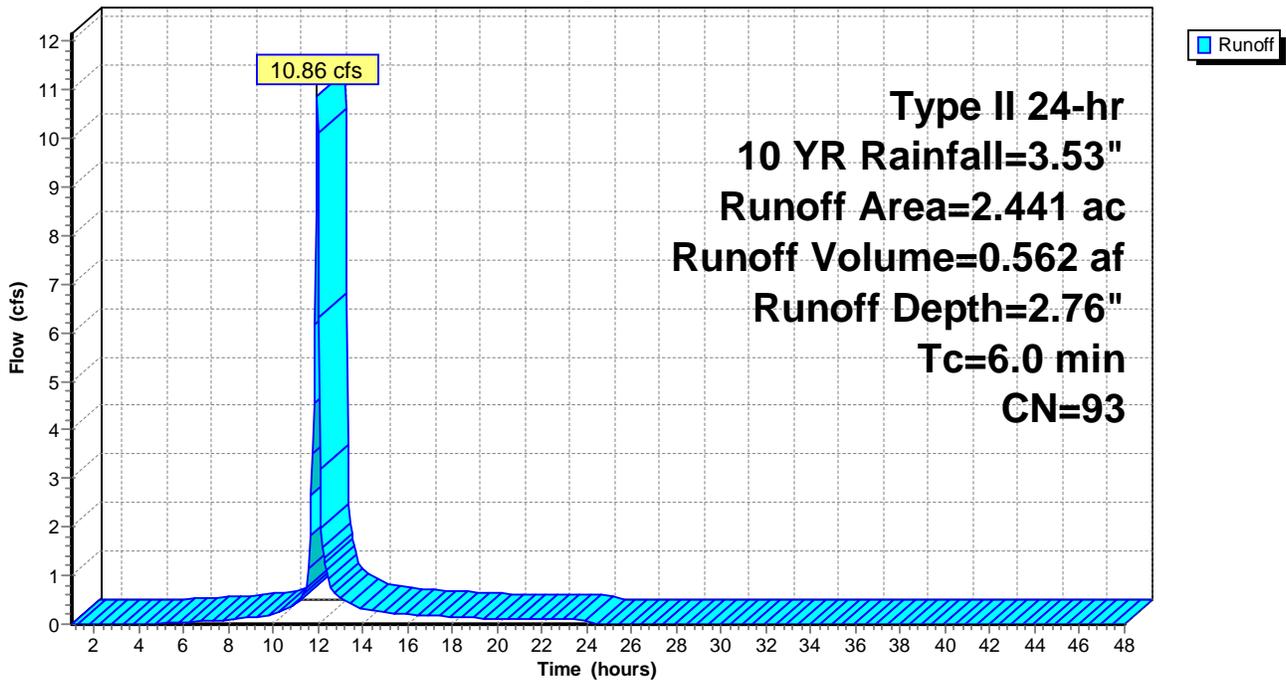
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.53"

Area (ac)	CN	Description
2.047	98	Paved parking, HSG B
0.394	69	50-75% Grass cover, Fair, HSG B
2.441	93	Weighted Average
0.394		16.14% Pervious Area
2.047		83.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Calculated Tc=4.9, 6 assumed

Subcatchment EX: DR-1 PRE

Hydrograph



Pre&Post-DR1

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Type II 24-hr 100 YR Rainfall=5.20"

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Summary for Subcatchment EX: DR-1 PRE

Runoff = 16.76 cfs @ 11.96 hrs, Volume= 0.894 af, Depth= 4.39"

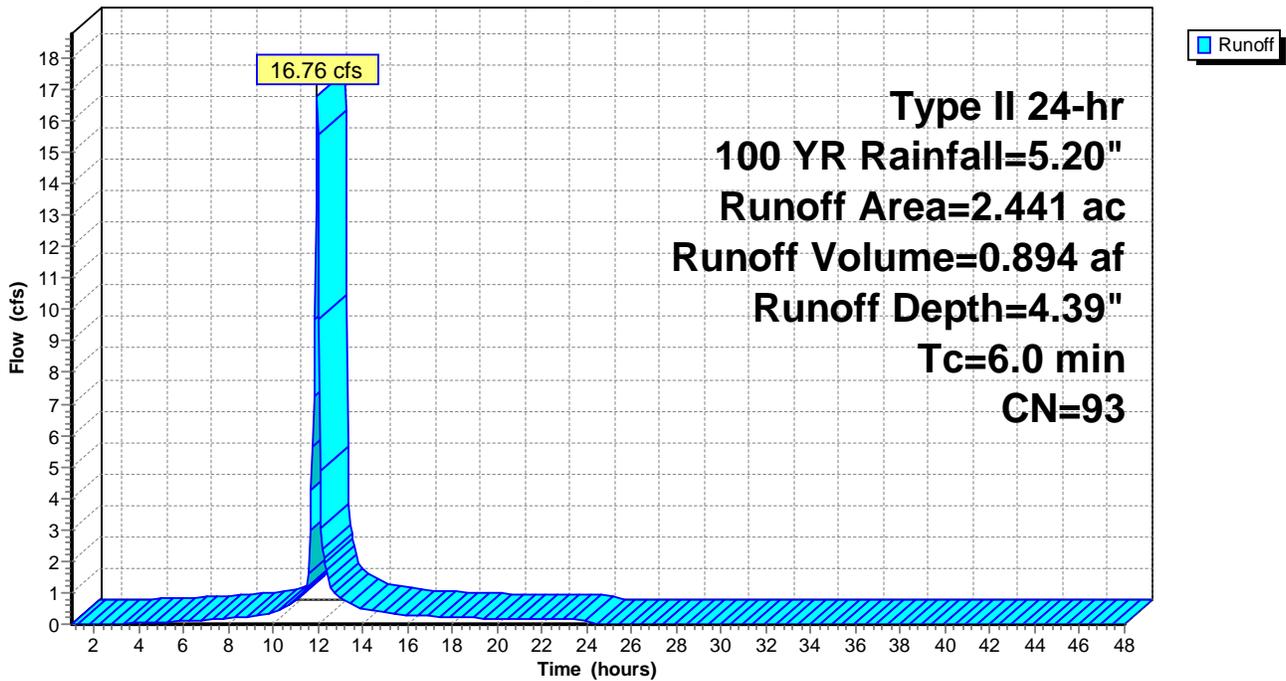
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=5.20"

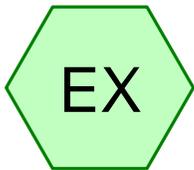
Area (ac)	CN	Description
2.047	98	Paved parking, HSG B
0.394	69	50-75% Grass cover, Fair, HSG B
2.441	93	Weighted Average
0.394		16.14% Pervious Area
2.047		83.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Calculated Tc=4.9, 6 assumed

Subcatchment EX: DR-1 PRE

Hydrograph

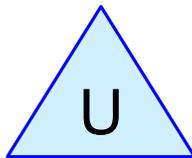




DR-2 PRE



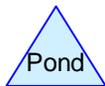
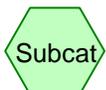
DR-2 POST



DR-2A POST

Underground Basin

POI-2



Routing Diagram for Pre&Post-DR1&2
Prepared by Bergmann Associates, Printed 7/13/2016
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Pre&Post-DR1&2

Prepared by Bergmann Associates

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.137	69	50-75% Grass cover, Fair, HSG B (EX)
0.946	61	>75% Grass cover, Good, HSG B (DR-2, DR-2A)
7.196	98	Paved parking, HSG B (DR-2, DR-2A, EX)
8.279	93	TOTAL AREA

Pre&Post-DR1&2

Prepared by Bergmann Associates

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	DR-2	0.00	0.00	415.0	0.0088	0.013	12.0	0.0	0.0
2	U	474.24	473.58	220.0	0.0030	0.013	24.0	0.0	0.0

Summary for Subcatchment DR-2: DR-2 POST

Runoff = 9.32 cfs @ 12.00 hrs, Volume= 0.495 af, Depth= 1.35"

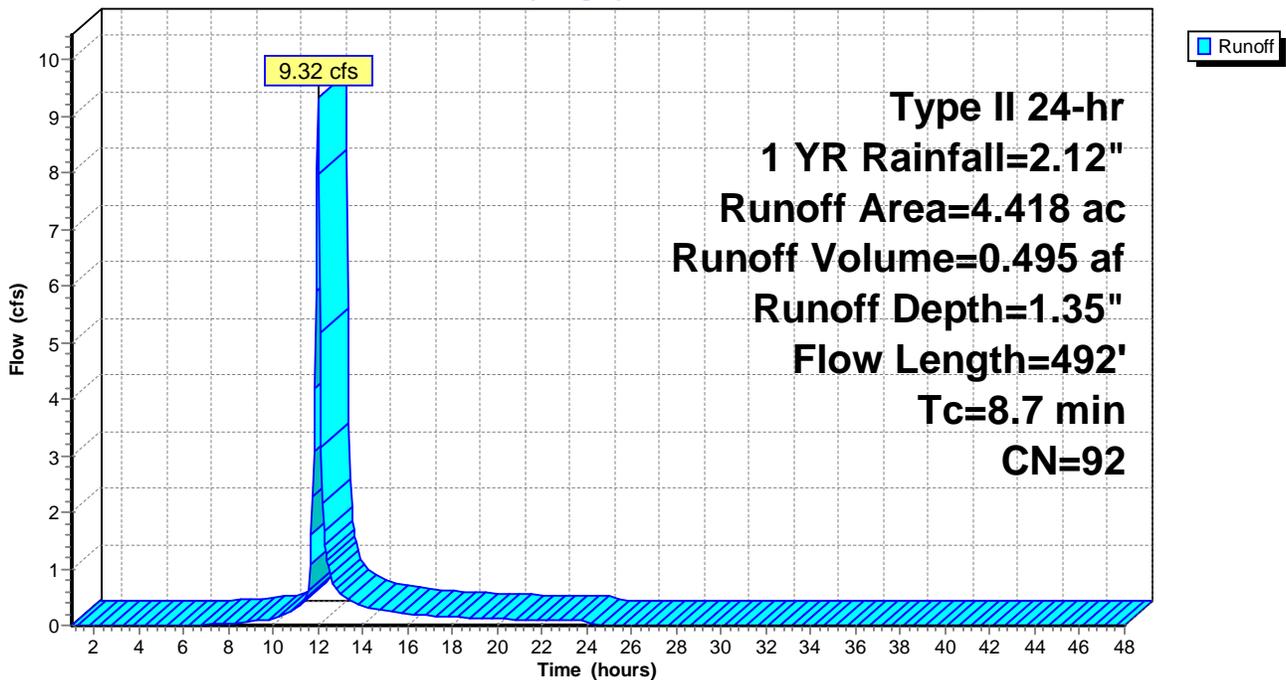
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
 Type II 24-hr 1 YR Rainfall=2.12"

Area (ac)	CN	Description
3.745	98	Paved parking, HSG B
0.673	61	>75% Grass cover, Good, HSG B
4.418	92	Weighted Average
0.673		15.23% Pervious Area
3.745		84.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	34	0.0261	0.09		Sheet Flow, Grass: Dense n= 0.240 P2= 2.31"
0.7	43	0.0220	1.03		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.31"
1.6	415	0.0088	4.26	3.34	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
8.7	492	Total			

Subcatchment DR-2: DR-2 POST

Hydrograph



Summary for Subcatchment DR-2A: DR-2A POST

Runoff = 5.90 cfs @ 11.97 hrs, Volume= 0.298 af, Depth= 1.51"

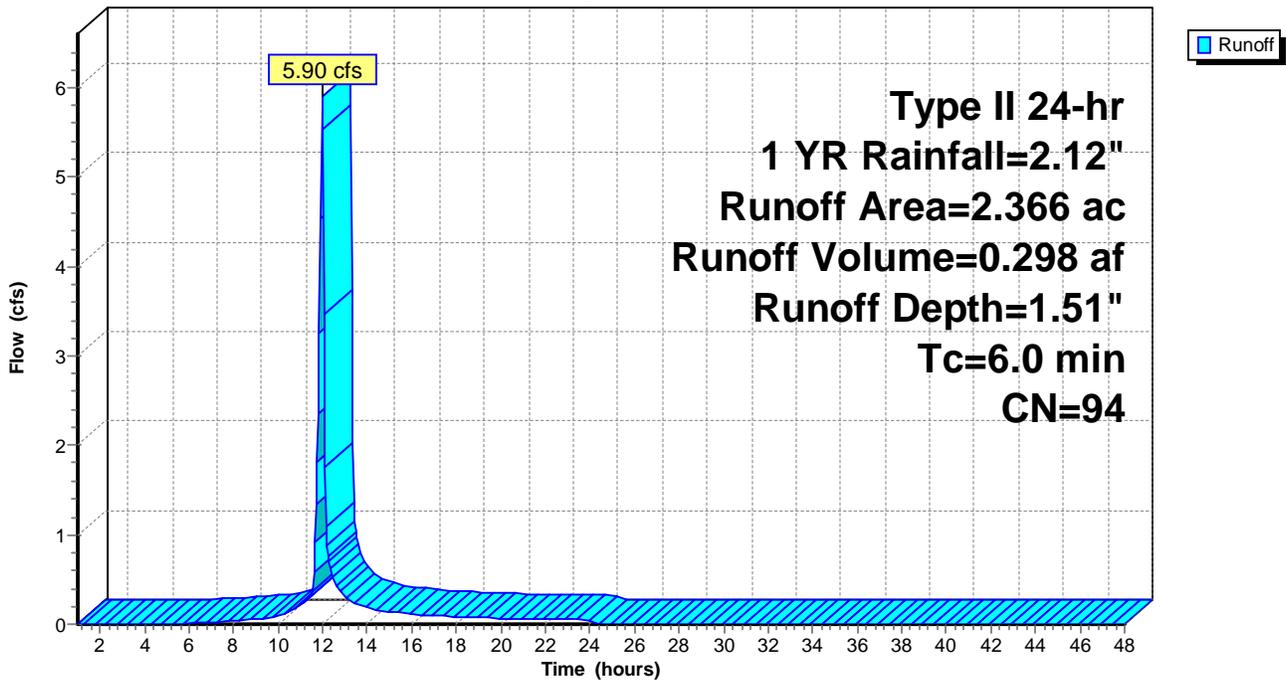
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
 Type II 24-hr 1 YR Rainfall=2.12"

Area (ac)	CN	Description
2.093	98	Paved parking, HSG B
0.273	61	>75% Grass cover, Good, HSG B
2.366	94	Weighted Average
0.273		11.54% Pervious Area
2.093		88.46% Impervious Area

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

Subcatchment DR-2A: DR-2A POST

Hydrograph



Summary for Subcatchment EX: DR-2 PRE

Runoff = 3.46 cfs @ 12.01 hrs, Volume= 0.199 af, Depth= 1.60"

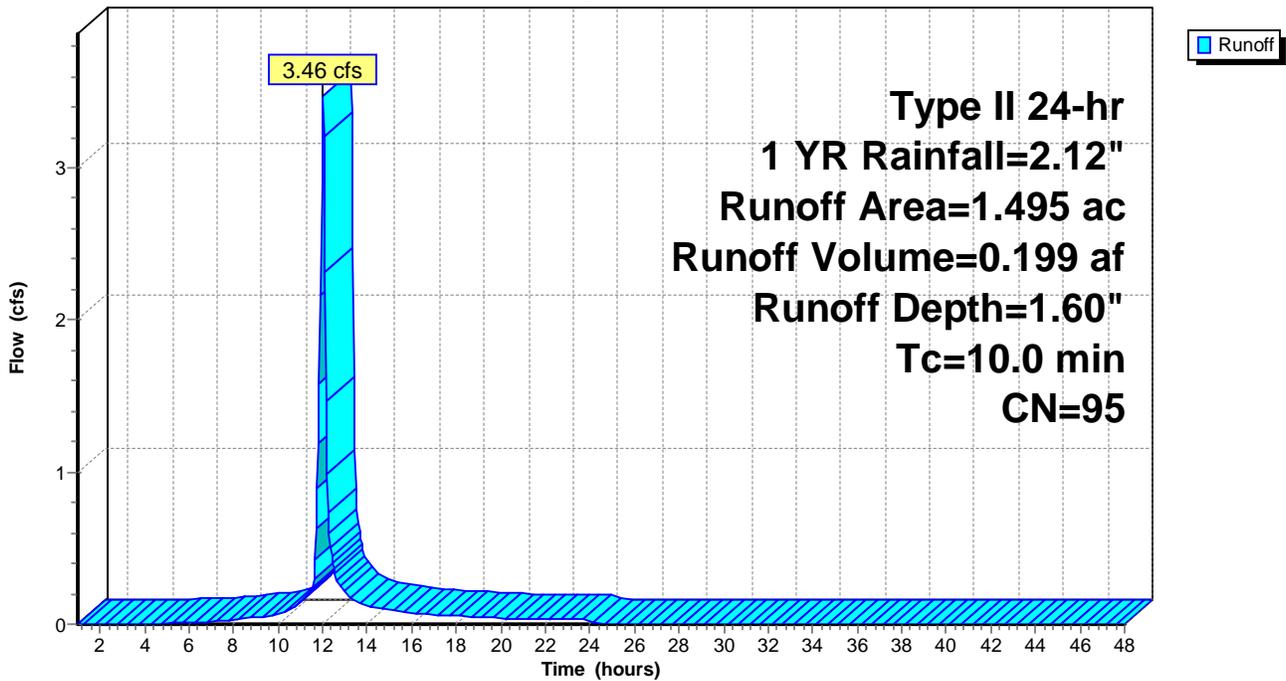
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
 Type II 24-hr 1 YR Rainfall=2.12"

Area (ac)	CN	Description
1.358	98	Paved parking, HSG B
0.137	69	50-75% Grass cover, Fair, HSG B
1.495	95	Weighted Average
0.137		9.16% Pervious Area
1.358		90.84% Impervious Area

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

Subcatchment EX: DR-2 PRE

Hydrograph



Summary for Pond U: Underground Basin

Inflow Area = 6.784 ac, 86.06% Impervious, Inflow Depth = 1.40" for 1 YR event
 Inflow = 15.03 cfs @ 11.99 hrs, Volume= 0.793 af
 Outflow = 3.41 cfs @ 12.19 hrs, Volume= 0.790 af, Atten= 77%, Lag= 12.1 min
 Primary = 3.41 cfs @ 12.19 hrs, Volume= 0.790 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 475.77' @ 12.19 hrs Surf.Area= 0.301 ac Storage= 0.292 af

Plug-Flow detention time= 67.4 min calculated for 0.790 af (100% of inflow)
 Center-of-Mass det. time= 65.5 min (873.0 - 807.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	474.24'	0.415 af	108.75'W x 120.42'L x 5.50'H Field A 1.653 af Overall - 0.616 af Embedded = 1.037 af x 40.0% Voids
#2A	474.99'	0.616 af	ADS_StormTech MC-3500 d +Cap x 240 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 15 Rows of 16 Chambers Cap Storage= +14.9 cf x 2 x 15 rows = 447.0 cf
		1.031 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	474.24'	24.0" Round Culvert L= 220.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 474.24' / 473.58' S= 0.0030 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	474.24'	15.0" W x 6.0" H Vert. 1-YR C= 0.600
#3	Device 1	475.75'	6.0" W x 6.0" H Vert. 50-YR C= 0.600

Primary OutFlow Max=3.41 cfs @ 12.19 hrs HW=475.77' TW=0.00' (Dynamic Tailwater)

- ↑ **1=Culvert** (Passes 3.41 cfs of 7.70 cfs potential flow)
- ↑ **2=1-YR** (Orifice Controls 3.40 cfs @ 5.45 fps)
- ↑ **3=50-YR** (Orifice Controls 0.01 cfs @ 0.49 fps)

Pond U: Underground Basin - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap storage)

Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf

Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap

Cap Storage= +14.9 cf x 2 x 15 rows = 447.0 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

16 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 118.42' Row Length +12.0" End Stone x 2 = 120.42' Base Length

15 Rows x 77.0" Wide + 9.0" Spacing x 14 + 12.0" Side Stone x 2 = 108.75' Base Width

9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

240 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 15 Rows = 26,835.5 cf Chamber Storage

72,026.2 cf Field - 26,835.5 cf Chambers = 45,190.7 cf Stone x 40.0% Voids = 18,076.3 cf Stone Storage

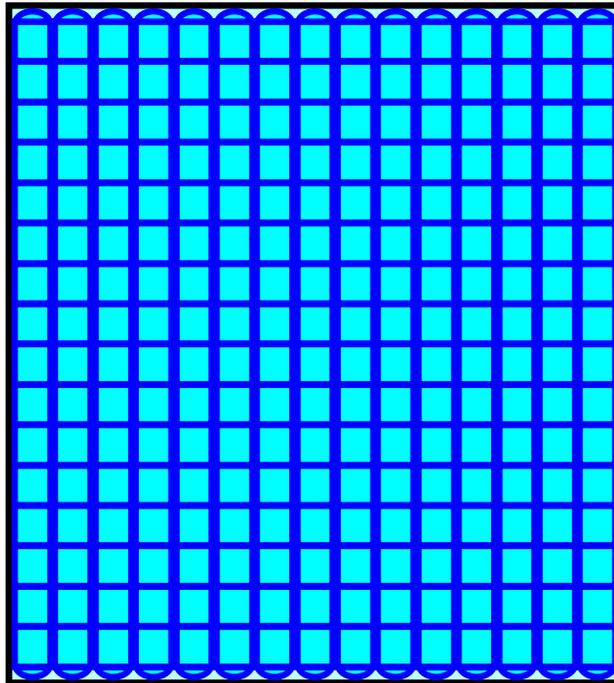
Chamber Storage + Stone Storage = 44,911.8 cf = 1.031 af

Overall Storage Efficiency = 62.4%

240 Chambers

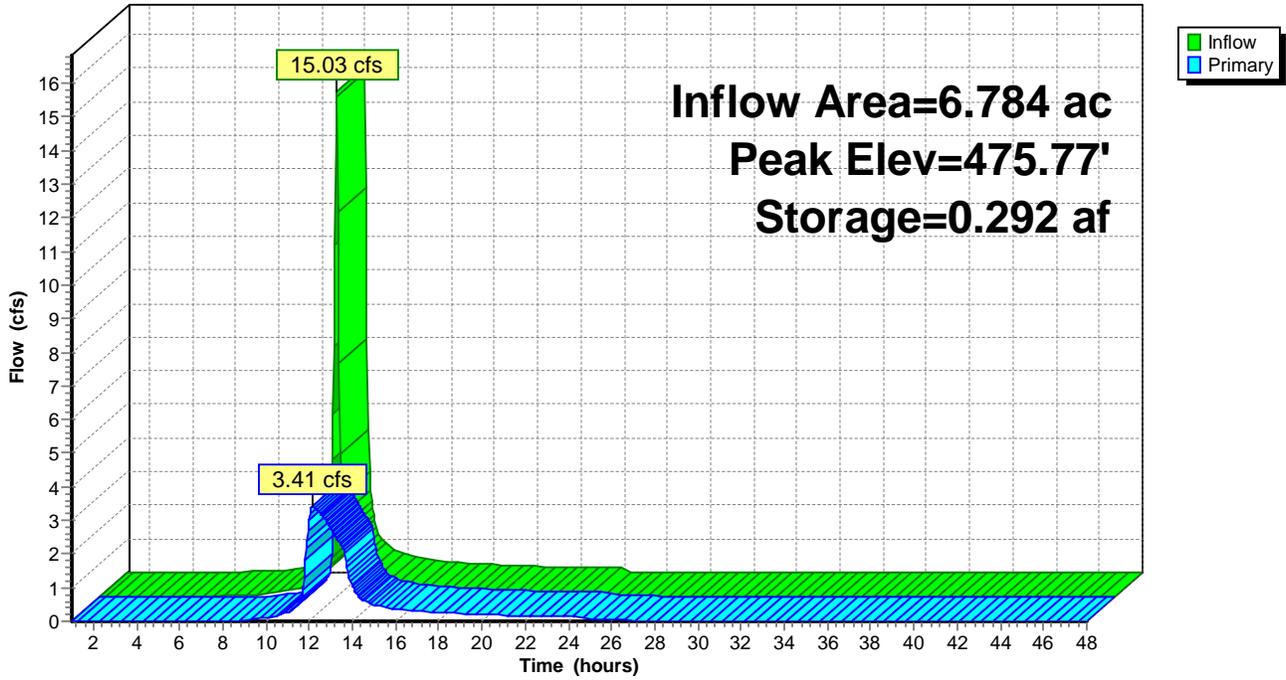
2,667.6 cy Field

1,673.7 cy Stone



Pond U: Underground Basin

Hydrograph



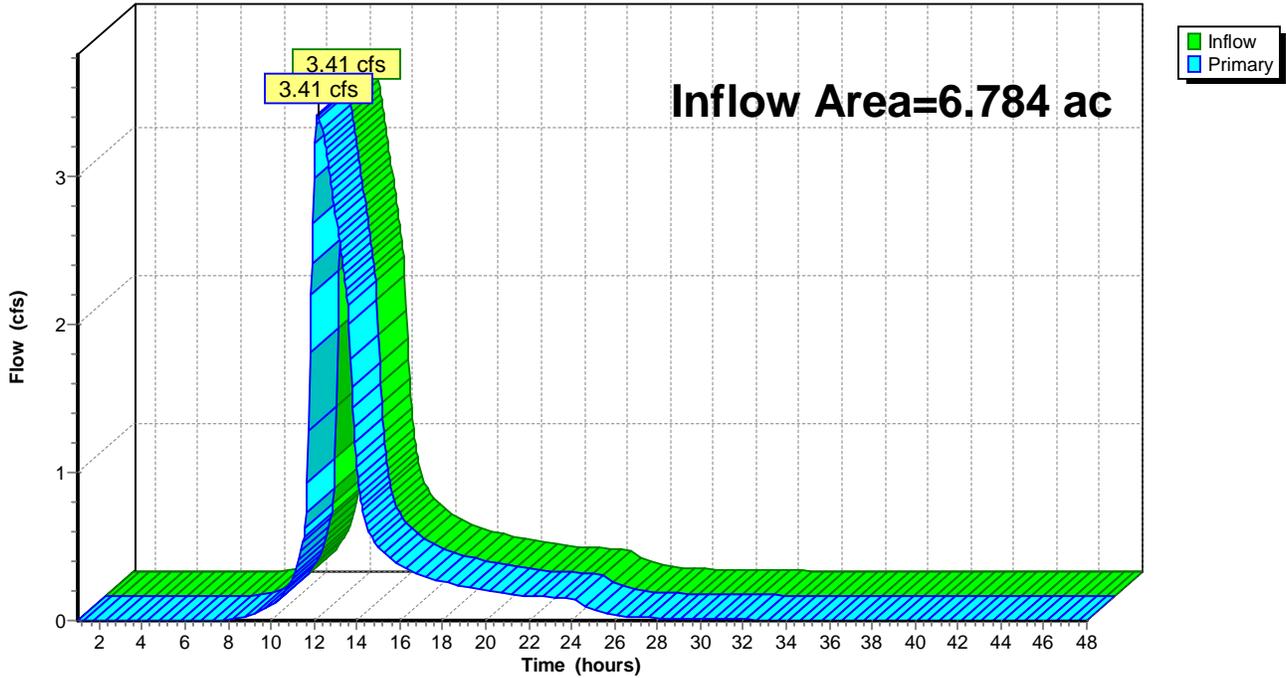
Summary for Link 2L: POI-2

Inflow Area = 6.784 ac, 86.06% Impervious, Inflow Depth > 1.40" for 1 YR event
Inflow = 3.41 cfs @ 12.19 hrs, Volume= 0.790 af
Primary = 3.41 cfs @ 12.19 hrs, Volume= 0.790 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs

Link 2L: POI-2

Hydrograph



Summary for Subcatchment DR-2: DR-2 POST

Runoff = 17.85 cfs @ 12.00 hrs, Volume= 0.981 af, Depth= 2.67"

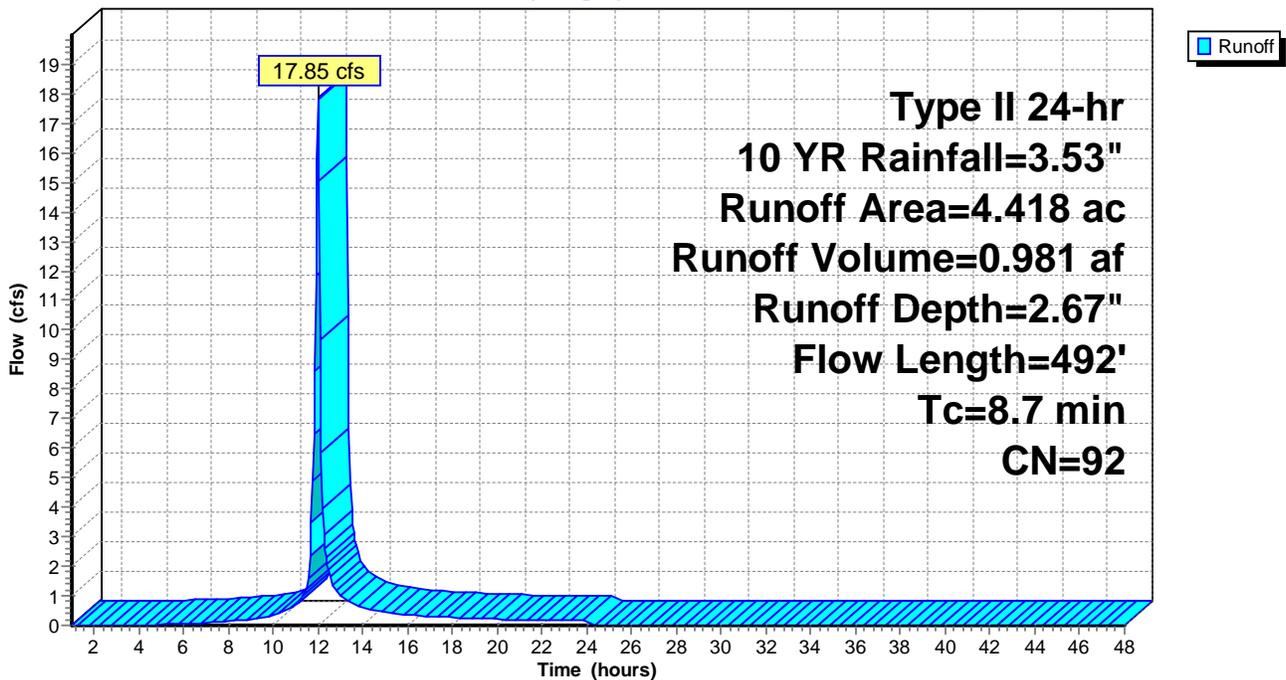
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
 Type II 24-hr 10 YR Rainfall=3.53"

Area (ac)	CN	Description
3.745	98	Paved parking, HSG B
0.673	61	>75% Grass cover, Good, HSG B
4.418	92	Weighted Average
0.673		15.23% Pervious Area
3.745		84.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	34	0.0261	0.09		Sheet Flow, Grass: Dense n= 0.240 P2= 2.31"
0.7	43	0.0220	1.03		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.31"
1.6	415	0.0088	4.26	3.34	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
8.7	492	Total			

Subcatchment DR-2: DR-2 POST

Hydrograph



Summary for Subcatchment DR-2A: DR-2A POST

Runoff = 10.77 cfs @ 11.96 hrs, Volume= 0.565 af, Depth= 2.86"

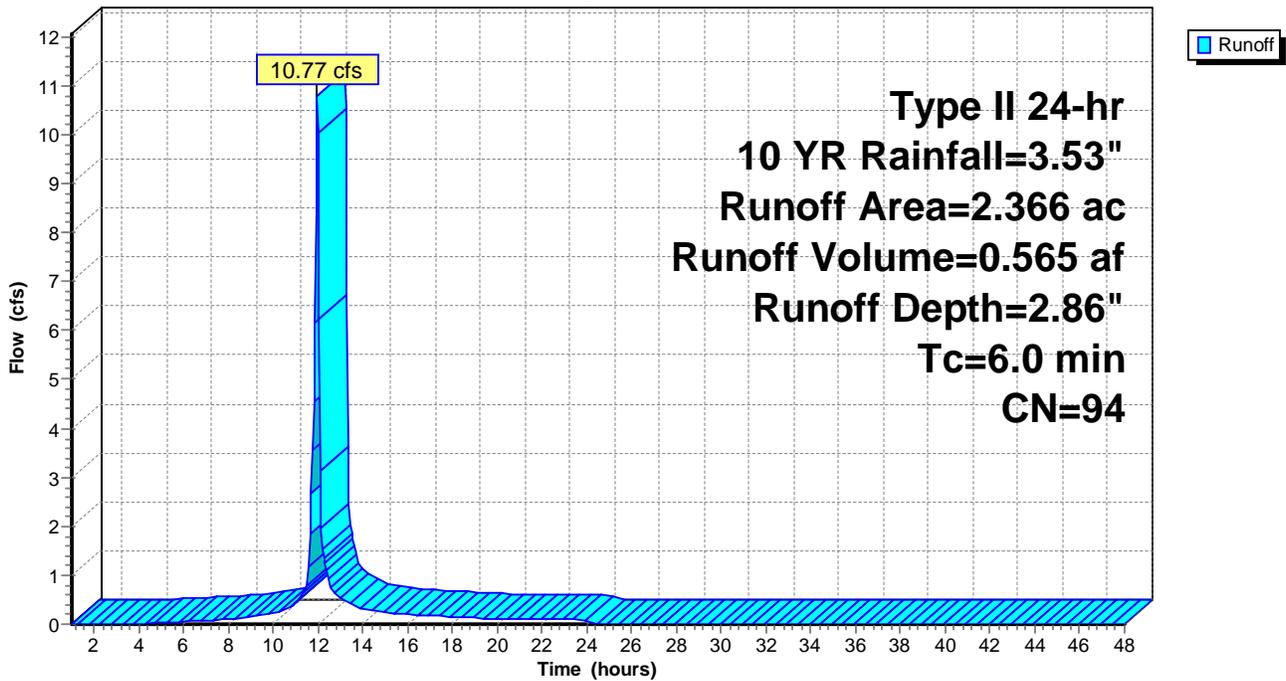
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
 Type II 24-hr 10 YR Rainfall=3.53"

Area (ac)	CN	Description
2.093	98	Paved parking, HSG B
0.273	61	>75% Grass cover, Good, HSG B
2.366	94	Weighted Average
0.273		11.54% Pervious Area
2.093		88.46% Impervious Area

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

Subcatchment DR-2A: DR-2A POST

Hydrograph



Summary for Subcatchment EX: DR-2 PRE

Runoff = 6.20 cfs @ 12.01 hrs, Volume= 0.370 af, Depth= 2.97"

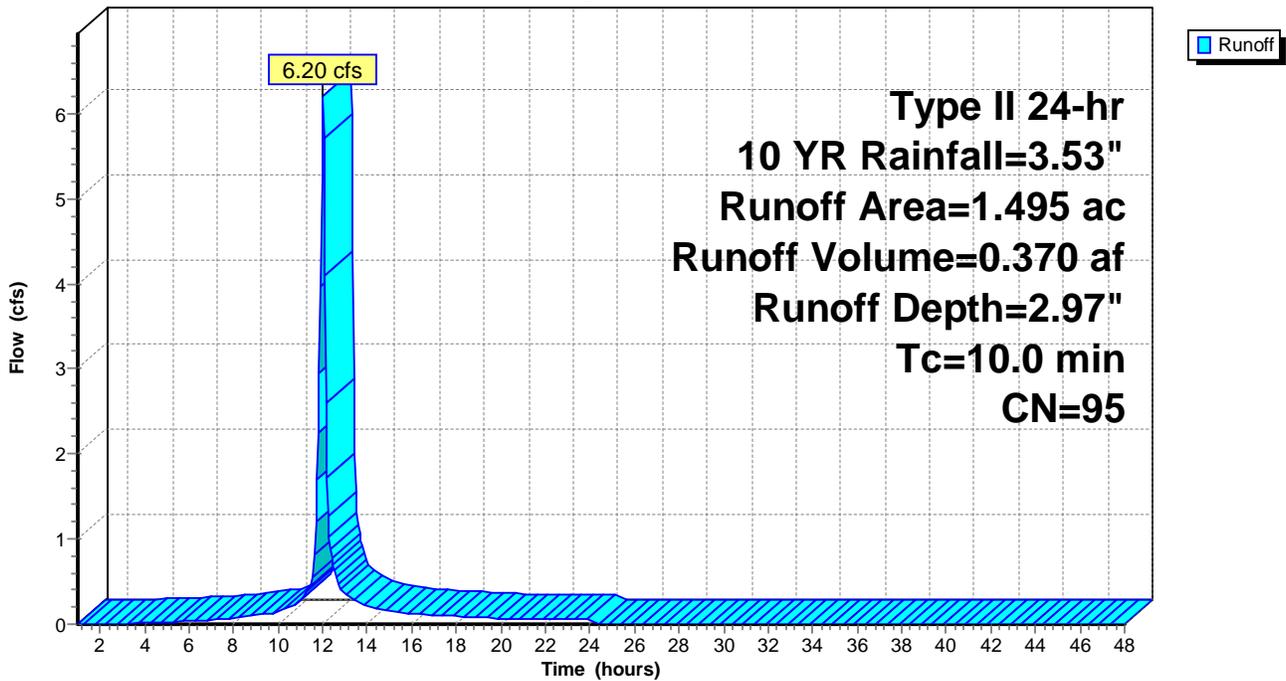
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
 Type II 24-hr 10 YR Rainfall=3.53"

Area (ac)	CN	Description
1.358	98	Paved parking, HSG B
0.137	69	50-75% Grass cover, Fair, HSG B
1.495	95	Weighted Average
0.137		9.16% Pervious Area
1.358		90.84% Impervious Area

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

Subcatchment EX: DR-2 PRE

Hydrograph



Summary for Pond U: Underground Basin

Inflow Area = 6.784 ac, 86.06% Impervious, Inflow Depth = 2.74" for 10 YR event
 Inflow = 28.27 cfs @ 11.98 hrs, Volume= 1.546 af
 Outflow = 5.90 cfs @ 12.20 hrs, Volume= 1.544 af, Atten= 79%, Lag= 12.8 min
 Primary = 5.90 cfs @ 12.20 hrs, Volume= 1.544 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 476.96' @ 12.20 hrs Surf.Area= 0.301 ac Storage= 0.580 af

Plug-Flow detention time= 64.6 min calculated for 1.544 af (100% of inflow)
 Center-of-Mass det. time= 63.6 min (852.4 - 788.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	474.24'	0.415 af	108.75'W x 120.42'L x 5.50'H Field A 1.653 af Overall - 0.616 af Embedded = 1.037 af x 40.0% Voids
#2A	474.99'	0.616 af	ADS_StormTech MC-3500 d +Cap x 240 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 15 Rows of 16 Chambers Cap Storage= +14.9 cf x 2 x 15 rows = 447.0 cf
		1.031 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	474.24'	24.0" Round Culvert L= 220.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 474.24' / 473.58' S= 0.0030 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	474.24'	15.0" W x 6.0" H Vert. 1-YR C= 0.600
#3	Device 1	475.75'	6.0" W x 6.0" H Vert. 50-YR C= 0.600

Primary OutFlow Max=5.90 cfs @ 12.20 hrs HW=476.96' TW=0.00' (Dynamic Tailwater)

- ↑ **1=Culvert** (Passes 5.90 cfs of 14.36 cfs potential flow)
- ↑ **2=1-YR** (Orifice Controls 4.72 cfs @ 7.56 fps)
- ↑ **3=50-YR** (Orifice Controls 1.17 cfs @ 4.70 fps)

Pond U: Underground Basin - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap storage)

Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf

Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap

Cap Storage= +14.9 cf x 2 x 15 rows = 447.0 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

16 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 118.42' Row Length +12.0" End Stone x 2 = 120.42' Base Length

15 Rows x 77.0" Wide + 9.0" Spacing x 14 + 12.0" Side Stone x 2 = 108.75' Base Width

9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

240 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 15 Rows = 26,835.5 cf Chamber Storage

72,026.2 cf Field - 26,835.5 cf Chambers = 45,190.7 cf Stone x 40.0% Voids = 18,076.3 cf Stone Storage

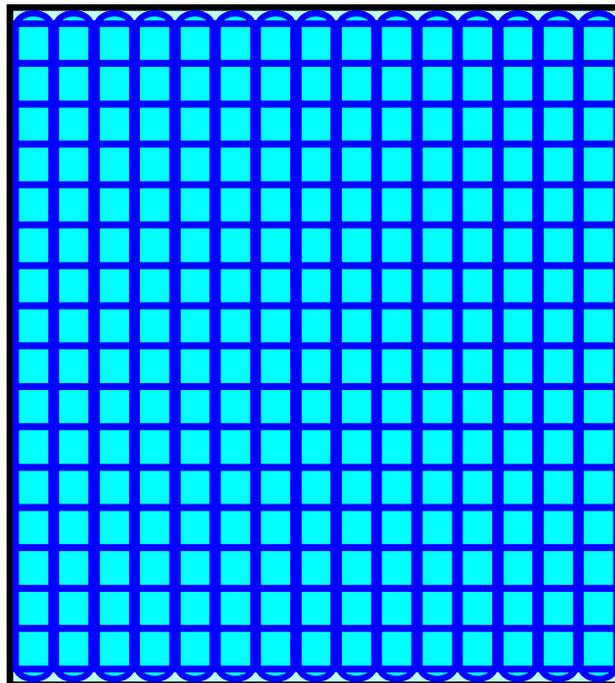
Chamber Storage + Stone Storage = 44,911.8 cf = 1.031 af

Overall Storage Efficiency = 62.4%

240 Chambers

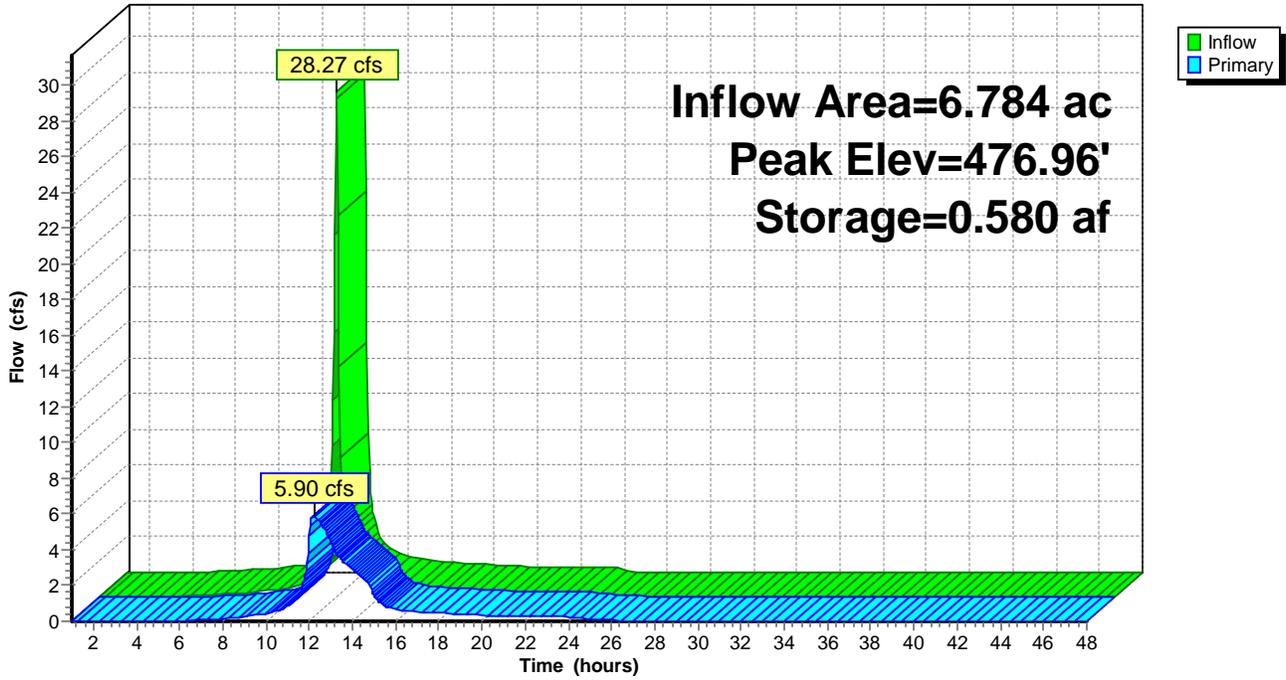
2,667.6 cy Field

1,673.7 cy Stone



Pond U: Underground Basin

Hydrograph



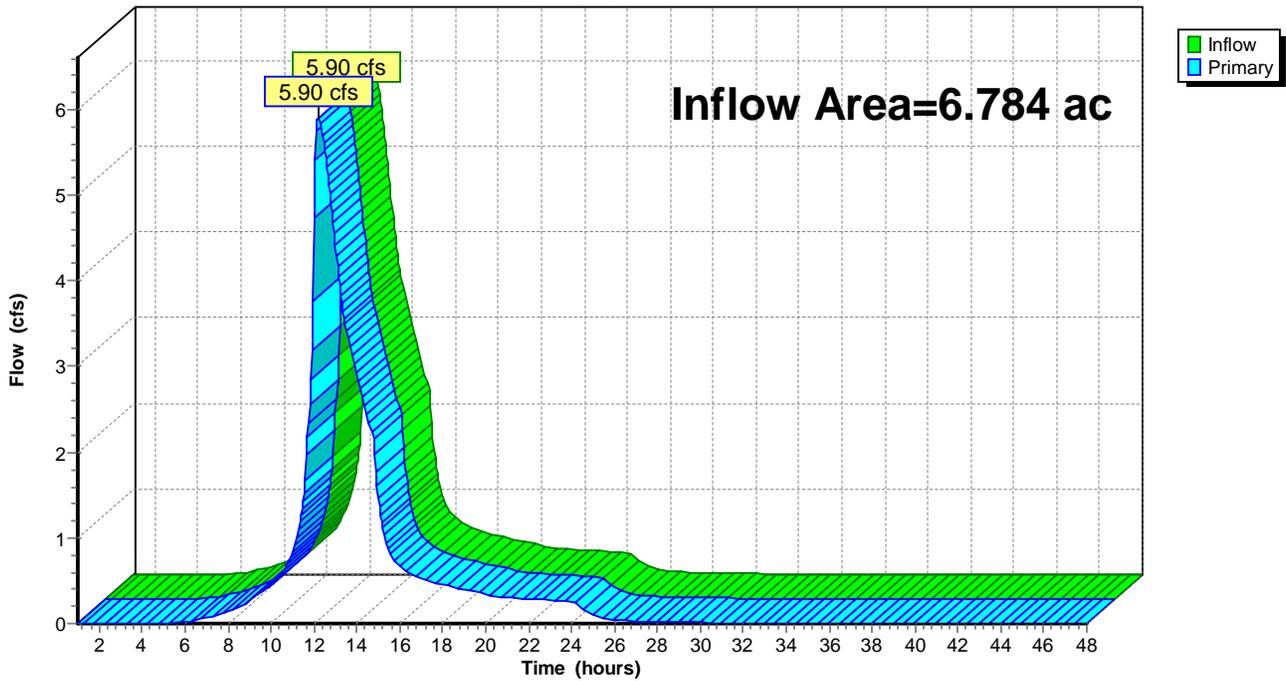
Summary for Link 2L: POI-2

Inflow Area = 6.784 ac, 86.06% Impervious, Inflow Depth > 2.73" for 10 YR event
Inflow = 5.90 cfs @ 12.20 hrs, Volume= 1.544 af
Primary = 5.90 cfs @ 12.20 hrs, Volume= 1.544 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs

Link 2L: POI-2

Hydrograph



Summary for Subcatchment DR-2: DR-2 POST

Runoff = 29.65 cfs @ 11.99 hrs, Volume= 1.686 af, Depth= 4.58"

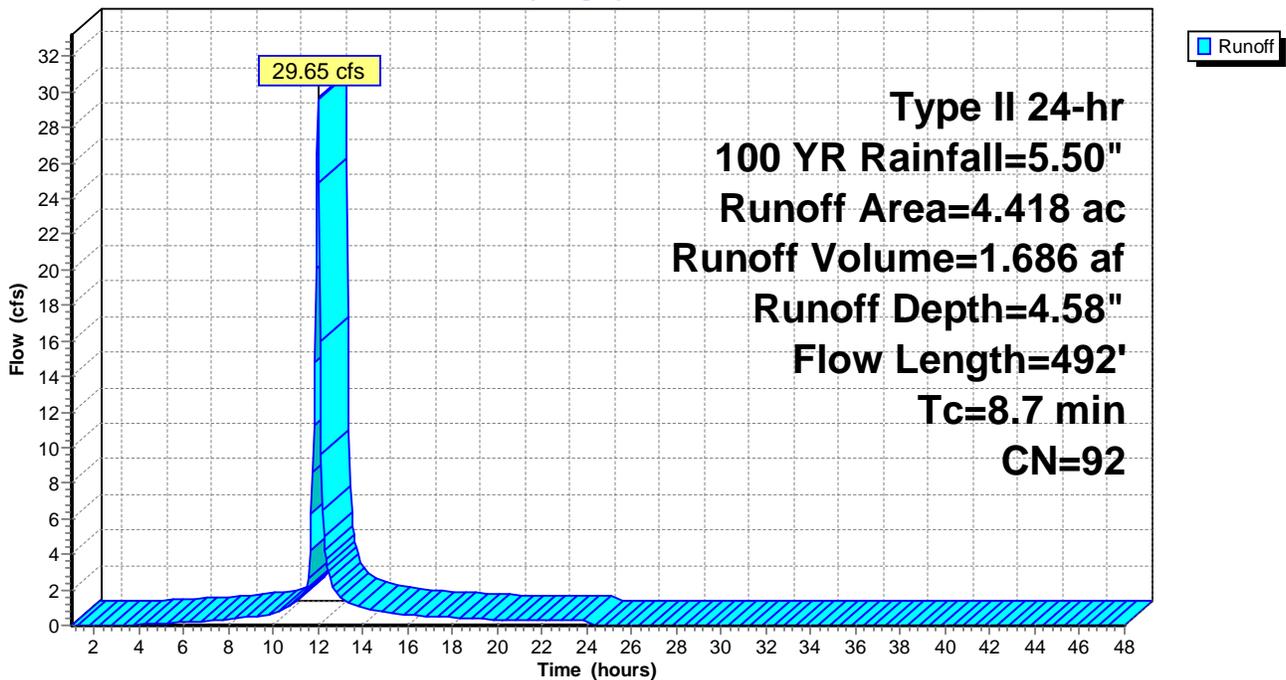
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
 Type II 24-hr 100 YR Rainfall=5.50"

Area (ac)	CN	Description
3.745	98	Paved parking, HSG B
0.673	61	>75% Grass cover, Good, HSG B
4.418	92	Weighted Average
0.673		15.23% Pervious Area
3.745		84.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	34	0.0261	0.09		Sheet Flow, Grass: Dense n= 0.240 P2= 2.31"
0.7	43	0.0220	1.03		Sheet Flow, Smooth surfaces n= 0.011 P2= 2.31"
1.6	415	0.0088	4.26	3.34	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
8.7	492	Total			

Subcatchment DR-2: DR-2 POST

Hydrograph



Summary for Subcatchment DR-2A: DR-2A POST

Runoff = 17.46 cfs @ 11.96 hrs, Volume= 0.947 af, Depth= 4.80"

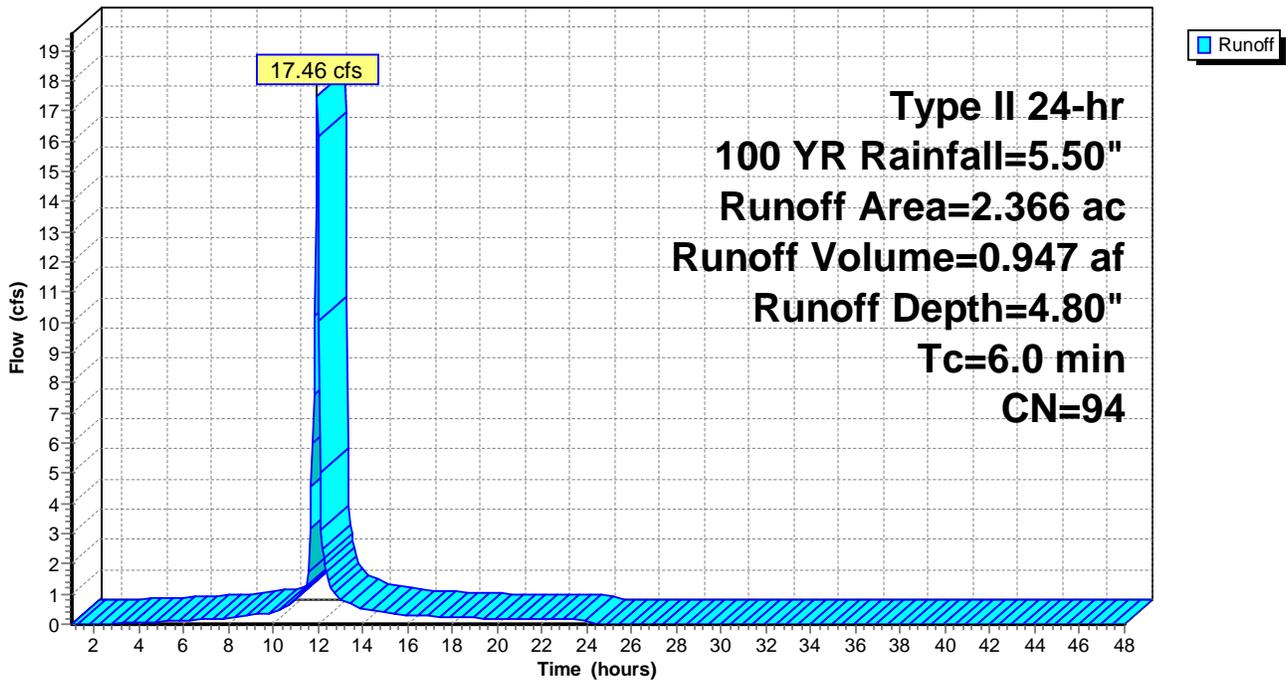
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
 Type II 24-hr 100 YR Rainfall=5.50"

Area (ac)	CN	Description
2.093	98	Paved parking, HSG B
0.273	61	>75% Grass cover, Good, HSG B
2.366	94	Weighted Average
0.273		11.54% Pervious Area
2.093		88.46% Impervious Area

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

Subcatchment DR-2A: DR-2A POST

Hydrograph



Summary for Subcatchment EX: DR-2 PRE

Runoff = 9.96 cfs @ 12.01 hrs, Volume= 0.612 af, Depth= 4.92"

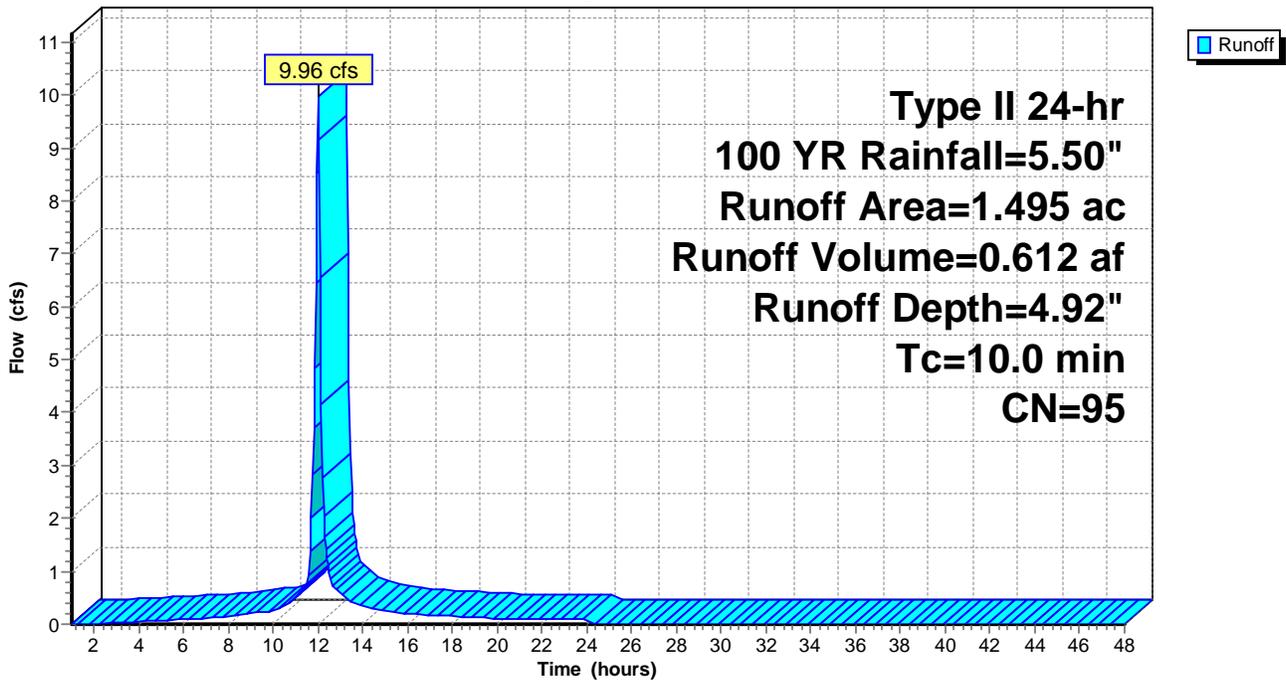
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
 Type II 24-hr 100 YR Rainfall=5.50"

Area (ac)	CN	Description
1.358	98	Paved parking, HSG B
0.137	69	50-75% Grass cover, Fair, HSG B
1.495	95	Weighted Average
0.137		9.16% Pervious Area
1.358		90.84% Impervious Area

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

Subcatchment EX: DR-2 PRE

Hydrograph



Summary for Pond U: Underground Basin

Inflow Area = 6.784 ac, 86.06% Impervious, Inflow Depth = 4.66" for 100 YR event
 Inflow = 46.55 cfs @ 11.98 hrs, Volume= 2.632 af
 Outflow = 8.96 cfs @ 12.21 hrs, Volume= 2.630 af, Atten= 81%, Lag= 13.6 min
 Primary = 8.96 cfs @ 12.21 hrs, Volume= 2.630 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 479.47' @ 12.21 hrs Surf.Area= 0.301 ac Storage= 0.999 af

Plug-Flow detention time= 64.9 min calculated for 2.627 af (100% of inflow)
 Center-of-Mass det. time= 65.1 min (839.8 - 774.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	474.24'	0.415 af	108.75'W x 120.42'L x 5.50'H Field A 1.653 af Overall - 0.616 af Embedded = 1.037 af x 40.0% Voids
#2A	474.99'	0.616 af	ADS_StormTech MC-3500 d +Cap x 240 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 15 Rows of 16 Chambers Cap Storage= +14.9 cf x 2 x 15 rows = 447.0 cf
		1.031 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	474.24'	24.0" Round Culvert L= 220.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 474.24' / 473.58' S= 0.0030 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	474.24'	15.0" W x 6.0" H Vert. 1-YR C= 0.600
#3	Device 1	475.75'	6.0" W x 6.0" H Vert. 50-YR C= 0.600

Primary OutFlow Max=8.95 cfs @ 12.21 hrs HW=479.46' TW=0.00' (Dynamic Tailwater)

- ↑ **1=Culvert** (Passes 8.95 cfs of 24.12 cfs potential flow)
- ↑ **2=1-YR** (Orifice Controls 6.71 cfs @ 10.74 fps)
- ↑ **3=50-YR** (Orifice Controls 2.24 cfs @ 8.96 fps)

Pond U: Underground Basin - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap storage)

Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf

Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap

Cap Storage= +14.9 cf x 2 x 15 rows = 447.0 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

16 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 118.42' Row Length +12.0" End Stone x 2 = 120.42' Base Length

15 Rows x 77.0" Wide + 9.0" Spacing x 14 + 12.0" Side Stone x 2 = 108.75' Base Width

9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

240 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 15 Rows = 26,835.5 cf Chamber Storage

72,026.2 cf Field - 26,835.5 cf Chambers = 45,190.7 cf Stone x 40.0% Voids = 18,076.3 cf Stone Storage

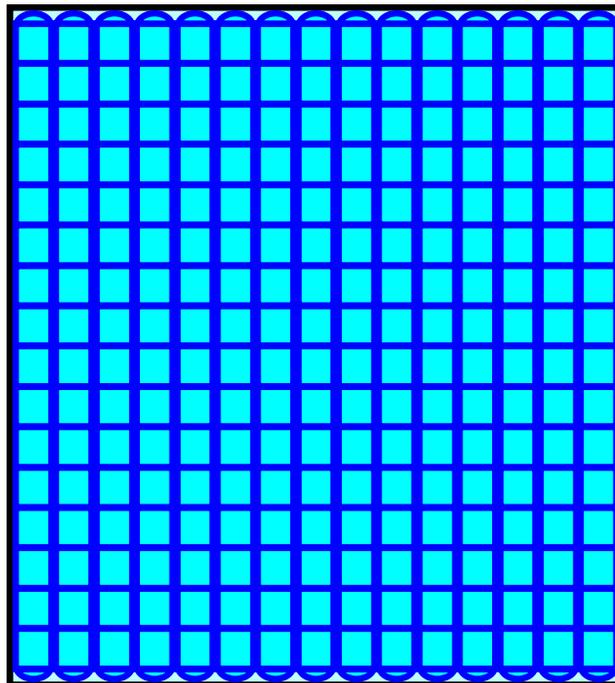
Chamber Storage + Stone Storage = 44,911.8 cf = 1.031 af

Overall Storage Efficiency = 62.4%

240 Chambers

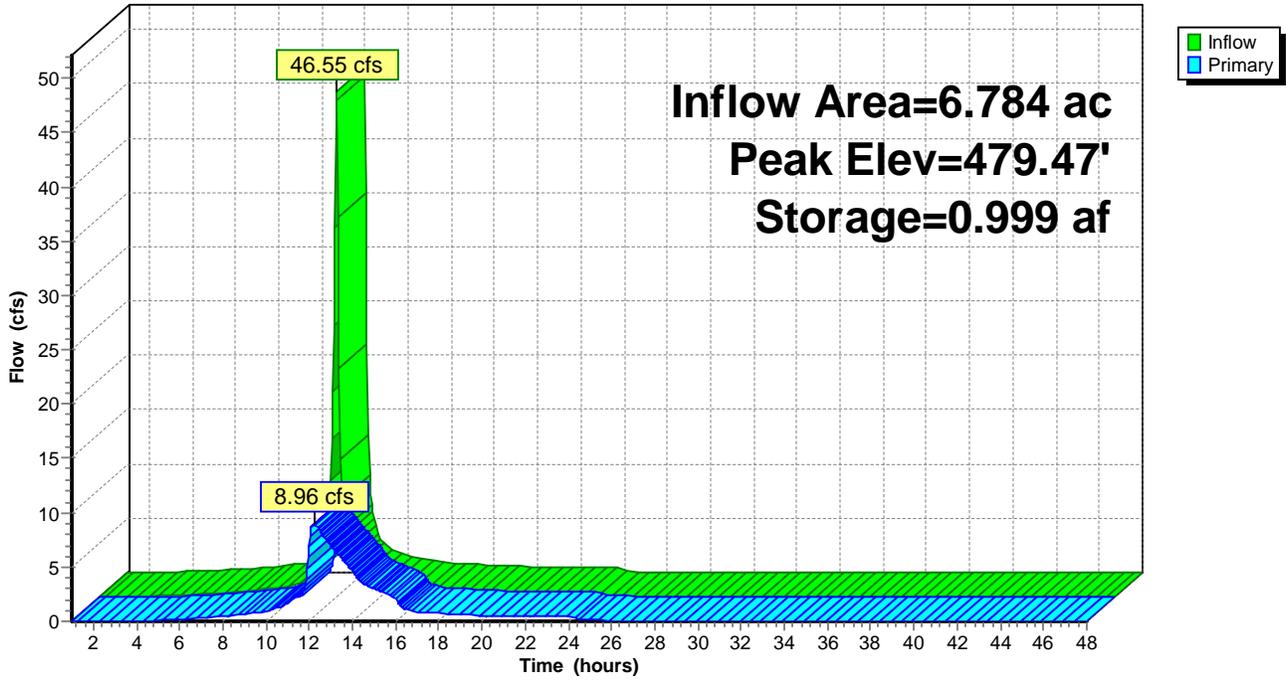
2,667.6 cy Field

1,673.7 cy Stone



Pond U: Underground Basin

Hydrograph



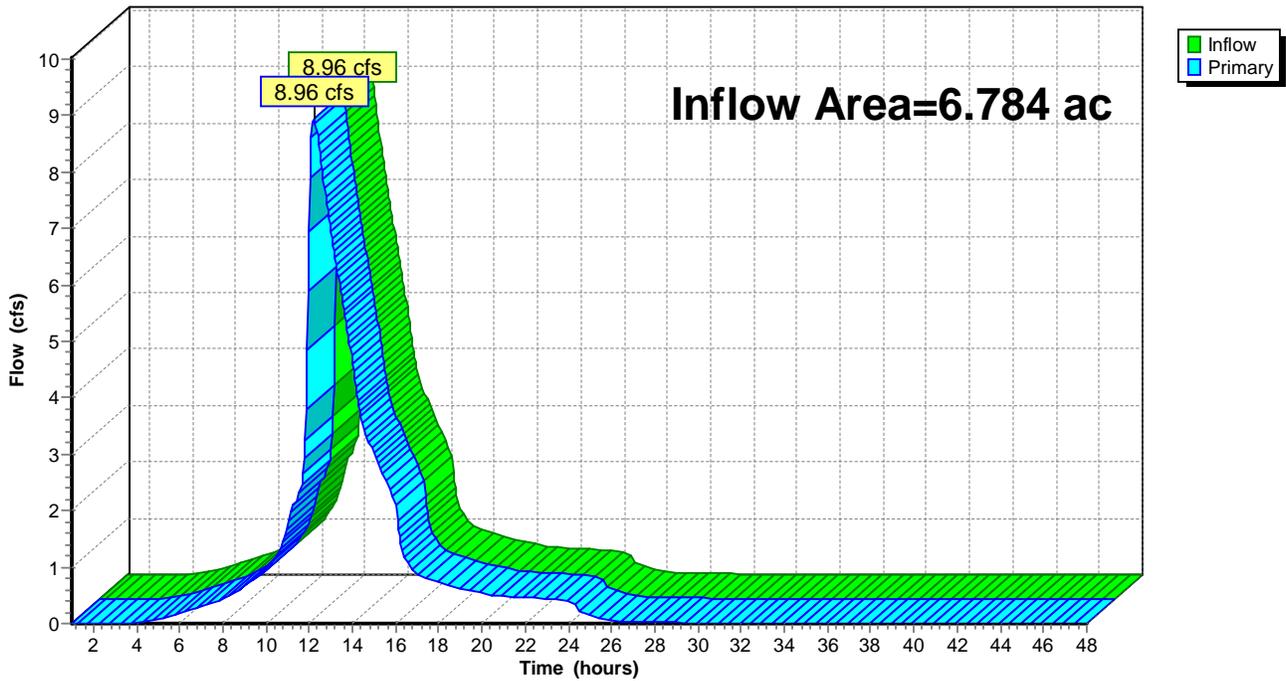
Summary for Link 2L: POI-2

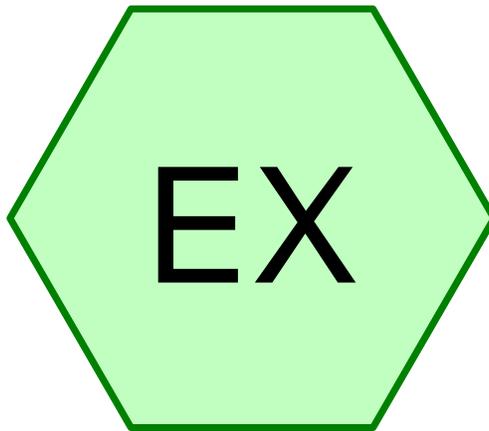
Inflow Area = 6.784 ac, 86.06% Impervious, Inflow Depth > 4.65" for 100 YR event
Inflow = 8.96 cfs @ 12.21 hrs, Volume= 2.630 af
Primary = 8.96 cfs @ 12.21 hrs, Volume= 2.630 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs

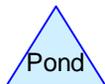
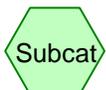
Link 2L: POI-2

Hydrograph





DR-3 PRE



Pre&Post-DR3

Prepared by Bergmann Associates

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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.178	69	50-75% Grass cover, Fair, HSG B (EX)
0.836	98	Paved parking, HSG B (EX)
1.014	93	TOTAL AREA

Pre&Post-DR3

Prepared by Bergmann Associates

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Type II 24-hr 1 YR Rainfall=2.12"

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Page 3

Summary for Subcatchment EX: DR-3 PRE

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 2.52 cfs @ 11.95 hrs, Volume= 0.120 af, Depth= 1.42"

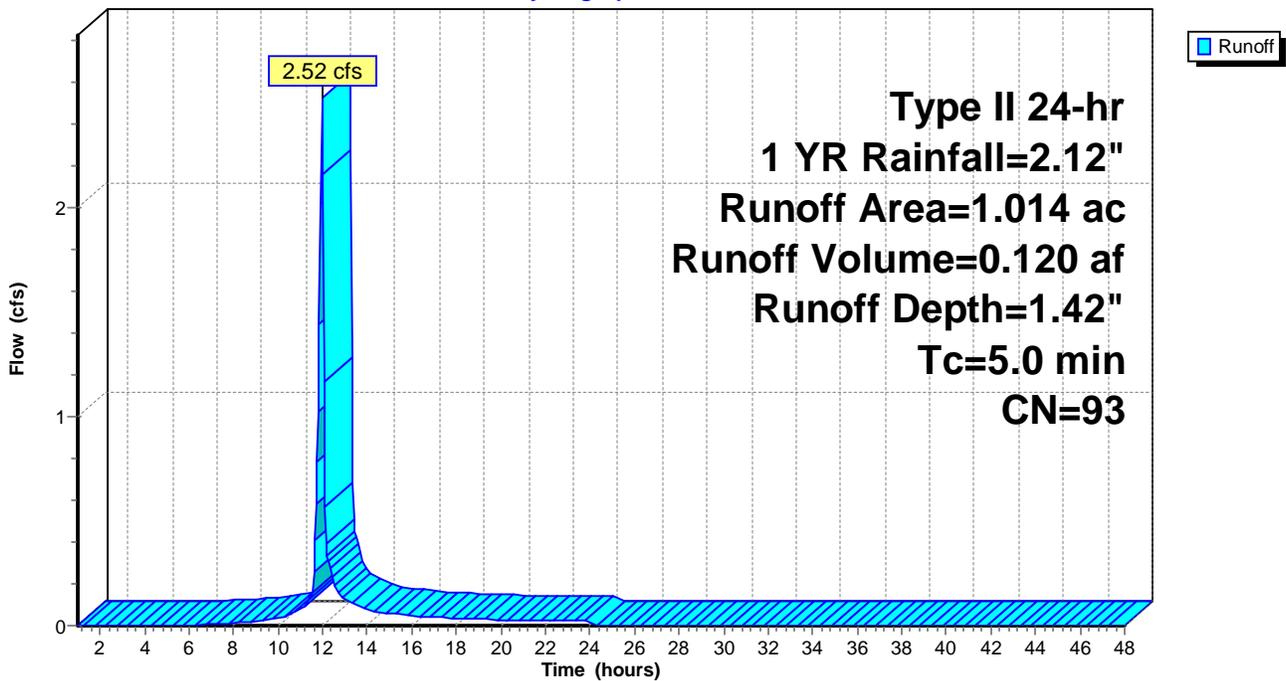
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt= 0.05$ hrs
Type II 24-hr 1 YR Rainfall=2.12"

Area (ac)	CN	Description
0.836	98	Paved parking, HSG B
0.178	69	50-75% Grass cover, Fair, HSG B
1.014	93	Weighted Average
0.178		17.55% Pervious Area
0.836		82.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 10

Subcatchment EX: DR-3 PRE

Hydrograph



Pre&Post-DR3

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Type II 24-hr 10 YR Rainfall=3.53"

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Page 4

Summary for Subcatchment EX: DR-3 PRE

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 4.70 cfs @ 11.95 hrs, Volume= 0.234 af, Depth= 2.76"

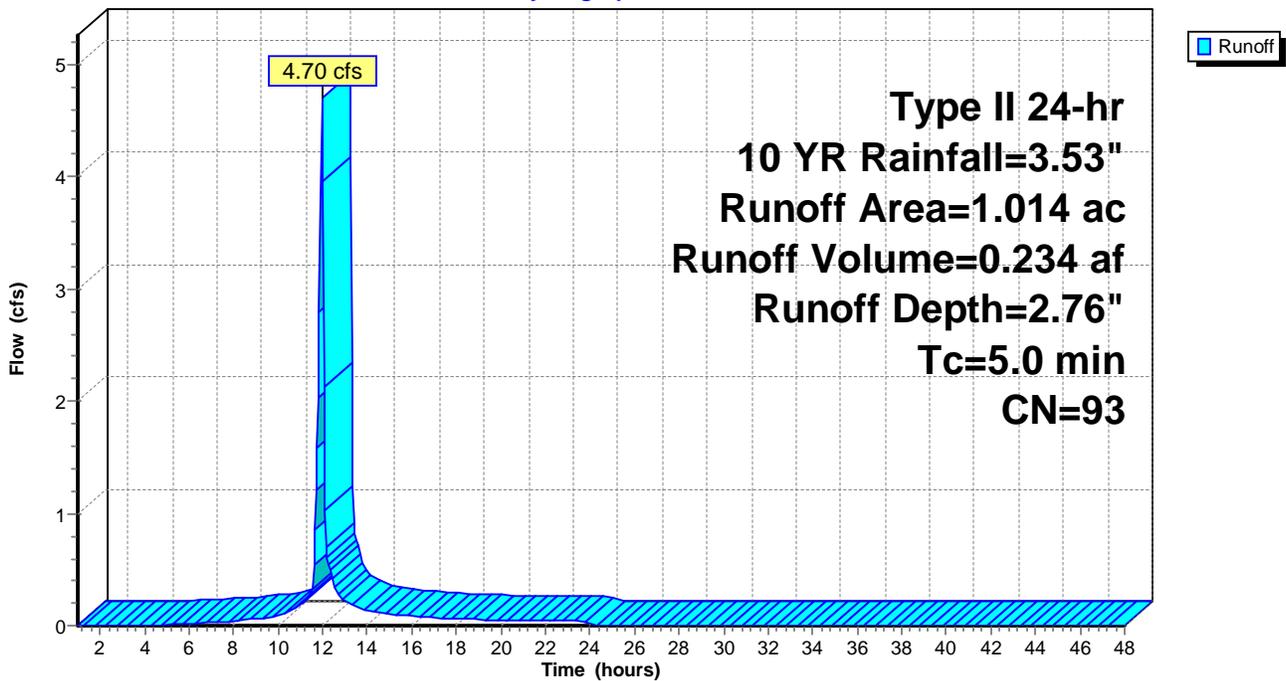
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, $dt= 0.05$ hrs
 Type II 24-hr 10 YR Rainfall=3.53"

Area (ac)	CN	Description
0.836	98	Paved parking, HSG B
0.178	69	50-75% Grass cover, Fair, HSG B
1.014	93	Weighted Average
0.178		17.55% Pervious Area
0.836		82.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 10

Subcatchment EX: DR-3 PRE

Hydrograph



Summary for Subcatchment EX: DR-3 PRE

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 7.24 cfs @ 11.95 hrs, Volume= 0.371 af, Depth= 4.39"

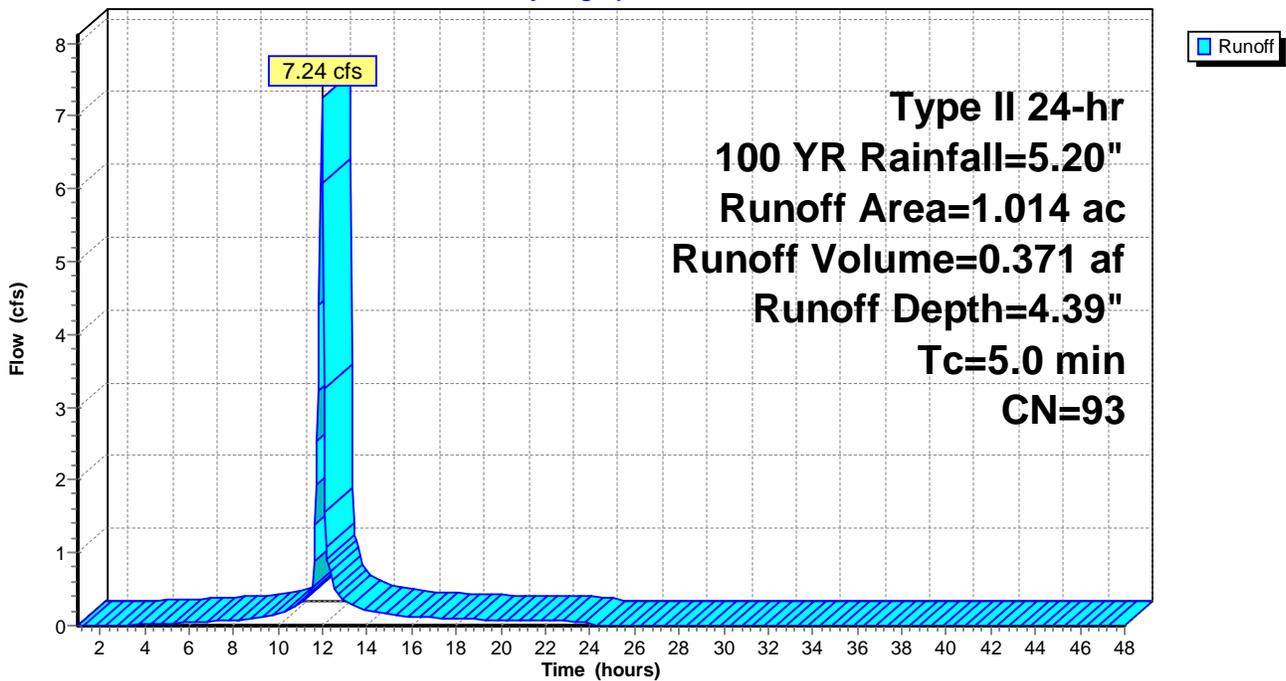
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
 Type II 24-hr 100 YR Rainfall=5.20"

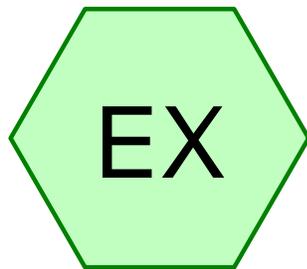
Area (ac)	CN	Description
0.836	98	Paved parking, HSG B
0.178	69	50-75% Grass cover, Fair, HSG B
1.014	93	Weighted Average
0.178		17.55% Pervious Area
0.836		82.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, 10

Subcatchment EX: DR-3 PRE

Hydrograph

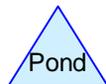
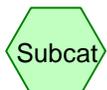




DR-4 PRE



DR-4 POST



Pre&Post-DR4

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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.694	69	50-75% Grass cover, Fair, HSG B (EX)
0.491	61	>75% Grass cover, Good, HSG B (PR)
2.104	98	Paved parking, HSG B (EX, PR)
3.289	86	TOTAL AREA

Pre&Post-DR4

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Type II 24-hr 1 YR Rainfall=2.12"

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Page 3

Summary for Subcatchment EX: DR-4 PRE

Runoff = 4.63 cfs @ 12.01 hrs, Volume= 0.256 af, Depth= 1.20"

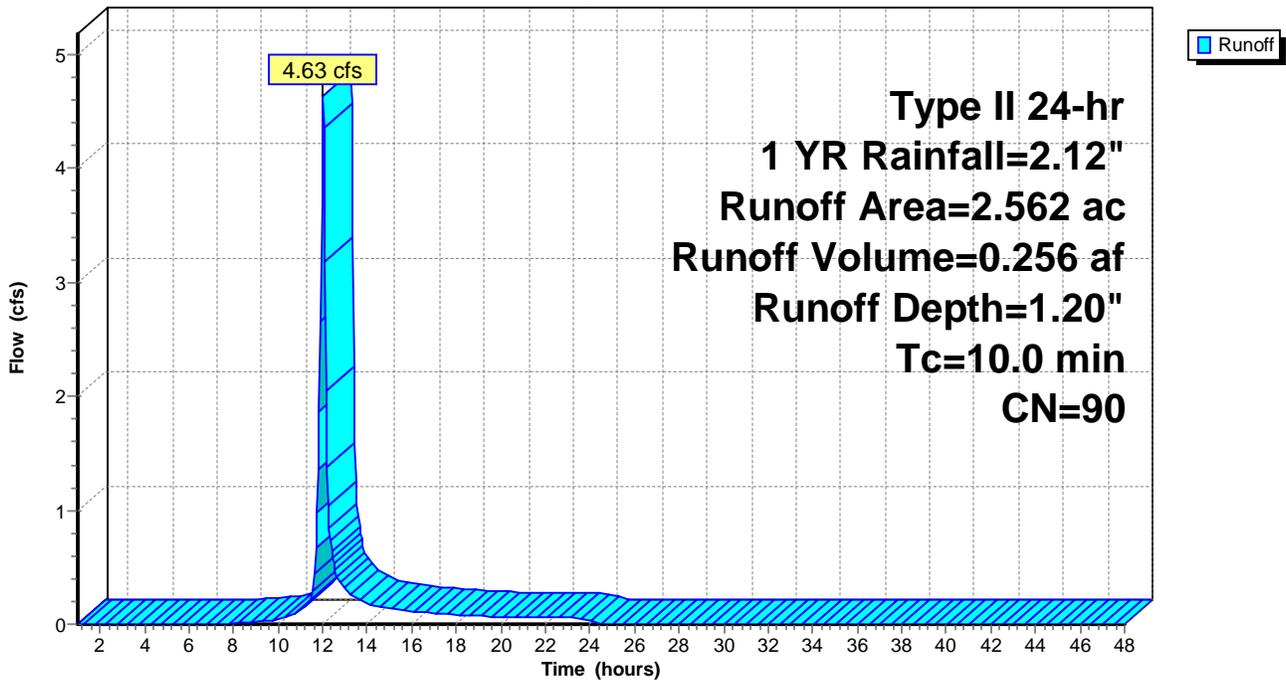
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.12"

Area (ac)	CN	Description
1.868	98	Paved parking, HSG B
0.694	69	50-75% Grass cover, Fair, HSG B
2.562	90	Weighted Average
0.694		27.09% Pervious Area
1.868		72.91% Impervious Area

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

Subcatchment EX: DR-4 PRE

Hydrograph



Pre&Post-DR4

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Type II 24-hr 1 YR Rainfall=2.12"

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Summary for Subcatchment PR: DR-4 POST

Runoff = 0.42 cfs @ 11.99 hrs, Volume= 0.023 af, Depth= 0.38"

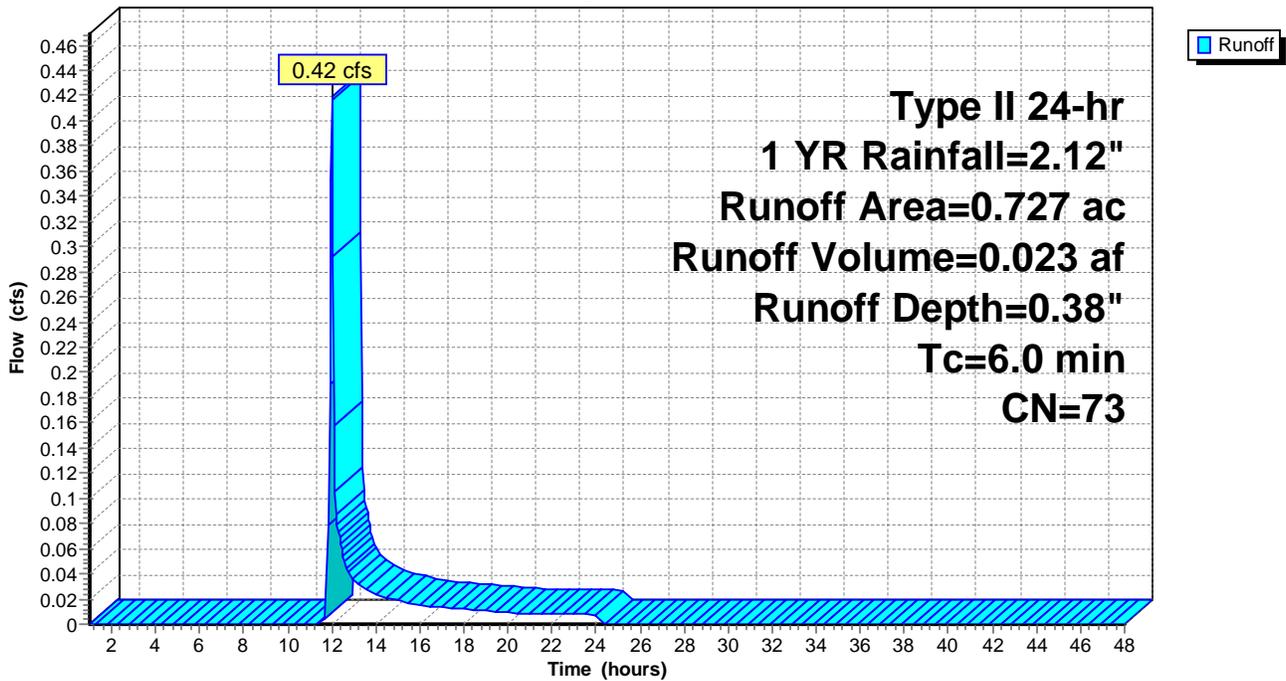
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.12"

Area (ac)	CN	Description
0.236	98	Paved parking, HSG B
0.491	61	>75% Grass cover, Good, HSG B
0.727	73	Weighted Average
0.491		67.54% Pervious Area
0.236		32.46% Impervious Area

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

Subcatchment PR: DR-4 POST

Hydrograph



Pre&Post-DR4

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Type II 24-hr 10 YR Rainfall=3.53"

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Page 5

Summary for Subcatchment EX: DR-4 PRE

Runoff = 9.34 cfs @ 12.01 hrs, Volume= 0.529 af, Depth= 2.48"

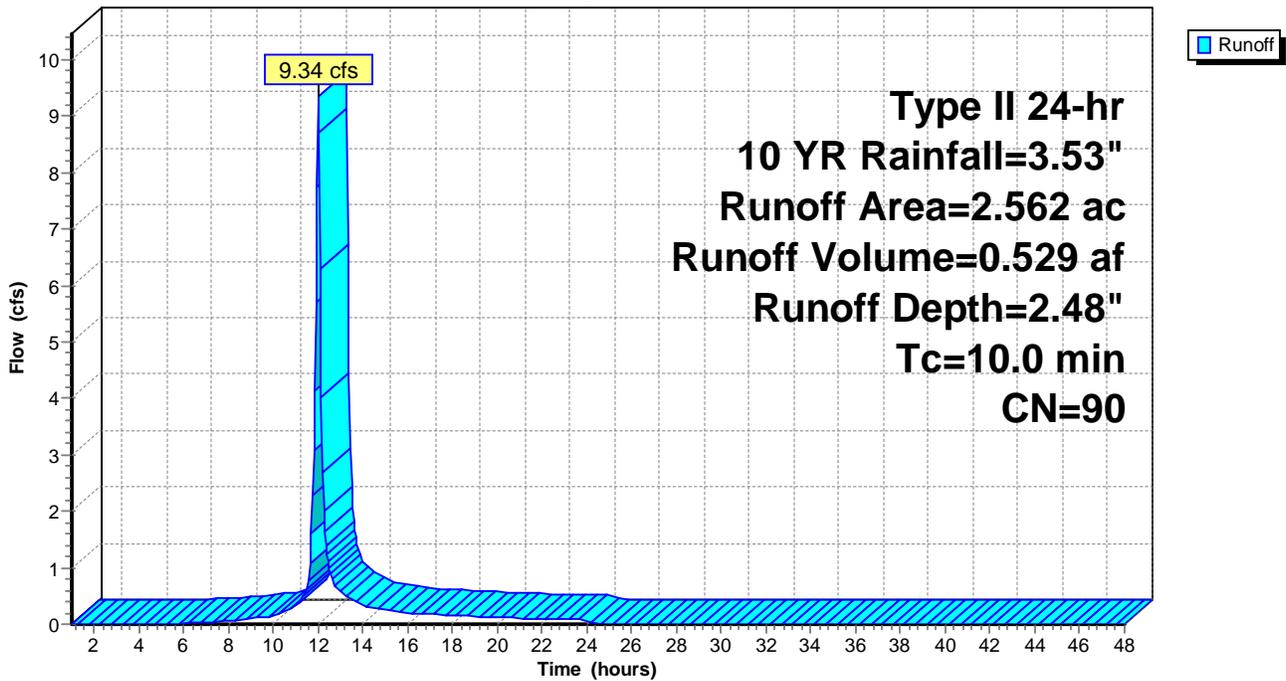
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.53"

Area (ac)	CN	Description
1.868	98	Paved parking, HSG B
0.694	69	50-75% Grass cover, Fair, HSG B
2.562	90	Weighted Average
0.694		27.09% Pervious Area
1.868		72.91% Impervious Area

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

Subcatchment EX: DR-4 PRE

Hydrograph



Pre&Post-DR4

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Type II 24-hr 10 YR Rainfall=3.53"

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Page 6

Summary for Subcatchment PR: DR-4 POST

Runoff = 1.51 cfs @ 11.98 hrs, Volume= 0.073 af, Depth= 1.20"

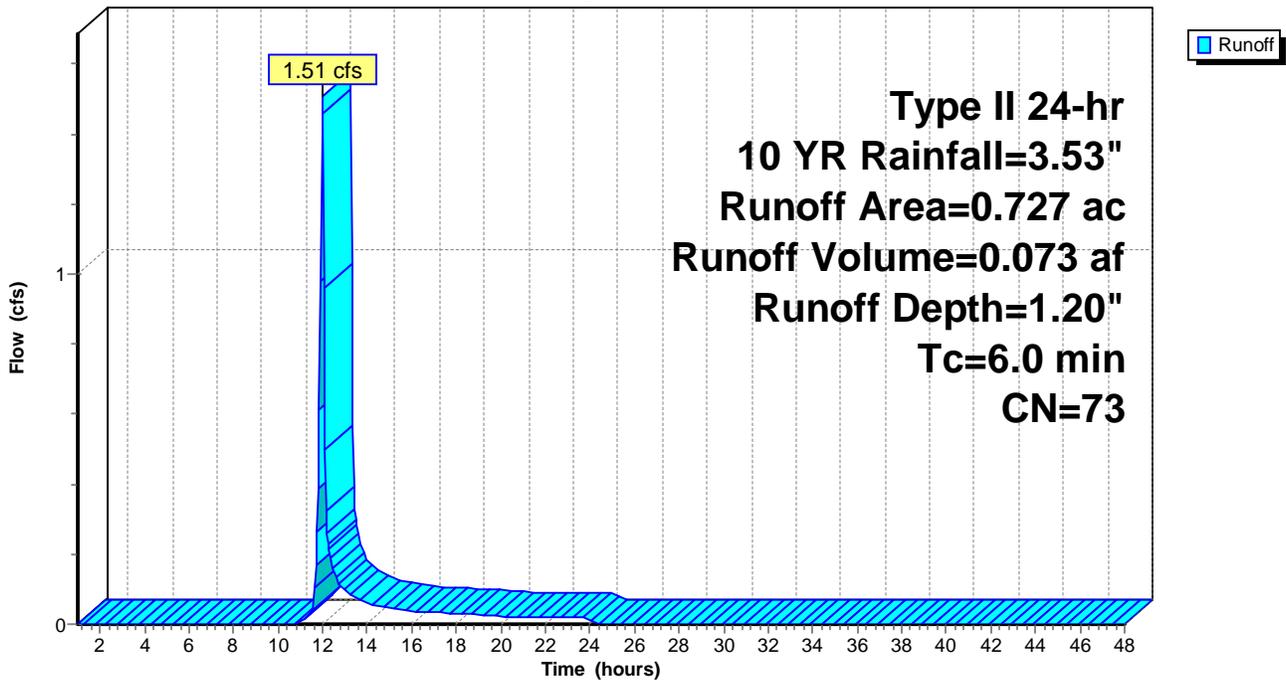
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.53"

Area (ac)	CN	Description
0.236	98	Paved parking, HSG B
0.491	61	>75% Grass cover, Good, HSG B
0.727	73	Weighted Average
0.491		67.54% Pervious Area
0.236		32.46% Impervious Area

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

Subcatchment PR: DR-4 POST

Hydrograph



Summary for Subcatchment EX: DR-4 PRE

Runoff = 14.95 cfs @ 12.01 hrs, Volume= 0.869 af, Depth= 4.07"

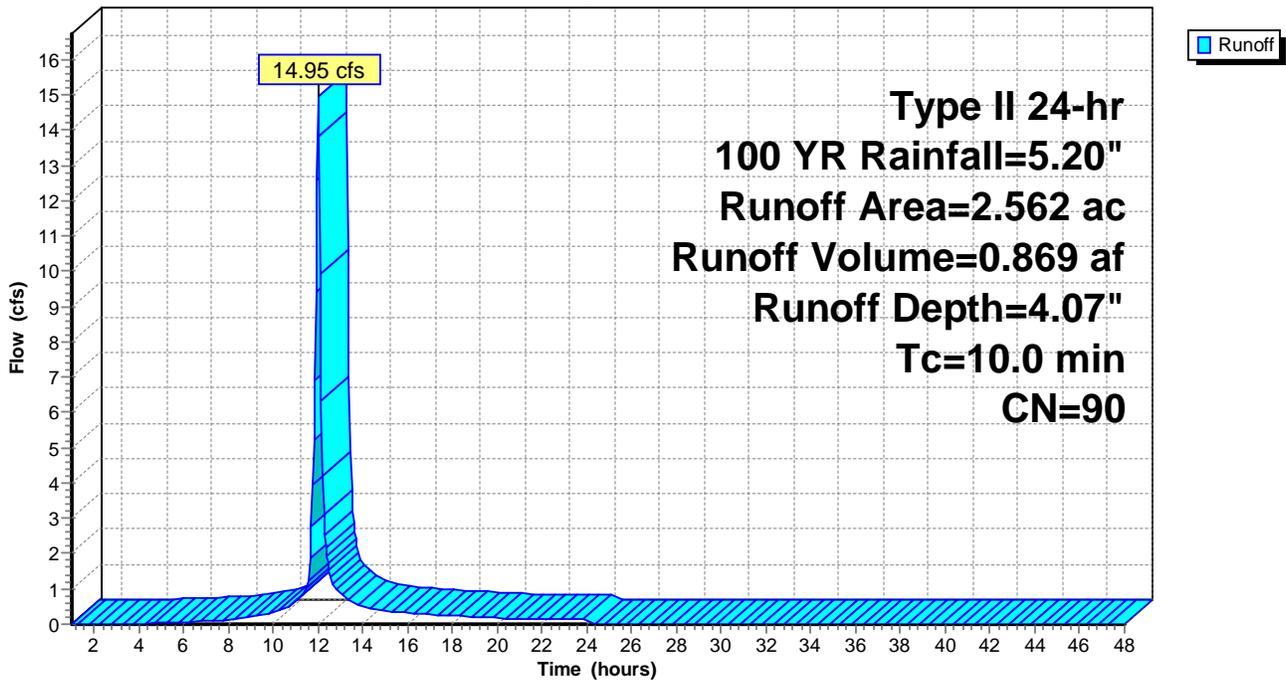
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=5.20"

Area (ac)	CN	Description
1.868	98	Paved parking, HSG B
0.694	69	50-75% Grass cover, Fair, HSG B
2.562	90	Weighted Average
0.694		27.09% Pervious Area
1.868		72.91% Impervious Area

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

Subcatchment EX: DR-4 PRE

Hydrograph



Summary for Subcatchment PR: DR-4 POST

Runoff = 3.06 cfs @ 11.97 hrs, Volume= 0.148 af, Depth= 2.44"

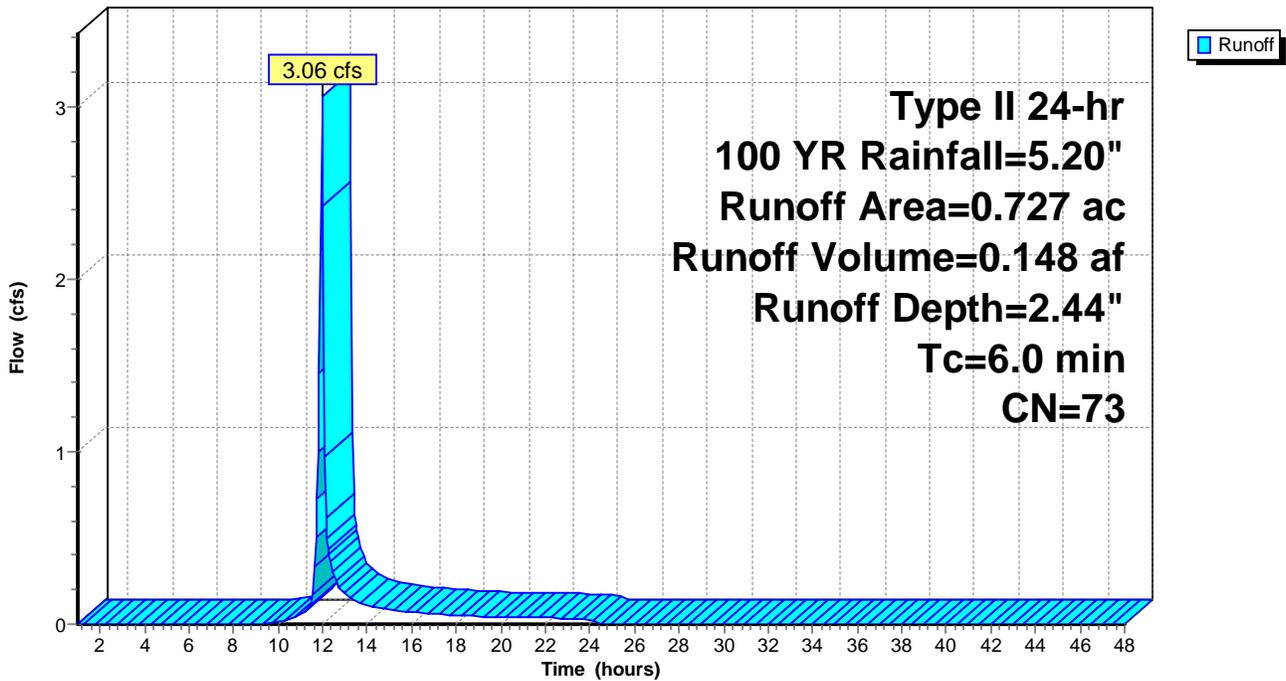
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-48.00 hrs, dt= 0.05 hrs
 Type II 24-hr 100 YR Rainfall=5.20"

Area (ac)	CN	Description
0.236	98	Paved parking, HSG B
0.491	61	>75% Grass cover, Good, HSG B
0.727	73	Weighted Average
0.491		67.54% Pervious Area
0.236		32.46% Impervious Area

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

Subcatchment PR: DR-4 POST

Hydrograph



StormTech MC-3500 Chamber

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots thus maximizing land usage for commercial and municipal applications.



StormTech MC-3500 Chamber (not to scale)

Nominal Chamber Specifications

Size (L x W x H)	90" (2286 mm) x 77" (1956 mm) x 45" (1143 mm)
Chamber Storage	109.9 ft ³ (3.11 m ³)
Min. Installed Storage*	178.9 ft ³ (5.06 m ³)
Weight	134 lbs (60.8 kg)

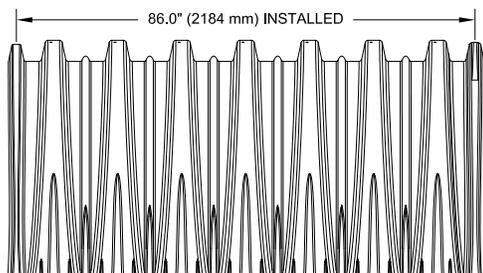
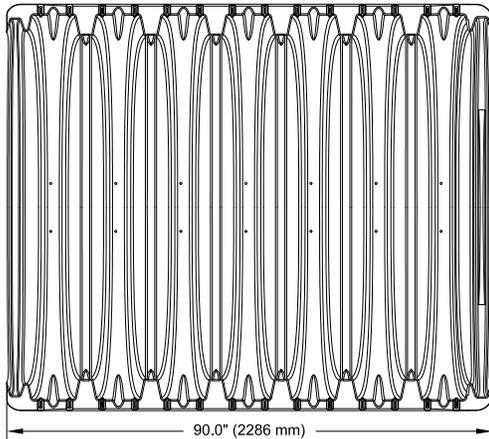
* This assumes a minimum of 12" (305 mm) of stone above, 9" (229 mm) of stone below chambers, 9" (229 mm) of row spacing, and 40% stone porosity.

Shipping

15 chambers/pallet

7 end caps/pallet

7 pallets/truck

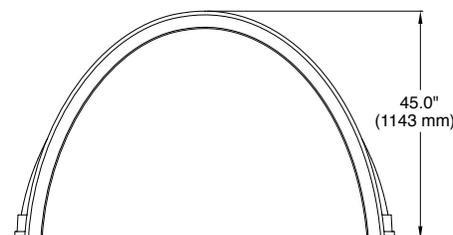
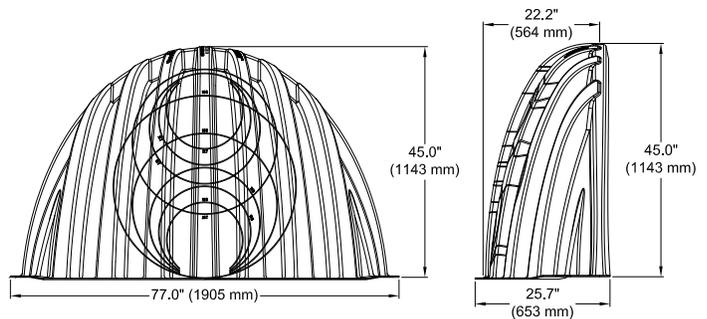


StormTech MC-3500 End Cap (not to scale)

Nominal End Cap Specifications

Size (L x W x H)	25.7" (653 mm) x 75" (1905 mm) x 45" (1143 mm)
End Cap Storage	14.9 ft ³ (0.42 m ³)
Min. Installed Storage*	46.0 ft ³ (1.30 m ³)
Weight	49 lbs (22.2 kg)

* This assumes a minimum of 12" (305mm) of stone above, 9" (229 mm) of stone below, 9" (229 mm) row spacing, 6" (152 mm) of stone perimeter, and 40% stone porosity.



Storage Volume Per Chamber/End Cap ft³ (m³)

	Bare Unit Storage ft ³ (m ³)	Chamber/End Cap and Stone Volume — Stone Foundation Depth in. (mm)			
		9 (229)	12 (305)	15 (381)	18 (457)
MC-3500 Chamber	109.9 (3.11)	178.9 (5.06)	184.0 (5.21)	189.2 (5.36)	194.3 (5.5)
MC-3500 End Cap	14.9 (0.42)	46.0 (1.33)	47.7 (1.35)	49.4 (1.40)	51.1 (1.45)

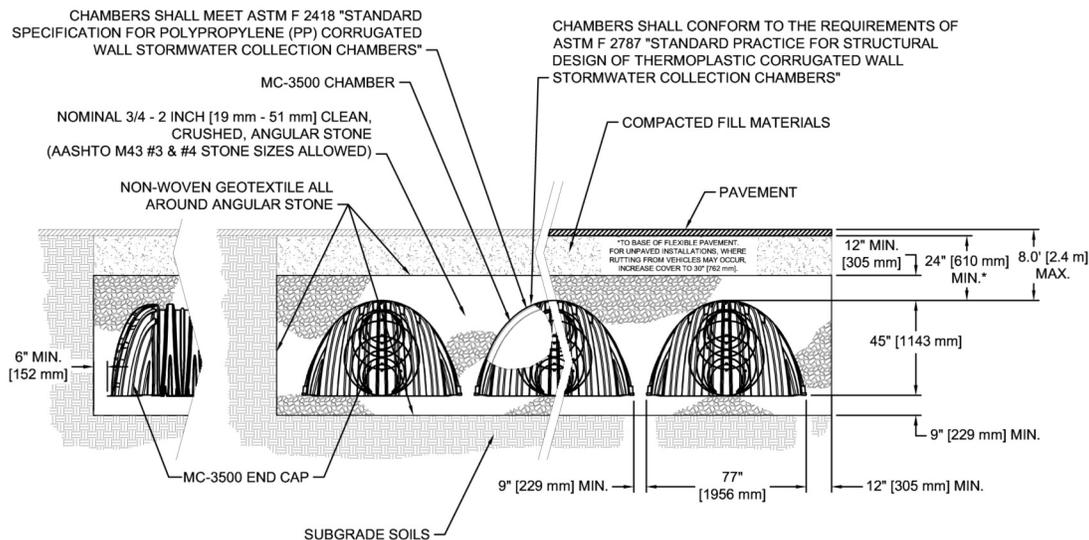
NOTE: Assumes 40% porosity for the stone plus the chamber/end cap volume. End Cap volume assumes 6" (152mm) stone perimeter.

Volume of Excavation Per Chamber/End Cap in yd³ (m³)

	Stone Foundation Depth in. (mm)			
	9 (229)	12 (305)	15 (381)	18 (457)
MC-3500	12.4 (9.5)	12.8 (9.8)	13.3 (10.2)	13.8 (10.5)
End Cap	4.1 (3.1)	4.2 (3.2)	4.4 (3.3)	4.5 (3.5)

NOTE: Assumes 9" (229 mm) of separation between chamber rows, 6" (152 mm) of perimeter in front of end caps, and 24" (610 mm) of cover. The volume of excavation will vary as depth of cover increases.

General Cross Section



NOTES:

1. THIS CROSS SECTION PROVIDES GENERAL INFORMATION FOR THE MC-3500 CHAMBER. STORMTECH MC-3500 CHAMBERS MUST BE DESIGNED AND INSTALLED IN ACCORDANCE WITH THE MC-3500 DESIGN MANUAL AND MC-3500 CONSTRUCTION GUIDE.
2. PROPERLY INSTALLED MC-3500 CHAMBERS PROVIDE THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR EARTH AND LIVE LOADS WITH CONSIDERATION FOR IMPACT AND MULTIPLE PRESENCES.
3. PERIMETER STONE MUST ALWAYS BE BROUGHT UP EVENLY WITH BACKFILL OF BED. PERIMETER STONE MUST EXTEND HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH STRAIGHT OR SLOPED SIDEWALLS.

Amount of Stone Per Chamber

ENGLISH tons (yd ³)	Stone Foundation Depth			
	9 in.	12 in.	15 in.	18 in.
MC-3500	9.1 (6.4)	9.7 (6.9)	10.4 (7.3)	11.1 (7.8)
End Cap	4.1 (2.9)	4.3 (3.0)	4.5 (3.2)	4.7 (3.3)
METRIC kg (m ³)	229 mm	305 mm	381 mm	457 mm
MC-3500	8220 (4.9)	8831 (5.3)	9443 (5.6)	10054 (6.0)
End Cap	3699 (2.2)	3900 (2.3)	4100 (2.4)	4301 (2.6)

NOTE: Assumes 12" (305 mm) of stone above, and 9" (229 mm) row spacing, and 6" (152mm) of perimeter stone in front of end caps.



A division of **ADS**

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S150909 03/2014





Project: COR Mercy Redevelopment
Drainage Area DR-1 & DR-2

Project No. 10487.00
Date: 7/13/2016
By: TCB
Checked: JWL
Sheet: 1 of 1

TITLE: **WATER QUALITY STORAGE VOLUME**
Vortechs Unit - TBD

Water Quality Volume

DESCRIPTION:

Total Water Quality Volume Required

Formula for calculating the Water Quality storage volume (WQv) = $\frac{(P)(Rv)(A)}{12}$

P = 90% Rainfall Event = 1.00

I = percent Impervious Cover = 86

Rv = $0.05 + 0.009(I)$ = 0.82

A = Acres = 6.784

Water Quality Storage Volume (acre-feet) = 0.47

20,292 Cubic-Feet

Alternative Practice: 15,219 Cubic-Feet 75% of WQv

Note:

Water Quality Volume is based on the formula in Section 9.2 of the New York State Stormwater Management Design Manual page 9-5. See Below for Calculation of the formula.

Existing impervious = - ac Proposed Impervious = - ac IC Reduction = 0% (25 -
 $(\% \text{ IC reduction} + \% \text{ WQv treatment by Standard practice} + \% \text{RRV}) * 3 = \% \text{WQv by Alt Practice}$
 $(25 - (0 + 0 + 0)) * 3 = 0$ -----> 0% IC reduction, 0% Standard Practice, 75% Alternative practice

PEAK WATER QUALITY DISCHARGE

Area contributing =	6.78	acres
WQv =	15,219	cf
P =	0.85	inch
I =	86.0	%
Rv =	0.82	

Peak Water Quality Discharge

$$CN = 1000 / [10 + 5P + 10Qa - 10(Qa^2 + 1.25 * Qa * P)^2]$$

Qa = 0.62 inches
Cn = 97.7

From TR-55

la = 0.151
la/P = 0.178
qu = 750.00
Tc = 0.10 hrs

Peak Qwq = (qu * A * Qa)	4.91	cfs
-----------------------------	------	-----

3. A hydrodynamic separator, such as the Vortechs Stormwater Treatment System, cannot be used in series with another hydrodynamic separator to achieve an enhanced removal rate for total suspended solids (TSS) removal under N.J.A.C. 7:8-5.5.
4. The maintenance plan for the sites using this device shall incorporate at a minimum, the maintenance requirements for the Vortechs Stormwater Treatment System, attached.

Table 1

Vortechs System Model	Grit Chamber Radius (ft)	Grit Chamber Area (ft ²)	Design Flow Rate (cfs)
1000	1.5	7.1	0.63
2000	2.0	12.6	1.12
3000	2.5	19.6	1.75
4000	3.0	28.3	2.5
5000	3.5	38.5	3.4
7000	4.0	50.3	4.5
9000	4.5	63.6	5.7
11000	5.0	78.5	7.0
16000	6.0	113.1	10.1

In addition to the attached, any project with a Stormwater BMP subject to the Stormwater Management Rules, N.J.A.C. 7:8, must include a detailed maintenance plan. The detailed maintenance plan must include all of the items identified in Stormwater Management Rules, N.J.A.C. 7:8-5.8. Such items include, but are not limited to, the list of inspection and maintenance equipment and tools, specific corrective and preventative maintenance tasks, indication of problems in the system, and training of maintenance personnel. Additional information can be found in Chapter 8: Maintenance of the New Jersey Stormwater Best Management Manual.

NJDEP anticipates proposing further adjustments to this process through the readoption of the Stormwater Management Rules. Additional information regarding the implementation of the Stormwater Management Rules N.J.A.C. 7:8 are available at www.njstormwater.org. If you have any questions regarding the above information, please contact Ms. Sandra Blick of my office at (609) 633-7021.

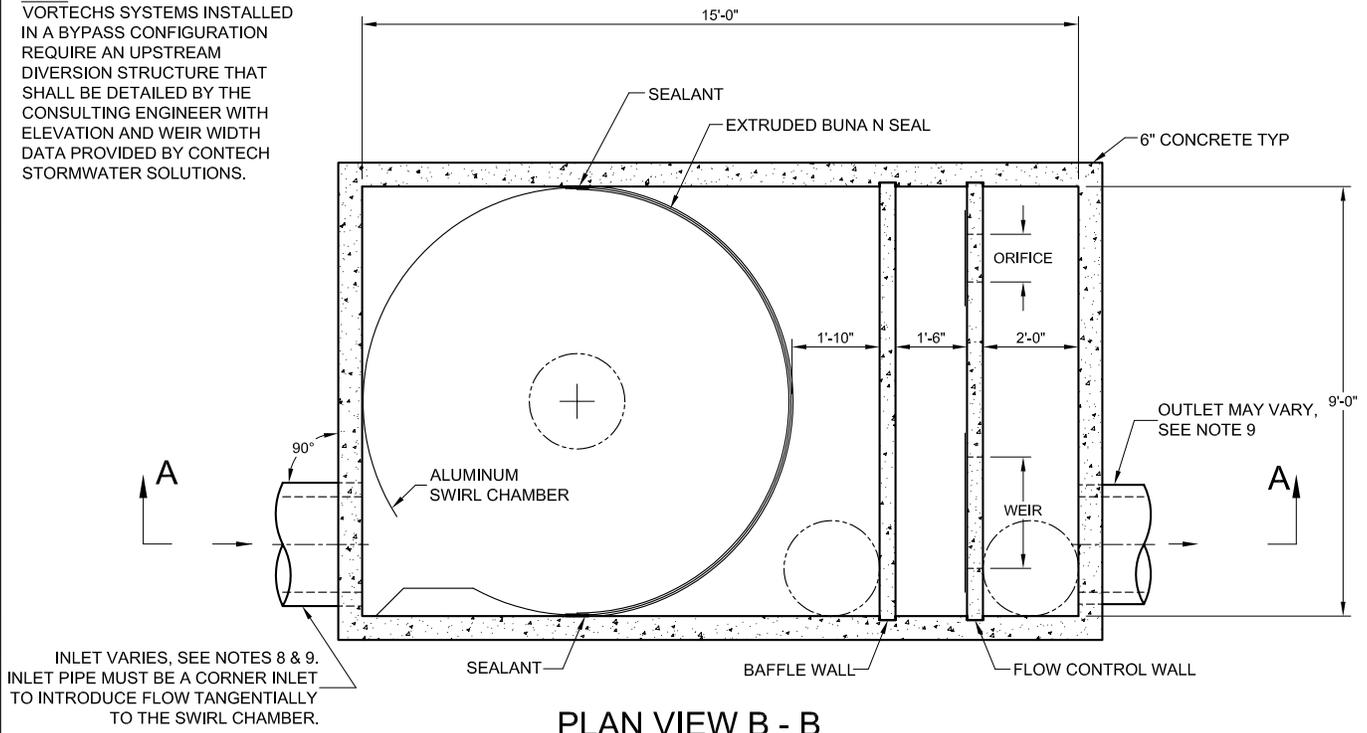
Sincerely,



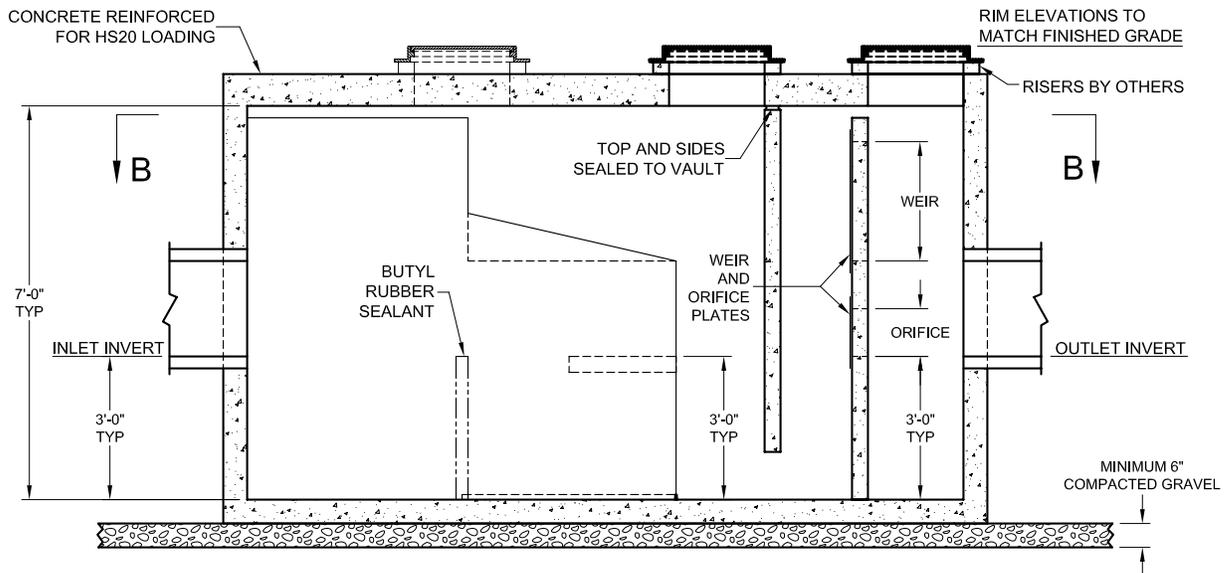
Ed Frankel, P.P., Acting Bureau Chief
Bureau of Nonpoint Pollution Control

C: Richard S. Magee, NJCAT
Chron file

NOTE:
 VORTECHS SYSTEMS INSTALLED
 IN A BYPASS CONFIGURATION
 REQUIRE AN UPSTREAM
 DIVERSION STRUCTURE THAT
 SHALL BE DETAILED BY THE
 CONSULTING ENGINEER WITH
 ELEVATION AND WEIR WIDTH
 DATA PROVIDED BY CONTECH
 STORMWATER SOLUTIONS.



PLAN VIEW B - B



SECTION A - A

NOTES:

1. STORMWATER TREATMENT SYSTEM (SWTS) SHALL HAVE:
 PEAK TREATMENT CAPACITY: 14 CFS
 SEDIMENT STORAGE: 4.8 CU YD
 SEDIMENT CHAMBER DIA: 9' MIN
2. SWTS SHALL BE CONTAINED IN ONE RECTANGULAR STRUCTURE
3. SWTS REMOVAL EFFICIENCY SHALL BE DOCUMENTED BASED ON PARTICLE SIZE
4. SWTS SHALL RETAIN FLOATABLES AND TRAPPED SEDIMENT UP TO AND INCLUDING PEAK TREATMENT CAPACITY
5. SWTS INVERTS IN AND OUT ARE TYPICALLY AT THE SAME ELEVATION
6. SWTS SHALL NOT BE COMPROMISED BY EFFECTS OF DOWNSTREAM TAILWATER
7. SWTS SHALL HAVE NO INTERNAL COMPONENTS THAT OBSTRUCT MAINTENANCE ACCESS
8. INLET PIPE MUST BE PERPENDICULAR TO THE STRUCTURE
9. PIPE ORIENTATION MAY VARY; SEE SITE PLAN FOR SIZE AND LOCATION
10. PURCHASER SHALL NOT BE RESPONSIBLE FOR ASSEMBLY OF UNIT
11. MANHOLE FRAMES AND PERFORATED COVERS SUPPLIED WITH SYSTEM, NOT INSTALLED
12. PURCHASER TO PREPARE EXCAVATION AND PROVIDE CRANE FOR OFF-LOADING AND SETTING AT TIME OF DELIVERY
13. VORTECHS SYSTEMS BY CONTECH STORMWATER SOLUTIONS; PORTLAND, OR (800)548-4667; SCARBOROUGH, ME (877) 907-8676; ELKRIDGE, MD (866) 740-3318.

PROPRIETARY INFORMATION - NOT TO BE USED FOR CONSTRUCTION PURPOSES

This CADD file is for the purpose of specifying stormwater treatment equipment to be furnished by CONTECH Stormwater Solutions and may only be transferred to other documents exactly as provided by CONTECH Stormwater Solutions. Title block information, excluding the CONTECH Stormwater Solutions logo and the Vortechs Stormwater Treatment System designation and patent number, may be deleted if necessary. Revisions to any part of this CADD file without prior coordination with CONTECH Stormwater Solutions shall be considered unauthorized use of proprietary information.



STANDARD DETAIL
 STORMWATER TREATMENT SYSTEM
 VORTECHS® MODEL 9000

U.S. PATENT No. 5,759,415

DATE: 4/5/06

SCALE: NONE

FILE NAME: STD9k

DRAWN: GMC

CHECKED: NDG