



July 24, 2018

Nell Donaldson, Senior Planner
City of Portland Planning Division
389 Congress Street
Portland, ME 04101

Re: MMC Staff Parking Garage | 222 St. John Street | Level III Site Plan
Response to Public Comments

Dear Nell:

Thank you for coordinating the review of the Maine Medical Center Parking Garage project located at 222 St. John Street. This letter provides a summation of our responses to the comments received from various reviewers as part of the Level III Site Plan process. We have repeated the original comment in italics below, and our response follows each.

Comment from John Peverada, City Parking Manager Dated June 27, 2018

With the size of the garage, will the two exit lanes onto St. John Street be sufficient to "empty" the garage in a reasonable amount of time? When they City boots MMC employees they say that they do not park in the existing garage because it takes too long to exit. Additionally, some employees who should currently be parking in the shuttle lot now say they don't because it takes too much time out of their day and they are not being paid while on the shuttle bus.

The hospital has staggered shifts, but there is concern that if this garage is not efficient, employees will park on the neighboring streets and the City will be chasing them around. Keeping in mind that St. John St only has one travel lane in each direction, there is concern that traffic may back up in the garage. MMC had discussed a second exit onto the Fore River Parkway, why is that not included in this plan?

Response:

The Gorrill Palmer traffic memo submitted to the City indicated a high level of service for the proposed entry/exit of the garage and the St John St intersection.

The entry and exit experience in the proposed employee garage will be different than the experience in the existing employee garage. The proposed garage's primary access point is from a signalized intersection on St John St - a commercial street. The existing garage's primary access point is from an unsignalized intersection on Gilman St – a residential street. In addition, much of the existing garage traffic desires a left turn onto Congress St from Gilman St – an unsignalized intersection.

A feasibility study of the options to connect the garage to the Fore River Parkway is included in the application.

Comment letter from City of Portland Fire Department Dated July 05, 2018

1. *The Street Address shall be marked on the structure with Arabic numerals, rather than spelled out.*

Response: Comment acknowledged, street address will be marked on structure with Arabic numerals, additional details will be provided during the building permit application process.

2. *A private fire hydrant will be required along the right side of the building, accessible from the lower parking lot.*

Response: A private hydrant has been proposed adjacent to the garage entrance accessible from the lower parking lot. Please refer to the attached revised design drawings for the updated hydrant location.

3. *Please indicate the location of the sprinkler system fire department connection.*

Response: No sprinklers are currently proposed within the garage; the garage will utilize a standpipe system. The location of standpipes and fire department connections are shown on the attached revised design drawings.

4. *There are sufficient public fire hydrants in the area, no additional public hydrants are required.*

Response: Acknowledged. As stated above, a private hydrant has been provided adjacent to the garage entrance accessible from the lower parking lot. Please refer to the attached revised design drawings for the updated hydrant location.

5. *Fire department access shall have an unobstructed vertical clearance of not less than 13 ft 6 in, to include the width of the St. John Street side access.*

Response: Comment acknowledged, unobstructed vertical clearance has been provided along the St. John Street access.

6. *The area in front of the building, St. John Street side must be capable of supporting 20 ton.*

Response: The proposed checker block has the capacity to support an HS-20 load rating. Please see the attached "Checker Block Technical Note Traffic Loading Calculation Example" provided by the manufacturer for documentation supporting the HS-20 loading capacity of the checkerboard pavers.

7. *The main entrance of the building must be the address for the building. The address for this building will be 190 St. John Street.*

Response: Comment acknowledged.

Comment letter from Wright-Pierce Comment Dated July 02, 2018

1. *Level III Site Plan applications with the City of Portland must submit a stormwater plan pursuant to the regulations of MaineDEP Chapter 500 Stormwater Management Rules. This includes conformance with the Basic, General, and Flooding Standards (Ref: Technical Manual, Section 5. II. Applicability in Portland. C. a.; and Ref: City of Portland Code of Ordinances Sec. 14-526. Site Plan Standards, (b). 3. b.)*

- a. *Basic Standard: Project Plans and Application should be provided to address erosion and sedimentation requirements, inspection and maintenance requirements, and good housekeeping practices in accordance with MaineDEP Chapter 500, Appendix A, B, and C. The applicant has provided information that the project will be subject to the Basic Standard. The applicant has provided:*

- i. *An Erosion and Sedimentation Control Plan in Section 12 of the application.*

- ii. *Inspection and Maintenance information in Section 12 of the application.*

- iii. *Erosion and Sedimentation Control Details and Notes on Sheet C-200.*
- iv. *Location of Erosion and Sedimentation Control best practices were observed on the Demolition Plan.*

Response: Comment acknowledged.

The proposed project meets the Basic Standards

b. *General Standard: The applicant has provided information regarding the size and scope of the project indicating that the project is subject to the Redevelopment Standard within the City of Portland, which is more stringent than the Chapter 500 requirements for redevelopment. The City requirements indicate that greater than 50% of the proposed impervious surfaces must receive stormwater quality treatment pursuant to the MaineDEP Chapter 500 requirements. The applicant has provided information that 85% of the facility impervious surfaces are conveyed to a Jellyfish Filter, a proprietary unit from Contech. The applicant shall clarify the following and provide responses:*

i. *The HydroCAD Subcatchments report a total drainage area of 157,512 SF conveyed to the stormwater treatment unit. These values match values reported in Table 12-1, but differ slightly from the calculations provided on Section 12, Page 13. The correct tributary area and required treatment volume to the proprietary unit shall be confirmed by the applicant.*

Response: The proposed site design has been modified slightly since the prior submission which has impacted the above referenced area. Section 12 of the Level III Site plan Narrative has been revised and attached with this letter; please refer to this section for additional clarification.

ii. *The MaineDEP approval letter dated January 21, 2015 for the Jellyfish Filter require manufacturer approval for each design, as noted in item 7 of this letter (page 14 of Section 12). This letter shall be provided as part of the application.*

Response: A letter from Contech has been requested for design approval and will be forwarded for review upon receipt.

iii. *The applicant will be required to inspect, maintain, and report on the filter in accordance with Chapter 32 stormwater requirements. The applicant has provided inspection, maintenance, and housekeeping information in Section 12 of the application. A stormwater maintenance agreement is required for the stormwater treatment units.*

Response: A stormwater maintenance agreement will be provided to the City upon approval of the Level III Site Plan Application.

c. *Flooding Standard: The applicant has provided information indicating that the total amount of impervious surface at the facility is being decreased. For this and additional supporting information provided in the application, the applicant is not required to meet the Flooding Standard of Chapter 500.*

Response: Comment acknowledged.

2. *Connection to Existing System:*

a. *The existing facility currently discharges to an 18" private storm drain. The proposed condition includes retaining surface runoff in order to allow runoff from a 25-year, 24-hour rain event to pass an 18" pipe. Flows from the East Stormdrain are proposed to connect to the existing 30" pipe in St. John Street. The applicant shall provide the following:*

i. *The applicant has indicated that the existing 18" pipe can convey 20.81 CFS at 95% capacity. A calculation was not provided in section 12 of the application, and this value was not observed in the HydroCAD output. The applicant shall provide a calculation for this flow rate. Once provided, this is anticipated to confirm that the project is in conformance with City of Portland Code of Ordinances section 14-526 (b) 3.a subsection ii regarding downstream private drainage.*

Response: During review it was discovered that the 20.81 CFS previously reported at 95% capacity was misreported and did not account for the appropriate slope for Pipe 25. This calculation has been revised to reflect the proposed slope for Pipe 25, the revised 95% capacity conveyance is 9.31 CFS. Utilizing strictly the Manning's Equation for the single pipe, the proposed 18" pipe can adequately convey the 10-year storm without backflow within the system. It is important to note that the HydroCAD model utilizes dynamic routing which takes into account possible backflow within the system during larger storm events. Although the 25-year storm event generates flows in exceedance of the Manning's Equation calculations, the HydroCAD model shows that there is an excess of 1-foot of freeboard within DMH-2 during this storm event, and flood elevations are not exceeded at any upstream structures within the system.

ii. *The applicant has indicated that conversations with the City have discussed the 30" stormdrain in St. John Street has capacity to receive additional flows from the project. The applicant shall provide written or e-mail confirmation from the Department of Public Works that this work is being completed in accordance with City of Portland Code of Ordinances section 14-526 (b) 3.a, subsection iii iv.*

Response: Woodard & Curran has discussed discharging stormwater flow from the garage entrance to the 30" stormdrain located in St. John Street. Please see attached correspondence with the City of Portland Public Works Department.

3. *Proposed Drainage Design*

a. *More information is needed to confirm that the pipe capacity and inlet capacity is adequate for each structure and pipe length.*

Response: To provide a conservative assessment of inlet flows and pipe conveyance capacity, an analysis of the project's largest subcatchment area has been conducted including pipe and inlet capacities. Flows generated at CB-2 were evaluated using HydroCAD analysis for the subcatchment area, a flow of 1.15 cfs is generated during the 25-year storm event. The Manning's Equation was utilized to determine the 95% capacity for Pipe 2 and was calculated to be 2.17 cfs. The proposed catch basin will utilize a standard 24 inch inlet grate with a capacity of 3.50 cfs.

All other subcatchment areas are of a similar or smaller area and utilize the same or larger pipe sizes, and as such were not analyzed. Please refer to the attached calculations for further clarification.

b. *Additional data/detailing is needed to confirm that the R-Tank system and Jellyfish Filter are designed in consonance with the HydroCAD model.*

Response: Pond 1P within the HydroCAD model utilizes information provided by both ACF Environmental and Contech. ACF Environmental provided a HydroCAD node for the R-Tank storage volume, and Contech Provided a HydroCAD node with the appropriate outlet information to ensure that flows routed to the Jellyfish Filter will meet the required cartridge flow rate design criteria.

c. *CB21 on sheet C-103 calls out a 15" pipe out of the structure, but the existing pipe between CB21 and the existing CB is referenced as 18". Please confirm the existing pipe is indeed an 18" pipe.*

Response: The correct pipe size has been updated, please refer to the attached revised design drawings for additional clarification.

d. *Pipe 22 has 0.0% slope. Confirm this is the intended design or if the pipe should be sloped to the JellyFish Filter.*

Response: Pipe 22 was designed with a 0.0% slope to the Jellyfish filter per Contech recommendations.

e. *CB12 has 1.37 feet of drop between the in and out inverts. Confirms this is the intended design or if the standard 0.1-foot drop is more appropriate.*

Response: Due to the large grade change from CB14 to CB11, a drop of 1.37-feet between inlet and outlet within CB12 was selected.

f. *The areas presented in the Water Quality Volume for Jellyfish Filter System calculations do not match those presented in Table 12-1 (see comment 1.b.i of this response). Please remedy.*

Response: Please refer to comment 1.b.i of this response letter, Water Quality Volumes have been revised and are further described within the attached revised Section 12 of the Level III Site plan Narrative.

g. *The HydroCAD output files reference 24-hour design rainfall amount of 3.1", 4.6" and 5.8" for the 2-, 10-, and 25-years events, respectively. Please provide the source of the rainfall amounts for review.*

Response: Rainfall amounts were taken from Appendix H of Maine DEP Chapter 500 and selected from South East Cumberland County.

4. *Capacity to Serve:*

a. *The applicant has sent Capacity to Serve Letters to Utilities. Responses to these letters are required parts of the application, and the applicant has indicated that they will be provided to the City as these letters are received.*

Response: Woodard & Curran has contacted utilities regarding status of capacity to serve the proposed parking garage, which are being reviewed at this time. Capacity to serve letters will be forwarded upon receipt.

5. *Parking Garage Drainage:*

- a. *Additional information is requested on where the floor drains from the parking garage convey surface flows. Please confirm that the surface flows from the parking garage's interior levels are conveyed into the oil/water separator on Sheet C-104, and then ultimately into the sanitary sewer. Please provide a detail for the oil/water separator or indicate which sheet this detail may be located on.*

Response: The open top deck of the parking garage drains into the stormwater detention system, all other floors below the top deck are conveyed towards the oil water separator shown on Sheet C-105 and detailed on Sheet C-201 of the attached revised design drawings.

6. *StormBasin Facility:*

- a. *The StormBasin facility will provide a level of hydrocarbon removal, and removal of other pollutants from surfaces that convey surface drainage towards St. John Street. It is understood that this proprietary unit is currently not accepted as a stormwater treatment method under MaineDEP Chapter 500, but the applicant has provided information that Jellyfish Filter contains ample treatment volume to meet the City's Redevelopment Standard.*

Response: Comment acknowledged.

7. *Soils:*

- a. *Web Soil Survey information was provided in Section 12 of the application. The information in the web soil survey was in consonance with the soil hydraulics ratings for the HydroCAD report.*

Response: Comment acknowledged.

- b. *Section 15 of the application notes that soils were observed to have potential ash substances, and that urban infill may be likely due to the location of the project. The applicant has noted in section 15 that a soil management plan will be provided. Final site grading will be reviewed after this soil management plan is available.*

Response: Comment has been addressed, please refer to email from Wright Pierce dated July 16, 2018.

8. *Snow Storage:*

- a. *The applicant has noted in Section 17 of the application that snow storage will be completed through means of removal and off-site storage. Snow melters will be located on the open-deck roof to the garage. It is understood that the exposed portion of the roof conveys flows to the Jellyfish Filter.*

Response: Comment acknowledged.

9. *Details have been provided confirming the following storm drain infrastructure items that are in conformance with the City Standard Details and Technical Manual:*

- a. *Catch Basin detail (3' sump)*
- b. *Manhole Frame, Cover*
- c. *Catch Basin Frame Cover*
- d. *Manhole, Manhole Steps*
- e. *Casco Trap*

Response: Comment acknowledged.

10. The following notes are provided for certain details:

a. *Sheet 17: St. John Street and D Street Intersection*

i. *Catch Basin at intersection of D Street and St. John St. is located in a transition ramp next to flat curb. Applicant shall provide spot grades or detail confirming how this catch basin grate shall be constructed with the adjacent tipdown curbing, and within a bicycle lane.*

Response: Notes have been added to the design drawings to confirm the intent of the catch basin grate modification. Please refer the to the attached design drawings for further clarification.

b. *Sheet 17: Checker Block Concrete Grid Detail:*

i. *Discussion from reviewers indicated concern over winter maintenance and proposed use of this material. From review of sheet C-106, it is apparent that the Checker Block system is anticipated to be used for fire access and maintenance access, and not for stormwater treatment. It is suggested that applicant confirm the use of this material and the entry curb is confirmed as acceptable with the City Fire Department. The applicant shall submit maintenance and housekeeping information on the Checker Block system to indicate how the system will be maintained in both the summer and snow/salt conditions.*

Response: Additional maintenance information has been provided with this response to comment letter, please see attached maintenance requirements.

Comment letter from Planning Department Dated July 02, 2018

Zoning Analysis

1. *Proposed sign does not match others on campus per sign plan submitted in 2008. In the final submittal, provide an explanation as to why the design diverges from the sign plan.*

Response: A signage plan that updates all MMC signs will be submitted with the site plan application for the Congress St. hospital building.

2. *Continued concern re likely success of some TDM measures and data collection. Wait on hiring of TDM coordinator to finalize TDM plan.*

Response: Comment acknowledged. The TDM coordinator position was filled on Monday July 16th. The TDM coordinator is in the process of familiarizing himself with MMC's plan. MMC has plans to meet with City reviewers on Wednesday July 25th to review the TDM plan.

3. *Campus-wide Parking analysis in IDP, GP's memo, and TDM plan do not entirely match. GP's memo cites a projected deficit of 500-600 spaces. This figure does not appear in the IDP, and doesn't mesh with employee growth figures from the IDP (approximately 300 new employees by 2026?). A table with ratios and existing and projected demands would be helpful.*

Response: Page 66 of the IDP states "...MMC estimates a need for 500-600 additional staff/physician parking spaces to accommodate future demands and resolve the existing parking shortage." Page 65 of the IDP states "The hospital requires about 150-200 additional on-campus parking spaces to alleviate current 2017 staff parking shortfalls." GP's cited projected deficit of 500-

600 spaces includes the current deficit of 150-200 spaces. The projected deficit accounts for addressing the current parking deficit, new employees, and a reduction in parking demand through TDM measures.

4. *CMP should include some discussion of methods to mitigate impacts to 210 St. John, particularly given location of construction access. Also speak directly to concerns about loss of landscaping there.*

Response: Comment acknowledged. MMC and its design team are scheduled to meet with the property owner of 210 St John St for a site walk-through to develop a mitigation plan on July 26, 2018.

5. *Need construction easements on Union Station Plaza lot. These will be required prior to building permit.*

Response: A construction agreement will be obtained prior to requesting a building permit.

6. *Speak to timing of deliveries (i.e. June meeting, we discussed loading during off-peak hours).*

Response: construction of the garage will require careful planning and management of the daily occurrences within the site limits. The logistical plan that is currently outlined is intended to keep all construction staging, laydown and temporary storage within the project limits and secured by temporary fencing. With designated areas delegated to subcontractors the site will remain accessible by incoming trucks without causing a queuing affect outside of the fence. A secondary storage yard is anticipated near the project site to store precast material not accommodated on site. The usage of this area will help to better control and manage the truck traffic to and from the site during the day, as nighttime truck use is prohibited by Maine. Precast trailers will only transport loads between the staging yard and the job site outside of peak traffic hours as defined by Gorrill Palmer as 7:30am – 8:30am and 4:00pm – 5:00pm.

7. *Finalize plan for temporary parking for displaced employees.*

Response: The Eagles parking needs will need to be addressed and managed throughout construction. During the construction process, MMC will provide 37 parking accommodations for the members of the Eagles. Tenants of 222 St John St will receive temporary parking adjacent to the building and in a lot located across St. John St. MMC is committed to providing safe and proximate parking for these properties throughout the construction process.

8. *Clarify which three spaces are being taken on St. John Street during construction (figures conflict).*

Response: During Phase 1, the primary entrance for sitework, concrete and precast deliveries will be through a paved right-of-way at the existing Eagles parking lot. Trucks will then exit the job site through the North gate accessing St. John St via the Union Plaza parking lot. A flagger will be employed to assist in navigating precast loads off St. John to the project site.

Phase 2 will begin once the garage has been 50% erected. The access through the Eagles lot will become blocked by the building diverting all deliveries through the North gate via the Union Station Plaza ROW.

Three on street parking spaces will likely need to be closed to public use for the large trucks to gain access to the project site during Phase 1 & Phase 2. However, the location of these closed parking spaces will change with the phases.

By utilizing the secondary storage area for large deliveries, we can coordinate material deliveries to the site during non-peak hours of traffic or pedestrian presence. Large deliveries will queue at the storage yard located on Commercial St, until the appropriate time is determined to bring the material to the project site for installation.

9. *Ped detour plan should include a temporary crosswalk at 210?*

Response: Included in the attached, updated CM Plan

10. *Provide more detail on how the public will be apprised of construction updates.*

Response: Quarterly reporting and updating of the CMP will be required to update the City and community of the following activities:

- 1) Construction schedule updates
- 2) Material deliveries, including notice of any oversized loads that may impact public traffic
- 3) Requests for upcoming off-hours work including weekends and holidays
- 4) Notice of any upcoming activities that may produce strong noise, vibration or dust that could adversely affect the neighboring communities.
- 5) Requests for any street openings or public sidewalk work to be completed as part of the construction contract

Additionally, MMC will provide updates via their project website. Inquiries about construction, logistics, schedule and safety will be specifically addressed on the website along with the contact information for individuals associated with each aspect of the project. Neighborhood outreach events will be scheduled at each major phase/milestone where changes to pedestrian or vehicular traffic patterns occur.

11. *Provide more information on how snow ban parking will be managed.*

Response: MMC will continue with established policies that allow for snow ban parking in its parking structures.

Site Plan Review

1. *Waiting on confirmation that MaineDOT agrees to the installation of traffic signal (GP was making initial contact)*

Response: Email response from Steve Landry of MaineDOT on July 9th, 2018 stated: "We would entertain the installation of the signal, only with you knowing it can't be turned on until you show it meets the signal warrants." We look forward to working with the City of Portland to work towards operationalizing the signal when the garage opens.

2. *Intersection Design:*

- a. *Further discussion on the design of bike lane pending- need to confirm best practice for avoiding southbound right turn/bike conflicts.*

Response: MMC received additional comments from the City of Portland on July 20, 2018 stating that additional information is forthcoming.

- b. *See bike lane paint specs here: <https://www.transpo.com/roads-highways/materials/pavement-marking-material/color-safe-bike-lanes>*

Response: Comment acknowledged

- c. *Include elevation of pedestrian connections through Western Promenade. There is evidence of desire lines off the formal path network. Could these be formalized? If so,*

lighting or additional safety measures (e.g. call boxes?) may be necessary. Any new lighting or paths would need to be approved by HP.

Response: An assessment of the Valley Street Trail has been conducted, additional comments from the City of Portland July 20, 2018 requested additional evaluation. A final Valley Street Assessment will be provided once complete.

3. *Technically, not required to provide a facility under site plan review, as the nearest pullout is less than a quarter of a mile north. However, there is an existing METRO stop in front of the Eagles lot. How will this stop be handled?*

Response: MMC received additional comments from the City of Portland on July 20, 2018 stating that additional information is forthcoming.

Note that METRO is working to install a shelter facility on Congress at the north end of Union Station Plaza.

Response: Comment acknowledged.

4. *See notes on parking analysis above.*

Response: Comment acknowledged. See response above.

5. *Support partial waiver on bike parking. However, bike parking location (in off-corners of the ground level garage) should be reevaluated. Is there a more accessible location closer to the entrances?*

Response: Additional bike parking has been provided at the lobby entrance along St. John Street to address this comment and design comments. Please refer to the attached revised design drawings for locations.

In addition, MMC is currently assessing all of its bike parking facilities on the Bramhall Campus.

6. *Add notes to planting plan regarding treatment of 210 St. John buffer. It is our understanding that existing arborvitae in this area will be replaced if damaged during construction. This (or any alternative plan for this area) should be noted.*

Response: The mature arborvitae hedge along the property line boarding the south boundary of 210 St. John Street will be protected during construction. If damage to the plants occur, the plants will be replaced.

7. *Clarify which fence detail goes in which location.*

Response: Additional clarification notes have been added to the attached revised design drawings.

8. *Maybe more comments re viability of checkerboard pavers in utility access area.*

Response: Please see the attached "Checker Block Technical Note Traffic Loading Calculation Example" for documentation supporting the H-20 loading capacity of the checkerboard pavers.

9. *Provide screening for transformer and generator on front of building.*

Response: Area of transformer and generator will be naturally screened from the roadway via, mounded landscaping berms.

10. *Need street trees on D Street, as possible*

Response: Comment acknowledged. MMC received additional comments from the City of Portland on July 20, 2018 stating that additional information is forthcoming.

11. *Continued concern re CPTED around site. Evaluate for additional opportunities for natural surveillance/ territorial reinforcement. Expand entrance? Bring security from with windows to grade level?*

Response: Windows have been added to the mechanical room on the first floor of the garage facing St John St, the canopy has been expanded, and bike racks have been added. See revised design drawings.

12. *Need capacity to serve letters*

Response: Woodard & Curran has contacted utilities regarding capacity to serve the proposed parking garage. Capacity to serve letters will be forwarded upon receipt.

13. *Revise dumpster enclosure to wood*

Response: It is our recommendation that the dumpster enclosure remain as previously proposed. Given the location and use of the site and surrounding areas, a black polyvinyl coated chain link fence with vertical privacy slats will provide a longer service life. A wood enclosure would be too easily damaged by truck traffic.

14. *Provide capacity to serve letters upon receipt.*

Response: Woodard & Curran has contacted utilities regarding capacity to serve the proposed parking garage. Capacity to serve letters will be forwarded upon receipt.

15. *Need waiver request for average illumination levels*

Response: The roof deck parking lot lighting has been intentionally limited to the center of the garage to minimize the visual impact from off-site. To meet IESNA safety standards for minimum illuminance of 0.5 footcandles the design solution results in a maximum illuminance level of 6.4 footcandles, and an average of 2.4 footcandles. We could have met the Portland standard if we had located lighting poles around the perimeter of the garage deck, but we did not feel that was appropriate.

Similarly, the north parking lot lighting poles have been kept to the center of the parking lot to avoid unacceptable levels of light trespass across the west property line which is immediately adjacent to the north parking lot boundary. To meet the IESNA safety standards for minimum illuminance of 0.5 footcandles the design solution results in an average of 1.9 footcandles.

Furthermore, the Portland lighting standards do not coincide with lighting IESNA recommendations for street intersections. The intersection of St. John Street and D Street, and the intersection of St. John Street and C Street require an average illuminance of at least 2.1 footcandles (based on a "collector" street and "local" street intersection with high pedestrian activity). Accordingly, the design solution for the St. John/D Street intersection results in an average of 2.2 footcandles, and the St. John/C Street intersection results in an average of 2.1 footcandles.

16. *Is there an opportunity to dim or turn off lights at night when use will be down?*

Response: The roof deck lighting will be controlled both by photocell and time/motion control. The photocell will allow the lights to operate only after dark. The time/motion control will restrict the

operation of the roof deck lighting by means of motion control in the hours after 10:00 pm until 5:00 am. The motion sensors will be located at the ramp leading up to the roof deck, as well as at the stairwells at the roof deck level.

Concern re visibility of rooftop lights from western prom. Can top deck be closed down at night and these lights be shutoff?

Response: MMC will install a timer and motion sensor system to the roof lighting system.

17. As noted above, may need lighting within Western Prom. Further info on this pending evaluation noted above.

Response: An assessment of the Valley Street Trail has been conducted, additional comments from the City of Portland July 20, 2018 requested additional evaluation. A final Valley Street Assessment will be provided once complete.

18. Can material samples be provided for Planning Board

Response: The design team is currently working on a palette of materials to share with the Planning Board and City Staff.

19. Right Title and Interest

a. Need Exhibit A of Eagles Purchase & Sale:

Response: See the attached, recorded deed for this property which should satisfy RTI.

b. Need evidence of rights to make improvements to 222. St. John and to Union Plaza lot

Response: Refer to Easements contained in Section 7 of the Site Plan Application, granting rights for improvements associated with access and drainage on Union Plaza land.

c. Need evidence of easement across Union Station Plaza for stormwater & access

Response: Refer to Easements contained in Section 7 of the Site Plan Application, granting rights for improvements associated with access and drainage on Union Plaza land.

d. Confirm that we have evidence of stormwater infrastructure easements with 222 St. John pursuant to lot split. Is there a figure showing this & the access easement?

Response: The two properties are managed by a common entity that has ownership of both parcels, and that has leased the properties to Maine Medical Center under a 50 year lease. The lease agreements for these properties are attached.

e. Need construction easements on Union Station Plaza lot. These will be required prior to building permit

Response: Right of entry / construction agreements will be established for the adjacent properties prior to the start of construction.

Comment letter from Jeremiah Bartlett, Traffic Systems Engineer Dated July 05, 2018

Sheet C-100

1. Additional detail shall be provided for pavement markings providing direction for cyclists through the proposed signalized intersection at the garage entrance, which could include skip markings, green paint, and other components. The approved plan will coordinate with DPW on the appropriate marking materials for this location.

Response: MMC received additional comments from the City of Portland on July 20, 2018 stating that additional information is forthcoming.

2. *The traffic signal proposed for the garage entrance, upon completion, shall be capable of bicycle and pedestrian detection.*

Response: Comment acknowledged, the signal will be capable of bicycle and pedestrian detection.

Sheet C-107

1. *The proposed sidewalk facility on the north side of D Street shall be placed as close to the right-of-way as possible and provide the maximum width without reducing the street to less than 36 feet in width.*

Response: MMC received additional comments from the City of Portland on July 20, 2018 stating that additional information is forthcoming on recommendations for layout of D Street.

2. *To adequately define the street and replace on-street parking being eliminated by the proposed intersection reconfiguration with St. John Street and the primary garage entrance, curbing should be placed on the south of D Street with existing driveways brought as close into conformance as possible. This would facility a future City sidewalk project in keeping with the original 1928 layout plans for D Street.*

Response: MMC received additional comments from the City of Portland on July 20, 2018 stating that additional information is forthcoming on recommendations for layout of D Street.

3. *The new crossing configuration of D Street, including islands and curb ramps shall consider either a payment upfront to facilitate the changes on a imminent MaineDOT paving project of Valley Street*

Response: Comment acknowledged. MMC has reached out to the project contact at MaineDOT, and is working to coordinate these improvements.

Comment letter from TYLIN International Traffic Dated July 05, 2018

1. *The parking garage has a number of spaces that do not meet the City's dimensional standards for size. The applicant should request a formal waiver with supporting documentation.*

Response: A waiver has been requested within the attached waiver request form.

2. *The garage plans should include dimensions for parking aisle widths.*

Response: Revised plans include additional dimensions.

3. *A traffic signal is proposed at the St. John street/D Street/Garage Driveway location. I support the installation of a traffic signal given vehicle volume conditions and anticipate pedestrian movements. I would note that the applicants responsible for the development of design plans and equipment specifications for review and approval by the City. All costs associated with the installation of the traffic signal is the responsibility of the applicant.*

Response: Comment acknowledged.

4. *The general layout of the St. John Street/D Street/ Garage Driveway intersection is generally acceptable. It should be noted that the City is currently reviewing bicycle facility*

recommendations and final direction will be provided in the future. Some initial comments are provided below:

- a. *The number of pavement marking arrows is excessive and should meet either City or MaineDOT Standards (they may be for traffic flow reasons). I would suggest the through lane arrows be eliminated on St. John Street.*

Response: Pavement markings have been reduced, please see the attached revised design drawings for updated pavement markings.

- b. *A crosswalk on the St. John Street southerly approach shall be provided.*

Response: An additional crosswalk has been added on the southerly approach on St. John Street. Please see the attached revised drawing set.

- c. *I continue to review the garage approach as it relates to providing a three-lane section with a reversible center lane and traffic control design elements.*

Response: MMC needs clarification regarding the cause for continuing review.

5. *The applicant has provided a traffic evaluation and my initial comments are noted below:*

- a. *I have requested the Synchro traffic model for review.*

Response: Synchro traffic models have been to City staff for review on July 6, 2018.

- b. *I have requested the traffic count data collection report for review.*

Response: Traffic counts have been sent to City staff for review on July 6, 2018 and a copy of the email only has been attached within the comment response letter for reference.

- c. *I find the methods used to estimate traffic volumes associated with the garage to be reasonable. I would note that additional review is required. The evaluation notes that a broader review of the area transportation system and parking garage will occur during Phase 3 of MMC's expansion.*

Response: Comment acknowledged.

- d. *From a vehicle capacity perspective, I would recommend a shared through/right shared lane configuration on the southbound St. John Street approach.*

Response: MMC received additional comments from the City of Portland on July 20, 2018 stating that additional information is forthcoming.

- e. *Some of the intersection level of service conclusions seem better than actual field conditions. I would suggest the applicant field confirm intersection delays and queues.*

Response: This comment was discussed in more detail with Mr. Errico on July 23, 2018. As discussed with Mr. Errico, the most significant perceived difference in level of service between the analysis and experience in the field is during the AM peak hour. The forecast AM peak hour of the garage occurs between 6:00-7:00 AM when the trip generation is forecast to be 1097 trip ends. Adjacent street traffic is minimal at this time of the morning. The garage is only expected to generate 556 trip ends (almost half) during the AM peak hour of the adjacent roadway network which occurs approximately between 7:30-8:30 AM. Since the garage peaks well before the adjacent street traffic, the levels of service are better than when commuter traffic creates congestion. In addition, specific to the intersection of St. John / Congress, there is currently an exclusive pedestrian phase that significantly decreases the capacity of the intersection when actuated by pedestrians. This exclusive pedestrian phase has previously

been identified by Gorrill Palmer to change to concurrent pedestrian phasing as part of the garage project, thus significantly improving the intersection level of service from existing conditions. It should be noted that the intersections in the immediate area will also be reevaluated in Phase 3 of the MMC expansion when a Traffic Movement Permit will be required.

6. *The applicant should provide information on the provisions of temporary parking conditions for both MMC and 222 St. John Street during construction activities.*

Response: MMC parkers will be relocated to the Gateway garage and shuttled to campus during the construction process. 222 St John St parkers will utilize the surface parking lot on the east side of St John St and portions of the rear surface parking lot.

7. *The sidewalk from St. John Street to the rear of 222 St. John Street should be ADA compliant and continuous.*

Response: The sidewalk in this location has been revised to provide a continuous sidewalk, while maintaining existing slopes adjacent to the existing entrance drive. Please refer to attached revised design drawings.

8. *The applicant should provide a parking analysis for the parking demand and supply conditions for 222 St. John Street.*

Response: A utilization analysis of parking behind 222 St John St is attached within this submission packet.

9. *I would suggest a crosswalk be provided across the 222 St. John Street driveway.*

Response: A crosswalk has been added in this location, please refer to the attached revised design drawings.

10. *The median refuge island on Valley Street needs to be a minimum width of 6-feet to meet ADA requirements. The ramp configuration on the west side should be revised to eliminate the flare condition. Warning signs may be required, and direction will be provided in the future.*

Response: Comment acknowledged, MMC will coordinate with the City of Portland and MaineDOT on final design details.

Comment letter from Bruce Hyman Transportation Program Manager Dated July 05, 2018

Site Layout and Materials Plan 1 (Sheet C-100)

1. *City Staff are reviewing various bikeway/roadway configuration, pavement marking and signage along the St. John Street frontage to provide the best bikeway given the high prevalence of right turns on the southbound St. John St. into the parking garage.*

Response: MMC received additional comments from the City of Portland on July 20, 2018 stating that additional information is forthcoming.

2. *The walkway along the driveway from the garage/Eagles building should provide a full usable width of 5' exclusive of the lighting poles/fixtures. The sidewalk should be widened or the poles moved out of the sidewalk.*

Response: The proposed sidewalk has been widened to provide a minimum of 5' width. Please refer to the attached revised design drawings.

3. *The sidewalk proposed along D St should have a wider effective/usable width given the likely location of the lighting poles within the sidewalk and the potential for moderate to high numbers of pedestrians using the sidewalk (6.5' is too narrow).*

Response: MMC received additional comments from the City of Portland on July 20, 2018 stating that additional information is forthcoming for the layout of D Street.

4. *Consideration should be given to curb the south side of D St as well to establish a standard width street of approximately 38' curb to curb to better organize its likely increased use and accommodate a future sidewalk.*

Response: The proposed D Street improvements have been revised to show a 36' curb to curb dimension as previously discussed with City Staff. Please refer to the attached revised design drawings. We anticipate additional changes to D Street based on comments received from the City on July 20th.

5. *The curb ramps at the NE and NW corners of the entrance/exit and D St may need to be reconfigured and may not be as large as shown (potentially reduce the length of flush curb and detectable warning panels).*

Response: The curb ramps in this location have been revised, please see the attached revised design drawings.

6. *Consideration should be given to provide a 4th crosswalk at the intersection with D St/ garage entrance-exit.*

Response: A fourth crosswalk has been added, please see the attached revised design drawings.

7. *It is unclear whether the plans for D St. account for the two driveways that currently exist today on the north side.*

Response: The two existing driveways have been accounted for within the D Street upgrades. Please see the attached revised design drawings.

8. *The curb ramp on the west side of Valley Street at D street may warrant a different configuration that does not use a flare- the proposed configuration is less traversable by those with disabilities.*

Response: MMC received additional comments from the City of Portland on July 20, 2018 stating that additional information is forthcoming.

9. *Valley Street will be under moratorium later this year it is paved via a MaineDOT project and the timing and impact of the construction of the proposed pedestrian crossing (ramp, refuge island) need to be considered.*

Response: Comment acknowledged. MMC has reached out to MaineDOT's project manager, as requested by the City, to coordinate project improvements.

10. *The pavement markings and labels for the reversible center lane for the garage exit/entrance are to be revised to be clearer.*

Response: Pavement markings and labels have been revised, please see attached revised design drawings.

11. *The driveway, as shown, does not conform to the Technical Manuals Sidewalk Material Policy- it is to be brick.*

Response: The driveway has been modified to show a brick apron, please refer to the attached design drawings. MMC continues to have concerns about the durability of a brick apron in this location.

Site Layout and Materials Plan 2 (Sheet C-101)

12. *A crosswalk across the Margarita's driveway should be provided.*

Response: A crosswalk has been added in this location, please see attached revised design drawings.

13. *A continuous sidewalk along the frontage of margarita's should be provided- there should be an expectation of some pedestrian use of that route to/from the 1st floor of the parking garage connecting to St. John St*

Response: The sidewalk in this location has been revised to provide a continuous sidewalk, while maintaining existing slopes adjacent to the existing entrance drive. Please refer to attached revised design drawings.

Sidewalk Improvement Plan (Sheet C-107)

14. *The network of pathways and lighting from Valley Street to the Western Prom should also be assessed for its adequacy to provide safe and direct connections to/from MMC and the parking garage to encourage walking*

Response: An assessment of the Valley Street Trail has been conducted, additional comments from the City of Portland July 20, 2018 requested additional evaluation. A final Valley Street Assessment will be provided once complete.

15. *A crosswalk across the driveway at 222/Margarita's is to be added.*

Response: A crosswalk has been added in this location, please see attached revised Design Drawings.

Civil Details (incl. Sheet C-202)

16. *The brick sidewalk detail is to be modified to state "2% cross slope (MAX." not (TYP).*

Response: The brick sidewalk detail has been revised, please see attached revised design drawings.

17. *Details are needed for detectable warning panels (cast iron) and Driveway (showing "2% cross slope (MAX.)").*

Response: The brick sidewalk detail has been revised, please see attached revised design drawings.

Comment letter from Caitlin Cameron, Urban Designer Dated July 02, 2018

1. *The one aspect of the current proposal that HP staff suggests be given further consideration is the color/tonal palette. The current proposal features a high level of contrast, which is visually striking, but also demanding. In staff's view, were the colors warmer in tone and "knocked down" in terms of contrast, the building would likely achieve a greater level of compatibility with its surrounding context.*

Response: The renderings emphasize the contrast between the actual material choices. Material samples will be provided.

2. *Staff recommend in order for the garage to be visually cohesive with the MMC campus and the surrounding context, the material color palette should be coordinated to include warm tones of the grey and white.*

Response: Material samples will be provided.

3. *Consider whether the high level of contrast is appropriate – though staff are supportive of the grey and white materials, the level of contrast may bring too much attention to the garage that otherwise is intending to be recessive.*

Response: Please refer to response above.

4. *Staff suggest more emphasis can be brought to both entrances – increase scale of entrances, canopies, lobby area, etc. to increase scale of these entrances in relationship with the scale of the building and the distance from the street.*

Response: MMC has added windows to the mechanical room on the first floor of the garage facing St John St, expanded the canopy facing St John St, and added bicycle storage in the lobby area. See revised plans.

5. *What is the material of the ramp roof? Is that depicted in the renderings?*

Response: The ramp roof will be precast concrete.

6. *There are some outstanding questions regarding the roof level design in relation to long views:*
 - a. *Are the ramp and circulation tower roofs adequately depicted in the renderings? It is difficult to tell how visible these will be with the materials provided.*

Response: Yes. They are very small and not visible from a distance.

- b. *Concern about the visibility of the roof lighting poles and light levels, especially the impact on the Western Promenade.*

Response: The roof deck lighting poles have intentionally been limited to locations along the center of the roof deck to minimize their visual impacts as might otherwise be experienced if the lighting poles were located along the perimeter of the roof deck.

7. *The project proposes limited activity at the ground floors – the building use is garage only and is set back from the street. There is a garage entrance oriented to St. John and shuttle activity and an entrance facing the side surface parking.*
 - a. *Consider ways of introducing more “eyes on the street” facing St. John Street whether that be more glass on the circulation tower, increasing the size of the entrance lobby, adding windows to the security/utility area of the façade (clerestory, 2nd level waiting lobby, etc.).*

Response: Windows have been added to the mechanical space facing St John St and the canopy has been enlarged. The proposed garage building will have full-time 24-hour 7-days-a-week security presence with security camera coverage of both the interior and exterior of the building. Bicycle racks have been added below the enlarged canopy to further activate the space.

8. *Staff request more information regarding the screening of cars. Screening methods include solid concrete spandrel wall with metal mesh railing on the ground floor. It is not clear whether the spandrel panels will conceal the headlights of cars. Will cars be screened from view on the top floor, from the Western Prom?*

Response: Yes, headlights will be screened by spandrel panels. Cars on the top floor of the garage will not be screened from the Western Prom. The elevation of the Western Prom is higher than the top floor elevation of the garage.

9. *Staff suggest the lobby entrance facing St. John Street could increase in size, include more fenestration, and/or include additional lighting.*

Response: Comment acknowledged. Windows have been added to the mechanical space on level 1 of the garage. See revised plans.

10. *Regarding "Eyes on the street" See Comment 8.*

Response: The proposed garage building will have full-time 24-hour 7-days-a-week security presence with security camera coverage of both the interior and exterior of the building.

11. *Rather than extend a wood fence to the street between the Railroad Building and the residential building, staff recommend using landscape.*

Response: A 4-foot fence along with landscaped screening will be provided between the Railroad Building and the residential building, please refer to attached revised design drawings.

12. *Clarify whether there is building lighting above ground level.*

Response: Along the western façade there are building lights that illuminate the emergency egress walkway. These lights are installed at 10'-0" above the finished grade of the walkway. At the garage entrances/exits at the eastern façade and at the northern façade there are lights installed at 20'-0" above the finished grade of the drive surfaces. Along the southern façade there are building security lights installed at 10'-0" above the finished grade. There also are lights installed under the ceiling of the entrance canopy at the eastern façade.

13. *Concern about light trespass on neighboring residential properties and level of light visible from the Western Promenade at night. More information is requested regarding the impact of site lighting from the long views, especially light trespass and visibility of the lighting on the upper stories and roof from the Western Promenade.*

Response: The roof lighting has been prepared to meet the lighting recommendations published by the Illuminating Engineering Society of North America (IESNA). The minimum recommended illuminance is 0.5 footcandles at the parking surface. The lighting design has been kept to a practical minimum to avoid excessive lighting levels. The designed minimum illuminance is 0.6 footcandles.

14. *Staff comment that the material color palette causes the building to stand out or be less recessive than desired. Therefore, the suggestion is that the grey and white materials should have a warm tone to be cohesive not only with the existing MMC campus but also the surrounding context.*

Response: The renderings emphasize the contrast between the actual material choices. Material samples will be provided. MMC is working to provide material samples for review.

15. *The rooftop design including light poles, ramp and circulation tower roofs, and any mechanicals should be accurately demonstrated in these renderings. It appears in the materials given that these rooftop appurtenances have minimal visual impact and are integrated into the design, but staff would like to clarify whether all these features have been included in the rendering images.*

Response: Yes, these features have minimal visual impact and were included on the renderings but may not be apparent from various vantage points due to scale of the objects relative to the building and/or eye elevation relative to the roof.

16. *Given the scale of the building and the set back from the street, the scale of the entrance lobby could increase to be more visible and provide a more "lively" space.*

Response: The proposed building entrance canopy has been extended along with the addition of bike racks, and windows in the mechanical room.

We look forward our next meeting with the Planning Board. Please do not hesitate to contact me if you have any questions or require additional information.

Sincerely,

WOODARD & CURRAN



David Senus, PE
Project Manager

Attachments

1. Design Change Letter
2. Checker Block Paver Documentation
3. City of Portland Department of Public Works Correspondence
4. Subcatchment Area Evaluation
5. Construction Management Plan
6. Right, Title, & Interest
7. Waiver Request Form
8. Traffic Correspondence July 06, 2018
9. 222 St. John Street Parking Assessment
10. Lighting Design Updates Letter
11. Section 12 of the Level III Site plan Narrative

ATTACHMENT 1: DESIGN CHANGE LETTER

July 24, 2018



Nell Donaldson, Senior Planner
City of Portland Planning Division
389 Congress Street
Portland, ME 04101

Re: MMC Staff Parking Garage | 222 St. John Street | Level III Site Plan
Design Change

Dear Nell:

The purpose of this memorandum is to summarize changes made within the attached revised design drawings since the initial Level III Site Plan Submission on June 22, 2018.

Drawing Sheet C-100 (Civil Site Layout)

- Additional garage entrance added at the southeast corner of the parking garage. This entrance will facilitate parking for users of 184 St. John Street (Fraternal Order of the Eagles). A total of 50 spaces within the parking garage have been designated for 184 St. John Street and will be sectioned off from Maine Medical Center Employee users internal to the building. Sidewalks added from the garage to the north and south side entrances of Eagles building.
- Reconfiguration of existing 184 St. John Street Parking lot; the existing parking lot is proposed to be reconstructed within its existing footprint. The reconstruction includes revised parking lot striping and the addition of a brick driveway apron in accordance with the City's standards.
- Addition of 6-foot high fence between 184 St. John Street and 190 St. John street entrances. The fence is intended for security purposes and to prevent pedestrians from crossing between driveways, and to provide additional security within the area.
- Reconfiguration of the transformer and generator pads. Equipment pad dimensions and locations have been updated to match current electrical drawings and code requirements for separation.
- Addition of bicycle parking at the garage lobby entrance. Based upon City of Portland comments and discussions, six additional bike racks have been added at the lobby entrance for users of the garage.
- Addition of brick driveway apron at garage entrance drive per City of Portland comments.
- Additional detailing of D Street design per City of Portland comments, as described in Response to Comment Letter. Awaiting final input from City for further revisions.
- Addition of fourth crosswalk at D street, St. John Street, Garage entrance intersection.

Drawing Sheet C-101 (Civil Site Layout)

- Addition of reinforced turf turn-around at the north entrance of the garage for access to pump station.



- Reconfiguration of the sidewalk to the north of 222 St. John Street. Per City of Portland comments the sidewalk has been reconfigured to be continuous in this location.

Drawing Sheet C-102 (Civil Grading & Drainage)

- Additional storm drain structures have been added to accommodate the new garage entrance from 184 St. John Street.
- Updated storm drain rim and invert elevations for storm drain along the western side of the garage.

Drawing Sheet C-103 (Civil Grading & Drainage)

- Reconfiguration of grading adjacent to the pedestrian walkway from the northeast corner of the garage to St. John Street. Grading has been revised along the northern edge of proposed stairs; narrow strip of stone armoring added immediately adjacent to stairs to provide stabilization and prevent erosion.
- Revised grading along Union Station Plaza entrance, proposed grades have been revised to match existing grades.

Drawing Sheet C-104 (Civil Utility)

- Relocation of fire hydrant to lower level northern entrance drive in response to fire department comments.
- Relocation of pump station and valve box.

Drawing Sheet C-201 (Civil Details)

- Addition of Oil Water Separator and Pump Station Details.

Drawing Sheet L1.0 (Landscape Plan)

- Revised planting plan behind 184 St. John Street.
- Revised planting along northern property line of 212/214 St. John Street.

Drawing Sheets PS1- PS6 (Garage Floor Plans)

- Revised garage layout to accommodate separate 184 St. John Street entrance and parking spaces.
- Relocated van accessible spaces to level G and reduce floor to floor level 1 and level 2.
- Design layout changes within travel lane.
- Adaptational travel lane dimensions.

Drawing Sheet G102 (Code Information Plan)

- Revised garage layout to accommodate separate 184 St. John Street entrance and parking spaces.



Drawing Sheets A101 and A102 (Building Elevations)

- Revised east façade to accommodate entrance for 184 St. John Street users (Eagles).
- Enlarged canopy over entrance area in response to City comments.
- Added windows at electrical / mechanical rooms in response to City comments.
- Reduced the floor to floor height of the first deck level (lower) by relocating van accessible spaces to level G; revision resulted in a reduction in the overall building height (revisions to elevation call outs)
- Removed the screening wall above the stair tower due to changes in mechanical equipment

Sincerely,

WOODARD & CURRAN

A handwritten signature in blue ink, appearing to read "David Senus".

David Senus, PE
Project Manager

**ATTACHMENT 2: CHECKER BLOCK PAVER
DOCUMENTATION**



Gretchen Kelly Giumarro, RLA
michael boucher landscape architecture
457 US Route 1 Suite 2
Freeport, ME 04032
t 207 865 1080 x7046

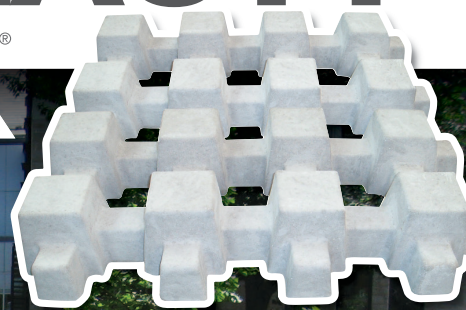
Checker Block Snow Guidelines.

Below are a few bullet points to make sure you are aware and guided through snow removal and maintenance.

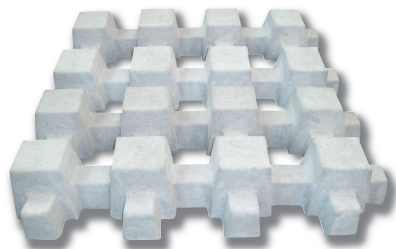
- Due to the open surface areas, the water from the melting snow will be absorbed back into the soils and not build up, therefore it will have a superior advantage to ice buildup because there will be no water pooling and water surface freeze.
- Checker Block is a concrete product and therefore if you need to use any de-icing products you should use them sparingly. If you are looking for better traction we recommend using a sand. All concrete block should be treated with caution when it comes to de-icing products
- Plows should be lifted 1-2 inches above surface this will aid in any unnecessary possible damage.
- This product is reinforced and therefore it has a great ability for weight transfer and load supporting ability.

Carl Peterson
Director of Education
Product Development
Nicolock Pavingstones
908-482-8483

REINFORCE YOUR TURF WITH STRENGTH & BEAUTY checker block®



go green.



24" x 24" x 4"
available in natural color

75%
SURFACE
OPENING



For more information visit
www.checkerblock.com

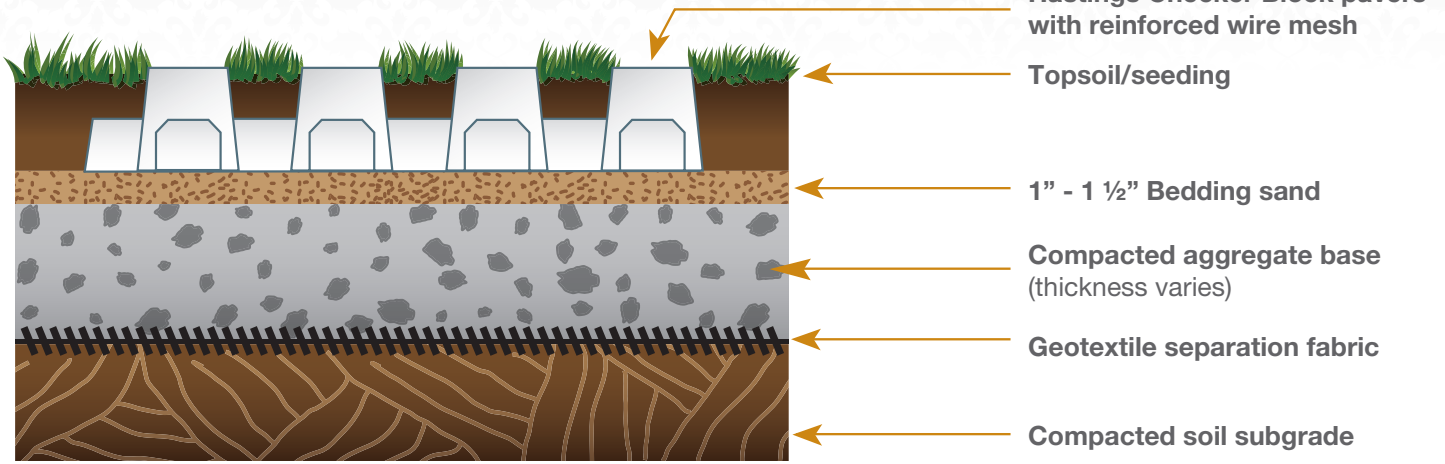
Checker Block® Features & Benefits:

- Steel-reinforced, 4" thick, heavy-duty slab with thick webs, ideal for commercial application.
- Pervious concrete grid.
- Approved for H-20 loading for parking, service roads, tree pits, and fire lanes. It is also Ideal for stabilizing embankments along streams, rivers, and lakes.
- LEED® credit potential: Open grid pavement with an SRI > 29; stormwater runoff reduction; and regional materials.
- Checker Block is manufactured in accordance with ASTM 1319, (Standard Specification for Concrete Grid Paving Units) which requires a minimum compressive strength of 5,000 psi.
- Large surface void area allows for significant turf establishment (not always feasible with plastic or Turfstone products).

checker block®

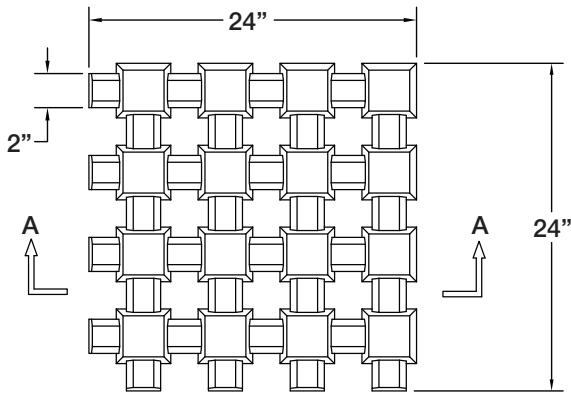
Strength plus nature's beauty.

The unique waffle-like configuration of this pervious castellated product provides significant grass coverage when properly filled with topsoil.

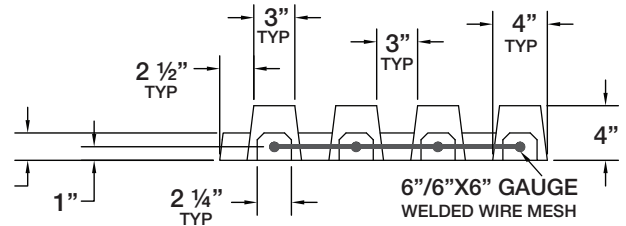


Each 4 square foot unit is 4" thick, and provides a 75% grass to concrete ratio (ratio measured by each 4 s.f. section), ensuring a green turf that can support significant vehicular loads.

CHECKER BLOCK: TOP VIEW



CHECKER BLOCK SIDE VIEW



specifications

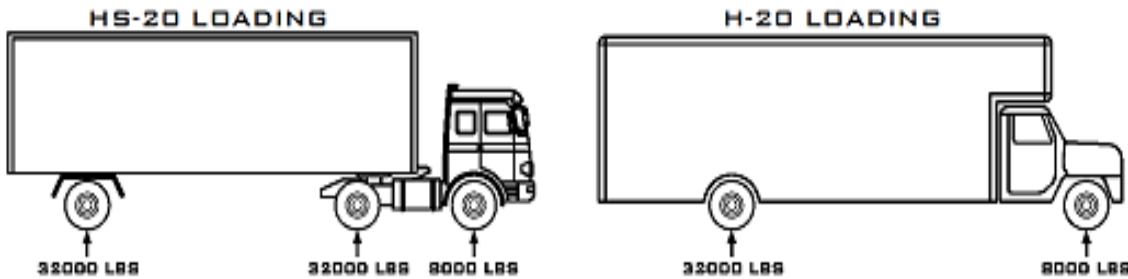
width	length	height	pieces per s.f.	s.f. per pallet	pieces per pallet	pallet weight
24"	24"	4"	.25	80	20	2000



CHECKER BLOCK TECHNICAL NOTE

TRAFFIC LOADING CALCULATION EXAMPLE

The following calculations demonstrate that Checker Block, a permeable reinforced grid paver, satisfies the requirements of meeting or exceeding an H20 or HS20 loading by comparing the theoretical design loads to the compressive strength of Checker Block.



Step #1) Determine the maximum wheel load:

$$W_L = 32,000 \text{ lb} / 2 \text{ (divide by 2 since there are two tires per axle)}$$

$$W_L = 16,000 \text{ lb}$$

Step #2) Increase the load by 30% to account for dynamic forces associated with moving vehicles:

$$W_{L-Dynamic} = W_L \times 1.30$$

$$W_{L-Dynamic} = 20,800 \text{ lb}$$

Step #3) Determine the tire contact area:

FHWA has defined an acceptable default tire contact area as a rectangle with an area of $0.01W_L \text{ (in}^2\text{)}$ with a length-to-width ratio of 1:2.5.

$$A_{contact} = 0.01 W_L$$

$$A_{contact} = 0.01 \times (16,000 \text{ lb}) = 160 \text{ in}^2$$

Check dimensions of contact area by confirming that $A_{contact}$ also = 160 in^2

$$L = \sqrt{\frac{160}{2.5}} \cdot \text{in}$$

$$W = (2.5 \times L)$$

$$L = 8 \text{ in}$$

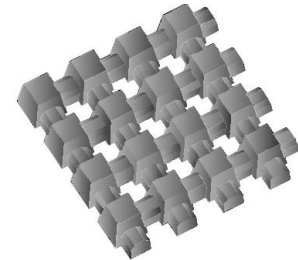
$$W = 20 \text{ in}$$

$$A_{contact} = L \times W = 8 \text{ in} \times 20 \text{ in} = 160 \text{ in}^2 \text{ ... checks.}$$



Step #4) Determine the stress exerted per tire in the dynamic load:

$$\sigma_{\text{tire}} = \frac{W_{L\text{-dynamic}}}{A_{\text{contact}}} \quad 20,800 \text{ lb}/160 \text{ in}^2 \quad \sigma_{\text{tire}} = 130 \frac{\text{lb}}{\text{in}^2}$$



Step # 5) Compare Checker Block strength to H20 or HS20 loading:

Checker Block is manufactured to ASTM C1319 standards requiring a minimum compressive strength of 5,000 psi, which is well in excess of any H20 or HS20 theoretical loading scenarios. As illustrated above, the maximum theoretical tire pressure exerted is 130 psi, so stresses are effectively transferred to the base and subgrade using Checker Block. This significant factor of safety, along with unique steel reinforcement, makes Checker Block the strongest concrete grid paver on the market. Checker Block is castellated, with a 75% turf surface area; optimized for grass establishment. No lattice grid paver can compare to the safety, strength, and turf coverage of Checker Block.

The subgrade soil and base preparation are critical to the performance of any pavement or paver system subjected to vehicular traffic. The subgrade soil and base, in addition to the paver product, must be able to safely transfer the load into the underlying foundation subgrade soil in a stable manner. The above calculations demonstrate that Checker Block is capable of supporting heavy vehicular design loading, but it is up to the design engineer to ensure that an adequate base thickness is specified and that verification of subgrade soil occurs prior to installation of any paver product. All pavement design is site-specific based on actual soil conditions and anticipated vehicular loading patterns.

Nicolock offers the following base thickness guidelines for typical Checker Block applications:

Minimum Dense-Graded Aggregate Base Thickness Guidelines for Checker Block¹

Conditions	Subgrade Soil Types	Residential Loading Driveways, walkways, paths, cart paths, trails	Commercial Loading Streetways, emergency access, erosion control, slopes, boat ramps
Stable, firm, dry granular soils (CBR > 10) Ground ruts with vehicular traffic (5<CBR<10) Ground is soft, moist, and ruts easily (CBR<5)	GP, GW, GC, SW, SP, SC ML, CL, MH, CH	8-inch base 10-inch base 12-inch base	8-inch base 12-inch base 16-inch base

¹ notes:

- Subgrade is compacted to 95% of standard Proctor density.
- No free-standing water is observed and a 6 oz woven separation fabric is installed to separate the subgrade from the base material.
- A 1” to 1.5” thick leveling sand bed is used to set the Checker Block grid pavers.

GO TO WWW.CHECKERBLOCK.COM FOR MORE INFORMATION, OR CALL (631) 867-5110

**ATTACHMENT 3: CITY OF PORTLAND
DEPARTMENT OF PUBLIC WORKS
CORRESPONDENCE**

Craig Sweet

From: Bradley Roland <brad@portlandmaine.gov>
Sent: Monday, July 23, 2018 3:22 PM
To: Lauren Swett
Cc: Craig Sweet
Subject: Re: MMC Garage Stormwater

Hello Lauren,

The St John Street storm drain system will be able to accommodate the proposed 3 CFS from the entrance roadway to the new MMC garage.

No questions on my end.

Just plan to tie into the pipe or a manhole as opposed to a catch basin (which we prefer not to allow).

Brad

--

Bradley A. Roland, P.E.
Senior Project Engineer
Portland Public Works
55 Portland Street
Portland, ME 04101
Tel: 207-874-8840
Fax: 207-874-8852
brad@portlandmaine.gov

On Thu, Jul 19, 2018 at 1:58 PM, Lauren Swett <lswett@woodardcurran.com> wrote:

Hi Brad,

A few weeks ago we discussed the ability to connect a portion of the site stormwater from the Maine Medical Center Garage project to the stormdrain in St. John Street. The garage itself and a majority of the site will discharge to the stormdrain system that exits the 222 St. John Street parking lot under the railroad tracks and through the County Jail. The portion of the site that fronts on St. John Street, which includes an access driveway and a landscaped area, will discharge to the stormdrain in St. John Street. Attached is the post-development stormwater figure, that shows Subcatchment 4S as the area that drains to St. John Street. In the 25-year storm, the flow from this area will be approximately 3 CFS.

Can you please confirm that this connection to St. John Street will be acceptable, and if you any questions or need any other information?

Thanks for the help!

Lauren

Lauren Swett, P.E.*

Technical Manager

Woodard & Curran

41 Hutchins Drive

Portland, Maine 04102

Phone: (207)558-3763 (direct)

(207)219-3591 (cell)

(800)426-4262 (office)

Email: lswett@woodardcurran.com

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www.woodardcurran.com

Notice: Under Maine law, documents - including e-mails - in the possession of public officials or city employees about government business may be classified as public records. There are very few exceptions. As a result, please be advised that what is written in an e-mail could be released to the public and/or the media if requested.

ATTACHMENT 4: SUBCATCHMENT AREA EVALUATION

CB2 Area

Prepared by WoodardCurran

HydroCAD® 10.00-18 s/n 01204 © 2016 HydroCAD Software Solutions LLC

Type III 24-hr 25 year Rainfall=5.80"

Printed 7/24/2018

Page 1

Summary for Subcatchment 3S: CB2

Runoff = 1.15 cfs @ 12.07 hrs, Volume= 3,431 cf, Depth= 3.50"

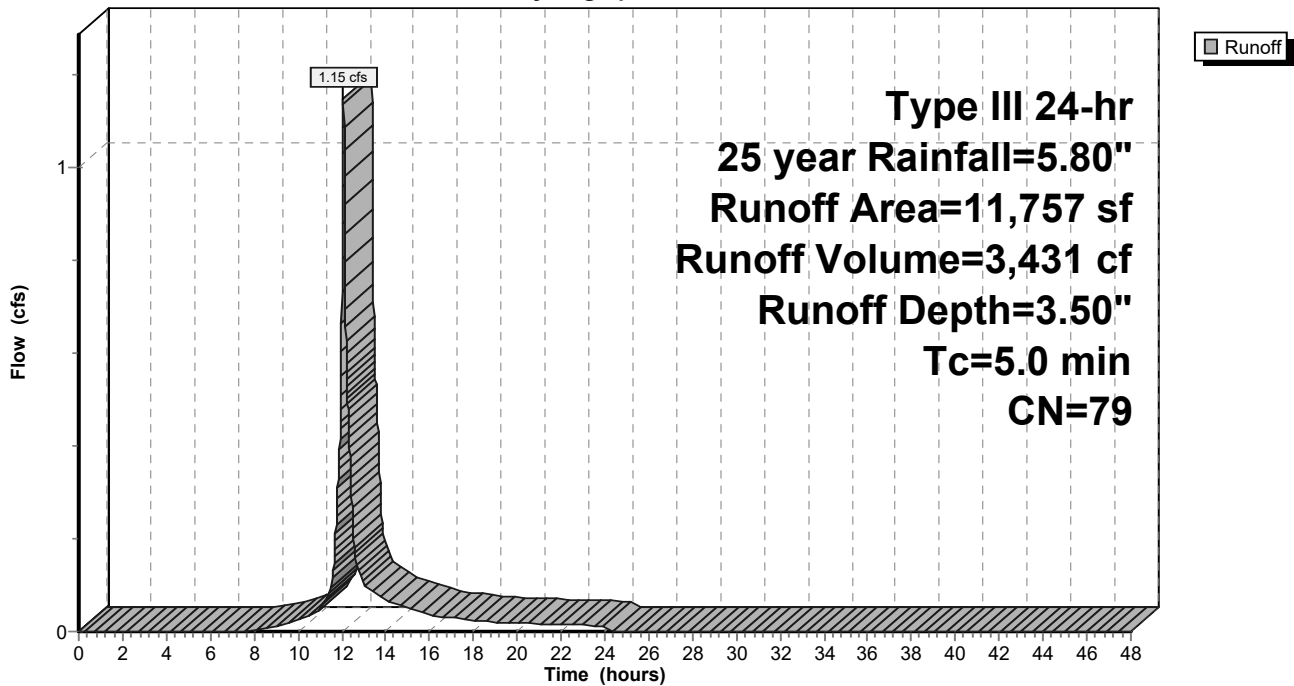
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year Rainfall=5.80"

	Area (sf)	CN	Description
*	2,398	98	Walks
	9,359	74	>75% Grass cover, Good, HSG C
	11,757	79	Weighted Average
	9,359		79.60% Pervious Area
	2,398		20.40% Impervious Area

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

Subcatchment 3S: CB2

Hydrograph





COMMITMENT & INTEGRITY
DRIVE RESULTS

CLIENT Maine Medical Center

41 HUTCHINS DRIVE
PORTLAND, MAINE 04102
TEL.(207)774-2112

PROJECT 222 St. John Street Garage

DESIGNED BY	<u>CMS</u>	DATE	<u>7/12/2018</u>
CHECKED BY	<u></u>	DATE	<u></u>
PROJECT NO.	<u>231158.00</u>	SHEET NO.	<u>1 of 1</u>

Pipe 2 Sizing

Percent Full	Flow Rate (gpd)	Flow Rate (cfs)	Velocity (fps)	Wetted Perimeter	Hydraulic Radius (feet)	Flow Area (sq. ft.)
0	0	0	0	0	0	0
1	197	0.000	0.329	0.167	0.006	0.001
2	877	0.001	0.521	0.236	0.011	0.003
3	2,099	0.003	0.681	0.290	0.016	0.005
4	3,891	0.006	0.822	0.336	0.022	0.007
5	6,270	0.010	0.951	0.376	0.027	0.010
10	27,260	0.042	1.485	0.536	0.053	0.028
15	63,470	0.098	1.913	0.663	0.077	0.051
20	114,343	0.177	2.277	0.773	0.100	0.078
25	178,858	0.277	2.594	0.873	0.122	0.107
30	255,699	0.395	2.874	0.966	0.142	0.138
35	343,323	0.531	3.121	1.055	0.161	0.170
40	440,008	0.681	3.340	1.141	0.179	0.204
45	543,867	0.841	3.534	1.226	0.194	0.238
50	652,855	1.010	3.703	1.309	0.208	0.273
55	764,769	1.183	3.848	1.392	0.221	0.307
60	877,228	1.357	3.971	1.477	0.231	0.342
65	987,650	1.528	4.070	1.563	0.240	0.375
70	1,093,189	1.691	4.146	1.652	0.247	0.408
75	1,190,648	1.842	4.197	1.745	0.251	0.439
80	1,276,288	1.974	4.220	1.845	0.253	0.468
85	1,345,456	2.081	4.211	1.955	0.253	0.494
90	1,391,622	2.152	4.163	2.082	0.248	0.517
95	1,403,004	2.170	4.054	2.242	0.239	0.535
100	1,305,712	2.019	3.703	2.618	0.208	0.545

Diam. (in)	<u>10</u>
Manning n	<u>0.01</u>
Slope(ft/ft)	<u>0.005</u>

**ATTACHMENT 5: CONSTRUCTION
MANAGEMENT PLAN**

June 22, 2018



St. John Street Parking Garage Construction Management Plan

Prepared For: Portland Department of Planning & Urban Development Department

Project Proponent: Colliers International

Construction Manager: Consigli Construction

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Construction Principles

The purpose of this Construction Management plan is to identify, mitigate and plan for all potential impacts throughout the duration of building the St. John Street Parking Garage. Maine Medical Center and Consigli Construction will strive for a seamless, incident free project by means of typical practices used to ensure that public safety and community are at the forefront of priorities.

Throughout this CM plan we will refer to specific examples of potential construction practices, traffic control scenarios, neighboring building considerations and public safety; as well as measures in which these items will be managed throughout the project to accommodate the community as much as possible. While we will take the necessary precautions to meet City and State requirements for traffic, noise, dust, vibration, etc., this project will be disruptive to adjacent properties compared to the current condition. Along with our subcontractor team members, it is imperative that we have complete participation from all parties affiliated with the project to maintain our strict safety requirements and ensure a quality building for Maine Medical Center.

Consigli Construction has been commissioned to construct a new 8 story, 2,450 space garage on the West side of St. John St. The garage is approximately 800,000 sf that will be primarily built out of precast concrete.

Consigli has extensively planned the project's schedule, site logistics and safety protocols that will be thoroughly covered in this report with graphics and narratives. This CM plan will continually be updated to meet the needs of the project, community and the city as the project progresses. We aim to deliver a safe and quality project to MMC, their employees and the City of Portland by means of communication, teamwork and stewardship.

Construction Administration and Communication

Consigli Construction will be the Construction Manager on site throughout the duration of the project. As such, there will be a dedicated team of individuals tasked with managing quality, schedule, site logistics and safety. These personnel will manage and enforce the proposed CMP with all associated subcontractors and material vendors.

Dave Thomas – Project Executive
207-650-8665, dthomas@consigli.com

Travis Kirby – Project Manager
207-272-6980, tkirby@consigli.com

Larry Chouinard – General Superintendent
207-650-5204, lchouinard@consigli.com

Site Communication

With the proximity to occupied buildings, community outreach and communication will be imperative throughout construction to keep the public informed of the expected turbulences caused by the project. Site signage will be prominently displayed to show pedestrian access around the site and any updates to the proposed CMP.

Quarterly reporting and updating of the CMP will be required to update the City and community of the following activities:

- 1) Construction schedule updates
- 2) Material deliveries, including notice of any oversized loads that may impact public traffic
- 3) Requests for upcoming off-hours work including weekends and holidays
- 4) Notice of any upcoming activities that may produce strong noise, vibration or dust that could adversely affect the neighboring communities.
- 5) Requests for any street openings or public sidewalk work to be completed as part of the construction contract

Additionally, MMC will provide updates via their project website. Inquiries about construction, logistics, schedule and safety will be specifically addressed on the website along as the contact information for individuals associated with each aspect of the project. Neighborhood outreach events will be scheduled at each major phase/milestone where changes to pedestrian or vehicular traffic patterns occur.

Construction Schedule

Project Work Hours

Construction work hours will be in accordance with section 17-18.

The project site is located within zoning group B2 – Business Community but is within 500 feet of buildings used for residential purposes. As such, work hours will be limited to Monday – Friday 7:00am – 6:00pm. Should work extend into Saturdays, the use of heavy equipment will be kept within the time constraints of 8:00am – 4:00pm.

Project Schedule/Logistics

The project is anticipated to begin in September 2018 will be partially turned over to MMC in December 2019. The work to complete will include completion of the garage fit-out from grid lines 9-12 along with landscaping items to be completed during the 2020 Spring planting season. Refer to the Overall Construction Sequence on page 10. Final occupancy of the building is expected the first quarter of 2020.

Regarding scheduled work to take place within public streets and sidewalks, this work will comply with Section 25-129 – Noise, dust and debris. The installation and connections to public utilities, traffic lane reconfigurations, and sidewalk construction will require work to be executed within St. John St. and D St. This work will be scheduled and planned with the City of Portland prior to the execution. All logistical concerns will be addressed with the City prior to starting the work. This work is tentatively scheduled to occur during the late summer of 2019. Temporary barricades, ramps and signage will be required during the installation to control pedestrian/vehicle movements around the work.

Material Storage and Laydown Area

The construction of the garage will require careful planning and management of the daily occurrences within the site limits. The logistical plan that is currently outlined is intended to keep all construction staging, laydown and temporary storage within the project limits and secured by temporary fencing. With designated areas delegated to subcontractors the site will remain accessible by incoming trucks without causing a queuing affect outside of the fence. A secondary storage yard is anticipated near the project site to store precast material not accommodated on site. The usage of this area will help to better control and manage the truck traffic to and from the site during the day, as nighttime truck use is prohibited by Maine. Precast trailers will only transport loads between the staging yard and the job site outside of peak traffic hours as defined by Gorrill Palmer as 7:30am – 8:30am and 4:00pm – 5:00pm.

Material Deliveries

The construction of the parking garage will require coordination of material deliveries throughout the duration of the project. The following logistical plans show the planned lay-down areas, truck routes and safety protocols that will be in place prior to the start of construction. Refer to the Truck Routing Plan on page 11. Truck access during construction will be broken up into two separate phases requiring different logistical needs to be addressed.

1. During Phase 1, the primary entrance for sitework, concrete and precast deliveries will be through a paved right-of-way at the existing Eagles parking lot. Trucks will then exit the job site through the North gate accessing St. John St via the Union Plaza parking lot. A flagger will be employed to assist in navigating precast loads off St. John to the project site.
2. Phase 2 will begin once the garage has been 50% erected. The access through the Eagles lot will become blocked by the building diverting all deliveries through the North gate via the Union Station Plaza ROW.
3. Three on street parking spaces will likely need to be closed to public use for the large trucks to gain access to the project site during Phase 1 & Phase 2. However, the location of these closed parking spaces will change with the phases. Please see the logistics plans on page 12 & 13 for more information.
4. By utilizing the secondary storage area for large deliveries, we can coordinate material deliveries to the site during non-peak hours of traffic or pedestrian presence. Large deliveries will stop off at the storage yard located on Commercial St, until the appropriate time is determined to bring the material to the project site for installation.

Contractor/Public Parking

At the peak of construction activity, it is anticipated that up to 100 people will be on site working various trades associated with the building. The current constraints of the project site do not allow for parking of subcontractors within the project limits. As such, contractor parking will be delegated to off site areas. Contractors will not be allowed to park on any residential street within the St. John neighborhood. Any violators will be fined or asked to leave the project depending on the frequency of the violations. Consigli is currently exploring options to acquire off site parking for the subcontractors that would not impact the neighboring community.

The Eagles parking needs will need to be addressed and managed throughout construction. During the construction process, MMC will provide 37 parking accommodations for the members of the Eagles. Tenants of 222 St John St will receive temporary parking adjacent to the building and in a lot located across St. John St. MMC is committed to providing safe and proximate parking for these properties throughout the construction process.

Fire Protection for Construction Activities

The 2013 Standard for Safeguarding Construction, Alteration and Demolition Operations will be enforced on this project by utilizing best management practices to mitigate the fire risks associated with the construction of the parking garage. Consigli and its subcontractors will execute the following measures to provide a safe and secure work place:

- 1) PFD Fire Command Center: This centralized location will hold all current project information and will act as the first responders meeting point to obtain the most up to date information of construction. The following documents will be found at this location:
 - a. Hot Work Permits: To be filled out daily by any person performing work that will generate a spark or create a potential fire risk on the job site. The permits are to be completed and approved by Consigli prior to work starting.
 - b. Updated Construction Schedule
 - c. Updated Construction Logistics Plan
 - d. Pre-Incident Fire Plan
- 2) On Site Fuel Storage: Different flammable liquids will be required throughout construction. A free standing, 30-minute fire-rated enclosure will be built to safely and securely store all flammable liquids and gases. Fueling trucks will be used as needed but under no circumstances be allowed to be parked or stored on site for any extended period.
- 3) Means of Egress: The parking garage will be permanently equipped with (3) 2-way stair assemblies for means of egress. During construction it is the intent to install the stair located in the Southwest corner first to provide emergency egress throughout construction. These stairs will be identified with temporary signage throughout construction indicating the floor level and exit path direction
- 4) Good Housekeeping: Consigli Construction will provide necessary dumpsters for the removal of debris from the site. All subcontractors are responsible for the daily clean-up of their work areas to ensure that no materials or tools are left out over night that could pose a hazard to the building. Daily safety walks by the Construction Superintendent will be utilized to ensure that all working floors are equipped with an inspected fire extinguisher and clear means of egress in the event of an emergency. Trash chutes and material hoists may be utilized to safely and efficiently remove all debris from the project.

- 5) On-site Security: The project site will be secured everyday by means of a temporary, post driven construction fence and scrim. Lockable gates will be located at (2) locations for site access.

- 6) Rapid Communication: Evacuation notification will be provided by means of 2-way radios/cellular devices as well as strategically positioned air horns. Upon evacuation of the building all project personnel will report to the muster point location where the Construction Manager and all subcontractor foremen will perform accountability checks. The General Contractor field staff will then be dispatched to all project entry points and the PFD Command Center. Upon arrival of the first responders to the PFD Command Center the General Contractor will provide an accountability and incident briefing.

Public Safety

The construction of the new MMC Parking Garage will be near pedestrian right of ways and will interact with public traffic throughout the duration of the project. Material deliveries, the use of cranes, lifts and other heavy machinery all have the potential to impact typical public activity. As a member of the Portland community, Consigli will strive to limit, mitigate and avoid these potential impacts as much as possible by means of controlling noise, on site dust, vibrations and traffic. By educating and informing the neighborhoods to the construction activities taking place we will aim to build to a project that produces the minimal of impacts to the St. John Street community.

Noise

Construction activities throughout the project will create noise that leaves the project site. It is the intent of the project team to limit the exposure to the noise by following section 17-18 of the City of Portland Code of Ordinances. This project site is located within 500 feet of buildings classified as residential. As such, the project hours will be limited the 7:00am – 6:00pm, Monday – Friday. Should any weekend or holiday work be required the use of heavy machinery will not commence before 8:00am. When this work is required, no less than 2-week advanced notice will be provided to MMC and the neighboring communities.

Work related to the pile foundation will likely be the loudest activity experienced during construction. Consigli has anticipated fast-tracking this work by utilizing (2) pile driving crews to reduce the duration of the sensory burden on the neighboring community. This work will take place from November 2018 – January 2019. Recently, many local projects have utilized the pile foundation to much success around Portland. The new WEX building on Commercial St. and the Hyatt in the Old Port both utilized piles in their foundation.

Dust Control/Air Quality

Maintaining an environmentally conscious project site will be a major priority for the project team to ensure safety not only for the neighboring communities but also for the construction workers on site day after day. All soils and debris will be kept within the project limits following the State of Maine Department of Environmental Protection erosion control Best Management Practices:

- 1) Erosion controlled construction entrances
- 2) Tarped dump trucks leaving the site with soil/debris
- 3) On-going sidewalk and street cleaning activities
- 4) The installation of temporary, compacted roads within the job site
- 5) Using wetting agents to control dust

- 6) Covering stock piles when material is to be piled for long periods of time
- 7) Smoking will not be allowed on the job site

Vibration Monitoring

Some of the construction practices required for this project will result in ground vibration waves that may transmit to nearby buildings. Prior to any potential vibration causing activities taking place a pre-construction survey will be conducted to review and document existing conditions. The survey will encompass all properties abutting the proposed project site to include the following addresses:

- 222 St. John St (Office Bldg.)
 - 210 St. John St (Residence)
 - 212 St. John St (Residence)
 - 160 St John St (Sid Harvey's)
 - 172 St. John St (Ferguson)
 - 184 St. John St (Eagles Bldg.)
- Vibration monitoring will also be conducted adjacent the railroad immediately west of the project site limit.

Pavement removal, vibratory compaction and pile driving will be employed on this project and will be monitored by a third-party monitoring company. A pre-construction meeting will be planned with abutting property owners to discuss geological conditions, construction specifications and methods of installation that create vibration.

Traffic Control

Throughout the construction process St. John St will experience increased traffic due to construction activities. Material deliveries, contractor access and public utility integration will be encountered and mitigated through coordinated logistics plans (starting on page 11), on site safety personnel, way-finding signage and well-organized traffic control devices. MMC & Consigli will strive to inform and direct the neighborhood to the activities taking place in public areas as they progress through completion. Beginning in July 2019, construction activities within St. John St will include public utility connections, traffic control installations and sidewalk improvements.

The main entrance point to the construction project will be through the East gate located within the existing Eagles parking lot. To navigate precast concrete deliveries to the project site a flagger will be stationed at St. John St. to usher the trucks into the right of way. Trucks and trailers will exit the project site through the North gate and re-enter traffic via the right of way through the Union Plaza parking lot. Due to the large turn radius of some of these trucks, it will be necessary to temporarily close parking spaces within the tenant lot as well as spaces located on St. John St. Please reference the trucking plan, on page 10, for more information.

Proximity to Neighboring Residences and Businesses

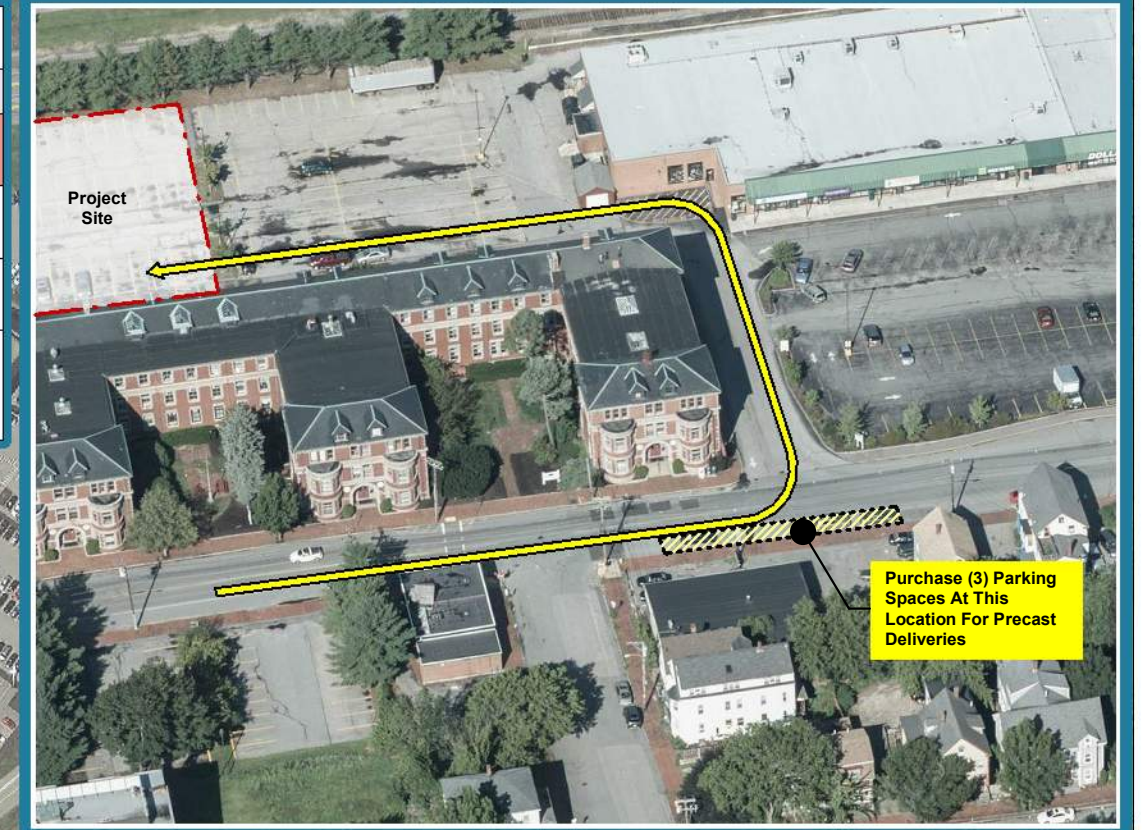
During the process of construction great attention will be required to ensure that homes and places of business are not overly impacted by construction activities or traffic. While the logistics of the CMP does not require work associated with or access through the adjacent properties, certain measures will be taken to minimize the potential for a disturbance. Erosion control, physical barriers, temporary shoring and staged material deliveries will be coordinated during construction.

Care will be given to the owners and users of 210 & 212 St. John St. The residences are the closest in proximity and will likely experience the greatest impact. Individual site meetings will be held with the owners of these properties to discuss their needs throughout construction. Consigli and MMC are committed to working through logistical challenges with the neighbors and providing adequate and reasonable measures to accommodate their requests.

Anticipated Construction Traffic Per Day

	2018				2019								2020									
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Earthwork/Ground Improvements	(9)	(20)	(25)	(25)	(25)	(25)				(5)	(7)	(7)	(10)							(5)	(5)	(5)
Structural Precast Erection							(20)	(20)	(20)	(20)	(10)	(5)										
Garage Fit-out													(15)	(15)	(13)	(10)	(6)					

Bird's Eye View

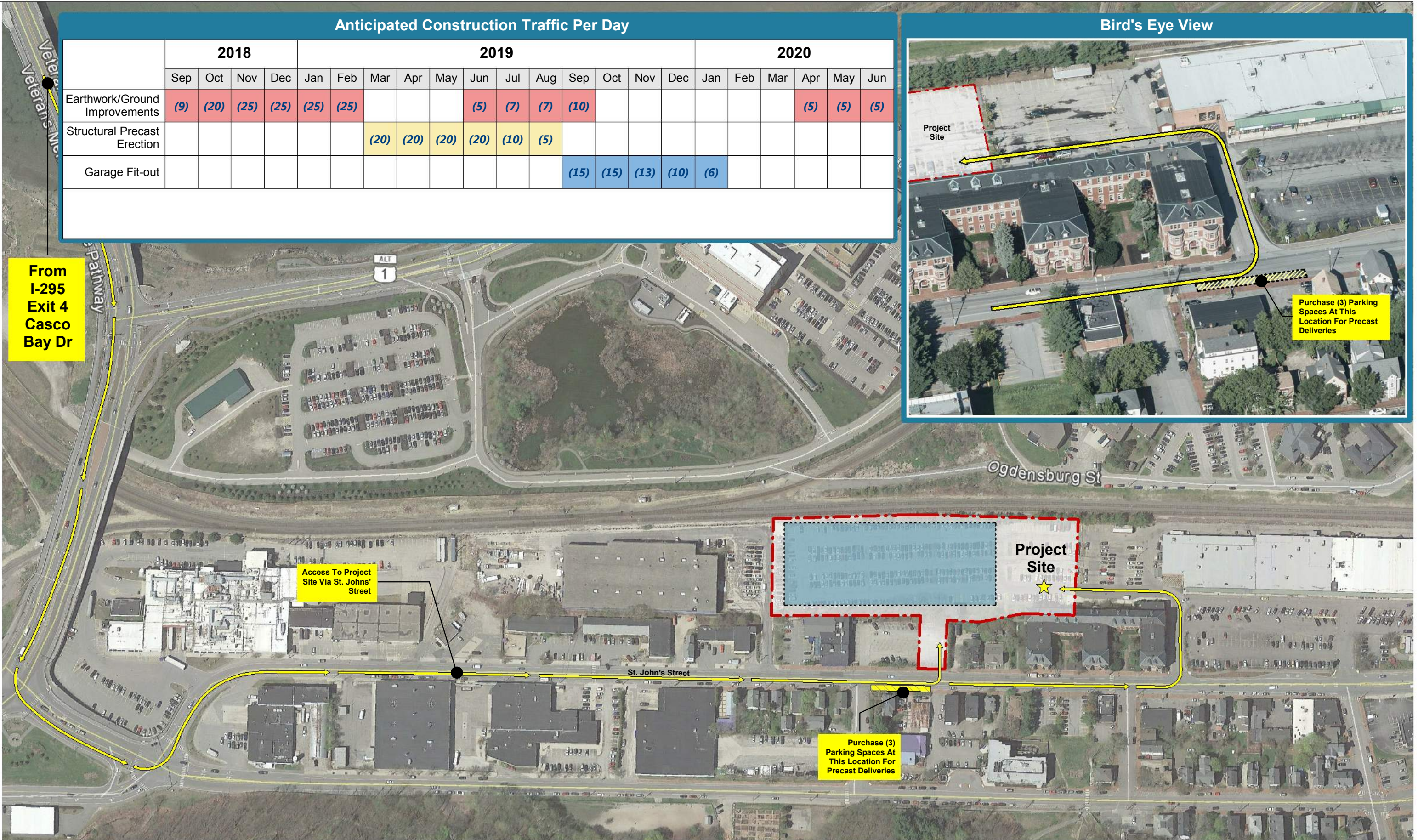


From I-295 Exit 4 Casco Bay Dr

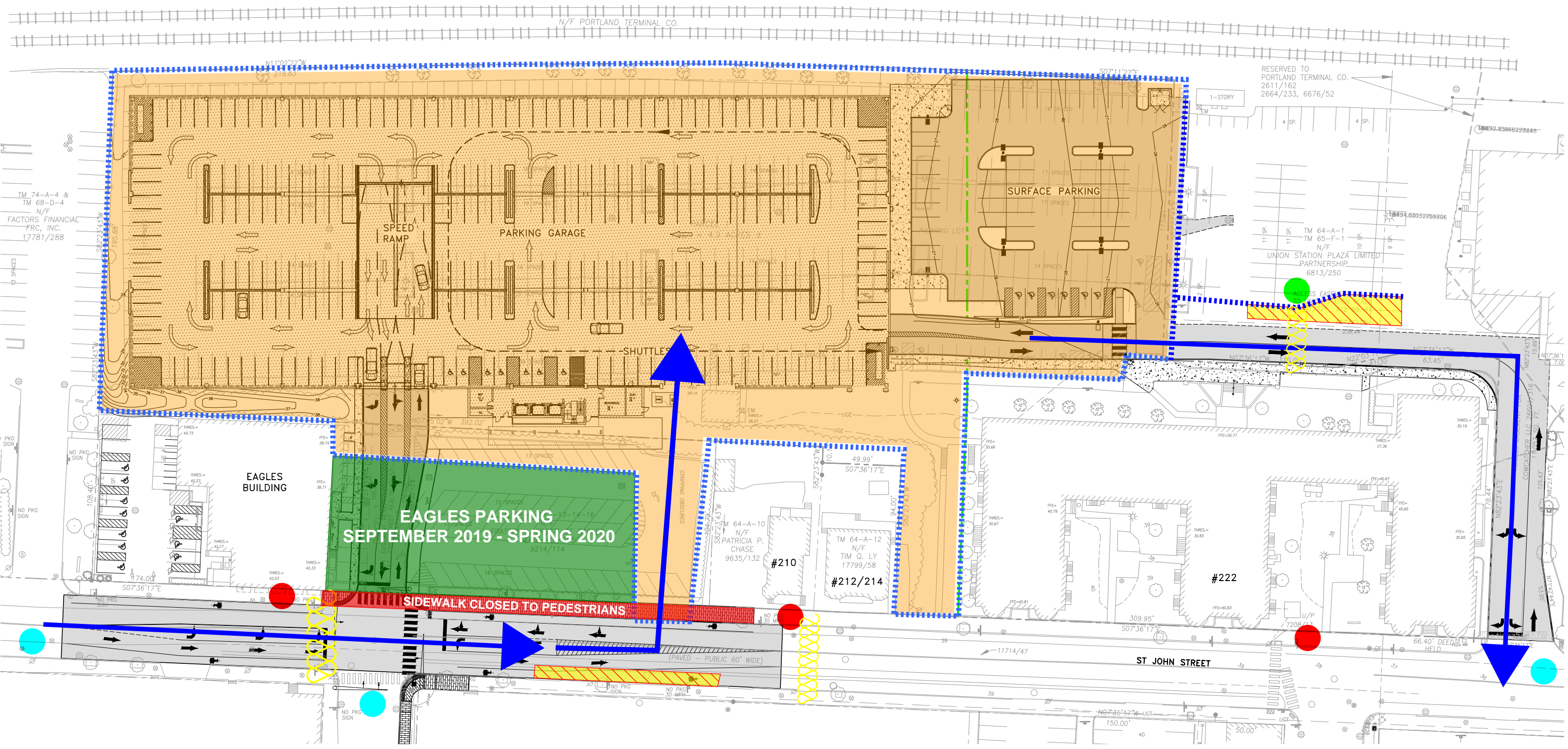
Access To Project Site Via St. Johns' Street

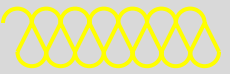







Purchase (3) Parking Spaces At This Location For Precast Deliveries

Purchase (3) Parking Spaces At This Location For Precast Deliveries



PHASE 1 LOGISTICS PLAN SEPTEMBER 2018 - SUMMER 2019

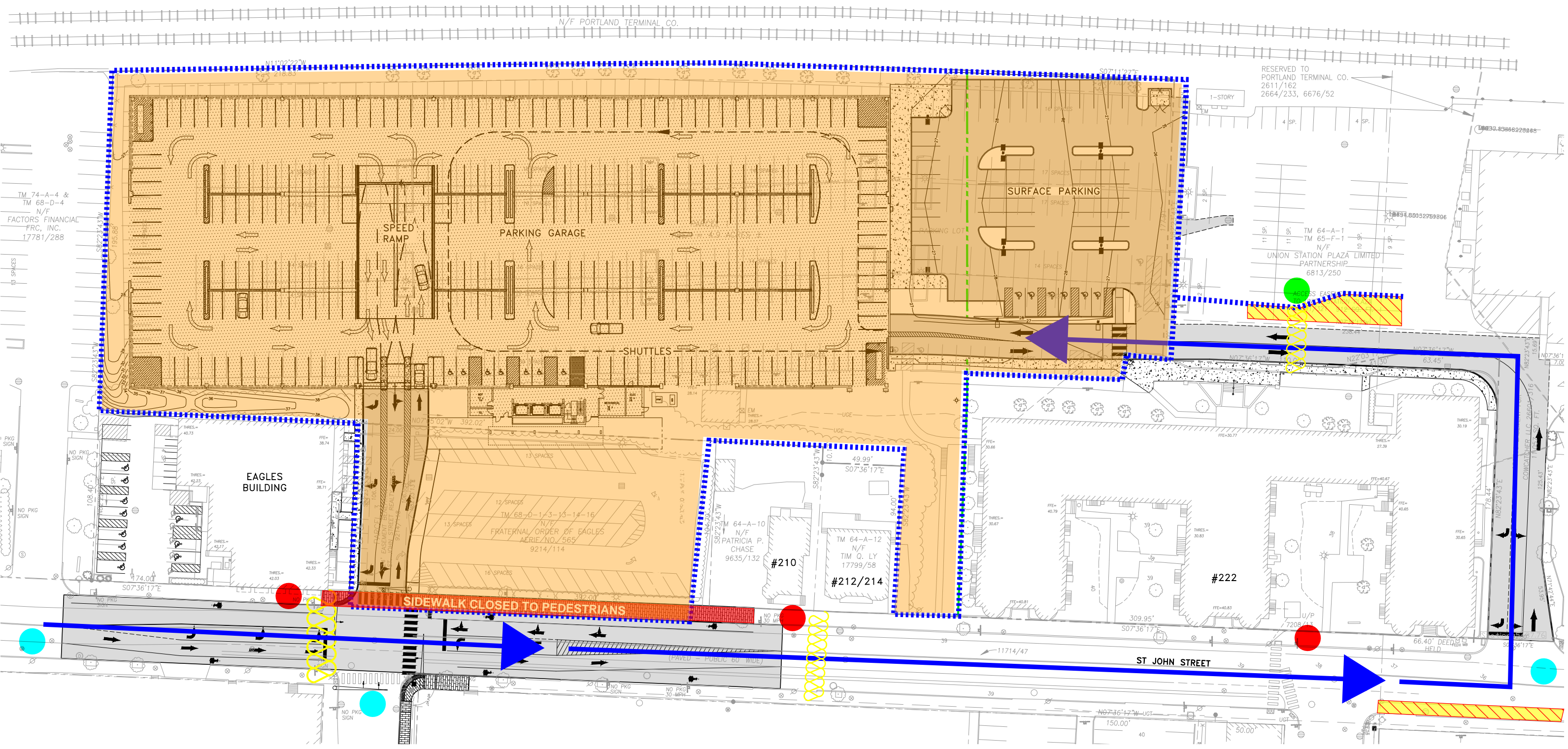


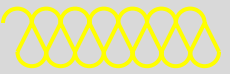







	TEMPORARY CROSSWALK		PARKING SPACES PROCURED FOR CONSTRUCTION		CONSTRUCTION VEHICLE TRAFFIC
	CROSSWALK SIGNAGE AND TRUCK CROSSING SENSOR		SIDEWALKS CLOSED DURING CONSTRUCTION		
	SIDEWALK CLOSURE SIGNAGE		PROJECT SITE		
	CONSTRUCTION TRAFFIC AHEAD SIGNAGE				



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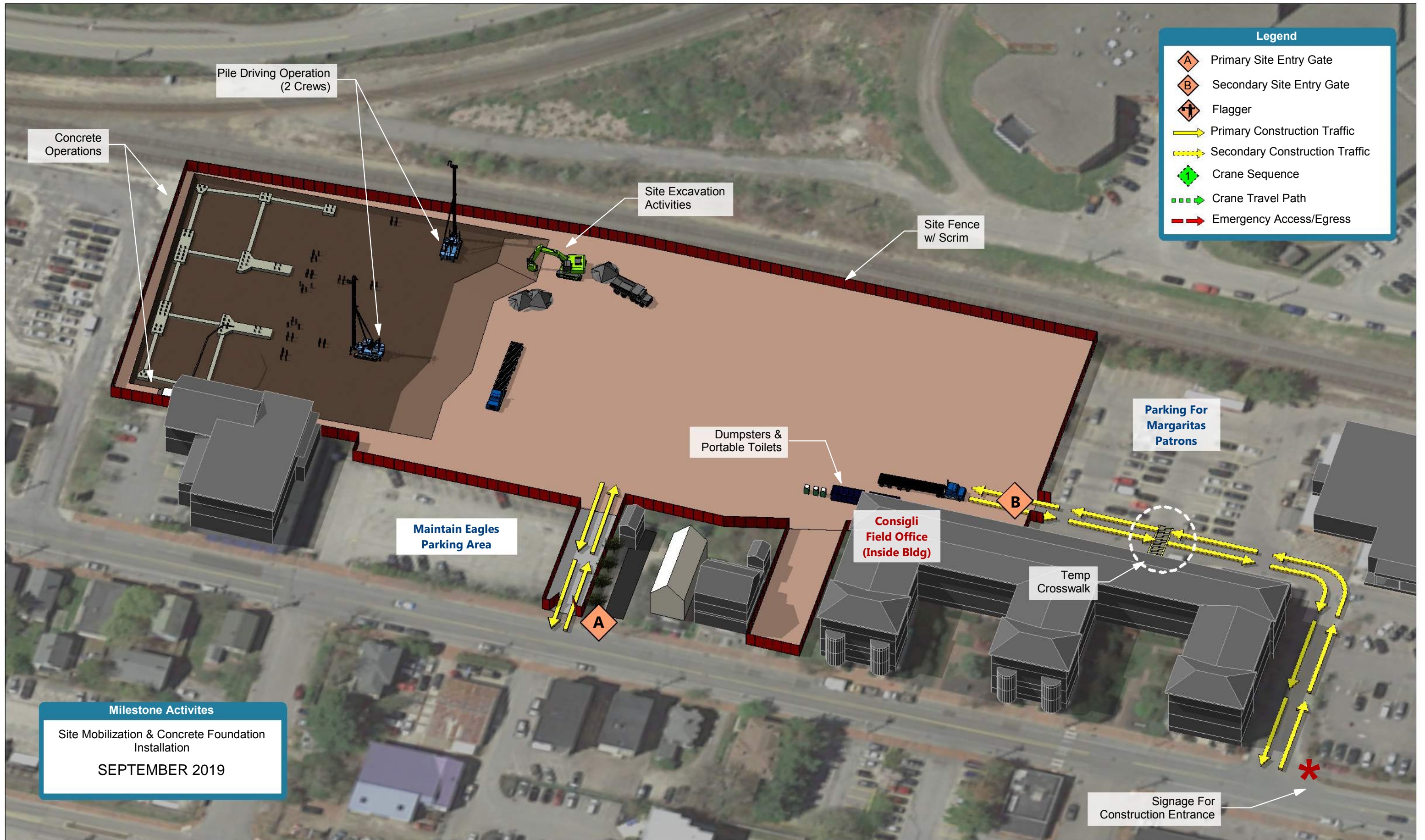
PHASE 2 LOGISTICS PLAN SUMMER 2019 - DECEMBER 2019

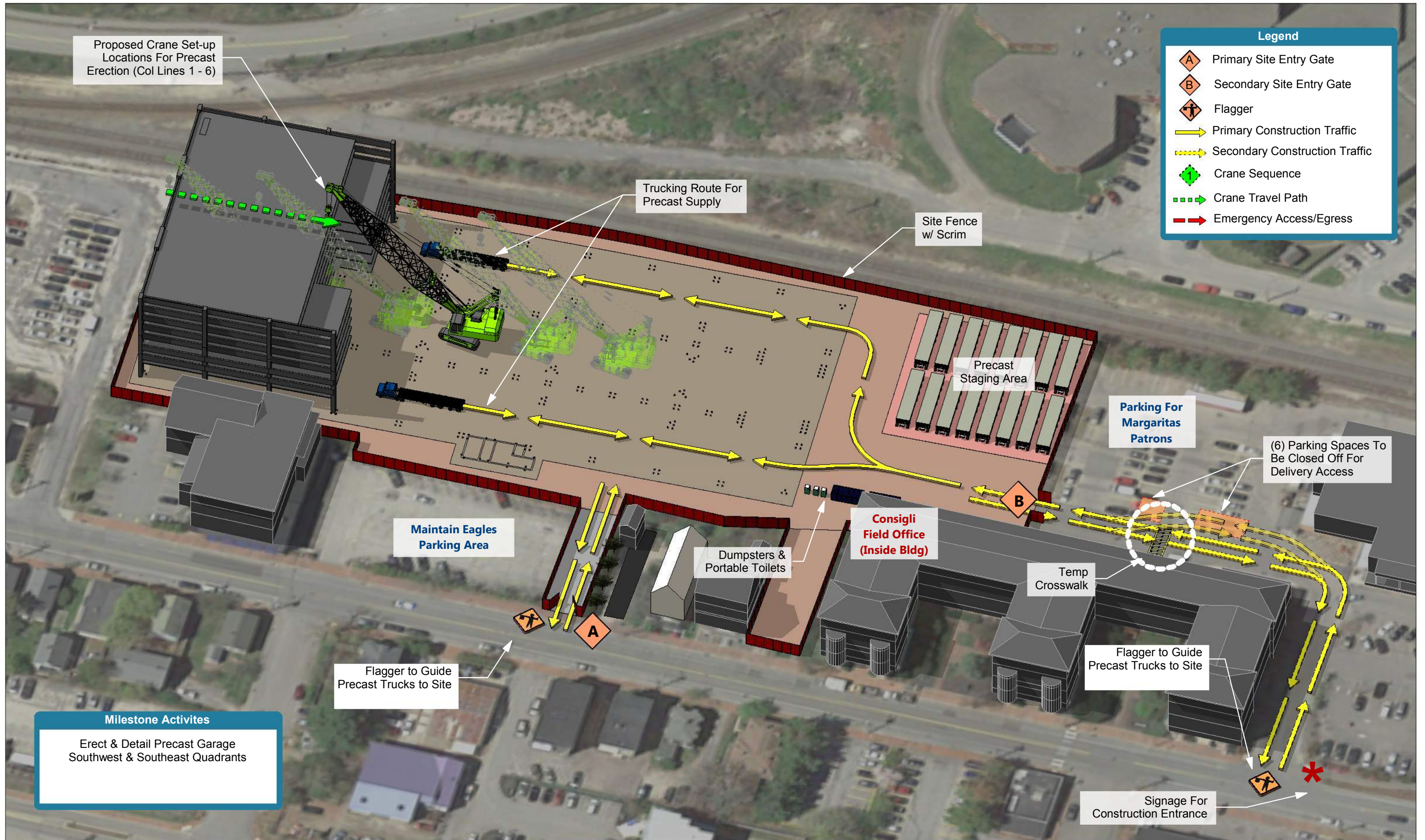


	TEMPORARY CROSSWALK		PARKING SPACES PROCURED FOR CONSTRUCTION		CONSTRUCTION VEHICLE TRAFFIC
	CROSSWALK SIGNAGE AND TRUCK CROSSING SENSOR		SIDEWALKS CLOSED DURING CONSTRUCTION		
	SIDEWALK CLOSURE SIGNAGE		PROJECT SITE		
	CONSTRUCTION TRAFFIC AHEAD SIGNAGE				



CONSIGLI



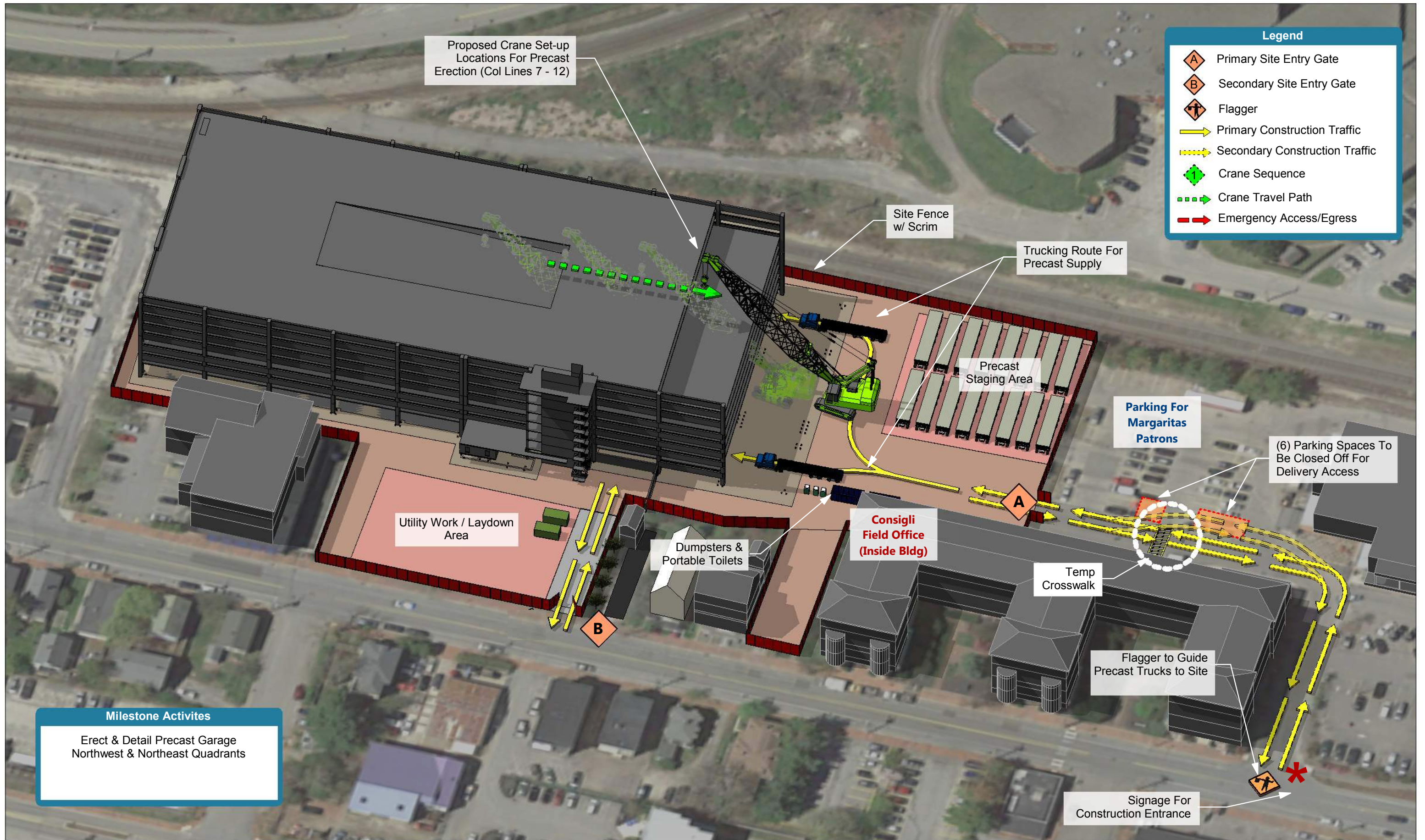


Legend	
	Primary Site Entry Gate
	Secondary Site Entry Gate
	Flagger
	Primary Construction Traffic
	Secondary Construction Traffic
	Crane Sequence
	Crane Travel Path
	Emergency Access/Egress

Milestone Activities

Erect & Detail Precast Garage Southwest & Southeast Quadrants

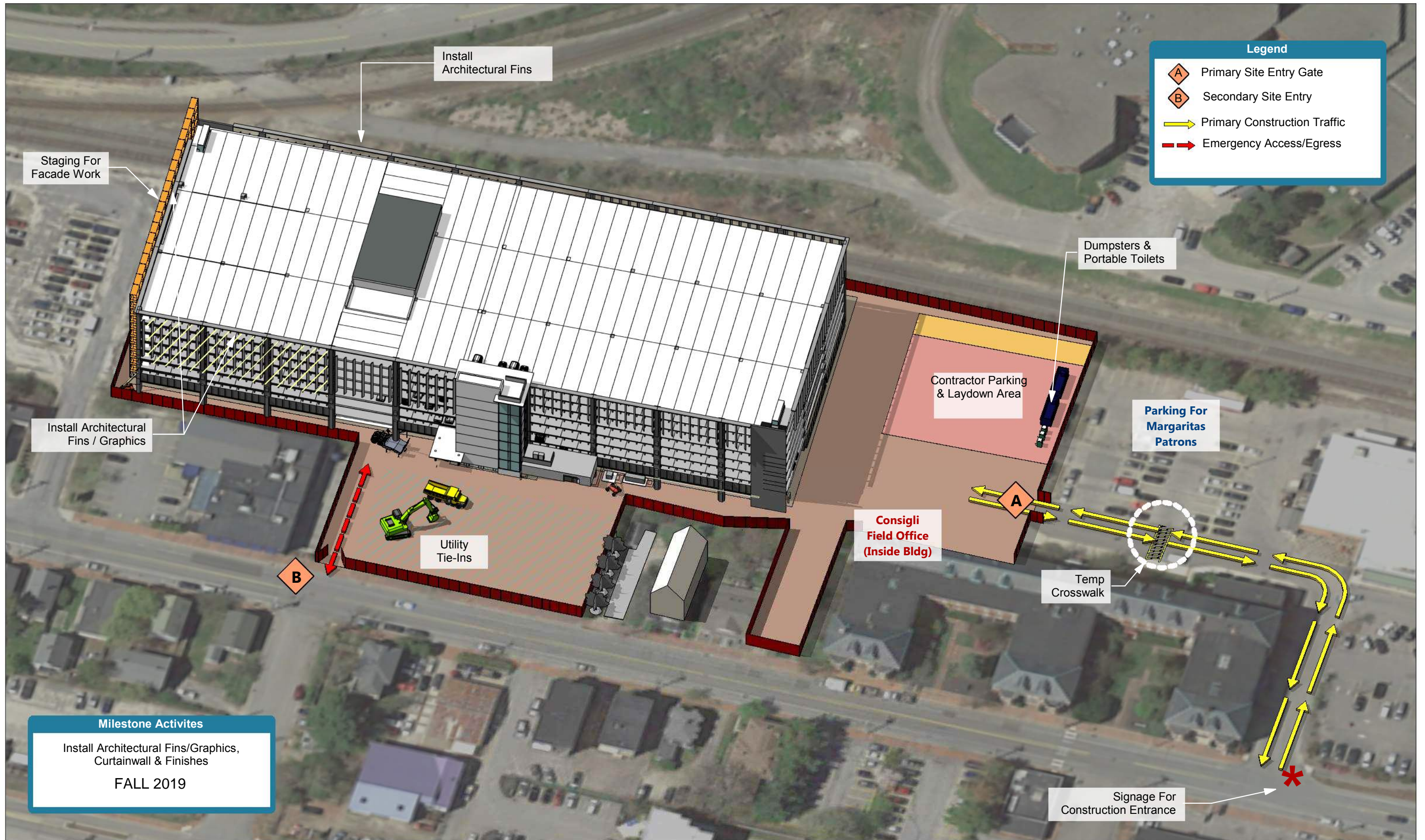
St. John Street Garage Site Logistics Plan - Precast Erection (Column Lines 1-6)



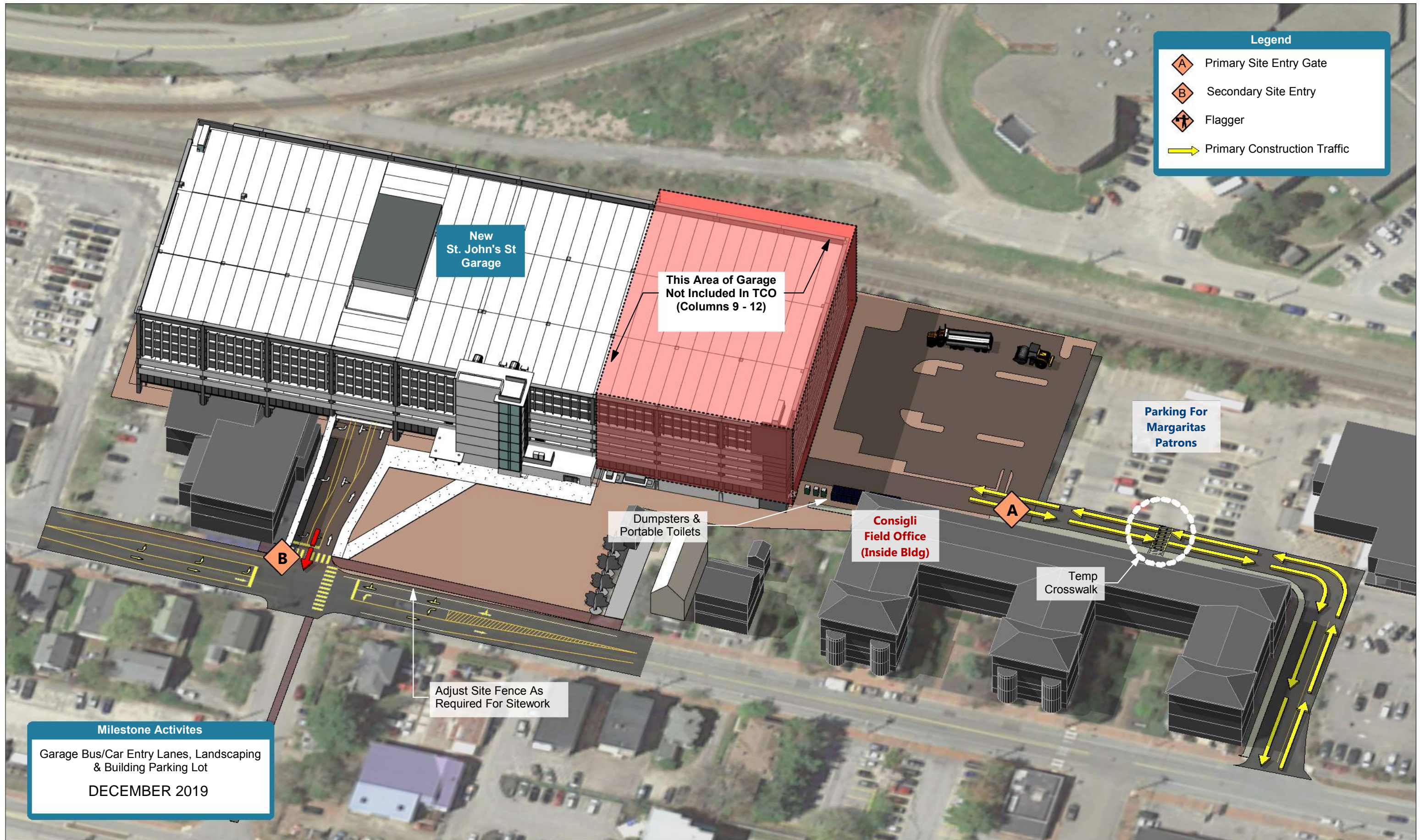
Legend	
	Primary Site Entry Gate
	Secondary Site Entry Gate
	Flagger
	Primary Construction Traffic
	Secondary Construction Traffic
	Crane Sequence
	Crane Travel Path
	Emergency Access/Egress

Milestone Activites

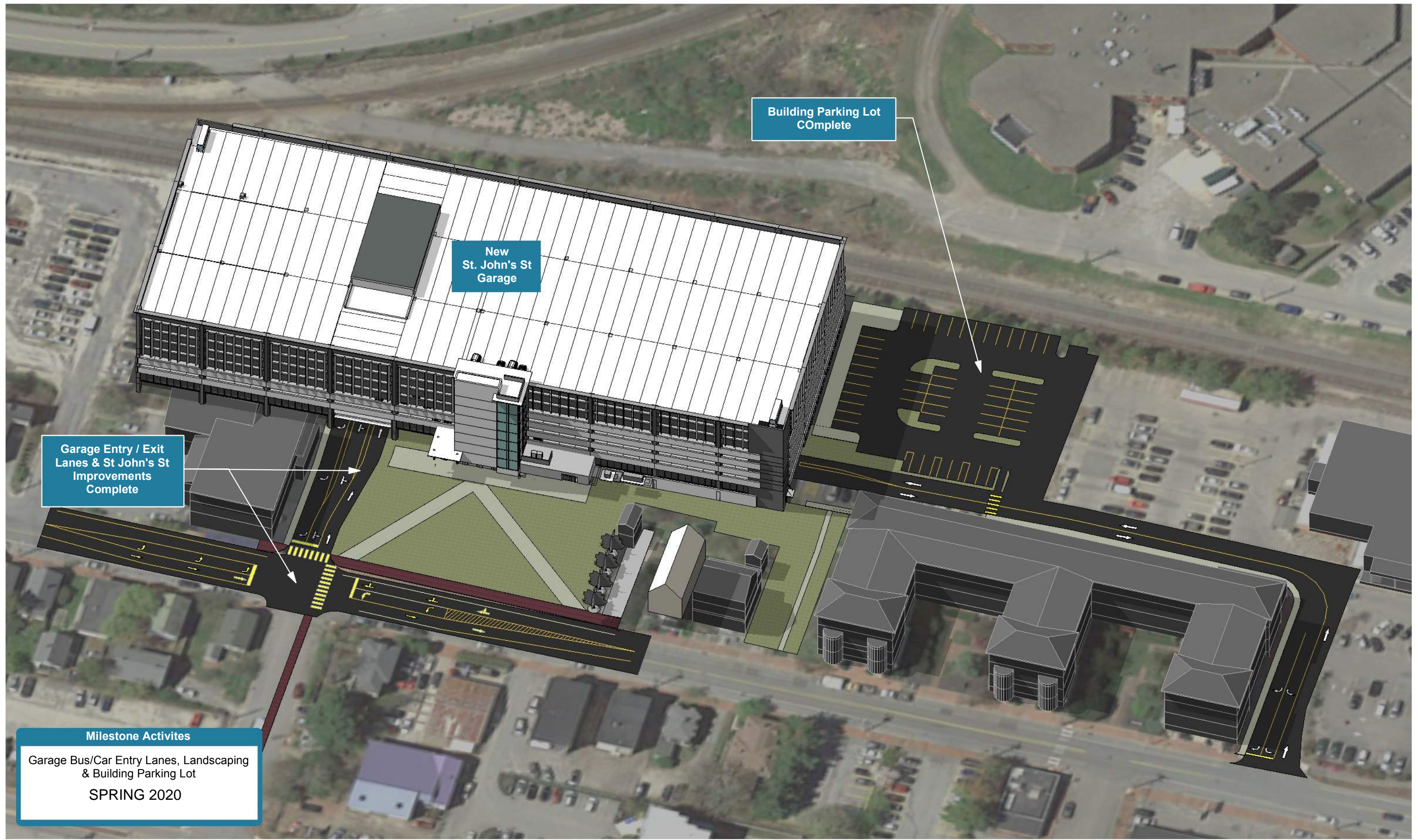
Erect & Detail Precast Garage Northwest & Northeast Quadrants



\\consigli\data\corporate\Projects\JOBS - MMC - St. John Street Parking Garage\1840 - BIM\1840 Logistics\St. John St Garage - Sequence Plan_CENTRAL_R2017.rvt



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ATTACHMENT 6: RIGHT, TITLE & INTEREST

MAINE REAL ESTATE TAX-Paid

1001840031199 QUITCLAIM DEED WITH COVENANT
(Statutory Short Form)

KNOW ALL PERSONS BY THESE PRESENTS that the **Fraternal Order of Eagles, Aerie No. 565 a/k/a Casco Aerie No. 565, Fraternal Order of Eagles**, a Maine non-profit corporation with a mailing address of 184 St. John Street, Portland, ME 04102, for consideration paid, grants to **Maine Medical Center**, a Maine non-profit corporation with a mailing address of 22 Bramhall Street, Portland, ME 04102, with quitclaim covenant, the land in the City of Portland, County of Cumberland and State of Maine, as described on **Exhibit A** attached hereto and made a part hereof.

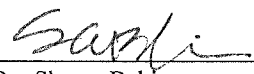
For source of title, reference is made to the following deeds recorded in the Cumberland County Registry of Deeds: (1) warranty deed from Charles E. Stickney and Anita C. Stickney, dated May 25, 1990 and recorded in Book 9214, Page 114; (2) quit claim deed without covenant from Charles E. Stickney and Anita C. Stickney, dated May 25, 1990 and recorded in Book 9214, Page 116; (3) quit claim deed without covenant from Daniel W. Hourihan, Trustee of the St. John Street Realty Trust, dated May 25, 1990 and recorded in Book 9214, Page 117; and (4) warranty deed from Dana A. Williams and Barbara H. Williams, dated July 28, 1995 and recorded in Book 12032, Page 41.

Meaning and intending to convey a portion of the property conveyed to the grantor by the above-referenced deeds.

Witness my/our hand(s) and seal(s) this 27th date of June, 2018.



Witness

FRATERNAL ORDER OF EAGLES, AERIE NO. 565


By: Shawn Babine
Its: President

STATE OF MAINE
COUNTY OF CUMBERLAND, SS.

June 27, 2018

Then personally appeared the above-named Shawn Babine, President of the Fraternal Order of Eagles, Aerie No. 565, and acknowledged the foregoing instrument to be his free act and deed in his said capacity, and the free act and deed of the Fraternal Order of Eagles, Aerie No. 565.

Before me,



Notary Public/Attorney at Law

Printed Name Patrick Thornton, Esq.
Maine Bar No. 4211

EXHIBIT A

A certain lot or parcel of land situated on the westerly side of St. John Street in the City of Portland, County of Cumberland and State of Maine described as follows:

Beginning at a point on the westerly sideline of St. John Street, said point being 159.50 feet from the northeasterly corner of land now or formerly of Factors Financial FRC, Inc. as described in deed Book 17781, Page 288, on a course of N 07°36'17" W;

Thence, S 82°23'43" W along remaining land of the Fraternal Order of Eagles Aerie No. 565 a distance of 106.90 feet to land now or formerly of Cowcatcher, LLC as described in deed Book 26330, Page 105;

Thence, N 07°05'02" W along land of said Cowcatcher, LLC 232.51 feet to land now or formerly of Patricia P. Chase as described in deed Book 9635 Page 132;

Thence, N 82°23'43" E along land of said Chase 104.79 feet to the westerly sideline of said St. John Street;

Thence, S 07°36'17" E along the westerly sideline of said St. John Street 232.50 feet to the point of beginning. Containing 24,609 square feet, more or less.

The above described parcel of land is shown on "Proposed Lot Division Plan 184 St. John Street, Portland, Maine made for Maine Medical Center" dated June 14, 2018 by Owen Haskell, Inc.

MEMORANDUM OF LEASE

LANDLORD: CASTE COW LLC, a Maine limited liability company with a mailing address of 100 Commercial Street Portland, Maine 04101.

TENANT: MAINE MEDICAL CENTER, a Maine nonprofit corporation with a mailing address of 22 Bramhall Street, Portland, Maine 04102.

DESCRIPTION: Premises in Portland, Maine and described in a deed recorded in the Cumberland County Registry of Deeds in Book 34754 Page 65.

DATE OF LEASE: April 4, 2018

TERM: **50 years** from the Commencement Date specified in the Lease. The parties shall record a Commencement Date certificate.

OPTION TO RENEW: **Two successive 25 year options.**

PURCHASE RIGHT: Tenant's right to purchase is described in the Lease.

DATED: April 4, 2018

CASTE COW LLC

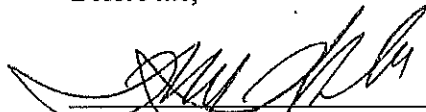
By: J. Tim Soley, Manager

STATE OF MAINE
Cumberland County

April 4, 2018

Personally appeared the above-named J. Tim Soley, Manager of Caste Cow LLC, and acknowledged the foregoing to be his free act and deed in that capacity and the free act and deed of the limited liability company.

Before me,



~~Notary Public~~ Attorney at Law


Print Name: William M. Welch, Esq

[TENANT SIGNATURE PAGE FOLLOWS]

TENANT SIGNATURE PAGE

Dated: April 4, 2018

MAINE MEDICAL CENTER



Richard W. Petersen
President & Chief Executive Officer

STATE OF MAINE
Cumberland County

April 4, 2018

Personally appeared the above-named Richard W. Petersen, President & Chief Executive Officer of Maine Medical Center, and acknowledged the foregoing to be his free act and deed in that capacity and the free act and deed of the corporation.

Before me,

Notary Public/Attorney at Law

Print Name: Benjamin Cunniff

Received
Recorded Register of Deeds
Apr 04, 2018 11:36:25A
Cumberland County
Nancy A. Lane

MEMORANDUM OF LEASE

LANDLORD: COWCATCHER LLC, a Maine limited liability company with a mailing address of 100 Commercial Street Portland, Maine 04101.

TENANT: MAINE MEDICAL CENTER, a Maine nonprofit corporation with a mailing address of 22 Bramhall Street, Portland, Maine 04102.

DESCRIPTION: Premises located at 222 St. John Street, Portland, Maine and described in deeds recorded in the Cumberland County Registry of Deeds in Book 26330, Page 105, Book 26601, Page 314, and Book 26601, Page 316, but excluding a parcel described in a deed of near or even date from Landlord to Caste Cow LLC and an approximately .34 acre parcel of land located on the easterly side of St John Street identified as Portland Tax Assessor Lots 064-F002, 064-F003 and 064-F004.

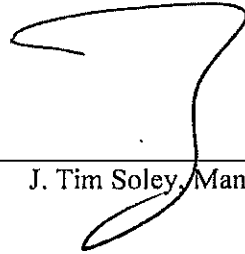
DATE OF LEASE: April 4, 2018

TERM: 50 years from the Commencement Date specified in the Lease. The parties shall record a Commencement Date certificate.

OPTION TO RENEW: Two successive 25 year options.

PURCHASE RIGHT: Tenant's right to purchase is described in the Lease.

DATED: April 4, 2018 COWCATCHER LLC

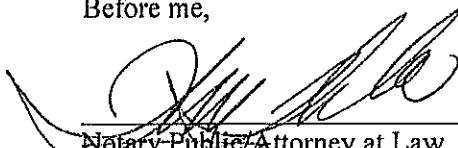

By: J. Tim Soley, Manager

STATE OF MAINE
Cumberland County

April 4, 2018

Personally appeared the above-named J. Tim Soley, Manager of Cowcatcher LLC, and acknowledged the foregoing to be his free act and deed in that capacity and the free act and deed of the limited liability company.

Before me,



Notary Public/Attorney at Law
Print Name: William M. Welch

[TENANT SIGNATURE PAGE FOLLOWS]

TENANT SIGNATURE PAGE

Dated: April 4, 2018

MAINE MEDICAL CENTER



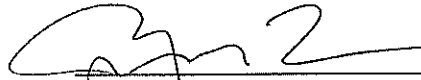
Richard W. Petersen
President & Chief Executive Officer

STATE OF MAINE
Cumberland County

April 4, 2018

Personally appeared the above-named Richard W. Petersen, President & Chief Executive Officer of Maine Medical Center, and acknowledged the foregoing to be his free act and deed in that capacity and the free act and deed of the corporation.

Before me,



Notary Public/Attorney at Law

Print Name: Benjamin Lund

Received
Recorded Register of Deeds
Apr 04, 2018 11:38:19A
Cumberland County
Nancy A. Lane

ATTACHMENT 7: WAIVER REQUEST FORM

Standard to be Waived: Cite Ordinance or Technical Manual Standard	Cite Standard Language: Cite specific language of applicable Ordinance or Technical Manual Standard	Waiver Being Sought: Describe waiver being sought. Ex. – We are requesting a two-way parking lot drive aisle width of 20' feet.	Justification for Waiver: Address specific waiver criteria, if applicable, and document reasons for the waiver request.

Standard to be Waived: Cite Ordinance or Technical Manual Standard	Cite Standard Language: Cite specific language of applicable Ordinance or Technical Manual Standard	Waiver Being Sought: Describe waiver being sought. Ex. – We are requesting a two-way parking lot drive aisle width of 20' feet.	Justification for Waiver: Address specific waiver criteria, if applicable, and document reasons for the waiver request.

ATTACHMENT 8: TRAFFIC CORRESPONDENCE

Craig Sweet

From: Randy Dunton <rdunton@gorrillpalmer.com>
Sent: Friday, July 6, 2018 9:59 AM
To: Helen Donaldson
Cc: Alexander M. Green; David Senus; Thomas Errico (Thomas.Errico@tylin.com); Jeremiah Bartlett; Bruce Hyman; Emily Tynes
Subject: MMC - Request for Traffic Information
Attachments: 2022 AM Post - signalized.syn; TMC for 06-19-18 Memo.pdf; AM St John-Union Station South2 15 min.pdf; PM Back Parking Lot 545-715 Passenger Cars.pdf; 2022 AM Post - signalized w right turn lane.syn; AM St John - D Street.pdf; PM St John-Union Station South 15 min.pdf; AM Back Parking Lot Passenger Cars.pdf; 2022 PM Post - signalized.syn; PM St John - D Street.pdf; PM St John-Union Station South2 15 min.pdf; 2022 PM Post - signalized w right turn lane.syn; AM St John-Union Station South.pdf; AM + PM Congress-Valley.pdf

Good morning Nell,

In recent reviews by Tom he identifies a request for supporting information.

Attached is the supporting information we understand Tom was requesting.

We understand there are also additional Traffic items that need to be addressed and will include those in a more detailed response in the near future, but wanted to get this supporting documentation / files out as soon as we could to keep things moving.

Thank you and have a great weekend.

Randy Dunton P.E., PTOE | Project Manager



707 Sable Oaks Drive, Suite 30 | South Portland, ME 04106
207.772.2515 x 246 (office) | 207.239.7430 (mobile)
www.gorrillpalmer.com

**ATTACHMENT 9: 222 ST. JOHN STREET
PARKING ASSESSMENT**

Parking Inventory & Occupancy Assessment 222 St. John Street Portland, Maine

Date: July 18, 2018
Subject: Parking Inventory & Occupancy Assessment
222 St. John Street, Portland, Maine
To: Al Green, MMC
From: Randy Dunton, Gorrill Palmer

The following is a parking inventory & occupancy assessment for parking areas associated with 222 St. John Street, Portland, Maine. The parking lots included in this study have been labeled A-E and are shown on the attached plan. The parking occupancy counts for the five areas were completed on Tuesday, July 18, 2018 at 9:00 AM, 11:00 AM, 2:00 PM, 4:00 PM, and 7:00 PM. A full inventory of parking spaces by category was previously completed and used in this assessment. A summary of the parking occupancy and inventory results is described in more detail as follows:

Daily Parking Occupancy Distribution:

The attached spreadsheet summarizes the results of the assessment and provides the following for each of the areas for each time period throughout the day:

- Occupied Spaces
- Number of total spaces
- Parking Rate expressed in percent of spaces occupied
- Unoccupied Spaces

The spreadsheet highlights both the individual peak parking demand times as well as the overall peak parking demand for each parking area. As highlighted in the spreadsheet, the overall peak parking demand occurred at 2:00 PM with a 51.5% occupancy.

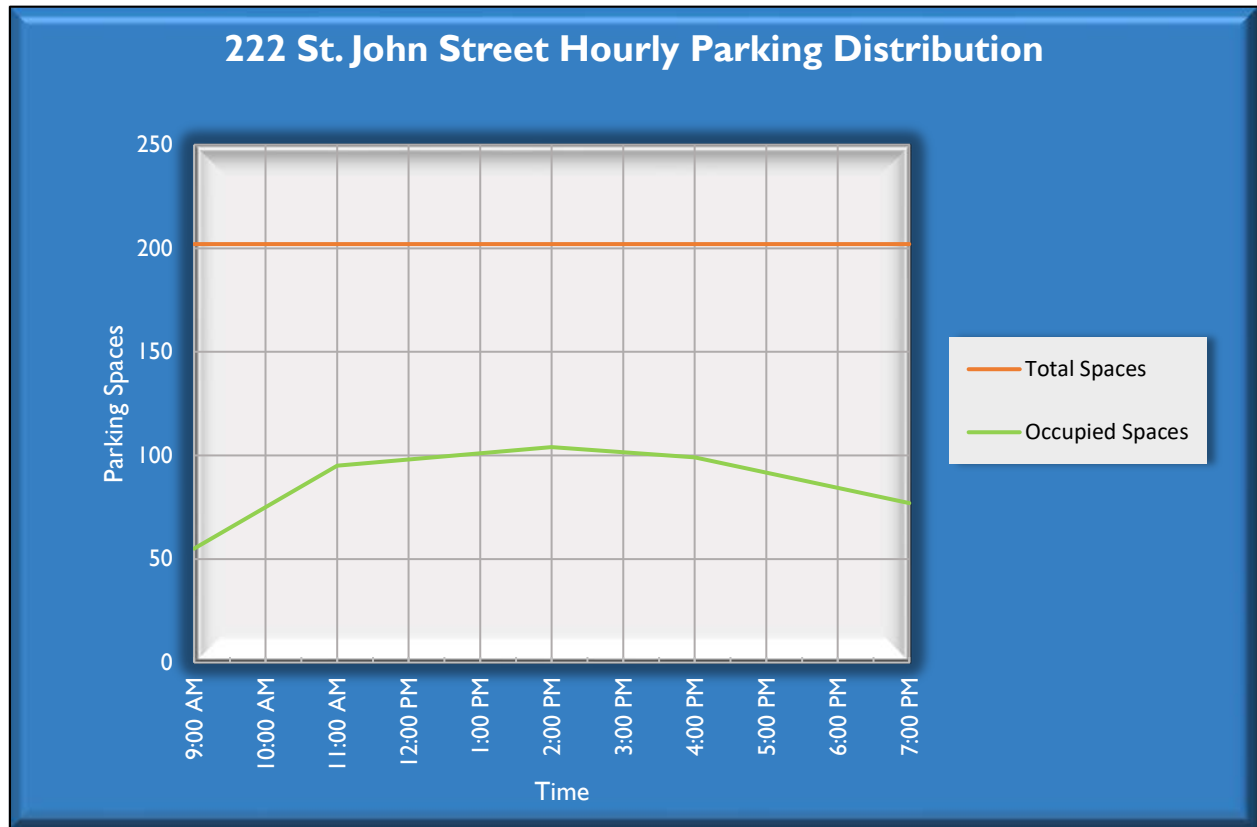
Typically, when parking area demand reaches approximately 85%, it is reaching practical capacity. This means that drivers are starting to drive up and down aisles seeking the last remaining available spaces, and then may require significant walking to get to their destination.

Overall, the parking areas are well below capacity for standard parking spaces or handicap accessible spaces. Areas 'D' and 'E', the two areas on the other side of St. John Street, appear to be the most utilized during the business day, while area 'A' nearest Margaritas is the busiest after business hours, as would be expected. This off set of peak parking demands could be an opportunity for shared parking.



Area C contains three parking spaces which are reserved for a separate building labeled “Building X” on the signs. All three reserved spaces were occupied during the 9:00 AM and 11:00 AM counts, so additional reserved parking spaces may be required to accommodate the parking for this building.

The following graph shows the parking demand distribution throughout the day for the five parking areas combined.

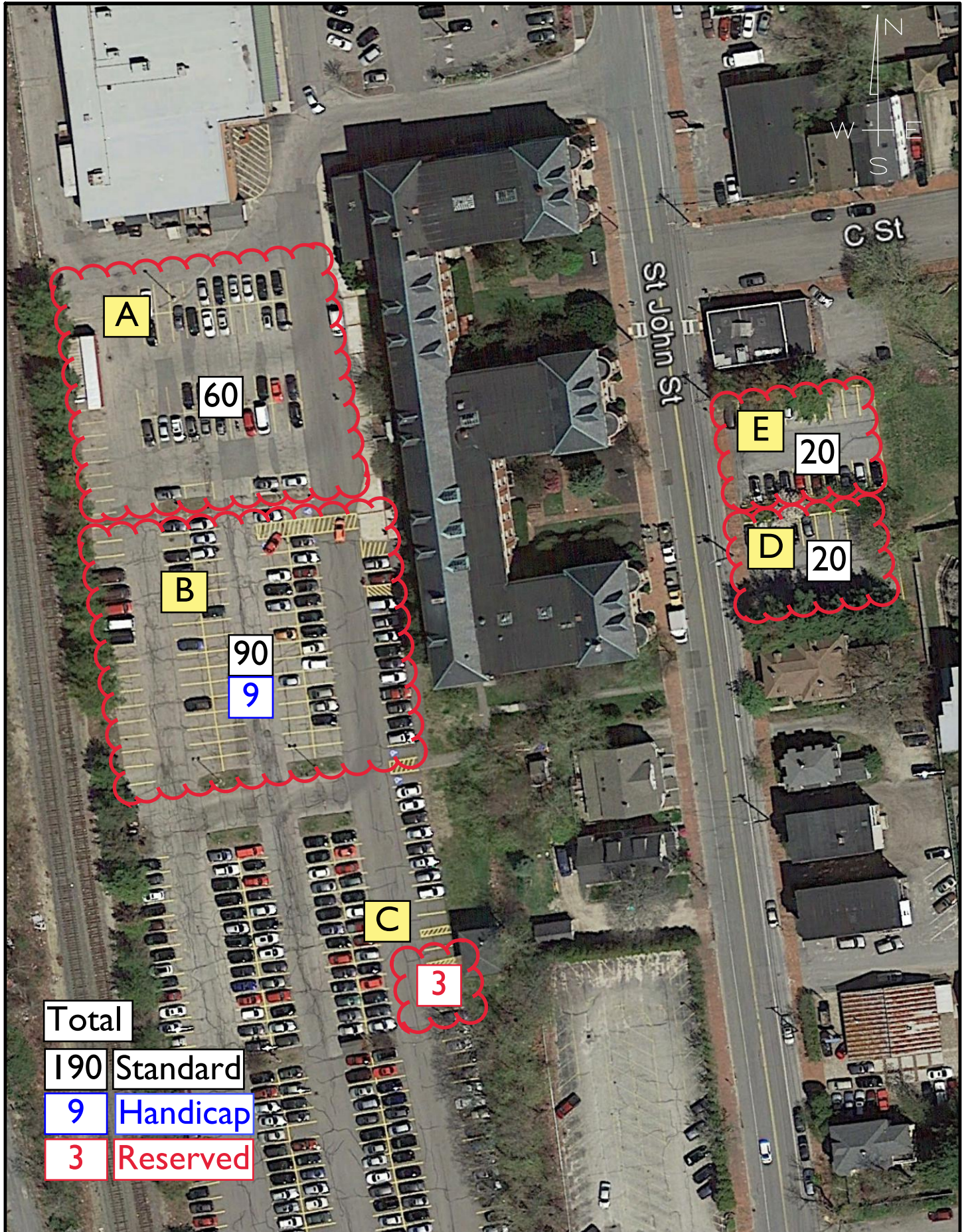


As the graph shows, the peak parking demand occurs at approximately 2 PM but is still well below capacity.

Conclusion:

Based on this assessment, it appears that the observed parking areas are well below capacity for standard parking spaces and handicap accessible spaces. The parking areas on the opposite side of St. John Street are nearest to reaching capacity during business hours while the area nearest Margaritas is the highest after business hours. Area C contains three parking spaces which are reserved for a separate building labeled “Building X” on the signs. All three reserved spaces were occupied during the 9:00 AM and 11:00 AM counts, so additional reserved parking spaces may be required to accommodate the parking for this building.

222 St. John Street Parking Assessment



Tuesday, July 17, 2018

222 St. John Street Parking Study

		Count Time				
		9:00 AM	11:00 AM	2:00 PM	4:00 PM	7:00 PM
A	Occupied Standard Spaces	5	16	19	25	45
	Standard Spaces	60	60	60	60	60
	Standard Parking Rate	8.3%	26.7%	31.7%	41.7%	75.0%
	Unoccupied Standard Spaces	55	44	41	35	15
B	Occupied Standard Spaces	26	47	50	51	15
	Standard Spaces	90	90	90	90	90
	Standard Parking Rate	28.9%	52.2%	55.6%	56.7%	16.7%
	Unoccupied Standard Spaces	64	43	40	39	75
	Occupied Handicap Spaces	2	2	3	2	1
	Handicap Spaces	9	9	9	9	9
	Handicap Parking Rate	22.2%	22.2%	33.3%	22.2%	11.1%
C	Unoccupied Handicap Spaces	7	7	6	7	8
	Occupied Reserved Spaces	3	3	2	1	1
	Reserved Spaces	3	3	3	3	3
	Reserved Parking Rate	100.0%	100.0%	66.7%	33.3%	33.3%
D	Unoccupied Reserved Spaces	0	0	1	2	2
	Occupied Standard Spaces	8	12	14	6	6
	Standard Spaces	20	20	20	20	20
	Standard Parking Rate	40.0%	60.0%	70.0%	30.0%	30.0%
E	Unoccupied Standard Spaces	12	8	6	14	14
	Occupied Standard Spaces	11	15	16	14	9
	Standard Spaces	20	20	20	20	20
	Standard Parking Rate	55.0%	75.0%	80.0%	70.0%	45.0%
Total	Unoccupied Standard Spaces	9	5	4	6	11
	Occupied Spaces	55	95	104	99	77
	Spaces	202	202	202	202	202
	Parking Rate	27.2%	47.0%	51.5%	49.0%	38.1%
	Unoccupied Spaces	147	107	98	103	125

ATTACHMENT 10: LIGHTING DESIGN UPDATES

MMC St. John Street Parking Garage
Portland, Maine

Page 1 of 4
July 24, 2018

PROPOSED SITE LIGHTING

Requirements for site lighting are addressed by the City of Portland in two documents: The City of Portland, Maine - Code of Ordinances, and the City of Portland - Technical Manual. Listed below are the issues pertaining to the proposed IMT site lighting as relates to the two city documents.

The City of Portland, Maine - Code of Ordinances

Chapter 14 – Land Use

Article III Zoning

Division 16.1 Institutional Overlay Zone

14-280 (a) Purpose

Any use conducted by an Eligible Institution and any construction by an Eligible Institution in an Institutional Overlay Zone shall be consistent with an Institutional Development Plan (IDP) approved by the planning Board in accordance with this ordinance..

RESPONSE: The proposed MMC St. John Garage site lighting has been designed to be in conformance with the approved IDP.

The City of Portland - Maine Code of Ordinances

Chapter 14 – Land Use

Article V Site Plan

14-526.6 Exterior Lighting

a. Site Lighting

(i) *All exterior site lighting, including lighting of building entrances, shall be full cut-off with no light emitted above the horizontal plane or spilled onto adjacent properties and streets. Illumination levels shall be adequate but not excessive for safety, comfort and convenience of occupants and users of the site, and shall conform to applicable standards of Section 12 of the Technical Manual.*

RESPONSE: All of the exterior site lighting has been selected to utilize full-cut-off optics with no light emitted above the horizontal plane. The *Illuminating Engineering Society of North America (IESNA)* classifies exterior luminaires according to their potential for producing uplight in the publication *IESNA TM-15-11*. The rating system is a numeric index that ranges from zero (no uplight) to five (greater than 5000 lumens direct upward). All of the proposed site lighting luminaires are classified as having a zero uplight rating.

14-526.6 Exterior Lighting

a. Site Lighting

(ii) *For major or minor site plans within or abutting a residential use or zone where light from the proposed development may adversely impact adjacent residential properties, exterior lighting shall employ house-side shielding.*

RESPONSE: See the Response included on page 4 for 12.2 Standards, 12.2.5 Light Trespass.

MMC St. John Street Parking Garage

Page 2 of 4

Portland, Maine

14-526.6 Exterior Lighting

c. Street Lighting

- (i) *Municipal street lighting shall be adequate for the safety and comfort of pedestrians and motorists and, where applicable, shall conform to specific lighting district requirements, as specified in Section 10 of the Technical Manual.*

RESPONSE: At the garage entrance and exit drives that are adjacent to the intersections of St. John Street and D Street, and St. John Street and C Street, additional 50-watt, LED street lights to be supplied by the *City of Portland* have been added to utility poles to meet the *IESNA* recommendations published in *IESNA RP-8-14 Roadway Lighting*. For intersections that are classified as connecting Collector streets and Local streets, and that have a high potential of pedestrian activity, the *IESNA* recommends an average of 2.1 footcandles and an average-to-minimum illuminance uniformity of 4-to-1, or better. The illuminance at the improved lighting at the intersections at St. John Street and D Street has been calculated to be as follows:

Minimum:	0.7 footcandles	Maximum:	4.9 footcandles
Average:	2.2 footcandles	Average-to-Minimum Uniformity:	3.1-to-1

The illuminance at the improved lighting at the intersection at St. John Street and C Street has been calculated to be as follows:

Minimum:	0.9 footcandles	Maximum:	3.8 footcandles
Average:	2.1 footcandles	Average-to-Minimum Uniformity:	2.4-to-1

A new sidewalk is proposed along D Street between St. John Street and Valley Street. The *American Association of State Highway and Transportation Officials (AASHTO)* recommends illuminance levels for streets in *Roadway Lighting Guide-1984*. The recommended standard for D Street, which is classified as a Local/Commercial street, is an average of 0.8 footcandles, and an average-to minimum uniformity of 6-to-1, or better. Additional 30-watt, LED street lights to be supplied by the *City of Portland* have been added to utility poles to meet the *AASHTO* recommendations. The illuminance at the improved lighting along D Street has been calculated to be as follows:

Minimum:	0.6 footcandles	Maximum:	1.1 footcandles
Average:	0.9 footcandles	Average-to-Minimum Uniformity:	1.5-to-1

New crosswalks are proposed at the intersection of D Street and Valley Street, and at the intersection of C Street and Valley Street. The *IESNA* recommends an average of 1.4 footcandles and an average-to-minimum illuminance uniformity of 6-to-1, or better, for intersections that are classified as connecting two Local streets, and that have a medium potential of pedestrian. Additional 30-watt, LED street lights to be supplied by the *City of Portland* have been added to utility poles to meet the *IESNA* recommendations. The illuminance at the D Street and Valley Street intersection has been calculated to be as follows:

Minimum:	0.6 footcandles	Maximum:	2.4 footcandles
Average:	1.5 footcandles	Average-to-Minimum Uniformity:	2.4-to-1

The illuminance at the C Street and Valley Street intersection has been calculated to be as follows:

Minimum:	0.8 footcandles	Maximum:	2.1 footcandles
Average:	1.6 footcandles	Average-to-Minimum Uniformity:	1.9-to-1

MMC St. John Street Parking Garage

Page 3 of 4
Portland, Maine

The City of Portland Technical Manual

Section 12 Site Lighting Standards

12.2 Standards

12.2.1. *Unless otherwise specified below, exterior lighting shall conform to the recommendations put forth in Lighting for Exterior Environments RP-33-99, or its successor, published by the Illuminating Engineering Society of North America (IESNA). Proposed uses that demonstrate a need to exceed the specific site lighting limits shown below for safe and reasonable exercise of the proposed use must provide a professionally produced lighting plan which adheres to the current Illuminating Engineering Society of North America (IESNA) recommendations for the proposed use.*

RESPONSE: The proposed lighting meets the recommendations of *IESNA RP-33-99*.

Section 12 Site Lighting Standards

12.2 Standards

12.2.2. *Uniformity: As measured in foot candles at grade, maximum-to-minimum illumination levels shall not exceed a ratio of twenty (20) to one (1.).*

RESPONSE: The north parking lot has a calculated maximum-to-minimum uniformity of 4.3-to-1. The top deck of the parking garage has a calculated maximum-to-minimum uniformity of 10.7-to-1.

12.2 Standards

12.2.3. *Illumination Levels:*

Minimum	0.2 footcandles (fc)
Maximum	5.0 footcandles (fc)
Average	1.25 footcandles (fc)

RESPONSE: *IESNA RP-20-14 Lighting for Parking Facilities* recommendations for surface parking lots a minimum illuminance level at grade of 0.5 footcandles, an average-to-minimum uniformity of 4-to-1, or better, and a maximum-to-minimum uniformity of 15-to-1, or better. The illuminance at the north parking lot has been calculated to be as follows:

Minimum: 0.6 footcandles Maximum: 2.6 footcandles
Average: 1.9 footcandles Average-to-Minimum Uniformity: 3.1-to-1

The illuminance at the top deck of the parking garage has been calculated to be as follows:

Minimum: 0.6 footcandles Maximum: 6.4 footcandles
Average: 2.4 footcandles Average-to-Minimum Uniformity: 4.0-to-1

The lighting poles at the roof deck have been limited in height to 18 feet, and are located only within the center zone of the parking deck to minimize the visual impact as might be viewed off-site. This design restriction requires a somewhat higher maximum illuminance level at center of the roof deck than is listed in the City's design criteria, however, the design meets all of the *IESNA* lighting recommendations.

12.2 Standards

12.2.4. *Wattage: No fixture shall exceed 250 watts, except in industrial areas.*

RESPONSE: The maximum wattage of any of the proposed luminaires is 129.5 watts.

MMC St. John Street Parking Garage

Page 4 of 4

Portland, Maine

12.2 Standards

12.2.5. Light Trespass: *The maximum illumination level at a property line shall not exceed 0.1 foot candle, as measured at grade, except where abutting industrial, or other non-sensitive uses. All residential uses and natural resource protection areas are to be considered sensitive to light trespass. In certain instances where a proposed development is adjacent to a sensitive use, house-side shielding may be necessary to comply with this standard.*

RESPONSE: The only residential property that abuts the project are the residences at 210 and 214/214 St. John Street. The proposed lighting has been selected and located to avoid any point of illuminance at grade across the residential property lines that exceeds 0.1 footcandle.

12.2 Standards

12.2.6. Luminaire Types: *All fixtures, including pole mounted and wall mounted luminaires, shall be a "cut-off" type where lenses, refractors or lamp sources do not extend below the surface of the fixture housing and no direct light shall be directed at or above the horizontal plane. Sites which are part of an historic district or require specific decorative lighting fixtures as means to achieve compatibility within an existing architectural context may propose non-cutoff fixtures providing that they have built in reflectors to mitigate uplighting and that photometrics fall within IESNA guidelines. Low pressure sodium bulbs are prohibited.*

RESPONSE: See the Response included on page 1 for Chapter 14 – Land use, Article V Site Plan, 14-526.6 Exterior Lighting, (a) Site Lighting. All proposed luminaires are classified as having “cut-off” optical distribution with no light being emitted above the horizontal plane.

12.2 Standards

12.2.7. Fixture Height: *Fixtures shall be mounted at the lowest height necessary with no fixture height to exceed twenty (20) feet above grade, except in sites proposed for large industrial and/or commercial uses, where the fixture height shall not exceed thirty (30) feet above grade. For the purposes of this standard only, a large industrial and/or commercial use is defined to have greater than fifty thousand (50,000) gross square feet of building space.*

RESPONSE: The luminaire mounting height at the lighting poles in the north parking lot is 20 feet. The luminaire mounting height at the lighting poles at the top deck of the parking garage is 18 feet.

12.2 Standards

12.2.8. Lighting Curfew: *For non-residential uses, lighting in vehicle parking areas containing twenty (20) or more parking spaces shall be reduced to 50% of permitted levels from one hour after the business closing to one hour before business opening. If lighting levels are already below 50% of permitted levels, no curfew adjustment is required. Motion sensor activated lighting shall be permitted during closed hours to activate additional lighting above the 50%permitted, for the purposes of public safety.*

RESPONSE: The parking garage will be in continuous use (at all hours), and therefore, reducing lighting levels after business closing is not applicable.

MMC St. John Street Parking Garage
Portland, Maine

July 16, 2018

**PROPOSED SITE LIGHTING LUMINAIRES
AND LIGHTING POLES**

- TYPE S1 & S1a:** 12-FOOT TALL POST LIGHTS
- TYPE S4:** WALL MOUNTED LIGHTS ABOVE WALKWAY
INSTALLED WITH BOTTOM OF LUMINAIRE AT 10 FEET
ABOVE GRADE
- TYPE S5:** LIGHTS MOUNTED ON UNDERSIDE OF FRONT CANOPY
- TYPE S6 & 6a:** WALL MOUNTED SECURITY LIGHTS INSTALLED
WITH BOTTOM OF LUMINAIRE AT 10 FEET ABOVE
GRADE
- TYPE S7:** WALL MOUNTED LIGHTS ABOVE GARAGE ENTRANCE
AND EXIT INSTALLED WITH BOTTOM OF LUMINAIRE AT
24 FEET ABOVE GRADE
- TYPE S8, S9 & 9a** 20 FOOT TALL PARKING LOT LIGHTING POLES
- TYPE S10** 18 FOOT TALL TOP GARAGE DECK LIGHTING POLES
- TYPE G1:** GARAGE INSIDE LIGHTS.

TYPES S1 and S1a

landscapeforms®

ALCOTT

Product Data Sheet



The Alcott pedestrian light is a contemporary interpretation of a traditional lamppost. Its gently curved posts are topped by a domed energy-efficient LED luminaire sealed with thermoformed lens. Proprietary AWEN™ optics combined with multiple aiming angles provide directional lighting, reducing light pollution and wasted energy.

General Description

- Offered in 3 standard mounting heights (12', 14', and 16')
- Asymmetrical and symmetrical distribution types available
- Mounting template and anchor hardware included
- Alcott ships completely assembled and ready for installation
- Zero up-light, International Dark-Sky approved
- UL Listed, suitable for wet locations

Electrical

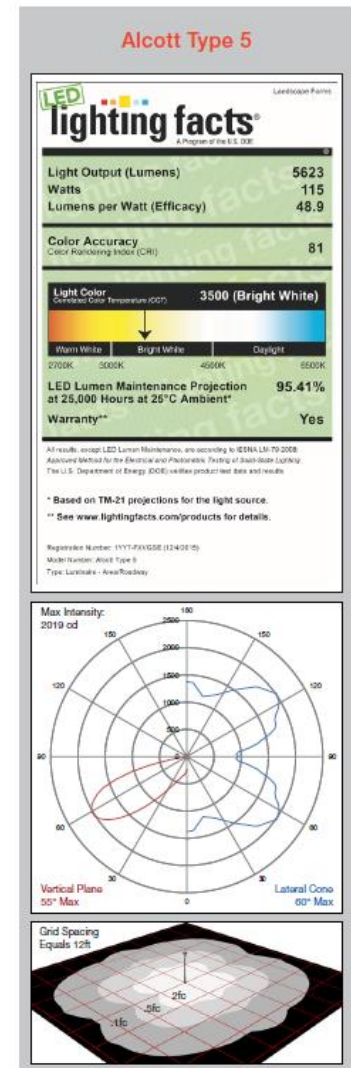
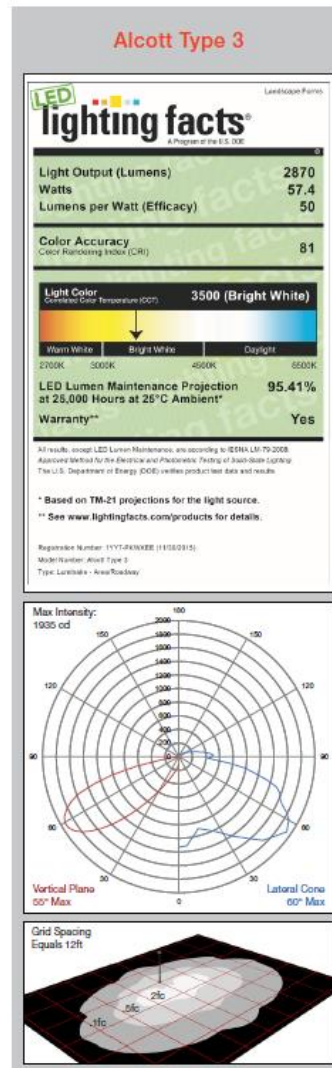
Surge protected 100V-277V 50/60 Hz, Class 2 dimmable driver mounted within integrated cast aluminum base cabinet. LED cartridge with weatherproof quick-disconnect provides ease of serviceability. Alcott ships prewired and fully assembled.

Alcott Type 3

Type 3 Distribution
 Structure: Housing, LED cartridge and cabinet are cast aluminum, pole is aluminum extrusion.
 Lamp: 48 Cree XP-E2 LEDs
 CCT: 3000K, 3500K, 4000K
 L70: >100,000 hrs
 Drive Current: 350mA
 Optic: AWEN™ Optic
 Lens: Diffused Acrylite®
 Power Supply: 100V-277V
 LED Driver: TRP PLED-75W
 Dimmable: 0-10V
 BUG Rating: B0 U0 G1
 IP Rating: IP66 for LED Cartridge

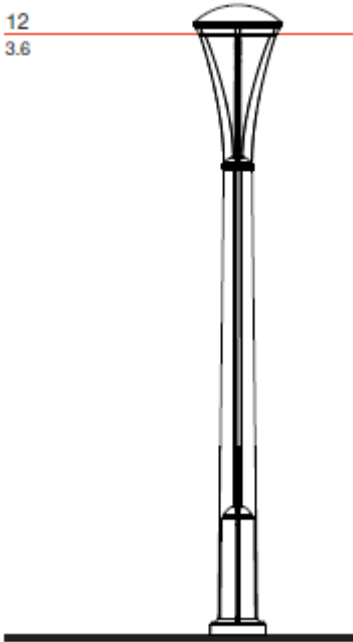
Alcott Type 5

Type 5 Distribution
 Structure: Housing, LED cartridge and cabinet are cast aluminum, pole is aluminum extrusion.
 Lamp: 96 Cree XP-E2 LEDs
 CCT: 3000K, 3500K, 4000K
 L70: >100,000 hrs
 Drive Current: 350mA
 Optic: AWEN™ Optic
 Lens: Diffused Acrylite®
 Power Supply: 100V-277V
 LED Driver: (2) TRP PLED-75W
 Dimmable: 0-10V
 BUG Rating: B3 U0 G1
 IP Rating: IP66 for LED Cartridge



Type S1: Alcott Type 3
Type S1a: Alcott Type 5

TYPES S1 and S1a



Finish

Pangard II®, offered exclusively by Landscape Forms, is a 19 step program of cleaning, priming, and powdercoating that resists rusting, chipping, peeling and fading to produce the finest metal finish available for site furniture and outdoor lighting. In addition, Pangard II® contains no heavy metals and is free of Hazardous Air Pollutants.

Product	Lamp	Drive Current	Color Temp.	Input Voltage	Mounting
AC Alcott	048L3 (48 LED, Type 3)	035F (350 mA)	40K (4000K)	UV1 (100-277VAC)	12 (144in)
	<hr/> 096L5 (96 LED, Type 5)		35K (3500K)		14 (168in)
			30K (3000K)		16 (192in)

TYPE S4



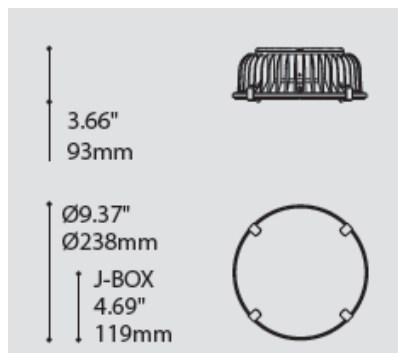
	A	B	C
AEL 12	20.79	5.40	3.60

Description	The Architectural Egress Luminaire combines a unique, patented design shaped with high performance, full cut-off optics to achieve completely unobtrusive illumination of a space or path of egress. When mounted over a doorway, the fixture is perceived as an element of the building structure and, additionally, provides water protection in the form of a drip cap over the doorway. Multiple lengths are available to match a given door opening and our unique quick mount system facilitates installation and maintenance.
Housing	Marine grade heat treated extruded aluminum. Chemically primed and finished with robotically applied polyester powder coat.
Wall Mount	Marine grade heat treated extruded aluminum. Chemically primed and finished with robotically applied polyester powder coat. Designed to provide quick mounting to housing and secured with (2) captive stainless steel TORX® head screws.
Lens Frame	Marine grade heat treated extruded aluminum, clear anodized. Secured to fixture via integral concealed hinge and (3) captive stainless steel TORX® head screws.
Lens	UV stabilized diffused extruded polycarbonate.
End Caps	Die-cast marine grade aluminum continuously welded to housing. All welds ground smooth.
Reflector	Electrostatically brightened anodized aluminum PVD coated and absolutely color-free of iridescence. Shaped to provide full cutoff, LED point dispersion and maximum efficiency.
Drivers	Constant current drivers at 350mA. High output version utilizes 700mA.
LED	Samsung LM561B+ Series @ 3000K, 3500K, 4000K, or 5000K and 82 CRI wired in parallel-series. L ₇₀ projected life of 130,000 hours at 50°C. Tested in accordance with LM-80. Ten year warranty on LED boards against operational defects.
Gaskets	Closed cell self-adhesive neoprene to provide watertight seal between fixture and wall and between fixture and lens frame.



SERIES	LED	CCT	VOLTS	LENS	COLOR
DP					
AEL 12	12" - 10W	3000K	120-277	DP	BKH
AEL 24	24" - 10W	3500K	347		BZH
AEL 36	24" - 20W	4000K			SVH

LUMINAIRES TO BE INSTALLED ON WALL WITH BOTTOM OF FIXTURE AT 10'-0" ABOVE GRADE

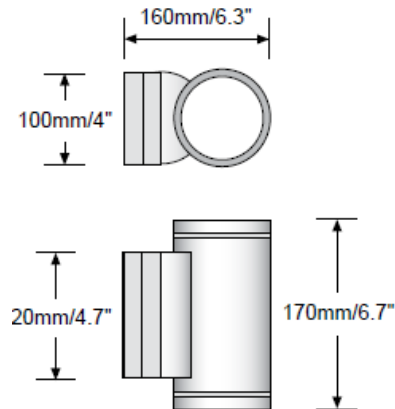
TYPE S5



DESIGN:	Coupé is an industrial-looking shallow fixture that can be installed on low ceilings. Add a conical metal shade for a modern look and you have the Turbo.
INSTALLATION:	These fixtures are perfect for indoor surface mounted applications and are easy to install due to an integrated connection box. Also designed for outdoor projects, Coupé & Turbo can be used in wet locations.
LIGHT SOURCE:	13W or 26W LED Chip-on-board (COB) emitter. Electronic dimming available on all models.
STRUCTURE:	Durable die cast aluminum enclosure with stainless steel spring clips. Turbo has an additional spun aluminum shade with exterior grade fine texture powder coat finish.
DIFFUSER:	Compound lens structured around layers of diffusing and conical deglaring prismatic sheet PMMA.
CERTIFIED:	CSA Listed to US and Canadian safety standards; 25°C ambient and wet-locations. IP64 rated

MODEL MODÈLE	
4766-SIJ	COUPÉ
LIGHT SOURCE SOURCE LUMINEUSE	
(WATTAGE, LAMP TYPE, OTHER INFO)	
LED.13	 13W, LED
LED.26	 26W, LED
COLOR TEMPERATURE TEMPÉRATURE DE COULEUR	
30	3000K
35	3500K
40	4000K
VOLTAGE VOLTAGE	
120V	120 VOLT
277V	277 VOLT
DIMMING OPTION OPTION DE GRADATION	
DV	0-10V DIMMING (120-277V)
DP	PHASE DIMMING (120V ONLY)
LED DIMMING DRIVER IS STANDARD IN THESE PRODUCTS, PLEASE SPECIFY YOUR DIMMING TYPE.	
HEATSINK FINISH FINI RADIATEUR	
BLKA	BLACK ANODISED
INTERIOR DIFFUSER FINISH FINI DIFFUSEUR INTÉRIEUR	
CDP	CONICAL DEGLARING PRISM

LUMINAIRES TO BE INSTALLED ON UNDERSIDE OF CANOPY



GENERAL SPECIFICATION

Housing: Die-cast and extruded aluminium.

External Screws: Stainless steel.

Lens: Clear glass.

Gaskets: One piece silicone.

Reflector: High purity aluminium, silver anodised. 14° and 40° reflectors may be adjusted to -12° from vertical.

Finish: Silver powder coated light gray or black coated as standard.

Drivers: HPF, electronic for 120-277V. Dimming 0-10V or Trailing edge 120V.

Minimum Starting Temperature: -20°C.

Weight: Maximum 8.8lb.

Approvals: ETL. Wet location, IP65.

Code:	Power:	*Delivered lms:	Distribution:
26 6033	2 x 6W LED	932lm	10°up + 35° down
26 6013	2 x 6W LED	932lm	10°up + 10° down
26 6023	2 x 6W LED	932lm	35°up + 35° down
26 6113	6W LED	466lm	10°down
26 6123	6W LED	466lm	35° down

B SPECIFY CCT

30 3000K (min 80 CRI)

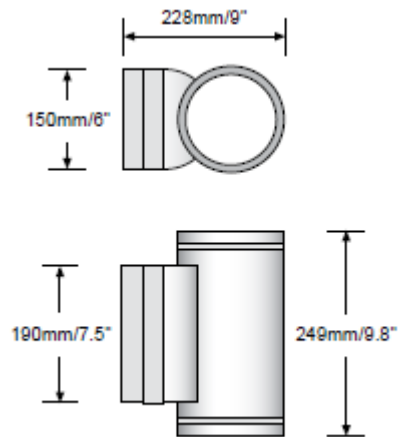
40 4000K (min 80 CRI)

C SPECIFY FINISH

BL Black

GR Light Gray

LUMINAIRES TO BE INSTALLED ON WALL WITH BOTTOM OF FIXTURE AT 10'-0" ABOVE GRADE



GENERAL SPECIFICATION

Housing: Die-cast and extruded aluminium.

External Screws: Stainless steel.

Lens: Clear glass.

Gaskets: One piece silicone.

Reflector: High purity aluminium, silver anodised. 14° and 40° reflectors may be adjusted to -12° from vertical.

Finish: Silver powder coated light gray or black coated as standard.

Drivers: HPF, electronic for 120-277V. Dimming 0-10V or Trailing edge 120V.

Minimum Starting Temperature: -20°C.

Weight: Maximum 8.8lb.

Approvals: ETL. Wet location, IP65.

Code:	Power:	*Delivered lms:	Distribution:
26 7033	2 x 14W LED	2098	10°up + 35° down
26 7013	2 x 14W LED	2098	10°up + 10° down
26 7023	2 x 14W LED	2098	35°up + 35° down
26 7113	14W LED	1049	10°down
26 7123	14W LED	1049	35° down

B SPECIFY CCT

30 3000K (min 80 CRI)

40 4000K (min 80 CRI)

C SPECIFY FINISH

BL Black

GR Light Gray

LUMINAIRES TO BE INSTALLED ON WALL WITH BOTTOM OF FIXTURE AT 10'-0" ABOVE GRADE

TYPE S7



HUBBELL
Outdoor Lighting

SPECIFICATIONS

Intended Use:

Slender wallpack/floodlight available in two sizes for a variety of applications including building perimeter/security lighting, entrances, stairways, loading docks or facades for schools, apartments or commercial buildings.

Construction:

Rugged die-cast aluminum housing with corrosion resistant powder coat finish both protects and provides architectural appearance. Heat dissipating fins provide superior thermal performance extending the life of the electronic components.

Electrical:

- 120-277V, 50/60Hz electronic drivers
- 347V and 480V available in larger SG2 housing
- 10KA surge protection included

LED(s) Optics, CCT:

- 3000K, 4000K and 5000K CCT nominal with 70 CRI
- Smaller SG1 housing has 2 LEDs, larger SG2 housing has 3 LEDs, see page 2 for electrical and photometric data

Lenses:

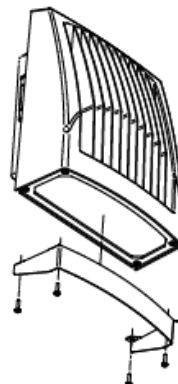
- Impact resistant tempered glass offers zero uplight
- Comfort lens available as an option or accessory to reduce glare (7-10% lumen reduction) and provide better uniformity

Options/Controls

- Button photocontrol for dusk to dawn energy savings. Stock versions include 120V-277V PC with a cover which provides a choice to engage photocontrol or not. PC is installed in top hub.
- Occupancy sensor available for on/off and dimming control in larger SG2 housing.
- SiteSync™ wireless lighting control delivers flexible control strategies for reducing power consumption and minimizing maintenance costs while delivering the right light levels with a simple and affordable wireless solution. See ordering information or visit www.hubbellighting.com/sitesync for more details.
- Battery backup options available in larger SG2 housing rated for either 0° C or -30° C. Performance exceeds NEC requirement providing 1 fc minimum over 10'x10' at 11' mounting height
- Diffused comfort lens provides glare control and improved uniformity. Available as an option or accessory

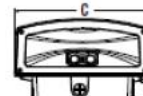
Listings

- DesignLights Consortium® (DLC) qualified. Please refer to the DLC website for specific product qualifications at www.designlights.org
- Listed to UL1598 for use in wet location, listed for -40C to 40C applications
- IDA approved with zero uplight for 3000K and warmer CCTs
- IP65



DIMENSIONS

SG1



A	B	C	Weight
4.19"	7.80"	6.61"	4.4 lbs.
106.5 mm	198 mm	168 mm	2 kg

SG2



A	B	C	Weight
5.80"	11.14"	9.52"	11 lbs.
147 mm	283 mm	242 mm	5 kg

FAMILY	CCT/CRI	DISTRIBUTION	VOLTAGE	COLOR/FINISH
SG1-20 Size 1, 20w	3K7 3000K, 70 CRI	FT Fwd Throw	UNV 120V-277V	DB Textured Dark Bronze
SG1-30 Size 1, 30w	4K7 4000K, 70 CRI		120' 120V	BL Textured Black
SG2-50 Size 2, 50w	5K7 5000K, 70 CRI		277' 277V	WH Textured White
SG2-80 Size 2, 80w			UHV' 347V-480V	GYS Smooth Gray
				PS Smooth Plat. Silver
				CC Custom Color

LUMINAIRES TO BE INSTALLED ON WALL WITH BOTTOM OF FIXTURE AT 20'-0" ABOVE GRADE

VIPER S SERIES

SMALL VIPER LUMINAIRE

Cat.#

Job

Type



Approvals

SPECIFICATIONS

Intended Use:

The Beacon Viper luminaire is available with a wide choice of different LED Wattage configurations and optical distributions designed to replace HID lighting up to 400W MH or HPS.

Construction:

- Manufactured with die cast aluminum.
- Coated with a polyester finish that meets ASTM B117 corrosion test requirements and ASTM D522 cracking and loss of adhesion test requirements.
- External hardware is corrosion resistant.
- One piece optical cartridge system consisting of an LED engine, LED lamps, optics, gasket and stainless steel bezel.
- Cartridge is held together with internal brass standoffs soldered to the board so that it can be field replaced as a one piece optical system.
- Two-piece silicone and micro-cellular polyurethane foam gasket ensures a weather-proof seal around each individual LED.

Electrical:

- 100V through 277V, 50 Hz to 60 Hz (UNV), or 347V or 480V input.
- Power factor is ≥ 0.90 at full load.
- All electrical components are rated at 50,000 hours at full load and 25°C ambient conditions per MIL- 217F Notice 2.
- Dimming drivers are standard, but must contact factory to request wiring leads for purpose of external dimming controls.
- Component-to-component wiring within the luminaire may carry no more than 80% of rated load and is certified by UL for use at 600VAC at 90°C or higher.
- Plug disconnects are certified by UL for use at 600 VAC, 13A or higher. 13A rating applies to primary (AC) side only.
- Fixture electrical compartment shall contain all LED driver components and shall be provided with a push-button terminal block for AC power connections.
- The housing is designed for an optional twist lock photo control receptacle.
- Ambient operating temperature -40°C to 40°C
- Surge protection - 20KA.
- Optional 7-pin ANSI C136.41-2013 twist-lock photo control receptacle available. Compatible with ANSI C136.41 external wireless control devices.
- Lifeshield™ Circuit - protects luminaire from excessive temperature. The device shall activate at a specific, factory-preset temperature, and progressively reduce power over a finite temperature range. Operation shall be smooth and undetectable to the eye. Thermal circuit is designed to "fail on", allowing the luminaire to revert to full power in the event of an interruption of its power supply, or faulty wiring connection to the drivers. The device shall be able to co-exist with other 0-10V control devices (occupancy sensors, external dimmers, etc.).

Controls/Options:

- Available with an optional passive infrared (PIR) motion sensor capable of detecting motion 360° around the luminaire. When no motion is detected for the specified time, the Motion Response system reduces the wattage to factory preset level, reducing the light level accordingly. When motion is detected by the PIR sensor, the luminaire returns to full wattage and full light output. Please contact Beacon Products if project requirements vary from standard configuration.
- Available with Energeni for optional set dimming, timed dimming with simple delay, or timed dimming based on time of night (see www.beaconproducts.com/products/energeni).
- In addition, Viper can be specified with SiteSync™ wireless control system for reduction in energy and maintenance cost while optimizing light quality 24/7. See ordering information or visit www.hubbellighting.com/sitesync for more details.

Installation:

- Mounting options for horizontal arm, vertical tenon or traditional arm mounting available. Mounting hardware included.

Finish:

- IFS polyester powder-coat electrostatically applied and thermocured.
- IFS finish consists of a five stage pretreatment regimen with a polymer primer sealer and top coated with a thermoset super TGIC polyester powder coat finish.
- The finish meets the AAMA 605.2 performance specification which includes passing a 3000 hour salt spray test for corrosion resistance and resists cracking or loss of adhesion per ASTM D522 and resists surface impacts of up to 160 inch-pounds.

Listings:

- DesignLights Consortium (DLC) qualified, consult DLC website for more details: <http://www.designlights.org/QPL>
- Listed to UL1598 and GSA2.2#250.0-24 for wet locations and 40°C ambient temperatures
- 3G rated for ANSI C136.31 high vibration applications with SF2 mounting
- IDA approved

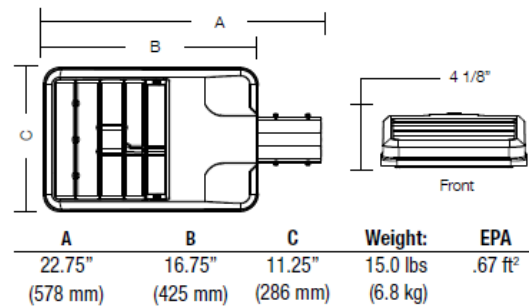
Warranty:

Five year limited warranty for more information visit: www.hubbellighting.com/resources/warranty

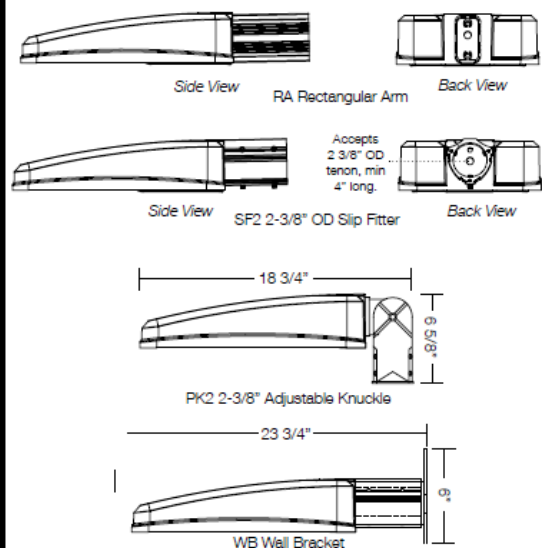
PRODUCT IMAGE(S)



DIMENSIONS



MOUNTING OPTIONS



TYPES S8, S9 & 9a



SERIES	ENGINE-WATTS	LED COLOR	VOLTAGE	ELECTRICAL OPTIONS	HOUSE SIDE SHIELD OPTIONS	FINISH
VPS viper-small	24NB-55 55W, LED array	3K 3000K	UNV 120-277V	PCR-TL Twist lock receptacle with photo control	HSS-90 house side shield 90°	BBT basic black textured
	30NB-70 70W, LED array	4K 4000K	347V 347V	PCR-SC Twist lock receptacle with shorting cap	HSS-180 house side shield 180°	BMT black matte textured
	36NB-80 80W, LED array	5K 5000K	480V 480V	PCR-U Twist lock receptacle dual power feed	BLC³ backlight control	WHT white textured
	48NB-110 110W, LED array	OPTICS⁴				MBT metallic bronze textured
	60NB-136 136W, LED array	T1 type I				BZT bronze textured
		T2 type II				DBT dark bronze textured
		T3 type III				GYS gray smooth
		T4 type IV				DPS dark platinum smooth
		T5R type V, rectangular				GNT green textured
		T5QM type V, square medium				MST metallic silver textured
		T5W type V, round wide				MTT metallic titanium textured
		FR front row auto optic				OWI old world iron
			CONTROL OPTIONS		BIRD DETERRENT	
			GENI-XX⁹ Energeni		BSP bird spike	
					MOUNTING OPTIONS	
					RA rectangular arm for round or square pole mount. RPA included.	

APPLICATIONS

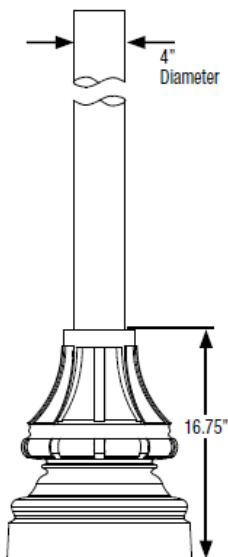
- Lighting installations for side and top mounting of luminaires with effective projected area (EPA) not exceeding maximum allowable loading of the specified pole in its installed geographic location

CONSTRUCTION

- SHAFT:** One-piece straight aluminum with fluted or smooth cross section; Extruded shafts of 6061-T6 aluminum in 1/8", 3/16", or 1/4" thickness. Decorative base of 356 cast aluminum.
- POLE CAP OR FINALS:** Cap or decorative finials available for side mounted luminaires. Open top or tenons provided for post top mounted luminaires.
- HAND HOLE:** Hand hole provided in cast base; Mounting provisions for grounding lug located behind cover
- ANCHOR BOLTS:** Four galvanized anchor bolts provided per pole with minimum yield of 55,000 psi (ASTM F1554). Galvanized hardware with two washers and two nuts per bolt for leveling

FINISH

- Durable thermoset polyester powder coat paint finish with nominal 3.0 mil thickness
- Powder paint finish coat available in twelve standard colors; Custom colors available; RAL number preferable.



POLE HEIGHT = 20'-0"

Catalog Number	Height		Nominal Shaft Dimensions	Wall Thickness	Bolt Circle (suggested)	Bolt Square	Base Plate Size	Anchor Bolt Size	Bolt Projection	Pole weight (lbs)
	Feet	Meters								
RSA-B-CENA-S-20-40-B	20	6.1	4" Round	0.188"	9.50"	6.72"	13-1/2" dia. X 16-3/4" Tall	5/8 x 24 x 3	3-1/4"	83

Type S8: TYPE T5W OPTICAL DISTRIBUTION – 110 WATT

Type S9: TYPE II OPTICAL DISTRIBUTION – 55 WATT

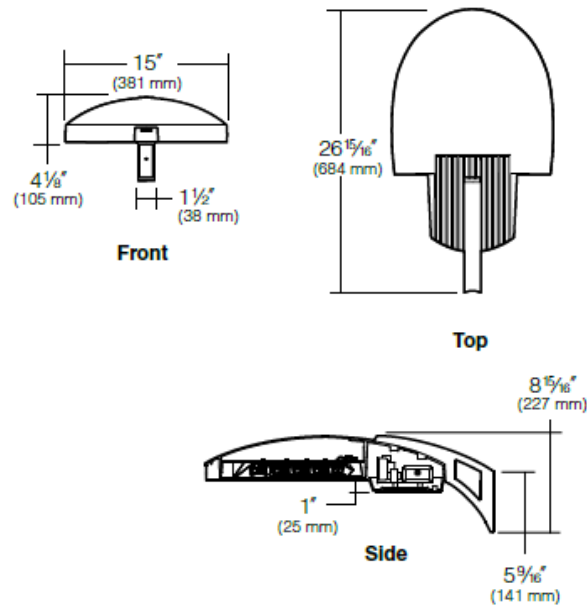
Type S9a: TYPE III OPTICAL DISTRIBUTION – 55 WATT

TYPE S10



KIM LIGHTING

WARP9® Small PicoEmitter® LED



Housing:

- One-piece die-cast, low copper (<0.6% Cu) aluminum alloy with integral cooling ribs over the optical chamber and electrical compartment.
- Solid barrier wall separates optical and electrical compartments.
- Double-thick wall with gussets on the support-arm mounting end.
- Housing forms a half cylinder with 55° front face plane providing a recess to allow a flush single-latch detail.
- All hardware is stainless steel or electro-zinc plated steel.

Lens Frame:

- Integral hinges with stainless steel pins provide no-tool mounting and removal from housing.
- Single die-cast aluminum cam-latch provides positive locking and sealing of the optical chamber by a one-piece extruded and vulcanized silicone gasket to provide an IP66 rating for the optical module.
- Clear 3/8" thick tempered glass lens retained by eight steel clips with full silicone gasketing around the perimeter.

Optical Module:

- Precision, replaceable PicoEmitters are positioned to achieve directional control toward desired task.
- The entire EmitterDeck fastens to the housing as a one-piece module.
- Type I, II, III, IV, V, L (left), and R (right) standard distributions. Custom available.
- 3000K, 4000K, 5000K standard CCT. Amber and custom available.
- IP66 certified
- Die-cast, low copper aluminum heat sink modules provide thermal transfer at PCB level.
- Anodized aluminum carrier plate and heat sink modules.

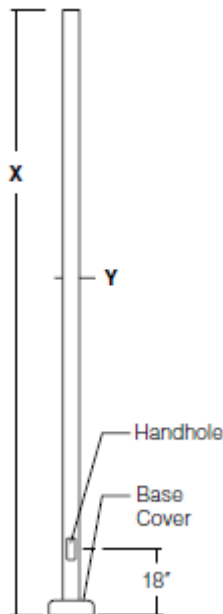
Configuration		EPA	Fixture			Electrical Module			Fixture Finish	Photocell Options	
Icon	Code	Mounting	EPA	Housing	Distribution	Drive Current	Source	Color Temperature ²	Voltagess	Finish	Options
↔	1SA	1 Arm Side Mt.	.52	WP9S Small, 60 LEDs	1 Type I	E35 350mA PicoEmitter	60L 60 LEDs, 66W	2K ³ 580nm 3K 3000K 4K 4000K 5K 5000K	120 120V 208 208V 240 240V 277 277V 347 ⁴ 347V 480 ⁴ 480V	BL	A25-7 ¹ 7-pin Photocell Receptacle
↔↔	2SB	2 Arm Side Mt.	1.0		2 Type II					A30 120V Button Photocell	
↔↔↔	2SL	2 Arm Side Mt.	.82		3 Type III					A31 208V Button Photocell	
↔↔↔↔	3ST	3 Arm Side Mt.	1.3		4 Type IV					A32 240V Button Photocell	
↔↔↔↔↔	3SY [*]	3 Arm Side Mt.	1.3		5 Type V					A33 277V Button Photocell	
↔↔↔↔↔↔	4SC	4 Arm Side Mt.	1.5		R Type R, Right					A34 480V Button Photocell	
↔	1W	Single Wall Mt.	n/a							WH	A354 347V Button Photocell

E70 700mA PicoEmitter

TYPE S10



KIM LIGHTING



Pole Height	Pole Diameter	Bolt Circle Dia.	Anchor Bolt Projection	Anchor Bolts Size	Base Cover Size	Conduit Opening
8'-14'	4"	8½"	3½"	¾" x 15" + 3"	11½"	3" dia.
8'-14'	5"	8½"	3½"	¾" x 30" + 4"	11½"	3" dia.
10'-14'	3¾"	7"	3½"	¾" x 15" + 3"	10½"	2½" dia.
12'	6"	10½"	3½"	¾" x 30" + 4"	11½"	3" dia.
14'	6"	10½"	3½"	¾" x 30" + 4"	11½"	3" dia.
16'-20'	4"-5"	8½"	3½"	¾" x 30" + 4"	11½"	3" dia.
16'-20'	6"	10½"	3½"	¾" x 30" + 4"	14"	5" dia.
25'-30'	6"	10½"	3½"	¾" x 30" + 4"	14"	5" dia.

15'-6"-Foot Pole Height on a Raised 2'-6" Base

Pole Construction: Seamless round extruded aluminum tube of alloy 6061-T6, welded to top and bottom of aluminum base casting of alloy 356.

Base Cover: Base has a two-piece cast aluminum full cover of 319 alloy, secured by stainless steel screws.

Pole Cap: A flush-sided cast aluminum pole cap is provided for side arm mounted luminaires.

Handhole: 18" up from base, with a gasketed cover and ground lug. Poles with a 3¾" O.D. include a handhole reinforcement casting welded in place.

Anchor Bolts: Four galvanized anchor bolts provided, complete with eight nuts, eight flat washers, and a presswood template.

Vibration Dampener: All poles 25' and above include an internally mounted, factory installed pendulum vibration dampener, with flush stainless steel socket head fasteners finished to match pole.

Strength: Poles will withstand wind loads as listed in chart (See page 2) when luminaires are mounted per fixture installation instructions.

Finish: Super TGIC thermoset polyester powder coat paint applied over a titanated zirconium conversion coating. Standard colors are Black, Dark Bronze, Light Gray, Graphite Platinum Silver, Titanium and White. Custom colors are available.

Pole - Pole Catalog Number	X	Y	Wind Map Steady Wind							
			85	90	100	110	120	130	140	150
□ PRA20-4188	19.5'	4" x .188	5.33	4.37	3.74	2.48	1.52	0.91	0.63	0.42

TYPE G1 (GARAGE LUMINAIRE)

<h2 style="margin: 0;">ENDURA SERIES</h2> <p style="margin: 0;">WALL/BUILDING MOUNT</p>	Cat.#		
	Job		
			Approvals

SPECIFICATIONS

Intended Use:

The Endura is a ceiling surface mounted or pendant mounted parking structure luminaire with a field replaceable LED light-engine & optical bezel system. Internal components are totally enclosed in a rain-tight and corrosion-resistant die cast aluminum housing. The Endura Luminaire is CSA listed and suitable for damp locations (wet location available on request).

Construction:

- Die cast aluminum two-piece housing
- Shape of the top housing is designed as a bird nesting deterrent
- Die cast main (thermal) housing provides direct-heat exchange between the LED light engine and the cool outdoor air by drawing heat through integral heat channels and out to the sculptured and functional luminaire surface.
- LED drivers are thermally isolated from the main housing, mechanically attached and heat-sunk to the top housing.
- Main housing is designed with heat dissipating fins for LED thermal management without the use of metallic screens, cages, or fans
- Main and top housings are designed to hinge open for easy mounting and easy access

LED/Optics:

- Endura luminaire is supplied with an Optical one piece cartridge system consisting of an LED engine, LED lamps, optics, gasket and stainless steel bezel
- Cartridge is held together with internal brass standoffs soldered to the board so that it can be field replaced as a one piece optical system.
- Two-piece silicone and polycarbonate foam gasket ensures a weather-proof seal around each individual LED and allows the Endura luminaire to be rated for high-pressure hose down applications.
- Optical cartridge is secured to the extruded housing with fasteners and a heat pad to ensure thermal conductivity. The optics are held in place without the use of adhesives and the complete assemble is gasketed for high pressure hose down cleaning.
- Cartridge assembly is available in various lighting distributions using TIR designed Acrylic optical lenses over each LED.

Electrical:

- 120V through 277V, 50 Hz to 60 Hz.
- Endura comes standard with 70 CRI.
- Power factor is min 0.92 at full load.
- Optional 0 to 10 volt dimming drivers are available upon request.
- Component-to-component wiring within the luminaire may carry no more than 80% of rated load and is listed by UL for use at 600VAC at 50°C or higher.
- Plug disconnects are listed by UL for use at 600 VAC, 15A or higher. 15A rating applies to primary (AC) side only.
- Surge protection - 20KA

Controls/Options:

- Endura is available with an optional passive infrared (PIR) motion sensor capable of detecting motion 360° around the luminaire. When no motion is detected for the specified time, the Motion Response system reduces the wattage down to a factory preset level, reducing light level accordingly. When motion is detected, the luminaire returns to full wattage and full light output. Please contact Beacon Products if project requirements vary from the standard configurations.
- Available with Energeni for optional set dimming with simple delay, or timed dimming based on hours of operation or time of night (see Energeni product page for more details www.beaconproducts.com/products/energeni)
- In addition, Endura can be specified with SiteSync™ wireless control system for reduction in energy and maintenance cost while optimizing light quality 24/7. See ordering information or visit: www.hubbellighting.com/sitesync/ for more details

Installation:

- Top housing is designed with various bolt patterns for mounting to a recessed, surface or rigid-pendant hung 4" junction box and rigid stem provided by others)
- After mounting the top housing to the junction box, the main housing is designed to hang and hinge closed after connecting the male and female quick connectors
- Mounting design permits a simple retrofit to existing parking structure luminaires that utilize surface mount or recessed junction boxes

Finish

- IFS polyester powder-coat electrostatically applied and thermocured.
- IFS finish consists of a five stage iron phosphate chemical pretreatment regimen with a polymer primer sealer, oven dry off, and top coated with a thermoset super TGIC polyester powder coat finish.
- The finish meets the AAMA 605.2 performance specification which includes passing a 3000 hour salt spray test for corrosion resistance and resists cracking or loss of adhesion per ASTM D522 and resists surface impacts of up to 160 inch-pounds.

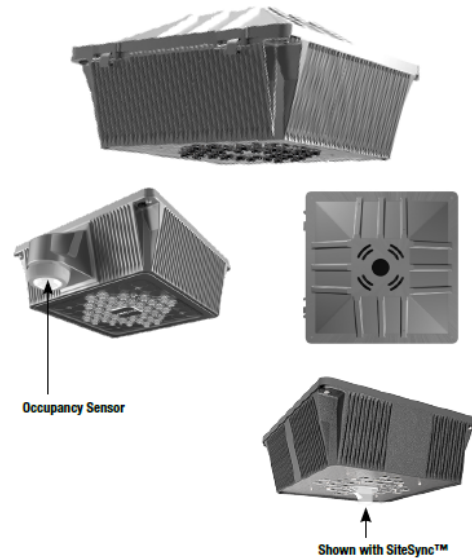
Listings:

- The luminaire shall bear a CSA label and be marked suitable for clamp locations (standard). Luminaire may be specified for wet locations.
- This product is approved by the Florida Fish and Wildlife Conservation Commission. Separate spec available at: <http://www.beaconproducts.com/products/endura>

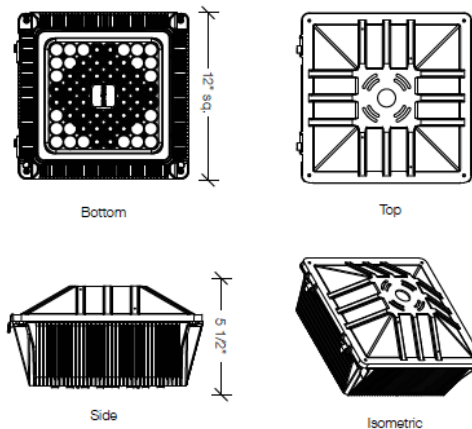
Warranty:

Five year limited warranty for more information visit: www.hubbellighting.com/resources/warranty

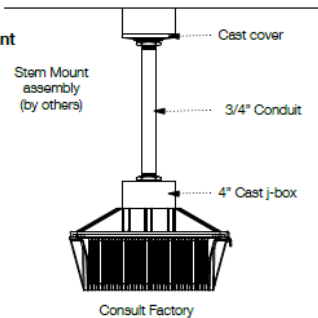
PRODUCT IMAGE(S)



DIMENSIONS



Ceiling Mount



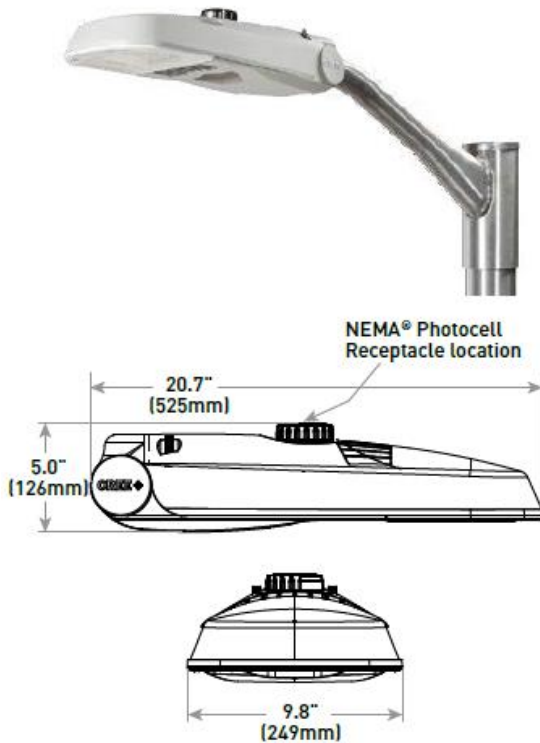
CERTIFICATIONS/LISTINGS



TYPE G1 (GARAGE LUMINAIRE)

SERIES	ENGINE-WATTS	LED COLOR ¹¹	OPTICS	VOLTAGE	ELECTRICAL OPTIONS	FINISH
EDR Endura	24NB-27	27 Watts - LED array	3K 3000K	UNV 120-277V 347 347V 480 480V	PEC Photocell, button 2PF ^{1,2,8} Dual power feed BPC ^{4,8} Cold weather battery pack BP ^{4,8} 0° C battery pack	BBT basic black textured BMT black matte textured WHT white textured MBT metallic bronze textured BZT bronze textured DBT dark bronze textured GYS gray smooth
	24NB-55	55 Watts - LED array	4K 4000K			
	36NB-80	80 Watts - LED array	5K 5000K (std.)			
	48NB-110	110 Watts - LED array	T5R Type V, rectangular T5W Type V, wide T5QM Type V, square medium T5QN Type V, square narrow T5QW Type V, square wide			
			HIGHER MOUNTING APPLICATIONS	CONTROL OPTIONS	SENSOR OPTIONS	
			2X2 Type V Concentrated Spot	GENI-XX ^{5,9} Energeni	MOB ^{3,7,9} Occupancy Sensor (33% or 50% dimming)	DPS dark platinum smooth
			4X4 Type V Concentrated Narrow	SWP ^{6,9} SiteSync Wireless Pre-Commission	OCS ^{8,10} Occupancy Sensor (on/off)	GNT green textured
			5X5 Type V Concentrated Medium	SWPM ^{6,7,9} SiteSync Wireless Pre-Commission w/ Motion Detection		MST metallic silver textured
						MTT metallic titanium textured
						OWI old world iron
						RAL _____

LUMINAIRES THAT ARE IMMEDIATELY ADJACENT TO THE PERIMETER WALLS SHALL BE CONTROLLED WITH DAYLIGHT SENSORS



Product Specifications

CREE WAVEMAX® TECHNOLOGY

Featuring up to 90% optical efficiency and precise control, Cree WaveMax® Technology provides unmatched comfort and decreased LED source luminance by smoothly spreading brightness over a broader area. When integrated with luminous surfaces made of a polymer medium engineered with DiamondFacet™ optical elements, extremely high efficacy luminaires are the result – ultimately creating more visually comfortable and appealing environments while exceeding illumination performance.

CONSTRUCTION & MATERIALS

- Housing constructed of high strength, lightweight bulk molding compound for long weathering and durability
- UV stabilized polymeric door with handle pocket for tool-less entry
- Straight in wiring to terminal block for power input (#6-#14 AWG)
- IP66 rated optic box and driver enclosure inside optic box
- Mounts on 1.25" (32mm) IP, 1.66" (42mm) O.D. or 2" (51mm) IP, 2.375" (60mm) O.D. horizontal tenon (minimum 8" [203mm] in length) and is adjustable +/- 5° in 2.5° increments to allow for fixture leveling (two axis T-level included)
- Luminaire secures with two mounting bolts
- Comes standard with Utility Label per ANSI C136.15 and 7-pin NEMA® Photocell Receptacle per ANSI C136.41
- **Weight:** 8.45 lbs. (3.8kg); add 0.4 lbs. (0.2kg) for RSW-BLSS accessory

ELECTRICAL SYSTEM

- **Input Voltage:** 120-277V, 50/60Hz
- **Power Factor:** > 0.9 at full load
- **Total Harmonic Distortion:** < 20% at full load
- Integral 10kV surge suppression protection standard
- When code dictates fusing, a slow blow fuse or type C/D breaker should be used to address inrush current
- **10V Source Current:** 0.25mA
- **Operating Temperature Range:** -40°C - +50°C (-40°F - + 122°F)

REGULATORY & VOLUNTARY QUALIFICATIONS

- cULus Listed
- Suitable for wet locations
- Certified to ANSI C136.31-2001, 3G bridge and overpass vibration standards
- Meets CALTrans 611 Vibration testing
- 10kV surge suppression protection tested in accordance with IEEE/ANSI C62.41.2
- Meets FCC Part 15, Subpart B, Class A standards for conducted and radiated emissions
- RoHS compliant. Consult factory for additional details
- Dark Sky Friendly, IDA Approved when ordered with 27K or 30K CCT
- DLC and DLC Premium qualified versions available. Please refer to <https://www.designlights.org/search/> for most current information

ATTACHMENT 11: STORMWATER MANAGEMENT PLAN & CALCULATIONS

12. STORMWATER MANAGEMENT PLAN & CALCULATIONS

The MMC staff parking garage project site consists of portions of the 222 St. John Street (Cowcatcher), 184 St. John Street (Eagles), and the Union Station Plaza property through an access easement. Within the stormwater design, these properties have been combined and evaluated as a single project site. Applicable regulations that govern stormwater management on this site include Section 5 of the City of Portland Technical Manual, Chapter 32 of the City of Portland Code of Ordinances, and the Maine Stormwater Best Management Practices (BMP) Manual. Under Section 5 of the City Technical Manual, the project is subject to the Redevelopment Standards and is required to adhere to the General Standards of the Maine Department of Environmental Protection Chapter 500 Stormwater Regulations.

The project will disturb greater than one acre of land; will result in a decrease of approximately 14,506 square feet (SF) of impervious area; and will result in the redevelopment of a non-roof impervious area greater than 5,000 SF. The project will therefore be required to meet the Basic Standards for erosion & sedimentation control, and the General Standards for treatment of redeveloped area. The project is not required to meet the Flooding Standard, as there is no new impervious surface proposed, however the project has been designed to minimize the impact of project flows on the surrounding stormdrain system. A small portion of the project area on the 184 St. John Street property will be connected to the existing separated stormdrain in St. John Street, east of the site. Drainage was not previously connected in this direction. The remainder of the post-development flows for the redeveloped site will be managed to reduce the flow to the existing downstream stormwater collection system west of the site. Adequate provisions have been made to collect, treat, and detain the required amount of stormwater runoff generated from the site. The following sections describe the design methodology and the proposed means of compliance with these standards.

12.1 Stormwater Modeling Methodology

Stormwater modeling was completed using the HydroCAD 10.0 Stormwater Modeling System by Applied Microcomputer Systems, which uses TR-20 runoff calculations methodology. The HydroCAD output for both the pre- and post-development models are attached to this section. The Chapter 500 Stormwater regulations define standard rainfall amounts for the 2-year, 10-year, and 25-year, 24-hour storm events; a Type III rainfall distribution was applied to the storm events.

Subcatchment drainage areas were delineated based on topographical information. HydroCAD provides a lookup table for curve number (CN), which is a measure of the retention and runoff properties of various surfaces based on the Hydrological Soil Group (HSG) and land cover type. The calculation of CN is based on TR-55 methodology. The HSG for the site was taken from the USDA Natural Resources Conservation Service Web Soil Survey, a copy of the survey map is attached; the Site consists of HSG Type A (representative of the most permeable soils) within the 184 St. John Street property and unclassifiable soils within the current 222 St. John Street Parking lot. The unclassifiable soils have been modeled as HSG Type D, the HSG representing the least permeable soil condition. The area of each land cover type was delineated using ground cover information from existing condition survey and GIS sources, and HydroCAD computed the final CN for each subcatchment based on the area-weighted average.

The Time of Concentration (T_c) is the time required for runoff to travel from the most hydrologically distant point of a watershed to the point of discharge. The T_c for each subcatchment drainage area was computed within HydroCAD using TR-55 methodology as the sum of the travel times for each consecutive flow segments along the longest hydraulic flow path. The longest hydraulic flow path was delineated utilizing contour data and partitioned into segments based on flow types, land cover, and slopes. The primary types of flow consist of sheet flow, shallow concentrated flow, and channel flow. A minimum T_c of six minutes was utilized for all subcatchments.

12.2 Pre- and Post-Development Site Conditions

For the purpose of this stormwater analysis, the model has been limited to the project area, which includes portions of the following properties:

- 222 St. John Street Property parking lot (Cowcatcher LLC);
- 184 St. John Street Property parking lot (Fraternal Order of Eagles); and
- A portion of the Union Station Plaza Parcel parking lot (Union Station Plaza Limited Partnership).

Areas proposed to be redeveloped as part of the design have been included within stormwater calculations described below. Two stormwater study points have been defined, an existing 30-inch stormdrain in St. John Street to the east of the site and an existing 18-inch stormdrain crossing the railroad tracks to the west of the site.

12.2.1 Pre-Development

Currently, stormwater runoff generated from the existing parking lot collects via catch basins into a closed storm drain system installed within the parking lots. The parking lot area is primarily flat and allows for additional relief along the western property line adjacent to the neighboring railroad tracks. The project area connects to a stormdrain system that continues through the main parking lot for 222 St. John Street and Union Station Plaza. These existing 18-inch diameter stormdrain pipes convey stormwater runoff from the site, to the west under the railroad tracks into the City of Portland's separated stormwater system that crosses Ogdensburg Street / County Way into the County Jail property.

Stormwater runoff generated from existing southern parking lot located on the 184 St. John Street Property, collects via a single catch basin and connects to the existing stormdrain located within St. John Street.

Existing drainage patterns and site features are shown on the Pre-Development Drainage Plan provided in this section. For the purposes of our analysis, we have used the existing 18-inch stormdrain system as the pre-development study point. A closed circuit television (CCTV) inspection of a portion of the downstream stormdrain system was completed by the applicant, and the results of that inspection show that the existing 18-inch concrete pipe is in good condition.

12.2.2 Post-Development

The proposed redevelopment will consist of the construction of a new free-standing parking garage, entrance driveways, a surface parking lot, walkways, landscaping and associated stormwater management systems. Proposed work will primarily consist of the redevelopment of existing paved parking lot areas. Drainage from the project area will discharge to two locations. The majority of the redeveloped area will continue to discharge via direct pipe connection into the existing 18-inch stormdrain that discharges to the west under the railroad tracks into the City's stormwater infrastructure. The redeveloped area along St. John Street, including an access driveway and associated landscaping, will be redirected to the existing stormwater drainage utilities within St. John Street. Proposed drainage patterns and features are shown on the Post-Development Stormwater figure provided in this section.

12.2.2.1 West Stormdrain

Stormwater runoff from the majority of the project site will be intercepted by a closed stormwater system that connects to a proprietary subsurface stormwater treatment system which will store and treat stormwater runoff generated from the following areas:

- Top deck of the parking garage and lobby structure roof, discharged to the system via internal garage plumbing;

- Crushed stone planting area which extends along the southern and western faces of the parking garage; and
- Northern surface parking lot, an adjacent grade level entrance driveway, and associated landscaping.

Details of the proposed treatment and storage are provided in the discussions of the General and Flooding Standards that follow in this report.

12.2.2.2 East Stormdrain

Stormwater runoff from the redeveloped area along St. John Street will be intercepted by a closed stormwater system that connects to a proprietary stormwater treatment system which will be installed within a new catch basin in the proposed entrance drive. The existing condition in this area is a parking lot that connects to the stormdrain to the west. This project proposes to instead direct stormwater from this area to the east into the existing 30-inch separated stormdrain in St. John Street. This is a small part of the overall project site, and the flow from this area will not be significant (see the Flooding Standard discussion below). Discussions with Brad Roland from the City of Portland Department of Public Works have indicated that the St. John Street stormdrain should have adequate capacity for the proposed connection.

The existing parking lot located to the south of the Fraternal Order of the Eagles building is proposed to be redeveloped. Stormwater runoff in this area will remain the same as previously described and will discharge into the existing stormdrain within St. John Street.

12.3 Basic Standards (Soil Erosion and Sedimentation Control)

These standards address erosion and sedimentation control, inspection and maintenance, and good housekeeping practices. The application includes erosion and sediment control plans, details, and notes. These notes cover good housekeeping practices. The Erosion and Sedimentation Control Plan for the proposed project is provided below. Additional erosion and sedimentation controls are located within the construction management plan and detail the sequence of the management practice installation.

12.3.1 Erosion and Sedimentation Control Plan

The overall goal of the Soil Erosion and Sedimentation Plan is to restrict the potential for erosion and sedimentation at the site and down-gradient of the site. A variety of erosion control techniques will be implemented to achieve this goal. During construction, these include:

- Positive grades throughout the construction site to direct flow to sediment control barriers;
- Diversion barriers to keep upslope runoff from flowing through the construction site;
- Installation and maintenance of sedimentation barriers adjacent to downhill areas of the perimeter of the project site;
- Installation and maintenance of construction entrances at the travelled interface between stabilized and non-stabilized portions of the project site;
- Controls for fugitive dust, debris, and other materials;
- Permanent seeding or mulching applied as soon as areas are at final grades; and
- Inspection of all in-place measures after every significant rainfall until permanent measures are in place.

Structural measures for erosion and sedimentation control will be installed where shown on the Demolition Plan, which is included in the drawings attached to Section 3 of this Report; details for the proposed measures are also included in

the drawings. Erosion and sedimentation control measures will be implemented in accordance with the “Maine Erosion and Sedimentation Handbook for Construction: Best Management Practices” and will be installed prior to earth disturbing activities. Temporary measures will be removed after the areas are permanently stabilized.

Permanent erosion control measures will include surface ground cover, including vegetation, pavement, crushed stone, and rip rap. Areas of concentrated flow will be protected from erosion by establishing vegetation and riprap. All measures will be maintained in effective operating condition. The Contractor will be responsible for implementing and maintaining all erosion and sediment control measures and will use the attached inspection report form or equivalent.

Due to the size of the site, the project will be required to conform with the Maine Construction General Permit. A Notice of Intent to Comply will be filed for the project prior to the start of construction, and will be provided to the City upon filing.

12.4 General Standard (Water Quality)

The City of Portland Technical Manual requires that all projects, not subject to the requirements of an existing Site Law or Stormwater Management Law Permit, that include redevelopment of non-roof impervious area greater than 5,000 square feet, and are subject to the City of Portland Review, provide stormwater quality treatment in accordance with the General Standard for no less than 50% of the redeveloped non-roof impervious area.

No new developed area will be created as part of this project, as the Site is already entirely developed. A majority of the site will be disturbed. The project will result in a net decrease of approximately 14,506 SF of impervious area. The project will result in approximately 146,887 square feet of redeveloped non-roof impervious area; it should be noted that the garage top deck is not considered “roof” under this analysis and is therefore counted toward the redeveloped area requiring treatment. The redevelopment standard requires 50% of this redevelopment area to be treated, requiring that a minimum 73,444 square feet of area be treated for this project.

A Jellyfish Filter with below-grade R-Tanks for water quality volume storage has been selected as the primary water quality treatment BMP for the Site. This system will provide treatment for the west stormdrain area (as described earlier under post-development site conditions). Alternative methods were considered, such as an underdrained subsurface sand filter, but were not selected due to elevation constraints associated with discharging to the existing stormdrain system located on the Union Station Plaza property. Above-grade storage systems, like underdrained soil filters and rain gardens, were also ruled out as there is limited available space on the Site.

Adequate provisions have been made to collect stormwater runoff from the project area via a series of catch basins and inlets, which drain to an underground R-Tank storage system designed to store the Water Quality Volume prior to treatment by the Jellyfish Filter. The proposed R-Tank System and Jellyfish Filter are proposed to be installed below-grade in the surface parking lot to the north of the parking garage and will collect, store and treat stormwater runoff generated from the post-development areas described above in Section 12.1.1.2.

The Jellyfish Filter is a proprietary system, which has been reviewed and approved for use by the MaineDEP; a copy of the approval letter is attached in this section. The proposed Jellyfish Filter has been sized to meet the MaineDEP approval standards to treat a minimum Water Quality Volume of 1-inch runoff from impervious areas and 0.4-inch runoff from pervious areas. Please see attached calculations demonstrating that the filter has been adequately sized to treat the required Water Quality Volume.

The Jellyfish Filter will be installed to provide treatment of greater than the minimum required area. The entire area of the site that is tributary to the proposed treatment system is approximately 157,512 square feet. Of this area, 125,012 square feet is redeveloped, non-roof impervious surface which exceeds the 73,444 square feet required for 50% treatment of the redeveloped impervious area.

A second treatment system is proposed for the east stormdrain area, which ties into St. John Street. This StormBasin catch basin filter will be installed within the redeveloped garage entrance along St. John Street. While the StormBasin filter is not an approved Maine DEP proprietary treatment option, the proposed stormdrain will aid in removal of pollutants generated within the highly trafficked entrance, providing treatment beyond the total amount required by the City's standards.

Table 12-1 outlines the areas as described, demonstrating conformance with the City of Portland Redevelopment Standards.

Table 12-1: Stormwater Treatment Area Breakdown

	Area (SF)	Area(AC)
<u>Total Project Area:</u>	235,937	5.42
<u>Proposed Disturbed Area:</u>	210662	4.84
<u>Total Impervious Surface Area:</u>		
Existing:	196,461	4.51
Proposed:	182,485	4.19
Reduction:	(13,976)	0.32
<u>Redeveloped Non-Roof Impervious Area:</u>		
Total (includes top floor of garage):	153,295	3.52
Required Treatment Area (50%):	76,648	1.76
<u>Provided Treatment Area:</u>		
<u>Jellyfish Filter & R-tanks</u>		
Total Area Treated:	160,921	3.69
Total Redeveloped Non-Roof Impervious Area Treated:	126,626	2.906
Percentage of Redeveloped Non-Roof Impervious Area Treated:	83%	
<u>StormBasin Catch Basin Filter</u>		
Total Area Treated:	10,000	0.75
Total Redeveloped Non-Roof Impervious Area Treated:	4,743	0.21
Percentage of Redeveloped Non-Roof Impervious Area Treated:	3.2%	
Total Percentage of Redeveloped Non-Roof Impervious Area Treated by Both Systems:	86.2%	

12.5 Flooding Standard (Water Quantity)

In accordance with the City of Portland's Redevelopment Standards, the adherence to the Flooding Standard is not required for the site, as there is no new impervious or new developed surface proposed. However, based upon good engineering practices, and current site constraints, the stormwater management system has been evaluated for the

24-hour, Type III storm event of the 2-,10-, and 25-year frequencies to ensure that peak flows from the Post-Development design of the site do not result in a negative impact on their tributary drainage systems.

The existing parking lot currently discharges to a stormdrain system that runs through the Union Station Plaza property and underneath the railroad tracks, connecting to an existing City-owned stormdrain system on Ogdensburg Street and County Way at the County Jail property located west of the project site. Examination of existing conditions on the site shows that the existing 18-inch stormdrain piping is not sized to adequately to handle current flows, and anecdotal evidence notes that ponding does occur in the parking lot during larger storm events. CCTV inspection of the existing pipe has shown that the existing RCP pipe is in good condition.

The intent of our design is to manage stormwater such that the post-development peak flows are reduced to flow rates that can be accommodated within the existing 18-inch stormdrain pipe west of the site. This is accomplished by increasing the size of the R-tank storage system. Based upon proposed conditions, the 18-inch pipe is able to convey 9.31 cfs of flow at 95% of its full capacity based upon the Manning’s Equation. Reviewing the peak flow calculations for this study point (see **Table 12-2**), the pipe capacity is exceeded in the existing conditions during all storm events. With no additional storage the existing conditions flood the parking lot. The proposed stormwater system will provide adequate storage such that flows from the project site will be reduced to a rate this below the 18-inch pipe’s capacity during all evaluated storm events, including the 25-year storm event. Although, utilizing strictly the Manning’s Equation for a single pipe the proposed exceed the capacity of a 18-inch pipe, the provided HydroCAD model utilizes dynamic routing which takes into account possible backflow into the storage system during larger storm events. The HydroCAD model for Post-Development shows that there is an excess of 1-foot of freeboard within the manhole in which the system connects (DMH-2).

The small portion of the site that will newly connect to the St. John Street stormdrain to the east of the site will result in flow to the 30-inch separated stormdrain system, where stormwater does not currently exist. The City has indicated that this increase can be handled by the existing infrastructure.

Adequate provisions have been made to collect and discharge stormwater generated from the developed area of the Site. The HydroCAD reports for both Pre-and Post-Development Conditions are attached to this Section. The tables below provides a summary of the peak runoff rates for the 24-hour, 2-year, 10-year, and 25-year Type III storm events.

Table 12-2: Summary of Peak Runoff Rates to Study Point 1 – 18-inch Stormdrain

	PEAK RUNOFF RATE (CFS)		
	2-YEAR STORM	10-YEAR STORM	25-YEAR STORM
Pre-Development (Existing) Site	11.20	21.56	27.70
Post-Development Site	4.49	11.83	18.94
Difference	-6.71	-9.73	-8.76

Table 12-3: Summary of Peak Runoff Rates to Study Point 2 – 30-inch St. John Street Stormdrain

	PEAK RUNOFF RATE (CFS)		
	2-YEAR STORM	10-YEAR STORM	25-YEAR STORM
Pre-Development (Existing) Site	0.41	0.62	0.78
Post-Development Site	1.50	2.70	3.70
Difference	+1.09	+2.08	+2.92

Table 12-4: Summary of Peak Runoff Rates Overall Project Site

	PEAK RUNOFF RATE (CFS)		
	2-YEAR STORM	10-YEAR STORM	25-YEAR STORM
Pre-Developed (Existing) Site	11.31	22.18	28.48
Post-Development	5.99	14.53	22.64
Difference	-5.32	-7.65	-5.84

As the Site’s peak runoff rate has been reduced, the proposed development is not anticipated to result in adverse effects, including flooding and erosion to abutting and downstream properties. All on-site piping has been designed to accommodate the 25-year storm event without resulting in flooding onto adjacent properties.

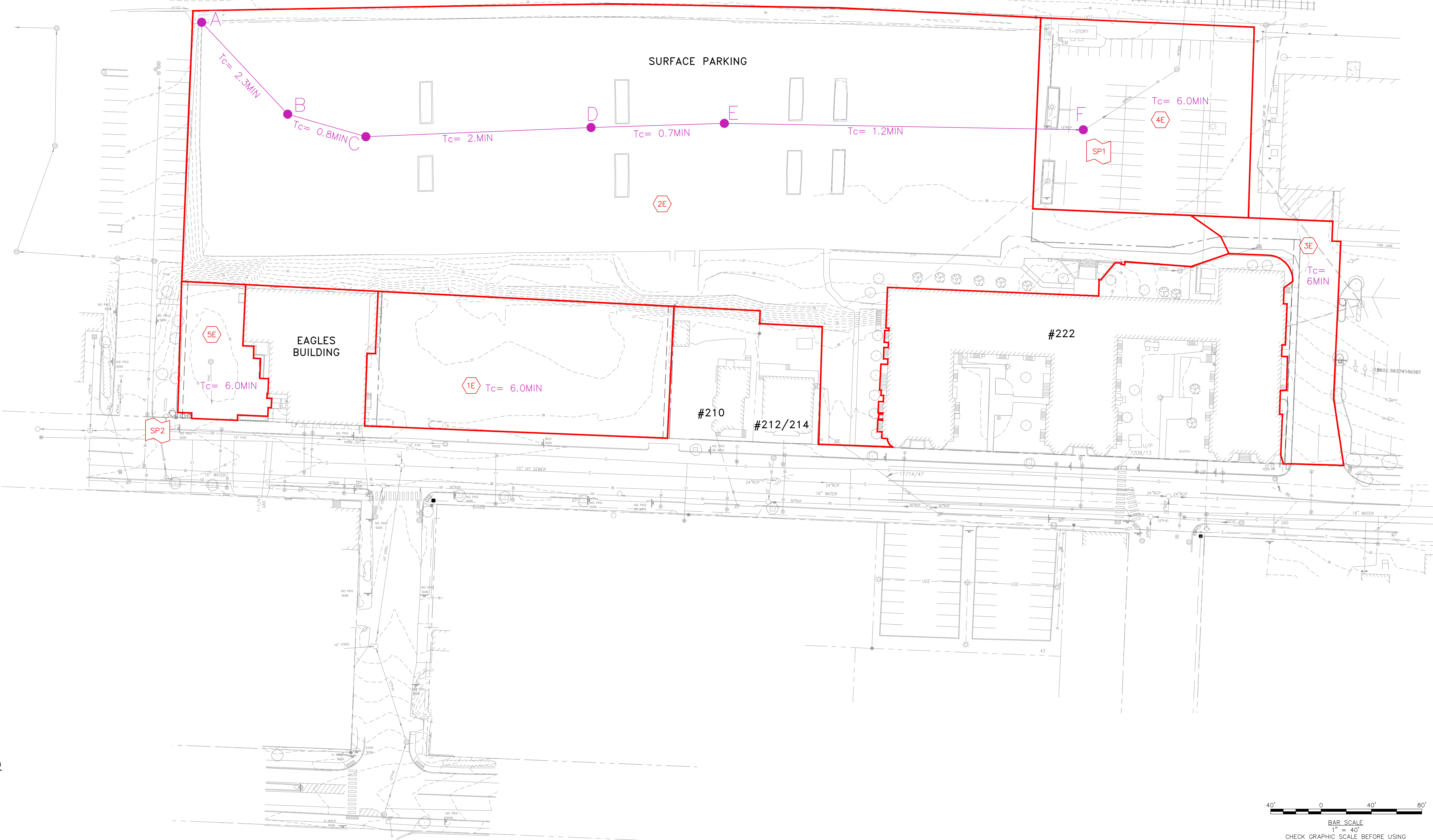
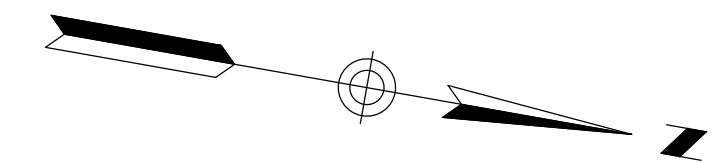
12.6 Inspection and Maintenance of Stormwater Systems

General inspection and maintenance during and after construction must take place in accordance with the requirements outlined in Chapter 500, Stormwater Management, Appendix B, Inspection and Maintenance and Stormwater Management, Maine Department of Environmental Protection Publication No. DEPLW0738. During construction, the contractor will be responsible for inspection and maintaining the Site. Upon completion, the property owner will be responsible for implementing the maintenance and inspection requirements for the stormwater management system associated with the new development. The responsible party will ensure that stormwater management facilities are properly maintained and inspected in accordance with the Stormwater Inspection and Maintenance Plan provided in this section.





12.7 Attachments

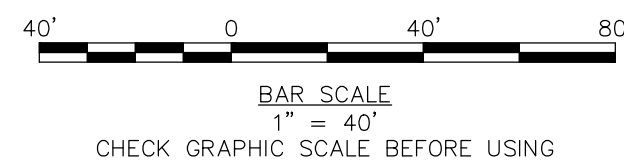
- Stormwater Erosion & Sedimentation Control Inspection Report Form
- USDA Natural Resources Conservation Service Web Soil Survey HSG Map
- Jellyfish Filter Sizing Calculations
- MaineDEP Jellyfish Filter approval letter
- Pre-Development Stormwater Figure

- Post-Development Stormwater Figure
- Pre-Development HydroCAD Report
- Post-Development HydroCAD Report
- Inspection and Maintenance Plan
- Jellyfish Filter Maintenance Guide
- BMP Maintenance Log
- StormBasin Maintenance Guide



STORMWATER LEGEND

-  SUBCATCHMENT AREAS
-  STUDY POINT
-  TIME OF CONCENTRATION (Tc) FLOW LINE
-  LIMIT OF DRAINAGE AREA



SITE PLAN APPLICATION - NOT FOR CONSTRUCTION

41 Hutchins Drive
Portland, Maine 04102
800.426.4262 | www.woodardcurran.com



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REV	DESCRIPTION	DATE

DESIGNED BY: CMS
CHECKED BY: DAS
DRAWN BY: BCL
DATE: 02/19/18
SCALE: 1" = 40'

PRE DEVELOPMENT STORMWATER FIGURE

MAINE MEDICAL CENTER
22 BRANHALL STREET
PORTLAND, ME 04102

MMC ST. JOHN STREET
EMPLOYEE PARKING GARAGE

JOB NO.: 0231158.00
DATE: JUNE 22, 2018
SCALE: 1" = 40'
SHEET: 1 OF 2

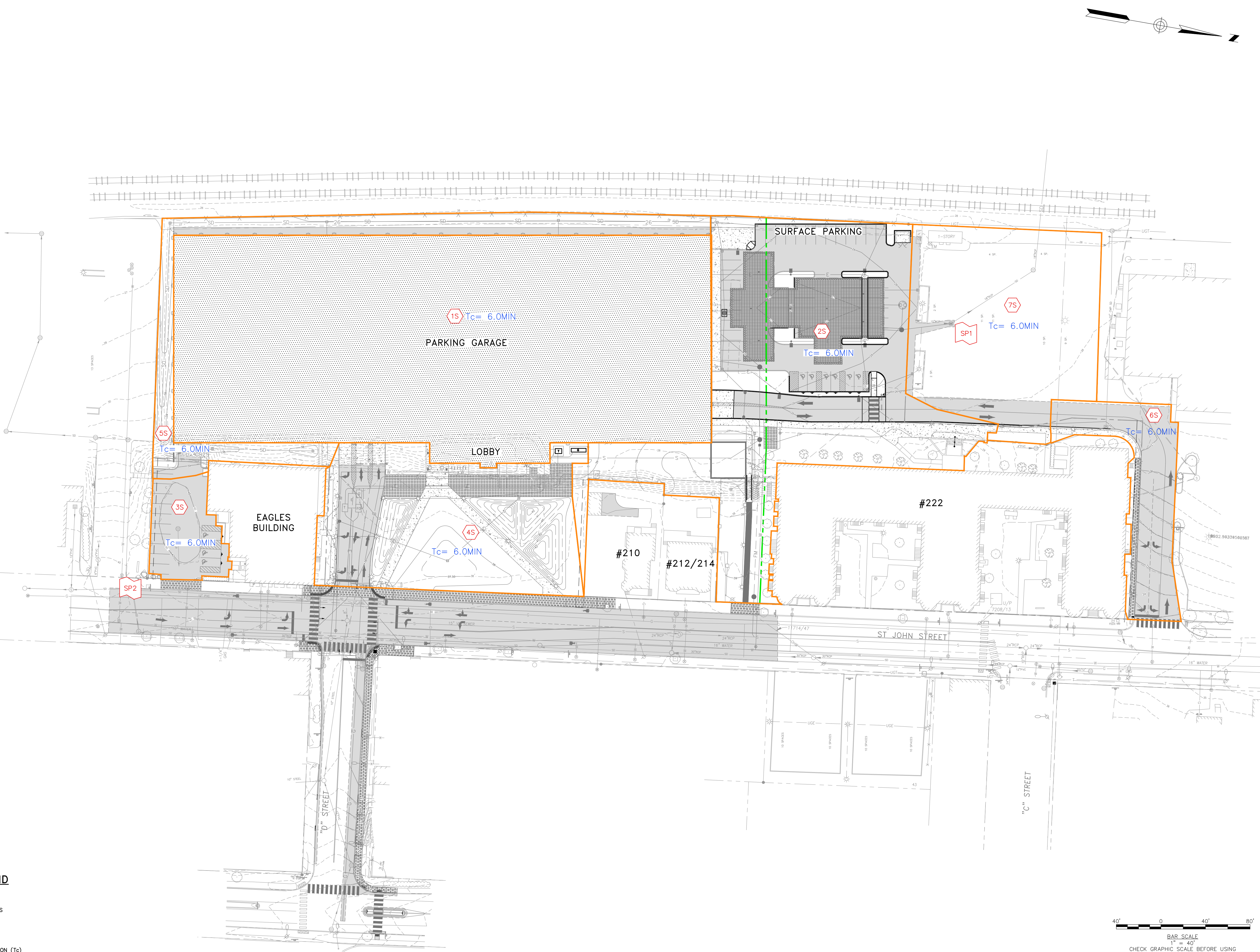
PRE

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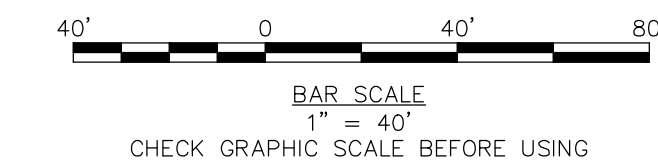
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STORMWATER LEGEND

- 1S SUBCATCHMENT AREAS
- SP1 STUDY POINT
- TIME OF CONCENTRATION (Tc) FLOW LINE
- LIMIT OF DRAINAGE AREA



REV	DESCRIPTION	DATE

DESIGNED BY: CMS
CHECKED BY: DAS
DRAWN BY: BCL
DATE: 02/19/2018
SCALE: 1" = 40'

POST DEVELOPMENT STORMWATER FIGURE

MAINE MEDICAL CENTER
22 BRANHALL STREET
PORTLAND, ME 04102

MMC ST. JOHN STREET
EMPLOYEE PARKING GARAGE

JOB NO.: 0231158.00
DATE: JUNE 22, 2018
SCALE: 1" = 40"
SHEET: 2 OF 2

POST

SITE PLAN APPLICATION - NOT FOR CONSTRUCTION



41 HUTCHINS DRIVE
PORTLAND, MAINE 04102
TEL. (207) 774-2112
FAX (207) 774-6635

CLIENT MAINE MEDICAL CENTER
PROJECT 222 St. John STREET GARAGE
DESIGNED BY CMS DATE 7-23-18
CHECKED BY _____ DATE _____
PROJECT NO. 0231158 SHEET NO. 1 OF 1

WATER Quality Volume for Jersey Filter System

$$WQV = (1'' - \text{IMPERVIOUS AREA}) + (0.4'' \cdot \text{PERVIOUS AREA})$$

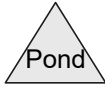
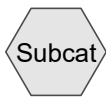
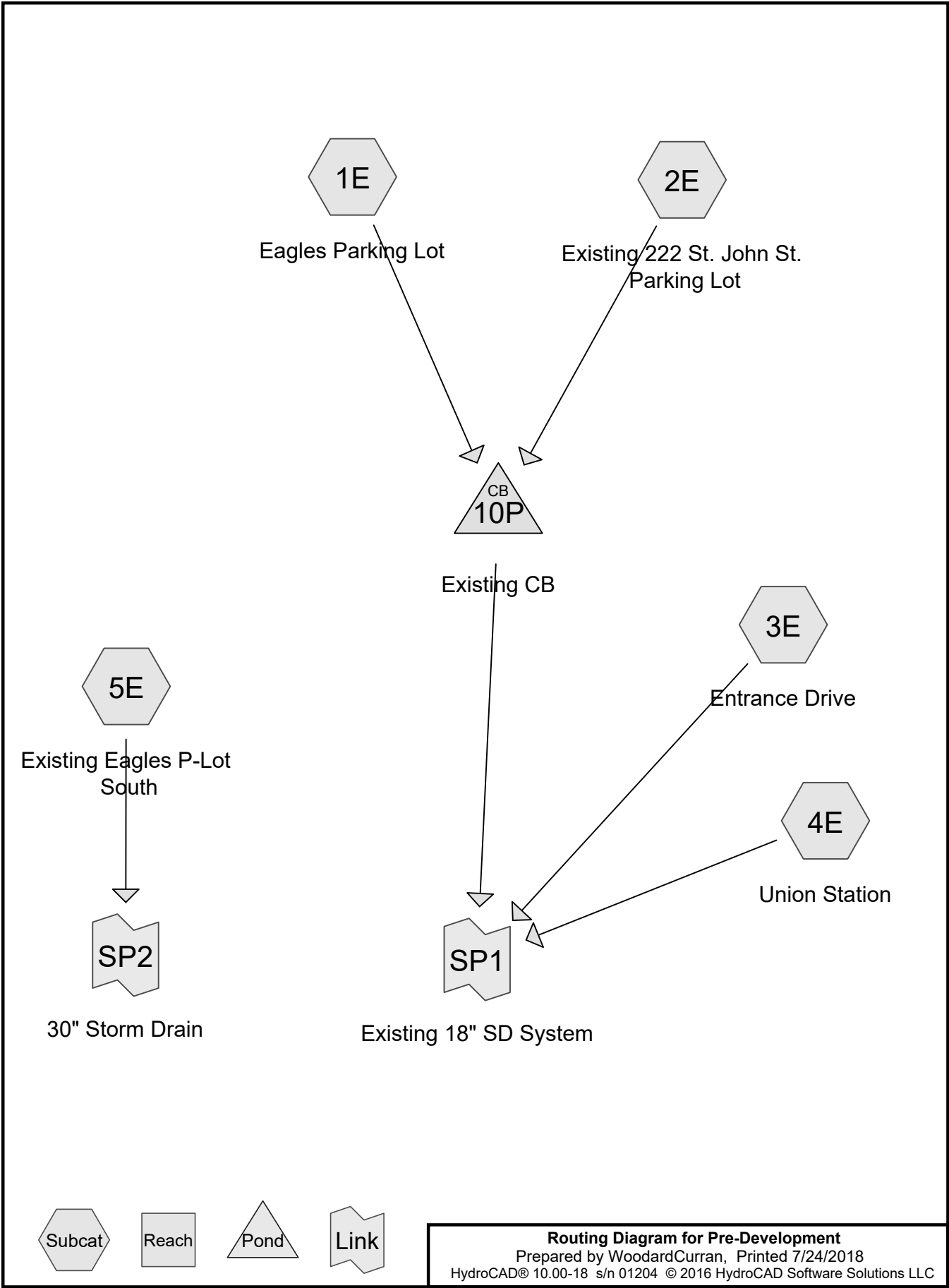
→ IMPERVIOUS AREA = 128,333 (INCLUDES LOBBY ROOF)
→ PERVIOUS AREA = 31,480

$$= (1''/12'' \cdot 128,333 \text{ SF}) + (0.4''/12'' \cdot 31,480 \text{ SF})$$

$$= 10,694.42 \text{ CF} + 1,049.33 \text{ CF}$$

$$= 11,743 \text{ CF REQUIRED}$$

$$\star WQV \text{ PROVIDED} = 11,832 \text{ CF} > 11,743 \text{ CF}$$



Routing Diagram for Pre-Development
 Prepared by WoodardCurran, Printed 7/24/2018
 HydroCAD® 10.00-18 s/n 01204 © 2016 HydroCAD Software Solutions LLC

Pre-Development

Prepared by WoodardCurran

HydroCAD® 10.00-18 s/n 01204 © 2016 HydroCAD Software Solutions LLC

Printed 7/24/2018

Page 2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
35,714	98	(3E, 4E)
18,343	79	50-75% Grass cover, Fair, HSG C (2E)
3,718	70	Brush, Fair, HSG C (1E)
129,899	98	Paved parking, HSG B (2E)
20,184	76	Woods/grass comb., Fair, HSG C (2E)
6,150	98	existing P-lot (5E)
21,798	98	parking lot (1E)
235,806	94	TOTAL AREA

Pre-Development

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
129,899	HSG B	2E
42,245	HSG C	1E, 2E
0	HSG D	
63,662	Other	1E, 3E, 4E, 5E
235,806		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
0	0	0	0	35,714	35,714	
0	0	18,343	0	0	18,343	50-75% Grass cover, Fair
0	0	3,718	0	0	3,718	Brush, Fair
0	129,899	0	0	0	129,899	Paved parking
0	0	20,184	0	0	20,184	Woods/grass comb., Fair
0	0	0	0	6,150	6,150	existing P-lot
0	0	0	0	21,798	21,798	parking lot
0	129,899	42,245	0	63,662	235,806	TOTAL AREA

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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	2E	0.00	0.00	179.0	0.0009	0.012	12.0	0.0	0.0
2	2E	0.00	0.00	105.0	0.0029	0.012	12.0	0.0	0.0
3	2E	0.00	0.00	285.0	0.0047	0.012	15.0	0.0	0.0
4	10P	20.50	19.15	281.0	0.0048	0.011	18.0	0.0	0.0

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Type III 24-hr 2 year Rainfall=3.10"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 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

Subcatchment1E: Eagles Parking Lot Runoff Area=25,516 sf 85.43% Impervious Runoff Depth>2.31"
Tc=6.0 min CN=94 Runoff=1.58 cfs 4,917 cf

Subcatchment2E: Existing 222 St. John Runoff Area=168,426 sf 77.13% Impervious Runoff Depth>2.22"
Flow Length=734' Tc=7.0 min CN=93 Runoff=9.85 cfs 31,138 cf

Subcatchment3E: Entrance Drive Runoff Area=9,847 sf 100.00% Impervious Runoff Depth>2.68"
Tc=6.0 min CN=98 Runoff=0.66 cfs 2,201 cf

Subcatchment4E: Union Station Runoff Area=25,867 sf 100.00% Impervious Runoff Depth>2.68"
Tc=6.0 min CN=98 Runoff=1.74 cfs 5,781 cf

Subcatchment5E: Existing Eagles P-Lot Runoff Area=6,150 sf 100.00% Impervious Runoff Depth>2.68"
Tc=6.0 min CN=98 Runoff=0.41 cfs 1,374 cf

Pond 10P: Existing CB Peak Elev=24.27' Inflow=11.42 cfs 36,055 cf
18.0" Round Culvert n=0.011 L=281.0' S=0.0048 '/' Outflow=11.42 cfs 36,055 cf

Link SP1: Existing 18" SD System Inflow=13.81 cfs 44,037 cf
Primary=13.81 cfs 44,037 cf

Link SP2: 30" Storm Drain Inflow=0.41 cfs 1,374 cf
Primary=0.41 cfs 1,374 cf

Total Runoff Area = 235,806 sf Runoff Volume = 45,411 cf Average Runoff Depth = 2.31"
17.92% Pervious = 42,245 sf 82.08% Impervious = 193,561 sf

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Type III 24-hr 2 year Rainfall=3.10"

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Summary for Subcatchment 1E: Eagles Parking Lot

Runoff = 1.58 cfs @ 12.09 hrs, Volume= 4,917 cf, Depth> 2.31"

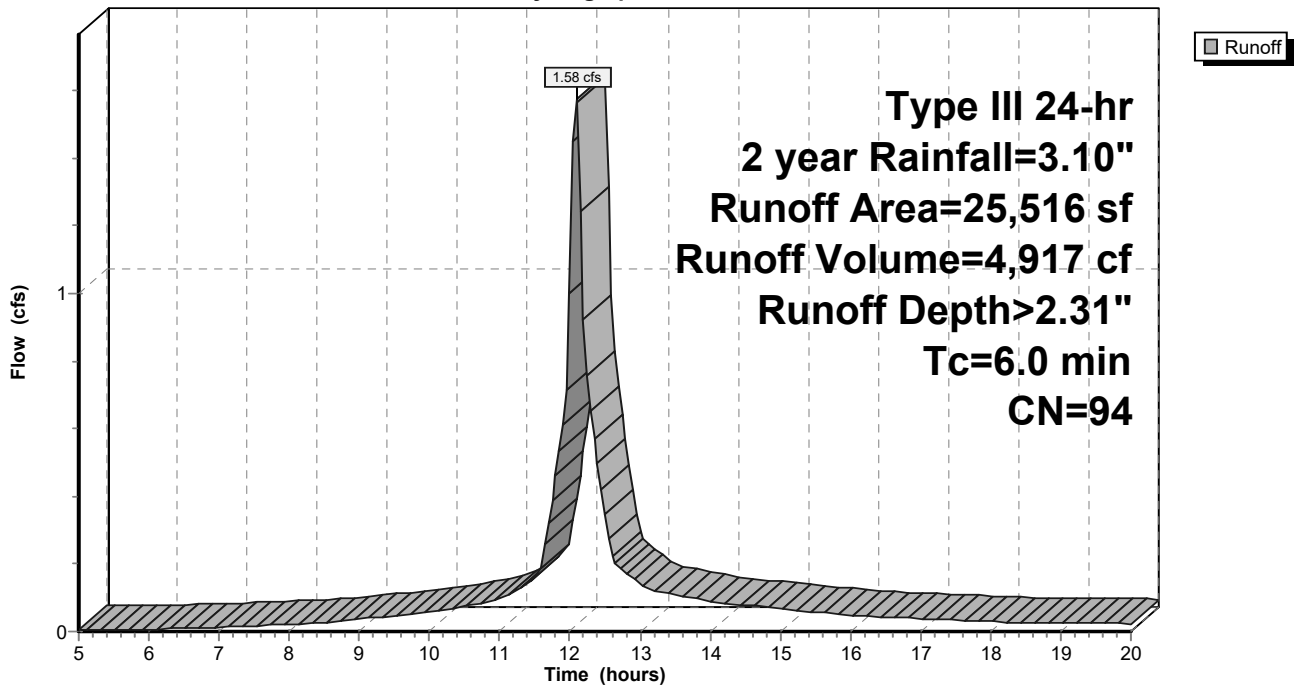
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.10"

Area (sf)	CN	Description
3,718	70	Brush, Fair, HSG C
* 21,798	98	parking lot
25,516	94	Weighted Average
3,718		14.57% Pervious Area
21,798		85.43% Impervious Area

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

Subcatchment 1E: Eagles Parking Lot

Hydrograph



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Type III 24-hr 2 year Rainfall=3.10"

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Summary for Subcatchment 2E: Existing 222 St. John St. Parking Lot

Runoff = 9.85 cfs @ 12.10 hrs, Volume= 31,138 cf, Depth> 2.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.10"

Area (sf)	CN	Description
129,899	98	Paved parking, HSG B
18,343	79	50-75% Grass cover, Fair, HSG C
20,184	76	Woods/grass comb., Fair, HSG C
168,426	93	Weighted Average
38,527		22.87% Pervious Area
129,899		77.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	100	0.0044	0.74		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.10"
0.8	65	0.0050	1.44		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.0	179	0.0009	1.47	1.16	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
0.7	105	0.0029	2.65	2.08	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
1.2	285	0.0047	3.91	4.80	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Concrete pipe, finished
7.0	734	Total			

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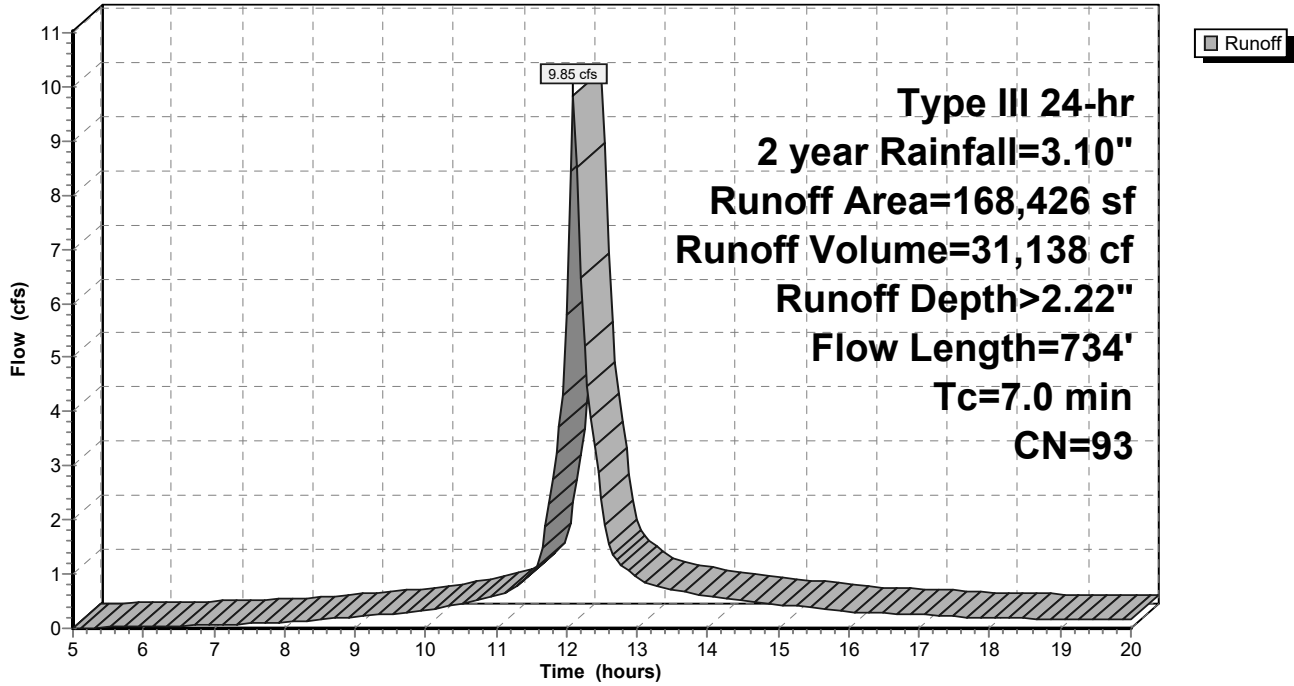
Type III 24-hr 2 year Rainfall=3.10"

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Subcatchment 2E: Existing 222 St. John St. Parking Lot

Hydrograph



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Type III 24-hr 2 year Rainfall=3.10"

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Summary for Subcatchment 3E: Entrance Drive

Runoff = 0.66 cfs @ 12.09 hrs, Volume= 2,201 cf, Depth> 2.68"

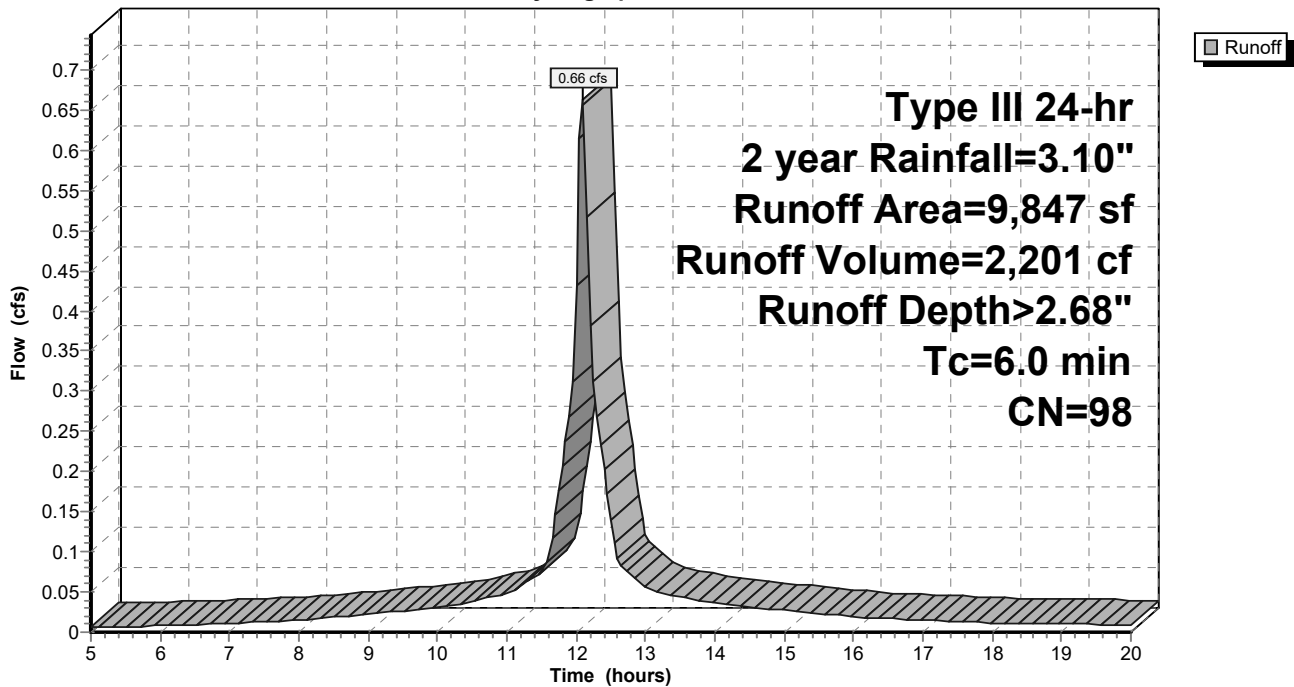
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.10"

Area (sf)	CN	Description
* 9,847	98	
9,847		100.00% Impervious Area

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

Subcatchment 3E: Entrance Drive

Hydrograph



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Type III 24-hr 2 year Rainfall=3.10"

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Summary for Subcatchment 4E: Union Station

Runoff = 1.74 cfs @ 12.09 hrs, Volume= 5,781 cf, Depth> 2.68"

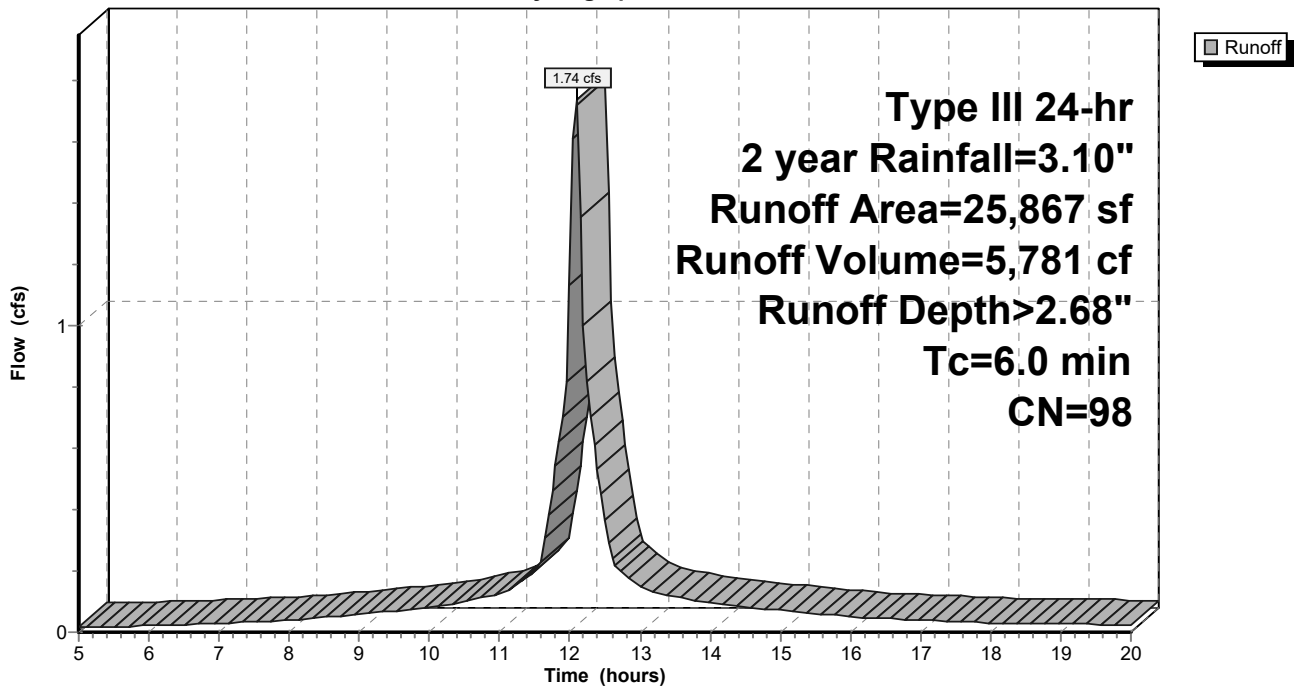
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.10"

Area (sf)	CN	Description
* 25,867	98	
25,867		100.00% Impervious Area

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

Subcatchment 4E: Union Station

Hydrograph



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Type III 24-hr 2 year Rainfall=3.10"

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Summary for Subcatchment 5E: Existing Eagles P-Lot South

Runoff = 0.41 cfs @ 12.09 hrs, Volume= 1,374 cf, Depth> 2.68"

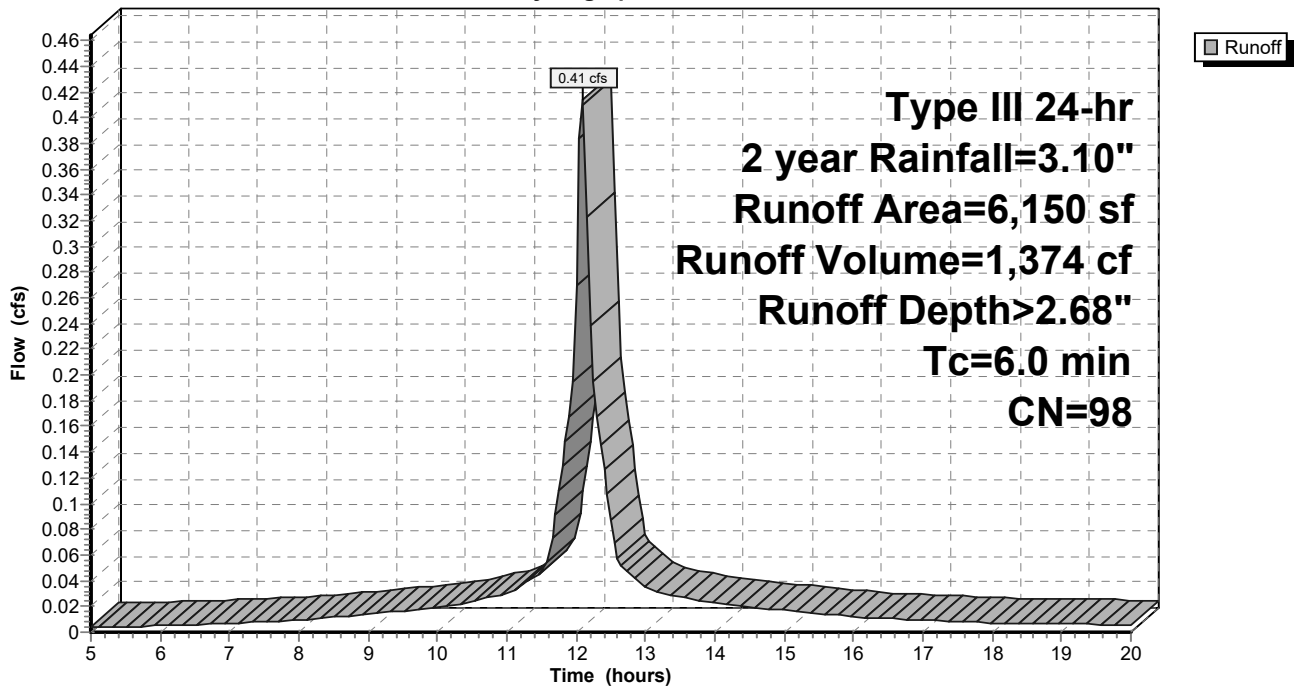
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year Rainfall=3.10"

Area (sf)	CN	Description
* 6,150	98	existing P-lot
6,150		100.00% Impervious Area

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

Subcatchment 5E: Existing Eagles P-Lot South

Hydrograph



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Type III 24-hr 2 year Rainfall=3.10"

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Summary for Pond 10P: Existing CB

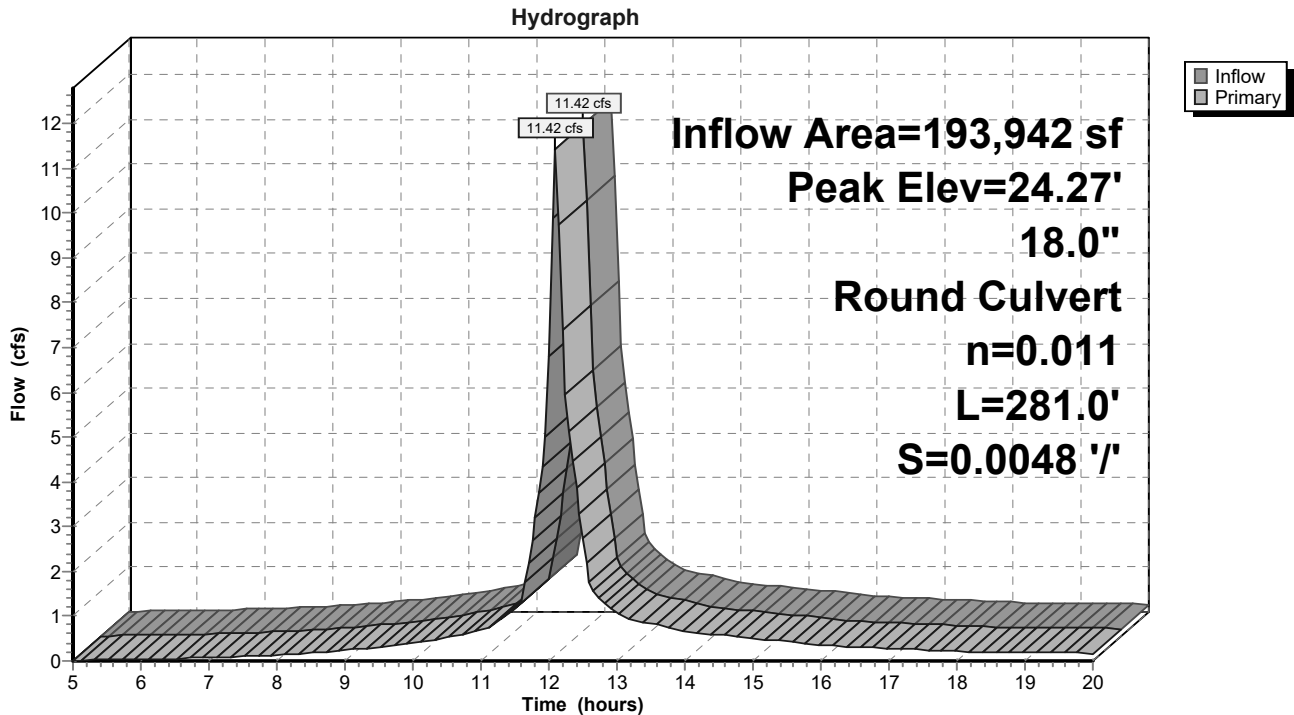
Inflow Area = 193,942 sf, 78.22% Impervious, Inflow Depth > 2.23" for 2 year event
Inflow = 11.42 cfs @ 12.10 hrs, Volume= 36,055 cf
Outflow = 11.42 cfs @ 12.10 hrs, Volume= 36,055 cf, Atten= 0%, Lag= 0.0 min
Primary = 11.42 cfs @ 12.10 hrs, Volume= 36,055 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 24.27' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	20.50'	18.0" Round Culvert L= 281.0' Ke= 0.900 Inlet / Outlet Invert= 20.50' / 19.15' S= 0.0048 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=11.38 cfs @ 12.10 hrs HW=24.25' TW=0.00' (Dynamic Tailwater)
↑1=Culvert (Barrel Controls 11.38 cfs @ 6.44 fps)

Pond 10P: Existing CB



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Type III 24-hr 2 year Rainfall=3.10"

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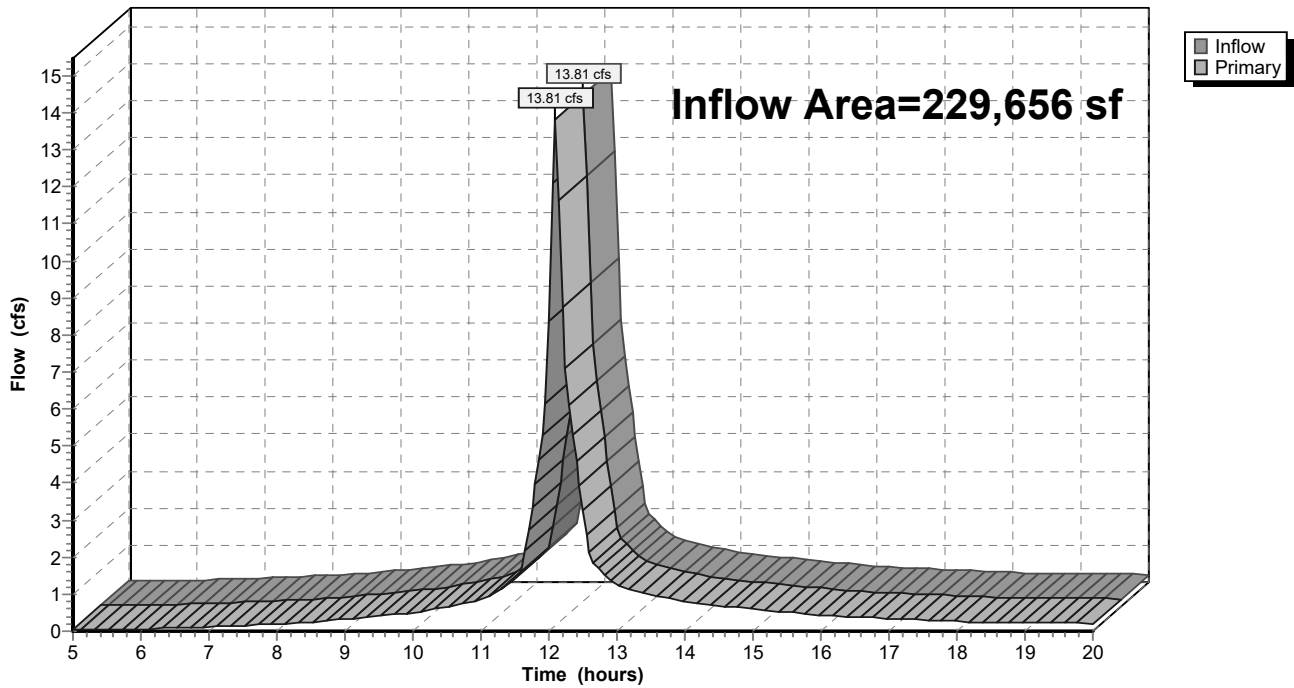
Summary for Link SP1: Existing 18" SD System

Inflow Area = 229,656 sf, 81.61% Impervious, Inflow Depth > 2.30" for 2 year event
Inflow = 13.81 cfs @ 12.10 hrs, Volume= 44,037 cf
Primary = 13.81 cfs @ 12.10 hrs, Volume= 44,037 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link SP1: Existing 18" SD System

Hydrograph



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Type III 24-hr 2 year Rainfall=3.10"

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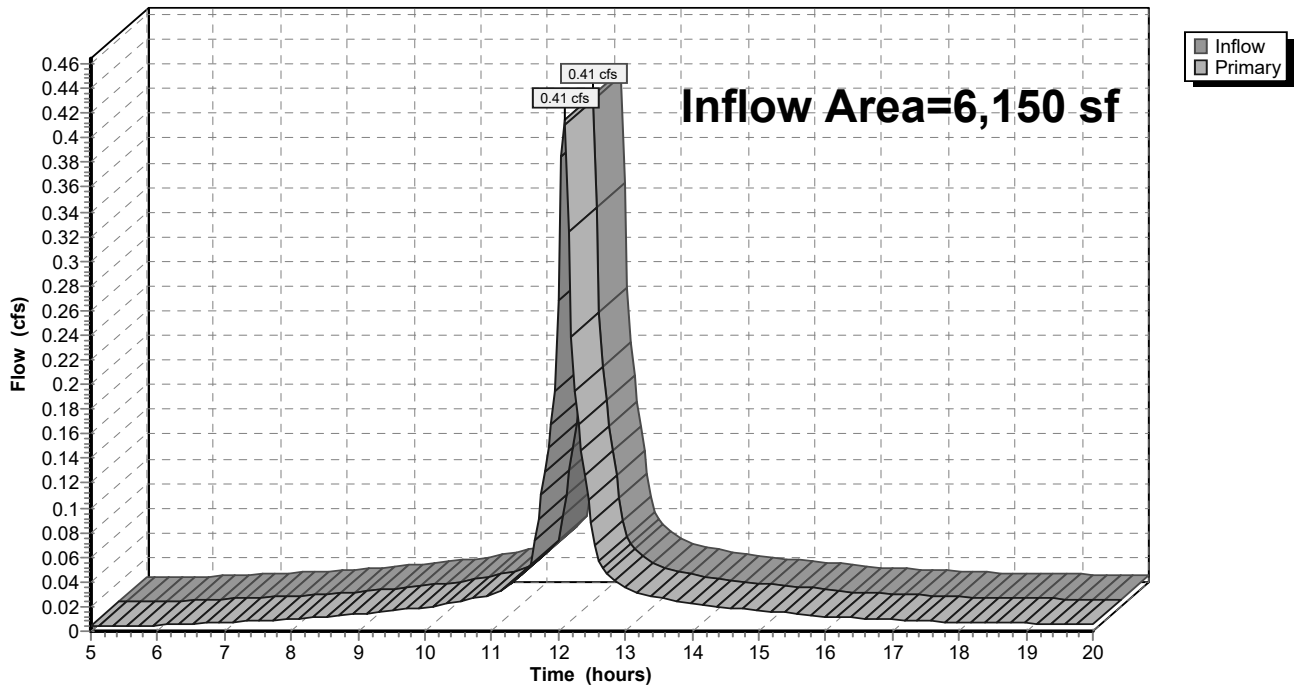
Summary for Link SP2: 30" Storm Drain

Inflow Area = 6,150 sf, 100.00% Impervious, Inflow Depth > 2.68" for 2 year event
Inflow = 0.41 cfs @ 12.09 hrs, Volume= 1,374 cf
Primary = 0.41 cfs @ 12.09 hrs, Volume= 1,374 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link SP2: 30" Storm Drain

Hydrograph



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Type III 24-hr 10 year Rainfall=4.60"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 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

Subcatchment1E: Eagles Parking Lot Runoff Area=25,516 sf 85.43% Impervious Runoff Depth>3.69"
Tc=6.0 min CN=94 Runoff=2.45 cfs 7,856 cf

Subcatchment2E: Existing 222 St. John Runoff Area=168,426 sf 77.13% Impervious Runoff Depth>3.60"
Flow Length=734' Tc=7.0 min CN=93 Runoff=15.54 cfs 50,460 cf

Subcatchment3E: Entrance Drive Runoff Area=9,847 sf 100.00% Impervious Runoff Depth>4.05"
Tc=6.0 min CN=98 Runoff=0.99 cfs 3,327 cf

Subcatchment4E: Union Station Runoff Area=25,867 sf 100.00% Impervious Runoff Depth>4.05"
Tc=6.0 min CN=98 Runoff=2.61 cfs 8,739 cf

Subcatchment5E: Existing Eagles P-Lot Runoff Area=6,150 sf 100.00% Impervious Runoff Depth>4.05"
Tc=6.0 min CN=98 Runoff=0.62 cfs 2,078 cf

Pond 10P: Existing CB Peak Elev=29.62' Inflow=17.98 cfs 58,316 cf
18.0" Round Culvert n=0.011 L=281.0' S=0.0048 '/' Outflow=17.98 cfs 58,316 cf

Link SP1: Existing 18" SD System Inflow=21.56 cfs 70,381 cf
Primary=21.56 cfs 70,381 cf

Link SP2: 30" Storm Drain Inflow=0.62 cfs 2,078 cf
Primary=0.62 cfs 2,078 cf

Total Runoff Area = 235,806 sf Runoff Volume = 72,459 cf Average Runoff Depth = 3.69"
17.92% Pervious = 42,245 sf 82.08% Impervious = 193,561 sf

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Type III 24-hr 10 year Rainfall=4.60"

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Summary for Subcatchment 1E: Eagles Parking Lot

Runoff = 2.45 cfs @ 12.09 hrs, Volume= 7,856 cf, Depth> 3.69"

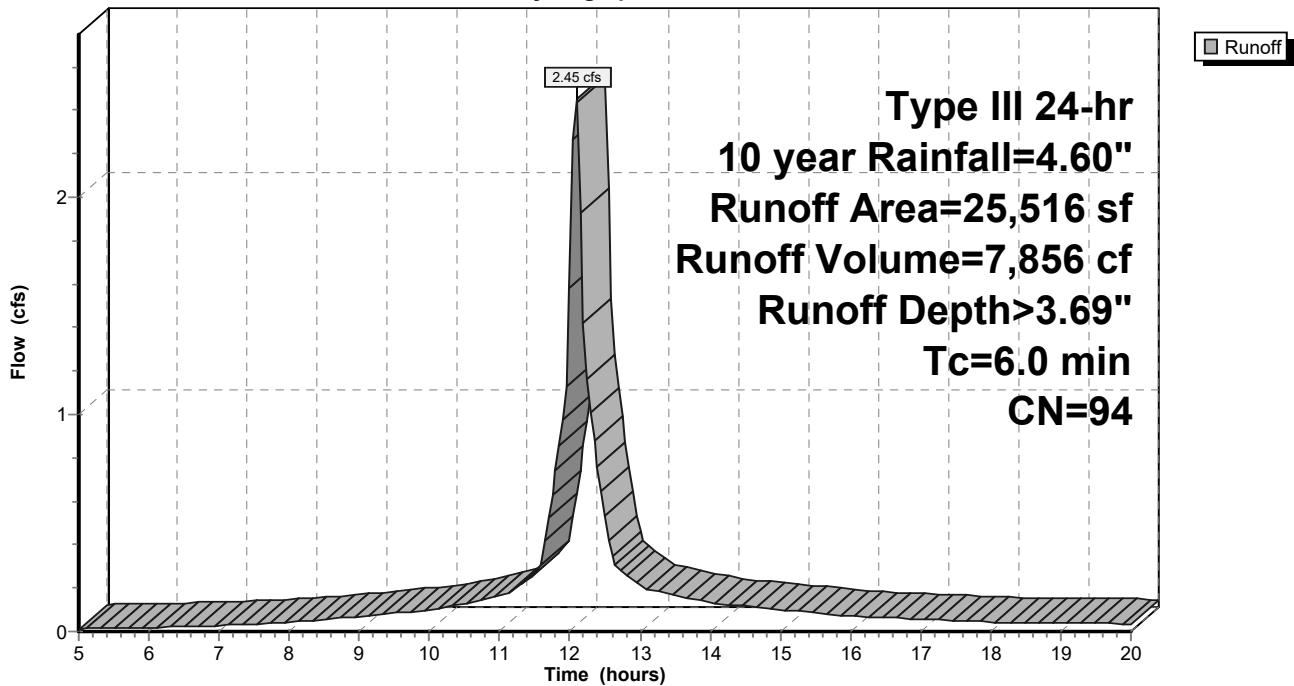
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=4.60"

Area (sf)	CN	Description
3,718	70	Brush, Fair, HSG C
* 21,798	98	parking lot
25,516	94	Weighted Average
3,718		14.57% Pervious Area
21,798		85.43% Impervious Area

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

Subcatchment 1E: Eagles Parking Lot

Hydrograph



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Type III 24-hr 10 year Rainfall=4.60"

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Summary for Subcatchment 2E: Existing 222 St. John St. Parking Lot

Runoff = 15.54 cfs @ 12.10 hrs, Volume= 50,460 cf, Depth> 3.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=4.60"

Area (sf)	CN	Description
129,899	98	Paved parking, HSG B
18,343	79	50-75% Grass cover, Fair, HSG C
20,184	76	Woods/grass comb., Fair, HSG C
168,426	93	Weighted Average
38,527		22.87% Pervious Area
129,899		77.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	100	0.0044	0.74		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.10"
0.8	65	0.0050	1.44		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.0	179	0.0009	1.47	1.16	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
0.7	105	0.0029	2.65	2.08	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
1.2	285	0.0047	3.91	4.80	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Concrete pipe, finished
7.0	734	Total			

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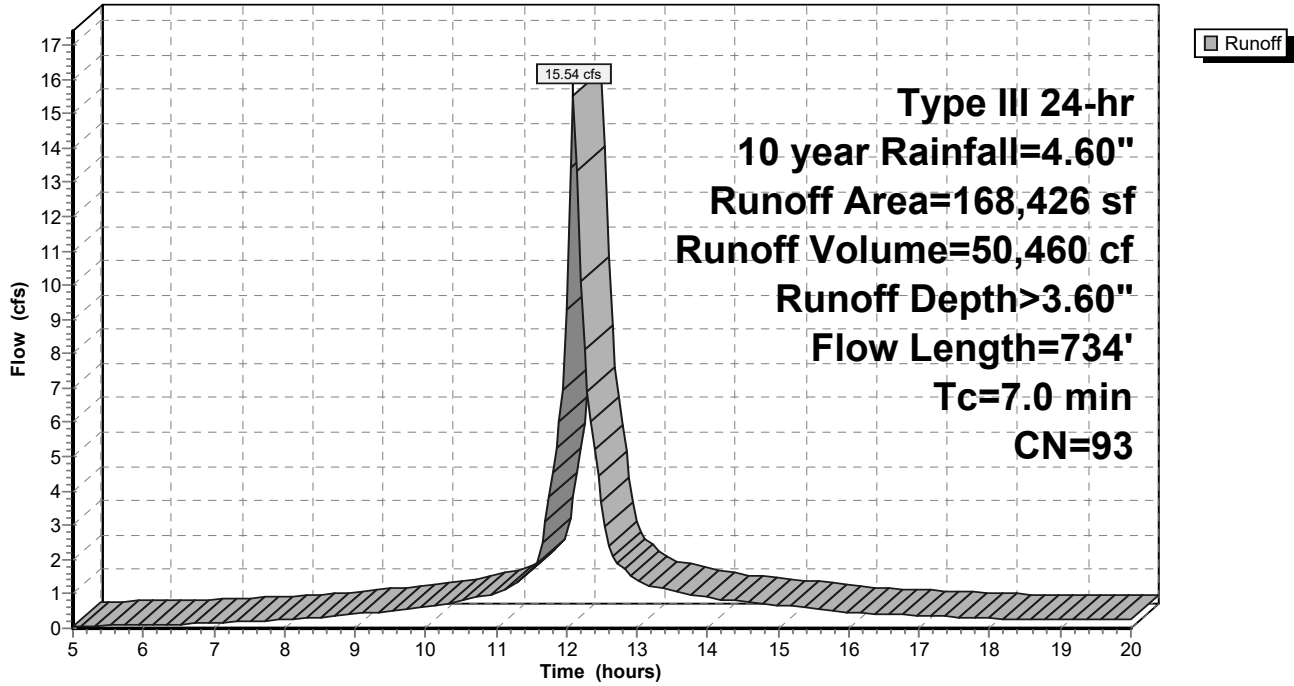
Type III 24-hr 10 year Rainfall=4.60"

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Subcatchment 2E: Existing 222 St. John St. Parking Lot

Hydrograph



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Type III 24-hr 10 year Rainfall=4.60"

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Summary for Subcatchment 3E: Entrance Drive

Runoff = 0.99 cfs @ 12.09 hrs, Volume= 3,327 cf, Depth> 4.05"

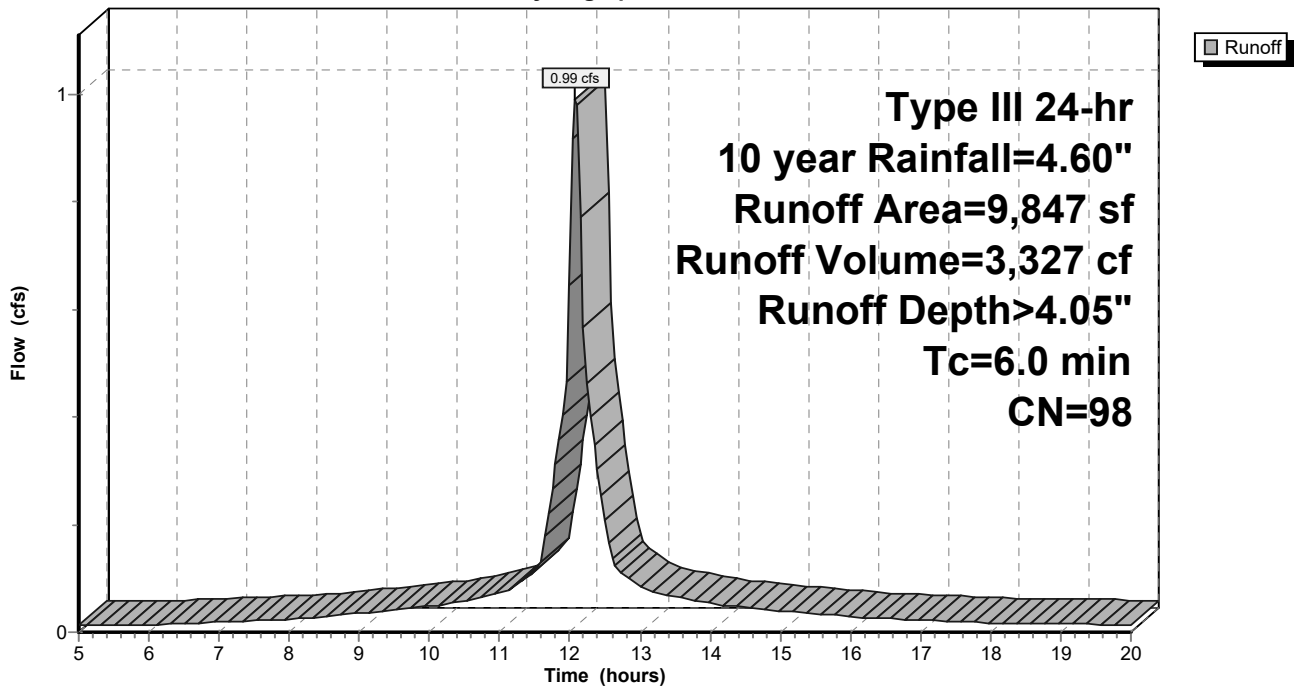
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=4.60"

Area (sf)	CN	Description
* 9,847	98	
9,847		100.00% Impervious Area

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

Subcatchment 3E: Entrance Drive

Hydrograph



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Type III 24-hr 10 year Rainfall=4.60"

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Summary for Subcatchment 4E: Union Station

Runoff = 2.61 cfs @ 12.09 hrs, Volume= 8,739 cf, Depth> 4.05"

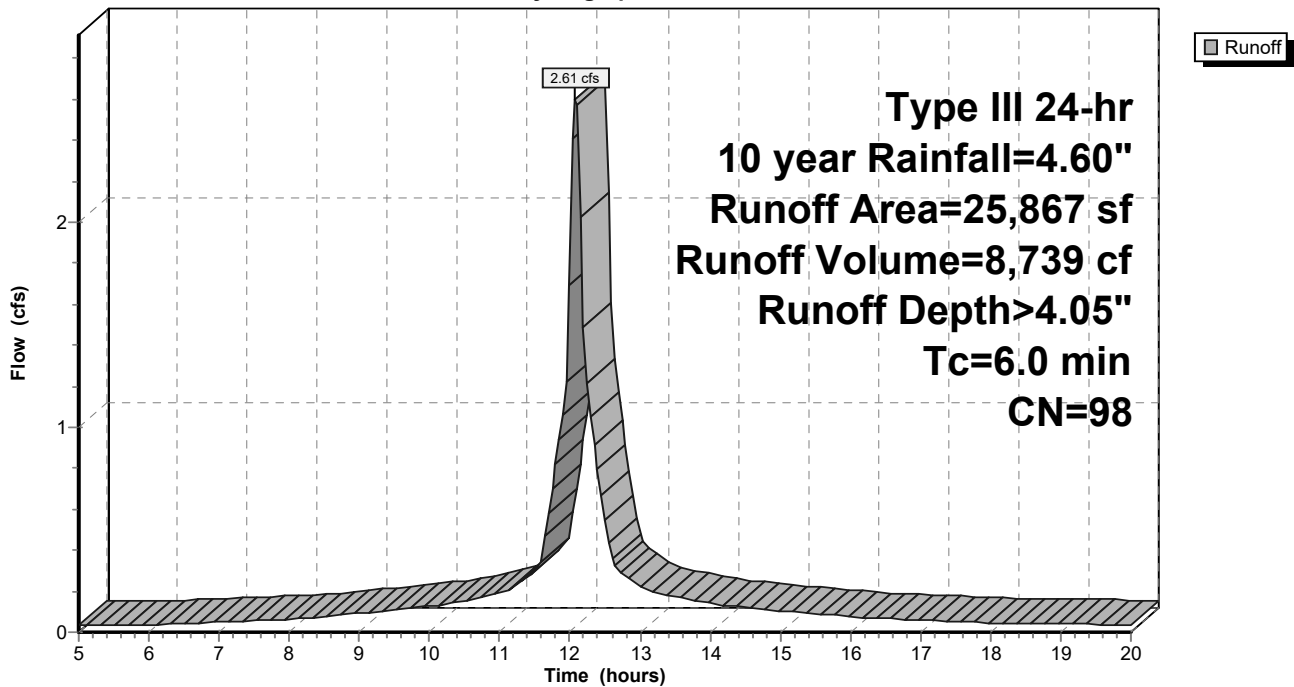
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=4.60"

Area (sf)	CN	Description
* 25,867	98	
25,867		100.00% Impervious Area

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

Subcatchment 4E: Union Station

Hydrograph



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Type III 24-hr 10 year Rainfall=4.60"

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Summary for Subcatchment 5E: Existing Eagles P-Lot South

Runoff = 0.62 cfs @ 12.09 hrs, Volume= 2,078 cf, Depth> 4.05"

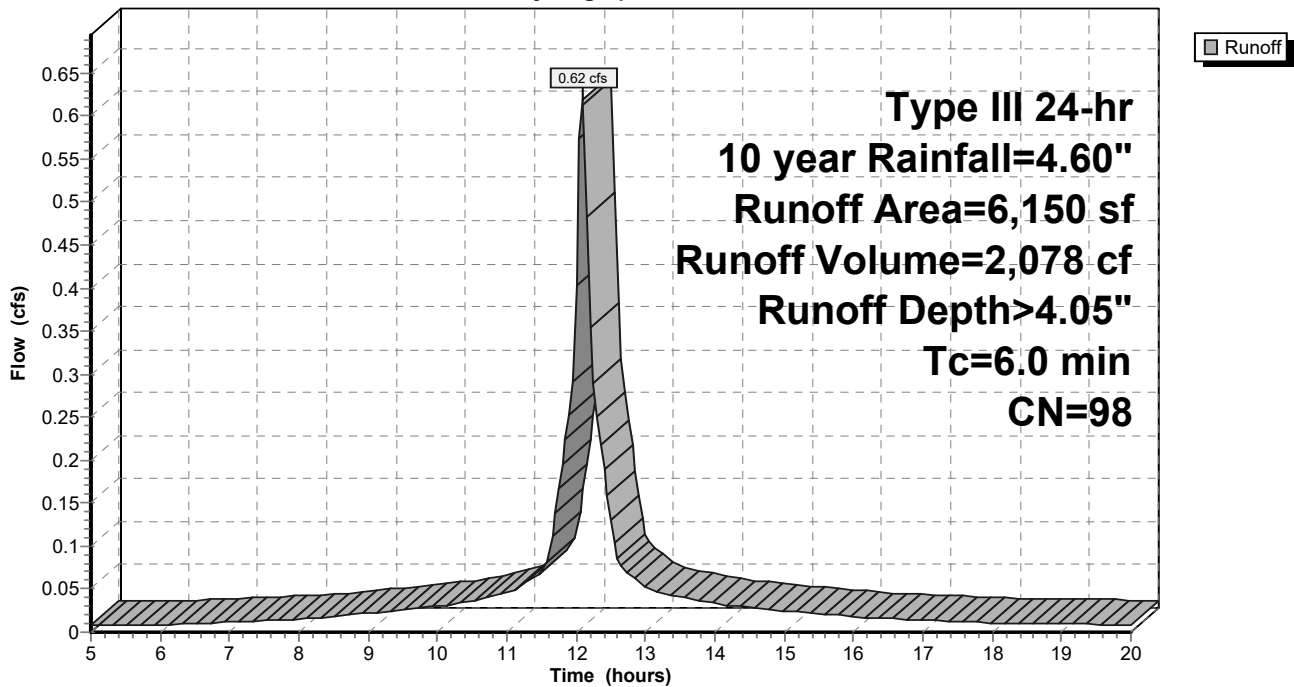
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=4.60"

Area (sf)	CN	Description
* 6,150	98	existing P-lot
6,150		100.00% Impervious Area

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

Subcatchment 5E: Existing Eagles P-Lot South

Hydrograph



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Type III 24-hr 10 year Rainfall=4.60"

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Summary for Pond 10P: Existing CB

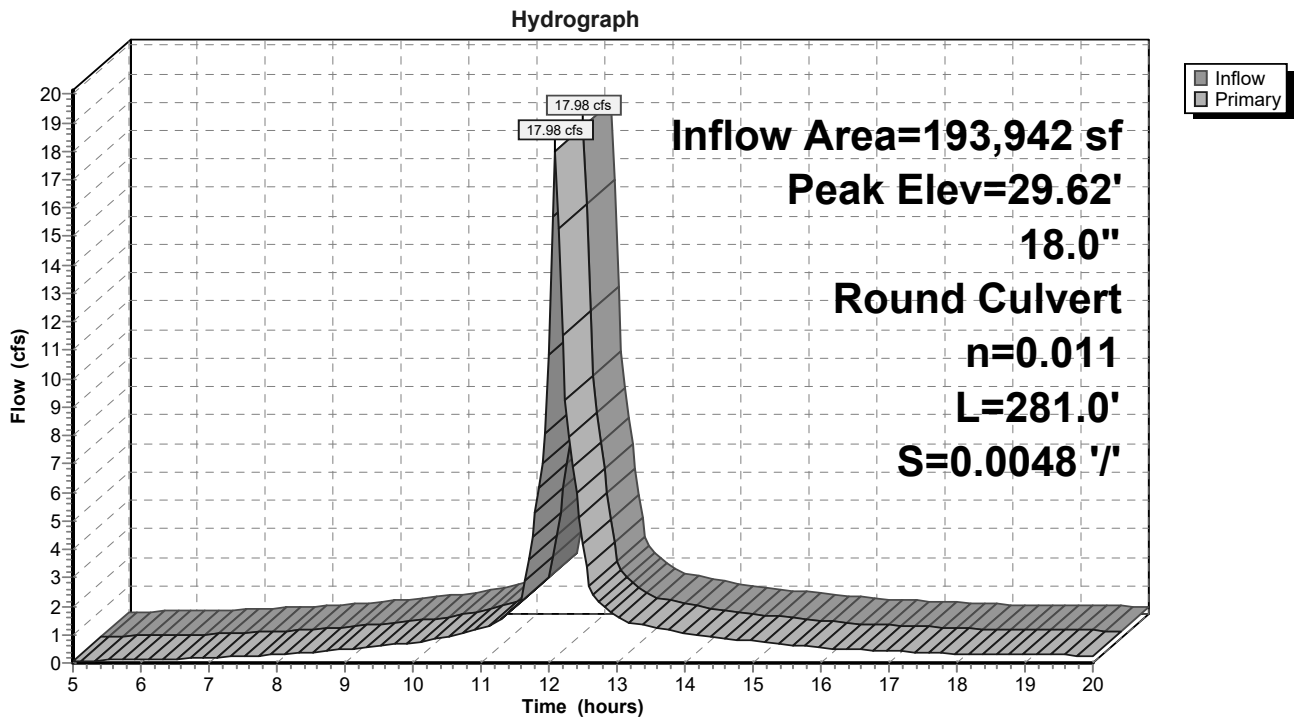
Inflow Area = 193,942 sf, 78.22% Impervious, Inflow Depth > 3.61" for 10 year event
Inflow = 17.98 cfs @ 12.10 hrs, Volume= 58,316 cf
Outflow = 17.98 cfs @ 12.10 hrs, Volume= 58,316 cf, Atten= 0%, Lag= 0.0 min
Primary = 17.98 cfs @ 12.10 hrs, Volume= 58,316 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 29.62' @ 12.10 hrs

Device #	Routing	Invert	Outlet Devices
1	Primary	20.50'	18.0" Round Culvert L= 281.0' Ke= 0.900 Inlet / Outlet Invert= 20.50' / 19.15' S= 0.0048 '/ Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=17.89 cfs @ 12.10 hrs HW=29.53' TW=0.00' (Dynamic Tailwater)
↑1=Culvert (Barrel Controls 17.89 cfs @ 10.12 fps)

Pond 10P: Existing CB



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Type III 24-hr 10 year Rainfall=4.60"

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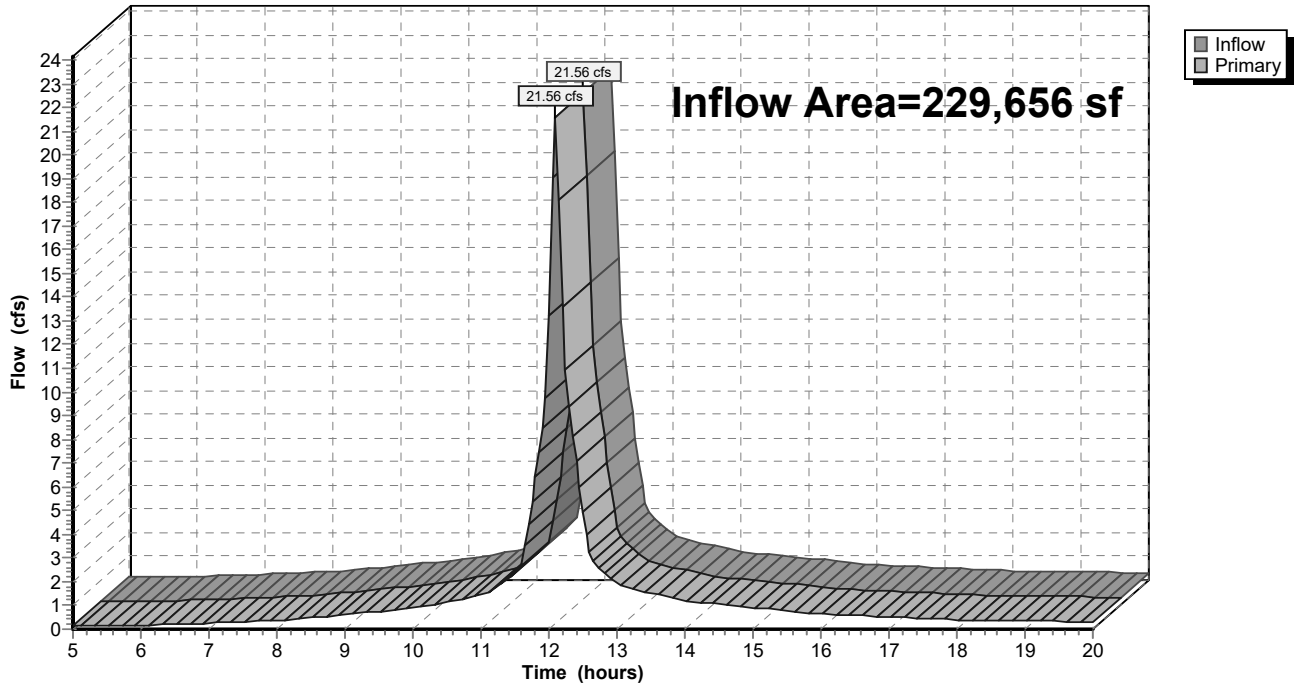
Summary for Link SP1: Existing 18" SD System

Inflow Area = 229,656 sf, 81.61% Impervious, Inflow Depth > 3.68" for 10 year event
Inflow = 21.56 cfs @ 12.10 hrs, Volume= 70,381 cf
Primary = 21.56 cfs @ 12.10 hrs, Volume= 70,381 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link SP1: Existing 18" SD System

Hydrograph



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Type III 24-hr 10 year Rainfall=4.60"

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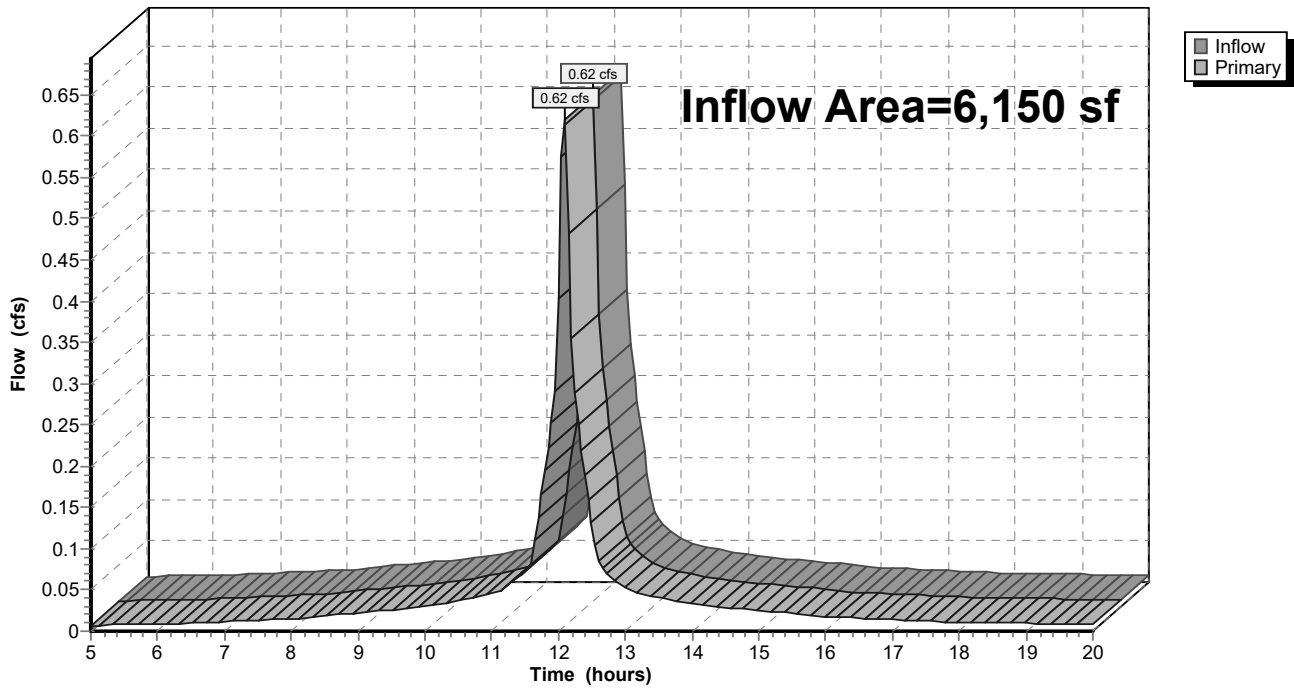
Summary for Link SP2: 30" Storm Drain

Inflow Area = 6,150 sf, 100.00% Impervious, Inflow Depth > 4.05" for 10 year event
Inflow = 0.62 cfs @ 12.09 hrs, Volume= 2,078 cf
Primary = 0.62 cfs @ 12.09 hrs, Volume= 2,078 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link SP2: 30" Storm Drain

Hydrograph



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Type III 24-hr 25 year Rainfall=5.80"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 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

Subcatchment1E: Eagles Parking Lot Runoff Area=25,516 sf 85.43% Impervious Runoff Depth>4.80"
Tc=6.0 min CN=94 Runoff=3.15 cfs 10,212 cf

Subcatchment2E: Existing 222 St. John Runoff Area=168,426 sf 77.13% Impervious Runoff Depth>4.70"
Flow Length=734' Tc=7.0 min CN=93 Runoff=20.05 cfs 66,005 cf

Subcatchment3E: Entrance Drive Runoff Area=9,847 sf 100.00% Impervious Runoff Depth>5.15"
Tc=6.0 min CN=98 Runoff=1.25 cfs 4,224 cf

Subcatchment4E: Union Station Runoff Area=25,867 sf 100.00% Impervious Runoff Depth>5.15"
Tc=6.0 min CN=98 Runoff=3.29 cfs 11,095 cf

Subcatchment5E: Existing Eagles P-Lot Runoff Area=6,150 sf 100.00% Impervious Runoff Depth>5.15"
Tc=6.0 min CN=98 Runoff=0.78 cfs 2,638 cf

Pond 10P: Existing CB Peak Elev=35.55' Inflow=23.18 cfs 76,217 cf
18.0" Round Culvert n=0.011 L=281.0' S=0.0048 ' Outflow=23.18 cfs 76,217 cf

Link SP1: Existing 18" SD System Inflow=27.70 cfs 91,536 cf
Primary=27.70 cfs 91,536 cf

Link SP2: 30" Storm Drain Inflow=0.78 cfs 2,638 cf
Primary=0.78 cfs 2,638 cf

Total Runoff Area = 235,806 sf Runoff Volume = 94,174 cf Average Runoff Depth = 4.79"
17.92% Pervious = 42,245 sf 82.08% Impervious = 193,561 sf

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Type III 24-hr 25 year Rainfall=5.80"

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Summary for Subcatchment 1E: Eagles Parking Lot

Runoff = 3.15 cfs @ 12.09 hrs, Volume= 10,212 cf, Depth> 4.80"

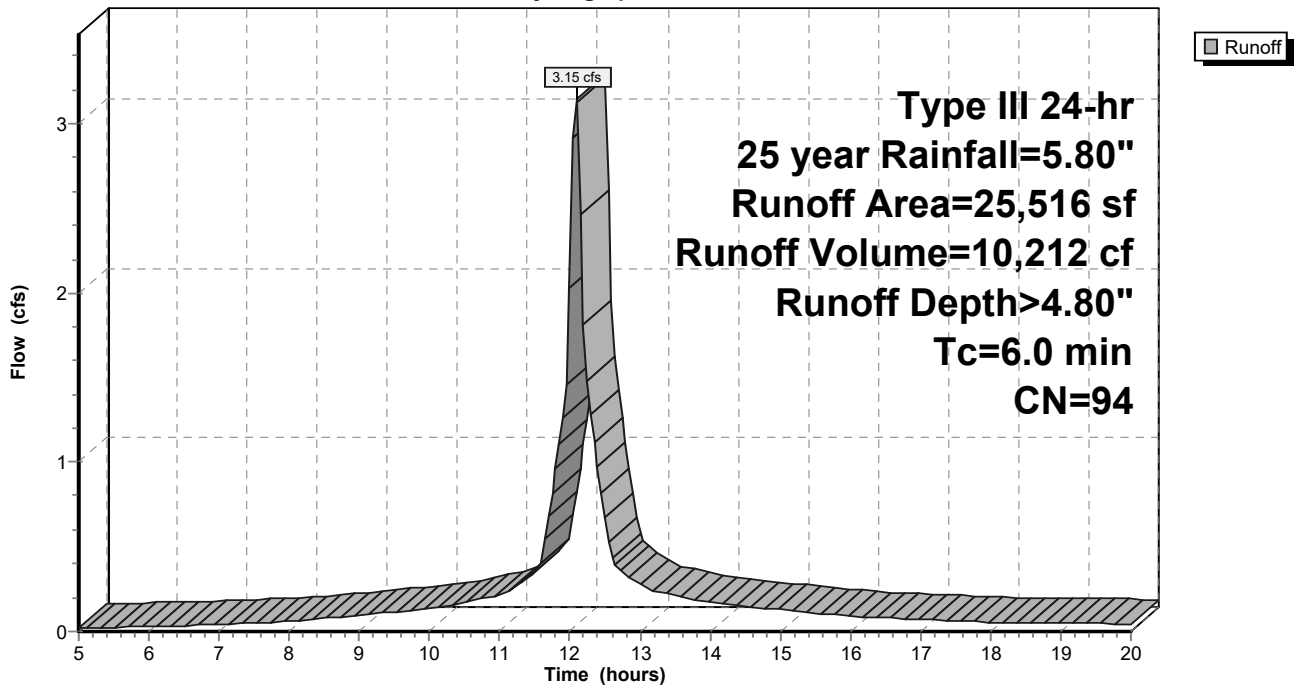
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year Rainfall=5.80"

Area (sf)	CN	Description
3,718	70	Brush, Fair, HSG C
* 21,798	98	parking lot
25,516	94	Weighted Average
3,718		14.57% Pervious Area
21,798		85.43% Impervious Area

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

Subcatchment 1E: Eagles Parking Lot

Hydrograph



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Type III 24-hr 25 year Rainfall=5.80"

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Summary for Subcatchment 2E: Existing 222 St. John St. Parking Lot

Runoff = 20.05 cfs @ 12.10 hrs, Volume= 66,005 cf, Depth> 4.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year Rainfall=5.80"

Area (sf)	CN	Description
129,899	98	Paved parking, HSG B
18,343	79	50-75% Grass cover, Fair, HSG C
20,184	76	Woods/grass comb., Fair, HSG C
168,426	93	Weighted Average
38,527		22.87% Pervious Area
129,899		77.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	100	0.0044	0.74		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.10"
0.8	65	0.0050	1.44		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.0	179	0.0009	1.47	1.16	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
0.7	105	0.0029	2.65	2.08	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
1.2	285	0.0047	3.91	4.80	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012 Concrete pipe, finished
7.0	734	Total			

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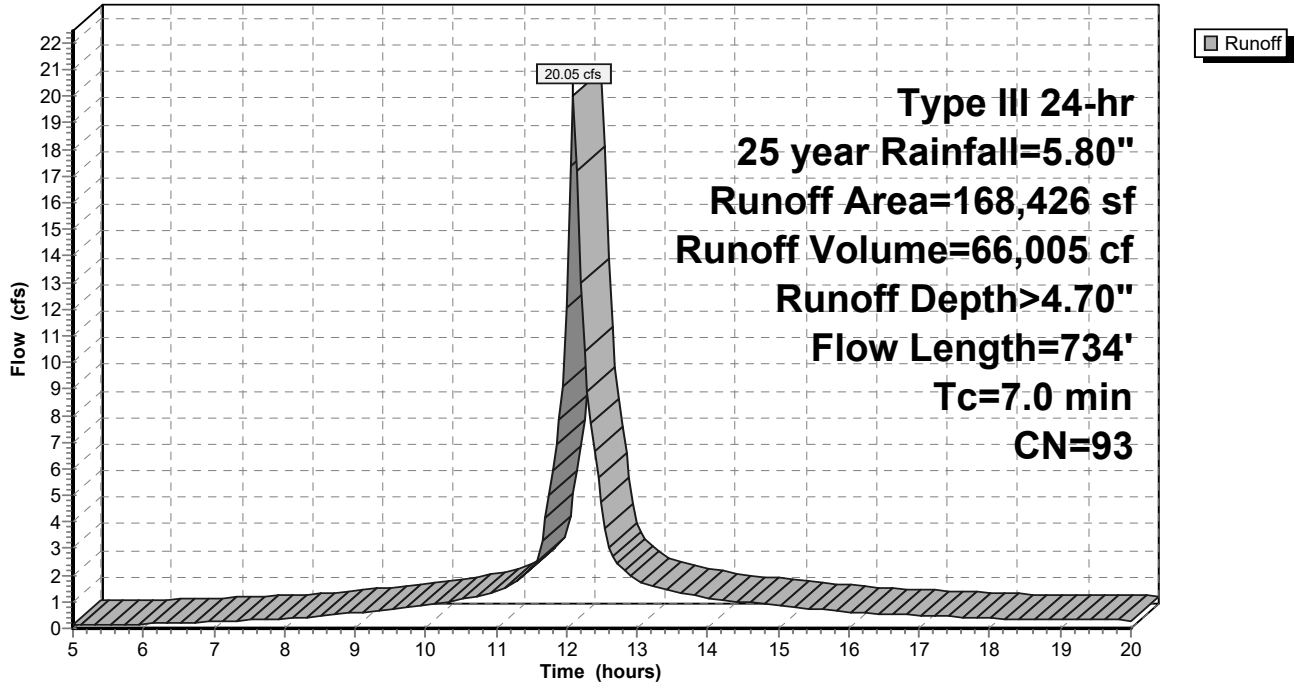
Type III 24-hr 25 year Rainfall=5.80"

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Subcatchment 2E: Existing 222 St. John St. Parking Lot

Hydrograph



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Type III 24-hr 25 year Rainfall=5.80"

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Summary for Subcatchment 3E: Entrance Drive

Runoff = 1.25 cfs @ 12.09 hrs, Volume= 4,224 cf, Depth> 5.15"

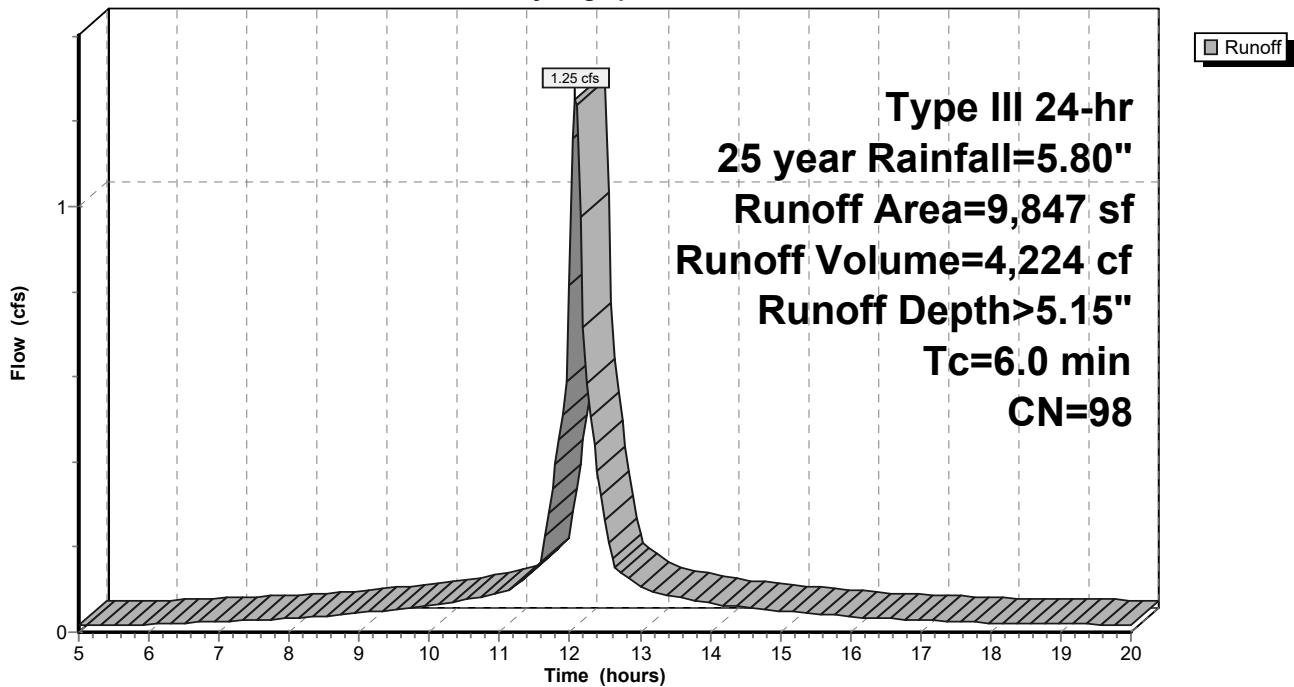
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year Rainfall=5.80"

Area (sf)	CN	Description
* 9,847	98	
9,847		100.00% Impervious Area

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

Subcatchment 3E: Entrance Drive

Hydrograph



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Type III 24-hr 25 year Rainfall=5.80"

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Summary for Subcatchment 4E: Union Station

Runoff = 3.29 cfs @ 12.09 hrs, Volume= 11,095 cf, Depth> 5.15"

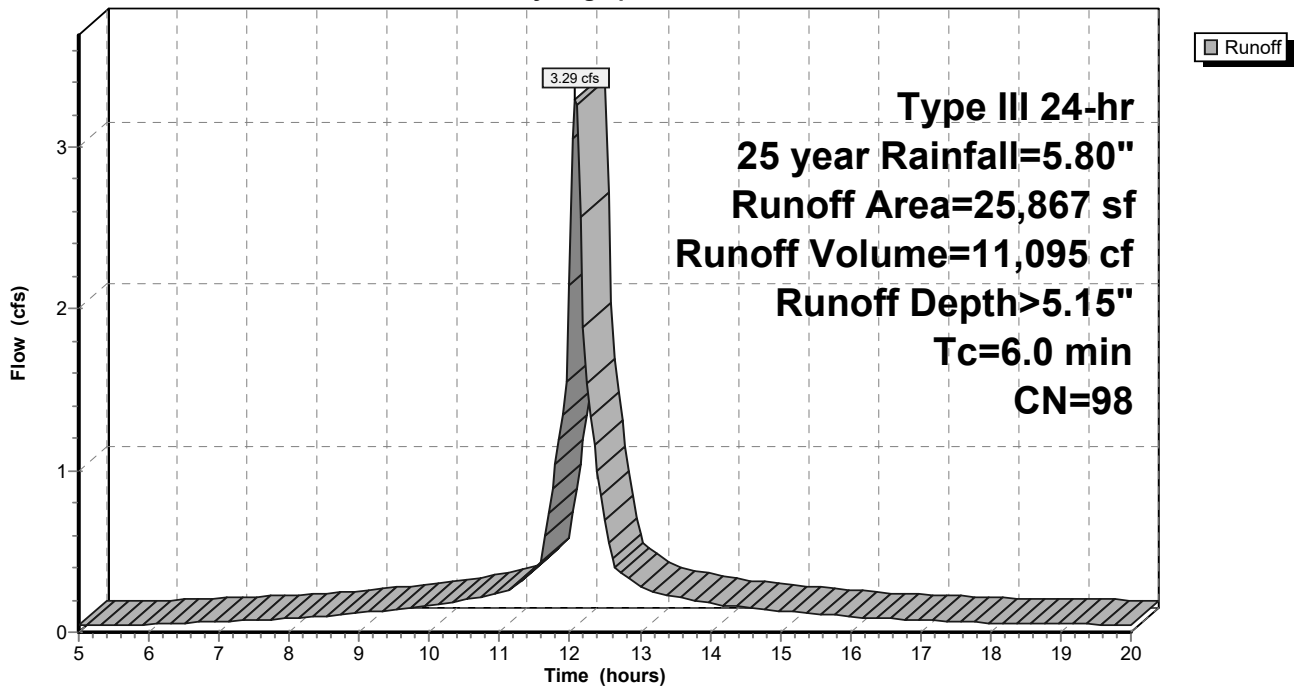
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year Rainfall=5.80"

Area (sf)	CN	Description
* 25,867	98	
25,867		100.00% Impervious Area

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

Subcatchment 4E: Union Station

Hydrograph



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Type III 24-hr 25 year Rainfall=5.80"

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Summary for Subcatchment 5E: Existing Eagles P-Lot South

Runoff = 0.78 cfs @ 12.09 hrs, Volume= 2,638 cf, Depth> 5.15"

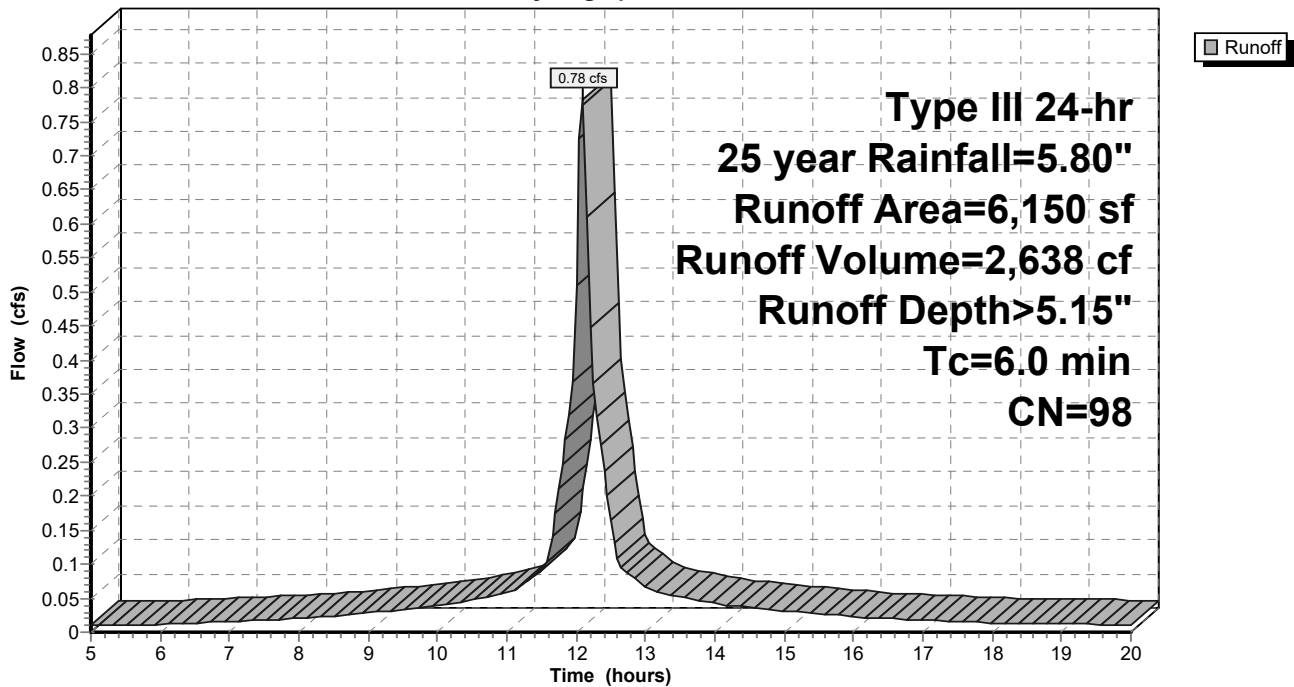
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year Rainfall=5.80"

Area (sf)	CN	Description
* 6,150	98	existing P-lot
6,150		100.00% Impervious Area

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

Subcatchment 5E: Existing Eagles P-Lot South

Hydrograph



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Type III 24-hr 25 year Rainfall=5.80"

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Summary for Pond 10P: Existing CB

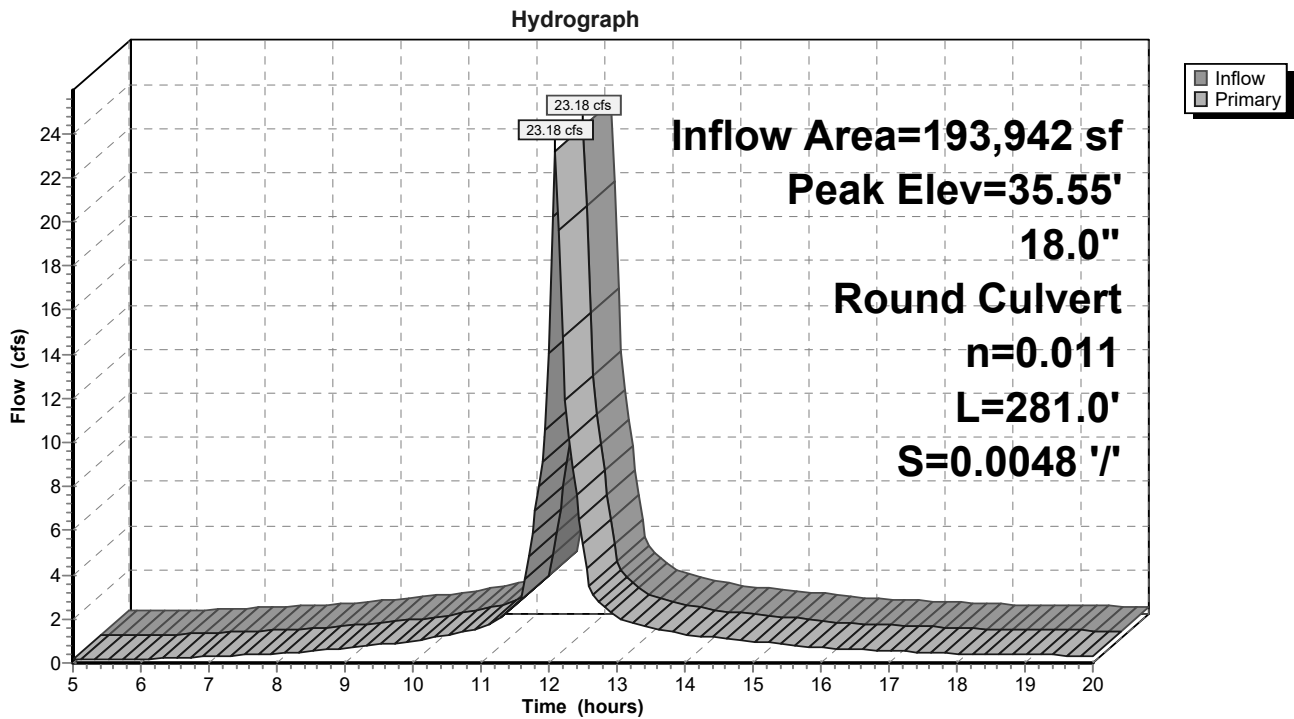
Inflow Area = 193,942 sf, 78.22% Impervious, Inflow Depth > 4.72" for 25 year event
Inflow = 23.18 cfs @ 12.10 hrs, Volume= 76,217 cf
Outflow = 23.18 cfs @ 12.10 hrs, Volume= 76,217 cf, Atten= 0%, Lag= 0.0 min
Primary = 23.18 cfs @ 12.10 hrs, Volume= 76,217 cf

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 35.55' @ 12.10 hrs

Device #1	Routing	Invert	Outlet Devices
	Primary	20.50'	18.0" Round Culvert L= 281.0' Ke= 0.900 Inlet / Outlet Invert= 20.50' / 19.15' S= 0.0048 '/ Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=23.04 cfs @ 12.10 hrs HW=35.37' TW=0.00' (Dynamic Tailwater)
1=Culvert (Barrel Controls 23.04 cfs @ 13.04 fps)

Pond 10P: Existing CB



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Type III 24-hr 25 year Rainfall=5.80"

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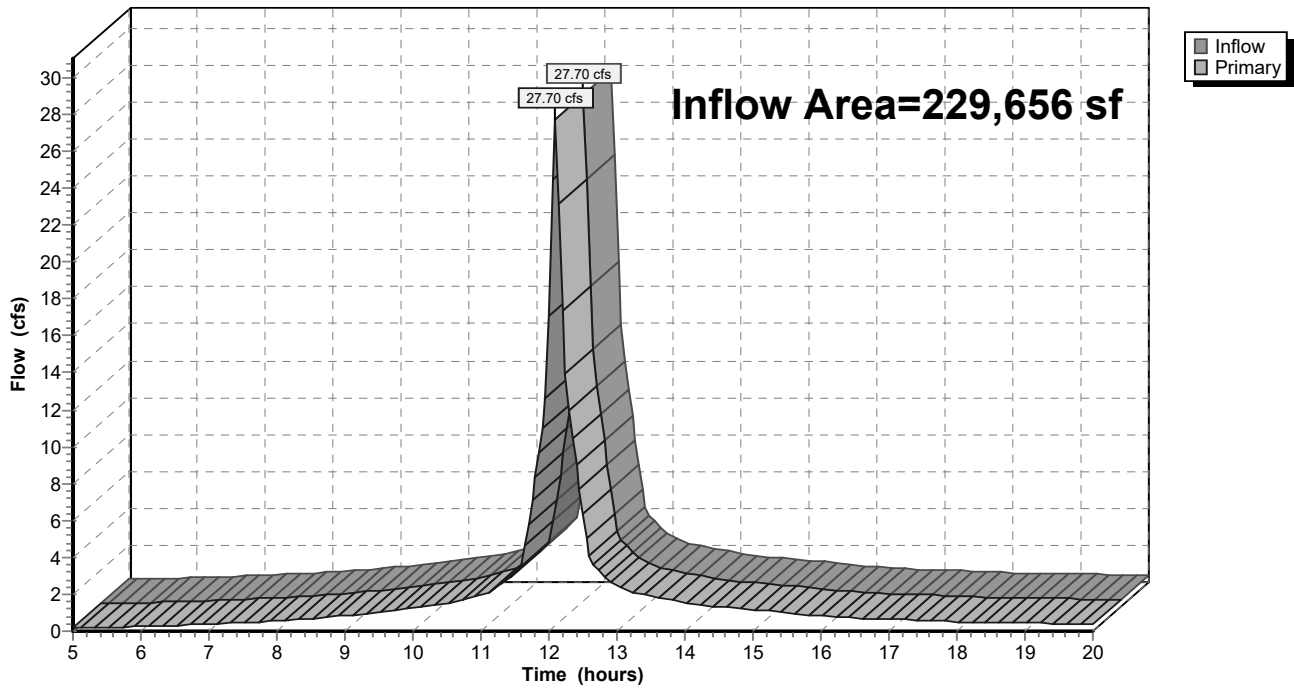
Summary for Link SP1: Existing 18" SD System

Inflow Area = 229,656 sf, 81.61% Impervious, Inflow Depth > 4.78" for 25 year event
Inflow = 27.70 cfs @ 12.10 hrs, Volume= 91,536 cf
Primary = 27.70 cfs @ 12.10 hrs, Volume= 91,536 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link SP1: Existing 18" SD System

Hydrograph



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Type III 24-hr 25 year Rainfall=5.80"

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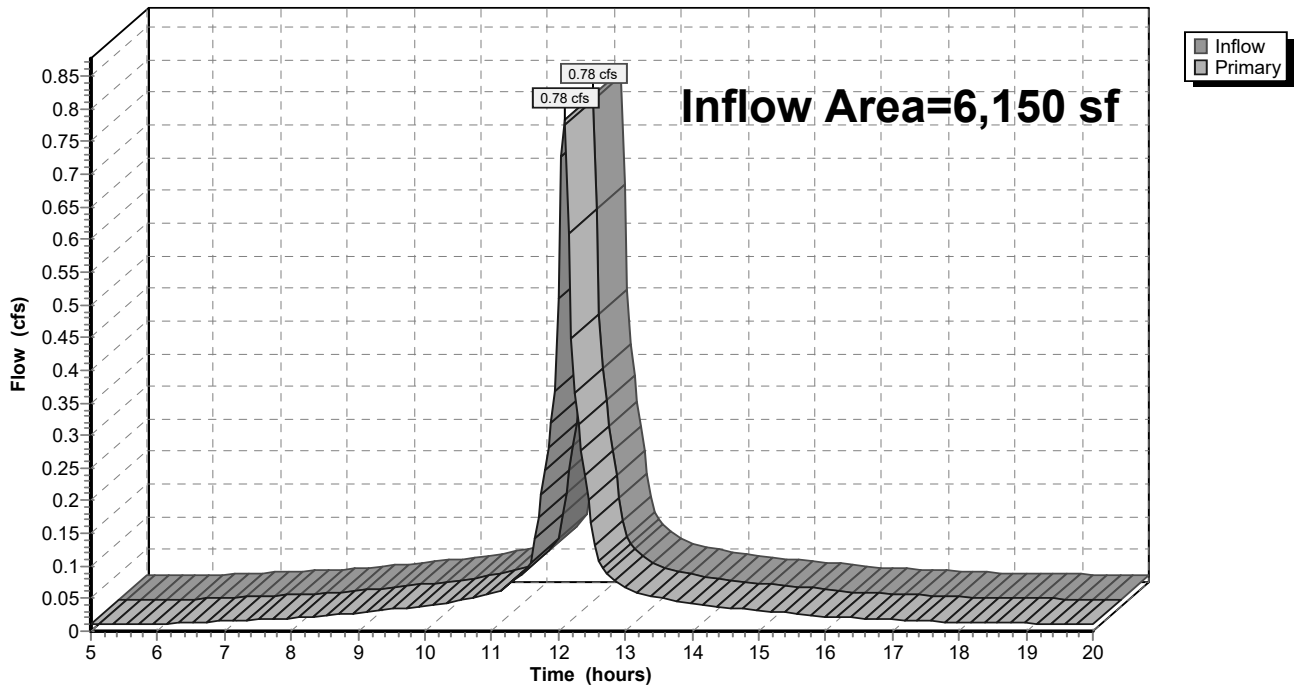
Summary for Link SP2: 30" Storm Drain

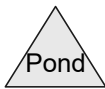
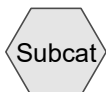
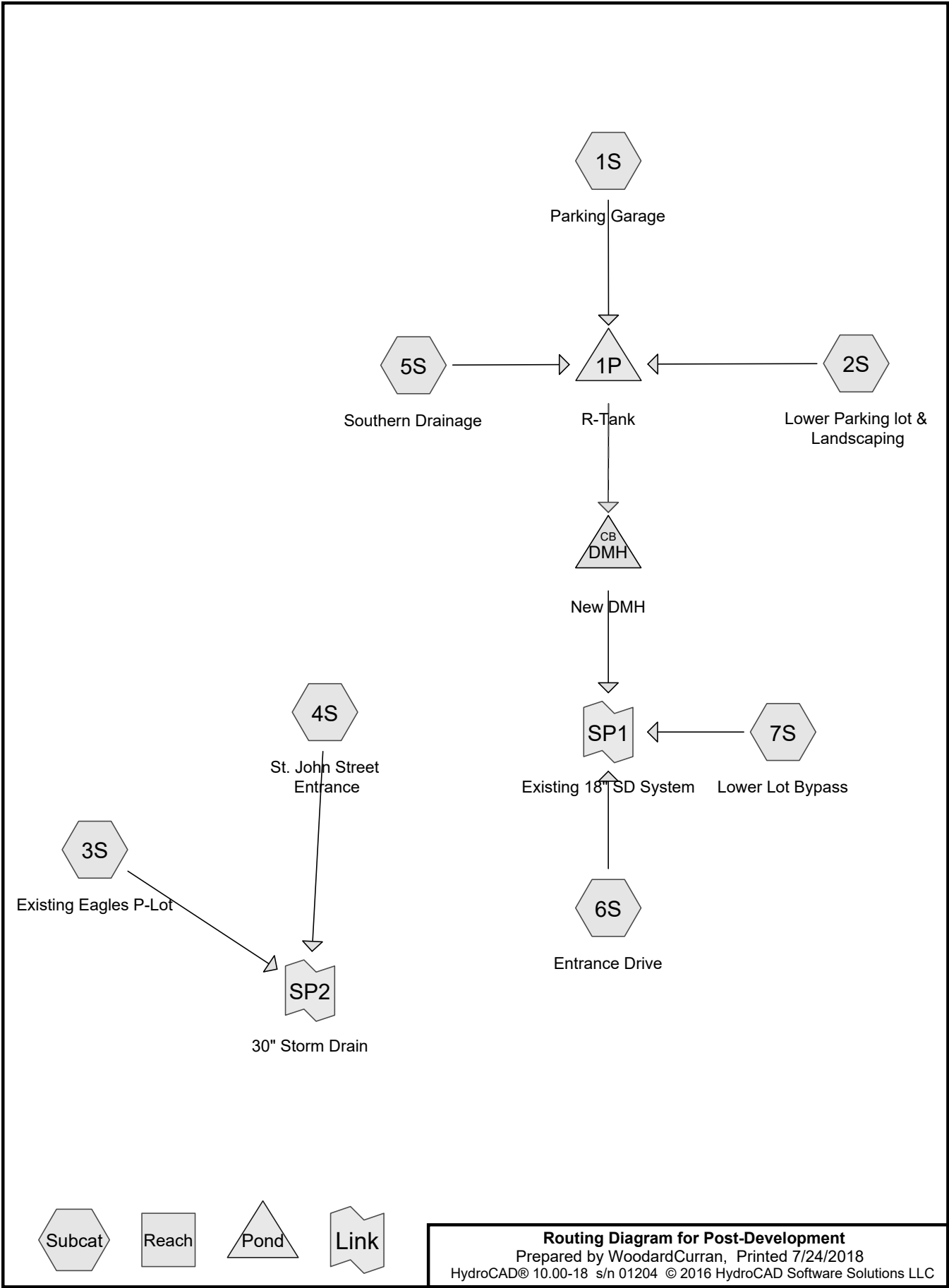
Inflow Area = 6,150 sf, 100.00% Impervious, Inflow Depth > 5.15" for 25 year event
Inflow = 0.78 cfs @ 12.09 hrs, Volume= 2,638 cf
Primary = 0.78 cfs @ 12.09 hrs, Volume= 2,638 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link SP2: 30" Storm Drain

Hydrograph





Routing Diagram for Post-Development
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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
513	84	50-75% Grass cover, Fair, HSG D (6S)
20,799	74	>75% Grass cover, Good, HSG C (4S)
20,397	80	>75% Grass cover, Good, HSG D (2S)
11,050	89	Crushed Stone (5S)
591	98	Eagles lot p-lot (5S)
28,534	98	Entrance Drive & Walks (7S)
9,891	98	Entrance Road (6S)
483	79	Landscaped area (7S)
9,319	98	New entrance drive and walks (4S)
32,944	98	Paved Parking Lot (2S)
89,825	98	Paved parking, HSG B (1S)
2,186	98	Roofs, HSG B (1S)
3,715	98	Sidewalk (5S)
213	89	eagles lot stone (5S)
5,477	98	existing P-lot (3S)
235,937	94	TOTAL AREA

Post-Development

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
92,011	HSG B	1S
20,799	HSG C	4S
20,910	HSG D	2S, 6S
102,217	Other	2S, 3S, 4S, 5S, 6S, 7S
235,937		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
0	0	0	513	0	513	50-75% Grass cover, Fair
0	0	20,799	20,397	0	41,196	>75% Grass cover, Good
0	0	0	0	11,050	11,050	Crushed Stone
0	0	0	0	591	591	Eagles lot p-lot
0	0	0	0	28,534	28,534	Entrance Drive & Walks
0	0	0	0	9,891	9,891	Entrance Road
0	0	0	0	483	483	Landscaped area
0	0	0	0	9,319	9,319	New entrane drive and walks
0	0	0	0	32,944	32,944	Paved Parking Lot
0	89,825	0	0	0	89,825	Paved parking
0	2,186	0	0	0	2,186	Roofs
0	0	0	0	3,715	3,715	Sidewalk
0	0	0	0	213	213	eagles lot stone
0	0	0	0	5,477	5,477	existing P-lot
0	92,011	20,799	20,910	102,217	235,937	TOTAL AREA

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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	1P	19.58	19.58	15.0	0.0000	0.012	15.0	0.0	0.0
2	1P	21.13	21.00	15.0	0.0087	0.012	15.0	0.0	0.0
3	DMH	19.25	19.15	40.0	0.0025	0.013	18.0	0.0	0.0

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Type III 24-hr 2 year Rainfall=3.10"

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Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Parking Garage Runoff Area=92,011 sf 100.00% Impervious Runoff Depth=2.87"
Tc=6.0 min CN=98 Runoff=6.35 cfs 21,990 cf

Subcatchment2S: Lower Parking lot & Runoff Area=53,341 sf 61.76% Impervious Runoff Depth=2.16"
Tc=6.0 min CN=91 Runoff=3.06 cfs 9,622 cf

Subcatchment3S: Existing Eagles P-Lot Runoff Area=5,477 sf 100.00% Impervious Runoff Depth=2.87"
Tc=6.0 min CN=98 Runoff=0.38 cfs 1,309 cf

Subcatchment4S: St. John Street Entrance Runoff Area=30,118 sf 30.94% Impervious Runoff Depth=1.39"
Tc=6.0 min CN=81 Runoff=1.12 cfs 3,491 cf

Subcatchment5S: Southern Drainage Runoff Area=15,569 sf 27.66% Impervious Runoff Depth=2.16"
Tc=6.0 min CN=91 Runoff=0.89 cfs 2,808 cf

Subcatchment6S: Entrance Drive Runoff Area=10,404 sf 95.07% Impervious Runoff Depth=2.76"
Tc=5.0 min CN=97 Runoff=0.73 cfs 2,391 cf

Subcatchment7S: Lower Lot Bypass Runoff Area=29,017 sf 98.34% Impervious Runoff Depth=2.87"
Tc=6.0 min CN=98 Runoff=2.00 cfs 6,935 cf

Pond 1P: R-Tank Peak Elev=21.87' Storage=17,455 cf Inflow=10.31 cfs 34,420 cf
Primary=0.03 cfs 4,370 cf Secondary=3.48 cfs 20,406 cf Outflow=3.51 cfs 24,776 cf

Pond DMH: New DMH Peak Elev=20.45' Inflow=3.51 cfs 24,776 cf
18.0" Round Culvert n=0.013 L=40.0' S=0.0025 '/' Outflow=3.51 cfs 24,776 cf

Link SP1: Existing 18" SD System Inflow=4.49 cfs 34,102 cf
Primary=4.49 cfs 34,102 cf

Link SP2: 30" Storm Drain Inflow=1.50 cfs 4,800 cf
Primary=1.50 cfs 4,800 cf

Total Runoff Area = 235,937 sf Runoff Volume = 48,545 cf Average Runoff Depth = 2.47"
22.66% Pervious = 53,455 sf 77.34% Impervious = 182,482 sf

Post-Development

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Type III 24-hr 2 year Rainfall=3.10"

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Summary for Subcatchment 1S: Parking Garage

Runoff = 6.35 cfs @ 12.08 hrs, Volume= 21,990 cf, Depth= 2.87"

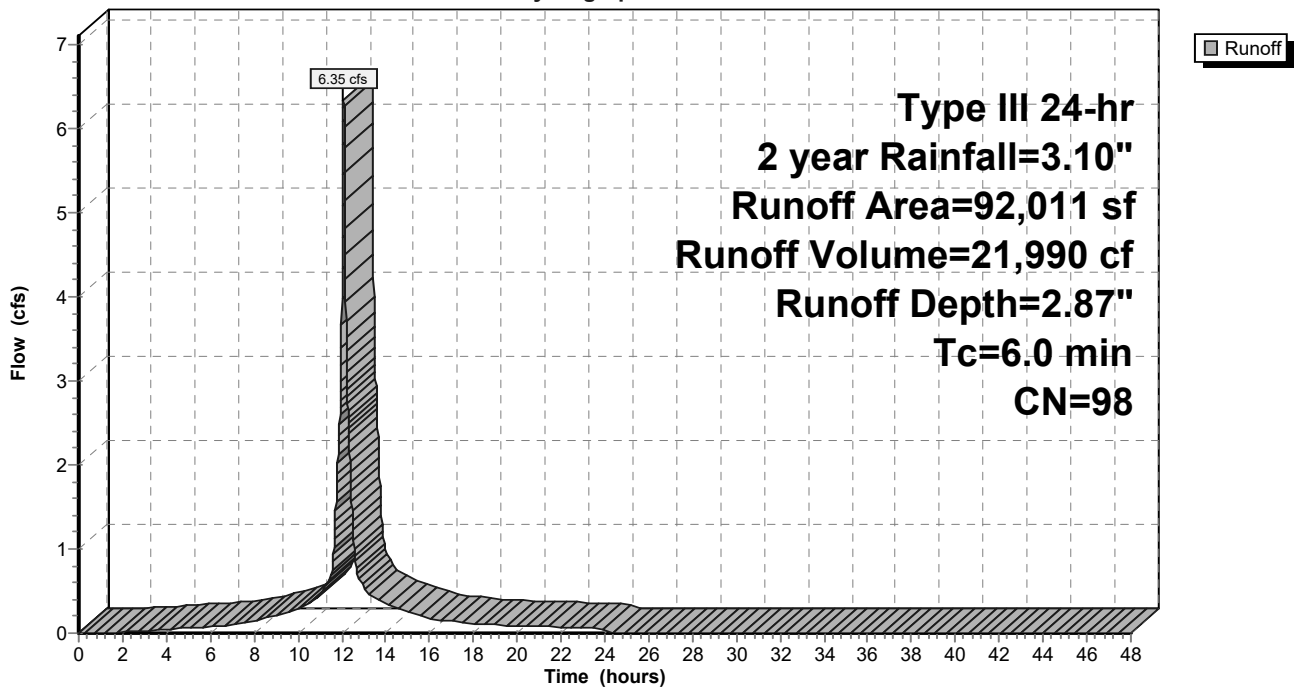
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.10"

Area (sf)	CN	Description
89,825	98	Paved parking, HSG B
2,186	98	Roofs, HSG B
92,011	98	Weighted Average
92,011		100.00% Impervious Area

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

Subcatchment 1S: Parking Garage

Hydrograph



Post-Development

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Type III 24-hr 2 year Rainfall=3.10"

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Summary for Subcatchment 2S: Lower Parking lot & Landscaping

Runoff = 3.06 cfs @ 12.09 hrs, Volume= 9,622 cf, Depth= 2.16"

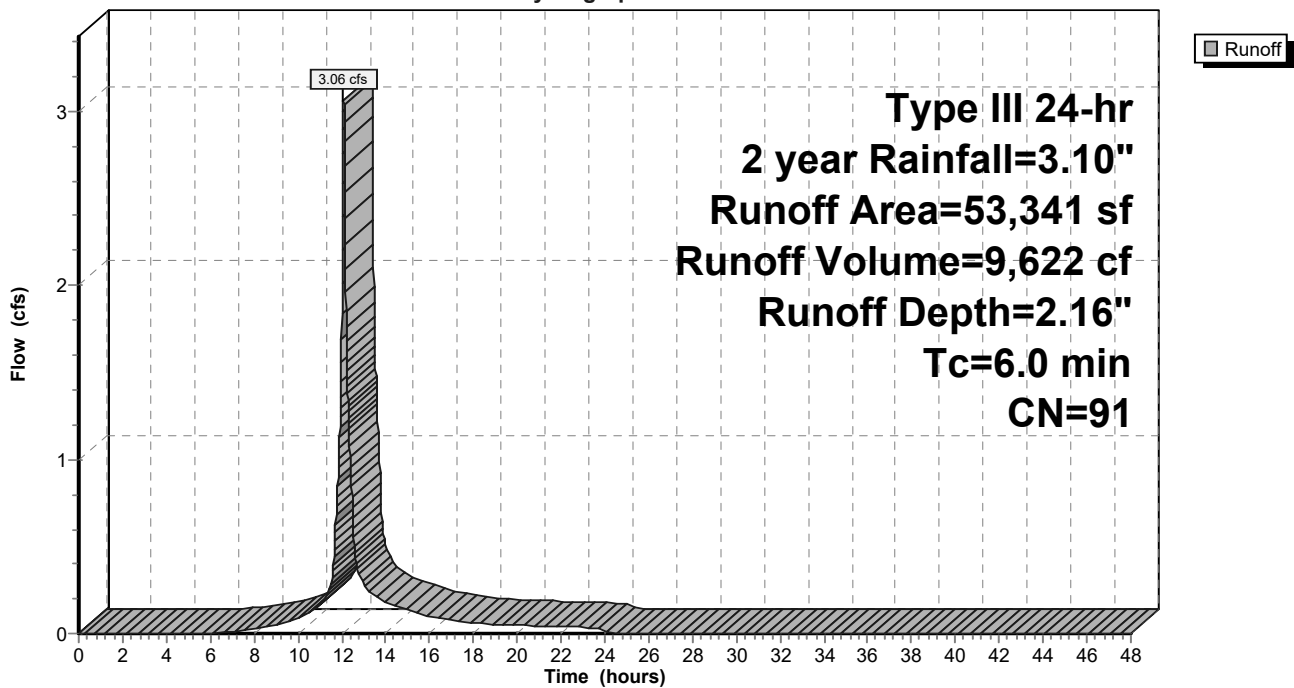
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.10"

	Area (sf)	CN	Description
*	32,944	98	Paved Parking Lot
	20,397	80	>75% Grass cover, Good, HSG D
	53,341	91	Weighted Average
	20,397		38.24% Pervious Area
	32,944		61.76% Impervious Area

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

Subcatchment 2S: Lower Parking lot & Landscaping

Hydrograph



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Type III 24-hr 2 year Rainfall=3.10"

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Summary for Subcatchment 3S: Existing Eagles P-Lot

Runoff = 0.38 cfs @ 12.08 hrs, Volume= 1,309 cf, Depth= 2.87"

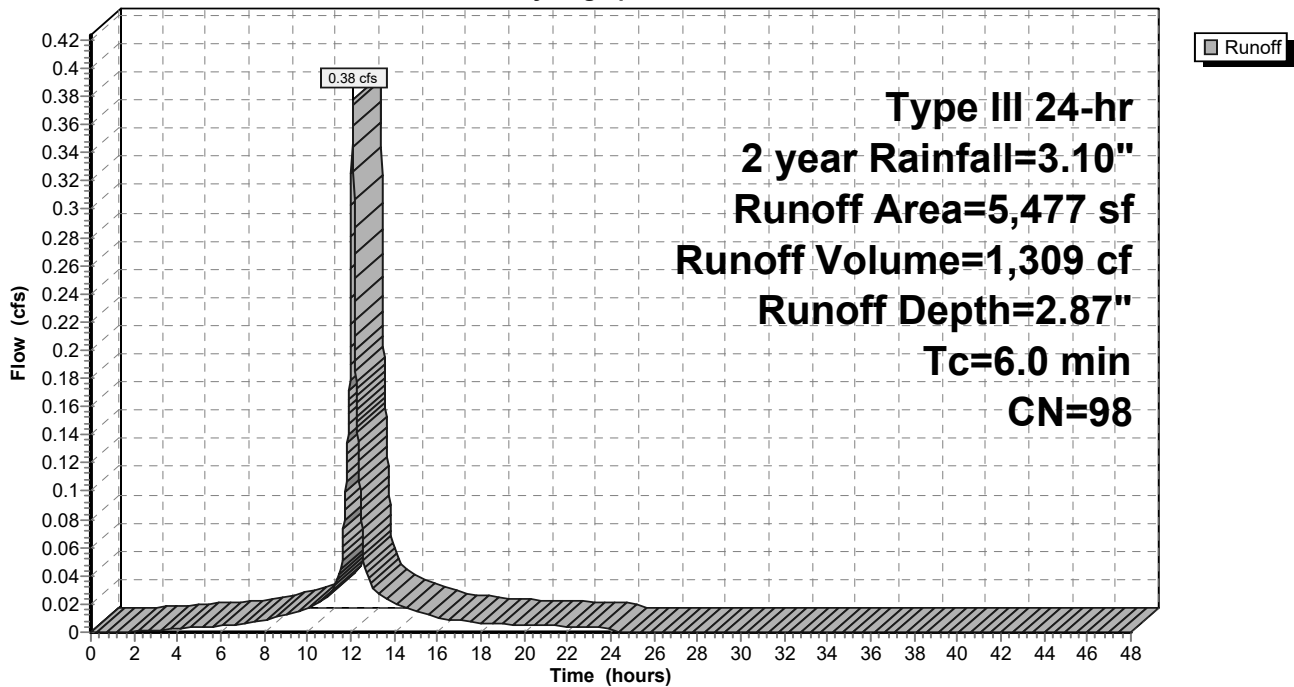
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2 year Rainfall=3.10"

Area (sf)	CN	Description
* 5,477	98	existing P-lot
5,477		100.00% Impervious Area

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

Subcatchment 3S: Existing Eagles P-Lot

Hydrograph



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Type III 24-hr 2 year Rainfall=3.10"

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Summary for Subcatchment 4S: St. John Street Entrance

Runoff = 1.12 cfs @ 12.09 hrs, Volume= 3,491 cf, Depth= 1.39"

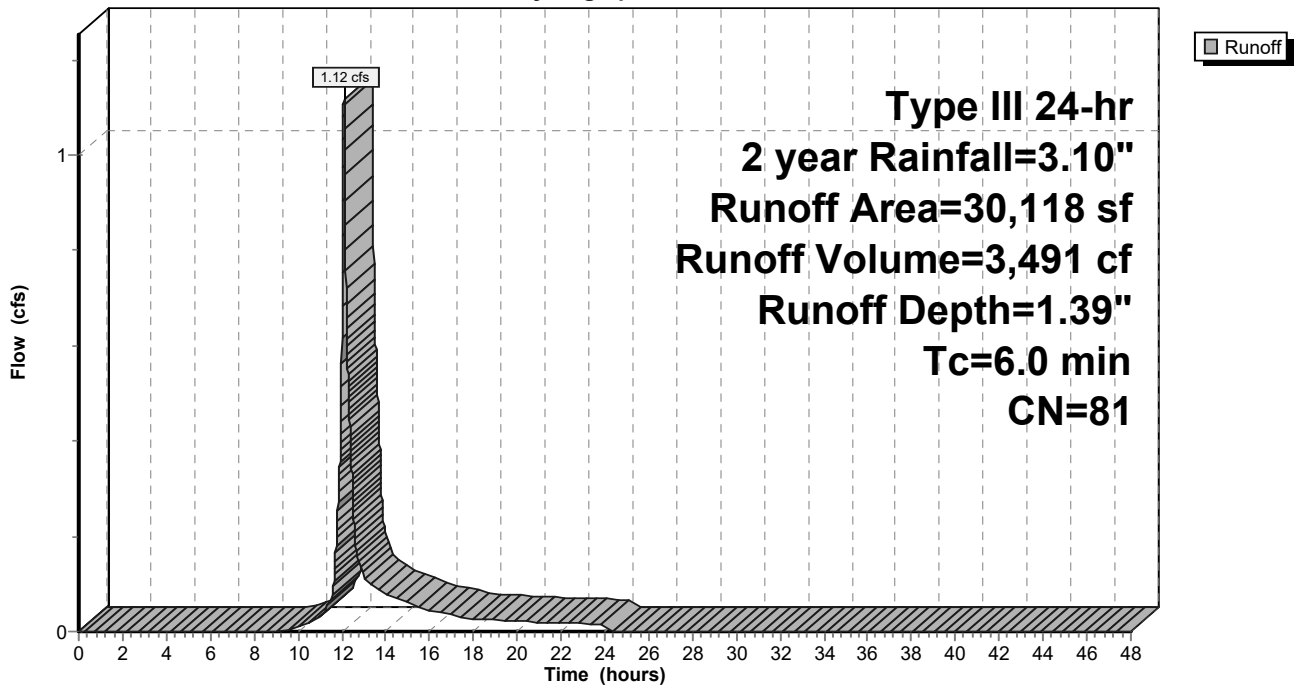
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.10"

	Area (sf)	CN	Description
*	9,319	98	New entrane drive and walks
	20,799	74	>75% Grass cover, Good, HSG C
	30,118	81	Weighted Average
	20,799		69.06% Pervious Area
	9,319		30.94% Impervious Area

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

Subcatchment 4S: St. John Street Entrance

Hydrograph



Post-Development

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Type III 24-hr 2 year Rainfall=3.10"

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Summary for Subcatchment 5S: Southern Drainage

Runoff = 0.89 cfs @ 12.09 hrs, Volume= 2,808 cf, Depth= 2.16"

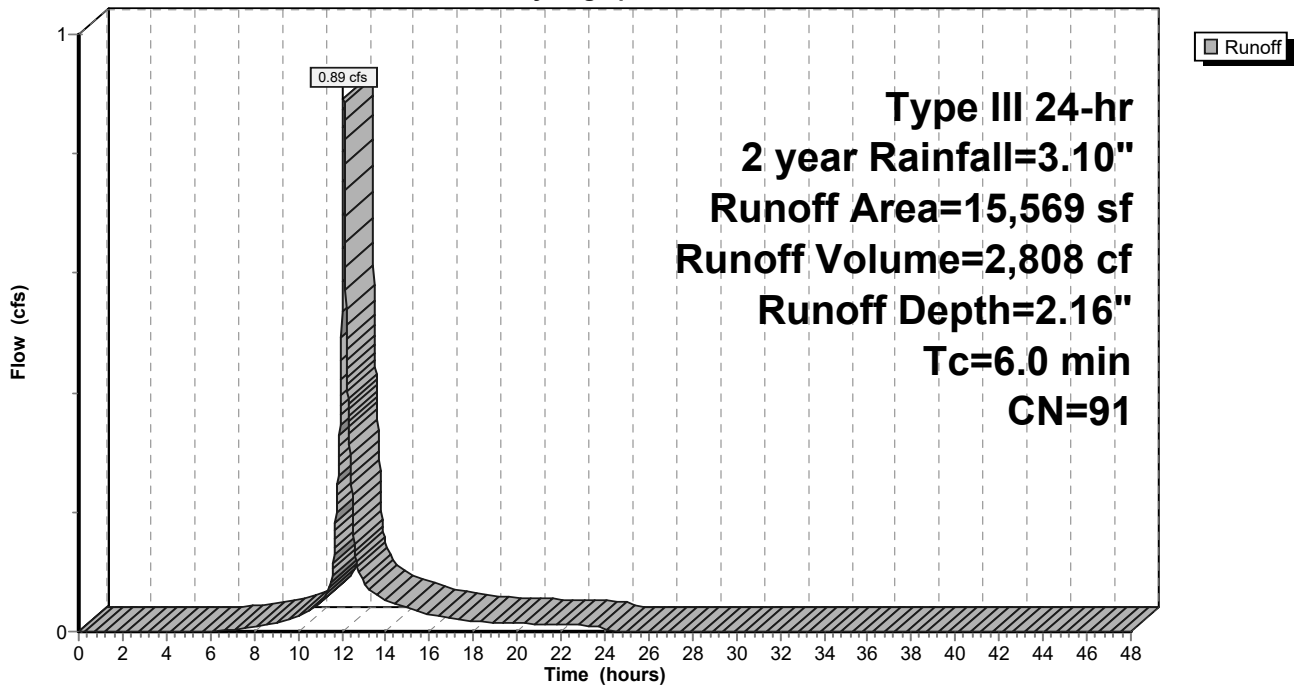
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.10"

	Area (sf)	CN	Description
*	11,050	89	Crushed Stone
*	3,715	98	Sidewalk
*	591	98	Eagles lot p-lot
*	213	89	eagles lot stone
	15,569	91	Weighted Average
	11,263		72.34% Pervious Area
	4,306		27.66% Impervious Area

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

Subcatchment 5S: Southern Drainage

Hydrograph



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Type III 24-hr 2 year Rainfall=3.10"

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Summary for Subcatchment 6S: Entrance Drive

Runoff = 0.73 cfs @ 12.07 hrs, Volume= 2,391 cf, Depth= 2.76"

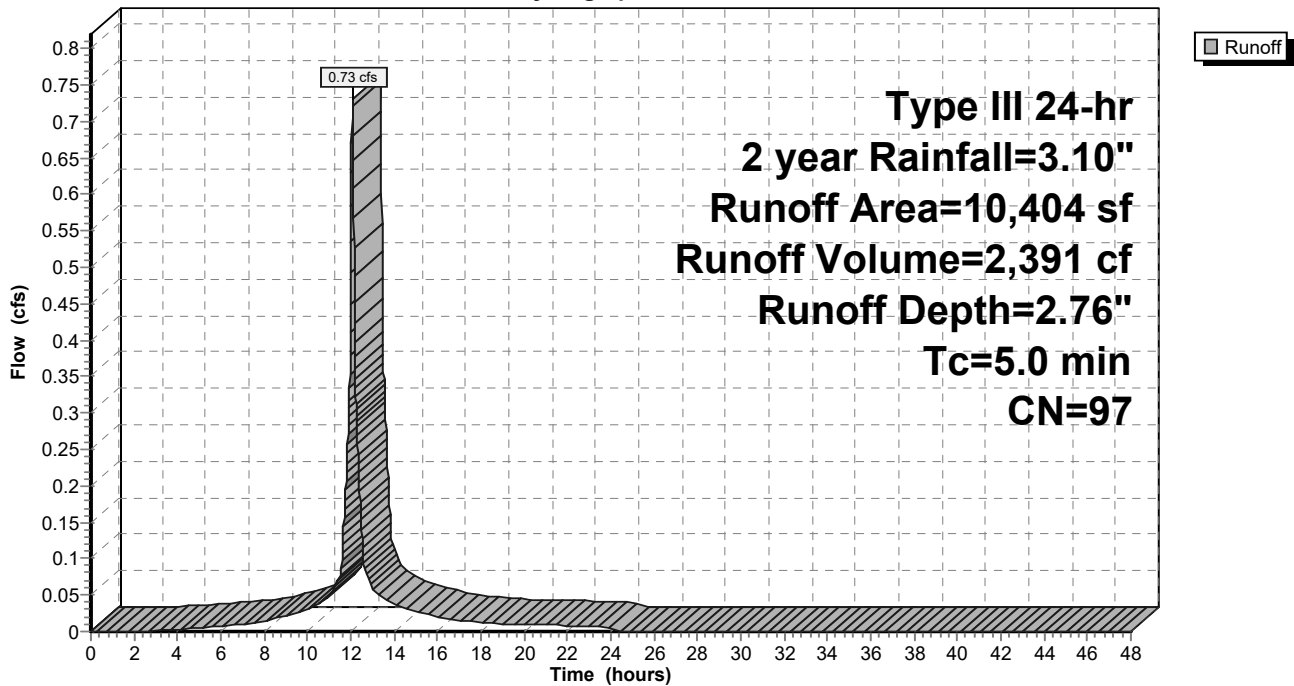
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.10"

	Area (sf)	CN	Description
*	9,891	98	Entrance Road
	513	84	50-75% Grass cover, Fair, HSG D
	10,404	97	Weighted Average
	513		4.93% Pervious Area
	9,891		95.07% Impervious Area

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

Subcatchment 6S: Entrance Drive

Hydrograph



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Type III 24-hr 2 year Rainfall=3.10"

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Summary for Subcatchment 7S: Lower Lot Bypass

Runoff = 2.00 cfs @ 12.08 hrs, Volume= 6,935 cf, Depth= 2.87"

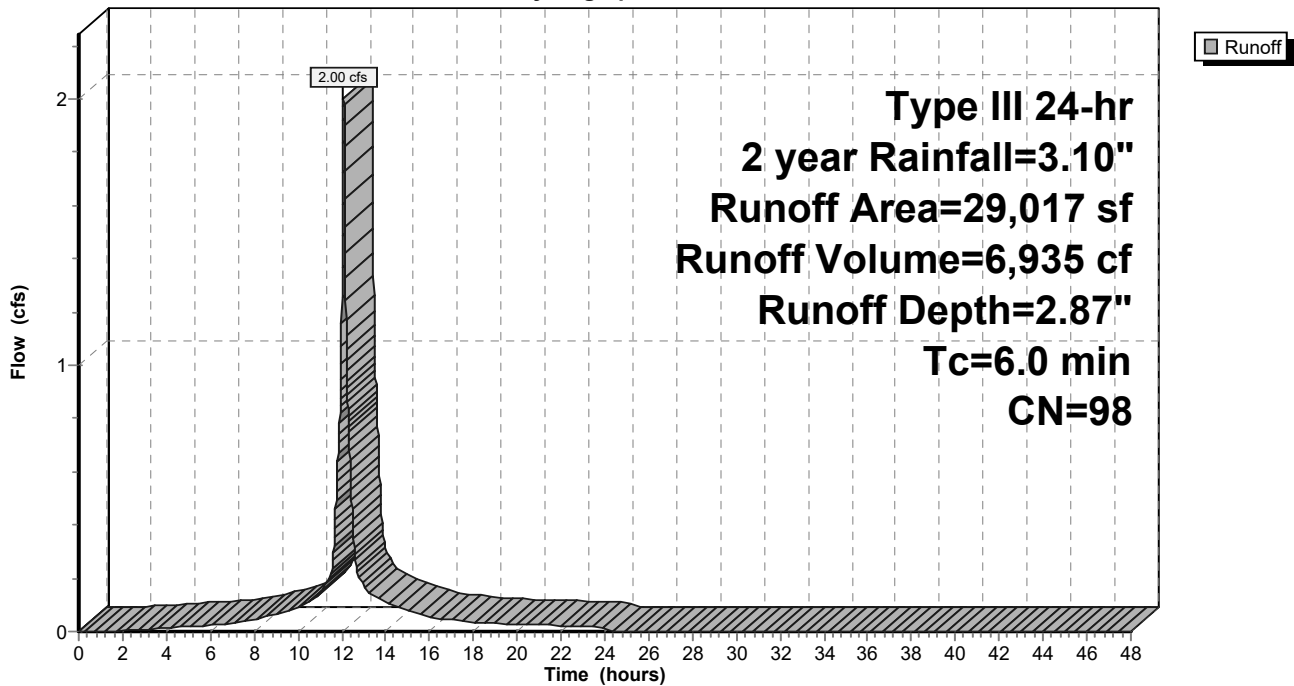
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.10"

	Area (sf)	CN	Description
*	28,534	98	Entrance Drive & Walks
*	483	79	Landscaped area
	29,017	98	Weighted Average
	483		1.66% Pervious Area
	28,534		98.34% Impervious Area

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

Subcatchment 7S: Lower Lot Bypass

Hydrograph



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Type III 24-hr 2 year Rainfall=3.10"

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Summary for Pond 1P: R-Tank

Inflow Area = 160,921 sf, 80.33% Impervious, Inflow Depth = 2.57" for 2 year event
 Inflow = 10.31 cfs @ 12.08 hrs, Volume= 34,420 cf
 Outflow = 3.51 cfs @ 12.36 hrs, Volume= 24,776 cf, Atten= 66%, Lag= 16.7 min
 Primary = 0.03 cfs @ 15.87 hrs, Volume= 4,370 cf
 Secondary = 3.48 cfs @ 12.36 hrs, Volume= 20,406 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 21.87' @ 12.36 hrs Surf.Area= 8,682 sf Storage= 17,455 cf

Plug-Flow detention time= 344.8 min calculated for 24,776 cf (72% of inflow)
 Center-of-Mass det. time= 253.8 min (1,027.7 - 773.9)

Volume	Invert	Avail.Storage	Storage Description
#1	19.58'	4,733 cf	Stone Envelope (Prismatic) Listed below (Recalc) 33,165 cf Overall - 21,333 cf Embedded = 11,832 cf x 40.0% Voids
#2	19.58'	20,267 cf	R-Tank Modules (Prismatic) Listed below (Recalc) Inside #1 21,333 cf Overall x 95.0% Voids
		24,999 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
19.58	8,682	0	0
23.40	8,682	33,165	33,165

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
19.58	7,565	0	0
22.40	7,565	21,333	21,333

Device	Routing	Invert	Outlet Devices
#1	Primary	19.58'	15.0" Round Culvert L= 15.0' Ke= 0.500 Inlet / Outlet Invert= 19.58' / 19.58' S= 0.0000 ' / Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	19.58'	1.0" Vert. Orifice/Grate C= 0.600
#3	Device 2	19.75'	1.7" Vert. Orifice/Grate C= 0.600
#4	Secondary	21.13'	15.0" Round Culvert X 2.00 L= 15.0' Ke= 0.500 Inlet / Outlet Invert= 21.13' / 21.00' S= 0.0087 ' / Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.03 cfs @ 15.87 hrs HW=21.34' TW=19.62' (Dynamic Tailwater)

- ↑1=Culvert (Passes 0.03 cfs of 5.25 cfs potential flow)
- ↑2=Orifice/Grate (Orifice Controls 0.03 cfs @ 6.31 fps)
- ↑3=Orifice/Grate (Passes 0.03 cfs of 0.09 cfs potential flow)

Secondary OutFlow Max=3.48 cfs @ 12.36 hrs HW=21.87' TW=20.45' (Dynamic Tailwater)

- ↑4=Culvert (Barrel Controls 3.48 cfs @ 3.32 fps)

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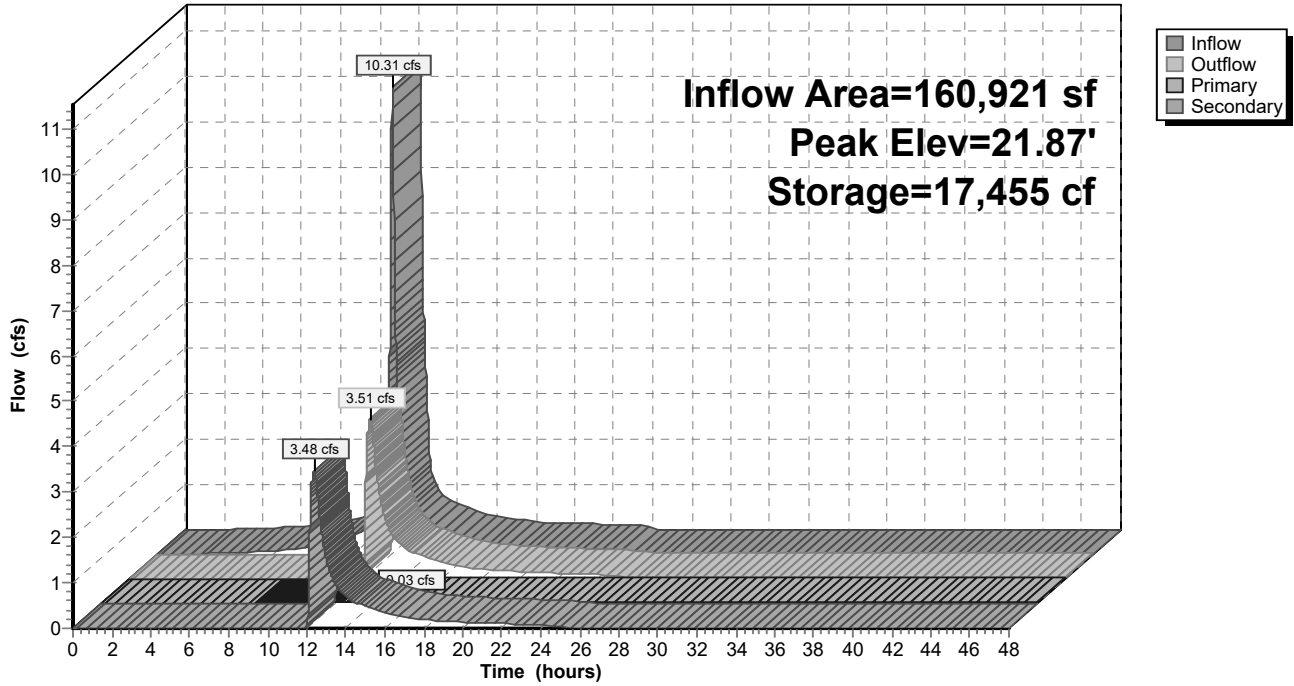
Type III 24-hr 2 year Rainfall=3.10"

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Pond 1P: R-Tank

Hydrograph



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Type III 24-hr 2 year Rainfall=3.10"

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Summary for Pond DMH: New DMH

Inflow Area = 160,921 sf, 80.33% Impervious, Inflow Depth > 1.85" for 2 year event
Inflow = 3.51 cfs @ 12.36 hrs, Volume= 24,776 cf
Outflow = 3.51 cfs @ 12.36 hrs, Volume= 24,776 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.51 cfs @ 12.36 hrs, Volume= 24,776 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2

Peak Elev= 20.45' @ 12.36 hrs

Flood Elev= 26.00'

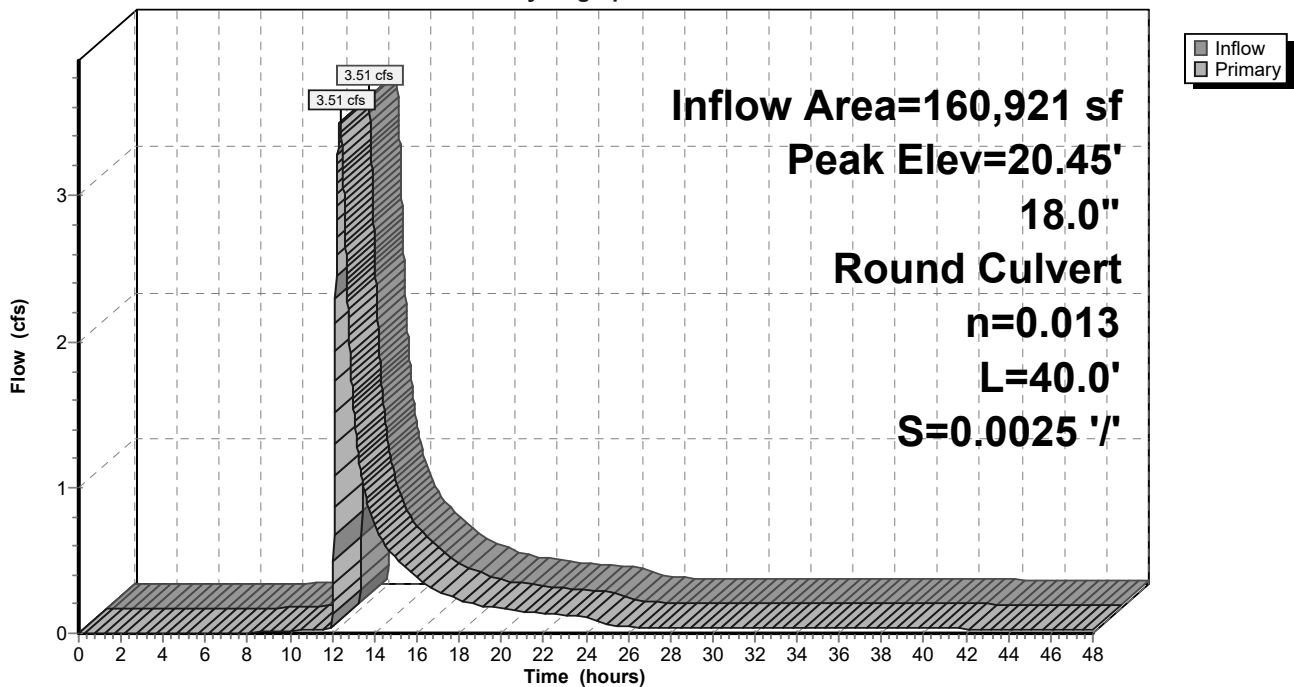
Device	Routing	Invert	Outlet Devices
#1	Primary	19.25'	18.0" Round Culvert L= 40.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 19.25' / 19.15' S= 0.0025 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=3.51 cfs @ 12.36 hrs HW=20.45' TW=0.00' (Dynamic Tailwater)

↑1=Culvert (Barrel Controls 3.51 cfs @ 3.18 fps)

Pond DMH: New DMH

Hydrograph



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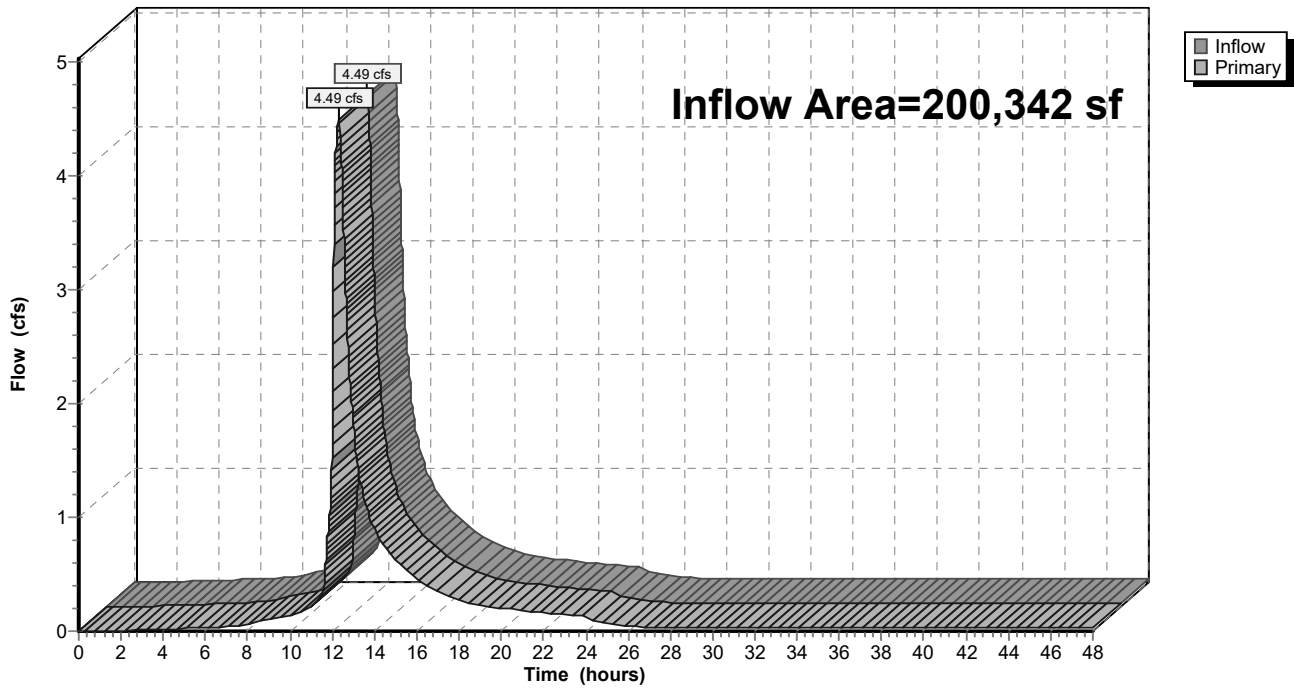
Summary for Link SP1: Existing 18" SD System

Inflow Area = 200,342 sf, 83.70% Impervious, Inflow Depth > 2.04" for 2 year event
Inflow = 4.49 cfs @ 12.30 hrs, Volume= 34,102 cf
Primary = 4.49 cfs @ 12.30 hrs, Volume= 34,102 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link SP1: Existing 18" SD System

Hydrograph



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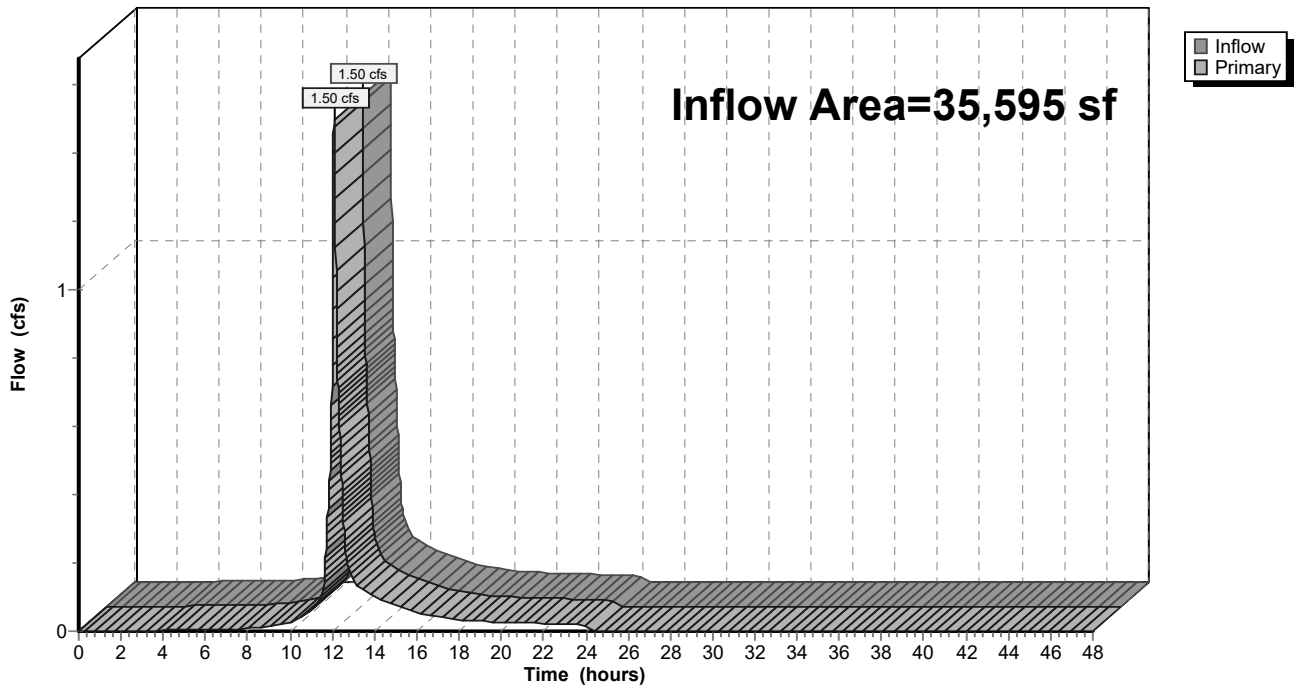
Summary for Link SP2: 30" Storm Drain

Inflow Area = 35,595 sf, 41.57% Impervious, Inflow Depth = 1.62" for 2 year event
Inflow = 1.50 cfs @ 12.09 hrs, Volume= 4,800 cf
Primary = 1.50 cfs @ 12.09 hrs, Volume= 4,800 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link SP2: 30" Storm Drain

Hydrograph



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Type III 24-hr 10 year Rainfall=4.60"

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Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Parking Garage Runoff Area=92,011 sf 100.00% Impervious Runoff Depth=4.36"
Tc=6.0 min CN=98 Runoff=9.50 cfs 33,460 cf

Subcatchment2S: Lower Parking lot & Runoff Area=53,341 sf 61.76% Impervious Runoff Depth=3.59"
Tc=6.0 min CN=91 Runoff=4.97 cfs 15,978 cf

Subcatchment3S: Existing Eagles P-Lot Runoff Area=5,477 sf 100.00% Impervious Runoff Depth=4.36"
Tc=6.0 min CN=98 Runoff=0.57 cfs 1,992 cf

Subcatchment4S: St. John Street Entrance Runoff Area=30,118 sf 30.94% Impervious Runoff Depth=2.63"
Tc=6.0 min CN=81 Runoff=2.14 cfs 6,613 cf

Subcatchment5S: Southern Drainage Runoff Area=15,569 sf 27.66% Impervious Runoff Depth=3.59"
Tc=6.0 min CN=91 Runoff=1.45 cfs 4,664 cf

Subcatchment6S: Entrance Drive Runoff Area=10,404 sf 95.07% Impervious Runoff Depth=4.25"
Tc=5.0 min CN=97 Runoff=1.10 cfs 3,684 cf

Subcatchment7S: Lower Lot Bypass Runoff Area=29,017 sf 98.34% Impervious Runoff Depth=4.36"
Tc=6.0 min CN=98 Runoff=2.99 cfs 10,552 cf

Pond 1P: R-Tank Peak Elev=22.53' Storage=21,974 cf Inflow=15.91 cfs 54,102 cf
Primary=0.03 cfs 4,534 cf Secondary=9.26 cfs 39,879 cf Outflow=9.28 cfs 44,413 cf

Pond DMH: New DMH Peak Elev=21.91' Inflow=9.28 cfs 44,413 cf
18.0" Round Culvert n=0.013 L=40.0' S=0.0025 '/' Outflow=9.28 cfs 44,413 cf

Link SP1: Existing 18" SD System Inflow=11.83 cfs 58,649 cf
Primary=11.83 cfs 58,649 cf

Link SP2: 30" Storm Drain Inflow=2.70 cfs 8,605 cf
Primary=2.70 cfs 8,605 cf

Total Runoff Area = 235,937 sf Runoff Volume = 76,942 cf Average Runoff Depth = 3.91"
22.66% Pervious = 53,455 sf 77.34% Impervious = 182,482 sf

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Type III 24-hr 10 year Rainfall=4.60"

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Summary for Subcatchment 1S: Parking Garage

Runoff = 9.50 cfs @ 12.08 hrs, Volume= 33,460 cf, Depth= 4.36"

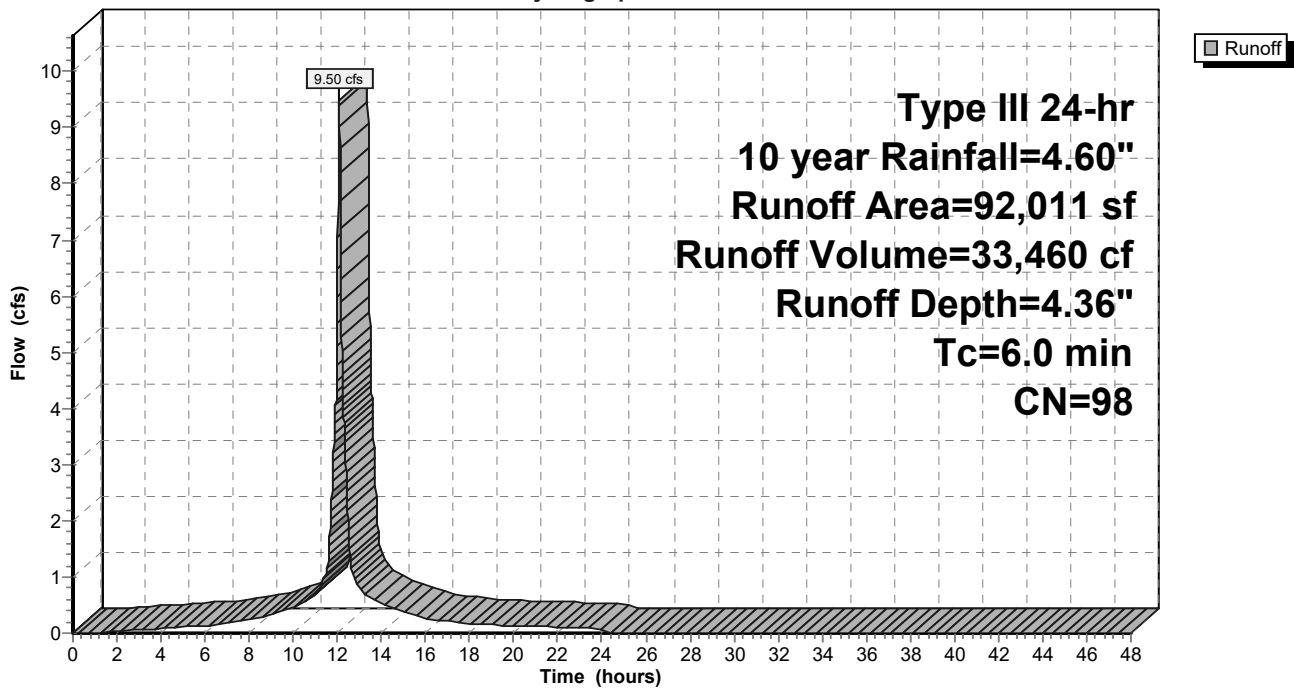
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year Rainfall=4.60"

Area (sf)	CN	Description
89,825	98	Paved parking, HSG B
2,186	98	Roofs, HSG B
92,011	98	Weighted Average
92,011		100.00% Impervious Area

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

Subcatchment 1S: Parking Garage

Hydrograph



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Type III 24-hr 10 year Rainfall=4.60"

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Summary for Subcatchment 2S: Lower Parking lot & Landscaping

Runoff = 4.97 cfs @ 12.08 hrs, Volume= 15,978 cf, Depth= 3.59"

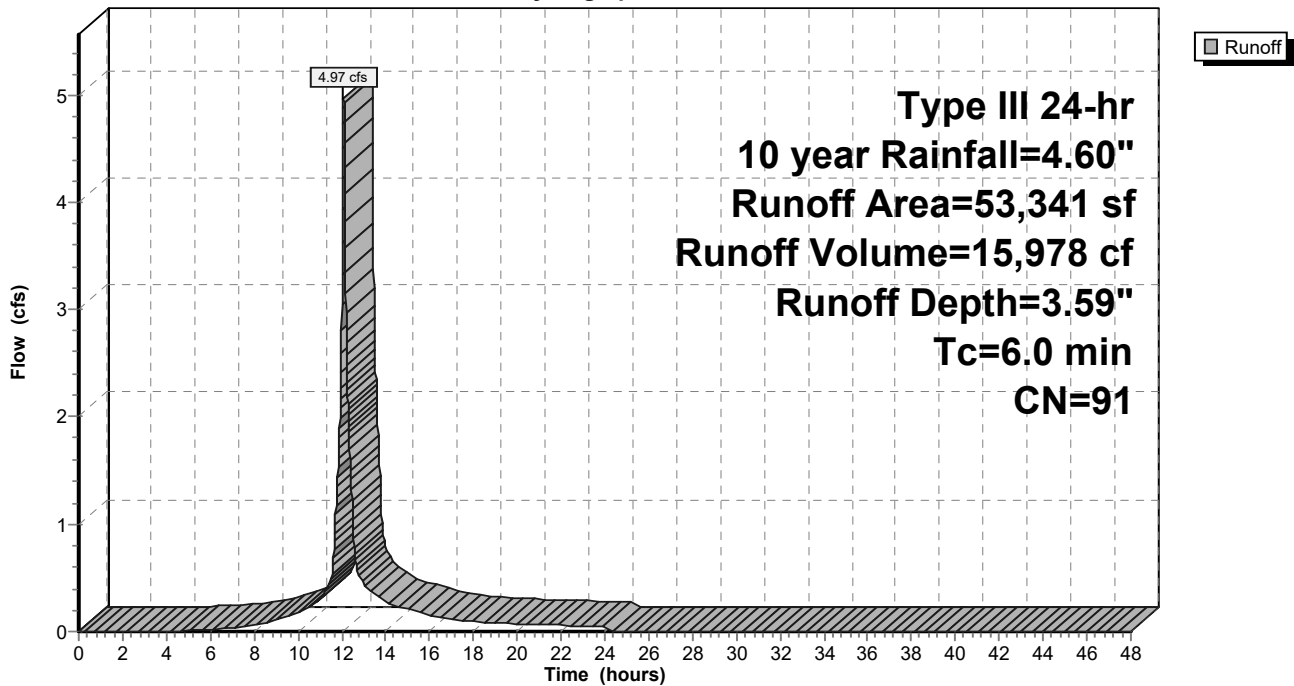
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year Rainfall=4.60"

	Area (sf)	CN	Description
*	32,944	98	Paved Parking Lot
	20,397	80	>75% Grass cover, Good, HSG D
	53,341	91	Weighted Average
	20,397		38.24% Pervious Area
	32,944		61.76% Impervious Area

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

Subcatchment 2S: Lower Parking lot & Landscaping

Hydrograph



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Type III 24-hr 10 year Rainfall=4.60"

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Summary for Subcatchment 3S: Existing Eagles P-Lot

Runoff = 0.57 cfs @ 12.08 hrs, Volume= 1,992 cf, Depth= 4.36"

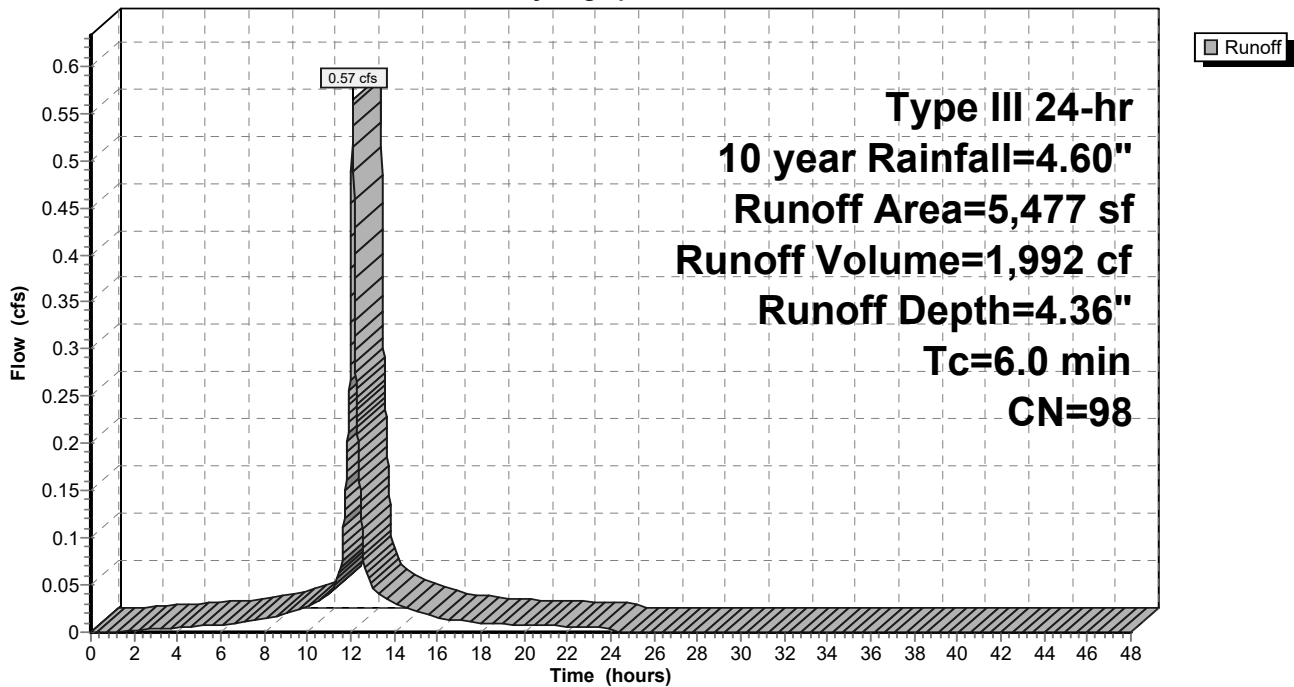
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year Rainfall=4.60"

Area (sf)	CN	Description
* 5,477	98	existing P-lot
5,477		100.00% Impervious Area

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

Subcatchment 3S: Existing Eagles P-Lot

Hydrograph



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Type III 24-hr 10 year Rainfall=4.60"

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Summary for Subcatchment 4S: St. John Street Entrance

Runoff = 2.14 cfs @ 12.09 hrs, Volume= 6,613 cf, Depth= 2.63"

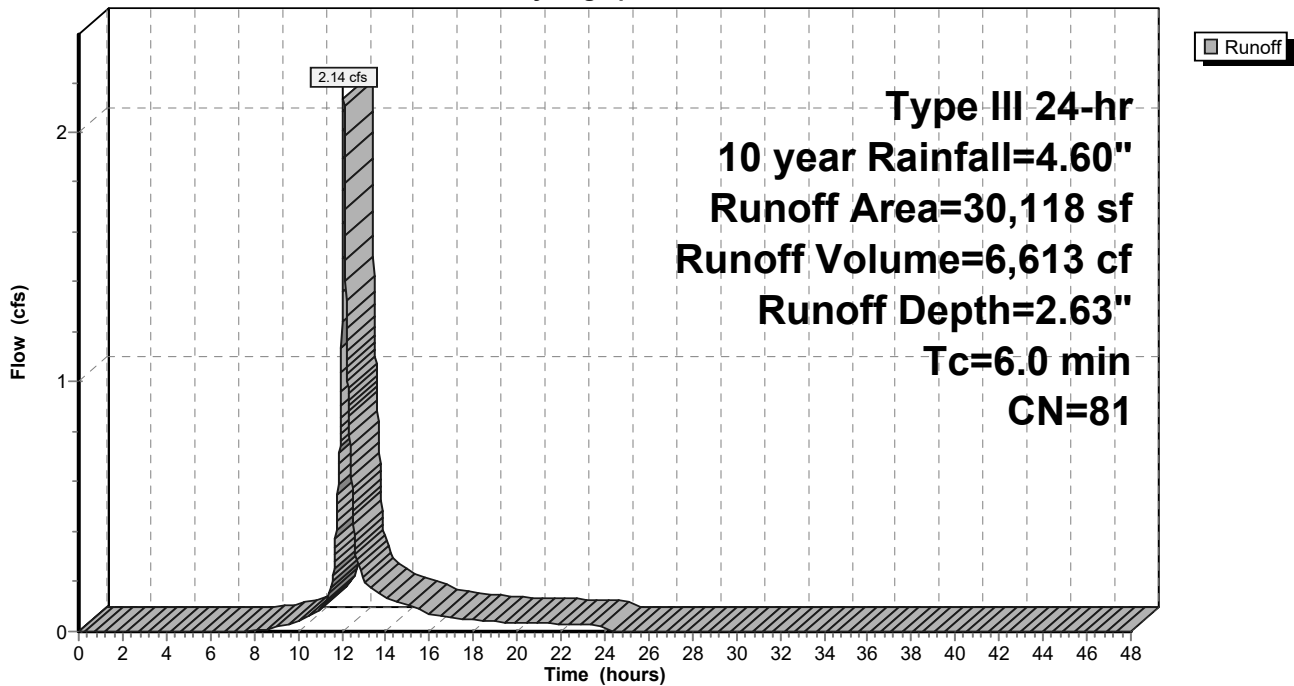
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year Rainfall=4.60"

	Area (sf)	CN	Description
*	9,319	98	New entrane drive and walks
	20,799	74	>75% Grass cover, Good, HSG C
	30,118	81	Weighted Average
	20,799		69.06% Pervious Area
	9,319		30.94% Impervious Area

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

Subcatchment 4S: St. John Street Entrance

Hydrograph



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Type III 24-hr 10 year Rainfall=4.60"

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Summary for Subcatchment 5S: Southern Drainage

Runoff = 1.45 cfs @ 12.08 hrs, Volume= 4,664 cf, Depth= 3.59"

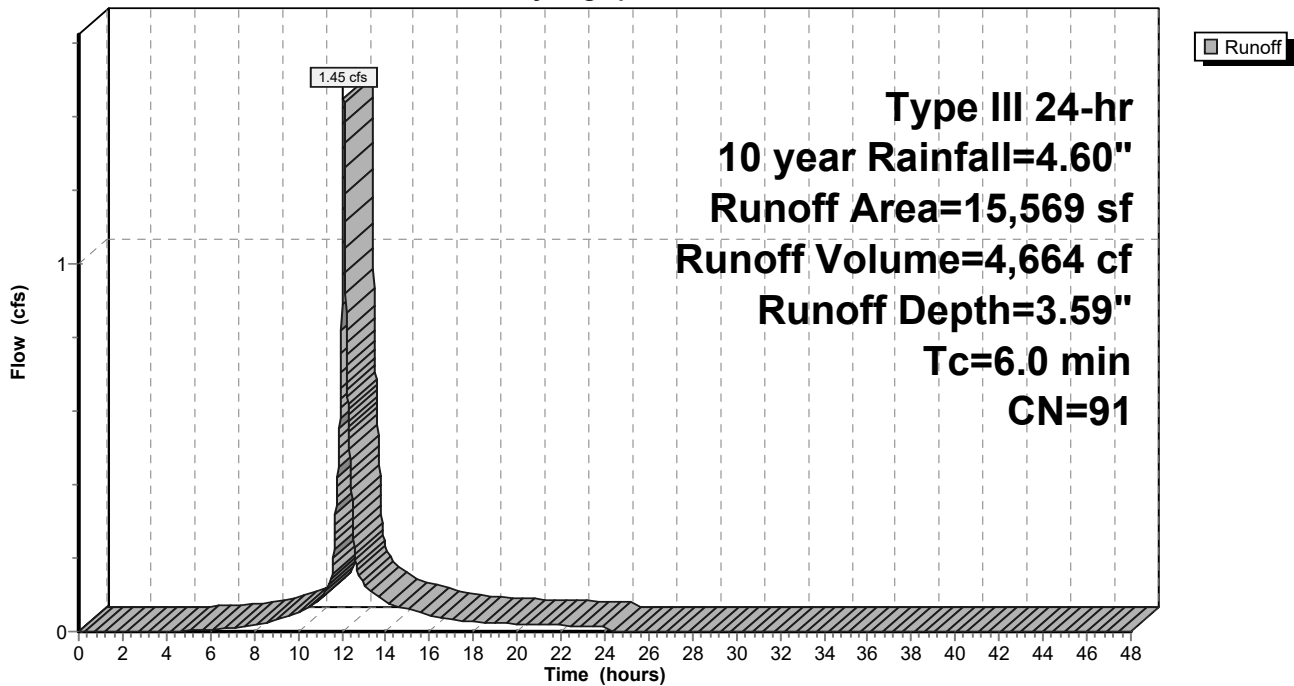
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year Rainfall=4.60"

	Area (sf)	CN	Description
*	11,050	89	Crushed Stone
*	3,715	98	Sidewalk
*	591	98	Eagles lot p-lot
*	213	89	eagles lot stone
	15,569	91	Weighted Average
	11,263		72.34% Pervious Area
	4,306		27.66% Impervious Area

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

Subcatchment 5S: Southern Drainage

Hydrograph



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Type III 24-hr 10 year Rainfall=4.60"

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Summary for Subcatchment 6S: Entrance Drive

Runoff = 1.10 cfs @ 12.07 hrs, Volume= 3,684 cf, Depth= 4.25"

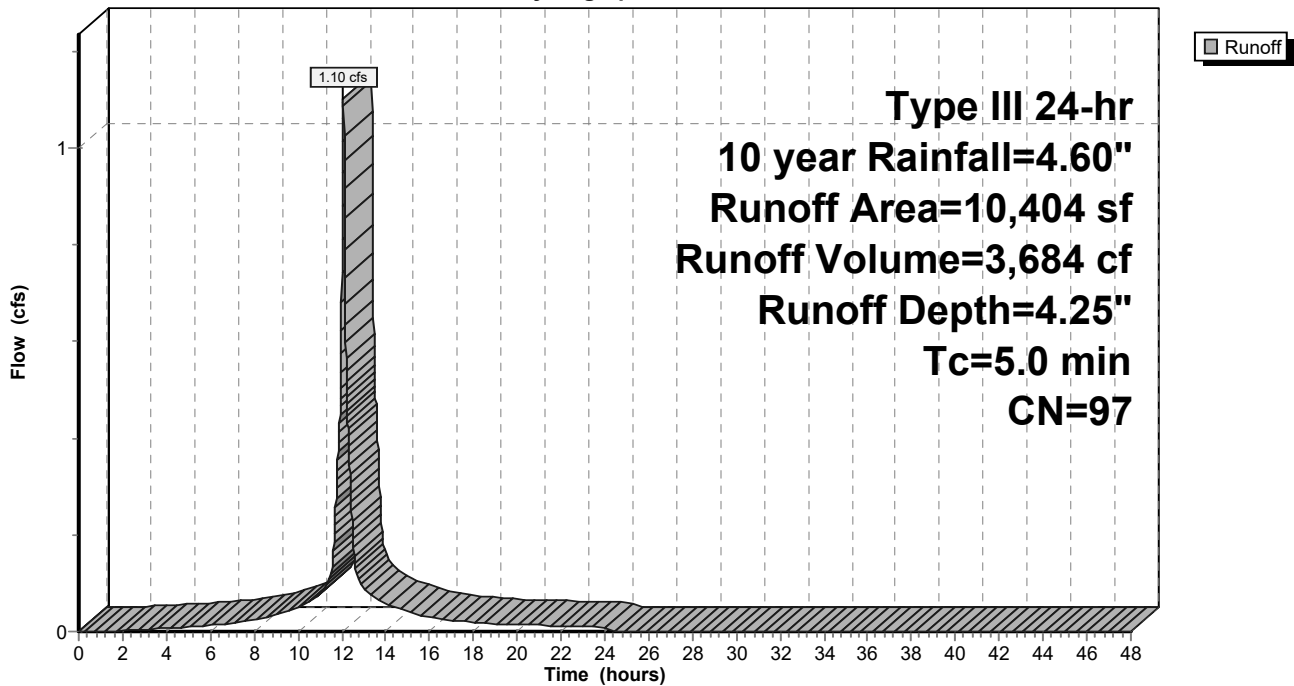
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10 year Rainfall=4.60"

	Area (sf)	CN	Description
*	9,891	98	Entrance Road
	513	84	50-75% Grass cover, Fair, HSG D
	10,404	97	Weighted Average
	513		4.93% Pervious Area
	9,891		95.07% Impervious Area

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

Subcatchment 6S: Entrance Drive

Hydrograph



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Type III 24-hr 10 year Rainfall=4.60"

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Summary for Subcatchment 7S: Lower Lot Bypass

Runoff = 2.99 cfs @ 12.08 hrs, Volume= 10,552 cf, Depth= 4.36"

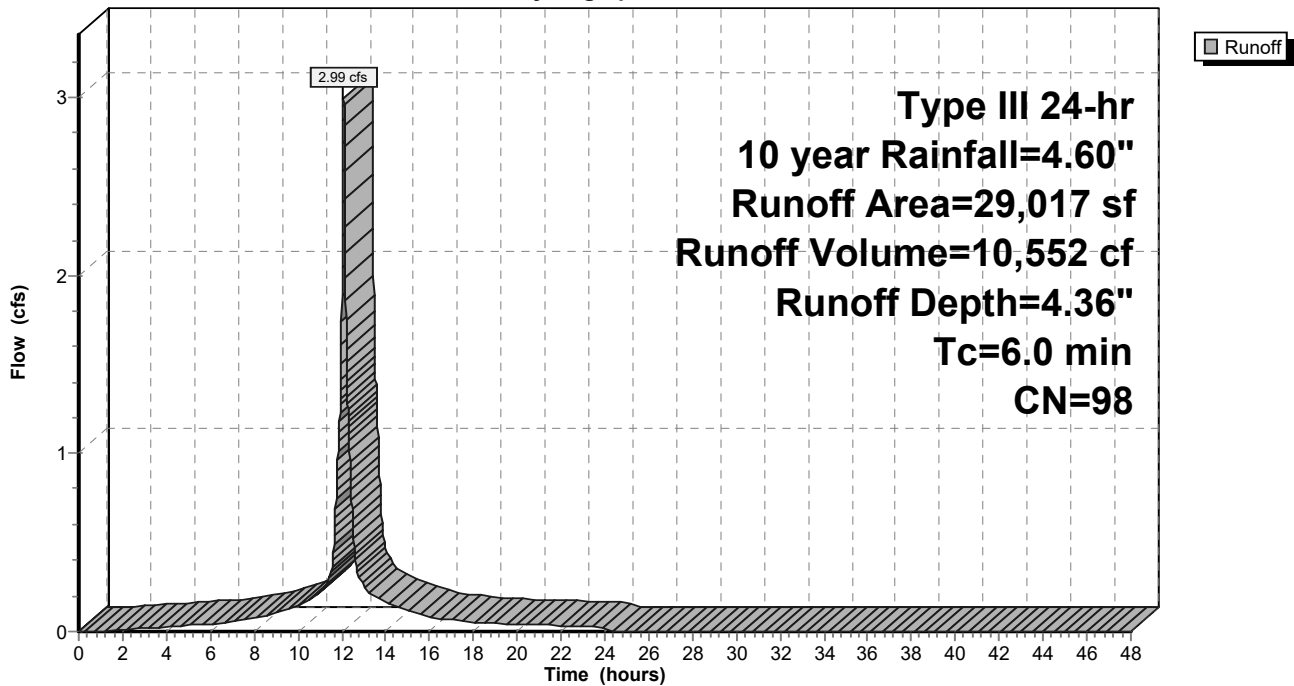
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10 year Rainfall=4.60"

	Area (sf)	CN	Description
*	28,534	98	Entrance Drive & Walks
*	483	79	Landscaped area
	29,017	98	Weighted Average
	483		1.66% Pervious Area
	28,534		98.34% Impervious Area

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

Subcatchment 7S: Lower Lot Bypass

Hydrograph



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Type III 24-hr 10 year Rainfall=4.60"

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Summary for Pond 1P: R-Tank

Inflow Area = 160,921 sf, 80.33% Impervious, Inflow Depth = 4.03" for 10 year event
 Inflow = 15.91 cfs @ 12.08 hrs, Volume= 54,102 cf
 Outflow = 9.28 cfs @ 12.18 hrs, Volume= 44,413 cf, Atten= 42%, Lag= 5.9 min
 Primary = 0.03 cfs @ 17.26 hrs, Volume= 4,534 cf
 Secondary = 9.26 cfs @ 12.18 hrs, Volume= 39,879 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 22.53' @ 12.19 hrs Surf.Area= 8,682 sf Storage= 21,974 cf

Plug-Flow detention time= 241.4 min calculated for 44,413 cf (82% of inflow)
 Center-of-Mass det. time= 169.5 min (934.2 - 764.8)

Volume	Invert	Avail.Storage	Storage Description
#1	19.58'	4,733 cf	Stone Envelope (Prismatic) Listed below (Recalc) 33,165 cf Overall - 21,333 cf Embedded = 11,832 cf x 40.0% Voids
#2	19.58'	20,267 cf	R-Tank Modules (Prismatic) Listed below (Recalc) Inside #1 21,333 cf Overall x 95.0% Voids
		24,999 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
19.58	8,682	0	0
23.40	8,682	33,165	33,165

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
19.58	7,565	0	0
22.40	7,565	21,333	21,333

Device	Routing	Invert	Outlet Devices
#1	Primary	19.58'	15.0" Round Culvert L= 15.0' Ke= 0.500 Inlet / Outlet Invert= 19.58' / 19.58' S= 0.0000 '/ Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	19.58'	1.0" Vert. Orifice/Grate C= 0.600
#3	Device 2	19.75'	1.7" Vert. Orifice/Grate C= 0.600
#4	Secondary	21.13'	15.0" Round Culvert X 2.00 L= 15.0' Ke= 0.500 Inlet / Outlet Invert= 21.13' / 21.00' S= 0.0087 '/ Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.03 cfs @ 17.26 hrs HW=21.34' TW=19.62' (Dynamic Tailwater)

- ↑1=Culvert (Passes 0.03 cfs of 5.25 cfs potential flow)
- ↑2=Orifice/Grate (Orifice Controls 0.03 cfs @ 6.31 fps)
- ↑3=Orifice/Grate (Passes 0.03 cfs of 0.09 cfs potential flow)

Secondary OutFlow Max=9.26 cfs @ 12.18 hrs HW=22.53' TW=21.90' (Dynamic Tailwater)

- ↑4=Culvert (Barrel Controls 9.26 cfs @ 4.22 fps)

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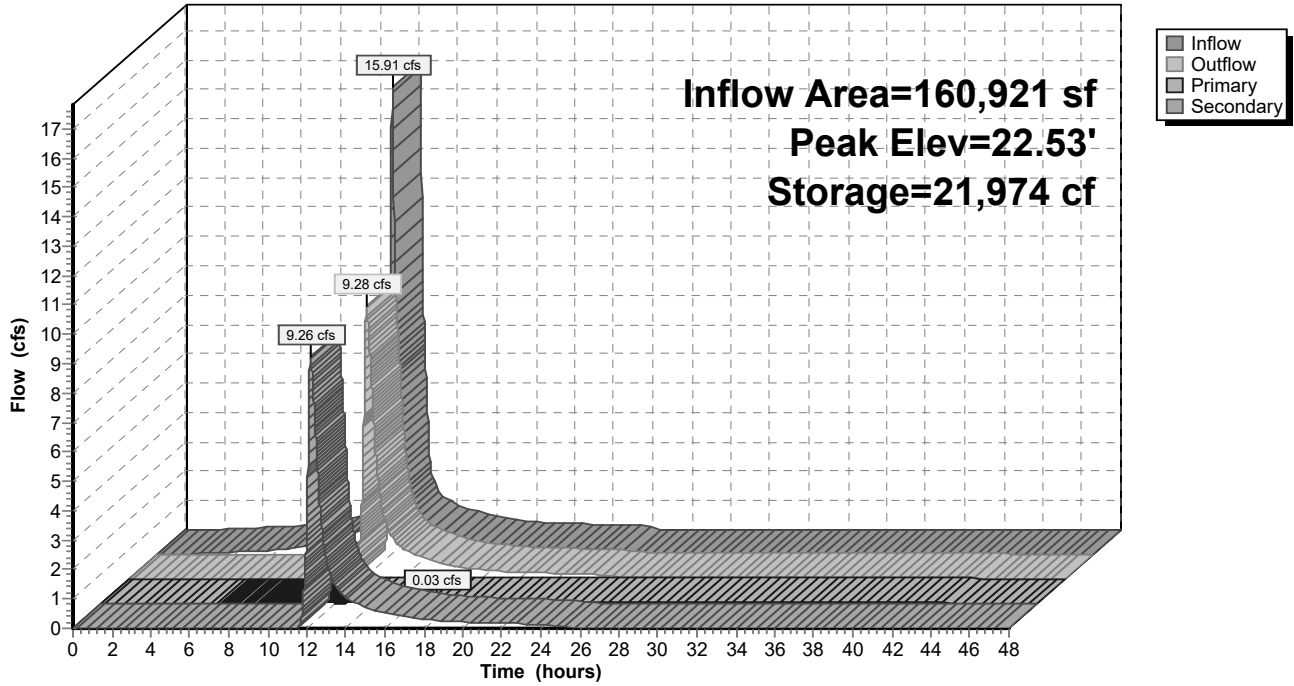
Type III 24-hr 10 year Rainfall=4.60"

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Pond 1P: R-Tank

Hydrograph



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Type III 24-hr 10 year Rainfall=4.60"

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Summary for Pond DMH: New DMH

Inflow Area = 160,921 sf, 80.33% Impervious, Inflow Depth > 3.31" for 10 year event
Inflow = 9.28 cfs @ 12.18 hrs, Volume= 44,413 cf
Outflow = 9.28 cfs @ 12.18 hrs, Volume= 44,413 cf, Atten= 0%, Lag= 0.0 min
Primary = 9.28 cfs @ 12.18 hrs, Volume= 44,413 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2

Peak Elev= 21.91' @ 12.18 hrs

Flood Elev= 26.00'

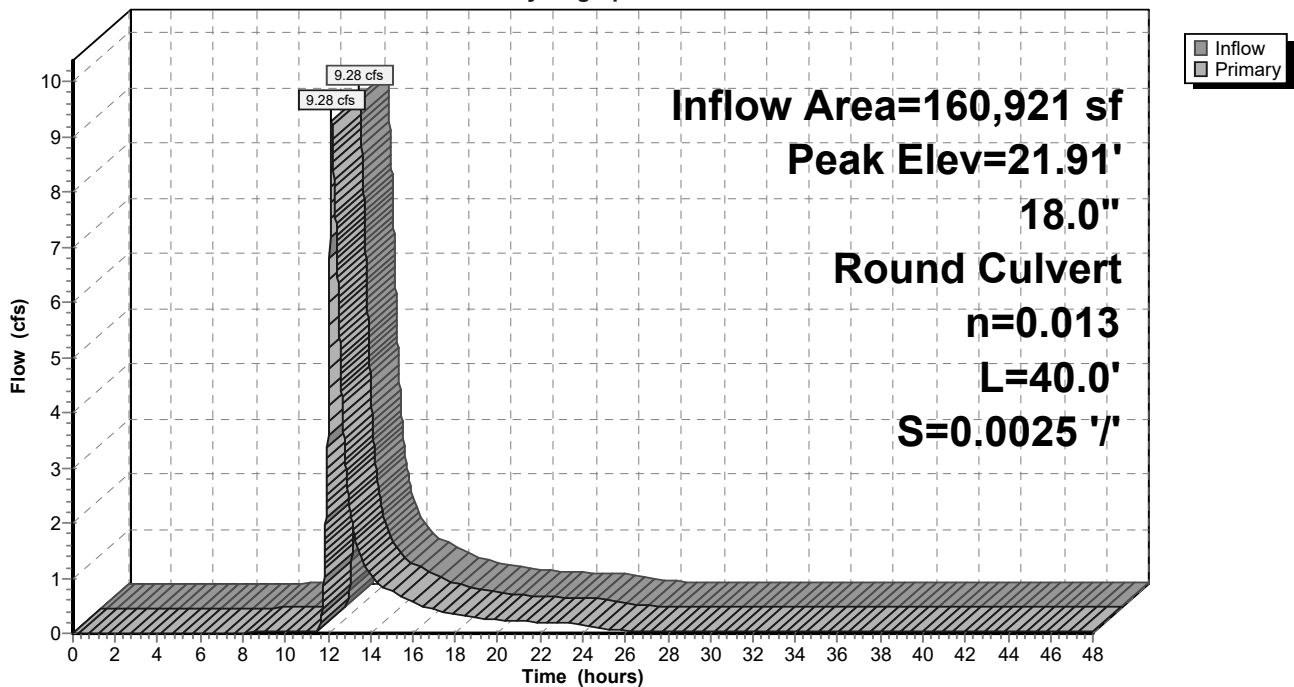
Device	Routing	Invert	Outlet Devices
#1	Primary	19.25'	18.0" Round Culvert L= 40.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 19.25' / 19.15' S= 0.0025 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=9.27 cfs @ 12.18 hrs HW=21.90' TW=0.00' (Dynamic Tailwater)

↑1=Culvert (Inlet Controls 9.27 cfs @ 5.25 fps)

Pond DMH: New DMH

Hydrograph



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Type III 24-hr 10 year Rainfall=4.60"

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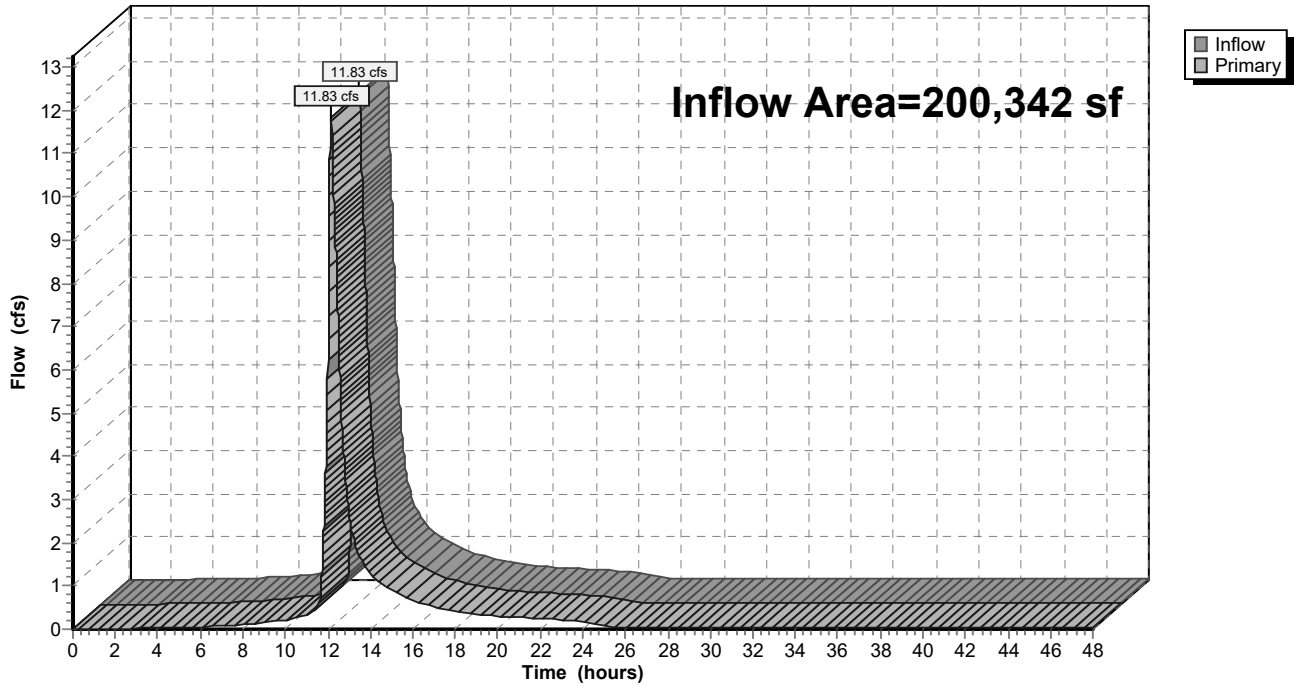
Summary for Link SP1: Existing 18" SD System

Inflow Area = 200,342 sf, 83.70% Impervious, Inflow Depth > 3.51" for 10 year event
Inflow = 11.83 cfs @ 12.16 hrs, Volume= 58,649 cf
Primary = 11.83 cfs @ 12.16 hrs, Volume= 58,649 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link SP1: Existing 18" SD System

Hydrograph



Post-Development

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Type III 24-hr 10 year Rainfall=4.60"

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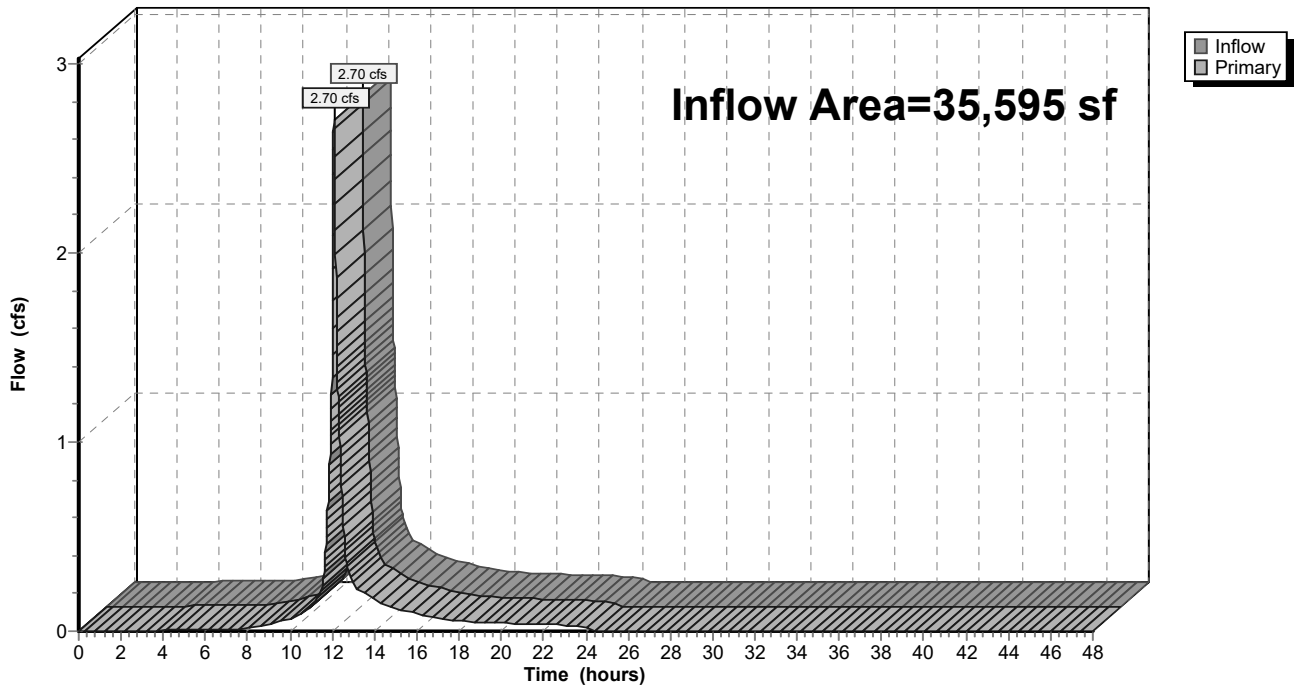
Summary for Link SP2: 30" Storm Drain

Inflow Area = 35,595 sf, 41.57% Impervious, Inflow Depth = 2.90" for 10 year event
Inflow = 2.70 cfs @ 12.09 hrs, Volume= 8,605 cf
Primary = 2.70 cfs @ 12.09 hrs, Volume= 8,605 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link SP2: 30" Storm Drain

Hydrograph



Post-Development

Type III 24-hr 25 year Rainfall=5.80"

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Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Parking Garage Runoff Area=92,011 sf 100.00% Impervious Runoff Depth=5.56"
Tc=6.0 min CN=98 Runoff=12.00 cfs 42,648 cf

Subcatchment2S: Lower Parking lot & Runoff Area=53,341 sf 61.76% Impervious Runoff Depth=4.76"
Tc=6.0 min CN=91 Runoff=6.48 cfs 21,166 cf

Subcatchment3S: Existing Eagles P-Lot Runoff Area=5,477 sf 100.00% Impervious Runoff Depth=5.56"
Tc=6.0 min CN=98 Runoff=0.71 cfs 2,539 cf

Subcatchment4S: St. John Street Entrance Runoff Area=30,118 sf 30.94% Impervious Runoff Depth=3.70"
Tc=6.0 min CN=81 Runoff=2.99 cfs 9,291 cf

Subcatchment5S: Southern Drainage Runoff Area=15,569 sf 27.66% Impervious Runoff Depth=4.76"
Tc=6.0 min CN=91 Runoff=1.89 cfs 6,178 cf

Subcatchment6S: Entrance Drive Runoff Area=10,404 sf 95.07% Impervious Runoff Depth=5.44"
Tc=5.0 min CN=97 Runoff=1.40 cfs 4,721 cf

Subcatchment7S: Lower Lot Bypass Runoff Area=29,017 sf 98.34% Impervious Runoff Depth=5.56"
Tc=6.0 min CN=98 Runoff=3.79 cfs 13,450 cf

Pond 1P: R-Tank Peak Elev=23.30' Storage=24,643 cf Inflow=20.37 cfs 69,991 cf
Primary=0.05 cfs 4,667 cf Secondary=14.68 cfs 56,063 cf Outflow=14.73 cfs 60,280 cf

Pond DMH: New DMH Peak Elev=24.81' Inflow=14.73 cfs 60,730 cf
18.0" Round Culvert n=0.013 L=40.0' S=0.0025 'l' Outflow=14.73 cfs 60,730 cf

Link SP1: Existing 18" SD System Inflow=18.94 cfs 78,900 cf
Primary=18.94 cfs 78,900 cf

Link SP2: 30" Storm Drain Inflow=3.70 cfs 11,830 cf
Primary=3.70 cfs 11,830 cf

Total Runoff Area = 235,937 sf Runoff Volume = 99,991 cf Average Runoff Depth = 5.09"
22.66% Pervious = 53,455 sf 77.34% Impervious = 182,482 sf

Post-Development

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Type III 24-hr 25 year Rainfall=5.80"

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Summary for Subcatchment 1S: Parking Garage

Runoff = 12.00 cfs @ 12.08 hrs, Volume= 42,648 cf, Depth= 5.56"

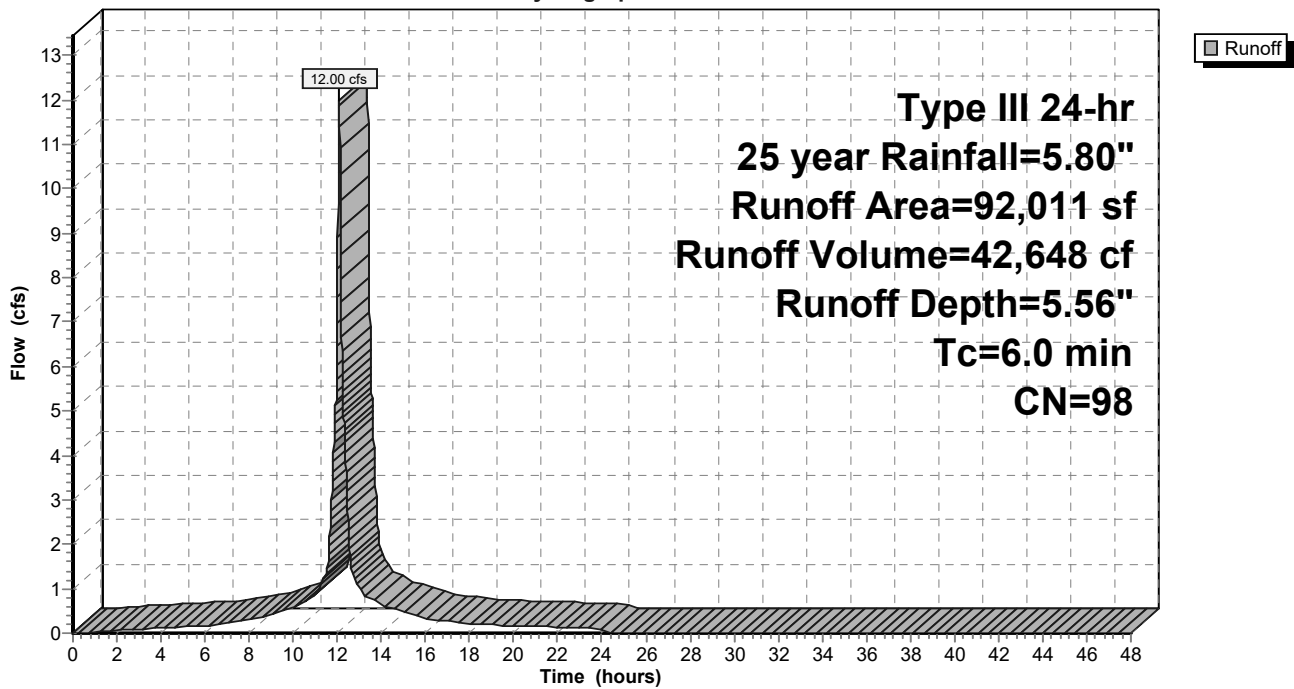
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year Rainfall=5.80"

Area (sf)	CN	Description
89,825	98	Paved parking, HSG B
2,186	98	Roofs, HSG B
92,011	98	Weighted Average
92,011		100.00% Impervious Area

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

Subcatchment 1S: Parking Garage

Hydrograph



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Type III 24-hr 25 year Rainfall=5.80"

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Summary for Subcatchment 2S: Lower Parking lot & Landscaping

Runoff = 6.48 cfs @ 12.08 hrs, Volume= 21,166 cf, Depth= 4.76"

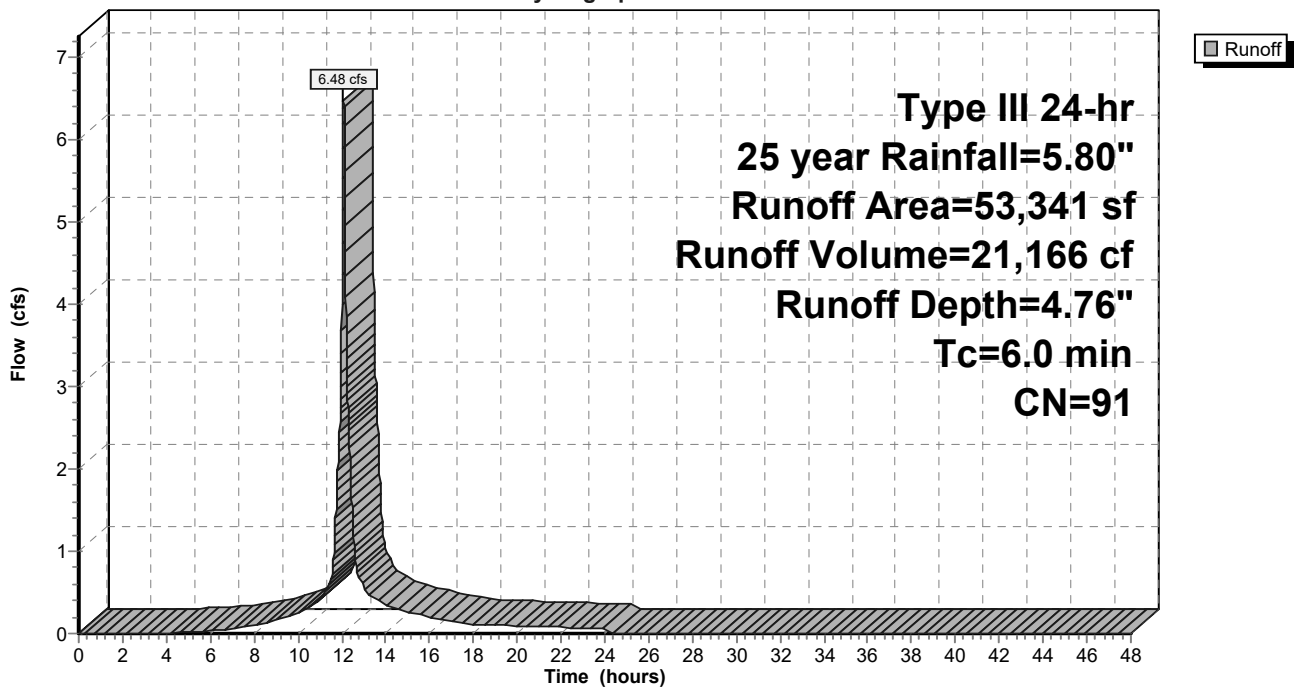
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25 year Rainfall=5.80"

	Area (sf)	CN	Description
*	32,944	98	Paved Parking Lot
	20,397	80	>75% Grass cover, Good, HSG D
	53,341	91	Weighted Average
	20,397		38.24% Pervious Area
	32,944		61.76% Impervious Area

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

Subcatchment 2S: Lower Parking lot & Landscaping

Hydrograph



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Type III 24-hr 25 year Rainfall=5.80"

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Summary for Subcatchment 3S: Existing Eagles P-Lot

Runoff = 0.71 cfs @ 12.08 hrs, Volume= 2,539 cf, Depth= 5.56"

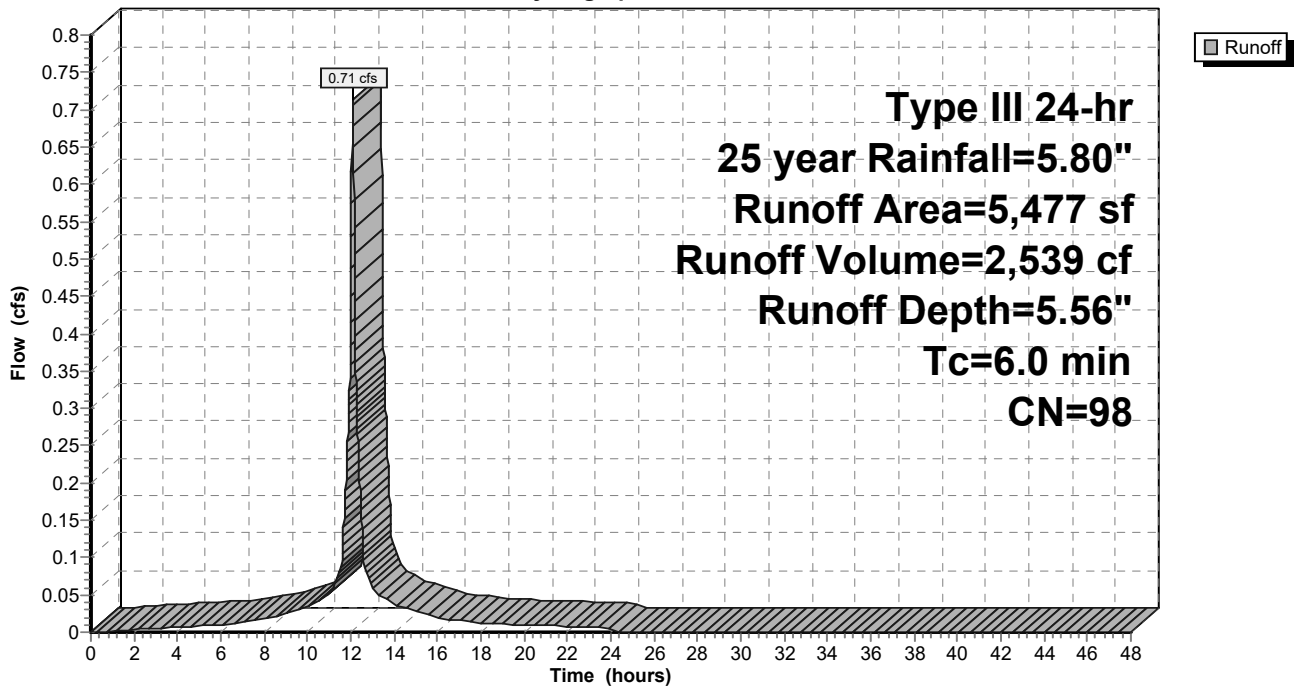
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year Rainfall=5.80"

Area (sf)	CN	Description
* 5,477	98	existing P-lot
5,477		100.00% Impervious Area

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

Subcatchment 3S: Existing Eagles P-Lot

Hydrograph



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Type III 24-hr 25 year Rainfall=5.80"

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Summary for Subcatchment 4S: St. John Street Entrance

Runoff = 2.99 cfs @ 12.09 hrs, Volume= 9,291 cf, Depth= 3.70"

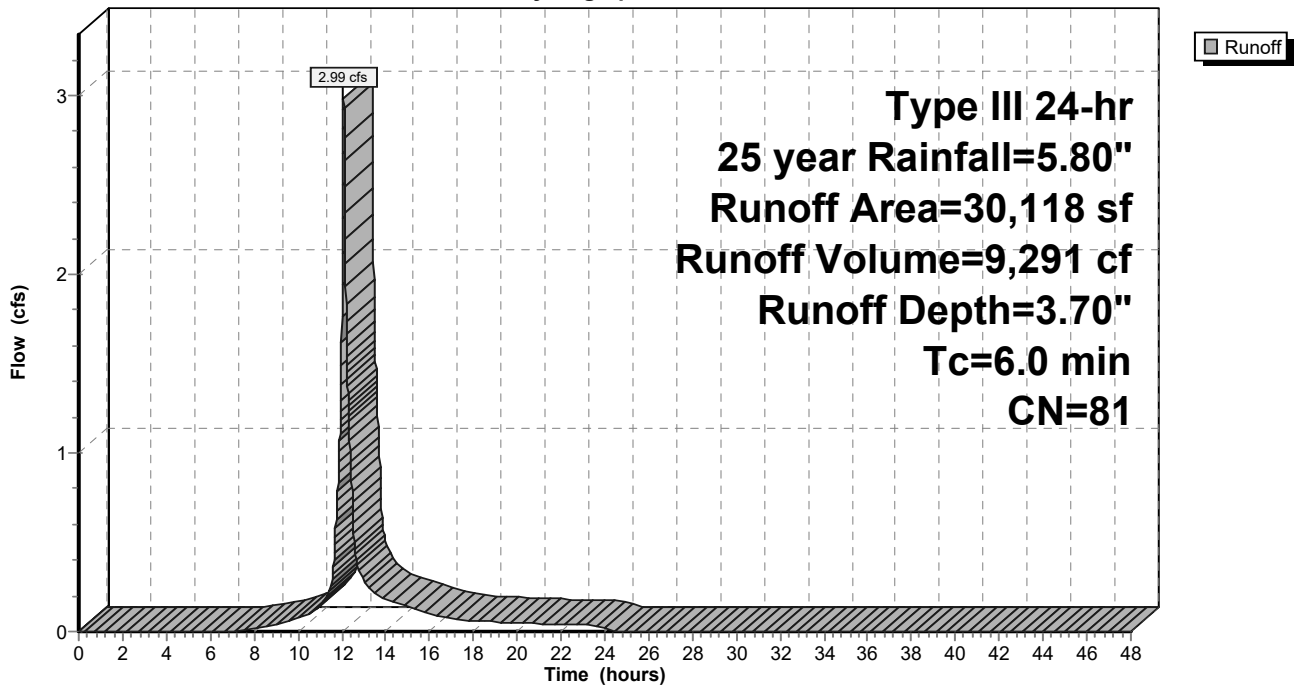
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25 year Rainfall=5.80"

	Area (sf)	CN	Description
*	9,319	98	New entrane drive and walks
	20,799	74	>75% Grass cover, Good, HSG C
	30,118	81	Weighted Average
	20,799		69.06% Pervious Area
	9,319		30.94% Impervious Area

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

Subcatchment 4S: St. John Street Entrance

Hydrograph



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Type III 24-hr 25 year Rainfall=5.80"

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Summary for Subcatchment 5S: Southern Drainage

Runoff = 1.89 cfs @ 12.08 hrs, Volume= 6,178 cf, Depth= 4.76"

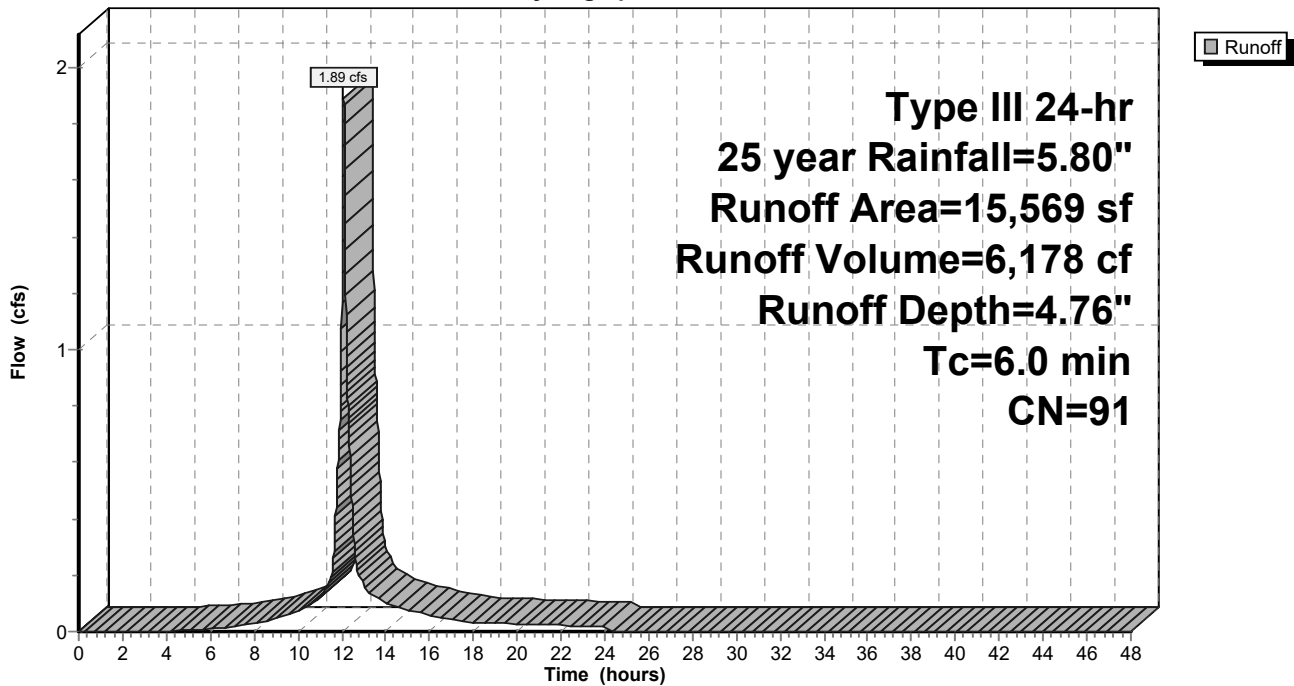
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year Rainfall=5.80"

	Area (sf)	CN	Description
*	11,050	89	Crushed Stone
*	3,715	98	Sidewalk
*	591	98	Eagles lot p-lot
*	213	89	eagles lot stone
	15,569	91	Weighted Average
	11,263		72.34% Pervious Area
	4,306		27.66% Impervious Area

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

Subcatchment 5S: Southern Drainage

Hydrograph



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Type III 24-hr 25 year Rainfall=5.80"

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Summary for Subcatchment 6S: Entrance Drive

Runoff = 1.40 cfs @ 12.07 hrs, Volume= 4,721 cf, Depth= 5.44"

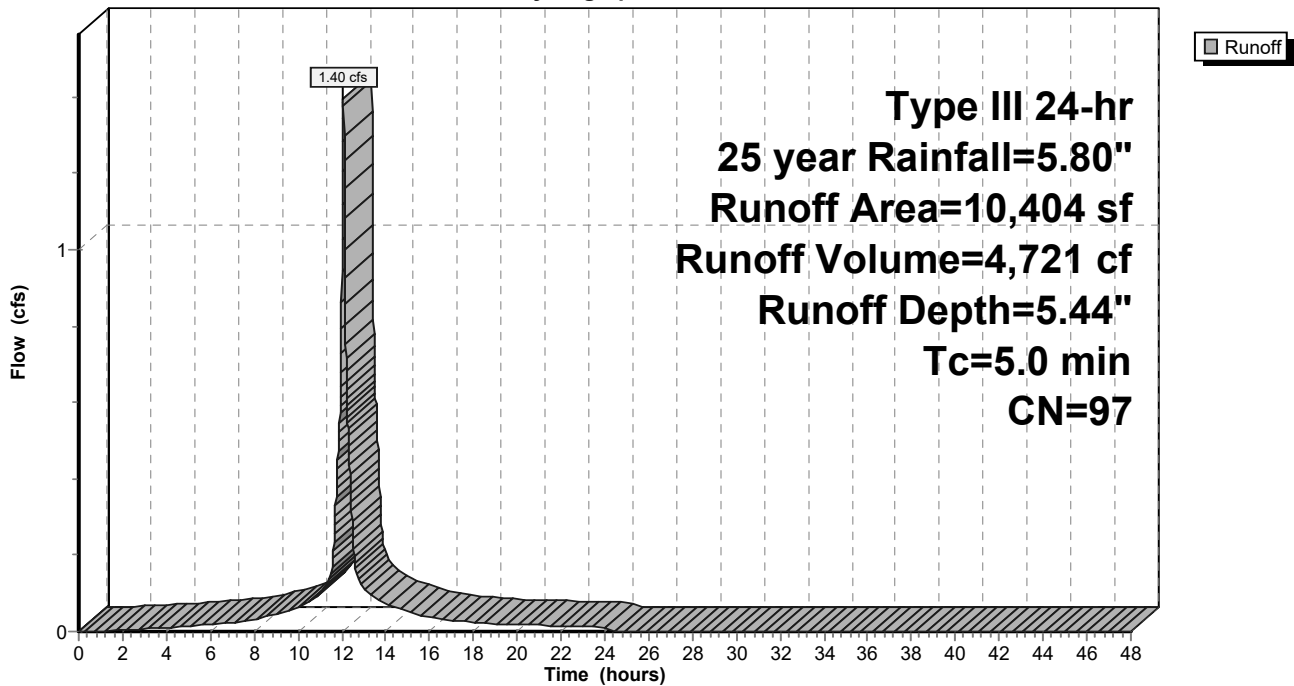
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year Rainfall=5.80"

	Area (sf)	CN	Description
*	9,891	98	Entrance Road
	513	84	50-75% Grass cover, Fair, HSG D
	10,404	97	Weighted Average
	513		4.93% Pervious Area
	9,891		95.07% Impervious Area

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

Subcatchment 6S: Entrance Drive

Hydrograph



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Type III 24-hr 25 year Rainfall=5.80"

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Summary for Subcatchment 7S: Lower Lot Bypass

Runoff = 3.79 cfs @ 12.08 hrs, Volume= 13,450 cf, Depth= 5.56"

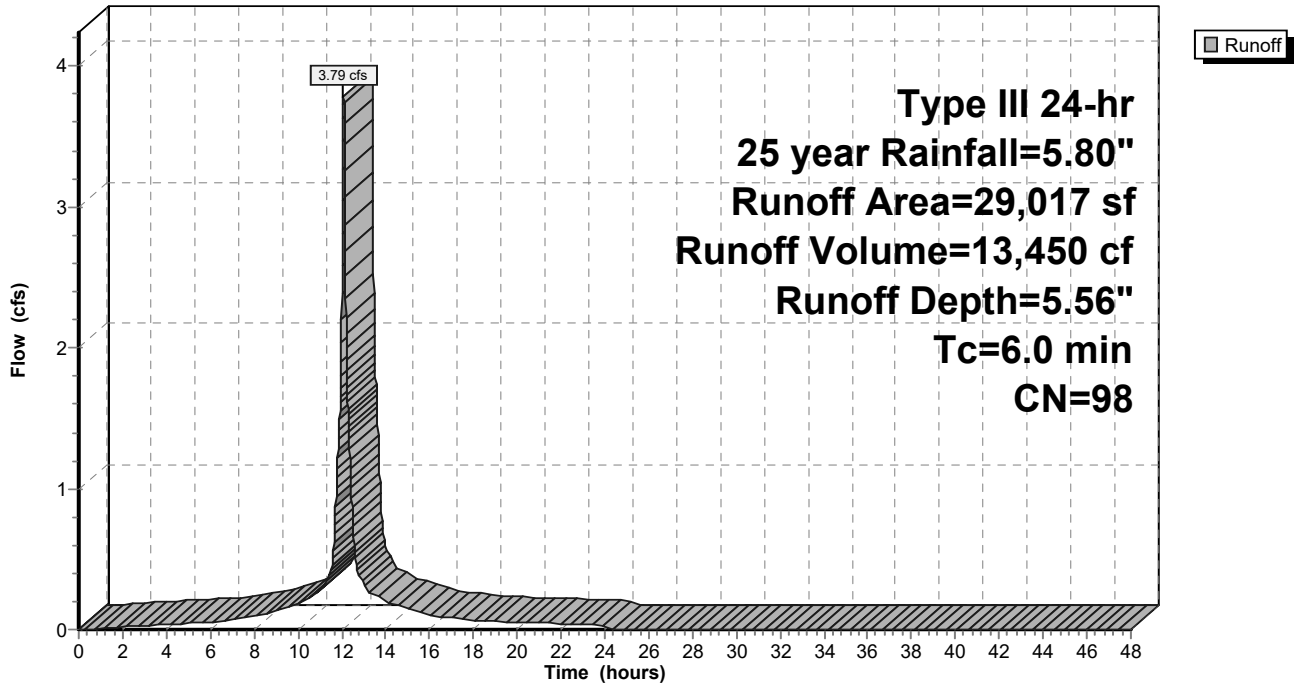
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year Rainfall=5.80"

	Area (sf)	CN	Description
*	28,534	98	Entrance Drive & Walks
*	483	79	Landscaped area
	29,017	98	Weighted Average
	483		1.66% Pervious Area
	28,534		98.34% Impervious Area

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

Subcatchment 7S: Lower Lot Bypass

Hydrograph



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Summary for Pond 1P: R-Tank

Inflow Area = 160,921 sf, 80.33% Impervious, Inflow Depth = 5.22" for 25 year event
 Inflow = 20.37 cfs @ 12.08 hrs, Volume= 69,991 cf
 Outflow = 14.73 cfs @ 12.16 hrs, Volume= 60,280 cf, Atten= 28%, Lag= 4.5 min
 Primary = 0.05 cfs @ 12.16 hrs, Volume= 4,667 cf
 Secondary = 14.68 cfs @ 12.16 hrs, Volume= 56,063 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 23.30' @ 12.16 hrs Surf.Area= 8,682 sf Storage= 24,643 cf

Plug-Flow detention time= 202.0 min calculated for 60,280 cf (86% of inflow)
 Center-of-Mass det. time= 140.3 min (900.2 - 759.9)

Volume	Invert	Avail.Storage	Storage Description
#1	19.58'	4,733 cf	Stone Envelope (Prismatic) Listed below (Recalc) 33,165 cf Overall - 21,333 cf Embedded = 11,832 cf x 40.0% Voids
#2	19.58'	20,267 cf	R-Tank Modules (Prismatic) Listed below (Recalc) Inside #1 21,333 cf Overall x 95.0% Voids
		24,999 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
19.58	8,682	0	0
23.40	8,682	33,165	33,165

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
19.58	7,565	0	0
22.40	7,565	21,333	21,333

Device	Routing	Invert	Outlet Devices
#1	Primary	19.58'	15.0" Round Culvert L= 15.0' Ke= 0.500 Inlet / Outlet Invert= 19.58' / 19.58' S= 0.0000 ' / Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	19.58'	1.0" Vert. Orifice/Grate C= 0.600
#3	Device 2	19.75'	1.7" Vert. Orifice/Grate C= 0.600
#4	Secondary	21.13'	15.0" Round Culvert X 2.00 L= 15.0' Ke= 0.500 Inlet / Outlet Invert= 21.13' / 21.00' S= 0.0087 ' / Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 12.16 hrs HW=23.30' TW=24.80' (Dynamic Tailwater)

- ↑1=Culvert (Controls 0.00 cfs)
- ↑2=Orifice/Grate (Controls 0.00 cfs)
- ↑3=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 12.16 hrs HW=23.30' TW=24.80' (Dynamic Tailwater)

- ↑4=Culvert (Controls 0.00 cfs)

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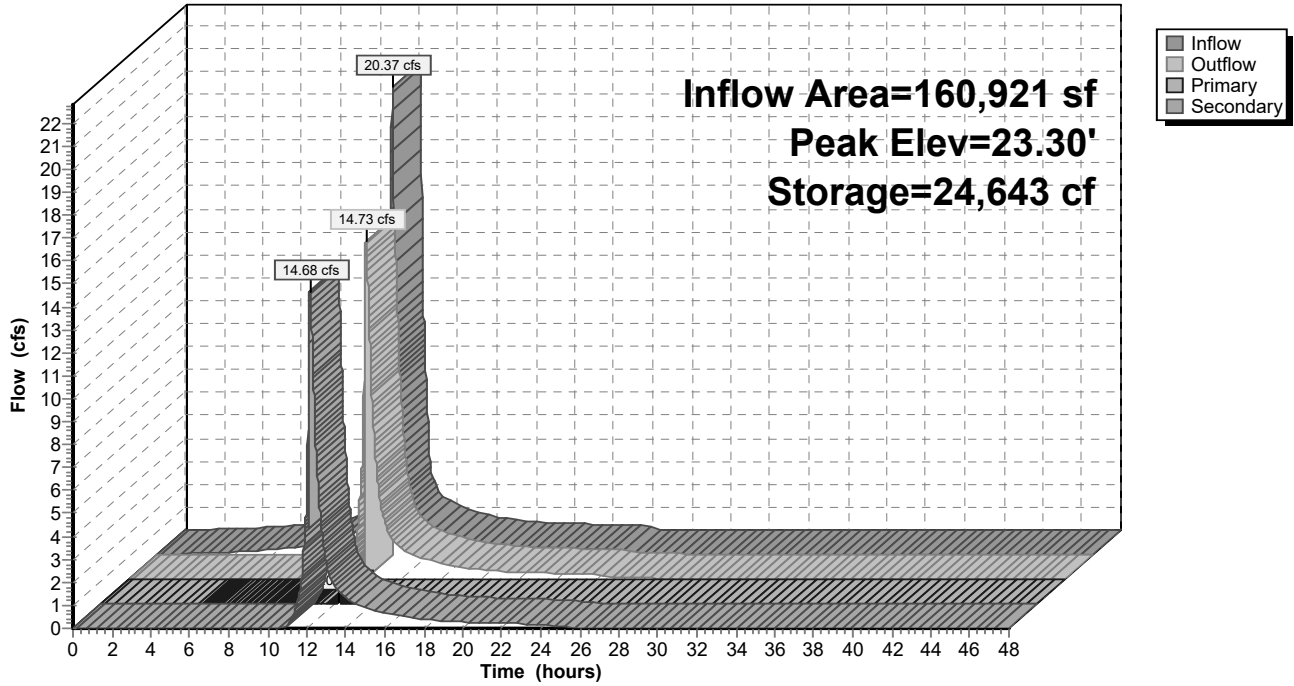
Type III 24-hr 25 year Rainfall=5.80"

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Pond 1P: R-Tank

Hydrograph



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Summary for Pond DMH: New DMH

Inflow Area = 160,921 sf, 80.33% Impervious, Inflow Depth > 4.53" for 25 year event
Inflow = 14.73 cfs @ 12.16 hrs, Volume= 60,730 cf
Outflow = 14.73 cfs @ 12.16 hrs, Volume= 60,730 cf, Atten= 0%, Lag= 0.0 min
Primary = 14.73 cfs @ 12.16 hrs, Volume= 60,730 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2

Peak Elev= 24.81' @ 12.16 hrs

Flood Elev= 26.00'

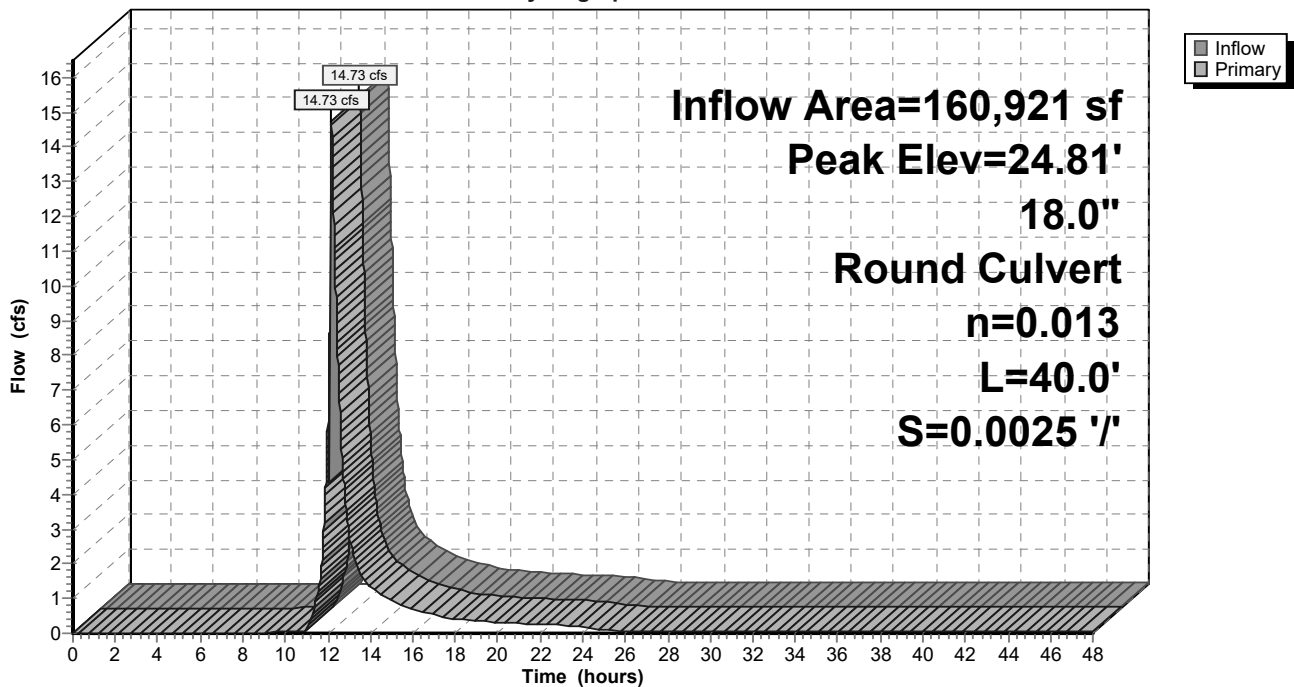
Device	Routing	Invert	Outlet Devices
#1	Primary	19.25'	18.0" Round Culvert L= 40.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 19.25' / 19.15' S= 0.0025 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=14.72 cfs @ 12.16 hrs HW=24.80' TW=0.00' (Dynamic Tailwater)

↑1=Culvert (Inlet Controls 14.72 cfs @ 8.33 fps)

Pond DMH: New DMH

Hydrograph



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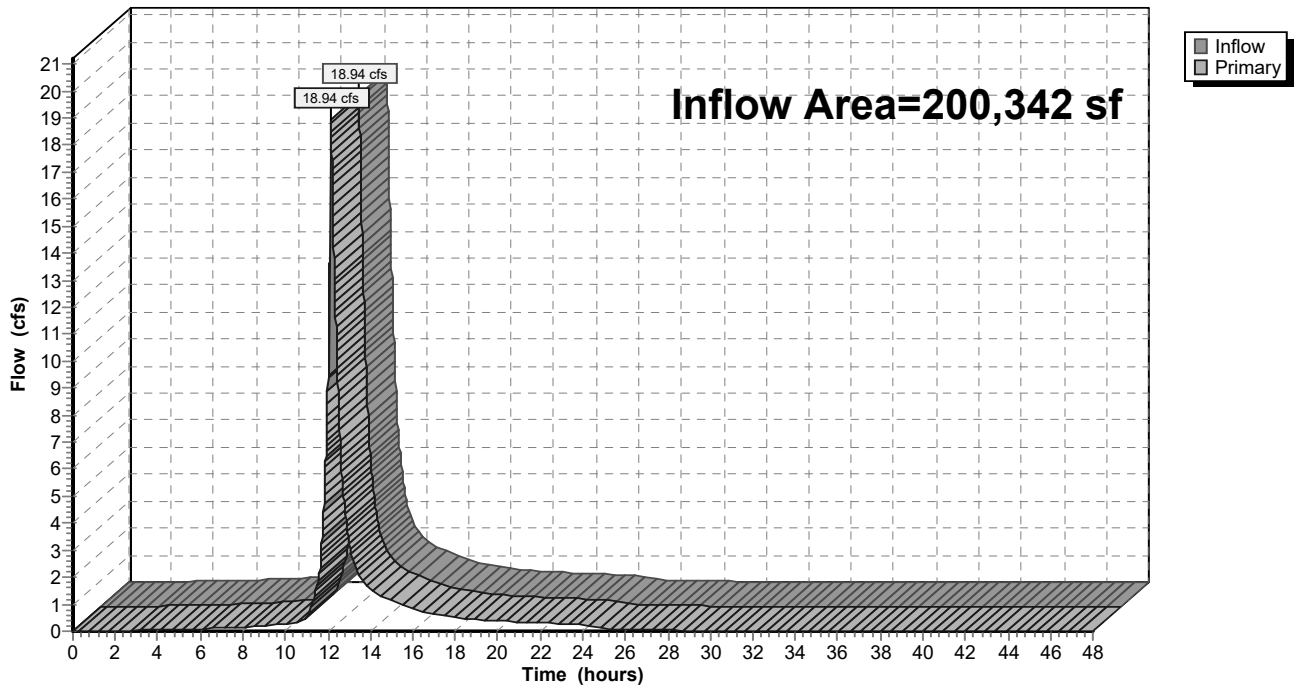
Summary for Link SP1: Existing 18" SD System

Inflow Area = 200,342 sf, 83.70% Impervious, Inflow Depth > 4.73" for 25 year event
Inflow = 18.94 cfs @ 12.12 hrs, Volume= 78,900 cf
Primary = 18.94 cfs @ 12.12 hrs, Volume= 78,900 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link SP1: Existing 18" SD System

Hydrograph



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Type III 24-hr 25 year Rainfall=5.80"

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Summary for Link SP2: 30" Storm Drain

Inflow Area = 35,595 sf, 41.57% Impervious, Inflow Depth = 3.99" for 25 year event
Inflow = 3.70 cfs @ 12.09 hrs, Volume= 11,830 cf
Primary = 3.70 cfs @ 12.09 hrs, Volume= 11,830 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link SP2: 30" Storm Drain

Hydrograph

