MANSFIELD
CONNECTICUT

Inland Wetlands Agency
March 16, 2020, 6:30 PM

Council Chamber | Audrey P. Beck Municipal Building
4 So. Eagleville Road, Mansfield, CT

Page

SPECIAL MEETING AGENDA

1. CALL TO ORDER AND ROLL CALL

2. APPROVAL OF MINUTES

A. March 2, 2020 Minutes 3 - 5
03-02-2020 IWA Minutes-Draft

B. March 4, 2020 Minutes 6 - 11
03-04-2020 IWA Minutes-Draft

3. COMMUNICATIONS

4. PUBLIC HEARINGS

5. OLD BUSINESS

A. W1612- Application of the Mansfield Non-Profit Housing Development Corporation (owner/applicant) for a multifamily development at 113-121 S. Eagleville Rd (Parcel ID 16.57.5) 12 - 477

W1612 Legal Notice
W1612 Legal Notice Proof
W1612-113-121 S. Eagleville Rd-Multifamily Development-Mansfield Non-Profit Housing Authority-PH Staff Memo
W1612 Wetlands Application
W1612 Wetlands Report
W1612 Eagleville Green Site Plans Revised thru 03-02-2020
W1612 Stormwater Management Report_Eagleville Green Revised through 03-02-20
W1612 C-4.0 GRADING & DRAINAGE PLAN_REV4 02-26-2020
W1611-1 HydroCAD Calculations REV 02-26-2020
W1612 Geotechnical Report
W1612 CME Wetland Review Letter 02-28-2020
W1612-02-25-20 Applicant Response to CME 02-19-2020
W1612- Eagleville Green Wetlands Clarification
W1612 CME Wetland Review Letter 02-19-2020
W1612- BSC Response to CME Comments 02-12-2020
W1612- CME Wetland Review-Letter-12-23-2019
W1612 UConn Letter re Eagleville Green 2 March 2020

6. NEW BUSINESS

7. **OTHER COMMUNICATIONS AND BILLS**

8. **REPORTS FROM OFFICERS AND COMMITTEES**

9. **ADJOURNMENT**

MINUTES (Draft)

Members Present:	S. Accorsi, B. Chandy, L. Cooley, D. Plante, K. Rawn, V. Ward
Members Absent:	P. Aho, C. Cotton, R. Hall
Alternates Present:	J. DeVivo, K. Fratoni
Staff Present:	J. Kaufman, Senior Planner/Inland Wetlands Agent; J. Wooodmansee, Planning Specialist

CALL TO ORDER AND ROLL CALL

Acting Chair Rawn called the meeting to order at 6:32 p.m. Members present are Accorsi, Chandy, Cooley, Plante, Rawn, and Ward. Alternates DeVivo and Fratoni are seated for absent members.

Kaufman presented members with an Agenda Item to add under New Business.

Ward MOVED, Chandy seconded, to add under Old Business B a revised motion for Jurisdictional Ruling (J-19) for proposed Timber Harvest located at 488-500 Mansfield Avenue. Motion PASSED unanimously.

APPROVAL OF MINUTES

Chandy MOVED, Plante seconded, to approve the February 3, 2020, meeting Minutes with the correction that the address be corrected from 488-500 Pleasant Valley Road to 488-500 Mansfield Avenue. Motion PASSED unanimously.

PUBLIC HEARINGS

A. 6:30 PM – W1612 – Application of the Mansfield non-Profit Housing Development Corporation (owner/applicant) for a multifamily development at 113-121 S. Eagleville Rd. (Parcel ID 16.57.5)

Rawn opened the Public Hearing at 6:34 p.m. Members present are Accorsi, Chandy, Cooley, Plante, Rawn and Ward. Alternate members DeVivo and Fratoni are seated for absent members. J. Kaufman read the Legal Notice that was published in *The Chronicle* on 2-18-2020 and 02-26-2020. Kaufman noted two additional documents, the 02-26-2020 Draft Minutes from the Conservation Commission that speak to this application and the letter from UConn dated 03-02-2020.

Kathy Dorgan of Dorgan Architecture and Planning and Robert Newton of BSC Group are present on behalf of the applicant. Dorgan gave an overview of the project including site design, driveway, structure on the property that will remain, design of buildings and different unit configurations. Newton gave an overview of the site in relation to the wetlands, stating that approximately 1 acre of the project will be developed within the upland review area. He noted grade changes, stormwater collection systems, detention basins and outlets, test pit data and

that public water and sewer will serve the site. He indicated that he is submitting the revised stormwater management plan.

Chuck Eaton from CHA and James Sipperly, Soil Scientist, are present on behalf of the Agency. Sipperly discussed the wetland delineation. During the site visit he noted standing water and vegetation that may have been indicative of a wetland. This issue has since been resolved by the applicant's soil scientist. . Sipperly discussed recommendations with regard to native plantings, fertilizer, snow removal and de-icing materials. He also noted the importance of sedimentation and erosion controls during construction and regular reporting.

There were no speakers from the public regarding this application.

Ward questioned if best practices regarding protection of the wetlands would be applied during construction. Newton responded that the maintenance schedule is listed on the plans and that the applicant is agreeable to reporting.

Rawn questioned the use of fertilizer at the site and Newton responded that the landscape plan calls for native plantings for a low maintenance landscape. Newton also reviewed the snow stockpile locations on the site plan and indicated that they had been moved further away from wetlands than on previous plans.

Ward MOVED, Plante seconded to close the public hearing at 7:12 p.m.

OLD BUSINESS

A. W1612 – Application of the Mansfield non-Profit Housing Development Corporation (owner/applicant) for a multifamily development at 113-121 S. Eagleville Rd. (Parcel ID 16.57.5)

Ward MOVED, Cooley seconded, to schedule a special meeting on March 16, 2020 at 6:30 pm in the Council Chamber, A.P. Beck Municipal Building, 4 South Eagleville Road to discuss the Inland Wetlands Application of the Mansfield Non-Profit Housing Corporation (owner/applicant) for a multifamily development at 113-121 S. Eagleville Rd. (Parcel ID 16.57.5) IWA File 1612). Motion PASSED unanimously.

NEW BUSINESS

A. J-20-Town of Mansfield Parks and Recreation Department Request for Jurisdictional Ruling – Footbridges at Simpson-Wood Preserve (Assessor's Parcel ID 19.70.-2.1)

Chandy MOVED, Fratoni seconded, to approve a Jurisdictional Ruling finding that the installation of a 4-foot by 40-foot footbridge and a foot bridge consisting of 6, 8 foot preconstruction wooden walkway at Simpson-Wood Preserve on land owned by the Town of Mansfield (Assessor's Parcel ID 19.70.2-1)(IWA File # J-20) as shown on a map dated 2/27/2020 and as described in the associated attachments is permitted as a non-regulated activity pursuant to Section 4 of the Inland Watercourses and Wetlands Regulations of the Town of Mansfield. Motion PASSED unanimously.

B. J-19 – Application of J. Randazzo for a Jurisdictional Ruling to Conduct a Timber Harvest at 488-500 Mansfield Avenue- Assessor's Parcel ID 37.93.4 (File J-19)

L. Cooley MOVED, Fratoni seconded, to approve a finding that the proposed timber harvest (IWA File #J-19) located at 488-500 Mansfield Avenue (Assessor's Parcel ID 37.93.4) on land owned by UW Stearns and Sons, Inc. as shown on a map dated 01/28/2020 and as described in the associated attachments is permitted as a right pursuant to Section 4/1 of the Mansfield Inland Wetlands and Watercourses Regulations. Motion PASSED unanimously.

OTHER COMMUNICATIONS AND BILLS

Noted. Kaufman noted that there is still time to sign up for the CT Land Conservation Conference coming up in March.

REPORTS FROM OFFICERS AND COMMITTEES

None.

ADJOURNMENT

The meeting adjourned at 7:22 p.m.

Respectfully Submitted:

Jillene Woodmansee
Planning Specialist

MINUTES (NOT YET APPROVED)

Members Present:	P. Aho, B. Chandy, L. Cooley, C. Cotton, D. Plante, K. Rawn, V. Ward
Members Absent:	S. Accorsi, R. Hall
Alternates Absent:	J. DeVivo, K. Fratoni
Staff Present:	J. Kaufman, Senior Planner/Inland Wetlands Agent; L. Painter, Director of Planning and Development, J. Woodmansee, Planning Specialist; E. Galbraith, Administrative Assistant

CALL TO ORDER AND ROLL CALL

Chair Aho called the regular meeting of the Planning and Zoning Commission to order at 6:33 p.m. Members present are Cotton, Rawn, Aho, Ward, Plante, Chandy and Cooley.

COMMUNICATIONS

A. Approved Conservation Commission meeting Minutes from 02-19-2020 were noted, as well as the not yet approved Conservation Commission meeting Minutes from 02-26-2020.

PUBLIC HEARINGS

6:30 pm W1611-1- Application of J.E. Shepard Company and Capstone Collegiate Communities-Construction of a 358-Unit Multi-family Development-1621 Storrs Road and Middle Turnpike (Assessor Parcel IDs 9.23.1, 9.23.7 and 9.23.8)

Aho opened the public hearing at 6:37 p.m. Members present are Cotton, Rawn, Aho, Ward, Planted, Chandy and Cooley.

Kaufman read aloud the legal notice for this public hearing which was published in Willimantic's newspaper, *The Chronicle,* on February 18, 2020 and February 26, 2020.

Kaufman listed communications received from the public as of 3-2-20. Those communications included recommendations from Michael Soares of the Conservation Committee date 3-4-20, a letter from Jo Ann Douda dated 2-27-20, a report from Charles Vidich dated 2-27-20, a letter from Mona Friedland dated 2-18-20, comments from J. Silander dated 2-14-20 and a letter from Don Fontaine received 3-2-20.

The public hearing began with Attorney Thomas Cody of Robinson and Cole located at 280 Trumbull Street in Hartford, CT taking the stand on behalf of the applicant. Cody identified the other members of the applicant's team as David Fresk of J.E. Shepard Company and Angela Rawie of Capstone Collegiate Communities, Geoff Fitzgerald of Boehler Engineering, Michael Klein of Davison Environmental and vernal pool expert Michael Klemens. Cody went on to detail

the applicant's process to date, including attending multiple site walks, reviewing findings from a third party consultant and considering expert findings on the area wetlands including vernal pools and species dependent on them. Third party consultant, Land Tech, suggested additional testing be performed, and the applicant heeded their advice resulting in a withdrawal of their wetlands application to allow for enough time to both complete the testing and stay within statutory guidelines regarding wetlands applications. The applicant received positive feedback from Land Tech in February 2020 after they reviewed revised plans reflecting changes based on the findings of the additional testing.

Cody explained the communications received and given to the University of Connecticut regarding the application. The University has filed as an intervener after both submittals of the wetlands applications for the proposed project. Cody stated that according to their statement of opposition, the University is concerned about the impact of the proposed project to the area's wetlands, specifically the system of vernal pools located on the site. Cody pointed out that the University's building of Discovery Drive was a project that fell between two vernal pools within the same system in question, which experts state would cause a disturbance to the vernal pool system. Referencing UConn's 15-month campaign opposing any multi-family housing within a potentially attractive distance to their students, Cody suggested that the opposition is stemming from a financial concern of potential loss of revenue rather than a concern for protecting the wetlands. Cody stated that the applicant has attempted to discuss the project with UConn but that there has been irregular participation. Lastly, Cody referenced the report submitted by Charles Vidich in regards to a neighboring property to the proposed project located at 1641 Storrs Rd and owned by Ayla Kardestuncer. Vidich's report cites deficiencies with the proposed application in relation to the wetlands which extend on to the Kardestuncer property as well as the proposed plan for stormwater management. Cody stated that the applicant offered to come onto Kardestuncer's property to delineate the wetlands there, at the expense of the applicant, and that they did not receive a response.

David Fresk, on behalf of the applicant distributed a hard copy of the applicant's power point presentation.

Klein took the stand introducing himself as a biologist and soil scientist who was part of the team that investigated wetland and biological resources on the site. Klein used a projected presentation to show a map of the property and abutters, wetland delineation and upland review area. Klein stated that the wetland systems consist of a Red Maple Swamp variety, described as being dominated by trees greater than 20 feet with specific types of vegetation present. He stated that the area has a perched water table, being wet for only part of the year and dry during the growing season, particularly during the summer when the water table is several feet below grade. Water on this site has been determined to travel within defined channels, flowing within an intermittent watercourse. Using the Highway methodology, Klein determined the principal wetland functions and values to be groundwater recharge and discharge, floodwater storage, sediment, toxicants and pathogen removal, and nutrient removal, retention and transformation. Klein stated that after reviewing the data, he felt the applicant has proposed an environmentally responsible plan for their proposed project.

Fitzgerald took the stand introducing himself as an engineer for Boehler Engineering of 1604 Old Forge Road in Rocky Hill, CT. He described the site design process including the geotechnical and test pit investigation after engineering plans went through several sets of revisions and alternatives. Revisions included removing plans for a dog park due to concerns of waste run-off, adding an amphibian barrier to help guide amphibians to the vernal pool and protecting the historical stone structure. Revisions based on comments from the IWA's technical consultant included increasing the area for the storm water filter basin and level spreader

outlets. In all, the site plan went through six alternative designs in an effort to be environmentally responsible particularly in regards to the wetlands. Fitzgerald explained in detail the test pit location in relation to the stormwater management treatment train. Examples of filter basins that are proposed for the site were shown. Fitzgerald outlined soil erosion and sediment control measures, including stormwater runoff management and site controls during construction. He indicated that the applicants would be willing to fund the town hiring an independent third party to monitor E&S during construction. Klemens took the stand introducing himself as a consultant and co-author of "Best Development Practices Conserving Pool-Breeding Amphibians in Residential and Commercial Developments in the Northeastern United States". Klemens went into further detail about the impacts on the vernal pool system when Discovery Drive was constructed on UConn property. He explained the vernal pool system citing a main or "source pool" and other pools which rely upon it, known as "decoy vernal pools". He explained that most of the decoy vernal pools in this system were cut off from their source pool as a result of building Discovery Drive. He went on in detail about the species that depend on healthy vernal pool systems, most notably in this system, the Wood Frog. Klemens explained the practice of identifying a vernal pool envelope as a 100 ft area from the pool's high water mark, and within which there should be absolutely no destruction to maintain best practices. Further, 75% of critical terrestrial habitat should remain suitable and forest corridors should be maintained. He felt the proposed water management system would not overwater the vernal pools nor underwater the wetlands. Klemens concluded that after reviewing the most recent plans for the project, he felt the applicant met these guidelines for best practices regarding vernal pools, that the project would have significant public benefits with the inclusion of a trail and conservation easement dedicated in perpetuity, and the preservation of the Revolutionary-era root cellar on the property. Klein returned to the stand to summarize the wetland impact assessment. He stated that the applicant's proposal would not directly impact the wetlands and that potential indirect impacts to the wetlands have been well addressed including those concerning water quality, wildlife, and the off-site vernal pool.

Tom Cody returned to the stand to offer the conclusion that after 2 years of work, the applicant has proposed an environmentally responsible plan, which was confirmed by experts and the third party consultant. Cody then asked the Inland Wetlands Agency members if there were any questions. Members asked about plans for snow removal and consideration for snow storage and potential run-off of deicing agents. Fitzgerald answered that plans include identified storage locations positioned to drain into structure's drainage system and that reserved snow shelves would be captured by the stormwater management system. Snow removal would be contracted to a property maintenance company which most commonly use a sodium-chloride mix as a deicing agent. Members asked if the water table was predicted to increase or rise, particularly in reference to the concerns outlined in Vidich's report regarding the Kardestuncer property, to which Klein answered that he does not predict such an impact and that he anticipates written responses from the applicant to the letters and comments provided by the public. Members asked if the Conservation Commission received the same presentation that the Inland Wetlands Agency was given, to which Cody answered that the Conservation Commission received a condensed version of the presentation at about half the length and including the same content.

Members asked to go down the list of the Conservation Commission's concerns. Cody indicated that some of the Conservation Commission's question were directed at the applicant, and others towards the third party consultant. Cody answered the questions directed at the applicant including concerns brought forth about the Kardestuncer property to which Cody replied that those concerns were answered via letters and that the applicant will continue attempts to discuss concerns with the property owner. The next question was in regards to the monitoring of the construction process. Cody confirmed that construction phase monitoring would be carried

out by a third party which would be hired by and report to the town. IWA members asked what the area of disturbance is according to the project scope, to which Cody replied 32%.

At this point the third party consultant took the stand to answer Conservation Commission questions directed at them. The consultants identified themselves as Chris Allan and Robert Pryor of Land Tech. Resumes were entered into the record The Conservation Commission questioned Land Tech in regards to the significant testing done relating to stormwater. Pryor responded that he believed the applicant's testing was adequate and reasonable.

Kaufman stated that Conservation Commission chair Michael Soares e-mailed a clarifying he believes that the Conservation Commission is requesting that the applicant request the owner's permission to delineate the wetlands on 1641 Storrs Rd and included on the site plans. Further, they request that the vernal pool/wetland delineation be added to the plans to verify the corresponding Vernal Pool Envelope and URA. Mr. Soares e-mail was entered into the record.

Richard Roberts from Halloran and Sage took the stand. Roberts stated that UConn has filed as an intervenor to this application because of the scientifically based assertion that it's effects upon the property's stormwater and groundwater will have a negative impact on the wetlands. Roberts stated they believe that there are prudent and feasible alternatives to the currently proposed plan, which would require a reduction in the project's size. He responded to the claims made about the harm caused to the vernal pool system when Discovery Drive was built. Roberts reported that the State Department of Energy and Environmental Protection oversaw the project, and that it was fully vetted by the State. Roberts then introduced the University's Consultant group NV5, naming Steve Normandin, Lynn Brass-Smith and Scott Angus.

The public hearing stopped for a 5-minute break to remedy a technology issue.

Normandin took the stand introducing himself as a professional engineer for NV5. He presented a map of the test pits and pointed out what he sees as flaws to the testing, citing that some spots should have had two test pits in order to get an accurate read because of the varying hydraulic conductivity. Normandin cited potential problems with the curtain drain system such as the potential for clogging and stated that the basins and spreaders are at the highest elevation on the property, which will negatively impact their intended functionality. He stated that he is not concerned with the quality of the water pertaining to the plans, but the quantity and anticipated patterns.

Brass-Smith took the stand introducing herself as the Supervising Environmental Specialist for NV5. Brass-Smith began by stating that the applicant does not know where the wetlands are on the Kardestuncer property. While a probable estimation has been made based on the entry and exit points of the wetlands to and from the property, it has not been determined definitely. Brass-Smith then stated that federally protected species could be living on the proposed project site's adjacent wetlands. She named the Northern long-eared bat as a species that could potentially live there according the Fish & Wildlife Services, but whose presence has not been confirmed. Brass-Smith agrees that the proposed plan would have no direct impact on the wetlands but sees potential for impacts to the upland review area. She went to explain in detail the importance of allowing for an environmentally responsible edge to the wetlands. The edge effect impacts sunlight, wind and temperature and should be taken into consideration to prevent great change and disturbance to the soil and vegetation found there. Brass-Smith asserted that a malfunction in the basins could cause plants in this edge to die off and invasives to take root, which would affect the wildlife present, including migratory birds.

Angus took the stand introducing himself as a wildlife biologist for NV5. He identified himself as an expert in vernal pools, mentioning that Klemens had already detailed the potential impacts to the Wood Frog found in these vernal pools. Angus agreed with Klemens statements in regards to the Wood Frog and added that the Marbled Salamander is another species to be concerned about regarding this project. Angus argued that the plan for the amphibian barrier does not encircle the entire site, which is a design flaw from an environmental protection standpoint. He also argued that the clearing process has the potential to wipe out species. In conclusion, Angus belies the plan revisions have included rearranging or buildings rather than a necessary reduction in size of the project in order to be environmentally responsible.

Roberts asked the Inland Wetland Agency if there were any questions for the consultants representing the intervenor. No questions were raised.

Allan and Pryor returned to the stand to deliver their comments regarding their review of the application. Allan provided a timeline of their meetings with the applicant and staff including site walks and subsequent recommendations including additional pit testing for groundwater and bedrock depths, adding provisionary soils, sediment traps, a conservation easement and site monitoring for no less than 3 years. On 2/13/2020 Land Tech provided the applicant with their final review letter which concluded that the applicant had addressed Land Tech's technical concerns with the final plan revision. Allan then asked if the Inland Wetland Agency had any questions for them. Members asked if they were critical of the curtain and footing drains. Land Tech responded that they are satisfied with the plan and think it is reasonable. Members asked if they predict ongoing supervision and maintenance of the system, to which Land Tech replied that it appears it will need minimal maintenance. Members asked if Land Tech will be responding to the intervenor. Kaufman replied that the consultants will need time to review the intervenor's submittals and will respond. Members asked if they had any concerns regarding the test pits. Land Tech responded that options were limited based on the development site and that the applicants worked within those perimeters.

Aho invited members of the public to speak in the order they signed in, with proponents speaking first, and opposed speaking second. Kaufman asked that members of the public identify if they are on any Town boards, commissions, or committees, and if so whether they are speaking on behalf of the group or as an individual. Todd Friedland of 35 Beech Mountain Road spoke in favor of the application. Beverly Sims of 61 Northwood Road spoke in favor of the application. Sims serves on the Town Gown committee and was representing herself. William Okeson of 61 Northwood Road spoke in favor of the application. Okeson serves on the Economic Development Commission and was representing himself. Martin Hirtchson of 63 Davis Road spoke in favor of the application. Martin serves on the Economic Development Commission and was representing himself. Cynthia Hirtchson of 63 Davis Road spoke in favor of the application. Steve Ferrigno of 28 Green Hill Road spoke in favor of the application. Ferrigno serves on the Economic Development Commission, the Mansfield Downtown Partnership, the School Building Committee and the Mansfield Discovery Depot Board, and was representing himself. Ayla Kardestuncer of 1641 Storrs Road spoke in opposition of the application. Quentin Kessel of 97 Codfish Road spoke in opposition of the application. Kessel serves on the Conservation Commission and Parks and Natural Resources and was speaking on behalf of himself. Scott Opperman of 1641 Storrs Road spoke in opposition of the application. Dawn Beamer of 123 Adelaide Street in Danielson, CT spoke in opposition of the application. Amelia Bidwell was called but had left the hearing. John Silander of 30 Silver Falls Lane spoke in opposition of the application. Silander serves on the Conservation Commission and was representing himself. Silander submitted written comments, which were entered into the record.

OLD BUSINESS

6:30 pm W1611-1- Application of J.E. Shepard Company and Capstone Collegiate Communities-Construction of a 358-Unit Multi-family Development-1621 Storrs Road and Middle Turnpike (Assessor Parcel IDs 9.23.1, 9.23.7 and 9.23.8)

Ward MOVED, Cooley seconded, to continue the public hearing to April 6, 2020 at 6:30 p.m. in the Audrey P. Beck Municipal Building. Motion PASSED unanimously.

ADJOURNMENT

The meeting was adjourned at 11:10 p.m.

Respectfully Submitted:

Emmy A. Galbraith
Administrative Assistant

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WILLIMANTIC CT 06226
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Fax (860)423-7641

ORDER CONFIRMATION

Salesperson: Laurie Moulthrope Printed at 01/24/20 10:06 by lmoul-cm

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Acct #: 3141 Ad #: 173689 Status: New

MANSFIELD PZC/IWA
ATTN: EMMY GALBRAITH
4 SOUTH EAGLEVILLE RD.
STORRS CT 06268

Start: 02/18/2020 Stop: 02/26/2020
Times Ord: 2 Times Run: ***
LEG 2.00 X 3.18 Words: 114
Total LEG 6.36
Class: 0005 LEGAL NOTICES
Rate: LEG Cost: 333.26
Affidavits: 1
Ad Descrpt: LEGAL NOTICE ON
Descr Cont: PUBLIC HEARING ON MARCH
Given by: *
P.O. #:
Created: lmoul 01/24/20 10:04
Last Changed: lmoul 01/24/20 10:06

Contact: EMMY GALBRAITH
Phone: (860)429-3330
Fax#: (860)429-6863
Email: GalbraithEA@mansfieldct.org
Agency:

COMMENTS:
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PUB	ZONE	EDT	TP	RUN DATES
CHR	A	97	S	02/18,26

AUTHORIZATION

Under this agreement rates are subject to change with 30 days notice. In the event of a cancellation before schedule completion, I understand that the rate charged will be based upon the rate for the number of insertions used.

Name (print or type) Name (signature)

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ORDER CONFIRMATION (CONTINUED)

Salesperson: Laurie Moulthrope Printed at 01/24/20 10:06 by lmoul-cm

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Acct #: 3141 Ad #: 173689 Status: New

LEGAL NOTICE

The Mansfield Inland Wetlands Agency will hold a Public Hearing on Monday, March 2, 2020, at 6:30 p.m. in the Council Chamber, A.P. Beck Bldg., 4. S. Eagleville Rd., Mansfield, CT to hear comments on the application of the Mansfield Nonprofit Housing Development Corporation (owner/applicant) for a 42-unit multifamily residential development at 113-121 S. Eagleville Rd (Parcel ID 16.57.5) pursuant to the Mansfield Inland Wetlands and Watercourses Regulations (File #W1612).

At this hearing, interested persons may be heard and written communications received. No information from the public shall be received after the close of the Public Hearings. Additional information is available in the Mansfield Planning Office.

P. Aho, Chair
V. Ward, Secretary

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P. Aho, Chair
V. Ward, Secretary

printed in "The Chronicle" on 2/18/2020

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P. Aho, Chair
V. Ward, Secretary

printed in "The Chronicle" on 2/26/2020

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ORDER CONFIRMATION

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MANSFIELD PZC/IWA
ATTN: EMMY GALBRAITH
4 SOUTH EAGLEVILLE RD.
STORRS CT 06268

Start: 02/18/2020 Stop: 02/26/2020
Times Ord: 2 Times Run: ***
LEG 2.00 X 3.18 Words: 114
Total LEG 6.36
Class: 0005 LEGAL NOTICES
Rate: LEG Cost: 333.26
Affidavits: 1
Ad Descrpt: LEGAL NOTICE ON
Descr Cont: PUBLIC HEARING ON MARCH
Given by: *
P.O. #:
Created: lmoul 01/24/20 10:04
Last Changed: lmoul 01/24/20 10:06

Contact: EMMY GALBRAITH
Phone: (860)429-3330
Fax#: (860)429-6863
Email: GalbraithEA@mansfieldct.org
Agency:

COMMENTS:
COPIED from AD 173665

PUB	ZONE	EDT	TP	RUN DATES
CHR	A	97	S	02/18,26

AUTHORIZATION

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Name (print or type) Name (signature)

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ORDER CONFIRMATION (CONTINUED)

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V. Ward, Secretary

LEGAL NOTICE

The Mansfield Inland Wetlands Agency will hold a Public Hearing on Monday, March 2, 2020, at 6:30 p.m. in the Council Chamber, A.P. Beck Bldg., 4. S. Eagleville Rd., Mansfield, CT to hear comments on the application of the Mansfield Nonprofit Housing Development Corporation (owner/applicant) for a 42-unit multifamily residential development at 113-121 S. Eagleville Rd (Parcel ID 16.57.5) pursuant to the Mansfield Inland Wetlands and Watercourses Regulations (File #W1612).

At this hearing, interested persons may be heard and written communications received. No information from the public shall be received after the close of the Public Hearings. Additional information is available in the Mansfield Planning Office.

P. Aho, Chair
V. Ward, Secretary

printed in "The Chronicle" on 2/18/2020

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P. Aho, Chair
V. Ward, Secretary

printed in "The Chronicle" on 2/26/2020

MEMO

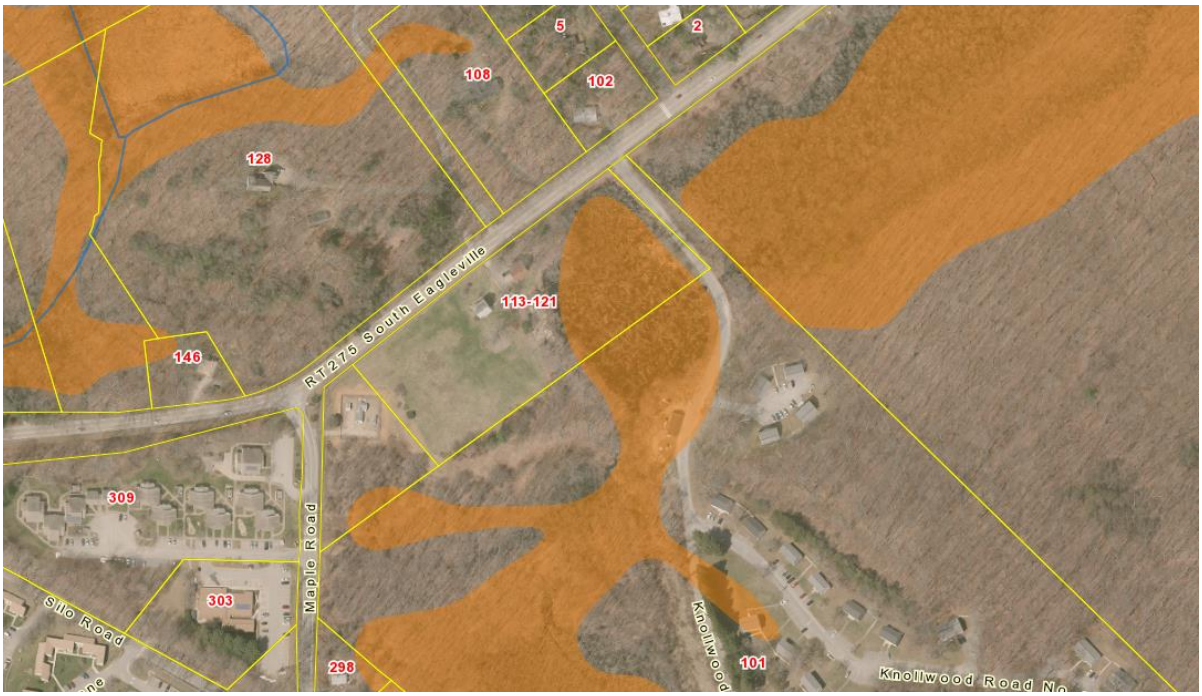
To: Mansfield Inland Wetlands Agency

From: Jennifer Kaufman, AICP, Senior Planner/Inland Wetlands Agent

Date: February 27, 2020

Subject: Application of the Mansfield Non-Profit Housing Development Corporation (owner/applicant) for a multifamily development at 113-121 S. Eagleville Rd (Parcel ID 16.57.5)(IWA File W-1612)

PROJECT OVERVIEW



At your meeting of March 2, 2020, you will hold a public hearing to hear comment regarding the Mansfield Non-Profit Housing Development Corporation application to construct a multi-family housing development. The proposed development will consist of seven (7) buildings, 81 parking spaces and other associated site improvements on a 5.2- acre property located at 113-121 S. Eagleville Rd (Parcel ID 16.57.5). There will be approximately 1.14-acres of disturbance in the upland review; the closest disturbance is 10 feet from the edge of wetlands. There is no proposed direct impacts to the wetlands.

At your December 2, 2019 meeting, you retained CME to provide the technical review of this application.

CME provided an initial review of the site plans on December 23, 2019. The applicant responded to these comments on February 12, 2020. Since then there have been two additional reviews of revised plans by CME to which the applicant has responded. CME has also reviewed and commented on concerns raised by the Conservation Commission at their February 26, 2020 special meeting (detailed in their minutes) and will address these concerns at the Public Hearing. CME's letter of February 28, 2020, identifies a few minor issues that should be clarified by the applicant prior to the close of the public hearing. Therefore, I recommend that the Inland Wetlands Agency hold a special meeting on March 16, 202 to continue the Public Hearing.

CME will be at the public hearing to provide comments and answer questions.

PLANNING MANAGEMENT

View

PROJECT

Case Name: Mansfield Non-Profit Housing Development Corporation Mult

PROPERTY INFORMATION

Properties: **Primary:** 113-121 SO EAGLEVILLE RD CT (16.57.5) (16.57.5)

INFORMATION

Approval #:		Status:	Created
Case #:	W-19-0068	Application Date:	11/25/2019
Case Type:	Wetlands Activity	Issued Date:	
Subcases:	Inland Wetlands - IWA	Expiration Date:	
Online Authentication Code:			

Description Of Work: The proposed project is located on approximately 5.2 acres of property at 113-121 South Eagleville Road. The property generally consists of the construction of multi-story mixed-housing in seven (7) buildings, surface parking for approximately 81 vehicles spaces, and other "typical" site improvements to support the proposed building program. These other site improvements consist of but are not limited to, drainage and grading, utility design, and landscape enhancements. Proposed access to the Site is via two driveways intersecting South Eagleville Road.

ADDITIONAL INFORMATION

IWA File No: W1612

ACTION DATES AND DEADLINES

Date Application Filed:	11/25/2019	Deadline for Decision:	
Decision Date:		Deadline to Advertise Decisions:	
Date Decision Advertised:			

NOTIFICATION DATES AND DEADLINES

Deadline for Abutter Notification:		Date of Abutter Notification:	
Deadline of DPH Notification:		Date of DPH Notification:	

Planning Management (W-19-0068)

Case Type: Wetlands Activity Inland Wetlands - IWA
Start Date: 11/25/2019
Status: Created
Issued Date:

ee Charges (3)

Item: Admin Fee
Amount: $2.00
Fee Assessed By: Jennifer Kaufman

Item: Land Use Fee
Amount: $58.00
Fee Assessed By: Jennifer Kaufman

Item: Wetlands Agency Fee
Amount: $1,000.00
Fee Assessed By: Jennifer Kaufman

Total Amount: $1,060.00
Amount Paid: $1,060.00
Amount Due: $0.00

ontacts (3)

Property Owner
Rebecca Fields (Mansfield Nonprofit Housing Development Corporation)
309 Maple Road Storrs, CT 06268
EDIT

Applicant
Rebecca Fields (Mansfield Nonprofit Housin Development Corporation)
309 Maple Road Storrs, CT 06268
EDIT

Property Owner
MANSFIELD NON-PROFIT HOUSING DEVELOPMENT
309 MAPLE RD STORRS, CT 06268
EDIT

roperties (1)

[16.57.5]
113-121 SO EAGLEVILLE RD CT

Historic District?	No
Within 150' of a wetland or watercourse?	Yes
Historic Village	N/A
Public Water Supply Watershed	Yes
Scenic Road?	No
Parcel ID	16.57.5
Zone	RAR-90
Map	16
Acreage	4.49
Subregional Drainage Basin	Fenton River
Block	57
USGS Quadrangle	Spring Hill
Natural Diversity Database (NDDB)	No

nspections (1)

Wetlands Inspection
Date:
Status: Unscheduled
Inspector:
Results: Pending

Deadline of Water Company Notification:		Date of Water Company Notification:	
Deadline for Adjoining Municipality Notification:		Date of Adjoining Municipality Notification:	

PUBLIC HEARING DATES AND DEADLINES

Advertising Date 1:		Advertising Date 2:	
Deadline To Open Public Hearing:		Deadline To Close Public Hearing:	
Date Public Hearing Opened:		Date Public Hearing Closed:	

PARCEL DATA

Zoning Classification:	RAR-90	Natural Diversity Database (NDDB):	No
USGS Quadrangle:	Spring Hill	Public Water Supply Watershed:	Yes
Subregional Drainage Basin:	Fenton River	Acreage:	4.49

PROJECT CRITERIA

1. How close will the proposed activity be from the edge of wetlands/watercourses? (feet):	10	2. Does the area of activity drain towards the wetlands/watercourses?:	Yes
3. Quantify the area of disturbance in the wetlands/watercourses (square feet):	0	4. Quantify the area of disturbance within 150 feet of wetlands/watercourse (square feet):	49807
5. Equipment/machinery used:	Bulldozers, excavators,		
6.1a Quantify the volume of materials being extracted in the wetlands/watercourses(cubic yards):	0	6.1b Quantify the volume of materials being deposited in the wetlands/watercourses(cubic yards):	0
6.1c Quantify the volume of materials being dispersed throughout the site in the wetlands/watercourses(cubic yards):	0		

ocuments (1)

fees_receipt_434_1575_434_11-26-2019-0.pdf
No Description
uploaded on 11/26/2019

agged Cases (0)

There are no Tagged Cases at this time.

Add Tag

ctivities (25)

Payment Applied.
jenniferk has applied a payment for Wetlands Agency Fee via Check Ck#11134
09:47:23 AM / Tue, Nov 26th, 2019
Jennifer Kaufman

Payment Applied.
jenniferk has applied a payment for Land Use Fee via Check Ck#11134
09:47:23 AM / Tue, Nov 26th, 2019
Jennifer Kaufman

Payment Applied.
jenniferk has applied a payment for Admin Fee via Check Ck#11134
09:47:22 AM / Tue, Nov 26th, 2019
Jennifer Kaufman

Fee Updated.
jenniferk has updated the fee Wetlands Agency Fee
09:46:26 AM / Tue, Nov 26th, 2019
Jennifer Kaufman

Planning Management Case Updated.
Jennifer Kaufman has updated planning management case #W-19-0068.
09:45:43 AM / Tue, Nov 26th, 2019
Jennifer Kaufman

Show all 25 Activities

6.2a Quantify the volume of materials being extracted within 150 feet of wetlands/watercourse(cubic yards): 1845

6.2b Quantify the volume of materials being deposited within 150 feet of wetlands/watercourse(cubic yards): 514

6.2c Quantify the volume of materials being dispersed throughout the site within 150 feet of wetlands/watercourse(cubic yards):

7.1 Describe the material deposited in the wetlands: None

7.2 Describe the material deposited within 150 feet of the wetlands: General Fill

8. Erosion and sedimentation controls proposed: Silt Fence

9. Are there other measures proposed to protect the wetlands/watercourses: No

10. Will the proposed activities impact the wetlands/watercourses of an adjoining property:	No	**11. What alternatives have you considered that would have less impact to the wetlands/watercour**	There were many considerations made to create less of an impact to the wetlands during design. For starters, we decreased the parking on the eastern side of the site in order to keep from grading into, as well as increasing impervious near the wetlands. Additionally, gardens were originally proposed next to the wetlands, but were eliminated in our design to enhance our efforts in creating as little disturbance on the border of the wetlands. The play area was formerly larger in size and the grading was therefore spread to the wetlands. The play area was greatly reduced in size allowing the grading to be tucked back towards the development to
12. Are the activities that you propose within 500 ft. of the adjoining municipality:	No	**13. Do the activities that you propose have the potential to cause traffic impacts to the adjacent municipality:**	No
14. Do the activities that you propose have the potential to cause water run-off impacts to the adjoining municipality:	No	**Conditions of Approval:**	
Held For:			

BSC GROUP
Transportation ▪ Energy ▪ Land Development

300 Winding Brook Drive
Glastonbury, CT 06033

Tel: 860-652-8227
800-288-8123

www.bscgroup.com

September 13, 2019

Ms. Kathleen A. Dorgan, FAIA, LEED-AP
Principal
Dorgan Architecture & Planning
10 Eastwood Road
Storrs, CT 06268

RE: Wetland Characterization of Wetland System adjacent to Proposed South Eagleville Road Housing Project
113-121 South Eagleville Road (SR 275)
Mansfield, Connecticut

Dear Ms. Dorgan:

BSC Group-Connecticut, Inc. (BSC) is pleased to provide the results of the wetland characterization of the wetland system adjacent to the proposed South Eagleville Road Housing Project located at 113-121 South Eagleville Road (SR 275) in Mansfield, Connecticut. The purpose of this report is to provide the results of the assessment of the wetland system located on site, summarize the observations of the environmental scientist, and provide general determinations of how the housing development may affect or enhance the ecological communities and functions of the wetland. BSC has also included some recommended management practices and other mitigative measures for the development to reduce potential impacts to the wetland system.

No wetland delineations were conducted.

Site Setting and Wetland Characterization

On September 4, 2019, BSC's wetland scientist Melissa Kaplan conducted a pedestrian survey of the wetland system perimeter to characterize the wetland and observe the general quality and function of the wetland system. The wetland is located south of South Eagleville Road and west of Knollwood Road in Storrs, Mansfield, Connecticut. A residence and associated maintained lawn are located to the west and the Knollwood Apartment complex is located to the south.

Surface water appears to flow into the wetland from a stream located to the south (off-property), as well as from South Eagleville Road to the north and from the yards of the residences to the west. Surface water then flows through a culverted outlet in the southeast corner (located off-property) of the wetland to a stream and additional wetlands located to the east. Eventually, the water flows to Tift Pond. No outlet was observed under South Eagleville Road, but the Property/Boundary Survey indicates an outlet is buried.

Engineers
Environmental Scientists
Custom Software Developers
Landscape Architects
Planners
Surveyors

The wetland is predominantly a scrub-shrub/herbaceous mixed wetland dominated with a red maple (*Acer rubrum*) and snag tree canopy in the center. Many of the trees in the wetland appear to be stressed or dead. The edges contained ash (*Fraxinus pennsylvanica*), red maple, willow (*Salix nigra*), and cottonwood (*Populus deltoides*) trees in the canopy. The shrub layer is dominated by highbush blueberry (*Vaccinium corymbosum*), meadowsweet (*Spirea alba*), steeplebush (*Spirea tomentosa*), speckled alder (*Alnus incana*), sweet-pepperbush (*Clethra alnifolia*), and spicebush (*Lindera benzoin*). The groundcover is dominated by many species of sedges, rushes, and grasses including tussock sedge (*Carex stricta*), woolgrass (*Scirpus cyperinus*), arrowhead (*Sagittaria latifoli*a), skunk cabbage (*Symplocarpus foetidus*), jewelweed (*Impatiens capensis*), cinnamon fern (*Osmunda cinnamomea*), sensitive fern (*Onoclea sensibilis*), duckweed (*Lemna minor*), rice cut grass (*Leersia oryzoides*), and cattails (*Typha* sp.).

Minimal invasive species were observed along the edges of the wetland including Japanese knotweed (*Fallopia japonica*), oriental bittersweet (*Celastrus orbiculatus*), and multifora rose (*Rosa multiflora*). An ornamental burning bush (*Euonymus alatus*) was observed in the adjacent uplands to the northwest of the wetland.

Overall the wetland has high species diversity and abundance. Many birds, frogs, dragonflies, squirrels, and other small mammals were observed using the wetland or the wetland edges. However, high nutrients and sedimentation were evident in the wetland. A thick algal, mineral surface was observed on top of the water in the wetland and the wetland is dominated by duckweed, both strong indicators of nutrients.

Additionally, high water levels appear evident from staining on vegetation and the presence of standing water throughout the wetland during a more dryer time of the year. The high water levels likely affected the trees within the wetland, stressing them and ultimately leading to their death in many areas of the wetland. The high water levels appears to have led to a higher dominance of more water tolerant shrub/herbaceous/grassy species.

Site Plan and Potential Effects

The proposed project includes the construction of multi-story mixed housing in seven (7) buildings, surface parking for approximately 81 vehicle spaces, and other standard site improvements necessary for the development. An appropriate stormwater management system that meets the requirements of CT DEEP and the CT Stormwater Quality Manual will be constructed. An above-ground detention basin/rain garden and an underground detention facility will be constructed to capture and fully treat stormwater.

An outfall to the assessed wetland is proposed as part of the stormwater management system, bringing the potential for some nutrients to enter the wetland. However, the discharge will be pre-treated and will meet the requirements of the CT stormwater manual. In addition, the project will include the removal of the septic systems from the adjacent residential houses, reducing some of the potential nutrient input that may be currently entering the wetland system.

Nutrient enriched environments often include higher numbers of species tolerant of high nutrient loadings such as cattails. Structural indications of nutrient enrichment also include biomass and stem height. The adjacent wetland did contain some large patches of cattails, thick vegetated patches of shrubby species and mats of thick forbs and graminoids. Due to

the lack of trees, presence of cattails, and biomass of vegetation, it could be said that the wetland currently contains plants that are tolerant to nutrients. However, the lack of invasive species such as Phragmites and large amounts of cattails indicate the wetland is not so eutrophic where it is causing detriment to the vegetation, but suggests the vegetation is tolerant of some levels of nutrient loads. The addition of a new treated stormwater input to the system is therefore not expected to change or diminish the ecological communities and functions of the wetland.

Along with nutrients, the development will direct stormwater flows into the wetland. However, the stormwater system is being designed such that that stormwater flows will match pre-construction conditions, as required under the stormwater guidelines. Under current conditions, stormwater generally flows across the proposed development property from the north, across the yard of the residences in a south to southeast direction, eventually entering the wetland beyond the property line. Under the development, stormwater will be directed into the two detention basins and piped to outfalls to the east and to the south, in generally the same direction as the current stormwater flows on the site. In addition, the proposed development will reduce peak flows, reducing the flashiness of the on-site flow into the wetland.

The development also has the potential to bring sedimentation into the wetland. However, the stormwater will be treated through the detention basin/rain garden which will settle out most sediment or be treated in the underground detention facility. Either way, the stormwater system will remove at least 80% of the average annual total suspended solids (TSS) load and 80% floatable debris, as required in the CT Stormwater Manual. The outfalls will also flow through swales or have overland flow before they enter the wetland, providing a form of secondary stormwater treatment to further reduce any sediments that may be present.

At the time of the assessment, the wetland did appear to have evidence of sedimentation, most likely from the adjacent roads but also from the land proposed for the development. The topography on the site leading to the east towards the wetland and the steep slopes from South Eagleville Road likely result in flashy stormwater inputs that bring sediment into the wetland. The proposed development, as stated above, will reduce peak flows and the overall the flashiness of the on-site flow into the wetland. A reduction in the flashiness and flow into the wetland could also reduce the potential for sedimentation within the wetland.

Management Recommendations

Specific management practices and mitigation measures can be implemented that could help reduce potential impacts of the development on the wetland. Some of these recommendations that could be implemented include:

- Using native plantings and seed mixes in landscape design throughout the development
- Requiring only native plantings and seed mixes to be used in the future. This can be included in the housing documents/bylaws.
- Planting the slopes of the development adjacent to the wetland with native shrubs and ground cover
- No use of fertilizers, pesticides and herbicides in vicinity of the wetland
- Adequate and enclosed trash receptacles throughout the development to prevent dumping

Conclusion

Overall, a new development will be constructed in proximity to the wetland. However, with the implementation of mitigation and management measures as well as fully treated stormwater, impacts to the wetland system are not expected. The current vegetation within the wetland consist of hardy, nutrient tolerant species and the proposed development is not expected to change the diversity or abundance of the ecological community or its functions and values.

Very truly yours,

BSC Group-Connecticut, Inc.

Melissa Kaplan

Melissa Kaplan, PWS
Manager of Ecological Sciences - CT

cc:

Photo #1: View of the wetland from Knollwood Road. Facing southwest. Cattails and stressed, dead trees present.

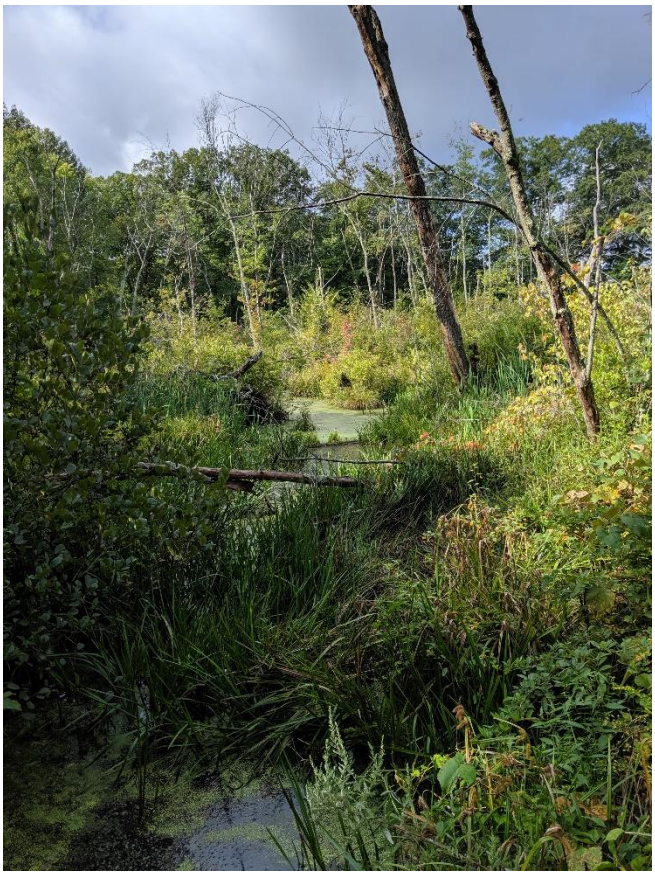


Photo #2: View of the nutrients and thick vegetation of the wetland system. Facing southwest.

Photo #3: More cattails, thick shrub and herbaceous species, and stresses/dead trees in the wetland. Facing west.

Photo #4: View of the layer of duckweed present in the wetland near South Eagleville Road. Facing southeast from South Eagleville Road.

Photo #5: View of the wetland from South Eagleville Road. Stressed red maple trees evident in wetland. Thick shrubby vegetation present. Facing southeast.

Photo #6: Thick algal/mineral surface of the wetland. Facing east.

Photo #7: View of the wetland from the western side, facing east/northeast. High species abundance and diversity present with high water levels and duckweed present.

Photo #8: View of the wetland near the property boundary, facing east. Thick grass and herbaceous ground cover evident.

Photo #9: General overview of the wetland from the western side, facing east/northeast.

Photo #10: View of the adjacent yard and wetland edge, just to the west of the existing 2-story wood frame house/garage. Facing west..

EAGLEVILLE GREEN

113-121 SOUTH EAGLEVILLE ROAD
MANSFIELD, CONNECTICUT

NOVEMBER 25, 2019

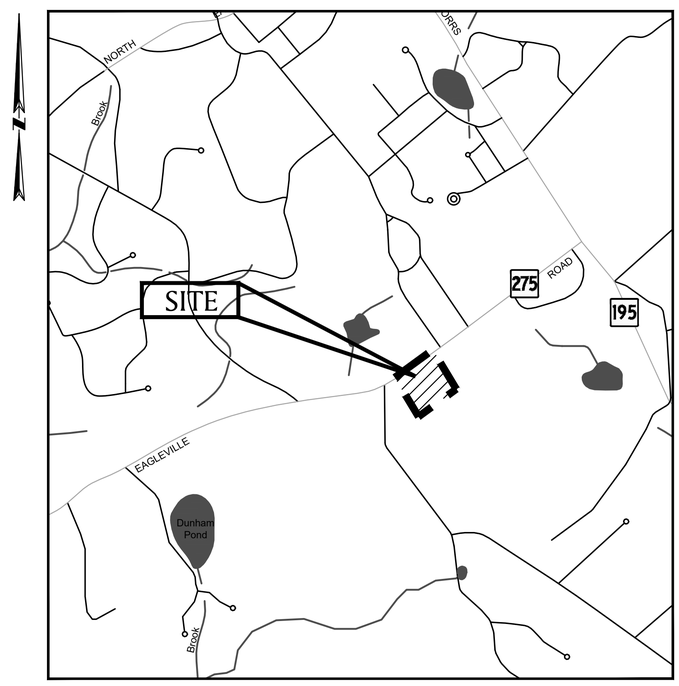
REVISED: MARCH 2, 2020

WETLAND DISTURBANCE = 0
UPLAND DISTANCE = 47,518 SF

ZONING TABLE

ZONE: SER–HO	REQUIRED	EXISTING	PROVIDED
MINIMUM LOT AREA/ACRES	5	5.2	5.2
MINIMUM LOT FRONTAGE (FT)	300	704	704
MINIMUM FRONT SETBACK[1] (FT)	25	44	30
MINIMUM SIDE SETBACK (FT)	5	272	16
MINIMUM STAIR SETBACK (FT)	2	48	2
MINIMUM REAR SETBACK (FT)	5	214	6
MAXIMUM HEIGHT (FT)	45	N/A	33 (WITHOUT CUPOLA) 38'–6" (WITH CUPOLA)
MAXIMUM BUILDING GROUND COVERAGE (%)	20	0.7	14.40
OFF–STREET PARKING	1/UNIT * 42 = 42	N/A	87
ACCESSIBLE PARKING SPACES	4	N/A	8
BUILDABLE AREA (AC)	N/A	N/A	3.2
DWELLING UNITS	–	N/A	42
RESIDENTIAL DENSITY	15	N/A	42/3.2 = 13.125
GROSS FLOOR AREA (SF)	–	N/A	40,198
OPEN SPACE (SF)	–	N/A	103,689

1. MEASURED FROM 30–FOOT HIGHWAY CLEARANCE SETBACK



SITE MAP

500 0 1000 2000 3000 feet

SCALE: 1"=1000'

INDEX OF DRAWINGS

T-1.0	TITLE SHEET
1, 1-2	SITE SURVEYS
EC-1.0	EXISTING CONDITIONS PLAN
OV-1.0	OVERALL SITE IMPROVEMENTS
G-1.0	GENERAL NOTES
C-1.0	EROSION & SEDIMENTATION CONTROL PLAN
C-2.0	SITE PREPARATION PLAN
C-3.0	LAYOUT & MATERIALS PLAN
C-3.1	UCONN FIRE TRUCK TURNING MOVEMENT PLAN
C-4.0	GRADING & DRAINAGE PLAN
C-5.0	UTILITY PLAN
C-5.1	SANITARY SEWER PLAN & PROFILE
C-6.0-6.5	DETAILS
C-7.0	INTERSECTION SIGHT DISTANCE PLAN
L-1.0	PLANTING PLAN
L-1.1	PLANTING RATIO
L-1.2	SHADE STUDY
L-2.0	PHOTOMETRICS PLAN
A1.1	SITE PLAN
A1.1a	SITE INFORMATION

PREPARED FOR:

MANSFIELD HOUSING DEV. CORP.
309 MAPLE ROAD
STORRS, CT 06268

ISSUED FOR PERMITTING

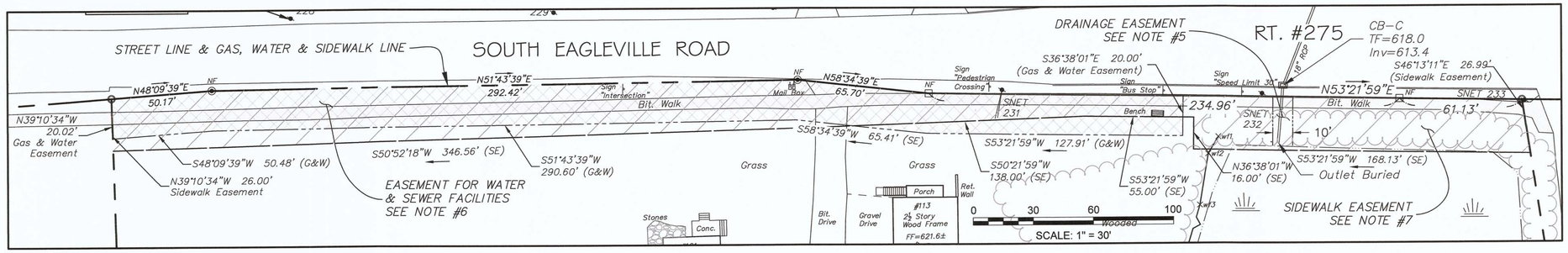
PREPARED BY:

BSC GROUP
300 Winding Brook Drive
Glastonbury, Connecticut 06033
860 652 8227

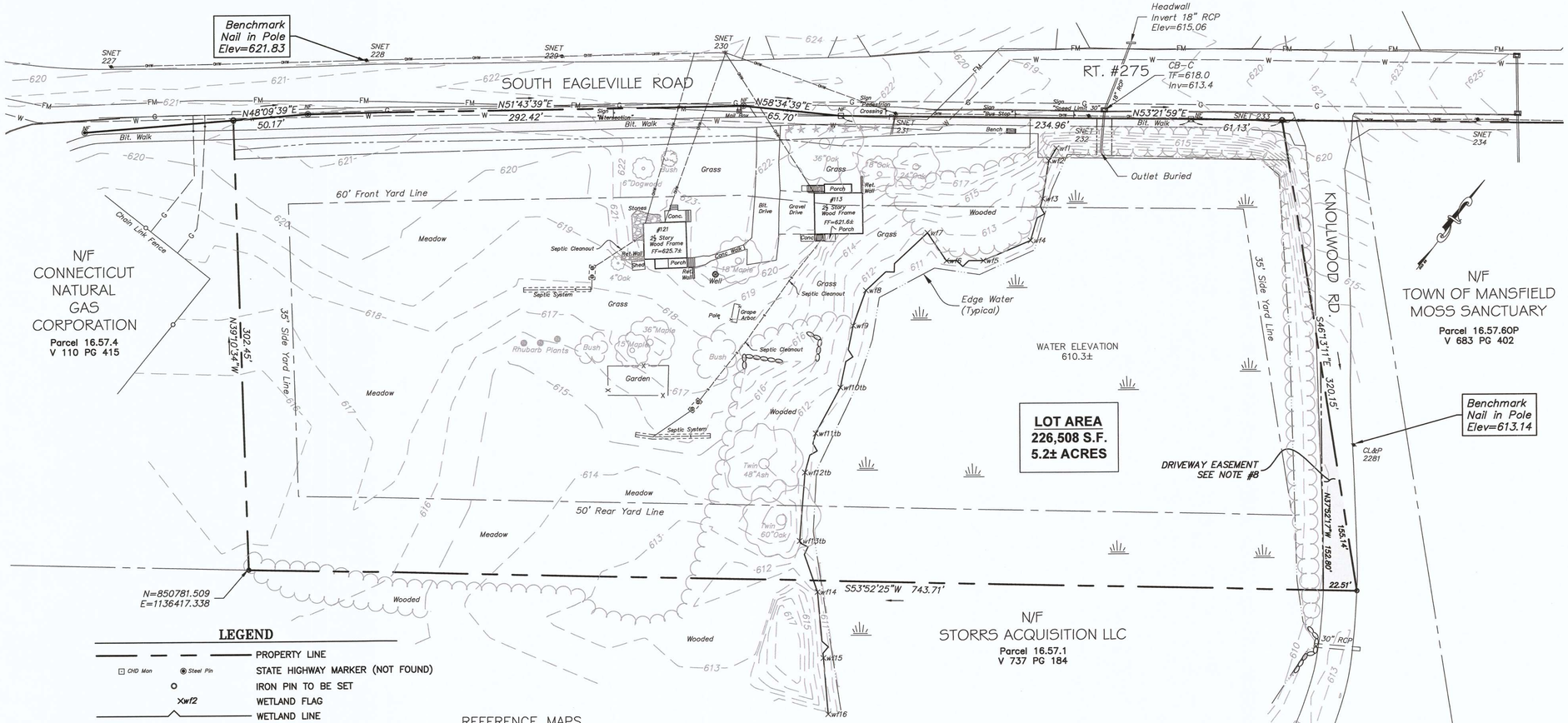
APPROVED BY THE MANSFIELD PLANNING & ZONING COMMISSION

CHAIRMAN - PLANNING AND ZONING COMMISSION _____ DATE _____

JOB NO: 83749.00 DWG NO: SHEET T–1.0



DETAIL DEPICTING EASEMENTS
Scale 1"=30'



LEGEND

- PROPERTY LINE
- CHD Mon / Steel Pin — STATE HIGHWAY MARKER (NOT FOUND)
- IRON PIN TO BE SET
- Xwf2 — WETLAND FLAG
- WETLAND LINE
- 616 — EXISTING GROUND CONTOUR
- TREELINE
- GAS & WATER EASEMENT LINE
- SIDEWALK EASEMENT LINE
- ROADWAY EASEMENT LINE
- DRAINAGE EASEMENT
- SETBACK LINE
- G — GAS MAIN
- W — WATER MAIN
- FM — SEWER FORCE MAIN
- SANITARY SEWER LINE
- OHW — OVERHEAD ELECTRIC WIRE
- WELL

REFERENCE MAPS

1. Connecticut State Highway Department Town of Mansfield Route 275 Plan showing highway line on the south side of the South Eagleville Road, between Maple Road and Knollwood Road. July 1969 Scale 1"=40' Furnished by CDOT District 2 Office NOTE: Monumentation set at the time of this survey has apparently been destroyed by subsequent construction projects.

2. Algonquin Gas Transmission Company Boston, Massachusetts Map Showing Land to be Acquired By Connecticut Natural Gas Corp. July 16, 1969 Scale 1"=40' Nathan Rossman, RLS 4797 Book 9 P 14 Mansfield Land Records

3. Town of Mansfield Map Showing Land & Easement Acquired From J. Alfred Warren South Eagleville Road Scale 1"=40' Date: May 1955 Map #318 Mansfield Land Records

4. Map Showing Easement to be Acquired From Elsie Warren, Mildred Chak and Patricia Chak by the Town of Mansfield Scale: 1"=40' October 1979 Grant Meitzler, RLS Map Book 12 Page 92 Mansfield Land Records

5. Map Showing Easement to be Acquired From Mildred Chak and Patricia Chak by the Town of Mansfield Scale 1"=40' Date Feb. 1988 Rev. May 1988 Lenard Engineering, Inc. Map Book 18 Page 23 Mansfield Land Records

6. ALTA/ACSM Land Title Survey Plan Prepared For Knollwood Apartments LLC Of Knollwood Apartment Complex Mansfield, Ct. Scale 1"=100' Date 9-6-1996 Meehan & Goodin Engineers – Surveyors Map Book 26 Page 34 Mansfield Land Records

7. Resurvey Prepared For The University Of Connecticut South Eagleville Road & Storrs Road Mansfield, Connecticut. Scale 1"=100' Date Oct. 2005 Rev. 6/04/07 Design Professionals, Civil Engineers, Planners, Surveyors, Landscape Architects

8. Water And Sewer Services Mansfield Retirement Community, Mansfield Connecticut South Eagleville Road Sta. 11+00 to Sta. 25+70 sheets #2 & #3, Scale As Noted Date: Aug. 1979 Rev. As Built 10-22-80 Loureiro Engineering Associates.

SURVEY MAPS

1. THIS SURVEY HAS BEEN PREPARED PURSUANT TO THE REGULATIONS OF CONNECTICUT STATE AGENCIES SECTIONS 20-300b-1 THROUGH 20-300b-20 AND THE "STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT" AS ADOPTED BY THE CONNECTICUT ASSOCIATION OF LAND SURVEYORS, INC. ON SEPTEMBER 26, 1996.

2. THIS SURVEY IS A FIRST SURVEY. NO PREVIOUS PROPERTY SURVEY OF THE PARCEL WAS FOUND. MULTIPLE EASEMENT SURVEYS WERE FOUND. THIS PLAN REPRESENTS A COMPILATION OF EASEMENT PLANS AND PROPERTY SURVEYS OF ADJACENT PROPERTIES AS LISTED.

3. BEARINGS ON THIS PLAN ARE BASED ON NAD 1983 COORDINATES. ELEVATIONS ARE BASED ON NAVD 1988 DATUM. EXISTING GROUND CONTOURS ARE 1' INTERVAL.

4. CURRENT OWNER OF THIS PROPERTY IS THE MANSFIELD NONPROFIT HOUSING DEVELOPMENT CORPORATION 309 MAPLE ROAD, STORRS, CT. 06268. PARCEL 16.57.5 DEED VOL 764 PG 555 MANSFIELD LAND RECORDS AREA=226,508 S.F. 5.2± ACRES

5. THIS PARCEL IS SUBJECT TO A DRAINAGE EASEMENT IN FAVOR OF THE STATE OF CONNECTICUT VOL 83 PG 71 REF. MAP #3 AREA=180± S.F.

6. THIS PARCEL IS SUBJECT TO A WATER & SEWER LINE EASEMENT IN FAVOR OF THE TOWN OF MANSFIELD VOL 176 PG 200 REF. MAP #4. AREA=10,696± S.F.

7. THIS PARCEL IS SUBJECT TO A SIDEWALK EASEMENT IN FAVOR OF THE TOWN OF MANSFIELD VOL 271 PG 255 REF. MAP #5. AREA=16,250± S.F.

8. THIS PARCEL IS SUBJECT TO A ROADWAY EASEMENT IN FAVOR OF KNOLLWOOD APARTMENTS VOL 378 PG 285 REF. MAP #6. AREA=1,655± S.F.

9. PROPERTY IS LOCATED IN RURAL AGRICULTURAL RESIDENCE 90 ZONE (RAR-90) BUILDING #113 S EAGLEVILLE ROAD IS NON-CONFORMING TO FRONT YARD REQUIREMENT, BUILT PRIOR TO PRESENT ZONING REGULATIONS.

10. PROPERTY IS NOT LOCATED IN FLOOD ZONE – FIRM MAP TOWN OF MANSFIELD CONNECTICUT TOLLAND COUNTY COMMUNITY-PANEL NUMBER 090128 0005 C EFFECTIVE JAN. 2, 1981

11. WETLANDS WERE DELINEATED ON JUNE 8, 2016 BY IAN T. COLE, REGISTERED SOIL SCIENTIST/PROFESSIONAL WETLAND SCIENTIST #2006. WETLAND FLAGS LOCATED AS SHOWN BY LENARD ENGINEERING, INC. JUNE 13, 2016.

12. UNDERGROUND UTILITY, STRUCTURE AND FACILITY LOCATIONS DEPICTED AND NOTED HEREON WERE HAVE BEEN COMPILED IN PART FROM RECORD MAPPING AND/OR OTHER SOURCES AND MUST BE CONSIDERED AS APPROXIMATE IN NATURE. ADDITIONALLY, OTHER SUCH FEATURES MAY EXIST ON THE SITE, THE EXISTENCE OF WHICH ARE UNKNOWN TO LENARD ENGINEERING, INC. THE SIZE, LOCATION AND EXISTENCE OF ALL SUCH FEATURES MUST BE FIELD DETERMINED AND VERIFIED BY APPROPRIATE AUTHORITIES PRIOR TO ANY EXCAVATION OR CONSTRUCTION CALL-BEFORE-YOU-DIG 1-800-922-4455.

13. THIS MAP & SURVEY CONFORMS TO CLASS A-2 HORIZONTAL ACCURACY AND CLASS T-2 TOPOGRAPHIC SURVEY ACCURACY.

To the best of my knowledge and belief this map is substantially correct as noted hereon.

KEVIN L. DaROS #13291 DATE 6/27/16

No certification is expressed or implied unless this map bears the embossed seal of the Land Surveyor whose signature appears hereon.

Designed By: KLD
Drawn By: KLD
Checked By: PM
CAD File: Basemap

Drawing Scale: 1"=40'
Drawing date: June 27, 2016

Rev.	Date	Revision	By

PROPERTY/BOUNDARY SURVEY

PREPARED FOR

MANSFIELD NON-PROFIT HOUSING DEVELOPMENT CORP.

113-121 SOUTH EAGLEVILLE ROAD

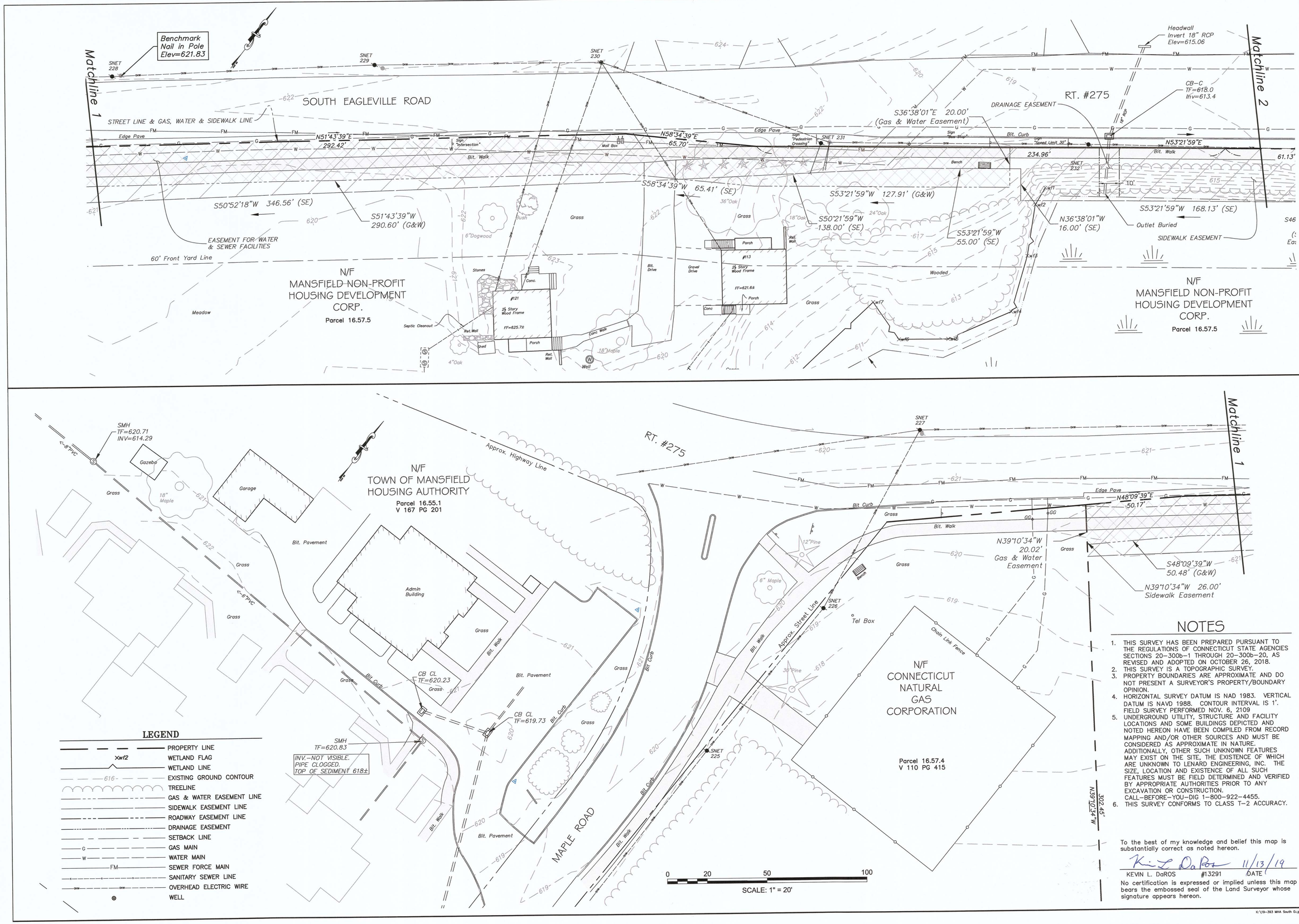
STORRS, CONNECTICUT

Lenard Engineering, Inc.
Civil, Environmental and Hydrogeological Consultants
19 Midstate Drive AUBURN, MA (508) 721-7000
140 Willow Street WINSTED, CT (860) 379-9669
2210 Main Street GLASTONBURY, CT (860) 659-3100

Drawing #: 1

Job #: 16-358

K:\16-383 MHA South Eagleville\Production Drawings\A-2 Survey.dwg 9/28/2019 1:10 PM



LEGEND

- PROPERTY LINE
- Xwf2 WETLAND FLAG
- WETLAND LINE
- 616 EXISTING GROUND CONTOUR
- TREELINE
- GAS & WATER EASEMENT LINE
- SIDEWALK EASEMENT LINE
- ROADWAY EASEMENT LINE
- DRAINAGE EASEMENT
- SETBACK LINE
- G GAS MAIN
- W WATER MAIN
- FM SEWER FORCE MAIN
- SANITARY SEWER LINE
- OHW OVERHEAD ELECTRIC WIRE
- WELL

NOTES

1. THIS SURVEY HAS BEEN PREPARED PURSUANT TO THE REGULATIONS OF CONNECTICUT STATE AGENCIES SECTIONS 20-300b-1 THROUGH 20-300b-20, AS REVISED AND ADOPTED ON OCTOBER 26, 2018.
2. THIS SURVEY IS A TOPOGRAPHIC SURVEY.
3. PROPERTY BOUNDARIES ARE APPROXIMATE AND DO NOT PRESENT A SURVEYOR'S PROPERTY/BOUNDARY OPINION.
4. HORIZONTAL SURVEY DATUM IS NAD 1983. VERTICAL DATUM IS NAVD 1988. CONTOUR INTERVAL IS 1'. FIELD SURVEY PERFORMED NOV. 6, 2109
5. UNDERGROUND UTILITY, STRUCTURE AND FACILITY LOCATIONS AND SOME BUILDINGS DEPICTED AND NOTED HEREON HAVE BEEN COMPILED FROM RECORD MAPPING AND/OR OTHER SOURCES AND MUST BE CONSIDERED AS APPROXIMATE IN NATURE. ADDITIONALLY, OTHER SUCH UNKNOWN FEATURES MAY EXIST ON THE SITE, THE EXISTENCE OF WHICH ARE UNKNOWN TO LENARD ENGINEERING, INC. THE SIZE, LOCATION AND EXISTENCE OF ALL SUCH FEATURES MUST BE FIELD DETERMINED AND VERIFIED BY APPROPRIATE AUTHORITIES PRIOR TO ANY EXCAVATION OR CONSTRUCTION. CALL-BEFORE-YOU-DIG 1-800-922-4455.
6. THIS SURVEY CONFORMS TO CLASS T-2 ACCURACY.

To the best of my knowledge and belief this map is substantially correct as noted hereon.

Kevin L. DaRos 11/13/19

KEVIN L. DaROS #13291 DATE

No certification is expressed or implied unless this map bears the embossed seal of the Land Surveyor whose signature appears hereon.

Designed By: KLD
Drawn By: KLD
Checked By: PM
CAD File: Survey2

Drawing Scale: 1"=20'

Rev.	Date	Revision	By

Drawing date: Nov. 13, 2019

TOPOGRAPHIC SURVEY

PREPARED FOR

MANSFIELD NON-PROFIT HOUSING DEVELOPMENT CORP.

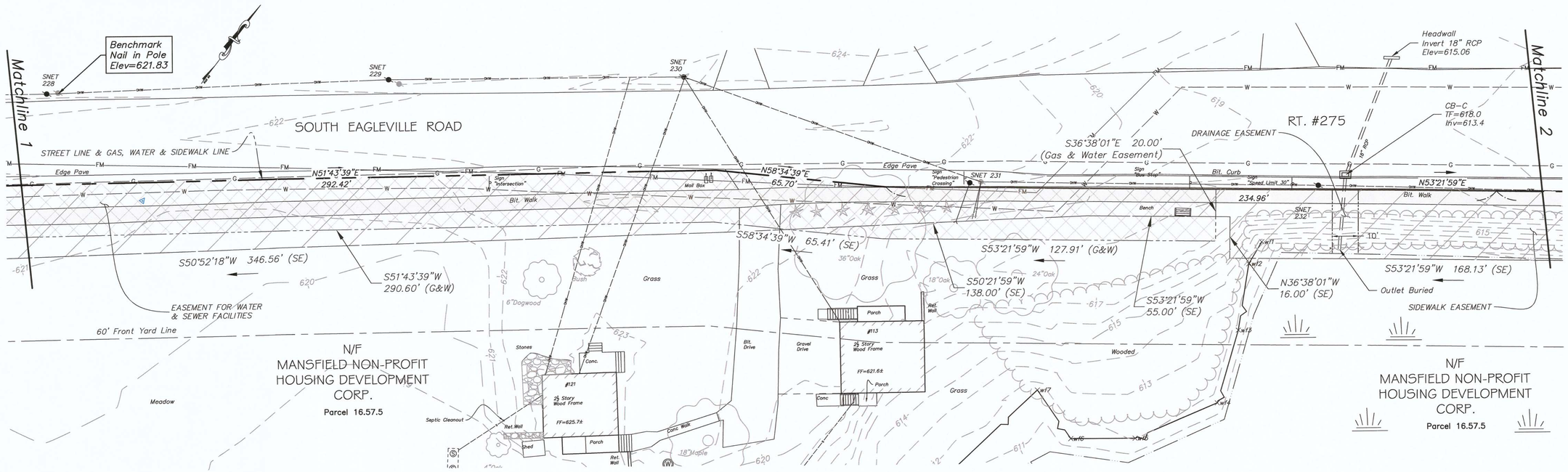
113-121 SOUTH EAGLEVILLE ROAD
STORRS, CONNECTICUT

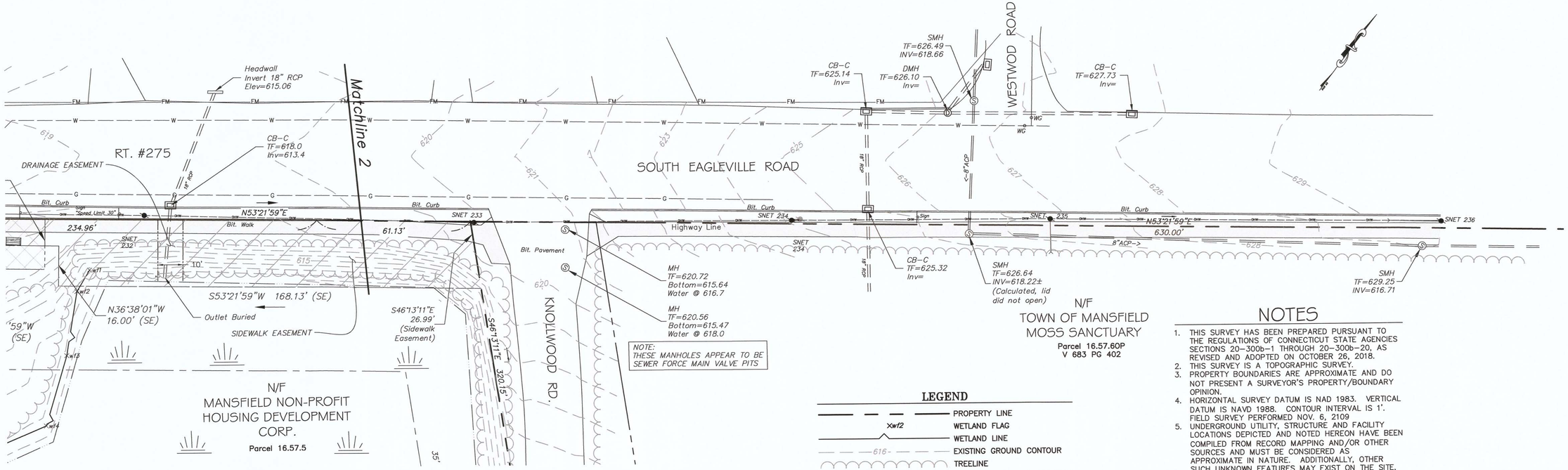
Lenard Engineering, Inc.
Civil, Environmental and Hydrogeological Consultants
2210 Main Street GLASTONBURY, CT (860) 659-3100
140 Willow Street WINSTED, CT (860) 379-6669
19 Midstate Drive AUBURN, MA (508) 721-7600

Drawing #: 1 of 2

Job #: 19-404

K:\19-393 MHA South Eagleville\Production Drawings\Survey2.dwg 11/18/2019 10:37 AM





Reference Map:
Property Boundary Survey Prepared for Mansfield Non-Profit Housing Development Corp. 113-121 South Eagleville Road, Storrs, Connecticut. Date June 24, 2016 Scale: 1"=40' Class A-2 and Class T-2 Accuracy Lenard Engineering, Inc. 2210 Main St. Glastonbury, Connecticut

0 20 50 100
SCALE: 1" = 20'

LEGEND

- PROPERTY LINE
- Xwf2 WETLAND FLAG
- WETLAND LINE
- 616 EXISTING GROUND CONTOUR
- TREELINE
- GAS & WATER EASEMENT LINE
- SIDEWALK EASEMENT LINE
- ROADWAY EASEMENT LINE
- DRAINAGE EASEMENT
- SETBACK LINE
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- FM SEWER FORCE MAIN
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NOTES

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6. THIS SURVEY CONFORMS TO CLASS T-2 ACCURACY.

To the best of my knowledge and belief this map is substantially correct as noted hereon.

Kevin L. DaRos 11/13/19
KEVIN L. DaROS #13291 DATE

No certification is expressed or implied unless this map bears the embossed seal of the Land Surveyor whose signature appears hereon.

Designed By: KLD
Drawn By: KLD
Checked By: PM
CAD File: Survey2

Drawing Scale: 1"=20'

Rev.	Date	Revision	By

Drawing date: Nov. 13, 2019

TOPOGRAPHIC SURVEY

PREPARED FOR

MANSFIELD NON-PROFIT HOUSING DEVELOPMENT CORP.

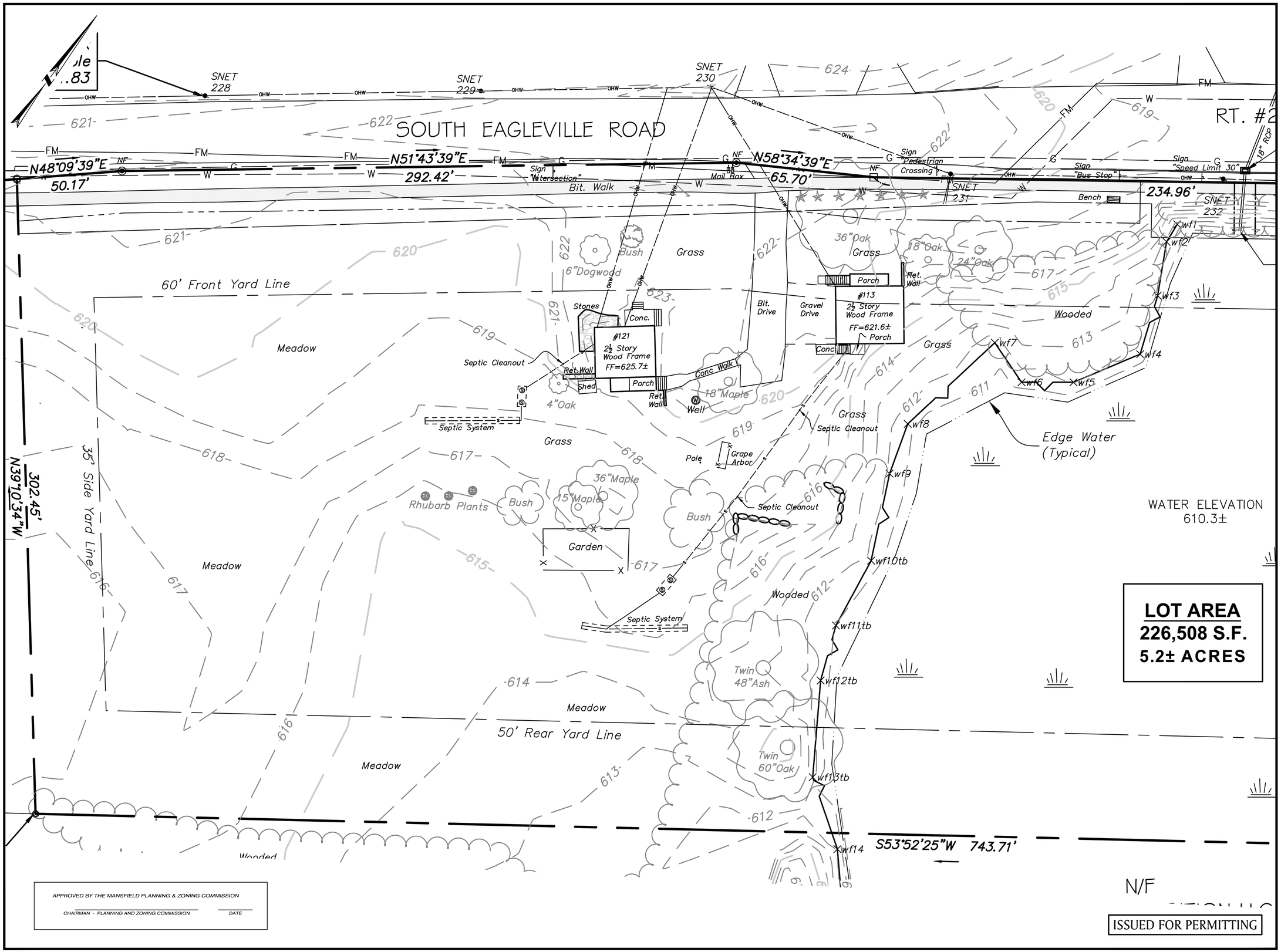
113-121 SOUTH EAGLEVILLE ROAD
STORRS, CONNECTICUT

Lenard Engineering, Inc.
Civil, Environmental and Hydrogeological Consultants
2210 Main Street, GLASTONBURY, CT (860) 659-3100
140 Willow Street, WINSTED, CT (860) 379-8689
19 Midstate Drive, AUBURN, MA (508) 721-7600

Drawing #: 2 OF 2

Job #: 19-404

K:\19-393 MHA South Eagleville\Production Drawings\Survey2.dwg 11/18/2019 10:36 AM



LOT AREA
226,508 S.F.
5.2± ACRES

APPROVED BY THE MANSFIELD PLANNING & ZONING COMMISSION

CHAIRMAN - PLANNING AND ZONING COMMISSION _____ DATE _____

ISSUED FOR PERMITTING

EAGLEVILLE GREEN - NOVEMBER 25, 2019

EAGLEVILLE GREEN

113-121 SOUTH EAGLEVILLE ROAD
IN
MANSFIELD
CONNECTICUT

EXISTING CONDITIONS PLAN

NOVEMBER 25, 2019

REVISIONS:

1	01/20/2020	PER TOWN COMMENTS
2	01/31/2020	PER TOWN COMMENTS
3	02/12/2020	PER TEST PIT RESULTS

PREPARED FOR:
MANSFIELD HOUSING DEV. CORP.
309 MAPLE ROAD
STORRS, CT 06268

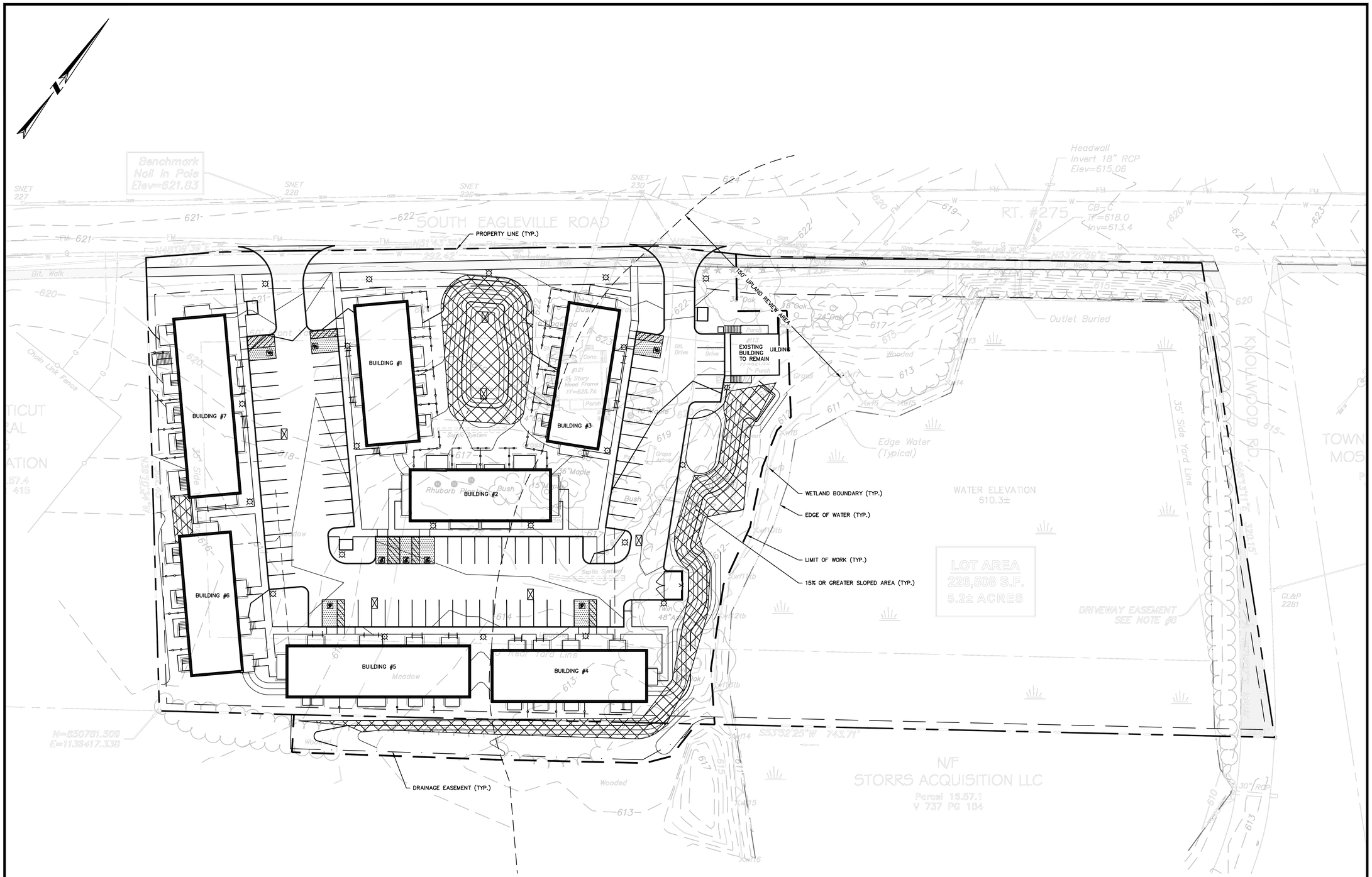
BSC GROUP
300 Winding Brook Drive
Glastonbury, Connecticut 06033
860 652 8227

© 2019 BSC GROUP, INC.

SCALE: 1" = 20'
0 10 20 40 FEET

FILE: 8374900-EC.DWG
DWG. NO:
JOB. NO: 83749.00

EC-1.0



PROPOSED STEEP SLOPES–15% OR GREATER = 0.25 ACRES
WETLAND AREA = 1.75 ACRES
EARTHWORK FILL = 6,868 CUBIC YARDS
EARTHWORK CUT = 591 CUBIC YARDS
NET EARTHWORK = 6,277 CUBIC YARDS

APPROVED BY THE MANSFIELD PLANNING & ZONING COMMISSION

CHAIRMAN - PLANNING AND ZONING COMMISSION DATE

ISSUED FOR PERMITTING

EAGLEVILLE GREEN - NOVEMBER 25, 2019

STATE OF CONNECTICUT ROBERT S. NEWTON No. 20662 LICENSED PROFESSIONAL ENGINEER

ROBERT NEWTON, PE No. 20662

EAGLEVILLE GREEN

113-121 SOUTH EAGLEVILLE ROAD
IN
MANSFIELD
CONNECTICUT

OVERALL SITE IMPROVEMENTS

NOVEMBER 25, 2019

REVISIONS:

1	01/20/2020	PER TOWN COMMENTS
2	01/31/2020	PER TOWN COMMENTS
3	02/12/2020	PER TEST PIT RESULTS

PREPARED FOR:
MANSFIELD HOUSING DEV. CORP.
309 MAPLE ROAD
STORRS, CT 06268

BSC GROUP
300 Winding Brook Drive
Glastonbury, Connecticut 06033
860 652 8227

© 2019 BSC GROUP, INC.

SCALE: 1" = 30'
0 15 30 60 FEET

FILE: 8374900–SITE.DWG
DWG. NO:
JOB. NO: 83749.00

OV-1.0

EAGLEVILLE GREEN - NOVEMBER 25, 2019

EROSION AND SEDIMENTATION CONTROL NOTES:

1. DO NOT PROCEED WITH THE WORK UNTIL ALL E&S CONTROL MEASURES ARE IN-PLACE AND HAVE BEEN INSPECTED AND APPROVED BY THE ENGINEER.
2. THE MEASURES SPECIFIED ARE THE MINIMUM REQUIREMENTS FOR E&S CONTROL AND ARE SHOWN IN GENERAL SIZE AND LOCATION ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT ALL E&S CONTROL MEASURES ARE CONFIGURED AND CONSTRUCTED IN A MANNER THAT WILL MINIMIZE EROSION OF SOILS AND PREVENT THE TRANSPORT OF SEDIMENTS AND OTHER POLLUTANTS TO ANY RESOURCE AREAS. PROVIDE ADDITIONAL E&S MEASURES AS REQUIRED TO CONTROL EROSION AND SILTATION THROUGHOUT THE DURATION OF THE CONSTRUCTION AS CONDITIONS DICTATE AND/OR AS DIRECTED BY THE OWNER OR THE ENGINEER.
3. MONITOR AND INSPECT ALL E&S MEASURES IN AN ONGOING MANNER THROUGHOUT THE WORK AND TAKE CORRECTIVE MEASURES, AS REQUIRED, TO MINIMIZE EROSION OF SOILS AND PREVENT THE TRANSPORT OF SEDIMENTS AND OTHER POLLUTANTS TO ANY RESOURCE AREAS.
4. ANY EROSION AND SEDIMENTATION MEASURE IMPLEMENTED BEYOND THAT SHOWN SHALL CONFORM TO APPLICABLE SECTIONS OF THE STATE OF CONNECTICUT'S 2002 "CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL."
5. ANY STOCKPILED MATERIAL SHALL BE SUBJECT TO EROSION CONTROL MEASURES THAT INCLUDE A MINIMUM OF SILT FENCE OR HAY BALE BARRIER. COVER STOCKPILES IF SIGNIFICANT RAINFALL IS PREDICTED.
6. PROVIDE TEMPORARY SEEDING WITH MULCH ON ALL EXPOSED SOIL AREAS WHERE WORK WILL BE SUSPENDED FOR LONGER THAN 30 DAYS. APPLY SEED AND MULCH WITHIN THE FIRST 7 DAYS OF SUSPENDING WORK. WHEN SEEDING IS NOT POSSIBLE DUE TO SEASONAL WEATHER CONDITIONS OR OTHER FACTORS, PROVIDE TEMPORARY STRUCTURAL SOIL PROTECTION SUCH AS MULCH, WOODCHIPS, EROSION CONTROL MATTING, OR COMPOST.
7. ALL TEMPORARY SLOPES IN EXCESS OF 3 (HORIZONTAL) TO 1 (VERTICAL) SHALL BE STABILIZED WITH EROSION CONTROL MATTING OR APPROVED EQUIVALENT.
8. NO RUNOFF SHALL BE ALLOWED TO ENTER ANY STORMWATER SYSTEM OR EXIT THE SITE PRIOR TO TREATMENT FOR SEDIMENT REMOVAL.
9. THE CONTRACTOR SHALL MAINTAIN A CLEAN CONSTRUCTION SITE AND SHALL NOT ALLOW THE ACCUMULATION OF RUBBISH OR CONSTRUCTION DEBRIS. ALL TRASH SHALL BE CLEANED ON A DAILY BASIS AND THE SITE SHALL BE LEFT IN A NEAT CONDITION AT THE END OF EACH WORK DAY.
10. TAKE ALL NECESSARY PRECAUTIONS TO AVOID THE SPILLAGE OF FUEL OR OTHER POLLUTANTS AND ADHERE TO ALL APPLICABLE POLICIES AND REGULATIONS RELATED TO SPILL PREVENTION, CONTROL, AND RESPONSE.
11. FOR DUST CONTROL, PERIODICALLY MOISTEN EXPOSED SOIL SURFACES WITH WATER AND MAINTAIN ADEQUATE MOISTURE LEVELS.
12. SWEEP ADJACENT ROADWAYS IF MUD OR SOIL IS TRACKED ON TO THEM, OR AS DIRECTED BY THE ENGINEER. SHOULD THE CONSTRUCTION ENTRANCE FAIL TO PREVENT THE TRACKING OF SOILS OR SEDIMENT OFF OF THE PROJECT SITE, A WASHING RACK SHALL BE INSTALLED ALONG WITH APPROPRIATE MEASURES TO COLLECT RESULTING WASTEWATER.
13. DRAINAGE STRUCTURE FILTER INSERTS SHALL BE INSTALLED AND CLEANED/CHANGED PER THE MANUFACTURER'S RECOMMENDATIONS. UNITS SHALL BE INSTALLED COMPLETELY AROUND INLETS OF EXISTING AND PROPOSED DRAINAGE STRUCTURES SUCH THAT NO RUNOFF IS ALLOWED TO ENTER DRAINAGE SYSTEMS WITHOUT FILTERING THROUGH THE DEVICE.

SUGGESTED CONSTRUCTION SEQUENCE:

1. CONDUCT A PRE-CONSTRUCTION MEETING WITH THE OWNER AND ENGINEER PRIOR TO ANY CONSTRUCTION ACTIVITY.
2. INSTALL CONSTRUCTION ENTRANCE(S) AND PLACE FILTER INSERTS IN EXISTING CATCH BASINS.
3. INSTALL PERIMETER E&S CONTROLS AND REQUEST PRE-CONSTRUCTION INSPECTION FROM THE ENGINEER.
4. FOLLOWING THE ENGINEER'S APPROVAL OF INSTALLED E&S CONTROLS, COMMENCE CONSTRUCTION OPERATIONS.
5. AT THE CONCLUSION OF CONSTRUCTION, COMPLETE THE INSTALLATION OF POST-CONSTRUCTION SITE STABILIZATION MEASURES AS SHOWN ON THE DRAWINGS.

NOTE: THE CONTRACTOR MAY MODIFY THE SUGGESTED CONSTRUCTION SEQUENCE INDICATED ABOVE, PROVIDED A REVISED SEQUENCE IS SUBMITTED FOR REVIEW AND APPROVED BY THE OWNER AND ENGINEER.

TEMPORARY E&S MEASURES MAINTENANCE SCHEDULE

E&S MEASURE	MAINTENANCE MEASURES	SCHEDULE
FILTER INSERTS IN DRAINAGE SYSTEM	CLEAN CATCH BASIN GRATE, REMOVE SEDIMENT/DEBRIS FROM FILTER INSERTS	WEEKLY & WITHIN 24 HOURS AFTER STORM GENERATING A DISCHARGE
TEMPORARY DIVERSION SWALES	REPAIR DAMAGED AREAS WITHIN 24 HRS OF OBSERVED FAILURE	WEEKLY & WITHIN 24 HOURS AFTER STORM GENERATING A DISCHARGE. INSPECT DAILY WHEN CONSTRUCTION ACTIVITIES ARE IN CLOSE PROXIMITY
HAY BALES/ SILT FENCE BARRIER	REPAIR/REPLACE WHEN FAILURE OBSERVED, REMOVE SILT WHEN ACCUMULATION REACHES APPROX. HALF HEIGHT OF BARRIER	WEEKLY & WITHIN 24 HOURS AFTER STORM GENERATING A DISCHARGE
TARP TEMPORARY STOCKPILES	ENSURE TARP IS SECURED OVER STOCKPILE AT THE END OF EACH DAY	DAILY
CONSTRUCTION ENTRANCE	SWEEP PAVED ROADWAY ADJACENT TO SITE ENTRANCE AS NECESSARY, REFRESH STONE AS NECESSARY, REMOVE SILTED GRAVEL	WEEKLY
MOISTEN EXPOSED SOILS	PERIODICALLY MOISTEN EXPOSED SOIL SURFACES WITH WATER ON UNPAVED TRAVELWAYS AND KEEP TRAVELWAYS DAMP	DAILY

PERCOLATION TEST RESULTS:

PERCOLATION TESTS PERFORMED ON 11/21/2019 BY BSC GROUP
SEE SHEET C-4.0 FOR LOCATIONS OF PERCOLATION TESTS

PT-A
DEPTH: ~30"
PRESOAK @ 11:30 AM
DRY @ 12:33 PM
BEGIN TEST @ 12:35 PM

TIME	DEPTH	CHANGE
12:35	9.5"	–
12:36	13.5"	4"
12:37	16.5"	3"
12:38	18.75"	2.25"
12:39	20.25"	1.5"
12:40	21.25"	1"
12:41	22.25"	1"
12:42	15.75"	REFILL
12:43	18"	2.25"
12:44	20"	2"
12:45	21.5"	1.5"
12:46	22.25"	0.75"
12:47	DRY	–

EFFECTIVE INFILTRATION RATE (FS=2) = 30 IN/HR

PT-B
DEPTH: ~30"
PRESOAK @ 12:00 PM
BEGIN TEST @ 2:00 PM

TIME	DEPTH	CHANGE
2:00	3"	–
2:05	5.25"	2.25"
2:10	7.25"	2"
2:15	8.75"	1.5"
2:20	10.25"	1.5"
2:25	11.50"	1.25"
2:30	12.50"	1"
2:35	13.50"	1"
2:40	14.50"	1"
2:45	15.50"	1"

EFFECTIVE INFILTRATION RATE (FS=2) = 6 IN/HR

PT-C
DEPTH: ~30"
PRESOAK @ 12:10 PM
DRY @ 12:54 PM
BEGIN TEST @ 1:00 PM

TIME	DEPTH	CHANGE
1:00	5.5"	–
1:01	7.25"	1.75"
1:02	8.25"	1"
1:03	9"	0.75"
1:04	9.75"	0.75"
1:06	11"	1.25"
1:08	12"	1"
1:10	13"	1"
1:12	14"	1"
1:14	14.75"	0.75"
1:16	15.50"	0.75"
1:18	16"	0.50"
1:20	16.5"	0.50"
1:22	17.25"	0.75"
1:24	DRY	–

EFFECTIVE INFILTRATION RATE (FS=2) =7.5 IN/HR

APPROVED BY THE MANSFIELD PLANNING & ZONING COMMISSION

CHAIRMAN - PLANNING AND ZONING COMMISSION *DATE*

SITE PREPARATION NOTES:

1. CONTRACTOR SHALL NOTIFY "CALL BEFORE YOU DIG" (1-800-922-4455) AND VERIFY UTILITY MARK-OUT WITH THE OWNER PRIOR TO THE INITIATION OF ANY SITE DISTURBANCE.
2. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR VERIFYING THE LOCATION AND NATURE OF ALL SUBSURFACE UTILITIES AT THE PROJECT WHICH MAY BE AFFECTED BY THE WORK. COORDINATE WITH RESPECTIVE UTILITY OWNERS AND PERFORM VERIFICATION OF TYPE, LOCATION AND INVERTS AS REQUIRED.
3. NOTIFY THE ENGINEER OF ANY AND ALL DISCREPANCIES BETWEEN EXISTING CONDITIONS AND THE CONTRACT DOCUMENTS BEFORE PROCEEDING WITH THAT PORTION OF THE WORK.
4. THE LOCATIONS OF EXISTING SITE FEATURES HAVE BEEN OBTAINED FROM MAPS, SURVEYS, FIELD INSPECTIONS, AND OTHER AVAILABLE INFORMATION. THEY MUST BE CONSIDERED APPROXIMATE BOTH TO LOCATION, SIZE, AND AS-BUILT CONDITION AND ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING ACTUAL FIELD CONDITIONS.
5. THE DIMENSIONS SHOWN ON THE PLANS, INCLUDING THE INTENDED DIMENSIONS OF THE WORK, MAY VARY FROM ACTUAL EXISTING CONDITIONS IN THE FIELD. THE CONTRACTOR SHALL TAKE APPROPRIATE MEASUREMENTS TO VERIFY ALL DIMENSIONS SHOWN ON THE DRAWINGS AS WELL AS OTHER DIMENSIONS HE MAY DEEM APPROPRIATE TO FACILITATE THE COMPLETION OF THE WORK. NOTIFY THE ENGINEER OF ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND THE CONTRACT DOCUMENTS BEFORE PROCEEDING WITH THAT PORTION OF THE WORK.
6. IMPLEMENTING WORKER SAFETY AND/OR HEALTH PROTOCOLS THAT ADDRESS COMPLIANCE WITH RULES, LAWS, AND REGULATIONS PERTAINING TO CONSTRUCTION SAFETY AND/OR THE POTENTIAL AND/OR ACTUAL RISK OF EXPOSURE TO SITE-SPECIFIC PHYSICAL OR CHEMICAL HAZARDS IS SOLELY THE RESPONSIBILITY OF THE CONTRACTOR.
7. ALL CONSTRUCTION FENCING AND WARNING SIGNS SHALL BE INSTALLED PRIOR TO ANY CONSTRUCTION. INSTALL CONSTRUCTION FENCING AT THE LIMIT OF WORK.
8. PRIOR TO THE TERMINATION, ABANDONMENT, OR REMOVAL OF ANY UTILITY, VERIFY THAT APPLICABLE NOTIFICATIONS HAVE BEEN MADE TO THE UTILITY OWNER/OPERATOR AND THAT THE UTILITY HAS BEEN PROPERLY TERMINATED, CAPPED, OR PLUGGED AS REQUIRED.
9. PROTECT ALL IMPROVEMENTS NOT INCLUDED IN THE SCOPE OF SITE DEMOLITION. ANY IMPROVEMENT WHICH IS DAMAGED SHALL BE REPAIRED OR REPLACED IN-KIND TO THE OWNER'S SATISFACTION.
10. UNLESS OTHERWISE INDICATED, ALL DISTURBED AREAS SHALL BE RESTORED WITH SIX (6) INCHES OF LOAM, SEEDED, FERTILIZED, AND MULCHED. PROVIDE ADDITIONAL EROSION CONTROLS AS REQUIRED.
11. NO TOPSOIL IS TO BE REMOVED FROM THE SITE.

UTILITY NOTES:

1. CONTRACTOR SHALL NOTIFY "CALL BEFORE YOU DIG" (1-800-922-4455) AND VERIFY UTILITY MARK-OUT WITH THE OWNER PRIOR TO THE INITIATION OF ANY SITE DISTURBANCE.
2. THE LOCATIONS OF EXISTING UTILITIES AS SHOWN ON THE PLANS MAY VARY FROM ACTUAL EXISTING CONDITIONS IN THE FIELD. COORDINATE WITH RESPECTIVE UTILITY OWNERS AND PERFORM VERIFICATION OF TYPE, LOCATION AND INVERTS AS REQUIRED. VERIFY ALL TIE-IN POINTS, ROUTING, CONFLICTS, CROSSINGS, AND BUILDING CONNECTION POINTS TO FACILITATE THE COMPLETION OF THE WORK.
3. PERFORM EXPLORATORY EXCAVATIONS AS REQUIRED TO VERIFY THE AS-BUILT LOCATION OF EXISTING SUBSURFACE UTILITIES WHERE CROSSINGS OR OTHER POTENTIAL CONFLICTS ARE PRESENT.
4. NOTIFY THE ENGINEER OF ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND THE CONTRACT DOCUMENTS BEFORE PROCEEDING WITH THAT PORTION OF THE WORK.
5. THE TOPS, RIMS, FRAMES, GRATES, AND COVERS (AS APPLICABLE) OF ALL UTILITY STRUCTURES THAT ARE TO REMAIN SHALL BE ADJUSTED TO MATCH FINAL GRADE IN A FLUSH CONDITION. ALL NEW UTILITY STRUCTURES SHALL BE INSTALLED WITH TOPS, RIMS, FRAMES, GRATES, AND COVERS (AS APPLICABLE) TO FINAL GRADE IN A FLUSH CONDITION.
6. ALL LIGHTING ELECTRICAL SUPPLIES SHALL BE INSTALLED IN MINIMUM 1-INCH PVC CONDUIT PER APPLICABLE SPECIFICATIONS. PLASTIC MARKING TAPE SHALL BE USED ON ALL CONDUIT RUNS.
7. THE ROUTING OF LIGHTING ELECTRICAL SUPPLIES SHOWN IS CONCEPTUAL. CONTRACTOR SHALL DETERMINE THE SPECIFIC ROUTING OF ALL LIGHTING SYSTEMS BASED ON THE ACTUAL LOCATION OF TIE-IN(S) TO EXISTING LIGHTING FEEDS AND AS REQUIRED TO AVOID CONFLICTS WITH OTHER CONSTRUCTION OR SUBSURFACE FACILITIES. PRIOR TO INSTALLATION, PROVIDE SHOP DRAWING SHOWING THE ROUTING OF ALL CONDUIT, LOCATIONS OF HANDHOLES, AND DETAILS OF TIE-INS TO EXISTING SYSTEM.
8. CONDUIT: RIGID PVC ELECTRICAL CONDUIT, NEMA TC 2 AND UL -651; FITTINGS AND CONDUIT BODIES: PVC TO MATCH CONDUIT, NEMA TC-3. PRIMER/SOLVENT CEMENT: ASTM F656/ASTM D2564; PULL ROPE: 3/8-INCH DOUBLE BRAIDED, LOW STRETCH POLYESTER COMPOSITE ROPE.
9. TRACER WIRE REQUIRED FOR TELECOMMUNICATIONS AND ELECTRIC ONLY. PROVIDE APPROPRIATE WIRE ACCESS POINTS.
10. ALL UNDERGROUND TELECOMMUNICATIONS AND ELECTRIC CONDUITS SHALL BE ENCASED IN CONCRETE EXCEPT BRANCH DISTRIBUTION FOR LIGHTING. WORK CONCRETE TO REMOVE ALL TRAPPED AIR AND INSURE EACH CONDUIT IS COMPLETELY SURROUNDED BY A MINIMUM 2" OF CONCRETE. ALLOW CONCRETE TO CURE FOR AT LEAST ONE HOUR BEFORE BACKFILLING.
11. FOR TELECOMMUNICATIONS AND ELECTRIC, WARNING TAPE SHALL BE INSTALLED 12-INCHES BELOW GRADE.
12. SEAL ALL CONDUIT ENDS WITH BLANK DUCT PLUGS. SECURE PULL ROPE TO DUCT PLUG.
13. ALL WORK ASSOCIATED WITH FIRE PROTECTION AND DOMESTIC WATER SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE LOCAL WATER UTILITY.
14. ALL WORK ASSOCIATED WITH ELECTRICAL SERVICE SHALL CONFORM TO THE STANDARDS OF EVERSOURCE. IF THERE ARE ANY CONFLICTS BETWEEN THE REQUIREMENTS INDICATED AND EVERSOURCE STANDARDS, EVERSOURCE STANDARDS SHALL PREVAIL.
15. ALL WORK ASSOCIATED WITH TELECOMMUNICATIONS SHALL CONFORM TO THE STANDARDS OF THE LOCAL PROVIDER.
16. INSTALL CONDUIT, PULL ROPE, CAPS, WARNING TAPE, AND TRACER WIRE PER APPLICABLE SPECIFICATIONS, STANDARDS, AND CODES.
17. ALTHOUGH NOT SHOWN ON THE DRAWINGS, PROVIDE FOR THE INSTALLATION OF ALL JOINTS, COUPLINGS, RESTRAINTS, BENDS, ANGLES, AND OTHER APPURTENANCES TO ACHIEVE A COMPLETE, FUNCTIONAL WATER SUPPLY SYSTEM.

LAYOUT AND MATERIALS NOTES:

1. NOTIFY "CALL BEFORE YOU DIG" (1-800-922-4455) AND VERIFY UTILITY MARK-OUT WITH THE OWNER PRIOR TO THE INITIATION OF ANY SITE DISTURBANCE.
2. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR VERIFYING THE LOCATION AND NATURE OF ALL SUBSURFACE UTILITIES AT THE PROJECT WHICH MAY BE AFFECTED BY THE WORK. COORDINATE WITH RESPECTIVE UTILITY OWNERS AND PERFORM VERIFICATION OF TYPE, LOCATION AND INVERTS AS REQUIRED.
3. NOTIFY THE ENGINEER OF ANY AND ALL DISCREPANCIES BETWEEN EXISTING CONDITIONS AND THE CONTRACT DOCUMENTS BEFORE PROCEEDING WITH THAT PORTION OF THE WORK.
4. THE LOCATIONS OF EXISTING SITE FEATURES AS SHOWN HAVE BEEN OBTAINED FROM MAPS, SURVEYS, FIELD INSPECTIONS, AND OTHER AVAILABLE INFORMATION. THEY MUST BE CONSIDERED APPROXIMATE BOTH TO LOCATION, SIZE, AND AS-BUILT CONDITION AND ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING ACTUAL FIELD CONDITIONS.
5. THE DIMENSIONS SHOWN ON THE PLANS, INCLUDING THE INTENDED DIMENSIONS OF THE WORK, MAY VARY FROM ACTUAL EXISTING CONDITIONS IN THE FIELD. THE CONTRACTOR SHALL TAKE APPROPRIATE MEASUREMENTS TO VERIFY ALL DIMENSIONS SHOWN ON THE DRAWINGS AS WELL AS OTHER DIMENSIONS HE MAY DEEM APPROPRIATE TO FACILITATE THE COMPLETION OF THE WORK. NOTIFY THE ENGINEER OF ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND THE CONTRACT DOCUMENTS BEFORE PROCEEDING WITH THAT PORTION OF THE WORK.
6. IMPLEMENTING WORKER SAFETY AND/OR HEALTH PROTOCOLS THAT ADDRESS COMPLIANCE WITH RULES, LAWS, AND REGULATIONS PERTAINING TO CONSTRUCTION SAFETY AND/OR THE POTENTIAL AND/OR ACTUAL RISK OF EXPOSURE TO SITE-SPECIFIC PHYSICAL OR CHEMICAL HAZARDS IS SOLELY THE RESPONSIBILITY OF THE CONTRACTOR.
7. ENGAGE A CONNECTICUT-LICENSED LAND SURVEYOR TO PERFORM LAND-SURVEYING SERVICES REQUIRED, INCLUDING, BUT NOT LIMITED TO VERIFICATION AND LAYOUT OF PROPOSED IMPROVEMENTS, DIMENSIONS, AND ELEVATIONS. REPORT DISCREPANCIES TO THE ENGINEER.
8. UNLESS OTHERWISE INDICATED, ALL DISTURBED AREAS SHALL BE RESTORED WITH SIX (6) INCHES OF LOAM, SEEDED, FERTILIZED, AND MULCHED. PROVIDE ADDITIONAL EROSION CONTROLS AS REQUIRED.
9. ALL CURBING IS BITUMINOUS CONCRETE UNLESS OTHERWISE INDICATED. WHERE CURBING IS CALLED-FOR ADJACENT TO SIDEWALKS, IT SHALL BE MONOLITHIC CONCRETE CURB AND SIDEWALK PER APPLICABLE DETAILS.
10. THE CROSS-SLOPE OF ANY SIDEWALK, WALKWAY, OR OTHER PEDESTRIAN SURFACE SHALL NOT BE STEEPER THAN 1:48 (2%).
11. ACCESSIBLE ROUTES SHALL COMPLY WITH CONNECTICUT BUILDING CODE. THE RUNNING SLOPE OF WALKING SURFACES SHALL NOT BE STEEPER THAN 1:20 (5%). THE CROSS SLOPE OF A WALKING SURFACE SHALL NOT BE STEEPER THAN 1:48 (2%).
12. RAMPS SHALL COMPLY WITH CT BUILDING CODE, REF. 2012 IBC SECTION 1010 AND ICC/ANSI A117.1 2009 CHAPTER 4, SECTION 405.
13. CONSTRUCTION JOINTS: REINFORCEMENT SHALL NOT CONTINUE THROUGH CONSTRUCTION JOINTS.
14. PRIOR TO INITIATION OF CONCRETE FLATWORK, SUBMIT PROPOSED CONSTRUCTION JOINT PLAN TO THE ENGINEER FOR REVIEW AND APPROVAL. COORDINATE SUCH PLAN WITH THE JOINT PATTERNS DEPICTED ON THE DRAWINGS.
15. UNLESS OTHERWISE SPECIFIED, MISCELLANEOUS CONCRETE PADS SHALL BE CONSTRUCTED PER SIDEWALK DETAIL.
16. ALL NON-ACCESSIBLE PARKING SPACES ARE 9' X 18'. VERIFY OVERALL LAYOUT DIMENSIONS BASED ON THESE DIMENSIONS AND THE NUMBER OF SPACES INDICATED. FIELD-ADJUST OVERALL LAYOUT DIMENSION IN CONCERT WITH THE ENGINEER IF REQUIRED.
17. DIMENSIONS INDICATED ARE TO FACE OF CURB, PAVEMENT EDGE, EDGE OR CENTERLINE OF IMPROVEMENT, OR AS OTHERWISE NOTED.
18. PROVIDE FOR THE LAYOUT AND STAKING/MARKING OF THE PROPOSED LOCATION OF ALL PROPOSED SITE IMPROVEMENTS, INCLUDING FURNISHINGS. OBTAIN ENGINEER'S APPROVAL OF THE LAYOUT PRIOR TO PROCEEDING WITH THE WORK.
19. UNLESS OTHERWISE INDICATED, LINES ARE PARALLEL OR PERPENDICULAR TO LINE FROM WHICH THEY ARE MEASURED.

PLANTING NOTES:

1. THE CONTRACTOR SHALL CLEARLY MARK LIMITS OF CLEARING AND LIMITS OF TREE REMOVAL, SELECTIVE PRUNING AND THINNING FOR REVIEW BY THE LANDSCAPE ARCHITECT PRIOR TO ANY CLEARING OPERATIONS. ALL TREE WORK SHALL BE EXECUTED BY A LICENSED ARBORIST.
2. THE CONTRACTOR SHALL TAKE ALL MEASURES NECESSARY TO PROTECT EXISTING VEGETATION THAT IS DESIGNATED, "TO REMAIN".
3. ALL TREES TO BE SAVED SHALL BE PROTECTED. SEE SPECIFICATION FOR TREE PROTECTION REQUIREMENTS.
4. EXISTING ON SITE TOPSOIL MAY BE REUSED UPON APPROVAL BY THE LANDSCAPE ARCHITECT. EXISTING TOPSOIL SHALL BE TESTED AND AMENDED FOR NUTRIENTS, ORGANIC MATTER, PH, AND SOIL TEXTURE. – SEE SPECIFICATIONS.
5. REMOVE ALL ROCKS AND DEBRIS FROM SOIL SURFACE AND GRADE TO AN EVEN SURFACE. – SEE SPECIFICATIONS.
6. COMPLETE QUANTITIES OF PLANTS FOR EACH AREA TO BE AVAILABLE ON SITE AT THE TIME OF PLANTING FOR FIELD LAYOUT BY OWNER'S REPRESENTATIVE. NO PARTIAL LAYOUT AND PLANTING OF AREAS WILL BE ACCEPTABLE.
7. ALL PLANT MATERIAL SHALL CONFORM TO THE MINIMUM GUIDELINES ESTABLISHED BY THE AMERICAN STANDARD FOR NURSERY STOCK PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMEN, INC. – SEE SPECIFICATION FOR DETAILED REQUIREMENTS.
8. ANY PROPOSED SUBSTITUTIONS OF PLANT MATERIAL SHALL BE MADE WITH MATERIAL EQUIVALENT TO THE DESIRED MATERIAL IN OVERALL FORM, HEIGHT, BRANCHING HABIT, FLOWER, LEAF, COLOR, FRUIT AND CULTURE. NO SUBSTITUTION OF PLANT SPECIES OR VARIETIES WILL BE ACCEPTABLE WITHOUT LANDSCAPE ARCHITECT'S WRITTEN APPROVAL.
9. OWNER'S REPRESENTATIVE TO APPROVE PLANT MATERIAL PRIOR TO DELIVERY TO SITE AND AGAIN AT THE PROJECT SITE PRIOR TO PLANTING.
10. VERIFY ALL EXISTING UTILITY LINES PRIOR TO PLANTING AND REPORT ANY CONFLICTS TO THE OWNER OR HIS REPRESENTATIVE.
11. NO PLANTING SHALL OCCUR PRIOR TO ACCEPTANCE OF FINAL GRADING.
12. INSTALL PLANTS WITH ROOT FLARES FLUSH WITH GRADE. IMMEDIATELY REPLANT PLANTS WHICH SETTLE OUT OF PLUMB OR BELOW FINISH GRADE.
13. SEE SPECIFICATIONS FOR PLANTING MAINTENANCE AND GUARANTEE REQUIREMENTS.
14. THE LANDSCAPE ARCHITECT OR ENGINEER RESERVES THE RIGHT TO ADJUST FINAL GRADES IN THE FIELD TO SAVE EXISTING VEGETATION.
15. PLANT QUANTITIES NOTED IN THE PLANT SCHEDULE ARE APPROXIMATE AND ARE PROVIDED FOR THE CONVENIENCE OF THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FURNISHING AND INSTALLATION OF ALL PLANT MATERIALS NOTED ON THE PLANTING PLAN.
16. CAUTION SHALL BE USED NOT TO EXTEND MULCH LAYER ABOVE SOIL LEVEL AT TRUNKS/STEMS OF INSTALLED PLANT MATERIAL.
17. PROVIDE FOUR (4) FOOT DIAMETER MULCH CIRCLE AROUND ALL INDIVIDUAL TREE PLANTINGS AND CONTINUOUS MULCH BED AROUND SHRUB, PERENNIAL AND GROUNDCOVER PLANTINGS, UNLESS OTHERWISE NOTED. DO NOT MOUND SOIL OR MULCH AT TRUNKS.
18. ALL PLANTING SHALL BE DONE UNDER FULL SUPERVISION OF CERTIFIED ARBORIST, NURSERYMAN, OR LICENSED LANDSCAPE ARCHITECT.
19. LOOSE OR CRACKED ROOTBALLS SHALL BE REJECTED.

SEWER DESIGN NOTES:

1. SEWER DESIGN IN ACCORDANCE WITH CT PUBLIC HEALTH CODE ON-SITE SEWAGE DISPOSAL REGULATIONS AND TECHNICAL STANDARDS FOR SUBSURFACE SEWAGE DISPOSAL SYSTEMS (SSDS), REVISED JANUARY 2018.
2. TOTAL NUMBER OF PROPOSED BEDROOMS = 73
3. PER SECTION IV.A, DESIGN FLOW = 150 GPD/BEDROOM
4. DESIGN FLOW = 150 GPD X 73 BEDROOMS = 10,950 GPD
5. MINIMUM PUMP CHAMBER SIZE = 10,950 GPD X 4 HOURS = 1,825 GALLONS
6. PUMP CHAMBER SIZE USED = 2,000 GALLONS

GRADING AND DRAINAGE NOTES:

1. CONTRACTOR SHALL NOTIFY "CALL BEFORE YOU DIG" (1-800-922-4455) AND VERIFY UTILITY MARK-OUT WITH THE OWNER PRIOR TO THE INITIATION OF ANY SITE DISTURBANCE.
2. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR VERIFICATION OF THE LOCATION AND NATURE OF ALL SUBSURFACE UTILITIES AT THE PROJECT WHICH MAY BE AFFECTED BY THE WORK. COORDINATE WITH RESPECTIVE UTILITY OWNERS AND PERFORM VERIFICATION OF TYPE, LOCATION AND INVERTS AS REQUIRED.
3. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY AND ALL DISCREPANCIES BETWEEN EXISTING CONDITIONS AND THE CONTRACT DOCUMENTS BEFORE PROCEEDING WITH THAT PORTION OF THE WORK.
4. THE LOCATIONS OF EXISTING SITE FEATURES AS SHOWN HAVE BEEN OBTAINED FROM MAPS, SURVEYS, FIELD INSPECTIONS, AND OTHER AVAILABLE INFORMATION. THEY MUST BE CONSIDERED APPROXIMATE BOTH TO LOCATION, SIZE, AND AS-BUILT CONDITION AND ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING ACTUAL FIELD CONDITIONS.
5. THE DIMENSIONS SHOWN ON THE PLANS, INCLUDING THE INTENDED DIMENSIONS OF THE WORK, MAY VARY FROM ACTUAL EXISTING CONDITIONS IN THE FIELD. THE CONTRACTOR SHALL TAKE APPROPRIATE MEASUREMENTS TO VERIFY ALL DIMENSIONS SHOWN ON THE DRAWINGS AS WELL AS OTHER DIMENSIONS HE MAY DEEM APPROPRIATE TO FACILITATE THE COMPLETION OF THE WORK.
6. ENGAGE A CONNECTICUT-LICENSED LAND SURVEYOR TO PERFORM LAND-SURVEYING SERVICES REQUIRED, INCLUDING, BUT NOT LIMITED TO VERIFICATION AND LAYOUT OF PROPOSED IMPROVEMENTS, DIMENSIONS, AND ELEVATIONS. REPORT DISCREPANCIES TO THE ENGINEER.
7. UNLESS OTHERWISE INDICATED, ALL DISTURBED AREAS SHALL BE RESTORED WITH SIX (6) INCHES OF LOAM, SEEDED, FERTILIZED, AND MULCHED. PROVIDE ADDITIONAL EROSION CONTROLS AS REQUIRED.
8. NO TOPSOIL IS TO BE REMOVED FROM THE SITE.
9. COMPLY WITH CONNECTICUT BUILDING CODE FOR ALL SITE CONSTRUCTION, INCLUDING HANDICAPPED ACCESSIBILITY.
10. THE CROSS-SLOPE OF ANY SIDEWALK, WALKWAY, OR OTHER PEDESTRIAN SURFACE SHALL NOT BE STEEPER THAN 1:48 (2%).
11. ACCESSIBLE ROUTES SHALL COMPLY WITH CONNECTICUT BUILDING CODE. THE RUNNING SLOPE OF WALKING SURFACES SHALL NOT BE STEEPER THAN 1:20 (5%). THE CROSS SLOPE OF A WALKING SURFACE SHALL NOT BE STEEPER THAN 1:48 (2%).
12. RAMPS SHALL COMPLY WITH CT BUILDING CODE, REF. 2012 IBC SECTION 1010 AND ICC/ANSI A117.1 2009 CHAPTER 4, SECTION 405.
13. VERIFY ALL GRADES AND SLOPES PRIOR TO CONCRETE PLACEMENT. REPORT DISCREPANCIES TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.
14. PROPOSED GRADES INDICATE DESIGN INTENT. VERIFY ELEVATIONS AND MAKE ADJUSTMENTS TO MEET FIELD CONDITIONS. DO NOT PROCEED WITH ANY ADJUSTMENT OR FIELD MODIFICATION UNTIL APPROVED BY THE ENGINEER.
15. GRADE TRANSITION BETWEEN TOPOGRAPHIC LINES AND SPOT GRADES SHALL BE UNIFORM UNLESS OTHERWISE INDICATED.
16. UNLESS OTHERWISE INDICATED, BLEND TRANSITIONS IN ELEVATION BETWEEN NEW WORK AND AREAS TO REMAIN AT A MAXIMUM SLOPE OF 1V:2H AND RESTORE WITH FOUR (4) INCHES OF LOAM AND SEED. PROVIDE ADDITIONAL EROSION CONTROLS AS REQUIRED. COORDINATE WITH ENGINEER IF DIMENSIONAL CONSTRAINTS REQUIRE STEEPER SLOPES.
17. UPON REACHING PROPOSED SUBGRADE ELEVATIONS WITHIN THE FIELD, ENGINEER WILL REVIEW SUBGRADE PRIOR TO INSTALLATION OF DRAINAGE SYSTEM. SEE SPECIFICATION SECTION 31 2310 – EARTHWORK.
18. ALL CATCH BASINS AND SHALLOW DROP INLETS SET AGAINST CURBS SHALL BE CONNDOT TYPE "C". ALL OTHERS SHALL BE CONNDOT TYPE "C-L"..
19. ALL UNDERDRAINS SHALL BE 6-INCH HDPE. SEE SPECIFICATIONS.
20. THE TOPS, RIMS, FRAMES, GRATES, AND COVERS (AS APPLICABLE) OF ALL UTILITY STRUCTURES THAT ARE TO REMAIN SHALL BE ADJUSTED TO MATCH FINAL GRADE IN A FLUSH CONDITION. ALL NEW UTILITY STRUCTURES SHALL BE INSTALLED WITH TOPS, RIMS, FRAMES, GRATES, AND COVERS (AS APPLICABLE) TO FINAL GRADE IN A FLUSH CONDITION.
21. AT THE CONCLUSION OF THE WORK, CONTRACTOR SHALL REMOVE ALL ACCUMULATED SEDIMENT MATERIAL FROM ALL PORTIONS OF THE STORM DRAINAGE SYSTEM, INCLUDING NEW WORK AND EXISTING WORK THAT REMAINS OR IS INCORPORATED INTO THE NEW SYSTEM.

OPERATION AND MAINTENANCE PLAN:

THE FOLLOWING MAINTENANCE PROCEDURES SHALL BE FOLLOWED BY THE CONTRACTOR FOR TEMPORARY AND PERMANENT EROSION AND SEDIMENTATION MEASURES AND STORMWATER TREATMENT SYSTEMS INSTALLED DURING THE CONSTRUCTION PERIOD:

- DUST CONTROL: MOISTEN DISTURBED SOIL AREAS WITH WATER PERIODICALLY, OR USE A NON-ASPHALTIC SOIL TACIFIER TO MINIMIZE DUST.
- TEMPORARY SEEDING: INSPECT WEEKLY AND WITHIN 24 HOURS OF A STORM GENERATING A DISCHARGE. CONTINUE INSPECTION UNTIL VEGETATION IS FIRMLY ESTABLISHED.
- PERMANENT SEEDING: INSPECT SEEDED AREAS WEEKLY AND WITHIN 24 HOURS AFTER A STORM GENERATING A DISCHARGE. CONTINUE INSPECTION UNTIL VEGETATION IS FIRMLY ESTABLISHED.
- TEMPORARY SOIL PROTECTION: INSPECT SEEDED AREAS WEEKLY AND WITHIN 24 HOURS AFTER A STORM GENERATING A DISCHARGE.
- TEMPORARY EROSION CONTROL MAT: INSPECT MATS WEEKLY AND WITHIN 24 HOURS AFTER A STORM GENERATING A DISCHARGE.
- CATCH BASIN FILTER INSERTS: INSPECT THE FABRIC AT LEAST ONCE A WEEK AND WITHIN 24 HOURS AFTER THE END OF A STORM GENERATING A DISCHARGE. CHECK THE FABRIC FOR STRUCTURAL SOUNDNESS (I.E. TEARS), PROPER ANCHORING/ALIGNMENT WITHIN THE GRATE AND ABILITY TO DRAIN RUNOFF (I.E. PERCENT OF CLOGGING BY SEDIMENT). REMOVE THE SEDIMENT EVERY WEEK, OR SOONER IF PONDING IS EXCESSIVE. EACH TIME THE SEDIMENT IS REMOVED, REPLACE THE SECTION OF FABRIC REMOVED WITH A NEW SECTION. DO NOT REMOVE THE SEDIMENT AND REUSE THE SAME SECTION OF FABRIC.
- HAY BALE/ SILT FENCE BARRIER: INSPECT THE BARRIER AT LEAST ONCE A WEEK AND WITHIN 24 HOURS AFTER THE END OF A STORM GENERATING A DISCHARGE. FOR DEWATERING OPERATIONS, INSPECT FREQUENTLY BEFORE, DURING AND AFTER PUMPING OPERATIONS. REMOVE THE SEDIMENT DEPOSITS WHEN THE DEPTH REACHES ONE HALF THE BARRIER HEIGHTS. REPAIR OR REPLACE A BARRIER WITHIN 24 HOURS OF OBSERVED FAILURE. MAINTAIN THE BARRIER UNTIL THE CONTRIBUTING DISTURBED AREA IS STABILIZED.
- CONSTRUCTION ENTRANCE/EXIT PAD: MAINTAIN THE PAD IN A CONDITION THAT WILL PREVENT TRACKING AND WASHING OF SEDIMENT ONTO PAVED SURFACES. PLACE ADDITIONAL CLEAN GRAVEL ON TOP OF GRAVEL THAT HAS BECOME SILTED, OR REMOVE THE SILTED GRAVEL AND REPLACE THE GRAVEL TO THE DEPTH REMOVED WITH CLEAN GRAVEL, AS CONDITIONS WARRANT. REMOVE IMMEDIATELY ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PAVED SURFACES. ROADS ADJACENT TO THE CONSTRUCTION SITE SHALL BE CLEANED AT THE END OF EACH DAY BY HAND SWEEPING OR SWEEPER TRUCK.
- DEWATERING SETTLING BASIN (IF USED): INSPECT THE BASIN AT LEAST EVERY TWO HOURS DURING PERIODS OF USE. REMOVE ACCUMULATED SEDIMENTS WHEN THE VOLUME EQUALS ONE HALF THE PROVIDED STORAGE VOLUME.
- EXISTING CATCH BASINS AND SUMPS: INSPECT THE SEDIMENT TRAPS AS SPECIFIED IN "F" ABOVE. AFTER FINAL REMOVAL OF THE SEDIMENT TRAPS AT THE END OF CONSTRUCTION, CLEAN THE SUMP OF ALL SILT AND DEBRIS.
- NEW CATCH BASINS AND SUMPS: AS NEW CATCH BASINS ARE CONSTRUCTED, A FILTER INSERT SHALL BE INSTALLED IN THE UNIT AND A SEDIMENT BARRIER INSTALLED AROUND THE GRATE. INSPECT THE FILTER AND BARRIER WEEKLY AND WITHIN 24 HOURS AFTER A STORM GENERATING A DISCHARGE. AFTER STABILIZATION OF THE DRAINAGE AREA ENTERING THE CATCH BASIN, REMOVE THE FILTER AND BARRIER AND CLEAN THE BASIN SUMP OF ALL SILT AND DEBRIS.
- TEMPORARY STOCKPILES: INSPECT TEMPORARY STOCKPILES AT THE END OF EACH WORKDAY TO ENSURE THAT TARPS ARE IN PLACE AND SECURED. TEMPORARY STOCKPILES THAT ARE EXPECTED TO BE INACTIVE FOR MORE THAN 30 DAYS SHOULD BE TEMPORARILY SEEDED (SEE ABOVE).

AFTER CONSTRUCTION IS COMPLETED AND ACCEPTED BY THE OWNER, IT SHALL BE THE RESPONSIBILITY OF THE OWNER TO MAINTAIN ALL DRAINAGE STRUCTURES. IN ADDITION, THE FOLLOWING INSPECTION AND MAINTENANCE GUIDELINES SHALL BE THE RESPONSIBILITY OF THE OWNER, OR THE OWNER'S REPRESENTATIVE, BEGINNING THE FIRST YEAR PERIOD FOLLOWING CONSTRUCTION COMPLETION AND ACCEPTANCE, AND SHALL BE FOLLOWED EACH YEAR THEREAFTER:

- PARKING LOT AND SITE CLEANUP: INSPECT ON A REGULAR BASIS NOT TO EXCEED WEEKLY FOR LITTER AND DEBRIS.
- PARKING LOT AND DRIVEWAY SWEEPING: AT LEAST TWICE A YEAR, WITH THE FIRST OCCURRING AS SOON AS POSSIBLE AFTER SNOWMELT AND THE SECOND NOT LESS THAN 90 DAYS FOLLOWING THE FIRST.
- CATCH BASIN SUMPS: SHALL BE INSPECTED SEMI-ANNUALLY AND CLEANED WHEN THE SUMP IS ONE HALF FULL OF SILT AND / OR DEBRIS.
- HYDRODYNAMIC SEPARATOR: SHALL BE INSPECTED AND CLEANED ANNUALLY.
- LANDSCAPED AREAS: INSPECT SEMI-ANNUALLY FOR EROSION OR DYING VEGETATION. REPAIR AND STABILIZE ANY BARE OR ERODED AREAS AND REPLACE VEGETATION AS SOON AS POSSIBLE.
- ABOVE-GROUND DETENTION BASIN: SHALL BE INSPECTED SEMI-ANNUALLY AND CLEANED OF ANY SEDIMENT AND/OR DEBRIS. SHALL BE MOWED ANNUALLY.
- UNDERGROUND DETENTION SYSTEMS: SHALL BE INSPECTED SEMI-ANNUALLY AND CLEANED OF ANY SEDIMENT AND/OR DEBRIS.

DEEP TEST PIT RESULTS:

DEEP TESTS PERFORMED ON 02/08/2020 BY BSC GROUP. SEE SHEET C-4.0 FOR LOCATIONS OF DEEP TESTS.

TH-1 (APPROX. GROUND EL. 619.00±)
0-8" TOPSOIL
8-40" BROWN SANDY LOAM
40-100" BROWN SAND WITH SOME FINES

GW @ 100"
NO MOTTLING
RESTRICTIVE LAYER @ EL. 610.67±

TH-2 (APPROX. GROUND EL. 615.75±)
0-12" TOPSOIL
12-20" BROWN SAND
20-72" GRAY GLACIAL TILL

GW @ 54"
MOTTLING @ 48"
RESTRICTIVE LAYER @ EL. 611.75±

TH-3 (APPROX. GROUND EL. 614.75±)
0-12" TOPSOIL
12-60" BROWN SILTY SAND

GW @ 60"
MOTTLING @ 38"
RESTRICTIVE LAYER @ EL. 611.58±

TH-4 (APPROX. GROUND EL. 616.50±)
0-12" TOPSOIL
12-36" BROWN SAND
36-84" GRAY GLACIAL TILL

POSSIBLE LEDGE @ 84"
GW @ 84"
RESTRICTIVE LAYER @ EL. 609.50±

TH-5 (APPROX. GROUND EL. 618.50±)
0-12" TOPSOIL
12-24" BROWN SANDY LOAM
24-84" BROWN FINE SAND

GW @ 80"
NO MOTTLING
RESTRICTIVE LAYER @ EL. 611.83±

TH-6 (APPROX. GROUND EL. 619.75±)
0-12" TOPSOIL
12-40" BROWN SAND WITH FINES
40-96" GRAY FINE SAND

NO GW OBSERVED
NO MOTTLING
RESTRICTIVE LAYER @ EL. 611.75±

ISSUED FOR PERMITTING

STATE OF CONNECTICUT · ROBERT S. NEWTON · No. 20662 · LICENSED PROFESSIONAL ENGINEER

ROBERT NEWTON, PE No. 20662

EAGLEVILLE GREEN

113-121 SOUTH EAGLEVILLE ROAD
IN
MANSFIELD
CONNECTICUT

GENERAL NOTES

NOVEMBER 25, 2019

REVISIONS:

1	01/20/2020	PER TOWN COMMENTS
2	01/31/2020	PER TOWN COMMENTS
3	02/12/2020	PER TEST PIT RESULTS
4	03/02/2020	PER TOWN COMMENTS

PREPARED FOR:
MANSFIELD HOUSING DEV. CORP.
309 MAPLE ROAD
STORRS, CT 06268

BSC GROUP
300 Winding Brook Drive
Glastonbury, Connecticut 06033
860 652 8227

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SCALE: 1" = 30'
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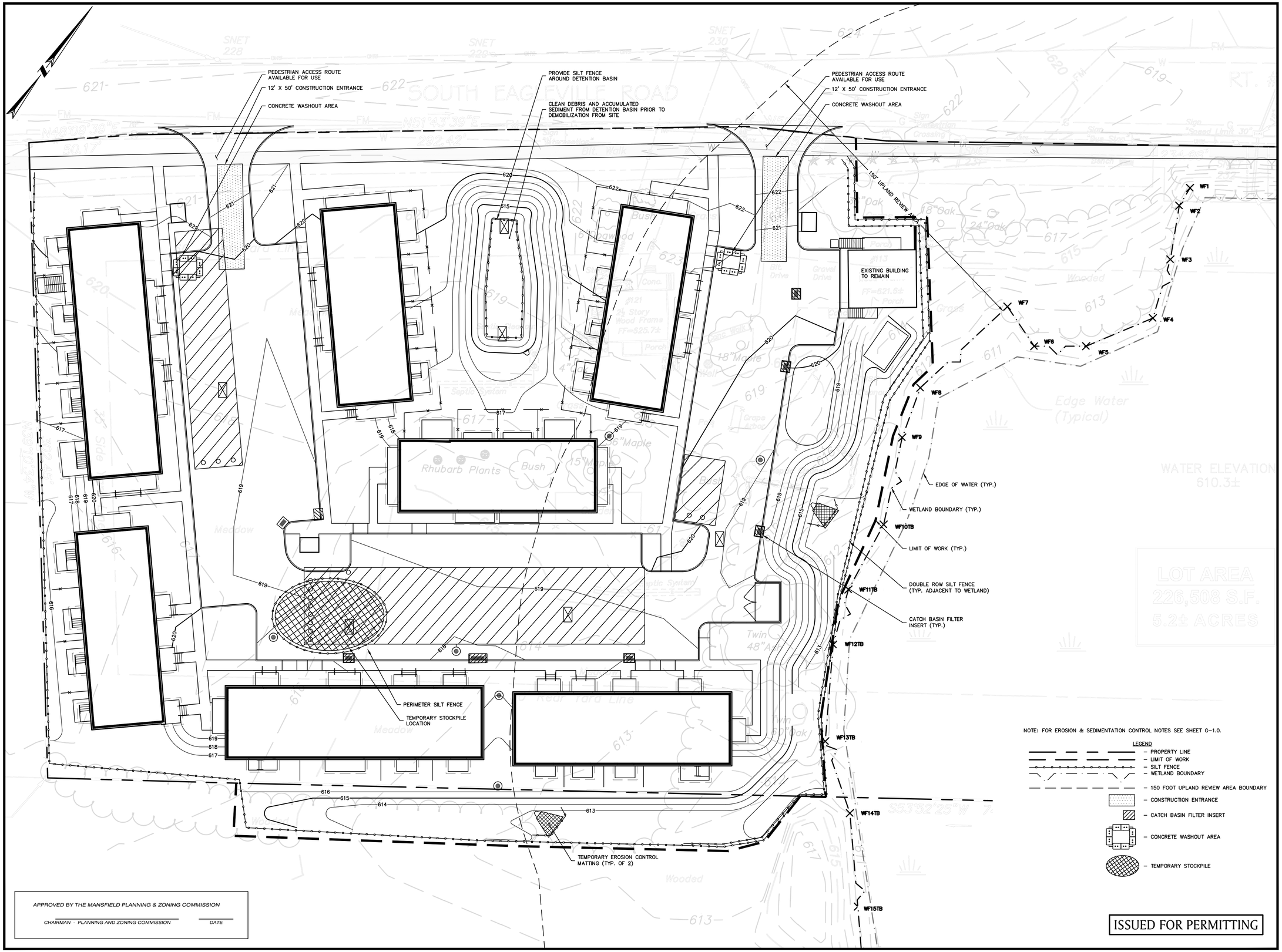
DWG. NO: G-1.0
JOB. NO: 83749.00



NOTE: FOR EROSION & SEDIMENTATION CONTROL NOTES SEE SHEET G-1.0.

LEGEND

- PROPERTY LINE
- LIMIT OF WORK
- SILT FENCE
- WETLAND BOUNDARY
- 150 FOOT UPLAND REVIEW AREA BOUNDARY
- CONSTRUCTION ENTRANCE
- CATCH BASIN FILTER INSERT
- CONCRETE WASHOUT AREA
- TEMPORARY STOCKPILE

ISSUED FOR PERMITTING

APPROVED BY THE MANSFIELD PLANNING & ZONING COMMISSION

CHAIRMAN - PLANNING AND ZONING COMMISSION _____ DATE _____

EAGLEVILLE GREEN - NOVEMBER 25, 2019

STATE OF CONNECTICUT ROBERT S. NEWTON No. 20662 LICENSED PROFESSIONAL ENGINEER

ROBERT NEWTON, PE No. 20662

EAGLEVILLE GREEN

113-121 SOUTH EAGLEVILLE ROAD
IN
MANSFIELD
CONNECTICUT

EROSION & SEDIMENTATION CONTROL PLAN

NOVEMBER 25, 2019

REVISIONS:

1	01/20/2020	PER TOWN COMMENTS
2	01/31/2020	PER TOWN COMMENTS
3	02/12/2020	PER TEST PIT RESULTS
4	03/02/2020	PER TOWN COMMENTS

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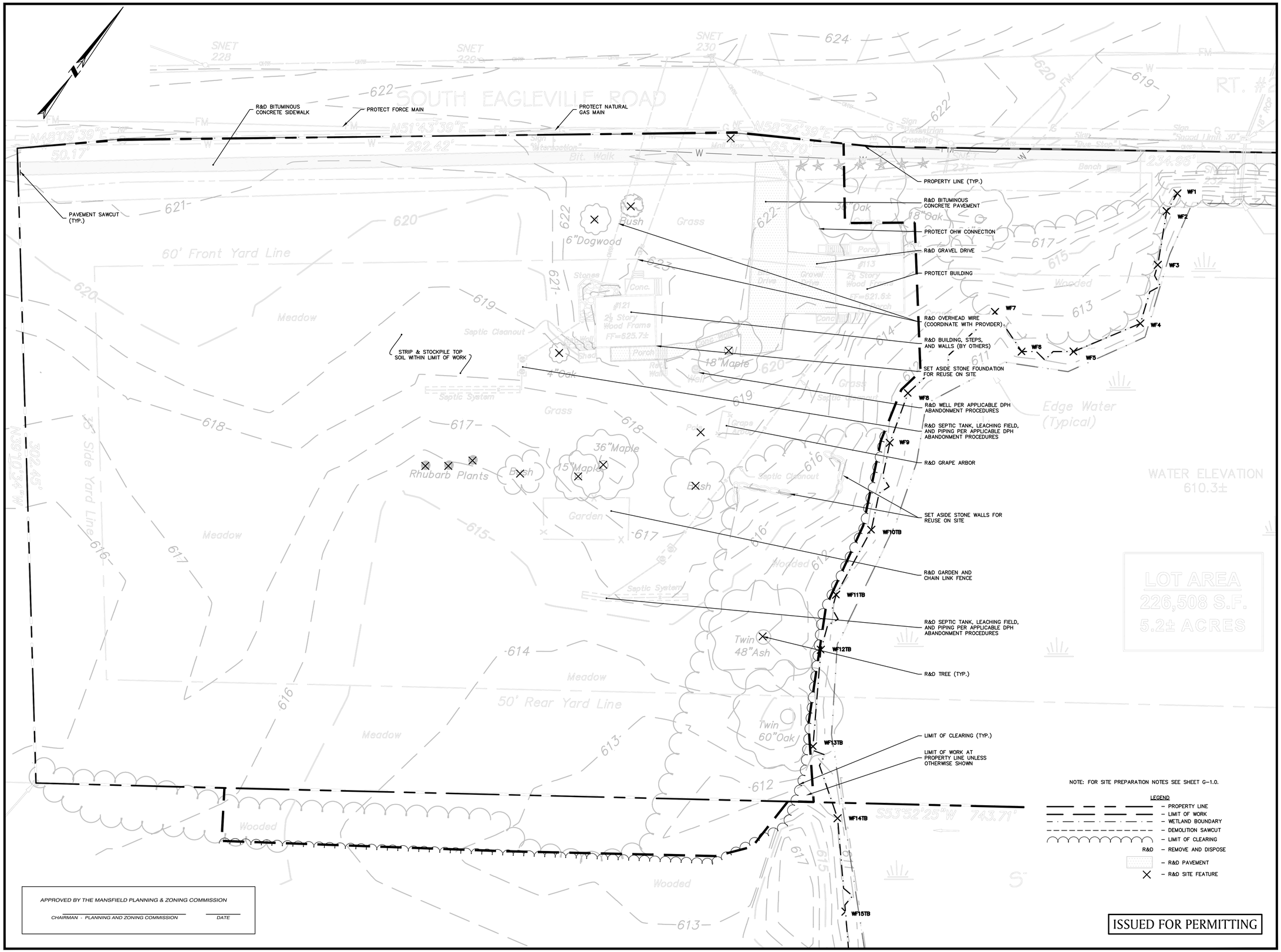
DWG. NO: C-1.0
JOB. NO: 83749.00



EAGLEVILLE GREEN - NOVEMBER 25, 2019

STATE OF CONNECTICUT ROBERT S. NEWTON No. 20662 LICENSED PROFESSIONAL ENGINEER

ROBERT NEWTON, PE No. 20662

EAGLEVILLE GREEN

113-121 SOUTH EAGLEVILLE ROAD
IN
MANSFIELD
CONNECTICUT

SITE PREPARATION PLAN

NOVEMBER 25, 2019

REVISIONS:

1	01/20/2020	PER TOWN COMMENTS
2	01/31/2020	PER TOWN COMMENTS
3	02/12/2020	PER TEST PIT RESULTS

PREPARED FOR:
MANSFIELD HOUSING DEV. CORP.
309 MAPLE ROAD
STORRS, CT 06268

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860 652 8227

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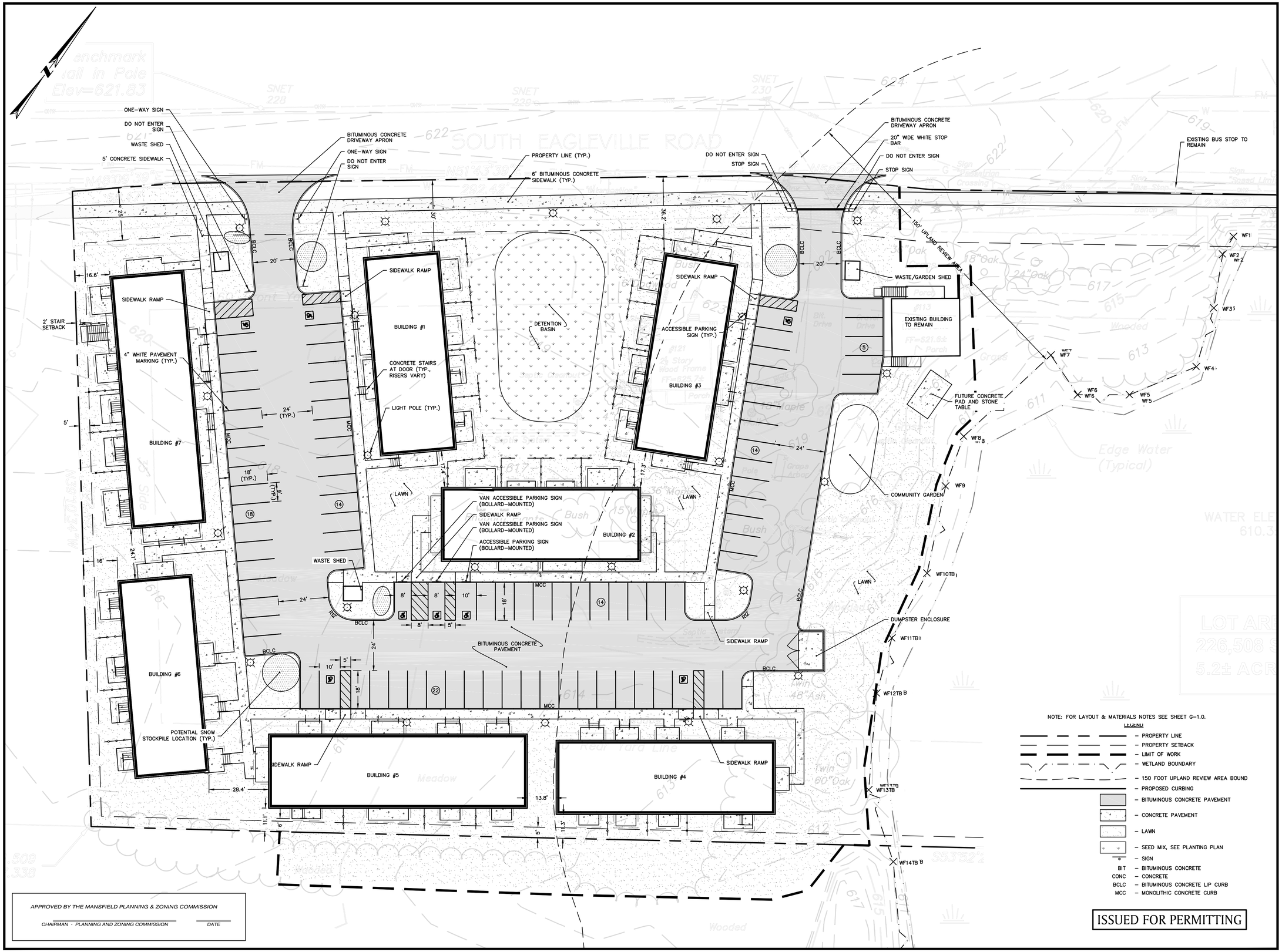
SCALE: 1" = 20'
0 10 20 40 FEET

FILE: 8374900-PREP.DWG
DWG. NO:
JOB. NO: 83749.00

C-2.0



APPROVED BY THE MANSFIELD PLANNING & ZONING COMMISSION

CHAIRMAN - PLANNING AND ZONING COMMISSION _____ DATE _____

NOTE: FOR LAYOUT & MATERIALS NOTES SEE SHEET G-1.0.

LEGEND

- PROPERTY LINE
- PROPERTY SETBACK
- LIMIT OF WORK
- WETLAND BOUNDARY
- 150 FOOT UPLAND REVIEW AREA BOUND
- PROPOSED CURBING
- BITUMINOUS CONCRETE PAVEMENT
- CONCRETE PAVEMENT
- LAWN
- SEED MIX, SEE PLANTING PLAN
- SIGN

BIT – BITUMINOUS CONCRETE
CONC – CONCRETE
BCLC – BITUMINOUS CONCRETE LIP CURB
MCC – MONOLITHIC CONCRETE CURB

ISSUED FOR PERMITTING

EAGLEVILLE GREEN - NOVEMBER 25, 2019

STATE OF CONNECTICUT ROBERT S. NEWTON No. 20662 LICENSED PROFESSIONAL ENGINEER

ROBERT NEWTON, PE No. 20662

EAGLEVILLE GREEN

113-121 SOUTH EAGLEVILLE ROAD
IN
MANSFIELD
CONNECTICUT

LAYOUT & MATERIALS PLAN

NOVEMBER 25, 2019

REVISIONS:

1	01/20/2020	PER TOWN COMMENTS
2	01/31/2020	PER TOWN COMMENTS
3	02/12/2020	PER TEST PIT RESULTS
4	03/02/2020	PER TOWN COMMENTS

PREPARED FOR:
MANSFIELD HOUSING DEV. CORP.
309 MAPLE ROAD
STORRS, CT 06268

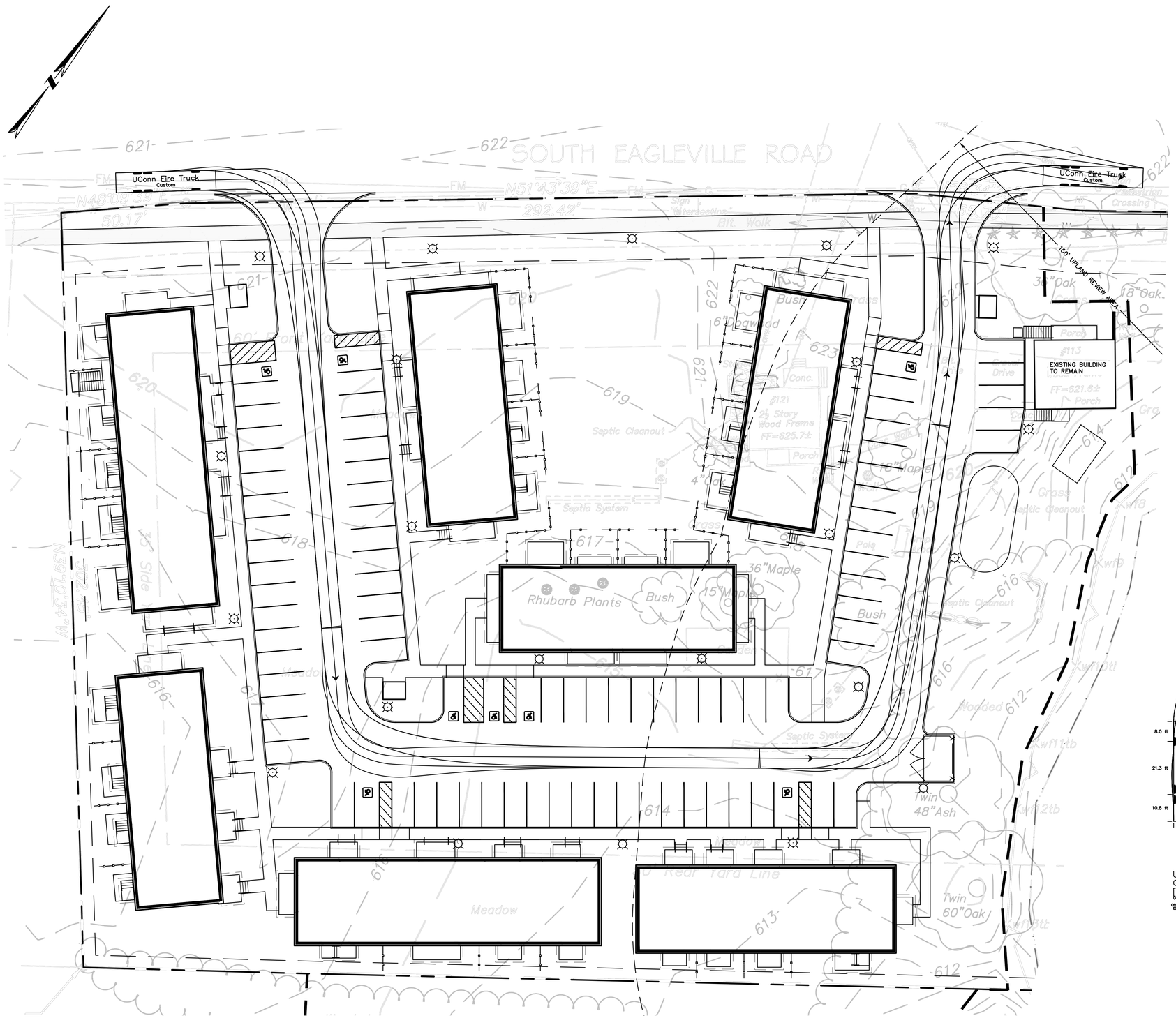
BSC GROUP
300 Winding Brook Drive
Glastonbury, Connecticut 06033
860 652 8227

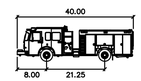
© 2019 BSC GROUP, INC.

SCALE: 1" = 20'
0 10 20 40 FEET

FILE: 8374900-LM.DWG
DWG. NO:
JOB. NO: 83749.00

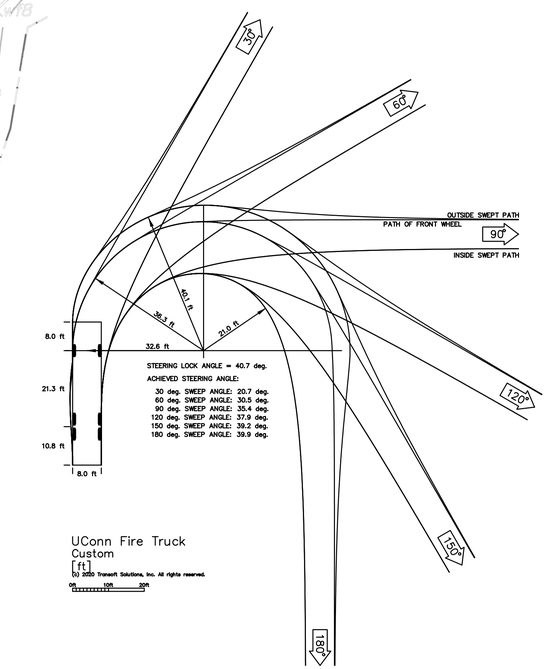
C-3.0





UConn Fire Truck

	feet
Width	: 8.00
Track	: 8.00
Lock to Lock Time	: 6.0
Steering Angle	: 40.7



ISSUED FOR PERMITTING

EAGLEVILLE GREEN - NOVEMBER 25, 2019

STATE OF CONNECTICUT ROBERT S. NEWBURY No. 20662 LICENSED PROFESSIONAL ENGINEER

ROBERT S. NEWBURY, P.E. No. 20662

EAGLEVILLE GREEN

113-121 SOUTH EAGLEVILLE ROAD
IN
MANSFIELD
CONNECTICUT

UCONN FIRE TRUCK TURNING MOVEMENT PLAN

NOVEMBER 25, 2019

REVISIONS:

1	01/20/2020	PER TOWN COMMENTS
2	01/31/2020	PER TOWN COMMENTS
3	02/12/2020	PER TEST PIT RESULTS

PREPARED FOR:
MANSFIELD HOUSING DEV. CORP.
309 MAPLE ROAD
STORRS, CT 06268

BSC GROUP
300 Winding Brook Drive
Glastonbury, Connecticut 06033
860 652 8227

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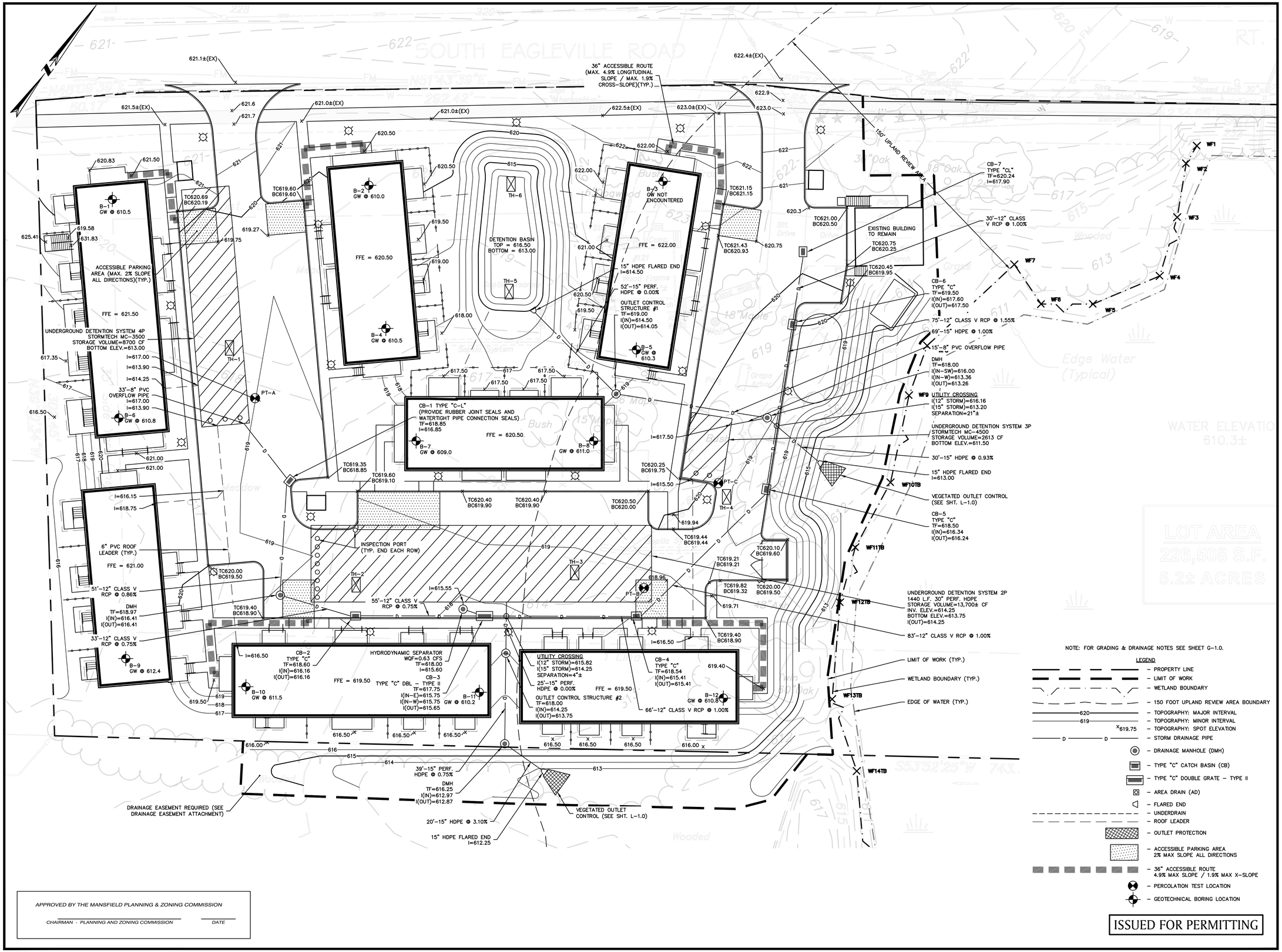
SCALE: 1" = 20'
0 10 20 40 FEET

FILE: 8374900–AUTOTURN.DWG
DWG. NO:
JOB. NO: 83749.00

C-3.1



NOTE: FOR GRADING & DRAINAGE NOTES SEE SHEET G-1.0.

LEGEND

- PROPERTY LINE
- LIMIT OF WORK
- WETLAND BOUNDARY
- 150 FOOT UPLAND REVIEW AREA BOUNDARY
- 620 — TOPOGRAPHY: MAJOR INTERVAL
- 619 — TOPOGRAPHY: MINOR INTERVAL
- x619.75 — TOPOGRAPHY: SPOT ELEVATION
- D — D — STORM DRAINAGE PIPE
- DRAINAGE MANHOLE (DMH)
- TYPE "C" CATCH BASIN (CB)
- TYPE "C" DOUBLE GRATE – TYPE II
- AREA DRAIN (AD)
- FLARED END
- UNDERDRAIN
- ROOF LEADER
- OUTLET PROTECTION
- ACCESSIBLE PARKING AREA 2% MAX SLOPE ALL DIRECTIONS
- 36" ACCESSIBLE ROUTE 4.9% MAX SLOPE / 1.9% MAX X-SLOPE
- PERCOLATION TEST LOCATION
- GEOTECHNICAL BORING LOCATION

ISSUED FOR PERMITTING

APPROVED BY THE MANSFIELD PLANNING & ZONING COMMISSION

CHAIRMAN - PLANNING AND ZONING COMMISSION DATE

EAGLEVILLE GREEN - NOVEMBER 25, 2019

STATE OF CONNECTICUT ROBERT S. NEWTON No. 20662 LICENSED PROFESSIONAL ENGINEER

ROBERT NEWTON, PE No. 20662

EAGLEVILLE GREEN

113-121 SOUTH EAGLEVILLE ROAD
IN
MANSFIELD
CONNECTICUT

GRADING & DRAINAGE PLAN

NOVEMBER 25, 2019

REVISIONS:

1	01/20/2020	PER TOWN COMMENTS
2	01/31/2020	PER TOWN COMMENTS
3	02/12/2020	PER TEST PIT RESULTS
4	02/26/2020	PER REVIEW COMMENTS

PREPARED FOR:
MANSFIELD HOUSING DEV. CORP.
309 MAPLE ROAD
STORRS, CT 06268

BSC GROUP
300 Winding Brook Drive
Glastonbury, Connecticut 06033
860 652 8227

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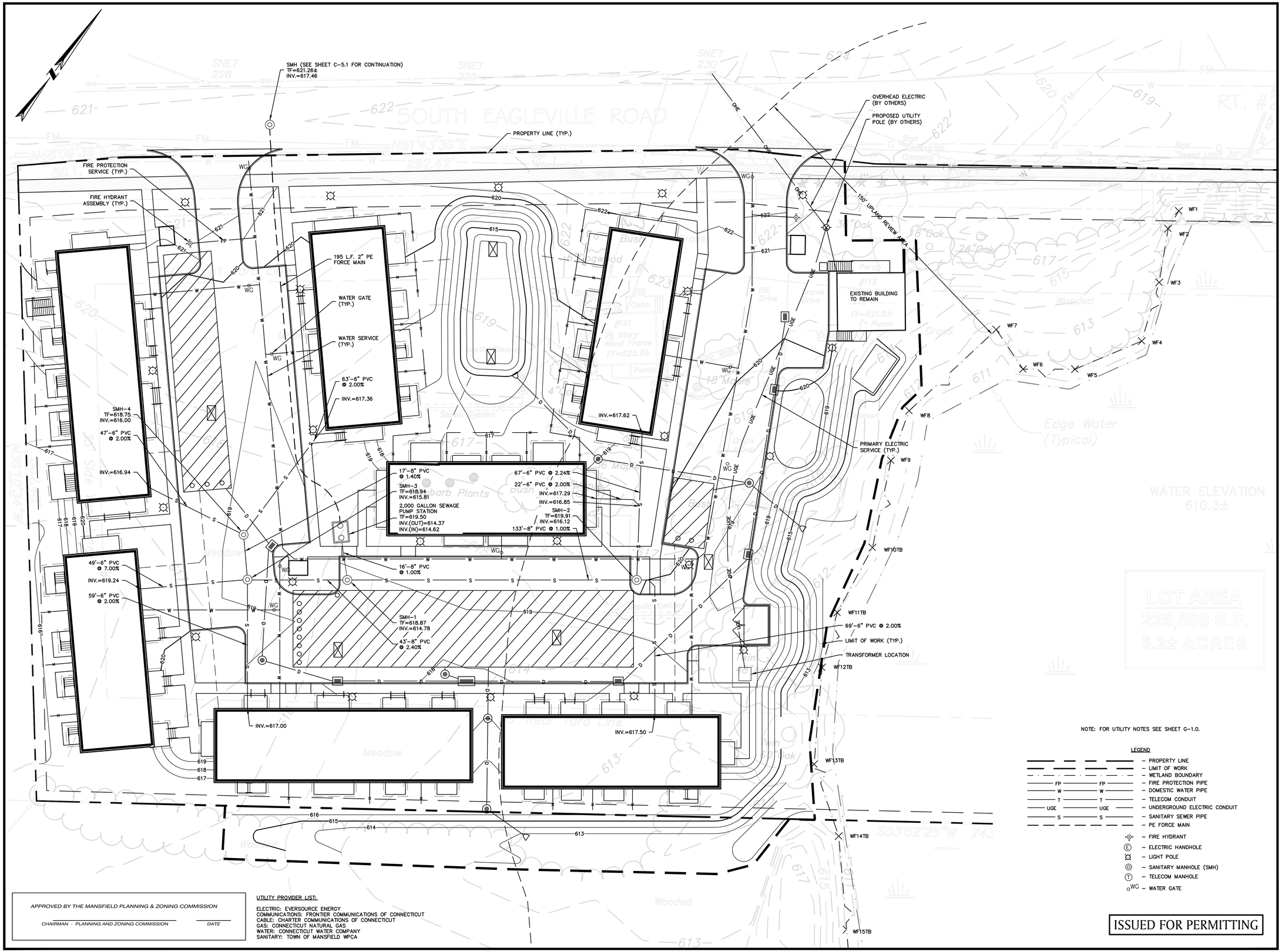
SCALE: 1" = 20'
0 10 20 40 FEET

FILE: 8374900-GRDR.DWG
DWG. NO:
JOB. NO: 83749.00

C-4.0



NOTE: FOR UTILITY NOTES SEE SHEET G-1.0.

LEGEND

- PROPERTY LINE
- LIMIT OF WORK
- WETLAND BOUNDARY
- FIRE PROTECTION PIPE
- DOMESTIC WATER PIPE
- TELECOM CONDUIT
- UNDERGROUND ELECTRIC CONDUIT
- SANITARY SEWER PIPE
- PE FORCE MAIN
- FIRE HYDRANT
- ELECTRIC HANDHOLE
- LIGHT POLE
- SANITARY MANHOLE (SMH)
- TELECOM MANHOLE
- WATER GATE

APPROVED BY THE MANSFIELD PLANNING & ZONING COMMISSION

CHAIRMAN - PLANNING AND ZONING COMMISSION _____ DATE _____

UTILITY PROVIDER LIST:

ELECTRIC: EVERSOURCE ENERGY
COMMUNICATIONS: FRONTIER COMMUNICATIONS OF CONNECTICUT
CABLE: CHARTER COMMUNICATIONS OF CONNECTICUT
GAS: CONNECTICUT NATURAL GAS
WATER: CONNECTICUT WATER COMPANY
SANITARY: TOWN OF MANSFIELD WPCA

ISSUED FOR PERMITTING

STATE OF CONNECTICUT ROBERT S. NEWTON No. 20662 LICENSED PROFESSIONAL ENGINEER

ROBERT NEWTON, PE No. 20662

EAGLEVILLE GREEN

113-121 SOUTH EAGLEVILLE ROAD
IN
MANSFIELD
CONNECTICUT

UTILITY PLAN

NOVEMBER 25, 2019

REVISIONS:

1	01/20/2020	PER TOWN COMMENTS
2	01/31/2020	PER TOWN COMMENTS
3	02/12/2020	PER TEST PIT RESULTS

PREPARED FOR:
MANSFIELD HOUSING DEV. CORP.
309 MAPLE ROAD
STORRS, CT 06268

BSC GROUP
300 Winding Brook Drive
Glastonbury, Connecticut 06033
860 652 8227

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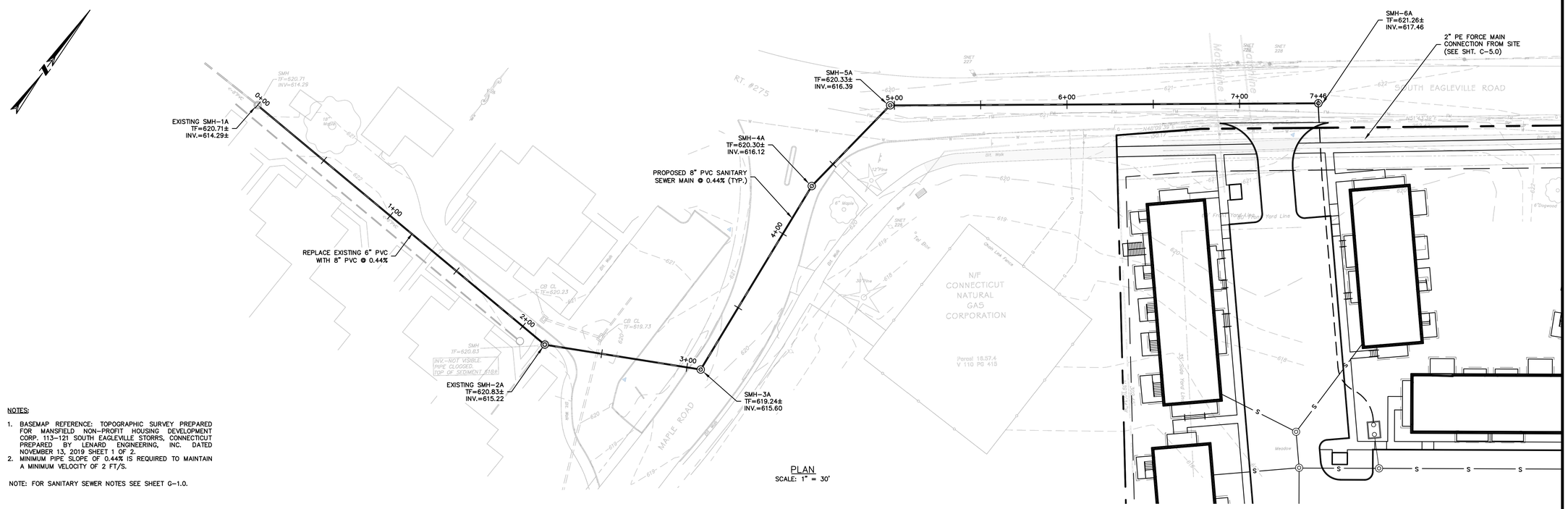
SCALE: 1" = 20'
0 10 20 40 FEET

FILE: 8374900-UT.DWG
DWG. NO:
JOB. NO: 83749.00

C-5.0

EAGLEVILLE GREEN - NOVEMBER 25, 2019



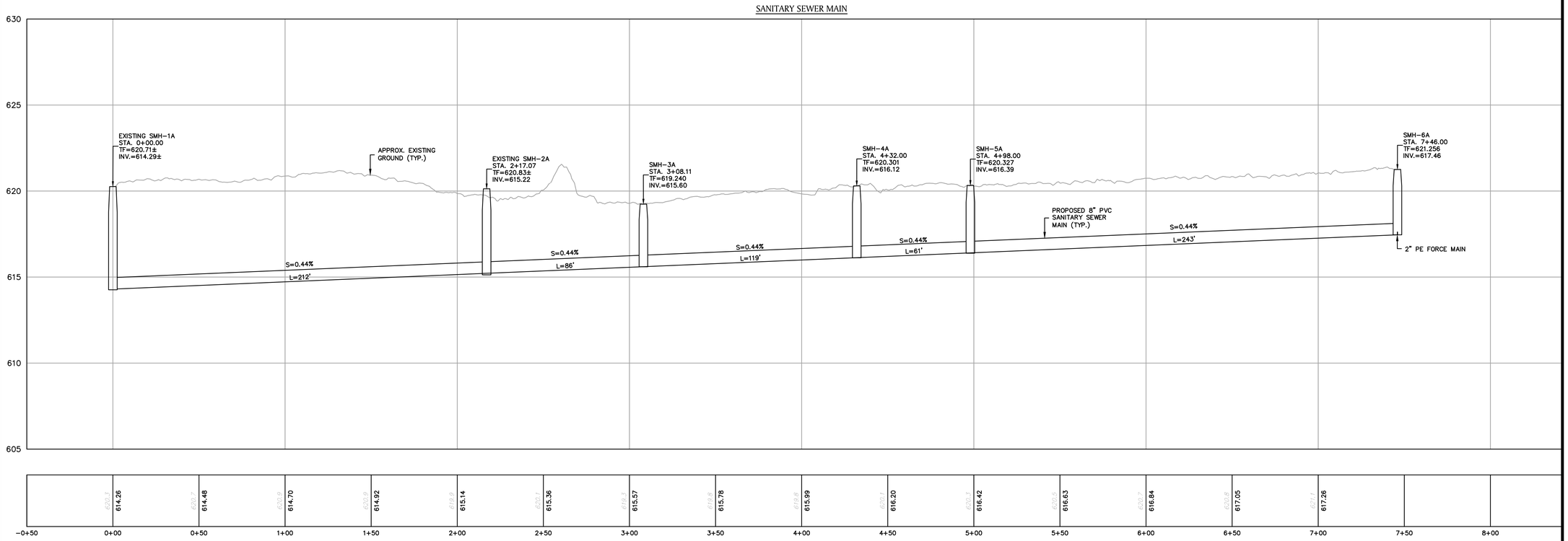
PLAN
SCALE: 1" = 30'

NOTES:

1. BASEMAP REFERENCE: TOPOGRAPHIC SURVEY PREPARED FOR MANSFIELD NON-PROFIT HOUSING DEVELOPMENT CORP. 113-121 SOUTH EAGLEVILLE STORRS, CONNECTICUT PREPARED BY LENARD ENGINEERING, INC. DATED NOVEMBER 13, 2019 SHEET 1 OF 2.
2. MINIMUM PIPE SLOPE OF 0.44% IS REQUIRED TO MAINTAIN A MINIMUM VELOCITY OF 2 FT/S.

NOTE: FOR SANITARY SEWER NOTES SEE SHEET G-1.0.

SANITARY SEWER MAIN



PROFILE
HORIZONTAL SCALE: 1" = 30'
VERTICAL SCALE: 1" = 3'

APPROVED BY THE MANSFIELD PLANNING & ZONING COMMISSION

CHAIRMAN - PLANNING AND ZONING COMMISSION _____ DATE _____

ISSUED FOR PERMITTING

EAGLEVILLE GREEN - NOVEMBER 25, 2019

STATE OF CONNECTICUT
ROBERT S. NEWTON
No. 20662
LICENSED
PROFESSIONAL ENGINEER

ROBERT NEWTON, PE No. 20662

EAGLEVILLE GREEN

113-121 SOUTH
EAGLEVILLE ROAD
IN
MANSFIELD
CONNECTICUT

SANITARY SEWER PLAN & PROFILE

NOVEMBER 25, 2019

REVISIONS:

1	01/20/2020	PER TOWN COMMENTS
2	01/31/2020	PER TOWN COMMENTS
3	02/12/2020	PER TEST PIT RESULTS

PREPARED FOR:
MANSFIELD HOUSING DEV. CORP.
309 MAPLE ROAD
STORRS, CT 06268

BSC GROUP
300 Winding Brook Drive
Glastonbury, Connecticut 06033
860 652 8227

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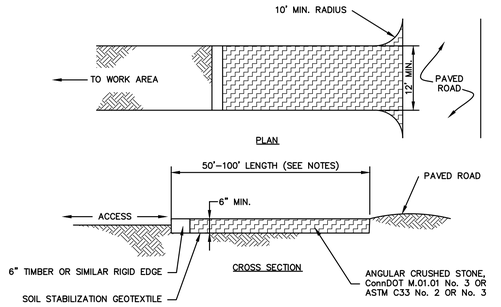
SCALE: 1" = 30'
0 15 30 60 FEET

FILE: 8374900-SEWER_ALT2.DWG
DWG. NO: C-5.1
JOB. NO: 83749.00

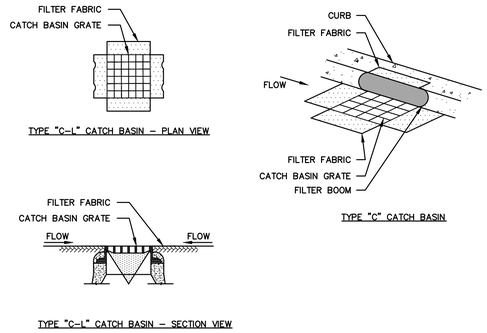


NOTES:

1. REMOVE TOPSOIL AND ORGANICS PRIOR TO CRUSHED STONE PLACEMENT.
2. INSTALL SUB-BASE OF FREE DRAINING BACKFILL OR ROAD STABILIZATION GEOTEXTILE AS NECESSARY ON UNSTABLE SOILS.
3. LENGTH SHALL BE 50 FOOT MINIMUM. WHERE TRACKED SEDIMENTS CONTAIN LESS THAN 80% SAND, LENGTH SHALL BE 100 FOOT MINIMUM.
4. IF THE GRADE OF THE CONSTRUCTION ENTRANCE DRAINS TO THE PAVED SURFACE AND IT EXCEEDS 2% SLOPE, CONSTRUCT ENTRANCE AT LEASE 15 FEET FROM ITS ENTRANCE ONTO THE PAVED SURFACE WHILE DIVERTING RUN-OFF WATER TO A SETTLING OR FILTERING AREA.
5. CONSTRUCT ANY DRAINAGE AND SETTLING FACILITIES REQUIRED TO ACCOMMODATE VEHICLE WASHING OPERATIONS. DIVERT ALL WASH WATER AWAY FROM ENTRANCE TO THE SETTLING AREA.
6. MAINTAIN ENTRANCE IS A CONDITION THAT WILL PREVENT WASHING OF SEDIMENT ONTO PAVED SURFACES.

CONSTRUCTION ENTRANCE

SCALE: NONE
EC-101-CT

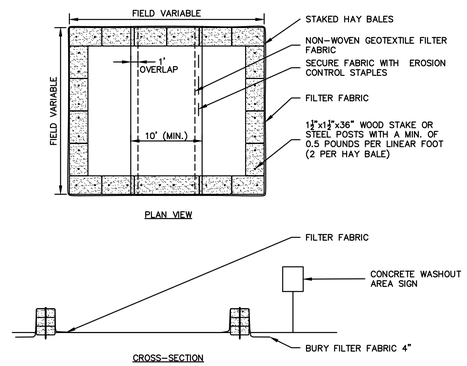


GENERAL NOTES

1. PROVIDE INLET PROTECTION TO ALL EXISTING CATCH BASINS IN THE VICINITY OF CONSTRUCTION. PROTECT NEW CATCH BASINS AS THEY ARE CONSTRUCTED.
2. GRATE TO BE PLACED OVER FILTER FABRIC.

CATCH BASIN FILTER INSERT

SCALE: NONE

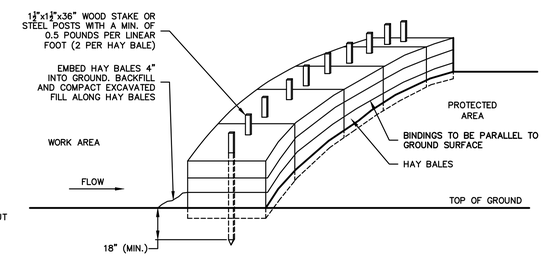


NOTES:

1. CONSTRUCT WASHOUT AREA LARGE ENOUGH TO ENSURE MATERIALS WILL BE CONTAINED WHERE WASTE CONCRETE CAN SOLIDIFY IN PLACE AND EXCESS WATER CAN SAFELY EVAPORATE.
2. WASHOUT AREA SHALL BE LARGE ENOUGH TO RETAIN ALL LIQUID AND WASTE CONCRETE MATERIALS FROM WASHOUT OPERATION.
3. WEEKLY INSPECTIONS OF WASHOUT AREAS SHALL BE CONDUCTED TO ASSESS THE HOLDING CAPACITY AND FUNCTIONALITY OF THE WASHOUT AREA.

TEMPORARY CONCRETE WASHOUT AREA

SCALE: NONE

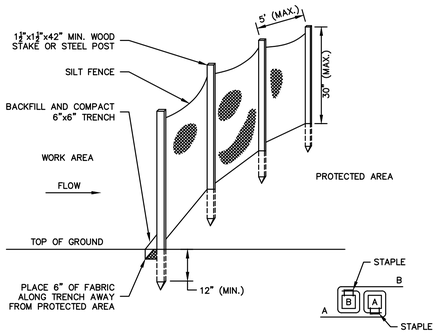


GENERAL NOTES

1. HAY BALES SHALL BE MADE OF HAY OR STRAW WITH 40 POUND MIN. WEIGHT AND 120 POUND MAX. WEIGHT HELD TOGETHER BY TWINE OR WIRE.
2. PLACE HAY BALES ON CONTOUR AND WING THE LAST HAY BALES UP SLOPE SO THAT THE TOP OF THE LAST SEVERAL HAY BALES ARE HIGHER THAN THE LINE OF HAY BALES.
3. DRIVE FIRST STAKE IN EACH BALE TOWARD THE PREVIOUSLY LAID BALE TO FORCE THEM TOGETHER.
4. PUT ONE HAY BALE PERPENDICULAR ALONG HAY BALE BARRIER EACH 100 FEET.

STRAW BALE BARRIER

SCALE: NONE
EC-106-CT

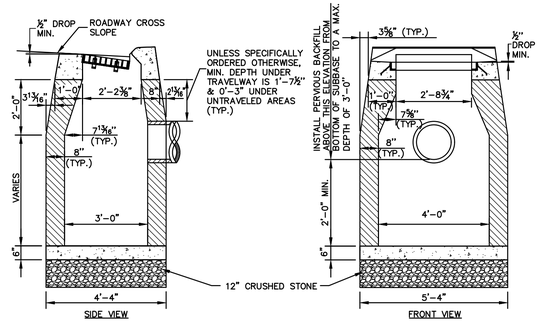


GENERAL NOTES

1. FOR SLOPE & SWALE INSTALLATIONS, EXTEND FENCE OP SLOPE SUCH THAT BOTTOM ENDS OF FENCE WILL BE HIGHER THAN THE TOP OF THE LOWEST PORTION OF FENCE.
2. FOR FENCE INSTALLED ON LEVEL TERRAIN INSTALL WING SECTIONS PERPENDICULAR TO MAIN BARRIER AT 50'-100' INTERVALS.

SILT FENCE BARRIER

SCALE: NONE
EC-107

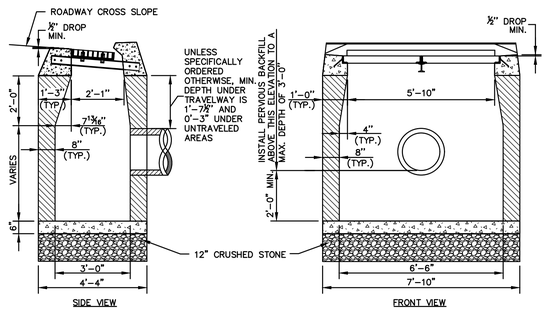


GENERAL NOTES

1. FRAME AND GRATE SHALL BE CONSTRUCTED PER SPECIFICATIONS.
2. ALL FACES OF STRUCTURES IN CONTACT WITH PAVEMENT SHALL BE COVERED WITH TAR PAPER OR APPROVED EQUAL.
3. TO CONVEY SUBSURFACE DRAINAGE, OPENINGS SHALL BE FORMED IN THE FOUR WALLS AT OR IMMEDIATELY ABOVE THE BOTTOM OF PERVIOUS BACKFILL.
4. WALL THICKNESS OF ALL CB'S OVER 10' DEEP SHALL BE INCREASED TO 12" THICK. INSIDE DIMENSION SHALL REMAIN THE SAME. (12" THICKNESS WILL START AFTER THE FIRST 10').
5. USE APPROPRIATE CONCRETE TOP FOR CURBING SHOWN ON PLANS, OR AS DIRECTED BY THE ENGINEER.
6. MINIMUM CONCRETE COMPRESSIVE STRENGTH OF F'c = 4000 PSI SHALL BE OBTAINED PRIOR TO SHIPPING.

TYPE "C" CATCH BASIN

SCALE: NONE
STM-101-CT

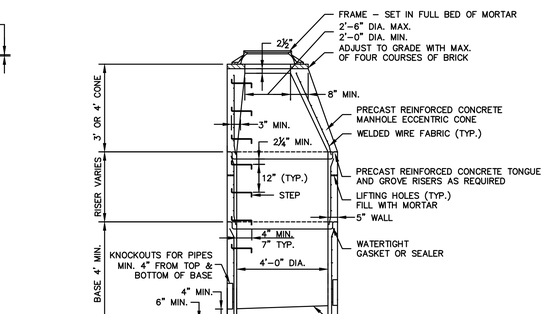


GENERAL NOTES

1. FRAME AND GRATE SHALL BE CONSTRUCTED PER SPECIFICATIONS.
2. ALL FACES OF STRUCTURES IN CONTACT WITH PAVEMENT SHALL BE COVERED WITH TAR PAPER OR APPROVED EQUAL.
3. TO CONVEY SUBSURFACE DRAINAGE, OPENINGS SHALL BE FORMED IN THE FOUR WALLS AT OR IMMEDIATELY ABOVE THE BOTTOM OF PERVIOUS BACKFILL.
4. WALL THICKNESS OF ALL CB'S OVER 10' DEEP SHALL BE INCREASED TO 12" THICK. INSIDE DIMENSION SHALL REMAIN THE SAME. (12" THICKNESS WILL START AFTER THE FIRST 10').
5. USE APPROPRIATE CONCRETE TOP FOR CURBING SHOWN ON PLANS, OR AS DIRECTED BY THE ENGINEER.
6. MINIMUM CONCRETE COMPRESSIVE STRENGTH OF F'c = 4000 PSI SHALL BE OBTAINED PRIOR TO SHIPPING.

TYPE "C" CATCH BASIN DOUBLE GRATE TYPE II

SCALE: NONE
STM-106-CT

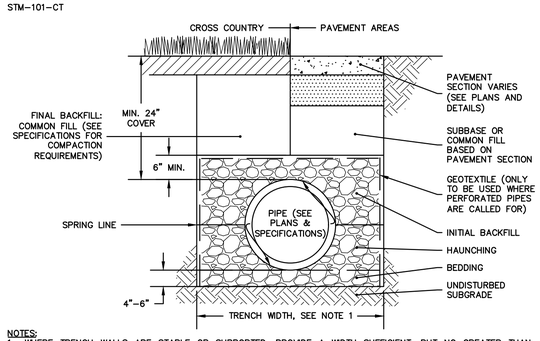


GENERAL NOTES

1. 5' OR 6' DIA. PRECAST BASES MAY BE USED WHEN REQUIRED DUE TO SIZE OR NUMBER OF PIPES AT THE MANHOLE. PRECAST REDUCERS WILL BE PLACED ABOVE THE 5' OR 6' BASES AS DIRECTED BY THE ENGINEER. WALL THICKNESS TO INCREASE 1" FOR EACH 1' OF INSIDE DIAMETER INCREASE.
2. FRAME DIAMETER OF 3'-3" WITH 4" FLANGE MUST BE USED WHEN THE TOP DIA. OF THE PRECAST CONE IS LESS THAN 3'-6". ALL OTHER FRAME DIMENSIONS ARE TO REMAIN THE SAME.
3. MINIMUM CONCRETE COMPRESSIVE STRENGTH OF F'c = 4000 PSI SHALL BE OBTAINED PRIOR TO SHIPPING.

STORM DRAINAGE MANHOLE

SCALE: NONE
STM-109-CT

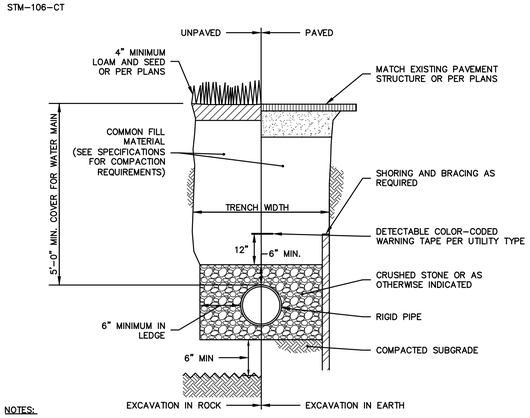


NOTES:

1. WHERE TRENCH WALLS ARE STABLE OR SUPPORTED, PROVIDE A WIDTH SUFFICIENT, BUT NO GREATER THAN NECESSARY, TO ENSURE WORKING ROOM TO PROPERLY PLACE AND COMPACT HAUNCHING AND OTHER EMBEDMENT MATERIALS. UNLESS OTHERWISE SPECIFIED BY THE PIPE MANUFACTURER, THE SPACE BETWEEN THE PIPE AND TRENCH WALL MUST BE WIDER THAN THE COMPACTION EQUIPMENT USED IN THE PIPE ZONE. MINIMUM WIDTH SHALL BE NOT LESS THAN THE GREATER OF EITHER THE PIPE OUTSIDE DIAMETER PLUS 16 INCHES OR THE PIPE OUTSIDE DIAMETER TIMES 1.25, PLUS 12 INCHES.
2. WHERE PERFORATED PIPES ARE CALLED-FOR, BEDDING, HAUNCHING, AND INITIAL BACKFILL SHALL BE CONNDOT NO. 6 CRUSHED STONE SHALL MEET THE REQUIREMENTS OF FORM 816 M.08.
3. WHERE THE TRENCH BOTTOM IS UNSTABLE, THE CONTRACTOR SHALL EXCAVATE TO A DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH SUITABLE MATERIAL PER THE SPECIFICATIONS. AS AN ALTERNATIVE, AND AT THE DISCRETION OF THE ENGINEER, THE TRENCH BOTTOM MAY BE STABILIZED USING A GEOTEXTILE MATERIAL UNDER SOME CIRCUMSTANCES.
4. BEDDING, HAUNCHING, AND INITIAL BACKFILL SHALL BE CONNDOT NO. 6, NO. 67, OR NO. 8 AGGREGATE OR OTHER MATERIALS MEETING THE REQUIREMENTS OF ASTM D2321 FOR CLASS IA, IB, II, OR III UNLESS OTHERWISE INDICATED BY THE PIPE MANUFACTURER.

TYPICAL TRENCH SECTION - THERMOPLASTIC DRAINAGE PIPE

SCALE: NONE

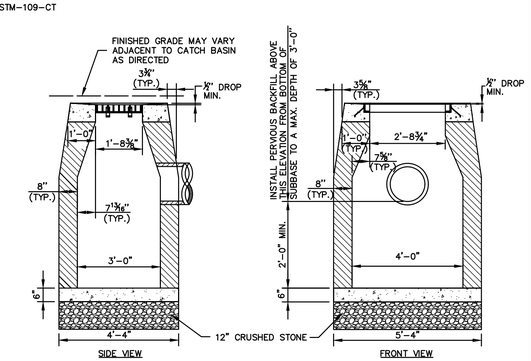


NOTES:

1. SHORING AND BRACING OF TRENCHES IS THE RESPONSIBILITY OF THE CONTRACTOR. ALL SHORING AND BRACING SHALL BE IN ACCORDANCE WITH THE LATEST OSHA STANDARDS AND INTERPRETATIONS, TO ALL OTHER APPLICABLE CODES, RULES, AND REGULATIONS, OF FEDERAL STATE AND LOCAL AUTHORITIES, AND AS REQUIRED TO MAINTAIN SAFE WORKING CONDITIONS AT ALL TIMES.
2. ANY DISTURBED SUBGRADE SHALL BE WELL COMPACTED. EXCAVATION IN ROCK SHALL BE A MINIMUM 6-INCHES BELOW BOTTOM OF BEDDING AND BACKFILLED WITH GRANULAR FILL OR OTHER APPROVED MATERIAL.
3. IN CASE OF CONFLICT BETWEEN THIS DETAIL AND INSTALLATION REQUIREMENTS OF THE PIPE MANUFACTURER OR LOCAL UTILITY OWNER, INSTALLATION REQUIREMENTS OF THE PIPE MANUFACTURER OR LOCAL UTILITY OWNER WILL PREVAIL.

TYPICAL PIPE TRENCH - RIGID PIPE

SCALE: NONE



GENERAL NOTES

1. FRAME AND GRATE SHALL BE CONSTRUCTED PER SPECIFICATIONS.
2. ALL FACES OF STRUCTURES IN CONTACT WITH PAVEMENT SHALL BE COVERED WITH TAR PAPER OR APPROVED EQUAL.
3. TO CONVEY SUBSURFACE DRAINAGE, OPENINGS SHALL BE FORMED IN THE FOUR WALLS AT OR IMMEDIATELY ABOVE THE BOTTOM OF PERVIOUS BACKFILL.
4. WALL THICKNESS OF ALL CB'S OVER 10' DEEP SHALL BE INCREASED TO 12" THICK. INSIDE DIMENSION SHALL REMAIN THE SAME. (12" THICKNESS WILL START AFTER THE FIRST 10').
5. MINIMUM CONCRETE COMPRESSIVE STRENGTH OF F'c = 4000 PSI SHALL BE OBTAINED PRIOR TO SHIPPING.

TYPE "C-L" CATCH BASIN

SCALE: NONE
STM-102-CT

ISSUED FOR PERMITTING

APPROVED BY THE MANSFIELD PLANNING & ZONING COMMISSION

CHAIRMAN - PLANNING AND ZONING COMMISSION _____ DATE _____

EAGLEVILLE GREEN - NOVEMBER 25, 2019

STATE OF CONNECTICUT ROBERT S. NEWTON No. 20662 LICENSED PROFESSIONAL ENGINEER

ROBERT NEWTON, PE No. 20662

EAGLEVILLE GREEN

113-121 SOUTH EAGLEVILLE ROAD
IN
MANSFIELD
CONNECTICUT

DETAILS

NOVEMBER 25, 2019

REVISIONS:

1	01/20/2020	PER TOWN COMMENTS
2	01/31/2020	PER TOWN COMMENTS
3	02/12/2020	PER TEST PIT RESULTS

PREPARED FOR:
MANSFIELD HOUSING DEV. CORP.
309 MAPLE ROAD
STORRS, CT 06268

BSC GROUP
300 Winding Brook Drive
Glastonbury, Connecticut 06033
860 652 8227

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SCALE: AS SHOWN

FILE: 8374900-DET.DWG
DWG. NO:
JOB. NO: 83749.00

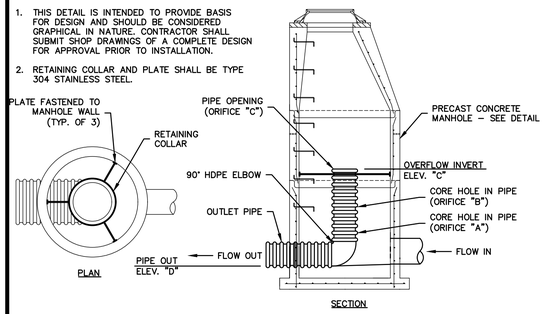
C-6.0

OUTLET CONTROL STRUCTURE	ORIFICE "A"		ORIFICE "B"		ELEV. "C"		ELEV. "D"	
	DIA.	INV.	DIA.	INV.	DIA.	INV.	DIA.	INV.
#1	6"	614.30'	N/A	N/A	15"	616.00'	15"	614.05'
#2	4"	614.86'	8"	615.33'	10"	617.00'	15"	613.25'

NOTES:
1. DESIGN TO CONFORM TO H-20 LOADING.
2. THE INLET PIPE CONNECTING THE OUTLET CONTROL STRUCTURE TO THE DETENTION SYSTEM SHALL BE SET AT 0.00% SLOPE.

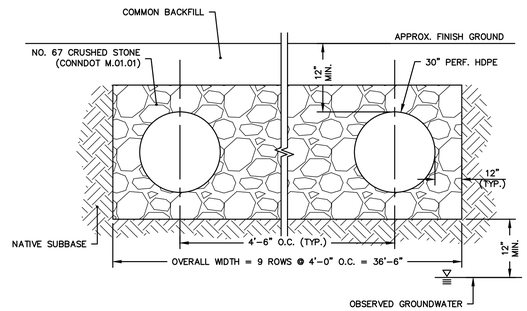
GENERAL NOTES

1. THIS DETAIL IS INTENDED TO PROVIDE BASIS FOR DESIGN AND SHOULD BE CONSIDERED GRAPHICAL IN NATURE. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS OF A COMPLETE DESIGN FOR APPROVAL PRIOR TO INSTALLATION.
2. RETAINING COLLAR AND PLATE SHALL BE TYPE 304 STAINLESS STEEL.



OUTLET CONTROL STRUCTURE

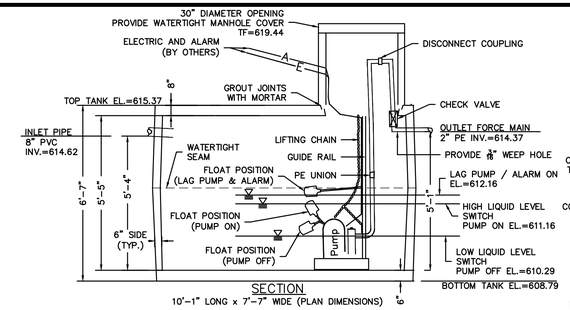
SCALE: NONE



NOTE:
1. PERFORATED PIPE SHALL BE WRAPPED IN GEOTEXTILE FABRIC.

30" PIPE DETENTION SECTION

SCALE: NONE

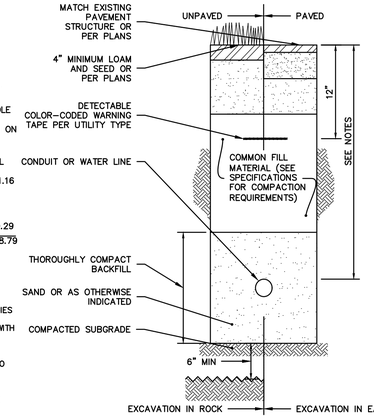


PRECAST CONCRETE PUMP CHAMBER NOTES:
1. TANK SIZE = 4 HOURS OF STORAGE = 10,950 GPD x 4 Hrs = 1,825. USE 2,000.
2. TANK DESIGN SHALL CONFORM TO LATEST ASTM DESIGNATION C913.
3. JOINT SEALANT: BUTYL RUBBER MASTIC TYPE SEAL THAT CONFORMS TO LATEST AASHTO SPECIFICATION M-198. MEETS FEDERAL SPECIFICATIONS SS-S-0021 (210-A).
4. PIPE INLET AND OUTLET LOCATIONS SHALL HAVE POLYLOK II PIPE SEALS.
5. TANK EXTERIOR SHALL BE COATED WITH BAY OIL, "EBONY" OR APPROVED EQUAL.
6. THE TANK INTERIOR SHALL BE COATED WITH FLOROK EPOXY OR EQUAL.
7. REINFORCING STEEL DEFORMED BARS SHALL CONFORM TO LATEST ASTM SPECIFICATION A615.
8. CONCRETE COMPRESSIVE STRENGHT – 4,000 PSI AT 28 DAYS.
9. METHOD OF MANUFACTURE: WET CAST.
10. SECTION SHALL BE MONOLITHIC.
11. CHAMBER TO BE DESIGNED FOR HS-20 LOADING.

PUMP DESIGN NOTES:
1. PUMPS SHALL BE LIBERTY PUMPS MODEL LSG200-SERIES SEWAGE GRINDER PUMP OR APPROVED EQUAL.
2. PUMP CYCLE DESIGNED FOR 10 MINUTES AT 50 GPM WITH 3 FEET OF STATIC HEAD.
3. PUMPS TO BE CONFIGURED WITH DUPLEX ELECTRICAL ALTERNATOR CONTROL PANEL.
4. ALL PUMPS AND APPURTENANCES TO BE INSTALLED TO MANUFACTURERS SPECIFICATIONS AND APPLICABLE BUILDING ELECTRICAL CODES.
5. PUMP AND FORCE MAIN SHALL BE CONFIGURED SUCH THAT THE FORCE MAIN WILL COMPLETELY DRAIN ONCE THE PUMP SHUTS OFF.
6. ROUTING OF ELECTRIC AND ALARM TO BE BY OTHERS.
7. CONTRACTOR SHALL SUBMIT A COMPLETE PUMPING SYSTEM SHOP DRAWING PACKAGE FOR REVIEW BY THE ENGINEER.

2,000 GALLON SEWAGE PUMP STATION

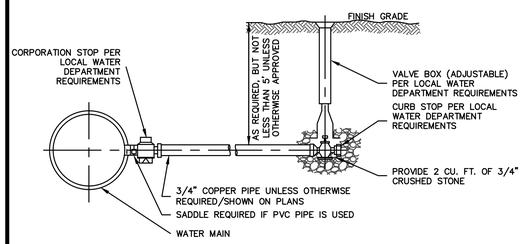
SCALE: NONE



NOTES:
1. THIS DETAIL IS APPLICABLE FOR SINGLE CONDUIT OR PIPE UP TO FOUR INCHES IN DIAMETER.
2. SHORING AND BRACING OF TRENCHES IS THE RESPONSIBILITY OF THE CONTRACTOR. ALL SHORING AND BRACING SHALL BE IN ACCORDANCE WITH THE LATEST OSHA STANDARDS AND INTERPRETATIONS, TO ALL OTHER APPLICABLE CODES, RULES, AND REGULATIONS, OF FEDERAL STATE AND LOCAL AUTHORITIES, AND AS REQUIRED TO MAINTAIN SAFE WORKING CONDITIONS AT ALL TIMES.
3. IN CASE OF CONFLICT BETWEEN THIS DETAIL AND INSTALLATION REQUIREMENTS OF THE PIPE MANUFACTURER OR LOCAL UTILITY OWNER, INSTALLATION REQUIREMENTS OF THE PIPE MANUFACTURER OR LOCAL UTILITY OWNER WILL PREVAIL.
4. ANY DISTURBED SUBGRADE SHALL BE WELL COMPACTED. EXCAVATION IN ROCK SHALL BE A MINIMUM 6-INCHES BELOW BOTTOM OF BEDDING AND BACKFILLED WITH GRANULAR FILL OR OTHER APPROVED MATERIAL.
5. PULL-LINE IN ALL CONDUIT: 3/8-INCH DOUBLE-BRAIDED LOW STRETCH POLYESTER COMPOSITE ROPE.
6. ALL CONDUIT AND PIPE DEPTHS PER CONNECTICUT BUILDING CODE OR UTILITY OWNER'S REQUIREMENTS, WHICHEVER IS MORE STRINGENT.

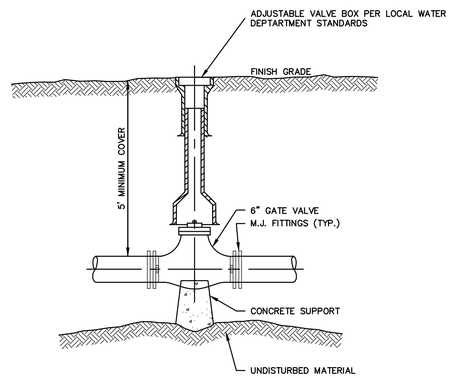
CONDUIT OR WATER SERVICE TRENCH

SCALE: NONE



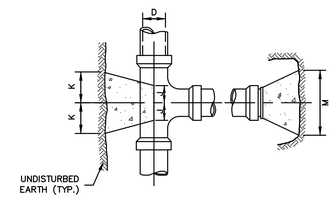
WATER SERVICE CONNECTION

SCALE: NONE
WTR-104-CT

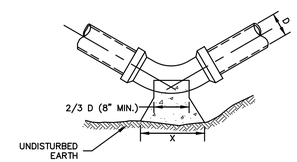


GATE VALVE

SCALE: NONE
WTR-102-CT



PLAN – TEE AND PLUG



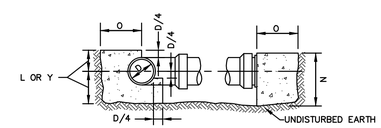
PLAN – HORIZ. AND VERT. BEND

SIZE OF BRANCH	J	K	L	M	N	O
4" TO 8"	10"	10"	1'-0"	2'-0"	1'-6"	10"
10" TO 16"	1'-0"	1'-6"	1'-8"	3'-10"	2'-10"	1'-6"
24"	1'-4"	2'-0"	2'-6"	5'-0"	3'-6"	1'-8"

TEES AND PLUGS

	90° & 45°			22½° & 11¼°		
D	4" TO 8"	10" TO 16"	24"	4" TO 8"	10" TO 16"	24"
X	1'-8"	3'-4"	3'-6"	1'-4"	2'-0"	3'-6"
Y	1'-2"	1'-8"	2'-4"	1'-0"	1'-2"	2'-4"

BENDS



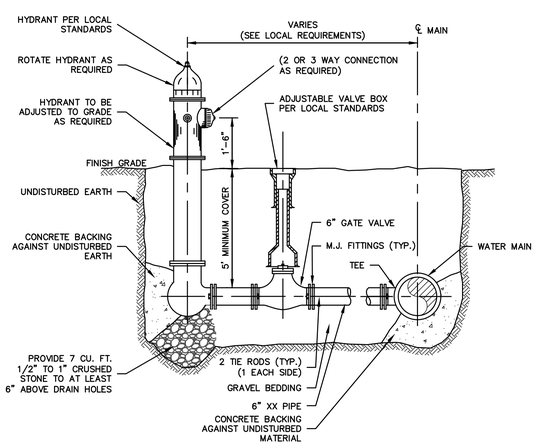
TYPICAL SECTION – TEES, BENDS AND PLUGS

GENERAL NOTES

1. PROVIDE CONCRETE THRUST BLOCKS AT ALL BENDS, DEAD ENDS, & TEES UNLESS OTHERWISE DIRECTED. CONCRETE FOR ALL THRUST BLOCKS TO BE PLACED AGAINST FIRM, UNDISTURBED EARTH. PROVIDE APPROVED ANCHOR HARNESS RODS AND SOCKET CLAMPS AS SPECIFIED AND IN ACCORDANCE WITH PIPE MANUFACTURERS RECOMMENDATIONS WHERE SOIL HAS BEEN DISTURBED OR THRUST BLOCKS CANNOT BE USED.
2. ALL SOCKET CLAMP METAL SHALL BE COATED WITH BLACK ASPHALTUM OR OTHER WATER DEPARTMENT APPROVED COATINGS.
3. CONCRETE THRUST BLOCKS POURED BEHIND 3-WAY TEE AND HYDRANT SHOE TO BE USED WITH SOCKET CLAMPS.
4. NO CONCRETE SHALL COVER PIPE JOINTS, FITTING JOINTS, BOLTS OR HYDRANT DRAINS.

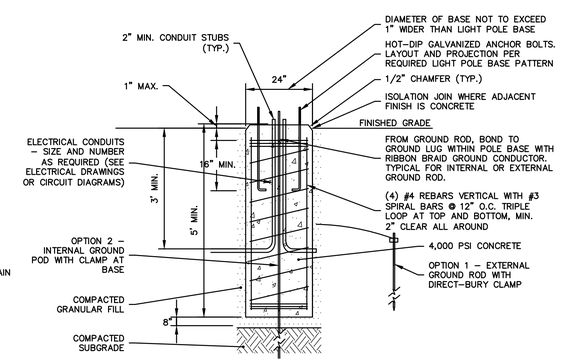
CONCRETE THRUST BLOCK FOR PRESSURE PIPE

SCALE: NONE
WTR-105-CT



FIRE HYDRANT & VALVE

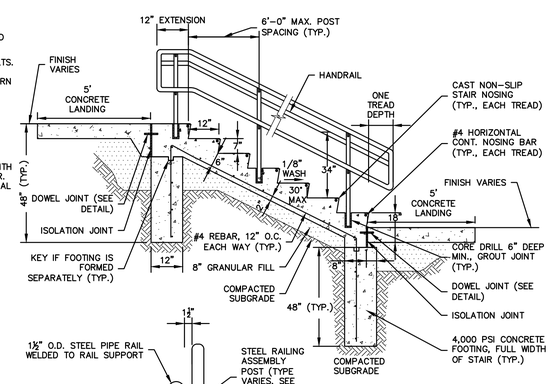
SCALE: NONE
WTR-103-CT

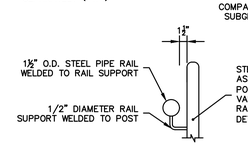


NOTES:
1. REINFORCING BARS SHALL BE DEFORMED BAR, ASTM A615 GRADE 60.
2. CONDUIT LOCATIONS SHOWN ARE CONCEPTUAL. REFER TO ELECTRICAL DRAWINGS OR CIRCUIT DIAGRAMS FOR THE NUMBER, SIZES, AND ORIENTATION REQUIRED.
3. ALL GROUND RODS SHALL BE COPPER-COATED. DIAMETER AND LENGTH PER APPLICABLE CODES. GROUNDING WIRE SHALL BE No. 4 AWG STRANDED COPPER WIRE UNLESS OTHERWISE SPECIFIED.
4. ANCHOR BOLTS SHOWN ARE CONCEPTUAL. ANCHOR BOLT SPECIFICATIONS SHALL MEET THE POLE MANUFACTURER'S REQUIREMENTS FOR SIZE, LENGTH, AND GRADE, BASED ON POLE TYPE, HEIGHT, AND FIXTURE(S).

LIGHT POLE BASE

SCALE: NONE





HANDRAIL DETAIL

NOTES:
1. COMPLY WITH ICC/ANSI A117.1 CHAPTER 5.
2. SUBMIT DETAILED SHOP DRAWINGS FOR APPROVAL SHOWING THE LAYOUT AND DIMENSIONS OF ALL STAIR SYSTEM COMPONENTS.
3. EXPOSED SURFACES TO BE BRUSHED FINISH TROWELED EDGES.
4. MINIMUM WIDTH TO BE 48" CLEAR HANDRAIL TO HANDRAIL.
5. MAXIMUM RADIUS OF CURVATURE AT THE LEADING EDGE OF TREADS SHALL BE 1/2".
6. CONSTRUCT CONCRETE LANDINGS PER SIDEWALK DETAIL.

CONCRETE STAIRS

SCALE: NONE

ISSUED FOR PERMITTING

APPROVED BY THE MANSFIELD PLANNING & ZONING COMMISSION

CHAIRMAN - PLANNING AND ZONING COMMISSION _____ DATE _____

EAGLEVILLE GREEN - NOVEMBER 25, 2019

STATE OF CONNECTICUT ROBERT S. NEWTON No. 20662 LICENSED PROFESSIONAL ENGINEER

ROBERT NEWTON, PE No. 20662

EAGLEVILLE GREEN

113-121 SOUTH EAGLEVILLE ROAD
IN
MANSFIELD
CONNECTICUT

DETAILS

NOVEMBER 25, 2019

REVISIONS:

1	01/20/2020	PER TOWN COMMENTS
2	01/31/2020	PER TOWN COMMENTS
3	02/12/2020	PER TEST PIT RESULTS

PREPARED FOR:
MANSFIELD HOUSING DEV. CORP.
309 MAPLE ROAD
STORRS, CT 06268

BSC GROUP
300 Winding Brook Drive
Glastonbury, Connecticut 06033
860 652 8227

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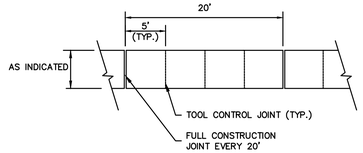
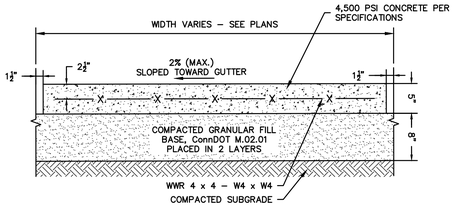
C-6.1



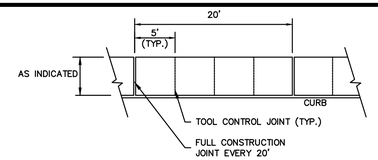


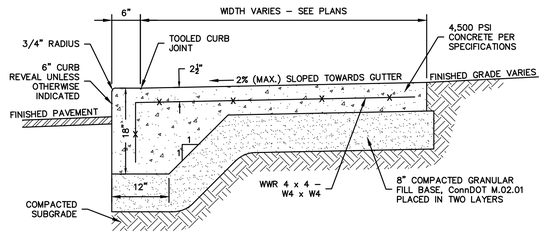
NOTES:

1. TOOLED CONTROL JOINTS SHALL BE 1/4 SLAB THICKNESS. TOOL JOINTS EARLY IN THE FINISHING PROCESS AND RE-RUN TO ENSURE GROOVE BOND HAS NOT OCCURRED.
2. FULL-DEPTH JOINTS SHALL INCORPORATE FULL-DEPTH JOINT FILLER PER SPECIFICATIONS AND DETAILS.
3. SIDEWALK SHALL HAVE LIGHT BROOM FINISH PERPENDICULAR TO THE DIRECTION OF TRAVEL.

CONCRETE SIDEWALK

SCALE: NONE



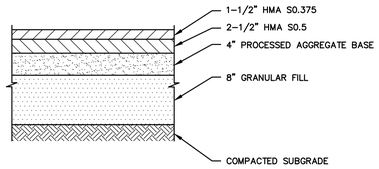


NOTES:

1. CURB REVEAL DIMENSION MAY VARY, SEE PLANS.
2. TOOLED CONTROL JOINTS SHALL BE 1/4 SLAB THICKNESS. TOOL JOINTS EARLY IN THE FINISHING PROCESS AND RE-RUN TO ENSURE GROOVE BOND HAS NOT OCCURRED.
3. TOOLED CURB JOINT SHALL BE 1/4-INCH DEEP MAX.
4. CONSTRUCTION JOINTS SHALL INCORPORATE FULL-DEPTH JOINT FILLER PER SPECIFICATIONS AND DETAILS.
5. SIDEWALKS SHALL HAVE LIGHT BROOM FINISH PERPENDICULAR TO THE DIRECTION OF TRAVEL.

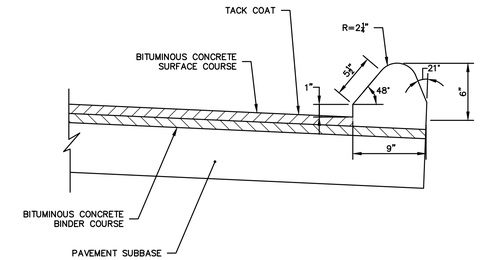
MONOLITHIC CONCRETE CURB AND SIDEWALK

SCALE: NONE



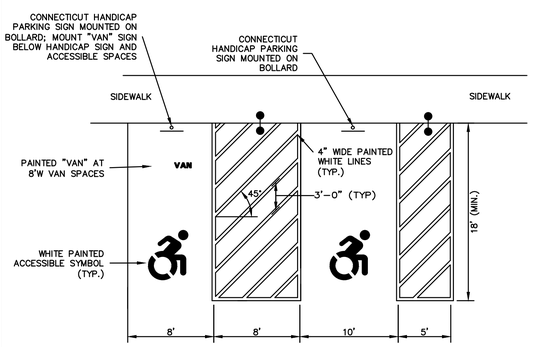
BITUMINOUS CONCRETE PAVEMENT

SCALE: NONE



6" BITUMINOUS CONCRETE LIP CURBING

SCALE: NONE
CRB-103-CT

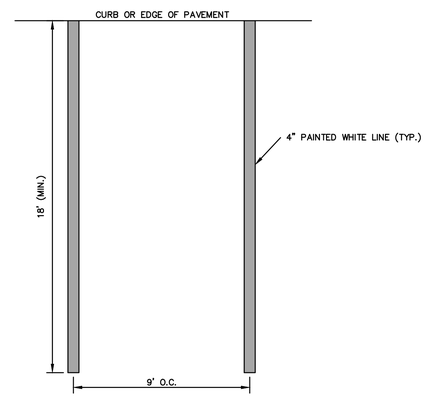


NOTES:

1. GRADING WITHIN HANDICAP SPACES SHALL BE LESS THAN 2.00% IN ALL DIRECTIONS
2. SIGN LOCATION VARIES – SEE PLAN

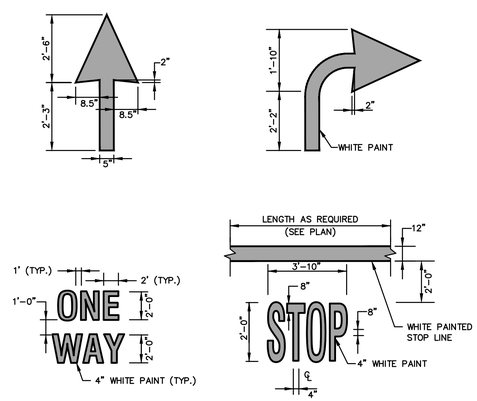
ACCESSIBLE PARKING SPACES

SCALE: NONE



STANDARD PAINTED PARKING MARKINGS

SCALE: NONE

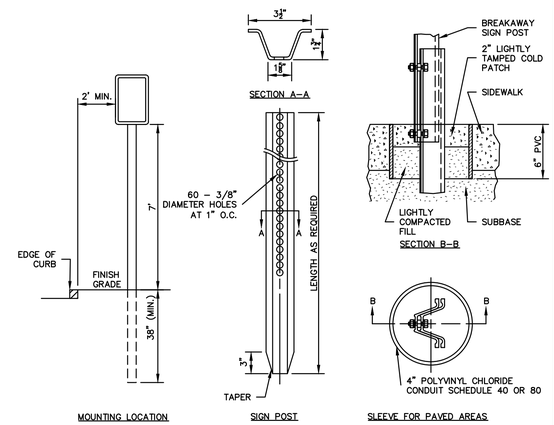


NOTES:

1. PAVEMENT MARKINGS SHOWN SHALL NOT BE INSTALLED ON PUBLIC ROADWAYS.

PAINTED PAVEMENT MARKINGS

SCALE: NONE
PVT-104-CT

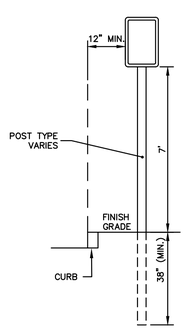


NOTES:

1. MOUNT SIGN TO POST PER CONNDOT 816 SPECIFICATIONS AND DETAILS.
2. PROVIDE SLEEVE FOR ALL SIGNS MOUNTED IN CONCRETE.

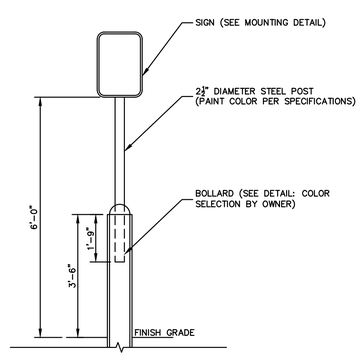
TYPICAL SIGN SUPPORT – BREAKAWAY TYPE II

SCALE: NONE



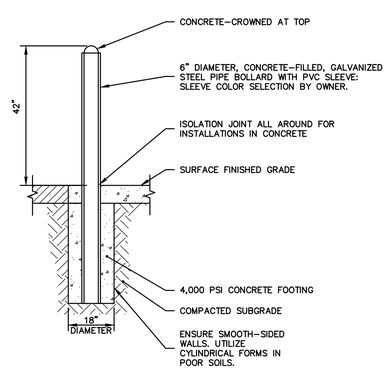
POST-MOUNTED SIGN

SCALE: NONE



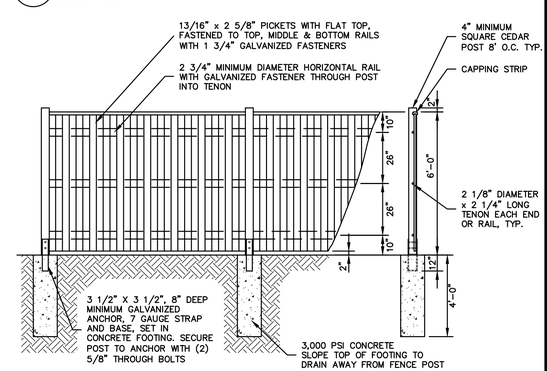
BOLLARD-MOUNTED SIGN

SCALE: NONE



CONCRETE-FILLED STEEL BOLLARD

SCALE: NONE



GENERAL NOTES

1. ALL FENCING MATERIAL SHALL BE TREATED NORTHERN WHITE CEDAR, TO THE DIMENSIONS SHOWN ON THE DRAWING.
2. LINE FENCE TOP AND BOTTOM SHALL BE INSTALLED STRAIGHT AND TRUE. ALL POSTS AND FACING BOARDS OR SLATS SHALL BE INSTALLED PARALLEL AND PLUMB. ALL RAILS SHALL BE INSTALLED PARALLEL AND TRUE.
3. ALL GATE HARDWARE SHALL BE DOUBLE DIP HOT GALVANIZED. THE CONTRACTOR SHALL SUBMIT GATE AND FENCE SHOP DRAWINGS TO THE ENGINEER FOR REVIEW.

6' SINGLE SIDED WOOD FENCE

SCALE: NONE
FSN-105-CT

ISSUED FOR PERMITTING

APPROVED BY THE MANSFIELD PLANNING & ZONING COMMISSION

CHAIRMAN - PLANNING AND ZONING COMMISSION DATE

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C-6.2

ADVANCED DRAINAGE SYSTEMS, INC.

STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-4500.
2. CHAMBERS SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORT PANELS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
4. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
5. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
6. CHAMBERS SHALL BE DESIGNED AND ALLOWABLE LOADS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
7. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. THE CHAMBER MANUFACTURER SHALL SUBMIT THE FOLLOWING UPON REQUEST TO THE SITE DESIGN ENGINEER FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE:
   a. A STRUCTURAL EVALUATION SEALED BY A REGISTERED PROFESSIONAL ENGINEER THAT DEMONSTRATES THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY AASHTO FOR THERMOPLASTIC PIPE.
   b. A STRUCTURAL EVALUATION SEALED BY A REGISTERED PROFESSIONAL ENGINEER THAT DEMONSTRATES THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET. THE 50 YEAR CREEP MODULUS DATA SPECIFIED IN ASTM F2418 MUST BE USED AS PART OF THE AASHTO STRUCTURAL EVALUATION TO VERIFY LONG-TERM PERFORMANCE.
   c. STRUCTURAL CROSS SECTION DETAIL ON WHICH THE STRUCTURAL EVALUATION IS BASED.
8. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-4500 CHAMBER SYSTEM

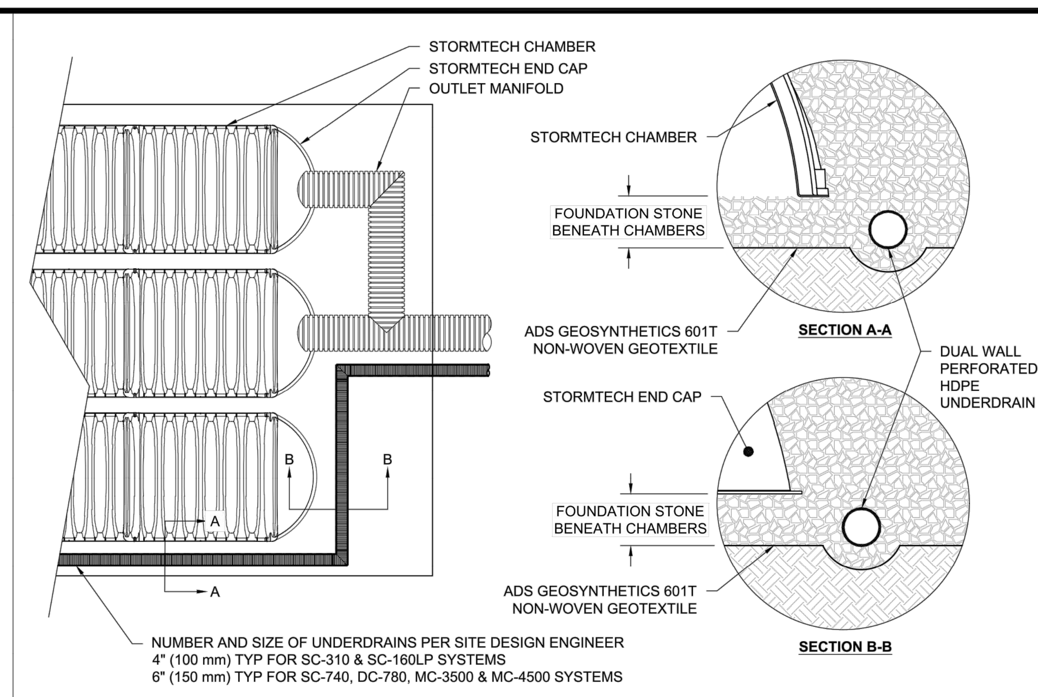
1. STORMTECH MC-4500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-4500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM 9" (230 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 12" (300 mm) INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE MEETING THE AASHTO M43 DESIGNATION OF #3 OR #4.
9. STONE SHALL BE BROUGHT UP EVENLY AROUND CHAMBERS SO AS NOT TO DISTORT THE CHAMBER SHAPE. STONE DEPTHS SHOULD NEVER DIFFER BY MORE THAN 12" (300 mm) BETWEEN ADJACENT CHAMBER ROWS.
10. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
11. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIAL BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
12. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

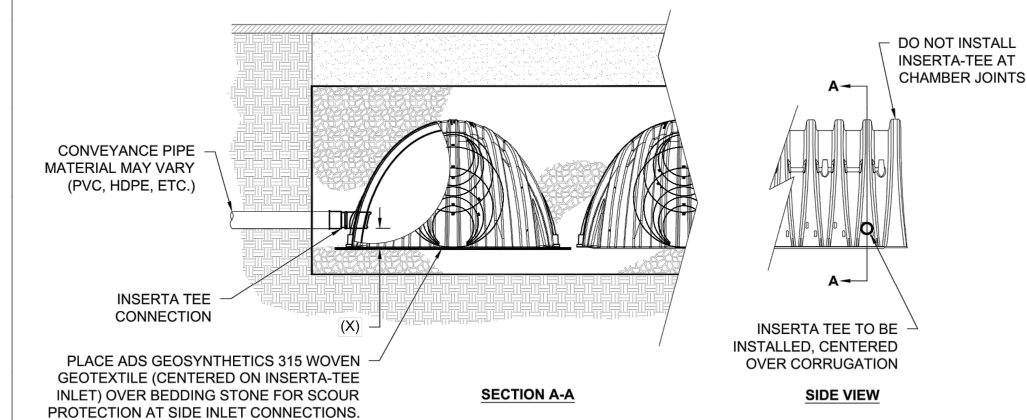
1. STORMTECH MC-4500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-4500 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.



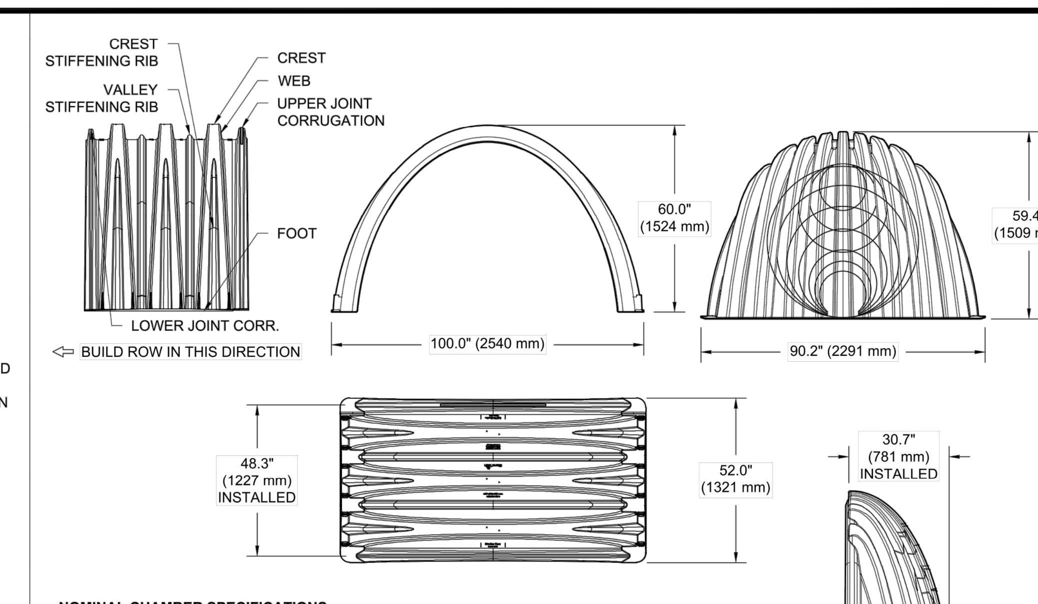
5 UNDERDRAIN DETAIL



CHAMBER	MAX DIAMETER OF INSERTA TEE	HEIGHT FROM BASE OF CHAMBER (X)
SC-310	6" (150 mm)	4" (100 mm)
SC-740	10" (250 mm)	4" (100 mm)
DC-780	10" (250 mm)	4" (100 mm)
MC-3500	12" (300 mm)	6" (150 mm)
MC-4500	12" (300 mm)	8" (200 mm)
INSERTA TEE FITTINGS AVAILABLE FOR SDR 26, SDR 35, SCH 40 IPS GASKETED & SOLVENT WELD, N-12, HP STORM, C-900 OR DUCTILE IRON		

NOTE:
PART NUMBERS WILL VARY BASED ON INLET PIPE MATERIALS. CONTACT STORMTECH FOR MORE INFORMATION.

6 INSERTA-TEE SIDE INLET DETAIL



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	100.0" X 60.0" X 48.3"	(2540 mm X 1524 mm X 1227 mm)
CHAMBER STORAGE	106.5 CUBIC FEET	(3.01 m³)
MINIMUM INSTALLED STORAGE*	162.6 CUBIC FEET	(4.60 m³)
WEIGHT	130.0 lbs.	(59.0 kg)

NOMINAL END CAP SPECIFICATIONS

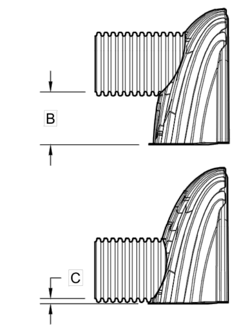
SIZE (W X H X INSTALLED LENGTH)	90.2" X 59.4" X 30.7"	(2291 mm X 1509 mm X 781 mm)
END CAP STORAGE	35.7 CUBIC FEET	(1.01 m³)
MINIMUM INSTALLED STORAGE*	108.7 CUBIC FEET	(3.08 m³)
WEIGHT	135.0 lbs.	(61.2 kg)

*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION AND BETWEEN CHAMBERS, 12" (305 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY.

STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
END CAPS WITH A WELDED CROWN PLATE END WITH "C"
END CAPS WITH A PREFABRICATED WELDED STUB END WITH "W"

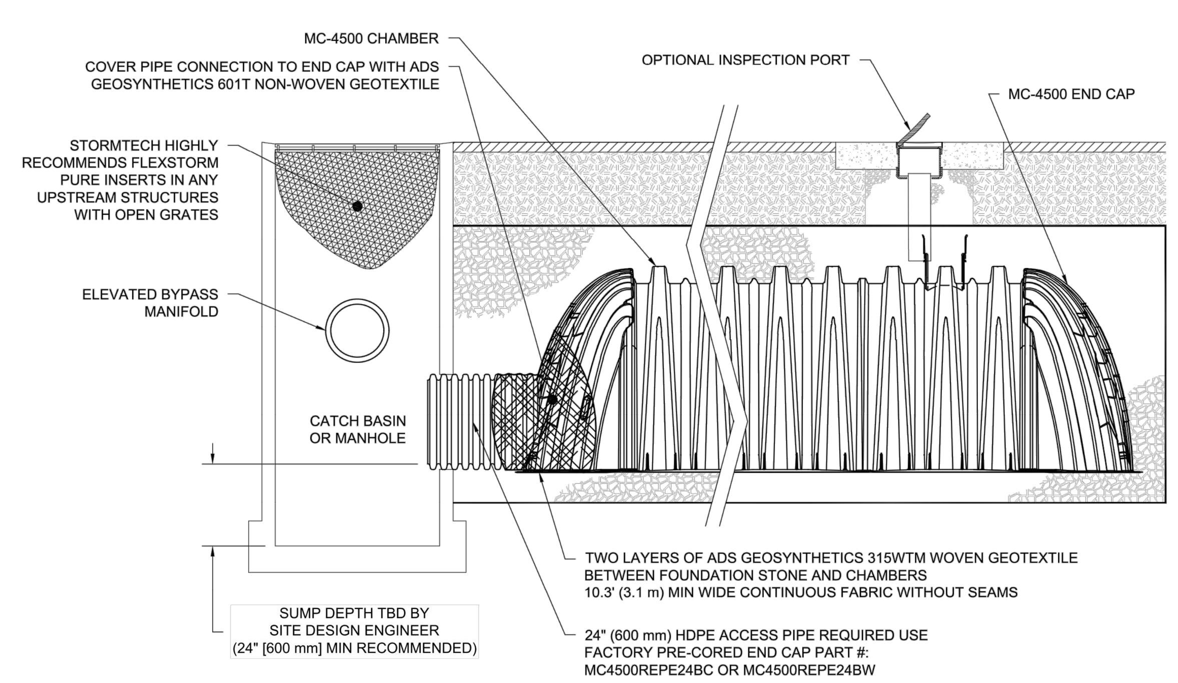
PART #	STUB	B	C
MC4500REPE06T	6" (150 mm)	42.54" (1.081 m)	---
MC4500REPE06B		---	0.86" (22 mm)
MC4500REPE08T	8" (200 mm)	40.50" (1.029 m)	---
MC4500REPE08B		---	1.01" (26 mm)
MC4500REPE10T	10" (250 mm)	38.37" (975 mm)	---
MC4500REPE10B		---	1.33" (34 mm)
MC4500REPE12T	12" (300 mm)	35.69" (907 mm)	---
MC4500REPE12B		---	1.55" (39 mm)
MC4500REPE15T	15" (375 mm)	32.72" (831 mm)	---
MC4500REPE15B		---	1.70" (43 mm)
MC4500REPE18TC	18" (450 mm)	29.36" (746 mm)	---
MC4500REPE18TW			
MC4500REPE18BC		---	1.97" (50 mm)
MC4500REPE18BW			
MC4500REPE24TC	24" (600 mm)	23.05" (585 mm)	---
MC4500REPE24TW			
MC4500REPE24BC		---	2.26" (57 mm)
MC4500REPE24BW			
MC4500REPE30BC	30" (750 mm)	---	2.95" (75 mm)
MC4500REPE36BC	36" (900 mm)	---	3.25" (83 mm)
MC4500REPE42BC	42" (1050 mm)	---	3.55" (90 mm)

NOTE: ALL DIMENSIONS ARE NOMINAL



CUSTOM PRECORED INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-4500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

2 MC-4500 TECHNICAL SPECIFICATIONS



INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

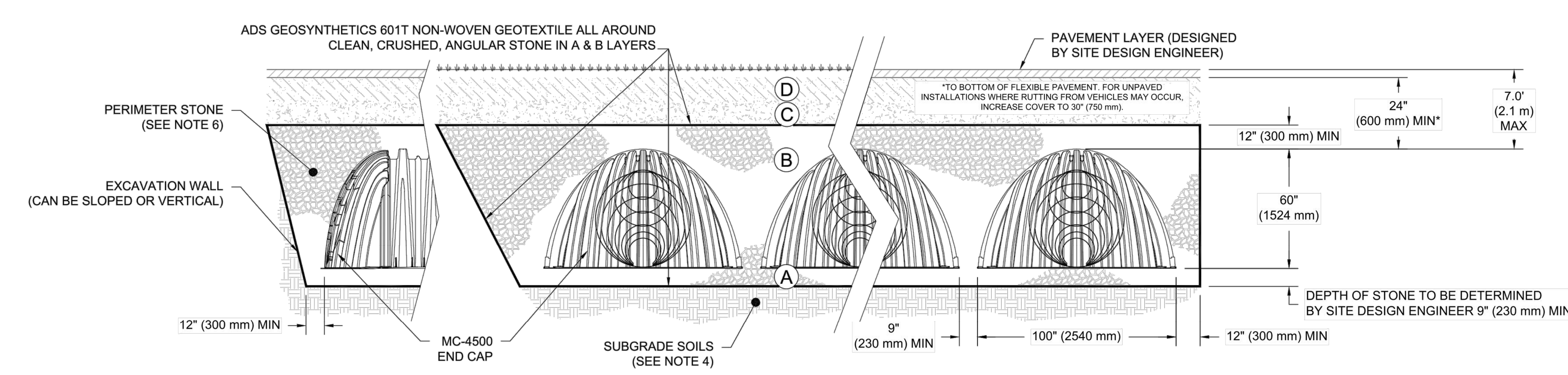
1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

3 MC-4500 ISOLATOR ROW DETAIL

ACCEPTABLE FILL MATERIALS: STORMTECH MC-4500 CHAMBER SYSTEMS

	MATERIAL LOCATION	DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

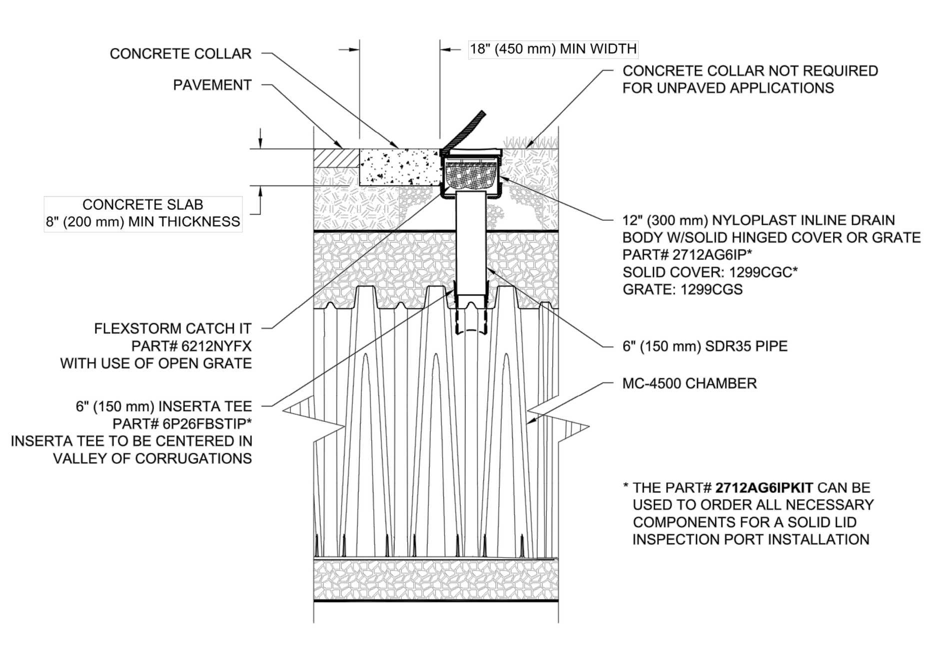
PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.



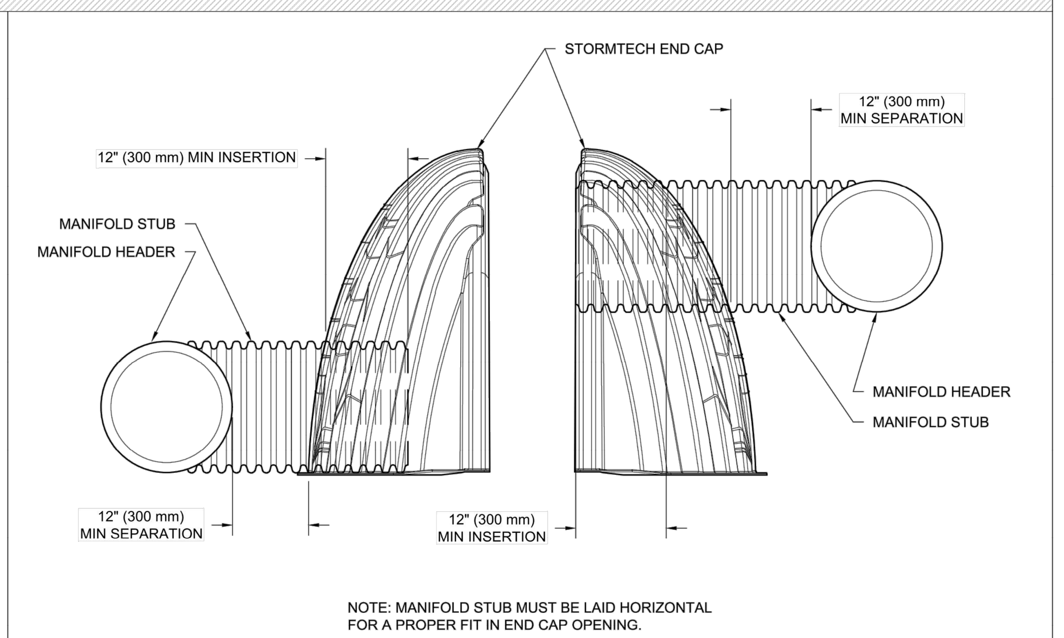
NOTES:

1. MC-4500 CHAMBERS SHALL CONFORM TO THE REQUIREMENTS OF ASTM F2418 "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. MC-4500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. "ACCEPTABLE FILL MATERIALS" TABLE ABOVE PROVIDES MATERIAL LOCATIONS, DESCRIPTIONS, GRADATIONS, AND COMPACTION REQUIREMENTS FOR FOUNDATION, EMBEDMENT, AND FILL MATERIALS.
4. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
5. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.
6. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.

1 MC-4500 CROSS SECTION DETAIL



4 MC-4500 6" (150 mm) INSPECTION PORT DETAIL



7 MC-SERIES END CAP INSERTION DETAIL

DRAWN: JLM | DATE: 08/28/18
REVIEWED: JLM | PROJECT NO:
REV: | NOT TO SCALE

MC-4500 STANDARD DETAILS

StormTech® Detention•Retention•Water Quality
70 INWOOD ROAD, SUITE 3 | ROCKY HILL | CT | 06067
860-529-8188 | 888-892-2694 | WWW.STORMTECH.COM

ADVANCED DRAINAGE SYSTEMS, INC.
4640 TRUEMAN BLVD
HILLIARD, OH 43026

SHEET 1 OF 1

ADVANCED DRAINAGE SYSTEMS, INC. ("ADS") HAS PREPARED THIS DETAIL BASED ON REFERENCED STANDARDS. ADS HAS NOT PERFORMED ANY ENGINEERING OR DESIGN SERVICES FOR THIS PROJECT, NOR HAS ADS INDEPENDENTLY VERIFIED THE INFORMATION SUPPLIED. THE INSTALLATION DETAILS PROVIDED HEREIN ARE GENERAL RECOMMENDATIONS AND ARE NOT SPECIFIC FOR THIS PROJECT, UNLESS THE PLANS ARE SIGNED AND SEALED BY THE SITE DESIGN ENGINEER. THE SITE DESIGN ENGINEER SHALL REVIEW THESE DETAILS PRIOR TO CONSTRUCTION AND SEALING THE DOCUMENT. IT IS THE SITE DESIGN ENGINEER'S RESPONSIBILITY TO ENSURE THAT THE DETAILS PROVIDED HEREIN MEETS OR EXCEEDS THE APPLICABLE NATIONAL, STATE, OR LOCAL REQUIREMENTS AND TO ENSURE THAT THE DETAILS PROVIDED HEREIN ARE ACCEPTABLE FOR THIS PROJECT.

APPROVED BY THE MANSFIELD PLANNING & ZONING COMMISSION

CHAIRMAN - PLANNING AND ZONING COMMISSION ______ DATE ______

ISSUED FOR PERMITTING

NOTES:
1. ADS STORMTECH MC-4500 USED AS BASIS FOR DESIGN. CONTRACTOR SHALL SELECT THIS PRODUCT OR APPROVED EQUAL AND SUBMIT A COMPLETE SHOP DRAWING PACKAGE FOR REVIEW AND APPROVAL BY THE ENGINEER.

ROBERT NEWTON, PE No. 20662

EAGLEVILLE GREEN

113-121 SOUTH EAGLEVILLE ROAD
IN
MANSFIELD CONNECTICUT

DETAILS

NOVEMBER 25, 2019

REVISIONS:

1	01/20/2020	PER TOWN COMMENTS
2	01/31/2020	PER TOWN COMMENTS
3	02/12/2020	PER TEST PIT RESULTS

PREPARED FOR:
MANSFIELD HOUSING DEV. CORP.
309 MAPLE ROAD
STORRS, CT 06268

BSC GROUP
300 Winding Brook Drive
Glastonbury, Connecticut 06033
860 652 8227

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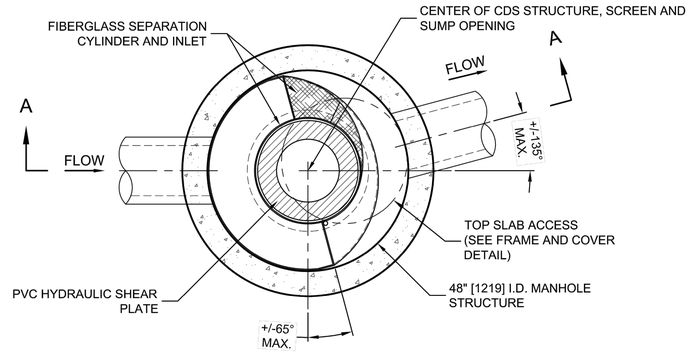
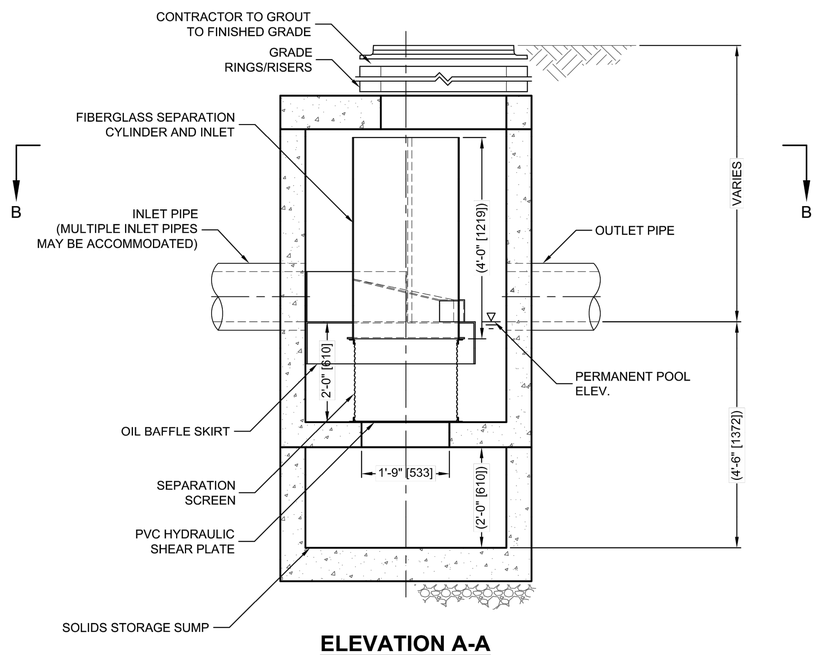
SCALE: AS SHOWN

FILE: 8374900-DET.DWG
DWG. NO: C-6.3
JOB. NO: 83749.00



PLAN VIEW B-B
N.T.S.



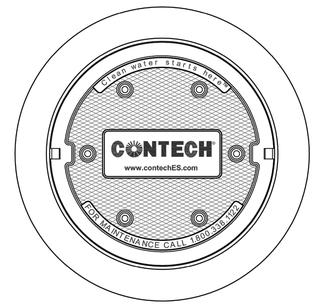
ELEVATION A-A
N.T.S.

THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 5,788,846; 6,641,720; 6,511,595; 6,581,793; RELATED FOREIGN PATENTS, OR OTHER PATENTS PENDING.

CDS2015-4-C DESIGN NOTES

THE STANDARD CDS2015-4-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES
SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
SEDIMENT WEIR FOR NJDEP / NJCAT CONFORMING UNITS



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (CFS OR L/s)	*
PEAK FLOW RATE (CFS OR L/s)	*
RETURN PERIOD OF PEAK FLOW (YRS)	*
SCREEN APERTURE (2400 OR 4700)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*

RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.contechES.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET HS20 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

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

CONTECH® ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CDS2015-4-C
INLINE CDS
STANDARD DETAIL

APPROVED BY THE MANSFIELD PLANNING & ZONING COMMISSION

CHAIRMAN - PLANNING AND ZONING COMMISSION DATE

ISSUED FOR PERMITTING

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EAGLEVILLE GREEN - NOVEMBER 25, 2019

STATE OF CONNECTICUT ROBERT S. NEWTON No. 20662 LICENSED PROFESSIONAL ENGINEER

ROBERT NEWTON, PE No. 20662

EAGLEVILLE GREEN

113-121 SOUTH EAGLEVILLE ROAD
IN
MANSFIELD CONNECTICUT

DETAILS

NOVEMBER 25, 2019

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3	02/12/2020	PER TEST PIT RESULTS

PREPARED FOR:
MANSFIELD HOUSING DEV. CORP.
309 MAPLE ROAD
STORRS, CT 06268

BSC GROUP
300 Winding Brook Drive
Glastonbury, Connecticut 06033
860 652 8227

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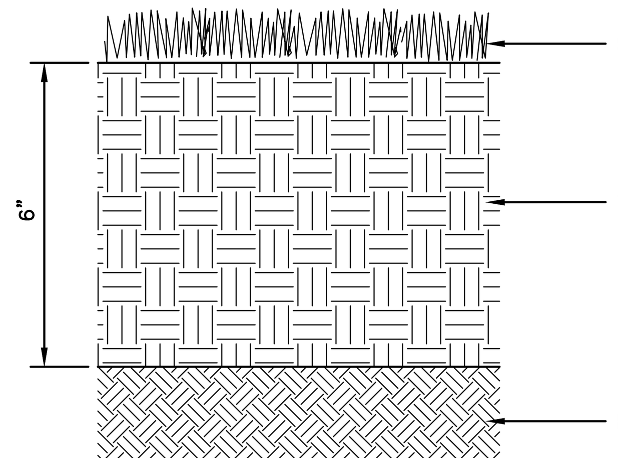
SCALE: AS SHOWN

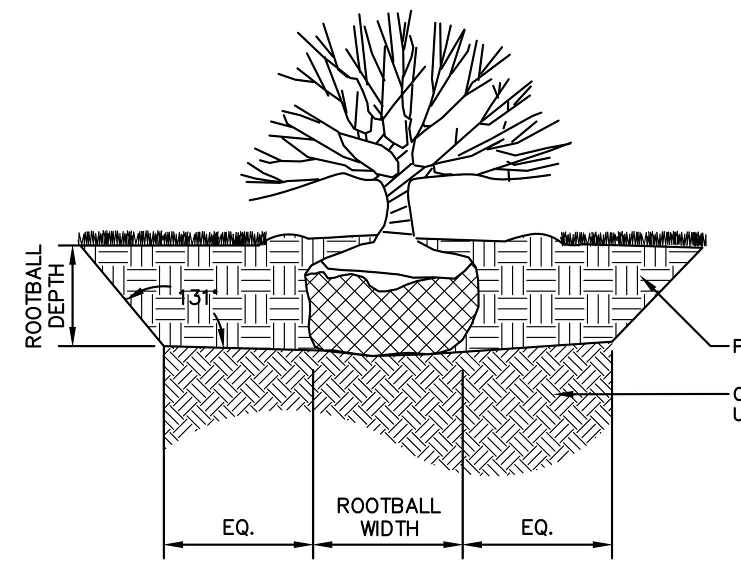
FILE: 8374900-DET.DWG
DWG. NO: C-6.4
JOB. NO: 83749.00



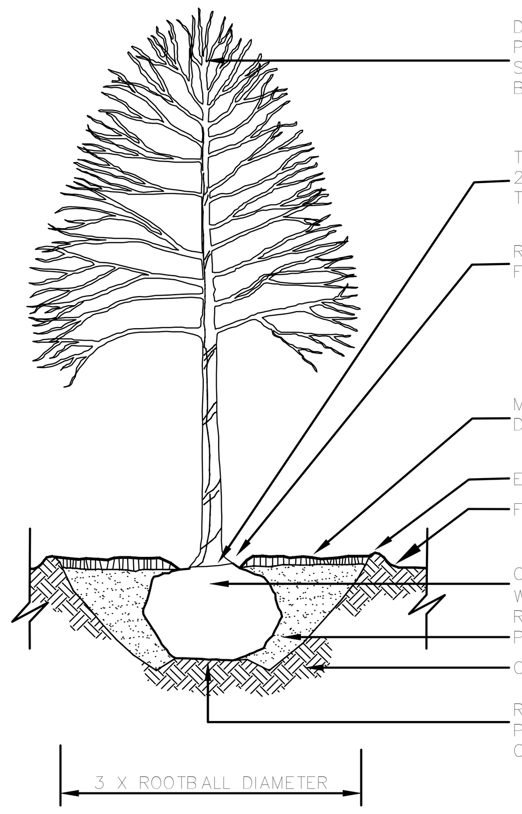
NOTES:
1. CONTRACTOR SHALL PREPARE SOILS IN ALL DISTURBED AREAS AND AREAS USED FOR EQUIPMENT ACCESS.

LAWN
SCALE: NONE

NOTES:
1. LOOSE OR CRACKED ROOT BALLS ARE UNACCEPTABLE.
2. EXCAVATE TO REQUIRED DEPTH AND DO NOT EXCAVATE BELOW ROOT BALL DEPTH.
3. SET SHRUBS PLUMB WITH ROOT FLARE 1" ABOVE FINISHED GRADE, BACKFILL WITH PLANTING MIX.
4. FLOOD WATERING SAUCER TWICE IN FIRST 24 HOURS AFTER PLANTING.
5. RAISE AND REPLANT ANY SHRUBS THAT SETTLE AFTER PLANTING & WATERING.
6. REMOVE 1/3 BURLAP PRIOR TO BACKFILL. SYNTHETIC BURLAP UNACCEPTABLE.E
7. 2" DEPTH MULCH (KEEP MULCH 1" AWAY FROM SHRUB BASE) 3" HIGH EARTH WATERING SAUCER 1'-0" BEYOND ROOT BALL PLANTING MIXTURE.
8. FOR CONTAINERIZED PLANTS: REMOVE CONTAINER PRIOR TO PLANTING, SCARIFY ROOT BALL BELOW EDGE 1/2" DEEP IN FOUR LOCATIONS.

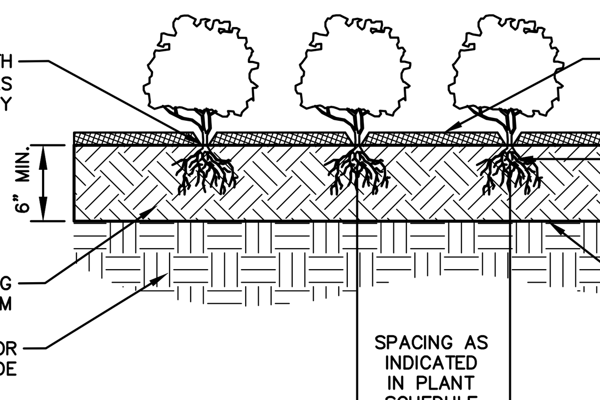


SHRUB PLANTING
SCALE: NONE



NOTES:
1. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
2. SAUCER SHALL BE FLOODED TWICE DURING THE FIRST 24 HOURS AFTER PLANTING.
3. DO NOT STAKE OR WRAP TREE UNLESS NOTED OTHERWISE.

DECIDUOUS TREE PLANTING
SCALE: NONE
PLNT-107-CT
11/05



GROUNDCOVER PLANTING TYP.
SCALE: NONE

1710LED VILLA SERIES
LED

*Fixture "A" shown above, additional styles on page 3.

EPA 0.78 (ft²) | WEIGHT 35 LBS | 7 YEAR WARRANTY | LUMEN RANGE 3,070 to 7,365 | LIFE SPAN L70 MINIMUM 100,000 HOURS | UL LISTED | CLICK FOR FAQ's | IP RATING* IP66
*Optical module only

JOB NAME
FIXTURE TYPE
MEMO

BUILD A PART NUMBER

ORDERING EXAMPLE: PT-1710CLED-RA-IH1-R3-1L40TS-MDL07-SV2-MS-R5-PE/BKT

Mounting Config.	Fixture	Roof	Internal Housing	Fitter	LED	CCT	Type	Driver	Internal Lens	Option Mini Shade	Option External Rings	Option Control Recept.	Option Control	Option Fuse	Option Hangstraight	Option House Side Shield	Arm See Arm Spec Sheets	Pole See Pole Spec Sheets	Finish

Mounting Configuration (Click here to view mounting configuration sheet)
- 1W • 2A • 3A90 • 1AM • CAT
- PT • 2A90 • 3APT • 2AM
- 1A • 2APT • 4A • 450PB
- 1APT • 3A • 4APT • SH44[1]

W = Wall Mount PT = Post Top A = Arm Mount AM = Arm Mid-Mount PB = Pier Base CAT = Catenary SH = Stem Hung
[1] Include overall drop length in inches after designation for stem application (IE: SH44-48").

Fixture
- 1710ALED • 1710BLED • 1710CLED
- 1710ALEDH • 1710BLEDH • 1710CLEDH

H = Hanging Fixture

Roof
- RA (Deep shade w/ sloped top)
- ~~RB (Deep shade w/ stepped top)~~
- RC[2] (Thin shade)
- RD (Shallow shade w/ flat top)
- RE[3] (No shade w/ flat top)

[2] Not for use with "A" or "B" style fixture
[3] Not for use with "B" style fixture

Internal Housing[7]
- IH1[4,5] (Stacked louvers)
- IH2[5] (Smooth cylinder)
- IH3[5] (Tapered cylinder)
- IH4[5] (4-vaned deco)
- IH5[5] (Ringed cylinder)
- IH6[6] (Low-rise cone)

[4] Not for use with "SV2RB" Internal Lens
[5] For use with "TS" optic only
[6] For use with "TSL" or "TAL" optic only
[7] Internal Housing offered with Silver finish only

Fitter
- R3 • R4 • NA[8]

[8] For use with hanging (H) fixture only

LED
- 1L

CCT - Color Temperature (K)
- 27(00) • 30(00) • 40(00) • 50(00)

Distribution Type
- TS (Symmetric, behind internal lens)
- TSL[9] (Symmetric, with large optic)
- TAL[9] (Asymmetric, with large optic)

[9] Not for use with "RC" roof.

Driver
- MDL05 (120V-277V, 500mA)
- MDL07 (120V-277V, 700mA)
- MDL09 (120V-277V, 900mA)
- MDL11 (120V-277V, 1100mA)
- MDH07 (347V-480V, 700mA)
- MDH09 (347V-480V, 900mA)
- MDH11 (347V-480V, 1100mA)

Internal Lens
- SV2RB[10] (Soft Vue Moderate Diffused Ribbed Acrylic Vertical Lens)
- SV2[10] (Soft Vue Moderate Diffused Acrylic Vertical Lens)
- SV4[10] (Soft Vue Maximum Diffused Acrylic Vertical Lens)
- NIL[11] (No Internal Vertical Lens)

[10] For use with "TS" optic only.
[11] For use with "TSL" or "TAL" optic only.

Options (Click here to view accessories sheet)
- MS[12] Mini-Shade
- ERS[12] External Rings
- R[13] 3-Pin control receptacle only
- R5[13] 5-Pin control receptacle only
- R7[13] 7-Pin control receptacle only
- PE[14] Twist-Lock Photocontrol (120V-277V)
- PE3[14] Twist-Lock Photocontrol (347V)
- PE4[14] Twist-Lock Photocontrol (480V)
- SC[14] Shorting Cap
- FHD[15] Double Fuse and Holder
- HSHS[16] Standard Horizontal Hangstraight, Spike Finial
- HSHN[16] Standard Horizontal Hangstraight, No Finial
- HSHB[16] Standard Horizontal Hangstraight, Ball Finial
- EZ[16] Vertical Hangstraight, Large, "EZ" Mount
- HSV[16] Vertical Hangstraight, Standard
- HSS 120° House Side Shield

[12] For use with "C" style fixture only
[13] Cannot be used with SH44, CAT, EZ or HSV mounting style
[14] Requires control receptacle
[15] Ships loose for installation in base
[16] For use with hanging (H) fixture only

Arm (Click here to link to arm specification page)
See Arms & Wall Brackets specification sheets.
- OMS • HMS • VCS
- VFS • VLS

Pole (Click here to link to pole specification page)
See Pole specification sheets.

Finish (Click here to view paint finish sheet)
Standard Urban Finishes
- UGMT Gun Metal Textured
- UGM Gun Metal Matte
- UBT Urban Bronze Textured
- UB Urban Bronze Matte
- ULBT Urban Light Bronze Textured
- ULB Urban Light Bronze Matte
- USLT Urban Silver Textured
- USL Urban Silver Matte
- UWHT Urban White Textured
- UWH Urban White Matte
- UCHS Urban Champagne Satin Smooth
- BKT Black Textured

Custom Urban Finishes[17]
- CM Custom Match
- CHL Custom Highlights (consult factory for more information)

[17] Custom finish requires upcharge, consult factory for more information.

Specifications

Fixture
Fixture shall be cylindrical in form (straight or tapered lens as specified), and feature both a roof casting and internal housing manufactured via permanent mold tooling. The outer lens shall be one-piece, injection molded, non-yellowing acrylic, sealed top and bottom with seamless silicone gaskets to an IP66 rating. Set screws and related hardware shall be finish painted to match the fixture housing. The luminaire shall be UL listed in the U.S. and Canada.

Optional Mini-Shade / External Rings
Offered on fixture style "C" only.
(Mini-Shade) A small cast aluminum louvered shade measuring 17-1/2" OD x 1-1/2" tall,
See next page

SternbergLighting
ESTABLISHED 1923 / EMPLOYEE OWNED
800-621-3376
555 Lawrence Ave., Roselle, IL 60172
info@sternberglighting.com
www.sternberglighting.com
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1710LED VILLA SERIES
LED

installed above the shade on roof style RC. Installed under shade on styles RA, RB, RD & RE
(External Rings) 2 flat cast aluminum rings measuring 13" OD, installed above the shade on roof style RC. Installed under shade on styles RA, RB, RD & RE

Fitter - Standard
Fixture shall house the driver and be provided with a heavy wall die cast aluminum fitter designed to slip-fit 3"OD (R3) or 4"OD (R4) x 3" tall tenons/poles. The fitter shall have three (3) stainless steel allen head screws to secure the connection between the fitter and tenon/pole. All external hardware shall be finish painted to match the rest of the fixture housing.

LEDs
The luminaire shall use high output, high brightness LED's, consisting of a two piece assembly complete with Chip on Board (COB) LED component and COB holder frame. The LED's and printed circuit boards shall be 100% recyclable; they shall also be protected from moisture and corrosion by a conformal coating of 1 to 3 mils. They shall not contain lead, mercury or any other hazardous substances and shall be RoHS compliant. The LED life rating data shall be determined in accordance with IESNA LM-80. The High Performance white LED's will have a life expectancy of approximately 100,000 hours with not less than 70% of original brightness (lumen maintenance), rated at 25°C. The High Brightness, High Output LED's shall be 4000K (2700K, 3000K or 5000K option) color temperature with a minimum of 70 CRI. Consult factory for custom color CCT. The luminaire shall have a minimum ______ (see table) delivered initial lumen rating when operated at steady state with an average ambient temperature of 25°C (77°F).

Optics
(TS Optic) The luminaire shall be provided with an individual, molded silicone refractor type optic applied to the COB (Chip On Board) LED assembly. An additional vertical diffused acrylic lens installed inside the unit allows for a high level of visual comfort. All testing shall be done in accordance with IESNA LM-79.
(TSL & TAL Optic) The luminaire shall be provided with an individual, large injection molded acrylic refractor type optic applied to the COB (Chip On Board) LED assembly. The optic visually spreads out size of the light source while creating a Symmetric (TSL) or asymmetric (TAL) light pattern. All testing shall be done in accordance with IESNA LM-79.

Electronic Drivers
The LED driver shall be U.L. Recognized. It shall be securely mounted inside the fixture, for optimized performance and longevity. It shall be supplied with a quick-disconnect electrical connector on the power supply, providing easy power connections and fixture installation. It shall have overload, overheat and short circuit protection, and have a DC voltage output, constant current design, 50/60HZ. It shall be supplied with line-ground, line-neutral and neutral-ground electrical surge protection in accordance with IEEE/ANSI C62.41.2 guidelines. It shall be a high efficiency driver with a THD less than 20% and a high power factor greater than .9. It shall be dimming capable using a 0-10v signal, consult factory for more information.

Photocontrols
Twist-Lock Style: The photocontrol shall be mounted externally on the fixture and prewired to driver. The twist lock type photocontrol is instant on with a 3-6 second turn off, and shall turn on at 1.5 footcandles with a turn-off at 2-3 footcandles. Photocontrol is 120-277 volt and warranted for 6 years.

Wireless Controls
A 5-pin (R5) or 7-pin (R7) NEMA receptacle can be included on the unit for wireless control systems.

Warranty
Seven-year limited warranty. See product and finish warranty guide for details.

Finish
Refer to website for details.

Performance (based on "C" style fixture with "RD" roof)

MODEL #	TS DELIVERED LUMENS	EFFICACY (LPW)	TSL DELIVERED LUMENS	EFFICACY (LPW)	TAL DELIVERED LUMENS	EFFICACY (LPW)	WATTAGE
1L40T_-MDL11	7325	114.5	7365	115.1	7270	113.6	64
1L30T_-MDL11	7140	111.6	7175	112.1	7085	110.7	64
1L27T_-MDL11	6485	101.3	6520	101.9	6435	100.5	64
1L40T_-MDL09	6060	116.5	6130	117.9	6045	116.3	52
1L30T_-MDL09	5905	113.6	5975	114.9	5890	113.3	52
1L27T_-MDL09	5365	103.2	5425	104.3	5350	102.9	52
1L40T_-MDL07	4790	116.8	4845	118.2	4770	116.3	41
1L30T_-MDL07	4670	113.9	4720	115.1	4650	113.4	41
1L27T_-MDL07	4240	103.4	4290	104.6	4225	103.0	41
1L40T_-MDL05	3500	116.7	3540	118.0	3470	115.7	30
1L30T_-MDL05	3410	113.7	3450	115.0	3380	112.7	30
1L27T_-MDL05	3100	103.3	3135	104.5	3070	102.3	30

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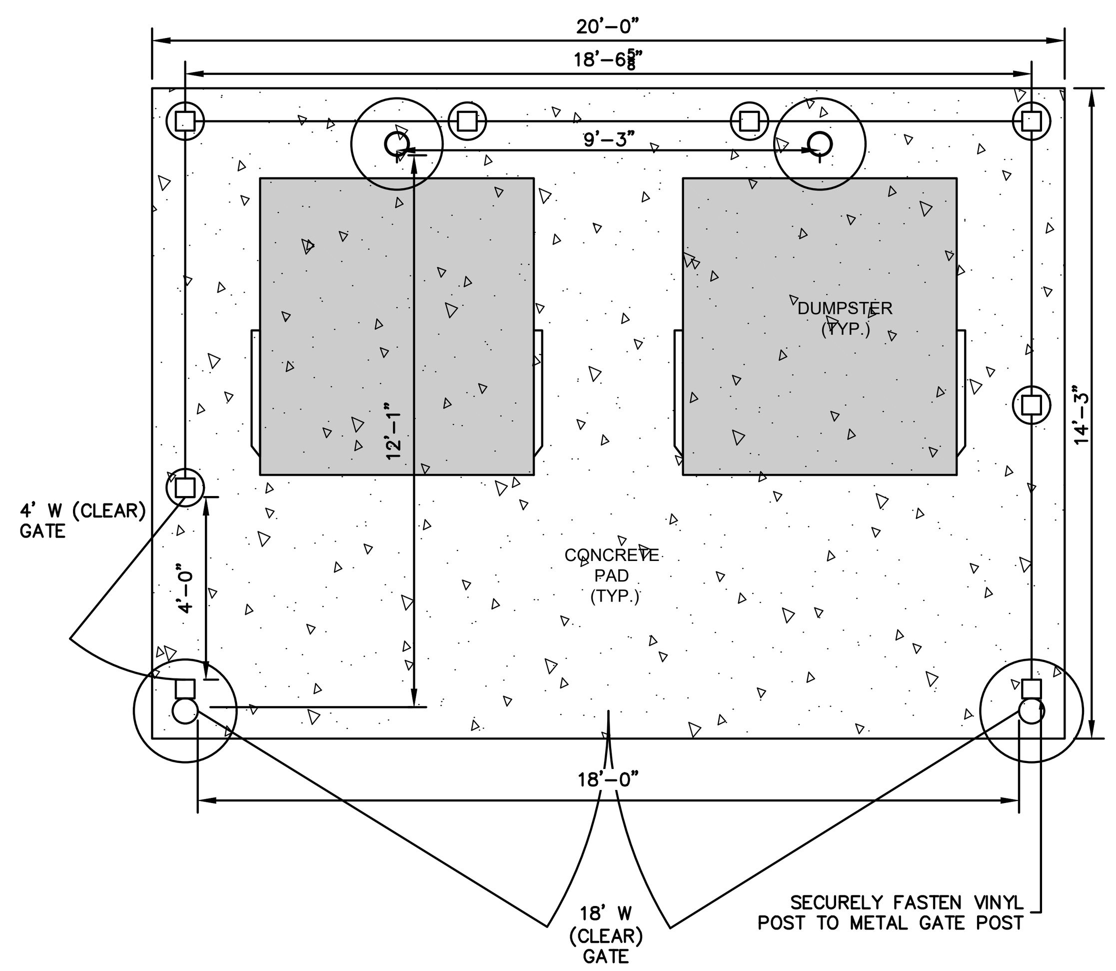
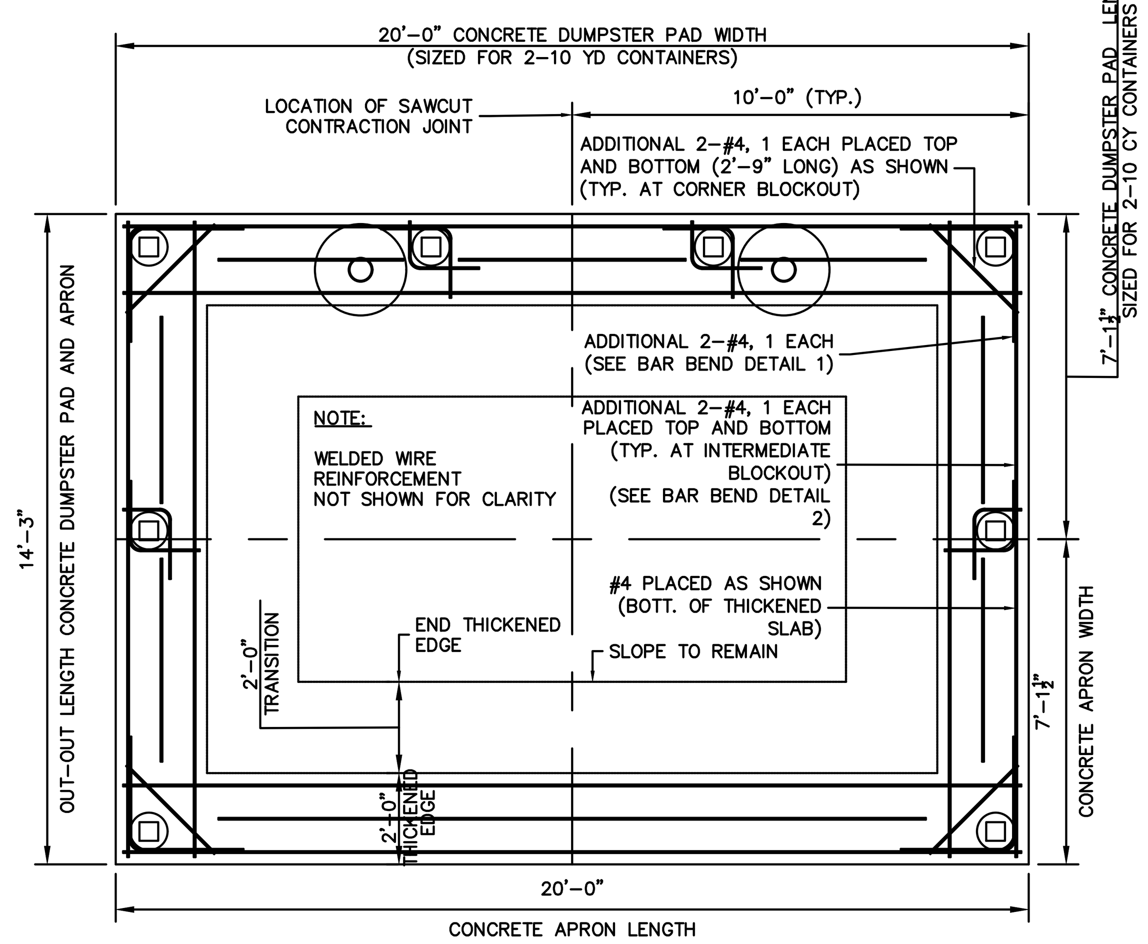
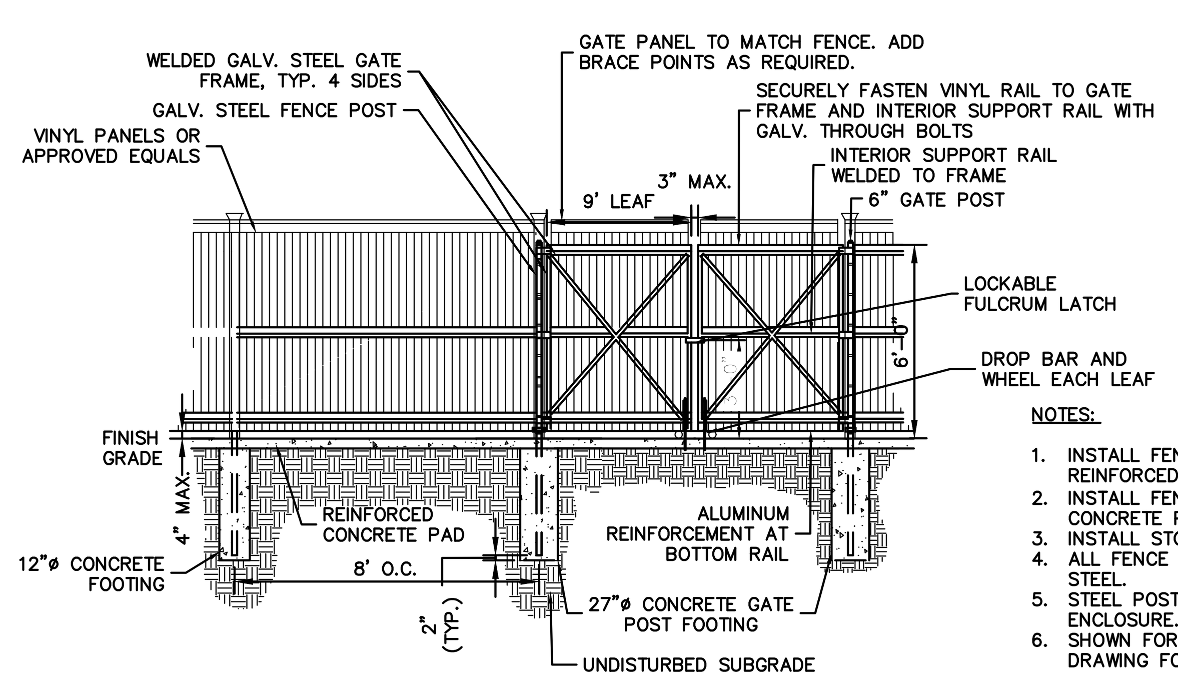


DUMPSTER PAD LAYOUT



CONCRETE SLAB LAYOUT



DUMPSTER PAD ENCLOSURE

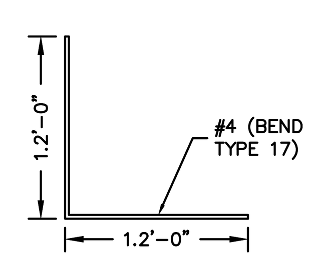
FENCE FRAMEWORK SCHEDULE

FENCE HEIGHT	UP TO 4'	5' TO 6'
FENCE POST	2.375" O.D.	2.875" O.D.
TOP AND BOTTOM RAIL	1.6" O.D.	2.375"
MIDDLE RAIL	NONE	2.375"
FOOTING	12" DIA.	12" DIA.

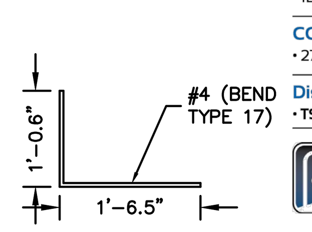
GATE FRAMEWORK SCHEDULE

GATE LEAF WIDTH	6'W OR LESS	>6'W - <12'W
GATE POST	6" O.D.	6" O.D.
GATE FRAME (4 SIDES)	2"	2.375"
INTERIOR SUPPORT	NONE	2.375"
HEAVY DUTY HINGE	3 PER LEAF	3 PER LEAF
FOOTING	16" DIA.	24" DIA.

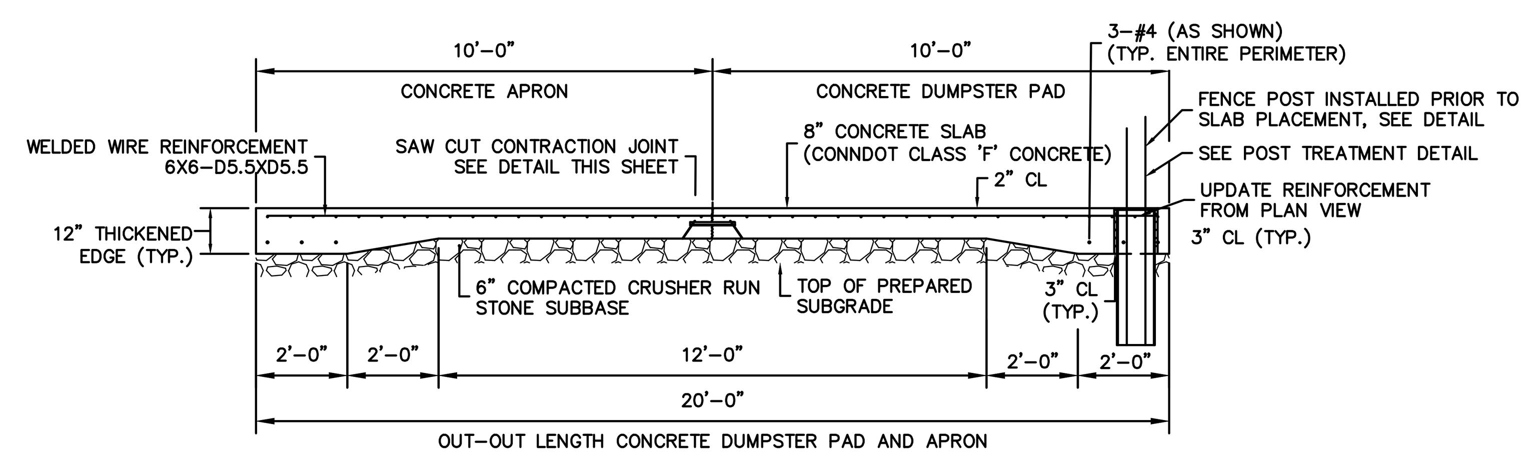
NOTES:
1. INSTALL FENCE FOOTINGS PRIOR TO INSTALLATION OF REINFORCED CONCRETE PAD.
2. INSTALL FENCE POSTS 6" FROM THE EDGE OF THE CONCRETE PAD.
3. INSTALL STOCKADE ON OUTSIDE OF POSTS.
4. ALL FENCE POSTS SHALL BE SCHEDULE 80 GALV. STEEL.
5. STEEL POSTS SHALL NOT BE VISIBLE FROM OUTSIDE OF ENCLOSURE.
6. SHOWN FOR DIAGRAMMATIC PURPOSES. PROVIDE SHOP DRAWING FOR APPROVAL.



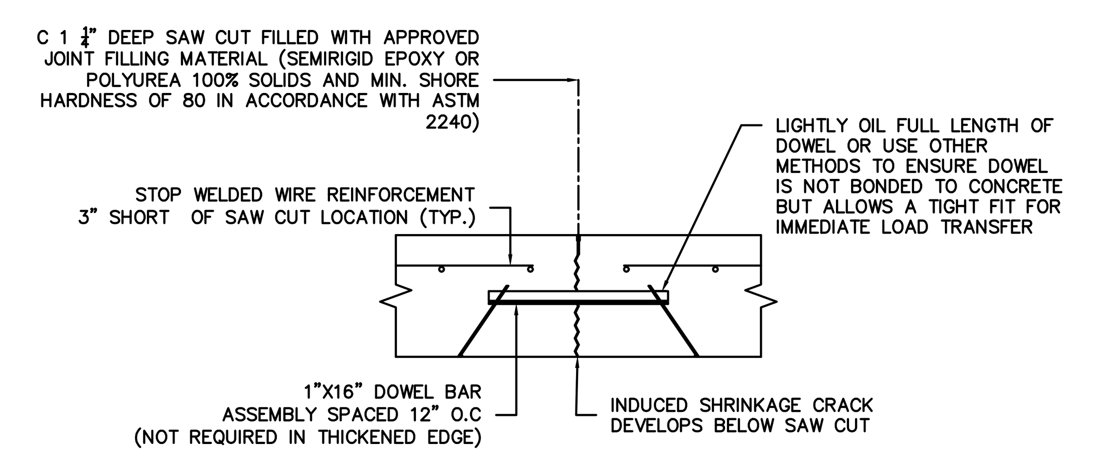
BAR BEND DETAIL 1



BAR BEND DETAIL 2



CONCRETE SLAB SECTION



SAWCUT CONTRACTION JOINT DETAIL

DUMPSTER ENCLOSURE
SCALE: NONE

APPROVED BY THE MANSFIELD PLANNING & ZONING COMMISSION

CHAIRMAN - PLANNING AND ZONING COMMISSION   *DATE*

ISSUED FOR PERMITTING

EAGLEVILLE GREEN - NOVEMBER 25, 2019

RACHEL N. SALCH, PLA   No. 1438

EAGLEVILLE GREEN

113-121 SOUTH EAGLEVILLE ROAD
IN
MANSFIELD CONNECTICUT

DETAILS

NOVEMBER 25, 2019

REVISIONS:

1	01/20/2020	PER TOWN COMMENTS
2	01/31/2020	PER TOWN COMMENTS
3	02/12/2020	PER TEST PIT RESULTS

PREPARED FOR:
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309 MAPLE ROAD
STORRS, CT 06268

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860 652 8227

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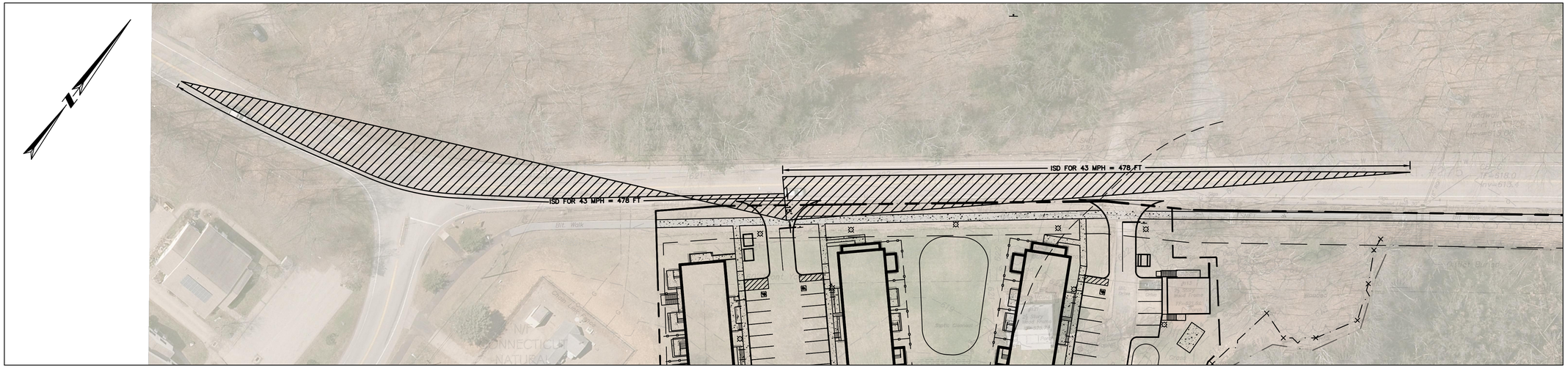

WEST EXIT - INTERSECTION SIGHT DISTANCE
SCALE: 1" = 40'

EAST EXIT - INTERSECTION SIGHT DISTANCE
SCALE: 1" = 40'

NOTES:

1. INTERSECTION SIGHT DISTANCE IDENTIFIED ON THIS PLAN IS DESIGNED IN ACCORDANCE WITH THE CONNECTICUT HIGHWAY DESIGN MANUAL, CHAPTER 11 "INTERSECTIONS AT GRADE," SECTION 2.03.01 – FIGURE 11–2C "INTERSECTION SIGHT DISTANCES (TWO–LANE HIGHWAY OR STREET)."
2. THE 85TH PERCENTILE SPEED ON SOUTH EAGLEVILLE ROAD (STATE ROUTE NO. 275) AT THE LOCATION OF THE SITE IS 43 MPH.
3. THE INTERSECTION SIGHT DISTANCE FOR A PASSENGER VEHICLE MAKING A LEFT TURN ONTO THE 43 MPH ROAD IS 478 FEET ALONG THE VEHICLE PATH.
4. THE INTERSECTION SIGHT DISTANCE LINE OF SIGHT IS MEASURED 15 FEET BACK OF THE GUTTER LINE AT THE CENTER OF THE EXIT LANE.
5. THE APPROACH GRADE AT BOTH INTERSECTIONS IS LESS THAN +3.0% SLOPE.

INTERSECTION DISTANCES (MINIMUM REQUIRED = 478 FEET):

WEST EXIT:
LEFT–TURN = GREATER THAN 1000 FEET
RIGHT–TURN = 478 FEET

EAST EXIT:
LEFT–TURN = GREATER THAN 1000 FEET
RIGHT–TURN = GREATER THAN 600 FEET

LEGEND

- PROPERTY LINE
- LIMIT OF WORK
- WETLAND BOUNDARY
- PROPOSED CURBING
- INTERSECTION SIGHT DISTANCE TRIANGLE

APPROVED BY THE MANSFIELD PLANNING & ZONING COMMISSION

CHAIRMAN - PLANNING AND ZONING COMMISSION _____ DATE _____

ISSUED FOR PERMITTING

EAGLEVILLE GREEN - NOVEMBER 25, 2019

STATE OF CONNECTICUT ROBERT S. NEWTON No. 20662 LICENSED PROFESSIONAL ENGINEER

ROBERT NEWTON, PE No. 20662

EAGLEVILLE GREEN

113-121 SOUTH EAGLEVILLE ROAD
IN
MANSFIELD
CONNECTICUT

INTERSECTION SIGHT DISTANCE PLAN

NOVEMBER 25, 2019

REVISIONS:

1	01/20/2020	PER TOWN COMMENTS
2	01/31/2020	PER TOWN COMMENTS
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STORRS, CT 06268

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SCALE: 1" = 40'
0 20 40 80 FEET

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JOB. NO: 83749.00

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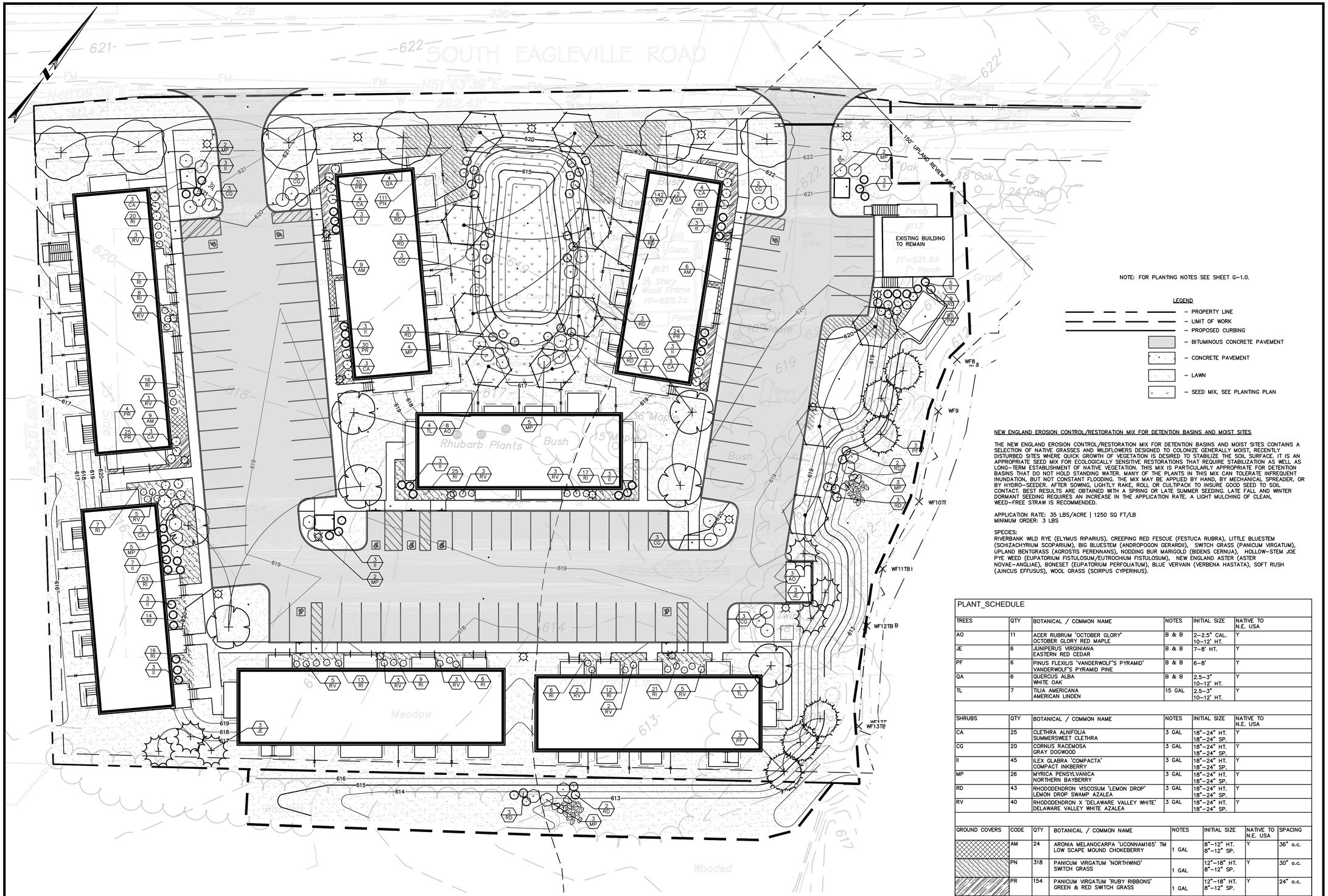

NOTE: FOR PLANTING NOTES SEE SHEET G-1.0.

LEGEND

- PROPERTY LINE
- LIMIT OF WORK
- PROPOSED CURBING
- BITUMINOUS CONCRETE PAVEMENT
- CONCRETE PAVEMENT
- LAWN
- SEED MIX, SEE PLANTING PLAN

NEW ENGLAND EROSION CONTROL/RESTORATION MIX FOR DETENTION BASINS AND MOIST SITES

THE NEW ENGLAND EROSION CONTROL/RESTORATION MIX FOR DETENTION BASINS AND MOIST SITES CONTAINS A SELECTION OF NATIVE GRASSES AND WILDFLOWERS DESIGNED TO COLONIZE GENERALLY MOIST, RECENTLY DISTURBED SITES WHERE QUICK GROWTH OF VEGETATION IS DESIRED TO STABILIZE THE SOIL SURFACE. IT IS AN APPROPRIATE SEED MIX FOR ECOLOGICALLY SENSITIVE RESTORATIONS THAT REQUIRE STABILIZATION AS WELL AS LONG-TERM ESTABLISHMENT OF NATIVE VEGETATION. THIS MIX IS PARTICULARLY APPROPRIATE FOR DETENTION BASINS THAT DO NOT HOLD STANDING WATER. MANY OF THE PLANTS IN THIS MIX CAN TOLERATE INFREQUENT INUNDATION, BUT NOT CONSTANT FLOODING. THE MIX MAY BE APPLIED BY HAND, BY MECHANICAL SPREADER, OR BY HYDRO-SEEDER. AFTER SOWING, LIGHTLY RAKE, ROLL OR CULTIPACK TO INSURE GOOD SEED TO SOIL CONTACT. BEST RESULTS ARE OBTAINED WITH A SPRING OR LATE SUMMER SEEDING. LATE FALL AND WINTER DORMANT SEEDING REQUIRES AN INCREASE IN THE APPLICATION RATE. A LIGHT MULCHING OF CLEAN, WEED-FREE STRAW IS RECOMMENDED.

APPLICATION RATE: 35 LBS/ACRE | 1250 SQ FT/LB
MINIMUM ORDER: 3 LBS

SPECIES:
RIVERBANK WILD RYE (ELYMUS RIPARIUS), CREEPING RED FESCUE (FESTUCA RUBRA), LITTLE BLUESTEM (SCHIZACHYRIUM SCOPARIUM), BIG BLUESTEM (ANDROPOGON GERARDII), SWITCH GRASS (PANICUM VIRGATUM), UPLAND BENTGRASS (AGROSTIS PERENNANS), NODDING BUR MARIGOLD (BIDENS CERNUA), HOLLOW-STEM JOE PYE WEED (EUPATORIUM FISTULOSUM/EUTROCHIUM FISTULOSUM), NEW ENGLAND ASTER (ASTER NOVAE-ANGLIAE), BONESET (EUPATORIUM PERFOLIATUM), BLUE VERVAIN (VERBENA HASTATA), SOFT RUSH (JUNCUS EFFUSUS), WOOL GRASS (SCIRPUS CYPERINUS).

PLANT_SCHEDULE

TREES	QTY	BOTANICAL / COMMON NAME	NOTES	INITIAL SIZE	NATIVE TO N.E. USA
AO	11	ACER RUBRUM 'OCTOBER GLORY' OCTOBER GLORY RED MAPLE	B & B	2-2.5" CAL. 10-12' HT.	Y
JE	6	JUNIPERUS VIRGINIANA EASTERN RED CEDAR	B & B	7-8' HT.	Y
PF	6	PINUS FLEXILIS 'VANDERWOLF'S PYRAMID' VANDERWOLF'S PYRAMID PINE	B & B	6-8'	Y
QA	6	QUERCUS ALBA WHITE OAK	B & B	2.5-3" 10-12' HT.	Y
TL	7	TILIA AMERICANA AMERICAN LINDEN	15 GAL	2.5-3" 10-12' HT.	Y

SHRUBS	QTY	BOTANICAL / COMMON NAME	NOTES	INITIAL SIZE	NATIVE TO N.E. USA
CA	25	CLETHRA ALNIFOLIA SUMMERSWEET CLETHRA	3 GAL	18"-24" HT. 18"-24" SP.	Y
CG	20	CORNUS RACEMOSA GRAY DOGWOOD	3 GAL	18"-24" HT. 18"-24" SP.	Y
II	45	ILEX GLABRA 'COMPACTA' COMPACT INKBERRY	3 GAL	18"-24" HT. 18"-24" SP.	Y
MP	26	MYRICA PENSYLVANICA NORTHERN BAYBERRY	3 GAL	18"-24" HT. 18"-24" SP.	Y
RD	43	RHODODENDRON VISCOSUM 'LEMON DROP' LEMON DROP SWAMP AZALEA	3 GAL	18"-24" HT. 18"-24" SP.	Y
RV	40	RHODODENDRON X 'DELAWARE VALLEY WHITE' DELAWARE VALLEY WHITE AZALEA	3 GAL	18"-24" HT. 18"-24" SP.	Y

GROUND COVERS	CODE	QTY	BOTANICAL / COMMON NAME	NOTES	INITIAL SIZE	NATIVE TO N.E. USA	SPACING
	AM	24	ARONIA MELANOCARPA 'UCONNAM165' TM LOW SCAPE MOUND CHOKEBERRY	1 GAL	8"-12" HT. 8"-12" SP.	Y	36" o.c.
	PN	318	PANICUM VIRGATUM 'NORTHWIND' SWITCH GRASS	1 GAL	12"-18" HT. 8"-12" SP.	Y	30" o.c.
	PR	154	PANICUM VIRGATUM 'RUBY RIBBONS' GREEN & RED SWITCH GRASS	1 GAL	12"-18" HT. 8"-12" SP.	Y	24" o.c.
	RI	250	RUDBECKIA FULGIDA 'INDIAN SUMMER' CONEFLOWER	1 GAL	8"-12" HT. 8"-12" SP.	Y	30" o.c.

APPROVED BY THE MANSFIELD PLANNING & ZONING COMMISSION

CHAIRMAN - PLANNING AND ZONING COMMISSION _____ DATE _____

ISSUED FOR PERMITTING

EAGLEVILLE GREEN - NOVEMBER 25, 2019

STATE OF CONNECTICUT · RACHEL NICOLE SALCH · LICENSED LANDSCAPE ARCHITECT

RACHEL N. SALCH, PLA No. 1438

EAGLEVILLE GREEN

113-121 SOUTH EAGLEVILLE ROAD
IN
MANSFIELD
CONNECTICUT

PLANTING PLAN

NOVEMBER 25, 2019

REVISIONS:

1	01/20/2020	PER TOWN COMMENTS
2	01/31/2020	PER TOWN COMMENTS
3	02/12/2020	PER TEST PIT RESULTS

PREPARED FOR:
MANSFIELD HOUSING DEV. CORP.
309 MAPLE ROAD
STORRS, CT 06268

BSC GROUP
300 Winding Brook Drive
Glastonbury, Connecticut 06033
860 652 8227

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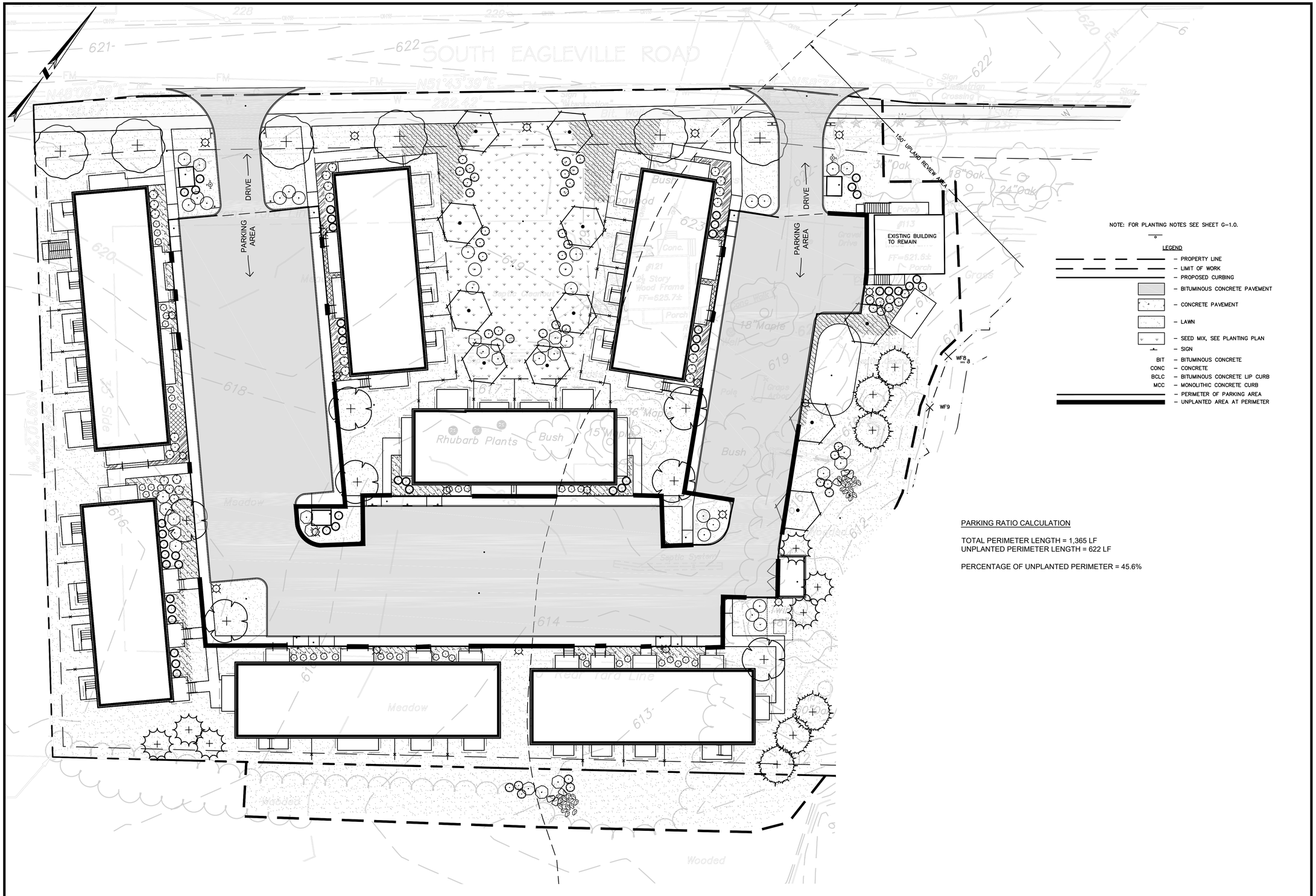
SCALE: 1" = 20'
0 10 20 40 FEET

FILE: 8374900-PLANT.DWG
DWG. NO:
JOB. NO: 83749.00

L-1.0



NOTE: FOR PLANTING NOTES SEE SHEET G-1.0.

LEGEND

- PROPERTY LINE
- LIMIT OF WORK
- PROPOSED CURBING
- BITUMINOUS CONCRETE PAVEMENT
- CONCRETE PAVEMENT
- LAWN
- SEED MIX, SEE PLANTING PLAN
- SIGN

BIT – BITUMINOUS CONCRETE
CONC – CONCRETE
BCLC – BITUMINOUS CONCRETE LIP CURB
MCC – MONOLITHIC CONCRETE CURB
– PERIMETER OF PARKING AREA
– UNPLANTED AREA AT PERIMETER

PARKING RATIO CALCULATION

TOTAL PERIMETER LENGTH = 1,365 LF
UNPLANTED PERIMETER LENGTH = 622 LF

PERCENTAGE OF UNPLANTED PERIMETER = 45.6%

APPROVED BY THE MANSFIELD PLANNING & ZONING COMMISSION

CHAIRMAN - PLANNING AND ZONING COMMISSION _____ DATE _____

ISSUED FOR PERMITTING

EAGLEVILLE GREEN - NOVEMBER 25, 2019

STATE OF CONNECTICUT
RACHEL NICOLE SALCH
LANDSCAPE ARCHITECT

RACHEL N. SALCH, PLA No. 1438

EAGLEVILLE GREEN

113-121 SOUTH EAGLEVILLE ROAD
IN
MANSFIELD
CONNECTICUT

PLANTING RATIO

NOVEMBER 25, 2019

REVISIONS:

1	01/20/2020	PER TOWN COMMENTS
2	01/31/2020	PER TOWN COMMENTS
3	02/12/2020	PER TEST PIT RESULTS

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JOB. NO: 83749.00

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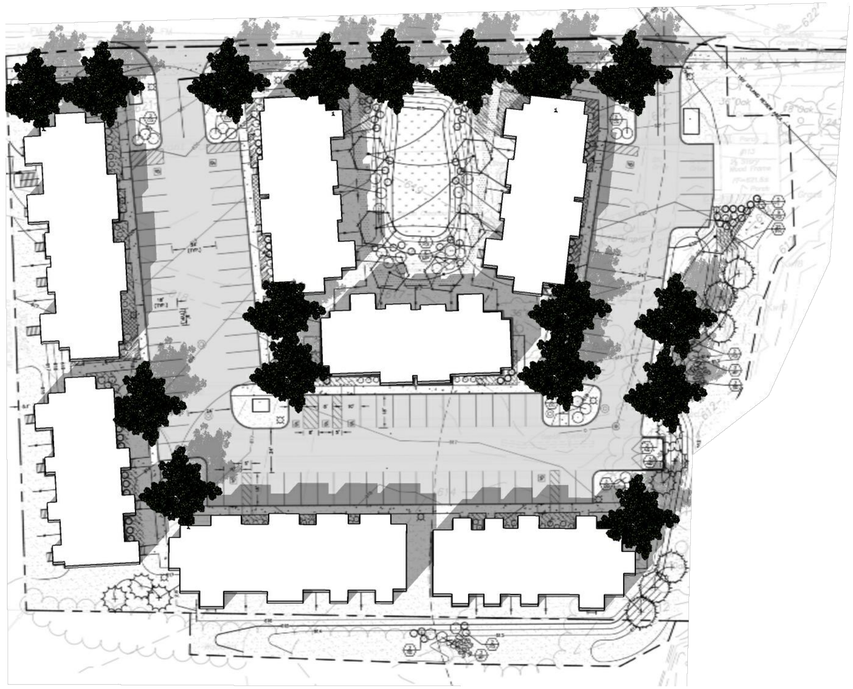
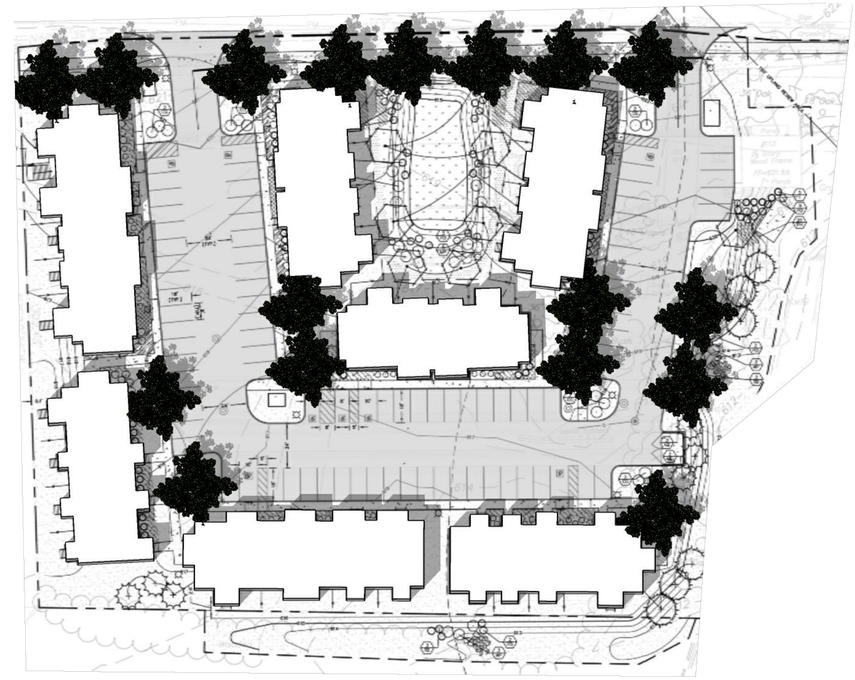
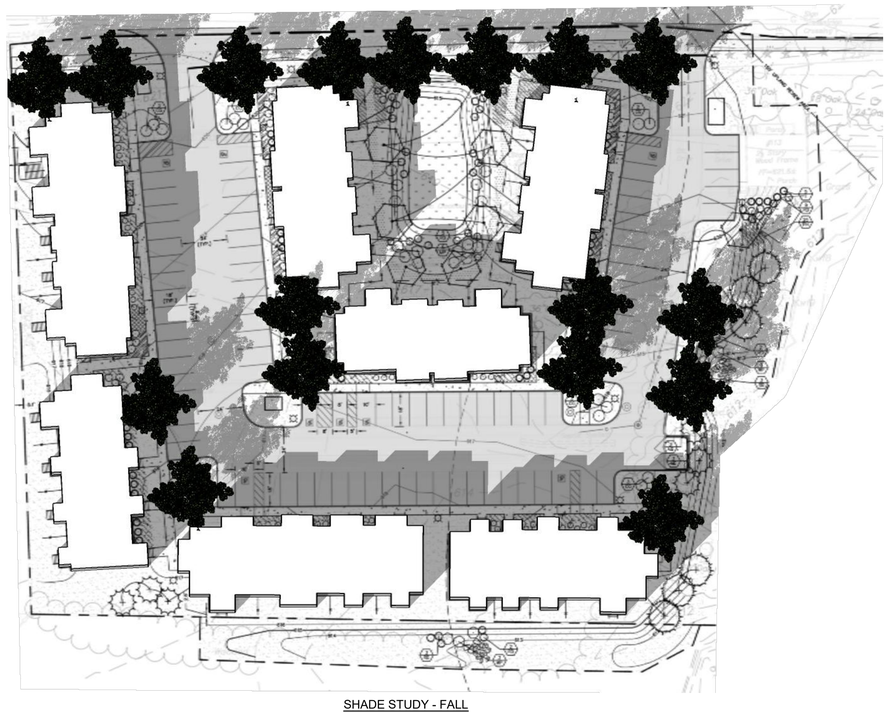


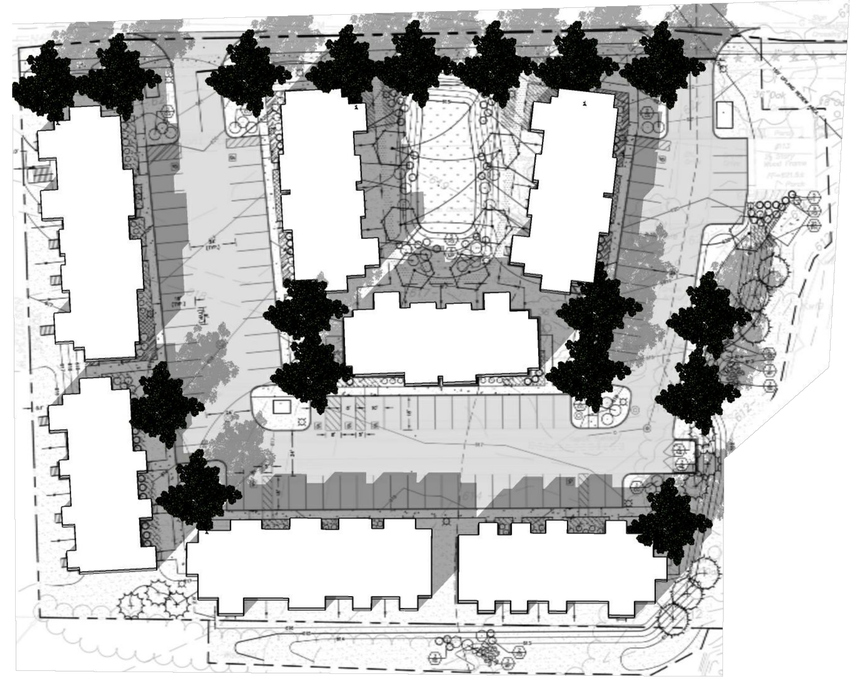
SHADE STUDY - SPRING



SHADE STUDY - SUMMER



SHADE STUDY - FALL



SHADE STUDY - WINTER

APPROVED BY THE MANSFIELD PLANNING & ZONING COMMISSION

CHAIRMAN - PLANNING AND ZONING COMMISSION DATE

ISSUED FOR PERMITTING

EAGLEVILLE GREEN - NOVEMBER 25, 2019

EAGLEVILLE GREEN

113-121 SOUTH
EAGLEVILLE ROAD
IN
MANSFIELD
CONNECTICUT

SHADE STUDY

NOVEMBER 25, 2019

REVISIONS:

1	01/20/2020	PER TOWN COMMENTS
2	01/31/2020	PER TOWN COMMENTS
3	02/12/2020	PER TEST PIT RESULTS

PREPARED FOR:
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309 MAPLE ROAD
STORRS, CT 06268

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Glastonbury, Connecticut 06033
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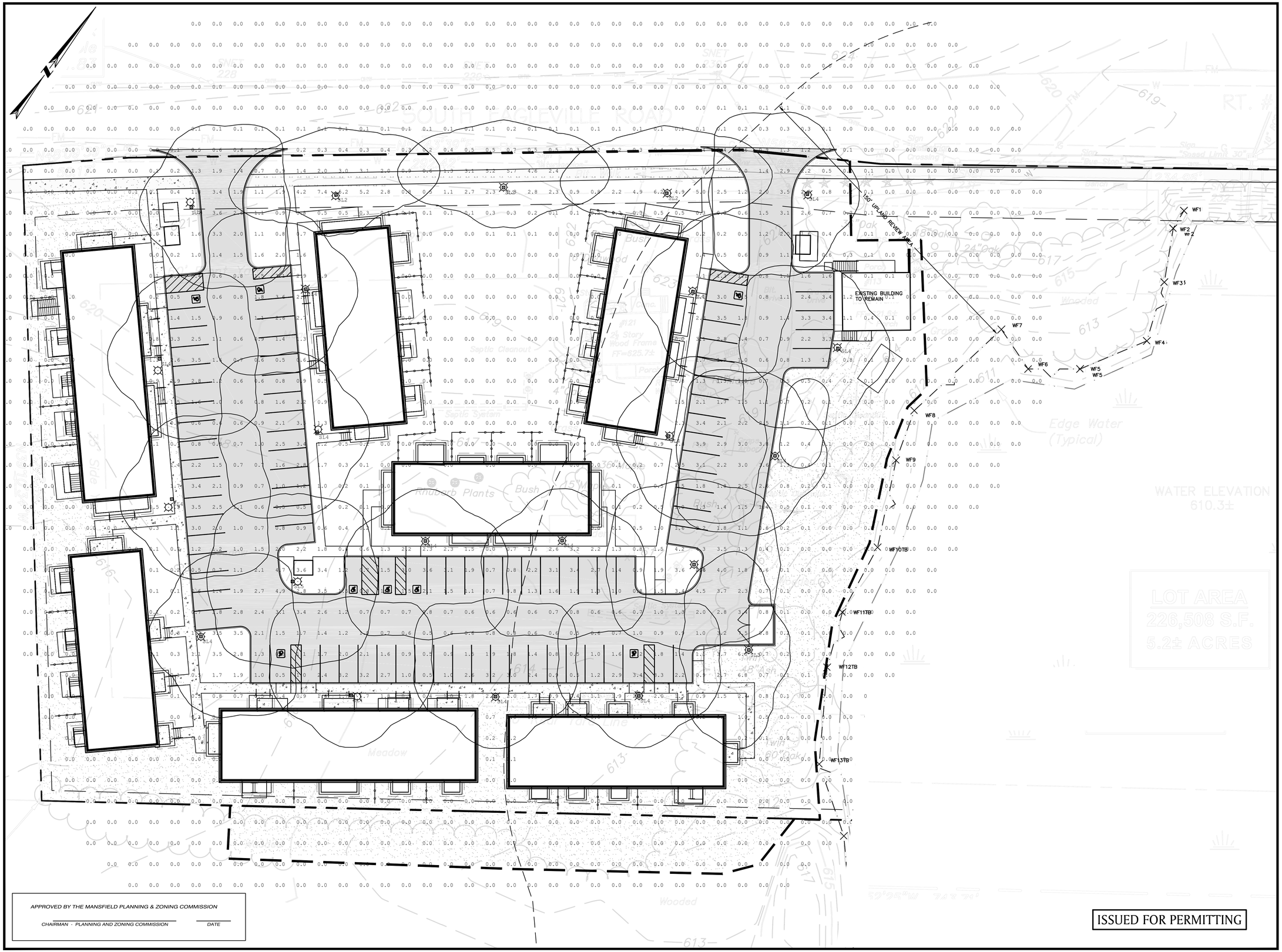
JOB. NO: 83749.00

L-1.2



APPROVED BY THE MANSFIELD PLANNING & ZONING COMMISSION

CHAIRMAN - PLANNING AND ZONING COMMISSION _____ DATE _____

ISSUED FOR PERMITTING

EAGLEVILLE GREEN - NOVEMBER 25, 2019

EAGLEVILLE GREEN

113-121 SOUTH EAGLEVILLE ROAD
IN
MANSFIELD
CONNECTICUT

PHOTOMETRICS PLAN

NOVEMBER 25, 2019

REVISIONS:

1	01/20/2020	PER TOWN COMMENTS
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SCALE: 1" = 20'
0 10 20 40 FEET

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DWG. NO:
JOB. NO: 83749.00

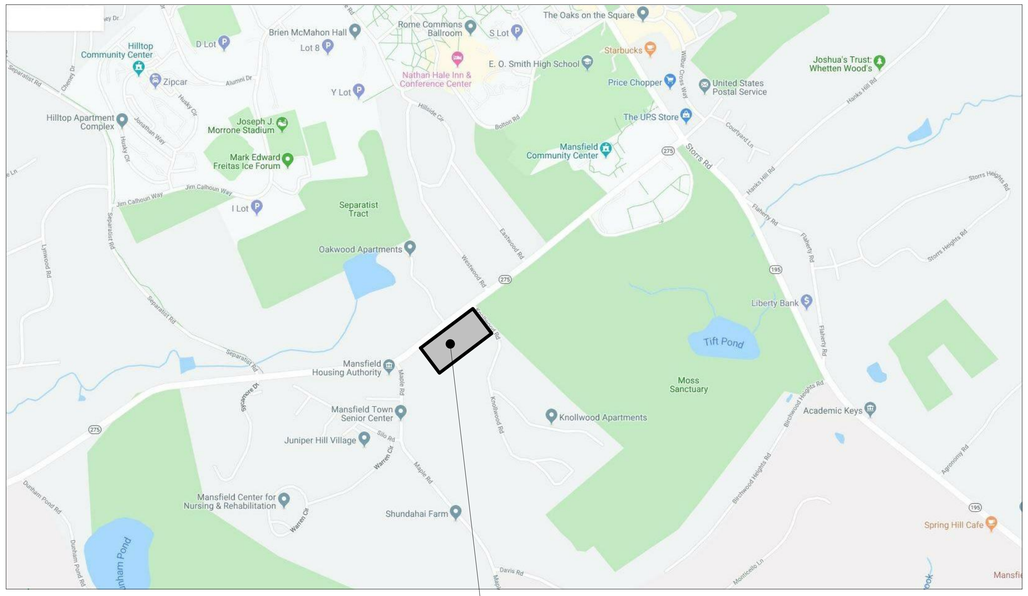
L-2.0

1
A1.1
CONCEPTUAL SITE PLAN
SCALE: 1" = 30'-0"

THESE DOCUMENTS ARE PROGRESS DRAWINGS PREPARED AS A SUPPLEMENT TO THE ZONING BOARD APPLICATION. THEY ARE NOT FOR CONSTRUCTION. IN THE CASE OF CONFLICTS THE ENGINEERING SET PREPARED BY BSC GROUP SHALL PREVAIL.

EAGLEVILLE GREEN	MANSFIELD NON-PROFIT HOUSING DEVELOPMENT CORP.	dorgan architecture & planning	1 Revision #1 2/11/20 REVISIONS:

SHEET TITLE: SITE PLAN
PROJECT NAME: EAGLEVILLE GREEN
PROJECT #:
DRAWN BY:
DATE: 2/6/20
SHEET NUMBER
A1.1



1 A1.1a LOCATION PLAN
SCALE: 1" = 1'-0"

PARKING

(79) REGULAR SPACES
(8) ACCESSIBLE SPACES

(87) TOTAL SPACES

87 SPACES/ 42 DWELLING UNITS = 2.07 SPACES/ UNIT

UNITS PER ACRE

PROPERTY AREA = +/-5.2 ACRES

UNITS/ ACRE, TOTAL SITE = 8.08

PROPERTY AREA - WETLANDS AREA = +/-3.2 ACRES

UNITS/ ACRE, TOTAL SITE - WETLANDS = 13.125

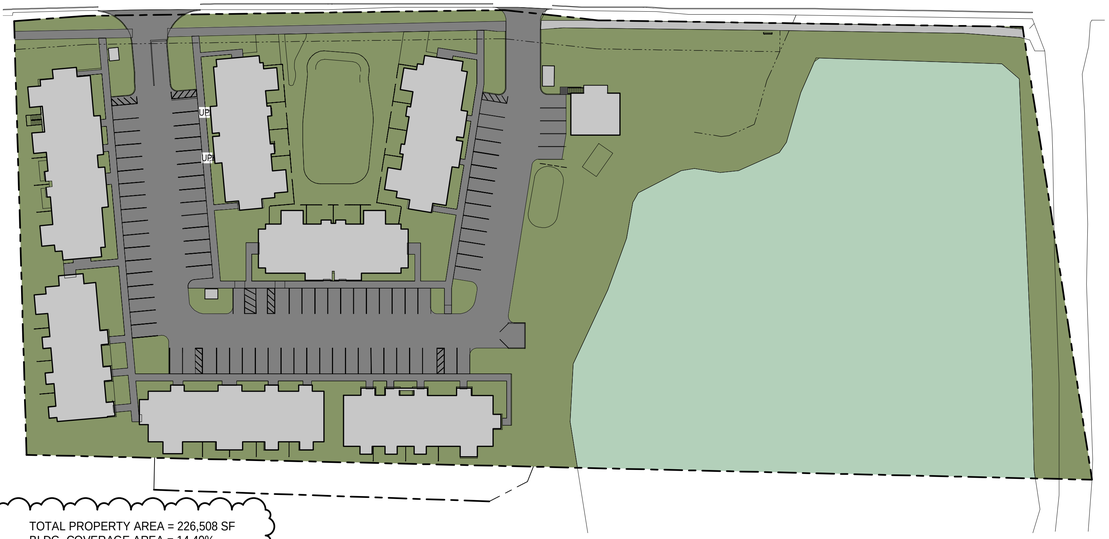
BUILDING HEIGHT

MAXIMUM BUILDING HEIGHT
(WITHOUT CUPOLA) = 33'-0"
(WITH CUPOLA) = 38'-6"

UNIT BREAKDOWN

UNIT TYPE	UNIT QUANTITY.		AFFORDABLE UNITS*				BEDS		BATHS		1/2 BATHS		NET AREA		COMMENTS
	QTY.	TOTAL	80%	60%	TOTAL	RENT	PER UNIT	TOTAL	PER UNIT	TOTAL	PER UNIT	TOTAL	PER UNIT	TOTAL	
1 BEDROOM - TYPE #1	6		2	1			1	6	1	6	0	0	706	4,236	Typical 1st floor unit
1 BEDROOM - TYPE #2	8		1	2			1	8	1	8	0	0	780	6,240	Typical 2nd floor unit
1 BEDROOM - TYPE #3	1						1	1	1	1	0	0	780	780	2nd floor - stacked over 3 BR
1 BEDROOM - TYPE #4	1						1	1	1	1	0	0	750	750	2nd floor - stacked over 3 BR
1 BEDROOM - ACCESSIBLE	2						1	2	1	2	0	0	706	1,412	1st floor - accessible
Total 1 BEDROOM UNITS		**18**	3	3	**6**										
2 BEDROOM - TYPE #1	12		2	2			2	24	1	12	1	12	1,045	12,540	Typical 2 story unit
2 BEDROOM - TYPE #2 (ACCESSIBLE)	2						2	4	1	2	0	0	980	1,960	1st floor - accessible
2 BEDROOM - TYPE #3	2		1				2	4	1	2	0	0	1,060	2,120	2nd floor - stacked over 2 BR
2 BEDROOM - EXISTING BUILDING	1						2	2	1	1	1	1	1,200	1,200	Renovated exist. residence
Total 2 BEDROOM UNITS		**17**	3	2	**5**										
3 BEDROOM - TYPE #1	6		1	1			3	18	2	12	0	0	1,260	7,560	Typical 2 story unit
3 BEDROOM - TYPE #2 (ACCESSIBLE)	1						3	3	2	2	0	0	1,400	1,400	1st floor - accessible
Total 3 BEDROOM UNITS		**7**	1	1	**2**										
TOTAL		**42**	7	6	**13 (31%)**			73		49		13		40,198	

*** THIS PLAN ILLUSTRATES A TYPICAL DISTRIBUTION OF AFFORDABLE UNITS. THE LOCATION OF AFFORDABLE UNITS WILL FLOAT DEPENDING ON THE NEEDS AND PREFERENCES OF RESIDENTS.**



TOTAL PROPERTY AREA = 226,508 SF
BLDG. COVERAGE AREA = 14.40%

2 A1.1a SITE COVERAGE PLAN
SCALE: 1" = 50'-0"

PROJECT NORTH

3 A1.1a DWELLING UNIT BREAKDOWN
SCALE: 1" = 50'-0"

PROJECT NORTH

THESE DOCUMENTS ARE PROGRESS DRAWINGS PREPARED AS A SUPPLEMENT TO THE ZONING BOARD APPLICATION. THEY ARE NOT FOR CONSTRUCTION. IN THE CASE OF CONFLICTS THE ENGINEERING SET PREPARED BY BSC GROUP SHALL PREVAIL.

EAGLEVILLE GREEN

MANSFIELD NON-PROFIT HOUSING DEVELOPMENT CORP.

dorgan architecture & planning

1 Revision #1 2/11/20
REVISIONS:

SHEET TITLE: SITE INFORMATION

PROJECT NAME: EAGLEVILLE GREEN
PROJECT #:
DRAWN BY:
DATE: 2/6/20

SHEET NUMBER
A1.1a

STORMWATER MANAGEMENT REPORT

Eagleville Green
113-121 South Eagleville Road
Mansfield, Connecticut

October 2019
Revised February 2020

PREPARED FOR:

Mansfield Non-Profit Housing Development Corporation
309 Maple Road
Storrs, CT 06268

PREPARED BY:

BSC GROUP, INC.
300 Winding Brook Drive
Glastonbury, CT 06033
PHONE: 860-652-8227 FAX: 860-652-8229

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Appendix B Proposed Stormwater Discharge Computations
Appendix C Proposed Hydraulic Sizing Computations
Appendix D Water Quality Computations

1.0 INTRODUCTION

This Stormwater Management Report contains the engineering design of the stormwater management systems for the proposed development of the Eagleville Green, located at 113-121 South Eagleville Road in Mansfield, Connecticut. (Figure 1 – Site Location Map). The development will consist of seven (7) multi-story housing buildings, surface parking for approximately 87 vehicle spaces, and other "typical" site improvements to support the proposed building program. The engineering design and report are prepared in accordance with Town of Mansfield Regulations, the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, the 2004 Connecticut Department of Energy & Environmental Protection (CT DEEP) Water Quality Manual, and the 2000 Connecticut Department of Transportation (ConnDOT) Drainage Manual.

2.0 EXECUTIVE SUMMARY

This report is prepared for Mansfield Housing Authority in support of the Eagleville Green proposed development. It addresses the impacts and drainage mitigation for the increase in site impervious caused by the new building complex and its appurtenances.

The following stormwater management facilities are designed in accordance with the Town of Mansfield in coordination with their engineering department, the Mansfield Zoning Regulations, CT DEEP, and ConnDOT Drainage Standards:

- As part of the construction, total site impervious area has been increased. Therefore, peak flows for the ,2-, 10-, 25-, and 100-year design storms have been mitigated.
- In accordance with the Town of Mansfield Regulations, the peak flow generated during the 2-year design storm has been reduced to 50% of the pre-development rate.
- On-site stormwater collection and conveyance is accomplished by a series of catch basins, manholes, piping, above-ground detention pond, water quality units and underground detention facilities.
- Short-term erosion control is achieved through use of construction entrances, inlet protection, silt fence and hay bale barriers.
- A stormwater treatment train is provided, including parking lot sweeping, catch basins with two (2) foot sumps for sediment collection, hydrodynamic separator, above-ground dry detention basin, and open bottom infiltrating underground detention units. All stormwater runoff from the proposed development will be directed to the proposed site drainage and management system, where it will pass through detention systems before ultimately discharging to the adjacent wetland onsite.
- Stormwater drainage piping has been designed to convey the 10-year design storm in accordance with the 2000 ConnDOT Drainage Manual.

3.0 PROJECT DESCRIPTION

This project involves the construction of a residential development containing 7 residential buildings spread over a 5.2-acre parcel. In addition to the constructed building complex, the site will include access via two driveways, an exterior play area for increase in activity and an improved sense of community, and a stone dust walking path through the middle of the site. The total area of construction activity (disturbed area) is approximately 3.2 acres.

Storm drainage and runoff control will be accomplished by directing site overland runoff to a series of area drains and catch basins, then via underground piping to either the above-ground detention basin or the underground detention system. The discharge of the collected stormwater from the site will drain

to the east, through outlet protection aprons, and into the adjacent onsite wetland. The roof runoff will be directed to roof leaders, then via underground piping to either the above-ground detention basin or dedicated infiltration units designed to hold and infiltrate the 100-year storm. See Section 4.6 for a more detailed discussion.

EXISTING CONDITIONS

3.1 Characteristics

The project site consists of an approximately 5.2-acre parcel located off of South Eagleville Road in Mansfield, Connecticut, with two (2) existing single-family residential buildings developed at the front of the site with a paved driveway, and grass area/wetlands surrounding. The property is bound by South Eagleville Road to the north, Oakwood Apartments across South Eagleville Road, Knollwood Apartments to the south, Knollwood Road to the east, and an Eversource Natural Gas facility to the west. Existing property access is off South Eagleville Road.

The site generally slopes downward to the southeast throughout the entire property. The highest elevation onsite is at South Eagleville Road at elevation ±622, adjacent to 121 South Eagleville Road, at which point it begins to slope down toward elevation ±612 over approximately 310 feet.

3.2 Soil

Following research of the USDA-NRCS Web-soil Survey online database, approximately 90 percent of the site is recorded as Agawam Fine Sandy Loam, 0 to 3 Percent Slopes. Agawam Fine Sandy Loam is suited for community development. This nearly level, well-drained soil is found in areas of irregular shape. Typically, the surface layer is dark brown fine sandy loam about 7 inches thick. The subsoil is yellowish brown, reddish yellow and light yellowish brown sandy loam 25 inches thick. The substratum extends to a depth of 60 inches or more. It is pale brown sand to a depth of 31 inches and gravelly sand at a depth of more than 31 inches. Slopes of more that 3 percent make up 10 percent of this unit. According to the online database, Agawam Fine Sandy Loam, 0 to 3 percent slopes is generally considered a Hydrologic Soil Group B.

The remaining 10 percent of the site, located along the southeast border of the site, is identified as Sudbury Sandy Loam, 0 to 3 Percent Slope and Timakwa and Natchaug Soils, 0 to 2 Percent Slopes. This complex is identified to have a hydrologic soil group range between B and D. For the purposes of this analysis, the site will be considered hydrologic group B for consistency.

3.3 Wetlands

Upon review of the Mansfield Geographic Information System (GIS) Mapping, there are wetlands located on the property to the east, adjacent to Knollwood Road. The proximity of the wetlands to the project site will put a portion of the site (± 3.41 Ac – 65.5% of the property) located within a designated Upland Review Area. Approximately 1.09 acres of this Upland Review Area will be located within the limits of disturbance for the project. We do not anticipate that the site improvements will have any impact on the regulated areas on or off site. A detailed description of the onsite wetlands can be found in the Wetlands Report, dated September 13, 2019, prepared by BSC Group.

3.4 Hydrology

The existing conditions for the site were modeled as two (2) distinct discharges from the property:

1. Overland sheet flow runoff on the west portion of the site. This area sheet flows offsite before ultimately discharging to the southwest grassy area. The tributary area for this discharge will be modeled as Existing Subwatershed "E1". This area ultimately discharges to the onsite wetland located to the east.

2. Overland sheet flow runoff on the east portion of the site. This area sheet flows offsite before ultimately discharging to the onsite wetland. The tributary area for this discharge will be modeled as Existing Subwatershed "E2".

The Existing Watershed Area Map has been included as Figure 2.

4.0 STORMWATER MANAGEMENT

4.1 Design Objective

The intent of the project hydrologic study is to determine rates of runoff for maximum storm frequencies of two, ten, twenty-five, and one hundred-year intervals under existing and proposed conditions for the designated design points. From this analysis, the proposed stormwater collection and management system is designed to mitigate the post development increase in the peak rates of runoff for the above-mentioned storm events associated with the construction of new buildings, driveways, and sidewalks.

4.2 Design Criteria

This project has been designed in accordance with the Town of Mansfield requirements.

The following rainfall volumes for hydrologic analysis were used for each storm event for a 24-hour Type III distribution Storm:

2-year – 3.33 in
10-year – 5.05 in
25-year – 6.12 in
100-year – 7.78 in

* Source: NOAA Atlas 14 Point Precipitation Frequency/Volume Estimates

4.3 Design Methodology

This study was prepared using methods contained in the USDA Soil Conservation Service Publication TR-55 "Urban Hydrology for Small Watersheds". TR-55 outlines procedures for calculating peak rates of runoff resulting from precipitation events and procedures for developing runoff hydrographs.

The watershed was simulated as a series of contributing subcatchments, and inflow and outflow structures. A value for area, curve number (CN) and time of concentration (Tc) was calculated for each contributing subcatchment.

The curve number is a land sensitive coefficient that dictates the relationship between total rainfall depth and direct storm runoff. Based on the coverage of soil groups and land use in the watershed, an average CN was determined for each subcatchment under existing and proposed conditions.

The time of concentration is defined as the time for runoff to travel from the hydraulically most distant point in the watershed to a point of interest. Values for the time of concentration were determined for existing and proposed conditions based on land cover and slope of the flow path using methods described in TR-55.

Values for time of concentration (Tc) and curve numbers (CN) were then entered into the "HydroCAD 10.0" computer program (which is based on TR-20 and TR-55) where subcatchment hydrographs were calculated. The hydrological analysis consists of developing an existing conditions model to first establish existing peak rates of runoff for the various storm events mentioned above. Second, an evaluation is then conducted of the proposed condition to determine the effect of the development on the sites peak rates of runoff.

4.4 Existing Conditions

Area, Curve Number, and Tc of the existing subwatersheds can be seen in the table below:

Watershed	Area (ac)	C	Tc (min.)
E1	0.60	61	15
E2	2.96	59	15.3
TOTAL	**3.56**	**59.3**	**-**

Existing stormwater discharge computations are located in Appendix A.

4.5 Proposed Conditions

The intent of the hydrologic design was to maintain or reduce the peak flow rate exiting the site. To achieve mitigation of the peak flow rates, the proposed site was divided into four (4) subwatersheds.

P1: This subwatershed is composed of the western most exterior portion of the site. Runoff in this subwatershed bypasses the drainage system and discharges via overland sheet flow offsite.

P2-1: This subwatershed is composed of the interior portion of the site. Roof runoff from Buildings 1, 2, and 3, as well as runoff from the land surrounding these buildings is directed to the above ground detention basin. This runoff is directed into the new drainage system, which discharges out of a flared pipe, through a vegetated stabilized outlet, and ultimately to the wetland at the east of the site.

P2-2: This subwatershed comprises of the majority of the developed site and includes the contributing drainage area that is directed to the three underground detention systems. The roof runoff from buildings 4, 5, 6, and 7 drains to either detention 3P or 4P. These systems are infiltration units designed to hold and infiltrate the 100-year storm. The remanding runoff in this subwatershed is directed into

the new drainage system, flows to the underground detention system 2P, out of a flared pipe, through a vegetated stabilized outlet and ultimately off the property to the southeast.

P2-3: This subwatershed is composed of the northern and eastern exterior portions of the site. Runoff in this area bypasses the drainage system and discharges via overland sheet flow offsite.

Cover characteristics of each proposed subwatershed can be seen in the table below:

Subwatershed	Area (ac)	CN	Tc (min.)
P1	0.14	61	6.0
P2-1	0.60	79	6.0
P2-2	1.14	89	6.0
P2-3	1.26	56	6.0
BLDG 4	0.099	89	6.0
BLDG 5	0.118	89	6.0
BLDG 6	0.090	89	6.0
BLDG 7	0.120	89	6.0
Total	**3.56**	**63.9**	**-**

Proposed stormwater discharge computations are represented in Appendix A. The proposed subwatershed areas are depicted in Figure 3.

4.6 Stormwater Detention

Following completion of the analysis, the cumulative storage shall be ±22,600 cubic feet of available storage. A combination of above-ground and underground storage systems will be utilized to create this storage volume. Below is a detailed description of each system:

Detention P1

- Type: Above-ground dry pond
- Bottom Elevation: 613.00
- Observed Restrictive Layer: 611.83’
- Top of Berm Elevation: 616.50
- Design Storm: 100-Year
- Design Stage Elevation: 615.83
- Maximum Mounding Elevation: 612.80
- Required WQV: 788 cf

- Storage Provided Below Outlet: 1,664 cf
- Outlets: Low flow 6" orifice @ 614.30, high flow 15" pipe @ 616.00
- Drawdown Computations:
  - Lowest Outlet Elevation = 614.30
  - Depth of Stored Water = 614.30 – 613.00 = 1.30 ft
  - Soil Type: Sandy Loam (Hydrologic Soil Group B)
  - Rawl's Rate: 1.02 in/hr (Rawls, Brakensiek and Saxton, 1982)
  - Time to Empty: 1.30 ft / 1.02 in/hr x 12 in/ft = 15.3 hrs
- Description: The above-ground pond receives flow from Subcatchment Area P2-1, which includes Buildings 4 – 7, as well as the surrounding "inner" portion of the site. The discharge from the pond is controlled by Outlet Control Structure #1, which has a vertical riser pipe for high flows and an orifice cored into the side for lower flows. Based on the project boring logs, the receiving soils in the pond are mostly find sands with little silt. Pond routing calculations do not account for infiltration, however it is anticipated that the pond will drain within a 24-hour period. Test pits were performed into the receiving soil to determine the restrictive layer. See Sheet G-1.0 for Test Pit Logs.

<u>Detention P2</u>

- Type: 36" Perforated Corrugated HDPE Pipe
- Bottom of Stone Elevation: 613.25
- Observed Restrictive Layer: 611.75'
- Invert Elevation: 613.75
- Top of Pipe Elevation: 616.75
- Design Storm: 100-Year
- Design Stage Elevation: 617.06
- Maximum Mounding Elevation: 613.68
- Required WQV: 2,246 cf
- Storage Provided Below Outlet: 2,541 cf
- Outlets: Low flow 6" orifice @ 614.72, high flow 8" orifice @ 615.33, overflow 10" pipe @ 617.00
- Drawdown Computations:
  - Lowest Outlet Elevation = 614.72
  - Depth of Stored Water = 614.72 – 613.25 = 1.47 ft
  - Soil Type: Gray Glacial Till (Hydrologic Soil Group C)
  - Rawl's Rate: 0.27 in/hr (Rawls, Brakensiek and Saxton, 1982)
  - Time to Empty: 1.47 ft / 0.27 in/hr x 12 in/ft = 65.33 hrs
- Description: The below-ground pipe storage receives flow from Subcatchment Area P2-2, which includes the site driveway, parking, and lawn areas. The discharge from the system is controlled by Outlet Control Structure #2, which has a vertical riser pipe for high flows, an orifice cored into the side for medium flows, and an orifice cored into the side for lower flows. Based on the project boring logs, the receiving soils under the stone base are mostly find sands with little silt. An in-situ percolation test was performed (PT-B, see Plan Sheet G-1.0) and an effective infiltration rate of 6 in/hr was measured. A Rawl's Rate for the given soil type of 0.27 in/hr was used for drawdown computations. Pond routing calculations do not account for infiltration, however it is anticipated that the system will drain within a 72-hour period. Test pits were performed into the receiving soil to determine the restrictive layer. See Sheet G-1.0 for Test Pit Logs.

<u>Detention P3</u>

- Type: 90"W x 60"H open-bottom plastic arch chambers

- Bottom of Stone Elevation: 611.50
- Observed Restrictive Layer: 609.50'
- Invert Elevation: 610.75
- Top of Chamber Elevation: 617.25
- Top of Stone Elevation: 618.25
- Design Storm: 100-Year
- Design Stage Elevation: 617.59
- Maximum Mounding Elevation: 610.53
- Required WQV: None
- Outlets: 8" overflow pipe @ 617.50
- Drawdown Computations:
  - Lowest Outlet Elevation = 617.50
  - Depth of Stored Water = 617.50 – 611.50 = 6.00 ft
  - Soil Type: Sandy Loam (Hydrologic Soil Group B)
  - Rawl's Rate: 1.02 in/hr (Rawls, Brakensiek and Saxton, 1982)
  - Time to Empty: 6.00 ft / 1.02 in/hr x 12 in/ft = 70.6 hrs
- Description: The open-bottom plastic arch chamber storage receives flow from Building #4 Roof via underground roof leader piping. Based on the project boring logs, the receiving soils under the stone base are mostly find sands with little silt. An in-situ percolation test was performed (PT-C, see Plan Sheet G-1.0) and an effective infiltration rate of 7.5 in/hr was measured. A Rawl's Rate for the given soil type of 1.02 in/hr was used for drawdown computations. Pond routing calculations do not account for infiltration, however it is anticipated that the system will drain within a 72-hour period. A maintenance access manhole to grade will be provided for periodic cleaning at the end of every row. Test pits were performed into the receiving soil to determine the restrictive layer. See Sheet G-1.0 for Test Pit Logs.

<u>Detention P4</u>

- Type: 90"W x 60"H open-bottom plastic arch chambers
- Bottom of Stone Elevation: 612.17
- Observed Restrictive Layer: 610.67'
- Invert Elevation: 617.00
- Top of Chamber Elevation: 617.92
- Top of Stone Elevation: 618.92
- Design Storm: 100-Year
- Design Stage Elevation: 617.26
- Maximum Mounding Elevation: 613.03
- Required WQV: None
- Outlets: 8" overflow @ 617.00
- Drawdown Computations:
  - Lowest Outlet Elevation = 617.00
  - Depth of Stored Water = 617.00 – 612.17 = 4.83 ft
  - Soil Type: Sandy Loam (Hydrologic Soil Group B)
  - Rawl's Rate: 1.02 in/hr (Rawls, Brakensiek and Saxton, 1982)
  - Time to Empty: 4.83 ft / 1.02 in/hr x 12 in/ft = 56.8 hrs
- Description: The open-bottom plastic arch chamber storage receives flow from Building #5, 6, 7, and 8 roofs via underground roof leader piping. Based on the project boring logs, the receiving soils under the stone base are mostly find sands with little silt. An in-situ percolation test was performed (PT-A, see Plan Sheet G-1.0) and an effective infiltration rate of 30 in/hr

was measured. A Rawl's Rate for the given soil type of 1.02 in/hr was used for drawdown computations. Pond routing calculations do not account for infiltration, however it is anticipated that the system will drain within a 72-hour period.
A maintenance access manhole to grade will be provided for periodic cleaning at the end of every row. Test pits were performed into the receiving soil to determine the restrictive layer. See Sheet G-1.0 for Test Pit Logs.

Pre- and Post-Development Comparison

Peak flows at the off-site analysis point are shown in the following table:

STORMWATER DISCHARGE COMPARISON				
Design Point	Storm Event	Existing (cfs)	Proposed (cfs)	Difference (cfs)
1 (Off-Site Flow, West)	2-year	0.18	0.05	-0.13
	10-year	0.67	0.21	-0.46
	25-year	1.05	0.33	-0.72
	100-year	1.71	0.53	-1.18
2 (Flow to On-Site Wetland)	2-year	0.66	0.34	-0.32
	10-year	2.87	2.27	-0.60
	25-year	4.65	3.99	-0.66
	100-year	7.76	6.97	-0.79
Total Site	2-year	0.83	0.34	-0.49
	10-year	3.54	2.37	-1.17
	25-year	5.70	4.27	-1.43
	100-year	9.47	7.49	-1.98

The data summarized above indicates that the total peak stormwater discharge offsite will be reduced from the existing condition to the proposed conditions for all design storms. The 2-year discharge has been reduced to 50% of the pre-development rate.

5.0 STORMWATER DRAINAGE SYSTEM

5.1 Design Criteria

Design of the storm drainage system was performed in accordance with the standards and procedures specified in the 2000 ConnDOT Drainage Manual. The capacity within the site driveways and parking lots were designed to safely accommodate the 10-year, 24-hour design storm.

5.2 Design Methodology

The storm drain collection system was analyzed using the Rational Method for estimating runoff for a 10-year design storm. The project site was divided into catchment areas, with each contributing runoff to an individual catch basin or area drain inlet. A value for acreage area, time of concentration, and a runoff coefficient was calculated for each contributing catchment area.

Values for time of concentration were chosen based on land cover and slope of the flow path from the hydraulically most distant point in the sub-area to the appropriate inlet. Per Rational Method, the minimum time of concentration value is assumed to be 5 minutes for paved surfaces and 10 minutes for unpaved surfaces. Using the time of concentration, rainfall intensities were determined using the Rainfall-Duration-Frequency Relationships for Connecticut (NOAA Atlas 14 Precipitation Frequency Estimates).

The average runoff coefficient, which is the ratio of peak runoff rate to the average rainfall rate for the period known as the time of concentration, was chosen using the following values:

Condition	C
Grass/Landscaped Areas	0.30
Pavement/Impervious Areas	0.90

Storm drainage pipes were then sized based upon calculated flows using Manning's Equation and the pipe sizes verified by solving for the hydraulic grade line. The drainage pipe materials proposed for this project are high density polyethylene pipe (HDPE) and reinforced concrete pipe (RCP).

Per the ConnDOT Drainage Manual (Table 6.C.1), the friction factor (n) utilized in the design is 0.011 for HDPE pipe and 0.013 for RCP.

Detailed calculations for the on-site stormwater sizing are included in this report in Appendix C. A Catchment Area Map has also been included (Figure 4) to detail the tributary area for each drainage structure.

6.0 STORMWATER QUALITY

The project has been designed to address both the short-term and long-term storm water quality. During construction, stormwater runoff is a concern due to the excess amount of exposed areas that do not have vegetation or other cover to prevent the removal and transportation of sediment to resource areas. The project addresses the short-term concerns by providing erosion control measures in the form of Erosion & Sediment Control Plans and a "During Construction" Operation and Maintenance Plan (Section 8.0).

The primary function of erosion and sediment control, as defined by the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control is to "absorb erosional energies and reduce runoff velocities that force the detachment and transport of soil and/or encourage the deposition of eroded soil particles before they reach any sensitive area." The short-term project erosion measures were designed per the 2002 manual.

After construction, stormwater runoff is a concern because it may contain contaminants such as suspended solids, petroleum hydrocarbons, nutrients, heavy metals, and salts that may have adverse effects on water quality. The sources of the pollutants are generally associated with urban land use, including automobile exhaust, mechanical wear of vehicles, leaf litter, deicing salts and atmospheric deposition. The pollutants accumulate on the land surfaces and are washed off during storm events into the receiving waterways and wetlands.

The objective of the stormwater management system designed for the proposed development is to effectively remove the contaminant loading from the site runoff and to provide long-term protection of the quality and use of downstream water resources. The long-term stormwater quality measures were designed per the 2004 Connecticut Stormwater Quality Manual.

6.1 Temporary Control of Sediment and Erosion

The objective of temporary erosion control during construction is to minimize the area of exposed soil, control runoff rate and direction, and provide for rapid stabilization of exposed areas. Prior to any construction activity, trenched silt fence and/or staked hay bales will be placed down gradient of the proposed work areas. The fence/barrier will provide some sediment control, as well as provide a limit of construction activity.

Construction entrances will be utilized to remove sediment from construction vehicle tires and prevent it from being tracked onto adjoining paved roadway areas.

Any excavated and stockpiled topsoil will be contained within staked silt fence. Erosion-prone areas left exposed for extended periods (>30 days) will be mulched and seeded for temporary vegetative cover. After construction, all exposed areas will be graded, mulched and re-vegetated with appropriate ground cover. The silt fence and/or hay bales will remain in place until groundcover is established.

Catch basin filter inserts will be used to collect sediment that may be carried in the storm runoff during construction. Filter inserts will be placed in each existing catch basin, yard drain, and in each new catch basin, during construction and until all disturbed areas of the site have been stabilized. Replacement of the filter inserts shall be as often as necessary to prevent excessive ponding due to clogged fabric.

Dewatering settling basins will be utilized where groundwater is encountered in trenching, foundation excavation, or any other excavation. The dewatering wastewaters will be infiltrated into the ground or discharged, after filtration into the nearest catch basin.

Throughout all phases of construction, the erosion control measures will be routinely inspected and cleaned, repaired, and replaced as necessary by the Contractor. See Section 8.0 entitled “Operation and Maintenance Plan” for more details.

Throughout the construction process, extra stocks of hay bales and silt fence will be kept on-site to replace those that become damaged and/or deteriorated.

Any erosion and sediment control measures, which upon inspection are found to be damaged, deteriorated, or not functioning properly, will be repaired, replaced, and corrected immediately after inspection.

Areas mulched or seeded for temporary vegetative cover will be inspected for proper cover at the end of each workday if precipitation is forecast and also prior to weekends. Additional seeding or mulch will be placed as necessary.

The temporary erosion and sediment control systems will not be removed until all stormwater drainage system components are in place, cleaned and working properly and until permanent vegetative cover and other stabilization measures are established.

6.2 Permanent Control of Stormwater Quality

The design intent of the 2004 Connecticut Stormwater Quality Manual is to provide a "stormwater treatment train," where stormwater quality is achieved through a series of treatment measures. Harmful pollutants, such as sediment, pathogens, organic material, hydrocarbons, metals, synthetic organic chemicals and deicing compounds, are carried by the low-flow storms. Many of these pollutants are associated with vehicular exhaust, engine leaks and deicing, therefore key areas of on-site treatment include parking lots and access drives. Since pollutants typically attach themselves to solid particles, treatment practices are designed to remove suspended solids.

The treatment train for this site includes:

- Parking lot sweeping
- Catch basins with two (2) foot sumps
- Hydrodynamic Separator prior to the underground detention system.
- Stormwater infiltration within the open-bottom detention galleries

The hydrodynamic separator unit will be designed to treat the Water Quality Flow in accordance with the 2004 manual, effectively removing floatables, captured sediment solids, and hydrocarbons to achieve a TSS removal rate of 80% (and often 90% or better).

7.0 OPERATION AND MAINTENANCE PLAN

7.1 During Construction

The following maintenance procedures shall be followed by the Contractor for temporary and permanent erosion and sedimentation measures and stormwater treatment systems installed during the construction period:

a. Dust Control: Moisten disturbed soil areas with water periodically, or use a non-asphaltic soil tacifier to minimize dust.

b. Temporary Seeding: Inspect weekly and within 24 hours of a storm generating a discharge. Continue inspection until vegetation is firmly established.

c. Permanent Seeding: Inspect seeded areas weekly and within 24 hours after a storm generating a discharge. Continue inspection until vegetation is firmly established.

d. Temporary Soil Protection: Inspect seeded areas weekly and within 24 hours after a storm generating a discharge.

e. Temporary Erosion Control Mat: Inspect mats weekly and within 24 hours after a storm generating a discharge.

f. Catch Basin Filter Inserts: Inspect the fabric at least once a week and within 24 hours after the end of a storm generating a discharge. Check the fabric for structural soundness (i.e. tears), proper anchoring/alignment within the grate and ability to drain runoff (i.e. percent of clogging by sediment). Remove the sediment every week, or sooner if ponding is excessive. Each time the sediment is removed, replace the section of fabric removed with a new section. Do not remove the sediment and reuse the same section of fabric.

g. Hay Bale/ Silt Fence Barrier: Inspect the barrier at least once a week and within 24 hours after the end of a storm generating a discharge. For dewatering operations, inspect frequently before, during and after pumping operations. Remove the sediment deposits when the depth reaches one half the barrier heights. Repair or replace a barrier within 24 hours of observed failure. Maintain the barrier until the contributing disturbed area is stabilized.

h. Construction Entrance/Exit Pad: Maintain the pad in a condition that will prevent tracking and washing of sediment onto paved surfaces. Place additional clean gravel on top of gravel that has become silted, or remove the silted gravel and replace the gravel to the depth removed with clean gravel, as conditions warrant. Remove immediately all sediment spilled, dropped, washed or tracked onto paved surfaces. Roads adjacent to the construction site shall be cleaned at the end of each day by hand sweeping or sweeper truck.

i. Dewatering Settling Basin (if used): Inspect the basin at least every two hours during periods of use. Remove accumulated sediments when the volume equals one half the provided storage volume.

j. Existing Catch Basins and Sumps: Inspect the sediment traps as specified in "f" above. After final removal of the sediment traps at the end of construction, clean the sump of all silt and debris.

k. New Catch Basins and Sumps: As new catch basins are constructed, a filter insert shall be installed in the unit and a sediment barrier installed around the grate. Inspect the filter and barrier weekly and within 24 hours after a storm generating a discharge. After stabilization of the drainage area entering the catch basin, remove the filter and barrier and clean the basin sump of all silt and debris.

l. Stone or Hay Bale Check Dams: Inspect the check dam at least once a week and within 24 hours after the end of a storm generating a discharge. Remove the sediment deposits when the depth reaches one half the check dam heights. Repair or replace a check dam within 24 hours of observed failure. Maintain the check dam until the contributing disturbed area is stabilized.

m. Temporary Stockpiles: Inspect temporary stockpiles at the end of each workday to ensure that tarps are in place and secured. Temporary stockpiles that are expected to be inactive for more than 30 days should be temporarily seeded (see above).

n. Temporary Sediment Traps: Inspect monthly and within 24 hours after a storm generating a discharge. Sediment and oil shall be removed when the storage volume is reduced by one half, or at least every 6 months during construction.

During construction, the Contractor shall be required to remove accumulated sediment from sediment control measures and water quality measures. Sediment shall be disposed of off-site in a manner and location approved by local and state agencies. Temporary storage of sediment on-site is permissible if it is protected from erosion and stockpiled in a manner that will prevent it from being carried by erosion into adjacent properties or resource areas.

Temporary sediment traps may be removed if the contributing drainage area is stabilized. The area shall be re-graded to match original grades or proposed grades as shown on the plans. The disturbed area shall be temporarily, or permanently seeded and mulched if the area is not to be paved.

Upon the stabilization of the contributing drainage area, silt fence shall be inspected for sediment accumulation prior to removal. For sediment depths greater than 6", the sediment shall be re-graded or removed. The silt fence shall be removed by pulling the support posts and cutting the geotextile at the ground level. Re-grade or remove the sediment as necessary and stabilize the disturbed soils by placing temporary or permanent seeding and mulch.

When dewatering has been completed, remove the hay bale barrier, sediment and stone, as appropriate, and re-grade the area to original or proposed grade. Stabilize the disturbed area with temporary or permanent seed and mulch.

After the drainage areas to the new and existing catch basins have been stabilized, the Contractor shall be required to clean all sumps and hoods of debris and silt. In addition, within the limits of work, the Contractor shall clean all storm drain piping of collected silt and debris by flushing with water. If the storm system discharges to ground, a hay bale and silt fence barrier must remain in place at each outfall to capture any sediment or debris carried down by the flushing. If the storm drain system discharges into a public or private drainage collection system, the Contractor must install a means of collecting debris and filtering the sediment from the flushing water in the on-site storm system before discharge to the existing storm system.

7.2 After Construction

After construction is completed and accepted by the Owner, it shall be the responsibility of the Owner to maintain all drainage structures. In addition, the following inspection and maintenance guidelines shall be the responsibility of the Owner, or the Owner's representative, beginning the first year period following construction completion and acceptance, and shall be followed each year thereafter:

a) Parking Lot and Site Cleanup: Inspect on a regular basis not to exceed weekly for litter and debris.

b) Parking Lot and Driveway Sweeping: At least twice a year, with the first occurring as soon as possible after snowmelt and the second not less than 90 days following the first.

c) Catch Basin Sumps: Shall be inspected semi-annually and cleaned when the sump is one half full of silt and / or debris.

d) Hydrodynamic Separator: Shall be inspected and cleaned annually.

e) Landscaped Areas: Inspect semi-annually for erosion or dying vegetation. Repair and stabilize any bare or eroded areas and replace vegetation as soon as possible.

f) Above-ground Detention Basin: Shall be inspected semi-annually and cleaned of any sediment and/or debris. Shall be mowed annually.

g) Underground Detention Systems: Shall be inspected semi-annually and cleaned of any sediment and/or debris.

8.0 CONCLUSION

The project has been designed to meet Town and State requirements for stormwater management, drainage sizing, and stormwater quality. Peak flows generated by the site for the 2-, 10-, 25-, and 100-year design storms have been mitigated to less than peak flows under existing conditions. The drainage system has been designed to convey the 10-year design storm and stormwater quality has been provided which meets both the State erosion sedimentation guidelines and the State stormwater quality requirements. There are no anticipated negative impacts on any of the upland review areas identified on this property.

LIST OF FIGURES/DRAWINGS

Figure 1 – Site Location Map

Figure 2 – Existing Watershed Area Map

Figure 3 – Proposed Watershed Area Map

Figure 4 – Catchment Area Map

FIGURE 1
Site Location Map

Figure 1 – Site Location Map

Eagleville Green

113-121 South Eagleville Road

Mansfield, Connecticut

Scale = 1:24,000

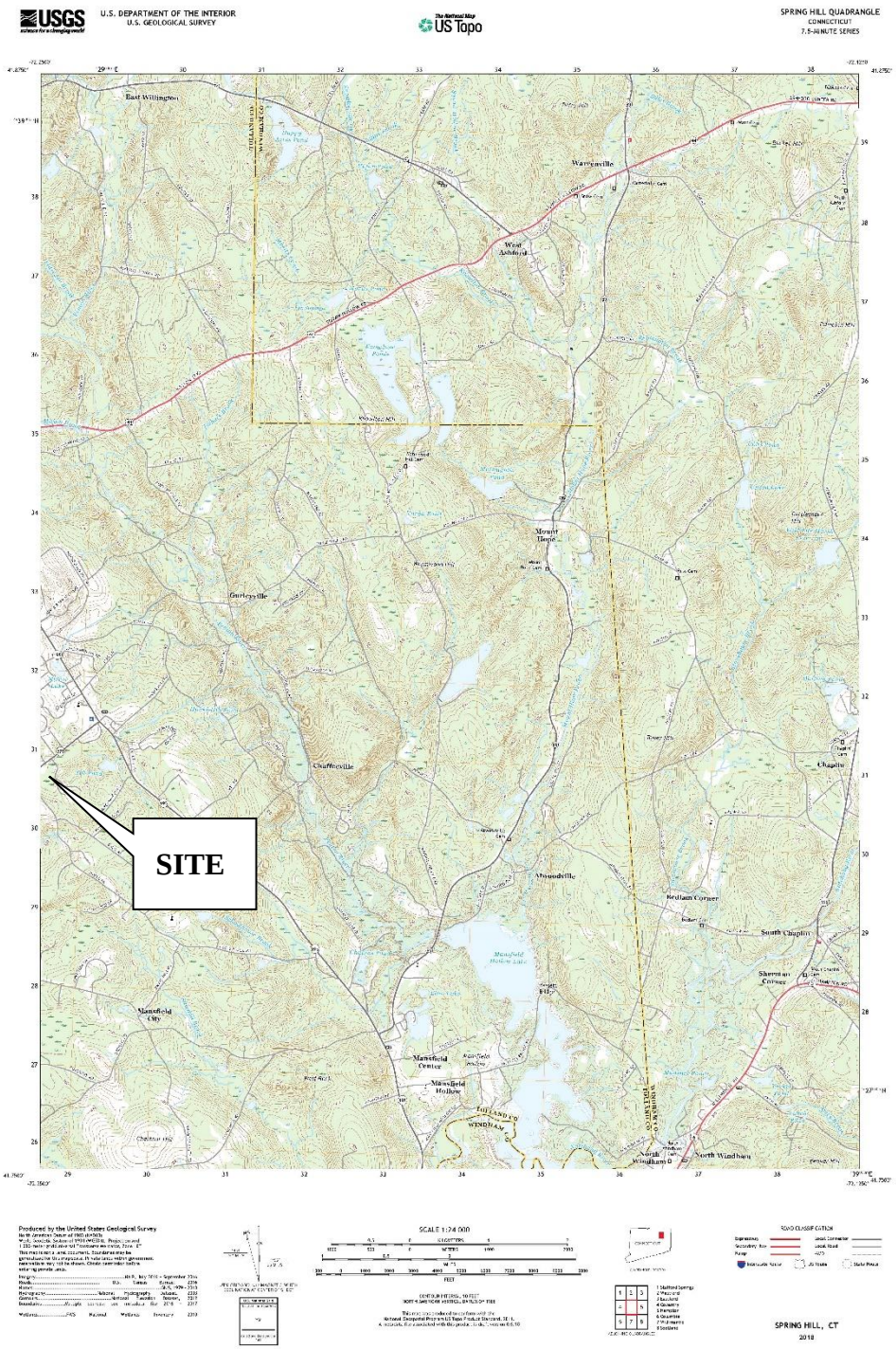
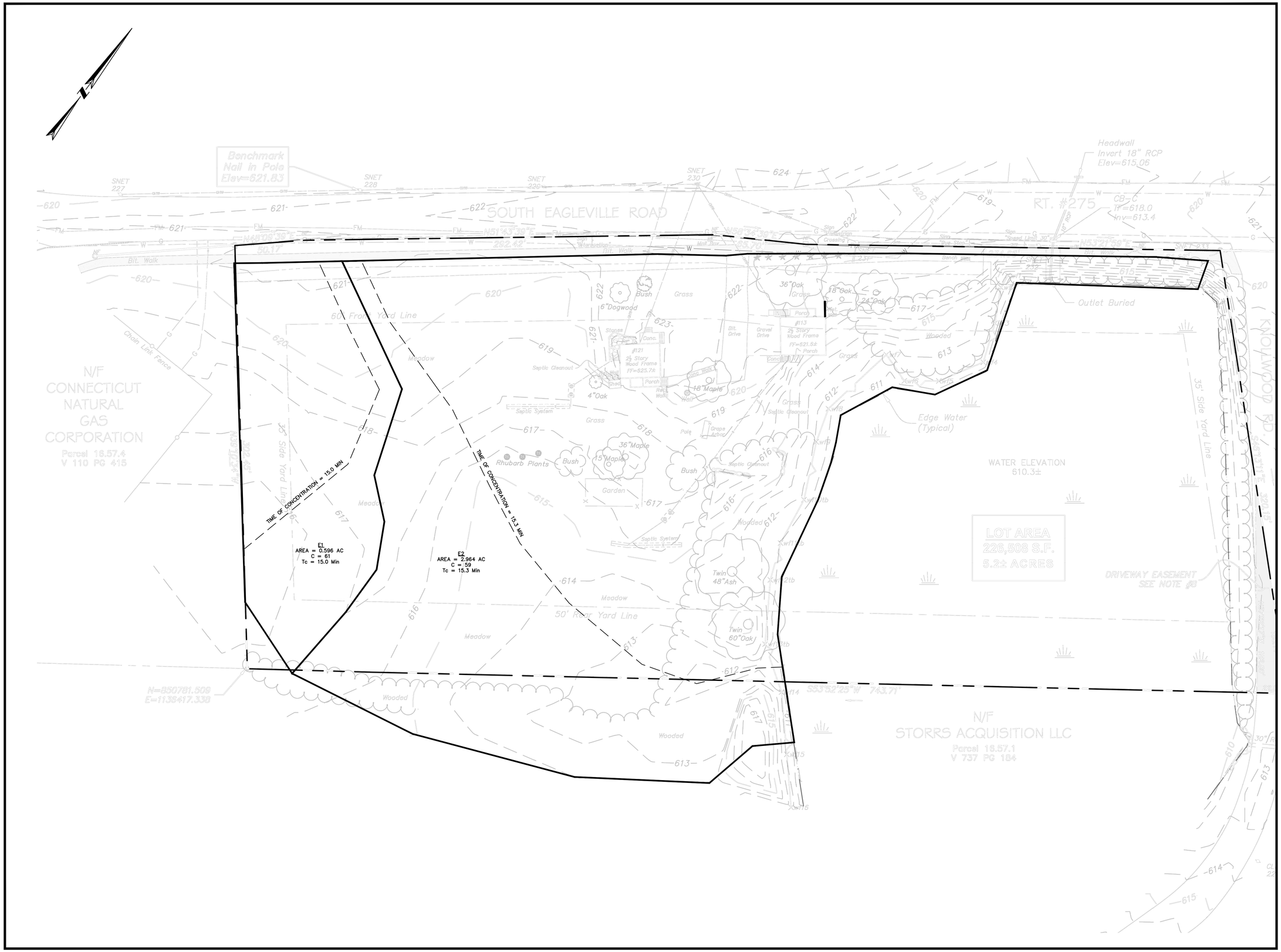


FIGURE 2
Existing Watershed Area Map



EAGLEVILLE GREEN - NOVEMBER 25, 2019

EAGLEVILLE GREEN

113-121 SOUTH
EAGLEVILLE ROAD
IN
MANSFIELD
CONNECTICUT

EXISTING WATERSHED AREA MAP

NOVEMBER 25, 2019

REVISIONS:

PREPARED FOR:
MANSFIELD HOUSING DEV. CORP.
309 MAPLE ROAD
STORRS, CT 06268

BSC GROUP
300 Winding Brook Drive
Glastonbury, Connecticut 06033
860 652 8227

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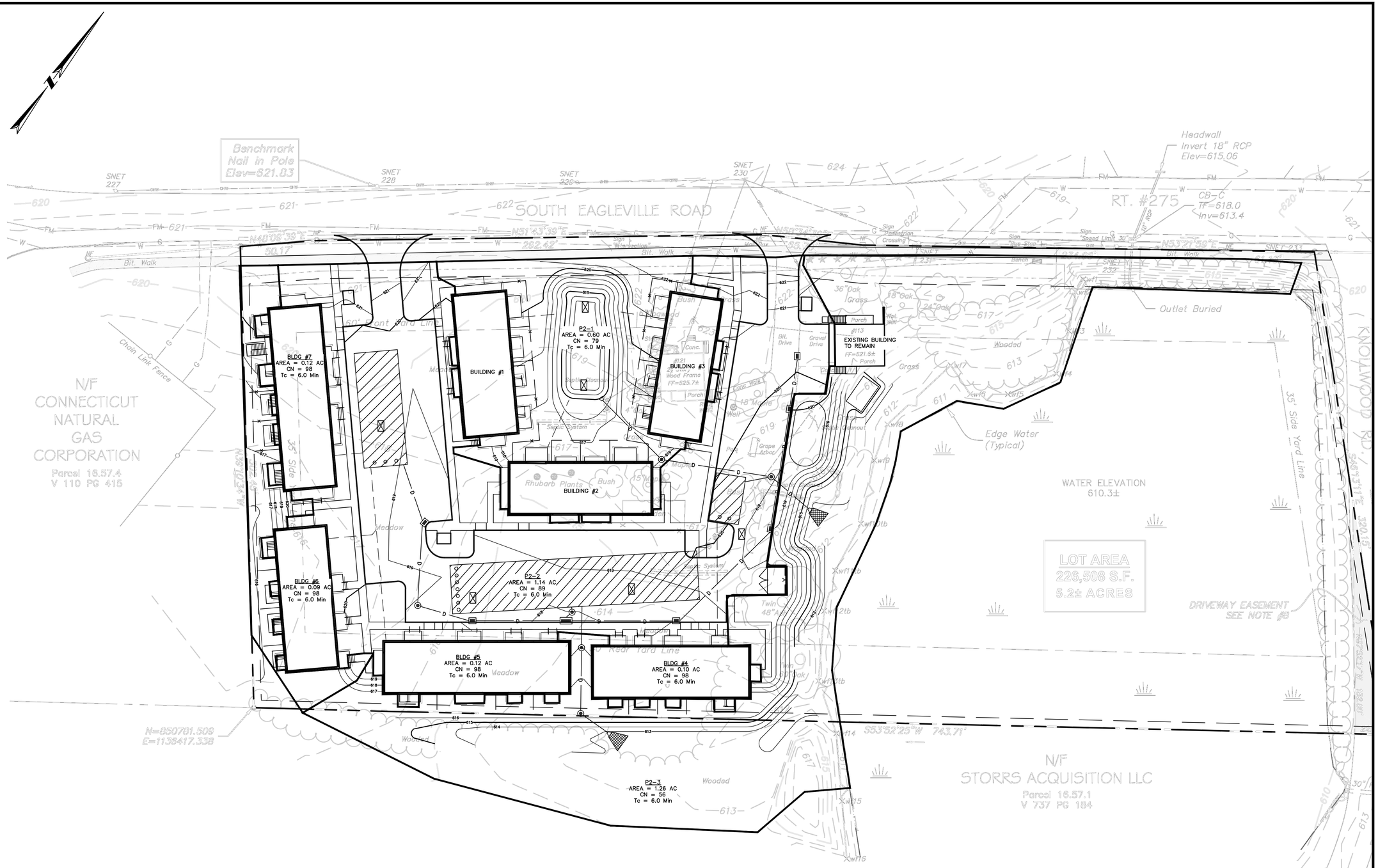
SCALE: 1" = 30'
0 15 30 60 FEET

FILE: 8374900-EWAM.DWG
DWG. NO:
JOB. NO: 83749.00

FIGURE 2

FIGURE 3
Proposed Watershed Area Map



EAGLEVILLE GREEN - NOVEMBER 25, 2019

EAGLEVILLE GREEN

113-121 SOUTH
EAGLEVILLE ROAD
IN
MANSFIELD
CONNECTICUT

PROPOSED WATERSHED
AREA MAP

FEBRUARY 12, 2020

REVISIONS:

PREPARED FOR:
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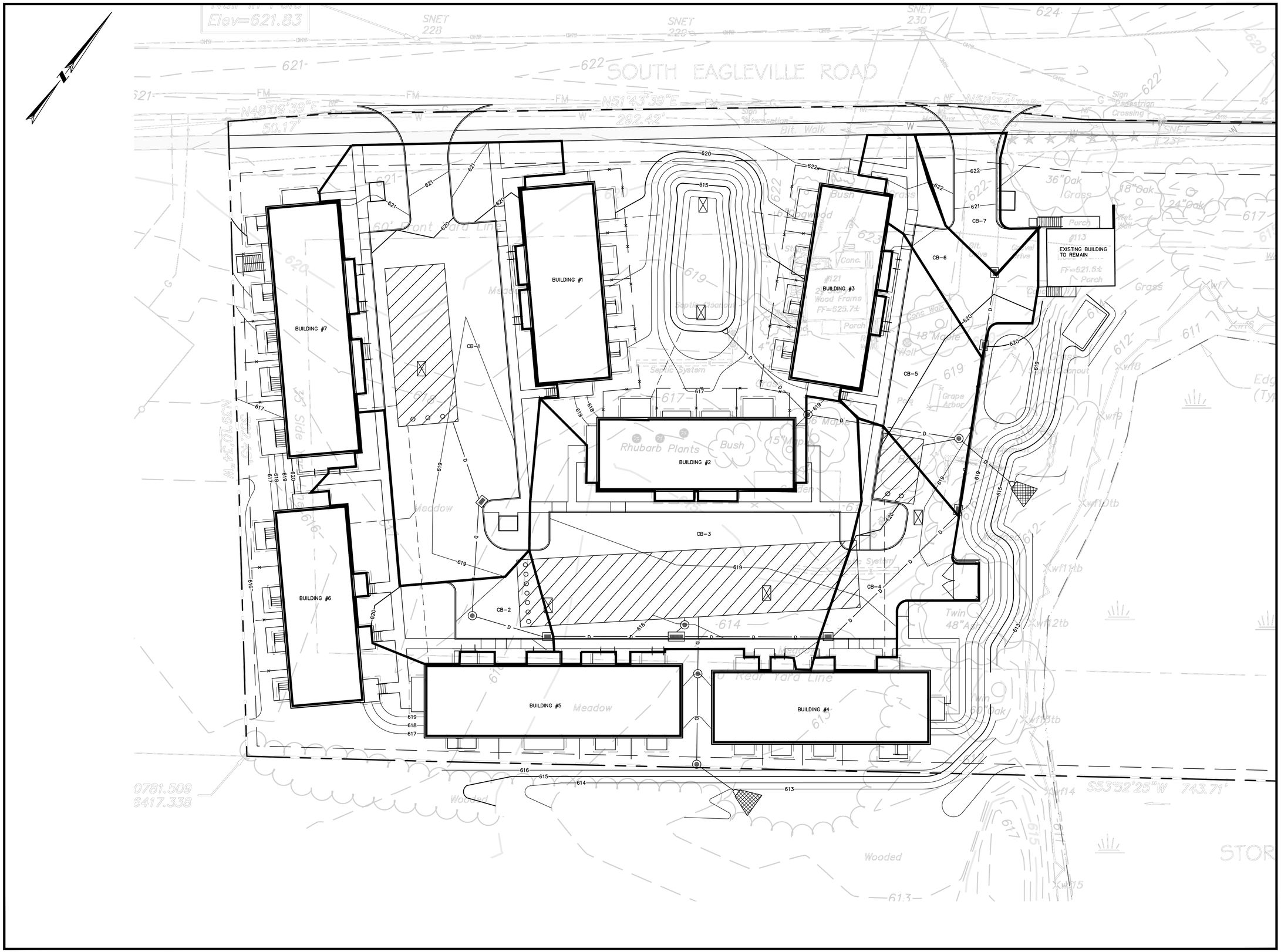
SCALE: 1" = 30'
0 15 30 60 FEET

FILE: 8374900-PWAM.DWG
DWG. NO:
JOB. NO: 83749.00

FIGURE 3

FIGURE 4
Catchment Area Map



EAGLEVILLE GREEN - NOVEMBER 25, 2019

EAGLEVILLE GREEN

113-121 SOUTH
EAGLEVILLE ROAD
IN
MANSFIELD
CONNECTICUT

CATCHMENT AREA MAP

FEBRUARY 12, 2020

REVISIONS:

PREPARED FOR:
MANSFIELD HOUSING DEV. CORP.
309 MAPLE ROAD
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SCALE: 1" = 20'

0 10 20 40 FEET

FILE: 8374900-CAM.DWG
DWG. NO:
JOB. NO: 83749.00

FIGURE 4

LIST OF APPENDICES

Appendix A – Existing Stormwater Discharge Computations

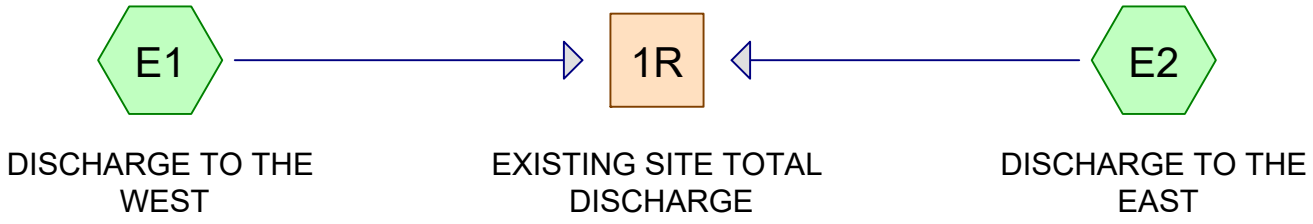
Appendix B – Proposed Stormwater Discharge Computations

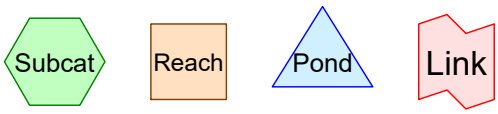
Appendix C – Proposed Hydraulic Sizing Computations

Appendix D – Water Quality Computations

APPENDIX A

Existing Stormwater Discharge Computations





Routing Diagram for 8374900-HYDRO
Prepared by {enter your company name here}, Printed 11/25/2019
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.580	61	>75% Grass cover, Good, HSG B (E1, E2)
0.870	48	Brush, Good, HSG B (E2)
0.110	98	Paved parking, HSG B (E2)
3.560	**59**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
3.560	HSG B	E1, E2
0.000	HSG C	
0.000	HSG D	
0.000	Other	
3.560		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	2.580	0.000	0.000	0.000	2.580	>75% Grass cover, Good	E1, E2
0.000	0.870	0.000	0.000	0.000	0.870	Brush, Good	E2
0.000	0.110	0.000	0.000	0.000	0.110	Paved parking	E2
0.000	**3.560**	**0.000**	**0.000**	**0.000**	**3.560**	**TOTAL AREA**	

Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: DISCHARGE TO THE Runoff Area=0.600 ac 0.00% Impervious Runoff Depth>0.50"
Flow Length=251' Tc=15.0 min CN=61 Runoff=0.18 cfs 0.025 af

Subcatchment E2: DISCHARGE TO THE Runoff Area=2.960 ac 3.72% Impervious Runoff Depth>0.42"
Flow Length=457' Tc=15.3 min CN=59 Runoff=0.66 cfs 0.104 af

Reach 1R: EXISTING SITE TOTAL DISCHARGE Inflow=0.83 cfs 0.129 af
Outflow=0.83 cfs 0.129 af

Total Runoff Area = 3.560 ac Runoff Volume = 0.129 af Average Runoff Depth = 0.43"
96.91% Pervious = 3.450 ac 3.09% Impervious = 0.110 ac

Summary for Subcatchment E1: DISCHARGE TO THE WEST

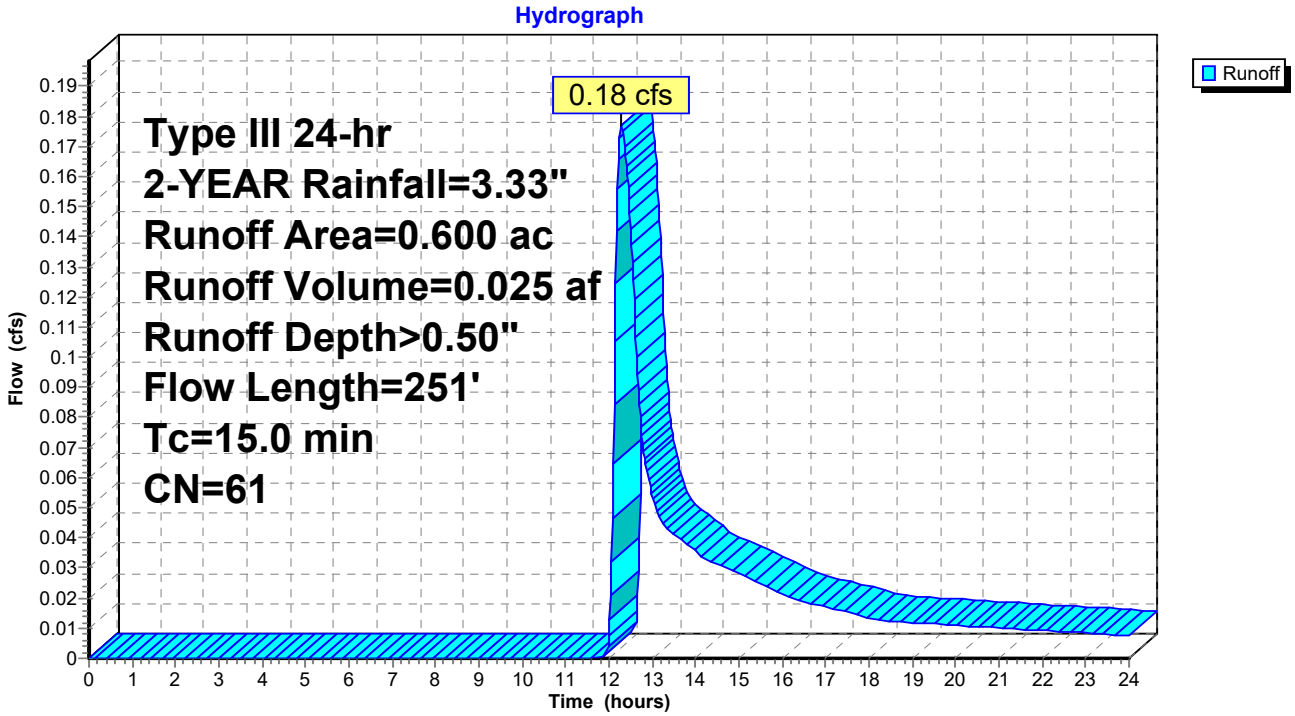
Runoff = 0.18 cfs @ 12.28 hrs, Volume= 0.025 af, Depth> 0.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-YEAR Rainfall=3.33"

Area (ac)	CN	Description
0.600	61	>75% Grass cover, Good, HSG B
0.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0	100	0.0200	0.12		**Sheet Flow, SEG 1** Grass: Dense n= 0.240 P2= 3.33"
1.0	151	0.0265	2.62		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
15.0	251	Total			

Subcatchment E1: DISCHARGE TO THE WEST



Summary for Subcatchment E2: DISCHARGE TO THE EAST

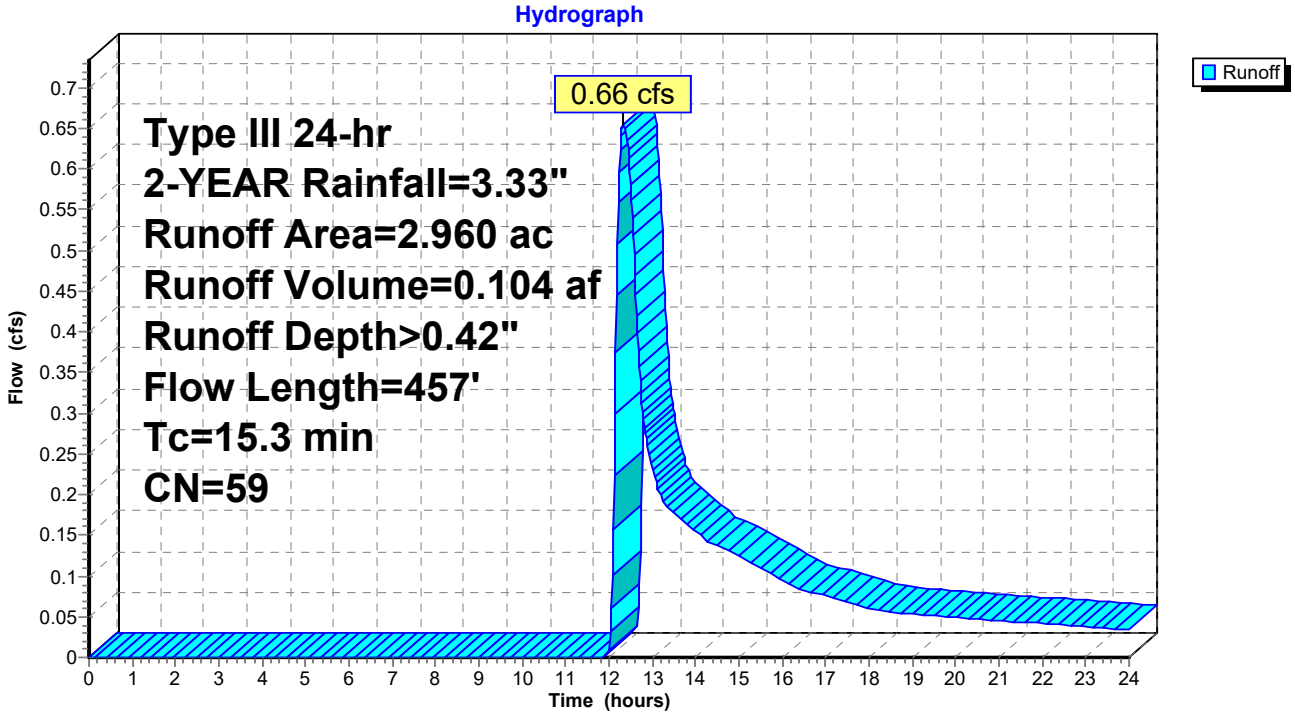
Runoff = 0.66 cfs @ 12.33 hrs, Volume= 0.104 af, Depth> 0.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-YEAR Rainfall=3.33"

Area (ac)	CN	Description
1.980	61	>75% Grass cover, Good, HSG B
0.870	48	Brush, Good, HSG B
0.110	98	Paved parking, HSG B
2.960	59	Weighted Average
2.850		96.28% Pervious Area
0.110		3.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	100	0.0250	0.13		**Sheet Flow, SEG 1** Grass: Dense n= 0.240 P2= 3.33"
2.5	357	0.0224	2.41		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
15.3	457	Total			

Subcatchment E2: DISCHARGE TO THE EAST



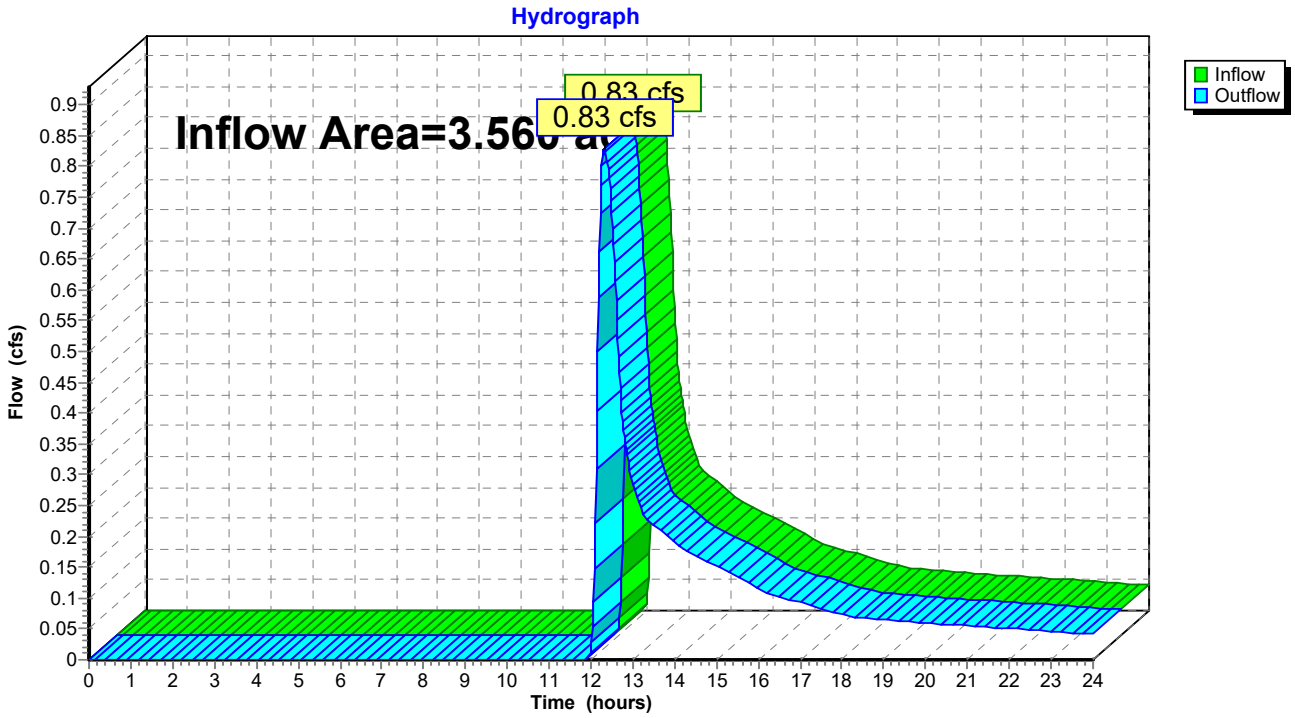
Summary for Reach 1R: EXISTING SITE TOTAL DISCHARGE

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.560 ac, 3.09% Impervious, Inflow Depth > 0.43" for 2-YEAR event
Inflow = 0.83 cfs @ 12.32 hrs, Volume= 0.129 af
Outflow = 0.83 cfs @ 12.32 hrs, Volume= 0.129 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 1R: EXISTING SITE TOTAL DISCHARGE



Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: DISCHARGE TO THE Runoff Area=0.600 ac 0.00% Impervious Runoff Depth>1.39"
Flow Length=251' Tc=15.0 min CN=61 Runoff=0.67 cfs 0.070 af

Subcatchment E2: DISCHARGE TO THE Runoff Area=2.960 ac 3.72% Impervious Runoff Depth>1.26"
Flow Length=457' Tc=15.3 min CN=59 Runoff=2.87 cfs 0.310 af

Reach 1R: EXISTING SITE TOTAL DISCHARGE Inflow=3.54 cfs 0.380 af
Outflow=3.54 cfs 0.380 af

Total Runoff Area = 3.560 ac Runoff Volume = 0.380 af Average Runoff Depth = 1.28"
96.91% Pervious = 3.450 ac 3.09% Impervious = 0.110 ac

Summary for Subcatchment E1: DISCHARGE TO THE WEST

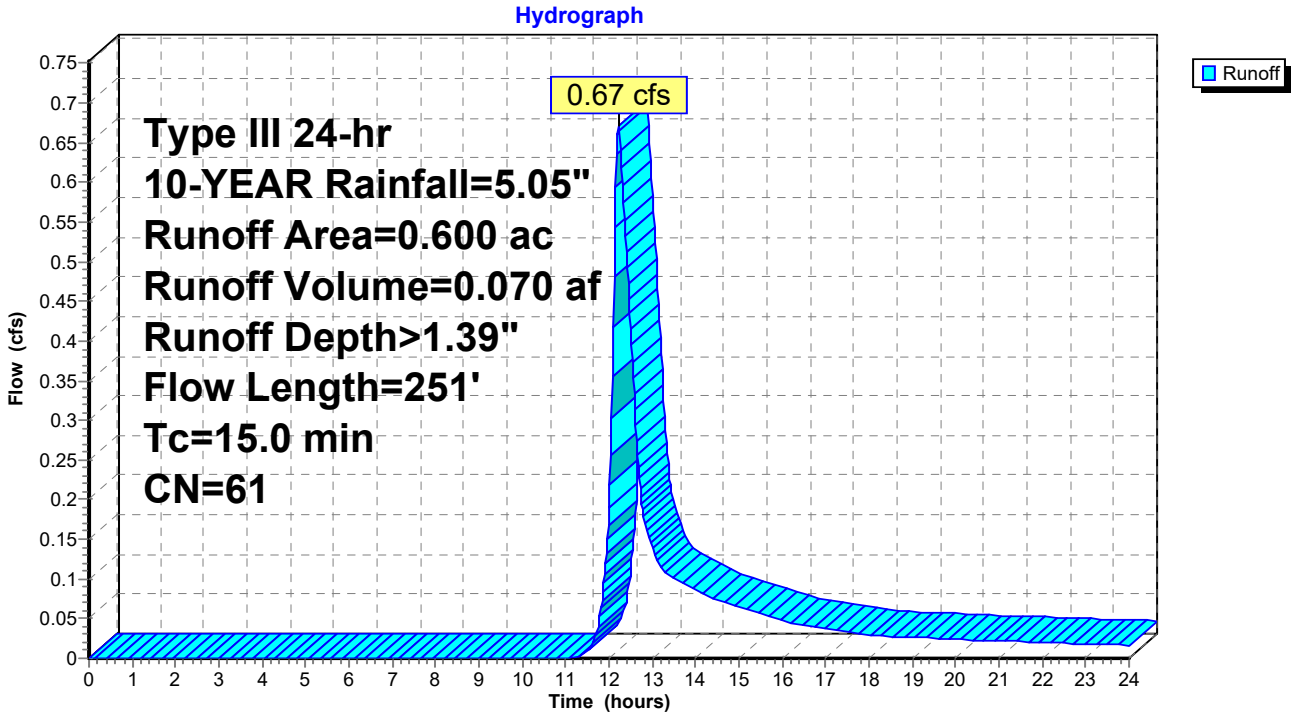
Runoff = 0.67 cfs @ 12.23 hrs, Volume= 0.070 af, Depth> 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YEAR Rainfall=5.05"

Area (ac)	CN	Description
0.600	61	>75% Grass cover, Good, HSG B
0.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0	100	0.0200	0.12		**Sheet Flow, SEG 1** Grass: Dense n= 0.240 P2= 3.33"
1.0	151	0.0265	2.62		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
15.0	251	Total			

Subcatchment E1: DISCHARGE TO THE WEST



Summary for Subcatchment E2: DISCHARGE TO THE EAST

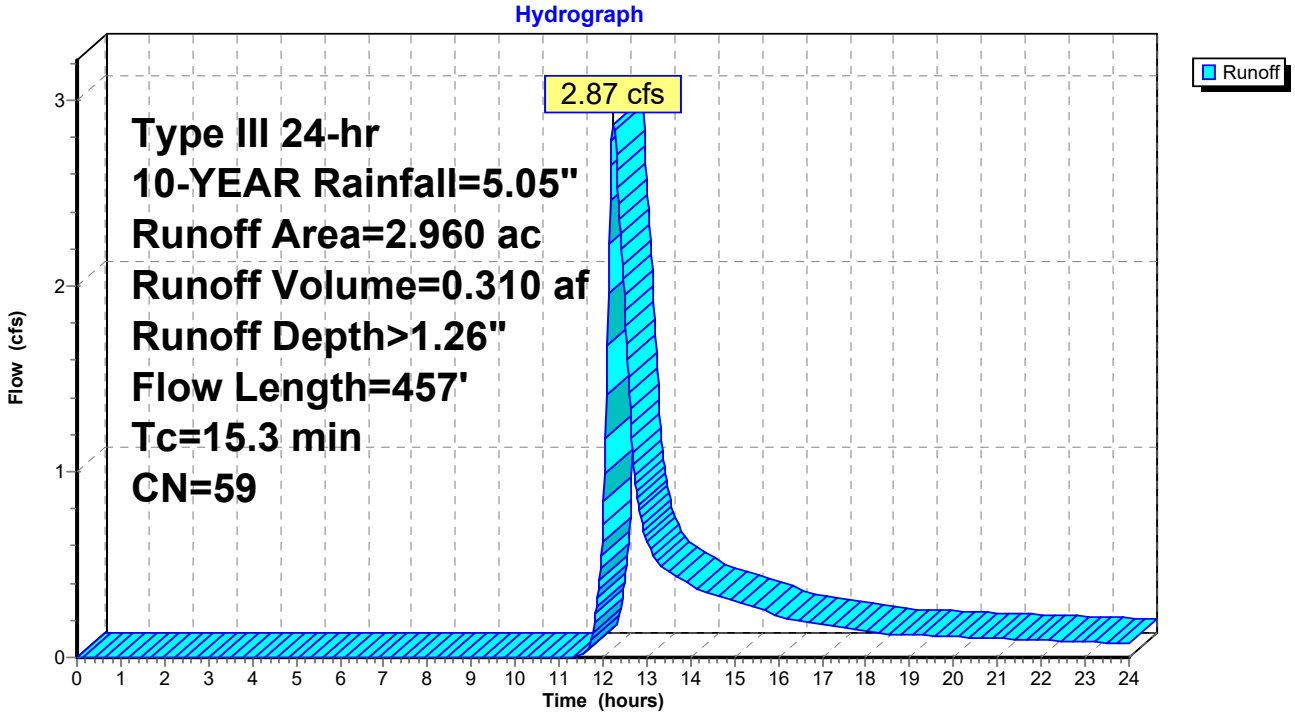
Runoff = 2.87 cfs @ 12.24 hrs, Volume= 0.310 af, Depth> 1.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YEAR Rainfall=5.05"

Area (ac)	CN	Description
1.980	61	>75% Grass cover, Good, HSG B
0.870	48	Brush, Good, HSG B
0.110	98	Paved parking, HSG B
2.960	59	Weighted Average
2.850		96.28% Pervious Area
0.110		3.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	100	0.0250	0.13		**Sheet Flow, SEG 1** Grass: Dense n= 0.240 P2= 3.33"
2.5	357	0.0224	2.41		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
15.3	457	Total			

Subcatchment E2: DISCHARGE TO THE EAST



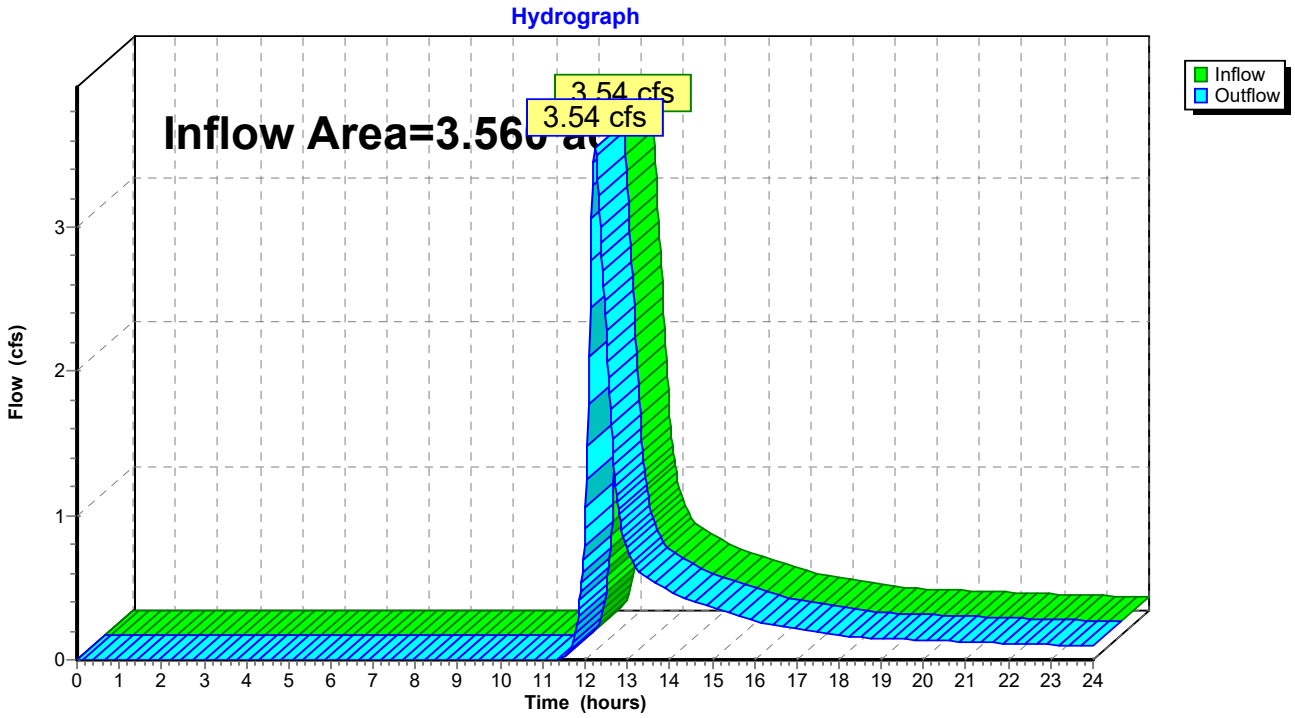
Summary for Reach 1R: EXISTING SITE TOTAL DISCHARGE

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.560 ac, 3.09% Impervious, Inflow Depth > 1.28" for 10-YEAR event
Inflow = 3.54 cfs @ 12.24 hrs, Volume= 0.380 af
Outflow = 3.54 cfs @ 12.24 hrs, Volume= 0.380 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 1R: EXISTING SITE TOTAL DISCHARGE



Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: DISCHARGE TO THE Runoff Area=0.600 ac 0.00% Impervious Runoff Depth>2.08"
Flow Length=251' Tc=15.0 min CN=61 Runoff=1.05 cfs 0.104 af

Subcatchment E2: DISCHARGE TO THE Runoff Area=2.960 ac 3.72% Impervious Runoff Depth>1.91"
Flow Length=457' Tc=15.3 min CN=59 Runoff=4.65 cfs 0.471 af

Reach 1R: EXISTING SITE TOTAL DISCHARGE Inflow=5.70 cfs 0.575 af
Outflow=5.70 cfs 0.575 af

Total Runoff Area = 3.560 ac Runoff Volume = 0.575 af Average Runoff Depth = 1.94"
96.91% Pervious = 3.450 ac 3.09% Impervious = 0.110 ac

Summary for Subcatchment E1: DISCHARGE TO THE WEST

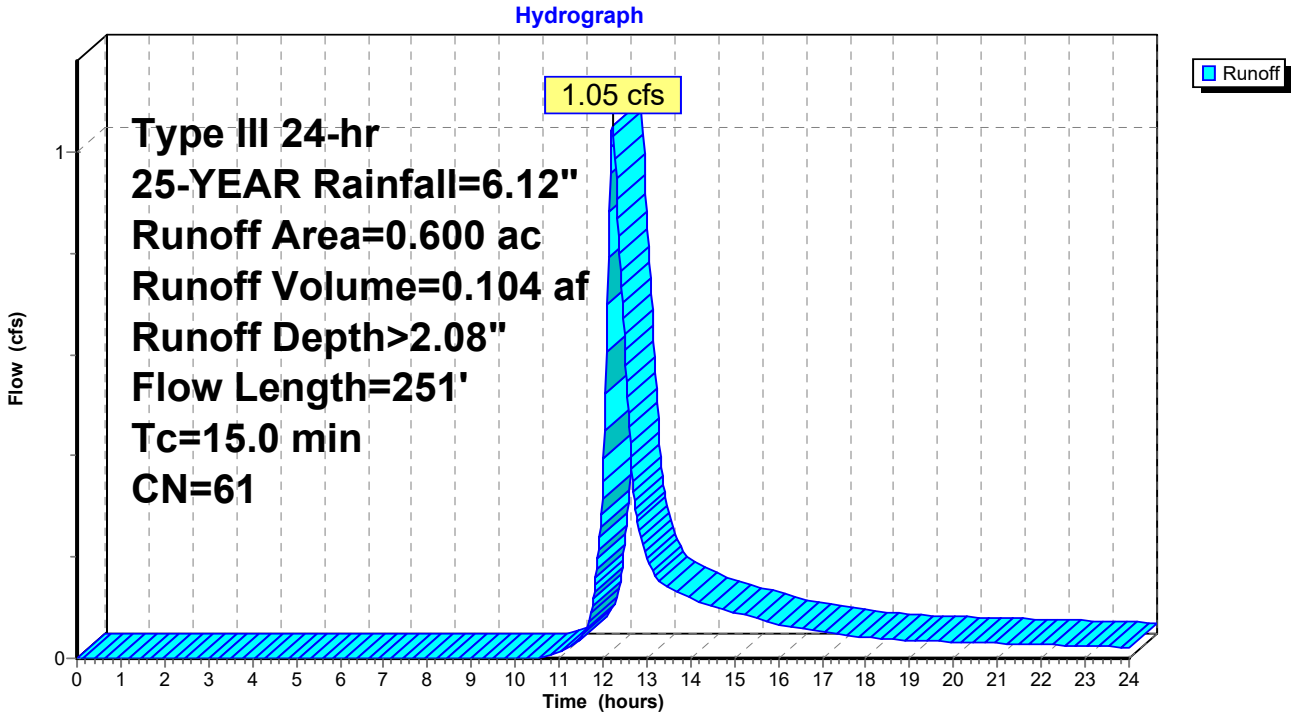
Runoff = 1.05 cfs @ 12.22 hrs, Volume= 0.104 af, Depth> 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YEAR Rainfall=6.12"

Area (ac)	CN	Description
0.600	61	>75% Grass cover, Good, HSG B
0.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0	100	0.0200	0.12		**Sheet Flow, SEG 1** Grass: Dense n= 0.240 P2= 3.33"
1.0	151	0.0265	2.62		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
15.0	251	Total			

Subcatchment E1: DISCHARGE TO THE WEST



Summary for Subcatchment E2: DISCHARGE TO THE EAST

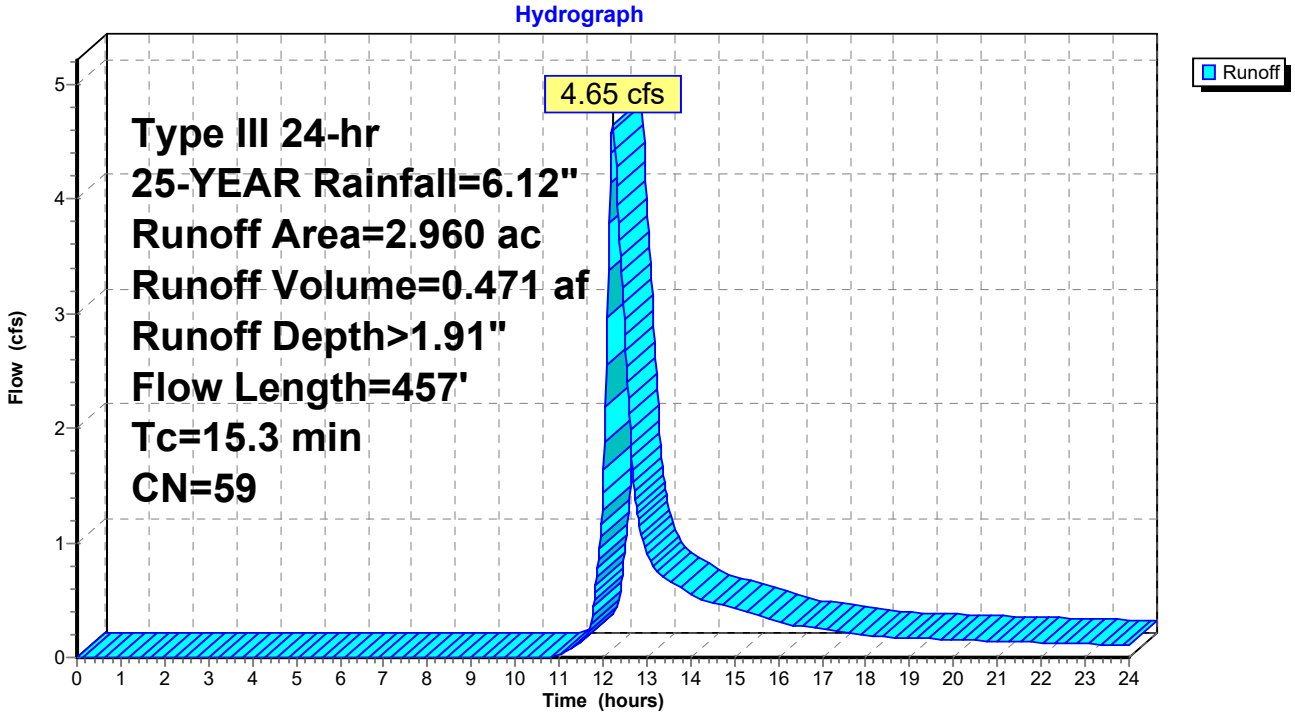
Runoff = 4.65 cfs @ 12.23 hrs, Volume= 0.471 af, Depth> 1.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YEAR Rainfall=6.12"

Area (ac)	CN	Description
1.980	61	>75% Grass cover, Good, HSG B
0.870	48	Brush, Good, HSG B
0.110	98	Paved parking, HSG B
2.960	59	Weighted Average
2.850		96.28% Pervious Area
0.110		3.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	100	0.0250	0.13		**Sheet Flow, SEG 1** Grass: Dense n= 0.240 P2= 3.33"
2.5	357	0.0224	2.41		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
15.3	457	Total			

Subcatchment E2: DISCHARGE TO THE EAST



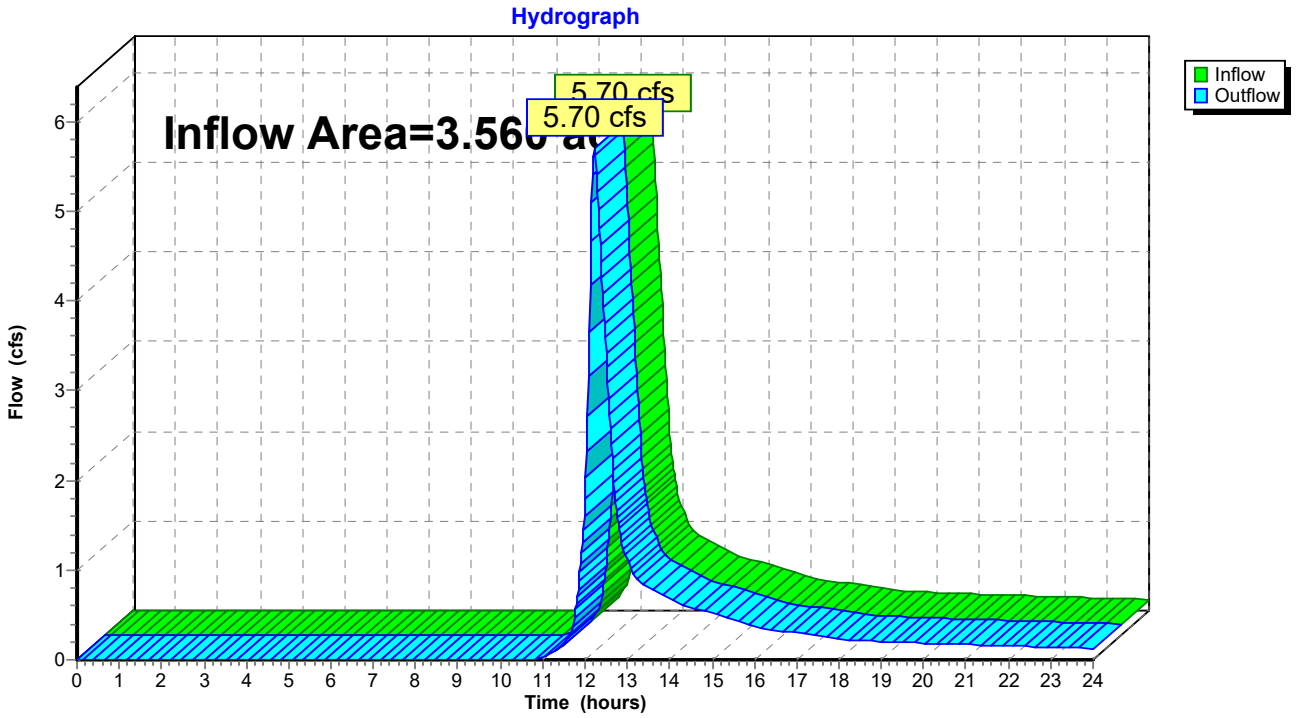
Summary for Reach 1R: EXISTING SITE TOTAL DISCHARGE

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.560 ac, 3.09% Impervious, Inflow Depth > 1.94" for 25-YEAR event
Inflow = 5.70 cfs @ 12.23 hrs, Volume= 0.575 af
Outflow = 5.70 cfs @ 12.23 hrs, Volume= 0.575 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 1R: EXISTING SITE TOTAL DISCHARGE



Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: DISCHARGE TO THE Runoff Area=0.600 ac 0.00% Impervious Runoff Depth>3.27"
Flow Length=251' Tc=15.0 min CN=61 Runoff=1.71 cfs 0.163 af

Subcatchment E2: DISCHARGE TO THE Runoff Area=2.960 ac 3.72% Impervious Runoff Depth>3.05"
Flow Length=457' Tc=15.3 min CN=59 Runoff=7.76 cfs 0.752 af

Reach 1R: EXISTING SITE TOTAL DISCHARGE Inflow=9.47 cfs 0.916 af
Outflow=9.47 cfs 0.916 af

Total Runoff Area = 3.560 ac Runoff Volume = 0.916 af Average Runoff Depth = 3.09"
96.91% Pervious = 3.450 ac 3.09% Impervious = 0.110 ac

Summary for Subcatchment E1: DISCHARGE TO THE WEST

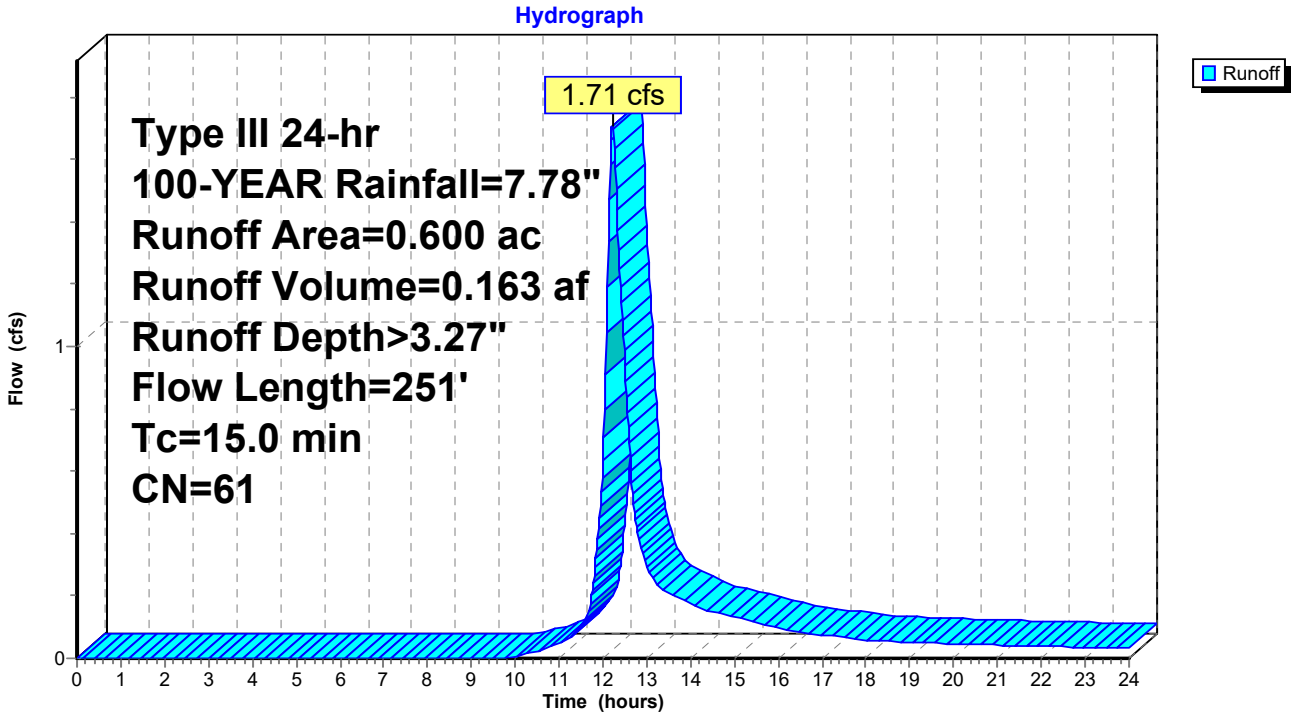
Runoff = 1.71 cfs @ 12.21 hrs, Volume= 0.163 af, Depth> 3.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-YEAR Rainfall=7.78"

Area (ac)	CN	Description
0.600	61	>75% Grass cover, Good, HSG B
0.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0	100	0.0200	0.12		**Sheet Flow, SEG 1** Grass: Dense n= 0.240 P2= 3.33"
1.0	151	0.0265	2.62		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
15.0	251	Total			

Subcatchment E1: DISCHARGE TO THE WEST



Summary for Subcatchment E2: DISCHARGE TO THE EAST

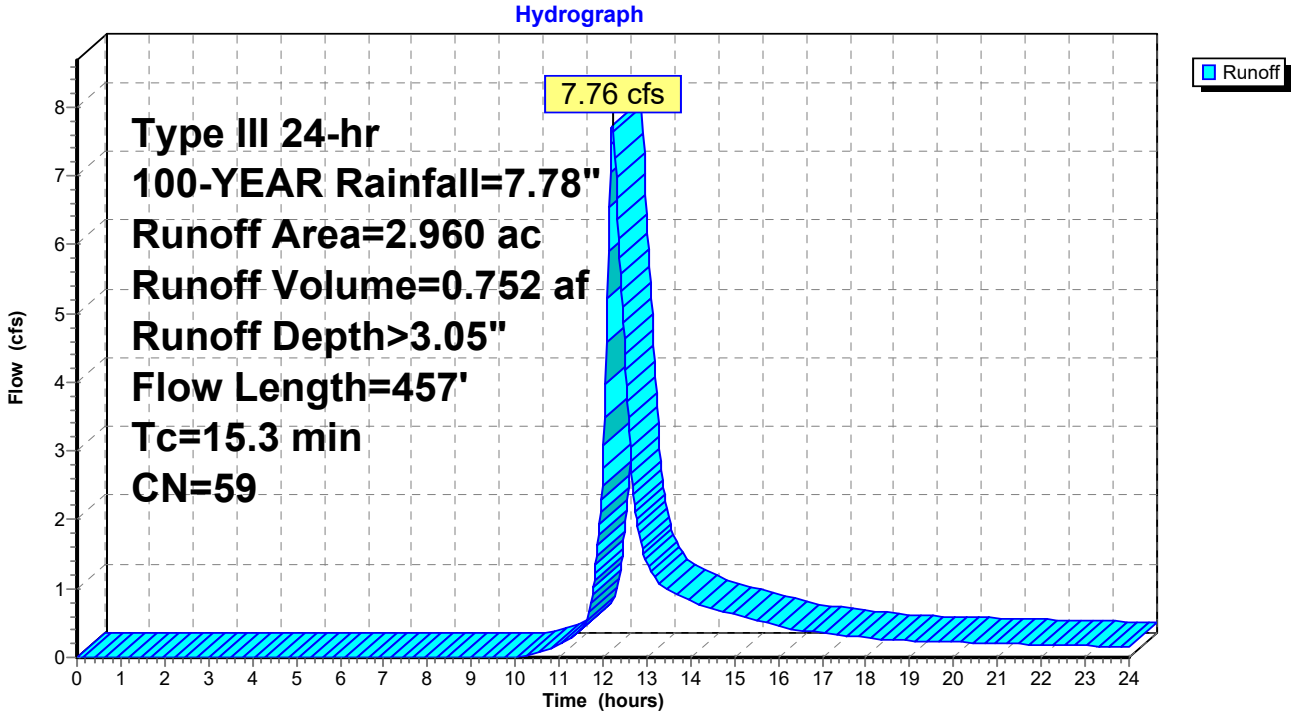
Runoff = 7.76 cfs @ 12.22 hrs, Volume= 0.752 af, Depth> 3.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-YEAR Rainfall=7.78"

Area (ac)	CN	Description
1.980	61	>75% Grass cover, Good, HSG B
0.870	48	Brush, Good, HSG B
0.110	98	Paved parking, HSG B
2.960	59	Weighted Average
2.850		96.28% Pervious Area
0.110		3.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	100	0.0250	0.13		**Sheet Flow, SEG 1** Grass: Dense n= 0.240 P2= 3.33"
2.5	357	0.0224	2.41		**Shallow Concentrated Flow, SEG 2** Unpaved Kv= 16.1 fps
15.3	457	Total			

Subcatchment E2: DISCHARGE TO THE EAST



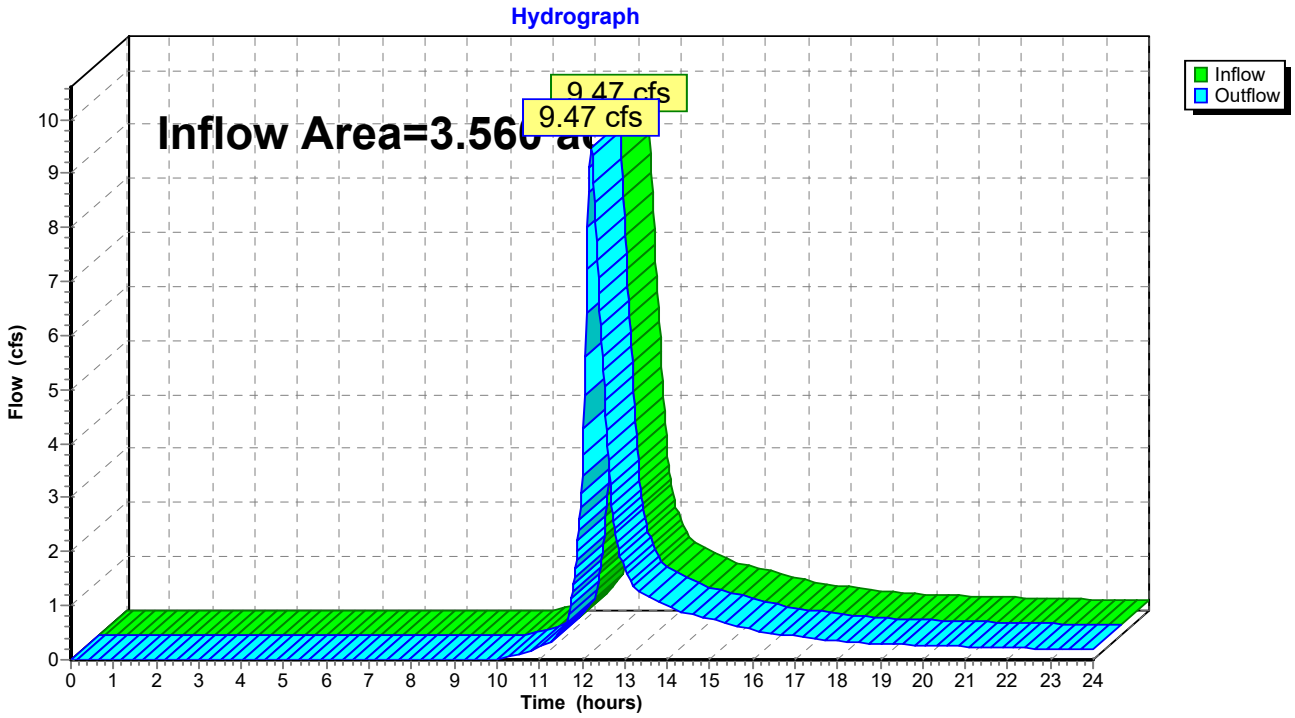
Summary for Reach 1R: EXISTING SITE TOTAL DISCHARGE

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	3.560 ac,	3.09% Impervious,	Inflow Depth >	3.09"	for 100-YEAR event
Inflow =	9.47 cfs @	12.22 hrs,	Volume=	0.916 af	
Outflow =	9.47 cfs @	12.22 hrs,	Volume=	0.916 af,	Atten= 0%, Lag= 0.0 min

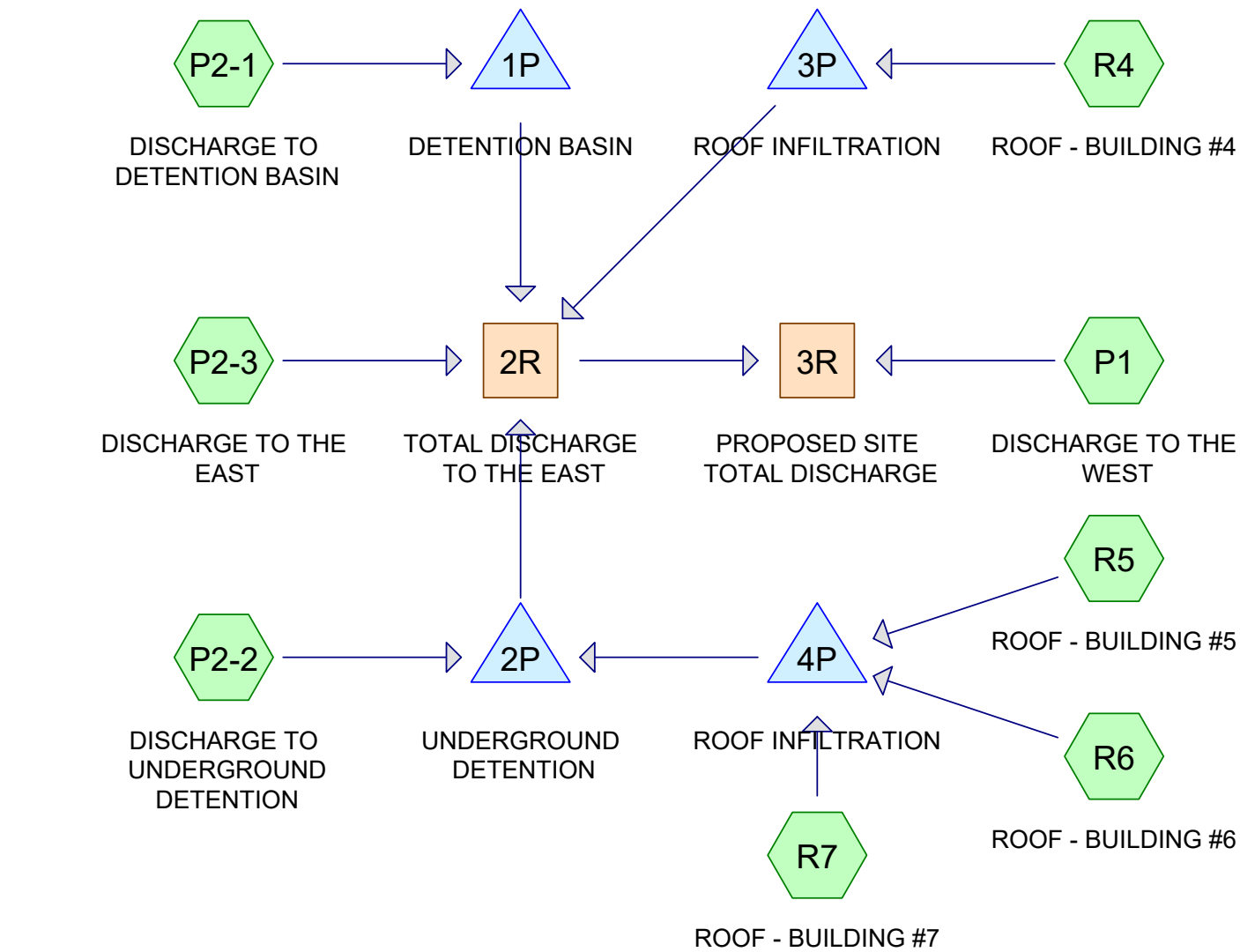
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

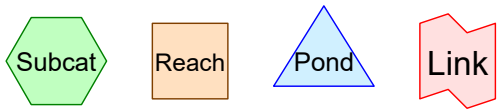
Reach 1R: EXISTING SITE TOTAL DISCHARGE



APPENDIX B

Proposed Stormwater Discharge Computations





Routing Diagram for 8374900-HYDRO2
Prepared by BSC Group, Printed 2/27/2020
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.400	61	>75% Grass cover, Good, HSG B (P1, P2-1, P2-2, P2-3)
0.550	48	Brush, Good, HSG B (P2-3)
1.180	98	Paved parking, HSG B (P2-1, P2-2, P2-3)
0.427	98	Unconnected roofs, HSG B (R4, R5, R6, R7)
3.557	**76**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
3.557	HSG B	P1, P2-1, P2-2, P2-3, R4, R5, R6, R7
0.000	HSG C	
0.000	HSG D	
0.000	Other	
3.557		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	1.400	0.000	0.000	0.000	1.400	>75% Grass cover, Good	P1, P2-1, P2-2, P2-3
0.000	0.550	0.000	0.000	0.000	0.550	Brush, Good	P2-3
0.000	1.180	0.000	0.000	0.000	1.180	Paved parking	P2-1, P2-2, P2-3
0.000	0.427	0.000	0.000	0.000	0.427	Unconnected roofs	R4, R5, R6, R7
0.000	**3.557**	**0.000**	**0.000**	**0.000**	**3.557**	**TOTAL AREA**	

Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1P	614.05	613.00	105.0	0.0100	0.011	15.0	0.0	0.0
2	2P	613.25	613.75	18.0	-0.0278	0.011	15.0	0.0	0.0
3	3P	617.50	616.00	15.0	0.1000	0.010	8.0	0.0	0.0
4	4P	617.00	617.00	33.0	0.0000	0.010	8.0	0.0	0.0

Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1: DISCHARGE TO THE WEST Runoff Area=0.140 ac 0.00% Impervious Runoff Depth>0.50"
Tc=6.0 min CN=61 Runoff=0.05 cfs 0.006 af

Subcatchment P2-1: DISCHARGE TO DETENTION BASIN Runoff Area=0.600 ac 48.33% Impervious Runoff Depth>1.43"
Tc=6.0 min CN=79 Runoff=1.00 cfs 0.072 af

Subcatchment P2-2: DISCHARGE TO UNDERGROUND DETENTION Runoff Area=1.140 ac 75.44% Impervious Runoff Depth>2.20"
Tc=6.0 min CN=89 Runoff=2.91 cfs 0.209 af

Subcatchment P2-3: DISCHARGE TO THE EAST Runoff Area=1.250 ac 2.40% Impervious Runoff Depth>0.32"
Tc=6.0 min CN=56 Runoff=0.19 cfs 0.033 af

Subcatchment R4: ROOF - BUILDING #4 Runoff Area=0.099 ac 100.00% Impervious Runoff Depth>3.09"
Tc=6.0 min CN=98 Runoff=0.32 cfs 0.026 af

Subcatchment R5: ROOF - BUILDING #5 Runoff Area=0.118 ac 100.00% Impervious Runoff Depth>3.09"
Tc=6.0 min CN=98 Runoff=0.38 cfs 0.030 af

Subcatchment R6: ROOF - BUILDING #6 Runoff Area=0.090 ac 100.00% Impervious Runoff Depth>3.09"
Tc=6.0 min CN=98 Runoff=0.29 cfs 0.023 af

Subcatchment R7: ROOF - BUILDING #7 Runoff Area=0.120 ac 100.00% Impervious Runoff Depth>3.09"
Tc=6.0 min CN=98 Runoff=0.39 cfs 0.031 af

Reach 2R: TOTAL DISCHARGE TO THE EAST Inflow=0.34 cfs 0.181 af
Outflow=0.34 cfs 0.181 af

Reach 3R: PROPOSED SITE TOTAL DISCHARGE Inflow=0.37 cfs 0.187 af
Outflow=0.37 cfs 0.187 af

Pond 1P: DETENTION BASIN Peak Elev=614.45' Storage=1,915 cf Inflow=1.00 cfs 0.072 af
Outflow=0.07 cfs 0.031 af

Pond 2P: UNDERGROUND DETENTION Peak Elev=615.31' Storage=5,415 cf Inflow=2.91 cfs 0.209 af
Outflow=0.22 cfs 0.117 af

Pond 3P: ROOF INFILTRATION Peak Elev=614.22' Storage=1,112 cf Inflow=0.32 cfs 0.026 af
8.0" Round Culvert n=0.010 L=15.0' S=0.1000 '/' Outflow=0.00 cfs 0.000 af

Pond 4P: ROOF INFILTRATION Peak Elev=615.12' Storage=0.085 af Inflow=1.06 cfs 0.085 af
8.0" Round Culvert n=0.010 L=33.0' S=0.0000 '/' Outflow=0.00 cfs 0.000 af

Total Runoff Area = 3.557 ac Runoff Volume = 0.430 af Average Runoff Depth = 1.45"
54.82% Pervious = 1.950 ac 45.18% Impervious = 1.607 ac

Summary for Subcatchment P1: DISCHARGE TO THE WEST

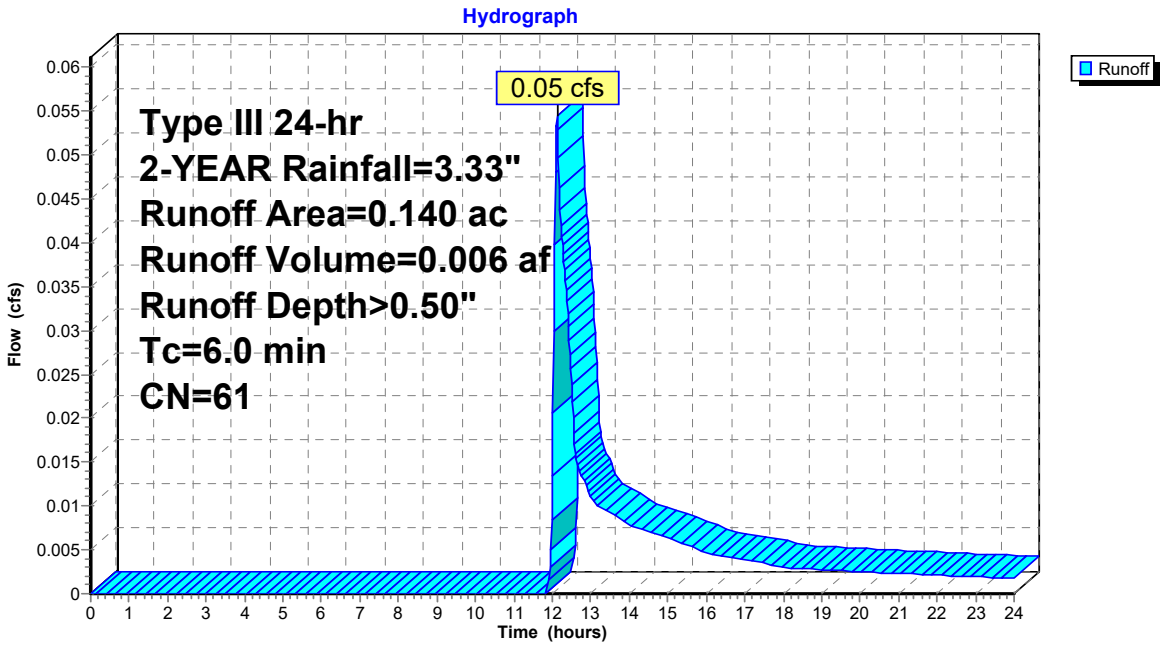
Runoff = 0.05 cfs @ 12.12 hrs, Volume= 0.006 af, Depth> 0.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-YEAR Rainfall=3.33"

Area (ac)	CN	Description
0.140	61	>75% Grass cover, Good, HSG B
0.140		100.00% Pervious Area

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

Subcatchment P1: DISCHARGE TO THE WEST



Summary for Subcatchment P2-1: DISCHARGE TO DETENTION BASIN

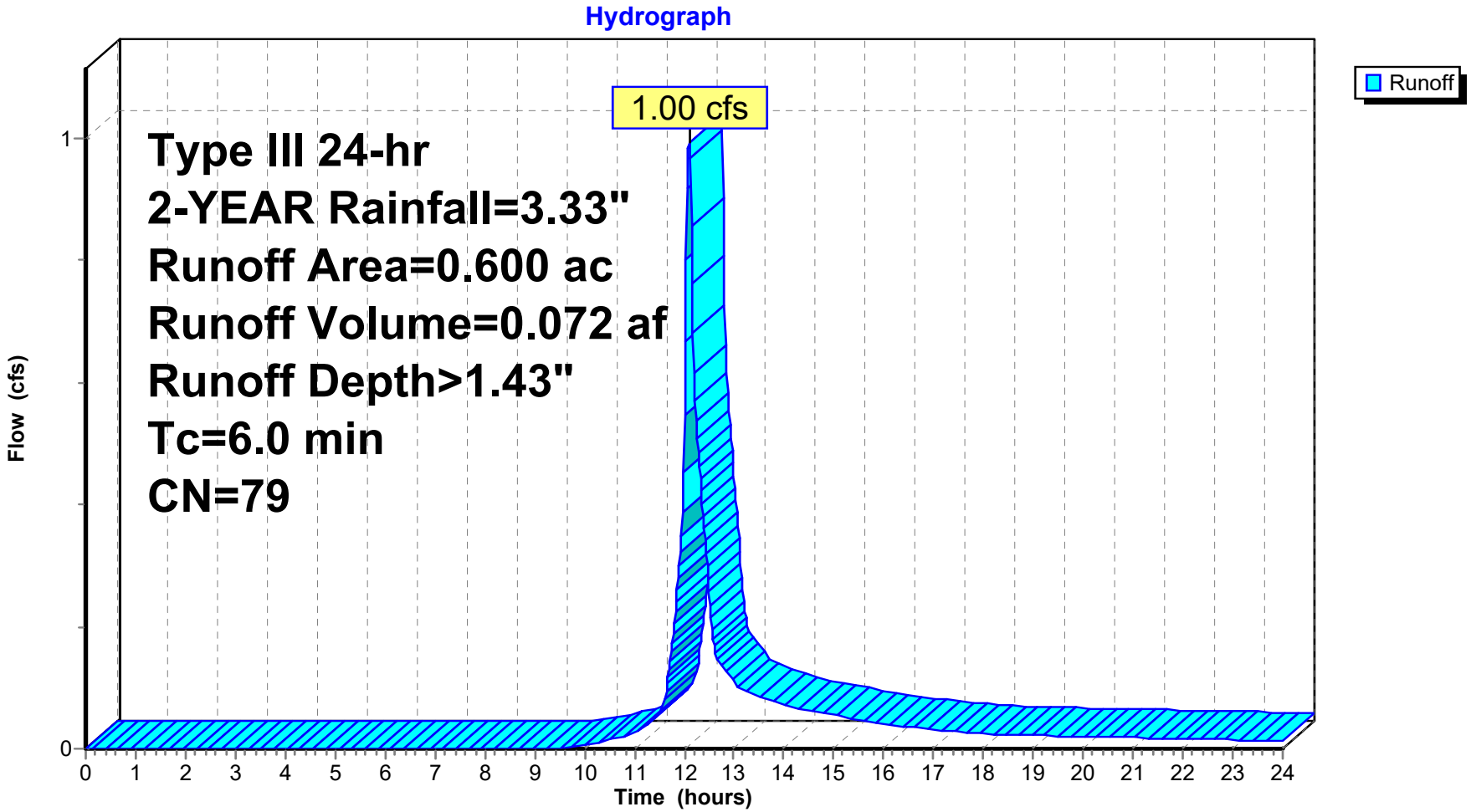
Runoff = 1.00 cfs @ 12.09 hrs, Volume= 0.072 af, Depth> 1.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-YEAR Rainfall=3.33"

Area (ac)	CN	Description
0.310	61	>75% Grass cover, Good, HSG B
0.290	98	Paved parking, HSG B
0.600	79	Weighted Average
0.310		51.67% Pervious Area
0.290		48.33% Impervious Area

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

Subcatchment P2-1: DISCHARGE TO DETENTION BASIN



Summary for Subcatchment P2-2: DISCHARGE TO UNDERGROUND DETENTION

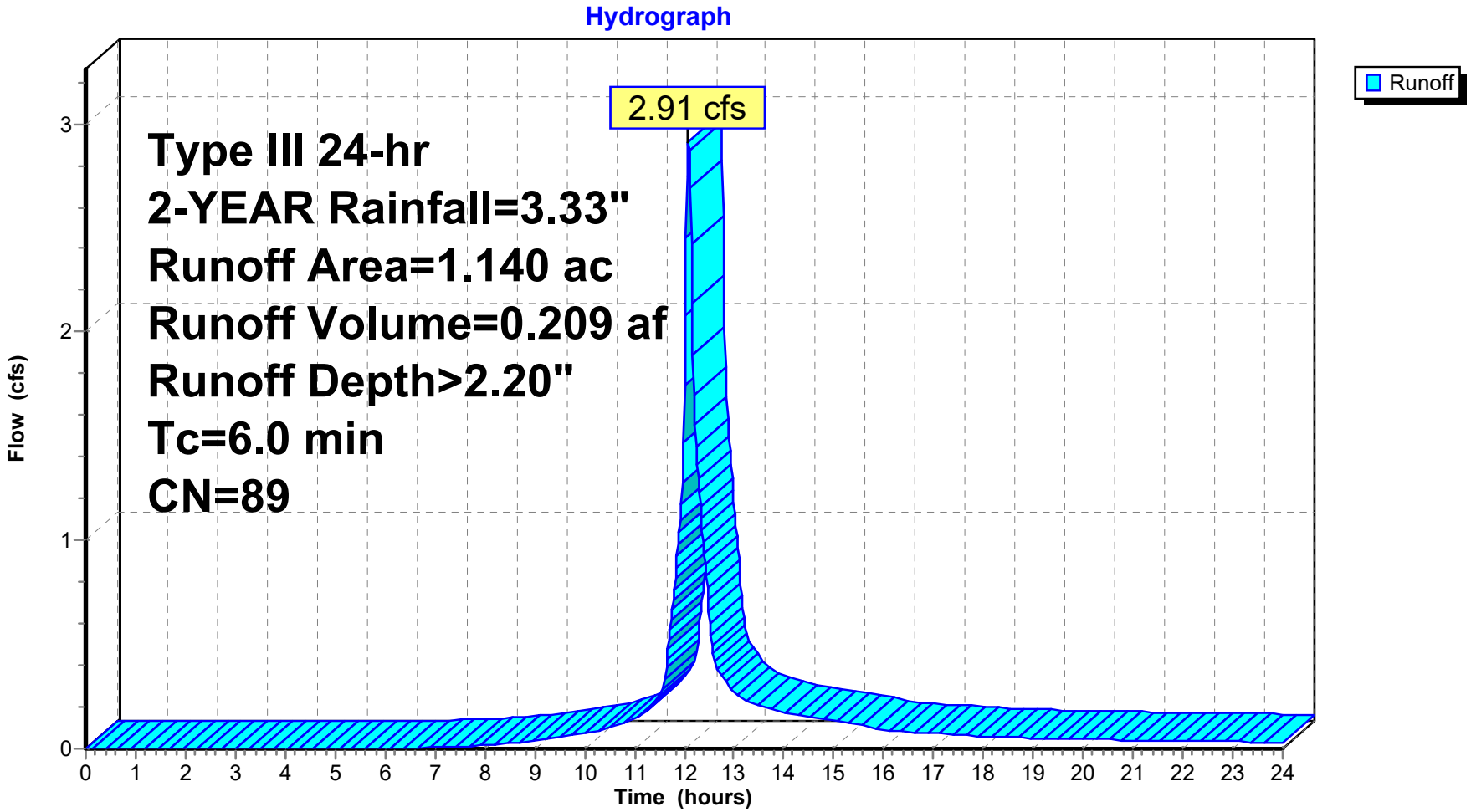
Runoff = 2.91 cfs @ 12.09 hrs, Volume= 0.209 af, Depth> 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-YEAR Rainfall=3.33"

Area (ac)	CN	Description
0.280	61	>75% Grass cover, Good, HSG B
0.860	98	Paved parking, HSG B
1.140	89	Weighted Average
0.280		24.56% Pervious Area
0.860		75.44% Impervious Area

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

Subcatchment P2-2: DISCHARGE TO UNDERGROUND DETENTION



Summary for Subcatchment P2-3: DISCHARGE TO THE EAST

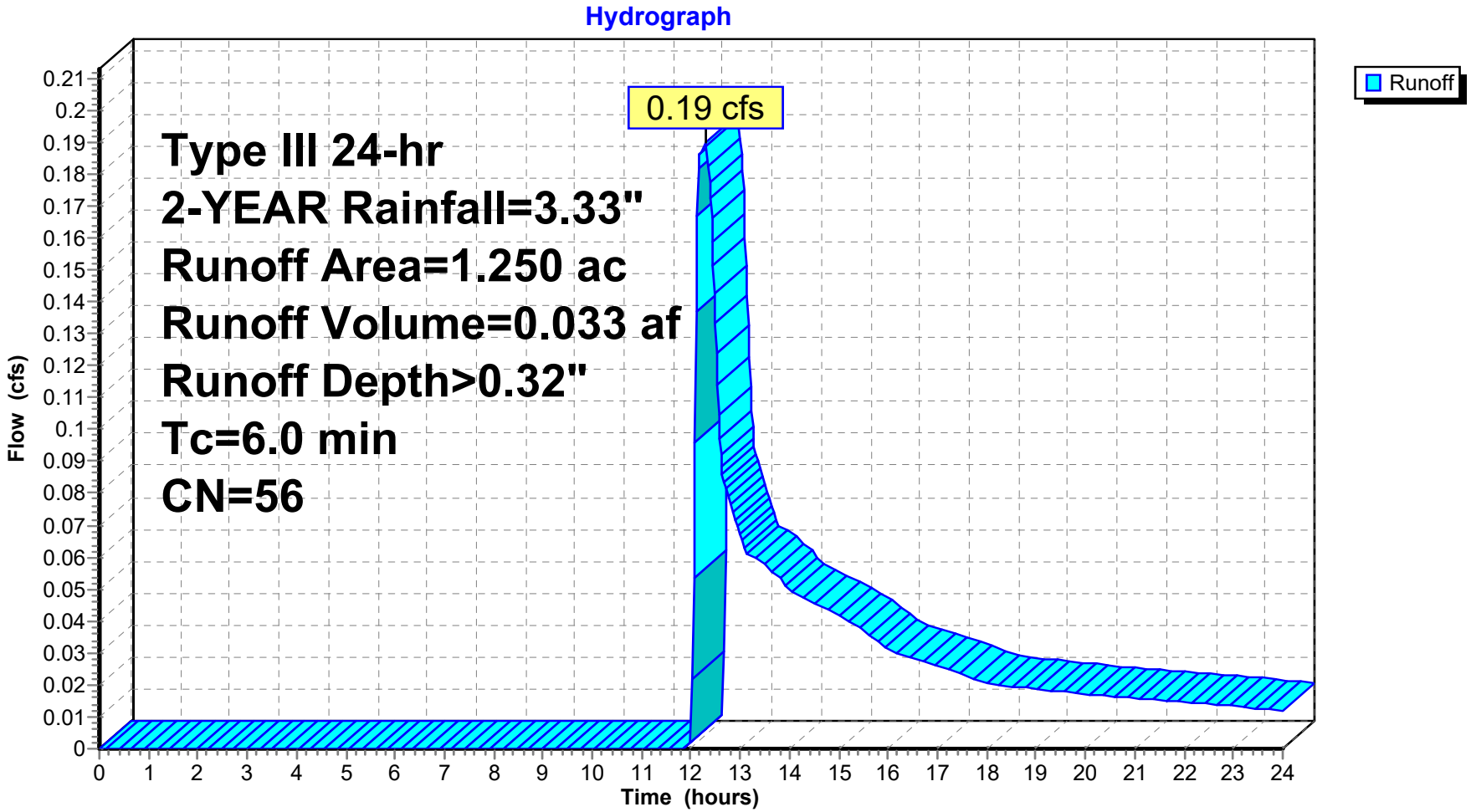
Runoff = 0.19 cfs @ 12.28 hrs, Volume= 0.033 af, Depth> 0.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-YEAR Rainfall=3.33"

Area (ac)	CN	Description
0.670	61	>75% Grass cover, Good, HSG B
0.550	48	Brush, Good, HSG B
0.030	98	Paved parking, HSG B
1.250	56	Weighted Average
1.220		97.60% Pervious Area
0.030		2.40% Impervious Area

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

Subcatchment P2-3: DISCHARGE TO THE EAST



Summary for Subcatchment R4: ROOF - BUILDING #4

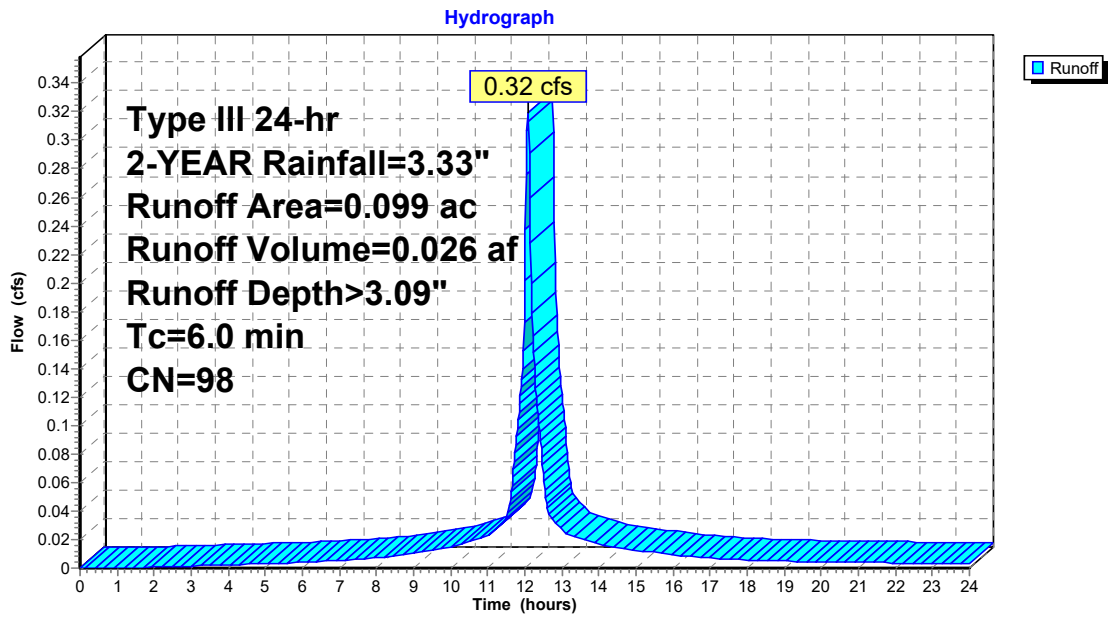
Runoff = 0.32 cfs @ 12.08 hrs, Volume= 0.026 af, Depth> 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-YEAR Rainfall=3.33"

Area (ac)	CN	Description
0.099	98	Unconnected roofs, HSG B
0.099		100.00% Impervious Area
0.099		100.00% Unconnected

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

Subcatchment R4: ROOF - BUILDING #4



Summary for Subcatchment R5: ROOF - BUILDING #5

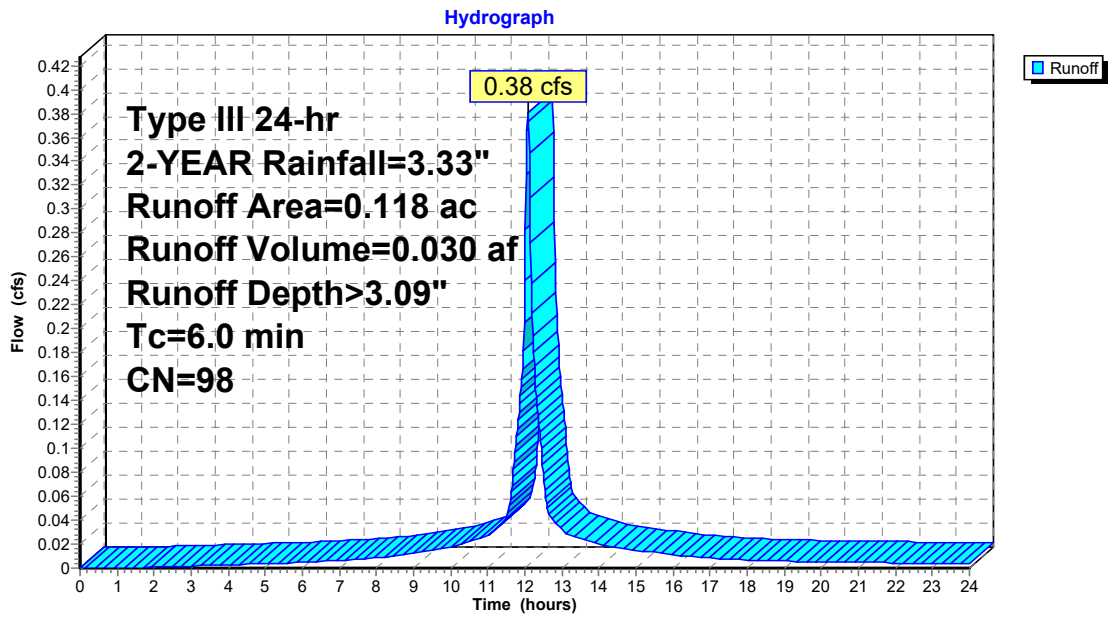
Runoff = 0.38 cfs @ 12.08 hrs, Volume= 0.030 af, Depth> 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-YEAR Rainfall=3.33"

Area (ac)	CN	Description
0.118	98	Unconnected roofs, HSG B
0.118		100.00% Impervious Area
0.118		100.00% Unconnected

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

Subcatchment R5: ROOF - BUILDING #5



Summary for Subcatchment R6: ROOF - BUILDING #6

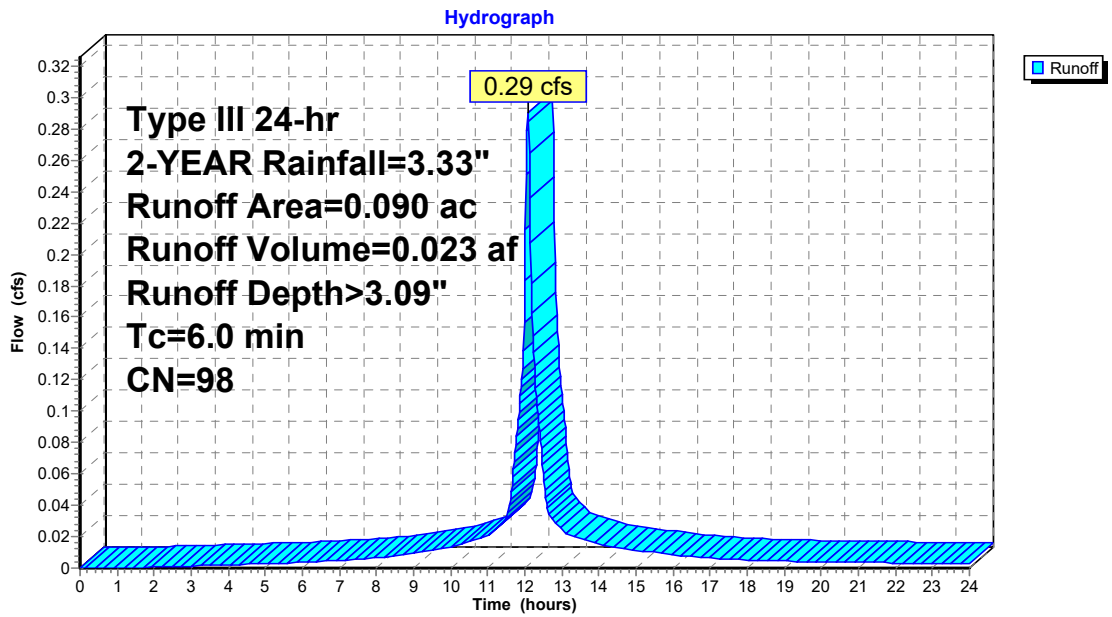
Runoff = 0.29 cfs @ 12.08 hrs, Volume= 0.023 af, Depth> 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-YEAR Rainfall=3.33"

Area (ac)	CN	Description
0.090	98	Unconnected roofs, HSG B
0.090		100.00% Impervious Area
0.090		100.00% Unconnected

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

Subcatchment R6: ROOF - BUILDING #6



Summary for Subcatchment R7: ROOF - BUILDING #7

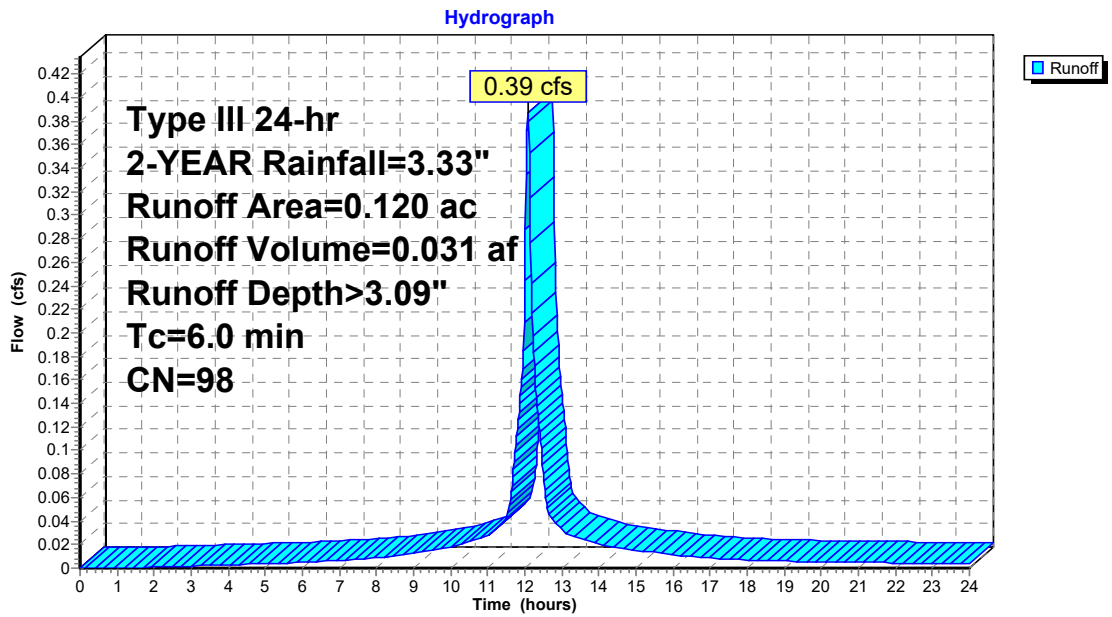
Runoff = 0.39 cfs @ 12.08 hrs, Volume= 0.031 af, Depth> 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-YEAR Rainfall=3.33"

Area (ac)	CN	Description
0.120	98	Unconnected roofs, HSG B
0.120		100.00% Impervious Area
0.120		100.00% Unconnected

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

Subcatchment R7: ROOF - BUILDING #7



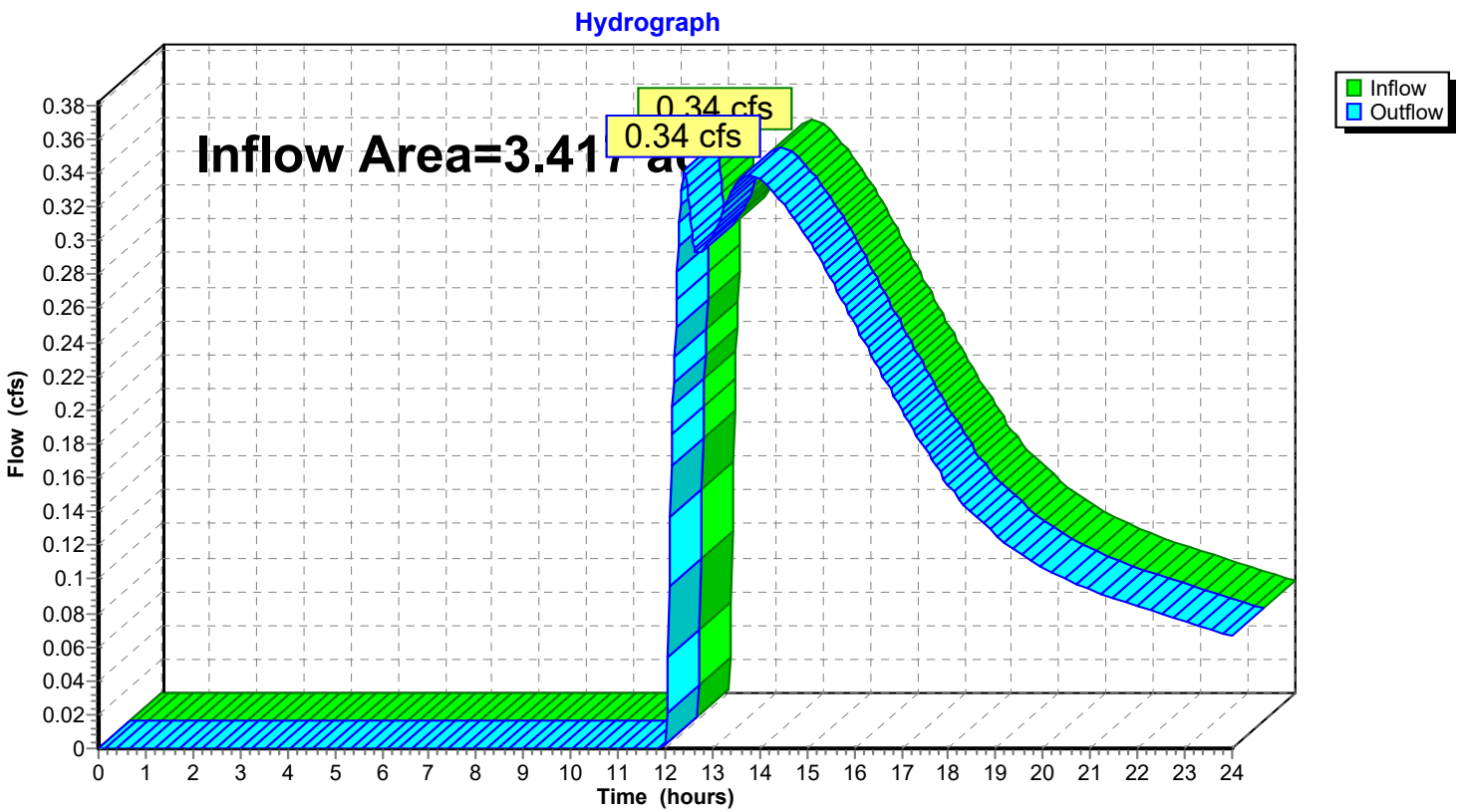
Summary for Reach 2R: TOTAL DISCHARGE TO THE EAST

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.417 ac, 47.03% Impervious, Inflow Depth > 0.64" for 2-YEAR event
Inflow = 0.34 cfs @ 12.40 hrs, Volume= 0.181 af
Outflow = 0.34 cfs @ 12.40 hrs, Volume= 0.181 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 2R: TOTAL DISCHARGE TO THE EAST



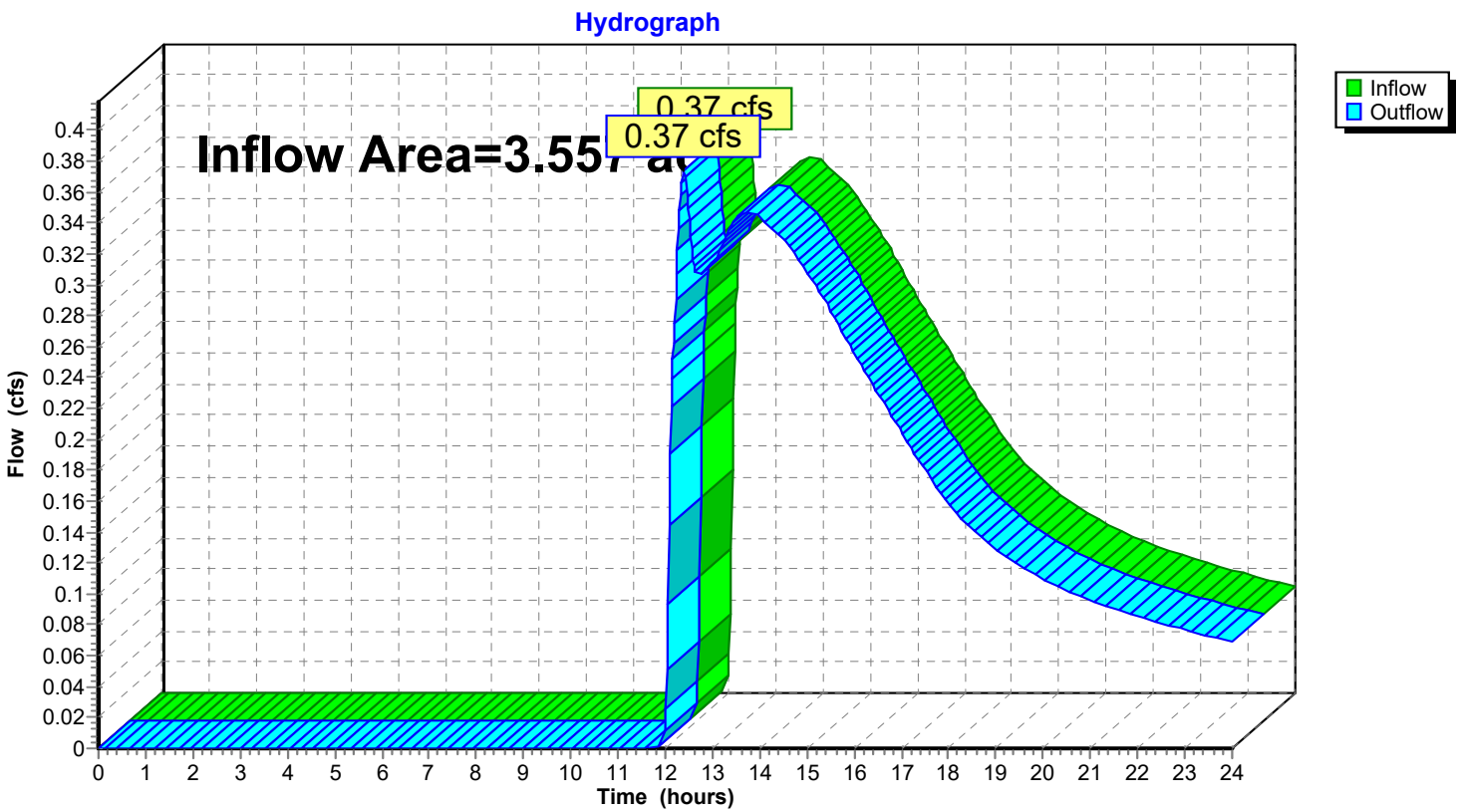
Summary for Reach 3R: PROPOSED SITE TOTAL DISCHARGE

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.557 ac, 45.18% Impervious, Inflow Depth > 0.63" for 2-YEAR event
Inflow = 0.37 cfs @ 12.39 hrs, Volume= 0.187 af
Outflow = 0.37 cfs @ 12.39 hrs, Volume= 0.187 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 3R: PROPOSED SITE TOTAL DISCHARGE



Summary for Pond 1P: DETENTION BASIN

Inflow Area = 0.600 ac, 48.33% Impervious, Inflow Depth > 1.43" for 2-YEAR event
Inflow = 1.00 cfs @ 12.09 hrs, Volume= 0.072 af
Outflow = 0.07 cfs @ 14.13 hrs, Volume= 0.031 af, Atten= 93%, Lag= 122.0 min
Primary = 0.07 cfs @ 14.13 hrs, Volume= 0.031 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 614.45' @ 14.13 hrs Surf.Area= 1,679 sf Storage= 1,915 cf
Flood Elev= 614.94' Surf.Area= 1,948 sf Storage= 2,797 cf

Plug-Flow detention time= 306.2 min calculated for 0.031 af (43% of inflow)
Center-of-Mass det. time= 180.6 min (1,023.7 - 843.1)

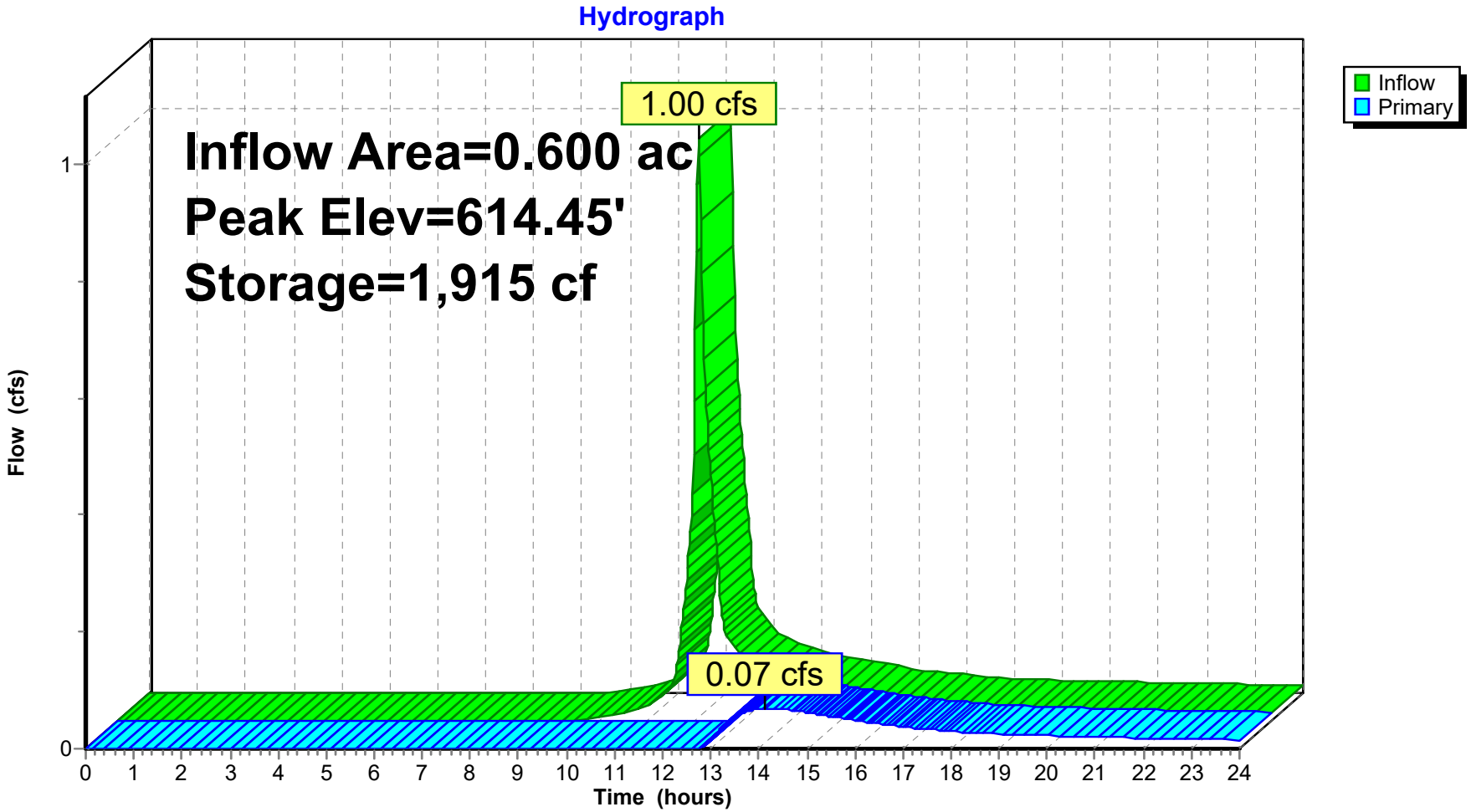
Volume	Invert	Avail.Storage	Storage Description
#1	613.00'	6,621 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
613.00	984	145.0	0	0	984
614.00	1,446	164.0	1,208	1,208	1,476
615.00	1,983	186.0	1,707	2,915	2,113
616.00	2,570	205.0	2,270	5,185	2,736
616.50	3,185	230.0	1,436	6,621	3,608

Device	Routing	Invert	Outlet Devices
#1	Primary	614.05'	**15.0" Round Culvert** L= 105.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 614.05' / 613.00' S= 0.0100 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf
#2	Device 1	614.30'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	616.00'	**15.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

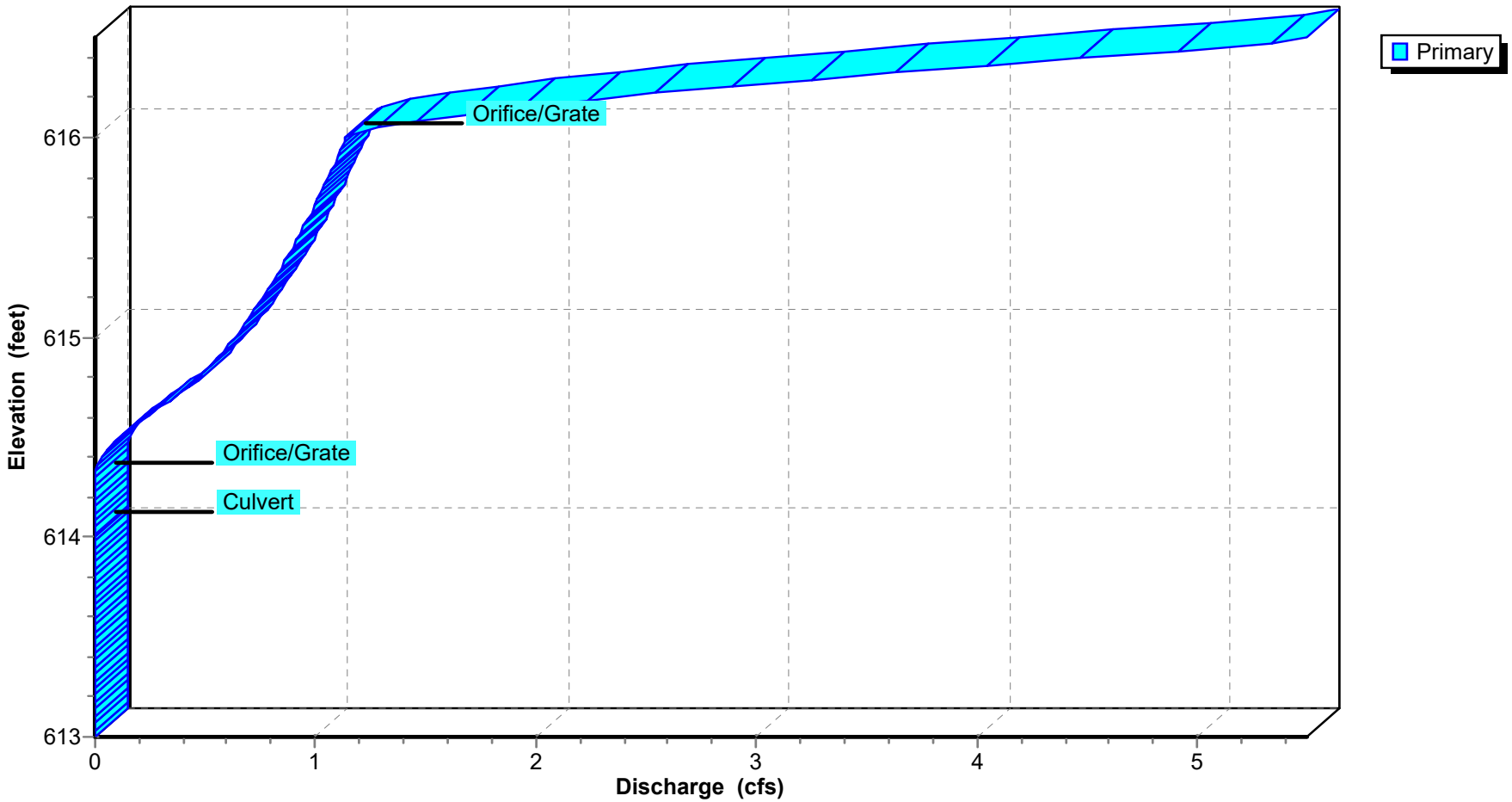
Primary OutFlow Max=0.07 cfs @ 14.13 hrs HW=614.45' (Free Discharge)
└─**1=Culvert** (Passes 0.07 cfs of 0.74 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.07 cfs @ 1.33 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: DETENTION BASIN

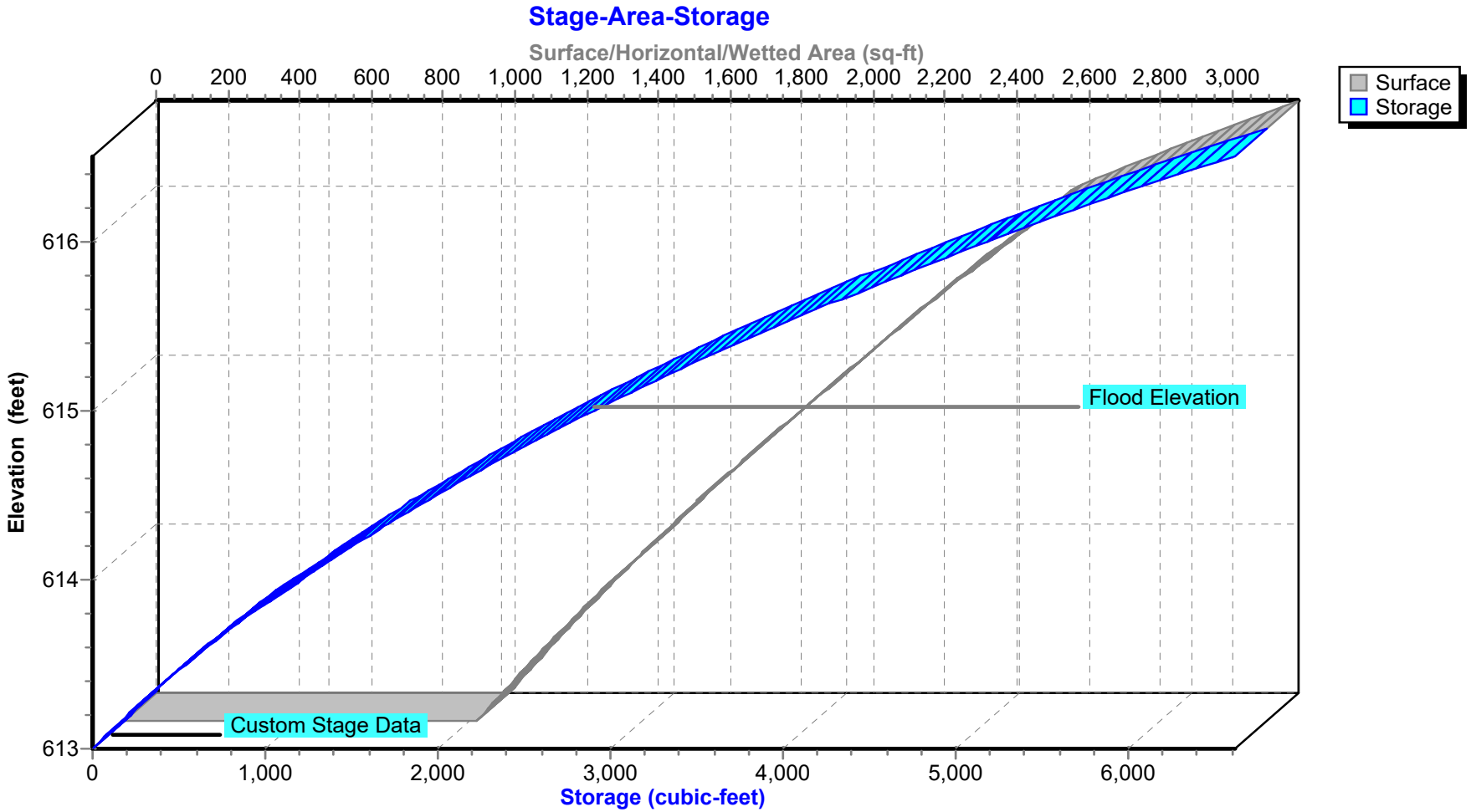


Pond 1P: DETENTION BASIN

Stage-Discharge



Pond 1P: DETENTION BASIN



Summary for Pond 2P: UNDERGROUND DETENTION

Inflow Area = 1.468 ac, 80.93% Impervious, Inflow Depth > 1.71" for 2-YEAR event
Inflow = 2.91 cfs @ 12.09 hrs, Volume= 0.209 af
Outflow = 0.22 cfs @ 13.38 hrs, Volume= 0.117 af, Atten= 92%, Lag= 77.6 min
Primary = 0.22 cfs @ 13.38 hrs, Volume= 0.117 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 615.31' @ 13.38 hrs Surf.Area= 5,936 sf Storage= 5,415 cf

Plug-Flow detention time= 278.9 min calculated for 0.117 af (56% of inflow)
Center-of-Mass det. time= 171.8 min (980.7 - 808.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	613.75'	6,633 cf	**36.50'W x 162.00'L x 4.00'H Field A** 23,652 cf Overall - 7,069 cf Embedded = 16,583 cf x 40.0% Voids
#2A	614.25'	7,069 cf	**CMP Round 30** x 72 Inside #1 Effective Size= 30.0"W x 30.0"H => 4.91 sf x 20.00'L = 98.2 cf Overall Size= 30.0"W x 30.0"H x 20.00'L 9 Rows of 8 Chambers
#3	614.25'	31 cf	**15.0" Round Pipe Storage** L= 25.0'
		13,733 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	613.75'	**15.0" Round Culvert** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 613.25' / 613.75' S= -0.0278 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf
#2	Device 1	614.86'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	615.33'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	617.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.22 cfs @ 13.38 hrs HW=615.31' (Free Discharge)
└─**1=Culvert** (Passes 0.22 cfs of 5.70 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.22 cfs @ 2.55 fps)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: UNDERGROUND DETENTION - Chamber Wizard Field A

Chamber Model = CMP Round 30 (Round Corrugated Metal Pipe)
Effective Size= 30.0"W x 30.0"H => 4.91 sf x 20.00'L = 98.2 cf
Overall Size= 30.0"W x 30.0"H x 20.00'L

30.0" Wide + 18.0" Spacing = 48.0" C-C Row Spacing

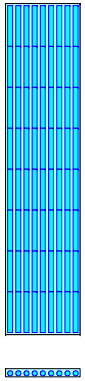
8 Chambers/Row x 20.00' Long = 160.00' Row Length +12.0" End Stone x 2 = 162.00' Base Length
9 Rows x 30.0" Wide + 18.0" Spacing x 8 + 12.0" Side Stone x 2 = 36.50' Base Width
6.0" Base + 30.0" Chamber Height + 12.0" Cover = 4.00' Field Height

72 Chambers x 98.2 cf = 7,068.6 cf Chamber Storage

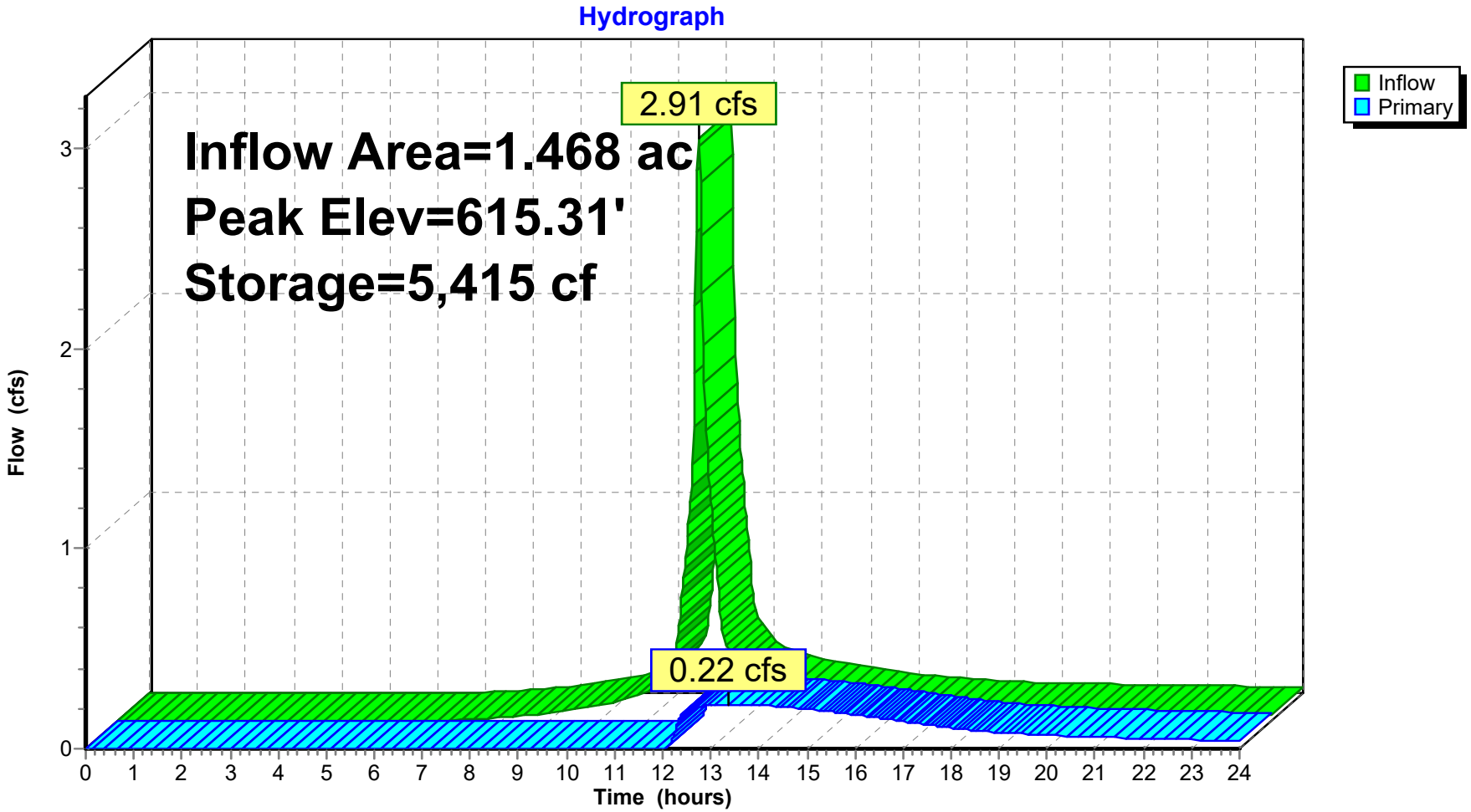
23,652.0 cf Field - 7,068.6 cf Chambers = 16,583.4 cf Stone x 40.0% Voids = 6,633.4 cf Stone Storage

Chamber Storage + Stone Storage = 13,702.0 cf = 0.315 af
Overall Storage Efficiency = 57.9%
Overall System Size = 162.00' x 36.50' x 4.00'

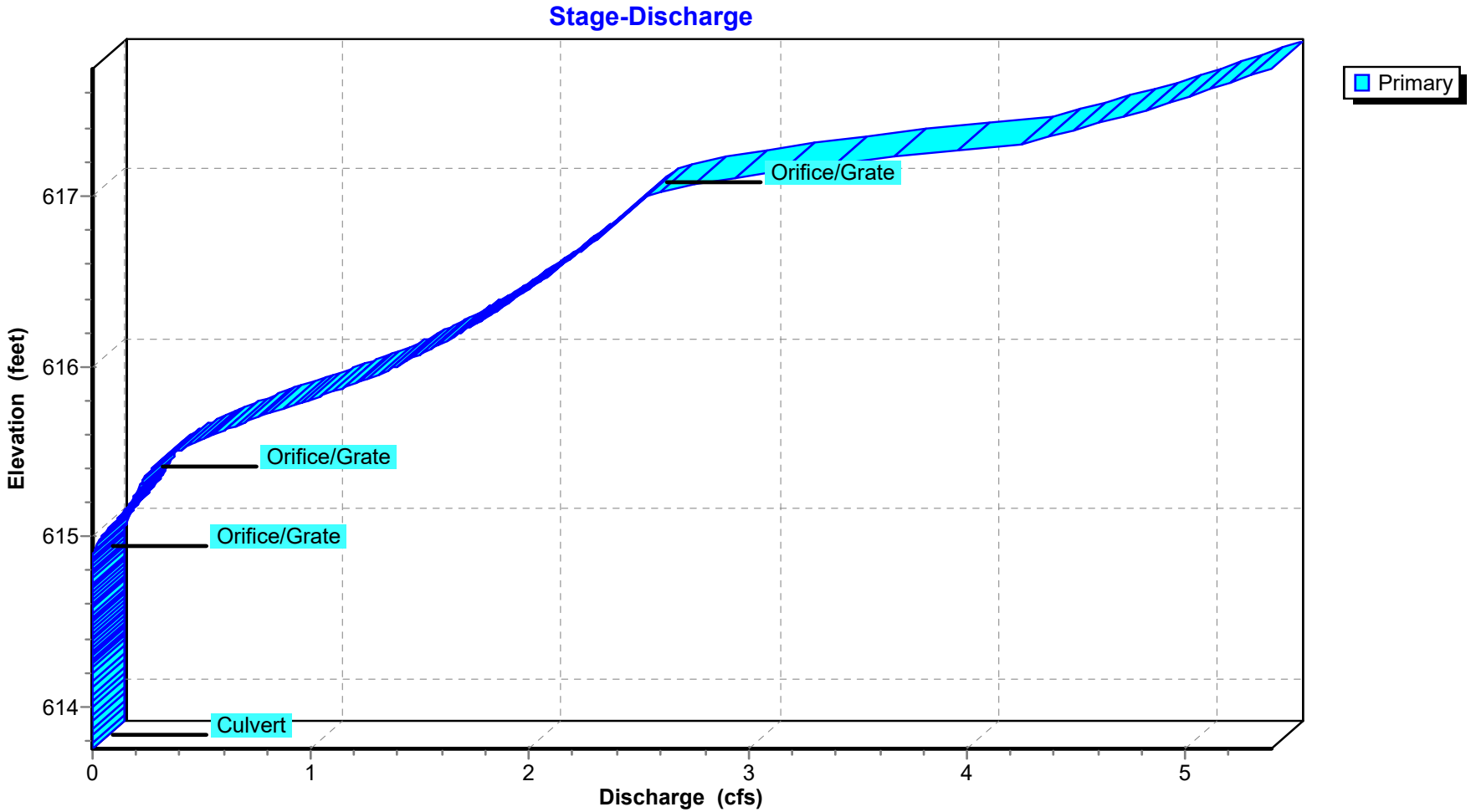
72 Chambers
876.0 cy Field
614.2 cy Stone



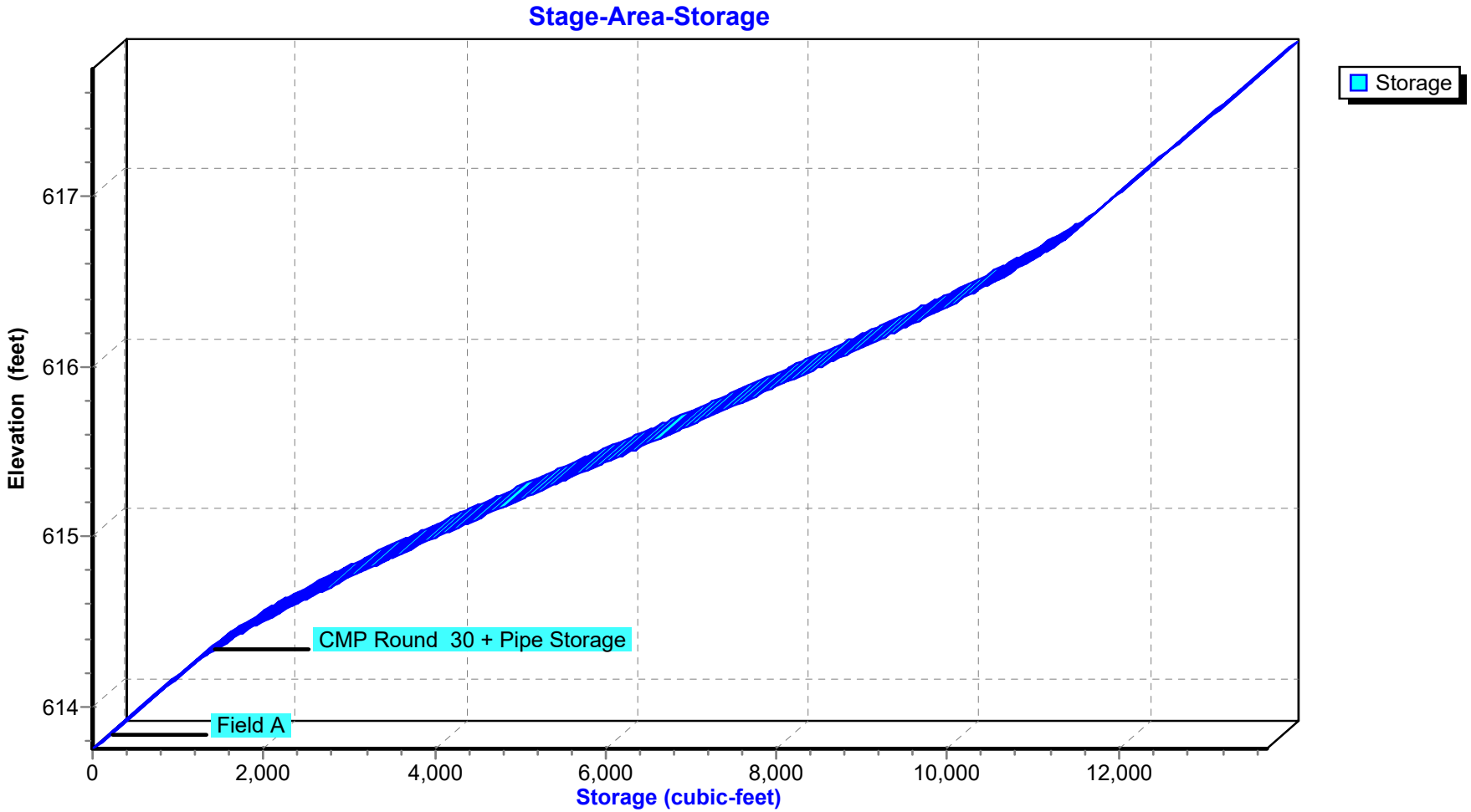
Pond 2P: UNDERGROUND DETENTION



Pond 2P: UNDERGROUND DETENTION



Pond 2P: UNDERGROUND DETENTION



Summary for Pond 3P: ROOF INFILTRATION

Inflow Area = 0.099 ac,100.00% Impervious, Inflow Depth > 3.09" for 2-YEAR event
Inflow = 0.32 cfs @ 12.08 hrs, Volume= 0.026 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 614.22' @ 24.00 hrs Surf.Area= 607 sf Storage= 1,112 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1A	611.50'	1,192 cf	**19.42'W x 31.27'L x 7.25'H Field A** 4,401 cf Overall - 1,421 cf Embedded = 2,981 cf x 40.0% Voids
#2A	612.25'	1,421 cf	**ADS_StormTech MC-4500 +Cap** x 12 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 2 Rows of 6 Chambers Cap Storage= +35.7 cf x 2 x 2 rows = 142.8 cf
		2,613 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	617.50'	**8.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 617.50' / 616.00' S= 0.1000 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=611.50' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)

Pond 3P: ROOF INFILTRATION - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-4500 +Cap (ADS StormTech® MC-4500 with cap volume)
Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf
Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap
Cap Storage= +35.7 cf x 2 x 2 rows = 142.8 cf

100.0" Wide + 9.0" Spacing = 109.0" C-C Row Spacing

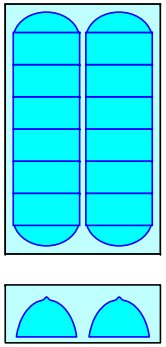
6 Chambers/Row x 4.02' Long +2.56' Cap Length x 2 = 29.27' Row Length +12.0" End Stone x 2 = 31.27' Base Length
2 Rows x 100.0" Wide + 9.0" Spacing x 1 + 12.0" Side Stone x 2 = 19.42' Base Width
9.0" Base + 60.0" Chamber Height + 18.0" Cover = 7.25' Field Height

12 Chambers x 106.5 cf + 35.7 cf Cap Volume x 2 x 2 Rows = 1,420.7 cf Chamber Storage

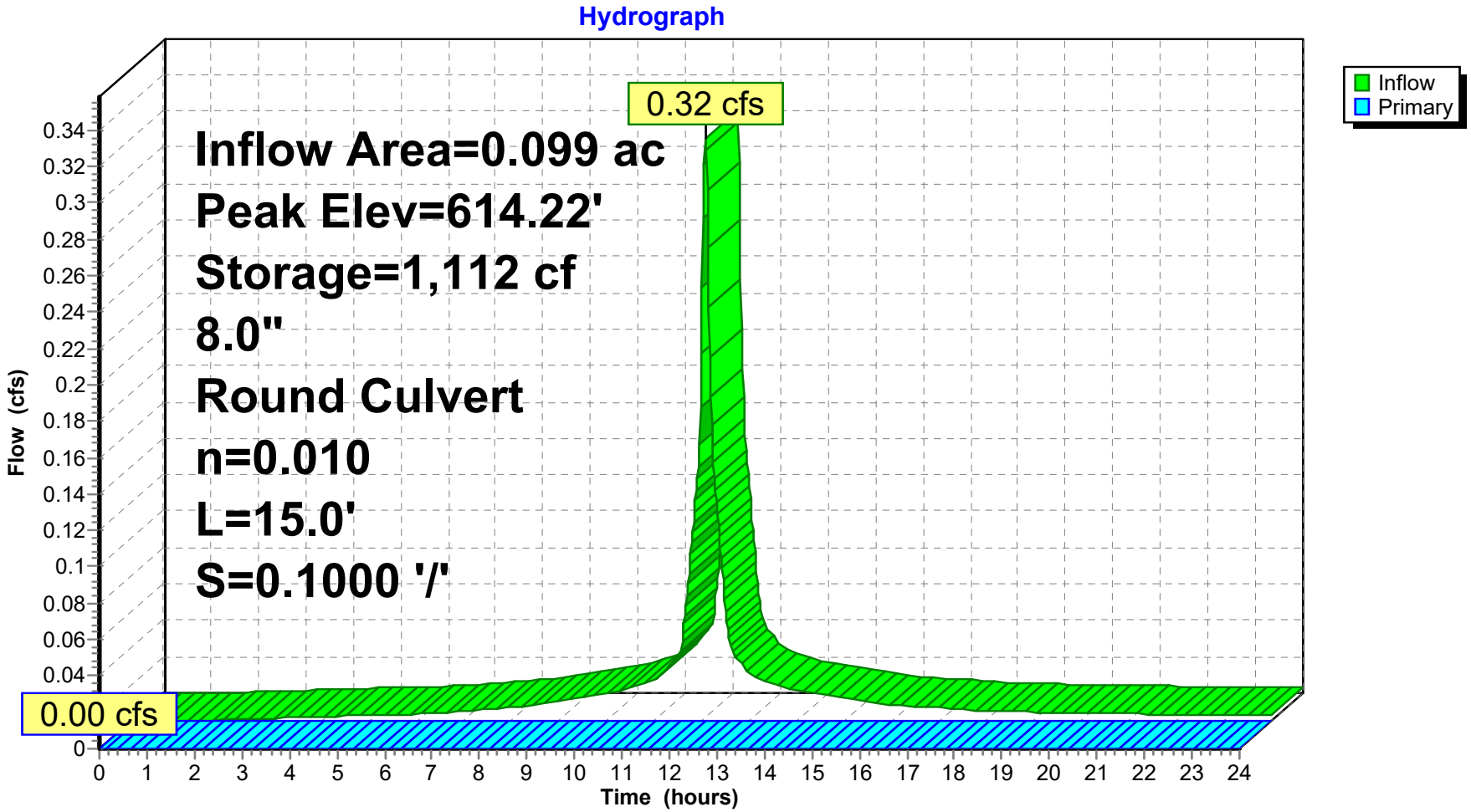
4,401.4 cf Field - 1,420.7 cf Chambers = 2,980.7 cf Stone x 40.0% Voids = 1,192.3 cf Stone Storage

Chamber Storage + Stone Storage = 2,613.0 cf = 0.060 af
Overall Storage Efficiency = 59.4%
Overall System Size = 31.27' x 19.42' x 7.25'

12 Chambers
163.0 cy Field
110.4 cy Stone

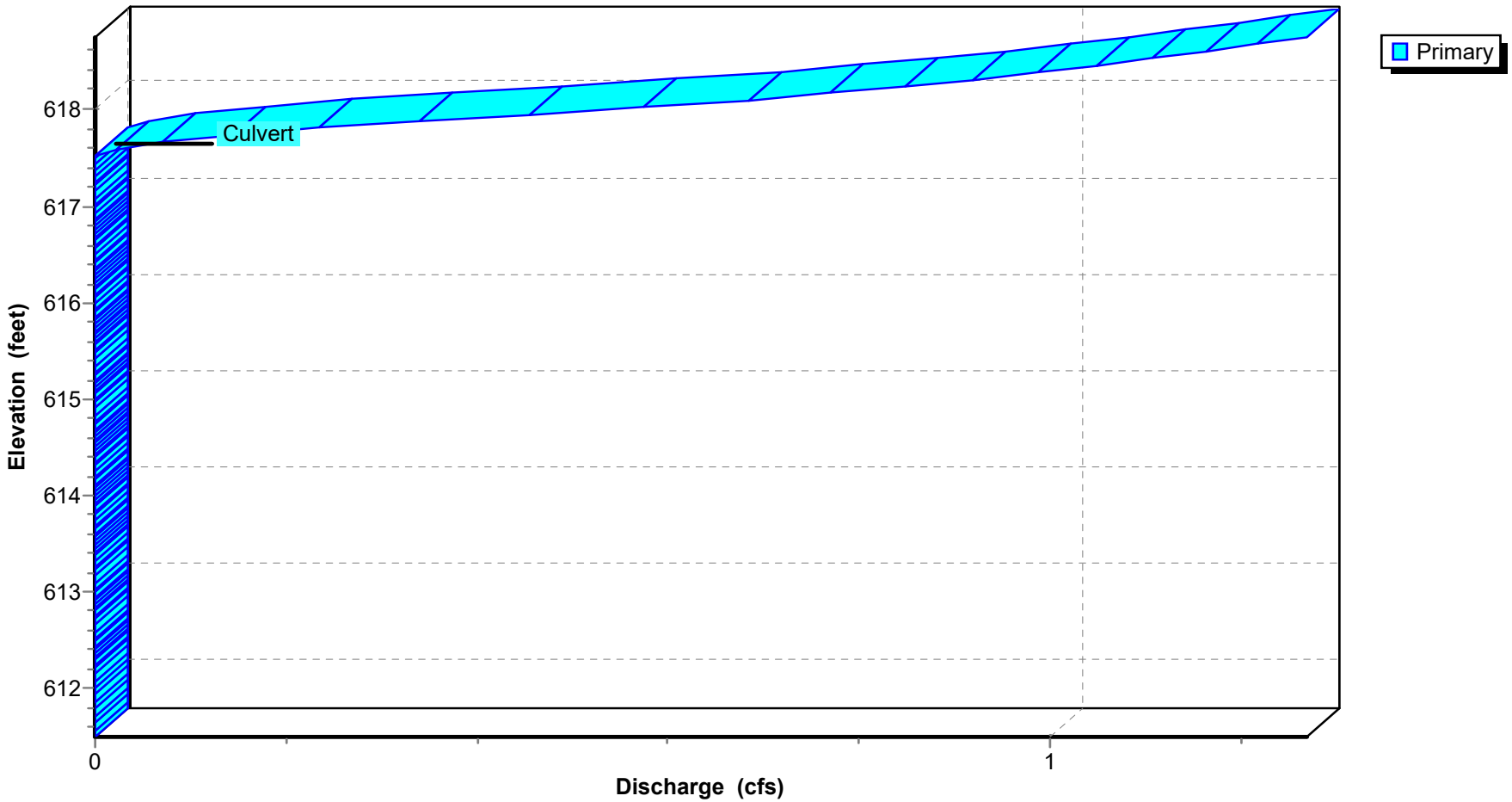


Pond 3P: ROOF INFILTRATION

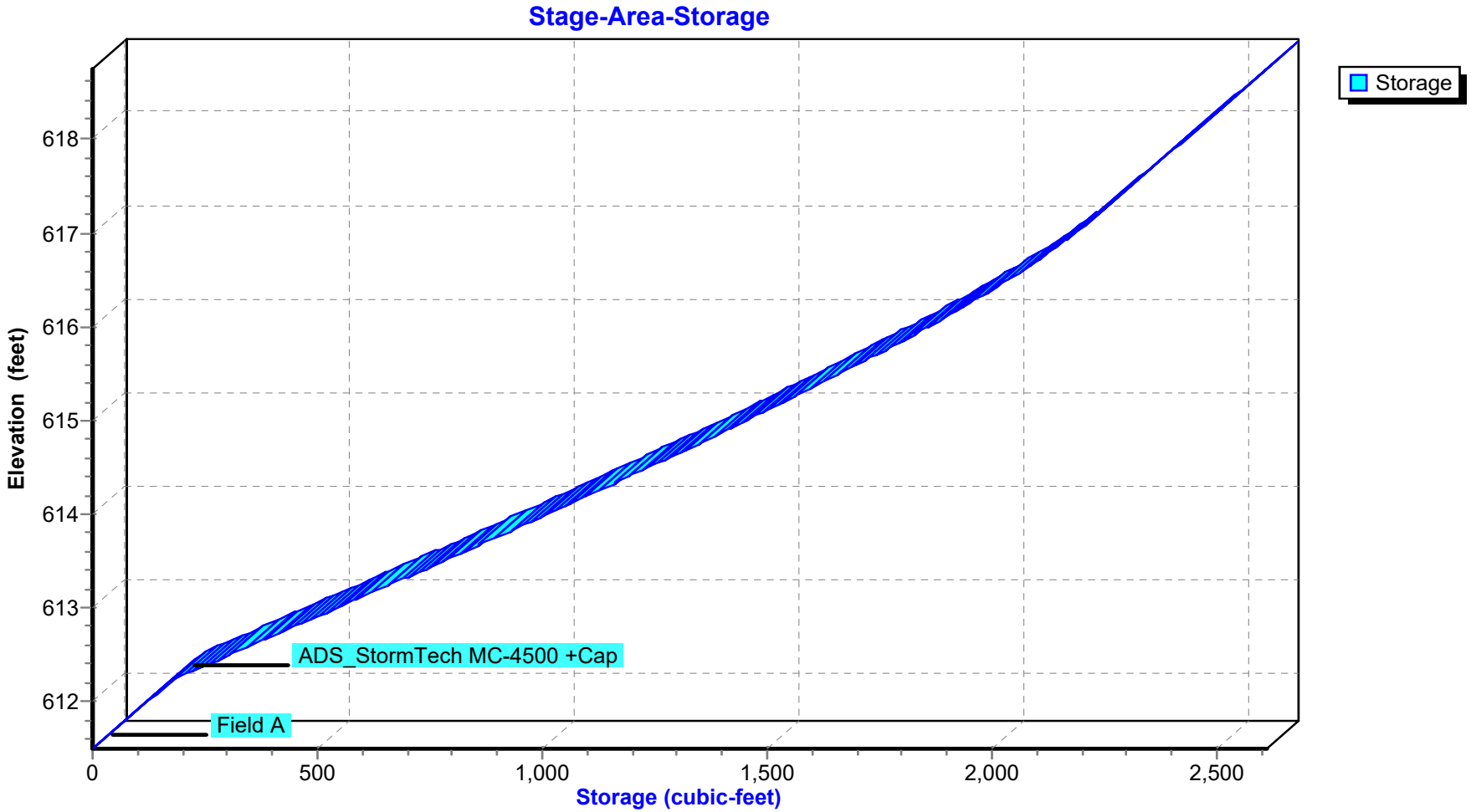


Pond 3P: ROOF INFILTRATION

Stage-Discharge



Pond 3P: ROOF INFILTRATION



Summary for Pond 4P: ROOF INFILTRATION

Inflow Area = 0.328 ac,100.00% Impervious, Inflow Depth > 3.09" for 2-YEAR event
Inflow = 1.06 cfs @ 12.08 hrs, Volume= 0.085 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 615.12' @ 24.00 hrs Surf.Area= 0.059 ac Storage= 0.085 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1A	613.00'	0.084 af	**22.75'W x 113.25'L x 5.50'H Field A** 0.325 af Overall - 0.116 af Embedded = 0.210 af x 40.0% Voids
#2A	613.75'	0.116 af	**ADS_StormTech MC-3500 d +Cap** x 45 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 3 Rows of 15 Chambers Cap Storage= +14.9 cf x 2 x 3 rows = 89.4 cf
		0.200 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	617.00'	**8.0" Round Culvert** L= 33.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 617.00' / 617.00' S= 0.0000 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=613.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)

Pond 4P: ROOF INFILTRATION - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 3 rows = 89.4 cf

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

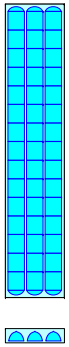
15 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 111.25' Row Length +12.0" End Stone x 2 = 113.25' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

45 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 3 Rows = 5,037.2 cf Chamber Storage

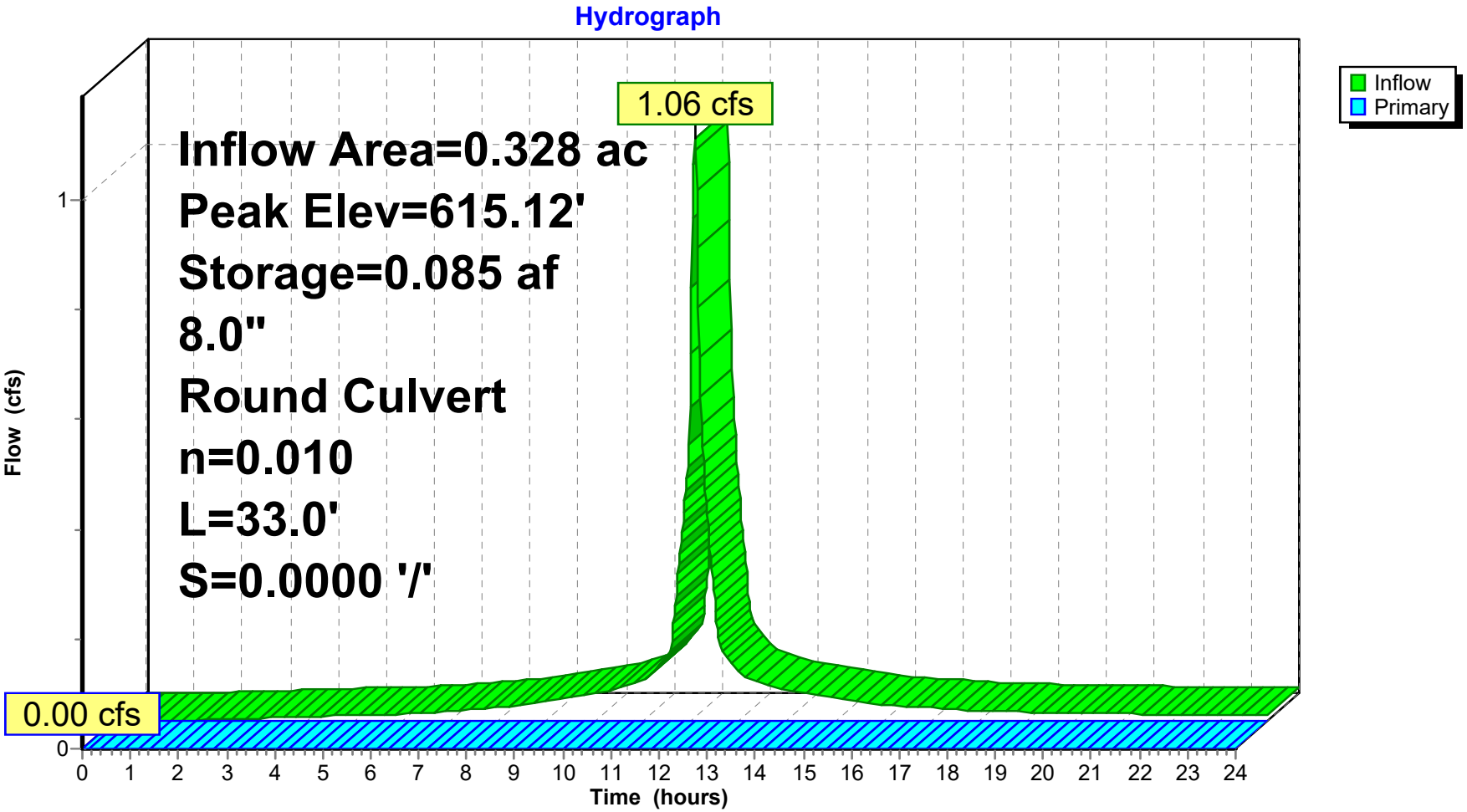
14,170.4 cf Field - 5,037.2 cf Chambers = 9,133.2 cf Stone x 40.0% Voids = 3,653.3 cf Stone Storage

Chamber Storage + Stone Storage = 8,690.5 cf = 0.200 af
Overall Storage Efficiency = 61.3%
Overall System Size = 113.25' x 22.75' x 5.50'

45 Chambers
524.8 cy Field
338.3 cy Stone

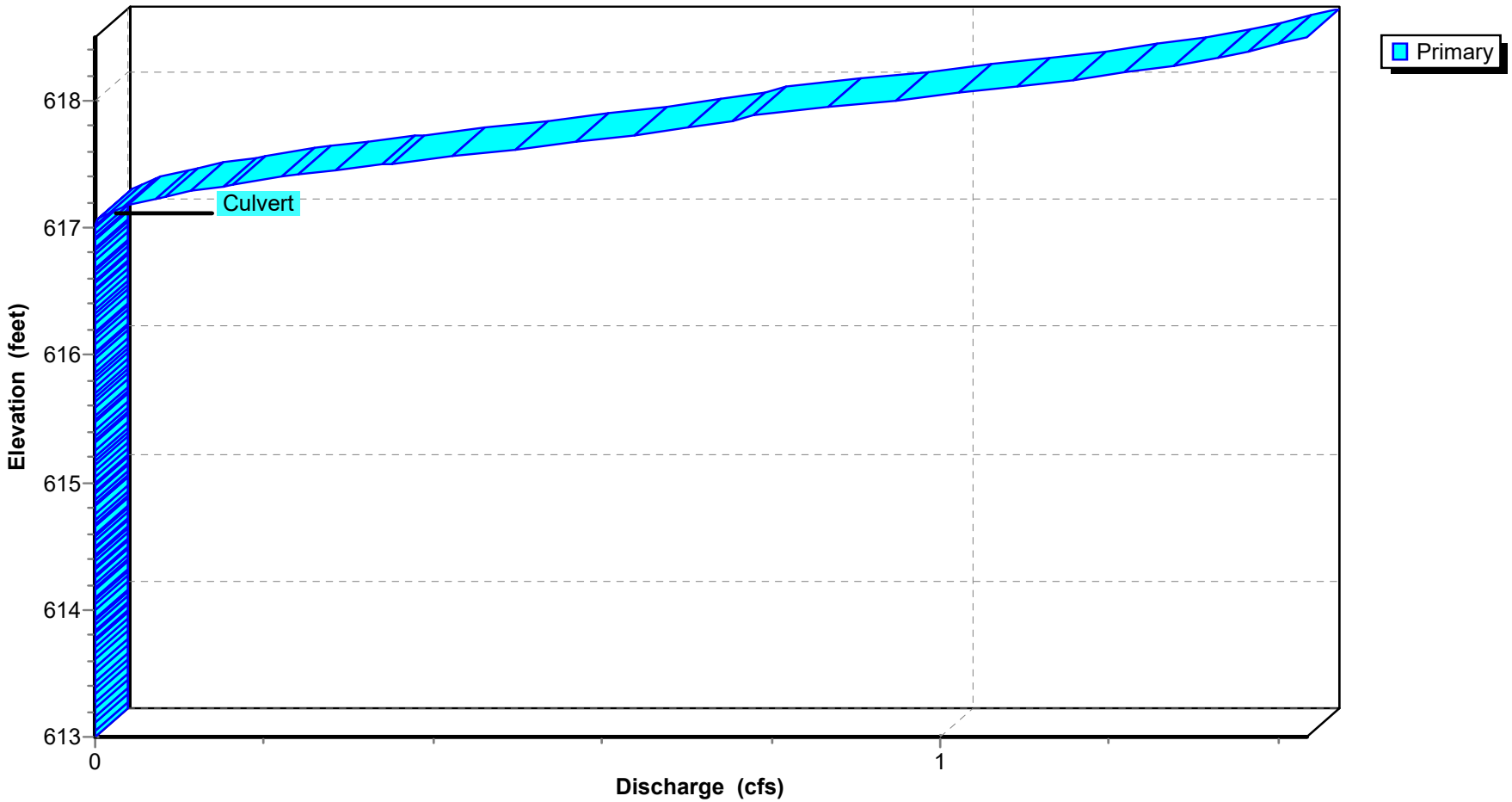


Pond 4P: ROOF INFILTRATION

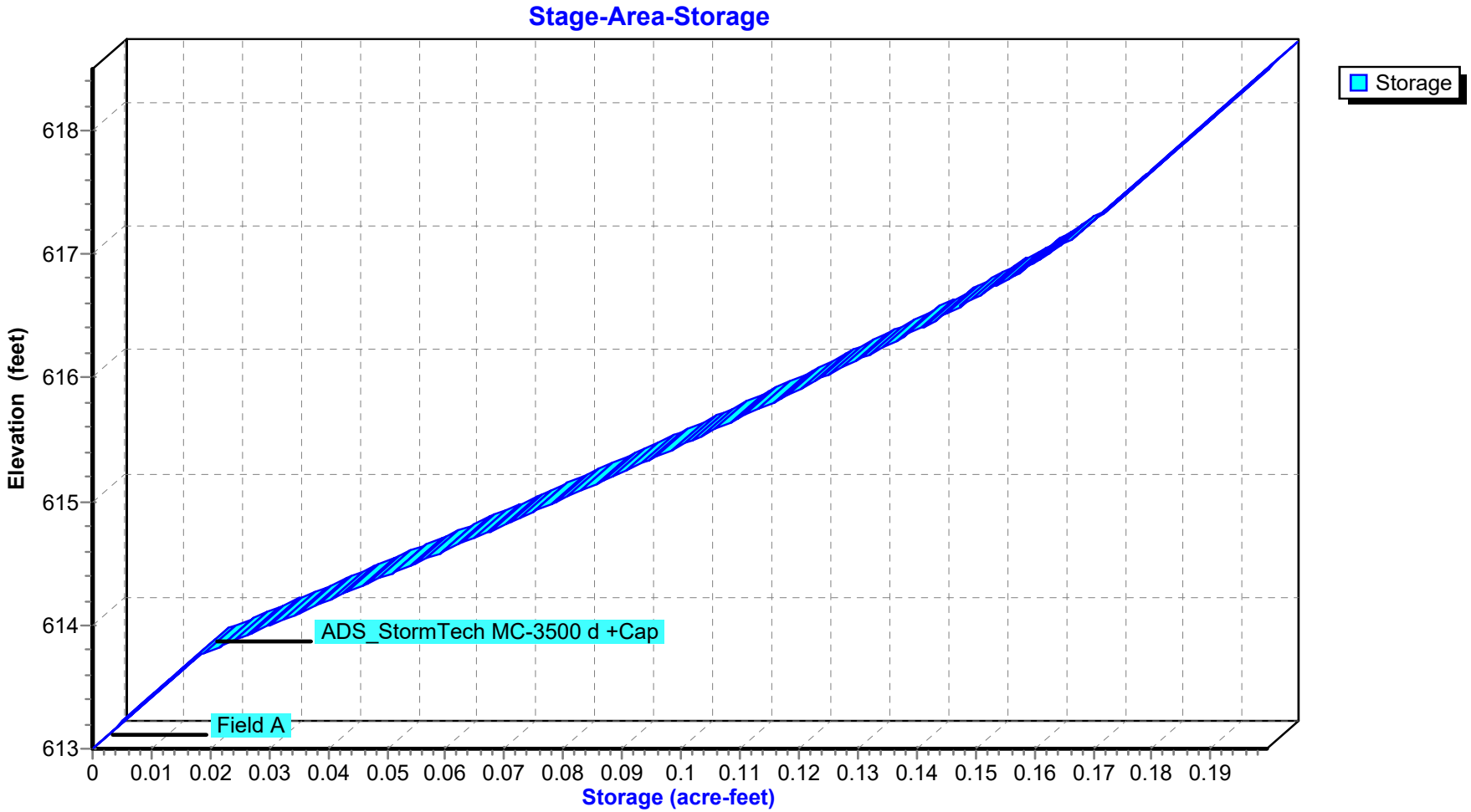


Pond 4P: ROOF INFILTRATION

Stage-Discharge



Pond 4P: ROOF INFILTRATION



Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1: DISCHARGE TO THE WEST Runoff Area=0.140 ac 0.00% Impervious Runoff Depth>1.40"
Tc=6.0 min CN=61 Runoff=0.21 cfs 0.016 af

Subcatchment P2-1: DISCHARGE TO DETENTION BASIN Runoff Area=0.600 ac 48.33% Impervious Runoff Depth>2.84"
Tc=6.0 min CN=79 Runoff=2.00 cfs 0.142 af

Subcatchment P2-2: DISCHARGE TO UNDERGROUND DETENTION Runoff Area=1.140 ac 75.44% Impervious Runoff Depth>3.82"
Tc=6.0 min CN=89 Runoff=4.95 cfs 0.363 af

Subcatchment P2-3: DISCHARGE TO THE EAST Runoff Area=1.250 ac 2.40% Impervious Runoff Depth>1.07"
Tc=6.0 min CN=56 Runoff=1.29 cfs 0.111 af

Subcatchment R4: ROOF - BUILDING #4 Runoff Area=0.099 ac 100.00% Impervious Runoff Depth>4.81"
Tc=6.0 min CN=98 Runoff=0.49 cfs 0.040 af

Subcatchment R5: ROOF - BUILDING #5 Runoff Area=0.118 ac 100.00% Impervious Runoff Depth>4.81"
Tc=6.0 min CN=98 Runoff=0.58 cfs 0.047 af

Subcatchment R6: ROOF - BUILDING #6 Runoff Area=0.090 ac 100.00% Impervious Runoff Depth>4.81"
Tc=6.0 min CN=98 Runoff=0.44 cfs 0.036 af

Subcatchment R7: ROOF - BUILDING #7 Runoff Area=0.120 ac 100.00% Impervious Runoff Depth>4.81"
Tc=6.0 min CN=98 Runoff=0.59 cfs 0.048 af

Reach 2R: TOTAL DISCHARGE TO THE EAST Inflow=2.37 cfs 0.478 af
Outflow=2.37 cfs 0.478 af

Reach 3R: PROPOSED SITE TOTAL DISCHARGE Inflow=2.47 cfs 0.495 af
Outflow=2.47 cfs 0.495 af

Pond 1P: DETENTION BASIN Peak Elev=614.89' Storage=2,704 cf Inflow=2.00 cfs 0.142 af
Outflow=0.55 cfs 0.101 af

Pond 2P: UNDERGROUND DETENTION Peak Elev=615.90' Storage=8,102 cf Inflow=4.95 cfs 0.363 af
Outflow=1.22 cfs 0.267 af

Pond 3P: ROOF INFILTRATION Peak Elev=615.66' Storage=1,728 cf Inflow=0.49 cfs 0.040 af
8.0" Round Culvert n=0.010 L=15.0' S=0.1000 '/' Outflow=0.00 cfs 0.000 af

Pond 4P: ROOF INFILTRATION Peak Elev=616.18' Storage=0.131 af Inflow=1.62 cfs 0.131 af
8.0" Round Culvert n=0.010 L=33.0' S=0.0000 '/' Outflow=0.00 cfs 0.000 af

Total Runoff Area = 3.557 ac Runoff Volume = 0.803 af Average Runoff Depth = 2.71"
54.82% Pervious = 1.950 ac 45.18% Impervious = 1.607 ac

Summary for Subcatchment P1: DISCHARGE TO THE WEST

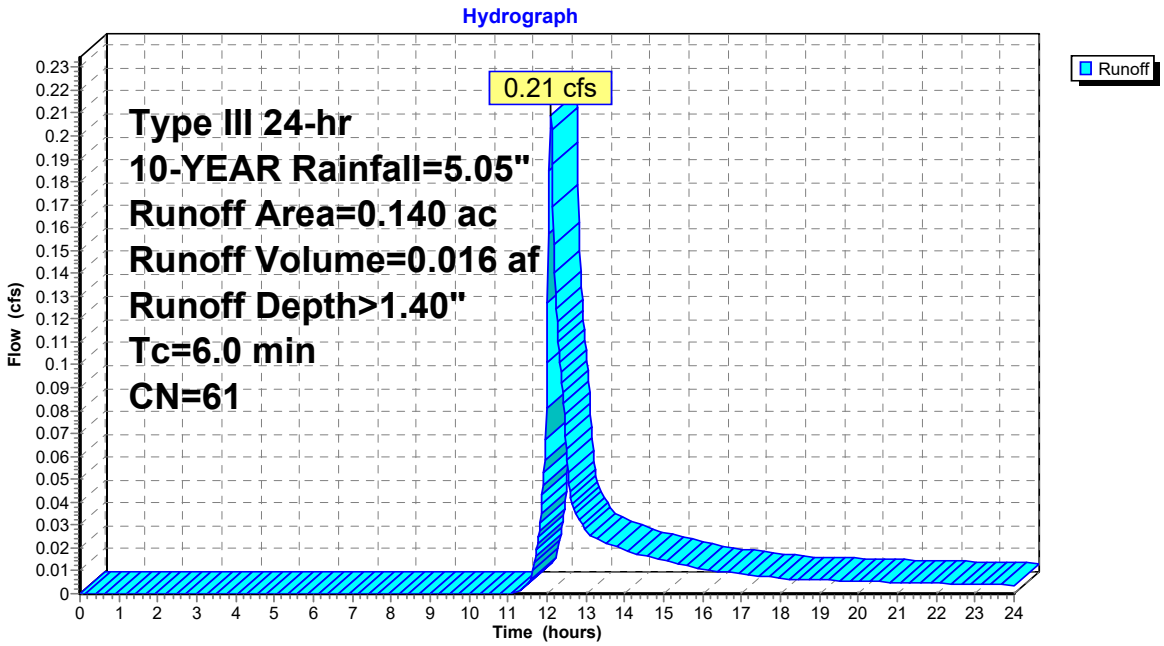
Runoff = 0.21 cfs @ 12.10 hrs, Volume= 0.016 af, Depth> 1.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YEAR Rainfall=5.05"

Area (ac)	CN	Description
0.140	61	>75% Grass cover, Good, HSG B
0.140		100.00% Pervious Area

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

Subcatchment P1: DISCHARGE TO THE WEST



Summary for Subcatchment P2-1: DISCHARGE TO DETENTION BASIN

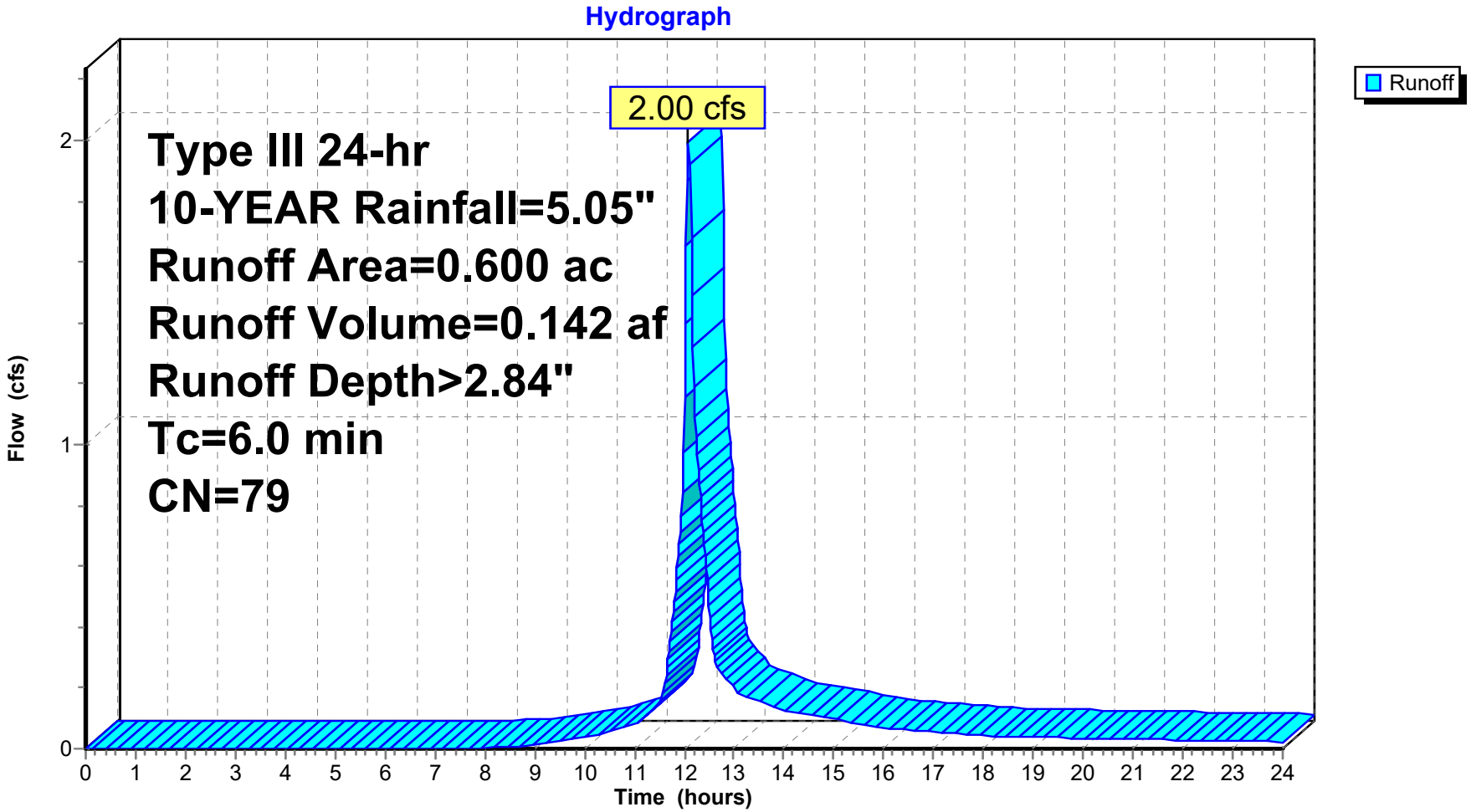
Runoff = 2.00 cfs @ 12.09 hrs, Volume= 0.142 af, Depth> 2.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YEAR Rainfall=5.05"

Area (ac)	CN	Description
0.310	61	>75% Grass cover, Good, HSG B
0.290	98	Paved parking, HSG B
0.600	79	Weighted Average
0.310		51.67% Pervious Area
0.290		48.33% Impervious Area

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

Subcatchment P2-1: DISCHARGE TO DETENTION BASIN



Summary for Subcatchment P2-2: DISCHARGE TO UNDERGROUND DETENTION

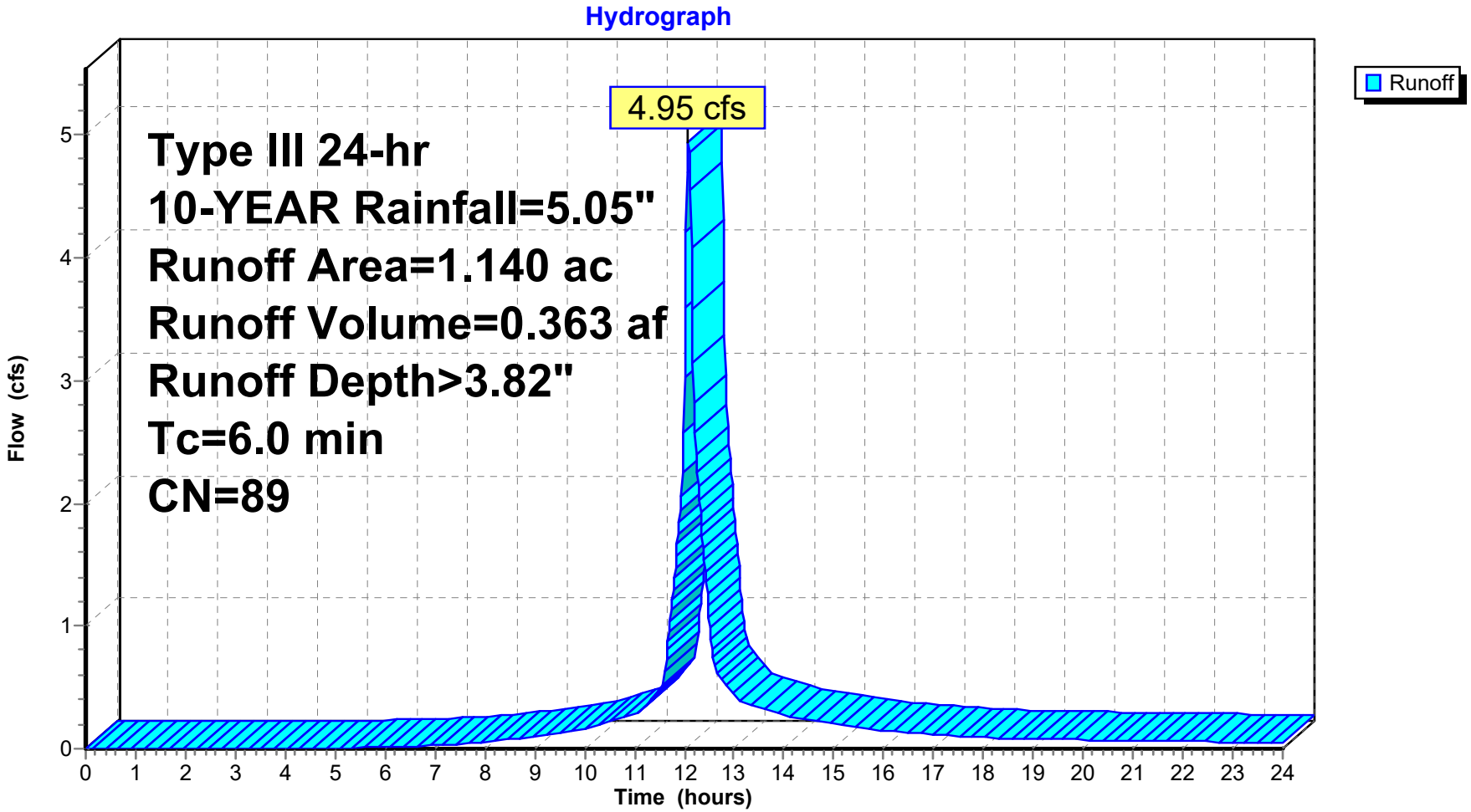
Runoff = 4.95 cfs @ 12.09 hrs, Volume= 0.363 af, Depth> 3.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YEAR Rainfall=5.05"

Area (ac)	CN	Description
0.280	61	>75% Grass cover, Good, HSG B
0.860	98	Paved parking, HSG B
1.140	89	Weighted Average
0.280		24.56% Pervious Area
0.860		75.44% Impervious Area

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

Subcatchment P2-2: DISCHARGE TO UNDERGROUND DETENTION



Summary for Subcatchment P2-3: DISCHARGE TO THE EAST

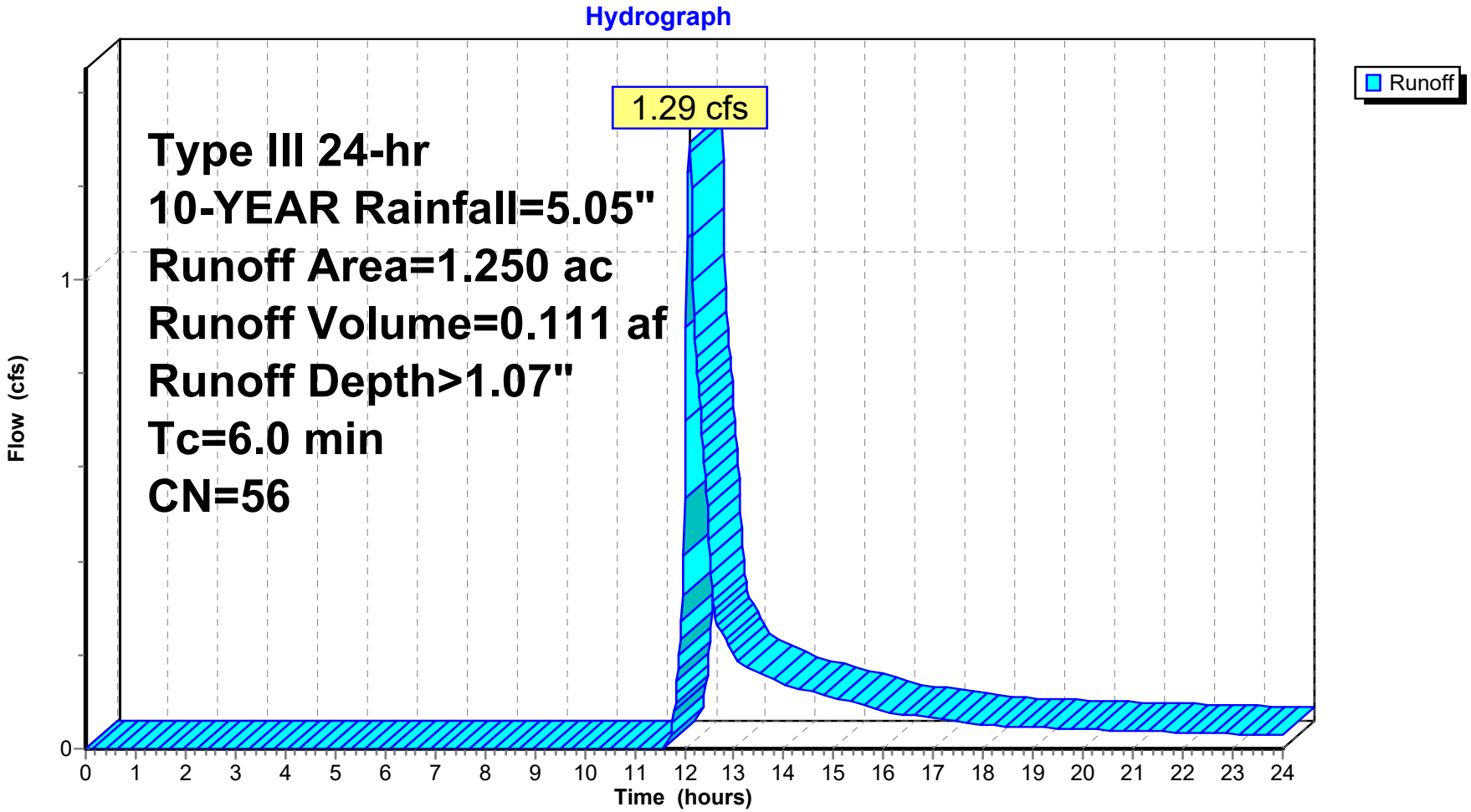
Runoff = 1.29 cfs @ 12.11 hrs, Volume= 0.111 af, Depth> 1.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YEAR Rainfall=5.05"

Area (ac)	CN	Description
0.670	61	>75% Grass cover, Good, HSG B
0.550	48	Brush, Good, HSG B
0.030	98	Paved parking, HSG B
1.250	56	Weighted Average
1.220		97.60% Pervious Area
0.030		2.40% Impervious Area

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

Subcatchment P2-3: DISCHARGE TO THE EAST



Summary for Subcatchment R4: ROOF - BUILDING #4

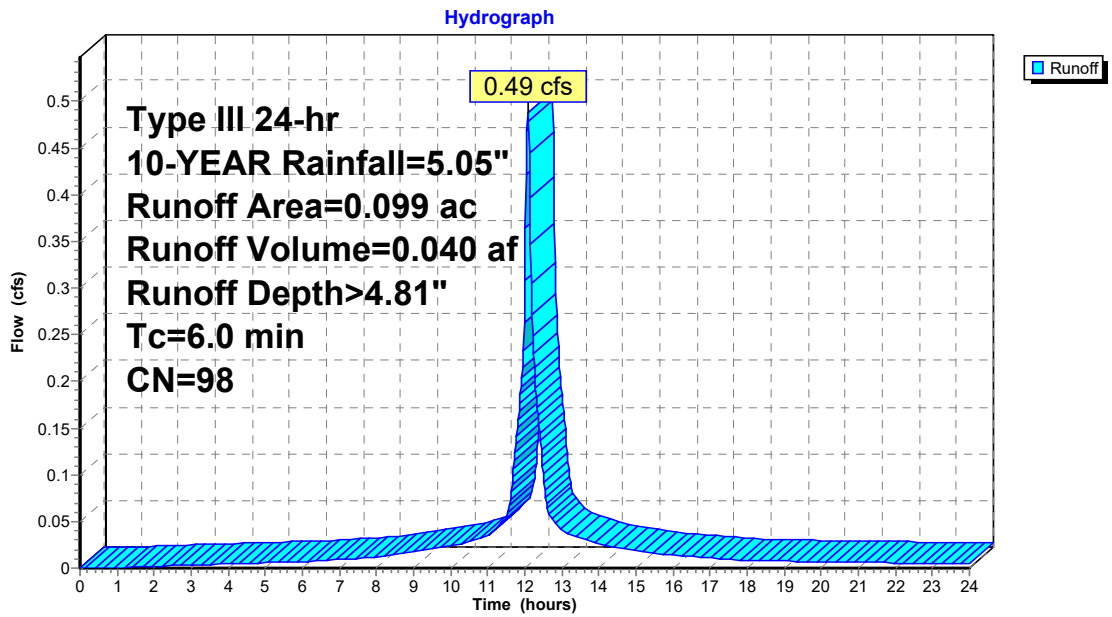
Runoff = 0.49 cfs @ 12.08 hrs, Volume= 0.040 af, Depth> 4.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YEAR Rainfall=5.05"

Area (ac)	CN	Description
0.099	98	Unconnected roofs, HSG B
0.099		100.00% Impervious Area
0.099		100.00% Unconnected

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

Subcatchment R4: ROOF - BUILDING #4



Summary for Subcatchment R5: ROOF - BUILDING #5

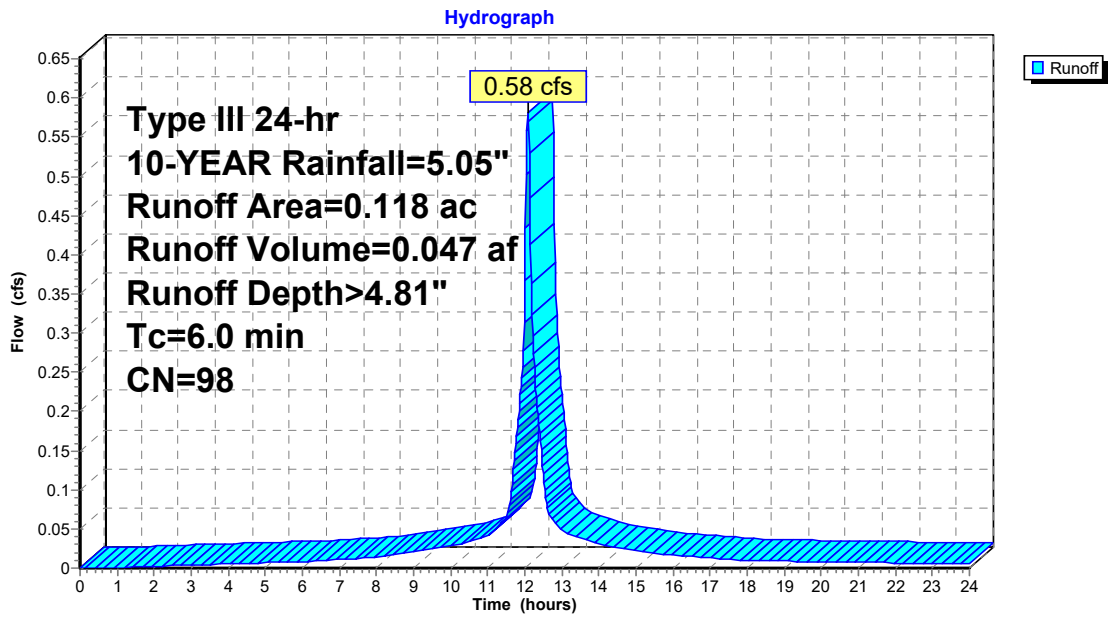
Runoff = 0.58 cfs @ 12.08 hrs, Volume= 0.047 af, Depth> 4.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YEAR Rainfall=5.05"

Area (ac)	CN	Description
0.118	98	Unconnected roofs, HSG B
0.118		100.00% Impervious Area
0.118		100.00% Unconnected

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

Subcatchment R5: ROOF - BUILDING #5



Summary for Subcatchment R6: ROOF - BUILDING #6

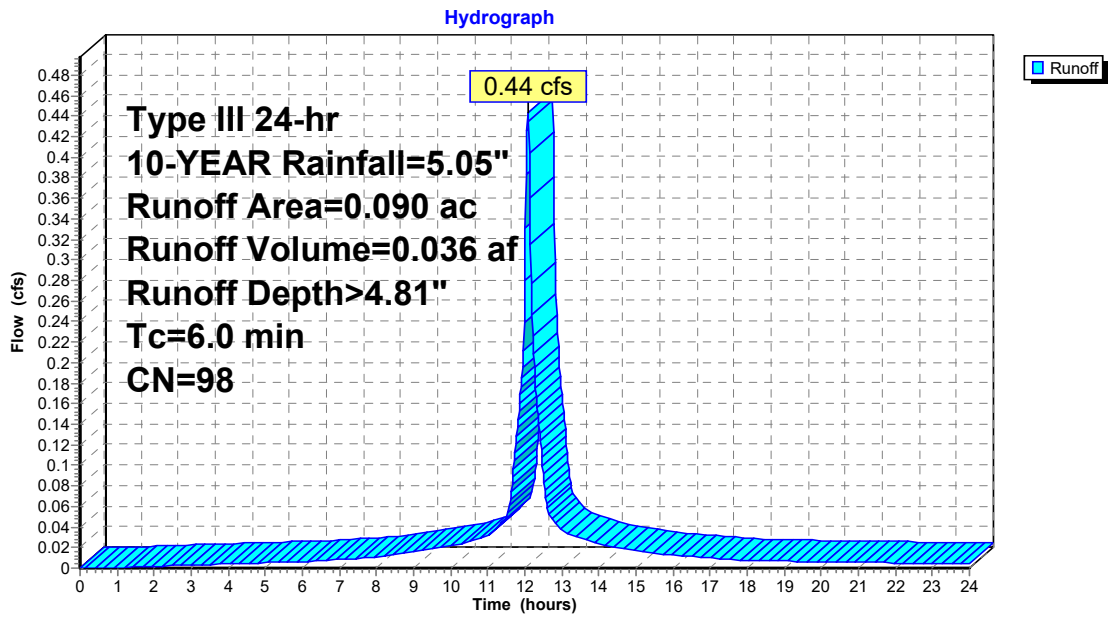
Runoff = 0.44 cfs @ 12.08 hrs, Volume= 0.036 af, Depth> 4.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YEAR Rainfall=5.05"

Area (ac)	CN	Description
0.090	98	Unconnected roofs, HSG B
0.090		100.00% Impervious Area
0.090		100.00% Unconnected

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

Subcatchment R6: ROOF - BUILDING #6



Summary for Subcatchment R7: ROOF - BUILDING #7

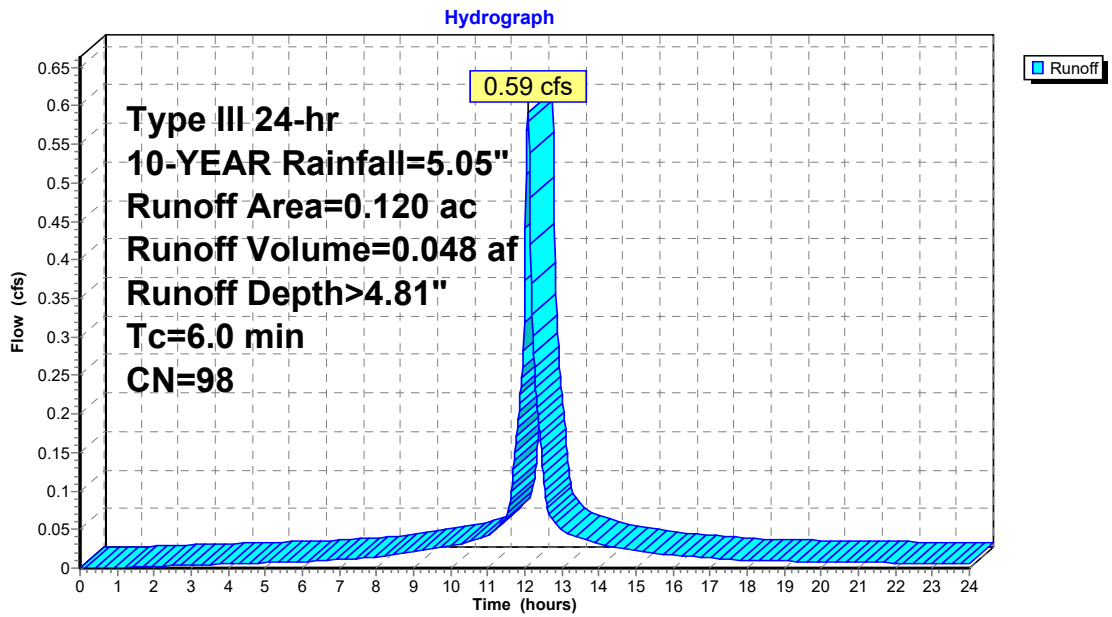
Runoff = 0.59 cfs @ 12.08 hrs, Volume= 0.048 af, Depth> 4.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YEAR Rainfall=5.05"

Area (ac)	CN	Description
0.120	98	Unconnected roofs, HSG B
0.120		100.00% Impervious Area
0.120		100.00% Unconnected

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

Subcatchment R7: ROOF - BUILDING #7



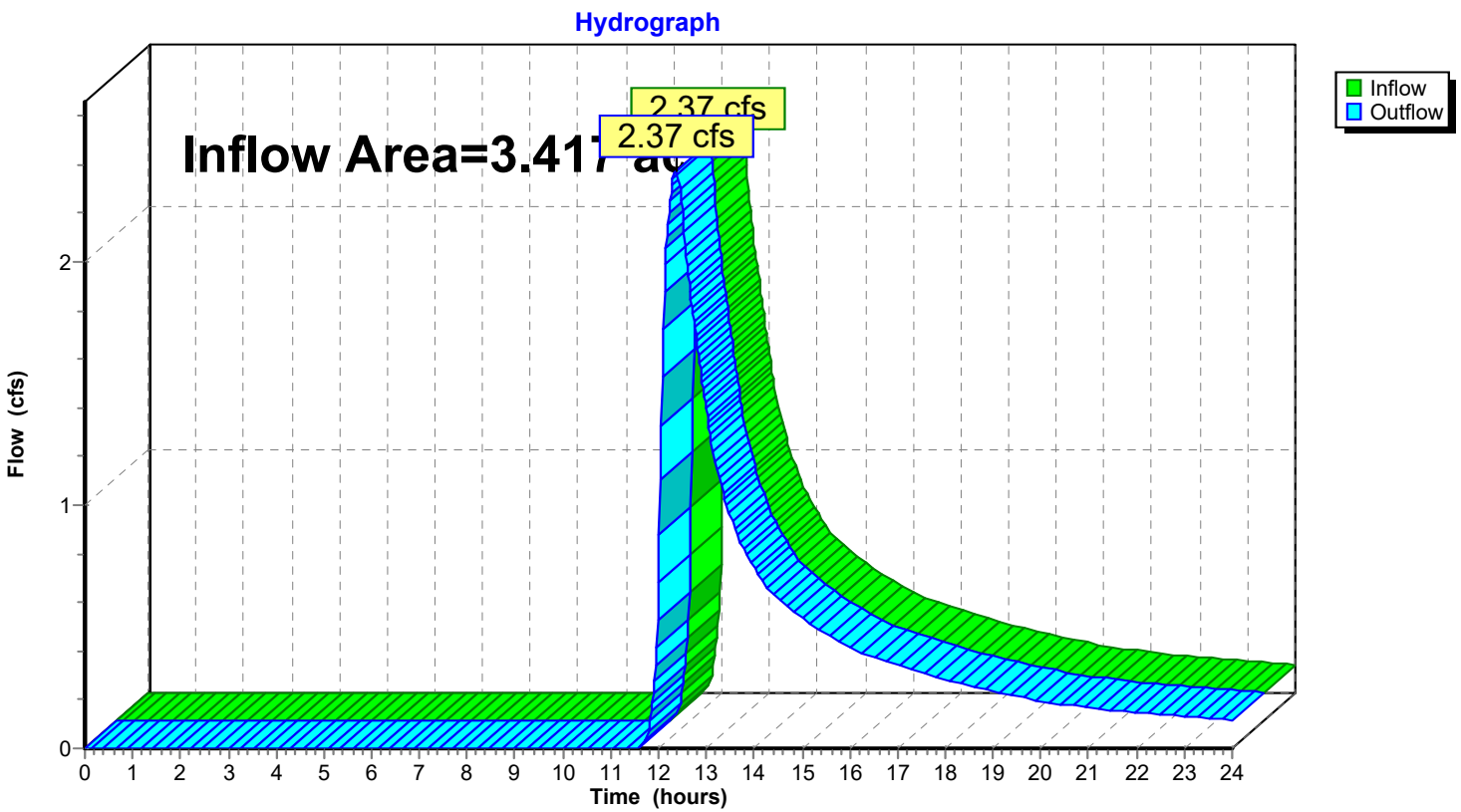
Summary for Reach 2R: TOTAL DISCHARGE TO THE EAST

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.417 ac, 47.03% Impervious, Inflow Depth > 1.68" for 10-YEAR event
Inflow = 2.37 cfs @ 12.36 hrs, Volume= 0.478 af
Outflow = 2.37 cfs @ 12.36 hrs, Volume= 0.478 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 2R: TOTAL DISCHARGE TO THE EAST



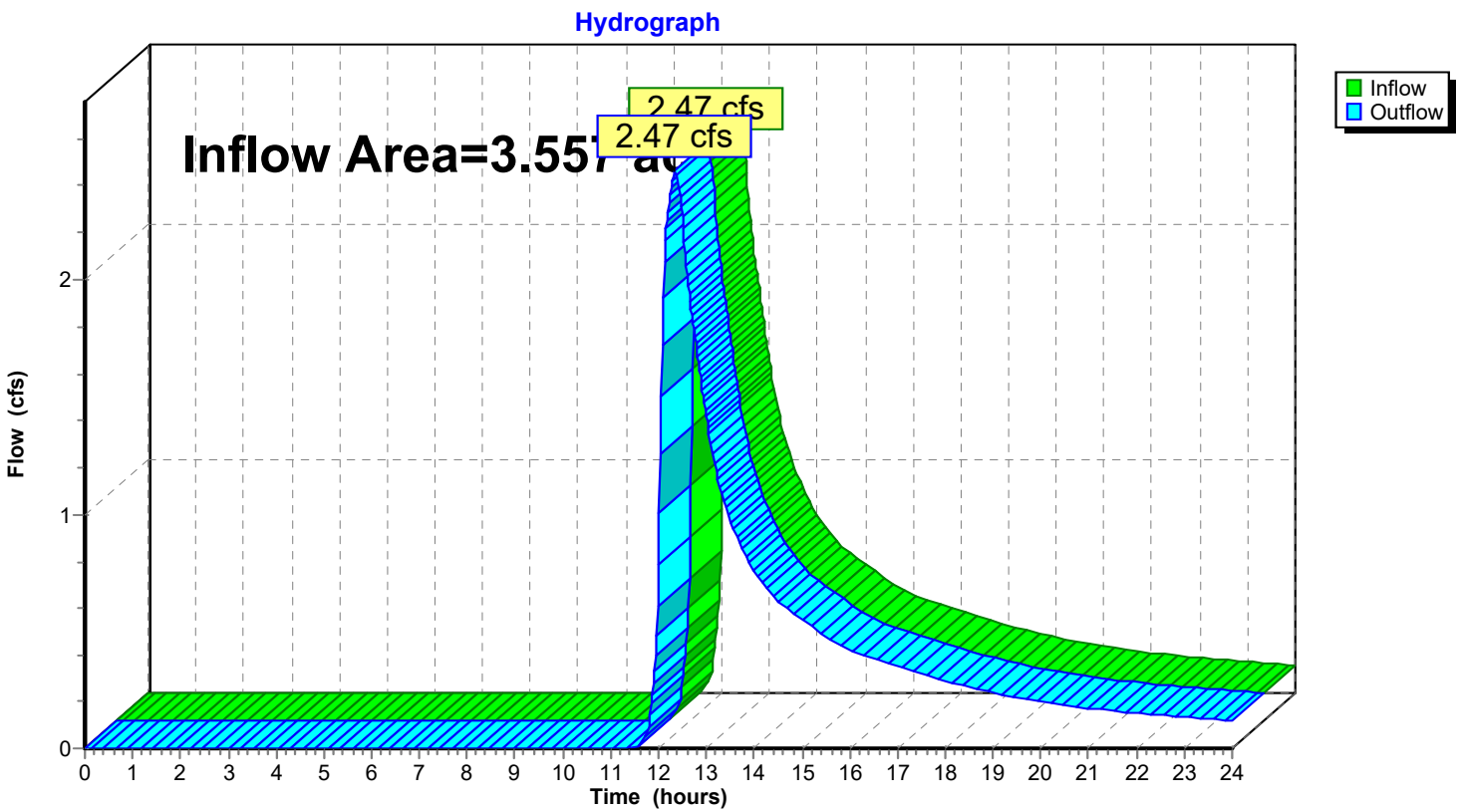
Summary for Reach 3R: PROPOSED SITE TOTAL DISCHARGE

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.557 ac, 45.18% Impervious, Inflow Depth > 1.67" for 10-YEAR event
Inflow = 2.47 cfs @ 12.35 hrs, Volume= 0.495 af
Outflow = 2.47 cfs @ 12.35 hrs, Volume= 0.495 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 3R: PROPOSED SITE TOTAL DISCHARGE



Summary for Pond 1P: DETENTION BASIN

Inflow Area = 0.600 ac, 48.33% Impervious, Inflow Depth > 2.84" for 10-YEAR event
Inflow = 2.00 cfs @ 12.09 hrs, Volume= 0.142 af
Outflow = 0.55 cfs @ 12.46 hrs, Volume= 0.101 af, Atten= 72%, Lag= 22.3 min
Primary = 0.55 cfs @ 12.46 hrs, Volume= 0.101 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 614.89' @ 12.46 hrs Surf.Area= 1,921 sf Storage= 2,704 cf
Flood Elev= 614.94' Surf.Area= 1,948 sf Storage= 2,797 cf

Plug-Flow detention time= 172.5 min calculated for 0.101 af (71% of inflow)
Center-of-Mass det. time= 78.2 min (901.5 - 823.4)

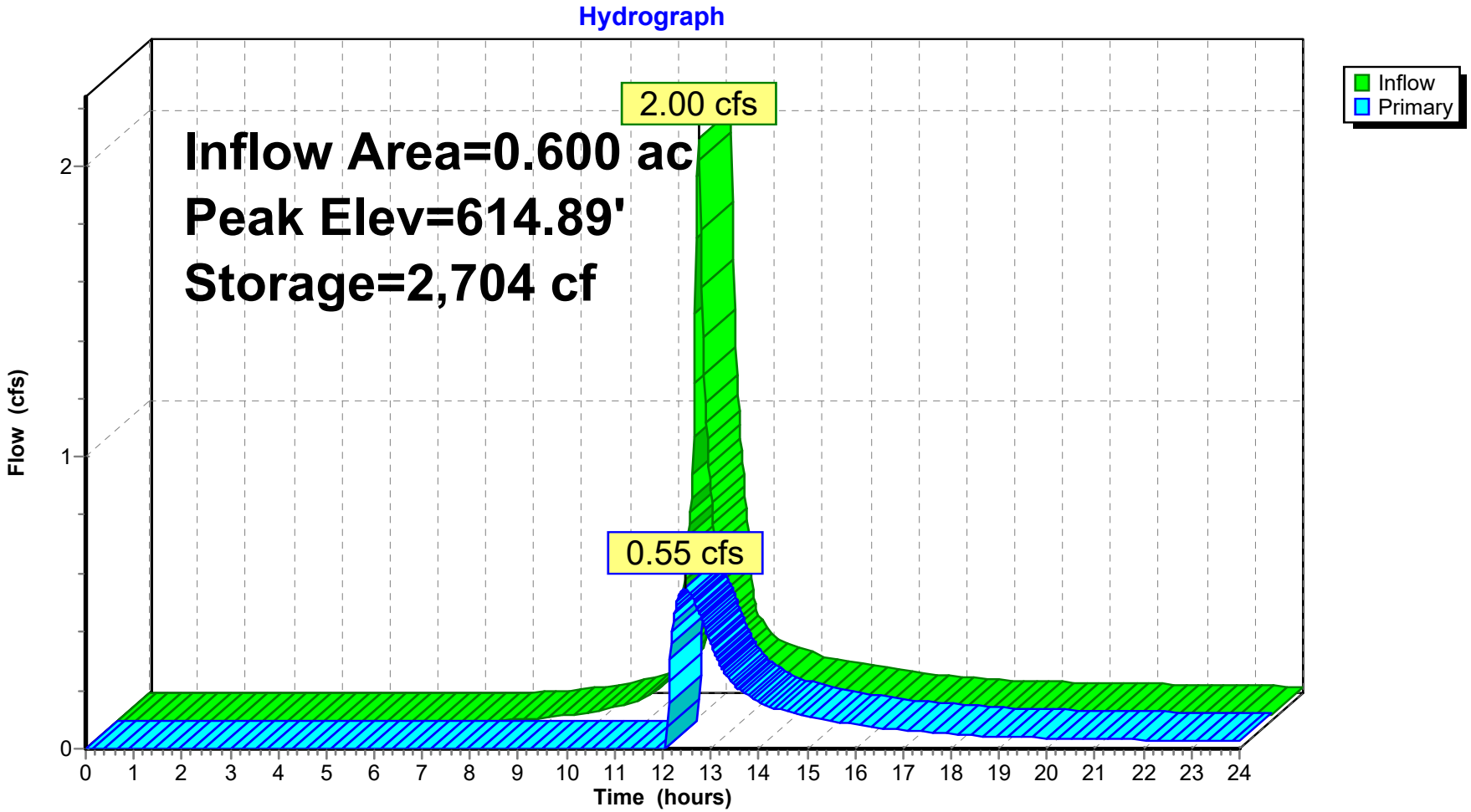
Volume	Invert	Avail.Storage	Storage Description
#1	613.00'	6,621 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
613.00	984	145.0	0	0	984
614.00	1,446	164.0	1,208	1,208	1,476
615.00	1,983	186.0	1,707	2,915	2,113
616.00	2,570	205.0	2,270	5,185	2,736
616.50	3,185	230.0	1,436	6,621	3,608

Device	Routing	Invert	Outlet Devices
#1	Primary	614.05'	**15.0" Round Culvert** L= 105.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 614.05' / 613.00' S= 0.0100 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf
#2	Device 1	614.30'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	616.00'	**15.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

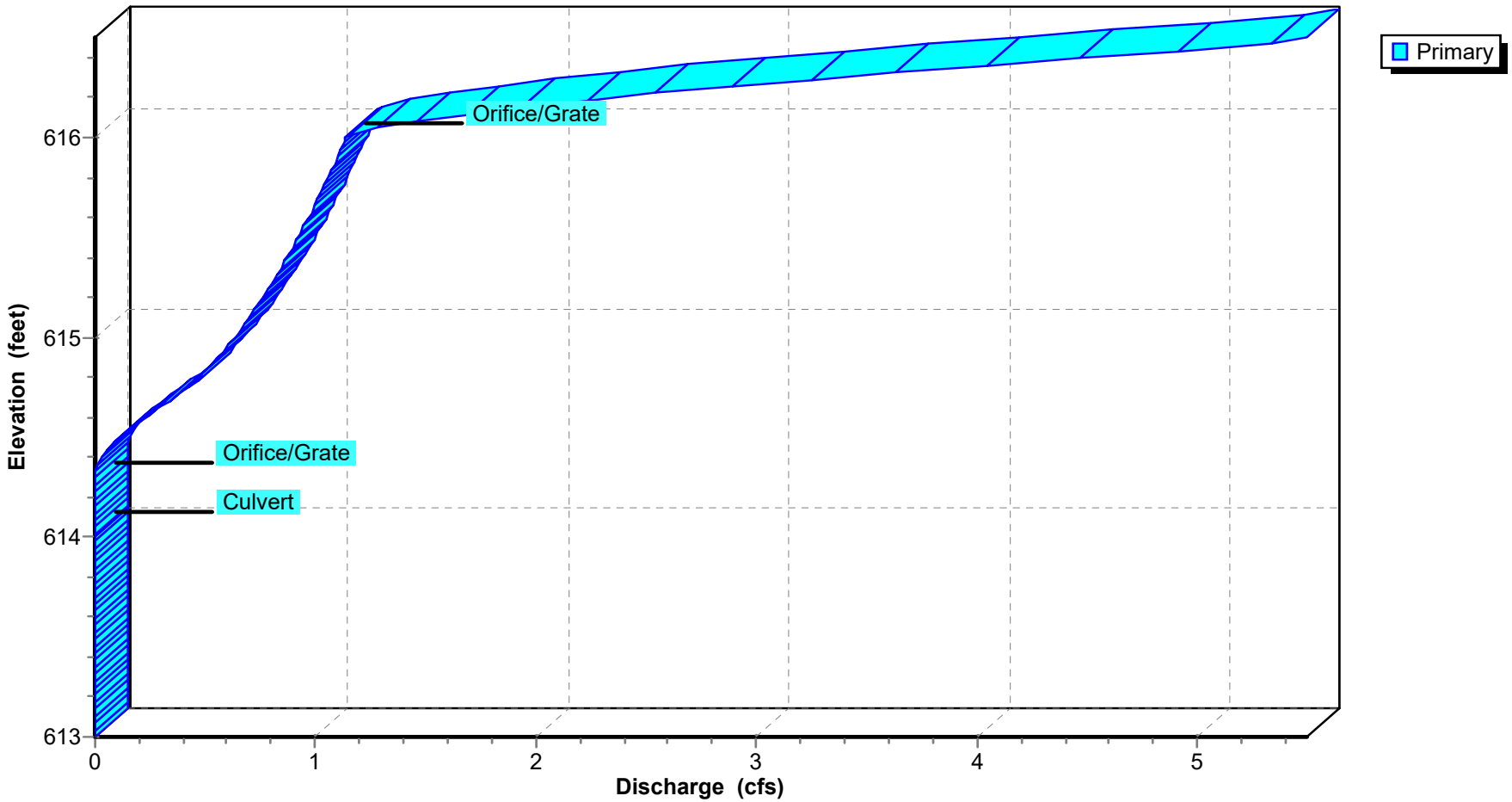
Primary OutFlow Max=0.55 cfs @ 12.46 hrs HW=614.89' (Free Discharge)
└─**1=Culvert** (Passes 0.55 cfs of 2.74 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.55 cfs @ 2.81 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: DETENTION BASIN

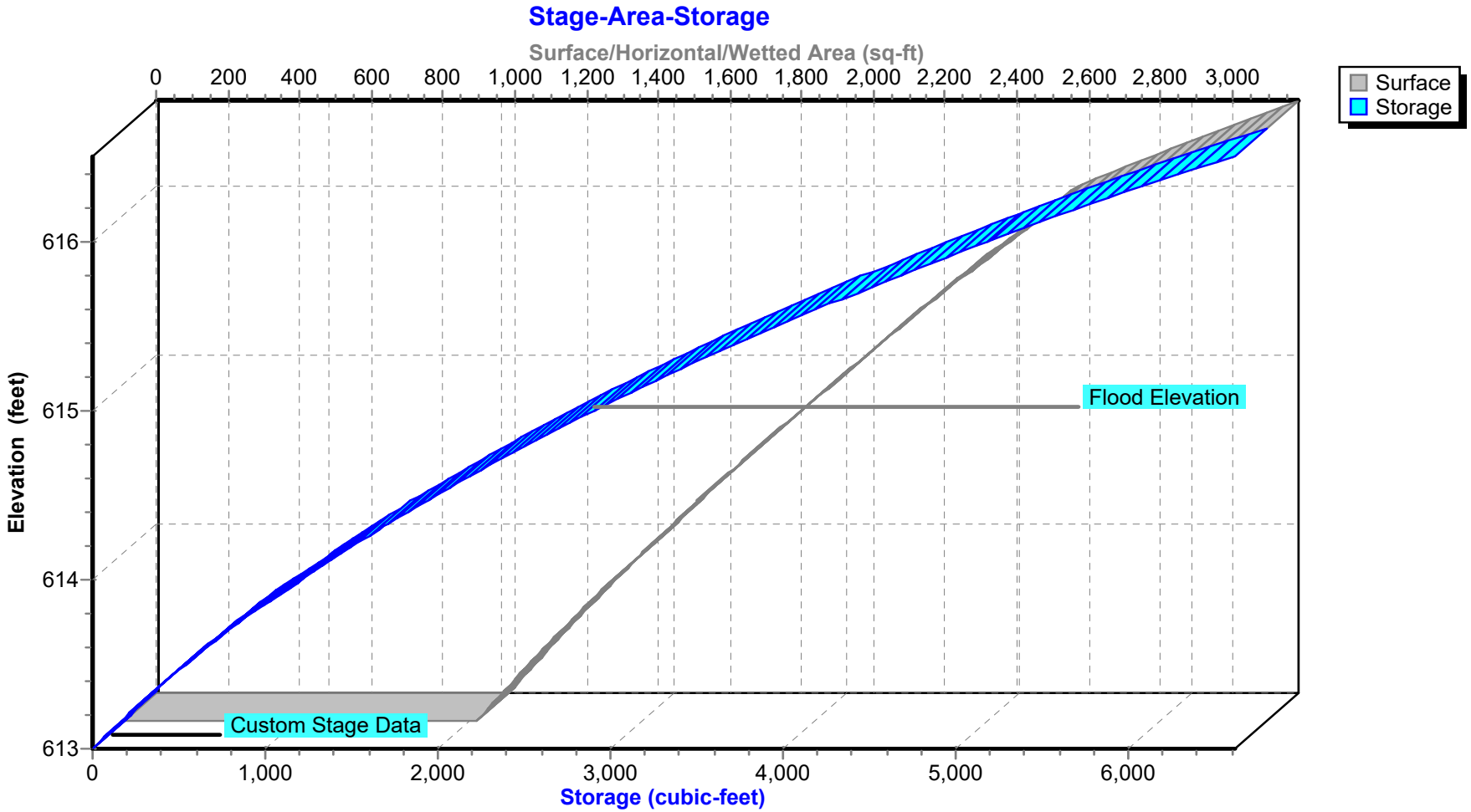


Pond 1P: DETENTION BASIN

Stage-Discharge



Pond 1P: DETENTION BASIN



Summary for Pond 2P: UNDERGROUND DETENTION

Inflow Area = 1.468 ac, 80.93% Impervious, Inflow Depth > 2.96" for 10-YEAR event
Inflow = 4.95 cfs @ 12.09 hrs, Volume= 0.363 af
Outflow = 1.22 cfs @ 12.47 hrs, Volume= 0.267 af, Atten= 75%, Lag= 23.0 min
Primary = 1.22 cfs @ 12.47 hrs, Volume= 0.267 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 615.90' @ 12.47 hrs Surf.Area= 5,913 sf Storage= 8,102 cf

Plug-Flow detention time= 210.8 min calculated for 0.267 af (74% of inflow)
Center-of-Mass det. time= 124.6 min (918.1 - 793.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	613.75'	6,633 cf	**36.50'W x 162.00'L x 4.00'H Field A** 23,652 cf Overall - 7,069 cf Embedded = 16,583 cf x 40.0% Voids
#2A	614.25'	7,069 cf	**CMP Round 30** x 72 Inside #1 Effective Size= 30.0"W x 30.0"H => 4.91 sf x 20.00'L = 98.2 cf Overall Size= 30.0"W x 30.0"H x 20.00'L 9 Rows of 8 Chambers
#3	614.25'	31 cf	**15.0" Round Pipe Storage** L= 25.0'
		13,733 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	613.75'	**15.0" Round Culvert** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 613.25' / 613.75' S= -0.0278 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf
#2	Device 1	614.86'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	615.33'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	617.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.22 cfs @ 12.47 hrs HW=615.90' (Free Discharge)
└─**1=Culvert** (Passes 1.22 cfs of 7.31 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.39 cfs @ 4.51 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.82 cfs @ 2.58 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: UNDERGROUND DETENTION - Chamber Wizard Field A

Chamber Model = CMP Round 30 (Round Corrugated Metal Pipe)
Effective Size= 30.0"W x 30.0"H => 4.91 sf x 20.00'L = 98.2 cf
Overall Size= 30.0"W x 30.0"H x 20.00'L

30.0" Wide + 18.0" Spacing = 48.0" C-C Row Spacing

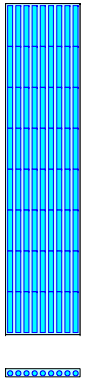
8 Chambers/Row x 20.00' Long = 160.00' Row Length +12.0" End Stone x 2 = 162.00' Base Length
9 Rows x 30.0" Wide + 18.0" Spacing x 8 + 12.0" Side Stone x 2 = 36.50' Base Width
6.0" Base + 30.0" Chamber Height + 12.0" Cover = 4.00' Field Height

72 Chambers x 98.2 cf = 7,068.6 cf Chamber Storage

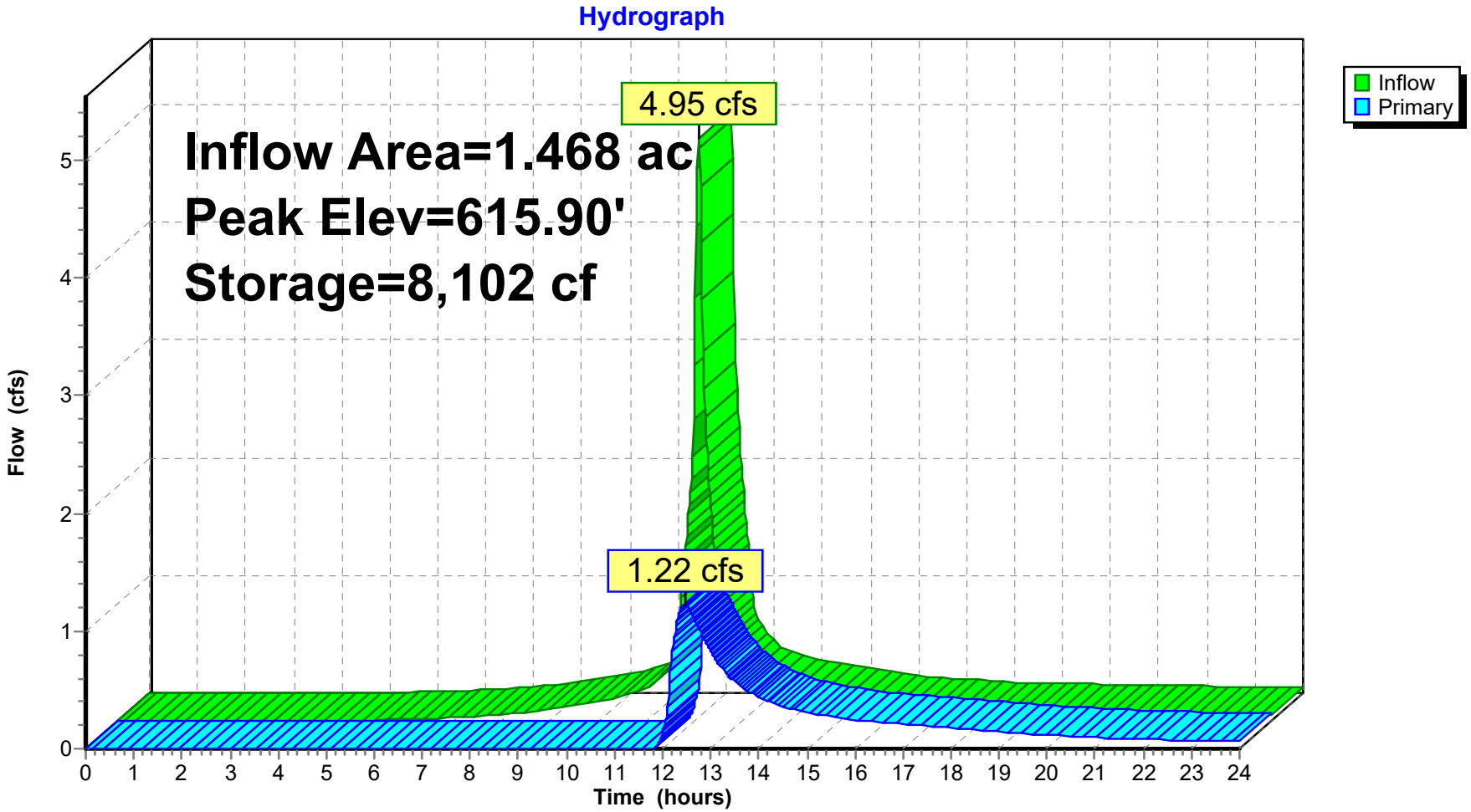
23,652.0 cf Field - 7,068.6 cf Chambers = 16,583.4 cf Stone x 40.0% Voids = 6,633.4 cf Stone Storage

Chamber Storage + Stone Storage = 13,702.0 cf = 0.315 af
Overall Storage Efficiency = 57.9%
Overall System Size = 162.00' x 36.50' x 4.00'

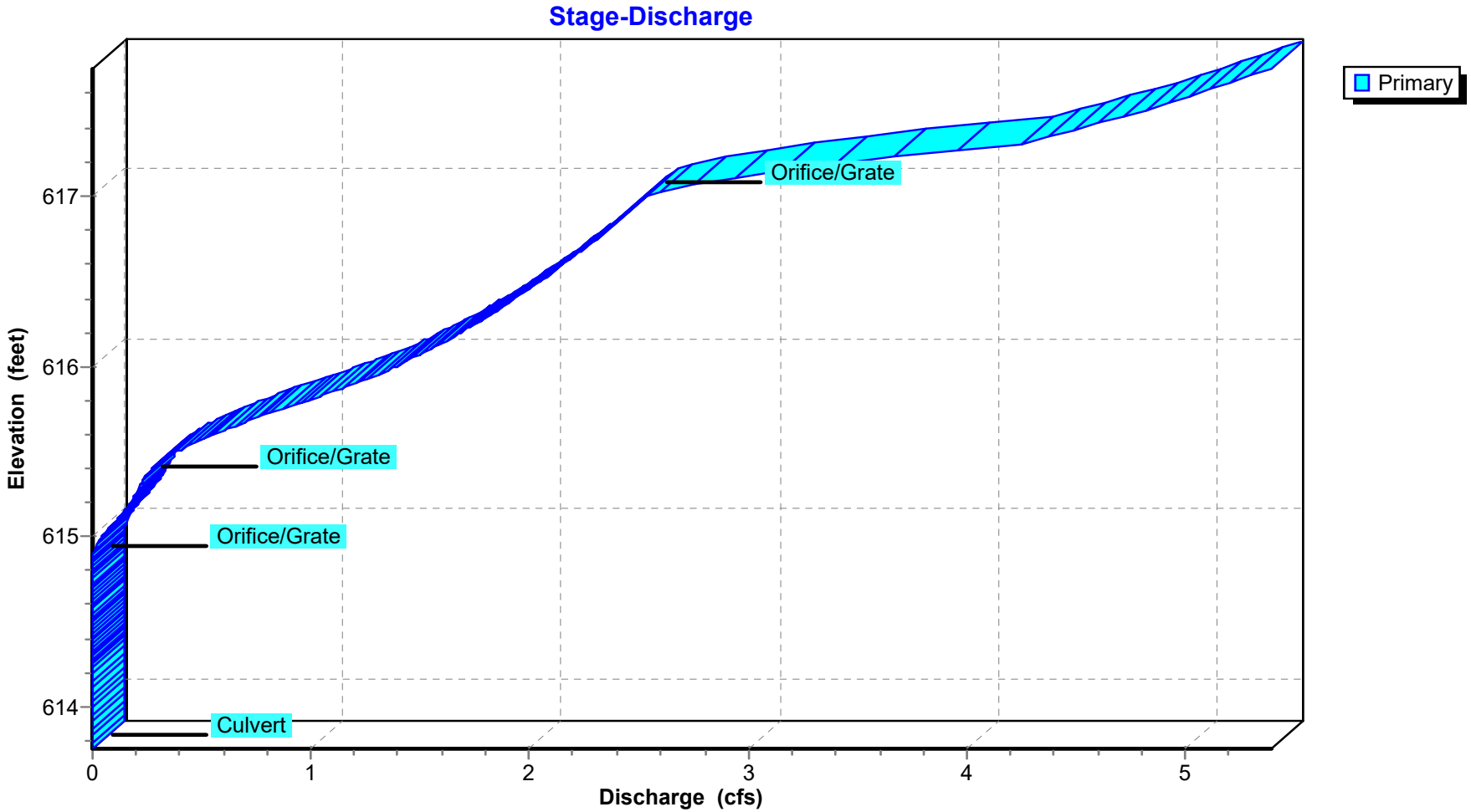
72 Chambers
876.0 cy Field
614.2 cy Stone



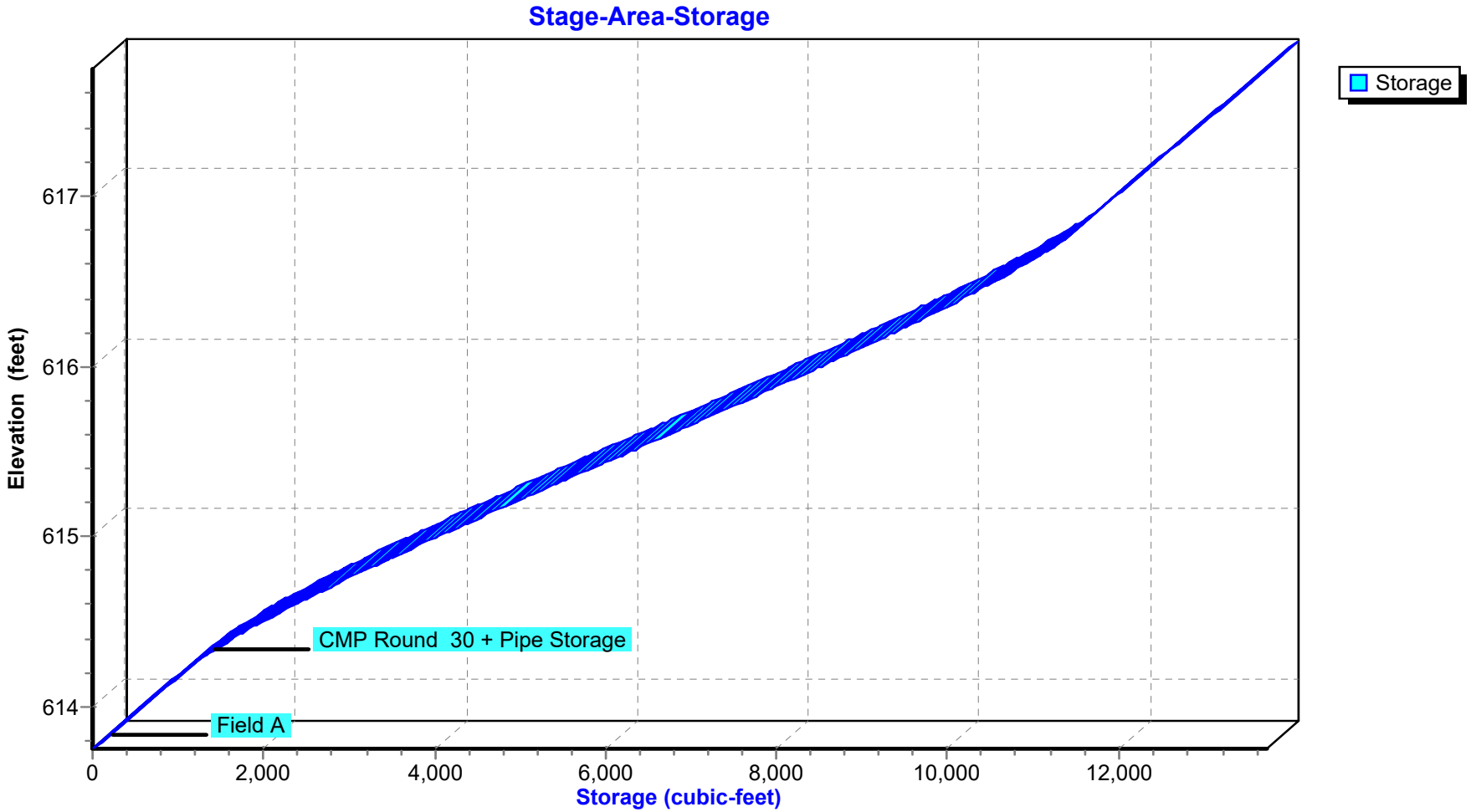
Pond 2P: UNDERGROUND DETENTION



Pond 2P: UNDERGROUND DETENTION



Pond 2P: UNDERGROUND DETENTION



Summary for Pond 3P: ROOF INFILTRATION

Inflow Area = 0.099 ac,100.00% Impervious, Inflow Depth > 4.81" for 10-YEAR event
Inflow = 0.49 cfs @ 12.08 hrs, Volume= 0.040 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 615.66' @ 24.00 hrs Surf.Area= 607 sf Storage= 1,728 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1A	611.50'	1,192 cf	**19.42'W x 31.27'L x 7.25'H Field A** 4,401 cf Overall - 1,421 cf Embedded = 2,981 cf x 40.0% Voids
#2A	612.25'	1,421 cf	**ADS_StormTech MC-4500 +Cap** x 12 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 2 Rows of 6 Chambers Cap Storage= +35.7 cf x 2 x 2 rows = 142.8 cf
		2,613 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	617.50'	**8.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 617.50' / 616.00' S= 0.1000 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=611.50' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)

Pond 3P: ROOF INFILTRATION - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-4500 +Cap (ADS StormTech® MC-4500 with cap volume)
Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf
Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap
Cap Storage= +35.7 cf x 2 x 2 rows = 142.8 cf

100.0" Wide + 9.0" Spacing = 109.0" C-C Row Spacing

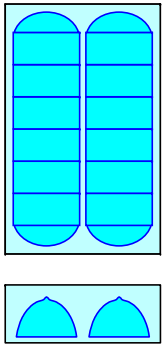
6 Chambers/Row x 4.02' Long +2.56' Cap Length x 2 = 29.27' Row Length +12.0" End Stone x 2 = 31.27' Base Length
2 Rows x 100.0" Wide + 9.0" Spacing x 1 + 12.0" Side Stone x 2 = 19.42' Base Width
9.0" Base + 60.0" Chamber Height + 18.0" Cover = 7.25' Field Height

12 Chambers x 106.5 cf + 35.7 cf Cap Volume x 2 x 2 Rows = 1,420.7 cf Chamber Storage

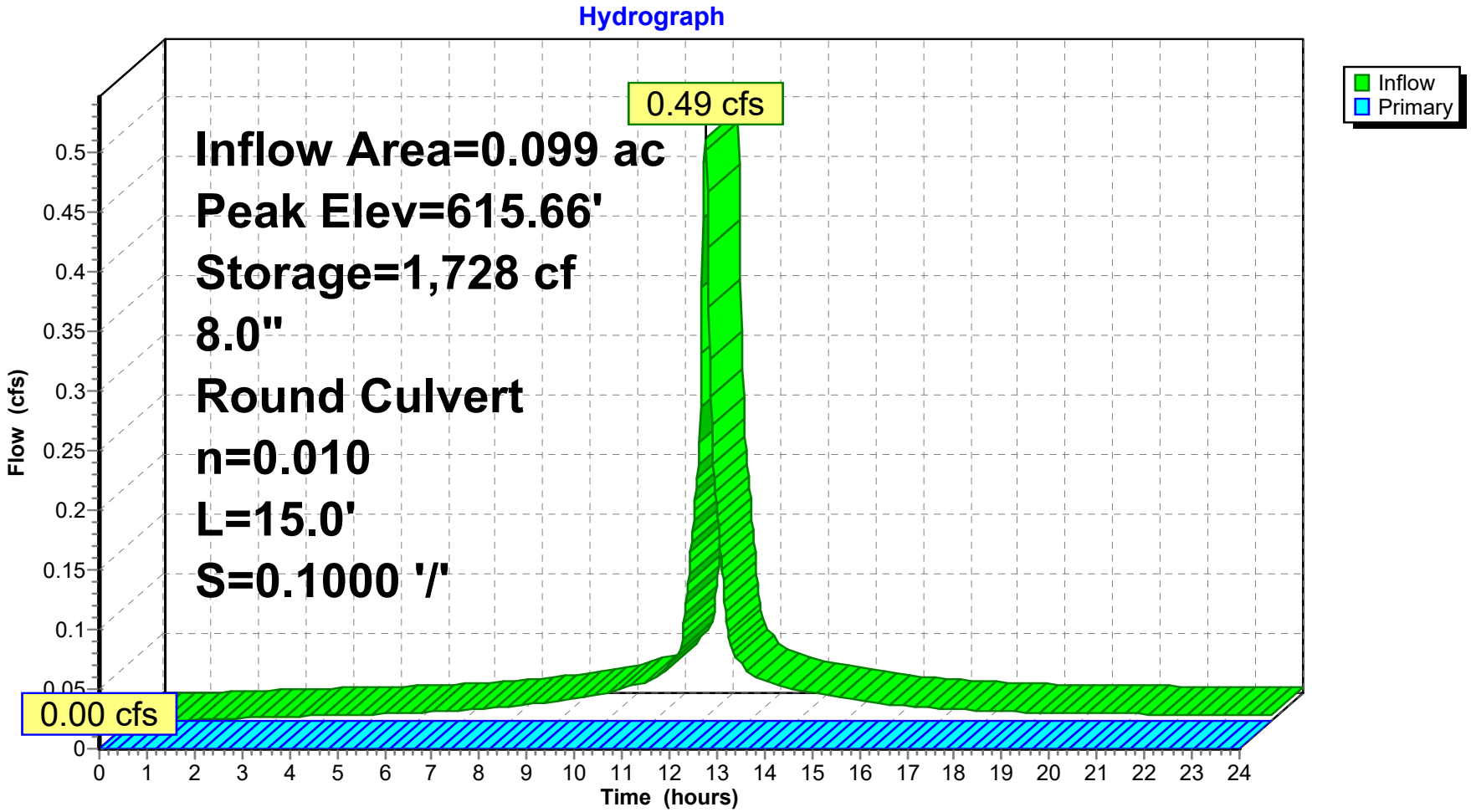
4,401.4 cf Field - 1,420.7 cf Chambers = 2,980.7 cf Stone x 40.0% Voids = 1,192.3 cf Stone Storage

Chamber Storage + Stone Storage = 2,613.0 cf = 0.060 af
Overall Storage Efficiency = 59.4%
Overall System Size = 31.27' x 19.42' x 7.25'

12 Chambers
163.0 cy Field
110.4 cy Stone

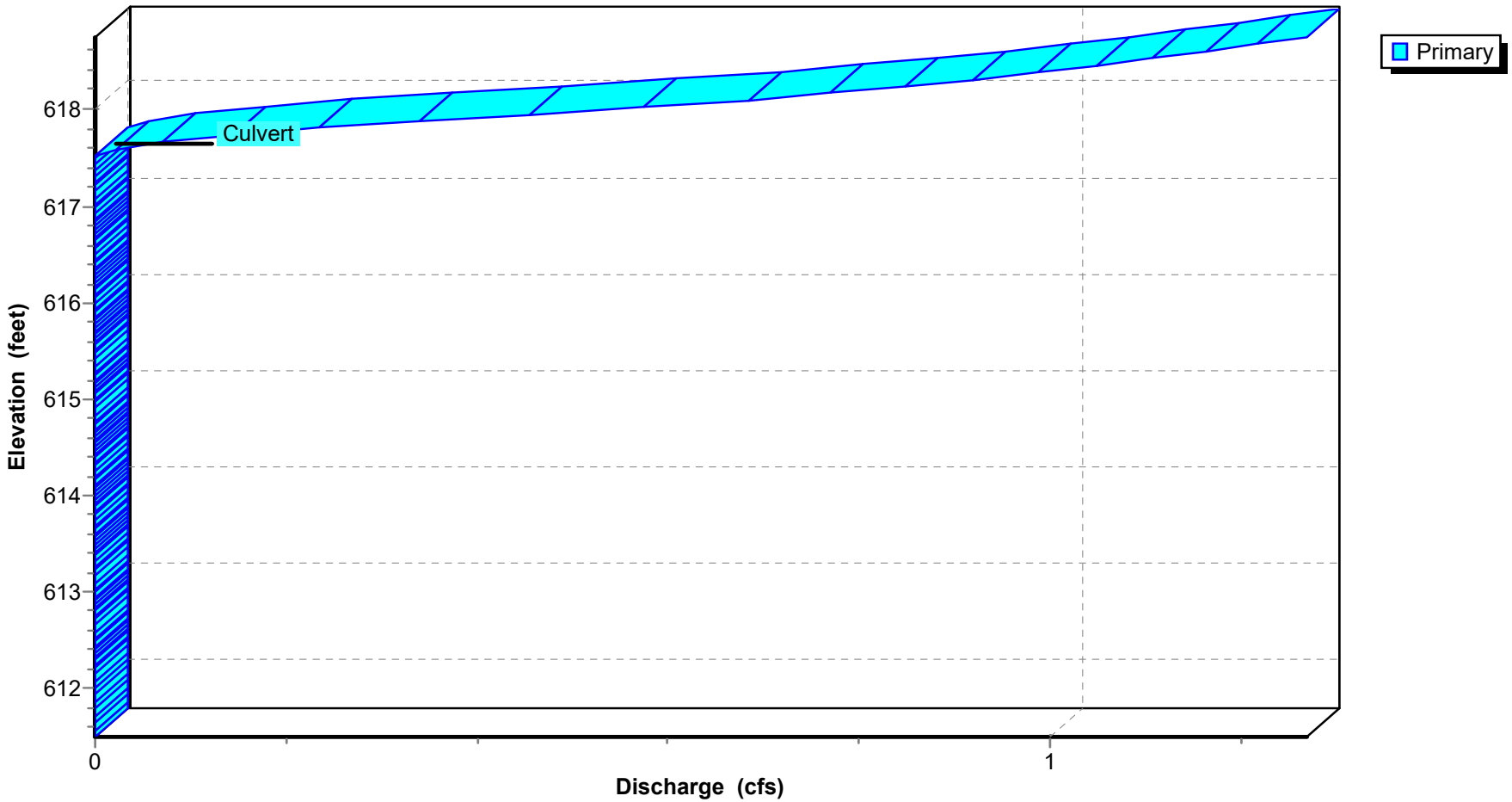


Pond 3P: ROOF INFILTRATION

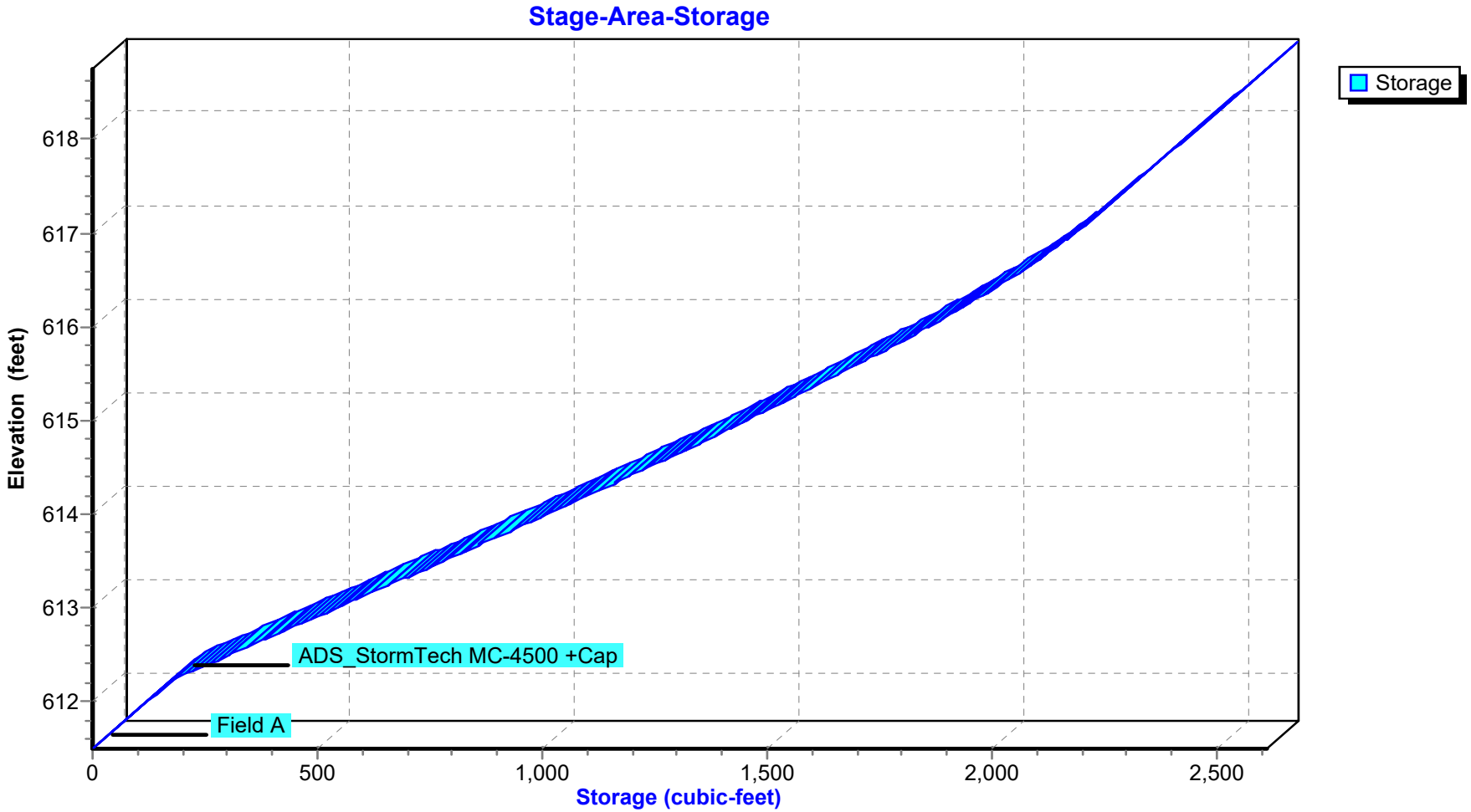


Pond 3P: ROOF INFILTRATION

Stage-Discharge



Pond 3P: ROOF INFILTRATION



Summary for Pond 4P: ROOF INFILTRATION

Inflow Area = 0.328 ac,100.00% Impervious, Inflow Depth > 4.81" for 10-YEAR event
Inflow = 1.62 cfs @ 12.08 hrs, Volume= 0.131 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 616.18' @ 24.00 hrs Surf.Area= 0.059 ac Storage= 0.131 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1A	613.00'	0.084 af	**22.75'W x 113.25'L x 5.50'H Field A** 0.325 af Overall - 0.116 af Embedded = 0.210 af x 40.0% Voids
#2A	613.75'	0.116 af	**ADS_StormTech MC-3500 d +Cap** x 45 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 3 Rows of 15 Chambers Cap Storage= +14.9 cf x 2 x 3 rows = 89.4 cf
		0.200 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	617.00'	**8.0" Round Culvert** L= 33.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 617.00' / 617.00' S= 0.0000 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=613.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)

Pond 4P: ROOF INFILTRATION - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 3 rows = 89.4 cf

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

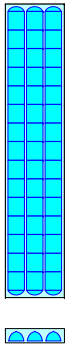
15 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 111.25' Row Length +12.0" End Stone x 2 = 113.25' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

45 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 3 Rows = 5,037.2 cf Chamber Storage

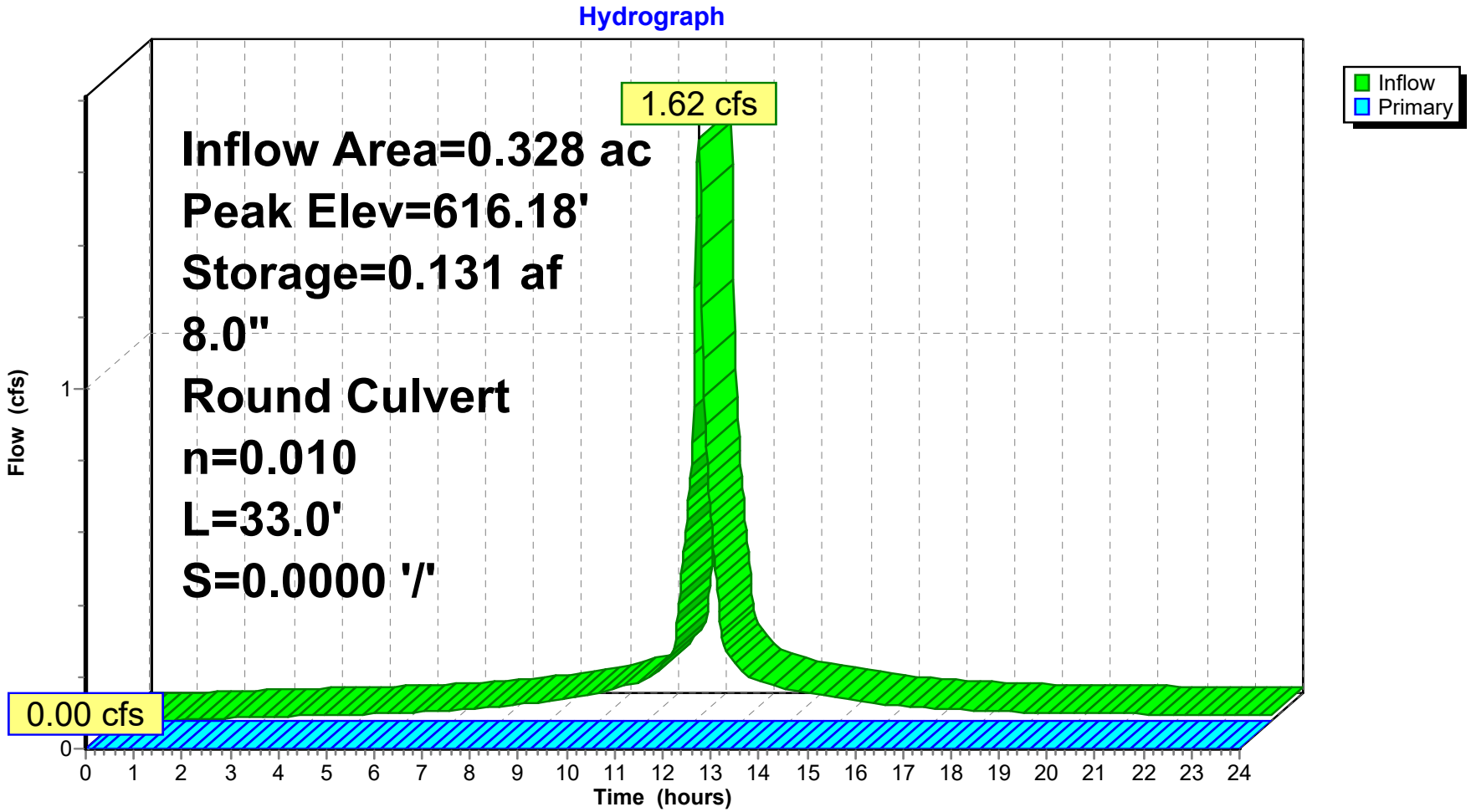
14,170.4 cf Field - 5,037.2 cf Chambers = 9,133.2 cf Stone x 40.0% Voids = 3,653.3 cf Stone Storage

Chamber Storage + Stone Storage = 8,690.5 cf = 0.200 af
Overall Storage Efficiency = 61.3%
Overall System Size = 113.25' x 22.75' x 5.50'

45 Chambers
524.8 cy Field
338.3 cy Stone

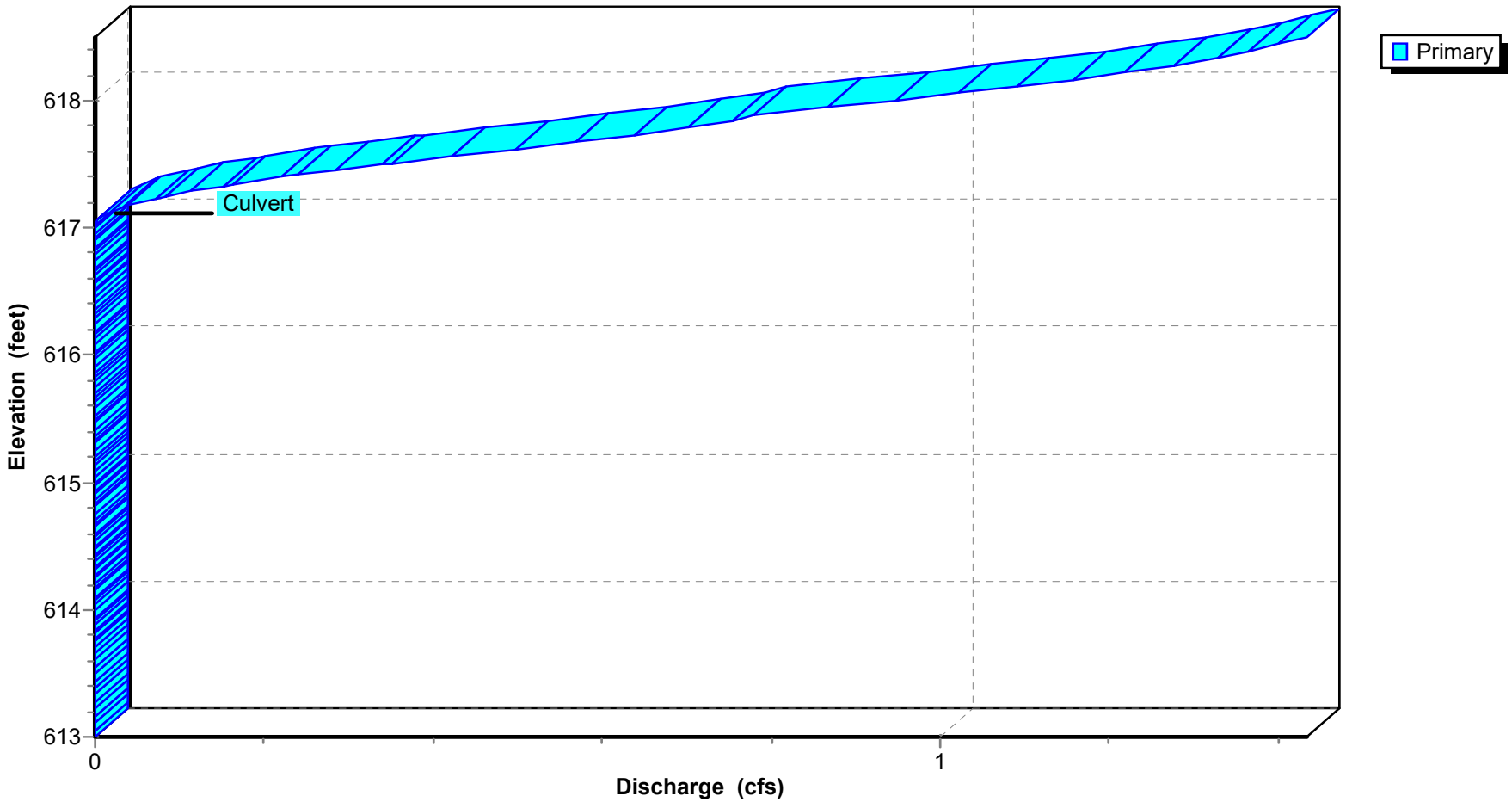


Pond 4P: ROOF INFILTRATION

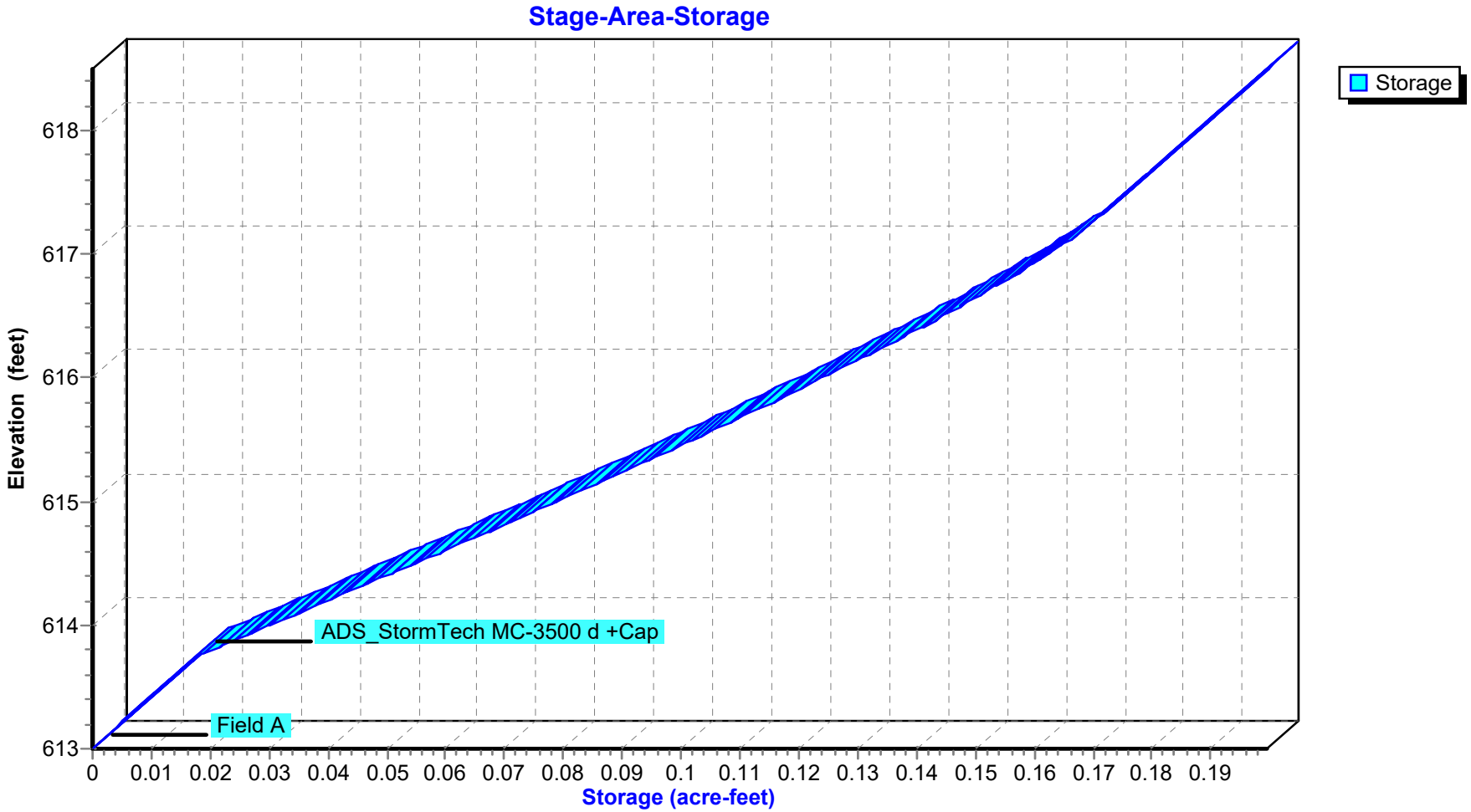


Pond 4P: ROOF INFILTRATION

Stage-Discharge



Pond 4P: ROOF INFILTRATION



Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1: DISCHARGE TO THE WEST Runoff Area=0.140 ac 0.00% Impervious Runoff Depth>2.08"
Tc=6.0 min CN=61 Runoff=0.33 cfs 0.024 af

Subcatchment P2-1: DISCHARGE TO DETENTION BASIN Runoff Area=0.600 ac 48.33% Impervious Runoff Depth>3.78"
Tc=6.0 min CN=79 Runoff=2.65 cfs 0.189 af

Subcatchment P2-2: DISCHARGE TO UNDERGROUND DETENTION Runoff Area=1.140 ac 75.44% Impervious Runoff Depth>4.85"
Tc=6.0 min CN=89 Runoff=6.21 cfs 0.461 af

Subcatchment P2-3: DISCHARGE TO THE EAST Runoff Area=1.250 ac 2.40% Impervious Runoff Depth>1.67"
Tc=6.0 min CN=56 Runoff=2.22 cfs 0.173 af

Subcatchment R4: ROOF - BUILDING #4 Runoff Area=0.099 ac 100.00% Impervious Runoff Depth>5.88"
Tc=6.0 min CN=98 Runoff=0.59 cfs 0.048 af

Subcatchment R5: ROOF - BUILDING #5 Runoff Area=0.118 ac 100.00% Impervious Runoff Depth>5.88"
Tc=6.0 min CN=98 Runoff=0.71 cfs 0.058 af

Subcatchment R6: ROOF - BUILDING #6 Runoff Area=0.090 ac 100.00% Impervious Runoff Depth>5.88"
Tc=6.0 min CN=98 Runoff=0.54 cfs 0.044 af

Subcatchment R7: ROOF - BUILDING #7 Runoff Area=0.120 ac 100.00% Impervious Runoff Depth>5.88"
Tc=6.0 min CN=98 Runoff=0.72 cfs 0.059 af

Reach 2R: TOTAL DISCHARGE TO THE EAST Inflow=4.02 cfs 0.683 af
Outflow=4.02 cfs 0.683 af

Reach 3R: PROPOSED SITE TOTAL DISCHARGE Inflow=4.33 cfs 0.708 af
Outflow=4.33 cfs 0.708 af

Pond 1P: DETENTION BASIN Peak Elev=615.27' Storage=3,461 cf Inflow=2.65 cfs 0.189 af
Outflow=0.80 cfs 0.147 af

Pond 2P: UNDERGROUND DETENTION Peak Elev=616.28' Storage=9,705 cf Inflow=6.21 cfs 0.461 af
Outflow=1.79 cfs 0.363 af

Pond 3P: ROOF INFILTRATION Peak Elev=616.73' Storage=2,112 cf Inflow=0.59 cfs 0.048 af
8.0" Round Culvert n=0.010 L=15.0' S=0.1000 '/' Outflow=0.00 cfs 0.000 af

Pond 4P: ROOF INFILTRATION Peak Elev=616.95' Storage=0.161 af Inflow=1.96 cfs 0.161 af
8.0" Round Culvert n=0.010 L=33.0' S=0.0000 '/' Outflow=0.00 cfs 0.000 af

Total Runoff Area = 3.557 ac Runoff Volume = 1.057 af Average Runoff Depth = 3.56"
54.82% Pervious = 1.950 ac 45.18% Impervious = 1.607 ac

Summary for Subcatchment P1: DISCHARGE TO THE WEST

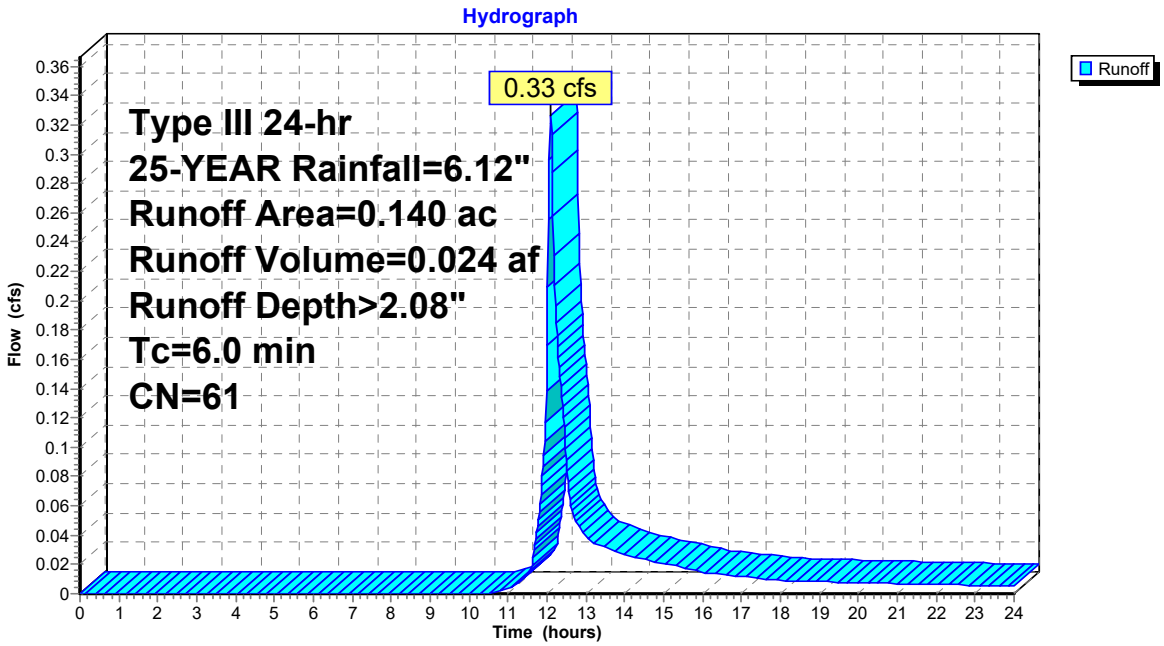
Runoff = 0.33 cfs @ 12.10 hrs, Volume= 0.024 af, Depth> 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YEAR Rainfall=6.12"

Area (ac)	CN	Description
0.140	61	>75% Grass cover, Good, HSG B
0.140		100.00% Pervious Area

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

Subcatchment P1: DISCHARGE TO THE WEST



Summary for Subcatchment P2-1: DISCHARGE TO DETENTION BASIN

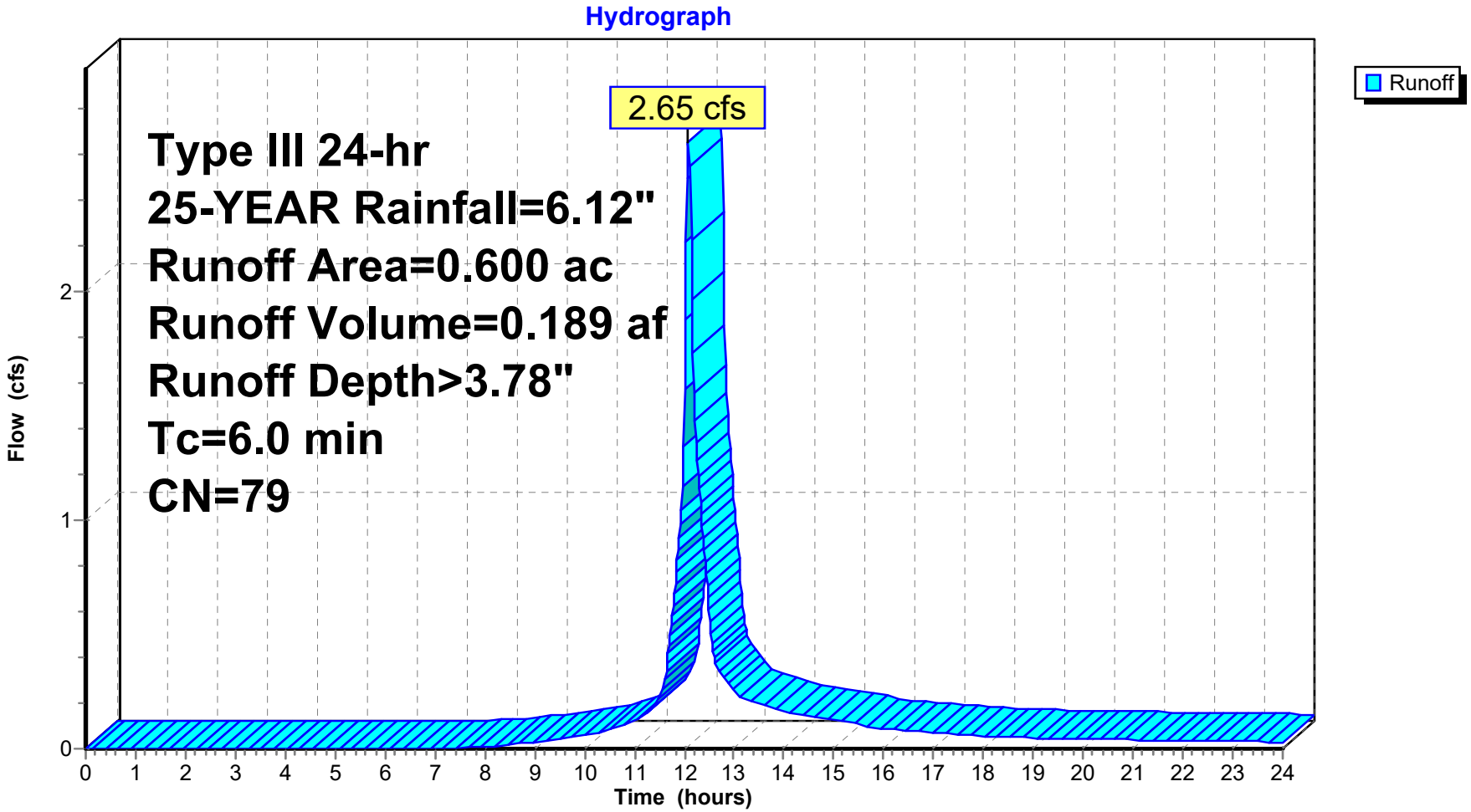
Runoff = 2.65 cfs @ 12.09 hrs, Volume= 0.189 af, Depth> 3.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YEAR Rainfall=6.12"

Area (ac)	CN	Description
0.310	61	>75% Grass cover, Good, HSG B
0.290	98	Paved parking, HSG B
0.600	79	Weighted Average
0.310		51.67% Pervious Area
0.290		48.33% Impervious Area

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

Subcatchment P2-1: DISCHARGE TO DETENTION BASIN



Summary for Subcatchment P2-2: DISCHARGE TO UNDERGROUND DETENTION

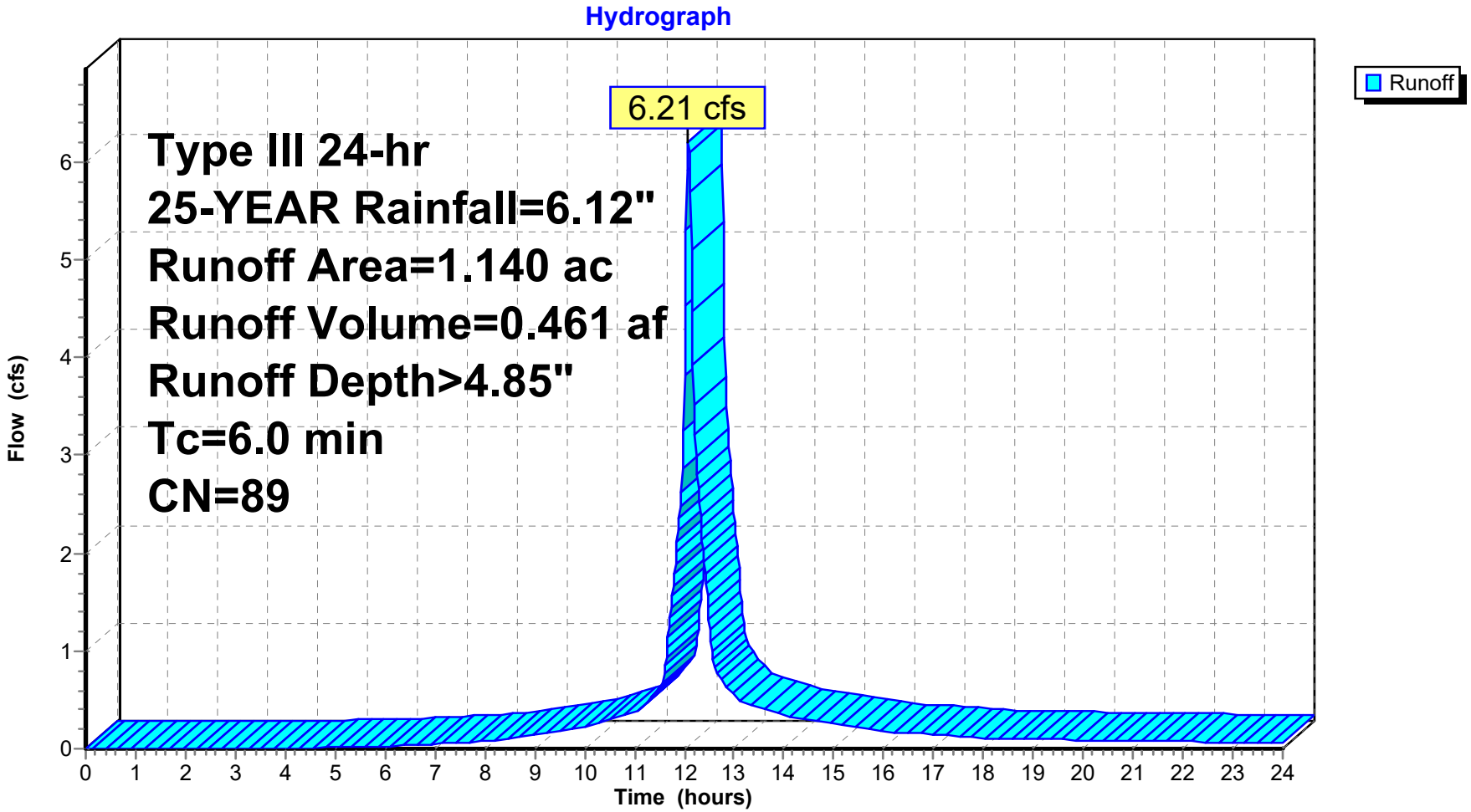
Runoff = 6.21 cfs @ 12.08 hrs, Volume= 0.461 af, Depth> 4.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YEAR Rainfall=6.12"

Area (ac)	CN	Description
0.280	61	>75% Grass cover, Good, HSG B
0.860	98	Paved parking, HSG B
1.140	89	Weighted Average
0.280		24.56% Pervious Area
0.860		75.44% Impervious Area

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

Subcatchment P2-2: DISCHARGE TO UNDERGROUND DETENTION



Summary for Subcatchment P2-3: DISCHARGE TO THE EAST

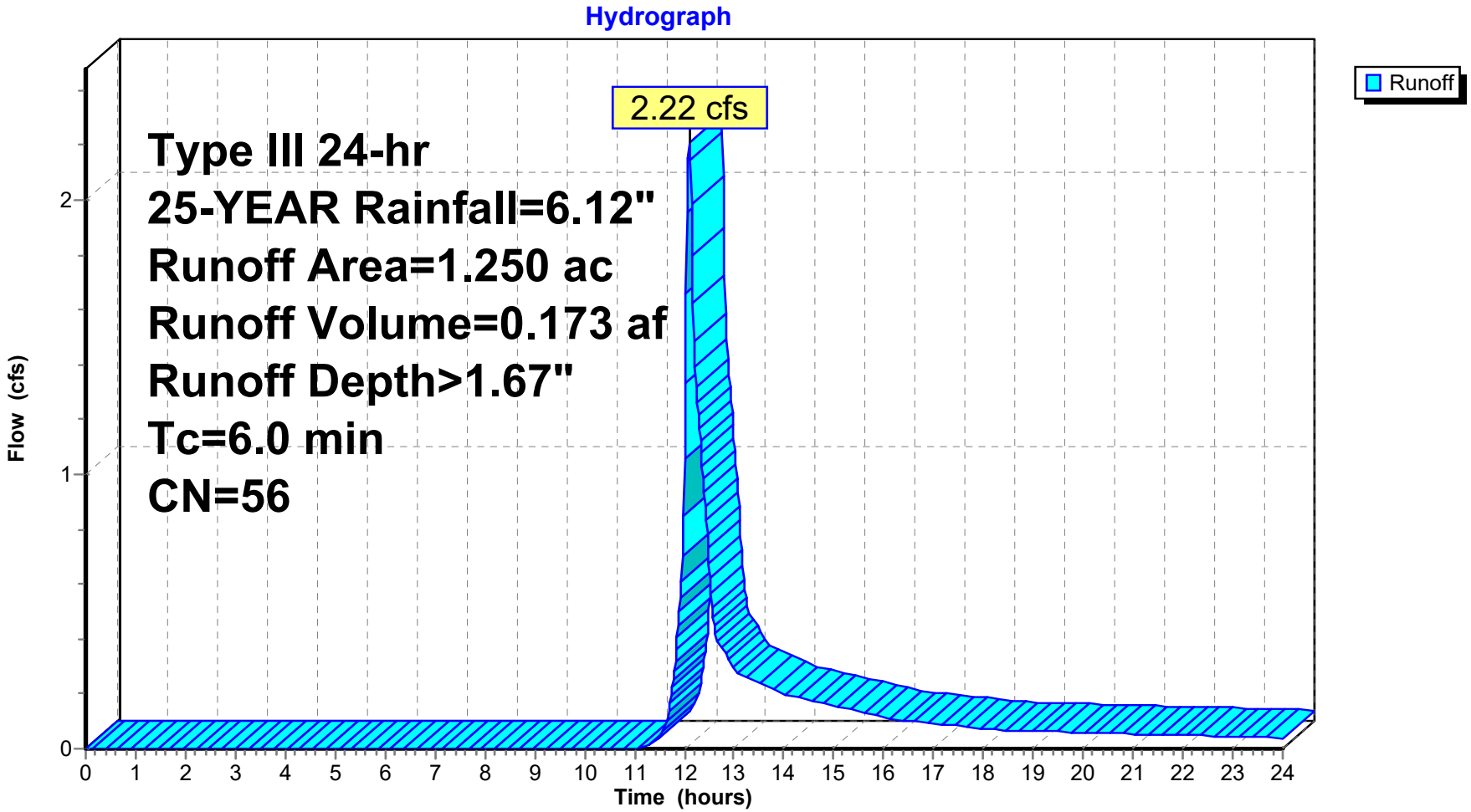
Runoff = 2.22 cfs @ 12.10 hrs, Volume= 0.173 af, Depth> 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YEAR Rainfall=6.12"

Area (ac)	CN	Description
0.670	61	>75% Grass cover, Good, HSG B
0.550	48	Brush, Good, HSG B
0.030	98	Paved parking, HSG B
1.250	56	Weighted Average
1.220		97.60% Pervious Area
0.030		2.40% Impervious Area

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

Subcatchment P2-3: DISCHARGE TO THE EAST



Summary for Subcatchment R4: ROOF - BUILDING #4

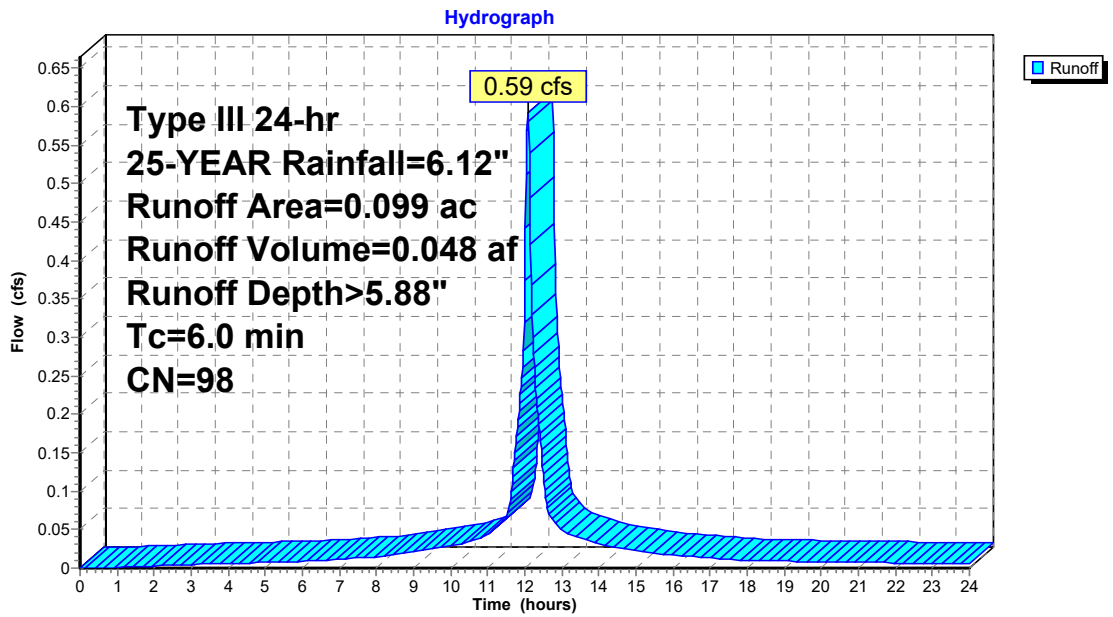
Runoff = 0.59 cfs @ 12.08 hrs, Volume= 0.048 af, Depth> 5.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YEAR Rainfall=6.12"

Area (ac)	CN	Description
0.099	98	Unconnected roofs, HSG B
0.099		100.00% Impervious Area
0.099		100.00% Unconnected

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

Subcatchment R4: ROOF - BUILDING #4



Summary for Subcatchment R5: ROOF - BUILDING #5

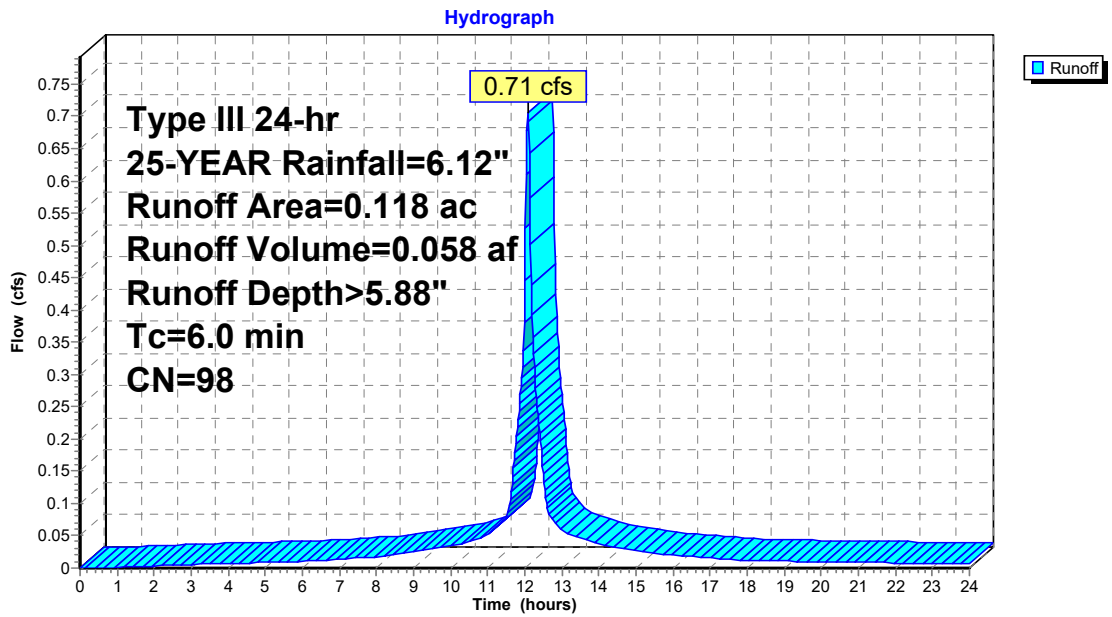
Runoff = 0.71 cfs @ 12.08 hrs, Volume= 0.058 af, Depth> 5.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YEAR Rainfall=6.12"

Area (ac)	CN	Description
0.118	98	Unconnected roofs, HSG B
0.118		100.00% Impervious Area
0.118		100.00% Unconnected

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

Subcatchment R5: ROOF - BUILDING #5



Summary for Subcatchment R6: ROOF - BUILDING #6

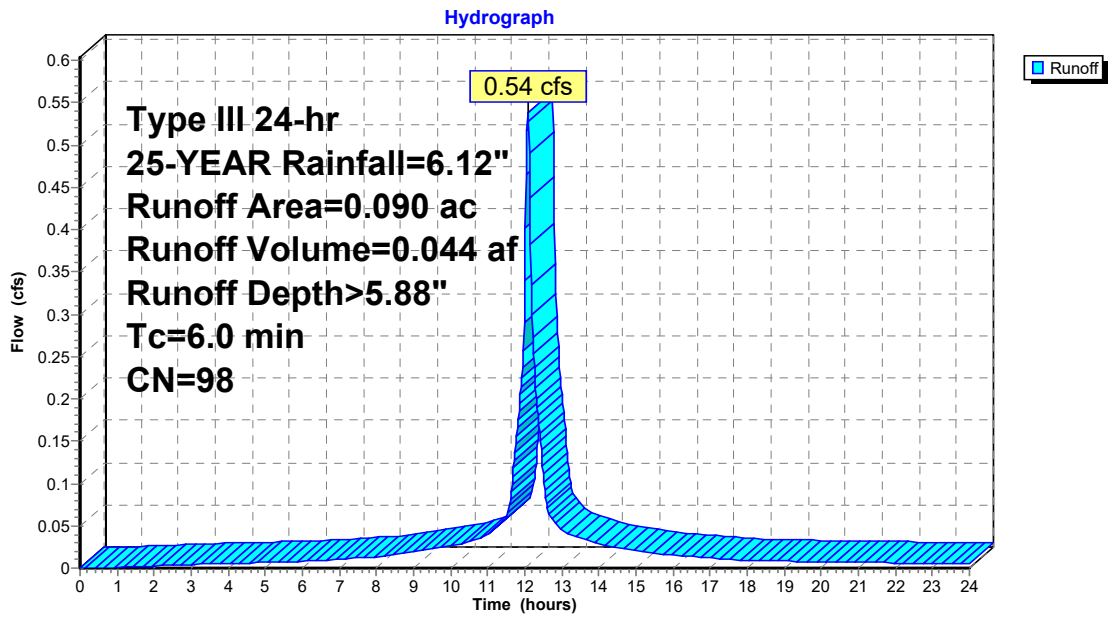
Runoff = 0.54 cfs @ 12.08 hrs, Volume= 0.044 af, Depth> 5.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YEAR Rainfall=6.12"

Area (ac)	CN	Description
0.090	98	Unconnected roofs, HSG B
0.090		100.00% Impervious Area
0.090		100.00% Unconnected

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

Subcatchment R6: ROOF - BUILDING #6



Summary for Subcatchment R7: ROOF - BUILDING #7

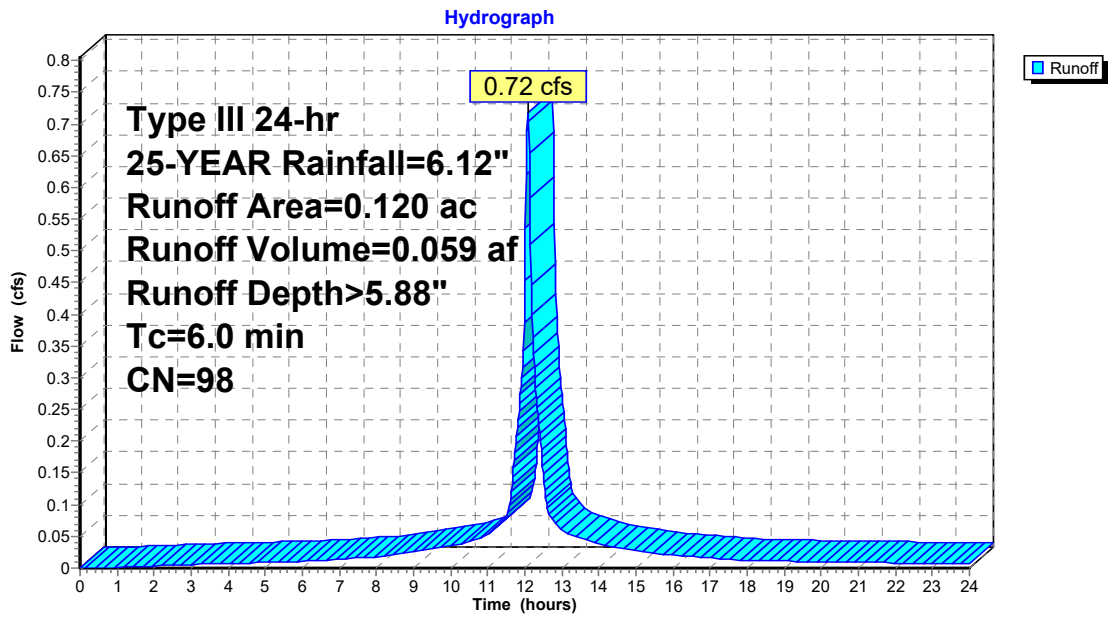
Runoff = 0.72 cfs @ 12.08 hrs, Volume= 0.059 af, Depth> 5.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YEAR Rainfall=6.12"

Area (ac)	CN	Description
0.120	98	Unconnected roofs, HSG B
0.120		100.00% Impervious Area
0.120		100.00% Unconnected

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

Subcatchment R7: ROOF - BUILDING #7



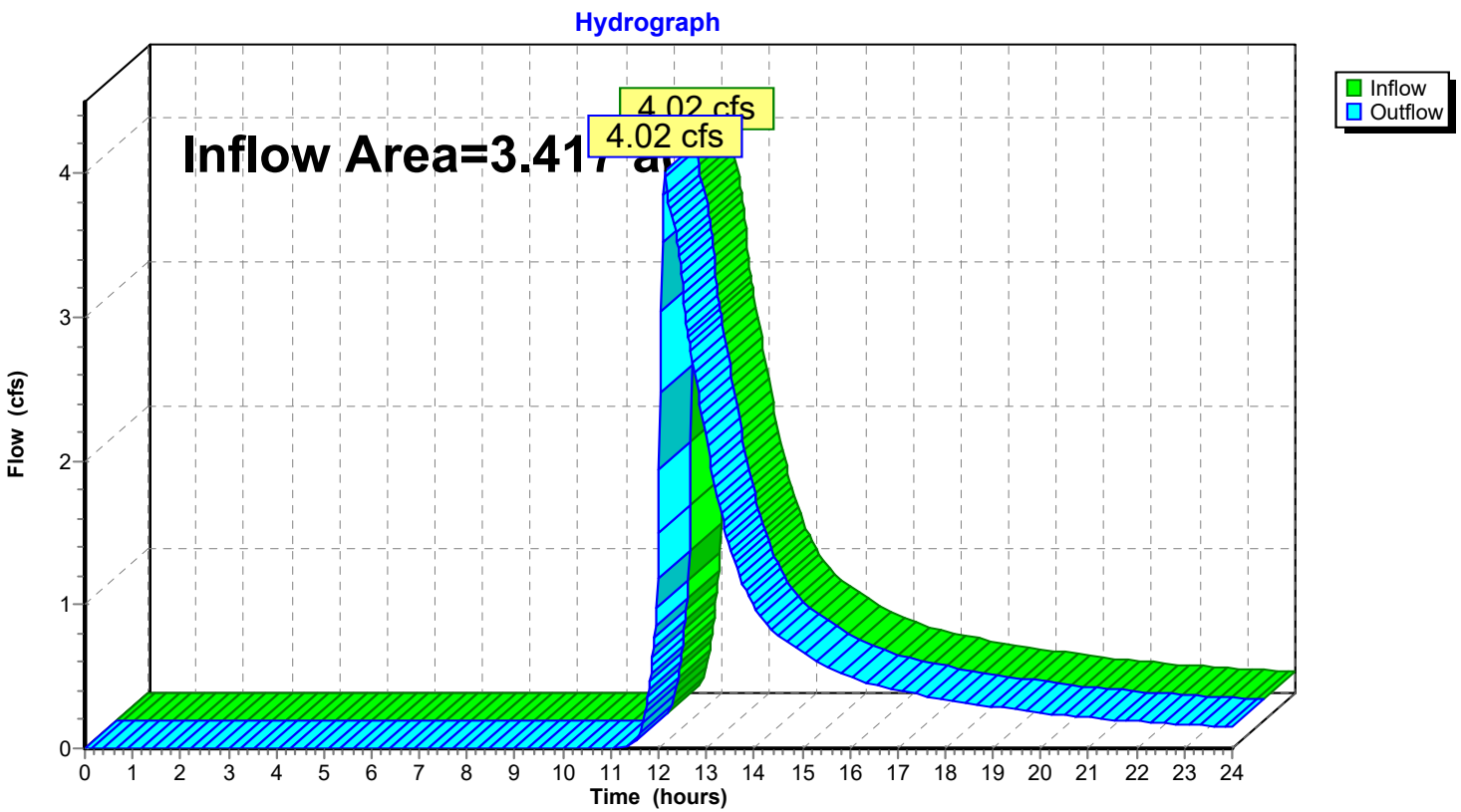
Summary for Reach 2R: TOTAL DISCHARGE TO THE EAST

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.417 ac, 47.03% Impervious, Inflow Depth > 2.40" for 25-YEAR event
Inflow = 4.02 cfs @ 12.13 hrs, Volume= 0.683 af
Outflow = 4.02 cfs @ 12.13 hrs, Volume= 0.683 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 2R: TOTAL DISCHARGE TO THE EAST



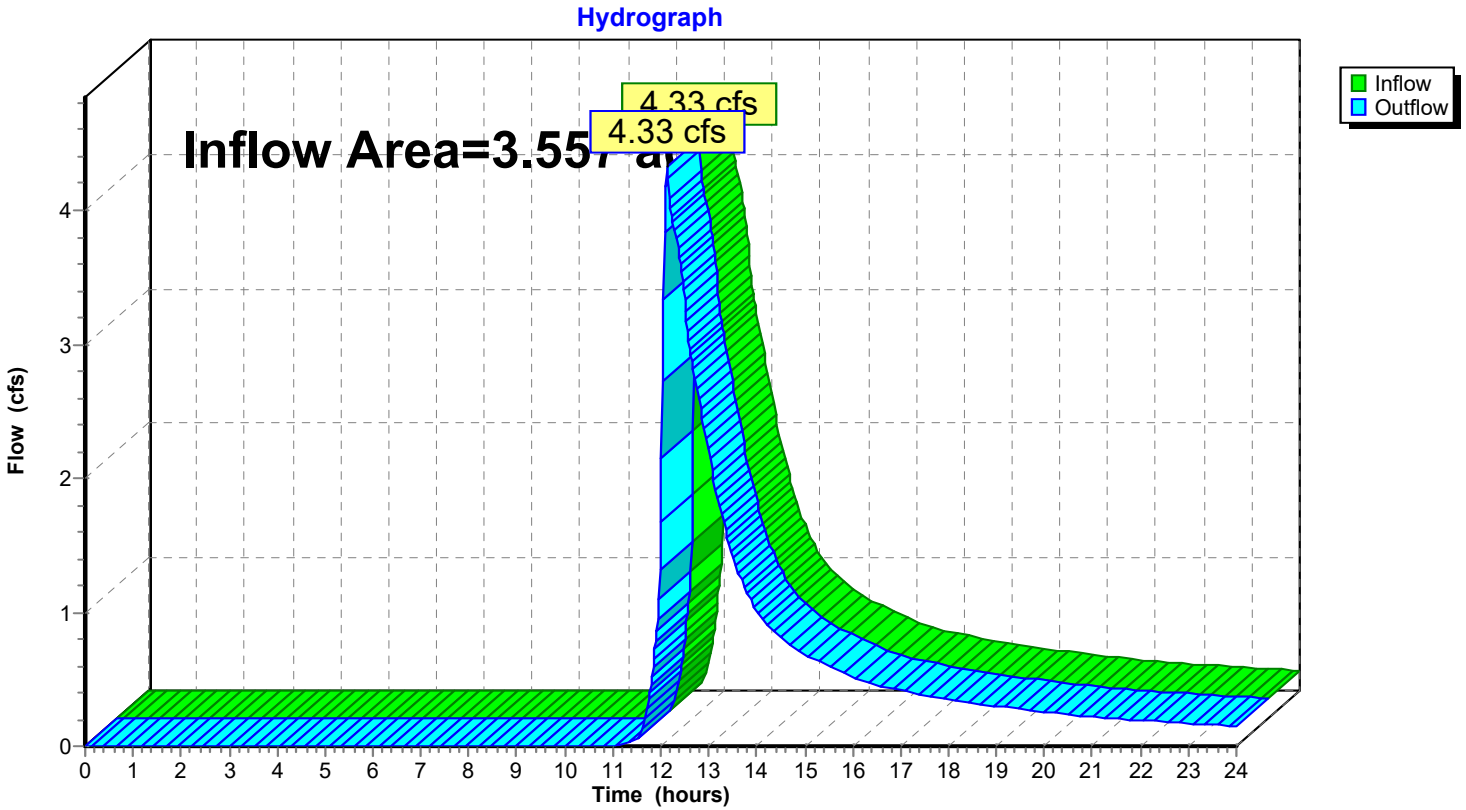
Summary for Reach 3R: PROPOSED SITE TOTAL DISCHARGE

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.557 ac, 45.18% Impervious, Inflow Depth > 2.39" for 25-YEAR event
Inflow = 4.33 cfs @ 12.13 hrs, Volume= 0.708 af
Outflow = 4.33 cfs @ 12.13 hrs, Volume= 0.708 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 3R: PROPOSED SITE TOTAL DISCHARGE



Summary for Pond 1P: DETENTION BASIN

[58] Hint: Peaked 0.33' above defined flood level

Inflow Area = 0.600 ac, 48.33% Impervious, Inflow Depth > 3.78" for 25-YEAR event
Inflow = 2.65 cfs @ 12.09 hrs, Volume= 0.189 af
Outflow = 0.80 cfs @ 12.43 hrs, Volume= 0.147 af, Atten= 70%, Lag= 20.4 min
Primary = 0.80 cfs @ 12.43 hrs, Volume= 0.147 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 615.27' @ 12.43 hrs Surf.Area= 2,131 sf Storage= 3,461 cf
Flood Elev= 614.94' Surf.Area= 1,948 sf Storage= 2,797 cf

Plug-Flow detention time= 147.6 min calculated for 0.147 af (78% of inflow)
Center-of-Mass det. time= 66.7 min (881.9 - 815.2)

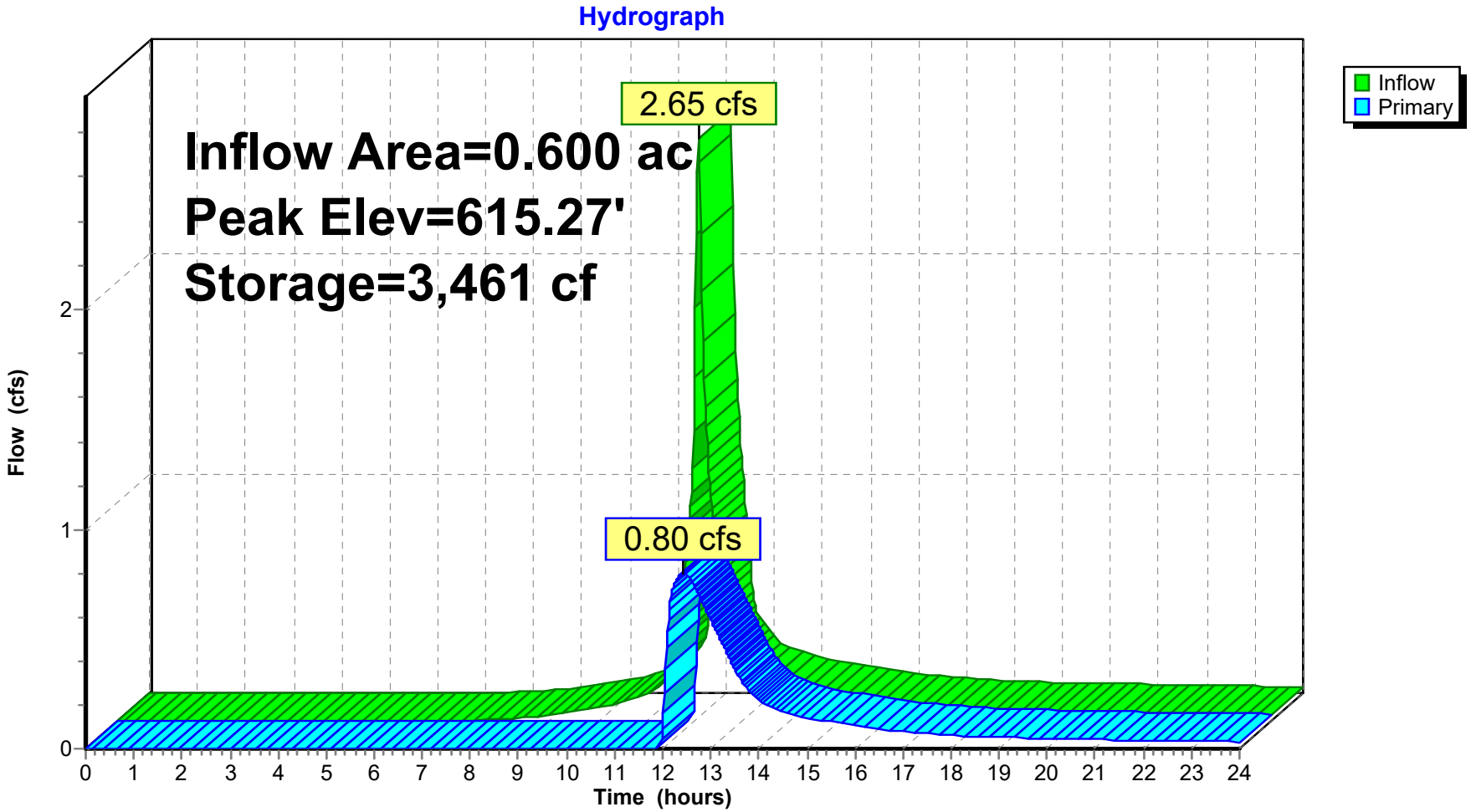
Volume	Invert	Avail.Storage	Storage Description
#1	613.00'	6,621 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
613.00	984	145.0	0	0	984
614.00	1,446	164.0	1,208	1,208	1,476
615.00	1,983	186.0	1,707	2,915	2,113
616.00	2,570	205.0	2,270	5,185	2,736
616.50	3,185	230.0	1,436	6,621	3,608

Device	Routing	Invert	Outlet Devices
#1	Primary	614.05'	**15.0" Round Culvert** L= 105.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 614.05' / 613.00' S= 0.0100 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf
#2	Device 1	614.30'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	616.00'	**15.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

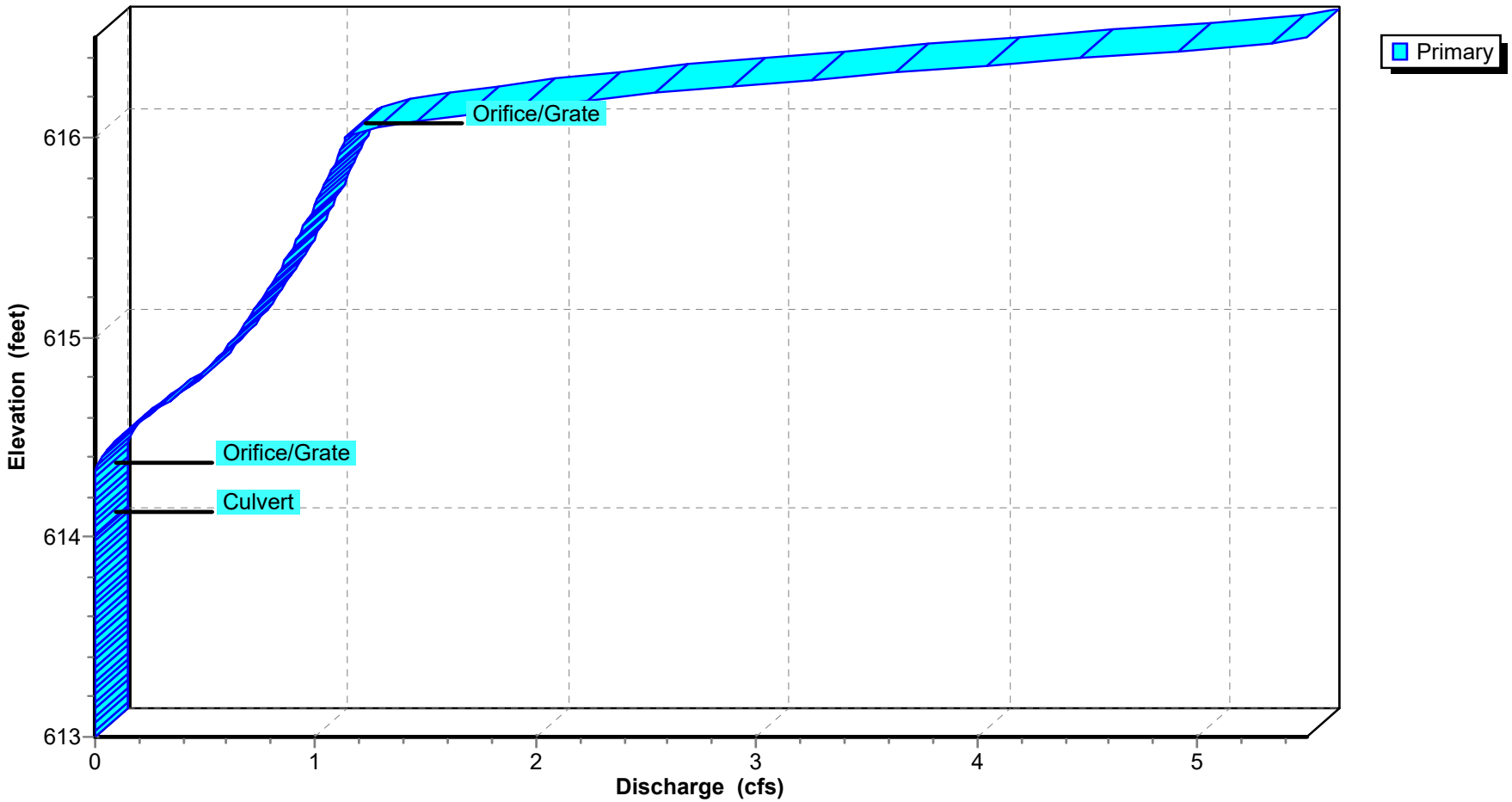
Primary OutFlow Max=0.80 cfs @ 12.43 hrs HW=615.27' (Free Discharge)
└─**1=Culvert** (Passes 0.80 cfs of 4.57 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.80 cfs @ 4.07 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: DETENTION BASIN

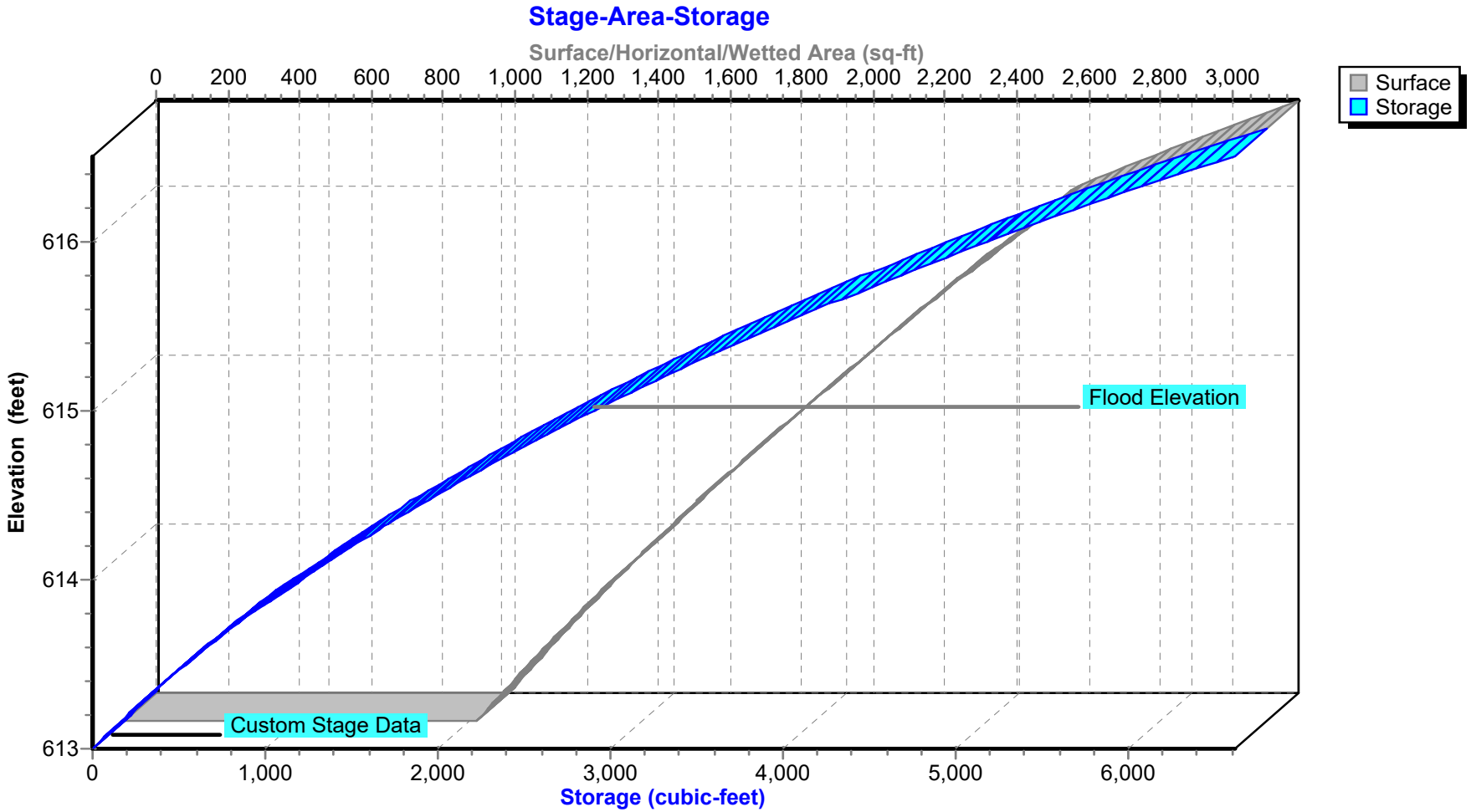


Pond 1P: DETENTION BASIN

Stage-Discharge



Pond 1P: DETENTION BASIN



Summary for Pond 2P: UNDERGROUND DETENTION

Inflow Area = 1.468 ac, 80.93% Impervious, Inflow Depth > 3.76" for 25-YEAR event
Inflow = 6.21 cfs @ 12.08 hrs, Volume= 0.461 af
Outflow = 1.79 cfs @ 12.42 hrs, Volume= 0.363 af, Atten= 71%, Lag= 20.1 min
Primary = 1.79 cfs @ 12.42 hrs, Volume= 0.363 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 616.28' @ 12.42 hrs Surf.Area= 5,913 sf Storage= 9,705 cf

Plug-Flow detention time= 187.5 min calculated for 0.362 af (79% of inflow)
Center-of-Mass det. time= 110.6 min (897.5 - 787.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	613.75'	6,633 cf	**36.50'W x 162.00'L x 4.00'H Field A** 23,652 cf Overall - 7,069 cf Embedded = 16,583 cf x 40.0% Voids
#2A	614.25'	7,069 cf	**CMP Round 30** x 72 Inside #1 Effective Size= 30.0"W x 30.0"H => 4.91 sf x 20.00'L = 98.2 cf Overall Size= 30.0"W x 30.0"H x 20.00'L 9 Rows of 8 Chambers
#3	614.25'	31 cf	**15.0" Round Pipe Storage** L= 25.0'
		13,733 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	613.75'	**15.0" Round Culvert** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 613.25' / 613.75' S= -0.0278 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf
#2	Device 1	614.86'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	615.33'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	617.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.79 cfs @ 12.42 hrs HW=616.28' (Free Discharge)
└─**1=Culvert** (Passes 1.79 cfs of 8.16 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.47 cfs @ 5.39 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 1.32 cfs @ 3.78 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: UNDERGROUND DETENTION - Chamber Wizard Field A

Chamber Model = CMP Round 30 (Round Corrugated Metal Pipe)
Effective Size= 30.0"W x 30.0"H => 4.91 sf x 20.00'L = 98.2 cf
Overall Size= 30.0"W x 30.0"H x 20.00'L

30.0" Wide + 18.0" Spacing = 48.0" C-C Row Spacing

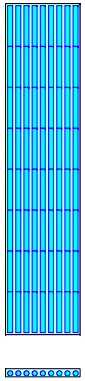
8 Chambers/Row x 20.00' Long = 160.00' Row Length +12.0" End Stone x 2 = 162.00' Base Length
9 Rows x 30.0" Wide + 18.0" Spacing x 8 + 12.0" Side Stone x 2 = 36.50' Base Width
6.0" Base + 30.0" Chamber Height + 12.0" Cover = 4.00' Field Height

72 Chambers x 98.2 cf = 7,068.6 cf Chamber Storage

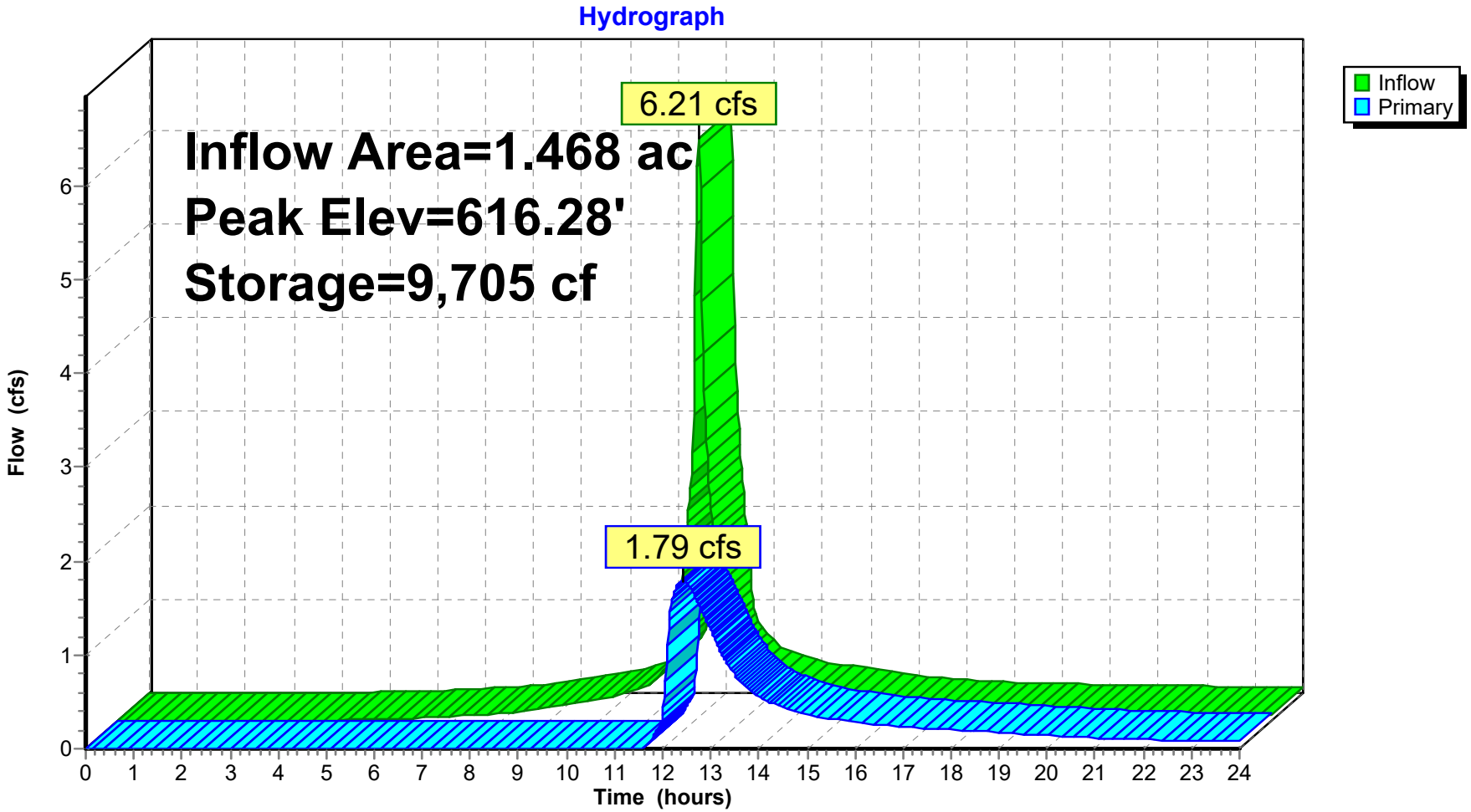
23,652.0 cf Field - 7,068.6 cf Chambers = 16,583.4 cf Stone x 40.0% Voids = 6,633.4 cf Stone Storage

Chamber Storage + Stone Storage = 13,702.0 cf = 0.315 af
Overall Storage Efficiency = 57.9%
Overall System Size = 162.00' x 36.50' x 4.00'

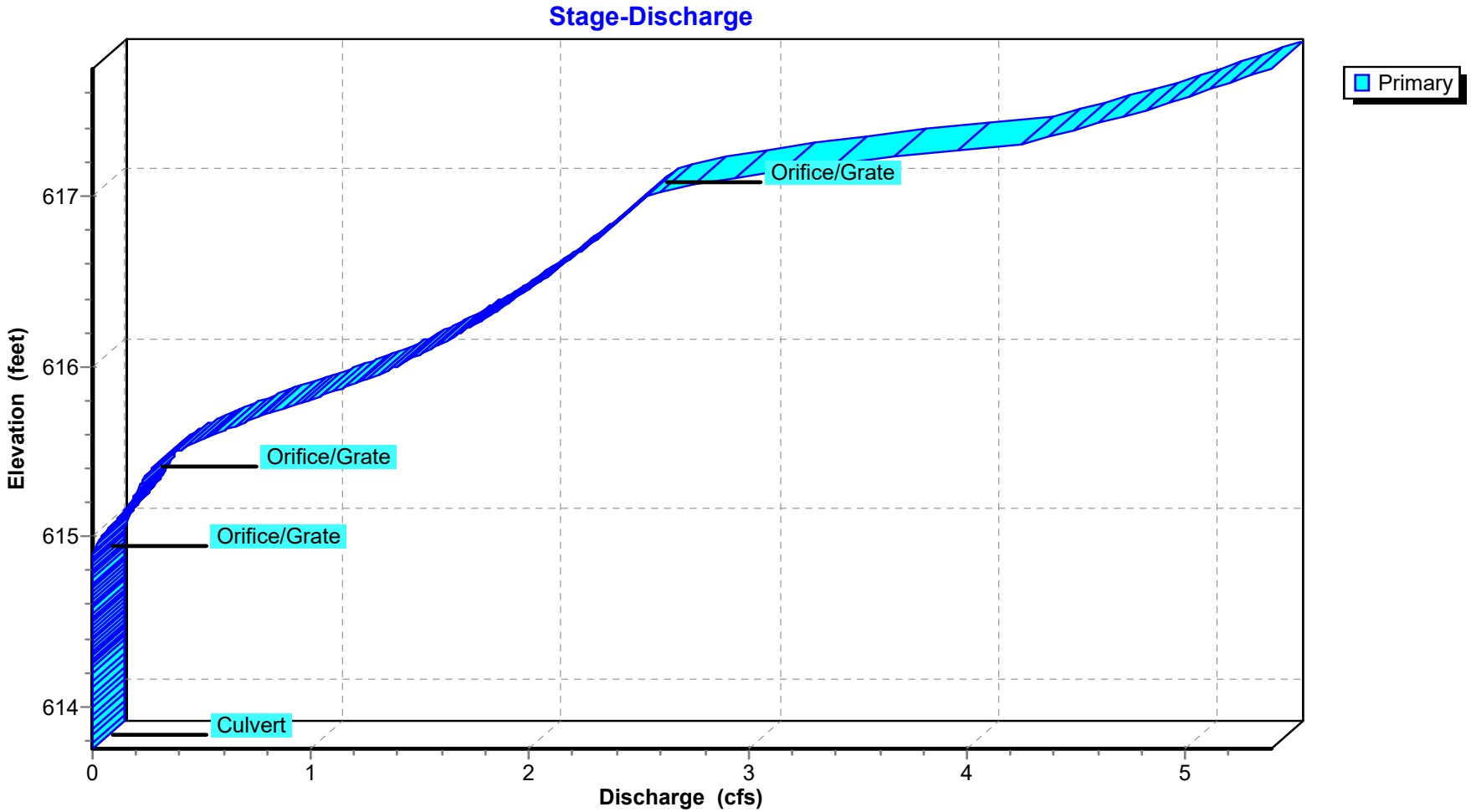
72 Chambers
876.0 cy Field
614.2 cy Stone



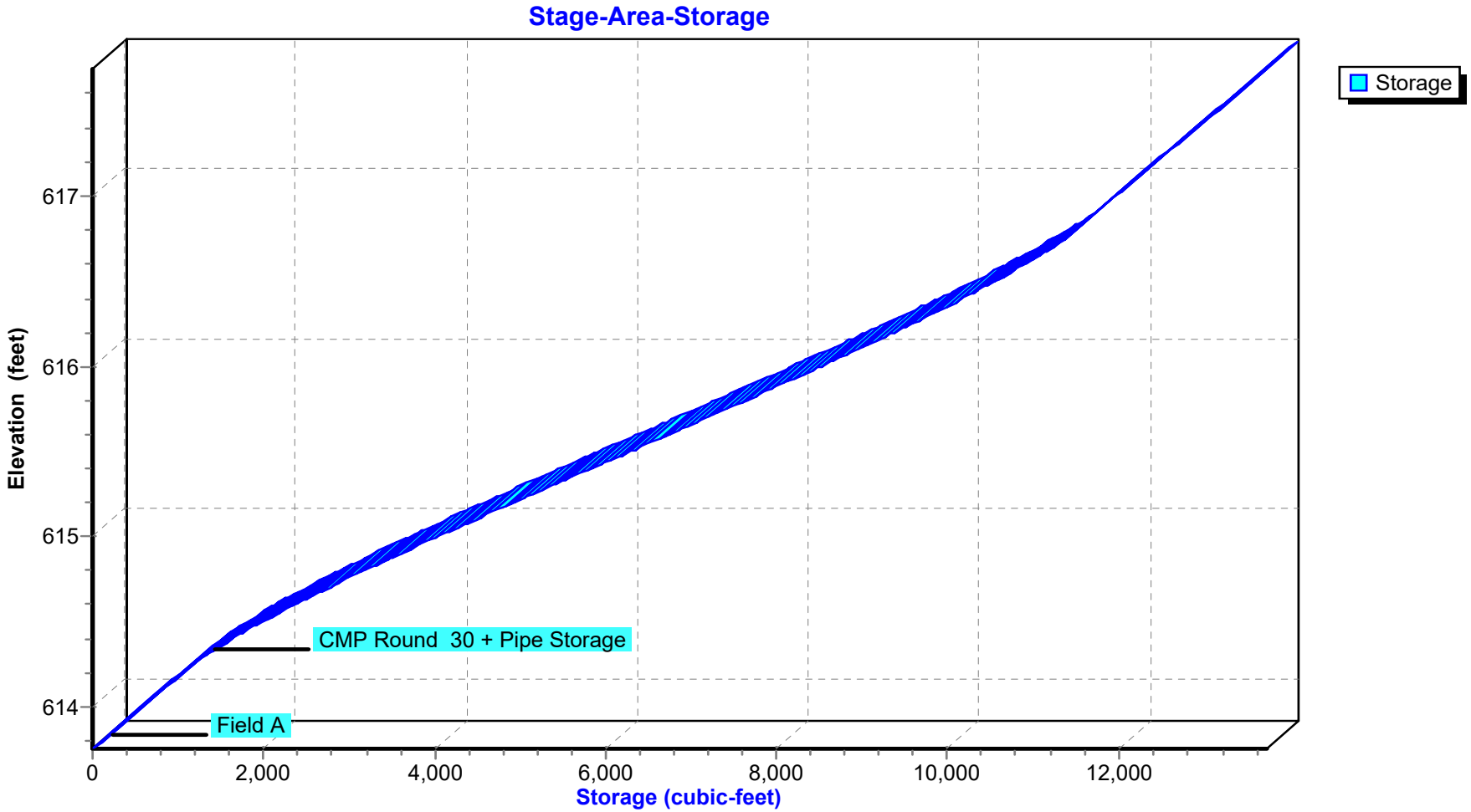
Pond 2P: UNDERGROUND DETENTION



Pond 2P: UNDERGROUND DETENTION



Pond 2P: UNDERGROUND DETENTION



Summary for Pond 3P: ROOF INFILTRATION

Inflow Area = 0.099 ac,100.00% Impervious, Inflow Depth > 5.88" for 25-YEAR event
Inflow = 0.59 cfs @ 12.08 hrs, Volume= 0.048 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 616.73' @ 24.00 hrs Surf.Area= 607 sf Storage= 2,112 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1A	611.50'	1,192 cf	**19.42'W x 31.27'L x 7.25'H Field A** 4,401 cf Overall - 1,421 cf Embedded = 2,981 cf x 40.0% Voids
#2A	612.25'	1,421 cf	**ADS_StormTech MC-4500 +Cap** x 12 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 2 Rows of 6 Chambers Cap Storage= +35.7 cf x 2 x 2 rows = 142.8 cf
		2,613 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	617.50'	**8.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 617.50' / 616.00' S= 0.1000 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=611.50' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)

Pond 3P: ROOF INFILTRATION - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-4500 +Cap (ADS StormTech® MC-4500 with cap volume)
Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf
Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap
Cap Storage= +35.7 cf x 2 x 2 rows = 142.8 cf

100.0" Wide + 9.0" Spacing = 109.0" C-C Row Spacing

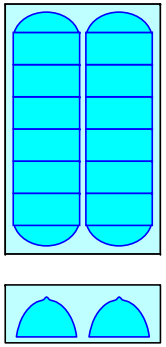
6 Chambers/Row x 4.02' Long +2.56' Cap Length x 2 = 29.27' Row Length +12.0" End Stone x 2 = 31.27' Base Length
2 Rows x 100.0" Wide + 9.0" Spacing x 1 + 12.0" Side Stone x 2 = 19.42' Base Width
9.0" Base + 60.0" Chamber Height + 18.0" Cover = 7.25' Field Height

12 Chambers x 106.5 cf + 35.7 cf Cap Volume x 2 x 2 Rows = 1,420.7 cf Chamber Storage

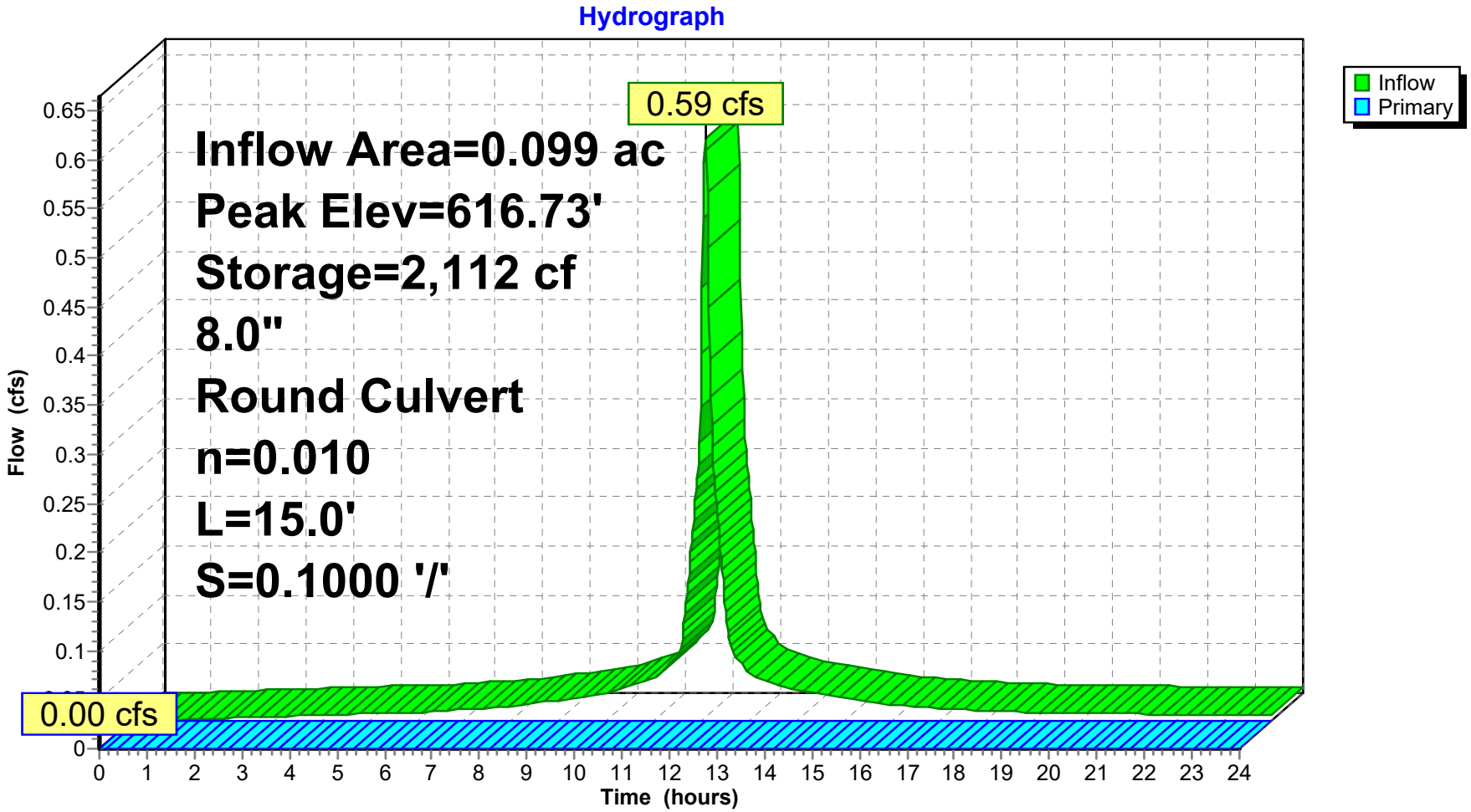
4,401.4 cf Field - 1,420.7 cf Chambers = 2,980.7 cf Stone x 40.0% Voids = 1,192.3 cf Stone Storage

Chamber Storage + Stone Storage = 2,613.0 cf = 0.060 af
Overall Storage Efficiency = 59.4%
Overall System Size = 31.27' x 19.42' x 7.25'

12 Chambers
163.0 cy Field
110.4 cy Stone

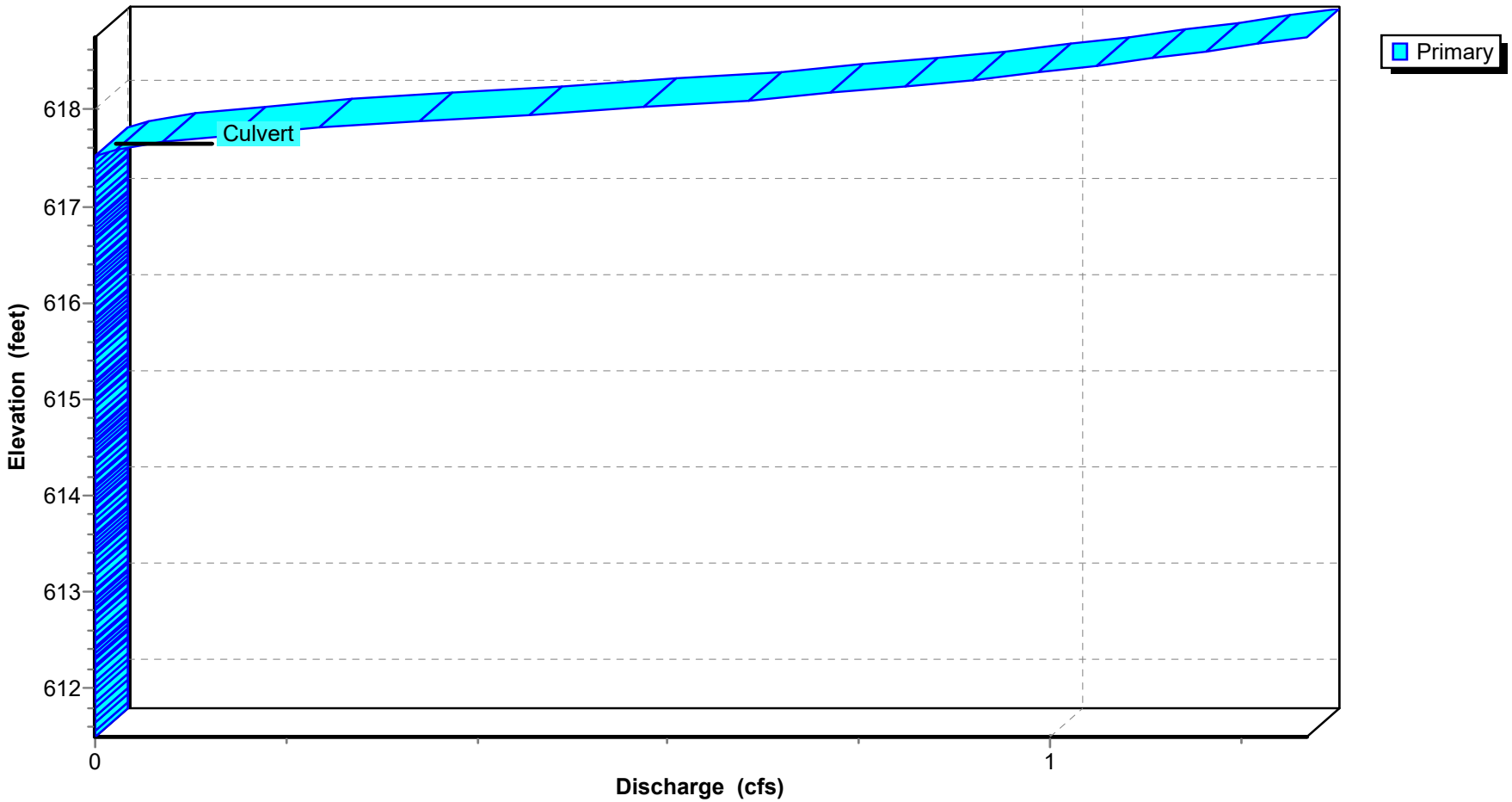


Pond 3P: ROOF INFILTRATION

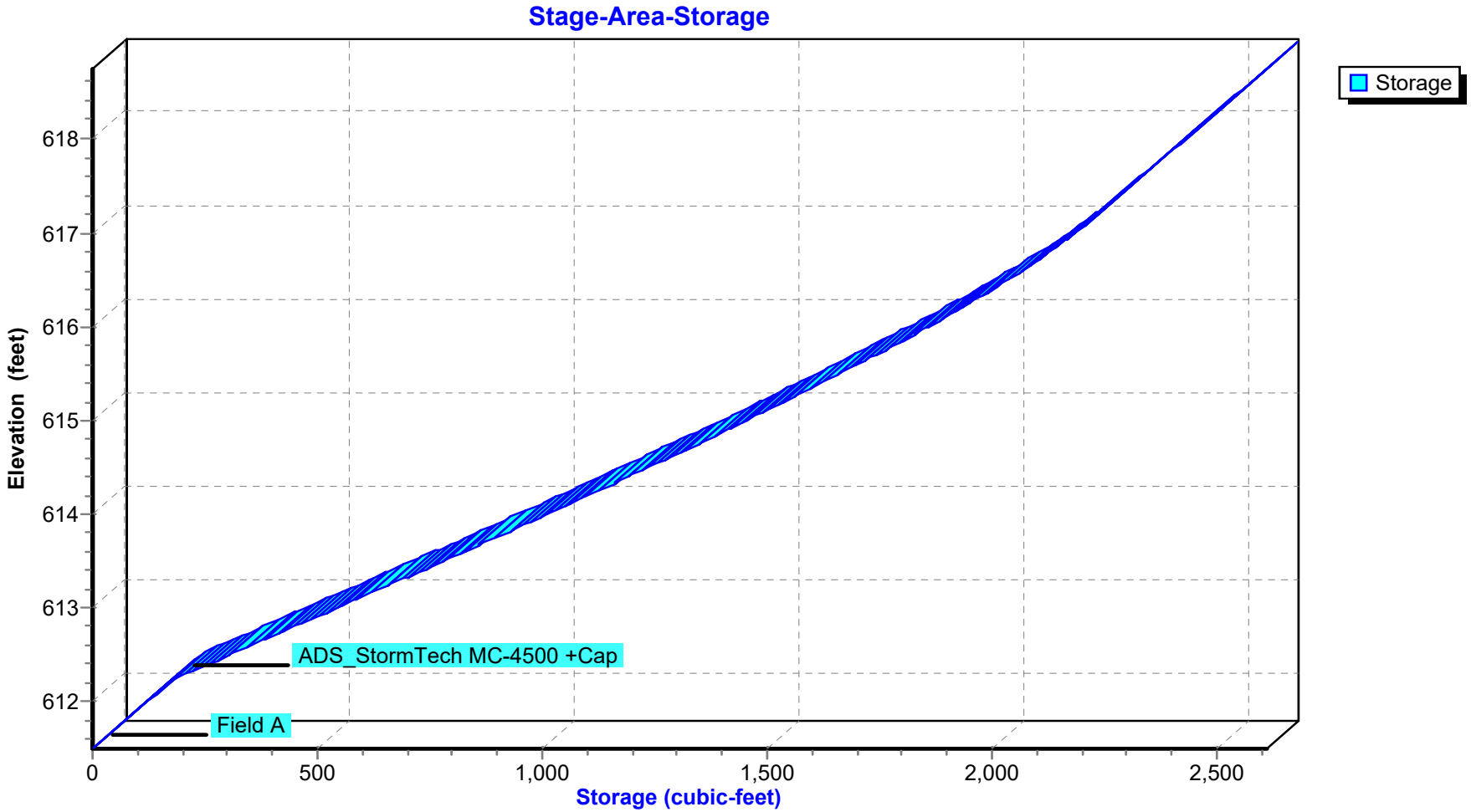


Pond 3P: ROOF INFILTRATION

Stage-Discharge



Pond 3P: ROOF INFILTRATION



Summary for Pond 4P: ROOF INFILTRATION

Inflow Area = 0.328 ac,100.00% Impervious, Inflow Depth > 5.88" for 25-YEAR event
Inflow = 1.96 cfs @ 12.08 hrs, Volume= 0.161 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 616.95' @ 24.00 hrs Surf.Area= 0.059 ac Storage= 0.161 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1A	613.00'	0.084 af	**22.75'W x 113.25'L x 5.50'H Field A** 0.325 af Overall - 0.116 af Embedded = 0.210 af x 40.0% Voids
#2A	613.75'	0.116 af	**ADS_StormTech MC-3500 d +Cap** x 45 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 3 Rows of 15 Chambers Cap Storage= +14.9 cf x 2 x 3 rows = 89.4 cf
		0.200 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	617.00'	**8.0" Round Culvert** L= 33.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 617.00' / 617.00' S= 0.0000 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=613.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)

Pond 4P: ROOF INFILTRATION - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 3 rows = 89.4 cf

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

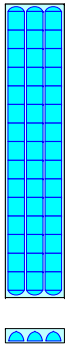
15 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 111.25' Row Length +12.0" End Stone x 2 = 113.25' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

45 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 3 Rows = 5,037.2 cf Chamber Storage

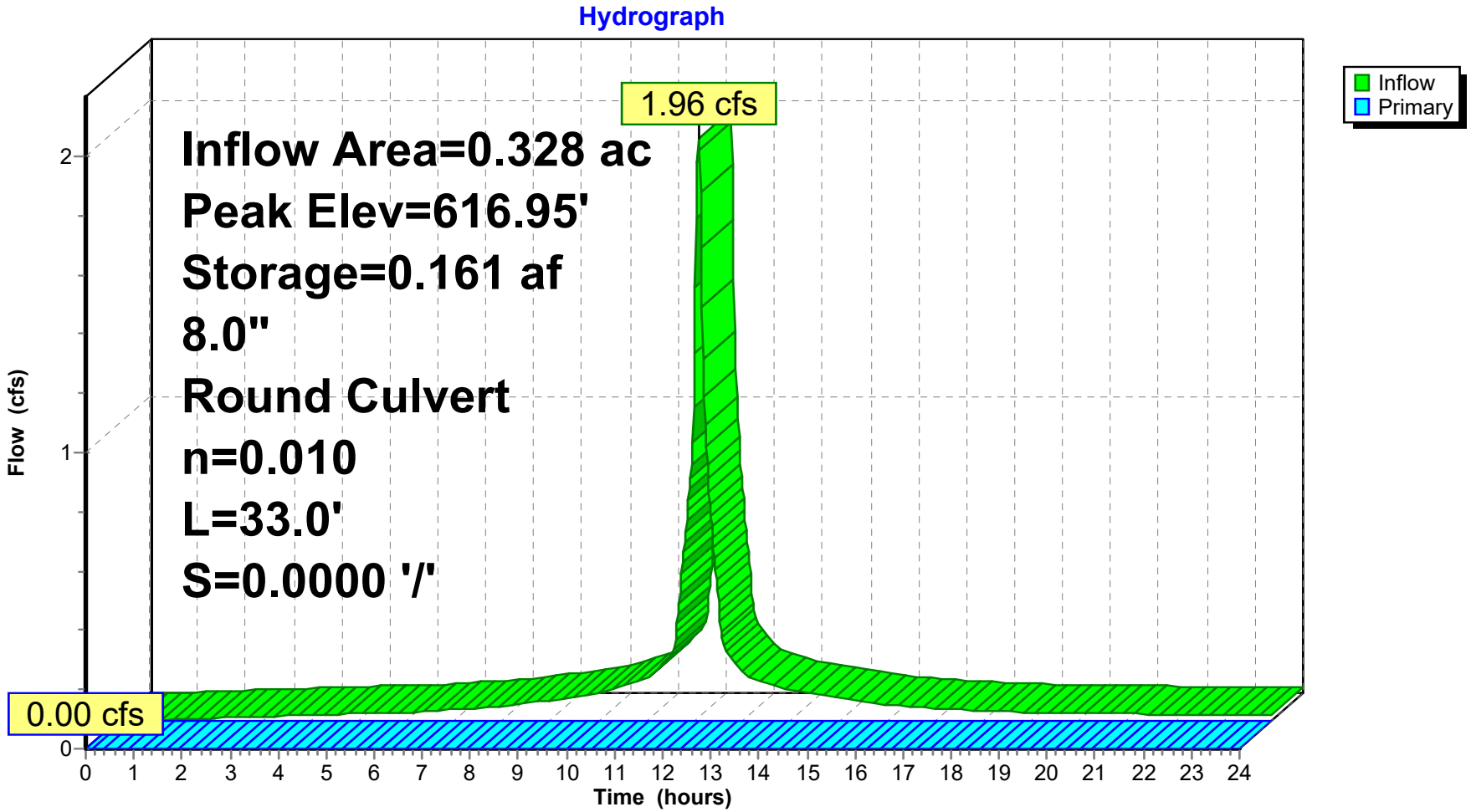
14,170.4 cf Field - 5,037.2 cf Chambers = 9,133.2 cf Stone x 40.0% Voids = 3,653.3 cf Stone Storage

Chamber Storage + Stone Storage = 8,690.5 cf = 0.200 af
Overall Storage Efficiency = 61.3%
Overall System Size = 113.25' x 22.75' x 5.50'

45 Chambers
524.8 cy Field
338.3 cy Stone

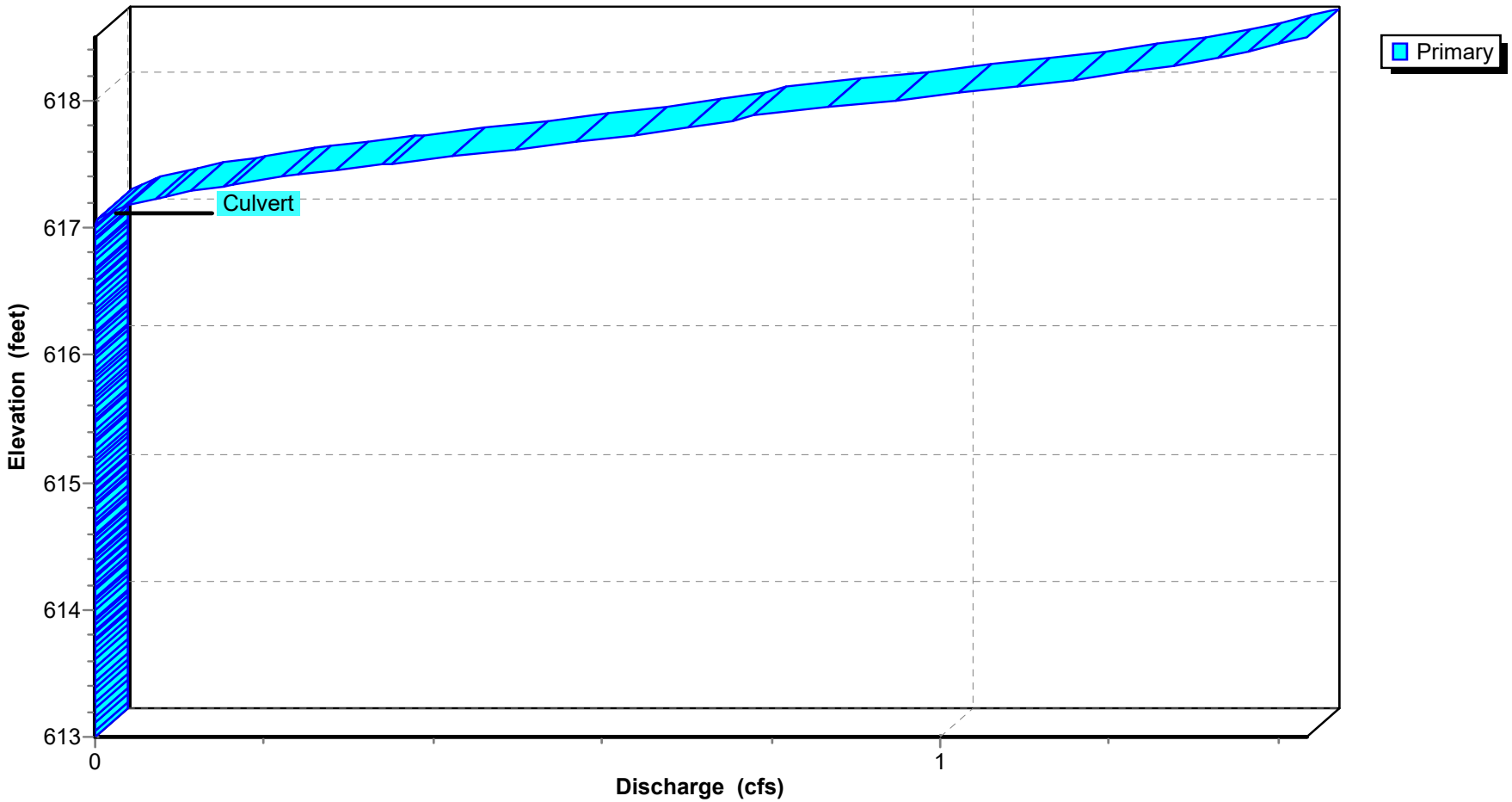


Pond 4P: ROOF INFILTRATION

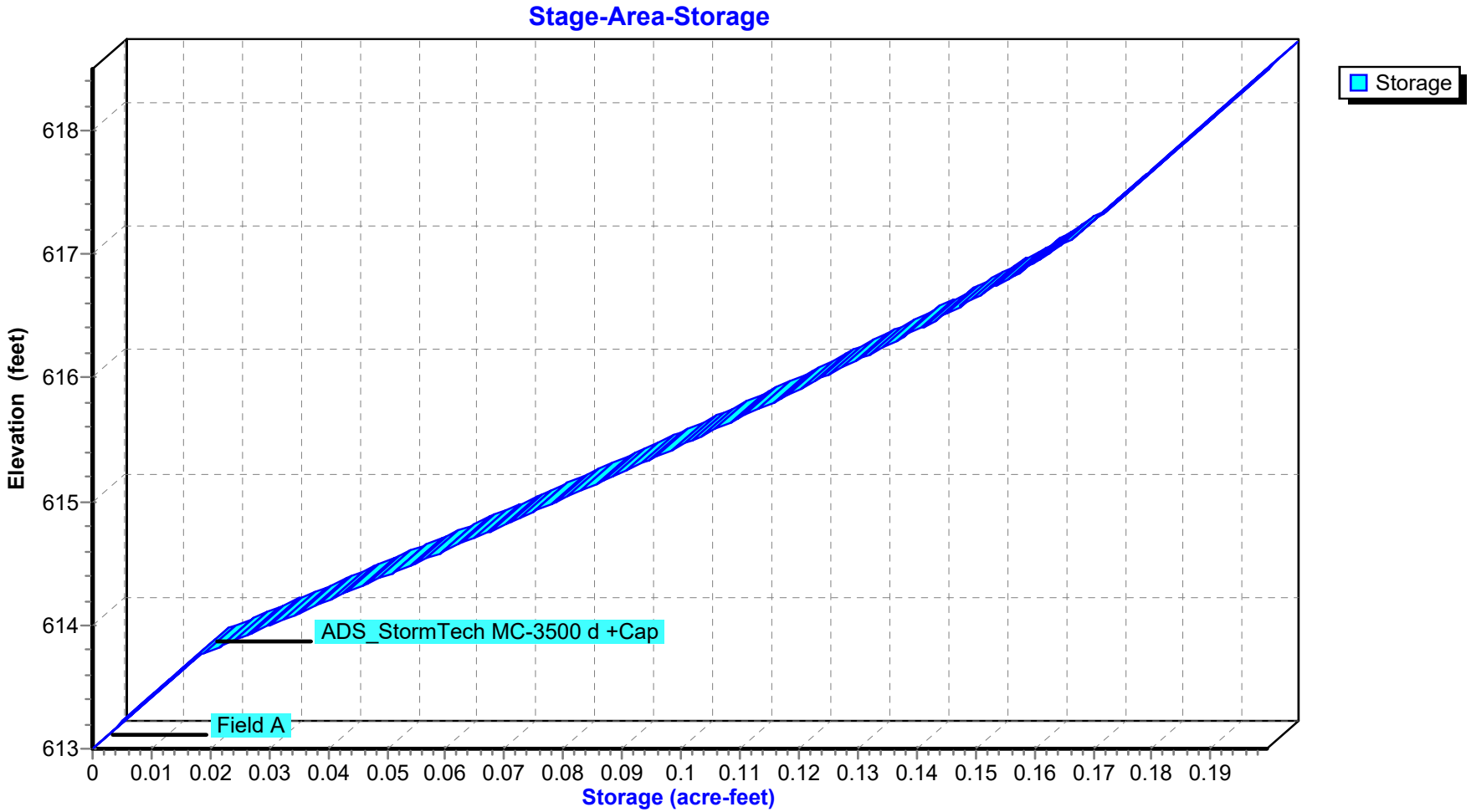


Pond 4P: ROOF INFILTRATION

Stage-Discharge



Pond 4P: ROOF INFILTRATION



Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1: DISCHARGE TO THE WEST Runoff Area=0.140 ac 0.00% Impervious Runoff Depth>3.27"
Tc=6.0 min CN=61 Runoff=0.53 cfs 0.038 af

Subcatchment P2-1: DISCHARGE TO DETENTION BASIN Runoff Area=0.600 ac 48.33% Impervious Runoff Depth>5.30"
Tc=6.0 min CN=79 Runoff=3.68 cfs 0.265 af

Subcatchment P2-2: DISCHARGE TO UNDERGROUND DETENTION Runoff Area=1.140 ac 75.44% Impervious Runoff Depth>6.47"
Tc=6.0 min CN=89 Runoff=8.15 cfs 0.614 af

Subcatchment P2-3: DISCHARGE TO THE EAST Runoff Area=1.250 ac 2.40% Impervious Runoff Depth>2.74"
Tc=6.0 min CN=56 Runoff=3.86 cfs 0.285 af

Subcatchment R4: ROOF - BUILDING #4 Runoff Area=0.099 ac 100.00% Impervious Runoff Depth>7.53"
Tc=6.0 min CN=98 Runoff=0.76 cfs 0.062 af

Subcatchment R5: ROOF - BUILDING #5 Runoff Area=0.118 ac 100.00% Impervious Runoff Depth>7.53"
Tc=6.0 min CN=98 Runoff=0.90 cfs 0.074 af

Subcatchment R6: ROOF - BUILDING #6 Runoff Area=0.090 ac 100.00% Impervious Runoff Depth>7.53"
Tc=6.0 min CN=98 Runoff=0.69 cfs 0.057 af

Subcatchment R7: ROOF - BUILDING #7 Runoff Area=0.120 ac 100.00% Impervious Runoff Depth>7.53"
Tc=6.0 min CN=98 Runoff=0.92 cfs 0.075 af

Reach 2R: TOTAL DISCHARGE TO THE EAST Inflow=6.62 cfs 1.064 af
Outflow=6.62 cfs 1.064 af

Reach 3R: PROPOSED SITE TOTAL DISCHARGE Inflow=7.15 cfs 1.102 af
Outflow=7.15 cfs 1.102 af

Pond 1P: DETENTION BASIN Peak Elev=615.83' Storage=4,750 cf Inflow=3.68 cfs 0.265 af
Outflow=1.07 cfs 0.222 af

Pond 2P: UNDERGROUND DETENTION Peak Elev=617.06' Storage=12,093 cf Inflow=8.15 cfs 0.653 af
Outflow=2.70 cfs 0.547 af

Pond 3P: ROOF INFILTRATION Peak Elev=617.59' Storage=2,331 cf Inflow=0.76 cfs 0.062 af
8.0" Round Culvert n=0.010 L=15.0' S=0.1000 '/' Outflow=0.02 cfs 0.009 af

Pond 4P: ROOF INFILTRATION Peak Elev=617.26' Storage=0.170 af Inflow=2.50 cfs 0.206 af
8.0" Round Culvert n=0.010 L=33.0' S=0.0000 '/' Outflow=0.09 cfs 0.039 af

Total Runoff Area = 3.557 ac Runoff Volume = 1.471 af Average Runoff Depth = 4.96"
54.82% Pervious = 1.950 ac 45.18% Impervious = 1.607 ac

Summary for Subcatchment P1: DISCHARGE TO THE WEST

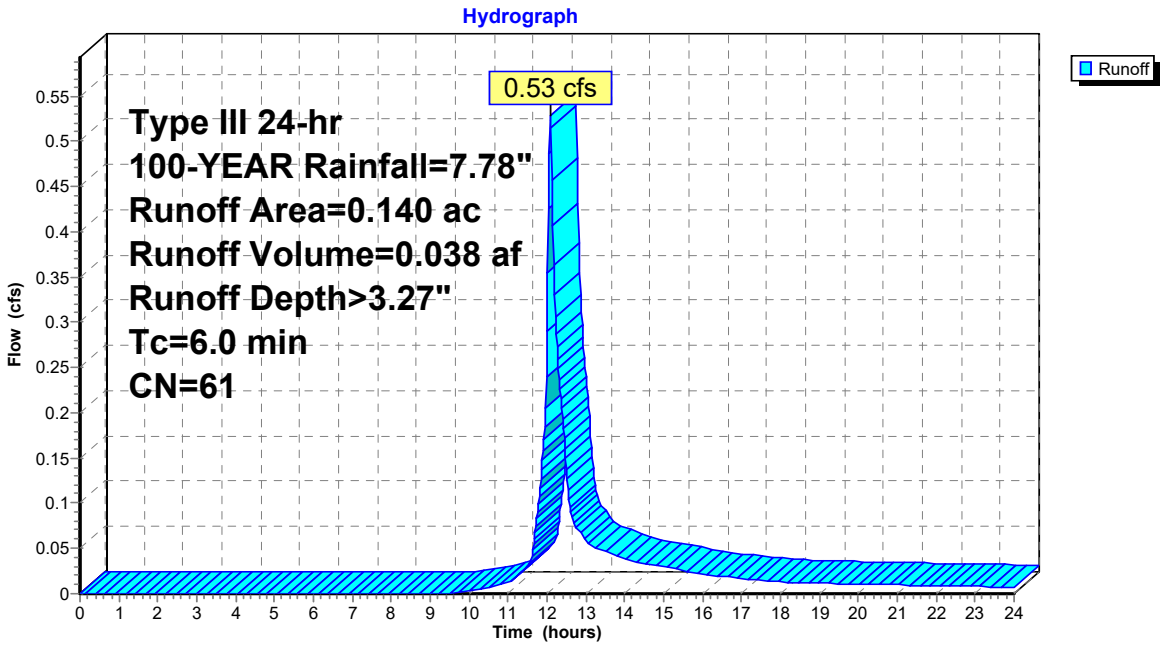
Runoff = 0.53 cfs @ 12.09 hrs, Volume= 0.038 af, Depth> 3.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-YEAR Rainfall=7.78"

Area (ac)	CN	Description
0.140	61	>75% Grass cover, Good, HSG B
0.140		100.00% Pervious Area

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

Subcatchment P1: DISCHARGE TO THE WEST



Summary for Subcatchment P2-1: DISCHARGE TO DETENTION BASIN

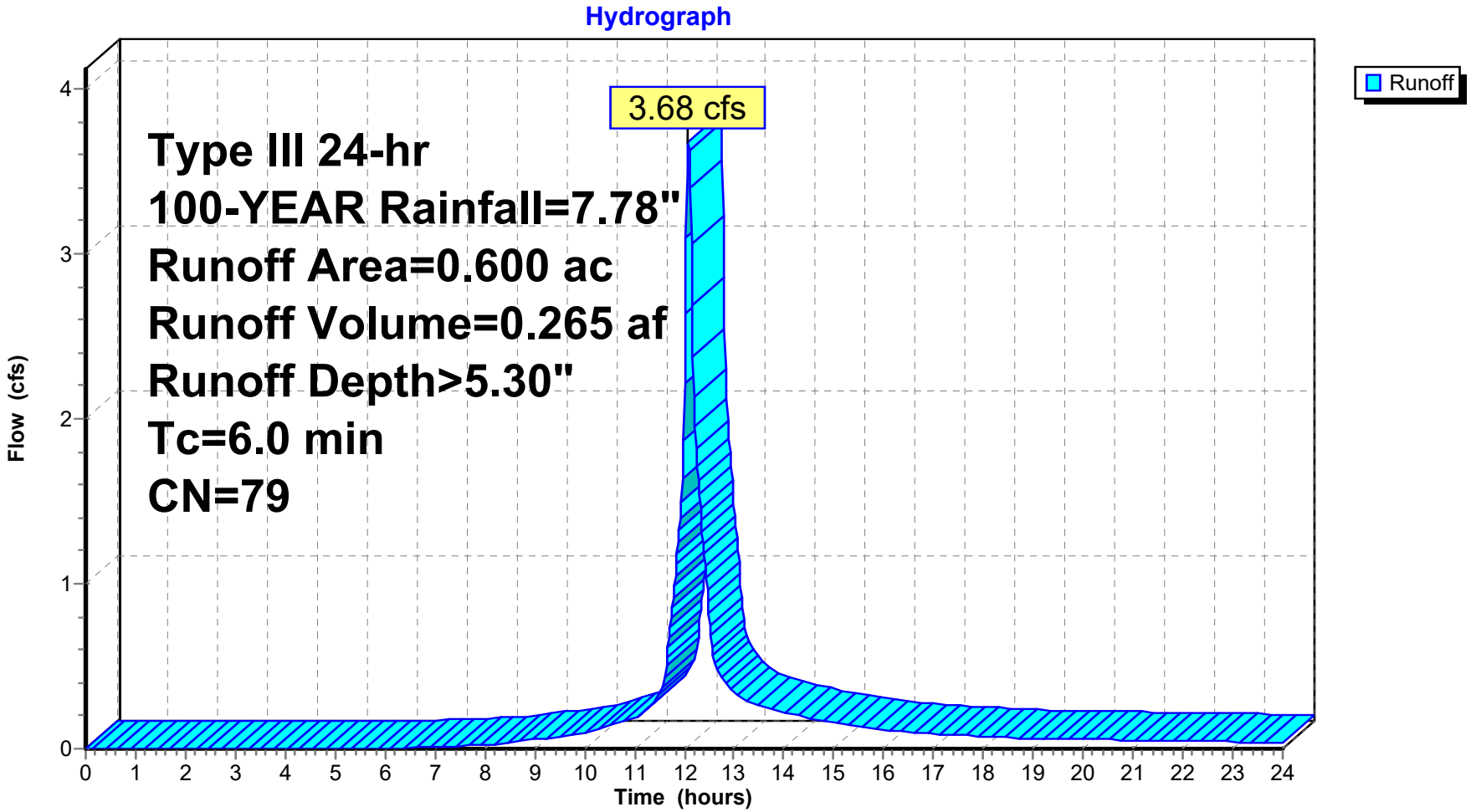
Runoff = 3.68 cfs @ 12.09 hrs, Volume= 0.265 af, Depth> 5.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-YEAR Rainfall=7.78"

Area (ac)	CN	Description
0.310	61	>75% Grass cover, Good, HSG B
0.290	98	Paved parking, HSG B
0.600	79	Weighted Average
0.310		51.67% Pervious Area
0.290		48.33% Impervious Area

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

Subcatchment P2-1: DISCHARGE TO DETENTION BASIN



Summary for Subcatchment P2-2: DISCHARGE TO UNDERGROUND DETENTION

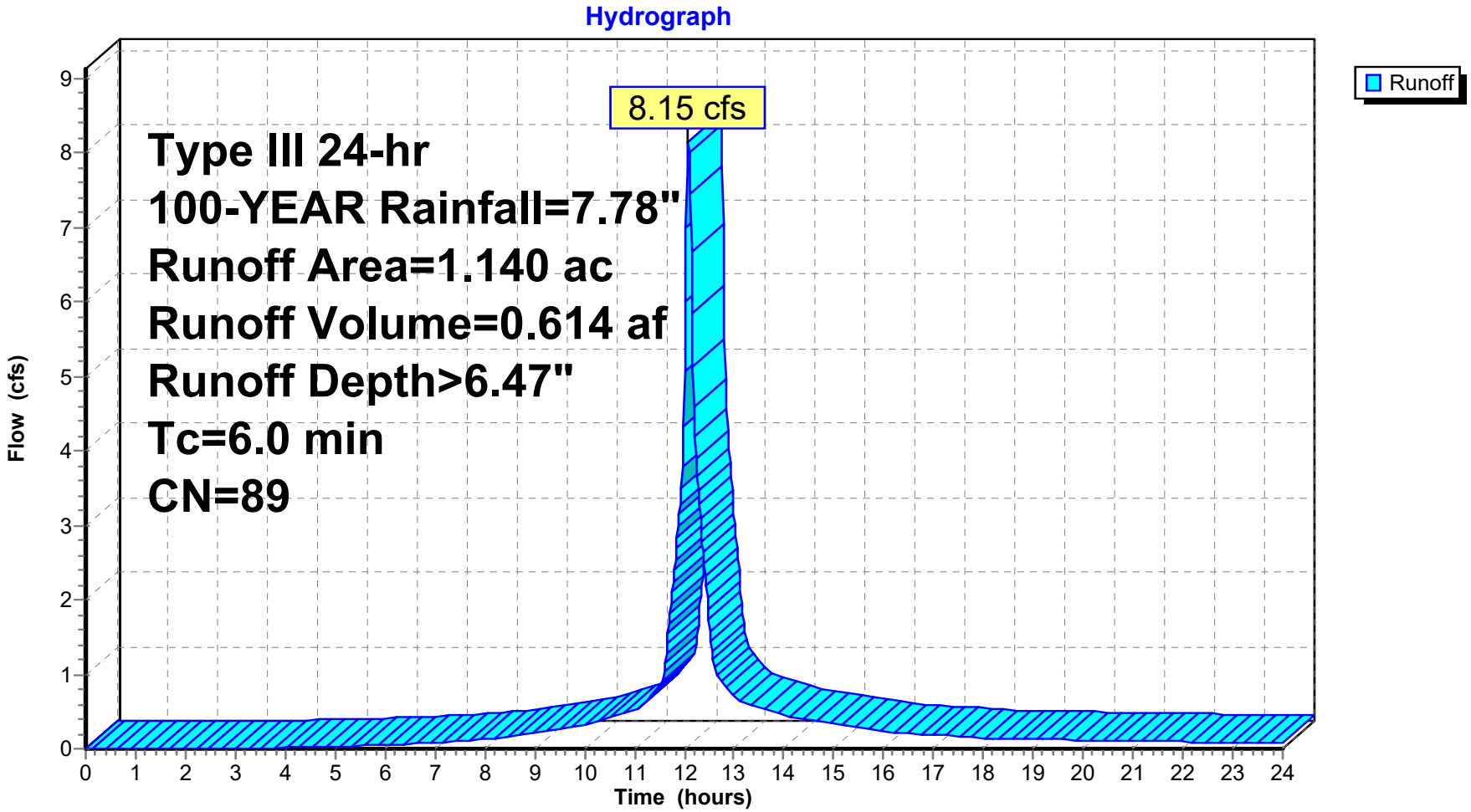
Runoff = 8.15 cfs @ 12.08 hrs, Volume= 0.614 af, Depth> 6.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-YEAR Rainfall=7.78"

Area (ac)	CN	Description
0.280	61	>75% Grass cover, Good, HSG B
0.860	98	Paved parking, HSG B
1.140	89	Weighted Average
0.280		24.56% Pervious Area
0.860		75.44% Impervious Area

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

Subcatchment P2-2: DISCHARGE TO UNDERGROUND DETENTION



Summary for Subcatchment P2-3: DISCHARGE TO THE EAST

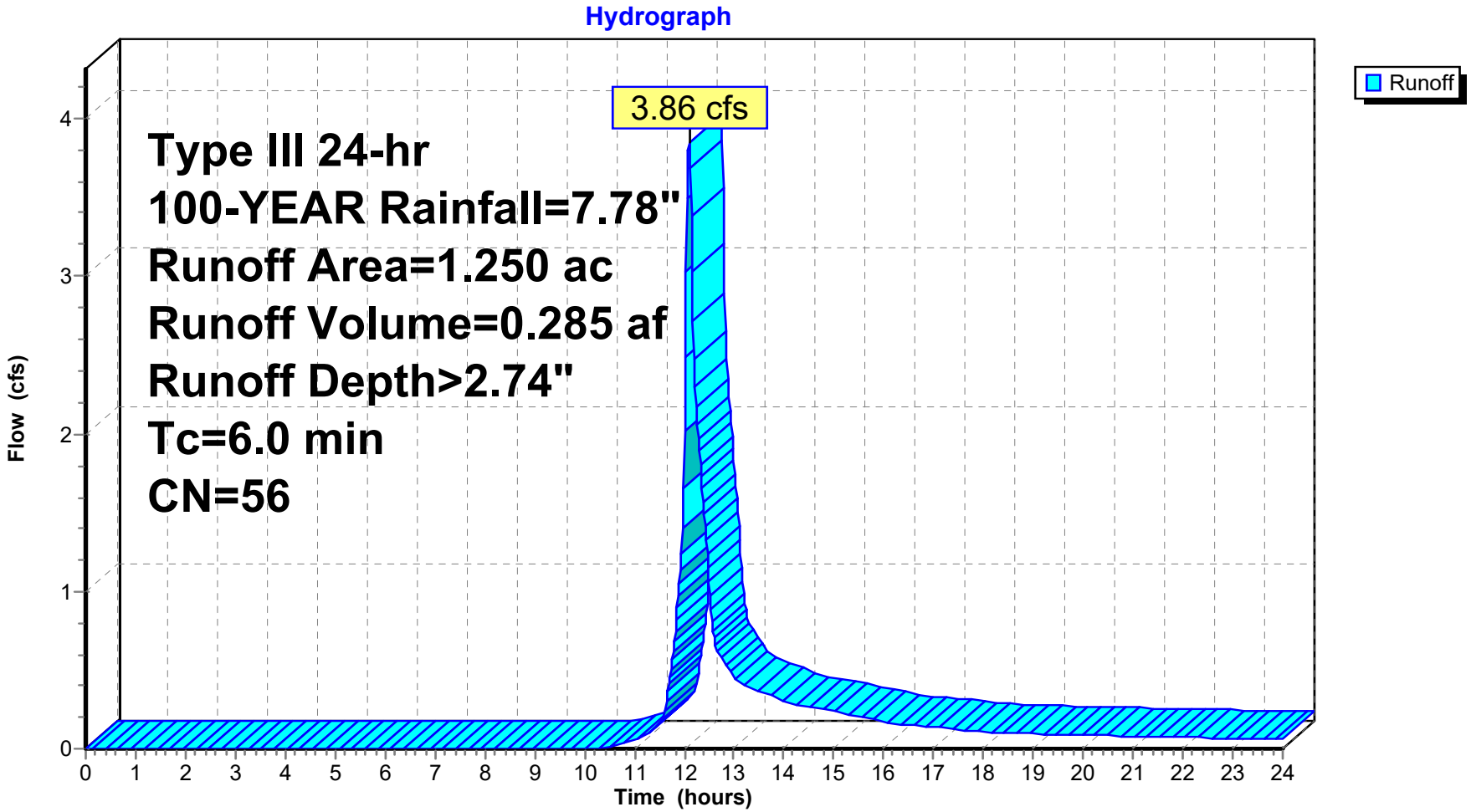
Runoff = 3.86 cfs @ 12.09 hrs, Volume= 0.285 af, Depth> 2.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-YEAR Rainfall=7.78"

Area (ac)	CN	Description
0.670	61	>75% Grass cover, Good, HSG B
0.550	48	Brush, Good, HSG B
0.030	98	Paved parking, HSG B
1.250	56	Weighted Average
1.220		97.60% Pervious Area
0.030		2.40% Impervious Area

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

Subcatchment P2-3: DISCHARGE TO THE EAST



Summary for Subcatchment R4: ROOF - BUILDING #4

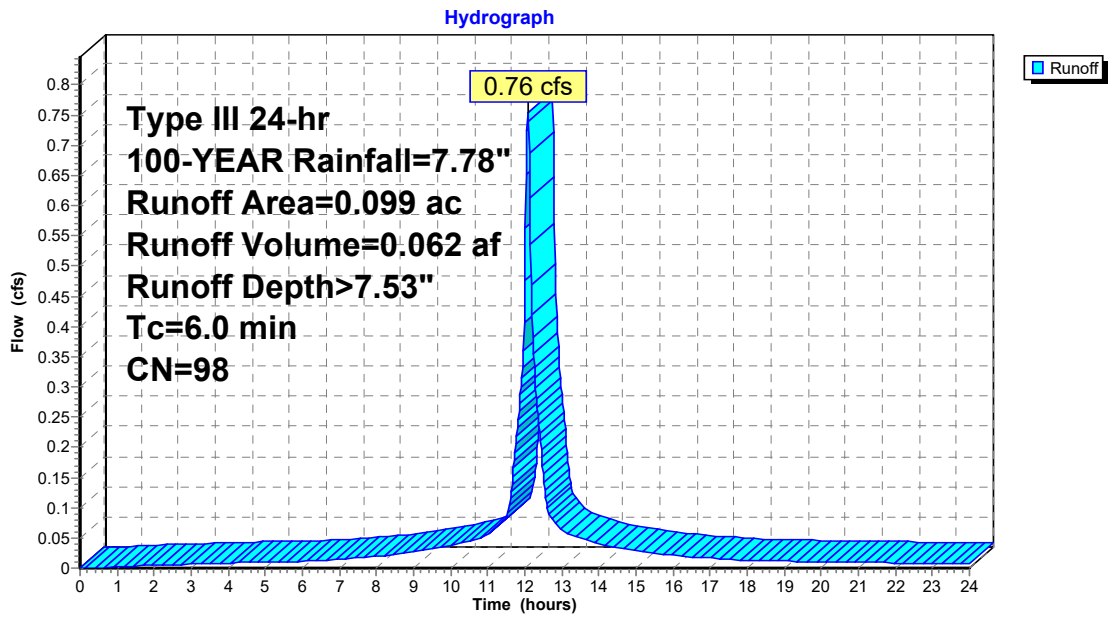
Runoff = 0.76 cfs @ 12.08 hrs, Volume= 0.062 af, Depth> 7.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-YEAR Rainfall=7.78"

Area (ac)	CN	Description
0.099	98	Unconnected roofs, HSG B
0.099		100.00% Impervious Area
0.099		100.00% Unconnected

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

Subcatchment R4: ROOF - BUILDING #4



Summary for Subcatchment R5: ROOF - BUILDING #5

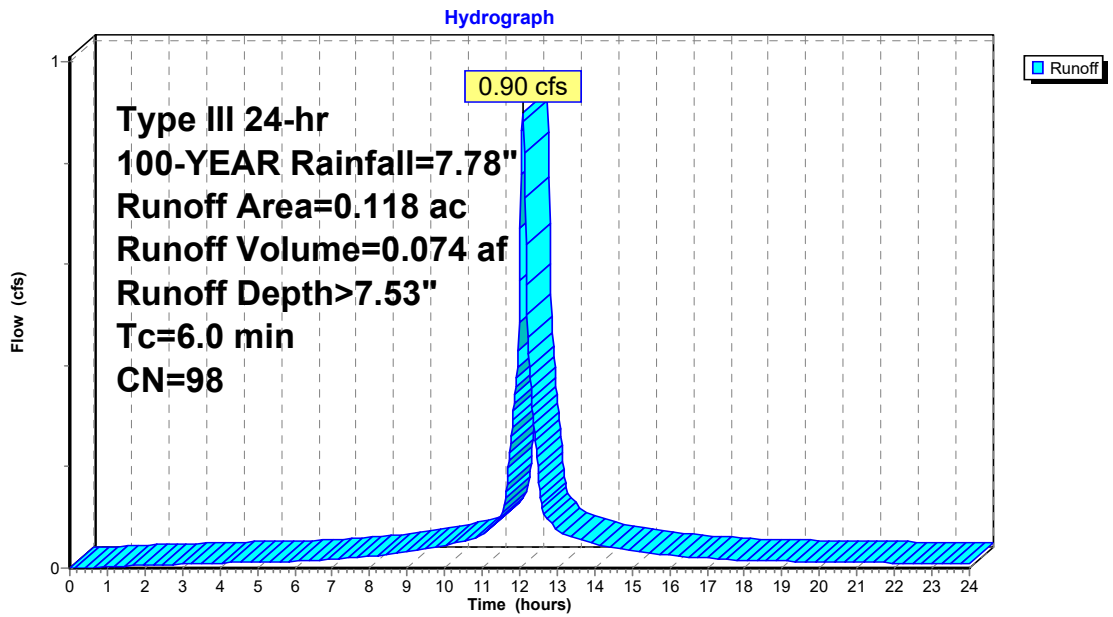
Runoff = 0.90 cfs @ 12.08 hrs, Volume= 0.074 af, Depth> 7.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-YEAR Rainfall=7.78"

Area (ac)	CN	Description
0.118	98	Unconnected roofs, HSG B
0.118		100.00% Impervious Area
0.118		100.00% Unconnected

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

Subcatchment R5: ROOF - BUILDING #5



Summary for Subcatchment R6: ROOF - BUILDING #6

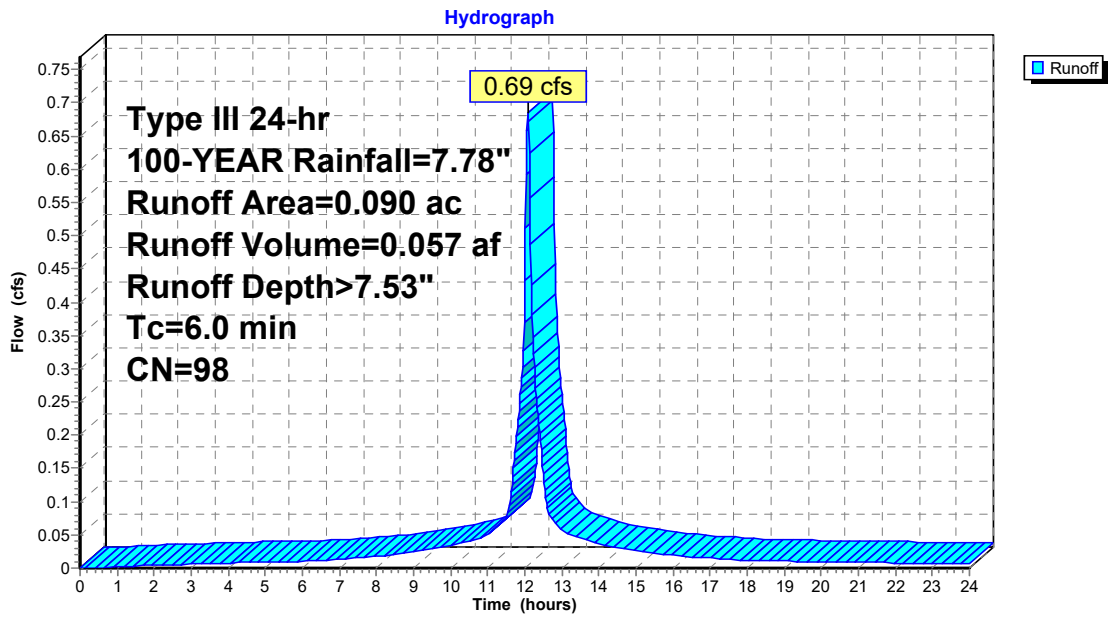
Runoff = 0.69 cfs @ 12.08 hrs, Volume= 0.057 af, Depth> 7.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-YEAR Rainfall=7.78"

Area (ac)	CN	Description
0.090	98	Unconnected roofs, HSG B
0.090		100.00% Impervious Area
0.090		100.00% Unconnected

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

Subcatchment R6: ROOF - BUILDING #6



Summary for Subcatchment R7: ROOF - BUILDING #7

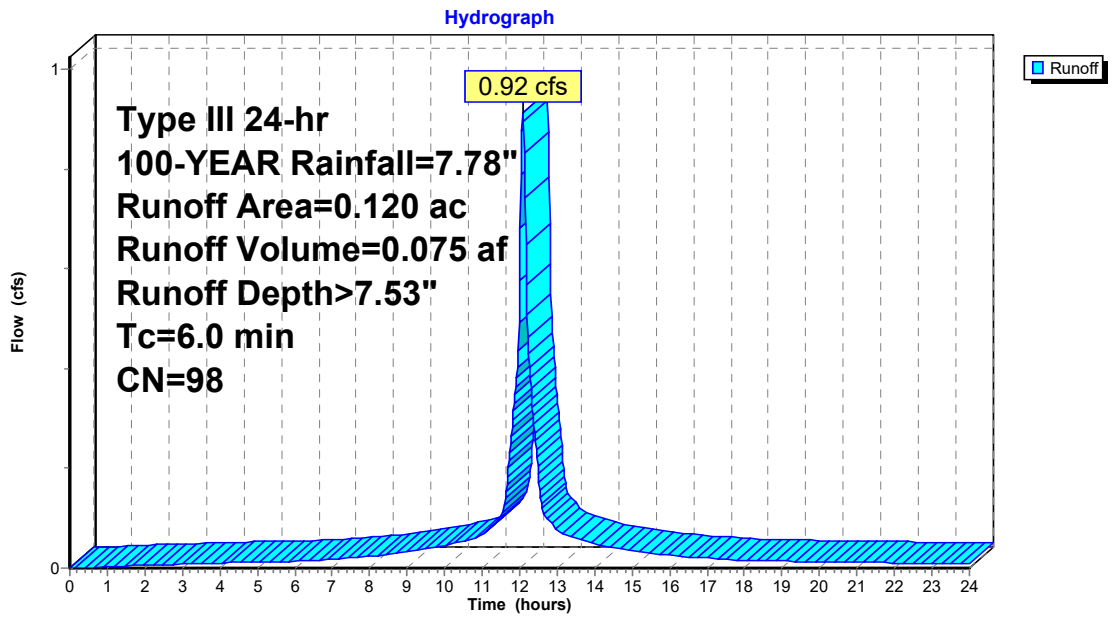
Runoff = 0.92 cfs @ 12.08 hrs, Volume= 0.075 af, Depth> 7.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-YEAR Rainfall=7.78"

Area (ac)	CN	Description
0.120	98	Unconnected roofs, HSG B
0.120		100.00% Impervious Area
0.120		100.00% Unconnected

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

Subcatchment R7: ROOF - BUILDING #7



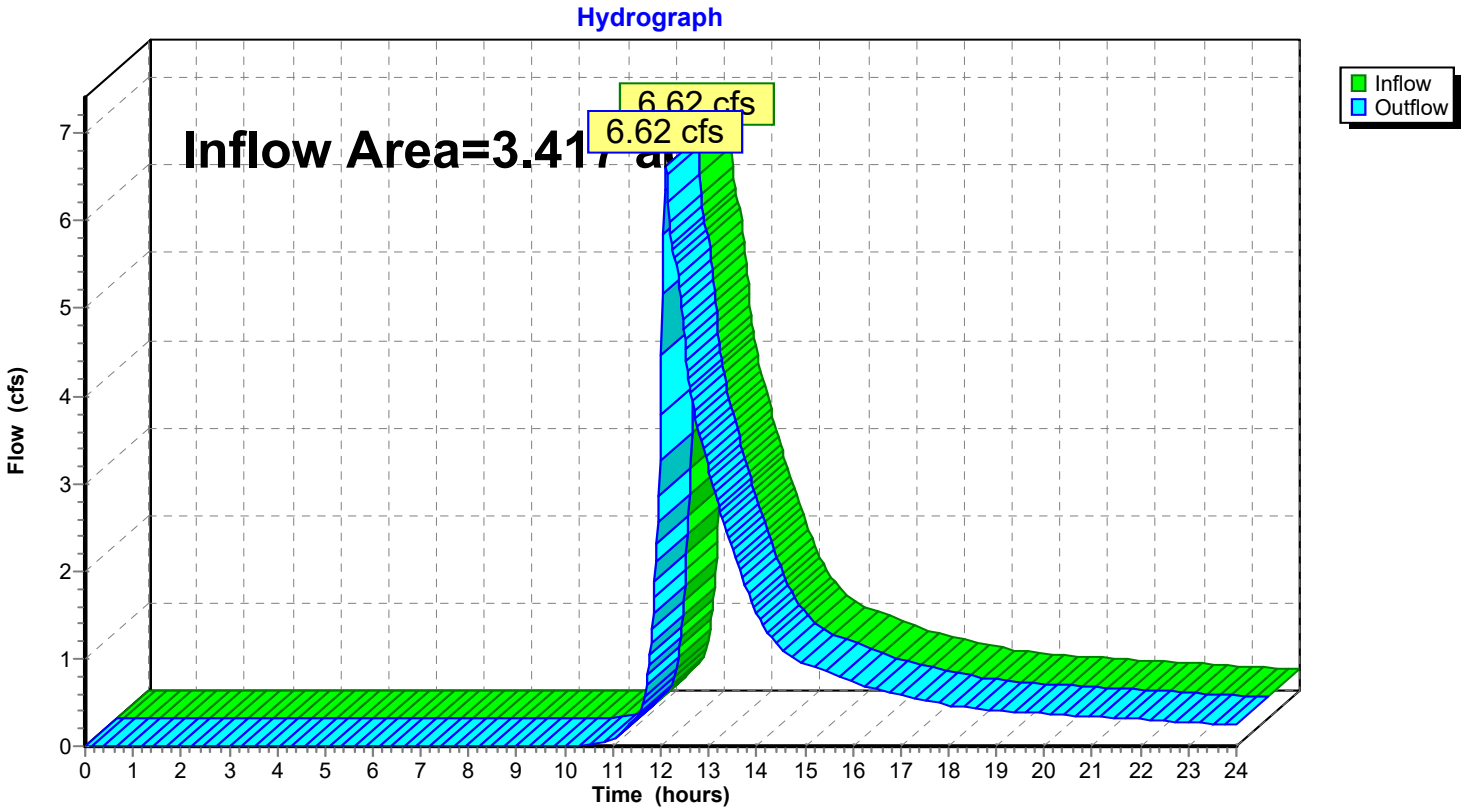
Summary for Reach 2R: TOTAL DISCHARGE TO THE EAST

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.417 ac, 47.03% Impervious, Inflow Depth > 3.74" for 100-YEAR event
Inflow = 6.62 cfs @ 12.11 hrs, Volume= 1.064 af
Outflow = 6.62 cfs @ 12.11 hrs, Volume= 1.064 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 2R: TOTAL DISCHARGE TO THE EAST



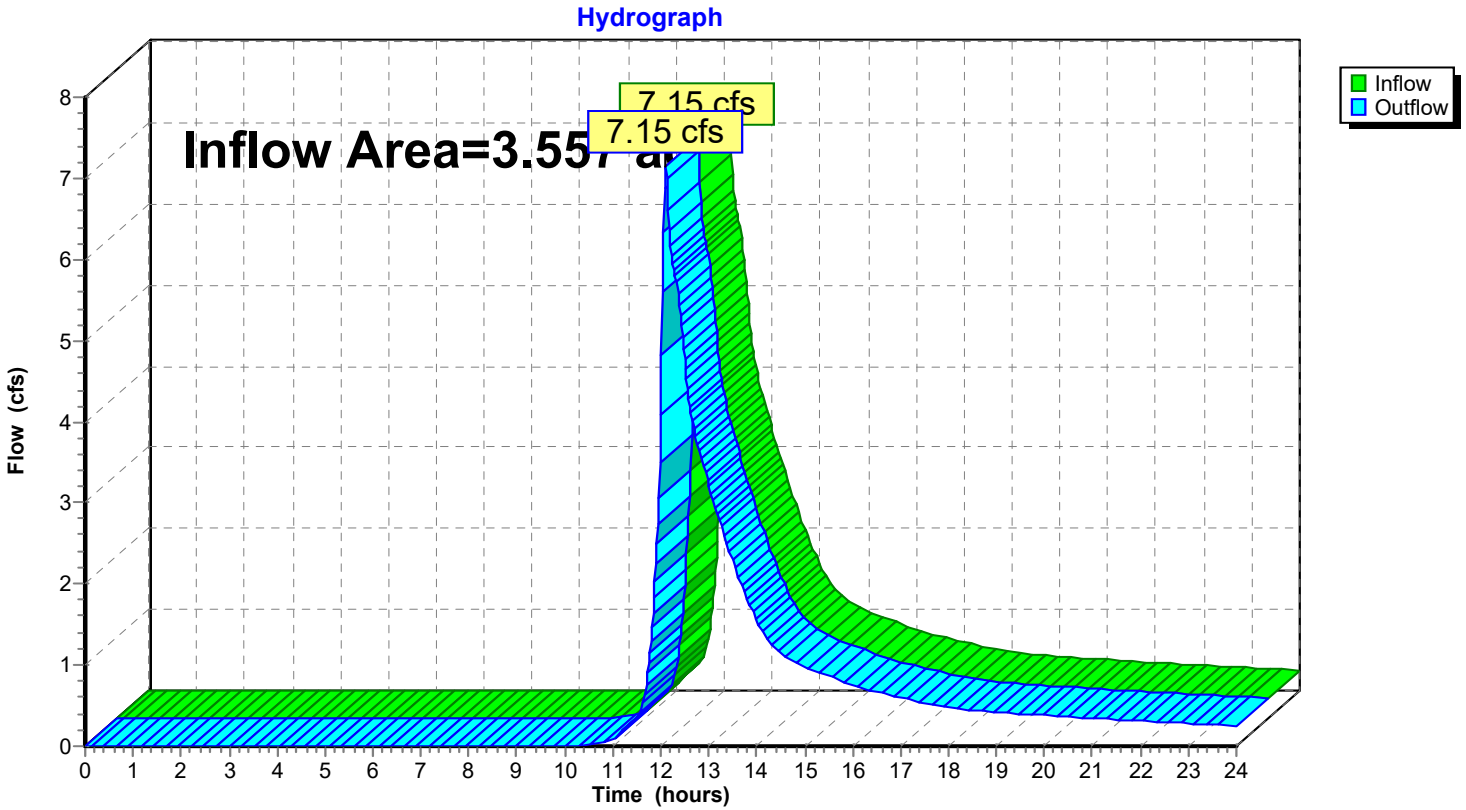
Summary for Reach 3R: PROPOSED SITE TOTAL DISCHARGE

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.557 ac, 45.18% Impervious, Inflow Depth > 3.72" for 100-YEAR event
Inflow = 7.15 cfs @ 12.11 hrs, Volume= 1.102 af
Outflow = 7.15 cfs @ 12.11 hrs, Volume= 1.102 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 3R: PROPOSED SITE TOTAL DISCHARGE



Summary for Pond 1P: DETENTION BASIN

[58] Hint: Peaked 0.89' above defined flood level

Inflow Area = 0.600 ac, 48.33% Impervious, Inflow Depth > 5.30" for 100-YEAR event
Inflow = 3.68 cfs @ 12.09 hrs, Volume= 0.265 af
Outflow = 1.07 cfs @ 12.43 hrs, Volume= 0.222 af, Atten= 71%, Lag= 20.7 min
Primary = 1.07 cfs @ 12.43 hrs, Volume= 0.222 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 615.83' @ 12.43 hrs Surf.Area= 2,463 sf Storage= 4,750 cf
Flood Elev= 614.94' Surf.Area= 1,948 sf Storage= 2,797 cf

Plug-Flow detention time= 128.9 min calculated for 0.222 af (84% of inflow)
Center-of-Mass det. time= 62.8 min (868.5 - 805.7)

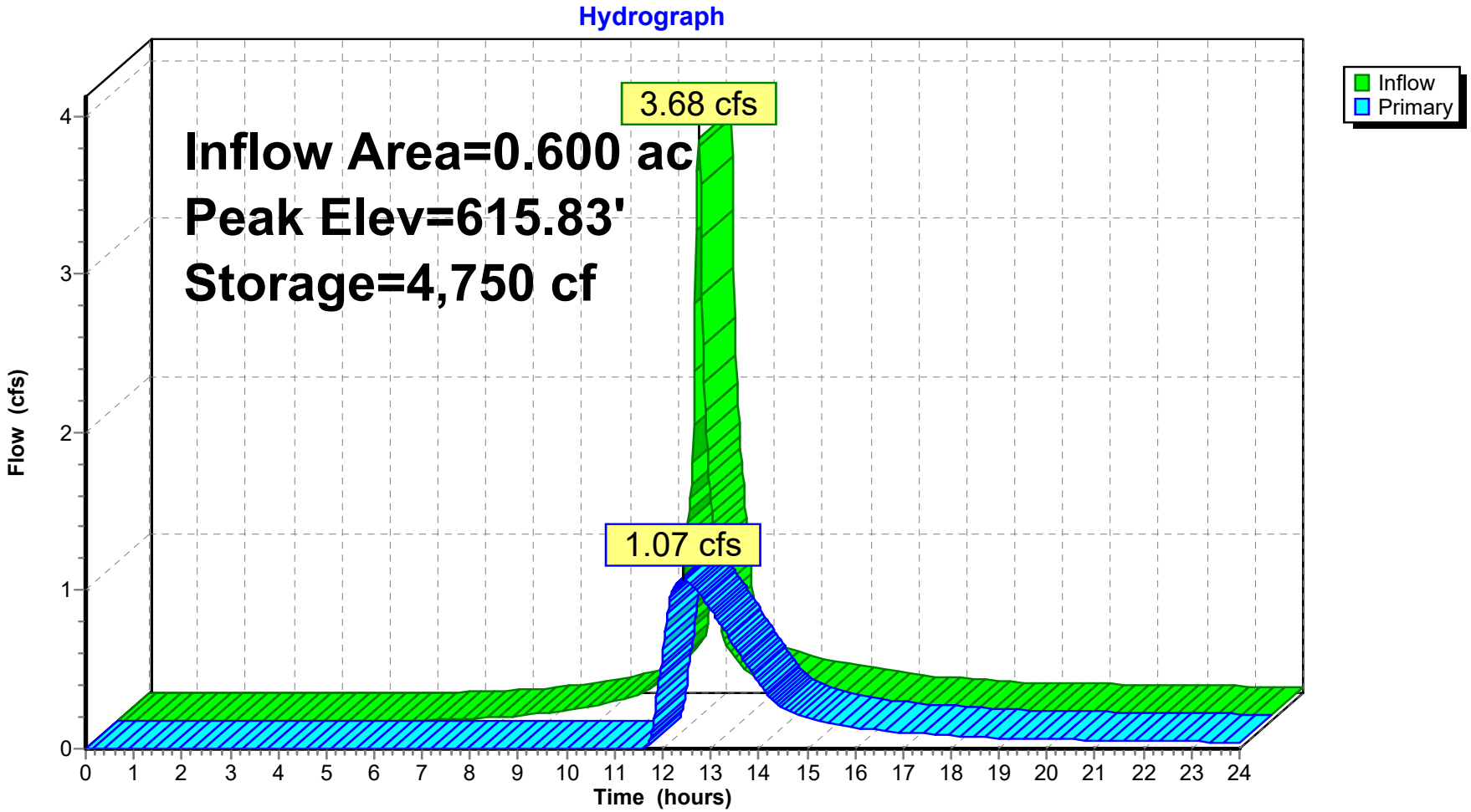
Volume	Invert	Avail.Storage	Storage Description
#1	613.00'	6,621 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
613.00	984	145.0	0	0	984
614.00	1,446	164.0	1,208	1,208	1,476
615.00	1,983	186.0	1,707	2,915	2,113
616.00	2,570	205.0	2,270	5,185	2,736
616.50	3,185	230.0	1,436	6,621	3,608

Device	Routing	Invert	Outlet Devices
#1	Primary	614.05'	**15.0" Round Culvert** L= 105.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 614.05' / 613.00' S= 0.0100 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf
#2	Device 1	614.30'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	616.00'	**15.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

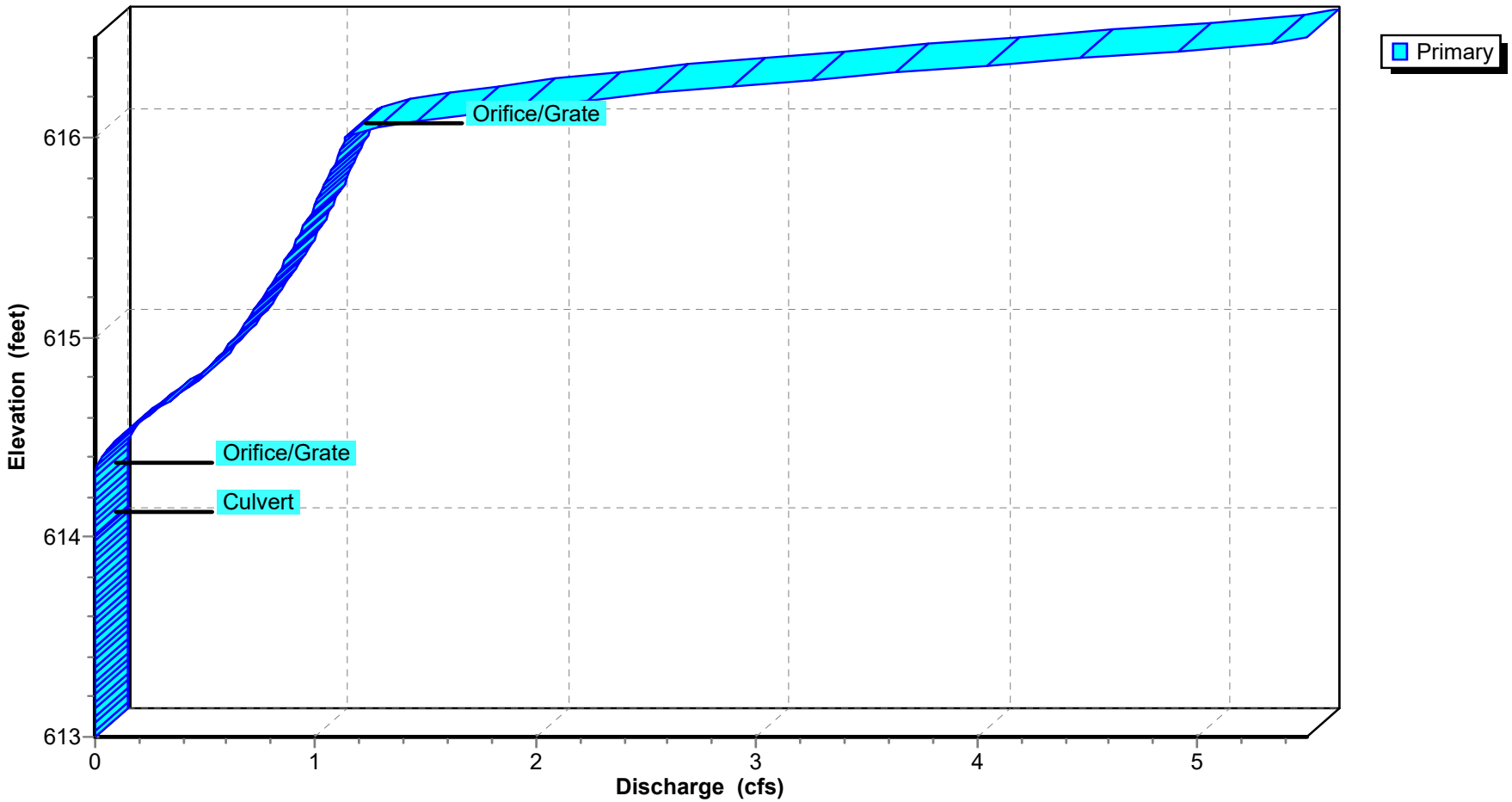
Primary OutFlow Max=1.07 cfs @ 12.43 hrs HW=615.83' (Free Discharge)
└─**1=Culvert** (Passes 1.07 cfs of 6.34 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.07 cfs @ 5.44 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: DETENTION BASIN

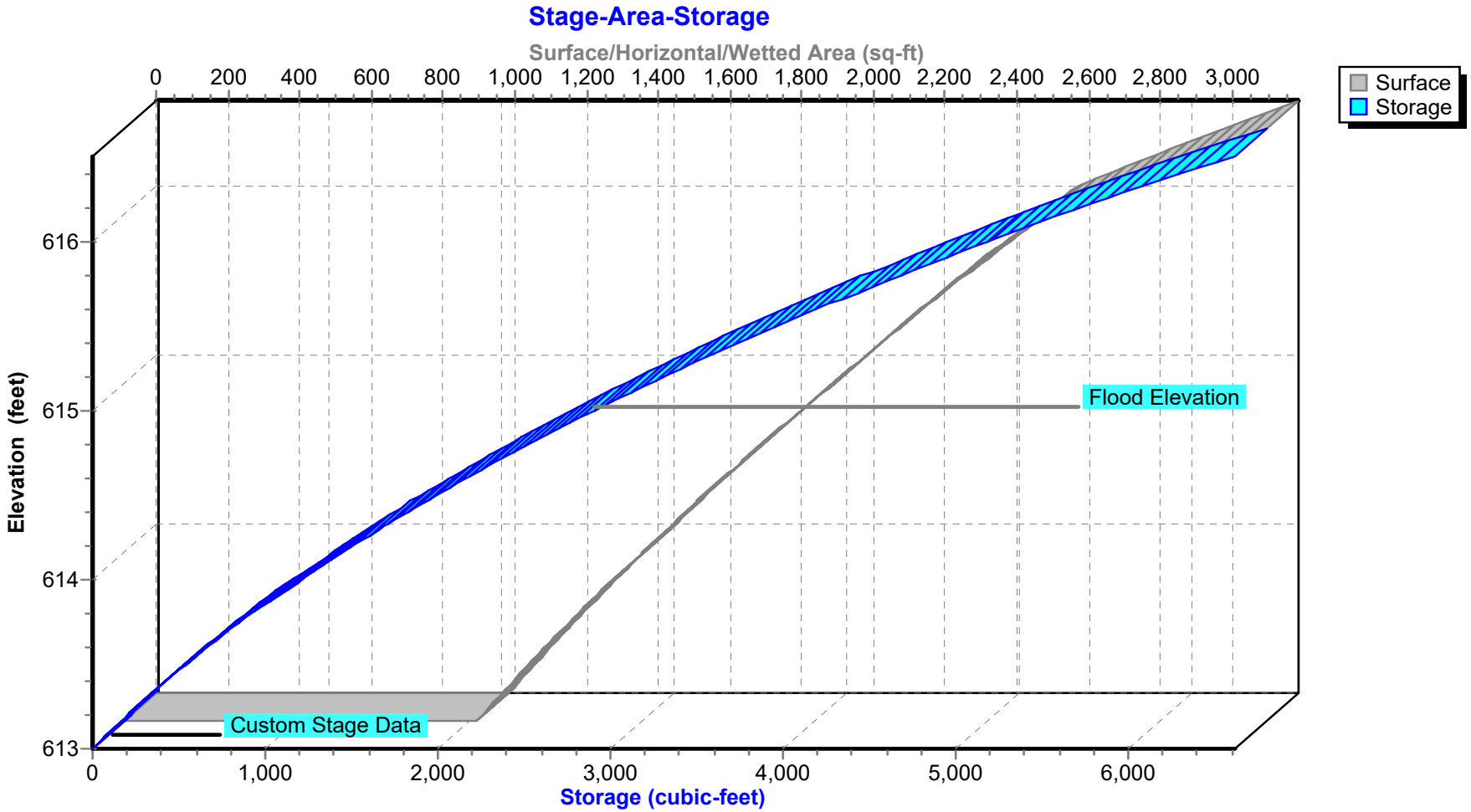


Pond 1P: DETENTION BASIN

Stage-Discharge



Pond 1P: DETENTION BASIN



Summary for Pond 2P: UNDERGROUND DETENTION

[81] Warning: Exceeded Pond 4P by 0.95' @ 12.30 hrs

Inflow Area = 1.468 ac, 80.93% Impervious, Inflow Depth > 5.34" for 100-YEAR event
Inflow = 8.15 cfs @ 12.08 hrs, Volume= 0.653 af
Outflow = 2.70 cfs @ 12.37 hrs, Volume= 0.547 af, Atten= 67%, Lag= 17.2 min
Primary = 2.70 cfs @ 12.37 hrs, Volume= 0.547 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 617.06' @ 12.37 hrs Surf.Area= 5,913 sf Storage= 12,093 cf

Plug-Flow detention time= 168.4 min calculated for 0.547 af (84% of inflow)
Center-of-Mass det. time= 97.4 min (894.9 - 797.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	613.75'	6,633 cf	**36.50'W x 162.00'L x 4.00'H Field A** 23,652 cf Overall - 7,069 cf Embedded = 16,583 cf x 40.0% Voids
#2A	614.25'	7,069 cf	**CMP Round 30** x 72 Inside #1 Effective Size= 30.0"W x 30.0"H => 4.91 sf x 20.00'L = 98.2 cf Overall Size= 30.0"W x 30.0"H x 20.00'L 9 Rows of 8 Chambers
#3	614.25'	31 cf	**15.0" Round Pipe Storage** L= 25.0'
		13,733 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	613.75'	**15.0" Round Culvert** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 613.25' / 613.75' S= -0.0278 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf
#2	Device 1	614.86'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	615.33'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	617.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.70 cfs @ 12.37 hrs HW=617.06' (Free Discharge)
└─**1=Culvert** (Passes 2.70 cfs of 9.68 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.60 cfs @ 6.86 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 1.98 cfs @ 5.68 fps)
  └─**4=Orifice/Grate** (Weir Controls 0.11 cfs @ 0.78 fps)

Pond 2P: UNDERGROUND DETENTION - Chamber Wizard Field A

Chamber Model = CMP Round 30 (Round Corrugated Metal Pipe)
Effective Size= 30.0"W x 30.0"H => 4.91 sf x 20.00'L = 98.2 cf
Overall Size= 30.0"W x 30.0"H x 20.00'L

30.0" Wide + 18.0" Spacing = 48.0" C-C Row Spacing

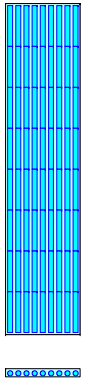
8 Chambers/Row x 20.00' Long = 160.00' Row Length +12.0" End Stone x 2 = 162.00' Base Length
9 Rows x 30.0" Wide + 18.0" Spacing x 8 + 12.0" Side Stone x 2 = 36.50' Base Width
6.0" Base + 30.0" Chamber Height + 12.0" Cover = 4.00' Field Height

72 Chambers x 98.2 cf = 7,068.6 cf Chamber Storage

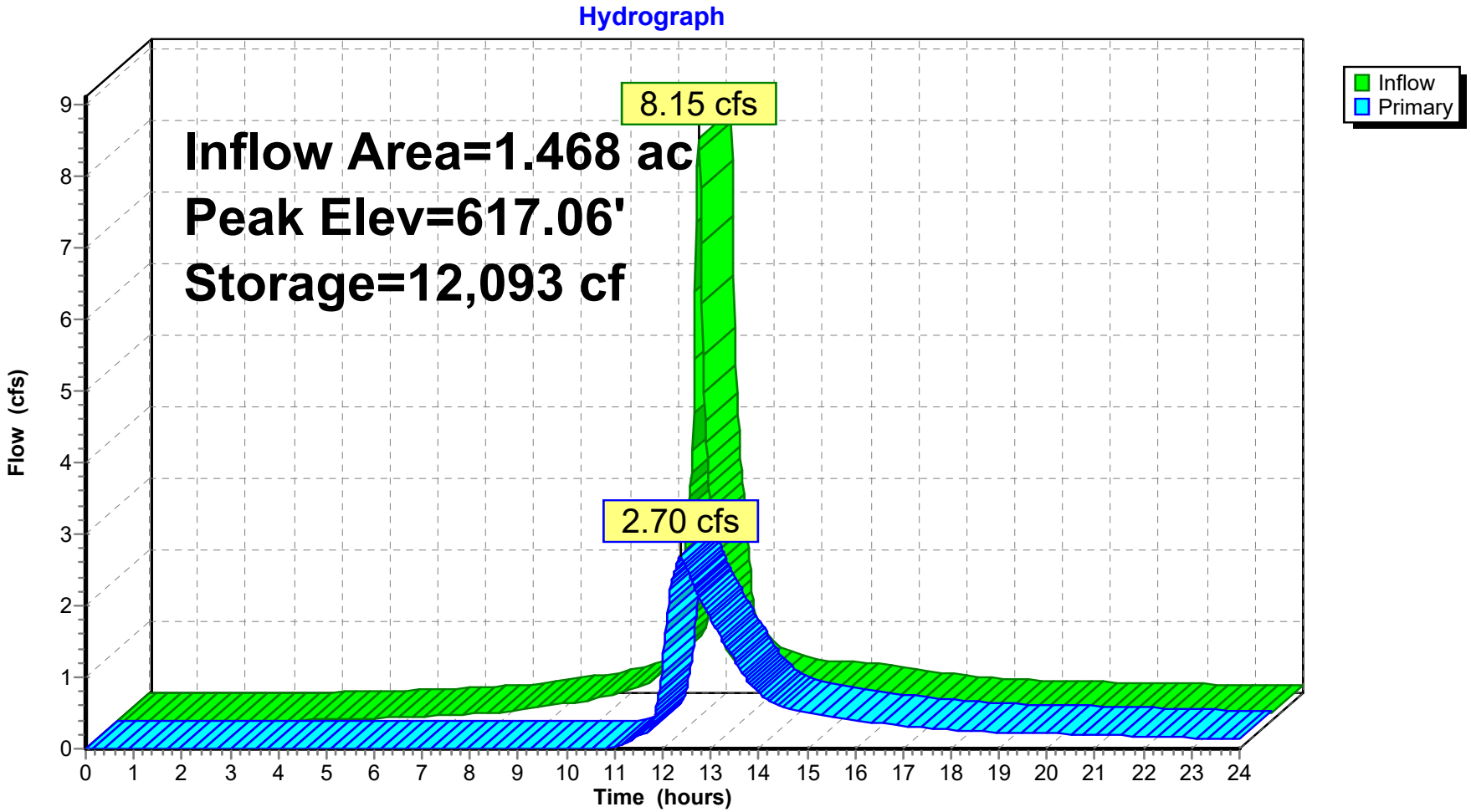
23,652.0 cf Field - 7,068.6 cf Chambers = 16,583.4 cf Stone x 40.0% Voids = 6,633.4 cf Stone Storage

Chamber Storage + Stone Storage = 13,702.0 cf = 0.315 af
Overall Storage Efficiency = 57.9%
Overall System Size = 162.00' x 36.50' x 4.00'

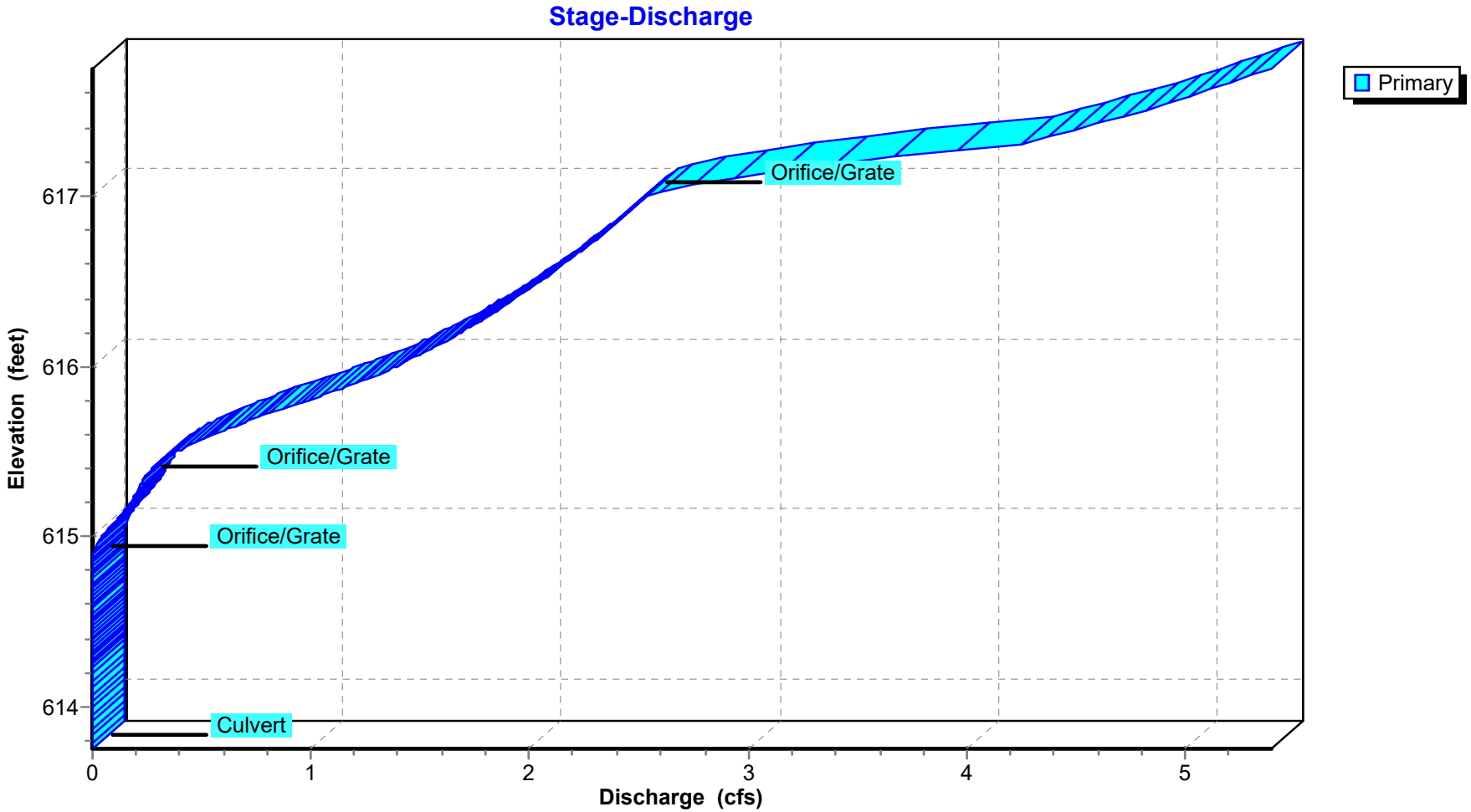
72 Chambers
876.0 cy Field
614.2 cy Stone



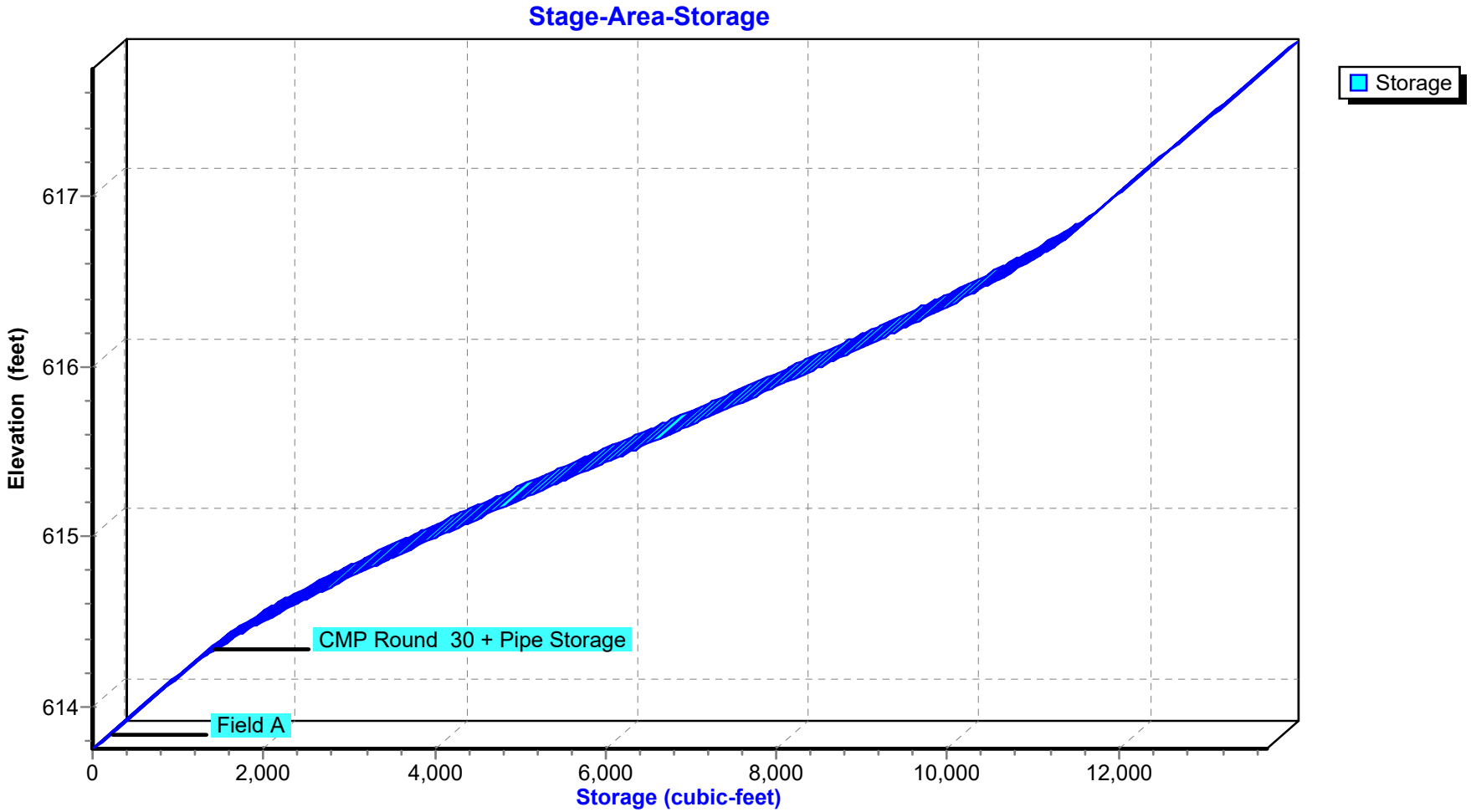
Pond 2P: UNDERGROUND DETENTION



Pond 2P: UNDERGROUND DETENTION



Pond 2P: UNDERGROUND DETENTION



Summary for Pond 3P: ROOF INFILTRATION

Inflow Area = 0.099 ac,100.00% Impervious, Inflow Depth > 7.53" for 100-YEAR event
Inflow = 0.76 cfs @ 12.08 hrs, Volume= 0.062 af
Outflow = 0.02 cfs @ 15.80 hrs, Volume= 0.009 af, Atten= 97%, Lag= 222.9 min
Primary = 0.02 cfs @ 15.80 hrs, Volume= 0.009 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 617.59' @ 15.80 hrs Surf.Area= 607 sf Storage= 2,331 cf

Plug-Flow detention time= 721.0 min calculated for 0.009 af (14% of inflow)
Center-of-Mass det. time= 385.3 min (1,126.3 - 741.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	611.50'	1,192 cf	**19.42'W x 31.27'L x 7.25'H Field A** 4,401 cf Overall - 1,421 cf Embedded = 2,981 cf x 40.0% Voids
#2A	612.25'	1,421 cf	**ADS_StormTech MC-4500 +Cap** x 12 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 2 Rows of 6 Chambers Cap Storage= +35.7 cf x 2 x 2 rows = 142.8 cf
		2,613 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	617.50'	**8.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 617.50' / 616.00' S= 0.1000 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=0.02 cfs @ 15.80 hrs HW=617.59' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.02 cfs @ 0.81 fps)

Pond 3P: ROOF INFILTRATION - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-4500 +Cap (ADS StormTech® MC-4500 with cap volume)
Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf
Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap
Cap Storage= +35.7 cf x 2 x 2 rows = 142.8 cf

100.0" Wide + 9.0" Spacing = 109.0" C-C Row Spacing

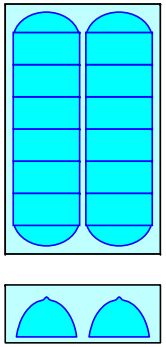
6 Chambers/Row x 4.02' Long +2.56' Cap Length x 2 = 29.27' Row Length +12.0" End Stone x 2 = 31.27' Base Length
2 Rows x 100.0" Wide + 9.0" Spacing x 1 + 12.0" Side Stone x 2 = 19.42' Base Width
9.0" Base + 60.0" Chamber Height + 18.0" Cover = 7.25' Field Height

12 Chambers x 106.5 cf + 35.7 cf Cap Volume x 2 x 2 Rows = 1,420.7 cf Chamber Storage

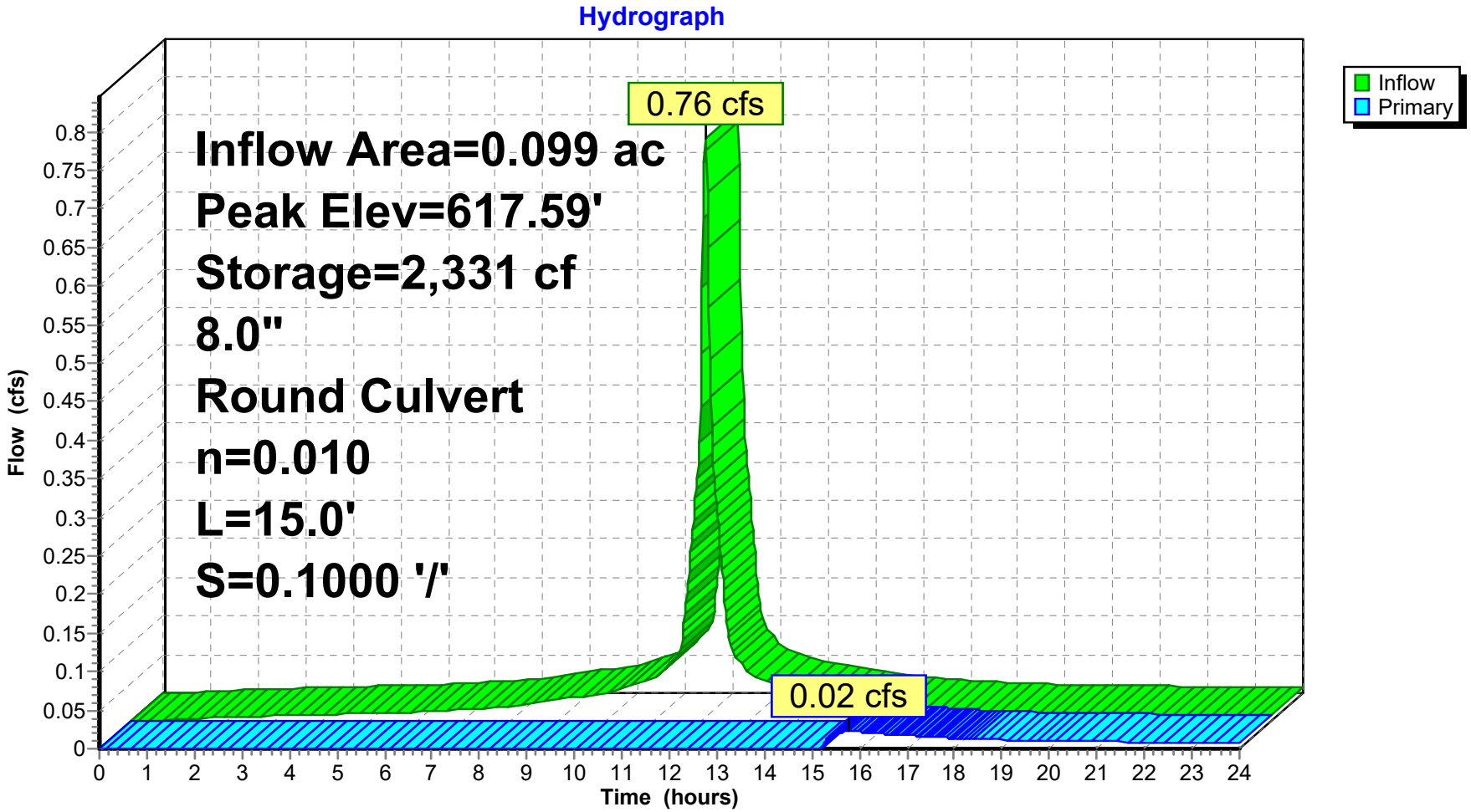
4,401.4 cf Field - 1,420.7 cf Chambers = 2,980.7 cf Stone x 40.0% Voids = 1,192.3 cf Stone Storage

Chamber Storage + Stone Storage = 2,613.0 cf = 0.060 af
Overall Storage Efficiency = 59.4%
Overall System Size = 31.27' x 19.42' x 7.25'

12 Chambers
163.0 cy Field
110.4 cy Stone

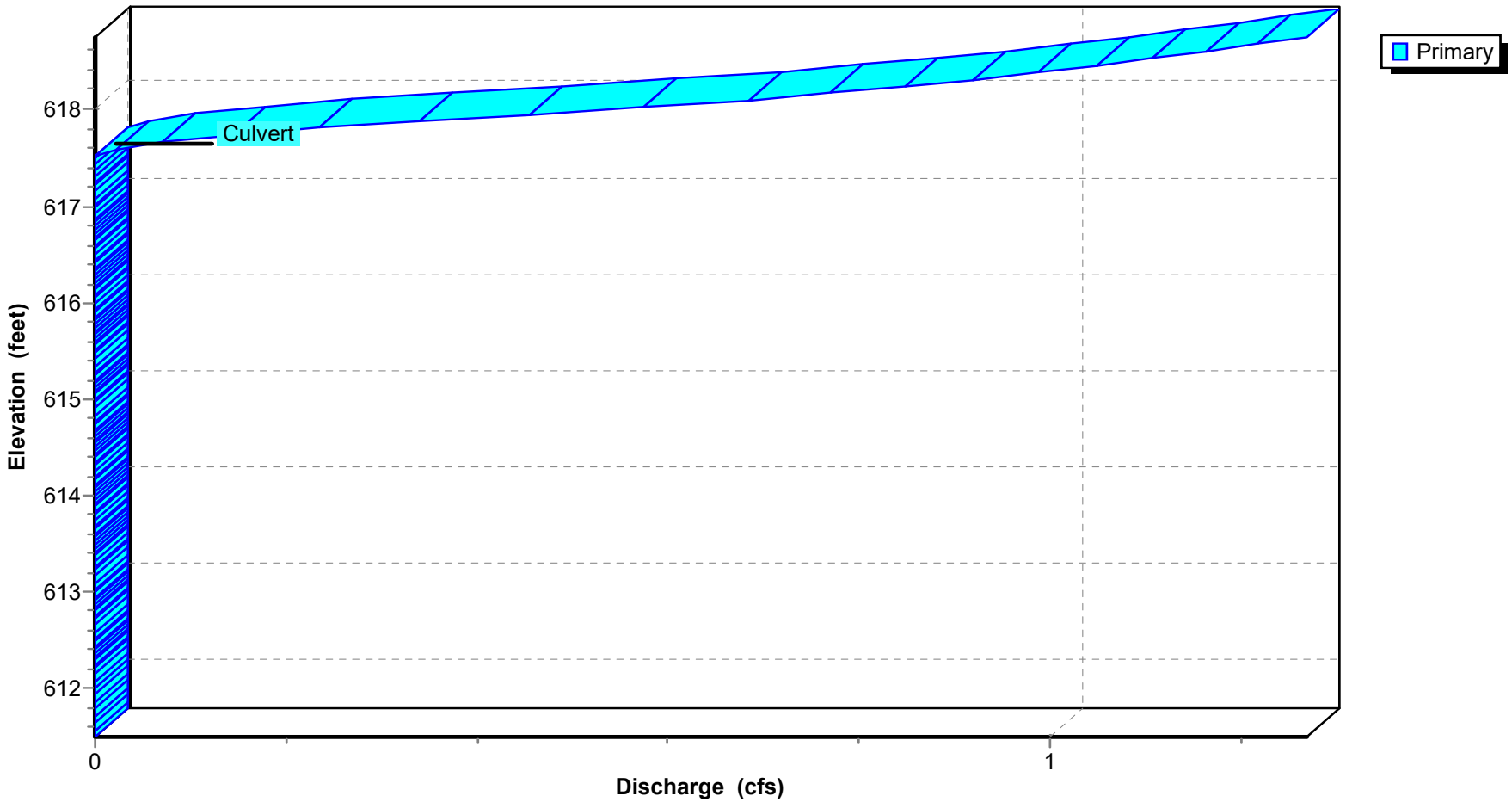


Pond 3P: ROOF INFILTRATION

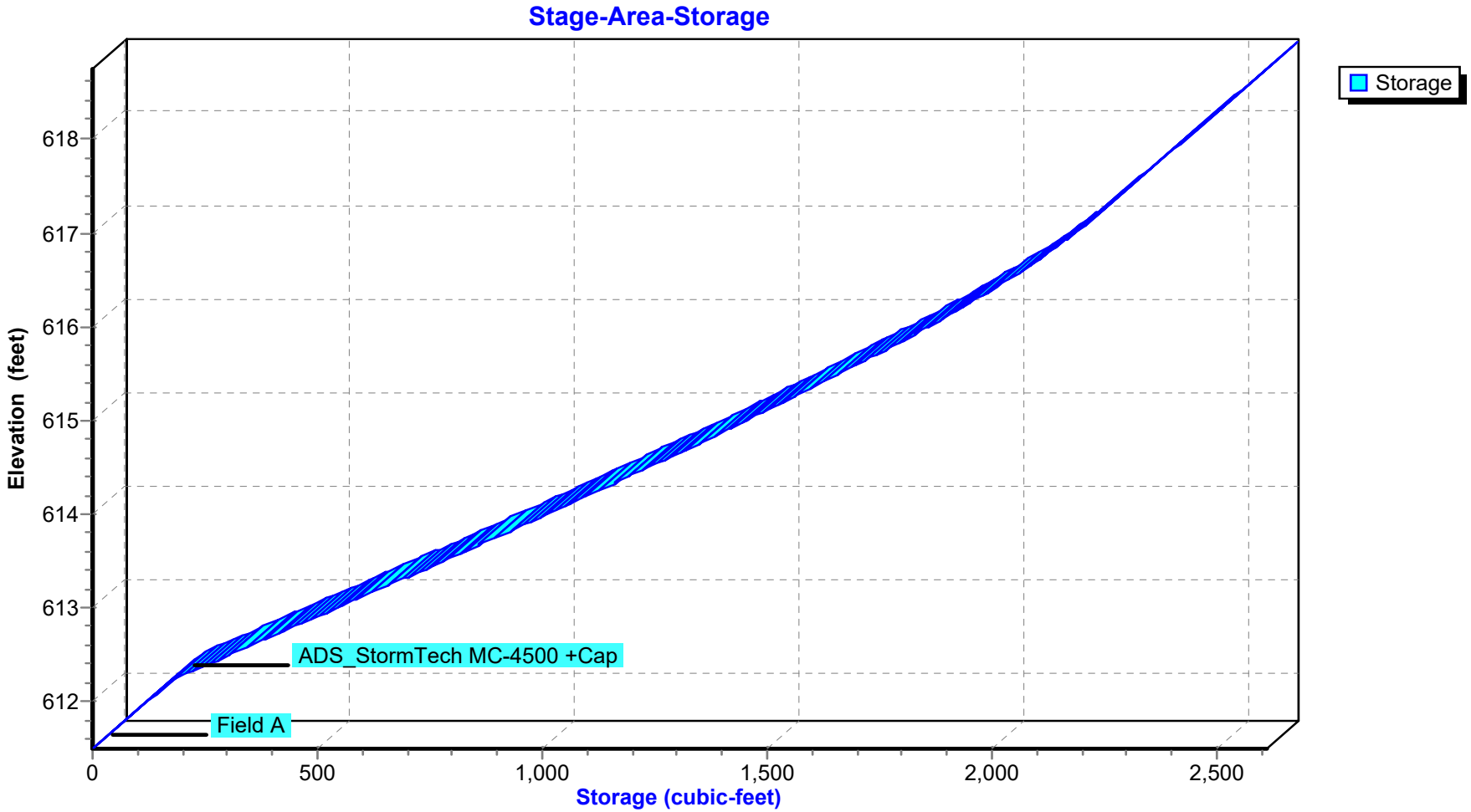


Pond 3P: ROOF INFILTRATION

Stage-Discharge



Pond 3P: ROOF INFILTRATION



Summary for Pond 4P: ROOF INFILTRATION

Inflow Area = 0.328 ac,100.00% Impervious, Inflow Depth > 7.53" for 100-YEAR event
Inflow = 2.50 cfs @ 12.08 hrs, Volume= 0.206 af
Outflow = 0.09 cfs @ 15.24 hrs, Volume= 0.039 af, Atten= 96%, Lag= 189.1 min
Primary = 0.09 cfs @ 15.24 hrs, Volume= 0.039 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 617.26' @ 15.24 hrs Surf.Area= 0.059 ac Storage= 0.170 af

Plug-Flow detention time= 626.1 min calculated for 0.039 af (19% of inflow)
Center-of-Mass det. time= 339.7 min (1,080.8 - 741.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	613.00'	0.084 af	**22.75'W x 113.25'L x 5.50'H Field A** 0.325 af Overall - 0.116 af Embedded = 0.210 af x 40.0% Voids
#2A	613.75'	0.116 af	**ADS_StormTech MC-3500 d +Cap** x 45 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 3 Rows of 15 Chambers Cap Storage= +14.9 cf x 2 x 3 rows = 89.4 cf
		0.200 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	617.00'	**8.0" Round Culvert** L= 33.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 617.00' / 617.00' S= 0.0000 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=0.09 cfs @ 15.24 hrs HW=617.26' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.09 cfs @ 1.07 fps)

Pond 4P: ROOF INFILTRATION - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 3 rows = 89.4 cf

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

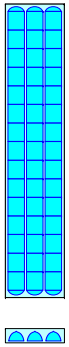
15 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 111.25' Row Length +12.0" End Stone x 2 = 113.25' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

45 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 3 Rows = 5,037.2 cf Chamber Storage

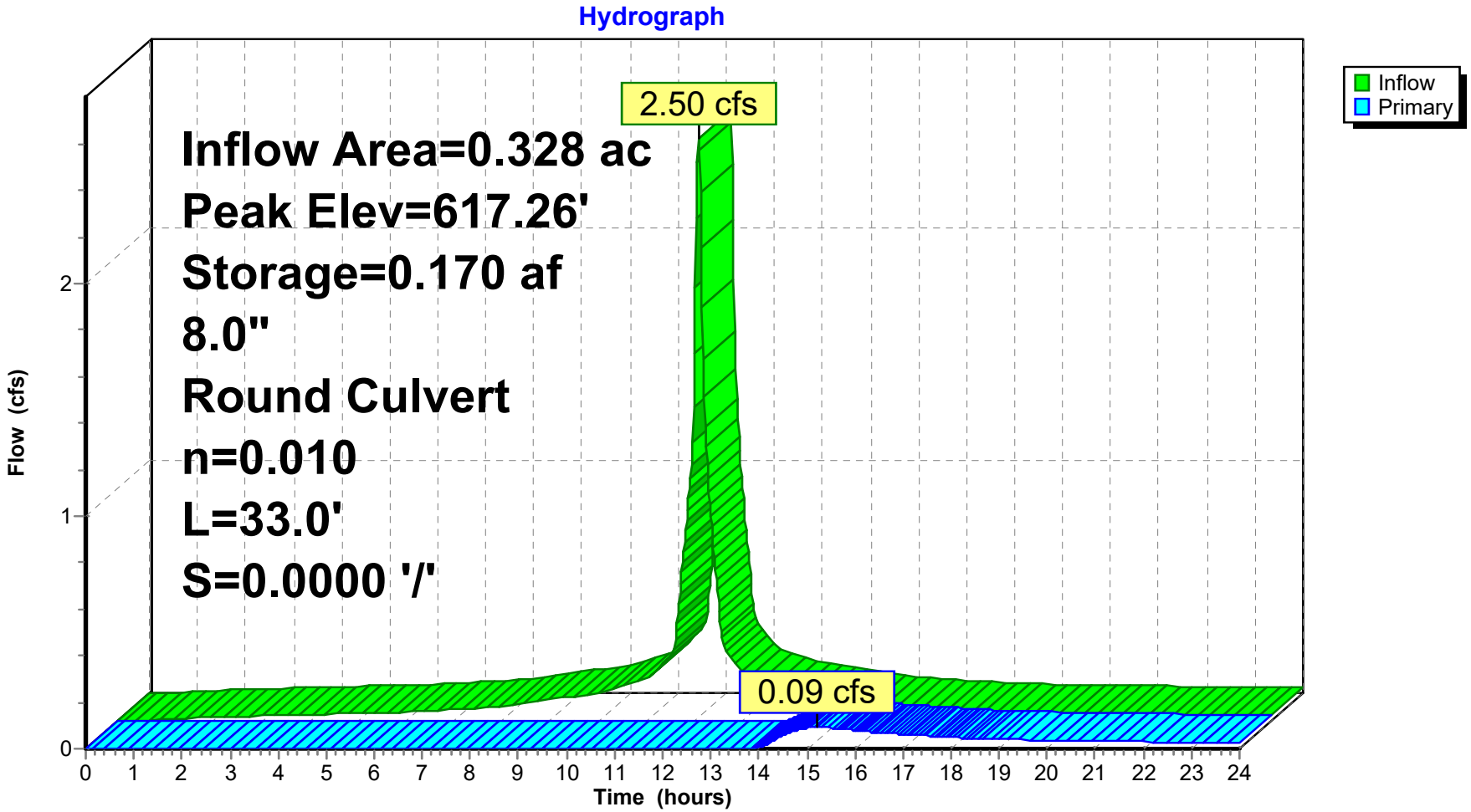
14,170.4 cf Field - 5,037.2 cf Chambers = 9,133.2 cf Stone x 40.0% Voids = 3,653.3 cf Stone Storage

Chamber Storage + Stone Storage = 8,690.5 cf = 0.200 af
Overall Storage Efficiency = 61.3%
Overall System Size = 113.25' x 22.75' x 5.50'

45 Chambers
524.8 cy Field
338.3 cy Stone

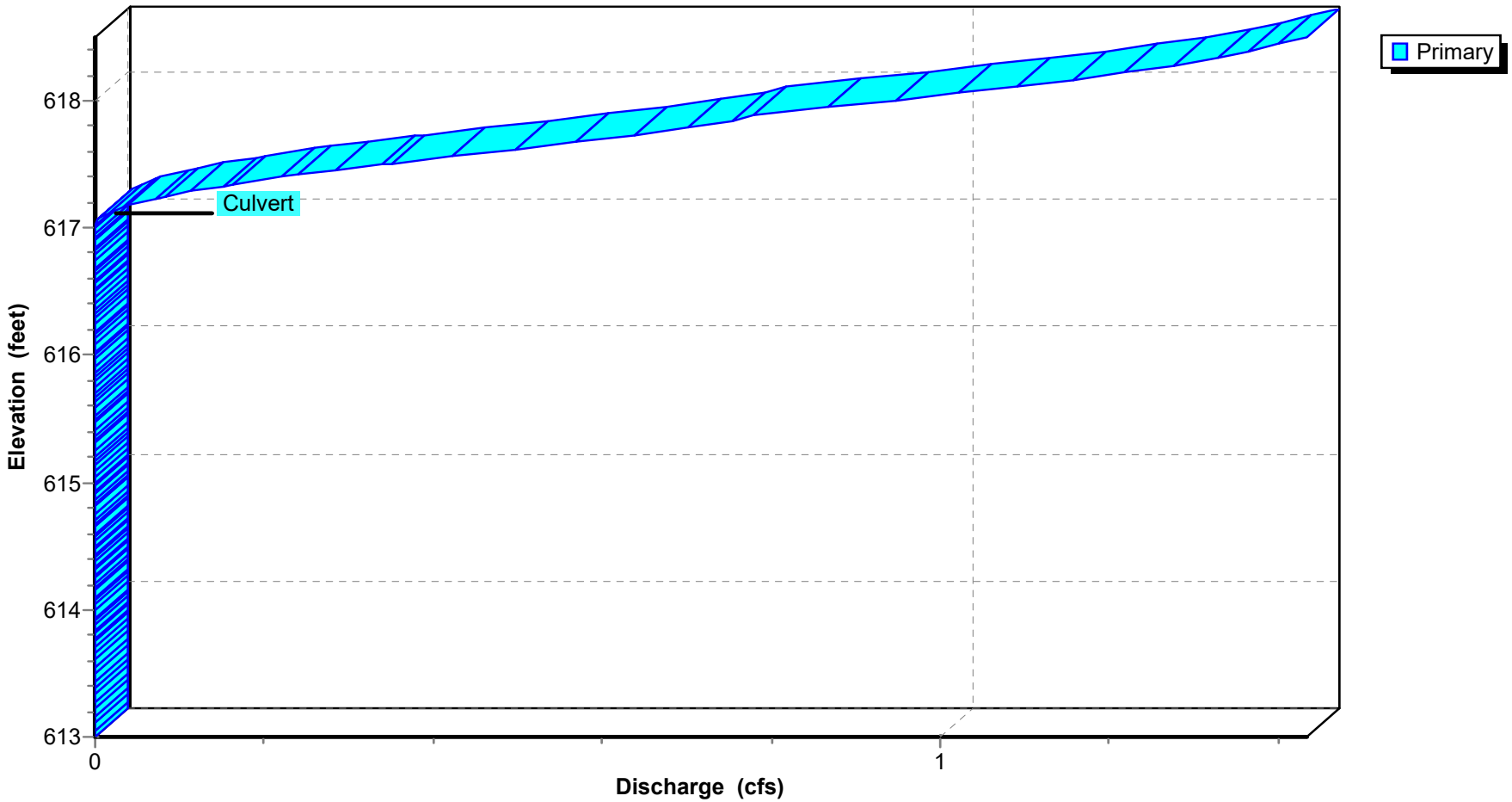


Pond 4P: ROOF INFILTRATION

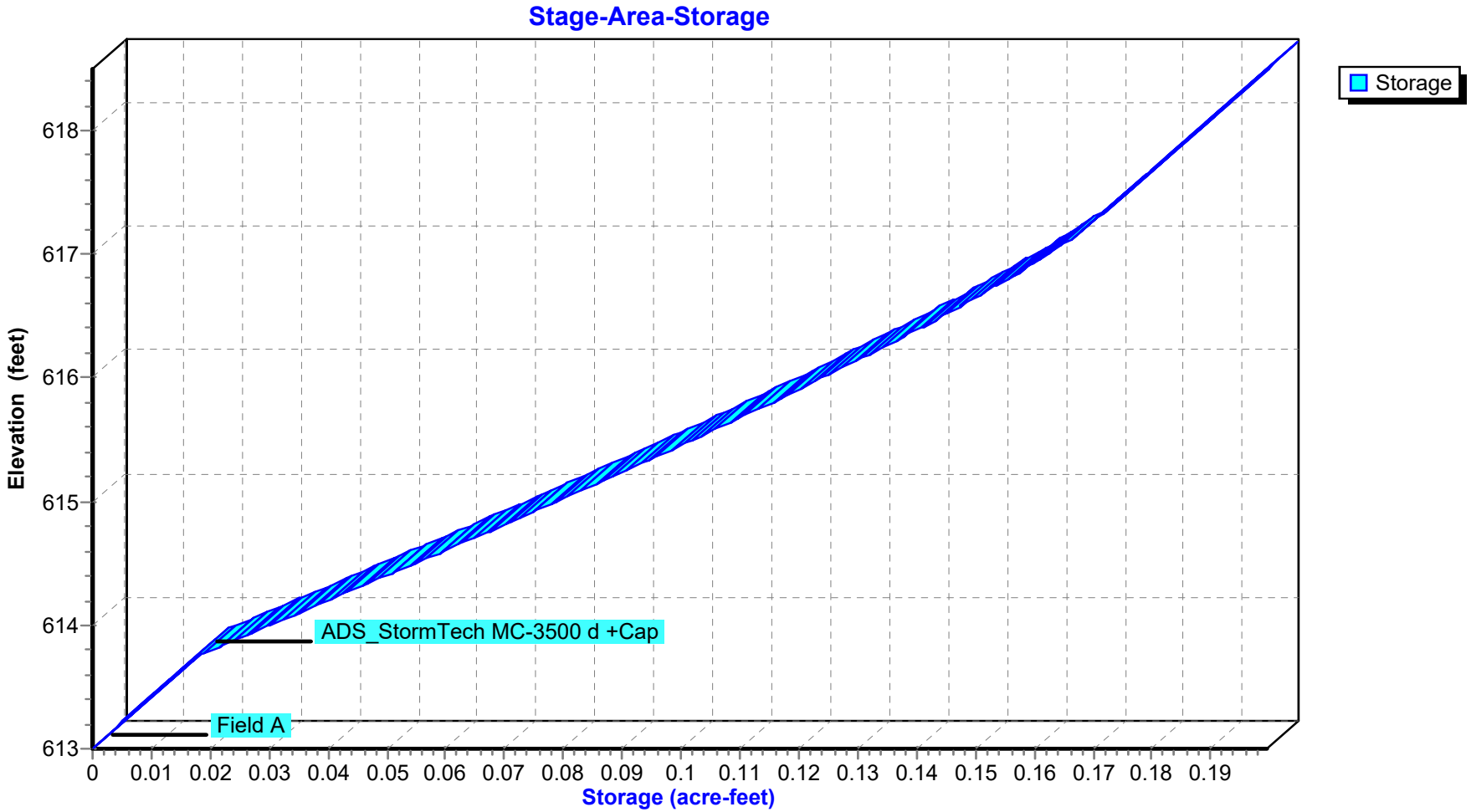


Pond 4P: ROOF INFILTRATION

Stage-Discharge



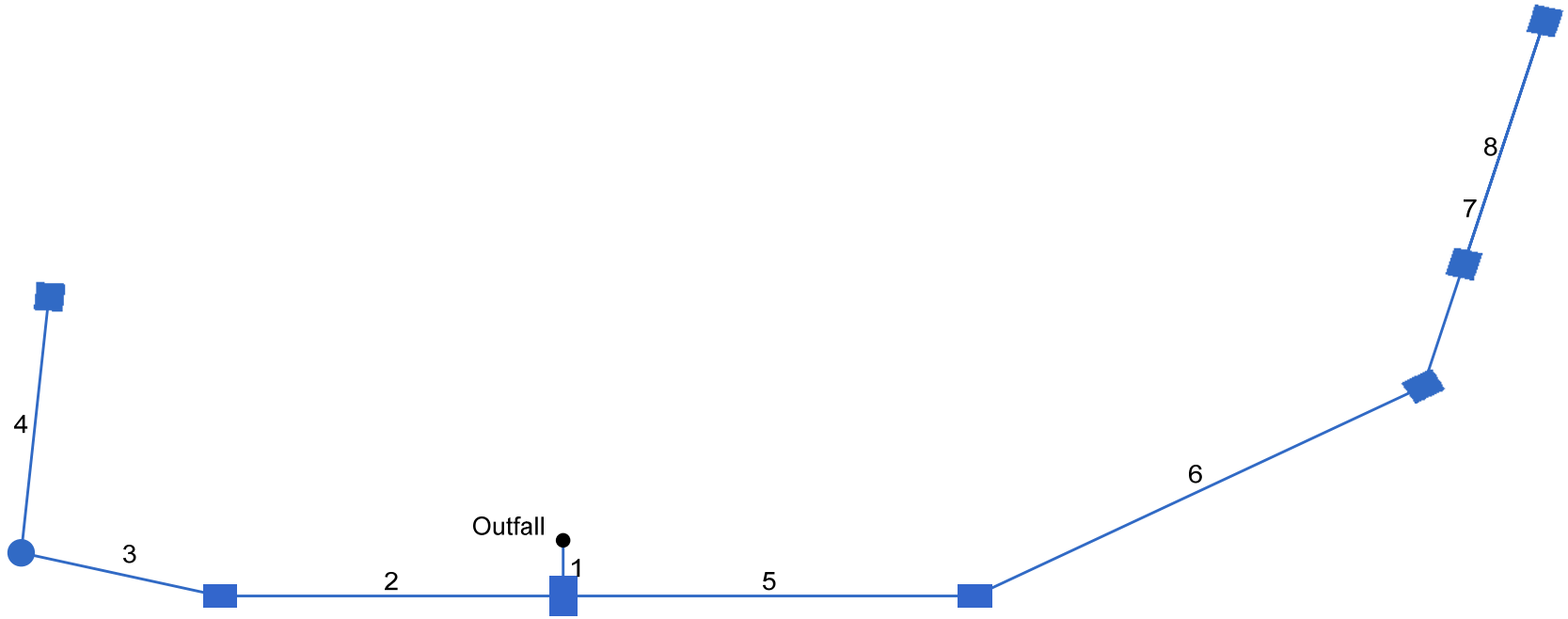
Pond 4P: ROOF INFILTRATION



APPENDIX C

Proposed Hydraulic Sizing Computations

Hydraflow Storm Sewers Extension for Autodesk® AutoCAD® Civil 3D® Plan



Project File: HydraFlow.stm	Number of lines: 8	Date: 2/12/2020

Storm Sewers v10.514

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	CB-3	4.26	15	Cir	11.000	615.54	615.65	1.000	616.28	616.48	0.84	616.48	End	Combination
2	CB-2	2.45	12	Cir	55.000	615.75	616.16	0.745	616.48	616.83	n/a	616.98 j	1	Combination
3	DMH	1.96	12	Cir	33.000	616.16	616.41	0.758	616.82	616.94	n/a	616.94	2	Manhole
4	CB-1	2.02	12	Cir	51.000	616.41	616.85	0.863	616.94	617.39	n/a	617.39	3	Combination
5	CB-4	1.34	12	Cir	66.000	615.75	616.41	1.000	615.36	615.54	n/a	615.54	1	Combination
6	CB-5	0.93	12	Cir	83.000	615.41	616.24	1.000	614.48	614.90	n/a	614.90	5	Combination
7	CB-6	0.54	12	Cir	75.000	616.34	617.50	1.547	614.90	615.64	n/a	615.64	6	Combination
8	CB-7	0.27	12	Cir	50.000	617.60	617.90	0.600	615.64	617.80	n/a	617.80	7	Grate

Project File: HydraFlow.stm | Number of lines: 8 | Run Date: 2/12/2020

NOTES: Return period = 10 Yrs. ; j - Line contains hyd. jump.

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	11.000	0.30	1.12	0.76	0.23	0.85	5.0	10.4	5.0	4.26	6.46	5.25	15	1.00	615.54	615.65	616.28	616.48	0.00	617.75	CB-3
2	1	55.000	0.11	0.49	0.70	0.08	0.36	5.0	5.6	6.8	2.45	3.07	4.16	12	0.75	615.75	616.16	616.48	616.83	617.75	618.60	CB-2
3	2	33.000	0.00	0.38	0.00	0.00	0.29	0.0	5.3	6.9	1.96	0.00	3.25	12	0.76	616.16	616.41	616.82	616.94	618.60	618.97	DMH
4	3	51.000	0.38	0.38	0.75	0.29	0.29	5.0	5.0	7.1	2.02	0.00	3.76	12	0.86	616.41	616.85	616.94	617.39	618.97	618.85	CB-1
5	1	66.000	0.11	0.33	0.80	0.09	0.26	5.0	9.9	5.1	1.34	0.00	3.74	12	1.00	615.75	616.41	615.36	615.54	617.75	618.54	CB-4
6	5	83.000	0.10	0.22	0.82	0.08	0.17	5.0	9.0	5.4	0.93	0.00	2.84	12	1.00	615.41	616.24	614.48	614.90	618.54	618.50	CB-5
7	6	75.000	0.07	0.12	0.74	0.05	0.09	5.0	7.4	5.9	0.54	0.00	2.79	12	1.55	616.34	617.50	614.90	615.64	618.50	619.50	CB-6
8	7	50.000	0.05	0.05	0.77	0.04	0.04	5.0	5.0	7.1	0.27	0.00	2.66	12	0.60	617.60	617.90	615.64	617.80	619.50	620.24	CB-7

Project File: HydraFlow.stm | Number of lines: 8 | Run Date: 2/12/2020

NOTES:Intensity = 32.36 / (Inlet time + 3.60) ^ 0.71; Return period =Yrs. 10 ; c = cir e = ellip b = box

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	CB-3	1.61	0.00	1.61	0.00	Comb	5.0	2.73	6.24	4.62	1.35	Sag	12.00	0.023	0.023	0.000	0.10	8.00	0.35	8.00	3.0	Off
2	CB-2	0.54	0.00	0.54	0.00	Comb	5.0	2.73	0.00	2.31	1.35	0.010	12.00	0.013	0.013	0.013	0.09	6.95	0.25	0.01	3.0	1
3	DMH	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
4	CB-1	2.02	0.00	2.02	0.00	Comb	5.0	2.73	3.12	2.31	1.35	Sag	12.00	0.017	0.017	0.000	-0.02	6.11	0.23	6.11	3.0	Off
5	CB-4	0.62	0.00	0.62	0.00	Comb	5.0	2.73	0.00	2.31	1.35	0.010	12.00	0.016	0.016	0.013	0.10	6.42	0.25	0.01	3.0	1
6	CB-5	0.58	0.00	0.58	0.00	Comb	5.0	2.73	0.00	2.31	1.35	0.009	12.00	0.024	0.024	0.013	0.12	4.95	0.25	0.00	3.0	5
7	CB-6	0.37	0.13	0.49	0.00	Comb	5.0	2.73	0.00	2.31	1.35	0.027	12.00	0.010	0.010	0.013	0.07	6.56	0.25	0.01	3.0	6
8	CB-7	0.27	0.00	0.14	0.13	Grate	0.0	0.00	0.00	2.31	1.35	0.010	12.00	0.011	0.011	0.013	0.07	5.95	0.30	4.48	3.0	7

Project File: HydraFlow.stm | Number of lines: 8 | Run Date: 2/12/2020

NOTES: Inlet N-Values = 0.016; Intensity = 32.36 / (Inlet time + 3.60) ^ 0.71; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are Horiz throat.

APPENDIX D
Water Quality Computations

PROJECT NAME: EAGLEVILLE GREEN
DATE: 11/25/2019
CALCS BY: MS
CHECKED BY: RN

P2-1

WATER QUALITY VOLUME	
IMPERVIOUS AREA (ac) =	0.29
IMPERVIOUS AREA (%) =	48.35%
TOTAL AREA (ac) =	0.60
R =	0.49
WQV (ac-ft) =	0.024
WQV (cf) =	1,049

GROUNDWATER RECHARGE VOLUME	
IMPERVIOUS AREA =	0.48
SOIL GROUP =	B
RECHARGE DEPTH (D) =	0.25
TOTAL AREA =	0.60
GRV (ac-ft) =	0.01
GRV (cf) =	261

EFFECTIVE WQV = 788 cf
0.018 ac-ft

WATER QUALITY VOLUME PROVIDED IN POND = 1,664 cf

WATER QUALITY FLOW	
RUNOFF DEPTH (in) =	0.364
DESIGN PRECIPITATION (in) =	1.0
RUNOFF CURVE NUMBER =	91
I_a (in) =	0.198
I_a/P =	0.2
T_c (min) =	
T_c (hr) =	0.0
q_u (cfs/mi^2/in) =	
A (mi^2) =	0.00093
WQF (cfs) =	0.00

P2-2

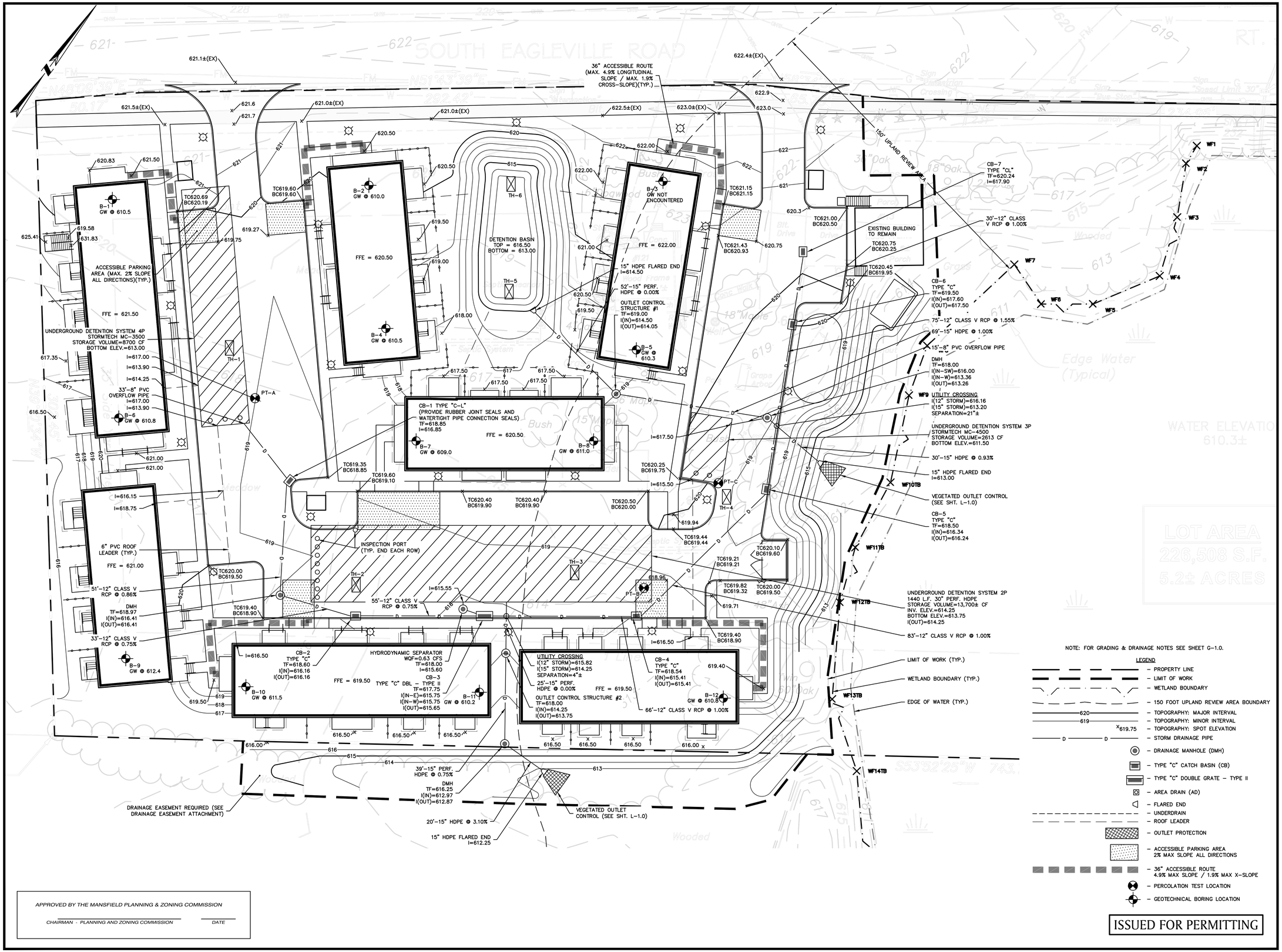
WATER QUALITY VOLUME	
IMPERVIOUS AREA (ac) =	0.86
IMPERVIOUS AREA (%) =	75.71%
TOTAL AREA (ac) =	1.14
R =	0.73
WQV (ac-ft) =	0.070
WQV (cf) =	3,030

GROUNDWATER RECHARGE VOLUME	
IMPERVIOUS AREA =	0.76
SOIL GROUP =	B
RECHARGE DEPTH (D) =	0.25
TOTAL AREA =	1.14
GRV (ac-ft) =	0.02
GRV (cf) =	784

WATER QUALITY FLOW	
RUNOFF DEPTH (in) =	0.542
DESIGN PRECIPITATION (in) =	1.0
RUNOFF CURVE NUMBER =	95
I_a (in) =	0.105
I_a/P =	0.1
T_c (min) =	6.0
T_c (hr) =	0.1
q_u (cfs/mi^2/in) =	650
A (mi^2) =	0.00178
WQF (cfs) =	0.63

EFFECTIVE WQV =	2,246 cf 0.052 ac-ft

WATER QUALITY VOLUME PROVIDED IN DETENTION = 2,541 cf



NOTE: FOR GRADING & DRAINAGE NOTES SEE SHEET G-1.0.

LEGEND

- PROPERTY LINE
- LIMIT OF WORK
- WETLAND BOUNDARY
- 150 FOOT UPLAND REVIEW AREA BOUNDARY
- 620 – TOPOGRAPHY: MAJOR INTERVAL
- 619 – TOPOGRAPHY: MINOR INTERVAL
- x619.75 – TOPOGRAPHY: SPOT ELEVATION
- D — D – STORM DRAINAGE PIPE
- DRAINAGE MANHOLE (DMH)
- TYPE "C" CATCH BASIN (CB)
- TYPE "C" DOUBLE GRATE – TYPE II
- AREA DRAIN (AD)
- FLARED END
- UNDERDRAIN
- ROOF LEADER
- OUTLET PROTECTION
- ACCESSIBLE PARKING AREA 2% MAX SLOPE ALL DIRECTIONS
- 36" ACCESSIBLE ROUTE 4.9% MAX SLOPE / 1.9% MAX X-SLOPE
- PERCOLATION TEST LOCATION
- GEOTECHNICAL BORING LOCATION

ISSUED FOR PERMITTING

APPROVED BY THE MANSFIELD PLANNING & ZONING COMMISSION

CHAIRMAN - PLANNING AND ZONING COMMISSION DATE

EAGLEVILLE GREEN - NOVEMBER 25, 2019

STATE OF CONNECTICUT ROBERT S. NEWTON No. 20662 LICENSED PROFESSIONAL ENGINEER

ROBERT NEWTON, PE No. 20662

EAGLEVILLE GREEN

113-121 SOUTH EAGLEVILLE ROAD
IN
MANSFIELD
CONNECTICUT

GRADING & DRAINAGE PLAN

NOVEMBER 25, 2019

REVISIONS:

1	01/20/2020	PER TOWN COMMENTS
2	01/31/2020	PER TOWN COMMENTS
3	02/12/2020	PER TEST PIT RESULTS
4	02/26/2020	PER REVIEW COMMENTS

PREPARED FOR:
MANSFIELD HOUSING DEV. CORP.
309 MAPLE ROAD
STORRS, CT 06268

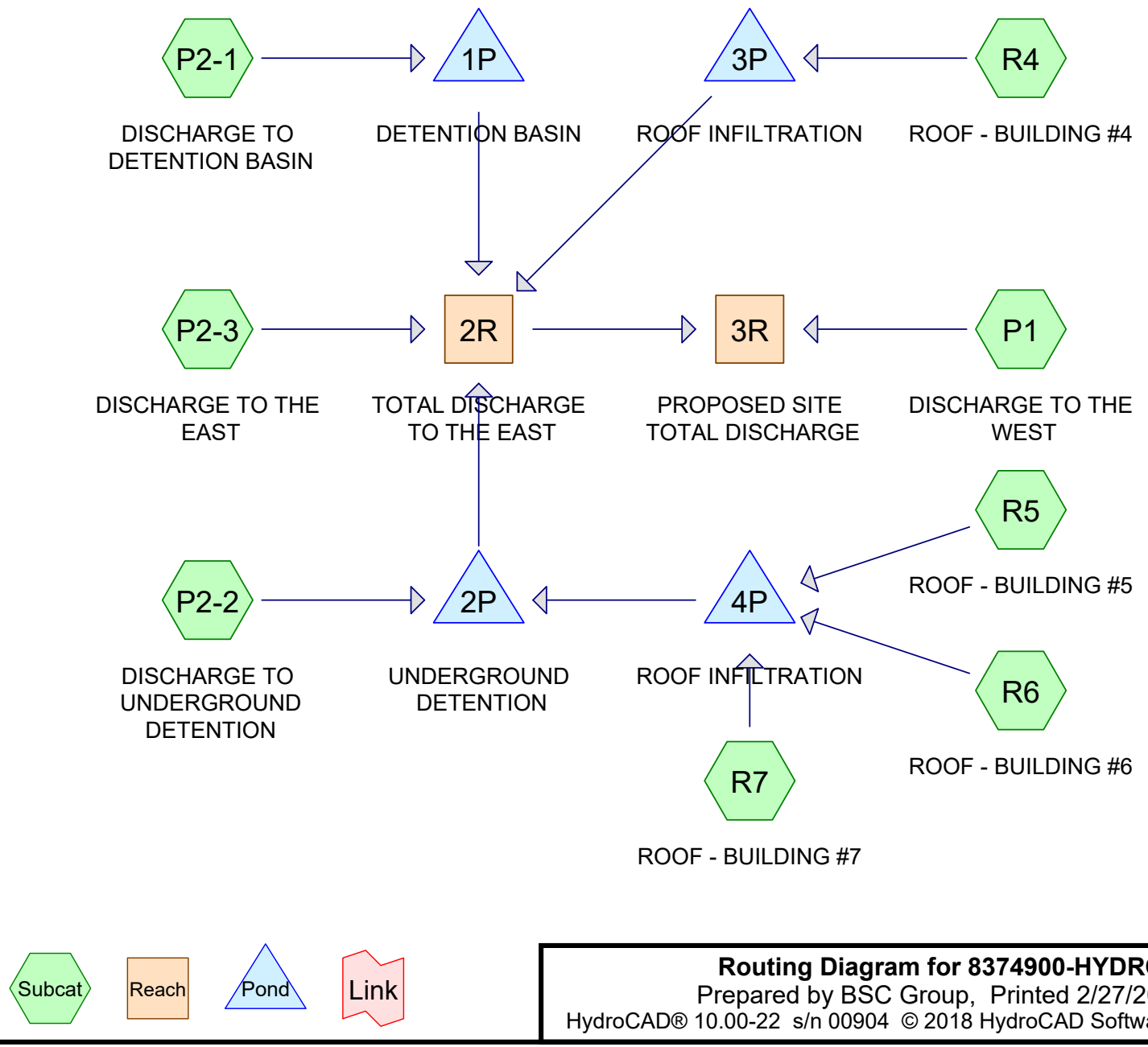
BSC GROUP
300 Winding Brook Drive
Glastonbury, Connecticut 06033
860 652 8227

© 2019 BSC GROUP, INC.

SCALE: 1" = 20'
0 10 20 40 FEET

FILE: 8374900-GRDR.DWG
DWG. NO:
JOB. NO: 83749.00

C-4.0



Routing Diagram for 8374900-HYDRO2
Prepared by BSC Group, Printed 2/27/2020
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.400	61	>75% Grass cover, Good, HSG B (P1, P2-1, P2-2, P2-3)
0.550	48	Brush, Good, HSG B (P2-3)
1.180	98	Paved parking, HSG B (P2-1, P2-2, P2-3)
0.427	98	Unconnected roofs, HSG B (R4, R5, R6, R7)
3.557	**76**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
3.557	HSG B	P1, P2-1, P2-2, P2-3, R4, R5, R6, R7
0.000	HSG C	
0.000	HSG D	
0.000	Other	
3.557		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	1.400	0.000	0.000	0.000	1.400	>75% Grass cover, Good	P1, P2-1, P2-2, P2-3
0.000	0.550	0.000	0.000	0.000	0.550	Brush, Good	P2-3
0.000	1.180	0.000	0.000	0.000	1.180	Paved parking	P2-1, P2-2, P2-3
0.000	0.427	0.000	0.000	0.000	0.427	Unconnected roofs	R4, R5, R6, R7
0.000	**3.557**	**0.000**	**0.000**	**0.000**	**3.557**	**TOTAL AREA**	

Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1P	614.05	613.00	105.0	0.0100	0.011	15.0	0.0	0.0
2	2P	613.25	613.75	18.0	-0.0278	0.011	15.0	0.0	0.0
3	3P	617.50	616.00	15.0	0.1000	0.010	8.0	0.0	0.0
4	4P	617.00	617.00	33.0	0.0000	0.010	8.0	0.0	0.0

Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1: DISCHARGE TO THE WEST Runoff Area=0.140 ac 0.00% Impervious Runoff Depth>0.50"
Tc=6.0 min CN=61 Runoff=0.05 cfs 0.006 af

Subcatchment P2-1: DISCHARGE TO DETENTION BASIN Runoff Area=0.600 ac 48.33% Impervious Runoff Depth>1.43"
Tc=6.0 min CN=79 Runoff=1.00 cfs 0.072 af

Subcatchment P2-2: DISCHARGE TO UNDERGROUND DETENTION Runoff Area=1.140 ac 75.44% Impervious Runoff Depth>2.20"
Tc=6.0 min CN=89 Runoff=2.91 cfs 0.209 af

Subcatchment P2-3: DISCHARGE TO THE EAST Runoff Area=1.250 ac 2.40% Impervious Runoff Depth>0.32"
Tc=6.0 min CN=56 Runoff=0.19 cfs 0.033 af

Subcatchment R4: ROOF - BUILDING #4 Runoff Area=0.099 ac 100.00% Impervious Runoff Depth>3.09"
Tc=6.0 min CN=98 Runoff=0.32 cfs 0.026 af

Subcatchment R5: ROOF - BUILDING #5 Runoff Area=0.118 ac 100.00% Impervious Runoff Depth>3.09"
Tc=6.0 min CN=98 Runoff=0.38 cfs 0.030 af

Subcatchment R6: ROOF - BUILDING #6 Runoff Area=0.090 ac 100.00% Impervious Runoff Depth>3.09"
Tc=6.0 min CN=98 Runoff=0.29 cfs 0.023 af

Subcatchment R7: ROOF - BUILDING #7 Runoff Area=0.120 ac 100.00% Impervious Runoff Depth>3.09"
Tc=6.0 min CN=98 Runoff=0.39 cfs 0.031 af

Reach 2R: TOTAL DISCHARGE TO THE EAST Inflow=0.34 cfs 0.181 af
Outflow=0.34 cfs 0.181 af

Reach 3R: PROPOSED SITE TOTAL DISCHARGE Inflow=0.37 cfs 0.187 af
Outflow=0.37 cfs 0.187 af

Pond 1P: DETENTION BASIN Peak Elev=614.45' Storage=1,915 cf Inflow=1.00 cfs 0.072 af
Outflow=0.07 cfs 0.031 af

Pond 2P: UNDERGROUND DETENTION Peak Elev=615.31' Storage=5,415 cf Inflow=2.91 cfs 0.209 af
Outflow=0.22 cfs 0.117 af

Pond 3P: ROOF INFILTRATION Peak Elev=614.22' Storage=1,112 cf Inflow=0.32 cfs 0.026 af
8.0" Round Culvert n=0.010 L=15.0' S=0.1000 '/' Outflow=0.00 cfs 0.000 af

Pond 4P: ROOF INFILTRATION Peak Elev=615.12' Storage=0.085 af Inflow=1.06 cfs 0.085 af
8.0" Round Culvert n=0.010 L=33.0' S=0.0000 '/' Outflow=0.00 cfs 0.000 af

Total Runoff Area = 3.557 ac Runoff Volume = 0.430 af Average Runoff Depth = 1.45"
54.82% Pervious = 1.950 ac 45.18% Impervious = 1.607 ac

Summary for Subcatchment P1: DISCHARGE TO THE WEST

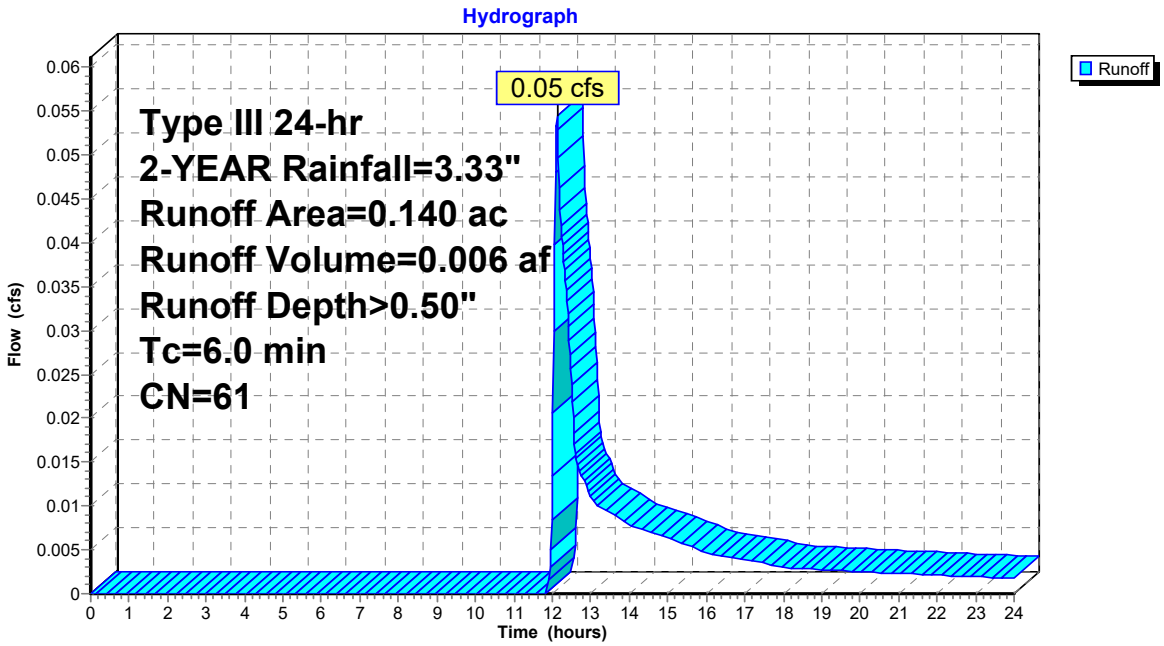
Runoff = 0.05 cfs @ 12.12 hrs, Volume= 0.006 af, Depth> 0.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-YEAR Rainfall=3.33"

Area (ac)	CN	Description
0.140	61	>75% Grass cover, Good, HSG B
0.140		100.00% Pervious Area

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

Subcatchment P1: DISCHARGE TO THE WEST



Summary for Subcatchment P2-1: DISCHARGE TO DETENTION BASIN

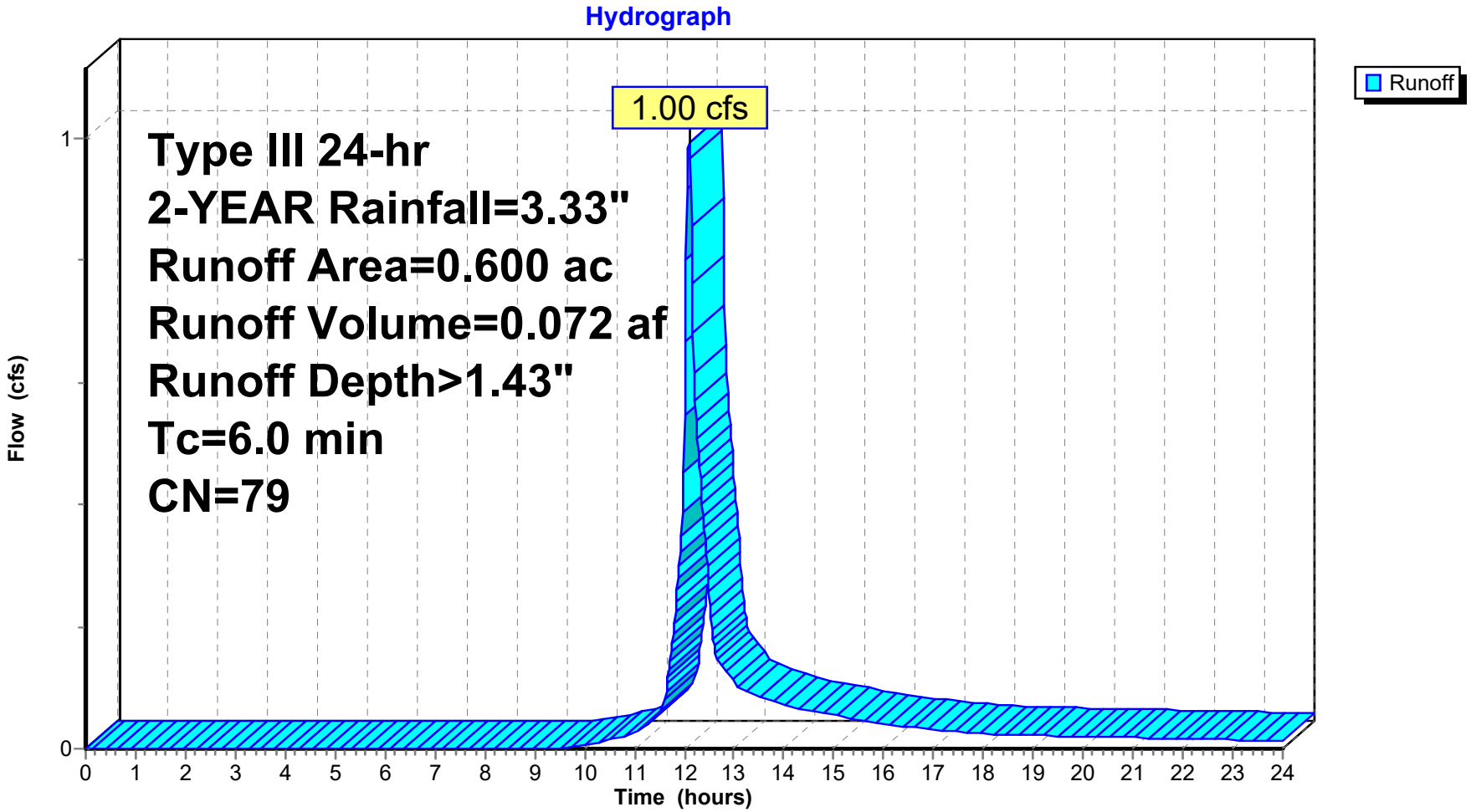
Runoff = 1.00 cfs @ 12.09 hrs, Volume= 0.072 af, Depth> 1.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-YEAR Rainfall=3.33"

Area (ac)	CN	Description
0.310	61	>75% Grass cover, Good, HSG B
0.290	98	Paved parking, HSG B
0.600	79	Weighted Average
0.310		51.67% Pervious Area
0.290		48.33% Impervious Area

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

Subcatchment P2-1: DISCHARGE TO DETENTION BASIN



Summary for Subcatchment P2-2: DISCHARGE TO UNDERGROUND DETENTION

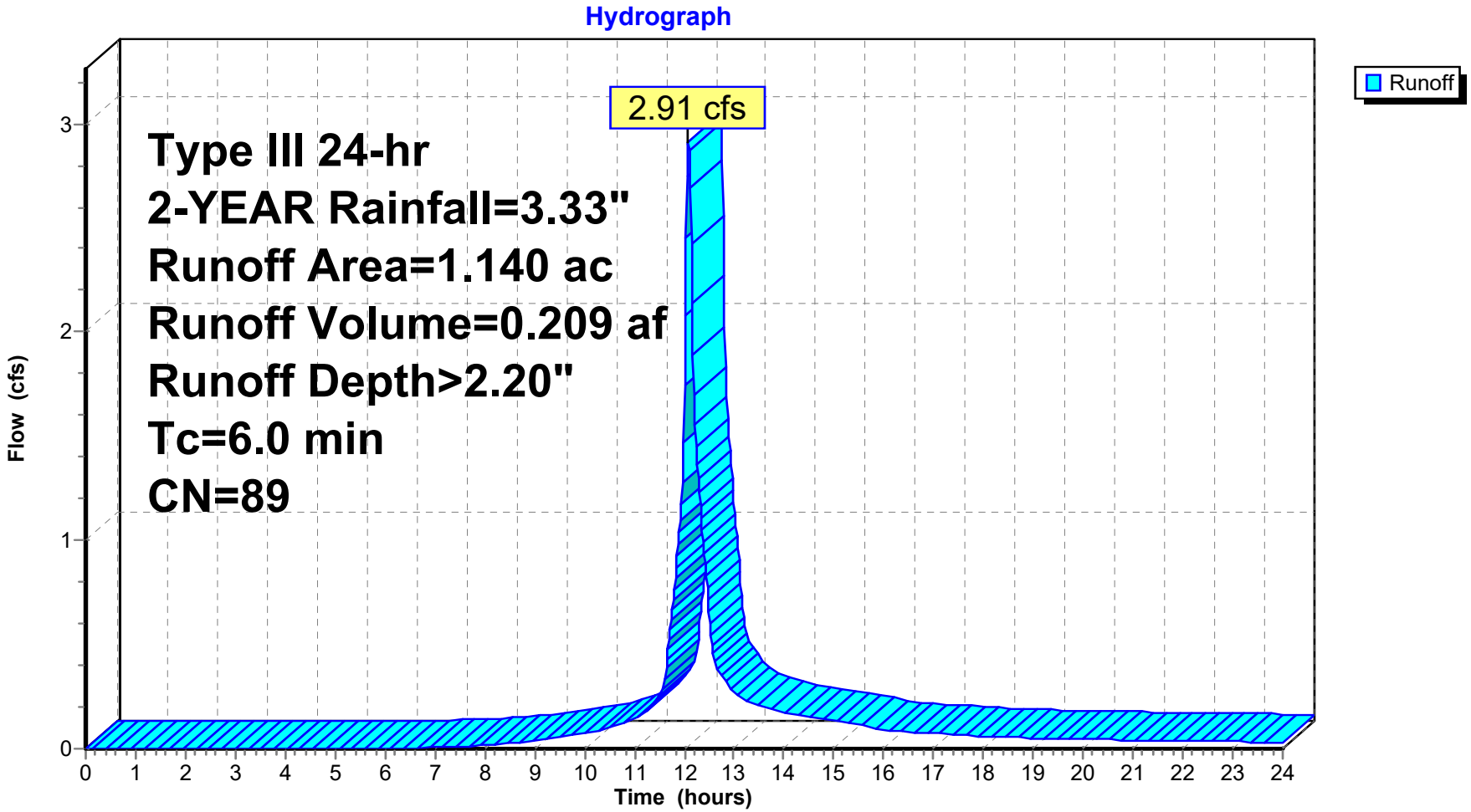
Runoff = 2.91 cfs @ 12.09 hrs, Volume= 0.209 af, Depth> 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-YEAR Rainfall=3.33"

Area (ac)	CN	Description
0.280	61	>75% Grass cover, Good, HSG B
0.860	98	Paved parking, HSG B
1.140	89	Weighted Average
0.280		24.56% Pervious Area
0.860		75.44% Impervious Area

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

Subcatchment P2-2: DISCHARGE TO UNDERGROUND DETENTION



Summary for Subcatchment P2-3: DISCHARGE TO THE EAST

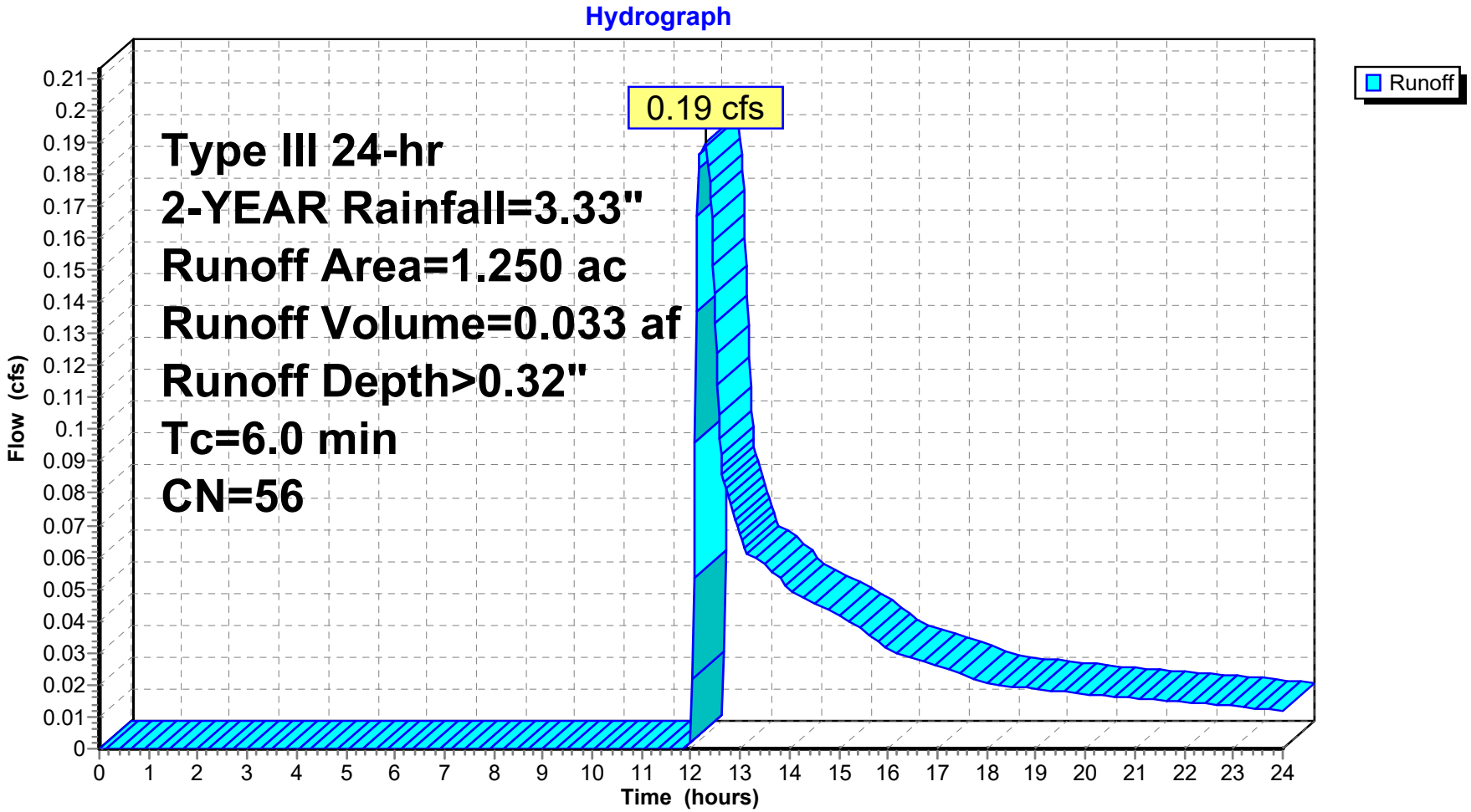
Runoff = 0.19 cfs @ 12.28 hrs, Volume= 0.033 af, Depth> 0.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-YEAR Rainfall=3.33"

Area (ac)	CN	Description
0.670	61	>75% Grass cover, Good, HSG B
0.550	48	Brush, Good, HSG B
0.030	98	Paved parking, HSG B
1.250	56	Weighted Average
1.220		97.60% Pervious Area
0.030		2.40% Impervious Area

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

Subcatchment P2-3: DISCHARGE TO THE EAST



Summary for Subcatchment R4: ROOF - BUILDING #4

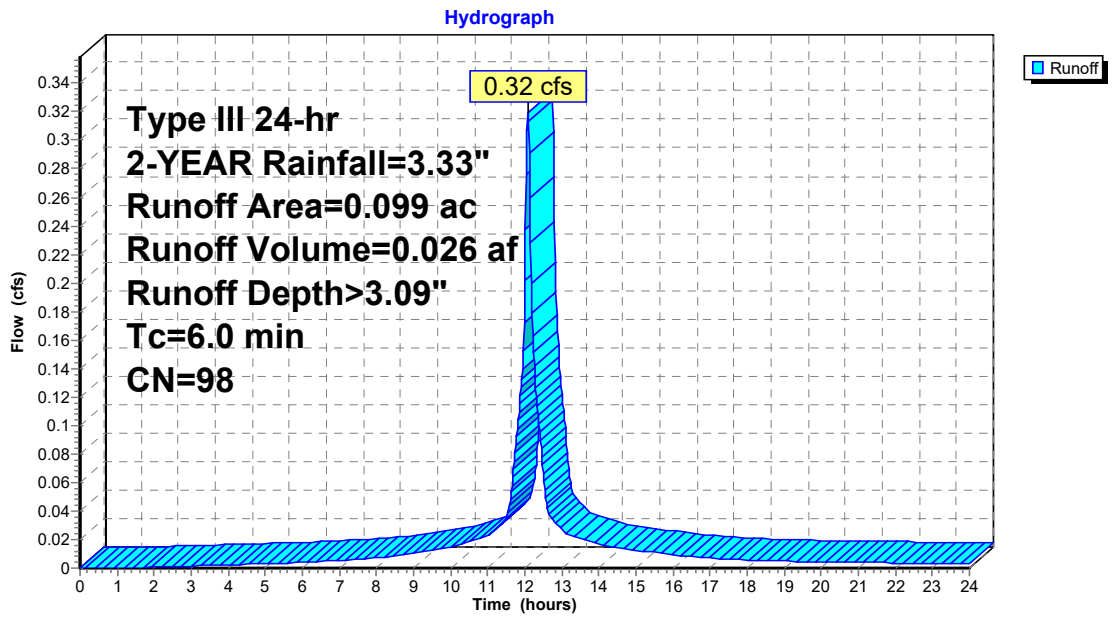
Runoff = 0.32 cfs @ 12.08 hrs, Volume= 0.026 af, Depth> 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-YEAR Rainfall=3.33"

Area (ac)	CN	Description
0.099	98	Unconnected roofs, HSG B
0.099		100.00% Impervious Area
0.099		100.00% Unconnected

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

Subcatchment R4: ROOF - BUILDING #4



Summary for Subcatchment R5: ROOF - BUILDING #5

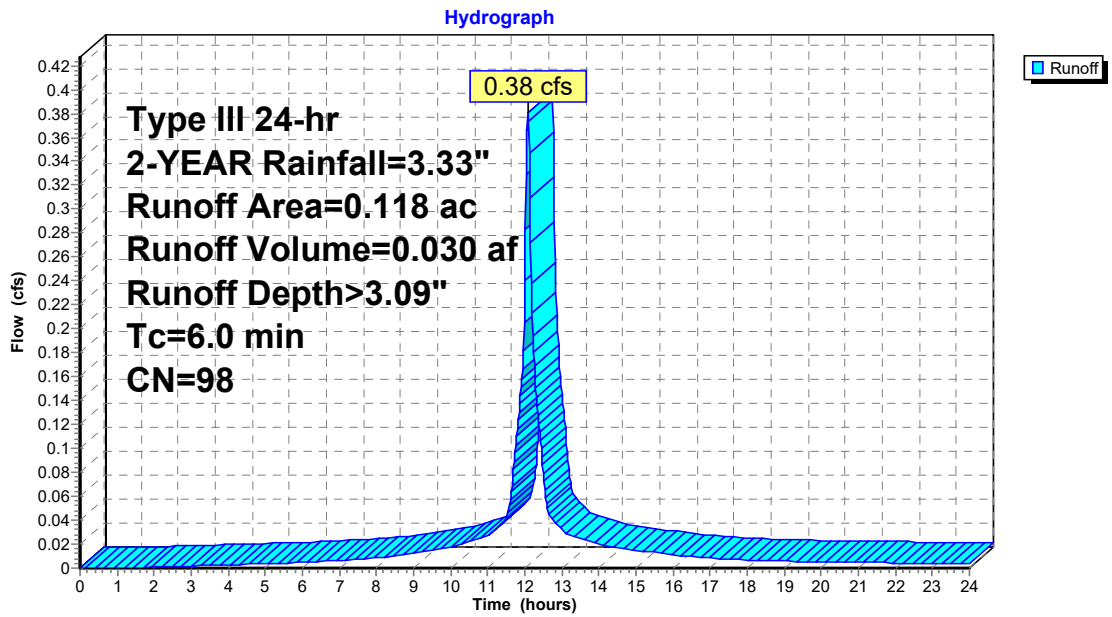
Runoff = 0.38 cfs @ 12.08 hrs, Volume= 0.030 af, Depth> 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-YEAR Rainfall=3.33"

Area (ac)	CN	Description
0.118	98	Unconnected roofs, HSG B
0.118		100.00% Impervious Area
0.118		100.00% Unconnected

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

Subcatchment R5: ROOF - BUILDING #5



Summary for Subcatchment R6: ROOF - BUILDING #6

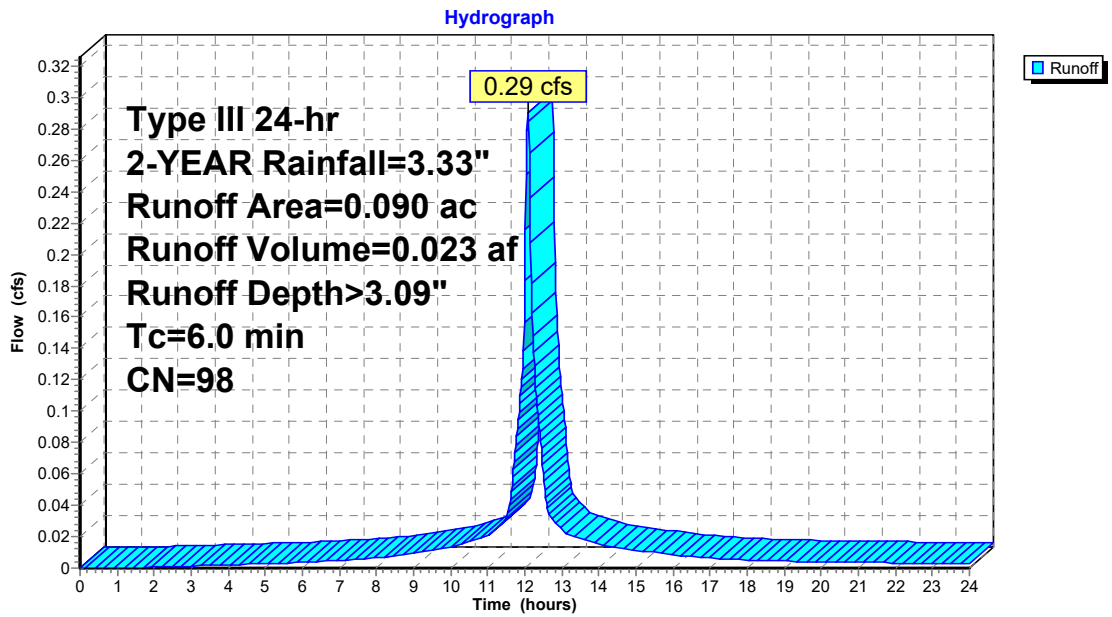
Runoff = 0.29 cfs @ 12.08 hrs, Volume= 0.023 af, Depth> 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-YEAR Rainfall=3.33"

Area (ac)	CN	Description
0.090	98	Unconnected roofs, HSG B
0.090		100.00% Impervious Area
0.090		100.00% Unconnected

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

Subcatchment R6: ROOF - BUILDING #6



Summary for Subcatchment R7: ROOF - BUILDING #7

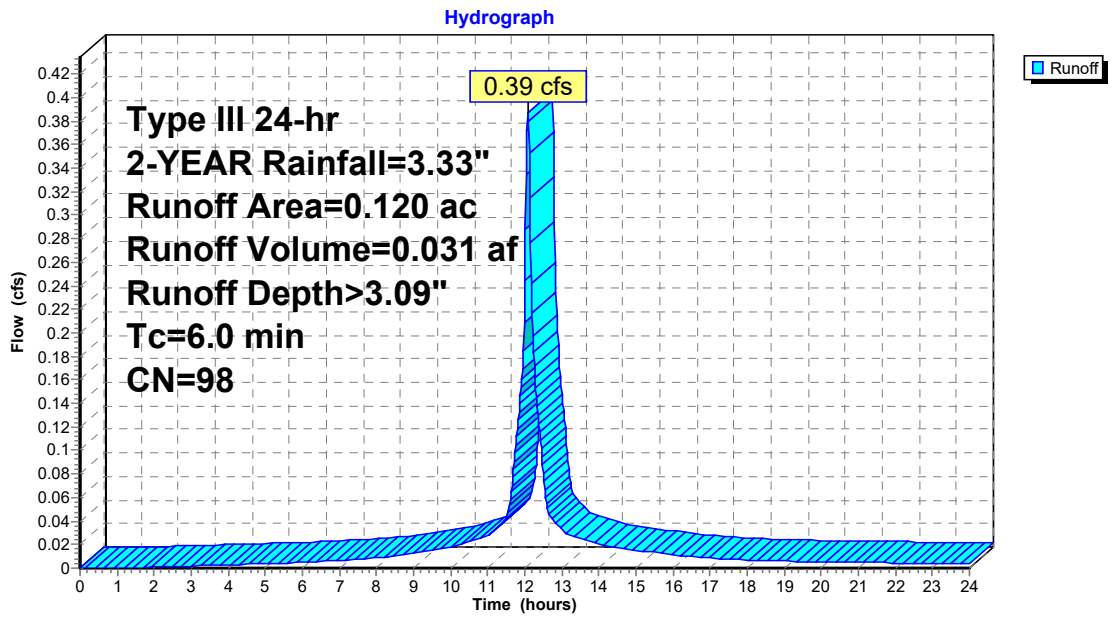
Runoff = 0.39 cfs @ 12.08 hrs, Volume= 0.031 af, Depth> 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-YEAR Rainfall=3.33"

Area (ac)	CN	Description
0.120	98	Unconnected roofs, HSG B
0.120		100.00% Impervious Area
0.120		100.00% Unconnected

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

Subcatchment R7: ROOF - BUILDING #7



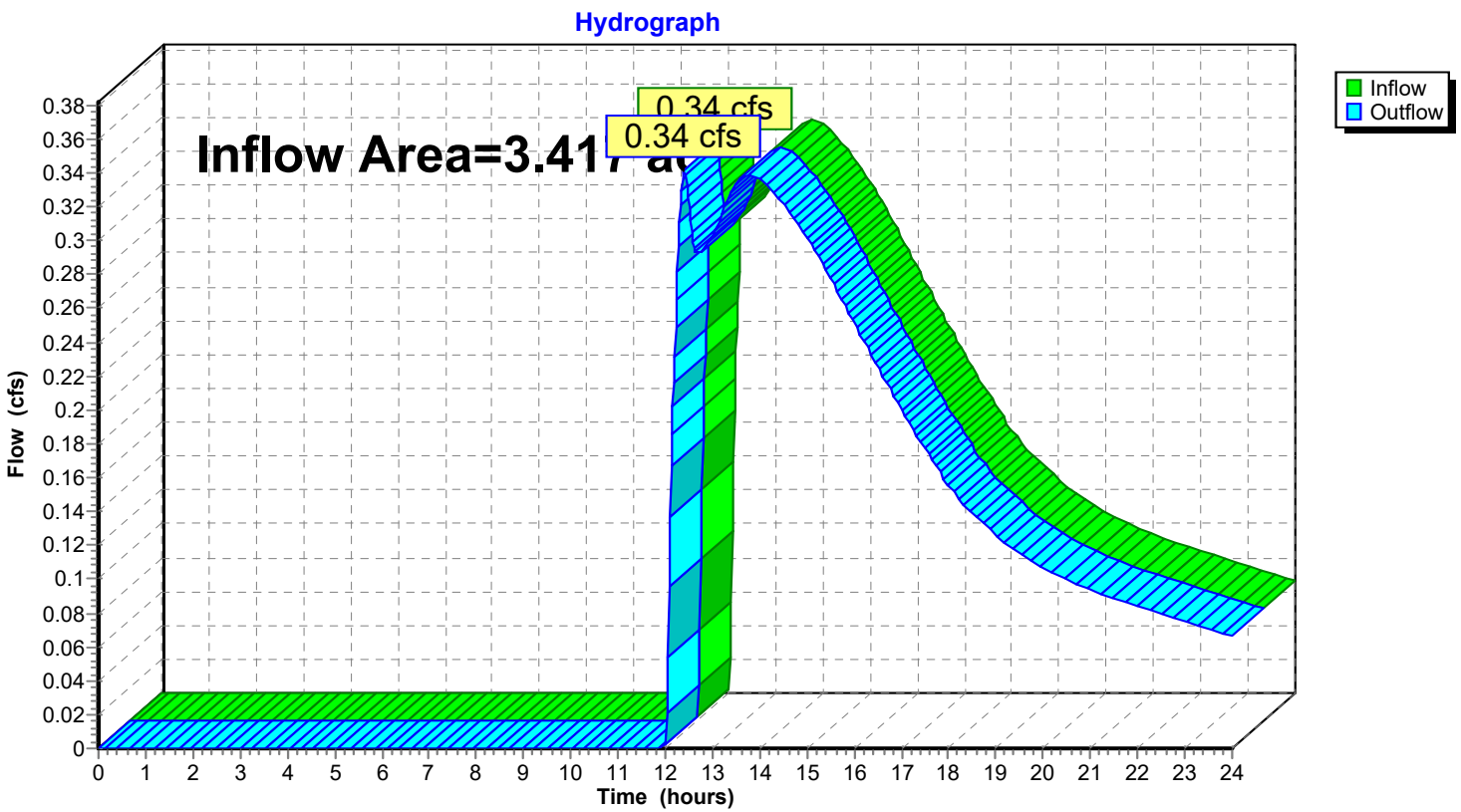
Summary for Reach 2R: TOTAL DISCHARGE TO THE EAST

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.417 ac, 47.03% Impervious, Inflow Depth > 0.64" for 2-YEAR event
Inflow = 0.34 cfs @ 12.40 hrs, Volume= 0.181 af
Outflow = 0.34 cfs @ 12.40 hrs, Volume= 0.181 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 2R: TOTAL DISCHARGE TO THE EAST



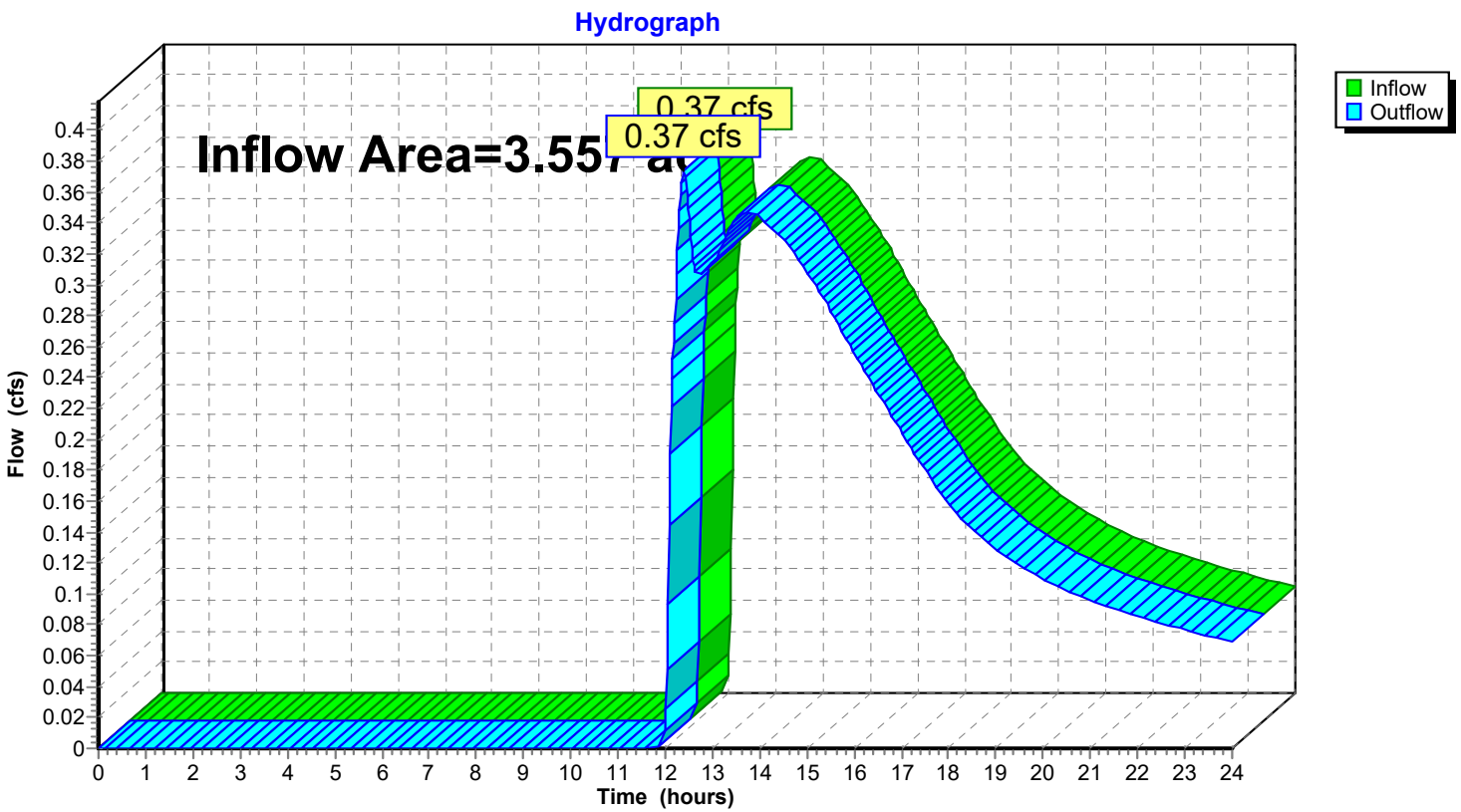
Summary for Reach 3R: PROPOSED SITE TOTAL DISCHARGE

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.557 ac, 45.18% Impervious, Inflow Depth > 0.63" for 2-YEAR event
Inflow = 0.37 cfs @ 12.39 hrs, Volume= 0.187 af
Outflow = 0.37 cfs @ 12.39 hrs, Volume= 0.187 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 3R: PROPOSED SITE TOTAL DISCHARGE



Summary for Pond 1P: DETENTION BASIN

Inflow Area = 0.600 ac, 48.33% Impervious, Inflow Depth > 1.43" for 2-YEAR event
Inflow = 1.00 cfs @ 12.09 hrs, Volume= 0.072 af
Outflow = 0.07 cfs @ 14.13 hrs, Volume= 0.031 af, Atten= 93%, Lag= 122.0 min
Primary = 0.07 cfs @ 14.13 hrs, Volume= 0.031 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 614.45' @ 14.13 hrs Surf.Area= 1,679 sf Storage= 1,915 cf
Flood Elev= 614.94' Surf.Area= 1,948 sf Storage= 2,797 cf

Plug-Flow detention time= 306.2 min calculated for 0.031 af (43% of inflow)
Center-of-Mass det. time= 180.6 min (1,023.7 - 843.1)

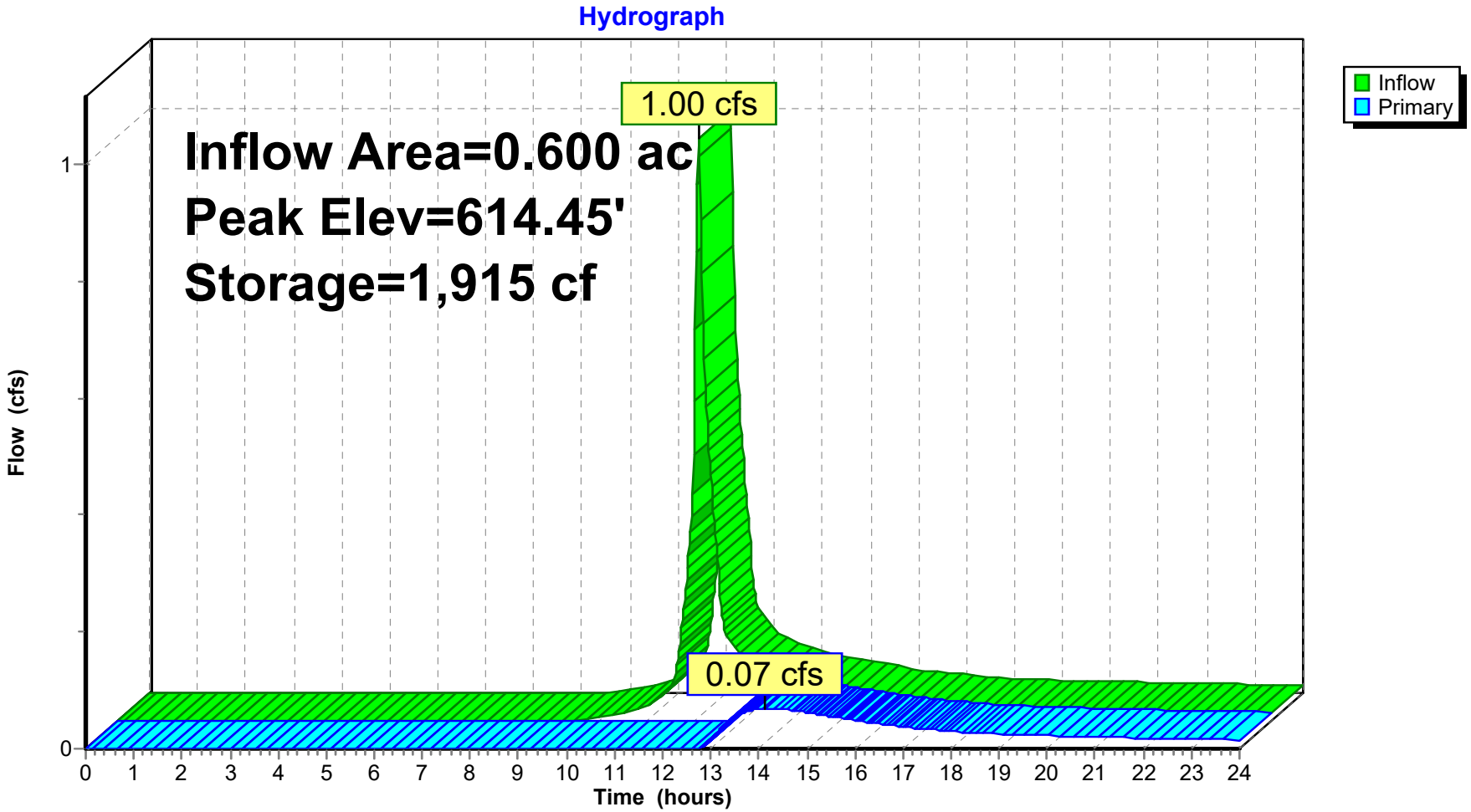
Volume	Invert	Avail.Storage	Storage Description
#1	613.00'	6,621 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
613.00	984	145.0	0	0	984
614.00	1,446	164.0	1,208	1,208	1,476
615.00	1,983	186.0	1,707	2,915	2,113
616.00	2,570	205.0	2,270	5,185	2,736
616.50	3,185	230.0	1,436	6,621	3,608

Device	Routing	Invert	Outlet Devices
#1	Primary	614.05'	**15.0" Round Culvert** L= 105.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 614.05' / 613.00' S= 0.0100 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf
#2	Device 1	614.30'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	616.00'	**15.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

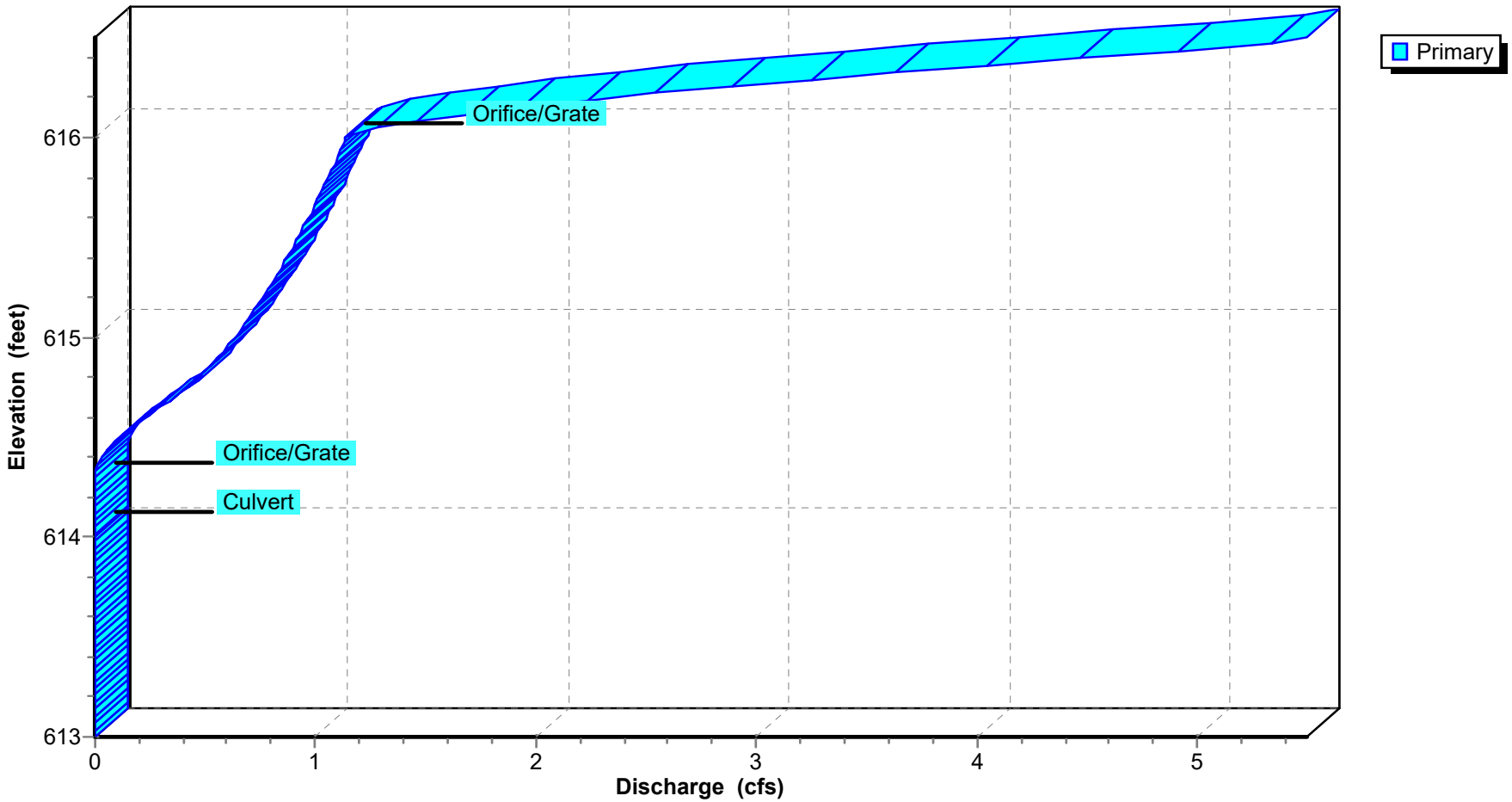
Primary OutFlow Max=0.07 cfs @ 14.13 hrs HW=614.45' (Free Discharge)
└─**1=Culvert** (Passes 0.07 cfs of 0.74 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.07 cfs @ 1.33 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: DETENTION BASIN

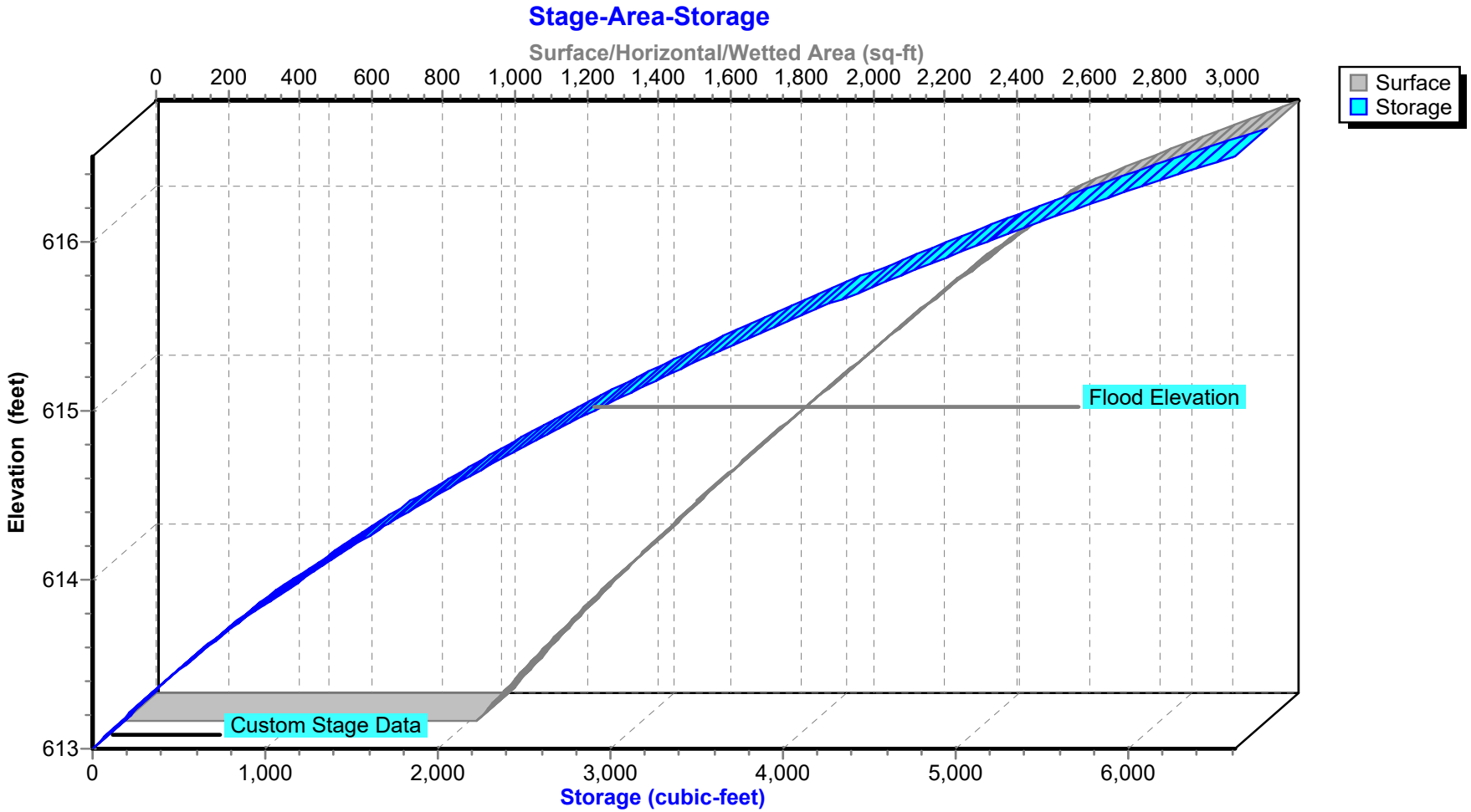


Pond 1P: DETENTION BASIN

Stage-Discharge



Pond 1P: DETENTION BASIN



Summary for Pond 2P: UNDERGROUND DETENTION

Inflow Area = 1.468 ac, 80.93% Impervious, Inflow Depth > 1.71" for 2-YEAR event
Inflow = 2.91 cfs @ 12.09 hrs, Volume= 0.209 af
Outflow = 0.22 cfs @ 13.38 hrs, Volume= 0.117 af, Atten= 92%, Lag= 77.6 min
Primary = 0.22 cfs @ 13.38 hrs, Volume= 0.117 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 615.31' @ 13.38 hrs Surf.Area= 5,936 sf Storage= 5,415 cf

Plug-Flow detention time= 278.9 min calculated for 0.117 af (56% of inflow)
Center-of-Mass det. time= 171.8 min (980.7 - 808.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	613.75'	6,633 cf	**36.50'W x 162.00'L x 4.00'H Field A** 23,652 cf Overall - 7,069 cf Embedded = 16,583 cf x 40.0% Voids
#2A	614.25'	7,069 cf	**CMP Round 30** x 72 Inside #1 Effective Size= 30.0"W x 30.0"H => 4.91 sf x 20.00'L = 98.2 cf Overall Size= 30.0"W x 30.0"H x 20.00'L 9 Rows of 8 Chambers
#3	614.25'	31 cf	**15.0" Round Pipe Storage** L= 25.0'
		13,733 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	613.75'	**15.0" Round Culvert** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 613.25' / 613.75' S= -0.0278 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf
#2	Device 1	614.86'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	615.33'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	617.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.22 cfs @ 13.38 hrs HW=615.31' (Free Discharge)
└─**1=Culvert** (Passes 0.22 cfs of 5.70 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.22 cfs @ 2.55 fps)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: UNDERGROUND DETENTION - Chamber Wizard Field A

Chamber Model = CMP Round 30 (Round Corrugated Metal Pipe)
Effective Size= 30.0"W x 30.0"H => 4.91 sf x 20.00'L = 98.2 cf
Overall Size= 30.0"W x 30.0"H x 20.00'L

30.0" Wide + 18.0" Spacing = 48.0" C-C Row Spacing

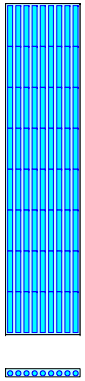
8 Chambers/Row x 20.00' Long = 160.00' Row Length +12.0" End Stone x 2 = 162.00' Base Length
9 Rows x 30.0" Wide + 18.0" Spacing x 8 + 12.0" Side Stone x 2 = 36.50' Base Width
6.0" Base + 30.0" Chamber Height + 12.0" Cover = 4.00' Field Height

72 Chambers x 98.2 cf = 7,068.6 cf Chamber Storage

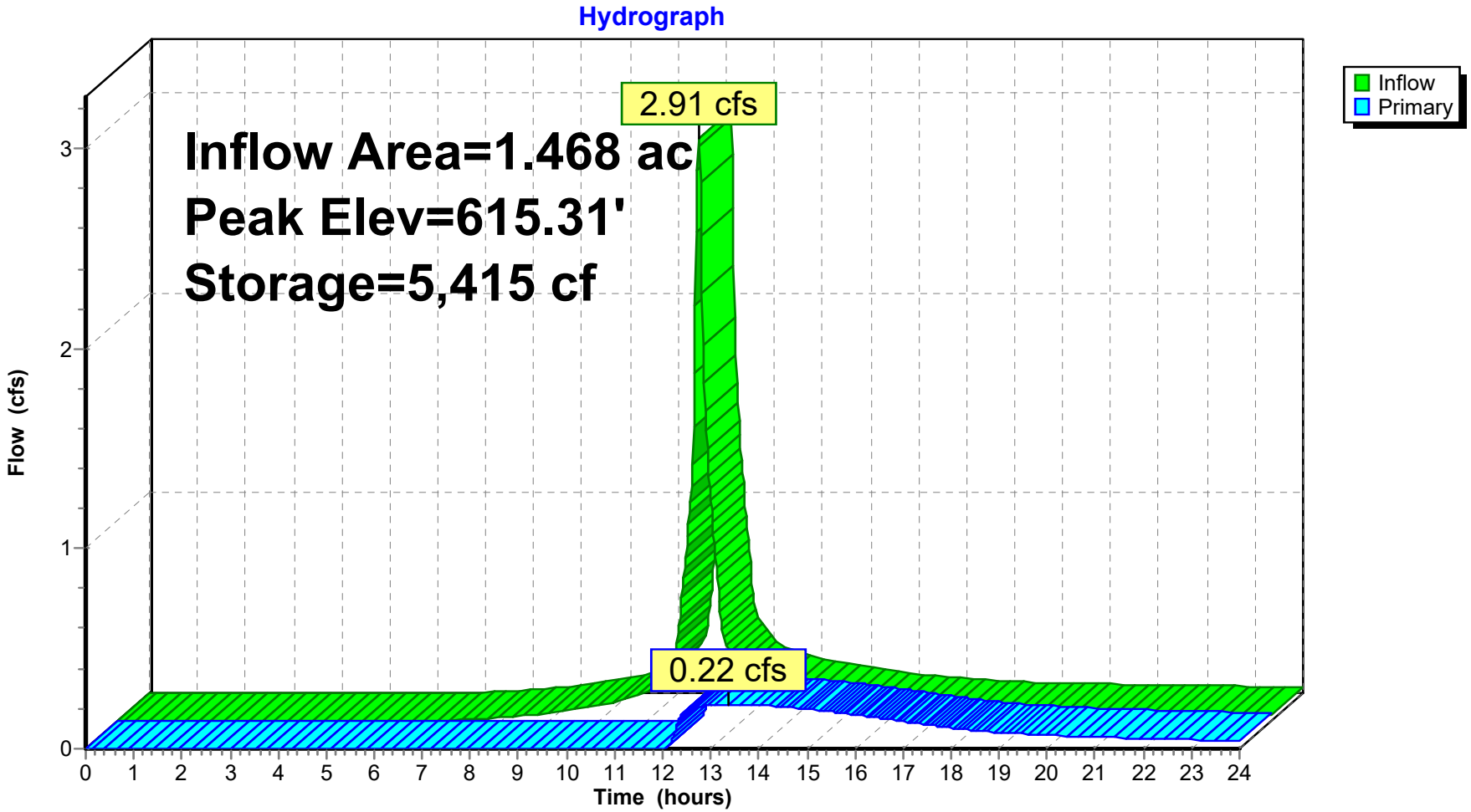
23,652.0 cf Field - 7,068.6 cf Chambers = 16,583.4 cf Stone x 40.0% Voids = 6,633.4 cf Stone Storage

Chamber Storage + Stone Storage = 13,702.0 cf = 0.315 af
Overall Storage Efficiency = 57.9%
Overall System Size = 162.00' x 36.50' x 4.00'

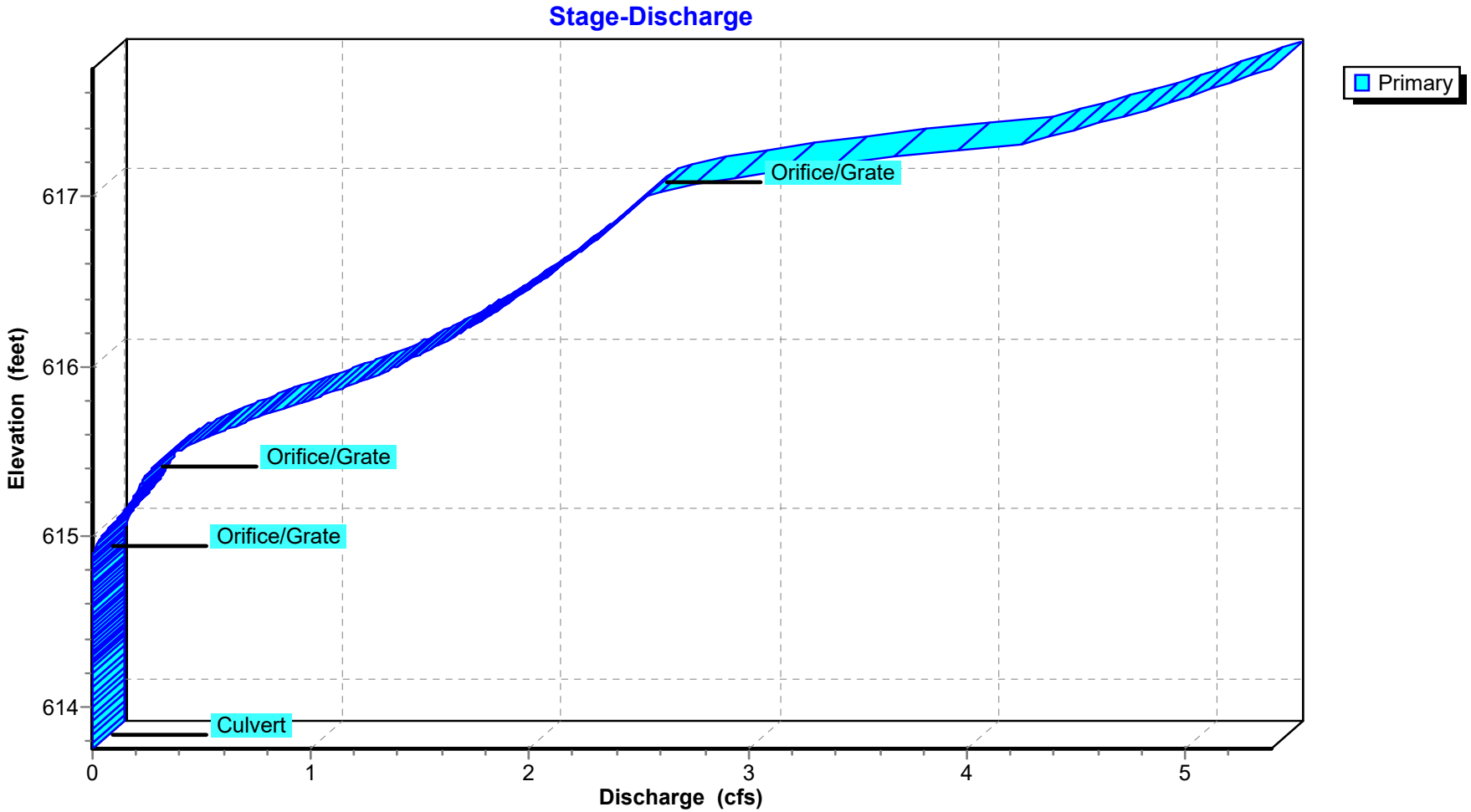
72 Chambers
876.0 cy Field
614.2 cy Stone



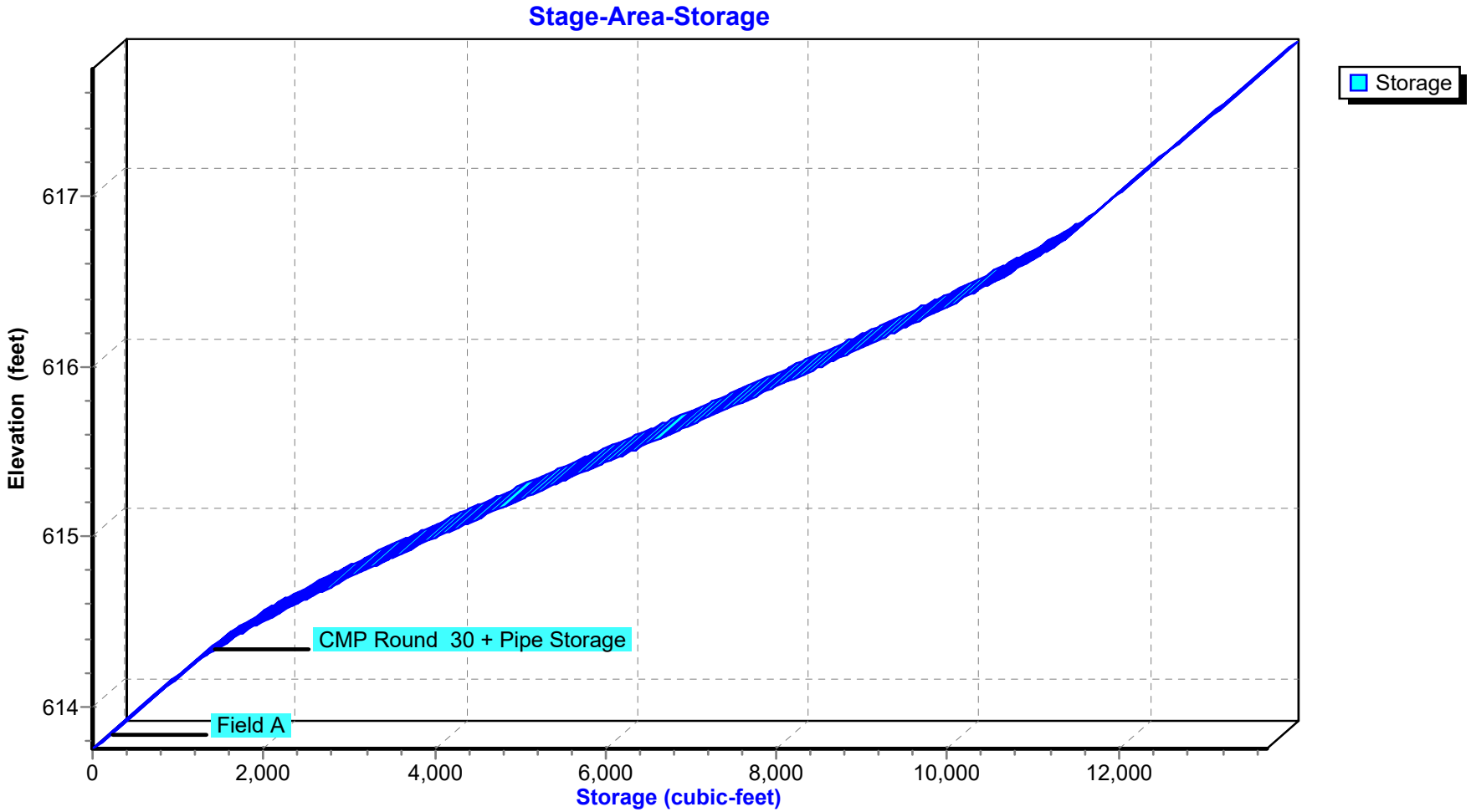
Pond 2P: UNDERGROUND DETENTION



Pond 2P: UNDERGROUND DETENTION



Pond 2P: UNDERGROUND DETENTION



Summary for Pond 3P: ROOF INFILTRATION

Inflow Area = 0.099 ac,100.00% Impervious, Inflow Depth > 3.09" for 2-YEAR event
Inflow = 0.32 cfs @ 12.08 hrs, Volume= 0.026 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 614.22' @ 24.00 hrs Surf.Area= 607 sf Storage= 1,112 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1A	611.50'	1,192 cf	**19.42'W x 31.27'L x 7.25'H Field A** 4,401 cf Overall - 1,421 cf Embedded = 2,981 cf x 40.0% Voids
#2A	612.25'	1,421 cf	**ADS_StormTech MC-4500 +Cap** x 12 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 2 Rows of 6 Chambers Cap Storage= +35.7 cf x 2 x 2 rows = 142.8 cf
		2,613 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	617.50'	**8.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 617.50' / 616.00' S= 0.1000 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=611.50' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)

Pond 3P: ROOF INFILTRATION - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-4500 +Cap (ADS StormTech® MC-4500 with cap volume)
Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf
Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap
Cap Storage= +35.7 cf x 2 x 2 rows = 142.8 cf

100.0" Wide + 9.0" Spacing = 109.0" C-C Row Spacing

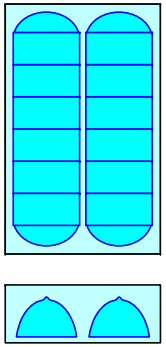
6 Chambers/Row x 4.02' Long +2.56' Cap Length x 2 = 29.27' Row Length +12.0" End Stone x 2 = 31.27' Base Length
2 Rows x 100.0" Wide + 9.0" Spacing x 1 + 12.0" Side Stone x 2 = 19.42' Base Width
9.0" Base + 60.0" Chamber Height + 18.0" Cover = 7.25' Field Height

12 Chambers x 106.5 cf + 35.7 cf Cap Volume x 2 x 2 Rows = 1,420.7 cf Chamber Storage

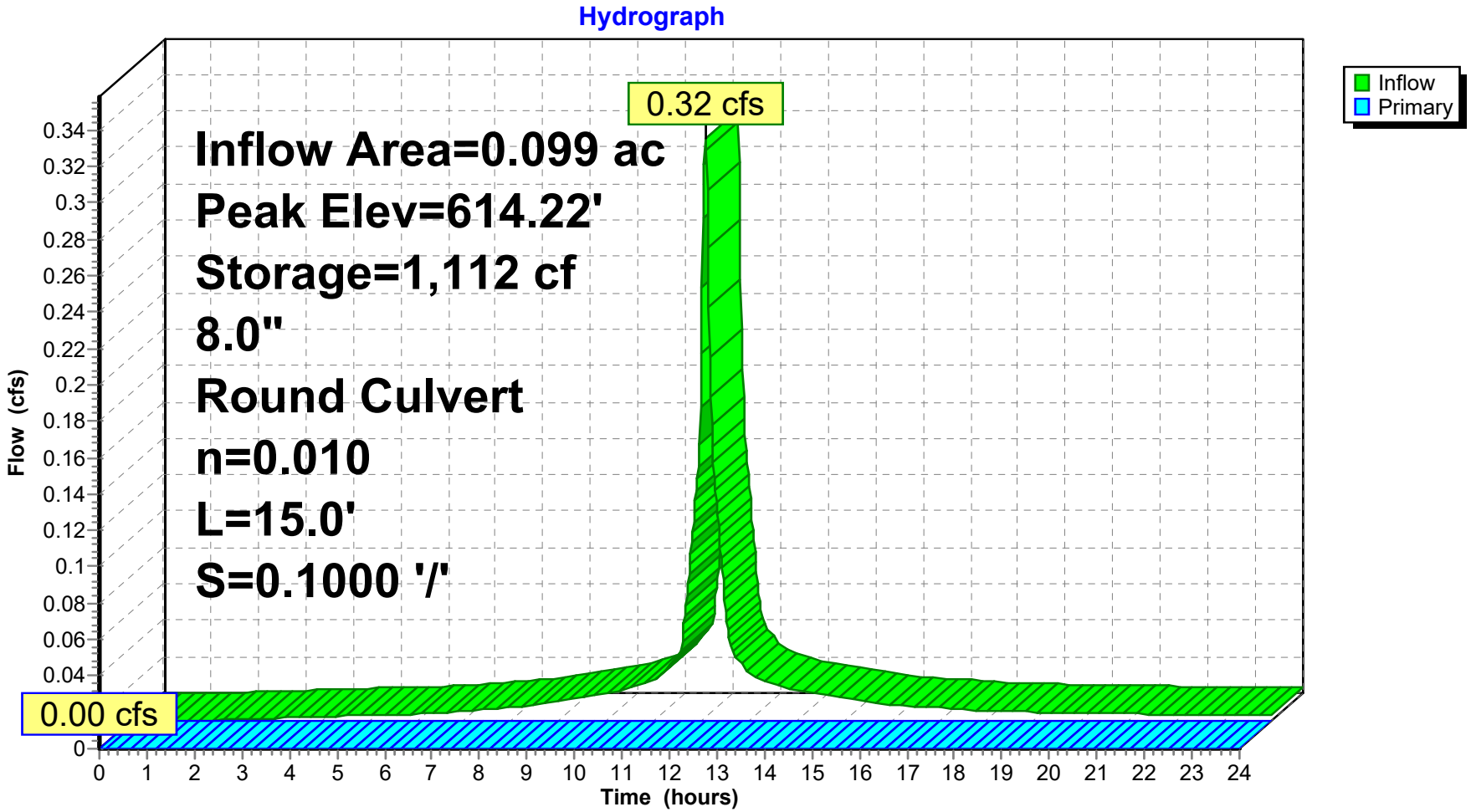
4,401.4 cf Field - 1,420.7 cf Chambers = 2,980.7 cf Stone x 40.0% Voids = 1,192.3 cf Stone Storage

Chamber Storage + Stone Storage = 2,613.0 cf = 0.060 af
Overall Storage Efficiency = 59.4%
Overall System Size = 31.27' x 19.42' x 7.25'

12 Chambers
163.0 cy Field
110.4 cy Stone

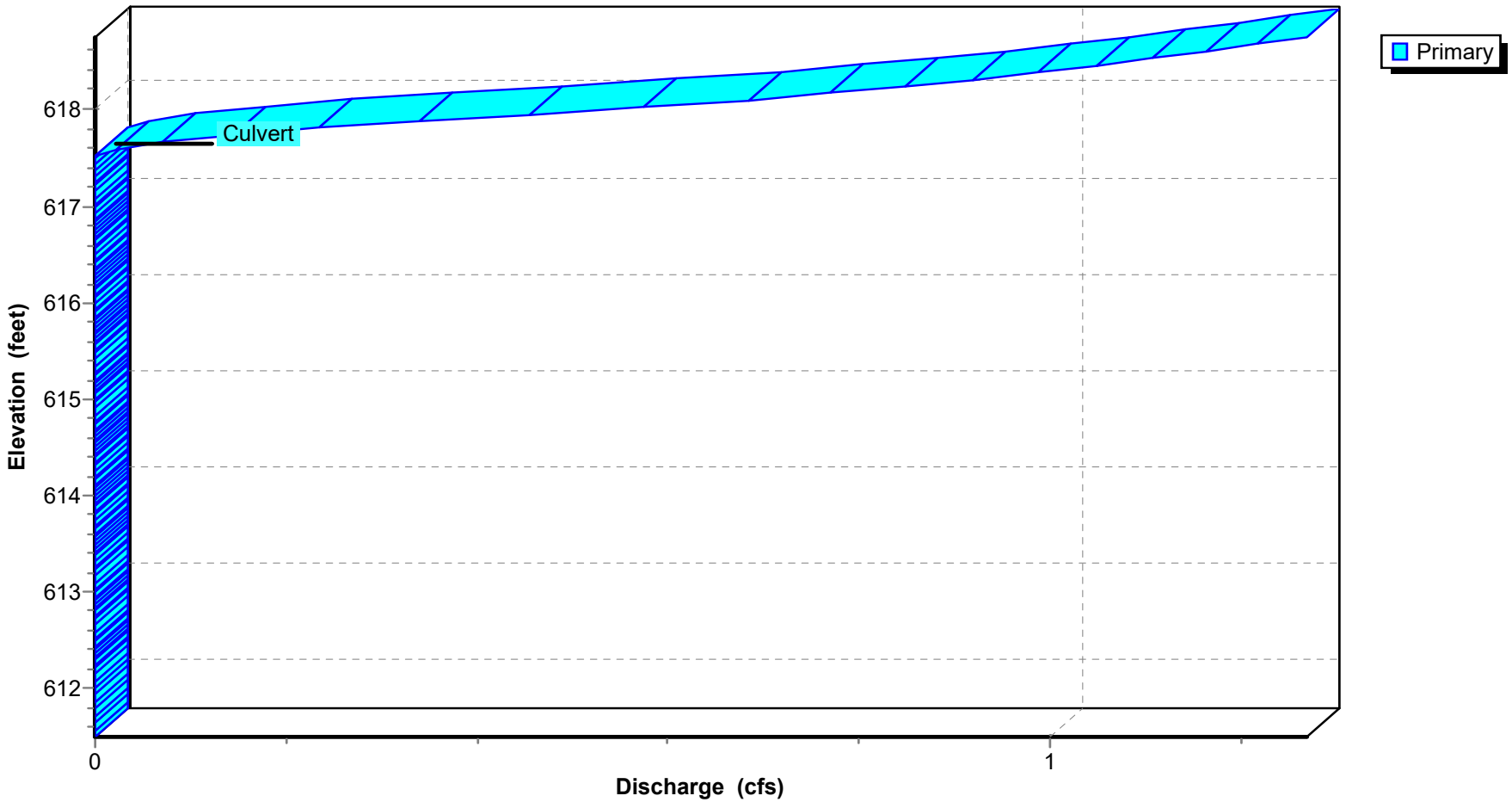


Pond 3P: ROOF INFILTRATION

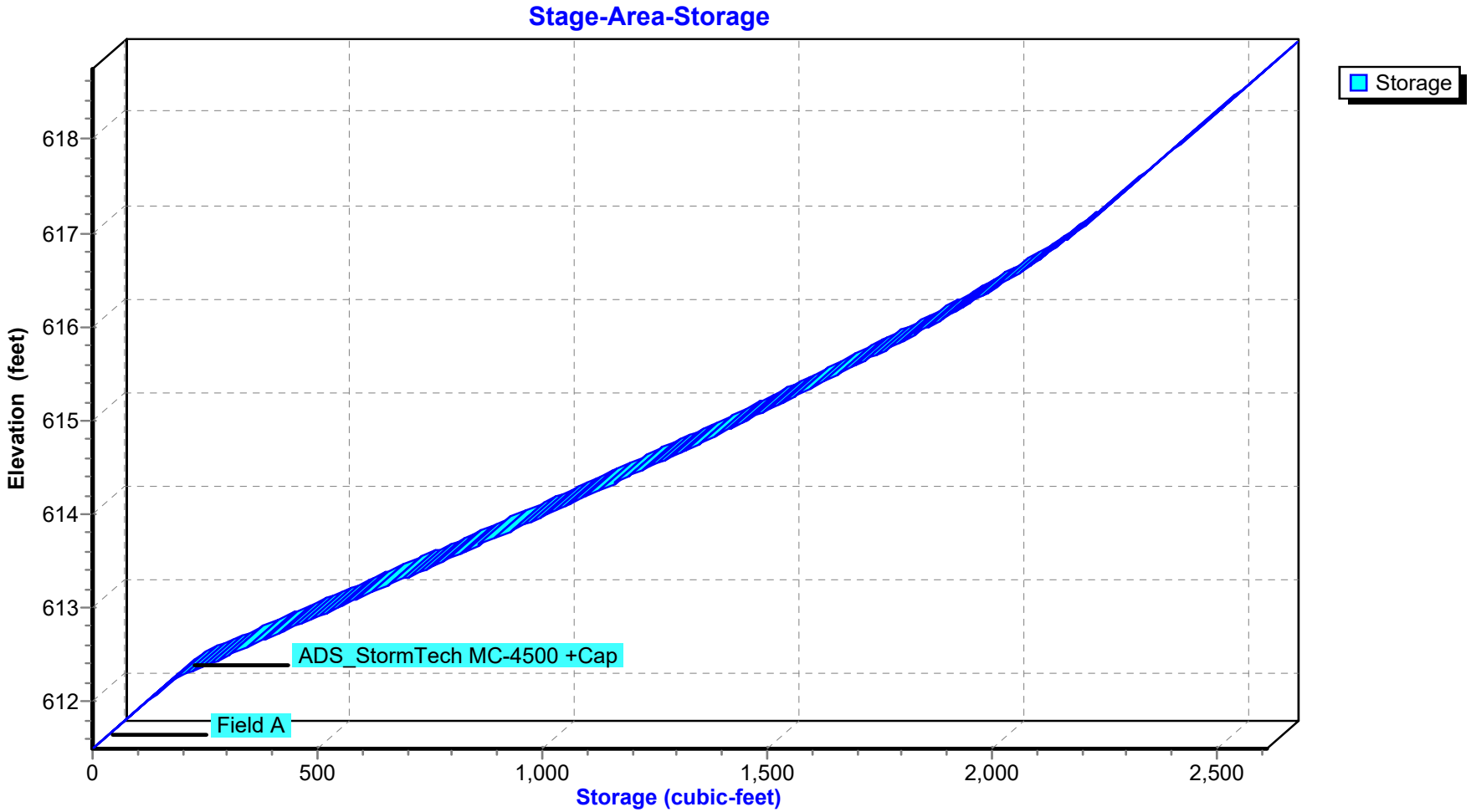


Pond 3P: ROOF INFILTRATION

Stage-Discharge



Pond 3P: ROOF INFILTRATION



Summary for Pond 4P: ROOF INFILTRATION

Inflow Area = 0.328 ac,100.00% Impervious, Inflow Depth > 3.09" for 2-YEAR event
Inflow = 1.06 cfs @ 12.08 hrs, Volume= 0.085 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 615.12' @ 24.00 hrs Surf.Area= 0.059 ac Storage= 0.085 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1A	613.00'	0.084 af	**22.75'W x 113.25'L x 5.50'H Field A** 0.325 af Overall - 0.116 af Embedded = 0.210 af x 40.0% Voids
#2A	613.75'	0.116 af	**ADS_StormTech MC-3500 d +Cap** x 45 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 3 Rows of 15 Chambers Cap Storage= +14.9 cf x 2 x 3 rows = 89.4 cf
		0.200 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	617.00'	**8.0" Round Culvert** L= 33.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 617.00' / 617.00' S= 0.0000 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=613.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)

Pond 4P: ROOF INFILTRATION - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 3 rows = 89.4 cf

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

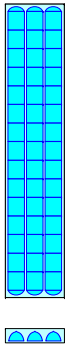
15 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 111.25' Row Length +12.0" End Stone x 2 = 113.25' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

45 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 3 Rows = 5,037.2 cf Chamber Storage

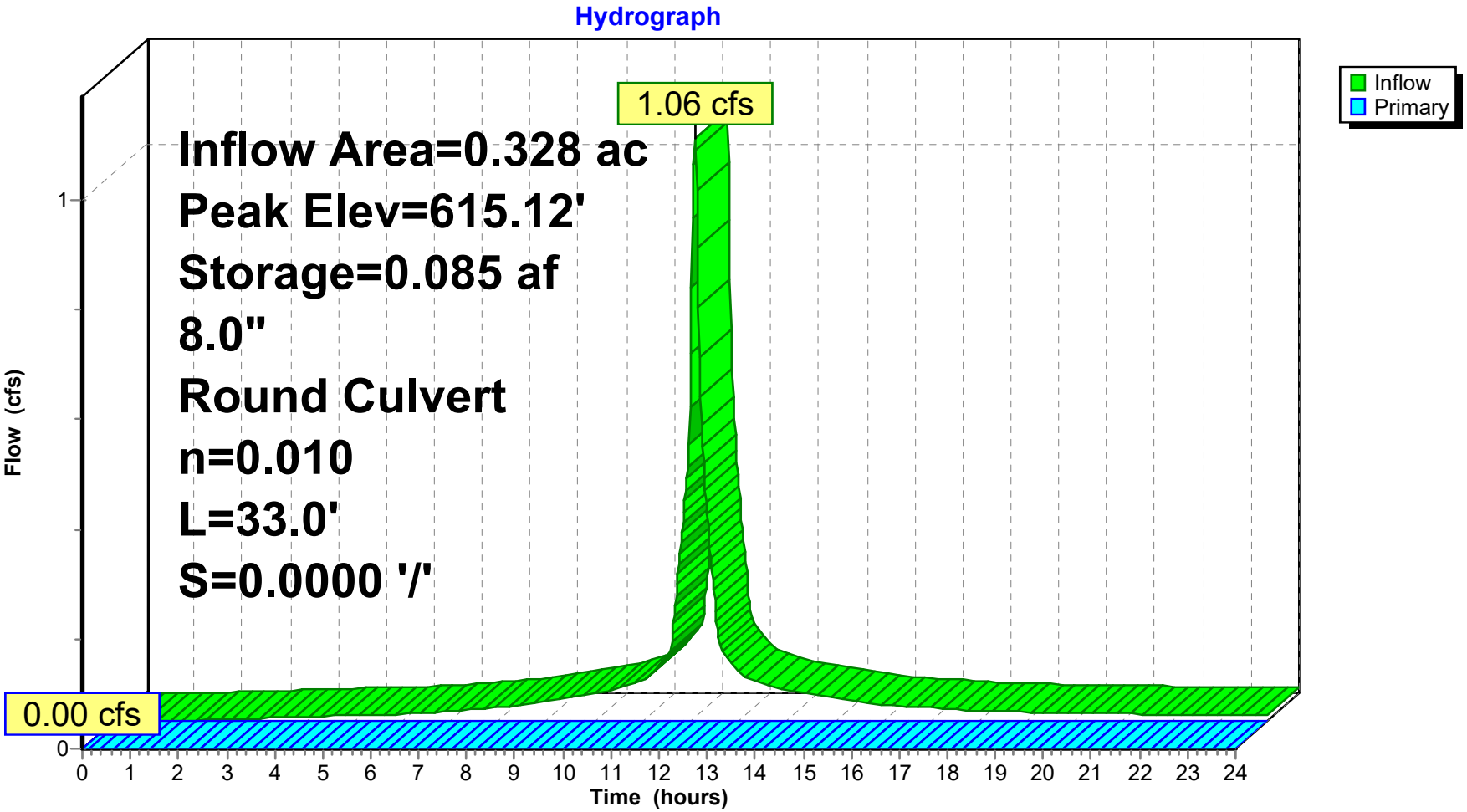
14,170.4 cf Field - 5,037.2 cf Chambers = 9,133.2 cf Stone x 40.0% Voids = 3,653.3 cf Stone Storage

Chamber Storage + Stone Storage = 8,690.5 cf = 0.200 af
Overall Storage Efficiency = 61.3%
Overall System Size = 113.25' x 22.75' x 5.50'

45 Chambers
524.8 cy Field
338.3 cy Stone

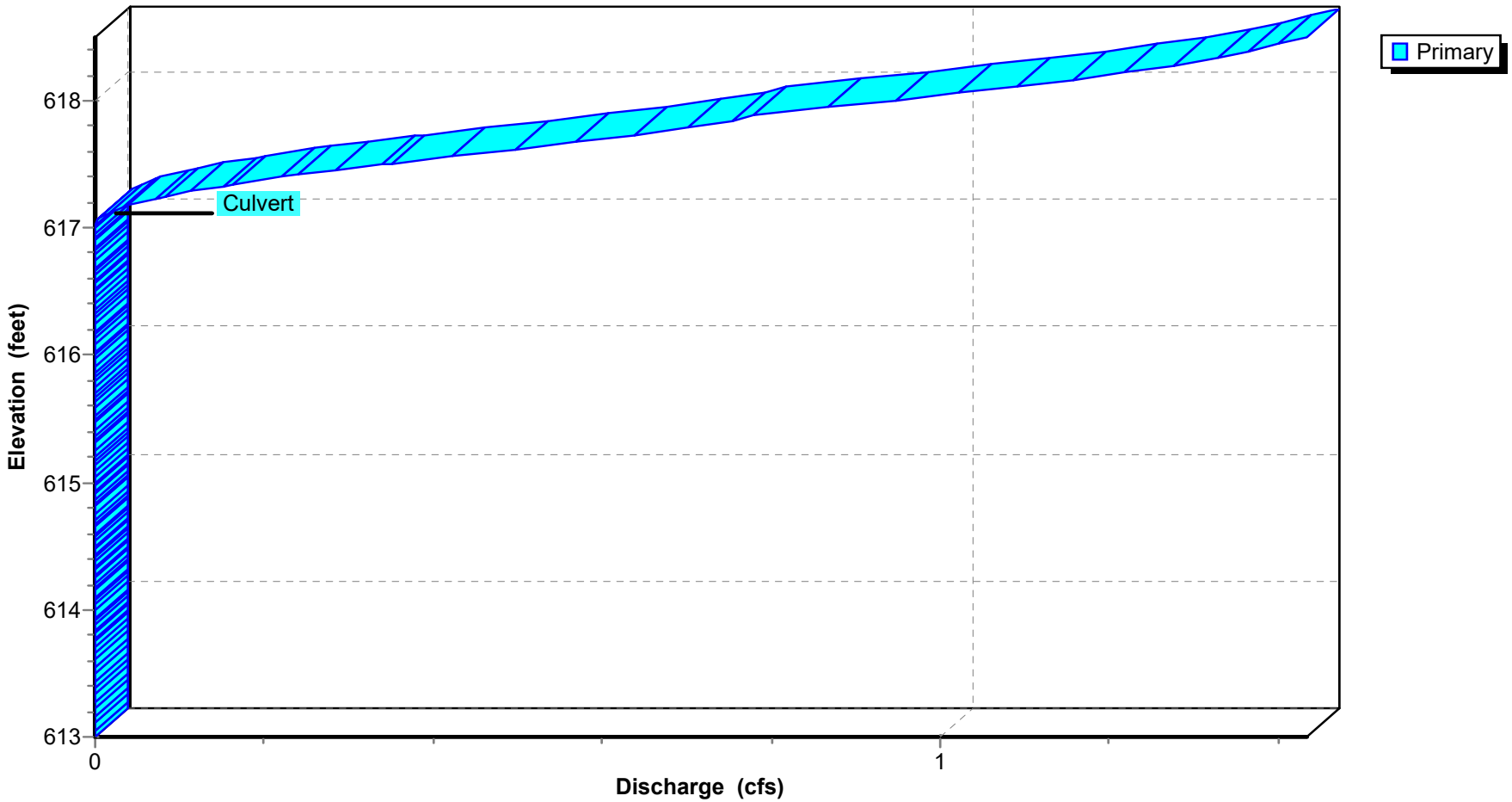


Pond 4P: ROOF INFILTRATION

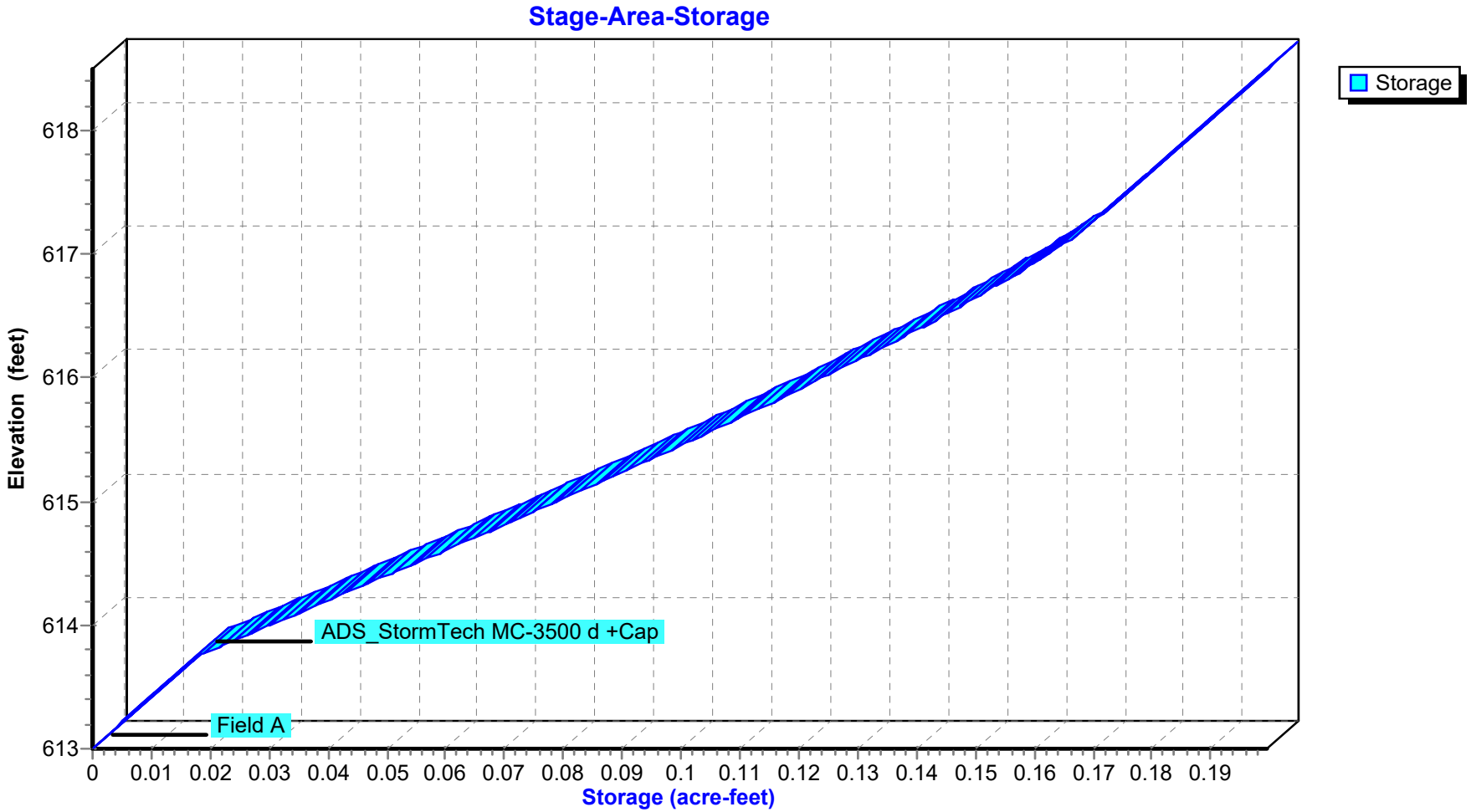


Pond 4P: ROOF INFILTRATION

Stage-Discharge



Pond 4P: ROOF INFILTRATION



Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1: DISCHARGE TO THE WEST Runoff Area=0.140 ac 0.00% Impervious Runoff Depth>1.40"
Tc=6.0 min CN=61 Runoff=0.21 cfs 0.016 af

Subcatchment P2-1: DISCHARGE TO DETENTION BASIN Runoff Area=0.600 ac 48.33% Impervious Runoff Depth>2.84"
Tc=6.0 min CN=79 Runoff=2.00 cfs 0.142 af

Subcatchment P2-2: DISCHARGE TO UNDERGROUND DETENTION Runoff Area=1.140 ac 75.44% Impervious Runoff Depth>3.82"
Tc=6.0 min CN=89 Runoff=4.95 cfs 0.363 af

Subcatchment P2-3: DISCHARGE TO THE EAST Runoff Area=1.250 ac 2.40% Impervious Runoff Depth>1.07"
Tc=6.0 min CN=56 Runoff=1.29 cfs 0.111 af

Subcatchment R4: ROOF - BUILDING #4 Runoff Area=0.099 ac 100.00% Impervious Runoff Depth>4.81"
Tc=6.0 min CN=98 Runoff=0.49 cfs 0.040 af

Subcatchment R5: ROOF - BUILDING #5 Runoff Area=0.118 ac 100.00% Impervious Runoff Depth>4.81"
Tc=6.0 min CN=98 Runoff=0.58 cfs 0.047 af

Subcatchment R6: ROOF - BUILDING #6 Runoff Area=0.090 ac 100.00% Impervious Runoff Depth>4.81"
Tc=6.0 min CN=98 Runoff=0.44 cfs 0.036 af

Subcatchment R7: ROOF - BUILDING #7 Runoff Area=0.120 ac 100.00% Impervious Runoff Depth>4.81"
Tc=6.0 min CN=98 Runoff=0.59 cfs 0.048 af

Reach 2R: TOTAL DISCHARGE TO THE EAST Inflow=2.37 cfs 0.478 af
Outflow=2.37 cfs 0.478 af

Reach 3R: PROPOSED SITE TOTAL DISCHARGE Inflow=2.47 cfs 0.495 af
Outflow=2.47 cfs 0.495 af

Pond 1P: DETENTION BASIN Peak Elev=614.89' Storage=2,704 cf Inflow=2.00 cfs 0.142 af
Outflow=0.55 cfs 0.101 af

Pond 2P: UNDERGROUND DETENTION Peak Elev=615.90' Storage=8,102 cf Inflow=4.95 cfs 0.363 af
Outflow=1.22 cfs 0.267 af

Pond 3P: ROOF INFILTRATION Peak Elev=615.66' Storage=1,728 cf Inflow=0.49 cfs 0.040 af
8.0" Round Culvert n=0.010 L=15.0' S=0.1000 '/' Outflow=0.00 cfs 0.000 af

Pond 4P: ROOF INFILTRATION Peak Elev=616.18' Storage=0.131 af Inflow=1.62 cfs 0.131 af
8.0" Round Culvert n=0.010 L=33.0' S=0.0000 '/' Outflow=0.00 cfs 0.000 af

Total Runoff Area = 3.557 ac Runoff Volume = 0.803 af Average Runoff Depth = 2.71"
54.82% Pervious = 1.950 ac 45.18% Impervious = 1.607 ac

Summary for Subcatchment P1: DISCHARGE TO THE WEST

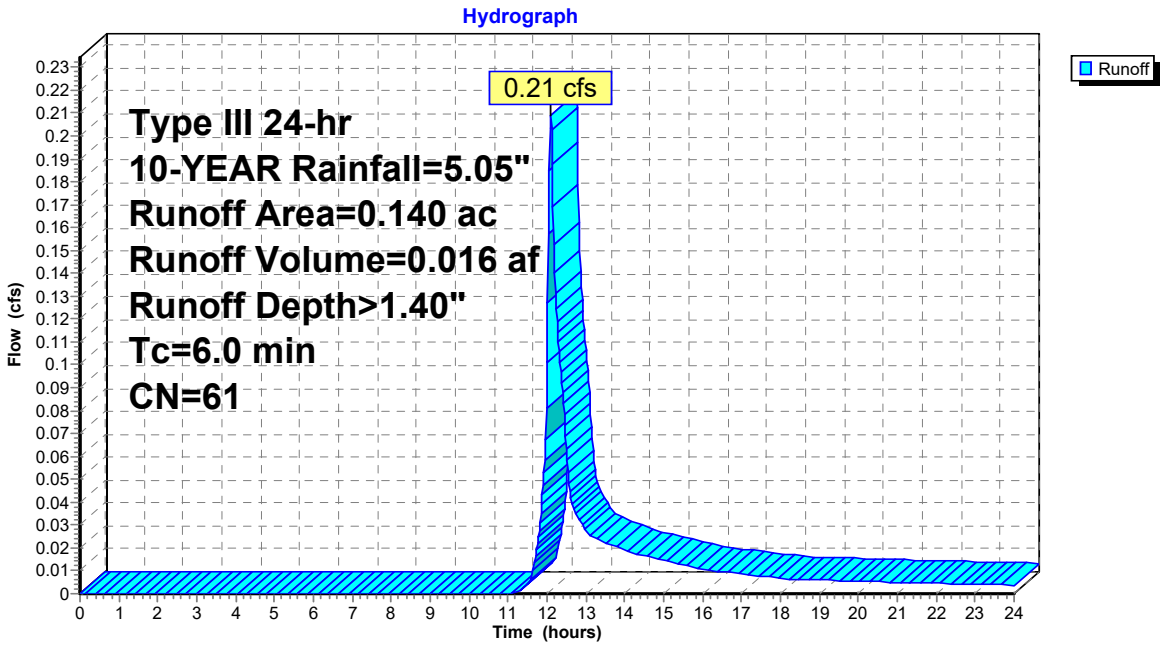
Runoff = 0.21 cfs @ 12.10 hrs, Volume= 0.016 af, Depth> 1.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YEAR Rainfall=5.05"

Area (ac)	CN	Description
0.140	61	>75% Grass cover, Good, HSG B
0.140		100.00% Pervious Area

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

Subcatchment P1: DISCHARGE TO THE WEST



Summary for Subcatchment P2-1: DISCHARGE TO DETENTION BASIN

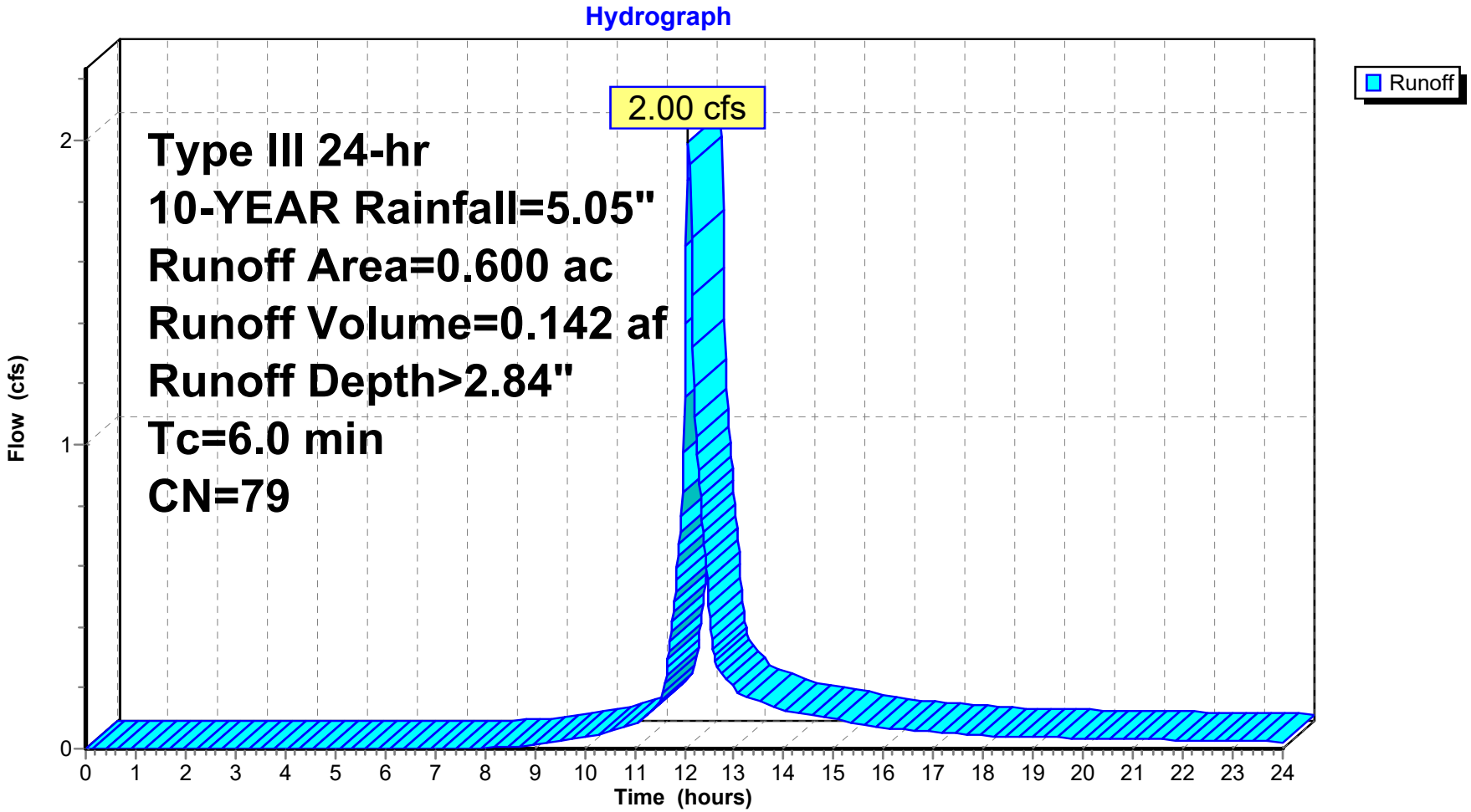
Runoff = 2.00 cfs @ 12.09 hrs, Volume= 0.142 af, Depth> 2.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YEAR Rainfall=5.05"

Area (ac)	CN	Description
0.310	61	>75% Grass cover, Good, HSG B
0.290	98	Paved parking, HSG B
0.600	79	Weighted Average
0.310		51.67% Pervious Area
0.290		48.33% Impervious Area

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

Subcatchment P2-1: DISCHARGE TO DETENTION BASIN



Summary for Subcatchment P2-2: DISCHARGE TO UNDERGROUND DETENTION

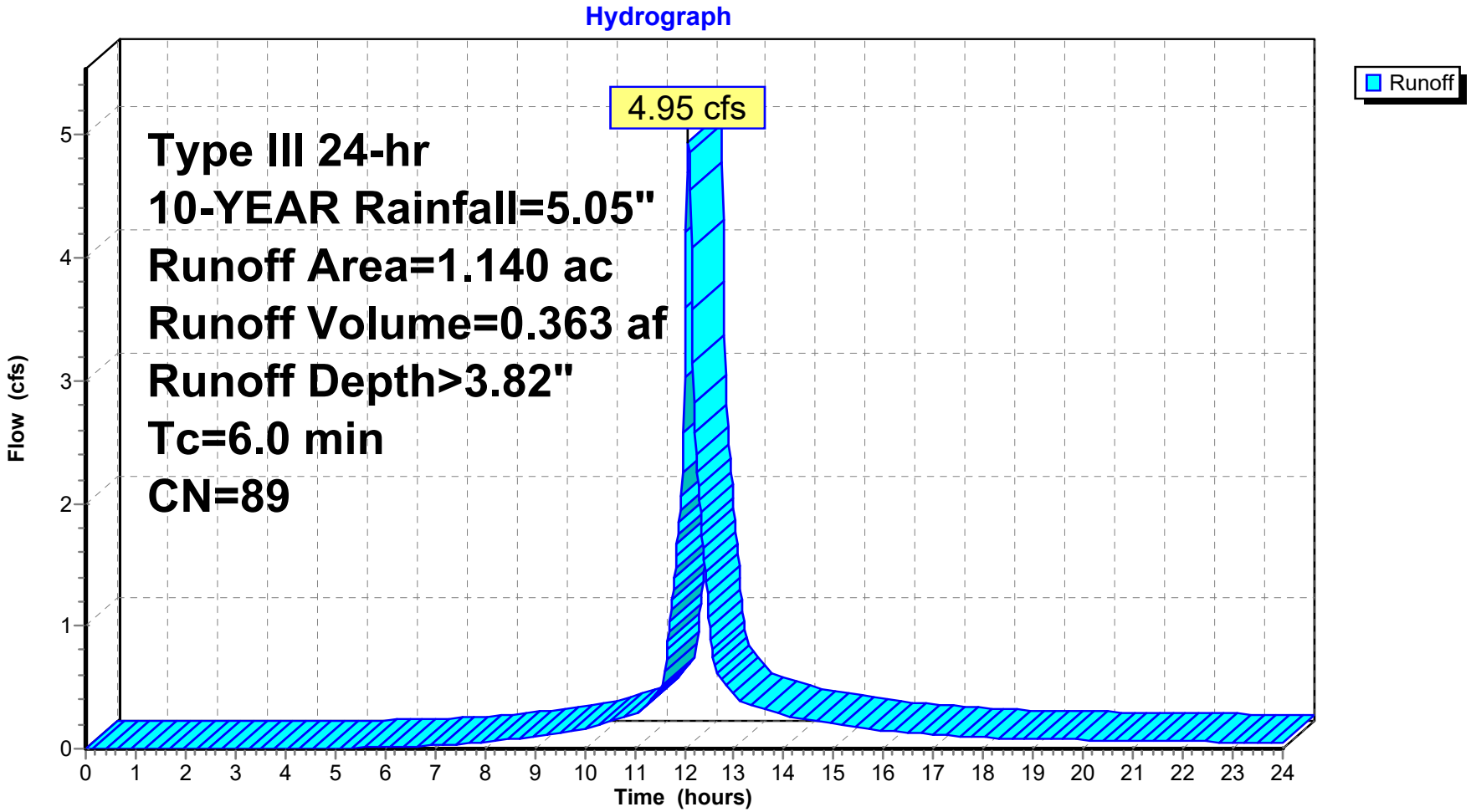
Runoff = 4.95 cfs @ 12.09 hrs, Volume= 0.363 af, Depth> 3.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YEAR Rainfall=5.05"

Area (ac)	CN	Description
0.280	61	>75% Grass cover, Good, HSG B
0.860	98	Paved parking, HSG B
1.140	89	Weighted Average
0.280		24.56% Pervious Area
0.860		75.44% Impervious Area

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

Subcatchment P2-2: DISCHARGE TO UNDERGROUND DETENTION



Summary for Subcatchment P2-3: DISCHARGE TO THE EAST

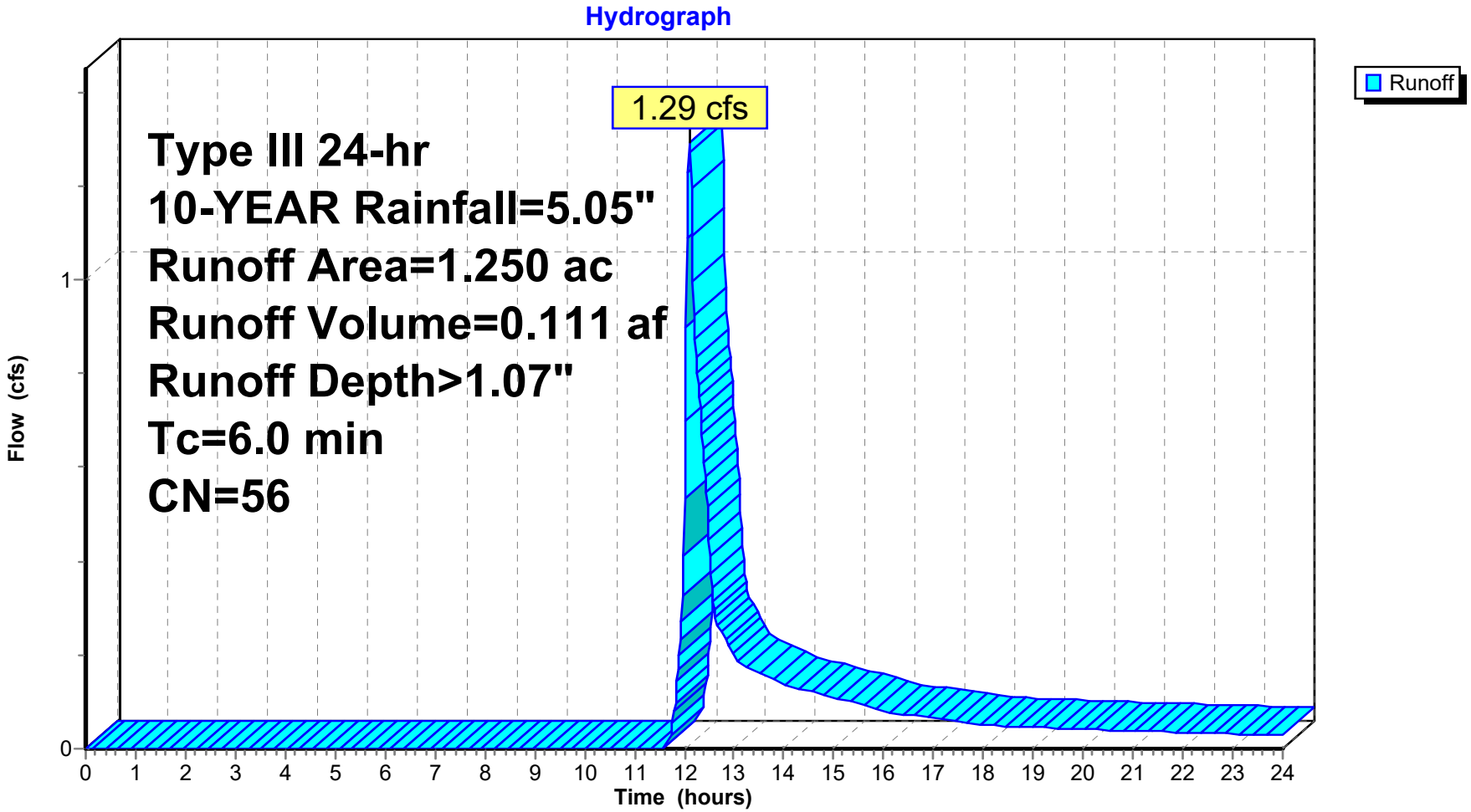
Runoff = 1.29 cfs @ 12.11 hrs, Volume= 0.111 af, Depth> 1.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YEAR Rainfall=5.05"

Area (ac)	CN	Description
0.670	61	>75% Grass cover, Good, HSG B
0.550	48	Brush, Good, HSG B
0.030	98	Paved parking, HSG B
1.250	56	Weighted Average
1.220		97.60% Pervious Area
0.030		2.40% Impervious Area

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

Subcatchment P2-3: DISCHARGE TO THE EAST



Summary for Subcatchment R4: ROOF - BUILDING #4

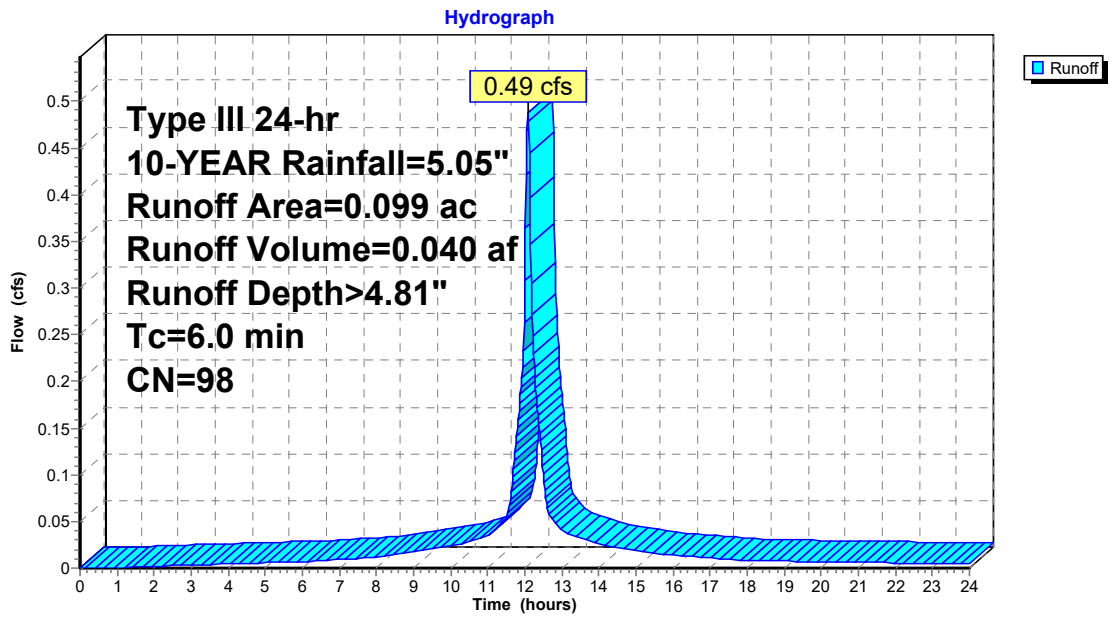
Runoff = 0.49 cfs @ 12.08 hrs, Volume= 0.040 af, Depth> 4.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YEAR Rainfall=5.05"

Area (ac)	CN	Description
0.099	98	Unconnected roofs, HSG B
0.099		100.00% Impervious Area
0.099		100.00% Unconnected

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

Subcatchment R4: ROOF - BUILDING #4



Summary for Subcatchment R5: ROOF - BUILDING #5

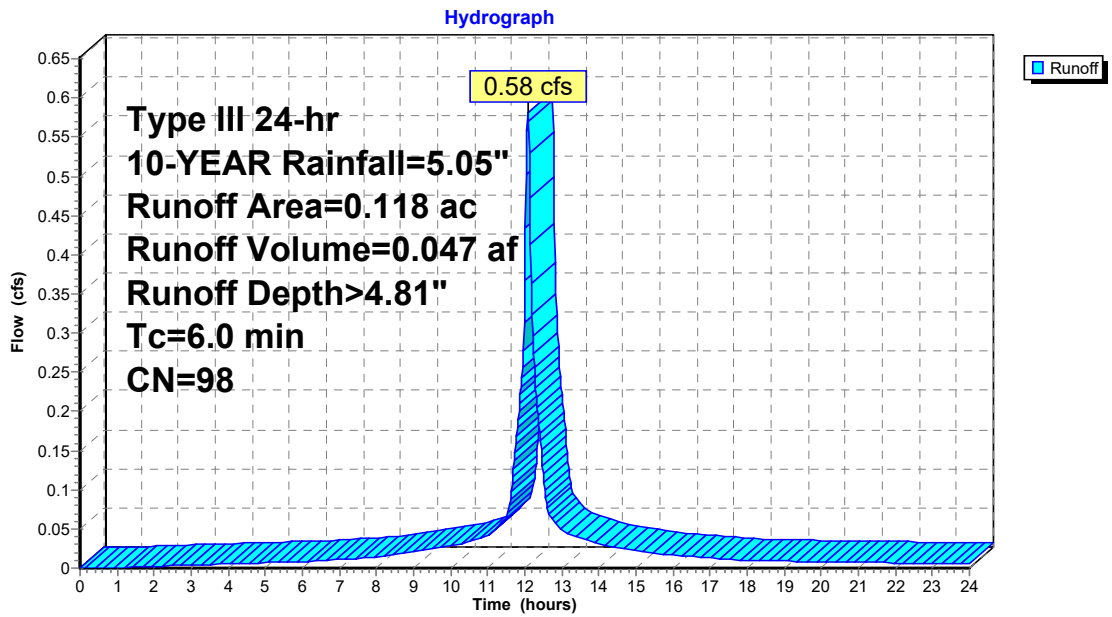
Runoff = 0.58 cfs @ 12.08 hrs, Volume= 0.047 af, Depth> 4.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YEAR Rainfall=5.05"

Area (ac)	CN	Description
0.118	98	Unconnected roofs, HSG B
0.118		100.00% Impervious Area
0.118		100.00% Unconnected

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

Subcatchment R5: ROOF - BUILDING #5



Summary for Subcatchment R6: ROOF - BUILDING #6

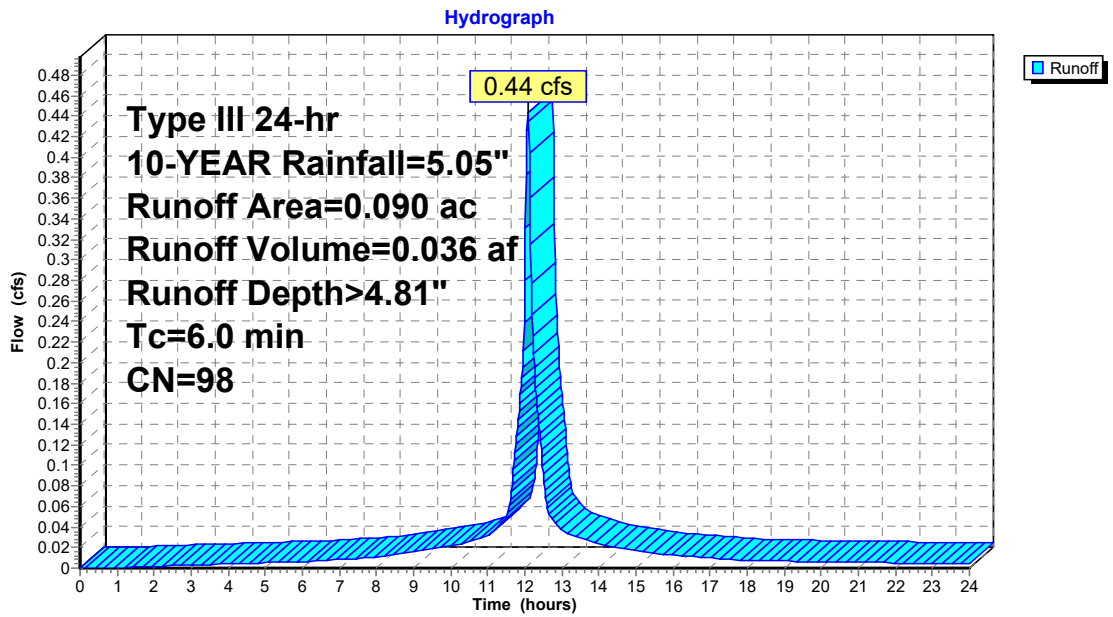
Runoff = 0.44 cfs @ 12.08 hrs, Volume= 0.036 af, Depth> 4.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YEAR Rainfall=5.05"

Area (ac)	CN	Description
0.090	98	Unconnected roofs, HSG B
0.090		100.00% Impervious Area
0.090		100.00% Unconnected

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

Subcatchment R6: ROOF - BUILDING #6



Summary for Subcatchment R7: ROOF - BUILDING #7

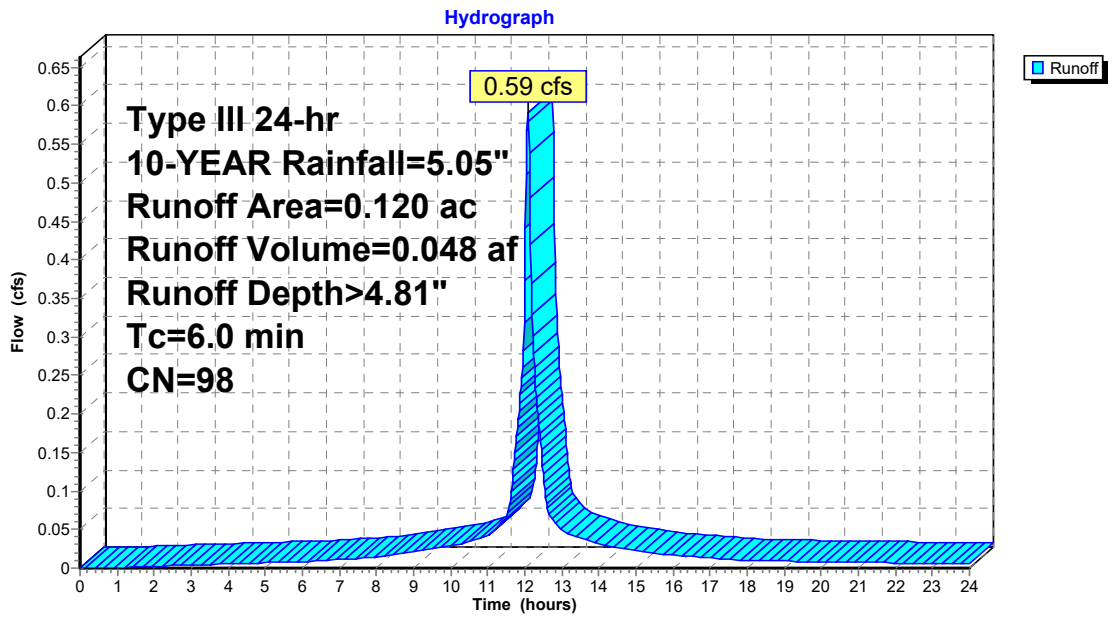
Runoff = 0.59 cfs @ 12.08 hrs, Volume= 0.048 af, Depth> 4.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-YEAR Rainfall=5.05"

Area (ac)	CN	Description
0.120	98	Unconnected roofs, HSG B
0.120		100.00% Impervious Area
0.120		100.00% Unconnected

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

Subcatchment R7: ROOF - BUILDING #7



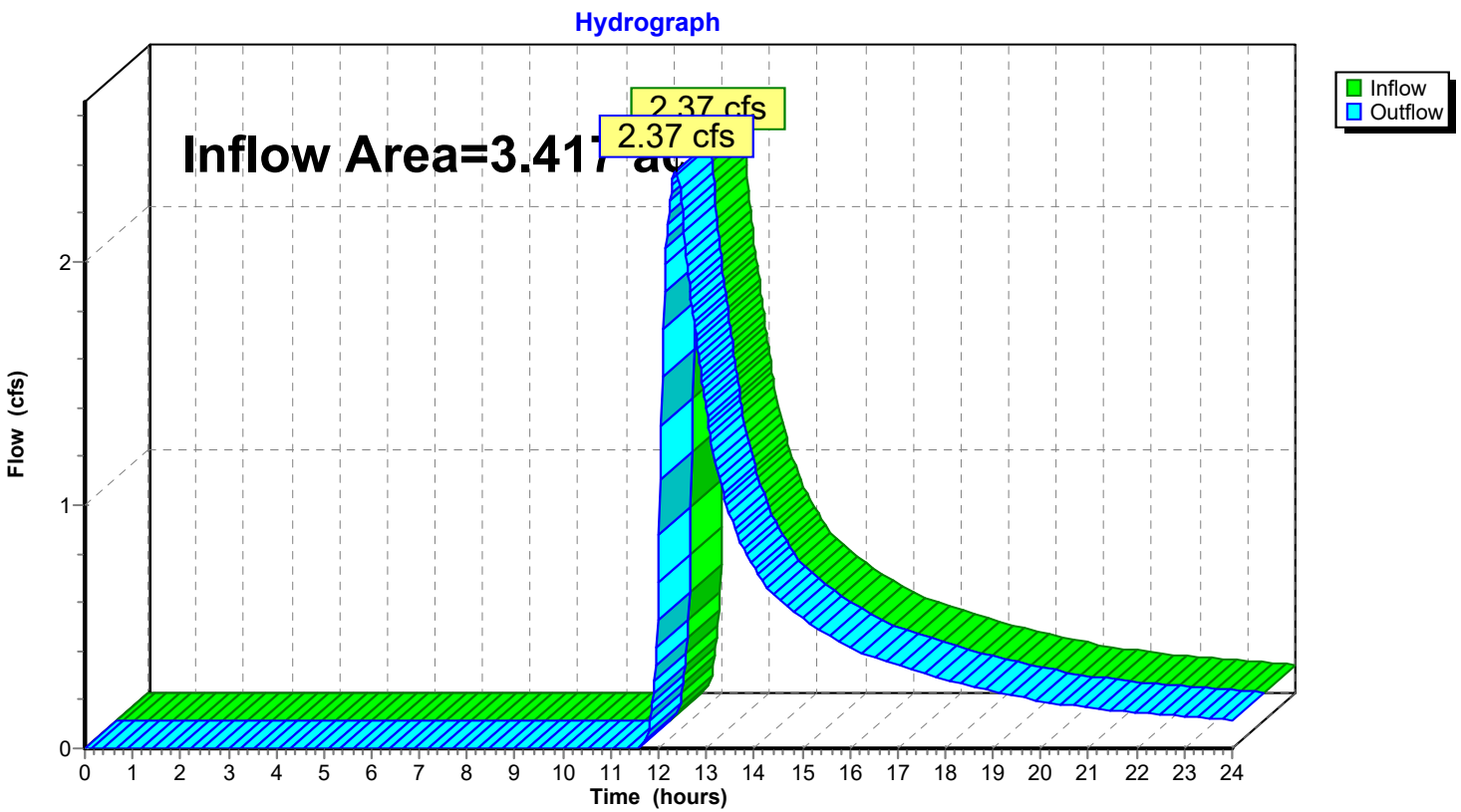
Summary for Reach 2R: TOTAL DISCHARGE TO THE EAST

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.417 ac, 47.03% Impervious, Inflow Depth > 1.68" for 10-YEAR event
Inflow = 2.37 cfs @ 12.36 hrs, Volume= 0.478 af
Outflow = 2.37 cfs @ 12.36 hrs, Volume= 0.478 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 2R: TOTAL DISCHARGE TO THE EAST



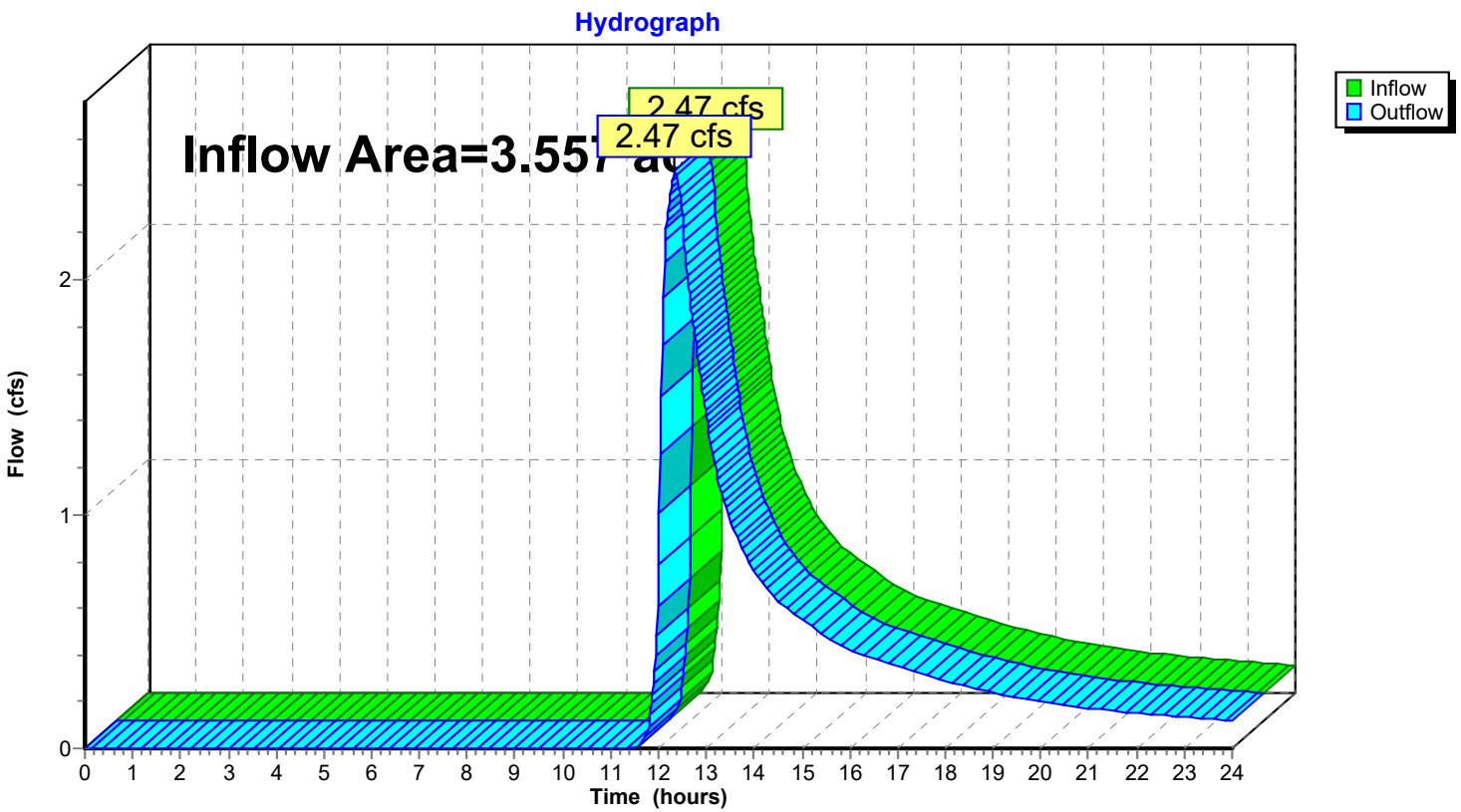
Summary for Reach 3R: PROPOSED SITE TOTAL DISCHARGE

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.557 ac, 45.18% Impervious, Inflow Depth > 1.67" for 10-YEAR event
Inflow = 2.47 cfs @ 12.35 hrs, Volume= 0.495 af
Outflow = 2.47 cfs @ 12.35 hrs, Volume= 0.495 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 3R: PROPOSED SITE TOTAL DISCHARGE



Summary for Pond 1P: DETENTION BASIN

Inflow Area = 0.600 ac, 48.33% Impervious, Inflow Depth > 2.84" for 10-YEAR event
Inflow = 2.00 cfs @ 12.09 hrs, Volume= 0.142 af
Outflow = 0.55 cfs @ 12.46 hrs, Volume= 0.101 af, Atten= 72%, Lag= 22.3 min
Primary = 0.55 cfs @ 12.46 hrs, Volume= 0.101 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 614.89' @ 12.46 hrs Surf.Area= 1,921 sf Storage= 2,704 cf
Flood Elev= 614.94' Surf.Area= 1,948 sf Storage= 2,797 cf

Plug-Flow detention time= 172.5 min calculated for 0.101 af (71% of inflow)
Center-of-Mass det. time= 78.2 min (901.5 - 823.4)

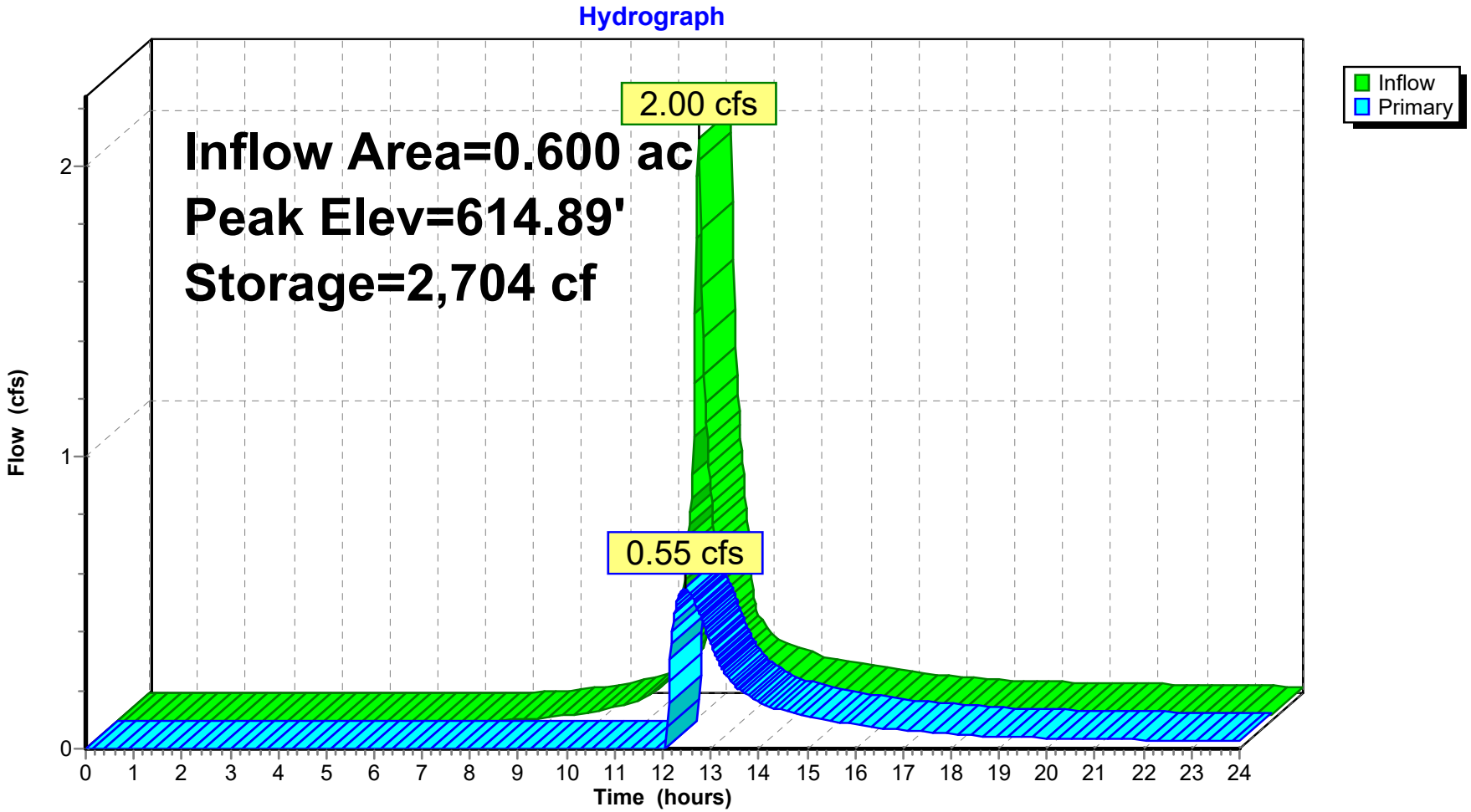
Volume	Invert	Avail.Storage	Storage Description
#1	613.00'	6,621 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
613.00	984	145.0	0	0	984
614.00	1,446	164.0	1,208	1,208	1,476
615.00	1,983	186.0	1,707	2,915	2,113
616.00	2,570	205.0	2,270	5,185	2,736
616.50	3,185	230.0	1,436	6,621	3,608

Device	Routing	Invert	Outlet Devices
#1	Primary	614.05'	**15.0" Round Culvert** L= 105.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 614.05' / 613.00' S= 0.0100 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf
#2	Device 1	614.30'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	616.00'	**15.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

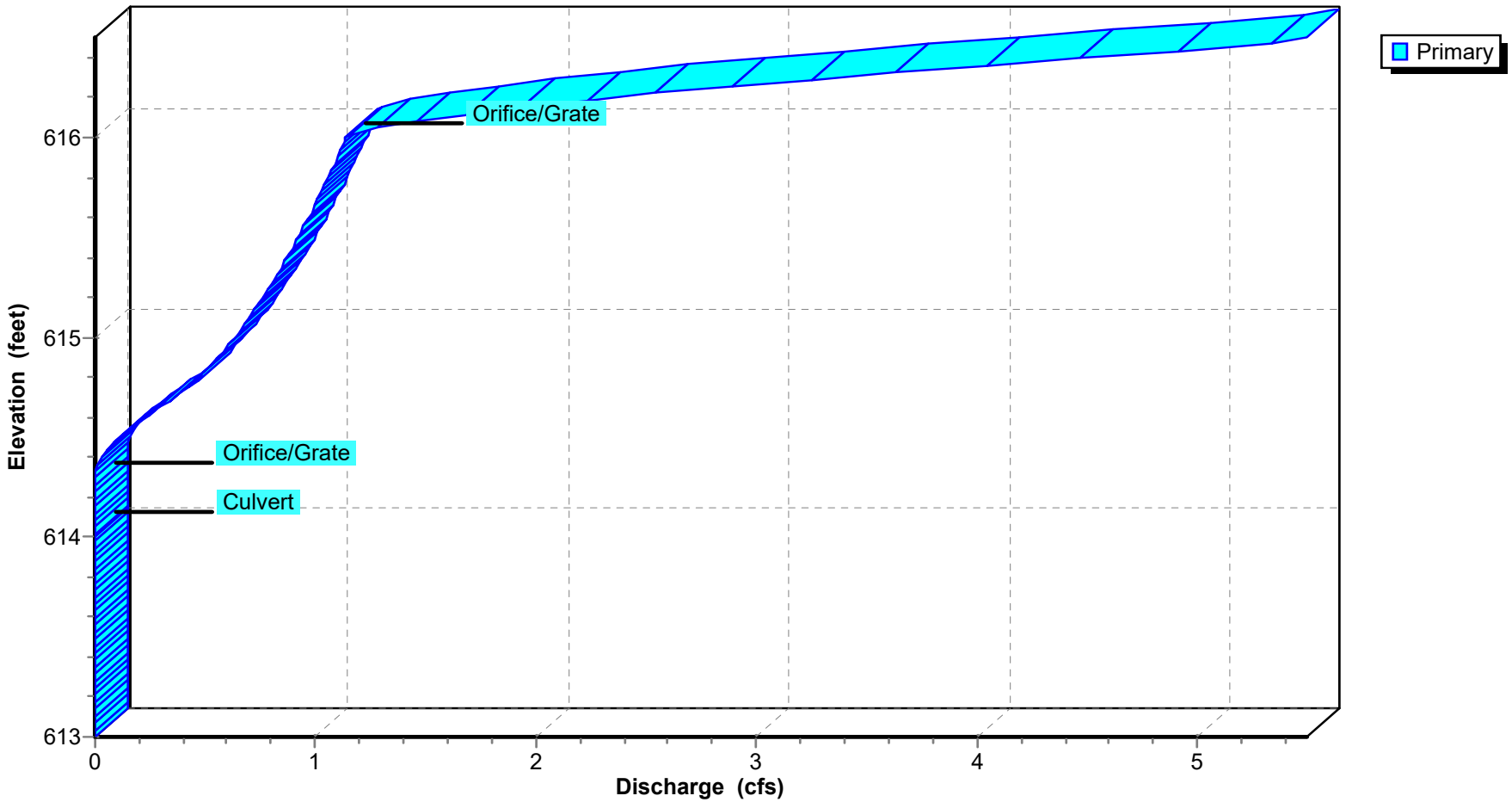
Primary OutFlow Max=0.55 cfs @ 12.46 hrs HW=614.89' (Free Discharge)
└─**1=Culvert** (Passes 0.55 cfs of 2.74 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.55 cfs @ 2.81 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: DETENTION BASIN

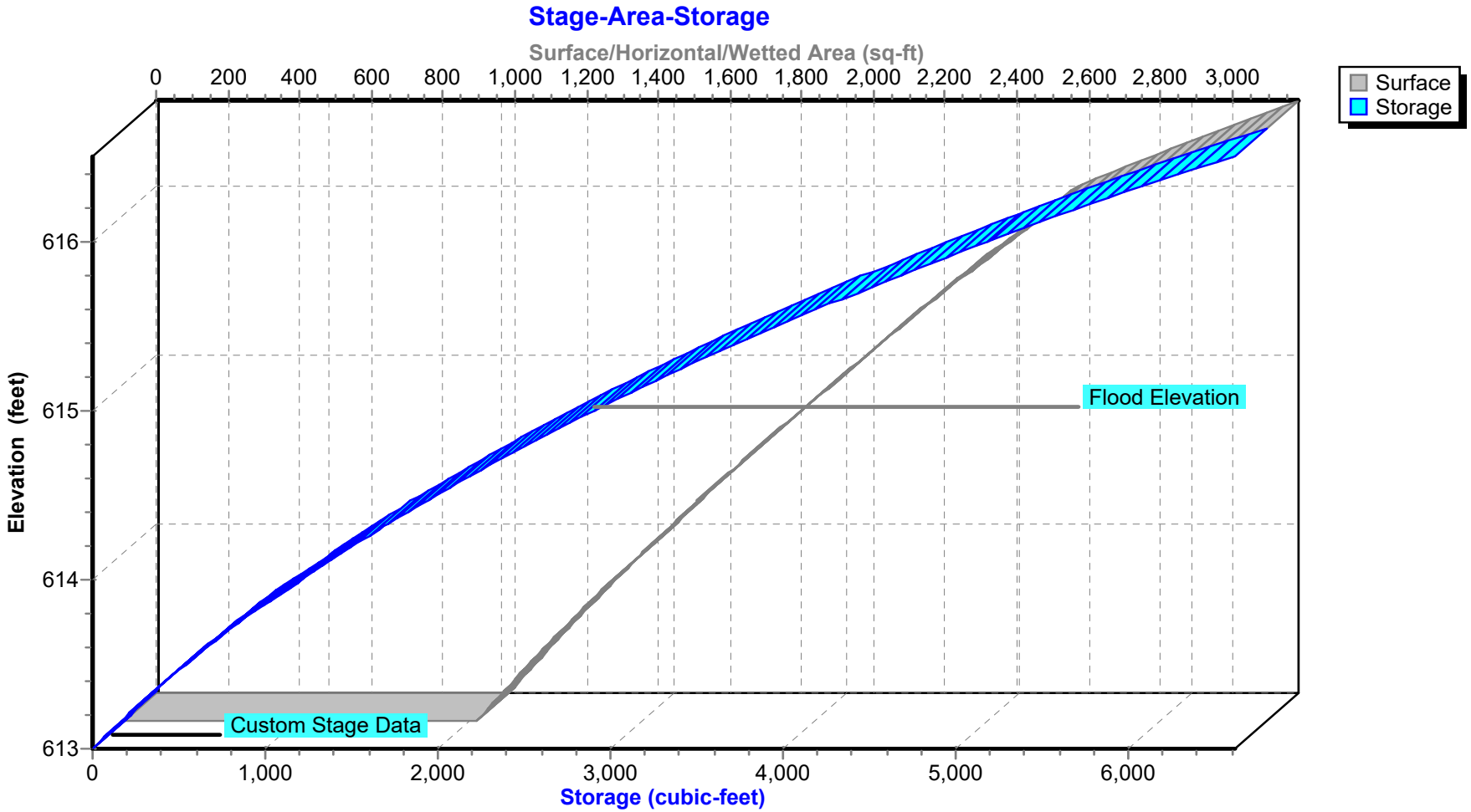


Pond 1P: DETENTION BASIN

Stage-Discharge



Pond 1P: DETENTION BASIN



Summary for Pond 2P: UNDERGROUND DETENTION

Inflow Area = 1.468 ac, 80.93% Impervious, Inflow Depth > 2.96" for 10-YEAR event
Inflow = 4.95 cfs @ 12.09 hrs, Volume= 0.363 af
Outflow = 1.22 cfs @ 12.47 hrs, Volume= 0.267 af, Atten= 75%, Lag= 23.0 min
Primary = 1.22 cfs @ 12.47 hrs, Volume= 0.267 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 615.90' @ 12.47 hrs Surf.Area= 5,913 sf Storage= 8,102 cf

Plug-Flow detention time= 210.8 min calculated for 0.267 af (74% of inflow)
Center-of-Mass det. time= 124.6 min (918.1 - 793.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	613.75'	6,633 cf	**36.50'W x 162.00'L x 4.00'H Field A** 23,652 cf Overall - 7,069 cf Embedded = 16,583 cf x 40.0% Voids
#2A	614.25'	7,069 cf	**CMP Round 30** x 72 Inside #1 Effective Size= 30.0"W x 30.0"H => 4.91 sf x 20.00'L = 98.2 cf Overall Size= 30.0"W x 30.0"H x 20.00'L 9 Rows of 8 Chambers
#3	614.25'	31 cf	**15.0" Round Pipe Storage** L= 25.0'
		13,733 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	613.75'	**15.0" Round Culvert** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 613.25' / 613.75' S= -0.0278 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf
#2	Device 1	614.86'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	615.33'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	617.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.22 cfs @ 12.47 hrs HW=615.90' (Free Discharge)
└─**1=Culvert** (Passes 1.22 cfs of 7.31 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.39 cfs @ 4.51 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.82 cfs @ 2.58 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: UNDERGROUND DETENTION - Chamber Wizard Field A

Chamber Model = CMP Round 30 (Round Corrugated Metal Pipe)
Effective Size= 30.0"W x 30.0"H => 4.91 sf x 20.00'L = 98.2 cf
Overall Size= 30.0"W x 30.0"H x 20.00'L

30.0" Wide + 18.0" Spacing = 48.0" C-C Row Spacing

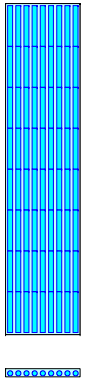
8 Chambers/Row x 20.00' Long = 160.00' Row Length +12.0" End Stone x 2 = 162.00' Base Length
9 Rows x 30.0" Wide + 18.0" Spacing x 8 + 12.0" Side Stone x 2 = 36.50' Base Width
6.0" Base + 30.0" Chamber Height + 12.0" Cover = 4.00' Field Height

72 Chambers x 98.2 cf = 7,068.6 cf Chamber Storage

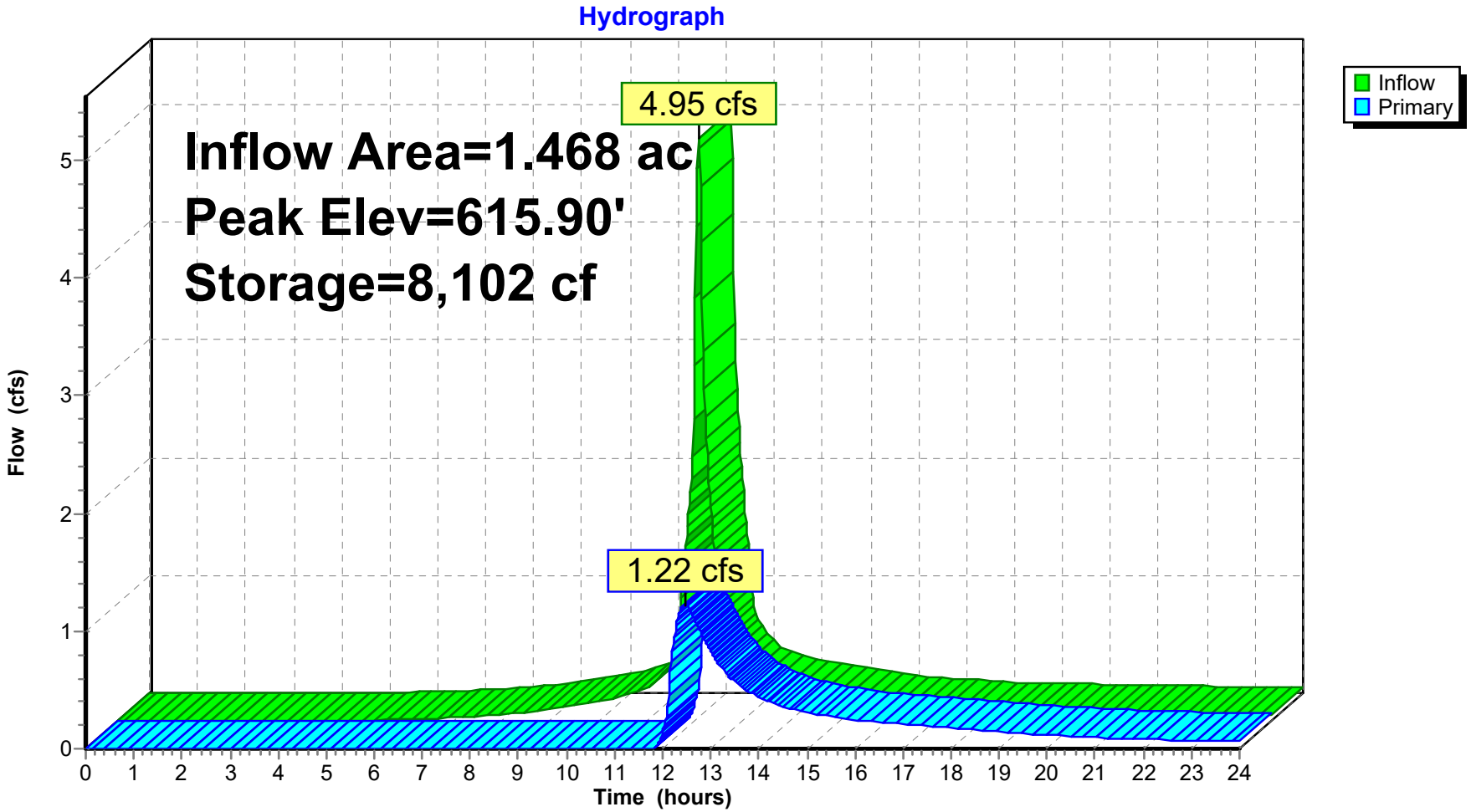
23,652.0 cf Field - 7,068.6 cf Chambers = 16,583.4 cf Stone x 40.0% Voids = 6,633.4 cf Stone Storage

Chamber Storage + Stone Storage = 13,702.0 cf = 0.315 af
Overall Storage Efficiency = 57.9%
Overall System Size = 162.00' x 36.50' x 4.00'

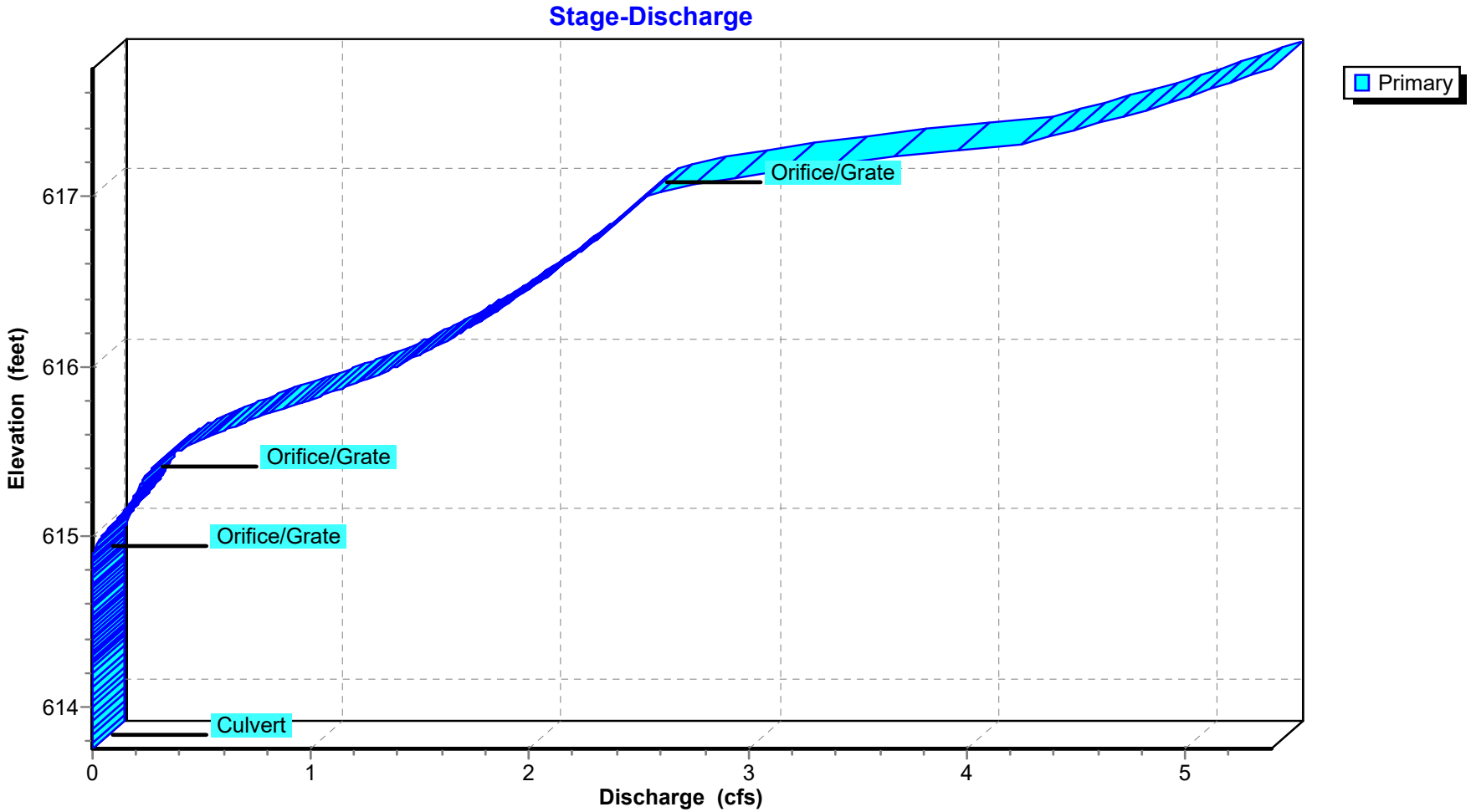
72 Chambers
876.0 cy Field
614.2 cy Stone



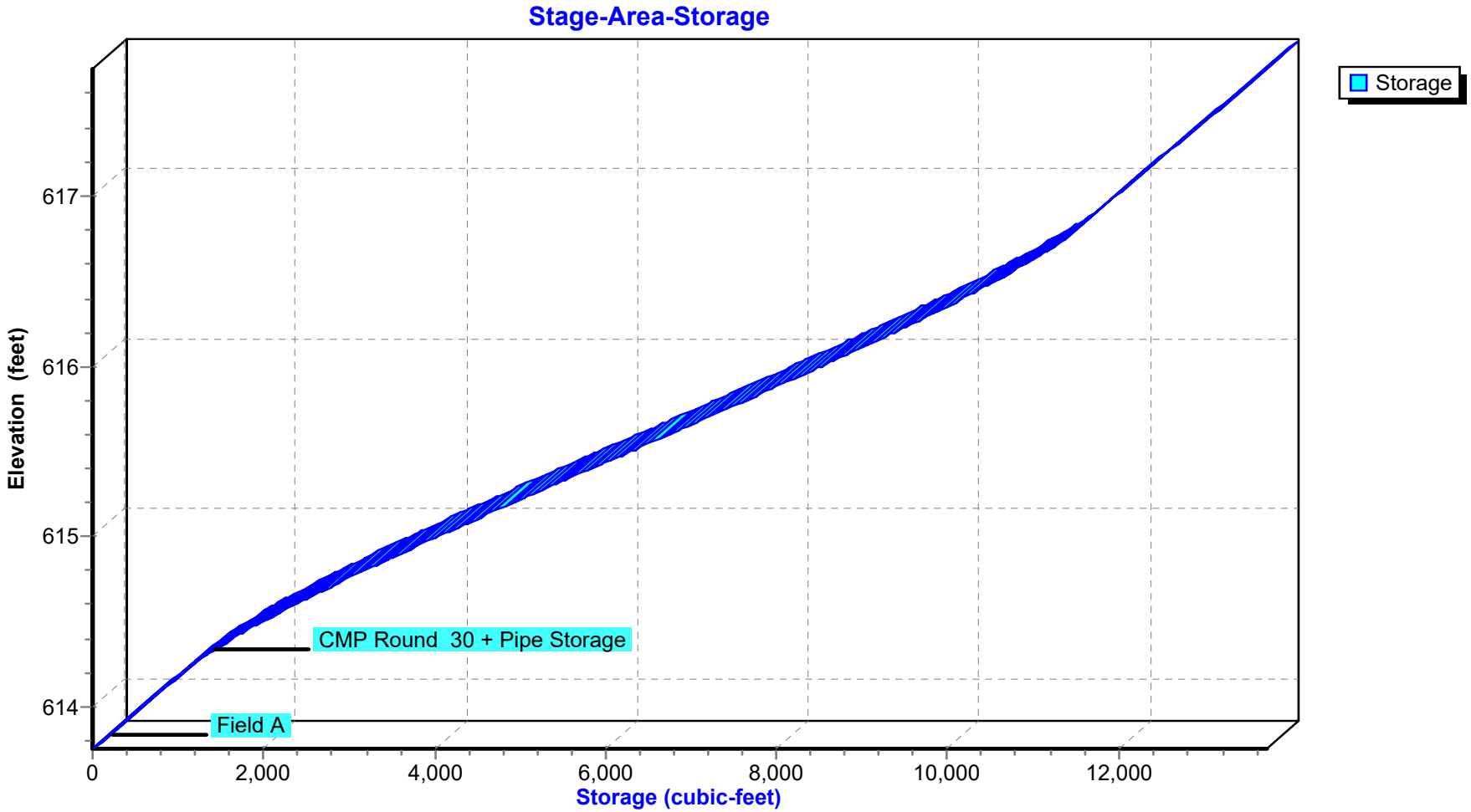
Pond 2P: UNDERGROUND DETENTION



Pond 2P: UNDERGROUND DETENTION



Pond 2P: UNDERGROUND DETENTION



Summary for Pond 3P: ROOF INFILTRATION

Inflow Area = 0.099 ac,100.00% Impervious, Inflow Depth > 4.81" for 10-YEAR event
Inflow = 0.49 cfs @ 12.08 hrs, Volume= 0.040 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 615.66' @ 24.00 hrs Surf.Area= 607 sf Storage= 1,728 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1A	611.50'	1,192 cf	**19.42'W x 31.27'L x 7.25'H Field A** 4,401 cf Overall - 1,421 cf Embedded = 2,981 cf x 40.0% Voids
#2A	612.25'	1,421 cf	**ADS_StormTech MC-4500 +Cap** x 12 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 2 Rows of 6 Chambers Cap Storage= +35.7 cf x 2 x 2 rows = 142.8 cf
		2,613 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	617.50'	**8.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 617.50' / 616.00' S= 0.1000 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=611.50' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)

Pond 3P: ROOF INFILTRATION - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-4500 +Cap (ADS StormTech® MC-4500 with cap volume)
Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf
Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap
Cap Storage= +35.7 cf x 2 x 2 rows = 142.8 cf

100.0" Wide + 9.0" Spacing = 109.0" C-C Row Spacing

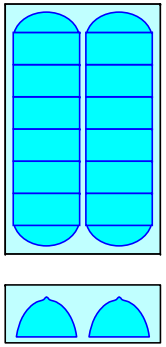
6 Chambers/Row x 4.02' Long +2.56' Cap Length x 2 = 29.27' Row Length +12.0" End Stone x 2 = 31.27' Base Length
2 Rows x 100.0" Wide + 9.0" Spacing x 1 + 12.0" Side Stone x 2 = 19.42' Base Width
9.0" Base + 60.0" Chamber Height + 18.0" Cover = 7.25' Field Height

12 Chambers x 106.5 cf + 35.7 cf Cap Volume x 2 x 2 Rows = 1,420.7 cf Chamber Storage

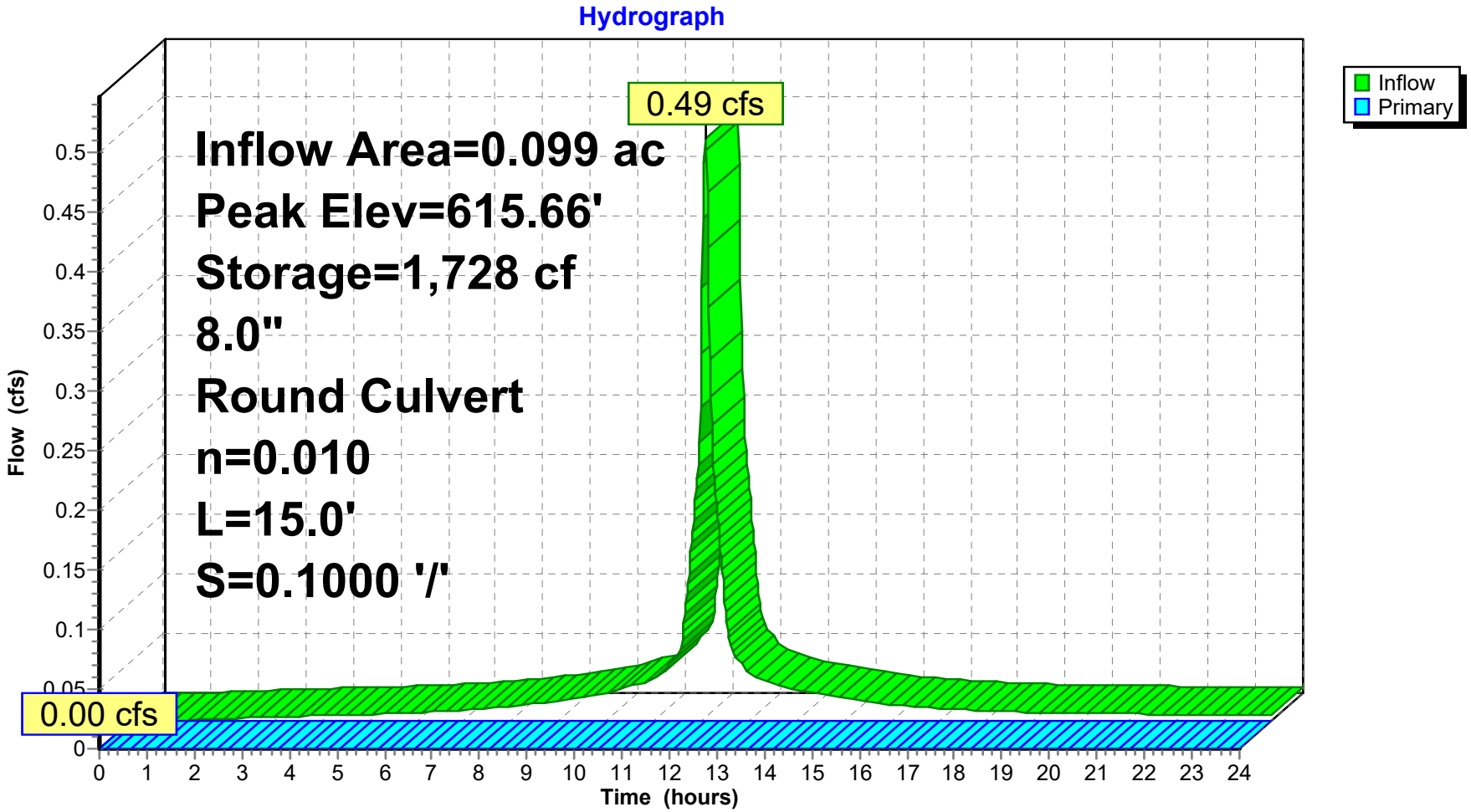
4,401.4 cf Field - 1,420.7 cf Chambers = 2,980.7 cf Stone x 40.0% Voids = 1,192.3 cf Stone Storage

Chamber Storage + Stone Storage = 2,613.0 cf = 0.060 af
Overall Storage Efficiency = 59.4%
Overall System Size = 31.27' x 19.42' x 7.25'

12 Chambers
163.0 cy Field
110.4 cy Stone

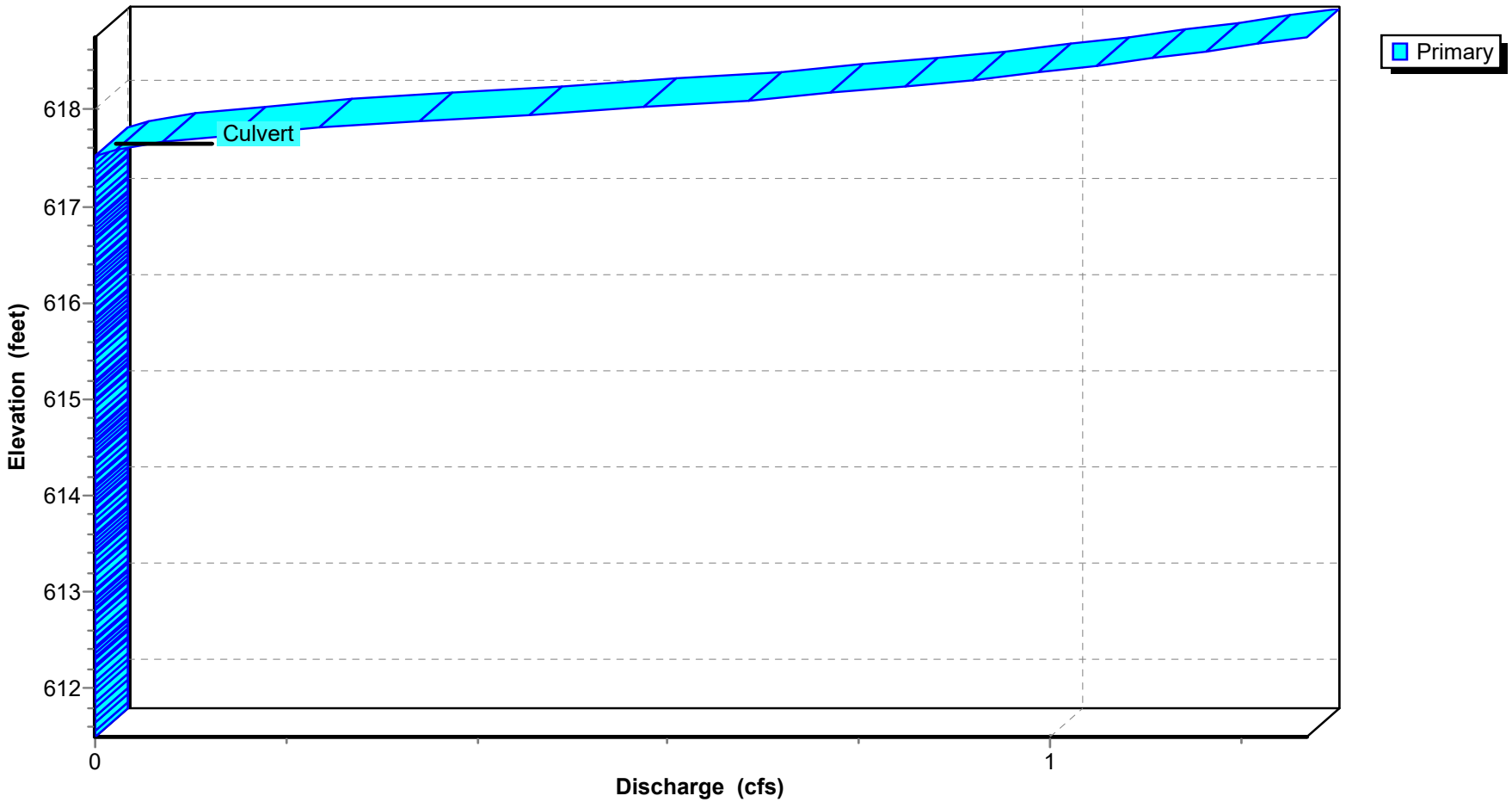


Pond 3P: ROOF INFILTRATION

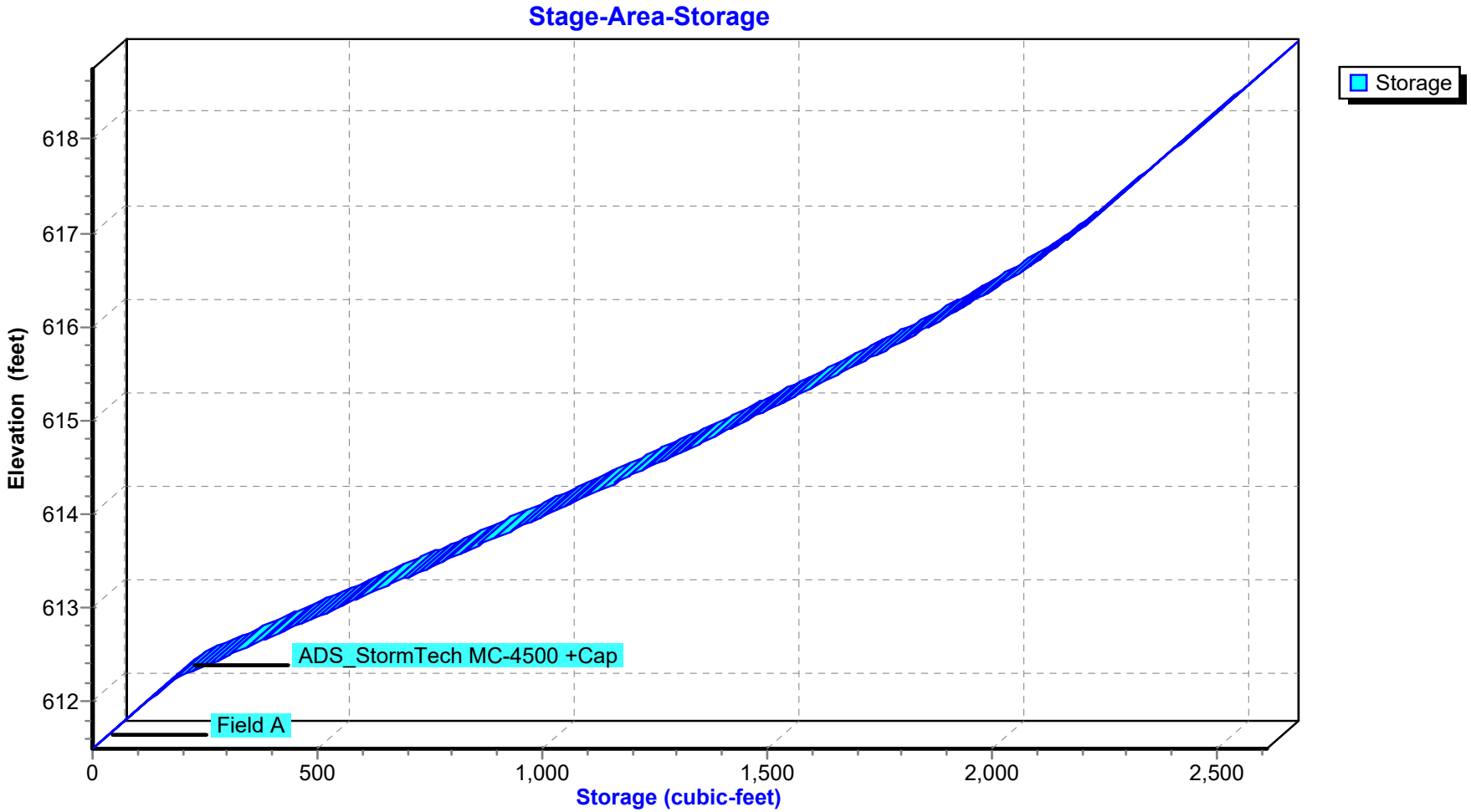


Pond 3P: ROOF INFILTRATION

Stage-Discharge



Pond 3P: ROOF INFILTRATION



Summary for Pond 4P: ROOF INFILTRATION

Inflow Area = 0.328 ac,100.00% Impervious, Inflow Depth > 4.81" for 10-YEAR event
Inflow = 1.62 cfs @ 12.08 hrs, Volume= 0.131 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 616.18' @ 24.00 hrs Surf.Area= 0.059 ac Storage= 0.131 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1A	613.00'	0.084 af	**22.75'W x 113.25'L x 5.50'H Field A** 0.325 af Overall - 0.116 af Embedded = 0.210 af x 40.0% Voids
#2A	613.75'	0.116 af	**ADS_StormTech MC-3500 d +Cap** x 45 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 3 Rows of 15 Chambers Cap Storage= +14.9 cf x 2 x 3 rows = 89.4 cf
		0.200 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	617.00'	**8.0" Round Culvert** L= 33.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 617.00' / 617.00' S= 0.0000 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=613.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)

Pond 4P: ROOF INFILTRATION - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 3 rows = 89.4 cf

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

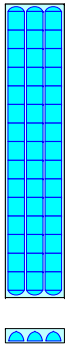
15 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 111.25' Row Length +12.0" End Stone x 2 = 113.25' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

45 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 3 Rows = 5,037.2 cf Chamber Storage

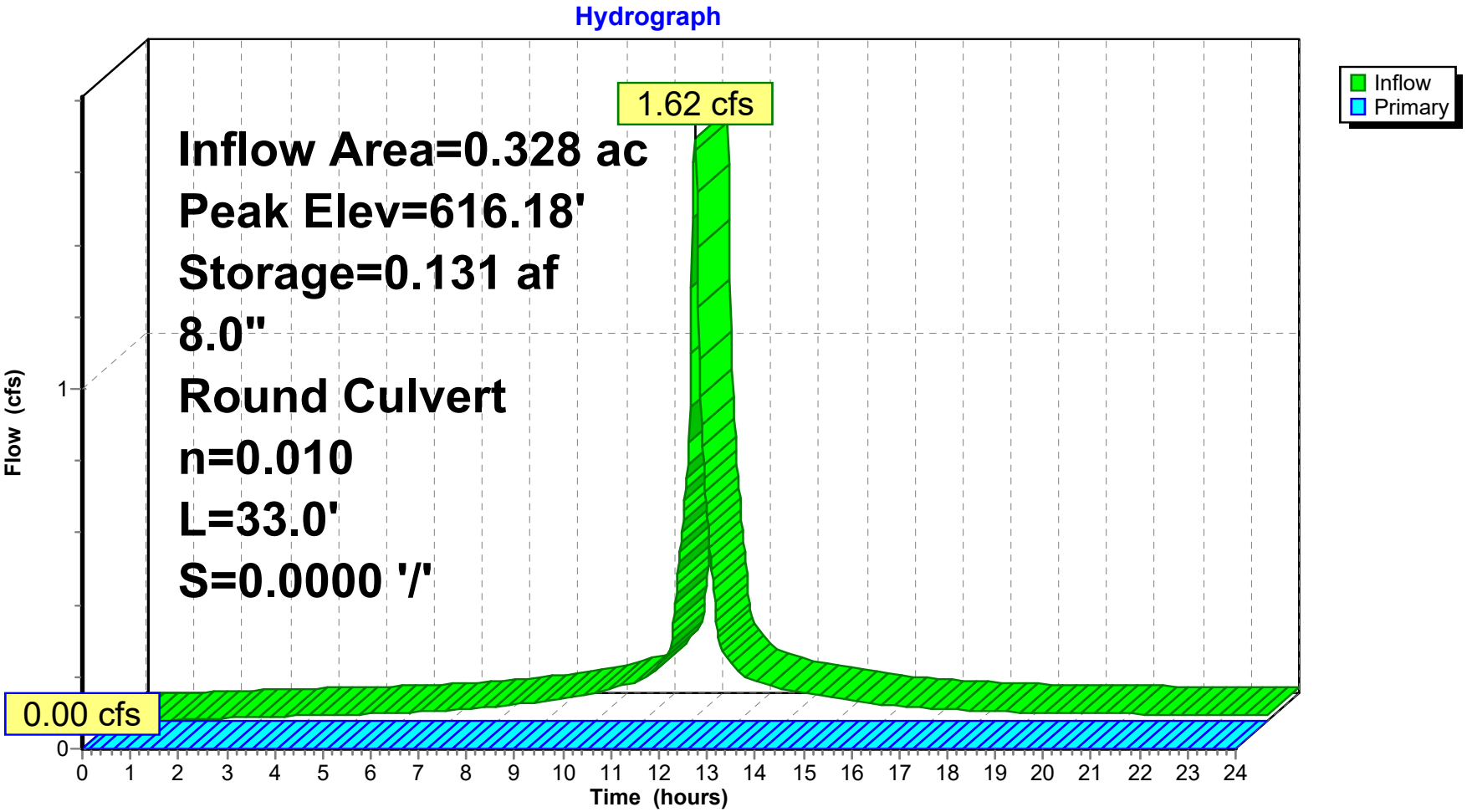
14,170.4 cf Field - 5,037.2 cf Chambers = 9,133.2 cf Stone x 40.0% Voids = 3,653.3 cf Stone Storage

Chamber Storage + Stone Storage = 8,690.5 cf = 0.200 af
Overall Storage Efficiency = 61.3%
Overall System Size = 113.25' x 22.75' x 5.50'

45 Chambers
524.8 cy Field
338.3 cy Stone

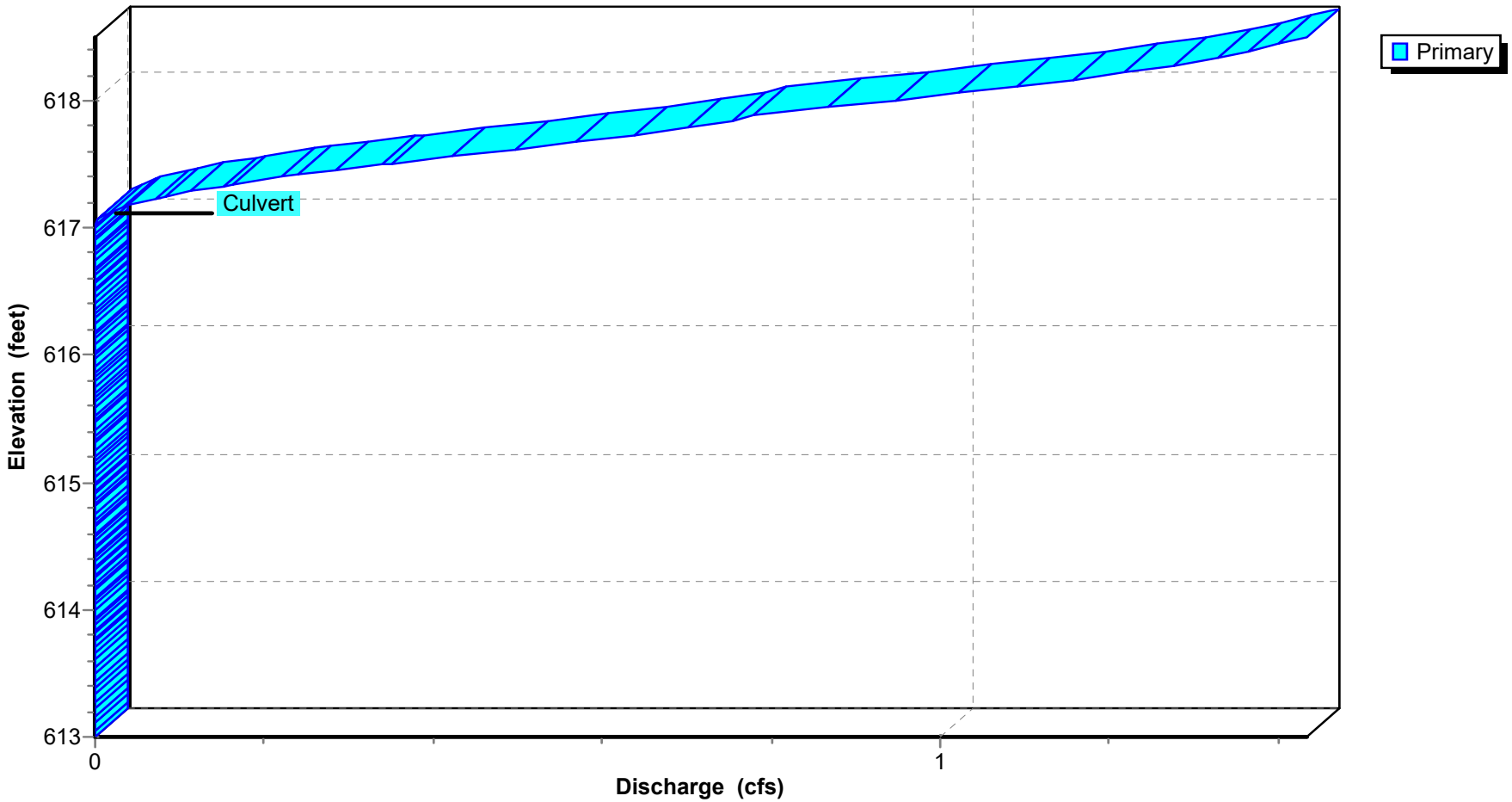


Pond 4P: ROOF INFILTRATION

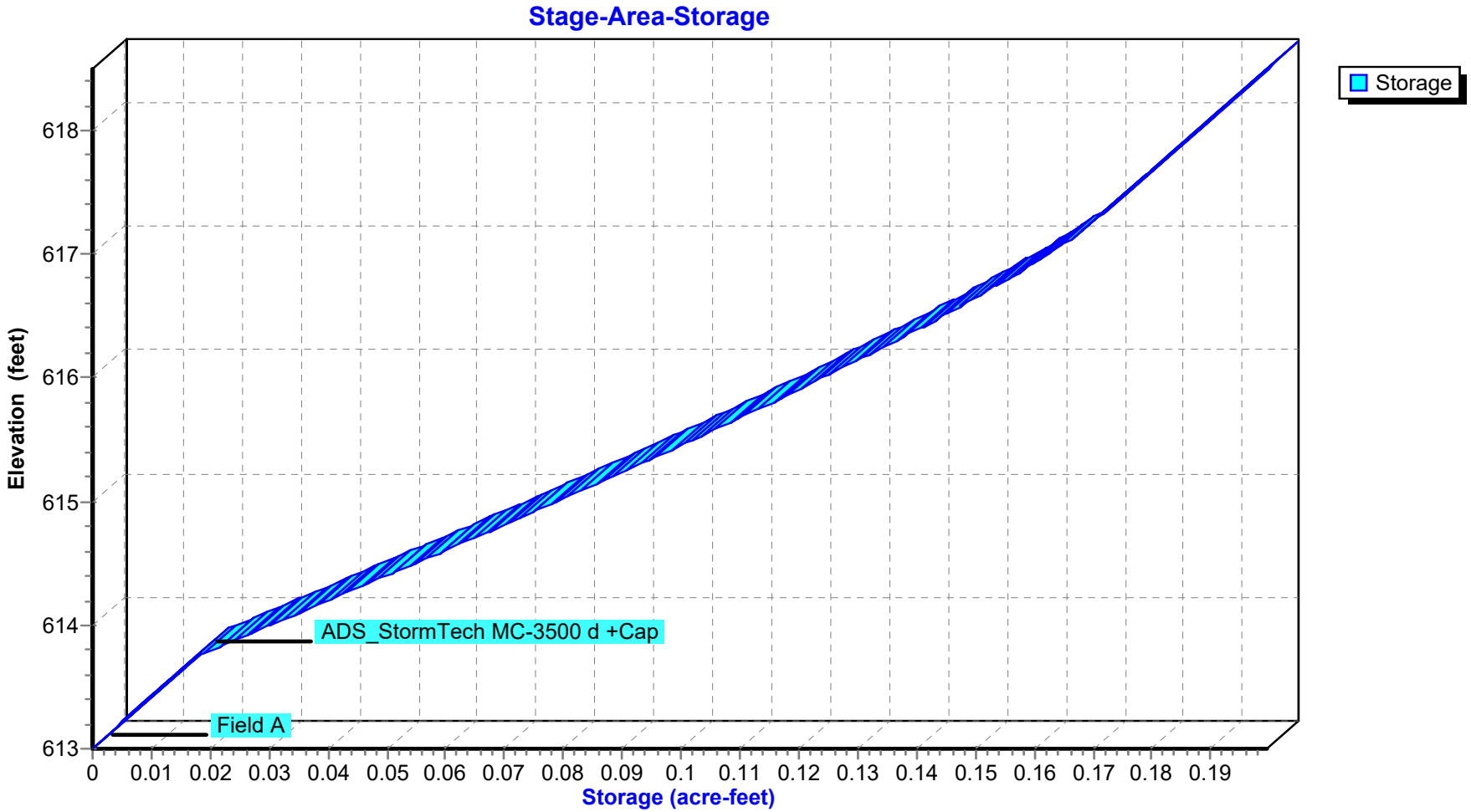


Pond 4P: ROOF INFILTRATION

Stage-Discharge



Pond 4P: ROOF INFILTRATION



Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1: DISCHARGE TO THE WEST Runoff Area=0.140 ac 0.00% Impervious Runoff Depth>2.08"
Tc=6.0 min CN=61 Runoff=0.33 cfs 0.024 af

Subcatchment P2-1: DISCHARGE TO DETENTION BASIN Runoff Area=0.600 ac 48.33% Impervious Runoff Depth>3.78"
Tc=6.0 min CN=79 Runoff=2.65 cfs 0.189 af

Subcatchment P2-2: DISCHARGE TO UNDERGROUND DETENTION Runoff Area=1.140 ac 75.44% Impervious Runoff Depth>4.85"
Tc=6.0 min CN=89 Runoff=6.21 cfs 0.461 af

Subcatchment P2-3: DISCHARGE TO THE EAST Runoff Area=1.250 ac 2.40% Impervious Runoff Depth>1.67"
Tc=6.0 min CN=56 Runoff=2.22 cfs 0.173 af

Subcatchment R4: ROOF - BUILDING #4 Runoff Area=0.099 ac 100.00% Impervious Runoff Depth>5.88"
Tc=6.0 min CN=98 Runoff=0.59 cfs 0.048 af

Subcatchment R5: ROOF - BUILDING #5 Runoff Area=0.118 ac 100.00% Impervious Runoff Depth>5.88"
Tc=6.0 min CN=98 Runoff=0.71 cfs 0.058 af

Subcatchment R6: ROOF - BUILDING #6 Runoff Area=0.090 ac 100.00% Impervious Runoff Depth>5.88"
Tc=6.0 min CN=98 Runoff=0.54 cfs 0.044 af

Subcatchment R7: ROOF - BUILDING #7 Runoff Area=0.120 ac 100.00% Impervious Runoff Depth>5.88"
Tc=6.0 min CN=98 Runoff=0.72 cfs 0.059 af

Reach 2R: TOTAL DISCHARGE TO THE EAST Inflow=4.02 cfs 0.683 af
Outflow=4.02 cfs 0.683 af

Reach 3R: PROPOSED SITE TOTAL DISCHARGE Inflow=4.33 cfs 0.708 af
Outflow=4.33 cfs 0.708 af

Pond 1P: DETENTION BASIN Peak Elev=615.27' Storage=3,461 cf Inflow=2.65 cfs 0.189 af
Outflow=0.80 cfs 0.147 af

Pond 2P: UNDERGROUND DETENTION Peak Elev=616.28' Storage=9,705 cf Inflow=6.21 cfs 0.461 af
Outflow=1.79 cfs 0.363 af

Pond 3P: ROOF INFILTRATION Peak Elev=616.73' Storage=2,112 cf Inflow=0.59 cfs 0.048 af
8.0" Round Culvert n=0.010 L=15.0' S=0.1000 '/' Outflow=0.00 cfs 0.000 af

Pond 4P: ROOF INFILTRATION Peak Elev=616.95' Storage=0.161 af Inflow=1.96 cfs 0.161 af
8.0" Round Culvert n=0.010 L=33.0' S=0.0000 '/' Outflow=0.00 cfs 0.000 af

Total Runoff Area = 3.557 ac Runoff Volume = 1.057 af Average Runoff Depth = 3.56"
54.82% Pervious = 1.950 ac 45.18% Impervious = 1.607 ac

Summary for Subcatchment P1: DISCHARGE TO THE WEST

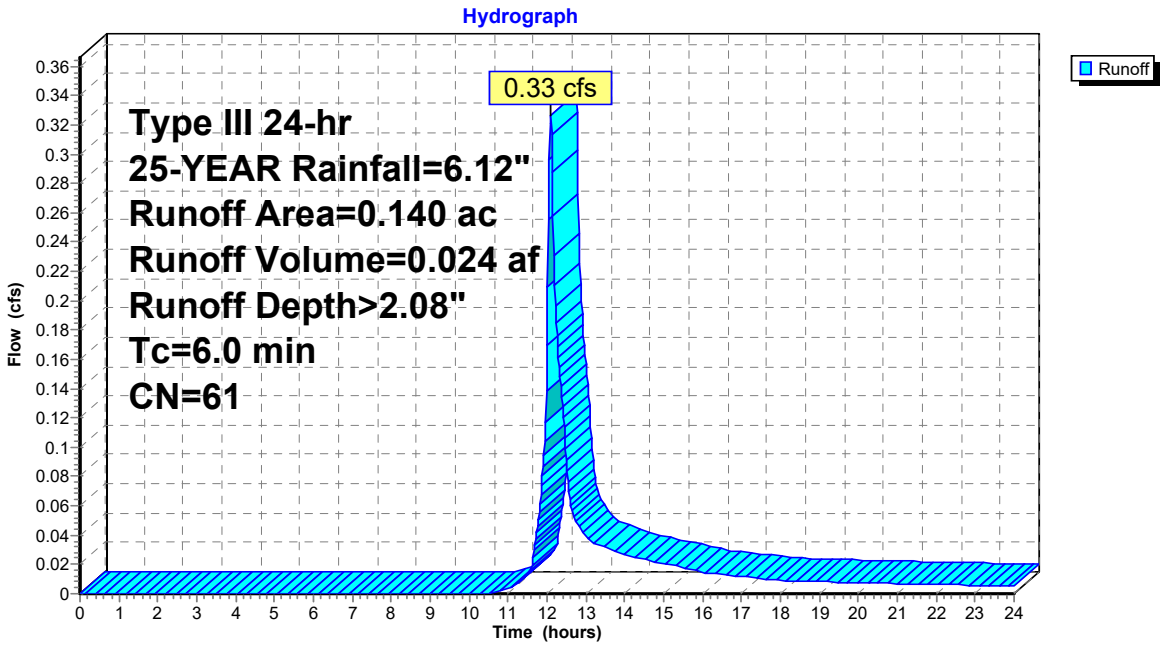
Runoff = 0.33 cfs @ 12.10 hrs, Volume= 0.024 af, Depth> 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YEAR Rainfall=6.12"

Area (ac)	CN	Description
0.140	61	>75% Grass cover, Good, HSG B
0.140		100.00% Pervious Area

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

Subcatchment P1: DISCHARGE TO THE WEST



Summary for Subcatchment P2-1: DISCHARGE TO DETENTION BASIN

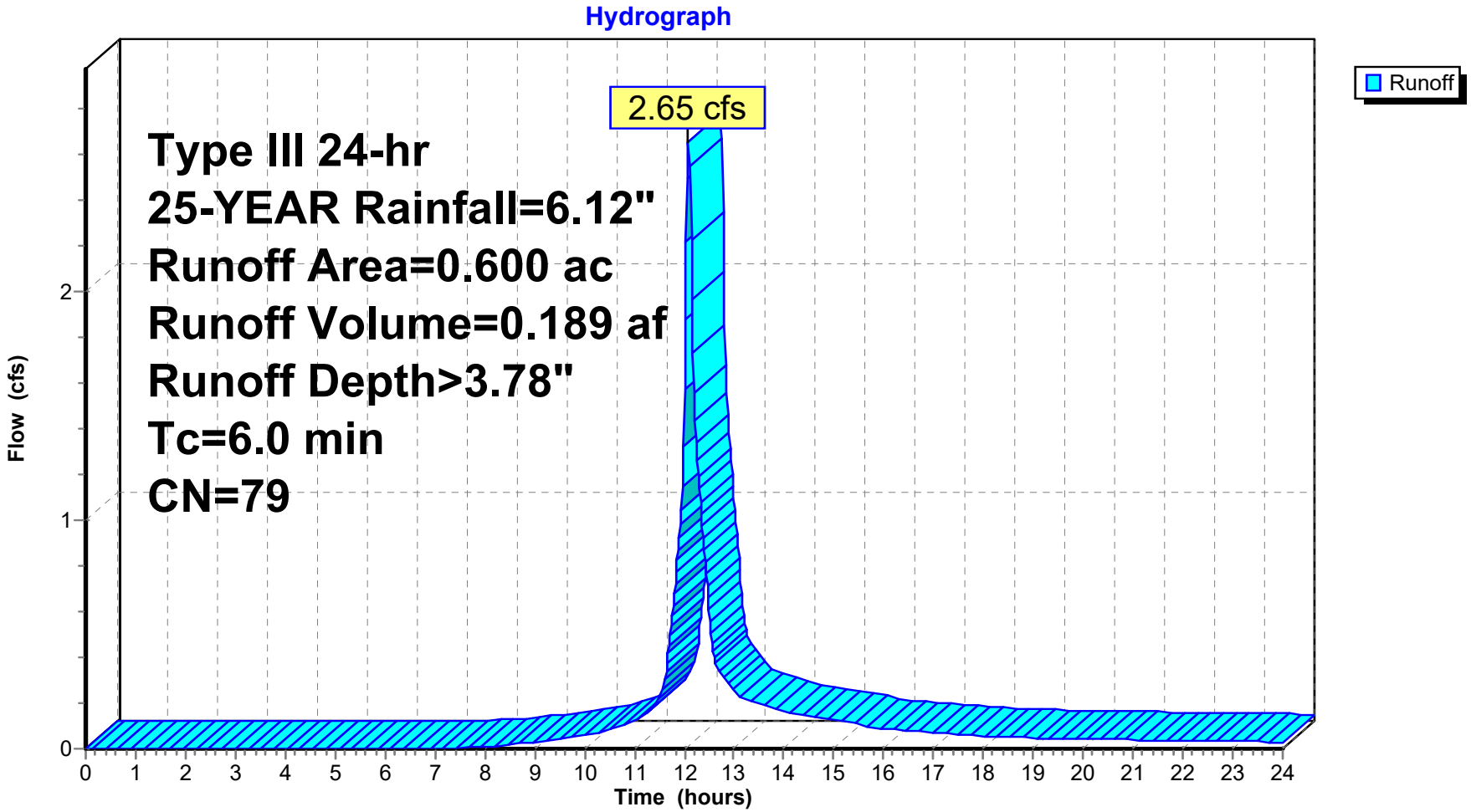
Runoff = 2.65 cfs @ 12.09 hrs, Volume= 0.189 af, Depth> 3.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YEAR Rainfall=6.12"

Area (ac)	CN	Description
0.310	61	>75% Grass cover, Good, HSG B
0.290	98	Paved parking, HSG B
0.600	79	Weighted Average
0.310		51.67% Pervious Area
0.290		48.33% Impervious Area

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

Subcatchment P2-1: DISCHARGE TO DETENTION BASIN



Summary for Subcatchment P2-2: DISCHARGE TO UNDERGROUND DETENTION

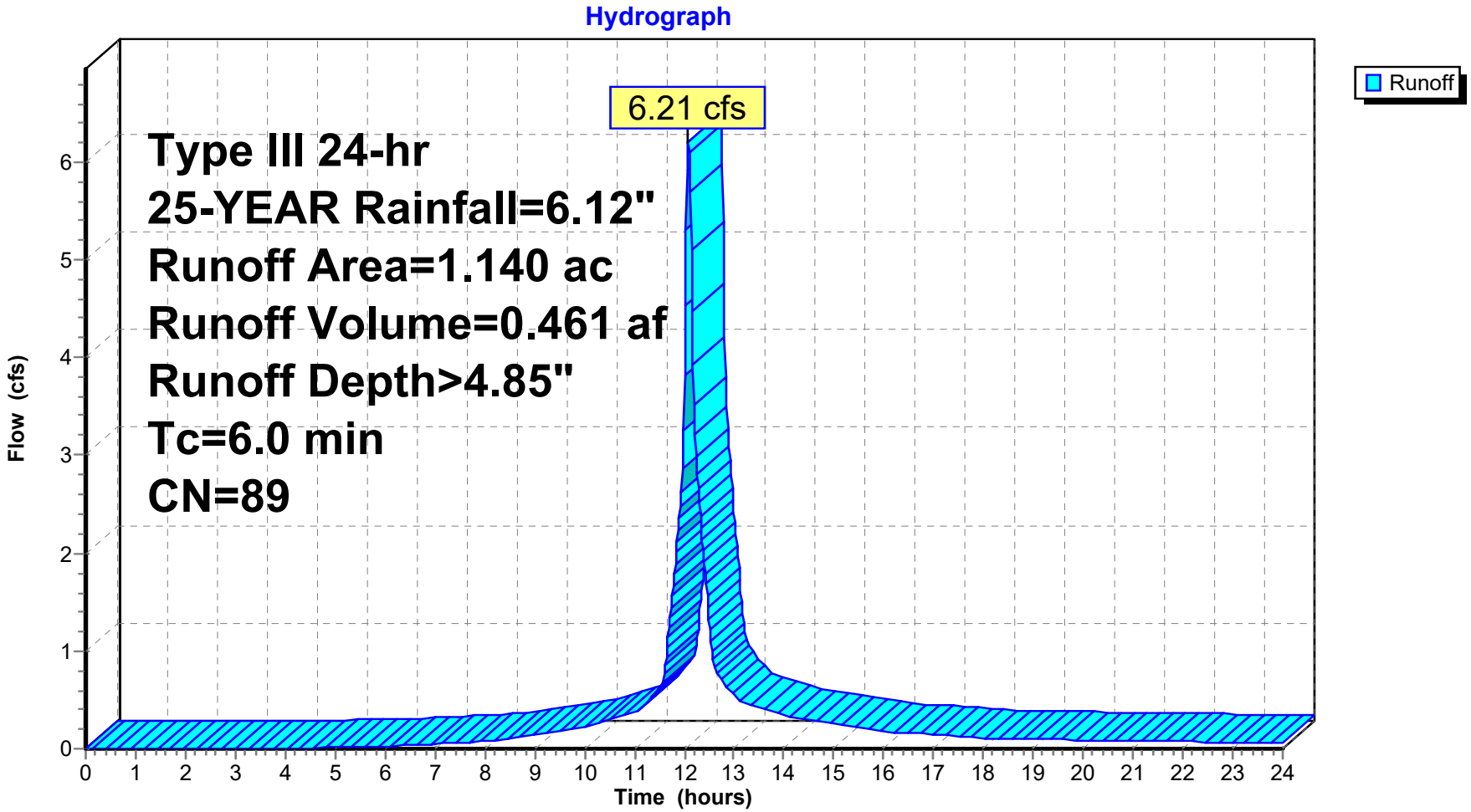
Runoff = 6.21 cfs @ 12.08 hrs, Volume= 0.461 af, Depth> 4.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YEAR Rainfall=6.12"

Area (ac)	CN	Description
0.280	61	>75% Grass cover, Good, HSG B
0.860	98	Paved parking, HSG B
1.140	89	Weighted Average
0.280		24.56% Pervious Area
0.860		75.44% Impervious Area

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

Subcatchment P2-2: DISCHARGE TO UNDERGROUND DETENTION



Summary for Subcatchment P2-3: DISCHARGE TO THE EAST

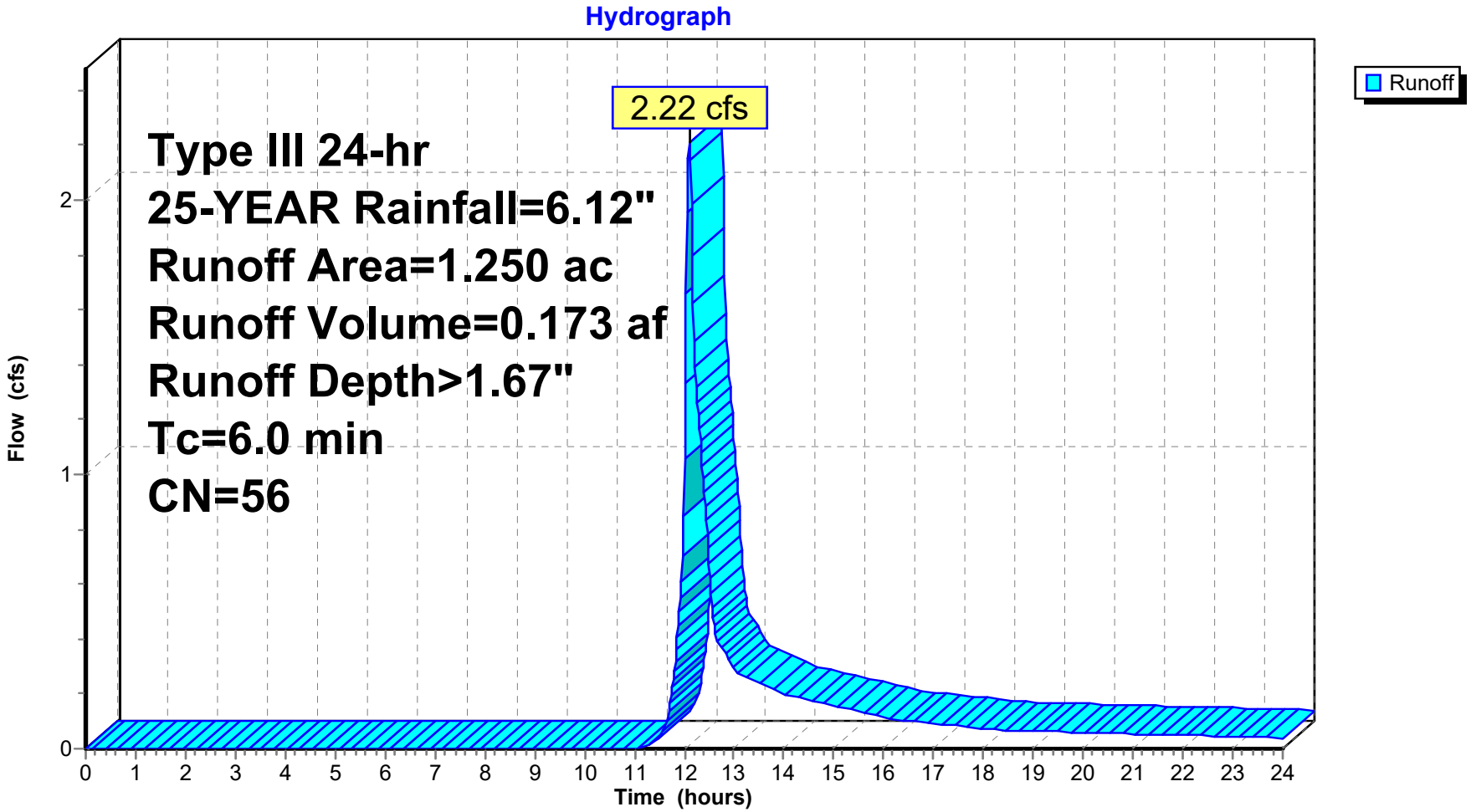
Runoff = 2.22 cfs @ 12.10 hrs, Volume= 0.173 af, Depth> 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YEAR Rainfall=6.12"

Area (ac)	CN	Description
0.670	61	>75% Grass cover, Good, HSG B
0.550	48	Brush, Good, HSG B
0.030	98	Paved parking, HSG B
1.250	56	Weighted Average
1.220		97.60% Pervious Area
0.030		2.40% Impervious Area

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

Subcatchment P2-3: DISCHARGE TO THE EAST



Summary for Subcatchment R4: ROOF - BUILDING #4

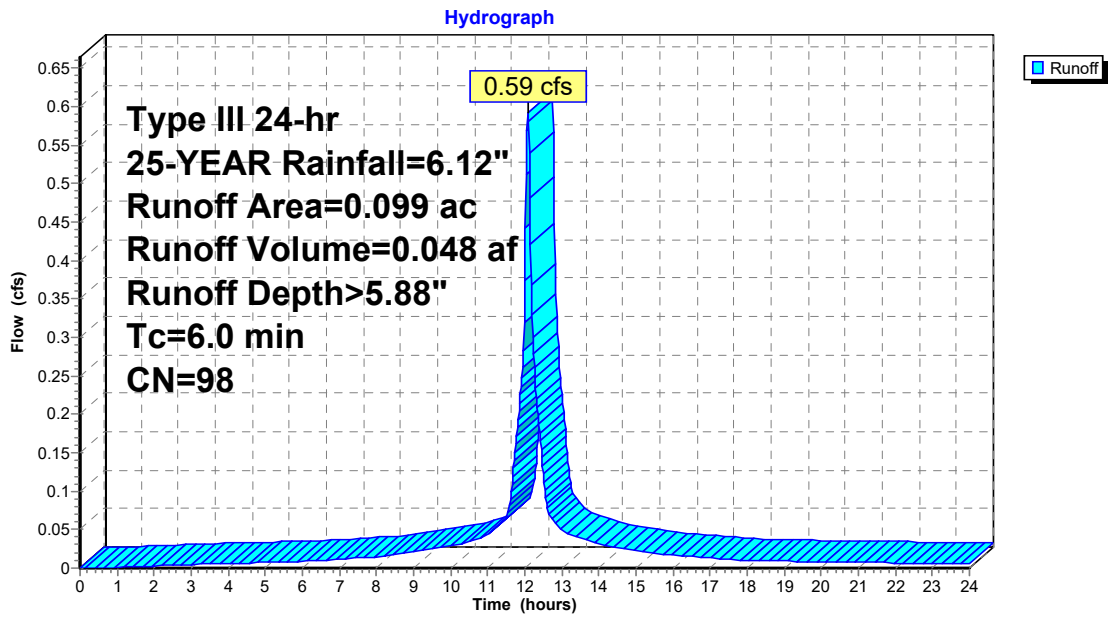
Runoff = 0.59 cfs @ 12.08 hrs, Volume= 0.048 af, Depth> 5.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YEAR Rainfall=6.12"

Area (ac)	CN	Description
0.099	98	Unconnected roofs, HSG B
0.099		100.00% Impervious Area
0.099		100.00% Unconnected

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

Subcatchment R4: ROOF - BUILDING #4



Summary for Subcatchment R5: ROOF - BUILDING #5

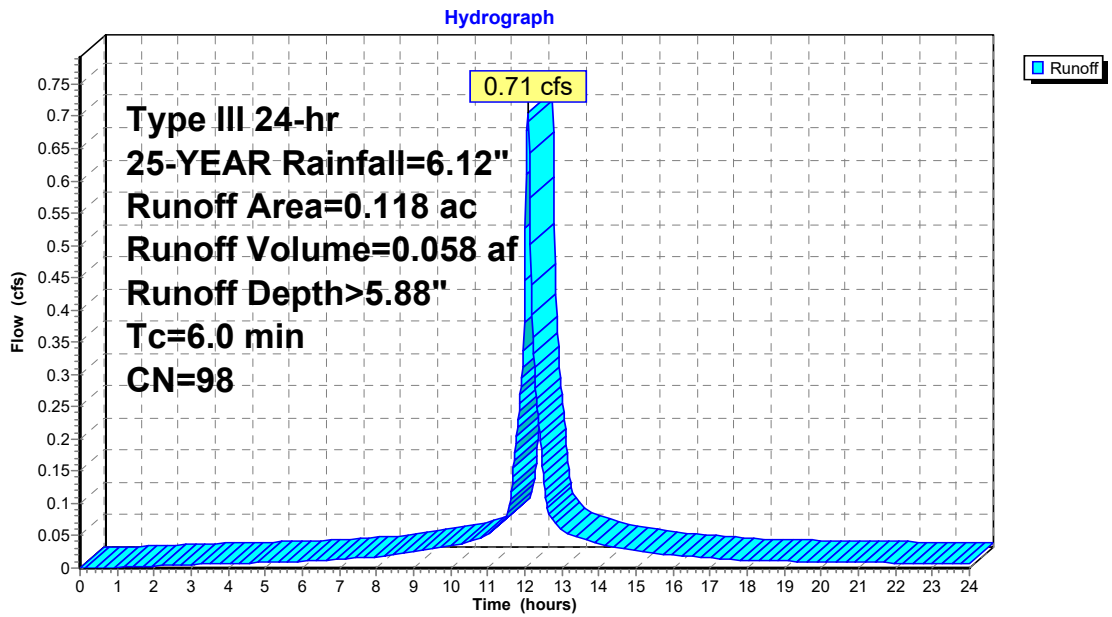
Runoff = 0.71 cfs @ 12.08 hrs, Volume= 0.058 af, Depth> 5.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YEAR Rainfall=6.12"

Area (ac)	CN	Description
0.118	98	Unconnected roofs, HSG B
0.118		100.00% Impervious Area
0.118		100.00% Unconnected

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

Subcatchment R5: ROOF - BUILDING #5



Summary for Subcatchment R6: ROOF - BUILDING #6

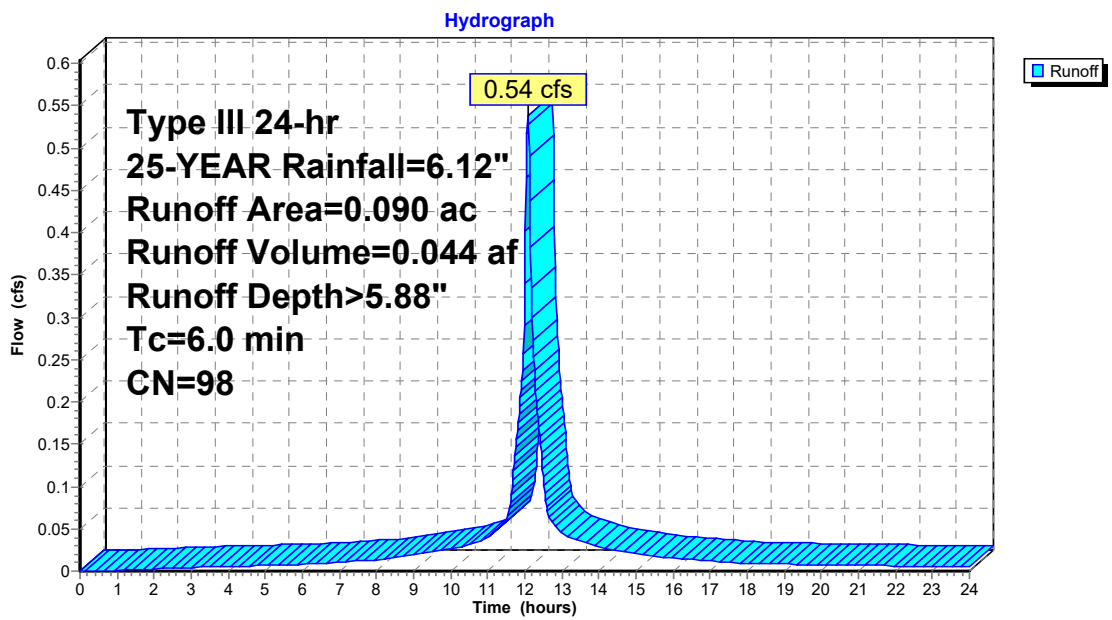
Runoff = 0.54 cfs @ 12.08 hrs, Volume= 0.044 af, Depth> 5.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YEAR Rainfall=6.12"

Area (ac)	CN	Description
0.090	98	Unconnected roofs, HSG B
0.090		100.00% Impervious Area
0.090		100.00% Unconnected

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

Subcatchment R6: ROOF - BUILDING #6



Summary for Subcatchment R7: ROOF - BUILDING #7

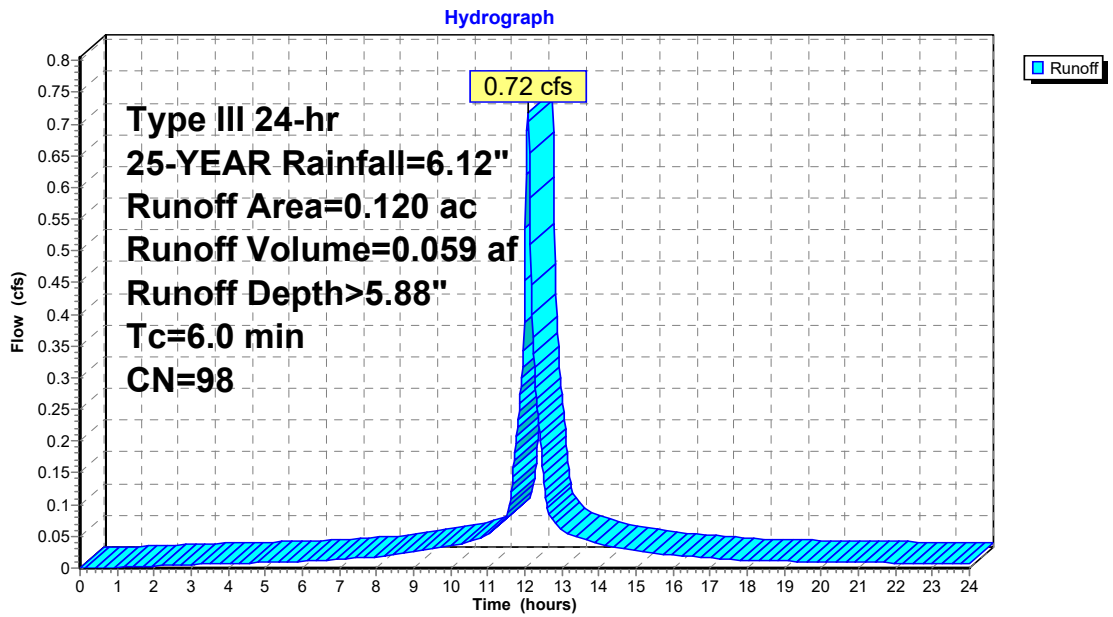
Runoff = 0.72 cfs @ 12.08 hrs, Volume= 0.059 af, Depth> 5.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-YEAR Rainfall=6.12"

Area (ac)	CN	Description
0.120	98	Unconnected roofs, HSG B
0.120		100.00% Impervious Area
0.120		100.00% Unconnected

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

Subcatchment R7: ROOF - BUILDING #7



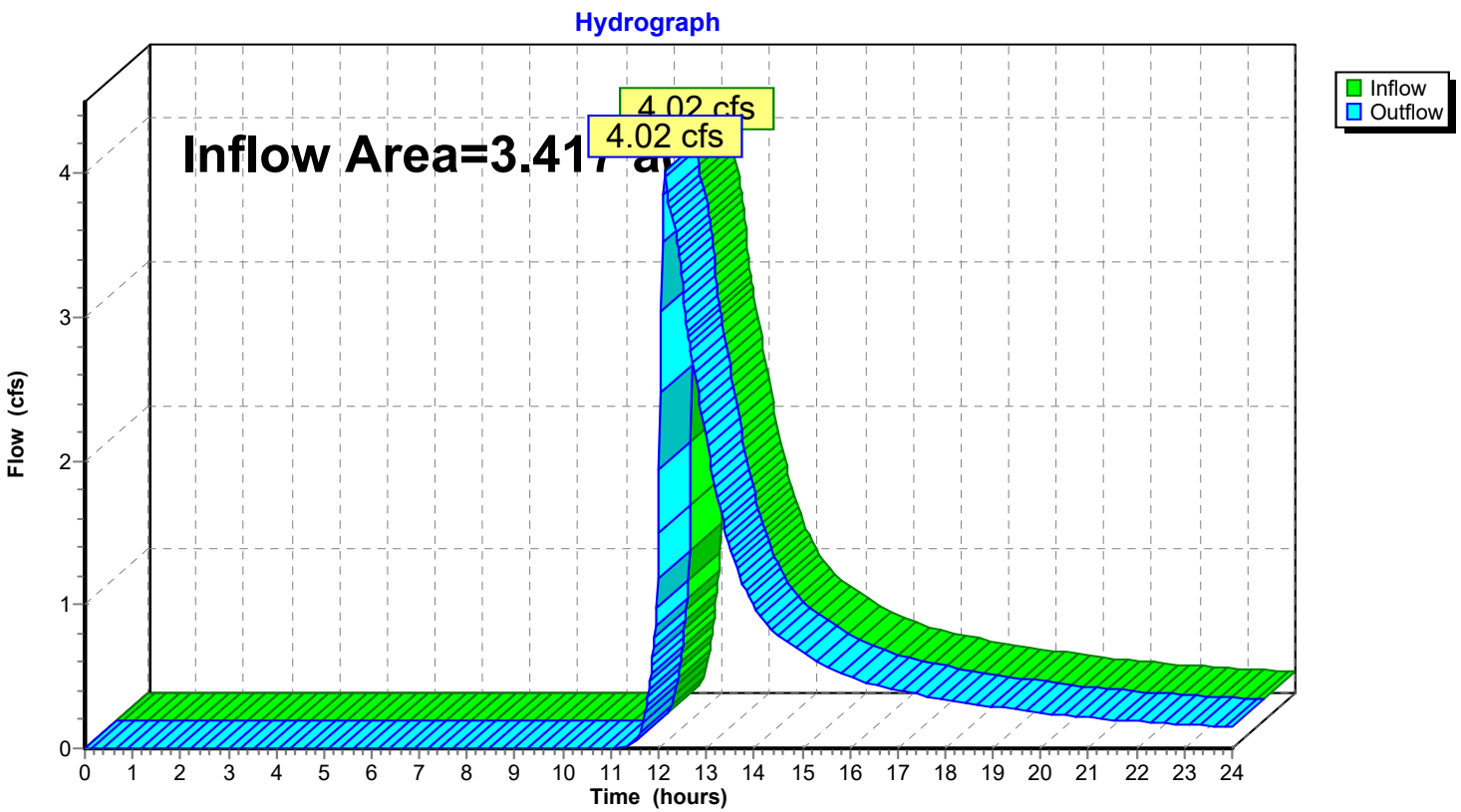
Summary for Reach 2R: TOTAL DISCHARGE TO THE EAST

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.417 ac, 47.03% Impervious, Inflow Depth > 2.40" for 25-YEAR event
Inflow = 4.02 cfs @ 12.13 hrs, Volume= 0.683 af
Outflow = 4.02 cfs @ 12.13 hrs, Volume= 0.683 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 2R: TOTAL DISCHARGE TO THE EAST



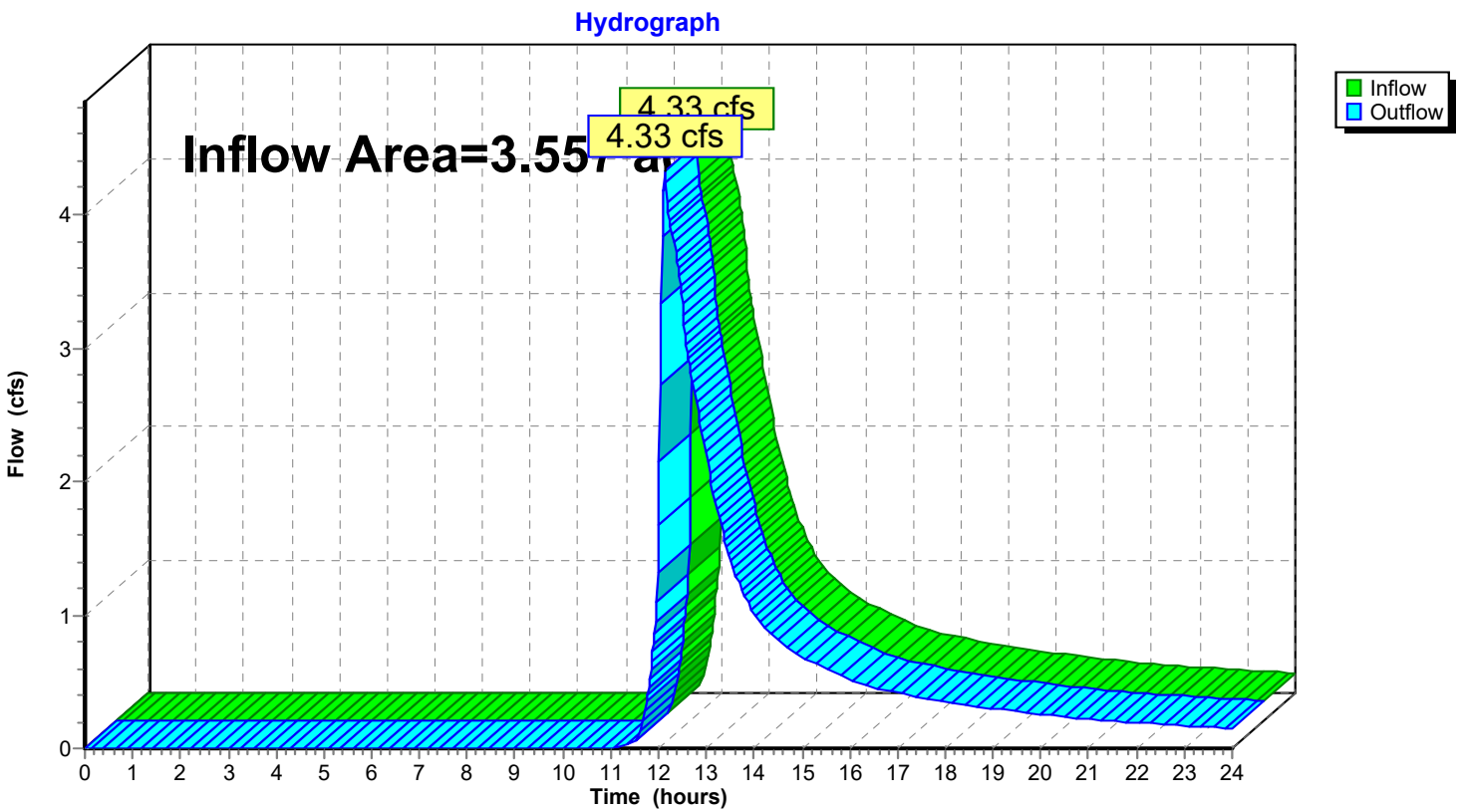
Summary for Reach 3R: PROPOSED SITE TOTAL DISCHARGE

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.557 ac, 45.18% Impervious, Inflow Depth > 2.39" for 25-YEAR event
Inflow = 4.33 cfs @ 12.13 hrs, Volume= 0.708 af
Outflow = 4.33 cfs @ 12.13 hrs, Volume= 0.708 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 3R: PROPOSED SITE TOTAL DISCHARGE



Summary for Pond 1P: DETENTION BASIN

[58] Hint: Peaked 0.33' above defined flood level

Inflow Area = 0.600 ac, 48.33% Impervious, Inflow Depth > 3.78" for 25-YEAR event
Inflow = 2.65 cfs @ 12.09 hrs, Volume= 0.189 af
Outflow = 0.80 cfs @ 12.43 hrs, Volume= 0.147 af, Atten= 70%, Lag= 20.4 min
Primary = 0.80 cfs @ 12.43 hrs, Volume= 0.147 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 615.27' @ 12.43 hrs Surf.Area= 2,131 sf Storage= 3,461 cf
Flood Elev= 614.94' Surf.Area= 1,948 sf Storage= 2,797 cf

Plug-Flow detention time= 147.6 min calculated for 0.147 af (78% of inflow)
Center-of-Mass det. time= 66.7 min (881.9 - 815.2)

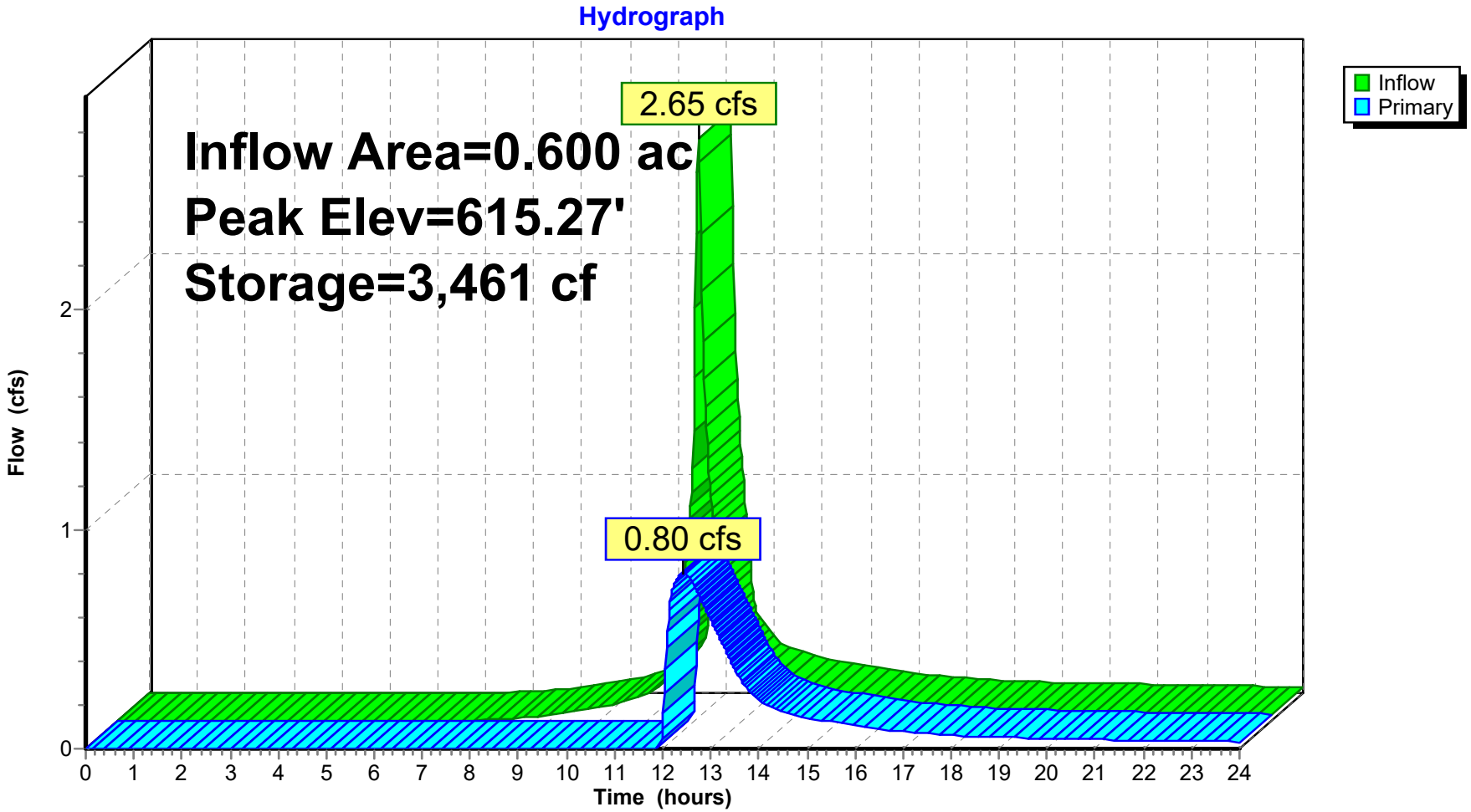
Volume	Invert	Avail.Storage	Storage Description
#1	613.00'	6,621 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
613.00	984	145.0	0	0	984
614.00	1,446	164.0	1,208	1,208	1,476
615.00	1,983	186.0	1,707	2,915	2,113
616.00	2,570	205.0	2,270	5,185	2,736
616.50	3,185	230.0	1,436	6,621	3,608

Device	Routing	Invert	Outlet Devices
#1	Primary	614.05'	**15.0" Round Culvert** L= 105.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 614.05' / 613.00' S= 0.0100 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf
#2	Device 1	614.30'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	616.00'	**15.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

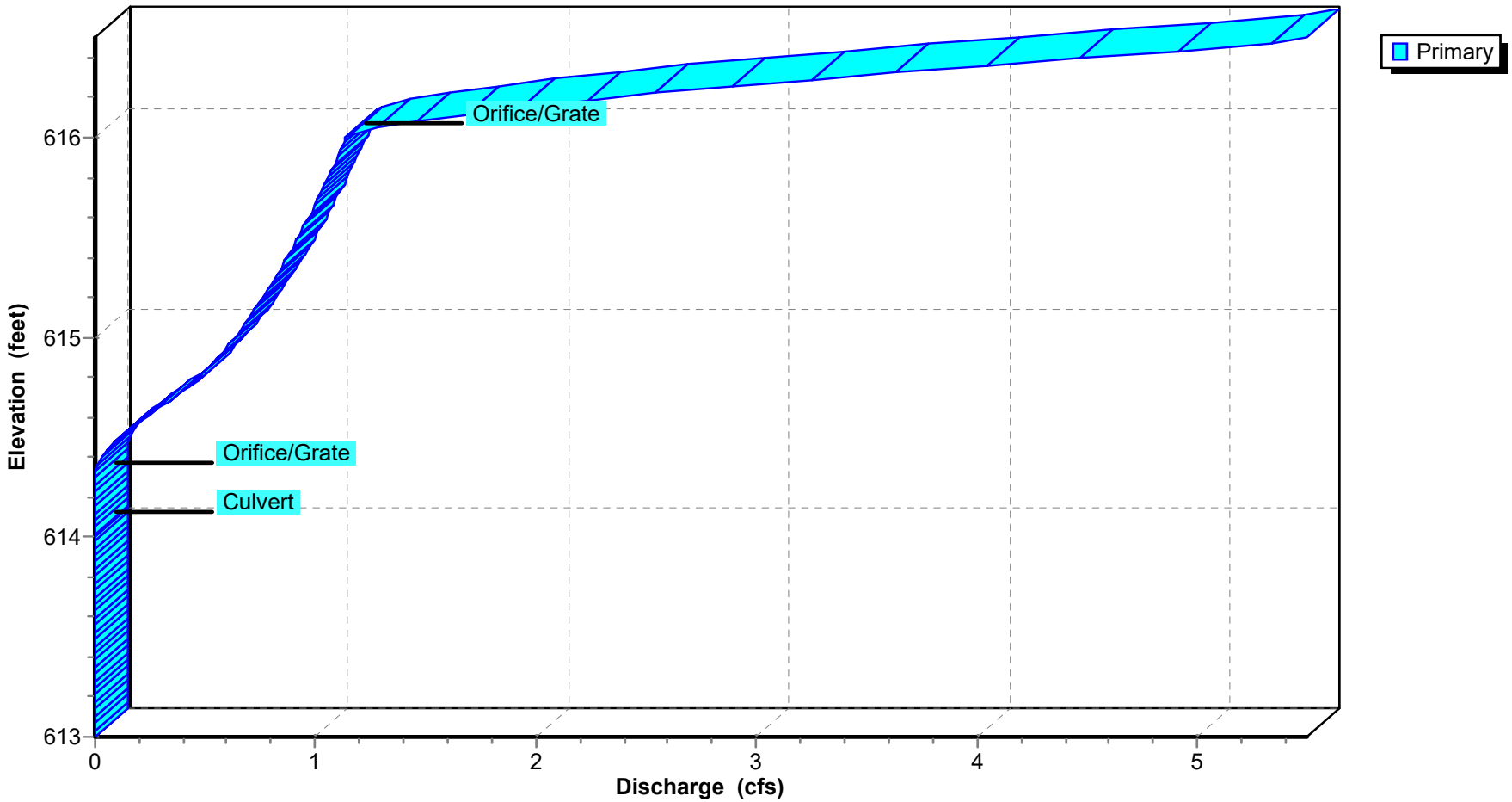
Primary OutFlow Max=0.80 cfs @ 12.43 hrs HW=615.27' (Free Discharge)
└─**1=Culvert** (Passes 0.80 cfs of 4.57 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.80 cfs @ 4.07 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: DETENTION BASIN

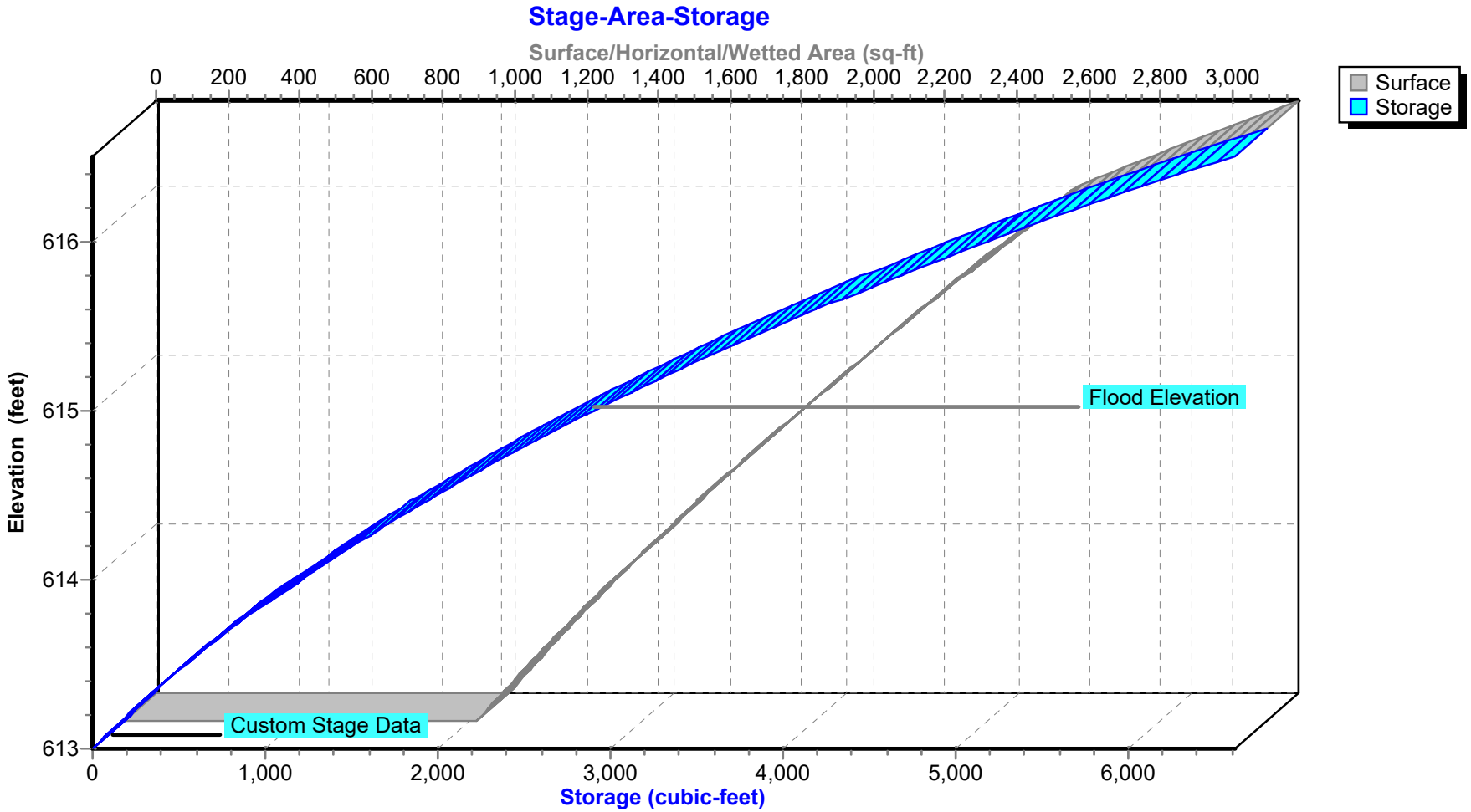


Pond 1P: DETENTION BASIN

Stage-Discharge



Pond 1P: DETENTION BASIN



Summary for Pond 2P: UNDERGROUND DETENTION

Inflow Area = 1.468 ac, 80.93% Impervious, Inflow Depth > 3.76" for 25-YEAR event
Inflow = 6.21 cfs @ 12.08 hrs, Volume= 0.461 af
Outflow = 1.79 cfs @ 12.42 hrs, Volume= 0.363 af, Atten= 71%, Lag= 20.1 min
Primary = 1.79 cfs @ 12.42 hrs, Volume= 0.363 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 616.28' @ 12.42 hrs Surf.Area= 5,913 sf Storage= 9,705 cf

Plug-Flow detention time= 187.5 min calculated for 0.362 af (79% of inflow)
Center-of-Mass det. time= 110.6 min (897.5 - 787.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	613.75'	6,633 cf	**36.50'W x 162.00'L x 4.00'H Field A** 23,652 cf Overall - 7,069 cf Embedded = 16,583 cf x 40.0% Voids
#2A	614.25'	7,069 cf	**CMP Round 30** x 72 Inside #1 Effective Size= 30.0"W x 30.0"H => 4.91 sf x 20.00'L = 98.2 cf Overall Size= 30.0"W x 30.0"H x 20.00'L 9 Rows of 8 Chambers
#3	614.25'	31 cf	**15.0" Round Pipe Storage** L= 25.0'
		13,733 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	613.75'	**15.0" Round Culvert** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 613.25' / 613.75' S= -0.0278 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf
#2	Device 1	614.86'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	615.33'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	617.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.79 cfs @ 12.42 hrs HW=616.28' (Free Discharge)
└─**1=Culvert** (Passes 1.79 cfs of 8.16 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.47 cfs @ 5.39 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 1.32 cfs @ 3.78 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: UNDERGROUND DETENTION - Chamber Wizard Field A

Chamber Model = CMP Round 30 (Round Corrugated Metal Pipe)
Effective Size= 30.0"W x 30.0"H => 4.91 sf x 20.00'L = 98.2 cf
Overall Size= 30.0"W x 30.0"H x 20.00'L

30.0" Wide + 18.0" Spacing = 48.0" C-C Row Spacing

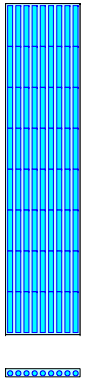
8 Chambers/Row x 20.00' Long = 160.00' Row Length +12.0" End Stone x 2 = 162.00' Base Length
9 Rows x 30.0" Wide + 18.0" Spacing x 8 + 12.0" Side Stone x 2 = 36.50' Base Width
6.0" Base + 30.0" Chamber Height + 12.0" Cover = 4.00' Field Height

72 Chambers x 98.2 cf = 7,068.6 cf Chamber Storage

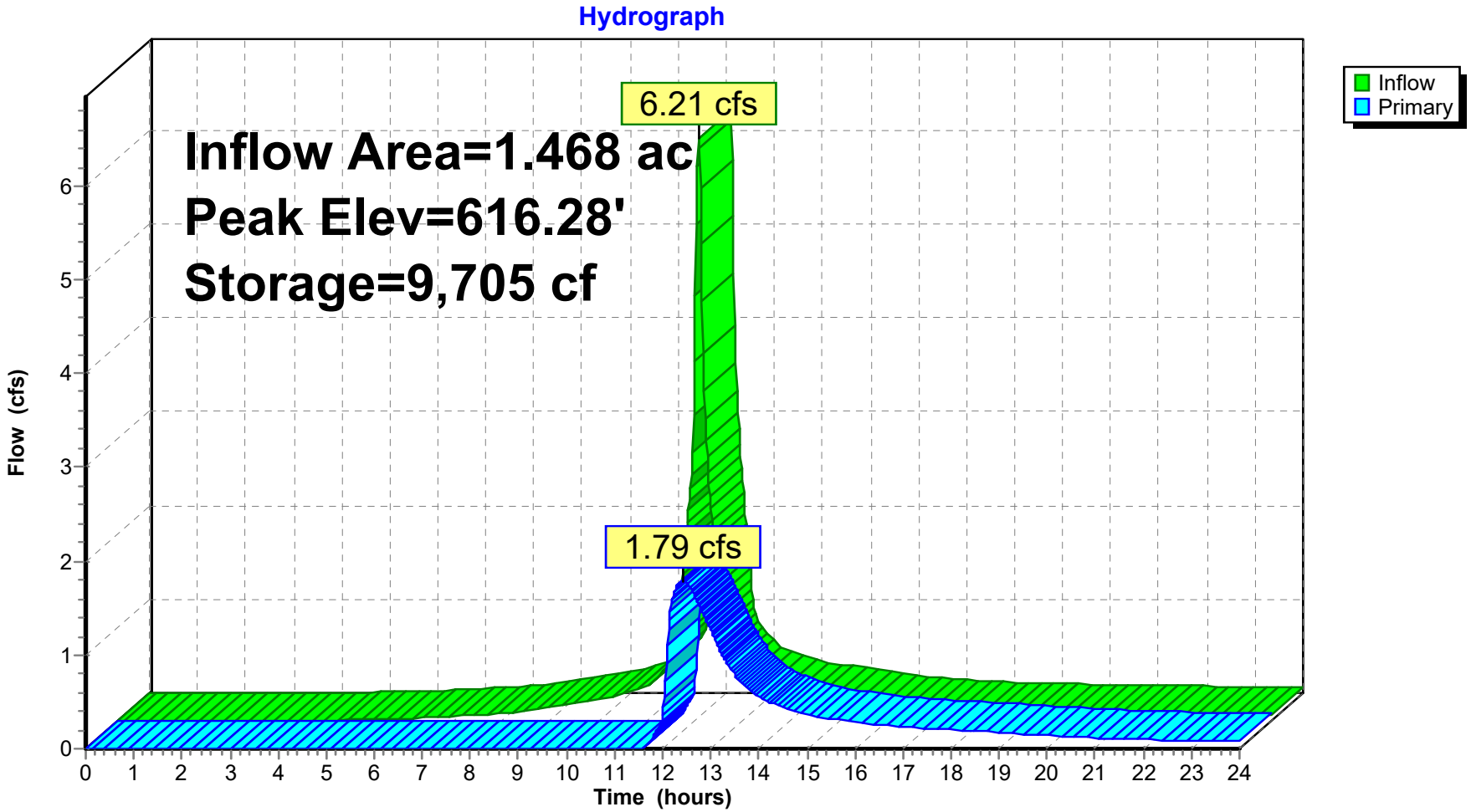
23,652.0 cf Field - 7,068.6 cf Chambers = 16,583.4 cf Stone x 40.0% Voids = 6,633.4 cf Stone Storage

Chamber Storage + Stone Storage = 13,702.0 cf = 0.315 af
Overall Storage Efficiency = 57.9%
Overall System Size = 162.00' x 36.50' x 4.00'

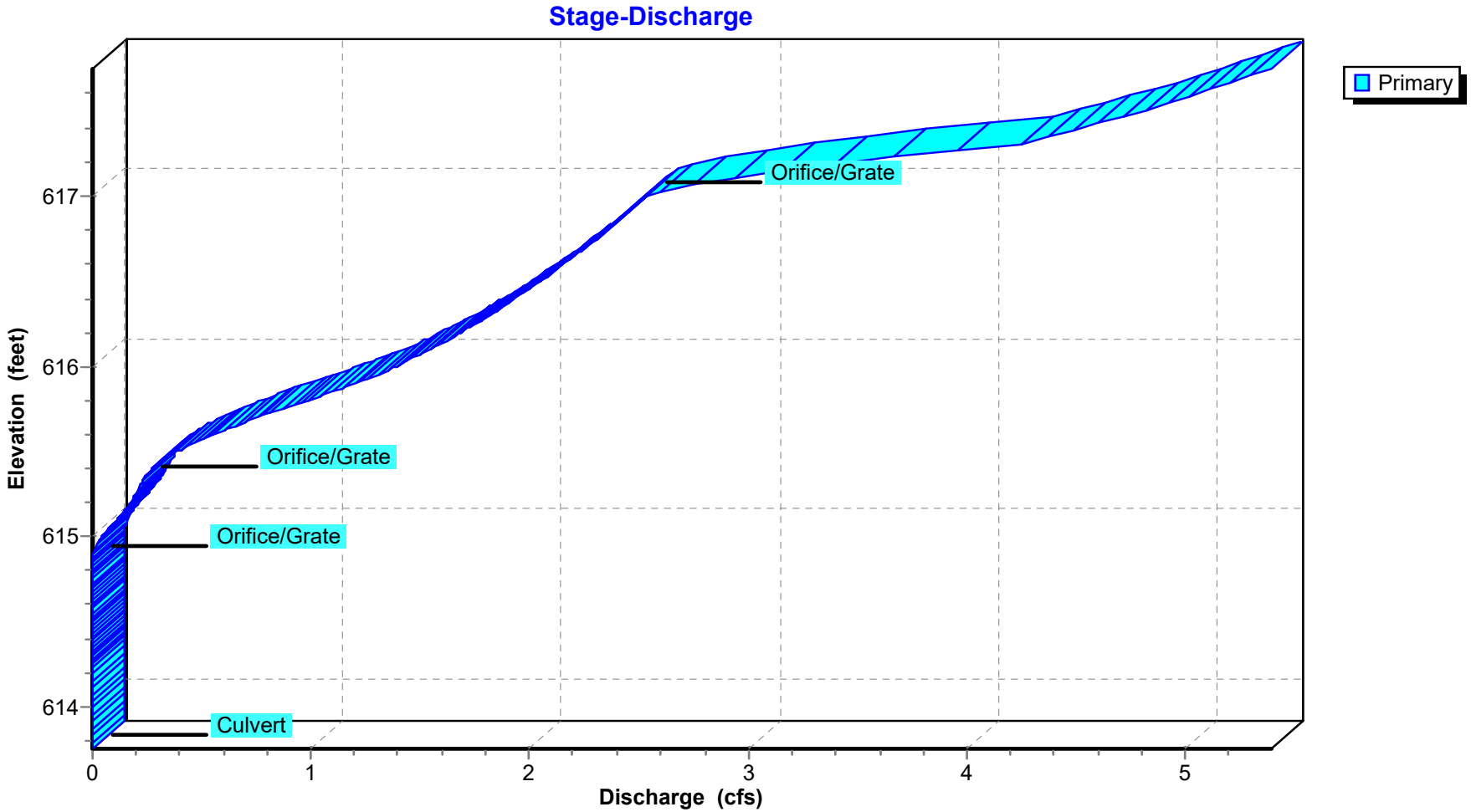
72 Chambers
876.0 cy Field
614.2 cy Stone



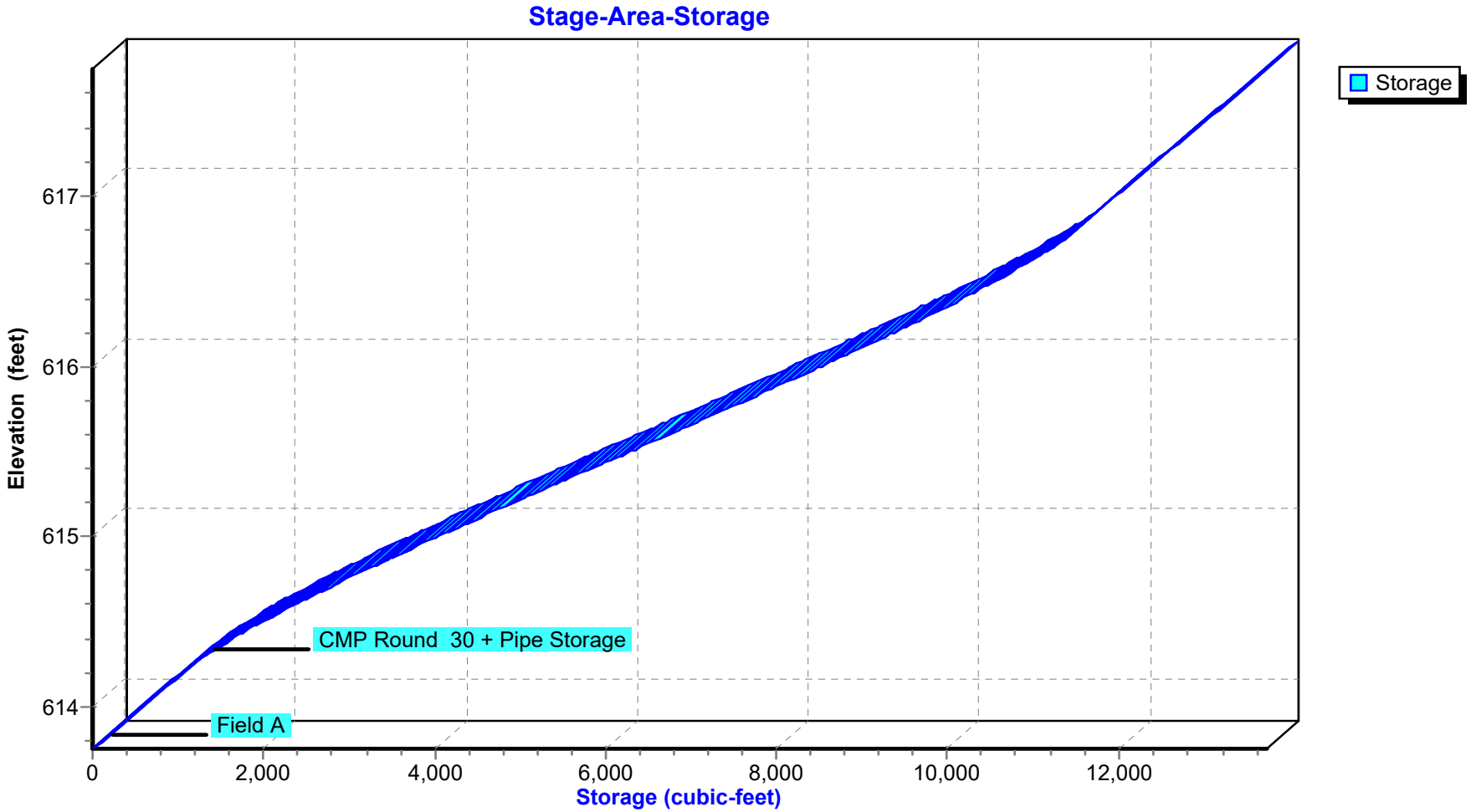
Pond 2P: UNDERGROUND DETENTION



Pond 2P: UNDERGROUND DETENTION



Pond 2P: UNDERGROUND DETENTION



Summary for Pond 3P: ROOF INFILTRATION

Inflow Area = 0.099 ac,100.00% Impervious, Inflow Depth > 5.88" for 25-YEAR event
Inflow = 0.59 cfs @ 12.08 hrs, Volume= 0.048 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 616.73' @ 24.00 hrs Surf.Area= 607 sf Storage= 2,112 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1A	611.50'	1,192 cf	**19.42'W x 31.27'L x 7.25'H Field A** 4,401 cf Overall - 1,421 cf Embedded = 2,981 cf x 40.0% Voids
#2A	612.25'	1,421 cf	**ADS_StormTech MC-4500 +Cap** x 12 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 2 Rows of 6 Chambers Cap Storage= +35.7 cf x 2 x 2 rows = 142.8 cf
		2,613 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	617.50'	**8.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 617.50' / 616.00' S= 0.1000 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=611.50' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)

Pond 3P: ROOF INFILTRATION - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-4500 +Cap (ADS StormTech® MC-4500 with cap volume)
Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf
Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap
Cap Storage= +35.7 cf x 2 x 2 rows = 142.8 cf

100.0" Wide + 9.0" Spacing = 109.0" C-C Row Spacing

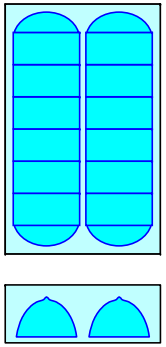
6 Chambers/Row x 4.02' Long +2.56' Cap Length x 2 = 29.27' Row Length +12.0" End Stone x 2 = 31.27' Base Length
2 Rows x 100.0" Wide + 9.0" Spacing x 1 + 12.0" Side Stone x 2 = 19.42' Base Width
9.0" Base + 60.0" Chamber Height + 18.0" Cover = 7.25' Field Height

12 Chambers x 106.5 cf + 35.7 cf Cap Volume x 2 x 2 Rows = 1,420.7 cf Chamber Storage

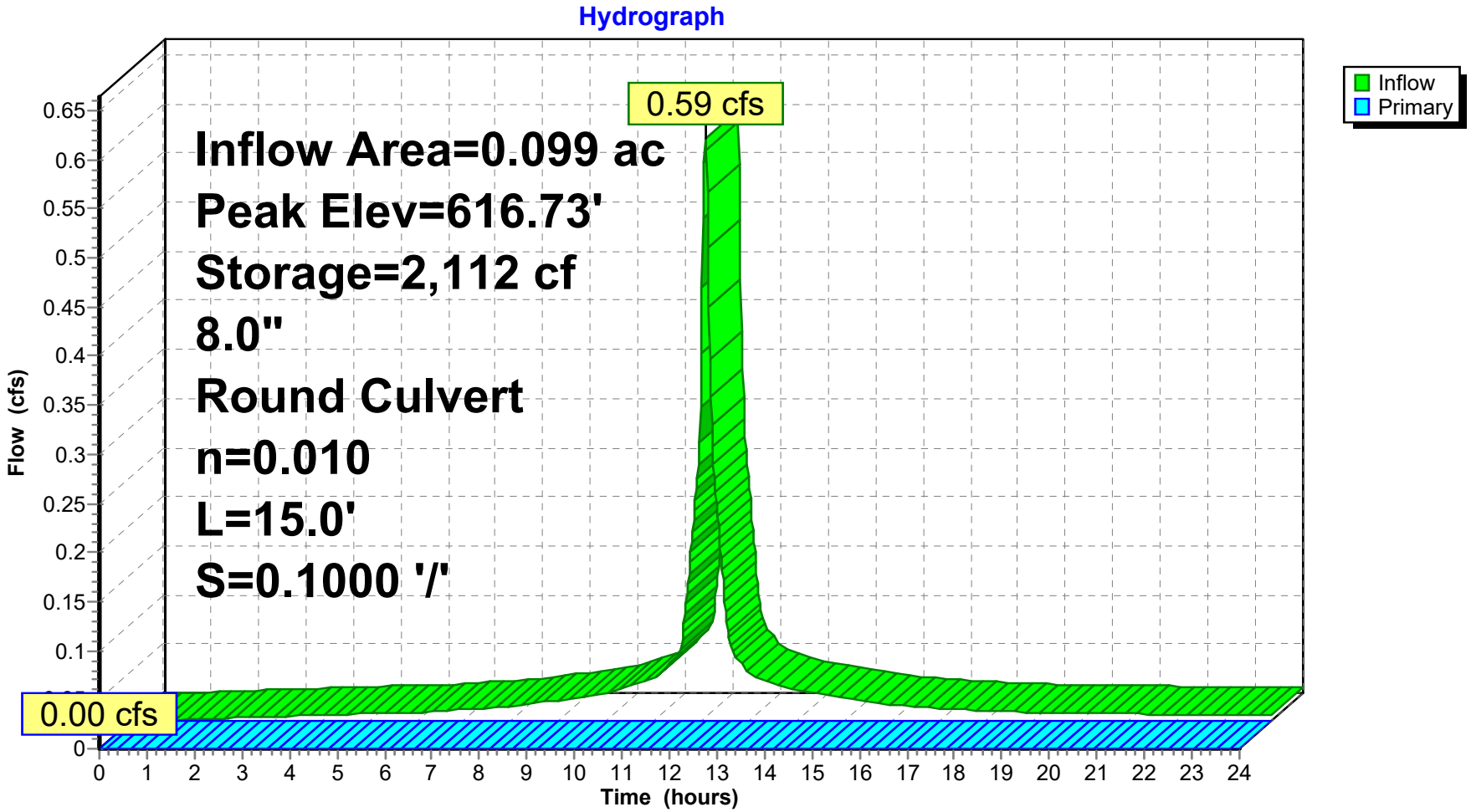
4,401.4 cf Field - 1,420.7 cf Chambers = 2,980.7 cf Stone x 40.0% Voids = 1,192.3 cf Stone Storage

Chamber Storage + Stone Storage = 2,613.0 cf = 0.060 af
Overall Storage Efficiency = 59.4%
Overall System Size = 31.27' x 19.42' x 7.25'

12 Chambers
163.0 cy Field
110.4 cy Stone

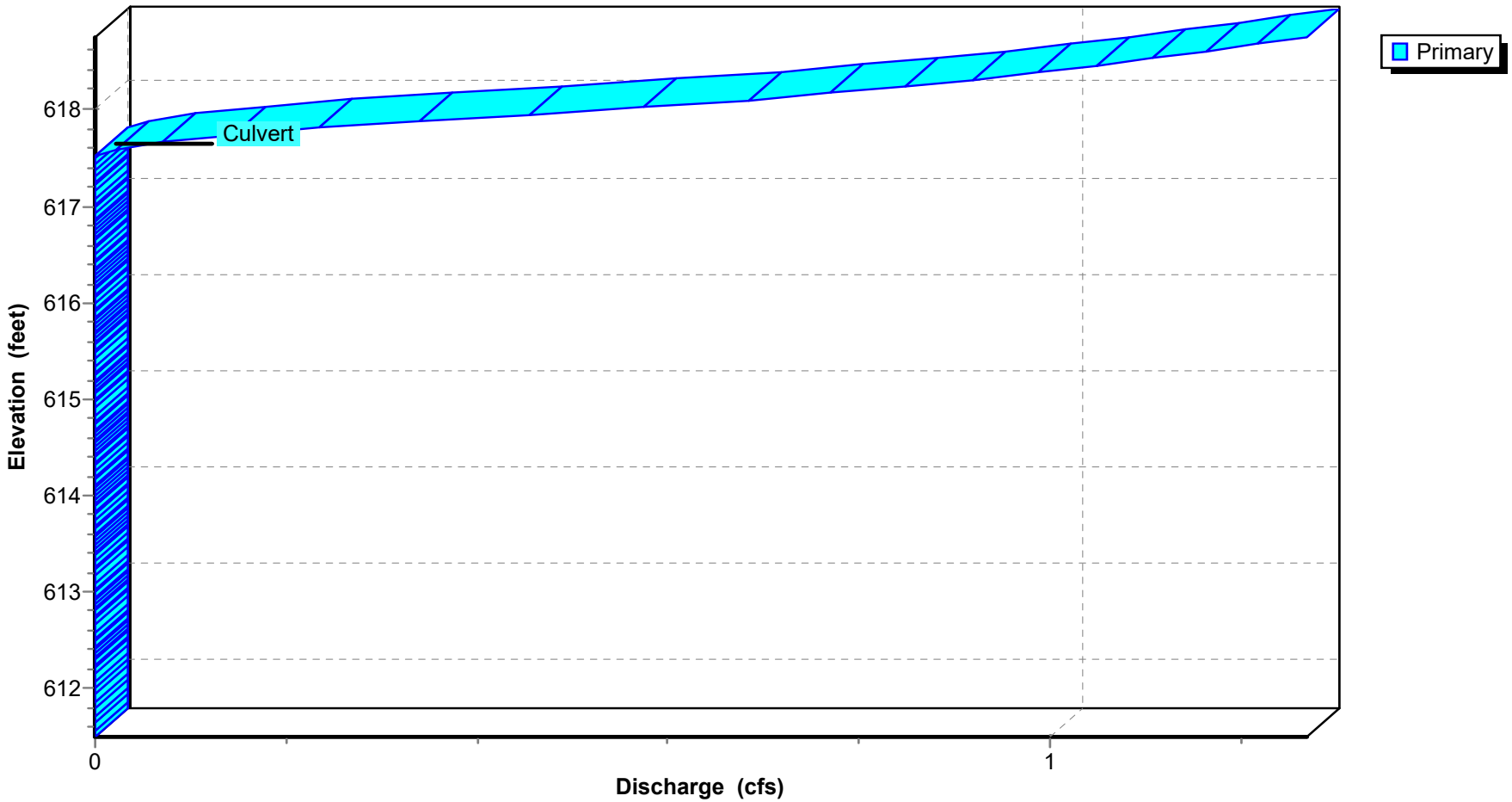


Pond 3P: ROOF INFILTRATION

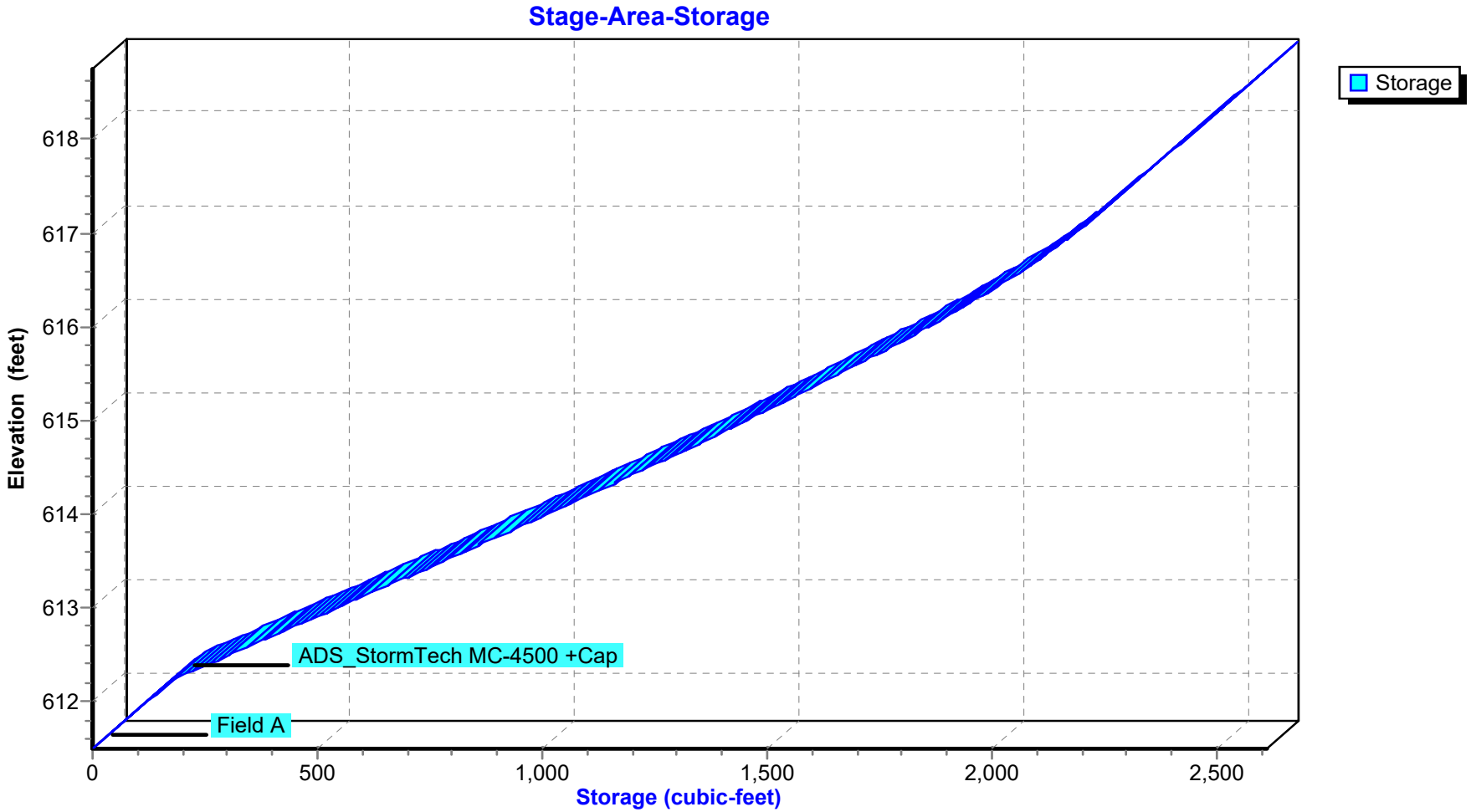


Pond 3P: ROOF INFILTRATION

Stage-Discharge



Pond 3P: ROOF INFILTRATION



Summary for Pond 4P: ROOF INFILTRATION

Inflow Area = 0.328 ac,100.00% Impervious, Inflow Depth > 5.88" for 25-YEAR event
Inflow = 1.96 cfs @ 12.08 hrs, Volume= 0.161 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 616.95' @ 24.00 hrs Surf.Area= 0.059 ac Storage= 0.161 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1A	613.00'	0.084 af	**22.75'W x 113.25'L x 5.50'H Field A** 0.325 af Overall - 0.116 af Embedded = 0.210 af x 40.0% Voids
#2A	613.75'	0.116 af	**ADS_StormTech MC-3500 d +Cap** x 45 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 3 Rows of 15 Chambers Cap Storage= +14.9 cf x 2 x 3 rows = 89.4 cf
		0.200 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	617.00'	**8.0" Round Culvert** L= 33.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 617.00' / 617.00' S= 0.0000 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=613.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)

Pond 4P: ROOF INFILTRATION - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 3 rows = 89.4 cf

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

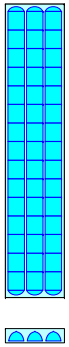
15 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 111.25' Row Length +12.0" End Stone x 2 = 113.25' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

45 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 3 Rows = 5,037.2 cf Chamber Storage

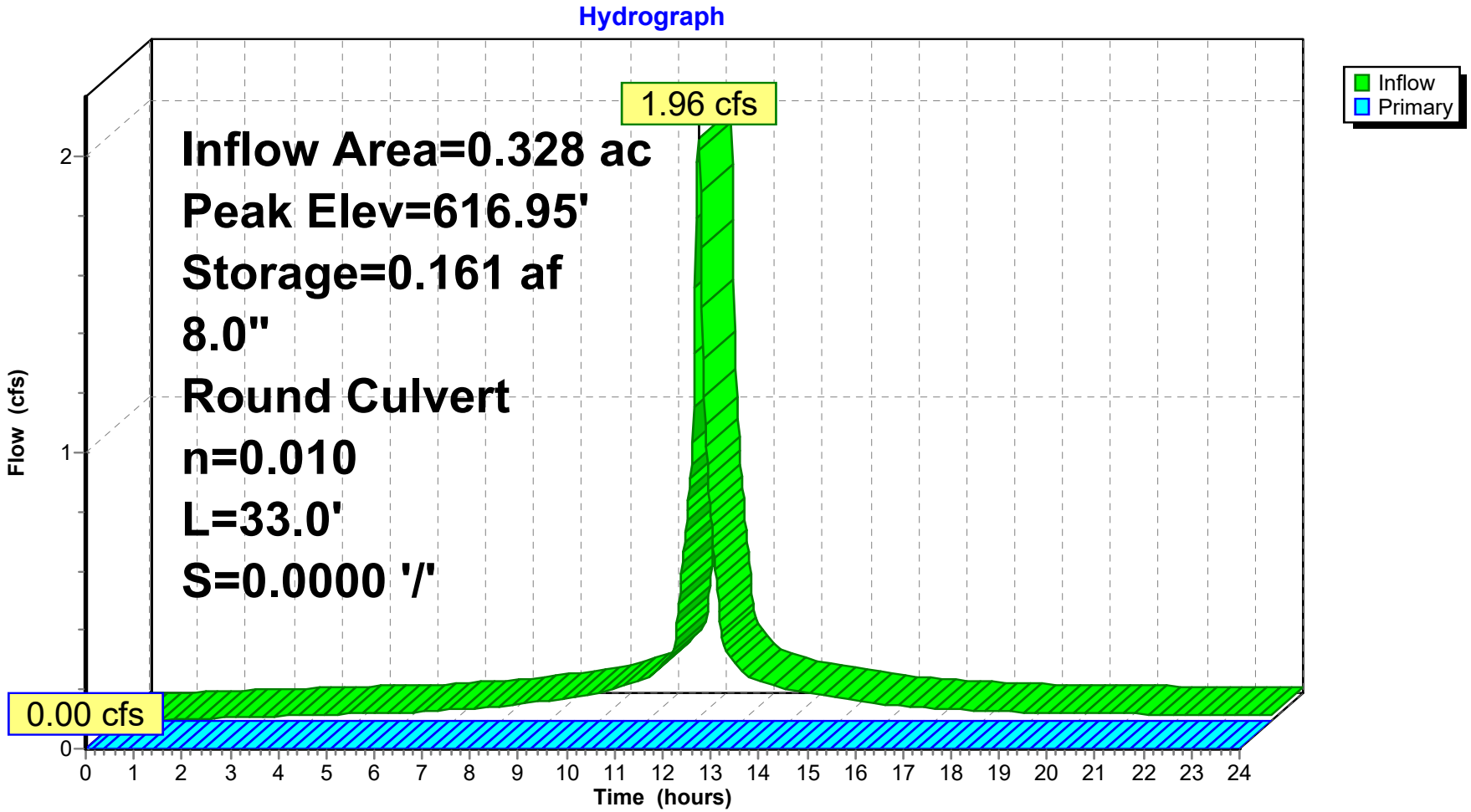
14,170.4 cf Field - 5,037.2 cf Chambers = 9,133.2 cf Stone x 40.0% Voids = 3,653.3 cf Stone Storage

Chamber Storage + Stone Storage = 8,690.5 cf = 0.200 af
Overall Storage Efficiency = 61.3%
Overall System Size = 113.25' x 22.75' x 5.50'

45 Chambers
524.8 cy Field
338.3 cy Stone

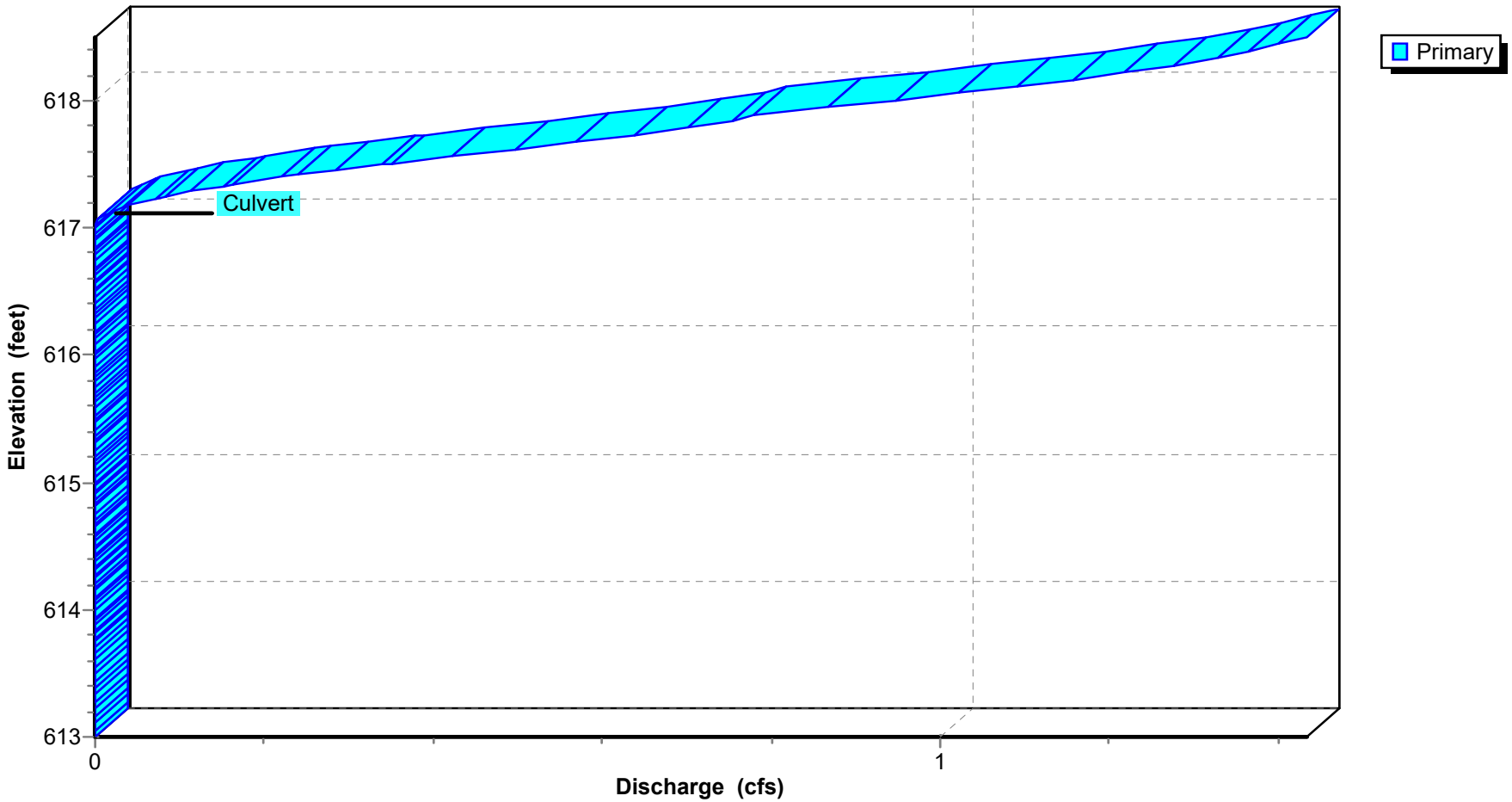


Pond 4P: ROOF INFILTRATION

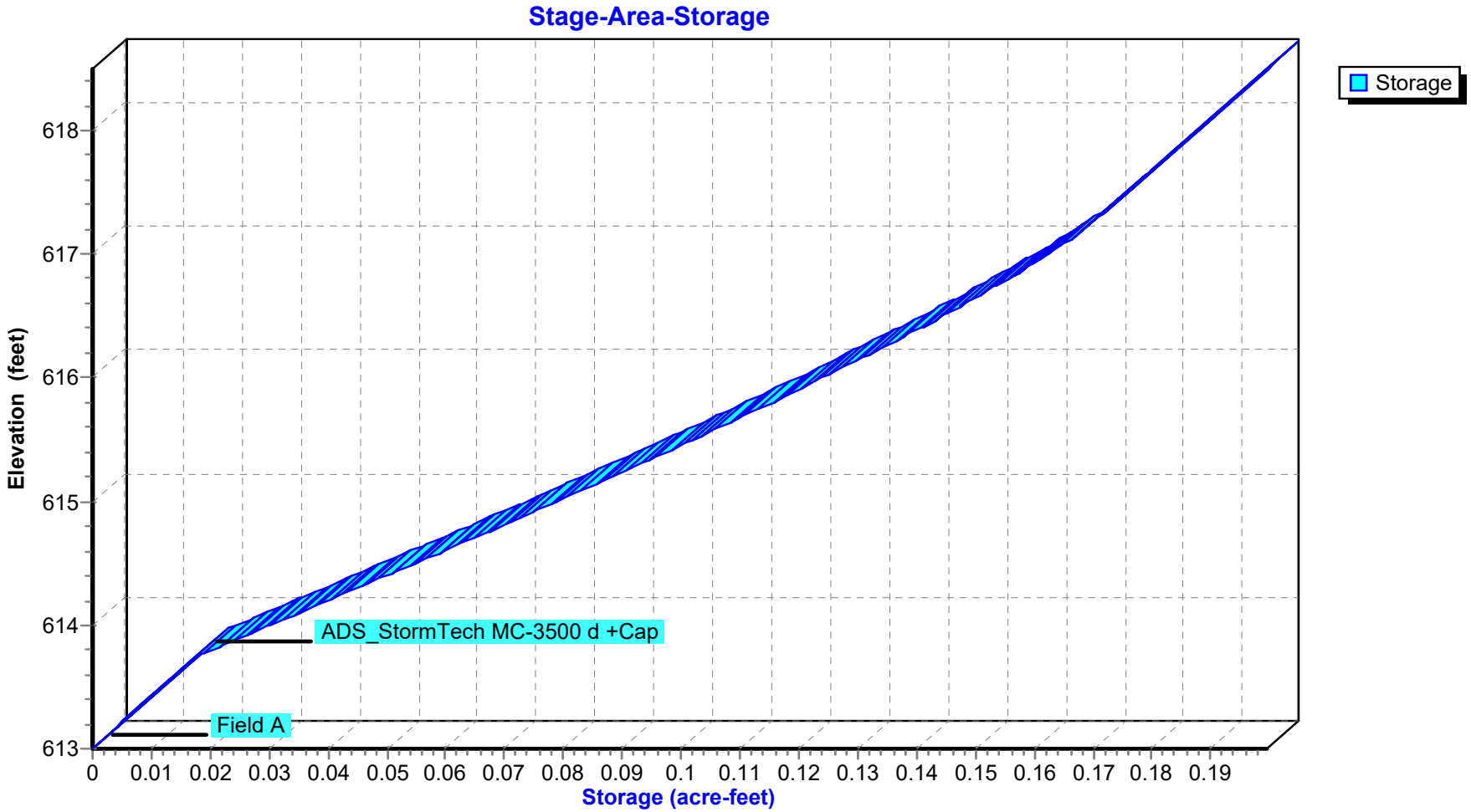


Pond 4P: ROOF INFILTRATION

Stage-Discharge



Pond 4P: ROOF INFILTRATION



Time span=0.00-24.00 hrs, dt=0.02 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1: DISCHARGE TO THE WEST Runoff Area=0.140 ac 0.00% Impervious Runoff Depth>3.27"
Tc=6.0 min CN=61 Runoff=0.53 cfs 0.038 af

Subcatchment P2-1: DISCHARGE TO DETENTION BASIN Runoff Area=0.600 ac 48.33% Impervious Runoff Depth>5.30"
Tc=6.0 min CN=79 Runoff=3.68 cfs 0.265 af

Subcatchment P2-2: DISCHARGE TO UNDERGROUND DETENTION Runoff Area=1.140 ac 75.44% Impervious Runoff Depth>6.47"
Tc=6.0 min CN=89 Runoff=8.15 cfs 0.614 af

Subcatchment P2-3: DISCHARGE TO THE EAST Runoff Area=1.250 ac 2.40% Impervious Runoff Depth>2.74"
Tc=6.0 min CN=56 Runoff=3.86 cfs 0.285 af

Subcatchment R4: ROOF - BUILDING #4 Runoff Area=0.099 ac 100.00% Impervious Runoff Depth>7.53"
Tc=6.0 min CN=98 Runoff=0.76 cfs 0.062 af

Subcatchment R5: ROOF - BUILDING #5 Runoff Area=0.118 ac 100.00% Impervious Runoff Depth>7.53"
Tc=6.0 min CN=98 Runoff=0.90 cfs 0.074 af

Subcatchment R6: ROOF - BUILDING #6 Runoff Area=0.090 ac 100.00% Impervious Runoff Depth>7.53"
Tc=6.0 min CN=98 Runoff=0.69 cfs 0.057 af

Subcatchment R7: ROOF - BUILDING #7 Runoff Area=0.120 ac 100.00% Impervious Runoff Depth>7.53"
Tc=6.0 min CN=98 Runoff=0.92 cfs 0.075 af

Reach 2R: TOTAL DISCHARGE TO THE EAST Inflow=6.62 cfs 1.064 af
Outflow=6.62 cfs 1.064 af

Reach 3R: PROPOSED SITE TOTAL DISCHARGE Inflow=7.15 cfs 1.102 af
Outflow=7.15 cfs 1.102 af

Pond 1P: DETENTION BASIN Peak Elev=615.83' Storage=4,750 cf Inflow=3.68 cfs 0.265 af
Outflow=1.07 cfs 0.222 af

Pond 2P: UNDERGROUND DETENTION Peak Elev=617.06' Storage=12,093 cf Inflow=8.15 cfs 0.653 af
Outflow=2.70 cfs 0.547 af

Pond 3P: ROOF INFILTRATION Peak Elev=617.59' Storage=2,331 cf Inflow=0.76 cfs 0.062 af
8.0" Round Culvert n=0.010 L=15.0' S=0.1000 '/' Outflow=0.02 cfs 0.009 af

Pond 4P: ROOF INFILTRATION Peak Elev=617.26' Storage=0.170 af Inflow=2.50 cfs 0.206 af
8.0" Round Culvert n=0.010 L=33.0' S=0.0000 '/' Outflow=0.09 cfs 0.039 af

Total Runoff Area = 3.557 ac Runoff Volume = 1.471 af Average Runoff Depth = 4.96"
54.82% Pervious = 1.950 ac 45.18% Impervious = 1.607 ac

Summary for Subcatchment P1: DISCHARGE TO THE WEST

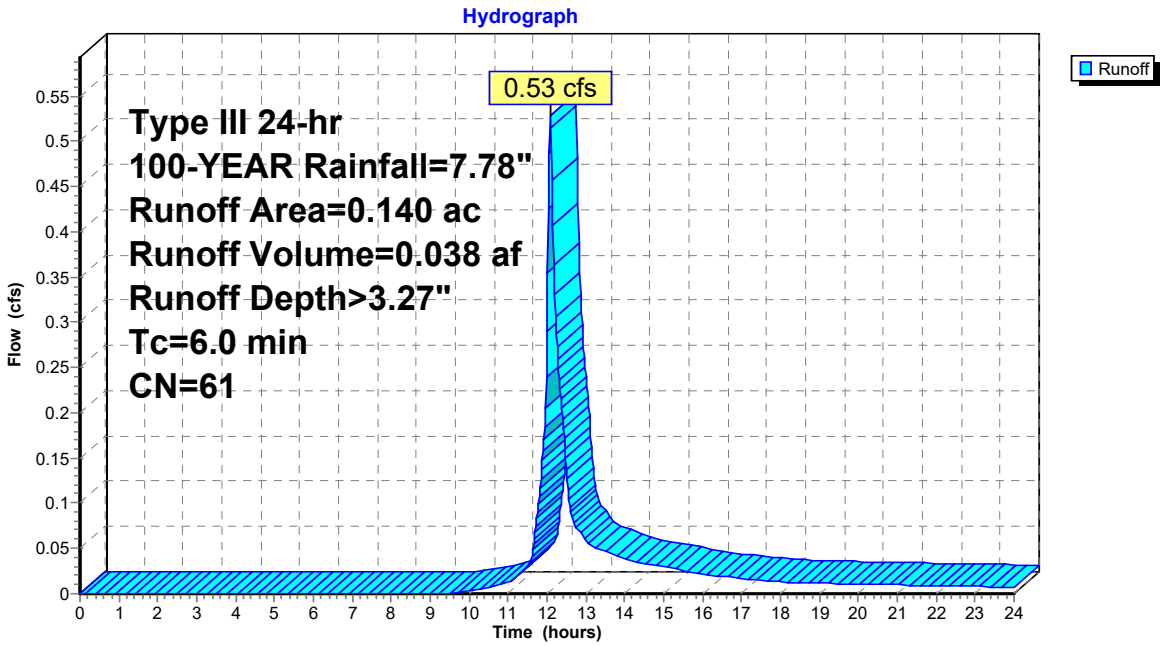
Runoff = 0.53 cfs @ 12.09 hrs, Volume= 0.038 af, Depth> 3.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-YEAR Rainfall=7.78"

Area (ac)	CN	Description
0.140	61	>75% Grass cover, Good, HSG B
0.140		100.00% Pervious Area

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

Subcatchment P1: DISCHARGE TO THE WEST



Summary for Subcatchment P2-1: DISCHARGE TO DETENTION BASIN

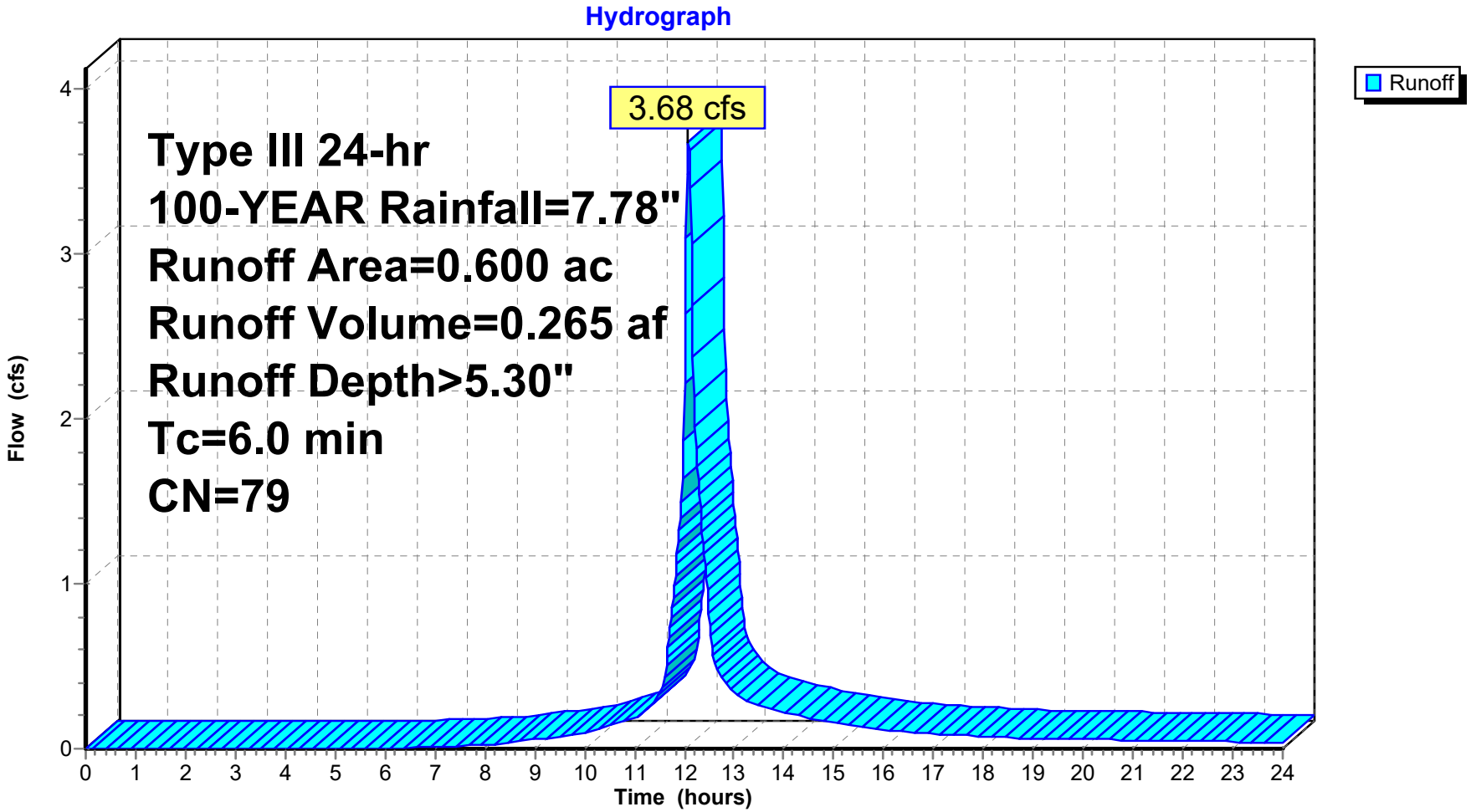
Runoff = 3.68 cfs @ 12.09 hrs, Volume= 0.265 af, Depth> 5.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-YEAR Rainfall=7.78"

Area (ac)	CN	Description
0.310	61	>75% Grass cover, Good, HSG B
0.290	98	Paved parking, HSG B
0.600	79	Weighted Average
0.310		51.67% Pervious Area
0.290		48.33% Impervious Area

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

Subcatchment P2-1: DISCHARGE TO DETENTION BASIN



Summary for Subcatchment P2-2: DISCHARGE TO UNDERGROUND DETENTION

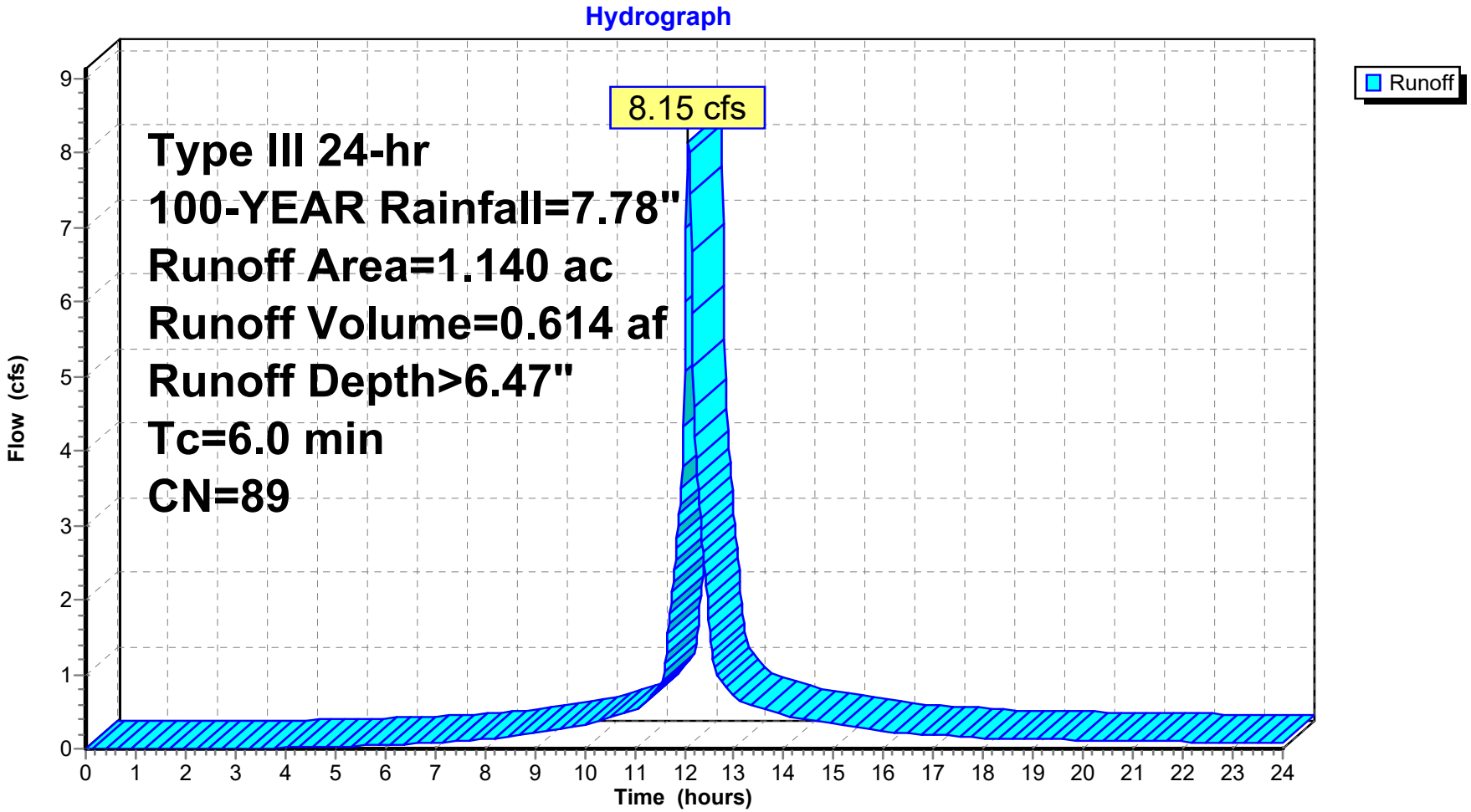
Runoff = 8.15 cfs @ 12.08 hrs, Volume= 0.614 af, Depth> 6.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-YEAR Rainfall=7.78"

Area (ac)	CN	Description
0.280	61	>75% Grass cover, Good, HSG B
0.860	98	Paved parking, HSG B
1.140	89	Weighted Average
0.280		24.56% Pervious Area
0.860		75.44% Impervious Area

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

Subcatchment P2-2: DISCHARGE TO UNDERGROUND DETENTION



Summary for Subcatchment P2-3: DISCHARGE TO THE EAST

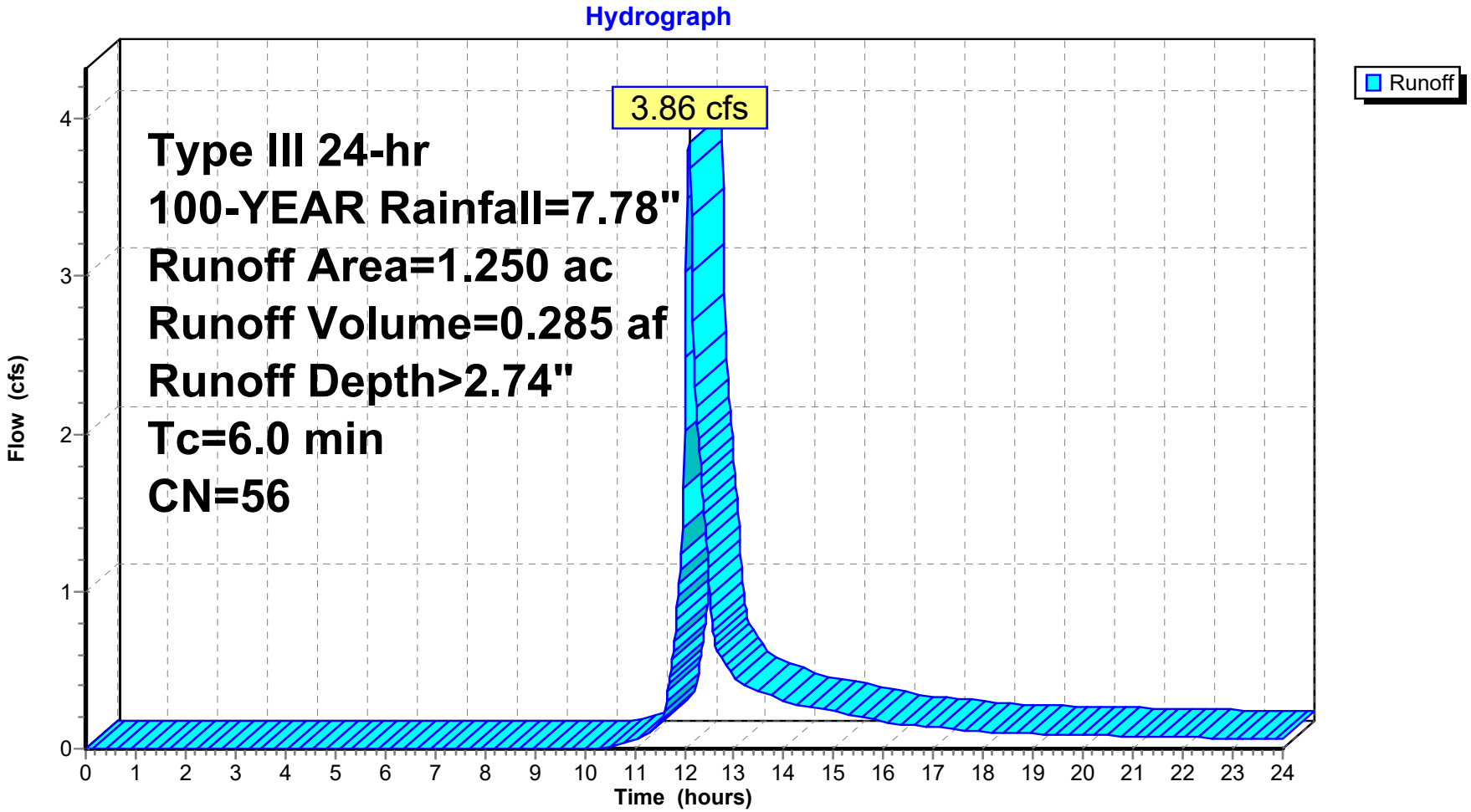
Runoff = 3.86 cfs @ 12.09 hrs, Volume= 0.285 af, Depth> 2.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-YEAR Rainfall=7.78"

Area (ac)	CN	Description
0.670	61	>75% Grass cover, Good, HSG B
0.550	48	Brush, Good, HSG B
0.030	98	Paved parking, HSG B
1.250	56	Weighted Average
1.220		97.60% Pervious Area
0.030		2.40% Impervious Area

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

Subcatchment P2-3: DISCHARGE TO THE EAST



Summary for Subcatchment R4: ROOF - BUILDING #4

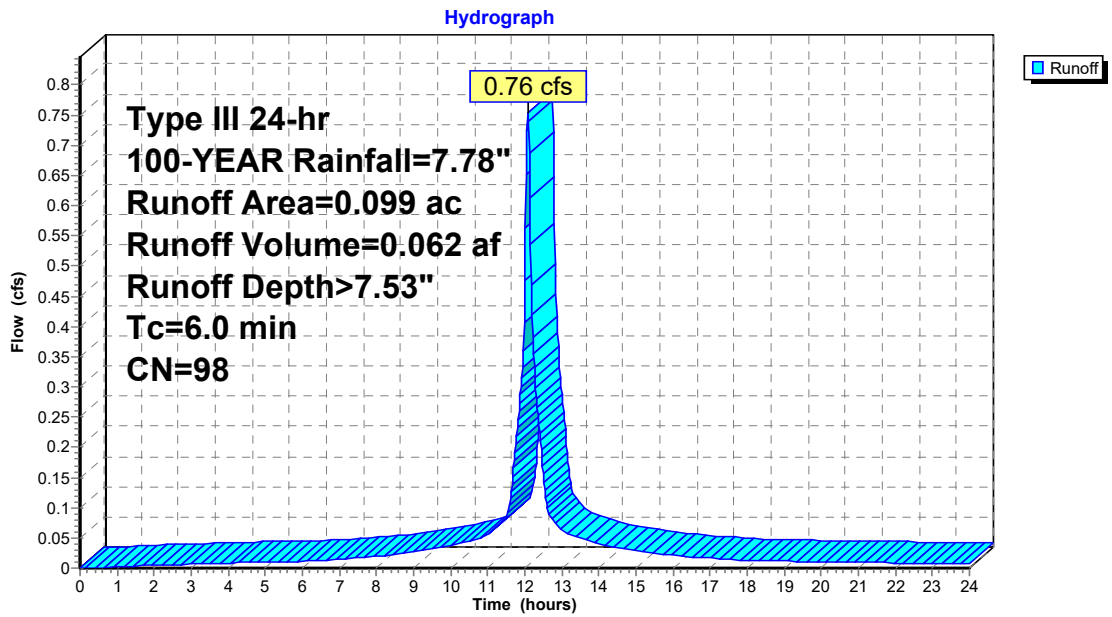
Runoff = 0.76 cfs @ 12.08 hrs, Volume= 0.062 af, Depth> 7.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-YEAR Rainfall=7.78"

Area (ac)	CN	Description
0.099	98	Unconnected roofs, HSG B
0.099		100.00% Impervious Area
0.099		100.00% Unconnected

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

Subcatchment R4: ROOF - BUILDING #4



Summary for Subcatchment R5: ROOF - BUILDING #5

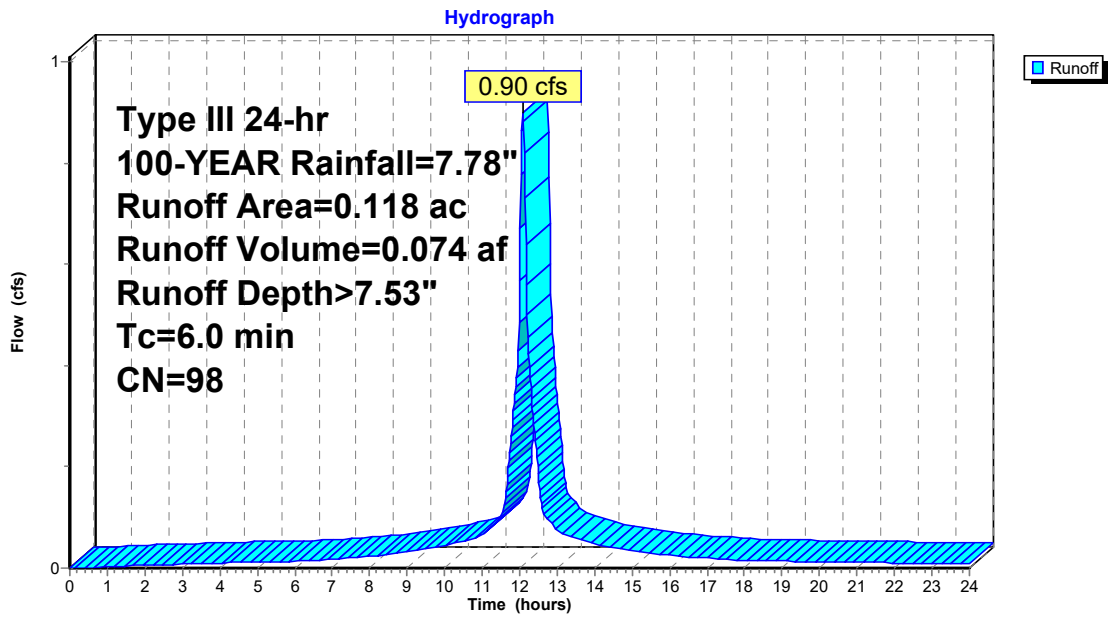
Runoff = 0.90 cfs @ 12.08 hrs, Volume= 0.074 af, Depth> 7.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-YEAR Rainfall=7.78"

Area (ac)	CN	Description
0.118	98	Unconnected roofs, HSG B
0.118		100.00% Impervious Area
0.118		100.00% Unconnected

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

Subcatchment R5: ROOF - BUILDING #5



Summary for Subcatchment R6: ROOF - BUILDING #6

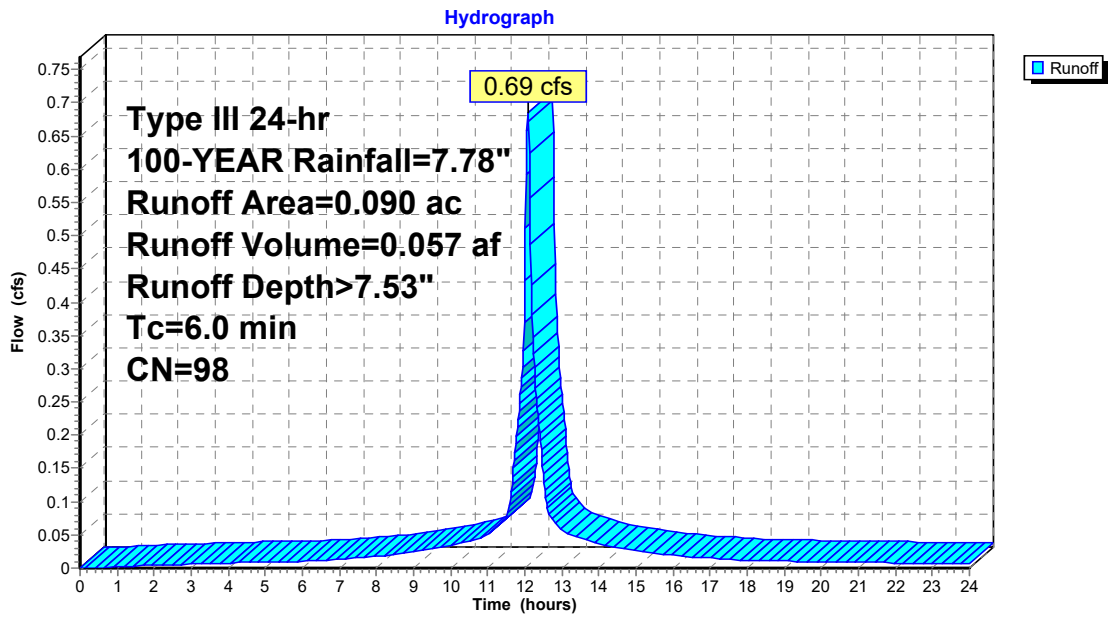
Runoff = 0.69 cfs @ 12.08 hrs, Volume= 0.057 af, Depth> 7.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-YEAR Rainfall=7.78"

Area (ac)	CN	Description
0.090	98	Unconnected roofs, HSG B
0.090		100.00% Impervious Area
0.090		100.00% Unconnected

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

Subcatchment R6: ROOF - BUILDING #6



Summary for Subcatchment R7: ROOF - BUILDING #7

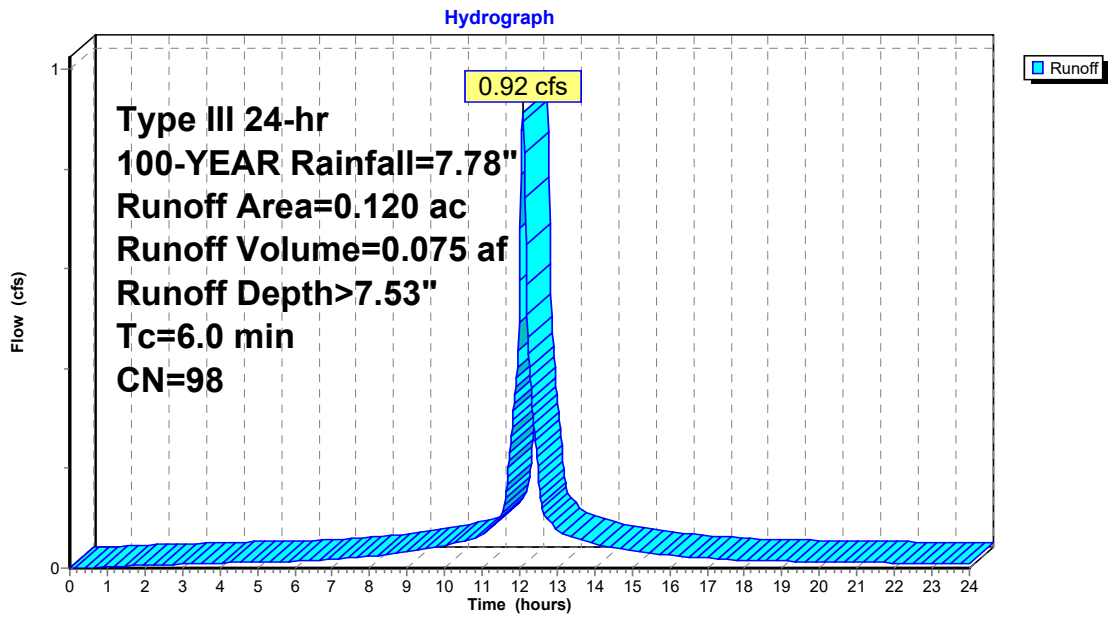
Runoff = 0.92 cfs @ 12.08 hrs, Volume= 0.075 af, Depth> 7.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-YEAR Rainfall=7.78"

Area (ac)	CN	Description
0.120	98	Unconnected roofs, HSG B
0.120		100.00% Impervious Area
0.120		100.00% Unconnected

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

Subcatchment R7: ROOF - BUILDING #7



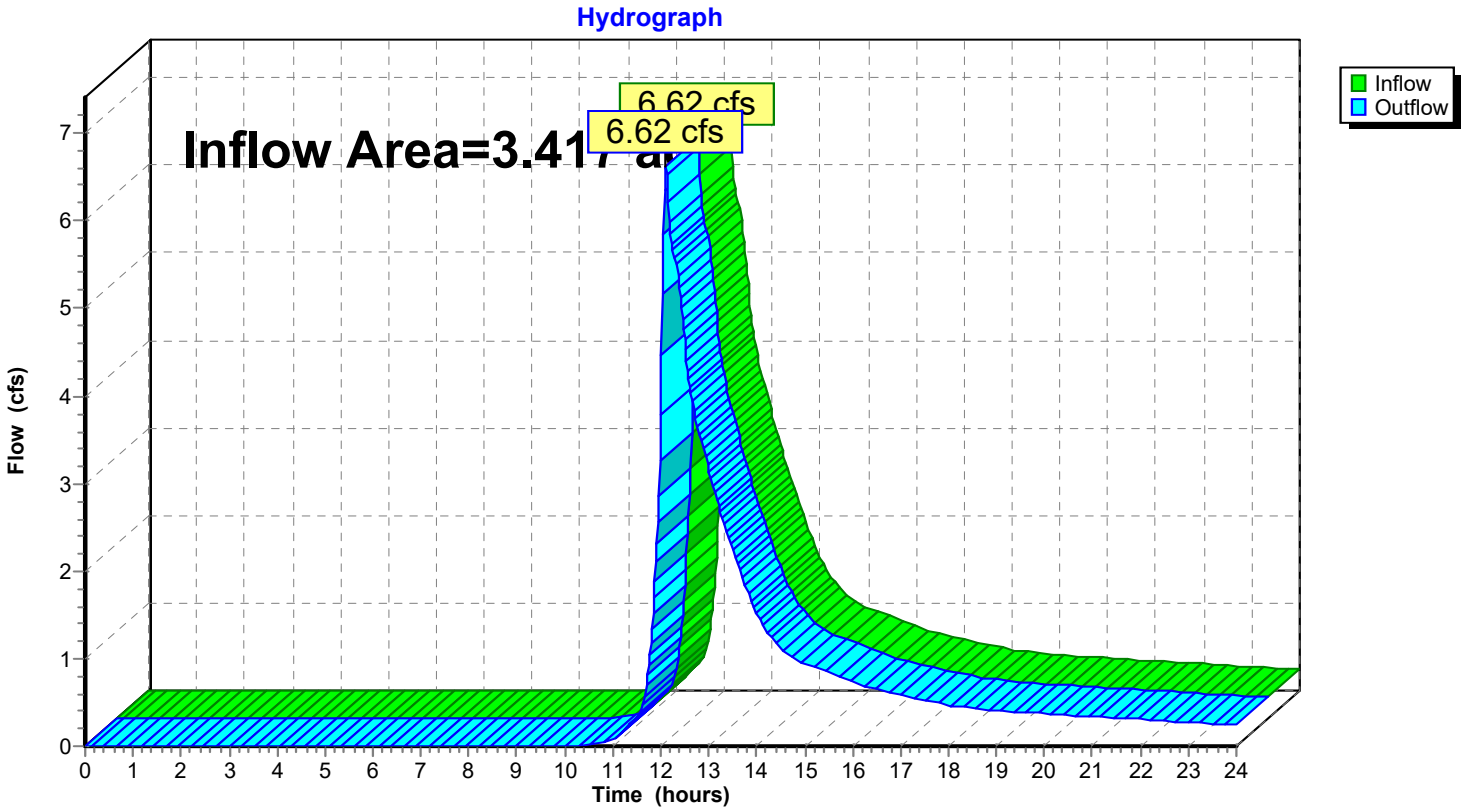
Summary for Reach 2R: TOTAL DISCHARGE TO THE EAST

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.417 ac, 47.03% Impervious, Inflow Depth > 3.74" for 100-YEAR event
Inflow = 6.62 cfs @ 12.11 hrs, Volume= 1.064 af
Outflow = 6.62 cfs @ 12.11 hrs, Volume= 1.064 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 2R: TOTAL DISCHARGE TO THE EAST



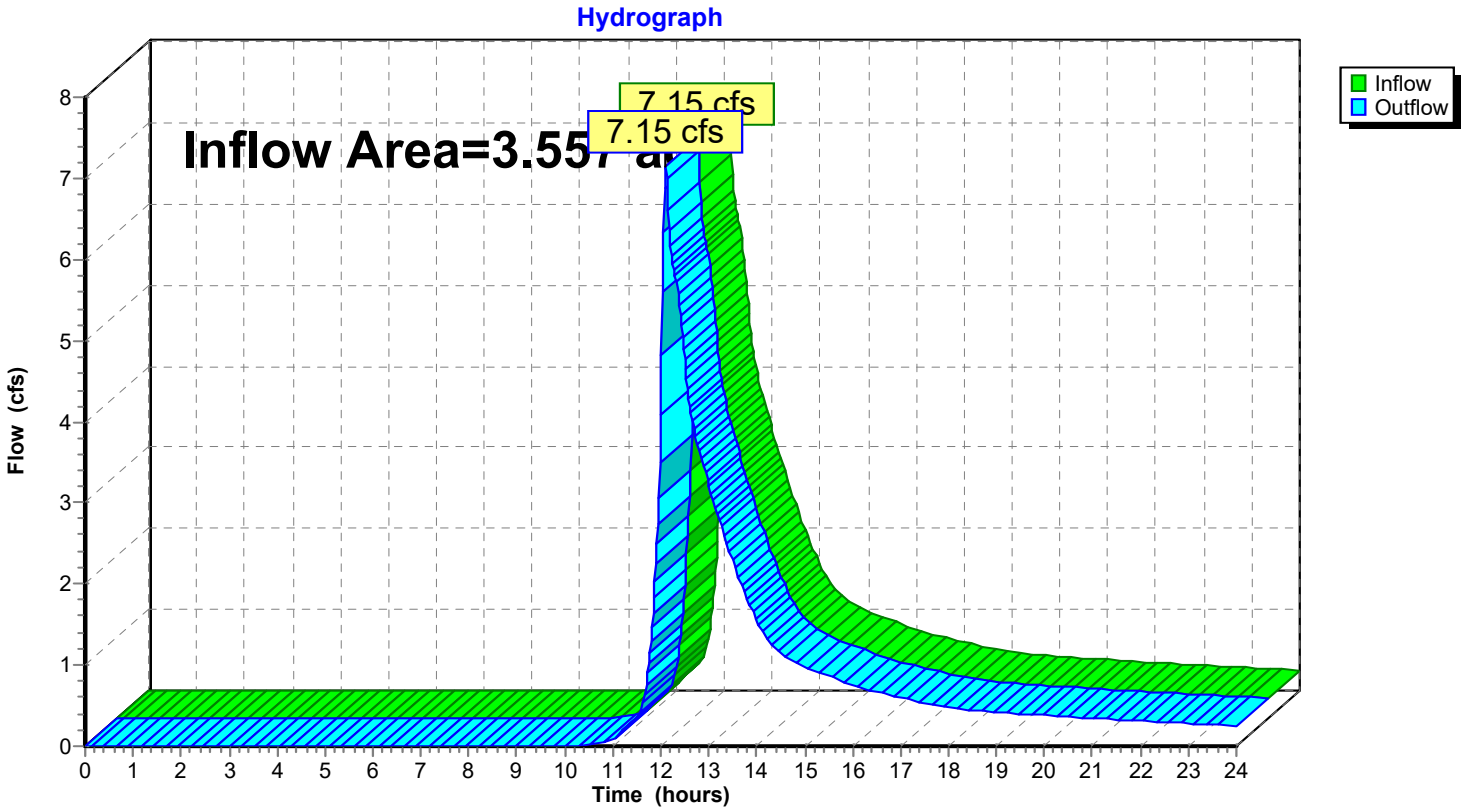
Summary for Reach 3R: PROPOSED SITE TOTAL DISCHARGE

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.557 ac, 45.18% Impervious, Inflow Depth > 3.72" for 100-YEAR event
Inflow = 7.15 cfs @ 12.11 hrs, Volume= 1.102 af
Outflow = 7.15 cfs @ 12.11 hrs, Volume= 1.102 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach 3R: PROPOSED SITE TOTAL DISCHARGE



Summary for Pond 1P: DETENTION BASIN

[58] Hint: Peaked 0.89' above defined flood level

Inflow Area = 0.600 ac, 48.33% Impervious, Inflow Depth > 5.30" for 100-YEAR event
Inflow = 3.68 cfs @ 12.09 hrs, Volume= 0.265 af
Outflow = 1.07 cfs @ 12.43 hrs, Volume= 0.222 af, Atten= 71%, Lag= 20.7 min
Primary = 1.07 cfs @ 12.43 hrs, Volume= 0.222 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 615.83' @ 12.43 hrs Surf.Area= 2,463 sf Storage= 4,750 cf
Flood Elev= 614.94' Surf.Area= 1,948 sf Storage= 2,797 cf

Plug-Flow detention time= 128.9 min calculated for 0.222 af (84% of inflow)
Center-of-Mass det. time= 62.8 min (868.5 - 805.7)

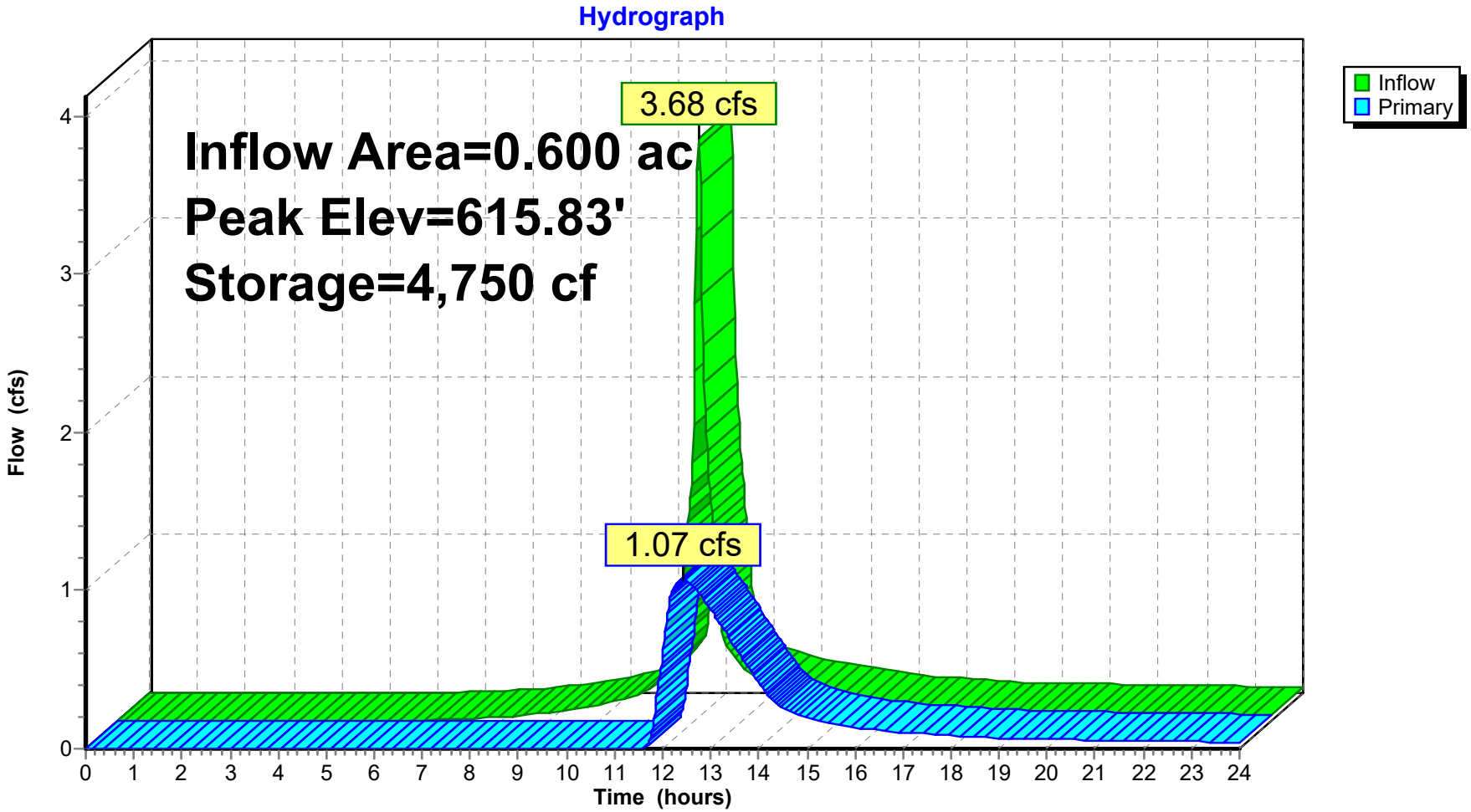
Volume	Invert	Avail.Storage	Storage Description
#1	613.00'	6,621 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
613.00	984	145.0	0	0	984
614.00	1,446	164.0	1,208	1,208	1,476
615.00	1,983	186.0	1,707	2,915	2,113
616.00	2,570	205.0	2,270	5,185	2,736
616.50	3,185	230.0	1,436	6,621	3,608

Device	Routing	Invert	Outlet Devices
#1	Primary	614.05'	**15.0" Round Culvert** L= 105.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 614.05' / 613.00' S= 0.0100 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf
#2	Device 1	614.30'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	616.00'	**15.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

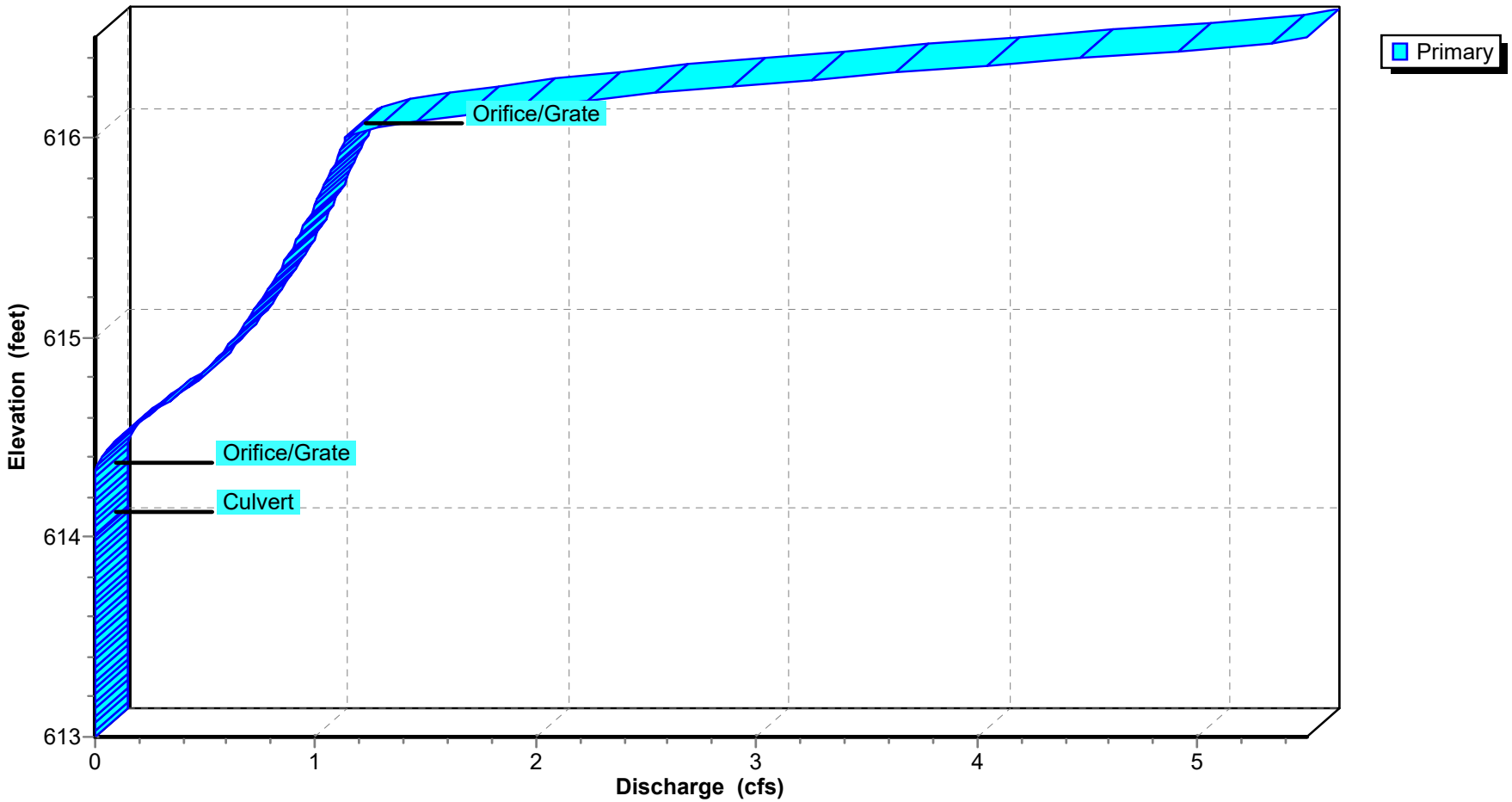
Primary OutFlow Max=1.07 cfs @ 12.43 hrs HW=615.83' (Free Discharge)
└─**1=Culvert** (Passes 1.07 cfs of 6.34 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.07 cfs @ 5.44 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: DETENTION BASIN

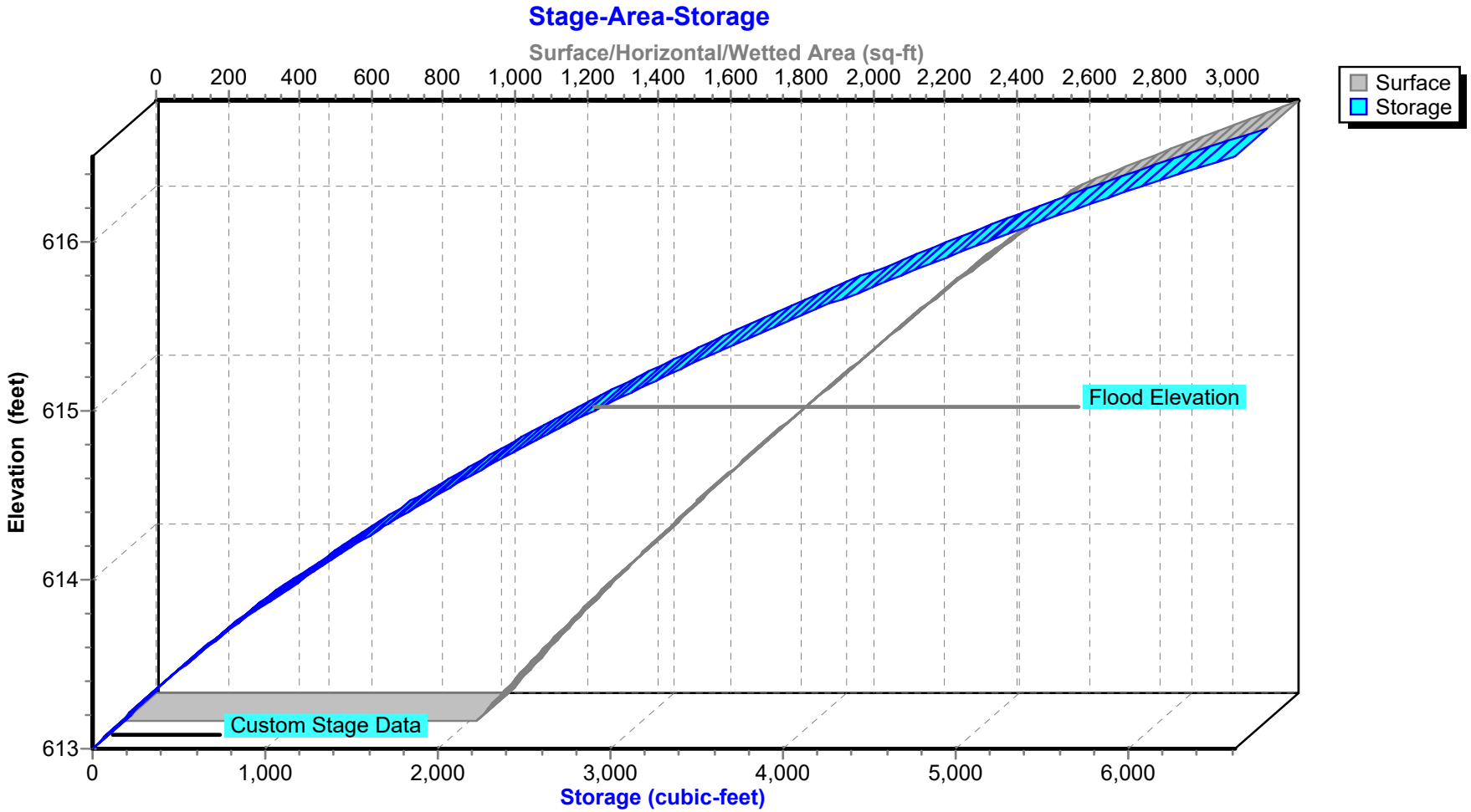


Pond 1P: DETENTION BASIN

Stage-Discharge



Pond 1P: DETENTION BASIN



Summary for Pond 2P: UNDERGROUND DETENTION

[81] Warning: Exceeded Pond 4P by 0.95' @ 12.30 hrs

Inflow Area = 1.468 ac, 80.93% Impervious, Inflow Depth > 5.34" for 100-YEAR event
Inflow = 8.15 cfs @ 12.08 hrs, Volume= 0.653 af
Outflow = 2.70 cfs @ 12.37 hrs, Volume= 0.547 af, Atten= 67%, Lag= 17.2 min
Primary = 2.70 cfs @ 12.37 hrs, Volume= 0.547 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 617.06' @ 12.37 hrs Surf.Area= 5,913 sf Storage= 12,093 cf

Plug-Flow detention time= 168.4 min calculated for 0.547 af (84% of inflow)
Center-of-Mass det. time= 97.4 min (894.9 - 797.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	613.75'	6,633 cf	**36.50'W x 162.00'L x 4.00'H Field A** 23,652 cf Overall - 7,069 cf Embedded = 16,583 cf x 40.0% Voids
#2A	614.25'	7,069 cf	**CMP Round 30** x 72 Inside #1 Effective Size= 30.0"W x 30.0"H => 4.91 sf x 20.00'L = 98.2 cf Overall Size= 30.0"W x 30.0"H x 20.00'L 9 Rows of 8 Chambers
#3	614.25'	31 cf	**15.0" Round Pipe Storage** L= 25.0'
		13,733 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	613.75'	**15.0" Round Culvert** L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 613.25' / 613.75' S= -0.0278 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf
#2	Device 1	614.86'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	615.33'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	617.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.70 cfs @ 12.37 hrs HW=617.06' (Free Discharge)
└─**1=Culvert** (Passes 2.70 cfs of 9.68 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.60 cfs @ 6.86 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 1.98 cfs @ 5.68 fps)
  └─**4=Orifice/Grate** (Weir Controls 0.11 cfs @ 0.78 fps)

Pond 2P: UNDERGROUND DETENTION - Chamber Wizard Field A

Chamber Model = CMP Round 30 (Round Corrugated Metal Pipe)
Effective Size= 30.0"W x 30.0"H => 4.91 sf x 20.00'L = 98.2 cf
Overall Size= 30.0"W x 30.0"H x 20.00'L

30.0" Wide + 18.0" Spacing = 48.0" C-C Row Spacing

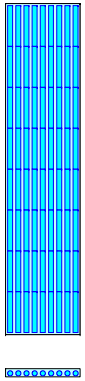
8 Chambers/Row x 20.00' Long = 160.00' Row Length +12.0" End Stone x 2 = 162.00' Base Length
9 Rows x 30.0" Wide + 18.0" Spacing x 8 + 12.0" Side Stone x 2 = 36.50' Base Width
6.0" Base + 30.0" Chamber Height + 12.0" Cover = 4.00' Field Height

72 Chambers x 98.2 cf = 7,068.6 cf Chamber Storage

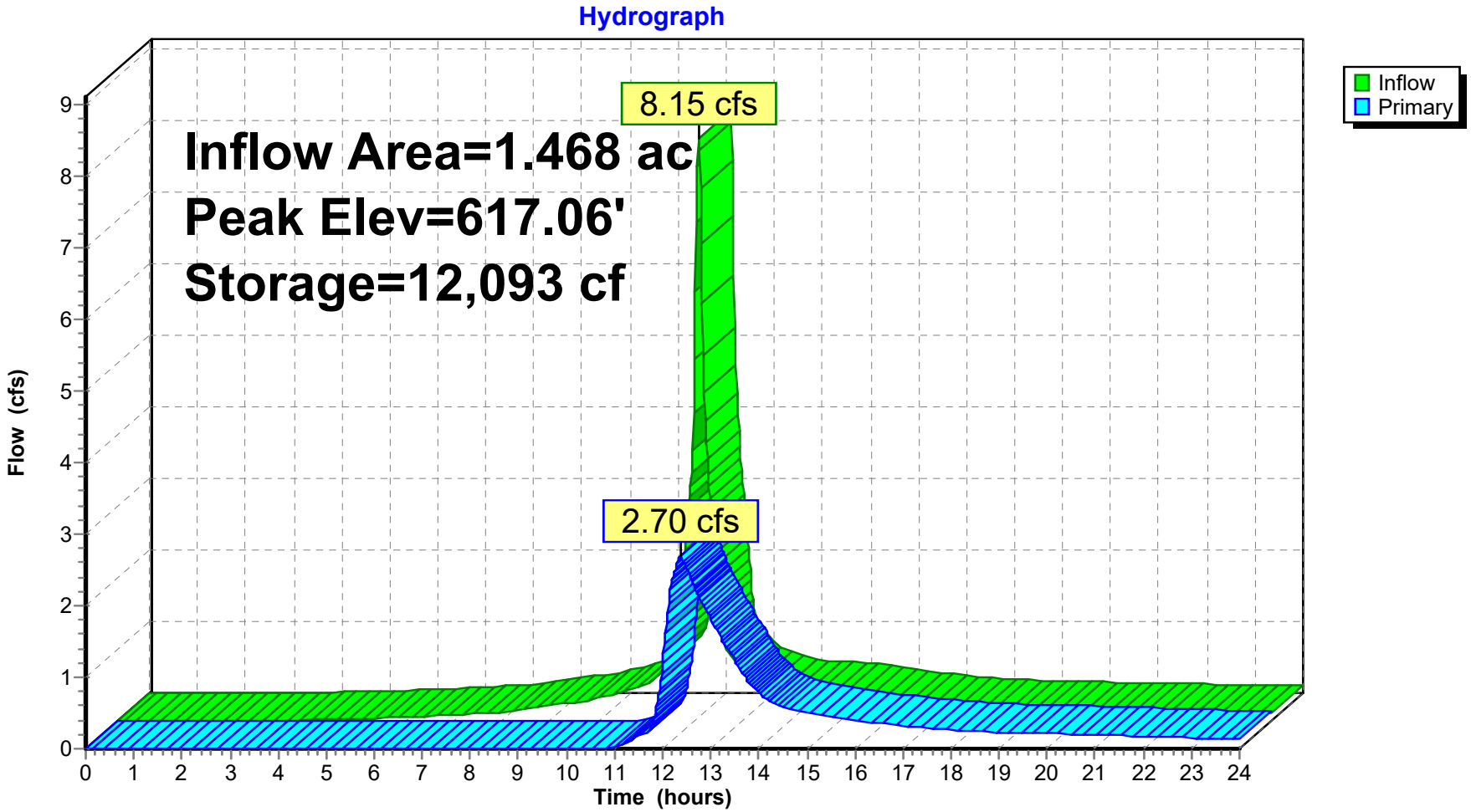
23,652.0 cf Field - 7,068.6 cf Chambers = 16,583.4 cf Stone x 40.0% Voids = 6,633.4 cf Stone Storage

Chamber Storage + Stone Storage = 13,702.0 cf = 0.315 af
Overall Storage Efficiency = 57.9%
Overall System Size = 162.00' x 36.50' x 4.00'

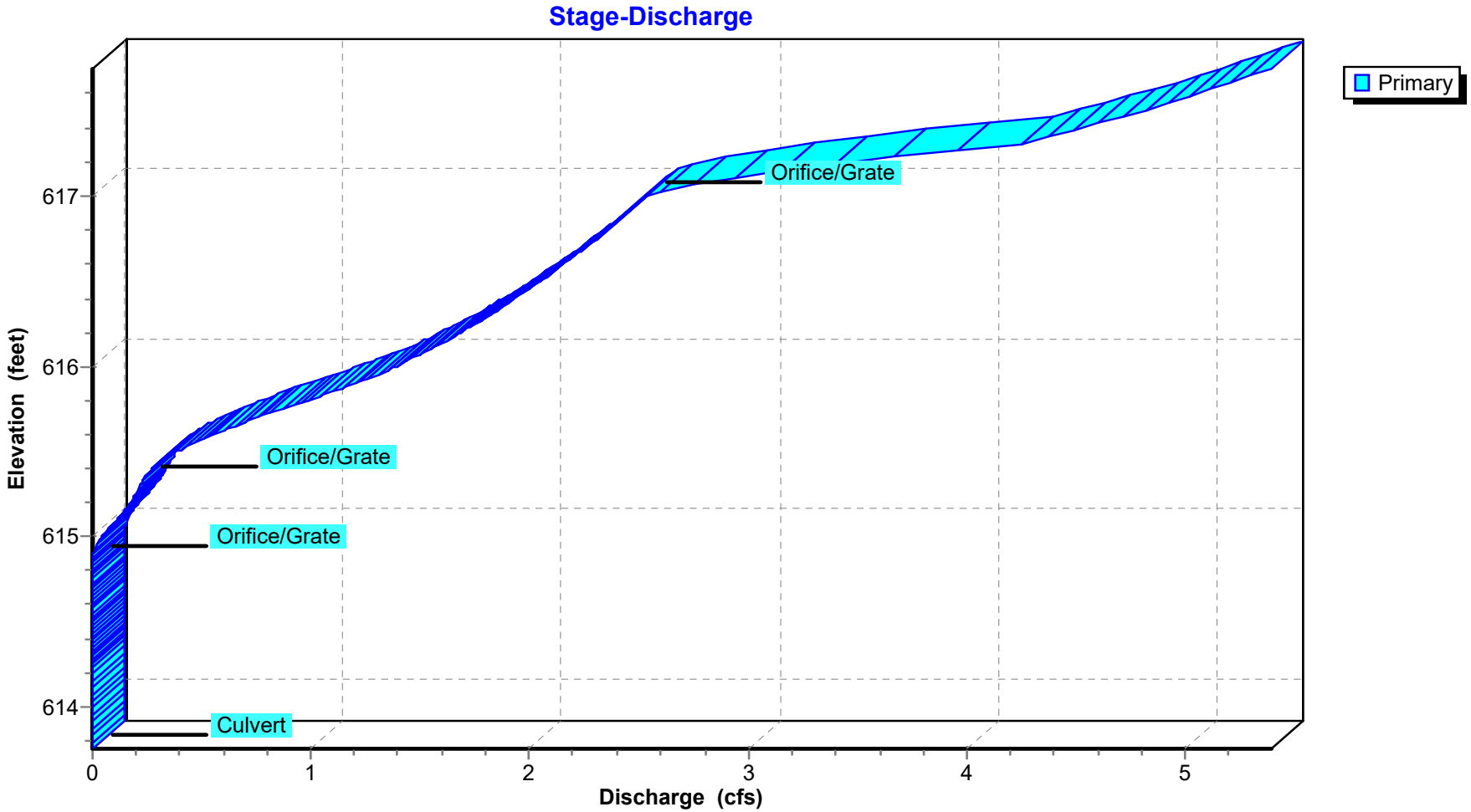
72 Chambers
876.0 cy Field
614.2 cy Stone



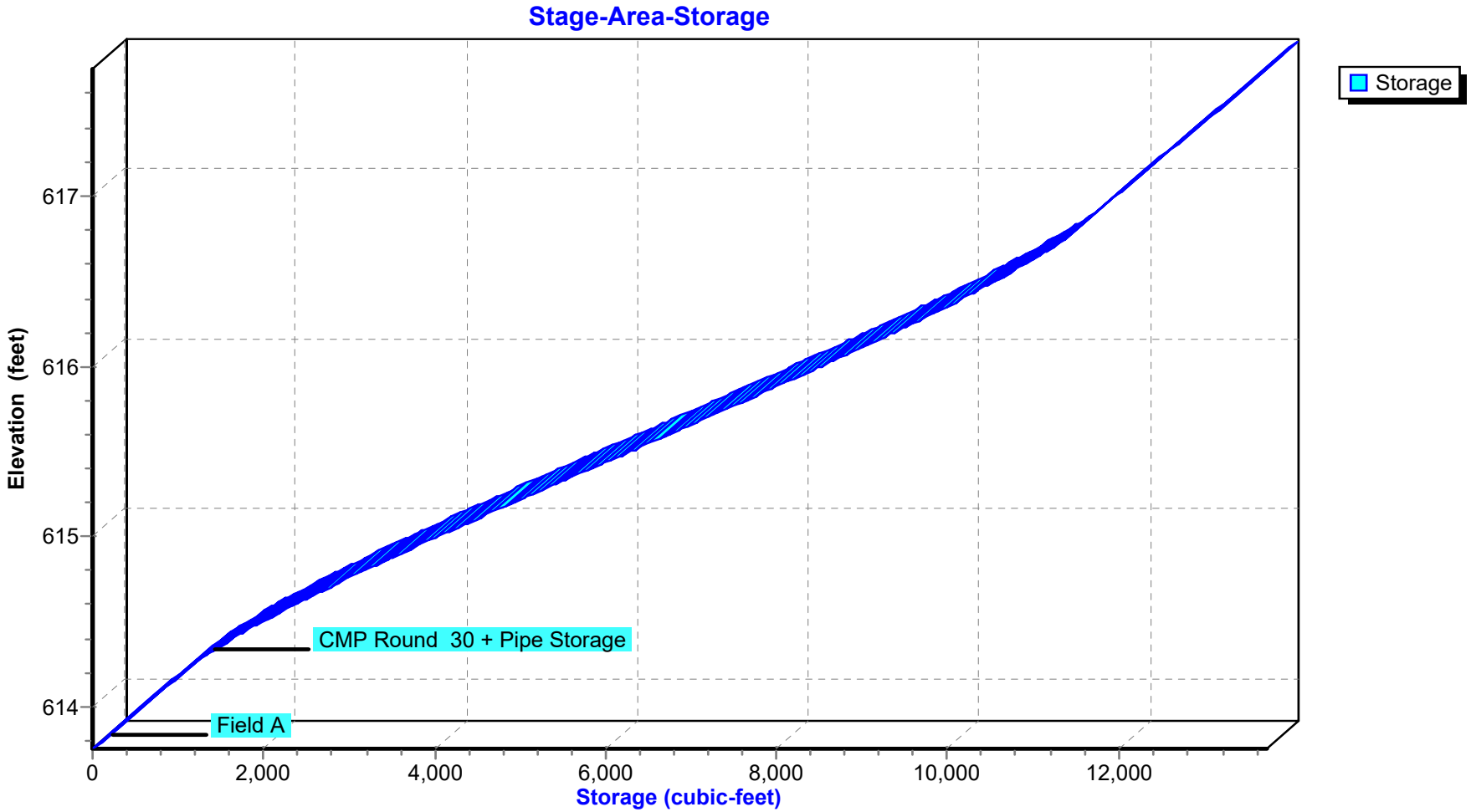
Pond 2P: UNDERGROUND DETENTION



Pond 2P: UNDERGROUND DETENTION



Pond 2P: UNDERGROUND DETENTION



Summary for Pond 3P: ROOF INFILTRATION

Inflow Area = 0.099 ac,100.00% Impervious, Inflow Depth > 7.53" for 100-YEAR event
Inflow = 0.76 cfs @ 12.08 hrs, Volume= 0.062 af
Outflow = 0.02 cfs @ 15.80 hrs, Volume= 0.009 af, Atten= 97%, Lag= 222.9 min
Primary = 0.02 cfs @ 15.80 hrs, Volume= 0.009 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 617.59' @ 15.80 hrs Surf.Area= 607 sf Storage= 2,331 cf

Plug-Flow detention time= 721.0 min calculated for 0.009 af (14% of inflow)
Center-of-Mass det. time= 385.3 min (1,126.3 - 741.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	611.50'	1,192 cf	**19.42'W x 31.27'L x 7.25'H Field A** 4,401 cf Overall - 1,421 cf Embedded = 2,981 cf x 40.0% Voids
#2A	612.25'	1,421 cf	**ADS_StormTech MC-4500 +Cap** x 12 Inside #1 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 2 Rows of 6 Chambers Cap Storage= +35.7 cf x 2 x 2 rows = 142.8 cf
		2,613 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	617.50'	**8.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 617.50' / 616.00' S= 0.1000 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=0.02 cfs @ 15.80 hrs HW=617.59' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.02 cfs @ 0.81 fps)

Pond 3P: ROOF INFILTRATION - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-4500 +Cap (ADS StormTech® MC-4500 with cap volume)
Effective Size= 90.4"W x 60.0"H => 26.46 sf x 4.03'L = 106.5 cf
Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap
Cap Storage= +35.7 cf x 2 x 2 rows = 142.8 cf

100.0" Wide + 9.0" Spacing = 109.0" C-C Row Spacing

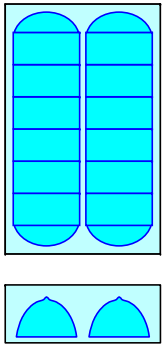
6 Chambers/Row x 4.02' Long +2.56' Cap Length x 2 = 29.27' Row Length +12.0" End Stone x 2 = 31.27' Base Length
2 Rows x 100.0" Wide + 9.0" Spacing x 1 + 12.0" Side Stone x 2 = 19.42' Base Width
9.0" Base + 60.0" Chamber Height + 18.0" Cover = 7.25' Field Height

12 Chambers x 106.5 cf + 35.7 cf Cap Volume x 2 x 2 Rows = 1,420.7 cf Chamber Storage

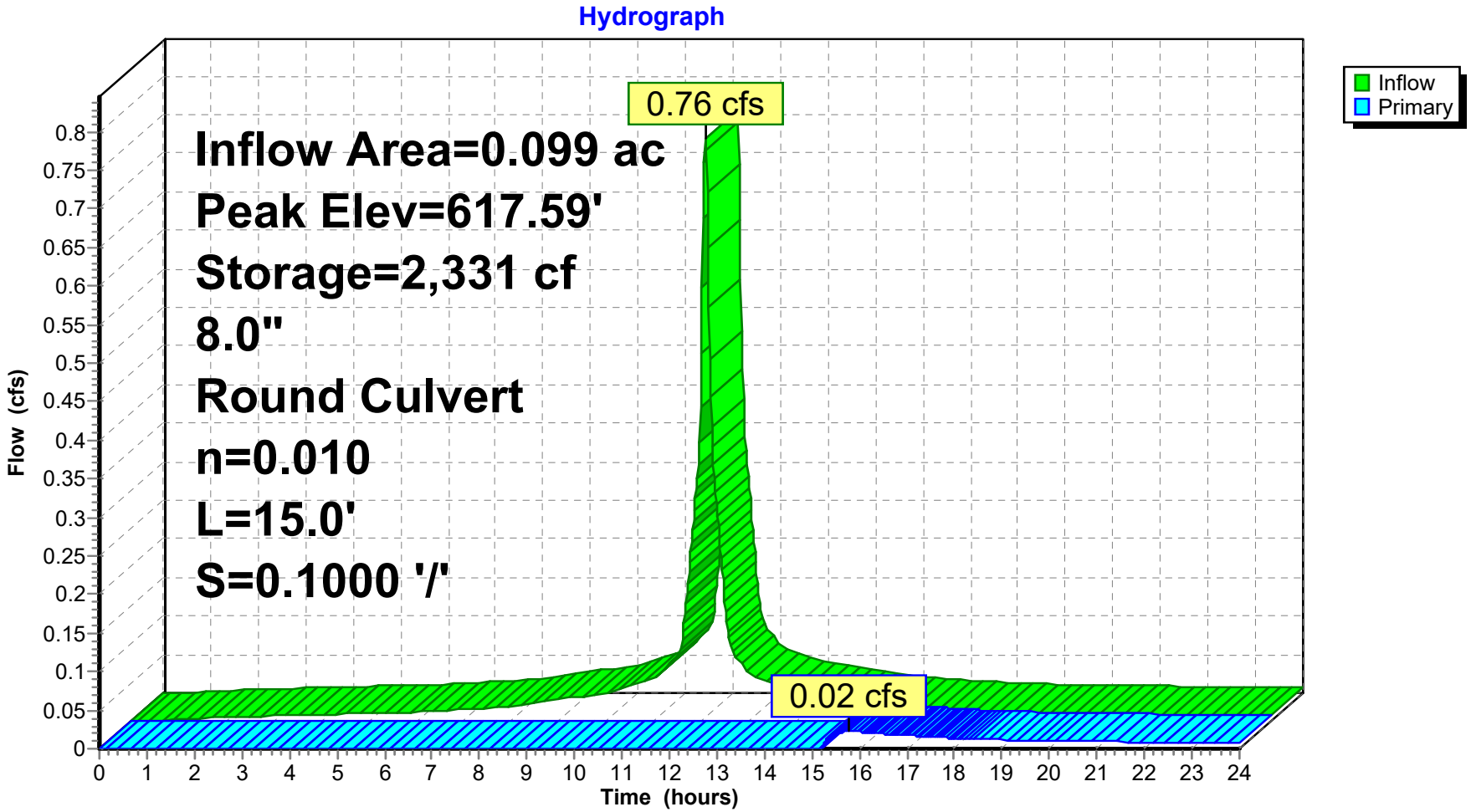
4,401.4 cf Field - 1,420.7 cf Chambers = 2,980.7 cf Stone x 40.0% Voids = 1,192.3 cf Stone Storage

Chamber Storage + Stone Storage = 2,613.0 cf = 0.060 af
Overall Storage Efficiency = 59.4%
Overall System Size = 31.27' x 19.42' x 7.25'

12 Chambers
163.0 cy Field
110.4 cy Stone

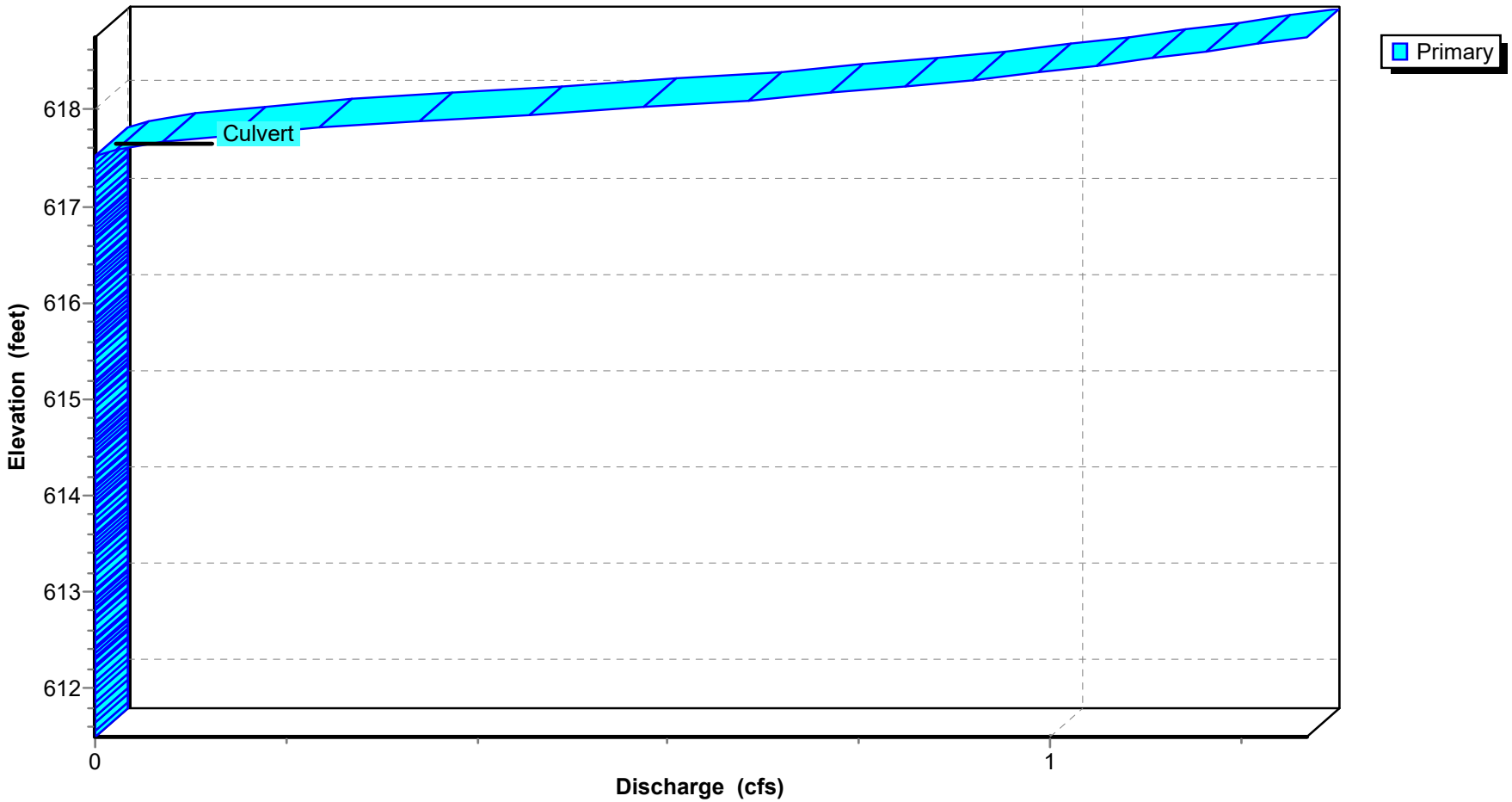


Pond 3P: ROOF INFILTRATION

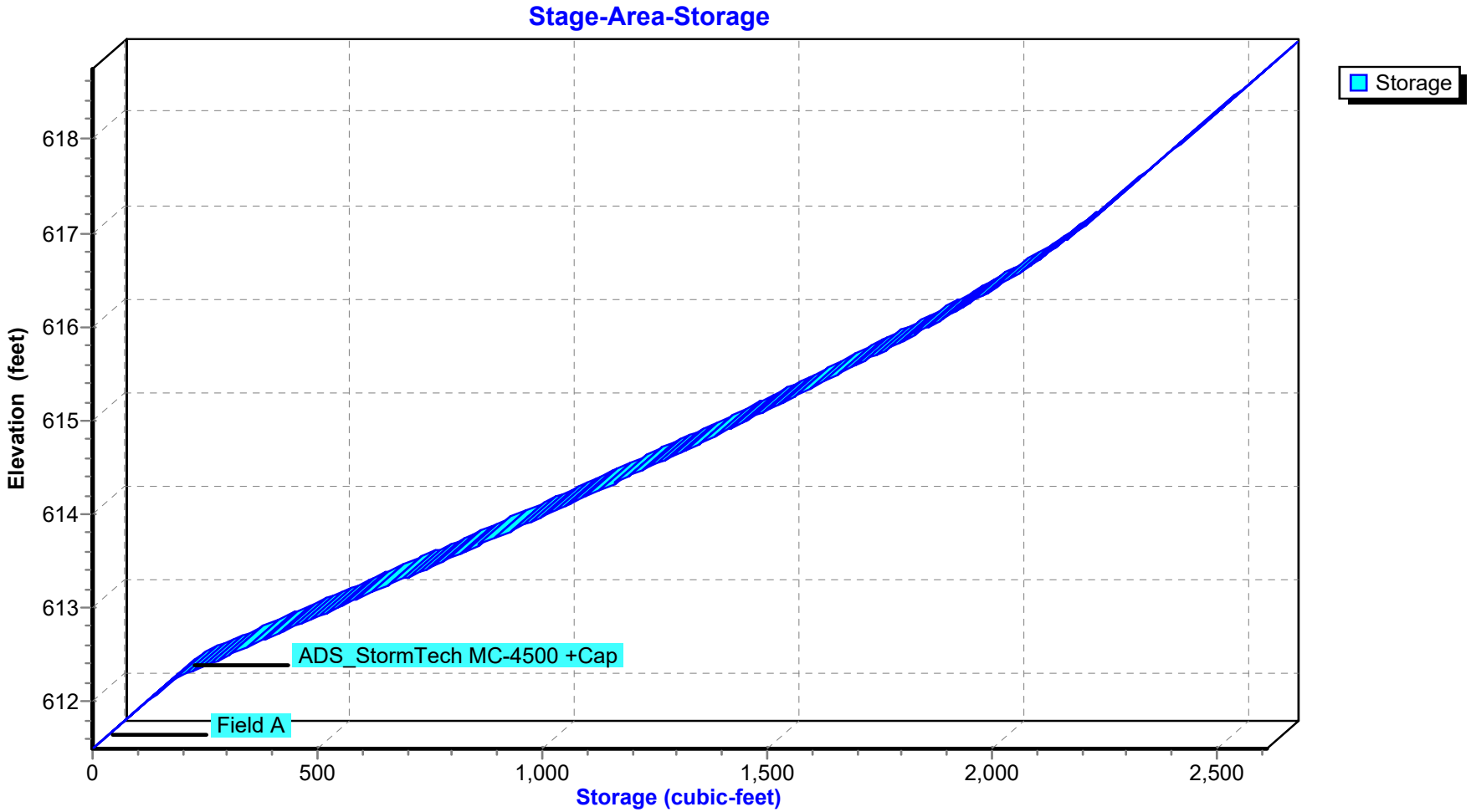


Pond 3P: ROOF INFILTRATION

Stage-Discharge



Pond 3P: ROOF INFILTRATION



Summary for Pond 4P: ROOF INFILTRATION

Inflow Area = 0.328 ac,100.00% Impervious, Inflow Depth > 7.53" for 100-YEAR event
Inflow = 2.50 cfs @ 12.08 hrs, Volume= 0.206 af
Outflow = 0.09 cfs @ 15.24 hrs, Volume= 0.039 af, Atten= 96%, Lag= 189.1 min
Primary = 0.09 cfs @ 15.24 hrs, Volume= 0.039 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 2
Peak Elev= 617.26' @ 15.24 hrs Surf.Area= 0.059 ac Storage= 0.170 af

Plug-Flow detention time= 626.1 min calculated for 0.039 af (19% of inflow)
Center-of-Mass det. time= 339.7 min (1,080.8 - 741.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	613.00'	0.084 af	**22.75'W x 113.25'L x 5.50'H Field A** 0.325 af Overall - 0.116 af Embedded = 0.210 af x 40.0% Voids
#2A	613.75'	0.116 af	**ADS_StormTech MC-3500 d +Cap** x 45 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 3 Rows of 15 Chambers Cap Storage= +14.9 cf x 2 x 3 rows = 89.4 cf
		0.200 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	617.00'	**8.0" Round Culvert** L= 33.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 617.00' / 617.00' S= 0.0000 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=0.09 cfs @ 15.24 hrs HW=617.26' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.09 cfs @ 1.07 fps)

Pond 4P: ROOF INFILTRATION - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 3 rows = 89.4 cf

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

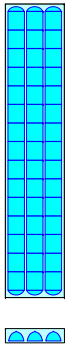
15 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 111.25' Row Length +12.0" End Stone x 2 = 113.25' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

45 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 3 Rows = 5,037.2 cf Chamber Storage

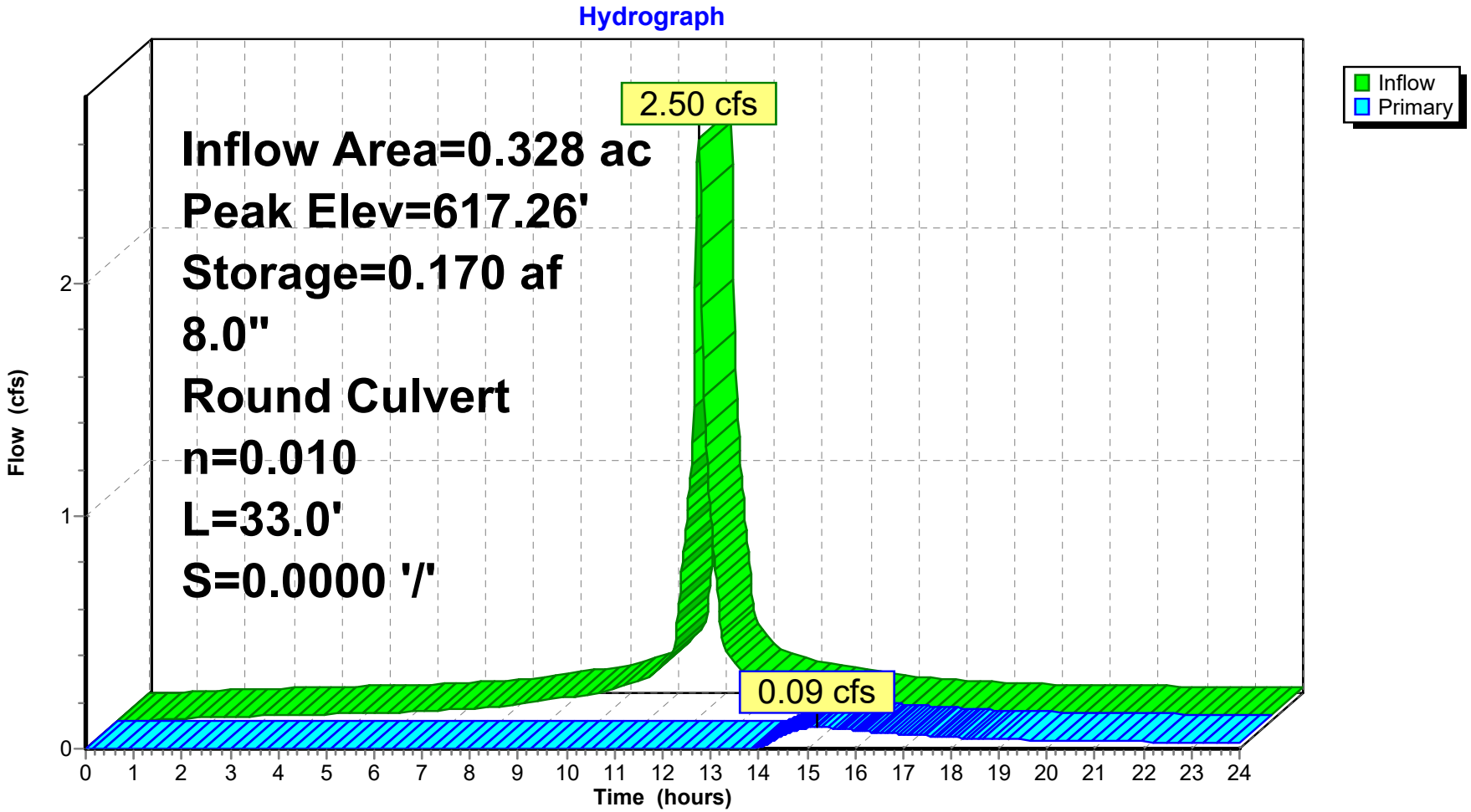
14,170.4 cf Field - 5,037.2 cf Chambers = 9,133.2 cf Stone x 40.0% Voids = 3,653.3 cf Stone Storage

Chamber Storage + Stone Storage = 8,690.5 cf = 0.200 af
Overall Storage Efficiency = 61.3%
Overall System Size = 113.25' x 22.75' x 5.50'

45 Chambers
524.8 cy Field
338.3 cy Stone

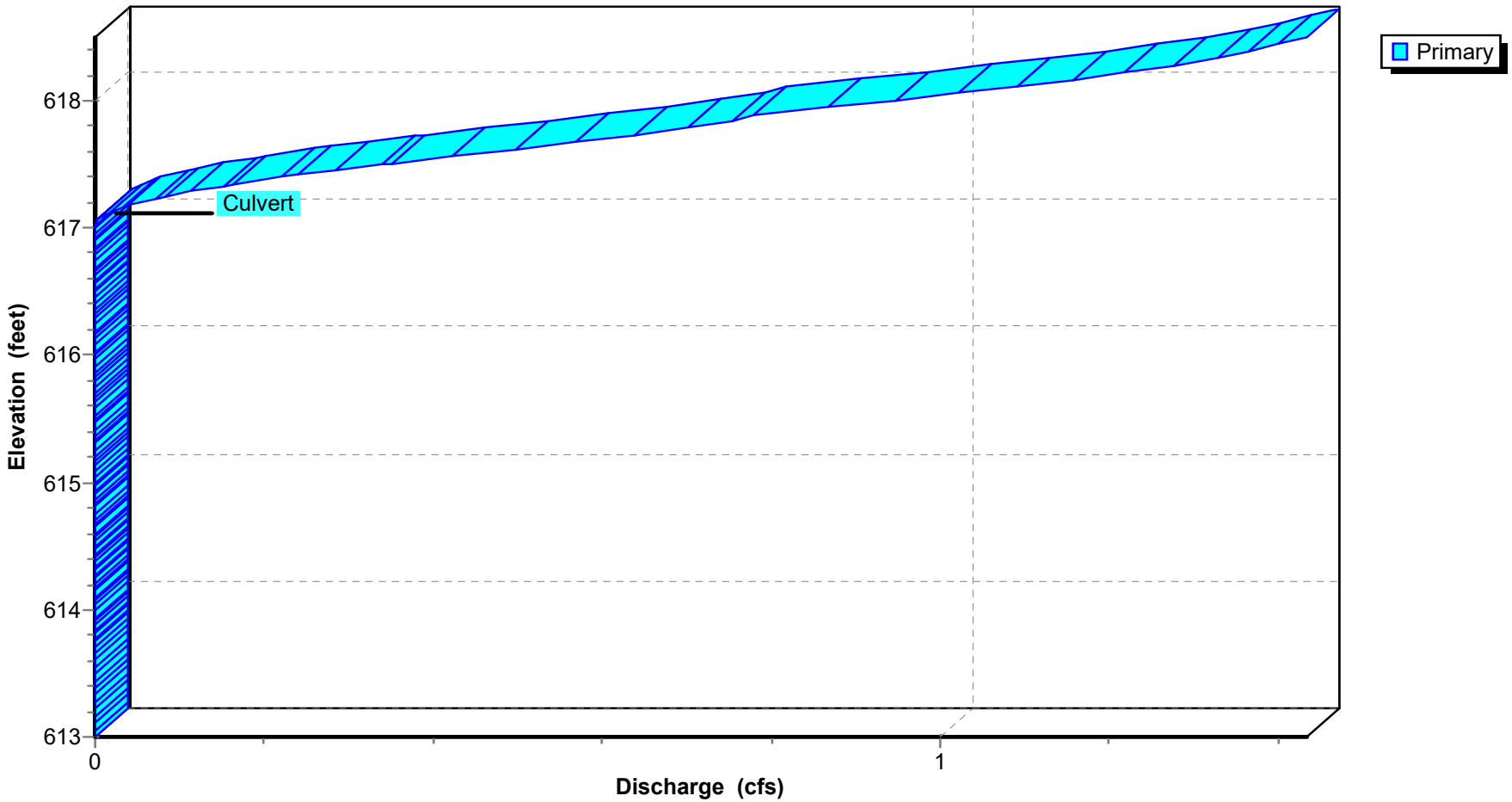


Pond 4P: ROOF INFILTRATION

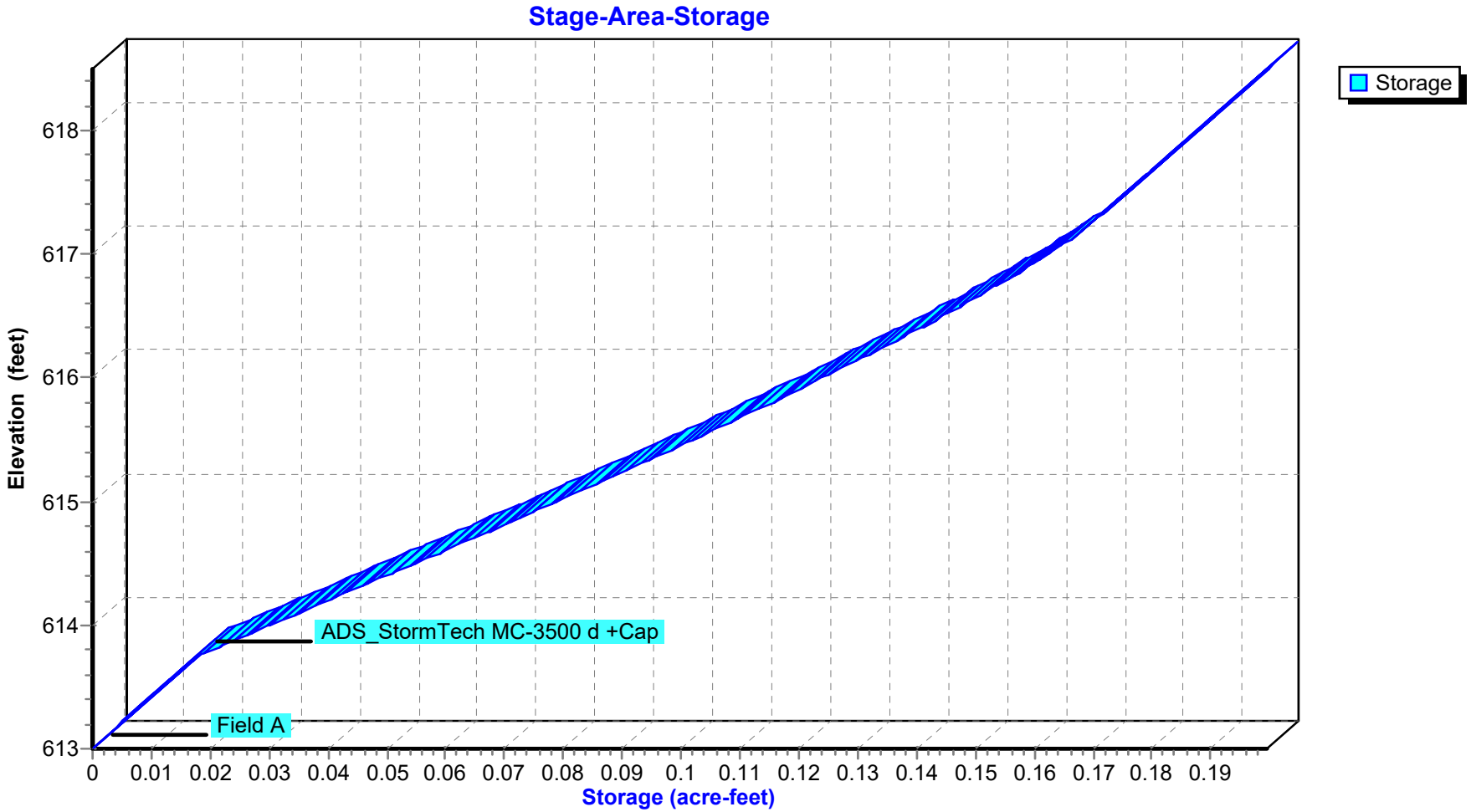


Pond 4P: ROOF INFILTRATION

Stage-Discharge



Pond 4P: ROOF INFILTRATION



WELTI GEOTECHNICAL, P.C.

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(860) 633-4623 / FAX (860) 657-2514

October 4, 2019

Ms. Rebecca M. Fields
Executive Director
Mansfield Housing Authority
309 Maple Road
Storrs, CT 06268

Re: Geotechnical Study for Proposed Housing, 113-121 South Eagleville Road, Storrs, CT

Dear Ms. Fields:

1.0 Herewith are the boring data pertaining to the above. Twelve borings were drilled to maximum depth of 26.5 feet or to auger refusal if above 26.5 feet. The boring locations are shown on the attached plan. *The borings were drilled by Clarence Welti Associates, Inc. and sampling was conducted by this firm solely to obtain indications of subsurface conditions as part of a geotechnical exploration program. No services were performed to evaluate subsurface environmental conditions.* Grain size gradation tests and water content tests were performed on six representative soil samples taken from the borings. The results of those tests are included in the Appendix.

2.0 The **Subject Project** will include the construction of a seven two story slab on grade housing structures with a total of 42 apartment units. The site development will include pavements for 72 regular spaces and 8 handicapped accessible spaces. The existing grades in the proposed developed area range from about Elev.622 to about Elev.612. There are two existing 2 ½ story residences on the site. At least one would be removed based on the proposed apartment building configuration. The site abuts a large wetland to the east of the developed area. A proposed grading plan was not available for this study.

3.0 The **Geologic Origin** of the natural inorganic soils consist generally of glacial lake deposits atop glacial moraine deposit. The lake deposits consist generally of medium compact to loose sand with trace to silt and gravel; or silt and fine sand.

3.1 The **Soils Cross Section** from the borings is generally as follows:

Topsoil to 6" to 12"

Locally Subsoil; fine to medium SAND, little to some Silt, trace Roots to 1.5 to 3 feet, loose

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3.0 The **Geologic Origin** of the natural inorganic soils consist generally of glacial lake deposits atop glacial moraine deposit. The lake deposits consist generally of medium compact to loose sand with trace to silt and gravel; or silt and fine sand.

3.1 The **Soils Cross Section** from the borings is generally as follows:

Topsoil to 6" to 12"

Locally Subsoil; fine to medium SAND, little to some Silt, trace Roots to 1.5 to 3 feet, loose

Glacial Lake Soils: Stratified fine to fine to coarse SAND, trace to little Silt and Gravel; or SILT and fine SAND to 4.5 to 26+ feet, medium compact to about 8 feet and loose to medium compact below 8 feet

Moraine Soils: fine to medium SAND, some Silt, little Gravel and Cobbles to auger refusal on probable bedrock at 9.5 feet to 26+ feet, dense to very dense

3.2 The **ground water** in the boreholes was at 2 to 10 feet below the existing grades at the completion of the borings (Elev. 610 to Elev.612). It is possible with heavy spring rains the water table could rise locally for short periods to 2 to 3 feet above the wetlands water level of Elev. 610. This mounding of the water table would normally be some distance from the wetland and could possibly be atop low permeability soil. Building slabs on grade should be kept above Elev. 616 and foundations should if possible be kept above Elev. 614.

4.0 The **Criteria for Foundation Type and Loading** are as follows:

1. The maximum total settlement should not exceed 3/4" and the maximum differential settlement shall not exceed ½ the maximum settlement.

2. The Foundations and Structures must address the seismic section of the building code

3. The Slab at Grade floors must not settle differentially more than ½" in excess of the main structure subsidence.

4.1 Regarding item 2 (above), the seismic site soil profile classification can be **"D"**. The mapped MCE spectral response acceleration values for Mansfield, CT are $\mathbf{S_1 = 0.062}$ for one second period and $\mathbf{S_S = 0.173}$ for short period. For transfer of ground shear into the soil the ultimate friction factor can be **0.60.**

5.0 Regarding the **Foundation Type,** the building can be supported on spread footings. The footing sub grades can be on the natural inorganic soils, or on a controlled fill placed after the removal of any existing fills, topsoil and locally frost disturbed subsoils (assume frost disturbed soil to at least 2.5 feet below the existing grades). There should be minimum 4" layer of processed base or 3/8" crushed stone on a geotextile beneath the footings on the natural soils. Controlled fills should conform to section 6.0 below and should extend horizontally beyond the footings for a distance equal to at least the depth of fill beneath the footings.

5.1 The **Allowable Bearing Pressure** for spread footings on the crushed stone layer atop the natural soils or on the controlled fill can be 4,000 psf. The allowable loading can be increased by 1/3 for seismic or wind loading. At retaining walls the maximum pressure on the toe can be 50% higher than the average pressure, cited above.

5.2 The static **Lateral Soil Loading** on retaining walls that are part of the building (if any), should be based on at-rest pressure using the coefficient $\mathbf{K_O = 0.45}$ as cited in the table below. Lateral soil loading on retaining walls apart from the building can be designed with active pressure using the coefficient $\mathbf{K_A = 0.28}$ for level backfill. The ultimate sliding coefficient for concrete cast on crushed stone or on controlled fill is **0.60.**

5.3 The **Frost Protection Depth** is 3.5 feet below the finish grades in areas, which are exposed to weather.

5.4 Summary of Foundation Design Parameters:

Parameter	Value
Allowable Bearing Pressure	4,000 psf
Soil Unit Weight (Backfill) *	125 pcf
Internal Friction Angle (Backfill) *	34°
At-Rest Pressure Coefficient, K_O	0.45
Active Pressure Coefficient, K_A (level backfill)	0.28
Ultimate Sliding Coefficient, concrete on crushed stone over soil	0.60
Seismic Site Soil Profile Classification	D
Mapped MCE Spectral Response Acceleration for one second period, S_1	0.062
Mapped MCE Spectral Response Acceleration for short period, S_S	0.173
Frost Protection Depth	3.5 feet

* Backfill material conforming to section 6.0 below

6.0 Regarding **Controlled Fill, Backfill for Retaining Walls and Excavations at Columns and Walls, plus Slab at Grade Underlayment** (to 4" below the slab bottom) the material should conform to the following or be 3/8" crushed stone:

Percent Passing	Sieve Size
100	3.5"

50 - 100	3/4"
25 - 75	No.4

The fraction, passing the No.4 sieve should have less than 15%, passing the No. 200 sieve.

All backfill and fill must be compacted to at least 95% of modified optimum density.

6.1 All existing fill, topsoil and subsoils should be removed beneath the building floor and replaced with controlled fill conforming to section 6.0 above. There should be at least 18" of controlled fill beneath the floor slabs. The final 4" layer beneath the floor slab should be 3/8" crushed stone or 3/4"minus processed base. A vapor retarder is required beneath the slab at grade floors.

7.0 Regarding **Earthwork,** excavations in the natural soils will fall in OSHA Class C. This will require sloping of excavations, which are unshored and exceed 5 feet in height, to be cut back to slopes less than 34° from the horizontal (1.5H:1V).

8.0 Regarding **New Pavements,** there should be at least 10" of CTDOT gravel subbase or material conforming to section 6.0 above placed beneath the pavement sections. If the sub grades are on wet subsoils, the subsoils would probably have to be removed to provide a stable sub grade for placement of fills and the pavement sections. The recommended pavement sections above the subbase are as follows:

For main access road; 4" of bituminous concrete (1.5" Class 2 over 2.5" Class 1) on 6" of processed stone base

For car parking areas; 3" of bituminous concrete on 6" of processed stone base

For concrete pavements; (1) truck access; 7" concrete over 8" of processed stone base, (2) for passenger vehicles; 5" of concrete on 8" processed stone base.

For pavers: below sand bedding over 8" of processed stone base

8.1 ***For concrete aprons contiguous to the building there should be free draining material, either gravel subbase or controlled fill conforming to section 6.0 above, to 18" below grade. This is to avoid movement of the slab at flush doorways.*** The modulus of sub grade reaction atop the subbase would be at least 200 pci.

9.0 This report has been prepared for specific application to the subject project in accordance with generally accepted soil and foundation engineering practices. No other warranty, express or implied, is made. In the event that any changes in the nature, design and location of structures are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing.

The analyses and recommendations submitted in this report are based in part upon data obtained from referenced explorations. The extent of variations between explorations may not become evident until construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report.

Welti Geotechnical, P.C., should perform a general review of the final design and specifications in order that geotechnical design recommendations may be properly interpreted and implemented as they were intended.

If you have any questions, please call our office.

Very truly yours,

Max Welti, P.E.
President, Welti Geotechnical, P.C.

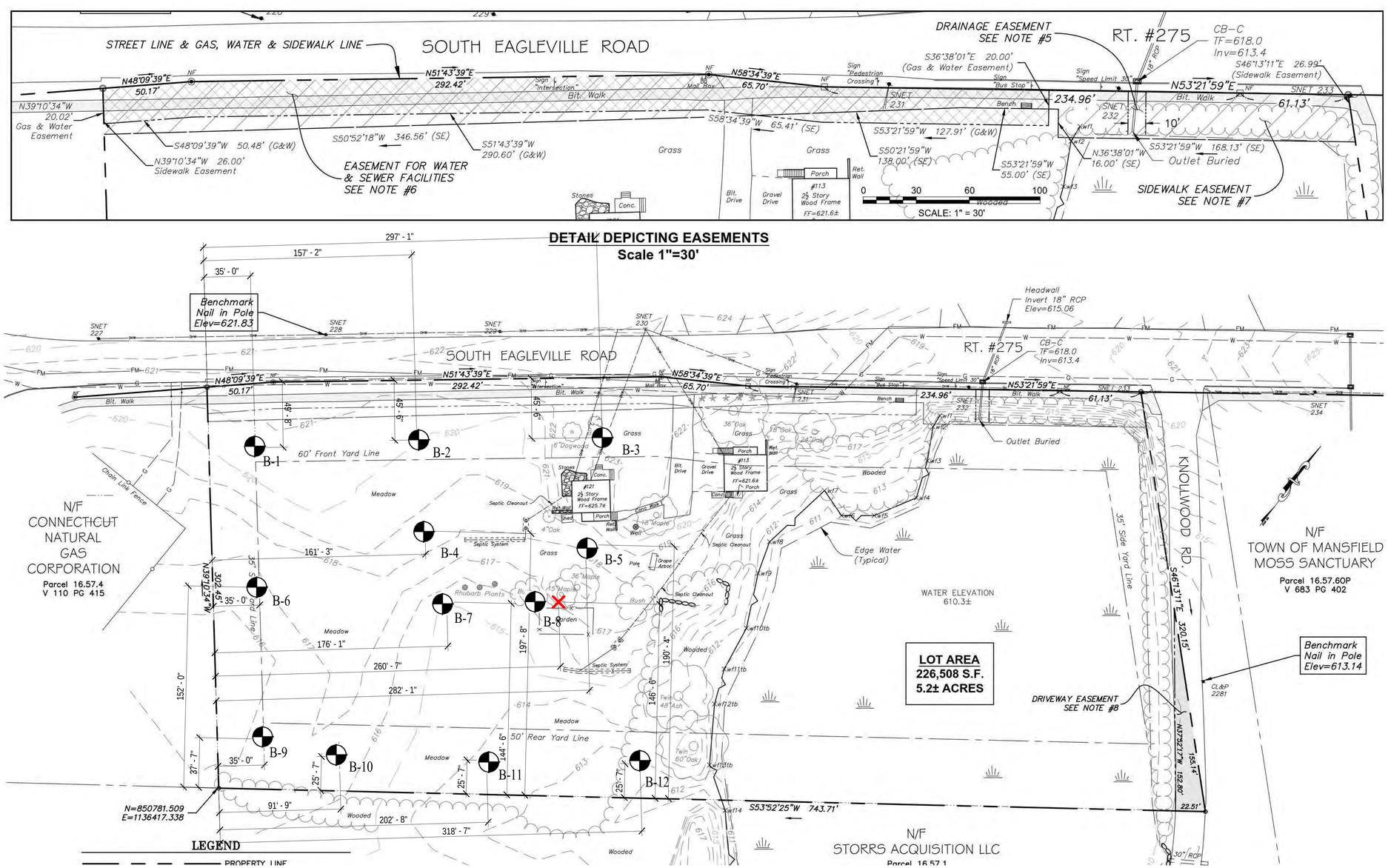
Clarence Welti Ph.D., P. E.

APPENDIX

Boring Location Plan

Boring Data

Laboratory Test Results



TEST BORING LOCATIONS
CLARENCE WELTI ASSOCIATES, INC.
9/26/19

1 A1.1 CONCEPTUAL SITE PLAN
SCALE: 1" = 30'-0"

PARKING

(73) REGULAR SPACES
(8) ACCESSIBLE SPACES

(81) TOTAL SPACES

81 SPACES/ 42 DWELLING UNITS = 1.92 SPACES/ UNIT

BUILDING HEIGHT

MAXIMUM BUILDING HEIGHT
(WITHOUT CUPOLA) = 33'-0"
(WITH CUPOLA) = 38'-6"

UNITS PER ACRE

PROPERTY AREA = 226,508 SF = +/-5.2 ACRES

UNITS/ ACRE, TOTAL SITE = 8.08

PROPERTY AREA - WETLANDS AREA = 150,720 SF = +/-3.46 ACRES

UNITS/ ACRE, TOTAL SITE - WETLANDS = 12.14

2 A1.1 DWELLING UNIT BREAKDOWN
SCALE: 1" = 60'-0"

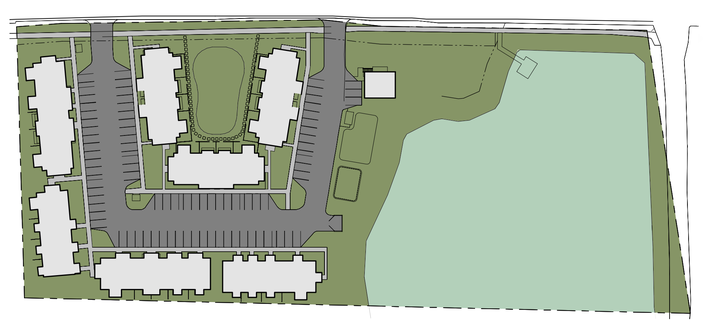
LEGEND

- 1 BED
- 2 BED
- 3 BED

(A) = ACCESSIBLE GROUND FLOOR UNIT

ACCESSIBLE & 1 BED UNITS ARE 1 STORY/ STACKED.
ALL OTHER UNITS ARE 2 STORIES

PROJECT NORTH



TOTAL PROPERTY AREA = 226,508 SF
BLDG. COVERAGE AREA = 32,620 SF
COVERAGE % = 14.40%

3 A1.1 SITE COVERAGE PLAN
SCALE: 1" = 80'-0"

UNIT BREAKDOWN

SOUTH EAGLEVILLE RD. HOUSING
MANSFIELD NON-PROFIT HOUSING DEVELOPMENT CORP.

UNIT TYPE	UNIT QTY.	BEDS		BATHS		1/2 BATHS		NET AREA	
		PER UNIT	TOTAL	PER UNIT	TOTAL	PER UNIT	TOTAL	PER UNIT	TOTAL
1 BEDROOM - TYPE #1	6	1	6	1	6	0	0	706	4,236
1 BEDROOM - TYPE #2	8	1	8	1	8	0	0	780	6,240
1 BEDROOM - TYPE #3	1	1	1	1	1	0	0	780	780
1 BEDROOM - TYPE #4	1	1	1	1	1	0	0	750	750
1 BEDROOM - ACCESSIBLE	2	1	2	1	2	0	0	706	1,412
2 BEDROOM - TYPE #1	12	2	24	1	12	1	12	1,045	12,540
2 BEDROOM - TYPE #2 (ACCESSIBLE)	2	2	4	1	2	0	0	980	1,960
2 BEDROOM - TYPE #3	2	2	4	1	2	0	0	1,060	2,120
2 BEDROOM - EXISTING BUILDING	1	2	2	1	1	1	1	1,200	1,200
3 BEDROOM - TYPE #1	6	3	18	2	12	0	0	1,260	7,560
3 BEDROOM - TYPE #2 (ACCESSIBLE)	1	3	3	2	2	0	0	1,400	1,400
TOTAL	42		73		49		13		40,198

S. EAGLEVILLE RD. HOUSING

MANSFIELD NON-PROFIT HOUSING DEVELOPMENT CORP.

da &p dorgan architecture & planning

REVISIONS:

SHEET TITLE: SITE PLAN

PROJECT NAME: S. EAGLEVILLE RD. HOUSING

PROJECT #:

DRAWN BY:

DATE: 5/17/19

SHEET NUMBER

A1.1

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033	CLIENT MANSFIELD HOUSING AUTHORITY	PROJECT NAME PROPOSED HOUSING LOCATION 113-121 SOUTH EAGLEVILLE ROAD, MANSFIELD, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV. 620.5 | HOLE NO. **B-1**

GROUND WATER OBSERVATIONS
AT 10.0 FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 9/24/19
FINISH DATE 9/24/19

DEPTH	SAMPLE NO.	BLOWS/6"	DEPTH	A	STRATUM DESCRIPTION + REMARKS		ELEV.
0	1	1-2-1-10	0.0'-2.0'		TOPSOIL	0.50	620
					BR.FINE-MED.SAND, LITTLE SILT, TRACE GRAVEL		
	2	9-15-20-15	2.0'-4.0'		LIGHT BR. FINE-CRS.SAND, LITTLE SILT & GRAVEL	2.0	
	3	9-11-11-13	4.0'-6.0'				
5							615
10	4	3-3-4	10.0'-11.5'		BR.FINE SAND, LITTLE SILT	10.0	610
15	5	2-3-4	15.0'-16.5'		GREY/BR.SILT, TRACE FINE SAND	15.0	605
20	6	3-3-3	20.0'-21.5'				600
					GREY FINE-MED.SAND, SOME SILT, LITTLE GRAVEL	24.0	
25	7	60	25.0'-25.3'		BOTTOM OF BORING @ 25.4'	25.4	595
30							590
35							

LEGEND: COL. A:

SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON

PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: K. CHRISTIANA
INSPECTOR:

SHEET 1 OF 1 | HOLE NO. **B-1**

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033	CLIENT MANSFIELD HOUSING AUTHORITY	PROJECT NAME PROPOSED HOUSING LOCATION 113-121 SOUTH EAGLEVILLE ROAD, MANSFIELD, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV. 620.0 | HOLE NO. **B-2**

GROUND WATER OBSERVATIONS
AT 10.0 FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 9/24/19
FINISH DATE 9/24/19

DEPTH	SAMPLE NO.	BLOWS/6"	DEPTH	A	STRATUM DESCRIPTION + REMARKS		ELEV.
0	1	1-0-1-0	0.0'-2.0'		TOPSOIL	0.50	620
					BR.FINE-MED.SAND, SOME SILT, TRACE GRAVEL		
	2	1-2-2-4	2.0'-4.0'			3.0	
					LIGHT BR.FINE SAND, LITTLE SILT		
	3	4-7-8-8	4.0'-6.0'				
5							615
						8.0	
					GREY FINE-MED.SAND, SOME SILT & GRAVEL, FEW COBBLES		
10	4	60	10.0'-10.3'				610
15	5	4-24-32	15.0'-16.5'				605
						19.5	
20					BOTTOM OF BORING @ 19.5' (AUGER REFUSAL)		600
25							595
30							590
35							585

LEGEND: COL. A:

SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON

PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: K. CHRISTIANA
INSPECTOR:

SHEET 1 OF 1 | HOLE NO. **B-2**

CLARENCE WELTI ASSOC., INC.
P.O. BOX 397
GLASTONBURY, CONN 06033

CLIENT
MANSFIELD HOUSING AUTHORITY

PROJECT NAME
PROPOSED HOUSING

LOCATION
113-121 SOUTH EAGLEVILLE ROAD, MANSFIELD, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV. 622.6

HOLE NO. **B-3**

GROUND WATER OBSERVATIONS
AT none FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 9/24/19
FINISH DATE 9/24/19

DEPTH	SAMPLE NO.	BLOWS/6"	DEPTH	A	STRATUM DESCRIPTION + REMARKS		ELEV.
0	1	1-2-4-3	0.0'-2.0'		TOPSOIL	0.50	
					BR.FINE-MED.SAND, SOME SILT, TRACE GRAVEL		
	2	2-3-2-12	2.0'-4.0'			2.5	620
					LIGHT BR.FINE-MED.SAND, LITTLE SILT, TRACE GRAVEL		
	3	10-28-60	4.0'-5.1'			4.5	
5					GREY/BR. FINE-CRS.SAND, LITTLE TO SOME SILT & GRAVEL		
							615
						9.5	
10					BOTTOM OF BORING @ 9.5' (AUGER REFUSAL)		
							610
15							
							605
20							
							600
25							
							595
30							
							590
35							

LEGEND: COL. A:
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON
PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: K. CHRISTIANA
INSPECTOR:

SHEET 1 OF 1 HOLE NO. **B-3**

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033	CLIENT MANSFIELD HOUSING AUTHORITY	PROJECT NAME PROPOSED HOUSING LOCATION 113-121 SOUTH EAGLEVILLE ROAD, MANSFIELD, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV. 618.5 | HOLE NO. **B-4**

GROUND WATER OBSERVATIONS
AT 8.0 FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 9/25/19
FINISH DATE 9/25/19

DEPTH	SAMPLE NO.	BLOWS/6"	DEPTH	A	STRATUM DESCRIPTION + REMARKS		ELEV.
0	1	1-0-1-3	0.0'-2.0'		TOPSOIL	0.57	
					BR.FINE-MED.SAND, SOME SILT, TRACE ROOTS		
	2	3-7-7-7	2.0'-4.0'				
					LIGHT BR.FINE-CRS.SAND, TRACE SILT & FINE GRAVEL	3.0	615
	3	5-6-7-8	4.0'-6.0'				
5							
							610
10	4	2-3-3	10.0'-11.5'		GREY/BR.FINE-MED.SAND, LITTLE SILT, TRACE GRAVEL	10.0	
							605
15	5	1-3-15	15.0'-16.5'				
					GREY FINE-MED.SAND, SOME SILT, LITTLE GRAVEL	16.0	
							600
					BOTTOM OF BORING @ 19.0' (AUGER REFUSAL)	19.0	
20							
							595
25							
							590
30							
							585
35							

LEGEND: COL. A:

SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON

PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: K. CHRISTIANA
INSPECTOR:

SHEET 1 OF 1 | HOLE NO. **B-4**

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033	CLIENT MANSFIELD HOUSING AUTHORITY	PROJECT NAME PROPOSED HOUSING LOCATION 113-121 SOUTH EAGLEVILLE ROAD, MANSFIELD, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV. 618.3 | HOLE NO. **B-5**

GROUND WATER OBSERVATIONS
AT 8.0 FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 9/26/19
FINISH DATE 9/26/19

DEPTH	SAMPLE NO.	BLOWS/6"	DEPTH	A	STRATUM DESCRIPTION + REMARKS		ELEV.
0	1	1-1-1-1	0.0'-2.0'		TOPSOIL		
					BR.FINE-CRS.SAND, LITTLE SILT, TRACE GRAVEL & ROOTS	1.0	
	2	6-10-10-8	2.0'-4.0'		BR.FINE-CRS.SAND, LITTLE GRAVEL, TRACE SILT	2.5	615
	3	6-6-9-9	4.0'-6.0'				
5					LIGHT BR.FINE-MED.SAND, TRACE SILT	5.0	
					GREY/BR. FINE-CRS.SAND, SOME SILT, LITTLE GRAVEL	8.0	610
10	4	60	10.0'-10.5'				
					BOTTOM OF BORING @ 11.0' (AUGER REFUSAL)	11.0	
							605
15							
							600
20							
							595
25							
							590
30							
							585
35							

LEGEND: COL. A:

SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON

PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: K. CHRISTIANA
INSPECTOR:

SHEET 1 OF 1 | HOLE NO. **B-5**

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033	CLIENT MANSFIELD HOUSING AUTHORITY	PROJECT NAME PROPOSED HOUSING LOCATION 113-121 SOUTH EAGLEVILLE ROAD, MANSFIELD, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV. 616.8 | HOLE NO. **B-6**

GROUND WATER OBSERVATIONS
AT 6.0 FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 9/24/19
FINISH DATE 9/24/19

DEPTH	SAMPLE NO.	BLOWS/6"	DEPTH	A	STRATUM DESCRIPTION + REMARKS		ELEV.
0	1	1-1-1-2	0.0'-2.0'		TOPSOIL	0.66	
					BR.FINE-CRS.SAND, SOME SILT, TRACE GRAVEL		615
	2	2-3-3-4	2.0'-4.0'		LIGHT BR. FINE-MED.SAND, TRACE TO LITTLE SILT	2.5	
	3	4-5-6-6	4.0'-6.0'				
5					GREY/BR.FINE SAND, TRACE TO LITTLE SILT	5.0	
							610
10	4	3-2-2	10.0'-11.5'				
							605
15	5	1-2-2	15.0'-16.5'				
							600
20	6	2-1-2	20.0'-21.5'				
							595
25	7	2-3-4	25.0'-27.0'				
					BOTTOM OF BORING @ 26.5'	26.5	590
30							
							585
35							

LEGEND: COL. A:

SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON

PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: K. CHRISTIANA
INSPECTOR:

SHEET 1 OF 1 | HOLE NO. **B-6**

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033	CLIENT MANSFIELD HOUSING AUTHORITY	PROJECT NAME PROPOSED HOUSING LOCATION 113-121 SOUTH EAGLEVILLE ROAD, MANSFIELD, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV. 615.0 | HOLE NO. **B-7**

GROUND WATER OBSERVATIONS
AT 6.0 FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 9/25/19
FINISH DATE 9/25/19

DEPTH	SAMPLE NO.	BLOWS/6"	DEPTH	A	STRATUM DESCRIPTION + REMARKS		ELEV.
0	1	1-1-1-1	0.0'-2.0'		TOPSOIL	0.56	615
					BR.FINE-MED.SAND, LITTLE TO SOME SILT		
	2	1-0-2-4	2.0'-4.0'			3.0	
					BR.FINE-CRS.SAND, LITTLE SILT		
	3	2-4-4-5	4.0'-6.0'			4.5	
5					BR. FINE-CRS.SAND, LITTLE SILT, TRACE GRAVEL		610
						8.0	
					GREY/BR.FINE-CRS.SAND, TRACE SILT & FINE GRAVEL		
10	4	1-2-2	10.0'-11.5'				605
15	5	2-3-3	15.0'-16.5'				600
20						20.0	595
	6	15-26-24	20.0'-21.5'		GREY/BR.FINE-MED.SAND, SOME SILT, LITTLE GRAVEL		
						23.0	
					BOTTOM OF BORING @ 23.0' (AUGER REFUSAL)		
25							590
30							585
35							580

LEGEND: COL. A:

SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON

PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: K. CHRISTIANA
INSPECTOR:

SHEET 1 OF 1 | HOLE NO. **B-7**

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033	CLIENT MANSFIELD HOUSING AUTHORITY	PROJECT NAME PROPOSED HOUSING LOCATION 113-121 SOUTH EAGLEVILLE ROAD, MANSFIELD, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV. 616.0 | HOLE NO. **B-8**

GROUND WATER OBSERVATIONS
AT 5.0 FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 9/26/19
FINISH DATE 9/26/19

DEPTH	SAMPLE NO.	BLOWS/6"	DEPTH	A	STRATUM DESCRIPTION + REMARKS		ELEV.
0	1	1-0-1-2	0.0'-2.0'		TOPSOIL	0.56	
					BR.FINE-CRS.SAND, SOME SILT, TRACE GRAVEL		615
	2	1-2-3-2	2.0'-4.0'			3.0	
					BR.FINE-MED.SAND, TRACE SILT		
	3	2-4-4-5	4.0'-6.0'			4.5	
5					GREY/BR.SILT, SOME FINE SAND		
							610
10	4	17-20-17	10.0'-11.5'			10.0	
					GREY/BR.FINE-CRS.SAND, SOME SILT & GRAVEL		605
						13.5	
					BOTTOM OF BORING @ 13.5' (AUGER REFUSAL)		
15							600
20							595
25							590
30							585
35							

LEGEND: COL. A:

SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON

PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: K. CHRISTIANA
INSPECTOR:

SHEET 1 OF 1 | HOLE NO. **B-8**

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033	CLIENT MANSFIELD HOUSING AUTHORITY	PROJECT NAME PROPOSED HOUSING LOCATION 113-121 SOUTH EAGLEVILLE ROAD, MANSFIELD, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV. 616.4
HOLE NO. **B-9**

GROUND WATER OBSERVATIONS
AT 4.0 FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 9/25/19
FINISH DATE 9/25/19

DEPTH	SAMPLE NO.	BLOWS/6"	DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0	1	1-1-1-1	0.0'-2.0'		TOPSOIL 0.50	
					BR.FINE-MED.SAND, SOME SILT, TRACE GRAVEL	615
	2	4-6-6-6	2.0'-4.0'		3.0	
					BR.FINE-MED. SAND, TRACE SILT & GRAVEL	
	3	4-5-5-6	4.0'-6.0'			
5					6.0	
					GREY/BR.FINE-MED.SAND, LITTLE SILT	610
10	4	2-2-2	10.0'-11.5'			
						605
15	5	3-3-4	15.0'-16.5'			
						600
20	6	2-3-3	20.0'-21.5'			
						595
25	7	4-6-7	25.0'-26.5'			
					26.5	590
					BOTTOM OF BORING @ 26.5'	
30						585
35						

LEGEND: COL. A:

SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON

PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: K. CHRISTIANA
INSPECTOR:

SHEET 1 OF 1 HOLE NO. **B-9**

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033	CLIENT MANSFIELD HOUSING AUTHORITY	PROJECT NAME PROPOSED HOUSING LOCATION 113-121 SOUTH EAGLEVILLE ROAD, MANSFIELD, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV. 616.5 | HOLE NO. **B-10**

GROUND WATER OBSERVATIONS
AT 5.0 FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 9/25/19
FINISH DATE 9/25/19

DEPTH	SAMPLE NO.	BLOWS/6"	DEPTH	A	STRATUM DESCRIPTION + REMARKS		ELEV.
0	1	1-1-0-2	0.0'-2.0'		TOPSOIL	0.56	
					BR.FINE-MED.SAND, LITTLE TO SOME SILT, TRACE GRAVEL		615
	2	1-3-5-5	2.0'-4.0'			3.0	
					BR.FINE-CRS.SAND, TRACE SILT & GRAVEL		
	3	3-5-6-6	4.0'-6.0'				
5							610
10	4	2-2-2	10.0'-11.5'		GREY/BR.FINE-MED.SAND, LITTLE SILT, TRACE GRAVEL	10.0	
							605
15	5	2-1-2	15.0'-16.5'				
							600
20	6	2-2-2	20.0'-21.5'				
							595
25	7	5-8-8	25.0'-26.5'				
					BOTTOM OF BORING @ 26.5'	26.5	590
30							585
35							

LEGEND: COL. A:

SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON

PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: K. CHRISTIANA
INSPECTOR:

SHEET 1 OF 1 | HOLE NO. **B-10**

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033	CLIENT MANSFIELD HOUSING AUTHORITY	PROJECT NAME PROPOSED HOUSING LOCATION 113-121 SOUTH EAGLEVILLE ROAD, MANSFIELD, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV. 613.7 | HOLE NO. **B-11**

GROUND WATER OBSERVATIONS
AT 3.5 FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 9/26/19
FINISH DATE 9/26/19

DEPTH	SAMPLE NO.	BLOWS/6"	DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0	1	1-2-4-5	0.0'-2.0'		TOPSOIL 0.56	
					LIGHT BR.FINE-CRS.SAND, TRACE TO LITTLE SILT	
	2	5-5-6-4	2.0'-4.0'			
					3.5	610
	3	3-4-5-4	4.0'-6.0'		BR.FINE-CRS.SAND, TRACE SILT	
5						
					9.0	605
					GREY/BR. FINE-CRS.SAND, SOME SILT, LITTLE GRAVEL, EW COBBLES	
10	4	24-32-60	10.0'-11.3'			
					14.0	600
					BOTTOM OF BORING @ 14.0' (AUGER REFUSAL)	
15						
						595
20						
						590
25						
						585
30						
						580
35						

LEGEND: COL. A:

SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON

PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: K. CHRISTIANA
INSPECTOR:

SHEET 1 OF 1 | HOLE NO. **B-11**

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033	CLIENT MANSFIELD HOUSING AUTHORITY	PROJECT NAME PROPOSED HOUSING LOCATION 113-121 SOUTH EAGLEVILLE ROAD, MANSFIELD, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV. 612.8
HOLE NO. **B-12**

GROUND WATER OBSERVATIONS
AT 2.0 FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 9/26/19
FINISH DATE 9/26/19

DEPTH	SAMPLE NO.	BLOWS/6"	DEPTH	A	STRATUM DESCRIPTION + REMARKS		ELEV.
0	1	1-3-6-5	0.0'-2.0'		TOPSOIL	0.50	
					GREY/BR.FINE-MED.SAND, TRACE TO LITTLE SILT		
	2	4-6-5-5	2.0'-4.0'				610
	3	3-3-5-5	4.0'-6.0'				
5							
							605
10	4	8-9-15	10.0'-11.5'		GREY FINE-MED.SAND, SOME SILT & GRAVEL	10.0	
							600
15	5	7-12-13	15.0'-16.5'				
							595
20					BOTTOM OF BORING @ 20.0' (AUGER REFUSAL)	20.0	
							590
25							
							585
30							
							580
35							

LEGEND: COL. A:

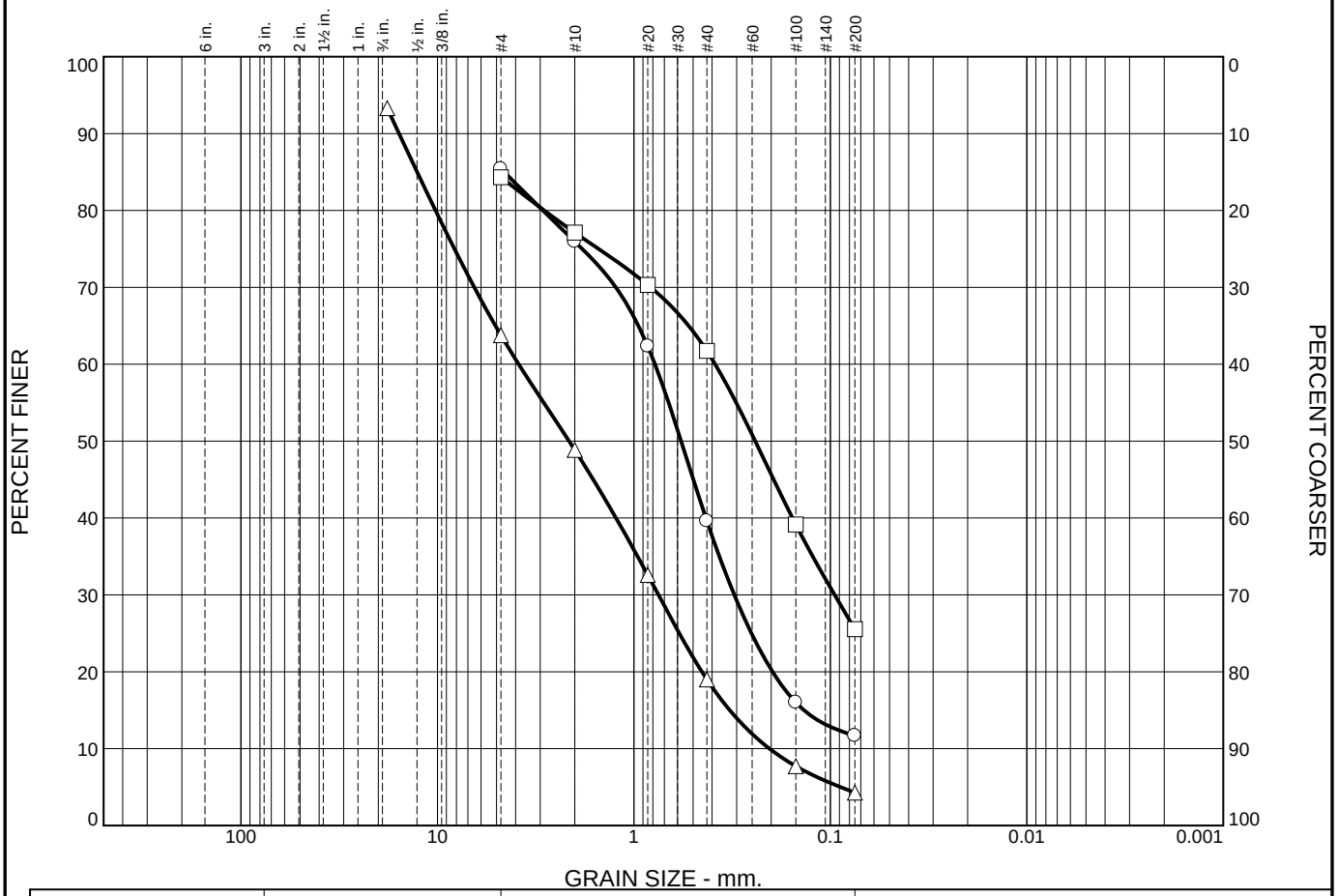
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON

PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: K. CHRISTIANA
INSPECTOR:

SHEET 1 OF 1 HOLE NO. **B-12**

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○				9.4	36.4	27.9	11.7	
□				7.2	15.4	36.2	25.5	
△				14.9	29.9	14.7	4.3	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			4.5758	0.7815	0.5748	0.3083	0.1364			
□				0.3857	0.2412	0.0952				
△			12.6836	3.8573	2.1377	0.7497	0.3251	0.2043	0.71	18.88

	Material Description	USCS	AASHTO
○			
□			
△			

Project No. **Client:** MANSFIELD HOUSING AUTHORITY

Project: PROPOSED HOUSING

○ **Source of Sample:** B-1 **Depth:** 0.50

□ **Source of Sample:** B-3 **Depth:** 2.0 **Sample Number:** 2

△ **Source of Sample:** B-5 **Depth:** 2.0 **Sample Number:** 2

Remarks:

○water content = 7.5%

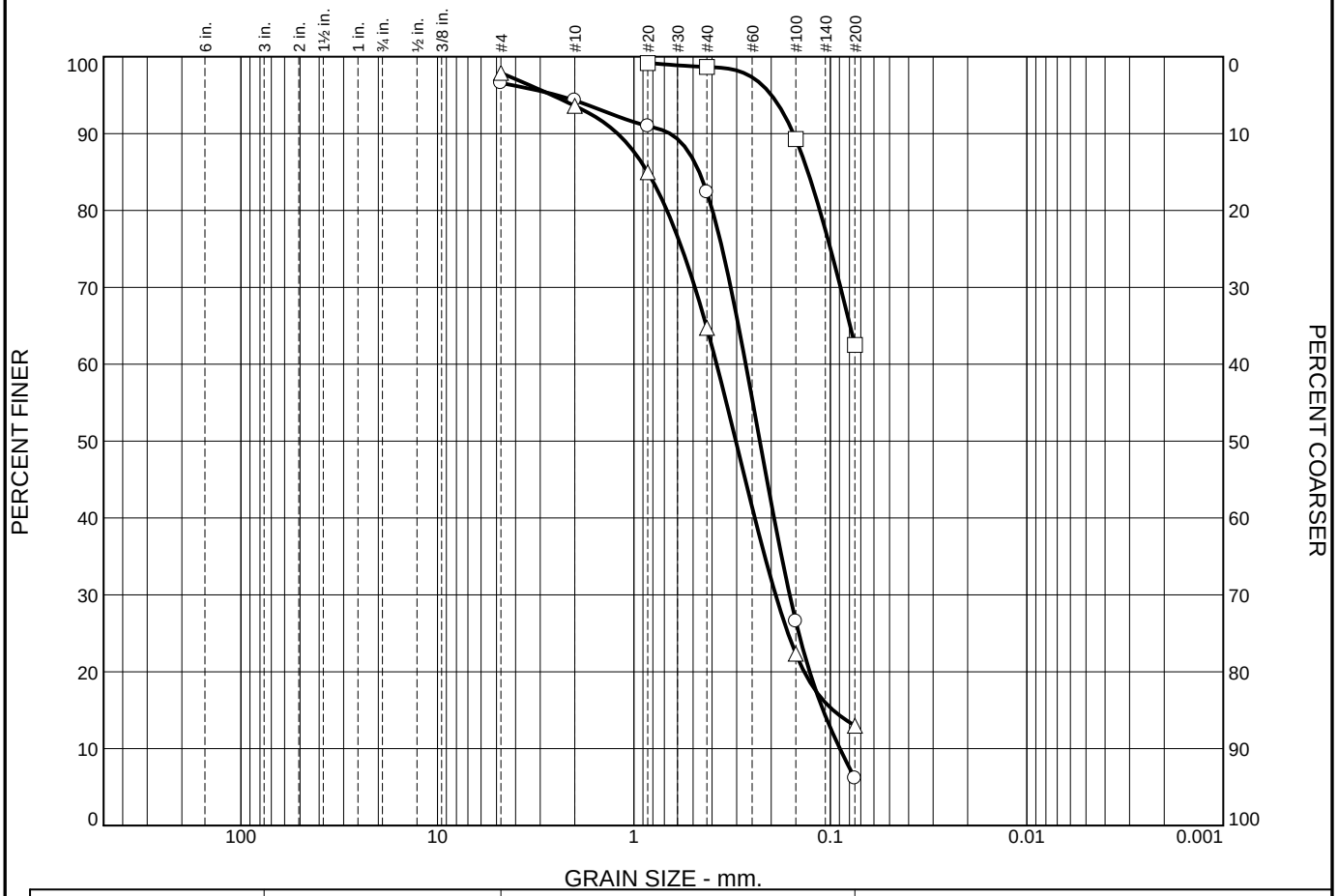
□water content = 11.3%

△water content = 3.0%

CLARENCE WELTI ASSOCIATES, INC.

Figure

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○				2.3	11.9	76.3	6.1	
□						36.2	62.5	
△				4.3	28.9	51.7	13.0	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.4646	0.2695	0.2286	0.1612	0.1090	0.0895	1.08	3.01
□			0.1301							
△			0.8513	0.3790	0.3026	0.1900	0.0968			

	Material Description	USCS	AASHTO
○			
□			
△			

Project No. **Client:** MANSFIELD HOUSING AUTHORITY

Project: PROPOSED HOUSING

○ **Source of Sample:** B-6 **Depth:** 2.0 **Sample Number:** 2

□ **Source of Sample:** B-8 **Depth:** 4.5

△ **Source of Sample:** B-10 **Depth:** 0.56

Remarks:

○water content = 8.5%

□water content = 25.6%

△water content = 11.9%

CLARENCE WELTI ASSOCIATES, INC.

Figure

Site Plan Review

Engineers
Designers
Consultants
Planners
Scientists

February 28, 2020

Mansfield Inland Wetlands Agency
C/O Jennifer Kaufman, Senior Planner & Inland Wetlands Agent
Audrey P. Beck Municipal Building
4 South Eagleville Road
Storrs Mansfield, CT 06268
Via email: kaufmanjs@mansfieldct.org

RE: **Eagleville Green, 113-121 South Eagleville Road**

Agency Members,

CME Associates, Inc. (CME) reviewed application materials submitted for the proposed house development on South Eagleville Road and provided comments letters on December 23, 2019 and February 19, 2020. On February 26, 2020, the applicant submitted the following materials in response to those letters:

Item 1 Sheet C-4.0 Grading & Drainage Plan prepared by BSC Group, dated November 25, 2019, revised February 26, 2020

Item 2 Letter, "RE: Eagleville Green, 113-121 South Eagleville Road, Response to CME Review Comments" with attachments, prepared by BSC Group, addressed to Kathleen Dorgan, Dorgan Architecture & Planning, dated February 25, 2020

Item 3 HydroCAD detention calculations, entitled "837490-HYDRO2", prepared by BSC Group, dated February 27, 2020

Those comments still outstanding are below. Original December 23 comments are in normal text. February 19 comments and responses are in *italic text*. All new comments are in **bold text**.

1. There are two drainage areas: one to the grassed area to the southwest and one to the eastern on-site wetlands. Due to the difference in times of concentration flow paths, peak flows for the two design points should be considered separately. In the provided calculations, peak flows for the two design points are combined to show an overall decrease; however, under the current design, peak flows will be increased to the eastern wetland system.
   The stormwater management design has been modified and peak flows will not be increased to the wetland system.

2. The submitted geotechnical report cites a possible high groundwater table at elevation 612 to 613 based on soil borings and wetland elevation observations. The Connecticut Stormwater Quality Manual (SQM) requires test pits to determine an accurate high groundwater elevation for use in stormwater management design. Test pits must be completed pursuant to the SQM for this site and the design must be revised accordingly including required separation from groundwater for each stormwater management system.
   Test pits were conducted at the proposed stormwater system locations and are recorded on the revised site plans. The stormwater management system has been modified according to the test pit results. The high groundwater elevation is within 2-feet of the bottom of stone for each of the three underground detention systems.
   With the outlet of the three detention systems set above the bottom of stone elevation, the designer is relying on infiltration to ensure the detention systems drain completely between each storm. If the systems do not drain completely, then the storage volume necessary to attenuate peak flows will not be available for a subsequent storm. A mounding analysis to demonstrate that the provided separation is adequate could replace the need to satisfy the SQM requirement of 3-feet of separation. Alternatively, the system could be raised to meet the groundwater separation and widened to maintain the required volume. Enlarging the footprint of the systems will also help decrease the drawdown time (See Comment 3.)
   Mounding calculations have been provided and demonstrate that the groundwater will remain at or below the bottom of the proposed stormwater systems through a 100-year storm. Two of the detention systems were modified to increase the separation from groundwater as a result of the mounding analysis.

3. Drawdown calculations must be provided for each of the four detention systems (1 basin and 3 underground systems). CME recommends verifying the soil type through test pits and utilizing USDA soil types and the associated Rawl's Rate to determine infiltration rates. Percolation tests provided to verify drawdown were

not performed at the bottom elevations of the proposed systems, additionally, pursuant to the SQM, percolation testing cannot be used in place of infiltration testing.

Drawdown calculations are provided in the revised Stormwater Management Report. The detention basin is expected to drain in 15.3 hours. Systems 2P, 3P and 4P are calculated to drain in 65.3, 70.6, and 56.8 hours, respectively. The SQM indicates underground detention facilities are typically designed to provide less than 24 hours of detention time in order to have the storage available for a subsequent storm. The Design Engineer must modify the design to ensure that these three detention systems will completely drain between storms (See Comment 2.)

Numerous sources including the 2008 Connecticut Department of Transportation Drainage Manual, the 2008 Massachusetts Stormwater Handbook, and the 2015 Rhode Island Stormwater Design and Installation Standards Manual indicate or require that systems drain within 72 hours. These manuals are more recent than the 2004 SQM. Multiple large storm events with significant rainfall rarely occur within a 72 hour time period. If multiple events were to occur within 72 hours and the detention systems became full of water, the overflow would discharge through the vegetated swales to the wetland. This overflow water would still be treated by the hydrodynamic separators prior to discharge to the vegetated swales. The wetland that receives the runoff from the site has the ability to absorb small increases in peak flow that might possibly occur due to back to back storms in a 72 hour period. The wetland would serve as a buffer between the site and downstream channelized flow, absorbing the small increase in stormflow volume and slowing the flow prior to it entering a channelized stream. The Design Engineer provided calculations indicating that the detention systems will drain within 72 hours and the 2 year peak storm flow is reduced to a 1 year peak storm flow. Based on this information we do not anticipate any impacts to the wetlands or downstream channels.

4. The Stormwater Management Report indicates that the detention basin is designed as a dry basin; however, the outlet is set 1.5-feet above the bottom of the basin. Without drawdown calculations to confirm that the basin will drain in less than 24 hours (pursuant to the SQM), the starting water surface elevation must be set at the outlet elevation in the drainage calculation for detention storage. If the basin does not drain, this storage will not be available for detention and the detention will be overestimated.

   Drawdown calculations are provided in the revised Stormwater Management Report and demonstrate that the basin will drain within 24 hours. In addition, adequate separation from groundwater has been demonstrated by test pits to ensure the basin

will not remain full of water. The basin should function for detention as designed. The Operation and Maintenance Plan After Construction must be revised to include inspections of the detention basin to ensure it is draining in less than 24-hours after a storm event.

CME recommends that inspection of the detention basin be added to the O&M Plan as noted above.

5. A detail for the two vegetated outlets must be provided and velocity calculations must be provided to verify the outlets will remain stable. If the outlets are not stable erosion may occur and sediment may enter the wetland system.

   The revised application materials indicate the outlet velocities are less than 4 feet-per-second and the outlets will remain stable with the proposed temporary matting and landscaping.

6. Provide a sediment barrier at the bottom elevation of the proposed stormwater quality basin immediately after grading to protect the basin from contamination with fine particles. The barrier must be maintained until the basin slopes are stabilized. If fine sediment eroded during construction enters the bottom of the basin, it will clog the soil pores and infiltration capacity will be significantly reduced.

   Sediment barrier has been added mid-way up the basin slopes in the revised site plans, sheet C-1.0. CME recommends locating the barrier at the bottom of basin (elevation 613). Providing the barrier is superior to mechanical cleanout in protecting any infiltration capacity compromised by eroded fines settling in the bottom of the basin.

   CME recommends that sediment barrier be added for the detention basin as noted above.

7. Pursuant to the Mansfield Zoning Regulations, the stormwater management design must reduce the peak runoff from the 2-year storm event to fifty percent of the pre-development conditions as well as provide zero increase in peak runoff for the 10-, 25-, and 100- year storm events. The SQM requires a reduction in the 2-year peak runoff to prevent downstream channel degradation. The design engineer must evaluate the downstream watercourse(s) to determine if the 2-year storm reduction is required.

   The revised application materials demonstrate the design has satisfied this requirement.

8. CME recommends that the stormwater operation and management plan be added to the plan set. This keeps the operation and management plan with the plan set and ensures that the Town and the contractor are aware of stormwater maintenance needs.
   The stormwater operation and management plan has been included on the revised site plans (Sheet G-1.0.)

9. Upon review at the field site visitation, the majority of the inland wetland delineation appears correct; however, upon close inspection of an area to the south-central portion of the property, along the rear property line, an area had a large amount of standing water at the surface with obligate wetland species identifiable. The wetland delineation was performed by Ian Cole in June of 2016. The existing flags in the field were re-staked by a land surveyor based on previous surveyed locations. This area may be an inland wetland based on subsurface soil characteristics of a wetland and the standing water at the surface. Note that the ground was not frozen, though there was an ice layer on the standing water. The soil scientist should review this area to determine if it is in fact a wetland and delineate the its limits accordingly.
   The applicant's Soil Scientist reviewed the area with standing water and concluded that the area is not a wetland and that the original wetland delineation of the site from 2016 is still valid. We have reviewed the provided report and concur with the conclusion that this area is not an inland wetland and that the grades were previously altered.

10. The report by Ms. Kaplan indicates that the wetlands on the site are established by surface runoff; however, there is a major groundwater component that exists. While there is some surface discharge into this wetland, it appears that groundwater is the primary source of water in this wetland given its size and height of some of the tussock sedges. The report does not address or classify the inland wetland soil and upland soil types on the site. Furthermore, the report does not evaluate the functions and values of the existing wetlands. This could have been done using the rationales of a standardized evaluation method (e.g. the US Army Corps of Engineers' Descriptive Approach 1995) and using her best professional judgment. These functions include: ground water recharge, flood flow alteration, sediment /shoreline stabilization, sediment/pathogen retention, nutrient removal, production export, aquatic habitat, endangered species habitat, visual quality/aesthetics, educational/scientific value, recreation- passive or active and uniqueness/historical.

The applicant's Soil Scientist reviewed the site as documented in response to Comment #9.

11. The stormwater basin is designed as a dry basin with many proposed plantings in the basin bottom. Due to the already existing high groundwater at the surface towards the rear property line, it may be appropriate to design the basins as wet basins and adjust the plantings accordingly.
    The recently completed test pits indicate that the bottom of the stormwater basin is well above high ground water; therefore, the proposed plantings will be appropriate.

12. We generally agree with Ms. Kaplan's evaluation of the potential effects on the wetlands from the proposed development. In addition to the evaluation, below are additional suggestions to enhance and protect the wetland system:

    a. Use native plantings for the trees, shrubs and groundcover in the landscape design.
       The applicant indicates that only native or adaptively native plants are included on the landscaping plan.

    b. No use of fertilizers, pesticides and/or herbicides in close proximity of the wetlands.
       The applicant agreed with this statement.

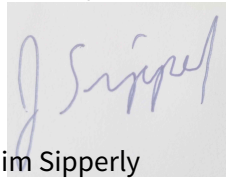
    c. That placards on fence posts be placed along the existing wetland that acknowledges the wetland resource and that no dumping of any type is allowed, including brush and leaves and other types of debris.
       The applicant indicated that placards will be considered if funding is available.

13. In conclusion, based on the proposed activities and the physical characteristics of the site we do not expect that there will be a significant adverse effect to the inland wetlands and watercourses on or off the site from the development.

14. **The applicant must submit a complete set of signed and sealed site plans and stormwater management report incorporating all the revisions submitted.**

Please contact us if you have any questions on the above comments.

Sincerely,



Jim Sipperly
Soil Scientist

Chuck Eaton, PE, LEED-AP
Civil Engineering Manager

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BSC GROUP
Transportation ▪ Energy ▪ Land Development

300 Winding Brook Drive
Glastonbury, CT 06033

Tel: 860-652-8227
800-288-8123

www.bscgroup.com

February 25, 2020

Kathleen A. Dorgan, FAIA, LEED-AP
Principal
Dorgan Architecture & Planning
10 Eastwood Road
Storrs, CT 06268

RE: Eagleville Green, 113-121 South Eagleville Road
Response to CME Review Comments

Dear Kathy:

Below are our responses to the comments prepared by CME on the site plan application documents.

Site Plan Review Comments to Planning & Zoning Commission
Dated February 19, 2020; Prepared by CME

1. There are two drainage areas: one to the grassed area to the southwest and one to the eastern on-site wetlands. Due to the difference in times of concentration flow paths, peak flows for the two design points should be considered separately. In the provided calculations, peak flows for the two design points are combined to show an overall decrease; however, under the current design, peak flows will be increased to the eastern wetland system.
   The stormwater management design has been modified and peak flows will not be increased to the wetland system.

   Response: None

2. The submitted geotechnical report cites a possible high groundwater table at elevation 612 to 613 based on soil borings and wetland elevation observations. The Connecticut Stormwater Quality Manual (SQM) requires test pits to determine an accurate high groundwater elevation for use in stormwater management design. Test pits must be completed pursuant to the SQM for this site and the design must be revised accordingly including required separation from groundwater for each stormwater management system.
   Test pits were conducted at the proposed stormwater system locations and are recorded on the revised site plans. The stormwater management system has been modified according to the test pit results. The high groundwater elevation is within

Engineers
Environmental Scientists
Custom Software Developers
Landscape Architects
Planners
Surveyors

2-feet of the bottom of stone for each of the three underground detention systems.

With the outlet of the three detention systems set above the bottom of stone elevation, the designer is relying on infiltration to ensure the detention systems drain completely between each storm. If the systems do not drain completely, then the storage volume necessary to attenuate peak flows will not be available for a subsequent storm. A mounding analysis to demonstrate that the provided separation is adequate could replace the need to satisfy the SQM requirement of 3-feet of separation. Alternatively, the system could be raised to meet the groundwater separation and widened to maintain the required volume. Enlarging the footprint of the systems will also help decrease the drawdown time (See Comment 3.)

Response: A mounding analysis was performed using the Hantush equations with the procedure outlined in the USGS Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins." The analysis was performed using the accompanying spreadsheet published by the USGS. The calculations and results of the analysis have been provided as attachments to these response to comments.

The analysis demonstrated that detention basins P1 and P3 will not be inundated by groundwater at the end of their respective drawdown periods. Basins P2 and P4 have been revised accordingly to demonstrate the same. The attached calculations and results show the revised basin conditions. The Grading and Drainage Plan will be revised to show the new basin elevations and sizes correctly.

3. Drawdown calculations must be provided for each of the four detention systems (1 basin and 3 underground systems). CME recommends verifying the soil type through test pits and utilizing USDA soil types and the associated Rawl's Rate to determine infiltration rates. Percolation tests provided to verify drawdown were not performed at the bottom elevations of the proposed systems, additionally, pursuant to the SQM, percolation testing cannot be used in place of infiltration testing.
Drawdown calculations are provided in the revised Stormwater Management Report. The detention basin is expected to drain in 15.3 hours. Systems 2P, 3P and 4P are calculated to drain in 65.3, 70.6, and 56.8 hours, respectively. The SQM indicates underground detention facilities are typically designed to provide less than 24 hours of detention time in order to have the storage available for a subsequent storm. The Design Engineer must modify the design to ensure that these three detention systems will completely drain between storms (See Comment 2.)

Response: While the Water Quality Manual states that basins are typically designed to drain within 24 hours, the ConnDOT Drainage Manual explicitly requires detention basins to drain within a 72-hour period. We feel we have adequately demonstrated compliance with this requirement.

4. The Stormwater Management Report indicates that the detention basin is designed as a dry basin; however, the outlet is set 1.5-feet above the bottom of the basin. Without drawdown calculations to confirm that the basin will drain in less than 24 hours (pursuant to the SQM), the starting water surface elevation must be set at the outlet elevation in the drainage calculation for detention storage. If the basin does not drain, this storage will not be available for detention and the detention will be overestimated.
   Drawdown calculations are provided in the revised Stormwater Management Report and demonstrate that the basin will drain within 24 hours. In addition, adequate separation from groundwater has been demonstrated by test pits to ensure the basin will not remain full of water. The basin should function for detention as designed. The Operation and Maintenance Plan After Construction must be revised to include inspections of the detention basin to ensure it is draining in less than 24-hours after a storm event.

   Response: A note will be added to the O&M Notes on the Plans.

5. The outlet elevation of the detention basin is noted as 614.5 on the site plans, this must be properly modeled in the HydroCAD calculations.
   The applicant's response clarified that the HydroCAD calculations for this outlet are based on Outlet Control Structure No. 1, the modeling appears to be accurate for this.

   Response: None

6. The outlet control structure table on Sheet C-6.1 indicates a 15-inch diameter for Orifice B in Outlet Control Structure #1. It appears this information is for the overflow invert. The Design Engineer must review and revise the table as necessary.
   The revised site plans corrected the Outlet Control Structure table.

   Response: None

7. A detail for the two vegetated outlets must be provided and velocity calculations should be provided to verify the outlets will remain stable. If the outlets are not stable erosion may occur and sediment may enter the wetland system.
   The revised application materials indicate the outlet velocities are less than 4 feet-per-second and the outlets will remain stable with the proposed temporary matting and landscaping.

Response: None

8. Additional details including maintenance manholes must be shown on the plans for the three underground detention systems. High level overflow grates for Systems 2P and 3P must be provided on the plans and details. If these details are not shown, the system may not be constructed correctly and function as designed.
Inspection ports have been included for the detention systems on the revised site plans. The designer connected Detention Systems 3P and 4P to the proposed outlets rather than providing high level overflow grates. The Operation and Maintenance Plan After Construction must be revised to include inspection of the detention systems to ensure they are draining in less than 24-hours after a storm event.

Response: A note will be added to the O&M Notes on the Plans.

9. The design engineer must provide a detail of Detention System 2P (36-inch corrugated metal pipe) to verify the drainage calculations and ensure the system is properly constructed. Additionally, CME recommends that plastic pipe be utilized in the detention system to avoid salt corrosion damage. The plastic pipe will have a considerably longer service life than metal pipe.
A detail for system 2P has been included on the revised site plans and the proposed pipe material is perforated HDPE.

Response: None

10. The design engineer must review and revise the plans and calculations for the bottom elevation of Detention System 2P. The plans indicate a bottom elevation of 611.75 and the report includes a bottom stone elevation of 611.25. The system detail states a minimum 9-inches of stone below the system.
The revised site plans clarify the elevations of Detention System 2P, the elevations now match the provided calculations.

Response: None

11. The Pre- and Post-Development Comparison table in the Stormwater Management Report contains addition errors in the Total Site rows, Proposed conditions column. The design engineer must review and revise as required.
The designer clarified that the rows are not strictly additive due to different times of concentrations.

Response: None

12. The Design Engineer must review and revise the invert elevations for the drainage

manhole downstream of Outlet Control Structure #1. It appears too many inverts are listed for this structure and the pipe to the vegetated outlet is sloped in reverse.
The invert elevations for Outlet Control Structure #1 have been modified in the revised site plans and the outlet pipe is now correctly sloped.

Response: None

13. Any proposed free-standing signs must be included on the site plans to ensure there are no sight line conflicts from the driveways.
The applicant indicates no signage is proposed for the site.

Response: None

14. Provide a sediment barrier at the bottom elevation of the proposed stormwater quality basin immediately after grading to protect the basin from contamination with fine particles. The barrier must be maintained until the basin slopes are stabilized. If fine sediment eroded during construction enters the bottom of the basin, it will clog the soil pores and infiltration capacity will be significantly reduced.
Sediment barrier has been added mid-way up the basin slopes in the revised site plans, sheet C-1.0. CME recommends locating the barrier at the bottom of basin (elevation 613). Providing the barrier is superior to mechanical cleanout in protecting any infiltration capacity compromised by eroded fines settling in the bottom of the basin.

Response: The E&S Plan will be modified accordingly.

15. The gas line on the abutting parcel(s) should be included on the site plans to ensure that no conflicts with proposed infrastructure exist.
The applicant indicates that there are no conflicts between the gas easement and the proposed drainage easement.

Response: None

16. The proposed landscaping plan may limit location options for stockpiling snow. Snow stockpile location(s) should be shown on the site plans.
The proposed snow stockpile locations included on the revised site plans do not appear to account for proposed landscaping in those areas.

Response: Snow stockpile areas will be revised to eliminate conflicts with landscaping.

17. The Sewer Design Notes on Sheet G-1.0 reference 42 bedrooms in the calculations for pump chamber sizing; however, it appears the development will have 73

bedrooms. The design engineer must review and revise this calculation must be updated.
The calculation for pump chamber sizing has been revised and the pump chamber size updated on the revised site plans.

Response: None

18. Pursuant to the Mansfield Zoning Regulations, the stormwater management design must reduce the peak runoff from the 2-year storm event to fifty percent of the pre-development conditions as well as provide zero increase in peak runoff for the 10-, 25-, and 100- year storm events. The SQM requires a reduction in the 2-year peak runoff to prevent downstream channel degradation. The design engineer must evaluate the downstream watercourse to determine if the 2-year storm reduction is required.
The revised application materials demonstrate the design has satisfied this requirement.

Response: None

19. The proposed pump station must meet the Separation Distances for stormwater pipes & structures outlined by Table 1 of the CT Public Health Code. Watertight pipe can be utilized to reduce these separation distances however, the code does not allow groundwater to be collected in the stormwater system. The proposed perforated pipes are subject to larger separation distances from the pump station.
The proposed pump station has been relocated adjacent to Building #2 in the revised site plans. The majority of the separation distances for stormwater are now met; however, CB-1 must be constructed in a watertight manner with rubber joint seals and watertight pipe connection seals. The Design Engineer must provide a call-out on the plan for this requirement.

Response: A note will be added to the Plans.

20. CME recommends that the stormwater operation and management plan be added to the plan set. This keeps the operation and management plan with the plan set and ensures that the Town and the contractor are aware of stormwater management needs.
The stormwater operation and management plan has been included on the revised site plans (Sheet G-1.0.)

Response: None

21. The Plan revisions satisfied the comments made by CME (December 23, 2019) and Linda Painter as to the details of the Affordability Plan, but we

remind the Commission that, when ultimately acting upon the application, it should include provisions in the terms of approval noting:

a. The specific entity at the Town to whom the annual report is to be submitted.

b. The Mansfield Housing Authority should be in possession of the "housing software program" as cited by the Plan.

Response: Not applicable to Applicant

Site Plan Review Comments to Inland Wetlands Commission
Dated February 19, 2020; Prepared by CME

1. There are two drainage areas: one to the grassed area to the southwest and one to the eastern on-site wetlands. Due to the difference in times of concentration flow paths, peak flows for the two design points should be considered separately. In the provided calculations, peak flows for the two design points are combined to show an overall decrease; however, under the current design, peak flows will be increased to the eastern wetland system.
   The stormwater management design has been modified and peak flows will not be increased to the wetland system.

   Response: None

2. The submitted geotechnical report cites a possible high groundwater table at elevation 612 to 613 based on soil borings and wetland elevation observations. The Connecticut Stormwater Quality Manual (SQM) requires test pits to determine an accurate high groundwater elevation for use in stormwater management design. Test pits must be completed pursuant to the SQM for this site and the design must be revised accordingly including required separation from groundwater for each stormwater management system.
   Test pits were conducted at the proposed stormwater system locations and are recorded on the revised site plans. The stormwater management system has been modified according to the test pit results. The high groundwater elevation is within 2-feet of the bottom of stone for each of the three underground detention systems.

   With the outlet of the three detention systems set above the bottom of stone elevation, the designer is relying on infiltration to ensure the detention systems drain completely between each storm. If the systems do not drain completely, then the storage volume necessary to attenuate peak flows will not be available for a subsequent storm. A mounding analysis to demonstrate that the provided separation

is adequate could replace the need to satisfy the SQM requirement of 3-feet of separation. Alternatively, the system could be raised to meet the groundwater separation and widened to maintain the required volume. Enlarging the footprint of the systems will also help decrease the drawdown time (See Comment 3.)

Response: A mounding analysis was performed using the Hantush equations with the procedure outlined in the USGS Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins." The analysis was performed using the accompanying spreadsheet published by the USGS. The calculations and results of the analysis have been provided as attachments to these response to comments.

The analysis demonstrated that detention basins P1 and P3 will not be inundated by groundwater at the end of their respective drawdown periods. Basins P2 and P4 have been revised accordingly to demonstrate the same. The attached calculations and results show the revised basin conditions. The Grading and Drainage Plan will be revised to show the new basin elevations and sizes correctly.

3. Drawdown calculations must be provided for each of the four detention systems (1 basin and 3 underground systems). CME recommends verifying the soil type through test pits and utilizing USDA soil types and the associated Rawl's Rate to determine infiltration rates. Percolation tests provided to verify drawdown were not performed at the bottom elevations of the proposed systems, additionally, pursuant to the SQM, percolation testing cannot be used in place of infiltration testing.
Drawdown calculations are provided in the revised Stormwater Management Report. The detention basin is expected to drain in 15.3 hours. Systems 2P, 3P and 4P are calculated to drain in 65.3, 70.6, and 56.8 hours, respectively. The SQM indicates underground detention facilities are typically designed to provide less than 24 hours of detention time in order to have the storage available for a subsequent storm. The Design Engineer must modify the design to ensure that these three detention systems will completely drain between storms (See Comment 2.)

   Response: While the Water Quality Manual states that basins are typically designed to drain within 24 hours, the ConnDOT Drainage Manual explicitly requires detention basins to drain within a 72-hour period. We feel we have adequately demonstrated compliance with this requirement.

4. The Stormwater Management Report indicates that the detention basin is designed as a dry basin; however, the outlet is set 1.5-feet above the bottom of the basin. Without drawdown calculations to confirm that the basin will drain in less than 24 hours (pursuant to the SQM), the starting water surface elevation must be set at the outlet elevation in the drainage calculation for detention storage. If the basin does not drain, this storage will not be available for detention and the detention will be

overestimated.
Drawdown calculations are provided in the revised Stormwater Management Report and demonstrate that the basin will drain within 24 hours. In addition, adequate separation from groundwater has been demonstrated by test pits to ensure the basin will not remain full of water. The basin should function for detention as designed. The Operation and Maintenance Plan After Construction must be revised to include inspections of the detention basin to ensure it is draining in less than 24-hours after a storm event.

Response: A note will be added to the O&M Notes on the Plans.

5. A detail for the two vegetated outlets must be provided and velocity calculations must be provided to verify the outlets will remain stable. If the outlets are not stable erosion may occur and sediment may enter the wetland system.
The revised application materials indicate the outlet velocities are less than 4 feet-per-second and the outlets will remain stable with the proposed temporary matting and landscaping.

Response: None

6. Provide a sediment barrier at the bottom elevation of the proposed stormwater quality basin immediately after grading to protect the basin from contamination with fine particles. The barrier must be maintained until the basin slopes are stabilized. If ine sediment eroded during construction enters the bottom of the basin, it will clog the soil pores and infiltration capacity will be significantly reduced.
Sediment barrier has been added mid-way up the basin slopes in the revised site plans, sheet C-1.0. CME recommends locating the barrier at the bottom of basin (elevation 613). Providing the barrier is superior to mechanical cleanout in protecting any infiltration capacity compromised by eroded fines settling in the bottom of the basin.

Response: The E&S Plan will be revised accordingly.

7. Pursuant to the Mansfield Zoning Regulations, the stormwater management design must reduce the peak runoff from the 2-year storm event to fifty percent of the pre-development conditions as well as provide zero increase in peak runoff for the 10-, 25-, and 100- year storm events. The SQM requires a reduction in the 2-year peak runoff to prevent downstream channel degradation. The design engineer must evaluate the downstream watercourse(s) to determine if the 2-year storm reduction is required.
The revised application materials demonstrate the design has satisfied this requirement.

Response: None

8. CME recommends that the stormwater operation and management plan be added to the plan set. This keeps the operation and management plan with the plan set and ensures that the Town and the contractor are aware of stormwater maintenance needs. ***The stormwater operation and management plan has been included on the revised site plans (Sheet G-1.0.)***

   Response: None

9. Upon review at the field site visitation, the majority of the inland wetland delineation appears correct; however, upon close inspection of an area to the south-central portion of the property, along the rear property line, an area had a large amount of standing water at the surface with obligate wetland species identifiable. The wetland delineation was performed by Ian Cole in June of 2016. The existing flags in the field were re-staked by a land surveyor based on previous surveyed locations. This area may be an inland wetland based on subsurface soil characteristics of a wetland and the standing water at the surface. Note that the ground was not frozen, though there was an ice layer on the standing water. The soil scientist should review this area to determine if it is in fact a wetland and delineate the its limits accordingly.
   The applicant's Soil Scientist reviewed the area with standing water and concluded that the area is not a wetland and that the original wetland delineation of the site from 2016 is still valid. We have reviewed the provided report and concur with the conclusion that this area is not an inland wetland and that the grades were previously altered.

   Response: None

10. The report by Ms. Kaplan indicates that the wetlands on the site are established by surface runoff; however, there is a major groundwater component that exists. While there is some surface discharge into this wetland, it appears that groundwater is the primary source of water in this wetland given its size and height of some of the tussock sedges. The report does not address or classify the inland wetland soil and upland soil types on the site. Furthermore, the report does not evaluate the functions and values of the existing wetlands. This could have been done using the rationales of a standardized evaluation method (e.g. the US Army Corps of Engineers' escriptive Approach 1995) and using her best professional judgment. These functions include: ground water recharge, flood flow alteration, sediment/shoreline stabilization, sediment/pathogen retention, nutrient removal, production export, aquatic habitat, endangered species habitat, visual quality/aesthetics, educational/scientific value, recreation- passive or active and uniqueness/historical.
    The applicant's Soil Scientist reviewed the site as documented in response to Comment #9.

Response: None

11. The stormwater basin is designed as a dry basin with many proposed plantings in the basin bottom. Due to the already existing high groundwater at the surface towards the rear property line, it may be appropriate to design the basins as wet basins and adjust the plantings accordingly.
    The recently completed test pits indicate that the bottom of the stormwater basin is well above high ground water; therefore, the proposed plantings will be appropriate.

    Response: None

12. We generally agree with Ms. Kaplan's evaluation of the potential effects on the wetlands from the proposed development. In addition to the evaluation, below are additional suggestions to enhance and protect the wetland system:
    a. Use native plantings for the trees, shrubs and groundcover in the landscape design.
       The applicant indicated that only native or adaptively native plants are included in the landscaping plan.
    b. No use of fertilizers, pesticides and/or herbicides in close proximity of the wetlands.
       The applicant agreed with this statement.
    c. That placards on fence posts be placed along the existing wetland that acknowledges the wetland resource and that no dumping of any type is allowed, including brush and leaves and other types of debris.
       The applicant indicated that placards will be considered if funding is available.

    Response: None

13. In conclusion, based on the proposed activities and the physical characteristics of the site we do not expect that there will be a significant adverse effect to the inland wetlands and watercourses on or off the site from the development.

    Response: None

Very truly yours,
BSC Group-Connecticut, Inc.

Robert S, Newton, PE, LEED AP

This spreadsheet will calculate the height of a groundwater mound beneath a stormwater infiltration basin. More information can be found in the U.S. Geological Survey Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins".

The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated.
Cells highlighted in yellow are values that can be changed by the user. Cells highlighted in red are output values based on user-specified inputs. The user MUST click the blue "Re-Calculate Now" button each time ANY of the user-specified inputs are changed otherwise necessary iterations to converge on the correct solution will not be done and values shown will be incorrect. Use consistent units for all input values (for example, feet and days)

Input Values

use consistent units (e.g. feet & days **or** inches & hours)

2.0400	*R*	**Recharge (infiltration) rate (feet/day)**
0.210	Sy	**Specific yield, Sy (dimensionless, between 0 and 1)**
20.40	K	**Horizontal hydraulic conductivity, Kh (feet/day)***
8.800	x	**1/2 length of basin (x direction, in feet)**
29.000	y	**1/2 width of basin (y direction, in feet)**
0.640	t	**duration of infiltration period (days)**
25.000	hi(0)	**initial thickness of saturated zone (feet)**

Conversion Table

inch/hour	feet/day
0.67	1.33
2.00	4.00

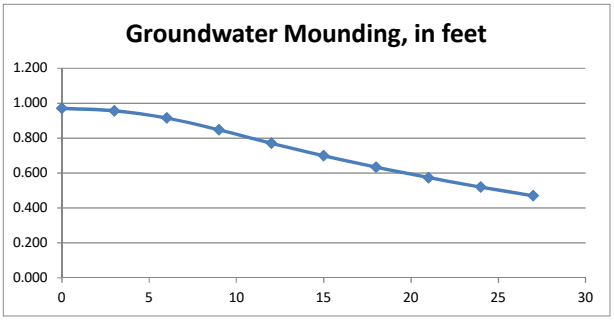
hours	days
36	1.50

In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).

25.970	h(max)	**maximum thickness of saturated zone (beneath center of basin at end of infiltration period)**
0.970	Δh(max)	**maximum groundwater mounding (beneath center of basin at end of infiltration period)**

Ground-water Mounding, in feet	Distance from center of basin in x direction, in feet
0.970	0
0.956	3
0.915	6
0.847	9
0.770	12
0.699	15
0.634	18
0.574	21
0.520	24
0.470	27

Re-Calculate Now



Disclaimer

This spreadsheet solving the Hantush (1967) equation for ground-water mounding beneath an infiltration basin is made available to the general public as a convenience for those wishing to replicate values documented in the USGS Scientific Investigations Report 2010-5102 "Groundwater mounding beneath hypothetical stormwater infiltration basins" or to calculate values based on user-specified site conditions. Any changes made to the spreadsheet (other than values identified as user-specified) after transmission from the USGS could have unintended, undesirable consequences. These consequences could include, but may not be limited to: erroneous output, numerical instabilities, and violations of underlying assumptions that are inherent in results presented in the accompanying USGS published report. The USGS assumes no responsibility for the consequences of any changes made to the spreadsheet. If changes are made to the spreadsheet, the user is responsible for documenting the changes and justifying the results and conclusions.

STORMWATER BASIN P1

Type:	Above Ground	
Overall Width, 2X:	17.5	ft; dimension parallel to assumed gw movement
Overall Length, 2Y:	58.0	ft; dimension perpendicular to assumed gw movement
Bottom Elevation:	613.00	ft
GW Elevation:	611.83	ft
Rawl's Rate:	1.02	in/hr; value based on observed soil type
Time to Empty:	15.3	hr; drawdown time

Hantush Equation Input Variables

Recharge Rate, R:	2.04	ft/day; converted from Rawl's Rate
Specific Yield, S_y:	0.21	; dimensionless, assumed for Fine Sand
Horizontal Hydraulic Conductivity, K_h:	20.40	ft/day
1/2 Width of Basin, X:	8.8	ft
1/2 Length of Basin, Y:	29.0	ft
Duration of Infiltration, t:	0.64	days
Initial thickness of saturated zone, $h_i(0)$:	25	ft; value assumed from Surficial Aquifer Potential Map of CT and reconciled with average depths of site borings

Hantush Equation Results and Analysis

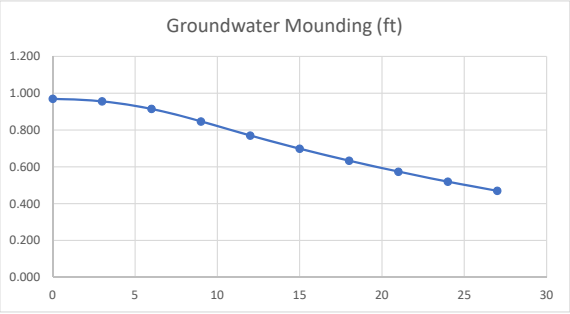
Datum Depth:	26.17	ft; measured from bottom elevation of basin
Datum Elevation:	586.83	ft
Maximum thickness of saturated zone:	25.97	ft; input from Hantush Spreadsheet Calculator
Maximum GW mounding:	0.97	ft; input from Hantush Spreadsheet Calculator

Therefore;

GW Mounding Elevation:	612.80	ft
Basin Bottom:	613.00	ft
Available Freeboard:	**0.20**	ft

Graphical Groundwater Mounding

y	x
0.970	0
0.956	3
0.915	6
0.847	9
0.770	12
0.699	15
0.634	18
0.574	21
0.520	24
0.470	27



Specific yields, in percent, of various materials

[Rounded to nearest whole percent]

Material	Number of determinations	Specific yield		
		Maximum	Minimum	Average
Clay	15	5	0	2
Silt	16	19	3	8
Sandy clay	12	12	3	7
Fine sand	17	28	10	21
Medium sand	17	32	15	26
Coarse sand	17	35	20	27
Gravelly sand	15	35	20	25
Fine gravel	17	35	21	25
Medium gravel	14	26	13	23
Coarse gravel	14	26	12	22

This spreadsheet will calculate the height of a groundwater mound beneath a stormwater infiltration basin. More information can be found in the U.S. Geological Survey Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins".

The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated.
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use consistent units (e.g. feet & days **or** inches & hours)

Input Values

0.5400	***R***	**Recharge (infiltration) rate (feet/day)**
0.210	**Sy**	**Specific yield, Sy (dimensionless, between 0 and 1)**
5.40	**K**	**Horizontal hydraulic conductivity, Kh (feet/day)***
18.300	**x**	**1/2 length of basin (x direction, in feet)**
81.000	**y**	**1/2 width of basin (y direction, in feet)**
1.520	**t**	**duration of infiltration period (days)**
25.000	**hi(0)**	**initial thickness of saturated zone (feet)**

Conversion Table

inch/hour	**feet/day**
0.67	1.33
2.00	4.00

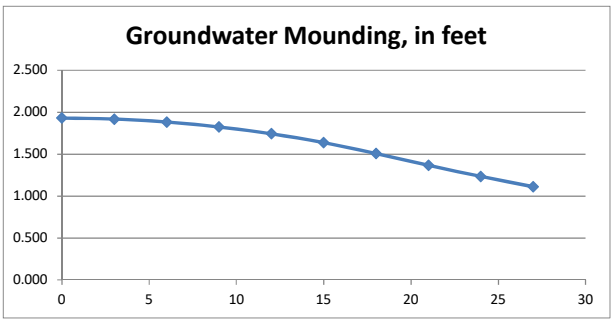
hours	**days**
36	1.50

In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).

26.929	**h(max)**	**maximum thickness of saturated zone (beneath center of basin at end of infiltration period)**
1.929	**Δh(max)**	**maximum groundwater mounding (beneath center of basin at end of infiltration period)**

Ground-water Mounding, in feet	**Distance from center of basin in x direction, in feet**
1.929	**0**
1.917	**3**
1.883	**6**
1.824	**9**
1.742	**12**
1.636	**15**
1.506	**18**
1.366	**21**
1.234	**24**
1.111	**27**

Re-Calculate Now



Disclaimer

This spreadsheet solving the Hantush (1967) equation for ground-water mounding beneath an infiltration basin is made available to the general public as a convenience for those wishing to replicate values documented in the USGS Scientific Investigations Report 2010-5102 "Groundwater mounding beneath hypothetical stormwater infiltration basins" or to calculate values based on user-specified site conditions. Any changes made to the spreadsheet (other than values identified as user-specified) after transmission from the USGS could have unintended, undesirable consequences. These consequences could include, but may not be limited to: erroneous output, numerical instabilities, and violations of underlying assumptions that are inherent in results presented in the accompanying USGS published report. The USGS assumes no responsibility for the consequences of any changes made to the spreadsheet. If changes are made to the spreadsheet, the user is responsible for documenting the changes and justifying the results and conclusions.

STORMWATER BASIN P2

Type:	Underground	
Overall Width, 2X:	36.5	ft; dimension parallel to assumed gw movement
Overall Length, 2Y:	162.0	ft; dimension perpendicular to assumed gw movement
Bottom Elevation:	614.25	ft
GW Elevation:	611.75	ft
Rawl's Rate:	0.27	in/hr; value based on observed soil type
Time to Empty:	36.4	hr; drawdown time

Hantush Equation Input Variables

Recharge Rate, R:	0.54	ft/day; converted from Rawl's Rate
Specific Yield, S_y:	0.21	; dimensionless, assumed for Fine Sand
Horizontal Hydraulic Conductivity, K_h:	5.40	ft/day
1/2 Width of Basin, X:	18.3	ft
1/2 Length of Basin, Y:	81.0	ft
Duration of Infiltration, t:	1.52	days
Initial thickness of saturated zone, $h_i(0)$:	25	ft; value assumed from Surficial Aquifer Potential Map of CT and reconciled with average depths of site borings

Hantush Equation Results and Analysis

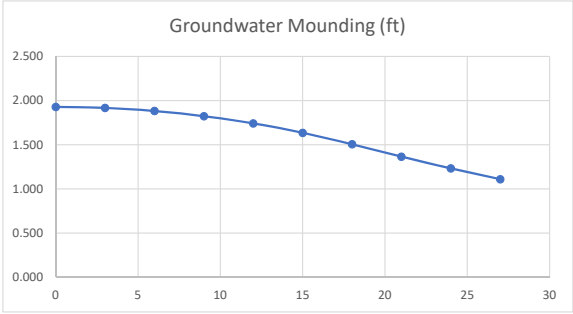
Datum Depth:	27.50	ft; measured from bottom elevation of basin
Datum Elevation:	586.75	ft
Maximum thickness of saturated zone:	26.93	ft; input from Hantush Spreadsheet Calculator
Maximum GW mounding:	1.93	ft; input from Hantush Spreadsheet Calculator

Therefore;

GW Mounding Elevation:	613.68	ft
Basin Bottom:	614.25	ft
Available Freeboard:	**0.57**	ft

Graphical Groundwater Mounding

y	x
1.929	0
1.917	3
1.883	6
1.824	9
1.742	12
1.636	15
1.506	18
1.366	21
1.234	24
1.111	27



Specific yields, in percent, of various materials

[Rounded to nearest whole percent]

Material	Number of determinations	Specific yield		
		Maximum	Minimum	Average
Clay	15	5	0	2
Silt	16	19	3	8
Sandy clay	12	12	3	7
Fine sand	17	28	10	21
Medium sand	17	32	15	26
Coarse sand	17	35	20	27
Gravelly sand	15	35	20	25
Fine gravel	17	35	21	25
Medium gravel	14	26	13	23
Coarse gravel	14	26	12	22

This spreadsheet will calculate the height of a groundwater mound beneath a stormwater infiltration basin. More information can be found in the U.S. Geological Survey Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins".

The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated.
Cells highlighted in yellow are values that can be changed by the user. Cells highlighted in red are output values based on user-specified inputs. The user MUST click the blue "Re-Calculate Now" button each time ANY of the user-specified inputs are changed otherwise necessary iterations to converge on the correct solution will not be done and values shown will be incorrect. Use consistent units for all input values (for example, feet and days)

use consistent units (e.g. feet & days **or** inches & hours)

Input Values

2.0400	*R*	**Recharge (infiltration) rate (feet/day)**
0.210	Sy	**Specific yield, Sy (dimensionless, between 0 and 1)**
20.40	K	**Horizontal hydraulic conductivity, Kh (feet/day)***
9.800	x	**1/2 length of basin (x direction, in feet)**
15.700	y	**1/2 width of basin (y direction, in feet)**
2.940	t	**duration of infiltration period (days)**
25.000	hi(0)	**initial thickness of saturated zone (feet)**

Conversion Table

inch/hour	**feet/day**
0.67	1.33
2.00	4.00

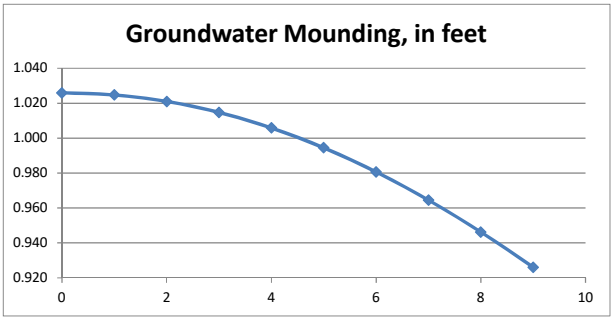
hours	**days**
36	1.50

In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).

26.026	h(max)	**maximum thickness of saturated zone (beneath center of basin at end of infiltration period)**
1.026	Δh(max)	**maximum groundwater mounding (beneath center of basin at end of infiltration period)**

Ground-water Mounding, in feet	**Distance from center of basin in x direction, in feet**
1.026	0
1.025	1
1.021	2
1.015	3
1.006	4
0.995	5
0.981	6
0.964	7
0.946	8
0.926	9

Re-Calculate Now



Disclaimer

This spreadsheet solving the Hantush (1967) equation for ground-water mounding beneath an infiltration basin is made available to the general public as a convenience for those wishing to replicate values documented in the USGS Scientific Investigations Report 2010-5102 "Groundwater mounding beneath hypothetical stormwater infiltration basins" or to calculate values based on user-specified site conditions. Any changes made to the spreadsheet (other than values identified as user-specified) after transmission from the USGS could have unintended, undesirable consequences. These consequences could include, but may not be limited to: erroneous output, numerical instabilities, and violations of underlying assumptions that are inherent in results presented in the accompanying USGS published report. The USGS assumes no responsibility for the consequences of any changes made to the spreadsheet. If changes are made to the spreadsheet, the user is responsible for documenting the changes and justifying the results and conclusions.

STORMWATER BASIN P3

Type:	Underground	
Overall Width, 2X:	19.5	ft; dimension parallel to assumed gw movement
Overall Length, 2Y:	31.3	ft; dimension perpendicular to assumed gw movement
Bottom Elevation:	611.50	ft
GW Elevation:	609.50	ft
Rawl's Rate:	1.02	in/hr; value based on observed soil type
Time to Empty:	70.6	hr; drawdown time

Hantush Equation Input Variables

Recharge Rate, R:	2.04	ft/day; converted from Rawl's Rate
Specific Yield, S_y:	0.21	; dimensionless, assumed for Fine Sand
Horizontal Hydraulic Conductivity, K_h:	20.40	ft/day
1/2 Width of Basin, X:	9.8	ft
1/2 Length of Basin, Y:	15.7	ft
Duration of Infiltration, t:	2.94	days
Initial thickness of saturated zone, $h_i(0)$:	25	ft; value assumed from Surficial Aquifer Potential Map of CT and reconciled with average depths of site borings

Specific yields, in percent, of various materials

[Rounded to nearest whole percent]

Material	Number of determinations	Specific yield		
		Maximum	Minimum	Average
Clay	15	5	0	2
Silt	16	19	3	8
Sandy clay	12	12	3	7
Fine sand	17	28	10	21
Medium sand	17	32	15	26
Coarse sand	17	35	20	27
Gravelly sand	15	35	20	25
Fine gravel	17	35	21	25
Medium gravel	14	26	13	23
Coarse gravel	14	26	12	22

Hantush Equation Results and Analysis

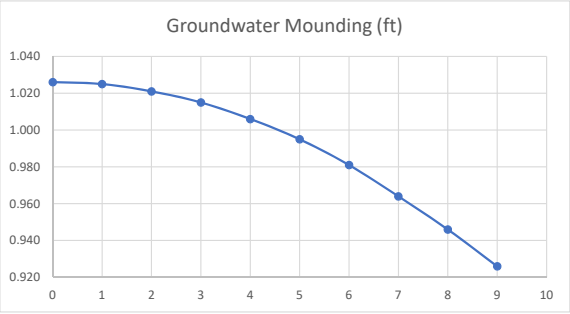
Datum Depth:	27.00	ft; measured from bottom elevation of basin
Datum Elevation:	584.50	ft
Maximum thickness of saturated zone:	26.03	ft; input from Hantush Spreadsheet Calculator
Maximum GW mounding:	1.03	ft; input from Hantush Spreadsheet Calculator

Therefore;

GW Mounding Elevation:	610.53	ft
Basin Bottom:	611.50	ft
Available Freeboard:	**0.97**	ft

Graphical Groundwater Mounding

y	x
1.026	0
1.025	1
1.021	2
1.015	3
1.006	4
0.995	5
0.981	6
0.964	7
0.946	8
0.926	9



This spreadsheet will calculate the height of a groundwater mound beneath a stormwater infiltration basin. More information can be found in the U.S. Geological Survey Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins".

The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated.
Cells highlighted in yellow are values that can be changed by the user. Cells highlighted in red are output values based on user-specified inputs. The user MUST click the blue "Re-Calculate Now" button each time ANY of the user-specified inputs are changed otherwise necessary iterations to converge on the correct solution will not be done and values shown will be incorrect. Use consistent units for all input values (for example, feet and days)

use consistent units (e.g. feet & days **or** inches & hours)

Input Values

2.0400	*R*	**Recharge (infiltration) rate (feet/day)**
0.210	Sy	**Specific yield, Sy (dimensionless, between 0 and 1)**
20.40	K	**Horizontal hydraulic conductivity, Kh (feet/day)***
11.400	x	**1/2 length of basin (x direction, in feet)**
56.600	y	**1/2 width of basin (y direction, in feet)**
1.960	t	**duration of infiltration period (days)**
25.000	hi(0)	**initial thickness of saturated zone (feet)**

Conversion Table

inch/hour	**feet/day**
0.67	1.33
2.00	4.00

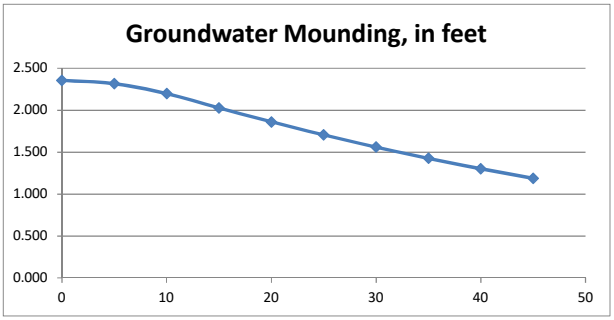
hours	**days**
36	1.50

In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).

27.356	h(max)	**maximum thickness of saturated zone (beneath center of basin at end of infiltration period)**
2.356	Δh(max)	**maximum groundwater mounding (beneath center of basin at end of infiltration period)**

Ground-water Mounding, in feet	**Distance from center of basin in x direction, in feet**
2.356	0
2.316	5
2.198	10
2.028	15
1.860	20
1.704	25
1.559	30
1.425	35
1.301	40
1.187	45

Re-Calculate Now



Disclaimer

This spreadsheet solving the Hantush (1967) equation for ground-water mounding beneath an infiltration basin is made available to the general public as a convenience for those wishing to replicate values documented in the USGS Scientific Investigations Report 2010-5102 "Groundwater mounding beneath hypothetical stormwater infiltration basins" or to calculate values based on user-specified site conditions. Any changes made to the spreadsheet (other than values identified as user-specified) after transmission from the USGS could have unintended, undesirable consequences. These consequences could include, but may not be limited to: erroneous output, numerical instabilities, and violations of underlying assumptions that are inherent in results presented in the accompanying USGS published report. The USGS assumes no responsibility for the consequences of any changes made to the spreadsheet. If changes are made to the spreadsheet, the user is responsible for documenting the changes and justifying the results and conclusions.

STORMWATER BASIN P4

Type:	Underground	
Overall Width, 2X:	113.25	ft; dimension parallel to assumed gw movement
Overall Length, 2Y:	22.75	ft; dimension perpendicular to assumed gw movement
Bottom Elevation:	613.00	ft
GW Elevation:	610.67	ft
Rawl's Rate:	1.02	in/hr; value based on observed soil type
Time to Empty:	47.1	hr; drawdown time

Hantush Equation Input Variables

Recharge Rate, R:	2.04	ft/day; converted from Rawl's Rate
Specific Yield, S_y:	0.21	; dimensionless, assumed for Fine Sand
Horizontal Hydraulic Conductivity, K_h:	20.40	ft/day
1/2 Width of Basin, X:	56.6	ft
1/2 Length of Basin, Y:	11.4	ft
Duration of Infiltration, t:	1.96	days
Initial thickness of saturated zone, $h_i(0)$:	25	ft; value assumed from Surficial Aquifer Potential Map of CT and reconciled with average depths of site borings

Hantush Equation Results and Analysis

Datum Depth:	27.33	ft; measured from bottom elevation of basin
Datum Elevation:	585.67	ft
Maximum thickness of saturated zone:	27.36	ft; input from Hantush Spreadsheet Calculator
Maximum GW mounding:	2.36	ft; input from Hantush Spreadsheet Calculator

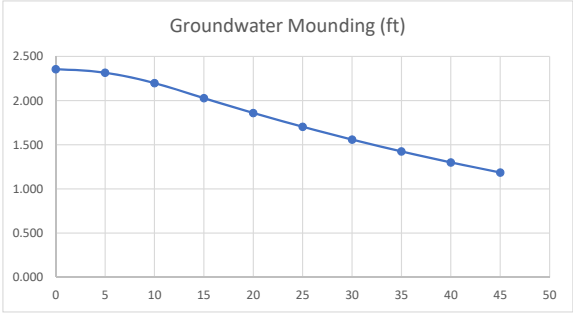
Therefore;

GW Mounding Elevation:	613.03	ft
Basin Bottom:	613.00	ft
Available Freeboard:	**-0.03**	ft

Effectively 0

Graphical Groundwater Mounding

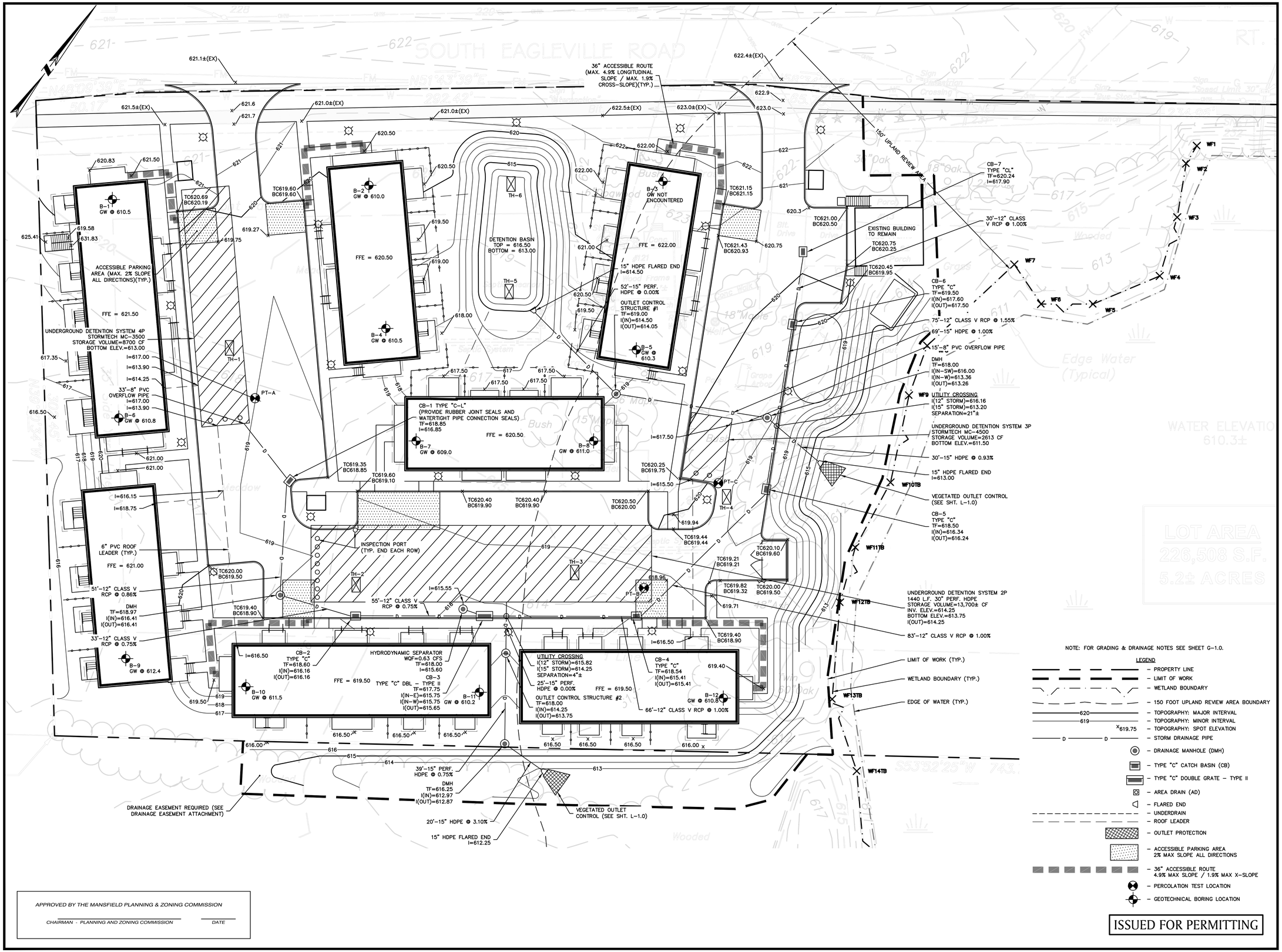
y	x
2.356	0
2.316	5
2.198	10
2.028	15
1.860	20
1.704	25
1.559	30
1.425	35
1.301	40
1.187	45



Specific yields, in percent, of various materials

[Rounded to nearest whole percent]

Material	Number of determinations	Specific yield: Maximum	Minimum	Average
Clay	15	5	0	2
Silt	16	19	3	8
Sandy clay	12	12	3	7
Fine sand	17	28	10	21
Medium sand	17	32	15	26
Coarse sand	17	35	20	27
Gravelly sand	15	35	20	25
Fine gravel	17	35	21	25
Medium gravel	14	26	13	23
Coarse gravel	14	26	12	22



NOTE: FOR GRADING & DRAINAGE NOTES SEE SHEET G-1.0.

LEGEND

- PROPERTY LINE
- LIMIT OF WORK
- WETLAND BOUNDARY
- 150 FOOT UPLAND REVIEW AREA BOUNDARY
- 620 – TOPOGRAPHY: MAJOR INTERVAL
- 619 – TOPOGRAPHY: MINOR INTERVAL
- x619.75 – TOPOGRAPHY: SPOT ELEVATION
- D — D – STORM DRAINAGE PIPE
- DRAINAGE MANHOLE (DMH)
- TYPE "C" CATCH BASIN (CB)
- TYPE "C" DOUBLE GRATE – TYPE II
- AREA DRAIN (AD)
- FLARED END
- UNDERDRAIN
- ROOF LEADER
- OUTLET PROTECTION
- ACCESSIBLE PARKING AREA 2% MAX SLOPE ALL DIRECTIONS
- 36" ACCESSIBLE ROUTE 4.9% MAX SLOPE / 1.9% MAX X-SLOPE
- PERCOLATION TEST LOCATION
- GEOTECHNICAL BORING LOCATION

ISSUED FOR PERMITTING

APPROVED BY THE MANSFIELD PLANNING & ZONING COMMISSION

CHAIRMAN - PLANNING AND ZONING COMMISSION DATE

EAGLEVILLE GREEN - NOVEMBER 25, 2019

STATE OF CONNECTICUT ROBERT S. NEWTON No. 20662 LICENSED PROFESSIONAL ENGINEER

ROBERT NEWTON, PE No. 20662

EAGLEVILLE GREEN

113-121 SOUTH EAGLEVILLE ROAD
IN
MANSFIELD
CONNECTICUT

GRADING & DRAINAGE PLAN

NOVEMBER 25, 2019

REVISIONS:

1	01/20/2020	PER TOWN COMMENTS
2	01/31/2020	PER TOWN COMMENTS
3	02/12/2020	PER TEST PIT RESULTS
4	02/26/2020	PER REVIEW COMMENTS

PREPARED FOR:
MANSFIELD HOUSING DEV. CORP.
309 MAPLE ROAD
STORRS, CT 06268

BSC GROUP
300 Winding Brook Drive
Glastonbury, Connecticut 06033
860 652 8227

© 2019 BSC GROUP, INC.

SCALE: 1" = 20'
0 10 20 40 FEET

FILE: 8374900-GRDR.DWG
DWG. NO:
JOB. NO: 83749.00

C-4.0

From: James Sipperly
To: Jennifer S. Kaufman
Subject: Re: W1612- Eagleville Green Clarification
Date: Wednesday, February 26, 2020 2:00:49 PM

Hi Jennifer,

As we discussed on the phone, I am satisfied with the characterization of the wetland on site as submitted in the original application package.

I don't anticipate any significant adverse impacts to the wetlands on site or adjacent to the site.

However, if there were direct impacts proposed and if there was wetland mitigation proposed then that would be a different story. If that were the case, I certainly would've requested that a detailed evaluation of the functions and values of the wetland be performed by a qualified individual.

I don't believe that is neccessary in this instance.

Sincerely,

James Sipperly

On Wed, Feb 26, 2020, 11:59 AM Jennifer S. Kaufman <KaufmanJS@mansfieldct.org> wrote:

> Hi James-
>
> Could you describe why you do not feel that a functions and values analysis is needed. See below comments provided by CME. Thank you.
>
> 10. The report by Ms. Kaplan indicates that the wetlands on the site are established by surface runoff; however, there is a major groundwater component that exists. While there is some surface discharge into this wetland, it appears that groundwater is the primary source of water in this wetland given its size and height of some of the tussock sedges. The report does not address or classify the inland wetland soil and upland soil types on the site. Furthermore, the report does not evaluate the functions and values of the existing wetlands. This could have been done using the rationales of a standardized evaluation method (e.g. the US Army Corps of Engineers' Descriptive Approach 1995) and using her best professional judgment. These functions include: ground water recharge, flood flow alteration, sediment /shoreline stabilization, sediment/pathogen retention, nutrient removal, production export, aquatic habitat, endangered species habitat, visual quality/aesthetics, educational/scientific value, recreation- passive or active and uniqueness/historical.

The applicant's Soil Scientist reviewed the site as documented in response to Comment #9.

Jennifer Kaufman, AICP

Senior Planner/Inland Wetlands Agent

860.429.3335 (external)

Ext. 6204 (internal)

Jennifer.Kaufman@MansfieldCT.org

mansfieldct.gov

Site Plan Review

Engineers
Designers
Consultants
Planners
Scientists

February 19, 2020

Mansfield Inland Wetlands Agency
C/O Jennifer Kaufman, Senior Planner & Inland Wetlands Agent
Audrey P. Beck Municipal Building
4 South Eagleville Road
Storrs Mansfield, CT 06268
Via email: kaufmanjs@mansfieldct.org

RE: **Eagleville Green, 113-121 South Eagleville Road**

Agency Members,

As requested, CME Associates, Inc. (CME) reviewed the following revised materials submitted for the proposed house development on South Eagleville Road:

Item 1 Twenty-five (25) sheet site plan "Eagleville Green, 113-121 South Eagleville Road, Mansfield, Connecticut" prepared by BSC Group, dated November 25, 2019, revised February 12, 2020

Item 2 Stormwater Management Report, Eagleville Green, prepared by BSC Group, dated October 2019, revised February 2020

Item 3 Wetland Delineation Review emailed from Ian Cole, dated January 3, 2020

Item 4 Letter, "RE: Eagleville Green, 113-121 South Eagleville Road, Response to CME Review Comments", prepared by BSC Group, addressed to Kathleen Dorgan, Dorgan Architecture & Planning, dated February 12, 2020

CME's December 23, 2019 comments below are in normal text. Updates to these comments, based on the revised application materials submitted, are in *italic text*. All new comments are in **bold text**.

1. There are two drainage areas: one to the grassed area to the southwest and one to the eastern on-site wetlands. Due to the difference in times of concentration flow paths, peak flows for the two design points should be considered separately. In the provided calculations, peak flows for the two design points are combined to show an overall decrease; however, under the current design, peak flows will be increased to the eastern wetland system.
   The stormwater management design has been modified and peak flows will not be increased to the wetland system.

2. The submitted geotechnical report cites a possible high groundwater table at elevation 612 to 613 based on soil borings and wetland elevation observations. The Connecticut Stormwater Quality Manual (SQM) requires test pits to determine an accurate high groundwater elevation for use in stormwater management design. Test pits must be completed pursuant to the SQM for this site and the design must be revised accordingly including required separation from groundwater for each stormwater management system.
   Test pits were conducted at the proposed stormwater system locations and are recorded on the revised site plans. The stormwater management system has been modified according to the test pit results. The high groundwater elevation is within 2-feet of the bottom of stone for each of the three underground detention systems.

   With the outlet of the three detention systems set above the bottom of stone elevation, the designer is relying on infiltration to ensure the detention systems drain completely between each storm. If the systems do not drain completely, then the storage volume necessary to attenuate peak flows will not be available for a subsequent storm. A mounding analysis to demonstrate that the provided separation is adequate could replace the need to satisfy the SQM requirement of 3-feet of separation. Alternatively, the system could be raised to meet the groundwater separation and widened to maintain the required volume. Enlarging the footprint of the systems will also help decrease the drawdown time (See Comment 3.)

3. Drawdown calculations must be provided for each of the four detention systems (1 basin and 3 underground systems). CME recommends verifying the soil type through test pits and utilizing USDA soil types and the associated Rawl's Rate to determine infiltration rates. Percolation tests provided to verify drawdown were not performed at the bottom elevations of the proposed systems, additionally,

pursuant to the SQM, percolation testing cannot be used in place of infiltration testing.

Drawdown calculations are provided in the revised Stormwater Management Report. The detention basin is expected to drain in 15.3 hours. Systems 2P, 3P and 4P are calculated to drain in 65.3, 70.6, and 56.8 hours, respectively. The SQM indicates underground detention facilities are typically designed to provide less than 24 hours of detention time in order to have the storage available for a subsequent storm. The Design Engineer must modify the design to ensure that these three detention systems will completely drain between storms (See Comment 2.)

4. The Stormwater Management Report indicates that the detention basin is designed as a dry basin; however, the outlet is set 1.5-feet above the bottom of the basin. Without drawdown calculations to confirm that the basin will drain in less than 24 hours (pursuant to the SQM), the starting water surface elevation must be set at the outlet elevation in the drainage calculation for detention storage. If the basin does not drain, this storage will not be available for detention and the detention will be overestimated.

   Drawdown calculations are provided in the revised Stormwater Management Report and demonstrate that the basin will drain within 24 hours. In addition, adequate separation from groundwater has been demonstrated by test pits to ensure the basin will not remain full of water. The basin should function for detention as designed. The Operation and Maintenance Plan After Construction must be revised to include inspections of the detention basin to ensure it is draining in less than 24-hours after a storm event.

5. A detail for the two vegetated outlets must be provided and velocity calculations must be provided to verify the outlets will remain stable. If the outlets are not stable erosion may occur and sediment may enter the wetland system.

   The revised application materials indicate the outlet velocities are less than 4 feet-per-second and the outlets will remain stable with the proposed temporary matting and landscaping.

6. Provide a sediment barrier at the bottom elevation of the proposed stormwater quality basin immediately after grading to protect the basin from contamination with fine particles. The barrier must be maintained until the basin slopes are stabilized. If fine sediment eroded during construction enters the bottom of the basin, it will clog the soil pores and infiltration capacity will be significantly reduced.

Sediment barrier has been added mid-way up the basin slopes in the revised site plans, sheet C-1.0. CME recommends locating the barrier at the bottom of basin (elevation 613). Providing the barrier is superior to mechanical cleanout in protecting any infiltration capacity compromised by eroded fines settling in the bottom of the basin.

7. Pursuant to the Mansfield Zoning Regulations, the stormwater management design must reduce the peak runoff from the 2-year storm event to fifty percent of the pre-development conditions as well as provide zero increase in peak runoff for the 10-, 25-, and 100- year storm events. The SQM requires a reduction in the 2-year peak runoff to prevent downstream channel degradation. The design engineer must evaluate the downstream watercourse(s) to determine if the 2-year storm reduction is required.
   The revised application materials demonstrate the design has satisfied this requirement.

8. CME recommends that the stormwater operation and management plan be added to the plan set. This keeps the operation and management plan with the plan set and ensures that the Town and the contractor are aware of stormwater maintenance needs.
   The stormwater operation and management plan has been included on the revised site plans (Sheet G-1.0.)

9. Upon review at the field site visitation, the majority of the inland wetland delineation appears correct; however, upon close inspection of an area to the south-central portion of the property, along the rear property line, an area had a large amount of standing water at the surface with obligate wetland species identifiable. The wetland delineation was performed by Ian Cole in June of 2016. The existing flags in the field were re-staked by a land surveyor based on previous surveyed locations. This area may be an inland wetland based on subsurface soil characteristics of a wetland and the standing water at the surface. Note that the ground was not frozen, though there was an ice layer on the standing water. The soil scientist should review this area to determine if it is in fact a wetland and delineate the its limits accordingly.
   The applicant's Soil Scientist reviewed the area with standing water and concluded that the area is not a wetland and that the original wetland delineation of the site from 2016 is still valid. We have reviewed the provided report and concur with the conclusion that this area is not an inland wetland and that the grades were previously altered.

10. The report by Ms. Kaplan indicates that the wetlands on the site are established by surface runoff; however, there is a major groundwater component that exists. While there is some surface discharge into this wetland, it appears that groundwater is the primary source of water in this wetland given its size and height of some of the tussock sedges. The report does not address or classify the inland wetland soil and upland soil types on the site. Furthermore, the report does not evaluate the functions and values of the existing wetlands. This could have been done using the rationales of a standardized evaluation method (e.g. the US Army Corps of Engineers' Descriptive Approach 1995) and using her best professional judgment. These functions include: ground water recharge, flood flow alteration, sediment /shoreline stabilization, sediment/pathogen retention, nutrient removal, production export, aquatic habitat, endangered species habitat, visual quality/aesthetics, educational/scientific value, recreation- passive or active and uniqueness/historical.

    The applicant's Soil Scientist reviewed the site as documented in response to Comment #9.

11. The stormwater basin is designed as a dry basin with many proposed plantings in the basin bottom. Due to the already existing high groundwater at the surface towards the rear property line, it may be appropriate to design the basins as wet basins and adjust the plantings accordingly.

    The recently completed test pits indicate that the bottom of the stormwater basin is well above high ground water; therefore, the proposed plantings will be appropriate.

12. We generally agree with Ms. Kaplan's evaluation of the potential effects on the wetlands from the proposed development. In addition to the evaluation, below are additional suggestions to enhance and protect the wetland system:

    a. Use native plantings for the trees, shrubs and groundcover in the landscape design.

       The applicant indicates that only native or adaptively native plants are included on the landscaping plan.

    b. No use of fertilizers, pesticides and/or herbicides in close proximity of the wetlands.

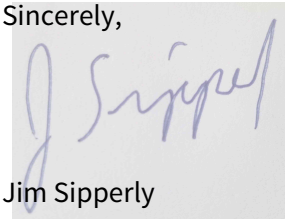
       The applicant agreed with this statement.

c. That placards on fence posts be placed along the existing wetland that acknowledges the wetland resource and that no dumping of any type is allowed, including brush and leaves and other types of debris.
The applicant indicated that placards will be considered if funding is available.

13. In conclusion, based on the proposed activities and the physical characteristics of the site we do not expect that there will be a significant adverse effect to the inland wetlands and watercourses on or off the site from the development.

Please contact us if you have any questions on the above comments.

Sincerely,



Jim Sipperly
Soil Scientist

Chuck Eaton, PE, LEED-AP
Civil Engineering Manager

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BSC GROUP
Transportation • Energy • Land Development

300 Winding Brook Drive
Glastonbury, CT 06033

Tel: 860-652-8227
800-288-8123

www.bscgroup.com

February 12, 2020

Kathleen A. Dorgan, FAIA, LEED-AP
Principal
Dorgan Architecture & Planning
10 Eastwood Road
Storrs, CT 06268

RE: Eagleville Green, 113-121 South Eagleville Road
Response to CME Review Comments

Dear Kathy:

Below are our responses to the comments prepared by CME on the site plan application documents.

Site Plan Review Comments to Planning & Zoning Commission
Dated December 23, 2019; Prepared by CME

1. There are two drainage areas: one to the grassed area to the southwest and one to the eastern on-site wetlands. Due to the difference in times of concentration flow paths, peak flows for the two design points should be considered separately. In the provided calculations, peak flows for the two design points are combined to show an overall decrease; however, under the current design, peak flows will be increased to the eastern wetland system.

   Response: The two drainage areas connect and both discharge to the wetlands located on the eastern half of the site. BSC feels it is appropriate to combine the drainage areas using the wetlands as a single design point.

2. The submitted geotechnical report cites a possible high groundwater table at elevation 612 to 613 based on soil borings and wetland elevation observations. The Connecticut Stormwater Quality Manual (SQM) requires test pits to determine an accurate high groundwater elevation for use in stormwater management design. Test pits must be completed pursuant to the SQM for this site and the design must be revised accordingly including required separation from groundwater for each stormwater management system.

   Response: Test pits were performed on February 8, 2020 at the locations of each of the detention systems. Based on the observed soil conditions, the elevations of the detention basins were adjusted. The test pit information and the boring information are shown on the plans.. See information provided on Sheet C-4.0

3. Drawdown calculations must be provided for each of the four detention systems (1 basin and 3 underground systems). CME recommends verifying the soil type through test pits and utilizing USDA soil types and the associated Rawl's Rate to determine

Engineers
Environmental Scientists
Custom Software Developers
Landscape Architects
Planners
Surveyors

infiltration rates. Percolation tests provided to verify drawdown were not performed at the bottom elevations of the proposed systems, additionally, pursuant to the SQM, percolation testing cannot be used in place of infiltration testing.

Response: Drawdown calculations are provided for each system. See revised Stormwater Management Report.

4. The Stormwater Management Report indicates that the detention basin is designed as a dry basin; however, the outlet is set 1.5-feet above the bottom of the basin. Without drawdown calculations to confirm that the basin will drain in less than 24 hours (pursuant to the SQM), the starting water surface elevation must be set at the outlet elevation in the drainage calculation for detention storage. If the basin does not drain, this storage will not be available for detention and the detention will be overestimated.

   Response: Drawdown calculations are provided. See revised Stormwater Management Report.

5. The outlet elevation of the detention basin is noted as 614.5 on the site plans, this must be properly modeled in the HydroCAD calculations.

   Response: The outlet control structure for the basin has an invert of 614.05. The pipe from the basin to the outlet control structure #1 is considered storage.

6. The outlet control structure table on Sheet C-6.1 indicates a 15-inch diameter for Orifice B in Outlet Control Structure #1. It appears this information is for the overflow invert. The Design Engineer must review and revise the table as necessary.

   Response: Table has been revised accordingly.

7. A detail for the two vegetated outlets must be provided and velocity calculations should be provided to verify the outlets will remain stable. If the outlets are not stable erosion may occur and sediment may enter the wetland system.

   Response: Outlet velocities are low (approximately 4 fps) and should not have an issue with the outlet protection being stable. Erosion control matting is called for to stabilize the ground until the vegetation can be fully established.

8. Additional details including maintenance manholes must be shown on the plans for the three underground detention systems. High level overflow grates for Systems 2P and 3P must be provided on the plans and details. If these details are not shown, the system may not be constructed correctly and function as designed.

   Response: Maintenance manholes have been shown and will be constructed in accordance with the approved shop drawing from the manufacturer.

9. The design engineer must provide a detail of Detention System 2P (36-inch corrugated metal pipe) to verify the drainage calculations and ensure the system is properly constructed. Additionally, CME recommends that plastic pipe be utilized in the detention system to avoid salt corrosion damage. The plastic pipe will have a

considerably longer service life than metal pipe.

Response: Corrugated Metal Pipe has been switched to HDPE pipe. A detail of the pipe bedding has been included. See sheet C-6.1.

10. The design engineer must review and revise the plans and calculations for the bottom elevation of Detention System 2P. The plans indicate a bottom elevation of 611.75 and the report includes a bottom stone elevation of 611.25. The system detail states a minimum 9-inches of stone below the system.

    Response: Detention System 2P is the 36-inch HDPE pipe storage, which has a 6" stone bedding. See detail provided in previous response.

11. The Pre- and Post-Development Comparison table in the Stormwater Management Report contains addition errors in the Total Site rows, Proposed conditions column. The design engineer must review and revise as required.

    Response: The Total Site rows are not strictly additive between the two discharge areas due to their different time of concentrations. The two hydrographs were combined to create the total site flow.

12. The Design Engineer must review and revise the invert elevations for the drainage manhole downstream of Outlet Control Structure #1. It appears too many inverts are listed for this structure and the pipe to the vegetated outlet is sloped in reverse.

    Response: Outlet invert has been revised. Overflow from System 3P enters this manhole.

13. Any proposed free-standing signs must be included on the site plans to ensure there are no sight line conflicts from the driveways.

    Response: Signage is not currently proposed for this site. If considered in the future, it will be located to ensure there are no sight line conflicts from the driveways.

14. Provide a sediment barrier at the bottom elevation of the proposed stormwater quality basin immediately after grading to protect the basin from contamination with fine particles. The barrier must be maintained until the basin slopes are stabilized. If fine sediment eroded during construction enters the bottom of the basin, it will clog the soil pores and infiltration capacity will be significantly reduced.

    Response: Silt fence has been added to the bottom of slopes leading into the basin. It is also required for the contractor to remove any collected sediment from the basin.

15. The gas line on the abutting parcel(s) should be included on the site plans to ensure that no conflicts with proposed infrastructure exist.

    Response: Survey of the abutting parcels is not required. Gas line easement is not located near the improvements with the drainage easement.

16. The proposed landscaping plan may limit location options for stockpiling snow.

Snow stockpile location(s) should be shown on the site plans.

Response: Snow stockpile areas will be identified.

17. The Sewer Design Notes on Sheet G-1.0 reference 42 bedrooms in the calculations for pump chamber sizing; however, it appears the development will have 73 bedrooms. The design engineer must review and revise this calculation must be updated.

    Response: Calculations have been updated for the additional bedrooms. See Sheet G-1.0.

18. Pursuant to the Mansfield Zoning Regulations, the stormwater management design must reduce the peak runoff from the 2-year storm event to fifty percent of the pre-development conditions as well as provide zero increase in peak runoff for the 10-, 25-, and 100- year storm events. The SQM requires a reduction in the 2-year peak runoff to prevent downstream channel degradation. The design engineer must evaluate the downstream watercourse to determine if the 2-year storm reduction is required.

    Response: Stormwater management design has been modified to include a 50% reduction on the 2-year storm event over pre-construction conditions.

19. The proposed pump station must meet the Separation Distances for stormwater pipes & structures outlined by Table 1 of the CT Public Health Code. Watertight pipe can be utilized to reduce these separation distances however, the code does not allow groundwater to be collected in the stormwater system. The proposed perforated pipes are subject to larger separation distances from the pump station

    Response: The separation between the pump station tank and the proposed detention system and catch basins meet separation distance requirements of 25 feet and 10 feet respectively.

20. CME recommends that the stormwater operation and management plan be added to the plan set. This keeps the operation and management plan with the plan set and ensures that the Town and the contractor are aware of stormwater management needs.

    Response: The Operation and management plan listed in the stormwater report has been placed on the plans as well. See Sheet G-1.0.

CME offers the following comments on the Affordability Plan:

21. The Affordability Plan appears to be largely in order. There several items of clarification that the Commission may wish to consider prior to final approval of this document:

    a. The annual status report of the Affordability Plan is submitted, per Section III, to "the Town" by January 31 to show the prior year's activity. The Commission should clarify the specific entity at the Town to whom this report should be directed.

Response: See separate response for Affordability Plan by Kathleen Dorgan.

b. In the Tenant Selection Process section VII.C.(a).1., a reference is made to a waiting list lottery created using the Administrator's "housing software program". The Commission should verify that the proposed Administrator – in this case, the Mansfield Housing Authority – is in possession of such software.

Response: See separate response for Affordability Plan by Kathleen Dorgan.

c. In the Tenant Selection Process section VII.C.(b).4.(iii).A, the background report for tenant applications must show that "No Applicant has a felony conviction within the last five (5) years for drug-related or violent criminal activity". In the case of drug-related convictions, particularly for non-violent crimes, the national standards appear to be changing, with recent state and federal level commutation of sentences reflecting a recalibration of the severity of non-violent drug-crime penalties. The Commission may wish to reconsider this automatic disqualification standard.

Response: See separate response for Affordability Plan by Kathleen Dorgan.

Site Plan Review Comments to Inland Wetlands Commission
Dated December 23, 2019; Prepared by CME

1. There are two drainage areas: one to the grassed area to the southwest and one to the eastern on-site wetlands. Due to the difference in times of concentration flow paths, peak flows for the two design points should be considered separately. In the provided calculations, peak flows for the two design points are combined to show an overall decrease; however, under the current design, peak flows will be increased to the eastern wetland system.

   Response: See response to Item 1 (Planning & Zoning Comments)

2. The submitted geotechnical report cites a possible high groundwater table at elevation 612 to 613 based on soil borings and wetland elevation observations. The Connecticut Stormwater Quality Manual (SQM) requires test pits to determine an accurate high groundwater elevation for use in stormwater management design. Test pits must be completed pursuant to the SQM for this site and the design must be revised accordingly including required separation from groundwater for each stormwater management system.

   Response: See response to Item 2 (Planning & Zoning Comments)

3. Drawdown calculations must be provided for each of the four detention systems (1 basin and 3 underground systems). CME recommends verifying the soil type through test pits and utilizing USDA soil types and the associated Rawl's Rate to determine infiltration rates. Percolation tests provided to verify drawdown were not performed at the bottom elevations of the proposed systems, additionally, pursuant to the SQM,

percolation testing cannot be used in place of infiltration testing.

Response: See response to Item 3 (Planning & Zoning Comments)

4. The Stormwater Management Report indicates that the detention basin is designed as a dry basin; however, the outlet is set 1.5-feet above the bottom of the basin. Without drawdown calculations to confirm that the basin will drain in less than 24 hours (pursuant to the SQM), the starting water surface elevation must be set at the outlet elevation in the drainage calculation for detention storage. If the basin does not drain, this storage will not be available for detention and the detention will be overestimated.

   Response: See response to Item 4 (Planning & Zoning Comments)

5. A detail for the two vegetated outlets must be provided and velocity calculations must be provided to verify the outlets will remain stable. If the outlets are not stable erosion may occur and sediment may enter the wetland system.

   Response: See response to Item 7 (Planning & Zoning Comments)

6. Provide a sediment barrier at the bottom elevation of the proposed stormwater quality basin immediately after grading to protect the basin from contamination with fine particles. The barrier must be maintained until the basin slopes are stabilized. If ine sediment eroded during construction enters the bottom of the basin, it will clog the soil pores and infiltration capacity will be significantly reduced.

   Response: See response to Item 14 (Planning & Zoning Comments)

7. Pursuant to the Mansfield Zoning Regulations, the stormwater management design must reduce the peak runoff from the 2-year storm event to fifty percent of the pre-development conditions as well as provide zero increase in peak runoff for the 10-, 25-, and 100- year storm events. The SQM requires a reduction in the 2-year peak runoff to prevent downstream channel degradation. The design engineer must evaluate the downstream watercourse(s) to determine if the 2-year storm reduction is required.

   Response: See response to Item 18 (Planning & Zoning Comments)

8. CME recommends that the stormwater operation and management plan be added to the plan set. This keeps the operation and management plan with the plan set and ensures that the Town and the contractor are aware of stormwater maintenance needs.

   Response: See response to Item 20 (Planning & Zoning Comments)

9. Upon review at the field site visitation, the majority of the inland wetland delineation appears correct; however, upon close inspection of an area to the south-central portion of the property, along the rear property line, an area had a large amount of standing water at the surface with obligate wetland species identifiable. The wetland delineation was performed by Ian Cole in June of 2016. The existing flags in the field were re-staked by a land surveyor based on previous surveyed locations. This area

may be an inland wetland based on subsurface soil characteristics of a wetland and the standing water at the surface. Note that the ground was not frozen, though there was an ice layer on the standing water. The soil scientist should review this area to determine if it is in fact a wetland and delineate the its limits accordingly.

Response: See attached correspondence from Ian Cole (Mansfield Housing Authority- Wetlands Delineation Review) dated January 3, 2020 and Ian Cole resume 12-9-19.pdf.

10. The report by Ms. Kaplan indicates that the wetlands on the site are established by surface runoff; however, there is a major groundwater component that exists. While there is some surface discharge into this wetland, it appears that groundwater is the primary source of water in this wetland given its size and height of some of the tussock sedges. The report does not address or classify the inland wetland soil and upland soil types on the site. Furthermore, the report does not evaluate the functions and values of the existing wetlands. This could have been done using the rationales of a standardized evaluation method (e.g. the US Army Corps of Engineers' escriptive Approach 1995) and using her best professional judgment. These functions include: ground water recharge, flood flow alteration, sediment/shoreline stabilization, sediment/pathogen retention, nutrient removal, production export, aquatic habitat, endangered species habitat, visual quality/aesthetics, educational/scientific value, recreation- passive or active and uniqueness/historical.

    Response: Ms. Kaplan was not responsible for the wetland delineation, soil characterization. Ms. Kaplan's report was to identify the health and quality of the wetland and the potential impact this proposed project would have on this natural resource. The Soil Scientist will provide the soil evaluation and characterization.

11. The stormwater basin is designed as a dry basin with many proposed plantings in the basin bottom. Due to the already existing high groundwater at the surface towards the rear property line, it may be appropriate to design the basins as wet basins and adjust the plantings accordingly.

    Response: The dry basin is approximately 2 feet above groundwater as identified in nearby borings. It is not expected to be a wet basin.

12. We generally agree with Ms. Kaplan's evaluation of the potential effects on the wetlands from the proposed development. In addition to the evaluation, below are additional suggestions to enhance and protect the wetland system:
    a. Use native plantings for the trees, shrubs and groundcover in the landscape design.
    b. No use of fertilizers, pesticides and/or herbicides in close proximity of the wetlands.
    c. That placards on fence posts be placed along the existing wetland that acknowledges the wetland resource and that no dumping of any type is allowed, including brush and leaves and other types of debris.

    Response: a. Only native and adaptively native plants have been called for on the plans. We are reviewing the recommendations provided for alternate plantings and will respond at a future time. b. Agreed c. Placards will be considered if funding is

available.

13. In conclusion, based on the proposed activities and the physical characteristics of the site we do not expect that there will be a significant adverse effect to the inland wetlands and watercourses on or off the site from the development.

    Response: Agreed

Very truly yours,

BSC Group-Connecticut, Inc.

Robert S, Newton, PE, LEED AP

Site Plan Review

Engineers
Designers
Consultants
Planners
Scientists

December 23, 2019

Mansfield Inland Wetlands Commission
C/O Jennifer Kaufman, Senior Planner & Inland Wetlands Agent
Audrey P. Beck Municipal Building
4 South Eagleville Road
Storrs Mansfield, CT 06268
Via email: kaufmanjs@mansfieldct.org

RE: **Eagleville Green, 113-121 South Eagleville Road**

Commission Members,

As requested, CME Associates, Inc. (CME) reviewed the following materials for the proposed house development on South Eagleville Road:

Item 1 Thirty-eight (38) sheet site plan "Eagleville Green, 113-121 South Eagleville Road, Mansfield, Connecticut" prepared by BSC Group, dated November 25, 2019

Item 2 Stormwater Management Report, Eagleville Green, prepared by BSC Group, dated October 2019, Revised November 2019

Item 3 Wetland Characterization of Wetland System adjacent to Proposed South Eagleville Road Housing Project, prepared by Melissa Kalpan, PWS, BSC Group, dated September 13, 2019

Based on a review of these materials and a site walk on December 12, 2019, we offer the following review comments based upon the Mansfield Wetlands Regulations and other applicable standards. This type of development (8-30g) provides relief from most local zoning regulations, therefore the majority of CME's review focused on items that may present health and safety risks and prevention of drainage and utility issues that have the potential to impact the wetland system:

860.885.1055
www.cmeengineering.com
33 Wilbur Cross Way, Suite 105, P.O. Box 535, Mansfield, CT 06268

1. There are two drainage areas: one to the grassed area to the southwest and one to the eastern on-site wetlands. Due to the difference in times of concentration flow paths, peak flows for the two design points should be considered separately. In the provided calculations, peak flows for the two design points are combined to show an overall decrease; however, under the current design, peak flows will be increased to the eastern wetland system.

2. The submitted geotechnical report cites a possible high groundwater table at elevation 612 to 613 based on soil borings and wetland elevation observations. The Connecticut Stormwater Quality Manual (SQM) requires test pits to determine an accurate high groundwater elevation for use in stormwater management design. Test pits must be completed pursuant to the SQM for this site and the design must be revised accordingly including required separation from groundwater for each stormwater management system.

3. Drawdown calculations must be provided for each of the four detention systems (1 basin and 3 underground systems). CME recommends verifying the soil type through test pits and utilizing USDA soil types and the associated Rawl's Rate to determine infiltration rates. Percolation tests provided to verify drawdown were not performed at the bottom elevations of the proposed systems, additionally, pursuant to the SQM, percolation testing cannot be used in place of infiltration testing.

4. The Stormwater Management Report indicates that the detention basin is designed as a dry basin; however, the outlet is set 1.5-feet above the bottom of the basin. Without drawdown calculations to confirm that the basin will drain in less than 24 hours (pursuant to the SQM), the starting water surface elevation must be set at the outlet elevation in the drainage calculation for detention storage. If the basin does not drain, this storage will not be available for detention and the detention will be overestimated.

5. A detail for the two vegetated outlets must be provided and velocity calculations must be provided to verify the outlets will remain stable. If the outlets are not stable erosion may occur and sediment may enter the wetland system.

6. Provide a sediment barrier at the bottom elevation of the proposed stormwater quality basin immediately after grading to protect the basin from contamination with fine particles. The barrier must be maintained until the basin slopes are

stabilized. If fine sediment eroded during construction enters the bottom of the basin, it will clog the soil pores and infiltration capacity will be significantly reduced.

7. Pursuant to the Mansfield Zoning Regulations, the stormwater management design must reduce the peak runoff from the 2-year storm event to fifty percent of the pre-development conditions as well as provide zero increase in peak runoff for the 10-, 25-, and 100- year storm events. The SQM requires a reduction in the 2-year peak runoff to prevent downstream channel degradation. The design engineer must evaluate the downstream watercourse(s) to determine if the 2-year storm reduction is required.

8. CME recommends that the stormwater operation and management plan be added to the plan set. This keeps the operation and management plan with the plan set and ensures that the Town and the contractor are aware of stormwater maintenance needs.

9. Upon review at the field site visitation, the majority of the inland wetland delineation appears correct; however, upon close inspection of an area to the south-central portion of the property, along the rear property line, an area had a large amount of standing water at the surface with obligate wetland species identifiable. The wetland delineation was performed by Ian Cole in June of 2016. The existing flags in the field were re-staked by a land surveyor based on previous surveyed locations. This area may be an inland wetland based on subsurface soil characteristics of a wetland and the standing water at the surface. Note that the ground was not frozen, though there was an ice layer on the standing water. The soil scientist should review this area to determine if it is in fact a wetland and delineate the its limits accordingly.

10. The report by Ms. Kaplan indicates that the wetlands on the site are established by surface runoff; however, there is a major groundwater component that exists. While there is some surface discharge into this wetland, it appears that groundwater is the primary source of water in this wetland given its size and height of some of the tussock sedges. The report does not address or classify the inland wetland soil and upland soil types on the site. Furthermore, the report does not evaluate the functions and values of the existing wetlands. This could have been done using the rationales of a standardized evaluation method (e.g. the US Army Corps of Engineers' Descriptive Approach 1995) and using her best professional judgment. These functions include: ground water recharge, flood flow alteration, sediment

/shoreline stabilization, sediment/pathogen retention, nutrient removal, production export, aquatic habitat, endangered species habitat, visual quality/aesthetics, educational/scientific value, recreation- passive or active and uniqueness/historical.

11. The stormwater basin is designed as a dry basin with many proposed plantings in the basin bottom. Due to the already existing high groundwater at the surface towards the rear property line, it may be appropriate to design the basins as wet basins and adjust the plantings accordingly.

12. We generally agree with Ms. Kaplan's evaluation of the potential effects on the wetlands from the proposed development. In addition to the evaluation, below are additional suggestions to enhance and protect the wetland system:

    a. Use native plantings for the trees, shrubs and groundcover in the landscape design.

    b. No use of fertilizers, pesticides and/or herbicides in close proximity of the wetlands.

    c. That placards on fence posts be placed along the existing wetland that acknowledges the wetland resource and that no dumping of any type is allowed, including brush and leaves and other types of debris.

13. In conclusion, based on the proposed activities and the physical characteristics of the site we do not expect that there will be a significant adverse effect to the inland wetlands and watercourses on or off the site from the development.

Please contact us if you have any questions on the above comments.

Sincerely,

Jim Sipperly
Soil Scientist

Chuck Eaton, PE, LEED-AP
Civil Engineering Manager

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UCONN
UNIVERSITY OF CONNECTICUT

Office of the Executive Vice President for
Administration and Chief Financial Officer
Scott A. Jordan
Executive Vice President
for Administration
and Chief Financial Officer

Via E-Mail Only

March 2, 2020

Paul Aho, Chair
Mansfield Inland Wetlands Agency
Mansfield Planning & Zoning Commission
Town of Mansfield
Aubrey P. Beck Municipal Building
4 South Eagleville Road
Mansfield, CT 06268

RE: **W1612** – Petition of the Mansfield Nonprofit Housing Development Corp for a Multifamily Development at 113-121 S. Eagleville Rd.; **P1364-1** – Petition of the Mansfield Nonprofit Housing Development Corp to Amend the Mansfield Zoning Map; **P1364-2** – Petition of the Mansfield Nonprofit Housing Development Corp for a Site Plan Approval

Dear Chair Aho and Agency/Commission Members:

The University of Connecticut ("UConn") has been on record with the Town of Mansfield ("Town") that it is opposed to development of undergraduate student housing in proximity to the University. However, UConn has a long history of supporting projects that provide real affordable housing opportunities in the Town and that do not focus on undergraduate student housing. Accordingly, I write on behalf of UConn to let you know that UConn does not oppose the above-referenced Petitions proposed by the Mansfield Nonprofit Housing Development Corporation ("Applicant").

These three Petitions present an application that materially differs from the other pending applications in Town that are being pursued as undergraduate student housing in the guise of multifamily housing. The Applicant here is a local non-profit development entity whose mission is to make more affordable housing available in Mansfield. The Applicant also has strong organizational links with the Mansfield Housing Authority ("MHA"), a municipal agency, and MHA is proposed to be the Administrator of the Applicant's Affordability Plan. We also understand that MHA received substantial predevelopment funding for this project from the Connecticut Department of Housing.

Eagleville Green is to be located in the narrowly-prescribed geographic area to which the South Eagleville Road – Housing Opportunity Zoning District applies, and is of modest size. It is proposed as a mixed-income rental housing development, with an assisted housing component, that we hope will be available to UConn graduate students, faculty and staff.

352 MANSFIELD ROAD, UNIT 1122
GULLEY HALL
STORRS, CT 06269-1122
PHONE 860.486.3455
www.evpacfo.uconn.edu

An Equal Opportunity Employer

We appreciate this opportunity to comment on the above-referenced Petitions.

Sincerely,

Scott A. Jordan
Executive Vice President for Administration and Chief Financial Officer

Encl.
CC: John Carrington, Interim Town Manager, Town of Mansfield (via E-Mail)
Robert Corbett, UConn
Robert Sitkowski, UConn

352 MANSFIELD ROAD, UNIT 1122
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