Appendices

Appendix 1. CUP Application Completeness Checklist and Compliance Table

Ordinance Reference	Requirement	Compliance	Location in Application
General CUP Application Data Submission Requirements			
8.2.4 (incorporating by reference the data submission requirements in 8.1.3)	Legal description of the area proposed for the conditional use, the mile of the site.	Legal description of the area proposed for conditional use is included in this application.	Section 1.
8.2.4 (incorporating by reference the data submission requirements in 8.1.3)	A map showing the existing land uses and zoning district classifications of the area.	A map showing the existing land uses and zoning district classification of the area is included in the application.	Appendix 4.
8.2.4 (incorporating by reference the data submission requirements in 8.1.3)	A site plan showing buildings and uses in the [area proposed for the conditional use] and the requested [conditional use].	A preliminary site plan has been provided with this Application that meets all applicable siting requirements. The final location of project components is subject to change following final engineering but will comply with all applicable township requirements/setbacks.	Appendix 3, Section 2.3.
8.2.4 (incorporating by reference the data submission requirements in 8.1.3)	A fee shall be paid in accordance with the schedule established by the Board of Supervisors.	$100.00 CUP application fee is required by Harmony Township.	$100.00 CUP application fee provided with this Application.
CUP Form Requirements			
Required in Harmony Township CUP Form (Appendix 2)	Site Plan	A preliminary site plan has been provided with this Application that meets all applicable siting requirements. The final location of project components is subject to change following final engineering but will comply with all applicable township requirements/setbacks.	Appendix 3, Section 2.3.
	Boundary Survey	A boundary survey has been prepared for the Project.	Appendix 5.
	Drainage/Grading Plan	A preliminary drainage and grading plan has	Appendix 3, Sheet C-03.

Ordinance Reference	Requirement	Compliance	Location in Application
		been prepared for the Project.	
	Stormwater Information	A preliminary stormwater report has been prepared for the Project.	Appendix 9.
	Noise Study	A noise study has been prepared for the Project. Noise levels within 100 feet of occupied residences or community buildings are below the required 45 dBA.	Appendix 11.
	Landscape Plan	A landscape plan has been prepared for the Project.	Appendix 3, Sheet L-01.
	Legal Description	Legal description of the area proposed for conditional use is included in this application.	Section 1.
	Building Plans	Architectural plans have been prepared for the Project.	Appendix 8.
	Utility plan	A utility plan has been prepared for the Project.	Appendix 3, Sheet C-04.
	Traffic Study	A preliminary traffic study has been prepared for the Project based on initial consultation with road authorities.	Appendix 10.
	Lighting Plan	A preliminary lighting plan has been prepared for the Project.	Appendix 3, Sheets E-01 and E-02.
	Fire Protection Information	Fire protection information provided in the application and Emergency Access Plan.	Appendix 7, Section 3.2.2.
Data Center-Specific Requirements			
Data Center Standards (Ord. Sec. 6.21.2)			
6.21.2.1	A conditional use permit must be obtained for any data center project.	The Applicant submits this CUP application for the consideration of Harmony Township.	Appendix 2.
6.21.2.2	**Location.** No data center may be located within one mile of any inhabited residence or community building.	The closest distance of an inhabited residence or community building to the Project exceeds 1 mile.	Section 4.1. Appendix 3.
6.21.2.3	**Setbacks.** Data centers must be set back at least 500 feet on all sides from	The closest distance of a data center building to the	Section 4.1. Appendix 3.

Ordinance Reference	Requirement	Compliance	Location in Application
	any property line or township right-of-way.	property line or township right-of-way is 554 feet.	
6.21.2.4	**Noise.** Broadband, tonal, and impulse exterior noise for a data center or any necessary appurtenances may not exceed 45 dBA within 100 feet of an inhabited residence or community building. Any application for a conditional use permit shall include a noise study demonstrating that the operation of the data center will comply with the Township's regulations related to noise. Twenty-four hour, real-time compliance monitoring for exterior noise levels by an independent third party contractor is required at the sole cost of applicant. Annual compliance reports shall be provided to the Township board of supervisors.	Noise levels will not exceed 45 dBA within 100 feet of an inhabited residence or community building. During operations, twenty-four hour, real-time compliance monitoring for exterior noise levels by an independent third-party contractor will be provided, along with annual compliance reports.	Section 2.3.4. Appendix 11.
6.21.2.5	**Equipment.** To provide visual screening and reduce noise levels, all equipment necessary for cooling, ventilating, powering, or otherwise operating the facility, including power generators or other power supply equipment, must meet state and federal fire code and sound requirements set forth above.	Fire service lines, fire building water, hydrants, the fire water storage pad, and the fire access and exit routes shown comply with federal fire code and sound requirements. All other equipment will meet state and federal fire code and sound requirements as set forth above and reviewed during building permit stage.	Section 2.3.2.
6.21.2.6	**Structures.**	--	--
6.21.2.6.a	**Height.** All data centers must comply with the height restrictions set forth in these ordinances.	The maximum height of a proposed data center building is 35 feet.	Section 2.3.3.and Appendix 8.
6.21.2.6.b	**Building Design.** A data center building must include a main entrance feature that is differentiated from the remainder of the building	The preliminary data center building design has incorporated a differentiated façade around the main entrance.	Section 2.3.3 and Appendix 8.

Ordinance Reference	Requirement	Compliance	Location in Application
	façade by a change in building material, pattern, texture, color, or accent material. The entrance feature must also either project or recess from the adjoining building plan.	The feature projects/recesses from the adjoining building plan.	
6.21.2.6.c	All building façades must include a change in the façade surface for every 150 horizontal feet of at least one of the following: building material, pattern, texture, color, or accent material; windows, doors, or other similar fenestration design features such as faux windows must be distributed horizontally and vertically across the façade and comprise of a minimum of 40 percent of the individual façade.	Building façade requirements have been satisfied, and compliance is described in this Application.	Section 2.3.3 and Appendix 8.
6.21.2.6.d	A data center building must be designed to minimize adverse visual impacts on the surrounding development as demonstrated by the submission of elevations, architectural sketches, and sight line studies. The building should have a high-quality design as evidence by the use of materials, color, and texture. Any structure should include changes in building height or other design techniques to provide variation in building mass as viewed from any nearby structure. Architectural depictions of the proposed building and associated equipment as viewed from all lot lines and street lines, as well as from above, shall be required at the time of submission of any application.	Data centers are designed to minimize adverse visual impacts and are designed in a high-quality way through the use of materials, colors, and textures. Structures included contain changes in building height/design to provide variation in building mass. Architectural depictions of the proposed buildings and associated equipment have been provided in the Architectural Elevations, views. Views from adjacent lot lines and street lines are provided as section views within the Site Plan. Views from above are provided within the Site Plan.	Section 2.3.3, Appendix 3.
6.21.2.7	**Cooling Water.** Cooling water or other wastewater	The facility will be dry-cooled with a closed loop	Section 2.4.6.2

Ordinance Reference	Requirement	Compliance	Location in Application
	from data centers may not be discharged into Township right-of-way. All water-based cooling systems must be recirculation and reuse systems.	system, and no process water will be discharged into any sanitary system. All domestic wastewater effluent from the development will be discharged and treated in the proposed septic system along the west border.	
6.21.2.8	All rules and regulations of all other agencies having jurisdiction over any phase of the proposed data center must be complied with, including, but not limited to all city, township, county, and state regulations.	The project complies with all rules and regulations of all other agencies having jurisdiction over any phase of the proposed data cater.	Section 4.
6.21.2.9	The necessary licenses and permits shall be obtained and provided to Township prior to construction activity associated with the data center that requires said license or permit.	The necessary licenses and permits will be obtained and provided to the township prior to the applicable building permit, construction activity, or operation requiring such approval.	Section 4
6.21.2.10	Construction of a data center shall commence within 4 years of issuance of a conditional use permit. In the event construction of a data center fails to commence within such 4 year period, the conditional use permit shall expire.	Construction of the data center will commence within 4 years of issuance of a conditional use permit. The applicant acknowledges that if construction fails to commence within such period, the conditional use permit will expire unless extended.	Section 3.1.
6.21.2.11	Applicant shall execute a Road Use Agreement by and between applicant and Township to ensure proper maintenance of roads during the construction and decommissioning periods, which shall require the establishment of an escrow account in the form of a cash deposit. The cash deposit shall be made prior to the commencement of project construction and project	The Applicant will enter into a Road Use Agreement with the Township.	Section 3.1.3

Ordinance Reference	Requirement	Compliance	Location in Application
	decommissioning, as applicable. The deposit shall be sufficient to cover all reasonable costs and expenses associated with anticipated road maintenance and repair costs incurred during the project construction or decommissioning period, as applicable. At any point during the zoning review process, the Township may require that the applicant place additional monies into the escrow account should the existing escrow funds deposited by the applicant be insufficient. If the Township determines the escrow account needs replenishing and the applicant refuses to do so within fourteen (14) days after receiving notice, all construction or decommissioning activity, as applicable, associated with the project shall cease unless and until the applicant makes the required escrow deposit. Such terms of the Road Use Agreement shall be as agreed upon between the applicant and the Board of Supervisors.		
6.21.2.12	Applicant shall pay an application fee as set by resolution, obtain all applicable building permits, and pay the applicable building permit fee as set by resolution. The application fee, less the Township's actual costs in considering the application, is refundable to the applicant in the event the conditional use permit is not approved. For purposes of this provision, the	Applicant will pay the applicable building permit fee upon submission of the building permit application.	$100.00 CUP application fee provided with this Application.

Ordinance Reference	Requirement	Compliance	Location in Application
	Township's costs include, but are not limited to, the following: costs associated with legal review, engineering review, and administrative time. In the event that the Township's costs exceed the application fee total, the applicant shall be responsible for such excess costs.		
Data Center CUP Application Content Requirements (Ord. Sec. 6.21.3)			
6.21.3.1	A map showing the boundaries of the entire property, with bearings and distances of the perimeter properties lines and any structures within 1 mile of the property line.	The boundaries of the entire property with bearing and distances of the perimeter properties lines and any structures within 1 mile of the property line are shown.	Appendix 5.
6.21.3.2	A site plan, drawn to scale, showing the location, dimensions, and maximum height in feet of all proposed improvements, including but not limited to structures, fencing, roadway access, utilities, and necessary appurtenances, and, if known, the proposed construction date for each improvement.	Dimensions, scales, location, and maximum height in feet are all included in the preliminary site plan. The final location of project components is subject to change following final engineering but will comply with all applicable township requirements/setbacks.	Appendix 3, Section 2.3.
6.21.3.3	Proposed means of ingress and egress to the property from a public street.	Means of ingress and egress to the property are shown in the site plan.	Section 2.4.3. Appendix 3.
6.21.3.4	Location of any existing or proposed parking spaces or loading docks.	Proposed parking, proof of parking, and loading areas included on site plan and were prepared in accordance with the Ordinance requirements.	Section 2.4.1. Appendix 3.
6.21.3.5	Plans for domestic and industrial water usage.	Plans for water usage and proposed routing of domestic watermain have been provided and were prepared in accordance with the Ordinance requirements.	Section 2.4.6 and Appendix 3.
6.21.3.6	Sanitary sewer and stormwater management plans.	Stormwater Management Plan and CUP Site Plan-Utility Plan provided for	Sections 2.4.7 and 2.4.8

Ordinance Reference	Requirement	Compliance	Location in Application
		proposed sanitary and stormwater main and were prepared in accordance with the Ordinance requirements.	Appendix 3 and Appendix 9
6.21.3.7	Location and width of all existing utility easements and the preliminary locations of new or relocated utilities.	CUP Site Plan and Utility plan identify preliminary locations of proposed utilities.	Appendix 3.
6.21.3.8	Emergency Plans.	Emergency Plan has been outlined within application and was prepared in accordance with the Ordinance requirements.	Section 3.2.2. Appendix 7.
6.21.3.9	Plan for reclamation and restoration of the site.	The Reclamation and Restoration Plan is included in this application and were prepared in accordance with the Ordinance requirements.	Sections 3.1.4, 3.3 and Appendix 6.
6.21.3.10	Plan for decommissioning.	The Decommissioning Plan has been outlined within this application and was prepared in accordance with the Ordinance requirements.	Section 3.3 and Appendix 6.
6.21.3.11	Copies of all signed permits or other documentation that indicates compliance with all applicable state and federal laws, statutes, rules, regulatory standards, including but not limited to the North Dakota State Electrical Board and the North Dakota State Electrical Code, and any amendment thereto, provided with the building permit application.	Copies of applicable signed permits or documentation demonstrating compliance with state and federal requirements will be provided as they become available and prior to the applicable building permit, construction activity, or operation requiring such approval.	Section 2.4.2
6.21.3.12	All application fees.	$100.00 CUP application fee required by Harmony Township.	$100.00 CUP application fee provided with this Application.
6.21.3.13	A study prepared by an acoustical engineer that describes the anticipated noise level of the facility and the proposed mitigation efforts such as sound walls,	A sound study has been prepared to provide a sound level analysis based upon the anticipated site layout, with installed mechanical and electrical equipment.	Section 2.3.4 and Appendix 11.

Ordinance Reference	Requirement	Compliance	Location in Application
	baffles, ventilation silencers, etc.		
6.21.3.14	A written statement provided by the applicant describing the proposed use, giving all pertinent information, specifically including:	A written statement describing the proposed use is included in this application.	Section 2.3
6.21.3.14 a	Type of operation	The type of operation is described in this application.	Section 3.2.
6.21.3.14 b	Hours of operation	The hour of operation is listed in this application.	Section 3.2.
6.21.3.14 c	Estimated number of patrons/clients/etc	Anticipated numbers of patrons/clients are provided in this application.	Section 3.2.
6.21.3.14 d	Proposed number of employees/attendants/etc.	The anticipated numbers of employees and non-employees attendants are provided in this application.	Section 2.2. Section 3.2.
6.21.3.14 e	Estimate of traffic impact of the proposed use, including the maximum expected trip generation and the distribution of these trips by mode and time of day	Estimated traffic impact of the proposed use, including maximum expected trip generation, distribution by mode, and time is included in this application.	Section 3.2.1. Appendix 10.
6.21.3.14 f	Vicinity or general area to be served by the use	The Project will serve users of digital infrastructure services. Data processing capacity will be determined by the final end-user and technology configuration but is expected to support large-scale computing, data storage, networking, and related technology operations throughout the region and beyond.	Section 1, 2.1.
6.21.3.14 g	Description of the building facade and architecture of proposed new building or additions	Description of the building facade and architecture of proposed buildings or additions is included in this application.	Section 2.3.3.
6.21.3.14 h	Description of any impacts to air quality and the technologies that will be	Description of potential impacts to air quality and the technologies to	Section 3.1.1.3.

Ordinance Reference	Requirement	Compliance	Location in Application
	applied to minimize emissions from sources of the pollution	minimize emissions from pollution sources are outlined in this application.	
6.21.3.14 i	Description of necessary lighting and the plan to minimize or eliminate light pollution;	A description of necessary lighting and the plan to minimize or eliminate light pollution is provided in this application.	Section 2.3.3
6.21.3.14 j	A listing of all hazardous or toxic substances as set forth in Title 40, Code of Federal Regulations, Parts 116.4, 302.4, and 355 and any amendments thereto; all hazardous waste as set forth by the North Dakota Department of Environmental Quality regulations and the North Dakota Century Code provisions; and petroleum products as defined in Title 40, Code of Federal Regulations Part 280; to be generated, utilized, store, treated, or disposed of on-site and the size and contents of any existing or proposed storage containers for the same.	The Project will comply with all applicable federal, state, and local regulations governing the generation, use, storage, handling, treatment, and disposal of hazardous and potentially hazardous materials. Any materials associated with facility operations will be stored, managed, and contained in accordance with regulatory requirements and industry's best practices.	Section 3.1.1.2
6.21.3.14 k	A statement that the proposed use conforms to the provisions of all applicable ordinances, regulations, adopted standards, and all applicable conditions; and	The proposed use will conform to the provisions of all applicable ordinances, regulations, adopted standards, and all applicable conditions.	Section 2.4.2
6.21.3.14 l	Narrative describing the proposed project, including a description of how the project meets market demand, the facility's processing capacity, and the facility's anticipated water and electricity needs.	A written statement describing the Project including how it addresses market demand, its anticipated processing capacity, and its projected water and electrical requirements, is included in this application.	Section 2.1, 2.2, 2.3, and 2.4.
6.21.3.15	Decommissioning Commercial Facility.	-	-

Ordinance Reference	Requirement	Compliance	Location in Application
6.21.3.15 a	Applicant must submit a decommissioning plan at the time of applying for the conditional use permit to ensure that facilities are properly removed after their useful life. The decommissioning plan must comply with all state and federal laws.	The decommissioning plan is included in this Application and will comply will all state and federal laws.	Section 3.3. Appendix 6.
6.21.3.15 b	Decommissioning of the project must occur in the event the project does not produce power for 12 consecutive months. An owner may petition for an extension of this period upon showing of reasonable circumstances that have caused the delay in the start of decommissioning.	The Applicant acknowledges that the project will be decommissioned if it ceases to produce power for a period of 12 consecutive months. The applicant further understands that an extension of this period may be requested from the Township upon demonstrating reasonable circumstances that have delayed the commencement of decommissioning activities.	Section 3.3. Appendix 6.
6.21.3.15 c	The plan shall include provisions for removal of all structures and foundations to a depth of 48 inches, restoration of soil and native vegetation and assurances that financial resources will be available to fully decommission the site.	Plans for removal of structures and restoration of soil and native vegetation are provided in this Application. A proposed plan for financial security to decommission the Project is also included.	Section 3.1.4, 3.3 Appendix 6.
6.21.3.15 d	At the discretion of the Township, the posting of a bond, letter of credit, parent guarantee, or other financial surety may be required to ensure proper decommissioning.	The Applicant acknowledges that the Township may require a bond, letter of credit, parent guarantee, or other financial surety.	Section 3.3. Appendix 6.
6.21.3.16	Failure to Decommission. If the financially responsible party for the	The Applicant acknowledges that if the financially responsible party for the project fails to	Section 3.3. and Appendix 6.

Ordinance Reference	Requirement	Compliance	Location in Application
	project does not complete the decommissioning of the commercial facility, the Township may take such action as may be necessary to complete decommissioning, including but not limited to, requiring forfeiture of the performance bond or assessment of the cost of decommissioning against the land. The issuance of the conditional use permit shall constitute agreement and consent by all parties to the agreement, including their respective heirs, successors, and assigns, that the Township may take such action as may be necessary to decommission the project and adequately restore the site, including the exercise by the Township, Township staff, and their contractors, of the right of ingress and egress for the purpose of decommissioning the project and restoring the property.	decommission the facility, the township may take necessary action to complete decommissioning.	

Appendix 2. CUP Application Form

HARMONY TOWNSHIP, CASS COUNTY, NORTH DAKOTA

CONDITIONAL USE PERMIT (CUP)

OFFICIAL APPLICATION, REVIEW, AND APPROVAL RECORD

Application No.	_____	**Permit No.**	_____
Date Received	_____	**Public Hearing**	_____
Board Action	_____	**Resolution No.**	_____

1. APPLICANT INFORMATION

Applicant	CCDC ND, LLC	**Property Owner**	Thomas & Jill Roden
Authorized Agent	Amber Miller	**Mailing Address**	8400 Normandale Lake Blvd, #1200, Bloomington MN
Phone	+1 (701) 543-0282	**Email**	HarmonyEP@geronimopower.com

2. PROPERTY INFORMATION

Project Name	Harmony Energy Park	**Property Address**	See page 4
Parcel Number(s)	See page 4	**Legal Description**	See page 4
Township Section(s)	See page 4	**Existing Zoning District**	Agriculture
Existing Land Use	Agriculture	**Project Acreage**	640

3. REQUEST

Conditional Use Requested	Data Center

Project Description:

Proposed data center campus with associated buildings, equipment, and infrastructure.

4. REQUIRED SUBMITTALS

▣ Site Plan	▣ Legal Description
▣ Boundary Survey	▣ Building Plans
▣ Drainage/Grading Plan	▣ Utility Plan
▣ Stormwater Information	▣ Traffic Study (if required)
▣ Noise Study (if required)	▣ Lighting Plan
▣ Landscape Plan	▣ Fire Protection Information
▣ Other: Refer to Application Package	

5. APPLICANT CERTIFICATION

I certify that the information contained in this application is true and correct to the best of my knowledge. I understand that approval of this Conditional Use Permit does not eliminate the requirement to obtain all other applicable federal, state, county, township, utility, or agency permits.

Applicant Signature	*Amber Miller*
Date	Sep 12, 2026

6. AHJ / STAFF REVIEW

Reviewed By	
Date	

Review Comments / Findings:

7. PLANNING & ZONING COMMISSION ACTION

Meeting Date	

☐ Recommended Approval ☐ Recommended Approval with Conditions ☐ Recommended Denial

Comments:

Chairperson	
Date	

8. BOARD OF SUPERVISORS ACTION

Meeting Date	

☐ Approved ☐ Approved with Conditions ☐ Denied

Chairperson	
Date	

9. CONDITIONS OF APPROVAL

PROJECT-SPECIFIC CONDITIONS	
1	
2	
3	
4	
5	

10. STANDARD CONDITIONS

1. Approval applies only to the use described in this permit.

2. Changes in ownership, site layout, building size, or operational characteristics may require amendment of this CUP.

3. All Township ordinances and applicable laws shall be complied with at all times.

4. Approval does not authorize construction or occupancy without required permits.

5. The Township may conduct reasonable inspections to verify compliance.

6. Violation of permit conditions may result in enforcement, suspension, or revocation after due process.

7. This CUP expires if substantial commencement has not occurred within 1 year unless extended by the Board.

8. The owner is responsible for ongoing compliance throughout the life of the project.

9. Approval does not waive private easements, covenants, deed restrictions, or other legal obligations.

10. The Board may impose additional conditions necessary to protect public health, safety, and welfare.

11. ZONING ADMINISTRATOR CERTIFICATION

I certify this Conditional Use Permit was approved in accordance with the Harmony Township Zoning Ordinance.

Zoning Administrator	
Date	

OFFICIAL TOWNSHIP RECORD

This form, together with all approved plans, exhibits, conditions, resolutions, and supporting documents, constitutes the official CUP record maintained by Harmony Township.

Tax Parcel ID No(s): 43-0000-06361-000; 43-0000-06360-000; 43-0000-06363-000; 43-0000-06362-000; 43-0000-06364-000; 43-0000-06391-020; 43-0000-06391-030; 43-0000-06389-000; and 43-0000-06390-060

NW1/4 of Section 15, Township 140 North, Range 51 West of the 5th P.M., Cass County, North Dakota.

AND

NE1/4 of Section 15, Township 140 North, Range 51 West of the 5th P.M., Cass County, North Dakota.

AND

W1/2 of the SW1/4 of Section 15, Township 140 North, Range 51 West of the 5th P.M., Cass County, North Dakota.

AND

E1/2 of the SW1/4 of Section 15, Township 140 North, Range 51 West of the 5th P.M., Cass County, North Dakota.

AND

SE1/4 of Section 15, Township 140 North, Range 51 West of the 5th P.M., Cass County, North Dakota.

The Property contains approximately <u>640.00</u> acres, more or less.

HEP CUP Form

Final Audit Report 2026-09-12

Created:	2026-09-12
By:	Victoria Orchard (vorchard@geronimopower.com)
Status:	Signed
Transaction ID:	CBJCHBCAABAArR4D6iOmGNhghanetl39CN7jGGYeYG6l

"HEP CUP Form" History

Document created by Victoria Orchard (vorchard@geronimopower.com)
2026-09-12 - 10:19:33 AM GMT

Document emailed to Amber Miller (amiller@geronimopower.com) for signature
2026-09-12 - 10:23:53 AM GMT

Email viewed by Amber Miller (amiller@geronimopower.com)
2026-09-12 - 3:28:03 PM GMT

Document e-signed by Amber Miller (amiller@geronimopower.com)
Signature Date: 2026-09-12 - 3:28:22 PM GMT - Time Source: server - Signature Appearance Selected: IMAGE

Agreement completed.
2026-09-12 - 3:28:22 PM GMT

Appendix 3. Site Plans

CUP SITE PLANS
FOR
HARMONY ENERGY PARK

SECTION 15, TOWNSHIP 140 N, RANGE 51 WEST
HARMONY TOWNSHIP, CASS COUNTY, ND

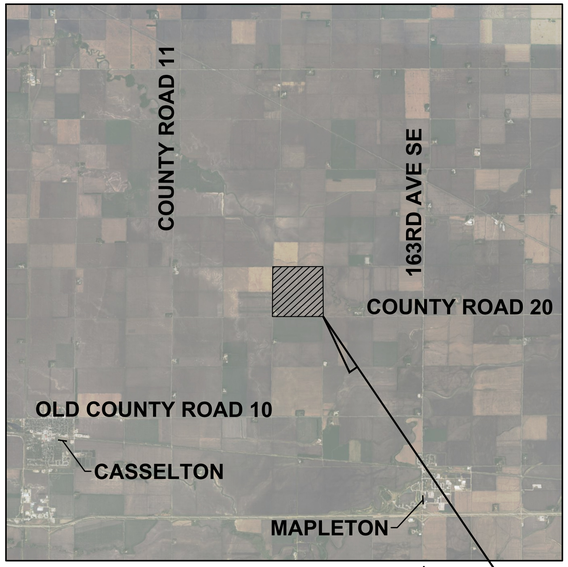
PROJECT TEAM:

ENGINEER
KIMLEY-HORN AND ASSOCIATES, INC.

PREPARED BY: MIKE C. BRANDT
767 EUSTIS ST, SUITE 100
ST. PAUL, MN 55114
TELEPHONE: (651) 645-4197

OWNER / DEVELOPER
CCDC ND, LLC
8400 NORMANDALE LAKE BLVD
SUITE 1200
BLOOMINGTON, MN 55437
TELEPHONE: (952) 988-9000
CONTACT: VICTORIA ORCHARD

ARCHITECT
HDR
1601 UTICA AVE S SUITE 600
GOLDEN VALLEY, MN 55416
TELEPHONE: (763) 951-5400
CONTACT: SCOTT BOYER



VICINITY
N.T.S.

NOTES:

1. CONTRACTOR SHALL CONFIRM THAT THE EXISTING SITE CONDITIONS MATCH WHAT IS SHOWN ON THE CONSTRUCTION DRAWINGS PRIOR TO CONSTRUCTION.
2. IF THE DRAWINGS ARE REPRODUCED, THE SCALES SHOWN ON THESE PLANS ARE BASED ON A ANSI full bleed D (34.00 x 22.00 Inches) SHEET.
3. ALL NECESSARY INSPECTIONS AND/OR CERTIFICATIONS REQUIRED BY CODES AND/OR UTILITY SERVICES COMPANIES SHALL BE PERFORMED PRIOR TO BUILDING OCCUPANCY AND THE FINAL CONNECTION OF SERVICES.
4. ALL GENERAL CONTRACTOR WORK TO BE COMPLETED (EARTHWORK, FINAL UTILITIES, AND FINAL GRADING) BY THE MILESTONE DATE IN PROJECT DOCUMENTS.

DRAWING INDEX

SHEET NUMBER	SHEET TITLE
C-00	COVER SHEET
C-01	PRELIMINARY SITE PLAN
C-02	OVERALL SETBACK PLAN
C-02.1	LOCATION SETBACK ENLARGEMENT
C-02.2	LOCATION SETBACK ENLARGEMENT
C-02.3	LOCATION SETBACK ENLARGEMENT
C-02.4	LOCATION SETBACK ENLARGEMENT
C-03	PRELIMINARY GRADING AND DRAINAGE PLAN
C-04	PRELIMINARY UTILITY PLAN
L-01	PRELIMINARY LANDSCAPE PLAN
L-02	ARCHITECTURAL DEPICTIONS AS VIEWED FROM LOT & STREET LINES
E-01	PRELIMINARY OVERALL LIGHTING PLAN
E-02	TYPICAL LIGHTING SCHEMATICS
AR-01	ARCHITECTURAL PLANS - BY OTHERS
AR-02	ARCHITECTURAL PLANS - BY OTHERS
AR-03	ARCHITECTURAL PLANS - BY OTHERS
AR-04	ARCHITECTURAL PLANS - BY OTHERS
AR-05	ARCHITECTURAL PLANS - BY OTHERS

Know what's **below.**
Call before you dig.

No.	REVISIONS	DATE	BY

Kimley»Horn
2026 KIMLEY-HORN AND ASSOCIATES, INC.
11995 SINGLETREE LANE SUITE 225, EDEN PRAIRIE, MN 55344
PHONE: 612-315-1272
WWW.KIMLEY-HORN.COM

KHA PROJECT	161211023
DATE	9/14/2025
SCALE	AS SHOWN
DESIGNED BY	LHC
DRAWN BY	SKB
CHECKED BY	NMB

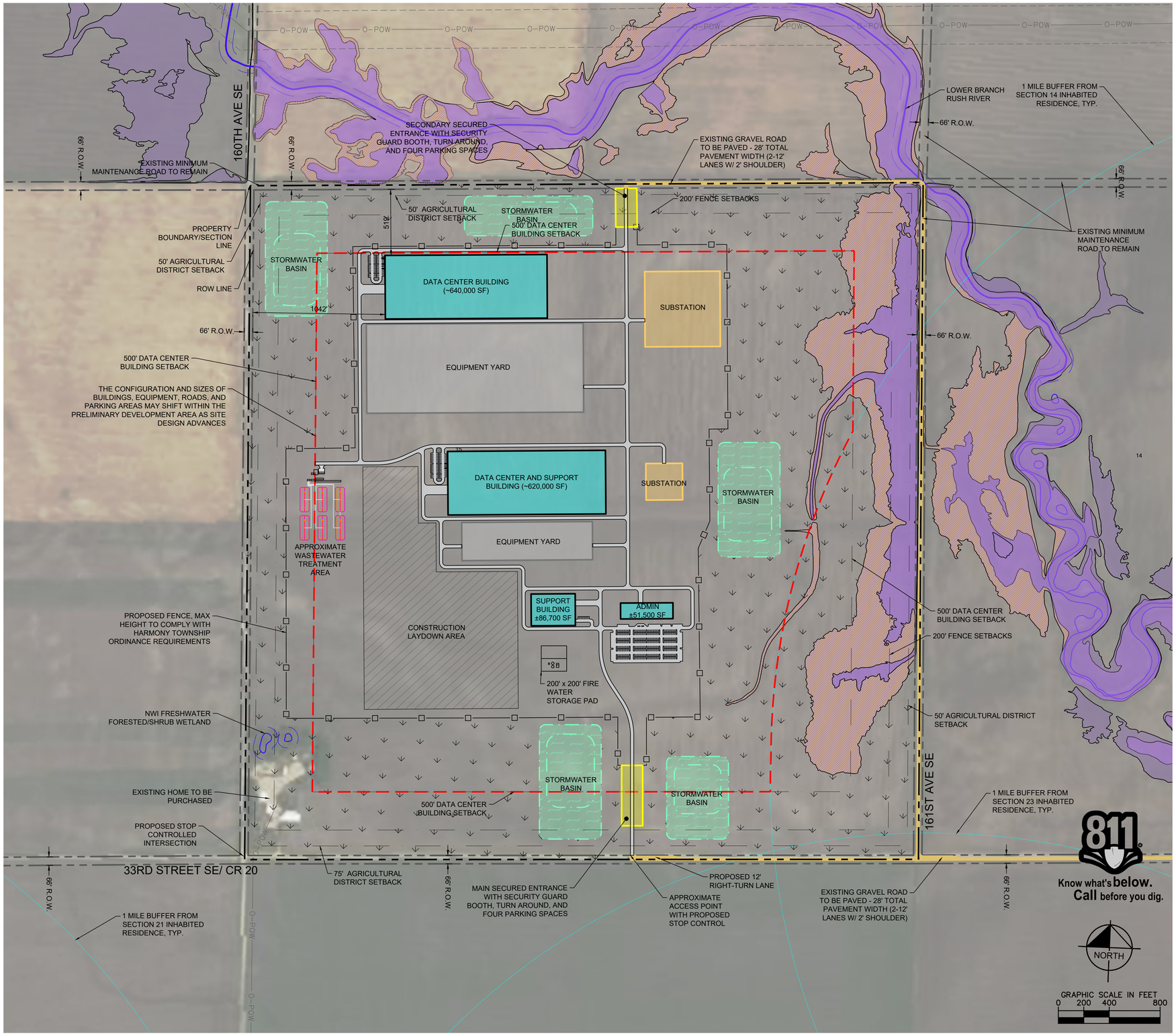
COVER SHEET

HARMONY ENERGY PARK
PREPARED FOR
CCDC ND, LLC
HARMONY TOWNSHIP NORTH DAKOTA

SHEET NUMBER
C-00

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LEGEND

- PROPERTY LINE
- BUILDING SETBACK
- PROOF OF PARKING
- EXISTING NWI WETLAND
- ASSUMED WETLAND BUFFER AREA
- EXISTING OVERHEAD POWERLINE
- EXISTING EASEMENT
- PROPOSED FENCE
- EXISTING PARCEL LINES
- PRELIMINARY DEVELOPMENT AREA
- VEGETATION AREA
- SUBSTATION AREA
- DATA CENTER & SUPPORT BUILDING
- SUBSTATION
- EQUIPMENT YARD
- ROADWAYS
- NEW PAVEMENT
- WASTEWATER TREATMENT & WATER STORAGE TANK AREA
- CONSTRUCTION LAYDOWN AREA
- SECURED ENTRANCE AREA
- STORMWATER BASINS
- FEMA FLOODPLAIN - ZONE A
- FEMA FLOODPLAIN - ZONE X

PROPERTY SUMMARY	
TOTAL PROPERTY AREA	±629 AC
PRELIMINARY DEVELOPMENT AREA	±383 AC
EXISTING IMPERVIOUS AREA	± 5 AC / 0%
EXISTING PERVIOUS AREA	± 624 AC / 100%
PROPOSED IMPERVIOUS AREA	± 158.78 AC / 26%
PROPOSED PERVIOUS AREA	± 470.31 AC / 75%

SITE DATA	
EXISTING ZONING	A-1 AGRICULTURAL DISTRICT
PROPOSED LAND USE	DATA CENTER
BUILDING SETBACKS	500'

BUILDING DATA	
TOTAL BUILDING AREA	1,560,115 SF
PERCENT OF TOTAL PROPERTY AREA	5.55%
MAXIMUM BUILDING HEIGHT	35 FT

SITE PLAN NOTES

1. PROPOSED IMPROVEMENTS INCLUDING DATA CENTER BUILDINGS, STRUCTURES, FENCING, ROADWAY ACCESS, UTILITIES, AND NECESSARY APPURTENANCES, MAX HEIGHT TO COMPLY WITH HARMONY TOWNSHIP ORDINANCE REQUIREMENTS.
2. STORMWATER BASIN CONFIGURATION IS PRELIMINARY AND BASED ON CURRENT SITE LAYOUT. THE CONFIGURATION MAY CHANGE WITH UPDATES TO SITE DESIGN, FINAL DESIGN WILL BE IN CONFORMANCE WITH ALL LOCAL AND STATE REGULATIONS.

ELEMENTS SHOWN ARE SCHEMATIC AND SUBJECT TO CHANGE, INCLUDING THE POSSIBLE ADDITION OF OTHER COMPONENTS SUCH AS BESS, WITHIN THE PRELIMINARY DEVELOPMENT AREA, UPON FUTURE BUILDING PERMIT

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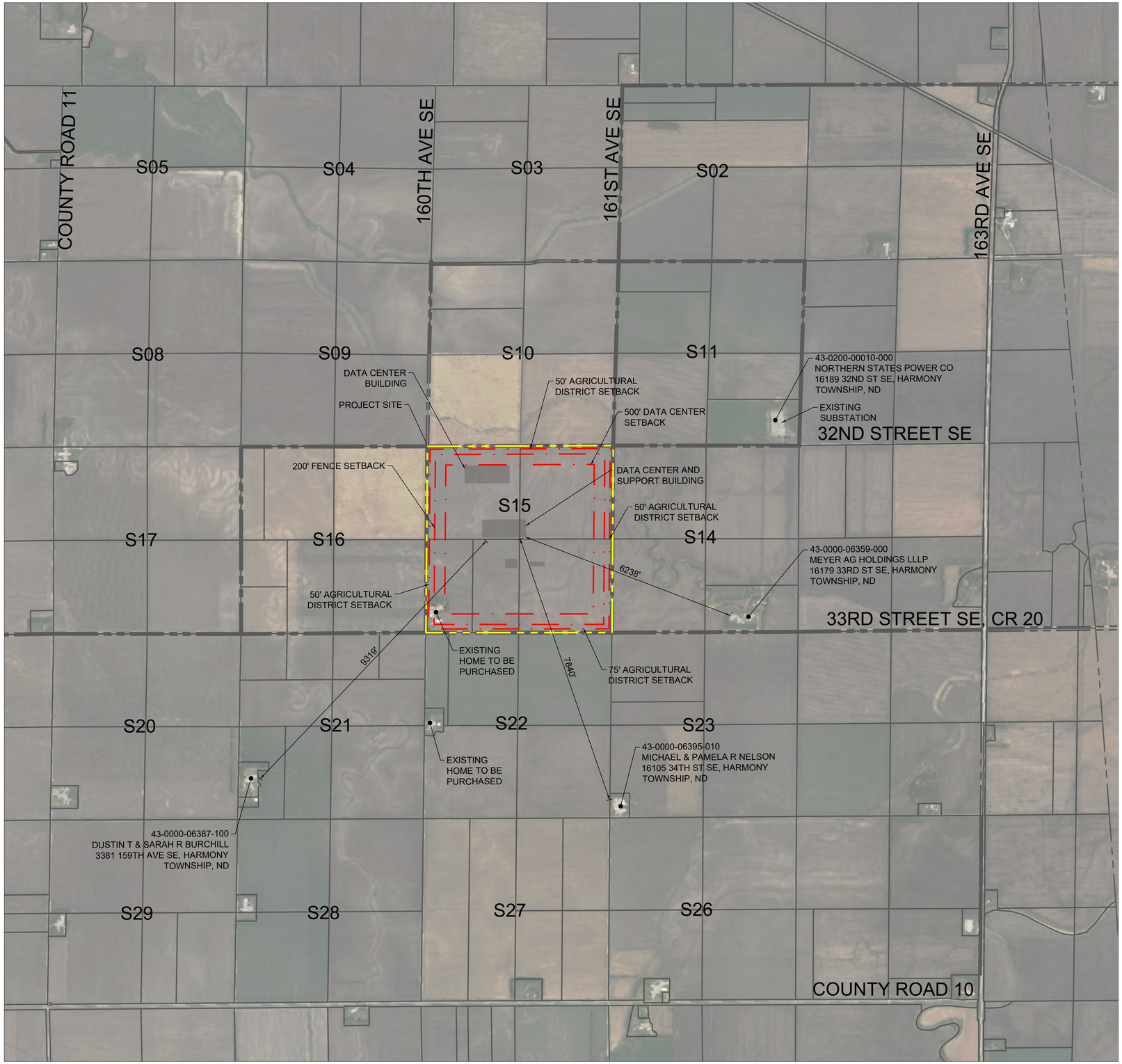
KHA PROJECT 161211023
DATE 9/11/2026
SCALE AS SHOWN
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DRAWN BY SKB
CHECKED BY NMB

PRELIMINARY SITE PLAN

HARMONY ENERGY PARK
PREPARED FOR
CCDC ND, LLC
HARMONY TOWNSHIP NORTH DAKOTA

SHEET NUMBER
C-01

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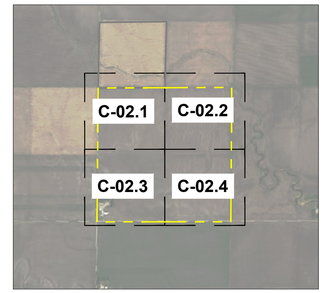


LEGEND

- PROPERTY LINE
- ROW EASEMENT
- SETBACK LINE

APPLICABLE SETBACKS	
DATA CENTER SETBACKS	
ROAD ROW, FRONT, SIDE AND REAR YARD	500'
INHABITED RESIDENCE OR COMMUNITY BUILDING	5280'
AGRICULTURAL DISTRICT YARD REQUIREMENTS	
FRONT YARD	75'
ROAD ROW, SIDE AND REAR YARD	50'
FENCE SETBACKS	
CENTER OF TOWNSHIP ROAD AND ADJACENT PROPERTIES	200'

KEYMAP



NOTES

1. DIMENSIONS AS SHOWN ARE MEASURED FROM THE NEAREST CORNER OF THE INHABITABLE RESIDENCE TO THE NEAREST CORNER OF THE PROPOSED DATA CENTER BUILDINGS.

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OVERALL SETBACK PLAN

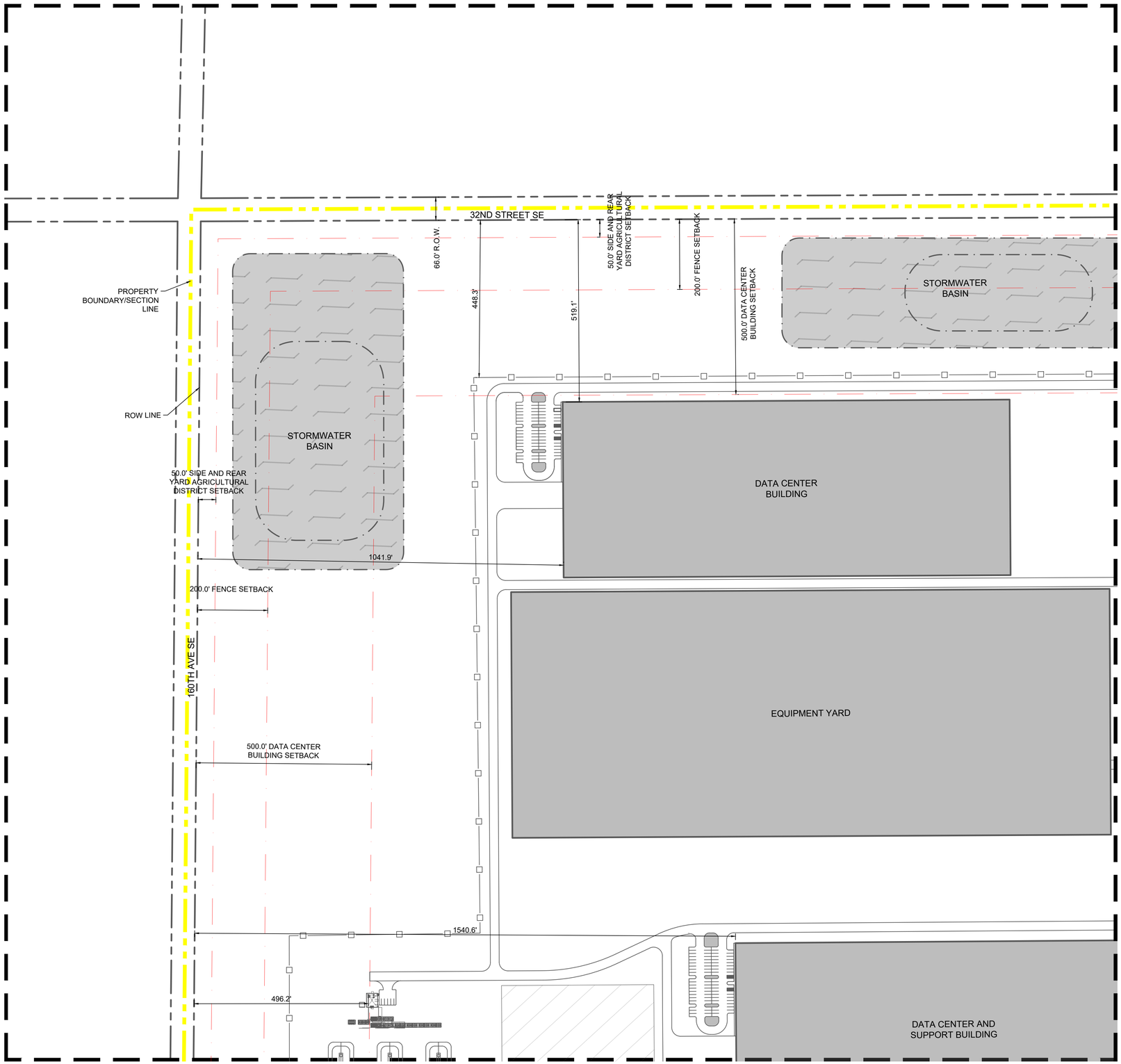
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HARMONY TOWNSHIP NORTH DAKOTA

SHEET NUMBER
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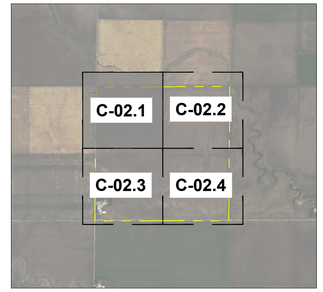
LEGEND

- PROPERTY LINE
- ROW EASEMENT
- SETBACK LINE
- PROPOSED FENCE

APPLICABLE SETBACKS

DATA CENTER SETBACKS	
ROAD ROW, FRONT, SIDE AND REAR YARD	500'
INHABITED RESIDENCE OR COMMUNITY BUILDING	5280'
AGRICULTURAL DISTRICT YARD REQUIREMENTS	
FRONT YARD	75'
ROAD ROW, SIDE AND REAR YARD	50'
FENCE SETBACKS	
CENTER OF TOWNSHIP ROAD AND ADJACENT PROPERTIES	200'

KEYMAP



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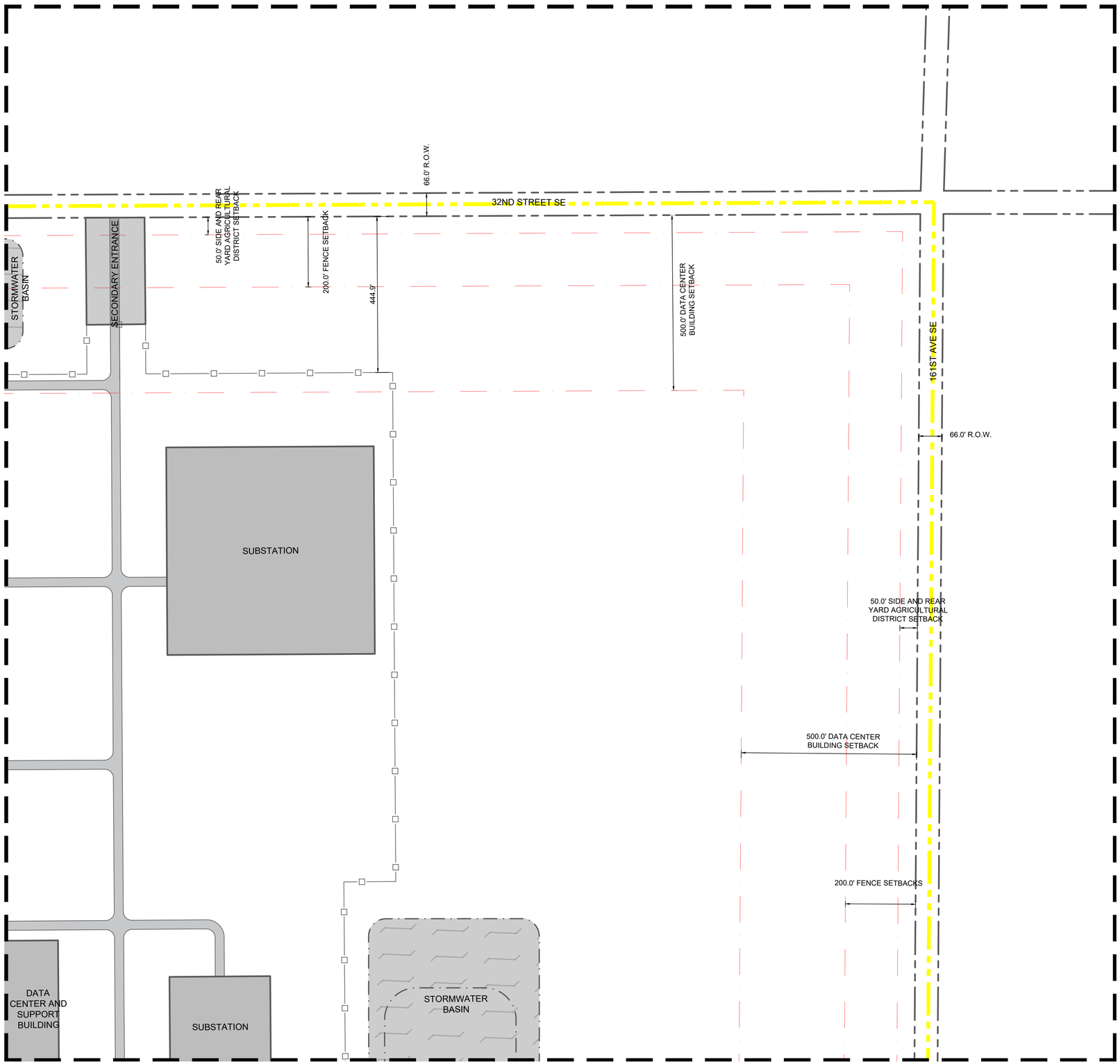
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SCALE	AS SHOWN
DESIGNED BY	LHC
DRAWN BY	MOB
CHECKED BY	NMB

LOCATION SETBACK ENLARGEMENT

HARMONY ENERGY PARK
PREPARED FOR
CCDC ND, LLC
HARMONY TOWNSHIP NORTH DAKOTA

SHEET NUMBER
C-02.1

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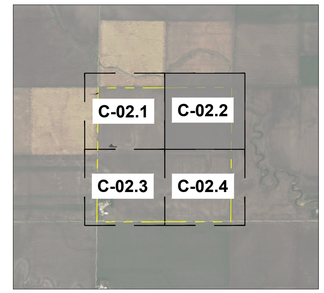
LEGEND

- PROPERTY LINE
- ROW EASEMENT
- SETBACK LINE
- PROPOSED FENCE

APPLICABLE SETBACKS

DATA CENTER SETBACKS	
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KEYMAP



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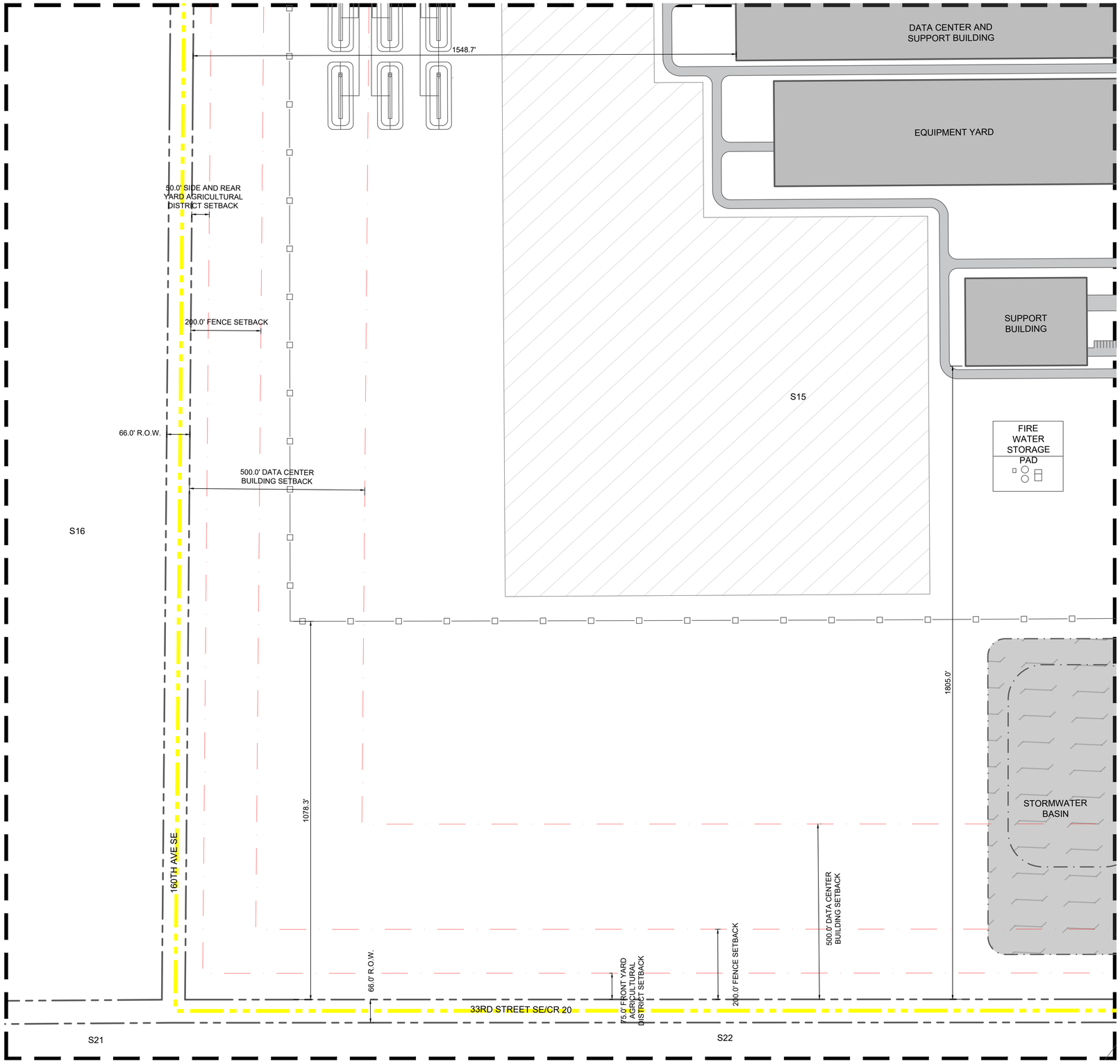
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LOCATION SETBACK ENLARGEMENT

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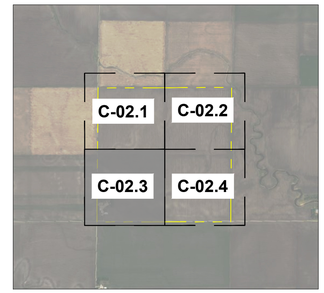
LEGEND

- PROPERTY LINE
- ROW EASEMENT
- SETBACK LINE
- PROPOSED FENCE

APPLICABLE SETBACKS

DATA CENTER SETBACKS	
ROAD ROW, FRONT, SIDE AND REAR YARD	500'
INHABITED RESIDENCE OR COMMUNITY BUILDING	5280'
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FRONT YARD	75'
ROAD ROW, SIDE AND REAR YARD	50'
FENCE SETBACKS	
CENTER OF TOWNSHIP ROAD AND ADJACENT PROPERTIES	200'

KEYMAP



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LOCATION SETBACK ENLARGEMENT

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PREPARED FOR
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HARMONY TOWNSHIP NORTH DAKOTA

SHEET NUMBER
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DATA CENTER AND SUPPORT BUILDING
SUBSTATION
EQUIPMENT YARD
STORMWATER BASIN
ADMIN
S15
S14
S22
S23
MAIN ENTRANCE
STORMWATER BASIN
STORMWATER BASIN
50.0' SIDE AND REAR YARD AGRICULTURAL DISTRICT SETBACK
200.0' FENCE SETBACKS
1939.5'
500.0' DATA CENTER BUILDING SETBACK
66.0' R.O.W.
1684.3'
707.8'
66.0' R.O.W.
75.0' FRONT YARD AGRICULTURAL DISTRICT SETBACK
200.0' FENCE SETBACK
500.0' DATA CENTER BUILDING SETBACK
161ST AVE SE
33RD STREET SE/CR 20

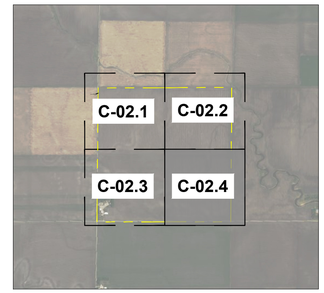
LEGEND

- PROPERTY LINE
- ROW EASEMENT
- SETBACK LINE
- PROPOSED FENCE

APPLICABLE SETBACKS

DATA CENTER SETBACKS	
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FRONT YARD	75'
ROAD ROW, SIDE AND REAR YARD	50'
FENCE SETBACKS	
CENTER OF TOWNSHIP ROAD AND ADJACENT PROPERTIES	200'

KEYMAP



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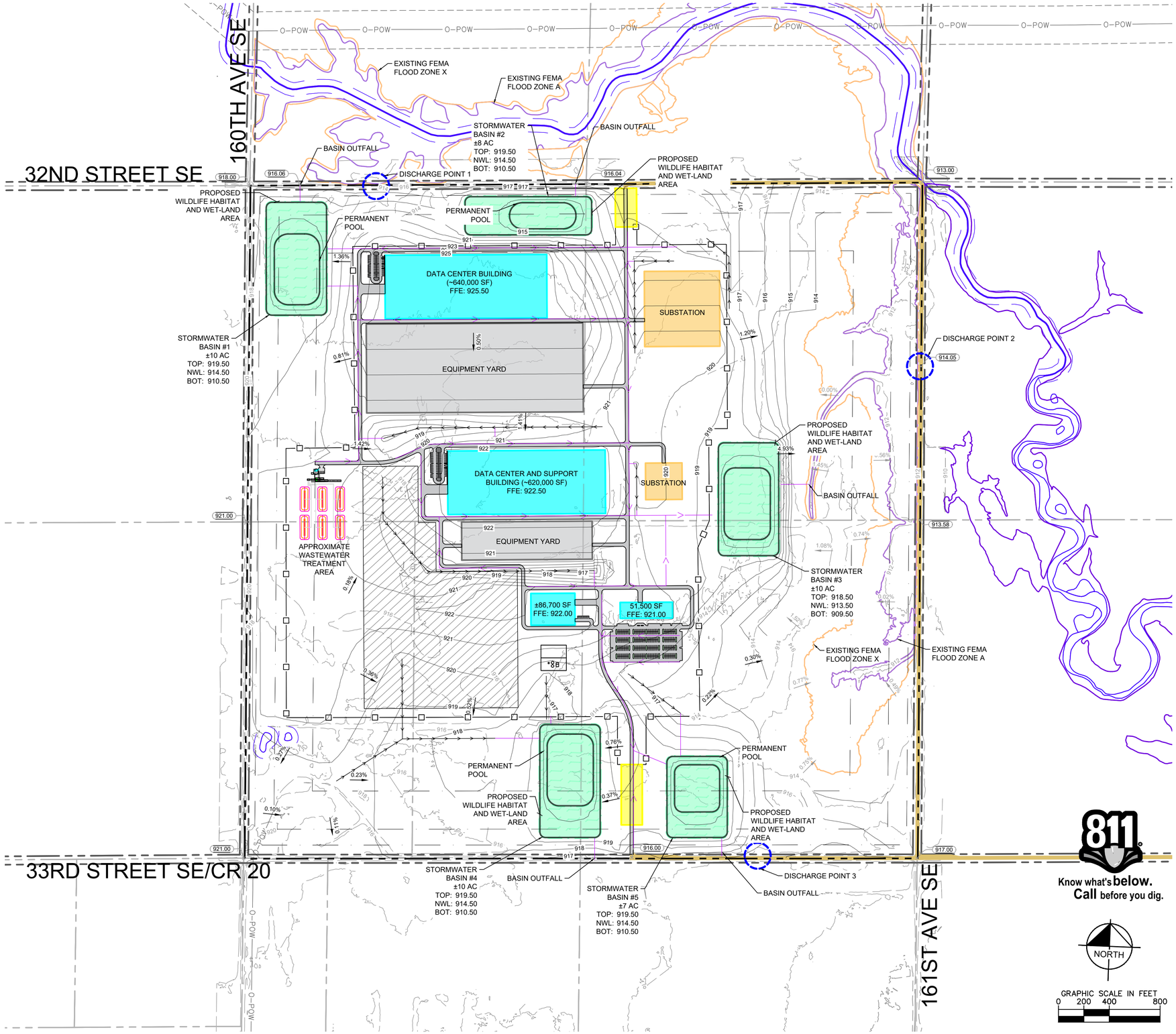
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DESIGNED BY	LHC
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LOCATION SETBACK ENLARGEMENT

HARMONY ENERGY PARK
PREPARED FOR
CCDC ND, LLC
HARMONY TOWNSHIP NORTH DAKOTA

SHEET NUMBER
C-02.4



LEGEND

- PROPERTY LINE
- EXISTING CONTOUR
- PROPOSED CONTOUR
- FEMA FLOODPLAIN - ZONE A
- FEMA FLOODPLAIN - ZONE X
- PROPOSED STORM SEWER
- PROPOSED SWALE
- PROPOSED DRAINAGE DIRECTION AND SLOPE
- EXISTING DRAINAGE DIRECTION AND SLOPE

GRADING PLAN NOTES

1. PRELIMINARY GRADING PLAN NOT FOR CONSTRUCTION.
2. REFER TO THE UTILITY PLANS FOR LAYOUT FOR PROPOSED SANITARY SEWER, WATER MAIN, AND OTHER BUILDING UTILITY SERVICE CONNECTIONS.

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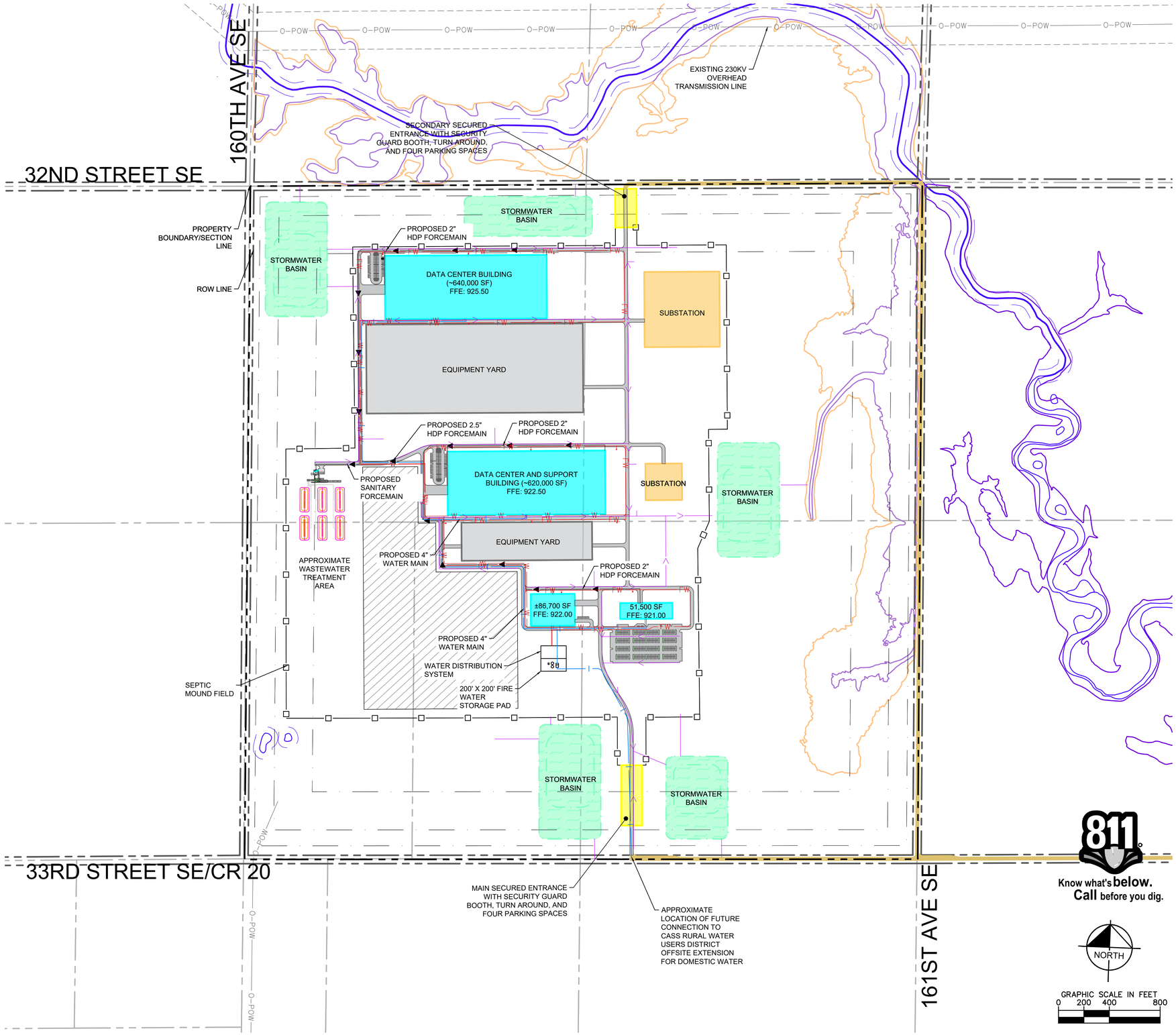
PRELIMINARY GRADING AND DRAINAGE PLAN

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PREPARED FOR
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HARMONY TOWNSHIP NORTH DAKOTA

SHEET NUMBER
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LEGEND

- PROPERTY LINE
- PROPOSED EASEMENT
- EXISTING OVERHEAD POWER
- FEMA FLOODPLAIN - ZONE A
- FEMA FLOODPLAIN - ZONE X
- PROPOSED HYDRANT
- PROPOSED 4" C900 PVC WATERMAIN
- PROPOSED SANITARY FORCEMAIN
- PROPOSED STORM SEWER
- PROPOSED 8" FIRE SERVICE LINE
- PROPOSED 10" FIRE BUILDING WATER

MINIMUM UTILITY SPACING

- 10'
- 10'
- 8'
- 5'

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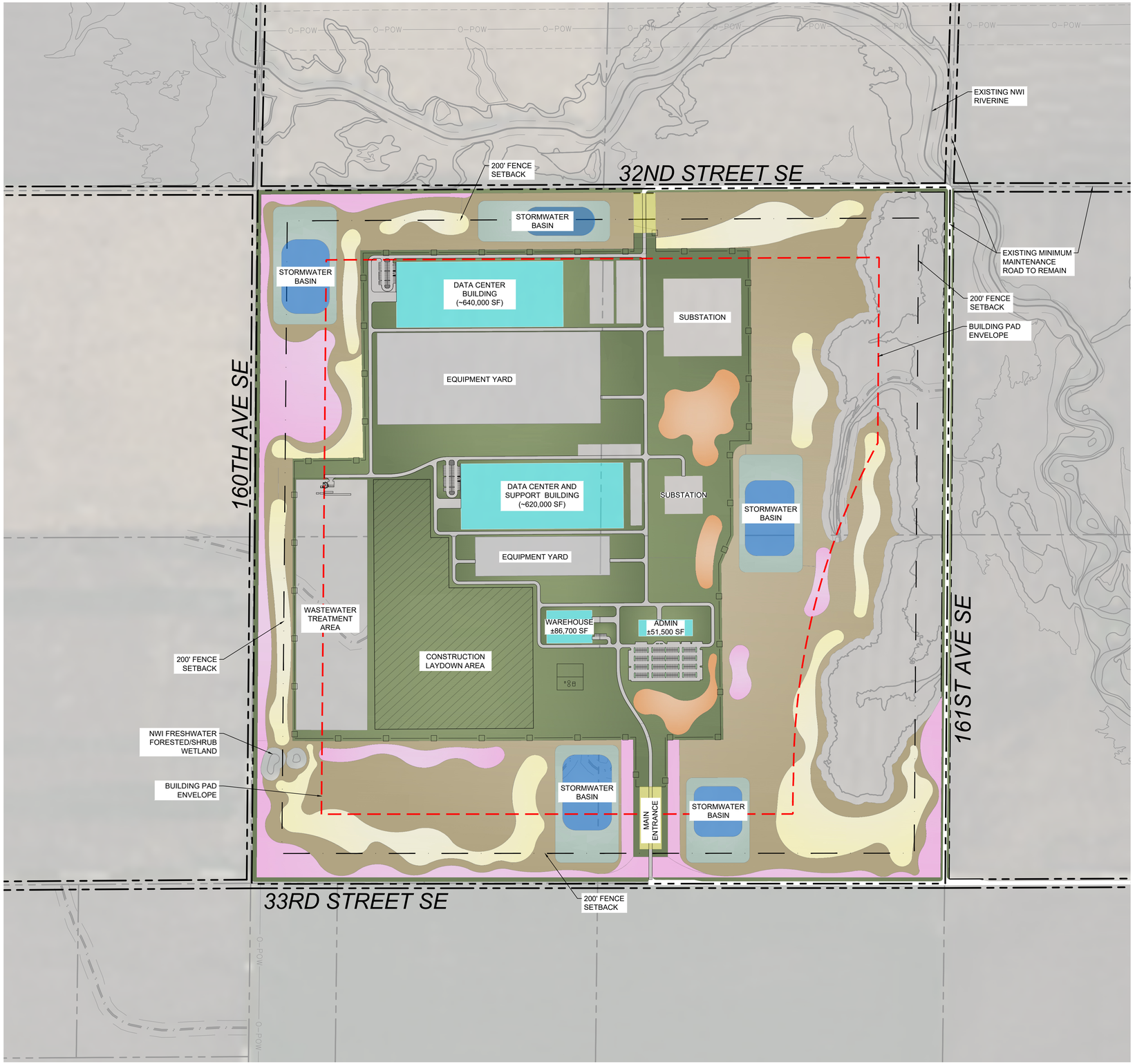
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PRELIMINARY UTILITY PLAN

HARMONY ENERGY PARK
PREPARED FOR
CCDC ND, LLC
HARMONY TOWNSHIP NORTH DAKOTA

SHEET NUMBER
C-04



LANDSCAPE SUMMARY

REQUIRED ROADSIDE SEEDING:	LAWN GRASS TYPE REQUIRED IN RIGHT-OF-WAY, OR WITHIN CONFINES OF DITCH BACKSLOPE.
PROVIDED ROADSIDE SEEDING:	LAWN GRASS TYPE SEEDING PROVIDED IN DITCH BACKSLOPE.

SEEDING SCHEDULE

SYMBOL	DESCRIPTION
SEED	
	SEED WITH LAWN SEED MIX (TYP.)
	SEED WITH NATIVE SEED MIX - TYPE 1 (TYP.)
	SEED WITH NATIVE STORMWATER SEED MIX (TYP.)
	SEED WITH NATIVE SEED MIX - TYPE 2 (TYP.)
	SEED WITH NATIVE SEED MIX - TYPE 3 (TYP.)
	SEED WITH NATIVE SEED MIX - TYPE 4 (TYP.)

LANDSCAPE DATA SUMMARY

LAND COVER TYPE	AREA (AC)	PERCENT OF TOTAL AREA	TOTAL AREA (AC)	TOTAL PERCENT
UNDISTURBED	146	23%	527	83%
BOTTOM OF BASIN	20	3%		
LAWN TYPE SEED	161	25%		
NATIVE TYPE SEED	200	32%		

NOTES

1. PROPOSED IMPROVEMENTS INCLUDING DATA CENTER BUILDINGS, STRUCTURES, FENCING, ROADWAY ACCESS, UTILITIES, AND NECESSARY APPURTENANCES, MAX HEIGHT TO COMPLY WITH HARMONY TOWNSHIP ORDINANCE REQUIREMENTS.
2. STORMWATER BASIN CONFIGURATION IS PRELIMINARY AND BASED ON CURRENT SITE LAYOUT. THE CONFIGURATION MAY CHANGE WITH UPDATES TO SITE DESIGN, FINAL DESIGN WILL BE IN CONFORMANCE WITH ALL LOCAL AND STATE REGULATIONS.

ELEMENTS SHOWN ARE SCHEMATIC AND SUBJECT TO CHANGE, INCLUDING THE POSSIBLE ADDITION OF OTHER COMPONENTS SUCH AS BATTERY ENERGY STORAGE SYSTEMS (BESS), WITHIN THE BUILDING PAD AREA, UPON FUTURE BUILDING PERMIT

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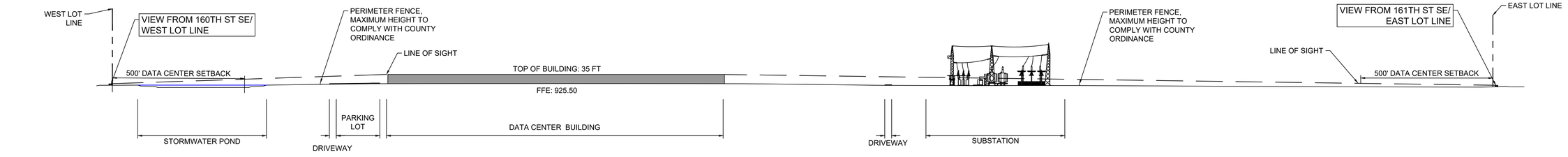
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DATE 09/13/2026
SCALE AS SHOWN
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DRAWN BY ATK
CHECKED BY RAH

PRELIMINARY LANDSCAPE PLAN

HARMONY ENERGY PARK
PREPARED FOR
CCDC ND, LLC
HARMONY TOWNSHIP NORTH DAKOTA

SHEET NUMBER
L-01

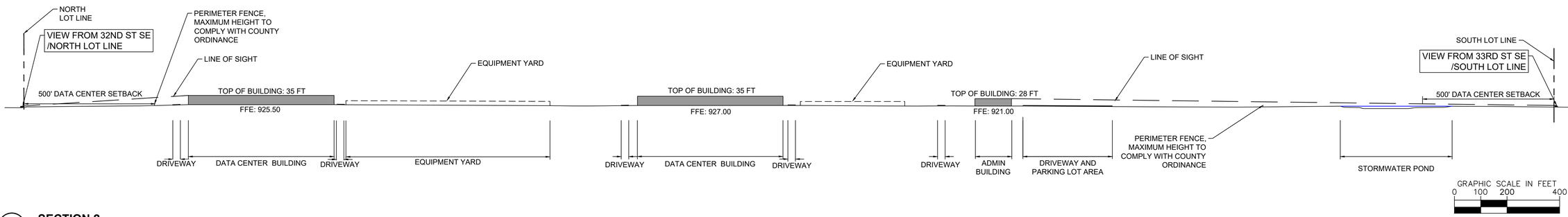
K:\TCW_LDEV\geronimo power\nd-cass-dc1\3 Design\CAD\plansheets\2026-0630 cup\L1-COLOR LANDSCAPE PLAN.DWG September 15, 2026 - 1:48pm
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1 SECTION 1

1" = 200'

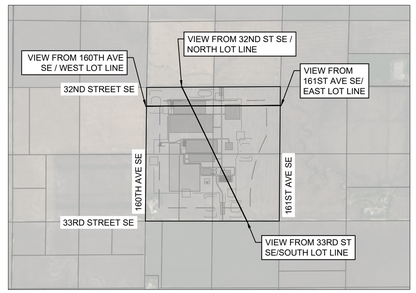


GRAPHIC SCALE IN FEET
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2 SECTION 2

1" = 200

KEYMAP



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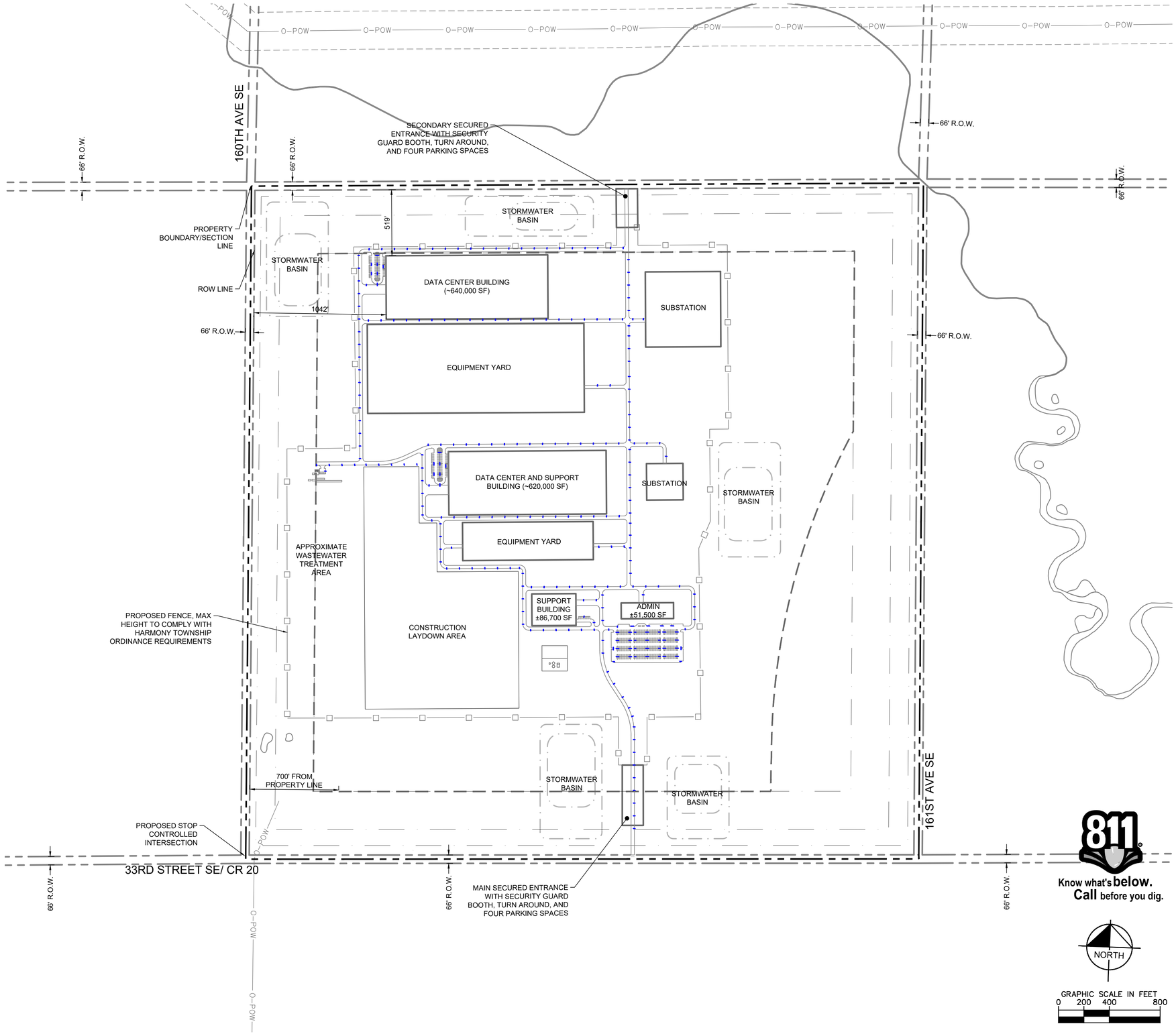
KHA PROJECT 161211023
DATE 9/14/2026
SCALE AS SHOWN
DESIGNED BY ATK
DRAWN BY MOB
CHECKED BY RAH

ARCHITECTURAL DEPICTIONS AS VIEWED FROM LOT & STREET LINES

HARMONY ENERGY PARK
PREPARED FOR
CCDC ND, LLC
HARMONY TOWNSHIP NORTH DAKOTA

SHEET NUMBER
L-02

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LEGEND

- PROPERTY LINE
- BUILDING SETBACK
- BUILDING ENVELOPE
- PROPOSED LIGHT POLE AND LUMINAIRE

SHEET NOTES

1. ALL WORK AND MATERIALS SHALL COMPLY WITH APPLICABLE TOWNSHIP ORDINANCES AND STATE REQUIREMENTS.
2. SITE LIGHTING SHALL COMPLY WITH U.S. FISH AND WILDLIFE SERVICE RECOMMENDATIONS AND REQUIREMENTS FOR THE PROTECTION OF MIGRATORY BIRDS.
3. ILLUMINATION LEVELS AT ADJACENT PROPERTY LINES SHALL NOT EXCEED 4 FOOT-CANDLES, AS MEASURED WITH A LIGHT METER.
4. ALL EXTERIOR LIGHT FIXTURES SHALL BE SHIELDED.
5. LUMINAIRE SYMBOLS ARE DIAGRAMMATIC ONLY. THE CONTRACTOR SHALL FIELD-VERIFY AND COORDINATE FINAL FIXTURE LOCATIONS AND SETBACKS TO AVOID CONFLICTS WITH UNDERGROUND UTILITIES AND OTHER SITE FEATURES.
6. BUILDING-MOUNTED LIGHTING FIXTURES SHALL BE DESIGNED BY THE PROJECT MEP ENGINEER AND ARE SHOWN ON THE PLANS FOR REFERENCE ONLY.
7. LIGHTING SPECIFICATIONS SHALL BE DESIGNED IN ACCORDANCE WITH DARK SKY PRINCIPLES. FIXTURES SHALL UTILIZE WARM-COLOR LIGHTING AND BE FULLY SHIELDED AND DIRECTED TO PREVENT OFF-SITE LIGHT SPILL AND GLARE BEYOND PROPERTY BOUNDARIES.
8. BUILDING MOUNTED FIXTURES WILL BE DESIGNED DURING THE BUILDING PERMIT PHASE AND WILL COMPLY WITH ALL APPLICABLE TOWNSHIP AND STATE REQUIREMENTS.
9. A FINAL PHOTOMETRIC LIGHTING PLAN SHALL BE PREPARED FOLLOWING COMPLETION OF THE SITE DESIGN AND SUBMITTED FOR REVIEW AND APPROVAL PRIOR TO ISSUANCE OF THE BUILDING PERMIT.
10. ALL LIGHTING SHALL COMPLY WITH APPLICABLE TOWNSHIP LIGHTING STANDARDS AND SHALL BE DESIGNED TO MINIMIZE IMPACTS TO ADJACENT PROPERTIES AND NATURAL RESOURCES.

THE SCHEMATIC LIGHTING PLAN TO COMPLY WITH ALL APPLICABLE TOWNSHIP ORDINANCE AND STATE REQUIREMENTS AND IS SUBJECT TO CHANGE UPON FUTURE BUILDING PERMIT.

No.	REVISIONS	DATE	BY

Kimley»Horn
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11995 SINGLETREE LANE SUITE 225, EDEN PRAIRIE, MN 55344
PHONE: 612-315-1272
WWW.KIMLEY-HORN.COM

KHA PROJECT 161211023
DATE 9/11/2026
SCALE AS SHOWN
DESIGNED BY LHC
DRAWN BY SKB
CHECKED BY NMB

PRELIMINARY OVERALL LIGHTING PLAN

HARMONY ENERGY PARK
PREPARED FOR
CCDC ND, LLC
HARMONY TOWNSHIP NORTH DAKOTA

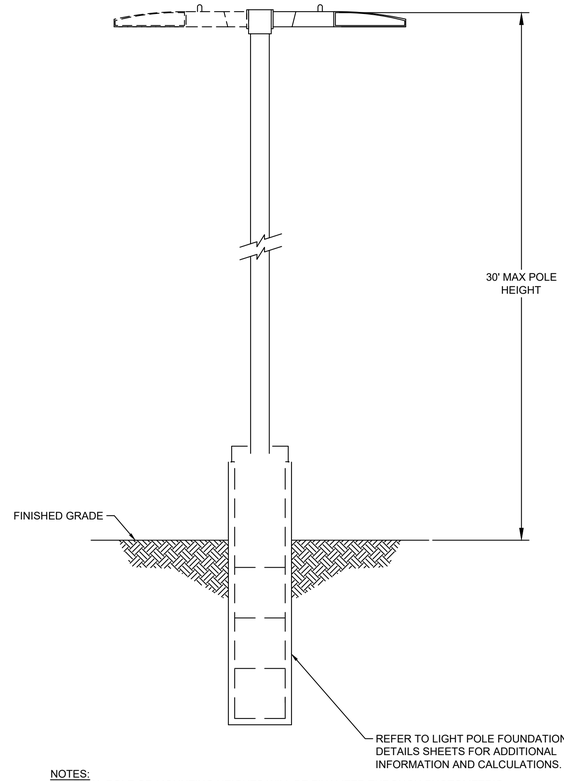
SHEET NUMBER
E-01

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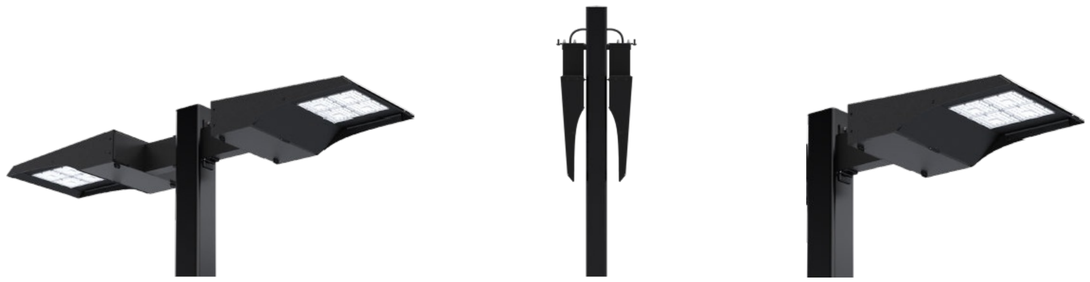
NOTES:
1. THIS IMAGE IS A REPRESENTATIVE VIEW OF POTENTIAL POLE LIGHTS AND IS NOT INDICATIVE OF PROPOSED BUILDING FACADE OR PROJECT SPECIFIC SITE DESIGN.

1 REPRESENTATIVE LIGHTING RENDERING
DESIGNED BY OTHERS

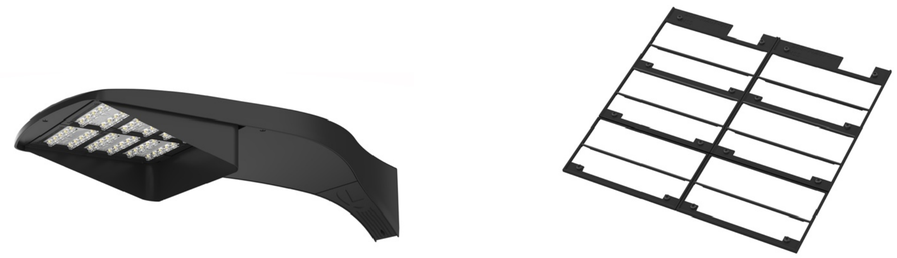


NOTES:
1. FINAL POLE OR MOUNTING HEIGHTS WILL BE FINALIZED THROUGH PHOTOMETRIC DESIGN TO COMPLY WITH ORDINANCE AND DARK-SKY REQUIREMENTS.

2 REPRESENTATIVE LIGHT POLE
N.T.S.



3 TYPICAL POLE-FIXTURE LIGHTING SYSTEM
DESIGNED BY OTHERS



4 TYPICAL SHIELD ACCESSORIES
DESIGNED BY OTHERS

No.	REVISIONS	DATE	BY

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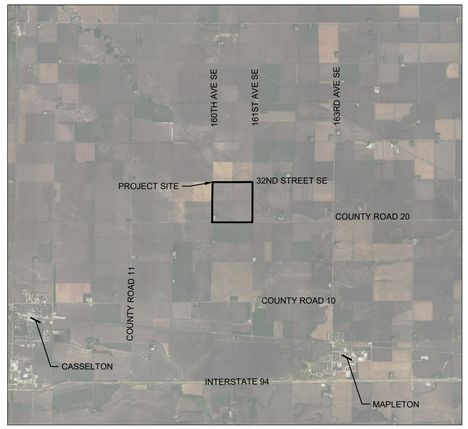
TYPICAL LIGHTING SCHEMATICS

HARMONY ENERGY PARK
PREPARED FOR
CCDC ND, LLC
HARMONY TOWNSHIP NORTH DAKOTA

SHEET NUMBER
E-02

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Appendix 4. Existing Land Use and Zoning Map



VICINITY MAP
NOT TO SCALE

LEGEND

PROPOSED PROPERTY LINE

A-1 AGRICULTURAL DISTRICT

GENERAL NOTES:

1. ALL HARMONY TOWNSHIP IS ZONED A-1 AGRICULTURAL PER HARMONY TOWNSHIP ZONING ORDINANCE 2026.
2. THE LAND USE OF ALL PARCEL SHOWN IS AGRICULTURAL UNLESS OTHERWISE NOTED.

Know what's **below.** **Call** before you dig.

NORTH

GRAPHIC SCALE IN FEET
0 300 600 1200

PROPERTY LINE

32ND STREET SE

160TH AVE SE

161ST AVE SE

33RD STREET SE/ CR 20

EXISTING LAND USE:
EXCEL ENERGY
BISON SUBSTATION

PROPOSED LAND USE:
POWERED DATA PARK

EXISTING LAND USE:
RESIDENTIAL AND
AGRICULTURAL

EXISTING LAND USE:
RESIDENTIAL AND
AGRICULTURAL

EXISTING LAND USE:
RESIDENTIAL AND
AGRICULTURAL

HARMONY ENERGY PARK | *EXISTING LAND USE AND ZONING MAP*

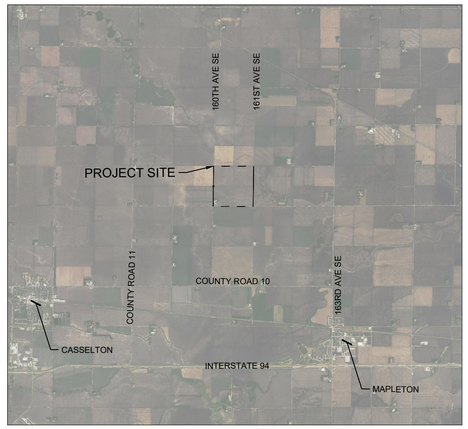
HARMONY TOWNSHIP, ND

Project # 161211023 August 14, 2026

Kimley»Horn

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Appendix 5. Property Boundary Exhibit



VICINITY MAP
NOT TO SCALE

LEGEND

- PROPOSED PROPERTY LINE
- EXISTING INHABITED RESIDENCE
- PERIMETER OF RESIDENTIAL PARCEL

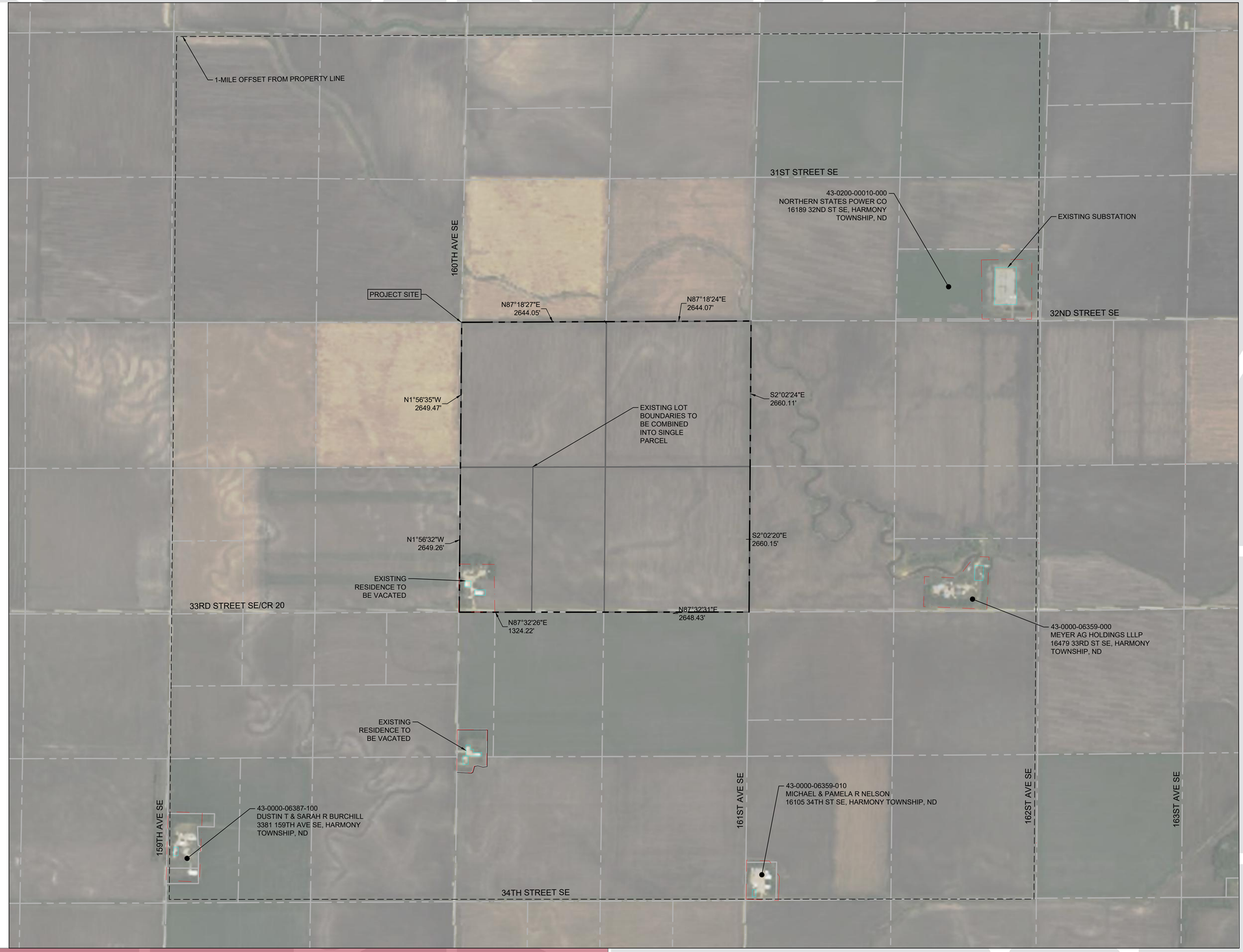
NOTES

THIS IS A PRELIMINARY PLANNING DOCUMENT AND IS NOT A PLAT OR LEGAL SURVEY EXHIBIT. BOUNDARIES SHOWN ON THIS PLAN ARE BASED ON THE BEST AVAILABLE PUBLIC DATA, AN ALTA BOUNDARY SURVEY WILL BE COMPLETED PRIOR TO ANY PROPERTY BOUNDARY REVISIONS FOR THIS DEVELOPMENT.

811 Know what's **below.** **Call** before you dig.

NORTH

GRAPHIC SCALE IN FEET
0 450 900 1800



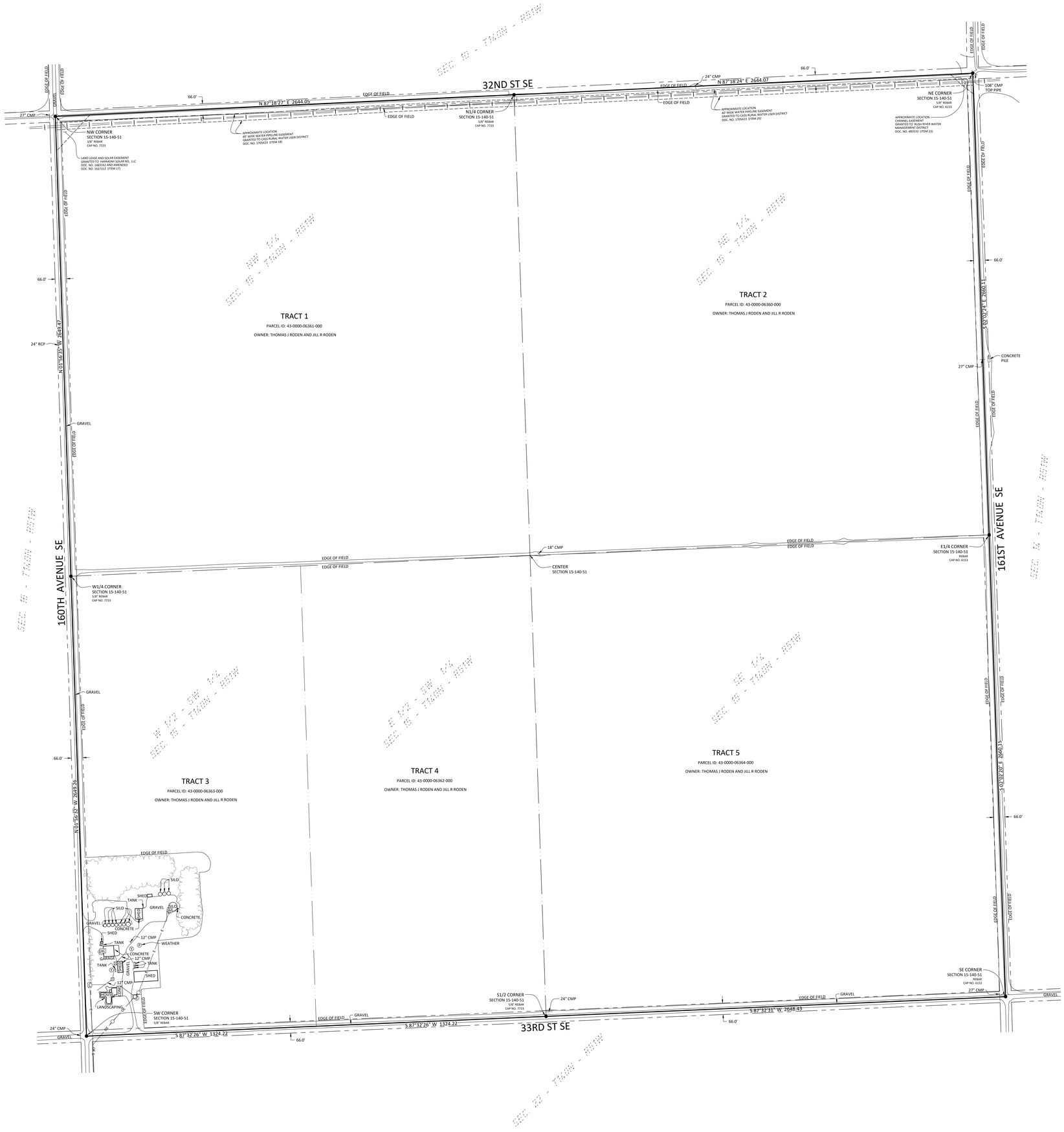
HARMONY ENERGY PARK | *Property Boundary Exhibit*

Harmony Township, ND

Project # 161211023 September 11, 2026

Kimley»Horn

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Horizontal Datum: North Dakota State Plane Coordinate System, South Zone, Grid - International Feet

LEGAL DESCRIPTION

TRACT 1

NW1/4 of Section 15, Township 140 North, Range 51 West of the 5th P.M., Cass County, North Dakota.

TRACT 2

NE1/4 of Section 15, Township 140 North, Range 51 West of the 5th P.M., Cass County, North Dakota.

TRACT 3

W1/2 of the SW1/4 of Section 15, Township 140 North, Range 51 West of the 5th P.M., Cass County, North Dakota.

TRACT 4

E1/2 of the SW1/4 of Section 15, Township 140 North, Range 51 West of the 5th P.M., Cass County, North Dakota.

TRACT 5

SE1/4 of Section 15, Township 140 North, Range 51 West of the 5th P.M., Cass County, North Dakota.

LEGEND

- MONUMENT FOUND
- UTILITY PEDESTAL COMMUNICATION
- UTILITY METER ELECTRIC
- POLE - LIGHT POLE
- CLEANOUT SANITARY
- AIR CONDITIONER
- POST
- TILE INLET
- POLE - GUY WIRE/ANCHOR
- POLE - UTILITY POLE
- HYDRANT
- COMMUNICATION UNDERGROUND
- OVERHEAD ELECTRIC
- UNDERGROUND ELECTRIC
- UNDERGROUND WATERMAIN
- TREE DRIP LINE - MULTIPLE DECIDUOUS

SURVEYOR'S CERTIFICATION

I hereby certify that this survey, plan, or report was prepared by me or under my direct supervision and that I am a duly Licensed Land Surveyor under the laws of the State of North Dakota.

08/28/2026
Date

By: Colin Marum
Colin.Marum@bolton-menk.com
www.bolton-menk.com
Registration No. 40663

CERTIFICATE OF SURVEY
CASS COUNTY, NORTH DAKOTA

BOLTON & MENK
1960 Premier Drive
Mankato, MN 56001
Phone: (507) 625-4171

SECTION 15, TOWNSHIP 140 NORTH, RANGE 51 WEST, CASS COUNTY, NORTH DAKOTA

FOR: CCDC ND, LLC

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Appendix 6. Decommissioning and Reclamation Plan

RECLAMATION AND DECOMISSIONING PLAN

HARMONY ENERGY PARK

Harmony Township, ND

PREPARED FOR: **HARMONY TOWNSHIP**

APPLICANT: **CCDC ND, LLC**

Application preparation provided by:

GERONIMO POWER, LLC

8400 Normandale Lake Blvd, Suite 1200

Bloomington, MN 55437

AND

KIMLEY-HORN & ASSOCIATES, INC.

11995 Singletree Lane, Suite 225
Eden Prairie, MN 55344

Prepared on:

9/15/2026

Kimley»Horn

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1.2 Site Location 3

1.3 Site Work Preparation 3

1.4 Proposed Site Improvements 3

1.5 Substation Equipment 4

1.6 Stormwater Management 4

1.7 Site and Emergency access 4

1.8 Timeline 5

1.9 Decommissioning & Reclamation tasks 5

1.10 Financial Assurance 7

INTRODUCTION

1.1 PURPOSE

This Reclamation and Decommissioning Plan (Plan) is provided to ensure the procedures, responsibilities, and future land use considerations associated with the eventual decommissioning of the proposed Harmony Energy Park (Project) are thoughtfully considered. The Project is not intended to be abandoned at the end of its useful life. Rather, the Project will be responsible for implementing the decommissioning and reclamation measures described herein under an industrial reuse scenario.

The purpose of this Plan is to establish a framework for the orderly closure, removal, and reclamation of Project facilities while prioritizing future reuse of the property as the preferred post-operational outcome. Harmony Township requires a decommissioning and reclamation plan as part of the Conditional Use Permit (CUP) application process, and this Plan outlines provisions for infrastructure removal, site restoration, and beneficial reuse opportunities. The overall objective is to ensure the property is left in a safe, stable, nonhazardous, and productive condition that supports continued economic development, agricultural use, open space, or other compatible land uses consistent with the long-term goals of Harmony Township and surrounding landowners.

Decommissioning shall commence according to 6.21.3.15 (b) of the Harmony Township Zoning Ordinance (Ordinance) in which the Project does not produce power for 12 consecutive months. The industrial reuse decommissioning approach provided below is intended to provide a clear pathway for reclamation while preserving future flexibility for beneficial use of the property. To ensure this work is completed, the Project will provide financial security to the Township prior to the commencement of construction, following issuance of a building permit.

1.2 SITE LOCATION

The Applicant is proposing to develop the Harmony Energy Park, consisting of a data center facility, in Harmony Township, ND. The Project is located Northwest of the intersection of East 33rd Street Southeast and 161st Avenue Southeast in Cass County, North Dakota and within tax parcel identification numbers 43-0000-06361-000; 43-0000-06360-000; 43-0000-06363-000; 43-0000- 06362-000; 43-0000-06364-000; 43-0000-06391-020; 43-0000-06391-030; 43-0000-06389-000; and 43-0000-06390-060, and is zoned A-1 Agricultural District. The Applicant will design and permit the Project with the authorities having jurisdiction, including Harmony Township, Cass County, and North Dakota. Upon permit issuance, the Owner/Operator will manage the construction, operation, and reclamation of the Project.

1.3 SITE WORK PREPARATION

Prior to demolition or construction, appropriate best management practices shall be implemented. This includes, but is not limited to, construction entrance and soil stabilization, perimeter control, and other security, erosion, and sediment control measures. In North Dakota, topsoil and subsoil stockpiles are commonly created during grading and trenching activities. Because exposed soils can be susceptible to erosion from heavy rainfall events, spring snowmelt, and strong prairie winds, perimeter controls such as silt fence are installed around stockpile areas to contain sediment on-site and prevent transport to adjacent properties, wetlands, drainageways, and road ditches. These controls remain in place until the stockpile is removed or permanently stabilized. The stockpile area shall be delineated with the implementation of silt fence or approved equal.

1.4 PROPOSED SITE IMPROVEMENTS

Currently, the Project Site is undeveloped and is being used for row crop agricultural purposes. The existing maximum elevation is 922' and the existing minimum elevation is 906'. With an existing elevation difference of 16' across the 645-acre site, the site is relatively flat. Existing vegetation consists predominantly of cultivated cropland, along with vegetation associated with drainage features, wetland areas, and field boundaries.

The preliminary Project design includes two data center buildings, associated parking, utilities, admin/support buildings, wastewater treatment area, electric substations (see section 1.6), and stormwater retention ponds (see section 1.7). Stormwater retention basins will be located along the perimeter of the site, with one along the northwest corner, one near the east-central portion, and two in the southeast corner. The preliminary design contemplates two data center buildings along with supplemental administrative structures. The administrative buildings will be located south of the data center buildings, and the wastewater treatment area will be located to the west. Substations will be located from the northeast corner towards the middle of the site. The final number of buildings and layout will be determined following final design/engineering and prior to an application for a building permit. Project components with the exception of stormwater basins will remain within the Preliminary Development Area (refer to Appendix 3 of CUP Application), and the Project's final design will comply with all township setbacks and requirements.

Re-grading will give the site a proposed maximum elevation of 925' and a proposed minimum elevation of 906'. Construction of the Project will require clearing existing vegetation, grading to establish building and equipment pads, installation of stormwater basins, and construction of access and utility improvements. Grading activities will be designed to maintain positive drainage across the site while accommodating the proposed development and stormwater management features.

1.5 SUBSTATION EQUIPMENT

The Project will include the construction of up to 2 electric switchyards/substations (collectively "substations"). The substations significant components include a control enclosure, main power transformers, circuit breakers, busbars, a grounding grid, and other electrical control equipment. Underground electrical duct banks connect the data center and the substation, while overhead power lines will connect the Utility switchyard with the building's substations. Substation equipment will be installed on concrete foundations with a fenced gravel yard. Substations will be designed according to regional utility practices, Midcontinent Independent Transmission System Operator Standards, Midwest Reliability Organization Standards, National Electrical Safety Code, and the Rural Utility Service Code. The area around the substations will be graveled and fenced. The Site Plan is preliminary, and the location of the substation areas are subject to change as a result of final engineering.

1.6 STORMWATER MANAGEMENT

Post-construction stormwater runoff will be captured by proposed stormwater ponds. The storm water basins are sited to capture, detain/retain, and treat runoff as well as protect the site from flooding during the Project's lifespan.

1.7 SITE AND EMERGENCY ACCESS

The Project will feature internal roadways and perimeter fencing. All access roads will comply with the relevant jurisdictional authority's regulations for emergency response and equipment manufacturer

specifications for delivery and maintenance. During the Project's lifespan, the roadways and fencing will be consistently maintained by the Owner/Operator.

Refer to Appendix 7 of the CUP Application for the preliminary Emergency Access Plan.

POST-PROJECT DECOMMISSIONING & RECLAMATION

1.8 TIMELINE

If the Project's original use ceases, it will be decommissioned and restored in accordance with 6.21.3.15 (b) of the Ordinance. Decommissioning and reclamation activities will be completed within 12 months.

1.9 DECOMMISSIONING & RECLAMATION TASKS

The Ordinance requires a decommissioning and restoration plan provided with a CUP application. The Ordinance states the plan must provide for removal of all structures and foundations to a depth of 48 inches. To comply with this standard, a full decommissioning and site restoration scenario has been provided below. However, the Project intends to implement, and requests Harmony Township approve the industrial reuse scenario also described below. This reuse scenario has been thoughtfully developed to ensure the property remains safe, productive, and compatible with the long-term land use goals of Harmony Township and surrounding landowners with an industrial reuse scenario. The decommissioning approach is intended to return the site to a stable condition, minimize long-term maintenance needs, and support continued use of the property in a manner consistent with local planning objectives and the character of the surrounding area.

- **Industrial Reuse Scenario –** The shell and associated infrastructure of the data center buildings could be adapted for light industrial, warehouse, distribution or manufacturing uses. Given the facility's proximity to the Fargo region and two interstate highways, the site is well positioned for continued economic use after data center operations cease. The Project's robust electrical service may be particularly valuable for manufacturing or industrial users with higher power demands, allowing the property to remain a productive economic asset for Harmony Township.

  Certain site improvements may be retained where they support future industrial development, including buildings or portions of buildings, foundations, stormwater infrastructure, access roads, perimeter security features, and utility infrastructure. Equipment yards would generally be removed or repurposed for truck courts, loading areas, vehicle parking, or other operational needs, with remaining areas converted to green open space where appropriate. Existing electrical infrastructure may remain in service to support future development opportunities, while other facilities that are no longer needed will be removed. Electrical systems for lighting, heating, and cooling for the buildings would not be removed. This approach allows the site to remain an economic asset to Harmony Township, minimizes waste and unnecessary site disturbance, and promotes productive future use of the property in a manner that is compatible with surrounding land uses and long-term community planning objectives. Refer to Ex-01 the end of this Plan.

  Any hazardous materials that are not permitted under the industrial reuse scenario would be safely removed and properly disposed of in accordance with then-current local, state, and federal requirements.

SUBSTATION EQUIPMENT: To support future industrial reuse and maintain the site's industrial redevelopment readiness after operations cease, the reclamation process will focus on removing only those aboveground facilities, conduits, cables, and foundations in the substation area that are not needed for the approved future industrial use.

STORMWATER MANAGEMENT Depending on the future use selected for the site after energy park operations cease, stormwater basins that are no longer needed under then-current local stormwater management requirements will be decommissioned. Decommissioned basins will be backfilled with soil comparable to existing on-site soils.

SITE ACCESS: To support future industrial reuse and maintain the site's industrial redevelopment readiness, access roads needed for the approved future industrial use may remain in place, while roads that are not needed will be removed or stabilized as part of reclamation.

After equipment, conduits, cables, and other facilities that are not needed for the approved future industrial use are removed, the property will be prepared to remain safe, stable, and ready for redevelopment. This may include grading, soil rehabilitation, erosion control, revegetation, decompaction, or drainage restoration where needed. Areas that are not reused for industrial purposes may be stabilized with native vegetation or agricultural cover crops to protect soils and support long-term productivity. The site will be monitored until permanent stabilization is achieved. When reclamation is complete, a final report documenting the work performed and the resulting site conditions will be submitted to Harmony Township and other applicable regulatory authorities. The overall objective is to protect site stability while preserving the property's industrial redevelopment readiness for future generations.

The principal advantage of the industrial use scenario is that it retains the physical building envelope and key utility infrastructure for potential future productive use. Utilities feeding the primary transformers would be secured through lockout/tagout rather than fully removed, allowing the structure to be placed back into service with less reconstruction effort than the full demolition alternatives. Electrical feeds serving data center equipment would be isolated to support safe removal activities, and plumbing connections would be isolated in a manner that allows for later reconnection.

- **Full Decommissioning and Site Restoration Scenario -** If Harmony Township determines that future industrial reuse is not appropriate, or if removal of structures and foundations to a depth of 48 inches is required as a condition of approval, the Project can be decommissioned under a full site restoration scenario. Under this scenario, buildings, equipment, foundations, concrete slabs, equipment pads, access roads, parking areas, stormwater infrastructure, fences, utility infrastructure, and other site improvements would be removed to the extent required to achieve compliance with the township's decommissioning requirements. Foundations and other structural elements would be removed to a depth of at least 48 inches below final grade, and associated underground conduits, electrical duct banks, cables, piping, and utility infrastructure within the removal zone would also be removed or abandoned in accordance with then-current regulatory requirements.

  Following removal activities, excavated areas would be backfilled with suitable material, regraded to establish stable drainage patterns, and stabilized through soil rehabilitation and revegetation. Topsoil would be replaced where necessary to restore productive soil conditions, and disturbed areas would be seeded with native vegetation, agricultural cover crops, or another approved stabilization method consistent with the post-reclamation land use. Materials generated during decommissioning would be recycled, reused, or disposed of in accordance with applicable local,

state, and federal requirements. Upon completion, the site would be restored to a safe, stable, and productive condition suitable for agricultural use, open space, or another approved use. Refer to Ex-02 the end of this Plan.

1.10 FINANCIAL ASSURANCE

The Harmony Township Ordinance provides that financial security may be required by the Board of Supervisors through the CUP. Any such requirement will be evaluated on a case-by-case basis and imposed at the township's discretion.

If the Board determines that financial security is required for the Project, the Owner/Operator or other responsible party for the facility at applicable time of decommissioning shall be responsible for maintaining and complying with all applicable financial assurance requirements. Consistent with the Ordinance, acceptable financial assurance mechanisms may include a bond, letter of credit, parent guarantee, or other financial surety acceptable to the Township to ensure that sufficient funds are available to complete required decommissioning and site reclamation activities. Any financial assurance required by Harmony Township shall be maintained in accordance with the terms of the applicable approval and shall remain in effect until decommissioning obligations have been satisfied.

A decommissioning cost estimate for the industrial reuse scenario has been prepared by Burns & McDonnell (a North Dakota-licensed engineering firm) attached below. Based on the preliminary design, the cost of decommissioning the Project to the specifications outlined above in the industrial reuse scenario is estimated to be $3,763,000. Once the design is finalized, the Project will have an updated decommissioning cost estimate prepared. Prior to construction and following receipt of the building permit, the Applicant will provide a surety bond to Harmony Township for that amount to ensure funding is in place to decommission the Project.

Harmony Energy Park Decommissioning Cost Estimate

ITEM	DESCRIPTION	ESTIMATED QUANTITY	UNIT	COST
1	**Contractor General Conditions**			
	Mobilization and De-Mobilization	1	LS	$ 150,000
	Management, Engineering, Administrative	1	LS	$ 830,000
	Permitting / Notifications	1	LS	$ 10,000
	Site Work (i.e. Fencing / Delineation of Work Areas, Erosion Controls)	1	LS	$ -
	Temporary Facilities & Power	1	LS	$ 223,000
			Subtotal for General Conditions Costs:	**$ 1,213,000**
2	**Utility Isolation**			
	Utility Isolations	1	LS	$ 100,000
			Subtotal for Utility Isolation Costs:	**$ 100,000**
3	**Environmental Decommissioning**			
	Regulated Waste Removal	1	LS	$ 210,000
	Universal Waste Removal	1	LS	$ 420,000
			Subtotal for Environmental Costs:	**$ 630,000**
4	**Structure Demolition**			
	Removal of Interior Components	1	LS	$ 8,810,000
			Subtotal for Demolition Costs:	**$ 8,810,000**
			TOTAL DIRECT COSTS:	**$ 10,753,000**
5	**Indirect Costs**			
	Bonds / Insurance (2% of Direct Costs)	1	LS	$ 220,000
	Engineering / Permitting Support / Construction Management Assistance (15% of Direct Costs)	1	LS	$ 1,400,000
	Contingency (30% of Direct Costs)	1	LS	$ 3,230,000
			TOTAL INDIRECT COST:	**$ 4,850,000**
			TOTAL DIRECT & INDIRECT COSTS:	**$ 15,603,000**
6	**Scrap & Equipment Sales**			
	Ferrous Metals (Prepared)	8,700	TONS	$ (640,000)
	Non-Ferrous Metals	3,920,000	POUNDS	$ (11,200,000)
			Subtotal for Scrap Sales:	**$ (11,840,000)**
			GRAND TOTAL COST	**$ 3,763,000**

BURNS McDONNELL

K:\TCW_LDE\VI\Geronimo Power\ND-Cass-DC1\3 Design\CAD\Exhibits\2026-0720 Reclamation Exhibits\2026-0720 Reclamation Exhibits.dwg September 15, 2026 - 2:39pm

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LEGEND

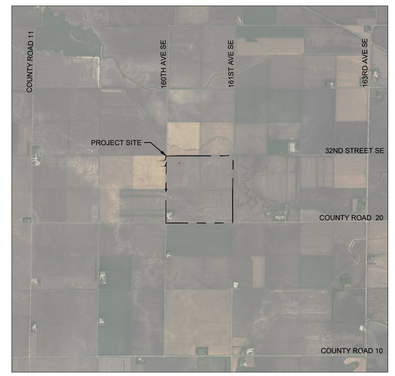
- PROPOSED PROPERTY LINE
- REMOVE INFRASTRUCTURE
- REMAIN IN PLACE OR REUSE

PROPERTY SUMMARY	
TOTAL PROPERTY AREA	±645 AC
DISTURBED AREA	±380 AC
SITE DATA	
EXISTING ZONING	A-1 AGRICULTURAL DISTRICT
PROPOSED LAND USE	INDUSTRIAL LAND USE
BUILDING SETBACKS	500'

BUILDING DATA	
TOTAL BUILDING AREA	1,560,115 SF
PERCENT OF TOTAL PROPERTY AREA	5.55%
MAXIMUM BUILDING HEIGHT	35 FT

* 34.5 ACRES OF FORMER UTILITY YARD SPACE AVAILABLE FOR PARKING TO MEET THE TOWNSHIP'S PARKING REQUIREMENTS FOR LIGHT INDUSTRIAL LAND USE WHICH CAN ACCOMODATE UP TO 4,800 PARKING STALLS.

VICINITY MAP



No.	REVISIONS	DATE	BY

Kimley»Horn
© 2026 KIMLEY-HORN AND ASSOCIATES, INC.
11995 SINGLETREE LANE SUITE 225, EDEN PRAIRIE, MN 55344
PHONE: 612-315-1272
WWW.KIMLEY-HORN.COM

KHA PROJECT	161211023
DATE	9/14/2026
SCALE	AS SHOWN
DESIGNED BY	LHC
DRAWN BY	SKB
CHECKED BY	NMB

RECLAMATION PLAN INDUSTRIAL REUSE SCENARIO

HARMONY ENERGY PARK

PREPARED FOR

CCDC ND, LLC

HARMONY TOWNSHIP NORTH DAKOTA

SHEET NUMBER

EX-01

K:\TCW_LDE\VGeronimo Power\ND-Cass-DC1\3 Design\CADIExhibits\2026-0720 Reclamation Exhibits\2026-0720 Reclamation Exhibits.dwg September 15, 2026 - 2:40pm

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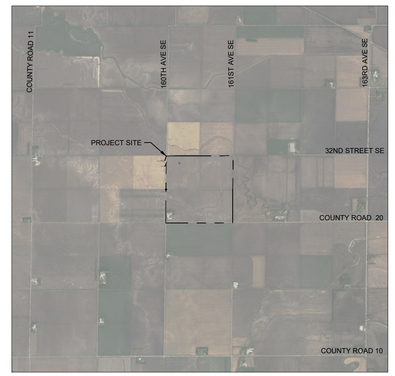


LEGEND

- PROPOSED PROPERTY LINE
- REMOVE INFRASTRUCTURE
- REMAIN IN PLACE OR REUSE

PROPERTY SUMMARY	
TOTAL PROPERTY AREA	±645 AC
DISTURBED AREA	±380 AC
SITE DATA	
EXISTING ZONING	A-1 AGRICULTURAL DISTRICT
PROPOSED LAND USE	OPEN SPACE/AG LAND USE

VICINITY MAP



No.	REVISIONS	DATE	BY

Kimley»Horn

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PHONE: 612-315-1272
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KHA PROJECT	161211023
DATE	9/14/2026
SCALE	AS SHOWN
DESIGNED BY	LHC
DRAWN BY	SKB
CHECKED BY	NMB

RECLAMATION PLAN FULL DECOMMISSIONING AND SITE RESTORATION SCENARIO

HARMONY ENERGY PARK

PREPARED FOR

CCDC ND, LLC

HARMONY TOWNSHIP NORTH DAKOTA

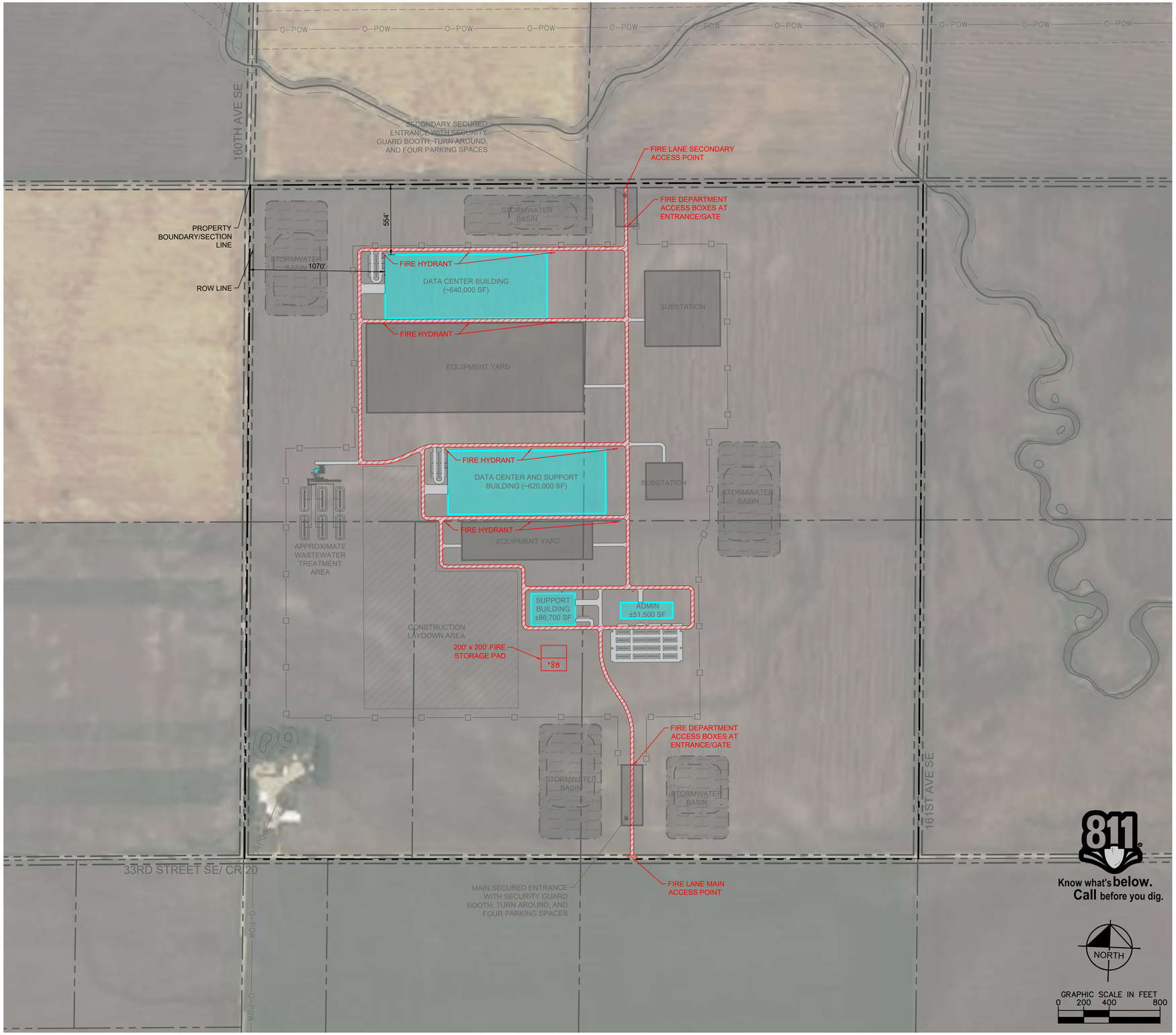
SHEET NUMBER

EX-02

Appendix 7. Emergency Access Plan

K:\TCW_LDE\VGeronimo Power\ND-Cass-DC113 Design\CAD\Exhibits\2026-0722 Emergency Access Exhibit\2026-0722 Emergency Access Exhibit.dwg September 15, 2026 - 2:31pm

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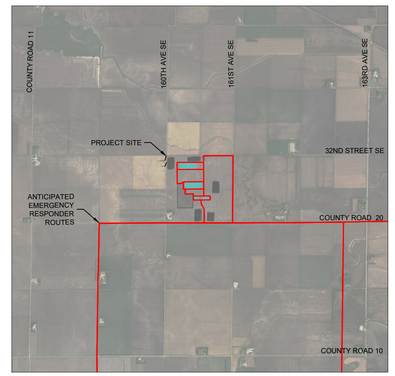
LEGEND

- PROPERTY LINE
- BUILDING SETBACK
- FIRE ACCESS/EXIT ROUTES
- PROPOSED HYDRANT

PROPERTY SUMMARY	
TOTAL PROPERTY AREA	±645 AC
DISTURBED AREA	±380 AC
SITE DATA	
EXISTING ZONING	A-1 AGRICULTURAL DISTRICT
PROPOSED LAND USE	POWER DATA PARK

BUILDING DATA	
TOTAL BUILDING AREA	1,560,115 SF
PERCENT OF TOTAL PROPERTY AREA	5.55%
MAXIMUM BUILDING HEIGHT	35 FT

VICINITY MAP



No.	REVISIONS	DATE	BY

Kimley»Horn
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KHA PROJECT 161211023
DATE 09/14/2026
SCALE AS SHOWN
DESIGNED BY LHC
DRAWN BY MOB
CHECKED BY NMB

PRELIMINARY EMERGENCY ACCESS PLAN

HARMONY ENERGY PARK
PREPARED FOR
CCDC ND, LLC
HARMONY TOWNSHIP NORTH DAKOTA

SHEET NUMBER
EX-01

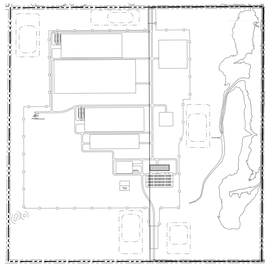
Appendix 8. Architectural Elevations

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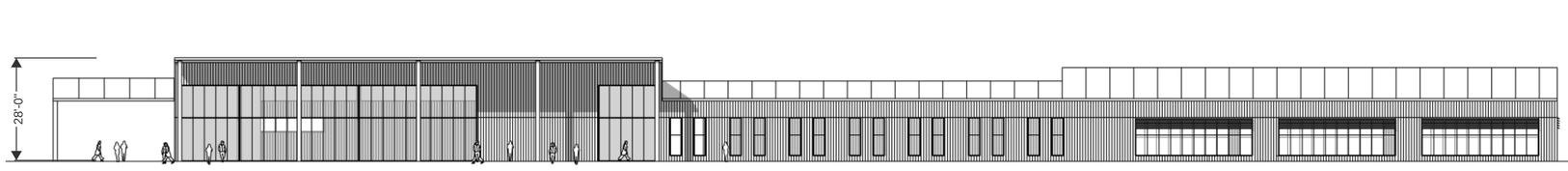
The final design, including building aesthetics, will be finalized by the end user and township during the permit application process.



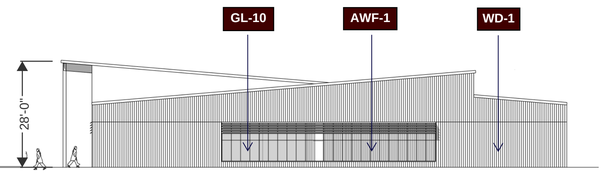
ADMIN BUILDING
NTS



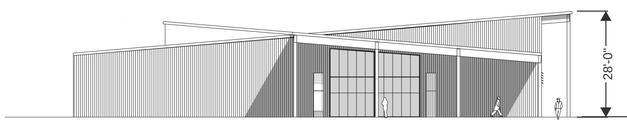
KEY PLAN
NTS



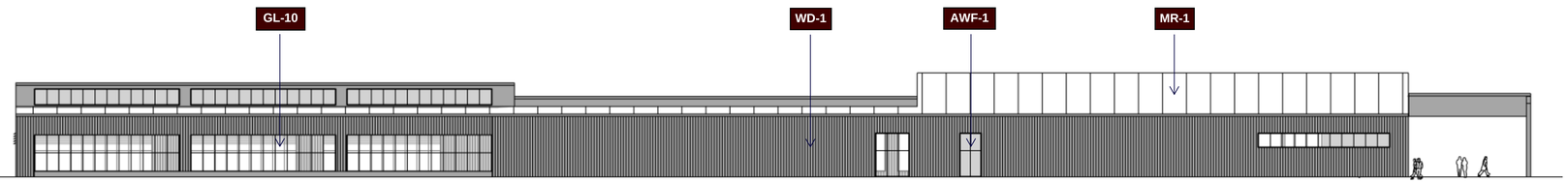
SOUTH ELEVATION
1" = 20'-0"



EAST ELEVATION
1" = 20'-0"



WEST ELEVATION
1" = 20'-0"



NORTH ELEVATION
1" = 20'-0"

EXTERIOR MATERIAL SCHEDULE

SYMBOL	MATERIAL DESCRIPTION	SPEC SECTION	MANUFACTURER	PRODUCT	PRODUCT INFORMATION FINISH/COLOR	NOTES
WD-1	ACETYLATED WOOD SIDING	07 46 23	ACCOYA	RESAWN TIMBER	DENALI	
MR-1	STANDING SEAM METAL ROOF	07 42 13.16	CENTRIA	SRS3	LIGHT SEAWOLF	
AWF-1	GLAZED ALUMINUM STOREFRONT	08 41 13	KAWNEER	Trifab 601UT SSG	DOVE GRAY	
GL-10	LOW-E COATED, INSULATED GLASS	08 80 00	VIRACON	VE1-2M	GRAY	

No.	REVISIONS	DATE	BY

Kimley»Horn
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11995 SINGLETREE LANE SUITE 225, EDEN PRAIRIE, MN 55344
PHONE: 612-315-1272
WWW.KIMLEY-HORN.COM

ARCHITECTURE
FDR

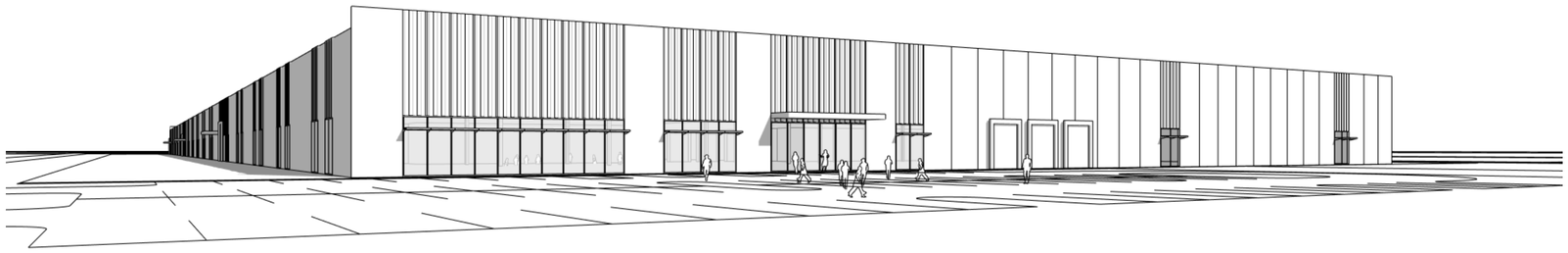
KHA PROJECT 161211023
DATE 07/31/2026
SCALE AS SHOWN
DESIGNED BY
DRAWN BY
CHECKED BY

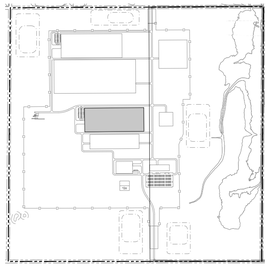
EXTERIOR ELEVATIONS -ADMIN BUILDING

HARMONY ENERGY PARK
PREPARED FOR
CCDC ND, LLC
HARMONY TOWNSHIP NORTH DAKOTA

SHEET NUMBER
AR-01

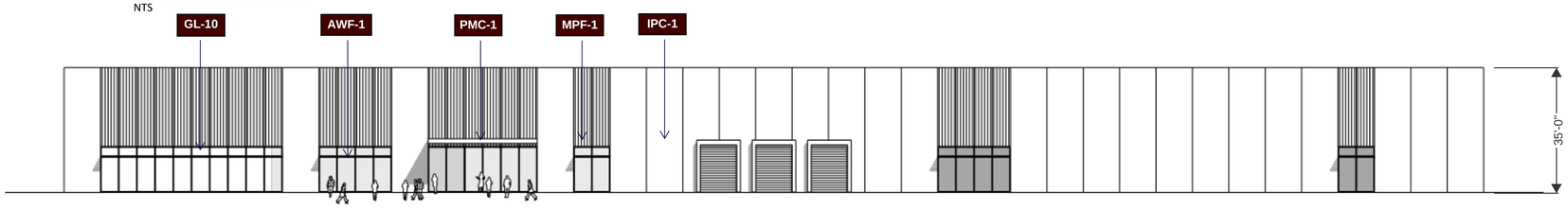
The final design, including building aesthetics, will be finalized by the end user and township during the permit application process.



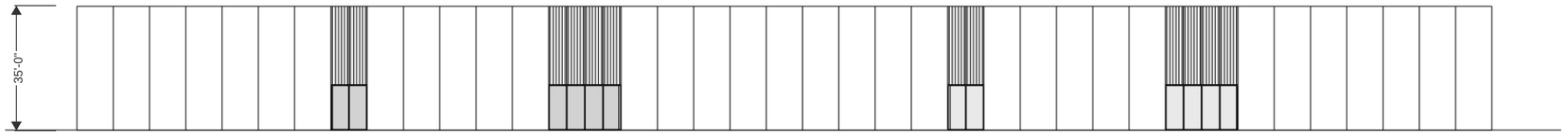


KEY PLAN
NTS

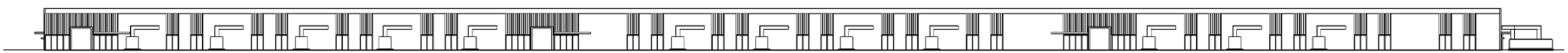
DATA CENTER BUILDING
NTS



WEST ELEVATION
1" = 20'-0"



EAST ELEVATION
1" = 20'-0"



NORTH ELEVATION
1" = 40'-0"



SOUTH ELEVATION
1" = 40'-0"

EXTERIOR MATERIAL SCHEDULE

SYMBOL	MATERIAL DESCRIPTION	SPEC SECTION	MANUFACTURER	PRODUCT	PRODUCT INFORMATION FINISH/COLOR	NOTES
IPC-1	PRECAST CONCRETE WALL PANELS	03 45 00	LOCAL FABRICATOR	INSULATED CONCRETE SANDWICH	MEDIUM SANDBLAST/BEIGE	
MPF-1	FORMED METAL WALL PANELS	07 42 13.13	MORIN	Z-12 CONCEALED	ZINC GRAY	
PMC-1	PREFABRICATED METAL CANOPY	10 73 16	MAPES	SUPER LUMIDECK	COLOR MATCH MPF-1	
AWF-1	GLAZED ALUMINUM STOREFRONT	08 41 13	KAWNEER	Trifab 601UT SSG	ZINC GRAY	
GL-10	LOW-E COATED, INSULATED GLASS	08 80 00	VIRACON	VE1-2M	GRAY	

No.	REVISIONS	DATE	BY

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2026 KIMLEY-HORN AND ASSOCIATES, INC.
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PHONE: 612-315-1272
WWW.KIMLEY-HORN.COM

ARCHITECTURE
HDR

KHA PROJECT 161211023
DATE 07/31/2026
SCALE AS SHOWN
DESIGNED BY
DRAWN BY
CHECKED BY

EXTERIOR ELEVATIONS -DATA CENTER BUILDING #1

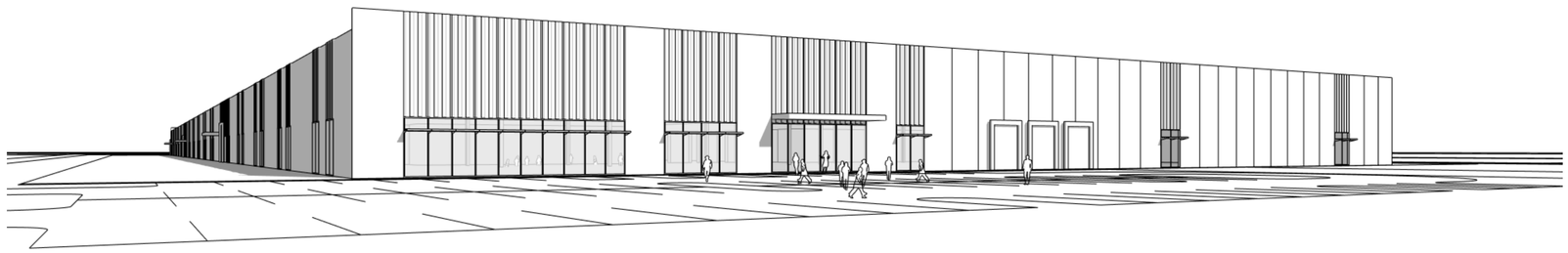
HARMONY ENERGY PARK
PREPARED FOR
CCDC ND, LLC
HARMONY TOWNSHIP NORTH DAKOTA

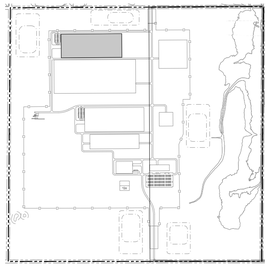
SHEET NUMBER
AR-02

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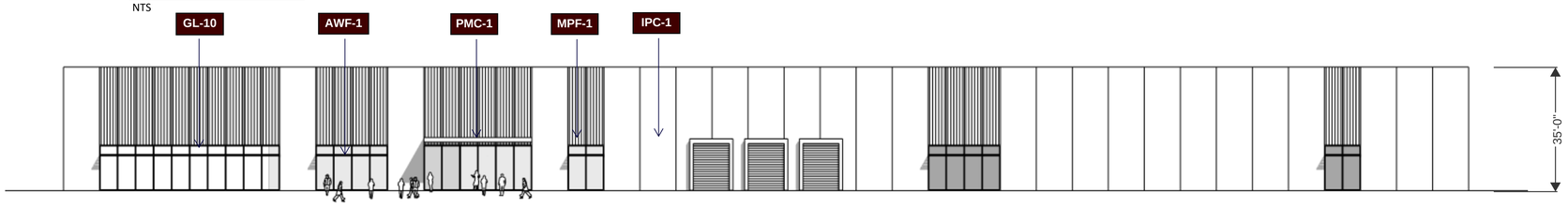
The final design, including building aesthetics, will be finalized by the end user and township during the permit application process.



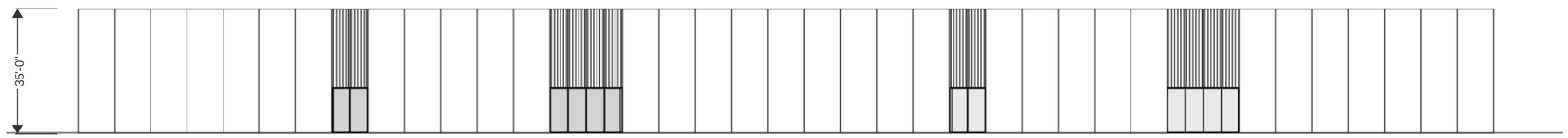


KEY PLAN
NTS

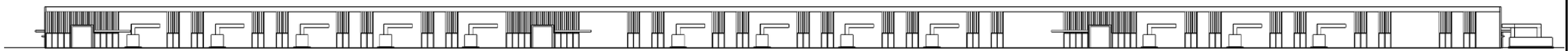
DATA CENTER BUILDING
NTS



WEST ELEVATION
1" = 20'-0"



EAST ELEVATION
1" = 20'-0"



NORTH ELEVATION
1" = 40'-0"



SOUTH ELEVATION
1" = 40'-0"

EXTERIOR MATERIAL SCHEDULE

SYMBOL	MATERIAL DESCRIPTION	SPEC SECTION	MANUFACTURER	PRODUCT	PRODUCT INFORMATION FINISH/COLOR	NOTES
IPC-1	PRECAST CONCRETE WALL PANELS	03 45 00	LOCAL FABRICATOR	INSULATED CONCRETE SANDWICH	MEDIUM SANDBLAST/BEIGE	
MPF-1	FORMED METAL WALL PANELS	07 42 13.13	MORIN	Z-12 CONCEALED	ZINC GRAY	
PMC-1	PREFABRICATED METAL CANOPY	10 73 16	MAPES	SUPER LUMIDECK	COLOR MATCH MPF-1	
AWF-1	GLAZED ALUMINUM STOREFRONT	08 41 13	KAWNEER	Trifab 601UT SSG	ZINC GRAY	
GL-10	LOW-E COATED, INSULATED GLASS	08 80 00	VIRACON	VE1-2M	GRAY	

No.	REVISIONS	DATE	BY

Kimley»Horn
2026 KIMLEY-HORN AND ASSOCIATES, INC.
11995 SINGLETREE LANE SUITE 225, EDEN PRAIRIE, MN 55344
PHONE: 612-315-1272
WWW.KIMLEY-HORN.COM

ARCHITECTURE
FDR

KHA PROJECT 161211023
DATE 07/31/2026
SCALE AS SHOWN
DESIGNED BY
DRAWN BY
CHECKED BY

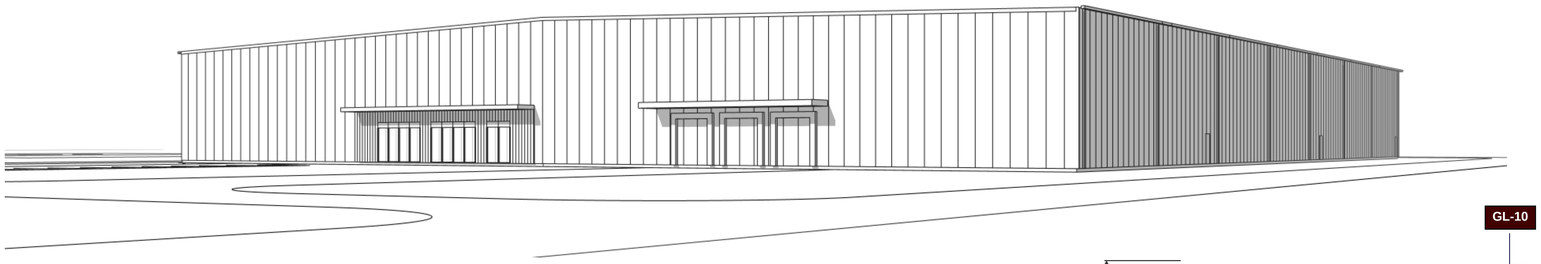
EXTERIOR ELEVATIONS -DATA CENTER BUILDING #2

HARMONY ENERGY PARK
PREPARED FOR
CCDC ND, LLC
HARMONY TOWNSHIP NORTH DAKOTA

SHEET NUMBER
AR-03

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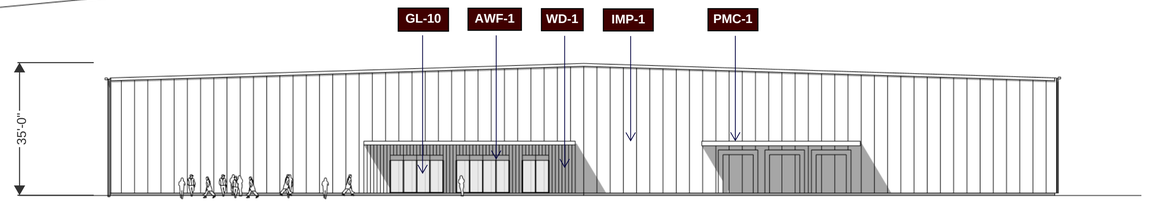
The final design, including building aesthetics, will be finalized by the end user and township during the permit application process.



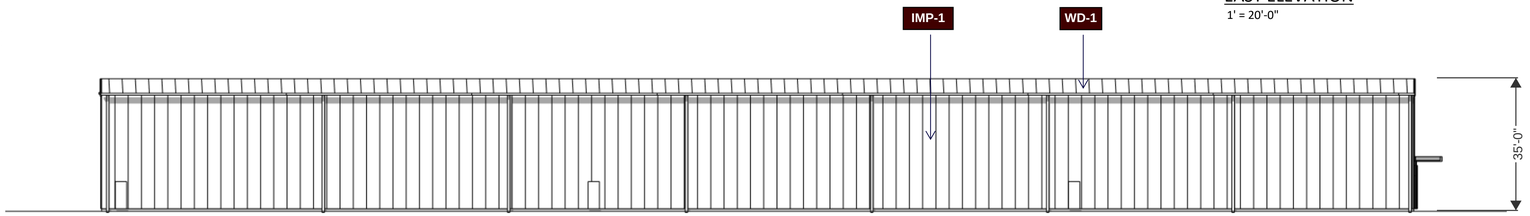
SUPPORT BUILDING
NTS



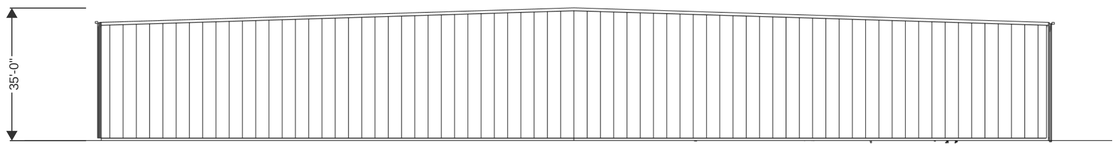
KEY PLAN
NTS



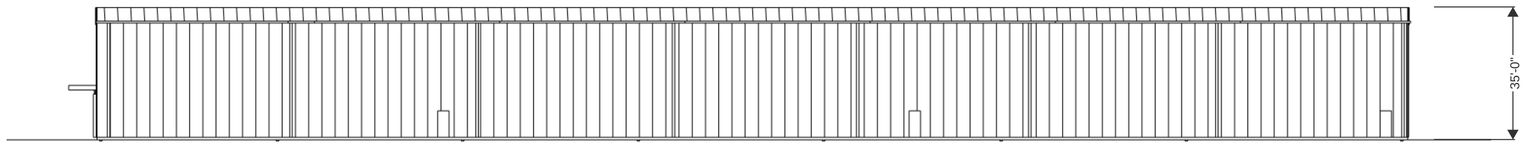
EAST ELEVATION
1" = 20'-0"



SOUTH ELEVATION
1" = 20'-0"



WEST ELEVATION
1" = 20'-0"



NORTH ELEVATION
1" = 20'-0"

EXTERIOR MATERIAL SCHEDULE

SYMBOL	MATERIAL DESCRIPTION	SPEC SECTION	MANUFACTURER	PRODUCT	PRODUCT INFORMATION FINISH/COLOR	NOTES
IMP-1	INSULATED METAL WALL PANELS	07 42 13.19	METL SPAN	CF-42 MESA	EMBOSSED/REGAL GRAY	
MR-2	INSULATED METAL ROOF PANELS	07 41 16	METL SPAN	CFR-42 MESA	EMBOSSED/CHROMIUM GRAY	
PMC-1	PREFABRICATED METAL CANOPY	10 73 16	MAPES	SUPER LUMIDECK	COLOR MATCH MPF-1	
AWF-1	GLAZED ALUMINUM STOREFRONT	08 41 13	KAWNEER	Trifab 601UT SSG	STD COLOR SELECTION BY ARCHITECT	
GL-10	LOW-E COATED, INSULATED GLASS	08 80 00	VIRACON	VE1-2M	GRAY	
WD-1	ACETYLATED WOOD SIDING	07 46 23	ACCOYA	RESAWN TIMBER	DENALI	

No.	REVISIONS	DATE	BY

Kimley»Horn
2026 KIMLEY-HORN AND ASSOCIATES, INC.
11995 SINGLETREE LANE SUITE 225, EDEN PRAIRIE, MN 55344
PHONE: 612-315-1272
WWW.KIMLEY-HORN.COM

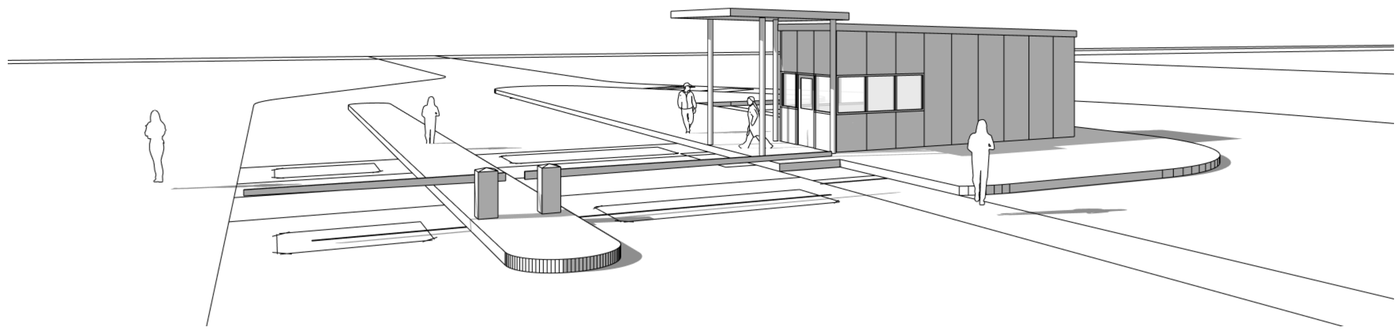
ARCHITECTURE
FDR

KHA PROJECT 161211023
DATE 07/31/2026
SCALE AS SHOWN
DESIGNED BY
DRAWN BY
CHECKED BY

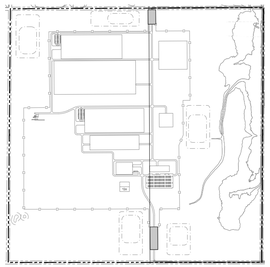
EXTERIOR ELEVATIONS -SUPPORT BUILDING

HARMONY ENERGY PARK
PREPARED FOR
CCDC ND, LLC
HARMONY TOWNSHIP NORTH DAKOTA

SHEET NUMBER
AR-04

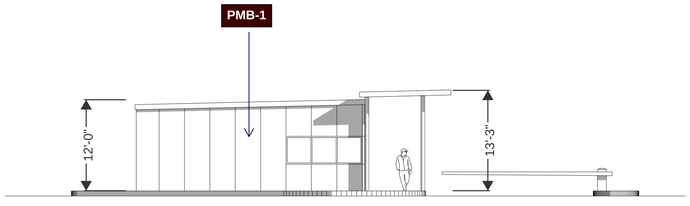


The final design, including building aesthetics, will be finalized by the end user and township during the permit application process.

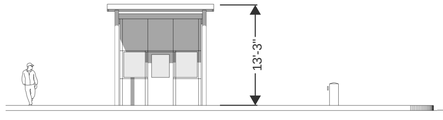


KEY PLAN
NTS

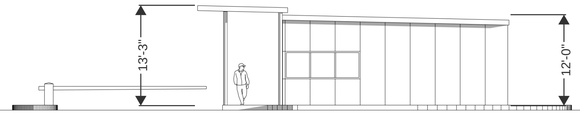
GUARDHOUSE 1 & 2
NTS



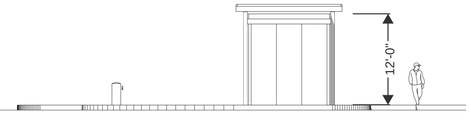
GH #1 -SOUTH ELEVATION
1' = 10'-0"



GH #1 -EAST ELEVATION
1' = 10'-0"



GH #1 -NORTH ELEVATION
1' = 10'-0"



GH #1 -WEST ELEVATION
1' = 10'-0"

EXTERIOR MATERIAL SCHEDULE

SYMBOL	MATERIAL DESCRIPTION	SPEC SECTION	MANUFACTURER	PRODUCT	PRODUCT INFORMATION FINISH/COLOR	NOTES
PMB-1	PREFABRICATED METAL BUILDING	13 34 26	PANEL BUILT	GUARDHOUSE	PAINT - DOVE GRAY / GLASS - GRAY	

No.	REVISIONS	DATE	BY

Kimley»Horn
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ARCHITECTURE
FDR

KHA PROJECT 161211023
DATE 07/31/2026
SCALE AS SHOWN
DESIGNED BY
DRAWN BY
CHECKED BY

EXTERIOR ELEVATIONS -GUARDHOUSE

HARMONY ENERGY PARK
PREPARED FOR
CCDC ND, LLC
HARMONY TOWNSHIP NORTH DAKOTA

SHEET NUMBER
AR-05

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Appendix 9. Stormwater Report

Conceptual Stormwater Management Plan

Harmony Energy Park
Harmony Township, ND

Harmony Township

Prepared for:
CCDC ND, LLC

Prepared by:
Kimley-Horn
11995 Singletree Lane, Suite 225
Eden Prairie, MN 55344
Contact: Michael C. Brandt, P.E.

Prepared on: 09/14/2026

Conceptual Stormwater Management Report

for

Harmony Energy Park

Prepared for:

CCDC ND, LLC

09/14/2026

Prepared By:

Kimley-Horn and Associates, Inc.
11995 Singletree Lane, Suite 225
Eden Prairie, MN 55344

_____

Michael C. Brandt, P.E.

Kimley»Horn

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1.0 Introduction

The proposed project is located south of 32nd Street SE and east of 160th Avenue SE in Section 15, Township 140 North, Range 51 West, Harmony Township, Cass County, North Dakota. The 629-acre property is currently zoned agricultural, and a conditional use permit will be obtained for the proposed data center development. The energy park will include two data center buildings, associated parking, utilities, administration/support buildings, substations, a wastewater treatment area, and stormwater detention ponds. The southwest corner of the property is not included in the current design; however, stormwater calculations account for future impervious area in this location to allow future revisions to this plan without requiring additional stormwater treatment.

2.0 Pre-development Conditions

The property is currently undeveloped and is used for agricultural fields. Based on the Web Soil Survey (see Appendix 3), the predominant soil type is silty clay. The Lower Branch Rush River flows along the northern and eastern property boundary and captures a significant portion of the site's runoff through existing swales and overland flow. Overall, site drainage flows from west to east, with the Lower Branch Rush River serving as the ultimate receiving waterbody.

The river flows southeast, crossing the intersection of 32nd Street SE and 161st Avenue SE through an existing culvert. The culvert size will be confirmed upon receipt of the survey data. Existing site runoff discharges at three separate points along the site perimeter. Based on aerial imagery of the site, Discharge Point No. 1 consists of an existing culvert along 32nd Street SE, Discharge Point No. 2 is an existing culvert along 161st Avenue SE, and Discharge Point No. 3 is along 33rd Street SE, as shown on Exhibit 1, Existing Drainage Exhibit. The survey is currently being conducted, and culvert information will be updated with the results of the survey.

An approximately 98.57-acre off-site drainage area, consisting of agricultural land, is located adjacent to the western project boundary and contributes runoff to Drainage Area 2. Runoff from the adjacent parcel will be routed through the proposed stormwater system to maintain existing drainage conditions on the neighboring property.

A summary of the pervious and impervious coverage for existing conditions is included below:

- *Total project area = 629.09 acres*
    - *Existing Pervious Area = 624.09 acres (99.19%)*
    - *Existing Impervious Area = 5.00 acres (0.81%)*
    - *Weighted Curve Number (CN) = 85*

- *Drainage Area 1 (V-DA-1) = 136.54 acres*
  - *Existing Pervious Area =136.54 acres (100.00%)*
  - *Existing Impervious Area = 0 acres (0.00%)*
  - *Weighted Curve Number = 85*

- *Drainage Area 2 (V-DA-2) = 435.85 acres*
  - *Existing Pervious Area = 435.85 acres (100.00%)*
  - *Existing Impervious Area = 0 acres (0.00%)*
  - *Weighted Curve Number = 85*

- *Drainage Area 3 (V-DA-3) = 56.70 acres*
  - *Existing Pervious Area = 51.70 acres (92.15%)*
  - *Existing Impervious Area = 5.0 acres (7.85%)*
  - *Weighted Curve Number = 86*

3.0 Post-development Conditions

The proposed development includes two data center buildings, associated parking, utilities, administration/support buildings, substations, and stormwater detention ponds. Site access will be provided by two driveway approaches from 33rd Street SE and 32nd Street SE. All buildings, gravel pads, drive lanes, parking infrastructure, and stormwater basins are considered impervious. In addition, approximately 9 acres of impervious area were included in Drainage Area 4 (see Exhibit 2, Proposed Drainage Areas) for potential future design.

Stormwater management across the site is provided by a storm sewer conveyance system and five detention basins located along the north, northwest, east, and south perimeters. Each basin has a total depth of approximately 9 feet, incorporating 5 feet of live storage above the normal water level for peak flow attenuation and extended detention prior to discharging to the Lower Branch Rush River. Each facility features an embedded permanent pool with a minimum average depth of 4 feet. This permanent pool is oversized to support fire water reuse and hold a volume equal to or greater than the runoff from the 2.5-inch rainfall event over the contributing drainage area under fully developed conditions (Nationwide Urban Runoff Program, NURP, guidelines).

Embedding the permanent pool within the larger detention footprint increases overall stormwater treatment efficiency while simplifying facility maintenance. The concentrated pool localizes sediment settling, allowing suspended solids to accumulate within a defined zone for routine removal. Furthermore, minimizing the exposed open water surface deters waterfowl and Canada geese from inhabiting the site, reducing nutrient loading from bird waste and preventing bank erosion.

A summary of the pervious and impervious coverage for proposed conditions is included below.

- *Total project area = 629.09 acres*
  - *Project Pervious Area = 470.31 acres (74.76%)*
  - *Project Impervious Area = 158.78 acres (25.24%)*
  - *Weighted Curve Number (CN) = 86*

- *Disturbed area = 531.89 acres*

- *Drainage Area 1 (C-DA-1) = 99.59 acres*
  - *Proposed Pervious Area = 45.65 acres (45.84%)*
  - *Proposed Impervious Area = 53.94 acres (54.16%)*
  - *Weighted Curve Number = 88*

- *Drainage Area 2 (C-DA-2) = 60.74 acres*
  - *Proposed Pervious Area = 41.41 acres (68.18%)*
  - *Proposed Impervious Area = 19.33 acres (31.82%)*
  - *Weighted Curve Number = 86*

- *Drainage Area 3 (C-DA-3) = 143.51 acres*
  - *Proposed Pervious Area = 101.41 acres (70.66%)*
  - *Proposed Impervious Area = 42.10 acres (29.34%)*
  - *Weighted Curve Number = 85*

- *Drainage Area 4 (C-DA-4) = 127.63 acres*
  - *Proposed Pervious Area = 102.83 acres (80.57%)*
  - *Proposed Impervious Area = 24.80 acres (19.43%)*
  - *Weighted Curve Number = 83*

- *Drainage Area 5 (C-DA-5) = 61.53 acres*
  - *Proposed Pervious Area = 45.63 acres (74.16%)*
  - *Proposed Impervious Area = 15.90 acres (25.84%)*
  - *Weighted Curve Number = 85*

- *Drainage Area 6 (C-DA-6) = 136.09 acres*
  - *Proposed Pervious Area = 125.09 acres (91.92%) (On-site undisturbed area)*
  - *Proposed Impervious Area = 11.00 acres (8.08%)*
  - *Weighted Curve Number =86*

4.0 Rate Attenuation Summary

On-site rate attenuation will be provided by the proposed detention basins. Proposed swales and storm sewers will collect runoff from the site and convey it to the basins. Basin outfalls will consist of culverts with skimmer structures to provide treatment to the 10-year event and rate control to the 100-year event. Basins 1 and 2 will be discharged north to the ditch along 32nd Street SE, Basin 3 will be discharged to the ditch along the eastern property boundary, and Basins 4 and 5 will be discharged to the ditch along 33rd Street SE. The discharge points of the drainage system will convey the water into the same areas as the existing conditions.

The proposed development achieves this requirement as outlined in the table below.

Table 2: Rate Attenuation

	2 Year (2.40 in.)	*5 Year (3.08 in.)*	*10 Year (3.70 in.)*	*100 Year (6.39 in.)*
Discharge Point 1 (Existing culvert along 32nd Street SE)				
Pre-Development Rate (CFS)	45.92	70.43	93.84	200.20
Post-Development Rate (CFS)	12.40	21.06	30.74	84.09
Discharge Point 2 (Existing culvert along 161st Avenue SE)				
Pre-Development Rate (CFS)	75.10	115.35	153.94	329.62
Post-Development Rate (CFS)	72.96	109.12	145.84	308.63
Discharge Point 3 (Existing culvert along 33rd Street SE)				
Pre-Development Rate (CFS)	12.35	18.54	24.35	50.81
Post-Development Rate (CFS)	9.48	10.32	15.65	42.45

5.0 Water Quality Summary

Water quality standards for the stormwater runoff quality for the project will be in accordance with the North Dakota Pollutant Discharge Elimination System (NDPDES) Construction General Permit and the EPA standards. On-site detention basins will provide stormwater treatment and pollutant reduction for the contributing drainage areas. The permanent pool volume exceeds the NURP detention requirement equivalent to the 2.5-inch storm event over the entire drainage area. Table 3 summarizes the required volume for this event and the volume provided for each of the proposed basins. The stormwater facilities will be maintained in accordance with the project's Operation and Maintenance Plan. The water quality standards and drainage plan will be submitted to the local and state drainage authorities for their approval prior to construction. Subject to rainfall availability, excess storage volume in the stormwater basins may be used to supply fire water and washdown water, reducing demand on the rural water system.

Table 3: Water Quality Volume Required

Stormwater Basin 1		**Stormwater Basin 4**	
Required Volume (AC-FT)	12.63	Required Volume (AC-FT)	12.29
Provided Volume (AC-FT)	17.01	Provided Volume (AC-FT)	17.90
Stormwater Basin 2		**Stormwater Basin 5**	
Required Volume (AC-FT)	6.73	Required Volume (AC-FT)	6.39
Provided Volume (AC-FT)	8.94	Provided Volume (AC-FT)	11.60
Stormwater Basin 3			
Required Volume (AC-FT)	15.48		
Provided Volume (AC-FT)	18.04		

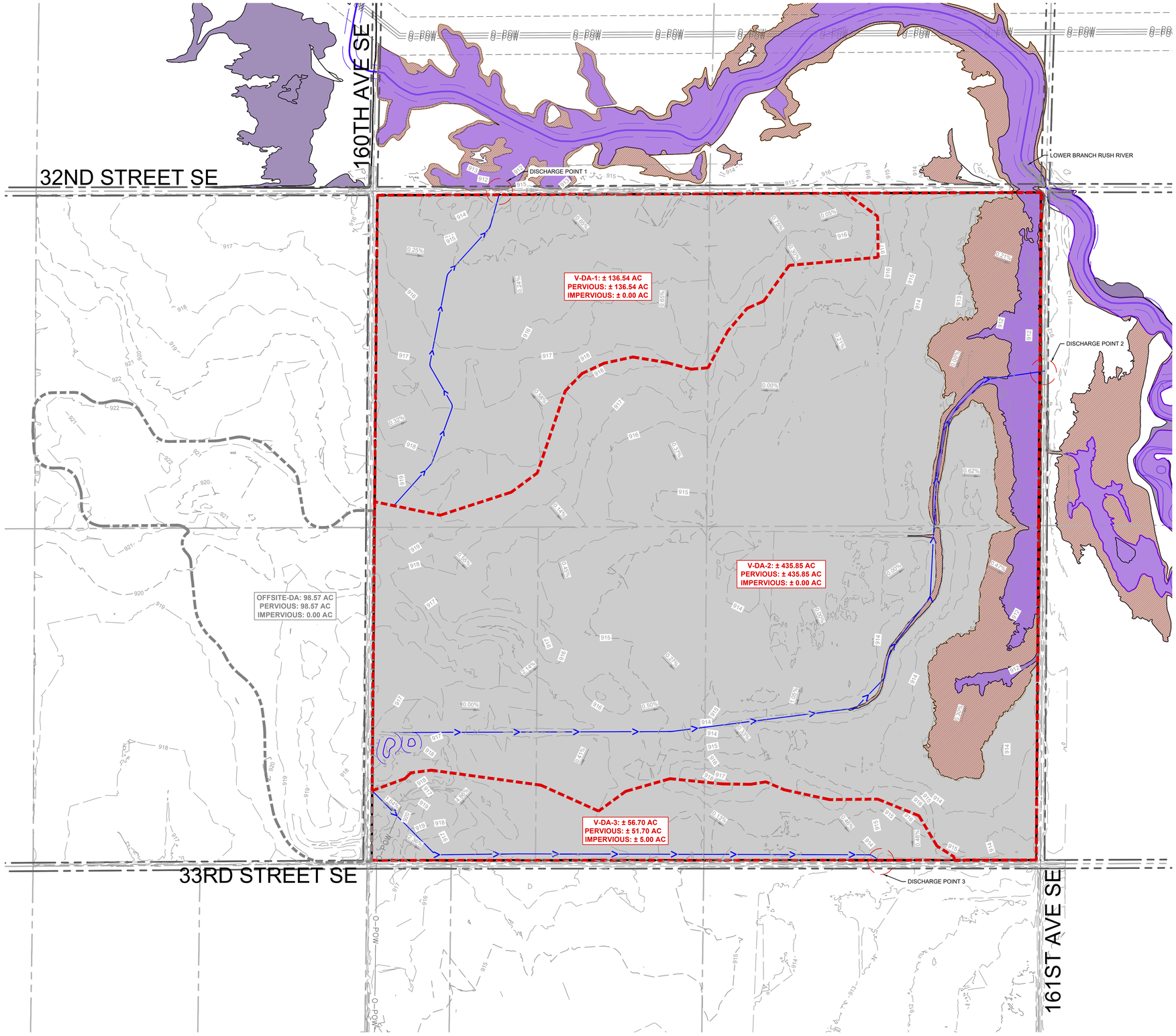
6.0 Report Summary

This Stormwater Management Report summarizes the existing and proposed drainage conditions for the Harmony Energy Park development in Harmony Township, Cass County, North Dakota. The proposed project will increase impervious coverage to approximately 158.78 acres. Stormwater runoff from the developed areas will be collected, routed, and managed through five detention basins and a storm sewer conveyance system.

The proposed stormwater management system is designed to provide water quality treatment, extended detention, and peak flow attenuation before discharge. Each detention basin is sized to maintain a minimum 4-foot permanent pool depth, with live storage above the normal water level for rate control. Based on the HydroCAD analysis, post-development discharge rates remain below pre-development rates at the existing discharge points for the analyzed storm events. The proposed improvements will maintain existing drainage patterns, reduce peak runoff rates, provide stormwater treatment, and convey runoff to the Lower Branch Rush River in a controlled manner.

Exhibits

Exhibit 1. Existing Drainage Exhibit



LEGEND

- PROPERTY LINE
- EXISTING DRAINAGE AREA
- EXISTING CONTOUR
- TIME OF CONCENTRATION FLOW PATH
- PROJECT AREA
- FEMA FLOODPLAIN - ZONE A
- FEMA FLOODPLAIN - ZONE X
- DISCHARGE POINT

NORTH

GRAPHIC SCALE IN FEET
0 200 400 800

Know what's **below.**
Call before you dig.

No.	REVISIONS	DATE	BY

Kimley»Horn

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EXISTING DRAINAGE AREA MAP

HARMONY ENERGY PARK
PREPARED FOR
CCDC ND, LLC
HARMONY TOWNSHIP NORTH DAKOTA

SHEET NUMBER
EX-1

K:\TCW_LDEV\Geronimo Power\ND-Cass-DC\13 Design\Drainage\Drainage Area Exhibits\2026-0715 Existing Drainage Area.dwg August 17, 2026 - 8:40am

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Exhibit 2. Proposed Drainage Exhibit

K:\TCW_LDEV\Geronimo Power\ND-Cass-DC\13 Design\Drainage\Drainage Area Exhibits\2026-07\5 Proposed Drainage Area.dwg September 15, 2026 - 3:01pm
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32ND STREET SE

160TH AVE SE

33RD STREET SE

161ST AVE SE

LOWER BRANCH RUSH RIVER

STORMWATER BASIN #2
±8 AC
TOP: 919.50
NWL: 914.50
BOT: 910.50

DISCHARGE POINT 1

PERMANENT POOL

PROPOSED WILDLIFE HABITAT AND WET-LAND AREA

PROPERTY BOUNDARY/SECTION LINE

STORMWATER BASIN #1
±10 AC
TOP: 919.50
NWL: 914.50
BOT: 910.50

C-DA-1: ± 99.59 AC
PERVIOUS: ± 53.94 AC
IMPERVIOUS: ± 45.65 AC

C-DA-2: ± 60.74 AC
PERVIOUS: ± 41.41 AC
IMPERVIOUS: ± 19.33 AC

C-DA-3: ± 143.51 AC
PERVIOUS: ± 101.41 AC
IMPERVIOUS: ± 42.10 AC

C-DA-4: ± 127.63 AC
PERVIOUS: ± 102.83 AC
IMPERVIOUS: ± 24.80 AC

C-DA-5: ± 61.53 AC
PERVIOUS: ± 45.63 AC
IMPERVIOUS: ± 15.90 AC

C-DA-6: ± 136.09 AC
PERVIOUS: ± 125.09 AC
IMPERVIOUS: ± 11.00 AC

OFFSITE-DA: 98.57 AC
PERVIOUS: 96.85 AC
IMPERVIOUS: 1.72 AC

DISCHARGE POINT 2

STORMWATER BASIN #3
±10 AC
TOP: 918.50
NWL: 913.50
BOT: 909.50

STORMWATER BASIN #4
±10 AC
TOP: 919.50
NWL: 914.50
BOT: 910.50

STORMWATER BASIN #5
±7 AC
TOP: 919.50
NWL: 914.50
BOT: 910.50

DISCHARGE POINT 3

LEGEND

- PROPERTY LINE
- PROPOSED DRAINAGE AREA
- PROPOSED DRAINAGE AREA
- PROPOSED TIME OF CONCENTRATION FLOW PATH
- EXISTING CONTOUR
- PROPOSED CONTOUR
- PROPOSED SWALE
- PROJECT AREA
- PROPOSED STORMWATER BASIN
- FEMA FLOODPLAIN - ZONE A
- FEMA FLOODPLAIN - ZONE X
- DISCHARGE POINT

NORTH

GRAPHIC SCALE IN FEET
0 200 400 800

Know what's **below.**
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PROPOSED DRAINAGE AREA MAP

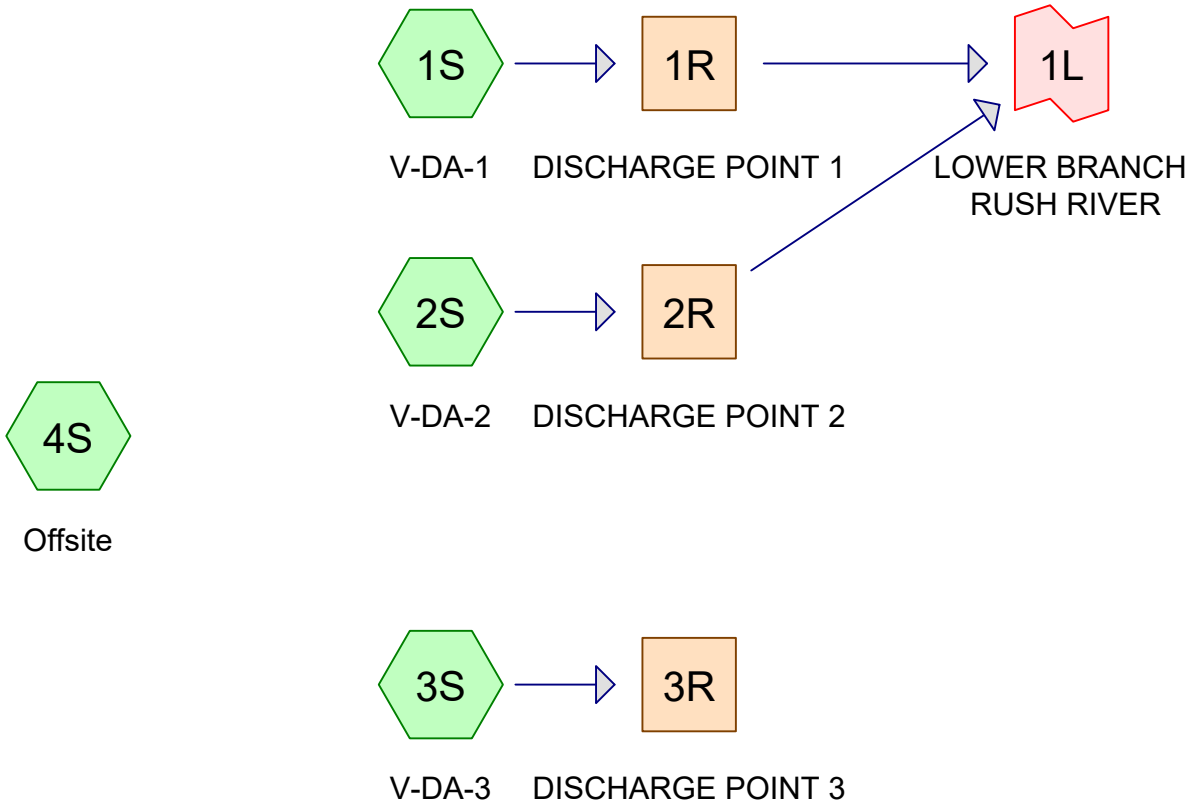
HARMONY ENERGY PARK
PREPARED FOR
CCDC ND, LLC
HARMONY TOWNSHIP NORTH DAKOTA

SHEET NUMBER
EX-2

Appendices

Appendix 1. Pre-Development HydroCAD Model Analysis

Existing Conditions



Subcat Reach Pond Link

Routing Diagram for Harmony Energy Park-Existing Conditions
Prepared by Kimley-Horn & Associates, Printed 8/17/2026
HydroCAD® 10.20-5c s/n 02344 © 2023 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YR-24 HR	Type II 24-hr		Default	24.00	1	2.40	2
2	5-YR-24 HR	Type II 24-hr		Default	24.00	1	3.08	2
3	10-YR-24 HR	Type II 24-hr		Default	24.00	1	3.70	2
4	100-YR-24 HR	Type II 24-hr		Default	24.00	1	6.39	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
722.660	85	Legumes, straight row, Good, HSG D (1S, 2S, 3S, 4S)
5.000	98	On Site Impervious (3S)
727.660	**85**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
722.660	HSG D	1S, 2S, 3S, 4S
5.000	Other	3S
727.660		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	722.660	0.000	722.660	Legumes, straight row, Good	1S, 2S, 3S, 4S
0.000	0.000	0.000	0.000	5.000	5.000	On Site Impervious	3S
0.000	**0.000**	**0.000**	**722.660**	**5.000**	**727.660**	**TOTAL AREA**	

Time span=0.00-90.00 hrs, dt=0.05 hrs, 1801 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: V-DA-1 Runoff Area=136.540 ac 0.00% Impervious Runoff Depth=1.10"
Flow Length=2,730' Tc=121.2 min CN=85/0 Runoff=45.92 cfs 12.509 af

Subcatchment2S: V-DA-2 Runoff Area=435.850 ac 0.00% Impervious Runoff Depth=1.10"
Flow Length=7,000' Tc=287.6 min CN=85/0 Runoff=75.10 cfs 39.929 af

Subcatchment3S: V-DA-3 Runoff Area=56.700 ac 8.82% Impervious Runoff Depth=1.19"
Flow Length=4,200' Tc=237.2 min CN=85/98 Runoff=12.35 cfs 5.641 af

Subcatchment4S: Offsite Runoff Area=98.570 ac 0.00% Impervious Runoff Depth=1.10"
Flow Length=7,100' Tc=303.0 min CN=85/0 Runoff=16.24 cfs 9.030 af

Reach 1R: DISCHARGE POINT 1 Inflow=45.92 cfs 12.509 af
Outflow=45.92 cfs 12.509 af

Reach 2R: DISCHARGE POINT 2 Inflow=75.10 cfs 39.929 af
Outflow=75.10 cfs 39.929 af

Reach 3R: DISCHARGE POINT 3 Inflow=12.35 cfs 5.641 af
Outflow=12.35 cfs 5.641 af

Link 1L: LOWER BRANCH RUSH RIVER Inflow=89.13 cfs 52.438 af
Primary=89.13 cfs 52.438 af

Total Runoff Area = 727.660 ac Runoff Volume = 67.109 af Average Runoff Depth = 1.11"
99.31% Pervious = 722.660 ac 0.69% Impervious = 5.000 ac

Summary for Subcatchment 1S: V-DA-1

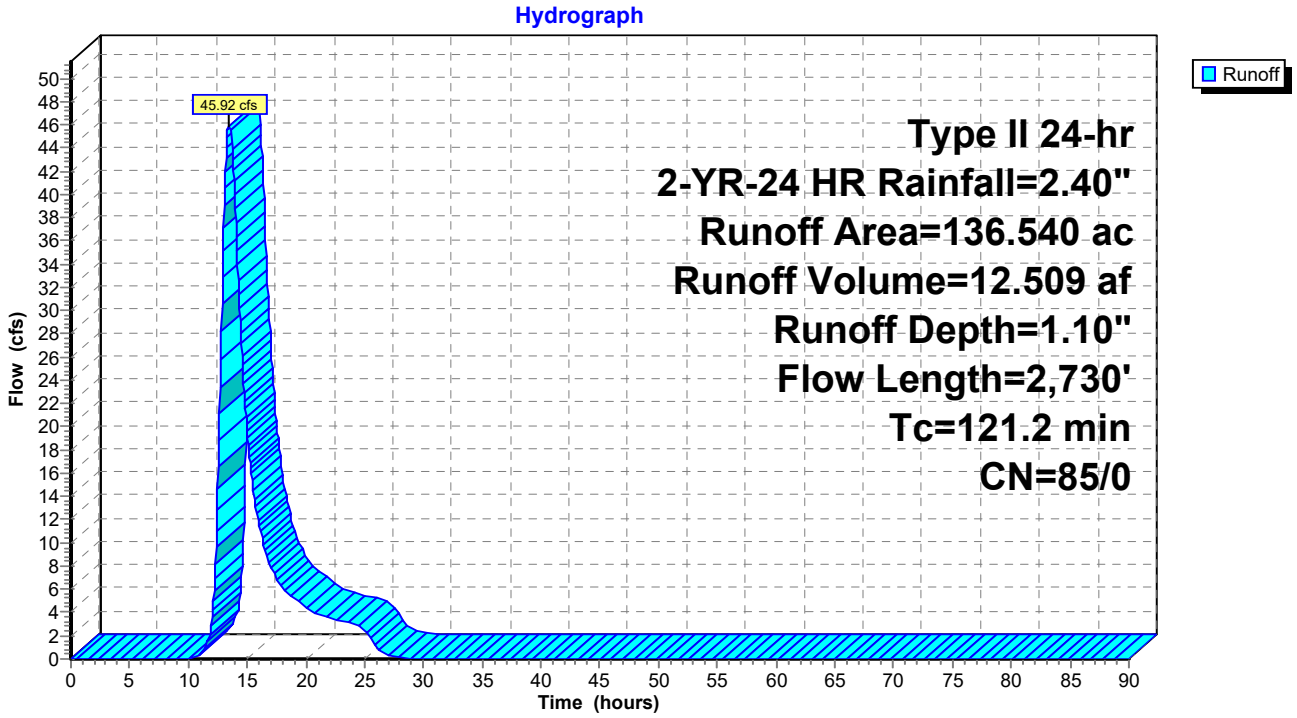
Runoff = 45.92 cfs @ 13.48 hrs, Volume= 12.509 af, Depth= 1.10"
Routed to Reach 1R : DISCHARGE POINT 1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR-24 HR Rainfall=2.40"

Area (ac)	CN	Description
136.540	85	Legumes, straight row, Good, HSG D
136.540	85	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0050	0.18		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.40"
111.7	2,630	0.0019	0.39		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
121.2	2,730	Total			

Subcatchment 1S: V-DA-1



Summary for Subcatchment 2S: V-DA-2

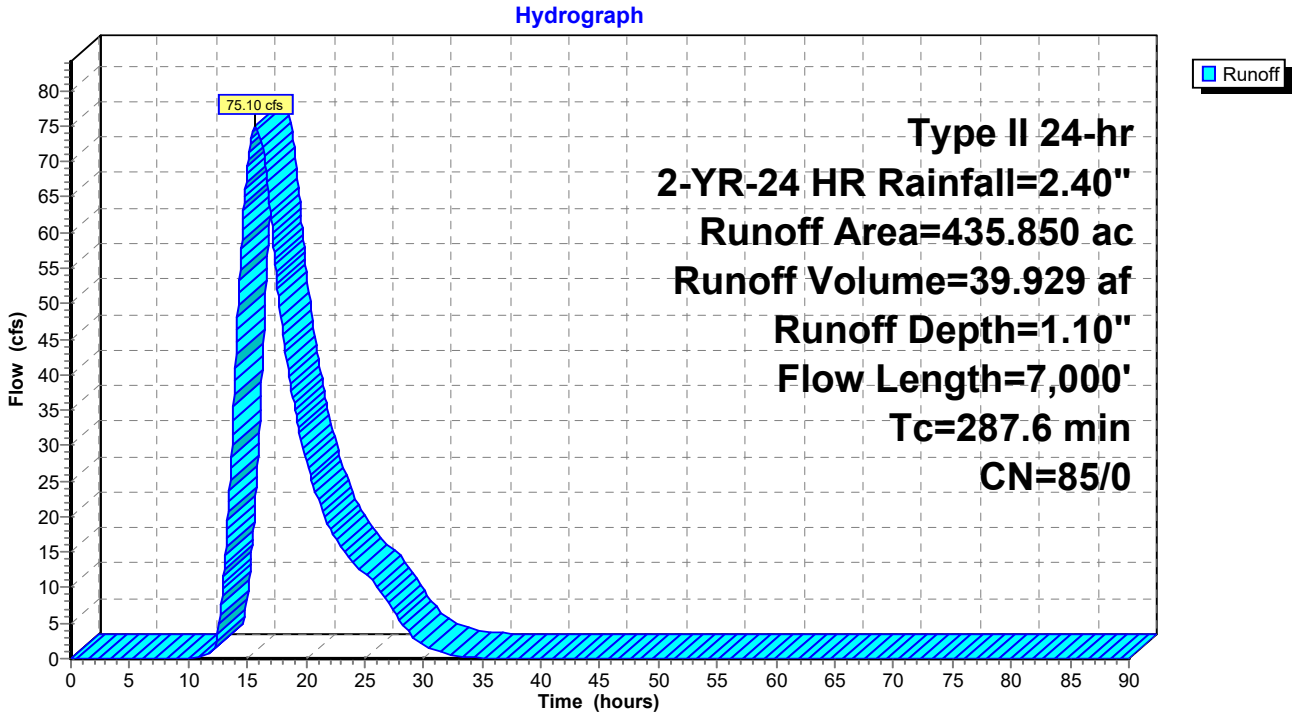
Runoff = 75.10 cfs @ 15.67 hrs, Volume= 39.929 af, Depth= 1.10"
Routed to Reach 2R : DISCHARGE POINT 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR-24 HR Rainfall=2.40"

Area (ac)	CN	Description
435.850	85	Legumes, straight row, Good, HSG D
435.850	85	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.8	100	0.0005	0.07		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.40"
229.2	3,500	0.0008	0.25		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
34.6	3,400	0.0010	1.64	130.70	**Channel Flow,** Area= 79.7 sf Perim= 97.8' r= 0.81' n= 0.025
287.6	7,000	Total			

Subcatchment 2S: V-DA-2



Summary for Subcatchment 3S: V-DA-3

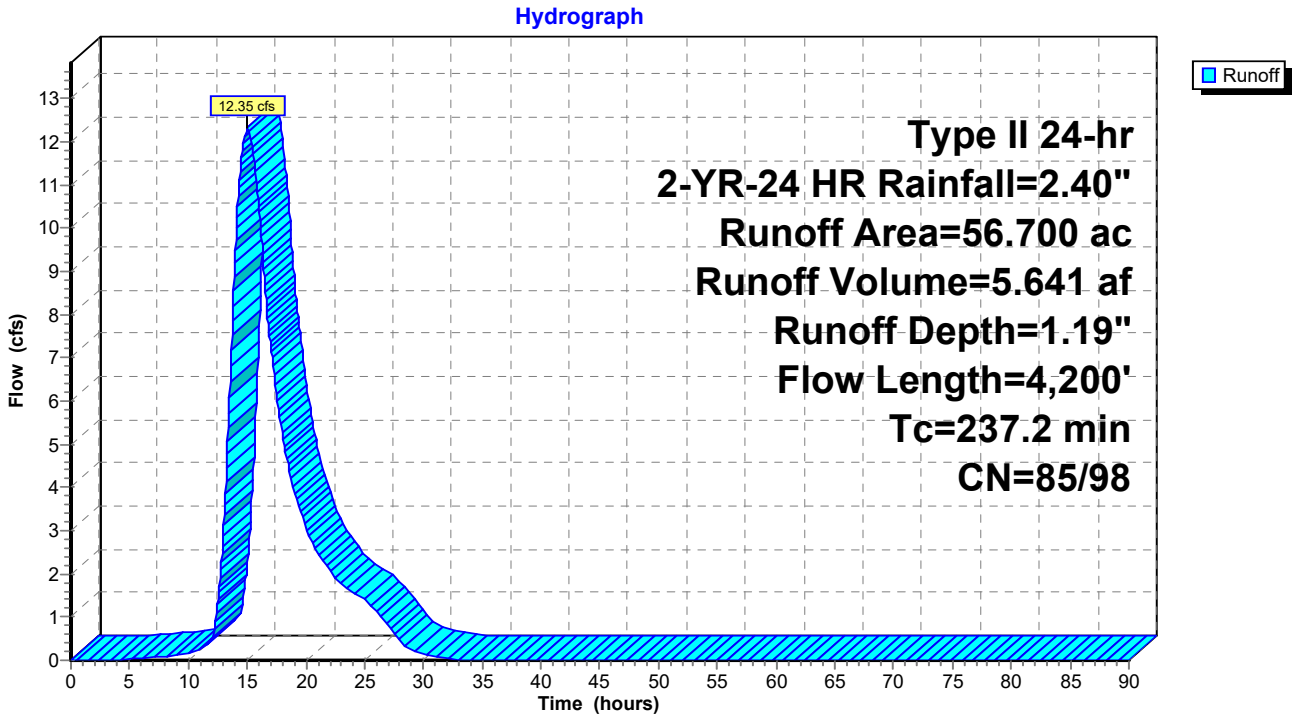
Runoff = 12.35 cfs @ 15.02 hrs, Volume= 5.641 af, Depth= 1.19"
Routed to Reach 3R : DISCHARGE POINT 3

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR-24 HR Rainfall=2.40"

	Area (ac)	CN	Description
	51.700	85	Legumes, straight row, Good, HSG D
*	5.000	98	On Site Impervious
	56.700	86	Weighted Average
	51.700	85	91.18% Pervious Area
	5.000	98	8.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.0	100	0.0010	0.09		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.40"
219.2	4,100	0.0012	0.31		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
237.2	4,200	Total			

Subcatchment 3S: V-DA-3



Summary for Subcatchment 4S: Offsite

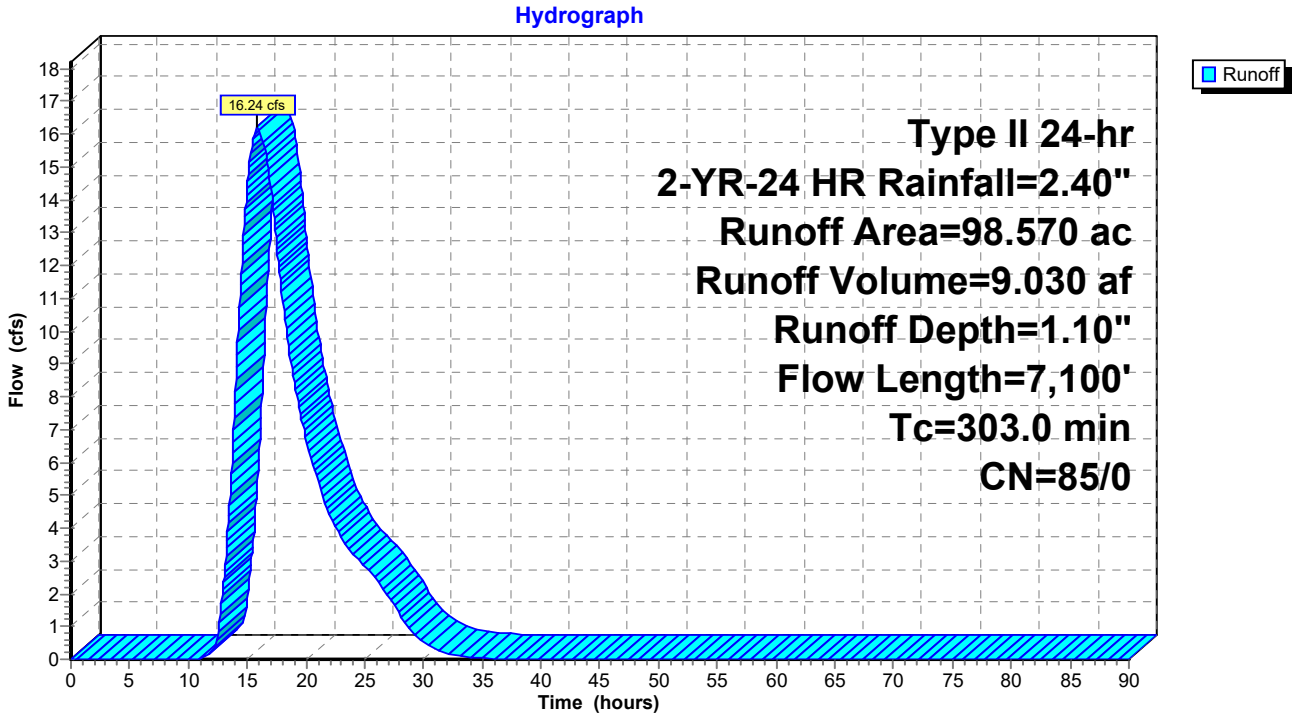
Runoff = 16.24 cfs @ 15.84 hrs, Volume= 9.030 af, Depth= 1.10"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR-24 HR Rainfall=2.40"

Area (ac)	CN	Description
98.570	85	Legumes, straight row, Good, HSG D
98.570	85	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	100	0.0100	0.23		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.40"
295.8	7,000	0.0006	0.39		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
303.0	7,100	Total			

Subcatchment 4S: Offsite



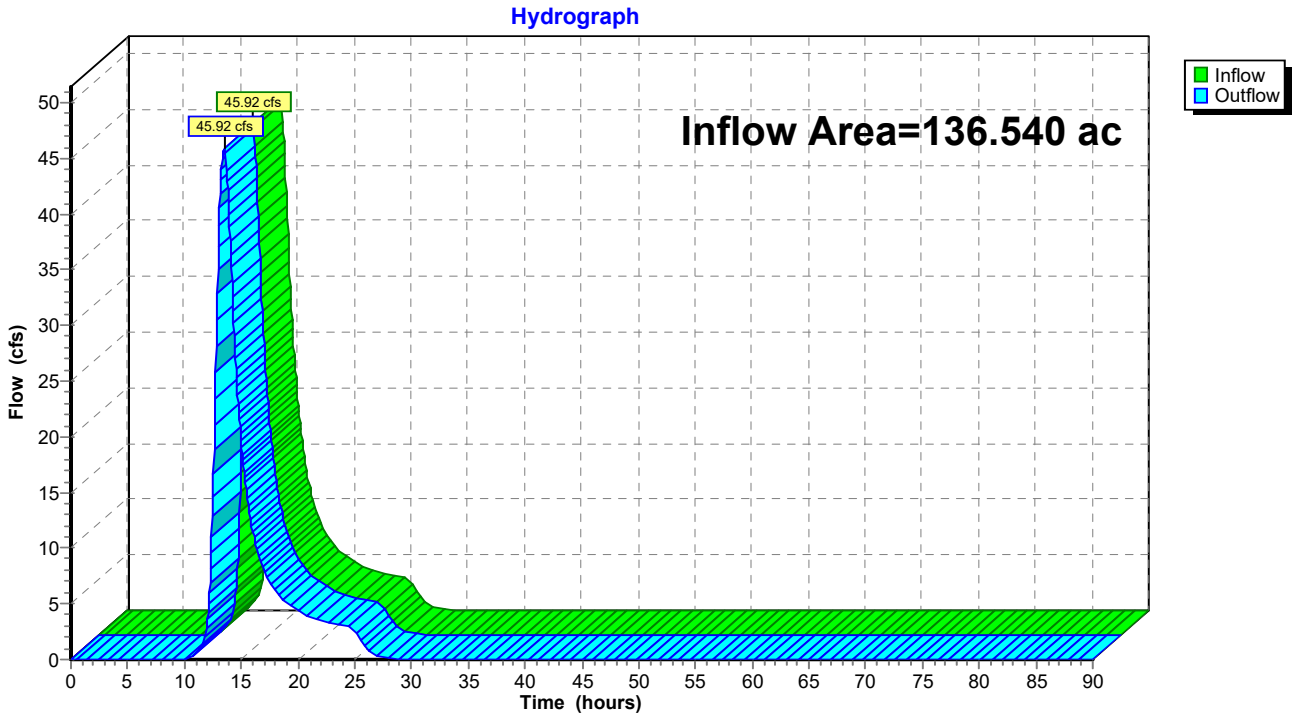
Summary for Reach 1R: DISCHARGE POINT 1

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

Inflow Area = 136.540 ac, 0.00% Impervious, Inflow Depth = 1.10" for 2-YR-24 HR event
Inflow = 45.92 cfs @ 13.48 hrs, Volume= 12.509 af
Outflow = 45.92 cfs @ 13.48 hrs, Volume= 12.509 af, Atten= 0%, Lag= 0.0 min
Routed to Link 1L : LOWER BRANCH RUSH RIVER

Routing by Stor-Ind+Trans method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Reach 1R: DISCHARGE POINT 1



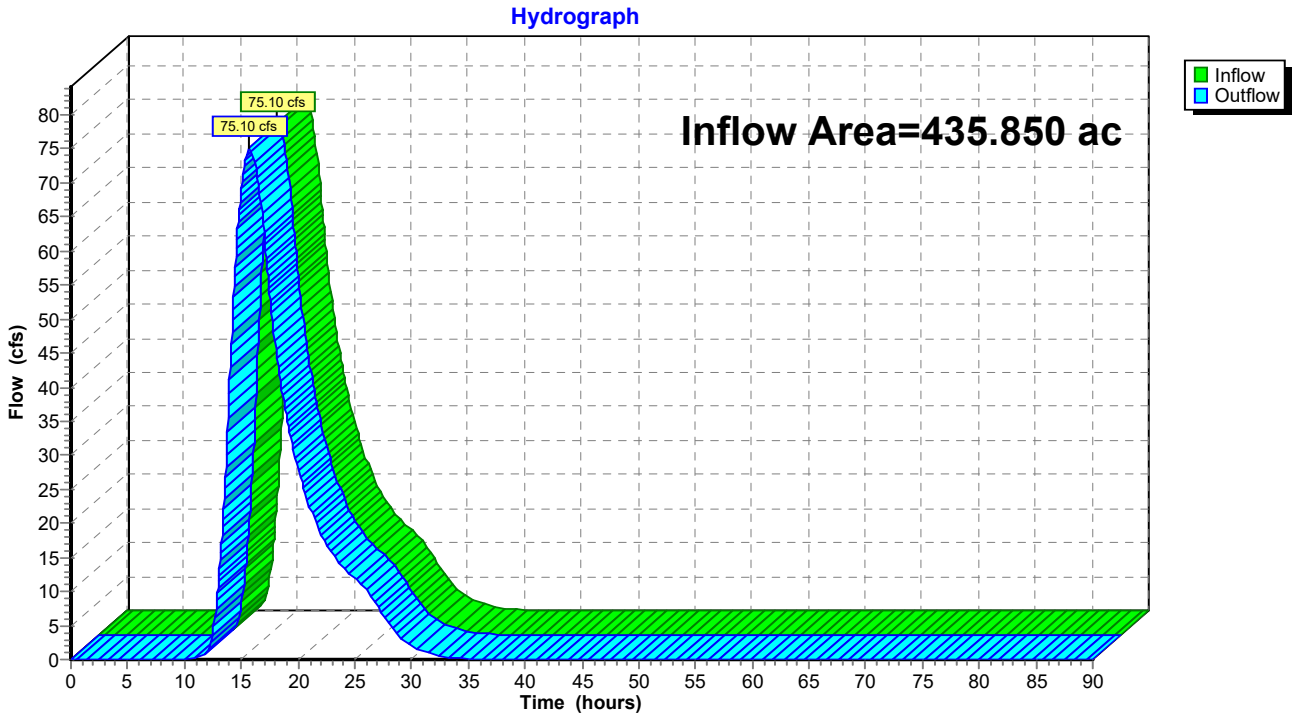
Summary for Reach 2R: DISCHARGE POINT 2

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

Inflow Area = 435.850 ac, 0.00% Impervious, Inflow Depth = 1.10" for 2-YR-24 HR event
Inflow = 75.10 cfs @ 15.67 hrs, Volume= 39.929 af
Outflow = 75.10 cfs @ 15.67 hrs, Volume= 39.929 af, Atten= 0%, Lag= 0.0 min
Routed to Link 1L : LOWER BRANCH RUSH RIVER

Routing by Stor-Ind+Trans method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Reach 2R: DISCHARGE POINT 2



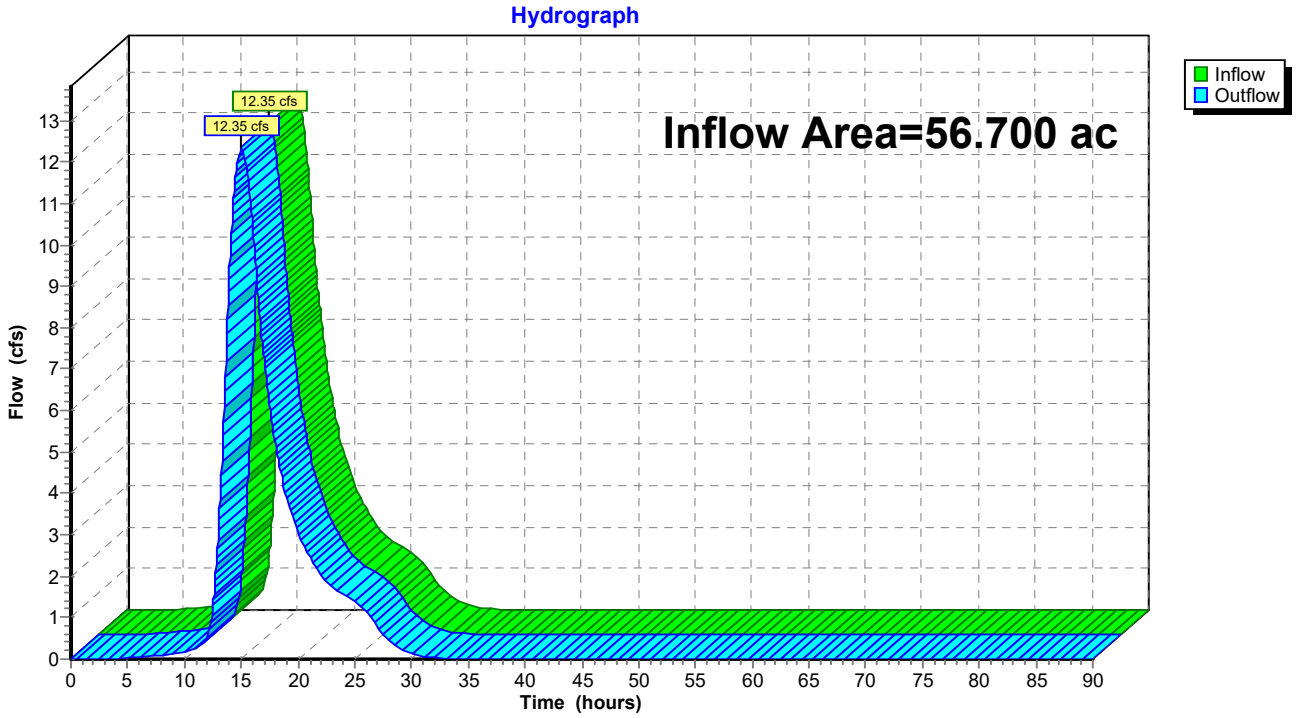
Summary for Reach 3R: DISCHARGE POINT 3

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

Inflow Area = 56.700 ac, 8.82% Impervious, Inflow Depth = 1.19" for 2-YR-24 HR event
Inflow = 12.35 cfs @ 15.02 hrs, Volume= 5.641 af
Outflow = 12.35 cfs @ 15.02 hrs, Volume= 5.641 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Reach 3R: DISCHARGE POINT 3

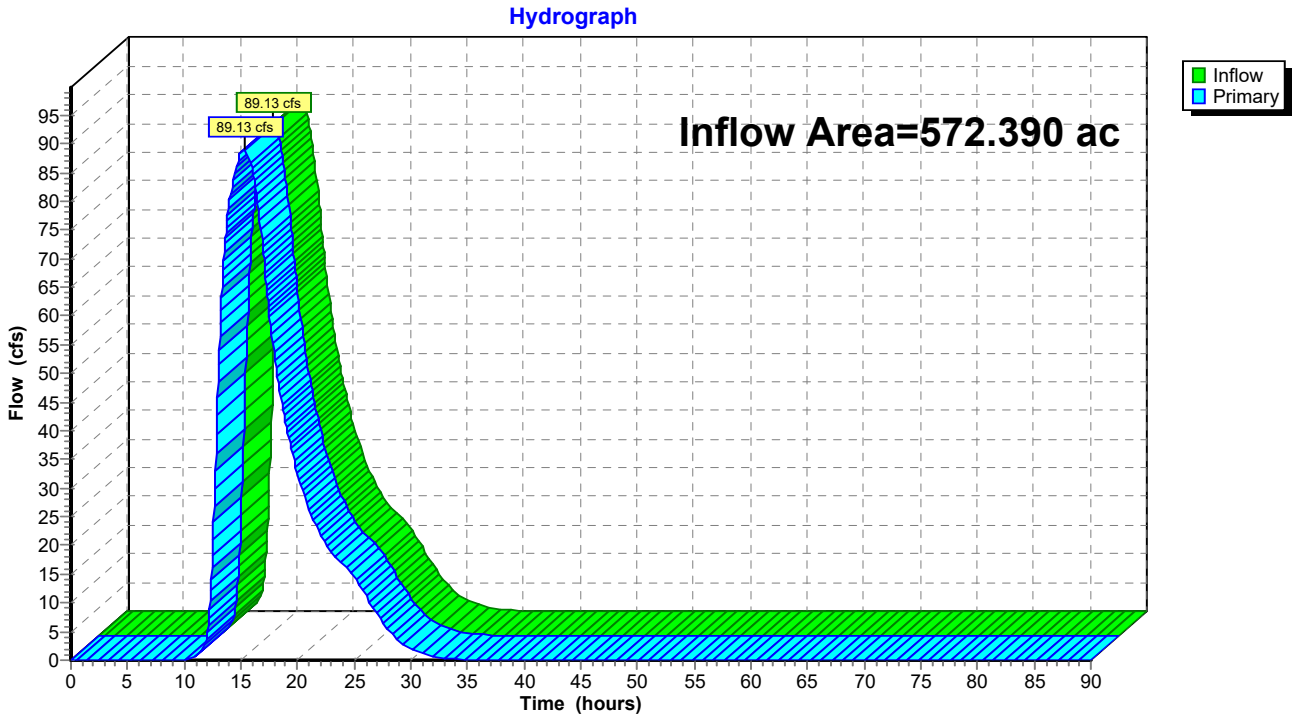


Summary for Link 1L: LOWER BRANCH RUSH RIVER

Inflow Area = 572.390 ac, 0.00% Impervious, Inflow Depth = 1.10" for 2-YR-24 HR event
Inflow = 89.13 cfs @ 15.33 hrs, Volume= 52.438 af
Primary = 89.13 cfs @ 15.33 hrs, Volume= 52.438 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Link 1L: LOWER BRANCH RUSH RIVER



Time span=0.00-90.00 hrs, dt=0.05 hrs, 1801 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: V-DA-1 Runoff Area=136.540 ac 0.00% Impervious Runoff Depth=1.66"
Flow Length=2,730' Tc=121.2 min CN=85/0 Runoff=70.43 cfs 18.839 af

Subcatchment2S: V-DA-2 Runoff Area=435.850 ac 0.00% Impervious Runoff Depth=1.66"
Flow Length=7,000' Tc=287.6 min CN=85/0 Runoff=115.35 cfs 60.135 af

Subcatchment3S: V-DA-3 Runoff Area=56.700 ac 8.82% Impervious Runoff Depth=1.76"
Flow Length=4,200' Tc=237.2 min CN=85/98 Runoff=18.49 cfs 8.320 af

Subcatchment4S: Offsite Runoff Area=98.570 ac 0.00% Impervious Runoff Depth=1.66"
Flow Length=7,100' Tc=303.0 min CN=85/0 Runoff=24.96 cfs 13.600 af

Reach 1R: DISCHARGE POINT 1 Inflow=70.43 cfs 18.839 af
Outflow=70.43 cfs 18.839 af

Reach 2R: DISCHARGE POINT 2 Inflow=115.35 cfs 60.135 af
Outflow=115.35 cfs 60.135 af

Reach 3R: DISCHARGE POINT 3 Inflow=18.49 cfs 8.320 af
Outflow=18.49 cfs 8.320 af

Link 1L: LOWER BRANCH RUSH RIVER Inflow=136.59 cfs 78.974 af
Primary=136.59 cfs 78.974 af

Total Runoff Area = 727.660 ac Runoff Volume = 100.893 af Average Runoff Depth = 1.66"
99.31% Pervious = 722.660 ac 0.69% Impervious = 5.000 ac

Summary for Subcatchment 1S: V-DA-1

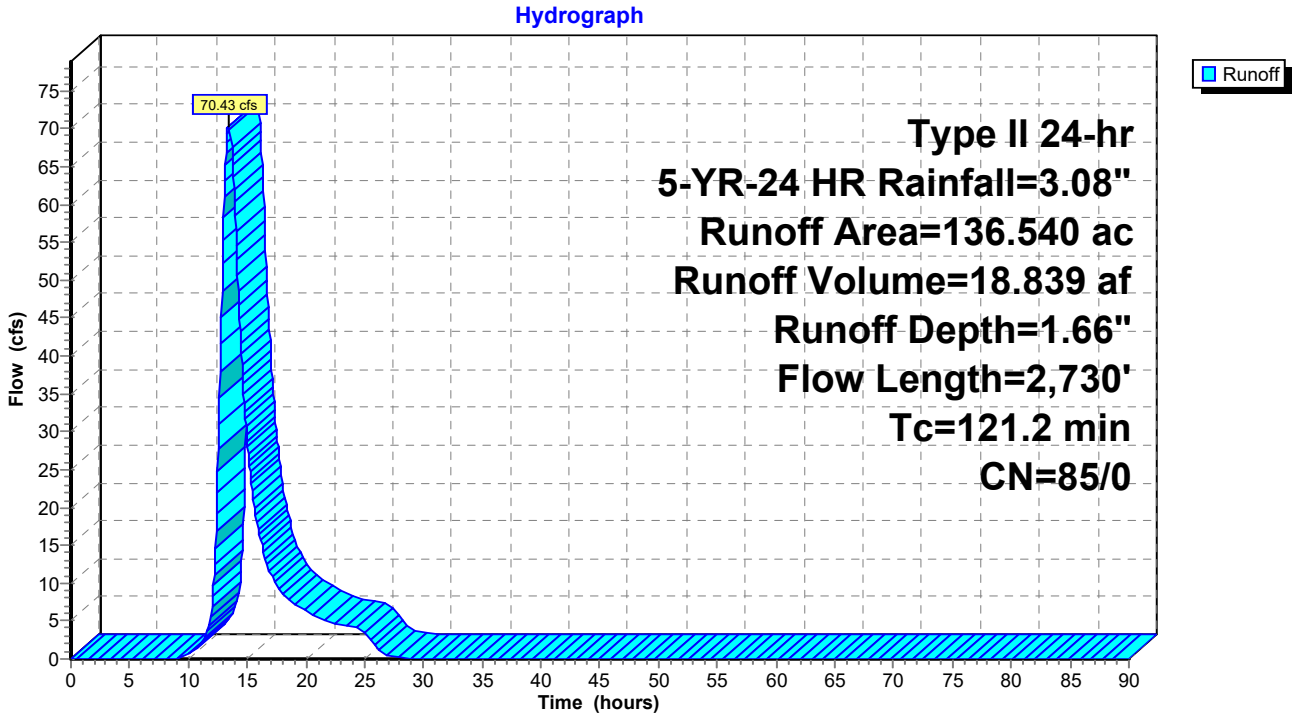
Runoff = 70.43 cfs @ 13.45 hrs, Volume= 18.839 af, Depth= 1.66"
Routed to Reach 1R : DISCHARGE POINT 1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-YR-24 HR Rainfall=3.08"

Area (ac)	CN	Description
136.540	85	Legumes, straight row, Good, HSG D
136.540	85	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0050	0.18		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.40"
111.7	2,630	0.0019	0.39		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
121.2	2,730	Total			

Subcatchment 1S: V-DA-1



Summary for Subcatchment 2S: V-DA-2

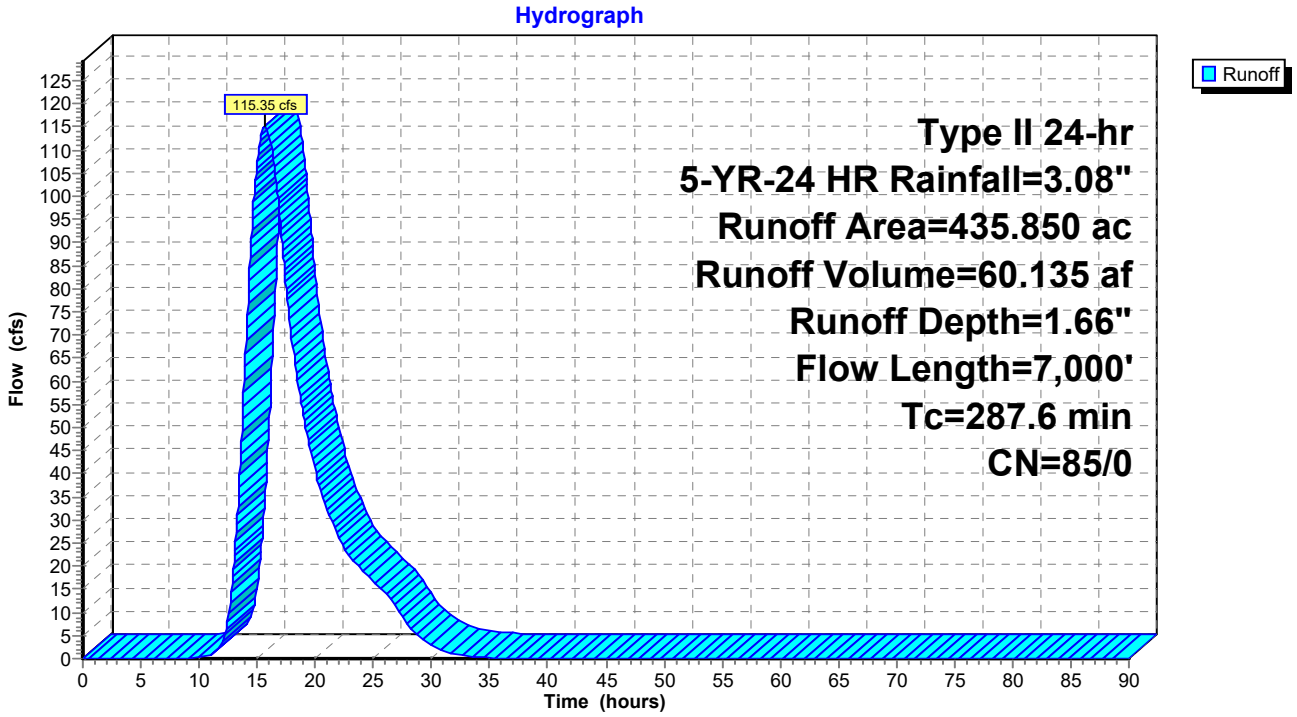
Runoff = 115.35 cfs @ 15.66 hrs, Volume= 60.135 af, Depth= 1.66"
Routed to Reach 2R : DISCHARGE POINT 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-YR-24 HR Rainfall=3.08"

Area (ac)	CN	Description
435.850	85	Legumes, straight row, Good, HSG D
435.850	85	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.8	100	0.0005	0.07		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.40"
229.2	3,500	0.0008	0.25		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
34.6	3,400	0.0010	1.64	130.70	**Channel Flow,** Area= 79.7 sf Perim= 97.8' r= 0.81' n= 0.025
287.6	7,000	Total			

Subcatchment 2S: V-DA-2



Summary for Subcatchment 3S: V-DA-3

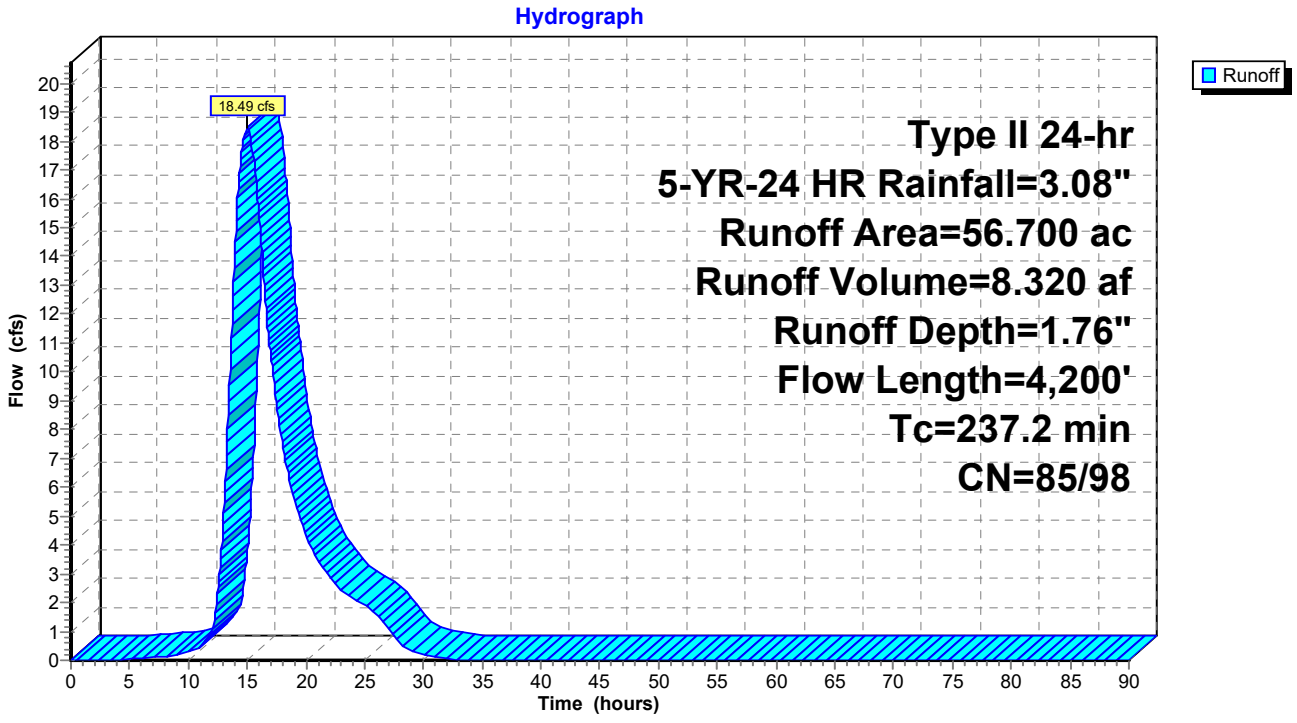
Runoff = 18.49 cfs @ 15.01 hrs, Volume= 8.320 af, Depth= 1.76"
Routed to Reach 3R : DISCHARGE POINT 3

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-YR-24 HR Rainfall=3.08"

	Area (ac)	CN	Description
	51.700	85	Legumes, straight row, Good, HSG D
*	5.000	98	On Site Impervious
	56.700	86	Weighted Average
	51.700	85	91.18% Pervious Area
	5.000	98	8.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.0	100	0.0010	0.09		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.40"
219.2	4,100	0.0012	0.31		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
237.2	4,200	Total			

Subcatchment 3S: V-DA-3



Summary for Subcatchment 4S: Offsite

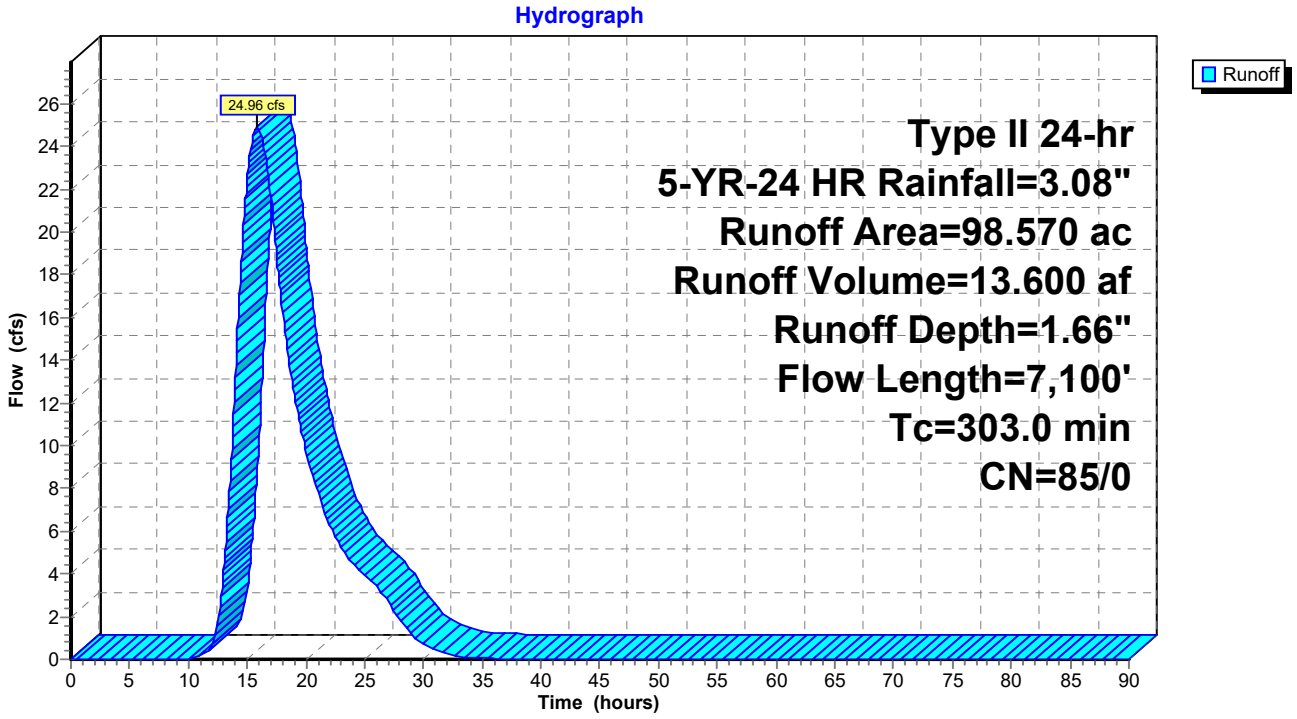
Runoff = 24.96 cfs @ 15.83 hrs, Volume= 13.600 af, Depth= 1.66"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-YR-24 HR Rainfall=3.08"

Area (ac)	CN	Description
98.570	85	Legumes, straight row, Good, HSG D
98.570	85	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	100	0.0100	0.23		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.40"
295.8	7,000	0.0006	0.39		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
303.0	7,100	Total			

Subcatchment 4S: Offsite



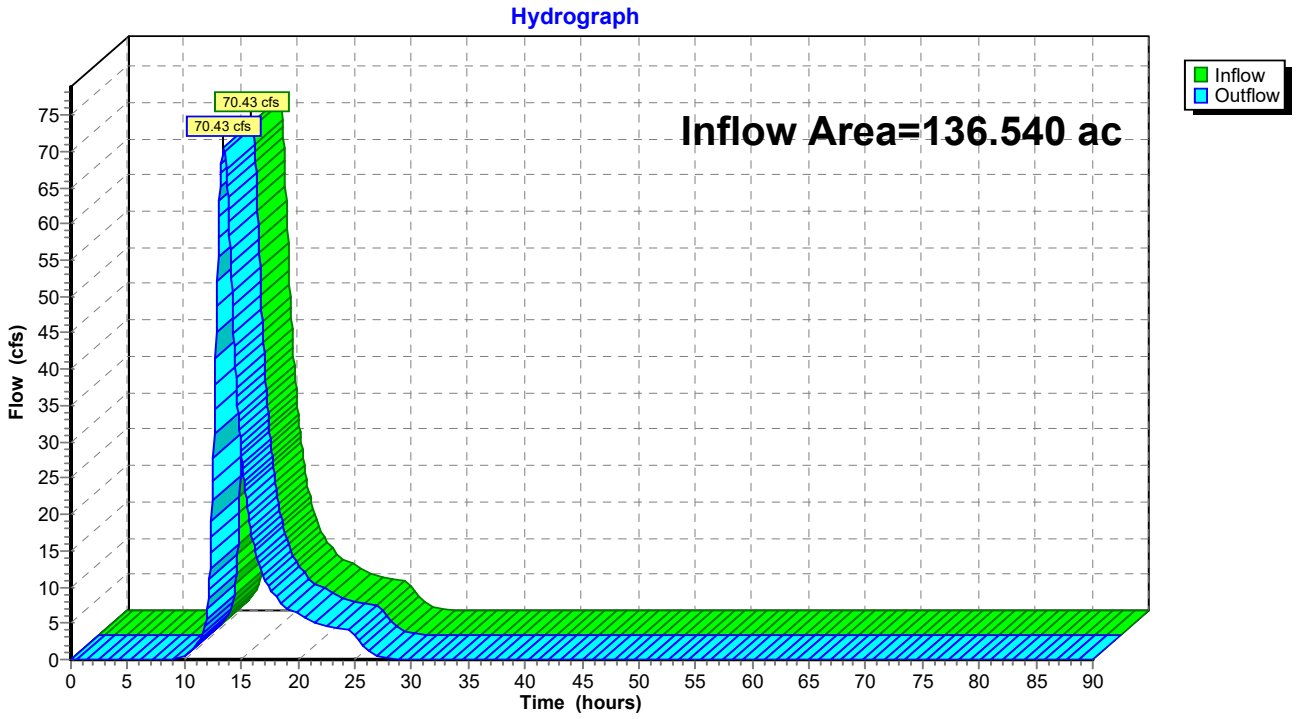
Summary for Reach 1R: DISCHARGE POINT 1

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

Inflow Area = 136.540 ac, 0.00% Impervious, Inflow Depth = 1.66" for 5-YR-24 HR event
Inflow = 70.43 cfs @ 13.45 hrs, Volume= 18.839 af
Outflow = 70.43 cfs @ 13.45 hrs, Volume= 18.839 af, Atten= 0%, Lag= 0.0 min
Routed to Link 1L : LOWER BRANCH RUSH RIVER

Routing by Stor-Ind+Trans method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Reach 1R: DISCHARGE POINT 1



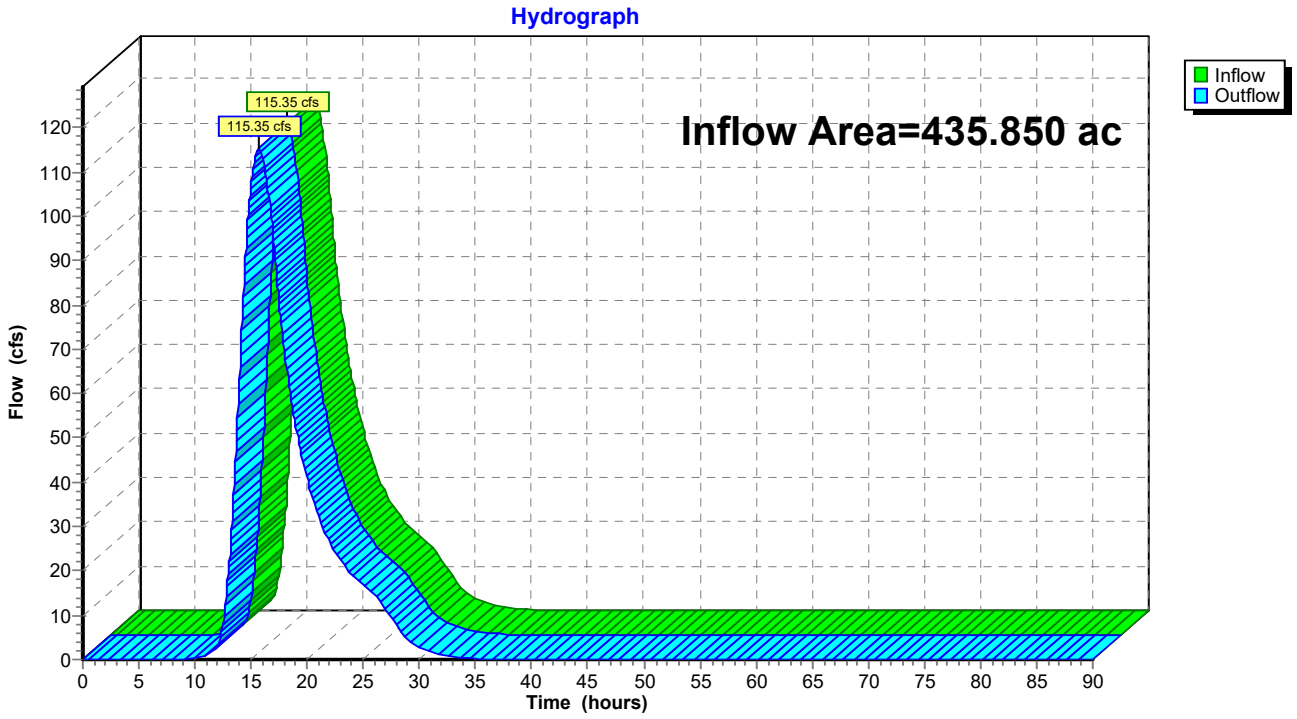
Summary for Reach 2R: DISCHARGE POINT 2

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

Inflow Area = 435.850 ac, 0.00% Impervious, Inflow Depth = 1.66" for 5-YR-24 HR event
Inflow = 115.35 cfs @ 15.66 hrs, Volume= 60.135 af
Outflow = 115.35 cfs @ 15.66 hrs, Volume= 60.135 af, Atten= 0%, Lag= 0.0 min
Routed to Link 1L : LOWER BRANCH RUSH RIVER

Routing by Stor-Ind+Trans method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Reach 2R: DISCHARGE POINT 2



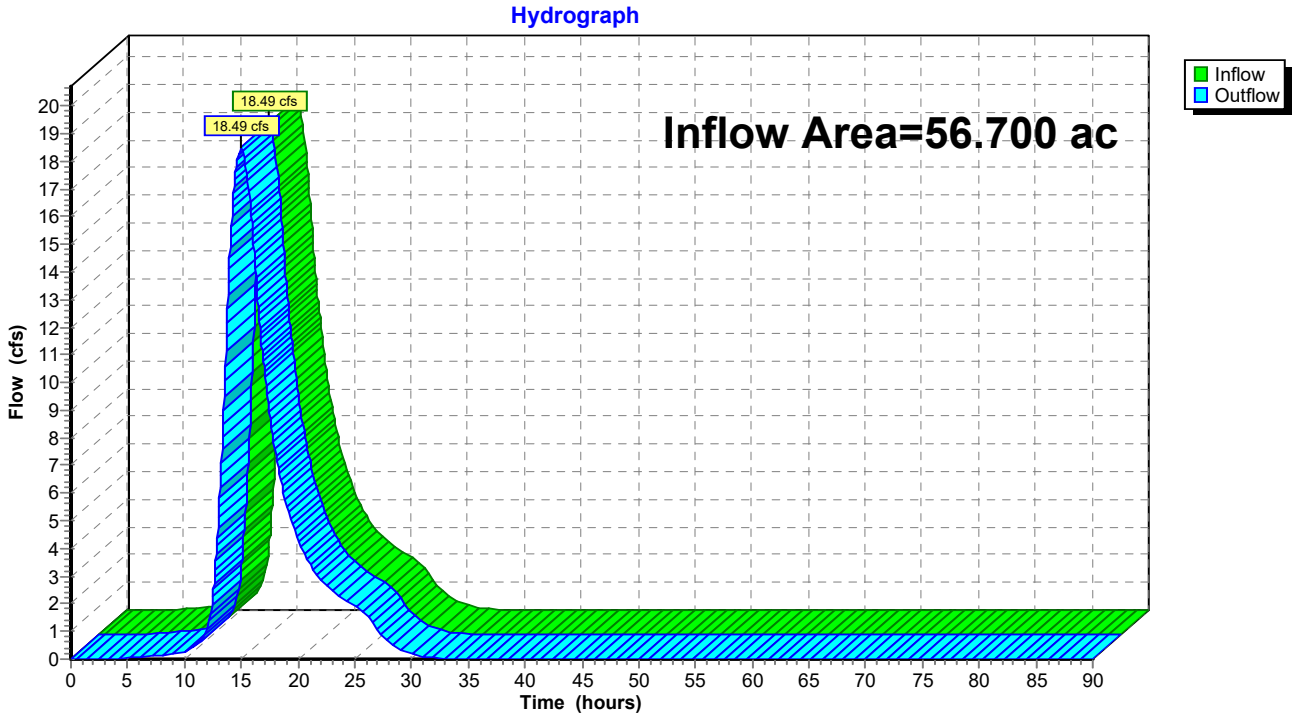
Summary for Reach 3R: DISCHARGE POINT 3

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

Inflow Area = 56.700 ac, 8.82% Impervious, Inflow Depth = 1.76" for 5-YR-24 HR event
Inflow = 18.49 cfs @ 15.01 hrs, Volume= 8.320 af
Outflow = 18.49 cfs @ 15.01 hrs, Volume= 8.320 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Reach 3R: DISCHARGE POINT 3

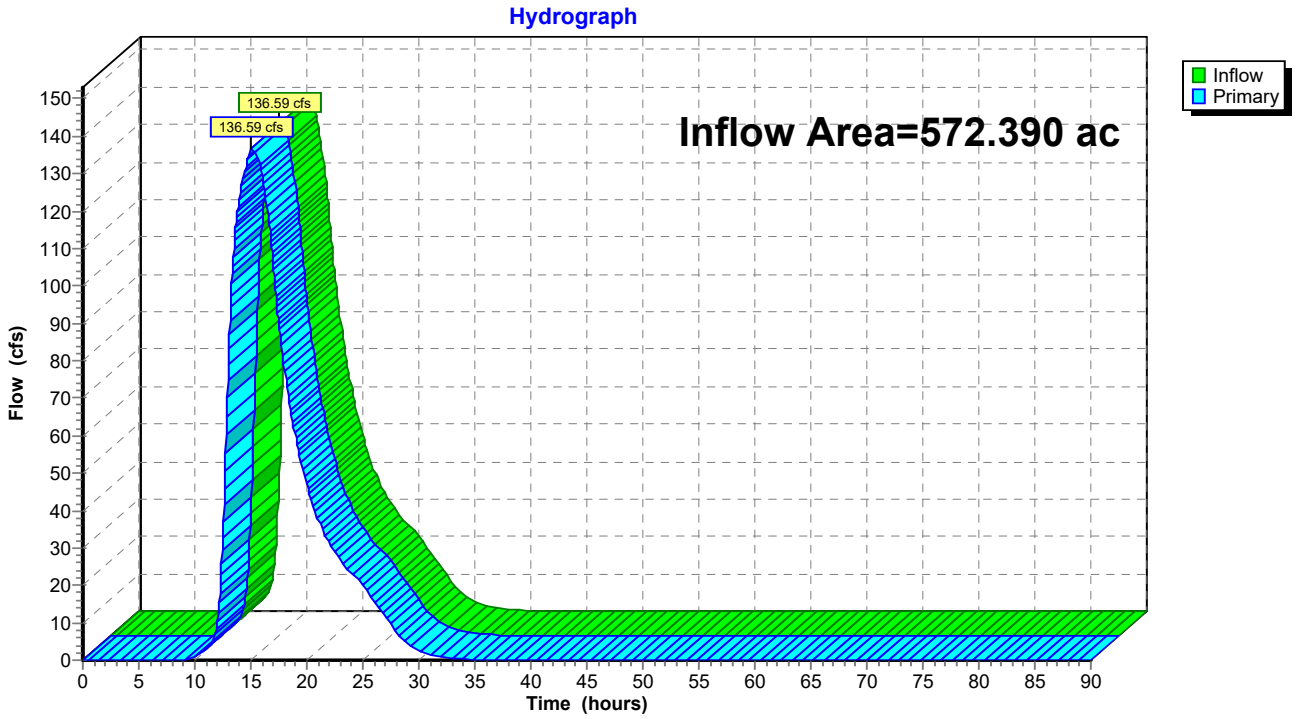


Summary for Link 1L: LOWER BRANCH RUSH RIVER

Inflow Area = 572.390 ac, 0.00% Impervious, Inflow Depth = 1.66" for 5-YR-24 HR event
Inflow = 136.59 cfs @ 15.05 hrs, Volume= 78.974 af
Primary = 136.59 cfs @ 15.05 hrs, Volume= 78.974 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Link 1L: LOWER BRANCH RUSH RIVER



Time span=0.00-90.00 hrs, dt=0.05 hrs, 1801 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: V-DA-1 Runoff Area=136.540 ac 0.00% Impervious Runoff Depth=2.19"
Flow Length=2,730' Tc=121.2 min CN=85/0 Runoff=93.84 cfs 24.936 af

Subcatchment2S: V-DA-2 Runoff Area=435.850 ac 0.00% Impervious Runoff Depth=2.19"
Flow Length=7,000' Tc=287.6 min CN=85/0 Runoff=153.94 cfs 79.600 af

Subcatchment3S: V-DA-3 Runoff Area=56.700 ac 8.82% Impervious Runoff Depth=2.30"
Flow Length=4,200' Tc=237.2 min CN=85/98 Runoff=24.35 cfs 10.886 af

Subcatchment4S: Offsite Runoff Area=98.570 ac 0.00% Impervious Runoff Depth=2.19"
Flow Length=7,100' Tc=303.0 min CN=85/0 Runoff=33.32 cfs 18.002 af

Reach 1R: DISCHARGE POINT 1 Inflow=93.84 cfs 24.936 af
Outflow=93.84 cfs 24.936 af

Reach 2R: DISCHARGE POINT 2 Inflow=153.94 cfs 79.600 af
Outflow=153.94 cfs 79.600 af

Reach 3R: DISCHARGE POINT 3 Inflow=24.35 cfs 10.886 af
Outflow=24.35 cfs 10.886 af

Link 1L: LOWER BRANCH RUSH RIVER Inflow=182.31 cfs 104.536 af
Primary=182.31 cfs 104.536 af

Total Runoff Area = 727.660 ac Runoff Volume = 133.424 af Average Runoff Depth = 2.20"
99.31% Pervious = 722.660 ac 0.69% Impervious = 5.000 ac

Summary for Subcatchment 1S: V-DA-1

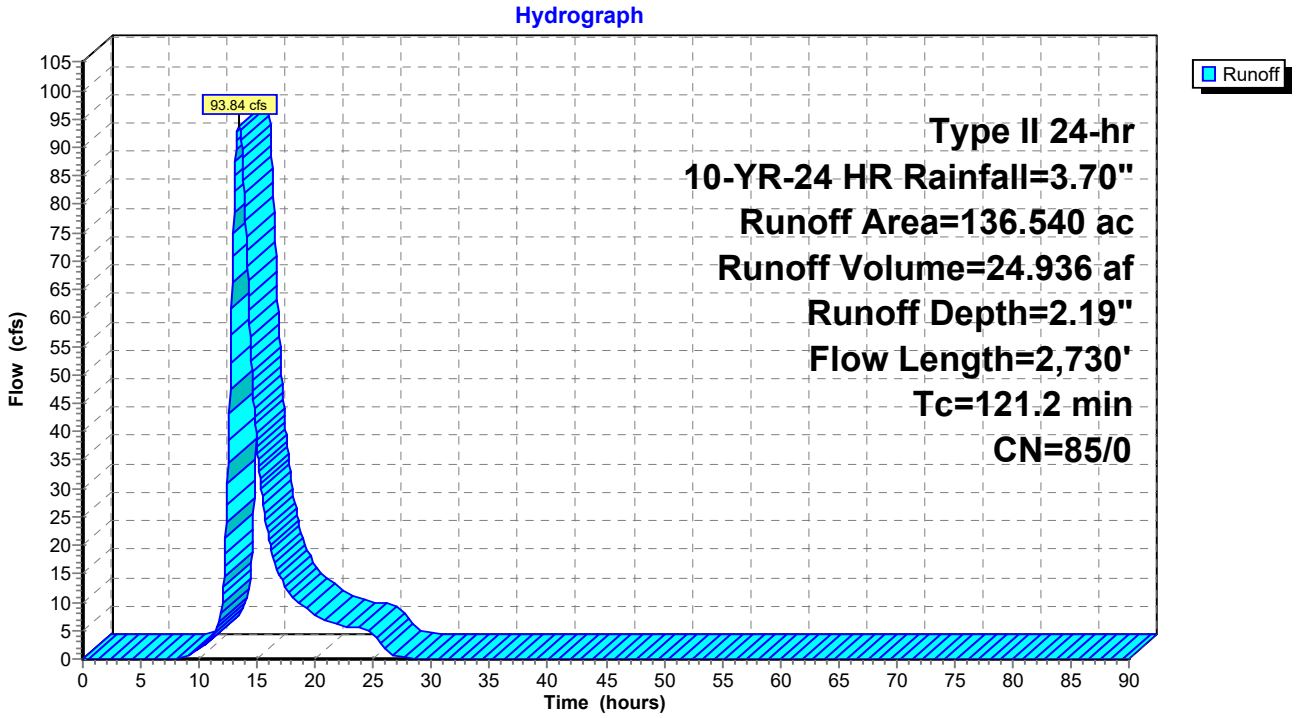
Runoff = 93.84 cfs @ 13.43 hrs, Volume= 24.936 af, Depth= 2.19"
Routed to Reach 1R : DISCHARGE POINT 1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR-24 HR Rainfall=3.70"

Area (ac)	CN	Description
136.540	85	Legumes, straight row, Good, HSG D
136.540	85	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0050	0.18		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.40"
111.7	2,630	0.0019	0.39		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
121.2	2,730	Total			

Subcatchment 1S: V-DA-1



Summary for Subcatchment 2S: V-DA-2

[47] Hint: Peak is 118% of capacity of segment #3

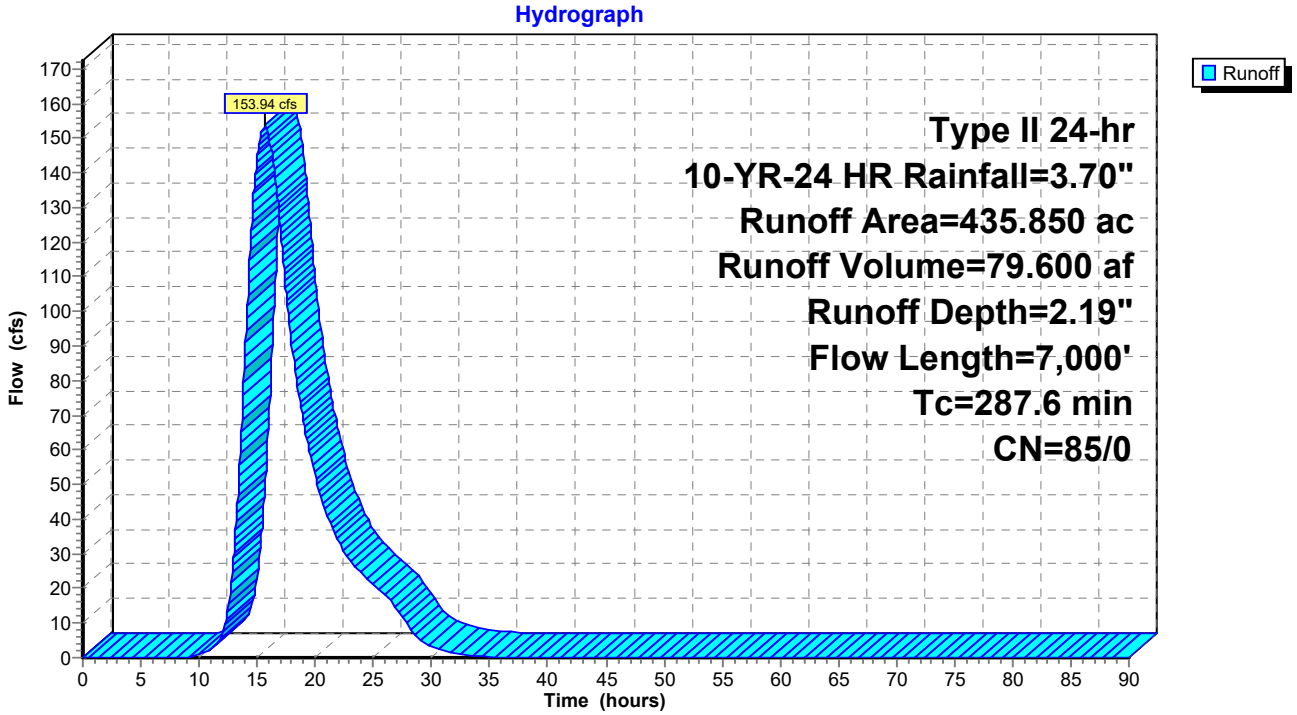
Runoff = 153.94 cfs @ 15.65 hrs, Volume= 79.600 af, Depth= 2.19"
Routed to Reach 2R : DISCHARGE POINT 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR-24 HR Rainfall=3.70"

Area (ac)	CN	Description
435.850	85	Legumes, straight row, Good, HSG D
435.850	85	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.8	100	0.0005	0.07		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.40"
229.2	3,500	0.0008	0.25		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
34.6	3,400	0.0010	1.64	130.70	**Channel Flow,** Area= 79.7 sf Perim= 97.8' r= 0.81' n= 0.025
287.6	7,000	Total			

Subcatchment 2S: V-DA-2



Summary for Subcatchment 3S: V-DA-3

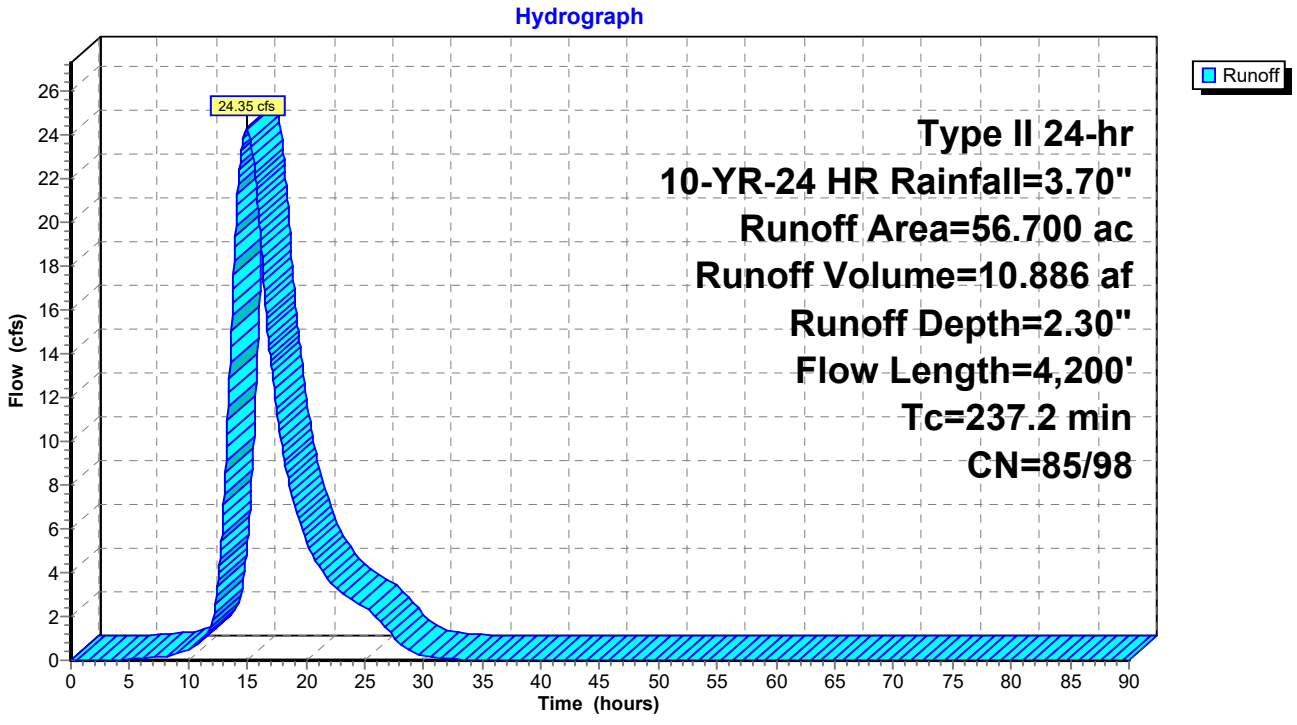
Runoff = 24.35 cfs @ 15.00 hrs, Volume= 10.886 af, Depth= 2.30"
Routed to Reach 3R : DISCHARGE POINT 3

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR-24 HR Rainfall=3.70"

	Area (ac)	CN	Description
	51.700	85	Legumes, straight row, Good, HSG D
*	5.000	98	On Site Impervious
	56.700	86	Weighted Average
	51.700	85	91.18% Pervious Area
	5.000	98	8.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.0	100	0.0010	0.09		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.40"
219.2	4,100	0.0012	0.31		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
237.2	4,200	Total			

Subcatchment 3S: V-DA-3



Summary for Subcatchment 4S: Offsite

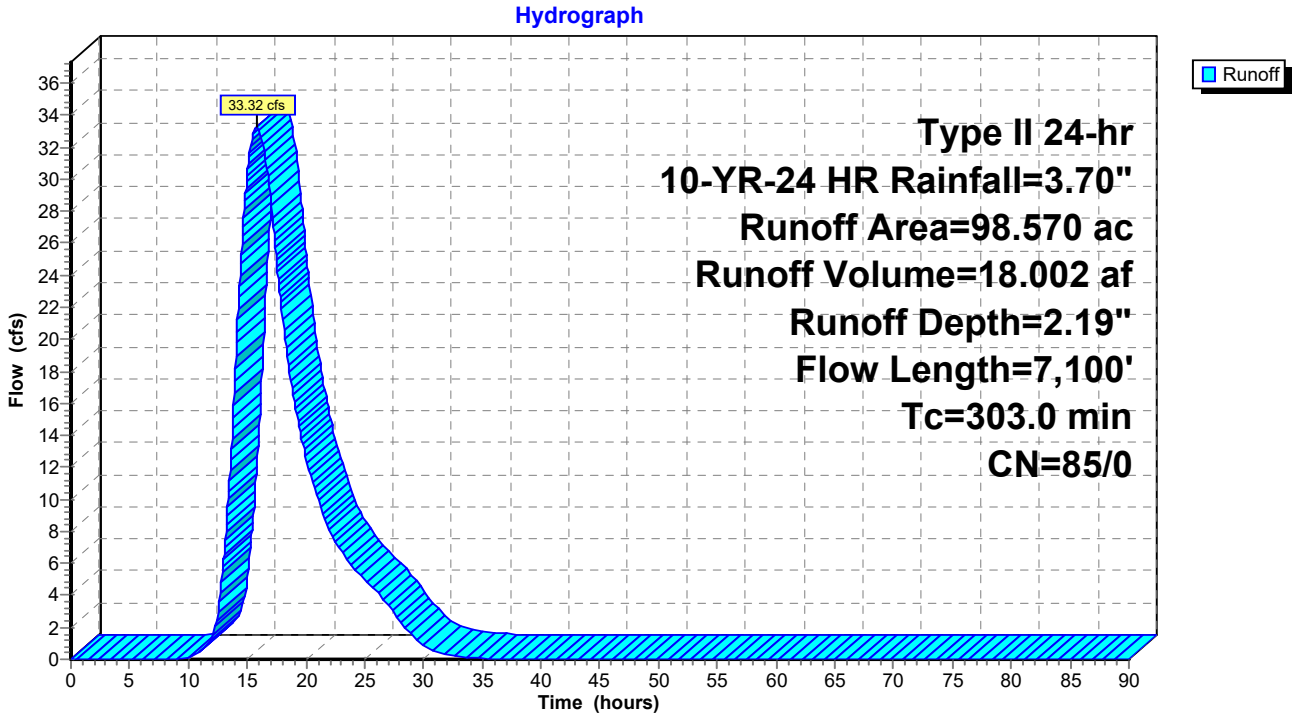
Runoff = 33.32 cfs @ 15.82 hrs, Volume= 18.002 af, Depth= 2.19"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR-24 HR Rainfall=3.70"

Area (ac)	CN	Description
98.570	85	Legumes, straight row, Good, HSG D
98.570	85	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	100	0.0100	0.23		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.40"
295.8	7,000	0.0006	0.39		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
303.0	7,100	Total			

Subcatchment 4S: Offsite



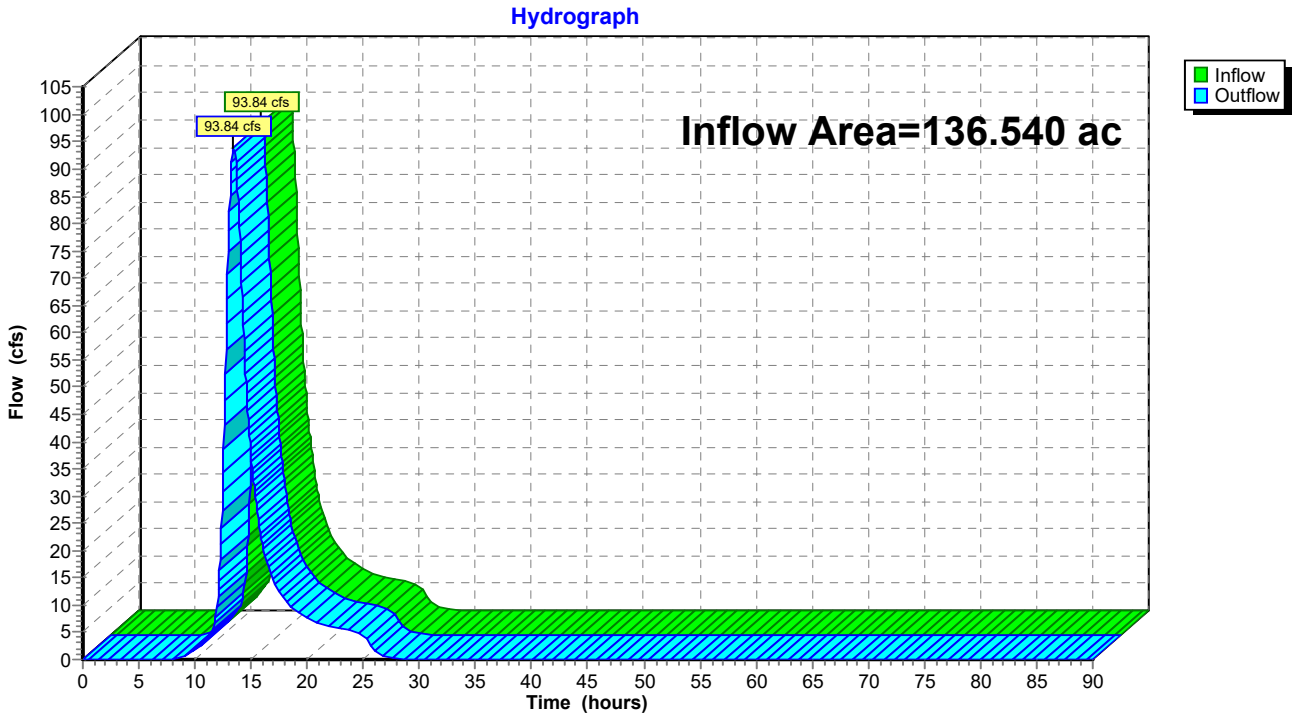
Summary for Reach 1R: DISCHARGE POINT 1

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

Inflow Area = 136.540 ac, 0.00% Impervious, Inflow Depth = 2.19" for 10-YR-24 HR event
Inflow = 93.84 cfs @ 13.43 hrs, Volume= 24.936 af
Outflow = 93.84 cfs @ 13.43 hrs, Volume= 24.936 af, Atten= 0%, Lag= 0.0 min
Routed to Link 1L : LOWER BRANCH RUSH RIVER

Routing by Stor-Ind+Trans method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Reach 1R: DISCHARGE POINT 1



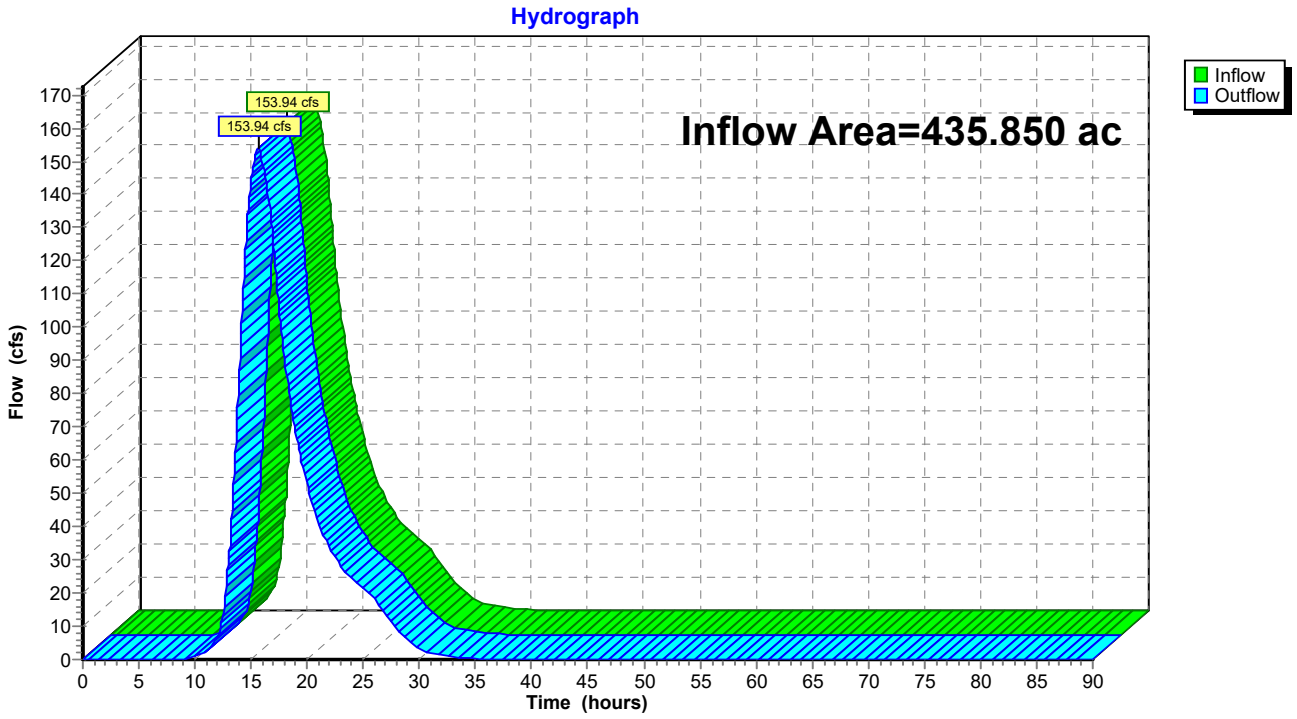
Summary for Reach 2R: DISCHARGE POINT 2

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

Inflow Area = 435.850 ac, 0.00% Impervious, Inflow Depth = 2.19" for 10-YR-24 HR event
Inflow = 153.94 cfs @ 15.65 hrs, Volume= 79.600 af
Outflow = 153.94 cfs @ 15.65 hrs, Volume= 79.600 af, Atten= 0%, Lag= 0.0 min
Routed to Link 1L : LOWER BRANCH RUSH RIVER

Routing by Stor-Ind+Trans method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Reach 2R: DISCHARGE POINT 2



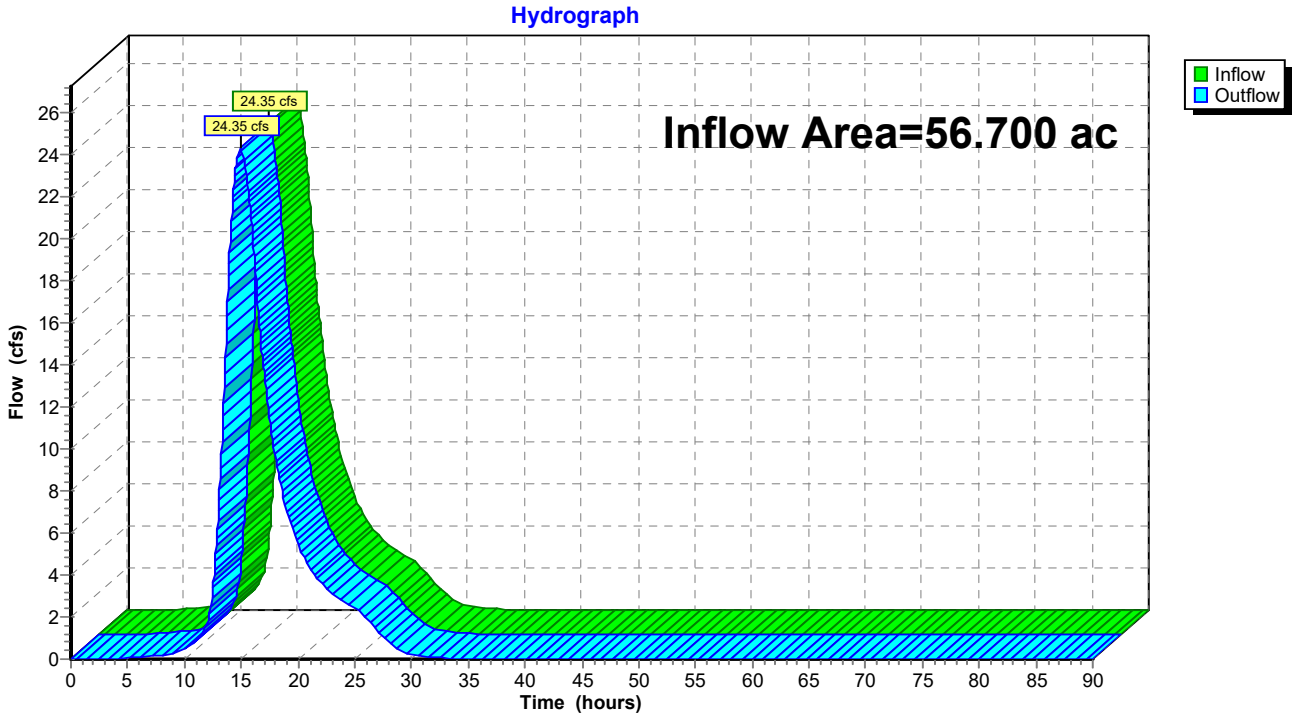
Summary for Reach 3R: DISCHARGE POINT 3

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

Inflow Area = 56.700 ac, 8.82% Impervious, Inflow Depth = 2.30" for 10-YR-24 HR event
Inflow = 24.35 cfs @ 15.00 hrs, Volume= 10.886 af
Outflow = 24.35 cfs @ 15.00 hrs, Volume= 10.886 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Reach 3R: DISCHARGE POINT 3

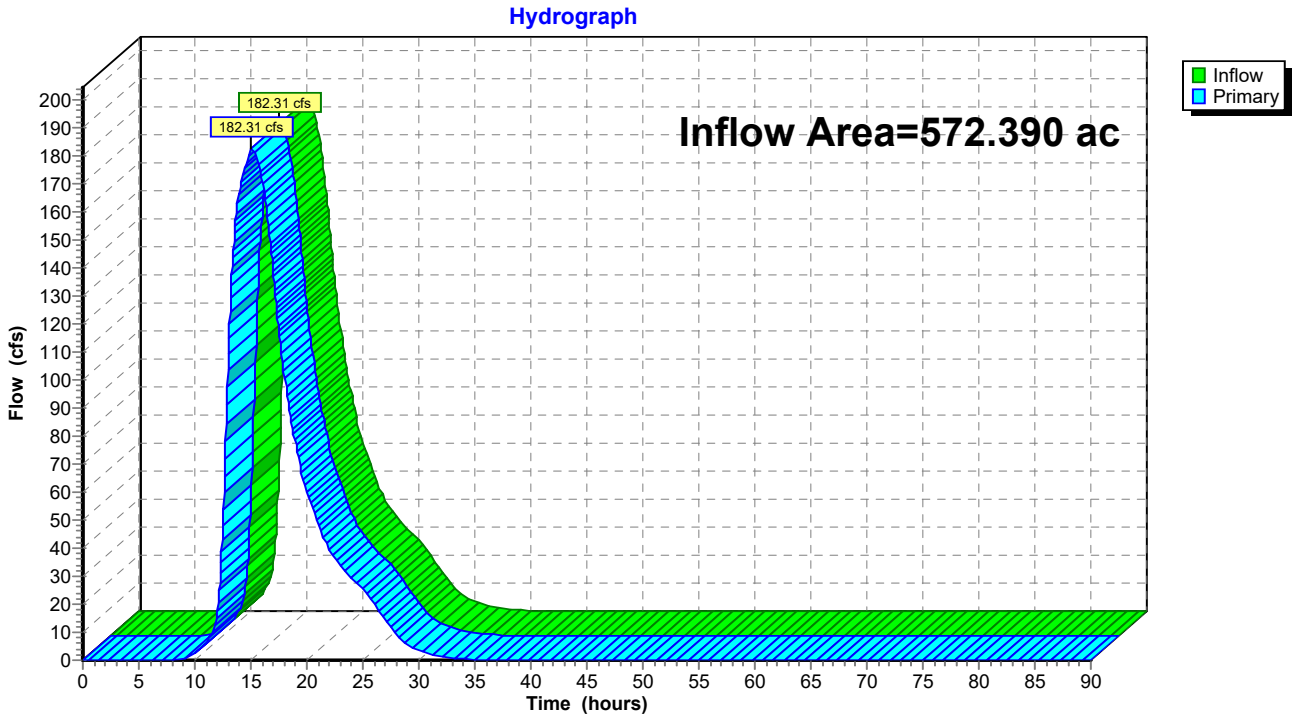


Summary for Link 1L: LOWER BRANCH RUSH RIVER

Inflow Area = 572.390 ac, 0.00% Impervious, Inflow Depth = 2.19" for 10-YR-24 HR event
Inflow = 182.31 cfs @ 15.04 hrs, Volume= 104.536 af
Primary = 182.31 cfs @ 15.04 hrs, Volume= 104.536 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Link 1L: LOWER BRANCH RUSH RIVER



Time span=0.00-90.00 hrs, dt=0.05 hrs, 1801 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: V-DA-1 Runoff Area=136.540 ac 0.00% Impervious Runoff Depth=4.67"
Flow Length=2,730' Tc=121.2 min CN=85/0 Runoff=200.20 cfs 53.154 af

Subcatchment2S: V-DA-2 Runoff Area=435.850 ac 0.00% Impervious Runoff Depth=4.67"
Flow Length=7,000' Tc=287.6 min CN=85/0 Runoff=329.62 cfs 169.673 af

Subcatchment3S: V-DA-3 Runoff Area=56.700 ac 8.82% Impervious Runoff Depth=4.80"
Flow Length=4,200' Tc=237.2 min CN=85/98 Runoff=50.81 cfs 22.690 af

Subcatchment4S: Offsite Runoff Area=98.570 ac 0.00% Impervious Runoff Depth=4.67"
Flow Length=7,100' Tc=303.0 min CN=85/0 Runoff=71.44 cfs 38.373 af

Reach 1R: DISCHARGE POINT 1 Inflow=200.20 cfs 53.154 af
Outflow=200.20 cfs 53.154 af

Reach 2R: DISCHARGE POINT 2 Inflow=329.62 cfs 169.673 af
Outflow=329.62 cfs 169.673 af

Reach 3R: DISCHARGE POINT 3 Inflow=50.81 cfs 22.690 af
Outflow=50.81 cfs 22.690 af

Link 1L: LOWER BRANCH RUSH RIVER Inflow=390.80 cfs 222.827 af
Primary=390.80 cfs 222.827 af

Total Runoff Area = 727.660 ac Runoff Volume = 283.890 af Average Runoff Depth = 4.68"
99.31% Pervious = 722.660 ac 0.69% Impervious = 5.000 ac

Summary for Subcatchment 1S: V-DA-1

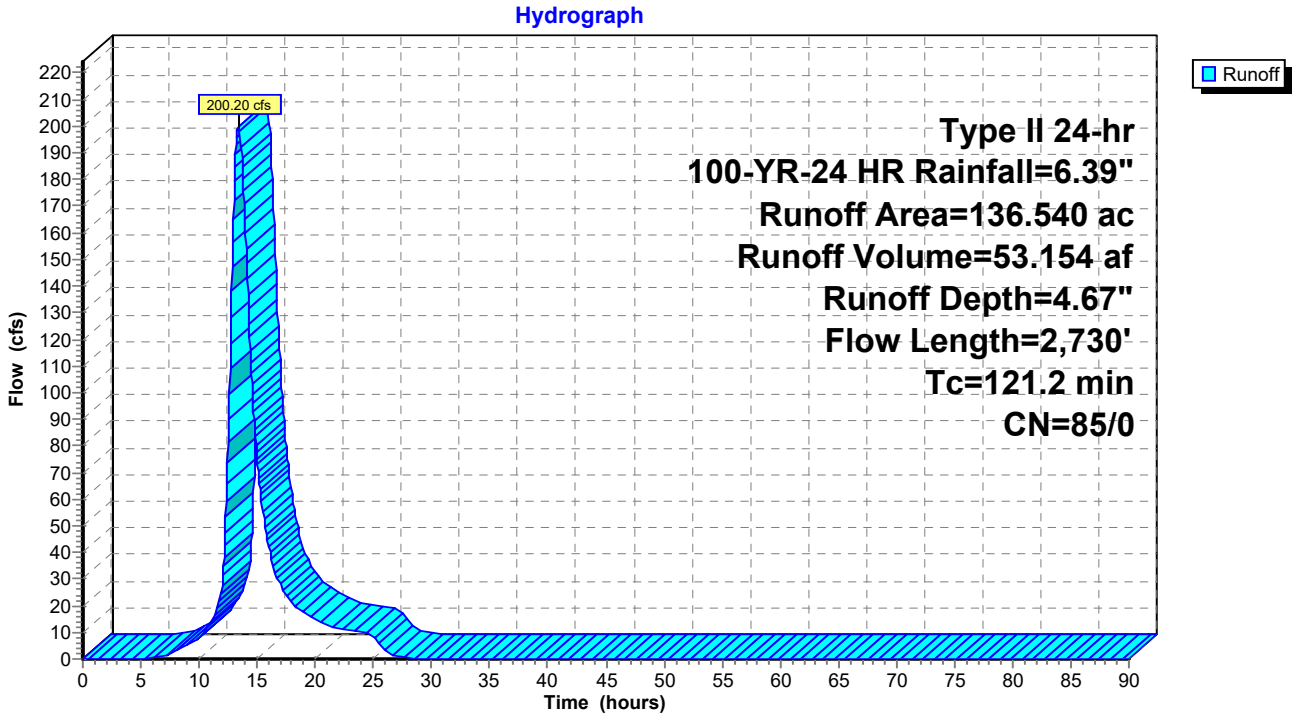
Runoff = 200.20 cfs @ 13.36 hrs, Volume= 53.154 af, Depth= 4.67"
Routed to Reach 1R : DISCHARGE POINT 1

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR-24 HR Rainfall=6.39"

Area (ac)	CN	Description
136.540	85	Legumes, straight row, Good, HSG D
136.540	85	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0050	0.18		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.40"
111.7	2,630	0.0019	0.39		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
121.2	2,730	Total			

Subcatchment 1S: V-DA-1



Summary for Subcatchment 2S: V-DA-2

[47] Hint: Peak is 252% of capacity of segment #3

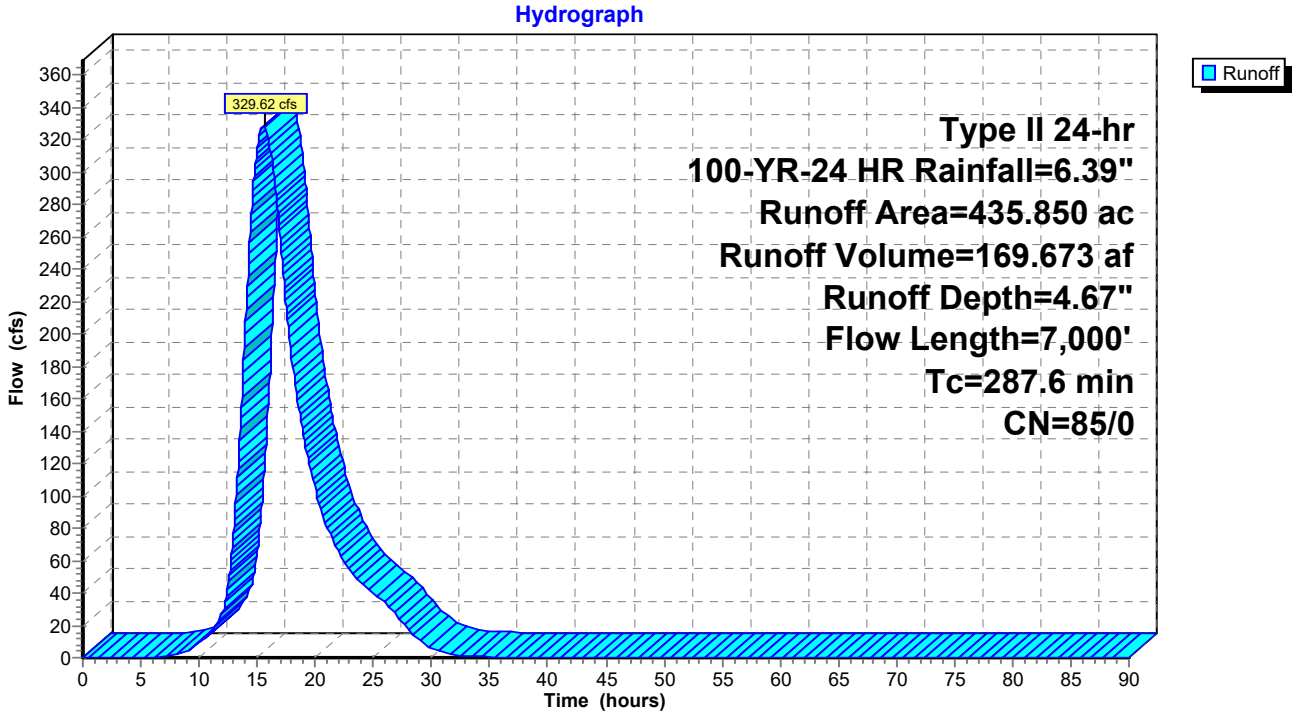
Runoff = 329.62 cfs @ 15.64 hrs, Volume= 169.673 af, Depth= 4.67"
Routed to Reach 2R : DISCHARGE POINT 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR-24 HR Rainfall=6.39"

Area (ac)	CN	Description
435.850	85	Legumes, straight row, Good, HSG D
435.850	85	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.8	100	0.0005	0.07		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.40"
229.2	3,500	0.0008	0.25		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
34.6	3,400	0.0010	1.64	130.70	**Channel Flow,** Area= 79.7 sf Perim= 97.8' r= 0.81' n= 0.025
287.6	7,000	Total			

Subcatchment 2S: V-DA-2



Summary for Subcatchment 3S: V-DA-3

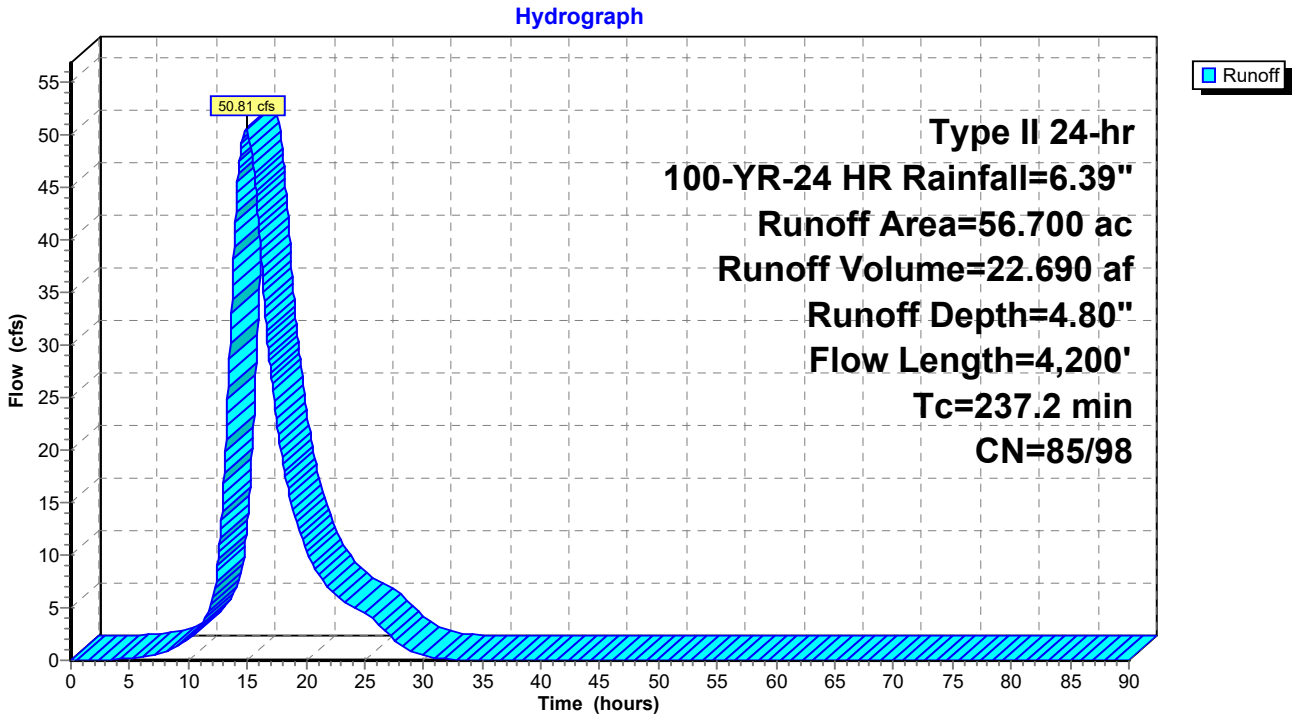
Runoff = 50.81 cfs @ 14.99 hrs, Volume= 22.690 af, Depth= 4.80"
Routed to Reach 3R : DISCHARGE POINT 3

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR-24 HR Rainfall=6.39"

	Area (ac)	CN	Description
	51.700	85	Legumes, straight row, Good, HSG D
*	5.000	98	On Site Impervious
	56.700	86	Weighted Average
	51.700	85	91.18% Pervious Area
	5.000	98	8.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.0	100	0.0010	0.09		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.40"
219.2	4,100	0.0012	0.31		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
237.2	4,200	Total			

Subcatchment 3S: V-DA-3



Summary for Subcatchment 4S: Offsite

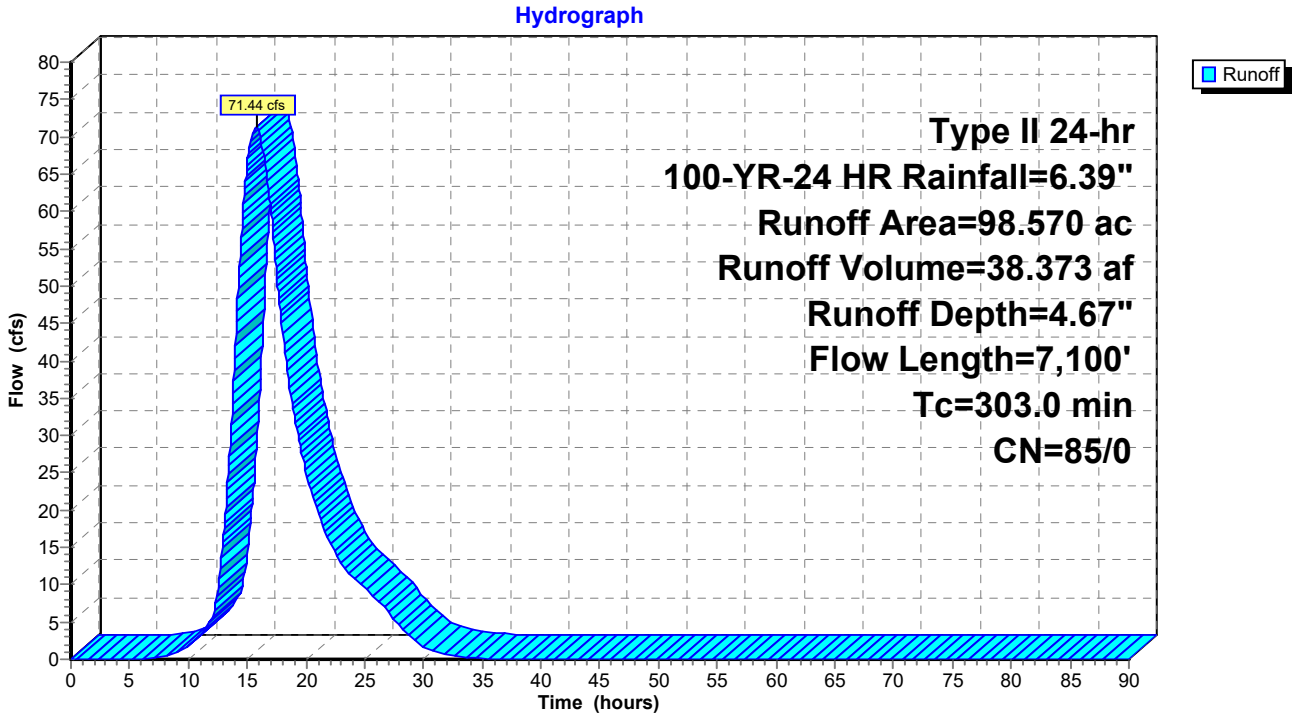
Runoff = 71.44 cfs @ 15.80 hrs, Volume= 38.373 af, Depth= 4.67"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR-24 HR Rainfall=6.39"

Area (ac)	CN	Description
98.570	85	Legumes, straight row, Good, HSG D
98.570	85	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	100	0.0100	0.23		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.40"
295.8	7,000	0.0006	0.39		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
303.0	7,100	Total			

Subcatchment 4S: Offsite



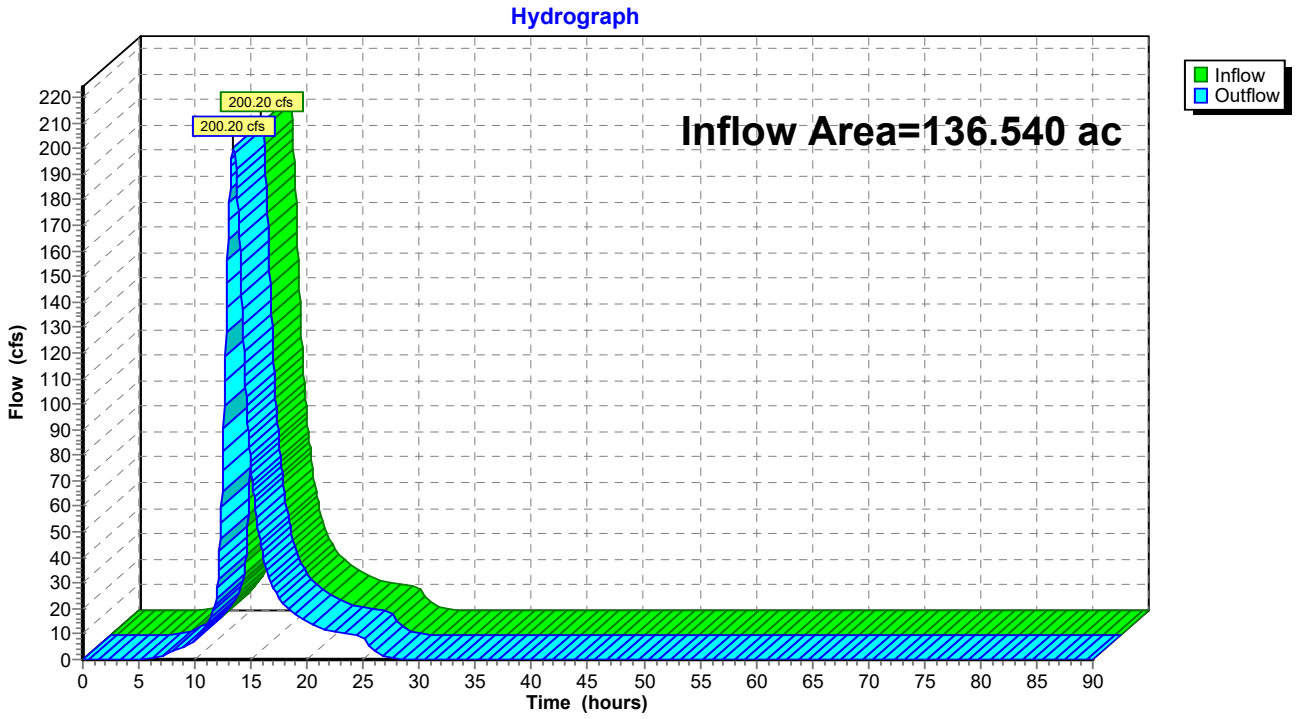
Summary for Reach 1R: DISCHARGE POINT 1

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

Inflow Area = 136.540 ac, 0.00% Impervious, Inflow Depth = 4.67" for 100-YR-24 HR event
Inflow = 200.20 cfs @ 13.36 hrs, Volume= 53.154 af
Outflow = 200.20 cfs @ 13.36 hrs, Volume= 53.154 af, Atten= 0%, Lag= 0.0 min
Routed to Link 1L : LOWER BRANCH RUSH RIVER

Routing by Stor-Ind+Trans method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Reach 1R: DISCHARGE POINT 1



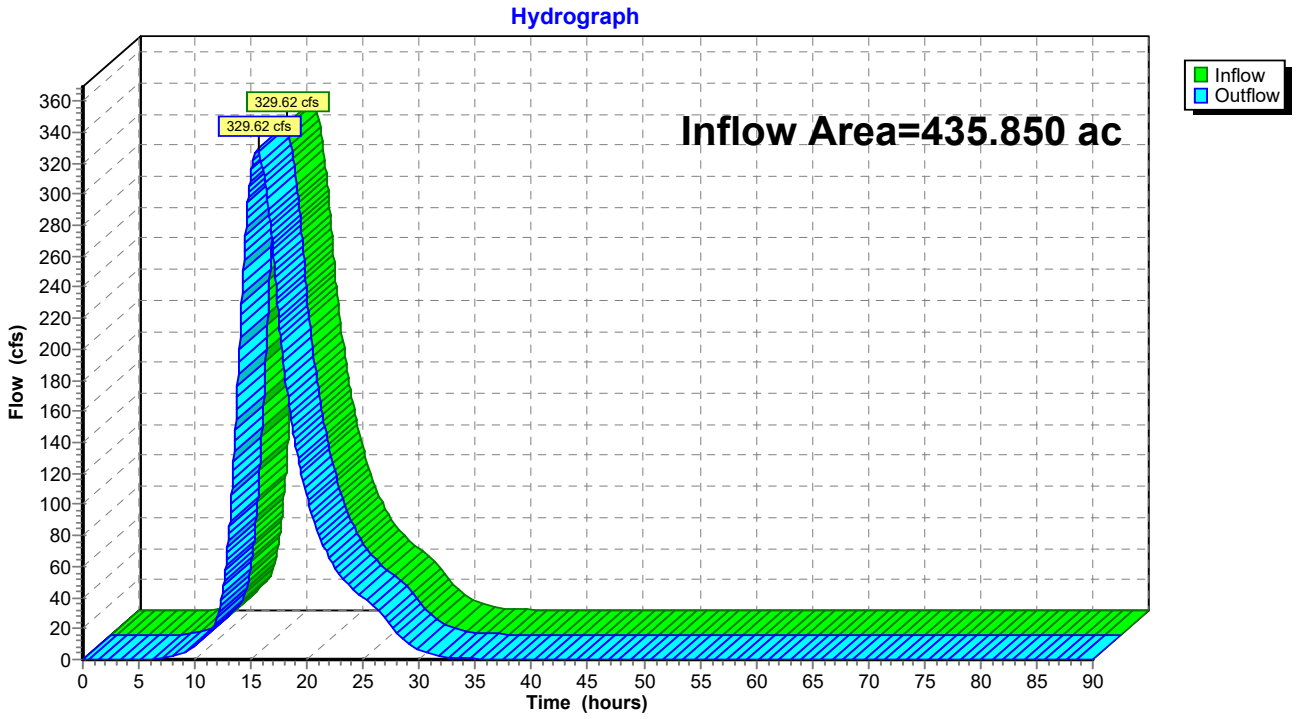
Summary for Reach 2R: DISCHARGE POINT 2

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

Inflow Area = 435.850 ac, 0.00% Impervious, Inflow Depth = 4.67" for 100-YR-24 HR event
Inflow = 329.62 cfs @ 15.64 hrs, Volume= 169.673 af
Outflow = 329.62 cfs @ 15.64 hrs, Volume= 169.673 af, Atten= 0%, Lag= 0.0 min
Routed to Link 1L : LOWER BRANCH RUSH RIVER

Routing by Stor-Ind+Trans method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Reach 2R: DISCHARGE POINT 2



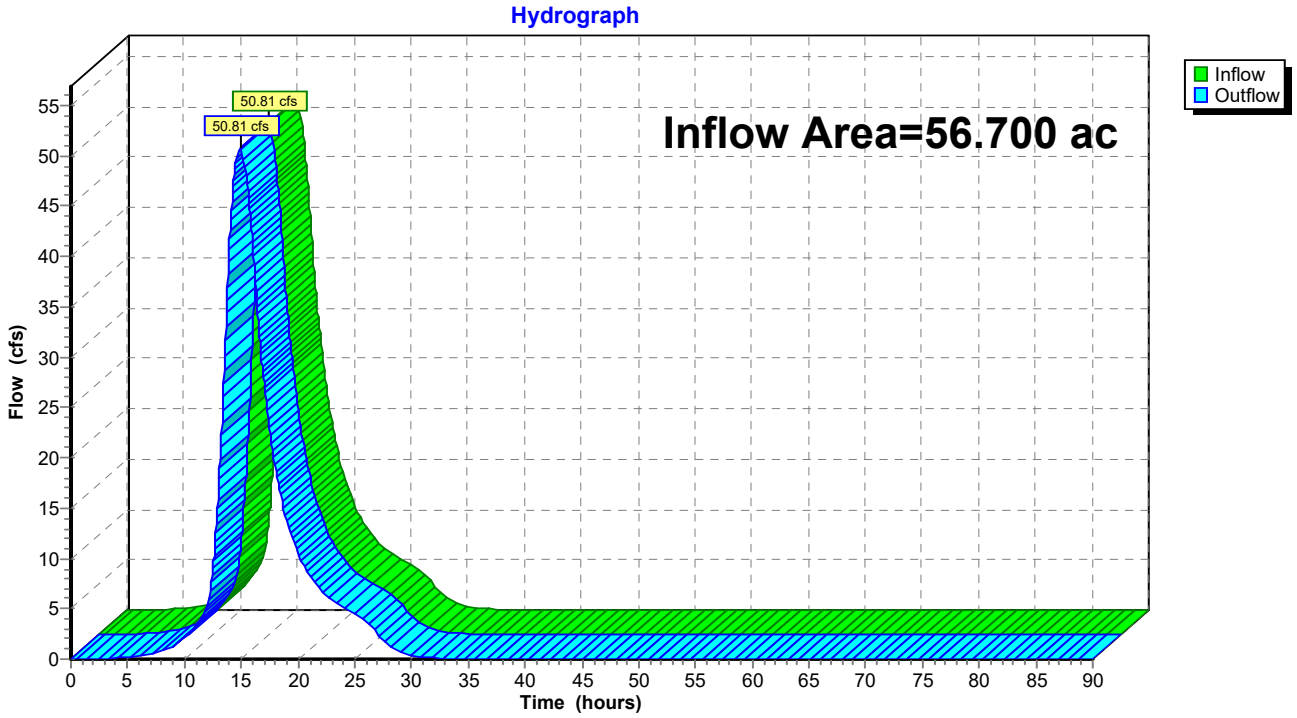
Summary for Reach 3R: DISCHARGE POINT 3

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

Inflow Area = 56.700 ac, 8.82% Impervious, Inflow Depth = 4.80" for 100-YR-24 HR event
Inflow = 50.81 cfs @ 14.99 hrs, Volume= 22.690 af
Outflow = 50.81 cfs @ 14.99 hrs, Volume= 22.690 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Reach 3R: DISCHARGE POINT 3

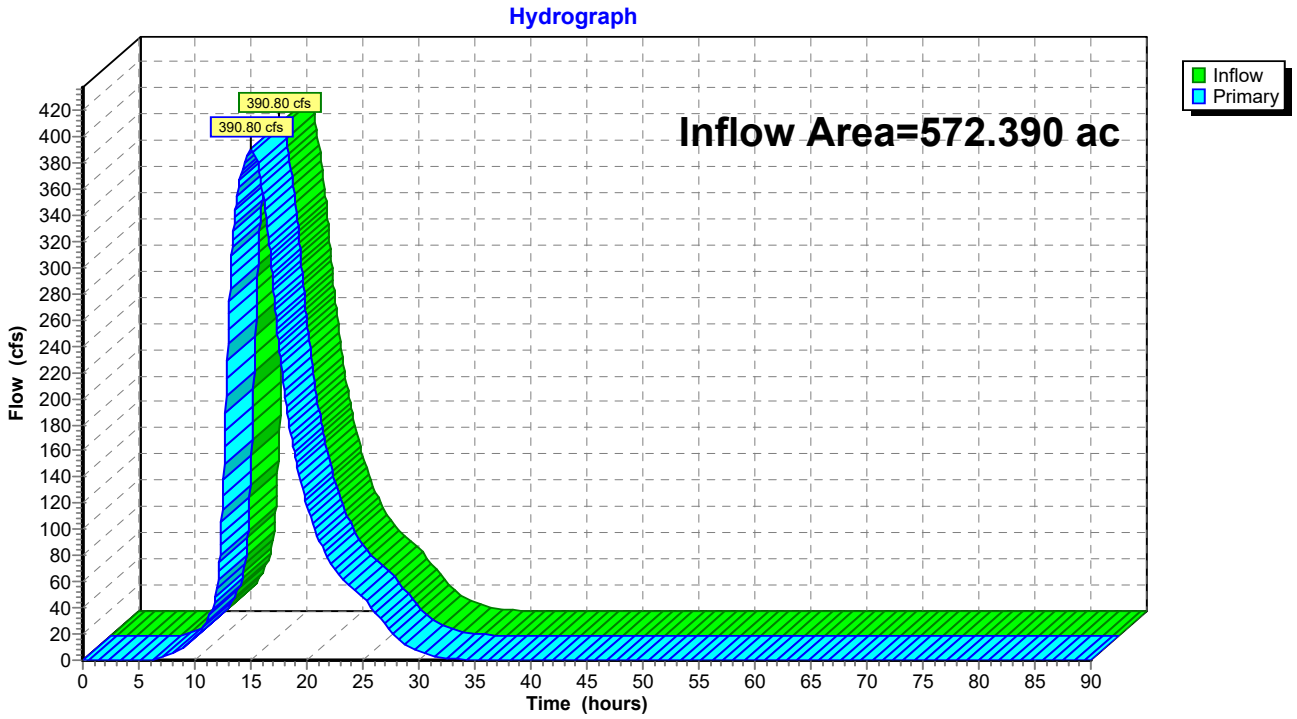


Summary for Link 1L: LOWER BRANCH RUSH RIVER

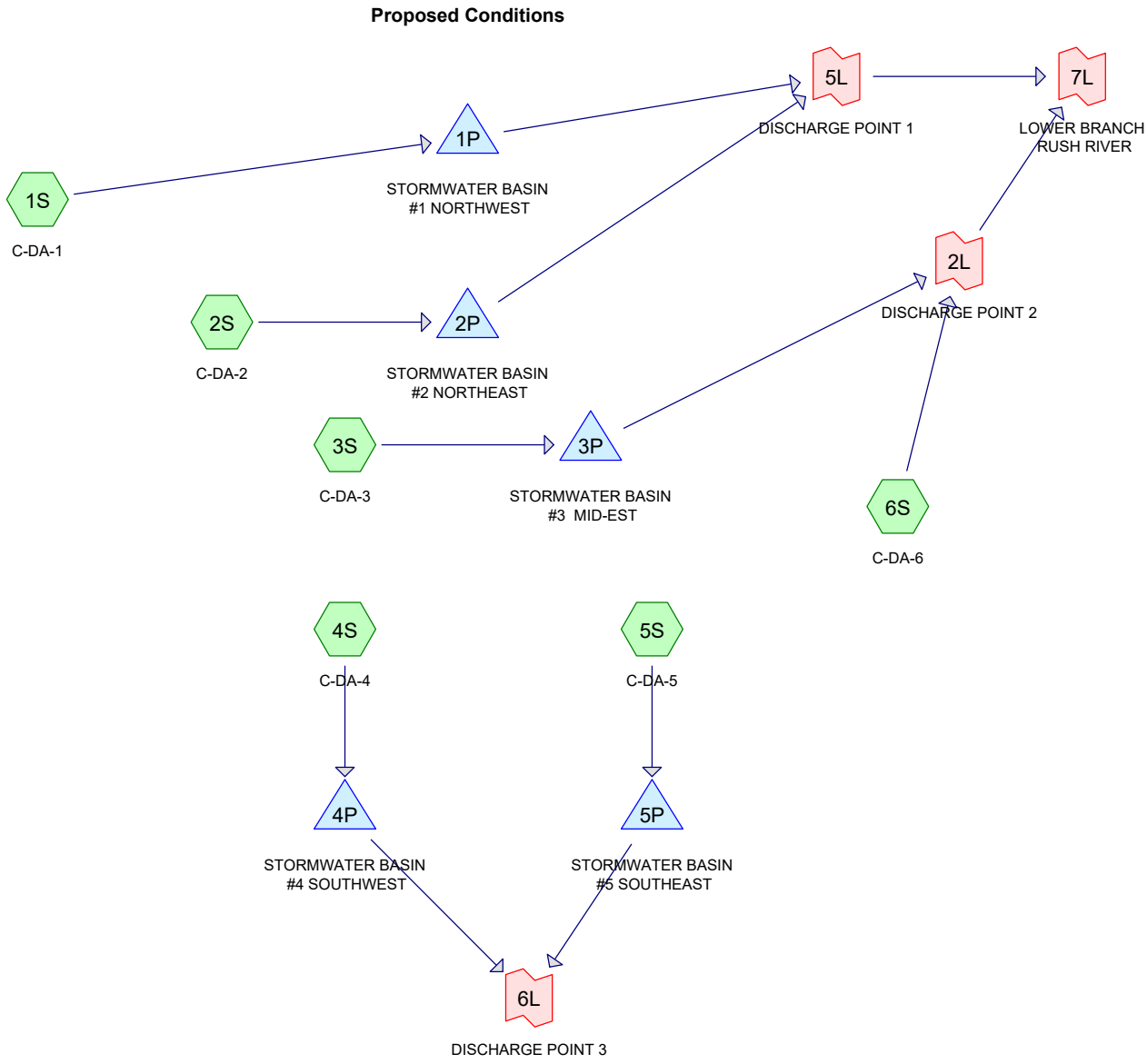
Inflow Area = 572.390 ac, 0.00% Impervious, Inflow Depth = 4.67" for 100-YR-24 HR event
Inflow = 390.80 cfs @ 15.01 hrs, Volume= 222.827 af
Primary = 390.80 cfs @ 15.01 hrs, Volume= 222.827 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Link 1L: LOWER BRANCH RUSH RIVER



Appendix 2. Post-Development HydroCAD Model Analysis



Subcat Reach Pond Link

Routing Diagram for Harmony Energy Park-Proposed Conditions
Prepared by Kimley-Horn & Associates, Printed 8/17/2026
HydroCAD® 10.20-5c s/n 02344 © 2023 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YR-24 HR	Type II 24-hr		Default	24.00	1	2.40	2
2	2.5" EVENT	Type II 24-hr		Default	24.00	1	2.50	2
3	5-YR-24 HR	Type II 24-hr		Default	24.00	1	3.08	2
4	10-YR-24 HR	Type II 24-hr		Default	24.00	1	3.70	2
5	100-YR-24 HR	Type II 24-hr		Default	24.00	1	6.39	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
345.220	80	>75% Grass cover, Good, HSG D (1S, 2S, 3S, 4S, 5S)
125.090	85	Legumes, straight row, Good, HSG D (6S)
158.780	98	On Site Impervious (1S, 2S, 3S, 4S, 5S, 6S)
629.090	**86**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
470.310	HSG D	1S, 2S, 3S, 4S, 5S, 6S
158.780	Other	1S, 2S, 3S, 4S, 5S, 6S
629.090		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	345.220	0.000	345.220	>75% Grass cover, Good	1S, 2S, 3S, 4S, 5S
0.000	0.000	0.000	125.090	0.000	125.090	Legumes, straight row, Good	6S
0.000	0.000	0.000	0.000	158.780	158.780	On Site Impervious	1S, 2S, 3S, 4S, 5S, 6S
0.000	**0.000**	**0.000**	**470.310**	**158.780**	**629.090**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	2S	0.00	0.00	1,000.0	0.0050	0.012	0.0	36.0	0.0	
2	3S	0.00	0.00	2,600.0	0.0050	0.012	0.0	48.0	0.0	
3	4S	0.00	0.00	350.0	0.0050	0.012	0.0	48.0	0.0	
4	5S	0.00	0.00	1,400.0	0.0050	0.012	0.0	36.0	0.0	
5	1P	914.75	913.75	100.0	0.0100	0.012	0.0	48.0	0.0	
6	2P	914.50	913.50	100.0	0.0100	0.012	0.0	48.0	0.0	
7	3P	913.50	912.50	100.0	0.0100	0.012	0.0	36.0	0.0	
8	4P	914.50	913.50	100.0	0.0100	0.012	0.0	24.0	0.0	
9	5P	914.50	913.50	100.0	0.0100	0.012	0.0	24.0	0.0	

Time span=0.00-90.00 hrs, dt=0.05 hrs, 1801 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: C-DA-1 Runoff Area=99.590 ac 45.84% Impervious Runoff Depth=1.44"
Flow Length=700' Tc=38.0 min CN=80/98 Runoff=98.67 cfs 11.948 af

Subcatchment2S: C-DA-2 Runoff Area=60.740 ac 31.82% Impervious Runoff Depth=1.25"
Flow Length=1,330' Tc=15.6 min CN=80/98 Runoff=88.86 cfs 6.329 af

Subcatchment3S: C-DA-3 Runoff Area=143.510 ac 29.34% Impervious Runoff Depth=1.22"
Flow Length=5,230' Tc=42.0 min CN=80/98 Runoff=111.92 cfs 14.551 af

Subcatchment4S: C-DA-4 Runoff Area=127.630 ac 19.43% Impervious Runoff Depth=1.08"
Flow Length=2,150' Tc=72.8 min CN=80/98 Runoff=59.48 cfs 11.518 af

Subcatchment5S: C-DA-5 Runoff Area=61.530 ac 25.84% Impervious Runoff Depth=1.17"
Flow Length=1,780' Tc=24.8 min CN=80/98 Runoff=65.40 cfs 5.997 af

Subcatchment6S: C-DA-6 Runoff Area=136.090 ac 8.08% Impervious Runoff Depth=1.19"
Flow Length=3,600' Tc=87.4 min CN=85/98 Runoff=63.16 cfs 13.450 af

Pond 1P: STORMWATERBASIN #1 Peak Elev=915.62' Storage=25.070 af Inflow=98.67 cfs 11.948 af
48.0" Round Culvert n=0.012 L=100.0' S=0.0100 '/' Outflow=6.44 cfs 9.983 af

Pond 2P: STORMWATERBASIN #2 Peak Elev=915.36' Storage=12.554 af Inflow=88.86 cfs 6.329 af
48.0" Round Culvert n=0.012 L=100.0' S=0.0100 '/' Outflow=6.23 cfs 6.199 af

Pond 3P: STORMWATERBASIN #3 Peak Elev=914.71' Storage=26.980 af Inflow=111.92 cfs 14.551 af
36.0" Round Culvert n=0.012 L=100.0' S=0.0100 '/' Outflow=9.98 cfs 13.927 af

Pond 4P: STORMWATERBASIN #4 Peak Elev=915.55' Storage=25.340 af Inflow=59.48 cfs 11.518 af
24.0" Round Culvert n=0.012 L=100.0' S=0.0100 '/' Outflow=5.82 cfs 10.728 af

Pond 5P: STORMWATERBASIN #5 Peak Elev=915.32' Storage=15.328 af Inflow=65.40 cfs 5.997 af
24.0" Round Culvert n=0.012 L=100.0' S=0.0100 '/' Outflow=3.76 cfs 5.694 af

Link 2L: DISCHARGE POINT 2 Inflow=71.39 cfs 27.377 af
Primary=71.39 cfs 27.377 af

Link 5L: DISCHARGE POINT 1 Inflow=12.40 cfs 16.182 af
Primary=12.40 cfs 16.182 af

Link 6L: DISCHARGE POINT 3 Inflow=9.48 cfs 16.422 af
Primary=9.48 cfs 16.422 af

Link 7L: LOWER BRANCH RUSH RIVER Inflow=82.84 cfs 43.558 af
Primary=82.84 cfs 43.558 af

Total Runoff Area = 629.090 ac Runoff Volume = 63.793 af Average Runoff Depth = 1.22"
74.76% Pervious = 470.310 ac 25.24% Impervious = 158.780 ac

Summary for Subcatchment 1S: C-DA-1

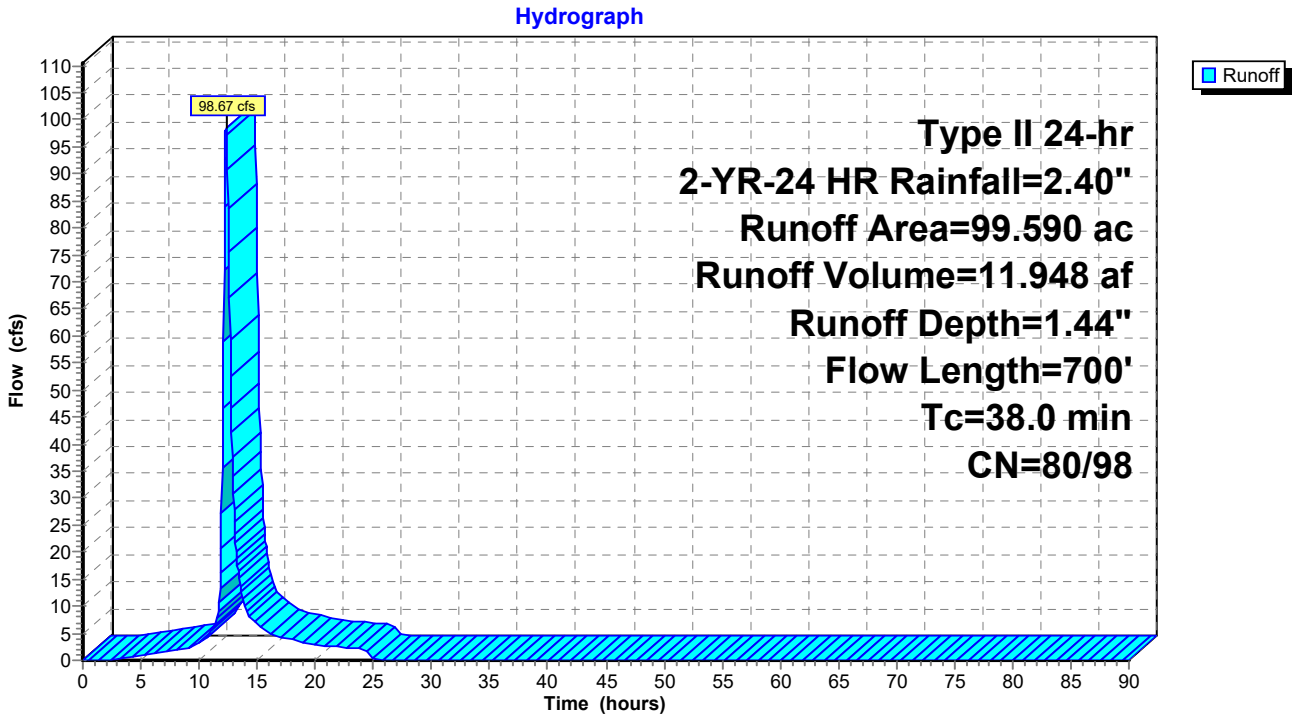
Runoff = 98.67 cfs @ 12.34 hrs, Volume= 11.948 af, Depth= 1.44"
Routed to Pond 1P : STORMWATER BASIN #1 NORTHWEST

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR-24 HR Rainfall=2.40"

	Area (ac)	CN	Description
*	45.650	98	On Site Impervious
	53.940	80	>75% Grass cover, Good, HSG D
	99.590	88	Weighted Average
	53.940	80	54.16% Pervious Area
	45.650	98	45.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	100	0.0100	0.18		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 1.40"
28.6	600	0.0025	0.35		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
38.0	700	Total			

Subcatchment 1S: C-DA-1



Summary for Subcatchment 2S: C-DA-2

[47] Hint: Peak is 174% of capacity of segment #3

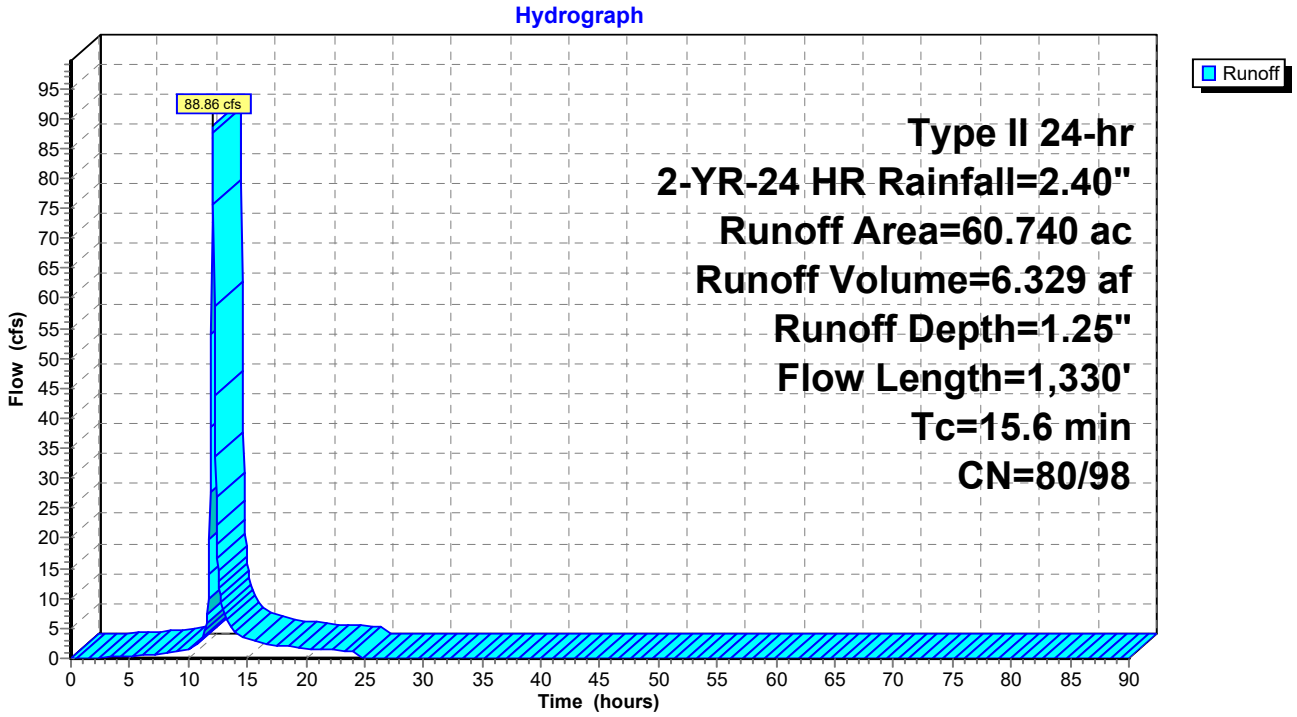
Runoff = 88.86 cfs @ 12.08 hrs, Volume= 6.329 af, Depth= 1.25"
Routed to Pond 2P : STORMWATER BASIN #2 NORTHEAST

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR-24 HR Rainfall=2.40"

	Area (ac)	CN	Description
*	19.330	98	On Site Impervious
*	41.410	80	>75% Grass cover, Good, HSG D
	60.740	86	Weighted Average
	41.410	80	68.18% Pervious Area
	19.330	98	31.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	100	0.0130	0.20		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 1.40"
4.8	230	0.0130	0.80		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.3	1,000	0.0050	7.23	51.09	**Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
15.6	1,330	Total			

Subcatchment 2S: C-DA-2



Summary for Subcatchment 3S: C-DA-3

[47] Hint: Peak is 290% of capacity of segment #3
[47] Hint: Peak is 102% of capacity of segment #4

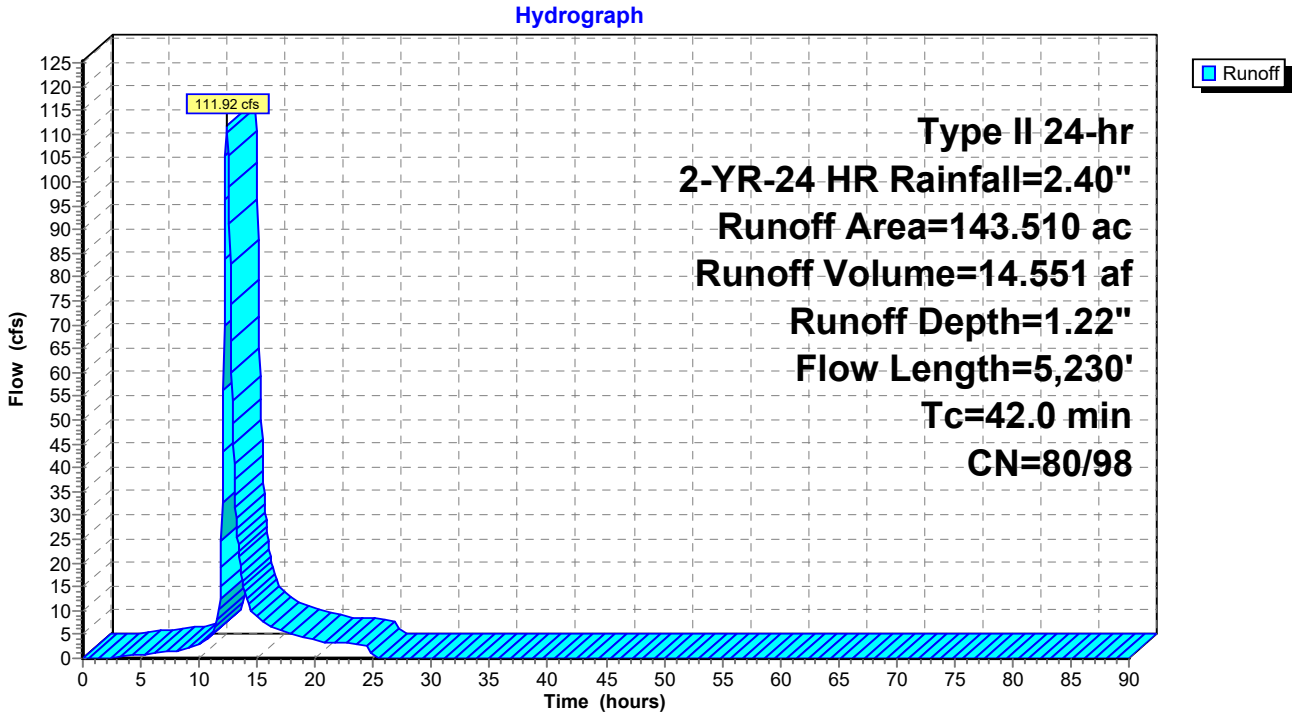
Runoff = 111.92 cfs @ 12.39 hrs, Volume= 14.551 af, Depth= 1.22"
Routed to Pond 3P : STORMWATER BASIN #3 MID-EST

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR-24 HR Rainfall=2.40"

	Area (ac)	CN	Description
*	42.100	98	On Site Impervious
	101.410	80	>75% Grass cover, Good, HSG D
	143.510	85	Weighted Average
	101.410	80	70.66% Pervious Area
	42.100	98	29.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	100	0.0050	0.13		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 1.40"
17.8	530	0.0050	0.49		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.9	2,000	0.0010	4.82	38.56	**Channel Flow,** Area= 8.0 sf Perim= 7.7' r= 1.04' n= 0.010
4.9	2,600	0.0050	8.76	110.04	**Pipe Channel,** 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.012 Corrugated PP, smooth interior
42.0	5,230	Total			

Subcatchment 3S: C-DA-3



Summary for Subcatchment 4S: C-DA-4

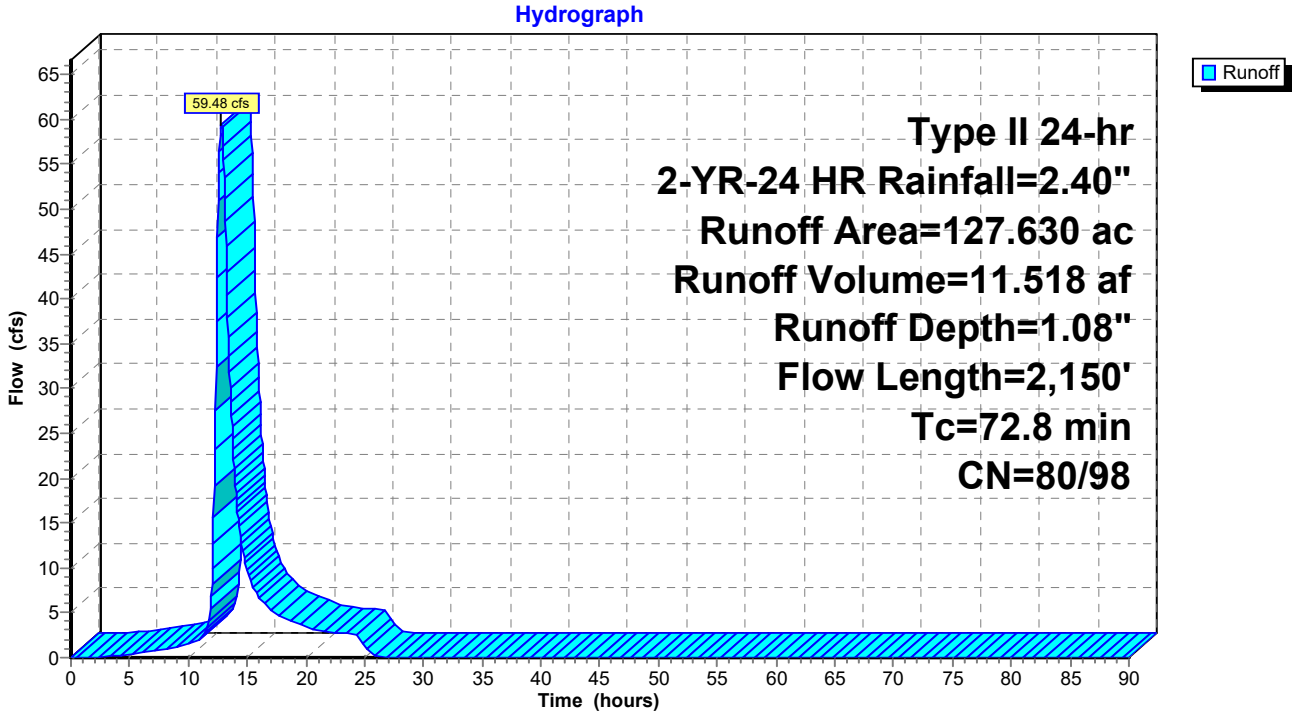
Runoff = 59.48 cfs @ 12.82 hrs, Volume= 11.518 af, Depth= 1.08"
Routed to Pond 4P : STORMWATER BASIN #4 SOUTHWEST

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR-24 HR Rainfall=2.40"

	Area (ac)	CN	Description
*	24.800	98	On Site Impervious
	102.830	80	>75% Grass cover, Good, HSG D
	127.630	83	Weighted Average
	102.830	80	80.57% Pervious Area
	24.800	98	19.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.4	100	0.0025	0.10		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 1.40"
55.7	1,700	0.0010	0.51		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.7	350	0.0050	8.76	110.04	**Pipe Channel,** 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.012
72.8	2,150	Total			

Subcatchment 4S: C-DA-4



Summary for Subcatchment 5S: C-DA-5

[47] Hint: Peak is 128% of capacity of segment #3

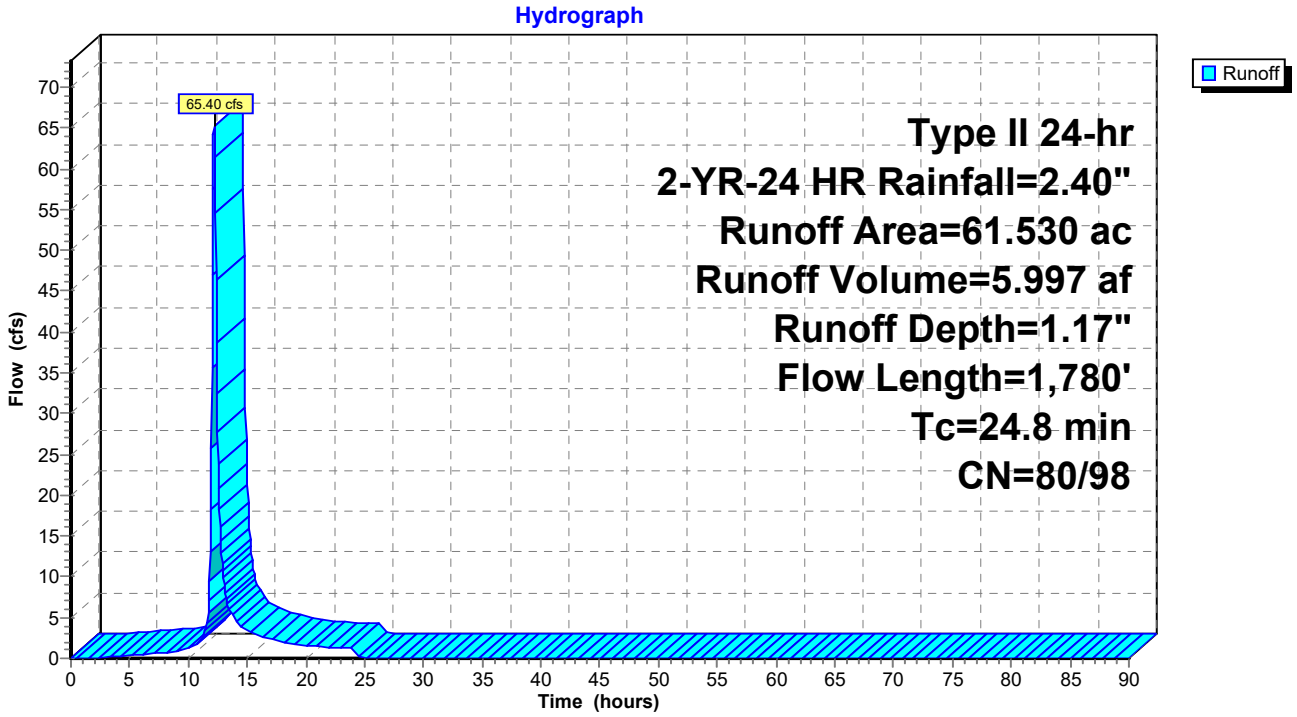
Runoff = 65.40 cfs @ 12.19 hrs, Volume= 5.997 af, Depth= 1.17"
Routed to Pond 5P : STORMWATER BASIN #5 SOUTHEAST

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR-24 HR Rainfall=2.40"

	Area (ac)	CN	Description
*	15.900	98	On Site Impervious
	45.630	80	>75% Grass cover, Good, HSG D
	61.530	85	Weighted Average
	45.630	80	74.16% Pervious Area
	15.900	98	25.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	100	0.0050	0.13		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 1.40"
9.2	280	0.0010	0.51		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.2	1,400	0.0050	7.23	51.09	**Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 Corrugated PP, smooth interior
24.8	1,780	Total			

Subcatchment 5S: C-DA-5



Summary for Subcatchment 6S: C-DA-6

[47] Hint: Peak is 112% of capacity of segment #3

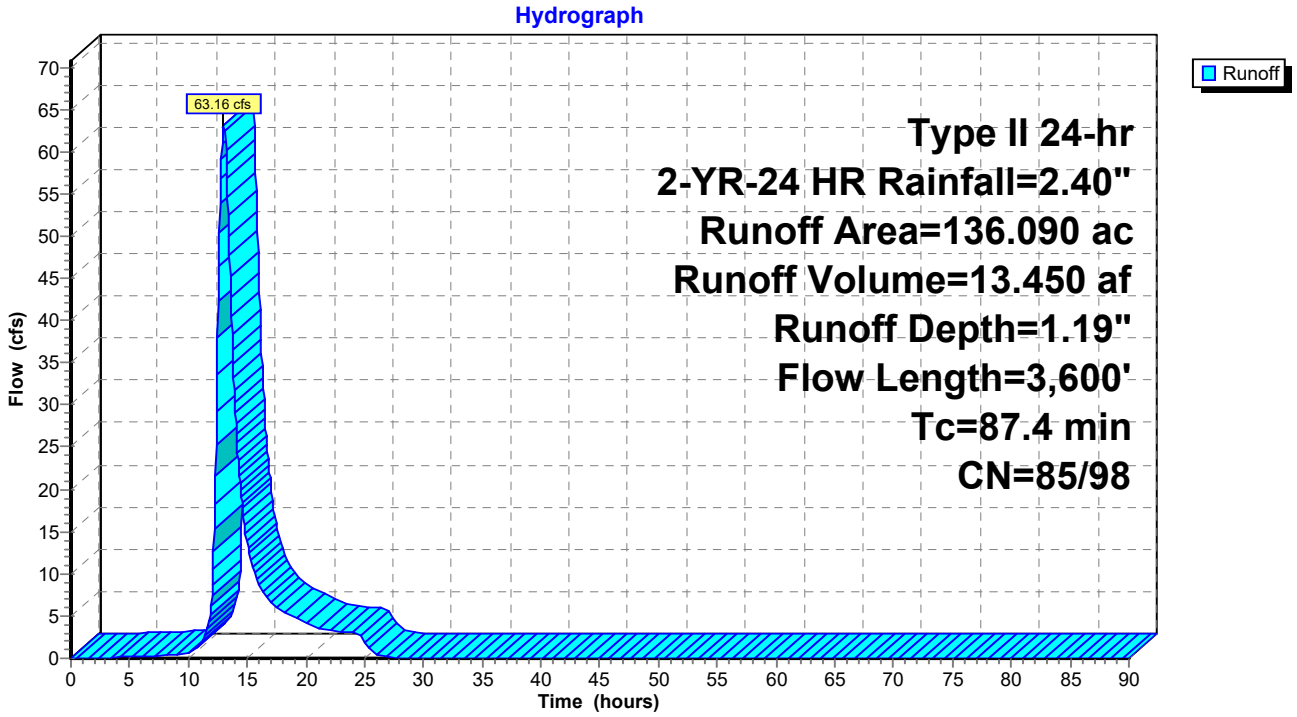
Runoff = 63.16 cfs @ 13.00 hrs, Volume= 13.450 af, Depth= 1.19"
Routed to Link 2L : DISCHARGE POINT 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR-24 HR Rainfall=2.40"

	Area (ac)	CN	Description
	125.090	85	Legumes, straight row, Good, HSG D
*	11.000	98	On Site Impervious
	136.090	86	Weighted Average
	125.090	85	91.92% Pervious Area
	11.000	98	8.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	100	0.0100	0.18		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 1.40"
57.9	1,500	0.0023	0.43		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
20.1	2,000	0.0010	1.66	56.28	**Channel Flow,** Area= 34.0 sf Perim= 31.3' r= 1.09' n= 0.030 Earth, grassed & winding
87.4	3,600	Total			

Subcatchment 6S: C-DA-6



Summary for Pond 1P: STORMWATER BASIN #1 NORTHWEST

Inflow Area = 99.590 ac, 45.84% Impervious, Inflow Depth = 1.44" for 2-YR-24 HR event
Inflow = 98.67 cfs @ 12.34 hrs, Volume= 11.948 af
Outflow = 6.44 cfs @ 15.04 hrs, Volume= 9.983 af, Atten= 93%, Lag= 162.3 min
Primary = 6.44 cfs @ 15.04 hrs, Volume= 9.983 af
Routed to Link 5L : DISCHARGE POINT 1

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Starting Elev= 914.50' Surf.Area= 4.482 ac Storage= 17.010 af
Peak Elev= 915.62' @ 15.04 hrs Surf.Area= 9.360 ac Storage= 25.070 af (8.060 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 860.9 min (1,679.4 - 818.5)

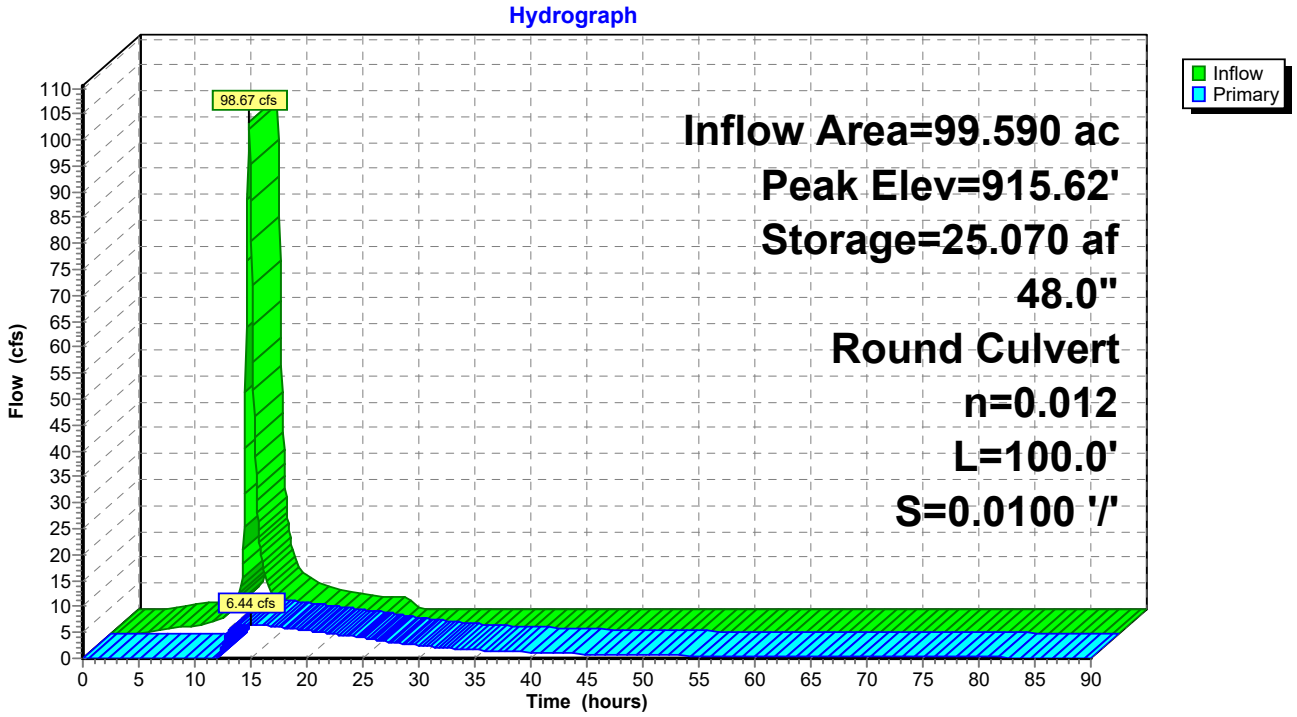
Volume	Invert	Avail.Storage	Storage Description
#1	910.50'	64.598 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
910.50	4.000	0.000	0.000
911.50	4.144	4.072	4.072
912.50	4.255	4.199	8.272
913.50	4.370	4.312	12.584
914.50	4.482	4.426	17.010
915.50	9.360	6.921	23.931
916.50	9.360	9.360	33.291
917.50	9.541	9.451	42.741
918.75	9.724	12.041	54.782
919.75	9.907	9.815	64.598

Device	Routing	Invert	Outlet Devices
#1	Primary	914.75'	**48.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 914.75' / 913.75' S= 0.0100 '/' Cc= 0.900 n= 0.012 RCP, Flow Area= 12.57 sf

Primary OutFlow Max=6.43 cfs @ 15.04 hrs HW=915.62' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 6.43 cfs @ 3.18 fps)

Pond 1P: STORMWATER BASIN #1 NORTHWEST



Summary for Pond 2P: STORMWATER BASIN #2 NORTHEAST

Inflow Area = 60.740 ac, 31.82% Impervious, Inflow Depth = 1.25" for 2-YR-24 HR event
Inflow = 88.86 cfs @ 12.08 hrs, Volume= 6.329 af
Outflow = 6.23 cfs @ 13.31 hrs, Volume= 6.199 af, Atten= 93%, Lag= 73.9 min
Primary = 6.23 cfs @ 13.31 hrs, Volume= 6.199 af
Routed to Link 5L : DISCHARGE POINT 1

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Starting Elev= 914.50' Surf.Area= 2.443 ac Storage= 8.939 af
Peak Elev= 915.36' @ 13.31 hrs Surf.Area= 5.988 ac Storage= 12.554 af (3.615 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 531.5 min (1,342.7 - 811.1)

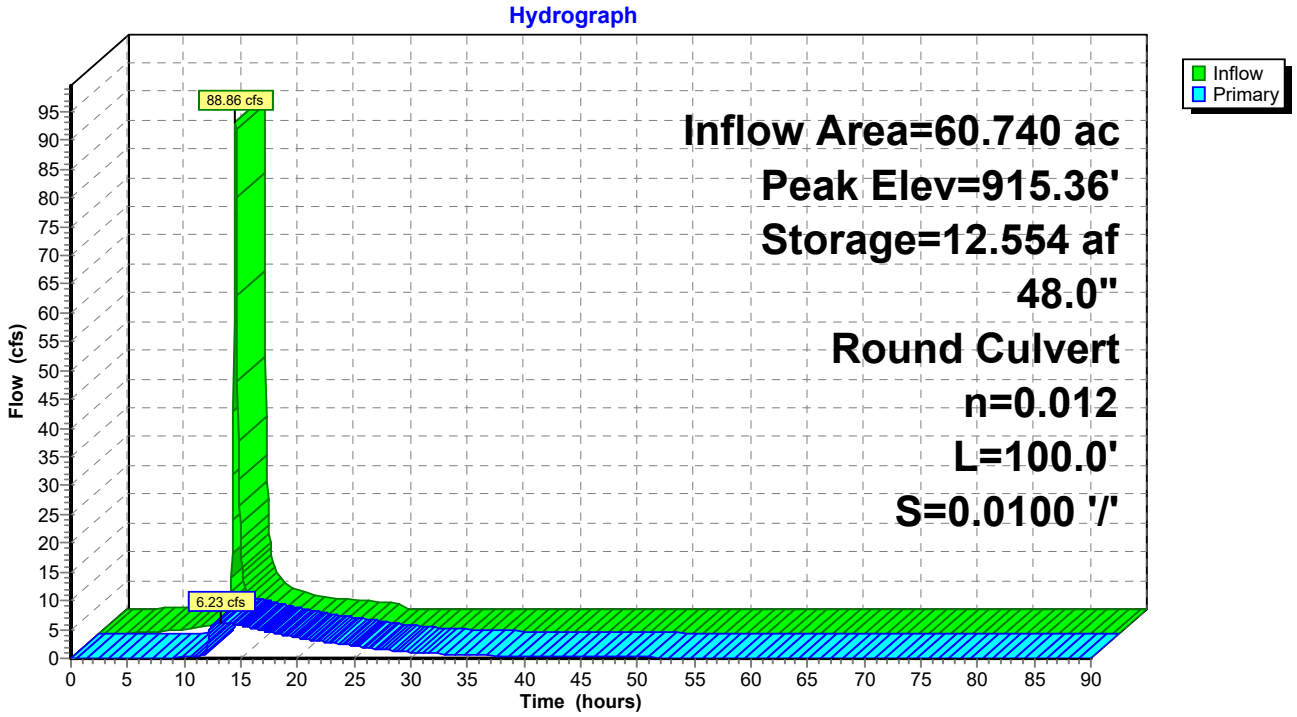
Volume	Invert	Avail.Storage	Storage Description
#1	910.50'	40.535 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
910.50	2.093	0.000	0.000
911.50	2.136	2.114	2.114
912.50	2.223	2.179	4.294
913.50	2.312	2.268	6.562
914.50	2.443	2.377	8.939
915.50	6.577	4.510	13.449
916.50	6.577	6.577	20.026
917.50	6.749	6.663	26.689
918.50	6.923	6.836	33.525
919.50	7.097	7.010	40.535

Device	Routing	Invert	Outlet Devices
#1	Primary	914.50'	**48.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 914.50' / 913.50' S= 0.0100 '/' Cc= 0.900 n= 0.012 RCP, Flow Area= 12.57 sf

Primary OutFlow Max=6.23 cfs @ 13.31 hrs HW=915.36' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 6.23 cfs @ 3.15 fps)

Pond 2P: STORMWATER BASIN #2 NORTHEAST



Summary for Pond 3P: STORMWATER BASIN #3 MID-EST

Inflow Area = 143.510 ac, 29.34% Impervious, Inflow Depth = 1.22" for 2-YR-24 HR event
Inflow = 111.92 cfs @ 12.39 hrs, Volume= 14.551 af
Outflow = 9.98 cfs @ 14.55 hrs, Volume= 13.927 af, Atten= 91%, Lag= 129.3 min
Primary = 9.98 cfs @ 14.55 hrs, Volume= 13.927 af
Routed to Link 2L : DISCHARGE POINT 2

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Starting Elev= 913.50' Surf.Area= 4.739 ac Storage= 18.041 af
Peak Elev= 914.71' @ 14.55 hrs Surf.Area= 9.289 ac Storage= 26.980 af (8.939 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 735.2 min (1,573.7 - 838.4)

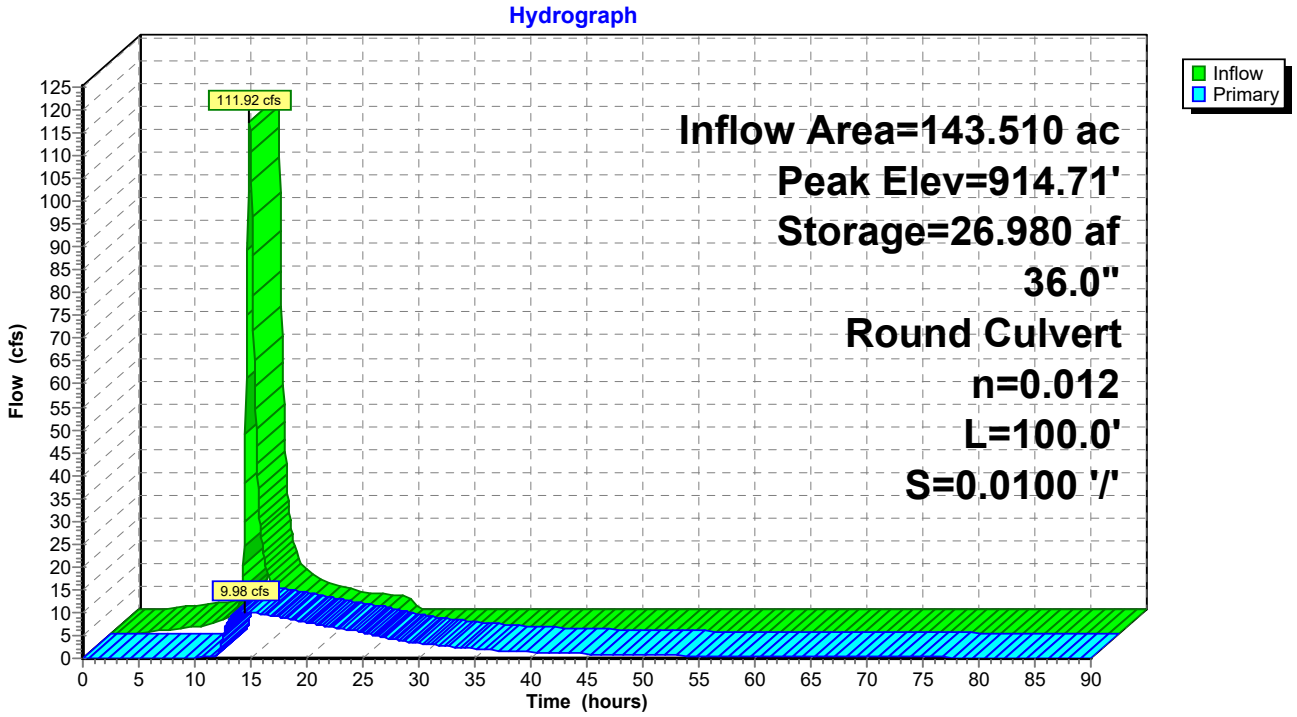
Volume	Invert	Avail.Storage	Storage Description
#1	909.50'	63.259 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
909.50	4.328	0.000	0.000
910.50	4.386	4.357	4.357
911.50	4.502	4.444	8.800
912.50	4.620	4.561	13.361
913.50	4.739	4.679	18.041
914.50	9.270	7.004	25.045
915.50	9.360	9.315	34.360
916.50	9.541	9.451	43.811
917.50	9.724	9.632	53.443
918.50	9.907	9.815	63.259

Device	Routing	Invert	Outlet Devices
#1	Primary	913.50'	**36.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 913.50' / 912.50' S= 0.0100 '/' Cc= 0.900 n= 0.012 RCP, Flow Area= 7.07 sf

Primary OutFlow Max=9.98 cfs @ 14.55 hrs HW=914.71' (Free Discharge)
↑**1=Culvert** (Inlet Controls 9.98 cfs @ 3.74 fps)

Pond 3P: STORMWATER BASIN #3 MID-EST



Summary for Pond 4P: STORMWATER BASIN #4 SOUTHWEST

Inflow Area = 127.630 ac, 19.43% Impervious, Inflow Depth = 1.08" for 2-YR-24 HR event
Inflow = 59.48 cfs @ 12.82 hrs, Volume= 11.518 af
Outflow = 5.82 cfs @ 16.57 hrs, Volume= 10.728 af, Atten= 90%, Lag= 224.8 min
Primary = 5.82 cfs @ 16.57 hrs, Volume= 10.728 af
Routed to Link 6L : DISCHARGE POINT 3

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Starting Elev= 914.50' Surf.Area= 4.702 ac Storage= 17.902 af
Peak Elev= 915.55' @ 16.57 hrs Surf.Area= 9.274 ac Storage= 25.340 af (7.437 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 919.9 min (1,799.7 - 879.8)

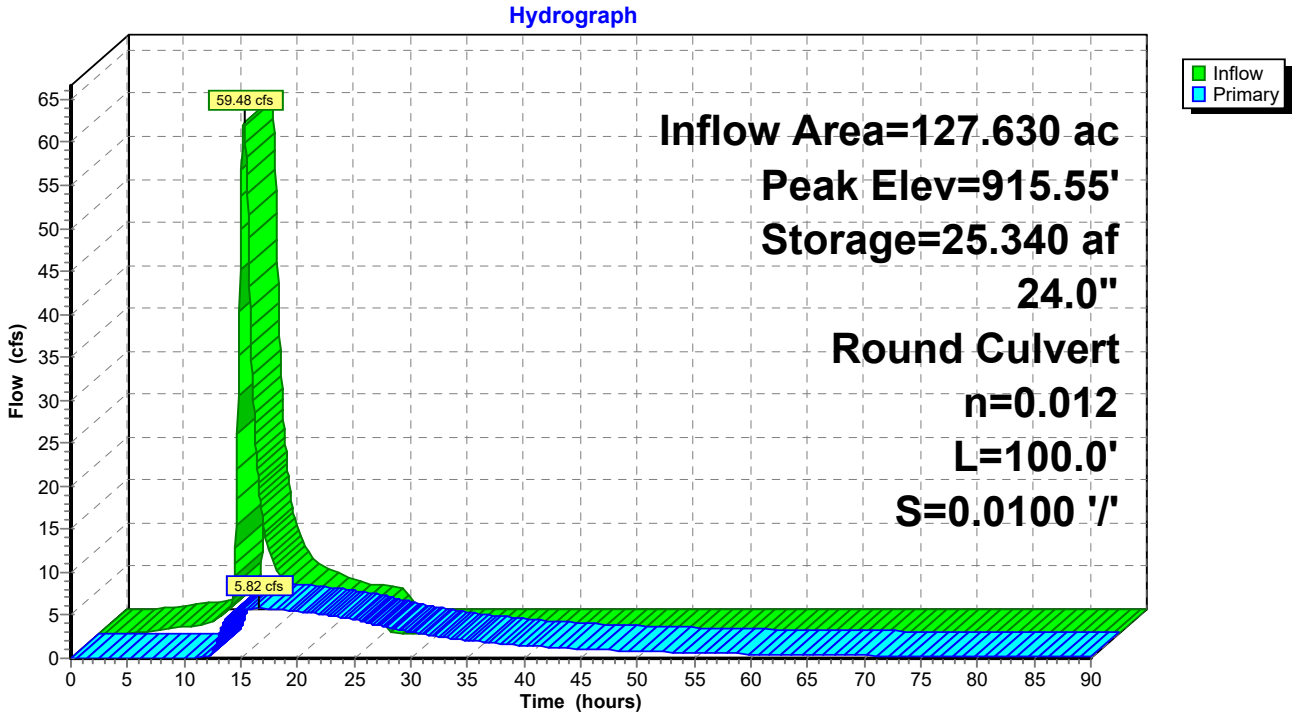
Volume	Invert	Avail.Storage	Storage Description
#1	910.50'	63.101 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
910.50	4.295	0.000	0.000
911.50	4.352	4.324	4.324
912.50	4.467	4.410	8.733
913.50	4.584	4.526	13.259
914.50	4.702	4.643	17.902
915.50	9.270	6.986	24.888
916.50	9.360	9.315	34.203
917.50	9.541	9.451	43.654
918.50	9.724	9.632	53.286
919.50	9.907	9.815	63.101

Device	Routing	Invert	Outlet Devices
#1	Primary	914.50'	**24.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 914.50' / 913.50' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=5.82 cfs @ 16.57 hrs HW=915.55' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 5.82 cfs @ 3.49 fps)

Pond 4P: STORMWATER BASIN #4 SOUTHWEST



Summary for Pond 5P: STORMWATER BASIN #5 SOUTHEAST

Inflow Area = 61.530 ac, 25.84% Impervious, Inflow Depth = 1.17" for 2-YR-24 HR event
Inflow = 65.40 cfs @ 12.19 hrs, Volume= 5.997 af
Outflow = 3.76 cfs @ 14.59 hrs, Volume= 5.694 af, Atten= 94%, Lag= 144.5 min
Primary = 3.76 cfs @ 14.59 hrs, Volume= 5.694 af
Routed to Link 6L : DISCHARGE POINT 3

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Starting Elev= 914.50' Surf.Area= 3.081 ac Storage= 11.603 af
Peak Elev= 915.32' @ 14.59 hrs Surf.Area= 5.985 ac Storage= 15.328 af (3.725 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 789.8 min (1,616.5 - 826.7)

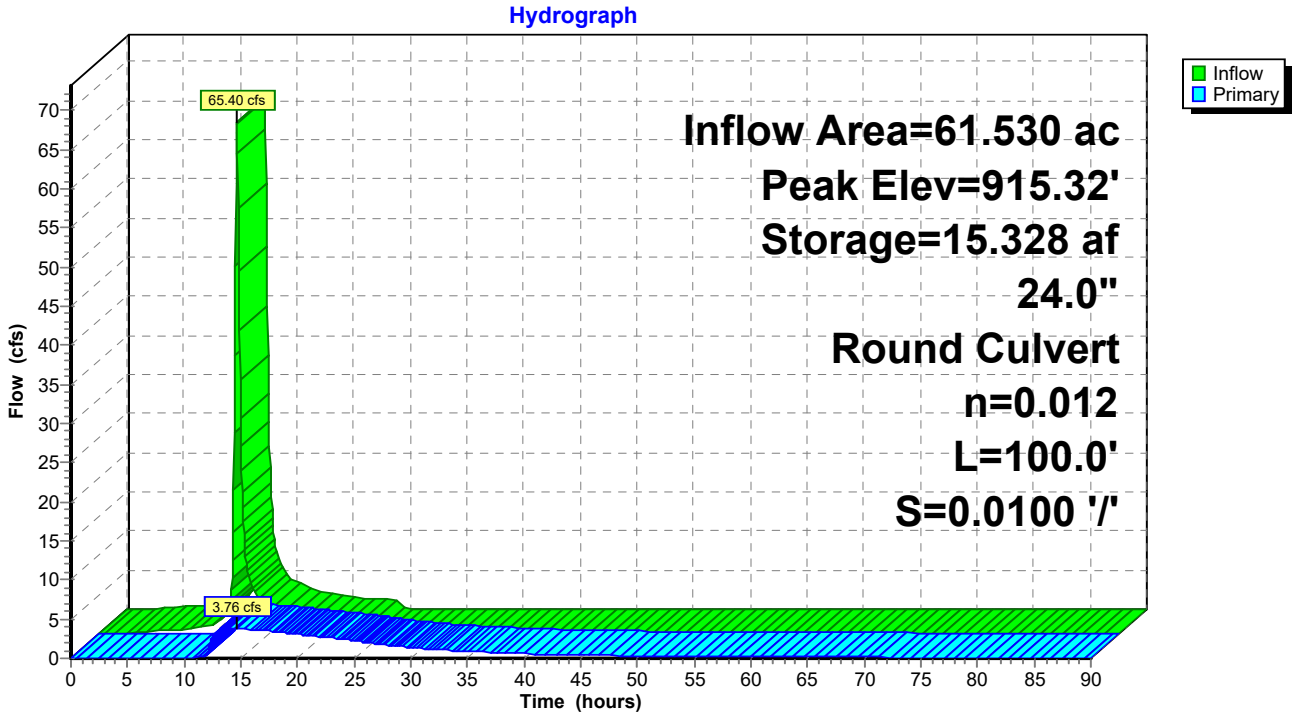
Volume	Invert	Avail.Storage	Storage Description
#1	910.50'	43.831 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
910.50	2.758	0.000	0.000
911.50	2.803	2.780	2.780
912.50	2.894	2.848	5.629
913.50	2.987	2.940	8.569
914.50	3.081	3.034	11.603
915.50	6.615	4.848	16.451
916.50	6.688	6.652	23.103
917.50	6.835	6.761	29.864
918.50	6.983	6.909	36.773
919.50	7.132	7.057	43.831

Device	Routing	Invert	Outlet Devices
#1	Primary	914.50'	**24.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 914.50' / 913.50' S= 0.0100 '/' Cc= 0.900 n= 0.012 RCP, Flow Area= 3.14 sf

Primary OutFlow Max=3.75 cfs @ 14.59 hrs HW=915.32' (Free Discharge)
↑**1=Culvert** (Inlet Controls 3.75 cfs @ 3.09 fps)

Pond 5P: STORMWATER BASIN #5 SOUTHEAST

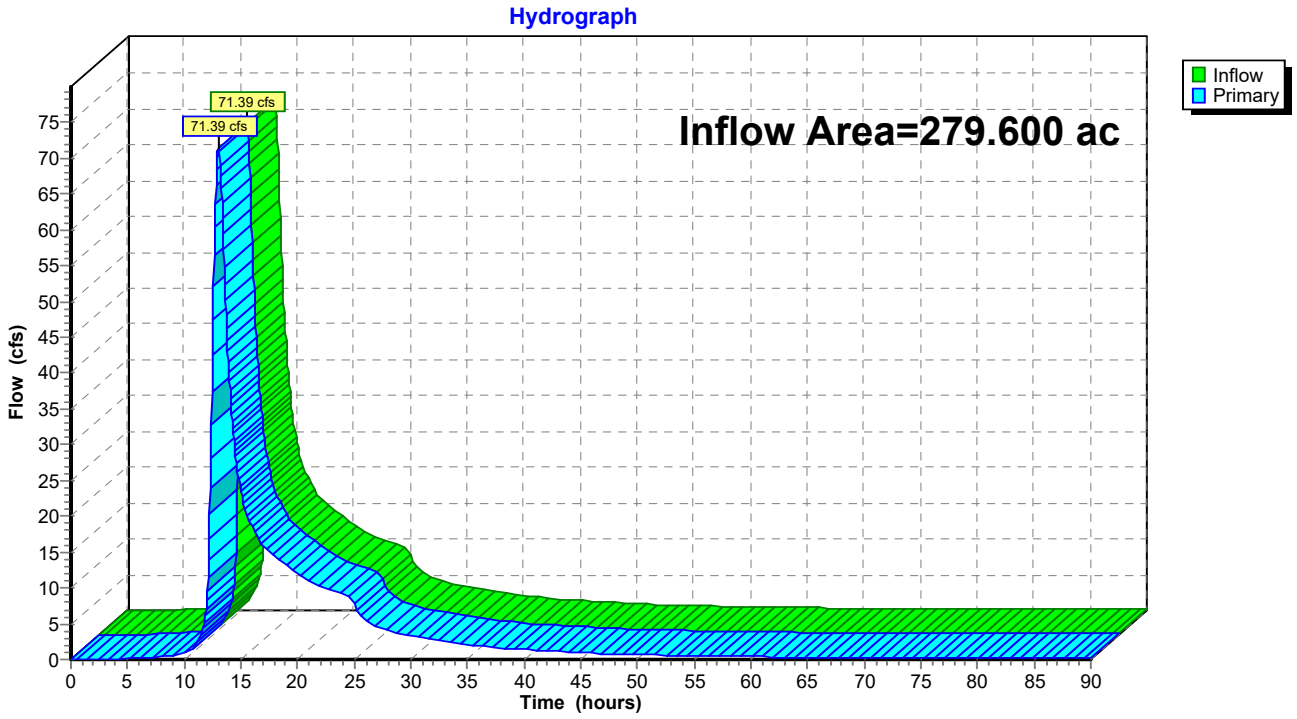


Summary for Link 2L: DISCHARGE POINT 2

Inflow Area = 279.600 ac, 18.99% Impervious, Inflow Depth > 1.17" for 2-YR-24 HR event
Inflow = 71.39 cfs @ 13.03 hrs, Volume= 27.377 af
Primary = 71.39 cfs @ 13.03 hrs, Volume= 27.377 af, Atten= 0%, Lag= 0.0 min
Routed to Link 7L : LOWER BRANCH RUSH RIVER

Primary outflow = Inflow, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Link 2L: DISCHARGE POINT 2

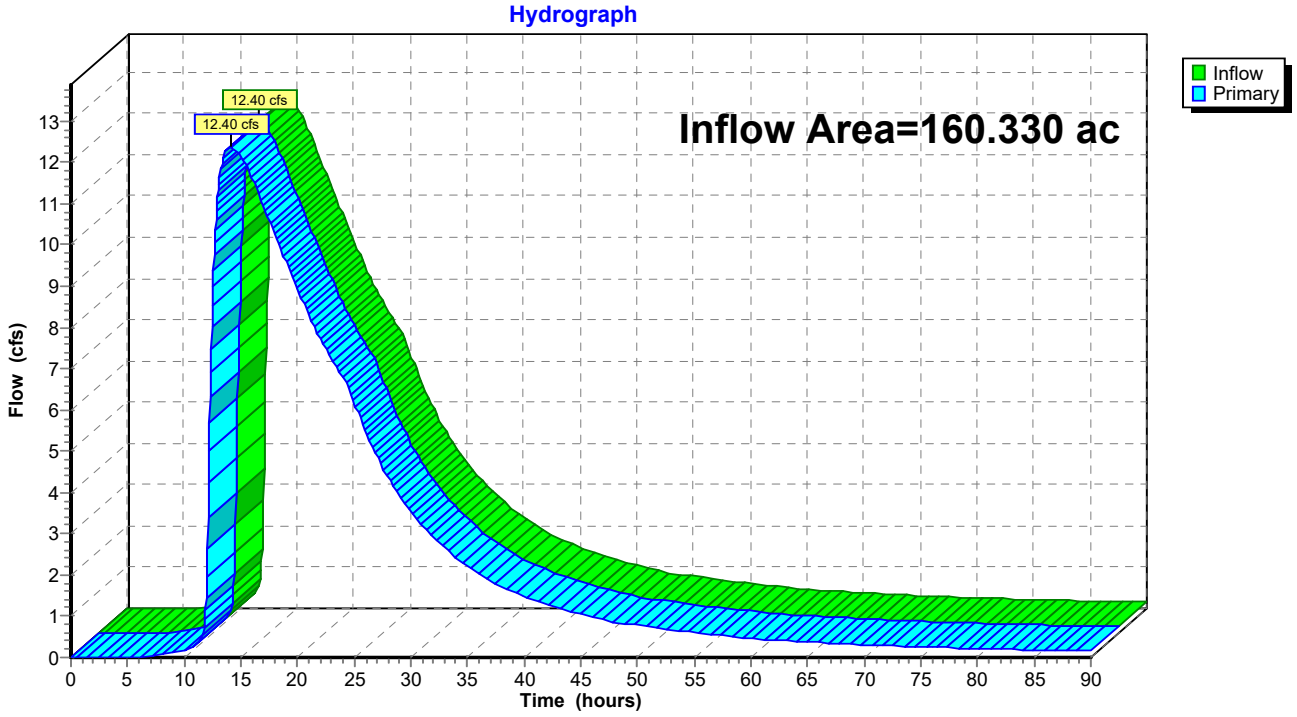


Summary for Link 5L: DISCHARGE POINT 1

Inflow Area = 160.330 ac, 40.53% Impervious, Inflow Depth > 1.21" for 2-YR-24 HR event
Inflow = 12.40 cfs @ 14.09 hrs, Volume= 16.182 af
Primary = 12.40 cfs @ 14.09 hrs, Volume= 16.182 af, Atten= 0%, Lag= 0.0 min
Routed to Link 7L : LOWER BRANCH RUSH RIVER

Primary outflow = Inflow, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Link 5L: DISCHARGE POINT 1

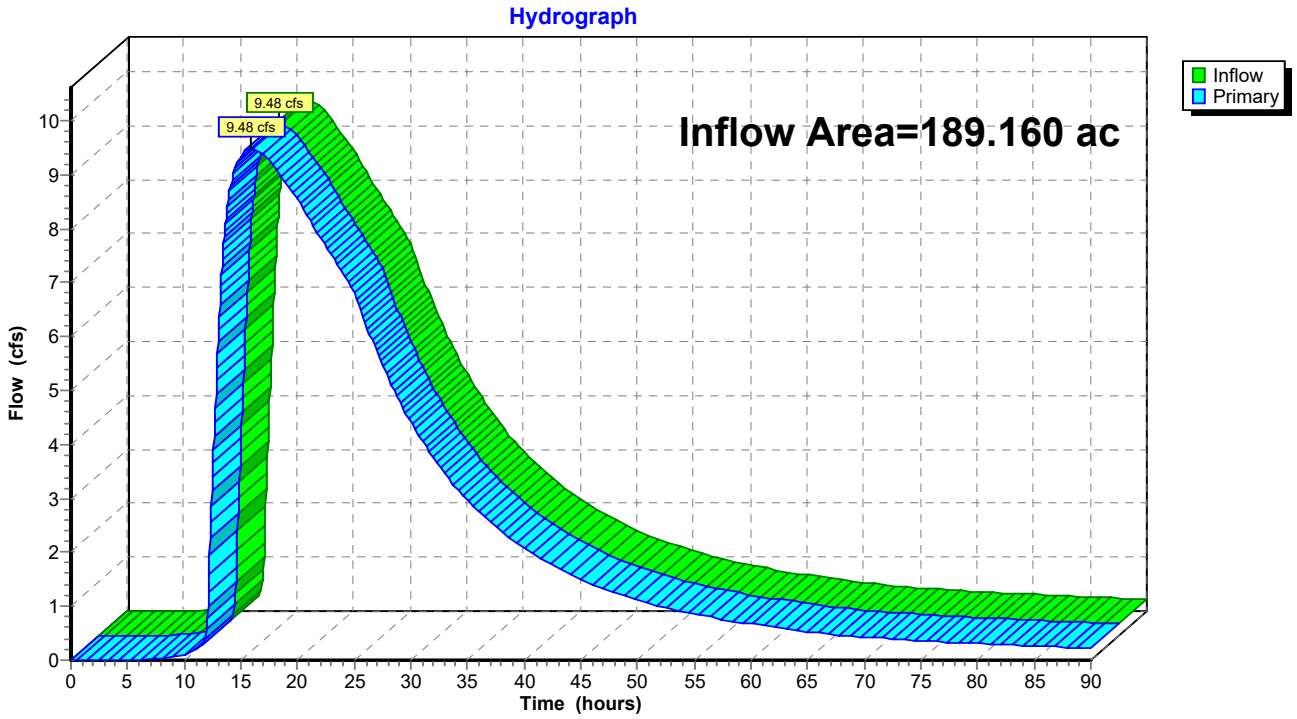


Summary for Link 6L: DISCHARGE POINT 3

Inflow Area = 189.160 ac, 21.52% Impervious, Inflow Depth > 1.04" for 2-YR-24 HR event
Inflow = 9.48 cfs @ 15.90 hrs, Volume= 16.422 af
Primary = 9.48 cfs @ 15.90 hrs, Volume= 16.422 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Link 6L: DISCHARGE POINT 3

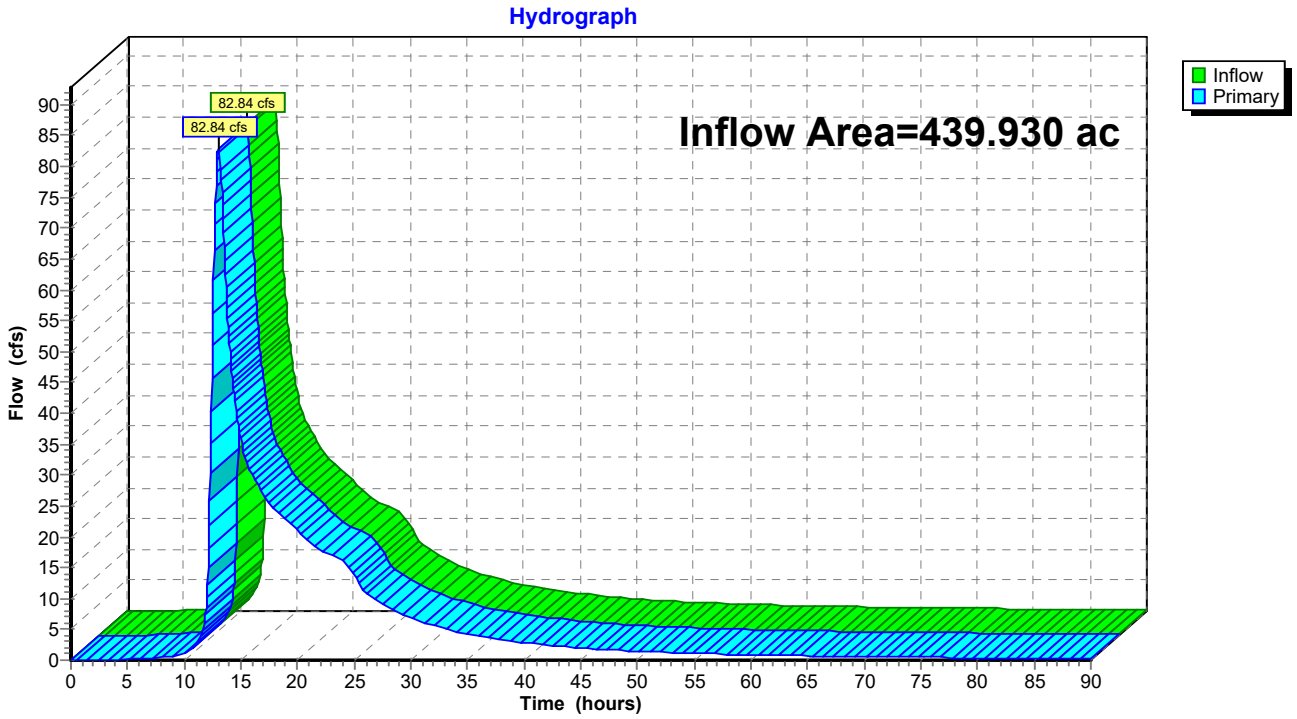


Summary for Link 7L: LOWER BRANCH RUSH RIVER

Inflow Area = 439.930 ac, 26.84% Impervious, Inflow Depth > 1.19" for 2-YR-24 HR event
Inflow = 82.84 cfs @ 13.06 hrs, Volume= 43.558 af
Primary = 82.84 cfs @ 13.06 hrs, Volume= 43.558 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Link 7L: LOWER BRANCH RUSH RIVER



Time span=0.00-90.00 hrs, dt=0.05 hrs, 1801 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: C-DA-1 Runoff Area=99.590 ac 45.84% Impervious Runoff Depth=1.52"
Flow Length=700' Tc=38.0 min CN=80/98 Runoff=104.50 cfs 12.634 af

Subcatchment2S: C-DA-2 Runoff Area=60.740 ac 31.82% Impervious Runoff Depth=1.33"
Flow Length=1,330' Tc=15.6 min CN=80/98 Runoff=94.65 cfs 6.725 af

Subcatchment3S: C-DA-3 Runoff Area=143.510 ac 29.34% Impervious Runoff Depth=1.29"
Flow Length=5,230' Tc=42.0 min CN=80/98 Runoff=119.47 cfs 15.478 af

Subcatchment4S: C-DA-4 Runoff Area=127.630 ac 19.43% Impervious Runoff Depth=1.16"
Flow Length=2,150' Tc=72.8 min CN=80/98 Runoff=63.89 cfs 12.310 af

Subcatchment5S: C-DA-5 Runoff Area=61.530 ac 25.84% Impervious Runoff Depth=1.25"
Flow Length=1,780' Tc=24.8 min CN=80/98 Runoff=69.92 cfs 6.389 af

Subcatchment6S: C-DA-6 Runoff Area=136.090 ac 8.08% Impervious Runoff Depth=1.27"
Flow Length=3,600' Tc=87.4 min CN=85/98 Runoff=67.67 cfs 14.366 af

Pond 1P: STORMWATERBASIN #1 Peak Elev=915.67' Storage=25.482 af Inflow=104.50 cfs 12.634 af
48.0" Round Culvert n=0.012 L=100.0' S=0.0100 '/' Outflow=7.07 cfs 10.662 af

Pond 2P: STORMWATERBASIN #2 Peak Elev=915.39' Storage=12.771 af Inflow=94.65 cfs 6.725 af
48.0" Round Culvert n=0.012 L=100.0' S=0.0100 '/' Outflow=6.75 cfs 6.595 af

Pond 3P: STORMWATERBASIN #3 Peak Elev=914.77' Storage=27.524 af Inflow=119.47 cfs 15.478 af
36.0" Round Culvert n=0.012 L=100.0' S=0.0100 '/' Outflow=10.89 cfs 14.848 af

Pond 4P: STORMWATERBASIN #4 Peak Elev=915.60' Storage=25.830 af Inflow=63.89 cfs 12.310 af
24.0" Round Culvert n=0.012 L=100.0' S=0.0100 '/' Outflow=6.34 cfs 11.508 af

Pond 5P: STORMWATERBASIN #5 Peak Elev=915.36' Storage=15.567 af Inflow=69.92 cfs 6.389 af
24.0" Round Culvert n=0.012 L=100.0' S=0.0100 '/' Outflow=4.09 cfs 6.083 af

Link 2L: DISCHARGE POINT 2 Inflow=76.70 cfs 29.214 af
Primary=76.70 cfs 29.214 af

Link 5L: DISCHARGE POINT 1 Inflow=13.54 cfs 17.257 af
Primary=13.54 cfs 17.257 af

Link 6L: DISCHARGE POINT 3 Inflow=10.32 cfs 17.591 af
Primary=10.32 cfs 17.591 af

Link 7L: LOWER BRANCH RUSH RIVER Inflow=89.22 cfs 46.471 af
Primary=89.22 cfs 46.471 af

Total Runoff Area = 629.090 ac Runoff Volume = 67.902 af Average Runoff Depth = 1.30"
74.76% Pervious = 470.310 ac 25.24% Impervious = 158.780 ac

Summary for Subcatchment 1S: C-DA-1

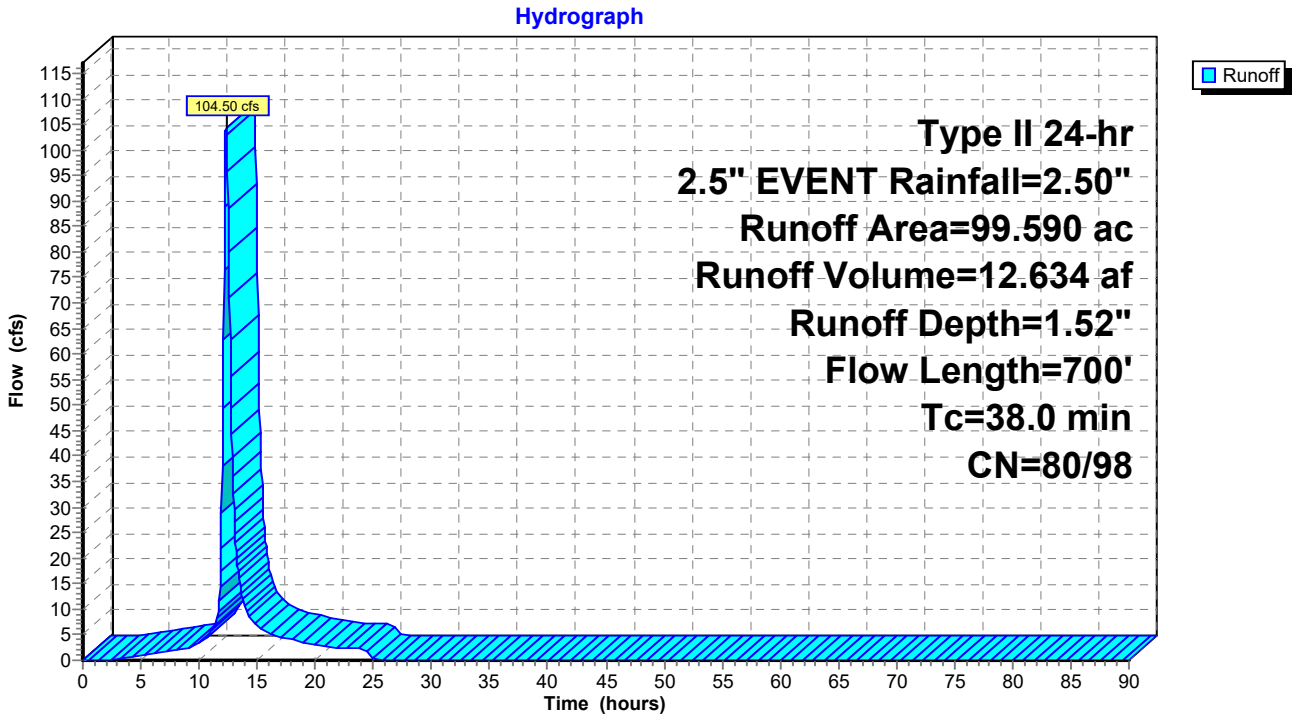
Runoff = 104.50 cfs @ 12.34 hrs, Volume= 12.634 af, Depth= 1.52"
Routed to Pond 1P : STORMWATER BASIN #1 NORTHWEST

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 2.5" EVENT Rainfall=2.50"

	Area (ac)	CN	Description
*	45.650	98	On Site Impervious
	53.940	80	>75% Grass cover, Good, HSG D
	99.590	88	Weighted Average
	53.940	80	54.16% Pervious Area
	45.650	98	45.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	100	0.0100	0.18		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 1.40"
28.6	600	0.0025	0.35		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
38.0	700	Total			

Subcatchment 1S: C-DA-1



Summary for Subcatchment 2S: C-DA-2

[47] Hint: Peak is 185% of capacity of segment #3

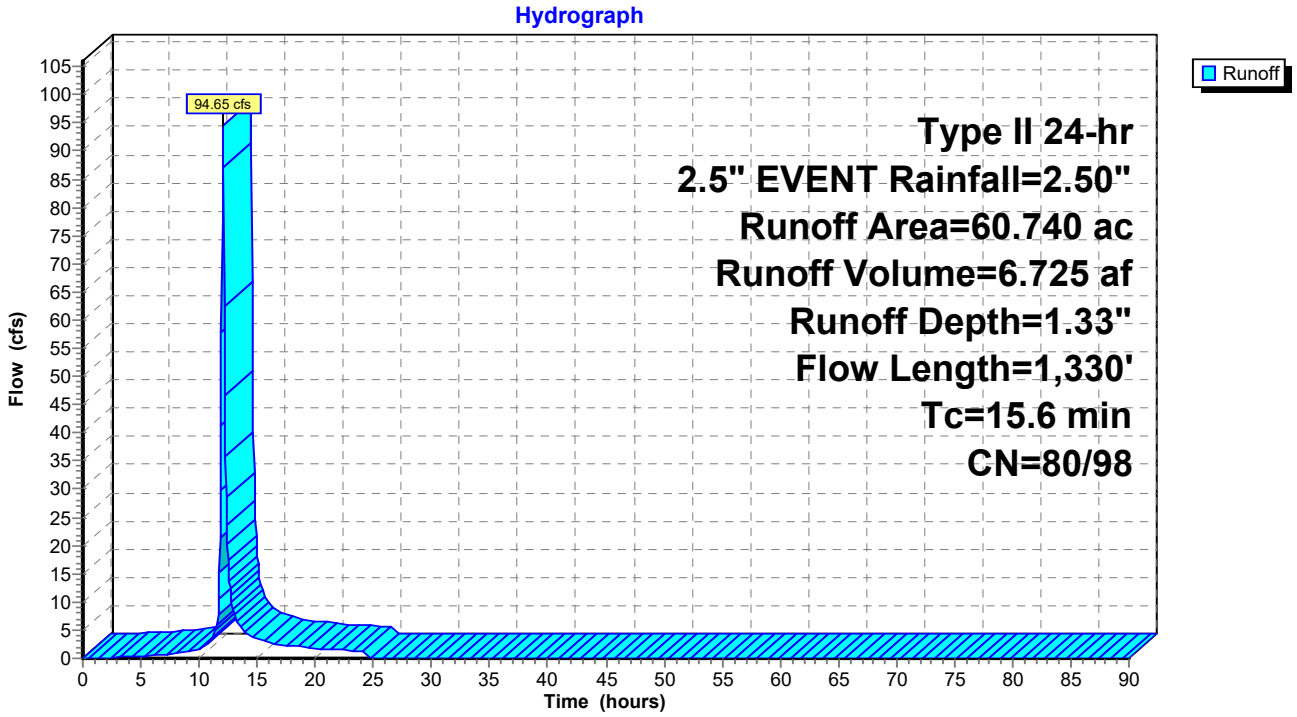
Runoff = 94.65 cfs @ 12.08 hrs, Volume= 6.725 af, Depth= 1.33"
Routed to Pond 2P : STORMWATER BASIN #2 NORTHEAST

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 2.5" EVENT Rainfall=2.50"

	Area (ac)	CN	Description
*	19.330	98	On Site Impervious
*	41.410	80	>75% Grass cover, Good, HSG D
	60.740	86	Weighted Average
	41.410	80	68.18% Pervious Area
	19.330	98	31.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	100	0.0130	0.20		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 1.40"
4.8	230	0.0130	0.80		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.3	1,000	0.0050	7.23	51.09	**Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
15.6	1,330	Total			

Subcatchment 2S: C-DA-2



Summary for Subcatchment 3S: C-DA-3

[47] Hint: Peak is 310% of capacity of segment #3
[47] Hint: Peak is 109% of capacity of segment #4

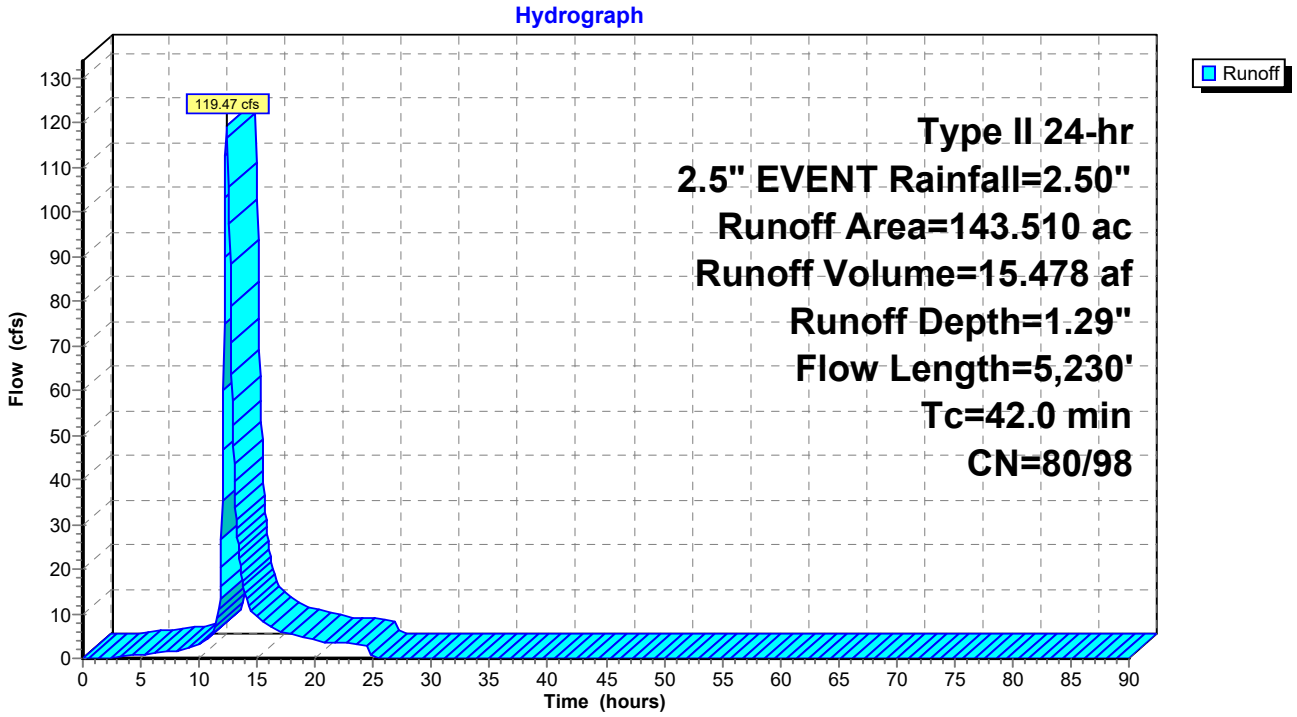
Runoff = 119.47 cfs @ 12.39 hrs, Volume= 15.478 af, Depth= 1.29"
Routed to Pond 3P : STORMWATER BASIN #3 MID-EST

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 2.5" EVENT Rainfall=2.50"

	Area (ac)	CN	Description
*	42.100	98	On Site Impervious
	101.410	80	>75% Grass cover, Good, HSG D
	143.510	85	Weighted Average
	101.410	80	70.66% Pervious Area
	42.100	98	29.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	100	0.0050	0.13		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 1.40"
17.8	530	0.0050	0.49		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.9	2,000	0.0010	4.82	38.56	**Channel Flow,** Area= 8.0 sf Perim= 7.7' r= 1.04' n= 0.010
4.9	2,600	0.0050	8.76	110.04	**Pipe Channel,** 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.012 Corrugated PP, smooth interior
42.0	5,230	Total			

Subcatchment 3S: C-DA-3



Summary for Subcatchment 4S: C-DA-4

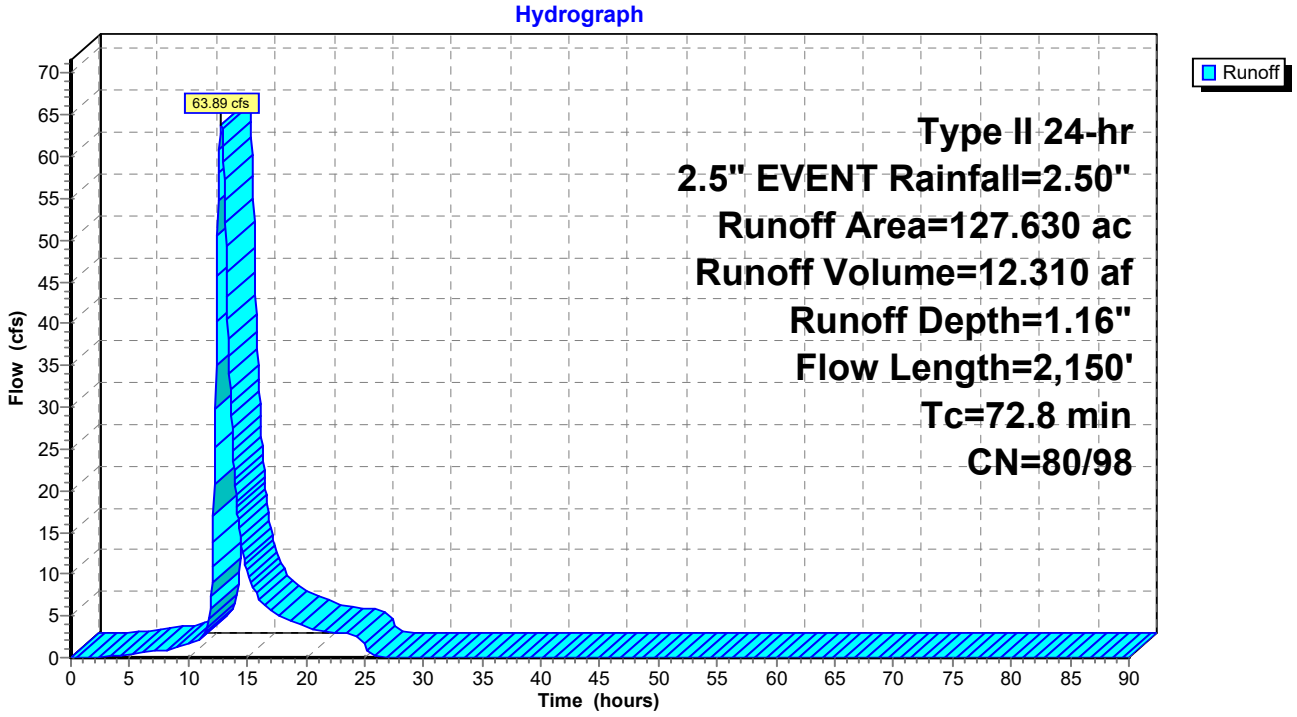
Runoff = 63.89 cfs @ 12.82 hrs, Volume= 12.310 af, Depth= 1.16"
Routed to Pond 4P : STORMWATER BASIN #4 SOUTHWEST

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 2.5" EVENT Rainfall=2.50"

	Area (ac)	CN	Description
*	24.800	98	On Site Impervious
	102.830	80	>75% Grass cover, Good, HSG D
	127.630	83	Weighted Average
	102.830	80	80.57% Pervious Area
	24.800	98	19.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.4	100	0.0025	0.10		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 1.40"
55.7	1,700	0.0010	0.51		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.7	350	0.0050	8.76	110.04	**Pipe Channel,** 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.012
72.8	2,150	Total			

Subcatchment 4S: C-DA-4



Summary for Subcatchment 5S: C-DA-5

[47] Hint: Peak is 137% of capacity of segment #3

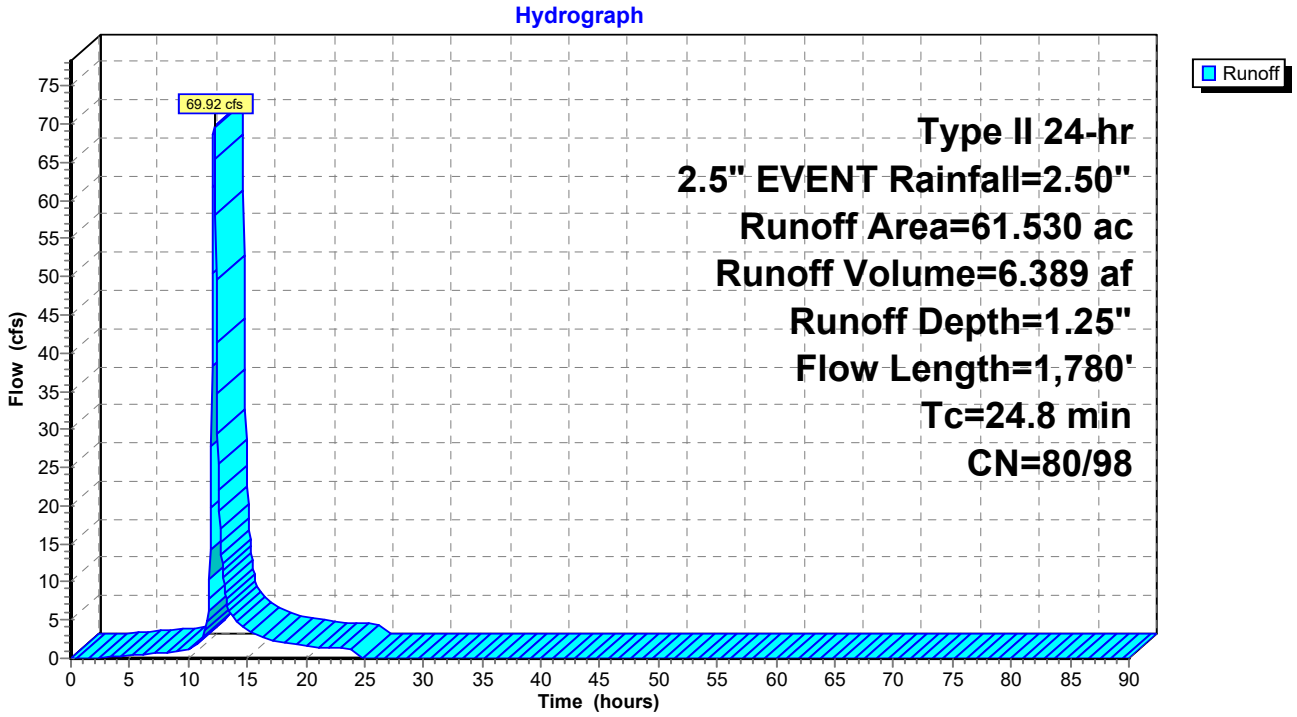
Runoff = 69.92 cfs @ 12.19 hrs, Volume= 6.389 af, Depth= 1.25"
Routed to Pond 5P : STORMWATER BASIN #5 SOUTHEAST

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 2.5" EVENT Rainfall=2.50"

	Area (ac)	CN	Description
*	15.900	98	On Site Impervious
	45.630	80	>75% Grass cover, Good, HSG D
	61.530	85	Weighted Average
	45.630	80	74.16% Pervious Area
	15.900	98	25.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	100	0.0050	0.13		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 1.40"
9.2	280	0.0010	0.51		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.2	1,400	0.0050	7.23	51.09	**Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 Corrugated PP, smooth interior
24.8	1,780	Total			

Subcatchment 5S: C-DA-5



Summary for Subcatchment 6S: C-DA-6

[47] Hint: Peak is 120% of capacity of segment #3

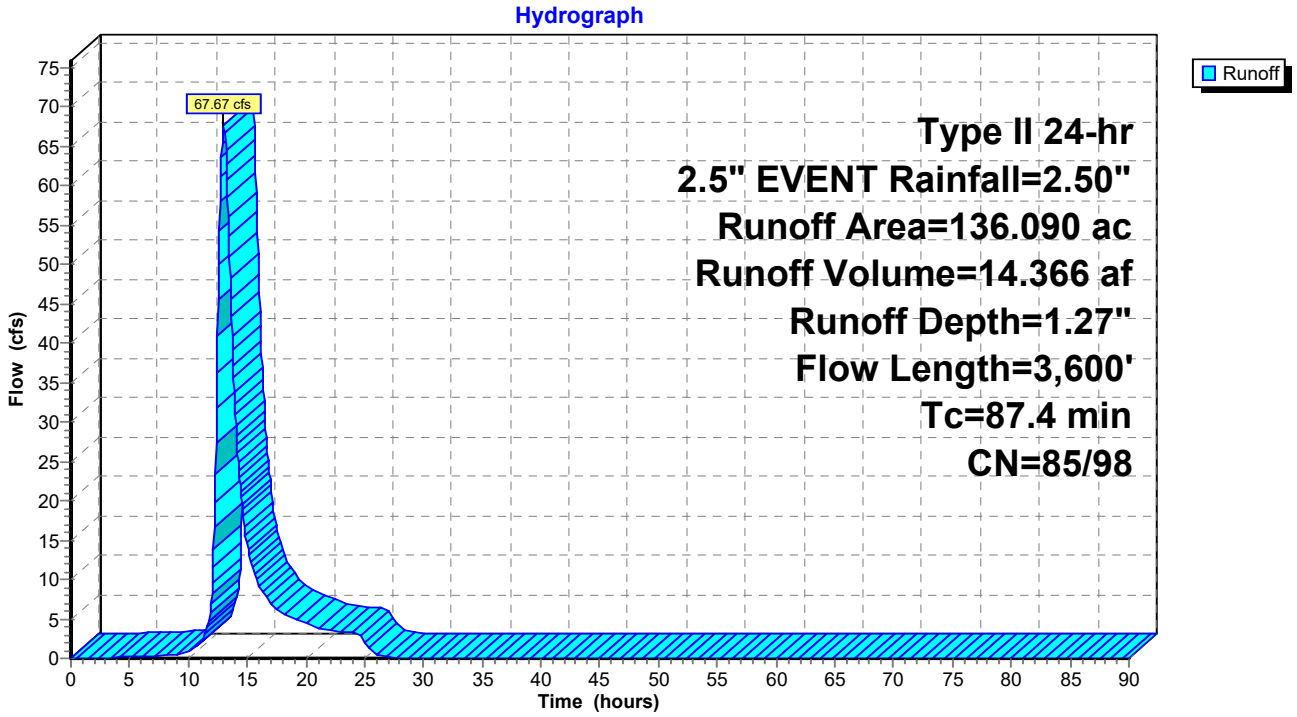
Runoff = 67.67 cfs @ 13.00 hrs, Volume= 14.366 af, Depth= 1.27"
Routed to Link 2L : DISCHARGE POINT 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 2.5" EVENT Rainfall=2.50"

	Area (ac)	CN	Description
	125.090	85	Legumes, straight row, Good, HSG D
*	11.000	98	On Site Impervious
	136.090	86	Weighted Average
	125.090	85	91.92% Pervious Area
	11.000	98	8.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	100	0.0100	0.18		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 1.40"
57.9	1,500	0.0023	0.43		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
20.1	2,000	0.0010	1.66	56.28	**Channel Flow,** Area= 34.0 sf Perim= 31.3' r= 1.09' n= 0.030 Earth, grassed & winding
87.4	3,600	Total			

Subcatchment 6S: C-DA-6



Summary for Pond 1P: STORMWATER BASIN #1 NORTHWEST

Inflow Area = 99.590 ac, 45.84% Impervious, Inflow Depth = 1.52" for 2.5" EVENT event
Inflow = 104.50 cfs @ 12.34 hrs, Volume= 12.634 af
Outflow = 7.07 cfs @ 14.86 hrs, Volume= 10.662 af, Atten= 93%, Lag= 151.6 min
Primary = 7.07 cfs @ 14.86 hrs, Volume= 10.662 af
Routed to Link 5L : DISCHARGE POINT 1

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Starting Elev= 914.50' Surf.Area= 4.482 ac Storage= 17.010 af
Peak Elev= 915.67' @ 14.86 hrs Surf.Area= 9.360 ac Storage= 25.482 af (8.472 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 842.5 min (1,660.3 - 817.8)

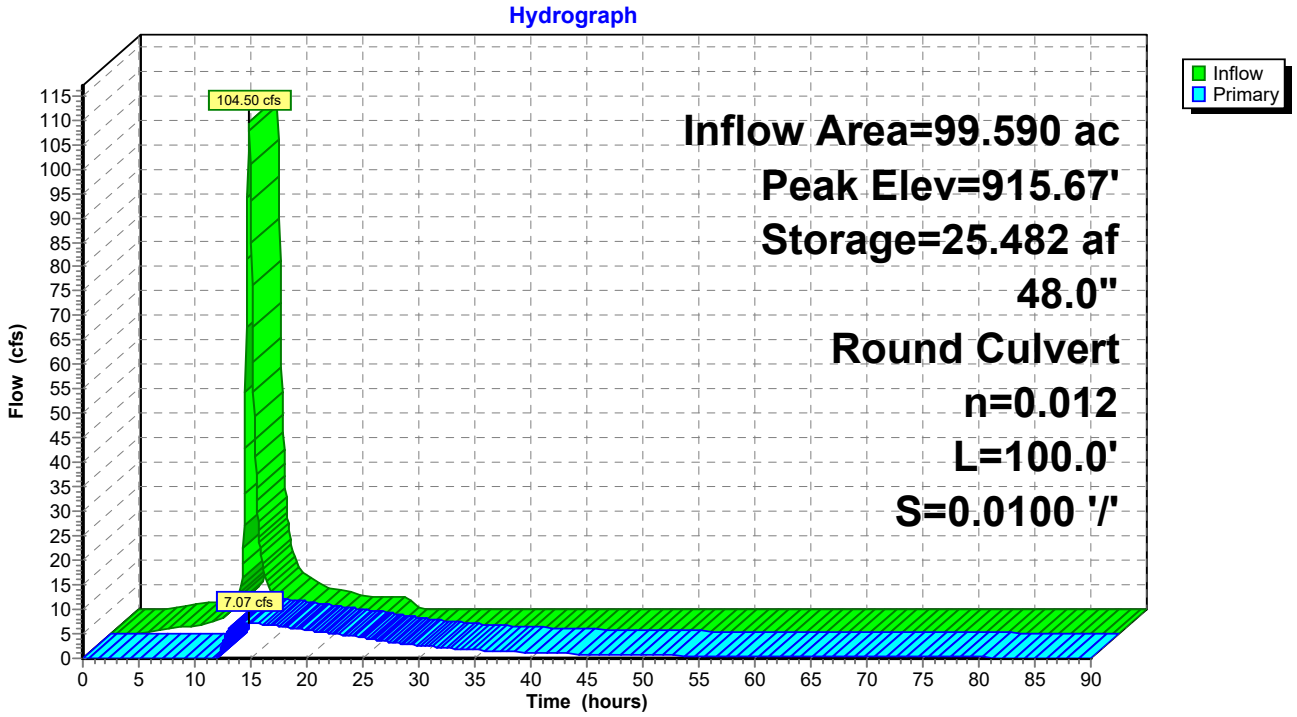
Volume	Invert	Avail.Storage	Storage Description
#1	910.50'	64.598 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
910.50	4.000	0.000	0.000
911.50	4.144	4.072	4.072
912.50	4.255	4.199	8.272
913.50	4.370	4.312	12.584
914.50	4.482	4.426	17.010
915.50	9.360	6.921	23.931
916.50	9.360	9.360	33.291
917.50	9.541	9.451	42.741
918.75	9.724	12.041	54.782
919.75	9.907	9.815	64.598

Device	Routing	Invert	Outlet Devices
#1	Primary	914.75'	**48.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 914.75' / 913.75' S= 0.0100 '/' Cc= 0.900 n= 0.012 RCP, Flow Area= 12.57 sf

Primary OutFlow Max=7.07 cfs @ 14.86 hrs HW=915.67' (Free Discharge)
↑**1=Culvert** (Inlet Controls 7.07 cfs @ 3.26 fps)

Pond 1P: STORMWATER BASIN #1 NORTHWEST



Summary for Pond 2P: STORMWATER BASIN #2 NORTHEAST

Inflow Area = 60.740 ac, 31.82% Impervious, Inflow Depth = 1.33" for 2.5" EVENT event
Inflow = 94.65 cfs @ 12.08 hrs, Volume= 6.725 af
Outflow = 6.75 cfs @ 13.27 hrs, Volume= 6.595 af, Atten= 93%, Lag= 71.3 min
Primary = 6.75 cfs @ 13.27 hrs, Volume= 6.595 af
Routed to Link 5L : DISCHARGE POINT 1

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Starting Elev= 914.50' Surf.Area= 2.443 ac Storage= 8.939 af
Peak Elev= 915.39' @ 13.27 hrs Surf.Area= 6.136 ac Storage= 12.771 af (3.832 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 521.6 min (1,331.9 - 810.3)

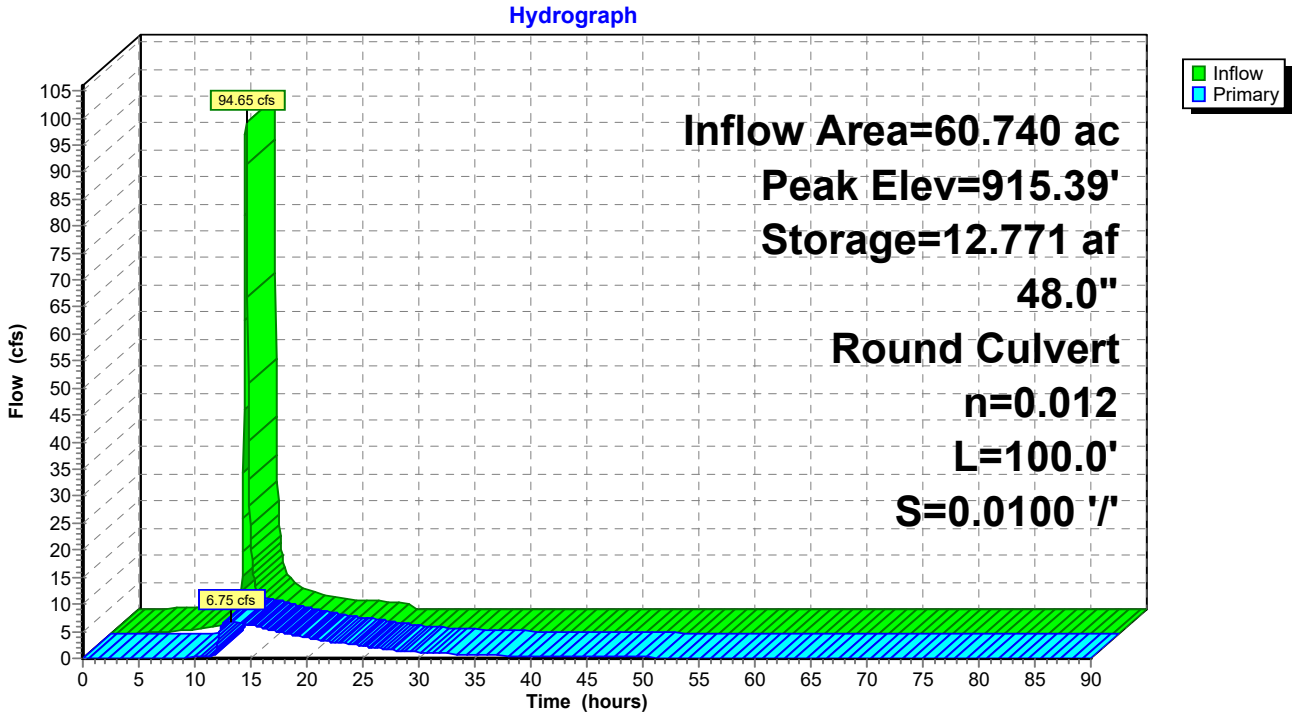
Volume	Invert	Avail.Storage	Storage Description
#1	910.50'	40.535 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
910.50	2.093	0.000	0.000
911.50	2.136	2.114	2.114
912.50	2.223	2.179	4.294
913.50	2.312	2.268	6.562
914.50	2.443	2.377	8.939
915.50	6.577	4.510	13.449
916.50	6.577	6.577	20.026
917.50	6.749	6.663	26.689
918.50	6.923	6.836	33.525
919.50	7.097	7.010	40.535

Device	Routing	Invert	Outlet Devices
#1	Primary	914.50'	**48.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 914.50' / 913.50' S= 0.0100 '/' Cc= 0.900 n= 0.012 RCP, Flow Area= 12.57 sf

Primary OutFlow Max=6.74 cfs @ 13.27 hrs HW=915.39' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 6.74 cfs @ 3.22 fps)

Pond 2P: STORMWATER BASIN #2 NORTHEAST



Summary for Pond 3P: STORMWATER BASIN #3 MID-EST

Inflow Area = 143.510 ac, 29.34% Impervious, Inflow Depth = 1.29" for 2.5" EVENT event
Inflow = 119.47 cfs @ 12.39 hrs, Volume= 15.478 af
Outflow = 10.89 cfs @ 14.47 hrs, Volume= 14.848 af, Atten= 91%, Lag= 124.7 min
Primary = 10.89 cfs @ 14.47 hrs, Volume= 14.848 af
Routed to Link 2L : DISCHARGE POINT 2

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Starting Elev= 913.50' Surf.Area= 4.739 ac Storage= 18.041 af
Peak Elev= 914.77' @ 14.47 hrs Surf.Area= 9.294 ac Storage= 27.524 af (9.483 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 721.8 min (1,559.4 - 837.6)

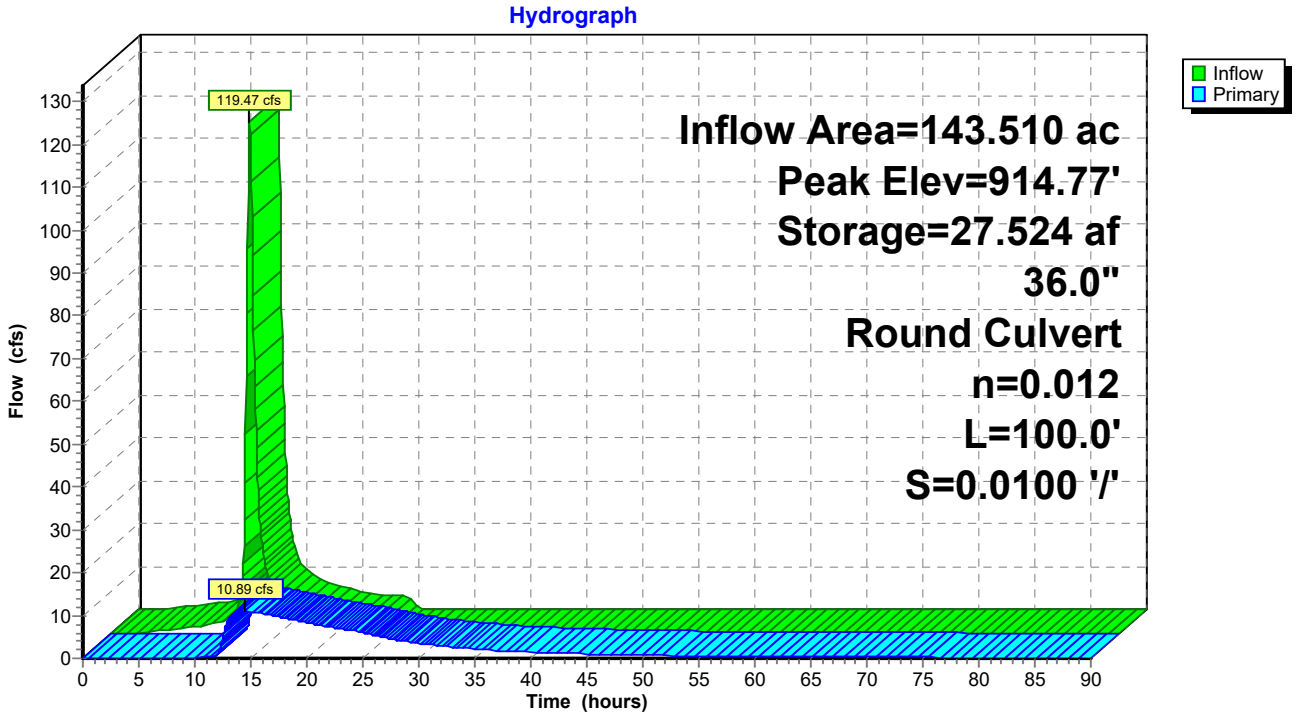
Volume	Invert	Avail.Storage	Storage Description
#1	909.50'	63.259 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
909.50	4.328	0.000	0.000
910.50	4.386	4.357	4.357
911.50	4.502	4.444	8.800
912.50	4.620	4.561	13.361
913.50	4.739	4.679	18.041
914.50	9.270	7.004	25.045
915.50	9.360	9.315	34.360
916.50	9.541	9.451	43.811
917.50	9.724	9.632	53.443
918.50	9.907	9.815	63.259

Device	Routing	Invert	Outlet Devices
#1	Primary	913.50'	**36.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 913.50' / 912.50' S= 0.0100 '/' Cc= 0.900 n= 0.012 RCP, Flow Area= 7.07 sf

Primary OutFlow Max=10.88 cfs @ 14.47 hrs HW=914.77' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 10.88 cfs @ 3.83 fps)

Pond 3P: STORMWATER BASIN #3 MID-EST



Summary for Pond 4P: STORMWATER BASIN #4 SOUTHWEST

Inflow Area = 127.630 ac, 19.43% Impervious, Inflow Depth = 1.16" for 2.5" EVENT event
Inflow = 63.89 cfs @ 12.82 hrs, Volume= 12.310 af
Outflow = 6.34 cfs @ 16.45 hrs, Volume= 11.508 af, Atten= 90%, Lag= 218.2 min
Primary = 6.34 cfs @ 16.45 hrs, Volume= 11.508 af
Routed to Link 6L : DISCHARGE POINT 3

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Starting Elev= 914.50' Surf.Area= 4.702 ac Storage= 17.902 af
Peak Elev= 915.60' @ 16.45 hrs Surf.Area= 9.279 ac Storage= 25.830 af (7.928 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 906.3 min (1,785.1 - 878.7)

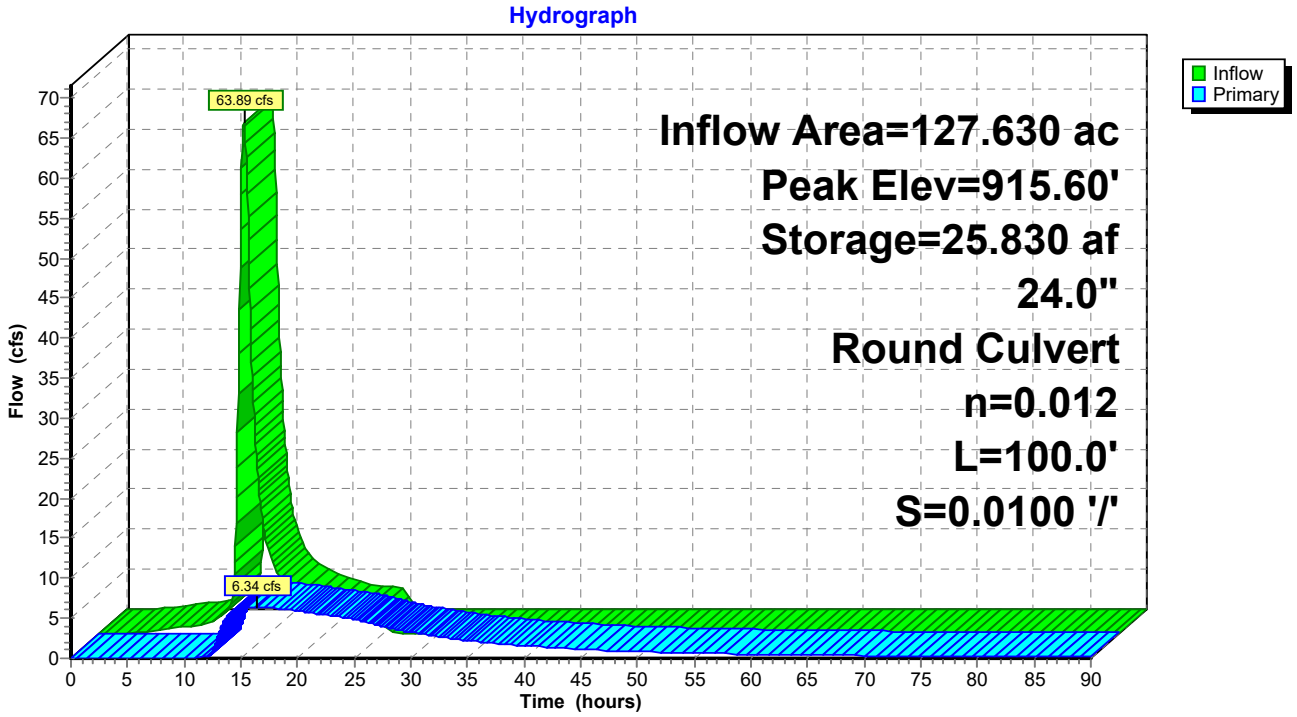
Volume	Invert	Avail.Storage	Storage Description
#1	910.50'	63.101 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
910.50	4.295	0.000	0.000
911.50	4.352	4.324	4.324
912.50	4.467	4.410	8.733
913.50	4.584	4.526	13.259
914.50	4.702	4.643	17.902
915.50	9.270	6.986	24.888
916.50	9.360	9.315	34.203
917.50	9.541	9.451	43.654
918.50	9.724	9.632	53.286
919.50	9.907	9.815	63.101

Device	Routing	Invert	Outlet Devices
#1	Primary	914.50'	**24.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 914.50' / 913.50' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=6.34 cfs @ 16.45 hrs HW=915.60' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 6.34 cfs @ 3.57 fps)

Pond 4P: STORMWATER BASIN #4 SOUTHWEST



Summary for Pond 5P: STORMWATER BASIN #5 SOUTHEAST

Inflow Area = 61.530 ac, 25.84% Impervious, Inflow Depth = 1.25" for 2.5" EVENT event
Inflow = 69.92 cfs @ 12.19 hrs, Volume= 6.389 af
Outflow = 4.09 cfs @ 14.48 hrs, Volume= 6.083 af, Atten= 94%, Lag= 138.0 min
Primary = 4.09 cfs @ 14.48 hrs, Volume= 6.083 af
Routed to Link 6L : DISCHARGE POINT 3

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Starting Elev= 914.50' Surf.Area= 3.081 ac Storage= 11.603 af
Peak Elev= 915.36' @ 14.48 hrs Surf.Area= 6.124 ac Storage= 15.567 af (3.963 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 775.9 min (1,601.6 - 825.8)

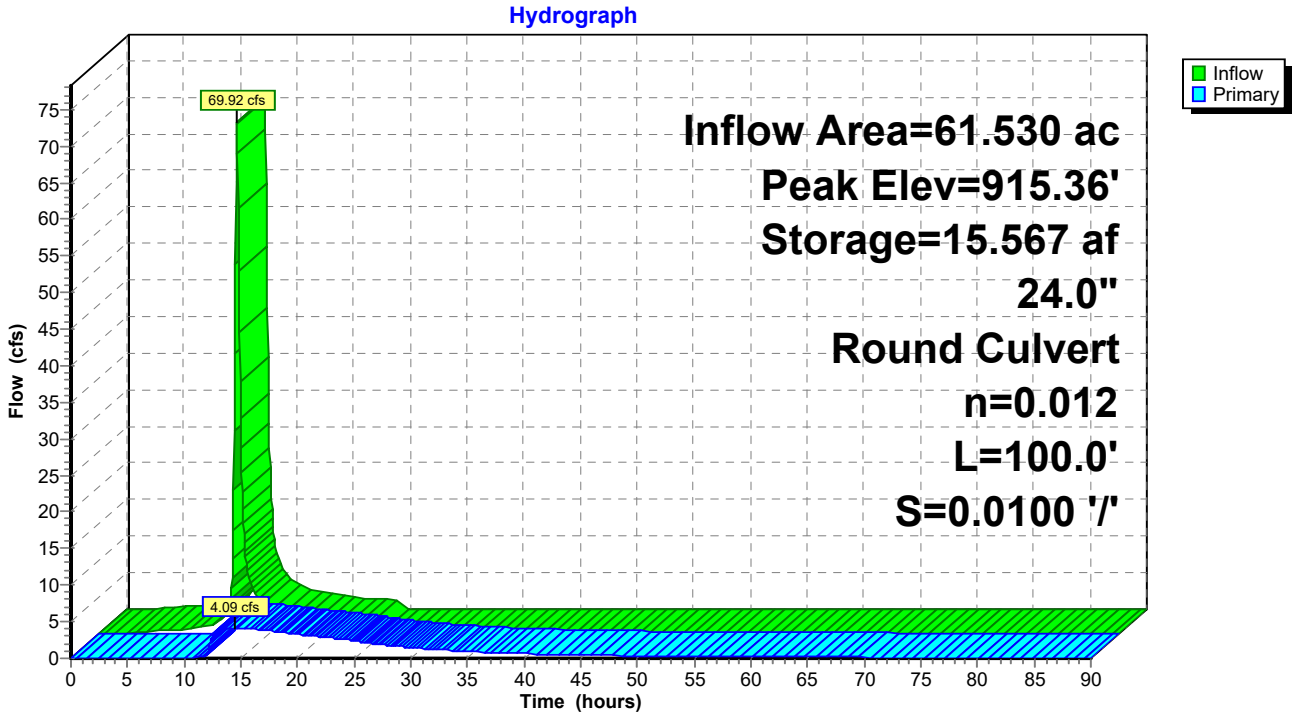
Volume	Invert	Avail.Storage	Storage Description
#1	910.50'	43.831 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
910.50	2.758	0.000	0.000
911.50	2.803	2.780	2.780
912.50	2.894	2.848	5.629
913.50	2.987	2.940	8.569
914.50	3.081	3.034	11.603
915.50	6.615	4.848	16.451
916.50	6.688	6.652	23.103
917.50	6.835	6.761	29.864
918.50	6.983	6.909	36.773
919.50	7.132	7.057	43.831

Device	Routing	Invert	Outlet Devices
#1	Primary	914.50'	**24.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 914.50' / 913.50' S= 0.0100 '/' Cc= 0.900 n= 0.012 RCP, Flow Area= 3.14 sf

Primary OutFlow Max=4.09 cfs @ 14.48 hrs HW=915.36' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 4.09 cfs @ 3.16 fps)

Pond 5P: STORMWATER BASIN #5 SOUTHEAST

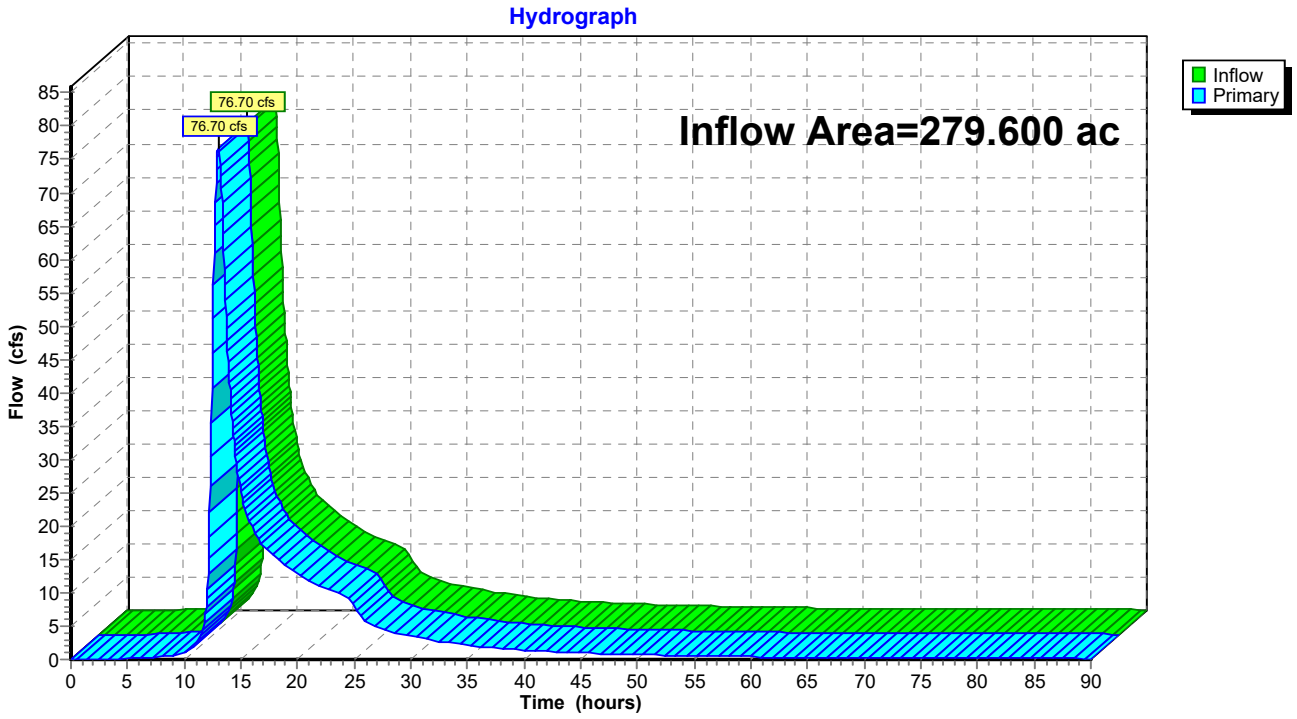


Summary for Link 2L: DISCHARGE POINT 2

Inflow Area = 279.600 ac, 18.99% Impervious, Inflow Depth > 1.25" for 2.5" EVENT event
Inflow = 76.70 cfs @ 13.02 hrs, Volume= 29.214 af
Primary = 76.70 cfs @ 13.02 hrs, Volume= 29.214 af, Atten= 0%, Lag= 0.0 min
Routed to Link 7L : LOWER BRANCH RUSH RIVER

Primary outflow = Inflow, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Link 2L: DISCHARGE POINT 2

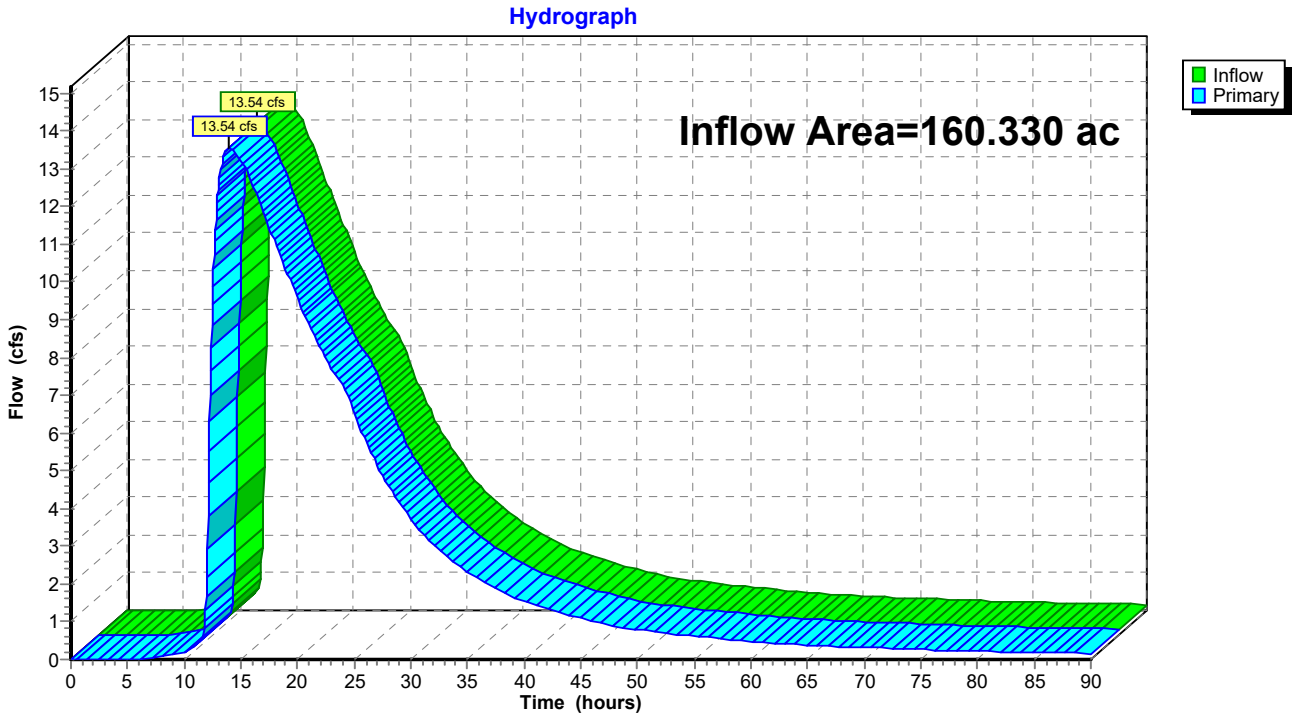


Summary for Link 5L: DISCHARGE POINT 1

Inflow Area = 160.330 ac, 40.53% Impervious, Inflow Depth > 1.29" for 2.5" EVENT event
Inflow = 13.54 cfs @ 14.02 hrs, Volume= 17.257 af
Primary = 13.54 cfs @ 14.02 hrs, Volume= 17.257 af, Atten= 0%, Lag= 0.0 min
Routed to Link 7L : LOWER BRANCH RUSH RIVER

Primary outflow = Inflow, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Link 5L: DISCHARGE POINT 1

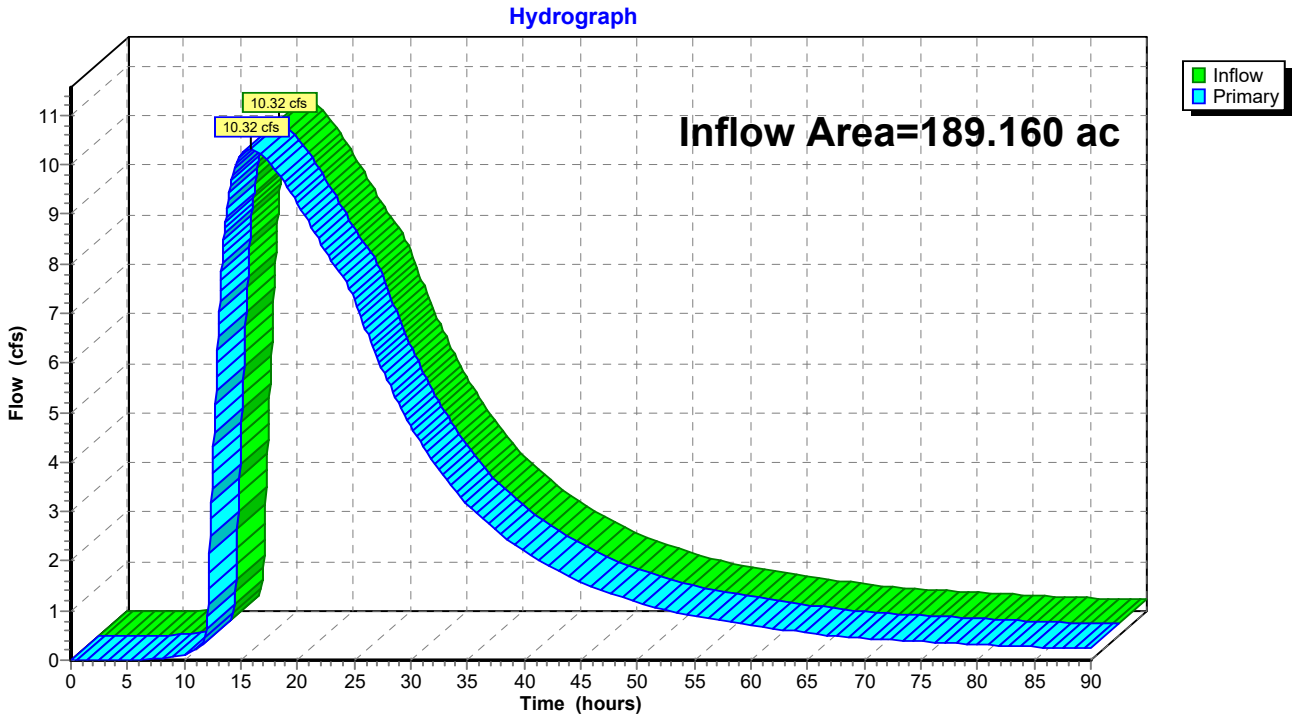


Summary for Link 6L: DISCHARGE POINT 3

Inflow Area = 189.160 ac, 21.52% Impervious, Inflow Depth > 1.12" for 2.5" EVENT event
Inflow = 10.32 cfs @ 15.81 hrs, Volume= 17.591 af
Primary = 10.32 cfs @ 15.81 hrs, Volume= 17.591 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Link 6L: DISCHARGE POINT 3

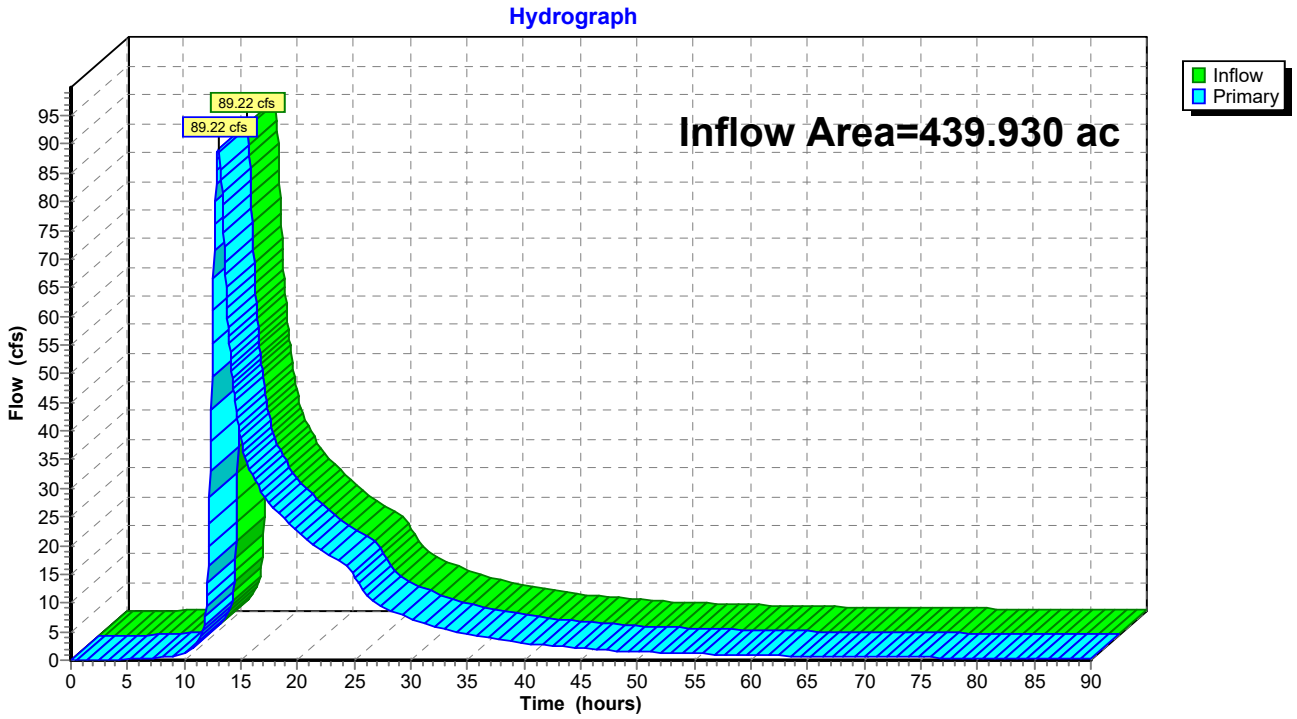


Summary for Link 7L: LOWER BRANCH RUSH RIVER

Inflow Area = 439.930 ac, 26.84% Impervious, Inflow Depth > 1.27" for 2.5" EVENT event
Inflow = 89.22 cfs @ 13.05 hrs, Volume= 46.471 af
Primary = 89.22 cfs @ 13.05 hrs, Volume= 46.471 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Link 7L: LOWER BRANCH RUSH RIVER



Time span=0.00-90.00 hrs, dt=0.05 hrs, 1801 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: C-DA-1 Runoff Area=99.590 ac 45.84% Impervious Runoff Depth=2.02"
Flow Length=700' Tc=38.0 min CN=80/98 Runoff=139.22 cfs 16.724 af

Subcatchment2S: C-DA-2 Runoff Area=60.740 ac 31.82% Impervious Runoff Depth=1.80"
Flow Length=1,330' Tc=15.6 min CN=80/98 Runoff=129.31 cfs 9.109 af

Subcatchment3S: C-DA-3 Runoff Area=143.510 ac 29.34% Impervious Runoff Depth=1.76"
Flow Length=5,230' Tc=42.0 min CN=80/98 Runoff=164.92 cfs 21.065 af

Subcatchment4S: C-DA-4 Runoff Area=127.630 ac 19.43% Impervious Runoff Depth=1.61"
Flow Length=2,150' Tc=72.8 min CN=80/98 Runoff=90.65 cfs 17.114 af

Subcatchment5S: C-DA-5 Runoff Area=61.530 ac 25.84% Impervious Runoff Depth=1.71"
Flow Length=1,780' Tc=24.8 min CN=80/98 Runoff=97.15 cfs 8.756 af

Subcatchment6S: C-DA-6 Runoff Area=136.090 ac 8.08% Impervious Runoff Depth=1.75"
Flow Length=3,600' Tc=87.4 min CN=85/98 Runoff=94.70 cfs 19.870 af

Pond 1P: STORMWATERBASIN #1 Peak Elev=915.93' Storage=27.924 af Inflow=139.22 cfs 16.724 af
48.0" Round Culvert n=0.012 L=100.0' S=0.0100 '/' Outflow=11.41 cfs 14.723 af

Pond 2P: STORMWATERBASIN #2 Peak Elev=915.60' Storage=14.102 af Inflow=129.31 cfs 9.109 af
48.0" Round Culvert n=0.012 L=100.0' S=0.0100 '/' Outflow=10.03 cfs 8.975 af

Pond 3P: STORMWATERBASIN #3 Peak Elev=915.12' Storage=30.775 af Inflow=164.92 cfs 21.065 af
36.0" Round Culvert n=0.012 L=100.0' S=0.0100 '/' Outflow=16.81 cfs 20.408 af

Pond 4P: STORMWATERBASIN #4 Peak Elev=915.92' Storage=28.801 af Inflow=90.65 cfs 17.114 af
24.0" Round Culvert n=0.012 L=100.0' S=0.0100 '/' Outflow=9.69 cfs 16.255 af

Pond 5P: STORMWATERBASIN #5 Peak Elev=915.58' Storage=16.997 af Inflow=97.15 cfs 8.756 af
24.0" Round Culvert n=0.012 L=100.0' S=0.0100 '/' Outflow=6.15 cfs 8.433 af

Link 2L: DISCHARGE POINT 2 Inflow=108.98 cfs 40.277 af
Primary=108.98 cfs 40.277 af

Link 5L: DISCHARGE POINT 1 Inflow=21.06 cfs 23.698 af
Primary=21.06 cfs 23.698 af

Link 6L: DISCHARGE POINT 3 Inflow=15.65 cfs 24.688 af
Primary=15.65 cfs 24.688 af

Link 7L: LOWER BRANCH RUSH RIVER Inflow=128.80 cfs 63.975 af
Primary=128.80 cfs 63.975 af

Total Runoff Area = 629.090 ac Runoff Volume = 92.638 af Average Runoff Depth = 1.77"
74.76% Pervious = 470.310 ac 25.24% Impervious = 158.780 ac

Summary for Subcatchment 1S: C-DA-1

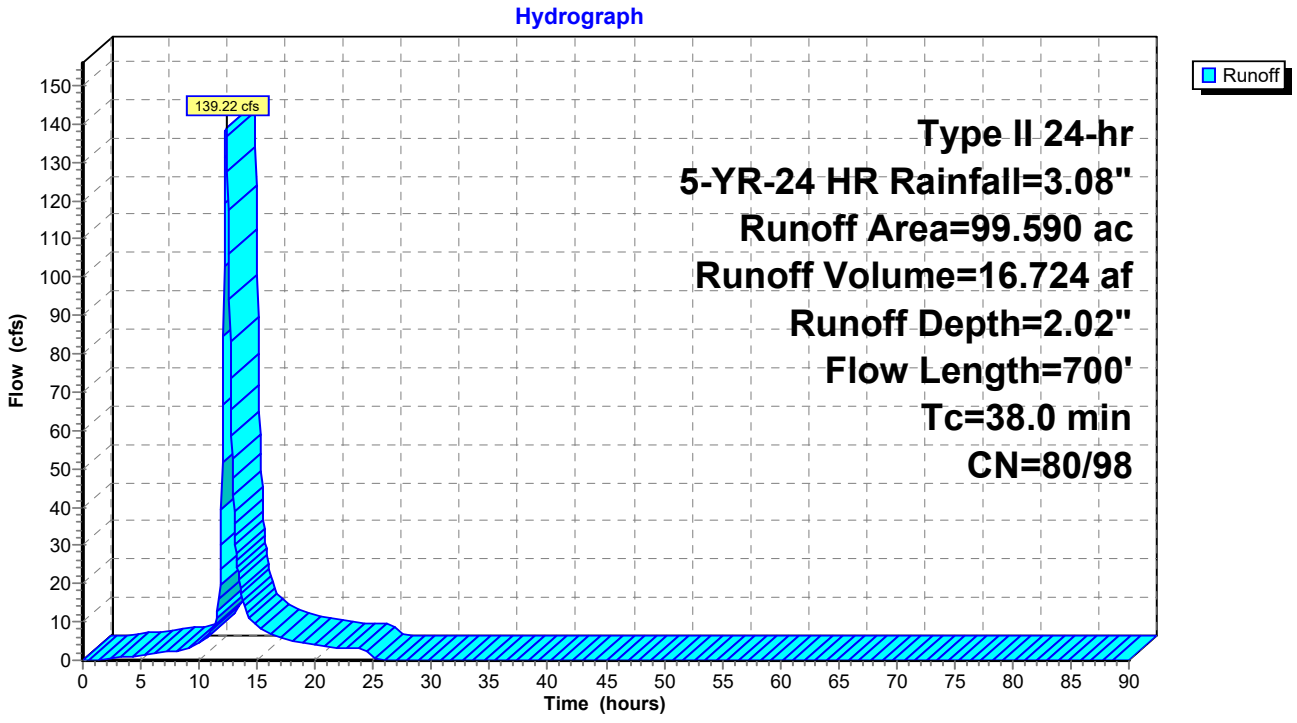
Runoff = 139.22 cfs @ 12.33 hrs, Volume= 16.724 af, Depth= 2.02"
Routed to Pond 1P : STORMWATER BASIN #1 NORTHWEST

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-YR-24 HR Rainfall=3.08"

	Area (ac)	CN	Description
*	45.650	98	On Site Impervious
	53.940	80	>75% Grass cover, Good, HSG D
	99.590	88	Weighted Average
	53.940	80	54.16% Pervious Area
	45.650	98	45.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	100	0.0100	0.18		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 1.40"
28.6	600	0.0025	0.35		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
38.0	700	Total			

Subcatchment 1S: C-DA-1



Summary for Subcatchment 2S: C-DA-2

[47] Hint: Peak is 253% of capacity of segment #3

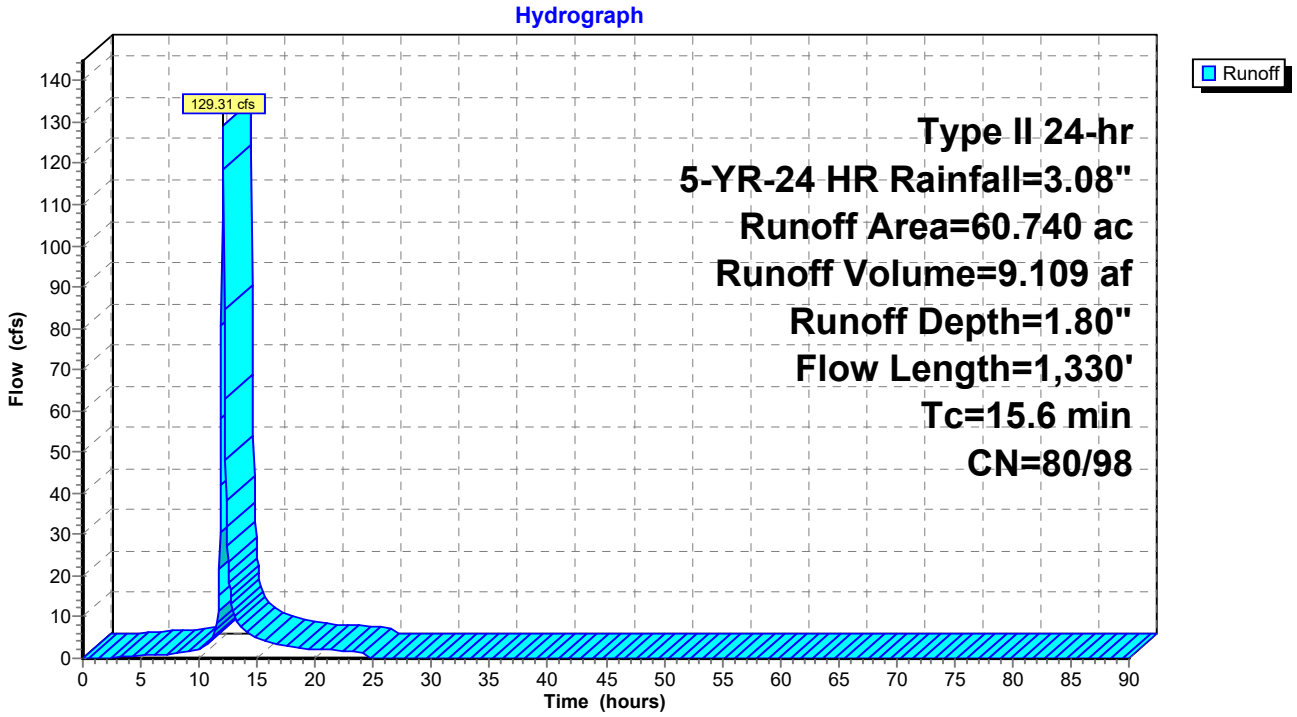
Runoff = 129.31 cfs @ 12.08 hrs, Volume= 9.109 af, Depth= 1.80"
Routed to Pond 2P : STORMWATER BASIN #2 NORTHEAST

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-YR-24 HR Rainfall=3.08"

	Area (ac)	CN	Description
*	19.330	98	On Site Impervious
*	41.410	80	>75% Grass cover, Good, HSG D
	60.740	86	Weighted Average
	41.410	80	68.18% Pervious Area
	19.330	98	31.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	100	0.0130	0.20		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 1.40"
4.8	230	0.0130	0.80		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.3	1,000	0.0050	7.23	51.09	**Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
15.6	1,330	Total			

Subcatchment 2S: C-DA-2



Summary for Subcatchment 3S: C-DA-3

[47] Hint: Peak is 428% of capacity of segment #3
[47] Hint: Peak is 150% of capacity of segment #4

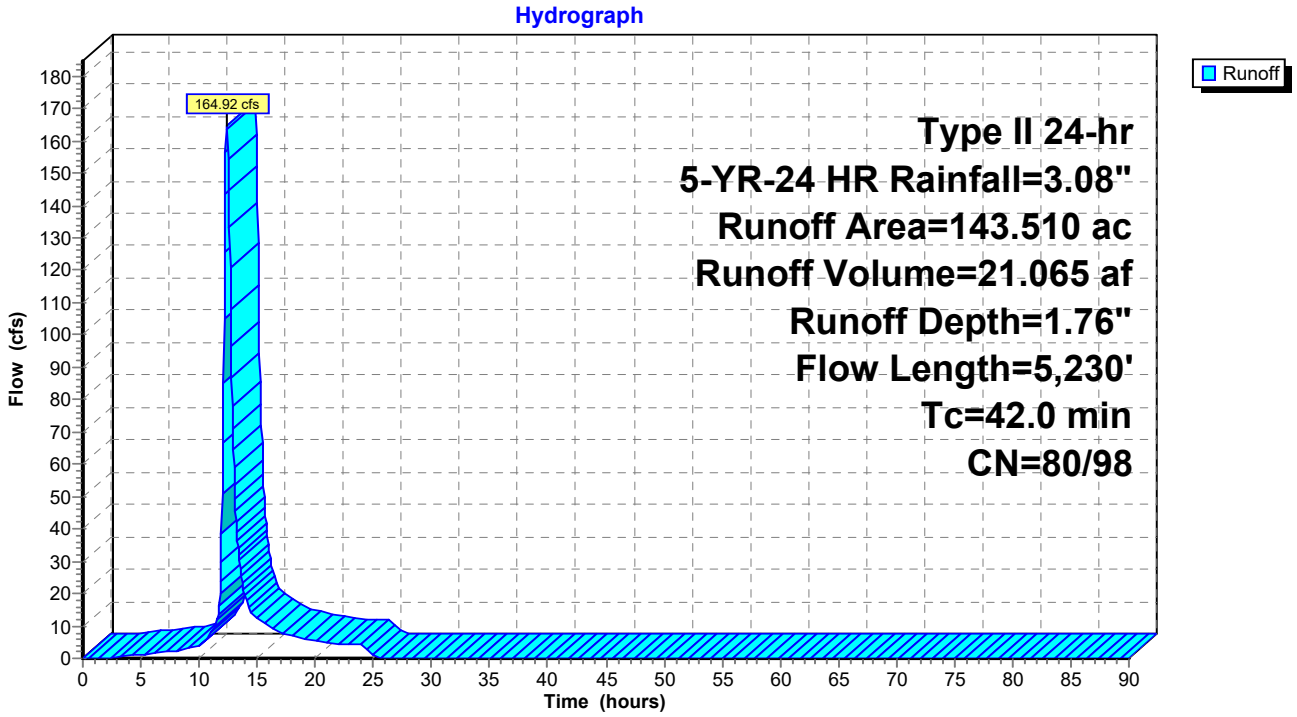
Runoff = 164.92 cfs @ 12.39 hrs, Volume= 21.065 af, Depth= 1.76"
Routed to Pond 3P : STORMWATER BASIN #3 MID-EST

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-YR-24 HR Rainfall=3.08"

	Area (ac)	CN	Description
*	42.100	98	On Site Impervious
	101.410	80	>75% Grass cover, Good, HSG D
	143.510	85	Weighted Average
	101.410	80	70.66% Pervious Area
	42.100	98	29.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	100	0.0050	0.13		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 1.40"
17.8	530	0.0050	0.49		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.9	2,000	0.0010	4.82	38.56	**Channel Flow,** Area= 8.0 sf Perim= 7.7' r= 1.04' n= 0.010
4.9	2,600	0.0050	8.76	110.04	**Pipe Channel,** 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.012 Corrugated PP, smooth interior
42.0	5,230	Total			

Subcatchment 3S: C-DA-3



Summary for Subcatchment 4S: C-DA-4

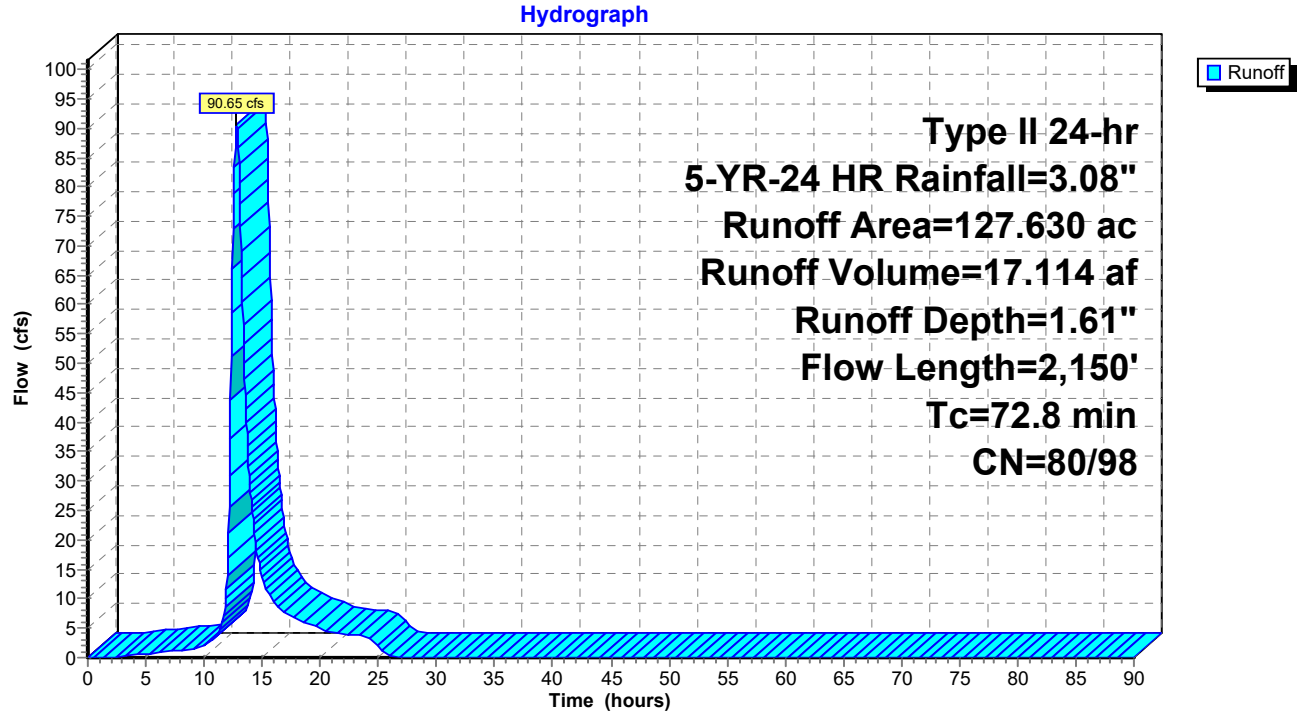
Runoff = 90.65 cfs @ 12.80 hrs, Volume= 17.114 af, Depth= 1.61"
Routed to Pond 4P : STORMWATER BASIN #4 SOUTHWEST

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-YR-24 HR Rainfall=3.08"

	Area (ac)	CN	Description
*	24.800	98	On Site Impervious
	102.830	80	>75% Grass cover, Good, HSG D
	127.630	83	Weighted Average
	102.830	80	80.57% Pervious Area
	24.800	98	19.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.4	100	0.0025	0.10		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 1.40"
55.7	1,700	0.0010	0.51		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.7	350	0.0050	8.76	110.04	**Pipe Channel,** 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.012
72.8	2,150	Total			

Subcatchment 4S: C-DA-4



Summary for Subcatchment 5S: C-DA-5

[47] Hint: Peak is 190% of capacity of segment #3

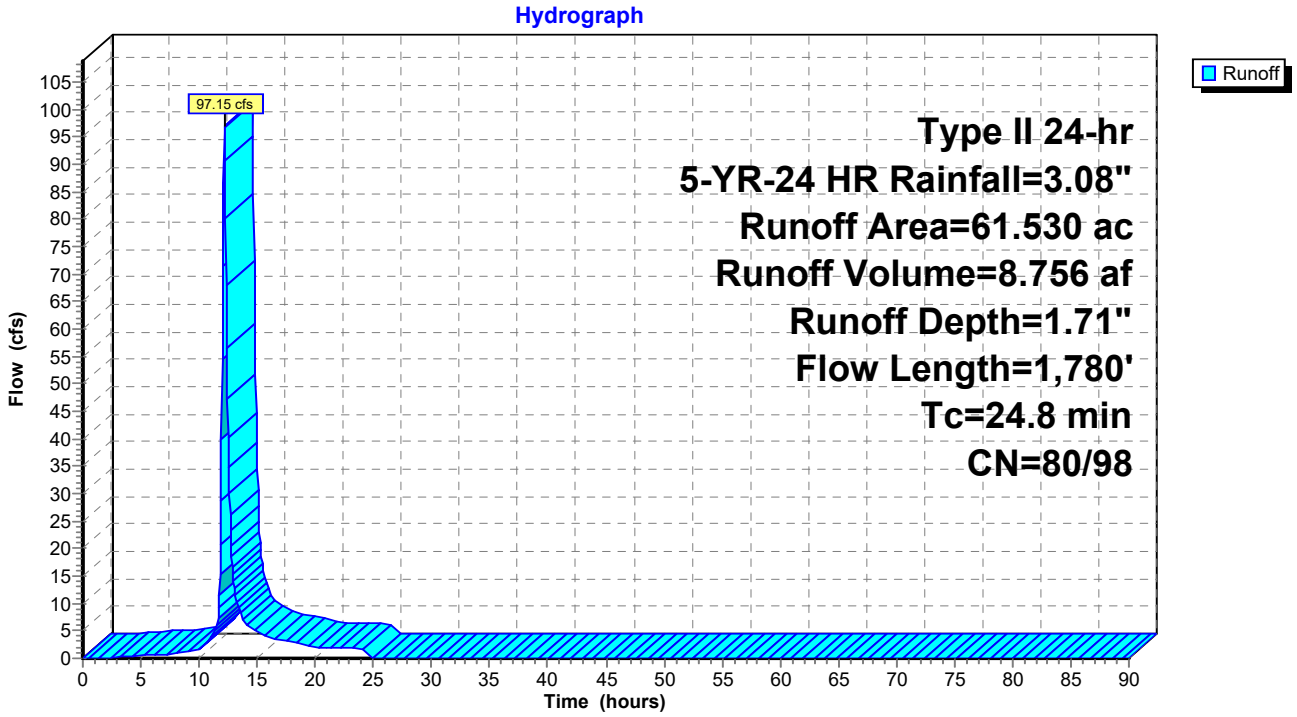
Runoff = 97.15 cfs @ 12.18 hrs, Volume= 8.756 af, Depth= 1.71"
Routed to Pond 5P : STORMWATER BASIN #5 SOUTHEAST

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-YR-24 HR Rainfall=3.08"

	Area (ac)	CN	Description
*	15.900	98	On Site Impervious
	45.630	80	>75% Grass cover, Good, HSG D
	61.530	85	Weighted Average
	45.630	80	74.16% Pervious Area
	15.900	98	25.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	100	0.0050	0.13		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 1.40"
9.2	280	0.0010	0.51		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.2	1,400	0.0050	7.23	51.09	**Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 Corrugated PP, smooth interior
24.8	1,780	Total			

Subcatchment 5S: C-DA-5



Summary for Subcatchment 6S: C-DA-6

[47] Hint: Peak is 168% of capacity of segment #3

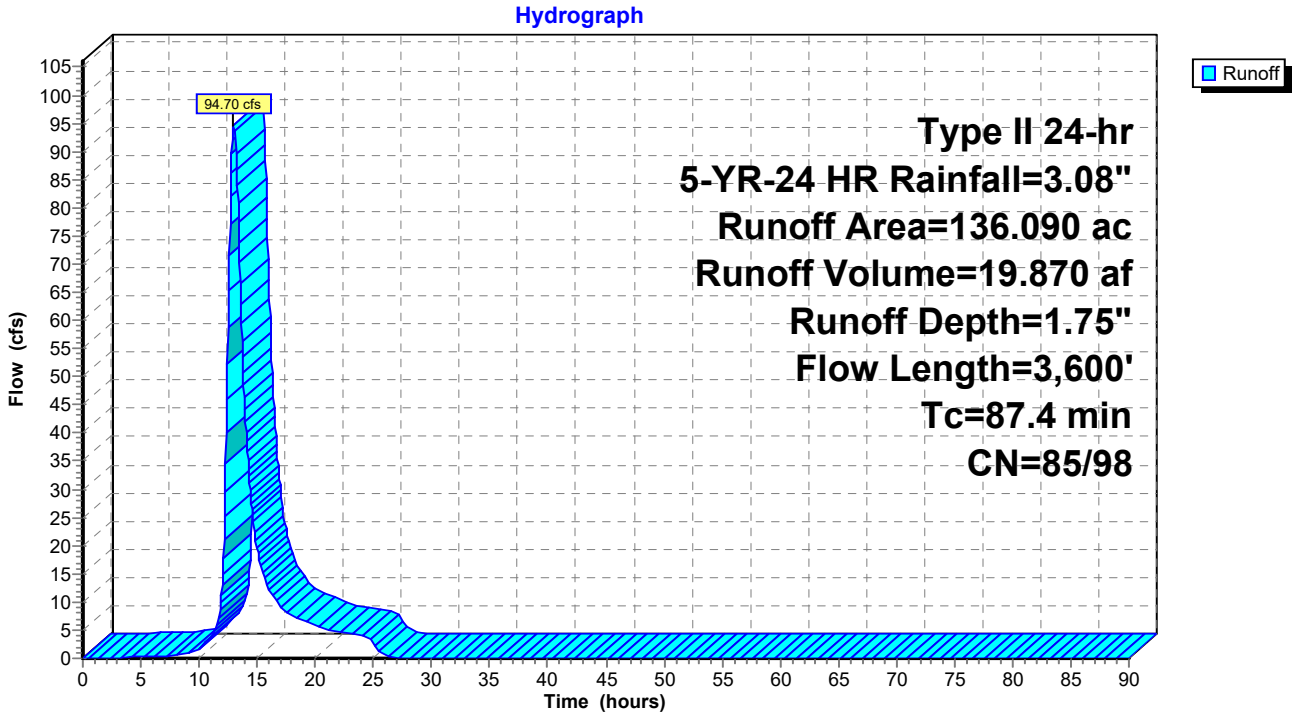
Runoff = 94.70 cfs @ 12.98 hrs, Volume= 19.870 af, Depth= 1.75"
Routed to Link 2L : DISCHARGE POINT 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-YR-24 HR Rainfall=3.08"

	Area (ac)	CN	Description
	125.090	85	Legumes, straight row, Good, HSG D
*	11.000	98	On Site Impervious
	136.090	86	Weighted Average
	125.090	85	91.92% Pervious Area
	11.000	98	8.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	100	0.0100	0.18		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 1.40"
57.9	1,500	0.0023	0.43		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
20.1	2,000	0.0010	1.66	56.28	**Channel Flow,** Area= 34.0 sf Perim= 31.3' r= 1.09' n= 0.030 Earth, grassed & winding
87.4	3,600	Total			

Subcatchment 6S: C-DA-6



Summary for Pond 1P: STORMWATER BASIN #1 NORTHWEST

Inflow Area = 99.590 ac, 45.84% Impervious, Inflow Depth = 2.02" for 5-YR-24 HR event
Inflow = 139.22 cfs @ 12.33 hrs, Volume= 16.724 af
Outflow = 11.41 cfs @ 14.25 hrs, Volume= 14.723 af, Atten= 92%, Lag= 114.9 min
Primary = 11.41 cfs @ 14.25 hrs, Volume= 14.723 af
Routed to Link 5L : DISCHARGE POINT 1

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Starting Elev= 914.50' Surf.Area= 4.482 ac Storage= 17.010 af
Peak Elev= 915.93' @ 14.25 hrs Surf.Area= 9.360 ac Storage= 27.924 af (10.914 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 753.6 min (1,567.7 - 814.0)

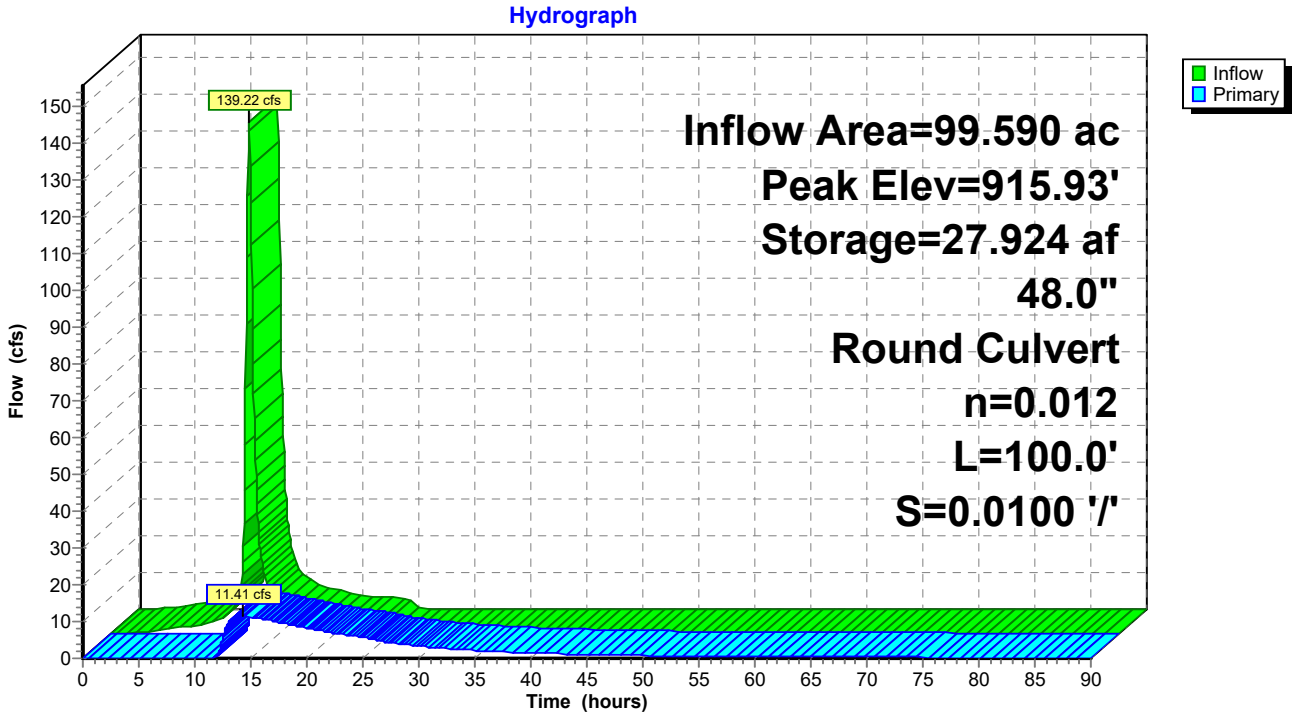
Volume	Invert	Avail.Storage	Storage Description
#1	910.50'	64.598 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
910.50	4.000	0.000	0.000
911.50	4.144	4.072	4.072
912.50	4.255	4.199	8.272
913.50	4.370	4.312	12.584
914.50	4.482	4.426	17.010
915.50	9.360	6.921	23.931
916.50	9.360	9.360	33.291
917.50	9.541	9.451	42.741
918.75	9.724	12.041	54.782
919.75	9.907	9.815	64.598

Device	Routing	Invert	Outlet Devices
#1	Primary	914.75'	**48.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 914.75' / 913.75' S= 0.0100 '/' Cc= 0.900 n= 0.012 RCP, Flow Area= 12.57 sf

Primary OutFlow Max=11.39 cfs @ 14.25 hrs HW=915.93' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 11.39 cfs @ 3.69 fps)

Pond 1P: STORMWATER BASIN #1 NORTHWEST



Summary for Pond 2P: STORMWATER BASIN #2 NORTHEAST

Inflow Area = 60.740 ac, 31.82% Impervious, Inflow Depth = 1.80" for 5-YR-24 HR event
Inflow = 129.31 cfs @ 12.08 hrs, Volume= 9.109 af
Outflow = 10.03 cfs @ 13.10 hrs, Volume= 8.975 af, Atten= 92%, Lag= 61.1 min
Primary = 10.03 cfs @ 13.10 hrs, Volume= 8.975 af
Routed to Link 5L : DISCHARGE POINT 1

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Starting Elev= 914.50' Surf.Area= 2.443 ac Storage= 8.939 af
Peak Elev= 915.60' @ 13.10 hrs Surf.Area= 6.577 ac Storage= 14.102 af (5.163 af above start)

Plug-Flow detention time= 4,799.6 min calculated for 0.036 af (0% of inflow)
Center-of-Mass det. time= 476.1 min (1,282.1 - 806.0)

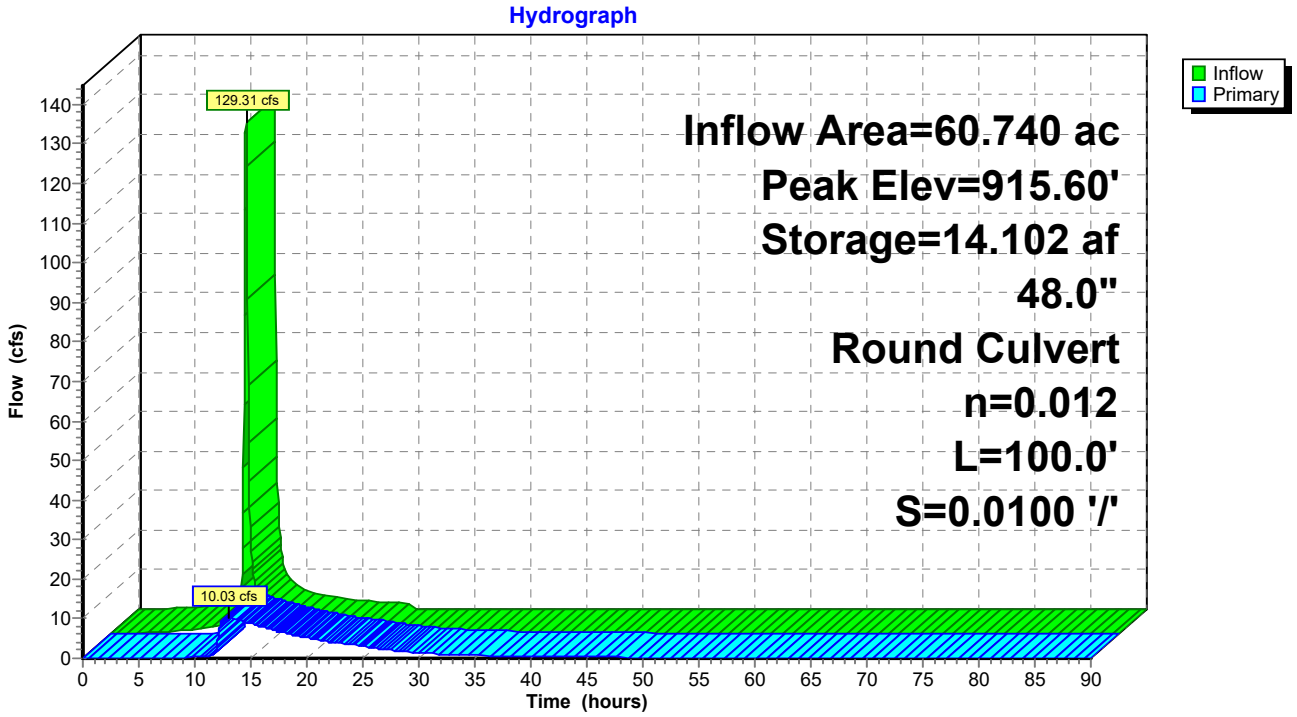
Volume	Invert	Avail.Storage	Storage Description
#1	910.50'	40.535 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
910.50	2.093	0.000	0.000
911.50	2.136	2.114	2.114
912.50	2.223	2.179	4.294
913.50	2.312	2.268	6.562
914.50	2.443	2.377	8.939
915.50	6.577	4.510	13.449
916.50	6.577	6.577	20.026
917.50	6.749	6.663	26.689
918.50	6.923	6.836	33.525
919.50	7.097	7.010	40.535

Device	Routing	Invert	Outlet Devices
#1	Primary	914.50'	**48.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 914.50' / 913.50' S= 0.0100 '/' Cc= 0.900 n= 0.012 RCP, Flow Area= 12.57 sf

Primary OutFlow Max=10.02 cfs @ 13.10 hrs HW=915.60' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 10.02 cfs @ 3.57 fps)

Pond 2P: STORMWATER BASIN #2 NORTHEAST



Summary for Pond 3P: STORMWATER BASIN #3 MID-EST

Inflow Area = 143.510 ac, 29.34% Impervious, Inflow Depth = 1.76" for 5-YR-24 HR event
Inflow = 164.92 cfs @ 12.39 hrs, Volume= 21.065 af
Outflow = 16.81 cfs @ 14.17 hrs, Volume= 20.408 af, Atten= 90%, Lag= 107.1 min
Primary = 16.81 cfs @ 14.17 hrs, Volume= 20.408 af
Routed to Link 2L : DISCHARGE POINT 2

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Starting Elev= 913.50' Surf.Area= 4.739 ac Storage= 18.041 af
Peak Elev= 915.12' @ 14.17 hrs Surf.Area= 9.325 ac Storage= 30.775 af (12.734 af above start)

Plug-Flow detention time= 2,645.3 min calculated for 2.367 af (11% of inflow)
Center-of-Mass det. time= 656.6 min (1,489.6 - 833.0)

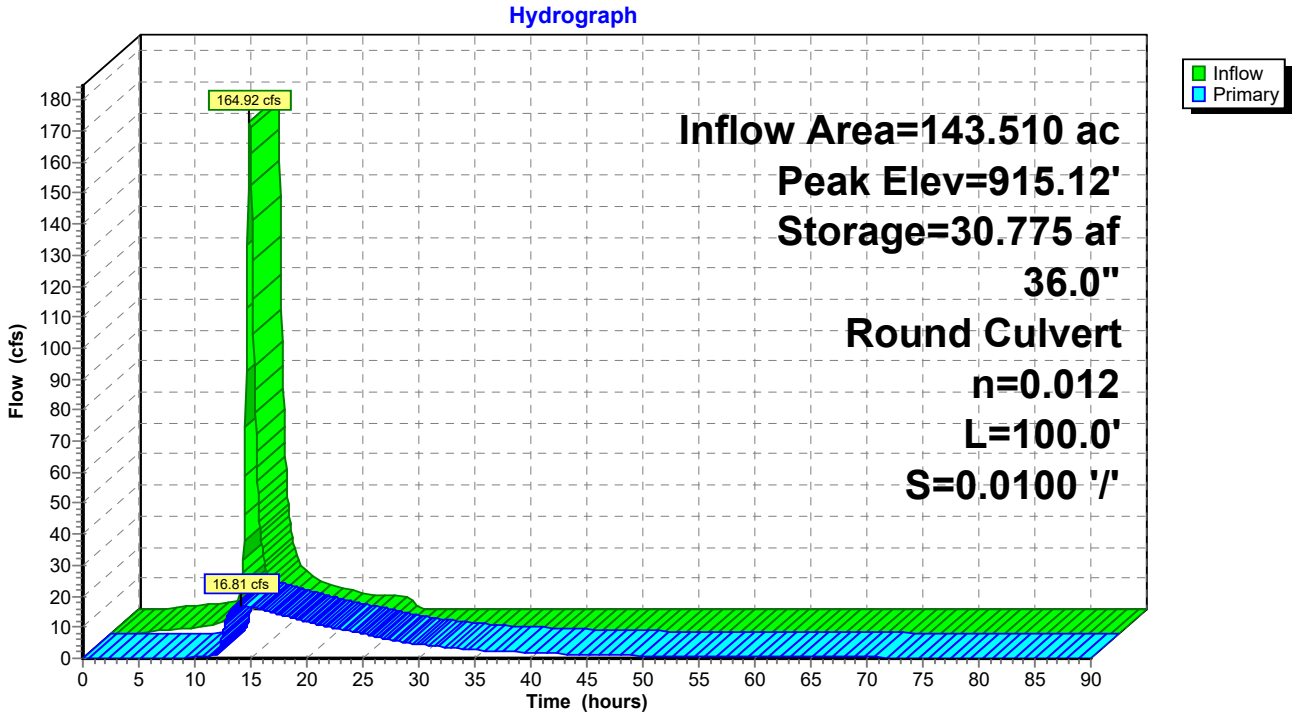
Volume	Invert	Avail.Storage	Storage Description
#1	909.50'	63.259 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
909.50	4.328	0.000	0.000
910.50	4.386	4.357	4.357
911.50	4.502	4.444	8.800
912.50	4.620	4.561	13.361
913.50	4.739	4.679	18.041
914.50	9.270	7.004	25.045
915.50	9.360	9.315	34.360
916.50	9.541	9.451	43.811
917.50	9.724	9.632	53.443
918.50	9.907	9.815	63.259

Device	Routing	Invert	Outlet Devices
#1	Primary	913.50'	**36.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 913.50' / 912.50' S= 0.0100 '/' Cc= 0.900 n= 0.012 RCP, Flow Area= 7.07 sf

Primary OutFlow Max=16.81 cfs @ 14.17 hrs HW=915.12' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 16.81 cfs @ 4.33 fps)

Pond 3P: STORMWATER BASIN #3 MID-EST



Summary for Pond 4P: STORMWATER BASIN #4 SOUTHWEST

Inflow Area = 127.630 ac, 19.43% Impervious, Inflow Depth = 1.61" for 5-YR-24 HR event
Inflow = 90.65 cfs @ 12.80 hrs, Volume= 17.114 af
Outflow = 9.69 cfs @ 15.94 hrs, Volume= 16.255 af, Atten= 89%, Lag= 188.5 min
Primary = 9.69 cfs @ 15.94 hrs, Volume= 16.255 af
Routed to Link 6L : DISCHARGE POINT 3

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Starting Elev= 914.50' Surf.Area= 4.702 ac Storage= 17.902 af
Peak Elev= 915.92' @ 15.94 hrs Surf.Area= 9.308 ac Storage= 28.801 af (10.898 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 843.0 min (1,716.1 - 873.0)

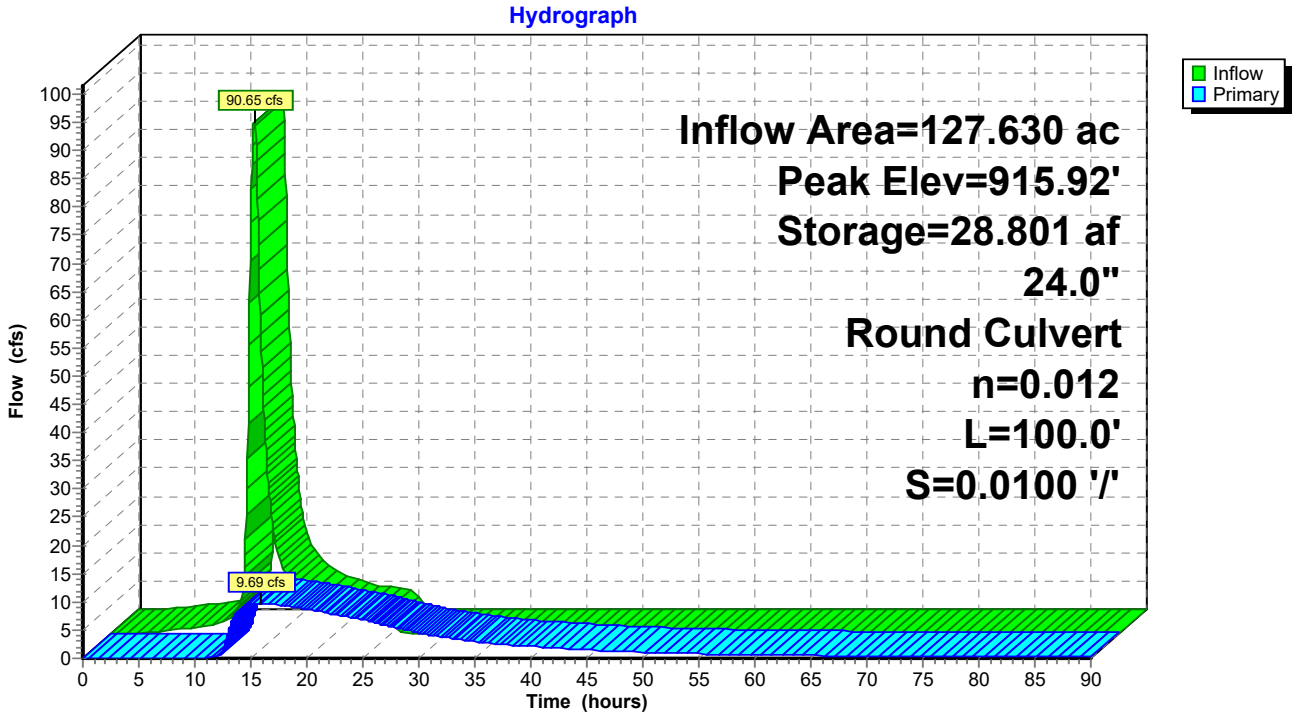
Volume	Invert	Avail.Storage	Storage Description
#1	910.50'	63.101 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
910.50	4.295	0.000	0.000
911.50	4.352	4.324	4.324
912.50	4.467	4.410	8.733
913.50	4.584	4.526	13.259
914.50	4.702	4.643	17.902
915.50	9.270	6.986	24.888
916.50	9.360	9.315	34.203
917.50	9.541	9.451	43.654
918.50	9.724	9.632	53.286
919.50	9.907	9.815	63.101

Device	Routing	Invert	Outlet Devices
#1	Primary	914.50'	**24.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 914.50' / 913.50' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=9.69 cfs @ 15.94 hrs HW=915.92' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 9.69 cfs @ 4.06 fps)

Pond 4P: STORMWATER BASIN #4 SOUTHWEST



Summary for Pond 5P: STORMWATER BASIN #5 SOUTHEAST

Inflow Area = 61.530 ac, 25.84% Impervious, Inflow Depth = 1.71" for 5-YR-24 HR event
Inflow = 97.15 cfs @ 12.18 hrs, Volume= 8.756 af
Outflow = 6.15 cfs @ 14.15 hrs, Volume= 8.433 af, Atten= 94%, Lag= 117.9 min
Primary = 6.15 cfs @ 14.15 hrs, Volume= 8.433 af
Routed to Link 6L : DISCHARGE POINT 3

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Starting Elev= 914.50' Surf.Area= 3.081 ac Storage= 11.603 af
Peak Elev= 915.58' @ 14.15 hrs Surf.Area= 6.621 ac Storage= 16.997 af (5.393 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 713.7 min (1,534.6 - 820.9)

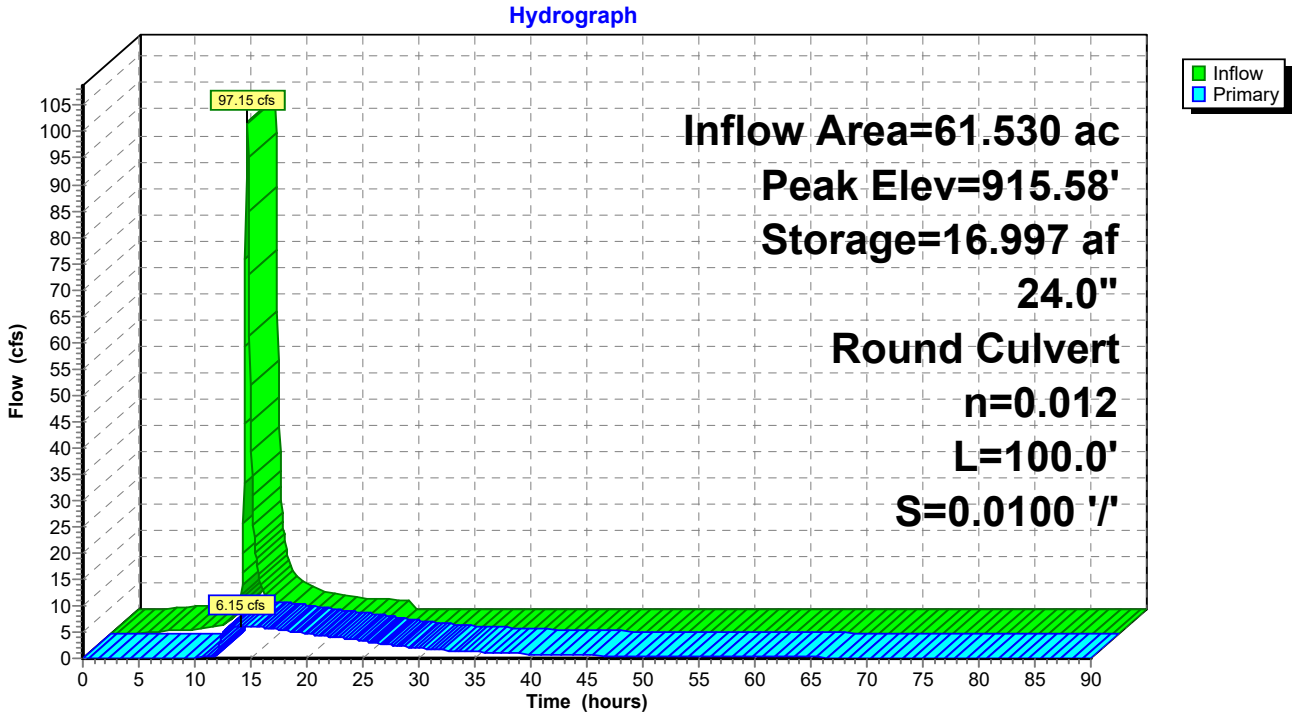
Volume	Invert	Avail.Storage	Storage Description
#1	910.50'	43.831 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
910.50	2.758	0.000	0.000
911.50	2.803	2.780	2.780
912.50	2.894	2.848	5.629
913.50	2.987	2.940	8.569
914.50	3.081	3.034	11.603
915.50	6.615	4.848	16.451
916.50	6.688	6.652	23.103
917.50	6.835	6.761	29.864
918.50	6.983	6.909	36.773
919.50	7.132	7.057	43.831

Device	Routing	Invert	Outlet Devices
#1	Primary	914.50'	**24.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 914.50' / 913.50' S= 0.0100 '/' Cc= 0.900 n= 0.012 RCP, Flow Area= 3.14 sf

Primary OutFlow Max=6.15 cfs @ 14.15 hrs HW=915.58' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 6.15 cfs @ 3.54 fps)

Pond 5P: STORMWATER BASIN #5 SOUTHEAST

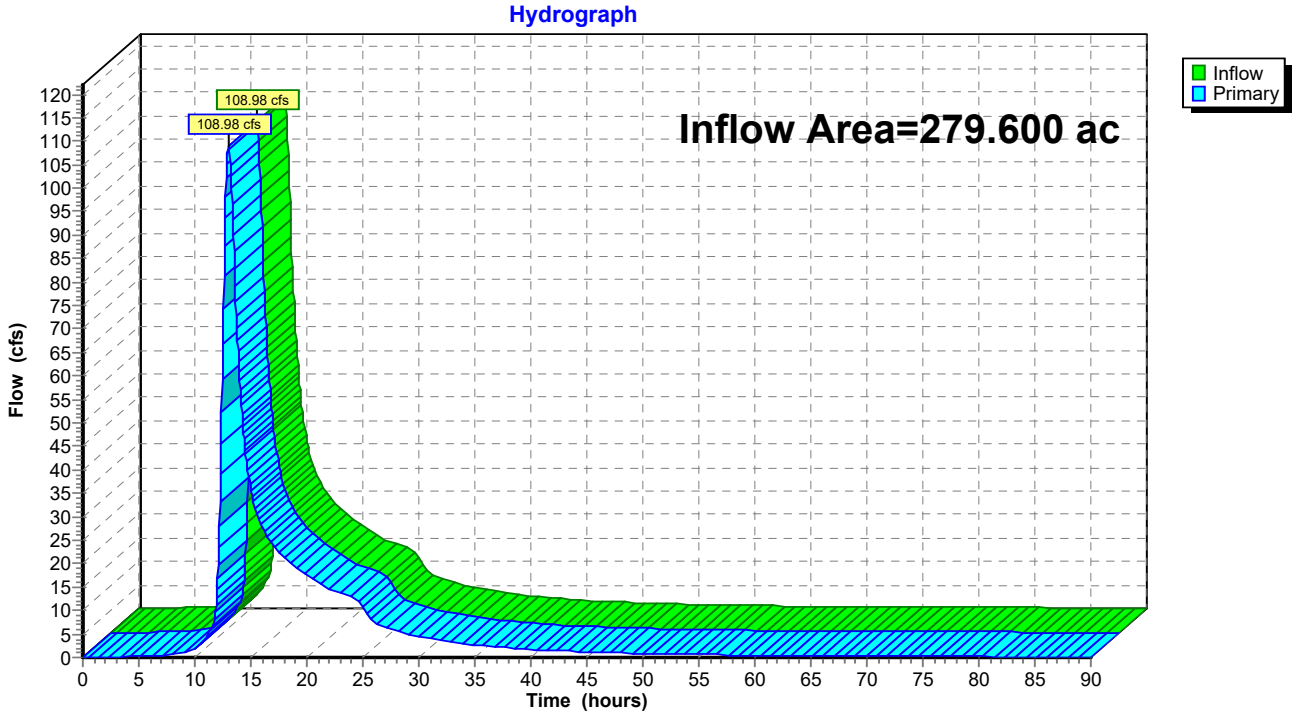


Summary for Link 2L: DISCHARGE POINT 2

Inflow Area = 279.600 ac, 18.99% Impervious, Inflow Depth > 1.73" for 5-YR-24 HR event
Inflow = 108.98 cfs @ 13.01 hrs, Volume= 40.277 af
Primary = 108.98 cfs @ 13.01 hrs, Volume= 40.277 af, Atten= 0%, Lag= 0.0 min
Routed to Link 7L : LOWER BRANCH RUSH RIVER

Primary outflow = Inflow, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Link 2L: DISCHARGE POINT 2

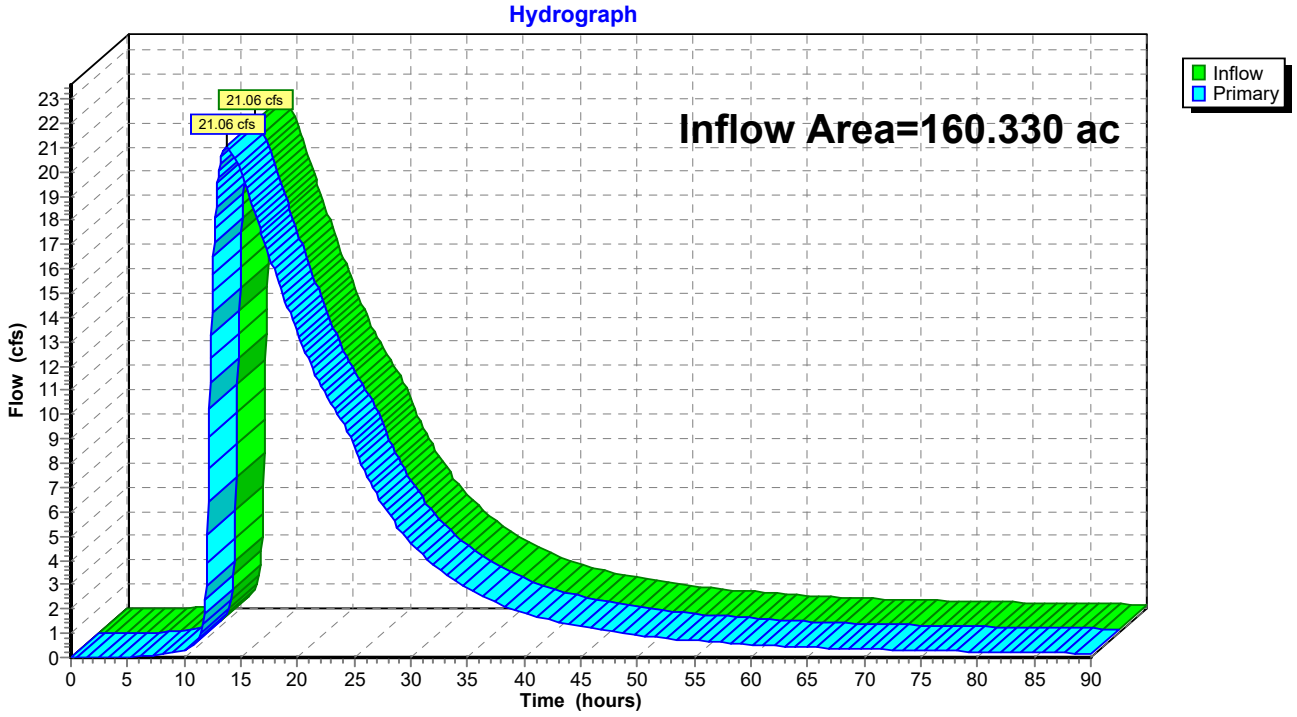


Summary for Link 5L: DISCHARGE POINT 1

Inflow Area = 160.330 ac, 40.53% Impervious, Inflow Depth > 1.77" for 5-YR-24 HR event
Inflow = 21.06 cfs @ 13.78 hrs, Volume= 23.698 af
Primary = 21.06 cfs @ 13.78 hrs, Volume= 23.698 af, Atten= 0%, Lag= 0.0 min
Routed to Link 7L : LOWER BRANCH RUSH RIVER

Primary outflow = Inflow, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Link 5L: DISCHARGE POINT 1

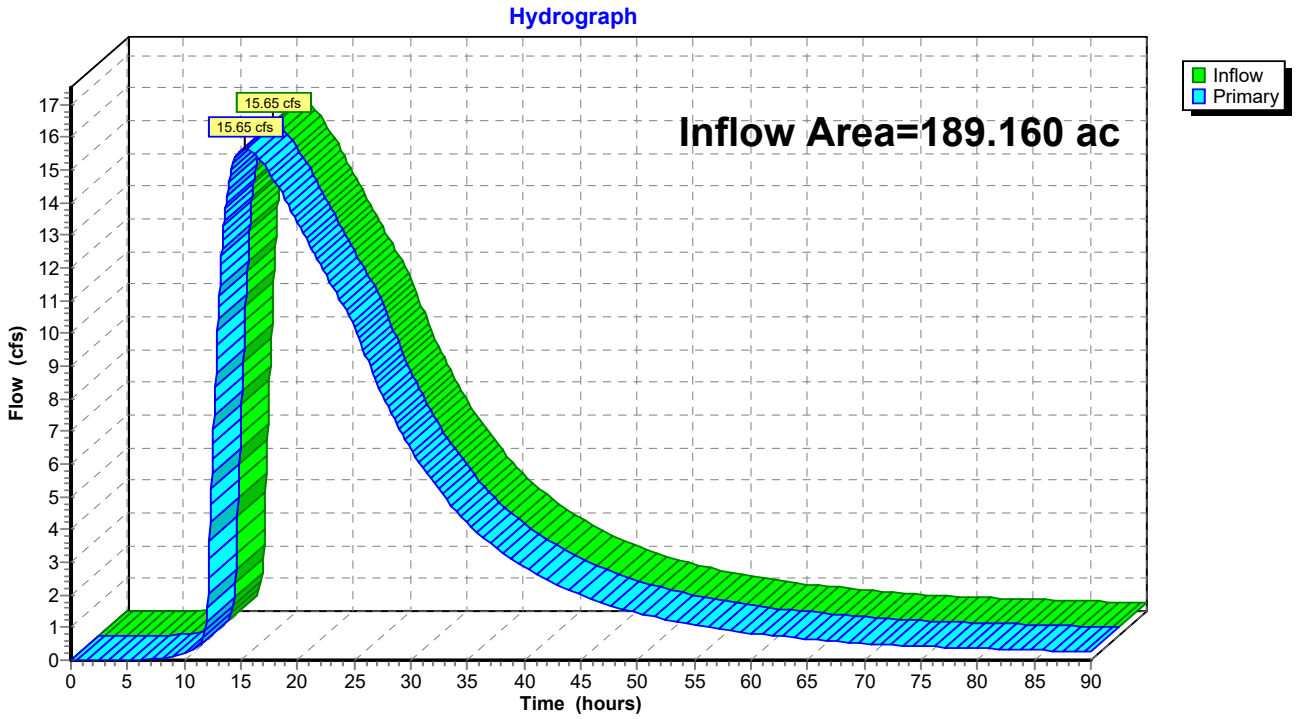


Summary for Link 6L: DISCHARGE POINT 3

Inflow Area = 189.160 ac, 21.52% Impervious, Inflow Depth > 1.57" for 5-YR-24 HR event
Inflow = 15.65 cfs @ 15.40 hrs, Volume= 24.688 af
Primary = 15.65 cfs @ 15.40 hrs, Volume= 24.688 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Link 6L: DISCHARGE POINT 3

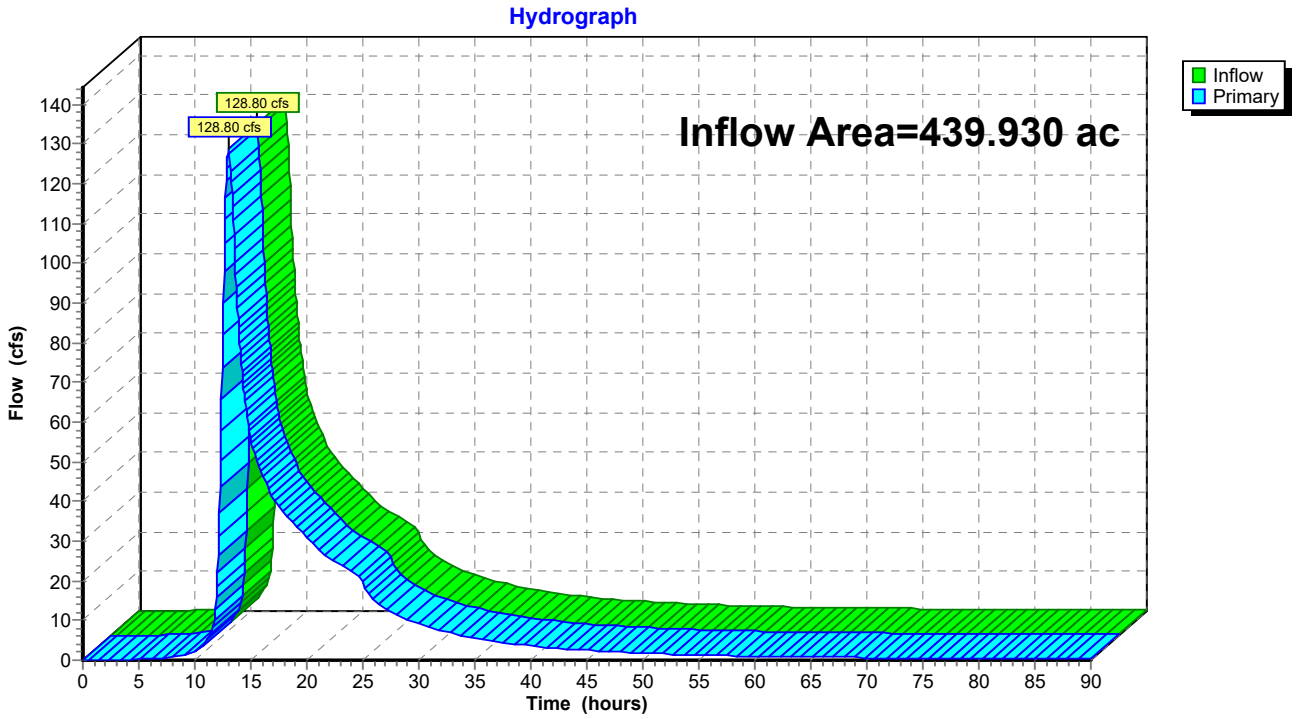


Summary for Link 7L: LOWER BRANCH RUSH RIVER

Inflow Area = 439.930 ac, 26.84% Impervious, Inflow Depth > 1.75" for 5-YR-24 HR event
Inflow = 128.80 cfs @ 13.03 hrs, Volume= 63.975 af
Primary = 128.80 cfs @ 13.03 hrs, Volume= 63.975 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Link 7L: LOWER BRANCH RUSH RIVER



Time span=0.00-90.00 hrs, dt=0.05 hrs, 1801 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: C-DA-1 Runoff Area=99.590 ac 45.84% Impervious Runoff Depth=2.56"
Flow Length=700' Tc=38.0 min CN=80/98 Runoff=177.61 cfs 21.260 af

Subcatchment2S: C-DA-2 Runoff Area=60.740 ac 31.82% Impervious Runoff Depth=2.33"
Flow Length=1,330' Tc=15.6 min CN=80/98 Runoff=167.89 cfs 11.782 af

Subcatchment3S: C-DA-3 Runoff Area=143.510 ac 29.34% Impervious Runoff Depth=2.29"
Flow Length=5,230' Tc=42.0 min CN=80/98 Runoff=215.82 cfs 27.341 af

Subcatchment4S: C-DA-4 Runoff Area=127.630 ac 19.43% Impervious Runoff Depth=2.12"
Flow Length=2,150' Tc=72.8 min CN=80/98 Runoff=120.89 cfs 22.557 af

Subcatchment5S: C-DA-5 Runoff Area=61.530 ac 25.84% Impervious Runoff Depth=2.23"
Flow Length=1,780' Tc=24.8 min CN=80/98 Runoff=127.67 cfs 11.423 af

Subcatchment6S: C-DA-6 Runoff Area=136.090 ac 8.08% Impervious Runoff Depth=2.29"
Flow Length=3,600' Tc=87.4 min CN=85/98 Runoff=124.71 cfs 26.022 af

Pond 1P: STORMWATERBASIN #1 Peak Elev=916.21' Storage=30.580 af Inflow=177.61 cfs 21.260 af
48.0" Round Culvert n=0.012 L=100.0' S=0.0100 '/' Outflow=17.09 cfs 19.236 af

Pond 2P: STORMWATERBASIN #2 Peak Elev=915.82' Storage=15.575 af Inflow=167.89 cfs 11.782 af
48.0" Round Culvert n=0.012 L=100.0' S=0.0100 '/' Outflow=14.22 cfs 11.646 af

Pond 3P: STORMWATERBASIN #3 Peak Elev=915.50' Storage=34.404 af Inflow=215.82 cfs 27.341 af
36.0" Round Culvert n=0.012 L=100.0' S=0.0100 '/' Outflow=23.95 cfs 26.663 af

Pond 4P: STORMWATERBASIN #4 Peak Elev=916.29' Storage=32.201 af Inflow=120.89 cfs 22.557 af
24.0" Round Culvert n=0.012 L=100.0' S=0.0100 '/' Outflow=13.46 cfs 21.646 af

Pond 5P: STORMWATERBASIN #5 Peak Elev=915.83' Storage=18.608 af Inflow=127.67 cfs 11.423 af
24.0" Round Culvert n=0.012 L=100.0' S=0.0100 '/' Outflow=8.66 cfs 11.087 af

Link 2L: DISCHARGE POINT 2 Inflow=145.65 cfs 52.686 af
Primary=145.65 cfs 52.686 af

Link 5L: DISCHARGE POINT 1 Inflow=30.74 cfs 30.882 af
Primary=30.74 cfs 30.882 af

Link 6L: DISCHARGE POINT 3 Inflow=21.81 cfs 32.733 af
Primary=21.81 cfs 32.733 af

Link 7L: LOWER BRANCH RUSH RIVER Inflow=175.10 cfs 83.568 af
Primary=175.10 cfs 83.568 af

Total Runoff Area = 629.090 ac Runoff Volume = 120.387 af Average Runoff Depth = 2.30"
74.76% Pervious = 470.310 ac 25.24% Impervious = 158.780 ac

Summary for Subcatchment 1S: C-DA-1

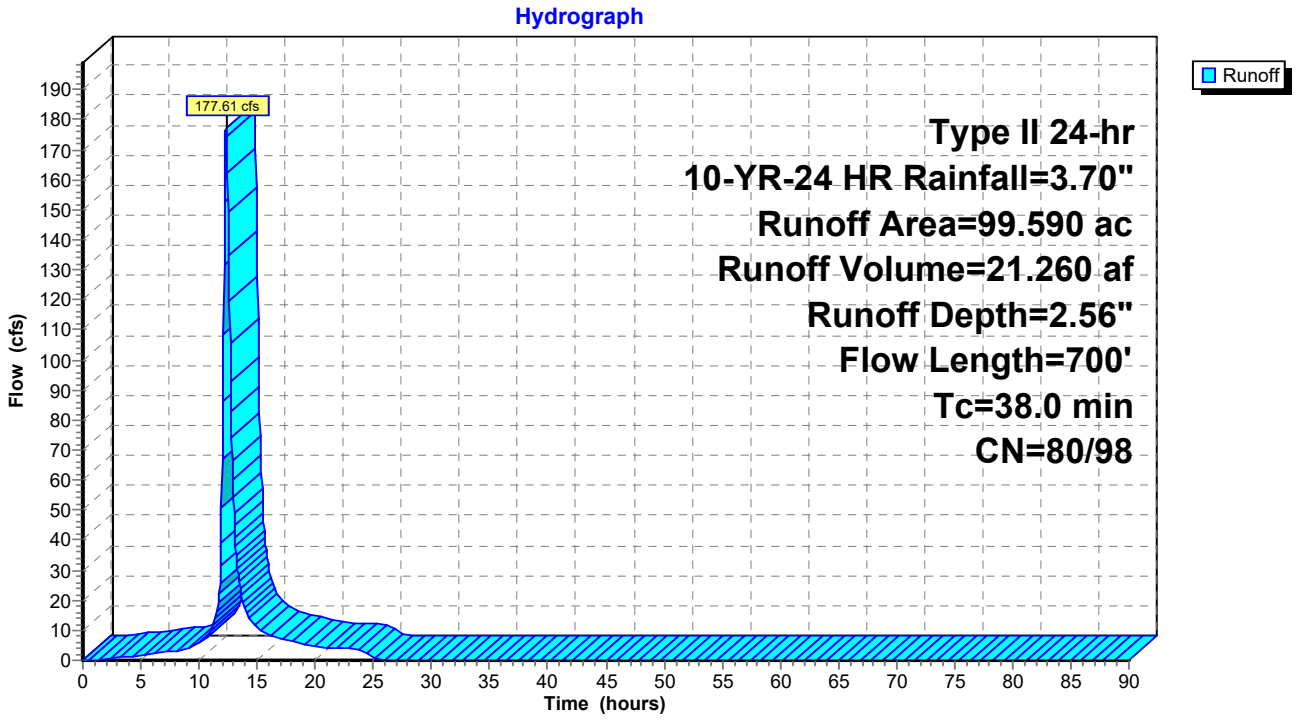
Runoff = 177.61 cfs @ 12.33 hrs, Volume= 21.260 af, Depth= 2.56"
Routed to Pond 1P : STORMWATER BASIN #1 NORTHWEST

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR-24 HR Rainfall=3.70"

	Area (ac)	CN	Description
*	45.650	98	On Site Impervious
	53.940	80	>75% Grass cover, Good, HSG D
	99.590	88	Weighted Average
	53.940	80	54.16% Pervious Area
	45.650	98	45.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	100	0.0100	0.18		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 1.40"
28.6	600	0.0025	0.35		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
38.0	700	Total			

Subcatchment 1S: C-DA-1



Summary for Subcatchment 2S: C-DA-2

[47] Hint: Peak is 329% of capacity of segment #3

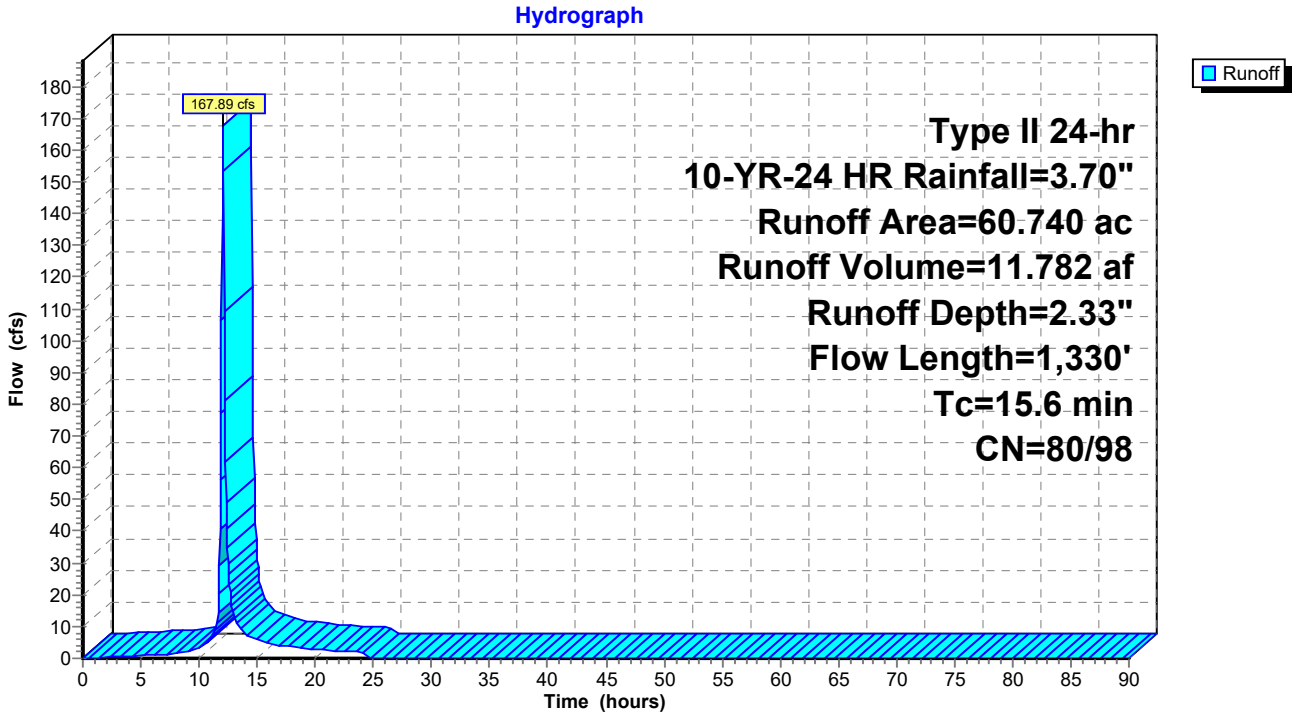
Runoff = 167.89 cfs @ 12.08 hrs, Volume= 11.782 af, Depth= 2.33"
Routed to Pond 2P : STORMWATER BASIN #2 NORTHEAST

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR-24 HR Rainfall=3.70"

	Area (ac)	CN	Description
*	19.330	98	On Site Impervious
*	41.410	80	>75% Grass cover, Good, HSG D
	60.740	86	Weighted Average
	41.410	80	68.18% Pervious Area
	19.330	98	31.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	100	0.0130	0.20		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 1.40"
4.8	230	0.0130	0.80		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.3	1,000	0.0050	7.23	51.09	**Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
15.6	1,330	Total			

Subcatchment 2S: C-DA-2



Summary for Subcatchment 3S: C-DA-3

[47] Hint: Peak is 560% of capacity of segment #3
[47] Hint: Peak is 196% of capacity of segment #4

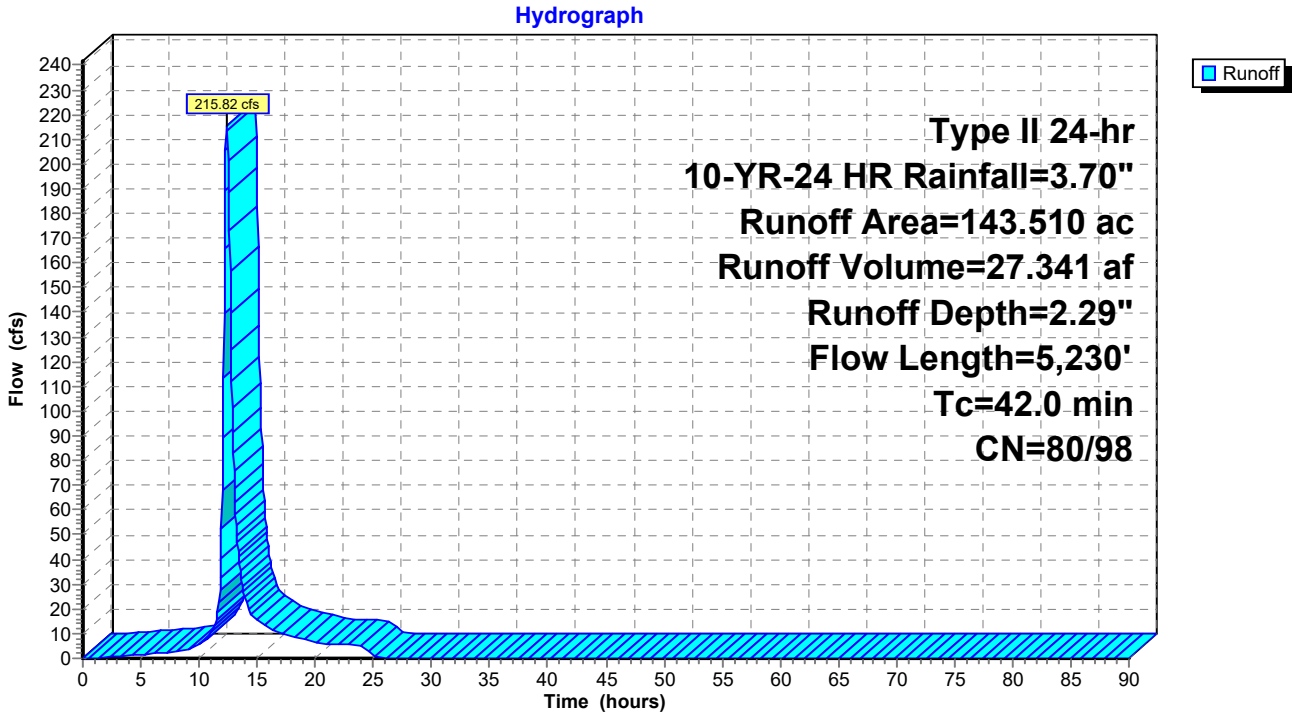
Runoff = 215.82 cfs @ 12.39 hrs, Volume= 27.341 af, Depth= 2.29"
Routed to Pond 3P : STORMWATER BASIN #3 MID-EST

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR-24 HR Rainfall=3.70"

	Area (ac)	CN	Description
*	42.100	98	On Site Impervious
	101.410	80	>75% Grass cover, Good, HSG D
	143.510	85	Weighted Average
	101.410	80	70.66% Pervious Area
	42.100	98	29.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	100	0.0050	0.13		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 1.40"
17.8	530	0.0050	0.49		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.9	2,000	0.0010	4.82	38.56	**Channel Flow,** Area= 8.0 sf Perim= 7.7' r= 1.04' n= 0.010
4.9	2,600	0.0050	8.76	110.04	**Pipe Channel,** 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.012 Corrugated PP, smooth interior
42.0	5,230	Total			

Subcatchment 3S: C-DA-3



Summary for Subcatchment 4S: C-DA-4

[47] Hint: Peak is 110% of capacity of segment #3

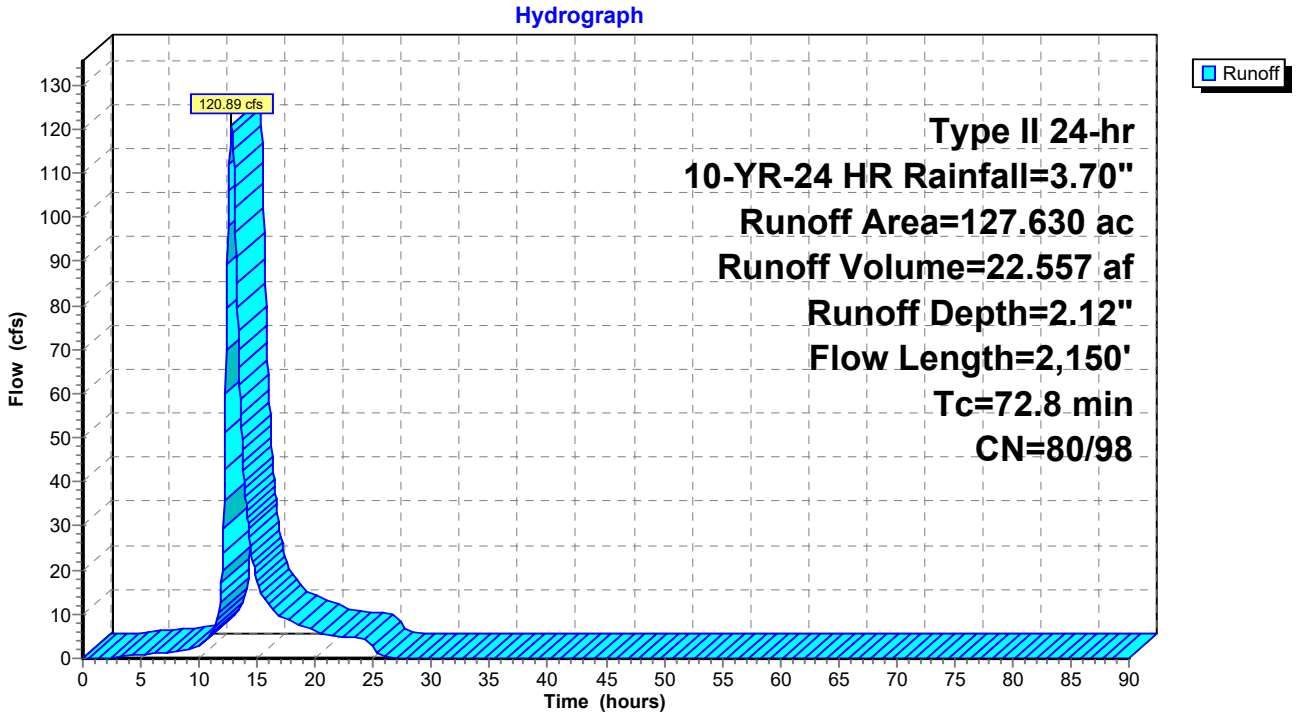
Runoff = 120.89 cfs @ 12.79 hrs, Volume= 22.557 af, Depth= 2.12"
Routed to Pond 4P : STORMWATER BASIN #4 SOUTHWEST

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR-24 HR Rainfall=3.70"

	Area (ac)	CN	Description
*	24.800	98	On Site Impervious
	102.830	80	>75% Grass cover, Good, HSG D
	127.630	83	Weighted Average
	102.830	80	80.57% Pervious Area
	24.800	98	19.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.4	100	0.0025	0.10		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 1.40"
55.7	1,700	0.0010	0.51		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.7	350	0.0050	8.76	110.04	**Pipe Channel,** 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.012
72.8	2,150	Total			

Subcatchment 4S: C-DA-4



Summary for Subcatchment 5S: C-DA-5

[47] Hint: Peak is 250% of capacity of segment #3

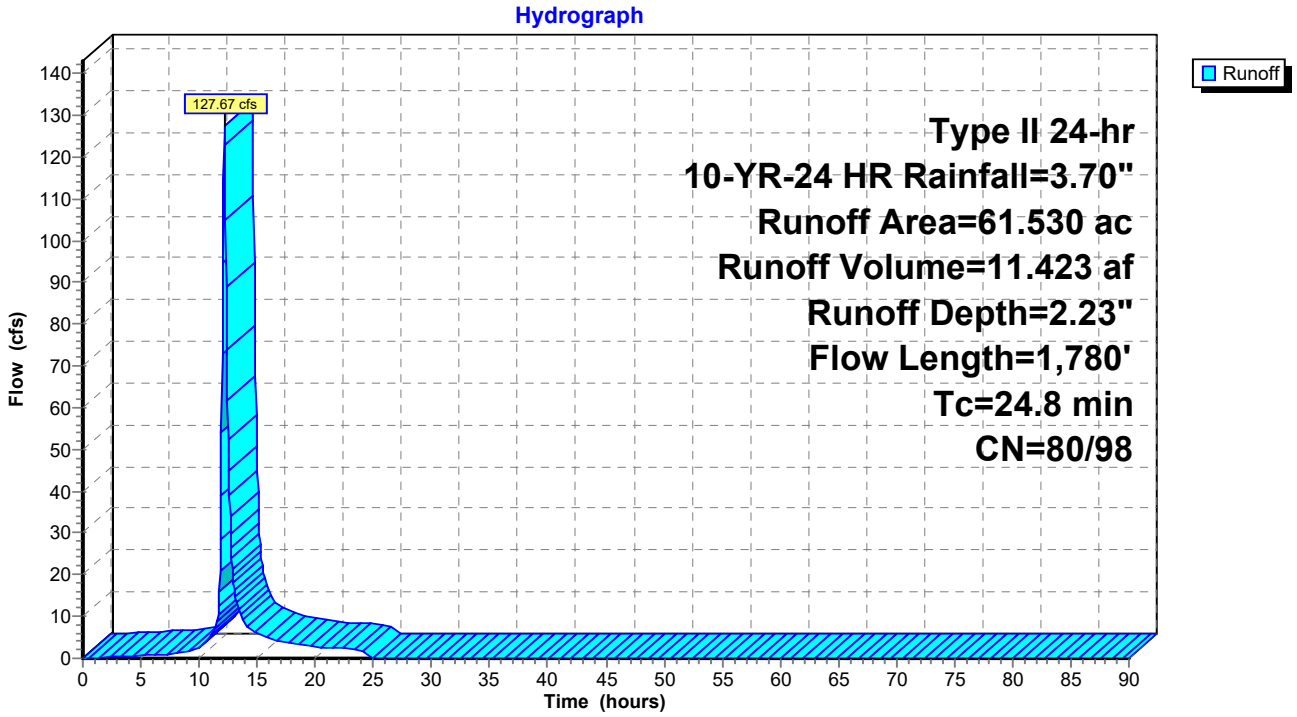
Runoff = 127.67 cfs @ 12.18 hrs, Volume= 11.423 af, Depth= 2.23"
Routed to Pond 5P : STORMWATER BASIN #5 SOUTHEAST

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR-24 HR Rainfall=3.70"

	Area (ac)	CN	Description
*	15.900	98	On Site Impervious
	45.630	80	>75% Grass cover, Good, HSG D
	61.530	85	Weighted Average
	45.630	80	74.16% Pervious Area
	15.900	98	25.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	100	0.0050	0.13		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 1.40"
9.2	280	0.0010	0.51		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.2	1,400	0.0050	7.23	51.09	**Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 Corrugated PP, smooth interior
24.8	1,780	Total			

Subcatchment 5S: C-DA-5



Summary for Subcatchment 6S: C-DA-6

[47] Hint: Peak is 222% of capacity of segment #3

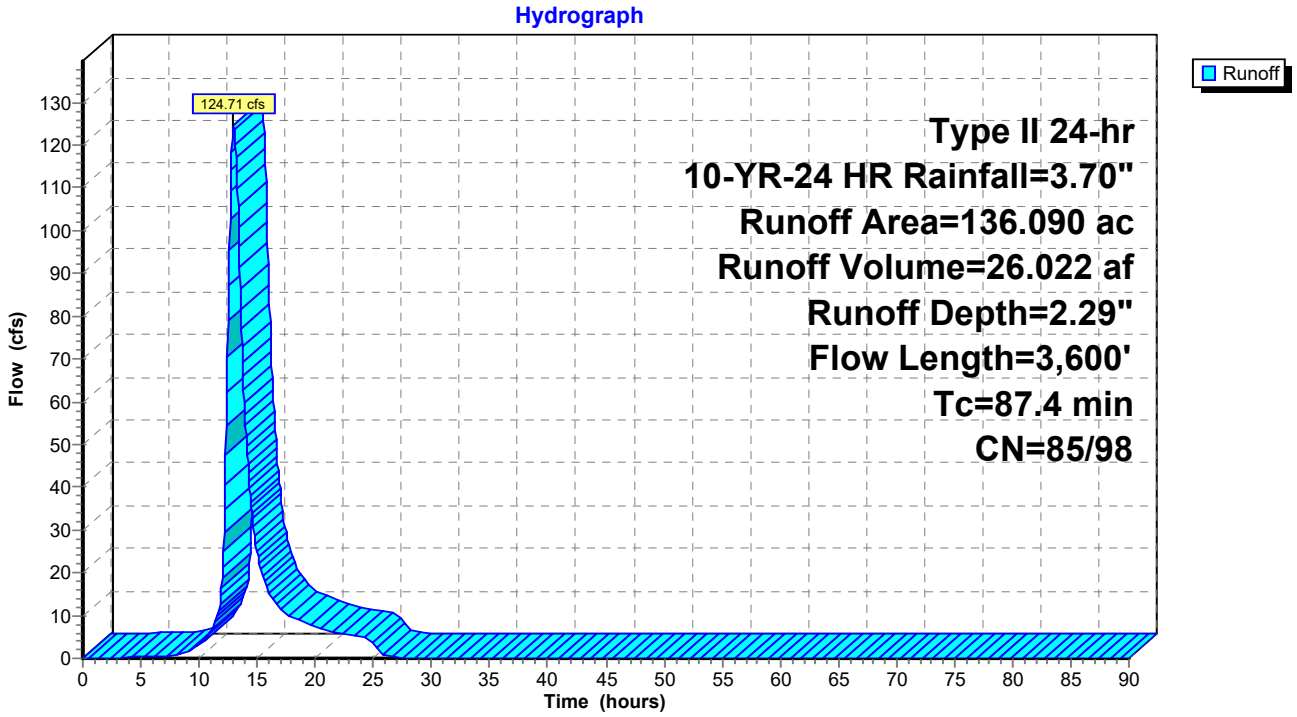
Runoff = 124.71 cfs @ 12.97 hrs, Volume= 26.022 af, Depth= 2.29"
Routed to Link 2L : DISCHARGE POINT 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR-24 HR Rainfall=3.70"

	Area (ac)	CN	Description
	125.090	85	Legumes, straight row, Good, HSG D
*	11.000	98	On Site Impervious
	136.090	86	Weighted Average
	125.090	85	91.92% Pervious Area
	11.000	98	8.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	100	0.0100	0.18		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 1.40"
57.9	1,500	0.0023	0.43		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
20.1	2,000	0.0010	1.66	56.28	**Channel Flow,** Area= 34.0 sf Perim= 31.3' r= 1.09' n= 0.030 Earth, grassed & winding
87.4	3,600	Total			

Subcatchment 6S: C-DA-6



Summary for Pond 1P: STORMWATER BASIN #1 NORTHWEST

Inflow Area = 99.590 ac, 45.84% Impervious, Inflow Depth = 2.56" for 10-YR-24 HR event
Inflow = 177.61 cfs @ 12.33 hrs, Volume= 21.260 af
Outflow = 17.09 cfs @ 13.93 hrs, Volume= 19.236 af, Atten= 90%, Lag= 96.0 min
Primary = 17.09 cfs @ 13.93 hrs, Volume= 19.236 af
Routed to Link 5L : DISCHARGE POINT 1

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Starting Elev= 914.50' Surf.Area= 4.482 ac Storage= 17.010 af
Peak Elev= 916.21' @ 13.93 hrs Surf.Area= 9.360 ac Storage= 30.580 af (13.570 af above start)

Plug-Flow detention time= 2,803.0 min calculated for 2.226 af (10% of inflow)
Center-of-Mass det. time= 682.3 min (1,492.9 - 810.6)

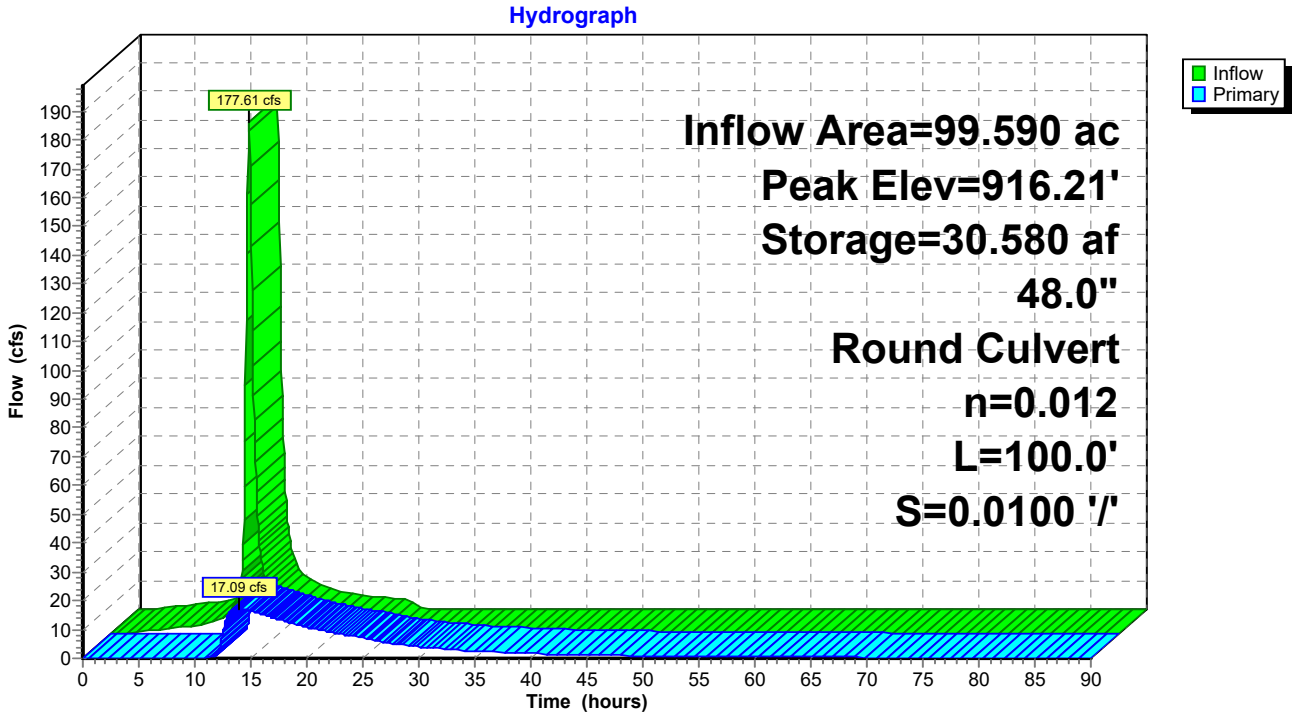
Volume	Invert	Avail.Storage	Storage Description
#1	910.50'	64.598 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
910.50	4.000	0.000	0.000
911.50	4.144	4.072	4.072
912.50	4.255	4.199	8.272
913.50	4.370	4.312	12.584
914.50	4.482	4.426	17.010
915.50	9.360	6.921	23.931
916.50	9.360	9.360	33.291
917.50	9.541	9.451	42.741
918.75	9.724	12.041	54.782
919.75	9.907	9.815	64.598

Device	Routing	Invert	Outlet Devices
#1	Primary	914.75'	**48.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 914.75' / 913.75' S= 0.0100 '/' Cc= 0.900 n= 0.012 RCP, Flow Area= 12.57 sf

Primary OutFlow Max=17.08 cfs @ 13.93 hrs HW=916.21' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 17.08 cfs @ 4.11 fps)

Pond 1P: STORMWATER BASIN #1 NORTHWEST



Summary for Pond 2P: STORMWATER BASIN #2 NORTHEAST

Inflow Area = 60.740 ac, 31.82% Impervious, Inflow Depth = 2.33" for 10-YR-24 HR event
Inflow = 167.89 cfs @ 12.08 hrs, Volume= 11.782 af
Outflow = 14.22 cfs @ 12.95 hrs, Volume= 11.646 af, Atten= 92%, Lag= 52.4 min
Primary = 14.22 cfs @ 12.95 hrs, Volume= 11.646 af
Routed to Link 5L : DISCHARGE POINT 1

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Starting Elev= 914.50' Surf.Area= 2.443 ac Storage= 8.939 af
Peak Elev= 915.82' @ 12.95 hrs Surf.Area= 6.577 ac Storage= 15.575 af (6.636 af above start)

Plug-Flow detention time= 1,433.4 min calculated for 2.707 af (23% of inflow)
Center-of-Mass det. time= 440.5 min (1,242.5 - 802.0)

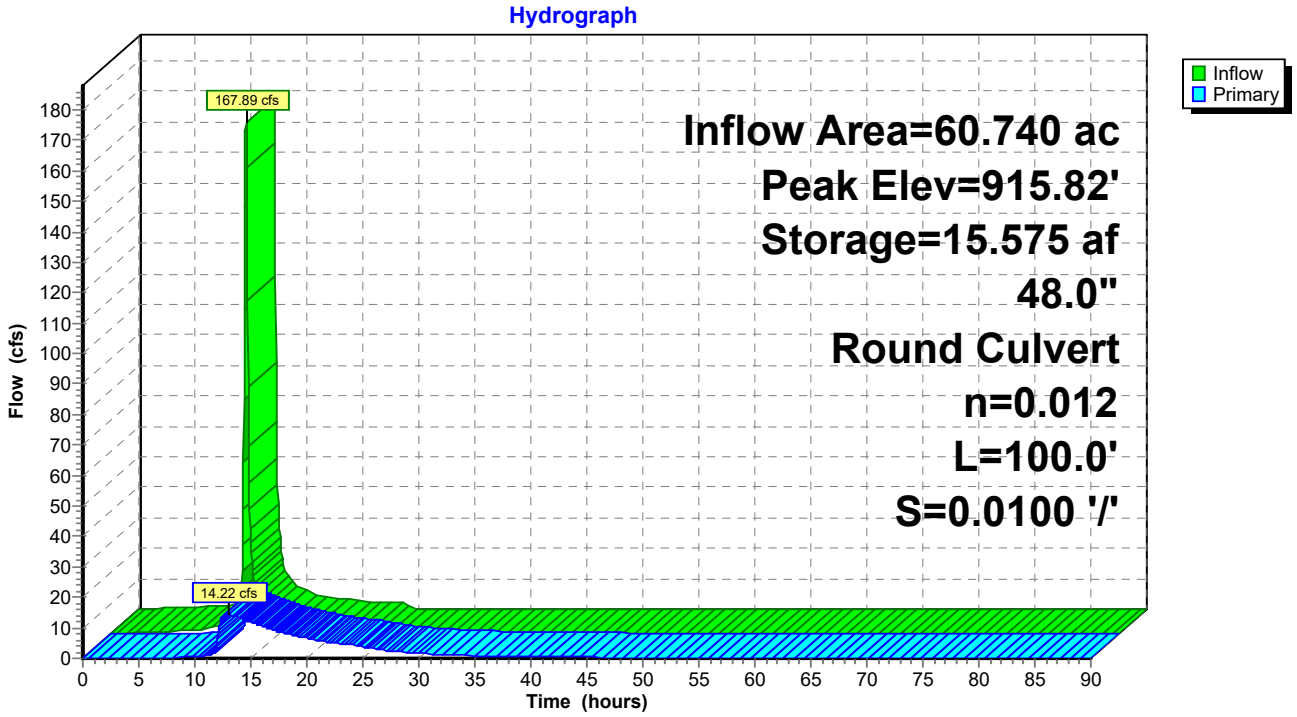
Volume	Invert	Avail.Storage	Storage Description
#1	910.50'	40.535 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
910.50	2.093	0.000	0.000
911.50	2.136	2.114	2.114
912.50	2.223	2.179	4.294
913.50	2.312	2.268	6.562
914.50	2.443	2.377	8.939
915.50	6.577	4.510	13.449
916.50	6.577	6.577	20.026
917.50	6.749	6.663	26.689
918.50	6.923	6.836	33.525
919.50	7.097	7.010	40.535

Device	Routing	Invert	Outlet Devices
#1	Primary	914.50'	**48.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 914.50' / 913.50' S= 0.0100 '/' Cc= 0.900 n= 0.012 RCP, Flow Area= 12.57 sf

Primary OutFlow Max=14.21 cfs @ 12.95 hrs HW=915.82' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 14.21 cfs @ 3.92 fps)

Pond 2P: STORMWATER BASIN #2 NORTHEAST



Summary for Pond 3P: STORMWATER BASIN #3 MID-EST

Inflow Area = 143.510 ac, 29.34% Impervious, Inflow Depth = 2.29" for 10-YR-24 HR event
Inflow = 215.82 cfs @ 12.39 hrs, Volume= 27.341 af
Outflow = 23.95 cfs @ 14.00 hrs, Volume= 26.663 af, Atten= 89%, Lag= 96.8 min
Primary = 23.95 cfs @ 14.00 hrs, Volume= 26.663 af
Routed to Link 2L : DISCHARGE POINT 2

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Starting Elev= 913.50' Surf.Area= 4.739 ac Storage= 18.041 af
Peak Elev= 915.50' @ 14.00 hrs Surf.Area= 9.361 ac Storage= 34.404 af (16.363 af above start)

Plug-Flow detention time= 1,554.2 min calculated for 8.618 af (32% of inflow)
Center-of-Mass det. time= 605.4 min (1,434.3 - 828.9)

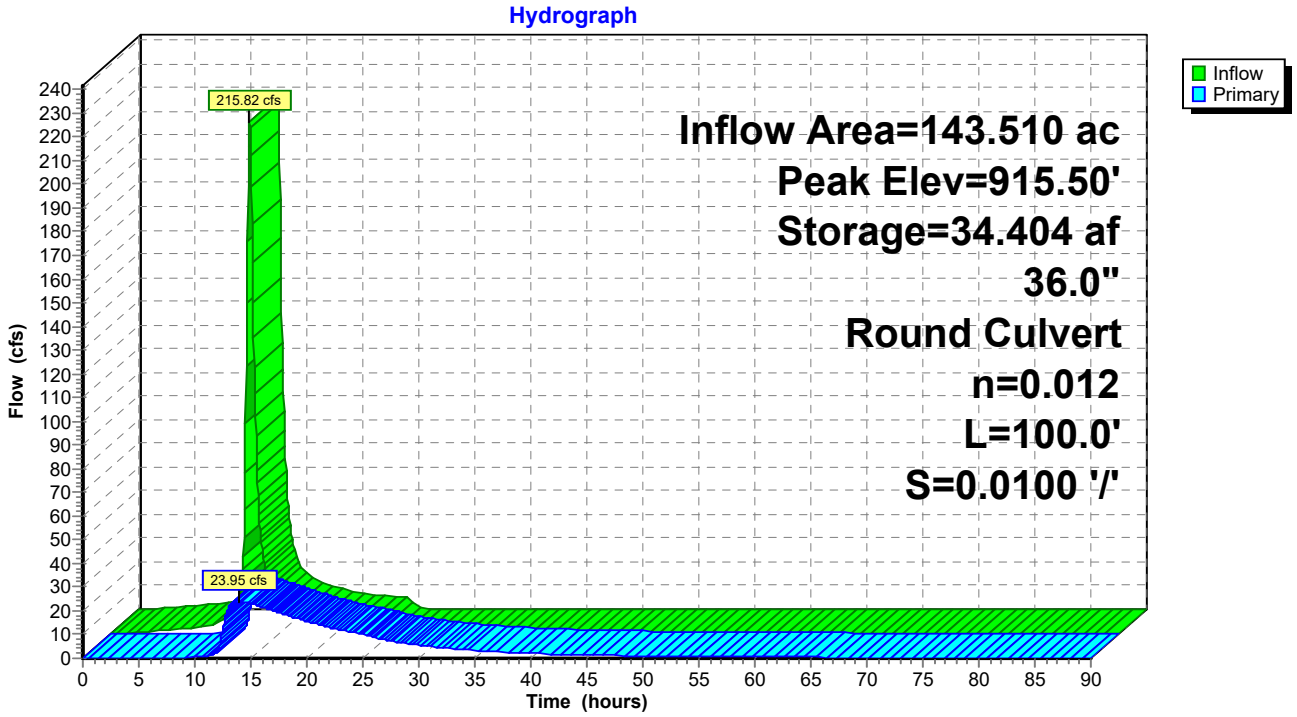
Volume	Invert	Avail.Storage	Storage Description
#1	909.50'	63.259 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
909.50	4.328	0.000	0.000
910.50	4.386	4.357	4.357
911.50	4.502	4.444	8.800
912.50	4.620	4.561	13.361
913.50	4.739	4.679	18.041
914.50	9.270	7.004	25.045
915.50	9.360	9.315	34.360
916.50	9.541	9.451	43.811
917.50	9.724	9.632	53.443
918.50	9.907	9.815	63.259

Device	Routing	Invert	Outlet Devices
#1	Primary	913.50'	**36.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 913.50' / 912.50' S= 0.0100 '/' Cc= 0.900 n= 0.012 RCP, Flow Area= 7.07 sf

Primary OutFlow Max=23.95 cfs @ 14.00 hrs HW=915.50' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 23.95 cfs @ 6.76 fps)

Pond 3P: STORMWATER BASIN #3 MID-EST



Summary for Pond 4P: STORMWATER BASIN #4 SOUTHWEST

Inflow Area = 127.630 ac, 19.43% Impervious, Inflow Depth = 2.12" for 10-YR-24 HR event
Inflow = 120.89 cfs @ 12.79 hrs, Volume= 22.557 af
Outflow = 13.46 cfs @ 15.68 hrs, Volume= 21.646 af, Atten= 89%, Lag= 173.5 min
Primary = 13.46 cfs @ 15.68 hrs, Volume= 21.646 af
Routed to Link 6L : DISCHARGE POINT 3

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Starting Elev= 914.50' Surf.Area= 4.702 ac Storage= 17.902 af
Peak Elev= 916.29' @ 15.68 hrs Surf.Area= 9.341 ac Storage= 32.201 af (14.299 af above start)

Plug-Flow detention time= 2,522.0 min calculated for 3.744 af (17% of inflow)
Center-of-Mass det. time= 799.0 min (1,666.9 - 867.9)

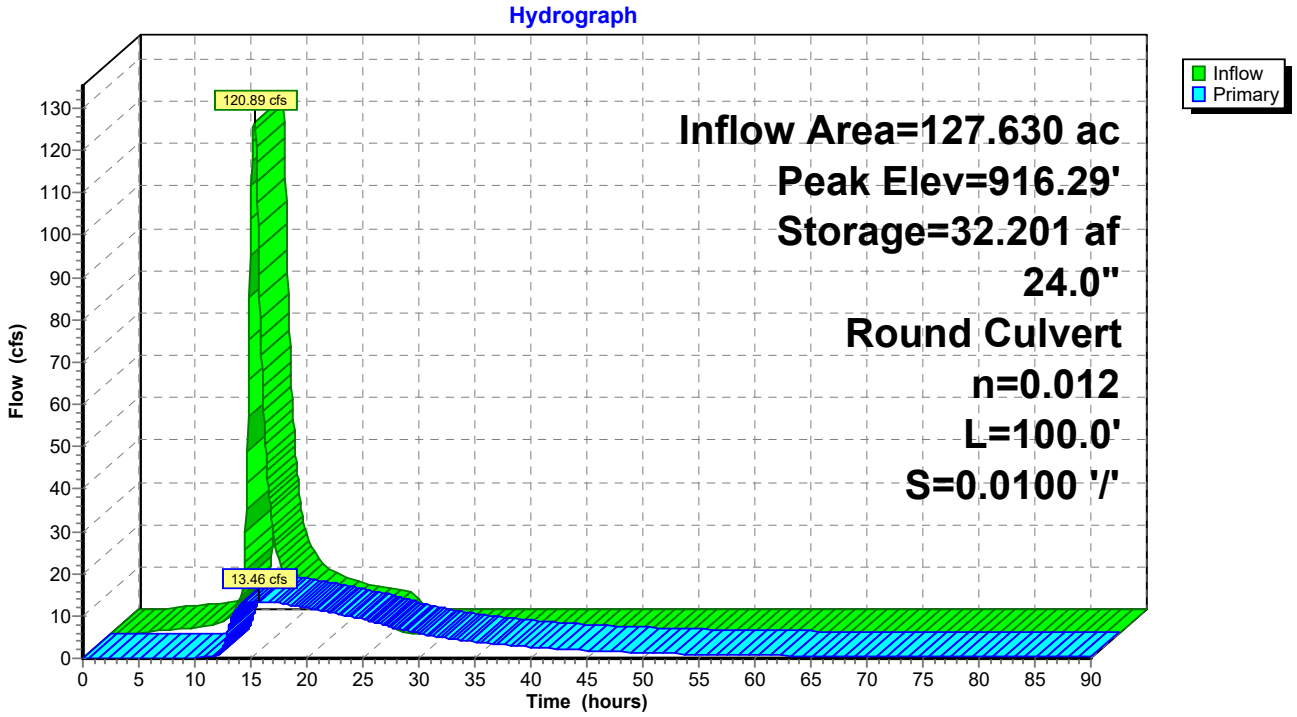
Volume	Invert	Avail.Storage	Storage Description
#1	910.50'	63.101 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
910.50	4.295	0.000	0.000
911.50	4.352	4.324	4.324
912.50	4.467	4.410	8.733
913.50	4.584	4.526	13.259
914.50	4.702	4.643	17.902
915.50	9.270	6.986	24.888
916.50	9.360	9.315	34.203
917.50	9.541	9.451	43.654
918.50	9.724	9.632	53.286
919.50	9.907	9.815	63.101

Device	Routing	Invert	Outlet Devices
#1	Primary	914.50'	**24.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 914.50' / 913.50' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=13.47 cfs @ 15.68 hrs HW=916.29' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 13.47 cfs @ 4.55 fps)

Pond 4P: STORMWATER BASIN #4 SOUTHWEST



Summary for Pond 5P: STORMWATER BASIN #5 SOUTHEAST

Inflow Area = 61.530 ac, 25.84% Impervious, Inflow Depth = 2.23" for 10-YR-24 HR event
Inflow = 127.67 cfs @ 12.18 hrs, Volume= 11.423 af
Outflow = 8.66 cfs @ 13.93 hrs, Volume= 11.087 af, Atten= 93%, Lag= 104.9 min
Primary = 8.66 cfs @ 13.93 hrs, Volume= 11.087 af
Routed to Link 6L : DISCHARGE POINT 3

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Starting Elev= 914.50' Surf.Area= 3.081 ac Storage= 11.603 af
Peak Elev= 915.83' @ 13.93 hrs Surf.Area= 6.639 ac Storage= 18.608 af (7.005 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 667.9 min (1,484.4 - 816.4)

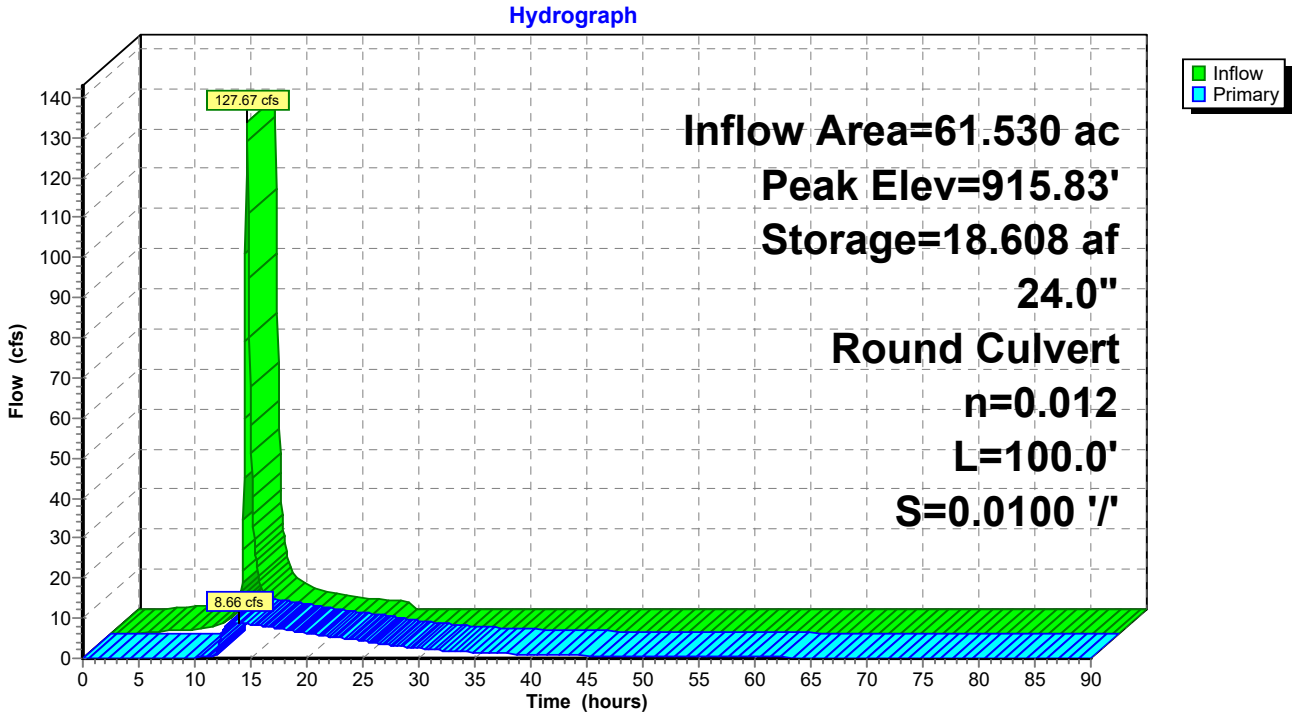
Volume	Invert	Avail.Storage	Storage Description
#1	910.50'	43.831 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
910.50	2.758	0.000	0.000
911.50	2.803	2.780	2.780
912.50	2.894	2.848	5.629
913.50	2.987	2.940	8.569
914.50	3.081	3.034	11.603
915.50	6.615	4.848	16.451
916.50	6.688	6.652	23.103
917.50	6.835	6.761	29.864
918.50	6.983	6.909	36.773
919.50	7.132	7.057	43.831

Device	Routing	Invert	Outlet Devices
#1	Primary	914.50'	**24.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 914.50' / 913.50' S= 0.0100 '/' Cc= 0.900 n= 0.012 RCP, Flow Area= 3.14 sf

Primary OutFlow Max=8.66 cfs @ 13.93 hrs HW=915.83' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 8.66 cfs @ 3.92 fps)

Pond 5P: STORMWATER BASIN #5 SOUTHEAST

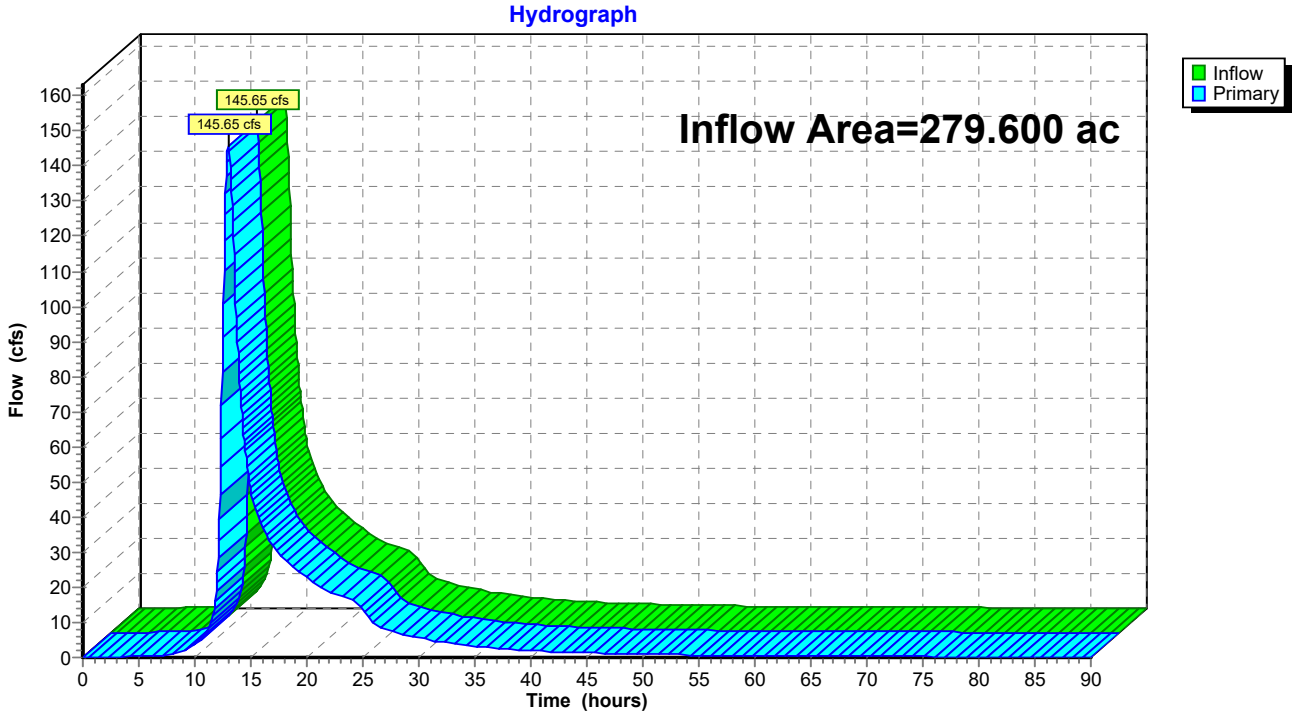


Summary for Link 2L: DISCHARGE POINT 2

Inflow Area = 279.600 ac, 18.99% Impervious, Inflow Depth > 2.26" for 10-YR-24 HR event
Inflow = 145.65 cfs @ 13.00 hrs, Volume= 52.686 af
Primary = 145.65 cfs @ 13.00 hrs, Volume= 52.686 af, Atten= 0%, Lag= 0.0 min
Routed to Link 7L : LOWER BRANCH RUSH RIVER

Primary outflow = Inflow, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Link 2L: DISCHARGE POINT 2

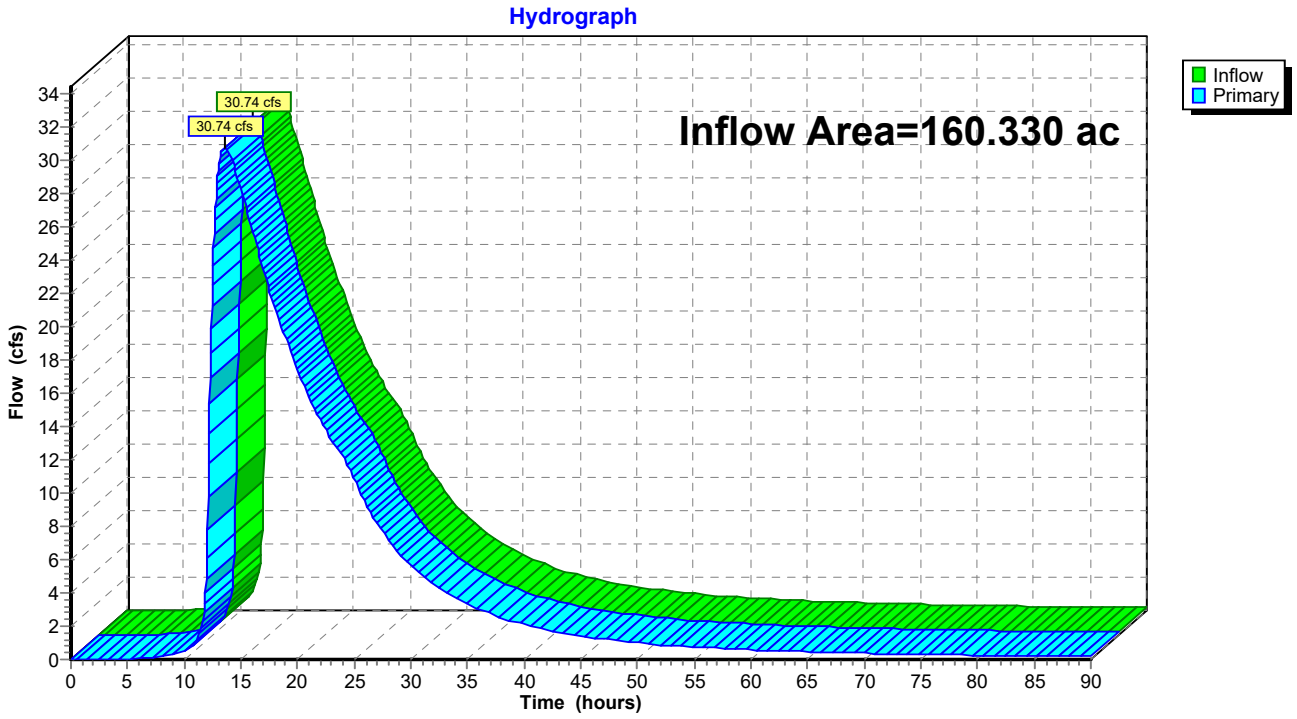


Summary for Link 5L: DISCHARGE POINT 1

Inflow Area = 160.330 ac, 40.53% Impervious, Inflow Depth > 2.31" for 10-YR-24 HR event
Inflow = 30.74 cfs @ 13.58 hrs, Volume= 30.882 af
Primary = 30.74 cfs @ 13.58 hrs, Volume= 30.882 af, Atten= 0%, Lag= 0.0 min
Routed to Link 7L : LOWER BRANCH RUSH RIVER

Primary outflow = Inflow, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Link 5L: DISCHARGE POINT 1

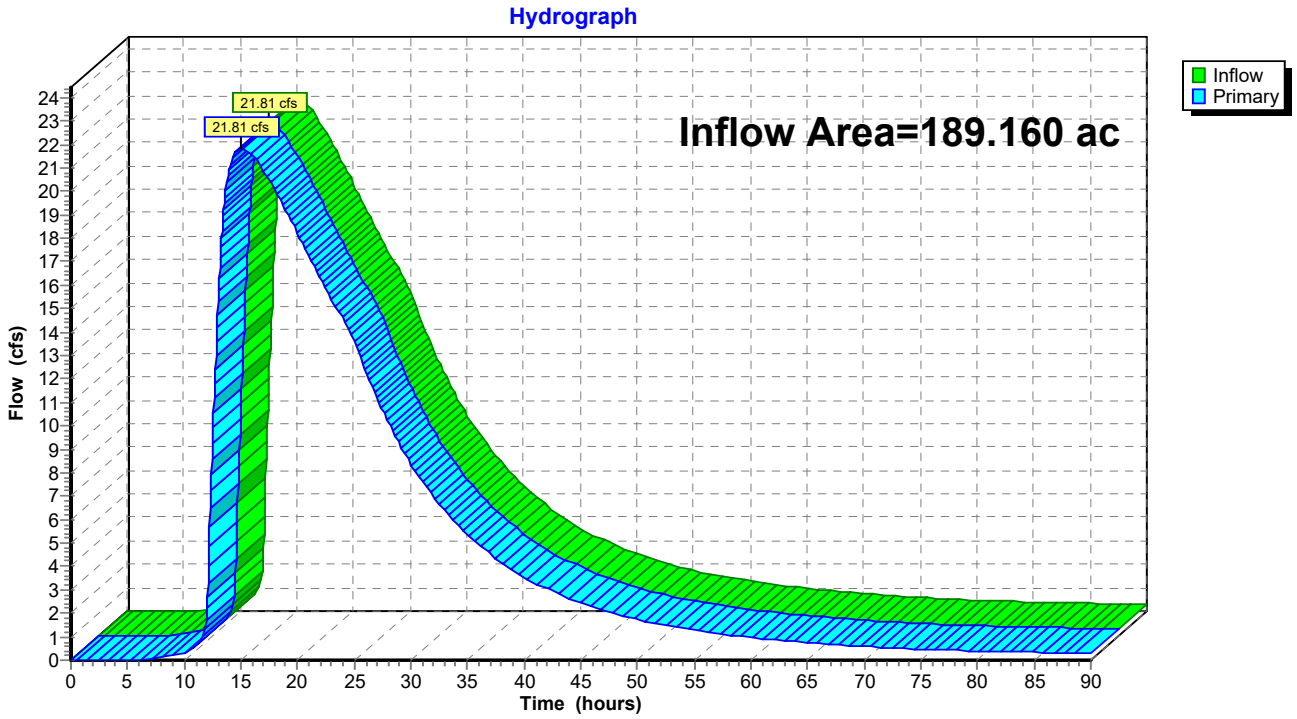


Summary for Link 6L: DISCHARGE POINT 3

Inflow Area = 189.160 ac, 21.52% Impervious, Inflow Depth > 2.08" for 10-YR-24 HR event
Inflow = 21.81 cfs @ 15.06 hrs, Volume= 32.733 af
Primary = 21.81 cfs @ 15.06 hrs, Volume= 32.733 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Link 6L: DISCHARGE POINT 3

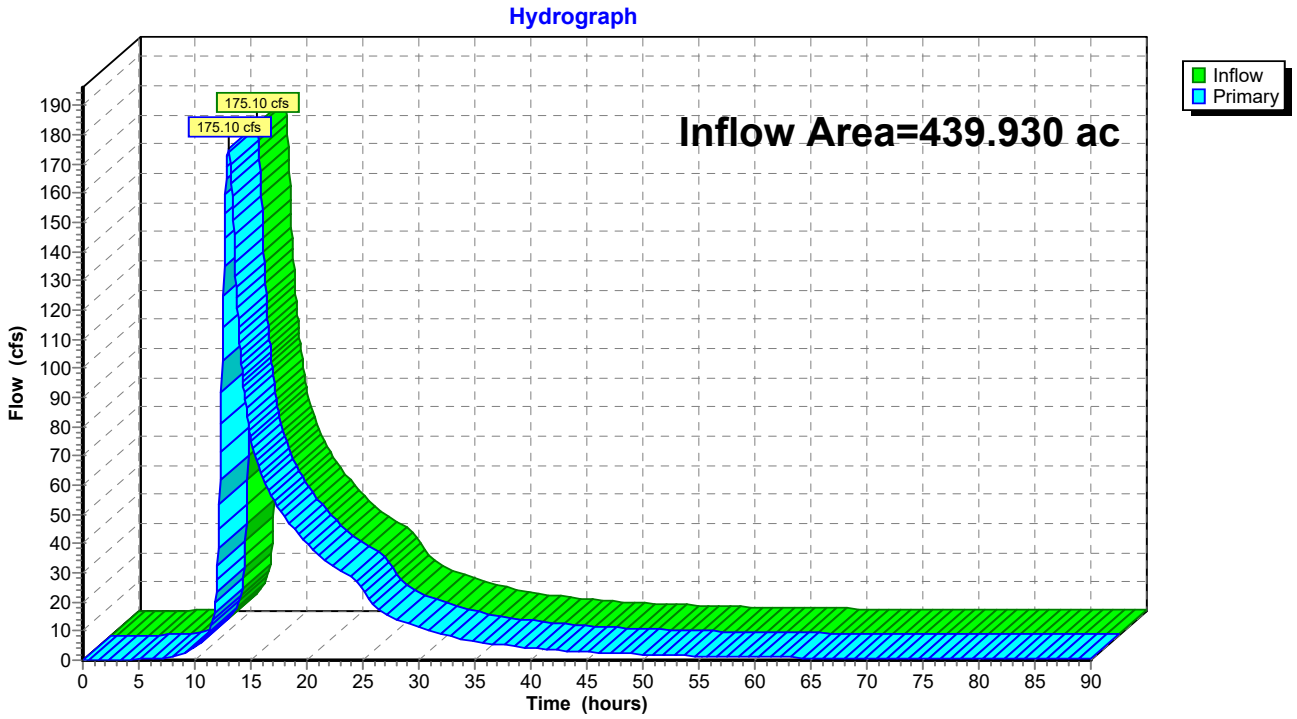


Summary for Link 7L: LOWER BRANCH RUSH RIVER

Inflow Area = 439.930 ac, 26.84% Impervious, Inflow Depth > 2.28" for 10-YR-24 HR event
Inflow = 175.10 cfs @ 13.02 hrs, Volume= 83.568 af
Primary = 175.10 cfs @ 13.02 hrs, Volume= 83.568 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Link 7L: LOWER BRANCH RUSH RIVER



Time span=0.00-90.00 hrs, dt=0.05 hrs, 1801 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: C-DA-1 Runoff Area=99.590 ac 45.84% Impervious Runoff Depth=5.06"
Flow Length=700' Tc=38.0 min CN=80/98 Runoff=351.01 cfs 41.988 af

Subcatchment2S: C-DA-2 Runoff Area=60.740 ac 31.82% Impervious Runoff Depth=4.78"
Flow Length=1,330' Tc=15.6 min CN=80/98 Runoff=343.56 cfs 24.178 af

Subcatchment3S: C-DA-3 Runoff Area=143.510 ac 29.34% Impervious Runoff Depth=4.73"
Flow Length=5,230' Tc=42.0 min CN=80/98 Runoff=449.20 cfs 56.525 af

Subcatchment4S: C-DA-4 Runoff Area=127.630 ac 19.43% Impervious Runoff Depth=4.53"
Flow Length=2,150' Tc=72.8 min CN=80/98 Runoff=261.18 cfs 48.146 af

Subcatchment5S: C-DA-5 Runoff Area=61.530 ac 25.84% Impervious Runoff Depth=4.66"
Flow Length=1,780' Tc=24.8 min CN=80/98 Runoff=267.94 cfs 23.874 af

Subcatchment6S: C-DA-6 Runoff Area=136.090 ac 8.08% Impervious Runoff Depth=4.79"
Flow Length=3,600' Tc=87.4 min CN=85/98 Runoff=259.61 cfs 54.336 af

Pond 1P: STORMWATERBASIN #1 Peak Elev=917.46' Storage=42.341 af Inflow=351.01 cfs 41.988 af
48.0" Round Culvert n=0.012 L=100.0' S=0.0100 '/' Outflow=48.10 cfs 39.911 af

Pond 2P: STORMWATERBASIN #2 Peak Elev=916.84' Storage=22.240 af Inflow=343.56 cfs 24.178 af
48.0" Round Culvert n=0.012 L=100.0' S=0.0100 '/' Outflow=38.03 cfs 24.035 af

Pond 3P: STORMWATERBASIN #3 Peak Elev=917.33' Storage=51.812 af Inflow=449.20 cfs 56.525 af
36.0" Round Culvert n=0.012 L=100.0' S=0.0100 '/' Outflow=51.97 cfs 55.786 af

Pond 4P: STORMWATERBASIN #4 Peak Elev=918.13' Storage=49.706 af Inflow=261.18 cfs 48.146 af
24.0" Round Culvert n=0.012 L=100.0' S=0.0100 '/' Outflow=24.53 cfs 47.005 af

Pond 5P: STORMWATERBASIN #5 Peak Elev=916.99' Storage=26.402 af Inflow=267.94 cfs 23.874 af
24.0" Round Culvert n=0.012 L=100.0' S=0.0100 '/' Outflow=18.47 cfs 23.494 af

Link 2L: DISCHARGE POINT 2 Inflow=308.24 cfs 110.122 af
Primary=308.24 cfs 110.122 af

Link 5L: DISCHARGE POINT 1 Inflow=84.09 cfs 63.946 af
Primary=84.09 cfs 63.946 af

Link 6L: DISCHARGE POINT 3 Inflow=42.45 cfs 70.499 af
Primary=42.45 cfs 70.499 af

Link 7L: LOWER BRANCH RUSH RIVER Inflow=391.28 cfs 174.068 af
Primary=391.28 cfs 174.068 af

Total Runoff Area = 629.090 ac Runoff Volume = 249.046 af Average Runoff Depth = 4.75"
74.76% Pervious = 470.310 ac 25.24% Impervious = 158.780 ac

Summary for Subcatchment 1S: C-DA-1

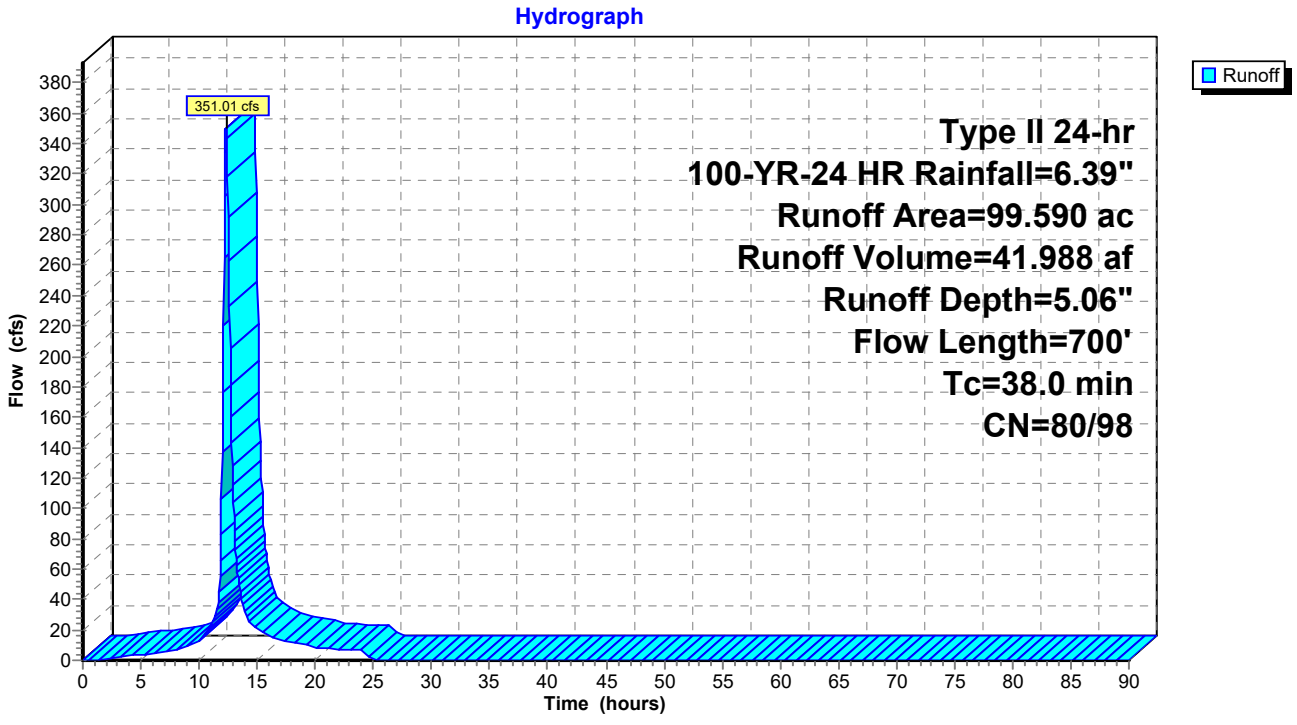
Runoff = 351.01 cfs @ 12.33 hrs, Volume= 41.988 af, Depth= 5.06"
Routed to Pond 1P : STORMWATER BASIN #1 NORTHWEST

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR-24 HR Rainfall=6.39"

	Area (ac)	CN	Description
*	45.650	98	On Site Impervious
	53.940	80	>75% Grass cover, Good, HSG D
	99.590	88	Weighted Average
	53.940	80	54.16% Pervious Area
	45.650	98	45.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	100	0.0100	0.18		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 1.40"
28.6	600	0.0025	0.35		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
38.0	700	Total			

Subcatchment 1S: C-DA-1



Summary for Subcatchment 2S: C-DA-2

[47] Hint: Peak is 672% of capacity of segment #3

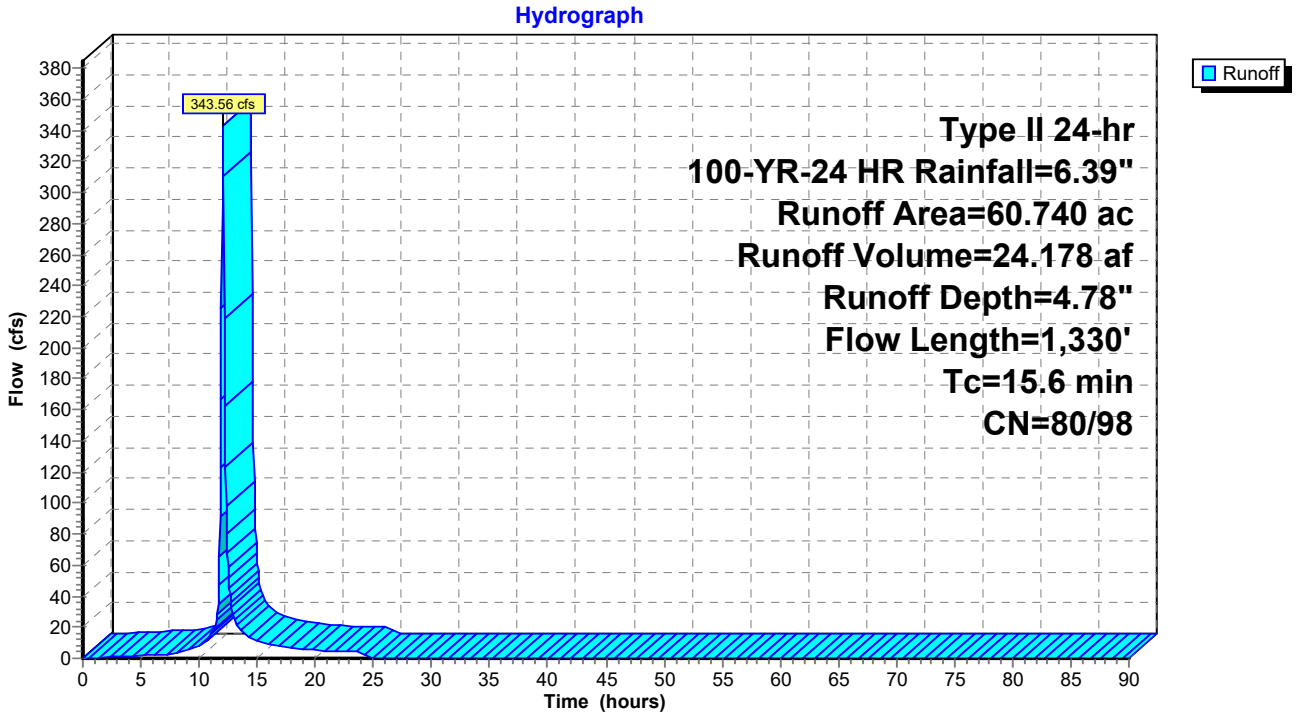
Runoff = 343.56 cfs @ 12.07 hrs, Volume= 24.178 af, Depth= 4.78"
Routed to Pond 2P : STORMWATER BASIN #2 NORTHEAST

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR-24 HR Rainfall=6.39"

	Area (ac)	CN	Description
*	19.330	98	On Site Impervious
*	41.410	80	>75% Grass cover, Good, HSG D
	60.740	86	Weighted Average
	41.410	80	68.18% Pervious Area
	19.330	98	31.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	100	0.0130	0.20		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 1.40"
4.8	230	0.0130	0.80		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.3	1,000	0.0050	7.23	51.09	**Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
15.6	1,330	Total			

Subcatchment 2S: C-DA-2



Summary for Subcatchment 3S: C-DA-3

[47] Hint: Peak is 1165% of capacity of segment #3
[47] Hint: Peak is 408% of capacity of segment #4

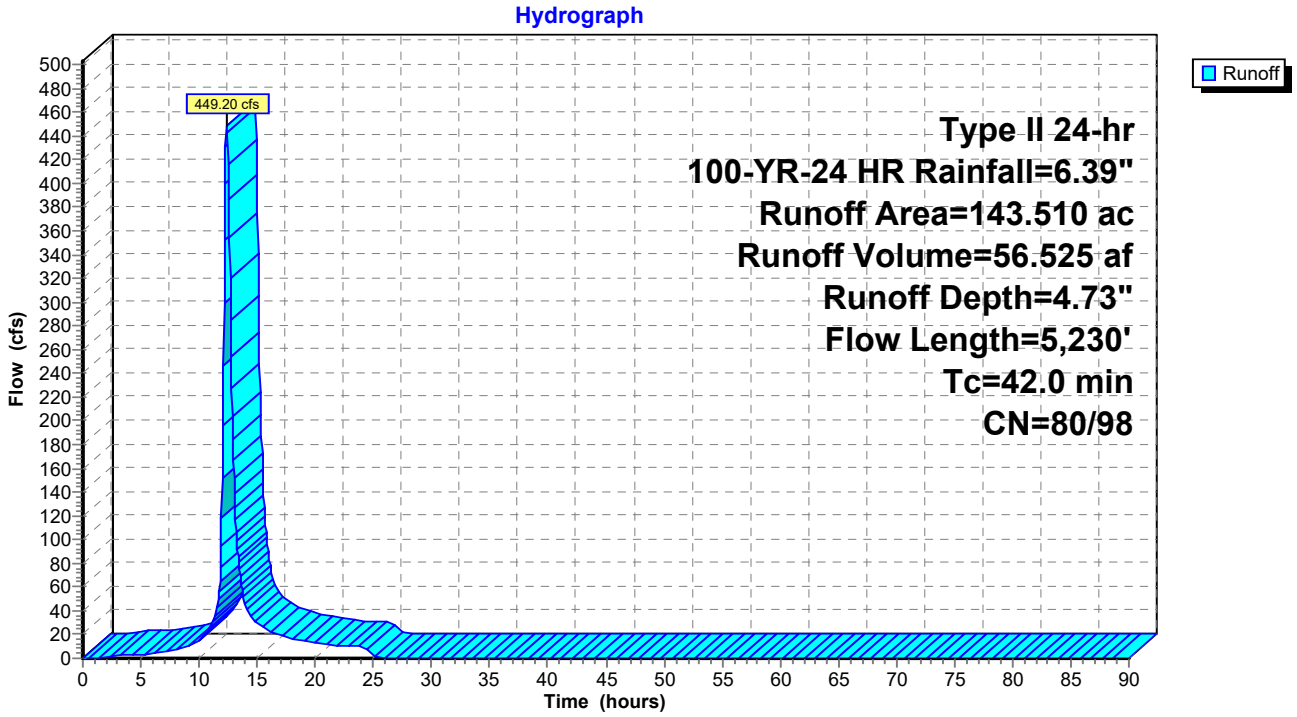
Runoff = 449.20 cfs @ 12.38 hrs, Volume= 56.525 af, Depth= 4.73"
Routed to Pond 3P : STORMWATER BASIN #3 MID-EST

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR-24 HR Rainfall=6.39"

	Area (ac)	CN	Description
*	42.100	98	On Site Impervious
	101.410	80	>75% Grass cover, Good, HSG D
	143.510	85	Weighted Average
	101.410	80	70.66% Pervious Area
	42.100	98	29.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	100	0.0050	0.13		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 1.40"
17.8	530	0.0050	0.49		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.9	2,000	0.0010	4.82	38.56	**Channel Flow,** Area= 8.0 sf Perim= 7.7' r= 1.04' n= 0.010
4.9	2,600	0.0050	8.76	110.04	**Pipe Channel,** 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.012 Corrugated PP, smooth interior
42.0	5,230	Total			

Subcatchment 3S: C-DA-3



Summary for Subcatchment 4S: C-DA-4

[47] Hint: Peak is 237% of capacity of segment #3

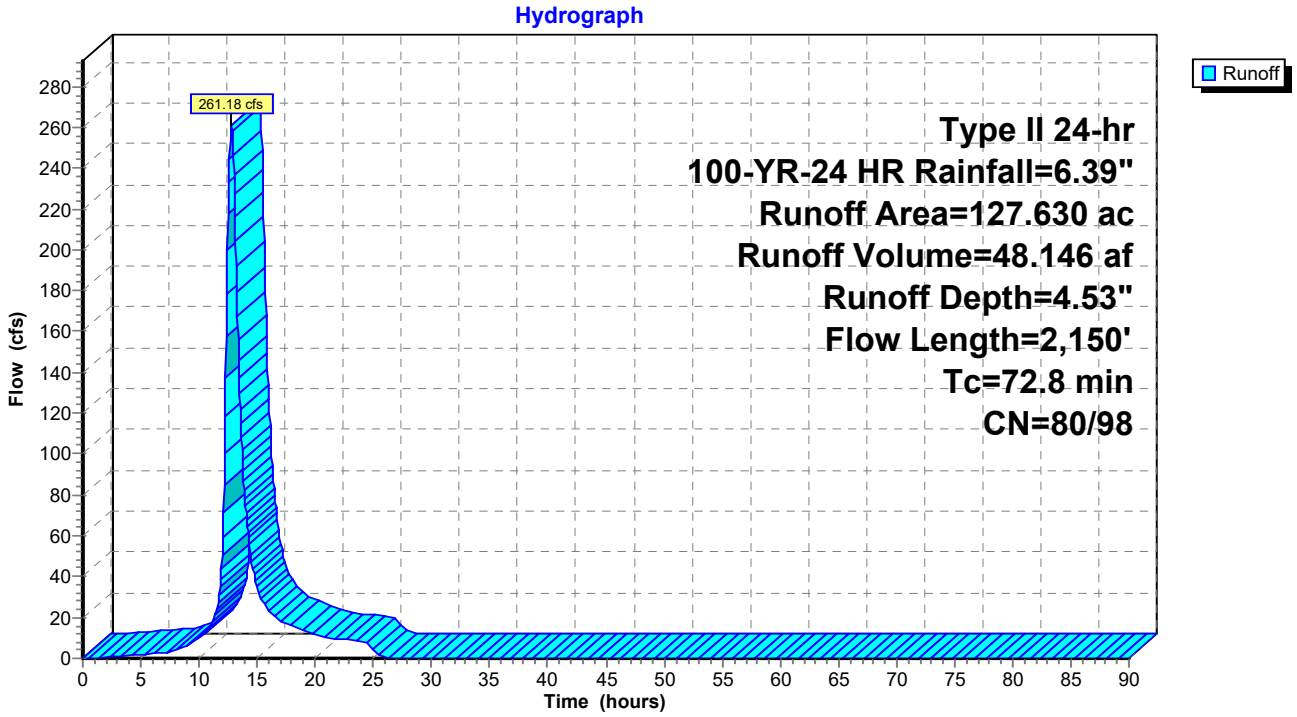
Runoff = 261.18 cfs @ 12.77 hrs, Volume= 48.146 af, Depth= 4.53"
Routed to Pond 4P : STORMWATER BASIN #4 SOUTHWEST

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR-24 HR Rainfall=6.39"

	Area (ac)	CN	Description
*	24.800	98	On Site Impervious
	102.830	80	>75% Grass cover, Good, HSG D
	127.630	83	Weighted Average
	102.830	80	80.57% Pervious Area
	24.800	98	19.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.4	100	0.0025	0.10		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 1.40"
55.7	1,700	0.0010	0.51		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.7	350	0.0050	8.76	110.04	**Pipe Channel,** 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.012
72.8	2,150	Total			

Subcatchment 4S: C-DA-4



Summary for Subcatchment 5S: C-DA-5

[47] Hint: Peak is 524% of capacity of segment #3

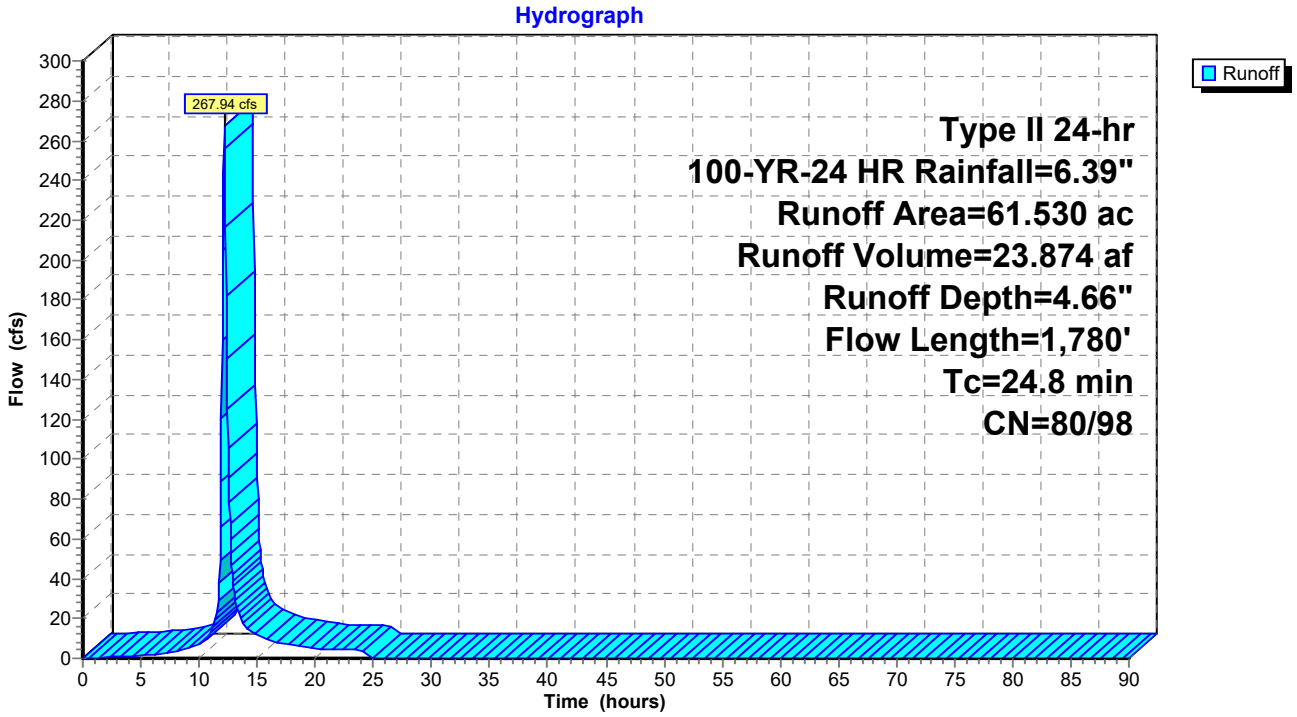
Runoff = 267.94 cfs @ 12.17 hrs, Volume= 23.874 af, Depth= 4.66"
Routed to Pond 5P : STORMWATER BASIN #5 SOUTHEAST

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR-24 HR Rainfall=6.39"

	Area (ac)	CN	Description
*	15.900	98	On Site Impervious
	45.630	80	>75% Grass cover, Good, HSG D
	61.530	85	Weighted Average
	45.630	80	74.16% Pervious Area
	15.900	98	25.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	100	0.0050	0.13		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 1.40"
9.2	280	0.0010	0.51		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.2	1,400	0.0050	7.23	51.09	**Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 Corrugated PP, smooth interior
24.8	1,780	Total			

Subcatchment 5S: C-DA-5



Summary for Subcatchment 6S: C-DA-6

[47] Hint: Peak is 461% of capacity of segment #3

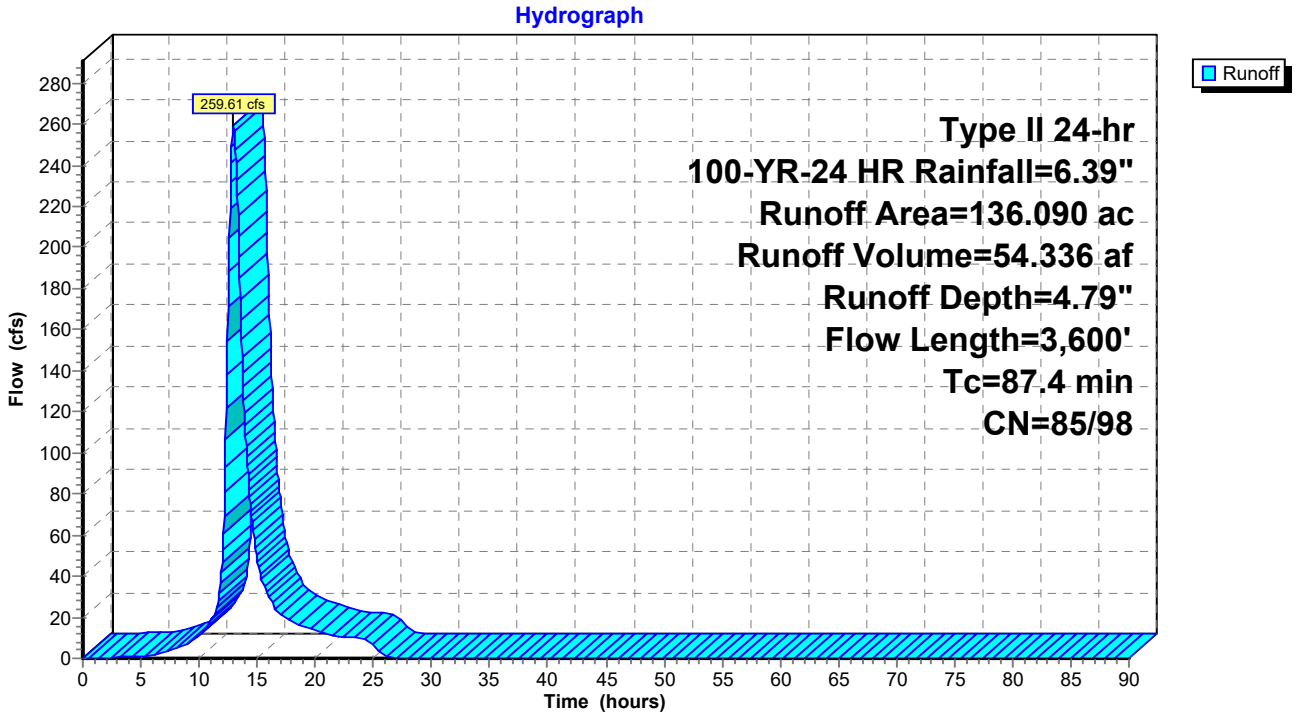
Runoff = 259.61 cfs @ 12.95 hrs, Volume= 54.336 af, Depth= 4.79"
Routed to Link 2L : DISCHARGE POINT 2

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR-24 HR Rainfall=6.39"

	Area (ac)	CN	Description
	125.090	85	Legumes, straight row, Good, HSG D
*	11.000	98	On Site Impervious
	136.090	86	Weighted Average
	125.090	85	91.92% Pervious Area
	11.000	98	8.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	100	0.0100	0.18		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 1.40"
57.9	1,500	0.0023	0.43		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
20.1	2,000	0.0010	1.66	56.28	**Channel Flow,** Area= 34.0 sf Perim= 31.3' r= 1.09' n= 0.030 Earth, grassed & winding
87.4	3,600	Total			

Subcatchment 6S: C-DA-6



Summary for Pond 1P: STORMWATER BASIN #1 NORTHWEST

Inflow Area = 99.590 ac, 45.84% Impervious, Inflow Depth = 5.06" for 100-YR-24 HR event
Inflow = 351.01 cfs @ 12.33 hrs, Volume= 41.988 af
Outflow = 48.10 cfs @ 13.45 hrs, Volume= 39.911 af, Atten= 86%, Lag= 67.6 min
Primary = 48.10 cfs @ 13.45 hrs, Volume= 39.911 af
Routed to Link 5L : DISCHARGE POINT 1

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Starting Elev= 914.50' Surf.Area= 4.482 ac Storage= 17.010 af
Peak Elev= 917.46' @ 13.45 hrs Surf.Area= 9.533 ac Storage= 42.341 af (25.331 af above start)

Plug-Flow detention time= 969.6 min calculated for 22.901 af (55% of inflow)
Center-of-Mass det. time= 516.7 min (1,316.7 - 800.0)

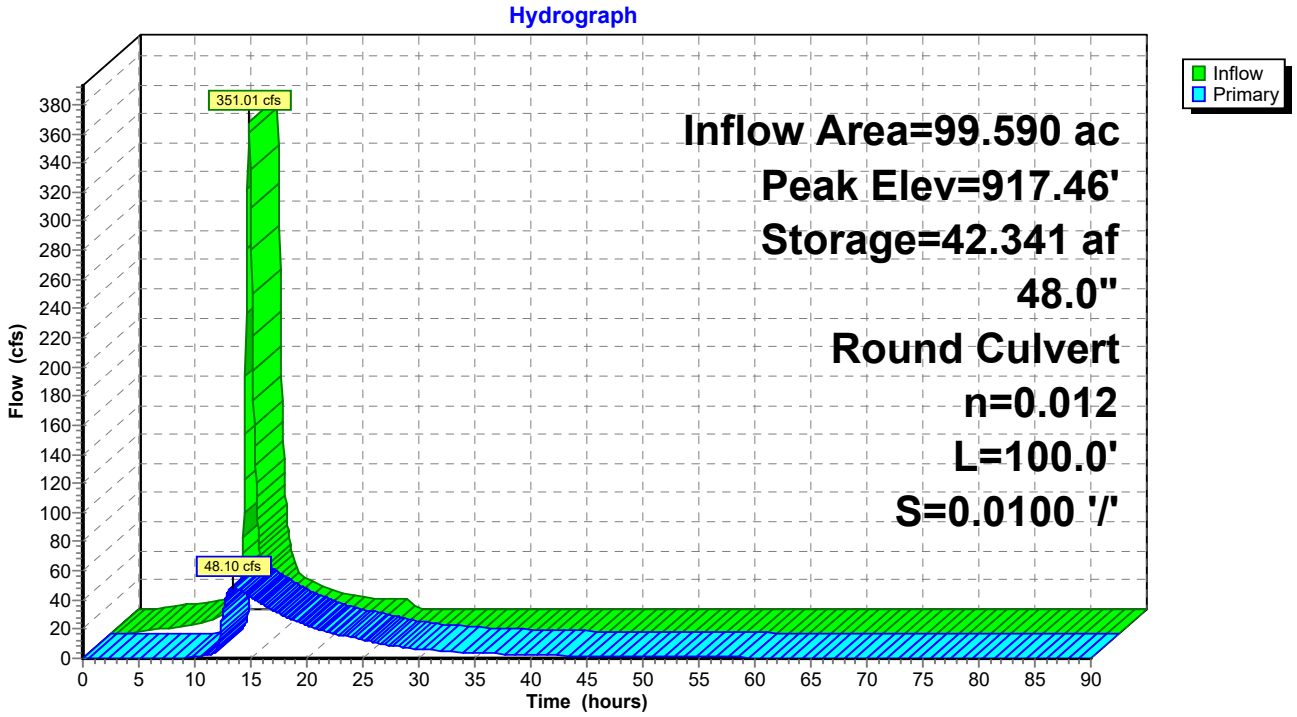
Volume	Invert	Avail.Storage	Storage Description
#1	910.50'	64.598 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
910.50	4.000	0.000	0.000
911.50	4.144	4.072	4.072
912.50	4.255	4.199	8.272
913.50	4.370	4.312	12.584
914.50	4.482	4.426	17.010
915.50	9.360	6.921	23.931
916.50	9.360	9.360	33.291
917.50	9.541	9.451	42.741
918.75	9.724	12.041	54.782
919.75	9.907	9.815	64.598

Device	Routing	Invert	Outlet Devices
#1	Primary	914.75'	**48.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 914.75' / 913.75' S= 0.0100 '/' Cc= 0.900 n= 0.012 RCP, Flow Area= 12.57 sf

Primary OutFlow Max=48.10 cfs @ 13.45 hrs HW=917.46' (Free Discharge)
↑**1=Culvert** (Barrel Controls 48.10 cfs @ 7.51 fps)

Pond 1P: STORMWATER BASIN #1 NORTHWEST



Summary for Pond 2P: STORMWATER BASIN #2 NORTHEAST

Inflow Area = 60.740 ac, 31.82% Impervious, Inflow Depth = 4.78" for 100-YR-24 HR event
Inflow = 343.56 cfs @ 12.07 hrs, Volume= 24.178 af
Outflow = 38.03 cfs @ 12.68 hrs, Volume= 24.035 af, Atten= 89%, Lag= 36.7 min
Primary = 38.03 cfs @ 12.68 hrs, Volume= 24.035 af
Routed to Link 5L : DISCHARGE POINT 1

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Starting Elev= 914.50' Surf.Area= 2.443 ac Storage= 8.939 af
Peak Elev= 916.84' @ 12.68 hrs Surf.Area= 6.635 ac Storage= 22.240 af (13.301 af above start)

Plug-Flow detention time= 666.3 min calculated for 15.087 af (62% of inflow)
Center-of-Mass det. time= 350.7 min (1,140.0 - 789.4)

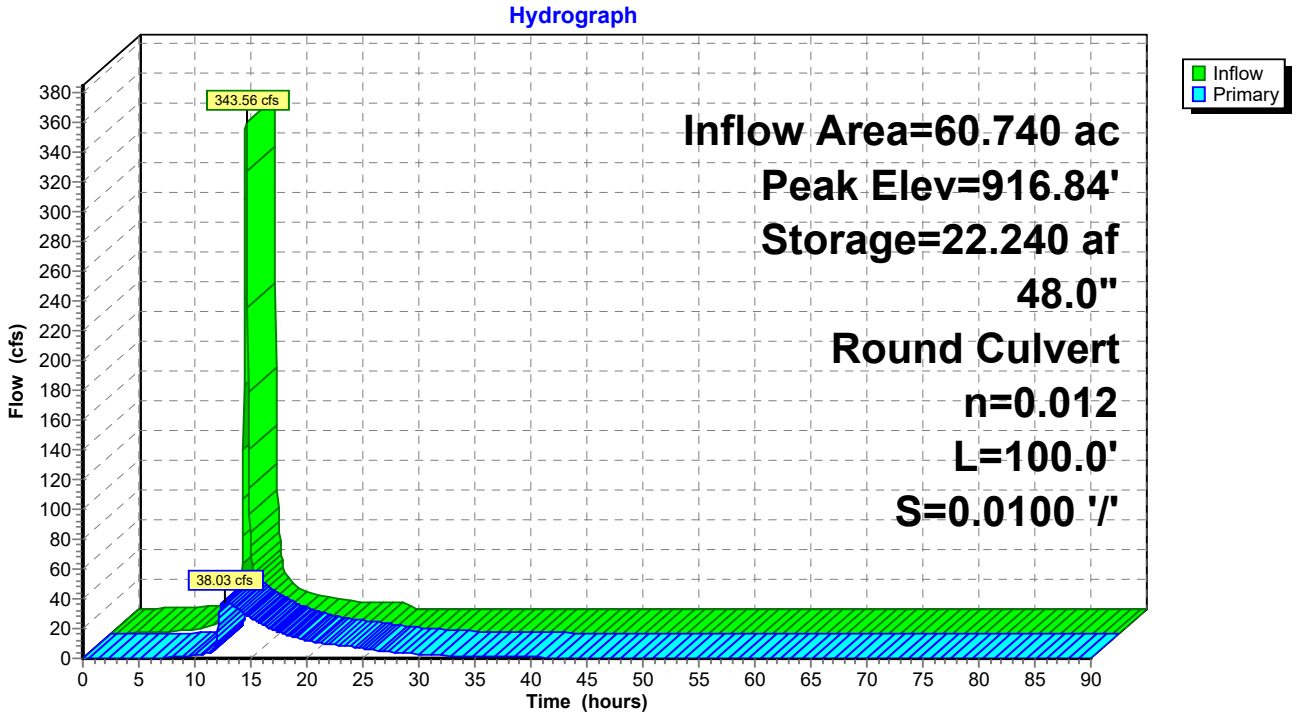
Volume	Invert	Avail.Storage	Storage Description
#1	910.50'	40.535 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
910.50	2.093	0.000	0.000
911.50	2.136	2.114	2.114
912.50	2.223	2.179	4.294
913.50	2.312	2.268	6.562
914.50	2.443	2.377	8.939
915.50	6.577	4.510	13.449
916.50	6.577	6.577	20.026
917.50	6.749	6.663	26.689
918.50	6.923	6.836	33.525
919.50	7.097	7.010	40.535

Device	Routing	Invert	Outlet Devices
#1	Primary	914.50'	**48.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 914.50' / 913.50' S= 0.0100 '/' Cc= 0.900 n= 0.012 RCP, Flow Area= 12.57 sf

Primary OutFlow Max=38.02 cfs @ 12.68 hrs HW=916.83' (Free Discharge)
↑**1=Culvert** (Barrel Controls 38.02 cfs @ 7.19 fps)

Pond 2P: STORMWATER BASIN #2 NORTHEAST



Summary for Pond 3P: STORMWATER BASIN #3 MID-EST

Inflow Area = 143.510 ac, 29.34% Impervious, Inflow Depth = 4.73" for 100-YR-24 HR event
Inflow = 449.20 cfs @ 12.38 hrs, Volume= 56.525 af
Outflow = 51.97 cfs @ 13.84 hrs, Volume= 55.786 af, Atten= 88%, Lag= 87.9 min
Primary = 51.97 cfs @ 13.84 hrs, Volume= 55.786 af
Routed to Link 2L : DISCHARGE POINT 2

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Starting Elev= 913.50' Surf.Area= 4.739 ac Storage= 18.041 af
Peak Elev= 917.33' @ 13.84 hrs Surf.Area= 9.693 ac Storage= 51.812 af (33.771 af above start)

Plug-Flow detention time= 846.3 min calculated for 37.725 af (67% of inflow)
Center-of-Mass det. time= 514.0 min (1,329.8 - 815.8)

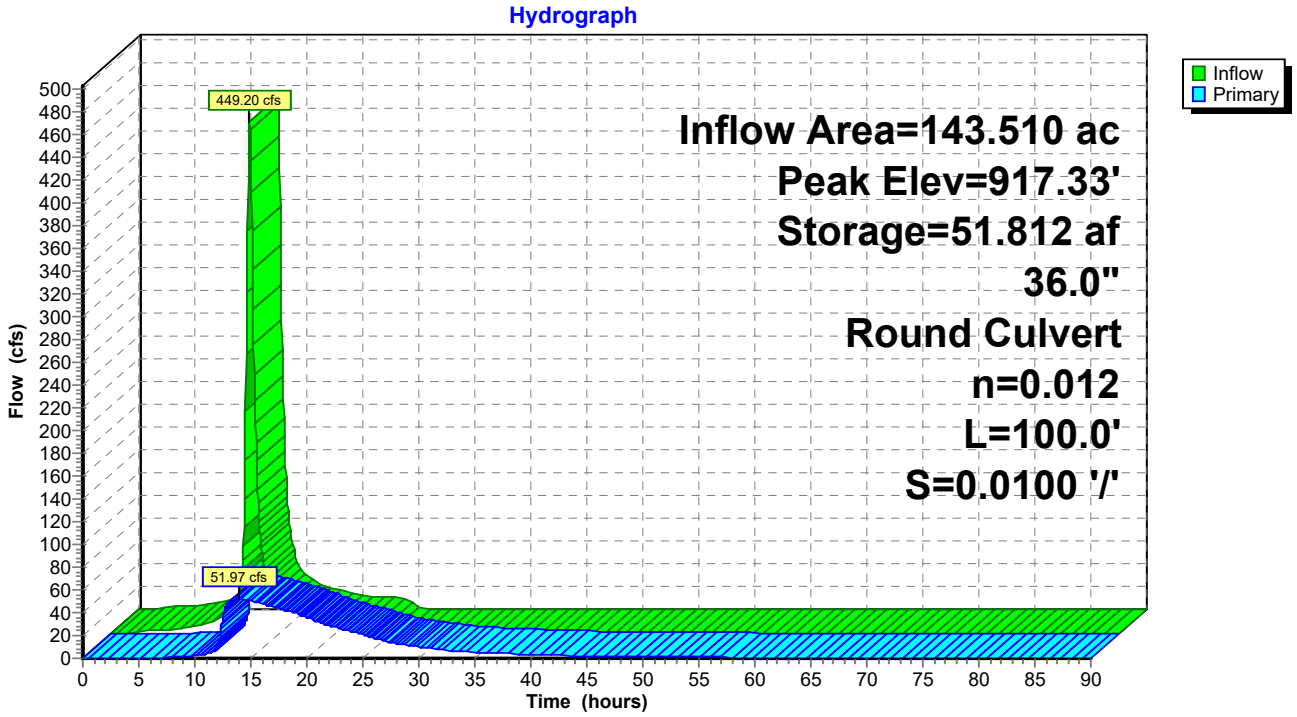
Volume	Invert	Avail.Storage	Storage Description
#1	909.50'	63.259 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
909.50	4.328	0.000	0.000
910.50	4.386	4.357	4.357
911.50	4.502	4.444	8.800
912.50	4.620	4.561	13.361
913.50	4.739	4.679	18.041
914.50	9.270	7.004	25.045
915.50	9.360	9.315	34.360
916.50	9.541	9.451	43.811
917.50	9.724	9.632	53.443
918.50	9.907	9.815	63.259

Device	Routing	Invert	Outlet Devices
#1	Primary	913.50'	**36.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 913.50' / 912.50' S= 0.0100 '/' Cc= 0.900 n= 0.012 RCP, Flow Area= 7.07 sf

Primary OutFlow Max=51.97 cfs @ 13.84 hrs HW=917.33' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 51.97 cfs @ 7.35 fps)

Pond 3P: STORMWATER BASIN #3 MID-EST



Summary for Pond 4P: STORMWATER BASIN #4 SOUTHWEST

Inflow Area = 127.630 ac, 19.43% Impervious, Inflow Depth = 4.53" for 100-YR-24 HR event
Inflow = 261.18 cfs @ 12.77 hrs, Volume= 48.146 af
Outflow = 24.53 cfs @ 15.88 hrs, Volume= 47.005 af, Atten= 91%, Lag= 186.6 min
Primary = 24.53 cfs @ 15.88 hrs, Volume= 47.005 af
Routed to Link 6L : DISCHARGE POINT 3

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Starting Elev= 914.50' Surf.Area= 4.702 ac Storage= 17.902 af
Peak Elev= 918.13' @ 15.88 hrs Surf.Area= 9.656 ac Storage= 49.706 af (31.804 af above start)

Plug-Flow detention time= 1,344.5 min calculated for 29.087 af (60% of inflow)
Center-of-Mass det. time= 826.3 min (1,678.6 - 852.3)

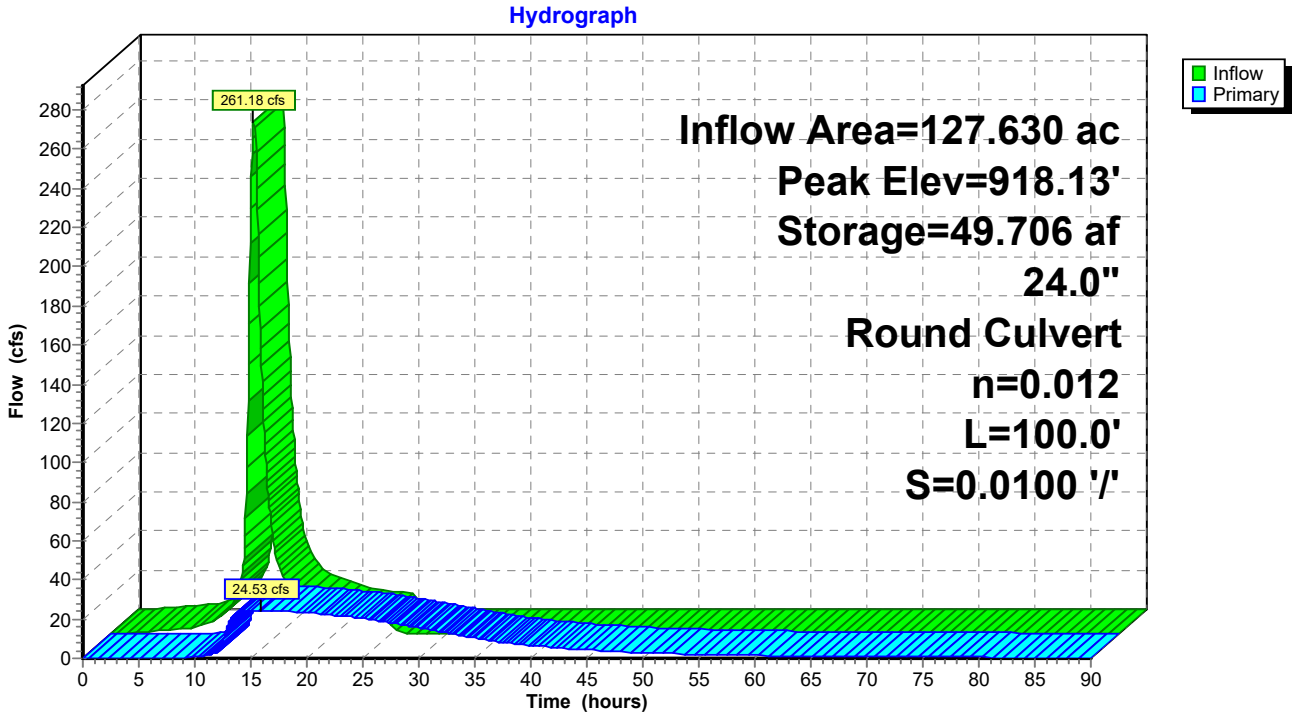
Volume	Invert	Avail.Storage	Storage Description
#1	910.50'	63.101 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
910.50	4.295	0.000	0.000
911.50	4.352	4.324	4.324
912.50	4.467	4.410	8.733
913.50	4.584	4.526	13.259
914.50	4.702	4.643	17.902
915.50	9.270	6.986	24.888
916.50	9.360	9.315	34.203
917.50	9.541	9.451	43.654
918.50	9.724	9.632	53.286
919.50	9.907	9.815	63.101

Device	Routing	Invert	Outlet Devices
#1	Primary	914.50'	**24.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 914.50' / 913.50' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=24.53 cfs @ 15.88 hrs HW=918.13' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 24.53 cfs @ 7.81 fps)

Pond 4P: STORMWATER BASIN #4 SOUTHWEST



Summary for Pond 5P: STORMWATER BASIN #5 SOUTHEAST

Inflow Area = 61.530 ac, 25.84% Impervious, Inflow Depth = 4.66" for 100-YR-24 HR event
Inflow = 267.94 cfs @ 12.17 hrs, Volume= 23.874 af
Outflow = 18.47 cfs @ 13.74 hrs, Volume= 23.494 af, Atten= 93%, Lag= 93.8 min
Primary = 18.47 cfs @ 13.74 hrs, Volume= 23.494 af
Routed to Link 6L : DISCHARGE POINT 3

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Starting Elev= 914.50' Surf.Area= 3.081 ac Storage= 11.603 af
Peak Elev= 916.99' @ 13.74 hrs Surf.Area= 6.760 ac Storage= 26.402 af (14.799 af above start)

Plug-Flow detention time= 1,154.9 min calculated for 11.883 af (50% of inflow)
Center-of-Mass det. time= 594.7 min (1,397.3 - 802.6)

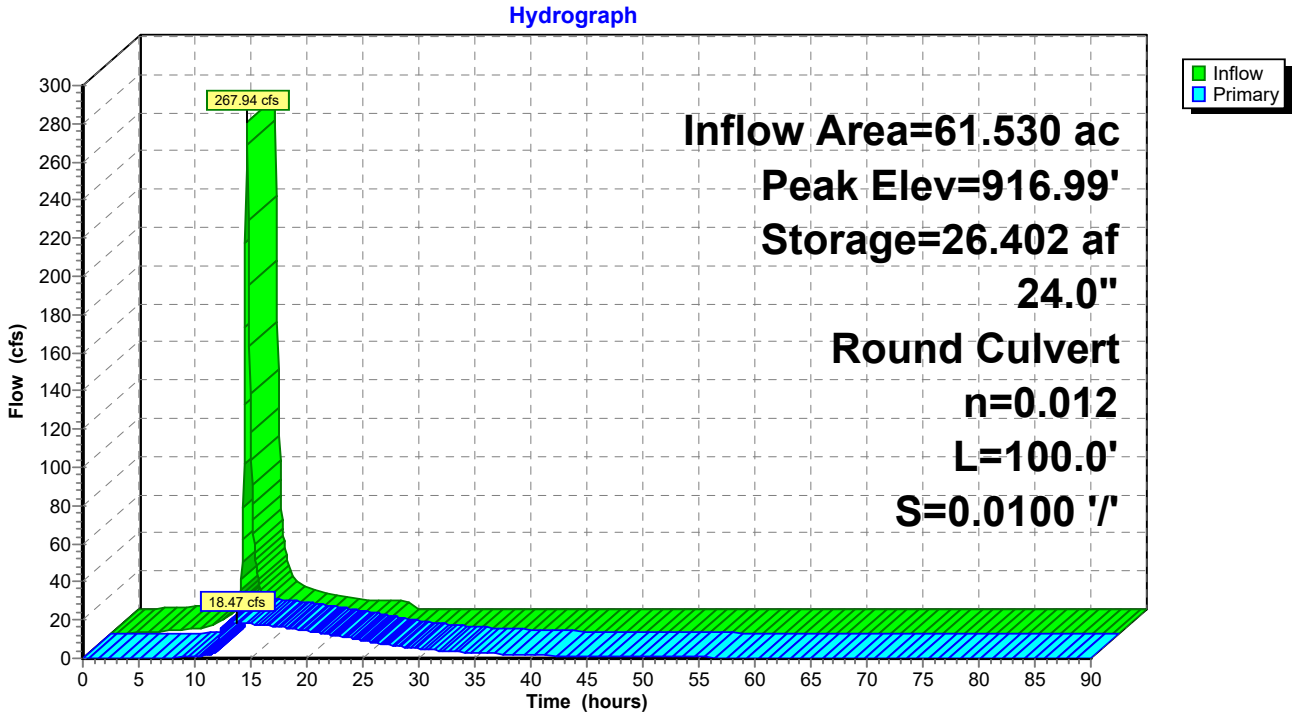
Volume	Invert	Avail.Storage	Storage Description
#1	910.50'	43.831 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
910.50	2.758	0.000	0.000
911.50	2.803	2.780	2.780
912.50	2.894	2.848	5.629
913.50	2.987	2.940	8.569
914.50	3.081	3.034	11.603
915.50	6.615	4.848	16.451
916.50	6.688	6.652	23.103
917.50	6.835	6.761	29.864
918.50	6.983	6.909	36.773
919.50	7.132	7.057	43.831

Device	Routing	Invert	Outlet Devices
#1	Primary	914.50'	**24.0" Round Culvert** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 914.50' / 913.50' S= 0.0100 '/' Cc= 0.900 n= 0.012 RCP, Flow Area= 3.14 sf

Primary OutFlow Max=18.47 cfs @ 13.74 hrs HW=916.99' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 18.47 cfs @ 5.88 fps)

Pond 5P: STORMWATER BASIN #5 SOUTHEAST

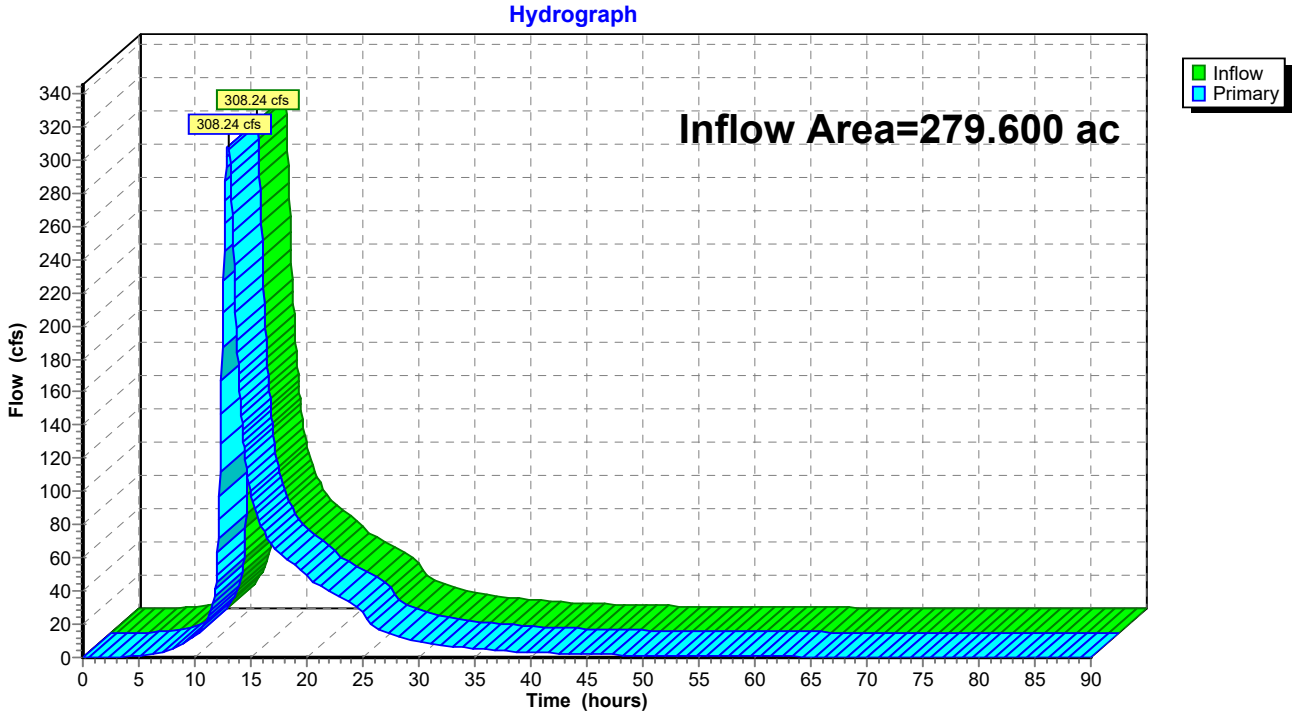


Summary for Link 2L: DISCHARGE POINT 2

Inflow Area = 279.600 ac, 18.99% Impervious, Inflow Depth > 4.73" for 100-YR-24 HR event
Inflow = 308.24 cfs @ 12.96 hrs, Volume= 110.122 af
Primary = 308.24 cfs @ 12.96 hrs, Volume= 110.122 af, Atten= 0%, Lag= 0.0 min
Routed to Link 7L : LOWER BRANCH RUSH RIVER

Primary outflow = Inflow, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Link 2L: DISCHARGE POINT 2

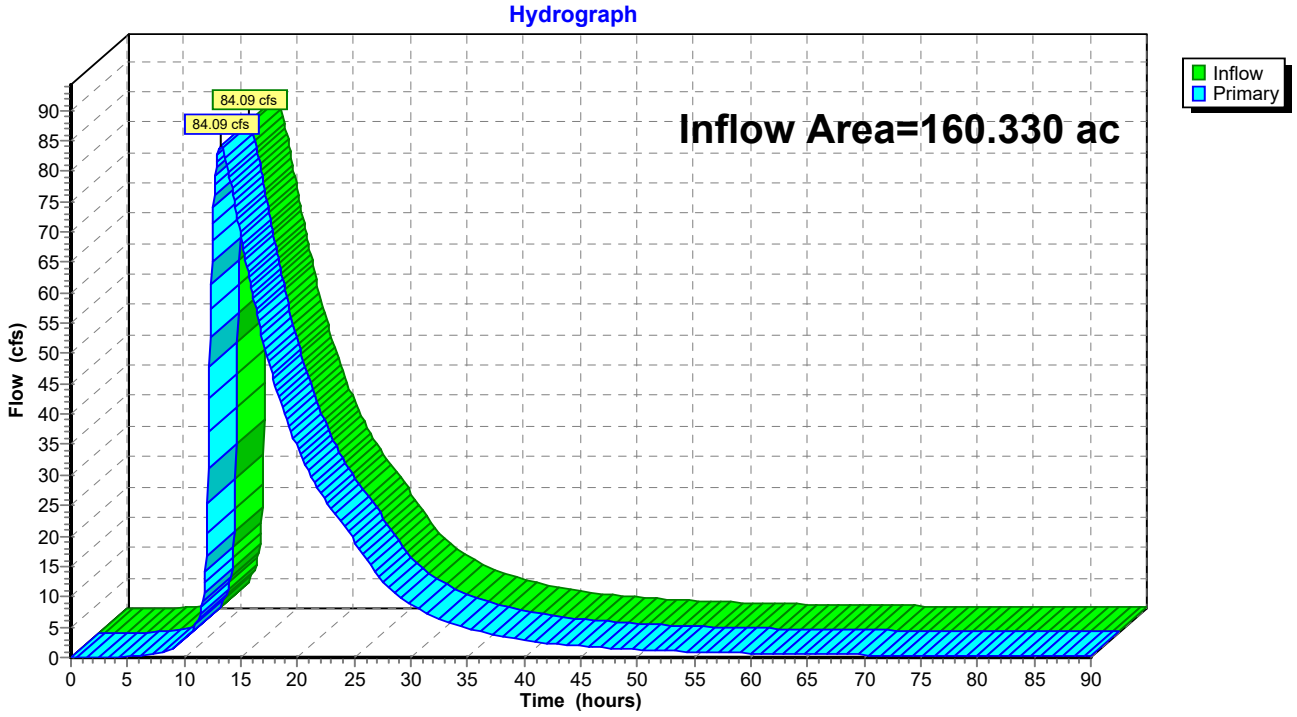


Summary for Link 5L: DISCHARGE POINT 1

Inflow Area = 160.330 ac, 40.53% Impervious, Inflow Depth > 4.79" for 100-YR-24 HR event
Inflow = 84.09 cfs @ 13.21 hrs, Volume= 63.946 af
Primary = 84.09 cfs @ 13.21 hrs, Volume= 63.946 af, Atten= 0%, Lag= 0.0 min
Routed to Link 7L : LOWER BRANCH RUSH RIVER

Primary outflow = Inflow, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Link 5L: DISCHARGE POINT 1

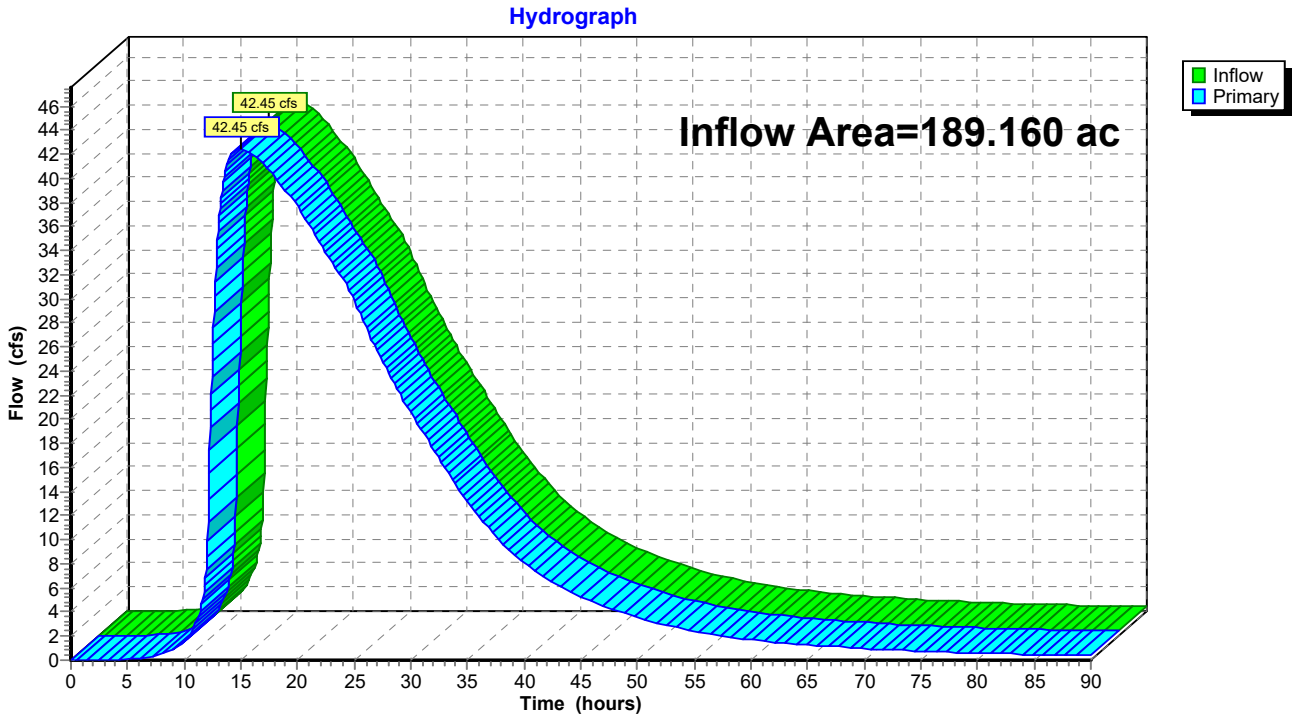


Summary for Link 6L: DISCHARGE POINT 3

Inflow Area = 189.160 ac, 21.52% Impervious, Inflow Depth > 4.47" for 100-YR-24 HR event
Inflow = 42.45 cfs @ 14.94 hrs, Volume= 70.499 af
Primary = 42.45 cfs @ 14.94 hrs, Volume= 70.499 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Link 6L: DISCHARGE POINT 3

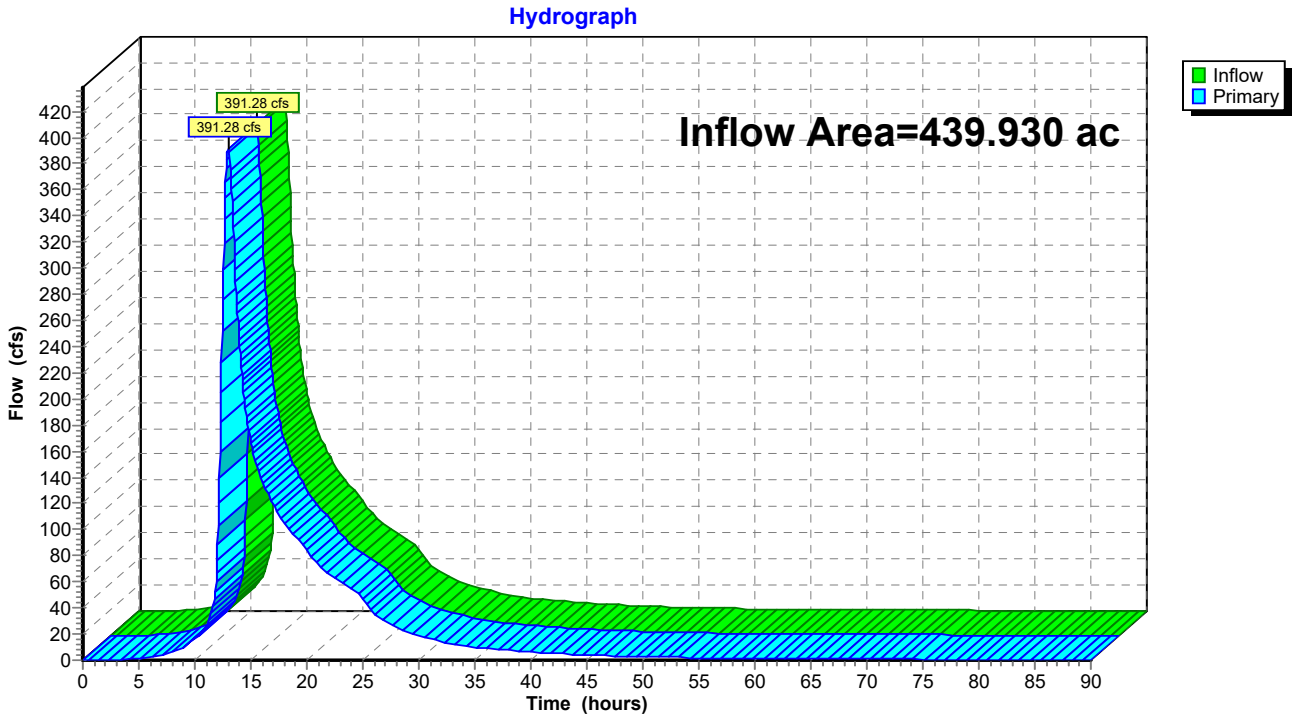


Summary for Link 7L: LOWER BRANCH RUSH RIVER

Inflow Area = 439.930 ac, 26.84% Impervious, Inflow Depth > 4.75" for 100-YR-24 HR event
Inflow = 391.28 cfs @ 12.98 hrs, Volume= 174.068 af
Primary = 391.28 cfs @ 12.98 hrs, Volume= 174.068 af, Atten= 0%, Lag= 0.0 min

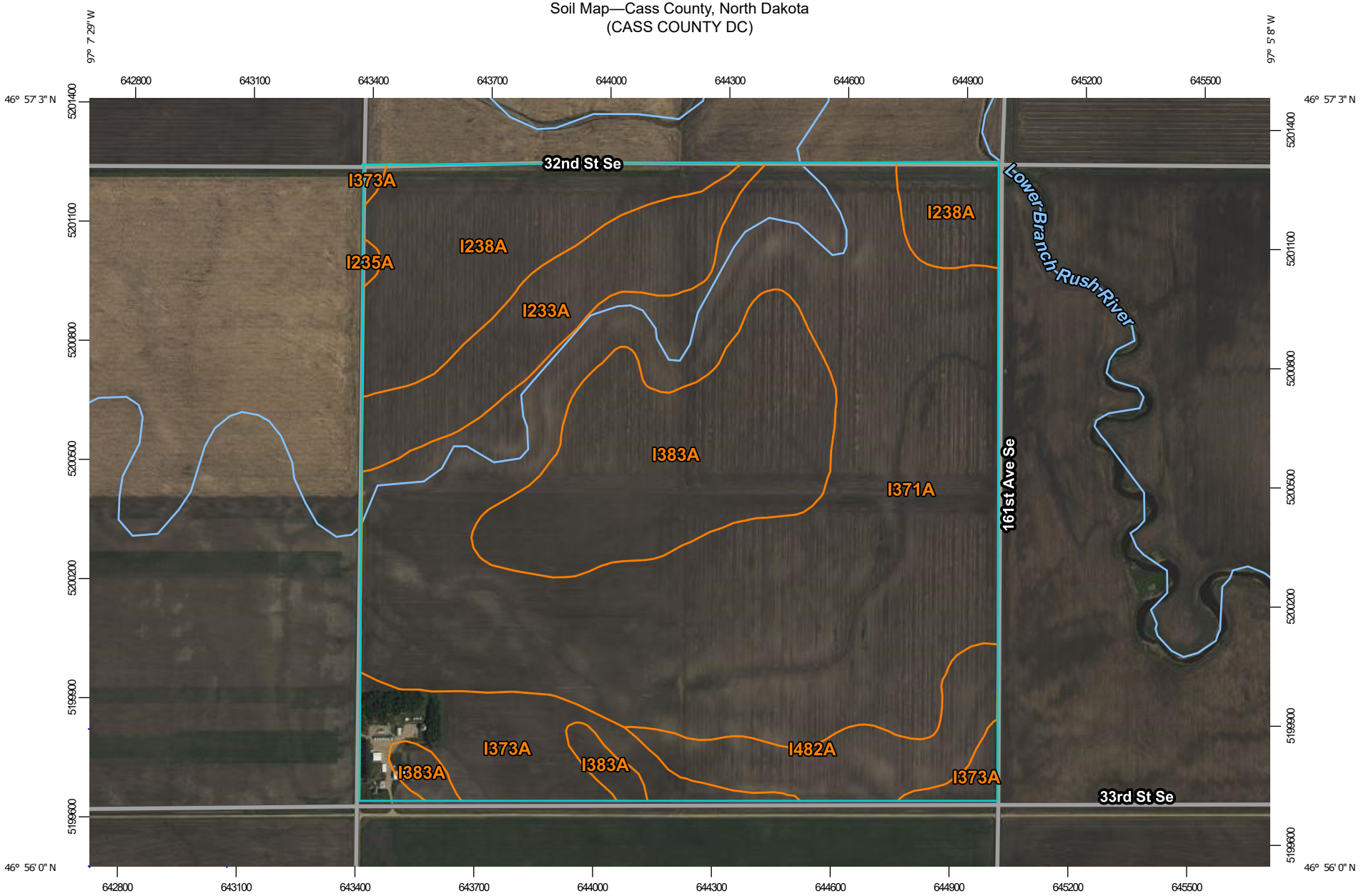
Primary outflow = Inflow, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Link 7L: LOWER BRANCH RUSH RIVER



Appendix 3. Web Soil Survey

Soil Map—Cass County, North Dakota
(CASS COUNTY DC)



Map Scale: 1:13,600 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 200 400 800 1200

Feet: 0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Cass County, North Dakota
Survey Area Data: Version 26, May 4, 2026

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

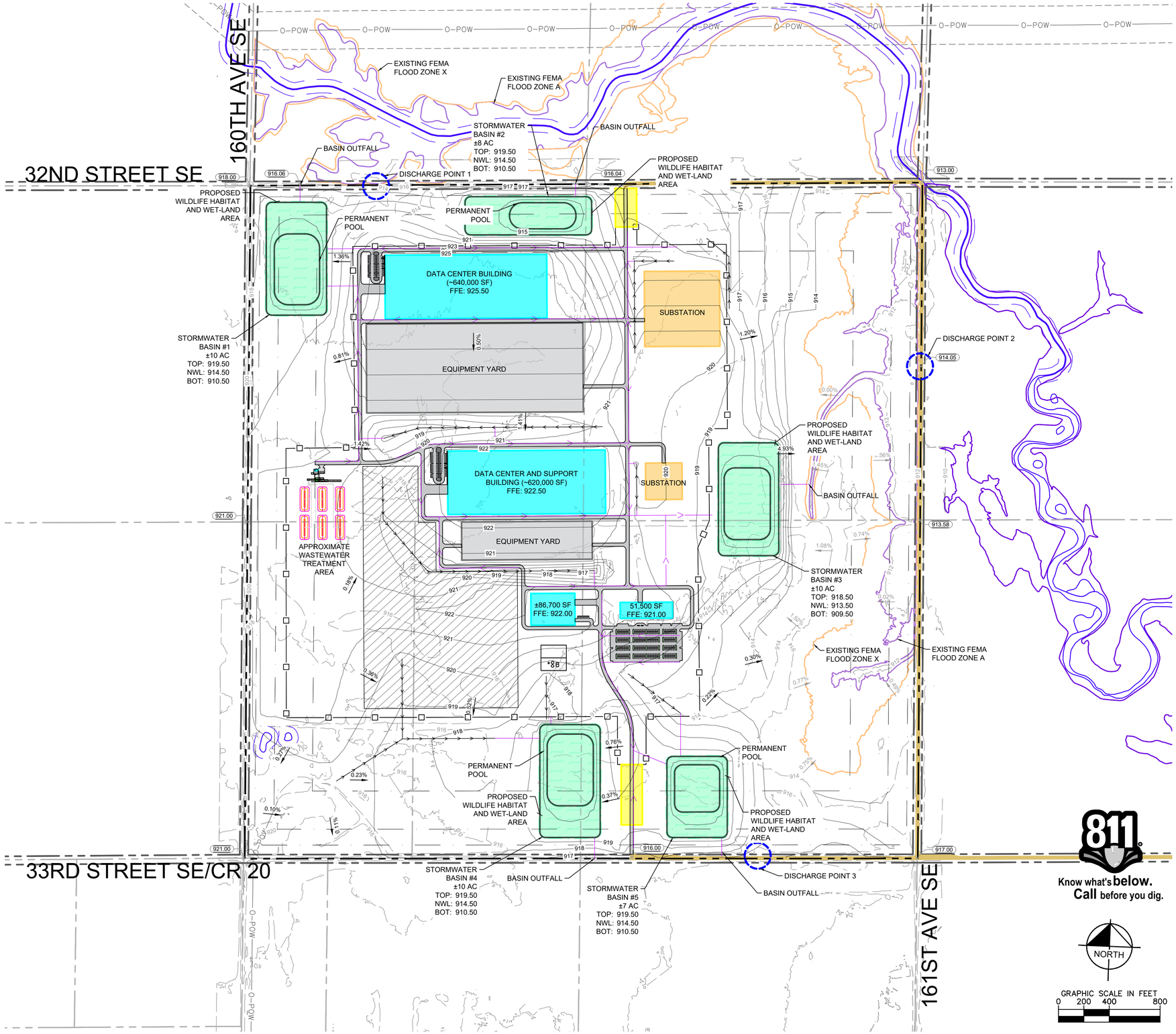
Date(s) aerial images were photographed: May 24, 2021—Jun 12, 2021

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
I233A	Fargo silty clay loam, 0 to 1 percent slopes	49.0	7.7%
I235A	Fargo silty clay, depressional, 0 to 1 percent slopes	0.9	0.1%
I238A	Fargo-Hegne silty clays, 0 to 1 percent slopes	80.8	12.6%
I371A	Bearden-Kindred silty clay loams, 0 to 2 percent slopes	328.3	51.3%
I373A	Kindred-Bearden silty clay loams, 0 to 2 percent slopes	47.5	7.4%
I383A	Overly silty clay loam, 0 to 2 percent slopes	99.1	15.5%
I482A	Overly-Bearden silt loams, 0 to 2 percent slopes	34.7	5.4%
Totals for Area of Interest		**640.4**	**100.0%**

Appendix 4. Grading and Drainage Plan and Drainage Details



LEGEND

- PROPERTY LINE
- EXISTING CONTOUR
- PROPOSED CONTOUR
- FEMA FLOODPLAIN - ZONE A
- FEMA FLOODPLAIN - ZONE X
- PROPOSED STORM SEWER
- PROPOSED SWALE
- PROPOSED DRAINAGE DIRECTION AND SLOPE
- EXISTING DRAINAGE DIRECTION AND SLOPE

GRADING PLAN NOTES

1. PRELIMINARY GRADING PLAN NOT FOR CONSTRUCTION.
2. REFER TO THE UTILITY PLANS FOR LAYOUT FOR PROPOSED SANITARY SEWER, WATER MAIN, AND OTHER BUILDING UTILITY SERVICE CONNECTIONS.

Know what's **below.** **Call** before you dig.

NORTH

GRAPHIC SCALE IN FEET
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No.	REVISIONS	DATE	BY

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KHA PROJECT 161211023
DATE 9/15/2026
SCALE AS SHOWN
DESIGNED BY LHC
DRAWN BY SKB
CHECKED BY NMB

PRELIMINARY GRADING AND DRAINAGE PLAN

HARMONY ENERGY PARK
PREPARED FOR
CCDC ND, LLC
HARMONY TOWNSHIP NORTH DAKOTA

SHEET NUMBER
C-03

K:\TCW_LDEV\Geronimo Power\ND-Cass-DC\13 Design\CAD\PlanSheets\2026-0630 CUP\C-04 GRADING AND DRAINAGE PLAN.dwg September 15, 2026 - 3:06pm
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Appendix 10 Traffic Study and Preliminary Roadway Exhibits

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MEMORANDUM

To: Geronimo Team

Date: September 14th, 2026

Subject: Desktop Traffic Report for Harmony Energy Park – Cass County, ND

This memorandum documents a desktop traffic study for the proposed Harmony Energy Park in Cass County, ND. The project site is generally located between 160th Avenue SE and 161st Avenue SE in the east–west direction and is bounded by 32nd Street SE and 33rd Street SE in the north–south direction. The site is located directly south of Newman in Cass County, North Dakota, as illustrated in **Figure 1**.

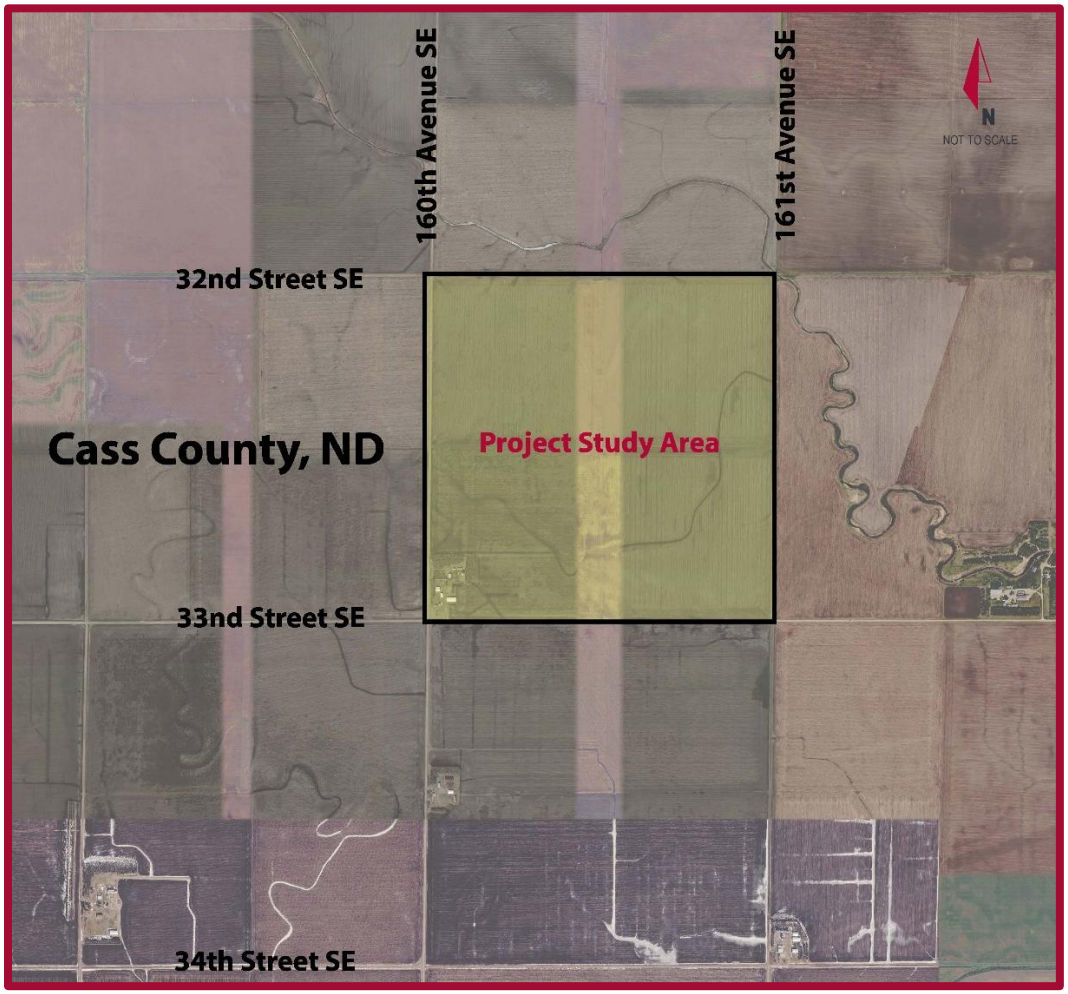


Figure 1 - Vicinity Map

Existing Conditions

The proposed Harmony Energy Park site development is located between 160th Avenue SE and 161st Avenue SE in the east–west direction and is bounded by 32nd Street SE and 33rd Street SE in the north–south direction. The following provides a detailed description of the surrounding roadways.

32nd Street SE. 33rd Street SE, and 34th Street SE function as rural township roadways providing east-west connectivity and local access to surrounding agricultural land uses. Both roadways are expected to operate as two-lane undivided facilities with typical statutory rural speed limits of 55 mph. 33rd Street east of County Road 11 is County Road 20.

160th Avenue SE, 161st Avenue SE, and 165th Avenue SE are north-south rural local roadways serving adjacent agricultural properties and providing site access. These facilities are anticipated to operate as two-lane undivided roadways with typical rural speed limits of 55 mph. 165th Avenue SE is County Road 15 south of County Road 10.

Figure 2 below shows the site in red and the surrounding roadways. Grey dashed lines are township gravel or dirt roads, yellow and black dashed roads are County gravel roads, solid red are paved state roads, solid green is the interstate, and solid yellow are paved county roads. Roadway information is from the Cass County Roadway Map.

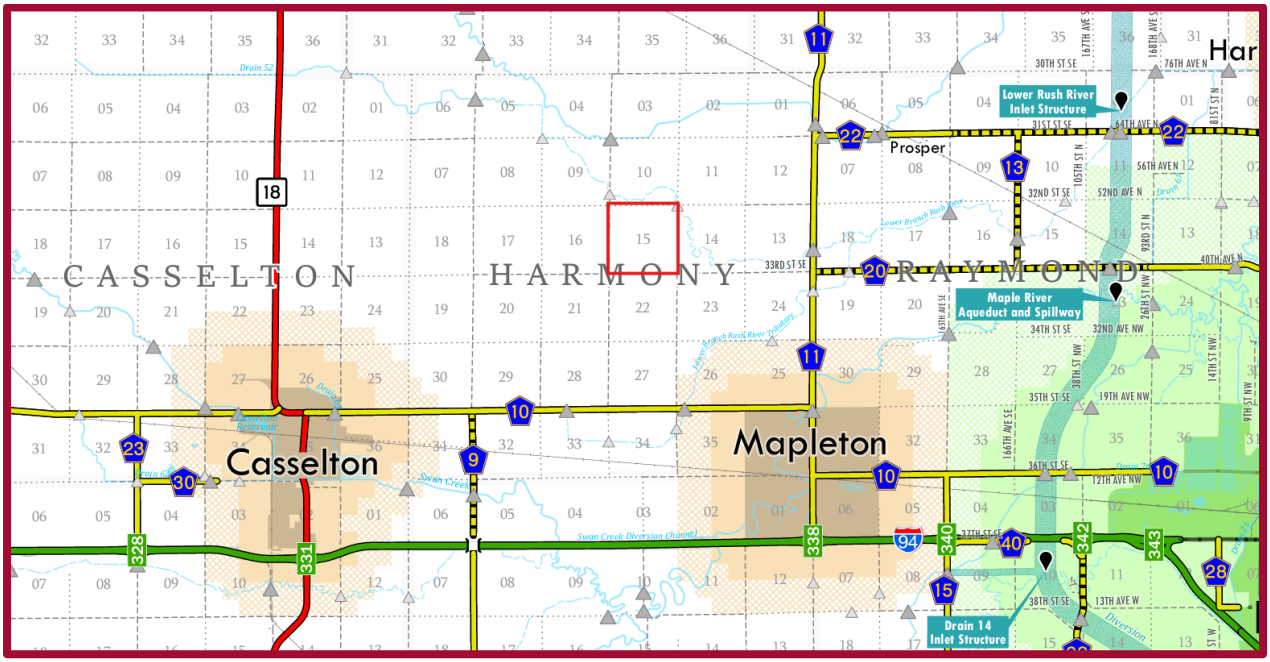


Figure 2 – Roadway Jurisdiction Map

All roadways within the study area have right-of-way (ROW) limits of at least 66' wide (33' each side of the centerline) unless noted otherwise. The following roadways have ROW limits differing from 66' or have variable ROW limits.

- 33rd Street SE / County Road 20 / 40th Avenue NW ROW: varies between 66' to 150"
- 35th Street SE / County Road 10 ROW: 150'

- 153rd venue SE / County Road 23 ROW: 200’
- North Dakota Highway 18 ROW: variable (greater than 66’)
- County Road 11 / 163rd Avenue SE ROW: variable (greater than 66’)
- County Road 15 / 165th Avenue ROW: variable (greater than 66’)

Site Access Requirements

The surrounding roadway network that provides access to the proposed site in Cass County is regulated by NDDOT, Cass County, and the Harmony Township based on roadway jurisdiction.

Under the Cass County (ND) Highway Access Ordinance, minimum access spacing is set at approximately ½ mile on higher-speed county roads outside municipal limits and approximately ¼ mile within incorporated areas, reflecting differences in operating speeds and access demand.

Access spacing along NDDOT facilities is guided by the NDDOT Design Manual and evaluated based on roadway classification, speed, and operational context. Direct access to arterial roadways is generally minimized, with preference given to consolidated or shared access and connections to lower classification.

Cass County classifies the proposed site land primarily as agricultural. The current site plan includes approximately 1,260,000 SF of data center buildings, two equipment yards, a 86,000 SF support building, a 51,500 SF admin building, three substations, and two secured access points. The primary access driveway would be located along 33rd Street SE. One secondary access would be provided along 32nd Street SE.

Figure 3 below shows the general layout of the proposed site, including the accesses. Note that the site plan is subject to change and that the density of the development shown below may increase or decrease.

33rd Street SE is currently a two-lane unpaved roadway near the proposed site. Turn lanes at the primary access point on 33rd Street SE will likely be required to accommodate the Harmony Energy Park development, with final mitigation measures to be determined through coordination with Cass County as part of the traffic study.

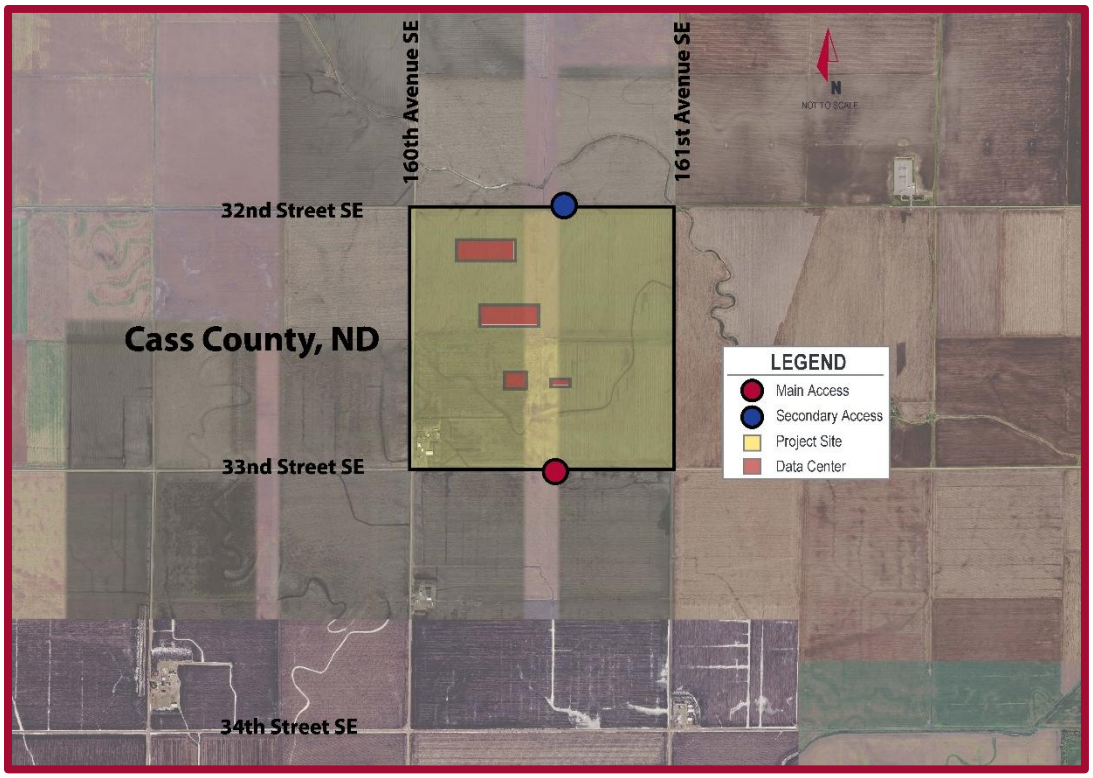


Figure 3 - Access Location

Trip Generation

The data center buildings total approximately 1,260,000 SF. Trip generation for the proposed development was estimated using the Institute of Transportation Engineers (ITE) Trip Generation Manual, 12th Edition. Standard ITE rates were applied, using the average peak hour of adjacent street rate for the proposed land use to estimate site-generated trips. Land Use Code (LUC) 160 – Data Center was used for the analysis. The resulting trip generation is summarized in **Table 1**.

Table 1 - Trip Generation

Land Use Description	Operational Traffic						
	Daily Trips	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
LUC 160 – Data Center	920	63	25	88	12	51	63

Trip generation was calculated for daily traffic and peak hour street traffic for both AM and PM peak periods. The data center buildings are expected to generate 920 daily trips with 88 trips occurring in the AM peak hour (63 entering and 25 exiting) and 63 trips in the PM peak hour (13 entering and 51 exiting).

Trip generation for the construction of the proposed site was based on known trip generation patterns exhibited by developments similar to the proposed Harmony Energy Park site. For the purpose of this analysis, it is assumed that around 1,500 construction workers will be on site per day, with shifts entering and exiting the site over a couple hour period in the AM and PM peak hours. Furthermore, the majority of site trips during the AM peak are expected to be entering trips while the opposite is true for the PM peak (the majority are exiting trips). The construction trip generation characteristics are summarized in **Table 2**.

Table 2 - Construction Trip Generation

Land Use Description	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Construction	595	65	660	55	485	540

The proposed site construction is anticipated to generate 660 AM peak hour trips (595 entering and 65 exiting) and 540 PM peak hour trips (55 entering and 485 exiting).

TRIP DISTRIBUTION

The distribution of traffic to the proposed development was based on review of the nearby roadway characteristics, existing traffic patterns, and professional judgement. The following global distribution was determined for trips entering and exiting the proposed development:

- 80% to/from the east from the Greater Fargo Area
- 20% to/from the west on I-94

Figure 4 shows the surrounding roadway network serving the site relative to the proposed trip generation.

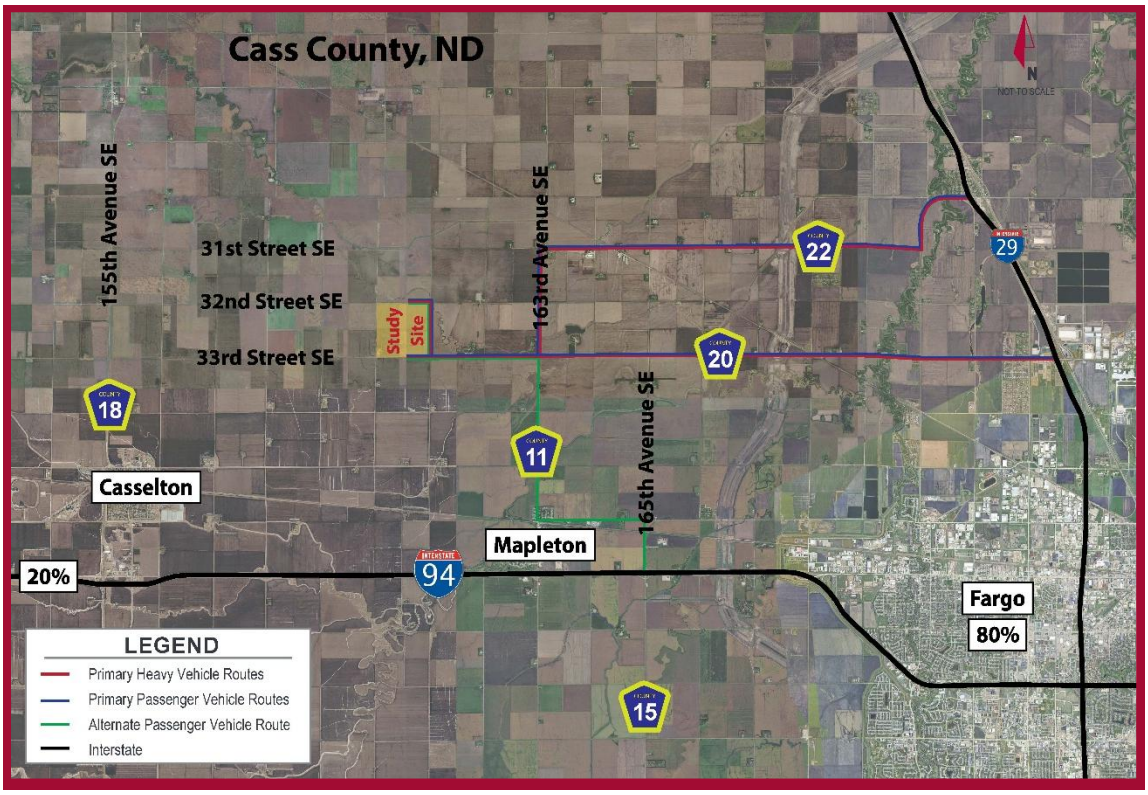


Figure 4 – Trip Distribution

Traffic Impact Analysis Requirements

In North Dakota, the requirement for a Traffic Impact Analysis (TIA) is determined on a case-by-case basis by the North Dakota Department of Transportation (NDDOT) and/or the applicable local jurisdiction. A TIA is typically requested when a proposed development is expected to generate traffic volumes that may impact roadway operations, safety, or access along adjacent facilities.

A Traffic Impact Analysis (TIA) is anticipated to be required for the Harmony Energy Park site due to the number of peak hour traffic generation and the project's interaction with the surrounding roadway network. While North Dakota does not establish a formal trip-based threshold, peak hour volumes exceeding approximately 100 vehicles are commonly used as an initial screening criterion to identify developments that may warrant further operational analysis.

Seasonal load restrictions may also influence construction traffic routing and timing, particularly during spring thaw conditions. Final mitigation requirements will be determined through coordination with Cass County and NDDOT and may be refined through a Traffic Impact Analysis (TIA).

Construction Traffic

Construction traffic associated with the proposed development is anticipated to primarily originate from regional aggregate sources, concrete batch plants, and material suppliers located within Cass County and the greater Fargo–Moorhead metropolitan area, as well as adjacent portions of eastern North Dakota and

western Minnesota. Haul traffic is expected to utilize key regional corridors including I-29 and I-94 with access to the project site provided via connecting Cass County highways.

Construction routing assumptions consider NDDOT designated truck route networks and applicable seasonal load restrictions which limit allowable axle and gross vehicle weights on state and local roadways during periods of reduced pavement strength. These restrictions are enacted based on real-time weather and roadway conditions to minimize structural damage and are commonly applied to state highways and local county roads, while the Interstate system typically remains unrestricted. Accordingly, heavy construction traffic would be expected to remain on higher-order facilities to the extent practicable during restricted periods, with reduced load hauling or alternative routing required on posted segments.

Based on the surrounding roadway network and review of NDDOT functional classification and mapping applications, the primary truck routes serving the study area are I-94, I-29, and State Route 18. These facilities provide direct regional connections for freight movement and accommodate heavy vehicle traffic traveling to and from the study site.

Based on the surrounding roadway network and existing infrastructure, the CR 20 or CR 22 corridors are expected to serve as a primary route for construction traffic associated with the proposed Harmony Energy Park development due to its direct connection to I-29. At least one of these routes will require paving to accommodate heavy vehicle traffic. Recent reconstruction of the CR 20 and CR 22 bridges over the Red River Diversion as part of the FM Area Diversion Project has enhanced ability to accommodate heavy vehicle traffic and support regional freight movement between Cass County and the Interstate system.

Existing bridges located along the primary construction routes were identified using information from the National Bridge Inventory. A review of the available bridge data indicates that no posted load restrictions are currently identified on bridges located along the anticipated primary construction routes. As such, the roadway network is generally expected to accommodate construction-related truck traffic, subject to applicable seasonal load restrictions and any future roadway maintenance activities.

Construction route signage should be implemented at all turning movements along the construction route from I-29 to the proposed site. Coordination with the Harmony Township Road Supervisor will be required to approve a traffic control plan.

Preliminary Traffic Mitigation & Construction Route Assumptions

Based on the existing rural roadway network and anticipated site-generated traffic, the following preliminary mitigation measures are expected:

- **Primary Site Access Point**
  The primary site access will likely require improvements to accommodate turning movements, including potential turn lanes, and localized widening as needed based on final construction vehicle routing. These improvements will be needed to support heavy vehicle traffic and maintain safe access operations.

- **Adjacent Roadway Network**
  Surrounding county and township roads are typically narrow and may have limited structural capacity. As a result, paving the primary routes to the site will be necessary.

The proposed passenger vehicle and construction vehicle routes are shown in **Exhibit 1**. The exhibit presents two primary routes for passenger vehicle and construction vehicle traffic. It was assumed only one of these routes would be eventually designated as the "primary route" and be fully paved. The following describes the proposed primary routes to the proposed development.

- **Exit 69 (I-29) to CR 20 to the site access**
- **Exit 72 (I-29) to CR 22 to CR 11 to CR 20 to the site access**

The Exit 69 route provides a more direct route to the site and is a shorter route for vehicles approaching from the Greater Fargo Area. Existing bridge infrastructure along both routes is expected to be adequate for construction related heavy vehicle traffic.

The average annual daily traffic (AADT) along CR 20 near the I-29 interchange is approximately 3,200 vehicles per day (vpd), while CR 22 near the I-29 interchange carries approximately 2,300 vpd. AADT values were sourced from NDDOT traffic data and both values were recorded in 2025. The proposed Harmony Energy Park is anticipated to generate over 2,000 daily vehicle trips during construction. Given the relatively low existing traffic volumes on the surrounding roadway network, adequate capacity is expected to accommodate the additional traffic without resulting in significant operational impacts.

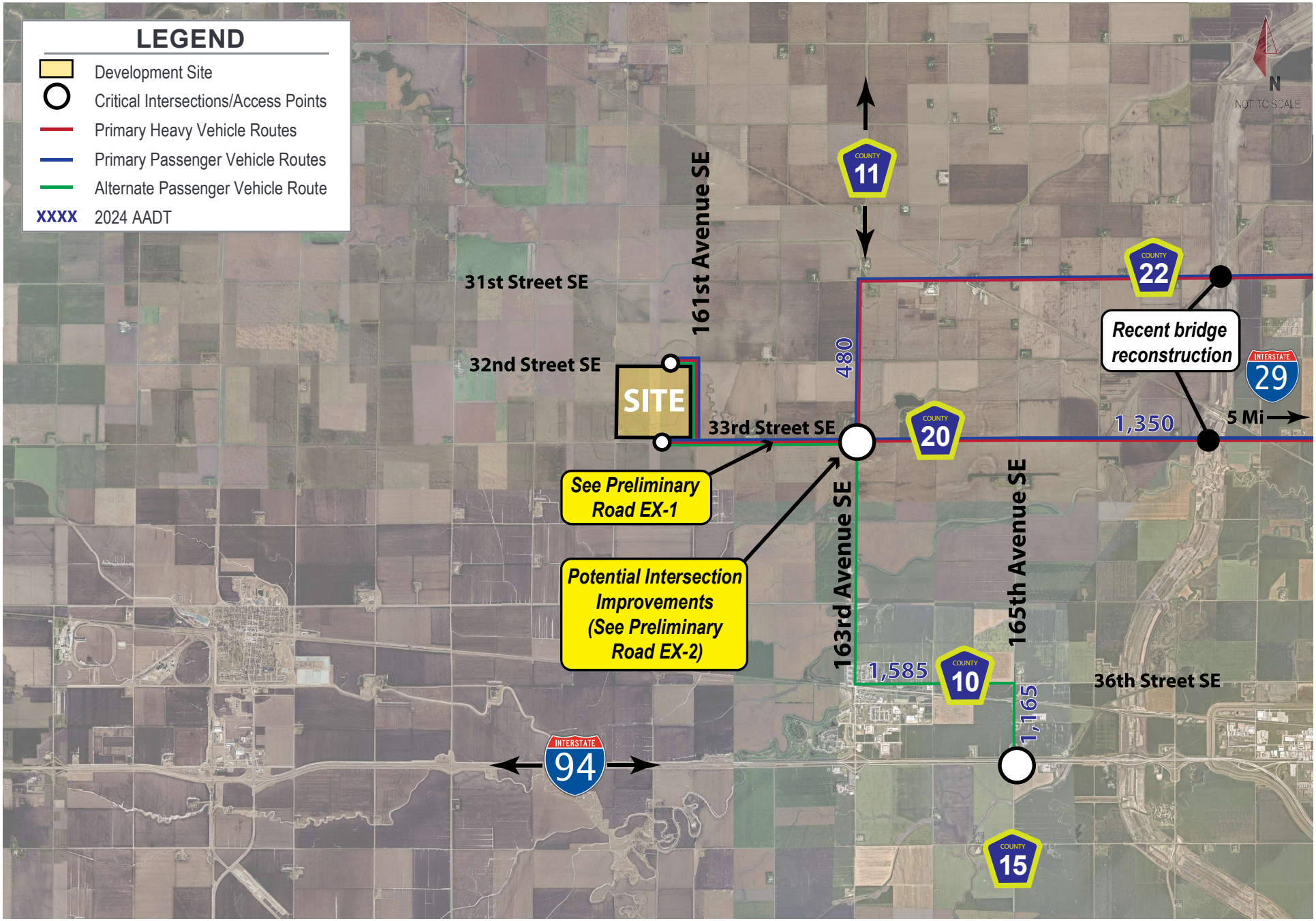
With the addition of site generated traffic along the primary routes, unpaved portions of the routes will require paving. Paved and unpaved distances along the primary routes are presented in **Table 3**. The existing conditions of the surrounding roadway system are shown in **Exhibit 2**.

Table 3 - Construction Route Road Inventory

Exit 69 (I-29) to CR 20 to the site access		
Roadway	**Paved (mi)**	**Unpaved (mi)**
CR 20 / 33rd Street SE (I-29 to Main Access)	4.5	7.5
161st Avenue SE (CR 20 to 32nd Street SE)	0	1
32nd Street SE (161st Avenue SE to Secondary Access)	0	0.5
TOTAL	**4.5**	**9**
Exit 72 (I-29) to CR 22 to CR 11 to CR 20 to the site access		
Roadway	**Paved (mi)**	**Unpaved (mi)**
CR 17 / CR 22 (I-29 to 31st Street SE)	2	0
CR 22 / 31st Street SE (I-17 to CR 11)	2	5
CR 11 / 163rd Avenue SE (CR 22 to CR 20)	2	0
CR 20 / 33rd Street SE (CR 13 to Main Access)	0	2.5
161st Avenue SE (CR 20 to 32nd Street SE)	0	1
32nd Street SE (161st Avenue SE to Secondary Access)	0	0.5
TOTAL	**6**	**9**

Both primary routes identified in this study would require approximately 9.0 miles of roadway paving to accommodate site-generated traffic. The County has indicated plans to pave one route, while the project would address improvements attributable to the proposed development. Using a planning-level estimate of $900,000 per mile for a rural two-lane road, and including a 35% contingency, each route improvement cost is estimated at approximately $8.1 million for the 9.0 miles identified in Table 3. Note that this estimate is

assuming only one route will ultimately be built out. While it is anticipated that all improvements can be accommodated within the existing right-of-way, the cost estimate excludes potential right-of-way acquisition and utility relocation. Preliminarily, it is anticipated that design and construction for potential off-site improvements would be 12 months. Note, that timelines are subject to change as more information becomes available.

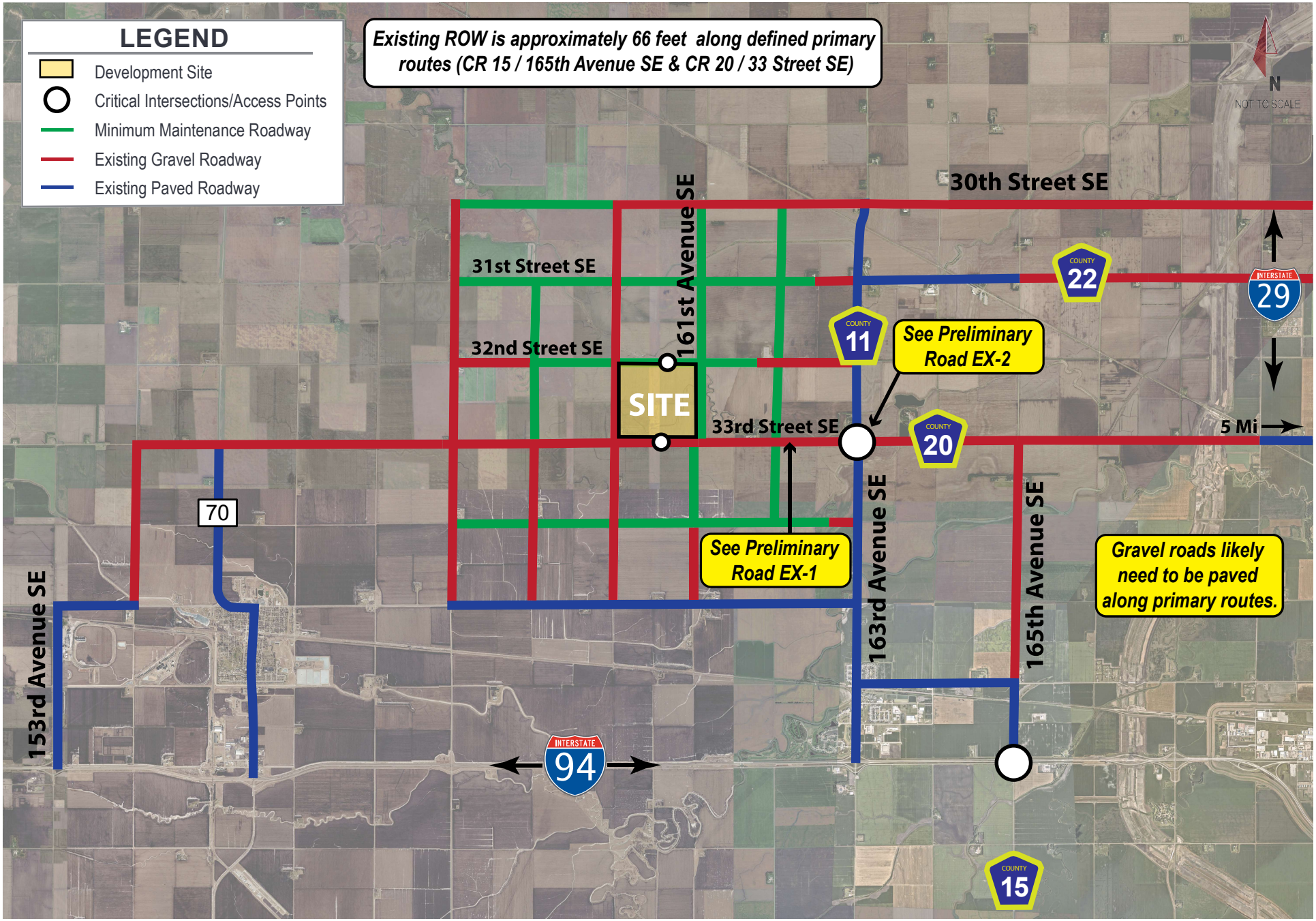


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EXHIBIT 1

ACCESS ROUTING AND POTENTIAL IMPROVEMENTS

HARMONY ENERGY PARK — Harmony Township, ND

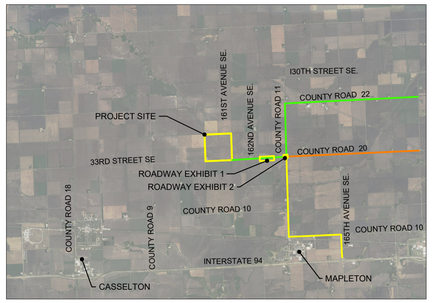


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EXHIBIT 2

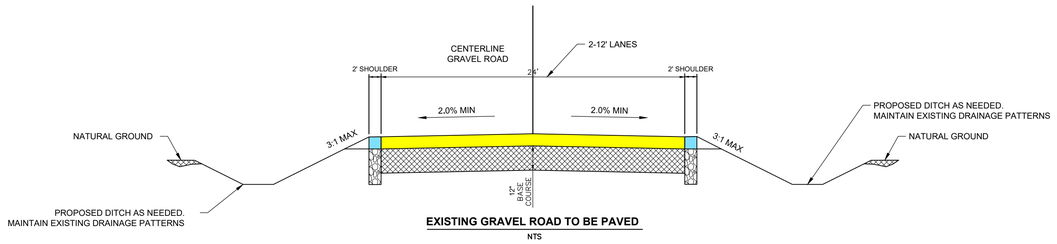
EXISTING ROADWAY CONDITIONS

HARMONY ENERGY PARK — Harmony Township, ND



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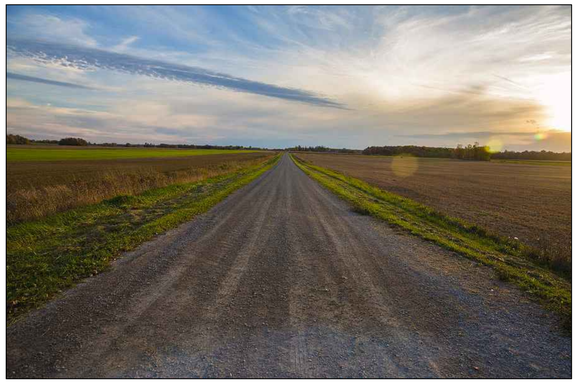


EXISTING GRAVEL ROAD TO BE PAVED
NTS

SECTION DETAIL OF 33RD STREET SE PROPOSED IMPROVEMENTS

LEGEND

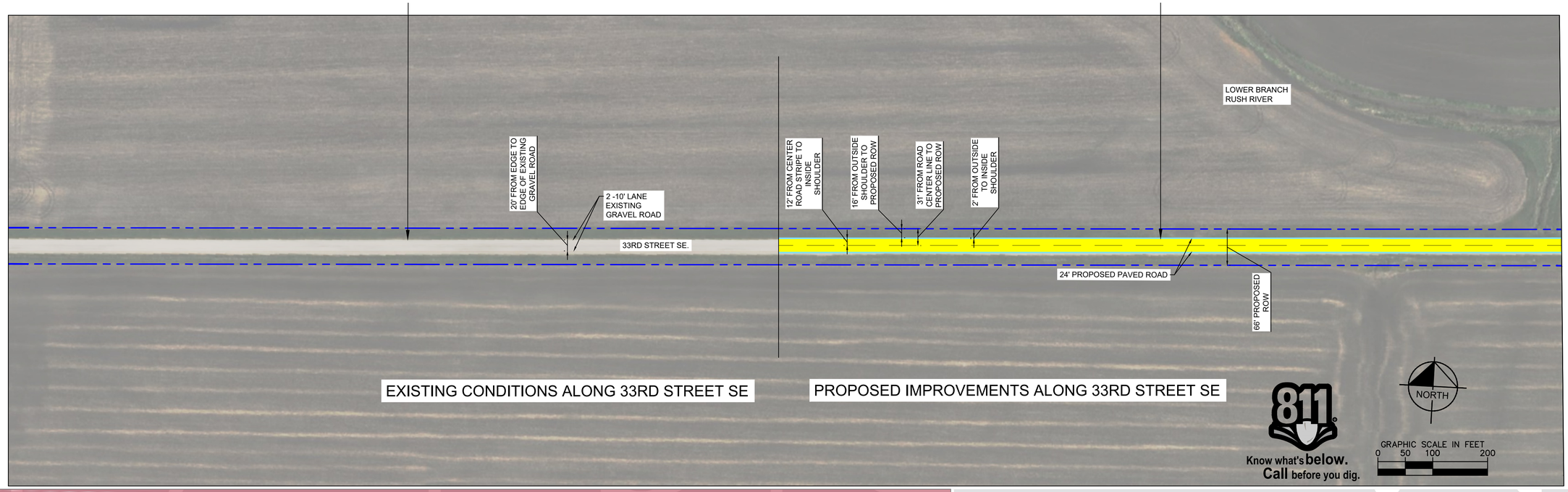
- PROPOSED PAVED ROAD
- EXISTING GRAVEL ROAD
- PROPOSED SHOULDER
- PROPOSED ROW
- CENTER ROAD STRIPE
- STOP SIGN



STREET VIEW OF 33RD ST. SE. LOOKING EAST



REPRESENTATIVE IMAGE OF SIMILAR RURAL TWO LANE PAVED ROAD



EXISTING CONDITIONS ALONG 33RD STREET SE

PROPOSED IMPROVEMENTS ALONG 33RD STREET SE

811 Know what's **below.** **Call** before you dig.

NORTH

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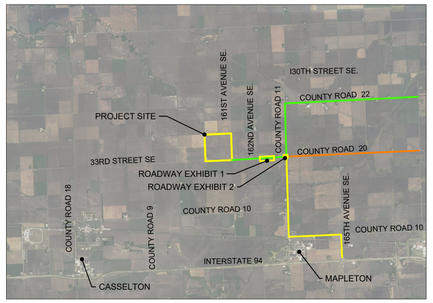
HARMONY ENERGY PARK | *PRELIMINARY ROADWAY EXHIBIT 1*

33RD STREET SE, Harmony Township, ND

Project # 161211023 9/14/26

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VICINITY MAP
NOT TO SCALE

NORTH



LEGEND

- PROPOSED PAVED 2-LANE ROAD
- EXISTING GRAVEL ROAD
- EXISTING PAVED ROAD
- PROPOSED RIGHT TURN LANE
- PROPOSED SHOULDER
- EXISTING SHOULDER
- PROPOSED ROW
- CENTER ROAD STRIPE
- EXISTING STOP SIGN

811 Know what's **below.** **Call** before you dig.

NORTH

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HARMONY ENERGY PARK | *PRELIMINARY ROADWAY EXHIBIT 2*

CR-20 AND CR-11, Harmony Township, ND

Project # 161211023 9/14/26

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Appendix 11. Noise Study

Noise Modeling Report

9/15/2026

Harmony Energy Park

CCDC ND, LLC



Paxwood Acoustics

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1.0 Introduction

CCDC ND, LLC ("Applicant") is planning to develop the Harmony Energy Park, 540 MW data center facility located in Harmony Township, Cass County, North Dakota ("Project"). Paxwood Acoustics was retained by the Applicant to conduct noise modeling of the Project.

Based on the information provided in this report, the Project is expected to produce sound levels that are not more than 40 dBA at the nearest nonparticipating residences. The projected sound levels are below the applicable limit in the Harmony Township Zoning Ordinance, which is discussed in Section 3.0 of this report.

This report includes:

- A description of the Project,
- Identification of the applicable noise standard,
- Sound propagation modeling methods and results,
- Identification of mitigation measures,
- Evaluation of the Project against the applicable noise standard, and
- Conclusions.

In addition, model input data is in Appendix A.

2.0 Project Description

The proposed Project is a 540 MW data center facility located on 33rd Street SE/County Road 20 in Harmony Township, North Dakota, on a parcel between 160th Ave SE and 161st Ave SE.

The primary equipment associated with the Project that has the potential to produce sound includes:

- Mechanical heat rejection equipment (chillers);
- Backup generators; and
- Substation main power transformers.

The final make and models of this equipment are yet to be determined, but for the purposes of this study, the sound modeling includes all equipment operating at 100% capacity simultaneously, including:

- air-cooled chillers;
- backup diesel generators; and
- main power transformers.

The mechanical equipment areas are planned for the inner portion of the parcel to utilize setbacks and the building structures as a noise mitigating element. Additionally, sound emissions associated with Otter Tail Power's utility substation have been included to show the cumulative sound level in the event that the utility substation is located within the Project site.

The area around the Project is composed primarily of agricultural land use with some rural residences. The closest nonparticipating residences are located approximately 1.25 miles to the east-southeast on 33rd Street SE and 1.5 miles southeast on 34th Street SE. There are also two participating residences that are closer to the Project, one on the southwest corner of the Project parcel, and the other about half a mile to the south on 160th Avenue SE. A map of the proposed Project and surrounding area is provided in Figure 1.

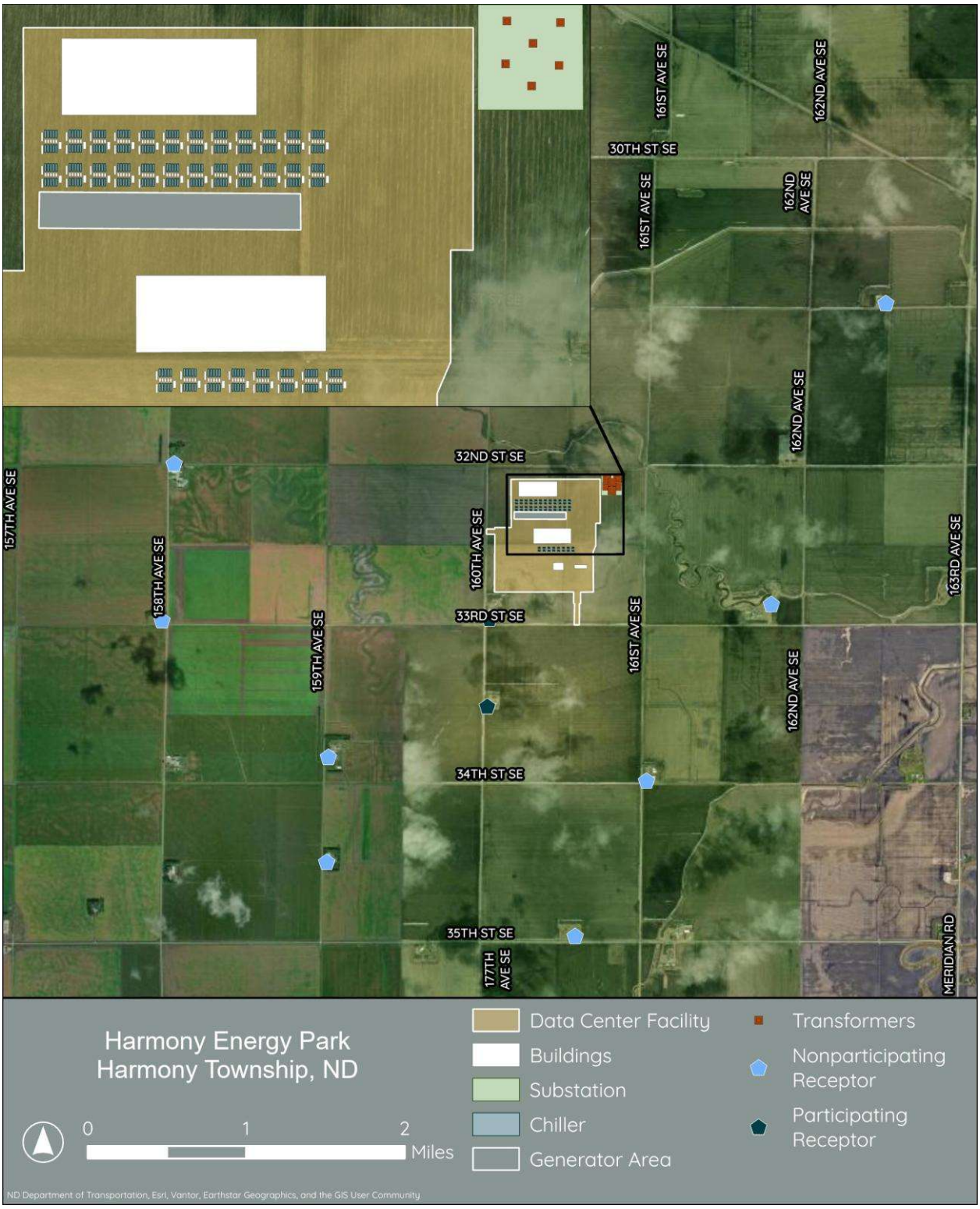


Figure 1: Map of the Project and Surrounding Area with an Enlarged Inset of the Project Site

3.0 Noise Standards

Harmony Township regulates noise from data centers in Section 6.21.2.4 of the zoning ordinance[1] ("Ordinance"), which states:

> ***Noise.*** *Excessive noise, whether high or low frequency, is a nuisance and the noise potential of a data center is incompatible with the agricultural and residential nature of the Township. Broadband, tonal, and impulsive exterior noise for a data center or any necessary appurtenances may not exceed 45 dBA within 100 feet of an inhabited residence or community building. Any application for a conditional use permit shall include a noise study demonstrating that the operation of the data center will comply with the Township's regulations related to noise. Twenty-four hour, real-time compliance monitoring for exterior noise levels by an independent third party contractor is required at the sole cost of applicant. Annual compliance reports shall be provided to the Township board of supervisors.*

Based on this, a limit of 45 dBA within 100 feet of an inhabited residence or community building is the criterion that is used for evaluating noise from the Project in this study.

[1] Harmony Township, Cass County, ND Zoning Ordinance, 2017, (Amended March 27, 2025 & July 21, 2026)

4.0 Sound Propagation Modeling

4.1 Modeling Procedure & Settings

Sound propagation modeling was completed using the modeling software CadnaA made by DataKustik GmbH. CadnaA implements the international sound propagation standard, ISO 9613-2 "Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation." Both CadnaA and the ISO 9613-2 standard are used by noise control professionals across the United States and are regularly relied upon by local and state jurisdictions. The model takes into account source sound emissions, topography, receptor locations, and several other factors. It conservatively calculates sound levels for meteorological conditions that are favorable for sound propagation, assuming that all receptors are downwind of the sound sources.

For this study, USGS terrain data was used for the Project to create the three-dimensional topography throughout the surrounding area. Other site features, including the proposed locations of equipment, the receptor locations, and Project boundaries, were provided by the Applicant. Model settings and input data are provided in Appendix B.

4.2 Modeled Sound Sources

The model included sound emissions from mechanical equipment yards that included air-cooled chillers and backup generators along with main power transformers at the Project substation.

Modeled sound power levels for the equipment and mechanical yards are provided in Appendix B.

4.3 Model Results

The model included two scenarios. The first scenario ("Maximum Cooling") included all air-cooled chillers operating at 100% capacity and all transformers operating in second-stage cooling (fans-on). This is a conservative model scenario to account for the possibility of maximum cooling needs.

The second scenario ("Maximum Cooling with Backup Power") is the same as the first scenario but also includes all backup generators operating simultaneously.

Model results for both scenarios were calculated throughout the Project area at a grid of receptors. Based on the grid of receptors, sound level isolines were generated throughout the area so that the projected sound levels could be shown. Additionally, discrete

receptors were placed within 100 feet of the nearest inhabited residences at a height of 5 feet (1.5 meters) above the ground. The scenario-specific results are presented below.

Maximum Cooling

The results for the Maximum Cooling scenario are presented in Figure 2. The model results are presented in two formats:

- Sound level isolines ranging from 60 dBA (solid purple line) to 30 dBA (solid dark blue line). The gray dashed lines between each solid color line represent 1 dB intervals. This format shows the projected sound levels at locations throughout the Project area.
- The highest projected sound level within 100 feet of each of the nine nonparticipating residences is labeled next to the corresponding receptor.

As shown in Figure 2, the sound levels decrease with increasing distance from the Project site as a result of geometric divergence, atmospheric attenuation, and ground effects. At one mile from the Project, the projected sound level is approximately 39 dBA or less under this scenario. The highest projected sound level under the maximum cooling scenario at a nonparticipating residence is 39 dBA.

Maximum Cooling with Backup Power

Results for the Maximum Cooling with Backup Power scenario are presented in Figure 3, in the same format as the previous figure. Under this scenario the sound levels at one mile from the Project are approximately 40 dBA or less, and the highest projected sound level at a nonparticipating residence is 40 dBA.

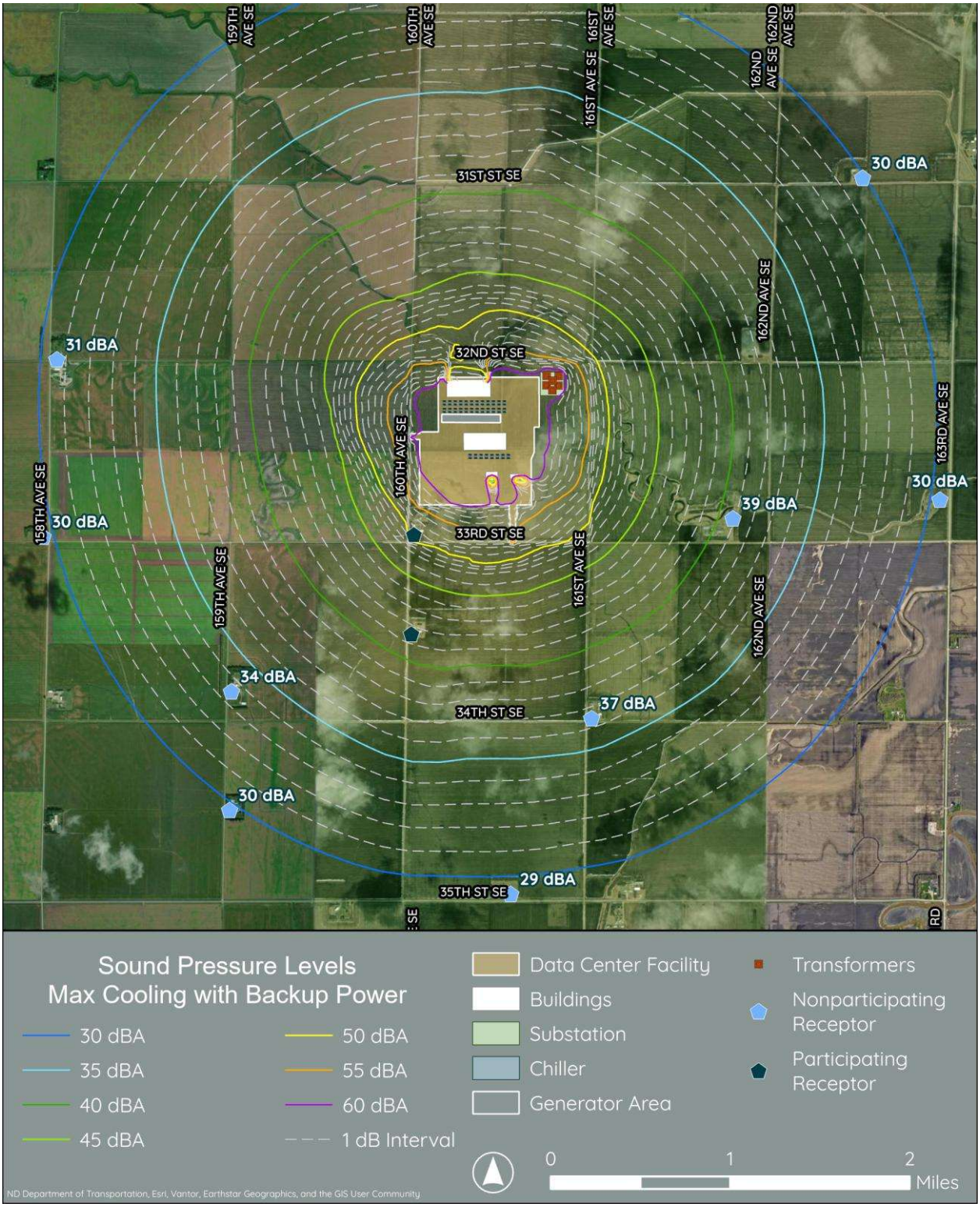


Figure 2: Map of Modeled Sound Pressure Levels, Max Cooling Scenario

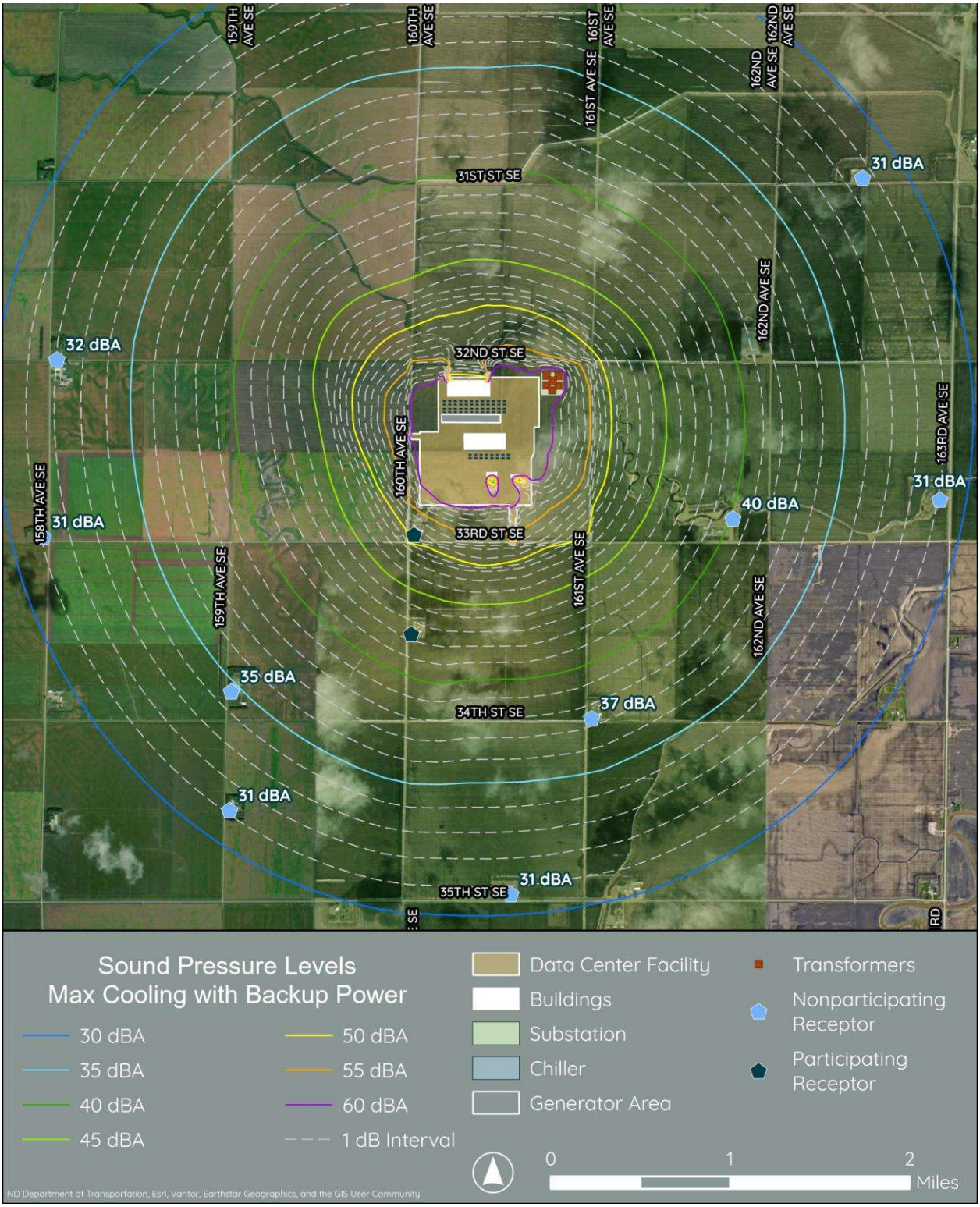


Figure 3: Map of Modeled Sound Pressure Levels, Max Cooling with Backup Power Scenario

5.0 Mitigation

The plan assessed in this report includes mitigation to reduce the potential noise impacts. These mitigation measures include:

- Strategic placement of the mechanical equipment yards near the center portion of the Project parcel to increase the setback between the primary sound sources and residences.
- Utilization of the data center hall buildings and other smaller buildings to block some of the sound from the mechanical equipment yards from propagating in the direction of the closest residences.
- For the air-cooled chillers, installing manufacturer-provided internal discharge compressor mufflers with sound enclosure and sound wrap on the discharge line. This sound attenuation package used in the model provides a 3 dBA reduction in overall sound power level when operating at 100% load.
- Installing hospital-grade silencers on each generator exhaust that provide an approximately 40 dBA reduction in exhaust noise. The attenuation by octave band used in this study is provided in Appendix B.
- Installing each generator in a sound attenuating enclosure that provides approximately 25 dBA of attenuation. The attenuation by octave band used in this study is provided in Appendix B.

6.0 Conclusions

Paxwood Acoustics conducted a noise modeling study of the proposed Harmony Energy Park in Harmony Township, North Dakota. This report included identification of the primary Project equipment that can create sound, a discussion of the applicable noise limits in the Harmony Township Zoning Ordinance, sound propagation modeling to project operational sound levels throughout the surrounding area, and identification of mitigation measures to reduce potential noise impacts.

As discussed in Section 4.0, sound propagation modeling was completed with CadnaA using ISO 9613-2, which calculates projected sound levels under meteorological conditions that are favorable for propagation. Two conservative scenarios were evaluated in the model. Under the Maximum Cooling scenario, with all chillers operating at 100% capacity and all main power transformers in second-stage (fans-on) cooling, the highest projected sound level within 100 feet of a nonparticipating residence is 39 dBA. Under the Maximum Cooling with Backup Power scenario, which adds all backup generators operating simultaneously, the highest projected sound level within 100 feet of a nonparticipating residence is 40 dBA. Projected sound levels under both scenarios fall below the 45 dBA limit in the Ordinance, with a margin of approximately 5 to 6 dB at the nonparticipating residence with the highest projected sound level.

The projected sound levels depend on the mitigation described in Section 5.0, all of which is reflected in the model. The final makes and models of the mechanical equipment have not been selected. This study uses equipment that is conservatively representative of what the Project may use including mechanical equipment yards with air-cooled chillers and backup generators, and a substation with main power transformers. The modeled sound power levels of this equipment are provided in Appendix B. If equipment with different sound power levels is selected, the modeling should be updated to confirm that projected sound levels remain below the Ordinance limit. Given the conservative scenarios assessed in this report and the 5 to 6 dB margin, the Project can reasonably be designed and operated in such a way as to meet the noise requirements of the Ordinance.

Appendix A: Model Settings & Input

Table 1: Sound Propagation Model Settings

Model Parameter	Setting
Ground Attenuation	ISO 9613-2 spectral ground attenuation with a ground factor of 0.0 inside the Project fenceline, 0.5 on the Project parcel outside the fenceline, and 1.0 elsewhere.
Topography	USGS terrain.
Foliage Attenuation	No attenuation due to forest was taken into account in the model.
Buildings	Only Project buildings were included in the model. Heights of each building type are as follows: data center halls, warehouse, and admin buildings – 35 feet, auxiliary buildings in the mechanical equipment yard near the chillers – 20 feet.
Reflections	Two-orders of reflections from vertical surfaces are included in the model.
Atmospheric Attenuation	Based on 70% relative humidity and 10° C.
Search Radius	5 miles (8,000 meters)
Receptor Grid	100 feet by 100 feet (30 meters by 30 meters) over the entire Project area at a height of 5 feet (1.5 meters) above grade.

Table 2: Modeled Sound Power Level (dB) by Octave Band Frequency

Source	Full Octave Band Center Frequency (Hz)									Overall Sound Power Level	
	31.5	63	125	250	500	1000	2000	4000	8000	dBA	dBZ
Main Power Transformer ONAF2 (Specified at 76 dBA at 2 meters) [2]	92	86	102	103	104	93	84	77	72	102	108
Generator Open Exhaust (unmitigated)[3]	-	-	136	132	124	122	124	123	122	131	138
Generator Open Mechanical (unmitigated)[3]	-	-	108	109	107	108	109	107	111	116	117
Air-Cooled Chiller at 100% Load with Sound Attenuation Package	-	97	99	97	97	98	94	86	77	101	105

[2] Spectral levels for the transformers were derived from the *Handbook of Acoustical Measurements and Noise Control, Third Edition*, Cyril M. Harris (ed.), 1998.

[3] These sound power levels for the generators are unmitigated. The attenuation modeled for the exhaust silencer and enclosure are provided separately in Table 3.

Table 3: Modeled Sound Reduction Provided by Mitigating Elements (dB) by Octave Band Frequency

Source	Full Octave Band Center Frequency (Hz)							
	63	125	250	500	1000	2000	4000	8000
Exhaust Silencer (~40 dBA insertion loss)	18	33	39	40	40	38	37	38
Generator Enclosure (~25 dBA reduction)	8	10	12	22	30	38	40	42

Table 4: Total Modeled Sound Power Level by Area

Area	Sound Power Level (dBA)	Relative Height (m)	Equipment
Substation	110	3.13	Main Power Transformers
Northern Mechanical Yard	125	2.54	Air-Cooled Chillers at 100% Load with Sound Attenuation Package
Northern Mechanical Yard	117	6.09	Backup Generators Exhaust with Silencers
Northern Mechanical Yard	114	4.57	Backup Generators Mechanical with Enclosures
Southern Mechanical Yard	120	2.54	Air-Cooled Chillers at 100% Load with Sound Attenuation Package

Table 5: Coordinates of Modeled Discrete Receptors

Receptor ID	Relative Height (m)	Coordinates (UTM NAD83 Z14N)		Elevation (m)
		X (m)	Y (m)	
01	1.5	643448	5199692	282
02	1.5	643450	5198800	281
03	1.5	647383	5203004	279
04	1.5	648157	5200138	278
05	1.5	646305	5199918	279
06	1.5	645088	5198090	280
07	1.5	644407	5196495	281
08	1.5	641851	5198241	282
09	1.5	641864	5197176	281