AGENDA REPORT

City Council Work Session - 15 Apr 2025

TITLE

Alimagnet Pickleball Project

Presenter(s) Garrett Beck Parks, Recreation and Facilities Director, Daryl Jacobson, Natural Resources Manager, Todd Halunen and Matt Cox, Kimley-Horn

ACTION REQUESTED

Review and provide feedback on the pickleball project.

POLICY CONSIDERATIONS

Does the city council wish to continue with a pickleball project?
If so, of the four parks presented that include Alimagnet, Cliff Fen, Hollows, and Rose park locations, are there any the city council does not wish to consider?

BACKGROUND

On October 4, 2022, the city council ordered a project to construct new pickleball courts in Alimagnet Park. In December 2022, staff asked the city council to pause new park investment projects while the city focused on creating a comprehensive parks plan. During the August 2024 work session, the city council asked staff to bring the Alimagnet pickleball project to a future work session for discussion and direction, and on October 15, 2024, the city council directed staff to work through the issues identified in schematic design and move the project through design and construction.

City Facilities Project Process

The city uses six steps to complete parks and facilities projects, with planned regular council communication and action to ensure project success.

1. Programming: defining goals, needs, and budget.
2. Schematic design: assessing feasibility and developing design concepts.
3. Design development: refining designs with materials and systems.
4. Construction documents: preparing detailed plans and specifications for construction.
5. Bidding: procuring a qualified contractor.
6. Construction: building the project.

We are currently in the schematic design phase of the project, which includes engaging the community to further develop project concepts.

Engagement

With the original work on the project almost two years old and new staff leading the project, staff resumed the project work with an open house to engage the community and residents living near Alimagnet Park.

In November 2024, a post card was mailed to over 260 Burnsville neighbors living within ¼ mile of the park inviting them to a project open house at city hall. At the meeting, 38 participants shared feedback with our team about court design and amenities, as well as a significant concern about the potential negative impacts a pickleball complex could have on lake water quality and noise impacts on people and wildlife living in and near the park.

In response to that feedback, staff coordinated a separate meeting with the community to discuss the water quality of Alimagnet lake and expanded the scope of the pickleball project to include a stormwater management plan, noise and species analysis. These engagement results and other community feedback provided evidence of a conflict between the projects goals.

With this conflict of guiding principles, staff paused design development efforts to allow for environmental analysis, additional site analysis and to seek additional feedback from the city council at the April 15, 2025 work session.

Alimagnet Lake Water Quality Management

Alimagnet Lake has been a focal point for natural resources management and water quality improvement efforts over the past 20 years. Due to high levels of phosphorus and poor water clarity, the lake has been on the state's impaired waters list since 2002. Collaborative initiatives between the City of Burnsville, Apple Valley, Dakota County, Vermillion River Watershed Joint Powers Organization, and local communities have been instrumental in restoring habitats and enhancing the lake's ecological health. Continued commitment to these efforts will maintain and further improve the natural resources and water quality of Alimagnet Lake, with the goal of eventual removal from the impaired waters list.

Protected Species Assessment

A protected species assessment conducted in Alimagnet Park, covering a 1.71-acre area, evaluated the presence of federally and state-protected species. The assessment determined that the Northern long-eared bat, red-shouldered hawk, and migratory birds may have suitable habitat within the study area, indicating a potential need for conservation measures to protect these species during park development. However, the Monarch butterfly and Rusty Patch Bumblebee were found to be unlikely to have suitable habitat in the same area based on existing conditions. Assessment recommended limiting tree clearing to winter months and providing opportunities to enhance habitats for the Monarch butterfly and Rusty Patch Bumblebee if desired.

Stormwater Management Plan

A project stormwater management plan was designed to control and mitigate the impact of runoff from rain or snowmelt, protect water quality, prevent flooding, and reduce erosion by outlining strategies like detention basins, permeable surfaces, or vegetation to manage water flow and filter pollutants before they reach natural waterways. The city contracted with Kimley-Horn to complete a stormwater management plan for the proposed Alimagnet site. The plan addressed site requirements, existing pre-development conditions, proposed development conditions, a discharge rates summary, infiltration and volume control summary and a water quality summary.

Noise Assessment

The city contracted with Kimley-Horn to complete a noise assessment for the proposed Alimagnet site. The assessment addressed characteristics of noise, common noise levels, noise standards, and noise mitigation methods. The proposed pickleball courts at Alimagnet Park are not expected to exceed noise limits based on Burnsville’s current regulations, the distance from nearby homes, and comparisons to a recent noise assessment. To further reduce potential noise impacts, the city could ensure the facility is located at least 500–600 feet from homes (or 1,000 feet if near a water body), preserve mature vegetation as a natural buffer, and install noise-absorbing fencing on the north and west sides.

Site Analysis
The site analysis and weighting system for the Alimagnet Park project is a comprehensive process divided into three phases: screening, evaluation, and priority. In the screening phase, site characteristics are rated to determine feasibility, followed by the evaluation phase, where site criteria are weighted based on project and community needs. The final priority phase ranks sites according to their total scores. The weighting system considers three key categories: environmental factors, which assess impacts on natural features and prioritize minimal disruption; human factors, including noise, access, parking, and community service; and operational factors, which evaluate cost, infrastructure, and the ease of development and maintenance. This structured approach ensures the selected site aligns with environmental, social, and practical requirements for the park's development.

Locations
The updated site analysis and weighting system for the pickleball complex project identified Alimagnet Park, Cliff Fen, Hollows, and Rose Park as potential sites for future consideration. This determination was made through a comprehensive evaluation process that rated and ranked each site based on environmental impacts, human factors such as noise and community access, and operational considerations like cost and ease of development. By applying this structured methodology, these four parks emerged as the most feasible locations to consider for further assessment and planning to determine if they would be an appropriate location for a pickleball complex.

Timeline
Pending council direction to move forward, next steps would include:

- Needs: define project goals, work scope and budget (1 to 2 months)
- Schematic design: assess feasibility, engage community and develop design options (1 month to 6 months)
- Design development: refine designs (2 months)
- Construction documents: prepare detailed plans and specifications for construction (2 months)
- Bidding: procure a qualified contractor (2 months)
- Construction: build the project (5 months)

BUDGET IMPACT
The current schematic design estimate of a pickleball project at Alimagnet park is $990,000. Should the city council direct continuation of a pickleball project, $1.15M is currently budgeted in the 2025 parks investment capital improvement plan fund for a pickleball project.

STRATEGIC PRIORITIES
Community Vibrancy: Burnsville is committed to creating energy that continues to bring our community to life for years to come
Infrastructure: Burnsville is committed to responsible stewardship of assets to allow our community to thrive

ATTACHMENTS
2025 Pickleball Complex Project Guidebook
2025 Pickleball Complex Site Analysis
2025 Alimagnet Pickleball Noise Memo

2025 Alimagnet Pickleball Stormwater Report
2025 Alimagnet Pickleball Species Memo

Pickleball Complex Project

City Of Burnsville

Process

Park projects include many operational steps, with planned regular council communication and action to ensure project success.

1. **Programming**: defining goals, needs, and budget.
2. **Schematic design**: assessing feasibility and developing design concepts.
3. **Design development**: refining designs with materials and systems.
4. **Construction documents**: preparing detailed plans and specifications for construction.
5. **Bidding**: procuring a qualified contractor.
6. **Construction**: building the project.

City Council Decisions

Based on the initial plan for this project, the city council will interact with the project at these milestones:

Step	**Pickleball Project**	**Timeline and Action**
Needs	Authorize project: approve scope and priorities, ensuring alignment with strategic goals and community needs.	October 4, 2022 Consent agenda
Partners	Approve partners: affirm partnerships proposed by staff and approve agreements to formalize them.	November 19, 2024 Consent agenda
Schematic Design	The community is engaged as staff determine alterative concepts to capture the character of the project for affirmation by the council.	October 15, 2024 Council work session
Design	Approve design: review and approve final designs based on staff recommendations and community input.	March – April, 2025 Council work session
Bids	Adopt plans and specifications and authorize advertisement of bid package. Authorize project accept bids and award contracts: approve bid packages and formally award contracts for construction.	June – July 2025 Consent agenda
Construction	Staff work with partners to develop a construction timeline to build the project.	Fall 2025 – Fall 2026 5 months

Pickleball Project Overview

Pickleball is one of the fastest growing sports in the United States, the twin cities metro area, and Burnsville with participation increasing 223.5% over the past three years according to the Sports & Fitness Industry Association. In 2024, the City has one dedicated pickleball complex with 8 courts in Red Oak Park. Since the opening in 2018, Red Oak pickleball courts have experienced extremely high participation use.

The city's Parks Plan, adopted in 2024, highlighted a community interest in investing in our current park infrastructure and adding new assets to meet the needs of a changing community. Specifically, the community requested that existing tennis and basketball courts be resurfaced and new pickleball courts be added.

Since 2022, staff have been working with a consultant and the community to determine if an existing community park site could accommodate an outdoor pickleball complex. The project has focused on spaces that could host 6 to 8 designated pickleball courts, shade structures, seating and lights in existing open spaces without displacing other uses.

Court Design Considerations

Before diving into the specifics of court dimensions and materials, there are several key factors to keep in mind when planning a pickleball court:

- Playability: Ensuring the court surface provides the right level of traction, bounce, and player comfort.
- Safety: Sufficient runoff space around the court and good lighting to avoid player injury.
- Durability: Using materials that can withstand weather conditions for outdoor courts and heavy use for indoor courts.
- Maintenance: Choosing surfaces and materials that are easy to clean and maintain, reducing long-term costs.

Surface Materials

The court surface plays a critical role in player safety, comfort, and game quality. The most common surface materials include asphalt, concrete and modular tiles. Each surface has advantages and disadvantages.

- Asphalt is durable, cost-effective and the most popular choice and preference for outdoor courts. The disadvantage is asphalt is prone to cracking over time.
- Concrete is more durable and requires less maintenance than asphalt but its hardness can put more strain on players joints.
- Modular tiles provide drainage, shock absorption and durability but does not provide the bounce consistency players expect.

Fencing

Fencing around and between courts is crucial to contain balls during play. Common fencing materials include chain link and vinyl-coated fencing which are durable and cost-effective.

- Fencing for multi-court facilities should by placed around the perimeter of the courts and it is preferred to have fencing to separate courts internally to ensure stray balls don't interfere with adjacent games.
- Height for fencing typically ranges from 6 to 10 feet around the perimeter of the complex and 3 to 4 feet internally.

Lighting

Lighting is essential to support evening play. LED lights are the standard for sport courts due to their energy efficiency and directional brightness. Lighting placement should be in the corners of the courts with lights aimed appropriately to minimize shadows and glares.

Net and Line Standards

Following official net and line dimensions ensures consistency with the rules of play.

- The net height must be 36 inches at the sidelines and 34 inches at the center.
- All court lines must be 2 inches wide, with clear boundary lines for the non-volley zone (kitchen), baseline, and centerlines.

ADA Compliance and Accessibility

Designing a pickleball court that is ADA compliant ensures that people with disabilities can access and enjoy the sport. Key considerations include:

- Accessible pathways ensure that there are smooth, wide pathways leading to the court.
- The court surface should be smooth and easy for wheelchair users to move on. Ramps or other features might be required if the court is not level with the surrounding ground.

Schedule

The following calendar and checklist identify the action and timing necessary for a successful pickleball replacement project:

Time	Item
October 4, 2022	Order project to construct new pickleball court in Alimagnet Park (23-411) was approved on the city council agenda.
January 23, 2023	Staff hosted a virtual engagement session with the community to discuss project kick-off.
January 31, 2023	Staff hosts an in-person engagement session at city hall to discuss project. 20 people signed at the meeting.
February 1, 2023	All new projects are paused to allow staff to complete a comprehensive parks plan.
June 11, 2024	The Parks Plan is presented to city council.
August 20, 2024	City council asks to discuss the pickleball at a future work session.
October 15, 2024	City council provided direction to move the pickleball project forward into design and community engagement.
November 18, 2024	Staff hosted an open house on the Alimagnet pickleball project. 37 people signed into the meeting.
November 19, 2024	Approve contract for Alimagnet pickleball design and construction management was approved on the city council agenda.
December 2, 2024	Staff present the Alimagnet pickleball schematic design results to the Parks and Natural Resources Commission. 5 members of the community signed in to speak at the meeting.
December 11, 2024	Staff hosted a neighborhood meeting to discuss the lake quality of Alimagnet Lake including questions and comments about the pickleball project.
January 5, 2025	Staff enter into a supplemental agreement with consultant to complete stormwater analysis, stormwater memorandum and noise impact memorandum.
April 15, 2025	Alimagnet pickleball design presentation planned for council work session based on recommendations and community input.
June 2025	Approval of plans and specifications and authorization for bid on council consent agenda.
July 2025	Accept bids and award contract for construction on council consent agenda.
Fall 2025 thru Fall 2026	Construction of project.

Engagement

Community engagement is vital in park projects because it ensures that the spaces reflect the needs, values, and desires of the people who will use them. When local residents are involved in the planning and design process, they can voice their preferences leading to **decisions** that are more functional and relevant to the community. This participation fosters a sense of ownership and pride, encouraging people to maintain and protect the park over time. Additionally, engaged communities are more likely to support funding and advocate for the project, smoothing the path for implementation. Ultimately, involving the community transforms parks into vibrant, inclusive hubs that strengthen social bonds and enhance quality of life. Additionally, engagement builds trust and demonstrates the city's commitment to collaboration and transparency.

Engagement Methods

A variety of engagement tools, such as virtual meetings, in-person open houses, and online feedback platforms, are essential because they ensure broader participation by accommodating diverse schedules, preferences, and accessibility needs, leading to more representative and inclusive community input.

- **Website:** Collaborate with the Communications team to create a dedicated project tab on the Parks website.
- **Postcard:** Work with Communications to design a generic postcard that informs the neighborhood about, the date and time of an open house(s), the importance of their feedback about the proposed project, and how to visit the website to learn more about the project and provide feedback.
- **Mailing Addresses**: In addition to broader city communication, all residents living within a ¼-mile radius of the park will receive a direct mailing(s).
- **Social Media**: Partner with Communications to develop and implement a social media messaging.
- **Online survey:** Create survey questions and provide opportunities for online feedback.
- **Open House:** Schedule an open house, set the date and time, and reserve a city facility for the event.

Engagement Summary

Community engagement for the proposed pickleball project involved a series of meetings and feedback channels to gather resident input. In January 2023, a virtual meeting was held, providing an accessible platform for initial discussions. That same month, an in-person open house drew over 20 residents, followed by another in-person open house later in the year attended by over 38 residents. The project was then paused until fall of 2024.

In November 2024, staff resumed work on the project which was kick-started by a project open house. A post card was mailed to over 260 residents within ¼ mile of the park to join staff at in-

person open house at city hall which was attended by over 38 people. At the meeting, staff and the consultant collected feedback about court design and amenities but also received a significant amount of concern about the potential negative impacts the pickleball complex could have on the lake water quality and noise impacts on people and wildlife living in and around the park.
In response to that feedback, staff coordinated a separate meeting with the community to discuss the water quality of Alimagnet lake and expanded the scope of the pickleball project to include a stormwater study, noise and species study. Further, staff revisited the site selection process, expanded the search and facilitated conversations with Collins Aerospace (Rose Park) and School District 191.

The December 2024 in-person open house specifically focused on Alimagnet Lake and allowed residents to provide targeted input regarding the water quality history, management and concerns about adding a pickleball complex to the park. Beyond these events, residents actively contributed feedback through online websites, emails, and participation in city council and commission meetings. Staff noted that the community engagement efforts provided clear preferences for amenities and court design for a project but more importantly, there was significant concerns about potential negative impacts, particularly on lake water quality and noise affecting both people and wildlife in and around the park.

The engagement results provided evidence of a conflict between the projects goals and guiding principles. These efforts exposed tension between residents in favor of environmental preservation and those looking for recreational development opportunities. With this conflict of guiding principles, staff paused design development efforts to allow for the evaluation of feedback, additional studies, site selection review and to seek additional feedback from council at the April 15, 2025 city council work session.

A detailed list of date, location, invitation criteria, invitations and attendees can be found in the appendix section of this guidebook.

Studies

As part of the planning process for the proposed Alimagnet site, the city completed several technical studies to evaluate potential environmental and community impacts. These studies—focused on stormwater management, noise, and protected species—inform project decisions and help ensure responsible development that aligns with city regulations and values.

Stormwater Management Plan

A project stormwater management plan is designed to control and mitigate the impact of runoff from rain or snowmelt, protect water quality, prevent flooding, and reduce erosion by outlining strategies like detention basins, permeable surfaces, or vegetation to manage water flow and filter pollutants before they reach natural waterways.

The city contracted with Kimley-Horn to complete a stormwater management plan for the proposed Alimagnet site. The plan addressed site requirements, existing pre-development conditions, proposed development conditions, a discharge rates summary, infiltration and volume control summary and a water quality summary. The results of this 274-page plan may be found in the exhibits section of this guidebook.

Noise Assessment

A noise assessment study was conducted to evaluate the potential sound impacts of a proposed pickleball complex on its surroundings, ensuring that noise levels remain within acceptable limits for both people and wildlife. By considering existing ambient noise and predicting future levels based on project activities, the study identifies potential disturbances—like the sharp, repetitive sounds of pickleball games—and informs mitigation strategies, such as sound barriers or restricted operating hours. Ultimately, the information in the study may be used to inform decision-making, minimizing conflicts and enhancing the project's compatibility in Alimagnet or at another park location.

The city contracted with Kimley-Horn to complete a noise assessment for the proposed Alimagnet site. The assessment addressed characteristics of noise, common noise levels, noise standards, and noise mitigation methods.

The proposed pickleball courts at Alimagnet Park are not expected to exceed noise limits based on Burnsville's current regulations, the distance from nearby homes, and comparisons to a recent noise assessment. To further reduce potential noise impacts, the city could ensure the facility is located at least 500–600 feet from homes (or 1,000 feet if near a water body), preserve mature vegetation as a natural buffer, and install noise-absorbing fencing on the north and west sides. The results of this assessment may be found in the exhibits section of this guidebook.

Protected Species Memorandum

A protected species study was conducted to identify and assess the presence of endangered or threatened plants, animals, or habitats within the proposed project area, ensuring compliance with environmental laws and safeguarding biodiversity. By reviewing the site, the study determines if species like rare birds, amphibians, or plants could be impacted by construction or ongoing activities. It provides critical data to guide project design, suggesting modifications like habitat buffers or seasonal work restrictions to minimize harm. The purpose is to balance development goals with ecological responsibility, protecting vulnerable species while determining if a project may proceed in a legally and environmentally sound manner.

The city contracted with Kimley-Horn to complete the protected species study for the proposed Alimagnet site. The memorandum addresses threatened and endangered species in the proposed project area and migratory birds.

Kimley-Horn identified potential suitable habitat in the study area for several protected species, including the northern long-eared bat, red-shouldered hawk, and migratory birds. To minimize impacts, tree clearing should be limited and, if necessary, occur between November 1 and March 31. While monarch butterflies and rusty patched bumble bees are unlikely to be present, reseeding disturbed areas with native plants could benefit them. No impacts are expected to the whooping crane or yellow pimpernel due to low habitat suitability. The results of this 26 page memorandum may be found in the exhibits section of this guidebook.

Pickleball Site Analysis

City Of Burnsville

Site Analysis

The site analysis section explores the various factors considered in determining the most suitable location for a new pickleball complex within Burnsville's park system. This comprehensive analysis is organized into three distinct phases:

- **Screening:** rating sites to determine initial feasibility
- **Evaluation:** weighting site criteria based on the needs of the project and the community
- **Priority:** ranking sites based on the total score

Each phase serves to assess the feasibility of different sites, ensuring that the final location chosen will meet both the recreational needs of the community and the logistical demands of the project.

Screening

Prior to site screening, the project team considered the feasibility of 76 community, neighborhood, mini and natural area parks in the park system. In general, community parks are diverse in nature, serving a broader purpose than neighborhood or mini parks. The focus of community parks is meeting community-based recreation, athletics and open space needs. These parks often have expansive areas, maximizing the potential for larger recreational spaces and amenities. Additionally, community parks often have established infrastructure making them prime locations to support and house a pickleball complex.

The park system has 21 community parks. Based on pre- screening, Birnamwood Golf Course has a specific recreational use. Hollows Park is a neighborhood park that was included because it came close to the preferred noise criteria. In all, 20 community parks and 1 neighborhood park progressed to screening.

Screening criteria such as noise levels, environmental impact, available infrastructure, and the potential for future expansion were considered to determine how well each location supports the goals of the pickleball complex. Point totals in screening do not suggest ranking, they provide us with a guide to further evaluate if a park location is appropriate. Each of the criteria are described below:

- **Open Space:** facility could be constructed in unused open park space or if displacing current users, the complex would require the removal of minimal infrastructure and displaced users would still have recreation opportunities in other parks in the system.
- **Environmental impact:** the location would support a complex with minimal environmental impacts.
- **Tree clearing**: site could be constructed with minimal need to remove trees.
- **Noise:** location is a minimum of 500 feet from residential property.
- **Parking:** location could support adequate parking for increased park activity.

- **Activity:** location currently supports high traffic, noisy park activities.
- **Level of service:** the park system currently has a premiere tennis court facility dual lined for pickleball in the northwest quadrant and an 8 court pickleball complex in the northeast quadrant.
- **Infrastructure:** location has existing infrastructure to support water and electrical needs.
- **Lights:** the location already has lighted park amenities nearby.
- **Earthwork:** location allows for construction with minimal earthwork.
- **Future expansion:** location could support the expansion of more courts in the future if desired.
- **Economy of site:** location could support construction without the need for significant additional dollars (minimal grading, trail, parking, water, electric) causing the least impact to the parks capital improvement fund.

Evaluation

The evaluation phase focuses on assessing the specific sites that were identified during the screening process and weighting site criteria based on the needs of the project and the community. The goal of this phase is to weigh each site's strengths and challenges to ensure that the selected location will best serve the community's needs and the city's long-term objectives.

Incorporating feedback we received from advocates and community members, the following criteria were weighted to determine the potential of site locations for a new pickleball complex.

- **Environmental:** evaluates the site's impact on natural resources. Ideal sites require minimal disruption to natural features and park infrastructure.
- **Human:** considers how the site affects and serves people, including noise distance from homes, parking capacity, compatibility with active park uses, and geographic equity across the park system.
- **Operational:** assesses the practicality and cost-efficiency of developing and maintaining the site, including existing utilities, lighting, grading needs, potential for expansion, and overall impact on the parks capital budget.

Each evaluation criteria was assigned a weight to reflect its relative importance in determining the suitability of each site. The table below outlines the factors used in the evaluation, the category they fall under, and their assigned weight:

Factor	Evaluation	Weight
Open space	Environmental	12
Environmental impact	Environmental	12
Tree clearing	Environmental	12
Noise	Human	9
Parking	Human	9
Activity	Human	9
Level of service	Human	9
Infrastructure	Operational	6
Lights	Operational	6
Earthwork	Operational	6
Economic of site	Operational	6
Future expansion	Operational	4
	Total	100

Priority

In the priority phase, each site was ranked based on the weighted scoring system. Each weight was applied consistently to every park when a criteria was identified. This ranking process allows for a clear comparison of the most viable sites for the pickleball complex, providing a basis for decision-making that ensures the best use of available resources while addressing the needs of the community.

Locations with weighted totals over 75 are considered the most viable park locations for a pickleball construction project. A summary description and map of each park follows.

City Of Burnsville

Pickleball Site Analysis

	Screening													Evaluation				Priority
	Open Space	Noise	Parking	Activity	Infrastructure	Level of Service	Lights	Environmental Impact	Earthwork	Tree clearing	Future Expansion	Economy of Site	Total	Environmental (12)	Human (9)	Operational (6)	Weighted Total (100)	Rank
Alimagnet	1	1	1	1	1	1	1		1	1		1	10	24	36	24	84	1
Cliff Fen	1	1	1	1	1	1	1		1	1		1	10	24	36	24	84	1
Hollows	1	1	1	1		1		1	1	1		1	9	36	36	12	84	1
Rose Park		1	1	1	1	1		1	1	1		1	9	24	36	18	78	3
Civic Center			1	1	1	1	1	1	1	1		1	9	24	36	12	75	5
Sue Fischer		1	1	1	1	1	1	1		1			8	24	27	24	72	6
Nicollet Commons			1	1	1	1	1	1	1	1			8	24	27	18	69	7
Wolk			1	1	1	1		1	1	1		1	8	24	27	18	69	7
North River Hills			1	1	1		1	1	1	1		1	8	24	18	24	66	9
Archer		1	1	1		1			1	1		1	7	12	36	12	60	10
Crystal Beach			1	1	1	1			1	1		1	7	12	27	18	57	11
Kelleher			1	1	1	1			1	1		1	7	12	27	18	57	11
Red Oak				1	1		1	1	1	1		1	7	24	9	24	57	13
Black Dog			1	1	1		1		1	1		1	7	12	18	24	54	14
Neill				1	1	1	1		1	1		1	7	12	18	24	54	14

	Screening													Evaluation				Priority
	Open Space	Noise	Parking	Activity	Infrastructure	Level of Service	Lights	Environmental Impact	Earthwork	Tree clearing	Future Expansion	Economy of Site	Total	Environmental (12)	Human (9)	Operational (6)	Weighted Total (100)	Rank
Sunset Pond				1	1	1			1	1		1	6	12	27	0	48	16
Lac Lavon		1		1	1	1	1		1				6	12	18	18	45	17
MN Riverfront		1		1		1				1			4	0	27	18	39	18
Rudy Kraemer		1	1	1		1							4	0	36	0	36	19
Terrace Oaks W			1	1	1								3	0	18	6	24	20
Crystal Lake W						1							1	0	9	0	9	21

Alimagnet Park

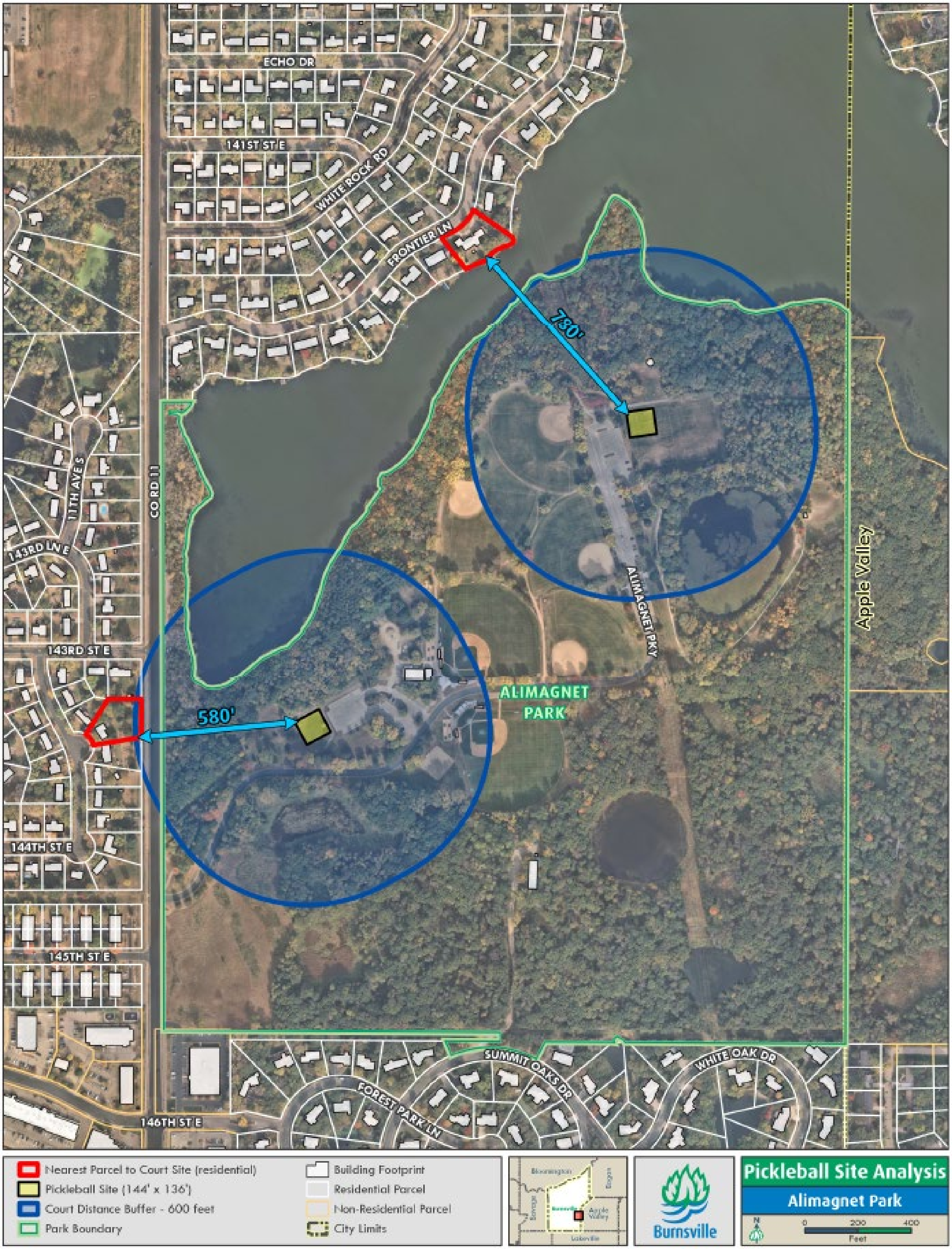
Evaluation

Open Space	The site offers unused open space due to the removal of the Alimagnet house, suitable for new construction without displacing existing park uses.
Noise	The location exceeds 500 feet from the nearest residence, minimizing potential noise concerns.
Environmental Impact	Potential environmental impact, requires further study.
Parking	There is adequate off-street parking available to support a new pickleball complex though some additional parking could be considered.
Activity	The park is heavily used for a wide variety of activities.
Tree Clearing	Minimal tree removal would be required to construct the facility.
Infrastructure	Existing infrastructure for water and electricity is already available at the park.
Level of Service	Southeast quadrant
Lights	Sports lighting
Earthwork	The site is relatively flat and does not require significant grading or earthwork.
Future Expansion	No future expansion based on current open space.
Economy of Site	Supported by existing infrastructure.

Summary

The original location considered for a potential pickleball complex offered open space due to the removal of the Alimagnet house. The location exceeded 500 feet to the closest resident, is a heavily used park, has lighted facilities, offers existing infrastructure to support a complex, is in a different quadrant of the city from the existing pickleball facility and could be constructed with low level impact on the parks improvement fund.

Challenges with the site include location near Alimagnet Lake, noise impacts to residents, park users and the environment. A second location in the park was also considered but did not impact the overall pros and cons of the site.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WHITE OAK DR
Nearest Parcel to Court Site (residential)
Pickleball Site (144' x 136')
Court Distance Buffer - 600 feet
Park Boundary
Building Footprint
Residential Parcel
Non-Residential Parcel
City Limits
Burnsville
Pickleball Site Analysis
Alimagnet Park
0
200
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Feet

Archer Park

Evaluation

Open Space	The site is fully developed with an archery range and parking lot.
Noise	There are no residential homes within 500 feet of this site.
Environmental Impact	No known impacts
Parking	The archer range has a parking lot and on street parking.
Activity	The park includes the only city archery range, which creates activity but would be displaced by a new complex.
Tree Clearing	Minimal tree removal would be required to construct the facility.
Infrastructure	The park does not provide infrastructure for water and electricity.
Level of Service	Northwest quadrant
Lights	No lights
Earthwork	The site is relatively flat and does not require significant grading or earthwork.
Future Expansion	No future expansion based on current open space.
Economy of Site	Costs impacted if there is a desire to replace the archery range.

Summary

Archer Park was constructed at the current location in 2017. Placing a pickleball complex in the park would require the elimination of the only city park archery range. As a result, Archer Park was not considered further as a potential location for a new pickleball complex.

ZENITH AVE S
ARCHER PARK
No Court Area
SUE FISCHER MEMORIAL PARK
RUDY KRAEMER PRESERVE PARK
No Court Area
Nearest Parcel to Court Site (residential)
Pickleball Site (144' x 136')
Court Distance Buffer - 600 feet
Park Boundary
Building Footprint
Residential Parcel
Non-Residential Parcel
City Limits
Bloomington
Burnsville
Apple Valley
Burnsville
Pickleball Site Analysis
Archer Park
0 40 80
Feet

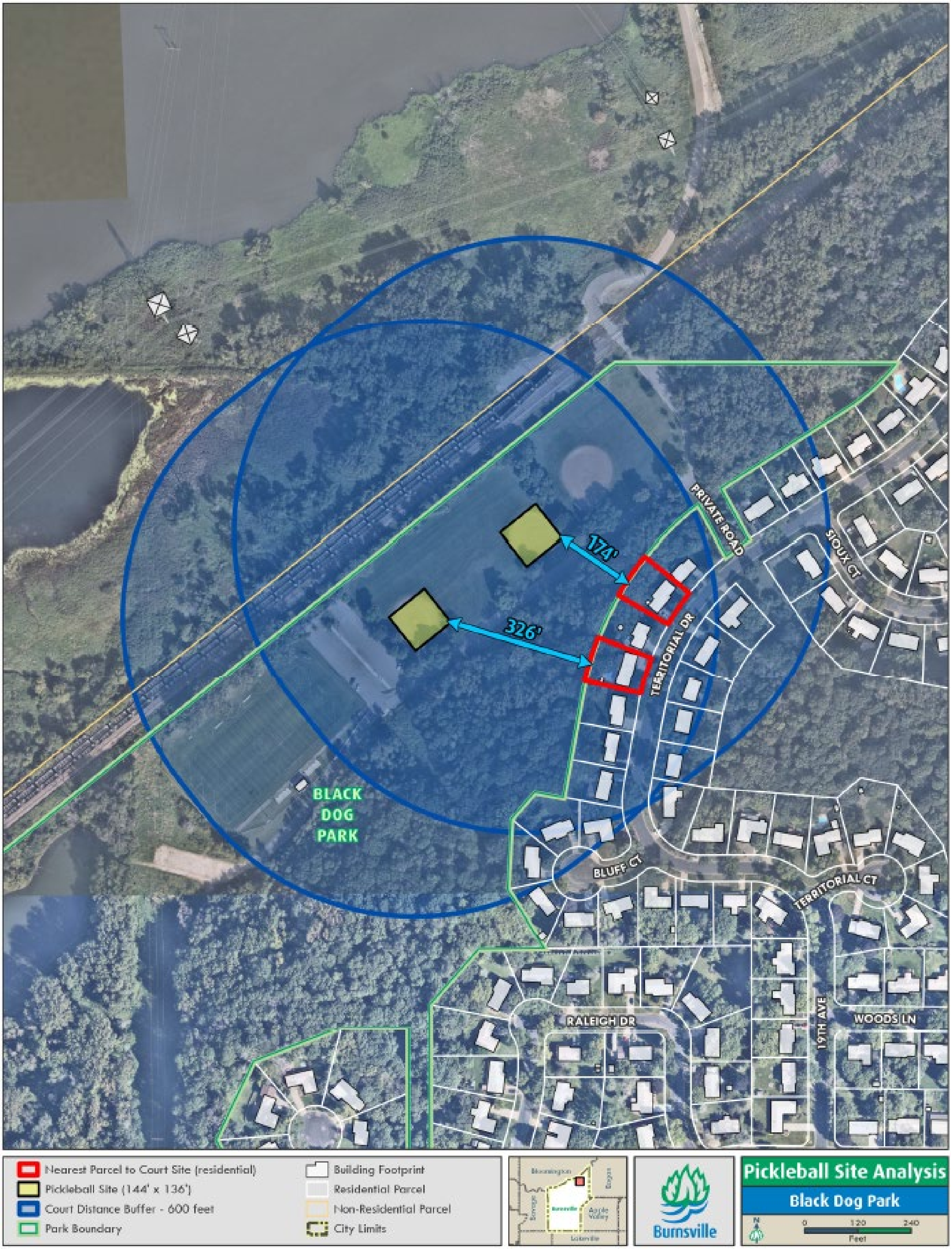
Black Dog Park

Evaluation

Open Space	The site is fully developed and would require the removal of existing amenities.
Noise	There are residential homes within 330 feet of this site.
Environmental Impact	Potential environmental impact, requires further study.
Parking	The athletic fields have parking to support existing uses.
Activity	Home to high-traffic activities such as youth football, baseball and softball.
Tree Clearing	Minimal tree removal would be required to construct the facility.
Infrastructure	Existing infrastructure for water and electricity is already available at the park.
Level of Service	Northeast quadrant
Lights	Sports lighting
Earthwork	The site is relatively flat and does not require significant grading or earthwork.
Future Expansion	Future expansion could place if displacing existing user groups.
Economy of Site	Infrastructure needs and parking may impact project costs

Summary

Black Dog park is the home to the primary football field for the youth athletic association and three bat and ball fields lacking open space for a new amenity. A complex placed in this park would be adjacent to Black Dog Lake and neighborhood homes under 350 feet. Additionally, challenges and concerns may arise from an increase in traffic through the adjacent neighborhoods.


174'
326'
PRIVATE ROAD
SIOUX CT
TERRITORIAL DR
BLACK DOG PARK
BLUFF CT
TERRITORIAL CT
RALEIGH DR
19TH AVE
WOODS LN
Nearest Parcel to Court Site (residential)
Pickleball Site (144' x 136')
Court Distance Buffer - 600 feet
Park Boundary
Building Footprint
Residential Parcel
Non-Residential Parcel
City Limits
Bloomington
Burnsville
Apple Valley
Lakeville
Savage
Eagan
Burnsville
Pickleball Site Analysis
Black Dog Park
0 120 240
Feet

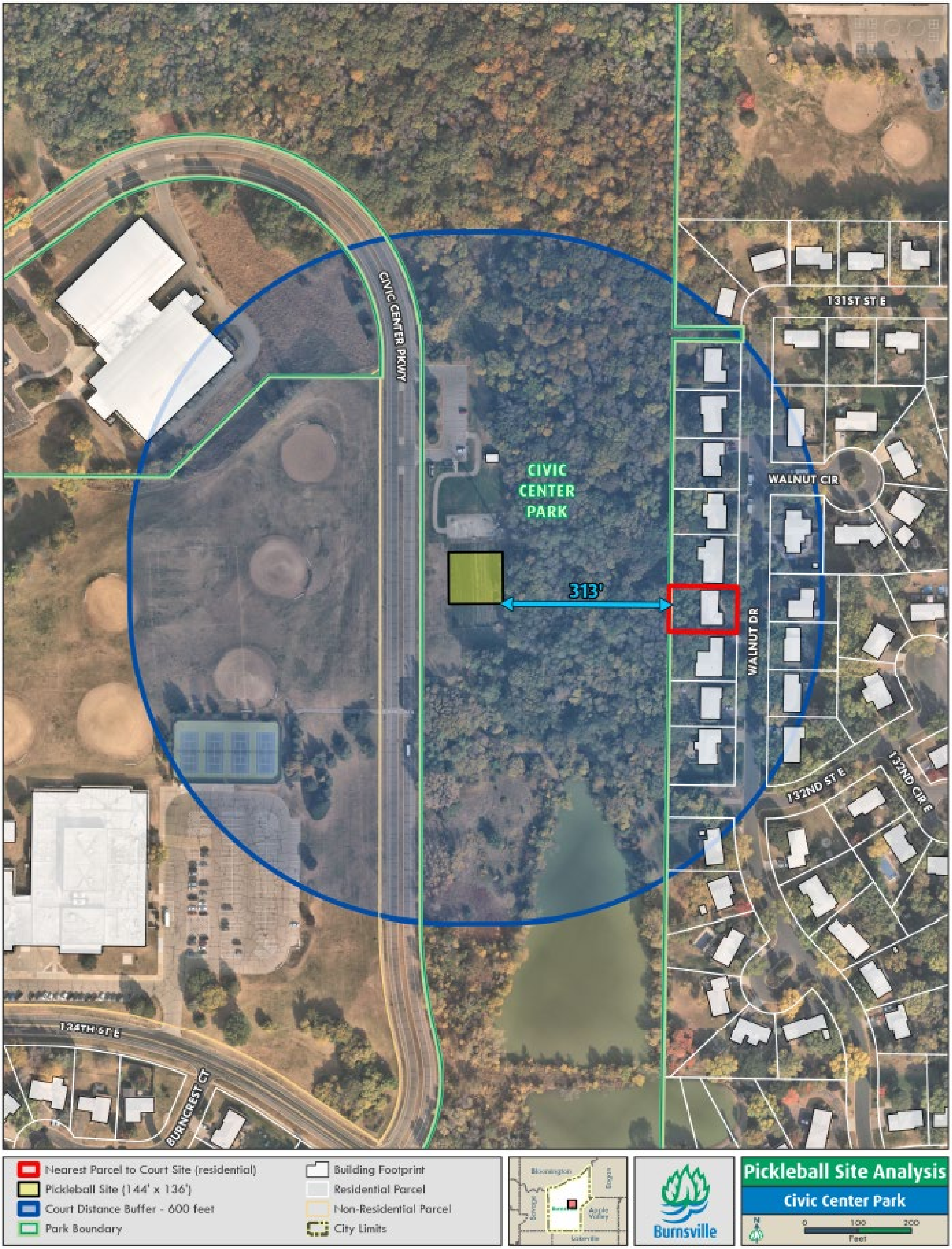
Civic Center Park

Evaluation

Open Space	The site would require the removal of existing amenities displacing current user groups.
Noise	There are residential homes within 320 feet of this site.
Environmental Impact	No known impacts
Parking	The site has some parking but may require additional parking to support an increase in traffic.
Activity	Currently supports high-traffic community events and activities.
Tree Clearing	Minimal tree removal would be required to construct the facility.
Infrastructure	Existing infrastructure for water and electricity is already available at the park.
Level of Service	Northeast quadrant
Lights	No lights
Earthwork	The site is relatively flat and does not require significant grading or earthwork.
Future Expansion	No future expansion based on current open space.
Economy of Site	Supported by existing infrastructure.

Summary

Civic Center is a developed park lacking open space for a new complex. Placement in the park would require the removal of an existing market garden and the location is within 350 feet of the adjacent neighborhood.



CIVIC CENTER PKWY
CIVIC CENTER PARK
313'
131ST ST E
WALNUT CIR
WALNUT DR
132ND ST E
132ND CIR E
124TH ST E
BURNCREST CT
Nearest Parcel to Court Site (residential)
Pickleball Site (144' x 136')
Court Distance Buffer - 600 feet
Park Boundary
Building Footprint
Residential Parcel
Non-Residential Parcel
City Limits
Burnsville
Pickleball Site Analysis
Civic Center Park
0
100
200
Feet

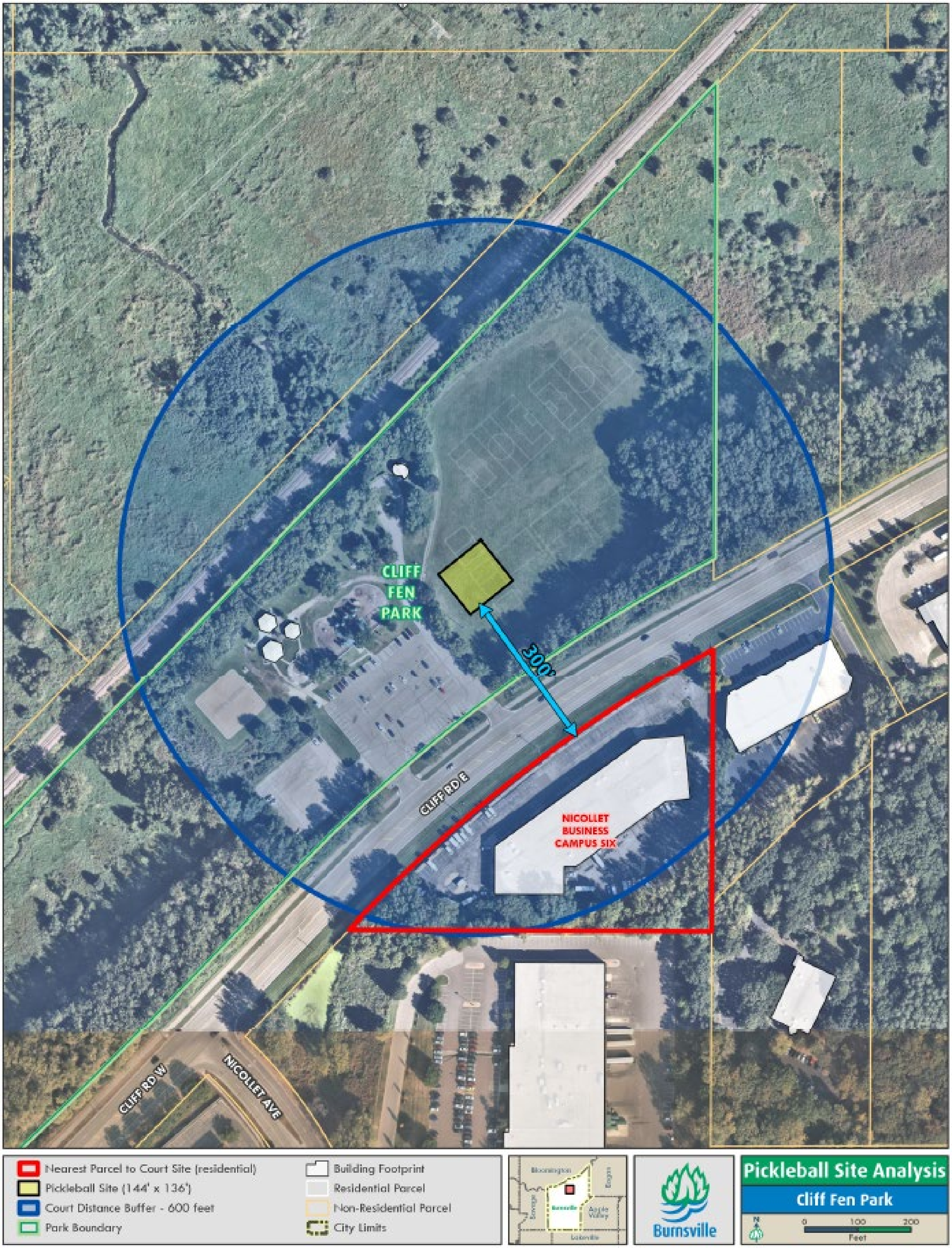
Cliff Fen Park

Evaluation

Open Space	The site would require the removal of existing amenities displacing current user groups.
Noise	There are no residential homes within 600 feet of this site.
Environmental Impact	No known impacts.
Parking	The site has some parking but may require additional parking to support an increase in traffic.
Activity	Currently supports high-traffic community events and activities.
Tree Clearing	Minimal tree removal would be required to construct the facility.
Infrastructure	Existing infrastructure for water and electricity is already available at the park.
Level of Service	Northeast quadrant
Lights	No lights
Earthwork	The site is relatively flat and does not require significant grading or earthwork.
Future Expansion	No future expansion based on current open space.
Economy of Site	Supported by existing infrastructure.

Summary

Cliff Fen park is a developed park, adjacent to a fen in Black Dog Preserve without any residential nearby. Placement of a complex in the park would require the removal of soccer field space that is consistently programmed by the local youth athletic association. Cliff Fen is located on a busy 4 lane road with no overflow parking nearby. If activities fill the parking lot, additional guests could experience significant inconvenience and safety challenges related to parking to get to the park.


CLIFF FEN PARK
300'
CLIFF RD E
NICOLLET BUSINESS CAMPUS SIX
CLIFF RD W
NICOLLET AVE
Nearest Parcel to Court Site (residential)
Pickleball Site (144' x 136')
Court Distance Buffer - 600 feet
Park Boundary
Building Footprint
Residential Parcel
Non-Residential Parcel
City Limits
Burnsville
Pickleball Site Analysis
Cliff Fen Park
0 100 200
Feet

Crystal Beach

Evaluation

Open Space	The site would require the removal of existing amenities displacing current user groups.
Noise	There are no residential homes nearby, mitigating noise concerns.
Environmental Impact	Potential environmental impact, requires further study.
Parking	The site has some parking but may require additional parking to support an increase in traffic given the heavy use of the park and no on street parking nearby.
Activity	The park is heavily used for a wide variety of activities.
Tree Clearing	Minimal tree removal would be required to construct the facility.
Infrastructure	Basic infrastructure is present, although upgrades may be required.
Level of Service	Northwest quadrant
Lights	No lights
Earthwork	The site is relatively flat and does not require significant grading or earthwork.
Future Expansion	Future expansion could place if displacing existing user groups.
Economy of Site	Infrastructure needs and parking may impact project costs

Summary

Crystal Beach is a developed park, adjacent to a lake with residential nearby. Given these existing conditions and lack of open space, Crystal Beach was not considered further as a potential location for a new pickleball complex.


SOUTHWIND DR
RUSHMORE DR
LAC LAVON CT
KELLER LN
KELLER LAKE RD
CRYSTAL LAKE RD E
CRYSTAL LAKE RD
LAC LAVON DR
169'
LAC LAVON PARK
CRYSTAL BEACH PARK
Nearest Parcel to Court Site (residential)
Pickleball Site (144' x 136')
Court Distance Buffer - 600 feet
Park Boundary
Building Footprint
Residential Parcel
Non-Residential Parcel
City Limits
Bloomington
Eagan
Savage
Burnsville
Apple Valley
Lakeville
Burnsville
Pickleball Site Analysis
Crystal Beach Park
0
100
200
Feet

Crystal Lake West

Evaluation

Open Space	The site lacks open land to support a complex.
Noise	The site lacks open space to support a complex.
Environmental Impact	Potential environmental impact, requires further study.
Parking	The site has a parking lot to support the boat launch.
Activity	The park is used for lake access and trail access.
Tree Clearing	Significant tree removal would be required.
Infrastructure	The site has electricity.
Level of Service	Southeast quadrant
Lights	No lights
Earthwork	Steep slopes throughout the park would require significant grading.
Future Expansion	No future expansion based on current open space.
Economy of Site	Topography would significantly impact project costs.

Summary

Crystal Lake West is a wooded park, with steep slopes and boat launch adjacent to a lake with residential nearby. Given these existing conditions and lack of open space, Crystal Lake West was not considered further as a potential location for a new pickleball complex.


CRYSTAL LAKE RD W
CRYSTAL LAKE RD E
EILEEN CIR E
151ST ST E
1ST AVE S
STEVENS AVE S
CRYSTAL VIEW CIR
CRYSTAL LAKE WEST PARK
No Court Area
I-35 RAMP
I-35
BUCKHILL RD
MAPLE ISLAND RD
Nearest Parcel to Court Site (residential)
Pickleball Site (144' x 136')
Court Distance Buffer - 600 feet
Park Boundary
Building Footprint
Residential Parcel
Non-Residential Parcel
City Limits
Burnsville
Pickleball Site Analysis
Crystal Lake West Park
0 120 240
Feet

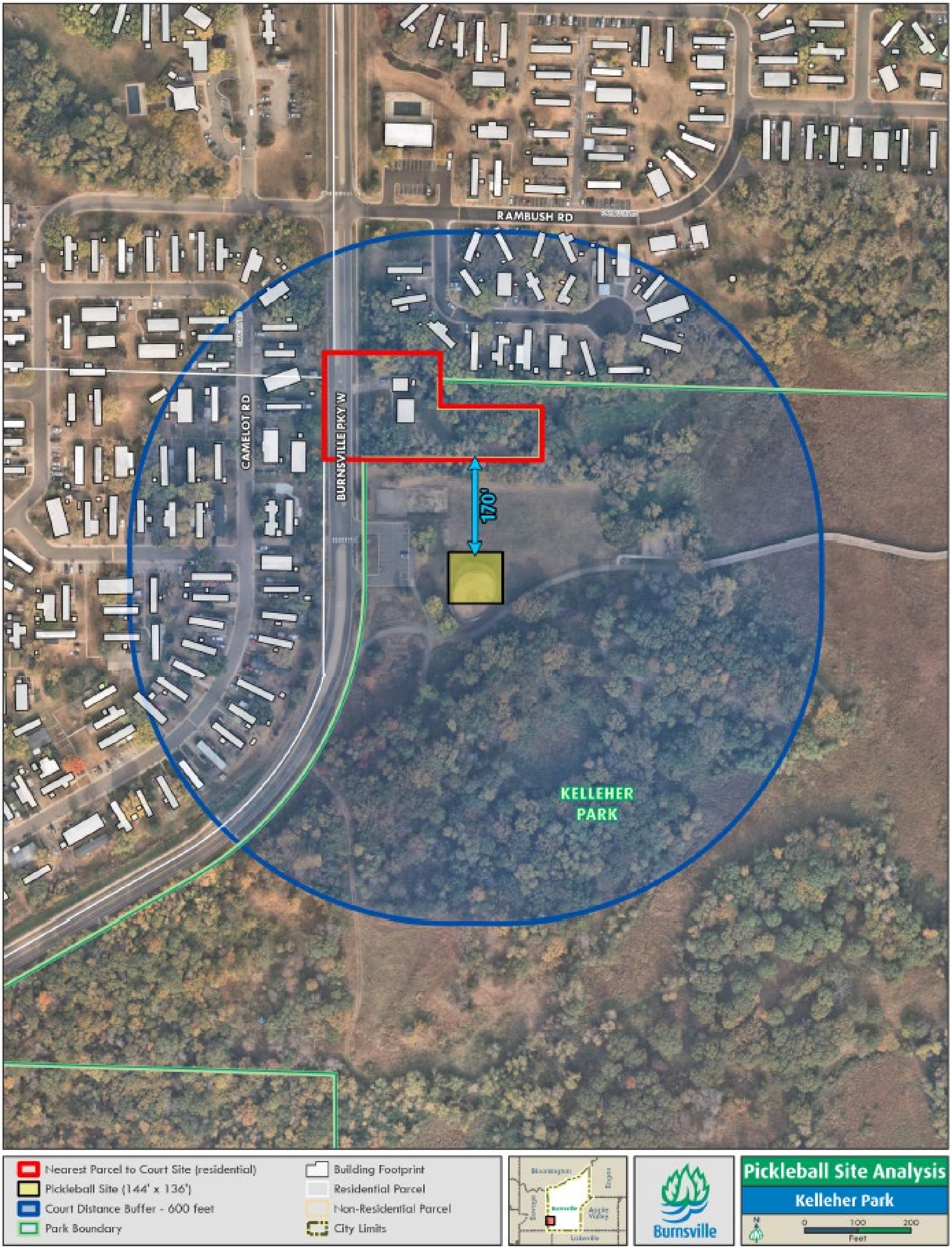
Kelleher Park

Evaluation

Open Space	The site would require the removal of existing amenities displacing current user groups.
Noise	There are residential homes within 170 feet of this site.
Environmental Impact	Potential environmental impact, requires further study.
Parking	Parking exists but may need expansion to accommodate a new complex.
Activity	The park offers a variety of use activities including basketball, baseball, soccer, a playground and trail access.
Tree Clearing	Minimal tree removal would be required to construct the facility.
Infrastructure	Basic infrastructure is present, although upgrades may be required.
Level of Service	Southwest quadrant
Lights	No lights
Earthwork	The site is relatively flat and does not require significant grading or earthwork.
Future Expansion	No future expansion based on current open space.
Economy of Site	Infrastructure needs and parking may impact project costs

Summary

Kelleher Park has a limited number of desired characteristics and is located within 500 feet of many neighborhood residents. A portion of the park is located within a flood plain.


RAMBUSH RD
CAMELOT RD
BURNSVILLE PKY W
170'
KELLEHER PARK
Nearest Parcel to Court Site (residential)
Pickleball Site (144' x 136')
Court Distance Buffer - 600 feet
Park Boundary
Building Footprint
Residential Parcel
Non-Residential Parcel
City Limits
Bloomington
Eagan
Savage
Burnsville
Apple Valley
Lakeville
Burnsville
Pickleball Site Analysis
Kelleher Park
0
100
200
Feet

Lac Lavon Park

Evaluation

Open Space	This site has open space, but development would impact user groups that reserve the shelter for large gatherings
Noise	The tennis court area is within 500 feet of homes. The picnic shelter location exceeds 500 feet to the closest residential home.
Environmental Impact	Potential environmental impact, requires further study.
Parking	The northern location in the park is supported by a small lot and on street parking but may have accessibility concerns.
Activity	The park is heavily used for a wide variety of activities.
Tree Clearing	Minimal tree removal would be required to construct the facility but significant tree removal if adding parking and access.
Infrastructure	Basic infrastructure is present, although upgrades may be required.
Level of Service	Southeast quadrant
Lights	Sports lighting
Earthwork	The site is relatively flat and does not require significant grading or earthwork.
Future Expansion	No future expansion based on current open space.
Economy of Site	Infrastructure needs and parking may impact project costs

Summary

Lac Lavon Park reviewed two potential location. The existing tennis court location is within 500 feet of several neighborhood residents. The northern location is existing open space however, several challenges and concerns could exist with parking and congestion, accessibility, economy of site, and environmental impacts to adjacent Keller Lake.

CRYSTAL BEACH PARK
CRYSTAL LAKE RD E
LAC LAVON DR
LAC LAVON PARK
709'
567'
185'
Apple Valley
JOSEPH ST
MARTIN AVE
DALLY ST
Nearest Parcel to Court Site (residential)
Pickleball Site (144' x 136')
Court Distance Buffer - 600 feet
Park Boundary
Building Footprint
Residential Parcel
Non-Residential Parcel
City Limits
Bloomington
Eagan
Savage
Burnsville
Apple Valley
Lakeville
Burnsville
Pickleball Site Analysis
Lac Lavon Park
0
140
280
Feet

Minnesota Riverfront Park

Evaluation

Open Space	The park lacks available open space due to its natural and flood-prone character.
Noise	The site lacks open space to support a complex.
Environmental Impact	Potential environmental impact, requires further study.
Parking	The park has a small lot to as part of the trailhead.
Activity	The park serves as a trailhead to the greenway.
Tree Clearing	Minimal tree removal would be required to construct the facility.
Infrastructure	The site has electricity.
Level of Service	Northeast quadrant
Lights	No lights
Earthwork	This site does not support a complex and exists in a flood area.
Future Expansion	No future expansion based on current open space.
Economy of Site	Infrastructure costs would be significant.

Summary

MN Riverfront Park is subject to flooding and lacks open space. Given these existing conditions, this park was not considered further as a potential location for a new pickleball complex.


Bloomington
MINNESOTA RIVERFRONT PARK
No Court Area
BLACK DOG RD W
Nearest Parcel to Court Site (residential)
Pickleball Site (144' x 136')
Court Distance Buffer - 600 feet
Park Boundary
Building Footprint
Residential Parcel
Non-Residential Parcel
City Limits
Burnsville
Pickleball Site Analysis
Minnesota Riverfront Park
0
40
80
Feet

Neill Park

Evaluation

Open Space	The site would require the removal of existing amenities displacing current user groups or creates safety concerns for park users (softball and sledding hill).
Noise	One location exceeds 500 feet to the closest residential. The other two locations are 200 feet away.
Environmental Impact	No known impacts
Parking	Two of the three potential locations may have parking and accessibility challenges.
Activity	The park is heavily used for a wide variety of activities.
Tree Clearing	Minimal tree removal would be required to construct the facility, but significant tree removal may be required if adding parking and access.
Infrastructure	Existing infrastructure for water and electricity is already available at the park.
Level of Service	Northwest quadrant
Lights	Sports lighting
Earthwork	The site is relatively flat and does not require significant grading or earthwork, but some areas may have soil issues which require further study.
Future Expansion	No future expansion based on current open space.
Economy of Site	Infrastructure needs, accessibility and parking may impact project costs

Summary

Neill park had three locations that were reviewed. The top left location displaces users and has several residents within 500 feet. The middle location displaces users, creates a safety issue for flying objects in the summer and fall and for sledding hill users in the winter. Additionally, challenges and concerns may exist for parking and accessibility. The right location is inside the 500 foot distance for senior living, is next to wetland, may have potential soil issue and may require additional parking to support baseball, community gardens and pickleball.


Pickleball Site Analysis
Neill Park
NEILL PARK
VALLEY RIDGE SENIOR LIVING
204'
699'
193'
Nearest Parcel to Court Site (residential)
Pickleball Site (144' x 136')
Court Distance Buffer - 600 feet
Park Boundary
Building Footprint
Residential Parcel
Non-Residential Parcel
City Limits
Burnsville
0
200
400
Feet
HIGHLAND DR
MANOR DR
DANA DR
PENN AVE
OLIVER AVE
RAYMAR CT
MORGAN AVE
MORGAN CT
UPTON AVE
135TH ST W
136TH ST W
BURNSVILLE PKY W
WASHBURN AVE
WASHBURN LN
VIVIAN DR
VINCENT CIR
VINCENT AVE S
VINCENT AVE
SHAWNEE LN
THOMAS AVE
SHADY LN
SCOTT ST
SHELLY LN
STEVEN RD
SHIRLEY DR
SUSAN LN
KNOX DR
CO RD 5
ELM LN
PRIVATE RD
LACOTA LN
ASPEN GROVE LN

Nicollet Commons

Evaluation

Open Space	The site lacks open land to support a complex.
Noise	This site lacks open space to support a complex.
Environmental Impact	No known impacts
Parking	Parking exists to support current downtown events, but capacity is limited for expanded use.
Activity	The park is heavily used for a wide variety of activities.
Tree Clearing	Minimal tree removal would be required to construct the facility.
Infrastructure	Existing infrastructure for water and electricity is already available at the park.
Level of Service	Northeast quadrant
Lights	No lights
Earthwork	The site is relatively flat and does not require significant grading or earthwork.
Future Expansion	No future expansion based on current open space.
Economy of Site	Amenity removal and replacement would may significantly impact project costs.

Summary

Nicollet Commons Park lacks open space. Given these existing conditions, this park was not considered further as a potential location for a new pickleball complex.

TRAVELERS TRL W
TRAVELERS TRL E
NICOLLET AVE
125TH ST
NICOLLET COMMONS PARK
No Court Area
126TH ST W
Nearest Parcel to Court Site (residential)
Pickleball Site (144' x 136')
Court Distance Buffer - 600 feet
Park Boundary
Building Footprint
Residential Parcel
Non-Residential Parcel
City Limits
Burnsville
Pickleball Site Analysis
Nicollet Commons Park
0
40
80
Feet

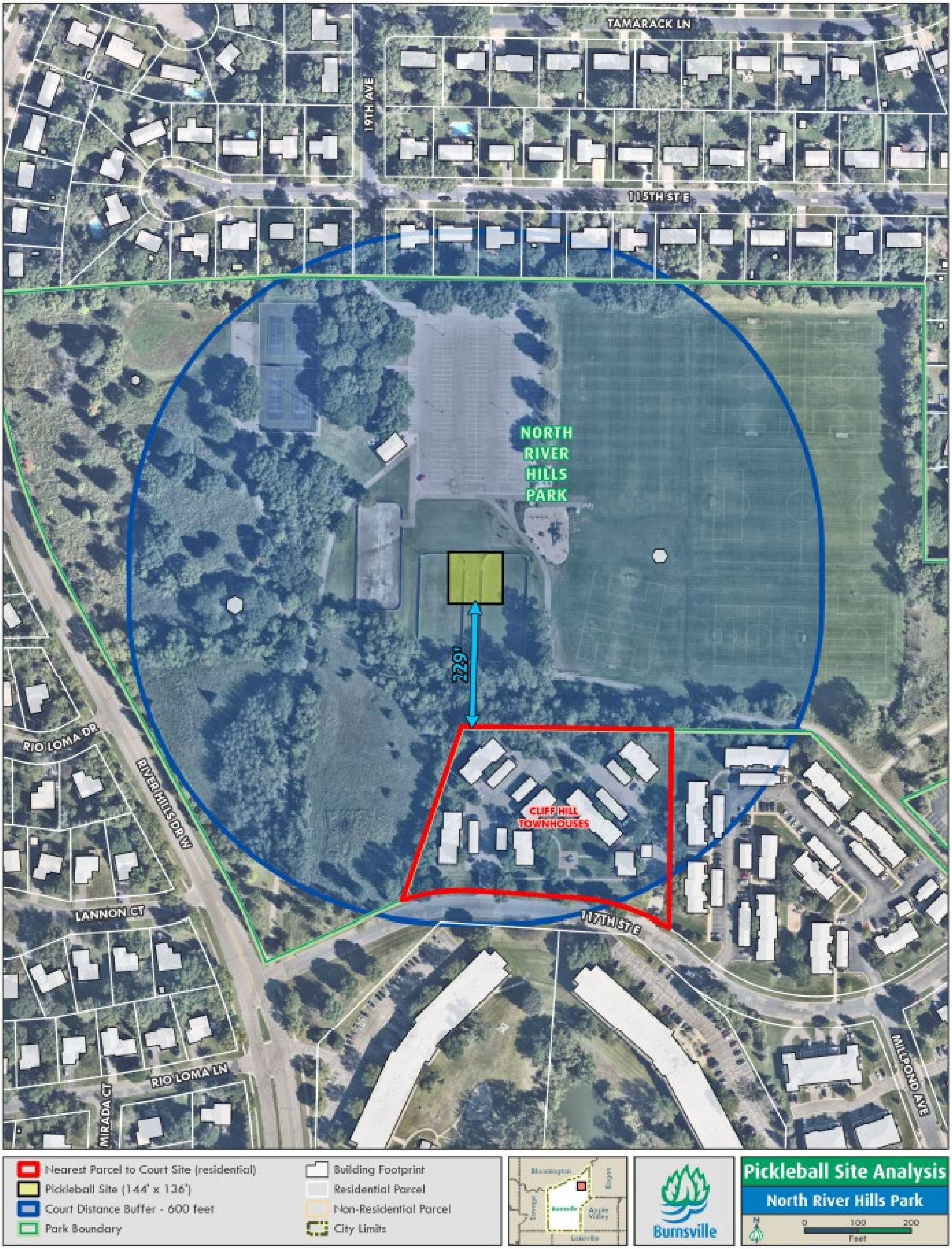
North River Hills

Evaluation

Open Space	The site would require the removal of existing amenities displacing current user groups.
Noise	The proposed site is within 500 feet of residential properties, raising noise concerns.
Environmental Impact	No known impacts
Parking	The park currently has adequate parking to support large-scale recreational events.
Activity	The park is heavily used for a wide variety of activities and serves as the premier soccer location in the city.
Tree Clearing	Minimal tree removal would be required to construct the facility.
Infrastructure	Has infrastructure for electric and water to support amenities.
Level of Service	Northeast quadrant
Lights	Sports lighting
Earthwork	The site is relatively flat and does not require significant grading or earthwork.
Future Expansion	No future expansion based on current open space.
Economy of Site	Supported by existing infrastructure.

Summary

North River Hills is a developed park that is home to the park systems heavily programmed premier soccer facility and the most popular winter skating location. The potential location considered would displace users and is within 500 feet of residents. A recent open house with park neighbors informed staff that residents preferred to keep the tennis courts in the existing location as opposed to removing a hockey rink.



TAMARACK LN
19TH AVE
115TH ST E
NORTH RIVER HILLS PARK
229'
CLIFF HILL TOWNHOUSES
RIO LOMA DR
RIVER HILLS DRW
LANNON CT
117TH ST E
RIO LOMA LN
MIRADA CT
MILLPOND AVE
Nearest Parcel to Court Site (residential)
Pickleball Site (144' x 136')
Court Distance Buffer - 600 feet
Park Boundary
Building Footprint
Residential Parcel
Non-Residential Parcel
City Limits
Burnsville
Pickleball Site Analysis
North River Hills Park
0
100
200
Feet

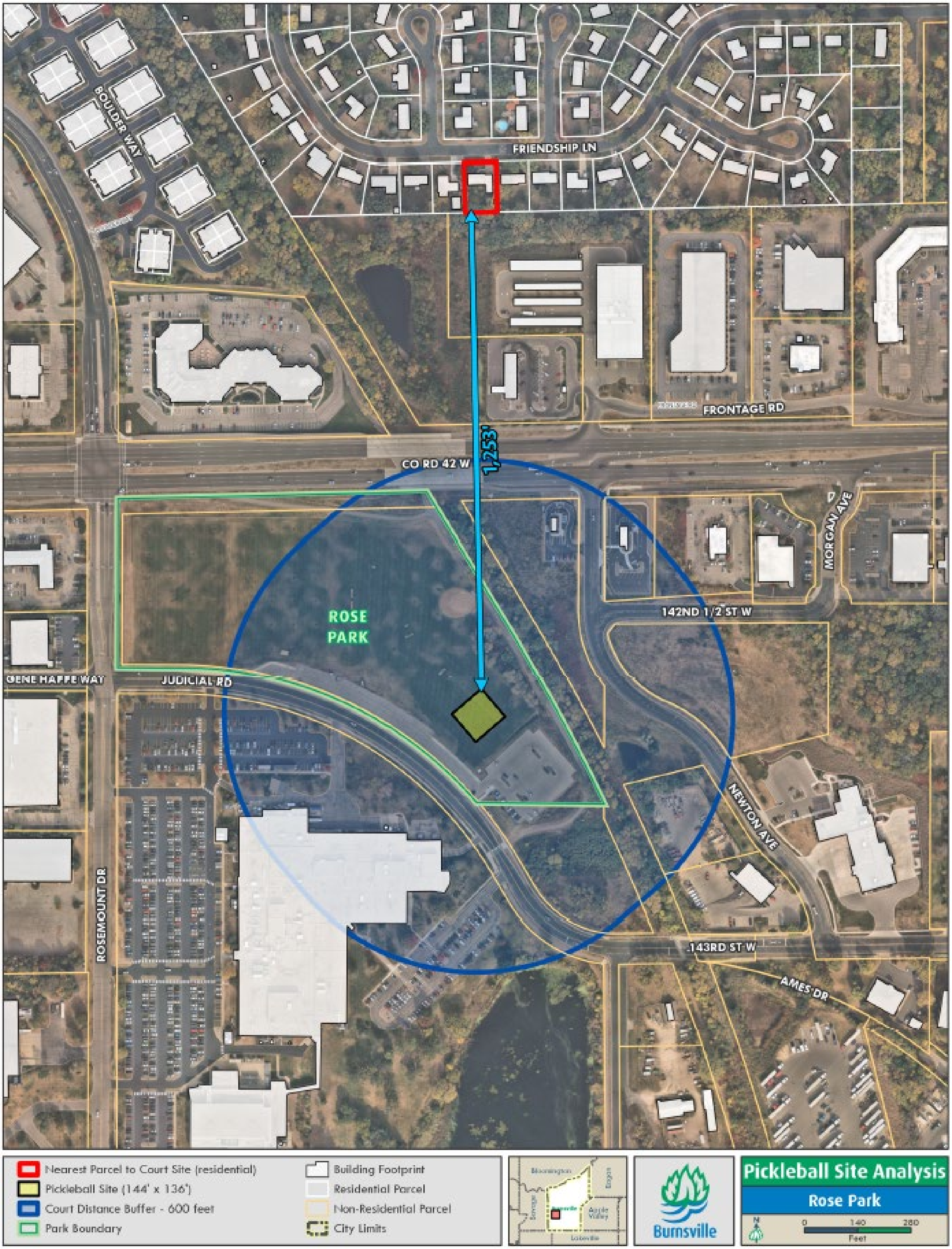
Rose Park

Evaluation

Open Space	The site is not owned by the city.
Noise	There are no residential homes within 500 feet of this site.
Environmental Impact	No known impacts
Parking	The site has an existing parking lot to support current use but may require additional parking.
Activity	The park is heavily used for a wide variety of activities.
Tree Clearing	Minimal tree removal would be required to construct the facility.
Infrastructure	Existing infrastructure for water and electricity is already available at the park.
Level of Service	Southwest quadrant
Lights	No lights
Earthwork	The site is relatively flat and does not require significant grading or earthwork.
Future Expansion	No future expansion based on current open space.
Economy of Site	Supported by existing infrastructure.

Summary

Rose Park is located on land owned by Collins Aerospace and leased to the city. The site has number of characteristics to support a pickleball complex but would displace one soccer field. However, under the current park agreement executed in 1992, either party could terminate the agreement with 180 days notice. Staff have inquired about the possibility of amending the lease for a pickleball complex.



FRIENDSHIP LN
BOULDER WAY
FRONTAGE RD
CO RD 42 W
1,253'
ROSE PARK
142ND 1/2 ST W
MORGAN AVE
GENE HAFFE WAY
JUDICIAL RD
NEWTON AVE
ROSEMOUNT DR
143RD ST W
AMES DR
Nearest Parcel to Court Site (residential)
Pickleball Site (144' x 136')
Court Distance Buffer - 600 feet
Park Boundary
Building Footprint
Residential Parcel
Non-Residential Parcel
City Limits
Burnsville
Pickleball Site Analysis
Rose Park
0
140
280
Feet

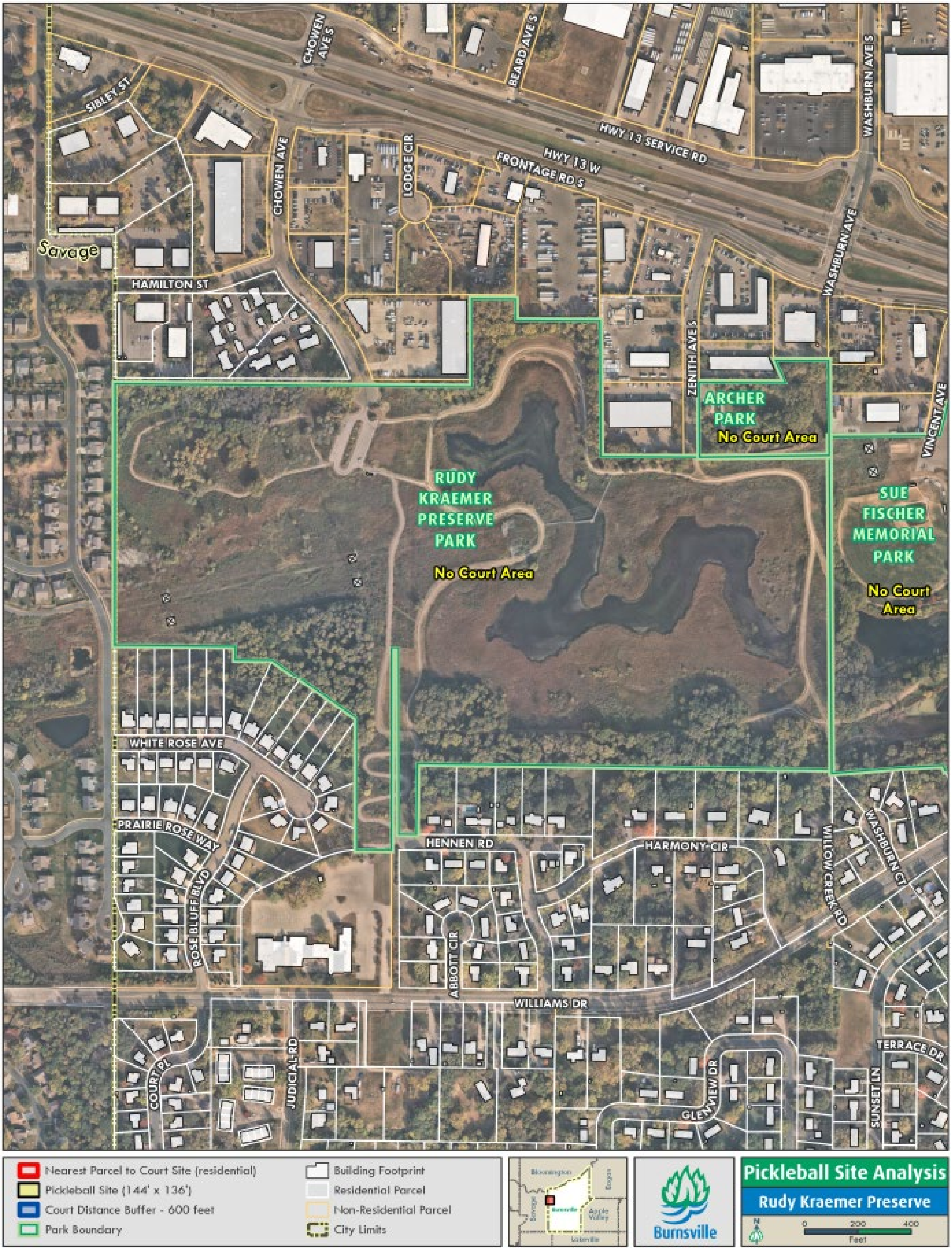
Rudy Kraemer

Evaluation

Open Space	The site lacks a significant number of site selection characteristics and therefore was not considered as a reasonable site location.
Noise	The site lacks a significant number of site selection characteristics and therefore was not considered as a reasonable site location.
Environmental Impact	Potential environmental impact, requires further study.
Parking	Basic parking is available for trail use with on street parking nearby.
Activity	The nature preserves primarily provides passive recreation opportunities.
Tree Clearing	Significant tree or natural plant removal would be required.
Infrastructure	This location lacks existing water and electricity.
Level of Service	Northwest quadrant
Lights	No lights
Earthwork	The site is relatively flat and does not require significant grading or earthwork, but some areas may have soil issues which require further study.
Future Expansion	No future expansion based on current open space.
Economy of Site	Infrastructure needs, accessibility and parking may impact project costs

Summary

Rudy Kraemer lacks a significant number of site selection characteristics. Given these existing conditions, this park was not considered further as a potential location for a new pickleball complex.



CHOWEN AVE S
BEARD AVE S
WASHBURN AVE S
SIBLEY ST
HWY 13 SERVICE RD
HWY 13 W
FRONTAGE RD S
CHOWEN AVE
LODGE CIR
WASHBURN AVE
Savage
HAMILTON ST
ZENITH AVE S
ARCHER PARK
No Court Area
VINCENT AVE
RUDY KRAEMER PRESERVE PARK
No Court Area
SUE FISCHER MEMORIAL PARK
No Court Area
WHITE ROSE AVE
PRAIRIE ROSE WAY
ROSE BLUFF BLVD
HENNEN RD
HARMONY CIR
WILLOW CREEK RD
WASHBURN CT
ABBOTT CIR
WILLIAMS DR
TERRACE DR
COURT PL
JUDICIAL RD
GLENVIEW DR
SUNSET LN
Nearest Parcel to Court Site (residential)
Pickleball Site (144' x 136')
Court Distance Buffer - 600 feet
Park Boundary
Building Footprint
Residential Parcel
Non-Residential Parcel
City Limits
Burnsville
Pickleball Site Analysis
Rudy Kraemer Preserve
0 200 400
Feet

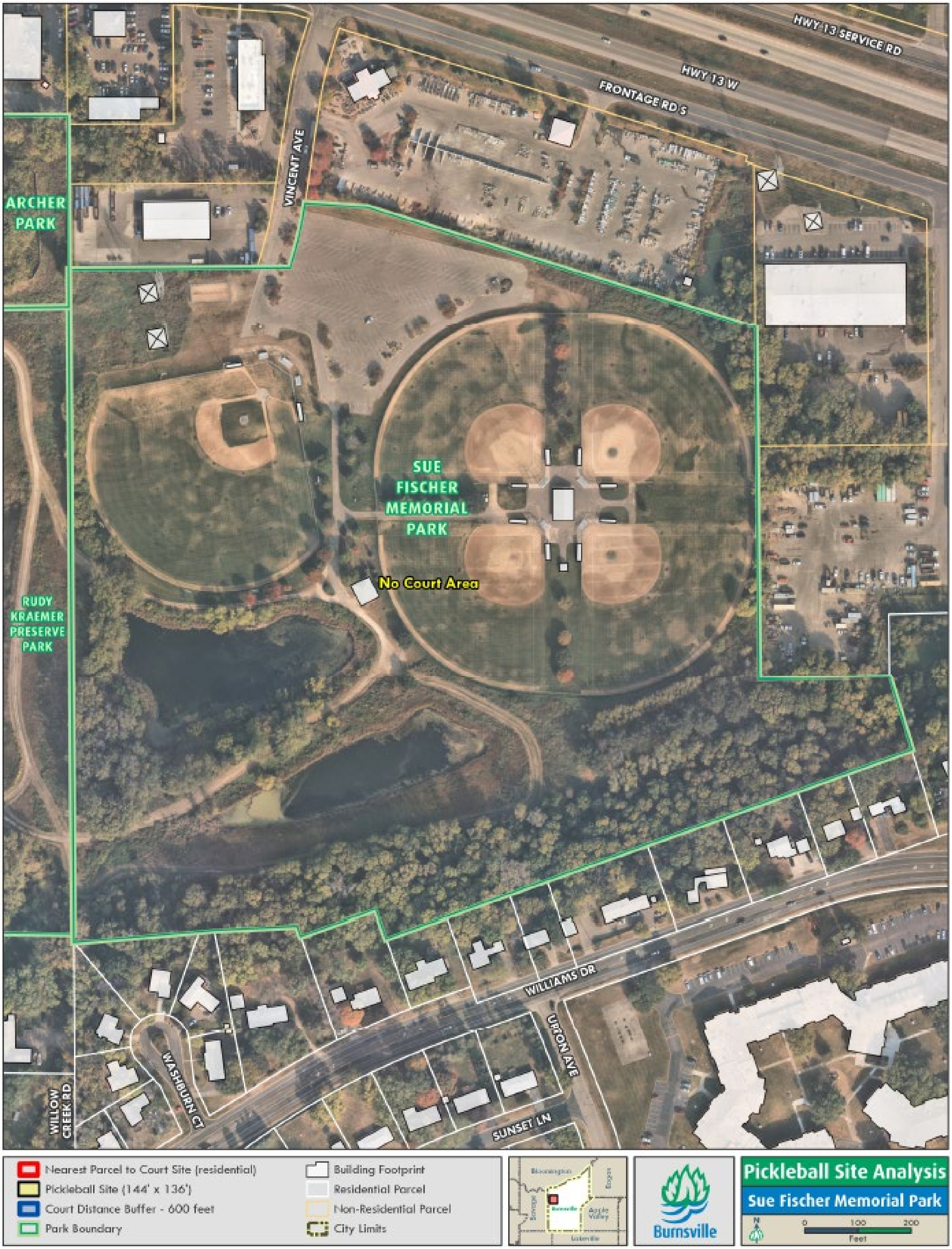
Sue Fischer

Evaluation

Open Space	The site would require the removal of existing amenities displacing current user groups.
Noise	Set back from major residential areas, noise impact would be low.
Environmental Impact	No known impacts
Parking	Existing parking may require expansion to support tournaments or large gatherings.
Activity	The park is heavily used for a wide variety of activities.
Tree Clearing	Minimal tree removal would be required to construct the facility.
Infrastructure	Existing infrastructure for water and electricity is already available at the park.
Level of Service	Northwest quadrant
Lights	Sports lighting
Earthwork	The site is relatively flat and does not require significant grading or earthwork, but some areas may have soil issues which require further study.
Future Expansion	No future expansion based on current open space.
Economy of Site	Supported by existing infrastructure.

Summary

Sue Fischer lacks a significant number of site selection characteristics. Given these existing conditions, this park was not considered further as a potential location for a new pickleball complex.


HWY 13 SERVICE RD
HWY 13 W
FRONTAGE RD S
VINCENT AVE
ARCHER PARK
SUE FISCHER MEMORIAL PARK
No Court Area
RUDY KRAEMER PRESERVE PARK
WILLIAMS DR
UPTON AVE
WASHBURN CT
WILLOW CREEK RD
SUNSET LN
Nearest Parcel to Court Site (residential)
Pickleball Site (144' x 136')
Court Distance Buffer - 600 feet
Park Boundary
Building Footprint
Residential Parcel
Non-Residential Parcel
City Limits
Burnsville
Pickleball Site Analysis
Sue Fischer Memorial Park
0 100 200
Feet

Sunset Pond

Evaluation

Open Space	While the site has some open space, the neighborhood shared their desire to keep the open spaces natural during trail engagement sessions.
Noise	There are residential homes within 85 feet of this site.
Environmental Impact	Natural wetland features present environmental sensitivities for development.
Parking	Parking exists but may be insufficient for the added complex traffic.
Activity	This park primarily provides passive recreation opportunities.
Tree Clearing	Minimal tree removal would be required to construct the facility.
Infrastructure	Basic infrastructure is present, although upgrades may be required.
Level of Service	Northwest quadrant
Lights	No lights
Earthwork	The site is relatively flat and does not require significant grading or earthwork.
Future Expansion	No future expansion based on current open space.
Economy of Site	Infrastructure needs, accessibility and parking may impact project costs

Summary

Sunset Pond lacks a significant number of site selection characteristics and is close to residential housing. Given these existing conditions, this park was not considered further as a potential location for a new pickleball complex.

SUNSET
POND
PARK
SUNSET LAKE DR
YORK AVE
XERXES AVE
81'
WEST PRESERVE BLVD
BURNSVILLE PKY W
Nearest Parcel to Court Site (residential)
Pickleball Site (144' x 136')
Court Distance Buffer - 600 feet
Park Boundary
Building Footprint
Residential Parcel
Non-Residential Parcel
City Limits
Bloomington
Eagan
Savage
Burnsville
Apple Valley
Lakeville
Burnsville
Pickleball Site Analysis
Sunset Pond Park
0
100
200
Feet

Terrace Oaks West

Evaluation

Open Space	This site lacks open space suitable for project development.
Noise	This site lacks open space suitable for project development.
Environmental Impact	Potential environmental impact, requires further study.
Parking	Parking exists to support current park use.
Activity	This park primarily provides passive recreation opportunities.
Tree Clearing	Significant tree removal would be required.
Infrastructure	Basic infrastructure is present, although upgrades may be required.
Level of Service	Northeast quadrant
Lights	No lights
Earthwork	Steep slopes throughout the park would require significant grading.
Future Expansion	No future expansion based on current open space.
Economy of Site	Topography would significantly impact project costs.

Summary

Terrace Oaks West lacks a significant number of site selection characteristics. Given these existing conditions, this park was not considered further as a potential location for a new pickleball complex.

MELODY LN
MYSTIC LN
125TH ST E
KENNELLY RD
DALRIDGE CIR
PINEHURST DR
31ST AVE
NORWAY PT
SKYLINE DR S
PARKWAY PL
BURNSVILLE PKY E
TETON CT
WIND CAVE CT
PARC DR
MEAD CT
CARLSBAD CT
ACADIA CT
APPLE VIEW LN
COUNTRY VIEW BLVD
MESA VERDE CT
LASSEN CT
COUNTRY VIEW CT
COUNTRY VIEW DR
CO RD 11
RAINIER CIR
RAINIER CT
ISLE ROYALE CT
GLACIER CT
BRYCE CT
No Court Area
TERRACE OAKS WEST PARK
130TH ST E
18TH AVE
HIGHPOINT CUR
SHEFFIELD LN
I-35E
Apple Valley
ACORN CIR
COMMONWEALTH DR
GREAT OAKS DR
I-35E RAMP
Nearest Parcel to Court Site (residential)
Pickleball Site (144' x 136')
Court Distance Buffer - 600 feet
Park Boundary
Building Footprint
Residential Parcel
Non-Residential Parcel
City Limits
Bloomington
Eagan
Savage
Burnsville
Apple Valley
Lakeville
Burnsville
Pickleball Site Analysis
Terrace Oaks West Park
0
260
520
Feet

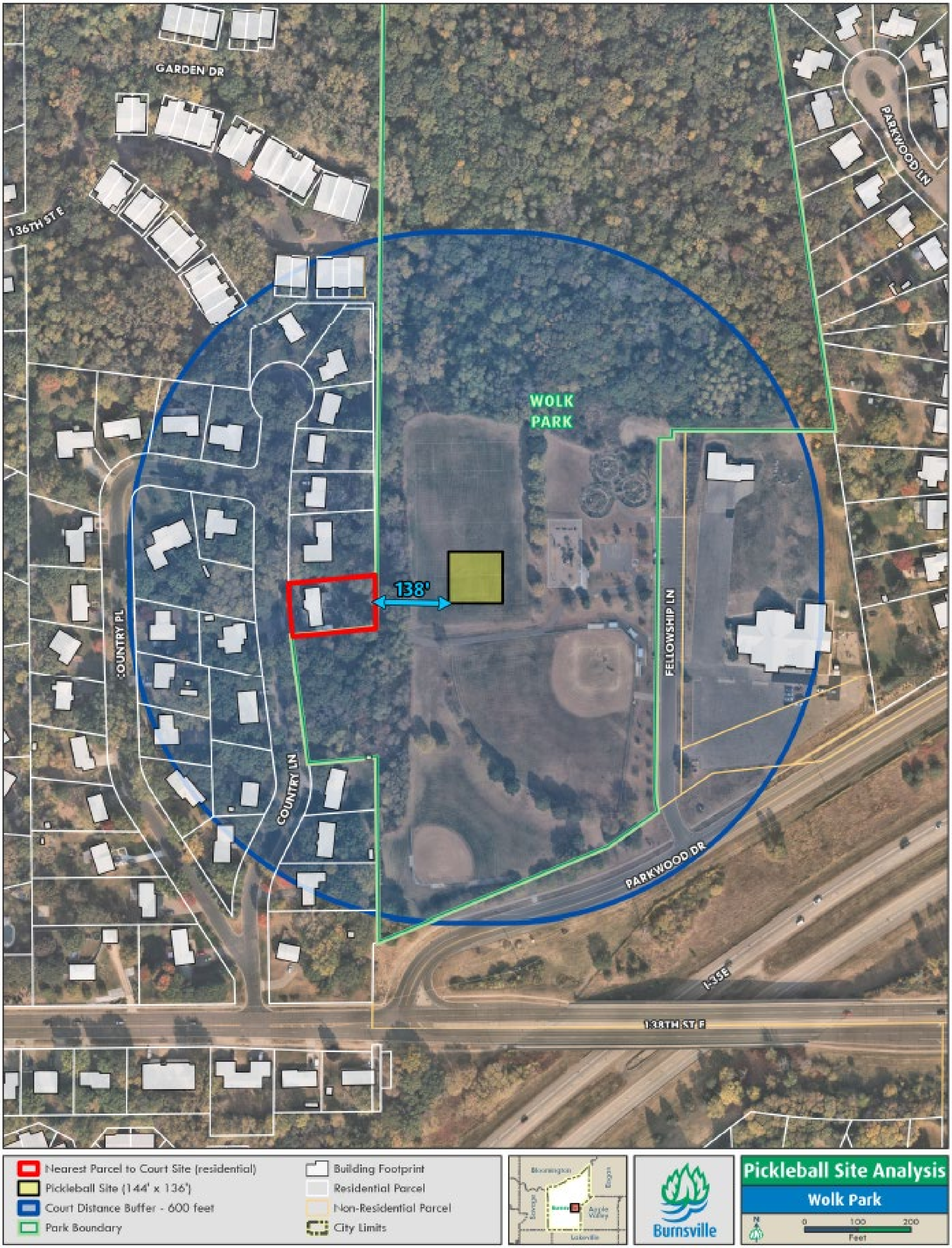
Wolk Park

Evaluation

Open Space	The site would require the removal of existing amenities displacing current user groups.
Noise	There are residential homes within 140 feet of this site.
Environmental Impact	Minimal environmental impact expected due to already developed land.
Parking	The park has ample parking, supporting existing uses.
Activity	The park is heavily used for a wide variety of activities.
Tree Clearing	Minimal tree removal would be required to construct the facility.
Infrastructure	Basic infrastructure is present, although upgrades may be required.
Level of Service	Northeast quadrant
Lights	No lights
Earthwork	The site is relatively flat and does not require significant grading or earthwork.
Future Expansion	Future expansion could place if displacing existing user groups.
Economy of Site	Supported by existing infrastructure.

Summary

Wolk Park was recently renovated in 2019 and has several residential homes within 500 feet. Given these existing conditions, this park was not considered further as a potential location for a new pickleball complex.


GARDEN DR
136TH ST E
PARKWOOD LN
WOLK
PARK
138'
FELLOWSHIP LN
COUNTRY PL
COUNTRY LN
PARKWOOD DR
I-35E
138TH ST E
Nearest Parcel to Court Site (residential)
Pickleball Site (144' x 136')
Court Distance Buffer - 600 feet
Park Boundary
Building Footprint
Residential Parcel
Non-Residential Parcel
City Limits
Burnsville
Pickleball Site Analysis
Wolk Park
0
100
200
Feet

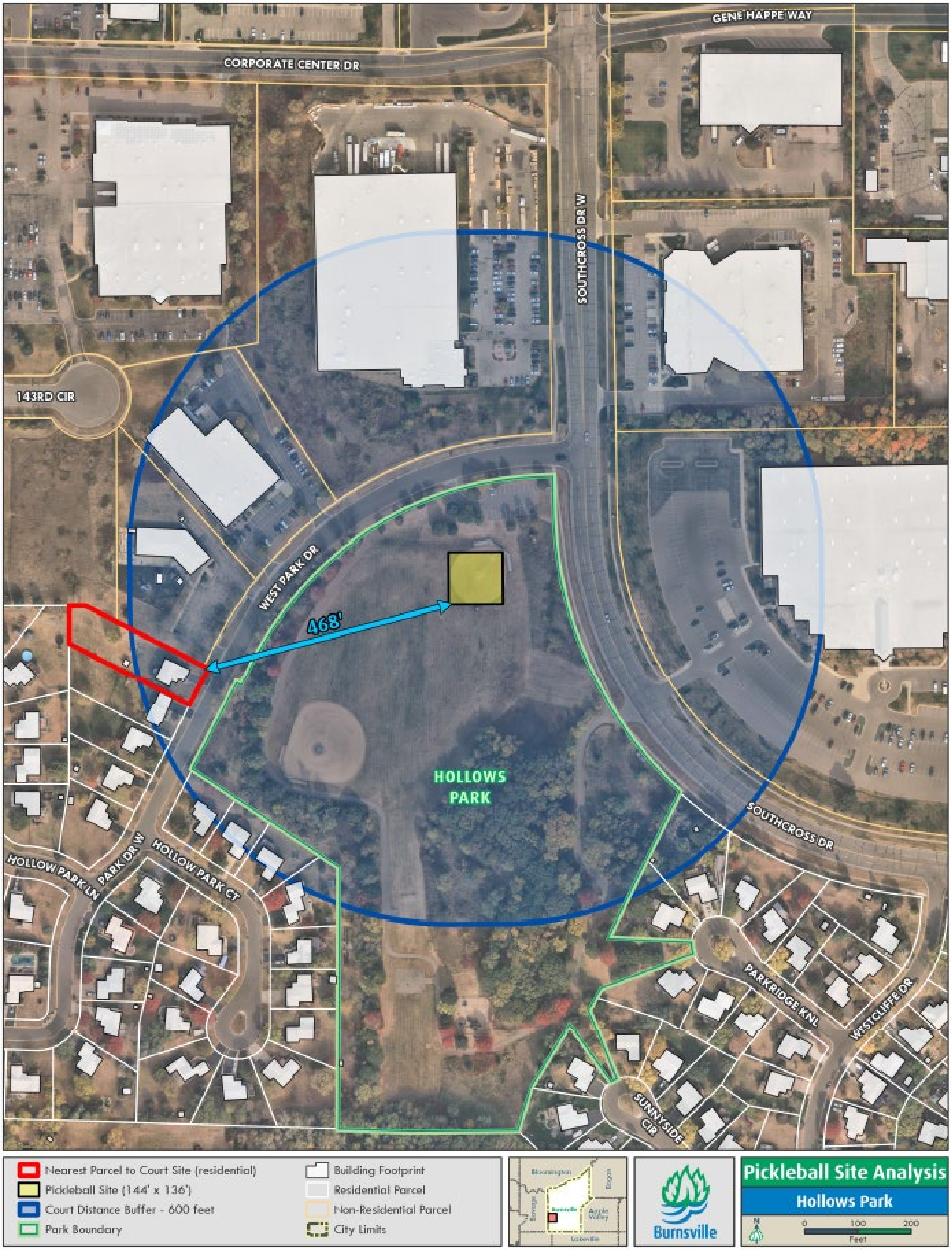
Hollows Park

Evaluation

Open Space	The park is fully developed, meaning a complex would displace existing users.
Noise	Nearby homes fall just inside the 500-foot site criteria.
Environmental Impact	Minimal environmental impact expected given current development.
Parking	Current parking is limited and may require expansion or more street parking.
Activity	This neighborhood park supports bat and ball activities, basketball and a playground.
Tree Clearing	Minimal tree removal would be required to construct the facility.
Infrastructure	This location lacks existing water and electricity.
Level of Service	Southwest quadrant
Lights	No lights
Earthwork	The site is relatively flat and does not require significant grading or earthwork.
Future Expansion	No future expansion based on current open space.
Economy of Site	Infrastructure needs and parking may impact project costs

Summary

Hollows Park is a neighborhood park with several positive criteria to potentially host a pickleball complex. The park is fully developed which would require the displacement of existing user groups. Additionally, several houses fall just inside the 500 feet of a potential location and limited parking would require an expansion of the parking lot or an increase in on street parking on West Park Drive.


GENE HAPPE WAY
CORPORATE CENTER DR
SOUTHCROSS DR W
143RD CIR
WEST PARK DR
468'
HOLLOWS PARK
SOUTHCROSS DR
HOLLOW PARK LN
PARK DR W
HOLLOW PARK CT
PARKRIDGE KNL
WESTCLIFFE DR
SUNNYSIDE CIR
Nearest Parcel to Court Site (residential)
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Non-Residential Parcel
City Limits
Burnsville
Pickleball Site Analysis
Hollows Park
0 100 200
Feet

Memorandum

To:	Garrett Beck, City of Burnsville
From:	Aaron Stolte & Katie Leise, Kimley-Horn
Date:	March 11, 2025
Subject:	Alimagnet Park Proposed Pickleball Court Facility – Noise Assessment

Project Description

The purpose of this technical memorandum is to qualitatively assess potential noise levels associated with the proposed Alimagnet Park Pickleball Court Facility. The site is generally located east of Dakota County Road 11, south of Alimagnet Lake and north of Alimagnet Parkway. The facility is surrounded by Alimagnet Park to the south and to the east, Alimagnet Lake to the north, and residential land uses to the north and west. The location of the project site is shown in **Figure 1**.

Figure 1: Site Location and Vicinity

Characteristics of Noise

Noise is generally defined as unwanted sound. It is emitted from many natural and man-made sources. Sound pressure levels are usually measured and expressed in decibels (dB). The decibel scale is logarithmic and expresses the ratio of the sound pressure unit being measured to a standard reference level. Most sounds occurring in the environment do not consist of a single frequency, but rather a broad band of differing frequencies. The intensities of each frequency add together to generate sound. Because the human ear does not respond to all frequencies equally, the method commonly used to quantify environmental noise consists of evaluating all of the frequencies of a sound according to a weighting system. It has been found that the A-weighted decibel [dB(A)] filter on a sound level meter, which includes circuits to differentially measure selected audible frequencies, best approximates the frequency response of the human ear.

The degree of disturbance from exposure to unwanted sound – noise – depends upon three factors:

1. The amount, nature, and duration of the intruding noise
2. The relationship between the intruding noise and the existing sound environment; and
3. The situation in which the disturbing noise is heard

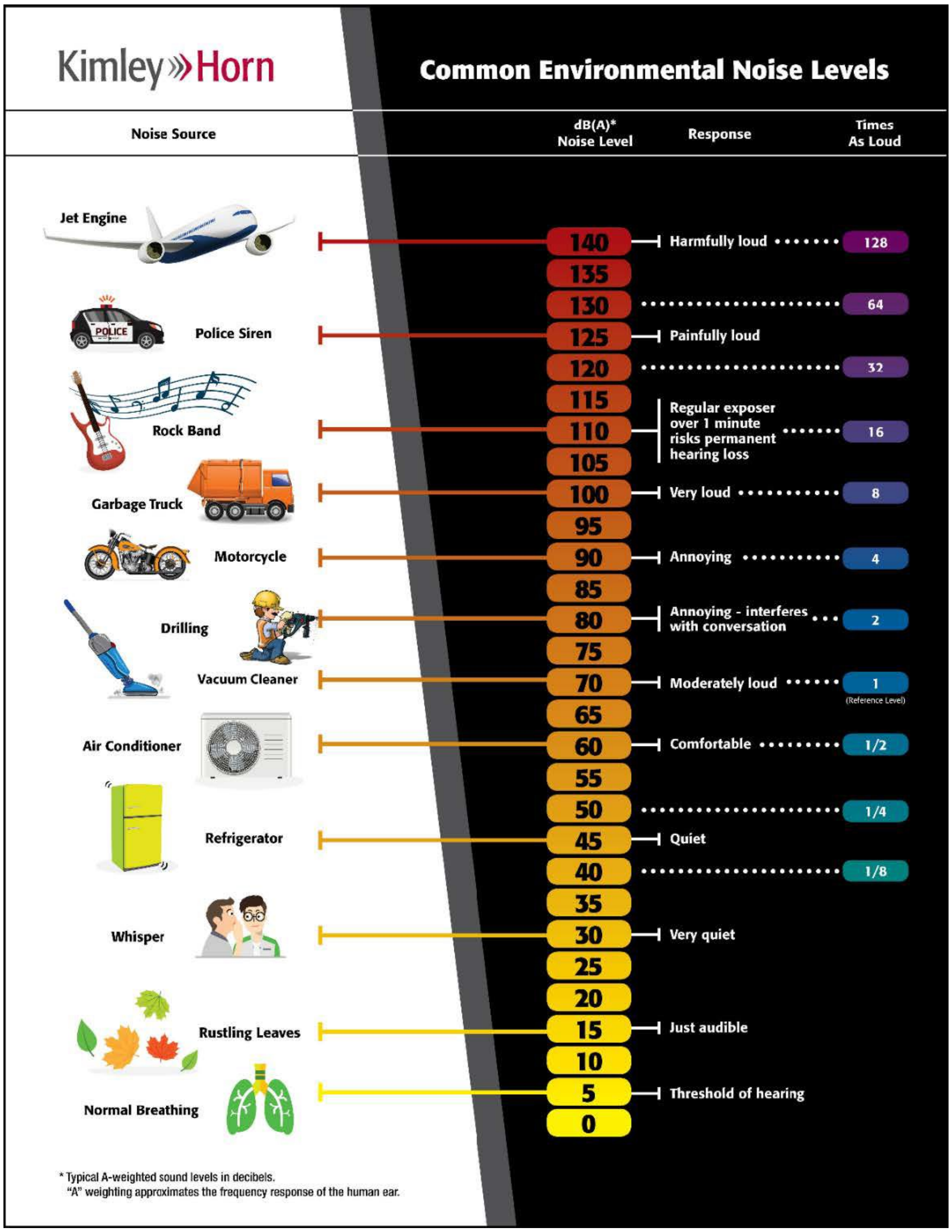
In considering the first of these factors, it is important to note that individuals have varying sensitivity to noise. Loud noises bother some people more than other people, and some individuals become increasingly disturbed if an unwanted noise persists. The time patterns and durations of noise(s) also affect perception as to whether or not it is offensive. For example, noises that occur during nighttime (sleeping) hours are typically considered to be more offensive than the same noises in the daytime.

With regard to the second factor, individuals tend to judge the annoyance of an unwanted noise in terms of its relationship to noise from other sources (background noise). A car horn blowing at night when background noise levels are low would generally be more objectionable than one blowing in the afternoon when background noise levels are typically higher. The response to noise stimulus is analogous to the response to turning on an interior light. During the daytime an illuminated bulb simply adds to the ambient light, but when eyes are conditioned to the dark of night, a suddenly illuminated bulb can be temporarily blinding.

The third factor – situational noise – is related to the interference of noise with activities of individuals. In a 60 [dB(A)] environment such as is commonly found in a large business office, normal conversation would be possible, while sleep might be difficult. Loud noises may easily interrupt activities that require a quiet setting for greater mental concentration or rest; however, the same loud noises may not interrupt activities requiring less mental focus or tranquility.

As shown in Figure 2, most individuals are exposed to fairly high noise levels from many sources on a regular basis. To perceive sounds of greatly varying pressure levels, human hearing has a non-linear sensitivity to sound pressure exposure. Doubling the sound pressure results in a three decibel change in the noise level; however, variations of three [dB(A)] or less are commonly considered “barely perceptible” to normal human hearing. A five [dB(A)] change is more readily noticeable. A ten-fold increase in the sound pressure level correlates to a 10 [dB(A)] noise level increase; however, it is judged by most people as sounding “twice as loud”.

Figure 2: Common Noise Levels



Over time, individuals tend to accept the noises that intrude into their lives on a regular basis; however, exposure to prolonged and/or extremely loud noise(s) can prevent use of exterior and interior spaces and has been theorized to pose health risks.

Noise Standards

The City of Burnsville has adopted the Minnesota Pollution Control Agency (MPCA) noise standards[1] for determining noise impacts for a variety of land uses in accordance with Minnesota Statute 166.07 and Minnesota Rules 7030.0010 to 7030.0080 (City Code of Burnsville, Minnesota, Chapter 10-7-9).

The MPCA noise standards quantify noise levels over a one-hour monitoring period. L_{10} represents the noise level that is exceeded for 10 percent of the hour, or six minutes, whereas L_{50} represents the noise level that is exceeded for 50 percent, or 30 minutes, of the hour. The Alimagnet Park Pickleball Court Facility is proposed within Alimagnet Park. This park is home to a dog park and baseball fields which facilitate recreational activities. These areas fall under Noise Area Classification 2. Residential properties approximately 700 feet to the west and 1200 feet to the north of the proposed facility fall under Noise Area Classification 1. The decibels are shown in the A-weighted scale [dB(A)] with weighted frequencies that correspond to human subjective response to noise. Table 1 shows the MPCA noise limits by NAC in decibels over six minutes (L_{10}) and 30 minutes (L_{50}) of an hour during the daytime and nighttime.

Table 1. MPCA Noise Limits by Noise Area Classification

Noise Area Classification	Daytime (7 a.m. – 10 p.m.)		Nighttime (10 p.m. – 7 a.m.)	
	L_{10} [dB(A)]	L_{50} [dB(A)]	L_{10} [dB(A)]	L_{50} [dB(A)]
1	65	60	55	50
2	70	65	70	65
3	80	75	80	75

Reference Study

To qualitatively assess potential noise impacts from the proposed facility, data from a pickleball noise assessment study were extrapolated for Alimagnet Park.[2] The purpose of the study was to provide data for assessing the short duration impulsive sound such as pickleball and paddle impacts and guidance for the acoustical planning of new pickleball facilities. The main concern for neighbors living close to pickleball courts is the “popping” sound produced by the paddle when it strikes the ball. The study classified this sound as “highly impulsive” which is relatable to metal/wood hammering, pile driving, jack hammering, and small arms gunfire. Impulsive sound is defined as sound whose pressure noticeable exceeds background sound pressure for brief periods of time, less than one second. The study explains that impulsive sounds can create particular annoyance because they are similar to sounds that alert us with important information

[1] Minnesota Pollution Control Agency. *A Guide to Noise Control in Minnesota*. Accessed at https://www.pca.state.mn.us/sites/default/files/p-gen6-01.pdf
[2] Spendiarian & Willis Acoustics & Noise Control LLC. *Pickleball Noise Impact Assessment and Abatement Planning*. 2023. Accessed at: https://www.centennialco.gov/files/sharedassets/public/v/1/documents/city-projects-and-initiatives/centennial-pickleball-noise-assessment.pdf

like a door closing or a loud sound outside the house. In summary, the study acknowledges the challenges of applying the sound generated from pickleball courts to other more recognizable neighborhood sources like traffic and creates a methodology appropriate for what neighbor's experience from an impulsive sound.

The study modeled estimated sound pressure generation from a hypothetical pickleball court arrangement. The study found that sounds tends to be directionally propagated in the direction of play; meaning, more sound is propagated parallel to the orientation of the play area than perpendicular. See **Figure 3** for the proposed layout of the Alimagnet Park Pickleball Court Facility. **Figure 4** depicts the modeled sound pressure level documented from the assessed study; a 55 dBA contour extends "685 feet in the direction of play and 340 feet laterally." Contour lines are measured in dBA. Distance from western to eastern extent of 55 dBA contour is approximately 340 feet. The mapped facility is on relatively level ground, similar to the proposed Alimagnet Park Pickleball Courts Facility.

Figure 3. Proposed Facility Site Plans

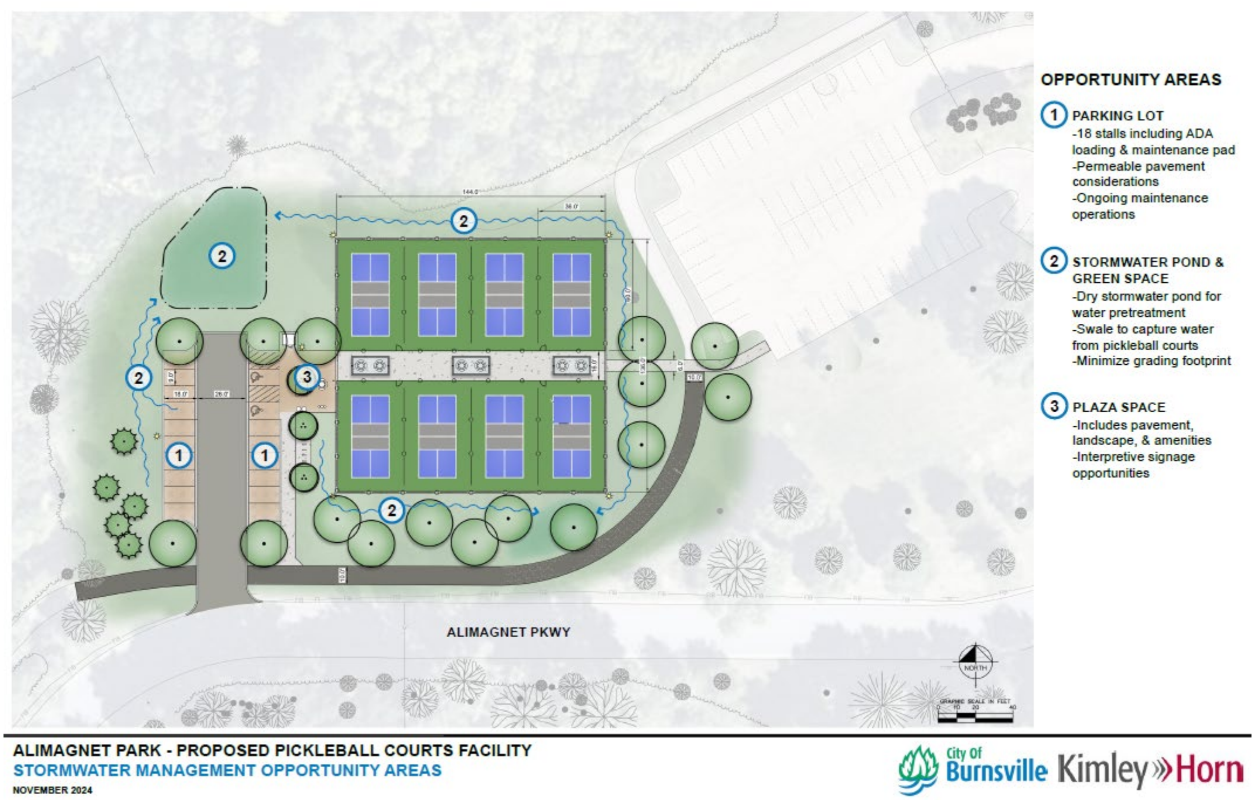
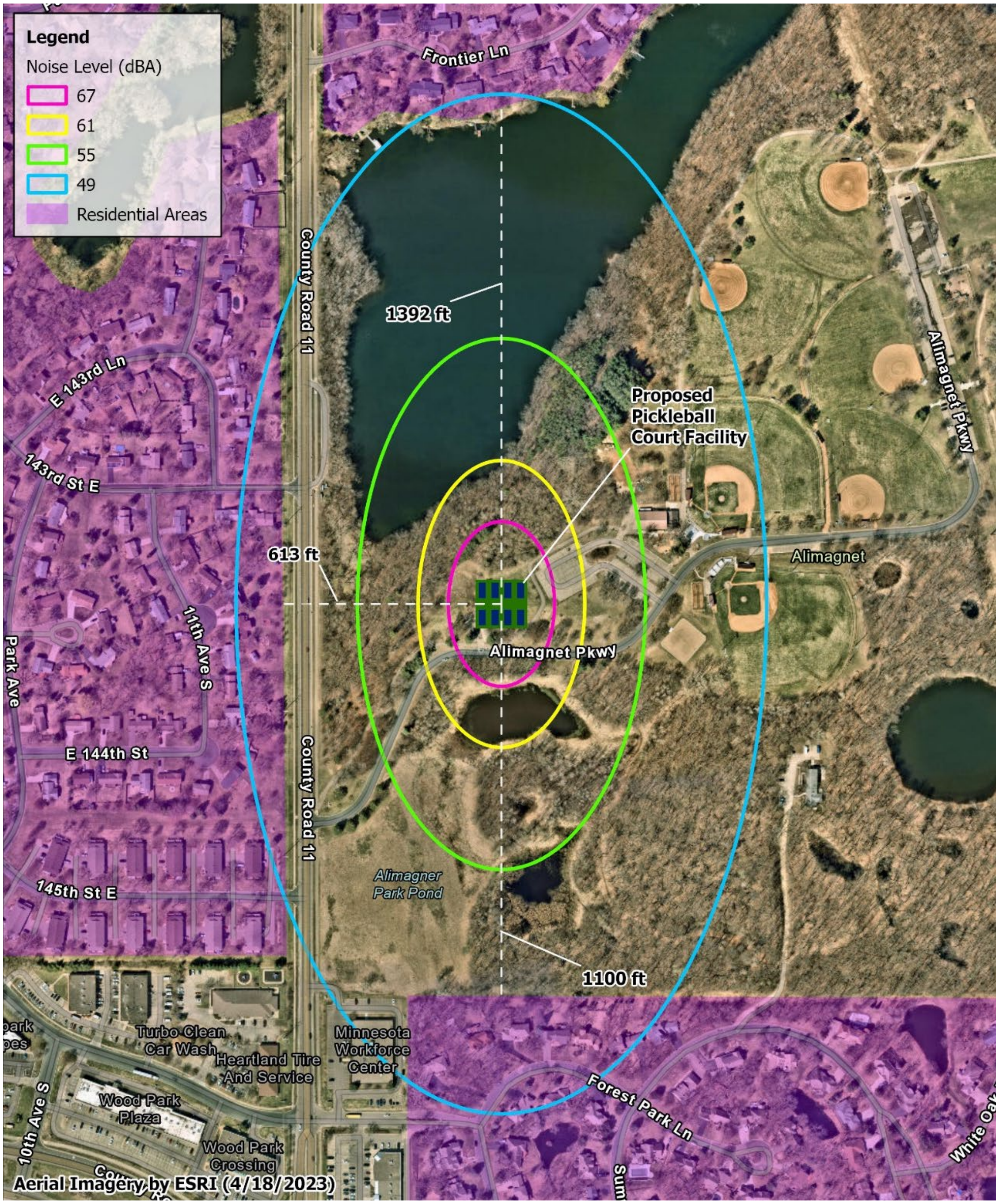


Figure 4: Noise Levels Extrapolated from Relevant Study



When extrapolating the results of the study, it is highly unlikely that the proposed pickleball courts would by above the MPCA thresholds. The direction of play will occur north to south, thus the residences 1200 feet to the north and 700 feet to the west are not anticipated to experience noise impacts that exceed MPCA thresholds. Furthermore, the study states that “noise complaints” about pickleball courts at distances greater than 500 to 600 feet are rare.” While noise can travel further over bodies of water such as Alimagnet Lake, the study states this typically only occurs to up to 1,000 feet. Additionally, environmental factors such as terrain and vegetation further buffer noise. Given the residential properties on the north shore of Alimagnet Lake are over 1,200 feet away from the proposed facility with a heavily vegetated buffer between the courts and the lake, noise thresholds are not anticipated to be exceeded.

Noise Mitigation Methods

Beyond physical distance between pickleball courts and residential neighborhoods, there are additional measures that can be taken to further reduce noise impact. The two major methods are: 1. The addition of a noise absorptive material to the fencing around the court facility and 2. Quieter equipment (paddles and balls) that produce less noise during play.

The USA Pickleball group provided researched and proven products that reduce noise travel[3]. Most of these products are acoustic dampening 'curtains' absorbing and minimizing noise outside of the pickleball courts. The products can reduce noise levels on average between 10dBA[4] and 25dBA[5]. From an acoustic standpoint, a reduction in 10dBA results in noise perceived as half as loud outside of the courts[6]. If one of these products is applied to a fence 10' height (minimum 8' height), most of the sound emanating from play would be mitigated.

The second method – requiring quieter equipment for play – though also effective, may be less practical to implement. This requires the city to introduce both policy around and regulation of pickleball players. The playability of quieter equipment is also under ongoing research and development to ensure that players can expect a similar experience to standard equipment[7].

Conclusions and Recommendations

Given the city of Burnsville's current noise regulations, distance of residential properties from proposed facility, and similarities between the proposed facility and a recent pickleball noise assessment, the Alimagnet Park Proposed Pickleball Courts Facility is not anticipated to exceed noise thresholds in its vicinity. To further mitigate for potential sound, the city could consider:

- Facility location that is at least 500 to 600 feet away from the nearest residential property and 1000 feet away from the nearest residential property if water body adjacent
- Minimizing existing vegetation impacts to allow the existing mature buffer intact
- Noise absorptive product installed on an 8'-10' height fence on the sides of most concern for noise travel (north and west) to provide an additional dampening effect

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[3] USA Pickleball. *Acoustics*. Accessed at https://usapickleball.org/acoustics/
[4] Acoustiblok. *Pickleblok Noise Reduction System for Pickleball Courts*. Accessed at https://acoustiblok.com/pickleblok-quiets-pickleball-noise/
[5] Pickleball United. *Sound Absorption Barriers*. Accessed at https://pickleballunitedusa.com/products/sound-absorption-panels
[6] USA Pickleball. *How USA Pickleball Officials Are Working To Make the Sport Quieter*. Accessed at https://usapickleball.org/equipment/how-usa-pickleball-officials-are-working-to-make-pickleball-quieter/
[7] USA Pickleball. *Acoustic Equipment*. Accessed at https://usapickleball.org/acoustics/acoustic-equipment/

Stormwater Management Plan

Alimagnet Pickleball Courts
Burnsville, MN

Prepared for:
City of Burnsville

Prepared by:
Kimley-Horn
767 Eustis Street, Suite 100
St. Paul, MN 55114
Contact: Todd Halunen, Katie Leise

Prepared On: 01/30/2025

Stormwater Management Report

for

Alimagnet Pickleball Courts

Prepared for:

City of Burnsville

01/30/2025

Prepared By:

Kimley-Horn and Associates, Inc.
767 Eustis Street, Suite 100
St. Paul, MN 55114

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I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of Minnesota.

____

Mathew L. Cox

Date: January 2025 Registration No. 60385

Kimley»Horn

Table of Contents

1.0 Introduction

The City of Burnsville (the City) is proposing two scenarios of development on approximately 1.11 acres in Alimagnet Park. Development scenario 1 would construct new community pickleball courts and permeable pavement parking lot. Development scenario 2 would construct the pickleball courts in the area without a parking. Pickleball players will utilize the existing parking for the baseball fields to the east. In either scenario, the proposed pickleball court area (the Site) is located south of Alimagnet Lake and north of Alimagnet Parkway, west of the existing baseball fields, and east of McAndrews Road, as shown in **Figure 1**.

Figure 1 - Project Location Map

The runoff from the Site will be controlled and treated through two vegetated filter strips and an infiltration basin feature with an outlet control structure.

Kimley-Horn has analyzed the drainage conditions of the Site and provides computations for applicable the City and Vermillion River Watershed Joint Powers Organization (VRWJPO) in this report. The analysis of existing and proposed development drainage conditions was completed using HydroCAD v10.20-5c, a computer-aided design system for modeling the hydrology and hydraulics of stormwater runoff. These calculations are largely based on the hydrology techniques developed by the Soil Conservation Service (SCS/NRCS), combined with other hydrology and hydraulics calculations. All calculations, hydrographs, and drainage area maps are provided in the appendices of this report. The stormwater management plan serves to summarize the final design and will be updated in the future as the design progresses.

2.0 Site Requirements

The proposed project is subject to requirements set by the City and the VRWJPO. The project must obtain permits from the City and the VRMJPO prior to construction.

City of Burnsville

The City Development Standards have stormwater management, erosion and sediment control, and flood control requirements, detailed below.

Stormwater Management

Stormwater management requires projects that create or redevelop the sum of 1 acre or greater of impervious surfaces must meet the following volume control, water quality, and rate control requirements.

Volume Control

- Stormwater runoff volume must be controlled. Projects shall retain volume onsite equivalent 1.1-inch of runoff from new and/or reconstructed impervious surfaces.

Stormwater runoff will be controlled through vegetated filter strips, which are detailed in **Section 6.0**. None of the infiltration prohibitions detailed in the development standards are applicable for the Site.

Water Quality

- No net increase from existing conditions in Total Phosphorus (TP) and Total Suspended Solids (TSS) to receiving water bodies.
- Selected treatment will remove 60% TP and 80% TSS.

The water quality requirement will be achieved through the infiltration basin treatment device, detailed further in **Section 7.0**.

Rate Control

- Manage discharge rates leaving the site such that the post construction discharge rates do not exceed the existing discharge rates for the 2-, 10- and 100-year, critical duration (24-hour) storm events.

The rate control requirement will be achieved and detailed further in **Section 5.0**.

Erosion and Sediment Control

- The project shall follow the most recent version of the MPCA's NPDES/SDS General Construction Stormwater Permit, including the preparation of a Stormwater Pollution Prevention Plan (SWPPP).

As the project progresses to final design phases, a SWPPP will be prepared.

Flood Control

- The low floor elevation shall be 2 feet or more above the 100-year, 24-hour event as determined by a technical evaluation by a qualified engineer or hydrologist.

As the project progresses to final design, an appropriate low floor elevation will be determined based on the proposed condition chosen. Due to the location of the proposed improvements, there is not expected to be any impact to existing structures.

Vermillion River Watershed Joint Powers Organization

The following are additional requirements outside of the City standard development policies, organized into four categories: post construction water quality, runoff temperature control, peak runoff rate control, and runoff volume control.

Post Construction Water Quality

- For projects in the Vermillion River Watershed, discharge rates leaving the site must not exceed the predevelopment rates (2005 condition) for the 1-year critical duration storm in addition to City requirements.

In 2005 conditions, the Site was a residential house with more than 8,000 SF of impervious area. This residential house has greater impervious area, therefore greater capacity for runoff in all critical storms than the graded open area which is present in current conditions. The 1-year critical storm will be evaluated for discharge rates. These Site conditions are shown in **Figure 2** below.

Figure 2 - The Site June 2005 (left) versus October 2024 (right) (Google Earth)

Runoff Temperature Control

- Temperature increases that occur due to land use changes that increase runoff from heated surfaces can be controlled by establishing buffers, using temperature sensitive BMPs, designing temperature sensitive wet ponds.

Any temperature impacts will be controlled via the temperature sensitive BMPs, vegetated filter strips and infiltration basin.

Peak Runoff Rate Control

- Discharge rates leaving the site must not exceed the predevelopment rates (2005 condition) for the 2-year critical duration storm.
- Peak runoff rate controls will keep flows from a 100-year, 4-day rain event from exceeding existing condition levels.

The discharge rates for the 2-year critical storm and the 100-year, 4-day rain event are included in the modeling results below.

Runoff Volume Control

- Runoff volume reducing practices built into site design are the preferred method for meeting volume control. These practices should be considered before designing infiltration or filtration facilities. Practices applying the Minnesota Minimal Impact Design Standards (MIDS) are allowed.

The proposed infiltration basin is modeled in MIDS. The report is attached in **Appendix 4 & 5.**

3.0 Existing Pre-Development Conditions

In existing conditions, the Site consists of open area, regraded, with a local low point in the northeast. The Site is bounded on the north and west by forest which slopes to Alimagnet Lake. The east and south are bounded by a trail, and Alimagnet Parkway, respectively. In 2005 conditions, the site was a residential house with more than 8,000 SF of impervious area. The existing conditions are shown in **Exhibit 1.**

Based on soil borings completed by AET, the soils on the Site are a mixture of Type B and C soils. Type B soil is suitable for infiltration. Additional soil information can be found in the Geotechnical Report (3/30/2023) produced by AET, found in **Appendix 3**.

Existing stormwater runoff on the Site is split. The southern half of the Site runs off to the south and discharges into the storm sewer along Alimagnet Parkway. The northern half of the Site is graded for water to runoff north into Alimagnet Lake.

A summary of the pervious and impervious coverage for existing conditions is included below based on Site drainage areas:

- *Total project drainage area = 4.42 acres*
  - *Existing Pervious Area = 3.01 acres (68.1%)*
  - *Existing Impervious Area = 1.41 acres (31.9%)*
  - *Weighted Curve Number (CN) = 85*

4.0 Proposed Post-Development Conditions

Two proposed condition scenarios are detailed below. In the first scenario, the proposed Site includes pickleball courts and a permeable pavement parking lot which are treated by vegetated filter strips and an infiltration basin. In the second scenario, the proposed Site includes pickleball courts only which are treated by vegetated filter strips and an expanded infiltration basin.

In both scenarios, the onsite soil will be amended to provide the infiltration rate, 0.8 in/hr, necessary to meet the following design. In addition, the plantings onsite will be maximized to feature the treatment, and signage will be added as an educational feature.

<u>**Scenario One – Pickleball Courts & Permeable Pavement Parking Lot**</u>

In proposed scenario one, the Site consists of proposed pickleball courts and a connected permeable pavement parking lot east of the existing trail. The north and west of the Site are bounded by forest. The east is bounded by the trail, and the south is bounded by Alimagnet Parkway. This proposed layout is presented in **Exhibit 2.**

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

- *Total project area = 4.42 acres*
  - *Proposed Pervious Area = 2.34 acres (53.0%)*
  - *Proposed Impervious Area = 2.08 acres (47.0%)*
  - *Weighted Curve Number (CN) = 88*

<u>**Scenario Two – Pickleball Courts with Expanded Infiltration**</u>

In proposed scenario two, the Site consists of proposed pickleball courts east of the existing trail. The north and west of the Site are bounded by forest. The east is bounded by the trail, and the south is bounded by Alimagnet Parkway. This proposed layout is presented in **Exhibit 3.**

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

- *Total project area = 4.42 acres*
  - *Proposed Pervious Area = 2.45 acres (56.5%)*
  - *Proposed Impervious Area = 1.92 acres (43.5%)*
  - *Weighted Curve Number (CN) = 87*

5.0 Discharge Rate Summary

Table 1 shows the pre-development and post-development discharge rates from the Site for each regulatory rainfall event. This discharge leaves the Site by runoff to Alimagnet Parkway and Alimagnet Lake. The Site discharge in the 100-year, 4-day event does not decrease from pre-development to post-development conditions. In every other rainfall event, rates decrease in the post-development conditions.

Table 1: Discharge Rates

	1-YR, 24-HR (2.47 in.)	***2-YR, 24-HR (2.81 in.)***	***10-YR, 24-HR (4.18 in.)***	***100-YR, 24-HR (7.43 in.)***	***100-YR, 4-DAY (8.48 in)***
Pre-Development Rate (CFS)	6.64	8.34	15.01	32.08	38.62
SC1: Post-Development Rate (CFS)	5.38	6.64	11.59	30.63	39.58
SC2: Post-Development Rate (CFS)	5.38	6.64	11.59	29.63	37.81

Table 2 shows the discharge rates from each proposed infiltration basin for each regulatory rainfall event. Scenario 1 contains the 10-year, 24-hour event completely within the basin. Scenario 2 contains all five rainfall events. Each of these basins contains the required volume control and water quality removals, as shown in the following Sections.

Table 2: Discharge to Alimagnet Lake from Proposed Infiltration

	1-YR, 24-HR (2.47 in.)	***2-YR, 24-HR (2.81 in.)***	***10-YR, 24-HR (4.18 in.)***	***100-YR, 24-HR (7.43 in.)***	***100-YR, 4-DAY (8.48 in)***
Pre-Development Rate (CFS)	0.71	0.93	1.83	4.18	4.96
SC1: Post-Development Rate (CFS)	0.0	0.0	0.0	3.21	4.69
SC2: Post-Development Rate (CFS)	0.0	0.0	0.0	0.0	0.0

6.0 Infiltration/Volume Control Summary

A summary of the infiltration basin sizing is provided in **Table 3** below. Per the City standards, 1.1 inches over the new or reconstructed impervious area must be retained onsite. In both proposed scenarios, the goal of design was to maximize the infiltration onsite to provide the greatest amount of treatment and retain greater volume. The difference between impervious area between scenarios is the area of the proposed pervious pavement parking lot. The parking lot area was included in scenario 1 for the most conservative estimate, though it is not proposed as impervious area. In both scenarios, more than double the infiltration volume required is provided by the proposed infiltration basin designs.

Table 3: Volume Control Summary

	Scenario 1	Scenario 2
Contributing Drainage Area (ac)	4.420	4.420
Proposed New Impervious Area (ac)	0.781	0.619
Treatment Depth Required	1.1 in.	1.1 in.
Required Infiltration Volume	3,100 CF	2,400 CF
Total Infiltration Volume Provided	**7,800 CF**	**16,800 CF**
Excess Infiltration Volume Provided	***4,700 CF***	***14,400 CF***

7.0 Water Quality Summary

A summary of the Site water quality in each scenario is provided in **Table 4**. The regulations for the City and watershed require two things. First, there cannot be an increase from pre-development to post-development in total phosphorus (TP) and total suspended solids (TSS) to receiving bodies. Second, the treatment devices must remove 60% TP and 80% TSS. The results shown in **Table 4** are taken from the MIDS Calculator. MIDS calculator reports are included for pre-development in **Appendix 4** and post-development in **Appendix 5**. The Pre-development condition pounds of TP and TSS removed are estimated as the Site area applied to infiltrate in the underlying soil profile, Type C. In scenario 1 and 2, the treatment is provided by proposed infiltration basins. **Table 4** shows the TP and TSS load is reduced from pre-development to post-development conditions, and they remove a greater percentage than the required TSS and TP.

Table 4: Water Quality Summary

Scenario	TP (% Removed)	TSS (% Removed)	TP (lbs to Receiving Bodies)	TSS (lbs to Receiving Bodies)
Pre-Development	0	0	3.85	699
SC1: Post-Development	93	93	0.34	62
SC2: Post-Development	99	99	0.04	8

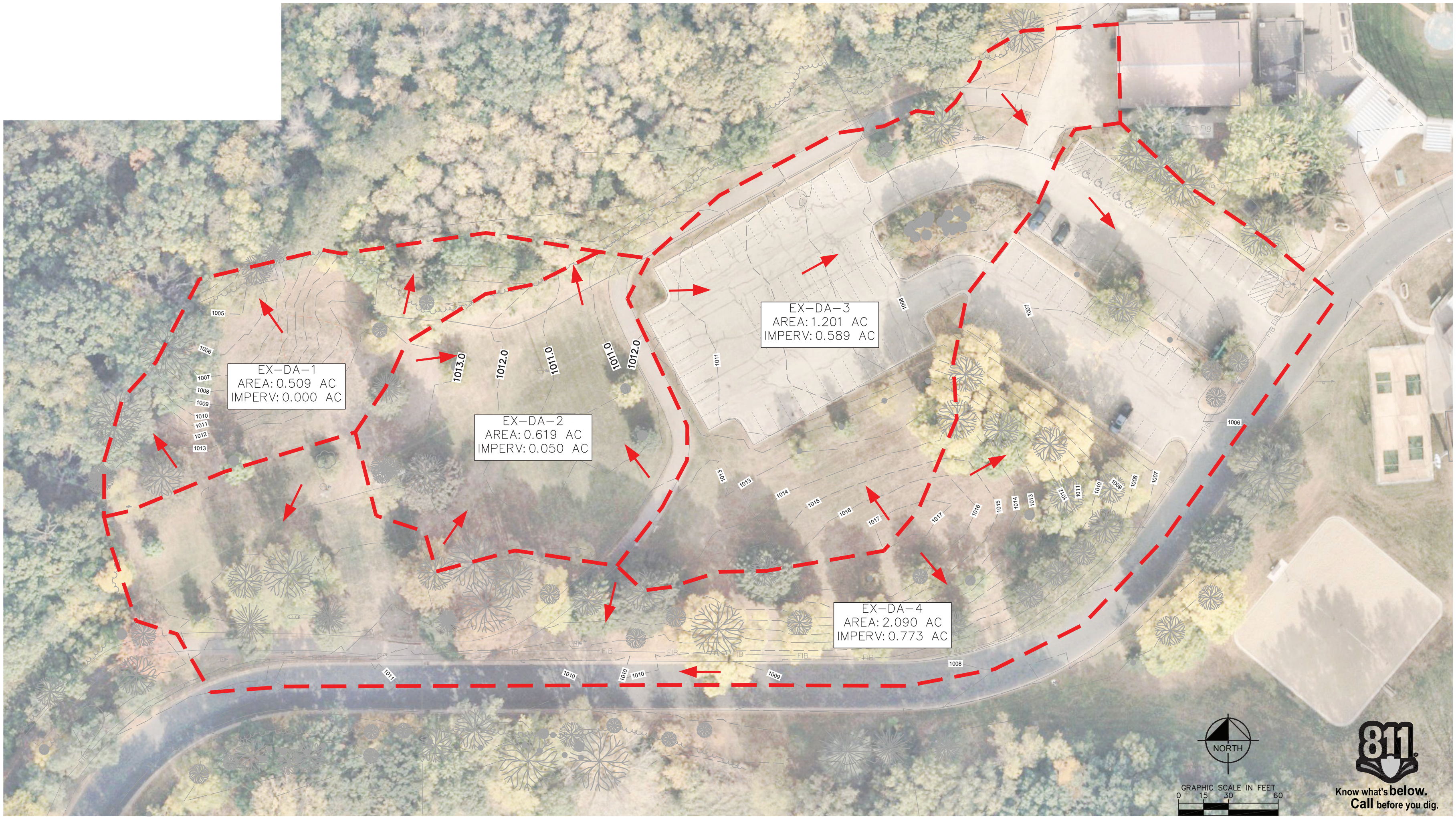
Kimley»Horn

Exhibits

Exhibit 1. Existing Drainage Exhibit

LEGEND

- PROPERTY LINE
- EXISTING CONTOUR
- EXISTING MANHOLE
- EXISTING CATCH BASIN
- EXISTING STORM SEWER
- DRAINAGE AREA DELINEATION
- FLOW ARROWS



PRELIMINARY - NOT FOR CONSTRUCTION

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No.	REVISIONS	DATE	BY

KHA PROJECT 160507092
DATE 01/30/2025
SCALE AS SHOWN
DESIGNED BY CNC
DRAWN BY CNC
CHECKED BY MLC

EXISTING DRAINAGE EXHIBIT

ALIMAGNET PICKLEBALL COURTS
PREPARED FOR
CITY OF BURNSVILLE
BURNSVILLE MN

SHEET NUMBER
EX-1

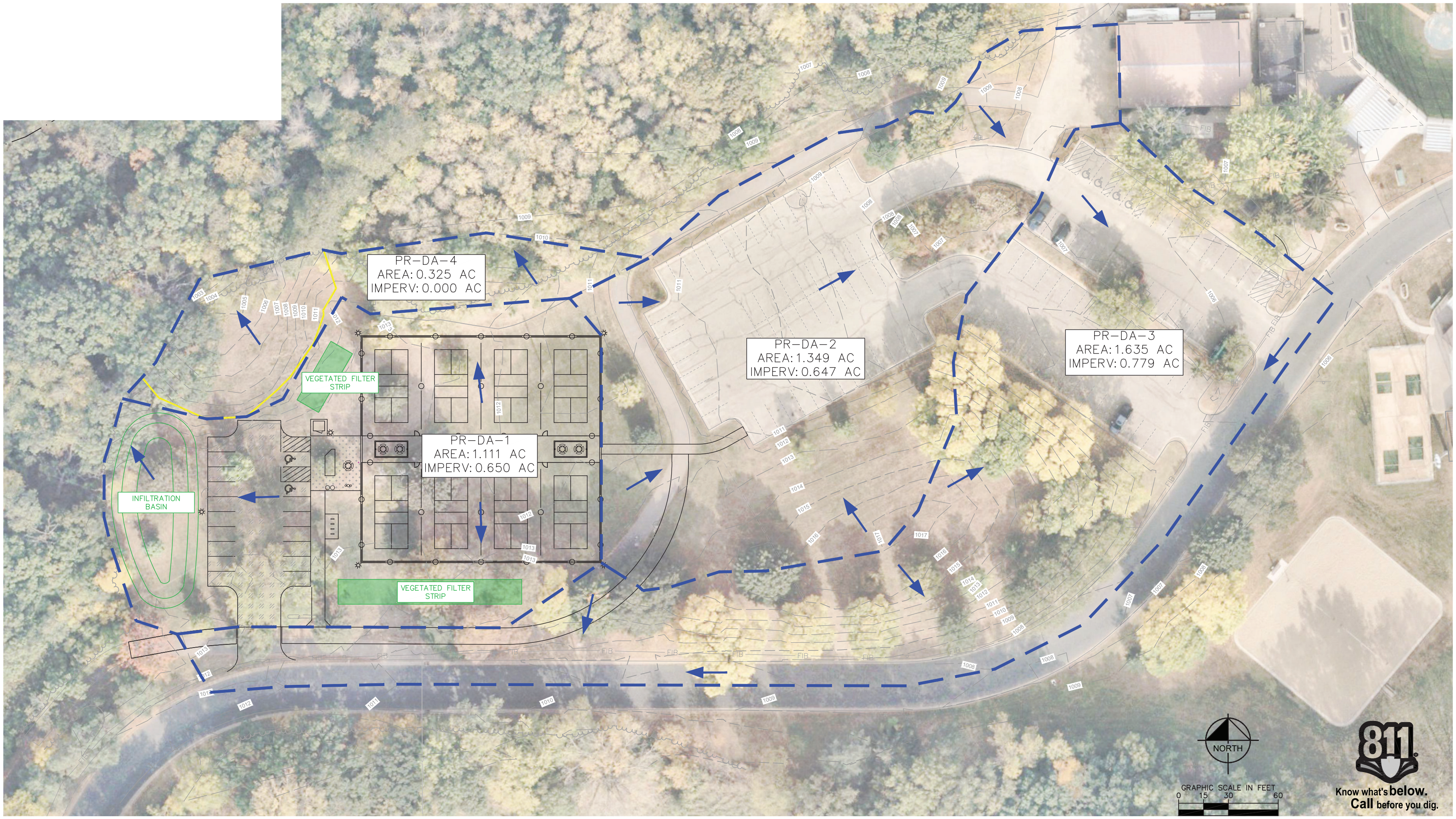
K:\TWC_Civil\City\BURNSVILLE\ALIMAGNET PICKLEBALL COURTS\CAD\Exhibits\DRAINAGE MAPS\EXISTING DRAINAGE MAP.dwg January 31, 2025 - 9:40am

Exhibit 2. Proposed Drainage Exhibit (Scenario 1)

SCENARIO 1

LEGEND

- PROPERTY LINE
- EXISTING CONTOUR
- EXISTING MANHOLE
- EXISTING CATCH BASIN
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- PROPOSED DRAINAGE AREA DELINEATION
- BLUFF SETBACK
- FLOW ARROWS



PRELIMINARY - NOT FOR CONSTRUCTION

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PROPOSED DRAINAGE EXHIBIT - SCENARIO 1

ALIMAGNET PICKLEBALL COURTS
PREPARED FOR
CITY OF BURNSVILLE
BURNSVILLE MN

SHEET NUMBER
EX-2

K:\TWC_Civil\City\BURNSVILLE\ALIMAGNET PICKLEBALL COURTS\CAD\Exhibits\DRAINAGE MAPS\PROPOSED DRAINAGE MAP.dwg January 29, 2025 - 4:44pm

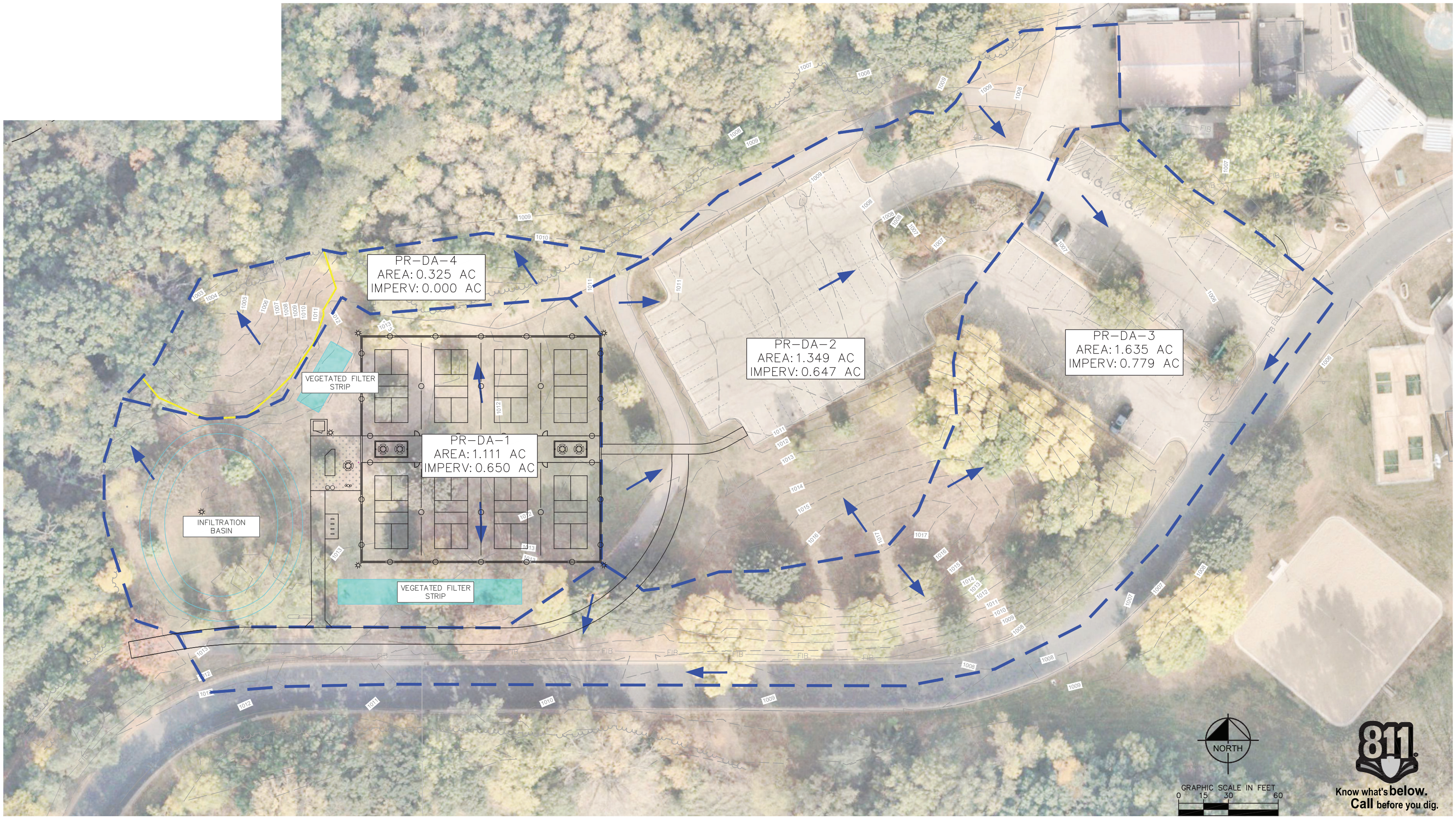
Exhibit 3. Proposed Drainage Exhibit (Scenario 2)

K:\TWC_Civil\City\BURNSVILLE\ALIMAGNET PICKLEBALL COURTS\CAD\Exhibits\DRAINAGE MAPS\PROPOSED DRAINAGE MAP.dwg January 29, 2025 - 4:48pm

SCENARIO 2

LEGEND

- PROPERTY LINE
- EXISTING CONTOUR
- EXISTING MANHOLE
- EXISTING CATCH BASIN
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- PROPOSED DRAINAGE AREA DELINEATION
- BLUFF SETBACK
- FLOW ARROWS



PRELIMINARY - NOT FOR CONSTRUCTION

No.	REVISIONS	DATE	BY

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KHA PROJECT 160507092
DATE 01/30/2025
SCALE AS SHOWN
DESIGNED BY CNC
DRAWN BY CNC
CHECKED BY MLC

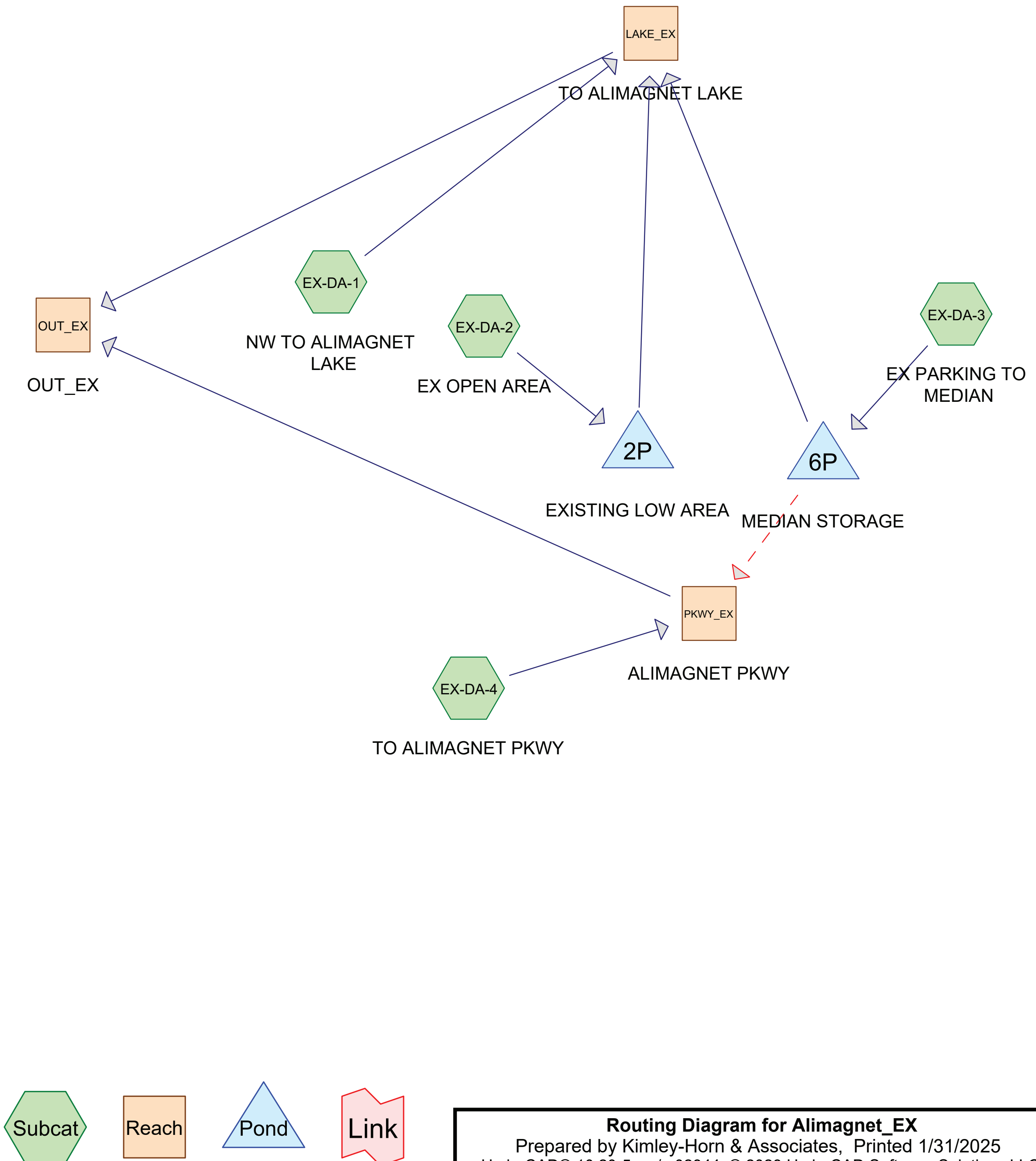
PROPOSED DRAINAGE EXHIBIT - SCENARIO 2

ALIMAGNET PICKLEBALL COURTS
PREPARED FOR
CITY OF BURNSVILLE
BURNSVILLE MN

SHEET NUMBER
EX-3

Appendices

Appendix 1. Pre-Development HydroCAD Model Analysis



Routing Diagram for Alimagnet_EX
Prepared by Kimley-Horn & Associates, Printed 1/31/2025
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	1-YR, 24-HR	MSE 24-hr	3	Default	24.00	1	2.47	2
2	2-YR, 24-HR	MSE 24-hr	3	Default	24.00	1	2.81	2
3	10-YR, 24-HR	Type II 24-hr		Default	24.00	1	4.18	2
4	100-YR, 24-HR	Type II 24-hr		Default	24.00	1	7.43	2
5	100-YR, 4-DAY	Type II 24-hr		Default	24.00	1	8.48	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.691	79	50-75% Grass cover, Fair, HSG C (EX-DA-1, EX-DA-2, EX-DA-3)
1.317	74	>75% Grass cover, Good, HSG C (EX-DA-4)
1.412	98	Paved parking, HSG C (EX-DA-2, EX-DA-3, EX-DA-4)
4.420	**84**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
4.420	HSG C	EX-DA-1, EX-DA-2, EX-DA-3, EX-DA-4
0.000	HSG D	
0.000	Other	
4.420		**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	1.691	0.000	0.000	1.691	50-75% Grass cover, Fair	EX-DA-1, EX-DA-2, EX-DA-3
0.000	0.000	1.317	0.000	0.000	1.317	>75% Grass cover, Good	EX-DA-4
0.000	0.000	1.412	0.000	0.000	1.412	Paved parking	EX-DA-2, EX-DA-3, EX-DA-4
0.000	**0.000**	**4.420**	**0.000**	**0.000**	**4.420**	**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	6P	1,006.50	1,006.00	120.0	0.0042	0.012	0.0	18.0	0.0	

Time span=0.00-48.00 hrs, dt=0.04 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentEX-DA-1: NW TO Runoff Area=0.509 ac 0.00% Impervious Runoff Depth=0.82"
Tc=7.0 min CN=79 Runoff=0.71 cfs 0.035 af

SubcatchmentEX-DA-2: EX OPEN AREA Runoff Area=0.619 ac 8.08% Impervious Runoff Depth=0.92"
Tc=7.0 min CN=81 Runoff=0.99 cfs 0.048 af

SubcatchmentEX-DA-3: EX PARKING TO Runoff Area=1.202 ac 49.00% Impervious Runoff Depth=1.36"
Tc=7.0 min CN=88 Runoff=2.83 cfs 0.136 af

SubcatchmentEX-DA-4: TO ALIMAGNET Runoff Area=2.090 ac 36.99% Impervious Runoff Depth=1.03"
Tc=0.0 min CN=83 Runoff=5.13 cfs 0.180 af

Reach LAKE_EX: TO ALIMAGNETLAKE Inflow=3.47 cfs 0.209 af
Outflow=3.47 cfs 0.209 af

Reach OUT_EX: OUT_EX Inflow=6.64 cfs 0.389 af
Outflow=6.64 cfs 0.389 af

Reach PKWY_EX: ALIMAGNETPKWY Inflow=5.13 cfs 0.180 af
Outflow=5.13 cfs 0.180 af

Pond 2P: EXISTING LOW AREA Peak Elev=1,010.87' Storage=543 cf Inflow=0.99 cfs 0.048 af
Outflow=0.78 cfs 0.039 af

Pond 6P: MEDIAN STORAGE Peak Elev=1,007.26' Storage=745 cf Inflow=2.83 cfs 0.136 af
18.0" Round Culvert n=0.012 L=120.0' S=0.0042 '/' Outflow=2.14 cfs 0.136 af

Total Runoff Area = 4.420 ac Runoff Volume = 0.398 af Average Runoff Depth = 1.08"
68.05% Pervious = 3.008 ac 31.95% Impervious = 1.412 ac

Summary for Subcatchment EX-DA-1: NW TO ALIMAGNET LAKE

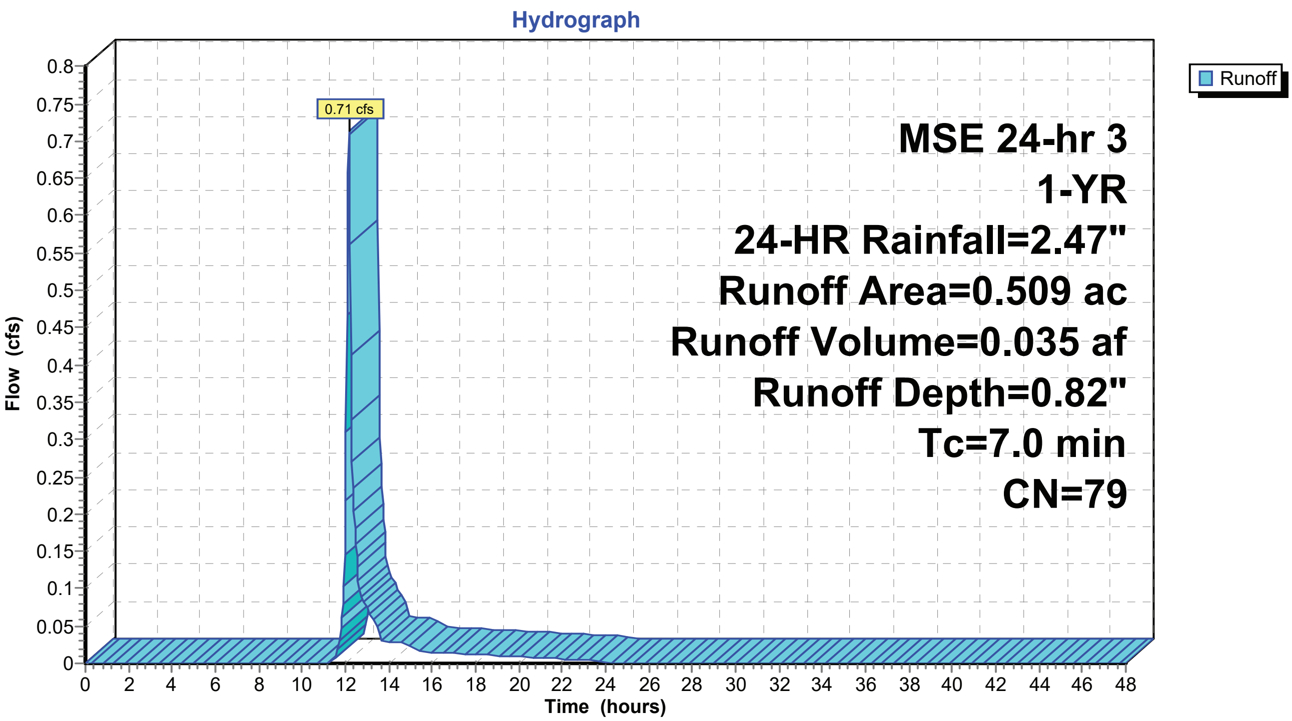
Runoff = 0.71 cfs @ 12.15 hrs, Volume= 0.035 af, Depth= 0.82"
Routed to Reach LAKE_EX : TO ALIMAGNET LAKE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
MSE 24-hr 3 1-YR, 24-HR Rainfall=2.47"

Area (ac)	CN	Description
0.509	79	50-75% Grass cover, Fair, HSG C
0.509		100.00% Pervious Area

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

Subcatchment EX-DA-1: NW TO ALIMAGNET LAKE



Summary for Subcatchment EX-DA-2: EX OPEN AREA

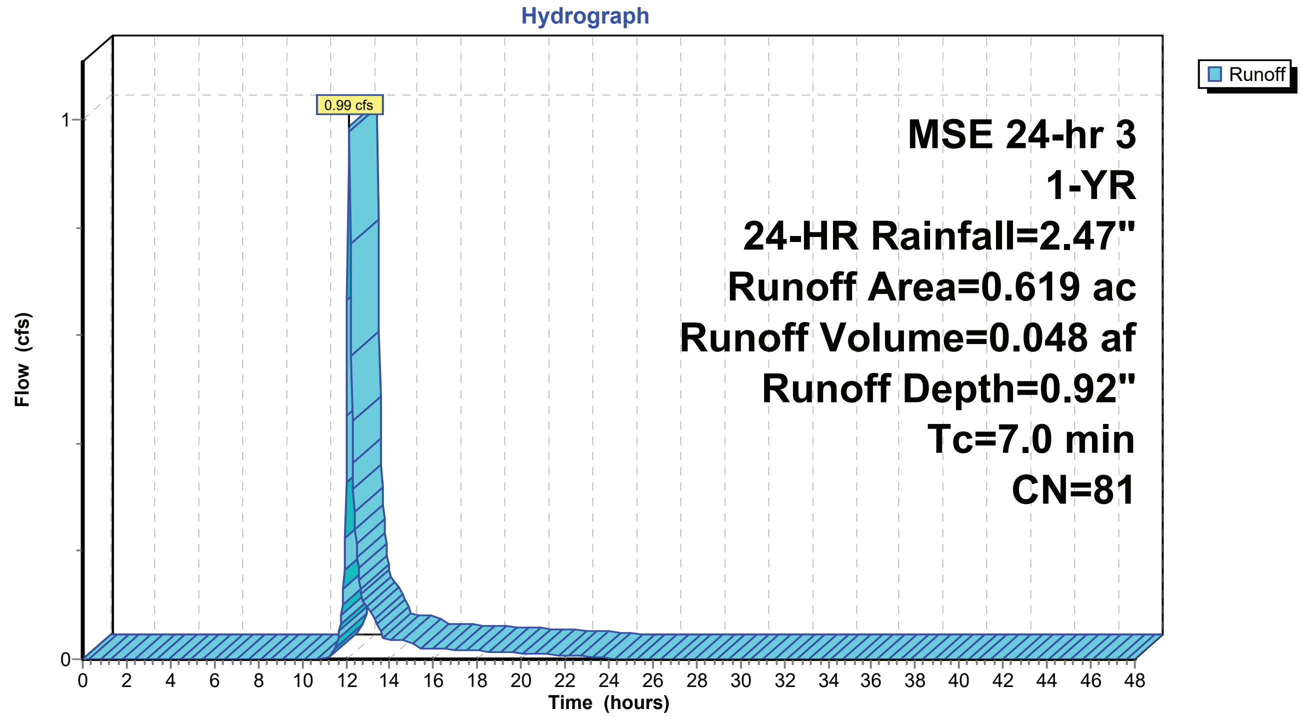
Runoff = 0.99 cfs @ 12.15 hrs, Volume= 0.048 af, Depth= 0.92"
Routed to Pond 2P : EXISTING LOW AREA

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
MSE 24-hr 3 1-YR, 24-HR Rainfall=2.47"

Area (ac)	CN	Description
0.050	98	Paved parking, HSG C
0.569	79	50-75% Grass cover, Fair, HSG C
0.619	81	Weighted Average
0.569		91.92% Pervious Area
0.050		8.08% Impervious Area

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

Subcatchment EX-DA-2: EX OPEN AREA



Summary for Subcatchment EX-DA-3: EX PARKING TO MEDIAN

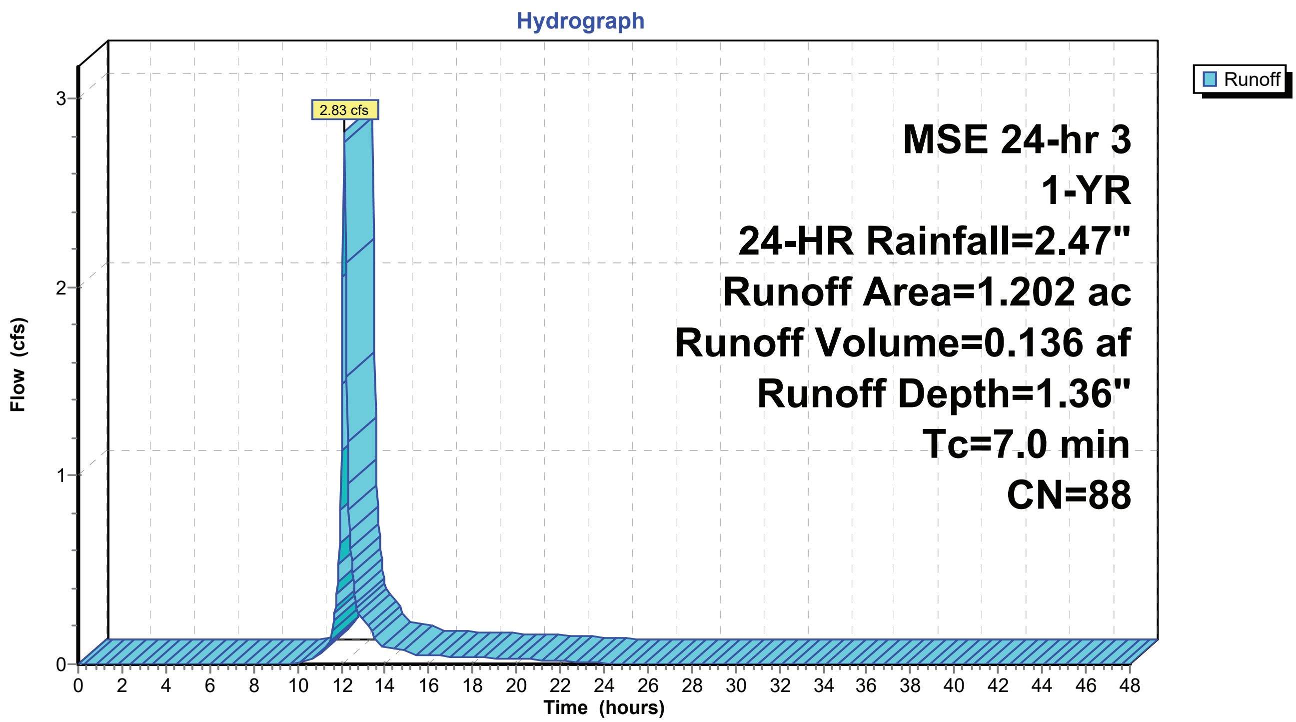
Runoff = 2.83 cfs @ 12.14 hrs, Volume= 0.136 af, Depth= 1.36"
Routed to Pond 6P : MEDIAN STORAGE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
MSE 24-hr 3 1-YR, 24-HR Rainfall=2.47"

Area (ac)	CN	Description
0.589	98	Paved parking, HSG C
0.613	79	50-75% Grass cover, Fair, HSG C
1.202	88	Weighted Average
0.613		51.00% Pervious Area
0.589		49.00% Impervious Area

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

Subcatchment EX-DA-3: EX PARKING TO MEDIAN



Summary for Subcatchment EX-DA-4: TO ALIMAGNET PKWY

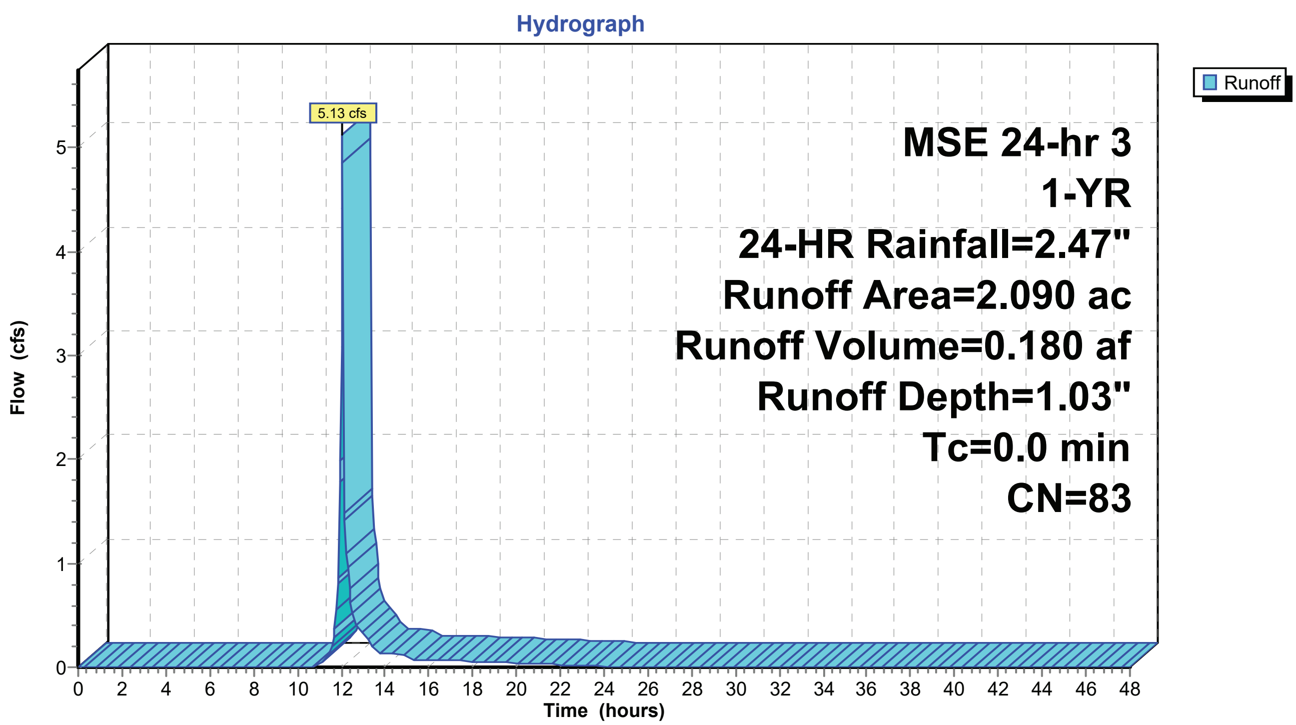
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 5.13 cfs @ 12.06 hrs, Volume= 0.180 af, Depth= 1.03"
Routed to Reach PKWY_EX : ALIMAGNET PKWY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
MSE 24-hr 3 1-YR, 24-HR Rainfall=2.47"

Area (ac)	CN	Description
0.773	98	Paved parking, HSG C
1.317	74	>75% Grass cover, Good, HSG C
2.090	83	Weighted Average
1.317		63.01% Pervious Area
0.773		36.99% Impervious Area

Subcatchment EX-DA-4: TO ALIMAGNET PKWY

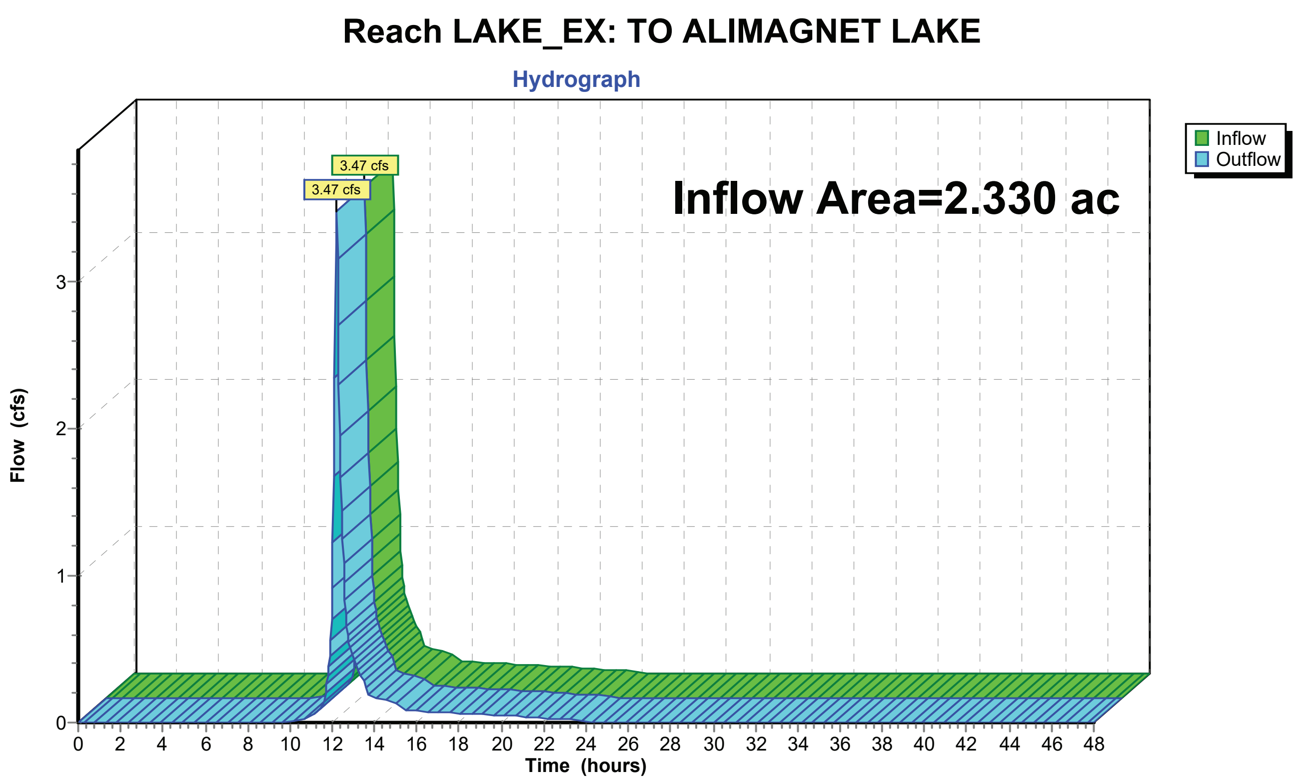


Summary for Reach LAKE_EX: TO ALIMAGNET LAKE

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

Inflow Area = 2.330 ac, 27.42% Impervious, Inflow Depth = 1.08" for 1-YR, 24-HR event
Inflow = 3.47 cfs @ 12.20 hrs, Volume= 0.209 af
Outflow = 3.47 cfs @ 12.20 hrs, Volume= 0.209 af, Atten= 0%, Lag= 0.0 min
Routed to Reach OUT_EX : OUT_EX

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs



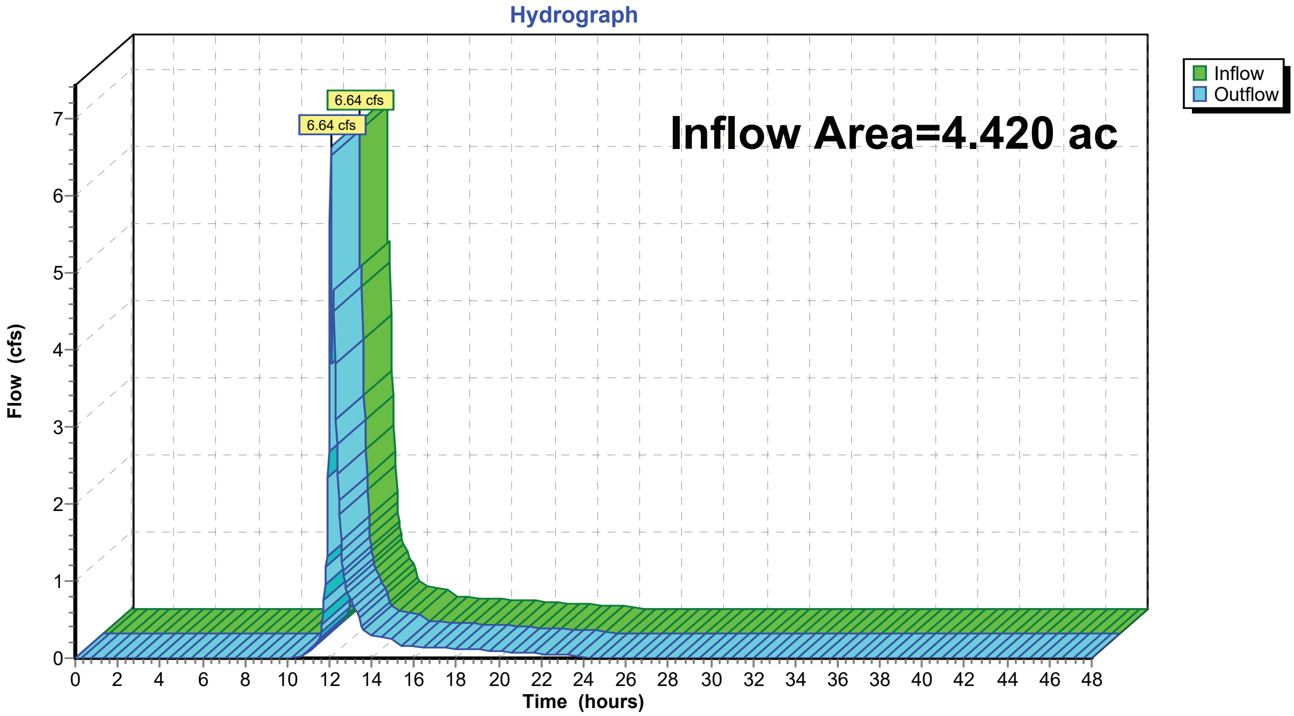
Summary for Reach OUT_EX: OUT_EX

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

Inflow Area = 4.420 ac, 31.95% Impervious, Inflow Depth = 1.06" for 1-YR, 24-HR event
Inflow = 6.64 cfs @ 12.07 hrs, Volume= 0.389 af
Outflow = 6.64 cfs @ 12.07 hrs, Volume= 0.389 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Reach OUT_EX: OUT_EX



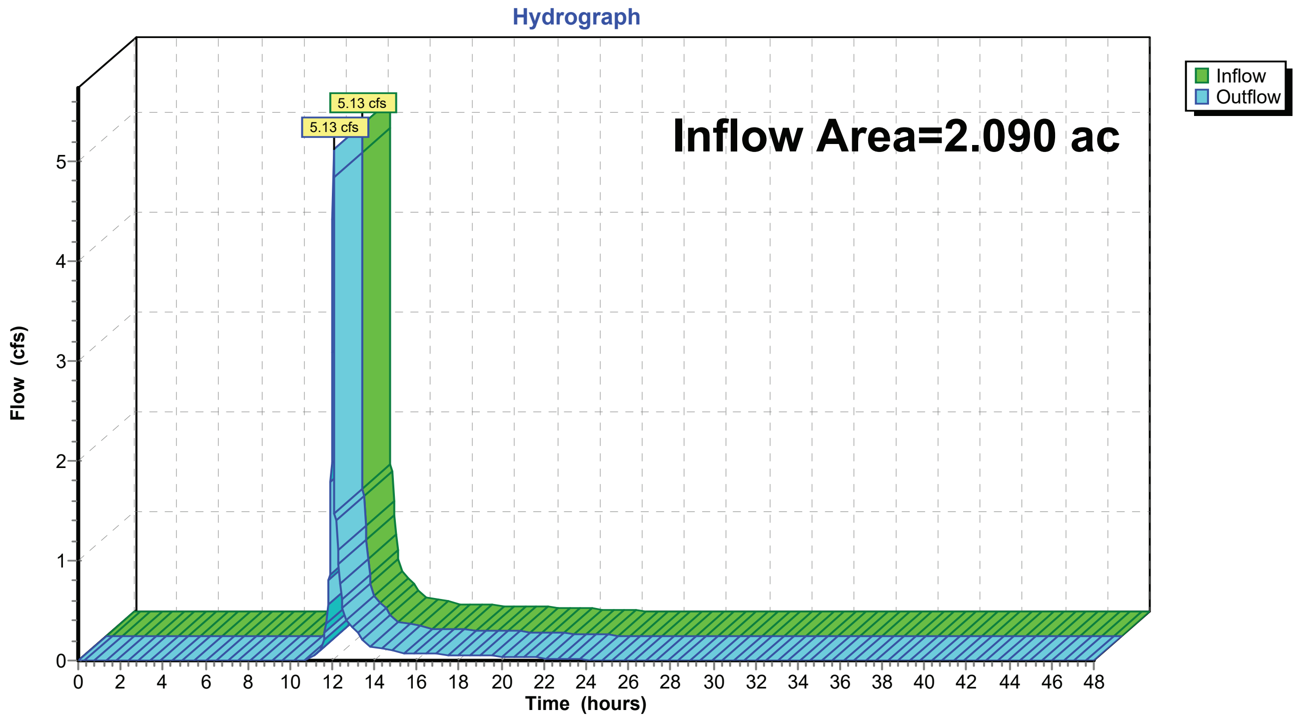
Summary for Reach PKWY_EX: ALIMAGNET PKWY

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

Inflow Area = 2.090 ac, 36.99% Impervious, Inflow Depth = 1.03" for 1-YR, 24-HR event
Inflow = 5.13 cfs @ 12.06 hrs, Volume= 0.180 af
Outflow = 5.13 cfs @ 12.06 hrs, Volume= 0.180 af, Atten= 0%, Lag= 0.0 min
Routed to Reach OUT_EX : OUT_EX

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Reach PKWY_EX: ALIMAGNET PKWY



Summary for Pond 2P: EXISTING LOW AREA

Inflow Area = 0.619 ac, 8.08% Impervious, Inflow Depth = 0.92" for 1-YR, 24-HR event
Inflow = 0.99 cfs @ 12.15 hrs, Volume= 0.048 af
Outflow = 0.78 cfs @ 12.21 hrs, Volume= 0.039 af, Atten= 22%, Lag= 3.7 min
Primary = 0.78 cfs @ 12.21 hrs, Volume= 0.039 af
Routed to Reach LAKE_EX : TO ALIMAGNET LAKE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,010.87' @ 12.21 hrs Surf.Area= 2,313 sf Storage= 543 cf

Plug-Flow detention time= 98.9 min calculated for 0.039 af (81% of inflow)
Center-of-Mass det. time= 31.4 min (854.2 - 822.9)

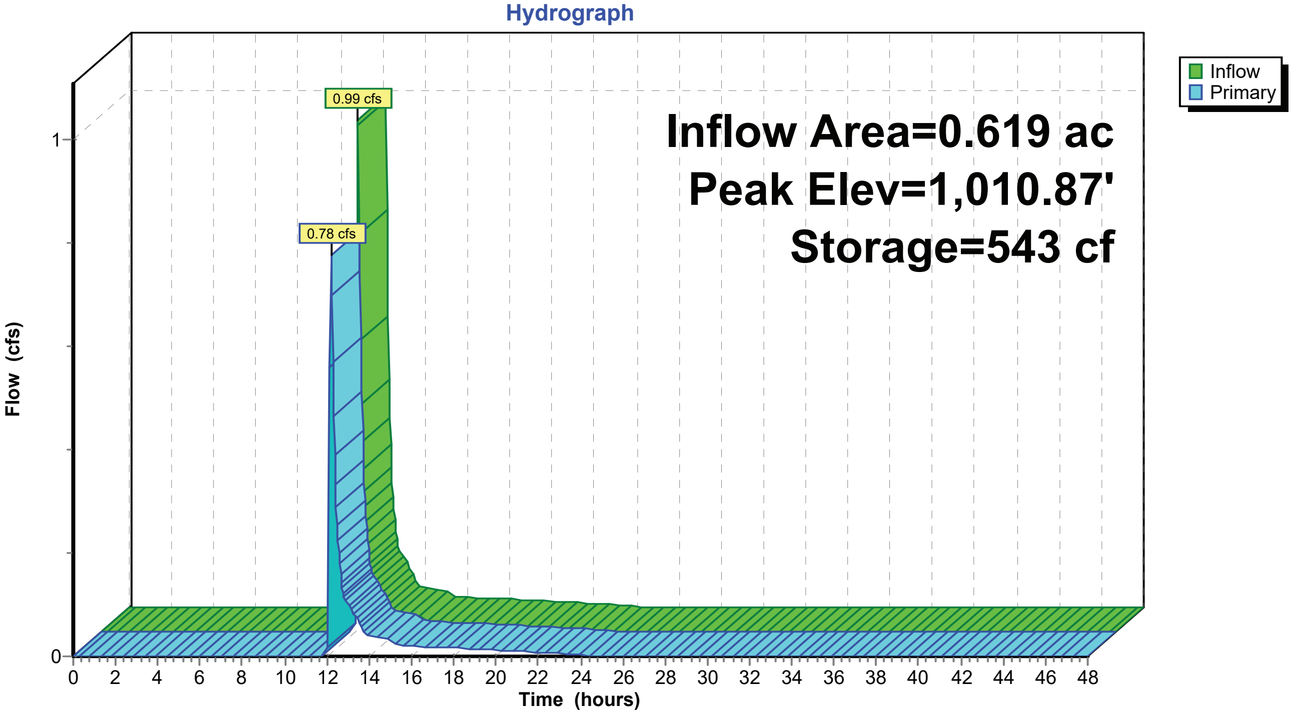
Volume	Invert	Avail.Storage	Storage Description
#1	1,010.40'	1,597 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,010.40	33	0	0
1,010.80	1,925	392	392
1,011.20	4,104	1,206	1,597

Device	Routing	Invert	Outlet Devices
#1	Primary	1,010.80'	**15.0' long + 4.0 '/' SideZ x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.75 cfs @ 12.21 hrs HW=1,010.87' TW=0.00' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Weir Controls 0.75 cfs @ 0.70 fps)

Pond 2P: EXISTING LOW AREA



Summary for Pond 6P: MEDIAN STORAGE

Inflow Area = 1.202 ac, 49.00% Impervious, Inflow Depth = 1.36" for 1-YR, 24-HR event
Inflow = 2.83 cfs @ 12.14 hrs, Volume= 0.136 af
Outflow = 2.14 cfs @ 12.20 hrs, Volume= 0.136 af, Atten= 24%, Lag= 3.6 min
Primary = 2.14 cfs @ 12.20 hrs, Volume= 0.136 af
Routed to Reach LAKE_EX : TO ALIMAGNET LAKE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,007.26' @ 12.20 hrs Surf.Area= 1,884 sf Storage= 745 cf
Flood Elev= 1,008.00' Surf.Area= 3,602 sf Storage= 2,783 cf

Plug-Flow detention time= 6.6 min calculated for 0.136 af (100% of inflow)
Center-of-Mass det. time= 6.6 min (810.1 - 803.5)

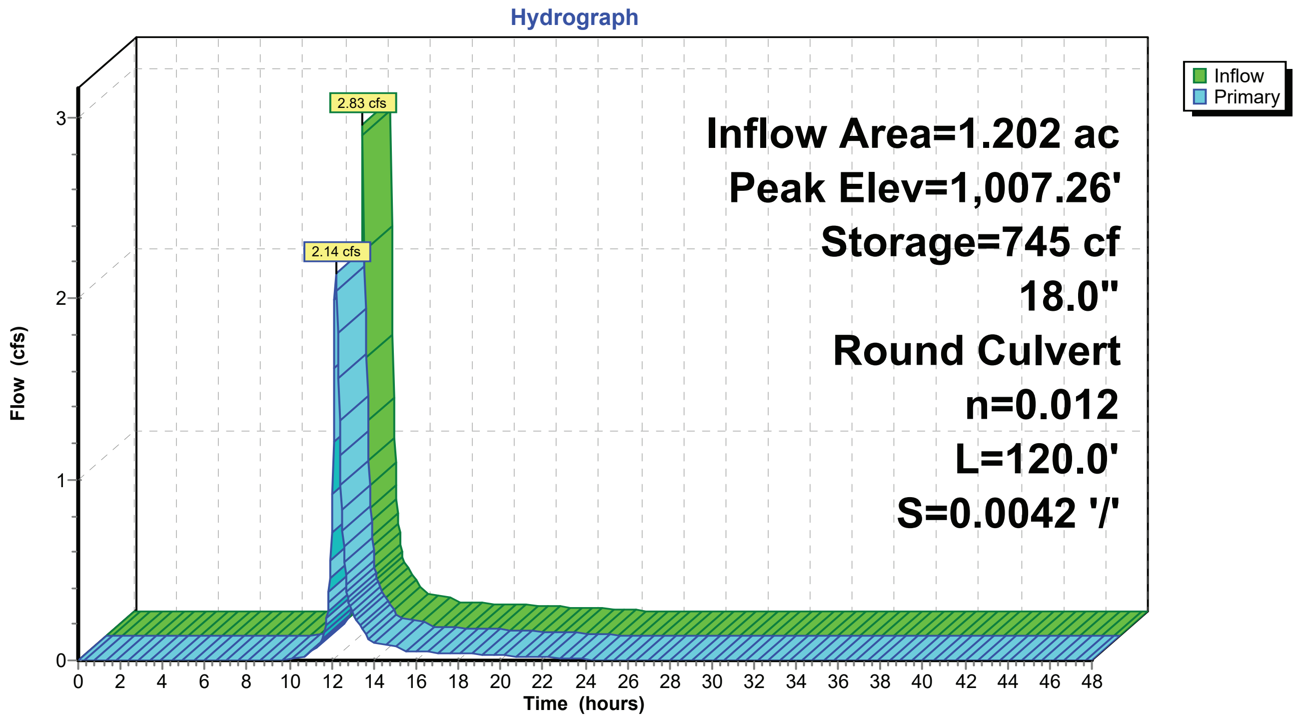
Volume	Invert	Avail.Storage	Storage Description
#1	1,006.50'	2,783 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,006.50	61	0	0
1,007.00	1,289	338	338
1,008.00	3,602	2,446	2,783

Device	Routing	Invert	Outlet Devices
#1	Primary	1,006.50'	**18.0" Round RCP_Round 18"** L= 120.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 1,006.50' / 1,006.00' S= 0.0042 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=2.13 cfs @ 12.20 hrs HW=1,007.26' TW=0.00' (Dynamic Tailwater)
1=RCP_Round 18" (Barrel Controls 2.13 cfs @ 3.49 fps)

Pond 6P: MEDIAN STORAGE



Time span=0.00-48.00 hrs, dt=0.04 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentEX-DA-1: NW TO Runoff Area=0.509 ac 0.00% Impervious Runoff Depth=1.05"
Tc=7.0 min CN=79 Runoff=0.93 cfs 0.045 af

SubcatchmentEX-DA-2: EX OPEN AREA Runoff Area=0.619 ac 8.08% Impervious Runoff Depth=1.17"
Tc=7.0 min CN=81 Runoff=1.26 cfs 0.060 af

SubcatchmentEX-DA-3: EX PARKING TO Runoff Area=1.202 ac 49.00% Impervious Runoff Depth=1.65"
Tc=7.0 min CN=88 Runoff=3.42 cfs 0.165 af

SubcatchmentEX-DA-4: TO ALIMAGNET Runoff Area=2.090 ac 36.99% Impervious Runoff Depth=1.30"
Tc=0.0 min CN=83 Runoff=6.39 cfs 0.226 af

Reach LAKE_EX: TO ALIMAGNETLAKE Inflow=4.45 cfs 0.261 af
Outflow=4.45 cfs 0.261 af

Reach OUT_EX: OUT_EX Inflow=8.39 cfs 0.487 af
Outflow=8.39 cfs 0.487 af

Reach PKWY_EX: ALIMAGNETPKWY Inflow=6.39 cfs 0.226 af
Outflow=6.39 cfs 0.226 af

Pond 2P: EXISTING LOW AREA Peak Elev=1,010.89' Storage=586 cf Inflow=1.26 cfs 0.060 af
Outflow=1.10 cfs 0.051 af

Pond 6P: MEDIAN STORAGE Peak Elev=1,007.34' Storage=910 cf Inflow=3.42 cfs 0.165 af
18.0" Round Culvert n=0.012 L=120.0' S=0.0042 '/' Outflow=2.59 cfs 0.165 af

Total Runoff Area = 4.420 ac Runoff Volume = 0.496 af Average Runoff Depth = 1.35"
68.05% Pervious = 3.008 ac 31.95% Impervious = 1.412 ac

Summary for Subcatchment EX-DA-1: NW TO ALIMAGNET LAKE

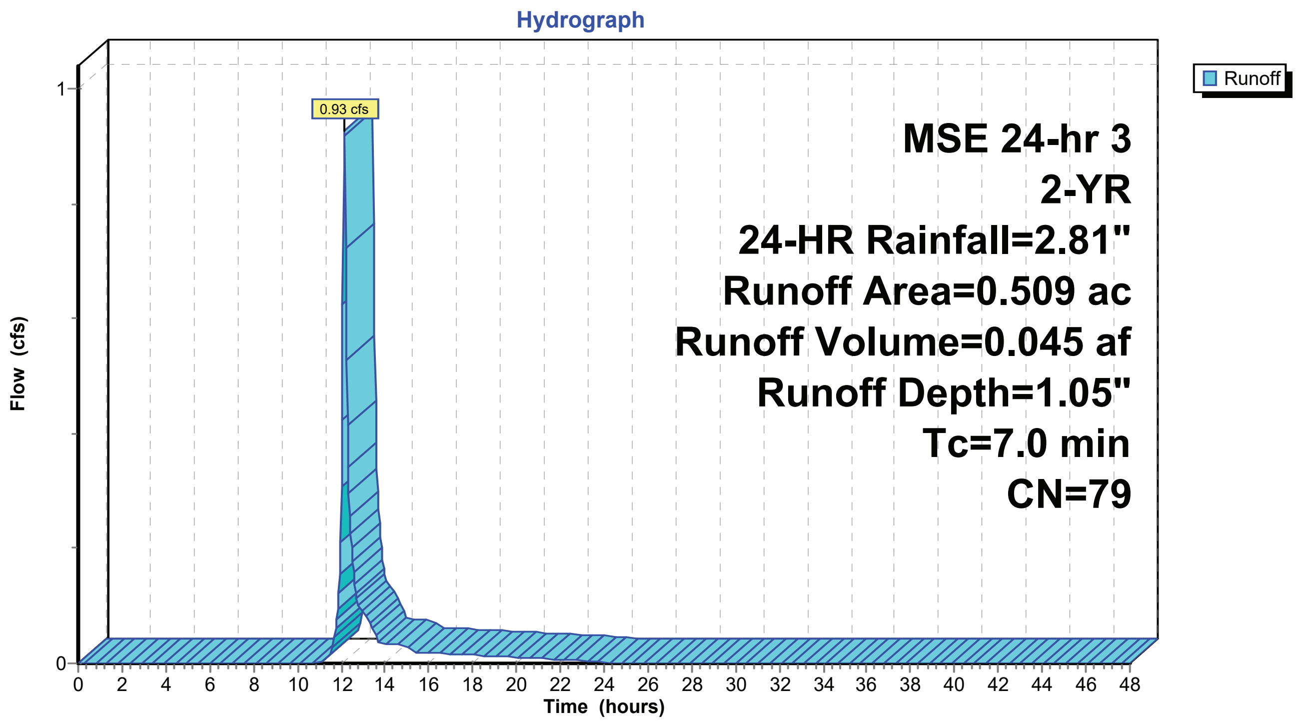
Runoff = 0.93 cfs @ 12.15 hrs, Volume= 0.045 af, Depth= 1.05"
Routed to Reach LAKE_EX : TO ALIMAGNET LAKE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
MSE 24-hr 3 2-YR, 24-HR Rainfall=2.81"

Area (ac)	CN	Description
0.509	79	50-75% Grass cover, Fair, HSG C
0.509		100.00% Pervious Area

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

Subcatchment EX-DA-1: NW TO ALIMAGNET LAKE



Summary for Subcatchment EX-DA-2: EX OPEN AREA

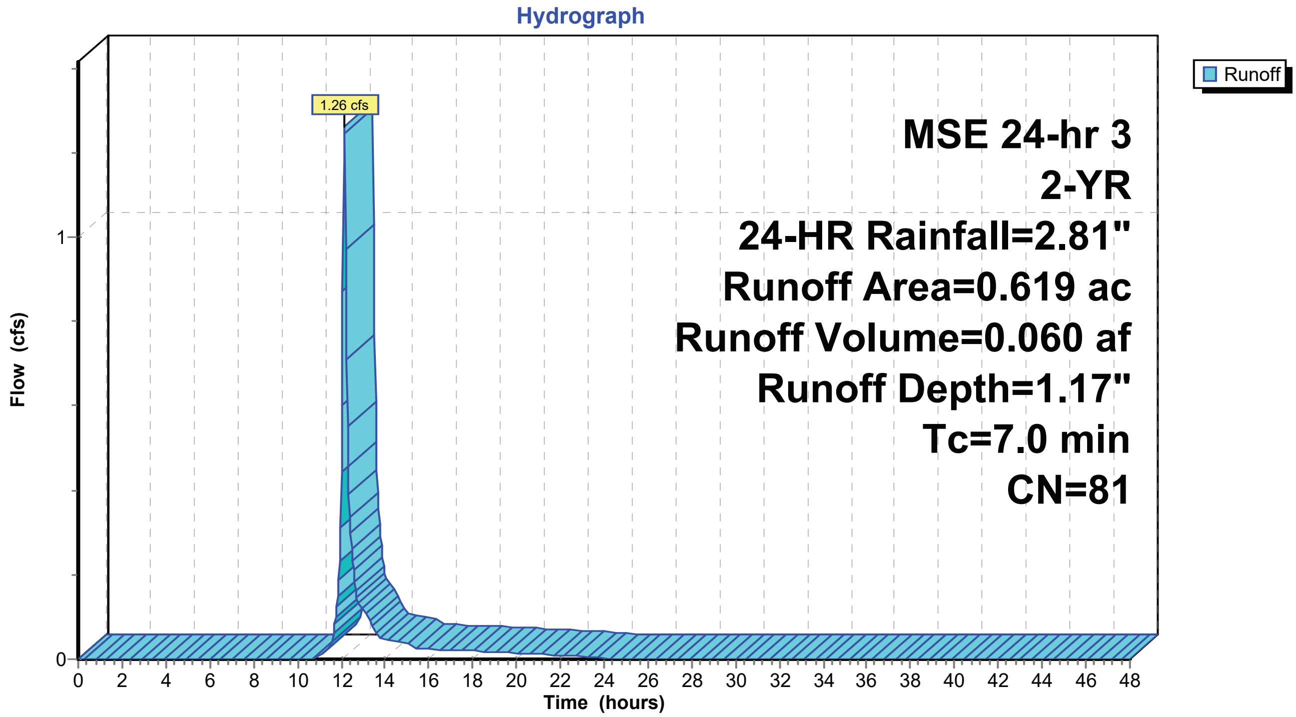
Runoff = 1.26 cfs @ 12.15 hrs, Volume= 0.060 af, Depth= 1.17"
Routed to Pond 2P : EXISTING LOW AREA

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
MSE 24-hr 3 2-YR, 24-HR Rainfall=2.81"

Area (ac)	CN	Description
0.050	98	Paved parking, HSG C
0.569	79	50-75% Grass cover, Fair, HSG C
0.619	81	Weighted Average
0.569		91.92% Pervious Area
0.050		8.08% Impervious Area

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

Subcatchment EX-DA-2: EX OPEN AREA



Summary for Subcatchment EX-DA-3: EX PARKING TO MEDIAN

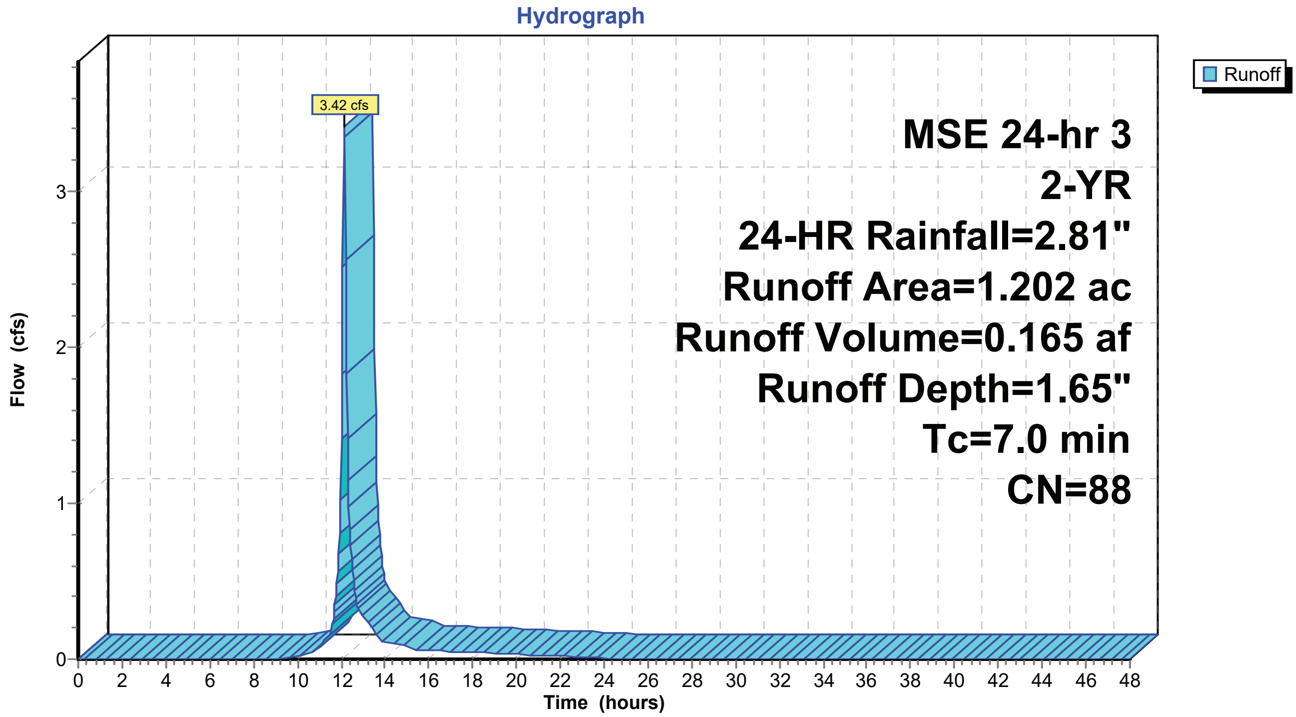
Runoff = 3.42 cfs @ 12.14 hrs, Volume= 0.165 af, Depth= 1.65"
Routed to Pond 6P : MEDIAN STORAGE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
MSE 24-hr 3 2-YR, 24-HR Rainfall=2.81"

Area (ac)	CN	Description
0.589	98	Paved parking, HSG C
0.613	79	50-75% Grass cover, Fair, HSG C
1.202	88	Weighted Average
0.613		51.00% Pervious Area
0.589		49.00% Impervious Area

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

Subcatchment EX-DA-3: EX PARKING TO MEDIAN



Summary for Subcatchment EX-DA-4: TO ALIMAGNET PKWY

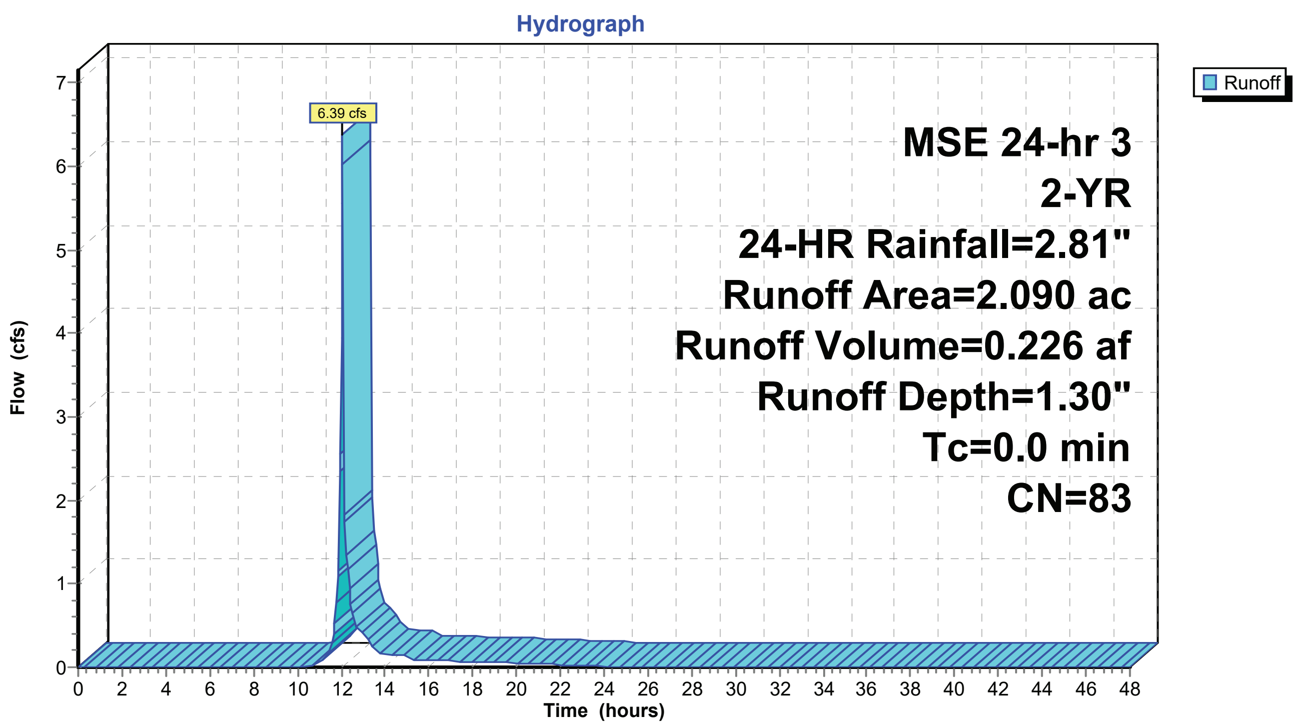
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 6.39 cfs @ 12.06 hrs, Volume= 0.226 af, Depth= 1.30"
Routed to Reach PKWY_EX : ALIMAGNET PKWY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
MSE 24-hr 3 2-YR, 24-HR Rainfall=2.81"

Area (ac)	CN	Description
0.773	98	Paved parking, HSG C
1.317	74	>75% Grass cover, Good, HSG C
2.090	83	Weighted Average
1.317		63.01% Pervious Area
0.773		36.99% Impervious Area

Subcatchment EX-DA-4: TO ALIMAGNET PKWY



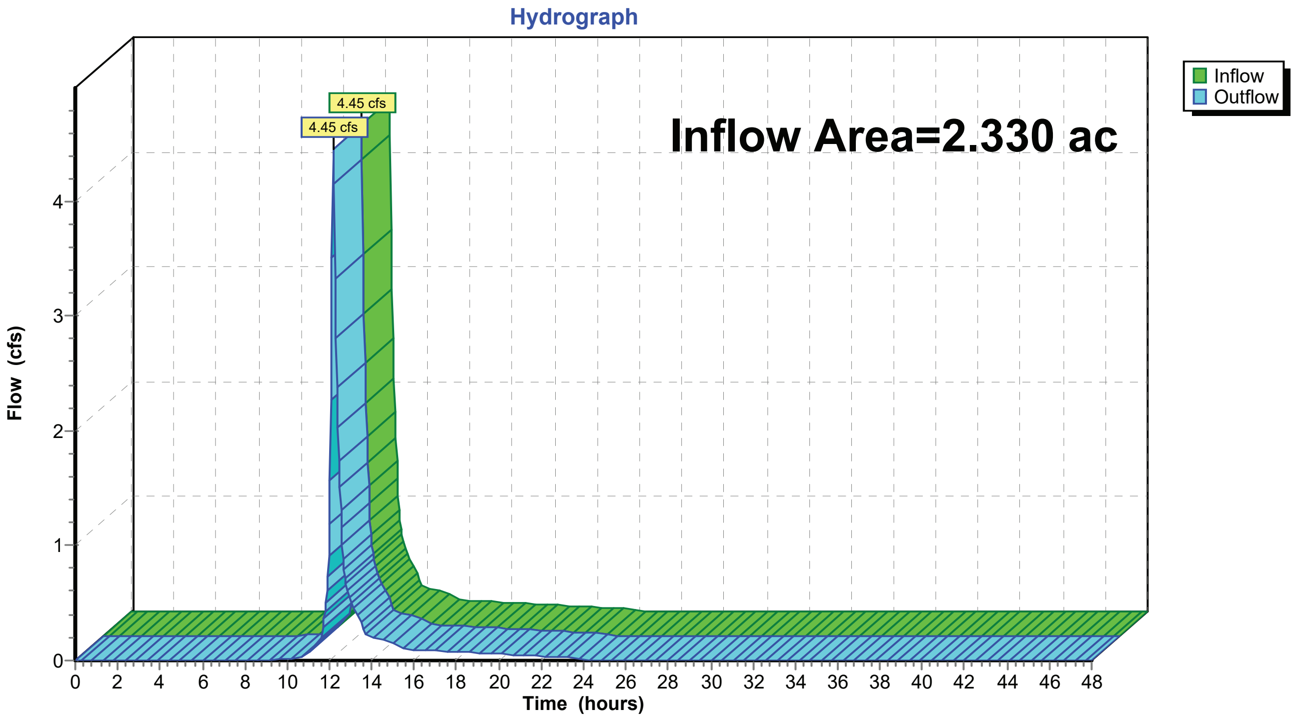
Summary for Reach LAKE_EX: TO ALIMAGNET LAKE

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

Inflow Area = 2.330 ac, 27.42% Impervious, Inflow Depth = 1.35" for 2-YR, 24-HR event
Inflow = 4.45 cfs @ 12.18 hrs, Volume= 0.261 af
Outflow = 4.45 cfs @ 12.18 hrs, Volume= 0.261 af, Atten= 0%, Lag= 0.0 min
Routed to Reach OUT_EX : OUT_EX

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Reach LAKE_EX: TO ALIMAGNET LAKE



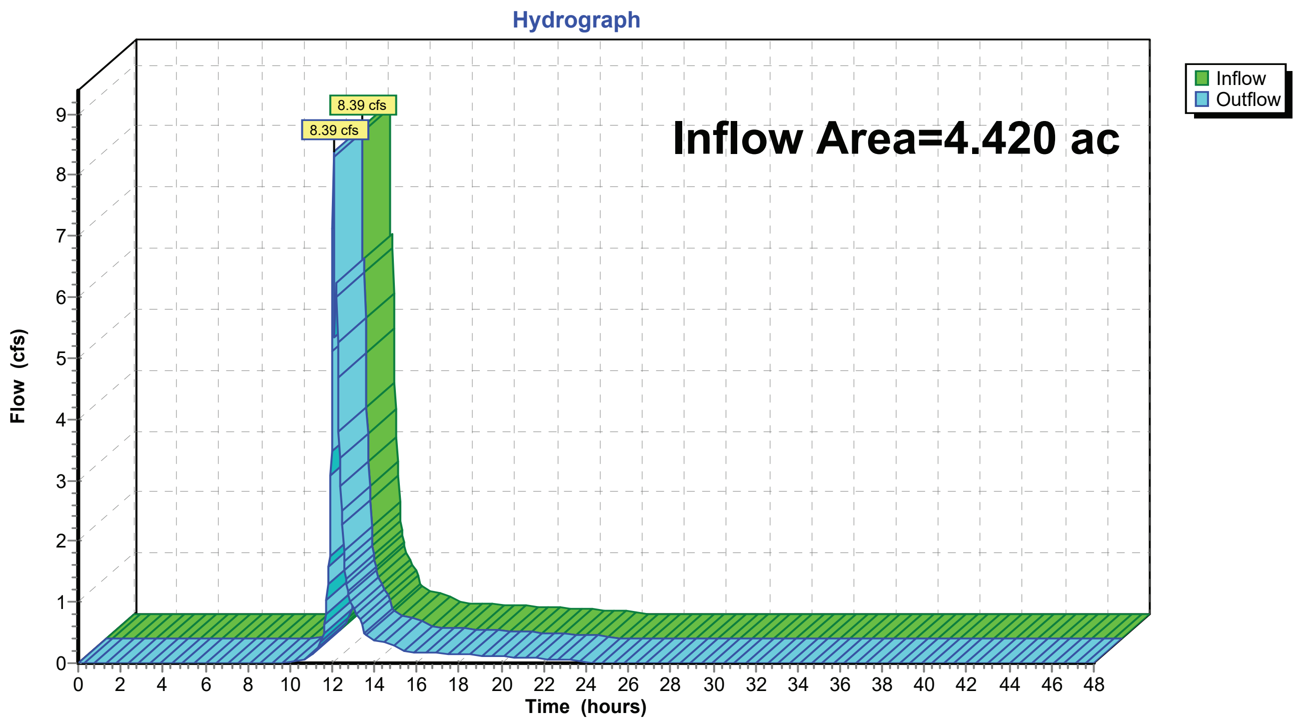
Summary for Reach OUT_EX: OUT_EX

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

Inflow Area = 4.420 ac, 31.95% Impervious, Inflow Depth = 1.32" for 2-YR, 24-HR event
Inflow = 8.39 cfs @ 12.07 hrs, Volume= 0.487 af
Outflow = 8.39 cfs @ 12.07 hrs, Volume= 0.487 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Reach OUT_EX: OUT_EX

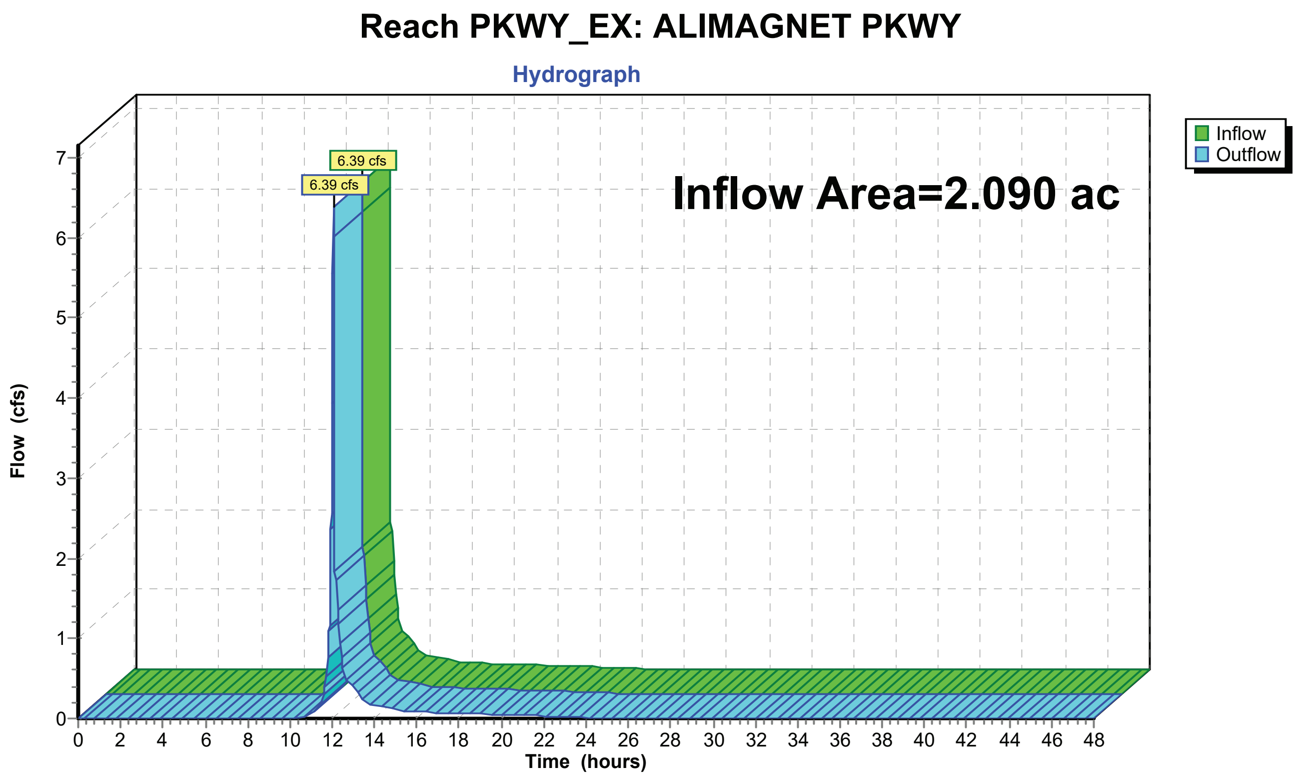


Summary for Reach PKWY_EX: ALIMAGNET PKWY

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

Inflow Area = 2.090 ac, 36.99% Impervious, Inflow Depth = 1.30" for 2-YR, 24-HR event
Inflow = 6.39 cfs @ 12.06 hrs, Volume= 0.226 af
Outflow = 6.39 cfs @ 12.06 hrs, Volume= 0.226 af, Atten= 0%, Lag= 0.0 min
Routed to Reach OUT_EX : OUT_EX

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs



Summary for Pond 2P: EXISTING LOW AREA

Inflow Area = 0.619 ac, 8.08% Impervious, Inflow Depth = 1.17" for 2-YR, 24-HR event
Inflow = 1.26 cfs @ 12.15 hrs, Volume= 0.060 af
Outflow = 1.10 cfs @ 12.19 hrs, Volume= 0.051 af, Atten= 13%, Lag= 2.4 min
Primary = 1.10 cfs @ 12.19 hrs, Volume= 0.051 af
Routed to Reach LAKE_EX : TO ALIMAGNET LAKE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,010.89' @ 12.19 hrs Surf.Area= 2,414 sf Storage= 586 cf

Plug-Flow detention time= 82.5 min calculated for 0.051 af (85% of inflow)
Center-of-Mass det. time= 24.6 min (842.3 - 817.7)

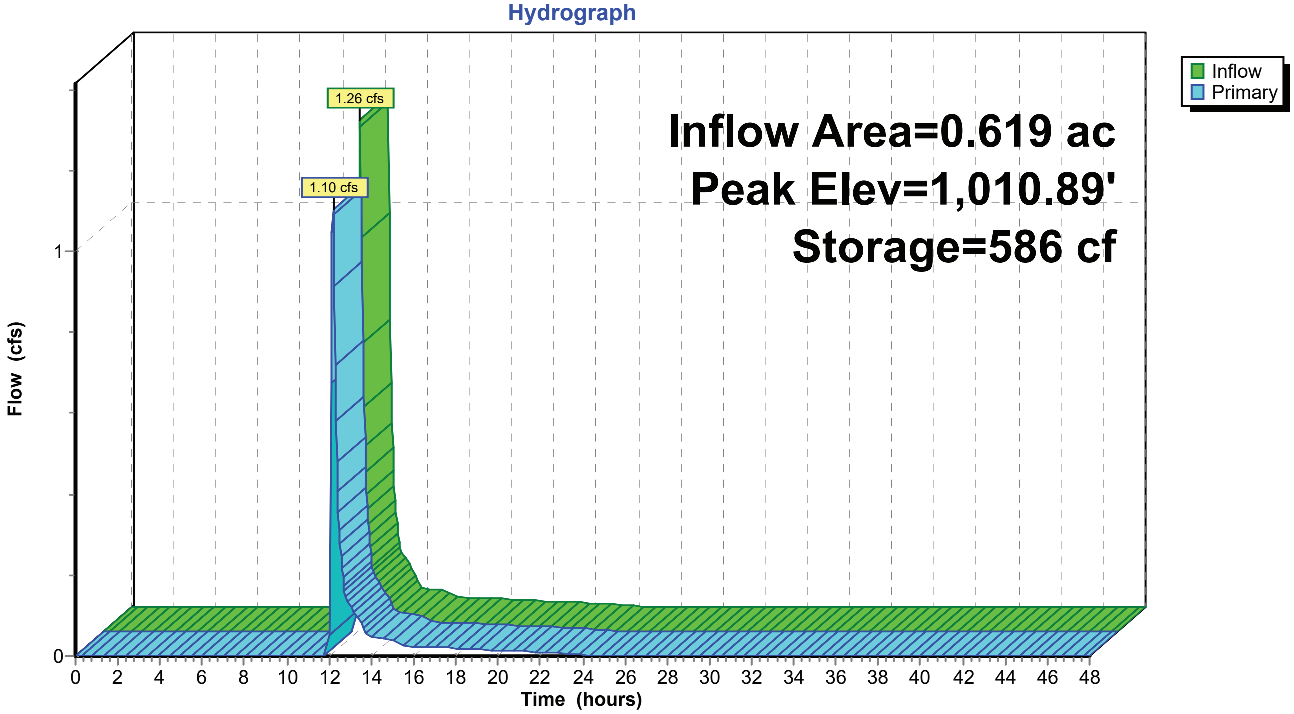
Volume	Invert	Avail.Storage	Storage Description
#1	1,010.40'	1,597 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,010.40	33	0	0
1,010.80	1,925	392	392
1,011.20	4,104	1,206	1,597

Device	Routing	Invert	Outlet Devices
#1	Primary	1,010.80'	**15.0' long + 4.0 '/' SideZ x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=1.08 cfs @ 12.19 hrs HW=1,010.89' TW=0.00' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 1.08 cfs @ 0.79 fps)

Pond 2P: EXISTING LOW AREA



Summary for Pond 6P: MEDIAN STORAGE

Inflow Area = 1.202 ac, 49.00% Impervious, Inflow Depth = 1.65" for 2-YR, 24-HR event
Inflow = 3.42 cfs @ 12.14 hrs, Volume= 0.165 af
Outflow = 2.59 cfs @ 12.20 hrs, Volume= 0.165 af, Atten= 24%, Lag= 3.6 min
Primary = 2.59 cfs @ 12.20 hrs, Volume= 0.165 af
Routed to Reach LAKE_EX : TO ALIMAGNET LAKE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,007.34' @ 12.20 hrs Surf.Area= 2,076 sf Storage= 910 cf
Flood Elev= 1,008.00' Surf.Area= 3,602 sf Storage= 2,783 cf

Plug-Flow detention time= 6.5 min calculated for 0.165 af (100% of inflow)
Center-of-Mass det. time= 6.5 min (806.1 - 799.5)

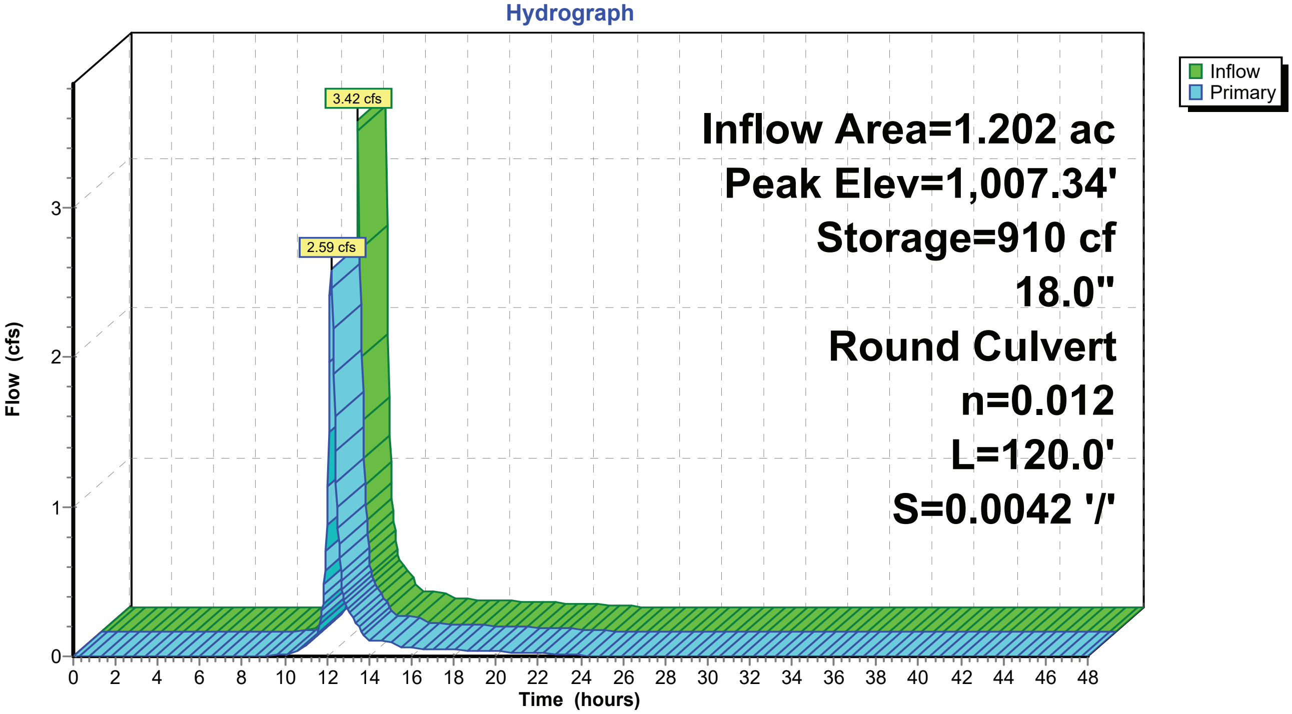
Volume	Invert	Avail.Storage	Storage Description
#1	1,006.50'	2,783 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,006.50	61	0	0
1,007.00	1,289	338	338
1,008.00	3,602	2,446	2,783

Device	Routing	Invert	Outlet Devices
#1	Primary	1,006.50'	**18.0" Round RCP_Round 18"** L= 120.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 1,006.50' / 1,006.00' S= 0.0042 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=2.58 cfs @ 12.20 hrs HW=1,007.34' TW=0.00' (Dynamic Tailwater)
1=RCP_Round 18" (Barrel Controls 2.58 cfs @ 3.67 fps)

Pond 6P: MEDIAN STORAGE



Time span=0.00-48.00 hrs, dt=0.04 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentEX-DA-1: NW TO Runoff Area=0.509 ac 0.00% Impervious Runoff Depth=2.11"
Tc=7.0 min CN=79 Runoff=1.83 cfs 0.090 af

SubcatchmentEX-DA-2: EX OPEN AREA Runoff Area=0.619 ac 8.08% Impervious Runoff Depth=2.27"
Tc=7.0 min CN=81 Runoff=2.38 cfs 0.117 af

SubcatchmentEX-DA-3: EX PARKING TO Runoff Area=1.202 ac 49.00% Impervious Runoff Depth=2.90"
Tc=7.0 min CN=88 Runoff=5.71 cfs 0.290 af

SubcatchmentEX-DA-4: TO ALIMAGNET Runoff Area=2.090 ac 36.99% Impervious Runoff Depth=2.44"
Tc=0.0 min CN=83 Runoff=10.06 cfs 0.426 af

Reach LAKE_EX: TO ALIMAGNETLAKE Inflow=8.17 cfs 0.488 af
Outflow=8.17 cfs 0.488 af

Reach OUT_EX: OUT_EX Inflow=15.08 cfs 0.913 af
Outflow=15.08 cfs 0.913 af

Reach PKWY_EX: ALIMAGNETPKWY Inflow=10.06 cfs 0.426 af
Outflow=10.06 cfs 0.426 af

Pond 2P: EXISTING LOW AREA Peak Elev=1,010.94' Storage=722 cf Inflow=2.38 cfs 0.117 af
Outflow=2.24 cfs 0.108 af

Pond 6P: MEDIAN STORAGE Peak Elev=1,007.64' Storage=1,628 cf Inflow=5.71 cfs 0.290 af
18.0" Round Culvert n=0.012 L=120.0' S=0.0042 '/' Outflow=4.34 cfs 0.290 af

Total Runoff Area = 4.420 ac Runoff Volume = 0.922 af Average Runoff Depth = 2.50"
68.05% Pervious = 3.008 ac 31.95% Impervious = 1.412 ac

Summary for Subcatchment EX-DA-1: NW TO ALIMAGNET LAKE

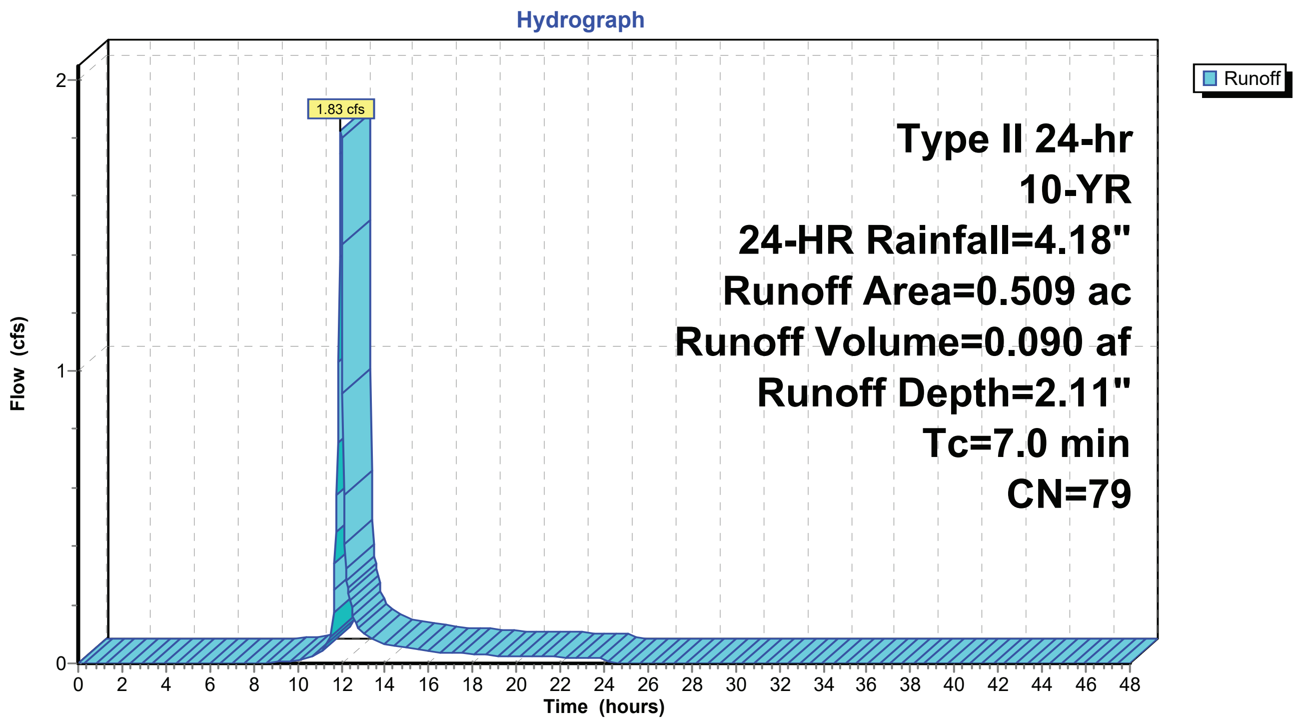
Runoff = 1.83 cfs @ 11.99 hrs, Volume= 0.090 af, Depth= 2.11"
Routed to Reach LAKE_EX : TO ALIMAGNET LAKE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 10-YR, 24-HR Rainfall=4.18"

Area (ac)	CN	Description
0.509	79	50-75% Grass cover, Fair, HSG C
0.509		100.00% Pervious Area

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

Subcatchment EX-DA-1: NW TO ALIMAGNET LAKE



Summary for Subcatchment EX-DA-2: EX OPEN AREA

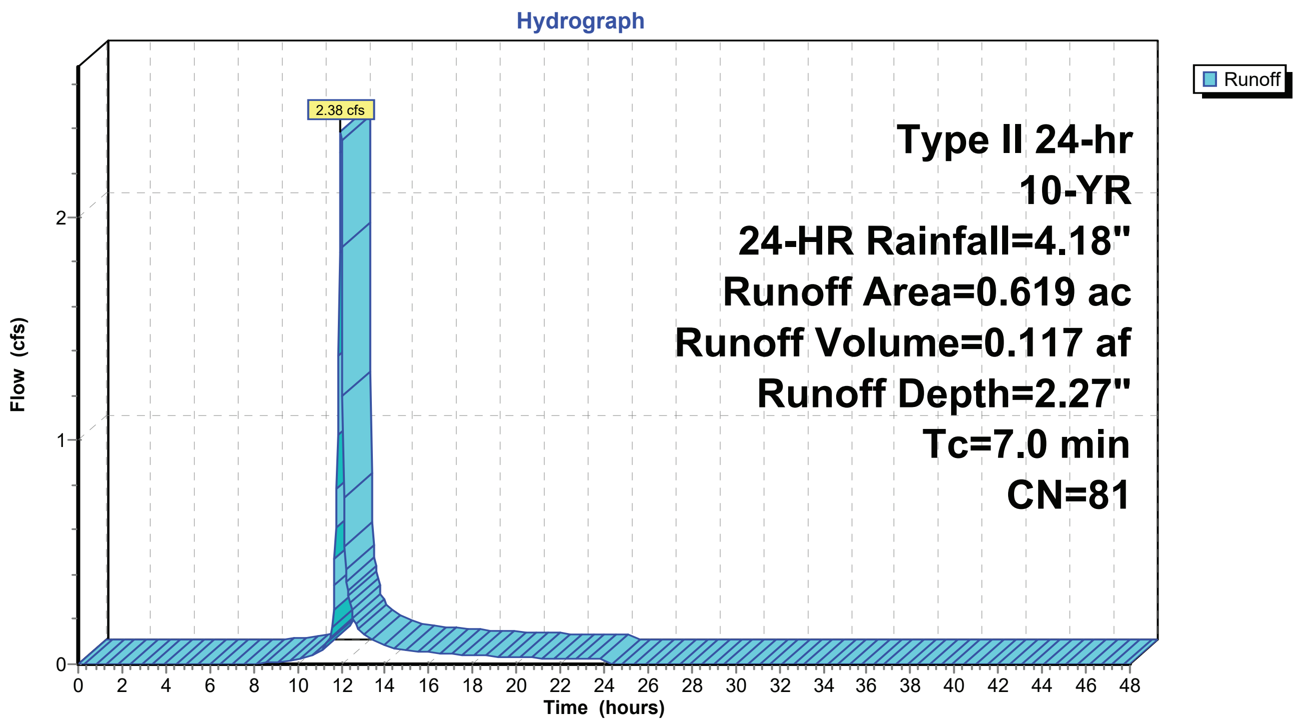
Runoff = 2.38 cfs @ 11.98 hrs, Volume= 0.117 af, Depth= 2.27"
Routed to Pond 2P : EXISTING LOW AREA

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 10-YR, 24-HR Rainfall=4.18"

Area (ac)	CN	Description
0.050	98	Paved parking, HSG C
0.569	79	50-75% Grass cover, Fair, HSG C
0.619	81	Weighted Average
0.569		91.92% Pervious Area
0.050		8.08% Impervious Area

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

Subcatchment EX-DA-2: EX OPEN AREA



Summary for Subcatchment EX-DA-3: EX PARKING TO MEDIAN

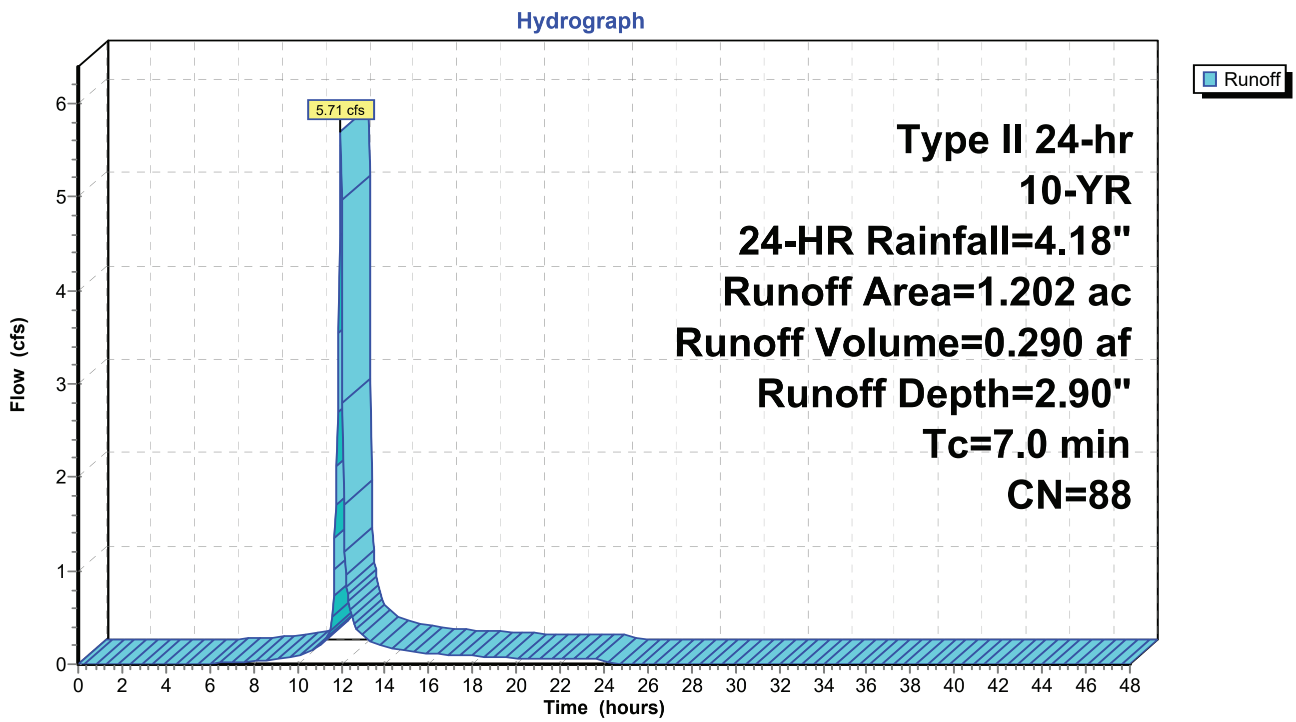
Runoff = 5.71 cfs @ 11.98 hrs, Volume= 0.290 af, Depth= 2.90"
Routed to Pond 6P : MEDIAN STORAGE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 10-YR, 24-HR Rainfall=4.18"

Area (ac)	CN	Description
0.589	98	Paved parking, HSG C
0.613	79	50-75% Grass cover, Fair, HSG C
1.202	88	Weighted Average
0.613		51.00% Pervious Area
0.589		49.00% Impervious Area

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

Subcatchment EX-DA-3: EX PARKING TO MEDIAN



Summary for Subcatchment EX-DA-4: TO ALIMAGNET PKWY

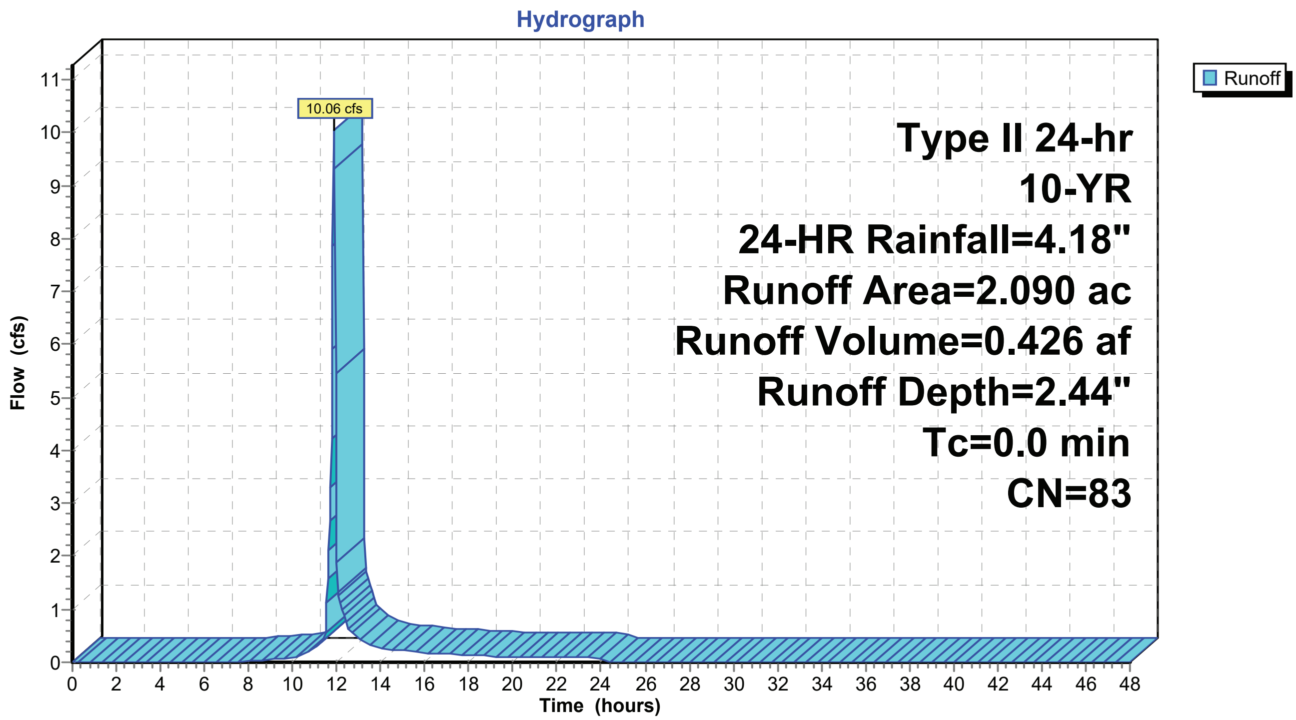
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 10.06 cfs @ 11.89 hrs, Volume= 0.426 af, Depth= 2.44"
Routed to Reach PKWY_EX : ALIMAGNET PKWY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 10-YR, 24-HR Rainfall=4.18"

Area (ac)	CN	Description
0.773	98	Paved parking, HSG C
1.317	74	>75% Grass cover, Good, HSG C
2.090	83	Weighted Average
1.317		63.01% Pervious Area
0.773		36.99% Impervious Area

Subcatchment EX-DA-4: TO ALIMAGNET PKWY

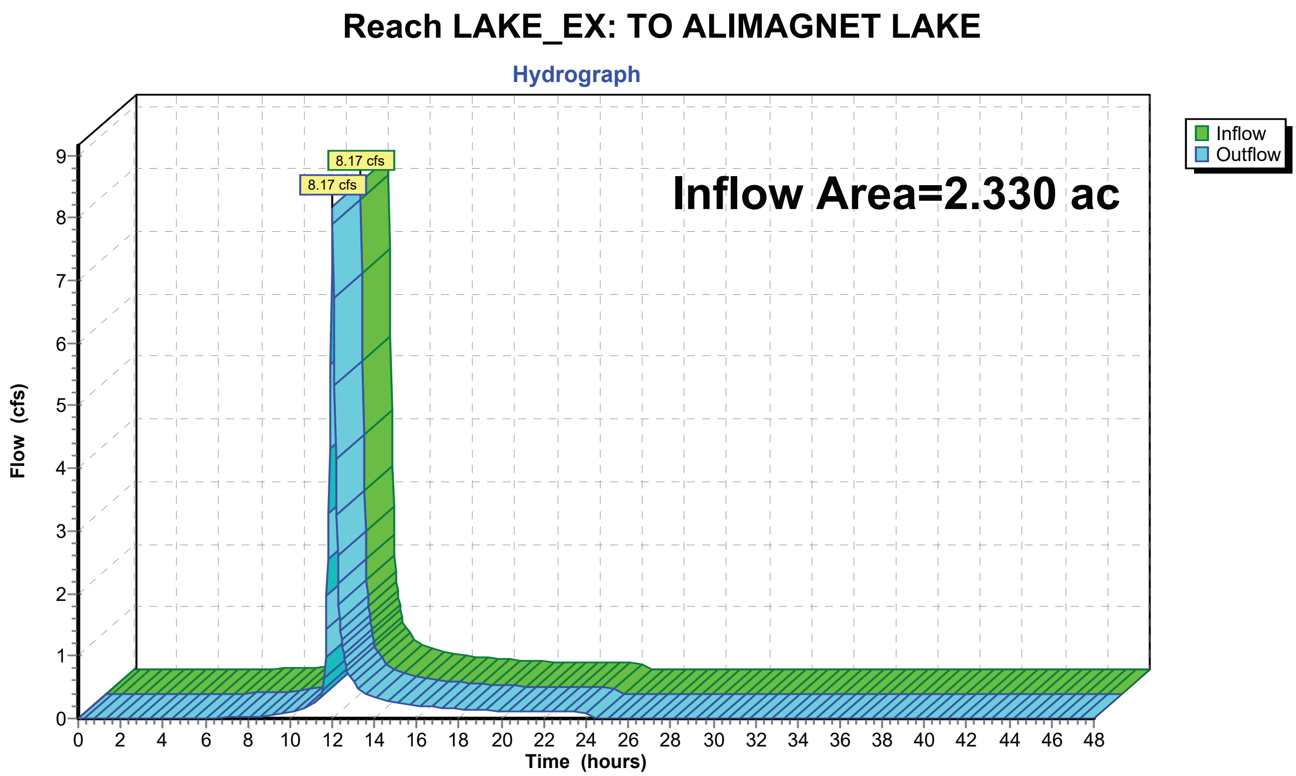


Summary for Reach LAKE_EX: TO ALIMAGNET LAKE

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

Inflow Area = 2.330 ac, 27.42% Impervious, Inflow Depth = 2.51" for 10-YR, 24-HR event
Inflow = 8.17 cfs @ 12.01 hrs, Volume= 0.488 af
Outflow = 8.17 cfs @ 12.01 hrs, Volume= 0.488 af, Atten= 0%, Lag= 0.0 min
Routed to Reach OUT_EX : OUT_EX

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

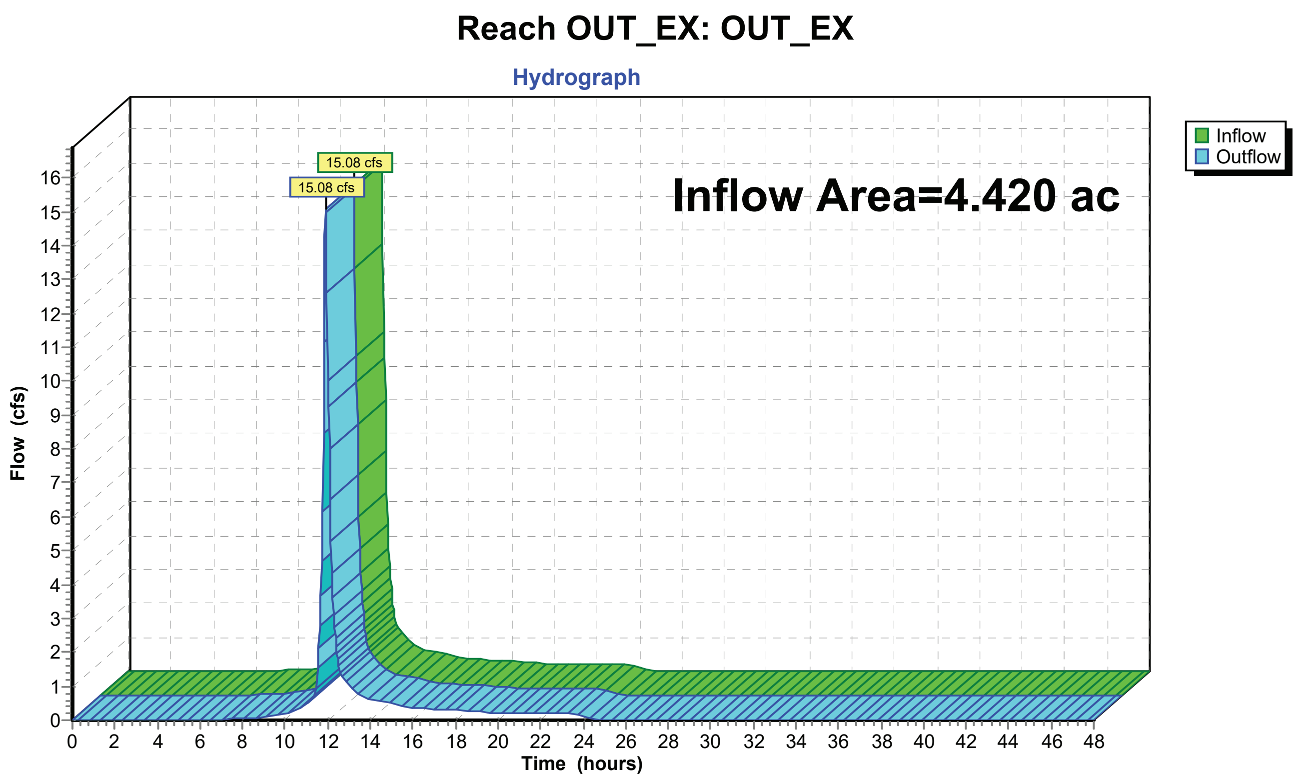


Summary for Reach OUT_EX: OUT_EX

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

Inflow Area = 4.420 ac, 31.95% Impervious, Inflow Depth = 2.48" for 10-YR, 24-HR event
Inflow = 15.08 cfs @ 11.91 hrs, Volume= 0.913 af
Outflow = 15.08 cfs @ 11.91 hrs, Volume= 0.913 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs



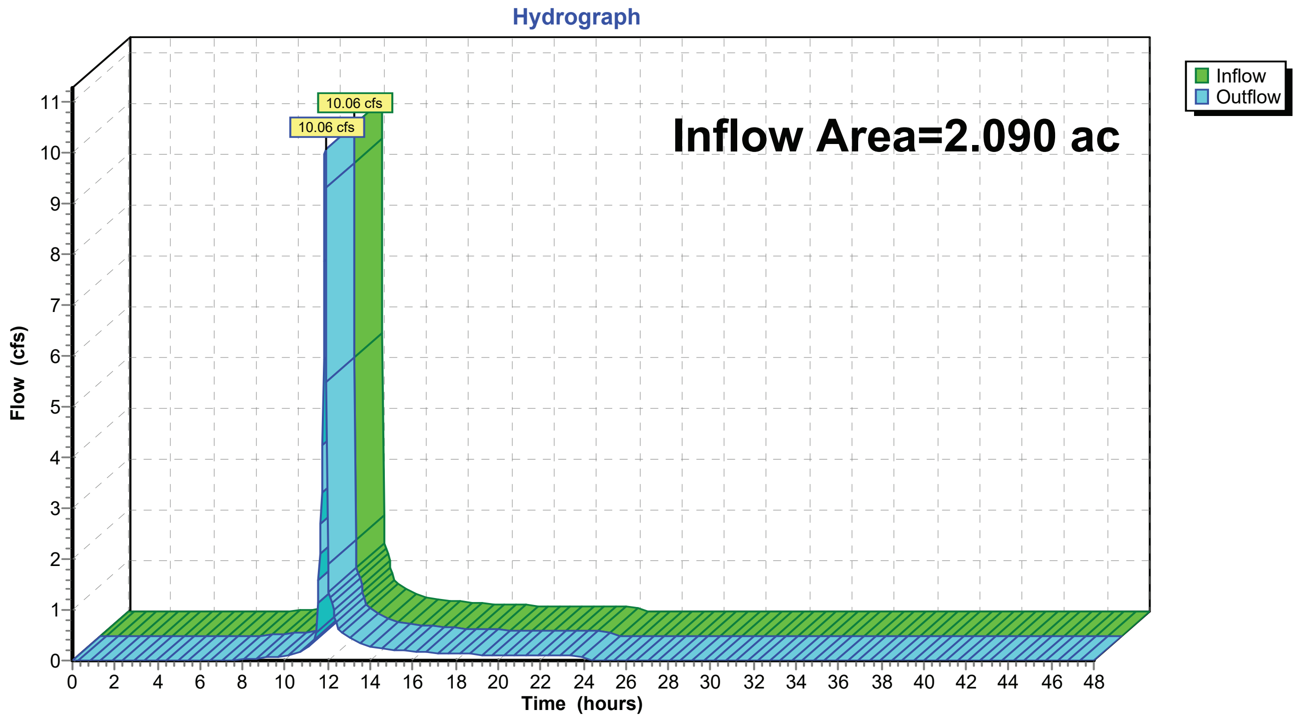
Summary for Reach PKWY_EX: ALIMAGNET PKWY

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

Inflow Area = 2.090 ac, 36.99% Impervious, Inflow Depth = 2.44" for 10-YR, 24-HR event
Inflow = 10.06 cfs @ 11.89 hrs, Volume= 0.426 af
Outflow = 10.06 cfs @ 11.89 hrs, Volume= 0.426 af, Atten= 0%, Lag= 0.0 min
Routed to Reach OUT_EX : OUT_EX

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Reach PKWY_EX: ALIMAGNET PKWY



Summary for Pond 2P: EXISTING LOW AREA

Inflow Area = 0.619 ac, 8.08% Impervious, Inflow Depth = 2.27" for 10-YR, 24-HR event
Inflow = 2.38 cfs @ 11.98 hrs, Volume= 0.117 af
Outflow = 2.24 cfs @ 12.01 hrs, Volume= 0.108 af, Atten= 6%, Lag= 1.6 min
Primary = 2.24 cfs @ 12.01 hrs, Volume= 0.108 af
Routed to Reach LAKE_EX : TO ALIMAGNET LAKE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,010.94' @ 12.01 hrs Surf.Area= 2,704 sf Storage= 722 cf

Plug-Flow detention time= 61.1 min calculated for 0.108 af (92% of inflow)
Center-of-Mass det. time= 19.6 min (844.3 - 824.7)

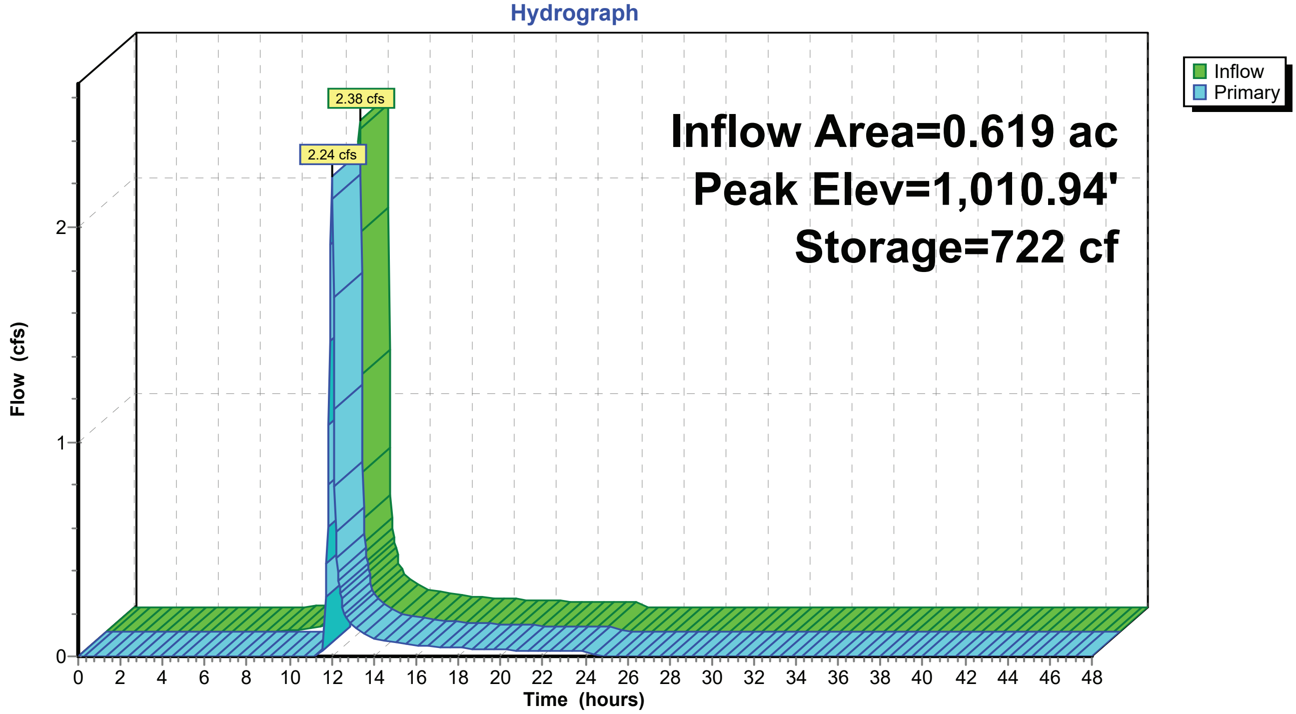
Volume	Invert	Avail.Storage	Storage Description
#1	1,010.40'	1,597 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,010.40	33	0	0
1,010.80	1,925	392	392
1,011.20	4,104	1,206	1,597

Device	Routing	Invert	Outlet Devices
#1	Primary	1,010.80'	**15.0' long + 4.0 '/' SideZ x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=2.20 cfs @ 12.01 hrs HW=1,010.94' TW=0.00' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 2.20 cfs @ 1.00 fps)

Pond 2P: EXISTING LOW AREA



Summary for Pond 6P: MEDIAN STORAGE

Inflow Area = 1.202 ac, 49.00% Impervious, Inflow Depth = 2.90" for 10-YR, 24-HR event
Inflow = 5.71 cfs @ 11.98 hrs, Volume= 0.290 af
Outflow = 4.34 cfs @ 12.04 hrs, Volume= 0.290 af, Atten= 24%, Lag= 3.6 min
Primary = 4.34 cfs @ 12.04 hrs, Volume= 0.290 af
Routed to Reach LAKE_EX : TO ALIMAGNET LAKE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,007.64' @ 12.04 hrs Surf.Area= 2,763 sf Storage= 1,628 cf
Flood Elev= 1,008.00' Surf.Area= 3,602 sf Storage= 2,783 cf

Plug-Flow detention time= 6.4 min calculated for 0.290 af (100% of inflow)
Center-of-Mass det. time= 6.5 min (808.8 - 802.3)

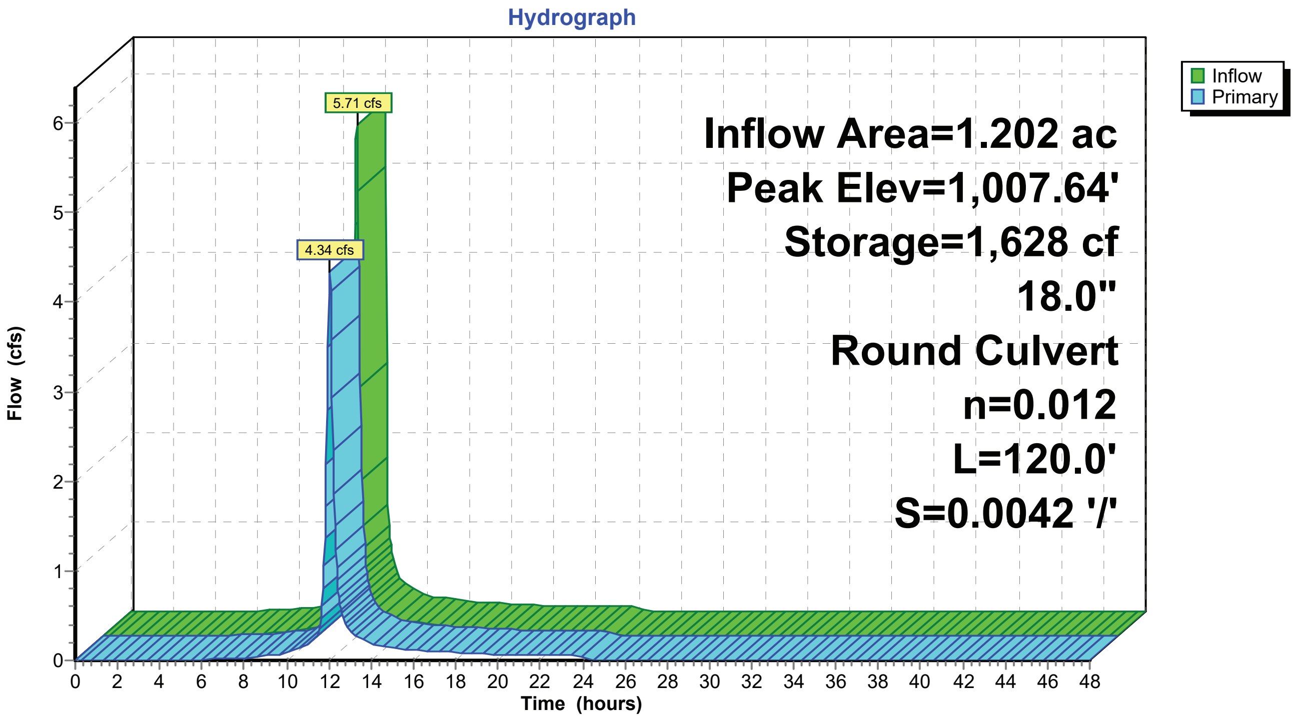
Volume	Invert	Avail.Storage	Storage Description
#1	1,006.50'	2,783 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,006.50	61	0	0
1,007.00	1,289	338	338
1,008.00	3,602	2,446	2,783

Device	Routing	Invert	Outlet Devices
#1	Primary	1,006.50'	**18.0" Round RCP_Round 18"** L= 120.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 1,006.50' / 1,006.00' S= 0.0042 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=4.33 cfs @ 12.04 hrs HW=1,007.64' TW=0.00' (Dynamic Tailwater)
1=RCP_Round 18" (Barrel Controls 4.33 cfs @ 4.18 fps)

Pond 6P: MEDIAN STORAGE



Time span=0.00-48.00 hrs, dt=0.04 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX-DA-1: NW TO Runoff Area=0.509 ac 0.00% Impervious Runoff Depth=4.98"
Tc=7.0 min CN=79 Runoff=4.18 cfs 0.211 af

Subcatchment EX-DA-2: EX OPEN AREA Runoff Area=0.619 ac 8.08% Impervious Runoff Depth=5.21"
Tc=7.0 min CN=81 Runoff=5.27 cfs 0.269 af

Subcatchment EX-DA-3: EX PARKING TO Runoff Area=1.202 ac 49.00% Impervious Runoff Depth=6.01"
Tc=7.0 min CN=88 Runoff=11.26 cfs 0.602 af

Subcatchment EX-DA-4: TO ALIMAGNET Runoff Area=2.090 ac 36.99% Impervious Runoff Depth=5.43"
Tc=0.0 min CN=83 Runoff=21.40 cfs 0.947 af

Reach LAKE_EX: TO ALIMAGNETLAKE Inflow=24.30 cfs 1.073 af
Outflow=24.30 cfs 1.073 af

Reach OUT_EX: OUT_EX Inflow=32.22 cfs 2.020 af
Outflow=32.22 cfs 2.020 af

Reach PKWY_EX: ALIMAGNETPKWY Inflow=21.40 cfs 0.947 af
Outflow=21.40 cfs 0.947 af

Pond 2P: EXISTING LOW AREA Peak Elev=1,011.04' Storage=1,016 cf Inflow=5.27 cfs 0.269 af
Outflow=5.03 cfs 0.260 af

Pond 6P: MEDIAN STORAGE Peak Elev=1,011.02' Storage=2,783 cf Inflow=11.26 cfs 0.602 af
18.0" Round Culvert n=0.012 L=120.0' S=0.0042 '/' Outflow=15.19 cfs 0.602 af

Total Runoff Area = 4.420 ac Runoff Volume = 2.029 af Average Runoff Depth = 5.51"
68.05% Pervious = 3.008 ac 31.95% Impervious = 1.412 ac

Summary for Subcatchment EX-DA-1: NW TO ALIMAGNET LAKE

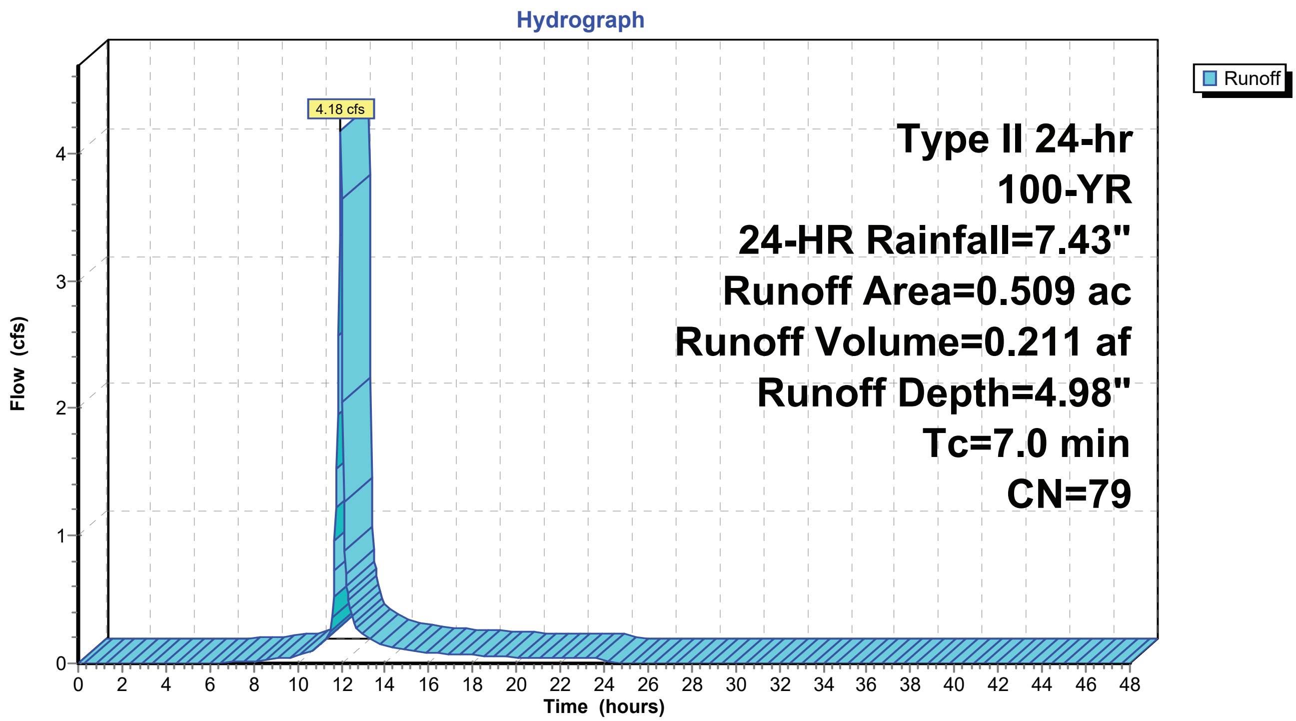
Runoff = 4.18 cfs @ 11.98 hrs, Volume= 0.211 af, Depth= 4.98"
Routed to Reach LAKE_EX : TO ALIMAGNET LAKE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-YR, 24-HR Rainfall=7.43"

Area (ac)	CN	Description
0.509	79	50-75% Grass cover, Fair, HSG C
0.509		100.00% Pervious Area

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

Subcatchment EX-DA-1: NW TO ALIMAGNET LAKE



Summary for Subcatchment EX-DA-2: EX OPEN AREA

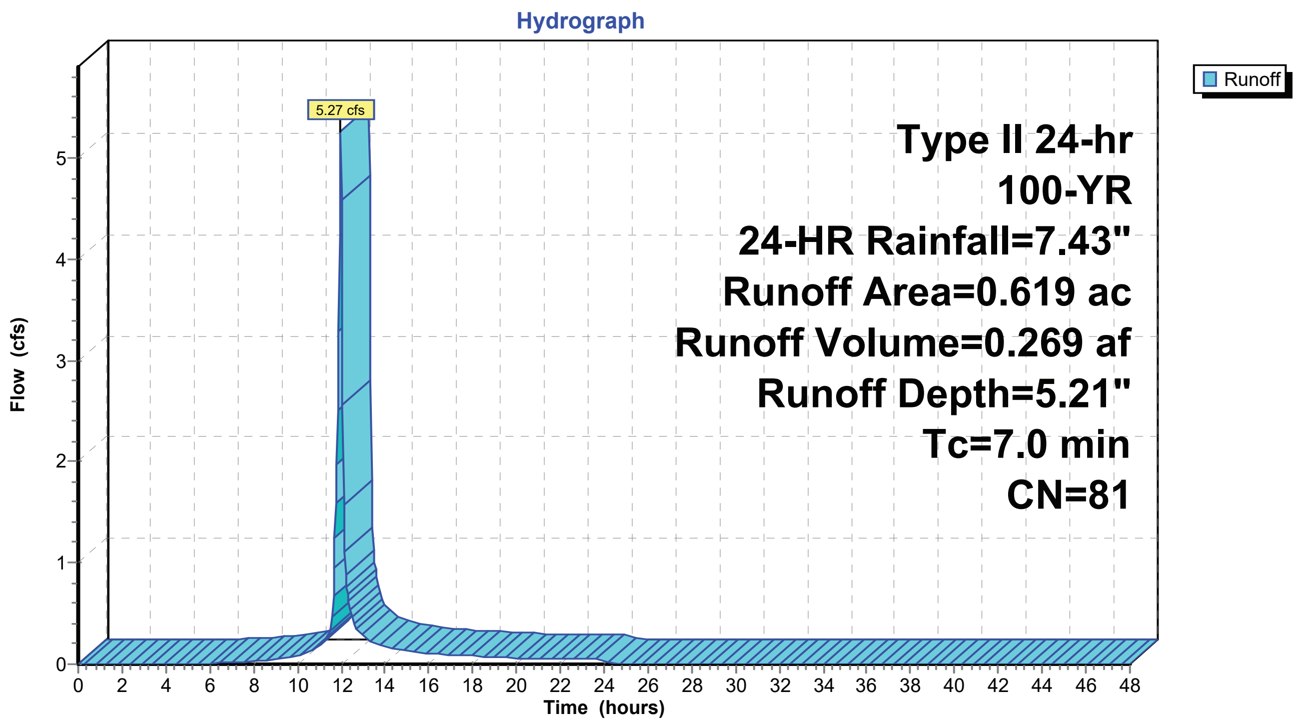
Runoff = 5.27 cfs @ 11.98 hrs, Volume= 0.269 af, Depth= 5.21"
Routed to Pond 2P : EXISTING LOW AREA

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-YR, 24-HR Rainfall=7.43"

Area (ac)	CN	Description
0.050	98	Paved parking, HSG C
0.569	79	50-75% Grass cover, Fair, HSG C
0.619	81	Weighted Average
0.569		91.92% Pervious Area
0.050		8.08% Impervious Area

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

Subcatchment EX-DA-2: EX OPEN AREA



Summary for Subcatchment EX-DA-3: EX PARKING TO MEDIAN

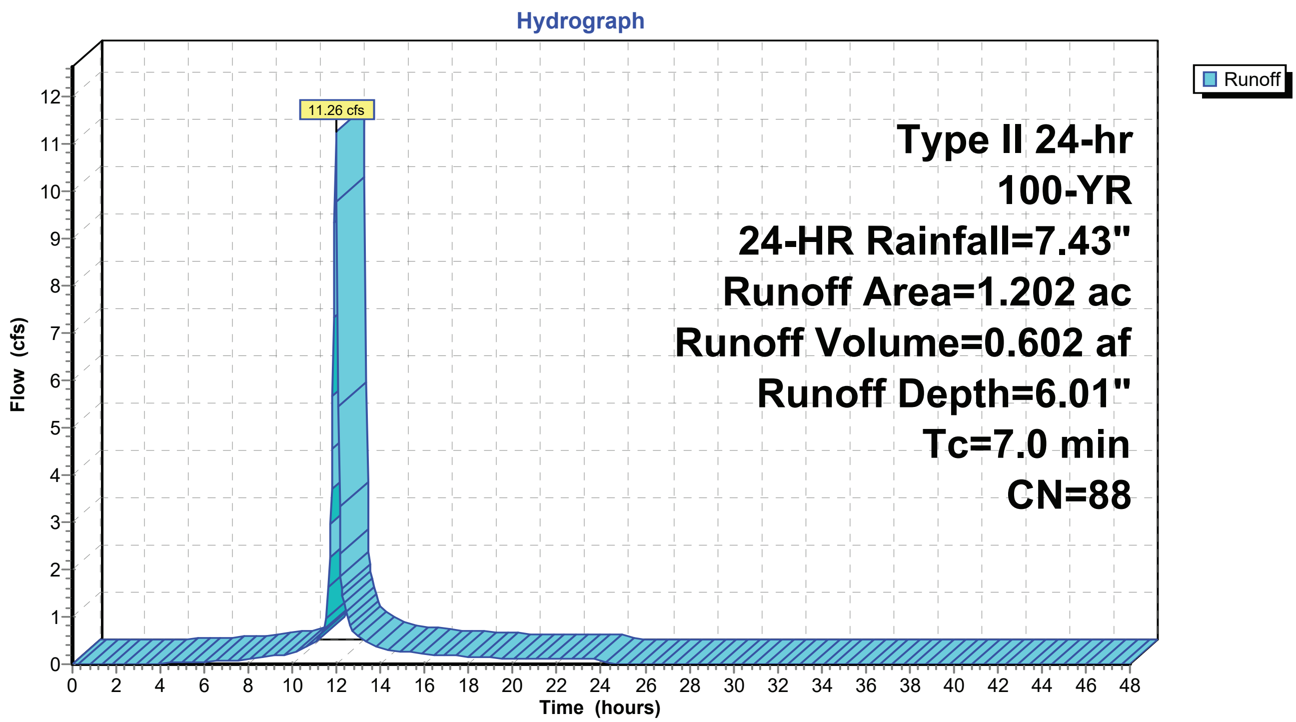
Runoff = 11.26 cfs @ 11.98 hrs, Volume= 0.602 af, Depth= 6.01"
Routed to Pond 6P : MEDIAN STORAGE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-YR, 24-HR Rainfall=7.43"

Area (ac)	CN	Description
0.589	98	Paved parking, HSG C
0.613	79	50-75% Grass cover, Fair, HSG C
1.202	88	Weighted Average
0.613		51.00% Pervious Area
0.589		49.00% Impervious Area

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

Subcatchment EX-DA-3: EX PARKING TO MEDIAN



Summary for Subcatchment EX-DA-4: TO ALIMAGNET PKWY

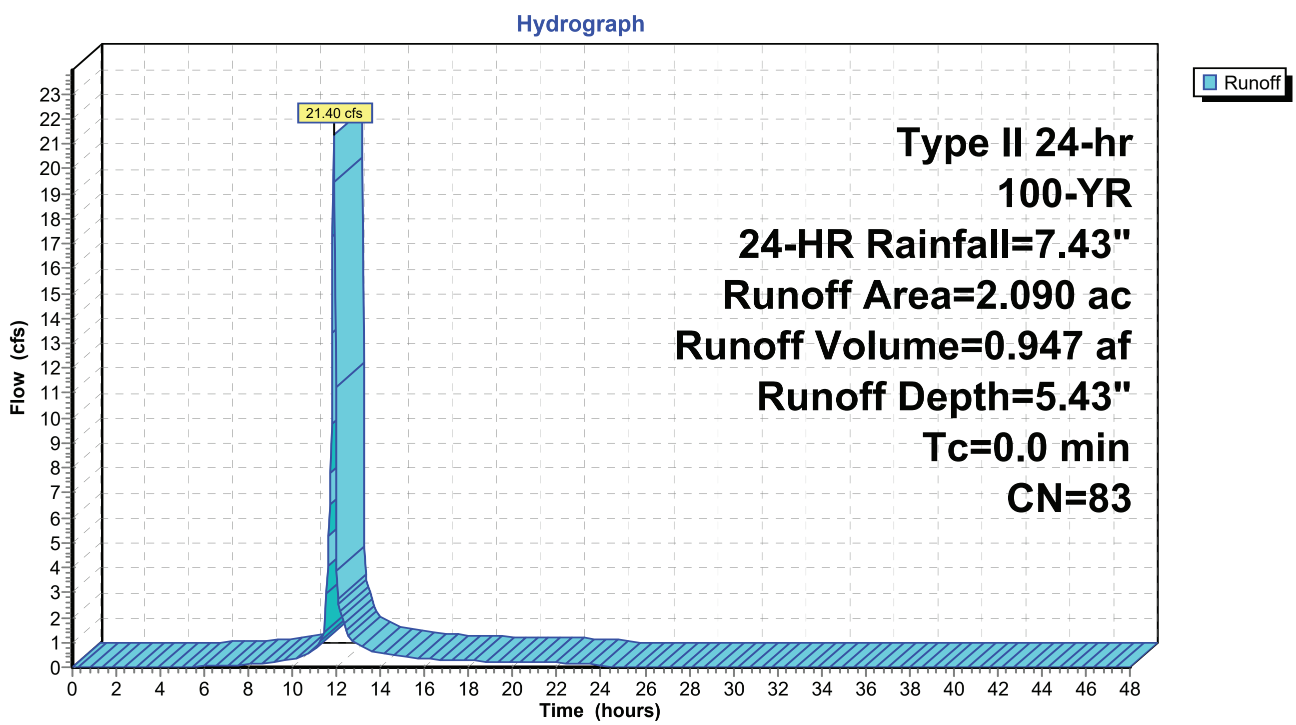
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 21.40 cfs @ 11.89 hrs, Volume= 0.947 af, Depth= 5.43"
Routed to Reach PKWY_EX : ALIMAGNET PKWY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-YR, 24-HR Rainfall=7.43"

Area (ac)	CN	Description
0.773	98	Paved parking, HSG C
1.317	74	>75% Grass cover, Good, HSG C
2.090	83	Weighted Average
1.317		63.01% Pervious Area
0.773		36.99% Impervious Area

Subcatchment EX-DA-4: TO ALIMAGNET PKWY



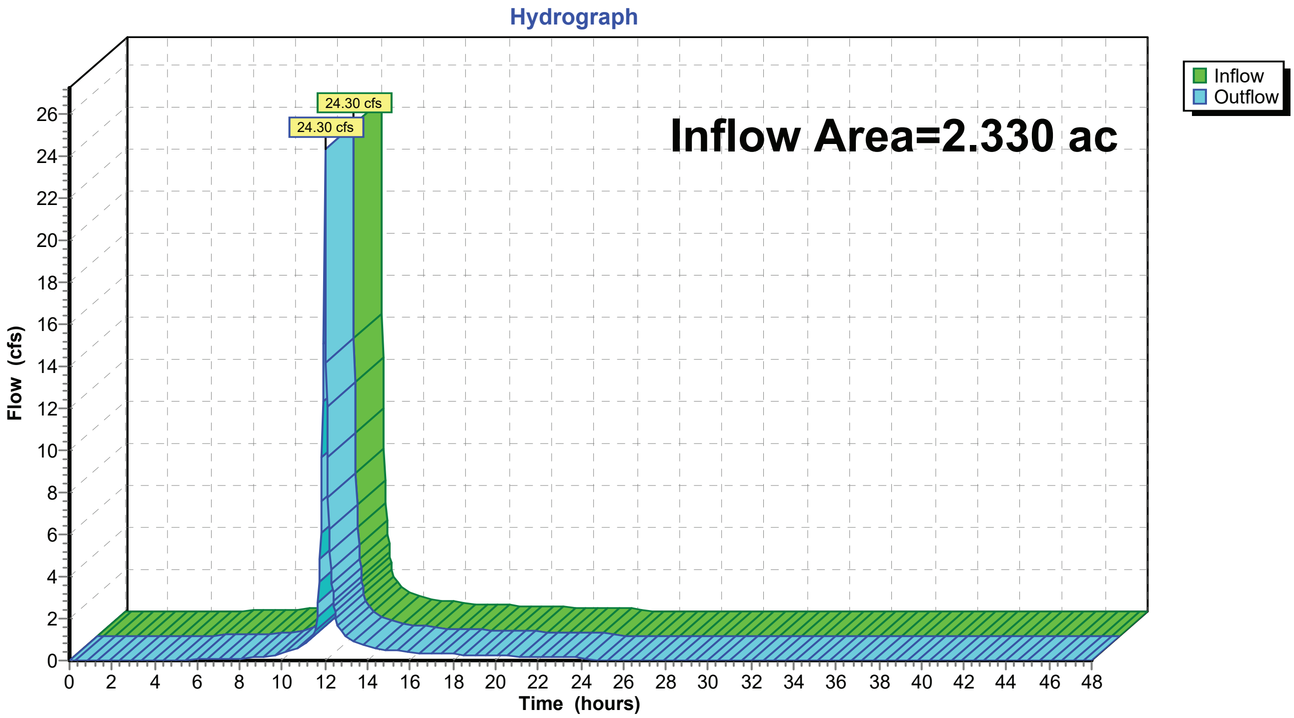
Summary for Reach LAKE_EX: TO ALIMAGNET LAKE

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

Inflow Area = 2.330 ac, 27.42% Impervious, Inflow Depth = 5.53" for 100-YR, 24-HR event
Inflow = 24.30 cfs @ 12.00 hrs, Volume= 1.073 af
Outflow = 24.30 cfs @ 12.00 hrs, Volume= 1.073 af, Atten= 0%, Lag= 0.0 min
Routed to Reach OUT_EX : OUT_EX

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Reach LAKE_EX: TO ALIMAGNET LAKE



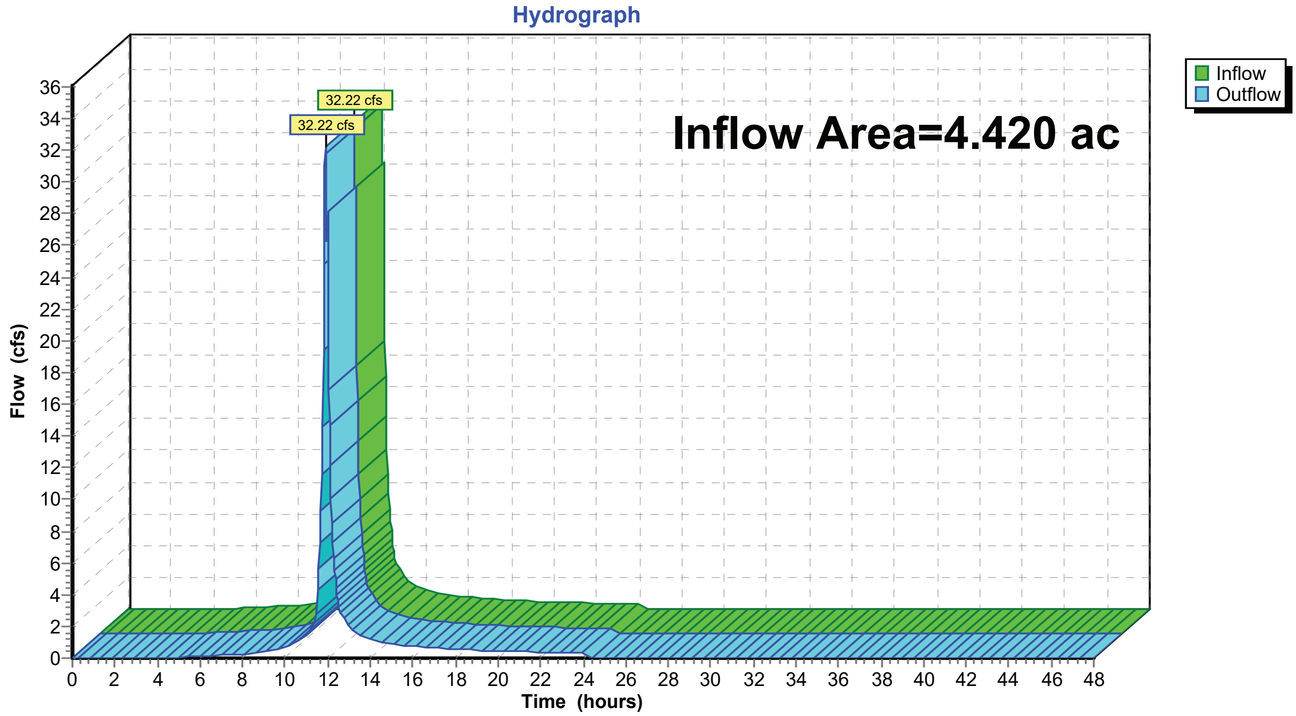
Summary for Reach OUT_EX: OUT_EX

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

Inflow Area = 4.420 ac, 31.95% Impervious, Inflow Depth = 5.48" for 100-YR, 24-HR event
Inflow = 32.22 cfs @ 11.91 hrs, Volume= 2.020 af
Outflow = 32.22 cfs @ 11.91 hrs, Volume= 2.020 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Reach OUT_EX: OUT_EX



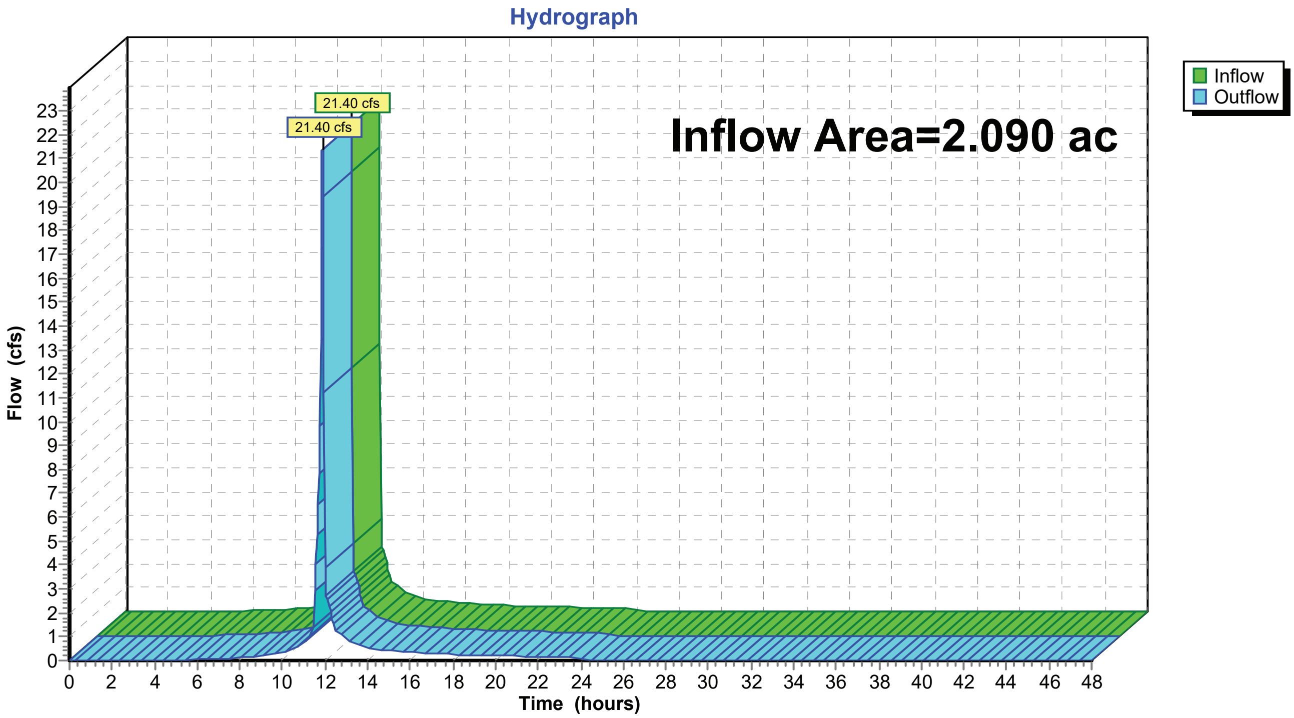
Summary for Reach PKWY_EX: ALIMAGNET PKWY

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

Inflow Area = 2.090 ac, 36.99% Impervious, Inflow Depth = 5.43" for 100-YR, 24-HR event
Inflow = 21.40 cfs @ 11.89 hrs, Volume= 0.947 af
Outflow = 21.40 cfs @ 11.89 hrs, Volume= 0.947 af, Atten= 0%, Lag= 0.0 min
Routed to Reach OUT_EX : OUT_EX

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Reach PKWY_EX: ALIMAGNET PKWY



Summary for Pond 2P: EXISTING LOW AREA

Inflow Area = 0.619 ac, 8.08% Impervious, Inflow Depth = 5.21" for 100-YR, 24-HR event
Inflow = 5.27 cfs @ 11.98 hrs, Volume= 0.269 af
Outflow = 5.03 cfs @ 12.00 hrs, Volume= 0.260 af, Atten= 5%, Lag= 1.4 min
Primary = 5.03 cfs @ 12.00 hrs, Volume= 0.260 af
Routed to Reach LAKE_EX : TO ALIMAGNET LAKE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,011.04' @ 12.00 hrs Surf.Area= 3,241 sf Storage= 1,016 cf

Plug-Flow detention time= 34.4 min calculated for 0.259 af (97% of inflow)
Center-of-Mass det. time= 14.6 min (815.6 - 801.1)

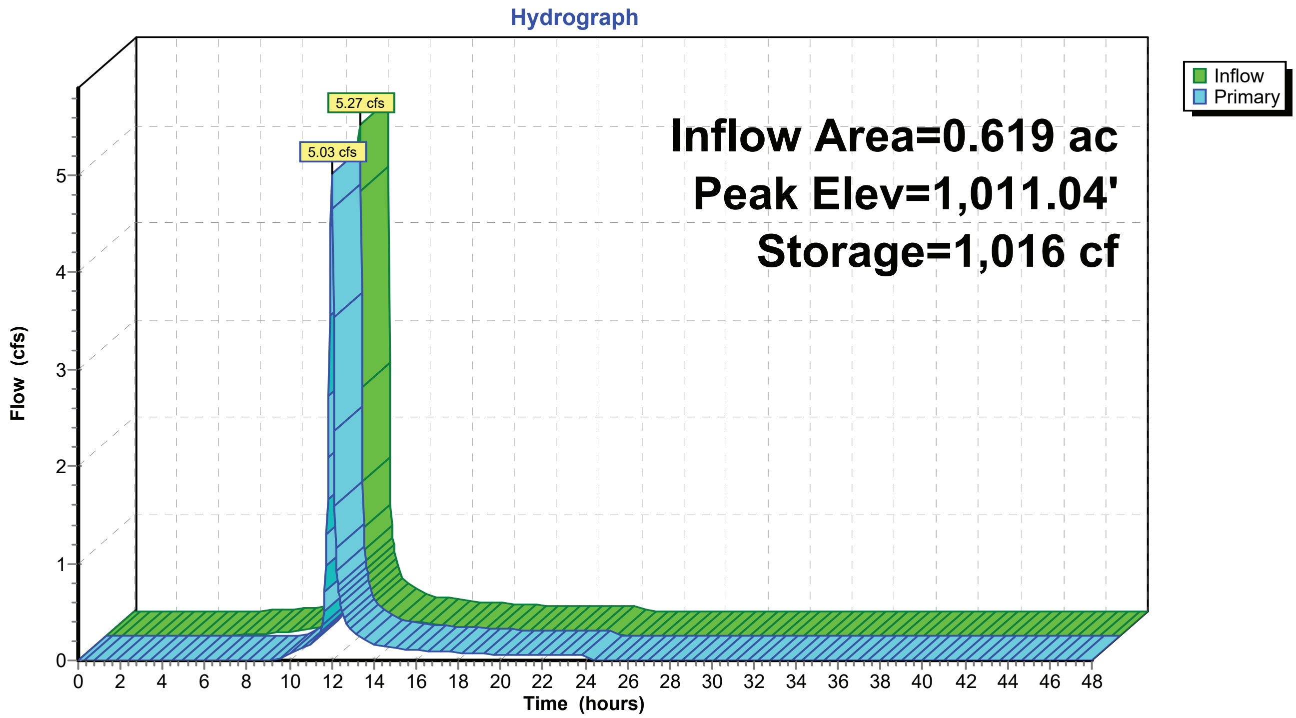
Volume	Invert	Avail.Storage	Storage Description
#1	1,010.40'	1,597 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,010.40	33	0	0
1,010.80	1,925	392	392
1,011.20	4,104	1,206	1,597

Device	Routing	Invert	Outlet Devices
#1	Primary	1,010.80'	**15.0' long + 4.0 '/' SideZ x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=4.99 cfs @ 12.00 hrs HW=1,011.04' TW=0.00' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Weir Controls 4.99 cfs @ 1.30 fps)

Pond 2P: EXISTING LOW AREA



Summary for Pond 6P: MEDIAN STORAGE

[93] Warning: Storage range exceeded by 3.02'
[58] Hint: Peaked 3.02' above defined flood level
[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 1.202 ac, 49.00% Impervious, Inflow Depth = 6.01" for 100-YR, 24-HR event
Inflow = 11.26 cfs @ 11.98 hrs, Volume= 0.602 af
Outflow = 15.19 cfs @ 12.00 hrs, Volume= 0.602 af, Atten= 0%, Lag= 1.3 min
Primary = 15.19 cfs @ 12.00 hrs, Volume= 0.602 af
Routed to Reach LAKE_EX : TO ALIMAGNET LAKE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,011.02' @ 12.00 hrs Surf.Area= 3,602 sf Storage= 2,783 cf
Flood Elev= 1,008.00' Surf.Area= 3,602 sf Storage= 2,783 cf

Plug-Flow detention time= 6.7 min calculated for 0.602 af (100% of inflow)
Center-of-Mass det. time= 6.1 min (788.2 - 782.0)

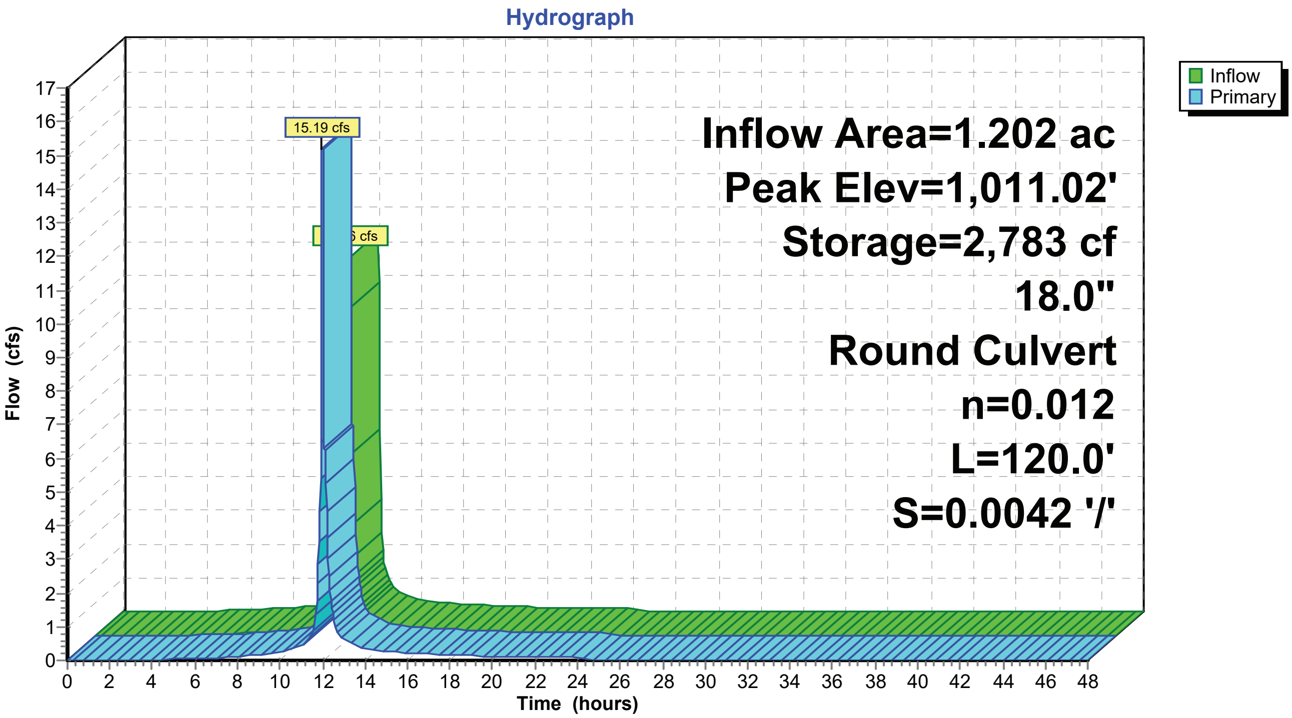
Volume	Invert	Avail.Storage	Storage Description
#1	1,006.50'	2,783 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,006.50	61	0	0
1,007.00	1,289	338	338
1,008.00	3,602	2,446	2,783

Device	Routing	Invert	Outlet Devices
#1	Primary	1,006.50'	**18.0" Round RCP_Round 18"** L= 120.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 1,006.50' / 1,006.00' S= 0.0042 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=15.16 cfs @ 12.00 hrs HW=1,011.01' TW=0.00' (Dynamic Tailwater)
1=RCP_Round 18" (Barrel Controls 15.16 cfs @ 8.58 fps)

Pond 6P: MEDIAN STORAGE



Time span=0.00-48.00 hrs, dt=0.04 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentEX-DA-1: NW TO Runoff Area=0.509 ac 0.00% Impervious Runoff Depth=5.96"
Tc=7.0 min CN=79 Runoff=4.96 cfs 0.253 af

SubcatchmentEX-DA-2: EX OPEN AREA Runoff Area=0.619 ac 8.08% Impervious Runoff Depth=6.20"
Tc=7.0 min CN=81 Runoff=6.21 cfs 0.320 af

SubcatchmentEX-DA-3: EX PARKING TO Runoff Area=1.202 ac 49.00% Impervious Runoff Depth=7.04"
Tc=7.0 min CN=88 Runoff=13.05 cfs 0.705 af

SubcatchmentEX-DA-4: TO ALIMAGNET Runoff Area=2.090 ac 36.99% Impervious Runoff Depth=6.44"
Tc=0.0 min CN=83 Runoff=25.06 cfs 1.121 af

Reach LAKE_EX: TO ALIMAGNETLAKE Inflow=25.00 cfs 1.268 af
Outflow=25.00 cfs 1.268 af

Reach OUT_EX: OUT_EX Inflow=38.74 cfs 2.389 af
Outflow=38.74 cfs 2.389 af

Reach PKWY_EX: ALIMAGNETPKWY Inflow=25.06 cfs 1.121 af
Outflow=25.06 cfs 1.121 af

Pond 2P: EXISTING LOW AREA Peak Elev=1,011.07' Storage=1,106 cf Inflow=6.21 cfs 0.320 af
Outflow=5.94 cfs 0.311 af

Pond 6P: MEDIAN STORAGE Peak Elev=1,010.68' Storage=2,783 cf Inflow=13.05 cfs 0.705 af
18.0" Round Culvert n=0.012 L=120.0' S=0.0042 '/' Outflow=14.56 cfs 0.705 af

Total Runoff Area = 4.420 ac Runoff Volume = 2.398 af Average Runoff Depth = 6.51"
68.05% Pervious = 3.008 ac 31.95% Impervious = 1.412 ac

Summary for Subcatchment EX-DA-1: NW TO ALIMAGNET LAKE

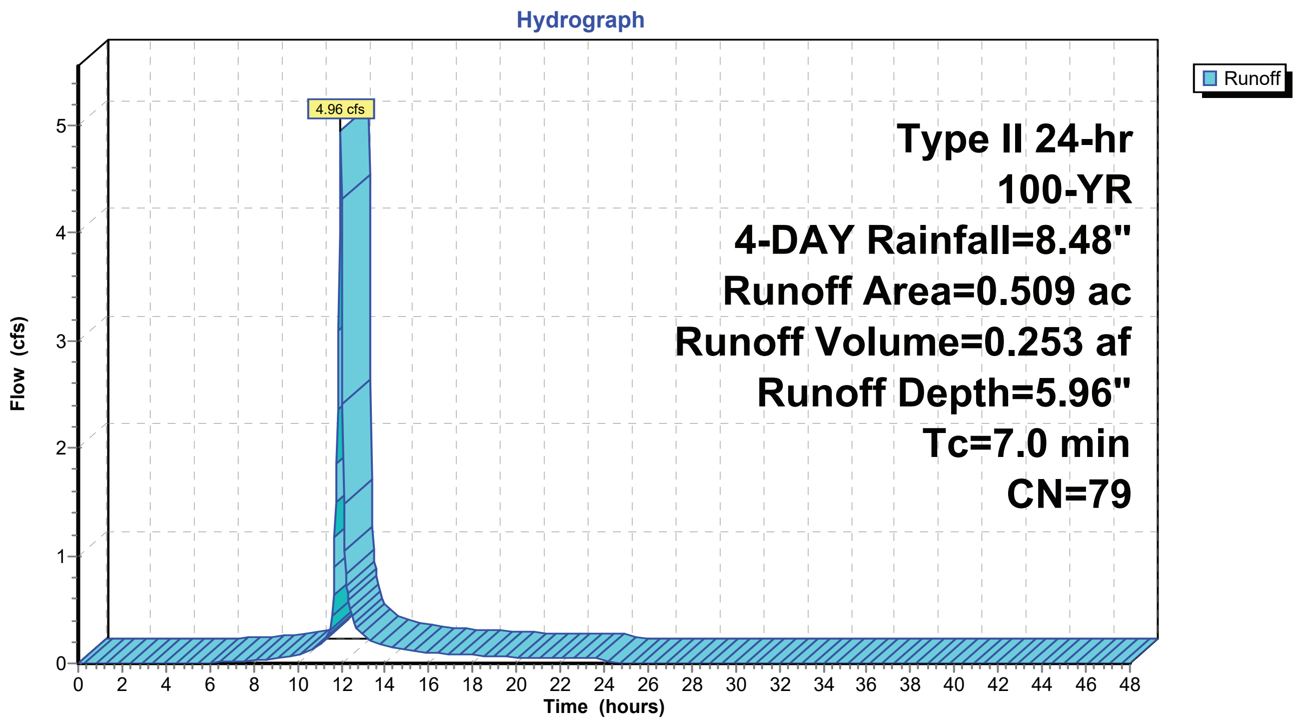
Runoff = 4.96 cfs @ 11.98 hrs, Volume= 0.253 af, Depth= 5.96"
Routed to Reach LAKE_EX : TO ALIMAGNET LAKE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-YR, 4-DAY Rainfall=8.48"

Area (ac)	CN	Description
0.509	79	50-75% Grass cover, Fair, HSG C
0.509		100.00% Pervious Area

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

Subcatchment EX-DA-1: NW TO ALIMAGNET LAKE



Summary for Subcatchment EX-DA-2: EX OPEN AREA

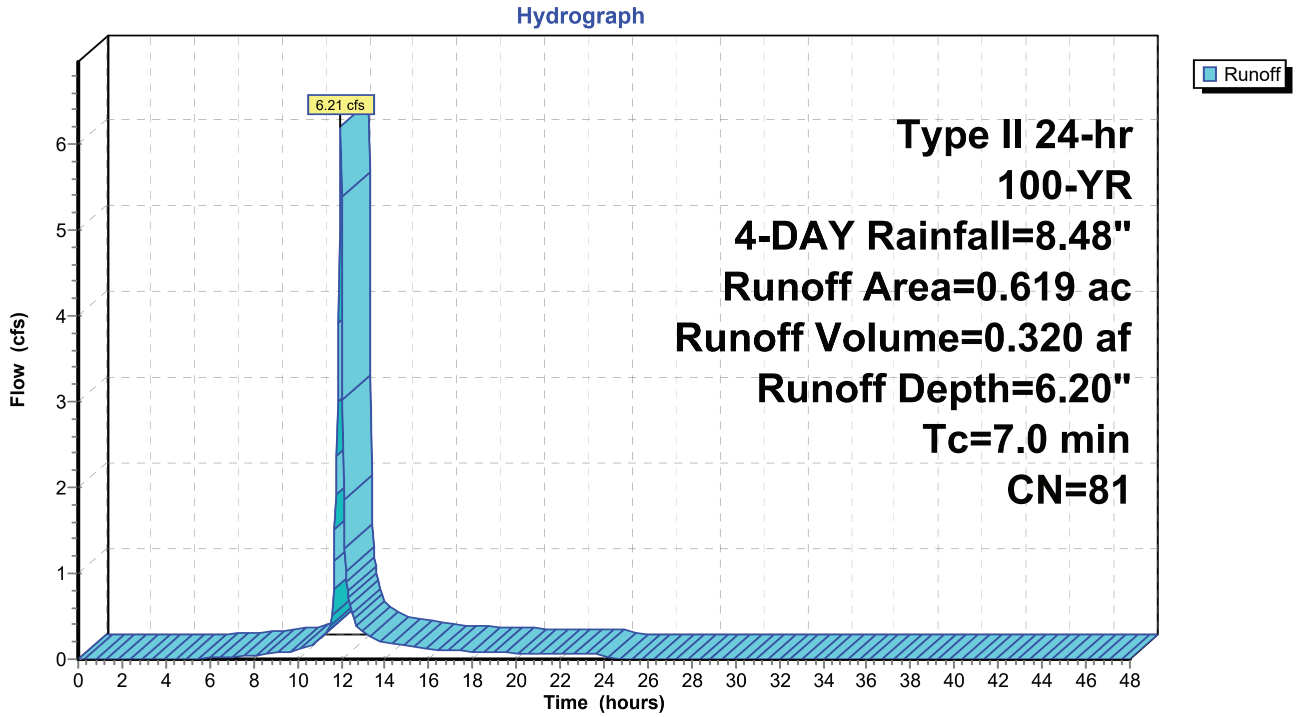
Runoff = 6.21 cfs @ 11.98 hrs, Volume= 0.320 af, Depth= 6.20"
Routed to Pond 2P : EXISTING LOW AREA

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-YR, 4-DAY Rainfall=8.48"

Area (ac)	CN	Description
0.050	98	Paved parking, HSG C
0.569	79	50-75% Grass cover, Fair, HSG C
0.619	81	Weighted Average
0.569		91.92% Pervious Area
0.050		8.08% Impervious Area

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

Subcatchment EX-DA-2: EX OPEN AREA



Summary for Subcatchment EX-DA-3: EX PARKING TO MEDIAN

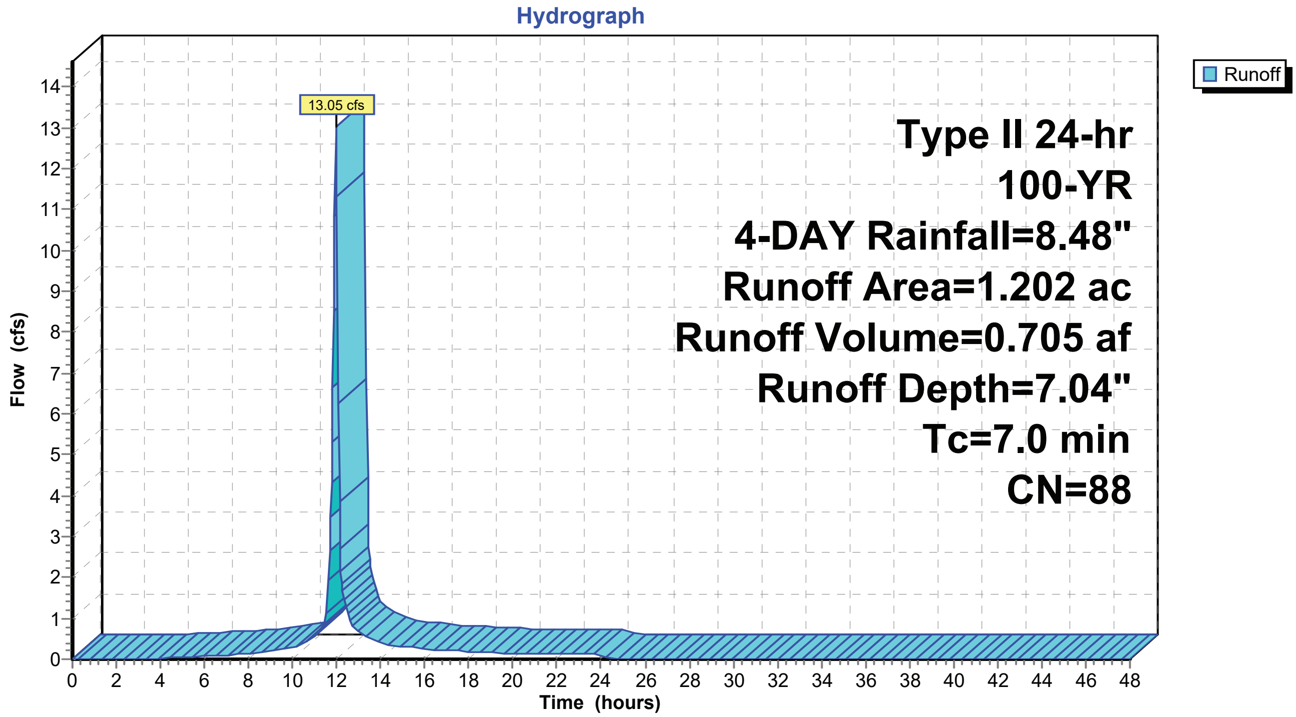
Runoff = 13.05 cfs @ 11.98 hrs, Volume= 0.705 af, Depth= 7.04"
Routed to Pond 6P : MEDIAN STORAGE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-YR, 4-DAY Rainfall=8.48"

Area (ac)	CN	Description
0.589	98	Paved parking, HSG C
0.613	79	50-75% Grass cover, Fair, HSG C
1.202	88	Weighted Average
0.613		51.00% Pervious Area
0.589		49.00% Impervious Area

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

Subcatchment EX-DA-3: EX PARKING TO MEDIAN



Summary for Subcatchment EX-DA-4: TO ALIMAGNET PKWY

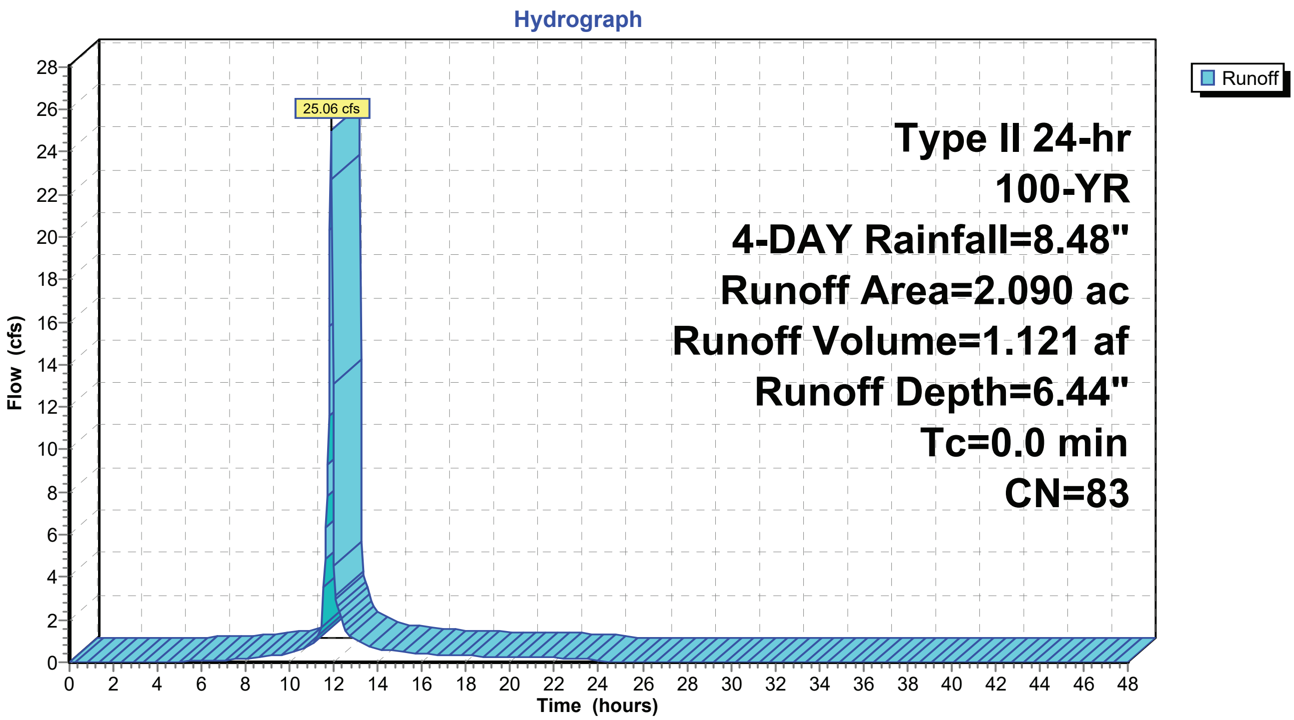
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 25.06 cfs @ 11.89 hrs, Volume= 1.121 af, Depth= 6.44"
Routed to Reach PKWY_EX : ALIMAGNET PKWY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-YR, 4-DAY Rainfall=8.48"

Area (ac)	CN	Description
0.773	98	Paved parking, HSG C
1.317	74	>75% Grass cover, Good, HSG C
2.090	83	Weighted Average
1.317		63.01% Pervious Area
0.773		36.99% Impervious Area

Subcatchment EX-DA-4: TO ALIMAGNET PKWY



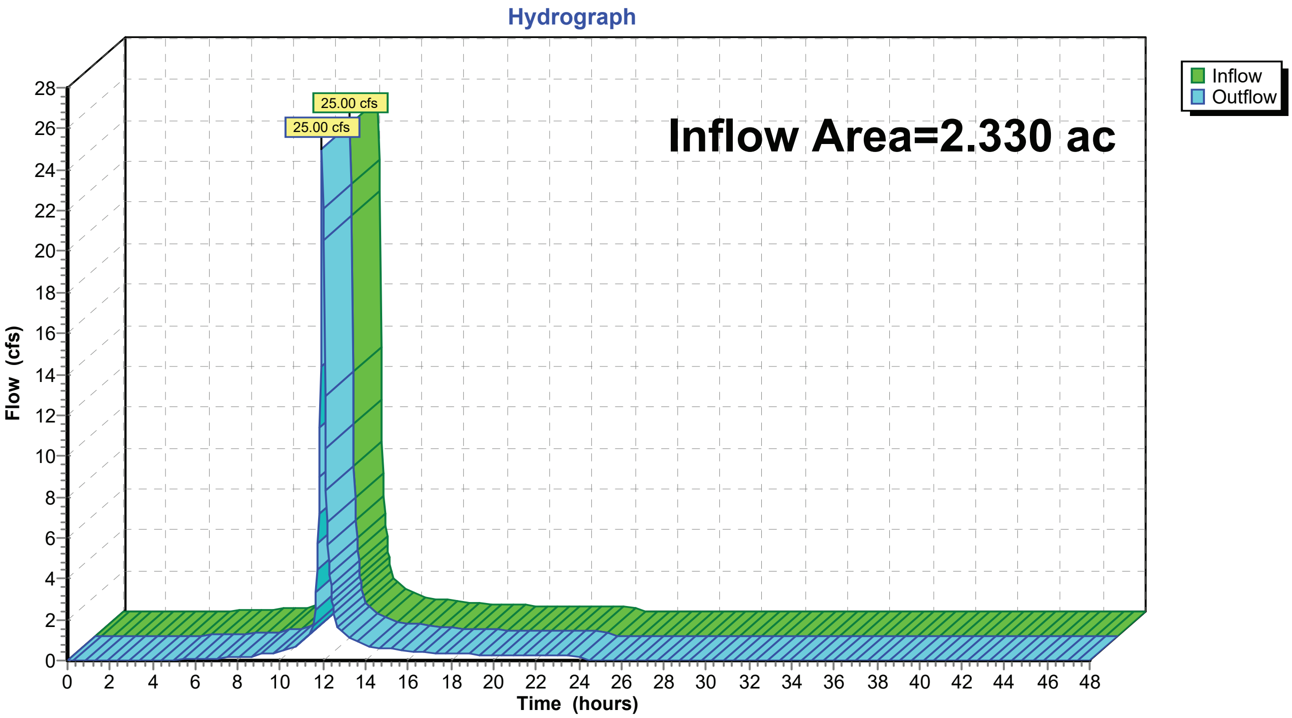
Summary for Reach LAKE_EX: TO ALIMAGNET LAKE

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

Inflow Area = 2.330 ac, 27.42% Impervious, Inflow Depth = 6.53" for 100-YR, 4-DAY event
Inflow = 25.00 cfs @ 11.97 hrs, Volume= 1.268 af
Outflow = 25.00 cfs @ 11.97 hrs, Volume= 1.268 af, Atten= 0%, Lag= 0.0 min
Routed to Reach OUT_EX : OUT_EX

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Reach LAKE_EX: TO ALIMAGNET LAKE

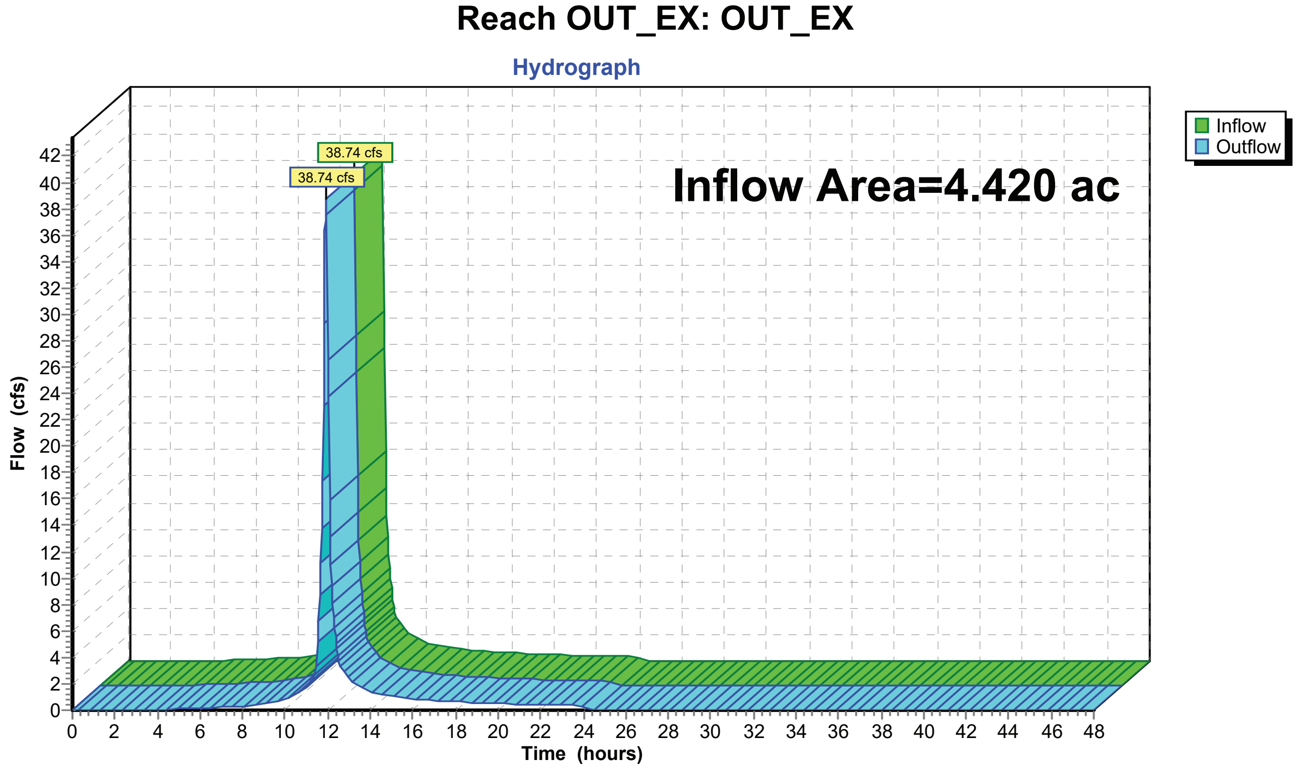


Summary for Reach OUT_EX: OUT_EX

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

Inflow Area =	4.420 ac,	31.95% Impervious,	Inflow Depth = 6.49"	for 100-YR, 4-DAY event
Inflow =	38.74 cfs @	11.94 hrs, Volume=	2.389 af	
Outflow =	38.74 cfs @	11.94 hrs, Volume=	2.389 af, Atten= 0%, Lag= 0.0 min	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs



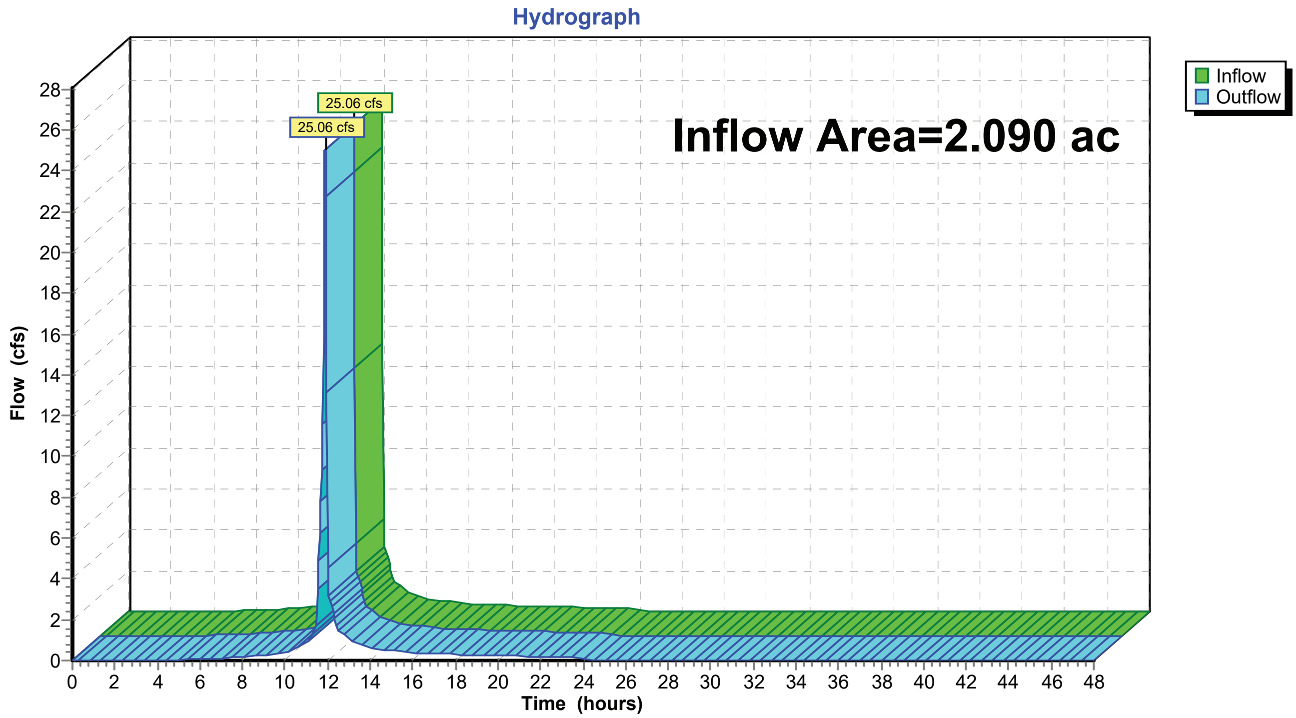
Summary for Reach PKWY_EX: ALIMAGNET PKWY

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

Inflow Area = 2.090 ac, 36.99% Impervious, Inflow Depth = 6.44" for 100-YR, 4-DAY event
Inflow = 25.06 cfs @ 11.89 hrs, Volume= 1.121 af
Outflow = 25.06 cfs @ 11.89 hrs, Volume= 1.121 af, Atten= 0%, Lag= 0.0 min
Routed to Reach OUT_EX : OUT_EX

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Reach PKWY_EX: ALIMAGNET PKWY



Summary for Pond 2P: EXISTING LOW AREA

Inflow Area = 0.619 ac, 8.08% Impervious, Inflow Depth = 6.20" for 100-YR, 4-DAY event
Inflow = 6.21 cfs @ 11.98 hrs, Volume= 0.320 af
Outflow = 5.94 cfs @ 12.00 hrs, Volume= 0.311 af, Atten= 4%, Lag= 1.4 min
Primary = 5.94 cfs @ 12.00 hrs, Volume= 0.311 af
Routed to Reach LAKE_EX : TO ALIMAGNET LAKE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,011.07' @ 12.00 hrs Surf.Area= 3,389 sf Storage= 1,106 cf

Plug-Flow detention time= 31.1 min calculated for 0.311 af (97% of inflow)
Center-of-Mass det. time= 13.6 min (809.8 - 796.2)

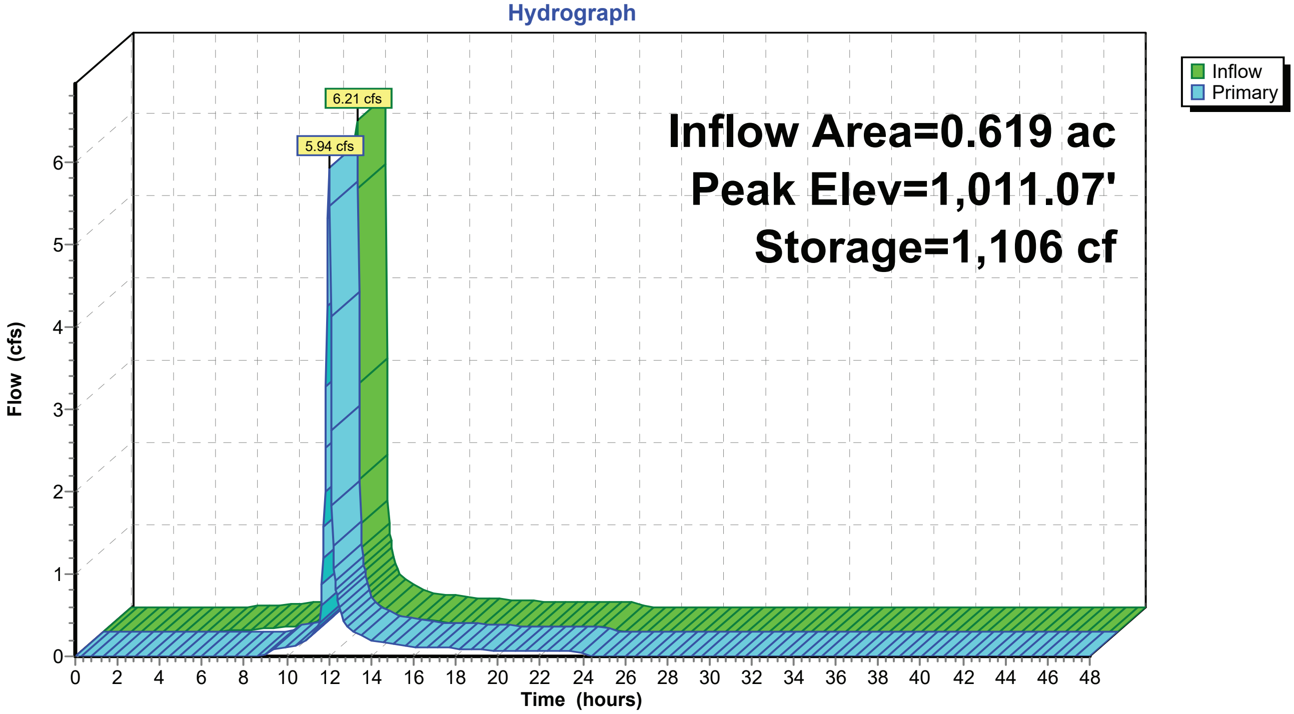
Volume	Invert	Avail.Storage	Storage Description
#1	1,010.40'	1,597 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,010.40	33	0	0
1,010.80	1,925	392	392
1,011.20	4,104	1,206	1,597

Device	Routing	Invert	Outlet Devices
#1	Primary	1,010.80'	**15.0' long + 4.0 '/' SideZ x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=5.90 cfs @ 12.00 hrs HW=1,011.07' TW=0.00' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Weir Controls 5.90 cfs @ 1.37 fps)

Pond 2P: EXISTING LOW AREA



Summary for Pond 6P: MEDIAN STORAGE

[93] Warning: Storage range exceeded by 2.68'
[58] Hint: Peaked 2.68' above defined flood level
[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 1.202 ac, 49.00% Impervious, Inflow Depth = 7.04" for 100-YR, 4-DAY event
Inflow = 13.05 cfs @ 11.98 hrs, Volume= 0.705 af
Outflow = 14.56 cfs @ 11.97 hrs, Volume= 0.705 af, Atten= 0%, Lag= 0.0 min
Primary = 14.56 cfs @ 11.97 hrs, Volume= 0.705 af
Routed to Reach LAKE_EX : TO ALIMAGNET LAKE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,010.68' @ 11.97 hrs Surf.Area= 3,602 sf Storage= 2,783 cf
Flood Elev= 1,008.00' Surf.Area= 3,602 sf Storage= 2,783 cf

Plug-Flow detention time= 6.5 min calculated for 0.705 af (100% of inflow)
Center-of-Mass det. time= 5.9 min (783.7 - 777.8)

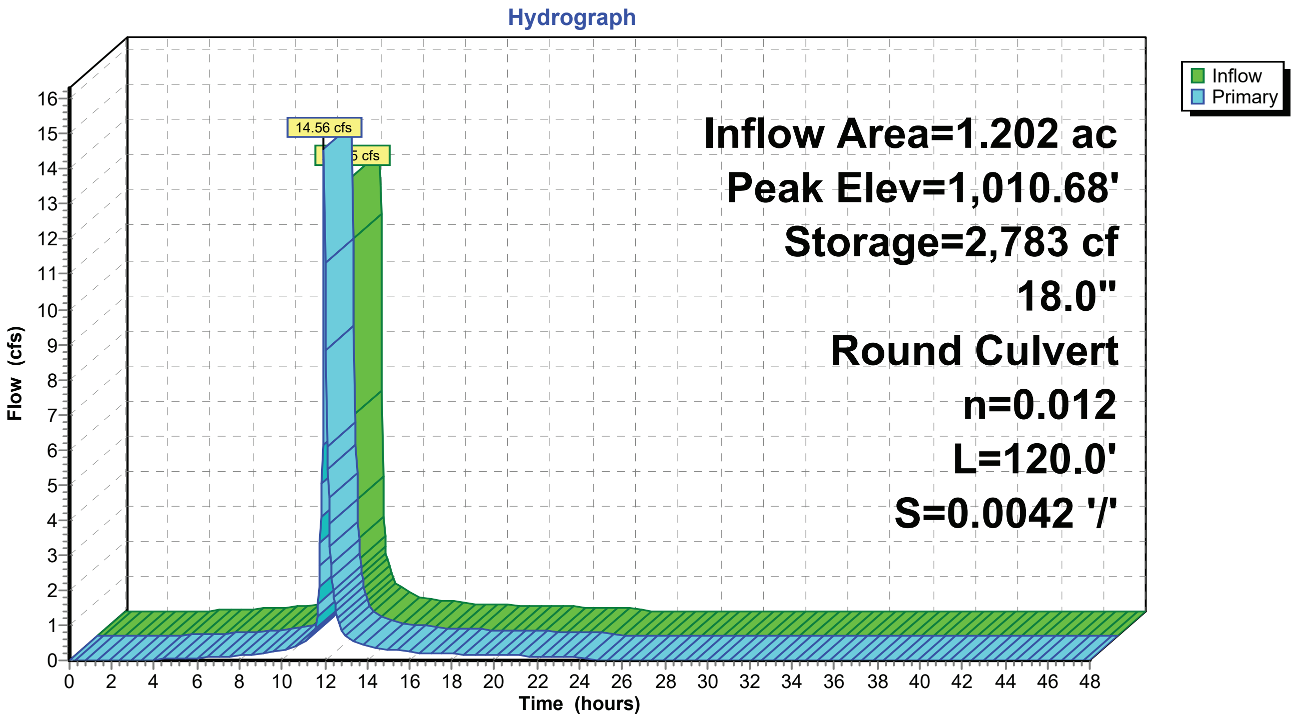
Volume	Invert	Avail.Storage	Storage Description
#1	1,006.50'	2,783 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,006.50	61	0	0
1,007.00	1,289	338	338
1,008.00	3,602	2,446	2,783

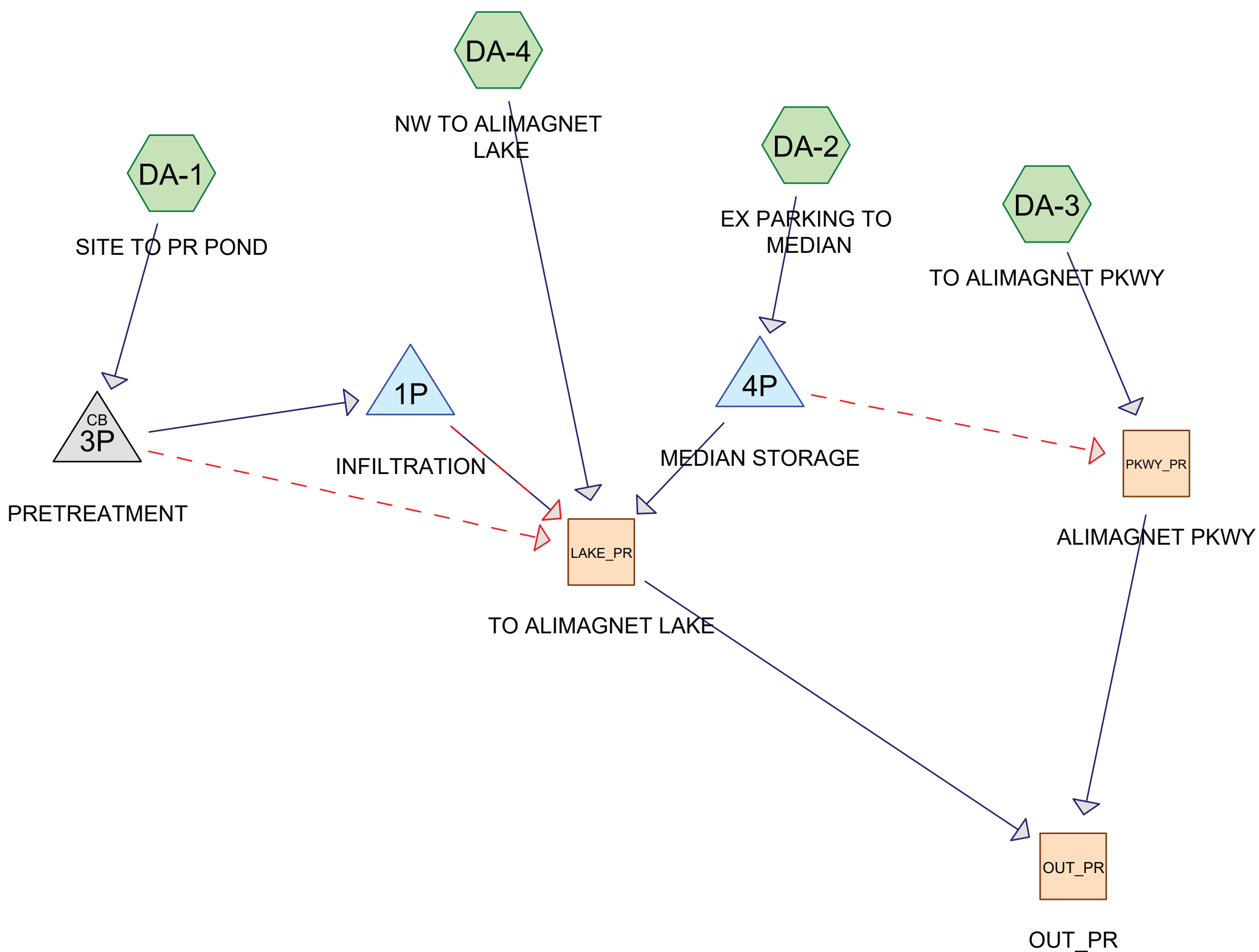
Device	Routing	Invert	Outlet Devices
#1	Primary	1,006.50'	**18.0" Round RCP_Round 18"** L= 120.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 1,006.50' / 1,006.00' S= 0.0042 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

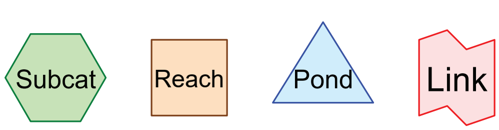
Primary OutFlow Max=13.63 cfs @ 11.97 hrs HW=1,010.34' TW=0.00' (Dynamic Tailwater)
↑**1=RCP_Round 18"** (Barrel Controls 13.63 cfs @ 7.72 fps)

Pond 6P: MEDIAN STORAGE



Appendix 2. Post-Development HydroCAD Model Analysis





Routing Diagram for Alimagnet_PR_SC1
Prepared by Kimley-Horn & Associates, Printed 1/31/2025
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	1-YR, 24-HR	MSE 24-hr	3	Default	24.00	1	2.47	2
2	2-YR, 24-HR	MSE 24-hr	3	Default	24.00	1	2.81	2
3	10-YR, 24-HR	Type II 24-hr		Default	24.00	1	4.18	2
4	100-YR, 24-HR	Type II 24-hr		Default	24.00	1	7.43	2
5	100-YR, 4-DAY	Type II 24-hr		Default	24.00	1	8.48	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.342	74	>75% Grass cover, Good, HSG C (DA-1, DA-2, DA-3, DA-4)
1.928	98	Paved parking, HSG C (DA-1, DA-2, DA-3)
0.150	83	Permeable Pavement, 20% Void, 10in sand (DA-1)
4.420	**85**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
4.270	HSG C	DA-1, DA-2, DA-3, DA-4
0.000	HSG D	
0.150	Other	DA-1
4.420		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Sub Nu
0.000	0.000	2.342	0.000	0.000	2.342	>75% Grass cover, Good	
0.000	0.000	1.928	0.000	0.000	1.928	Paved parking	
0.000	0.000	0.000	0.000	0.150	0.150	Permeable Pavement, 20% Void, 10in sand	
0.000	**0.000**	**4.270**	**0.000**	**0.150**	**4.420**	**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	1P	1,009.20	1,006.00	100.0	0.0320	0.013	0.0	15.0	0.0	
2	3P	1,008.00	1,006.00	30.0	0.0667	0.012	0.0	18.0	0.0	
3	4P	1,006.50	1,006.00	120.0	0.0042	0.012	0.0	18.0	0.0	

Time span=0.00-48.00 hrs, dt=0.04 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentDA-1: SITE TO PR POND Runoff Area=1.111 ac 45.09% Impervious Runoff Depth=1.22"
Tc=7.0 min CN=86 Runoff=2.36 cfs 0.113 af

SubcatchmentDA-2: EX PARKING TO Runoff Area=1.349 ac 47.96% Impervious Runoff Depth=1.22"
Tc=7.0 min CN=86 Runoff=2.87 cfs 0.137 af

SubcatchmentDA-3: TO ALIMAGNETPKWY Runoff Area=1.635 ac 47.71% Impervious Runoff Depth=1.15"
Tc=7.0 min CN=85 Runoff=3.29 cfs 0.157 af

SubcatchmentDA-4: NW TO ALIMAGNET Runoff Area=0.325 ac 0.00% Impervious Runoff Depth=0.59"
Tc=0.0 min CN=74 Runoff=0.45 cfs 0.016 af

Reach LAKE_PR: TO ALIMAGNETLAKE Inflow=2.29 cfs 0.153 af
Outflow=2.29 cfs 0.153 af

Reach OUT_PR: OUT_PR Inflow=5.38 cfs 0.310 af
Outflow=5.38 cfs 0.310 af

Reach PKWY_PR: ALIMAGNETPKWY Inflow=3.29 cfs 0.157 af
Outflow=3.29 cfs 0.157 af

Pond 1P: INFILTRATION Peak Elev=1,007.72' Storage=3,455 cf Inflow=2.36 cfs 0.113 af
Discarded=0.05 cfs 0.113 af Primary=0.00 cfs 0.000 af Outflow=0.05 cfs 0.113 af

Pond 3P: PRETREATMENT Peak Elev=1,008.63' Inflow=2.36 cfs 0.113 af
18.0" Round Culvert n=0.012 L=30.0' S=0.0667 '/' Outflow=2.36 cfs 0.113 af

Pond 4P: MEDIAN STORAGE Peak Elev=1,007.26' Storage=751 cf Inflow=2.87 cfs 0.137 af
18.0" Round Culvert n=0.012 L=120.0' S=0.0042 '/' Outflow=2.16 cfs 0.137 af

Total Runoff Area = 4.420 ac Runoff Volume = 0.423 af Average Runoff Depth = 1.15"
56.38% Pervious = 2.492 ac 43.62% Impervious = 1.928 ac

Summary for Subcatchment DA-1: SITE TO PR POND

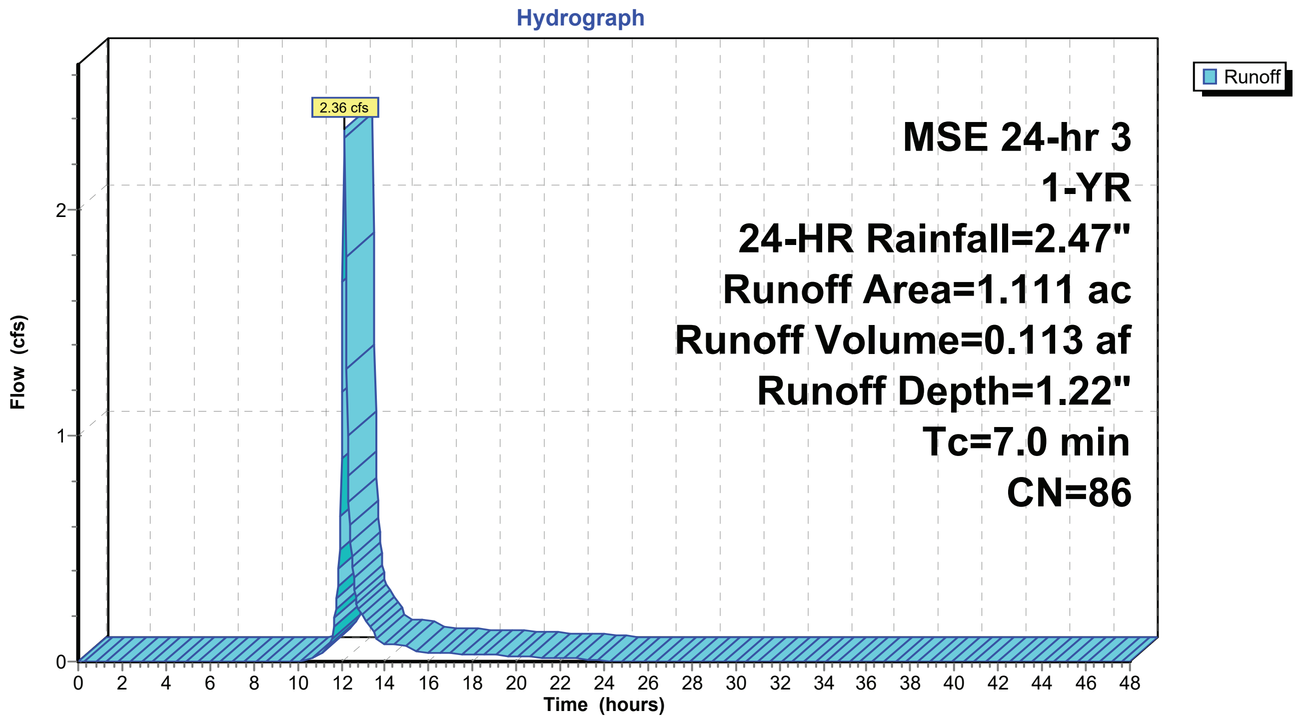
Runoff = 2.36 cfs @ 12.15 hrs, Volume= 0.113 af, Depth= 1.22"
Routed to Pond 3P : PRETREATMENT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
MSE 24-hr 3 1-YR, 24-HR Rainfall=2.47"

	Area (ac)	CN	Description
	0.501	98	Paved parking, HSG C
*	0.150	83	Permeable Pavement, 20% Void, 10in sand
	0.460	74	>75% Grass cover, Good, HSG C
	1.111	86	Weighted Average
	0.610		54.91% Pervious Area
	0.501		45.09% Impervious Area

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

Subcatchment DA-1: SITE TO PR POND



Summary for Subcatchment DA-2: EX PARKING TO MEDIAN

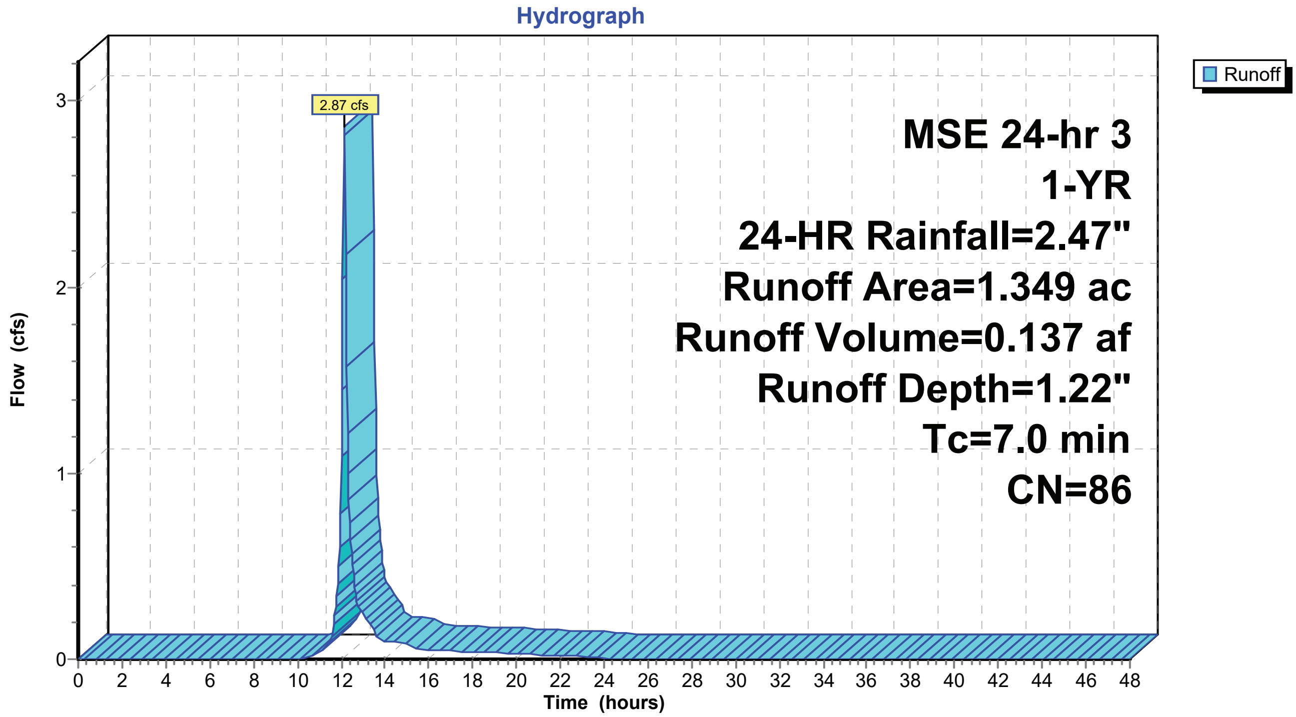
Runoff = 2.87 cfs @ 12.15 hrs, Volume= 0.137 af, Depth= 1.22"
Routed to Pond 4P : MEDIAN STORAGE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
MSE 24-hr 3 1-YR, 24-HR Rainfall=2.47"

Area (ac)	CN	Description
0.647	98	Paved parking, HSG C
0.702	74	>75% Grass cover, Good, HSG C
1.349	86	Weighted Average
0.702		52.04% Pervious Area
0.647		47.96% Impervious Area

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

Subcatchment DA-2: EX PARKING TO MEDIAN



Summary for Subcatchment DA-3: TO ALIMAGNET PKWY

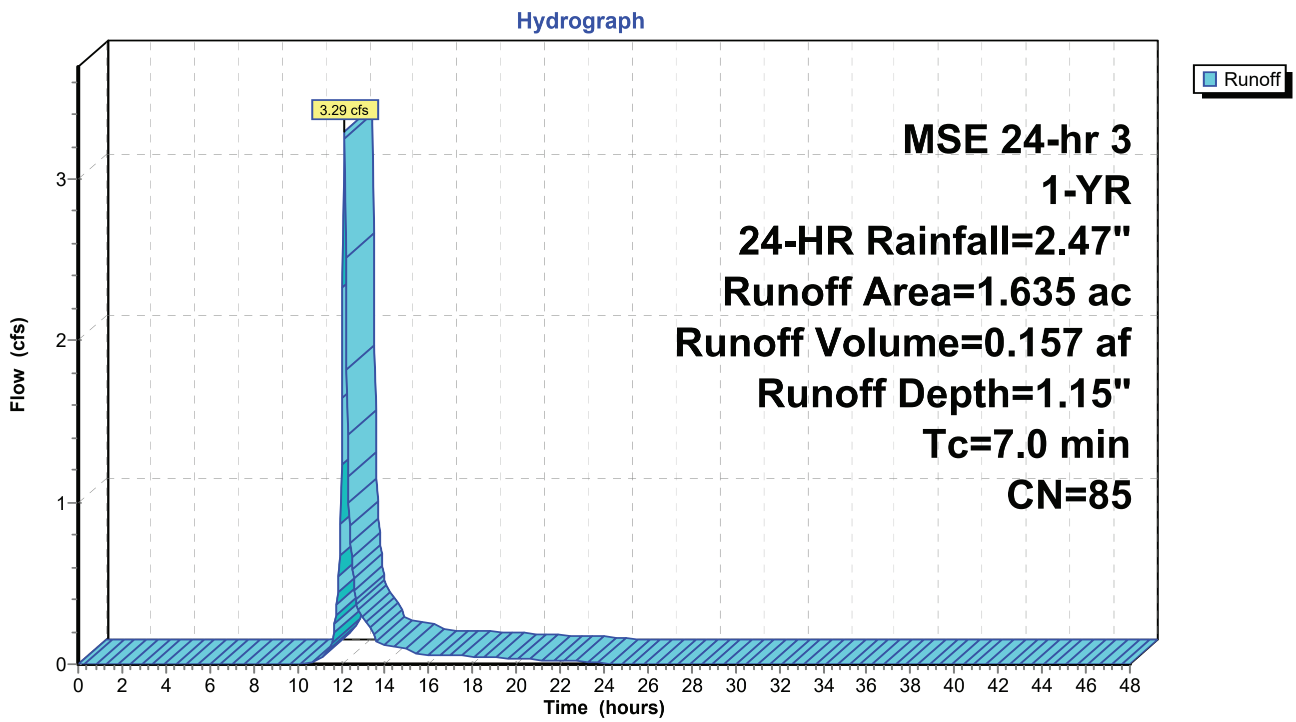
Runoff = 3.29 cfs @ 12.15 hrs, Volume= 0.157 af, Depth= 1.15"
Routed to Reach PKWY_PR : ALIMAGNET PKWY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
MSE 24-hr 3 1-YR, 24-HR Rainfall=2.47"

Area (ac)	CN	Description
0.780	98	Paved parking, HSG C
0.855	74	>75% Grass cover, Good, HSG C
1.635	85	Weighted Average
0.855		52.29% Pervious Area
0.780		47.71% Impervious Area

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

Subcatchment DA-3: TO ALIMAGNET PKWY



Summary for Subcatchment DA-4: NW TO ALIMAGNET LAKE

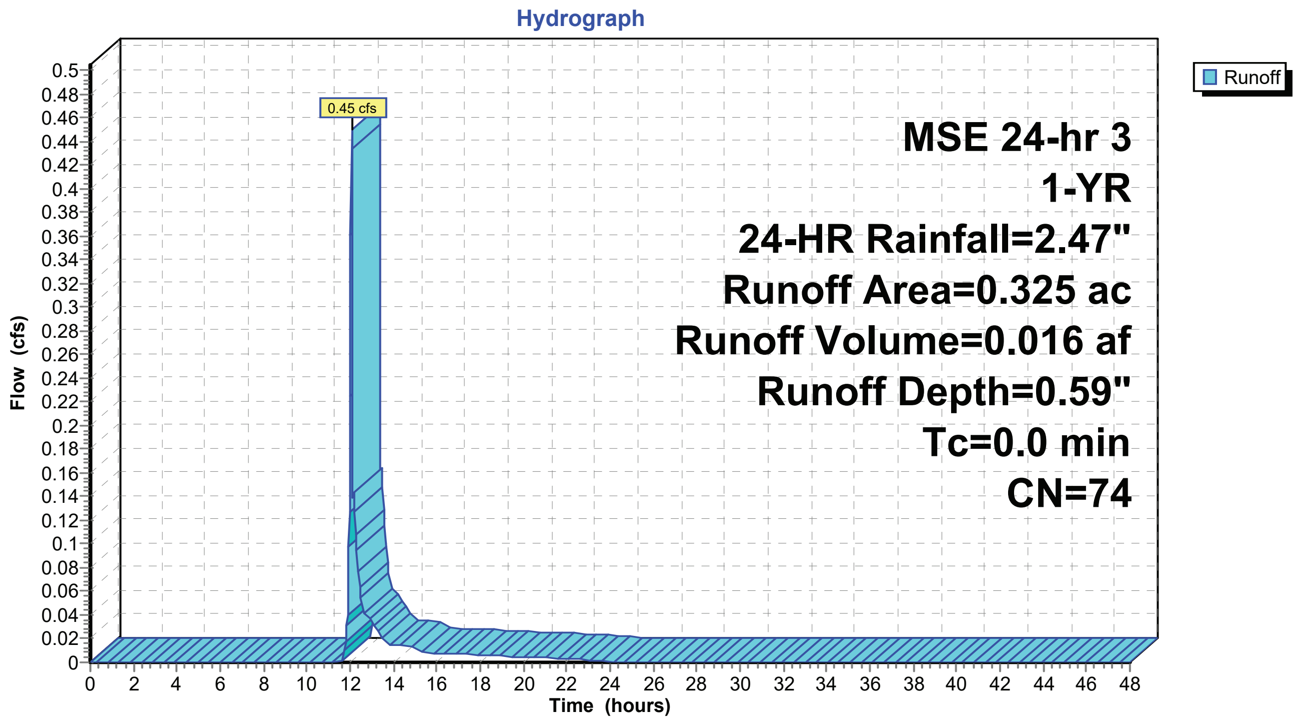
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.45 cfs @ 12.07 hrs, Volume= 0.016 af, Depth= 0.59"
Routed to Reach LAKE_PR : TO ALIMAGNET LAKE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
MSE 24-hr 3 1-YR, 24-HR Rainfall=2.47"

Area (ac)	CN	Description
0.325	74	>75% Grass cover, Good, HSG C
0.325		100.00% Pervious Area

Subcatchment DA-4: NW TO ALIMAGNET LAKE

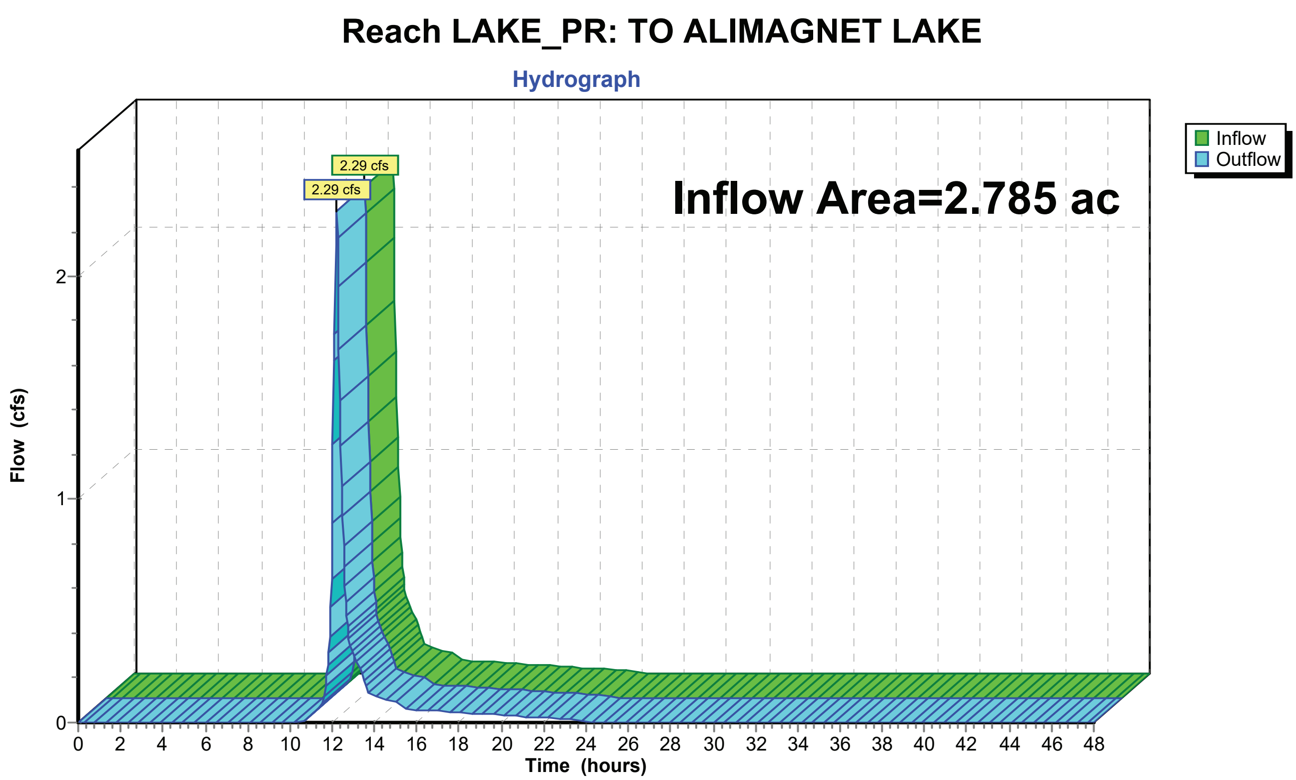


Summary for Reach LAKE_PR: TO ALIMAGNET LAKE

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

Inflow Area = 2.785 ac, 41.22% Impervious, Inflow Depth = 0.66" for 1-YR, 24-HR event
Inflow = 2.29 cfs @ 12.20 hrs, Volume= 0.153 af
Outflow = 2.29 cfs @ 12.20 hrs, Volume= 0.153 af, Atten= 0%, Lag= 0.0 min
Routed to Reach OUT_PR : OUT_PR

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs



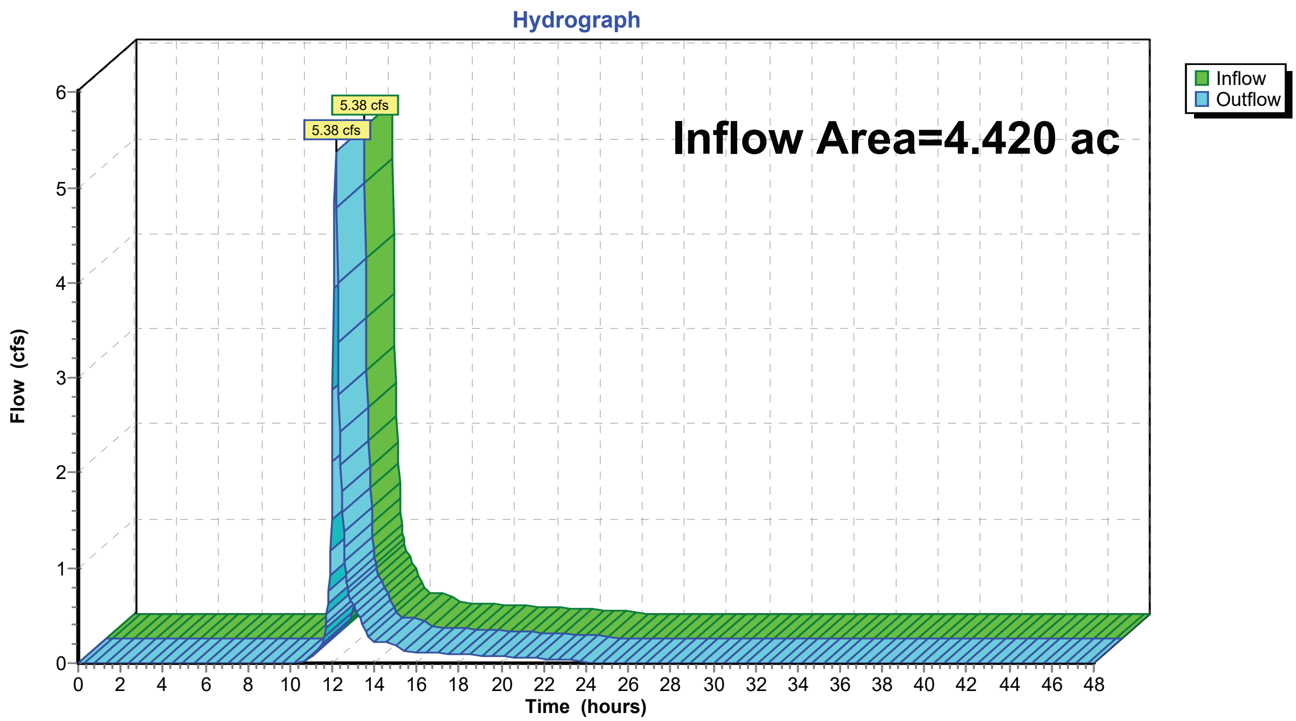
Summary for Reach OUT_PR: OUT_PR

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

Inflow Area = 4.420 ac, 43.62% Impervious, Inflow Depth = 0.84" for 1-YR, 24-HR event
Inflow = 5.38 cfs @ 12.16 hrs, Volume= 0.310 af
Outflow = 5.38 cfs @ 12.16 hrs, Volume= 0.310 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Reach OUT_PR: OUT_PR



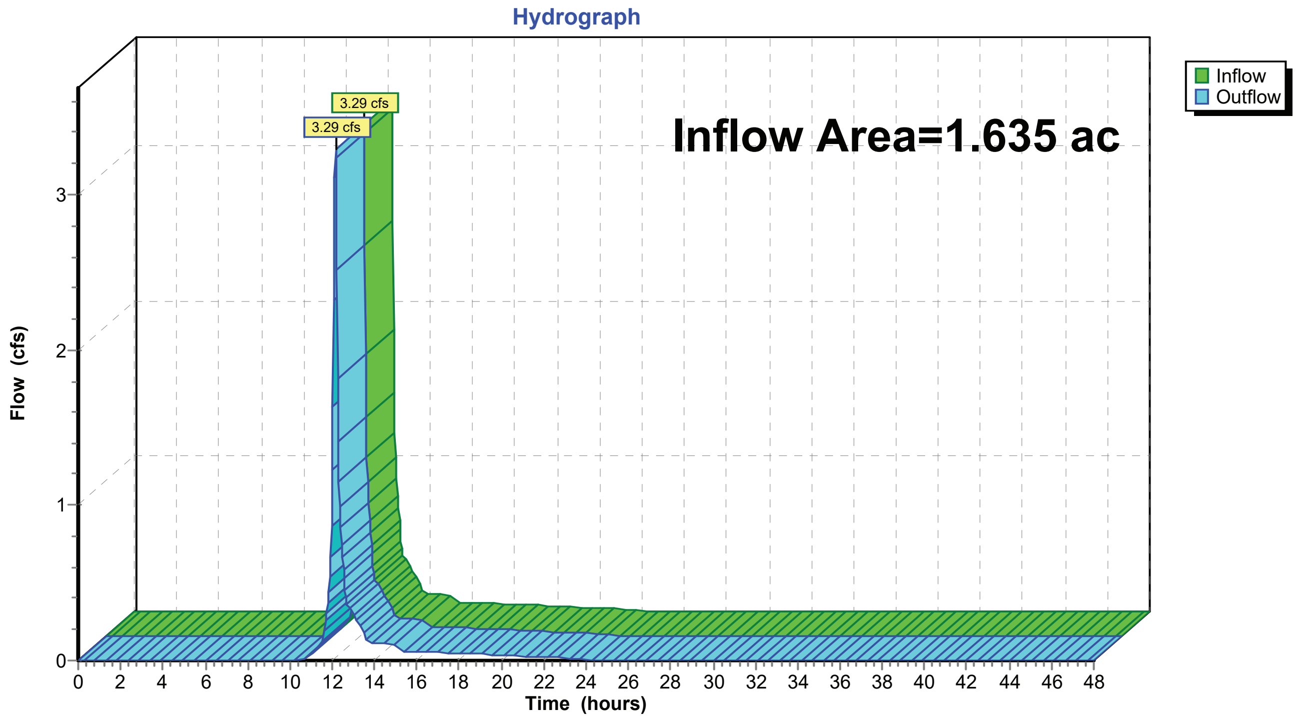
Summary for Reach PKWY_PR: ALIMAGNET PKWY

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

Inflow Area = 1.635 ac, 47.71% Impervious, Inflow Depth = 1.15" for 1-YR, 24-HR event
Inflow = 3.29 cfs @ 12.15 hrs, Volume= 0.157 af
Outflow = 3.29 cfs @ 12.15 hrs, Volume= 0.157 af, Atten= 0%, Lag= 0.0 min
Routed to Reach OUT_PR : OUT_PR

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Reach PKWY_PR: ALIMAGNET PKWY



Summary for Pond 1P: INFILTRATION

Inflow Area = 1.111 ac, 45.09% Impervious, Inflow Depth = 1.22" for 1-YR, 24-HR event
Inflow = 2.36 cfs @ 12.15 hrs, Volume= 0.113 af
Outflow = 0.05 cfs @ 15.18 hrs, Volume= 0.113 af, Atten= 98%, Lag= 182.0 min
Discarded = 0.05 cfs @ 15.18 hrs, Volume= 0.113 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach LAKE_PR : TO ALIMAGNET LAKE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,007.72' @ 15.18 hrs Surf.Area= 2,521 sf Storage= 3,455 cf
Flood Elev= 1,011.00' Surf.Area= 5,000 sf Storage= 15,400 cf

Plug-Flow detention time= 812.9 min calculated for 0.113 af (100% of inflow)
Center-of-Mass det. time= 813.3 min (1,622.6 - 809.2)

Volume	Invert	Avail.Storage	Storage Description
#1	1,006.00'	15,400 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

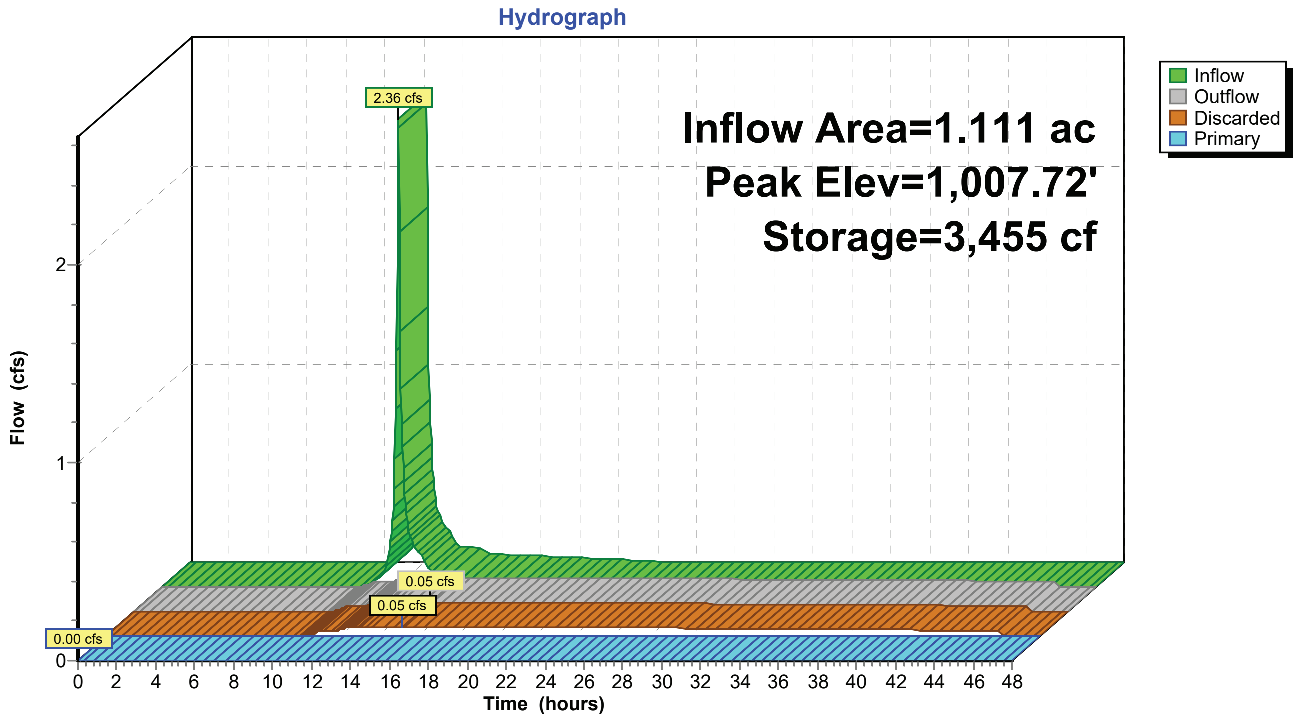
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,006.00	1,500	0	0
1,009.20	3,400	7,840	7,840
1,011.00	5,000	7,560	15,400

Device	Routing	Invert	Outlet Devices
#1	Discarded	1,006.00'	**0.800 in/hr Exfiltration over Surface area**
#2	Primary	1,009.20'	**15.0" Round RCP_Round 15"** L= 100.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,009.20' / 1,006.00' S= 0.0320 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf

Discarded OutFlow Max=0.05 cfs @ 15.18 hrs HW=1,007.72' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,006.00' TW=0.00' (Dynamic Tailwater)
2=RCP_Round 15" (Controls 0.00 cfs)

Pond 1P: INFILTRATION



Summary for Pond 3P: PRETREATMENT

[57] Hint: Peaked at 1,008.63' (Flood elevation advised)

Inflow Area =	1.111 ac,	45.09% Impervious,	Inflow Depth = 1.22"	for 1-YR, 24-HR event
Inflow =	2.36 cfs @	12.15 hrs, Volume=	0.113 af	
Outflow =	2.36 cfs @	12.15 hrs, Volume=	0.113 af, Atten= 0%, Lag= 0.0 min	
Primary =	2.36 cfs @	12.15 hrs, Volume=	0.113 af	

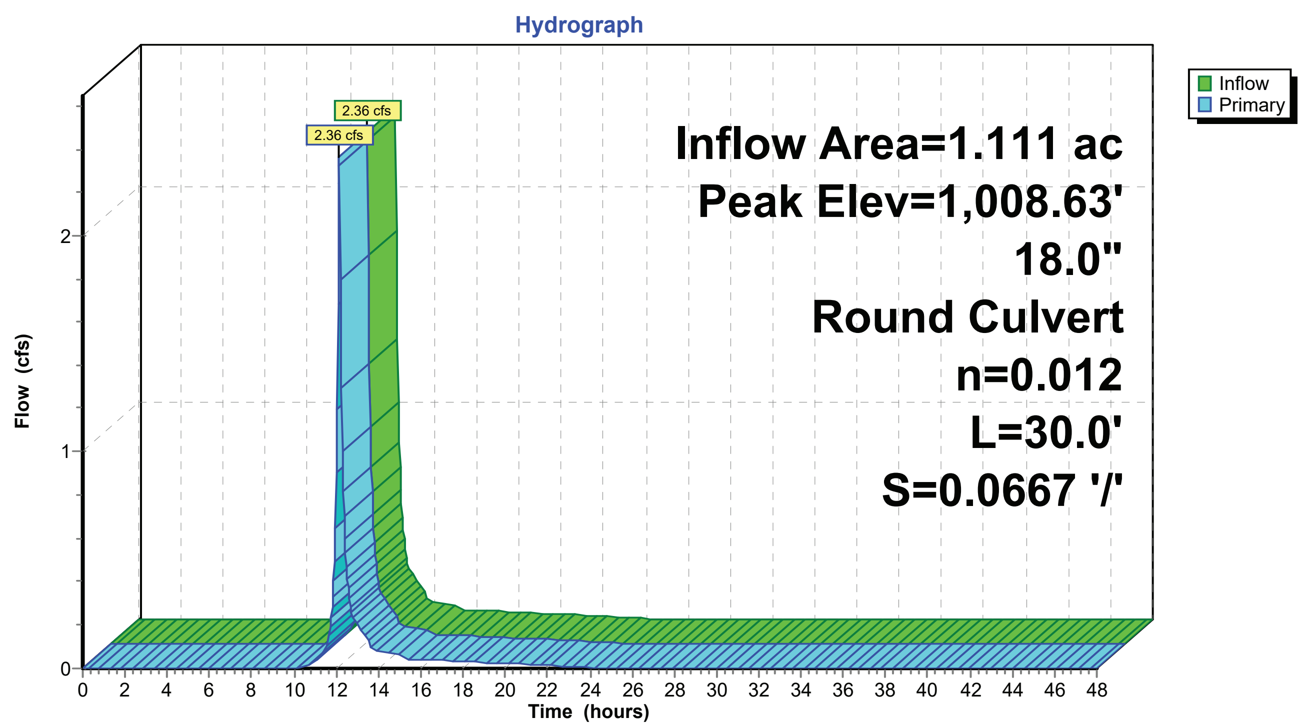
Routed to Pond 1P : INFILTRATION

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,008.63' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,008.00'	**18.0" Round RCP_Round 18"** L= 30.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 1,008.00' / 1,006.00' S= 0.0667 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=2.29 cfs @ 12.15 hrs HW=1,008.62' TW=1,006.78' (Dynamic Tailwater)
└1=RCP_Round 18" (Inlet Controls 2.29 cfs @ 3.34 fps)

Pond 3P: PRETREATMENT



Summary for Pond 4P: MEDIAN STORAGE

Inflow Area = 1.349 ac, 47.96% Impervious, Inflow Depth = 1.22" for 1-YR, 24-HR event
Inflow = 2.87 cfs @ 12.15 hrs, Volume= 0.137 af
Outflow = 2.16 cfs @ 12.21 hrs, Volume= 0.137 af, Atten= 25%, Lag= 3.6 min
Primary = 2.16 cfs @ 12.21 hrs, Volume= 0.137 af
Routed to Reach LAKE_PR : TO ALIMAGNET LAKE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,007.26' @ 12.21 hrs Surf.Area= 1,886 sf Storage= 751 cf
Flood Elev= 1,008.00' Surf.Area= 3,579 sf Storage= 2,772 cf

Plug-Flow detention time= 6.6 min calculated for 0.137 af (100% of inflow)
Center-of-Mass det. time= 6.6 min (815.8 - 809.2)

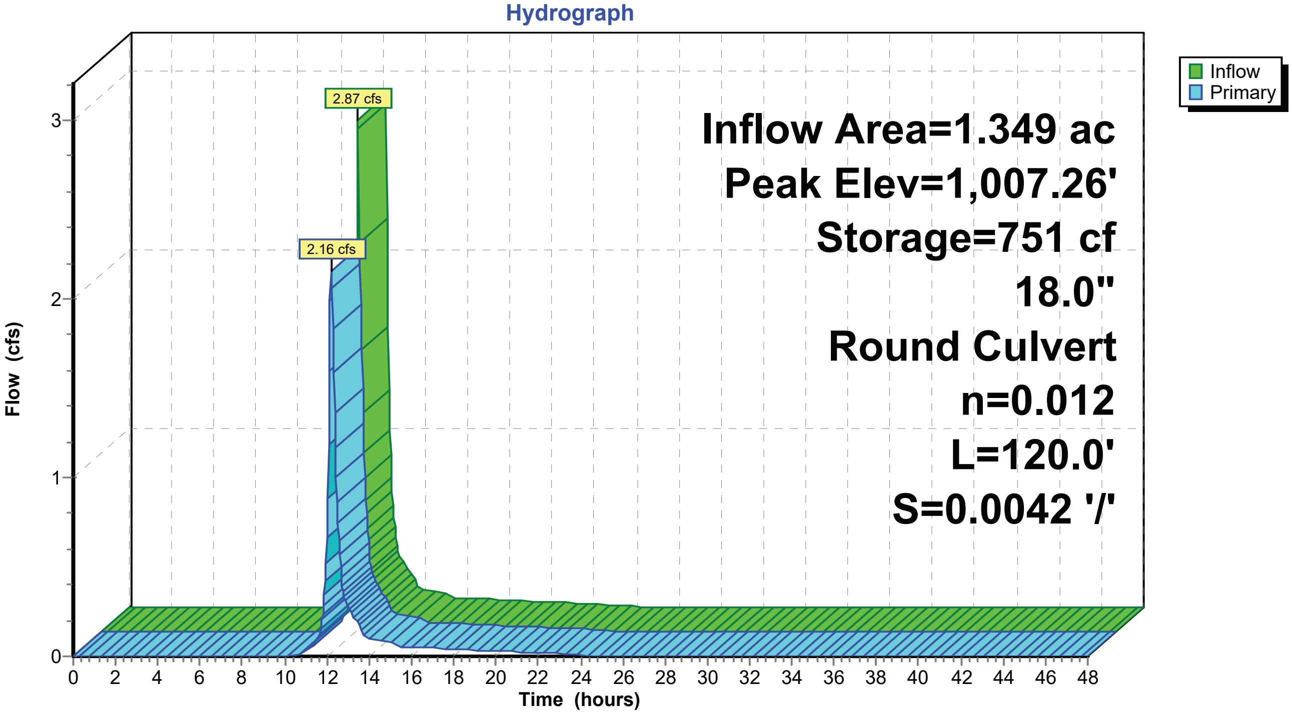
Volume	Invert	Avail.Storage	Storage Description
#1	1,006.50'	2,807 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,006.50	61	0	0
1,007.00	1,289	338	338
1,008.01	3,602	2,470	2,807

Device	Routing	Invert	Outlet Devices
#1	Primary	1,006.50'	**18.0" Round RCP_Round 18"** L= 120.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 1,006.50' / 1,006.00' S= 0.0042 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=2.15 cfs @ 12.21 hrs HW=1,007.26' TW=0.00' (Dynamic Tailwater)
└─**1=RCP_Round 18"** (Barrel Controls 2.15 cfs @ 3.50 fps)

Pond 4P: MEDIAN STORAGE



Time span=0.00-48.00 hrs, dt=0.04 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentDA-1: SITE TO PR POND Runoff Area=1.111 ac 45.09% Impervious Runoff Depth=1.50"
Tc=7.0 min CN=86 Runoff=2.90 cfs 0.139 af

SubcatchmentDA-2: EX PARKING TO Runoff Area=1.349 ac 47.96% Impervious Runoff Depth=1.50"
Tc=7.0 min CN=86 Runoff=3.52 cfs 0.169 af

SubcatchmentDA-3: TO ALIMAGNETPKWY Runoff Area=1.635 ac 47.71% Impervious Runoff Depth=1.43"
Tc=7.0 min CN=85 Runoff=4.07 cfs 0.195 af

SubcatchmentDA-4: NW TO ALIMAGNET Runoff Area=0.325 ac 0.00% Impervious Runoff Depth=0.79"
Tc=0.0 min CN=74 Runoff=0.61 cfs 0.021 af

Reach LAKE_PR: TO ALIMAGNETLAKE Inflow=2.81 cfs 0.190 af
Outflow=2.81 cfs 0.190 af

Reach OUT_PR: OUT_PR Inflow=6.64 cfs 0.385 af
Outflow=6.64 cfs 0.385 af

Reach PKWY_PR: ALIMAGNETPKWY Inflow=4.07 cfs 0.195 af
Outflow=4.07 cfs 0.195 af

Pond 1P: INFILTRATION Peak Elev=1,008.07' Storage=4,373 cf Inflow=2.90 cfs 0.139 af
Discarded=0.05 cfs 0.131 af Primary=0.00 cfs 0.000 af Outflow=0.05 cfs 0.131 af

Pond 3P: PRETREATMENT Peak Elev=1,008.70' Inflow=2.90 cfs 0.139 af
18.0" Round Culvert n=0.012 L=30.0' S=0.0667 '/' Outflow=2.90 cfs 0.139 af

Pond 4P: MEDIAN STORAGE Peak Elev=1,007.35' Storage=931 cf Inflow=3.52 cfs 0.169 af
18.0" Round Culvert n=0.012 L=120.0' S=0.0042 '/' Outflow=2.65 cfs 0.169 af

Total Runoff Area = 4.420 ac Runoff Volume = 0.524 af Average Runoff Depth = 1.42"
56.38% Pervious = 2.492 ac 43.62% Impervious = 1.928 ac

Summary for Subcatchment DA-1: SITE TO PR POND

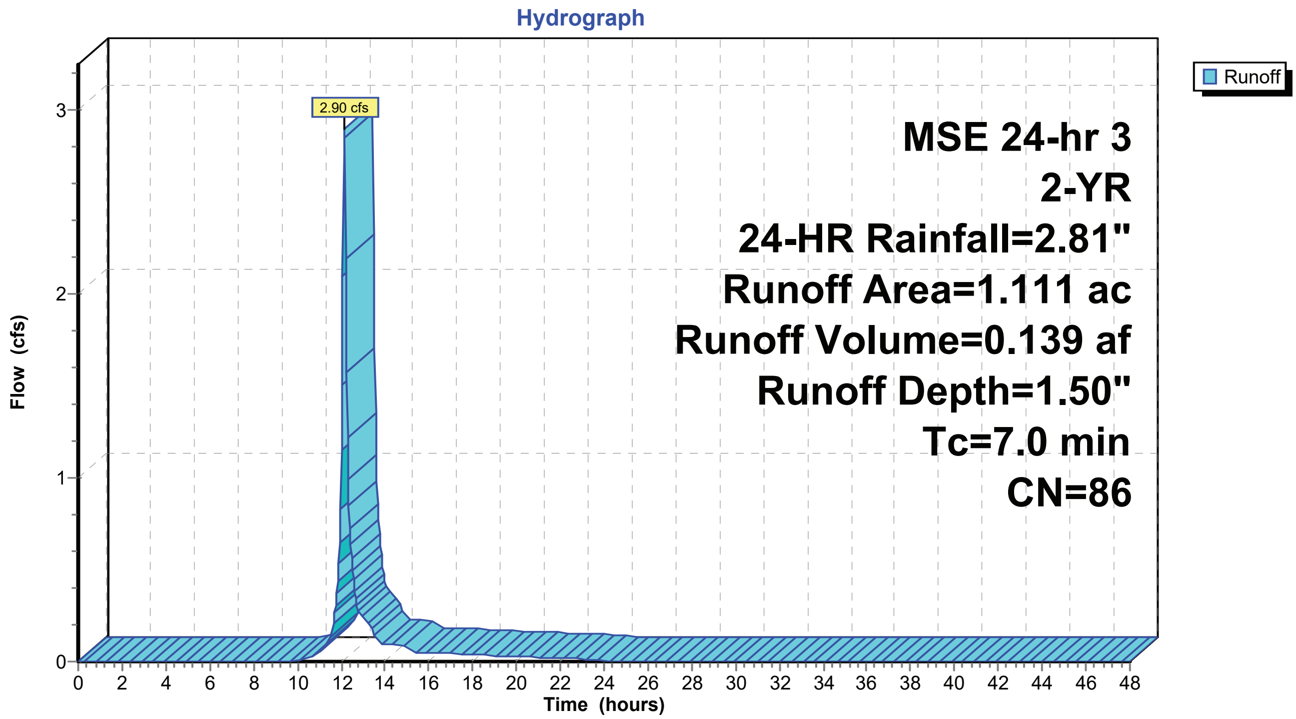
Runoff = 2.90 cfs @ 12.14 hrs, Volume= 0.139 af, Depth= 1.50"
Routed to Pond 3P : PRETREATMENT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
MSE 24-hr 3 2-YR, 24-HR Rainfall=2.81"

	Area (ac)	CN	Description
	0.501	98	Paved parking, HSG C
*	0.150	83	Permeable Pavement, 20% Void, 10in sand
	0.460	74	>75% Grass cover, Good, HSG C
	1.111	86	Weighted Average
	0.610		54.91% Pervious Area
	0.501		45.09% Impervious Area

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

Subcatchment DA-1: SITE TO PR POND



Summary for Subcatchment DA-2: EX PARKING TO MEDIAN

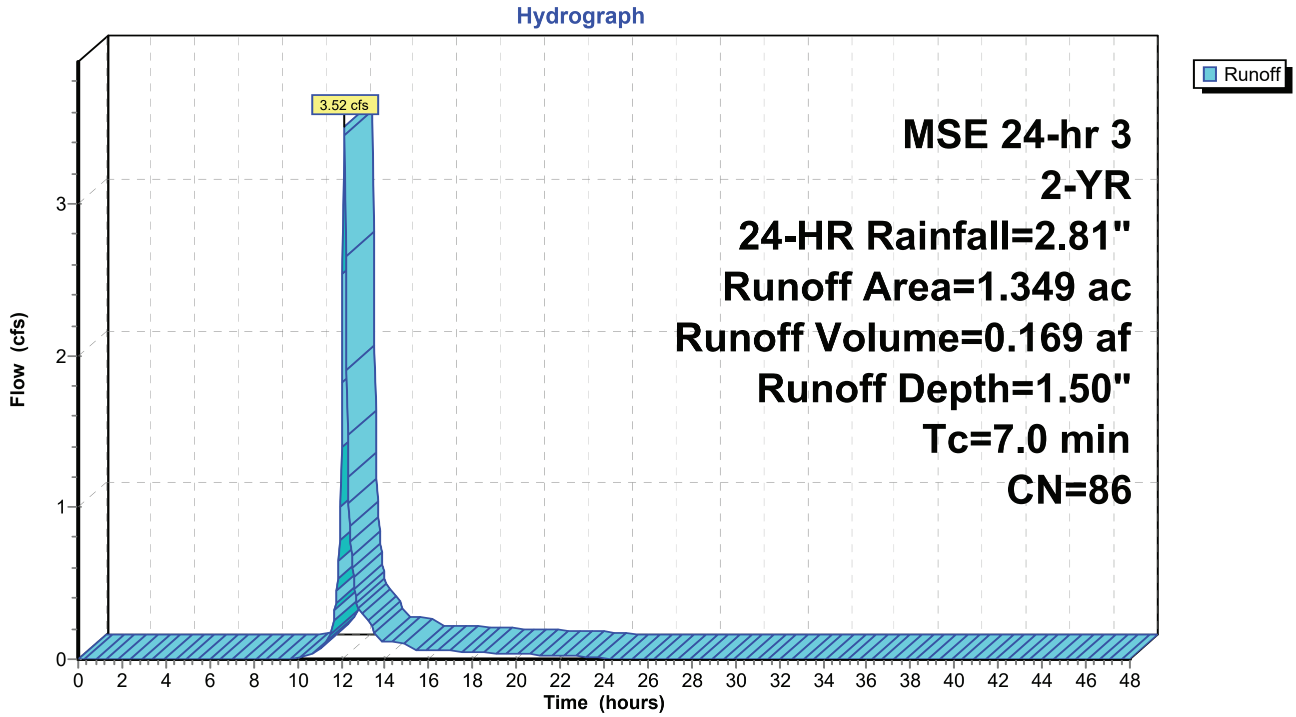
Runoff = 3.52 cfs @ 12.14 hrs, Volume= 0.169 af, Depth= 1.50"
Routed to Pond 4P : MEDIAN STORAGE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
MSE 24-hr 3 2-YR, 24-HR Rainfall=2.81"

Area (ac)	CN	Description
0.647	98	Paved parking, HSG C
0.702	74	>75% Grass cover, Good, HSG C
1.349	86	Weighted Average
0.702		52.04% Pervious Area
0.647		47.96% Impervious Area

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

Subcatchment DA-2: EX PARKING TO MEDIAN



Summary for Subcatchment DA-3: TO ALIMAGNET PKWY

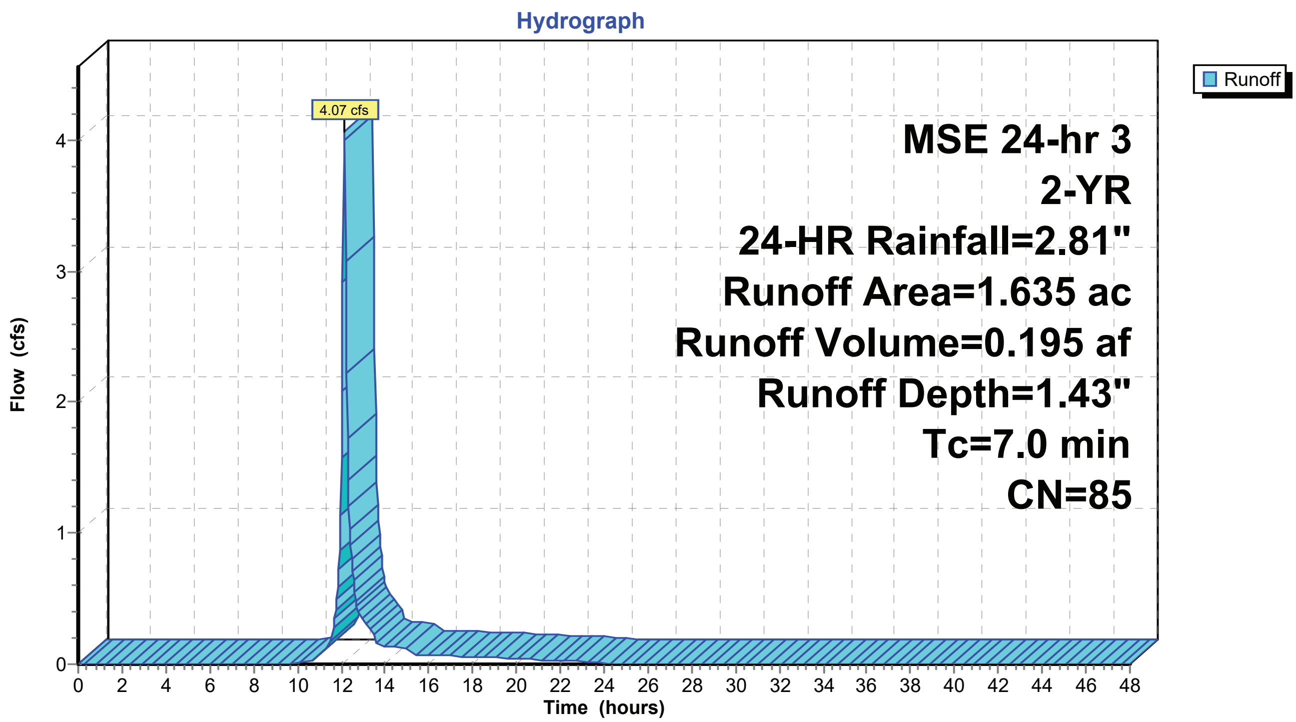
Runoff = 4.07 cfs @ 12.14 hrs, Volume= 0.195 af, Depth= 1.43"
Routed to Reach PKWY_PR : ALIMAGNET PKWY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
MSE 24-hr 3 2-YR, 24-HR Rainfall=2.81"

Area (ac)	CN	Description
0.780	98	Paved parking, HSG C
0.855	74	>75% Grass cover, Good, HSG C
1.635	85	Weighted Average
0.855		52.29% Pervious Area
0.780		47.71% Impervious Area

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

Subcatchment DA-3: TO ALIMAGNET PKWY



Summary for Subcatchment DA-4: NW TO ALIMAGNET LAKE

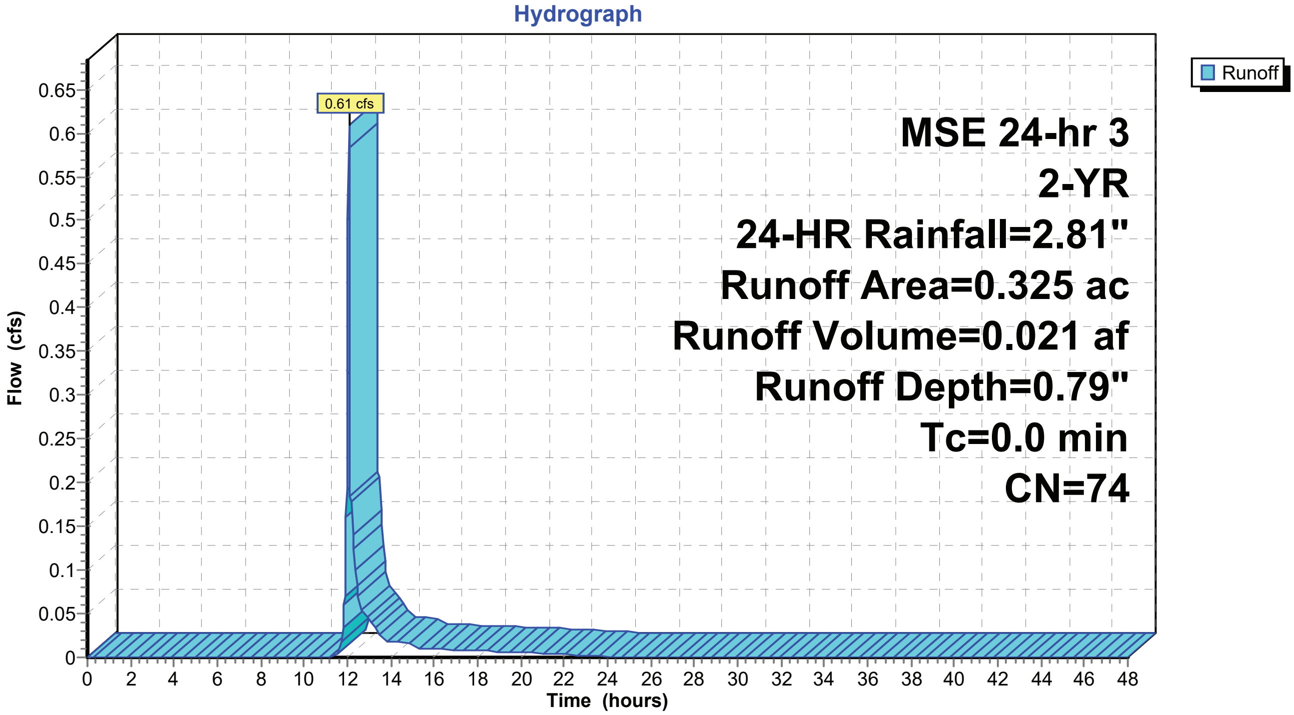
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.61 cfs @ 12.07 hrs, Volume= 0.021 af, Depth= 0.79"
Routed to Reach LAKE_PR : TO ALIMAGNET LAKE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
MSE 24-hr 3 2-YR, 24-HR Rainfall=2.81"

Area (ac)	CN	Description
0.325	74	>75% Grass cover, Good, HSG C
0.325		100.00% Pervious Area

Subcatchment DA-4: NW TO ALIMAGNET LAKE



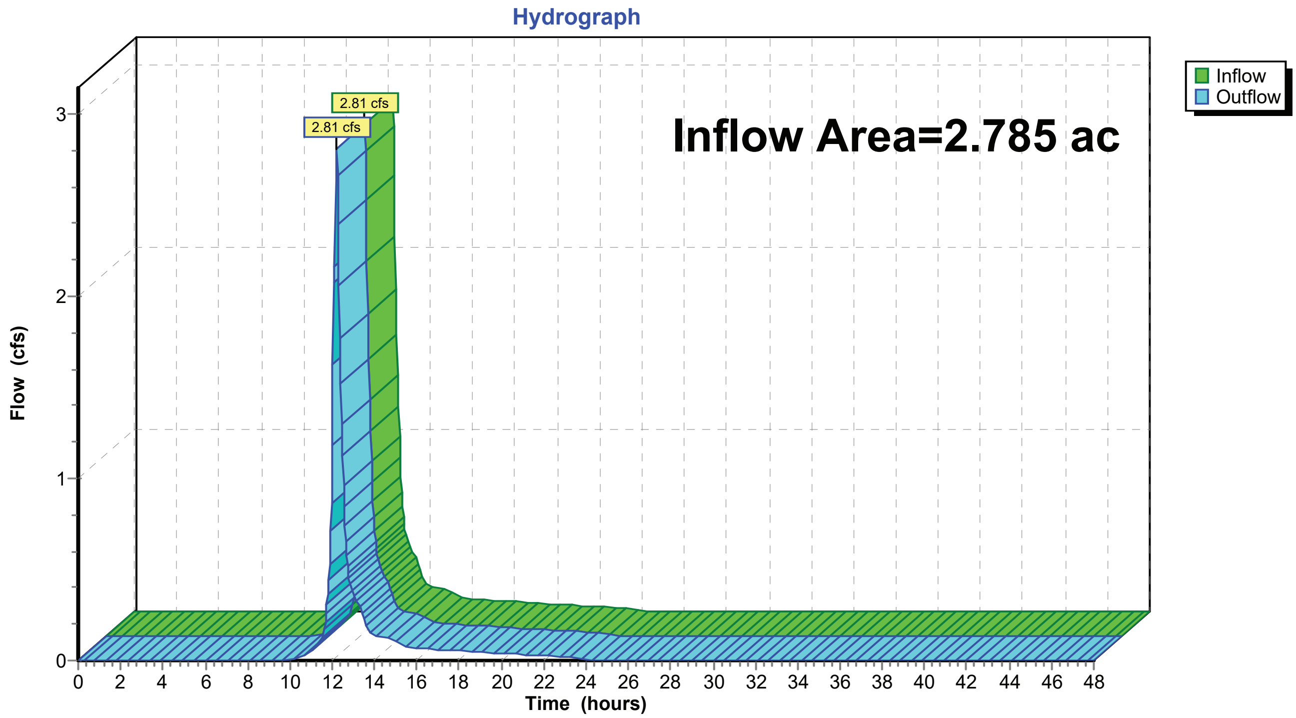
Summary for Reach LAKE_PR: TO ALIMAGNET LAKE

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

Inflow Area = 2.785 ac, 41.22% Impervious, Inflow Depth = 0.82" for 2-YR, 24-HR event
Inflow = 2.81 cfs @ 12.20 hrs, Volume= 0.190 af
Outflow = 2.81 cfs @ 12.20 hrs, Volume= 0.190 af, Atten= 0%, Lag= 0.0 min
Routed to Reach OUT_PR : OUT_PR

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Reach LAKE_PR: TO ALIMAGNET LAKE



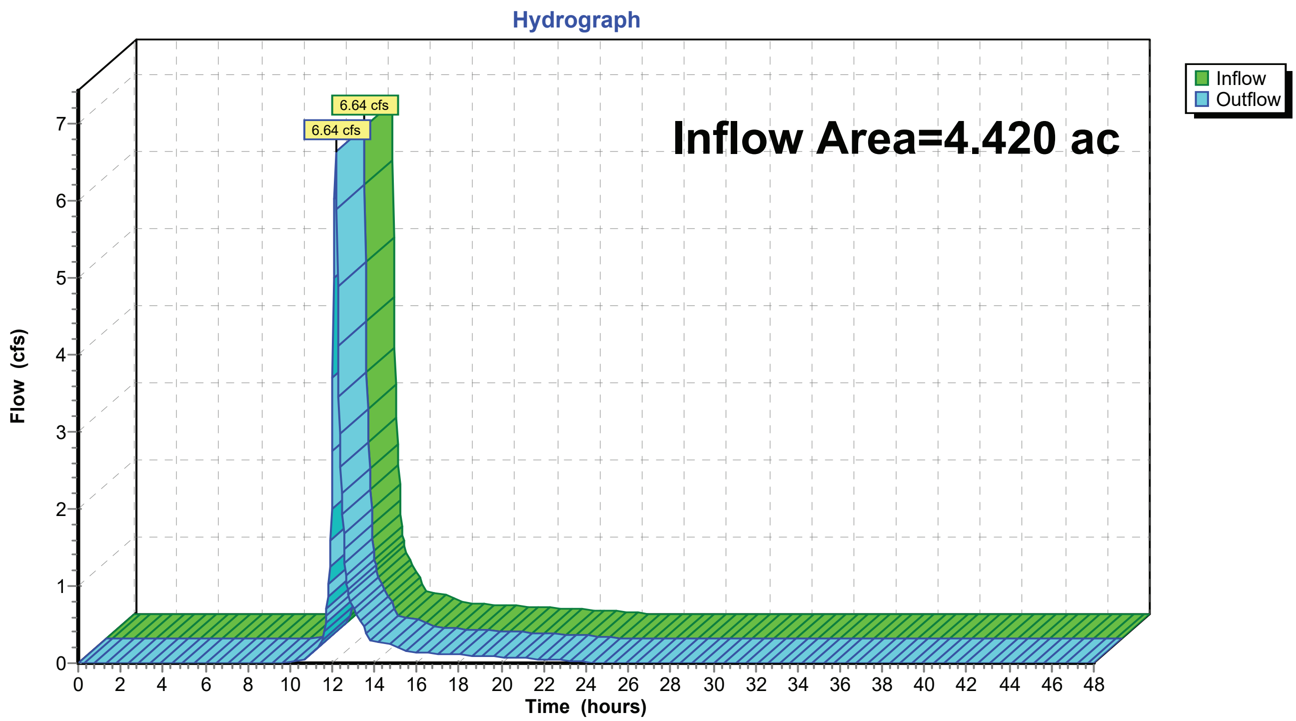
Summary for Reach OUT_PR: OUT_PR

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

Inflow Area =	4.420 ac, 43.62% Impervious, Inflow Depth = 1.05"	for 2-YR, 24-HR event	
Inflow =	6.64 cfs @ 12.16 hrs, Volume=	0.385 af	
Outflow =	6.64 cfs @ 12.16 hrs, Volume=	0.385 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Reach OUT_PR: OUT_PR



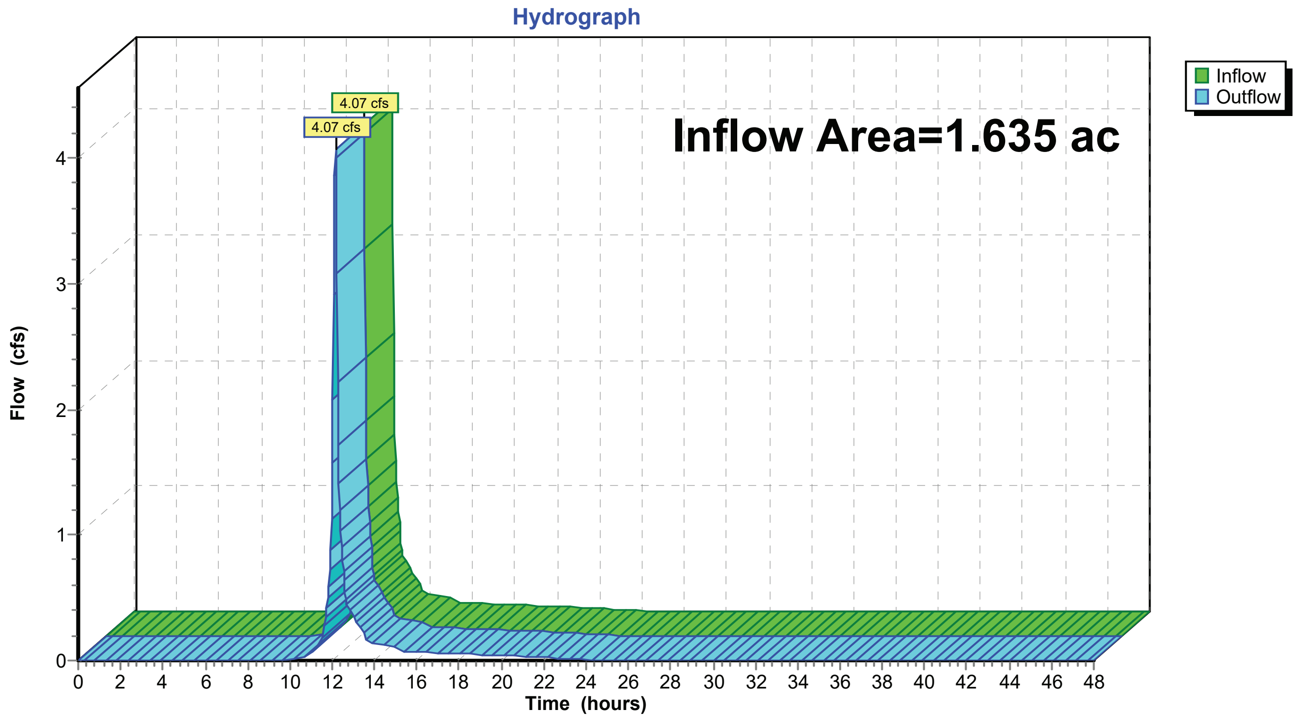
Summary for Reach PKWY_PR: ALIMAGNET PKWY

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

Inflow Area = 1.635 ac, 47.71% Impervious, Inflow Depth = 1.43" for 2-YR, 24-HR event
Inflow = 4.07 cfs @ 12.14 hrs, Volume= 0.195 af
Outflow = 4.07 cfs @ 12.14 hrs, Volume= 0.195 af, Atten= 0%, Lag= 0.0 min
Routed to Reach OUT_PR : OUT_PR

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Reach PKWY_PR: ALIMAGNET PKWY



Summary for Pond 1P: INFILTRATION

Inflow Area = 1.111 ac, 45.09% Impervious, Inflow Depth = 1.50" for 2-YR, 24-HR event
Inflow = 2.90 cfs @ 12.14 hrs, Volume= 0.139 af
Outflow = 0.05 cfs @ 15.48 hrs, Volume= 0.131 af, Atten= 98%, Lag= 200.4 min
Discarded = 0.05 cfs @ 15.48 hrs, Volume= 0.131 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach LAKE_PR : TO ALIMAGNET LAKE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,008.07' @ 15.48 hrs Surf.Area= 2,728 sf Storage= 4,373 cf
Flood Elev= 1,011.00' Surf.Area= 5,000 sf Storage= 15,400 cf

Plug-Flow detention time= 902.8 min calculated for 0.130 af (94% of inflow)
Center-of-Mass det. time= 874.1 min (1,679.1 - 805.0)

Volume	Invert	Avail.Storage	Storage Description
#1	1,006.00'	15,400 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

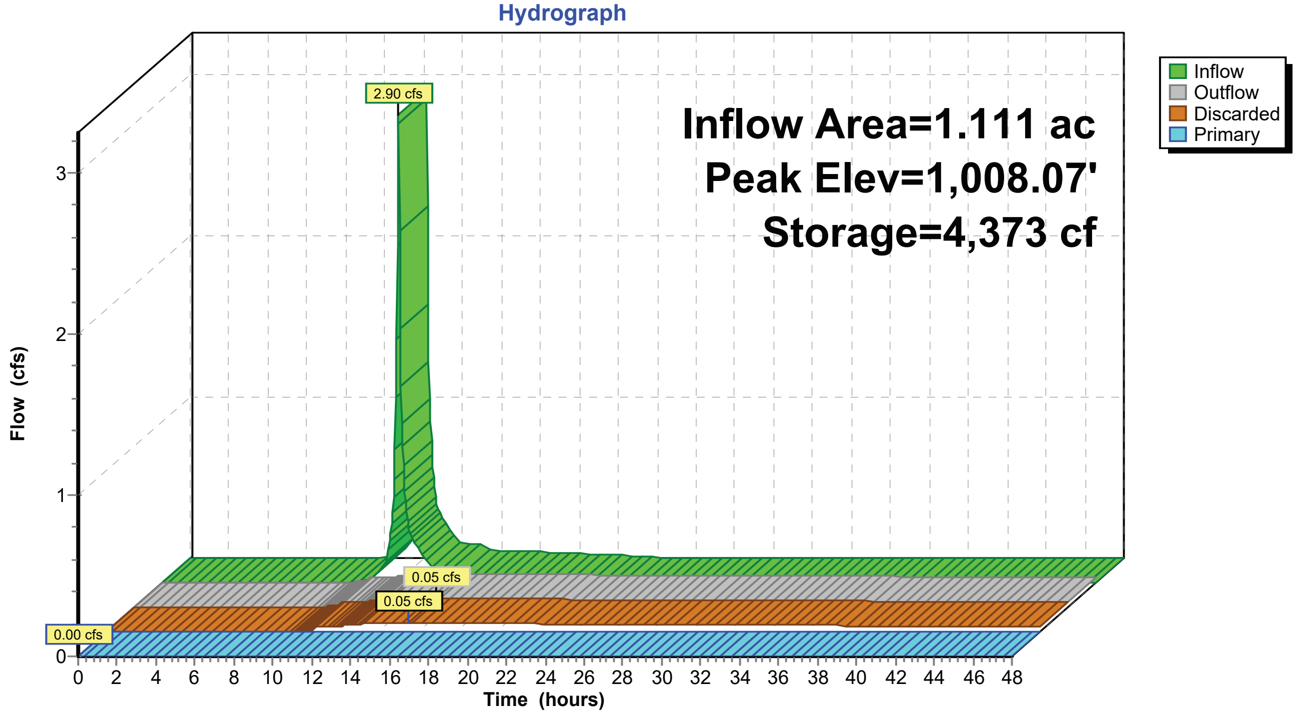
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,006.00	1,500	0	0
1,009.20	3,400	7,840	7,840
1,011.00	5,000	7,560	15,400

Device	Routing	Invert	Outlet Devices
#1	Discarded	1,006.00'	**0.800 in/hr Exfiltration over Surface area**
#2	Primary	1,009.20'	**15.0" Round RCP_Round 15"** L= 100.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,009.20' / 1,006.00' S= 0.0320 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf

Discarded OutFlow Max=0.05 cfs @ 15.48 hrs HW=1,008.07' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,006.00' TW=0.00' (Dynamic Tailwater)
2=RCP_Round 15" (Controls 0.00 cfs)

Pond 1P: INFILTRATION



Summary for Pond 3P: PRETREATMENT

[57] Hint: Peaked at 1,008.70' (Flood elevation advised)

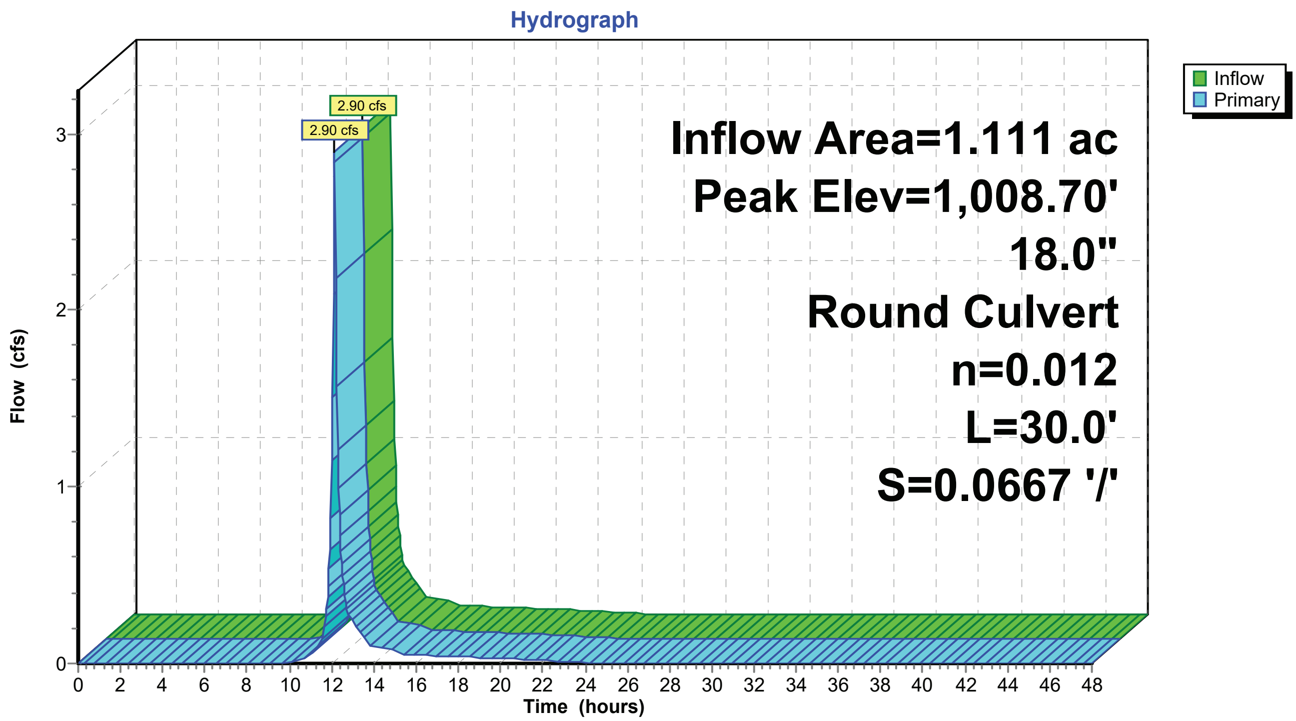
Inflow Area = 1.111 ac, 45.09% Impervious, Inflow Depth = 1.50" for 2-YR, 24-HR event
Inflow = 2.90 cfs @ 12.14 hrs, Volume= 0.139 af
Outflow = 2.90 cfs @ 12.14 hrs, Volume= 0.139 af, Atten= 0%, Lag= 0.0 min
Primary = 2.90 cfs @ 12.14 hrs, Volume= 0.139 af
Routed to Pond 1P : INFILTRATION

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,008.70' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,008.00'	**18.0" Round RCP_Round 18"** L= 30.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 1,008.00' / 1,006.00' S= 0.0667 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=2.81 cfs @ 12.14 hrs HW=1,008.69' TW=1,006.99' (Dynamic Tailwater)
1=RCP_Round 18" (Inlet Controls 2.81 cfs @ 3.54 fps)

Pond 3P: PRETREATMENT



Summary for Pond 4P: MEDIAN STORAGE

Inflow Area = 1.349 ac, 47.96% Impervious, Inflow Depth = 1.50" for 2-YR, 24-HR event
Inflow = 3.52 cfs @ 12.14 hrs, Volume= 0.169 af
Outflow = 2.65 cfs @ 12.20 hrs, Volume= 0.169 af, Atten= 25%, Lag= 3.6 min
Primary = 2.65 cfs @ 12.20 hrs, Volume= 0.169 af
Routed to Reach LAKE_PR : TO ALIMAGNET LAKE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,007.35' @ 12.20 hrs Surf.Area= 2,093 sf Storage= 931 cf
Flood Elev= 1,008.00' Surf.Area= 3,579 sf Storage= 2,772 cf

Plug-Flow detention time= 6.5 min calculated for 0.169 af (100% of inflow)
Center-of-Mass det. time= 6.5 min (811.5 - 805.0)

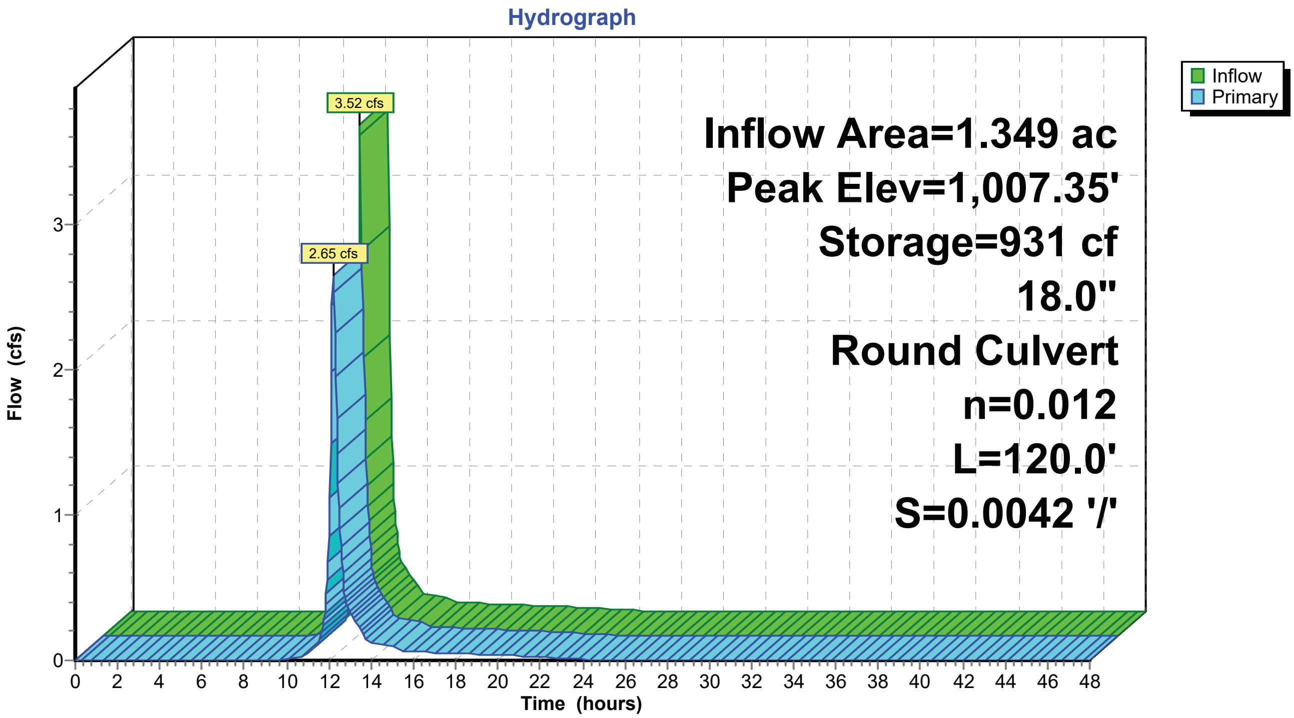
Volume	Invert	Avail.Storage	Storage Description
#1	1,006.50'	2,807 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,006.50	61	0	0
1,007.00	1,289	338	338
1,008.01	3,602	2,470	2,807

Device	Routing	Invert	Outlet Devices
#1	Primary	1,006.50'	**18.0" Round RCP_Round 18"** L= 120.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 1,006.50' / 1,006.00' S= 0.0042 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=2.63 cfs @ 12.20 hrs HW=1,007.35' TW=0.00' (Dynamic Tailwater)
1=RCP_Round 18" (Barrel Controls 2.63 cfs @ 3.69 fps)

Pond 4P: MEDIAN STORAGE



Time span=0.00-48.00 hrs, dt=0.04 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentDA-1: SITE TO PR POND Runoff Area=1.111 ac 45.09% Impervious Runoff Depth=2.71"
Tc=7.0 min CN=86 Runoff=5.00 cfs 0.251 af

SubcatchmentDA-2: EX PARKING TO Runoff Area=1.349 ac 47.96% Impervious Runoff Depth=2.71"
Tc=7.0 min CN=86 Runoff=6.07 cfs 0.305 af

SubcatchmentDA-3: TO ALIMAGNETPKWY Runoff Area=1.635 ac 47.71% Impervious Runoff Depth=2.62"
Tc=7.0 min CN=85 Runoff=7.15 cfs 0.357 af

SubcatchmentDA-4: NW TO ALIMAGNET Runoff Area=0.325 ac 0.00% Impervious Runoff Depth=1.73"
Tc=0.0 min CN=74 Runoff=1.13 cfs 0.047 af

Reach LAKE_PR: TO ALIMAGNETLAKE Inflow=4.73 cfs 0.352 af
Outflow=4.73 cfs 0.352 af

Reach OUT_PR: OUT_PR Inflow=11.59 cfs 0.709 af
Outflow=11.59 cfs 0.709 af

Reach PKWY_PR: ALIMAGNETPKWY Inflow=7.15 cfs 0.357 af
Outflow=7.15 cfs 0.357 af

Pond 1P: INFILTRATION Peak Elev=1,009.22' Storage=7,915 cf Inflow=5.00 cfs 0.251 af
Discarded=0.06 cfs 0.180 af Primary=0.00 cfs 0.000 af Outflow=0.07 cfs 0.180 af

Pond 3P: PRETREATMENT Peak Elev=1,009.22' Inflow=5.00 cfs 0.251 af
18.0" Round Culvert n=0.012 L=30.0' S=0.0667 '/' Outflow=5.00 cfs 0.251 af

Pond 4P: MEDIAN STORAGE Peak Elev=1,007.68' Storage=1,731 cf Inflow=6.07 cfs 0.305 af
18.0" Round Culvert n=0.012 L=120.0' S=0.0042 '/' Outflow=4.58 cfs 0.305 af

Total Runoff Area = 4.420 ac Runoff Volume = 0.959 af Average Runoff Depth = 2.60"
56.38% Pervious = 2.492 ac 43.62% Impervious = 1.928 ac

Summary for Subcatchment DA-1: SITE TO PR POND

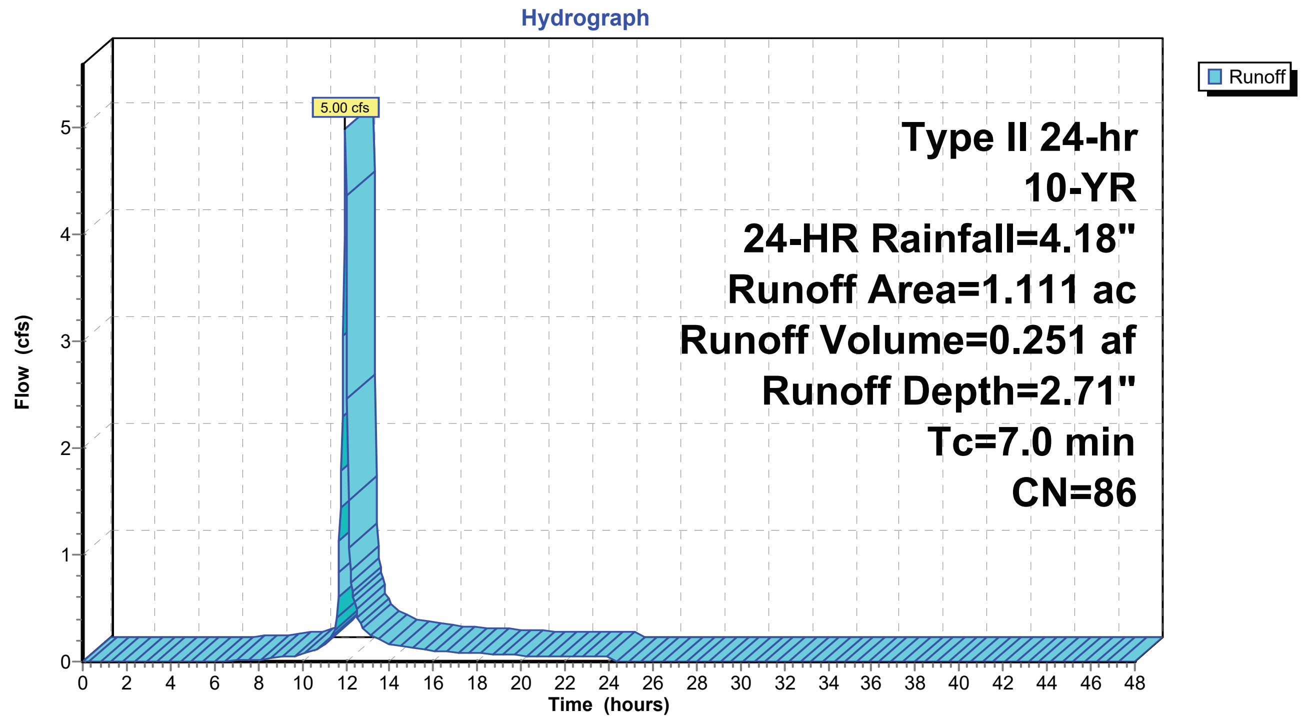
Runoff = 5.00 cfs @ 11.98 hrs, Volume= 0.251 af, Depth= 2.71"
Routed to Pond 3P : PRETREATMENT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 10-YR, 24-HR Rainfall=4.18"

	Area (ac)	CN	Description
	0.501	98	Paved parking, HSG C
*	0.150	83	Permeable Pavement, 20% Void, 10in sand
	0.460	74	>75% Grass cover, Good, HSG C
	1.111	86	Weighted Average
	0.610		54.91% Pervious Area
	0.501		45.09% Impervious Area

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

Subcatchment DA-1: SITE TO PR POND



Summary for Subcatchment DA-2: EX PARKING TO MEDIAN

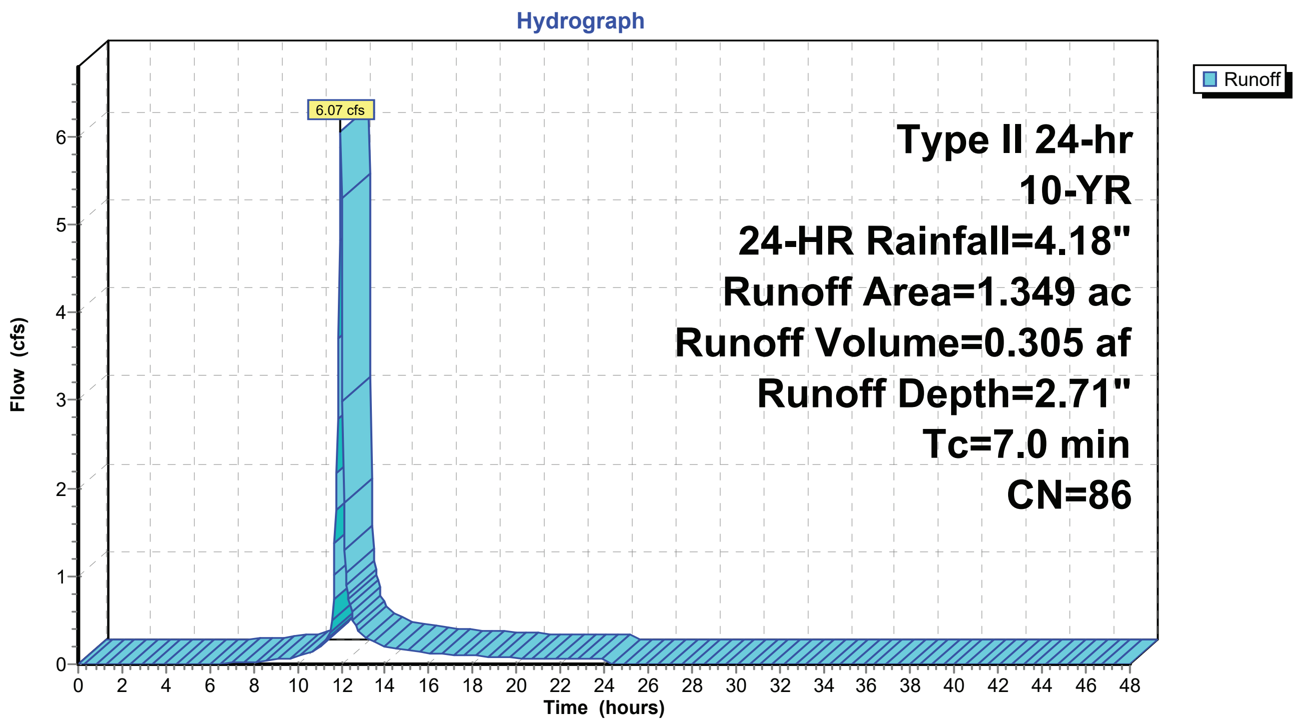
Runoff = 6.07 cfs @ 11.98 hrs, Volume= 0.305 af, Depth= 2.71"
Routed to Pond 4P : MEDIAN STORAGE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 10-YR, 24-HR Rainfall=4.18"

Area (ac)	CN	Description
0.647	98	Paved parking, HSG C
0.702	74	>75% Grass cover, Good, HSG C
1.349	86	Weighted Average
0.702		52.04% Pervious Area
0.647		47.96% Impervious Area

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

Subcatchment DA-2: EX PARKING TO MEDIAN



Summary for Subcatchment DA-3: TO ALIMAGNET PKWY

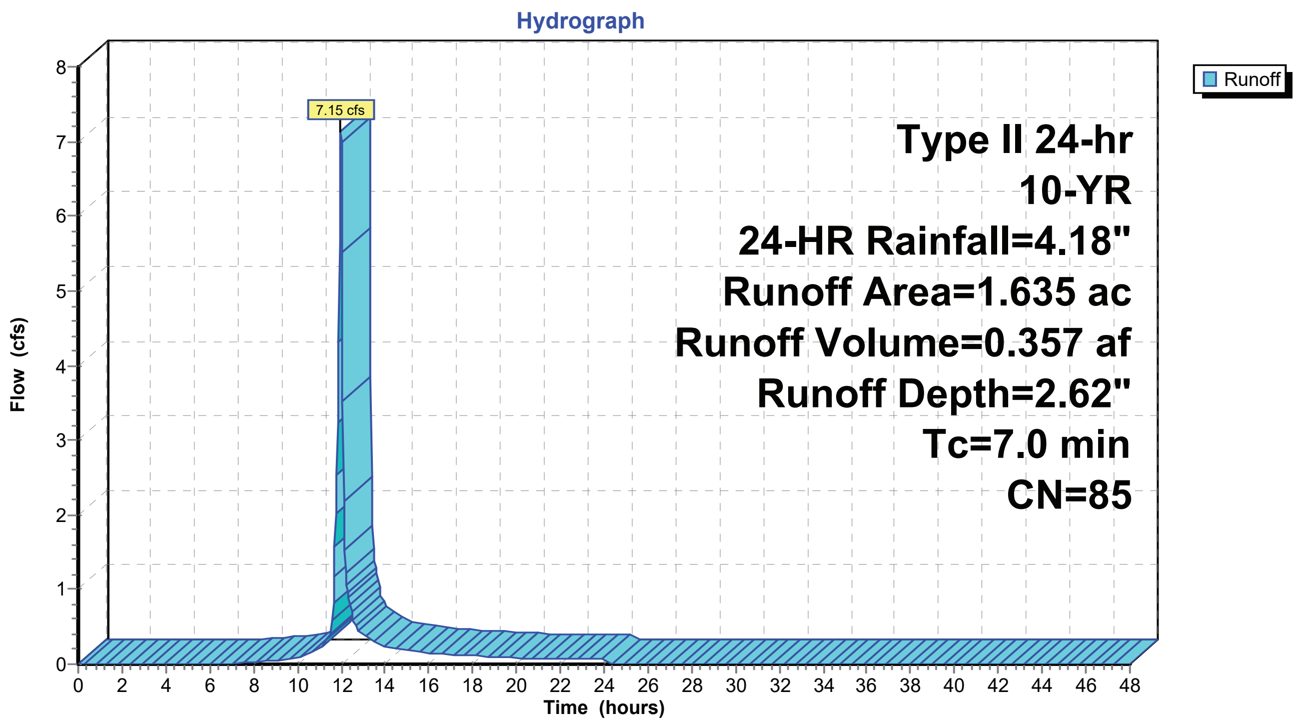
Runoff = 7.15 cfs @ 11.98 hrs, Volume= 0.357 af, Depth= 2.62"
Routed to Reach PKWY_PR : ALIMAGNET PKWY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 10-YR, 24-HR Rainfall=4.18"

Area (ac)	CN	Description
0.780	98	Paved parking, HSG C
0.855	74	>75% Grass cover, Good, HSG C
1.635	85	Weighted Average
0.855		52.29% Pervious Area
0.780		47.71% Impervious Area

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

Subcatchment DA-3: TO ALIMAGNET PKWY



Summary for Subcatchment DA-4: NW TO ALIMAGNET LAKE

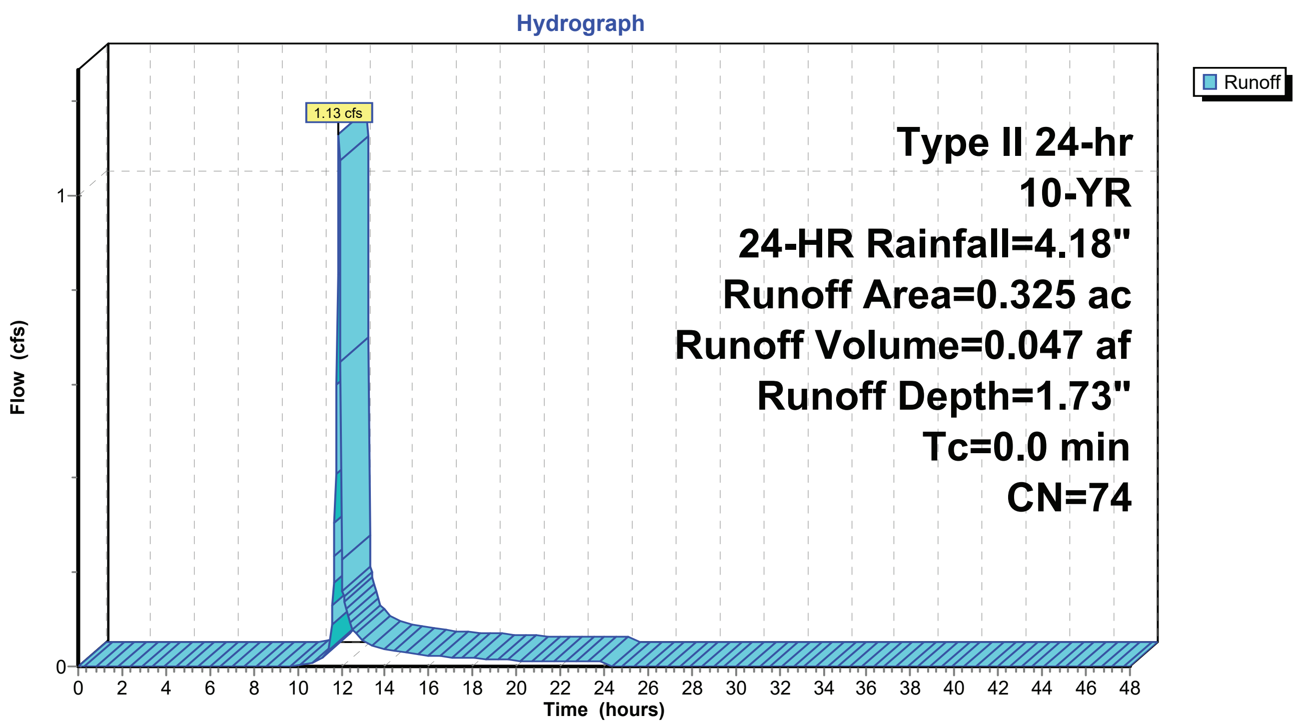
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 1.13 cfs @ 11.90 hrs, Volume= 0.047 af, Depth= 1.73"
Routed to Reach LAKE_PR : TO ALIMAGNET LAKE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 10-YR, 24-HR Rainfall=4.18"

Area (ac)	CN	Description
0.325	74	>75% Grass cover, Good, HSG C
0.325		100.00% Pervious Area

Subcatchment DA-4: NW TO ALIMAGNET LAKE



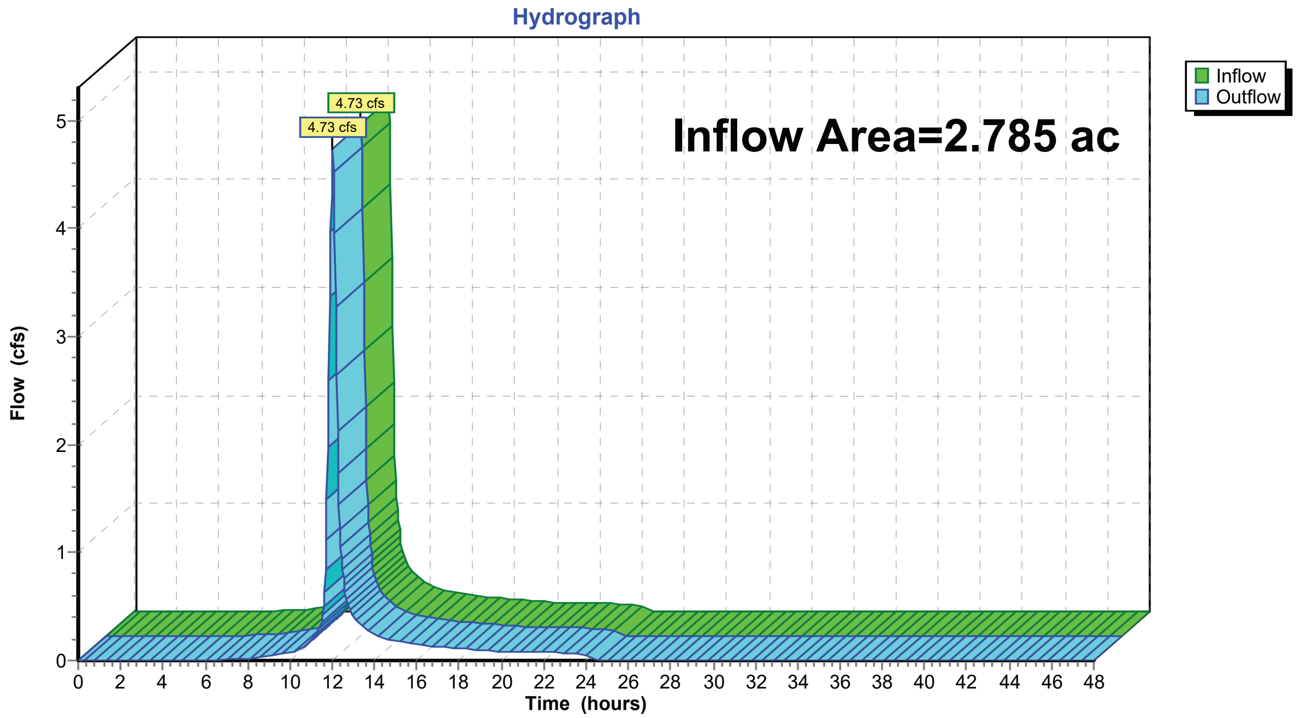
Summary for Reach LAKE_PR: TO ALIMAGNET LAKE

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

Inflow Area = 2.785 ac, 41.22% Impervious, Inflow Depth = 1.52" for 10-YR, 24-HR event
Inflow = 4.73 cfs @ 12.04 hrs, Volume= 0.352 af
Outflow = 4.73 cfs @ 12.04 hrs, Volume= 0.352 af, Atten= 0%, Lag= 0.0 min
Routed to Reach OUT_PR : OUT_PR

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Reach LAKE_PR: TO ALIMAGNET LAKE

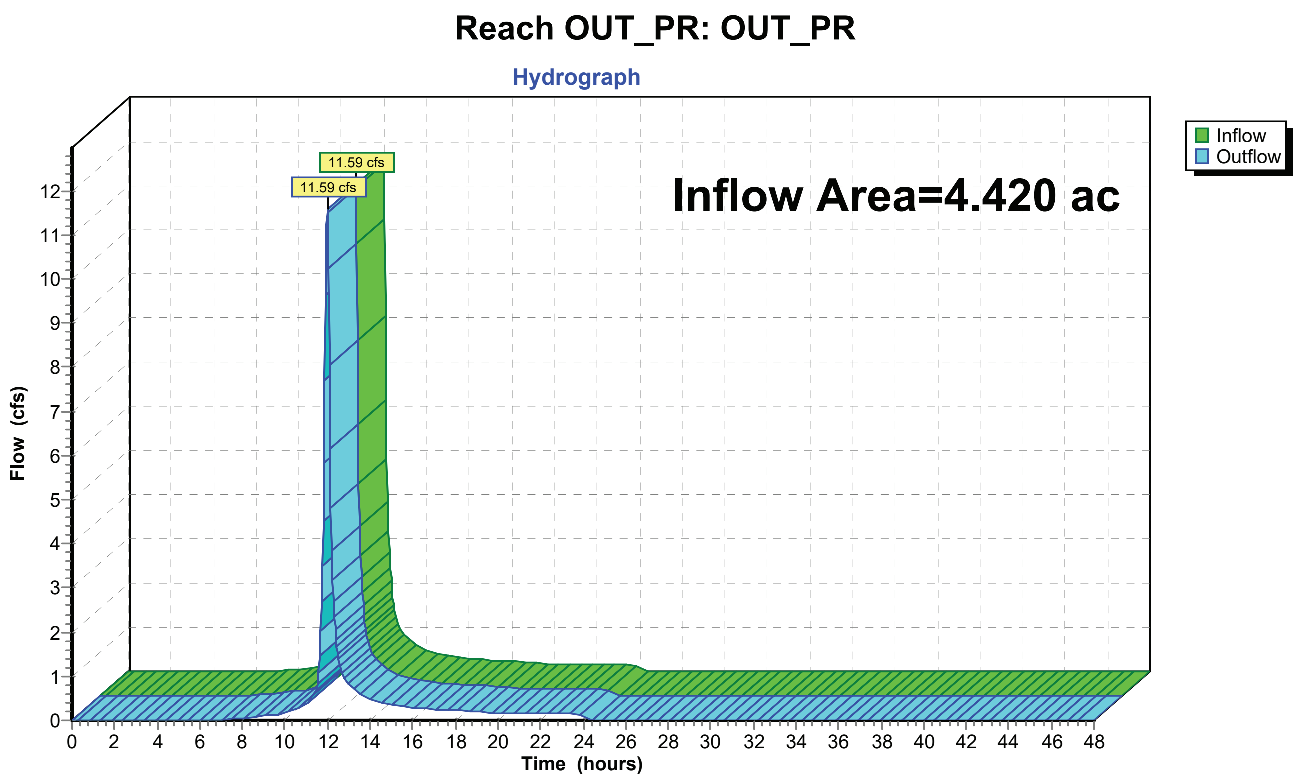


Summary for Reach OUT_PR: OUT_PR

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

Inflow Area =	4.420 ac,	43.62% Impervious,	Inflow Depth = 1.92"	for 10-YR, 24-HR event
Inflow =	11.59 cfs @	11.99 hrs,	Volume=	0.709 af
Outflow =	11.59 cfs @	11.99 hrs,	Volume=	0.709 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs



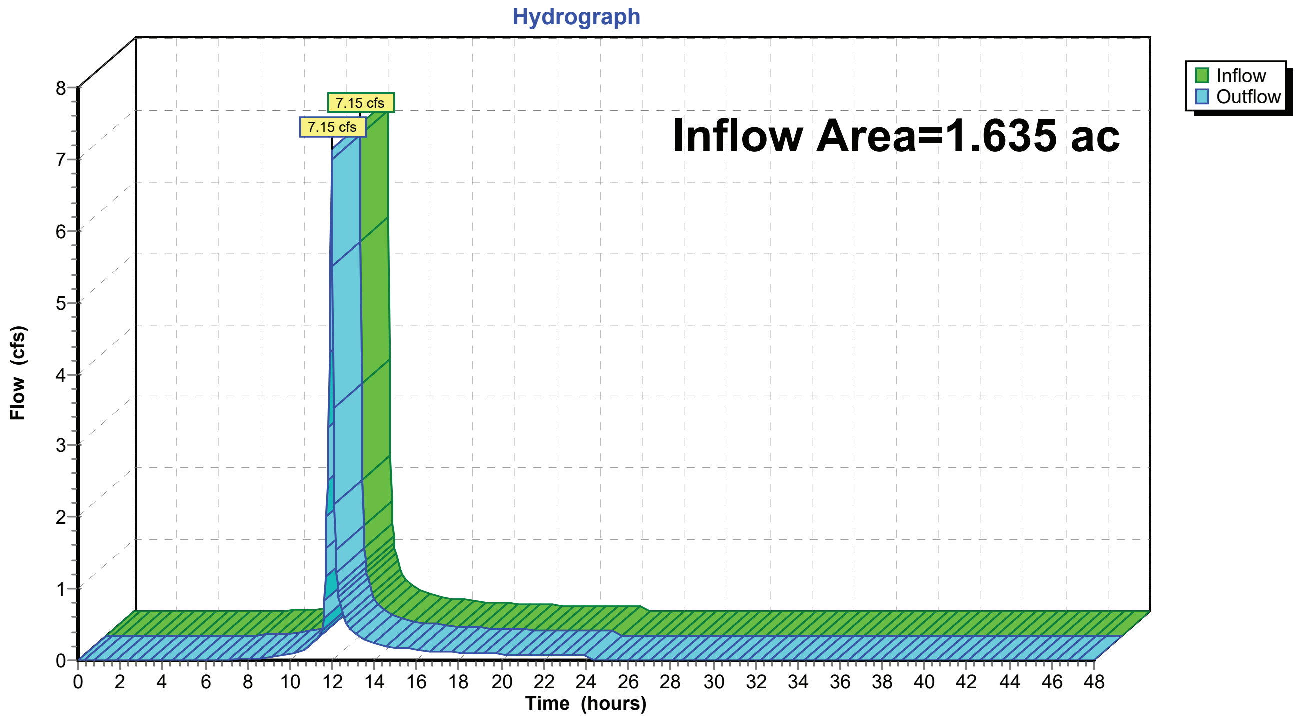
Summary for Reach PKWY_PR: ALIMAGNET PKWY

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

Inflow Area = 1.635 ac, 47.71% Impervious, Inflow Depth = 2.62" for 10-YR, 24-HR event
Inflow = 7.15 cfs @ 11.98 hrs, Volume= 0.357 af
Outflow = 7.15 cfs @ 11.98 hrs, Volume= 0.357 af, Atten= 0%, Lag= 0.0 min
Routed to Reach OUT_PR : OUT_PR

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Reach PKWY_PR: ALIMAGNET PKWY



Summary for Pond 1P: INFILTRATION

[80] Warning: Exceeded Pond 3P by 1.14' @ 24.44 hrs (6.58 cfs 1.220 af)

Inflow Area = 1.111 ac, 45.09% Impervious, Inflow Depth = 2.71" for 10-YR, 24-HR event
Inflow = 5.00 cfs @ 11.98 hrs, Volume= 0.251 af
Outflow = 0.07 cfs @ 19.09 hrs, Volume= 0.180 af, Atten= 99%, Lag= 426.3 min
Discarded = 0.06 cfs @ 19.09 hrs, Volume= 0.180 af
Primary = 0.00 cfs @ 19.09 hrs, Volume= 0.000 af
Routed to Reach LAKE_PR : TO ALIMAGNET LAKE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,009.22' @ 19.09 hrs Surf.Area= 3,420 sf Storage= 7,915 cf
Flood Elev= 1,011.00' Surf.Area= 5,000 sf Storage= 15,400 cf

Plug-Flow detention time= 957.7 min calculated for 0.180 af (72% of inflow)
Center-of-Mass det. time= 860.9 min (1,670.2 - 809.3)

Volume	Invert	Avail.Storage	Storage Description
#1	1,006.00'	15,400 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

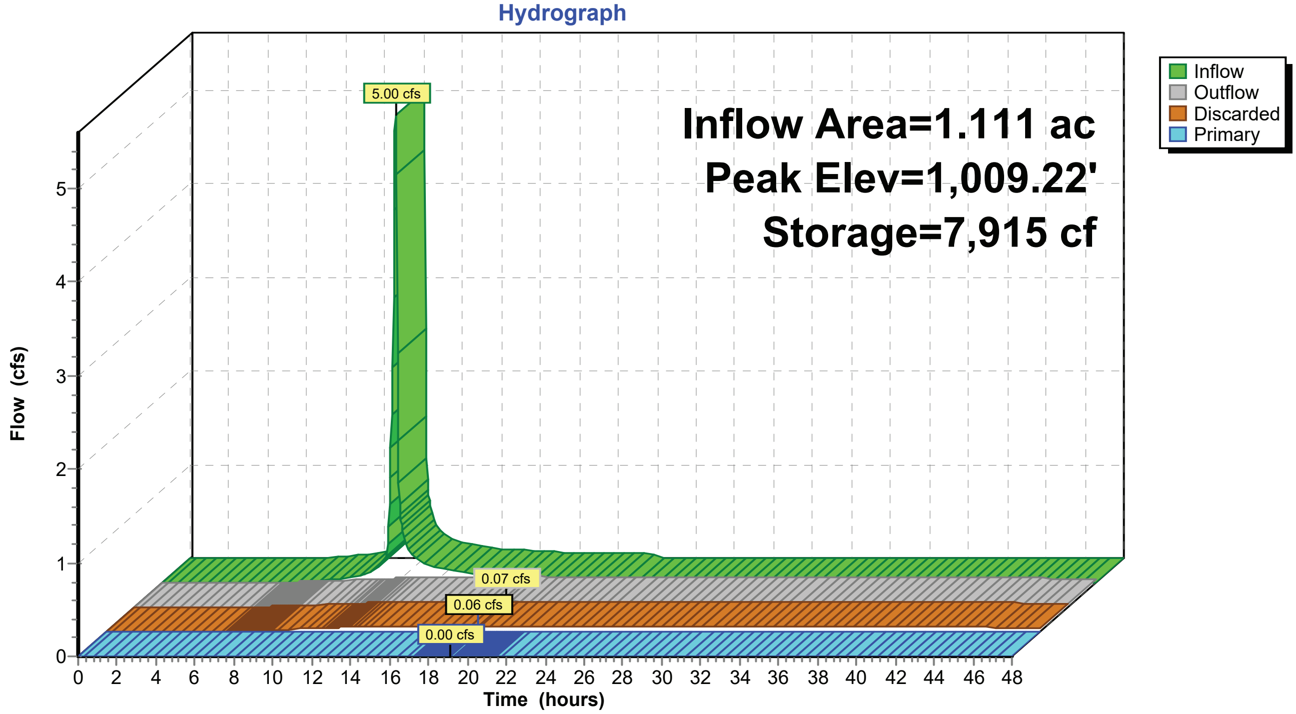
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,006.00	1,500	0	0
1,009.20	3,400	7,840	7,840
1,011.00	5,000	7,560	15,400

Device	Routing	Invert	Outlet Devices
#1	Discarded	1,006.00'	**0.800 in/hr Exfiltration over Surface area**
#2	Primary	1,009.20'	**15.0" Round RCP_Round 15"** L= 100.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,009.20' / 1,006.00' S= 0.0320 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf

Discarded OutFlow Max=0.06 cfs @ 19.09 hrs HW=1,009.22' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.00 cfs @ 19.09 hrs HW=1,009.22' TW=0.00' (Dynamic Tailwater)
└─**2=RCP_Round 15"** (Inlet Controls 0.00 cfs @ 0.50 fps)

Pond 1P: INFILTRATION



Summary for Pond 3P: PRETREATMENT

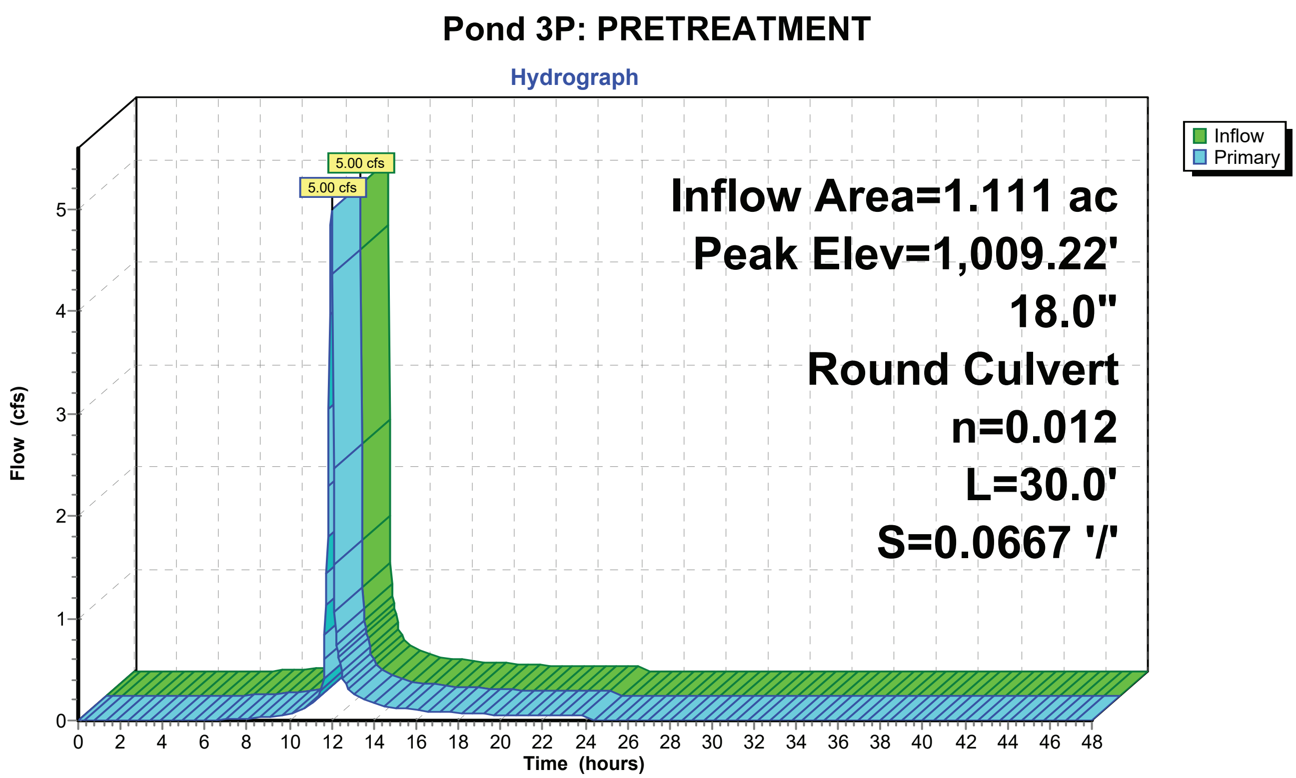
[57] Hint: Peaked at 1,009.22' (Flood elevation advised)

Inflow Area = 1.111 ac, 45.09% Impervious, Inflow Depth = 2.71" for 10-YR, 24-HR event
Inflow = 5.00 cfs @ 11.98 hrs, Volume= 0.251 af
Outflow = 5.00 cfs @ 11.98 hrs, Volume= 0.251 af, Atten= 0%, Lag= 0.0 min
Primary = 5.00 cfs @ 11.98 hrs, Volume= 0.251 af
Routed to Pond 1P : INFILTRATION

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,009.22' @ 19.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,008.00'	**18.0" Round RCP_Round 18"** L= 30.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 1,008.00' / 1,006.00' S= 0.0667 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=4.86 cfs @ 11.98 hrs HW=1,008.95' TW=1,007.80' (Dynamic Tailwater)
1=RCP_Round 18" (Inlet Controls 4.86 cfs @ 4.14 fps)



Summary for Pond 4P: MEDIAN STORAGE

Inflow Area = 1.349 ac, 47.96% Impervious, Inflow Depth = 2.71" for 10-YR, 24-HR event
Inflow = 6.07 cfs @ 11.98 hrs, Volume= 0.305 af
Outflow = 4.58 cfs @ 12.04 hrs, Volume= 0.305 af, Atten= 25%, Lag= 3.7 min
Primary = 4.58 cfs @ 12.04 hrs, Volume= 0.305 af
Routed to Reach LAKE_PR : TO ALIMAGNET LAKE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,007.68' @ 12.04 hrs Surf.Area= 2,836 sf Storage= 1,731 cf
Flood Elev= 1,008.00' Surf.Area= 3,579 sf Storage= 2,772 cf

Plug-Flow detention time= 6.4 min calculated for 0.304 af (100% of inflow)
Center-of-Mass det. time= 6.4 min (815.7 - 809.3)

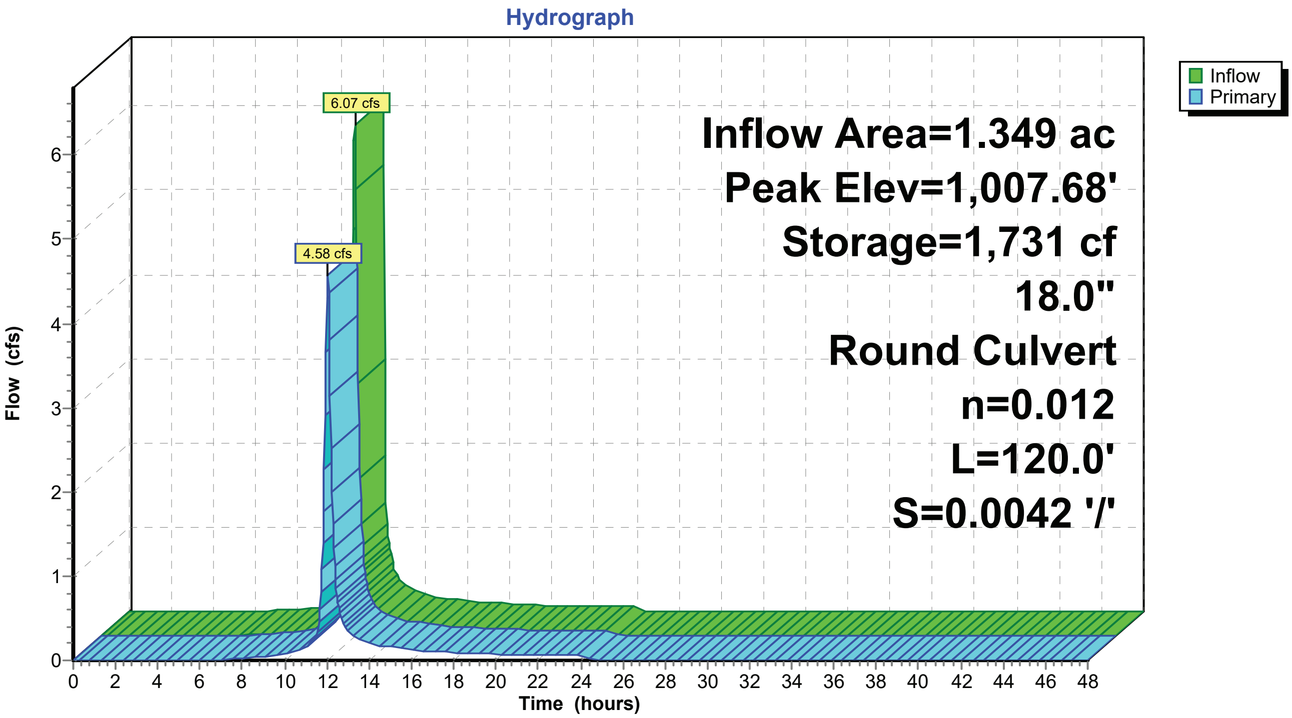
Volume	Invert	Avail.Storage	Storage Description
#1	1,006.50'	2,807 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,006.50	61	0	0
1,007.00	1,289	338	338
1,008.01	3,602	2,470	2,807

Device	Routing	Invert	Outlet Devices
#1	Primary	1,006.50'	**18.0" Round RCP_Round 18"** L= 120.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 1,006.50' / 1,006.00' S= 0.0042 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=4.56 cfs @ 12.04 hrs HW=1,007.67' TW=0.00' (Dynamic Tailwater)
└─**1=RCP_Round 18"** (Barrel Controls 4.56 cfs @ 4.23 fps)

Pond 4P: MEDIAN STORAGE



Time span=0.00-48.00 hrs, dt=0.04 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment DA-1: SITE TO PR POND Runoff Area=1.111 ac 45.09% Impervious Runoff Depth=5.78"
Tc=7.0 min CN=86 Runoff=10.15 cfs 0.535 af

Subcatchment DA-2: EX PARKING TO Runoff Area=1.349 ac 47.96% Impervious Runoff Depth=5.78"
Tc=7.0 min CN=86 Runoff=12.32 cfs 0.650 af

Subcatchment DA-3: TO ALIMAGNET PKWY Runoff Area=1.635 ac 47.71% Impervious Runoff Depth=5.66"
Tc=7.0 min CN=85 Runoff=14.73 cfs 0.772 af

Subcatchment DA-4: NW TO ALIMAGNET Runoff Area=0.325 ac 0.00% Impervious Runoff Depth=4.42"
Tc=0.0 min CN=74 Runoff=2.82 cfs 0.120 af

Reach LAKE_PR: TO ALIMAGNET LAKE Inflow=16.04 cfs 1.034 af
Outflow=16.04 cfs 1.034 af

Reach OUT_PR: OUT_PR Inflow=30.63 cfs 1.805 af
Outflow=30.63 cfs 1.805 af

Reach PKWY_PR: ALIMAGNET PKWY Inflow=14.73 cfs 0.772 af
Outflow=14.73 cfs 0.772 af

Pond 1P: INFILTRATION Peak Elev=1,010.13' Storage=11,383 cf Inflow=10.15 cfs 0.535 af
Discarded=0.08 cfs 0.194 af Primary=3.21 cfs 0.264 af Outflow=3.29 cfs 0.458 af

Pond 3P: PRETREATMENT Peak Elev=1,010.27' Inflow=10.15 cfs 0.535 af
18.0" Round Culvert n=0.012 L=30.0' S=0.0667 '/' Outflow=10.15 cfs 0.535 af

Pond 4P: MEDIAN STORAGE Peak Elev=1,010.62' Storage=2,807 cf Inflow=12.32 cfs 0.650 af
18.0" Round Culvert n=0.012 L=120.0' S=0.0042 '/' Outflow=14.32 cfs 0.650 af

Total Runoff Area = 4.420 ac Runoff Volume = 2.076 af Average Runoff Depth = 5.64"
56.38% Pervious = 2.492 ac 43.62% Impervious = 1.928 ac

Summary for Subcatchment DA-1: SITE TO PR POND

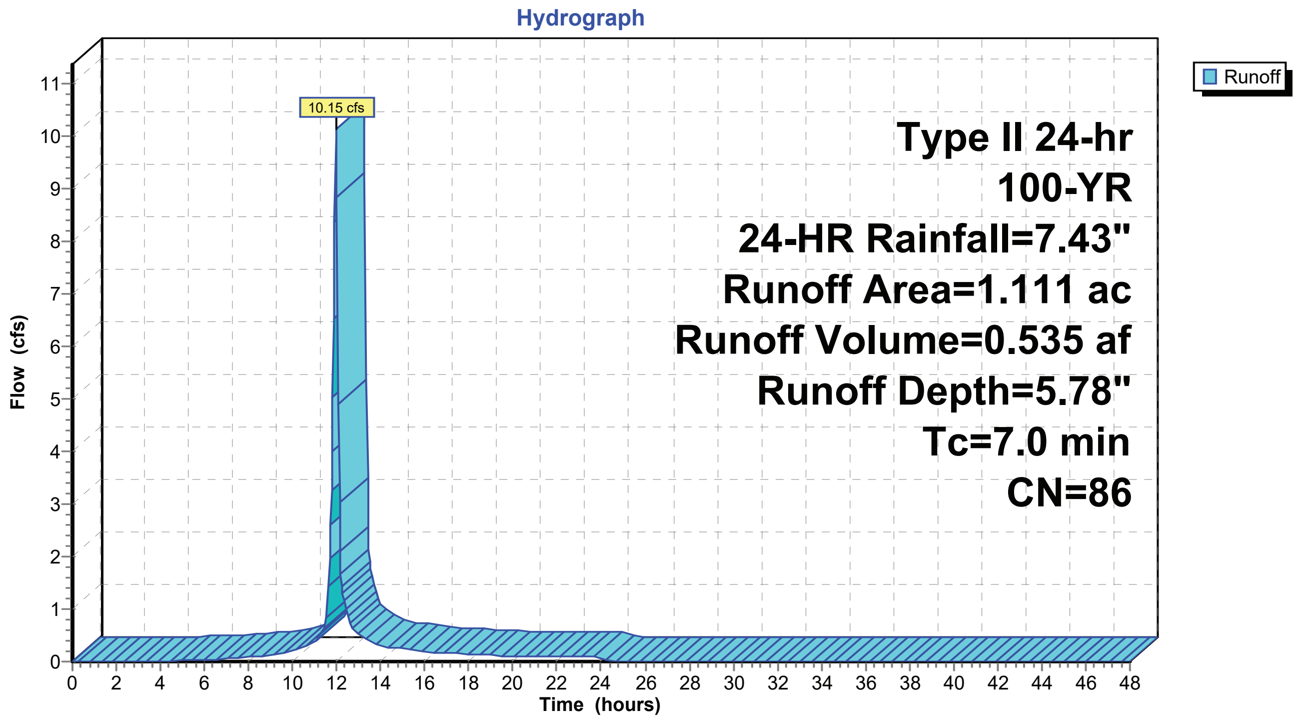
Runoff = 10.15 cfs @ 11.98 hrs, Volume= 0.535 af, Depth= 5.78"
Routed to Pond 3P : PRETREATMENT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-YR, 24-HR Rainfall=7.43"

	Area (ac)	CN	Description
	0.501	98	Paved parking, HSG C
*	0.150	83	Permeable Pavement, 20% Void, 10in sand
	0.460	74	>75% Grass cover, Good, HSG C
	1.111	86	Weighted Average
	0.610		54.91% Pervious Area
	0.501		45.09% Impervious Area

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

Subcatchment DA-1: SITE TO PR POND



Summary for Subcatchment DA-2: EX PARKING TO MEDIAN

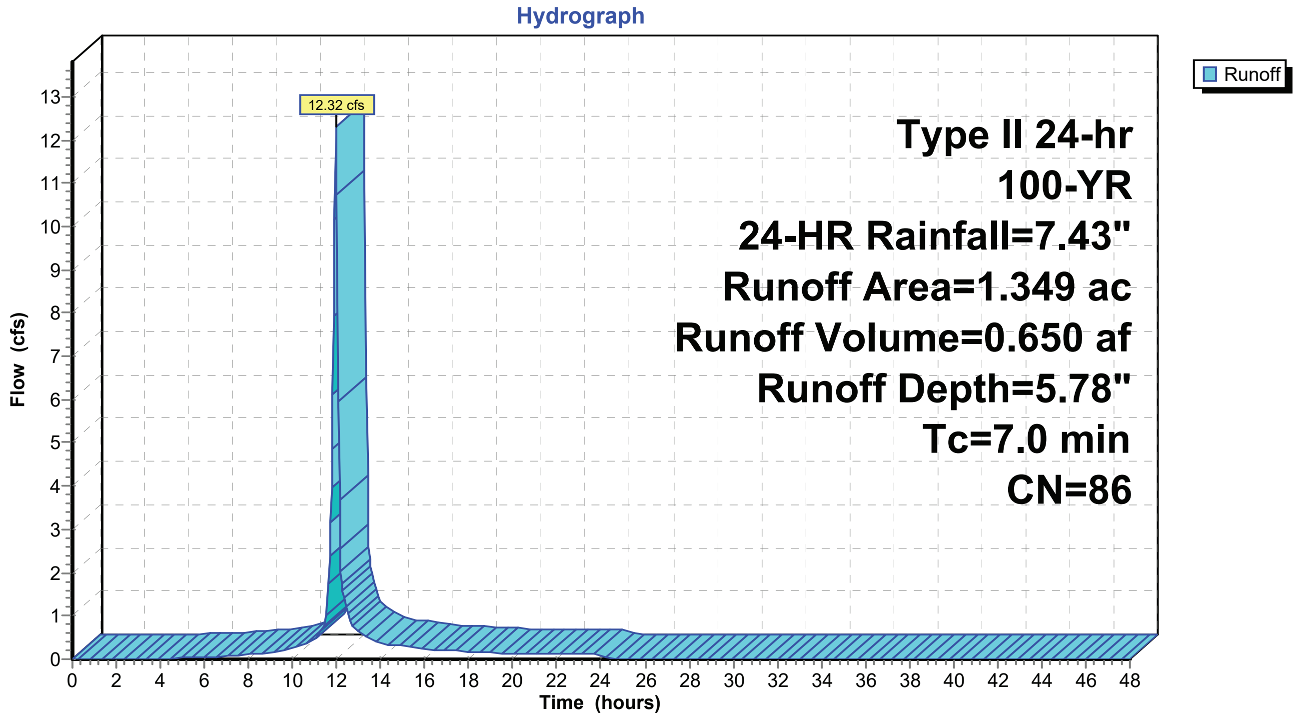
Runoff = 12.32 cfs @ 11.98 hrs, Volume= 0.650 af, Depth= 5.78"
Routed to Pond 4P : MEDIAN STORAGE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-YR, 24-HR Rainfall=7.43"

Area (ac)	CN	Description
0.647	98	Paved parking, HSG C
0.702	74	>75% Grass cover, Good, HSG C
1.349	86	Weighted Average
0.702		52.04% Pervious Area
0.647		47.96% Impervious Area

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

Subcatchment DA-2: EX PARKING TO MEDIAN



Summary for Subcatchment DA-3: TO ALIMAGNET PKWY

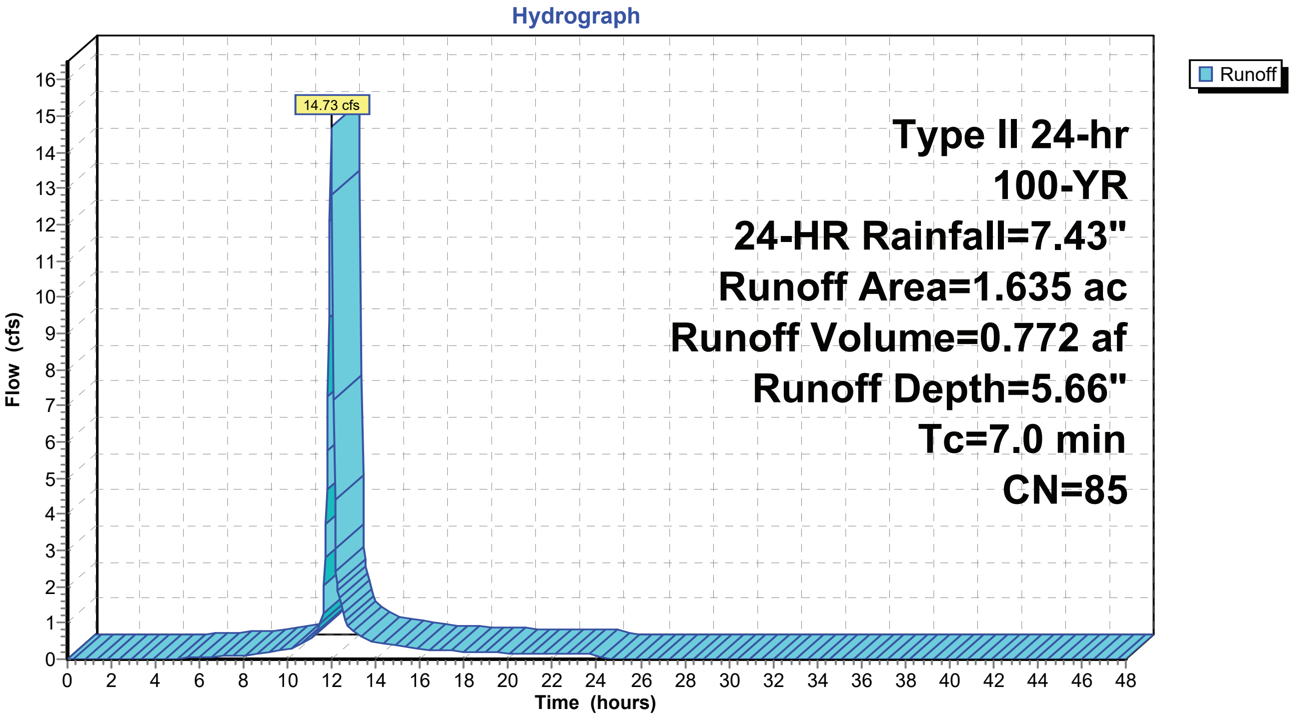
Runoff = 14.73 cfs @ 11.98 hrs, Volume= 0.772 af, Depth= 5.66"
Routed to Reach PKWY_PR : ALIMAGNET PKWY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-YR, 24-HR Rainfall=7.43"

Area (ac)	CN	Description
0.780	98	Paved parking, HSG C
0.855	74	>75% Grass cover, Good, HSG C
1.635	85	Weighted Average
0.855		52.29% Pervious Area
0.780		47.71% Impervious Area

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

Subcatchment DA-3: TO ALIMAGNET PKWY



Summary for Subcatchment DA-4: NW TO ALIMAGNET LAKE

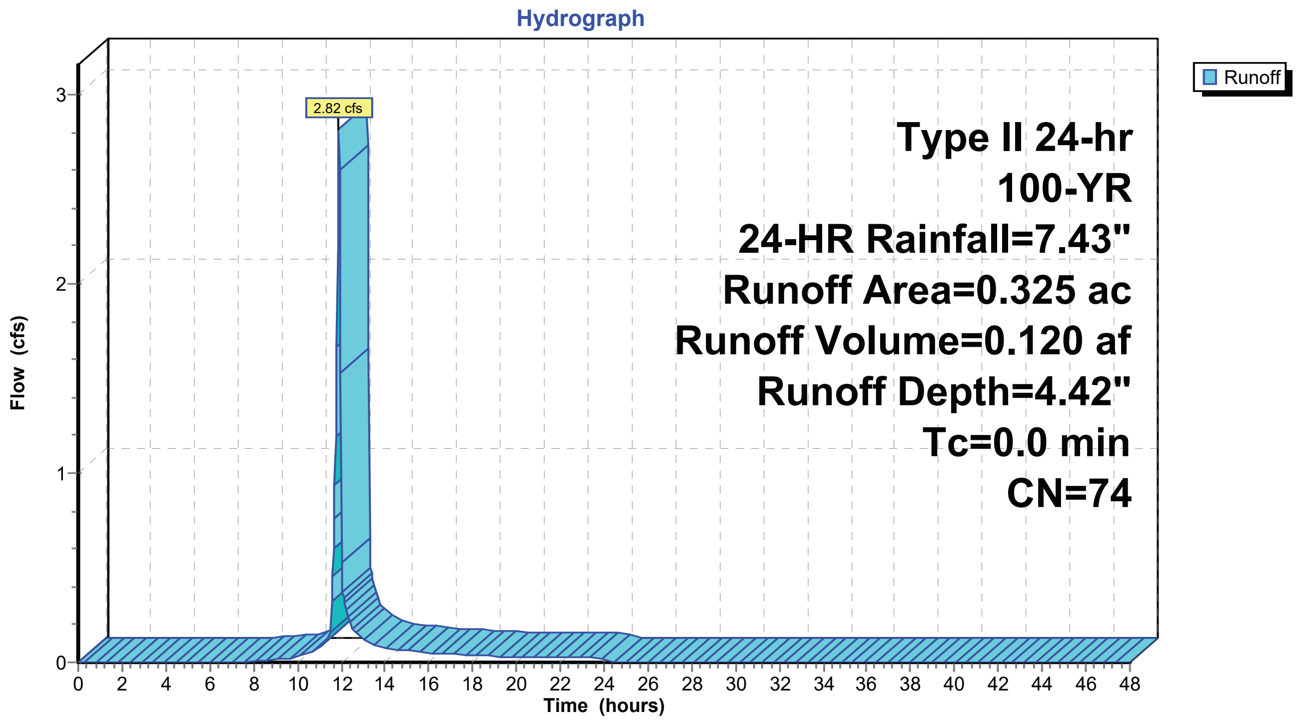
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 2.82 cfs @ 11.89 hrs, Volume= 0.120 af, Depth= 4.42"
Routed to Reach LAKE_PR : TO ALIMAGNET LAKE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-YR, 24-HR Rainfall=7.43"

Area (ac)	CN	Description
0.325	74	>75% Grass cover, Good, HSG C
0.325		100.00% Pervious Area

Subcatchment DA-4: NW TO ALIMAGNET LAKE



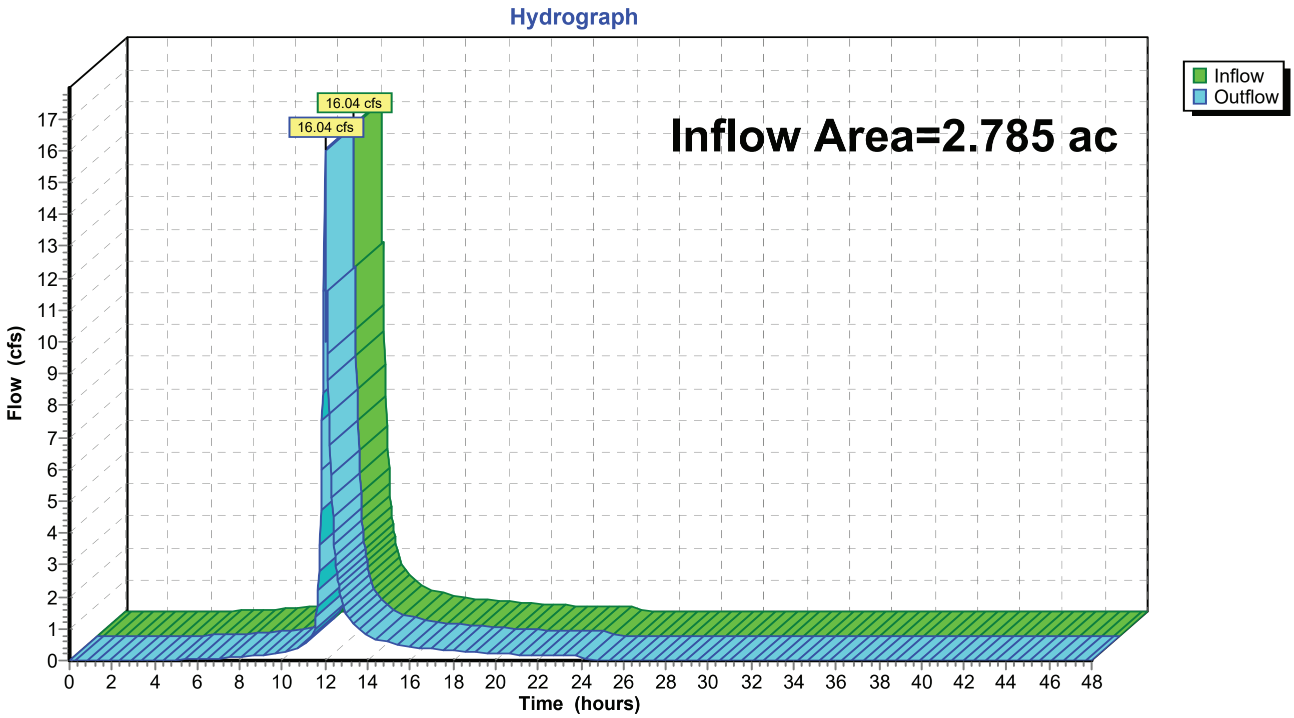
Summary for Reach LAKE_PR: TO ALIMAGNET LAKE

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

Inflow Area = 2.785 ac, 41.22% Impervious, Inflow Depth = 4.45" for 100-YR, 24-HR event
Inflow = 16.04 cfs @ 12.00 hrs, Volume= 1.034 af
Outflow = 16.04 cfs @ 12.00 hrs, Volume= 1.034 af, Atten= 0%, Lag= 0.0 min
Routed to Reach OUT_PR : OUT_PR

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Reach LAKE_PR: TO ALIMAGNET LAKE



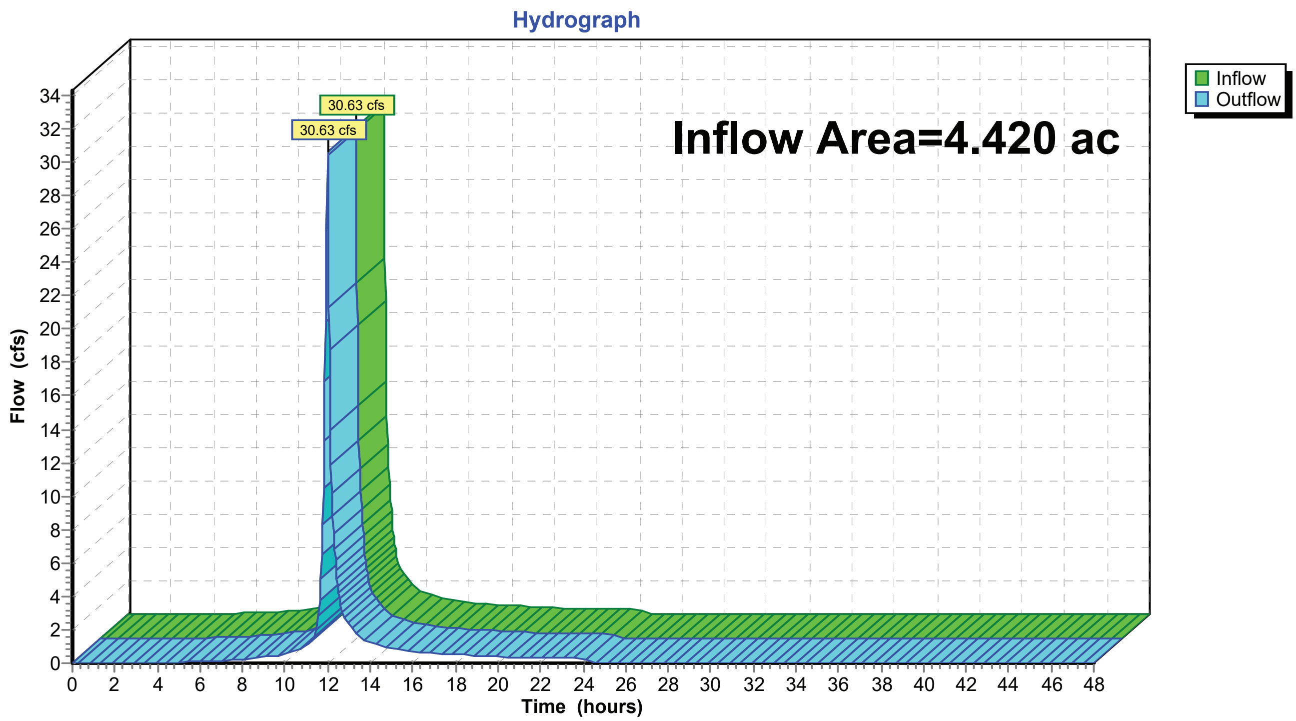
Summary for Reach OUT_PR: OUT_PR

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

Inflow Area = 4.420 ac, 43.62% Impervious, Inflow Depth = 4.90" for 100-YR, 24-HR event
Inflow = 30.63 cfs @ 11.99 hrs, Volume= 1.805 af
Outflow = 30.63 cfs @ 11.99 hrs, Volume= 1.805 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Reach OUT_PR: OUT_PR

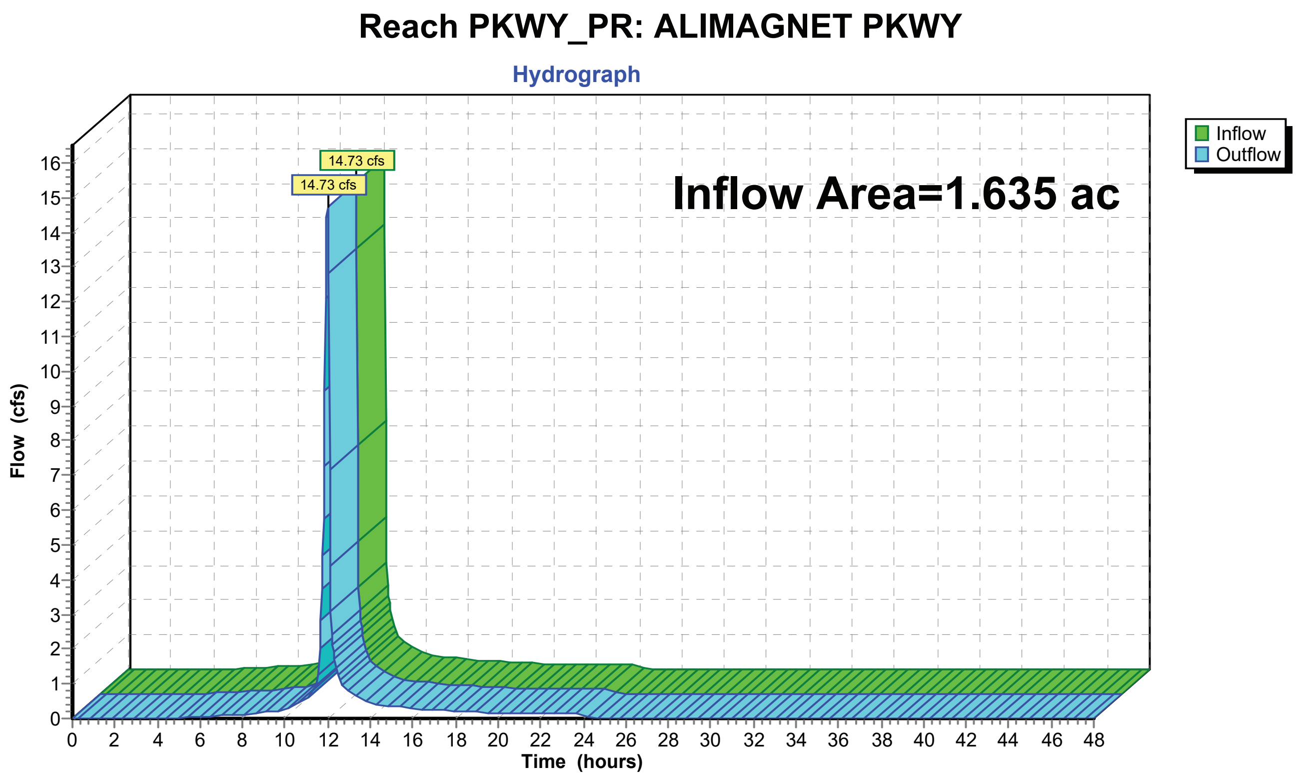


Summary for Reach PKWY_PR: ALIMAGNET PKWY

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

Inflow Area = 1.635 ac, 47.71% Impervious, Inflow Depth = 5.66" for 100-YR, 24-HR event
Inflow = 14.73 cfs @ 11.98 hrs, Volume= 0.772 af
Outflow = 14.73 cfs @ 11.98 hrs, Volume= 0.772 af, Atten= 0%, Lag= 0.0 min
Routed to Reach OUT_PR : OUT_PR

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs



Summary for Pond 1P: INFILTRATION

[80] Warning: Exceeded Pond 3P by 1.24' @ 24.48 hrs (7.44 cfs 1.359 af)

Inflow Area = 1.111 ac, 45.09% Impervious, Inflow Depth = 5.78" for 100-YR, 24-HR event
Inflow = 10.15 cfs @ 11.98 hrs, Volume= 0.535 af
Outflow = 3.29 cfs @ 12.12 hrs, Volume= 0.458 af, Atten= 68%, Lag= 8.5 min
Discarded = 0.08 cfs @ 12.12 hrs, Volume= 0.194 af
Primary = 3.21 cfs @ 12.12 hrs, Volume= 0.264 af
Routed to Reach LAKE_PR : TO ALIMAGNET LAKE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,010.13' @ 12.12 hrs Surf.Area= 4,226 sf Storage= 11,383 cf
Flood Elev= 1,011.00' Surf.Area= 5,000 sf Storage= 15,400 cf

Plug-Flow detention time= 443.1 min calculated for 0.458 af (86% of inflow)
Center-of-Mass det. time= 378.4 min (1,166.3 - 787.9)

Volume	Invert	Avail.Storage	Storage Description
#1	1,006.00'	15,400 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

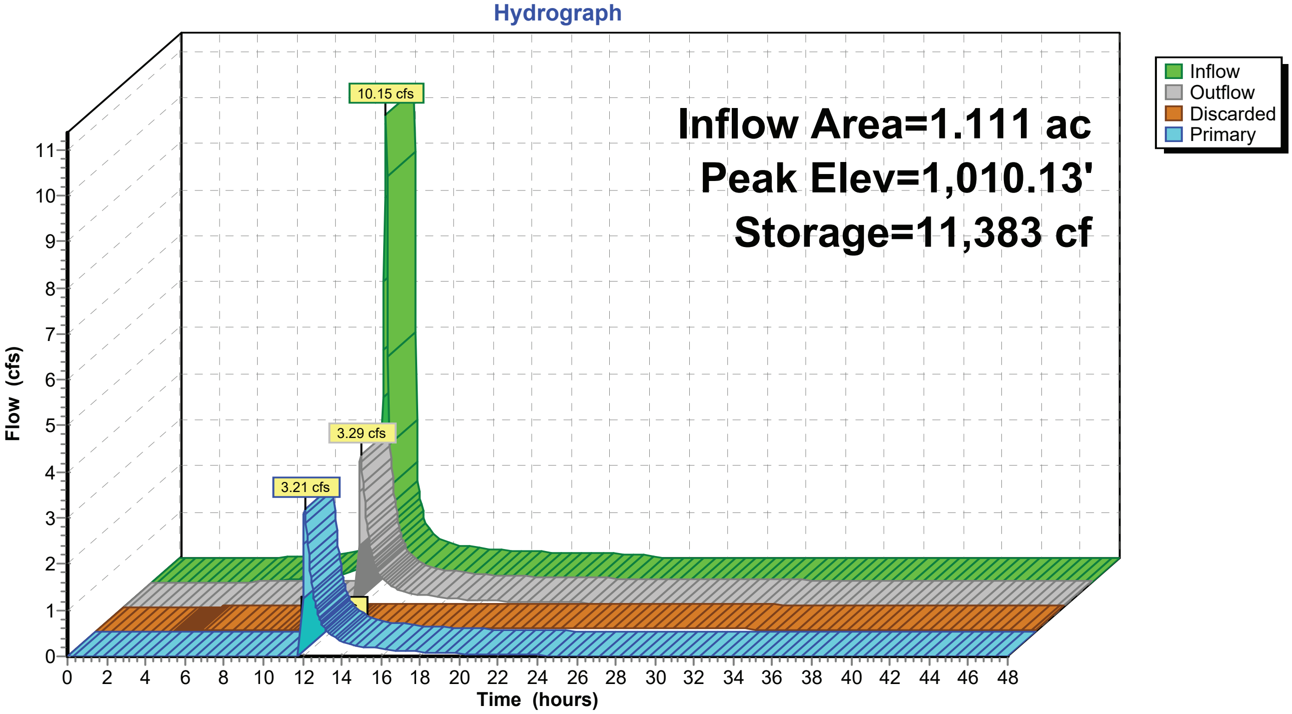
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,006.00	1,500	0	0
1,009.20	3,400	7,840	7,840
1,011.00	5,000	7,560	15,400

Device	Routing	Invert	Outlet Devices
#1	Discarded	1,006.00'	**0.800 in/hr Exfiltration over Surface area**
#2	Primary	1,009.20'	**15.0" Round RCP_Round 15"** L= 100.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,009.20' / 1,006.00' S= 0.0320 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf

Discarded OutFlow Max=0.08 cfs @ 12.12 hrs HW=1,010.13' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=3.21 cfs @ 12.12 hrs HW=1,010.13' TW=0.00' (Dynamic Tailwater)
└─**2=RCP_Round 15"** (Inlet Controls 3.21 cfs @ 3.28 fps)

Pond 1P: INFILTRATION



Summary for Pond 3P: PRETREATMENT

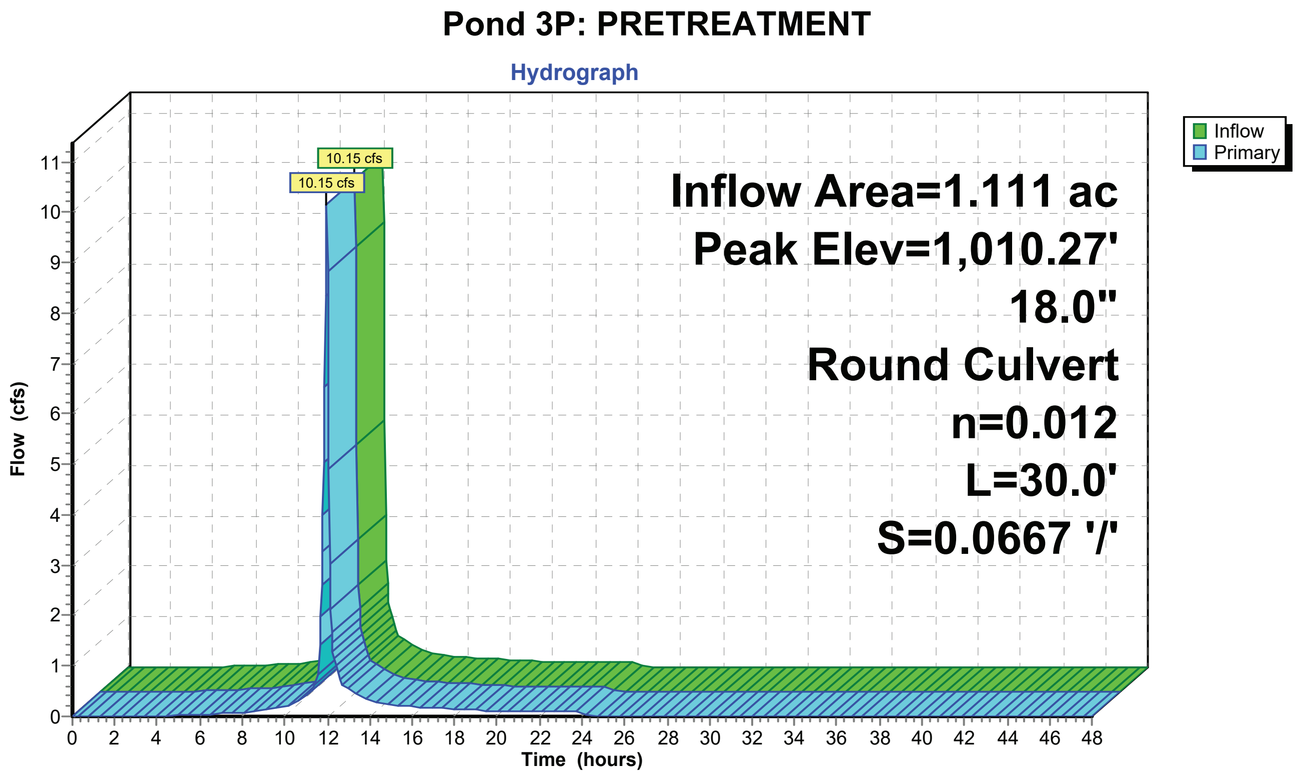
[57] Hint: Peaked at 1,010.27' (Flood elevation advised)

Inflow Area = 1.111 ac, 45.09% Impervious, Inflow Depth = 5.78" for 100-YR, 24-HR event
Inflow = 10.15 cfs @ 11.98 hrs, Volume= 0.535 af
Outflow = 10.15 cfs @ 11.98 hrs, Volume= 0.535 af, Atten= 0%, Lag= 0.0 min
Primary = 10.15 cfs @ 11.98 hrs, Volume= 0.535 af
Routed to Pond 1P : INFILTRATION

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,010.27' @ 12.03 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,008.00'	**18.0" Round RCP_Round 18"** L= 30.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 1,008.00' / 1,006.00' S= 0.0667 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=7.56 cfs @ 11.98 hrs HW=1,010.05' TW=1,009.54' (Dynamic Tailwater)
1=RCP_Round 18" (Inlet Controls 7.56 cfs @ 4.28 fps)



Summary for Pond 4P: MEDIAN STORAGE

[93] Warning: Storage range exceeded by 2.61'
[58] Hint: Peaked 2.62' above defined flood level
[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 1.349 ac, 47.96% Impervious, Inflow Depth = 5.78" for 100-YR, 24-HR event
Inflow = 12.32 cfs @ 11.98 hrs, Volume= 0.650 af
Outflow = 14.32 cfs @ 12.00 hrs, Volume= 0.650 af, Atten= 0%, Lag= 1.0 min
Primary = 14.32 cfs @ 12.00 hrs, Volume= 0.650 af
Routed to Reach LAKE_PR : TO ALIMAGNET LAKE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,010.62' @ 12.00 hrs Surf.Area= 3,602 sf Storage= 2,807 cf
Flood Elev= 1,008.00' Surf.Area= 3,579 sf Storage= 2,772 cf

Plug-Flow detention time= 6.0 min calculated for 0.649 af (100% of inflow)
Center-of-Mass det. time= 6.0 min (793.9 - 787.9)

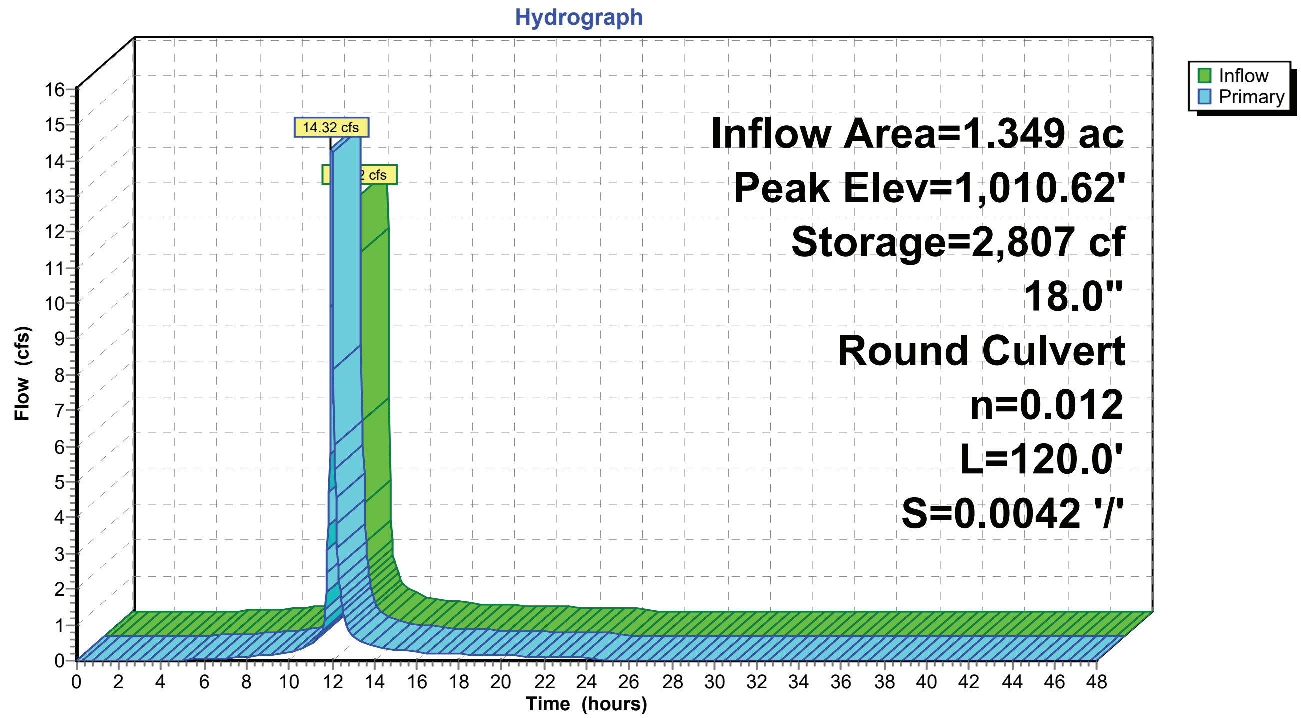
Volume	Invert	Avail.Storage	Storage Description
#1	1,006.50'	2,807 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,006.50	61	0	0
1,007.00	1,289	338	338
1,008.01	3,602	2,470	2,807

Device	Routing	Invert	Outlet Devices
#1	Primary	1,006.50'	**18.0" Round RCP_Round 18"** L= 120.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 1,006.50' / 1,006.00' S= 0.0042 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=13.79 cfs @ 12.00 hrs HW=1,010.40' TW=0.00' (Dynamic Tailwater)
└─**1=RCP_Round 18"** (Barrel Controls 13.79 cfs @ 7.81 fps)

Pond 4P: MEDIAN STORAGE



Time span=0.00-48.00 hrs, dt=0.04 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentDA-1: SITE TO PR POND Runoff Area=1.111 ac 45.09% Impervious Runoff Depth=6.80"
Tc=7.0 min CN=86 Runoff=11.81 cfs 0.629 af

SubcatchmentDA-2: EX PARKING TO Runoff Area=1.349 ac 47.96% Impervious Runoff Depth=6.80"
Tc=7.0 min CN=86 Runoff=14.34 cfs 0.764 af

SubcatchmentDA-3: TO ALIMAGNETPKWY Runoff Area=1.635 ac 47.71% Impervious Runoff Depth=6.68"
Tc=7.0 min CN=85 Runoff=17.19 cfs 0.910 af

SubcatchmentDA-4: NW TO ALIMAGNET Runoff Area=0.325 ac 0.00% Impervious Runoff Depth=5.36"
Tc=0.0 min CN=74 Runoff=3.39 cfs 0.145 af

Reach LAKE_PR: TO ALIMAGNETLAKE Inflow=22.74 cfs 1.264 af
Outflow=22.74 cfs 1.264 af

Reach OUT_PR: OUT_PR Inflow=39.72 cfs 2.174 af
Outflow=39.72 cfs 2.174 af

Reach PKWY_PR: ALIMAGNETPKWY Inflow=17.19 cfs 0.910 af
Outflow=17.19 cfs 0.910 af

Pond 1P: INFILTRATION Peak Elev=1,010.45' Storage=12,794 cf Inflow=11.81 cfs 0.629 af
Discarded=0.08 cfs 0.197 af Primary=4.69 cfs 0.355 af Outflow=4.77 cfs 0.552 af

Pond 3P: PRETREATMENT Peak Elev=1,011.01' Inflow=11.81 cfs 0.629 af
18.0" Round Culvert n=0.012 L=30.0' S=0.0667 '/' Outflow=11.81 cfs 0.629 af

Pond 4P: MEDIAN STORAGE Peak Elev=1,013.15' Storage=2,807 cf Inflow=14.34 cfs 0.764 af
18.0" Round Culvert n=0.012 L=120.0' S=0.0042 '/' Outflow=19.26 cfs 0.764 af

Total Runoff Area = 4.420 ac Runoff Volume = 2.448 af Average Runoff Depth = 6.65"
56.38% Pervious = 2.492 ac 43.62% Impervious = 1.928 ac

Summary for Subcatchment DA-1: SITE TO PR POND

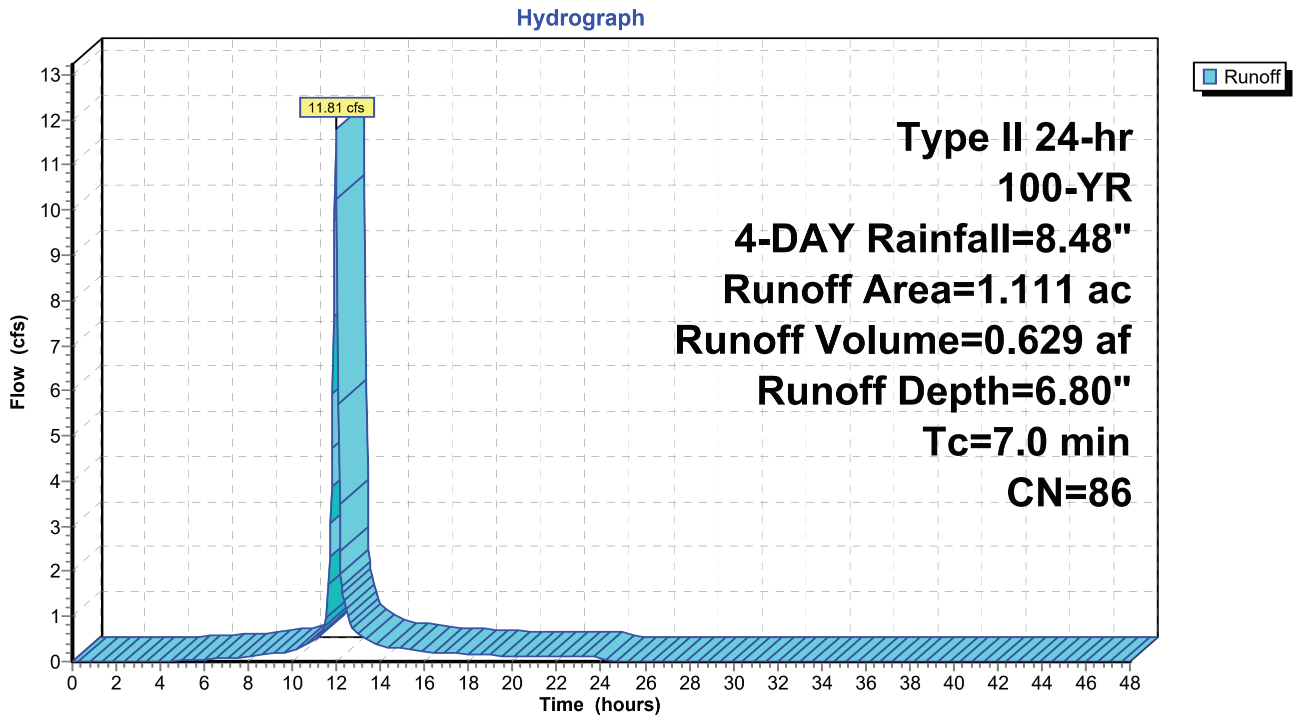
Runoff = 11.81 cfs @ 11.98 hrs, Volume= 0.629 af, Depth= 6.80"
Routed to Pond 3P : PRETREATMENT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-YR, 4-DAY Rainfall=8.48"

	Area (ac)	CN	Description
	0.501	98	Paved parking, HSG C
*	0.150	83	Permeable Pavement, 20% Void, 10in sand
	0.460	74	>75% Grass cover, Good, HSG C
	1.111	86	Weighted Average
	0.610		54.91% Pervious Area
	0.501		45.09% Impervious Area

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

Subcatchment DA-1: SITE TO PR POND



Summary for Subcatchment DA-2: EX PARKING TO MEDIAN

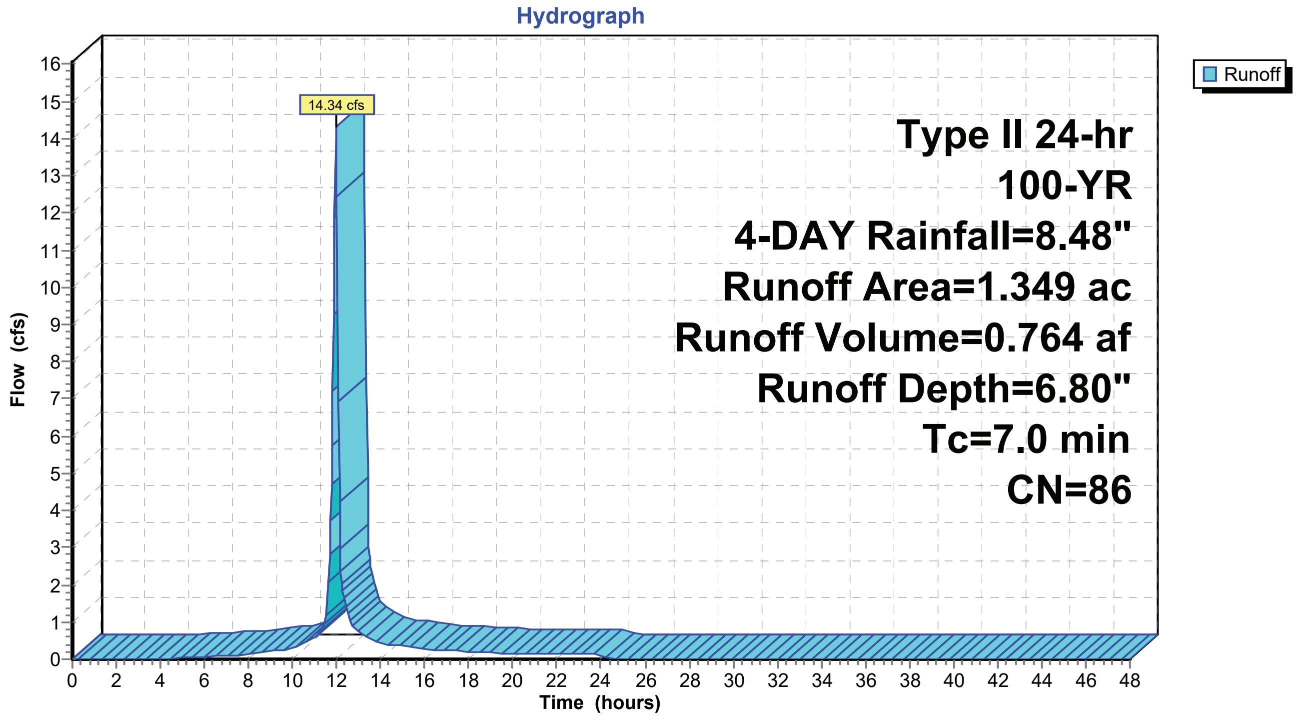
Runoff = 14.34 cfs @ 11.98 hrs, Volume= 0.764 af, Depth= 6.80"
Routed to Pond 4P : MEDIAN STORAGE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-YR, 4-DAY Rainfall=8.48"

Area (ac)	CN	Description
0.647	98	Paved parking, HSG C
0.702	74	>75% Grass cover, Good, HSG C
1.349	86	Weighted Average
0.702		52.04% Pervious Area
0.647		47.96% Impervious Area

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

Subcatchment DA-2: EX PARKING TO MEDIAN



Summary for Subcatchment DA-3: TO ALIMAGNET PKWY

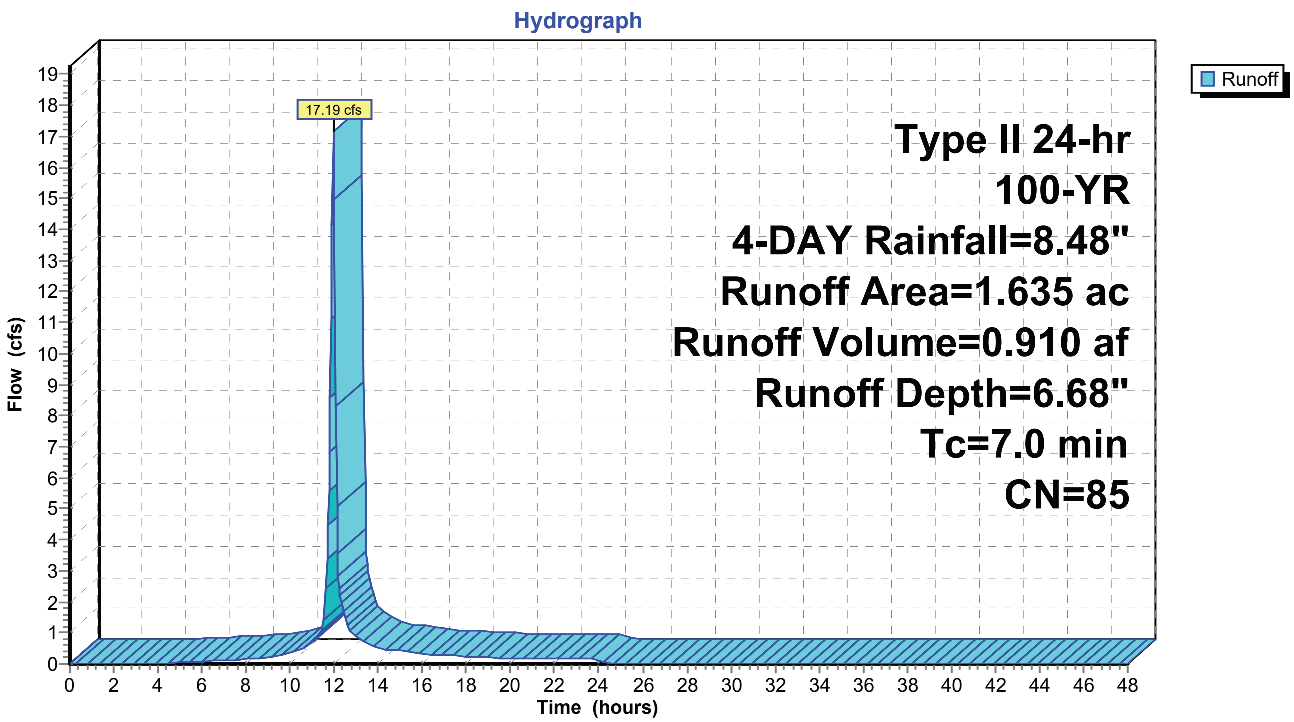
Runoff = 17.19 cfs @ 11.98 hrs, Volume= 0.910 af, Depth= 6.68"
Routed to Reach PKWY_PR : ALIMAGNET PKWY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-YR, 4-DAY Rainfall=8.48"

Area (ac)	CN	Description
0.780	98	Paved parking, HSG C
0.855	74	>75% Grass cover, Good, HSG C
1.635	85	Weighted Average
0.855		52.29% Pervious Area
0.780		47.71% Impervious Area

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

Subcatchment DA-3: TO ALIMAGNET PKWY



Summary for Subcatchment DA-4: NW TO ALIMAGNET LAKE

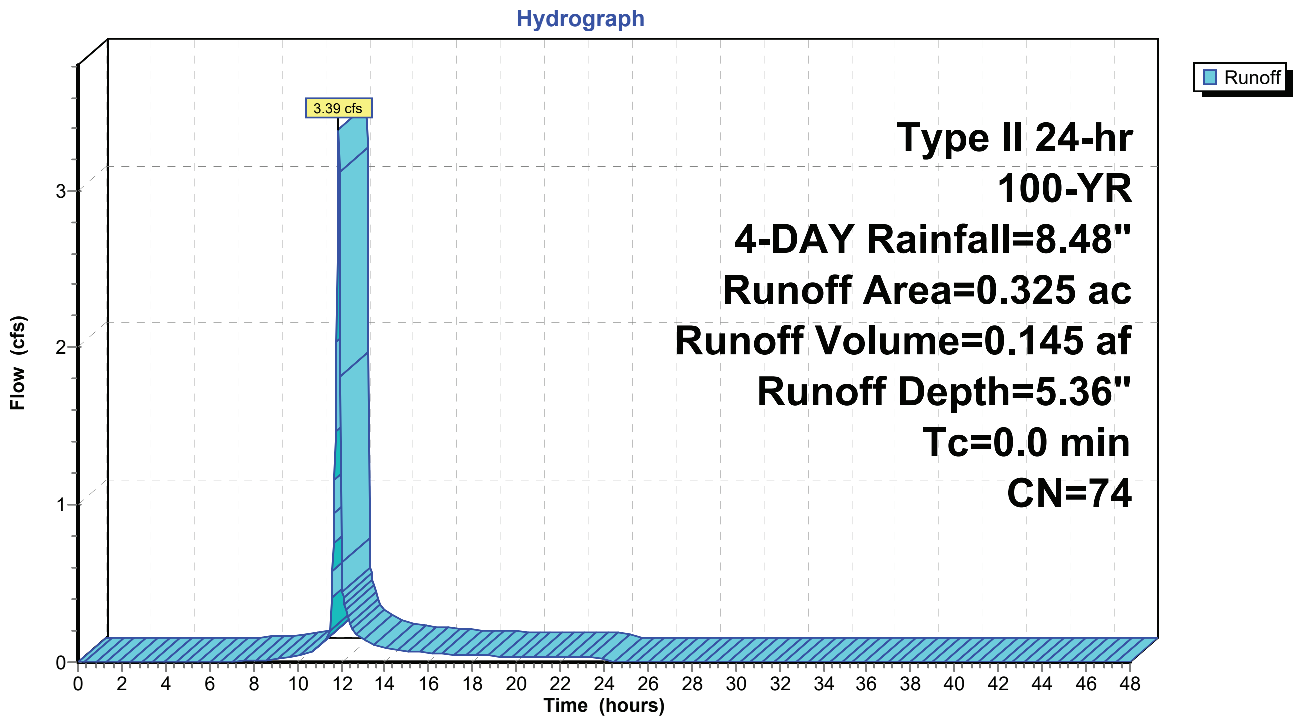
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 3.39 cfs @ 11.89 hrs, Volume= 0.145 af, Depth= 5.36"
Routed to Reach LAKE_PR : TO ALIMAGNET LAKE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-YR, 4-DAY Rainfall=8.48"

Area (ac)	CN	Description
0.325	74	>75% Grass cover, Good, HSG C
0.325		100.00% Pervious Area

Subcatchment DA-4: NW TO ALIMAGNET LAKE



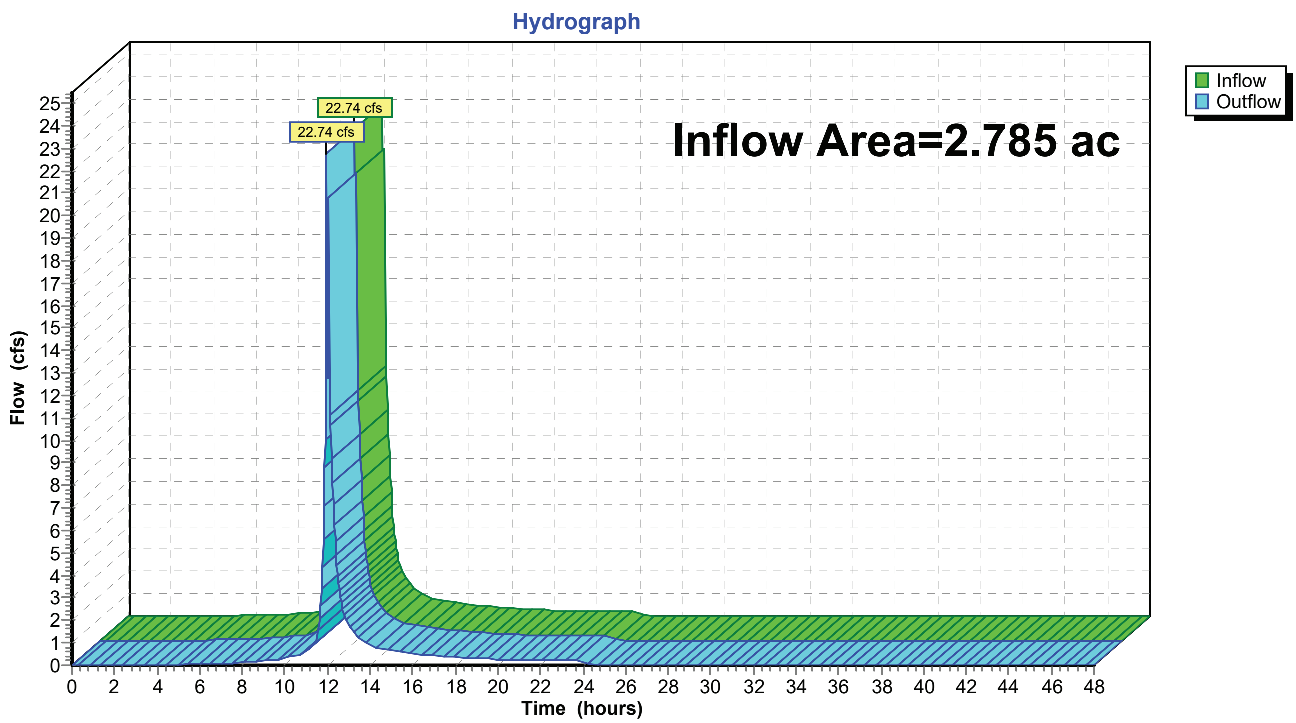
Summary for Reach LAKE_PR: TO ALIMAGNET LAKE

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

Inflow Area = 2.785 ac, 41.22% Impervious, Inflow Depth = 5.45" for 100-YR, 4-DAY event
Inflow = 22.74 cfs @ 11.96 hrs, Volume= 1.264 af
Outflow = 22.74 cfs @ 11.96 hrs, Volume= 1.264 af, Atten= 0%, Lag= 0.0 min
Routed to Reach OUT_PR : OUT_PR

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Reach LAKE_PR: TO ALIMAGNET LAKE



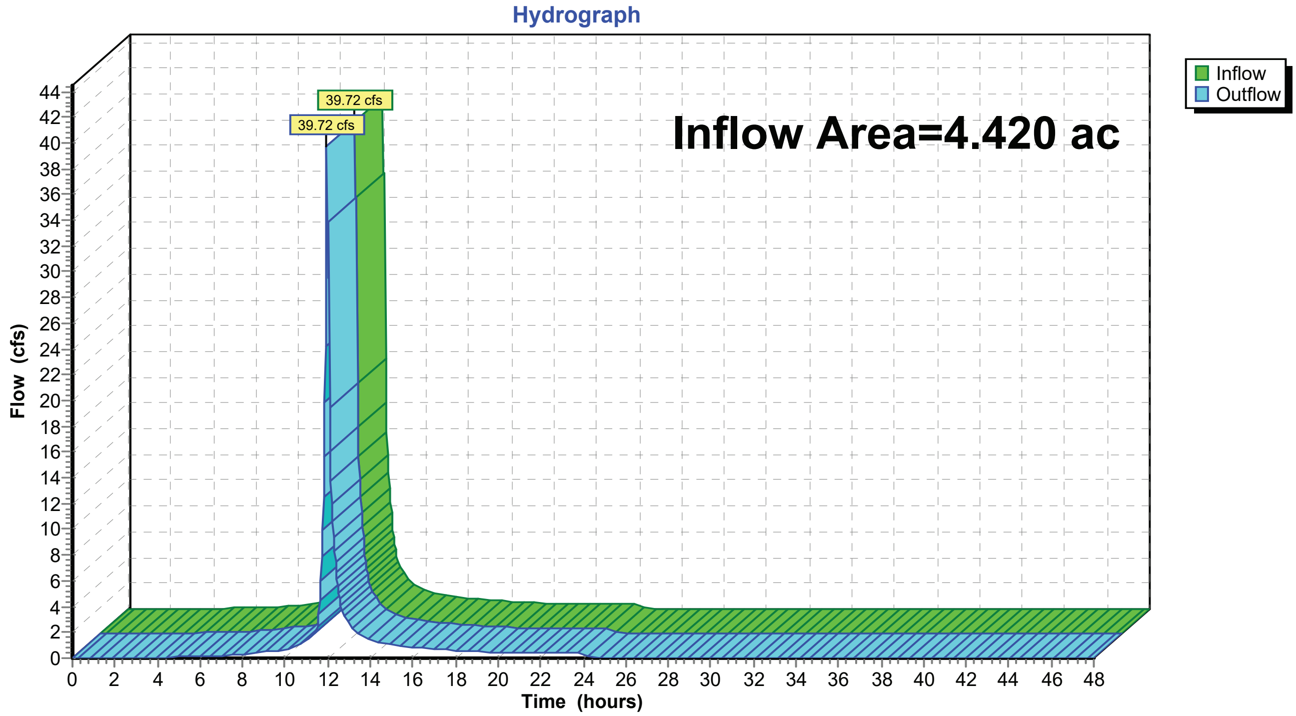
Summary for Reach OUT_PR: OUT_PR

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

Inflow Area = 4.420 ac, 43.62% Impervious, Inflow Depth = 5.90" for 100-YR, 4-DAY event
Inflow = 39.72 cfs @ 11.96 hrs, Volume= 2.174 af
Outflow = 39.72 cfs @ 11.96 hrs, Volume= 2.174 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Reach OUT_PR: OUT_PR

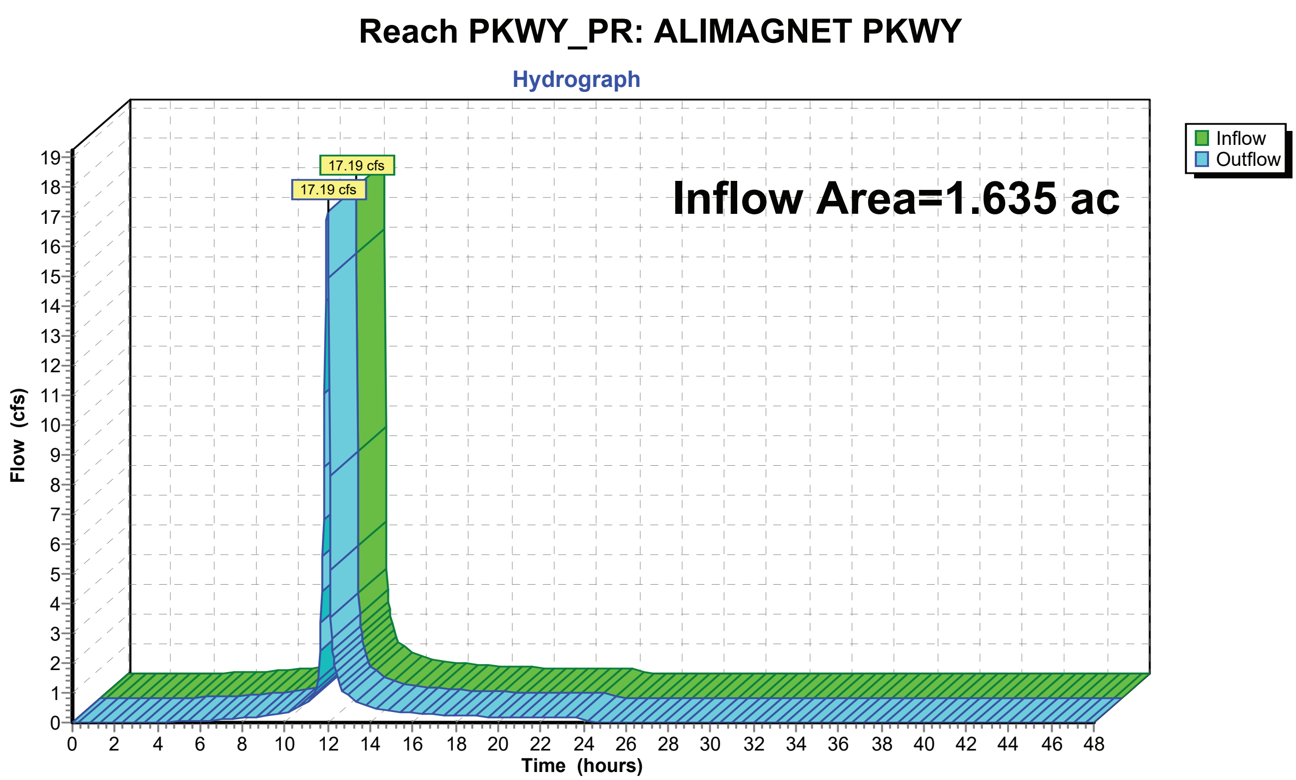


Summary for Reach PKWY_PR: ALIMAGNET PKWY

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

Inflow Area = 1.635 ac, 47.71% Impervious, Inflow Depth = 6.68" for 100-YR, 4-DAY event
Inflow = 17.19 cfs @ 11.98 hrs, Volume= 0.910 af
Outflow = 17.19 cfs @ 11.98 hrs, Volume= 0.910 af, Atten= 0%, Lag= 0.0 min
Routed to Reach OUT_PR : OUT_PR

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs



Summary for Pond 1P: INFILTRATION

[80] Warning: Exceeded Pond 3P by 1.26' @ 24.48 hrs (7.54 cfs 1.390 af)

Inflow Area = 1.111 ac, 45.09% Impervious, Inflow Depth = 6.80" for 100-YR, 4-DAY event
Inflow = 11.81 cfs @ 11.98 hrs, Volume= 0.629 af
Outflow = 4.77 cfs @ 12.10 hrs, Volume= 0.552 af, Atten= 60%, Lag= 7.2 min
Discarded = 0.08 cfs @ 12.10 hrs, Volume= 0.197 af
Primary = 4.69 cfs @ 12.10 hrs, Volume= 0.355 af
Routed to Reach LAKE_PR : TO ALIMAGNET LAKE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,010.45' @ 12.10 hrs Surf.Area= 4,513 sf Storage= 12,794 cf
Flood Elev= 1,011.00' Surf.Area= 5,000 sf Storage= 15,400 cf

Plug-Flow detention time= 381.3 min calculated for 0.552 af (88% of inflow)
Center-of-Mass det. time= 321.8 min (1,105.3 - 783.5)

Volume	Invert	Avail.Storage	Storage Description
#1	1,006.00'	15,400 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

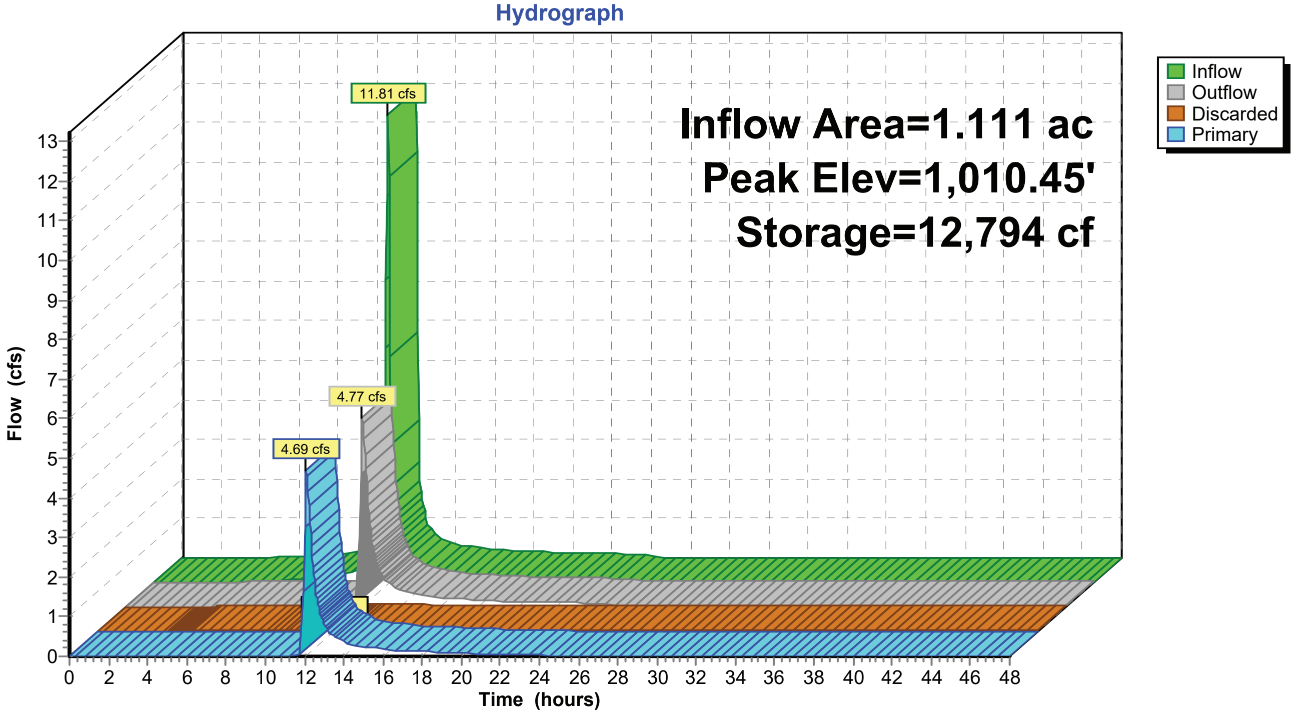
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,006.00	1,500	0	0
1,009.20	3,400	7,840	7,840
1,011.00	5,000	7,560	15,400

Device	Routing	Invert	Outlet Devices
#1	Discarded	1,006.00'	**0.800 in/hr Exfiltration over Surface area**
#2	Primary	1,009.20'	**15.0" Round RCP_Round 15"** L= 100.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,009.20' / 1,006.00' S= 0.0320 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf

Discarded OutFlow Max=0.08 cfs @ 12.10 hrs HW=1,010.44' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=4.65 cfs @ 12.10 hrs HW=1,010.44' TW=0.00' (Dynamic Tailwater)
2=RCP_Round 15" (Inlet Controls 4.65 cfs @ 3.79 fps)

Pond 1P: INFILTRATION



Summary for Pond 3P: PRETREATMENT

[57] Hint: Peaked at 1,011.01' (Flood elevation advised)

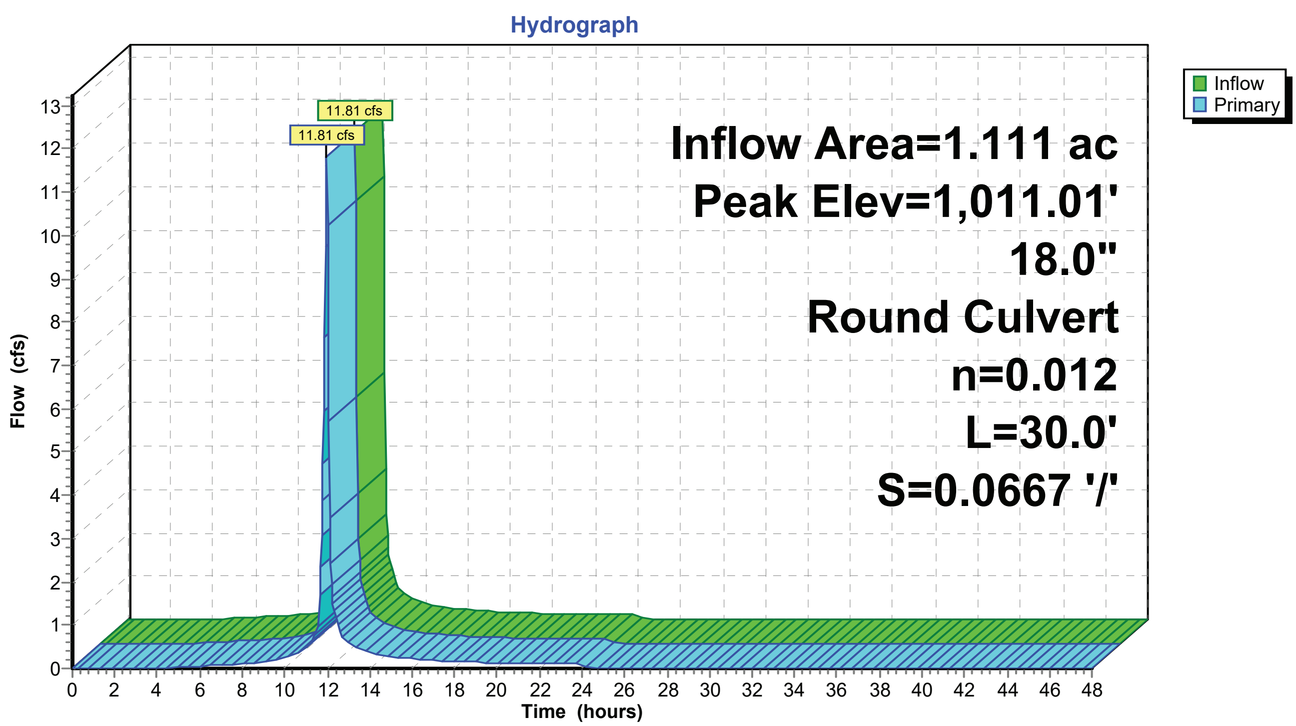
Inflow Area = 1.111 ac, 45.09% Impervious, Inflow Depth = 6.80" for 100-YR, 4-DAY event
Inflow = 11.81 cfs @ 11.98 hrs, Volume= 0.629 af
Outflow = 11.81 cfs @ 11.98 hrs, Volume= 0.629 af, Atten= 0%, Lag= 0.0 min
Primary = 11.81 cfs @ 11.98 hrs, Volume= 0.629 af
Routed to Pond 1P : INFILTRATION

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,011.01' @ 12.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,008.00'	**18.0" Round RCP_Round 18"** L= 30.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 1,008.00' / 1,006.00' S= 0.0667 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=9.75 cfs @ 11.98 hrs HW=1,010.81' TW=1,009.97' (Dynamic Tailwater)
1=RCP_Round 18" (Inlet Controls 9.75 cfs @ 5.52 fps)

Pond 3P: PRETREATMENT



Summary for Pond 4P: MEDIAN STORAGE

[93] Warning: Storage range exceeded by 5.14'
[58] Hint: Peaked 5.15' above defined flood level
[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 1.349 ac, 47.96% Impervious, Inflow Depth = 6.80" for 100-YR, 4-DAY event
Inflow = 14.34 cfs @ 11.98 hrs, Volume= 0.764 af
Outflow = 19.26 cfs @ 11.96 hrs, Volume= 0.764 af, Atten= 0%, Lag= 0.0 min
Primary = 19.26 cfs @ 11.96 hrs, Volume= 0.764 af
Routed to Reach LAKE_PR : TO ALIMAGNET LAKE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,013.15' @ 11.96 hrs Surf.Area= 3,602 sf Storage= 2,807 cf
Flood Elev= 1,008.00' Surf.Area= 3,579 sf Storage= 2,772 cf

Plug-Flow detention time= 5.7 min calculated for 0.764 af (100% of inflow)
Center-of-Mass det. time= 5.7 min (789.2 - 783.5)

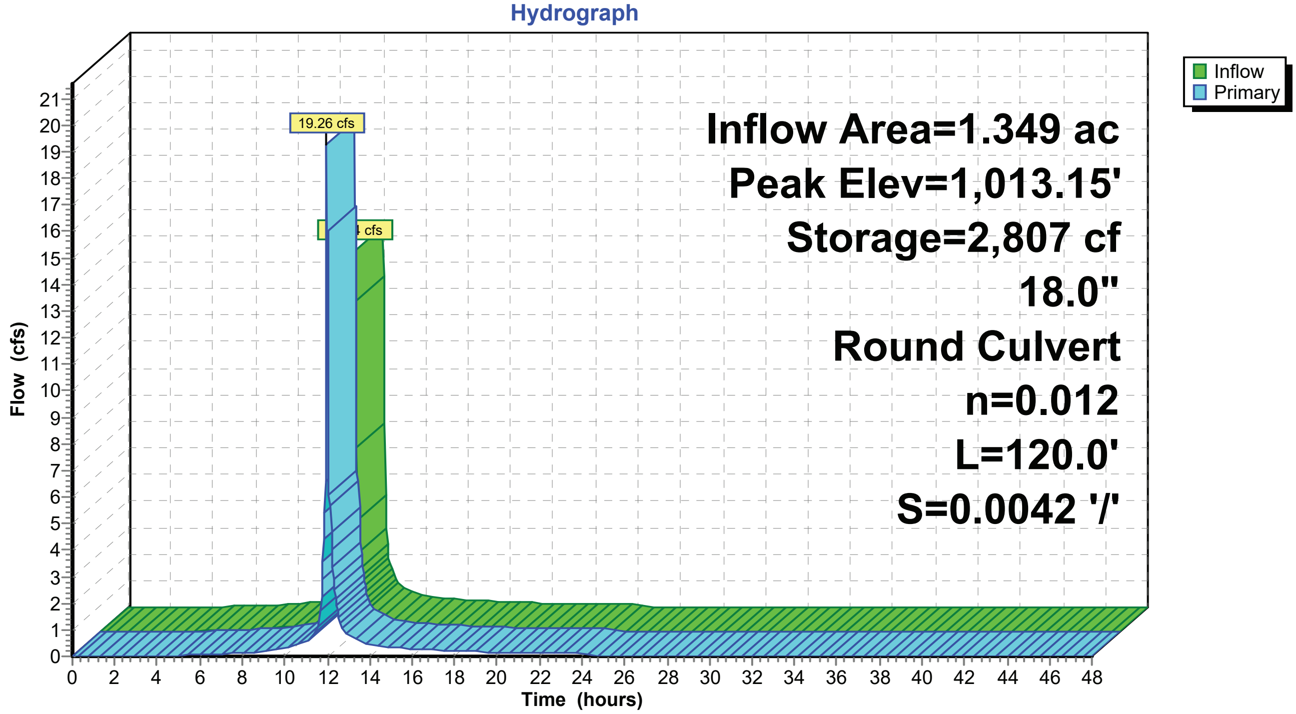
Volume	Invert	Avail.Storage	Storage Description
#1	1,006.50'	2,807 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

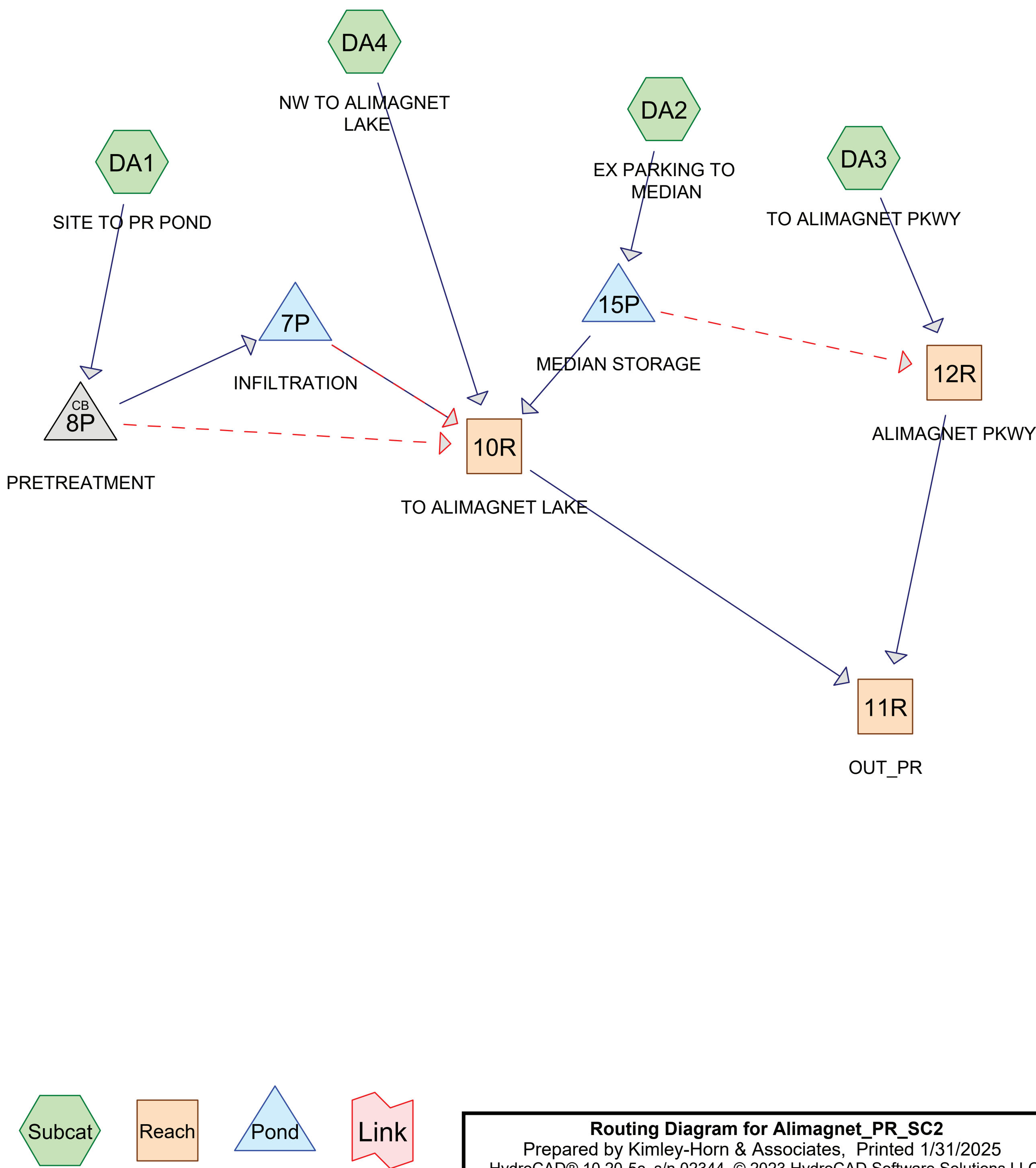
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,006.50	61	0	0
1,007.00	1,289	338	338
1,008.01	3,602	2,470	2,807

Device	Routing	Invert	Outlet Devices
#1	Primary	1,006.50'	**18.0" Round RCP_Round 18"** L= 120.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 1,006.50' / 1,006.00' S= 0.0042 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=18.85 cfs @ 11.96 hrs HW=1,012.92' TW=0.00' (Dynamic Tailwater)
└─**1=RCP_Round 18"** (Barrel Controls 18.85 cfs @ 10.67 fps)

Pond 4P: MEDIAN STORAGE





Routing Diagram for Alimagnet_PR_SC2
Prepared by Kimley-Horn & Associates, Printed 1/31/2025
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	1-YR, 24-HR	MSE 24-hr	3	Default	24.00	1	2.47	2
2	2-YR, 24-HR	MSE 24-hr	3	Default	24.00	1	2.81	2
3	10-YR, 24-HR	Type II 24-hr		Default	24.00	1	4.18	2
4	100-YR, 24-HR	Type II 24-hr		Default	24.00	1	7.43	2
5	100-YR, 4-DAY	Type II 24-hr		Default	24.00	1	8.48	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.497	74	>75% Grass cover, Good, HSG C (DA1, DA2, DA3, DA4)
1.923	98	Paved parking, HSG C (DA1, DA2, DA3)
4.420	**84**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
4.420	HSG C	DA1, DA2, DA3, DA4
0.000	HSG D	
0.000	Other	
4.420		**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	2.497	0.000	0.000	2.497	>75% Grass cover, Good	DA1, DA2, DA3, DA4
0.000	0.000	1.923	0.000	0.000	1.923	Paved parking	DA1, DA2, DA3
0.000	**0.000**	**4.420**	**0.000**	**0.000**	**4.420**	**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	7P	1,009.20	1,006.00	100.0	0.0320	0.013	0.0	15.0	0.0	
2	8P	1,008.00	1,006.00	30.0	0.0667	0.012	0.0	18.0	0.0	
3	15P	1,006.50	1,006.00	120.0	0.0042	0.012	0.0	18.0	0.0	

Time span=0.00-48.00 hrs, dt=0.04 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentDA1: SITE TO PR POND Runoff Area=1.111 ac 44.64% Impervious Runoff Depth=1.15"
Tc=7.0 min CN=85 Runoff=2.24 cfs 0.107 af

SubcatchmentDA2: EX PARKING TO Runoff Area=1.349 ac 47.96% Impervious Runoff Depth=1.22"
Tc=7.0 min CN=86 Runoff=2.87 cfs 0.137 af

SubcatchmentDA3: TO ALIMAGNETPKWY Runoff Area=1.635 ac 47.71% Impervious Runoff Depth=1.15"
Tc=7.0 min CN=85 Runoff=3.29 cfs 0.157 af

SubcatchmentDA4: NW TO ALIMAGNET Runoff Area=0.325 ac 0.00% Impervious Runoff Depth=0.59"
Tc=0.0 min CN=74 Runoff=0.45 cfs 0.016 af

Reach 10R: TO ALIMAGNETLAKE Inflow=2.29 cfs 0.153 af
Outflow=2.29 cfs 0.153 af

Reach 11R: OUT_PR Inflow=5.38 cfs 0.310 af
Outflow=5.38 cfs 0.310 af

Reach 12R: ALIMAGNETPKWY Inflow=3.29 cfs 0.157 af
Outflow=3.29 cfs 0.157 af

Pond 7P: INFILTRATION Peak Elev=1,006.53' Storage=2,640 cf Inflow=2.24 cfs 0.107 af
Discarded=0.10 cfs 0.107 af Primary=0.00 cfs 0.000 af Outflow=0.10 cfs 0.107 af

Pond 8P: PRETREATMENT Peak Elev=1,008.61' Inflow=2.24 cfs 0.107 af
18.0" Round Culvert n=0.012 L=30.0' S=0.0667 '/' Outflow=2.24 cfs 0.107 af

Pond 15P: MEDIAN STORAGE Peak Elev=1,007.26' Storage=751 cf Inflow=2.87 cfs 0.137 af
18.0" Round Culvert n=0.012 L=120.0' S=0.0042 '/' Outflow=2.16 cfs 0.137 af

Total Runoff Area = 4.420 ac Runoff Volume = 0.417 af Average Runoff Depth = 1.13"
56.49% Pervious = 2.497 ac 43.51% Impervious = 1.923 ac

Summary for Subcatchment DA1: SITE TO PR POND

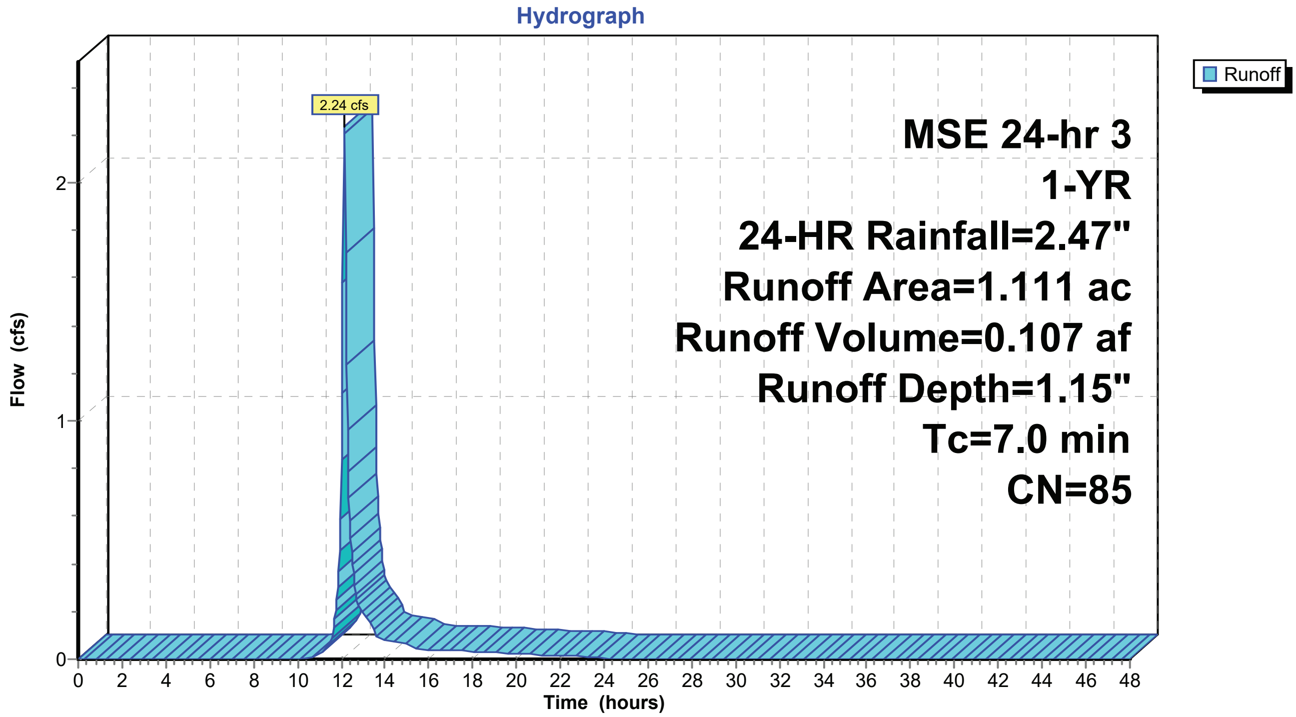
Runoff = 2.24 cfs @ 12.15 hrs, Volume= 0.107 af, Depth= 1.15"
Routed to Pond 8P : PRETREATMENT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
MSE 24-hr 3 1-YR, 24-HR Rainfall=2.47"

Area (ac)	CN	Description
0.496	98	Paved parking, HSG C
0.615	74	>75% Grass cover, Good, HSG C
1.111	85	Weighted Average
0.615		55.36% Pervious Area
0.496		44.64% Impervious Area

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

Subcatchment DA1: SITE TO PR POND



Summary for Subcatchment DA2: EX PARKING TO MEDIAN

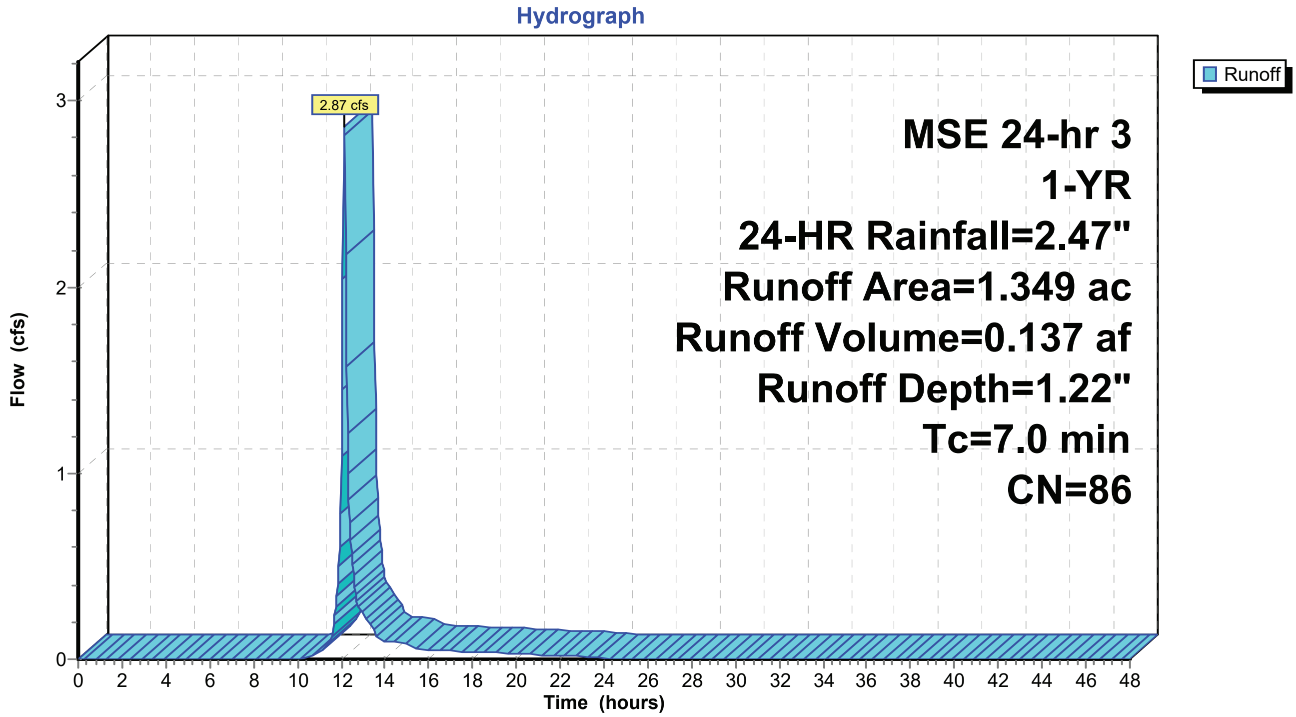
Runoff = 2.87 cfs @ 12.15 hrs, Volume= 0.137 af, Depth= 1.22"
Routed to Pond 15P : MEDIAN STORAGE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
MSE 24-hr 3 1-YR, 24-HR Rainfall=2.47"

Area (ac)	CN	Description
0.647	98	Paved parking, HSG C
0.702	74	>75% Grass cover, Good, HSG C
1.349	86	Weighted Average
0.702		52.04% Pervious Area
0.647		47.96% Impervious Area

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

Subcatchment DA2: EX PARKING TO MEDIAN



Summary for Subcatchment DA3: TO ALIMAGNET PKWY

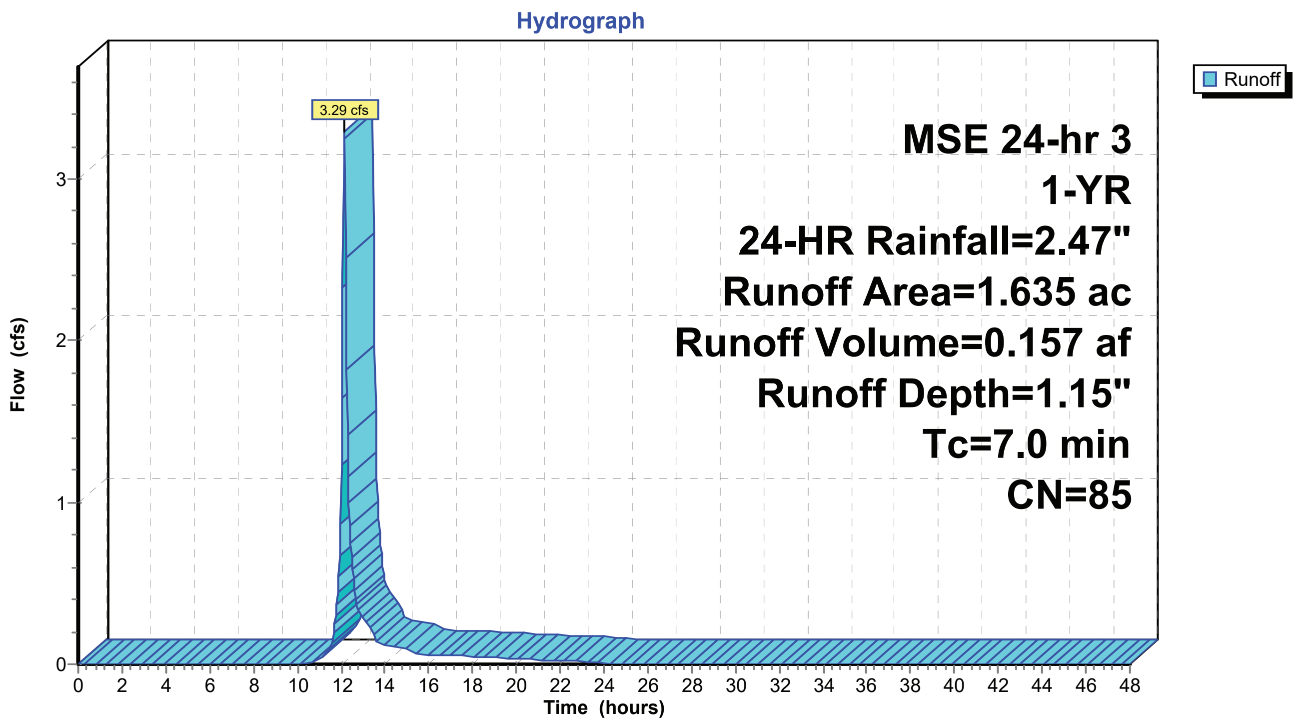
Runoff = 3.29 cfs @ 12.15 hrs, Volume= 0.157 af, Depth= 1.15"
Routed to Reach 12R : ALIMAGNET PKWY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
MSE 24-hr 3 1-YR, 24-HR Rainfall=2.47"

Area (ac)	CN	Description
0.780	98	Paved parking, HSG C
0.855	74	>75% Grass cover, Good, HSG C
1.635	85	Weighted Average
0.855		52.29% Pervious Area
0.780		47.71% Impervious Area

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

Subcatchment DA3: TO ALIMAGNET PKWY



Summary for Subcatchment DA4: NW TO ALIMAGNET LAKE

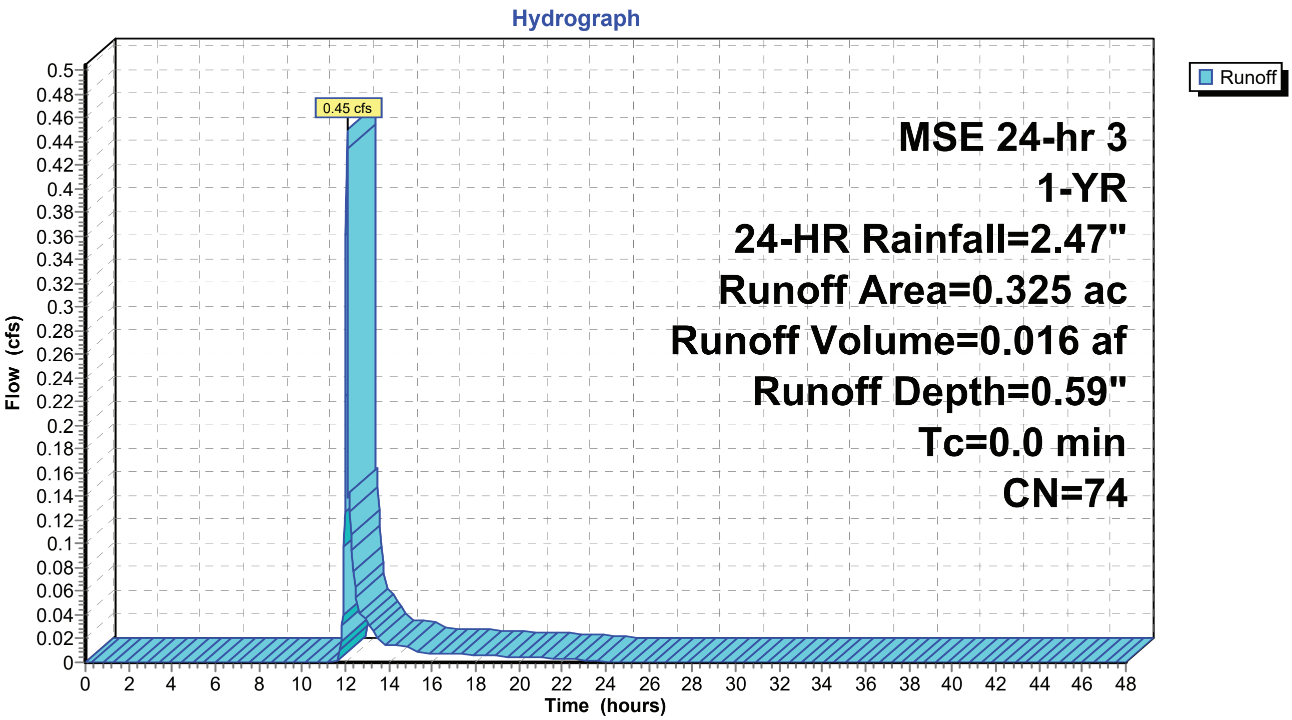
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.45 cfs @ 12.07 hrs, Volume= 0.016 af, Depth= 0.59"
Routed to Reach 10R : TO ALIMAGNET LAKE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
MSE 24-hr 3 1-YR, 24-HR Rainfall=2.47"

Area (ac)	CN	Description
0.325	74	>75% Grass cover, Good, HSG C
0.325		100.00% Pervious Area

Subcatchment DA4: NW TO ALIMAGNET LAKE



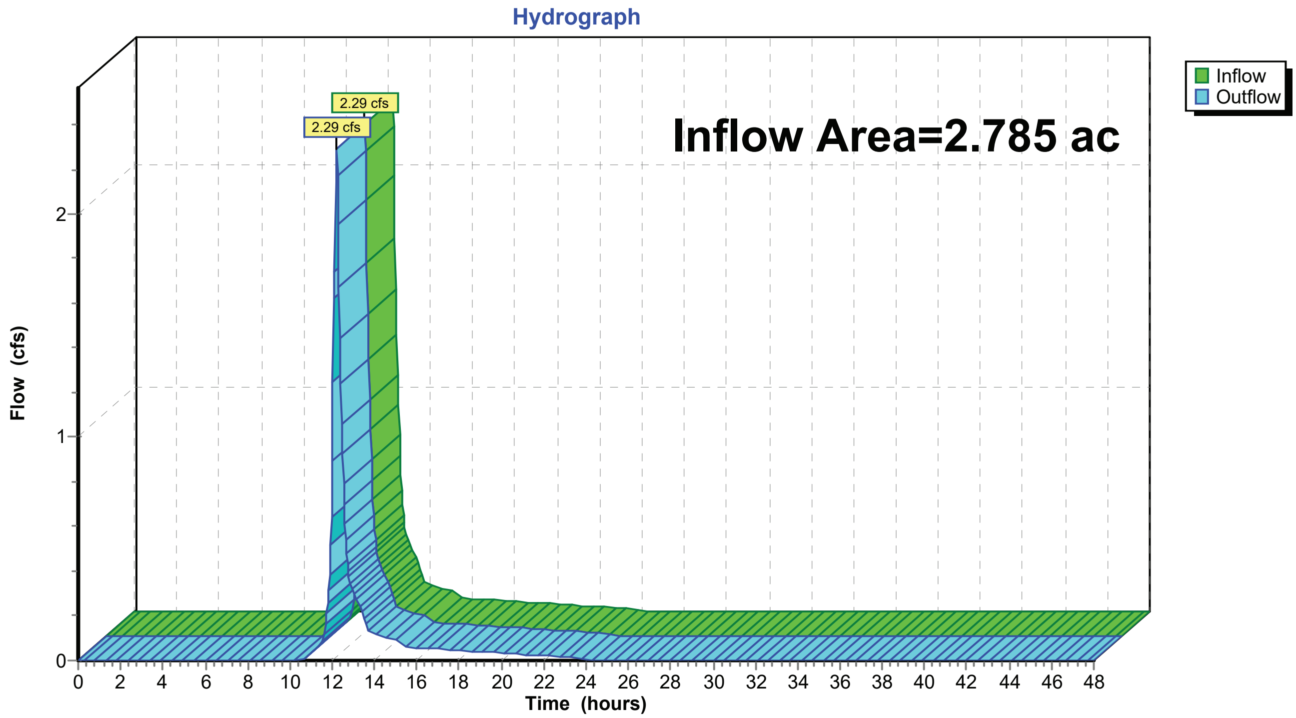
Summary for Reach 10R: TO ALIMAGNET LAKE

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

Inflow Area = 2.785 ac, 41.04% Impervious, Inflow Depth = 0.66" for 1-YR, 24-HR event
Inflow = 2.29 cfs @ 12.20 hrs, Volume= 0.153 af
Outflow = 2.29 cfs @ 12.20 hrs, Volume= 0.153 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 11R : OUT_PR

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Reach 10R: TO ALIMAGNET LAKE

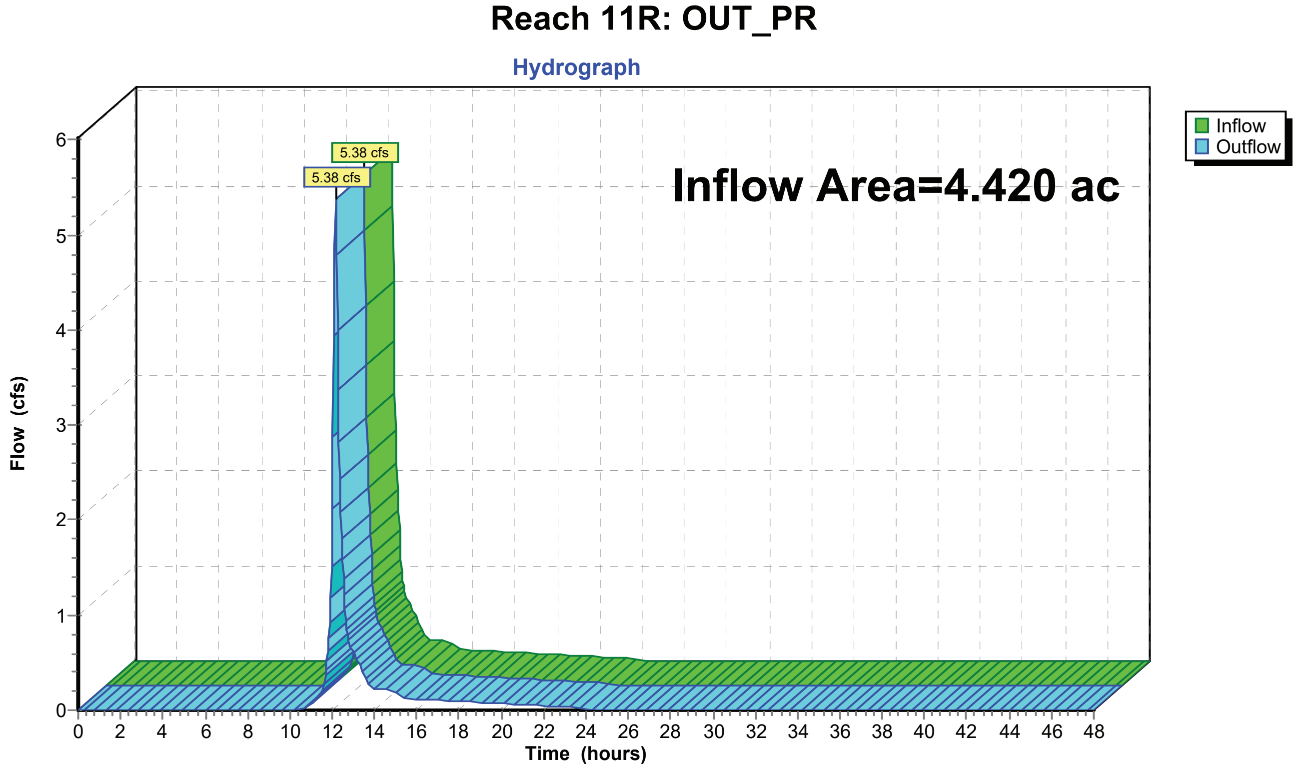


Summary for Reach 11R: OUT_PR

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

Inflow Area = 4.420 ac, 43.51% Impervious, Inflow Depth = 0.84" for 1-YR, 24-HR event
Inflow = 5.38 cfs @ 12.16 hrs, Volume= 0.310 af
Outflow = 5.38 cfs @ 12.16 hrs, Volume= 0.310 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs



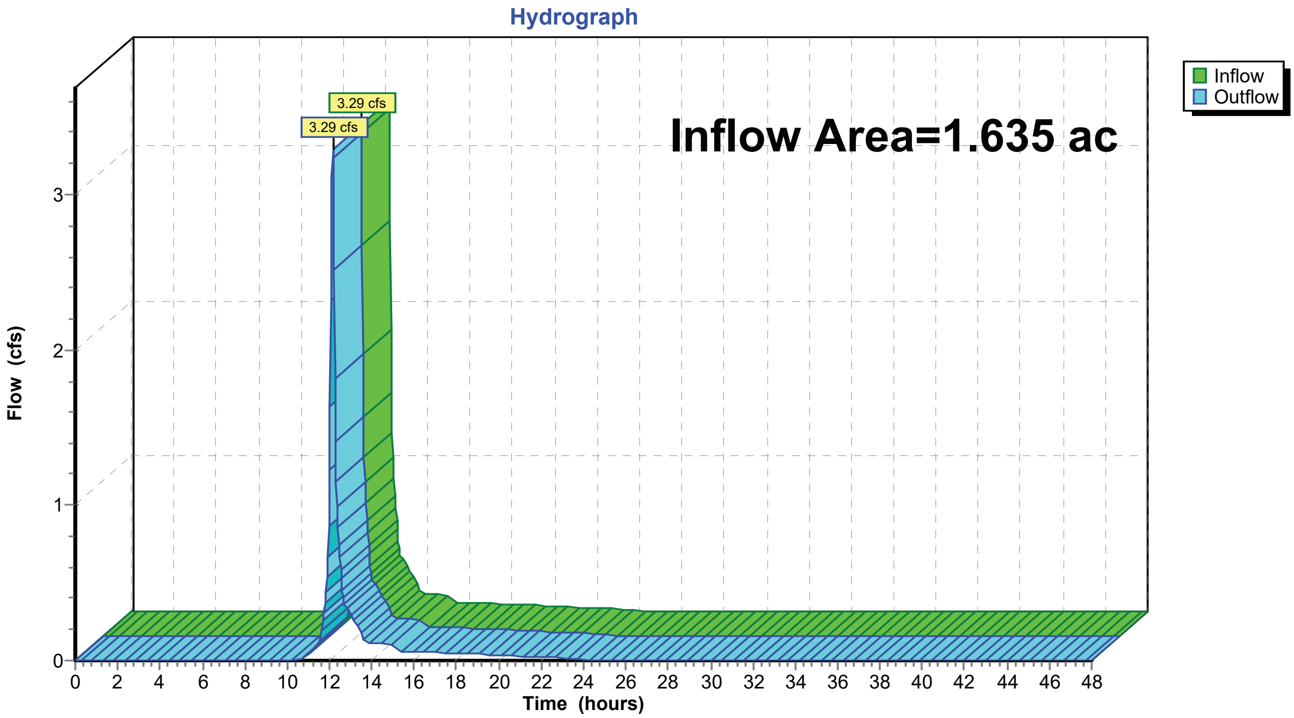
Summary for Reach 12R: ALIMAGNET PKWY

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

Inflow Area = 1.635 ac, 47.71% Impervious, Inflow Depth = 1.15" for 1-YR, 24-HR event
Inflow = 3.29 cfs @ 12.15 hrs, Volume= 0.157 af
Outflow = 3.29 cfs @ 12.15 hrs, Volume= 0.157 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 11R : OUT_PR

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Reach 12R: ALIMAGNET PKWY



Summary for Pond 7P: INFILTRATION

Inflow Area = 1.111 ac, 44.64% Impervious, Inflow Depth = 1.15" for 1-YR, 24-HR event
Inflow = 2.24 cfs @ 12.15 hrs, Volume= 0.107 af
Outflow = 0.10 cfs @ 13.61 hrs, Volume= 0.107 af, Atten= 96%, Lag= 88.1 min
Discarded = 0.10 cfs @ 13.61 hrs, Volume= 0.107 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 10R : TO ALIMAGNET LAKE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,006.53' @ 13.61 hrs Surf.Area= 5,212 sf Storage= 2,640 cf
Flood Elev= 1,011.00' Surf.Area= 9,200 sf Storage= 34,210 cf

Plug-Flow detention time= 271.1 min calculated for 0.107 af (100% of inflow)
Center-of-Mass det. time= 271.4 min (1,083.5 - 812.0)

Volume	Invert	Avail.Storage	Storage Description
#1	1,006.00'	34,210 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

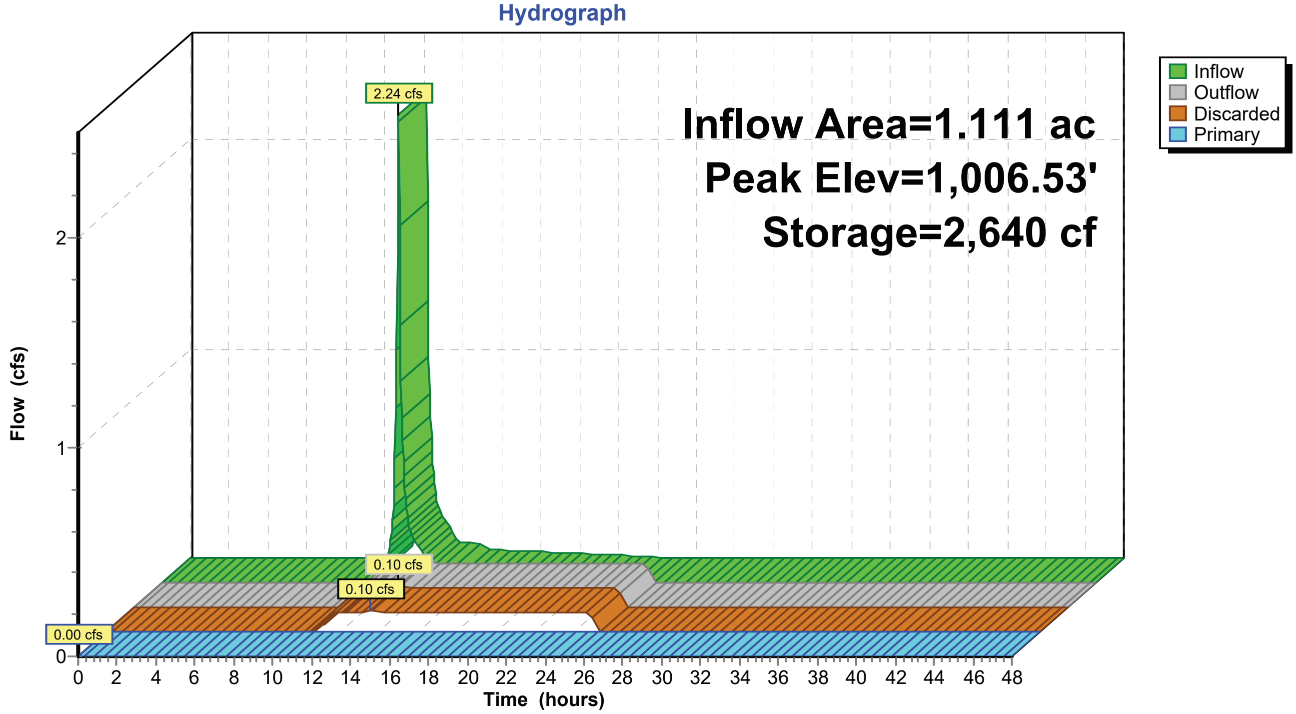
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,006.00	4,800	0	0
1,009.20	7,300	19,360	19,360
1,011.00	9,200	14,850	34,210

Device	Routing	Invert	Outlet Devices
#1	Discarded	1,006.00'	**0.800 in/hr Exfiltration over Surface area**
#2	Primary	1,009.20'	**15.0" Round RCP_Round 15"** L= 100.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,009.20' / 1,006.00' S= 0.0320 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf

Discarded OutFlow Max=0.10 cfs @ 13.61 hrs HW=1,006.53' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,006.00' TW=0.00' (Dynamic Tailwater)
└─**2=RCP_Round 15"** (Controls 0.00 cfs)

Pond 7P: INFILTRATION



Summary for Pond 8P: PRETREATMENT

[57] Hint: Peaked at 1,008.61' (Flood elevation advised)

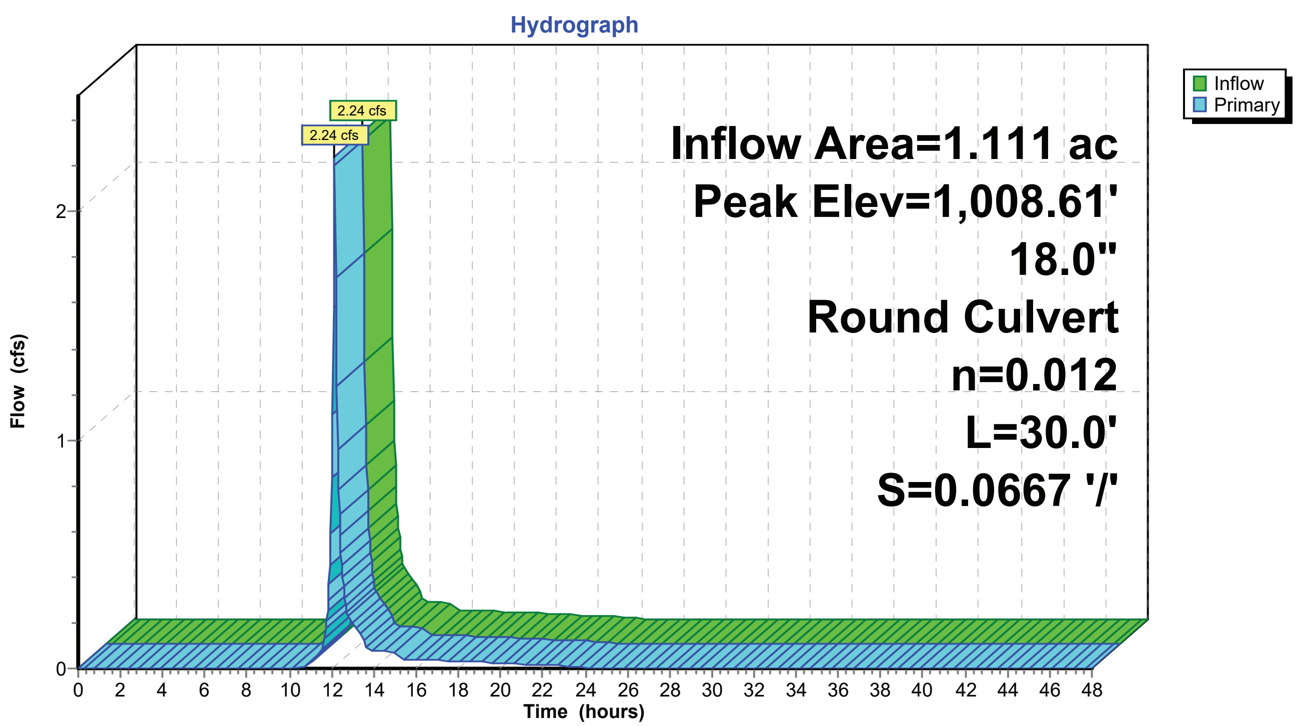
Inflow Area = 1.111 ac, 44.64% Impervious, Inflow Depth = 1.15" for 1-YR, 24-HR event
Inflow = 2.24 cfs @ 12.15 hrs, Volume= 0.107 af
Outflow = 2.24 cfs @ 12.15 hrs, Volume= 0.107 af, Atten= 0%, Lag= 0.0 min
Primary = 2.24 cfs @ 12.15 hrs, Volume= 0.107 af
Routed to Pond 7P : INFILTRATION

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,008.61' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,008.00'	**18.0" Round RCP_Round 18"** L= 30.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 1,008.00' / 1,006.00' S= 0.0667 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=2.17 cfs @ 12.15 hrs HW=1,008.60' TW=1,006.22' (Dynamic Tailwater)
1=RCP_Round 18" (Inlet Controls 2.17 cfs @ 3.29 fps)

Pond 8P: PRETREATMENT



Summary for Pond 15P: MEDIAN STORAGE

Inflow Area = 1.349 ac, 47.96% Impervious, Inflow Depth = 1.22" for 1-YR, 24-HR event
Inflow = 2.87 cfs @ 12.15 hrs, Volume= 0.137 af
Outflow = 2.16 cfs @ 12.21 hrs, Volume= 0.137 af, Atten= 25%, Lag= 3.6 min
Primary = 2.16 cfs @ 12.21 hrs, Volume= 0.137 af
Routed to Reach 10R : TO ALIMAGNET LAKE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,007.26' @ 12.21 hrs Surf.Area= 1,886 sf Storage= 751 cf
Flood Elev= 1,008.00' Surf.Area= 3,579 sf Storage= 2,772 cf

Plug-Flow detention time= 6.6 min calculated for 0.137 af (100% of inflow)
Center-of-Mass det. time= 6.6 min (815.8 - 809.2)

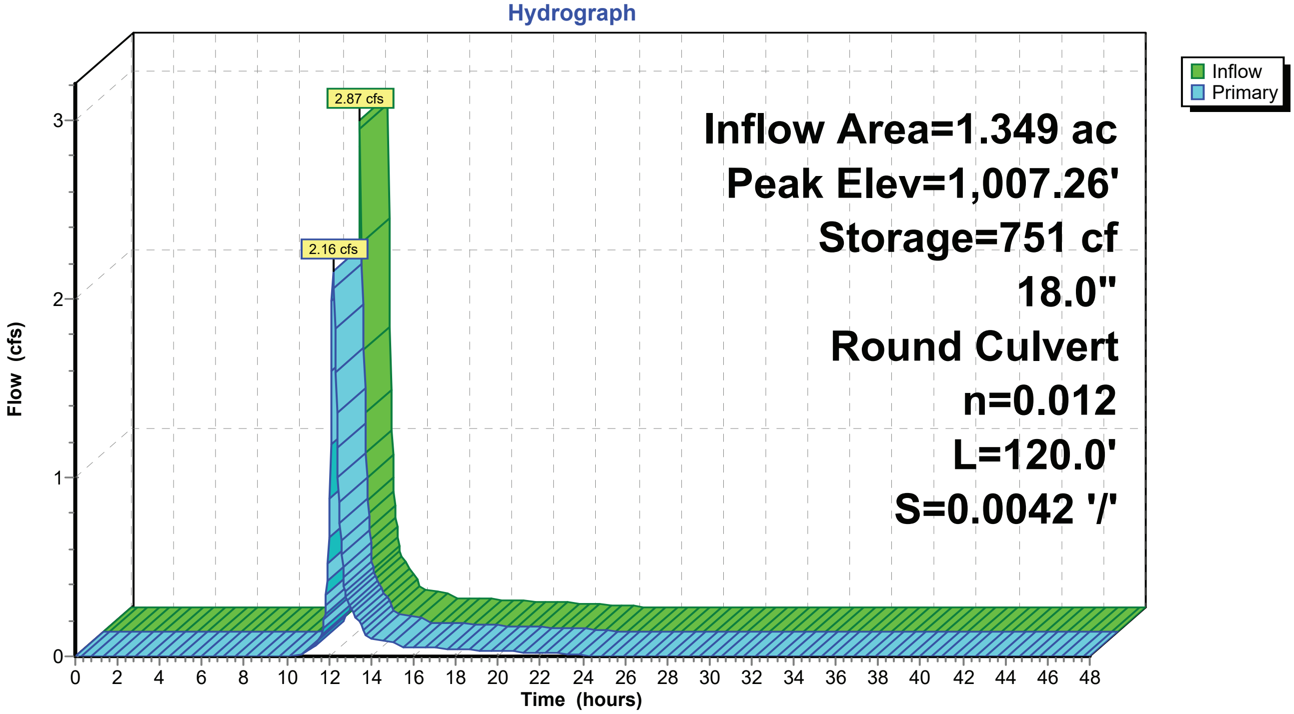
Volume	Invert	Avail.Storage	Storage Description
#1	1,006.50'	2,807 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,006.50	61	0	0
1,007.00	1,289	338	338
1,008.01	3,602	2,470	2,807

Device	Routing	Invert	Outlet Devices
#1	Primary	1,006.50'	**18.0" Round RCP_Round 18"** L= 120.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 1,006.50' / 1,006.00' S= 0.0042 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=2.15 cfs @ 12.21 hrs HW=1,007.26' TW=0.00' (Dynamic Tailwater)
└─**1=RCP_Round 18"** (Barrel Controls 2.15 cfs @ 3.50 fps)

Pond 15P: MEDIAN STORAGE



Time span=0.00-48.00 hrs, dt=0.04 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentDA1: SITE TO PR POND Runoff Area=1.111 ac 44.64% Impervious Runoff Depth=1.43"
Tc=7.0 min CN=85 Runoff=2.77 cfs 0.132 af

SubcatchmentDA2: EX PARKING TO Runoff Area=1.349 ac 47.96% Impervious Runoff Depth=1.50"
Tc=7.0 min CN=86 Runoff=3.52 cfs 0.169 af

SubcatchmentDA3: TO ALIMAGNETPKWY Runoff Area=1.635 ac 47.71% Impervious Runoff Depth=1.43"
Tc=7.0 min CN=85 Runoff=4.07 cfs 0.195 af

SubcatchmentDA4: NW TO ALIMAGNET Runoff Area=0.325 ac 0.00% Impervious Runoff Depth=0.79"
Tc=0.0 min CN=74 Runoff=0.61 cfs 0.021 af

Reach 10R: TO ALIMAGNETLAKE Inflow=2.81 cfs 0.190 af
Outflow=2.81 cfs 0.190 af

Reach 11R: OUT_PR Inflow=6.64 cfs 0.385 af
Outflow=6.64 cfs 0.385 af

Reach 12R: ALIMAGNETPKWY Inflow=4.07 cfs 0.195 af
Outflow=4.07 cfs 0.195 af

Pond 7P: INFILTRATION Peak Elev=1,006.68' Storage=3,437 cf Inflow=2.77 cfs 0.132 af
Discarded=0.10 cfs 0.132 af Primary=0.00 cfs 0.000 af Outflow=0.10 cfs 0.132 af

Pond 8P: PRETREATMENT Peak Elev=1,008.69' Inflow=2.77 cfs 0.132 af
18.0" Round Culvert n=0.012 L=30.0' S=0.0667 '/' Outflow=2.77 cfs 0.132 af

Pond 15P: MEDIAN STORAGE Peak Elev=1,007.35' Storage=931 cf Inflow=3.52 cfs 0.169 af
18.0" Round Culvert n=0.012 L=120.0' S=0.0042 '/' Outflow=2.65 cfs 0.169 af

Total Runoff Area = 4.420 ac Runoff Volume = 0.517 af Average Runoff Depth = 1.40"
56.49% Pervious = 2.497 ac 43.51% Impervious = 1.923 ac

Summary for Subcatchment DA1: SITE TO PR POND

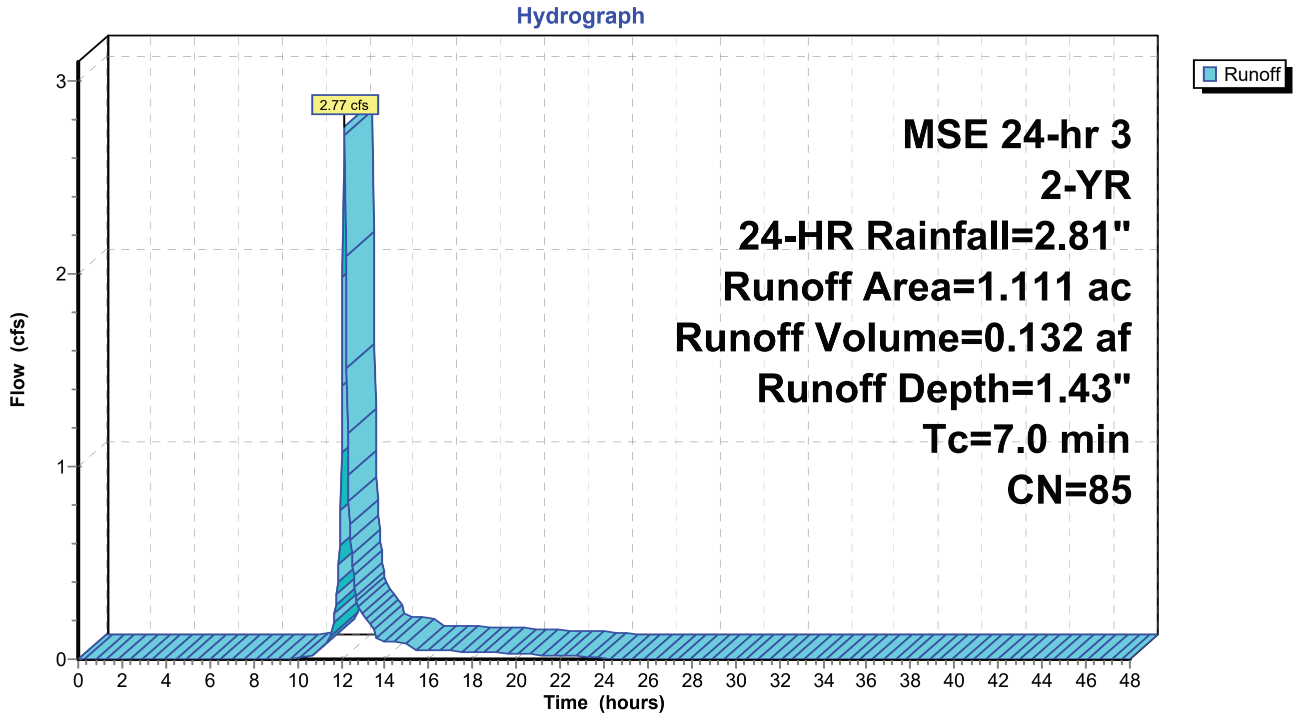
Runoff = 2.77 cfs @ 12.14 hrs, Volume= 0.132 af, Depth= 1.43"
Routed to Pond 8P : PRETREATMENT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
MSE 24-hr 3 2-YR, 24-HR Rainfall=2.81"

Area (ac)	CN	Description
0.496	98	Paved parking, HSG C
0.615	74	>75% Grass cover, Good, HSG C
1.111	85	Weighted Average
0.615		55.36% Pervious Area
0.496		44.64% Impervious Area

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

Subcatchment DA1: SITE TO PR POND



Summary for Subcatchment DA2: EX PARKING TO MEDIAN

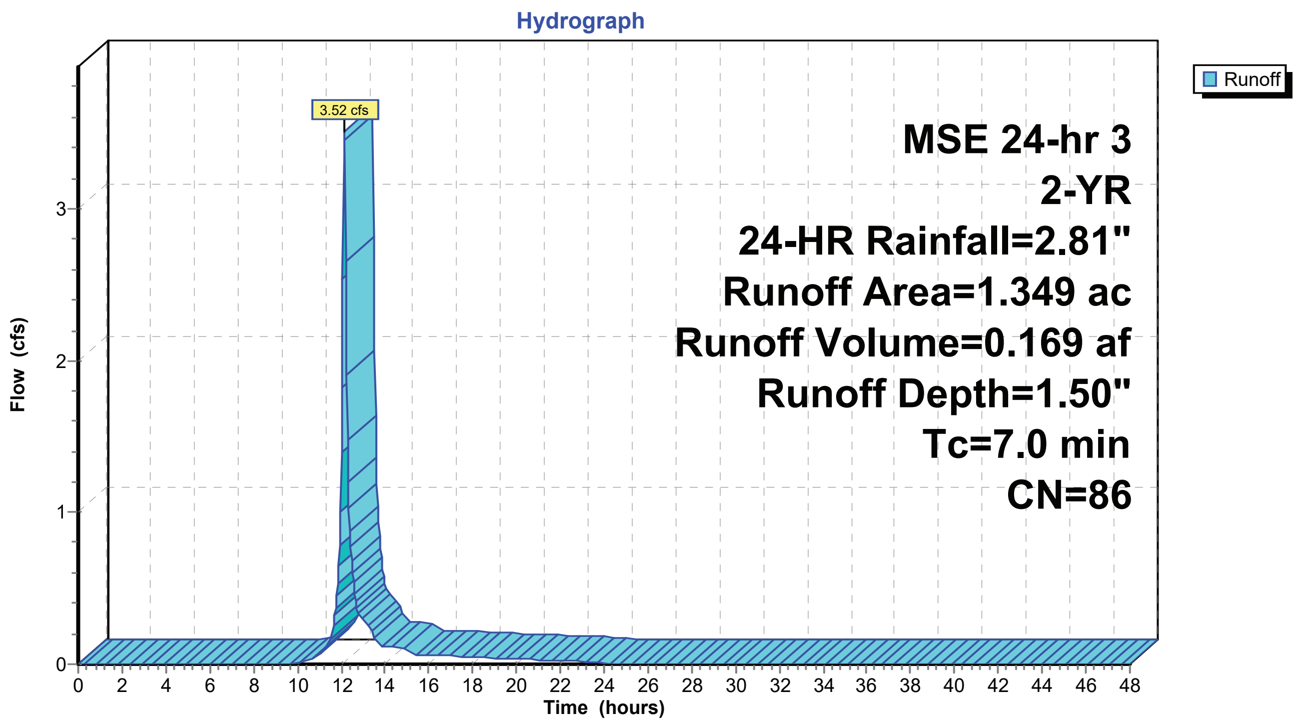
Runoff = 3.52 cfs @ 12.14 hrs, Volume= 0.169 af, Depth= 1.50"
Routed to Pond 15P : MEDIAN STORAGE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
MSE 24-hr 3 2-YR, 24-HR Rainfall=2.81"

Area (ac)	CN	Description
0.647	98	Paved parking, HSG C
0.702	74	>75% Grass cover, Good, HSG C
1.349	86	Weighted Average
0.702		52.04% Pervious Area
0.647		47.96% Impervious Area

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

Subcatchment DA2: EX PARKING TO MEDIAN



Summary for Subcatchment DA3: TO ALIMAGNET PKWY

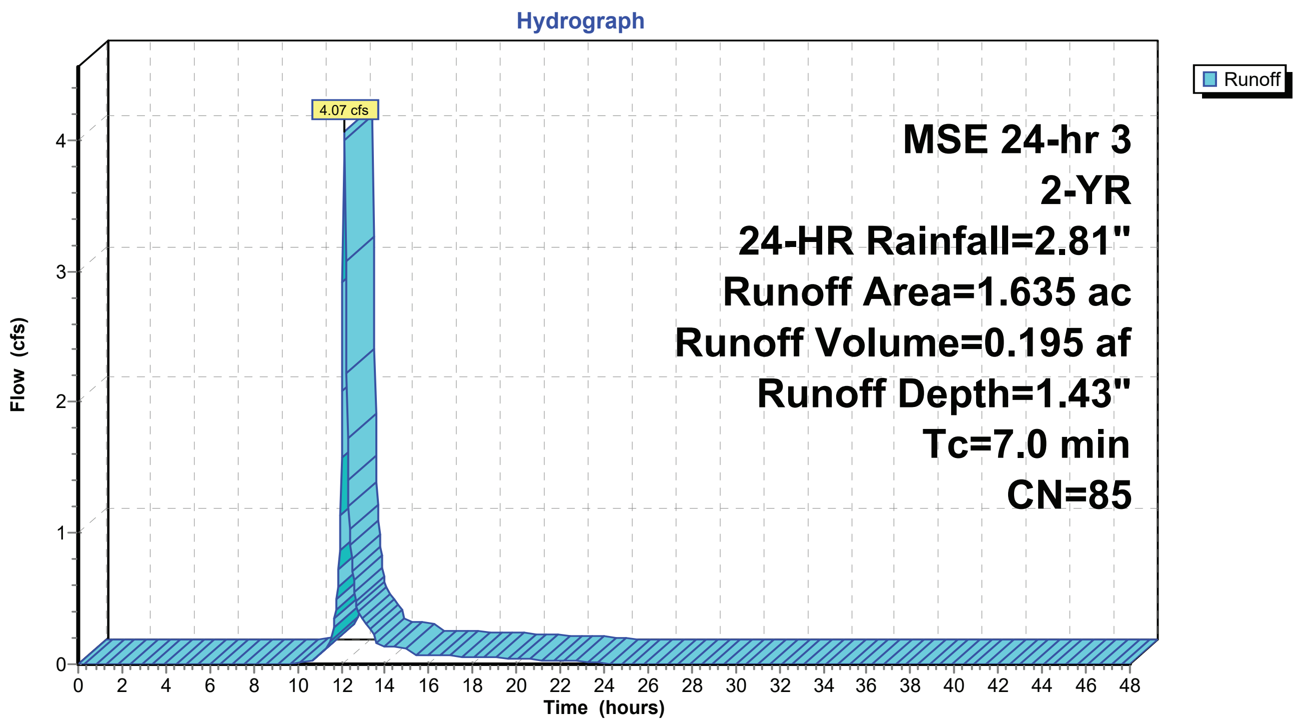
Runoff = 4.07 cfs @ 12.14 hrs, Volume= 0.195 af, Depth= 1.43"
Routed to Reach 12R : ALIMAGNET PKWY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
MSE 24-hr 3 2-YR, 24-HR Rainfall=2.81"

Area (ac)	CN	Description
0.780	98	Paved parking, HSG C
0.855	74	>75% Grass cover, Good, HSG C
1.635	85	Weighted Average
0.855		52.29% Pervious Area
0.780		47.71% Impervious Area

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

Subcatchment DA3: TO ALIMAGNET PKWY



Summary for Subcatchment DA4: NW TO ALIMAGNET LAKE

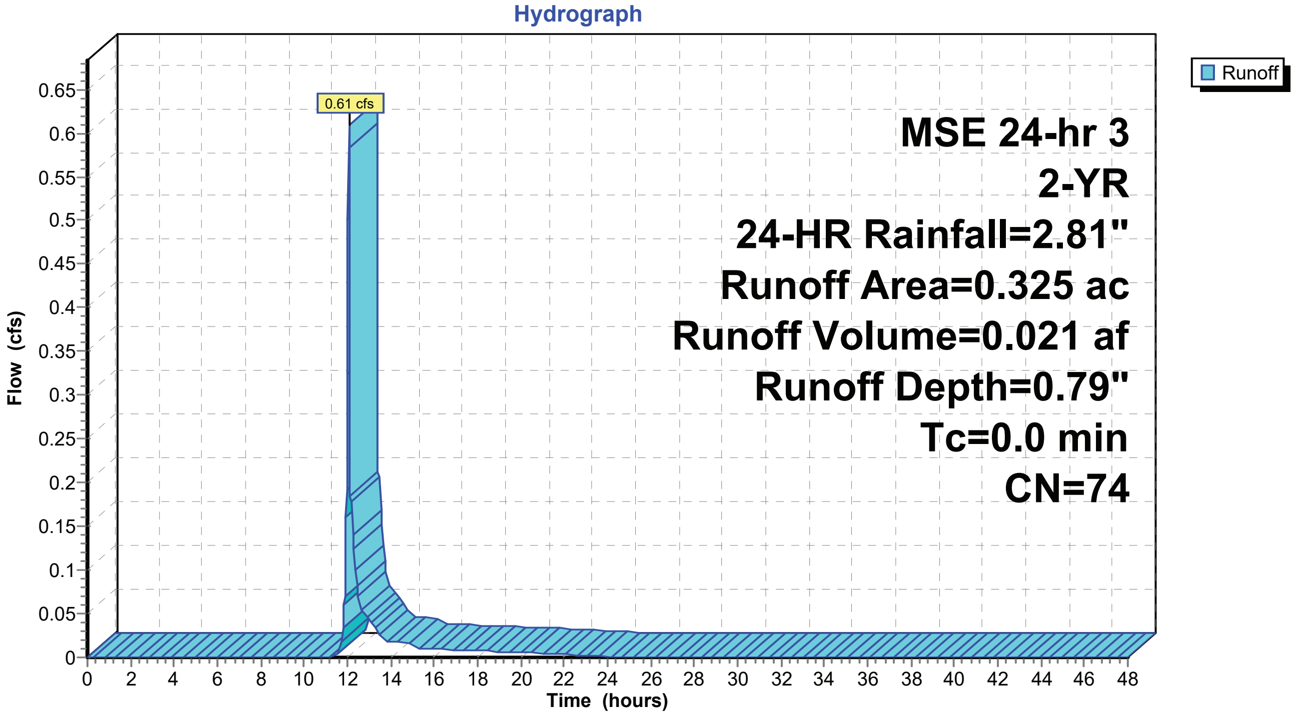
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.61 cfs @ 12.07 hrs, Volume= 0.021 af, Depth= 0.79"
Routed to Reach 10R : TO ALIMAGNET LAKE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
MSE 24-hr 3 2-YR, 24-HR Rainfall=2.81"

Area (ac)	CN	Description
0.325	74	>75% Grass cover, Good, HSG C
0.325		100.00% Pervious Area

Subcatchment DA4: NW TO ALIMAGNET LAKE



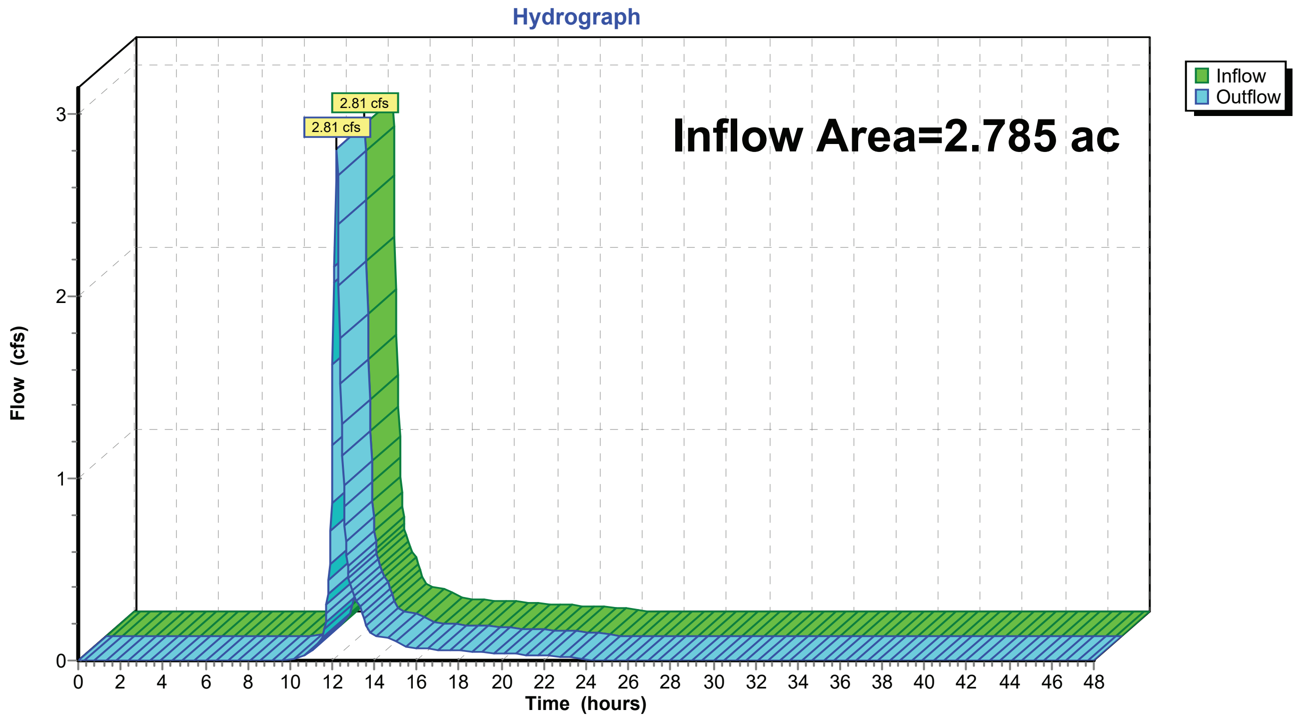
Summary for Reach 10R: TO ALIMAGNET LAKE

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

Inflow Area = 2.785 ac, 41.04% Impervious, Inflow Depth = 0.82" for 2-YR, 24-HR event
Inflow = 2.81 cfs @ 12.20 hrs, Volume= 0.190 af
Outflow = 2.81 cfs @ 12.20 hrs, Volume= 0.190 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 11R : OUT_PR

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Reach 10R: TO ALIMAGNET LAKE



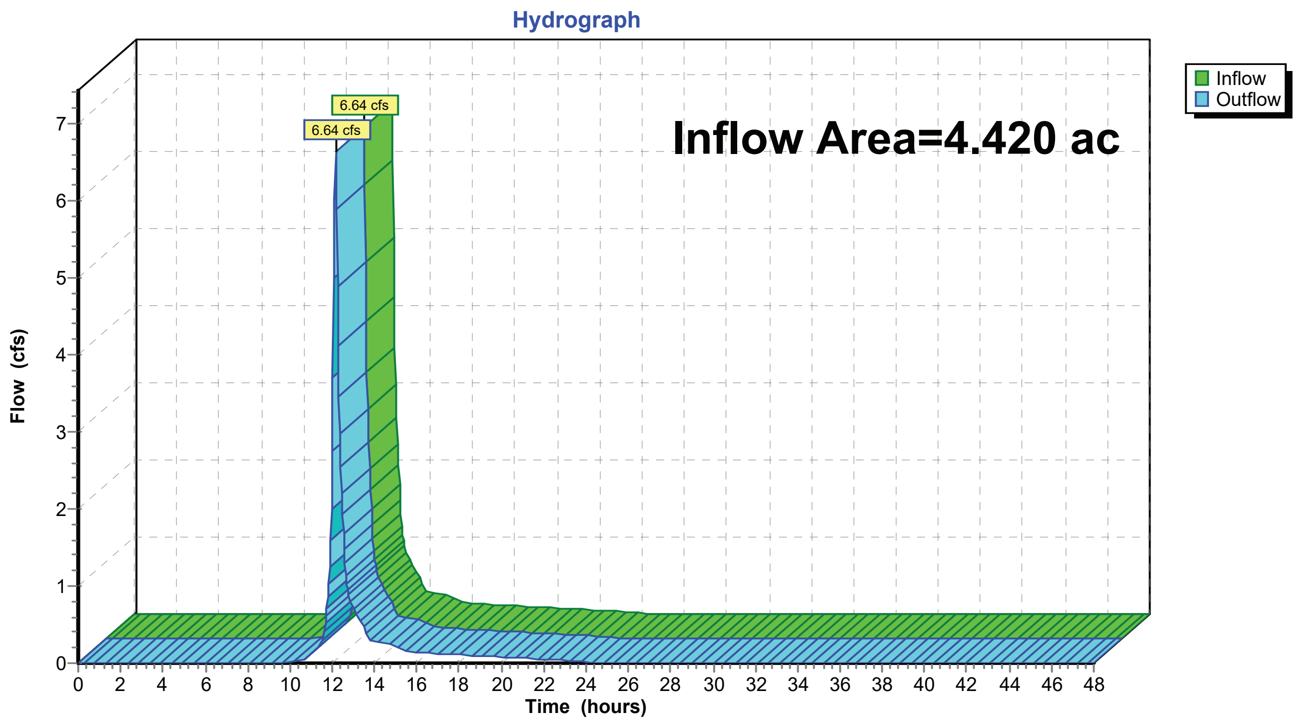
Summary for Reach 11R: OUT_PR

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

Inflow Area = 4.420 ac, 43.51% Impervious, Inflow Depth = 1.05" for 2-YR, 24-HR event
Inflow = 6.64 cfs @ 12.16 hrs, Volume= 0.385 af
Outflow = 6.64 cfs @ 12.16 hrs, Volume= 0.385 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Reach 11R: OUT_PR



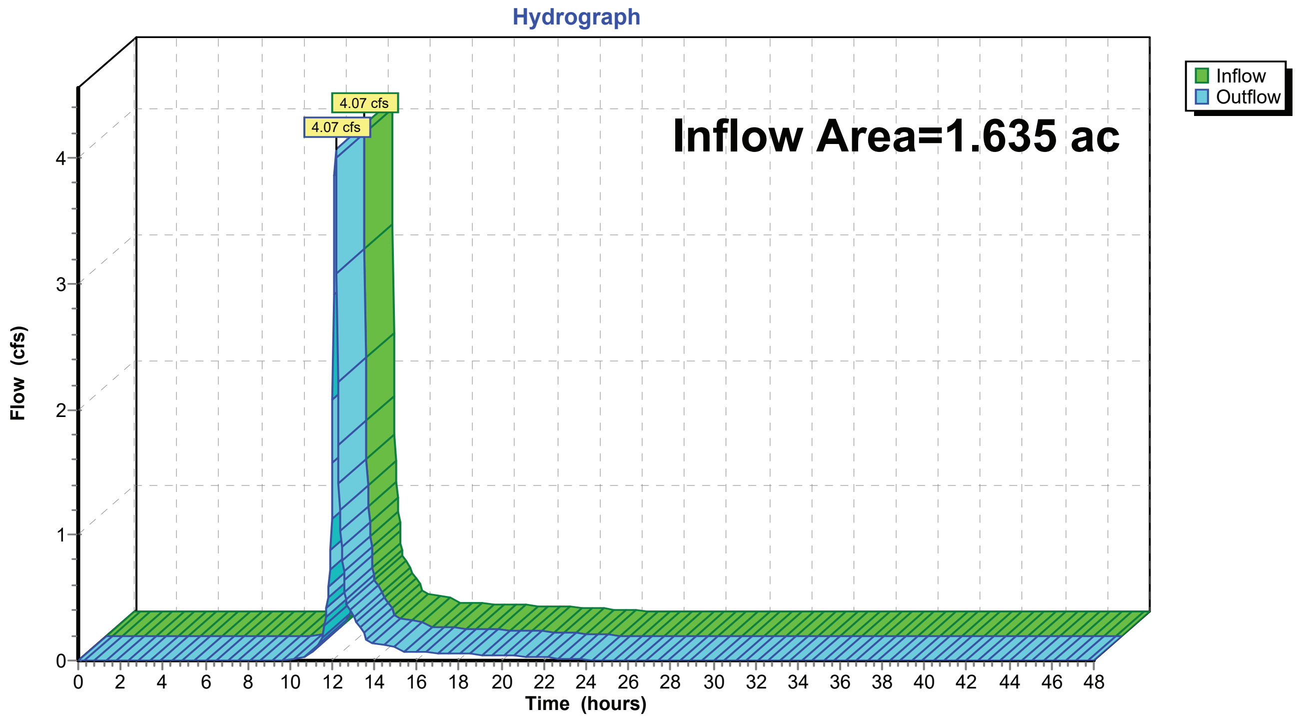
Summary for Reach 12R: ALIMAGNET PKWY

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

Inflow Area = 1.635 ac, 47.71% Impervious, Inflow Depth = 1.43" for 2-YR, 24-HR event
Inflow = 4.07 cfs @ 12.14 hrs, Volume= 0.195 af
Outflow = 4.07 cfs @ 12.14 hrs, Volume= 0.195 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 11R : OUT_PR

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Reach 12R: ALIMAGNET PKWY



Summary for Pond 7P: INFILTRATION

Inflow Area = 1.111 ac, 44.64% Impervious, Inflow Depth = 1.43" for 2-YR, 24-HR event
Inflow = 2.77 cfs @ 12.14 hrs, Volume= 0.132 af
Outflow = 0.10 cfs @ 13.70 hrs, Volume= 0.132 af, Atten= 96%, Lag= 93.0 min
Discarded = 0.10 cfs @ 13.70 hrs, Volume= 0.132 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 10R : TO ALIMAGNET LAKE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,006.68' @ 13.70 hrs Surf.Area= 5,330 sf Storage= 3,437 cf
Flood Elev= 1,011.00' Surf.Area= 9,200 sf Storage= 34,210 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 350.8 min (1,158.4 - 807.6)

Volume	Invert	Avail.Storage	Storage Description
#1	1,006.00'	34,210 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

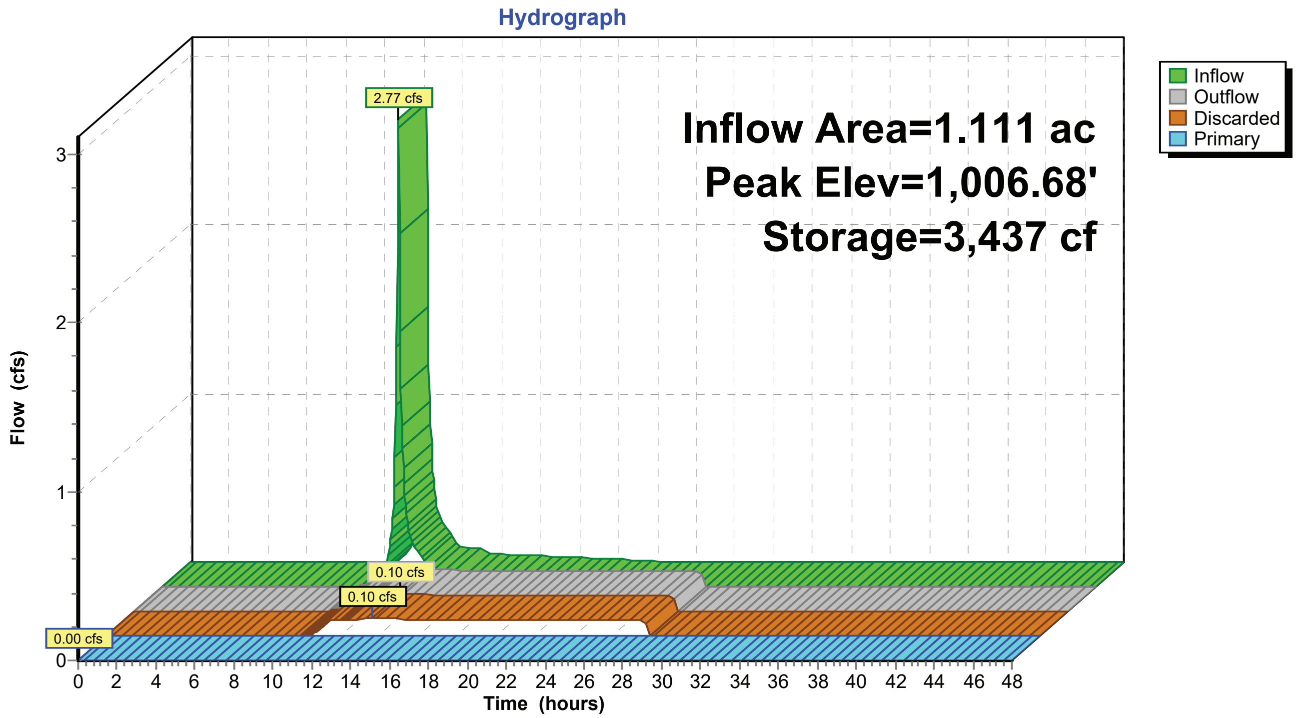
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,006.00	4,800	0	0
1,009.20	7,300	19,360	19,360
1,011.00	9,200	14,850	34,210

Device	Routing	Invert	Outlet Devices
#1	Discarded	1,006.00'	**0.800 in/hr Exfiltration over Surface area**
#2	Primary	1,009.20'	**15.0" Round RCP_Round 15"** L= 100.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,009.20' / 1,006.00' S= 0.0320 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf

Discarded OutFlow Max=0.10 cfs @ 13.70 hrs HW=1,006.68' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,006.00' TW=0.00' (Dynamic Tailwater)
2=RCP_Round 15" (Controls 0.00 cfs)

Pond 7P: INFILTRATION



Summary for Pond 8P: PRETREATMENT

[57] Hint: Peaked at 1,008.69' (Flood elevation advised)

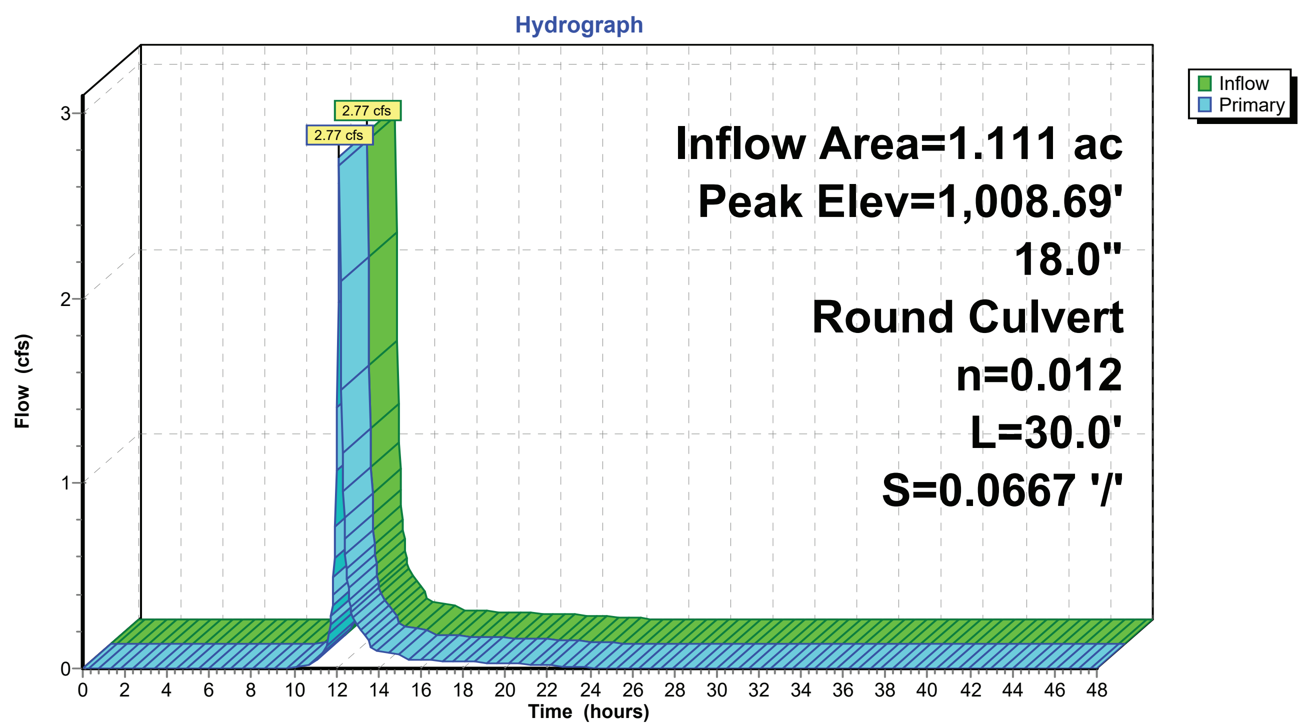
Inflow Area = 1.111 ac, 44.64% Impervious, Inflow Depth = 1.43" for 2-YR, 24-HR event
Inflow = 2.77 cfs @ 12.14 hrs, Volume= 0.132 af
Outflow = 2.77 cfs @ 12.14 hrs, Volume= 0.132 af, Atten= 0%, Lag= 0.0 min
Primary = 2.77 cfs @ 12.14 hrs, Volume= 0.132 af
Routed to Pond 7P : INFILTRATION

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,008.69' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,008.00'	**18.0" Round RCP_Round 18"** L= 30.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 1,008.00' / 1,006.00' S= 0.0667 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=2.68 cfs @ 12.14 hrs HW=1,008.67' TW=1,006.29' (Dynamic Tailwater)
1=RCP_Round 18" (Inlet Controls 2.68 cfs @ 3.49 fps)

Pond 8P: PRETREATMENT



Summary for Pond 15P: MEDIAN STORAGE

Inflow Area = 1.349 ac, 47.96% Impervious, Inflow Depth = 1.50" for 2-YR, 24-HR event
Inflow = 3.52 cfs @ 12.14 hrs, Volume= 0.169 af
Outflow = 2.65 cfs @ 12.20 hrs, Volume= 0.169 af, Atten= 25%, Lag= 3.6 min
Primary = 2.65 cfs @ 12.20 hrs, Volume= 0.169 af
Routed to Reach 10R : TO ALIMAGNET LAKE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,007.35' @ 12.20 hrs Surf.Area= 2,093 sf Storage= 931 cf
Flood Elev= 1,008.00' Surf.Area= 3,579 sf Storage= 2,772 cf

Plug-Flow detention time= 6.5 min calculated for 0.169 af (100% of inflow)
Center-of-Mass det. time= 6.5 min (811.5 - 805.0)

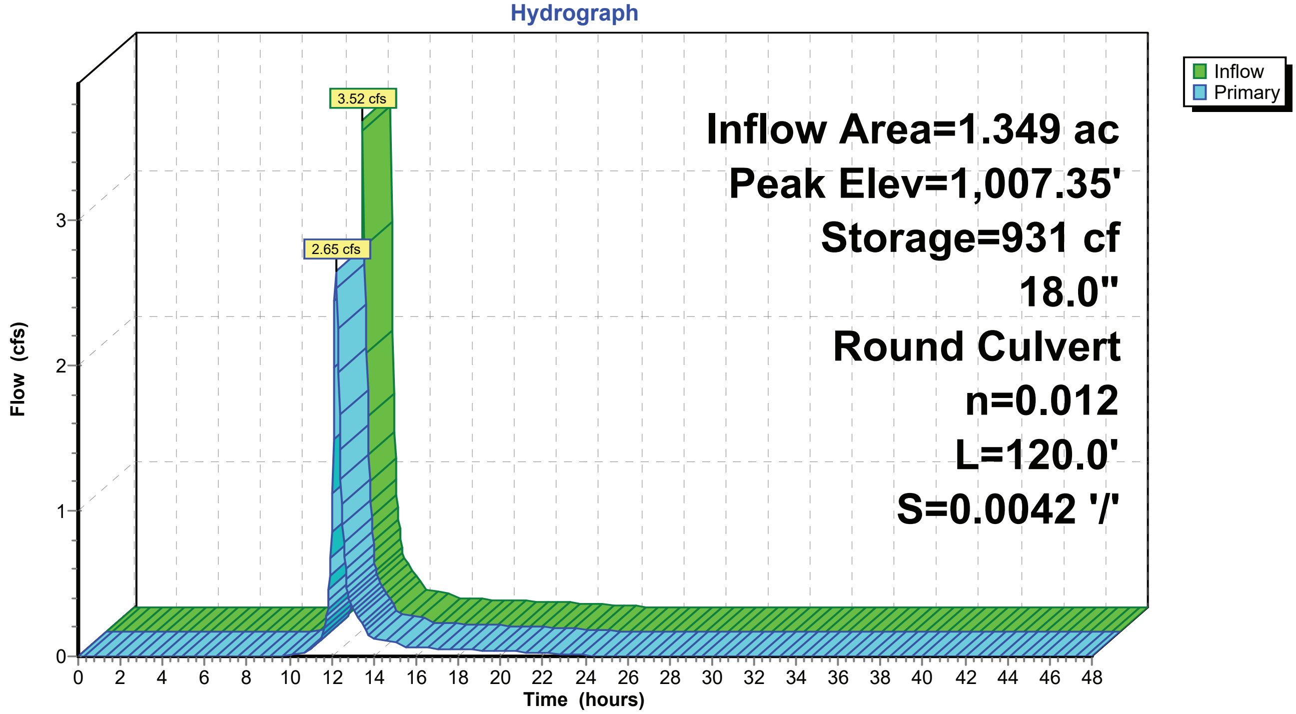
Volume	Invert	Avail.Storage	Storage Description
#1	1,006.50'	2,807 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,006.50	61	0	0
1,007.00	1,289	338	338
1,008.01	3,602	2,470	2,807

Device	Routing	Invert	Outlet Devices
#1	Primary	1,006.50'	**18.0" Round RCP_Round 18"** L= 120.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 1,006.50' / 1,006.00' S= 0.0042 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=2.63 cfs @ 12.20 hrs HW=1,007.35' TW=0.00' (Dynamic Tailwater)
1=RCP_Round 18" (Barrel Controls 2.63 cfs @ 3.69 fps)

Pond 15P: MEDIAN STORAGE



Time span=0.00-48.00 hrs, dt=0.04 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentDA1: SITE TO PR POND Runoff Area=1.111 ac 44.64% Impervious Runoff Depth=2.62"
Tc=7.0 min CN=85 Runoff=4.86 cfs 0.243 af

SubcatchmentDA2: EX PARKINGTO Runoff Area=1.349 ac 47.96% Impervious Runoff Depth=2.71"
Tc=7.0 min CN=86 Runoff=6.07 cfs 0.305 af

SubcatchmentDA3: TO ALIMAGNETPKWY Runoff Area=1.635 ac 47.71% Impervious Runoff Depth=2.62"
Tc=7.0 min CN=85 Runoff=7.15 cfs 0.357 af

SubcatchmentDA4: NW TO ALIMAGNET Runoff Area=0.325 ac 0.00% Impervious Runoff Depth=1.73"
Tc=0.0 min CN=74 Runoff=1.13 cfs 0.047 af

Reach 10R: TO ALIMAGNETLAKE Inflow=4.73 cfs 0.351 af
Outflow=4.73 cfs 0.351 af

Reach 11R: OUT_PR Inflow=11.59 cfs 0.708 af
Outflow=11.59 cfs 0.708 af

Reach 12R: ALIMAGNETPKWY Inflow=7.15 cfs 0.357 af
Outflow=7.15 cfs 0.357 af

Pond 7P: INFILTRATION Peak Elev=1,007.20' Storage=6,317 cf Inflow=4.86 cfs 0.243 af
Discarded=0.11 cfs 0.243 af Primary=0.00 cfs 0.000 af Outflow=0.11 cfs 0.243 af

Pond 8P: PRETREATMENT Peak Elev=1,008.95' Inflow=4.86 cfs 0.243 af
18.0" Round Culvert n=0.012 L=30.0' S=0.0667 '/' Outflow=4.86 cfs 0.243 af

Pond 15P: MEDIAN STORAGE Peak Elev=1,007.68' Storage=1,731 cf Inflow=6.07 cfs 0.305 af
18.0" Round Culvert n=0.012 L=120.0' S=0.0042 '/' Outflow=4.58 cfs 0.305 af

Total Runoff Area = 4.420 ac Runoff Volume = 0.951 af Average Runoff Depth = 2.58"
56.49% Pervious = 2.497 ac 43.51% Impervious = 1.923 ac

Summary for Subcatchment DA1: SITE TO PR POND

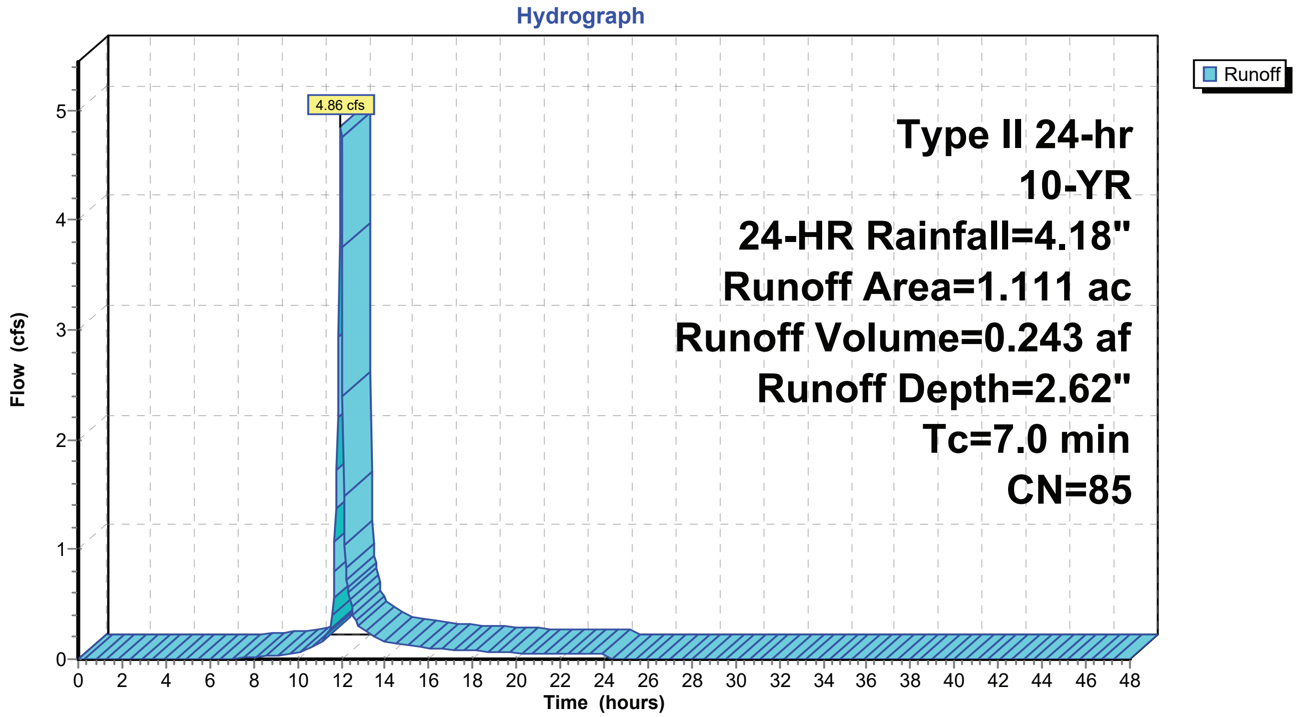
Runoff = 4.86 cfs @ 11.98 hrs, Volume= 0.243 af, Depth= 2.62"
Routed to Pond 8P : PRETREATMENT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 10-YR, 24-HR Rainfall=4.18"

Area (ac)	CN	Description
0.496	98	Paved parking, HSG C
0.615	74	>75% Grass cover, Good, HSG C
1.111	85	Weighted Average
0.615		55.36% Pervious Area
0.496		44.64% Impervious Area

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

Subcatchment DA1: SITE TO PR POND



Summary for Subcatchment DA2: EX PARKING TO MEDIAN

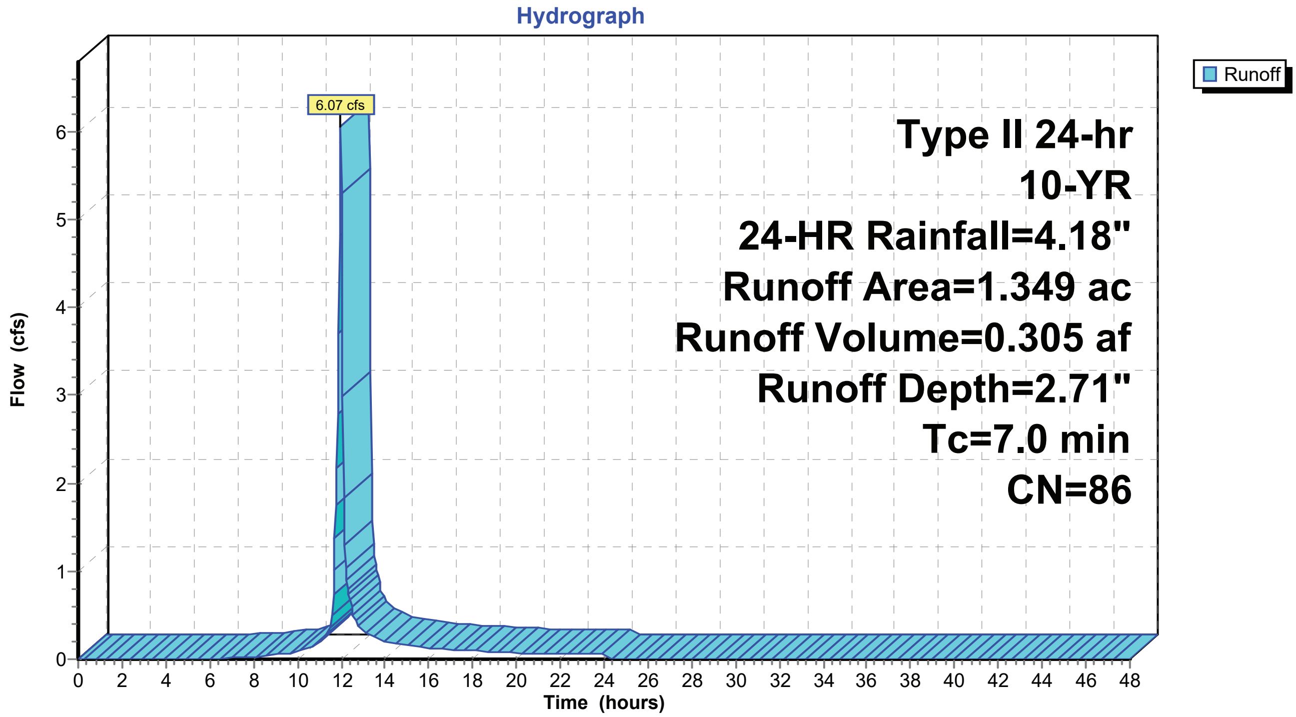
Runoff = 6.07 cfs @ 11.98 hrs, Volume= 0.305 af, Depth= 2.71"
Routed to Pond 15P : MEDIAN STORAGE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 10-YR, 24-HR Rainfall=4.18"

Area (ac)	CN	Description
0.647	98	Paved parking, HSG C
0.702	74	>75% Grass cover, Good, HSG C
1.349	86	Weighted Average
0.702		52.04% Pervious Area
0.647		47.96% Impervious Area

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

Subcatchment DA2: EX PARKING TO MEDIAN



Summary for Subcatchment DA3: TO ALIMAGNET PKWY

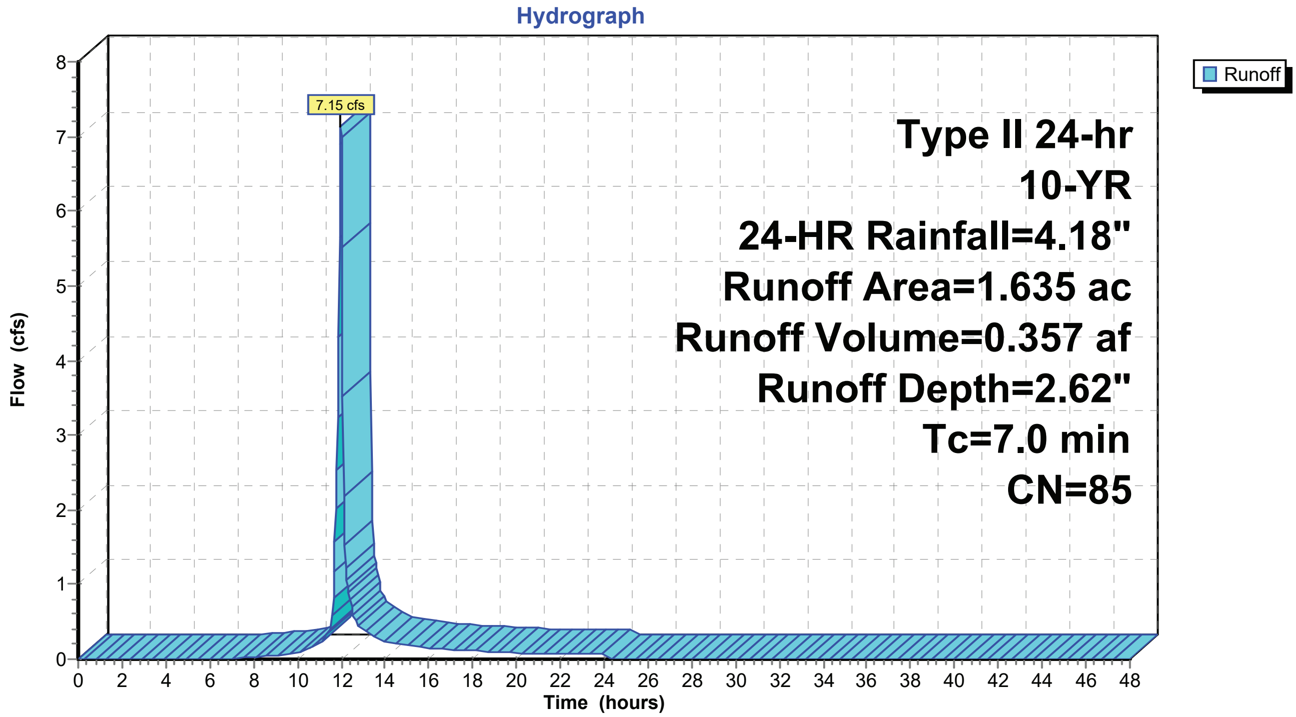
Runoff = 7.15 cfs @ 11.98 hrs, Volume= 0.357 af, Depth= 2.62"
Routed to Reach 12R : ALIMAGNET PKWY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 10-YR, 24-HR Rainfall=4.18"

Area (ac)	CN	Description
0.780	98	Paved parking, HSG C
0.855	74	>75% Grass cover, Good, HSG C
1.635	85	Weighted Average
0.855		52.29% Pervious Area
0.780		47.71% Impervious Area

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

Subcatchment DA3: TO ALIMAGNET PKWY



Summary for Subcatchment DA4: NW TO ALIMAGNET LAKE

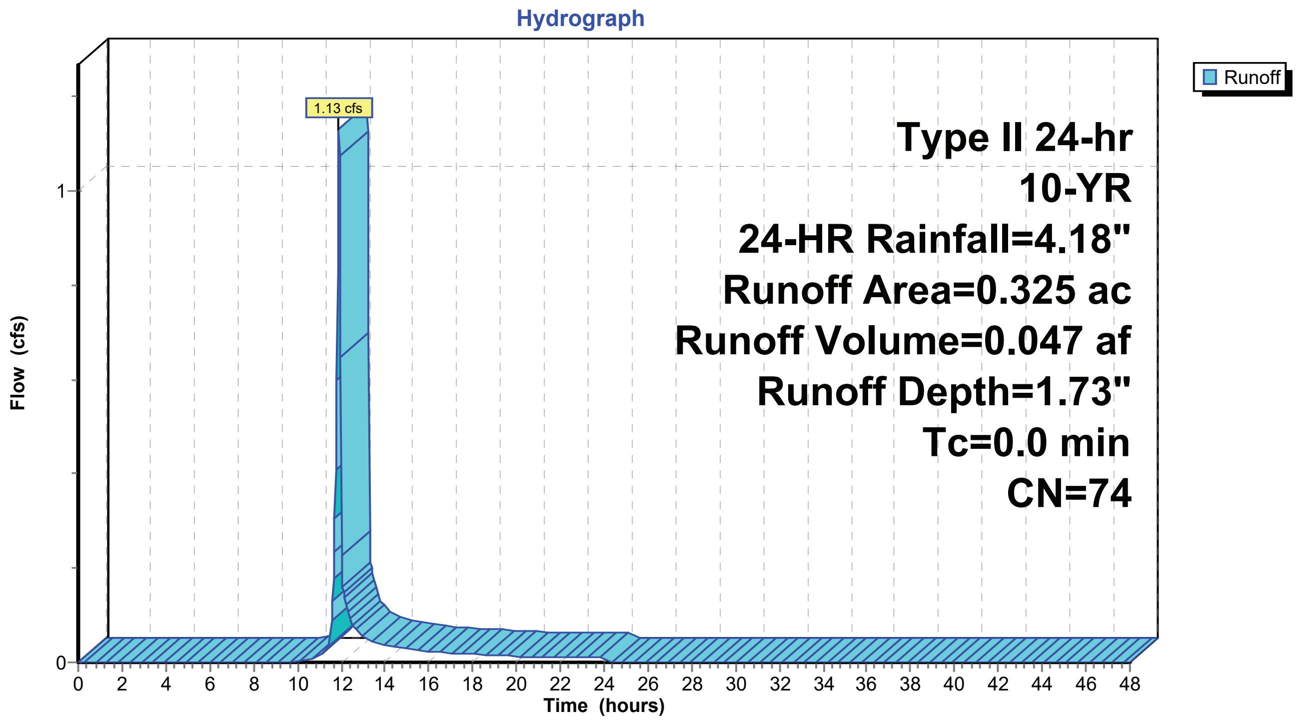
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 1.13 cfs @ 11.90 hrs, Volume= 0.047 af, Depth= 1.73"
Routed to Reach 10R : TO ALIMAGNET LAKE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 10-YR, 24-HR Rainfall=4.18"

Area (ac)	CN	Description
0.325	74	>75% Grass cover, Good, HSG C
0.325		100.00% Pervious Area

Subcatchment DA4: NW TO ALIMAGNET LAKE



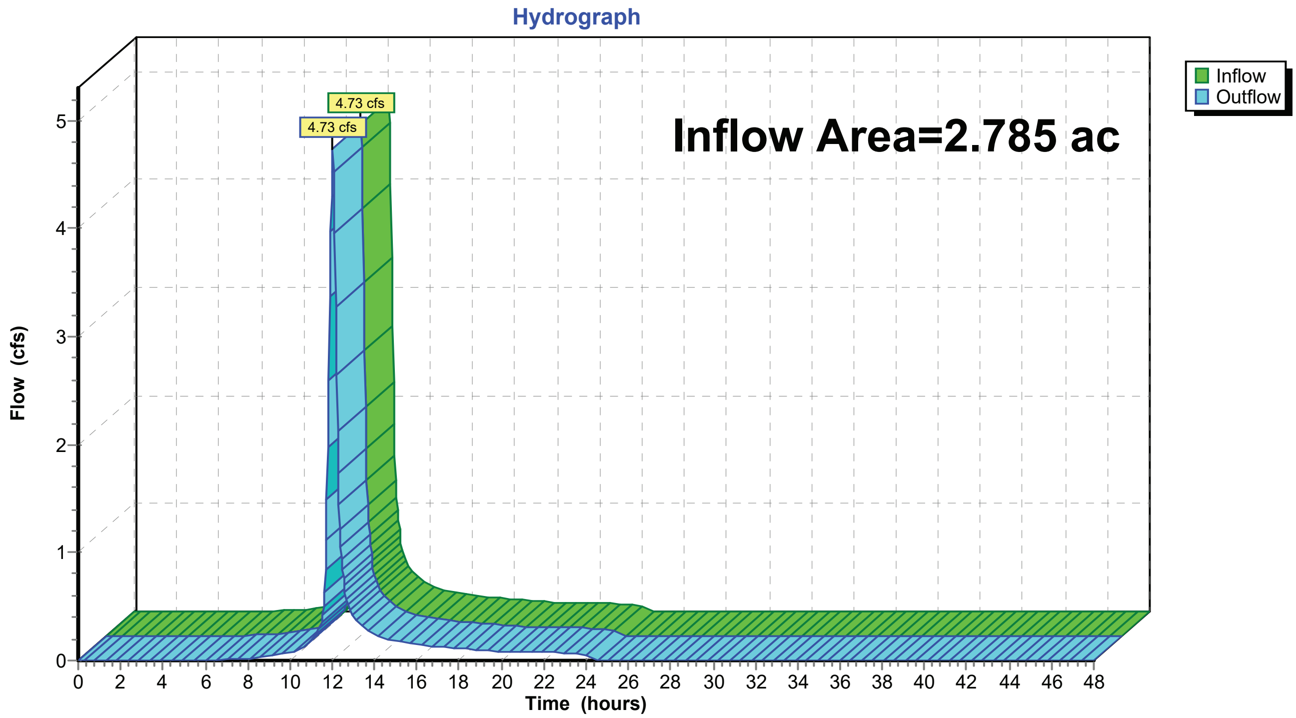
Summary for Reach 10R: TO ALIMAGNET LAKE

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

Inflow Area = 2.785 ac, 41.04% Impervious, Inflow Depth = 1.51" for 10-YR, 24-HR event
Inflow = 4.73 cfs @ 12.04 hrs, Volume= 0.351 af
Outflow = 4.73 cfs @ 12.04 hrs, Volume= 0.351 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 11R : OUT_PR

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Reach 10R: TO ALIMAGNET LAKE

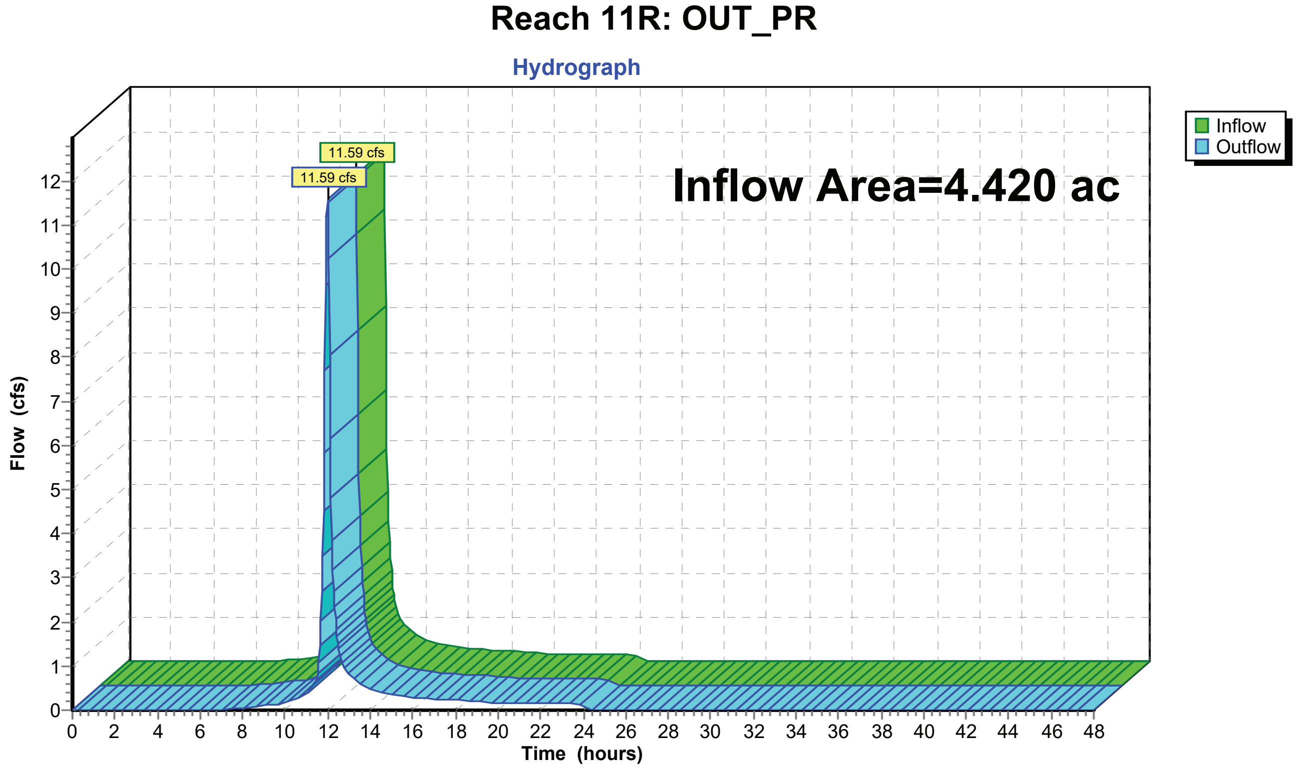


Summary for Reach 11R: OUT_PR

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

Inflow Area =	4.420 ac,	43.51% Impervious,	Inflow Depth = 1.92"	for 10-YR, 24-HR event
Inflow =	11.59 cfs @	11.99 hrs, Volume=	0.708 af	
Outflow =	11.59 cfs @	11.99 hrs, Volume=	0.708 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs



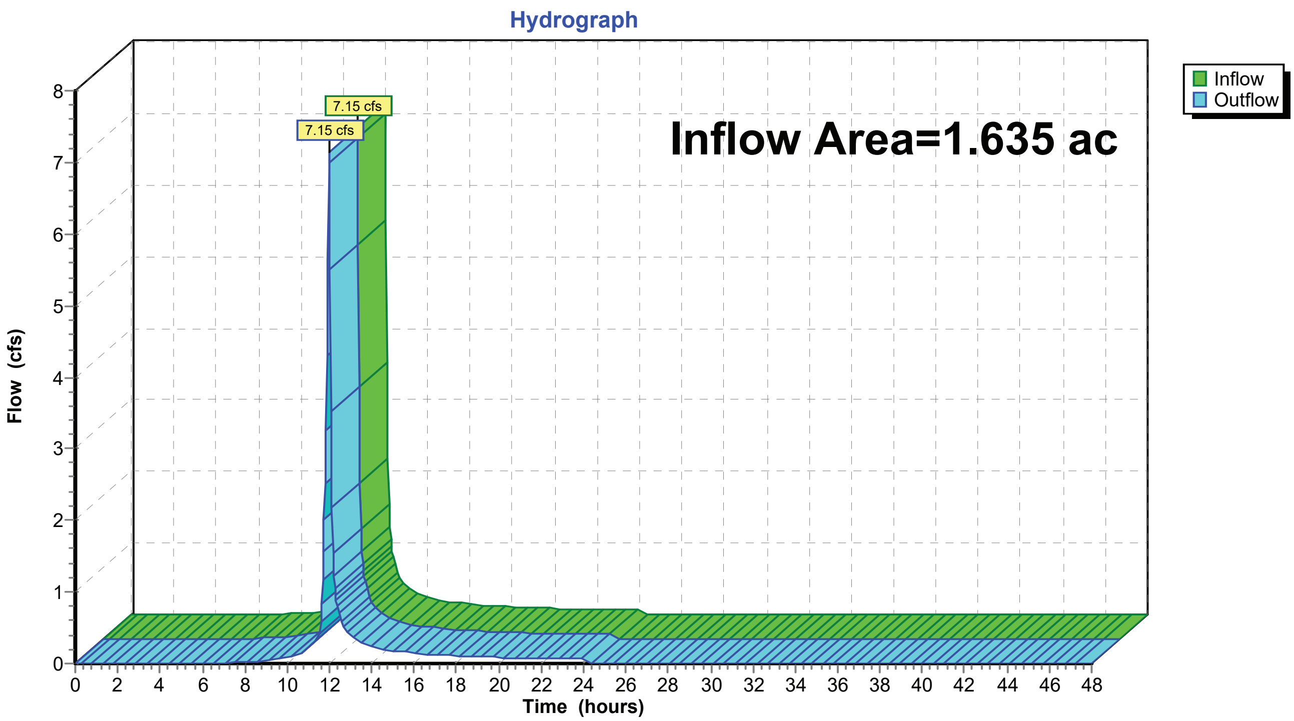
Summary for Reach 12R: ALIMAGNET PKWY

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

Inflow Area = 1.635 ac, 47.71% Impervious, Inflow Depth = 2.62" for 10-YR, 24-HR event
Inflow = 7.15 cfs @ 11.98 hrs, Volume= 0.357 af
Outflow = 7.15 cfs @ 11.98 hrs, Volume= 0.357 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 11R : OUT_PR

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Reach 12R: ALIMAGNET PKWY



Summary for Pond 7P: INFILTRATION

Inflow Area = 1.111 ac, 44.64% Impervious, Inflow Depth = 2.62" for 10-YR, 24-HR event
Inflow = 4.86 cfs @ 11.98 hrs, Volume= 0.243 af
Outflow = 0.11 cfs @ 15.70 hrs, Volume= 0.243 af, Atten= 98%, Lag= 223.2 min
Discarded = 0.11 cfs @ 15.70 hrs, Volume= 0.243 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 10R : TO ALIMAGNET LAKE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,007.20' @ 15.70 hrs Surf.Area= 5,737 sf Storage= 6,317 cf
Flood Elev= 1,011.00' Surf.Area= 9,200 sf Storage= 34,210 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 614.2 min (1,426.8 - 812.5)

Volume	Invert	Avail.Storage	Storage Description
#1	1,006.00'	34,210 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

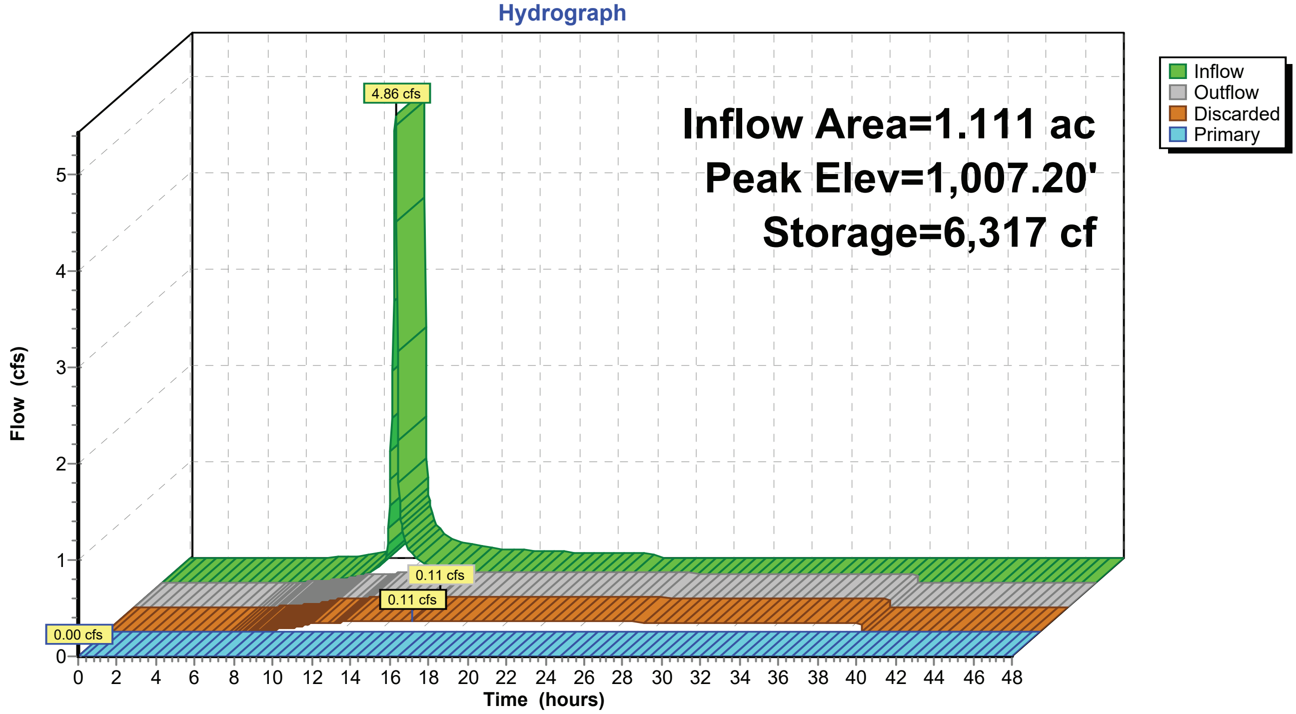
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,006.00	4,800	0	0
1,009.20	7,300	19,360	19,360
1,011.00	9,200	14,850	34,210

Device	Routing	Invert	Outlet Devices
#1	Discarded	1,006.00'	**0.800 in/hr Exfiltration over Surface area**
#2	Primary	1,009.20'	**15.0" Round RCP_Round 15"** L= 100.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,009.20' / 1,006.00' S= 0.0320 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf

Discarded OutFlow Max=0.11 cfs @ 15.70 hrs HW=1,007.20' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,006.00' TW=0.00' (Dynamic Tailwater)
2=RCP_Round 15" (Controls 0.00 cfs)

Pond 7P: INFILTRATION



Summary for Pond 8P: PRETREATMENT

[57] Hint: Peaked at 1,008.95' (Flood elevation advised)

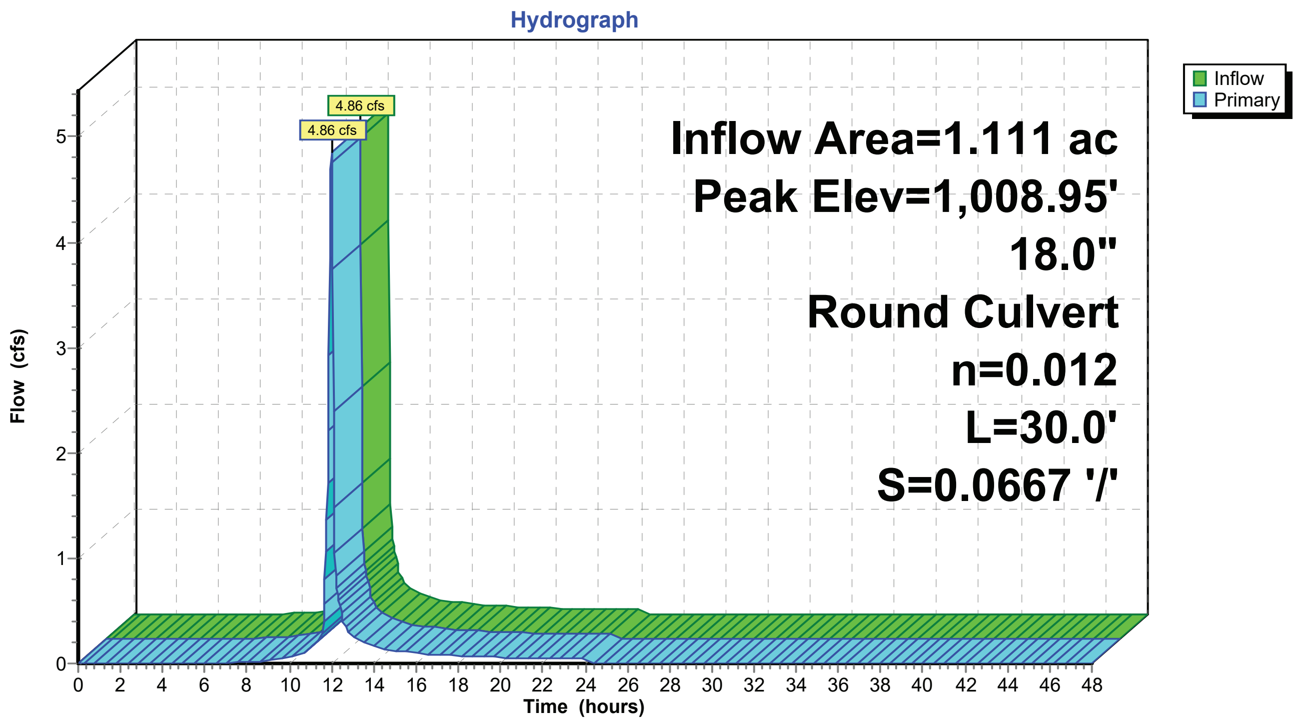
Inflow Area = 1.111 ac, 44.64% Impervious, Inflow Depth = 2.62" for 10-YR, 24-HR event
Inflow = 4.86 cfs @ 11.98 hrs, Volume= 0.243 af
Outflow = 4.86 cfs @ 11.98 hrs, Volume= 0.243 af, Atten= 0%, Lag= 0.0 min
Primary = 4.86 cfs @ 11.98 hrs, Volume= 0.243 af
Routed to Pond 7P : INFILTRATION

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,008.95' @ 11.98 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,008.00'	**18.0" Round RCP_Round 18"** L= 30.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 1,008.00' / 1,006.00' S= 0.0667 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=4.72 cfs @ 11.98 hrs HW=1,008.93' TW=1,006.60' (Dynamic Tailwater)
↑—**1=RCP_Round 18"** (Inlet Controls 4.72 cfs @ 4.10 fps)

Pond 8P: PRETREATMENT



Summary for Pond 15P: MEDIAN STORAGE

Inflow Area = 1.349 ac, 47.96% Impervious, Inflow Depth = 2.71" for 10-YR, 24-HR event
Inflow = 6.07 cfs @ 11.98 hrs, Volume= 0.305 af
Outflow = 4.58 cfs @ 12.04 hrs, Volume= 0.305 af, Atten= 25%, Lag= 3.7 min
Primary = 4.58 cfs @ 12.04 hrs, Volume= 0.305 af
Routed to Reach 10R : TO ALIMAGNET LAKE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,007.68' @ 12.04 hrs Surf.Area= 2,836 sf Storage= 1,731 cf
Flood Elev= 1,008.00' Surf.Area= 3,579 sf Storage= 2,772 cf

Plug-Flow detention time= 6.4 min calculated for 0.304 af (100% of inflow)
Center-of-Mass det. time= 6.4 min (815.7 - 809.3)

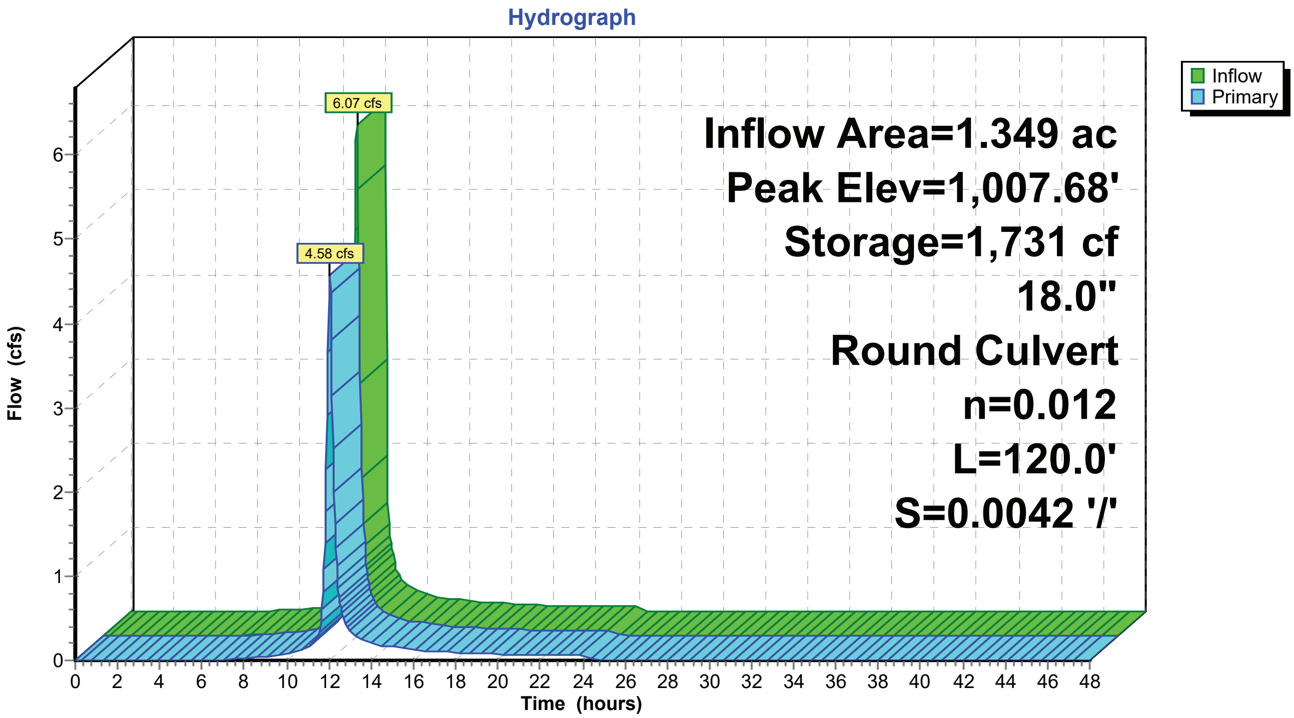
Volume	Invert	Avail.Storage	Storage Description
#1	1,006.50'	2,807 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,006.50	61	0	0
1,007.00	1,289	338	338
1,008.01	3,602	2,470	2,807

Device	Routing	Invert	Outlet Devices
#1	Primary	1,006.50'	**18.0" Round RCP_Round 18"** L= 120.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 1,006.50' / 1,006.00' S= 0.0042 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=4.56 cfs @ 12.04 hrs HW=1,007.67' TW=0.00' (Dynamic Tailwater)
└─**1=RCP_Round 18"** (Barrel Controls 4.56 cfs @ 4.23 fps)

Pond 15P: MEDIAN STORAGE



Time span=0.00-48.00 hrs, dt=0.04 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentDA1: SITE TO PR POND Runoff Area=1.111 ac 44.64% Impervious Runoff Depth=5.66"
Tc=7.0 min CN=85 Runoff=10.01 cfs 0.524 af

SubcatchmentDA2: EX PARKING TO Runoff Area=1.349 ac 47.96% Impervious Runoff Depth=5.78"
Tc=7.0 min CN=86 Runoff=12.32 cfs 0.650 af

SubcatchmentDA3: TO ALIMAGNETPKWY Runoff Area=1.635 ac 47.71% Impervious Runoff Depth=5.66"
Tc=7.0 min CN=85 Runoff=14.73 cfs 0.772 af

SubcatchmentDA4: NW TO ALIMAGNET Runoff Area=0.325 ac 0.00% Impervious Runoff Depth=4.42"
Tc=0.0 min CN=74 Runoff=2.82 cfs 0.120 af

Reach 10R: TO ALIMAGNETLAKE Inflow=14.95 cfs 0.769 af
Outflow=14.95 cfs 0.769 af

Reach 11R: OUT_PR Inflow=29.63 cfs 1.541 af
Outflow=29.63 cfs 1.541 af

Reach 12R: ALIMAGNETPKWY Inflow=14.73 cfs 0.772 af
Outflow=14.73 cfs 0.772 af

Pond 7P: INFILTRATION Peak Elev=1,008.73' Storage=16,044 cf Inflow=10.01 cfs 0.524 af
Discarded=0.13 cfs 0.397 af Primary=0.00 cfs 0.000 af Outflow=0.13 cfs 0.397 af

Pond 8P: PRETREATMENT Peak Elev=1,009.63' Inflow=10.01 cfs 0.524 af
18.0" Round Culvert n=0.012 L=30.0' S=0.0667 '/' Outflow=10.01 cfs 0.524 af

Pond 15P: MEDIAN STORAGE Peak Elev=1,010.62' Storage=2,807 cf Inflow=12.32 cfs 0.650 af
18.0" Round Culvert n=0.012 L=120.0' S=0.0042 '/' Outflow=14.32 cfs 0.650 af

Total Runoff Area = 4.420 ac Runoff Volume = 2.066 af Average Runoff Depth = 5.61"
56.49% Pervious = 2.497 ac 43.51% Impervious = 1.923 ac

Summary for Subcatchment DA1: SITE TO PR POND

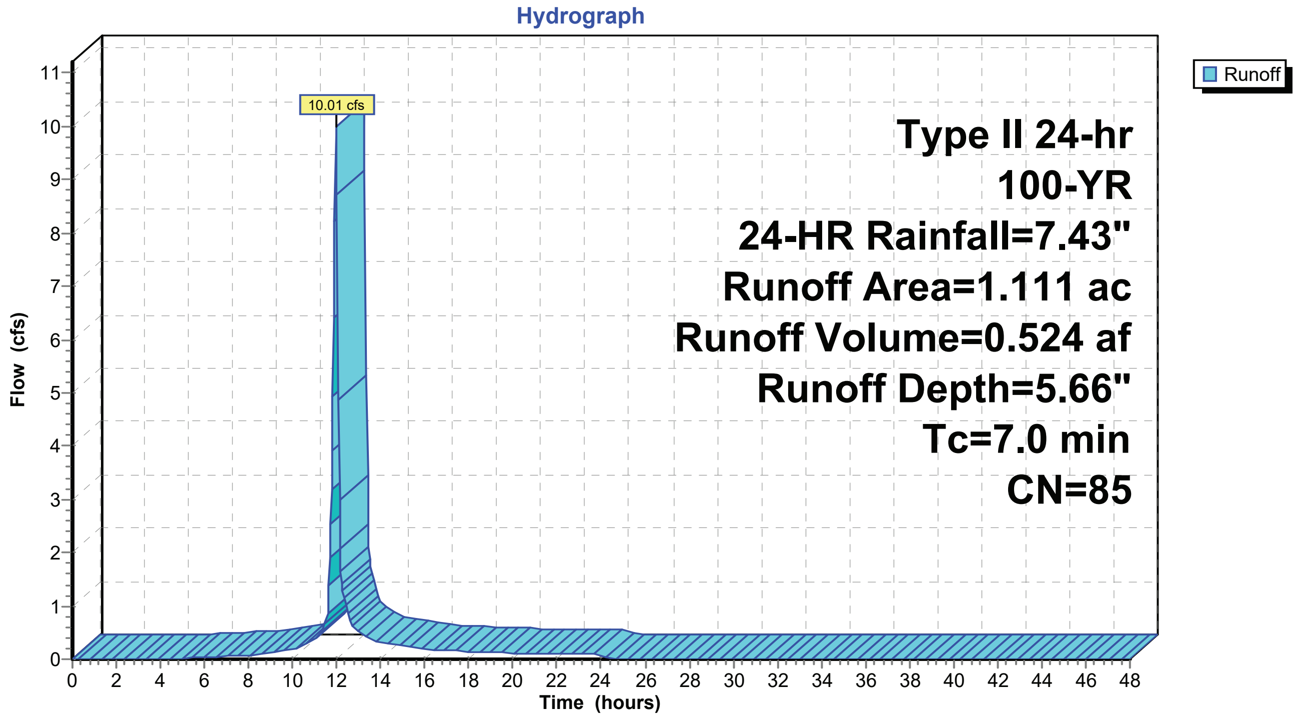
Runoff = 10.01 cfs @ 11.98 hrs, Volume= 0.524 af, Depth= 5.66"
Routed to Pond 8P : PRETREATMENT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-YR, 24-HR Rainfall=7.43"

Area (ac)	CN	Description
0.496	98	Paved parking, HSG C
0.615	74	>75% Grass cover, Good, HSG C
1.111	85	Weighted Average
0.615		55.36% Pervious Area
0.496		44.64% Impervious Area

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

Subcatchment DA1: SITE TO PR POND



Summary for Subcatchment DA2: EX PARKING TO MEDIAN

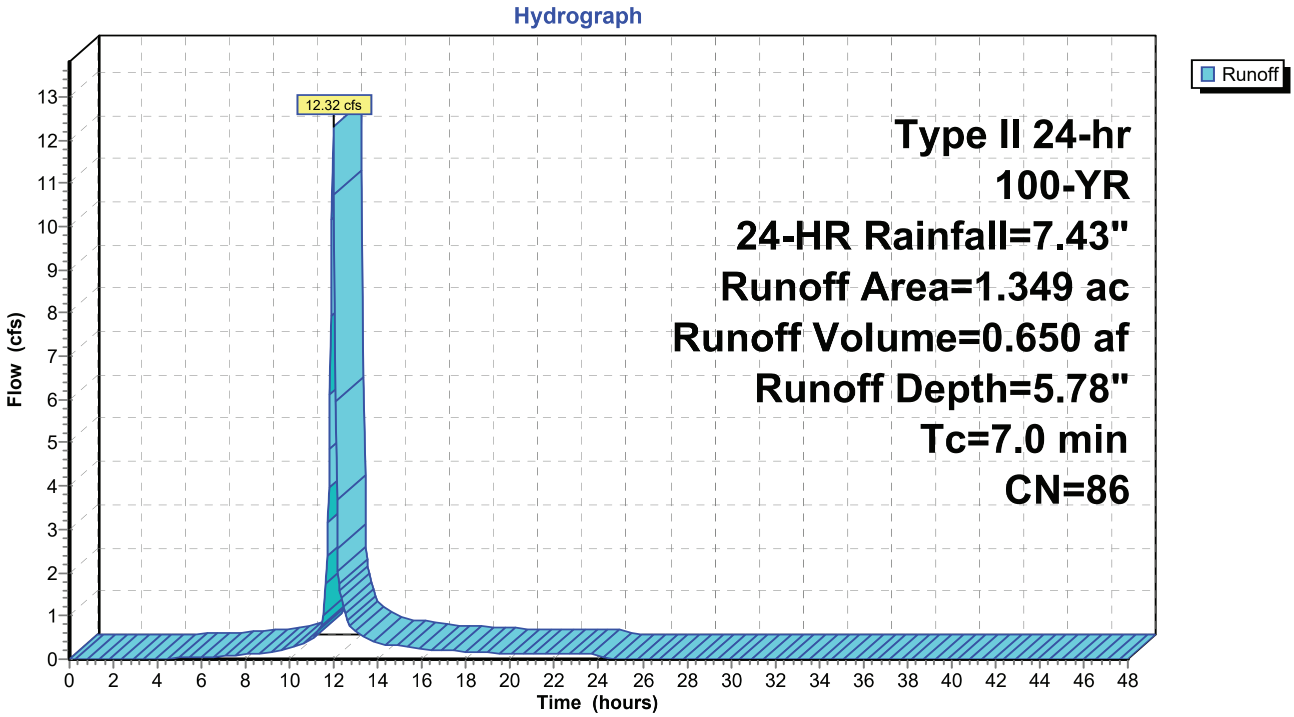
Runoff = 12.32 cfs @ 11.98 hrs, Volume= 0.650 af, Depth= 5.78"
Routed to Pond 15P : MEDIAN STORAGE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-YR, 24-HR Rainfall=7.43"

Area (ac)	CN	Description
0.647	98	Paved parking, HSG C
0.702	74	>75% Grass cover, Good, HSG C
1.349	86	Weighted Average
0.702		52.04% Pervious Area
0.647		47.96% Impervious Area

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

Subcatchment DA2: EX PARKING TO MEDIAN



Summary for Subcatchment DA3: TO ALIMAGNET PKWY

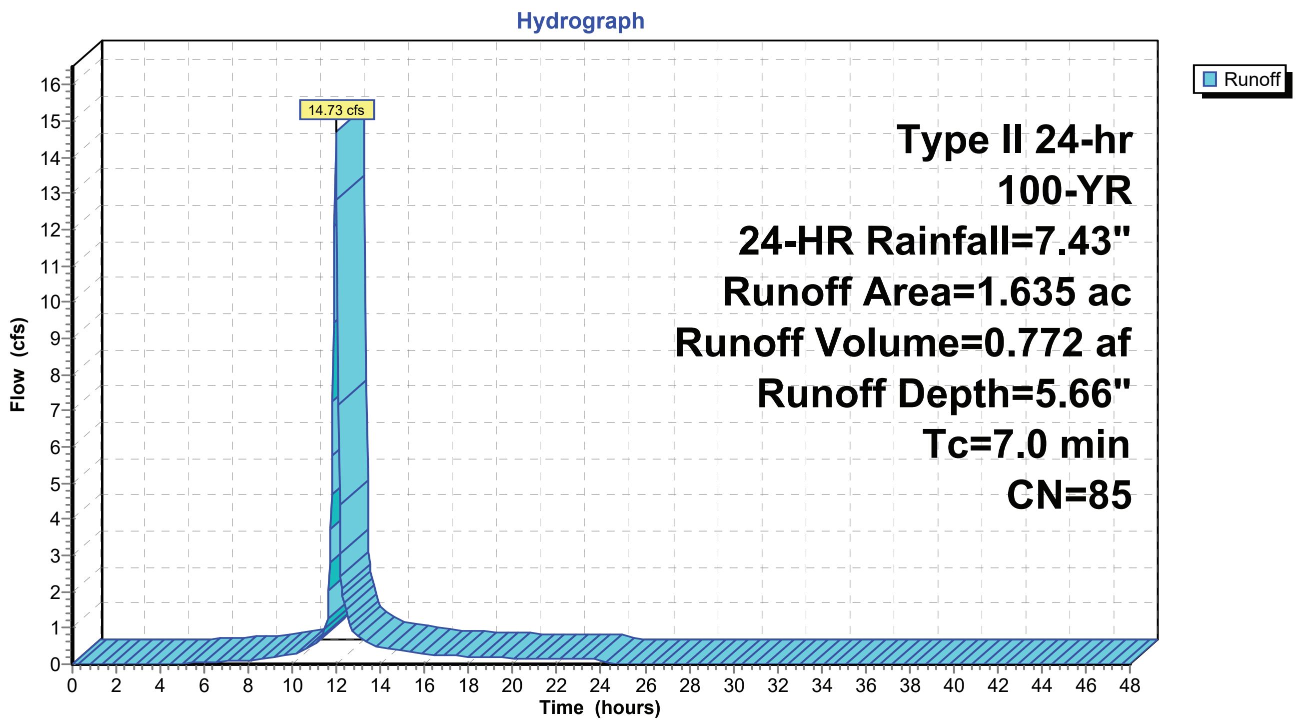
Runoff = 14.73 cfs @ 11.98 hrs, Volume= 0.772 af, Depth= 5.66"
Routed to Reach 12R : ALIMAGNET PKWY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-YR, 24-HR Rainfall=7.43"

Area (ac)	CN	Description
0.780	98	Paved parking, HSG C
0.855	74	>75% Grass cover, Good, HSG C
1.635	85	Weighted Average
0.855		52.29% Pervious Area
0.780		47.71% Impervious Area

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

Subcatchment DA3: TO ALIMAGNET PKWY



Summary for Subcatchment DA4: NW TO ALIMAGNET LAKE

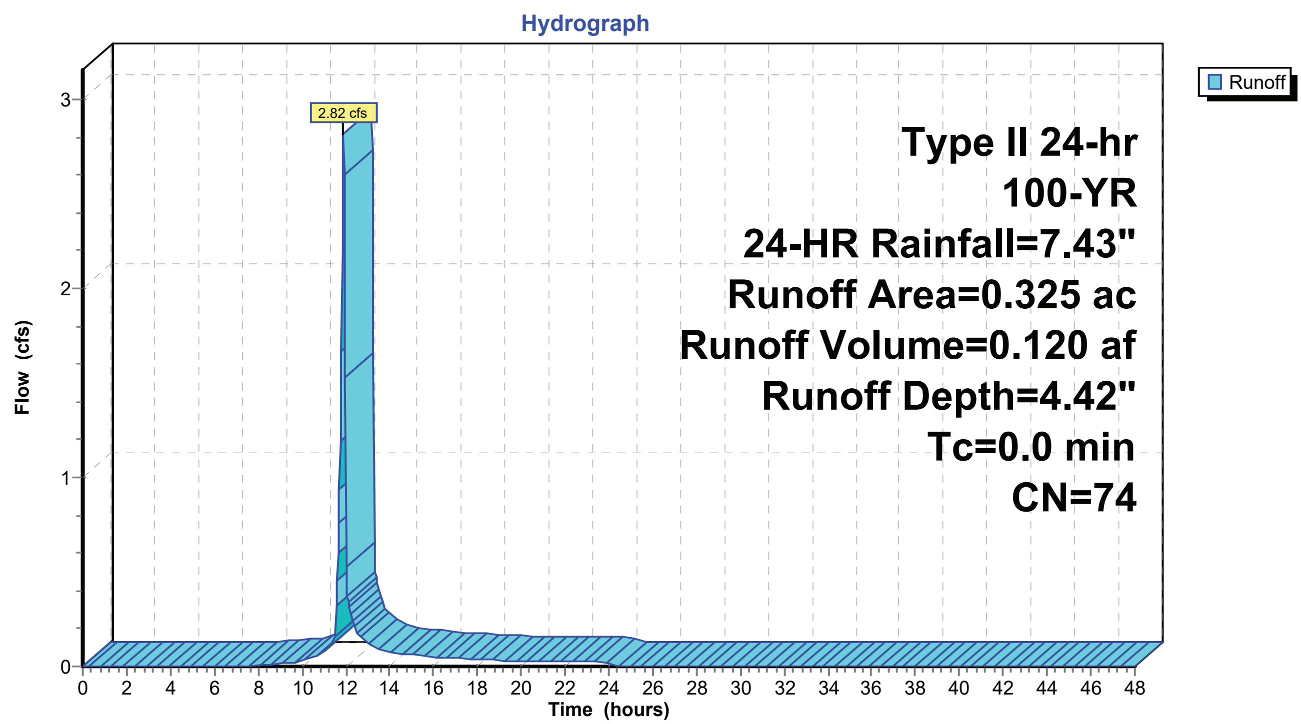
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 2.82 cfs @ 11.89 hrs, Volume= 0.120 af, Depth= 4.42"
Routed to Reach 10R : TO ALIMAGNET LAKE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-YR, 24-HR Rainfall=7.43"

Area (ac)	CN	Description
0.325	74	>75% Grass cover, Good, HSG C
0.325		100.00% Pervious Area

Subcatchment DA4: NW TO ALIMAGNET LAKE



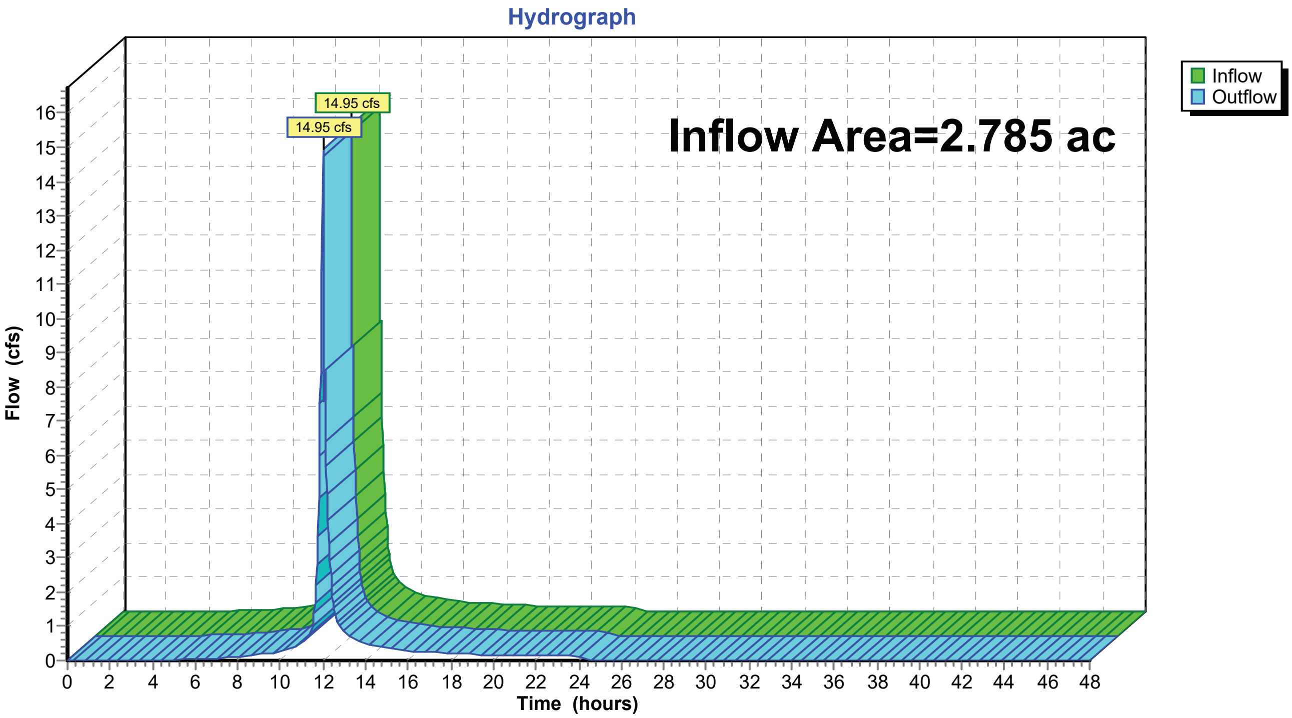
Summary for Reach 10R: TO ALIMAGNET LAKE

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

Inflow Area = 2.785 ac, 41.04% Impervious, Inflow Depth = 3.32" for 100-YR, 24-HR event
Inflow = 14.95 cfs @ 11.99 hrs, Volume= 0.769 af
Outflow = 14.95 cfs @ 11.99 hrs, Volume= 0.769 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 11R : OUT_PR

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Reach 10R: TO ALIMAGNET LAKE

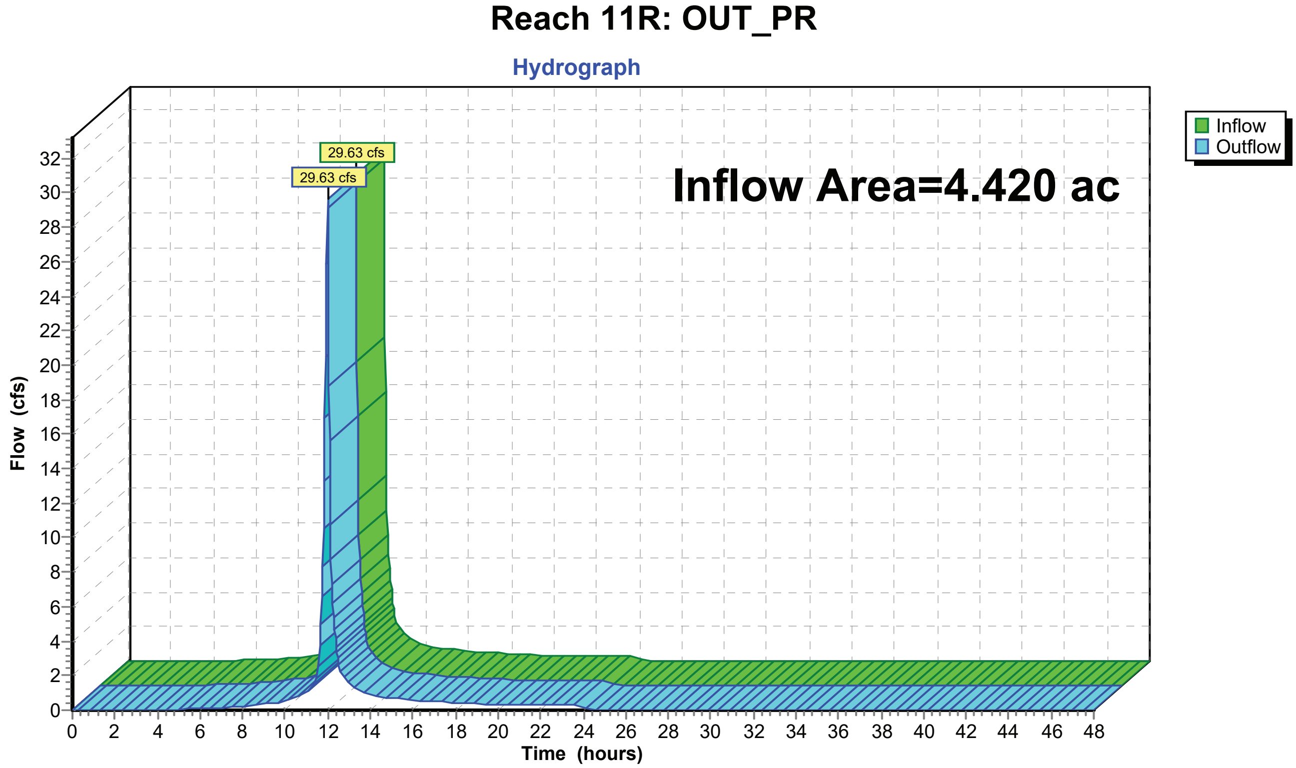


Summary for Reach 11R: OUT_PR

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

Inflow Area = 4.420 ac, 43.51% Impervious, Inflow Depth = 4.18" for 100-YR, 24-HR event
Inflow = 29.63 cfs @ 11.99 hrs, Volume= 1.541 af
Outflow = 29.63 cfs @ 11.99 hrs, Volume= 1.541 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs



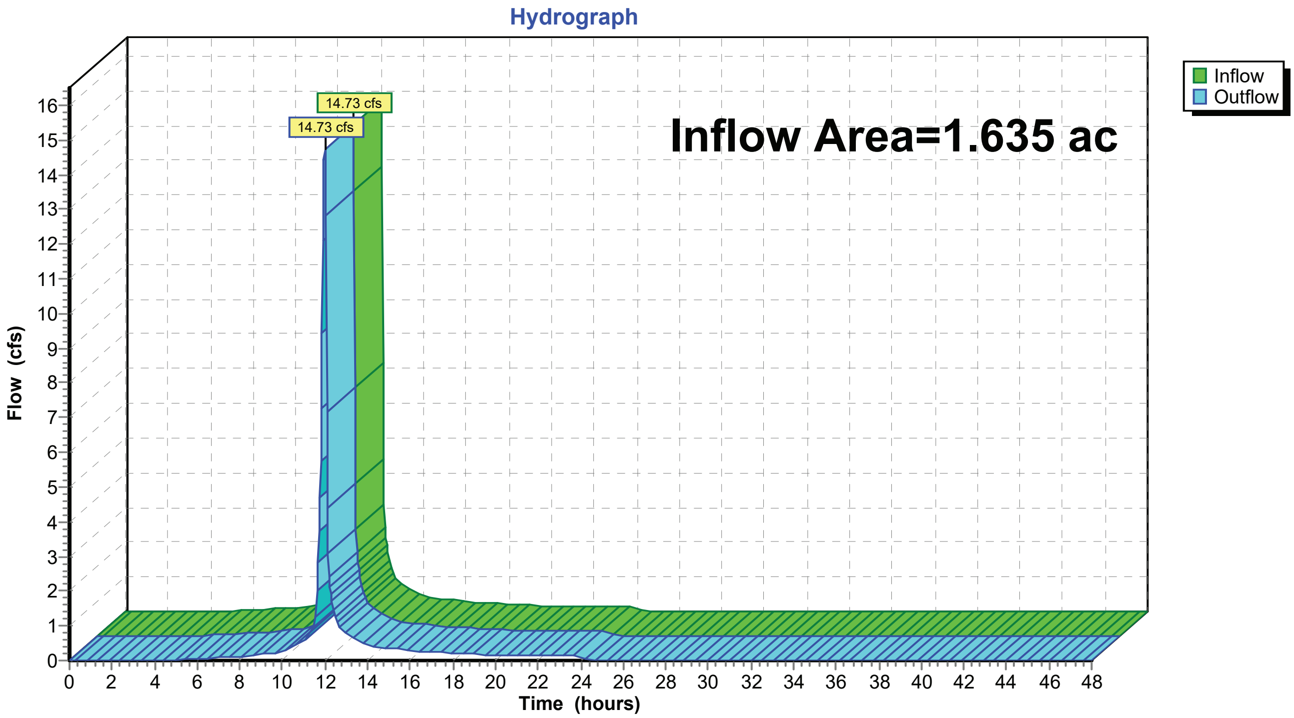
Summary for Reach 12R: ALIMAGNET PKWY

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

Inflow Area = 1.635 ac, 47.71% Impervious, Inflow Depth = 5.66" for 100-YR, 24-HR event
Inflow = 14.73 cfs @ 11.98 hrs, Volume= 0.772 af
Outflow = 14.73 cfs @ 11.98 hrs, Volume= 0.772 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 11R : OUT_PR

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Reach 12R: ALIMAGNET PKWY



Summary for Pond 7P: INFILTRATION

[80] Warning: Exceeded Pond 8P by 0.64' @ 24.44 hrs (2.23 cfs 0.199 af)

Inflow Area = 1.111 ac, 44.64% Impervious, Inflow Depth = 5.66" for 100-YR, 24-HR event
Inflow = 10.01 cfs @ 11.98 hrs, Volume= 0.524 af
Outflow = 0.13 cfs @ 18.85 hrs, Volume= 0.397 af, Atten= 99%, Lag= 412.1 min
Discarded = 0.13 cfs @ 18.85 hrs, Volume= 0.397 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 10R : TO ALIMAGNET LAKE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,008.73' @ 18.85 hrs Surf.Area= 6,936 sf Storage= 16,044 cf
Flood Elev= 1,011.00' Surf.Area= 9,200 sf Storage= 34,210 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 847.7 min (1,638.5 - 790.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,006.00'	34,210 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

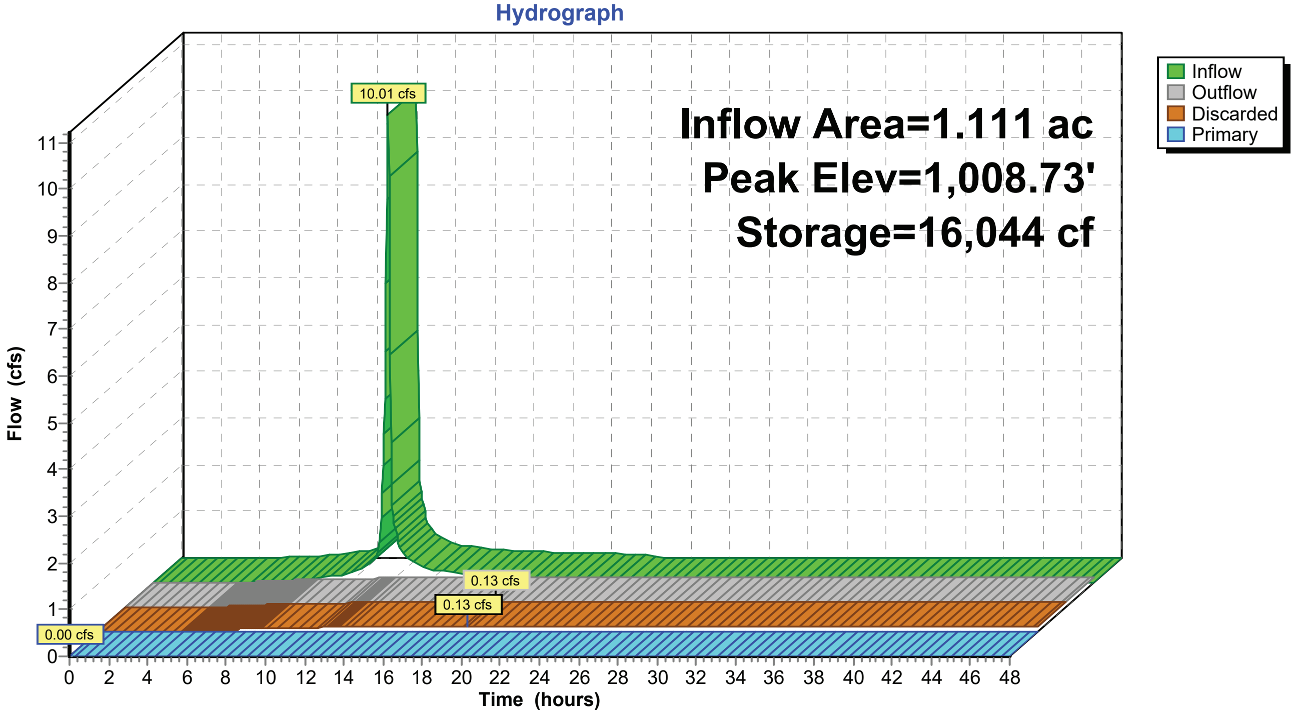
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,006.00	4,800	0	0
1,009.20	7,300	19,360	19,360
1,011.00	9,200	14,850	34,210

Device	Routing	Invert	Outlet Devices
#1	Discarded	1,006.00'	**0.800 in/hr Exfiltration over Surface area**
#2	Primary	1,009.20'	**15.0" Round RCP_Round 15"** L= 100.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,009.20' / 1,006.00' S= 0.0320 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf

Discarded OutFlow Max=0.13 cfs @ 18.85 hrs HW=1,008.73' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.13 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,006.00' TW=0.00' (Dynamic Tailwater)
↑—**2=RCP_Round 15"** (Controls 0.00 cfs)

Pond 7P: INFILTRATION



Summary for Pond 8P: PRETREATMENT

[57] Hint: Peaked at 1,009.63' (Flood elevation advised)

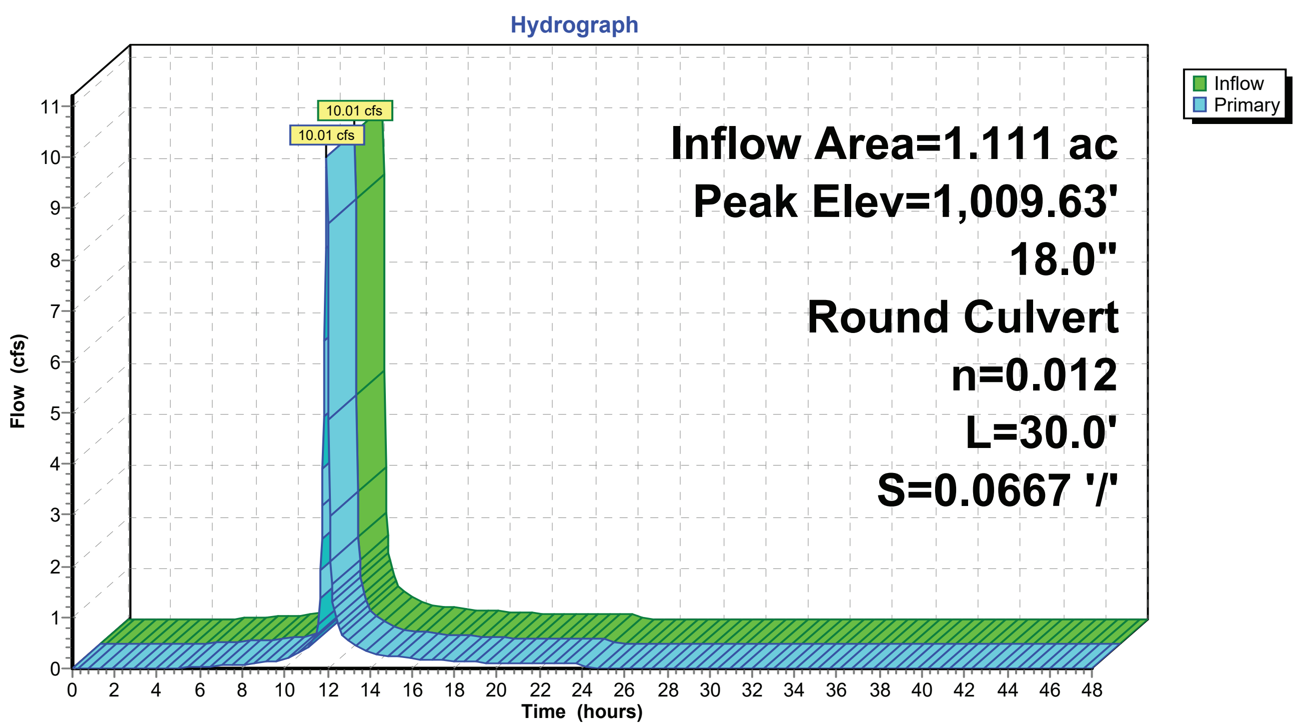
Inflow Area = 1.111 ac, 44.64% Impervious, Inflow Depth = 5.66" for 100-YR, 24-HR event
Inflow = 10.01 cfs @ 11.98 hrs, Volume= 0.524 af
Outflow = 10.01 cfs @ 11.98 hrs, Volume= 0.524 af, Atten= 0%, Lag= 0.0 min
Primary = 10.01 cfs @ 11.98 hrs, Volume= 0.524 af
Routed to Pond 7P : INFILTRATION

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,009.63' @ 11.98 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,008.00'	**18.0" Round RCP_Round 18"** L= 30.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 1,008.00' / 1,006.00' S= 0.0667 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=9.81 cfs @ 11.98 hrs HW=1,009.60' TW=1,007.47' (Dynamic Tailwater)
1=RCP_Round 18" (Inlet Controls 9.81 cfs @ 5.55 fps)

Pond 8P: PRETREATMENT



Summary for Pond 15P: MEDIAN STORAGE

[93] Warning: Storage range exceeded by 2.61'
[58] Hint: Peaked 2.62' above defined flood level
[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 1.349 ac, 47.96% Impervious, Inflow Depth = 5.78" for 100-YR, 24-HR event
Inflow = 12.32 cfs @ 11.98 hrs, Volume= 0.650 af
Outflow = 14.32 cfs @ 12.00 hrs, Volume= 0.650 af, Atten= 0%, Lag= 1.0 min
Primary = 14.32 cfs @ 12.00 hrs, Volume= 0.650 af
Routed to Reach 10R : TO ALIMAGNET LAKE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,010.62' @ 12.00 hrs Surf.Area= 3,602 sf Storage= 2,807 cf
Flood Elev= 1,008.00' Surf.Area= 3,579 sf Storage= 2,772 cf

Plug-Flow detention time= 6.0 min calculated for 0.649 af (100% of inflow)
Center-of-Mass det. time= 6.0 min (793.9 - 787.9)

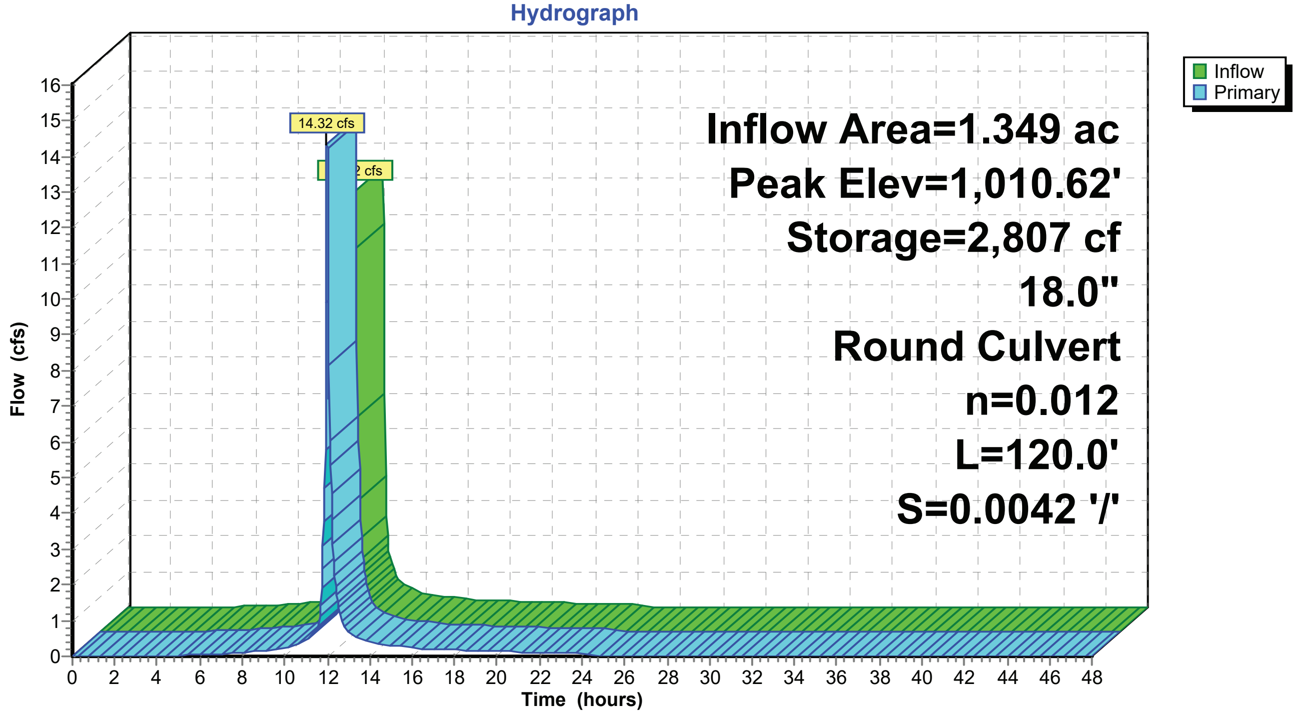
Volume	Invert	Avail.Storage	Storage Description
#1	1,006.50'	2,807 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,006.50	61	0	0
1,007.00	1,289	338	338
1,008.01	3,602	2,470	2,807

Device	Routing	Invert	Outlet Devices
#1	Primary	1,006.50'	**18.0" Round RCP_Round 18"** L= 120.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 1,006.50' / 1,006.00' S= 0.0042 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=13.79 cfs @ 12.00 hrs HW=1,010.40' TW=0.00' (Dynamic Tailwater)
1=RCP_Round 18" (Barrel Controls 13.79 cfs @ 7.81 fps)

Pond 15P: MEDIAN STORAGE



Time span=0.00-48.00 hrs, dt=0.04 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentDA1: SITE TO PR POND Runoff Area=1.111 ac 44.64% Impervious Runoff Depth=6.68"
Tc=7.0 min CN=85 Runoff=11.68 cfs 0.618 af

SubcatchmentDA2: EX PARKING TO Runoff Area=1.349 ac 47.96% Impervious Runoff Depth=6.80"
Tc=7.0 min CN=86 Runoff=14.34 cfs 0.764 af

SubcatchmentDA3: TO ALIMAGNETPKWY Runoff Area=1.635 ac 47.71% Impervious Runoff Depth=6.68"
Tc=7.0 min CN=85 Runoff=17.19 cfs 0.910 af

SubcatchmentDA4: NW TO ALIMAGNET Runoff Area=0.325 ac 0.00% Impervious Runoff Depth=5.36"
Tc=0.0 min CN=74 Runoff=3.39 cfs 0.145 af

Reach 10R: TO ALIMAGNETLAKE Inflow=21.05 cfs 0.909 af
Outflow=21.05 cfs 0.909 af

Reach 11R: OUT_PR Inflow=37.96 cfs 1.819 af
Outflow=37.96 cfs 1.819 af

Reach 12R: ALIMAGNETPKWY Inflow=17.19 cfs 0.910 af
Outflow=17.19 cfs 0.910 af

Pond 7P: INFILTRATION Peak Elev=1,009.21' Storage=19,454 cf Inflow=11.68 cfs 0.618 af
Discarded=0.14 cfs 0.423 af Primary=0.00 cfs 0.000 af Outflow=0.14 cfs 0.424 af

Pond 8P: PRETREATMENT Peak Elev=1,009.95' Inflow=11.68 cfs 0.618 af
18.0" Round Culvert n=0.012 L=30.0' S=0.0667 '/' Outflow=11.68 cfs 0.618 af

Pond 15P: MEDIAN STORAGE Peak Elev=1,013.15' Storage=2,807 cf Inflow=14.34 cfs 0.764 af
18.0" Round Culvert n=0.012 L=120.0' S=0.0042 '/' Outflow=19.26 cfs 0.764 af

Total Runoff Area = 4.420 ac Runoff Volume = 2.437 af Average Runoff Depth = 6.62"
56.49% Pervious = 2.497 ac 43.51% Impervious = 1.923 ac

Summary for Subcatchment DA1: SITE TO PR POND

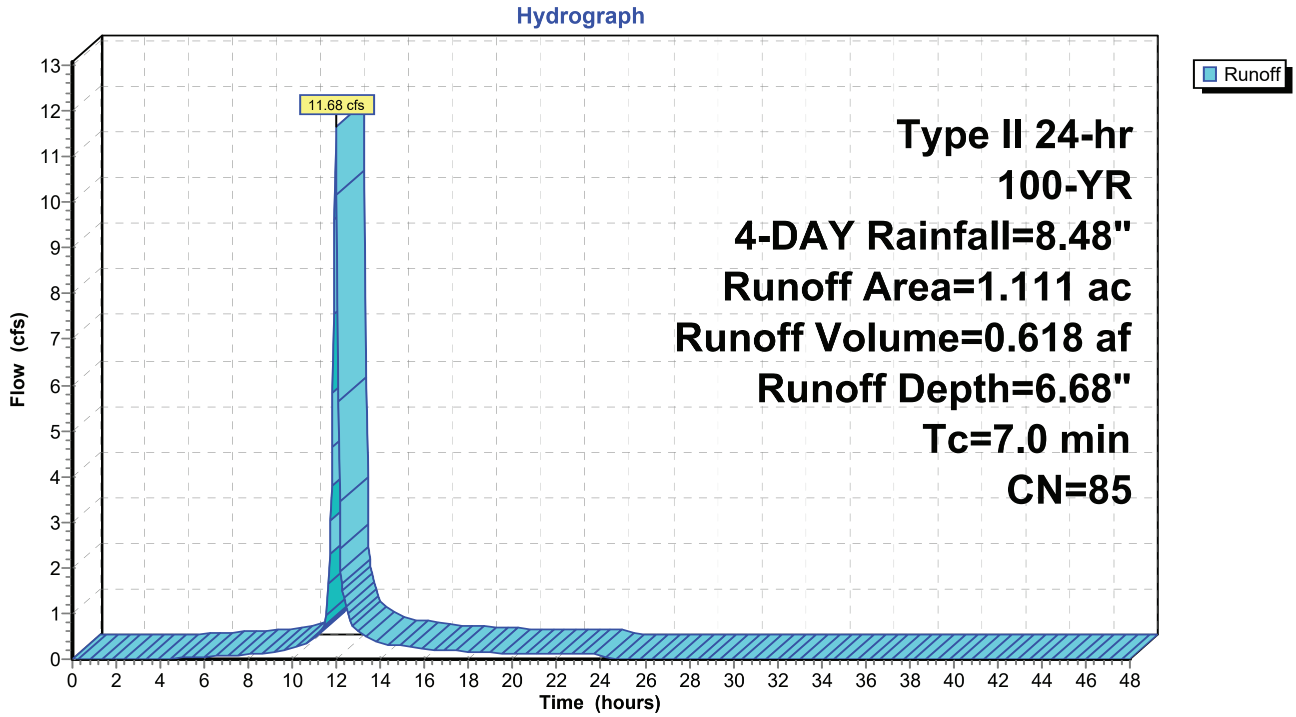
Runoff = 11.68 cfs @ 11.98 hrs, Volume= 0.618 af, Depth= 6.68"
Routed to Pond 8P : PRETREATMENT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-YR, 4-DAY Rainfall=8.48"

Area (ac)	CN	Description
0.496	98	Paved parking, HSG C
0.615	74	>75% Grass cover, Good, HSG C
1.111	85	Weighted Average
0.615		55.36% Pervious Area
0.496		44.64% Impervious Area

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

Subcatchment DA1: SITE TO PR POND



Summary for Subcatchment DA2: EX PARKING TO MEDIAN

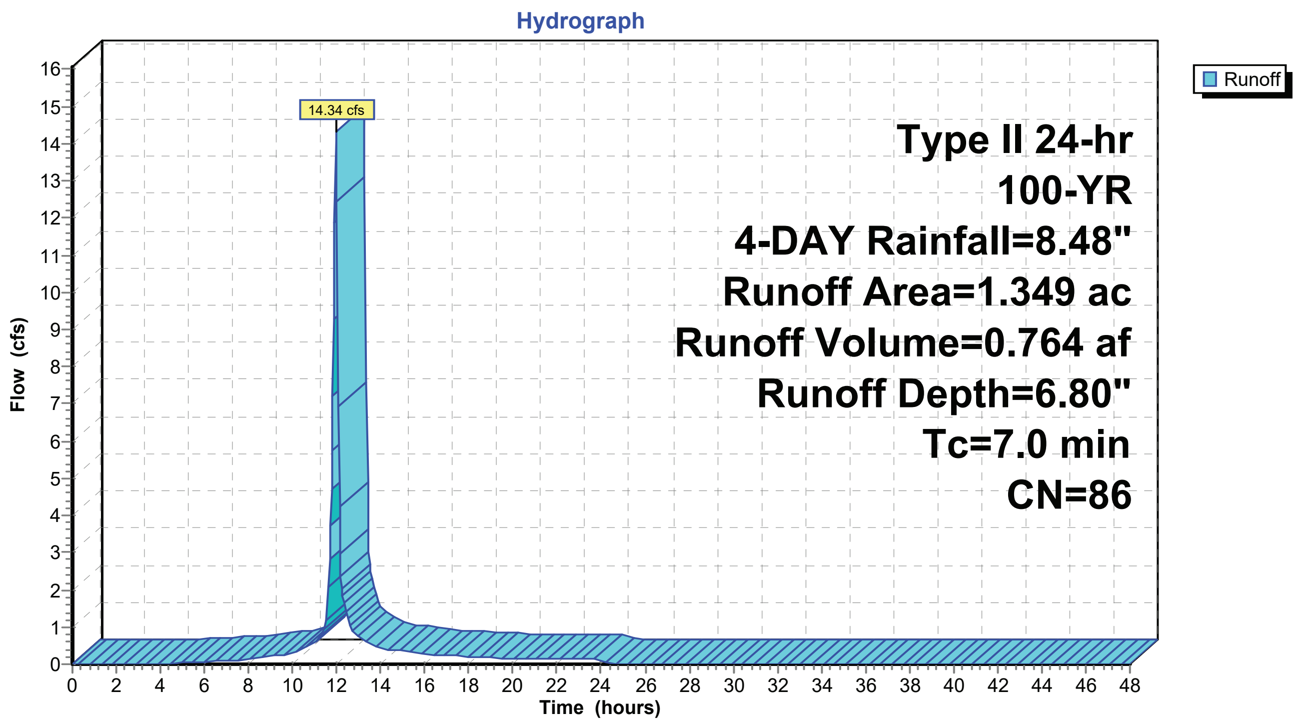
Runoff = 14.34 cfs @ 11.98 hrs, Volume= 0.764 af, Depth= 6.80"
Routed to Pond 15P : MEDIAN STORAGE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-YR, 4-DAY Rainfall=8.48"

Area (ac)	CN	Description
0.647	98	Paved parking, HSG C
0.702	74	>75% Grass cover, Good, HSG C
1.349	86	Weighted Average
0.702		52.04% Pervious Area
0.647		47.96% Impervious Area

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

Subcatchment DA2: EX PARKING TO MEDIAN



Summary for Subcatchment DA3: TO ALIMAGNET PKWY

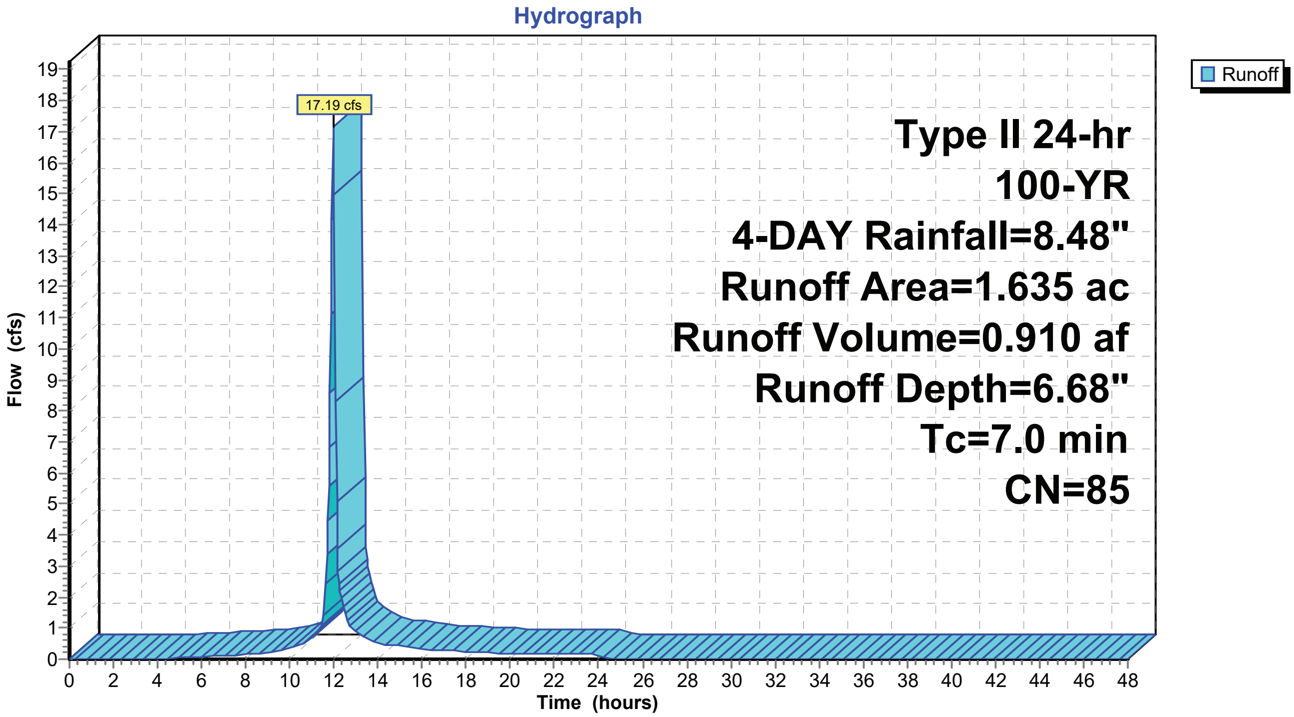
Runoff = 17.19 cfs @ 11.98 hrs, Volume= 0.910 af, Depth= 6.68"
Routed to Reach 12R : ALIMAGNET PKWY

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-YR, 4-DAY Rainfall=8.48"

Area (ac)	CN	Description
0.780	98	Paved parking, HSG C
0.855	74	>75% Grass cover, Good, HSG C
1.635	85	Weighted Average
0.855		52.29% Pervious Area
0.780		47.71% Impervious Area

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

Subcatchment DA3: TO ALIMAGNET PKWY



Summary for Subcatchment DA4: NW TO ALIMAGNET LAKE

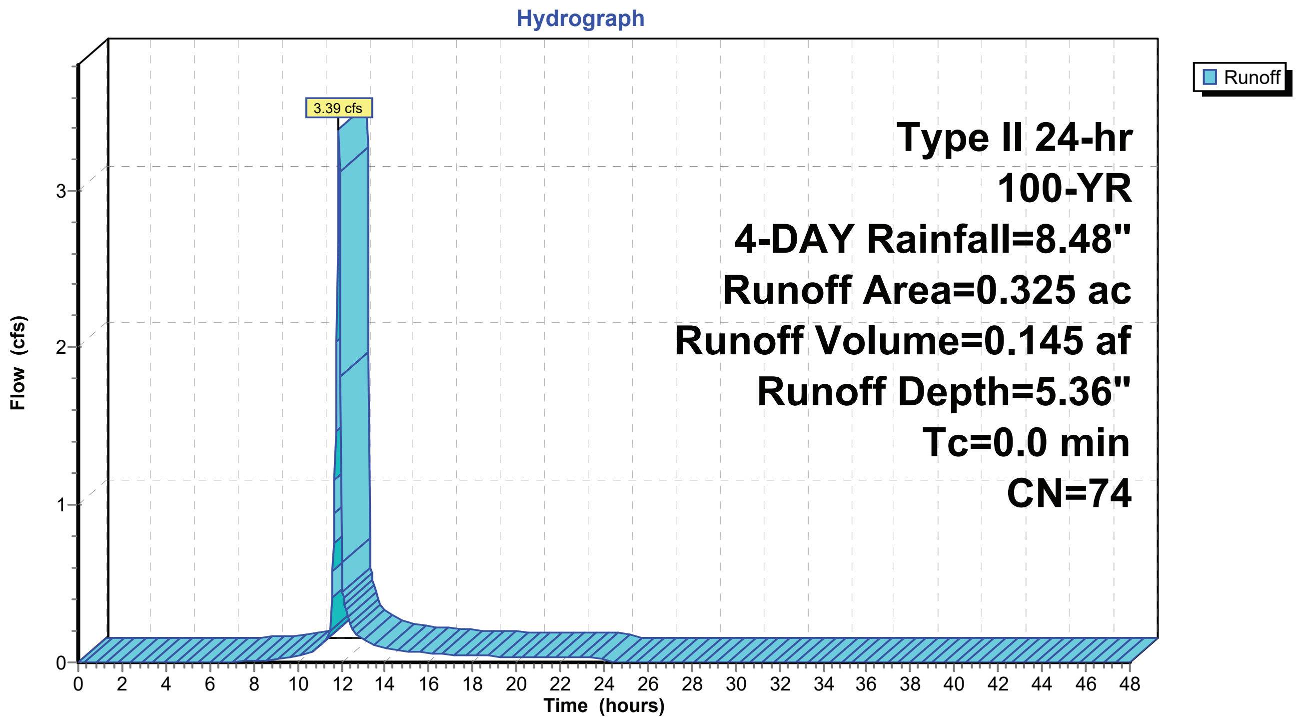
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 3.39 cfs @ 11.89 hrs, Volume= 0.145 af, Depth= 5.36"
Routed to Reach 10R : TO ALIMAGNET LAKE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-YR, 4-DAY Rainfall=8.48"

Area (ac)	CN	Description
0.325	74	>75% Grass cover, Good, HSG C
0.325		100.00% Pervious Area

Subcatchment DA4: NW TO ALIMAGNET LAKE



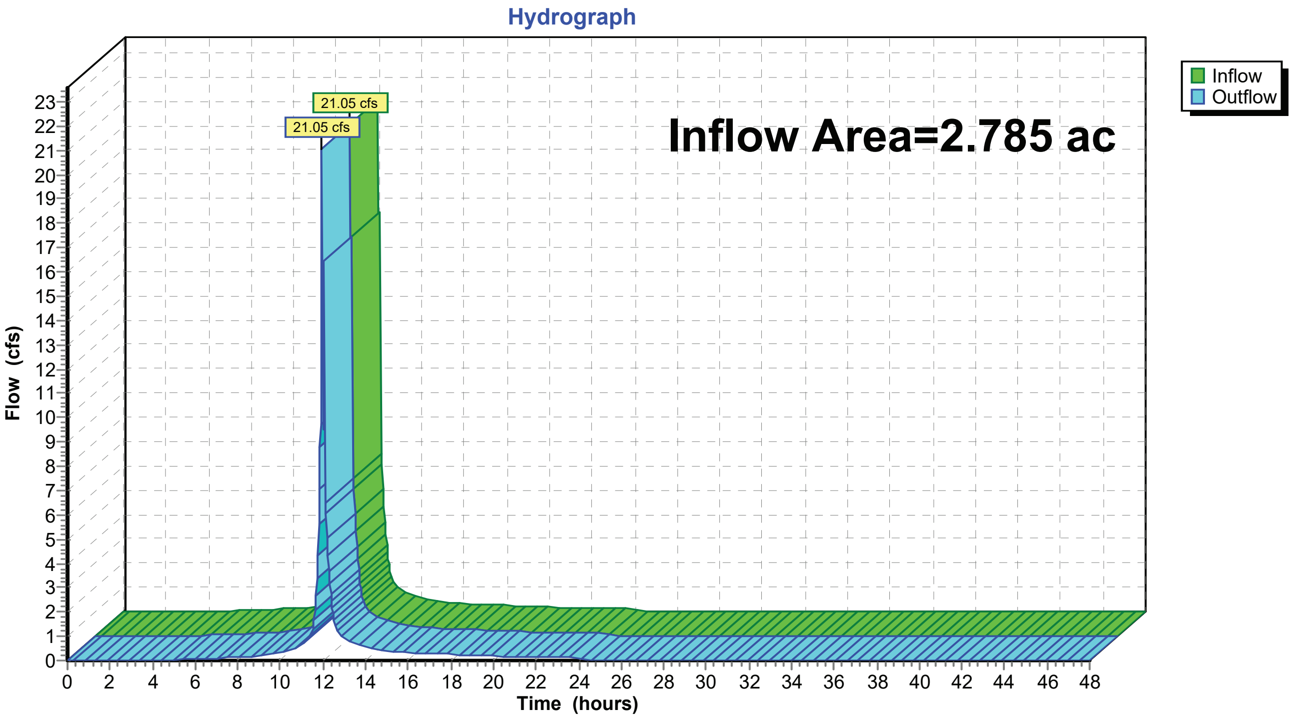
Summary for Reach 10R: TO ALIMAGNET LAKE

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

Inflow Area = 2.785 ac, 41.04% Impervious, Inflow Depth = 3.92" for 100-YR, 4-DAY event
Inflow = 21.05 cfs @ 11.96 hrs, Volume= 0.909 af
Outflow = 21.05 cfs @ 11.96 hrs, Volume= 0.909 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 11R : OUT_PR

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Reach 10R: TO ALIMAGNET LAKE



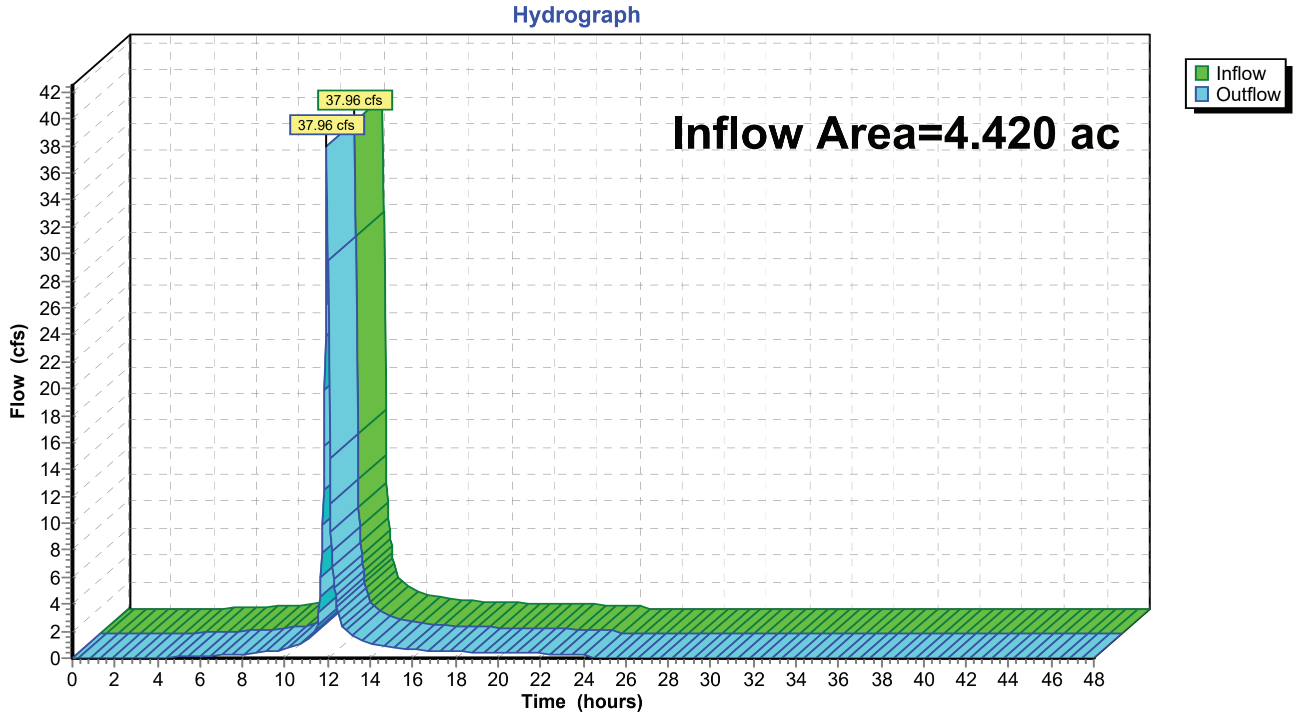
Summary for Reach 11R: OUT_PR

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

Inflow Area = 4.420 ac, 43.51% Impervious, Inflow Depth = 4.94" for 100-YR, 4-DAY event
Inflow = 37.96 cfs @ 11.96 hrs, Volume= 1.819 af
Outflow = 37.96 cfs @ 11.96 hrs, Volume= 1.819 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Reach 11R: OUT_PR



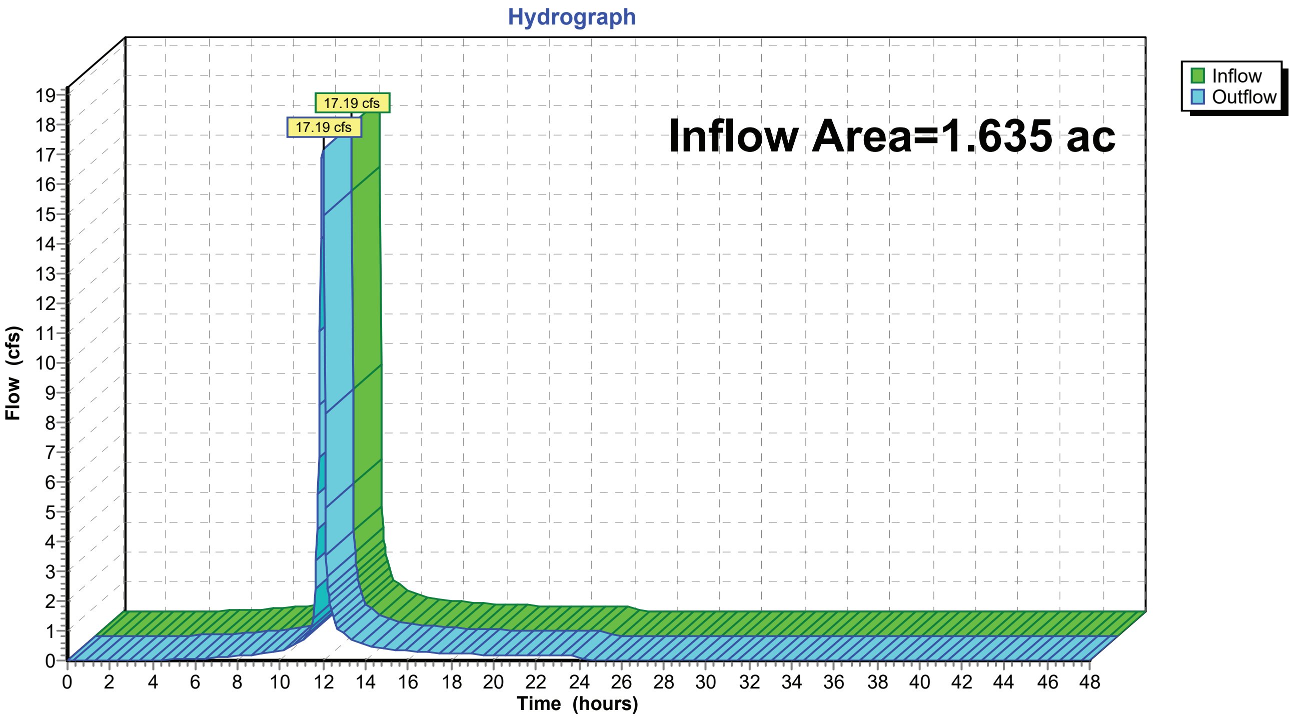
Summary for Reach 12R: ALIMAGNET PKWY

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

Inflow Area = 1.635 ac, 47.71% Impervious, Inflow Depth = 6.68" for 100-YR, 4-DAY event
Inflow = 17.19 cfs @ 11.98 hrs, Volume= 0.910 af
Outflow = 17.19 cfs @ 11.98 hrs, Volume= 0.910 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 11R : OUT_PR

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs

Reach 12R: ALIMAGNET PKWY



Summary for Pond 7P: INFILTRATION

[80] Warning: Exceeded Pond 8P by 1.14' @ 24.48 hrs (6.51 cfs 1.119 af)

Inflow Area = 1.111 ac, 44.64% Impervious, Inflow Depth = 6.68" for 100-YR, 4-DAY event
Inflow = 11.68 cfs @ 11.98 hrs, Volume= 0.618 af
Outflow = 0.14 cfs @ 19.36 hrs, Volume= 0.424 af, Atten= 99%, Lag= 442.9 min
Discarded = 0.14 cfs @ 19.36 hrs, Volume= 0.423 af
Primary = 0.00 cfs @ 19.36 hrs, Volume= 0.000 af
Routed to Reach 10R : TO ALIMAGNET LAKE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,009.21' @ 19.36 hrs Surf.Area= 7,314 sf Storage= 19,454 cf
Flood Elev= 1,011.00' Surf.Area= 9,200 sf Storage= 34,210 cf

Plug-Flow detention time= 941.8 min calculated for 0.423 af (68% of inflow)
Center-of-Mass det. time= 845.4 min (1,631.6 - 786.2)

Volume	Invert	Avail.Storage	Storage Description
#1	1,006.00'	34,210 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

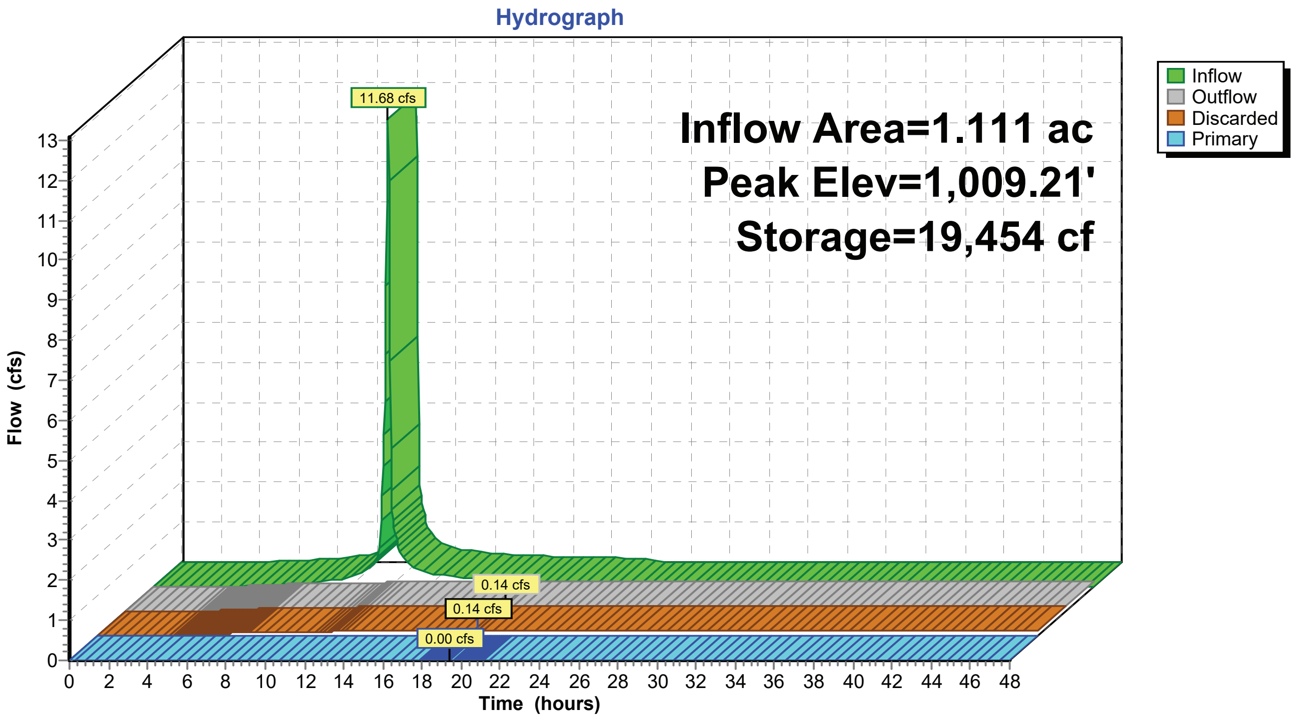
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,006.00	4,800	0	0
1,009.20	7,300	19,360	19,360
1,011.00	9,200	14,850	34,210

Device	Routing	Invert	Outlet Devices
#1	Discarded	1,006.00'	**0.800 in/hr Exfiltration over Surface area**
#2	Primary	1,009.20'	**15.0" Round RCP_Round 15"** L= 100.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,009.20' / 1,006.00' S= 0.0320 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf

Discarded OutFlow Max=0.14 cfs @ 19.36 hrs HW=1,009.21' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=0.00 cfs @ 19.36 hrs HW=1,009.21' TW=0.00' (Dynamic Tailwater)
└─**2=RCP_Round 15"** (Inlet Controls 0.00 cfs @ 0.39 fps)

Pond 7P: INFILTRATION



Summary for Pond 8P: PRETREATMENT

[57] Hint: Peaked at 1,009.95' (Flood elevation advised)

Inflow Area =	1.111 ac,	44.64% Impervious,	Inflow Depth = 6.68"	for 100-YR, 4-DAY event
Inflow =	11.68 cfs @	11.98 hrs, Volume=	0.618 af	
Outflow =	11.68 cfs @	11.98 hrs, Volume=	0.618 af, Atten= 0%, Lag= 0.0 min	
Primary =	11.68 cfs @	11.98 hrs, Volume=	0.618 af	

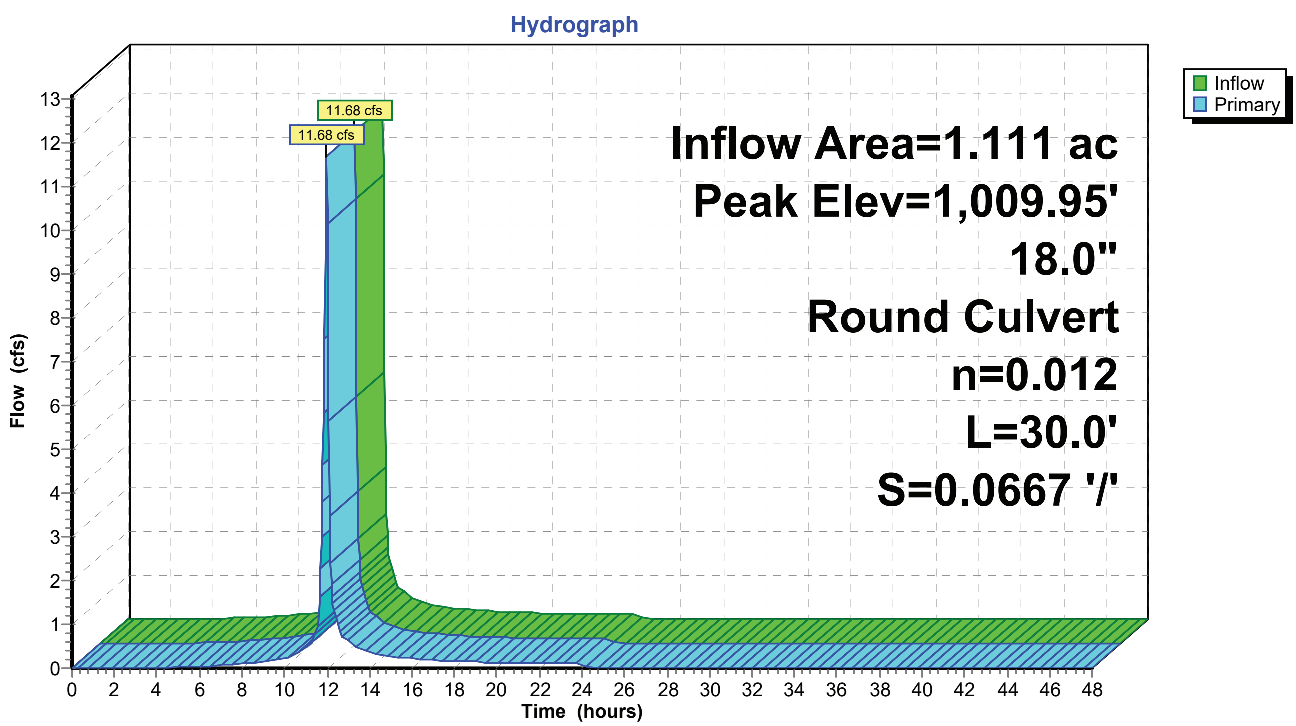
Routed to Pond 7P : INFILTRATION

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,009.95' @ 11.98 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,008.00'	**18.0" Round RCP_Round 18"** L= 30.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 1,008.00' / 1,006.00' S= 0.0667 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=11.44 cfs @ 11.98 hrs HW=1,009.91' TW=1,007.75' (Dynamic Tailwater)
1=RCP_Round 18" (Inlet Controls 11.44 cfs @ 6.47 fps)

Pond 8P: PRETREATMENT



Summary for Pond 15P: MEDIAN STORAGE

[93] Warning: Storage range exceeded by 5.14'
[58] Hint: Peaked 5.15' above defined flood level
[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 1.349 ac, 47.96% Impervious, Inflow Depth = 6.80" for 100-YR, 4-DAY event
Inflow = 14.34 cfs @ 11.98 hrs, Volume= 0.764 af
Outflow = 19.26 cfs @ 11.96 hrs, Volume= 0.764 af, Atten= 0%, Lag= 0.0 min
Primary = 19.26 cfs @ 11.96 hrs, Volume= 0.764 af
Routed to Reach 10R : TO ALIMAGNET LAKE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.04 hrs
Peak Elev= 1,013.15' @ 11.96 hrs Surf.Area= 3,602 sf Storage= 2,807 cf
Flood Elev= 1,008.00' Surf.Area= 3,579 sf Storage= 2,772 cf

Plug-Flow detention time= 5.7 min calculated for 0.764 af (100% of inflow)
Center-of-Mass det. time= 5.7 min (789.2 - 783.5)

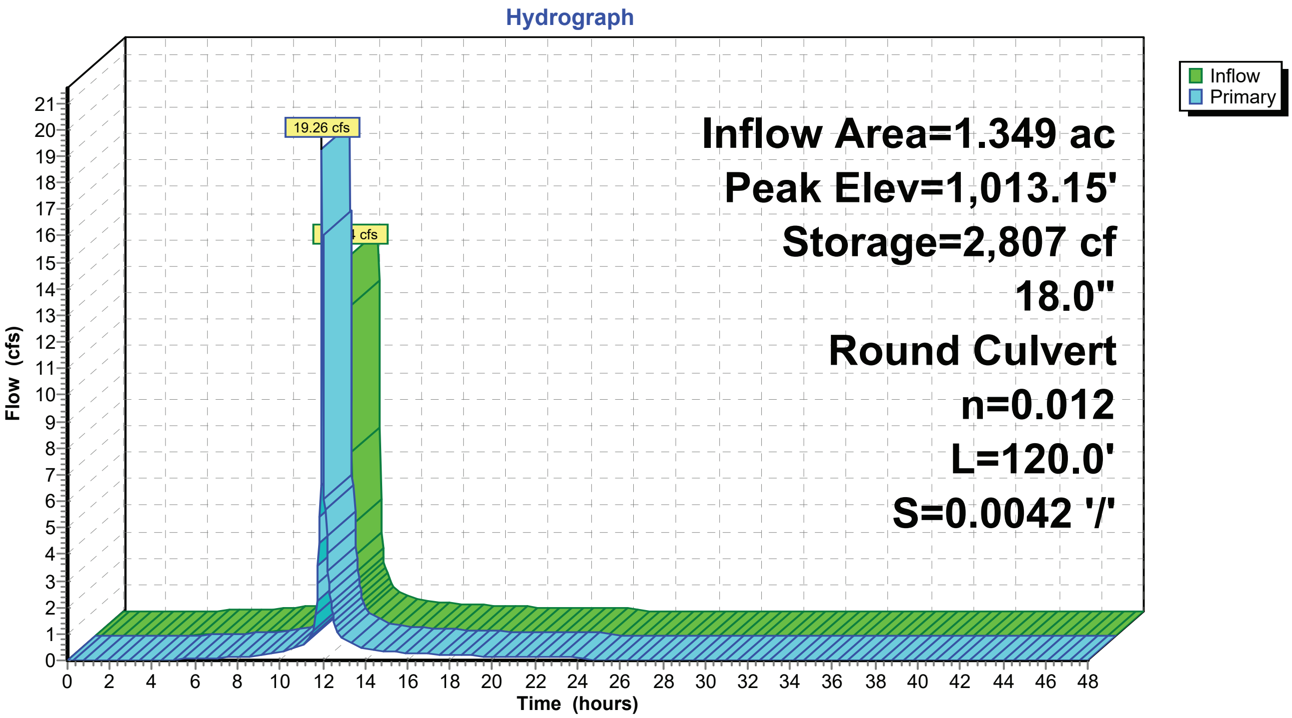
Volume	Invert	Avail.Storage	Storage Description
#1	1,006.50'	2,807 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,006.50	61	0	0
1,007.00	1,289	338	338
1,008.01	3,602	2,470	2,807

Device	Routing	Invert	Outlet Devices
#1	Primary	1,006.50'	**18.0" Round RCP_Round 18"** L= 120.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 1,006.50' / 1,006.00' S= 0.0042 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=18.85 cfs @ 11.96 hrs HW=1,012.92' TW=0.00' (Dynamic Tailwater)
└─**1=RCP_Round 18"** (Barrel Controls 18.85 cfs @ 10.67 fps)

Pond 15P: MEDIAN STORAGE



Appendix 3. Geotechnical Report

REPORT OF GEOTECHNICAL EXPLORATION

Alimagnet Pickleball Court Facility
1200 Alimagnet Parkway
Burnsville, Minnesota

AET Project No. P-0017491
Kimley-Horn Project No. 160507092

Date: March 30, 2023

Prepared for:

Kimley-Horn
767 Eustis Street, Suite 100
Saint Paul, Minnesota 55114

Geotechnical • Materials
Forensic • Environmental
Building Technology
Petrography/Chemistry

American Engineering Testing
550 Cleveland Avenue North
Saint Paul, Minnesota 55114-1804
TeamAET.com • 800.792.6364

March 30, 2023

Kimley-Horn
767 Eustis Street, Suite 100
Saint Paul, Minnesota 55114

Attn: Mr. Todd Halunen, PLA, ASLA

RE: Report of Geotechnical Exploration
Alimagnet Pickleball Court Facility
1200 Alimagnet Parkway
Burnsville, Minnesota
AET Project No. P-0017491

Dear Mr. Halunen:

American Engineering Testing, Inc. (AET) is pleased to present the results of our subsurface exploration program and geotechnical engineering analysis for the upcoming pickleball court project in Burnsville, Minnesota. Our services were performed according to our proposal dated October 18, 2022.

Please contact us if you have any questions about the report. We are also available to arrange construction observation, inspection and testing services.

Sincerely,
American Engineering Testing, Inc.

Mitchell G Nelson

Mitchell G. Nelson, P.E.
Staff Engineer
Geotechnical Division
mnelson@teamAET.com
612-756-3332

SIGNATURE PAGE

Prepared for:

Kimley-Horn
767 Eustis Street, Suite 100
Saint Paul, Minnesota 55114

Attn: Mr. Todd Halunen, PLA, ASLA

Prepared by:

American Engineering Testing, Inc.
550 Cleveland Avenue North
Saint Paul, Minnesota 55114
(651) 659-9001 / www.teamAET.com

Authored by:

Mitchell G. Nelson, P.E. (MN)
Staff Geotechnical Engineer

Reviewed by:

Andrew T. Schmid, P.E. (MN, WI, ND, FL, GA)
Principal Engineer

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under Minnesota Statute Section 326.02 to 326.15

Name: **Mitchell G. Nelson**

Date: **March 30, 2023** **License #:** **59401**

TABLE OF CONTENTS

1.0 INTRODUCTION

We understand Kimley-Horn is designing a pickleball court facility for the City of Burnsville and Dakota County. To assist planning and design, the project team has authorized American Engineering Testing, Inc. (AET) to complete a subsurface exploration program at the site, conduct soil laboratory testing, and perform a geotechnical engineering review for the project. This report presents the results of the above services and provides our engineering recommendations based on this data.

2.0 SCOPE OF SERVICES

AET's services were performed according to our proposal dated October 18, 2022 which was authorized by Kimley-Horn on February 2, 2023. The authorized scope consisted of the following:

- Completing 7 standard penetration test borings to depths ranging from 10 to 14 ½ feet
- Performing review and classification of samples and soils laboratory testing
- Conducting a geotechnical engineering analysis and preparing this summary report

These services are intended for geotechnical purposes only. The scope is not intended to explore for the presence or extent of environmental contamination in the soil or groundwater.

3.0 PROJECT INFORMATION

We understand Kimley-Horn is designing an outdoor pickleball court facility for the City of Burnsville and Dakota County. The project will primarily include the construction of an 8-court pickleball facility. We understand construction will also include a stormwater basin / management feature, paved bituminous surface parking, and a paved trail. The project site is at Alimagnet Park, located west of 1200 Alimagnet Parkway in Burnsville, Minnesota.

4.0 SUBSURFACE EXPLORATION AND TESTING

4.1 Field Exploration Program

The subsurface exploration program conducted for the project consisted of seven standard penetration test (SPT) soil borings. Soil borings were completed on March 9, 2023. Borings were placed at approximate locations provided with the initial project request. The logs of the borings and details of the methods used appear in Appendix A. The logs contain information concerning soil layering, soil classification, geologic origins, and moisture condition. A density description or consistency is also noted for the natural soils, which is based on the standard penetration resistance (N-value) where applicable.

Final locations and ground surface elevations were recorded with a field GPS unit with submeter accuracy. Please note that GPS elevations were recorded for informational purposes to provide relative consistency for presenting geotechnical data and are typically not considered registered survey-quality precise. The boring locations are provided in Figure 1 in Appendix A.

4.2 Laboratory Testing

Samples collected in the field were analyzed at the AET soils laboratory to provide a more detailed characterization of sample properties. The laboratory testing program included moisture content tests on fine-grained soil samples. Additionally, gradation testing was performed to determine the amount of clay and silt particles in select samples, and to produce grain size distribution curves of select samples. Test results appear in Appendix A on the individual boring logs adjacent to the samples upon which they were performed, or on the data sheets following the logs. Laboratory review and characterization of soil samples also provided the Unified Soil Classification System (USCS) classifications of material encountered during site exploration.

5.0 SITE CONDITIONS

5.1 Surface Observations

The project site is currently an undeveloped open area located on City of Burnsville property within the existing Alimagnet Park. The ground surface cover at the site is primarily open grassland. Surrounding areas include wooded property to the north and west, open park space to the south, and a paved parking lot to the east. Ground surface elevations at the site ranged from approximately 1011 to 1018 feet.

5.2 Subsurface Profile and Soil Characteristics

The subsurface profile of the site is characterized by topsoil and existing site fill underlain by natural soil deposits, primarily coarse and mixed alluvium and glacial till. A layer of sandy silt in boring B-3 was classified as “coarse alluvium or fill” as the geologic origin was not clear based on recovered samples. The estimates of strength, compressibility and drainage given in the paragraphs below are subjective in nature meant to give a generalized view of the soil properties.

Fill soils were mostly mixtures of clay and sand with varying amounts of organic material and gravel. The variable N-values and the composition of the soils indicate that the fill was likely not placed in a controlled manner for structural support. The fine-grained clay and silt observed in most fill samples can be considered relatively slow-draining, and susceptible to frost-heave displacement if exposed to freezing conditions. We judge the fill soils to be moisture-sensitive and generally unsuitable to support structural loads from new construction.

Coarse and mixed alluvial and glacial till samples included silty sands (SM), sands with silt (SP-SM), and sandy silts (ML). The alluvial samples were generally medium dense in consistency. We judge the observed alluvial soils to have moderate strength and low compressibility properties. Fine alluvial samples were primarily lean clay (CL). The observed fine alluvial clay samples were stiff in consistency. We judge the observed fine alluvial clay soils to have moderate strength and compressibility properties in their current state. Fine alluvial clay soils can be considered moisture-sensitive; we caution that some constructability concerns may be present if exposed clay soils encounter excess moisture during construction or excavation. Additionally, the fine alluvial soils observed onsite can be considered relatively slow-draining and not readily conducive to infiltration. If exposed to freezing conditions, the lean clay soils can be considered susceptible to frost-heave displacement. Detailed material properties and stratigraphy information are available on the boring logs provided in Appendix A.

Existing bituminous pavement was encountered in boring B-5. Fill soils in this boring contained varying amounts of sand and gravel, indicating a possible pavement base layer in some areas. However, consistent and uniformly graded pavement subbase layers were not observed beneath existing pavements. Please refer to the boring logs in Appendix A for more information.

5.3 Groundwater

Groundwater was not observed during the site exploration. We caution that groundwater levels can fluctuate due to varying seasonal and annual rainfall and snow melt amounts, as well as other environmental factors. Additionally, regional groundwater levels can change due to construction events such as alterations in ground cover, surface water runoff control, and dewatering systems.

6.0 RECOMMENDATIONS

6.1 Approach Discussion

The primary construction concern is to protect the planned pickleball courts from frost-heave damage. This will involve replacing the frost-susceptible soils beneath the court with compacted, free-draining sand. Earthwork support for new pavements should involve removing existing site fill, buried organics and debris to support pavement loads. Design and construction consideration will also be needed to prevent damage to surface structures, sidewalks, and paved trails due to seasonal frost-heave displacement in fine-grained soils near the ground surface.

6.2 Parking Lot Support

6.2.1 Excavation

We understand new surface parking is planned in areas characterized by borings B-2 and B-7. To prepare the parking area for pavement support, we recommend earthwork involve the removal of existing pavements, surface vegetation, topsoil, and soft or unstable clayey, silty, and organic fill soils that exist within the upper 3 feet of the subgrade soils (referred to as the critical subgrade zone). This excavation should also include ½:1 lateral oversizing outside the curb lines or edges of the pavements.

After this excavation, we recommend the exposed soils should be scarified to a depth of about 12 inches, moisture conditioned, and then recompacted to a minimum of 100% of the standard Proctor maximum dry density (ASTM: D698). Scarifying and compacting the exposed excavation will result in a more uniform subgrade condition. If the scarified soils are more than 3 feet below the pavement subgrade, the compaction can be reduced to 95%.

6.2.2 Sand Subbase Layer and Drainage

Due to the fine-grained subgrade soils encountered in our borings, we recommend a subcut be performed to allow for the placement of a sand subbase layer consisting of Select Granular Material.

For transitioning the thickness of the sand subbase along the profile of the roadway, we recommend the thickness have a longitudinal taper of 10H:1V. A transverse taper of 4H:1V can be used perpendicular to the centerline for cross street/driveway connections. The subcut and sand subbase placement should extend slightly beyond the outer edge of curbs, where placed, to maintain frost uniformity.

The sand subbase will overlie slow draining soil; therefore, subsurface drainage must be provided to minimize build-up of water within the subbase and base layers. Drainage can be accomplished by adding Subsurface Drains, Subcut Drain Type (MnDOT Spec. 2502.3.B); these drains should be connected to the storm sewer, since daylighting will likely not be feasible at this site. Refer to MnDOT Standard Plans 5-297.430 and 5-297.433 for more information.

6.2.3 Subgrade Preparation and Fill Placement

After excavation, structural fill will be needed to re-attain pavement subgrade elevations. We judge the existing sand, clay, and gravel mixture fill soils to be suitable for reuse as structural fill within the pavement area provided they can be properly moisture conditioned and compacted and do not contain debris or organic materials. Fill soils containing debris and buried organics can be considered generally unsuitable for reuse as structural fill. Our scope of services does not include earthwork quantity estimating. If the site does not contain enough suitable reuse material, import borrow fill will be needed. We recommend using Granular Material or Select Granular Material as outlined in MnDOT Specification 3149 Table 3149.2.

All new fill and reworked soils for pavement support should be placed and compacted per MnDOT Specification 2106, including the moisture content and compaction requirements shown in MnDOT Tables 2106.3-1 and 2106.3-4, respectively. In ASTM terms, this specification requires soils placed within 3 feet of paving grade be compacted to a minimum of 100% of the standard maximum dry unit weight defined in ASTM D 698 (Standard Proctor test). A reduced minimum compaction level of 95% of the standard maximum dry unit weight can be used below the critical subgrade zone for non-granular materials (those which do not meet MnDOT Spec 3149.2B). If encountered, frozen soils should not be used as fill, and fill should not be placed over frozen soils.

6.2.4 Subgrade Testing

Before placement of the sand subbase, ultimate performance of the final subgrade should be evaluated with subgrade proof roll testing before pavement construction. After the subgrade has been prepared and compacted at bottom-of-pavement-base elevation, and before placement of aggregate base material, stability of subgrade soils should be evaluated by test rolling the subgrade with a loaded tandem axle dump truck under observation by the construction quality and management teams. We generally recommend testing with a gross vehicle weight of approximately 20 tons. The design team can consider other options for test weight during the subgrade proof roll if a more representative estimate of anticipated traffic loading is available. The test roll will help to delineate any unstable soils that will not be acceptable as pavement subgrade soils. These unstable soils should be removed and replaced; or aerated, dried and recompacted back into place as recommended by AET geotechnical and construction services personnel.

After the test roll procedure has indicated subgrade material is stable, we recommend placing a compacted sand subbase layer with a thickness of one foot; this will protect the underlying subgrade soils from disturbance during construction and will provide a uniform working surface for aggregate base and pavement placement. The sand subbase material should generally meet the description of Granular Material as outlined in MnDOT Specification 3149.

6.2.5 Geotextile

We recommend placement of a geotextile fabric meeting the requirements of MnDOT Spec. 3733, Type 10 beneath sand subbase due to the predominant fine-grained subgrade soils encountered at the site. The fabric will limit the mixing of the sand subbase with the underlying fine-grained subgrade. Generally, if a 30-inch frost free condition is provided in the pavement section, the geotextile can be removed from the design as permitted by construction conditions.

A geotextile fabric could also be placed as a construction aid, in areas of wet or unstable soils, to facilitate compaction of soils placed above. In low-lying widening areas or at the top of subgrade in areas where additional subcutting and sand subbase placement is not practical from a drainage standpoint, the use of a geotextile could help reduce pumping and migration or loss of the sand subbase or drainage layer into the underlying fine-grained soils during compaction.

6.2.6 Aggregate Base

Aggregate base placed for pavement support should meet the gradation and quality requirements for Class 5 or 6 per MnDOT Spec. 3138, and any reclaimed material placed as aggregate base should meet the gradation requirements of Table 3138.2-6. Aggregate base placement and compaction should be performed according to MnDOT Spec. 2211. All aggregate base material (including existing, imported, or reclaimed) should be tested for compaction using the Penetration Index Method per the requirements of Table 2211.3-3.

6.3 Parking Lot Pavements

6.3.1 Section Thicknesses

We are presenting pavement thickness recommendations based on two potential traffic situations: light duty and heavy duty. The light duty design refers to parking areas which are intended only for automobiles and passenger trucks/vans. The heavy duty design is intended for drive lane pavements which will experience heavier truck traffic (9-ton to 10-ton design load), such as delivery trucks, garbage trucks, and snow plows. These recommendations can be revised, if needed, when traffic count frequency and specific use requirements are known. Table 6.3.1 provides the general section thickness recommendations and an example of each course type.

Please note that the pavement thickness designs recommended in Table 6.3.1 are minimum thicknesses, not average thicknesses. They should be noted as such on the project plans and specifications. The recommended section thicknesses should provide a minimum thickness of 3 inches for light duty and 3½ inches for the heavy duty, accounting for industry placement methods and allowed tolerances of ¼ inch per lift.

Table 6.3.1 – General Pavement Thickness Recommendations

Pavement Course	Section Thickness (inches) and Design Mix Example	
	Light Duty	Heavy Duty
Bituminous Wear Upper	1½ - (e.g.: SPWEA330F*)	2 - (e.g.: SPWEA440F*)
Bituminous Wear Lower	2 - (e.g.: SPWEB340F*)	2 - (e.g.: SPWEB330F*)
Aggregate Base	6	8
Sand Subbase	12	12
Geotextile Fabric	Yes	Yes

*Recommended Asphalt Binder: PG 58V-34

6.3.2 Bituminous Materials

Imported aggregate base should meet the gradation and quality requirements for Class 5 or 6 per MnDOT Spec. 3138. The base can be crushed limestone or recycled material. Aggregate base placement and compaction should be performed according to MnDOT Spec. 2211. All aggregate base material should be tested for compaction using the Penetration Index Method per MnDOT Spec. 2211.3.D.2.C.

The bituminous materials should meet appropriate MnDOT 2360 specifications. The bituminous pavement materials should be compacted to the specified density. The use of Recycled Asphalt Products (RAP) is a cost saving measure that is often suggested, however there will be a higher probability of pavement thermal cracking when RAP is used. We recommend limiting RAP within the upper wear course to a maximum of 10% and in lower courses to a maximum of 20% to reduce thermal cracking. Minimizing the number of mixes and binder oils (PG grades) used on a project is generally more economical. The use of an F-binder oil (PG 58V-34) in the wear layers will reduce rutting caused by turning movements, slow speeds, and starting/stopping traffic. An E-binder oil (PG 58H-28) could be substituted for the recommended F-binder (PG 58V-34) to save cost; however, increased frequency of thermal cracking will likely occur. Alternatively, a C-binder (PG 58H-34) could be used as a cost saving measure; however, the C-binder is less resistant to rutting.

6.3.3 Bituminous Pavement Comments

The project owner should not expect that the pavements would last their anticipated design life without maintenance. Even if placed and compacted properly on stable subgrade conditions, bituminous pavements can experience cracking in 1 to 3 years, primarily due to temperature-related expansion and shrinkage. Each of the design recommendations given above assumes that a regularly scheduled maintenance program consisting of patching cracks and repairing locally distressed areas will be implemented. Seal coating of the pavement surface after 3 to 5 years often helps prolong pavement life.

6.4 Surface Structures, Sidewalks and Frost Heave

Some of the surficial fill soils contain clay and silt soils, which are considered moderately frost susceptible. If exposed to freezing conditions, some differential frost heave may be expected at sidewalks, stoops, paved trails or other similar structures that are directly supported by these fine, slow-draining soils. This could contribute to ponding surface water, tripping hazards, cracks and other damage.

A method to limit the potential for heaving to occur is to remove the frost-susceptible soil from below the sidewalks and trail areas. Typically, removal to a depth of about 42 inches will provide adequate protection from frost heaving. A significant reduction can be accomplished however, by lesser excavation depth of 2 to 3 feet. The excavated soil should be replaced by non-frost susceptible soils consisting of sands and gravels with less than 7% of the particles by weight passing the #200 sieve. A drain tile outlet or other drainage system should be provided to avoid water from accumulating within the new sand layer. All backfill which will support sidewalks, stoops, signs or similar structural elements should be compacted to at least 95% of the standard Proctor maximum dry density per ASTM: D698. Fills placed in landscaped areas can be compacted to a reduced level of 90%.

6.5 Stormwater Management

We understand a stormwater infiltration basin is planned for the northwestern portion of the site, characterized by boring B-1. We anticipate the bottom of the basin will be in a layer of sandy silt, or the underlying silty sand layer. Based on the Minnesota Storm Water Manual (MSWM) produced by the Minnesota Pollution Control Agency (MPCA), the infiltration rates for silts are estimated to be 0.20 inches per hour. Because infiltration will be limited to the least-permeable soil type, we consider this characterization representative of the expected infiltration performance of the basin. If excavation extends beneath the silt layer to the underlying silty sand soils (a depth of approximately 9 feet), the estimated infiltration rate based on the MSWM will be 0.45 inches per hour.

More site-specific representative rates may be determined by performing in-situ testing via the Double-Ring Infiltrometer (DRI) method or Modified Phillip-Dunne (MPD) Infiltrometer method, if desired. This testing, if performed, should be conducted at or just below the bottom elevations of the proposed infiltration structures/devices. This testing should be used to document that the infiltration rates used by the design engineer are comparable with the in-place soils.

6.6 Pickleball Courts Support

The planned surface courts are characterized by borings B-3 and B-4. The presence of frost-susceptible silty and clayey soils in these areas poses a risk of heave displacement damaging the court surfaces. Replacing these soils with non-frost-susceptible sands will reduce the risk of frost-heave related displacement. To completely eliminate the risk of frost heave, a subcut replacement depth comprising the entire seasonal frost depth – generally up to five feet – would be needed. However, unless strict performance standard compliance is required, this approach is often not financially feasible.

A common approach is to over-excavate beneath the planned court surface elevation to a reduced depth which is uniform across the entire court surface area. In this case, frost movements may still occur, but the differential nature of the movement is significantly moderated by the uniform subgrade thickness. The thickness of this sand layer is generally a function of cost versus performance expectations, typically ranging from 1 to 3 feet. Provided the project owner does not have strict performance requirements, we recommend considering a compacted sand subbase layer at least two feet in thickness.

7.0 CONSTRUCTION CONSIDERATIONS

7.1 Potential Difficulties

7.1.1 Runoff Water in Excavation

Water can be expected to collect in the excavation bottom during times of inclement weather or snow melt. To allow observation of the excavation bottom, to reduce the potential for soil disturbance, and to facilitate filling operations, we recommend water be removed from within the excavation during construction. Based on the soils encountered, we anticipate the groundwater can be handled with conventional sump pumping.

7.1.2 Disturbance of Soils

The on-site soils can be disturbed under construction traffic, especially if the soils are wet. If soils become disturbed, they should be subcut to the underlying undisturbed soils. The subcut soils can then be dried and recompacted back into place, or they should be removed and replaced with drier imported fill.

7.1.3 Cobbles and Boulders

While obstructions were not encountered during drilling, variations in soil composition could include cobbles and boulders. This may make excavating procedures somewhat more difficult than normal if they are encountered.

7.2 Excavation Backsloping

If excavation faces are not retained, the excavations should maintain maximum allowable slopes in accordance with *OSHA Regulations (Standards 29 CFR), Part 1926, Subpart P, "Excavations"* (can be found on www.osha.gov). Even with the required OSHA sloping, water seepage or surface runoff can potentially induce sideslope erosion or sloughing which could require slope maintenance. We recommend the contractor's Competent Person review this report and assess the soils onsite to determine the soil type designation for excavation safety.

7.3 Observation and Testing

The recommendations in this report are based on the subsurface conditions found at our test boring locations. Since the soil conditions can be expected to vary away from the soil boring locations, we recommend on-site observation by a geotechnical engineer/technician during construction to evaluate these potential changes. Soil density testing should also be performed on new fill placed in order to document that project specifications for compaction have been satisfied.

8.0 ASTM STANDARDS

When we refer to an ASTM Standard in this report, we mean that our services were performed in general accordance with that standard. Compliance with any other standards referenced within the specified standard is neither inferred nor implied.

9.0 LIMITATIONS

Within the limitations of scope, budget, and schedule, we have endeavored to provide our services according to generally accepted geotechnical engineering practices at this time and location. Other than this, no warranty, express or implied, is intended.

Important information regarding risk management and proper use of this report is given in Appendix B entitled "Geotechnical Report Limitations and Guidelines for Use."

Appendix A

Geotechnical Field Exploration and Testing
Boring Log Notes
Unified Soil Classification System
Figure 1: Boring Locations Figure
Subsurface Boring Logs
Sieve Analysis Results – Gradation Curves

Appendix A
Geotechnical Field Exploration and Testing
Report No. P-0017491

A.1 FIELD EXPLORATION

The subsurface conditions at the site were explored by drilling and sampling seven (7) standard penetration test borings. The locations of the borings are provided, preceding the Subsurface Boring Logs in this appendix.

A.2 SAMPLING METHODS

A.2.1 Split-Spoon Samples (SS) - Calibrated to N_{60} Values

Standard penetration (split-spoon) samples were collected in general accordance with ASTM: D1586 with one primary modification. The ASTM test method consists of driving a 2-inch O.D. split-barrel sampler into the in-situ soil with a 140-pound hammer dropped from a height of 30 inches. The sampler is driven a total of 18 inches into the soil. After an initial set of 6 inches, the number of hammer blows to drive the sampler the final 12 inches is known as the standard penetration resistance or N-value. Our method uses a modified hammer weight, which is determined by measuring the system energy using a Pile Driving Analyzer (PDA) and an instrumented rod.

In the past, standard penetration N-value tests were performed using a rope and cathead for the lift and drop system. The energy transferred to the split-spoon sampler was typically limited to about 60% of its potential energy due to the friction inherent in this system. This converted energy then provides what is known as an N_{60} blow count.

The most recent drill rigs incorporate an automatic hammer lift and drop system, which has higher energy efficiency and subsequently results in lower N-values than the traditional N_{60} values. By using the PDA energy measurement equipment, we are able to determine actual energy generated by the drop hammer. With the various hammer systems available, we have found highly variable energies ranging from 55% to over 100%. Therefore, the intent of AET's hammer calibrations is to vary the hammer weight such that hammer energies lie within about 60% to 65% of the theoretical energy of a 140-pound weight falling 30 inches. The current ASTM procedure acknowledges the wide variation in N-values, stating that N-values of 100% or more have been observed. Although we have not yet determined the statistical measurement uncertainty of our calibrated method to date, we can state that the accuracy deviation of the N-values using this method is significantly better than the standard ASTM Method.

A.2.2 Disturbed Samples (DS)/Spin-up Samples (SU)

Sample types described as "DS" or "SU" on the boring logs are disturbed samples, which are taken from the flights of the auger. Because the auger disturbs the samples, possible soil layering and contact depths should be considered approximate.

A.2.3 Sampling Limitations

Unless actually observed in a sample, contacts between soil layers are estimated based on the spacing of samples and the action of drilling tools. Cobbles, boulders, and other large objects generally cannot be recovered from test borings, and they may be present in the ground even if they are not noted on the boring logs.

Determining the thickness of "topsoil" layers is usually limited, due to variations in topsoil definition, sample recovery, and other factors. Visual-manual description often relies on color for determination, and transitioning changes can account for significant variation in thickness judgment. Accordingly, the topsoil thickness presented on the logs should not be the sole basis for calculating topsoil stripping depths and volumes. If more accurate information is needed relating to thickness and topsoil quality definition, alternate methods of sample retrieval and testing should be employed.

A.3 CLASSIFICATION METHODS

Soil descriptions shown on the boring logs are based on the Unified Soil Classification (USC) system. The USC system is described in ASTM: D2487 and D2488. Where laboratory classification tests (sieve analysis or Atterberg Limits) have been performed, accurate classifications per ASTM: D2487 are possible. Otherwise, soil descriptions shown on the boring logs are visual-manual judgments. Charts are attached which provide information on the USC system, the descriptive terminology, and the symbols used on the boring logs.

The boring logs include descriptions of apparent geology. The geologic depositional origin of each soil layer is interpreted primarily by observation of the soil samples, which can be limited. Observations of the surrounding topography, vegetation, and development can sometimes aid this judgment.

A.4 WATER LEVEL MEASUREMENTS

The groundwater level measurements are shown at the bottom of the boring logs. The following information appears under “Water Level Measurements” on the logs:

- Date and Time of measurement
- Sampled Depth: lowest depth of soil sampling at the time of measurement
- Casing Depth: depth to bottom of casing or hollow-stem auger at time of measurement
- Cave-in Depth: depth at which measuring tape stops in the borehole
- Water Level: depth in the borehole where free water is encountered
- Drilling Fluid Level: same as Water Level, except that the liquid in the borehole is drilling fluid

The true location of the water table at the boring locations may be different than the water levels measured in the boreholes. This is possible because there are several factors that can affect the water level measurements in the borehole. Some of these factors include: permeability of each soil layer in profile, presence of perched water, amount of time between water level readings, presence of drilling fluid, weather conditions, and use of borehole casing.

A.5 LABORATORY TEST METHODS

A.5.1 Water Content Tests

Conducted per AET Procedure 01-LAB-010, which is performed in general accordance with ASTM: D2216 and AASHTO: T265.

A.5.2 Particle Size Analysis (% Passing No. 200 Sieve)

Conducted per AET Procedure 01-LAB-060, which is performed in general accordance with ASTM: D1140 and AASHTO: T11.

A.5.3 Sieve Analysis of Soils (thru #200 Sieve)

Conducted per AET Procedure 01-LAB-040, which is performed in general conformance with ASTM: D6913, Method A.

A.6 TEST STANDARD LIMITATIONS

Field and laboratory testing is done in general conformance with the described procedures. Compliance with any other standards referenced within the specified standard is neither inferred nor implied.

A.7 SAMPLE STORAGE

Unless notified to do otherwise, we routinely retain representative samples of the soils recovered from the borings for a period of 30 days.

BORING LOG NOTES

DRILLING AND SAMPLING SYMBOLS

Symbol	Definition
AR:	Sample of material obtained from cuttings blown out the top of the borehole during air rotary procedure.
B, H, N:	Size of flush-joint casing
CAS:	Pipe casing, number indicates nominal diameter in inches
COT:	Clean-out tube
DC:	Drive casing; number indicates diameter in inches
DM:	Drilling mud or bentonite slurry
DR:	Driller (initials)
DS:	Disturbed sample from auger flights
DP:	Direct push drilling; a 2.125 inch OD outer casing with an inner 1½ inch ID plastic tube is driven continuously into the ground.
FA:	Flight auger; number indicates outside diameter in inches
HA:	Hand auger; number indicates outside diameter
HSA:	Hollow stem auger; number indicates inside diameter in inches
LG:	Field logger (initials)
MC:	Column used to describe moisture condition of samples and for the ground water level symbols
N (BPF):	Standard penetration resistance (N-value) in blows per foot (see notes)
NQ:	NQ wireline core barrel
PQ:	PQ wireline core barrel
RDA:	Rotary drilling with compressed air and roller or drag bit.
RDF:	Rotary drilling with drilling fluid and roller or drag bit
REC:	In split-spoon (see notes), direct push and thin-walled tube sampling, the recovered length (in inches) of sample. In rock coring, the length of core recovered (expressed as percent of the total core run). Zero indicates no sample recovered.
SS:	Standard split-spoon sampler (steel; 1.5" is inside diameter; 2" outside diameter); unless indicated otherwise
SU	Spin-up sample from hollow stem auger
TW:	Thin-walled tube; number indicates inside diameter in inches
WASH:	Sample of material obtained by screening returning rotary drilling fluid or by which has collected inside the borehole after “falling” through drilling fluid
WH:	Sampler advanced by static weight of drill rod and hammer
WR:	Sampler advanced by static weight of drill rod
94mm:	94 millimeter wireline core barrel
▼:	Water level directly measured in boring
▽:	Estimated water level based solely on sample appearance

TEST SYMBOLS

Symbol	Definition
CONS:	One-dimensional consolidation test
DEN:	Dry density, pcf
DST:	Direct shear test
E:	Pressuremeter Modulus, tsf
HYD:	Hydrometer analysis
LL:	Liquid Limit, %
LP:	Pressuremeter Limit Pressure, tsf
OC:	Organic Content, %
PERM:	Coefficient of permeability (K) test; F - Field; L - Laboratory
PL:	Plastic Limit, %
q_p:	Pocket Penetrometer strength, tsf (approximate)
q_c:	Static cone bearing pressure, tsf
q_u:	Unconfined compressive strength, psf
R:	Electrical Resistivity, ohm-cms
RQD:	Rock Quality Designation of Rock Core, in percent (aggregate length of core pieces 4" or more in length as a percent of total core run)
SA:	Sieve analysis
TRX:	Triaxial compression test
VSR:	Vane shear strength, remolded (field), psf
VSU:	Vane shear strength, undisturbed (field), psf
WC:	Water content, as percent of dry weight
%-200:	Percent of material finer than #200 sieve

STANDARD PENETRATION TEST NOTES
(Calibrated Hammer Weight)

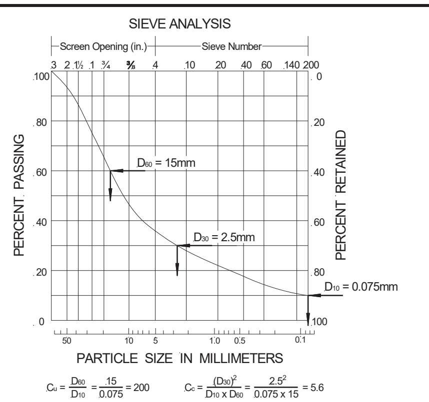
The standard penetration test consists of driving a split-spoon sampler with a drop hammer (calibrated weight varies to provide N_{60} values) and counting the number of blows applied in each of three 6" increments of penetration. If the sampler is driven less than 18" (usually in highly resistant material), permitted in ASTM: D1586, the blows for each complete 6" increment and for each partial increment is on the boring log. For partial increments, the number of blows is shown to the nearest 0.1' below the slash.

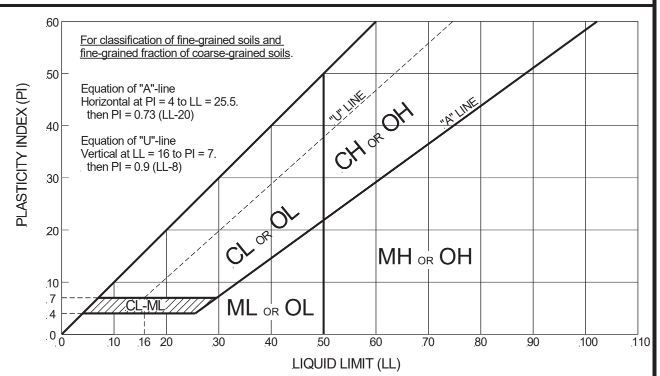
The length of sample recovered, as shown on the “REC” column, may be greater than the distance indicated in the N column. The disparity is because the N-value is recorded below the initial 6" set (unless partial penetration defined in ASTM: D1586 is encountered) whereas the length of sample recovered is for the entire sampler drive (which may even extend more than 18").

UNIFIED SOIL CLASSIFICATION SYSTEM
ASTM Designations: D 2487, D2488

AMERICAN ENGINEERING TESTING, INC.

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests[A]				Soil Classification: Group Symbol	Soil Classification: Group Name[B]
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels More than 50% coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines[C]	Cu≥4 and 1≤Cc≤3[E]	GW	Well graded gravel[F]
			Cu<4 and/or 1>Cc>3[E]	GP	Poorly graded gravel[F]
		Gravels with Fines more than 12% fines [C]	Fines classify as ML or MH	GM	Silty gravel[F.G.H]
			Fines classify as CL or CH	GC	Clayey gravel[F.G.H]
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines[D]	Cu≥6 and 1≤Cc≤3[E]	SW	Well-graded sand[I]
			Cu<6 and/or 1>Cc>3[E]	SP	Poorly-graded sand[I]
		Sands with Fines more than 12% fines [D]	Fines classify as ML or MH	SM	Silty sand[G.H.I]
			Fines classify as CL or CH	SC	Clayey sand[G.H.I]
Fine-Grained Soils 50% or more passes the No. 200 sieve (see Plasticity Chart below)	Silts and Clays Liquid limit less than 50	inorganic	PI>7 and plots on or above "A" line[J]	CL	Lean clay[K.L.M]
			PI<4 or plots below "A" line[J]	ML	Silt[K.L.M]
		organic	$\frac{\text{Liquid limit–oven dried}}{\text{Liquid limit – not dried}} < 0.75$	OL	Organic clay[K.L.M.N] Organic silt[K.L.M.O]
	Silts and Clays Liquid limit 50 or more	inorganic	PI plots on or above "A" line	CH	Fat clay[K.L.M]
			PI plots below "A" line	MH	Elastic silt[K.L.M]
		organic	$\frac{\text{Liquid limit–oven dried}}{\text{Liquid limit – not dried}} < 0.75$	OH	Organic clay[K.L.M.P] Organic silt[K.L.M.Q]
Highly organic soil			Primarily organic matter, dark in color, and organic in odor	PT	Peat[R]





Plasticity Chart

Notes

[A]Based on the material passing the 3-in (75-mm) sieve.

[B]If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C]Gravels with 5 to 12% fines require dual symbols:
- GW-GM well-graded gravel with silt
- GW-GC well-graded gravel with clay
- GP-GM poorly graded gravel with silt
- GP-GC poorly graded gravel with clay

[D]Sands with 5 to 12% fines require dual symbols:
- SW-SM well-graded sand with silt
- SW-SC well-graded sand with clay
- SP-SM poorly graded sand with silt
- SP-SC poorly graded sand with clay

[E]$Cu = D_{60} / D_{10}$, $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$

[F]If soil contains ≥15% sand, add "with sand" to group name.

[G]If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H]If fines are organic, add "with organic fines" to group name.

[I]If soil contains ≥15% gravel, add "with gravel" to group name.

[J]If Atterberg limits plot is hatched area, soil is a CL-ML silty clay.

[K]If soil contains 15 to 29% plus No. 200 add "with sand" or "with gravel", whichever is predominant.

[L]If soil contains ≥30% plus No. 200, predominantly sand, add "sandy" to group name.

[M]If soil contains ≥30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N]Pl≥4 and plots on or above "A" line.

[O]Pl<4 or plots below "A" line.

[P]Pl plots on or above "A" line.

[Q]Pl plots below "A" line.

[R]Fiber Content description shown below.

ADDITIONAL TERMINOLOGY NOTES USED BY AET FOR SOIL IDENTIFICATION AND DESCRIPTION

Grain Size

Term	Particle Size
Boulders	Over 12"
Cobbles	3" to 12"
Gravel	#4 sieve to 3"
Sand	#200 to #4 sieve
Fines (silt & clay)	Pass #200 sieve

Gravel Percentages

Term	Percent
A Little Gravel	3% - 14%
With Gravel	15% - 29%
Gravelly	30% - 50%

Consistency of Plastic Soils

Term	N-Value, BPF
Very Soft	less than 2
Soft	2 - 4
Firm	5 - 8
Stiff	9 - 15
Very Stiff	16 - 30
Hard	Greater than 30

Relative Density of Non-Plastic Soils

Term	N-Value, BPF
Very Loose	0 - 4
Loose	5 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	Greater than 50

Moisture/Frost Condition
(MC Column)

D (Dry):	Absence of moisture, dusty, dry to touch.
M (Moist):	Damp, although free water not visible. Soil may still have a high water content (over "optimum").
W (Wet/ Waterbearing):	Free water visible, intended to describe non-plastic soils. Waterbearing usually relates to sands and sand with silt.
F (Frozen):	Soil frozen

Layering Notes

Laminations:	Layers less than ½" thick of differing material or color.
Lenses:	Pockets or layers greater than ½" thick of differing material or color.

Peat Description

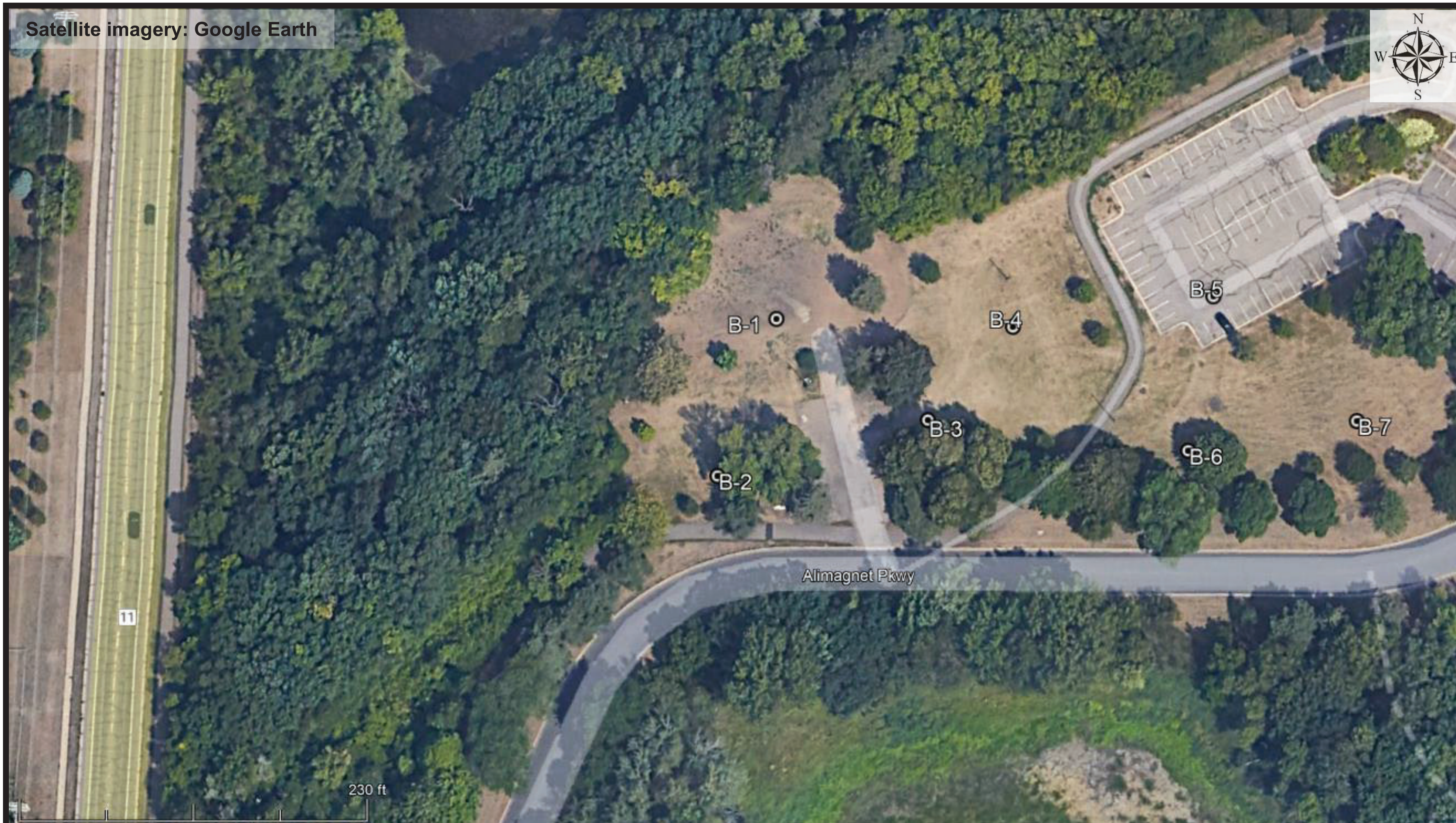
Term	Fiber Content (Visual Estimate)
Fibric Peat:	Greater than 67%
Hemic Peat:	33 – 67%
Sapric Peat:	Less than 33%

Organic Description (if no lab tests)

Soils are described as *organic*, if soil is not peat and is judged to have sufficient organic fines content to influence the Liquid Limit properties. *Slightly organic* used for borderline cases.

Root Inclusions

With roots:	Judged to have sufficient quantity of roots to influence the soil properties.
Trace roots:	Small roots present, but not judged to be in sufficient quantity to significantly affect soil properties.



AMERICAN ENGINEERING TESTING	**PROJECT** Pickleball Facility, Burnsville, Minnesota	**AET NO.** P-0017491
	SUBJECT Final SPT Soil Boring Locations	**DATE** March 2023
	SCALE As Shown / **PREPARED BY** MN	**FIGURE 1**

AMERICAN ENGINEERING TESTING

SUBSURFACE BORING LOG

AET No: P-0017491 Log of Boring No. B-1 (p. 1 of 1)

Project: Alimagnet Pickleball Court Facility; Burnsville, MN

Surface Elevation 1011.7

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	WC	DEN	LL	PL	%-#200
0–2	FILL, mostly sandy lean clay, slightly organic, trace roots, dark brown and black	FILL	3	M	SS	8	28				
2–4	FILL, mostly sandy lean clay, brown with dark brown		2	M	SS	7	25				
4–7	FILL, mixture of sand with silt and silty sand, pieces of concrete, brown		4	M	SS	6					
7–9	SILT WITH SAND, brown, moist, medium dense, laminations of sand (ML)	FINE ALLUVIUM	14	M	SS	17	18				70
9–11	SILTY SAND, a little gravel, medium grained, brown, moist, medium dense (SM)	COARSE ALLUVIUM	26	M	SS	19					18
11	**END OF BORING**										

DEPTH:	DRILLING METHOD	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-9'	3.25" HSA							

WATER LEVEL MEASUREMENTS

BORING COMPLETED: 3/9/23

DR: SD LG: JT Rig: 69C

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AET_CORP P-0017491.GPJ AET+CPT+WELL.GDT 3/30/23

SUBSURFACE BORING LOG

AET No: **P-0017491** Log of Boring No. **B-2 (p. 1 of 1)**

Project: **Alimagnet Pickleball Court Facility; Burnsville, MN**

Surface Elevation **1013.3**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	WC	DEN	LL	PL	%-#200
1	FILL, mostly sandy lean clay, a little gravel, slightly organic, trace roots and wood, dark brown to black	FILL	9	M	SS	12	17 16				
2	FILL, mostly clayey sand, a little gravel, slightly organic, apparent cobbles, dark brown										
3–4	FILL, mostly lean clay, trace roots, brown		9	M	SS	13	19				
5–7	SILT WITH SAND, a little gravel, fine grained, light brown, moist, medium dense (ML)	COARSE ALLUVIUM	15	M	SS	24					59
8–11	CLAYEY SAND, a little gravel, brown, very stiff (SC)	TILL	14	M	SS	18	12				
			25	M	SS						
	END OF BORING										

DEPTH:	DRILLING METHOD
0-9½'	3.25" HSA

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL

BORING COMPLETED: **3/9/23**

DR: **SD** LG: **JT** Rig: **69C**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AET_CORP P-0017491.GPJ AET+CPT+WELL.GDT 3/30/23

SUBSURFACE BORING LOG

AMERICAN ENGINEERING TESTING

AET No: **P-0017491** Log of Boring No. **B-3 (p. 1 of 1)**

Project: **Alimagnet Pickleball Court Facility; Burnsville, MN**

Surface Elevation **1012.8**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	WC	DEN	LL	PL	%-#200
0–1.5	FILL, mostly clayey sand with a little gravel, slightly organic, trace roots, dark brown, frozen to 3.5'	FILL		F	SS	20	12 14				
1.5–4.5	FILL, mostly sandy lean clay, slightly organic, trace roots, lens of sand at 4', brown, frozen to 3.5'		11	F	SS	22	13				
4.5–7	SILT WITH SAND, a little gravel, brown, moist, (ML) (possible fill)	COARSE ALLUVIUM OR FILL	11	M	SS	18	23				67
7–12.5	SILTY SAND, a little gravel, brown, medium dense to dense (SM)	COARSE ALLUVIUM	26	M	SS	13	7				
			36	M	SS	23	7				
12.5–14.5	LEAN CLAY, brown with reddish brown mottled, stiff, laminations of fine sand (CL)	FINE ALLUVIUM	14	M	SS	21	18				

END OF BORING

DEPTH:	DRILLING METHOD
0-12½'	3.25" HSA

BORING COMPLETED: **3/9/23**

DR: **SD** LG: **JT** Rig: **69C**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AET_CORP P-0017491.GPJ AET+CPT+WELL.GDT 3/30/23

SUBSURFACE BORING LOG

AMERICAN ENGINEERING TESTING

AET No: **P-0017491** Log of Boring No. **B-4 (p. 1 of 1)**

Project: **Alimagnet Pickleball Court Facility; Burnsville, MN**

DEPTH IN FEET	Surface Elevation **1010.9** MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	WC	DEN	LL	PL	%-#200
0–0.7	FILL, mostly sandy lean clay, slightly organic, trace roots, dark brown	FILL					31				
1	FILL, mostly sandy lean clay, trace roots, brown		5	M	SS	20	22				
3			10	M	SS	14	24				
5.5			7	M	SS	19	28				93
7	CLAYEY SAND WITH A LITTLE GRAVEL, apparent cobbles, brown, medium dense, laminations of sand (SC)	MIXED ALLUVIUM									
8			13	M	SS	18	10				
10.5			28	M	SS	6	11				
	END OF BORING										

DEPTH:	DRILLING METHOD	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-9½'	**3.25" HSA**							

WATER LEVEL MEASUREMENTS

BORING COMPLETED: **3/9/23**

DR: **SD** LG: **JT** Rig: **69C**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AET_CORP P-0017491.GPJ AET+CPT+WELL.GDT 3/30/23

SUBSURFACE BORING LOG

AMERICAN ENGINEERING TESTING

AET No: **P-0017491** Log of Boring No. **B-5 (p. 1 of 1)**

Project: **Alimagnet Pickleball Court Facility; Burnsville, MN**

Surface Elevation **1010.9**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	WC	DEN	LL	PL	%-#200
	.25" Bituminous pavement	FILL					24				
1	FILL, mostly silt and gravel, pieces of bituminous, dark brown, frozen to 2'		20	M	SS	17					
2–4	FILL, mostly sandy lean clay, a little gravel, brown		18	M	SS	17	23				90
5–6	FILL, mostly sandy lean clay, a little gravel, laminations of sand, brown		8	M	SS	10	13				
7–9	SILTY SAND, a little gravel, apparent cobbles, fine grained, brown, moist, medium dense, laminations of silt (SM)	COARSE ALLUVIUM	13	M	SS	16					
10–14	SAND WITH SILT, a little gravel, medium grained, brown, moist, medium dense, lenses of lean clay (SP-SM)		16	M	SS	18					
			28	M	SS	20					
	END OF BORING										

DEPTH:	DRILLING METHOD
0-12½'	**3.25" HSA**

BORING COMPLETED: **3/9/23**

DR: **SD** LG: **JT** Rig: **69C**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AET_CORP P-0017491.GPJ AET+CPT+WELL.GDT 3/30/23

SUBSURFACE BORING LOG

AMERICAN ENGINEERING TESTING

AET No: **P-0017491** Log of Boring No. **B-6 (p. 1 of 1)**

Project: **Alimagnet Pickleball Court Facility; Burnsville, MN**

Surface Elevation **1015.6**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	WC	DEN	LL	PL	%-#200
	FILL, mostly clayey sand, a little gravel, slightly organic, trace roots, dark brown with tan mottled, frozen to 2'	FILL					19				
1			17	F	SS	24					
2	FILL, mostly clayey sand with a little gravel, brown						17				
3			12	M	SS	12	8				48
4											
5	FILL, mostly lean clay, brown										
6			15	M	SS	20	12				
7	LEAN CLAY, brown, stiff (CL)	FINE ALLUVIUM									
8			16	M	SS	17	14				
9											
10			15	M	SS	18	15				
11	SAND WITH SILT, medium grained, brown, moist, medium dense (SP-SM)	COARSE ALLUVIUM									
	END OF BORING										

DEPTH:	DRILLING METHOD	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-9½'	**3.25" HSA**							

WATER LEVEL MEASUREMENTS

BORING COMPLETED: **3/9/23**

DR: **SD** LG: **JT** Rig: **69C**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AET_CORP P-0017491.GPJ AET+CPT+WELL.GDT 3/30/23

SUBSURFACE BORING LOG

AMERICAN ENGINEERING TESTING

AET No: **P-0017491** Log of Boring No. **B-7 (p. 1 of 1)**

Project: **Alimagnet Pickleball Court Facility; Burnsville, MN**

Surface Elevation **1017.8**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	WC	DEN	LL	PL	%-#200
0–0.5	FILL, mostly sandy lean clay, slightly organic, trace roots, dark brown, frozen to 2.5'	FILL									
1	FILL, mostly clayey sand, a little gravel, brown to dark brown		21	F	SS	19	25 10				
3			16	M	SS	20					
4.5	FILL, mostly sandy lean clay, a little gravel, brown with light brown mottle										
5.5			15	M	SS	12	6				
7	SILTY SAND, a little gravel, medium to fine grained, brown, moist, medium dense (SM)	COARSE ALLUVIUM									
8			15	M	SS	13					
10.5			18	M	SS	22					
11.5	**END OF BORING**										

DEPTH:	DRILLING METHOD
0-9½'	3.25" HSA

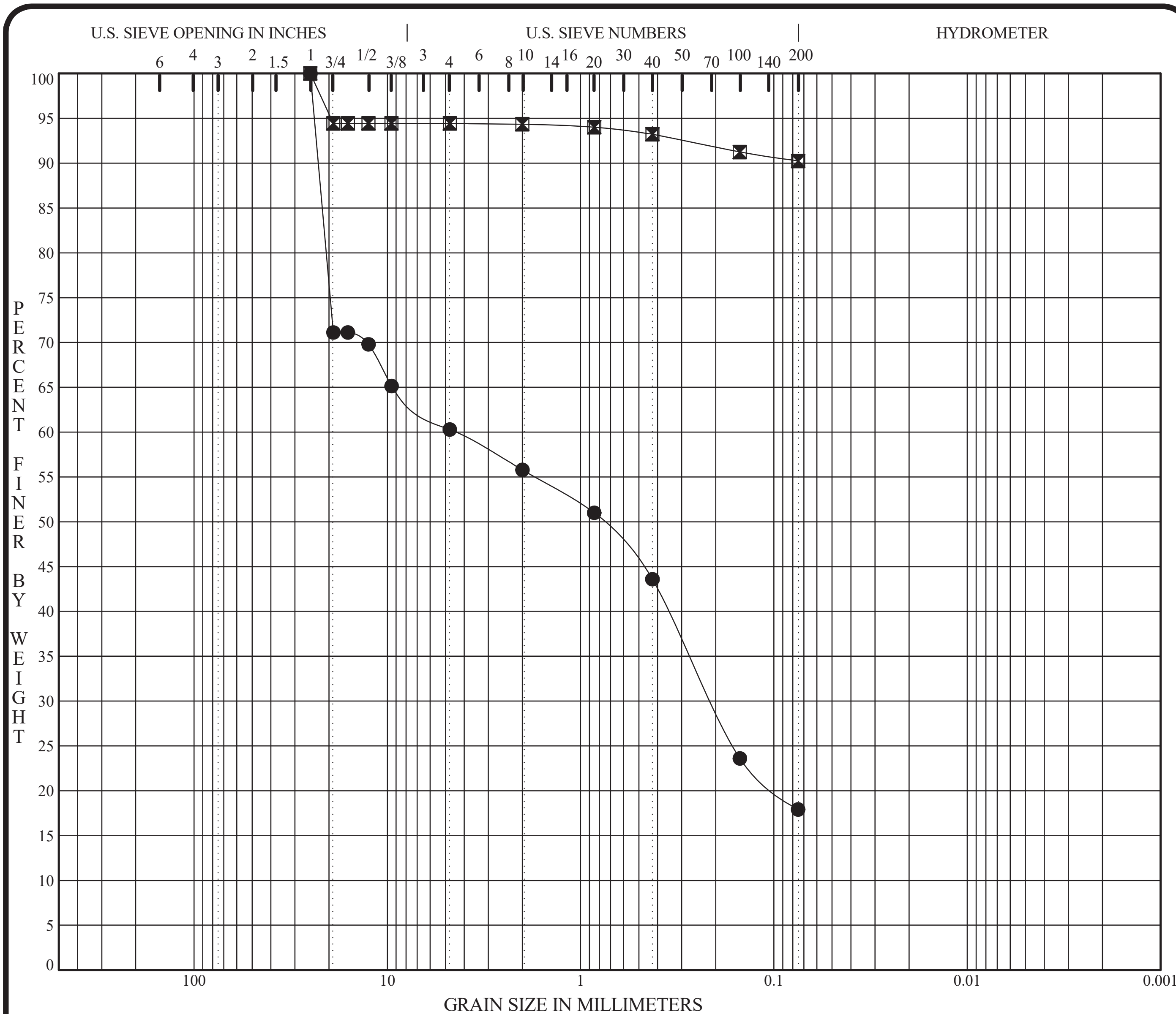
WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL

BORING COMPLETED: **3/9/23**

DR: **SD** LG: **JT** Rig: **69C**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification			Classification	MC%	LL	PL	PI	Cc	Cu
●	**B-1**	**9.0'**	**SILTY SAND (SM)**						
⧗	**B-5**	**2.0'**	**LEAN CLAY (CL) (FILL)**	**23**					

Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-1**	**9.0'**	**25.00**	**4.49**	**0.209**		**39.7**	**42.4**	**17.9**	
⧗	**B-5**	**2.0'**	**25.00**				**5.6**	**4.2**	**90.3**	

PROJECT **Alimagnet Pickleball Court Facility; Burnsville, MN**

AET JOB NO. **P-0017491**
DATE **3/9/23**

AMERICAN ENGINEERING TESTING
AET
550 Cleveland Avenue North
St. Paul, MN 55114
Telephone: (651) 659-9001
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GRADATION CURVES

Appendix B

Geotechnical Report Limitations and Guidelines for Use

Appendix B
Geotechnical Report Limitations and Guidelines for Use
Report No. P-0017491

B.1 REFERENCE

This appendix provides information to help you manage your risks relating to subsurface problems which are caused by construction delays, cost overruns, claims, and disputes. This information was developed and provided by GBA[1], of which, we are a member firm.

B.2 RISK MANAGEMENT INFORMATION

B.2.1 Understand the Geotechnical Engineering Services Provided for this Report

Geotechnical engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical engineering services is typically a geotechnical engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

B.2.2 Geotechnical Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared solely for the client.

Likewise, geotechnical engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do <u>not</u> rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. If you are the least bit uncertain about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

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1 Geoprofessional Business Association, 1300 Piccard Drive, LL14, Rockville, MD 20850
Telephone: 301/565-2733: www.geoprofessional.org, 2019

B.2.3 Read the Full Report
Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. Read and refer to the report in full.

B.2.4 You Need to Inform Your Geotechnical Engineer About Change
Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, always inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

B.2.5 Most of the "Findings" Related in This Report Are Professional Opinions
Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed. The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

B.2.6 This Report's Recommendations Are Confirmation-Dependent
The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations only after observing actual subsurface conditions exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.

B.2.7 This Report Could Be Misinterpreted
Other design professionals' misinterpretation of geotechnical engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

B.2.8 Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical engineering report, along with any attachments or appendices, with your contract documents, but be certain to note conspicuously that you've included the material for information purposes only. To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, only from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and be sure to allow enough time to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

B.2.9 Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. Read these provisions closely. Ask questions. Your geotechnical engineer should respond fully and frankly.

B.2.10 Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical engineering study. For that reason, a geotechnical engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. Unanticipated subsurface environmental problems have led to project failures. If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

B.2.11 Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. Geotechnical engineers are not building-envelope or mold specialists.

Appendix 4. Existing Conditions MIDS Report

Project Information

Calculator Version:	Version 4: July 2020
Project Name:	Alimagnet Pickle Ball Courts - Existing Conditions V2
User Name / Company Name:	Mat Cox / Kimley-Horn
Date:	01/29/2025
Project Description:	
Construction Permit?:	No

Site Information

Retention Requirement (inches):	1.1
Site's Zip Code:	55337
Annual Rainfall (inches):	31.4
Phosphorus EMC (mg/l):	0.3
TSS EMC (mg/l):	54.5

Total Site Area

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land					0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed			3.008		3.008
			Impervious Area (acres)		1.411
			Total Area (acres)		4.419

Site Areas Routed to BMPs

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land					0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed					0
			Impervious Area (acres)		
			Total Area (acres)		0

Summary Information

Performance Goal Requirement

Performance goal volume retention requirement:	5634	ft3
Volume removed by BMPs towards performance goal:		ft^3
Percent volume removed towards performance goal		**%**

Annual Volume and Pollutant Load Reductions

Post development annual runoff volume	4.7152	acre-ft
Annual runoff volume removed by BMPs:		acre-ft
Percent annual runoff volume removed:		**%**
Post development annual particulate P load:	2.1162	lbs
Annual particulate P removed by BMPs:		lbs
Post development annual dissolved P load:	1.731	lbs
Annual dissolved P removed by BMPs:	0	lbs
Total P removed by BMPs	0	lbs
Percent annual total phosphorus removed:		**%**
Post development annual TSS load:	699	lbs
Annual TSS removed by BMPs:		lbs
Percent annual TSS removed:		**%**

BMP Summary

Performance Goal Summary

BMP Name	BMP Volume Capacity (ft3)	Volume Recieved (ft3)	Volume Retained (ft3)	Volume Outflow (ft3)	Percent Retained (%)

Annual Volume Summary

BMP Name	Volume From Direct Watershed (acre-ft)	Volume From Upstream BMPs (acre-ft)	Volume Retained (acre-ft)	Volume outflow (acre-ft)	Percent Retained (%)

Particulate Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)

Dissolved Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)

Total Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)

TSS Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)

BMP Schematic

Appendix 5. Proposed Conditions MIDS Report

Project Information

Calculator Version:	Version 4: July 2020
Project Name:	Alimagnet Pickle Ball Courts - Proposed Conditions
User Name / Company Name:	Mat Cox / Kimley-Horn
Date:	01/29/2025
Project Description:	Proposed Conditions - Pickleball courts and permeable parking lot with vegetated filter strips and an infiltration basin
Construction Permit?:	No

Site Information

Retention Requirement (inches):	1.1
Site's Zip Code:	55337
Annual Rainfall (inches):	31.4
Phosphorus EMC (mg/l):	0.3
TSS EMC (mg/l):	54.5

Total Site Area

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land					0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed			2.343		2.343
			Impervious Area (acres)		2.076
			Total Area (acres)		4.419

Site Areas Routed to BMPs

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land					0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed			2.343		2.343
			Impervious Area (acres)		2.076
			Total Area (acres)		4.419

Summary Information

Performance Goal Requirement

Performance goal volume retention requirement:	8289	ft3
Volume removed by BMPs towards performance goal:	8000	ft^3
Percent volume removed towards performance goal	**97**	**%**

Annual Volume and Pollutant Load Reductions

Post development annual runoff volume	5.8584	acre-ft
Annual runoff volume removed by BMPs:	0.3118	acre-ft
Percent annual runoff volume removed:	**5**	**%**
Post development annual particulate P load:	2.6293	lbs
Annual particulate P removed by BMPs:	2.443	lbs
Post development annual dissolved P load:	2.151	lbs
Annual dissolved P removed by BMPs:	1.999	lbs
Total P removed by BMPs	4.442	lbs
Percent annual total phosphorus removed:	**93**	**%**
Post development annual TSS load:	868.5	lbs
Annual TSS removed by BMPs:	807	lbs
Percent annual TSS removed:	**93**	**%**

BMP Summary

Performance Goal Summary

BMP Name	BMP Volume Capacity (ft3)	Volume Recieved (ft3)	Volume Retained (ft3)	Volume Outflow (ft3)	Percent Retained (%)
Infiltration Basin	8000	8289	8000	289	97
Permeable Pavement	0	599	0	599	0
Vegetated Filter Strips	0	7690	0	7690	0

Annual Volume Summary

BMP Name	Volume From Direct Watershed (acre-ft)	Volume From Upstream BMPs (acre-ft)	Volume Retained (acre-ft)	Volume outflow (acre-ft)	Percent Retained (%)
Infiltration Basin	0	0.3356	0.3118	0.0238	93
Permeable Pavement	0.3356	0	0	0.3356	0
Vegetated Filter Strips	5.5229	0	0	5.5229	0

Particulate Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
Infiltration Basin	0	2.6293	2.4431	0.1862	93
Permeable Pavement	0.1506	0	0	0.1506	0
Vegetated Filter Strips	2.4787	0	0	2.4787	0

Dissolved Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
Infiltration Basin	0	2.1512	1.9989	0.1523	93
Permeable Pavement	0.1232	0	0	0.1232	0
Vegetated Filter Strips	2.028	0	0	2.028	0

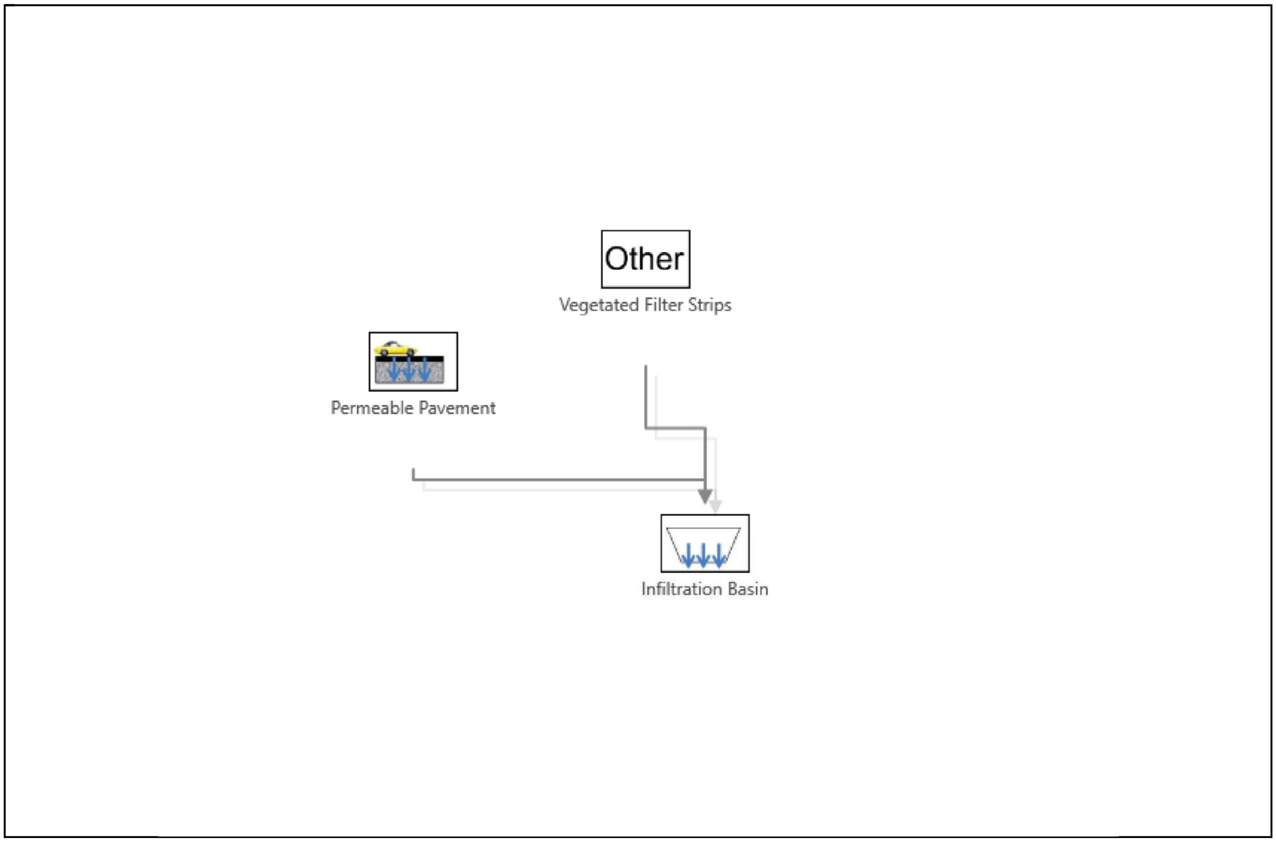
Total Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
Infiltration Basin	0	4.7805	4.442	0.3385	93
Permeable Pavement	0.2738	0	0	0.2738	0
Vegetated Filter Strips	4.5067	0	0	4.5067	0

TSS Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
Infiltration Basin	0	868.46	806.96	61.5	93
Permeable Pavement	49.75	0	0	49.75	0
Vegetated Filter Strips	818.71	0	0	818.71	0

BMP Schematic


Other
Vegetated Filter Strips
Permeable Pavement
Infiltration Basin

Project Information

Calculator Version:	Version 4: July 2020
Project Name:	Alimagnet Pickle Ball Courts - Proposed Conditions
User Name / Company Name:	Mat Cox / Kimley-Horn
Date:	01/29/2025
Project Description:	Proposed Conditions - Pickleball courts with vegetated filter strips and an infiltration basin
Construction Permit?:	No

Site Information

Retention Requirement (inches):	1.1
Site's Zip Code:	55337
Annual Rainfall (inches):	31.4
Phosphorus EMC (mg/l):	0.3
TSS EMC (mg/l):	54.5

Total Site Area

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land					0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed			2.498		2.498
			Impervious Area (acres)		1.921
			Total Area (acres)		4.419

Site Areas Routed to BMPs

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land					0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed			2.498		2.498
			Impervious Area (acres)		1.921
			Total Area (acres)		4.419

Summary Information

Performance Goal Requirement

Performance goal volume retention requirement:	7671	ft3
Volume removed by BMPs towards performance goal:	7671	ft^3
Percent volume removed towards performance goal	**100**	**%**

Annual Volume and Pollutant Load Reductions

Post development annual runoff volume	5.592	acre-ft
Annual runoff volume removed by BMPs:	0	acre-ft
Percent annual runoff volume removed:	**0**	**%**
Post development annual particulate P load:	2.5097	lbs
Annual particulate P removed by BMPs:	2.487	lbs
Post development annual dissolved P load:	2.053	lbs
Annual dissolved P removed by BMPs:	2.035	lbs
Total P removed by BMPs	4.522	lbs
Percent annual total phosphorus removed:	**99**	**%**
Post development annual TSS load:	829	lbs
Annual TSS removed by BMPs:	821.5	lbs
Percent annual TSS removed:	**99**	**%**

BMP Summary

Performance Goal Summary

BMP Name	BMP Volume Capacity (ft3)	Volume Recieved (ft3)	Volume Retained (ft3)	Volume Outflow (ft3)	Percent Retained (%)
Infiltration Basin	16800	7671	7671	0	100
Vegetated Filter Strips	0	7671	0	7671	0

Annual Volume Summary

BMP Name	Volume From Direct Watershed (acre-ft)	Volume From Upstream BMPs (acre-ft)	Volume Retained (acre-ft)	Volume outflow (acre-ft)	Percent Retained (%)
Infiltration Basin	0	0	0	0	99
Vegetated Filter Strips	5.592	0	0	5.592	0

Particulate Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
Infiltration Basin	0	2.5097	2.4871	0.0226	99
Vegetated Filter Strips	2.5097	0	0	2.5097	0

Dissolved Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
Infiltration Basin	0	2.0534	2.0349	0.0185	99
Vegetated Filter Strips	2.0534	0	0	2.0534	0

Total Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
Infiltration Basin	0	4.5631	4.522	0.0411	99
Vegetated Filter Strips	4.5631	0	0	4.5631	0

TSS Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
Infiltration Basin	0	828.95	821.48	7.4700000000	99
Vegetated Filter Strips	828.95	0	0	828.95	0

BMP Schematic

Kimley»Horn

MEMORANDUM

To:	Garrett Beck *City of Burnsville*
From:	Aaron Stolte *Kimley-Horn and Associates, Inc.*
Date:	January 31, 2025
Subject:	*Burnsville, Dakota County, Minnesota – Alimagnet Park Proposed Pickleball Court Facility Protected Species Memorandum*

INTRODUCTION

Kimley-Horn was contracted by Burnsville, MN to review the Alimagnet Park Proposed Pickleball Court Facility project study area for potential effects to protected species. See Figure 1 for project location and Figure 2 for the study area boundary, which represents the proposed construction limits. The study area is located in Burnsville, Dakota County, Minnesota. The study area is approximately 1.71 acres in size. Kimley-Horn reviewed available background data to assist in determining whether protected species could be encountered in the study area. This memorandum also lists recommendations/project commitments that could be implemented to minimize the potential to encounter these species.

THREATENED AND ENDANGERED SPECIES:

Federally and State Listed Protected Species

Kimley-Horn conducted a preliminary review of the potential for federally listed threatened, endangered, and proposed species to occur within the study area or be affected by the proposed project for the purposes of due diligence in compliance with the Endangered Species Act (ESA). A list of the threatened, endangered, and proposed species, and designated critical habitat that could occur in Dakota County was obtained and evaluated from the USFWS Information for Planning and Consultation (IPaC) online planning tool. The resource list is not considered official USFWS correspondence for ESA consultation. Habitat descriptions for the identified species were compared to the habitat within or near the study area. The resource list obtained via the USFWS IPaC for the project identified four species that should be considered in an effects analysis. The resource list is included in Attachment A and the identified species are reviewed below in Table 1.

Kimley-Horn reviewed the Natural Heritage Information System (NHIS) data per license agreement LA-2024-006 for state listed species within one-mile of the project study area. The database includes known occurrence of any state endangered, threatened, or special concern species. The identity of the species and location are restricted and should not be shared publicly.

Table 1. Federally and State Listed Protected Species

Species	Status	Suitable Habitat Review	Avoidance/Minimization Measures
Myotis septentrionalis (Northern Long-Eared Bat [NLEB]) - Mammal	Federal Endangered	During summer, NLEB roost singly or in colonies underneath bark, in cavities, or in crevices of both live and dead trees. This bat uses tree species based on suitability to retain bark or provide cavities or crevices. It has also been found, rarely, roosting in structures like barns and sheds. Northern long-eared bats spend winter hibernating in caves and mines. No critical habitat has been designated for this species. Minimal suitable habitat may be present within the study area due to the presence of potentially suitable roosting trees.	Any tree trimming or removal should be completed between November 1 and March 31.
Grus americana (Whooping crane) - Bird	Federal Experimental population, Non-essential	The whooping crane breeds, migrates, winters and forages in a variety of habitats, including coastal marshes and estuaries, inland marshes, lakes, open ponds, shallow bays, salt marsh and sand or tidal flats, upland swales, wet meadows and rivers, pastures, and agricultural fields. No critical habitat has been designated for this species. While potential suitable habitat may be present, the study area is located on lands outside of a federal National Wildlife Refuge or National Park.	Experimental population, non-essential status does not provide species protection under the ESA listing process outside of federal lands; therefore, negative impacts to this species are unlikely.
Danaus plexippus	Federal Candidate	The monarch butterfly requires grassland habitats where milkweed and flowers are present. North American	While impacts to this species are not anticipated, reseeding with native seed mixes could provide

Species	**Status**	**Suitable Habitat Review**	**Avoidance/Minimization Measures**
(Monarch butterfly) - Insect		populations of the monarch butterfly typically follow a seasonal migration pattern. No critical habitat has been designated for this species. Minimal preferred habitat may appear within the study area. Because the area is primarily manicured monoculture lawn, the extent of suitable habitat is likely minimal.	a benefit to the species post construction.
Bombus affinis (Rusty Patched Bumble Bee [RPBB]) - Insect	Federal Endangered	RPBB has been observed in a variety of habitats, including prairies, woodlands, marshes, agricultural landscapes and residential parks and gardens. RPBB requires areas that support sufficient food, including nectar and pollen from diverse and abundant flowers, as well as undisturbed nesting sites that are in proximity to those floral resources. The study area falls within a USFWS designated critical habitat for the RPBB. However, the study area is primarily manicured lawn with scattered trees on compacted soils; therefore, there is no suitable habitat for the RPBB present within the study area. NHIS mapping depicts a siting of this species east of Alimagnet Park, beyond the study area, in 2020.	While impacts to this species are not anticipated, reseeding with native seed mixes could provide a benefit to the species post construction.
Buteo lineatus (Red Shouldered Hawk) - Bird	State special concern	NHIS mapping depicts an observation of the red shouldered hawk southeast of the study area in 2022. This species has the potential to occur in	Given the relatively flat topography of the study area and sparse distribution of trees, impacts to this species will likely be minimal. Tree trimming or removal could be limited to winter

Species	Status	Suitable Habitat Review	Avoidance/Minimization Measures
		topographically diverse uplands with scattered wetlands and lakes. This often includes mature deciduous forest.	months as a precautionary measure.
Taenidia integerrima (Yellow Pimpernel) - Plant	State special concern	NHIS mapping depicts an observation of the yellow pimpernel southeast of the study area in 2023. This species has the potential to occur in upland deciduous woods such as oak savannas, woodlands, and drier hardwood forests. The majority of the study area is manicured lawn and trees within a park; therefore, there is no suitable habitat within the study area.	Impacts to this species are not anticipated due to the highly manicured nature of the study area.

Migratory Birds

According to the IPaC resource list, 19 migratory species on the Birds of Conservation Concern (BCC) list have been identified within the study area. The BCC list was updated in 2023 by the USFWS and is an effort to “identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act.”

Kimley-Horn downloaded the Trust Resources Report Migratory Bird List from the IPaC online planning tool. The IPaC results are included in Attachment A. Kimley-Horn conducted a preliminary desktop review of the potential for migratory bird habitat (focusing primarily on trees and shrubs) to occur on the proposed study area or be affected by the proposed study area for the purposes of due diligence in complying with the Migratory Bird Treaty Act. The desktop review revealed the presence of minimal potential migratory bird habitat within the study area. While the likelihood of the study area containing suitable habitat is low, tree trimming or removal could be limited to November 1 to April 15 to avoid the migratory bird nesting season.

CONCLUSIONS AND RECOMMENDATIONS:

Based on the information reviewed, Kimley-Horn has identified avoidance/minimization measures that could benefit or mitigate impacts to protected species.

Potential suitable habitat for listed federal and state species may be present within the study area. These species include the northern long-eared bat, red shouldered hawk, and an assortment of migratory birds. To mitigate impacts to these species, it is recommended:

- Tree clearing be minimized, and if unavoidable, completed between November 1 and March 31.

The monarch butterfly and rusty patched bumble bee are unlikely to have suitable habitat within the study area. However, the following measure could provide a benefit to these species:

- Reseed construction areas with native seed mixes.

Impacts are not anticipated to the whooping crane or yellow pimpernel due to the low likelihood of suitable habitat within the study area.

Figures

Kimley»Horn

0 0.5 1 Miles

N

Figure 1. Project Location
Burnsville, MN
Alimagnet Park Proposed Pickleball Court Facility

Kimley»Horn

Figure 2. Study Area Boundary
Burnsville, MN
Alimagnet Park Proposed Pickleball Court Facility

ATTACHMENT A

Species Resources

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Minnesota-Wisconsin Ecological Services Field Office
3815 American Blvd East
Bloomington, MN 55425-1659
Phone: (952) 858-0793

In Reply Refer To: 01/15/2025 14:33:31 UTC
Project Code: 2025-0042352
Project Name: Alimagnet Park Proposed Pickleball Court Facility

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

This response has been generated by the Information, Planning, and Conservation (IPaC) system to provide information on natural resources that could be affected by your project. The U.S. Fish and Wildlife Service (Service) provides this response under the authority of the Endangered Species Act of 1973 (16 U.S.C. 1531-1543), the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d), the Migratory Bird Treaty Act (16 U.S.C. 703-712), and the Fish and Wildlife Coordination Act (16 U.S.C. 661 *et seq*.).

Threatened and Endangered Species
The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and may be affected by your proposed project. The species list fulfills the requirement for obtaining a Technical Assistance Letter from the U.S. Fish and Wildlife Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

Consultation Technical Assistance
Please refer to refer to our Section 7 website for guidance and technical assistance, including step-by-step instructions for making effects determinations for each species that might be present and for specific guidance on the following types of projects: projects in developed areas, HUD, CDBG, EDA, USDA Rural Development projects, pipelines, buried utilities, telecommunications, and requests for a Conditional Letter of Map Revision (CLOMR) from FEMA.

We recommend running the project (if it qualifies) through our **Minnesota-Wisconsin Federal Endangered Species Determination Key (Minnesota-Wisconsin ("D-key"))**. A demonstration video showing how-to access and use the determination key is available. Please note that the Minnesota-Wisconsin D-key is the third option of 3 available d-keys. D-keys are tools to help Federal agencies and other project proponents determine if their proposed action has the potential to adversely affect federally listed species and designated critical habitat. The Minnesota-Wisconsin D-key includes a structured set of questions that assists a project proponent in determining whether a proposed project qualifies for a certain predetermined consultation outcome for all federally listed species found in Minnesota and Wisconsin (except for the northern long-eared bat- see below), which includes determinations of “no effect” or “may affect, not likely to adversely affect." In each case, the Service has compiled and analyzed the best available information on the species’ biology and the impacts of certain activities to support these determinations.

If your completed d-key output letter shows a "No Effect" (NE) determination for all listed species, print your IPaC output letter for your files to document your compliance with the Endangered Species Act.

For Federal projects with a “Not Likely to Adversely Affect” (NLAA) determination, our concurrence becomes valid if you do not hear otherwise from us after a 30-day review period, as indicated in your letter.

If your d-key output letter indicates additional coordination with the Minnesota-Wisconsin Ecological Services Field Office is necessary (i.e., you get a “May Affect” determination), you will be provided additional guidance on contacting the Service to continue ESA coordination outside of the key; ESA compliance cannot be concluded using the key for “May Affect” determinations unless otherwise indicated in your output letter.

Note: Once you obtain your official species list, you are not required to continue in IPaC with d-keys, although in most cases these tools should expedite your review. If you choose to make an effects determination on your own, you may do so. If the project is a Federal Action, you may want to review our section 7 step-by-step instructions before making your determinations.

Using the IPaC Official Species List to Make No Effect and May Affect Determinations for Listed Species

1. If IPaC returns a result of “There are no listed species found within the vicinity of the project,” then project proponents can conclude the proposed activities will have **no effect** on any federally listed species under Service jurisdiction. Concurrence from the Service is not required for **no effect** determinations. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records.
2. If IPaC returns one or more federally listed, proposed, or candidate species as potentially present in the action area of the proposed project – other than bats (see below) – then project proponents must determine if proposed activities will have **no effect** on or **may affect** those species. For assistance in determining if suitable habitat for listed, candidate, or proposed species occurs within your project area or if species may be affected by project activities, you can obtain Life History Information for Listed and Candidate Species on our office website. If no impacts will occur to a species on the IPaC species list (e.g., there is no habitat present in the project area), the appropriate determination is **no effect**. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records.

3. Should you determine that project activities **may affect** any federally listed, please contact our office for further coordination. Letters with requests for consultation or correspondence about your project should include the Consultation Tracking Number in the header. Electronic submission is preferred.

Northern Long-Eared Bats
Northern long-eared bats occur throughout Minnesota and Wisconsin and the information below may help in determining if your project may affect these species.

Suitable summer habitat for northern long-eared bats consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags ≥3 inches dbh for northern long-eared bat that have exfoliating bark, cracks, crevices, and/or hollows), as well as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Individual trees may be considered suitable habitat when they exhibit the characteristics of a potential roost tree and are located within 1,000 feet (305 meters) of forested/wooded habitat. Northern long-eared bats have also been observed roosting in human-made structures, such as buildings, barns, bridges, and bat houses; therefore, these structures should also be considered potential summer habitat and evaluated for use by bats. If your project will impact caves or mines or will involve clearing forest or woodland habitat containing suitable roosting habitat, northern long-eared bats could be affected. For bat activity dates, please review Appendix L in the Range-wide Indiana Bat and Northern Long-Eared Bat Survey Guidelines.

Examples of unsuitable habitat include:

- Individual trees that are greater than 1,000 feet from forested or wooded areas,
- Trees found in highly developed urban areas (e.g., street trees, downtown areas),
- A pure stand of less than 3-inch dbh trees that are not mixed with larger trees, and
- A monoculture stand of shrubby vegetation with no potential roost trees.

If IPaC returns a result that northern long-eared bats are potentially present in the action area of the proposed project, project proponents can conclude the proposed activities **may affect** this species **IF** one or more of the following activities are proposed:

- Clearing or disturbing suitable roosting habitat, as defined above, at any time of year,
- Any activity in or near the entrance to a cave or mine,
- Mining, deep excavation, or underground work within 0.25 miles of a cave or mine,
- Construction of one or more wind turbines, or
- Demolition or reconstruction of human-made structures that are known to be used by bats based on observations of roosting bats, bats emerging at dusk, or guano deposits or stains.

If none of the above activities are proposed, project proponents can conclude the proposed activities will have **no effect** on the northern long-eared bat. Concurrence from the Service is not required for **No Effect** determinations. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records.

If any of the above activities are proposed, and the northern long-eared bat appears on the user's species list, the federal project user will be directed to either the northern long-eared bat and tricolored bat range-wide D-key or the Federal Highways Administration, Federal Railways Administration, and Federal Transit Administration Indiana bat/Northern long-eared bat D-key, depending on the type of project and federal agency involvement. Similar to the Minnesota-Wisconsin D-key, these d-keys helps to determine if prohibited take might occur and, if not, will generate an automated verification letter. Additional information about available tools can be found on the Service's northern long-eared bat website.

Whooping Crane

Whooping crane is designated as a non-essential experimental population in Wisconsin and consultation under Section 7(a)(2) of the Endangered Species Act is only required if project activities will occur within a National Wildlife Refuge or National Park. If project activities are proposed on lands outside of a National Wildlife Refuge or National Park, then you are not required to consult. For additional information on this designation and consultation requirements, please review "Establishment of a Nonessential Experimental Population of Whooping Cranes in the Eastern United States."

Other Trust Resources and Activities

Bald and Golden Eagles **-** Although the bald eagle has been removed from the endangered species list, this species and the golden eagle are protected by the Bald and Golden Eagle Act and the Migratory Bird Treaty Act. It is the responsibility of the project proponent to survey the area for any migratory bird nests. If there is an eagle nest on-site while work is on-going, eagles may be disturbed. We recommend avoiding and minimizing disturbance to eagles whenever practicable. If you cannot avoid eagle disturbance, you may seek a permit. A nest take permit is always required for removal, relocation, or obstruction of an eagle nest. For communication and wind energy projects, please refer to additional guidelines below.

Migratory Birds **-** The Migratory Bird Treaty Act (MBTA) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Service. The Service has the responsibility under the MBTA to proactively prevent the mortality of migratory birds whenever possible and we encourage implementation of recommendations that minimize potential impacts to migratory birds. Such measures include clearing forested habitat outside the nesting season (generally March 1 to August 31) or conducting nest surveys prior to clearing to avoid injury to eggs or nestlings.

Communication Towers **-** Construction of new communications towers (including radio, television, cellular, and microwave) creates a potentially significant impact on migratory birds, especially some 350 species of night-migrating birds. However, the Service has developed voluntary guidelines for minimizing impacts.

Transmission Lines **-** Migratory birds, especially large species with long wingspans, heavy bodies, and poor maneuverability can also collide with power lines. In addition, mortality can occur when birds, particularly hawks, eagles, kites, falcons, and owls, attempt to perch on uninsulated or unguarded power poles. To minimize these risks, please refer to guidelines developed by the Avian Power Line Interaction Committee and the Service. Implementation of these measures is especially important along sections of lines adjacent to wetlands or other areas that support large numbers of raptors and migratory birds.

Wind Energy **-** To minimize impacts to migratory birds and bats, wind energy projects should follow the Service's Wind Energy Guidelines. In addition, please refer to the Service's Eagle Conservation Plan Guidance, which provides guidance for conserving bald and golden eagles in the course of siting, constructing, and operating wind energy facilities.

State Department of Natural Resources Coordination
While it is not required for your Federal section 7 consultation, please note that additional state endangered or threatened species may also have the potential to be impacted. **Please contact the Minnesota or Wisconsin Department of Natural Resources for information on state listed species that may be present in your proposed project area.**

Minnesota
Minnesota Department of Natural Resources - Endangered Resources Review Homepage
Email: Review.NHIS@state.mn.us

Wisconsin
Wisconsin Department of Natural Resources - Endangered Resources Review Homepage
Email: DNRERReview@wi.gov

We appreciate your concern for threatened and endangered species. Please feel free to contact our office with questions or for additional information.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Bald & Golden Eagles
- Migratory Birds
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Minnesota-Wisconsin Ecological Services Field Office
3815 American Blvd East
Bloomington, MN 55425-1659
(952) 858-0793

PROJECT SUMMARY

Project Code: 2025-0042352
Project Name: Alimagnet Park Proposed Pickleball Court Facility
Project Type: Recreation - New Construction
Project Description: Development of parkland into pickleball court facility.
Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@44.742353550000004,-93.25581592811903,14z

Counties: Dakota County, Minnesota

ENDANGERED SPECIES ACT SPECIES

There is a total of 4 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered

BIRDS

NAME	STATUS
Whooping Crane *Grus americana* Population: U.S.A. (AL, AR, CO, FL, GA, ID, IL, IN, IA, KY, LA, MI, MN, MS, MO, NC, NM, OH, SC, TN, UT, VA, WI, WV, western half of WY) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/758	Experimental Population, Non-Essential

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743	Proposed Threatened
Rusty Patched Bumble Bee *Bombus affinis* There is **proposed** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9383 General project design guidelines: https://ipac.ecosphere.fws.gov/project/OQKFBQLZ4RBWJIE7JNSQN4OK6U/documents/generated/5967.pdf	Endangered

CRITICAL HABITATS

There is 1 critical habitat wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Rusty Patched Bumble Bee *Bombus affinis* https://ecos.fws.gov/ecp/species/9383#crithab	Proposed

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

BALD & GOLDEN EAGLES

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act [2] and the Migratory Bird Treaty Act (MBTA) [1]. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate avoidance and minimization measures, as described in the various links on this page.

---

1. The Bald and Golden Eagle Protection Act of 1940.
2. The Migratory Birds Treaty Act of 1918.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

There are Bald Eagles and/or Golden Eagles in your project area.

Measures for Proactively Minimizing Eagle Impacts
For information on how to best avoid and minimize disturbance to nesting bald eagles, please review the National Bald Eagle Management Guidelines. You may employ the timing and activity-specific distance recommendations in this document when designing your project/ activity to avoid and minimize eagle impacts. For bald eagle information specific to Alaska, please refer to Bald Eagle Nesting and Sensitivity to Human Activity.

The FWS does not currently have guidelines for avoiding and minimizing disturbance to nesting Golden Eagles. For site-specific recommendations regarding nesting Golden Eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

If disturbance or take of eagles cannot be avoided, an incidental take permit may be available to authorize any take that results from, but is not the purpose of, an otherwise lawful activity. For assistance making this determination for Bald Eagles, visit the Do I Need A Permit Tool. For assistance making this determination for golden eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

Ensure Your Eagle List is Accurate and Complete
If your project area is in a poorly surveyed area in IPaC, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the Supplemental Information on Migratory Birds and Eagles, to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to bald or golden eagles on your list, see the "Probability of Presence Summary" below to see when these bald or golden eagles are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

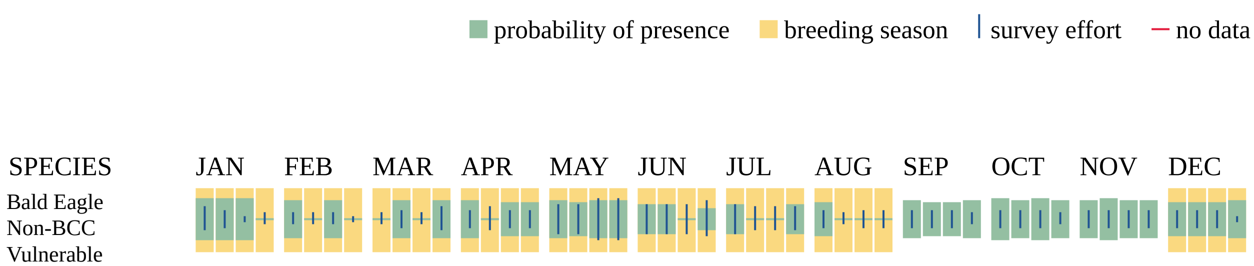
Probability of Presence ( )

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season ( )
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds

- Nationwide avoidance and minimization measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

MIGRATORY BIRDS

The Migratory Bird Treaty Act (MBTA) [1] prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (Service). The incidental take of migratory birds is the injury or death of birds that results from, but is not the purpose, of an activity. The Service interprets the MBTA to prohibit incidental take.

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the "Probability of Presence Summary" below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31
Black Tern *Chlidonias niger surinamenisis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3093	Breeds May 15 to Aug 20
Black-billed Cuckoo *Coccyzus erythropthalmus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10
Bobolink *Dolichonyx oryzivorus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9454	Breeds May 20 to Jul 31

NAME	BREEDING SEASON
Canada Warbler *Cardellina canadensis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9643	Breeds May 20 to Aug 10
Cerulean Warbler *Setophaga cerulea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/2974	Breeds Apr 22 to Jul 20
Chimney Swift *Chaetura pelagica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9406	Breeds Mar 15 to Aug 25
Eastern Whip-poor-will *Antrostomus vociferus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10678	Breeds May 1 to Aug 20
Golden-winged Warbler *Vermivora chrysoptera* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8745	Breeds May 1 to Jul 20
Grasshopper Sparrow *Ammodramus savannarum perpallidus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8329	Breeds Jun 1 to Aug 20
Henslow's Sparrow *Centronyx henslowii* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3941	Breeds May 1 to Aug 31
Le Conte's Sparrow *Ammospiza leconteii* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9469	Breeds Jun 1 to Aug 15
Lesser Yellowlegs *Tringa flavipes* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Long-eared Owl *asio otus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3631	Breeds Mar 1 to Jul 15

NAME	BREEDING SEASON
Pectoral Sandpiper *Calidris melanotos* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9561	Breeds elsewhere
Red-headed Woodpecker *Melanerpes erythrocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9398	Breeds May 10 to Sep 10
Rusty Blackbird *Euphagus carolinus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9478	Breeds elsewhere
Semipalmated Sandpiper *Calidris pusilla* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9603	Breeds elsewhere
Short-billed Dowitcher *Limnodromus griseus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9480	Breeds elsewhere
Wood Thrush *Hylocichla mustelina* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9431	Breeds May 10 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

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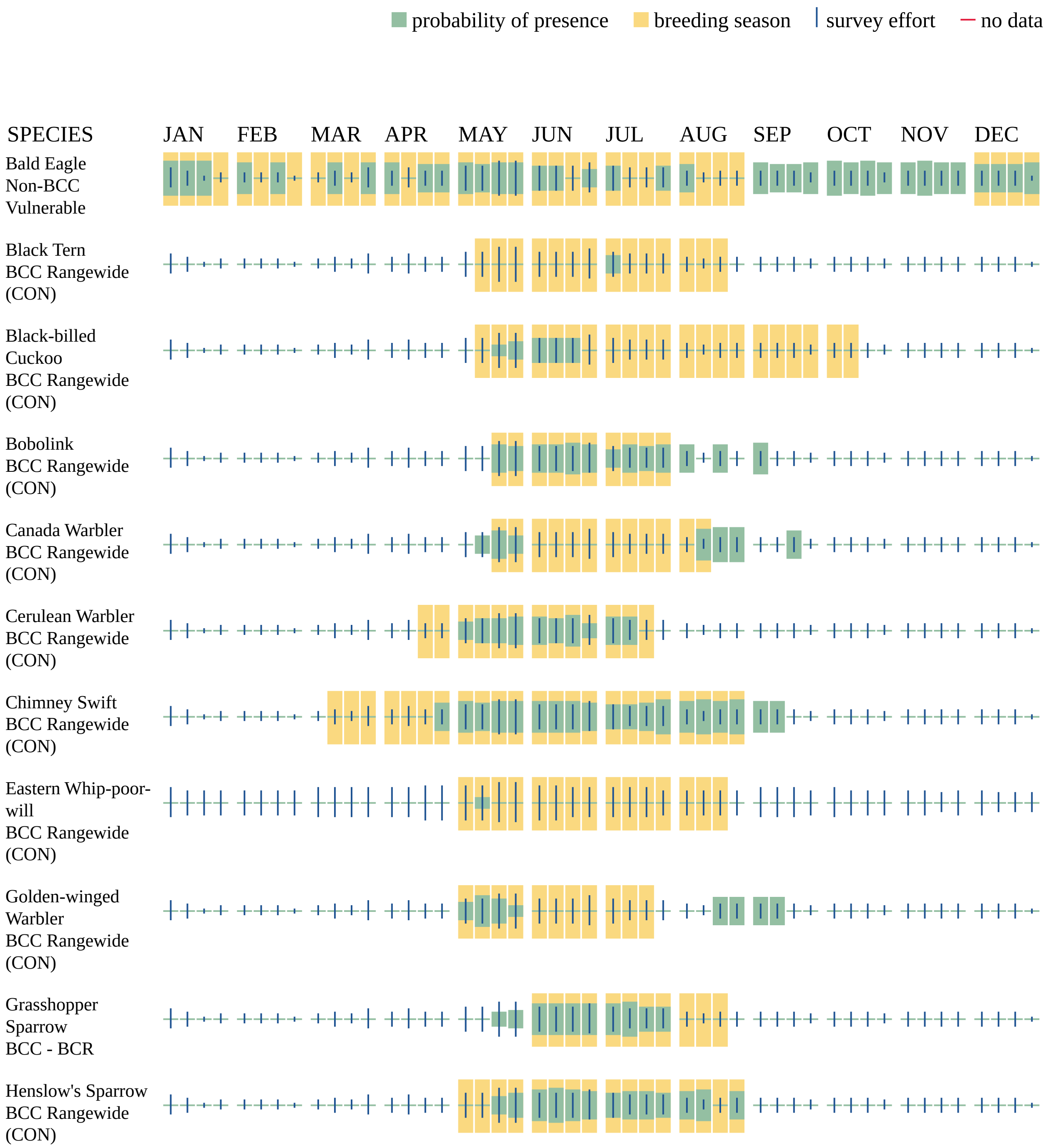

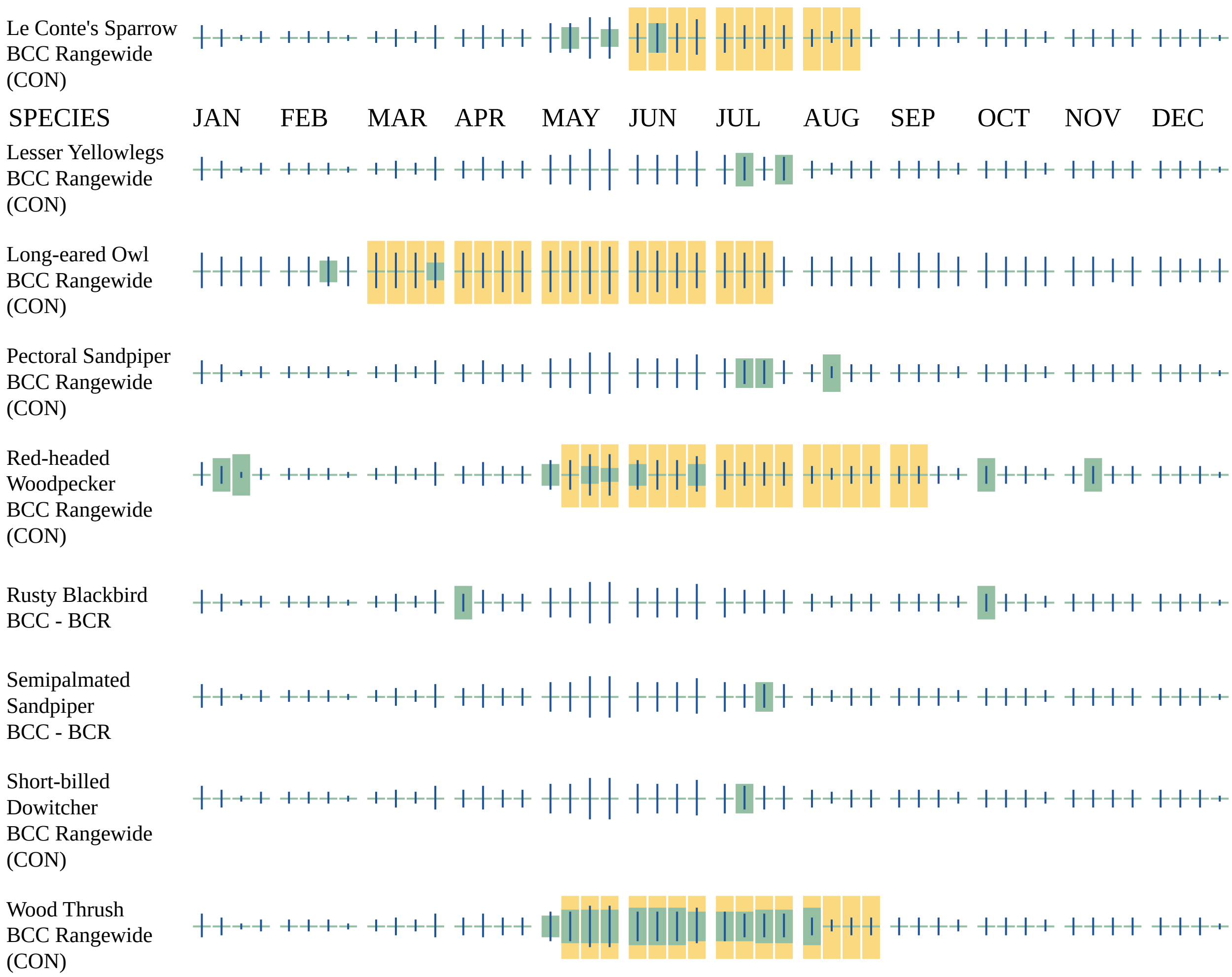

Additional information can be found using the following links:

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- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

WETLANDS

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

THERE ARE NO WETLANDS WITHIN YOUR PROJECT AREA.

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