

ZONING COMMITTEE STAFF REPORT

1. **FILE NAME:** Site Plan for Treehouse Senior Development **FILE #** 22-116-859
 2. **APPLICANT:** Trellis Treehouse Acquisition LLC **HEARING DATE:** December 1, 2022
 3. **TYPE OF APPLICATION:** Site Plan Review
 4. **LOCATION:** 0 Madison St. (N of 2319 W 7th St. and St. Paul Avenue)
 5. **PIN & LEGAL DESCRIPTION:** 22.28.23.22.0080; Lane's Edgcumbe Hills S 100 Ft Of E 263.4 Ft Of Lot 79
 6. **PLANNING DISTRICT:** 15 – Highland District Council **PRESENT ZONING:** R1
 7. **ZONING CODE REFERENCE:** §61.402(c) Site plan review and approval
 8. **STAFF REPORT DATE:** November 23, 2022 **BY:** Ashley Skarda
 9. **DATE RECEIVED:** August 23, 2022 **DEADLINE FOR ACTION:** February 20, 2023
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A. **PURPOSE:**

Site Plan review for a new multi-family residential development for seniors with 36 dwelling units and 7 structured parking spaces to be accessed via a private street on the adjoining property at 2319 7th St W.

B. **PARCEL SIZE:** 26,340 square feet (approx. 0.6 acre)

C. **EXISTING LAND USE:** vacant land with wooded steep slopes. The parcel is landlocked with no frontage on an improved street.

D. **SURROUNDING LAND USE:**

North: Wooded bluff & 1-family residential in an R1 district.

East: Wooded bluff on unimproved Madison Street ROW & parkland in an R1 district.

South: Mixed multifamily residential and rehabilitation center in RM2 and commercial in a T3 districts.

West: 1-family residential in an R1 district.

E. **ZONING CODE CITATION:**

§61.402(c) - Findings for site plan review

F. **HISTORY/DISCUSSION:**

There are no previous zoning cases concerning this property. The Department of Safety and

Inspections (DSI) received a Site Plan Review application for consideration on August 23, 2022. The Site Plan Review Committee met with the project team to review and discuss the site plan on September 26, 2022 and issued a Staff Memo on October 11, 2022, with feedback to bring the site plan into compliance with City Ordinances and Policies. An updated site plan was received on November 2, 2022 in response to staff's comments. The Zoning Administrator referred the file to the Zoning Committee of the Planning Commission. In addition to the Site Plan application, the applicant applied to rezone the property from R1 – one-family residential district to RM2 - medium-density multiple-family residential district and a variance of 63.111(b) to allow the creation of trough-shaped yards between the new building and new retaining walls.

G. DISTRICT COUNCIL RECOMMENDATION:

The Highland District Council (DC 15) hosted multiple community meetings regarding the proposed development. The Highland District Council did not provide a recommendation specifically on the site plan application but indicated support in a letter stating that the “Highland District Council Board of Directors supports the Trellis senior living project at St. Paul Ave and West 7th Street, behind the Highland Chateau, and Resolution 2022-13D recommends support for the applications to rezone the property from R-1 to RM-2 and a variance for the retaining wall along the hill side of the project.”

H. FINDINGS: § 61.402(c) of the Zoning Code states that in “order to approve the site plan, the planning commission shall consider and find that the site plan is consistent with” the findings listed below:

1. *The city's adopted comprehensive plan and development or project plans for sub-areas of the city.*

The site plan is consistent with the Comprehensive Plan. The 2040 Comprehensive Plan does not specifically address residential development on steep slopes. Land use policy LU-21 calls for identifying, preserving, protecting and, where possible, restoring natural resources and habitat throughout the city with the following ordinances: Tree Preservation Overlay District; River Corridor Overlay District; and Subdivision Regulations). However, with no subdivision proposed, none of the ordinances referenced in policy LU-21 apply to the proposed project.

The Comprehensive Plan's land use chapter designates the site of the proposed development just north of St. Paul Avenue and West 7th Street as urban neighborhood. The site is also in proximity to a designated neighborhood node and an existing transit corridor (Metro Transit Route 46 along St. Paul Avenue and Routes 54 and 74 along West 7th Street). The proposed development is consistent with several land use and housing policies. Policy LU-1 encourages transit-supportive density and directs the majority of growth to areas with

the highest existing or planned transit capacity. Improved access to affordable housing is a goal of the Housing Plan and Policy H-46 calls for supporting the development of new housing, particularly in areas identified as mixed-use, urban neighborhoods, and/or in areas with the highest existing or planned transit service, to meet market demand for living in walkable, transit-accessible, urban neighborhoods. Policy H-31 calls for supporting the development of new affordable housing units throughout the city and Policy H-37 calls for encouraging the development of affordable housing in areas well-served by transit and/or in proximity to employment centers. The proposed multi-family residential building will provide 36 units of affordable senior housing near existing transit routes and neighborhood businesses.

The Highland Park District 15 Plan notes that opportunity sites like Sibley/West 7th bring with them the potential for more diverse and affordable housing types, and that many residents desire housing for senior citizens to allow them to age in community. The plan has several housing objectives and strategies that support development of denser housing and affordable housing including Policy H1.8. that encourages development of affordable housing throughout Highland Park and Policy H3.1 that calls for promoting denser housing development along transit corridors to help support transit ridership.

2. *Applicable ordinances of the City of Saint Paul.*

The site plan as proposed does not meet this finding without a variance and rezoning. The following standards and conditions apply:

- §66.212 – Intent, R1 one-family residential district.
 - The proposed multi-family /senior housing use is not permitted in the current R1 single-family residential zoning district. A condition of site plan approval is that the property be rezoned to RM2 before a multi-family use may be established.
- §66.230 - Residential District Density and Dimensional Standards
 - The proposed site plan assumes density and dimensional standards for RM2 zoning. In RM2 Zoning District, the maximum building height is fifty (50) feet. Where a building is located on sloping terrain, the height may be measured from the average ground level of the grade at the building wall to the highest point of the roof surface for a flat roof.
- §66.242 - Multiple-family design standards.
 - The proposed multi-family building meets design standards regarding materials, window and door openings, addition of a public sidewalk, and pedestrian connections to the building.
- §63.111 – Residential Development on Steep Slopes
 - The proposed site plan requires a variance of Leg. Code Sec. 63.111 (b) before it may be established: Buildings should be designed to fit into the hillside without significant regrading to protect the stability of the slope and preserve existing trees while preventing excessively tall retaining walls and unattractive trough-shaped

- yards between buildings and retaining walls. Multi-story buildings are encouraged to reduce the size of the building footprint.
- §67.203 – Tree Preservation Plans are required when development occurs on steep slopes. Replacement trees are required for removals of healthy trees 12" diameter or more that occur more than 15' from the proposed building footprint. A condition of the approval is that the City Forester sign off on the final Landscape and Tree Preservation Plans.
3. *Preservation of unique geologic, geographic or historically significant characteristics of the city and environmentally sensitive areas.*

The site plan meets this finding. The proposed building and walls must be constructed under city permit with frost footings as required by the state building code and engineered to retain lateral earth pressures consistent with the principles of soils mechanics and detailed to minimize hydrostatic pressures. Retaining walls and building are engineered with the unique geological and hydrological conditions of this site in mind. Per §63.111 – Residential Development on Steep Slopes, an engineering report on slope stability and hydrology prepared by a registered hydrological, geotechnical or soils engineer is required. A report had not been received at this time this report was written.

A condition of approval is that the City Forester accept the Landscape and Tree Preservation Plans for the post construction establishment of trees and vegetation on this slope. All final slopes must be immediately stabilized to prevent erosion. Trees must be planted, and all disturbed soils on the slope must be adequately covered with a suitable topsoil and seeded per Minnesota Board of Water and Soil Resources specifications for native vegetation establishment.

4. *Protection of adjacent and neighboring properties through reasonable provision for such matters as surface water drainage, sound and sight buffers, preservation of views, light and air, and those aspects of design which may have substantial effects on neighboring land uses.*

This finding is met. Stormwater management, tree preservation practices, and maintaining a buffer of undisturbed wooded area mitigate the effects of development on neighboring properties. During construction, erosion control measures will be in place to protect the slope and adjacent properties.

Today, the majority of surface water infiltrates or sheet drains to The Chateau's crescent drive and on to St. Paul Ave. storm sewers via catch basins. In the proposed development rainwater will be collected from the roof, behind, and in front of the building then directed to the city storm sewer at a controlled rate. The remaining ¼ of the site will infiltrate or flow naturally down the slope to the existing Chateau driveway as it does today.

The existing trees are in poor condition as the wooded area is not actively managed today. Although trees will be removed in the construction of this development, replacement trees and vegetation will be planted behind and alongside the proposed building.

5. *The arrangement of buildings uses and facilities of the proposed development in order to assure abutting property and/or its occupants will not be unreasonably affected.*

This finding is met. The developer was approached by the Highland Chateau to develop a compatible senior housing use at their 0 Madison St. property. The resulting proposal has been designed with the Highland Chateau site in mind. As part of this development review, existing site concerns at The Highland Chateau will be remedied, specifically installation of public sidewalk, ROW improvements, and ensuring there is trash pickup space in the rear of The Chateau. The Chateau and Treehouse signed a Reciprocal Maintenance, Use, and Utility easement to document shared spaces and responsibilities.

The disturbed areas will be stabilized with site specific vegetation, engineered retaining walls, and trees to the north, east, and west of the building. The views and slope of the single-family property to the north will not be affected by this project.

6. *Creation of energy-conserving design through landscaping and location, orientation and elevation of structures.*

The site plan meets this finding. There are strong correlations between energy-conserving design and multi-family buildings. The buildings will meet minimum energy standards for new buildings in MN. Furthermore, the development shall comply with the City's Sustainable Building Ordinance based on funding requirements.

7. *Safety and convenience of both vehicular and pedestrian traffic both within the site and in relation to access streets, including traffic circulation features, the locations and design of entrances and exits and parking areas within the site.*

The site plan meets this finding. Although the development site is landlocked, the Dept. of Public Works Mapping and Records division determined that an address may be based on frontage on an improved private street. The applicant proposes to make improvements to the existing crescent shaped drive on the adjoining Highland Chateau parcel at 2319 7th St W. and provide access and public services via a private street with a reciprocal maintenance, use, and easement agreement. The existing one-way site circulation will continue with a vehicular entrance to the private street from West 7th Street and an exit onto St. Paul Avenue.

The Highland Park District 15 Plan notes that the West 7th and St. Paul Ave. intersection is a key intersection for safety improvements. Improvements along the Highland Chateau's St

Paul Avenue frontage are required per Public Works and Zoning to provide the safest possible scenario for all modes arriving at the site.

Specifically:

- The existing drive will become a private street to be used by both properties.
- Widening the one-way access drive to give adequate space for Treehouse resident drop off, maneuvering isles, and trash pickup.
- A public sidewalk added to the Highland Chateau parcel along St. Paul Ave.
- Removal of existing encroachments in the ROW
- Minimize curb cuts and meet Public Works' standards for curb and driveway design.
- Room for passenger drop off will remain at the Chateau.

A traffic memo is under review by Public Works Traffic Engineering. Public Works sign-off of the site plan and acceptance of the traffic memo are recommended conditions of site plan approval.

8. *The satisfactory availability and capacity of storm and sanitary sewers, including solutions to any drainage problems in the area of the development.*

This finding is met. Sanitary sewers in the area have capacity for the additional units. Currently, runoff on the vacant lot sheet drains to the Highland Chateau's existing drive and is conveyed to public catch basins. A storm water retention system to meet the St. Paul Sewer Department's Stormwater Rate Control requirements has been designed which collects water both uphill and downhill of the building. The water is slowed to an acceptable rater before entering the public storm water system.

A separate geotechnical and hydrology report has been requested but has not yet been received.

9. *Sufficient landscaping, fences, walls and parking necessary to meet the above objectives.*

The finding is met. To reduce disturbance to the surrounding slopes, a sheet piling retaining wall will be installed. The applicant has applied for a variance to create a U-shaped trough between the retaining wall and the building. It would provide room for an effective stormwater management system and additional natural light for lower units. Stormwater will flow down the slope towards the retaining wall and be directed east to a proposed stormwater management system with collection areas above and below the proposed building.

Trees and vegetation will be replanted on both sides of the main retaining wall, behind and alongside the building. Per Tree Preservation requirements, the project is required to plant 14 trees of at least two and one-half (2 ½) caliper inches.

The project meets required bicycle parking minimums and the seven tuck-under parking spaces do not exceed parking maximums. The development is located along transit. The development team has completed a Travel Demand Management plan with Move MN which meets the City's transportation planning objectives.

10. *Site accessibility in accordance with the provisions of the Americans with Disabilities Act (ADA), including parking spaces, passenger loading zones and accessible routes.*

The site plan meets this finding. Public sidewalks will be added to The Chateau site along St. Paul Ave. A sidewalk will also be added along the western side of the existing crescent drive. This new sidewalk will serve as a direct pedestrian connection for the new building and will be constructed in accordance with ADA provisions. Compliant parking spaces, passenger loading zones, and accessible routes will be available for both the Highland Chateau and the proposed Treehouse development.

11. *Provision for erosion and sediment control as specified in the Minnesota Pollution Control Agency's "Manual for Protecting Water Quality in Urban Areas."*

The site plan meets this finding. The site plan includes an erosion and sediment control plan that is consistent with BMP practices per the Minnesota Pollution Control Agency. If land disturbance exceeds an acre, then a General Storm Water Permit for Construction Activity from the Minnesota Pollution Control Agency will be required.

I. STAFF RECOMMENDATION:

Based on the findings above, the staff recommends approval of the site plan to allow a new multi-family residential development at 0 Madison St. (N of 2319 W 7th St. and St. Paul Avenue) with the following conditions:

1. Sign-off by Site Plan Review staff for technical compliance of the site plan that is substantially similar to this approved site plan.
2. Sign-off by Site Plan Review staff for technical compliance of supporting site plan documentation including the final Tree Preservation and Landscape plan by the City Forester and acceptance of the Traffic Memo by Traffic Engineering.
3. Approval of a variance of 63.111(b) to allow the proposed retaining walls and creation of trough-shaped yards between the new building and new retaining walls.
4. Approval of rezoning of the property from R1 – one-family residential district to RM2 - medium-density multiple-family residential district.
5. During Construction, final slopes must be immediately stabilized to prevent erosion. Trees

must be planted, and all disturbed soils on the slope must be adequately covered with a suitable topsoil and seeded per Minnesota Board of Water and Soil Resources specifications for native vegetation establishment.

6. The specified elements of the required engineering report on slope stability and hydrology per § 63.111(a)(1-3) must be submitted to the City for review and acceptance before any permits will be issued, including grading permits. The findings in the engineering report may result in required revisions to project plans as determined by Department of Safety and Inspections staff. If revisions to project plans are required as a result of the engineering report, these revisions to plans must be made to all plans submitted to the City for approval before any permits will be issued, including grading permits.
7. A private street to serve the development must be established. The private street must be established based upon a plan submitted to and approved by both the Department of Public Works and the Department of Safety and Inspections, Division of Fire Inspections, before final site plan approval.



CITY OF ST PAUL
 DEPARTMENT OF SAFETY AND INSPECTIONS
 375 JACKSON STREET, SUITE 220
 ST. PAUL, MINNESOTA 55101-1806
 Phone: 651-266-8989 Fax: 651-266-9124
 Visit our Web Site at www.stpaul.gov/dsi

Site Plan Review Application



Application Date Received Aug 23, 2022	Application Method Mail <input type="checkbox"/> Email <input checked="" type="checkbox"/> Walk-in <input type="checkbox"/> Fax <input type="checkbox"/>	Site Plan Review Meeting Date (STAFF ENTRY ONLY) Sept 28, 2022 - TBC
Site Address(es) Un-assigned Oak Avenue (2317 7th St W, St Paul, MN 55116 is adjacent parcel to south)		Property Identification Number (PIN) 222823220080

Project Name **Treehouse**

Project Type: Multifamily

New Construction Addition Parking Lot Only Other Site Work

Proposed Land Use:

Commercial Mixed-Use Multi-Family Residential Industrial

Institutional Recreational Single-Family Duplex

Project Description:
 New 5 story building consisting of 36 dwelling units for seniors (all affordable). First floor to consist of tuck-under parking and amenity space. New retaining walls to address the topography. New paving and low retaining walls on adjacent southern parcel to enhance pedestrian and fire access.

Project Contacts: Site Plans and documents shall be uploaded to the Electronic Plan Review system planreview.stpaul.gov/ProjectDox

Applicant Trellis Co.	Address 614 North First Street, Suite 100 City State Zip Minneapolis MN 55104	Email dwalsh@trellismn.org
		Phone 612-274-7817
Responsible Party (Developer/Property Owner) Trellis Treehouse Acquisition LLC	Address 614 North First Street, Suite 100 City State Zip Minneapolis MN 55104	Email dwalsh@trellismn.org
		Phone 612-274-7817
Architect Mike Madden, LHB	Address 701 Washington Ave N, Suite 200 City State Zip Minneapolis MN 55401	Email mike.madden@lhbcorp.com
		Phone 612.766.2844
Civil Engineer David Polson, LHB	Address 21 W Superior Street, Suite 500 City State Zip Duluth MN 55802	Email david.polson@lhbcorp.com
		Phone 218.279.2242

REQUIRED: Email to receive Electronic Plan Review document upload link: matt.finn@lhbcorp.com

Project and Land Use Details:

Est. Project Start/End Dates: April 2023 - April 2024	Estimated Project Cost: \$ 9,150,000
Existing Use: Undeveloped	Proposed Use: Multi-family (Senior apartments)
Parcel Area (square feet): 26,340 SF	Disturbed Land Area (square feet): 17,750 SF
Building Gross Floor Area: 31,280 SF	Floor Area Ratio: 1.19
No. of Existing Off-Street Parking Spaces: 0	No. of Proposed Off-Street Parking Spaces: 7
No. of Existing Residential Units: 0	No. of Proposed Residential Units: 36
No. of Affordable Residential Units: 0 existing/ 36 proposed	% AMI for Affordable Residential Units: 30-50% AMI
<input type="checkbox"/> Flood Plain Property <input type="checkbox"/> Historic District/Property	<input checked="" type="checkbox"/> Steep Slopes (>12%) 70% max <input checked="" type="checkbox"/> Travel Demand Mgmt. Plan

If you are a religious institution you may have certain rights under RLUIPA. Check this box if you identify as a religious institution.

Applicant certifies that all information provided herein is true and accurate.

APPLICANT NAME (PRINT) Trellis Co.	SPR File # (STAFF ENTRY ONLY) 22-091995
APPLICANT SIGNATURE 	SPR Fee \$ (STAFF ENTRY ONLY) TBC
	<input type="checkbox"/> Check <input type="checkbox"/> Credit Card <input type="checkbox"/> Online Payment



CITY OF SAINT PAUL

DEPARTMENT OF SAFETY AND INSPECTIONS
 375 JACKSON STREET, SUITE 220
 ST. PAUL, MINNESOTA 55101-1806
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Site Plan Review Application Submittal Requirements



Site Plan Review applications and application fees may be submitted to the City of Saint Paul Department of Safety and Inspections at 375 Jackson Street, Suite 220, St. Paul MN 55101, by email at SitePlanReview@ci.stpaul.mn.us or by fax at 651-266-9124. Site Plan Review can be reached at 651-266-9008 from 7:30 am - 4:30 pm, Monday through Friday.

Site Plan Review is required for multi-family residential, commercial, industrial, institutional, or recreational new construction, additions, or parking lots, as well as land disturbances greater than 10,000 feet square, construction on slopes 12% or greater, or one and two-family residential properties over one acre or located in a tree preservation district.

Identify the items below that are included with the submittal of your Site Plan Review application package. Provide an explanation for any item indicated as Not Included or Not Applicable. Failure to provide required documentation may result in your Site Plan Review application being rejected.

Upload this completed document and the following required Site Plan materials to your Electronic Plan Review project.

Item	Yes	No	N/A	Comments:
Site Plan Review Application	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Application Fee (check or credit card)— \$525 for first 10,000 sf of disturbance, plus \$210 for each additional 10,000 sf increment of disturbance for expansions or parcel area for new construction. Additional fees may apply, e.g. TDMP, Flood Plain, Steep Slopes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Project Description/Overview— Narrative description of the project, project contacts and design professionals	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	On Title page of drawings
Location Map— Map of the proposed development within the City	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	On Title page of drawings
Certified Survey— Including existing conditions such as property lines, easements, buildings, utilities, parking, sidewalks, driveways, landscaping, wetland, park land	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Demolition Plan— Including private property and public realm removals, utility cuts, tree protection measures	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Erosion Control Plan— Including measures such as silt fences, inlet protection, rock construction entrance and street cleaning, stormwater pollution prevention plan	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Site Layout and Paving Plan— Including proposed buildings, dimensions, and other appropriate labels. Consider Zoning design and dimensional standards.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	



PROJECT NARRATIVE

TREEHOUSE APARTMENTS WILL PROVIDE NEW CONSTRUCTION OF 36 AFFORDABLE DWELLING UNITS. THE PROJECT WILL INCLUDE AMENITIES SUCH AS A COMMUNITY ROOM WITH AN OUTDOOR PATIO, TENANT STORAGE, COMMON LAUNDRY, ONSITE SERVICES AND A MOVIE THEATER LOUNGE.

A SERIES OF RETAINING WALLS ARE USED TO ADDRESS THE SLOPING SITE AND CREATE A BUILDABLE AREA DIRECTLY BEHIND THE HIGHLAND CHATEAU HEALTH AND REHABILITATION CENTER. ACCESS TO THE NEW BUILDING WILL BE PROVIDED VIA AN ACCESS EASEMENT WITH THE CHATEAU PARCEL. IMPROVEMENTS TO THE EXISTING ACCESS DRIVE INCLUDING A NEW ACCESSIBLE PEDESTRIAN PATH WILL HELP CONNECT THE NEW BUILDING TO ST PAUL AVENUE AND 7TH ST WEST.

THE BUILDING RESPONDS TO THE UNIQUE CONDITIONS OF THE SITE. THE NORTH SIDE OF THE FIRST TWO FLOORS ARE BELOW GRADE AND THEREFORE CONTAIN SUPPORT SPACES. THE REMAINDER OF THE FIRST FLOOR IS COMPRISED OF THE LOBBY, COMMUNITY ROOM, MANAGEMENT OFFICE AND TUCK-UNDER PARKING. THE UNITS ARE DISTRIBUTED ON THE UPPER FLOORS WITH THE LARGER AND DEEPER UNITS FACING SOUTH TO TAKE ADVANTAGE OF THE SOUTH LIGHT. THE NORTH FACING UNITS ARE WIDER AND SHALLOWER.

THE EXTERIOR MATERIALS ARE SELECTED TO REFLECT THE NATURAL SURROUNDINGS. THE FIRST FLOOR IS CLAD IN GREY BRICK SIMILAR TO THE BEDROCK THAT UNDERLIES THE SITE. A WOOD GRAIN FIBER CEMENT PRODUCT IS VERTICALLY ORIENTED AT THREE DIFFERENT VOLUMES. THE REMAINDER OF THE BUILDING IS CLAD IN A GREY FIBER CEMENT LAP SIDING. GREEN ACCENTS ARE FOUND ON THE SOUTH SUNSHADES ON THE WINDOWS AS WELL AS THE TRELIS OVER THE COMMUNITY PATIO AND EGRESS DOOR.

ZONING ANALYSIS

ZONING CLASSIFICATION
 CURRENT: R1
 PROPOSED: RM2
 NOTE: ADJACENT CHATEAU PARCEL IS RM2

SETBACKS
 FRONT: 25' (FACING ST PAUL AVENUE)
 SIDE: 9'
 REAR: 9'

BUILDING HEIGHT
 MAXIMUM: 50'
 PROPOSED: 46'-6" FROM AVERAGE GRADE PLANE TO TOP OF ROOF MEMBRANE

FLOOR AREA RATIO
 MAXIMUM: 2.25 WITH STRUCTURED PARKING
 PROPOSED: 31,280 BUILDING / 26,340 SITE = 1.19

PARKING
 MINIMUM: 0
 PROPOSED: 7 SPACES STRUCTURED TUCK-UNDER

BICYCLE PARKING
 MINIMUM: 1 SPACE FOR 3 UNITS = 12 SPACES
 PROPOSED: 8 RACKS, FOR 15 BIKES LOCATED IN FIRST FLOOR BIKE ROOM

PROJECT TEAM

CLIENT	CIVIL ENGINEER	LANDSCAPE ARCHITECT
TRELLIS, CO. 614 NORTH FIRST STREET, STE 100 MINNEAPOLIS, MN 55401 PHONE: 612.274.7817 CONTACT: DAN WALSH	LHB, INC. 701 WASHINGTON AVE N, SUITE 200 MINNEAPOLIS, MN 55401 PHONE: 612.752.6956 CONTACT: DAVID POLSON E-MAIL: DAVID.POLSON@LHBCORP.COM	LHB, INC. 701 WASHINGTON AVE N, SUITE 200 MINNEAPOLIS, MN 55401 PHONE: 612.752.6931 CONTACT: MARK ANDERSON E-MAIL: MARK.ANDERSON@LHBCORP.COM
ARCHITECT	STRUCTURAL ENGINEER	MECHANICAL ENGINEER
LHB, INC. 701 WASHINGTON AVE N, SUITE 200 MINNEAPOLIS, MN 55401 PHONE: 612.766.2844 CONTACT: MIKE MADDEN E-MAIL: MIKE.MADDEN@LHBCORP.COM	CAIN THOMAS 3433 BROADWAY ST NE, #475 MINNEAPOLIS, MN 55413 PHONE: 612.279.4200 CONTACT: RYAN STEPHANS E-MAIL: RSTEPHANS@CTAMEP.COM	CAIN THOMAS 3433 BROADWAY ST NE, #475 MINNEAPOLIS, MN 55413 PHONE: 612.279.4200 CONTACT: RYAN STEPHANS E-MAIL: RSTEPHANS@CTAMEP.COM
ELECTRICAL ENGINEER	CAIN THOMAS 3433 BROADWAY ST NE, #475 MINNEAPOLIS, MN 55413 PHONE: 612.279.4200 CONTACT: DAVID CARSLON-MCLAGAN E-MAIL: DCARLSON@CTAMEP.COM	

SHEET INDEX

GENERAL SHEETS

G0.00 PROJECT TITLE SHEET

V101 SURVEY

CIVIL SHEETS

C001 CIVIL NOTES
 C101 EROSION CONTROL
 C111 DEMOLITION PLAN
 C201 UTILITY PLAN
 C301 GRADING AND DRAINAGE PLAN
 C401 SITE LAYOUT AND SURFACING PLAN
 C411 VEHICLE TURNING EXHIBIT
 C501 LANDSCAPE PLAN AND TREE REPLACEMENT PLAN
 C511 TREE PRESERVATION PLAN

ARCHITECTURAL SHEETS

A1.1 FIRST FLOOR PLAN
 A1.2 SECOND FLOOR PLAN
 A1.3 THIRD - FIFTH FLOOR PLAN
 A1.4 ROOF PLAN
 A2.2 EXTERIOR ELEVATIONS
 A2.4 EXTERIOR ELEVATIONS
 A3.0 BUILDING SECTIONS
 A3.1 PERSPECTIVES

BUILDING GROSS AREA

First Floor*	4756 SF
Second Floor	6631 SF
Third Floor	6631 SF
Fourth Floor	6631 SF
Fifth Floor	6631 SF
Total Gross Area	31,280 SF

* Does not include area first floor parking located under building above (1726 SF)

UNIT TYPES AND DATA

Unit Type	Description					No. / Floor	Total Type	Unit Area (GSF)	Unit Area (NSF)	Combined Area (GSF)			
	BR	BA	ACC	Type	1st						2nd	3rd	4th
STUDIO A	0	1	A	-	-	1	1	3	465	428	1455		
STUDIO B.1	0	1	B	-	-	1	1	3	450	392	1350		
STUDIO B.2	0	1	B	-	-	1	1	3	435	375	1305		
STUDIO B.3	0	1	B	-	-	1	1	3	462	396	1386		
STUDIO B.4	0	1	B	-	-	1	1	4	472	412	1888		
STUDIOS = 16 TOTAL													
1BR A	1	1	A	-	-	1	1	4	735	634	2940		
1BR B	1	1	B	-	-	4	4	16	570	504	9120		
1-BEDROOM = 20 TOTAL													
PROJECT TOTALS							-	6	10	10	10	36	19,444

UNIT ACCESSIBILITY DATA

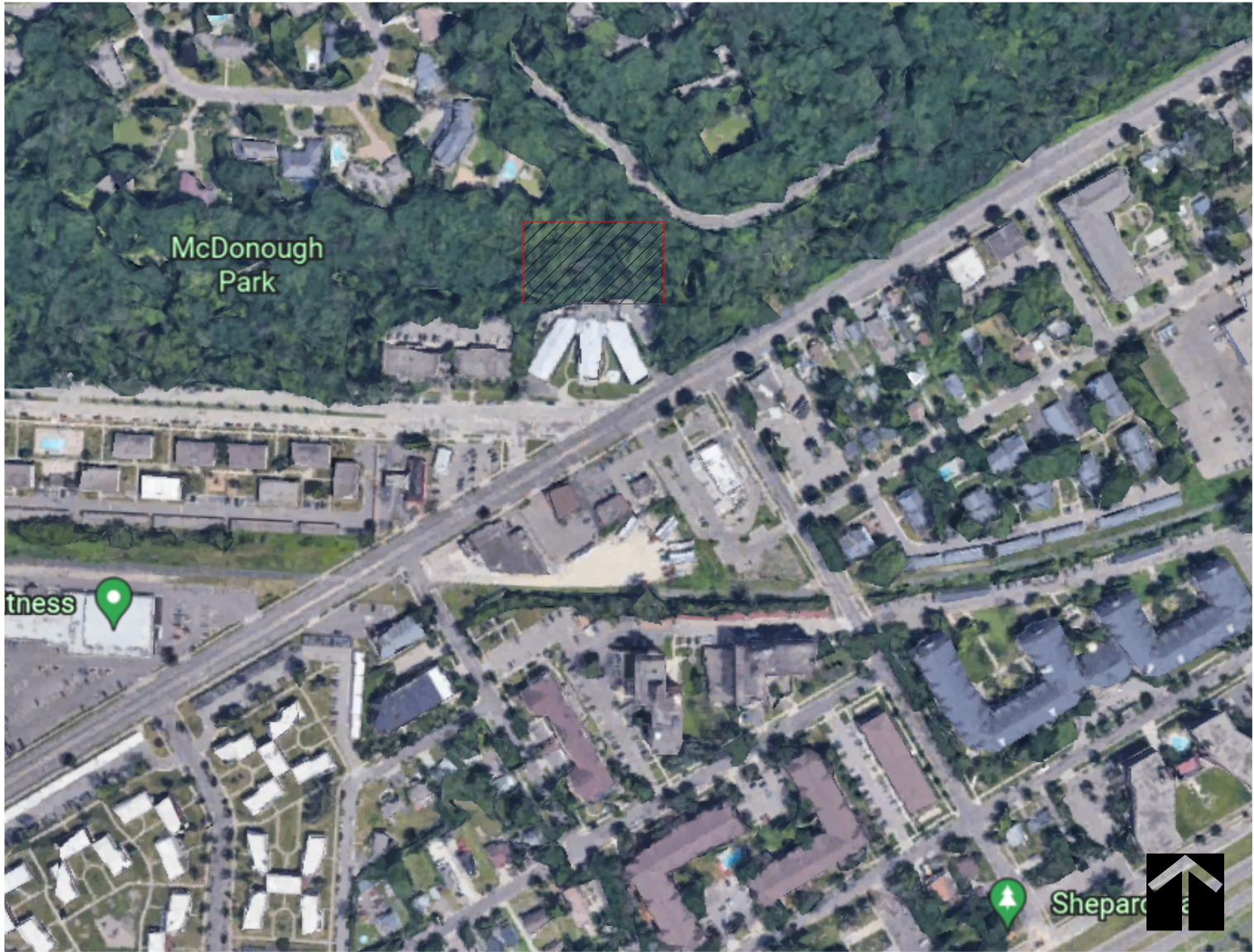
Units are designed to the following Accessibility Standards:
 ACC_Type Accessibility Standard
 A ICC/ANSI 117.1 - Type 'A' Accessible Unit
 B ICC/ANSI 117.1 - Type 'B' Accessible Unit
 B-HVI ICC/ANSI 117.1 - Units with Accessible Communication Features

NUMBER OF ACCESSIBLE UNITS REQUIRED

1. MN 1107.6.2.1.1 requires 2% of dwelling units be Type 'A' Accessible: 36 Units x 2% = 1
2. MHFA requires 5% of dwelling units be Type 'A' Accessible: 36 Units x 5% = 2
3. HUD requires 5% of dwelling units be Type 'A' Accessible: 36 Units x 5% = 2
4. HUD/ MHFA requires 2% of dwelling units for visual and hearing impaired: 36 Units x 2% = 1
5. MHFA governs

NUMBER OF ACCESSIBLE UNITS PROVIDED

7 - Type 'A' Accessible Units are provided.
 1 - Unit with accessible audible and visual alarms for the visual and hearing impaired is provided.



LOCATION MAP

TREEHOUSE SENIOR APARTMENTS

2319 7TH ST W
ST. PAUL, MN



21 W. Superior St., Ste 500 | Duluth, MN 55802 | 218.727.8446

CONSULTANT #1:
CONSULTANT #1 NAME
Address Line 1
Address Line 2

CONSULTANT #2:
CONSULTANT #2 NAME
Address Line 1
Address Line 2

CLIENT:
TREEHOUSE LIMITED PARTNERSHIP

THIS SQUARE APPEARS 1/2"x1/2" ON FULL SIZE SHEETS

NO	DATE	ISSUED FOR
02	11/01/22	RESPONSE TO STAFF COMMENTS
01	8/19/22	LAND USE APPLICATION
NO	DATE	ISSUED FOR

NO	DATE	REVISION
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PRELIMINARY NOT FOR CONSTRUCTION 11/01/2022

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PROJECT NAME:
Treehouse

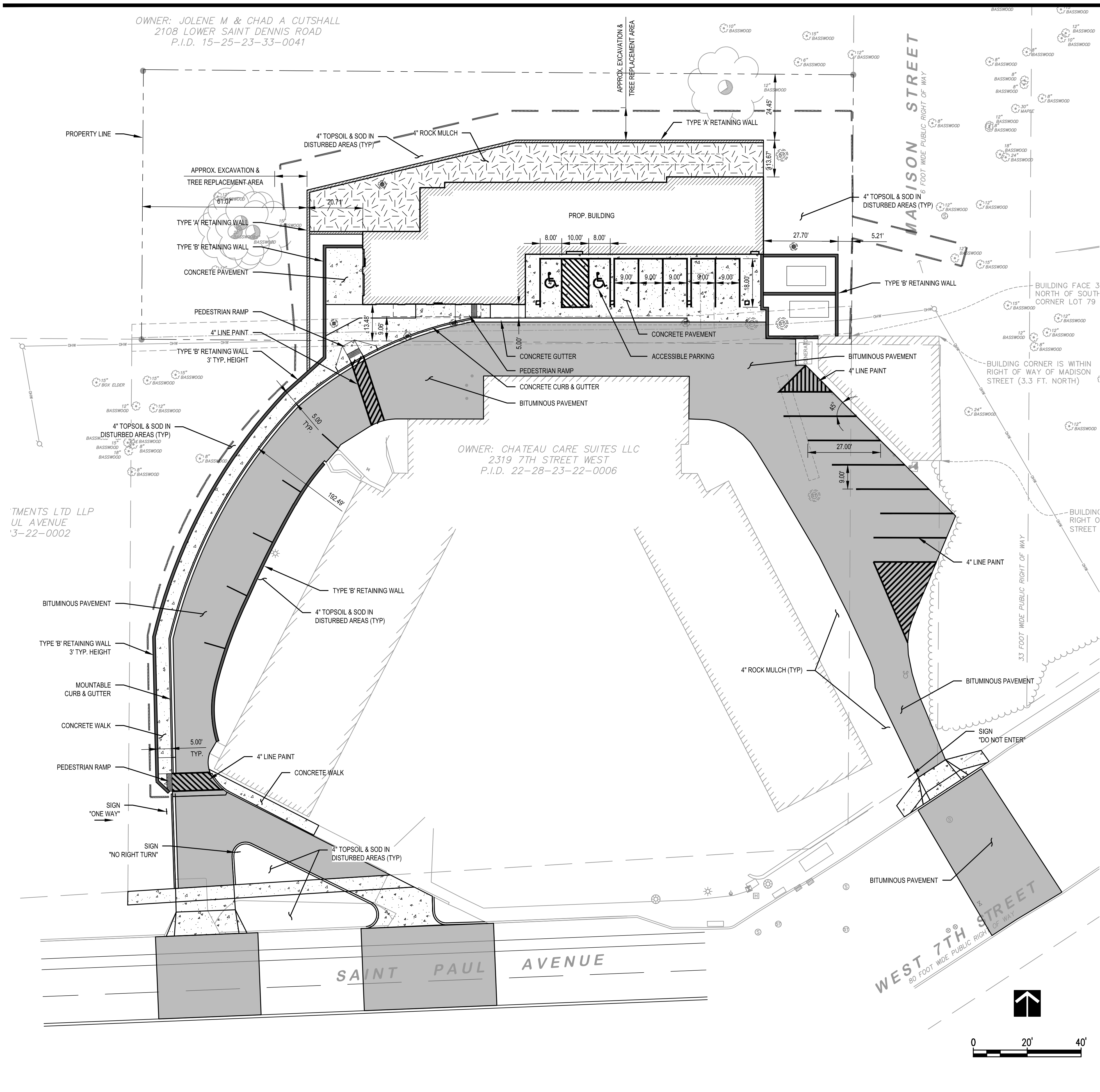
DRAWING TITLE:
PROJECT TITLE SHEET

DRAWN BY: Author
 CHECKED BY: Checker
 PROJ. NO: 220142
 DRAWING NO:

G0.00

OWNER: JOLENE M & CHAD A CUTSHALL
2108 LOWER SAINT DENNIS ROAD
P.I.D. 15-25-23-33-0041

OWNER: CHATEAU CARE SUITES LLC
2319 7TH STREET WEST
P.I.D. 22-28-23-22-0006



SHEET LEGEND

- PROPERTY LINE
- CONSTRUCTION & DISTURBANCE LIMITS
- PROP. BUILDING
- PROP. BITUMINOUS PAVEMENT
- PROP. CONCRETE PAVEMENT
- PROP. 4" ROCK MULCH
- PROP. CONCRETE CURB & GUTTER
- PROP. TYPE 'A' RETAINING WALL - SHEET PILE
EXTEND SHEET PILE RETAINING WALL TO 1'-0" ABOVE ADJACENT GRADE. PROVIDE WEATHERING STEEL PLATE CAP CONTINUOUS AT TOP OF WALL. PROVIDE STEEL GUARDRAIL ATTACHED TO CAP. TOP OF GUARDRAIL TO BE 42" ABOVE ADJACENT GRADE.
- PROP. TYPE 'B' RETAINING WALL - SEGMENTAL LANDSCAPE BLOCK

SHEET NOTES

1. REFER TO C001 FOR GENERAL NOTES.
2. CONTRACTOR TO MAINTAIN ACCESS TO THE FIRE DEPARTMENT CONNECTION FOR FIRE DEPARTMENT PERSONNEL AT ALL TIMES DURING THE CONSTRUCTION PERIOD.
3. PROVIDE 4-INCH WIDE WHITE SOLID STRIPING IN AUTOMOBILE PARKING AREAS.
4. PROVIDE PAINT SYMBOLS AND SIGNAGE AT ACCESSIBLE PARKING SPACES.
5. REFER TO ARCHITECTURAL AND STRUCTURAL PLANS FOR ACTUAL BUILDING DIMENSIONS, STOOP AND RAMP LOCATIONS.
6. CONTINUE ALL JOINTS THROUGH THE CURB.
7. MATCH NEW CONSTRUCTION/CONTRACTION JOINTS WITH JOINTS IN ADJACENT CONCRETE.
8. PROVIDE 4" OF TOPSOIL AND SOD IN ALL AREAS DISTURBED BY THE WORK.



21 W. Superior St., Ste. 500 | Duluth, MN 55802 | 218.727.8446

CLIENT:
Trellis, Co.

THIS SQUARE APPEARS 1/2" x 1/2"
ON FULL SIZE SHEETS

NO	DATE	ISSUED FOR
01	11/01/22	RESPONSE TO STAFF COMMENTS
02	8/19/22	LAND USE APPLICATION
NO	DATE	ISSUED FOR

NO	DATE	REVISION
1	9/23/22	ADDITIONAL DETENTION
NO	DATE	REVISION

PRELIMINARY
NOT FOR CONSTRUCTION
11/01/2022

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PROJECT NAME:
Treehouse

DRAWING TITLE:
SITE LAYOUT AND SURFACING PLAN

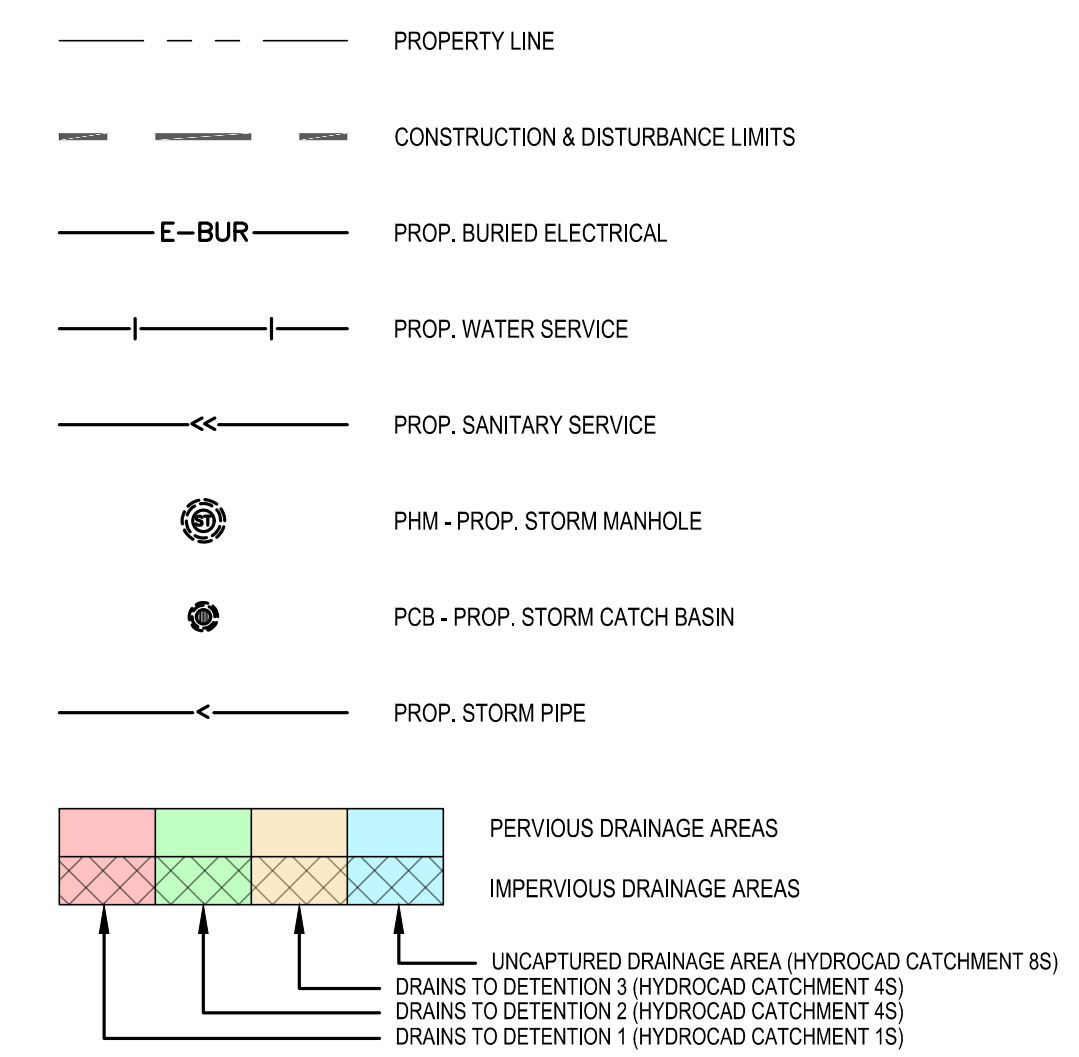
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CHECKED BY: MSA
PROJ. NO: 220142
DRAWING NO:

C401

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Plot Date: 11/17/2022 4:07 PM

CLIENT:
Trellis, Co.

SHEET LEGEND



SHEET NOTES

- REFER TO C001 FOR GENERAL NOTES AND SAINT PAUL REGIONAL WATER SERVICES (SPRWS) NOTES.
- CONTRACTOR TO COORDINATE NATURAL GAS SERVICE LOCATION AND ROUTING WITH UTILITY COMPANY AND MECHANICAL.
- SANITARY AND/OR STORM SEWER SERVICE PASSING WITHIN 10 FEET OF THE BUILDING ARE GOVERNED BY THE MN PLUMBING CODE. SPECIFICATION FOR PIPE MATERIAL SELECTION AND NOTES FOR REQUIRED AIR TEST OF THE PIPING COMPLIANT WITH MN STATE PLUMBING CODE 4714 SECTION 1107.0.

THIS SQUARE APPEARS 1/2" x 1/2" ON FULL SIZE SHEETS

02	11/01/22	RESPONSE TO STAFF COMMENTS
01	8/19/22	LAND USE APPLICATION
NO	DATE	ISSUED FOR

1	9/23/22	ADDITIONAL DETENTION
NO	DATE	REVISION

PRELIMINARY
NOT FOR CONSTRUCTION
11/01/2022

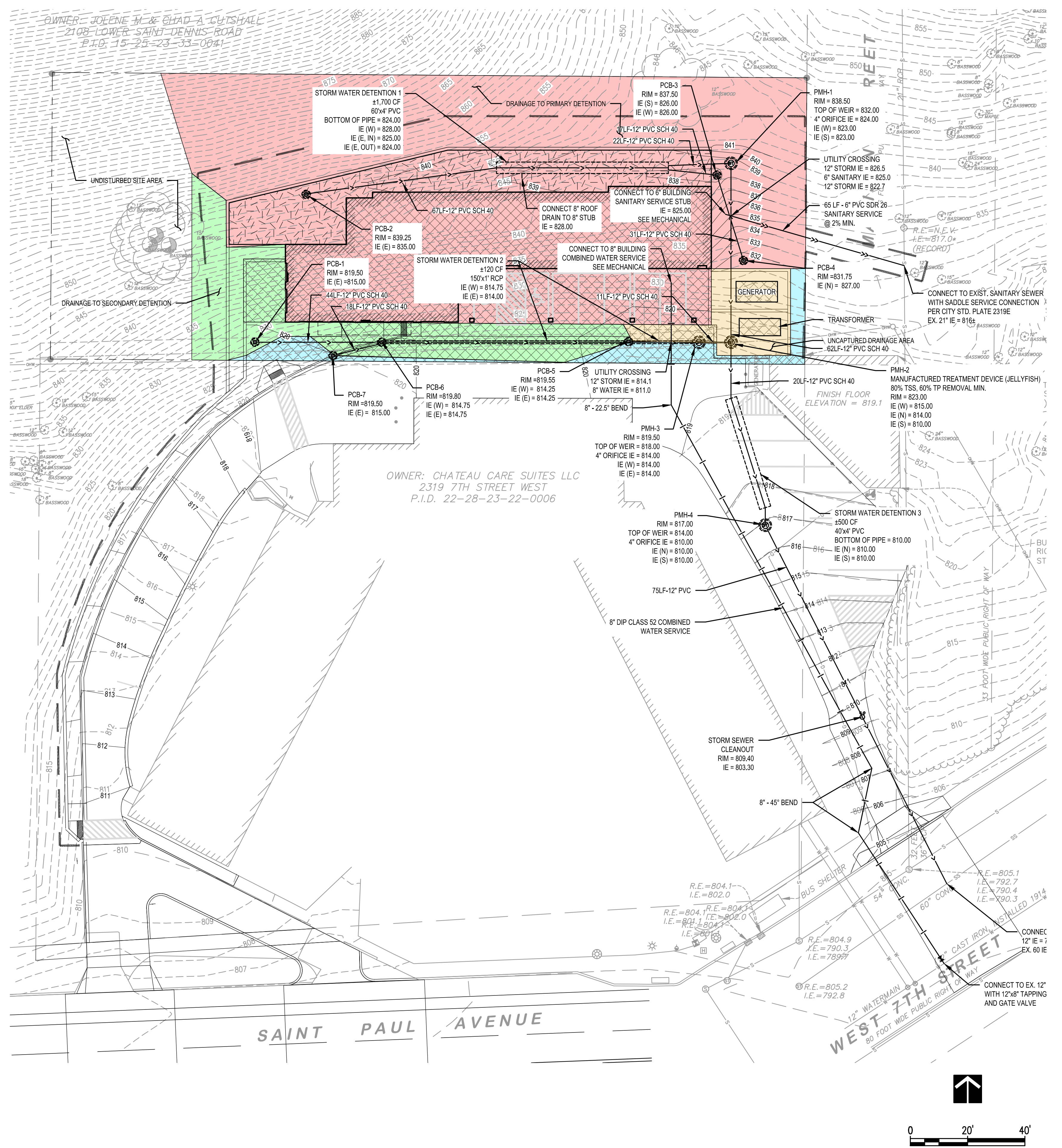
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PROJECT NAME:
Treehouse

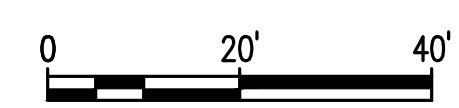
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UTILITY PLAN

DRAWN BY: JPH
CHECKED BY: MSA
PROJ. NO: 220142
DRAWING NO:

C201

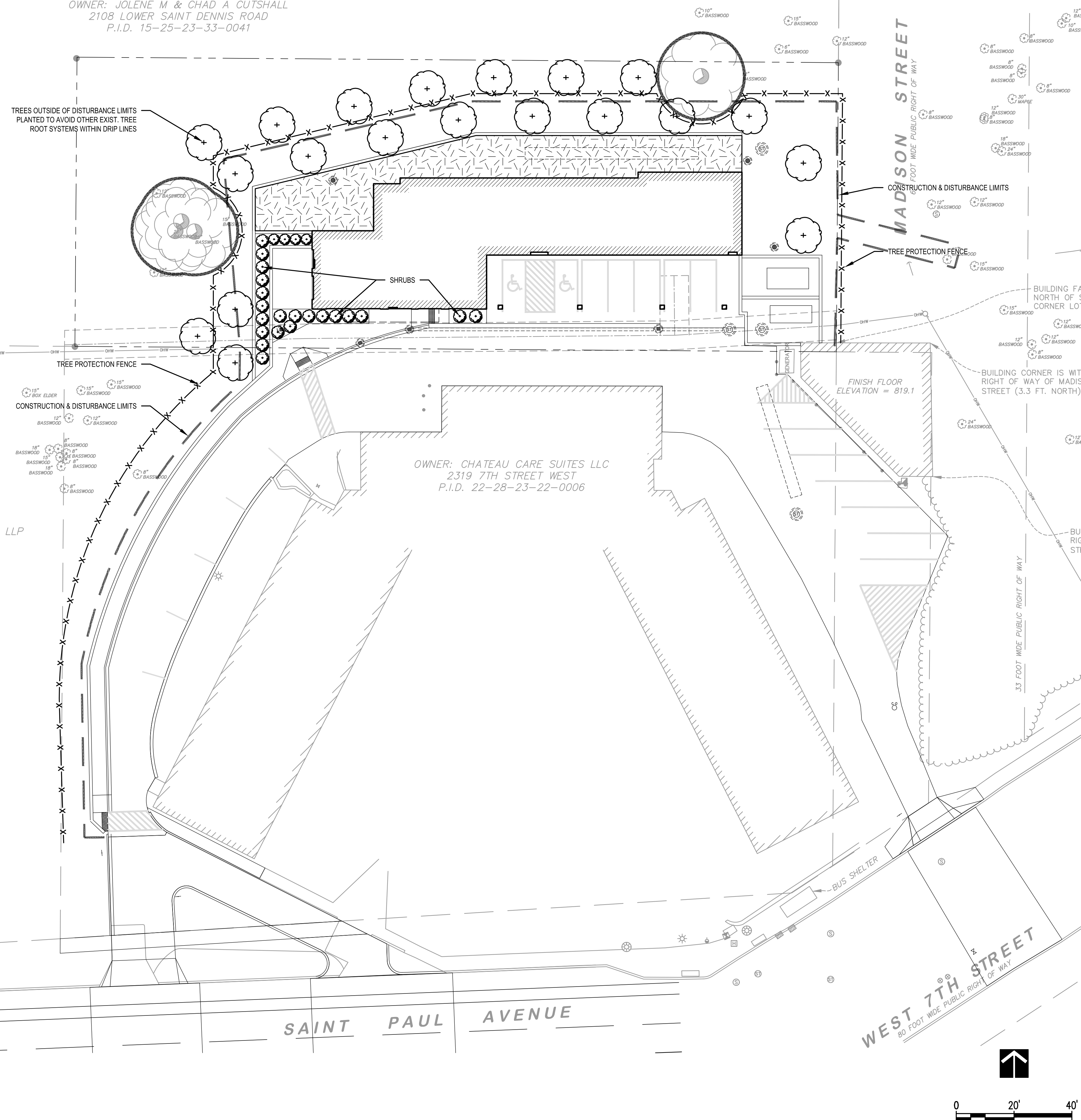


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Plot Date: 11/17/2022 4:08 PM



OWNER: JOLENE M & CHAD A CUTSHALL
2108 LOWER SAINT DENNIS ROAD
P.I.D. 15-25-23-33-0041

OWNER: CHATEAU CARE SUITES LLC
2319 7TH STREET WEST
P.I.D. 22-28-23-22-0006



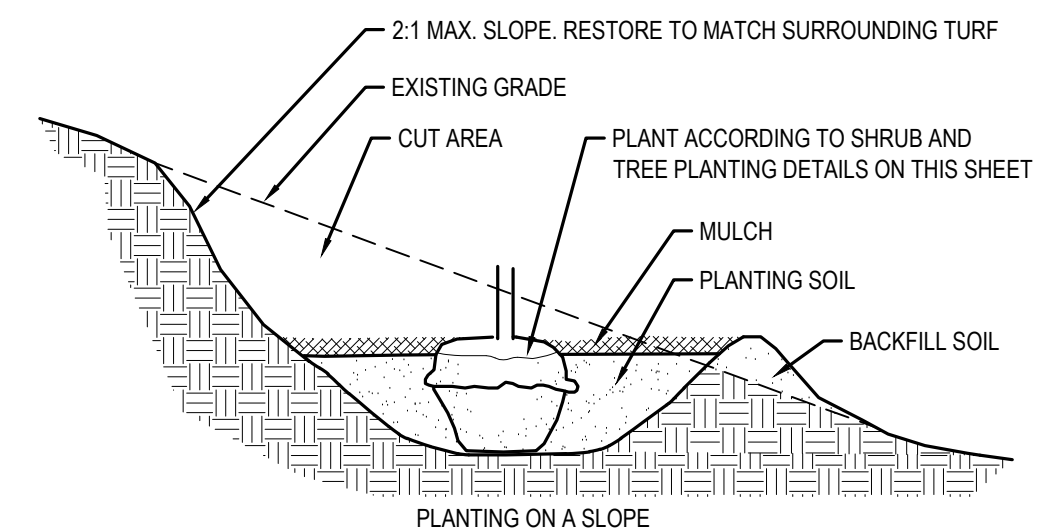
SHEET LEGEND

- PROPERTY LINE
- - - CONSTRUCTION & DISTURBANCE LIMITS
- X-X-X-X- TREE PROTECTION FENCE
- ⊕ PROP. TREE
- ⊙ PROP. SHRUB

REPLACEMENT TREES				
SYMBOL	QUANTITY	COMMON NAME	BOTANICAL NAME	SIZE
⊕	21	BASSWOOD	TILIA AMERICANA SP	2-1/2" CAL B&B
DESCRIPTION				
○	4	DRIP LINE OF EXIST. BASSWOOD OVER 12" CAL PRESERVED		

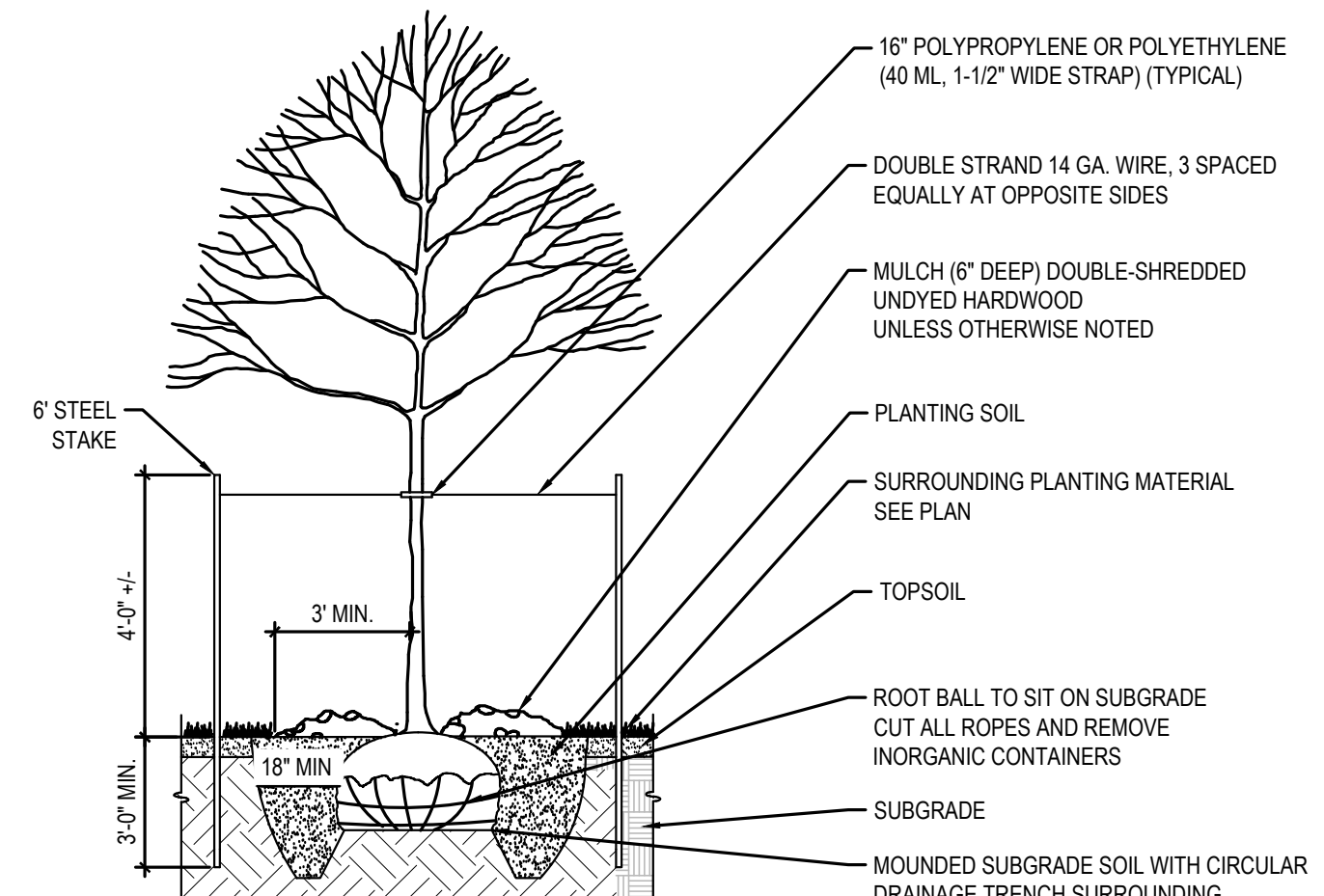
TREE REPLACEMENT QUANTITIES

QUANTITY OF EXIST. REMOVED	QUANTITY REPLACED
1 @ 24" CAL X 3	3
7 @ 18"-24" CAL X 2	14
4 @ 12"-18" CAL X 1	4
TOTAL	21



NOTE:
1. EXTEND EXCAVATION AND BACKFILL SOIL TO A POINT DOWNSLOPE EQUAL TO OR LOWER IN ELEVATION THAN THE BOTTOM OF THE HOLE DIRECTLY BENEATH THE PLANT TO ENSURE ADEQUATE DRAINAGE IN HEAVY SOILS. GRANULAR SOIL MUST BE ADDED AS BACKFILL IN AREAS OF POOR DRAINAGE.

2 SHRUB OR TREE PLANTING ON A SLOPE
NOT TO SCALE



1 DECIDUOUS TREE
NOT TO SCALE



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CLIENT:
Trellis, Co.

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NO	DATE	ISSUED FOR
02	11/01/22	RESPONSE TO STAFF COMMENTS
01	8/19/22	LAND USE APPLICATION
NO		

NO	DATE	REVISION
1	9/23/22	ADDITIONAL DETENTION
NO		

PRELIMINARY
NOT FOR CONSTRUCTION
11/01/2022

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PROJECT NAME:
Treehouse

DRAWING TITLE:
LANDSCAPE AND TREE REPLACEMENT PLAN

DRAWN BY: JPH
CHECKED BY: MSA
PROJ. NO: 220142
DRAWING NO:

C501

File Path: \\2021\2020 Drawings\220142_C501 - Landscape & Tree Replacement Plan.dwg
Plot Date: 11/17/2022 4:04 PM

CONSULTANT #1:
CONSULTANT #1 NAME
 Address Line 1
 Address Line 2

CONSULTANT #2:
CONSULTANT #2 NAME
 Address Line 1
 Address Line 2

CLIENT:
TREEHOUSE LIMITED PARTNERSHIP

THIS SQUARE APPEARS 1/2"x1/2"
 ON FULL SIZE SHEETS

NO	DATE	REVISION
02	11/01/22	RESPONSE TO STAFF COMMENTS
01	8/19/22	LAND USE APPLICATION
NO	DATE	ISSUED FOR

NO	DATE	REVISION

PRELIMINARY
NOT FOR CONSTRUCTION
 11/01/2022

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PROJECT NAME:
Treehouse

DRAWING TITLE:
FIRST FLOOR PLAN

DRAWN BY: Author
 CHECKED BY: Checker
 PROJ. NO: 220142
 DRAWING NO:

A1.1

D
C
B
A



1 FIRST FLOOR PLAN
 1/8" = 1'-0"

BIM_360/220142_Treehouse Apartments/220142_Treehouse Apartments A20.rvt
 11/1/2022 7:28:39 PM

CONSULTANT #1:
CONSULTANT #1 NAME
 Address Line 1
 Address Line 2

CONSULTANT #2:
CONSULTANT #2 NAME
 Address Line 1
 Address Line 2

CLIENT:
TREEHOUSE LIMITED PARTNERSHIP

A	B	C
D	E	F
G	H	J

KEYPLAN

THIS SQUARE APPEARS 1/2"x1/2" ON FULL SIZE SHEETS

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01	8/19/22	LAND USE APPLICATION
NO	DATE	ISSUED FOR

NO	DATE	REVISION

PRELIMINARY
NOT FOR CONSTRUCTION
 11/01/2022

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PROJECT NAME:
Treehouse

DRAWING TITLE:
SECOND FLOOR

DRAWN BY: Author
 CHECKED BY: Checker
 PROJ. NO: 220142
 DRAWING NO:

A1.2



1 SECOND FLOOR PLAN
 1/8" = 1'-0"

CONSULTANT #1:
CONSULTANT #1 NAME
 Address Line 1
 Address Line 2

CONSULTANT #2:
CONSULTANT #2 NAME
 Address Line 1
 Address Line 2

CLIENT:
TREEHOUSE LIMITED PARTNERSHIP

A	B	C
D	E	F
G	H	J

KEYPLAN

THIS SQUARE APPEARS 1/2"x1/2" ON FULL SIZE SHEETS

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01	8/19/22	LAND USE APPLICATION
NO	DATE	ISSUED FOR

NO	DATE	REVISION

PRELIMINARY
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 11/01/2022

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PROJECT NAME:
Treehouse

DRAWING TITLE:
THIRD - FIFTH FLOOR PLAN

DRAWN BY: Author
 CHECKED BY: Checker
 PROJ. NO: 220142
 DRAWING NO:

A1.3



1 THIRD - FIFTH FLOOR PLAN
 1/8" = 1'-0"

CONSULTANT #1:
CONSULTANT #1 NAME

Address Line 1
Address Line 2

CONSULTANT #2:
CONSULTANT #2 NAME

Address Line 1
Address Line 2

CLIENT:
TREEHOUSE LIMITED PARTNERSHIP

A	B	C
D	E	F
G	H	J

KEYPLAN

THIS SQUARE APPEARS 1/2"x1/2" ON FULL SIZE SHEETS

NO	DATE	REVISION
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01	8/19/22	LAND USE APPLICATION
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PRELIMINARY
NOT FOR CONSTRUCTION
11/01/2022

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PROJECT NAME:
Treehouse

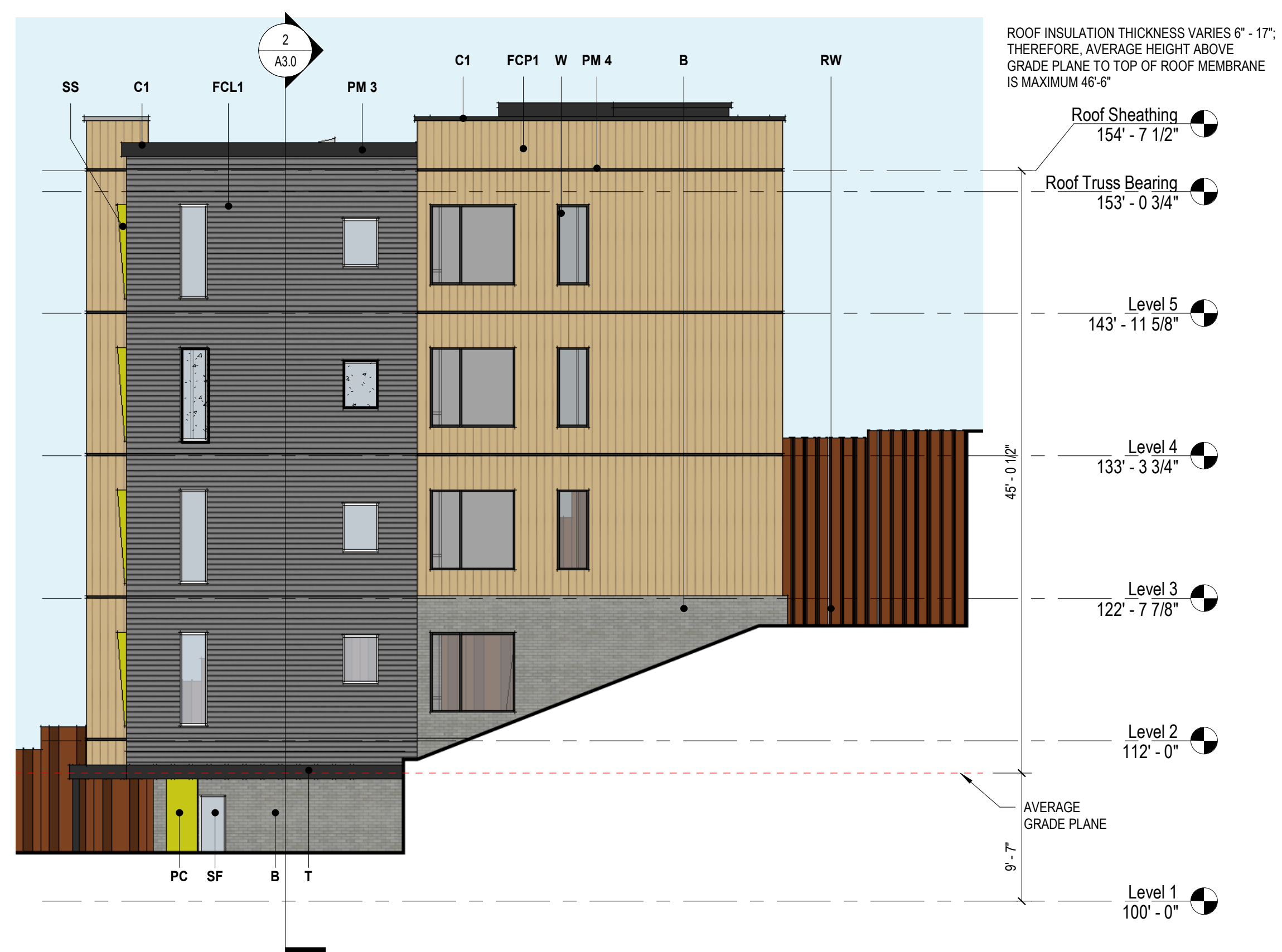
DRAWING TITLE:
EXTERIOR ELEVATIONS

DRAWN BY: Author
CHECKED BY: Checker
PROJ. NO: 220142
DRAWING NO:

A2.2

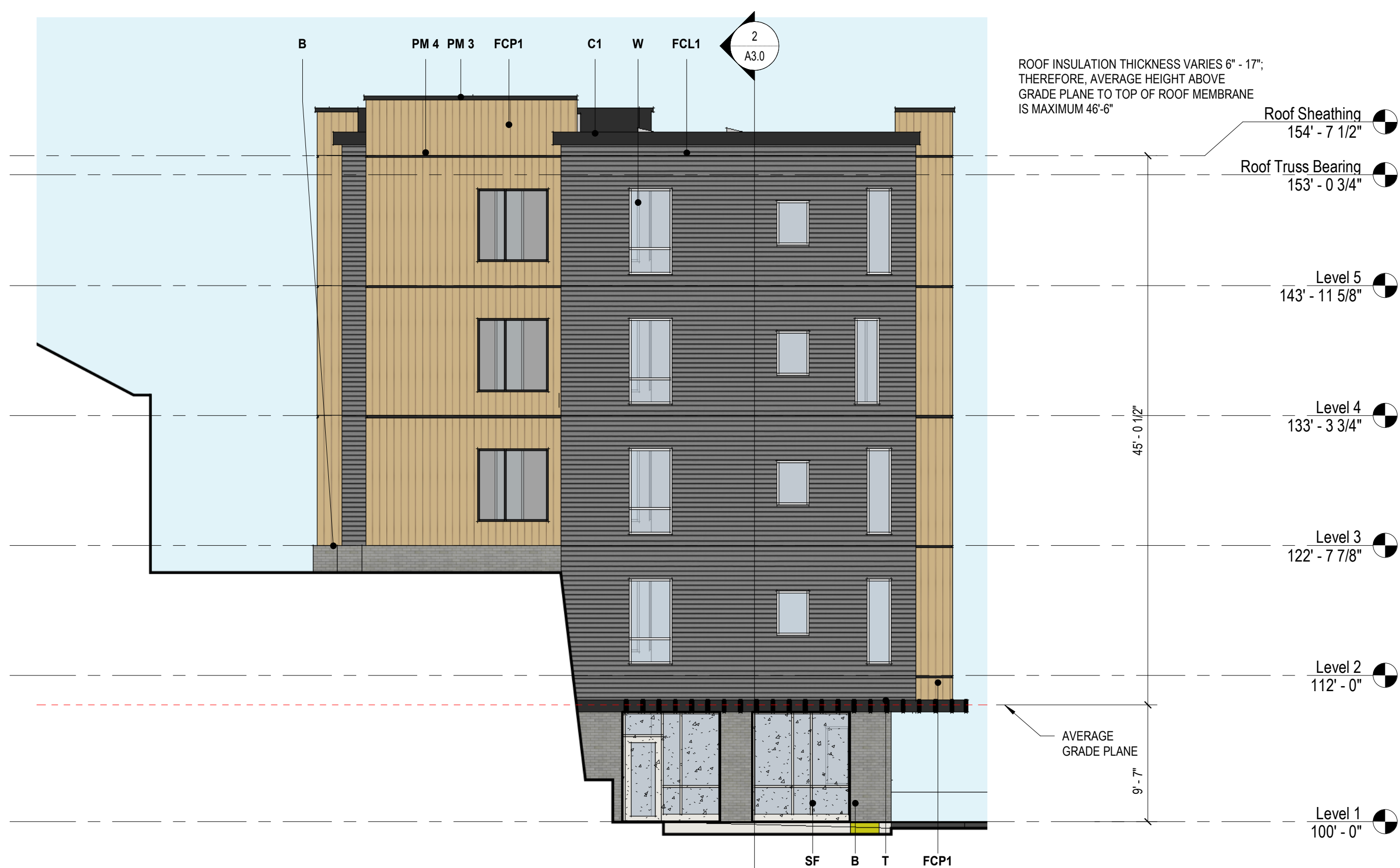
EXTERIOR ELEVATION KEY

- B** BRICK - NORMAN
- C1** CORNICE - PREFINISHED SHEET METAL
- RW** RETAINING WALL BEYOND
- CD** INSULATED COILING DOOR
- FCL1** LAP SIDING (HARDI FIBER CEMENT 4" EXPOSED FACE)
- FCL2** LAP SIDING (HARDI ARTISAN SHIPLAP)
- FCP1** FIBER CEMENT PANEL (NICHIIA, VINTAGEWOOD)
- HM** HOLLOW METAL (INSULATED) DOOR
- PM 1** PREFINISHED METAL SILL DETAIL, TYP. ALL OPENINGS IN BRICK
- PM 2** PREFINISHED METAL TRIM
- PM 3** PREFINISHED METAL COPING
- PM 4** PREFINISHED METAL REVEAL/ COMPRESSION JOINT
- PC** PRECAST COLUMN, PAINT
- RDO** ROOF DRAIN OVERFLOW - DISCHARGE 12" ABOVE GRADE. PROVIDE CONCRETE SPLASH BLOCK.
- SS** ALUMINIUM SUN SHADE. CUSTOM COLOR
- SF** THERMALLY BROKEN STOREFRONT
- T** PREFINISHED ALUMINIUM TRELLIS. CUSTOM COLOR
- W** FIBERGLASS WINDOW, TYP.



TOTAL AREA OF WEST FACADE = 2,450
TOTAL AREA OF WINDOWS/ DOORS = 280 SF
PERCENTAGE OF OPENINGS = 11%
REQUIRED BY ZONING = 10%

2 SCHEMATIC ELEVATION - EAST
1/8" = 1'-0"



TOTAL AREA OF WEST FACADE = 2,500
TOTAL AREA OF WINDOWS/ DOORS = 390 SF
PERCENTAGE OF OPENINGS = 15%
REQUIRED BY ZONING = 10%

1 SCHEMATIC ELEVATION - WEST
1/8" = 1'-0"

CONSULTANT #1:
CONSULTANT #1 NAME
Address Line 1
Address Line 2

CONSULTANT #2:
CONSULTANT #2 NAME
Address Line 1
Address Line 2

CLIENT:
TREEHOUSE LIMITED PARTNERSHIP

A	B	C
D	E	F
G	H	J

KEYPLAN

THIS SQUARE APPEARS 1/2"x1/2" ON FULL SIZE SHEETS

NO	DATE	REVISION
02	11/01/22	RESPONSE TO STAFF COMMENTS
01	8/19/22	LAND USE APPLICATION
NO	DATE	ISSUED FOR

PRELIMINARY
NOT FOR CONSTRUCTION
11/01/2022

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PROJECT NAME:
Treehouse

DRAWING TITLE:
EXTERIOR ELEVATIONS

DRAWN BY: Author
CHECKED BY: Checker
PROJ. NO: 220142
DRAWING NO:

A2.4

EXTERIOR ELEVATION KEY

- B** BRICK - NORMAN
- C1** CORNICE - PREFINISHED SHEET METAL
- RW** RETAINING WALL BEYOND
- CD** INSULATED COILING DOOR
- FCL1** LAP SIDING (HARDI FIBER CEMENT 4" EXPOSED FACE)
- FCL2** LAP SIDING (HARDI ARTISAN SHIPLAP)
- FCP1** FIBER CEMENT PANEL (NICHHA, VINTAGEWOOD)
- HM** HOLLOW METAL (INSULATED) DOOR
- PM 1** PREFINISHED METAL SILL DETAIL, TYP. ALL OPENINGS IN BRICK
- PM 2** PREFINISHED METAL TRIM
- PM 3** PREFINISHED METAL COPING
- PM 4** PREFINISHED METAL REVEAL/ COMPRESSION JOINT
- PC** PRECAST COLUMN, PAINT
- RDO** ROOF DRAIN OVERFLOW - DISCHARGE 12" ABOVE GRADE. PROVIDE CONCRETE SPLASH BLOCK.
- SS** ALUMINIUM SUN SHADE. CUSTOM COLOR
- SF** THERMALLY BROKEN STOREFRONT
- T** PREFINISHED ALUMINIUM TRELLIS. CUSTOM COLOR
- W** FIBERGLASS WINDOW, TYP.



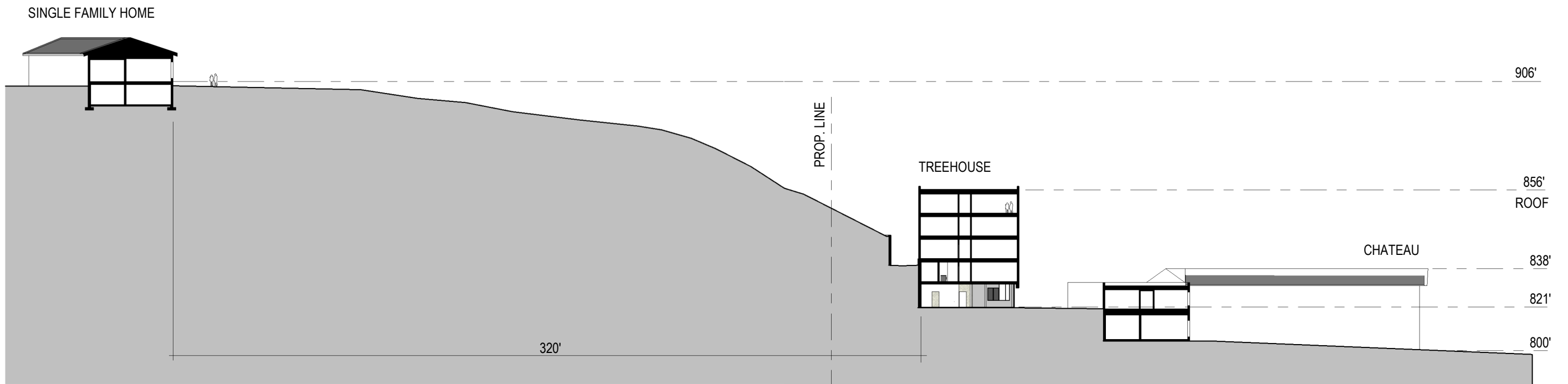
TOTAL AREA OF WEST FACADE = 5,432 SF
TOTAL AREA OF WINDOWS/ DOORS = 860 SF
PERCENTAGE OF OPENINGS = 15%
REQUIRED BY ZONING = 10%

2 SCHEMATIC ELEVATION - NORTH
1/8" = 1'-0"



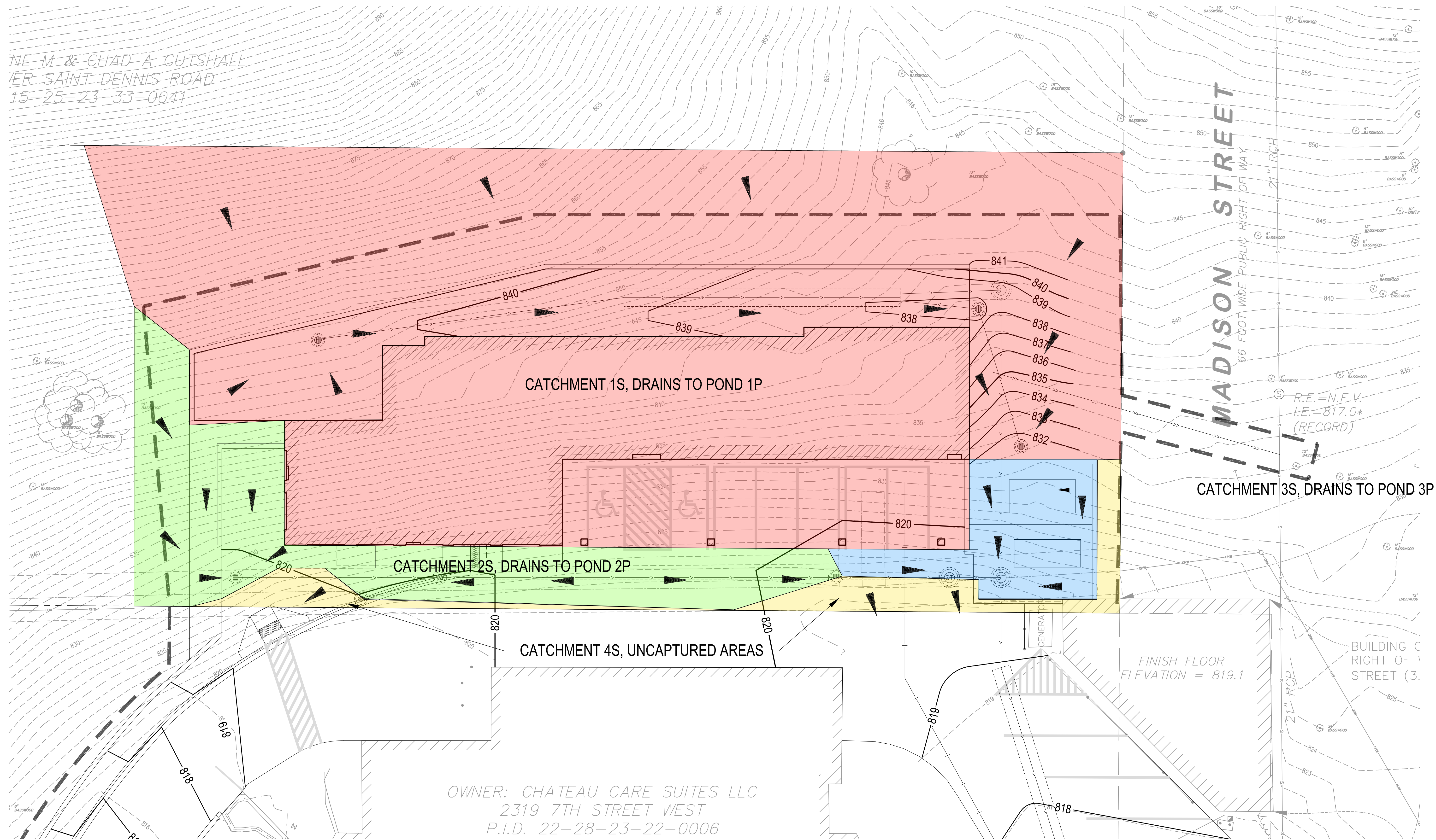
TOTAL AREA OF WEST FACADE = 8,985 SF
TOTAL AREA OF WINDOWS/ DOORS = 2,218 SF
PERCENTAGE OF OPENINGS = 25%
REQUIRED BY ZONING = 15%

1 SCHEMATIC ELEVATION - SOUTH
1/8" = 1'-0"

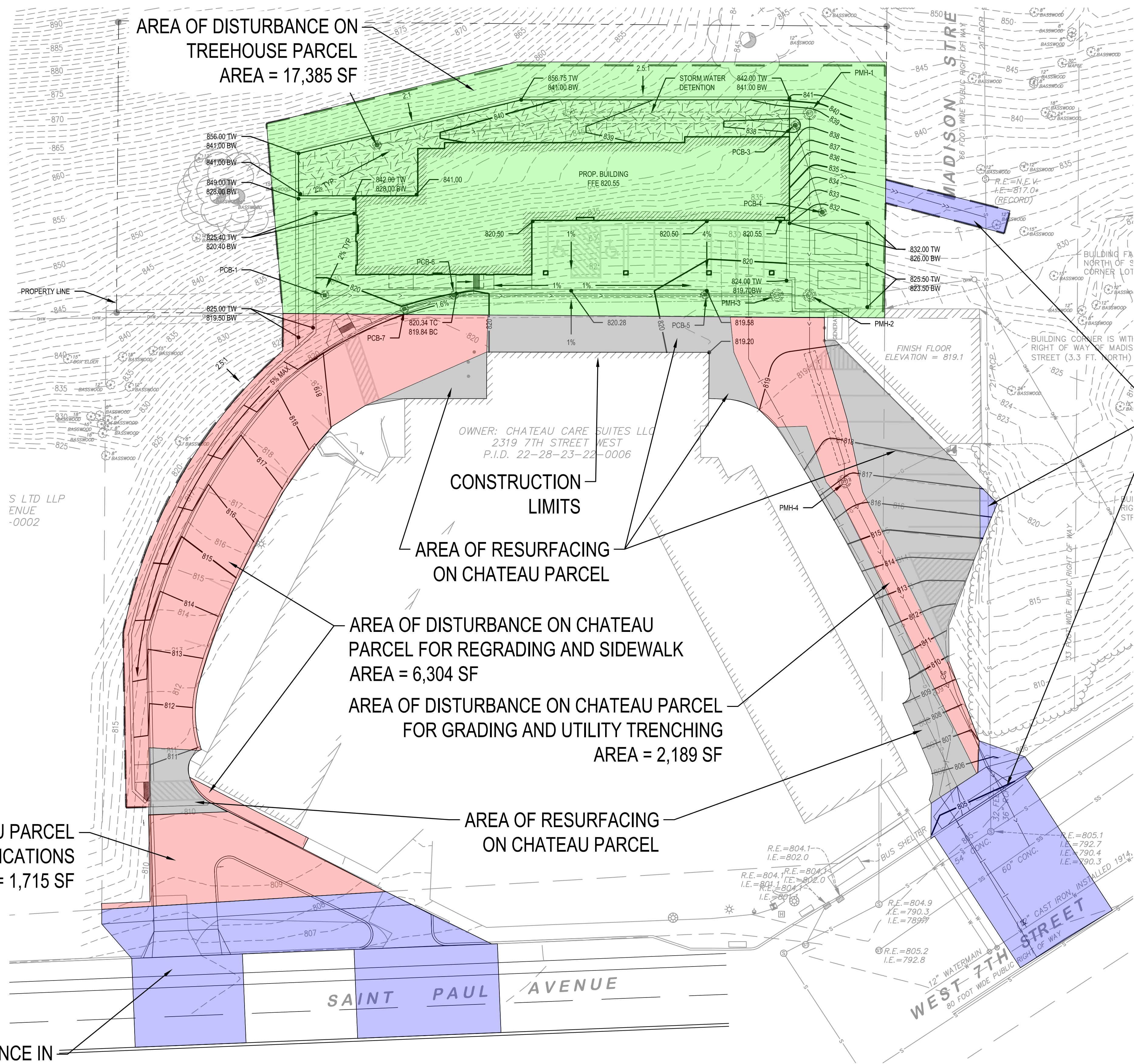


Treehouse
Context Section

NE M & CHAD A CUTSHALL
PER SAINT DENNIS ROAD
15-25-23-33-0041



TREEHOUSE - PROPOSED DRAINAGE AREAS EXHIBIT



AREA OF DISTURBANCE ON TREEHOUSE PARCEL
AREA = 17,385 SF

AREA OF DISTURBANCE IN RIGHT OF WAY
AREA = 2,862 SF

OWNER: CHATEAU CARE SUITES LLC
2319 7TH STREET WEST
P.I.D. 22-28-23-22-0006

CONSTRUCTION LIMITS

AREA OF RESURFACING ON CHATEAU PARCEL

AREA OF DISTURBANCE ON CHATEAU PARCEL FOR REGRADING AND SIDEWALK
AREA = 6,304 SF

AREA OF DISTURBANCE ON CHATEAU PARCEL FOR GRADING AND UTILITY TRENCHING
AREA = 2,189 SF

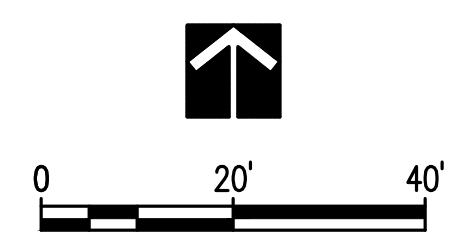
AREA OF RESURFACING ON CHATEAU PARCEL

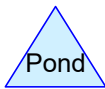
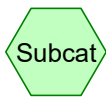
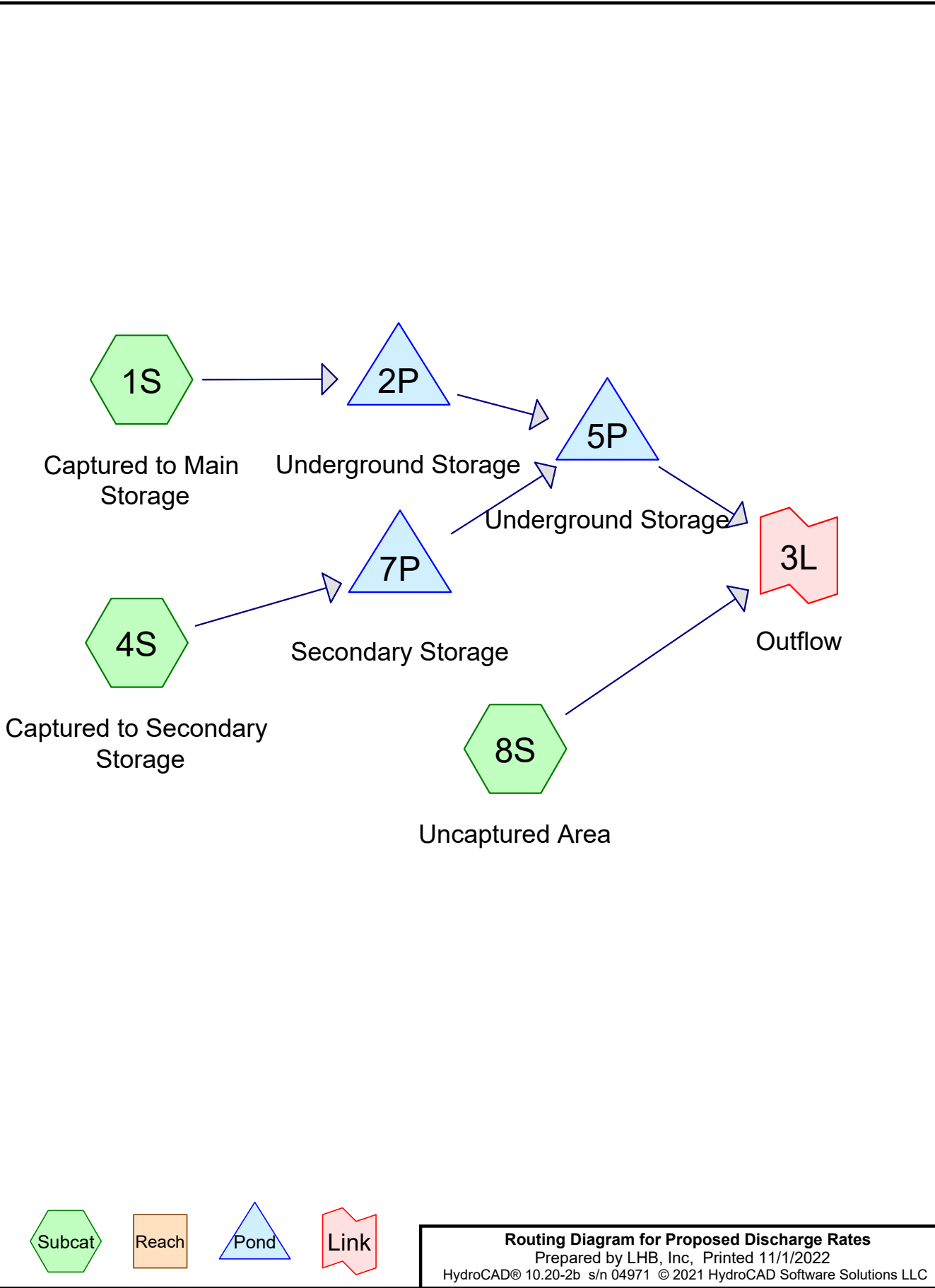
AREA OF DISTURBANCE ON CHATEAU PARCEL FOR DRIVEWAY MODIFICATIONS
AREA = 1,715 SF

AREA OF DISTURBANCE IN RIGHT OF WAY FOR DRIVEWAY MODIFICATIONS
AREA = 4,734 SF

CHATEAU PARCEL TOTAL DISTURBED AREA = 10,208 SF (EXCLUDES MILL AND OVERLAY AREAS)
1/4 ACRE THRESHOLD FOR STORMWATER RATE CONTROL = 10,890 SF
CHATEAU PARCEL TOTAL RESURFACING AREA = 5,330 SF (MILL AND OVERLAY, NO GRADE CHANGE)
TREEHOUSE PARCEL TOTAL DISTURBED AREA = 17,385 SF
RIGHT OF WAY TOTAL DISTURBED AREA = 7,596 SF
TOTAL CONSTRUCTION LIMITS AREA = 40,519 SF
1 ACRE THRESHOLD FOR CAPITOL REGION WATERSHED DISTRICT PERMIT = 43,560 SF

DISTURBANCE AREAS EXHIBIT





Routing Diagram for Proposed Discharge Rates
 Prepared by LHB, Inc, Printed 11/1/2022
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Proposed Discharge Rates

Prepared by LHB, Inc

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Printed 11/1/2022

Page 2

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YR	Type II 24-hr		Default	24.00	1	2.79	2
2	10-YR	Type II 24-hr		Default	24.00	1	4.13	2
3	100-YR	Type II 24-hr		Default	24.00	1	6.68	2
4	City 100-YR	Type II 24-hr		Default	24.00	1	5.90	2

Proposed Discharge Rates

Prepared by LHB, Inc

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Page 3

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.286	39	>75% Grass cover, Good, HSG A (1S, 4S, 8S)
0.150	98	Impervious (1S)
0.053	98	Paved parking, HSG A (4S, 8S)
0.489	63	TOTAL AREA

Proposed Discharge Rates

Prepared by LHB, Inc

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Page 4

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.339	HSG A	1S, 4S, 8S
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.150	Other	1S
0.489		TOTAL AREA

Proposed Discharge Rates

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Page 5

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.286	0.000	0.000	0.000	0.000	0.286	>75% Grass cover, Good	1S, 4S, 8S
0.000	0.000	0.000	0.000	0.150	0.150	Impervious	1S
0.053	0.000	0.000	0.000	0.000	0.053	Paved parking	4S, 8S
0.339	0.000	0.000	0.000	0.150	0.489	TOTAL AREA	

Proposed Discharge Rates

Prepared by LHB, Inc

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Type II 24-hr 2-YR Rainfall=2.79"

Printed 11/1/2022

Page 6

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment1S: Captured to Main Runoff Area=16,999 sf 38.41% Impervious Runoff Depth=0.32"
Tc=5.0 min CN=62 Runoff=0.17 cfs 0.010 af

Subcatchment4S: Captured to Secondary Runoff Area=2,752 sf 54.98% Impervious Runoff Depth=0.64"
Tc=5.0 min CN=71 Runoff=0.07 cfs 0.003 af

Subcatchment8S: Uncaptured Area Runoff Area=1,547 sf 51.26% Impervious Runoff Depth=0.56"
Tc=5.0 min CN=69 Runoff=0.03 cfs 0.002 af

Pond 2P: Underground Storage Peak Elev=824.28' Storage=23 cf Inflow=0.17 cfs 0.010 af
Outflow=0.14 cfs 0.010 af

Pond 5P: Underground Storage Peak Elev=810.35' Storage=21 cf Inflow=0.20 cfs 0.014 af
Outflow=0.18 cfs 0.014 af

Pond 7P: Secondary Storage Peak Elev=814.18' Storage=1 cf Inflow=0.07 cfs 0.003 af
Outflow=0.07 cfs 0.003 af

Link 3L: Outflow Inflow=0.20 cfs 0.015 af
Primary=0.20 cfs 0.015 af

Total Runoff Area = 0.489 ac Runoff Volume = 0.015 af Average Runoff Depth = 0.38"
58.51% Pervious = 0.286 ac 41.49% Impervious = 0.203 ac

Proposed Discharge Rates

Prepared by LHB, Inc

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Type II 24-hr 2-YR Rainfall=2.79"

Printed 11/1/2022

Page 7

Summary for Subcatchment 1S: Captured to Main Storage

Runoff = 0.17 cfs @ 11.99 hrs, Volume= 0.010 af, Depth= 0.32"

Routed to Pond 2P : Underground Storage

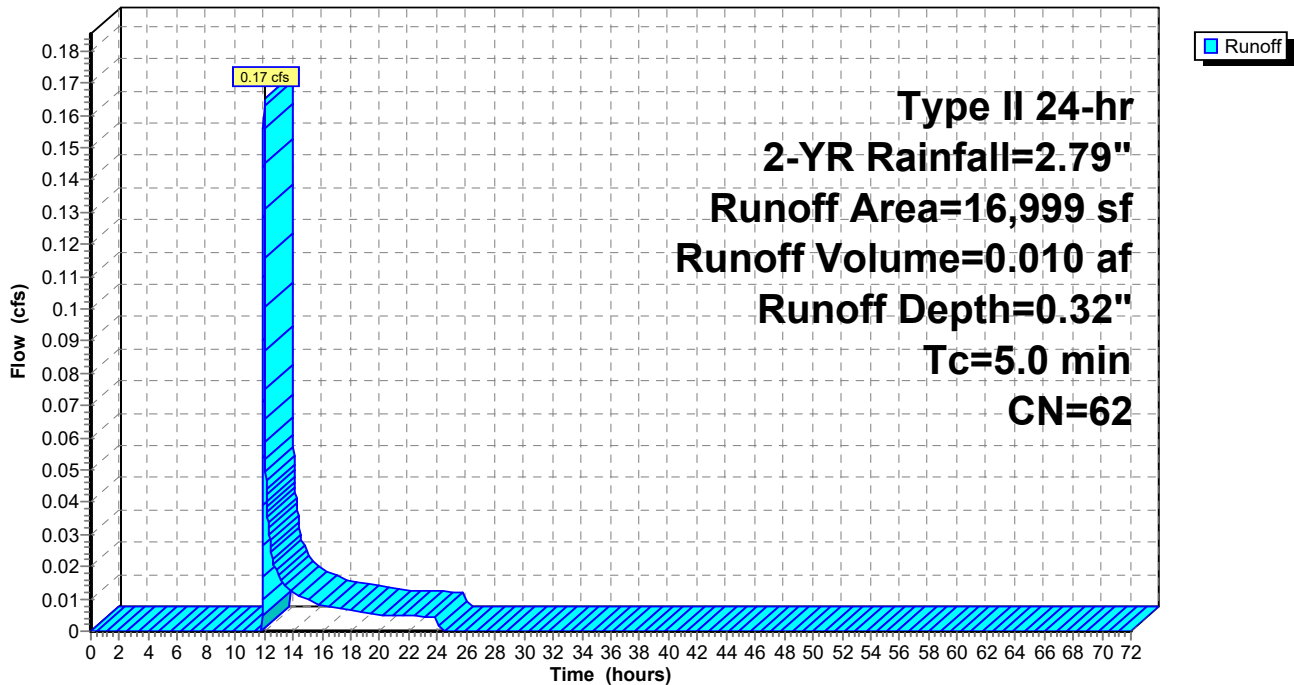
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-YR Rainfall=2.79"

	Area (sf)	CN	Description
*	6,530	98	Impervious
	10,469	39	>75% Grass cover, Good, HSG A
	16,999	62	Weighted Average
	10,469		61.59% Pervious Area
	6,530		38.41% Impervious Area

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

Subcatchment 1S: Captured to Main Storage

Hydrograph



Proposed Discharge Rates

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Type II 24-hr 2-YR Rainfall=2.79"

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Summary for Subcatchment 4S: Captured to Secondary Storage

Runoff = 0.07 cfs @ 11.97 hrs, Volume= 0.003 af, Depth= 0.64"

Routed to Pond 7P : Secondary Storage

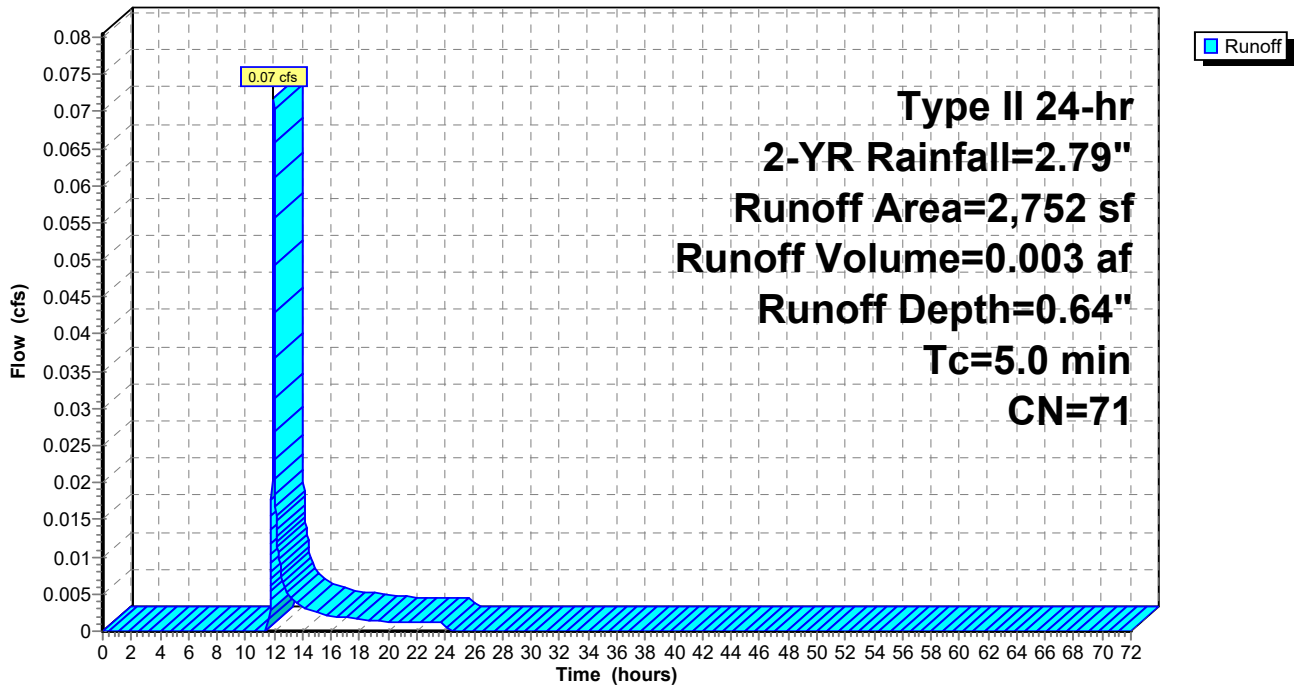
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type II 24-hr 2-YR Rainfall=2.79"

Area (sf)	CN	Description
1,239	39	>75% Grass cover, Good, HSG A
1,513	98	Paved parking, HSG A
2,752	71	Weighted Average
1,239		45.02% Pervious Area
1,513		54.98% Impervious Area

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

Subcatchment 4S: Captured to Secondary Storage

Hydrograph



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Type II 24-hr 2-YR Rainfall=2.79"

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Summary for Subcatchment 8S: Uncaptured Area

Runoff = 0.03 cfs @ 11.98 hrs, Volume= 0.002 af, Depth= 0.56"
 Routed to Link 3L : Outflow

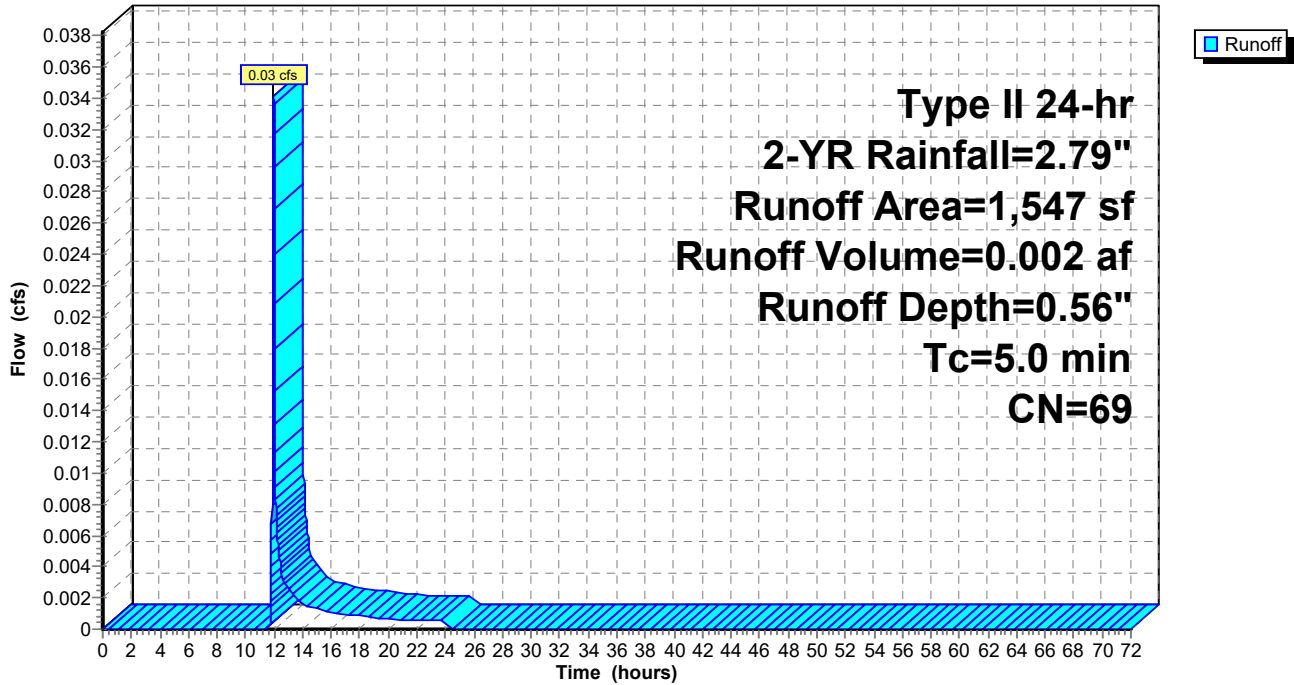
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type II 24-hr 2-YR Rainfall=2.79"

Area (sf)	CN	Description
793	98	Paved parking, HSG A
754	39	>75% Grass cover, Good, HSG A
1,547	69	Weighted Average
754		48.74% Pervious Area
793		51.26% Impervious Area

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

Subcatchment 8S: Uncaptured Area

Hydrograph



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Type II 24-hr 2-YR Rainfall=2.79"

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Summary for Pond 2P: Underground Storage

Inflow Area = 0.390 ac, 38.41% Impervious, Inflow Depth = 0.32" for 2-YR event
 Inflow = 0.17 cfs @ 11.99 hrs, Volume= 0.010 af
 Outflow = 0.14 cfs @ 12.03 hrs, Volume= 0.010 af, Atten= 17%, Lag= 2.1 min
 Primary = 0.14 cfs @ 12.03 hrs, Volume= 0.010 af
 Routed to Pond 5P : Underground Storage

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 6
 Peak Elev= 824.28' @ 12.03 hrs Surf.Area= 122 sf Storage= 23 cf

Plug-Flow detention time= 4.0 min calculated for 0.010 af (100% of inflow)
 Center-of-Mass det. time= 4.0 min (930.5 - 926.5)

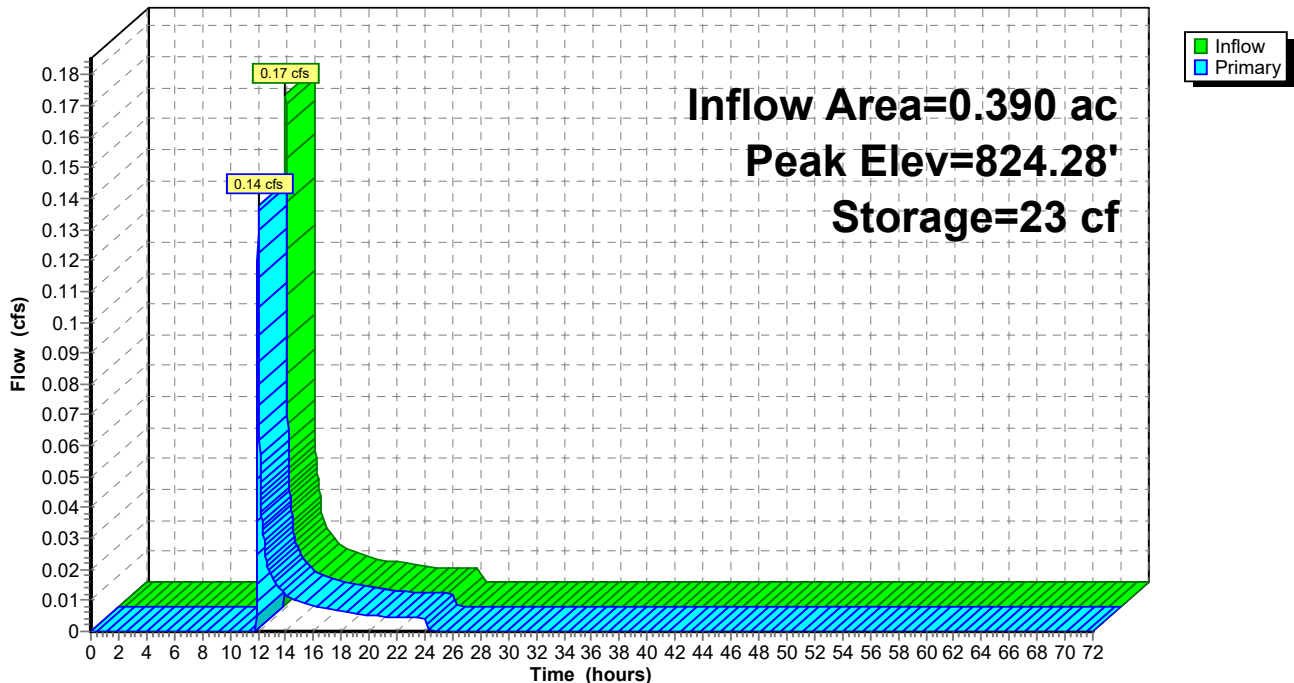
Volume	Invert	Avail.Storage	Storage Description
#1	824.00'	754 cf	48.0" Round Pipe Storage 48" x 60" L= 60.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	824.00'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.14 cfs @ 12.03 hrs HW=824.28' (Free Discharge)
 ←1=Orifice/Grate (Orifice Controls 0.14 cfs @ 1.79 fps)

Pond 2P: Underground Storage

Hydrograph



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Type II 24-hr 2-YR Rainfall=2.79"

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Summary for Pond 5P: Underground Storage

Inflow Area = 0.453 ac, 40.72% Impervious, Inflow Depth = 0.36" for 2-YR event
 Inflow = 0.20 cfs @ 12.01 hrs, Volume= 0.014 af
 Outflow = 0.18 cfs @ 12.04 hrs, Volume= 0.014 af, Atten= 11%, Lag= 2.0 min
 Primary = 0.18 cfs @ 12.04 hrs, Volume= 0.014 af
 Routed to Link 3L : Outflow

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 6
 Peak Elev= 810.35' @ 12.04 hrs Surf.Area= 90 sf Storage= 21 cf

Plug-Flow detention time= 2.5 min calculated for 0.014 af (100% of inflow)
 Center-of-Mass det. time= 2.5 min (920.3 - 917.8)

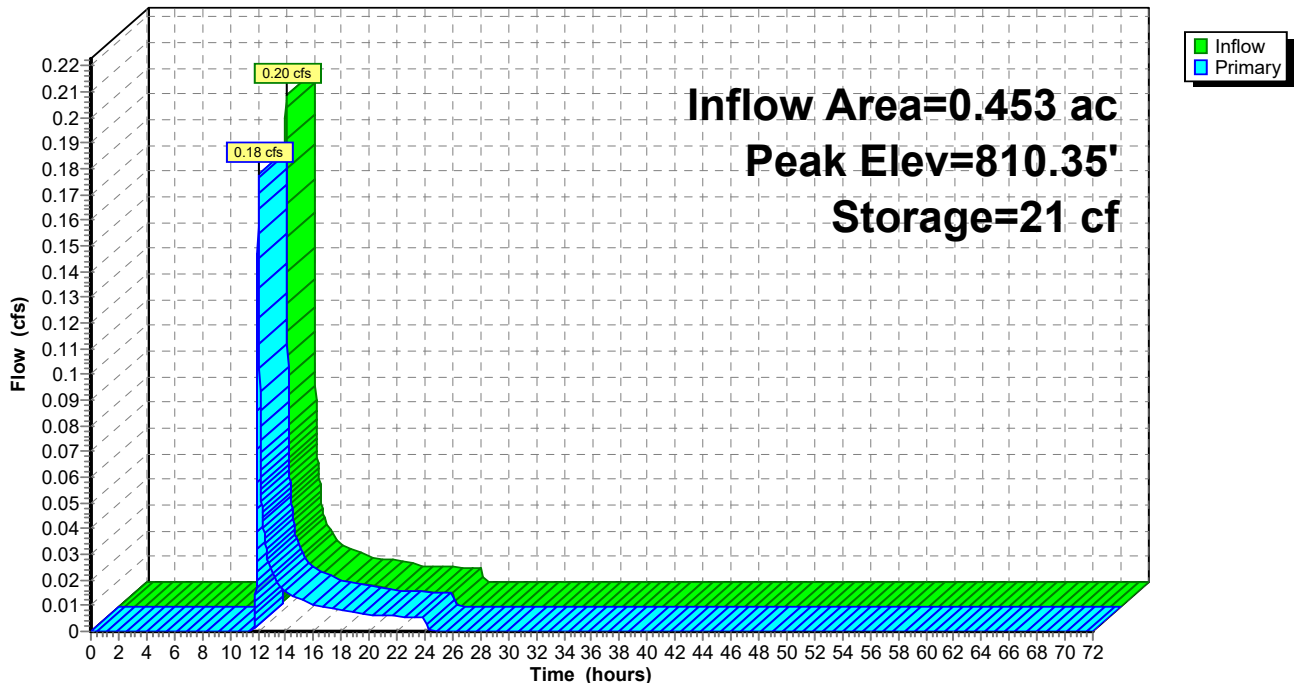
Volume	Invert	Avail.Storage	Storage Description
#1	810.00'	503 cf	48.0" Round Pipe Storage 48" x 40' L= 40.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	810.00'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.18 cfs @ 12.04 hrs HW=810.35' (Free Discharge)
 ←1=Orifice/Grate (Orifice Controls 0.18 cfs @ 2.03 fps)

Pond 5P: Underground Storage

Hydrograph



Proposed Discharge Rates

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Type II 24-hr 2-YR Rainfall=2.79"

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Summary for Pond 7P: Secondary Storage

Inflow Area = 0.063 ac, 54.98% Impervious, Inflow Depth = 0.64" for 2-YR event
 Inflow = 0.07 cfs @ 11.97 hrs, Volume= 0.003 af
 Outflow = 0.07 cfs @ 11.98 hrs, Volume= 0.003 af, Atten= 1%, Lag= 0.5 min
 Primary = 0.07 cfs @ 11.98 hrs, Volume= 0.003 af
 Routed to Pond 5P : Underground Storage

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 814.18' @ 11.98 hrs Surf.Area= 20 sf Storage= 1 cf

Plug-Flow detention time= 0.2 min calculated for 0.003 af (100% of inflow)
 Center-of-Mass det. time= 0.2 min (879.1 - 878.9)

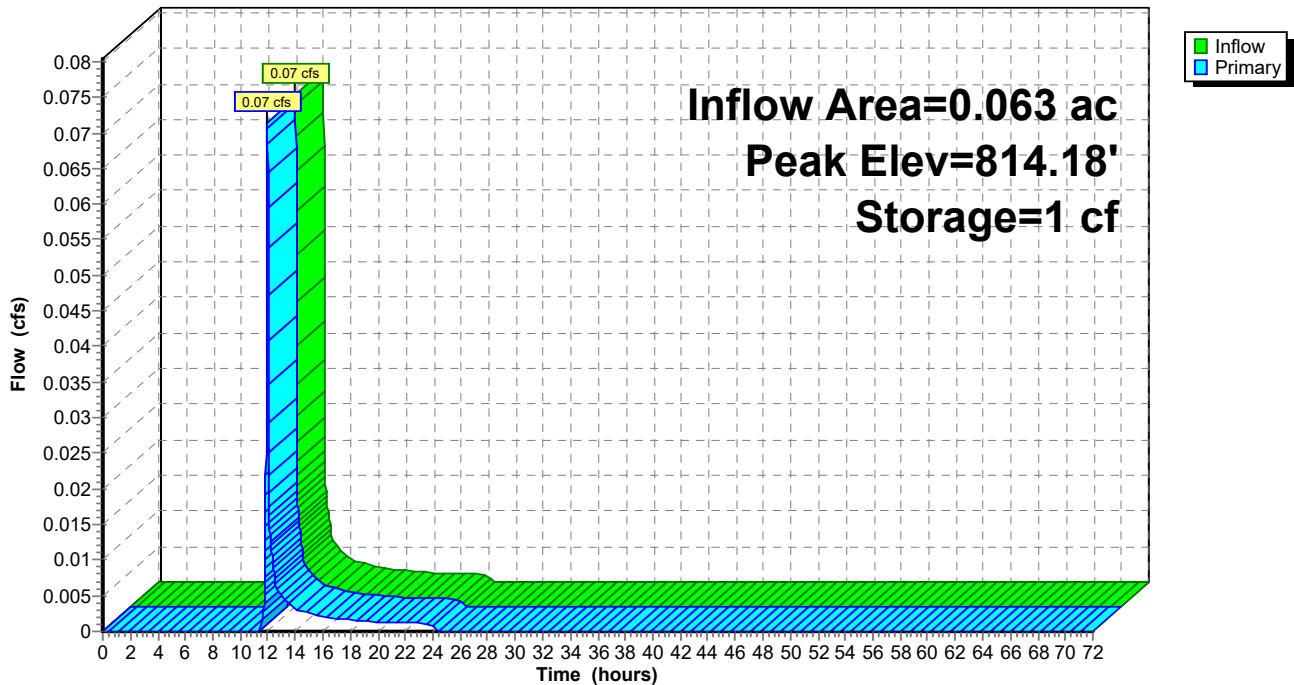
Volume	Invert	Avail.Storage	Storage Description
#1	814.00'	118 cf	12.0" Round Pipe Storage L= 150.0' S= 0.0050 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	814.00'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.07 cfs @ 11.98 hrs HW=814.18' (Free Discharge)
 ←1=Orifice/Grate (Orifice Controls 0.07 cfs @ 1.45 fps)

Pond 7P: Secondary Storage

Hydrograph



Proposed Discharge Rates

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Type II 24-hr 2-YR Rainfall=2.79"

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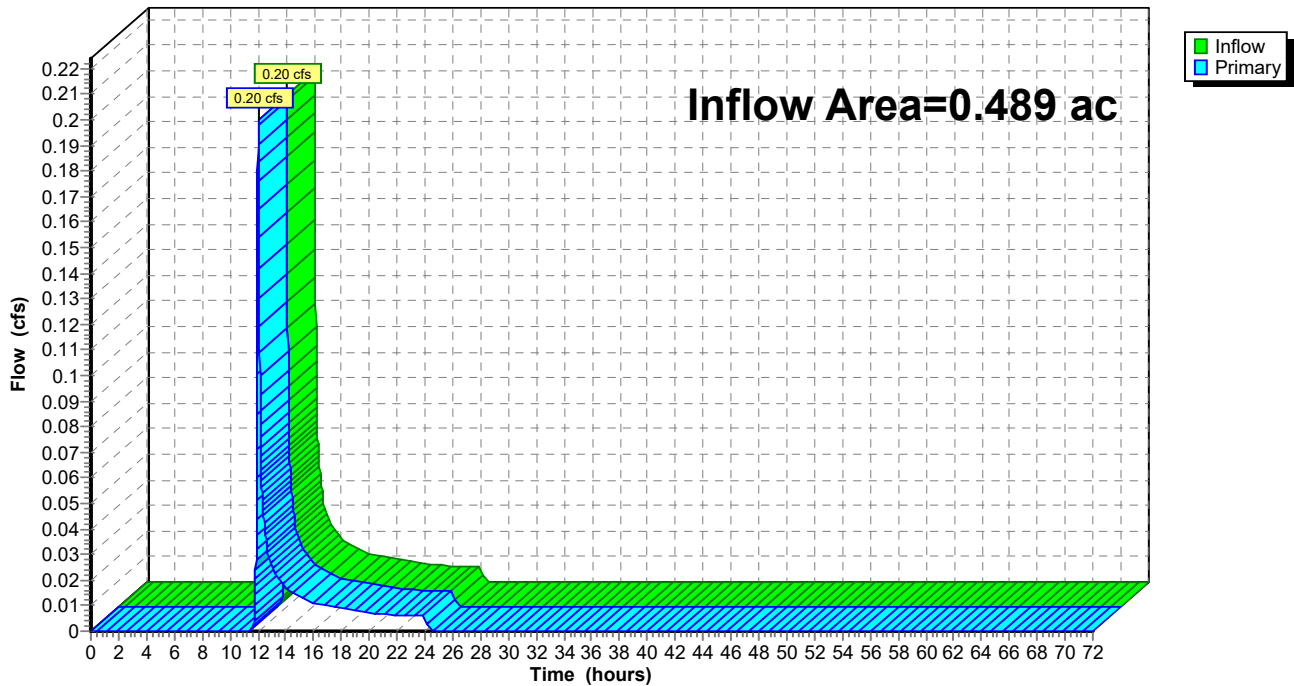
Summary for Link 3L: Outflow

Inflow Area = 0.489 ac, 41.49% Impervious, Inflow Depth = 0.38" for 2-YR event
Inflow = 0.20 cfs @ 12.03 hrs, Volume= 0.015 af
Primary = 0.20 cfs @ 12.03 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 3L: Outflow

Hydrograph



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Type II 24-hr 10-YR Rainfall=4.13"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment1S: Captured to Main Runoff Area=16,999 sf 38.41% Impervious Runoff Depth=0.93"
Tc=5.0 min CN=62 Runoff=0.64 cfs 0.030 af

Subcatchment4S: Captured to Secondary Runoff Area=2,752 sf 54.98% Impervious Runoff Depth=1.48"
Tc=5.0 min CN=71 Runoff=0.17 cfs 0.008 af

Subcatchment8S: Uncaptured Area Runoff Area=1,547 sf 51.26% Impervious Runoff Depth=1.35"
Tc=5.0 min CN=69 Runoff=0.09 cfs 0.004 af

Pond 2P: Underground Storage Peak Elev=825.02' Storage=152 cf Inflow=0.64 cfs 0.030 af
Outflow=0.39 cfs 0.030 af

Pond 5P: Underground Storage Peak Elev=811.13' Storage=116 cf Inflow=0.54 cfs 0.038 af
Outflow=0.41 cfs 0.038 af

Pond 7P: Secondary Storage Peak Elev=814.33' Storage=6 cf Inflow=0.17 cfs 0.008 af
Outflow=0.17 cfs 0.008 af

Link 3L: Outflow Inflow=0.45 cfs 0.042 af
Primary=0.45 cfs 0.042 af

Total Runoff Area = 0.489 ac Runoff Volume = 0.042 af Average Runoff Depth = 1.04"
58.51% Pervious = 0.286 ac 41.49% Impervious = 0.203 ac

Proposed Discharge Rates

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Type II 24-hr 10-YR Rainfall=4.13"

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Summary for Subcatchment 1S: Captured to Main Storage

Runoff = 0.64 cfs @ 11.97 hrs, Volume= 0.030 af, Depth= 0.93"

Routed to Pond 2P : Underground Storage

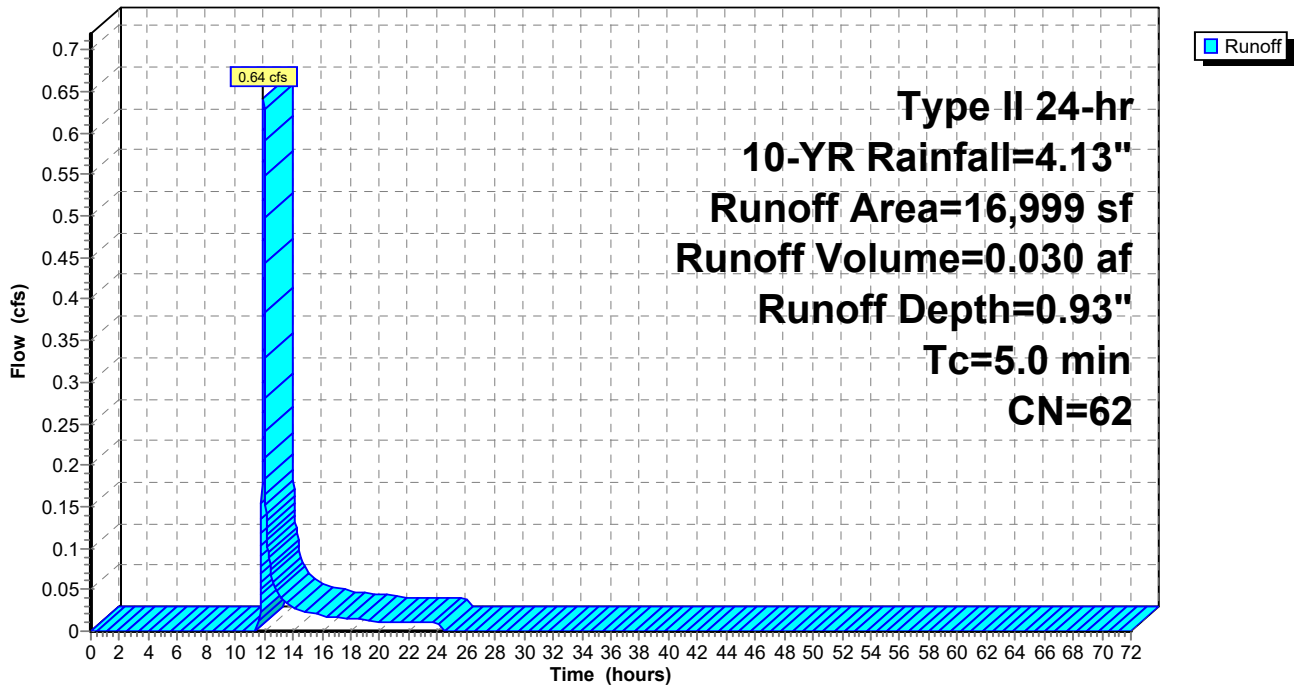
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-YR Rainfall=4.13"

	Area (sf)	CN	Description
*	6,530	98	Impervious
	10,469	39	>75% Grass cover, Good, HSG A
	16,999	62	Weighted Average
	10,469		61.59% Pervious Area
	6,530		38.41% Impervious Area

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

Subcatchment 1S: Captured to Main Storage

Hydrograph



Proposed Discharge Rates

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Type II 24-hr 10-YR Rainfall=4.13"

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Summary for Subcatchment 4S: Captured to Secondary Storage

Runoff = 0.17 cfs @ 11.97 hrs, Volume= 0.008 af, Depth= 1.48"

Routed to Pond 7P : Secondary Storage

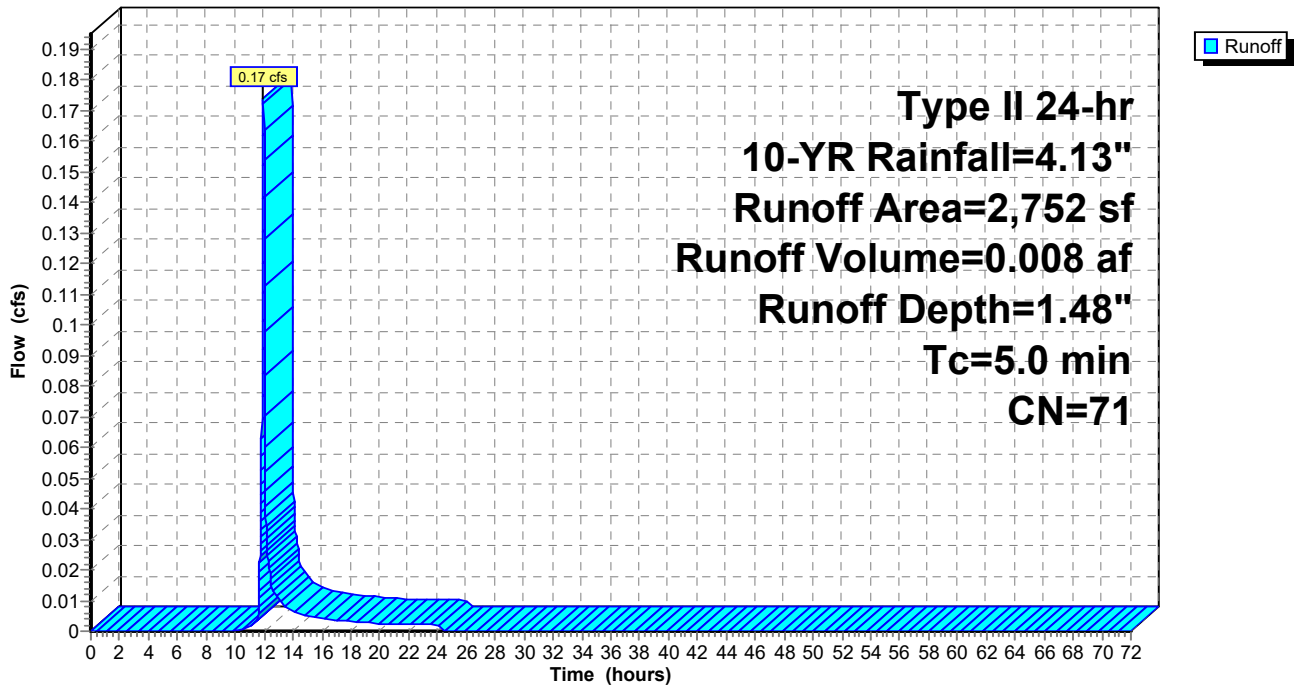
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10-YR Rainfall=4.13"

Area (sf)	CN	Description
1,239	39	>75% Grass cover, Good, HSG A
1,513	98	Paved parking, HSG A
2,752	71	Weighted Average
1,239		45.02% Pervious Area
1,513		54.98% Impervious Area

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

Subcatchment 4S: Captured to Secondary Storage

Hydrograph



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Type II 24-hr 10-YR Rainfall=4.13"

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Summary for Subcatchment 8S: Uncaptured Area

Runoff = 0.09 cfs @ 11.97 hrs, Volume= 0.004 af, Depth= 1.35"
 Routed to Link 3L : Outflow

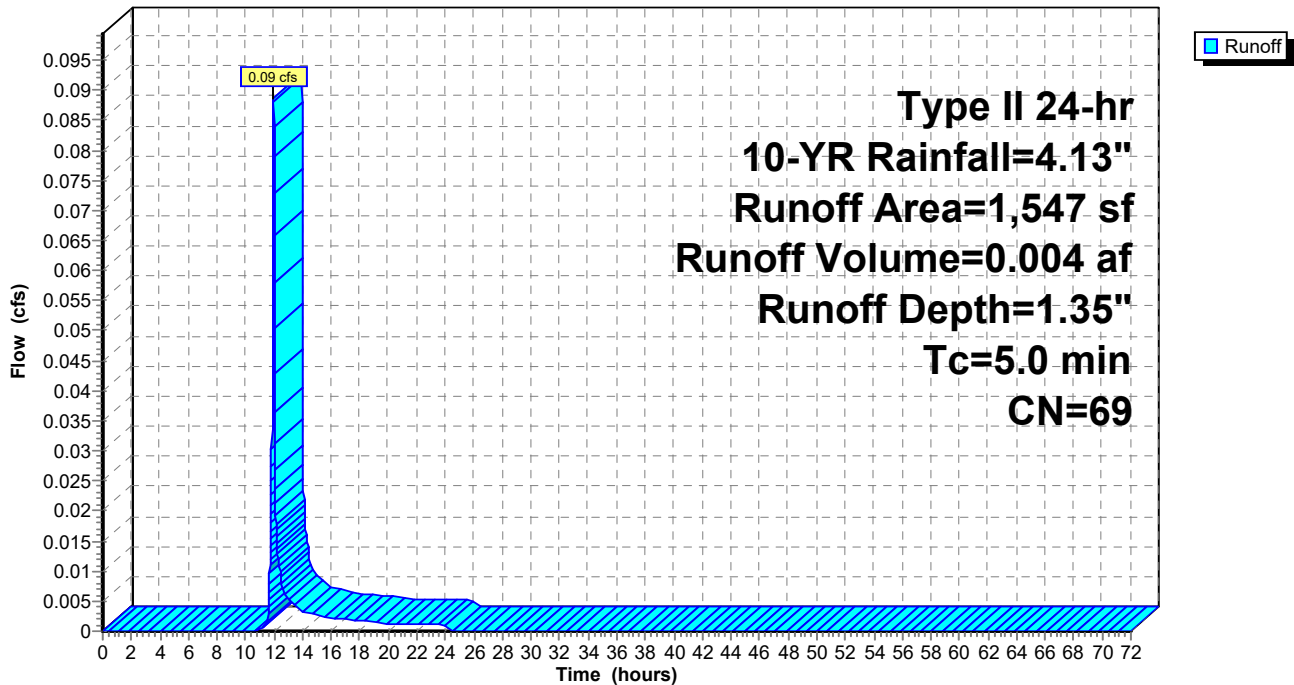
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type II 24-hr 10-YR Rainfall=4.13"

Area (sf)	CN	Description
793	98	Paved parking, HSG A
754	39	>75% Grass cover, Good, HSG A
1,547	69	Weighted Average
754		48.74% Pervious Area
793		51.26% Impervious Area

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

Subcatchment 8S: Uncaptured Area

Hydrograph



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Type II 24-hr 10-YR Rainfall=4.13"

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Summary for Pond 2P: Underground Storage

Inflow Area = 0.390 ac, 38.41% Impervious, Inflow Depth = 0.93" for 10-YR event
 Inflow = 0.64 cfs @ 11.97 hrs, Volume= 0.030 af
 Outflow = 0.39 cfs @ 12.04 hrs, Volume= 0.030 af, Atten= 39%, Lag= 4.0 min
 Primary = 0.39 cfs @ 12.04 hrs, Volume= 0.030 af
 Routed to Pond 5P : Underground Storage

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 6
 Peak Elev= 825.02' @ 12.04 hrs Surf.Area= 209 sf Storage= 152 cf

Plug-Flow detention time= 4.0 min calculated for 0.030 af (100% of inflow)
 Center-of-Mass det. time= 4.0 min (884.1 - 880.1)

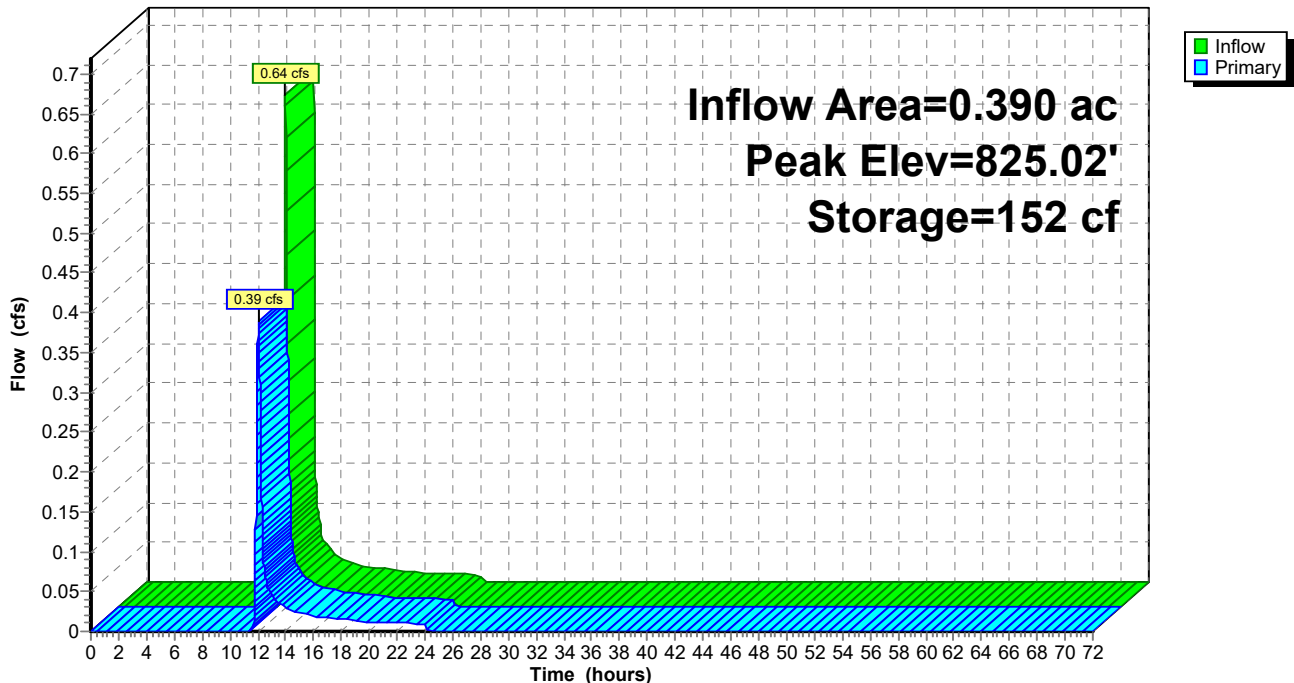
Volume	Invert	Avail.Storage	Storage Description
#1	824.00'	754 cf	48.0" Round Pipe Storage 48" x 60" L= 60.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	824.00'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.39 cfs @ 12.04 hrs HW=825.02' (Free Discharge)
 ←1=Orifice/Grate (Orifice Controls 0.39 cfs @ 4.46 fps)

Pond 2P: Underground Storage

Hydrograph



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Summary for Pond 5P: Underground Storage

Inflow Area = 0.453 ac, 40.72% Impervious, Inflow Depth = 1.01" for 10-YR event
 Inflow = 0.54 cfs @ 12.01 hrs, Volume= 0.038 af
 Outflow = 0.41 cfs @ 12.09 hrs, Volume= 0.038 af, Atten= 23%, Lag= 5.2 min
 Primary = 0.41 cfs @ 12.09 hrs, Volume= 0.038 af
 Routed to Link 3L : Outflow

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 6
 Peak Elev= 811.13' @ 12.09 hrs Surf.Area= 144 sf Storage= 116 cf

Plug-Flow detention time= 2.8 min calculated for 0.038 af (100% of inflow)
 Center-of-Mass det. time= 2.8 min (880.3 - 877.5)

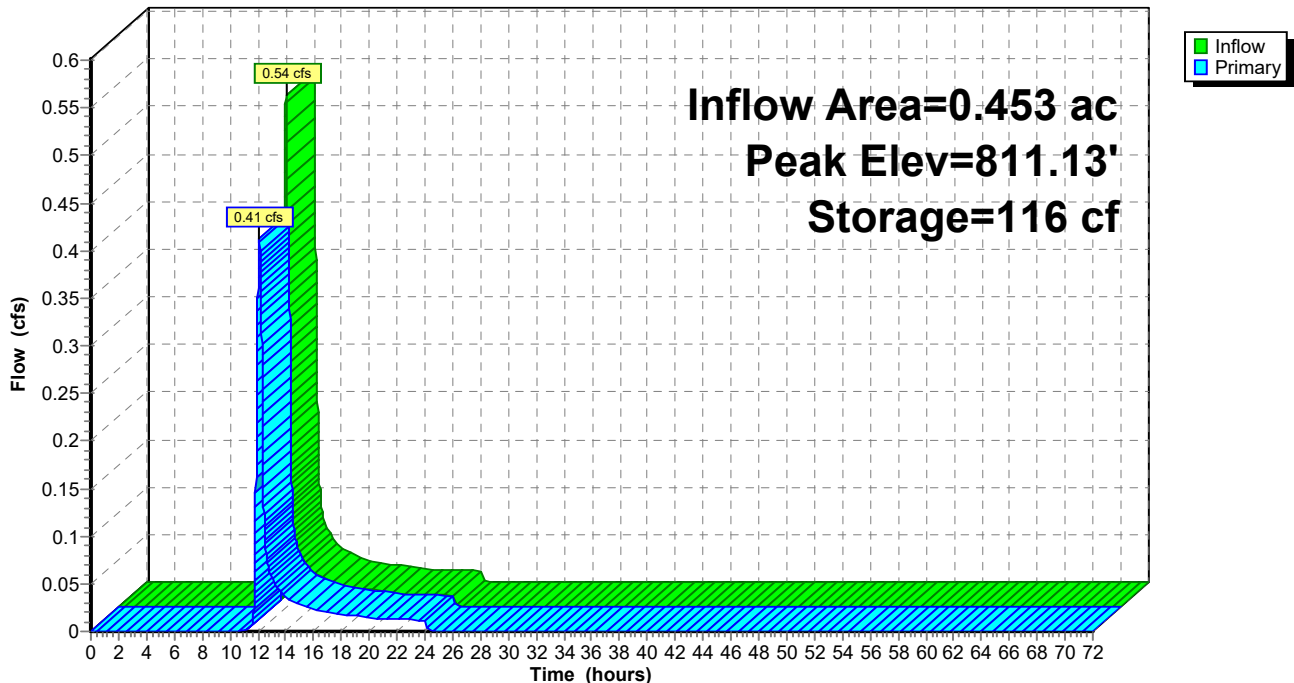
Volume	Invert	Avail.Storage	Storage Description
#1	810.00'	503 cf	48.0" Round Pipe Storage 48" x 40" L= 40.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	810.00'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.41 cfs @ 12.09 hrs HW=811.13' (Free Discharge)
 ←1=Orifice/Grate (Orifice Controls 0.41 cfs @ 4.72 fps)

Pond 5P: Underground Storage

Hydrograph



Proposed Discharge Rates

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Type II 24-hr 10-YR Rainfall=4.13"

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Summary for Pond 7P: Secondary Storage

Inflow Area = 0.063 ac, 54.98% Impervious, Inflow Depth = 1.48" for 10-YR event
 Inflow = 0.17 cfs @ 11.97 hrs, Volume= 0.008 af
 Outflow = 0.17 cfs @ 11.98 hrs, Volume= 0.008 af, Atten= 3%, Lag= 1.0 min
 Primary = 0.17 cfs @ 11.98 hrs, Volume= 0.008 af
 Routed to Pond 5P : Underground Storage

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 814.33' @ 11.98 hrs Surf.Area= 44 sf Storage= 6 cf

Plug-Flow detention time= 0.3 min calculated for 0.008 af (100% of inflow)
 Center-of-Mass det. time= 0.3 min (851.7 - 851.4)

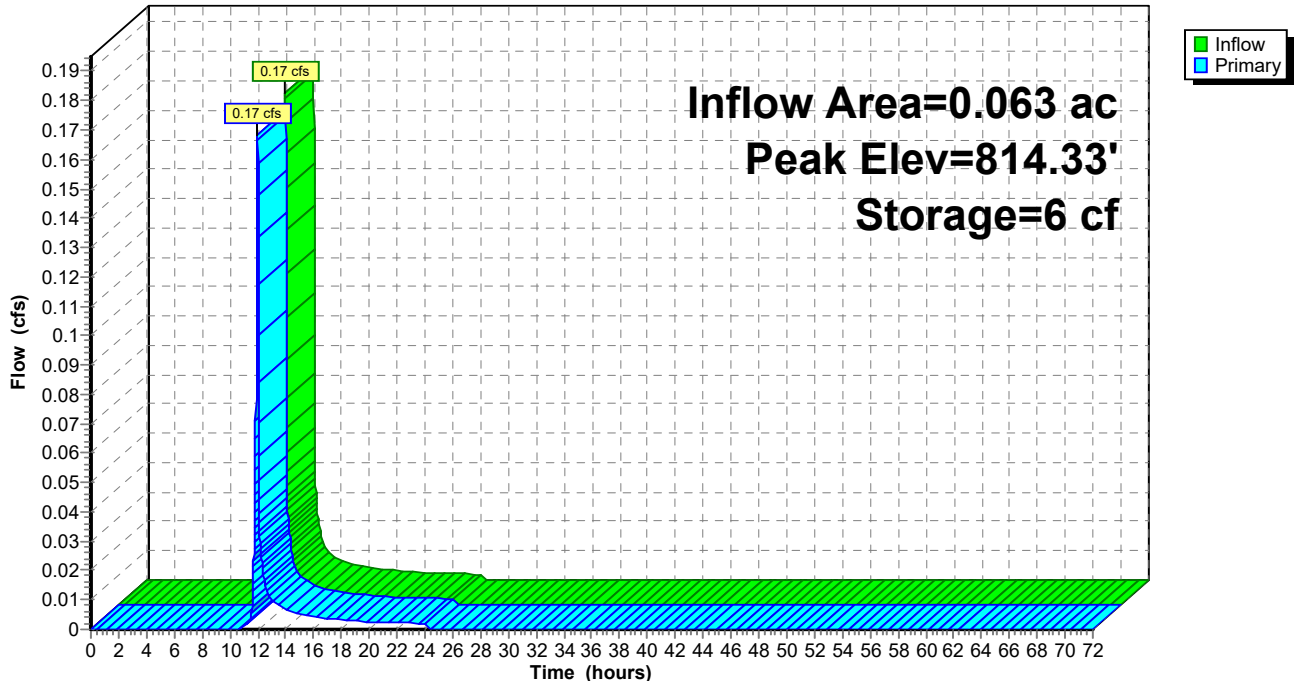
Volume	Invert	Avail.Storage	Storage Description
#1	814.00'	118 cf	12.0" Round Pipe Storage L= 150.0' S= 0.0050 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	814.00'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.17 cfs @ 11.98 hrs HW=814.33' (Free Discharge)
 ←1=Orifice/Grate (Orifice Controls 0.17 cfs @ 1.94 fps)

Pond 7P: Secondary Storage

Hydrograph



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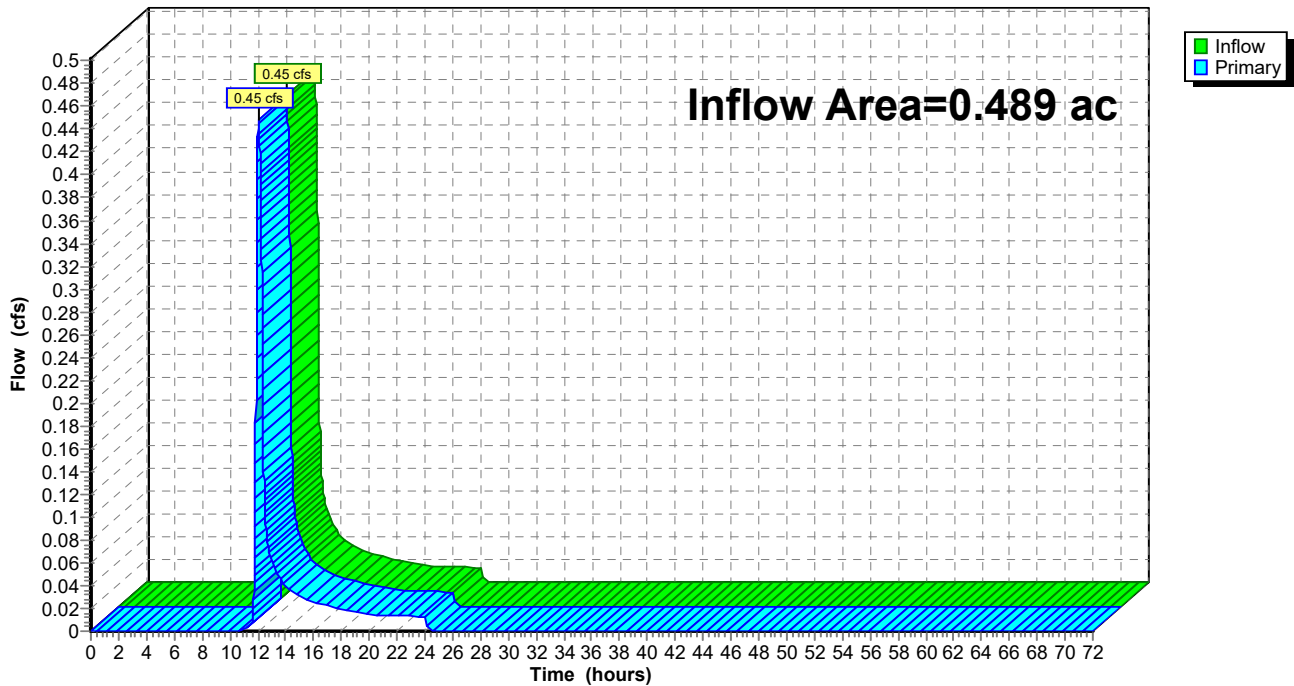
Summary for Link 3L: Outflow

Inflow Area = 0.489 ac, 41.49% Impervious, Inflow Depth = 1.04" for 10-YR event
Inflow = 0.45 cfs @ 12.03 hrs, Volume= 0.042 af
Primary = 0.45 cfs @ 12.03 hrs, Volume= 0.042 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 3L: Outflow

Hydrograph



Proposed Discharge Rates

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Type II 24-hr 100-YR Rainfall=6.68"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment1S: Captured to Main Runoff Area=16,999 sf 38.41% Impervious Runoff Depth=2.57"
Tc=5.0 min CN=62 Runoff=1.87 cfs 0.084 af

Subcatchment4S: Captured to Secondary Runoff Area=2,752 sf 54.98% Impervious Runoff Depth=3.46"
Tc=5.0 min CN=71 Runoff=0.40 cfs 0.018 af

Subcatchment8S: Uncaptured Area Runoff Area=1,547 sf 51.26% Impervious Runoff Depth=3.25"
Tc=5.0 min CN=69 Runoff=0.21 cfs 0.010 af

Pond 2P: Underground Storage Peak Elev=827.80' Storage=740 cf Inflow=1.87 cfs 0.084 af
Outflow=0.80 cfs 0.084 af

Pond 5P: Underground Storage Peak Elev=813.33' Storage=448 cf Inflow=1.11 cfs 0.102 af
Outflow=0.75 cfs 0.102 af

Pond 7P: Secondary Storage Peak Elev=814.77' Storage=45 cf Inflow=0.40 cfs 0.018 af
Outflow=0.33 cfs 0.018 af

Link 3L: Outflow Inflow=0.78 cfs 0.111 af
Primary=0.78 cfs 0.111 af

Total Runoff Area = 0.489 ac Runoff Volume = 0.111 af Average Runoff Depth = 2.73"
58.51% Pervious = 0.286 ac 41.49% Impervious = 0.203 ac

Proposed Discharge Rates

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Type II 24-hr 100-YR Rainfall=6.68"

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Summary for Subcatchment 1S: Captured to Main Storage

Runoff = 1.87 cfs @ 11.97 hrs, Volume= 0.084 af, Depth= 2.57"

Routed to Pond 2P : Underground Storage

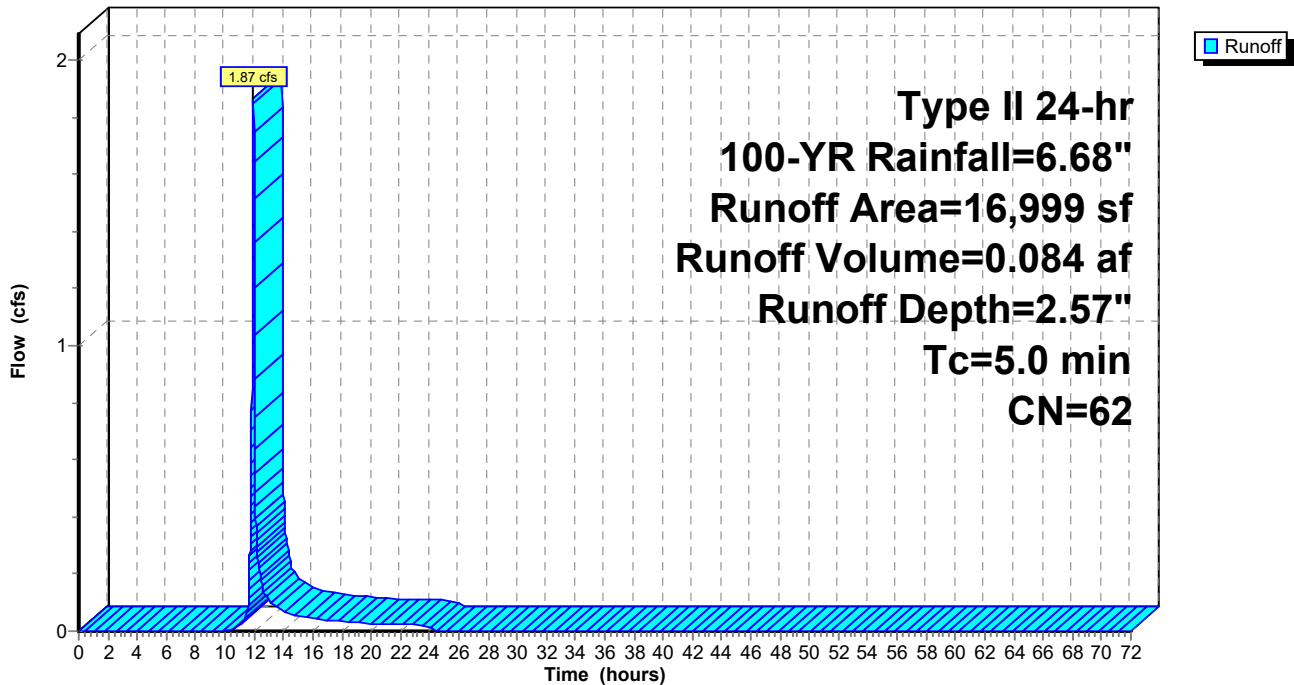
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100-YR Rainfall=6.68"

	Area (sf)	CN	Description
*	6,530	98	Impervious
	10,469	39	>75% Grass cover, Good, HSG A
	16,999	62	Weighted Average
	10,469		61.59% Pervious Area
	6,530		38.41% Impervious Area

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

Subcatchment 1S: Captured to Main Storage

Hydrograph



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Type II 24-hr 100-YR Rainfall=6.68"

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Summary for Subcatchment 4S: Captured to Secondary Storage

Runoff = 0.40 cfs @ 11.96 hrs, Volume= 0.018 af, Depth= 3.46"

Routed to Pond 7P : Secondary Storage

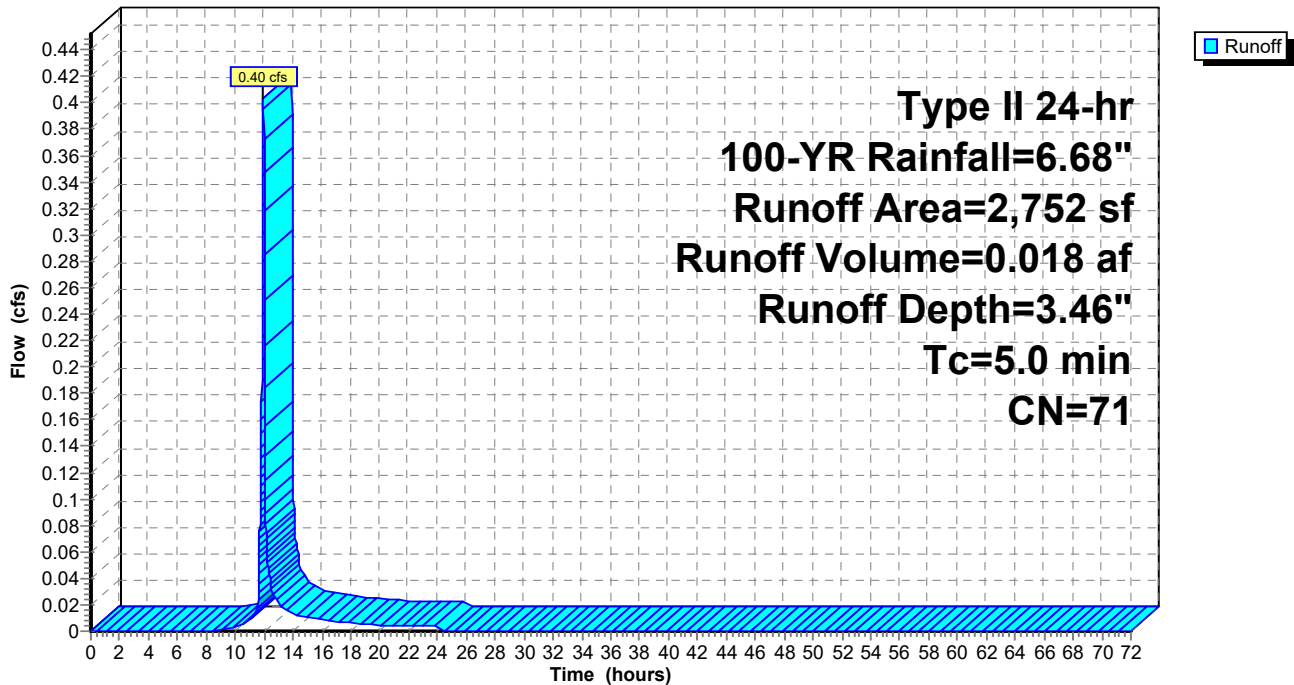
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-YR Rainfall=6.68"

Area (sf)	CN	Description
1,239	39	>75% Grass cover, Good, HSG A
1,513	98	Paved parking, HSG A
2,752	71	Weighted Average
1,239		45.02% Pervious Area
1,513		54.98% Impervious Area

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

Subcatchment 4S: Captured to Secondary Storage

Hydrograph



Proposed Discharge Rates

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Type II 24-hr 100-YR Rainfall=6.68"

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Summary for Subcatchment 8S: Uncaptured Area

Runoff = 0.21 cfs @ 11.96 hrs, Volume= 0.010 af, Depth= 3.25"
 Routed to Link 3L : Outflow

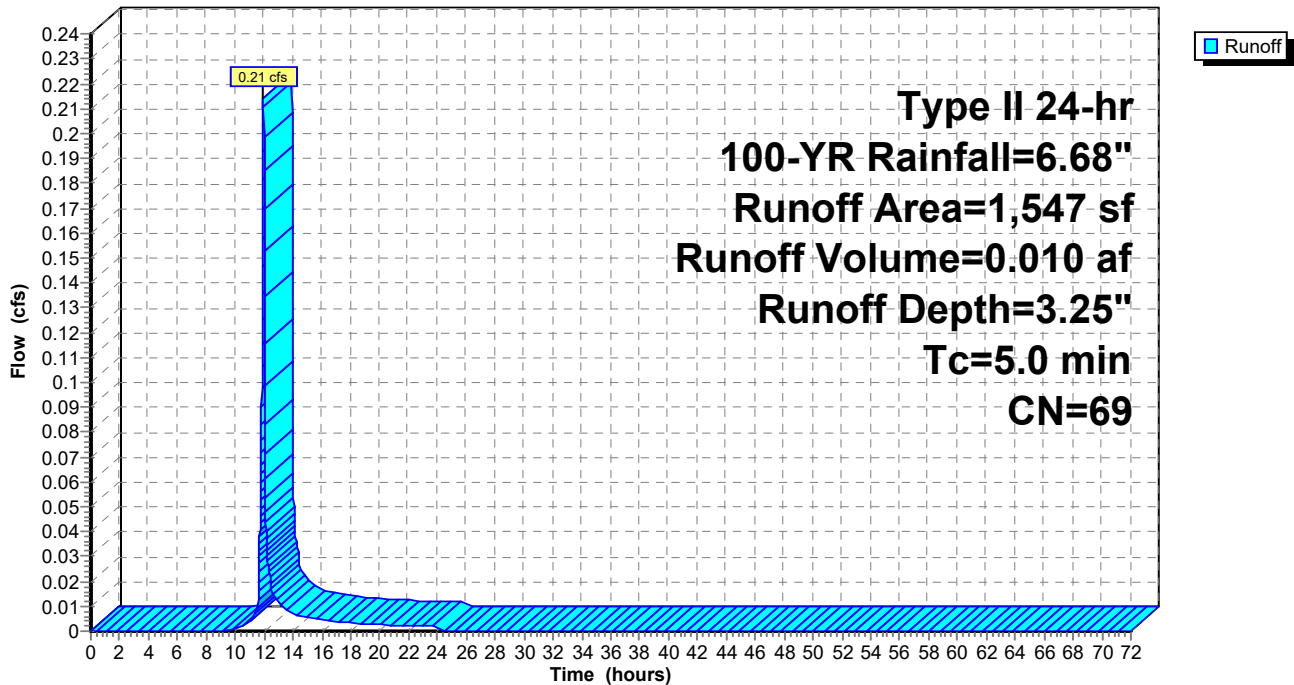
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100-YR Rainfall=6.68"

Area (sf)	CN	Description
793	98	Paved parking, HSG A
754	39	>75% Grass cover, Good, HSG A
1,547	69	Weighted Average
754		48.74% Pervious Area
793		51.26% Impervious Area

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

Subcatchment 8S: Uncaptured Area

Hydrograph



Proposed Discharge Rates

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Type II 24-hr 100-YR Rainfall=6.68"

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Summary for Pond 2P: Underground Storage

Inflow Area = 0.390 ac, 38.41% Impervious, Inflow Depth = 2.57" for 100-YR event
 Inflow = 1.87 cfs @ 11.97 hrs, Volume= 0.084 af
 Outflow = 0.80 cfs @ 12.06 hrs, Volume= 0.084 af, Atten= 57%, Lag= 5.4 min
 Primary = 0.80 cfs @ 12.06 hrs, Volume= 0.084 af
 Routed to Pond 5P : Underground Storage

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 6
 Peak Elev= 827.80' @ 12.06 hrs Surf.Area= 105 sf Storage= 740 cf

Plug-Flow detention time= 7.1 min calculated for 0.084 af (100% of inflow)
 Center-of-Mass det. time= 7.1 min (854.2 - 847.1)

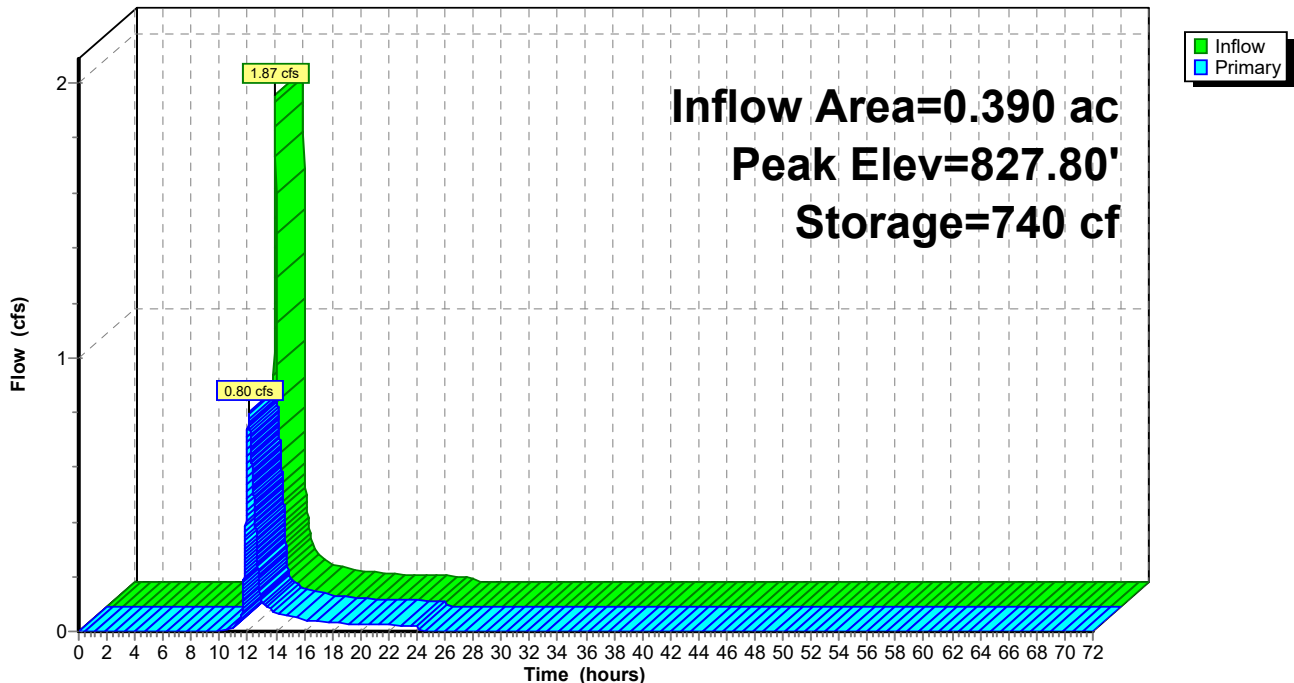
Volume	Invert	Avail.Storage	Storage Description
#1	824.00'	754 cf	48.0" Round Pipe Storage 48" x 60" L= 60.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	824.00'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.80 cfs @ 12.06 hrs HW=827.80' (Free Discharge)
 ←1=Orifice/Grate (Orifice Controls 0.80 cfs @ 9.17 fps)

Pond 2P: Underground Storage

Hydrograph



Proposed Discharge Rates

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Type II 24-hr 100-YR Rainfall=6.68"

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Summary for Pond 5P: Underground Storage

Inflow Area = 0.453 ac, 40.72% Impervious, Inflow Depth = 2.69" for 100-YR event
 Inflow = 1.11 cfs @ 12.04 hrs, Volume= 0.102 af
 Outflow = 0.75 cfs @ 12.19 hrs, Volume= 0.102 af, Atten= 32%, Lag= 9.0 min
 Primary = 0.75 cfs @ 12.19 hrs, Volume= 0.102 af
 Routed to Link 3L : Outflow

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 6
 Peak Elev= 813.33' @ 12.19 hrs Surf.Area= 119 sf Storage= 448 cf

Plug-Flow detention time= 5.1 min calculated for 0.102 af (100% of inflow)
 Center-of-Mass det. time= 5.1 min (854.5 - 849.4)

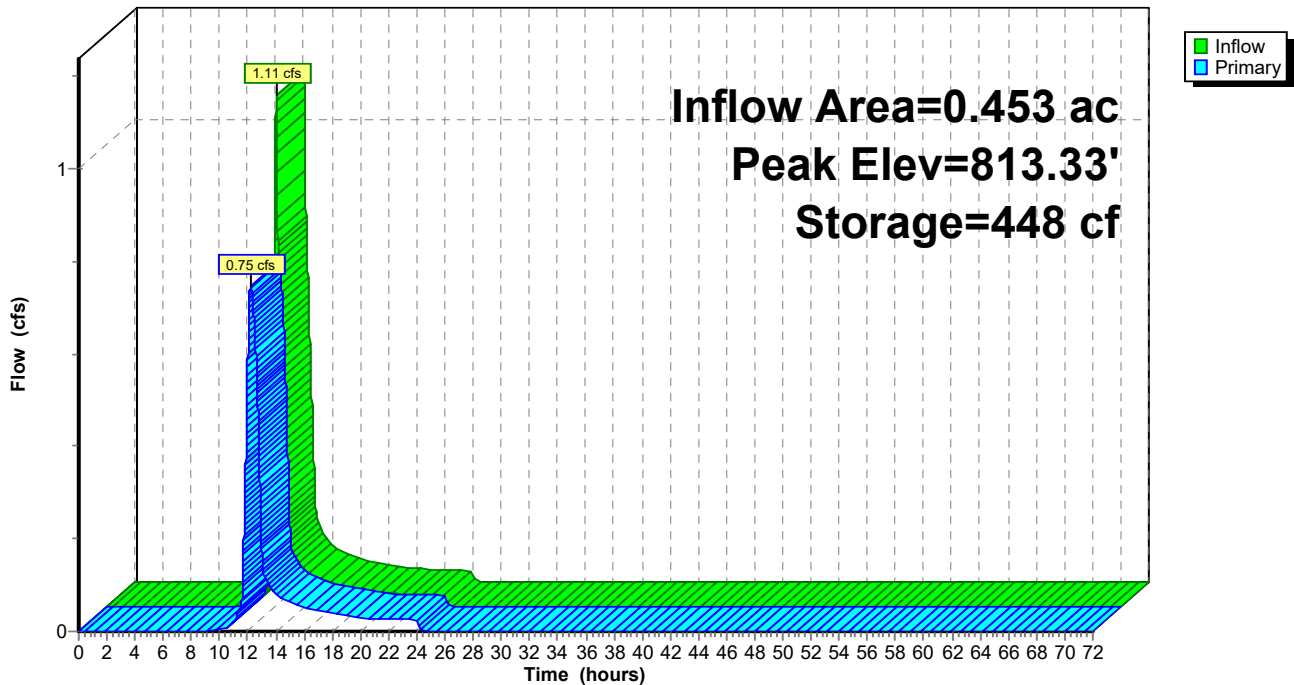
Volume	Invert	Avail.Storage	Storage Description
#1	810.00'	503 cf	48.0" Round Pipe Storage 48" x 40' L= 40.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	810.00'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.75 cfs @ 12.19 hrs HW=813.33' (Free Discharge)
 ←1=Orifice/Grate (Orifice Controls 0.75 cfs @ 8.57 fps)

Pond 5P: Underground Storage

Hydrograph



Proposed Discharge Rates

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Type II 24-hr 100-YR Rainfall=6.68"

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Summary for Pond 7P: Secondary Storage

Inflow Area = 0.063 ac, 54.98% Impervious, Inflow Depth = 3.46" for 100-YR event
 Inflow = 0.40 cfs @ 11.96 hrs, Volume= 0.018 af
 Outflow = 0.33 cfs @ 12.01 hrs, Volume= 0.018 af, Atten= 19%, Lag= 2.7 min
 Primary = 0.33 cfs @ 12.01 hrs, Volume= 0.018 af
 Routed to Pond 5P : Underground Storage

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 814.77' @ 12.01 hrs Surf.Area= 129 sf Storage= 45 cf

Plug-Flow detention time= 0.7 min calculated for 0.018 af (100% of inflow)
 Center-of-Mass det. time= 0.7 min (827.4 - 826.7)

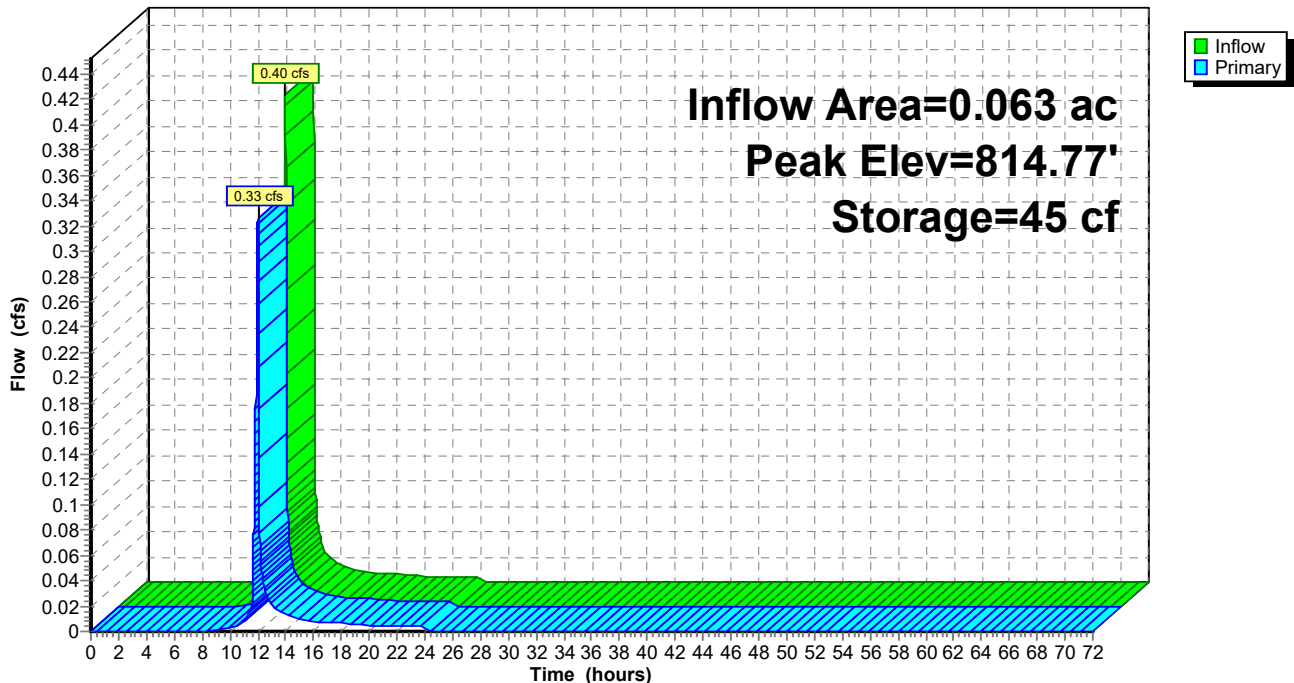
Volume	Invert	Avail.Storage	Storage Description
#1	814.00'	118 cf	12.0" Round Pipe Storage L= 150.0' S= 0.0050 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	814.00'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.33 cfs @ 12.01 hrs HW=814.77' (Free Discharge)
 ←1=Orifice/Grate (Orifice Controls 0.33 cfs @ 3.73 fps)

Pond 7P: Secondary Storage

Hydrograph



Proposed Discharge Rates

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Type II 24-hr 100-YR Rainfall=6.68"

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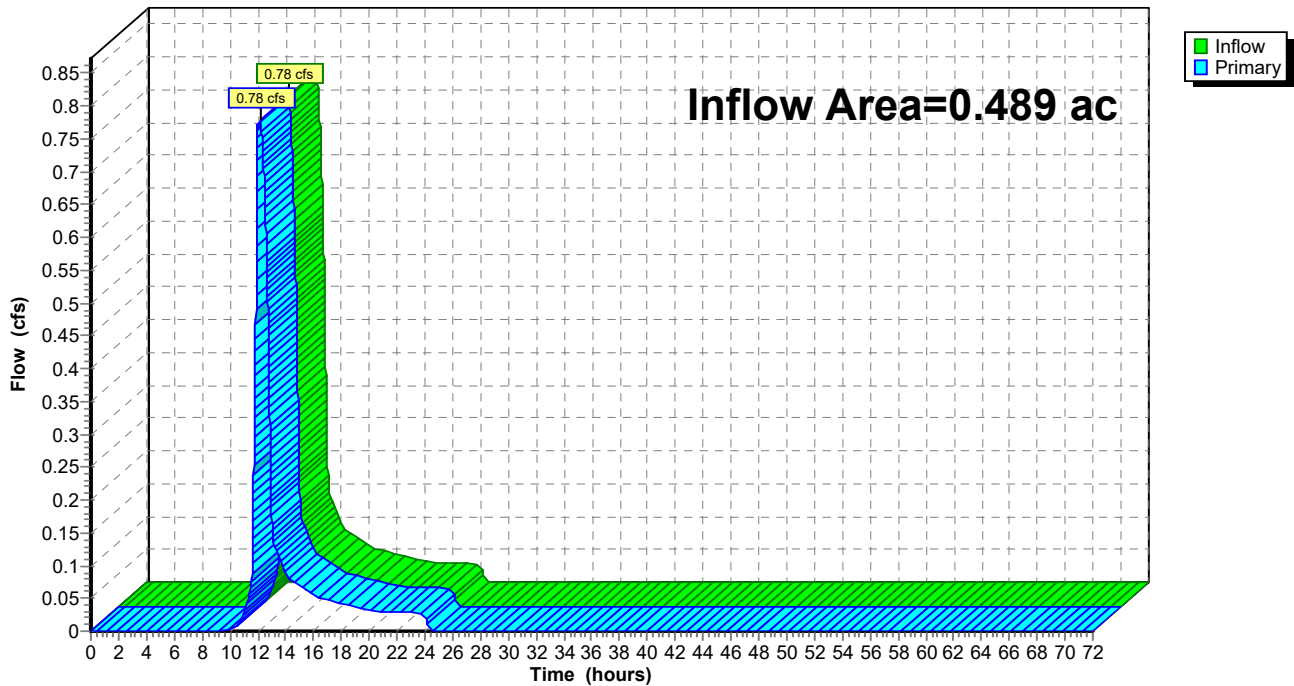
Summary for Link 3L: Outflow

Inflow Area = 0.489 ac, 41.49% Impervious, Inflow Depth = 2.73" for 100-YR event
Inflow = 0.78 cfs @ 12.16 hrs, Volume= 0.111 af
Primary = 0.78 cfs @ 12.16 hrs, Volume= 0.111 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 3L: Outflow

Hydrograph



Proposed Discharge Rates

Type II 24-hr City 100-YR Rainfall=5.90"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment1S: Captured to Main Runoff Area=16,999 sf 38.41% Impervious Runoff Depth=2.02"
Tc=5.0 min CN=62 Runoff=1.46 cfs 0.066 af

Subcatchment4S: Captured to Secondary Runoff Area=2,752 sf 54.98% Impervious Runoff Depth=2.82"
Tc=5.0 min CN=71 Runoff=0.33 cfs 0.015 af

Subcatchment8S: Uncaptured Area Runoff Area=1,547 sf 51.26% Impervious Runoff Depth=2.63"
Tc=5.0 min CN=69 Runoff=0.17 cfs 0.008 af

Pond 2P: Underground Storage Peak Elev=826.63' Storage=526 cf Inflow=1.46 cfs 0.066 af
Outflow=0.66 cfs 0.066 af

Pond 5P: Underground Storage Peak Elev=812.48' Storage=328 cf Inflow=0.93 cfs 0.081 af
Outflow=0.64 cfs 0.081 af

Pond 7P: Secondary Storage Peak Elev=814.62' Storage=28 cf Inflow=0.33 cfs 0.015 af
Outflow=0.28 cfs 0.015 af

Link 3L: Outflow Inflow=0.68 cfs 0.088 af
Primary=0.68 cfs 0.088 af

Total Runoff Area = 0.489 ac Runoff Volume = 0.088 af Average Runoff Depth = 2.17"
58.51% Pervious = 0.286 ac 41.49% Impervious = 0.203 ac

Proposed Discharge Rates

Type II 24-hr City 100-YR Rainfall=5.90"

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Summary for Subcatchment 1S: Captured to Main Storage

Runoff = 1.46 cfs @ 11.97 hrs, Volume= 0.066 af, Depth= 2.02"
 Routed to Pond 2P : Underground Storage

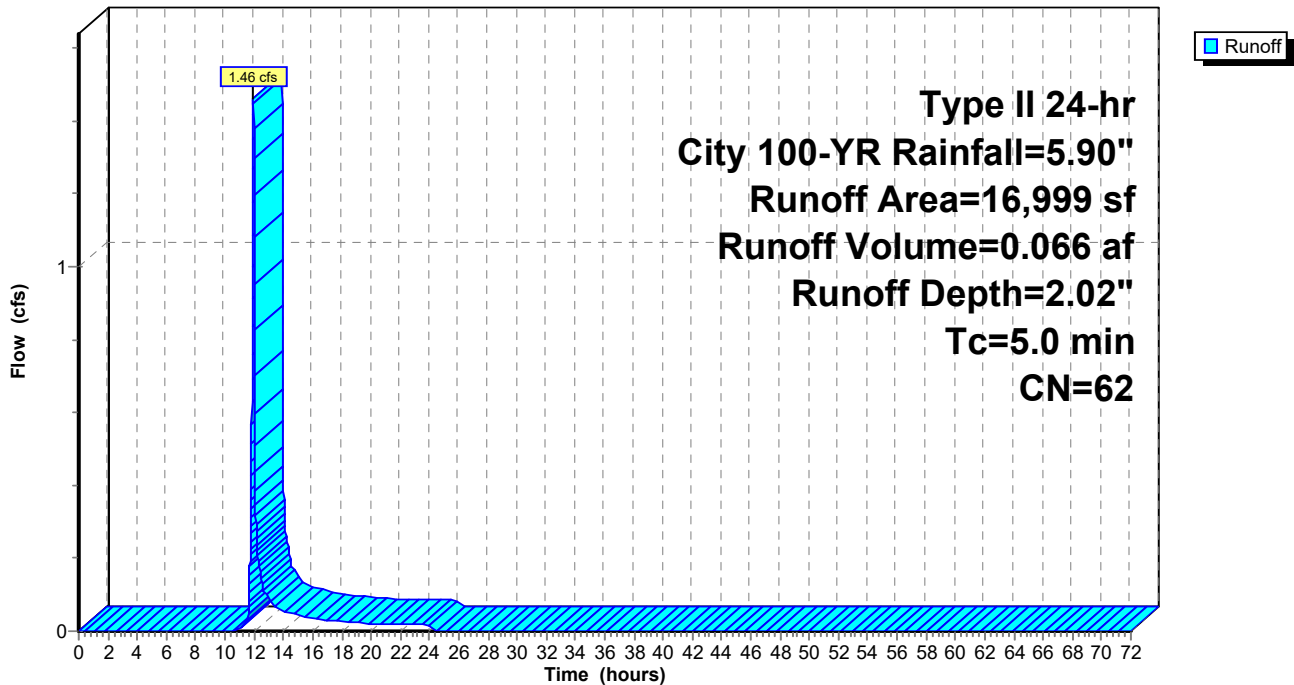
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type II 24-hr City 100-YR Rainfall=5.90"

	Area (sf)	CN	Description
*	6,530	98	Impervious
	10,469	39	>75% Grass cover, Good, HSG A
	16,999	62	Weighted Average
	10,469		61.59% Pervious Area
	6,530		38.41% Impervious Area

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

Subcatchment 1S: Captured to Main Storage

Hydrograph



Proposed Discharge Rates

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Type II 24-hr City 100-YR Rainfall=5.90"

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Summary for Subcatchment 4S: Captured to Secondary Storage

Runoff = 0.33 cfs @ 11.96 hrs, Volume= 0.015 af, Depth= 2.82"

Routed to Pond 7P : Secondary Storage

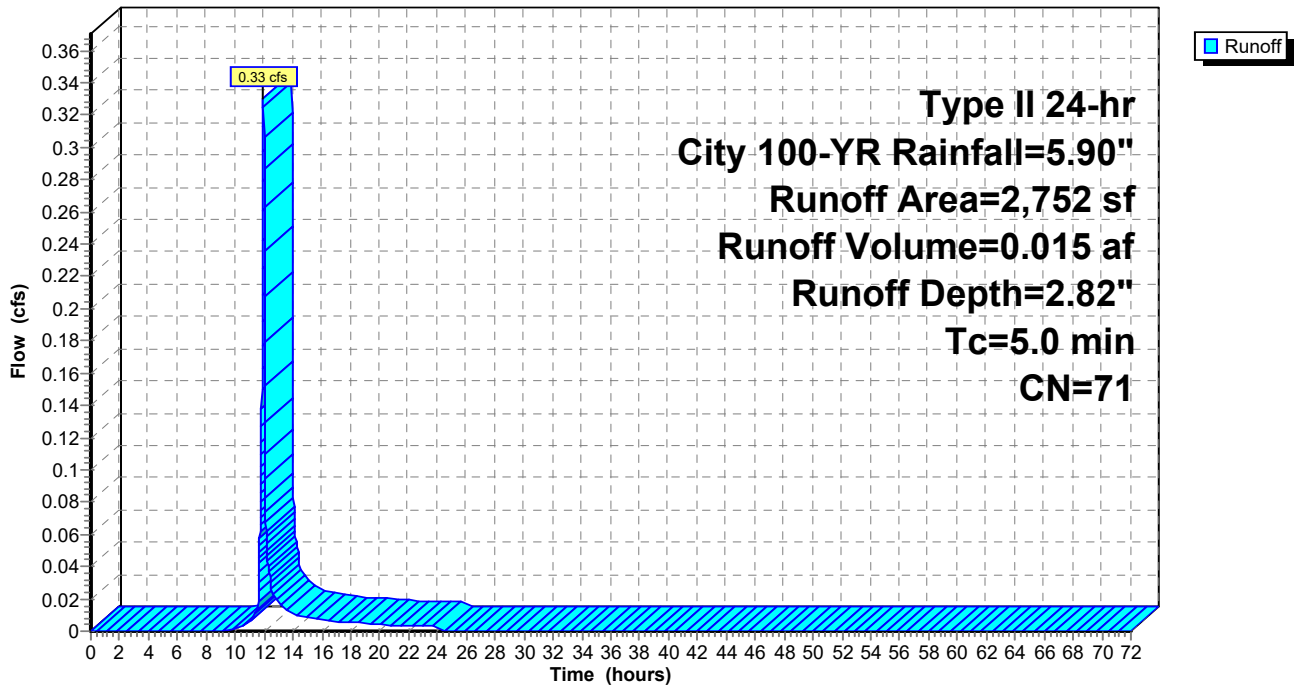
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type II 24-hr City 100-YR Rainfall=5.90"

Area (sf)	CN	Description
1,239	39	>75% Grass cover, Good, HSG A
1,513	98	Paved parking, HSG A
2,752	71	Weighted Average
1,239		45.02% Pervious Area
1,513		54.98% Impervious Area

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

Subcatchment 4S: Captured to Secondary Storage

Hydrograph



Proposed Discharge Rates

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Type II 24-hr City 100-YR Rainfall=5.90"

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Summary for Subcatchment 8S: Uncaptured Area

Runoff = 0.17 cfs @ 11.96 hrs, Volume= 0.008 af, Depth= 2.63"
 Routed to Link 3L : Outflow

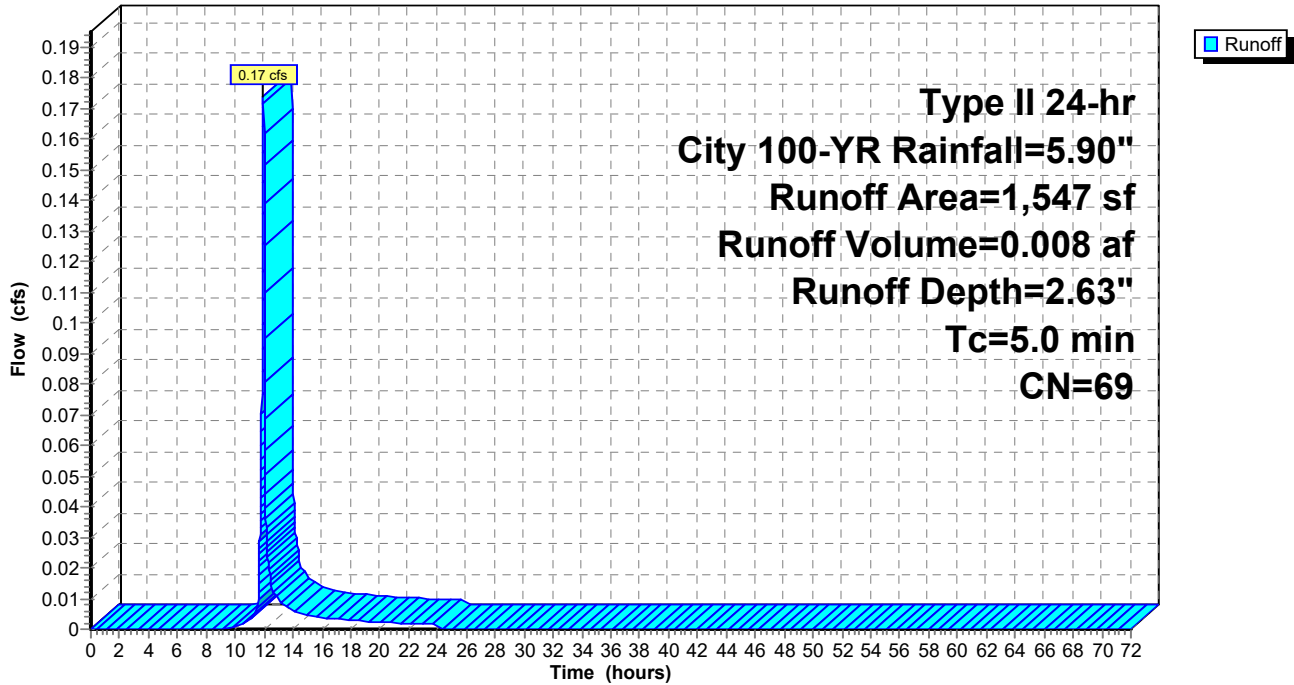
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type II 24-hr City 100-YR Rainfall=5.90"

Area (sf)	CN	Description
793	98	Paved parking, HSG A
754	39	>75% Grass cover, Good, HSG A
1,547	69	Weighted Average
754		48.74% Pervious Area
793		51.26% Impervious Area

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

Subcatchment 8S: Uncaptured Area

Hydrograph



Proposed Discharge Rates

Type II 24-hr City 100-YR Rainfall=5.90"

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Summary for Pond 2P: Underground Storage

Inflow Area = 0.390 ac, 38.41% Impervious, Inflow Depth = 2.02" for City 100-YR event
 Inflow = 1.46 cfs @ 11.97 hrs, Volume= 0.066 af
 Outflow = 0.66 cfs @ 12.05 hrs, Volume= 0.066 af, Atten= 55%, Lag= 5.2 min
 Primary = 0.66 cfs @ 12.05 hrs, Volume= 0.066 af
 Routed to Pond 5P : Underground Storage

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 6
 Peak Elev= 826.63' @ 12.05 hrs Surf.Area= 228 sf Storage= 526 cf

Plug-Flow detention time= 6.1 min calculated for 0.066 af (100% of inflow)
 Center-of-Mass det. time= 6.1 min (860.4 - 854.4)

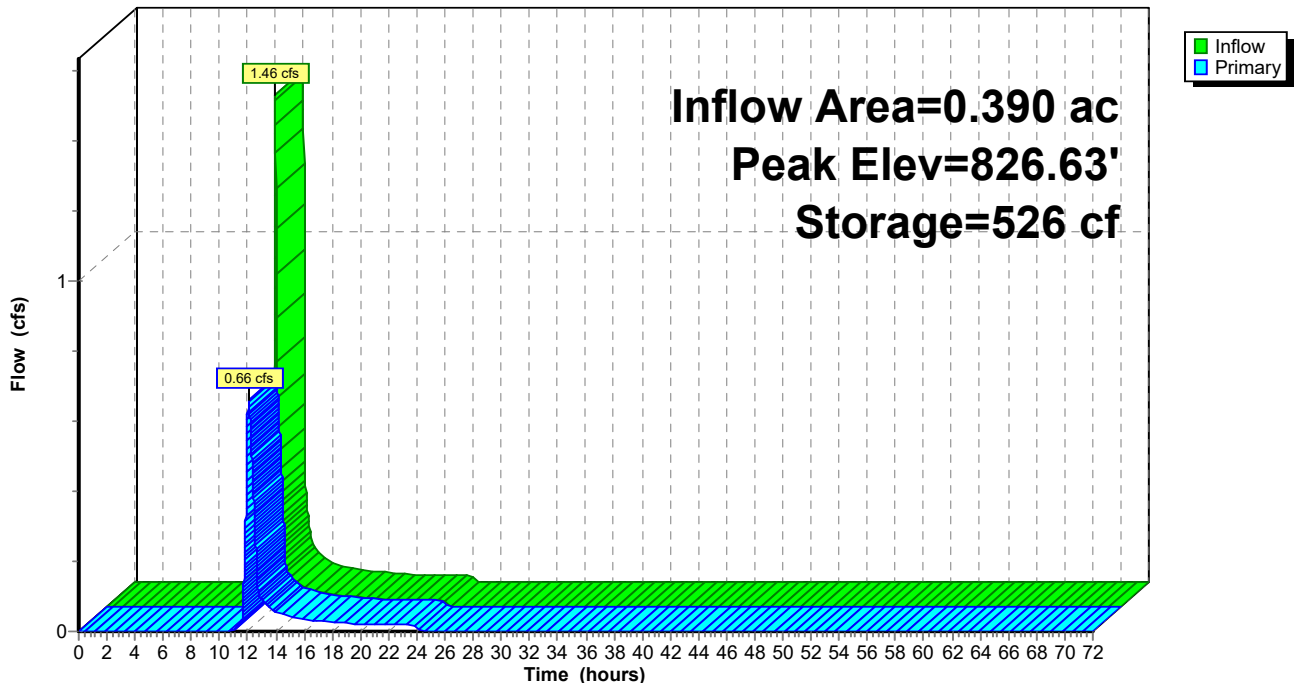
Volume	Invert	Avail.Storage	Storage Description
#1	824.00'	754 cf	48.0" Round Pipe Storage 48" x 60" L= 60.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	824.00'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.66 cfs @ 12.05 hrs HW=826.63' (Free Discharge)
 ←1=Orifice/Grate (Orifice Controls 0.66 cfs @ 7.56 fps)

Pond 2P: Underground Storage

Hydrograph



Proposed Discharge Rates

Type II 24-hr City 100-YR Rainfall=5.90"

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Summary for Pond 5P: Underground Storage

Inflow Area = 0.453 ac, 40.72% Impervious, Inflow Depth = 2.13" for City 100-YR event
 Inflow = 0.93 cfs @ 12.03 hrs, Volume= 0.081 af
 Outflow = 0.64 cfs @ 12.17 hrs, Volume= 0.081 af, Atten= 31%, Lag= 8.6 min
 Primary = 0.64 cfs @ 12.17 hrs, Volume= 0.081 af
 Routed to Link 3L : Outflow

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 6
 Peak Elev= 812.48' @ 12.17 hrs Surf.Area= 155 sf Storage= 328 cf

Plug-Flow detention time= 4.4 min calculated for 0.081 af (100% of inflow)
 Center-of-Mass det. time= 4.4 min (859.8 - 855.4)

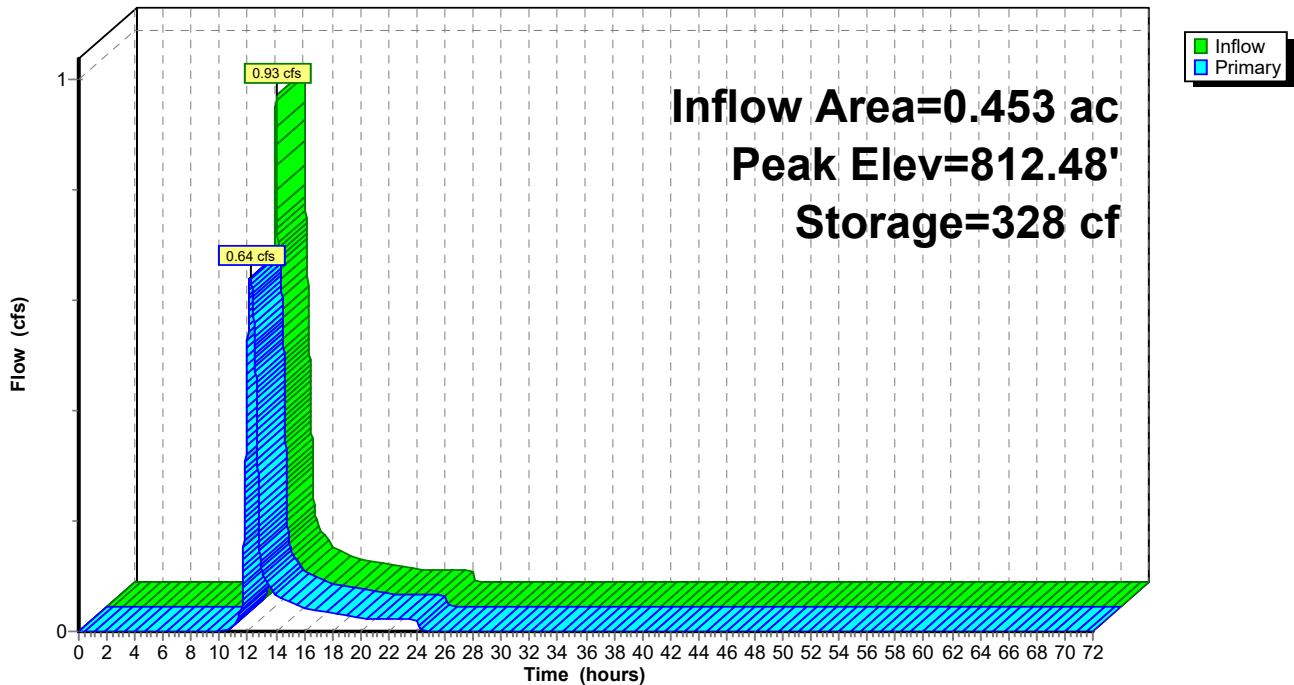
Volume	Invert	Avail.Storage	Storage Description
#1	810.00'	503 cf	48.0" Round Pipe Storage 48" x 40' L= 40.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	810.00'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.64 cfs @ 12.17 hrs HW=812.48' (Free Discharge)
 ←1=Orifice/Grate (Orifice Controls 0.64 cfs @ 7.33 fps)

Pond 5P: Underground Storage

Hydrograph



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Type II 24-hr City 100-YR Rainfall=5.90"

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Summary for Pond 7P: Secondary Storage

Inflow Area = 0.063 ac, 54.98% Impervious, Inflow Depth = 2.82" for City 100-YR event
 Inflow = 0.33 cfs @ 11.96 hrs, Volume= 0.015 af
 Outflow = 0.28 cfs @ 12.00 hrs, Volume= 0.015 af, Atten= 14%, Lag= 2.3 min
 Primary = 0.28 cfs @ 12.00 hrs, Volume= 0.015 af
 Routed to Pond 5P : Underground Storage

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 814.62' @ 12.00 hrs Surf.Area= 103 sf Storage= 28 cf

Plug-Flow detention time= 0.5 min calculated for 0.015 af (100% of inflow)
 Center-of-Mass det. time= 0.5 min (833.1 - 832.6)

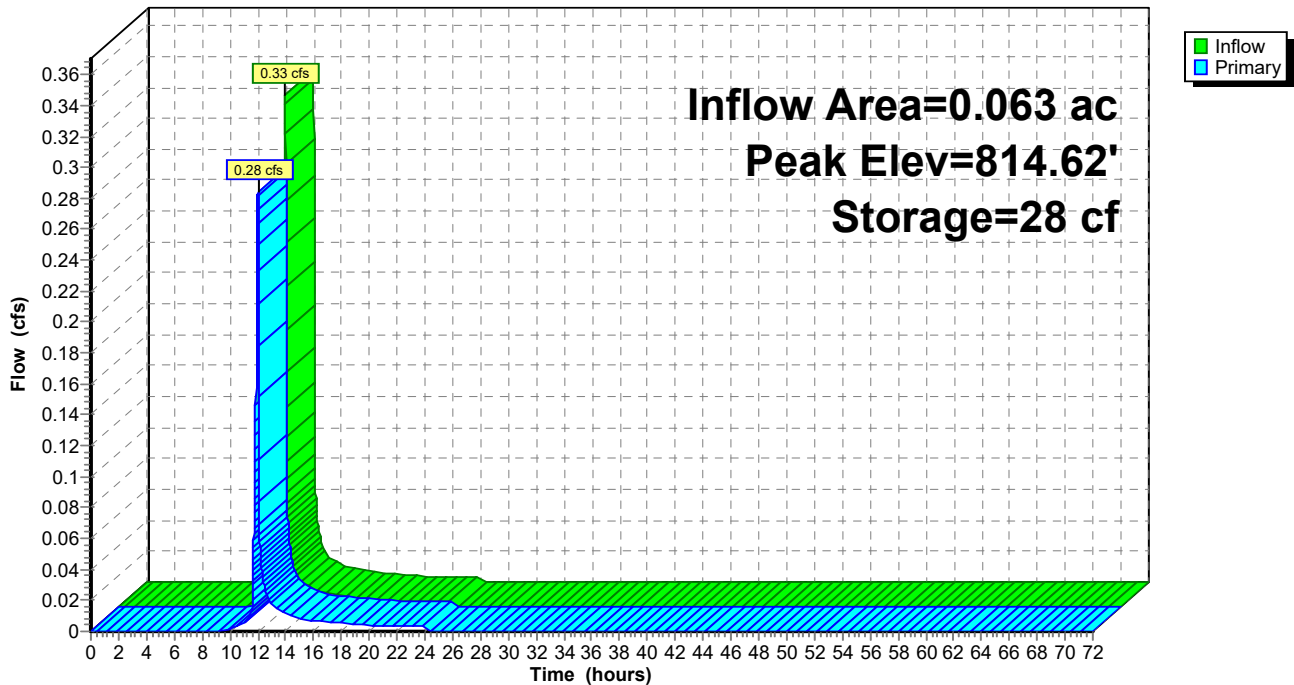
Volume	Invert	Avail.Storage	Storage Description
#1	814.00'	118 cf	12.0" Round Pipe Storage L= 150.0' S= 0.0050 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	814.00'	4.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.28 cfs @ 12.00 hrs HW=814.62' (Free Discharge)
 ←1=Orifice/Grate (Orifice Controls 0.28 cfs @ 3.25 fps)

Pond 7P: Secondary Storage

Hydrograph



Proposed Discharge Rates

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Type II 24-hr City 100-YR Rainfall=5.90"

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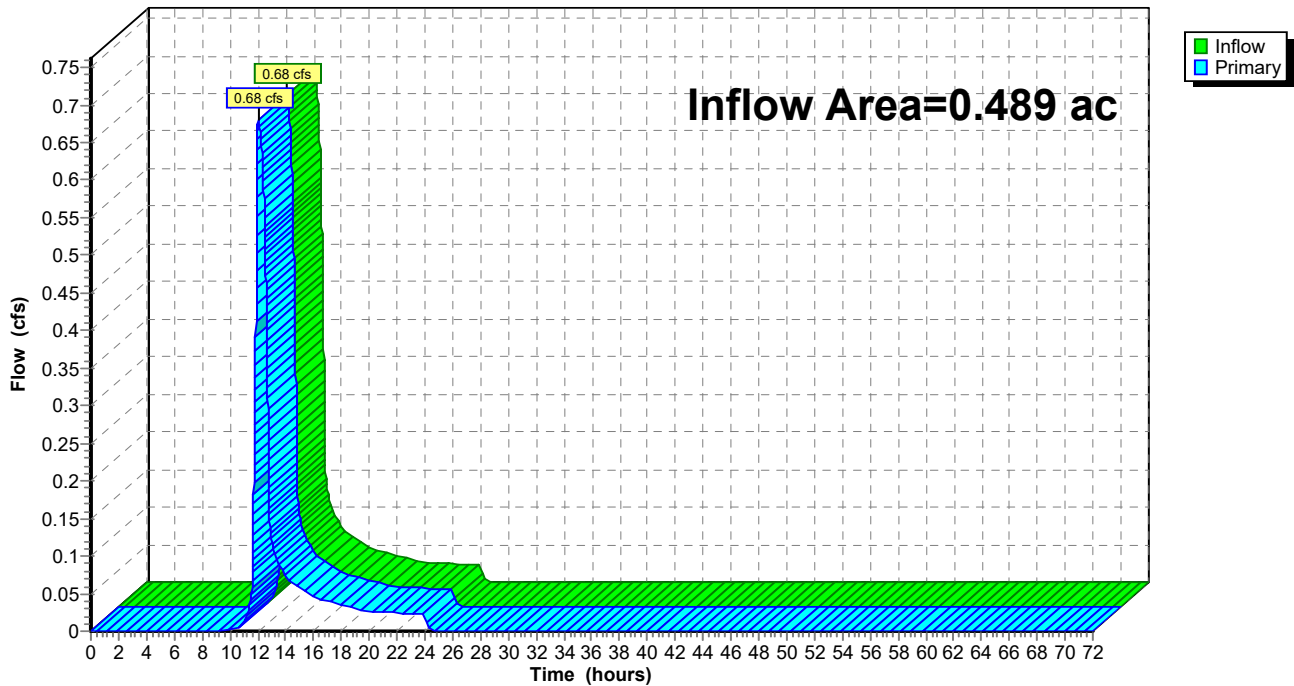
Summary for Link 3L: Outflow

Inflow Area = 0.489 ac, 41.49% Impervious, Inflow Depth = 2.17" for City 100-YR event
Inflow = 0.68 cfs @ 12.01 hrs, Volume= 0.088 af
Primary = 0.68 cfs @ 12.01 hrs, Volume= 0.088 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 3L: Outflow

Hydrograph



City of Saint Paul Transportation Demand Management Form

Project Address	Un-assigned Oak Avenue (2317 7th St W, St Paul, MN 55116 is adjacent parcel to south)
Project Name	Treehouse
Developer	Trellis Treehouse Aquisition LLC
TDM Coordinator Name	Dan Walsh
TDM Coordinator Contact Information	Dan Walsh 612-274-7817 dwalsh@trellismn.org

Introduction

This form will guide you in determining your project's Travel Demand Management (TDM) Point Target. Once you establish your Point Target, you will select TDM Strategies with point values that meet or exceed that Point Target.

Determining whether a TDM Plan is required

A TDM Plan is required for developments that meet or surpass the following thresholds:

- 25 or more new dwelling units
- 20,000 square feet Gross Floor Area or more of new construction of non-residential uses

Order of Steps

If a TDM Plan is required for your project, follow these steps to identify what your required point target will be and what Travel Demand Management Strategies you will use to reach that target.

1. Identify the project type and proposed parking ratio(s);
2. Use the table to determine the project's location type;
3. Determine the TDMP land use category;
4. Use the location type and land use category to determine a parking ratio range;
5. Use the above information to determine the project's point target;
6. Contact Move Movement to discuss the best TDM Strategies for this site and development.
7. Select appropriate TDM Strategies to reach your point target.

1. Project type and proposed parking ratio:

Enter the information that applies to your project type in the chart below. If your project includes both residential and commercial uses, fill in both sections. If the parking ratio for one use does not meet its corresponding threshold above, leave that section blank; parking for that part of your project will not need to be factored into this TDM Plan.

RESIDENTIAL	
Gross Floor Area (GFA)	31,280 GFA
Residential Units	36 dwelling units
Number of Parking Spaces	7 dwelling units
Proposed Parking Ratio (<i>spaces per dwelling unit</i>)	0.2 spaces per dwelling unit
COMMERCIAL, Industrial, or Institutional?	
Gross Floor Area Square Footage	N/A
Number of Parking Spaces	N/A
Proposed Parking Ratio (<i>spaces per square foot GFA</i>)	N/A

Proposed Parking Ratio (<i>from above</i>)	0.2 spaces per dwelling unit
---	------------------------------

2. Location Type:

Development within a quarter mile of a high frequency transit line (i.e., Bus Rapid Transit, Streetcar, or Light rail) or in downtown will have a higher target point assigned than other areas. Find your zoning district [here](#) and your transit proximity [here](#).

Place a check mark next to your project’s location type.

<input checked="" type="checkbox"/>	Transit Proximate (within a quarter mile of BRT or light rail) On High Frequency route (54)
<input type="checkbox"/>	In B4 or B5 Zoning Districts (Downtown)
<input type="checkbox"/>	All other locations

3. TDMP Land Use Category:

Land uses from the zoning code have been grouped into four categories that reflect the travel characteristics of its users. Consult the TDM Program Standards Guide for help determine your land use category.

Place a check mark next to the land use category/categories that describe(s) your project.

<input checked="" type="checkbox"/>	Home-End Uses – Uses that predominantly generate trip-origin patterns of parking demand, such as housing
<input type="checkbox"/>	Commute-End Uses – Uses that predominantly generate daily-trip or long-term discretionary-trip patterns of parking demand, such as offices and schools
<input type="checkbox"/>	Visit-End Uses – Uses that predominantly generate short-term discretionary-trip forms of parking demand such as retail
<input type="checkbox"/>	Other Uses – Uses that typically generate moderate or minimal parking demand and/or are typically minimally responsive to TDM mitigation efforts.

4. Parking Ratio Range:

Your project’s location type and TDMP land use category determine the parking ratio range for your project. Providing more or less parking than this range will impact your point target. In the TDM Program Standards Guide, the top end of the ratio range is called the “Excess Parking Ratio”, and the bottom end is called the “Reduced Parking Ratio”.

Reduced Parking Ratios:

Land Use Category	B4 and B5 Districts	Transit-Proximate Locations	All Other Areas
Home-End Uses	1 space per 2 Dwelling Units (DU)	1 space per DU	1.5 spaces per DU
Commute-End Uses	1 space per 1,000 SF GFA	1 space per 500 SF GFA	1 space per 250 SF GFA
Visit-End Uses	1 space per 1,000 SF GFA	1 space per 500 SF GFA	1 space per
Other Uses	N/A		

Excess Parking Ratios:

Land Use Category	B4 and B5 Districts	Transit-Proximate Locations	All Other Areas
Home-End Uses	1.25 spaces per DU	1.5 spaces per DU	2 spaces per DU
Commute-End Uses	1 space per 500 SF GFA	1 space per 330 SF GFA	1 space per 250 SF GFA
Visit-End Uses	1 space per 500 SF GFA	1 space per 330 SF GFA	1 space per 250 SF GFA
Other Uses	N/A		

Required Parking Ratio	1 space per DU
-------------------------------	----------------

5. Point Target:

After your parking ratio range is determined, find and check your point target in the table below.

Land Use Category	Proposed parking amount	Point Targets		
		All Other Areas	Transit-Proximate Locations	B4 and B5 Districts Downtown
Home-End, Commute-End, and Visit-End Uses	Parking provided within the parking ratio range	6 points <input type="checkbox"/>	8 points <input type="checkbox"/>	10 points <input type="checkbox"/>
	Parking provided below the parking ratio range	4 points, minus 1 point for each 20% that parking is provided below the parking ratio range - for a minimum possible target of 0. <input type="checkbox"/>	6 points, minus 1 point for each 20% that parking is provided below the parking ratio range - for a minimum possible target of 1 point. <input checked="" type="checkbox"/>	8 points, minus 1 point for each 20% that parking is provided below the parking ratio range - for a minimum possible target of 3 points. <input type="checkbox"/>
	Parking provided above the parking ratio range	7 points, plus 1 point for each 10% that parking is provided above the parking ratio range. <input type="checkbox"/>	9 points, plus 1 point for each 10% that parking is provided above the parking ratio range. <input type="checkbox"/>	11 points, plus 1 point for each 10% that parking is provided above the parking ratio range. <input type="checkbox"/>
Other Uses	Any amount of parking spaces	0 points	2 points	4 points

Required Point Target	2 Point Target
------------------------------	-----------------------

REDUCED PARKING RATIO = 1 PER DU
 PROVIDED PARKING RATIO = .2 PER DU
 DIFFERENCE = .80 (80%)

80% REPRESENTS 4 POINT DEDUCTION

6 POINT - 4 POINTS = 2 POINTS

6. TDM Strategies:

Use the TDM Program Standards Guide to select the TDM Strategies you will implement to achieve your point target. At least one-third of a proposed development’s TDM Plan points requirement must be met through physical measures. Section 63.211 requires parking to be unbundled from the cost of rent for any development or redevelopment of a structure with twenty-five (25) or more residential dwelling units. If you’re project meets this threshold list unbundling as a strategy, but no points can be allocated for this strategy if its required. Affordable housing dwelling units with financing that requires the cost for parking and housing be bundled together are exempt from this requirement.

Fill in the table below with the TDM Strategies and their associated points. Include any other TDM Strategies you will implement above your required point total.

Category	Strategy	Points
Physical 12	Affordable Housing (Providing greater than 50% of units for on-site affordable housing)	4
	TOTAL	4

Overall Budget for TDM Strategies	\$ N/A - FEATURES ARE PART OF PROJECT
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Please provide the following information:

Date for Review:	10/19/2022
Signature:	