PLANNING COMMISSION JULY REGULAR MEETING

Council Chambers, 800 1st Terrace, Lansing, KS 66043
Wednesday, July 16, 2025 at 7:00 PM

AGENDA

CALL TO ORDER

ROLL CALL / QUORUM ANNOUNCEMENT

OLD BUSINESS

1. **Approval of Minutes, May 21st, 2025, Regular Meeting**

NEW BUSINESS

2. **Site Plan Case 2025-DEV-007- Fairlane Townhomes Phase II**

   The Applicant proposes to construct 21 homes to build out Lot 1 of Fairlanes Townhomes subdivision. The homes will consist of 6 townhomes and 2 duplexes, with unit size space in the duplexes at 600 square feet (sf) and 1,110 sf for the townhome units.

3. **Preliminary Plat Case 2025-DEV-008- Monroe Manor**

   The applicant is requesting the approval of a Preliminary Plat for Monroe Manor subdivision, a 45.28-acre subdivision with a proposed 194 single-family lots. The developer is proposing to build out the subdivision through 3 phases. The developer is proposing to develop the 40' lots with an average lot size of 6,578 sf.

NOTICES AND COMMUNICATIONS

4. **Public Hearing Notifications- RHID**

REPORTS - Commission and Staff Members

- Commission Members
- Director, Community & Economic Development
- Director, Public Works / City Engineer
- Director, Wastewater Utility
- Building Inspector, Community & Economic Development

ADJOURNMENT

For information on how to view prior meetings, please visit our website at *https://www.lansingks.org*. If you require any special assistance, please notify the Community and Economic Development Director prior to the meeting.

CITY OF LANSING KANSAS

PLANNING COMMISSION MAY REGULAR MEETING

Council Chambers, 800 1st Terrace, Lansing, KS 66043
Wednesday, May 21, 2025, at 7:00 PM

MINUTES

CALL TO ORDER

The May regular meeting of the Lansing Planning Commission was called to order by Chairman Jerry Gies at 7:00 p.m.

ROLL CALL / QUORUM ANNOUNCEMENT-

In attendance were Chairman Jerry Gies, Commissioners Ginger Riddle, Janette Labbee-Holdeman, Nancy McDougal and Mike Suozzo. Vice Chairman Brian Payne and Commissioner Richard Hannon were not present. Chairman Gies noted that there was a quorum present.

OLD BUSINESS-

1. **Approval of Minutes, April 23rd, 2025, Regular Meeting**
   A motion was made by Commissioner Labbee-Holdeman to approve the minutes as written, and it was seconded by Commissioner Riddle. Motion passed 3-0, with Commissioners McDougal and Suozzo abstaining.

NEW BUSINESS-

2. **Election of Officers**
   In accordance with the bylaws of the Planning Commission, officers are to be elected annually by a majority vote of the Commission. The positions of Chairman and Vice-Chairman are currently up for election. These officers will serve for a one-year term, or until successors are elected, and are responsible for presiding over meetings and assisting in the coordination of Commission business.

   Commissioner McDougal moved to nominate Jerry Geis for re-election of Chairman, and it was seconded by Commissioner Suozzo. Motion passed 5-0.

   Commissioner Suozzo moved to nominate Brian Payne for re-election of Vice Chairman, and it was seconded by Commissioner Labbe-Holdeman. Motion passed 5-0.

3. **Case 2025-DEV-005- Towne Centre Final Plat**
   The City is requesting the approval of a Final Plat for the Lansing Towne Centre 2nd Replat subdivision, which will enable the development of a Junior Box retail development. The city is partnering with a developer to create a 5-tenant shopping center with 3 additional pad sites. The developer has submitted a site plan to run concurrently with this application. The developer has proposed vacating Centre Drive's Right of Way (ROW) between W Mary Street and Kay Street to enable this development. The plat contains dedication of access easements for internal circulation and continued connection to both 301 Centre Drive and Parcel 106-24-0-40-07-001.02.

DRAFT

Discussion on this case began with Mr. Gentzler stated that with this replat, we are taking two lots and combining them and vacating Centre Drive. There will be an internal access drive to Dr. Redell's property as well as The Dobski property (McDonalds), etc. With this replat, we are re-establishing lot lines, creating new lots, and removing the roadway (developer maintained). On this property, there is a public access easement as well as a sewer line easement. Chairman Gies inquired about the purpose of the multiple lots for different developers such as restaurants, to be able to own it. Mr. Gentzler stated that there are already plans for each of the purposed lots.

Mr. Gies confirmed how much land is on each lot; there was then discussion about a possible McDonalds and it was confirmed which lots were owned by the City of Lansing. Mr. Gentzler recommends the approval of Cases No. 2025-DEV-005 with the reduction of open space to the City Council. Mr. Gies inquired about information still needed to which Mr. Gentzler stated that the City has everything needed for approval.

With no further discussion, Commissioner Suozzo moved to approve Case 2025-DEV-005 with the reduction of open space requirements to the City Council, and Commissioner McDougal seconded the motion. Motion carried 5-0.

4. Case 2025-DEV-006- Towne Centre Retail Site Plan

The Applicant proposes to construct four commercial retail buildings to build out the northern end of the Lansing Towne Centre development. The tenant space will range from 1,000 square feet (sf) to 25,042 sf. Currently the plans include a minimum of 8 tenants with more available with the pad site on Lot 7 (NE corner).

This proposal will fill the Northern portion of Lansing Towne Centre which has sat vacant since 2008. No buildings currently exist on the property. The plan includes the site work, landscaping, parking lot improvements, building construction and other appurtenances to the project. Approval of this Site Plan would authorize staff to issue a building permit for the project upon completion of review for compliance with building codes, subject to any conditions added during the approval process at the Planning Commission meeting. The developer has indicated the coffee usage on Lot 8 will not be built out with that tenant in mind but will be another retail/office use. Any change to this site plan may necessitate a further site plan review as either an administrative or Planning Commission procedure. Building elevations are included in the site plan. The timeline of the project, should this application be approved, is to proceed with construction as quickly as possible after approval of the final plat by the City Council.

Discussion began with Mr. Gentzler showing the body the site plan for a retail development for 5 large tenants, a restaurant, a possible coffee shop as well as a small strip center, depending on what the developer brings to the area. The developer has several leases signed in hand. It was stated that there are several conditions to make sure it falls in compliance with the UDO. Additionally, the approval of the site plan will depend on the acceptance of the roadway vacation by the City Council, as the site plan does not work without that. Access shall be maintained to Family Eye Care as well as the Dobski property during the entirety of the construction process. Commissioner McDougal inquired about the entrances into the property and where the entrances are. Mr. Gentzler stated that they are both are on Mary and explained where the road will be removed and where the different entrances are.

Dr Jonathan Redell spoke briefly about his concerns with going from a public drive to a private one. He also stated that he would want a written agreement in regard to continuity of access during construction, to make sure their customers have a way of getting to their office during construction.

Todd Minnis is the developer and spoke about his experience in retail development as well as locating a site while working with the City of Lansing and surrounding businesses. Currently there are leases with the three largest tenants and others are in the discussion process.

Commissioner McDougal inquired about the reasoning behind not having access on Kay St. and making it only one entrance for the development. The developer stated that the detention facility must be expanded, and they are not wanting to push traffic toward the nearby neighborhood. Commissioner McDougal also asked about the need for additional traffic lights. Mr. Spickelmier, director of Public Works, stated that there is no necessity for additional signals. It was also stated that there will be a traffic study provided as required, but Towne Centre was designed for a full build in that area.

Commissioner Labbee-Holdeman inquired about the location of the road to access Family Eye Care Center if the road will be taken out. Mr. Gentzler as well as the developer explained the locations of access roads and easements. Chairman Gies asked if the retail space on the north is on a separate lot and expressed concerns as to why it is kept separate, and what that might bring. Mr. Minnis then explained the future plans for the specific lots. He explained that the retailers that they plan to bring in are national retailers that have over 1,000 stores. He also spoke about the location of buffers and streetscapes on the property. He expects to begin construction in the fall, possibly October, and it should take about one year to complete. There was discussion about the process for the removal of soil and the impact of the expansion of the pond.

With no further discussion, Commissioner Riddle moved to approve Case 2025-DEV-006 with conditions as outlined in the staff report as well as the amendments 8 and 9 that were added. Commissioner Labbee-Holdeman seconded it. Motion carried 5-0.

NOTICES AND COMMUNICATIONS-

None.

REPORTS- Commission and Staff Members-

Commissioner McDougal inquired about any future plans for McDonald's to move in, to which Mr. Gentzler stated that this development could possibly be the start of Mr. Dobski following suite, once it is more developed in the area. Commissioner Riddle then asked if there was a timeline in place for KCKCC. Mr. Gentzler stated that there is a potential opening date of Fall 2027 or Spring 2028, however the City has not received any plans, only concepts. But there is still an active interest in the community and the City will proceed accordingly.

ADJOURNMENT-

Commissioner Labbee-Holdeman moved to adjourn, and the motion was seconded by Commissioner Riddle. The meeting was adjourned by acclamation at 7:36 pm.

Respectfully submitted,

Melissa Baker, Secretary

Reviewed by,

Joshua Gentzler, Community and Economic Development Director

DRAFT

Planning Commission Staff Report
July 16, 2025

Site Plan Case 2025-DEV-007
Fairlane Townhomes Phase II
Santa Fe Drive

Project Facts

Applicant
Benesch

Owner
Jeremy Greenamyre

Address
91 Fairlane

Property ID
094-19-0-20-03-026.00

Zoning
B-4 Multi-Family Residential District

Future Land Use
Commercial

Land
3.2 acres

Building
Existing: 5 townhomes
Proposed: 6 townhomes & 2 duplex

Requested Approvals
Site Plan

Project Summary
The Applicant proposes to construct 21 homes to build out Lot 1 of Fairlanes Townhomes subdivision. The homes will consist of 6 townhomes and 2 duplexes, with unit size space in the duplexes at 600 square feet (sf) and 1,110 sf for the townhome units.

Open Items

Site Plan Application items

Community & Economic Development
The Community & Economic Development Director has reviewed the site plan for conformance with the site plan requirements as outlined in the Unified Development Ordinance (UDO), as well as the Site Plan Application, and found the following items of concern:

The Director reviewed this site plan application for the following:

1. In general, any site plan in compliance with all requirements of this code shall be approved.
    - **a. Article 4 Zoning Districts & Use Standards**
        - **i.** The site plan is in compliance with standards found in **Table 4-1 General Development Standards** and uses outlined in **Table 4-2 Table of Uses.**
    - **b. Article 5.Special Districts & Standards**
        - i. The plan is not required to meet standards found in Article 5.
    - c. **Article 6 Site & Landscape Standards**
        - i. **6.02 Open Space Design**
            1. The Final Plat was approved with no additional open space provided.
        - ii. **6.03 Landscape Design**
            1. Modifications needed. See attached comments on the Landscape Plan (Page 2) in packet.
            2. **Table 6-1** requires 2 large trees per 40' of street frontage if buildings are setback more than 30'. Buildings 6-8 are greater than 30' from Santa Fe Drive. Developer is requesting approval of site plan without additional trees be required as *"Buildings 6-8 will have a roofed patio that extends to or close to the 30-ft building line.* (See 2025.07.02 Response Letter).
        - **iii. 6.04 Buffers & Screening**
            1. In compliance.
    - d. **Article 7 Access & Parking Standards**
        - i. Meets requirements.
    - e. **Article 8 Sign Standards**
        - i. Meets requirements.
2. In making a determination of compliance, or for site plans accompanying any discretionary review or administrative relief, the review body shall consider whether:
    - The site is capable of accommodating the buildings, proposed use, access and other site design elements required by the code and will not negatively impact the function and design of rights-of-way or adjacent property.
        - *The site appears to be capable of accommodating the proposed development based on the Unified Development Code. An official review of building feasibility regarding drainage and grading plans will be conducted by the Public Works Department during the review of construction documents.*
    - The design and arrangement of buildings and open spaces is consistent with good planning, landscape design and site engineering principles and practices.
        - *Proposed site arrangement and landscape design is adequate for the site and context*.
    - The architecture and building design use quality materials and the style is appropriate for the context considering the proportion, massing, and scale of different elements of the building.
        - *The proposed architectural style and building materials appear to be appropriate for the site.*
    - The overall design is compatible to the context considering the location and relationships of other buildings, open spaces, natural features, or site design elements.
        - *The proposed design appears to be appropriate for the location and continuation as the next phase of the Fairlane Townhomes development.*
    - Whether any additional site-specific conditions are necessary to meet the intent and design objectives of any of the applicable development standards.
        - *Not applicable.*
3. The application meets the criteria for all other reviews needed to build the project as proposed.
    - *Official review is underway by other appropriate City Departments, including Public Works and Wastewater. Fulfillment of all criteria as outlined in the UDO and/or granted through this application will be required before a building permit can be issued for this project.*

4. The recommendations of professional staff.
    - *Staff recommends approval of this site development plan.*

Public Works
The Public Works Director / City Engineer has reviewed the site plan for conformance with City requirements and found items of discussion as shown on the attached review copy of Site Plan.

Wastewater Department
The Wastewater Director has reviewed the site plan for conformance with City requirements and found no items of concern.

Fire Department
The Fire Chief has reviewed the site plan for conformance with City requirements and found items of discussion as shown on the attached review copy of Site Plan.

Acknowledgments

The following City of Lansing staff members reviewed this project and provided information for this report:

- Michael W. Spickelmier, PE, Public Works Director
- Anthony R. Zell, JR, MBA, Wastewater Director
- Joe Gates, Fire Chief, Fire Department
- Joshua Gentzler, Director, Community & Economic Development

Notice of City Codes

The Applicant is subject to all applicable City codes within the Municipal Code – whether specifically stated in this report or not – including, but not limited to, Zoning, Buildings and Construction, Subdivisions, and Sign Code. The Applicant is also subject to all applicable Federal, State, and local laws.

Recommendation

Staff recommends conditional approval of Case 2025-DEV-007, Site Plan for Fairlane Townhomes Phase II dependent on submittal of revised site plans that address Staff comments.

Proposed conditions:

1) The Planning Commission accepts the Developer's response that the landscape plan meets the intent of **Table 6-1.**
2) Developer shall be responsible for obtaining NOI from KDHE and prior to any construction beginning on site if necessary.

Action Options

"I move to _____."

1. Approve Case No. 2025-DEV-007; or
2. Approve Case No. 2025-DEV-007 with Conditions as outlined in the Staff Report; or

3. Approve Case No. 2025-DEV-007 with Conditions as outlined in the Staff Report and with amendments; or
4. Deny Case No. 2025-DEV-007 for specified reasons; or
5. Table the case to another date, time and place.

Attachments

1. Application
2. 2025.07.02 Response Letter
3. 2025.07.03 Site Plan with City Review Comments
4. 2025.07.03 Submitted Site Plan

CITY OF LANSING KANSAS

Preliminary Plat Application

Date: 06/27/2025

Applicant / Owner

Applicant Name:	Krystal Voth, Atlas Land Consulting	Owner Name:	LANSING TOWNHOME PARTNERS LLC
Address:	14500 Parallel Road	Address:	Attn: URBAN SW CAPITAL LLC 888 W SAM HOUSTON PKWY #STE 215 HOUSTON, TX 77042
City, State, Zip:	Basehor, KS 66007	City, State, Zip:	,
Phone:	4176222907	Phone:	

Surveyor

Surveyor Name:	Roger Dill	Address:	329 W. Mary Street
Phone:	4176222907	City, State, Zip:	Lansing, KS 66043

Subdivision Info

Subdivision Name:	Lansing Heights Addiiton 1st Replat	Residential Lots:	NA
General Location:	329 W Mary Street	Commercial Lots:	NA
Plat Acres:	22.03	Industrial Lots:	NA
Minimum Frontage:	414'	Other Lots:	NA
Min Lot Area:	22.03	Total Lots:	1
Existing Zoning:	R-4 Multi-Family Residential District		

How Guaranteed: NA

Project Details

Project Name:	Lansing Heights Addition 1st Replat	Location:	329 W Mary Street
Agent:	Krystal Voth	Proposed Zoning:	R-4 Multi-Family Residential District
		Rezone Reason:	NA

Project Description: Replat of an existing lot to provide access to landlocked parcel to the south

I do hereby certify that the information contained herein is true and correct.

Krystal A. Voth — Name

06/27/2025 — Date

benesch

July 2, 2025

Joshua Gentzler
Director, Community and Economic Development
City of Lansing
730 1st Terrace, Suite 2
Lansing, KS 66043

RE: Site Plan Comment Response
Fairlane Townhomes Phase 2
Lansing, Kansas

The following is summary of the plan updates in reference to the Site Plan written comments received from **The City of Lansing** June 25, 2025.

Site Plan

1) **Water – Napier Engineering Review**
   a. The project will require a water main extension with a 15-ft water main easement will be required.
      Acknowledged.
2) **Site Plan**
   a. Provide legal description.
      The legal description has been provided.
   b. Provide name and address of owner of record and Developer.
      The name and address of the owner and Developer has been provided.
   c. Provide dimensions of all existing and proposed structures.
      The building dimensions have been provided on details sheet 3. These dimensions follow the existing building dimensions constructed in Phase 1.
   d. Provide number of stories of all existing and proposed structures.
      The number of stories has been provided on Detail sheet 3. The proposed buildings again follow the existing buildings constructed in Phase 1.
   e. Provide Gross floor area of all existing and proposed structures.
      The Gross floor area has been provided on Detail sheet 3. The proposed structures follow the gross floor area of the structures constructed in Phase 1.
   f. Provide typical elevations of all proposed structures.
      The typical elevations and photo of the building have been provided on Detail sheet 3.
   g. Provide list of building materials for proposed structure.
      The building materials list has been provided on Detail sheet 3.
   h. Provide location, height, and materials for screening walls and fences.
      Details of the trash enclosure have been provided on Detail sheet 3. The trash enclosure will match the trash enclosure constructed in Phase 1.

15700 College Blvd. – Suite 202 • Lenexa, KS 66219 • 913.888.4647 fax: 913.390.9865

i. Provide type of surfacing and base course for all parking, loading and walkways.
Standard details for the pavement surfacing have been provided on Detail sheet 3.

j. Submit lighting plan that complies with **6.05 Outdoor Lighting**.
Site lighting will follow Lansing Unified Development Ordinance Section 6.05. Site lighting plan will be submitted prior to issuance of building permit. Site lighting will primarily come from building lights with shielding for dark sky lighting and may utilize 6-ft pedestal lighting as shown on Detail sheet 3.

k. Add location, height, size, materials, and design of all proposed signage.
Monument signage will match the monument sign installed on Phase 1 of the project on Fairlane Street as shown on Detail sheet 3.

l. Provide screening details of outdoor trash storage area.
Details of the trash enclosure have been provided on Detail sheet 3. The trash enclosure will match the trash enclosure constructed in Phase 1.

m. As per conversation with Cpt. Mackey – Hydrant may be needed depending on water flow. Provide details on water main on site.
Acknowledged. A fire hydrant will be incorporated into the water design for the site.

n. Depending on the depth of this manhole, it may need to shift west slightly to avoid future digging that close to the foundation/entrance.
Acknowledged. The location of the manhole in reference to the building pad will be considered when developing the sanitary plans for the site.

3) **Landscape Plan**

a. **6.04 Landscape Design** of UDO requires foundation and parking planting areas.
Foundation and parking planting areas have been updated.

b. **Table 6-1 Plan Requirements** lists 2 large trees per 40’ if buildings setback more than 30’. Buildings 6-8 are setback on average 44’. Increase number of trees or move buildings.
Buildings 6-8 will have a roofed patio that extends to or close to the 30-ft building line. Per the meeting held on 6/30/25 only 1 large tree per 40’ will be required.

c. Building 5 needs Foundation planting added.
Foundation plantings have been added to building 5.

d. **Table 6-3: Tree Diversity** requires 2 genus of trees if 5-10 trees required.
Two genus of trees have been included along Santa Fe Drive.

Please contact us with any questions regarding these plan updates.
Sincerely,

Ethan Deardeuff, PE
BENESCH

cc: File/1325-500010.00

Reviewed By WW Dept
No Comments
07/07/2025 3:31:22 PM
By azell

Reviewed by Public Works
No Exceptions
07/08/2025 2:35:35 PM
By mspickelmier

Reviewed by Community & Economic Development
07/08/2025 2:49:33 PM by jgentzler
See Review Comments

FAIRLANE TOWNHOMES

Phase 2 Site Plan - Sheet 1 of 3
Fairlane Commercial Development
Northwest 1/4 of Section 19, Township 9 South, Range 23 East
City of Lansing, Leavenworth County, Kansas

LEGAL DESCRIPTION: A tract of land being all of Lot 2B Midtown Court Subdivision, 2nd Plat, and all of Lot 2, Fairlane Commercial Development, and a part of Abandoned Railroad of Santa Fe Subdivisionm all being a part of the Northwest Quarter of Section 19, Township 9 South, Range 23 East of the 6th P.M. in the City of Lansing, Leavenworth County, Kansas.

1.Correct legal description. An administrative plat was filed creating Fairlane Townhomes, 1st Plat on 12.27.2023 Doc 2023P00058.

NOTES:

1. DATE OF SURVEY: FIELD SURVEY WAS PERFORMED APRIL 14, 2024.
2. BASIS OF BEARINGS: NORTH LINE OF MIDTOWN COURT, 2ND PLAT, BEING N 88°45'25" E. (NOT GRID NORTH.)
3. FLOOD INFORMATION: THE SUBJECT PROPERTY IS LOCATED ON FLOOD INSURANCE RATE MAP NUMBER 20103C0144G, EFFECTIVE DATE: JULY 16, 2015, PANEL 144 OF 425 IN ZONE X (AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN). FLOOD INFORMATION IS SUBJECT TO CHANGE.
4. PROJECT BENCHMARK: SQUARE CUT ON NORTHWEST CORNER OF CURB INLET NORTHWEST OF INTERSECTION OF FAIRLANE ST. AND SANTE FE DR., ELEVATION: 819.39 - NAVD 88 VERTICAL DATUM.
5. SANITARY SEWER SERVICE TO BE PROVIDED BY CITY OF LANSING
6. PUBLIC WATER SERVICE PROVIDED BY LANDEL WATER.
7. SEDIMENT WILL BE CONTROLLED DURING ALL GRADING AND CONSTRUCTION PHASES OF DEVELOPMENT.
8. ALL EXISTING AND PROPOSED TOWNHOMES ARE 2 STORY UNITS, EXCEPT BUILDING 4.
9. MONUMENT SIGN TO MATCH MONUMENT SIGN LOCATED ON FAIRLANE STREET.

GENERAL SITE DATA:

GROSS AREA: 137,072 SQ. FT. - 3.2 ACRES
EXISTING ZONING:
R-4 - MULTI-FAMILY RESIDENTIAL DISTRICT
MINIMUM LOT SIZE = 10,000 S.F
MINIMUM LOT WIDTH = 60 FEET
MINIMUM SETBACKS:

FRONT:	25 FEET
SIDE:	10 FEET
REAR:	30 FEET

PARKING DATA

LANSING UNIFIED DVELOPMENT ORDINANCE RECOMMENDS 2 STALLS PER UNIT.

TOTAL UNITS	21
PARKING W/ 2 ADA	44 SPACES

LEGEND

HP -	HIGH POINT
ME -	MATCH EXISTING
TP -	TOP OF PAVEMENT
LP -	LOW POINT
	- CONCRETE PAVEMENT
	- ASPHALT PAVEMENT

OWNER / DEVELOPER
GREENAMYRE RENTALS, INC.
2500 S 2ND STREET
LEAVENWORTH, KS 66048

20 0 20
scale feet
1" = 20'

NO.	REVISIONS	DATE

SITE PLAN

FAIRLANE TOWNHOMES PH 2
LANSING, KANSAS

benesch
Alfred Benesch & Company
15700 College Blvd, Suite 202
Lenexa, Kansas 66219
913-888-4647
Job No. - 2020-035.10

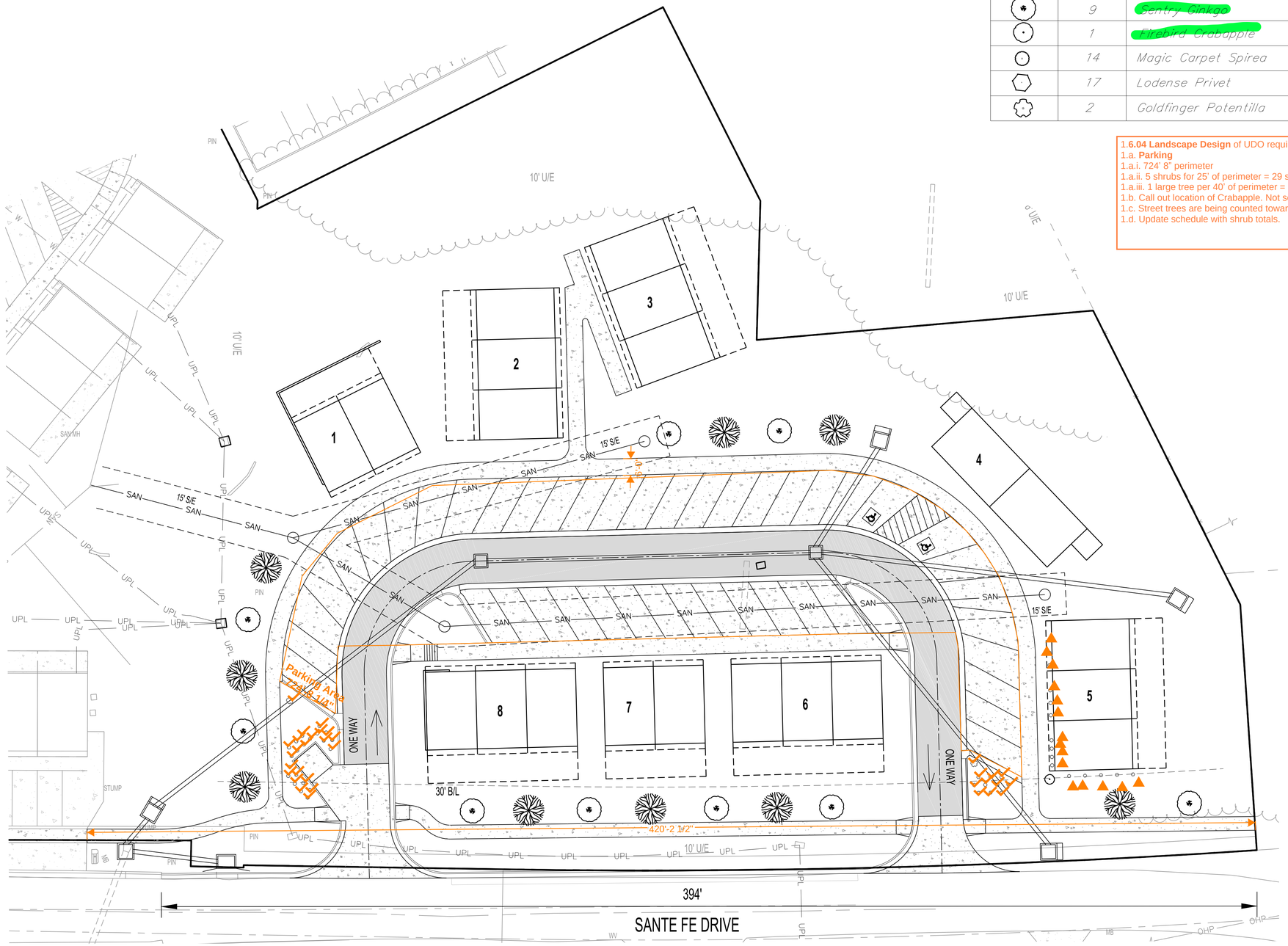
PROJECT: FAIRLANE TOWNHOMES
DATE: July 2, 2025
JOB NO.: 1325-500010.00
SHEET NO.: 1 of 3

[File Location: Y:\Kansas\LTAX-505\1325-500010.00_Greenamyre\Eng_Docs\Drawings\1325-500010.00-Site Plan\1325-500010_Site Plan Ph 2.dwg] [Plot Date: 7/22/2025 9:32:11 AM] [Last Saved: 7/22/2025 9:32:13 AM, Edwardsd1]

PLANTING SCHEDULE

Symbol	Total	Common Name	Botanical Name	Size
	9	Commemoration Sugar Maple	Acer saccharum	2"Cal Min.
	9	Sentry Ginkgo	Princeton Sentry	2"Cal Min.
	1	Firebird Crabapple	Malus Sargentii	2"Cal Min.
	14	Magic Carpet Spirea	Spiraea japonica	2 gal Min.
	17	Lodense Privet	Ligustrum vulgare	2 gal Min.
	2	Goldfinger Potentilla	Potentila fruticosa	2 gal Min.

1.**6.04 Landscape Design** of UDO requires foundation and parking planting areas.
1.a. **Parking**
1.a.i. 724' 8" perimeter
1.a.ii. 5 shrubs for 25' of perimeter = 29 shrubs. 31 provided.
1.a.iii. 1 large tree per 40' of perimeter = 18 large trees. 19 provided
1.b. Call out location of Crabapple. Not seeing on plan.
1.c. Street trees are being counted toward parking planting.
1.d. Update schedule with shrub totals.



OWNER / DEVELOPER
GREENAMYRE RENTALS, INC.
2500 S 2ND STREET
LEAVENWORTH, KS 66048

20 0 20
scale feet
1" = 20'

NO.	REVISIONS	DATE

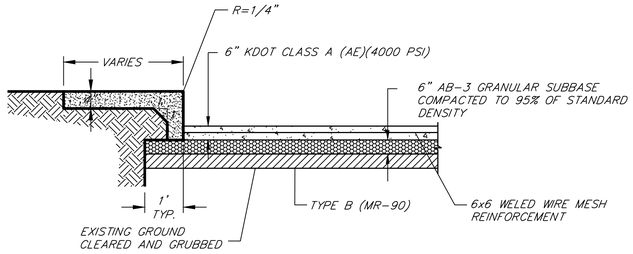
LANDSCPAE PLAN

FAIRLANE TOWNHOMES PH 2
LANSING, KANSAS

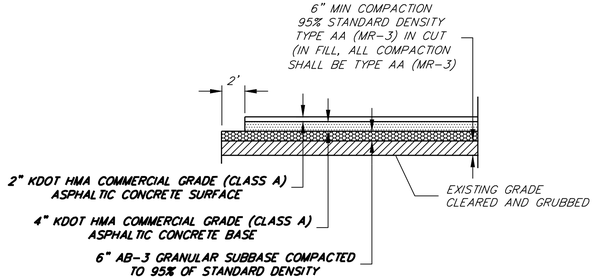
benesch
Alfred Benesch & Company
15700 College Blvd, Suite 202
Lenexa, Kansas 66219
913-888-4647
Job No. - 2020-035 10

PROJECT: FAIRLANE TOWNHOMES
DATE: July 2, 2025
JOB NO.: 1325-500010.00
SHEET NO.: 2 of 3

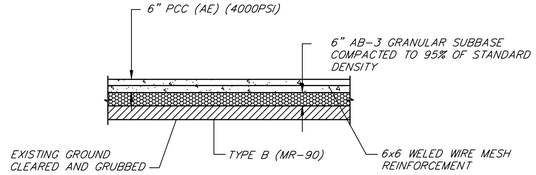
[File Location: K:\Kansas\13XX-SHS\1325-500010.00_Greenamyre\Eng_Docs\Drawings\1325-500010.00-Site Plans\1325-500010_Site Plan_Ph 2.dwg] [Plot Date: 7/2/2025 12:27:05 PM] [Last Saved: 7/2/2025 12:36:33 PM] [Saved By: Edendwolf]



TURN DOWN SIDEWALK
NOT TO SCALE



TYPICAL ASPHALT PAVEMENT SECTION
NOT TO SCALE



TYPICAL CONCRETE PAVEMENT & TRASH ENCLOSURE SECTION
NOT TO SCALE

SITE PAVEMENTS

NOTE: PAVEMENTS SHALL CONSIST OF 6-INCHES OF ASPHALT OR CONCRETE AS SHOWN IN THE SITE PLAN WITH A 6-INCH AGGREGATE BASE. PARKING, LOADING, AND WALKWAYS SHALL BE CONCRETE PAVEMENT.

TRASH ENCLOSURE
NOT TO SCALE

TRASH STORAGE SCREENING DETAIL

NOTE: PROPOSED TRASH ENCLOSURE SIZE, MATERIALS, AND COLOR SCHEME TO MATCH OR BE VERY SIMILAR TO THE FAIRLANE TOWNHOMES PHASE 1 DEVELOPMENT.

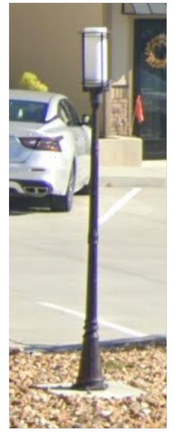
TYPICAL BUILDING FINISHES 20-FT STRUCTURE HEIGHT
NOT TO SCALE

STRUCTURE BUILDING MATERIALS

NOTE: BUILDING SIZING, COLOR SCHEME, AND MATERIALS WILL BE THE SAME OR VERY SIMILAR TO THE FAIRLANE TOWNHOMES PHASE 1 DEVELOPMENT AND WILL CONSIST OF THE FOLLOWING:

1. 6" THICK CONCRETE SLAB ON GRADE PER CODE.
2. STRUCTURAL LUMBER FOR FRAMING, ½" ROOF DECKING AND ¾" T&G PLYWOOD FOR FLOORING ON 2ND FLOOR.
3. DOUBLE PANE HIGH EFFICIENCY WINDOWS.
4. SMART SIDING AND SMART LAP SIDING.
5. BLOWN IN INSULATION (BIB) TYPE INSULATION IN ALL WALLS AND CEILING AND OVERHANGS.
6. WIRING PER CODE.
7. HVAC BY BESELS PER CODE. ALL EQUIPMENT TO BE HIGH EFFICIENCY, ELECTRIC FURNACE AND AC EQUIPMENT.
8. ROOFING TO BE 60 MIL SINGLE PLY ROOFING INSTALLED OVER 1" RIGID INSULATION WITH R-VALUE OF 7. THIS INSULATION BOARD ADDED TO THE 12" BATT INSULATION IN CEILING WILL BRING THE TOTAL INSULATION VALUE OF THE CEILING TO R-40. WALLS WILL BE R-22 BIB INSULATION.
9. FLOORING ON MAIN FLOOR TO BE LUXURY VINYL WITH STAIRS AND UPSTAIRS ROOM TO BE CARPET.
10. FIRE WALLS SEPARATING UNITS WILL BE 2' SHAFT LINER TO MEET CODES.
11. TWO COARS OF EXTERIOR PAINT ON ALL EXTERIOR SIDING.
12. SHEETROCK ON INTERIOR WALLS TO BE TAPED, MUDDED, PRIMED AND PAINTED.

MONUMENT SIGN
NOT TO SCALE

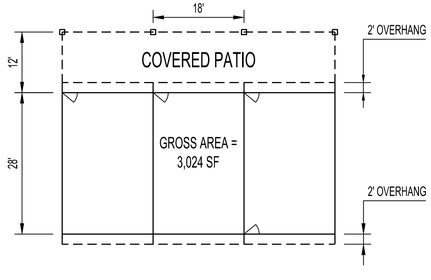


6' PEDESTAL LIGHT
NOT TO SCALE

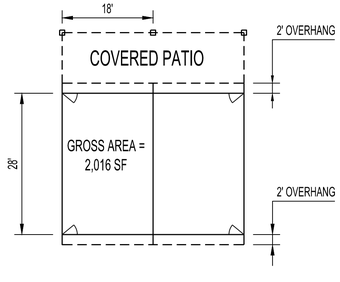
LIGHTING DETAIL

NOTE: SITE LIGHTING WILL FOLLOW LANSING UNIFIED DEVELOPMENT ORDINANCE SECTION 6.05. SITE LIGHTING PLAN WILL BE SUBMITTED PRIOR TO ISSUANCE OF BUILDING PERMIT. SITE LIGHTING WILL PRIMARILY COME FROM BUILDING LIGHTS WITH SHIELDING FOR DARK SKY LIGHTING AND MAY UTILIZE 6-FT PEDESTAL LIGHTING AS SHOWN IN DETAIL.

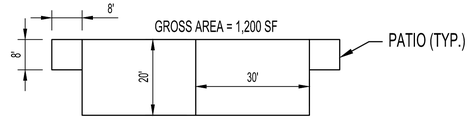
TRIPLEX BUILDING FOOT PRINT TWO STORY



DUPLEX BUILDING FOOT PRINT TWO STORY



DUPLEX BUILDING FOOT PRINT (SINGLE STORY)



NO.	REVISIONS	DATE

SITE DETAILS

FAIRLANE TOWNHOMES PH 2
LANSING, KANSAS

benesch
Alfred Benesch & Company
15700 College Blvd, Suite 202
Lenexa, Kansas 66219
913-888-4647
Job No. - 2020-035.10

PROJECT: FAIRLANE TOWNHOMES
DATE: July 2, 2025
JOB NO.: 1325-500010.00
SHEET NO.: 3 of 3

[File Location: K:\Kansas\13XX-50\51325-500010.00_Greensmyre\Eng_Docs\Drawings\1325-500010.00-Site Plan\1325-500010_Site Plan Ph 2.dwg] [Plot Date: 7/2/2025 2:35:19 PM] [Last Saved: 7/2/2025 2:34:55 PM, Edwardsd1]

FAIRLANE TOWNHOMES

Phase 2 Site Plan - Sheet 1 of 3
Fairlane Commercial Development
Northwest 1/4 of Section 19, Township 9 South, Range 23 East
City of Lansing, Leavenworth County, Kansas

LEGAL DESCRIPTION: A tract of land being all of Lot 2B Midtown Court Subdivision, 2nd Plat, and all of Lot 2, Fairlane Commercial Development, and a part of Abandoned Railroad of Santa Fe Subdivisionm all being a part of the Northwest Quarter of Section 19, Township 9 South, Range 23 East of the 6th P.M. in the City of Lansing, Leavenworth County, Kansas.

NOTES:

1. DATE OF SURVEY: FIELD SURVEY WAS PERFORMED APRIL 14, 2024.
2. BASIS OF BEARINGS: NORTH LINE OF MIDTOWN COURT, 2ND PLAT, BEING N 88°45'25" E. (NOT GRID NORTH.)
3. FLOOD INFORMATION: THE SUBJECT PROPERTY IS LOCATED ON FLOOD INSURANCE RATE MAP NUMBER 20103C0144G, EFFECTIVE DATE: JULY 16, 2015, PANEL 144 OF 425 IN ZONE X (AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN). FLOOD INFORMATION IS SUBJECT TO CHANGE.
4. PROJECT BENCHMARK: SQUARE CUT ON NORTHWEST CORNER OF CURB INLET NORTHWEST OF INTERSECTION OF FAIRLANE ST. AND SANTE FE DR., ELEVATION: 819.39 - NAVD 88 VERTICAL DATUM.
5. SANITARY SEWER SERVICE TO BE PROVIDED BY CITY OF LANSING
6. PUBLIC WATER SERVICE PROVIDED BY LANDEL WATER.
7. SEDIMENT WILL BE CONTROLLED DURING ALL GRADING AND CONSTRUCTION PHASES OF DEVELOPMENT.
8. ALL EXISTING AND PROPOSED TOWNHOMES ARE 2 STORY UNITS, EXCEPT BUILDING 4.
9. MONUMENT SIGN TO MATCH MONUMENT SIGN LOCATED ON FAIRLANE STREET.

GENERAL SITE DATA:

GROSS AREA: 137,072 SQ. FT. - 3.2 ACRES
EXISTING ZONING:
R-4 - MULTI-FAMILY RESIDENTIAL DISTRICT
MINIMUM LOT SIZE = 10,000 S.F
MINIMUM LOT WIDTH = 60 FEET
MINIMUM SETBACKS:

FRONT: 25 FEET
SIDE: 10 FEET
REAR: 30 FEET

PARKING DATA

LANSING UNIFIED DVELOPMENT ORDINANCE RECOMMENDS 2 STALLS PER UNIT.
TOTAL UNITS 21
PARKING W/ 2 ADA 44 SPACES

LEGEND
HP - HIGH POINT
ME - MATCH EXISTING
TP - TOP OF PAVEMENT
LP - LOW POINT
- CONCRETE PAVEMENT
- ASPHALT PAVEMENT

OWNER / DEVELOPER
GREENAMYRE RENTALS, INC.
2500 S 2ND STREET
LEAVENWORTH, KS 66048

20 0 20
scale feet
1" = 20'

DATE | REVISIONS | NO.

SITE PLAN

FAIRLANE TOWNHOMES PH 2
LANSING, KANSAS

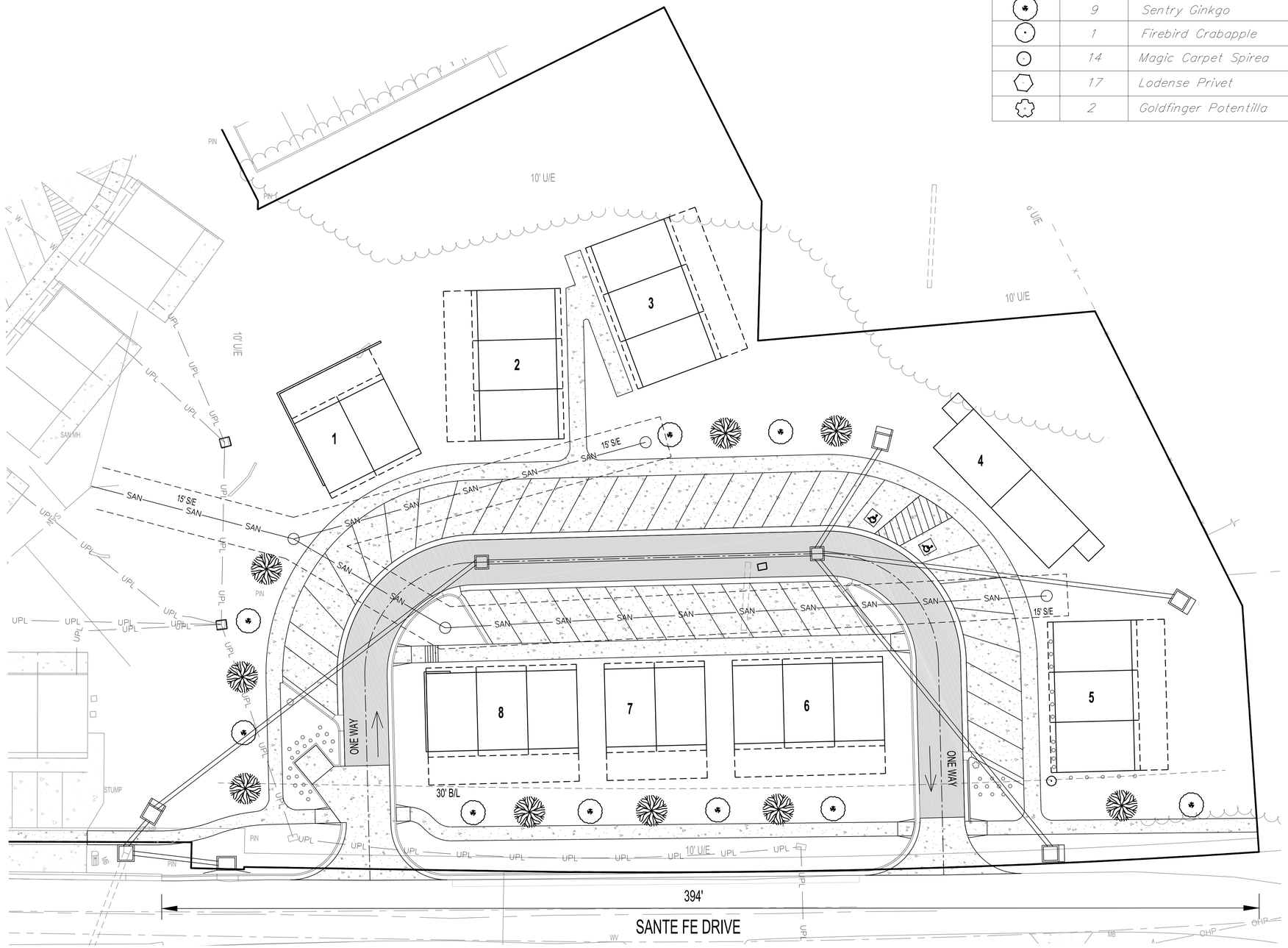
benesch
Alfred Benesch & Company
15700 College Blvd, Suite 202
Lenexa, Kansas 66219
913-888-4647
Job No. - 2020-035.10

PROJECT: FAIRLANE TOWNHOMES
DATE: July 2, 2025
JOB NO.: 1325-500010.00
SHEET NO.: 1 of 3

[File Location: Y:\Kansas\LXK-SOS\1325-500010.00-Greenamyre\Eng_Docs\Drawings\1325-500010.00-Site Plan\1325-500010_Site Plan_Ph 2.dwg] [Plot Date: 7/2/2025 9:32:11 AM] [Last Saved: 7/2/2025 9:32:13 AM, Edwardsd1]

PLANTING SCHEDULE

Symbol	Total	Common Name	Botanical Name	Size
	9	Commemoration Sugar Maple	Acer saccharum	2"Cal Min.
	9	Sentry Ginkgo	Princeton Sentry	2"Cal Min.
	1	Firebird Crabapple	Malus Sargentii	2"Cal Min.
	14	Magic Carpet Spirea	Spiraea japonica	2 gal Min.
	17	Lodense Privet	Ligustrum vulgare	2 gal Min.
	2	Goldfinger Potentilla	Potentila fruticosa	2 gal Min.



OWNER / DEVELOPER
GREENAMYRE RENTALS, INC.
2500 S 2ND STREET
LEAVENWORTH, KS 66048

20 0 20
scale feet
1" = 20'

NO.	REVISIONS	DATE

LANDSCPAE PLAN

FAIRLANE TOWNHOMES PH 2
LANSING, KANSAS

benesch
Alfred Benesch & Company
15700 College Blvd, Suite 202
Lenexa, Kansas 66219
913-888-4647 Job No. - 2020-035 10

PROJECT: FAIRLANE TOWNHOMES
DATE: July 2, 2025
JOB NO.: 1325-500010.00
SHEET NO.: 2 of 3

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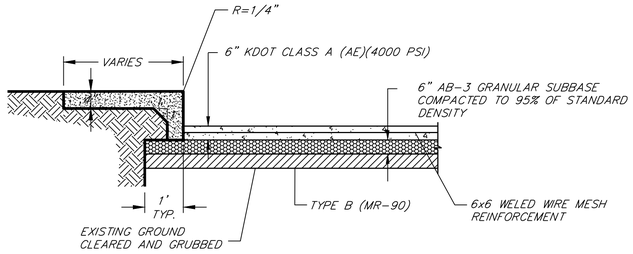
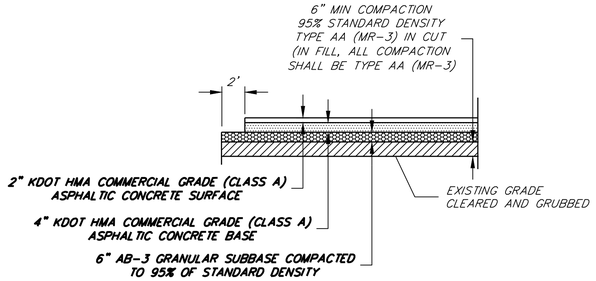


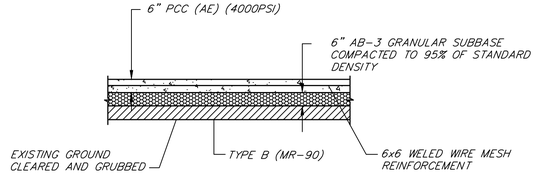
TURN DOWN SIDEWALK

NOT TO SCALE



TYPICAL ASPHALT PAVEMENT SECTION

NOT TO SCALE



TYPICAL CONCRETE PAVEMENT & TRASH ENCLOSURE SECTION

NOT TO SCALE

SITE PAVEMENTS

NOTE: PAVEMENTS SHALL CONSIST OF 6-INCHES OF ASPHALT OR CONCRETE AS SHOWN IN THE SITE PLAN WITH A 6-INCH AGGREGATE BASE. PARKING, LOADING, AND WALKWAYS SHALL BE CONCRETE PAVEMENT.

TRASH ENCLOSURE

NOT TO SCALE

TRASH STORAGE SCREENING DETAIL

NOTE: PROPOSED TRASH ENCLOSURE SIZE, MATERIALS, AND COLOR SCHEME TO MATCH OR BE VERY SIMILAR TO THE FAIRLANE TOWNHOMES PHASE 1 DEVELOPMENT.

TYPICAL BUILDING FINISHES 20-FT STRUCTURE HEIGHT

NOT TO SCALE

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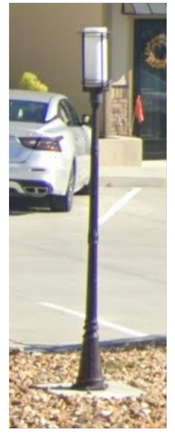

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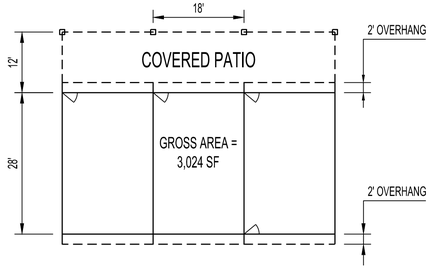

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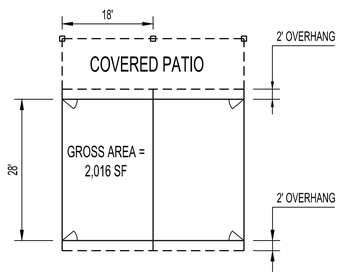
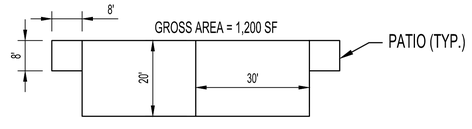


DUPLEX BUILDING FOOT PRINT (SINGLE STORY)



NO.	REVISIONS	DATE

SITE DETAILS

FAIRLANE TOWNHOMES PH 2
LANSING, KANSAS

benesch
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913-888-4647
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PROJECT: FAIRLANE TOWNHOMES
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(Published in the *Leavenworth Times* on the ____ day of _____, 2025)

Resolution No. B-6-2025

A RESOLUTION OF THE GOVERNING BODY OF THE CITY OF LANSING, KANSAS DETERMINING THAT THE CITY IS CONSIDERING ESTABLISHING A REINVESTMENT HOUSING INCENTIVE DISTRICT WITHIN THE CITY AND ADOPTING A PLAN FOR THE DEVELOPMENT OF HOUSING AND PUBLIC FACILITIES IN SUCH PROPOSED DISTRICT; ESTABLISHING THE DATE AND TIME OF A PUBLIC HEARING ON SUCH MATTER, AND PROVIDING FOR THE GIVING OF NOTICE OF SUCH PUBLIC HEARING
(FAIRLANE TOWN HOMES PHASE II REINVESTMENT HOUSING INCENTIVE DISTRICT)

WHEREAS, the Kansas Reinvestment Housing Incentive District Act, K.S.A. 12-5241 *et seq.* (the "Act") authorizes any city incorporated in accordance with the laws of the state of Kansas (the State) to designate Reinvestment housing incentive districts ("RHID") within such city; and

WHEREAS, the City of Lansing, Kansas (the "City") constitutes a City as said term is defined in the Act; and

WHEREAS, a housing needs analysis titled Housing Lansing (the "Analysis") has been performed with regard to the City, a copy of which is on file in the office of the City Clerk;

WHEREAS, Resolution No. B-10-2024 adopted by the City Council (the "Governing Body") made certain findings relating to the need for financial incentives for the construction of quality housing within the City, declared it advisable to establish a Reinvestment Housing Incentive District pursuant to the Act and authorized the submission of such Resolution and Analysis to the Kansas Department of Commerce in accordance with the Act; and

WHEREAS, the Secretary of the Kansas Department of Commerce, pursuant to a letter dated August 12, 2024, authorized the City to proceed with the establishment of a Reinvestment Housing Incentive District pursuant to the Act; and

WHEREAS, the City has caused to be prepared a plan (the "Plan") for the development or redevelopment of housing and public facilities in the Fairlane Town Homes Phase II Reinvestment Housing Incentive District (the "District") in accordance with the provisions of the Act; and

WHEREAS, the Plan includes:

1. The legal description and map required K.S.A. 12-5244(a);
2. The existing assessed valuation of the real estate in the proposed District listing the land and improvement values separately;

3. A list of the names and addresses of the owners of record of all real estate parcels within the proposed District;
4. A description of the housing and public facilities project or projects that are proposed to be constructed or improved in the District, and the location thereof;
5. A listing of the names, addresses and specific interests in real estate in the proposed District of the developers responsible for development of the housing and public facilities in the proposed District;
6. The contractual assurances, if any, the Governing Body has received from such developer or developers, guaranteeing the financial feasibility of specific housing tax incentive projects in the proposed District;
7. A comprehensive analysis of the feasibility of providing housing tax incentives in the proposed District as provided in the Act, which shows that the public benefits derived from such District will exceed the costs and that the income therefrom, together with all public and private sources of funding, will be sufficient to pay for the Eligible Costs and public improvements that may be undertaken in such District. If other sources of public or private funds are to be used to finance the improvements, they shall be identified in the analysis; and

WHEREAS, the Governing Body proposes to continue proceedings necessary to create the District and adopt the Plan by the calling of a public hearing on such matters.

THERFORE BE IT RESOLVED by the Governing Body of the City of Lansing, Kansas as follows:

Section 1. Proposed Reinvestment Housing Incentive District. The Governing Body hereby declares an intent to establish the District. The District is proposed to be formed within the boundaries of the real estate legally described in ***Exhibit A*** attached herein, and shown on the map depicting the existing parcels of land attached herein as ***Exhibit B***. A list of the names and addresses of the owners of record of all real estate parcels within the proposed District and the existing assessed valuation of said real estate, listing the land improvement values separately, is attached hereto as ***Exhibit C***.

Section 2. Proposed Plan. The Governing Body hereby further declares intent to adopt the Plan in substantially the form presented to the Governing Body on this date, with such changes or supplements as may be approved by the City. A copy of the Plan shall be filed in the office of the City Clerk and be available for public inspection during normal business hours. A description of the housing and public facilities projects that are proposed to be constructed or improved in the proposed District, and the location thereof are described in ***Exhibit D*** attached hereto. A summary of the contractual assurances by the developer and the comprehensive feasibility analysis is contained in ***Exhibit E*** attached hereto.

Section 3. Public Hearing. Notice is hereby given that a public hearing will be held by the Governing Body of the City to consider the establishment of the District and adoption of the Plan on **August 7, 2025** at the City Hall, located at 800 First Terrace, Lansing, Kansas 66043; the public hearing to commence at 7:00 p.m. or as soon thereafter as the Governing Body can hear the matter. At the public hearing, the Governing Body will receive public comment on such matters, and may, after the conclusion of such public hearing, consider the findings necessary for establishment of the District and adoption of the Plan, all pursuant to the Act.

Section 4. Notice of Public Hearing. The City Clerk is hereby authorized and directed to provide for notice of the public hearing by taking the following actions:

A. A certified copy of this Resolution shall be delivered to:
   i. The Board of County Commissioners of Leavenworth County, Kansas;
   ii. The Board of Education of Unified School District No. 469, Leavenworth County, Kansas (Lansing); and
   iii. The Planning Commission of the City.

B. This Resolution, specifically including ***Exhibits A*** thru ***E*** attached hereto, shall be published at least once in the official newspaper of the City not less than one week or more than two weeks preceding the date of the public hearing.

C. The Resolution, including ***Exhibits A*** thru ***E*** attached hereto, is available for inspection at the office of the clerk of the City at normal business hours. Members of the public are invited to review the plan and attend the public hearing on the date announced in this Resolution.

Section 5. Further Action. The Mayor, City Administrator, City Clerk and the officials and employees of the City, including the City Attorney and Gilmore & Bell, P.C. as counsel to the City, are hereby further authorized and directed to take such other actions as may be appropriate or desirable to accomplish the purposes of this Resolution.

Section 6. Effective Date. This Resolution shall take effect after its adoption by the Governing Body.

ADOPTED by the Governing Body of the City of Lansing, Kansas on this 17th day of June 2025.

Anthony R. McNeill, Mayor

ATTEST:

Tish Sims, City Clerk

(SEAL)

EXHIBIT A

LEGAL DESCRIPTION OF PROPOSED RHID BOUNDARIES FOR THE FAIRLANE TOWN HOMES PHASE II RHID

Legal Description:

A tract of land being a part of Lot 1, Fairlane Townhomes, 1st Plat, an Administrative Plat in Lansing, Leavenworth County, Kansas, filed as Document Number 2023P00058 at the Register of Deeds office of Leavenworth County; a description written by D. Steven West, PS No. 1614, on June 10, 2025, and being more particularly described as follows:

Beginning at the Northwest Corner of said Lot 1, said point being the same point as the Point of Beginning for said plat boundary of Fairlane Townhomes, 1st Plat; thence N 88°45'25" E along the North boundary line of said plat, a distance of 118.22 feet; thence S 68°29'00" E along the North boundary line of said plat, a distance of 88.51 feet to a point of curvature; thence Southwesterly along the East boundary line of said plat along a curve to the right having an initial tangent bearing of S 21°31'00" W, a radius of 3270.00 feet, a delta angle of 04°45'10", and an arc length of 271.25 feet; thence continuing along the East boundary line of said plat S 26°16'09" W, a distance of 93.31 feet; thence N 63°27'11" W, a distance of 236.04 feet;

thence N 01°04'45" W along part of the West boundary of said plat, a distance of 162.94 feet;

thence N 88°38'53" E along part of the West boundary of said plat, a distance of 77.92 feet;

thence S 63°07'28" E along part of the West boundary of said plat, a distance of 50.04 feet;

thence N 20°22'03" E along part of the West boundary of said plat, a distance of 121.48 feet to the Point of Beginning, and containing 81,198.56 square feet, more or less.

EXHIBIT B

MAP OF PROPOSED

FAIRLANE TOWN HOMES PHASE II REVINVESTMENT HOUSING INCENTIVE DISTRICT

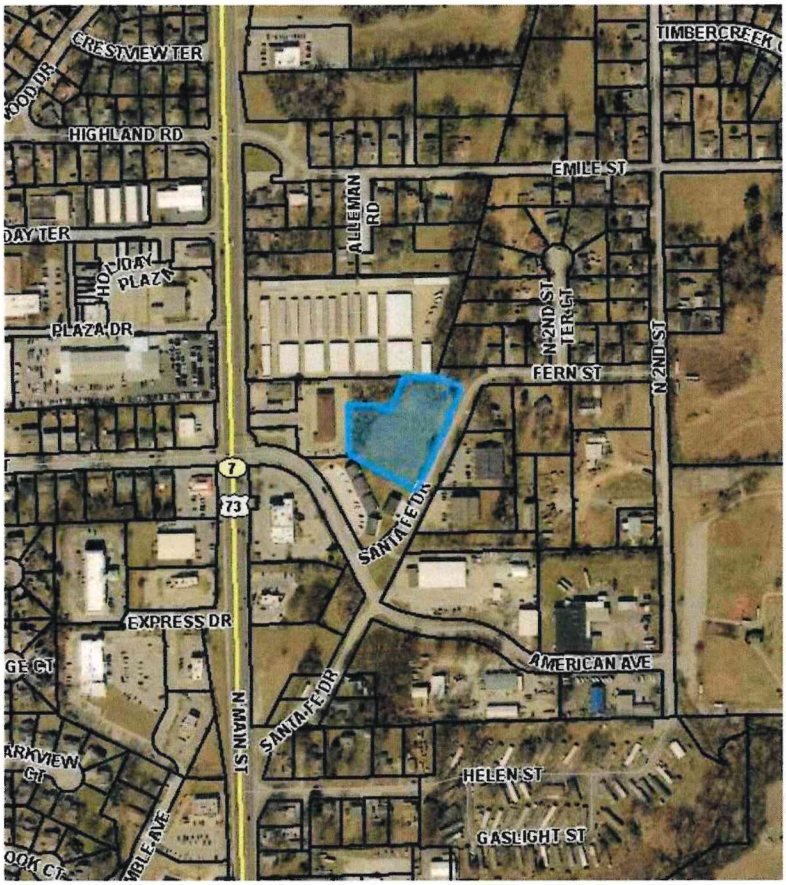
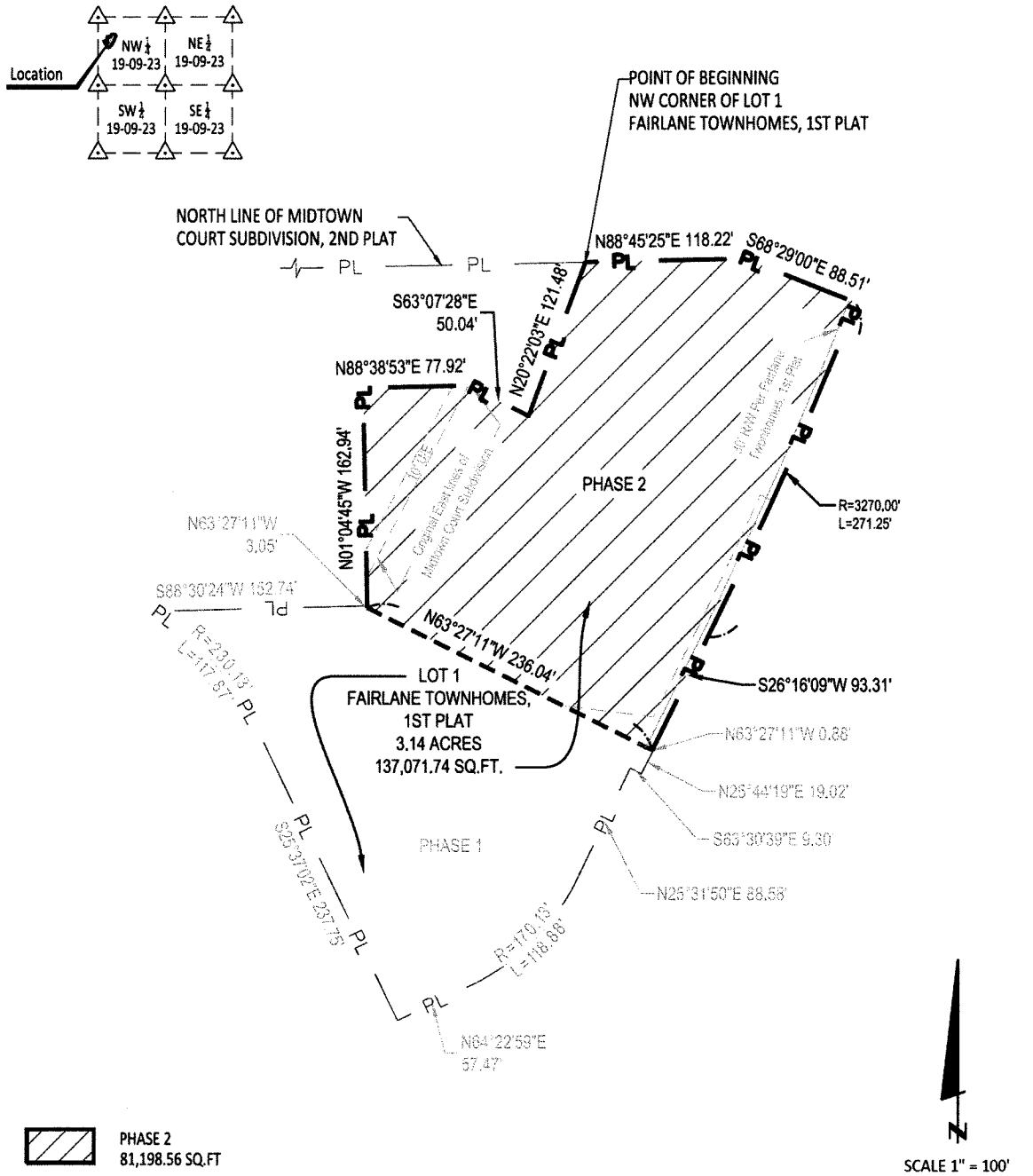


ILLUSTRATION FOR EXHIBIT A



This illustration does not represent a monumented survey. It is intended only to depict the attached legal description.

EXHIBIT A FAIRLANE TOWNHOMES, 1ST PLAT - PHASE 2	SHEET NO. 2 of 2

EXHIBIT C

NAME AND ADDRESSES OF THE OWNERS OF RECORD OF ALL REAL ESTATE PARCELS WITHIN THE PROPOSED FAIRLANE TOWN HOMES PHASE II REINVESTMENT HOUSING INCENTIVE DISTRICT AND THE EXISTING ASSESSED VALUATION OF SAID REAL ESTATE PARCELS AND NAMES AND ADDRESSES OF THE DEVELOPERS

Owners of Real Property:	Greenamyre Rentals, Inc. 2500 S. 2nd Street Leavenworth, KS 66048
Developer:	Greenamyre Rentals, Inc. 2500 S. 2nd Street Leavenworth, KS 66048
Individuals with specific interest	Greenamyre Rentals, Inc. 2500 S. 2nd Street Leavenworth, KS 66048
Existing Assessed Valuation of the District	Land: $27,141.00 Improvements: $0.00

EXHIBIT D

DESCRIPTION OF THE HOUSING AND PUBLIC FACILITIES PROJECT OR PROJECTS THAT ARE PROPOSED TO BE CONSTRUCTED OR IMPROVED IN THE PROPOSED RHID

The housing and public facility project will include the construction and extension of certain infrastructure and utility improvements needed to develop a townhome project within the District, which is currently anticipated to include approximately 21 units, consisting primarily of five (5) triplex buildings (15 units) and three (3) duplexes (6 units), which will include nineteen (19) 2-bedroom/1.5-bath units and two (2) 1-bed/1-bath units, as ultimately determined by developer consistent with the City of Lansing's RHID Policy.

ELIGIBLE COSTS. Developer is largely not seeking reimbursement of traditional infrastructure expenses as they are already constructed, but is seeking reimbursement for the vertical construction per K.S.A. 12-5249(a)(12), which allows for eligible costs to include:

> *(12) renovation or construction of residential dwellings, multi- family units or buildings or other structures exclusively for residential use located on existing lots if:*
>
> *(A) The infrastructure, including streets, sewer, water and utilities, has been in existence for at least 10 years; or*
>
> *(B) the existing lot has been subject to any tax assessment levied pursuant to chapter 12, article 6a or chapter 19, article 27 of the Kansas Statutes Annotated, and amendments thereto, because such lot is located in an improvement district established pursuant to chapter 12, article 6a or chapter 19, article 27 of the Kansas Statutes Annotated, and amendments thereto.*

Developer and City agree that such construction costs are eligible pursuant to K.S.A. 12-5249(a)(12)(A) as the infrastructure, including streets, sewer, water and utilities, has been existence for at least 10 years.

EXHIBIT E

SUMMARY OF THE CONTRACTUAL ASSURANCES BY THE DEVELOPER AND OF THE COMPREHENSIVE FEASIBILITY ANALYSIS

Contractual Assurances

The Governing Body of the City of Lansing will enter into a development agreement with Greenamyre Rentals, Inc., the developer. This agreement, as supplemented and amended, will include the project construction schedule, a description of projects to be constructed, financial obligations of the developer and financial and administrative support from the City of Lansing, Kansas.

Feasibility Study

The Developer conducted a study to determine whether the public benefits derived from the District will exceed the costs and that the income from the District, together with other sources of revenue provided by the developer, would be sufficient to pay for the public improvements and other Eligible Costs to be undertaken in the District. The analysis estimates the property tax revenues that will be generated from the Development, less existing property taxes and certain unavailable property tax revenues to determine the revenue stream available to support the costs of the public infrastructure and other Eligible Costs. The estimates indicate that the revenue realized from the project together with other sources of Developer funds would be adequate to pay the eligible costs.

Planning Commission Staff Report
July 16, 2025

Cases 2025-DEV-008
724 N De Soto Rd

Project Facts

Applicant
SMH Consultants

Owner
Circle H Holdings

Address
724 N De Soto Road

Property ID
106-13-0-30-03-003.00, 106-13-0-30-03-004.00, and 106-13-0-30-01-049.00

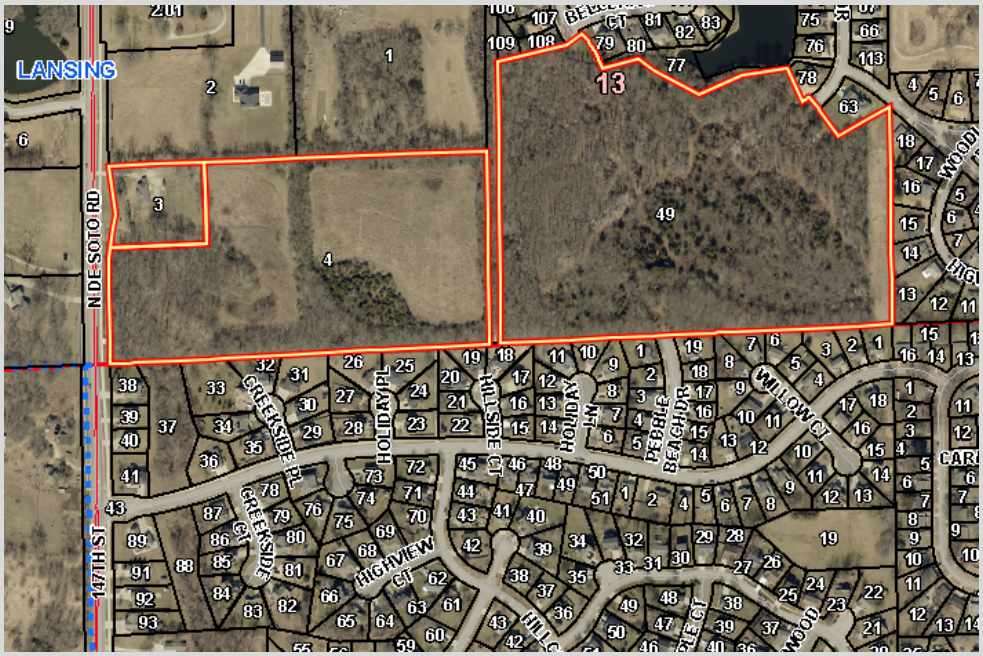
Zoning
R-2 Single-Unit Residential District & R-2-P Single-Unit Residential Planned District

Future Land Use
Single-Family Residential & Medium Density Residential

Land
45.28 acres

Building
Existing: 1 Residential (pending removal)

Requested Approvals
Preliminary Plat



Summary

The applicant is requesting the approval of a Preliminary Plat for Monroe Manor subdivision, a 45.28-acre subdivision with a proposed 194 single-family lots. The developer is proposing to build out the subdivision through 3 phases. The developer is proposing to develop the 40’ lots with an average lot size of 6,578 sf.

Discussion points from Checklist

The checklist was reviewed and completed by the Director of Community & Economic Development. Items marked no are discussed below **(Review completed 7/8/2025 items from Checklist may have been addressed by the time meeting occurs)**:

- Item 1 – No payment made.
- Item 3 – Physical copies of the plat were not submitted.
- Item 8.G.1. – Dedicated park location remains outstanding issue to be resolved upon Final Plat.
- Item 8.L - Dedicated park location remains outstanding issue to be resolved upon Final Plat. Plat currently dedicates land along Winslow Trail to the City, but the City recognizes that as ROW which has already been dedicated.

Staff Comments

Comments on this preliminary plat have not been addressed to date but can be during the process of moving from preliminary to final plat.

Community & Economic Development (from Article 2.02-D of the UDO):

- The application is in accordance with the Comprehensive Plan and in particular the physical patterns, arrangement of streets, blocks, lots and open spaces, and public realm investments that reflect the principles and concepts of the plan.
  - The City's 2030 Comprehensive Plan Future Land Use Map has defined this area as residential use.
- Compliance with the requirements of this Land Development Code, and in particular the blocks and lots proposed are capable of meeting all development and site design standards under the existing or proposed zoning.
  - The current zoning for the site is split between R-2 and R-2-P Single Unit Residential District. All proposed lots have the potential to provide building sites conforming to City zoning requirements.
- Any phasing proposed in the application is clearly indicated and demonstrates a logical and coordinated approach to development, including coordination with existing and potential development on adjacent property.
  - The three proposed phases meets these expectations..
- Any impacts identified by specific studies or technical reports, including a preliminary review of storm water, are mitigated with generally accepted and sound planning, engineering, and urban design solutions that reflect long-term solutions and sound fiscal investments.
  - The Public Works Director / City Engineer and Wastewater Director have both reviewed the Preliminary Plat. Certain questions remain outstanding and need to be addressed regarding the location of proposed street trees and its future impact on critical infrastructure in the ROW.
- The application does not deter any existing or future development on adjacent property from meeting the goals and policies of the Comprehensive Plan.
  - The current use conforms with the goals and policies of the Comprehensive Plan, and the application would not deter future development from meeting current goals and policies.
- The design does not impede the construction of anticipated or planned future public infrastructure within the area.
  - There are no impacts to planned future public infrastructure within the area.
- The recommendations of professional staff, or any other public entity asked to officially review the plat.
  - There are no items outstanding other than those listed in specific sections within this report.

<u>Article 6 Site & Landscape Standards</u>

1. Street tree plan to be resubmitted with species of trees and mixture of trees to meet regulations.

Public Works / City Engineer:

- See City Review documents attached to report.

Wastewater:

- See City Review documents attached to report.

Acknowledgments

The following City of Lansing staff members reviewed this project and provided information for this report:

- Joshua Gentzler, AICP – Director, Community & Economic Development
- Michael Spickelmier, P.E. – Director, Public Works / City Engineer
- Anthony Zell, MBA – Director, Wastewater

Recommendation

Staff recommends conditional approval of Cases 2025-DEV-008, Monroe Manor Preliminary Plat.

Conditions

1. Before the Final Plat for any phase is scheduled for City Council consideration, the developer shall meet with the City's Community & Economic Development and Parks & Recreation Departments to evaluate whether dedicating all or part of **Tract A** as public parkland best meets the intent of **UDO 3.05**. If the parties agree that dedication is desirable, Tract A (or the agreed-upon portion) shall be conveyed to an HOA or City by separate instrument prior to plat recordation. If dedication is not mutually determined to be in the City's best interest, the developer shall instead remit the required park fee-in-lieu pursuant to **UDO 3.05.C** before the Final Plat is recorded.
2. Developer shall submit a Street Tree plan that addresses comments made by Public Works, Community & Economic Development, and Wastewater Departments. The updated plan must:
    a. Identify species, spacing, caliper, and planting locations for all street trees on both sides of each new public street, consistent with UDO §3.06 and the City's approved species list; and
    b. Demonstrate avoidance of conflicts with underground/overhead utilities, street-lighting, and sight-distance triangles.

Action Options

"I move to _____."

1. Approve Cass No. 2025-DEV-008; or
2. Conditionally approve Case No. 2025-DEV-008 for specified reason[s]; or
3. Deny Case No. 2025-DEV-008 for specified reason[s]; or
4. Table the case to another date, time and place.

Notice of City Codes

The Applicant is subject to all applicable City codes within the Municipal Code – whether specifically stated in this report or not – including, but not limited to, Zoning, Buildings and Construction, Subdivisions, and Sign Code. The Applicant is also subject to all applicable Federal, State, and local laws.

Attachments

1. City Reviews
    a. 2025.07.03 Street Plans
    b. 2025.07.08 Street Plans
    c. 2025.07.03 Prelim Plat
2. Submitted Plat

CITY OF LANSING KANSAS

Preliminary Plat Application

Date: 06/12/2025

Applicant / Owner

Applicant Name:	Circle H Holdings LLC, Roman Haehn	Owner Name:	REILLY DEVELOPMENT LLC
Address:	5858 Naples Drive	Address:	608 DELAWARE ST LEAVENWORTH, KS 66048
City, State, Zip:	Flower Mound, Texas 75028	City, State, Zip:	,
Phone:	(512) 900-0338	Phone:	

Surveyor

Surveyor Name:		Address:	
Phone:		City, State, Zip:	

Subdivision Info

Subdivision Name:		Residential Lots:	
General Location:	East of De Soto Road, West of Highland Road, North of Holiday Drive, South of Bellerive Court & Kane Drive.	Commercial Lots:	
		Industrial Lots:	
		Other Lots:	
		Total Lots:	
Plat Acres:	45.28		
Minimum Frontage:			
Min Lot Area:			
Existing Zoning:	R-2 Single-Unit Residential District		

How Guaranteed:

Project Details

Project Name:	Monroe Manor	Location:	East of De Soto Road, West of Highland Road, North of Holiday Drive, South of Bellerive Court & Kane Drive.
Agent:	SMH Consultants, Ben Gasper, PE	Proposed Zoning:	R-2 Single-Unit Residential District
		Rezone Reason:	This property will not be rezoned with this project.

Project Description: This project will consist of 194 Single Family Residential homes along with accompanying Sanitary Sewer, Water, Streets and Storm Sewers. Property Parcel ID: 052-106-13-0-30-03-003.00-0, 052-106-13-0-30-03-004.00-0, 052-106-13-0-30-01-049.00-0

I do hereby certify that the information contained herein is true and correct.

_____ 06/12/2025

Name Date

Preliminary Plat

MONROE MANOR

Part of the SW 1/4, Section 13, Township 9 South, Range 22 East
City of Lansing, Leavenworth County, Kansas

GENERAL NOTES:

1. PLAN SCALE IS 1"=100' (THIS SHEET).
2. EXISTING AND PROPOSED TOPOGRAPHY IS AS INDICATED ON PLAN.
3. LEGAL DESCRIPTION IS AS SHOWN ON PLAN.
4. EXISTING AND PROPOSED ZONING IS AS SHOWN ON PLAN.
5. PROPERTY BOUNDARY IS AS SHOWN ON PLAN.
6. EXISTING AND PROPOSED RIGHT-OF-WAYS ARE AS SHOWN ON PLAN.
7. APPROXIMATE LOCATION OF PROPOSED UTILITIES ARE AS SHOWN ON PLAN.
8. PHASING IS AS SHOWN ON PLAN.
9. GENERAL CONFIGURATION OF LOTS AS INDICATED ON PLAN.
10. ALL UTILITY EASEMENTS AS SHOWN ON PLAN.
11. ALL PROPOSED STREETS ARE TO BE PUBLIC.
12. CUL-DE-SAC RADII'S ARE AS SHOWN ON PLAN.
13. TOPOGRAPHIC INFORMATION WAS PROVIDED BY SMH CONSULTANTS INC. CONTOURS ARE AT 2' INTERVALS.
14. UTILITY EASEMENTS SHALL BE PROVIDED ALONG SIDE AND REAR LOTS AT TIME OF PLATTING AS REQUIRED. EASEMENTS SHALL BE A MINIMUM WIDTH OF 10 FEET ALONG SIDE AND REAR LOT LINES. EASEMENTS OF ADDITIONAL WIDTH SHALL BE PROVIDED TO ENCOMPASS UTILITIES AS NEEDED.
15. ALL BUILDING LINES SHOWN ON PLAN ARE 15 FEET FROM RIGHT-OF-WAY LINE.
16. RESIDENTIAL UNIT TYPES ARE SINGLE FAMILY.
17. STREET NAMES SHALL BE SUBJECT TO CHANGE UNTIL FINAL PLAT RECORDING.

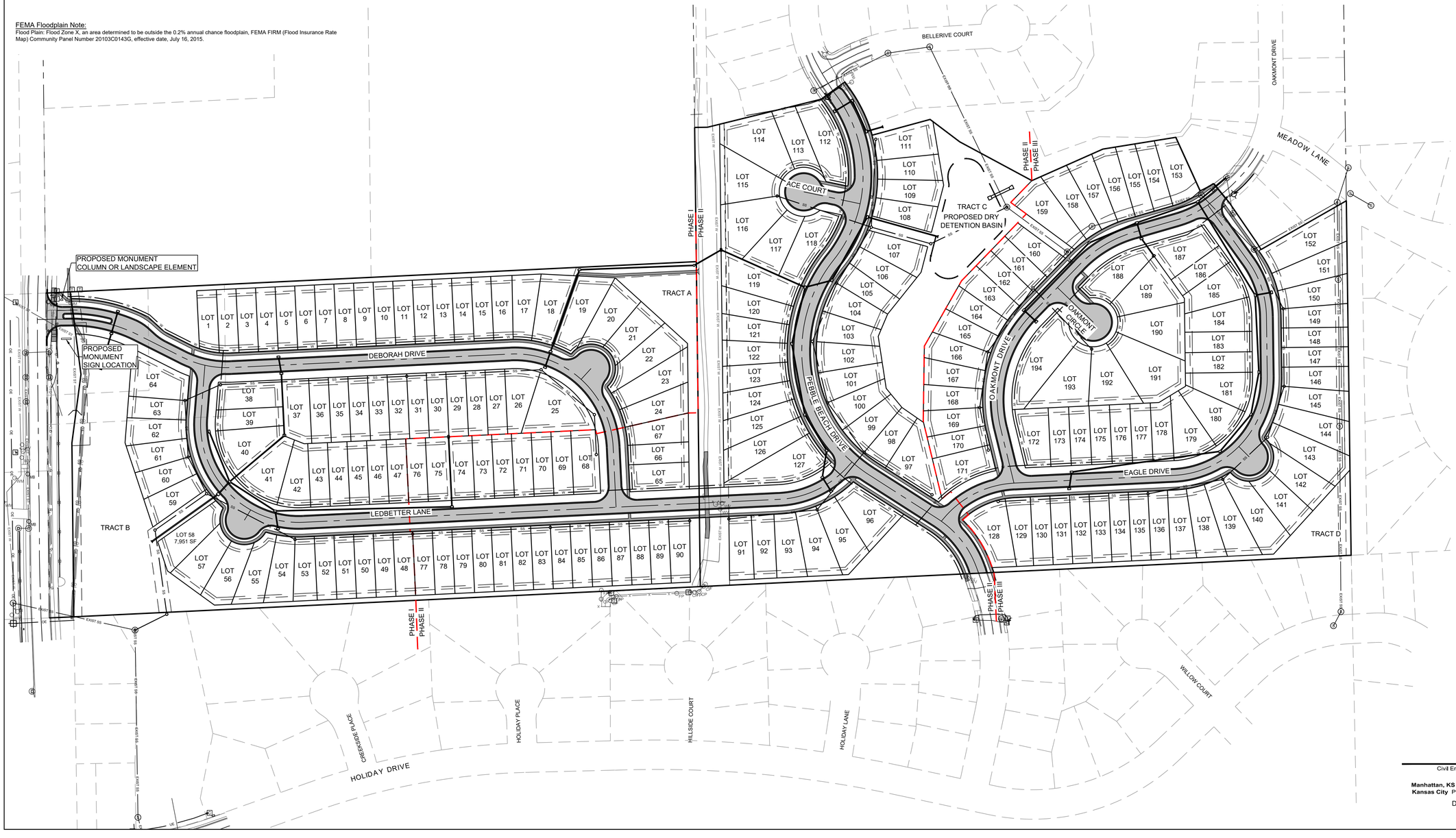
SITE DATA TABLE:

EXISTING LAND USE:	VACANT/AGRICULTURAL
EXISTING ZONING:	R-2/R-2-P
PROPOSED ZONING:	R-2/R-2-P
GROSS SITE AREA:	45.28 ACRES
TRACT AREA:	6.97 ACRES (15.39% OF TOTAL AREA)
RIGHT-OF-WAY AREA:	9.01 ACRES (19.90% OF TOTAL AREA)
LOT AREA:	29.30 ACRES (64.71% OF TOTAL AREA)
PROPOSED NUMBER OF LOTS:	194
MINIMUM LOT SIZE:	4,800 SF
AVERAGE LOT SIZE:	6,578 SF
MAXIMUM LOT SIZE:	13,336 SF
BUILDING SETBACKS:	FRONT YARD: 15 FEET REAR YARD: 15 FEET SIDE YARD: 5 FEET

LAND AREA LEGEND	
LOTS	29.30 ACRES
TRACTS	6.97 ACRES
RIGHT-OF-WAY	9.01 ACRES
TOTAL	45.28 ACRES

PHASE LEGEND		
PHASE NUMBER	ACREAGE	LOTS
PHASE I	14.86 ACRES	64
PHASE II	16.25 ACRES	63
PHASE III	14.17 ACRES	67
TOTAL	45.28 ACRES	194

FEMA Floodplain Note:
Flood Plain: Flood Zone X, an area determined to be outside the 0.2% annual chance floodplain, FEMA FIRM (Flood Insurance Rate Map) Community Panel Number 20103C0143G, effective date, July 16, 2015.



Reviewed by Public Works
No Exceptions
07/08/2025 2:22:23 PM
By mspickelmier

Reviewed by CED
07/08/2025 4:51:22 PM
By jgentzler

LEGAL DESCRIPTION:

Tract 1:
The South 1/2 of the Southwest 1/4 of the Southwest 1/4 of Section 13, Township 9 South, Range 22 East of the 6th P.M., Leavenworth County, Kansas EXCEPT: A tract of land in the South Half of the Southwest Quarter of the Southwest Quarter of Section 13, Township 9, Range 22, East of the 6th Principal Meridian, described as follows: Beginning at a point on the West line of Section 13, said point being 662.91 feet North of the Southwest corner of said Section; thence North 87°43'00" East 208.71 feet to a point; thence South and parallel to the West line of said Section 208.71 feet to a point; thence South 87°43'00" West 208.71 feet to a point on the West line of said Section; thence North along said West line 208.71 feet to the point of beginning, Leavenworth County, Kansas. less that part taken for road purposes

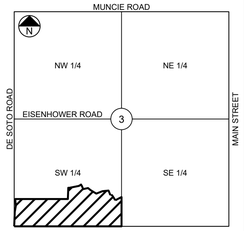
ALSO EXCEPT: A tract of land in the Northwest Quarter of the Southwest Quarter of the Southwest Quarter of Section 13, Township 9 South, Range 22 East of the 6th P.M., City of Lansing, Leavenworth County, Kansas, described as follows; Commencing at the Southwest corner of said Section 13; thence North 01°20'07" East (assumed), 394.07 feet along the West line of Section 13 to the point of beginning of this tract; thence, North 01°20'07" East 60.00 feet along said West line; thence, North 89°11'24" East 208.71 feet parallel with the North line of the South half of the Southwest Quarter of Section 13; thence, North 01°20'07" East, 208.71 feet to the North line of the South half of the Southwest Quarter of Section 13; thence North 89°11'24" East, 156.00 feet along said North line; thence South 01°20'07" West, 268.71 feet; thence, South 89°11'24" West, 364.71 feet to the point of beginning, Leavenworth County, Kansas. less part taken or used for road purposes

Tract 2:
All the part of the East 1/2 of the Southwest 1/4 of Section 13, Township 9, Range 22 that lies South of Fairway Estates, 4th Plat, in Lansing, Leavenworth County, Kansas, subject to that part of any, in streets, roadways, highways or other public rights-of-ways.

Tract 3:
A tract of land in the South Half of the Southwest Quarter of the Southwest Quarter of Section 13, Township 9, Range 22, East of the 6th Principal Meridian, described as follows: Beginning at a point on the West line of Section 13, said point being 662.91 feet North of the Southwest corner of said Section; thence North 87°43'00" East 208.71 feet to a point; thence South and parallel to the West line of said Section 208.71 feet to a point; thence South 87°43'00" West 208.71 feet to a point on the West line of said Section; thence North along said West line 208.71 feet to the point of beginning, Leavenworth County, Kansas. less that part taken for road purposes

AND

A tract of land in the Northwest Quarter of the Southwest Quarter of the Southwest Quarter of the Southwest Quarter of Section 13, Township 9 South, Range 22 East of the 6th P.M., City of Lansing, Leavenworth County, Kansas, described as follows; Commencing at the Southwest corner of said Section 13; thence North 01°20'07" East (assumed), 394.07 feet along the West line of Section 13 to the point of beginning of this tract; thence, North 01°20'07" East 60.00 feet along said West line; thence, North 89°11'24" East 208.71 feet parallel with the North line of the South half of the Southwest Quarter of Section 13; thence, North 01°20'07" East, 208.71 feet to the North line of the South half of the Southwest Quarter of Section 13; thence North 89°11'24" East, 156.00 feet along said North line; thence South 01°20'07" West, 268.71 feet; thence, South 89°11'24" West, 364.71 feet to the point of beginning, Leavenworth County, Kansas. less part taken or used for road purposes



VICINITY MAP
Section 13, T09S, R22E
Leavenworth County, Kansas

SHEET INDEX:
1 - Overall Layout
2 - Subdivision Plan (West)
3 - Subdivision Plan (East)

OWNER/DEVELOPER:
CIRCLE H HOLDINGS, LLC
5858 NAPLES DR.
FLOWER MOUND, TX 75028

ENGINEER/SURVEYOR:
SMH CONSULTANTS
5201 JOHNSON DRIVE, SUITE 405
MISSION, KS 66205

NORTH
100' 50' 0' 100'
SCALE: 1" = 100'

SMH CONSULTANTS
Civil Engineering • Land Surveying • Landscape Architecture
www.smhconsultants.com
Manhattan, KS - HQ P: (785) 776-0541 • **Dodge City, KS** P: (620) 255-1952
Kansas City P: (913) 444-9615 • **Colorado Springs, CO** P: (719) 428-8677

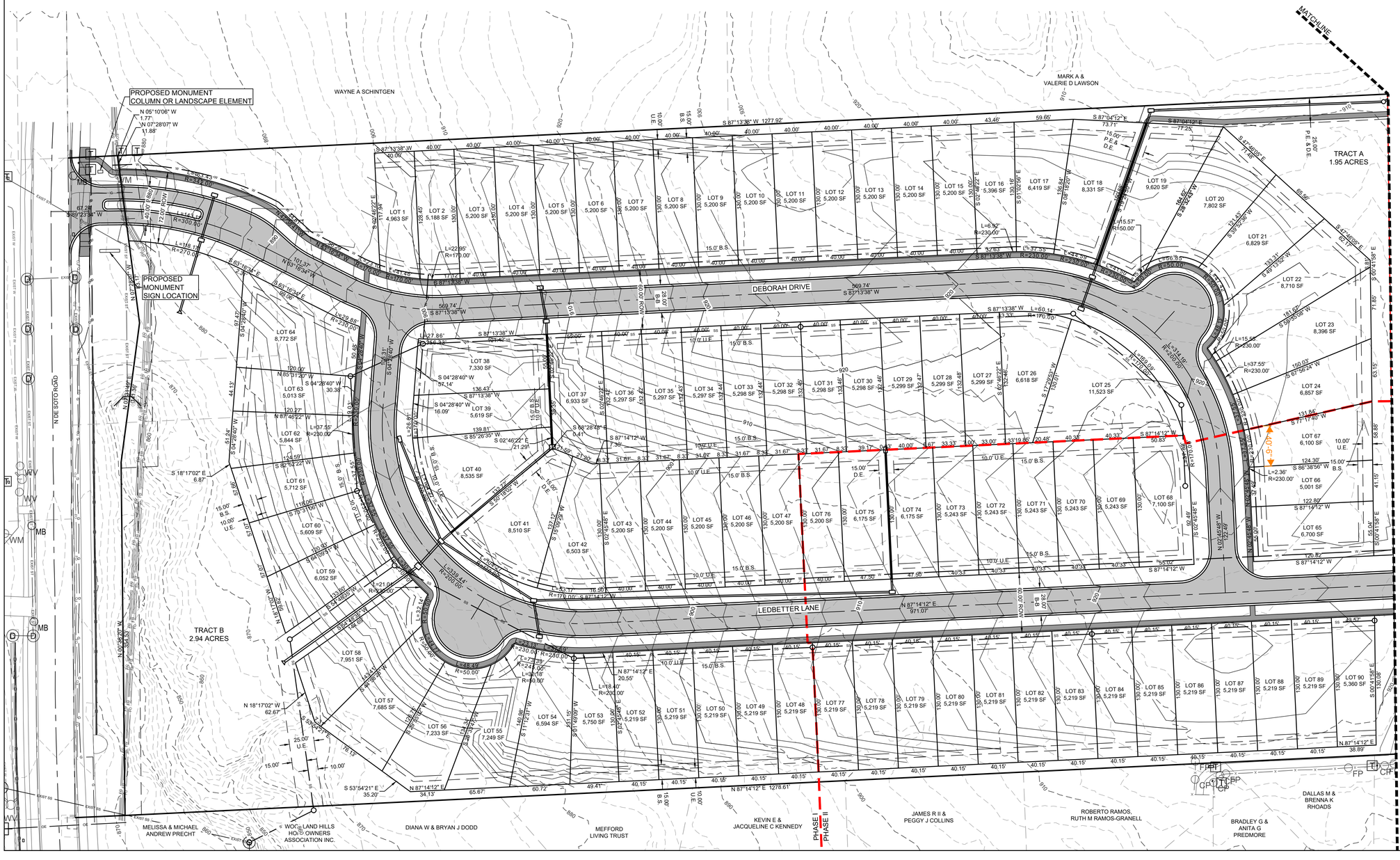
Drawn By:JMT Project #2501-0018 TDS:101

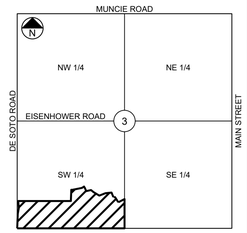
JULY 2025

Preliminary Plat

MONROE MANOR

Part of the SW 1/4, Section 13, Township 9 South, Range 22 East
City of Lansing, Leavenworth County, Kansas





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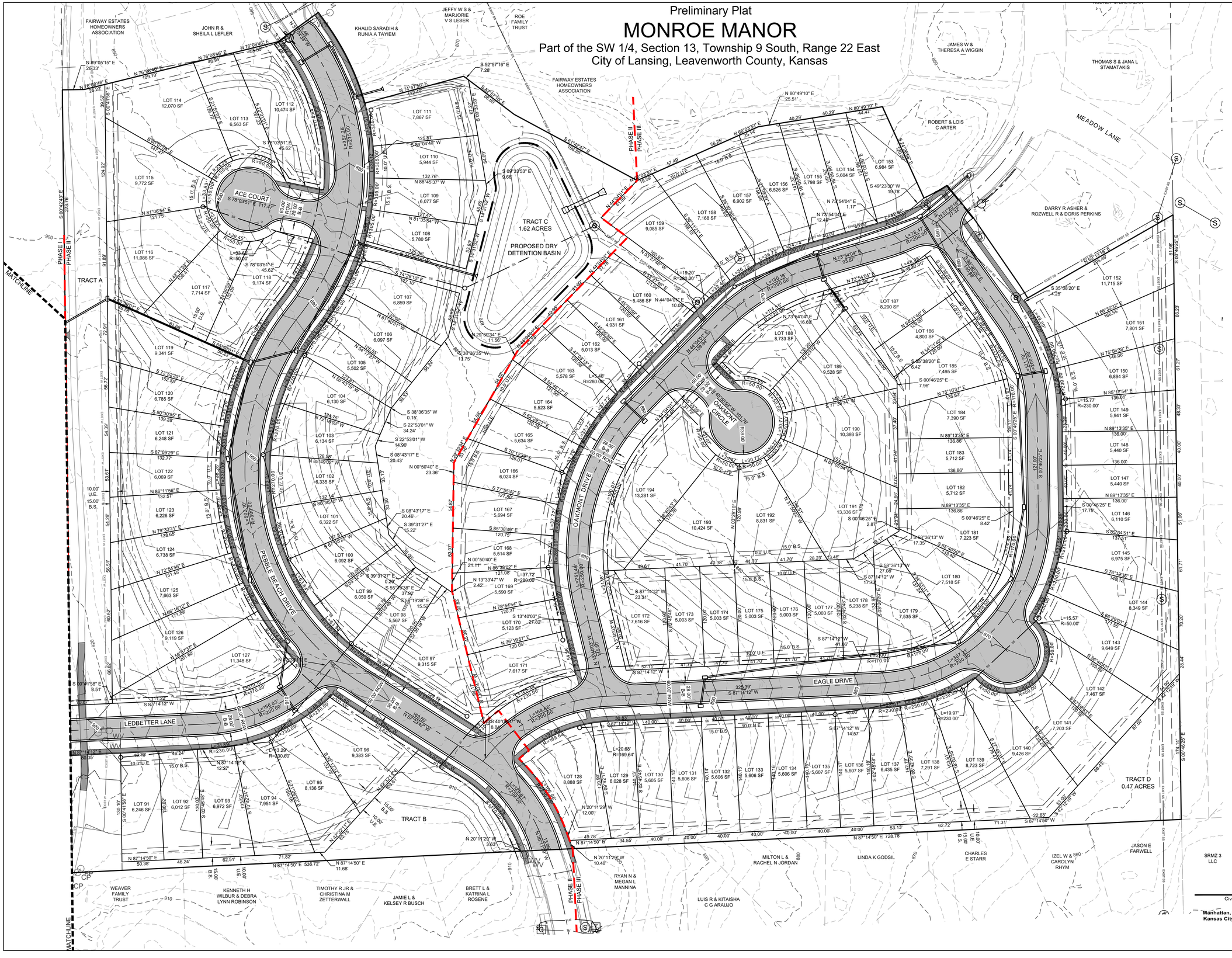
FAIRWAY ESTATES HOMEOWNERS ASSOCIATION
JOHN R & SHEILA L LEFLER
KHALID SARADIH & RUNIA A TAYIEM
JEFFY W S & MARJORIE V S LESER
ROE 1 FAMILY TRUST
JAMES W & THERESA A WIGGIN
THOMAS S & JANA L STAMATAKIS
ROBERT & LOIS C CARTER
DARRY R ASHER & ROZWELL R & DORIS PERKINS
MEADOW LANE
ACE COURT
PEBBLE BEACH DRIVE
OAKMONT DRIVE
OAKMONT CIRCLE
EAGLE DRIVE
LEDBETTER LANE
TRACT A
TRACT B
TRACT C 1.62 ACRES
PROPOSED DRY DETENTION BASIN
TRACT D 0.47 ACRES
PHASE II
PHASE III
MATCHLINE
LOT 114 12,070 SF
LOT 115 9,772 SF
LOT 116 11,086 SF
LOT 117 7,714 SF
LOT 118 9,174 SF
LOT 119 9,341 SF
LOT 120 6,785 SF
LOT 121 6,248 SF
LOT 122 6,069 SF
LOT 123 6,226 SF
LOT 124 6,738 SF
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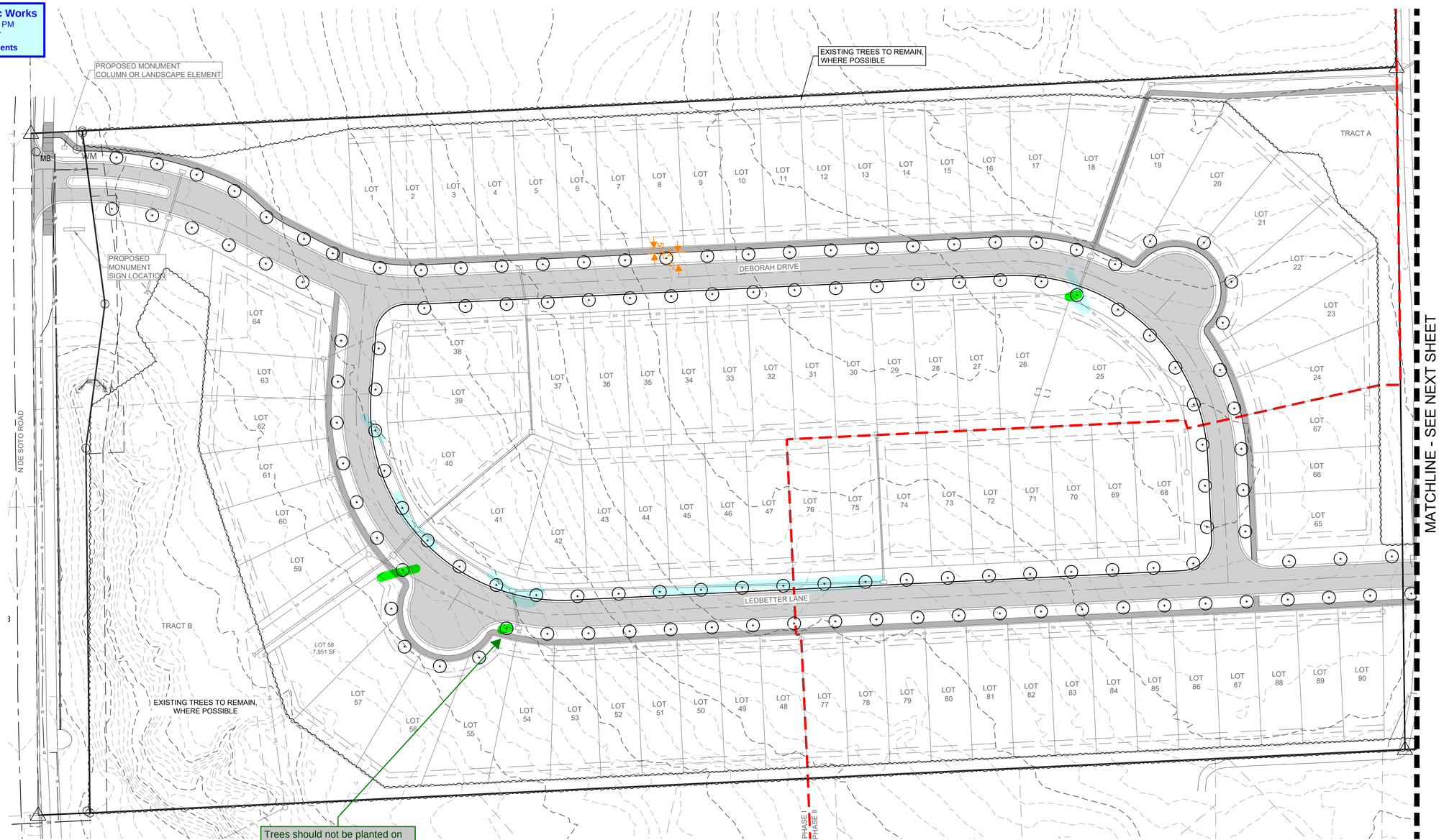
LOT 143 9,649 SF
LOT 144 8,349 SF
LOT 145 6,975 SF
LOT 146 6,110 SF
LOT 147 5,440 SF
LOT 148 5,440 SF
LOT 149 5,941 SF
LOT 150 6,894 SF
LOT 151 7,801 SF
LOT 152 11,715 SF
LOT 153 6,984 SF
LOT 154 5,604 SF
LOT 155 5,798 SF
LOT 156 6,526 SF
LOT 157 6,902 SF
N 76°08'40" E 109.10
N 76°08'46" E 48.51'
N 89°05'15" E 26.33'
N 76°08'40" E 25.22'
S 00°41'58" E 39.52'
S 76°08'40" W 147.71'
S 78°03'51" E 45.62'
S 22°21'01" E 10.21'
S 52°57'16" E 7.28'
N 72°47'05" E 125.40'
S 64°52'06" E 66.60'
S 61°42'42" E 166.63'
S 09°33'53" E 8.66'
N 80°49'10" E 25.51'
N 80°49'10" E 44.47'
N 66°01'32" E 20.18'
N 23°10'28" E 67.49'
N 44°04'01" E 67.49'
N 73°54'04" E 1.17'
N 73°54'04" E 12.46'
S 49°23'30" W 19.78'
S 24°40'08" E 67.49'
S 23°10'28" W 67.49'
S 66°01'32" W 20.18'
S 80°49'10" W 44.47'
S 80°49'10" W 25.51'
N 73°54'04" E 95.57'
N 73°54'04" E 16.69'
N 73°54'04" E 16.86'
S 73°54'04" W 95.57'
S 44°04'01" W 67.49'
S 44°04'01" W 19.96'
S 45°55'59" E 120.00'
S 45°55'59" E 120.00'
S 45°55'59" E 120.00

NOTE:
STREET TREE LOCATIONS WILL NEED TO BE ADJUSTED IN THE FIELD BASED ON UTILITY & DRIVEWAY LOCATIONS.

Reviewed By WW Dept - See Comments
07/07/2025 3:25:52 PM
By azell

Reviewed by Public Works
07/08/2025 2:18:16 PM
By mspickelmier
See Review Comments



Trees should not be planted on top of or within the easement of any sanitary sewer due to possibility of future public and private property damage. Trees should be located outside of ROW.

Trees should not be planted on top of storm sewer lines. This will eventually lead to root intrusion and destruction of the pipes/system.

PW Note to Planning Commission:
We may want to have a discussion on our tree requirements. Specifically location within the ROW. We have had numerous problems with trees in the ROW. All of which have lead to premature infrastructure degradation, and significant financial expenditure to remedy.

LEGEND

+ TREE, 40' MAX SPACING

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MONROE MANOR

PROGRESS DOCUMENTS - NOT FOR CONSTRUCTION

LANSING, KANSAS

REVISION DESCRIPTION (DESCRIPTION)
REVISION DATE 00/00/00

STREET TREE PLAN

NORTH

SCALE: 1" = 50'

PROJECT #: 2501-0018
CHECKED BY: BCG
DRAWN BY: BMS

DATE: 07/03/2025

SHEET # 1

TOTAL SHEETS 2

NOTE:
STREET TREE LOCATIONS WILL NEED TO BE ADJUSTED IN THE FIELD BASED ON UTILITY & DRIVEWAY LOCATIONS.

Trees should not be planted on top of or within the easement of any sanitary sewer due to possibility of future public and private property damage. Trees should be located outside of ROW.

EXISTING TREES TO REMAIN, WHERE POSSIBLE

See Tree Note from Page 1

MATCHLINE - SEE PREVIOUS SHEET

ACE COURT
PEBBLE BEACH DRIVE
OAKMONT DRIVE
OAKMONT CIRCLE
EAGLE DRIVE
MEADOW LANE

TRACT C
PROPOSED DRY DETENTION BASIN
TRACT D

PHASE II
PHASE III

EXISTING TREES TO REMAIN, WHERE POSSIBLE

EXISTING TREES TO REMAIN, WHERE POSSIBLE

EXISTING TREES TO REMAIN, WHERE POSSIBLE

LOT 91 LOT 92 LOT 93 LOT 94 LOT 95 LOT 96 LOT 97 LOT 98 LOT 99 LOT 100 LOT 101 LOT 102 LOT 103 LOT 104 LOT 105 LOT 106 LOT 107 LOT 108 LOT 109 LOT 110 LOT 111 LOT 112 LOT 113 LOT 114 LOT 115 LOT 116 LOT 117 LOT 118 LOT 119 LOT 120 LOT 121 LOT 122 LOT 123 LOT 124 LOT 125 LOT 126 LOT 127 LOT 128 LOT 129 LOT 130 LOT 131 LOT 132 LOT 133 LOT 134 LOT 135 LOT 136 LOT 137 LOT 138 LOT 139 LOT 140 LOT 141 LOT 142 LOT 143 LOT 144 LOT 145 LOT 146 LOT 147 LOT 148 LOT 149 LOT 150 LOT 151 LOT 152 LOT 153 LOT 154 LOT 155 LOT 156 LOT 157 LOT 158 LOT 159 LOT 160 LOT 161 LOT 162 LOT 163 LOT 164 LOT 165 LOT 166 LOT 167 LOT 168 LOT 169 LOT 170 LOT 171 LOT 172 LOT 173 LOT 174 LOT 175 LOT 176 LOT 177 LOT 178 LOT 179 LOT 180 LOT 181 LOT 182 LOT 183 LOT 184 LOT 185 LOT 186 LOT 187 LOT 188 LOT 189 LOT 190 LOT 191 LOT 192 LOT 193 LOT 194

LEGEND

TREE, 40' MAX SPACING

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MONROE MANOR

PROGRESS DOCUMENTS - NOT FOR CONSTRUCTION

LANSING, KANSAS

REVISION DATE	REVISION DESCRIPTION
00/00/00	(DESCRIPTION)

STREET TREE PLAN

NORTH

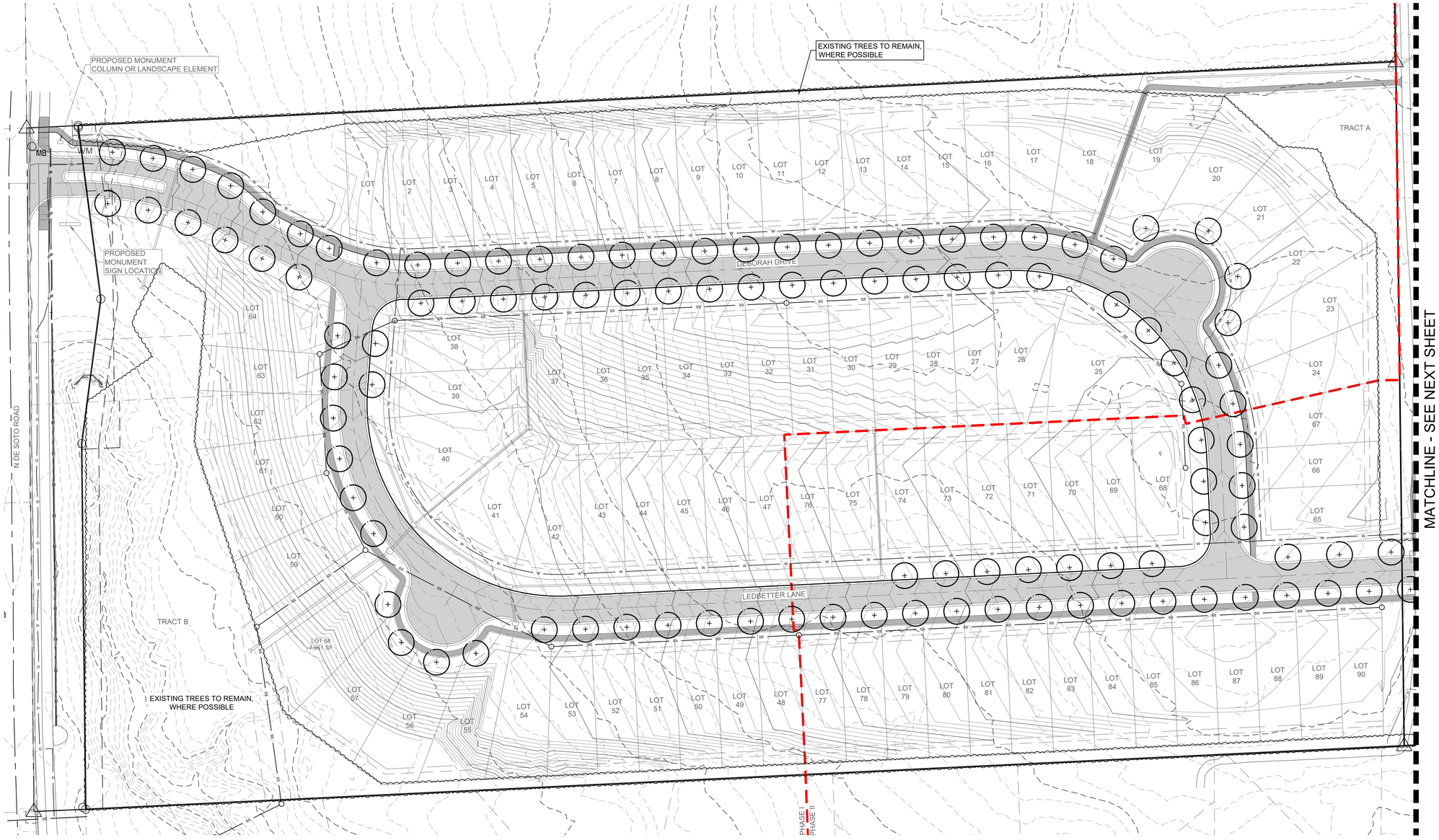
SCALE: 1" = 50'

PROJECT #: 2501-0018
CHECKED BY: BCG
DRAWN BY: BMS

DATE: 07/03/2025

SHEET # 2

TOTAL SHEETS 2



Reviewed by Community & Economic Development
07/08/2025 4:37:48 PM by jgentzler
See Review Comments

1. Provide type of trees in legend. Trees shall meet Table 6-3: Tree Diversity

LEGEND

STREET TREE

NOTE:
STREET TREE LOCATIONS WILL NEED TO BE ADJUSTED IN THE FIELD BASED ON UTILITY & DRIVEWAY LOCATIONS.

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PROGRESS DOCUMENTS - NOT FOR CONSTRUCTION

LANSING, KANSAS

REVISION DATE		REVISION DESCRIPTION
00/00/00		(DESCRIPTION)

STREET TREE PLAN

NORTH

SCALE: 1" = 50'

PROJECT #: 2501-0018
CHECKED BY: BCG
DRAWN BY: BMS

DATE: 07/03/2025

SHEET # 1

TOTAL SHEETS 2

LEGEND

STREET TREE

NOTE:
STREET TREE LOCATIONS WILL NEED TO BE ADJUSTED IN THE FIELD BASED ON UTILITY & DRIVEWAY LOCATIONS.

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MONROE MANOR

PROGRESS DOCUMENTS - NOT FOR CONSTRUCTION

LANSING, KANSAS

REVISION	DATE	(DESCRIPTION)
	00/00/00	

STREET TREE PLAN

NORTH

50' 25' 0' 50'
SCALE: 1" = 50'

PROJECT #: 2501-0018
CHECKED BY: BCG
DRAWN BY: BMS

DATE: 07/03/2025

SHEET # 2

TOTAL SHEETS 2

PRELIMINARY STORMWATER MANAGEMENT STUDY

MONROE MANOR

EAST OF DE SOTO ROAD, BETWEEN BELLERIVE COURT & HOLIDAY DRIVE
LANSING, LEAVENWORTH COUNTY, KANSAS

DRAFT

SMH CONSULTANTS

Prepared for:
Circle H Land Development
5858 Naples Drive
Flower Mound, TX 75028

Prepared by:
SMH Consultants
5201 Johnson Drive, Suite 405
Mission KS 66025

June 2025

CONTENTS

INTRODUCTION 3
METHODOLOGY 3
PRE-DEVELOPMENT DRAINAGE CONDITIONS 4
POST-DEVELOPMENT DRAINAGE CONDITIONS 5
SUMMARY 8

Figure 1: **Pre-Development Drainage Boundaries Map**

Figure 2: **Post-Development Drainage Boundaries Map**

Exhibit 1: **Fairway Estates Subdivision Lansing, Kansas Drainage Calculation Sheets (Prepared by Cook, Flatt and Strobel Engineers, P.A., May 1995)**

Exhibit 2: **Fairway Estates Phase II Lake Re-Study (Prepared by George Butler Associates Inc., September 1999)**

Exhibit 3: **Final Drainage Memo – Fairway Estates Drainage Study – Phase 5 & 6 (Prepared by Napier Engineering, LLC, August 2018)**

Exhibit 4: **NRCS Soils Report**

Exhibit 5: **NOAA 14 Point Precipitation Frequency Estimate**

Exhibit 6: **Hydraflow Output for 2-, 10-, and 100-Year Events**

INTRODUCTION

SMH Consultants (SMH) has provided a preliminary stormwater management study for the proposed Monroe Manor development in Lansing, Kansas. The purpose of this plan is to assess potential impacts arising from the development of single-family residential lots with associated infrastructure and to propose necessary mitigative measures.

The development is located East of De Soto Road between Bellerive Court and Holiday Drive in Lansing, Leavenworth County, Kansas. The site is in the Missouri Watershed. The site is bordered on all sides by residential properties.

The following resources were referenced in evaluating the drainage impacts of the proposed development: **City of Lansing, Design Criteria for Storm Drainage Facilities; United States Department of Agriculture, Urban Hydrology for Small Watersheds, TR-55; United States Department of Agriculture, Web Soil Survey** and **Hydraflow Hydrographs Extensions Software**, as developed by Autodesk. The existing site has been previously studied three times. First in the **Fairway Estates Subdivision Drainage Calculation Sheets** prepared by Cook, Flatt and Strobel Engineers, P.A. dated May 1995. Secondly, in the **Fairway Estates Phase II Lake Re-Study** prepared by George Butler Associates, Inc. dated September 24, 1999. Most recently the property was studied in the **Final Drainage Memo – Fairway Estates Drainage Study – Phase 5 & 6** prepared by Napier Engineering, LLC dated August 2, 2018. The existing drainage reports for the site and surrounding sites can be found in Exhibits 1 through 3 of the Appendix.

METHODOLOGY

The design methodology used to analyze the impacts of the proposed improvements is based on the City of Lansing Engineering Design Criteria. The Rational method was used for all drainage calculations besides for the Stormwater Detention portion of the project, as recommended by the Design Criteria for areas requiring Storm Detention Facilities. The Design Criteria for Storm Drainage Facilities does not detail the SCS method, so the urban Hydrology for Small Watersheds, TR-55 design guide, was utilized in addition to the Design Criteria for Storm Drainage Facilities for this drainage analysis.

The onsite soils consist primarily of Grundy silty clay loam with slopes ranging from 3 to 7 percent, eroded, Sharpsburg silty clay loam, with slopes ranging from 4 to 8 percent, eroded and Vinland Sibleyville complex, with slopes ranging from 5 to 12 percent. A Custom Soil Resource Report for the proposed site, obtained from Web Soil Survey (accessed March 25, 2025) is included in Exhibit 4 of the Appendix. See Figure 1 in the appendix section for a pre-development soils map.

Drainage Characteristics were delineated based on pre-development and proposed topographic information from survey data. The pre- and post-development site generally flows to one of four directions. The primary directions of flow are Southwest to an existing Drainage Channel on the East side of De Soto Road, Northeast to an existing wet detention basin located offsite, South to an existing dry detention basin or Southeast to an existing Drainage Channel located West of Valley Drive. All drainage areas flow via an unnamed tributary to Sevenmile Creek, which eventually flows into the Missouri River, near Wolcott Road and McIntyre Road.

Figures 1 and 2 provide pre-development and post-development drainage characteristics. These figures and maps represent the data used to make determinations on sizes and locations of inlet structures, pipes and detention facilities.

Pre-and post-development conditions were analyzed using the 24-hour Type II SCS method for the 2-, 10- and 100-year storm events. Rainfall depths were determined using NOAA 14 Point Precipitation Frequency Estimate, included in Exhibit 5 of the appendix, with rainfall depths of 3.54, 5.26, and 8.34 inches, respectively. Weighted Curve numbers were determined by land usage per TR-55 Table 2.2a. Lag Time was calculated using 35 of the calculated time of concentration. Drainage Characteristics can be found in Table 1 below.

Table 1 – Drainage Characteristics

Basin	Area (Acres)	"C" Value	Curve Number	Longest Flow Path	Slope (%)	Time of Concentration (Min.)	Lag Time (3/5 T_c)
Pre-Development							
1	93.76	0.45	81.45	2,872	3.17	15	9.24
2	14.13	0.31	80.71	1,576	5.57	10	5.82
3	1.57	0.30	79.41	1,246	4.07	11	6.56
4	22.40	0.30	80.62	1,887	4.08	11	6.88
5	7.17	0.30	80.01	1,924	4.43	11	6.41
Post-Development							
1	93.64	0.45	82.35	2,872	3.17	15	9.20
2	14.36	0.54	89.62	1,590	5.14	7	4.49
3	0.80	0.54	79.41	1,140	3.39	8	5.06
4	18.13	0.54	89.62	448	3.79	8	4.82
5	2.88	0.54	89.62	1,924	4.08	9	5.60
6	9.22	0.54	89.62	686	4.21	8	4.62

PRE-DEVELOPMENT DRAINAGE CONDITIONS

The existing site consists of an undeveloped agricultural land, primarily consisting of pasture and heavily wooded treed areas. The existing site can be split into five basins.

Drainage Basin 1 generally consists of existing residential developments and pasture, and generally flows South through an existing 8'X6' existing Storm Sewer Box under De Soto Road, near the Northwest corner of the project site to an existing Drainage Ditch located on the East Side of De Soto Road. This existing Drainage ditch flows to Point of Concentration #1, an existing 7' CMP pipe under Holiday Drive, which continues South along an existing Drainage Ditch to an unnamed tributary which flows into Sevenmile Creek, which eventually flows into the Missouri River, Southeast of Lansing.

Drainage Basin 2 generally consists of existing pasture, with a small portion being an existing residential development, and generally flows Southwest to Point of Concentration #1, an existing 7' CMP pipe under Holiday Drive, which continues South along an existing Drainage Ditch to an

unnamed tributary which flows into Sevenmile Creek, which eventually flows into the Missouri River, Southeast of Lansing.

Drainage Basin 3 generally consists of existing pasture residential developments, and generally flows Southeast to Point of Concentration #3, located at the intersection of Pebble Beach Drive and Holiday Drive, which eventually flows into an existing dry detention basin located South of Holiday Drive and West of Fairlane Street. The existing dry detention basin outlets South to an unnamed tributary via underground storm sewer system which flows into Sevenmile Creek, which eventually flows into the Missouri River, Southeast of Lansing.

Drainage Basin 4 generally consists of existing pasture, and generally flows Northeast to Point of Concentration #4, an existing wet detention basin located between Pebble Beach Drive and Oakmont Drive. The existing wet detention basin outlets northeast to another wet detention basin located offsite, which discharges into an unnamed tributary which flows into Sevenmile Creek, which eventually flows into the Missouri River, Southeast of Lansing.

Drainage Basin 5 generally consists of existing pasture, and generally flows Southeast to Point of Concentration #5, an existing concrete channel located between Valley Drive and Caraway Place. The existing concrete channel which flows South via an underground storm sewer system to an unnamed tributary which flows into Sevenmile Creek, which eventually flows into the Missouri River, Southeast of Lansing.

The pre-development site runoff flows are summarized in Table 2 below. Pre-Development Hydrographs can be found in Exhibit 6.

Table 2 – Pre-Development Drainage Conditions			
	2-Year (cfs)	10-Year (cfs)	100-Year (cfs)
Point of Concentration #1	154.85	228.47	446.25
Point of Concentration #3	1.90	2.79	5.45
Point of Concentration #4	27.06	39.86	77.75
Point of Concentration #5	8.66	12.76	24.89

POST-DEVELOPMENT DRAINAGE CONDITIONS

The proposed development area is 45.27 acres and at full build out will include 194 single family homes, with an average density of 4 lots per acre and average lot size of approximately 0.25 acre. Generally, the proposed development will follow existing flow patterns. The post development site can be split into six primary basins.

Drainage Basin 1 generally consists of existing residential homes, pasture and a small portion of proposed residential properties, and generally flows south through an existing 8’X6’ existing Storm Sewer Box under De Soto Road, near the Northwest corner of the project site to an existing Drainage Ditch located on the East Side of De Soto Road. This existing Drainage ditch flows to Point of Concentration #1, an existing 7’ CMP pipe under Holiday Drive, which continues South along an existing Drainage Ditch to an unnamed tributary which flows into Sevenmile Creek, which eventually flows into the Missouri River, Southeast of Lansing.

Drainage Basin 2 generally consists of proposed residential properties and generally flows Southwest via underground storm sewer and overland flow to Point of Concentration #1, an existing 7' CMP pipe under Holiday Drive. This existing drainage ditch travels South to an unnamed tributary which flows into Sevenmile Creek, which eventually flows into the Missouri River, Southeast of Lansing.

Drainage Basin 3 generally consists of proposed residential properties, and generally flows Southeast to Point of Concentration #3, located at the intersection of Pebble Beach Drive and Holiday Drive, which eventually flows into an existing dry detention basin located South of Holiday Drive and West of Fairlane Street. The existing dry detention basin outlets South to an unnamed tributary via underground storm sewer system which flows into Sevenmile Creek, which eventually flows into the Missouri River, Southeast of Lansing.

Drainage Basin 4 consists of proposed residential properties, and generally flows Northeast via underground storm sewers into a proposed dry detention basin on the north side of the site. This detention basin will outflow to Point of Concentration #4. The proposed detention basin will reduce the peak flow rate of the drainage basin to be equal to or less than existing conditions. The existing wet detention basin outlets northeast to an other wet detention basin located offsite, which discharges into an unnamed tributary which flows into Sevenmile Creek, which eventually flows into the Missouri River, Southeast of Lansing.

Drainage Basin 5 generally consists of proposed residential properties, and generally flows Southeast to Point of Concentration #5, an existing concrete channel located between Valley Drive and Caraway Place. The existing concrete channel which flows South via an underground storm sewer system to an unnamed tributary which flows into Sevenmile Creek, which eventually flows into the Missouri River, Southeast of Lansing.

Drainage Basin 6 consists of proposed residential properties and generally flows northeast to an existing storm sewer system located on Oakmont Drive. According to the previous studies completed in 1999 and 2018, prepared by George Butler Associates, Inc. and Napier Engineering, respectively, from the project site of Monroe Manor, 9.10 acres needs to be redirected from entering the pond to the underground storm sewer system located on Oakmont Drive. The 2018 study shows an existing design capacity of 36.79 ft^3/s. When performing the analysis SMH determined that 9.22 acres could be diverted to the existing storm sewer while not exceeding the existing capacity. The proposed dry detention basin will allow water to outflow from the existing wet detention basin before water from Monroe Manor reaches the existing wet detention basin.

The proposed dry detention basin will be utilized for stormwater detention. The detention basin characteristics are summarized in Table 3 below. By utilizing the proposed dry detention basin, the proposed development has reduced the site's existing condition peak discharge rates as seen in Table 4. Post-Development Hydrographs can be found in Exhibit 6.

Table 3 – Detention Basin Characteristics	
Attribute	
Tributary Area (Acres)	18.13
Total Facility Storage (ft^3)	89,021
Greatest Depth of Facility (ft)	7.0
100-Year Peak Storage Volume (ft^3)	52,429
Ponding Depth (ft)(W.S. Elev.)	
2-Year	2.28
10-Year	3.25
100-Year	4.91
Discharge Rates (cfs)	
2-Year	37.92
10-Year	67.23
100-Year	103.24
Outlet Structure	48” Pipe

Table 4 –Post-Development Drainage Conditions			
	2-Year (cfs)	10-Year (cfs)	100-Year (cfs)
Point of Concentration #1	145.44	214.60	419.22
Point of Concentration #3	2.01	2.97	5.78
Point of Concentration #4	21.95	35.13	71.68
Point of Concentration #5	6.87	10.13	19.74
To Existing Oakmont Storm Sewer System	23.18	34.17	66.58

Table 5 – Drainage Improvements			
	2-Year (cfs)	10-Year (cfs)	100-Year (cfs)
Point of Concentration #1			
Pre-Development	154.85	228.47	446.25
Post-Development	145.44	214.60	419.22
Point of Concentration #3			
Pre-Development	1.90	2.79	5.45
Post-Development	2.01	2.97	5.78
Point of Concentration #4			
Pre-Development	27.06	39.86	77.75
Post-Development	21.95	35.13	71.68
Point of Concentration #5			
Pre-Development	8.66	12.76	24.89
Post-Development	6.87	10.13	19.74

SUMMARY

In summary, post-development stormwater peak flow rates at all Point of Concentrations shall be equal to or less than pre-development stormwater flow rates leaving the development. The Final Stormwater Management Study and analysis will be completed at the Final Plat and Final Construction Documents submittal.

LEGEND

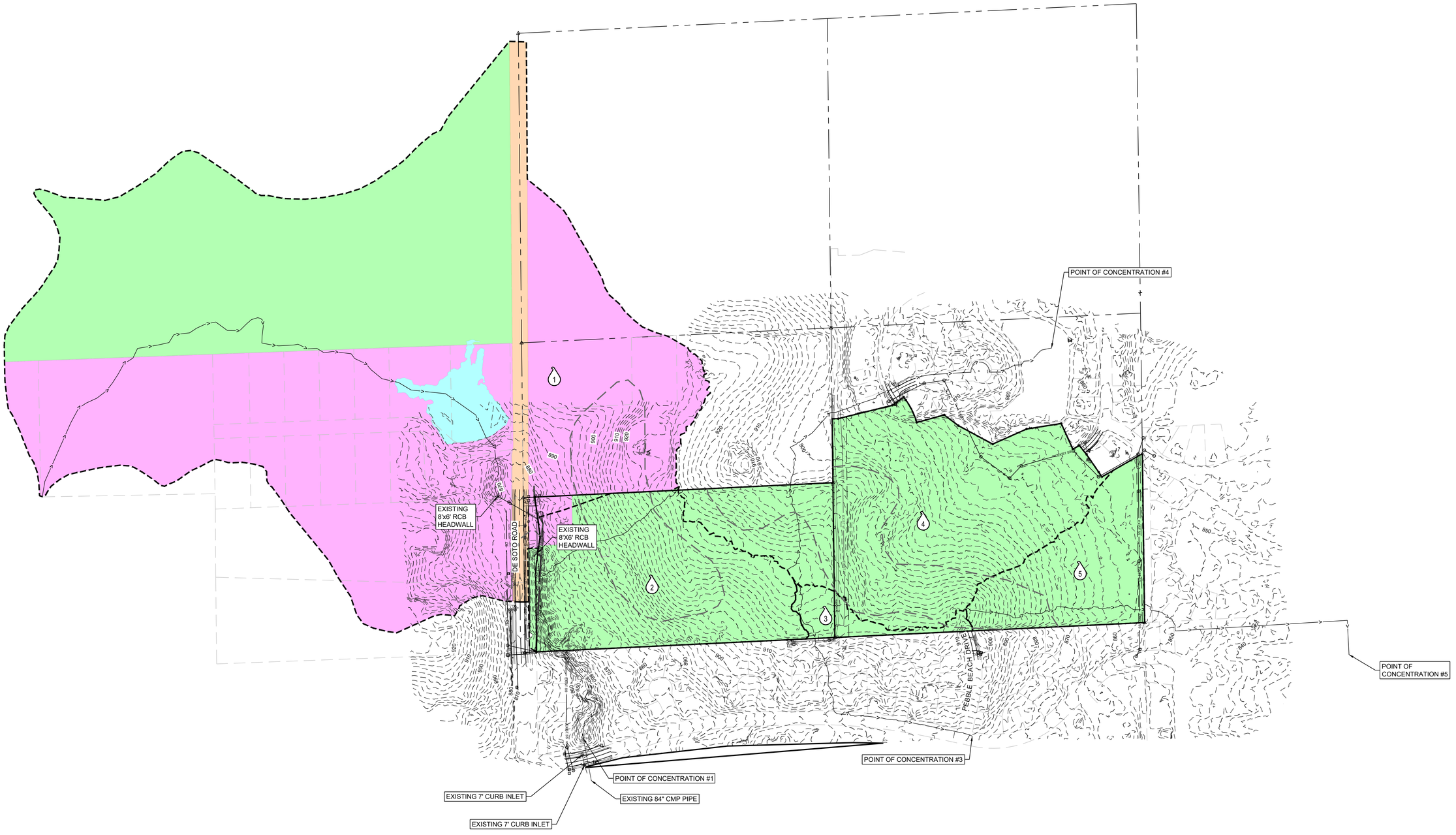
- HYDROLOGICAL SOIL GROUP BOUNDARY
- DRAINAGE BOUNDARY
- (##) DRAINAGE BASIN NUMBER

TABLE 1 - PRE-DEVELOPMENT CALCULATIONS

MAP ID	SITE	AREA (SF)	AREA (ACRES)	RATIONAL C-VALUE	CURVE NUMBER	LONGEST FLOW PATH (FT)	MAX OVERLAND FLOW DISTANCE (FT)	HIGH POINT	LOW POINT	AVERAGE SLOPE	INLET TIME (MIN)	SHALLOW TRAVEL TIME (MIN)	CHANNEL FLOW (MIN)	TIME OF CONCENTRATION (MIN)	LAG TIME (3/5 TC)
1	TO EXISTING 8'X6' RCB	4,084,273	93.76	0.45	81.45	2,872	100	953.00	862.00	3.17%	8.01	4.62	2.77	15	9.24
2	TO EXISTING 7' CMP	615,614	14.13	0.31	80.71	1,576	100	931.08	843.30	5.57%	8.06	1.64	0.00	10	5.82
3	TO SOUTH EXISTING DRY DETENTION BASIN	68,177	1.57	0.30	79.41	1,246	100	930.33	879.68	4.07%	9.02	1.91	0.00	11	6.56
4	NORTH TO EXISTING POND	975,738	22.40	0.30	80.62	1,887	100	931.57	854.60	4.08%	9.01	2.46	0.00	11	6.88
5	SOUTHEAST TO EXISTING DRAINAGE CHANNEL	312,311	7.17	0.30	80.01	1,924	100	913.14	828.00	4.43%	8.77	1.91	0.00	11	6.41

LAND COVER SUMMARY

COVER	AREA (ACRES)
RESIDENTIAL (SINGLE FAMILY)	50.64
UNDEVELOPED AREAS/OPEN SPACE	82.02
WET DETENTION BASIN	2.17
IMPERVIOUS	3.79
TOTAL	138.62



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MONROE MANOR
PROGRESS DOCUMENTS - NOT FOR CONSTRUCTION
LANSING, KANSAS

REVISION DATE		REVISION DESCRIPTION
00/00/00		(DESCRIPTION)

PRE-DEVELOPMENT DRAINAGE MAP

NORTH

200' 100' 0' 200'
SCALE: 1" = 200'

PROJECT #: 2501-0018
CHECKED BY: BCG
DRAWN BY: JMT

DATE: 06/11/2025

SHEET # FIG. 1

TOTAL SHEETS 2

LEGEND

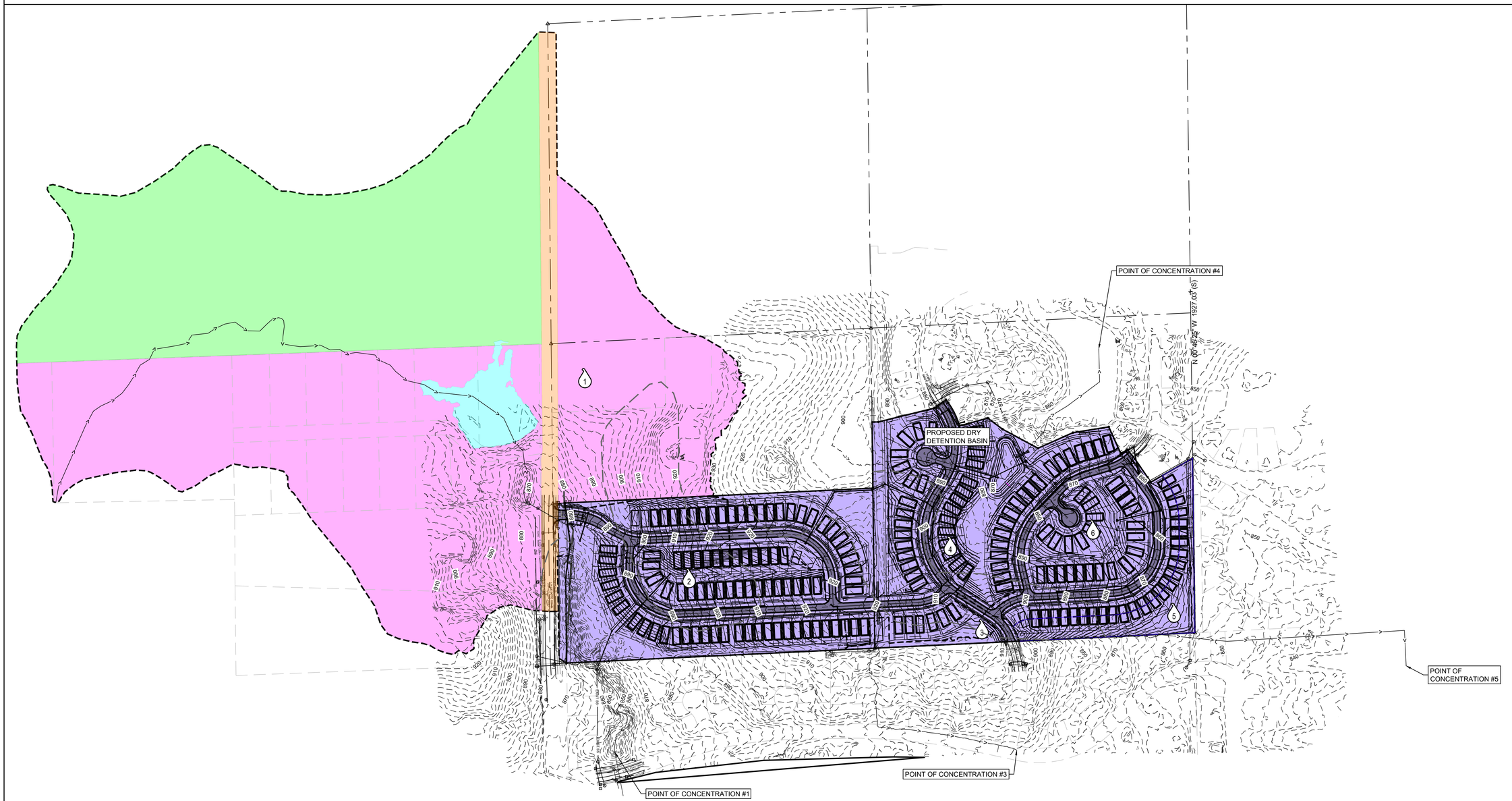
- HYDROLOGICAL SOIL GROUP BOUNDARY
- DRAINAGE BOUNDARY
- (##) DRAINAGE BASIN NUMBER

TABLE 2 - POST-DEVELOPMENT CALCULATIONS

MAP ID	SITE	AREA (SF)	AREA (ACRES)	RATIONAL C-VALUE	CURVE NUMBER	LONGEST FLOW PATH (FT)	MAX OVERLAND FLOW DISTANCE (FT)	HIGH POINT	LOW POINT	AVERAGE SLOPE	INLET TIME (MIN)	SHALLOW TRAVEL TIME (MIN)	CHANNEL FLOW (MIN)	TIME OF CONCENTRATION (MIN)	LAG TIME (3/5 TC)
1	TO WEST DRAINAGE DITCH	4,078,889	93.64	0.45	82.35	2,872	100	953.00	862.00	3.17%	7.95	4.62	2.77	15	9.20
2	TO WEST DRAINAGE DITCH (THROUGH DEVELOPMENT)	625,668	14.36	0.54	89.62	1,590	100	925.00	843.30	5.14%	5.83	1.66	0.00	7	4.49
3	TO SOUTH EXISTING DRY DETENTION BASIN	34,962	0.80	0.54	79.41	1,140	100	918.29	879.68	3.39%	6.70	1.73	0.00	8	5.06
4	NORTH TO EXISTING POND	789,665	18.13	0.54	89.62	448	100	925.00	908.00	3.79%	6.45	0.58	1.00	8	4.82
5	SOUTHEAST TO EXISTING DRAINAGE CHANNEL	125,463	2.88	0.54	89.62	1,924	100	906.50	828.00	4.08%	6.30	3.04	0.00	9	5.60
6	NORTH TO EXISTING STORM SEWER	401,497	9.22	0.54	89.62	686	100	908.78	879.92	4.21%	6.23	0.98	0.48	8	4.62

LAND COVER SUMMARY

COVER	AREA (ACRES)
RESIDENTIAL (EXISTING)	50.13
RESIDENTIAL (PROPOSED)	45.81
UNDEVELOPED AREAS/OPEN SPACE	36.72
WET DETENTION BASIN	2.17
IMPERVIOUS	3.79
TOTAL	138.62



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MONROE MANOR

PROGRESS DOCUMENTS - NOT FOR CONSTRUCTION

LANSING, KANSAS

REVISION DATE		REVISION DESCRIPTION
00/00/00		(DESCRIPTION)

POST-DEVELOPMENT DRAINAGE MAP

NORTH

200' 100' 0' 200'
SCALE: 1" = 200'

PROJECT #: 2501-0018
CHECKED BY: BCG
DRAWN BY: JMT

DATE: 06/11/2025

SHEET # FIG. 2

TOTAL SHEETS 2

COOK, FLATT & STROBEL
ENGINEERS, P.A.

FAIRWAY ESTATES SUBDIVISION
LANSING, KANSAS

Drainage Calculation Sheets

May, 1995

Prepared By:

Cook, Flatt and Strobel
Engineers,P.A.

Charles R. Peavler, P.E.

DRAINAGE CALCULATIONS
FAIRWAY ESTATES SUBDIVISION

Fairway Estates Subdivision
Phase I
Lansing, Kansas

Enclosed are the calculation sheets for the referenced project. The drainage area map is included in the construction documents. The sheets are grouped as follows:

Offsite and Miscellaneous Flowrates.....A-1 thru A-7
Inlet and Sewer Sizing.....B-1 thru B-2
Channel Sizing.....C-1 thru C-4
Total Watershed Flowrates.....D-1 thru D-2
10 Year Hydrograph (Total Watershed).....E-1 thru E-3
100 Year Hydrograph (Total Watershed).....F-1 thru F-3
Outlet Structure.....G-1 thru G-7
10 Year Flood Routing.....H-1 thru H-4
100 Year Flood Routing.....I-1 thru I-4
Outlet Pipe Sizing.....J-1 thru J-1

All flowrates are based on the rational method. All inlets and storm sewers are designed in accordance with the City of Lansing design criteria. Enclosed systems are designed for a 10 year flowrate and open channels are designed for a 25 year storm with the capacity to pass the 100 year storm.
The pond storm routing was performed using "Pond 2" software. The detention pond has an outlet structure with a lower weir based on a 10 year inflow and a higher weir that passes the 100 year storm inflow hydrograph.

Summary of Storm Detention Calculations:

Normal Pool Elevation =	852.00
11 Foot Lower Weir Elevation =	852.00
20 Foot Upper Weir Elevation =	855.00
Minimum Floor Elevation =	858.00
Maximum Allowable Pool Elevation =	857.00
10 Year Undeveloped Flowrate =	309.1 cfs (max. release rate)
10 Year Developed Flowrate =	385.6 cfs (inflow rate)
100 Year Developed Flowrate =	701.1 cfs
10 Year Peak Outflow =	156.2 cfs
10 Peak Elevation =	854.94
100 Year Peak Outflow =	379.5 cfs
100 Peak Elevation =	856.42

Fairway Estates Subdivision

Lansing, Kansas

CP 4/28/95
C,F&S
f: fairway

Area "A"

Areas:

Acres	Surface	"C"	Acres	Surface	"C"
0	pavement	0.85	22.4	residential	0.50
0	roof	0.90	0	commercial	0.80
0	turf	0.15	0	unimproved	0.30
0	total	ERR	22.4	total	0.50

22.4 Total Acres c= 0.50 (composite)
c x A= 11.2

Inlet Time:

D	S	C	Ti (min)	Say
300	1.5	0.5	16.4	15.0
(300 max.)			(5 to 15 min.)	

Travel Time:

L	V	Tt (min)
1500	10	2.5

Time of Concentration:
Tc = 18 min.

Flowrate:

10 Year Return Period		K=	1.00	
Intensity =	4.76 "/hr.			
K x c =	0.50		Quantity =	53.3 cfs
25 Year Return Period		K=	1.10	
Intensity =	5.52 "/hr.			
K x c =	0.55		Quantity =	68.0 cfs
50 Year Return Period		K=	1.20	
Intensity =	6.16 "/hr.			
K x c =	0.60		Quantity =	82.8 cfs
100 Year Return Period		K=	1.25	
Intensity =	6.77 "/hr.			
K x c =	0.63		Quantity =	94.8 cfs

A-1

Fairway Estates Subdivision

Lansing, Kansas

CP 4/28/95
C,F&S
f: fairway

Area "B"

Areas:

Acres	Surface	"C"	Acres	Surface	"C"
0	pavement	0.85	8	residential	0.50
0	roof	0.90	0	commercial	0.80
0	turf	0.15	0	unimproved	0.30
0	total	ERR	8	total	0.50

8.0 Total Acres c= 0.50 (composite)
c x A= 4

Inlet Time:

D	S	C	Ti (min)	Say
300	3	0.5	13.0	13.0
(300 max.)			(5 to 15 min.)	

Travel Time:

L	V	Tt (min)
1050	10	1.8

Time of Concentration:
Tc = 14.8 min.

Flowrate:

10 Year Return Period			K=	1.00	
Intensity =	5.21	"/hr.			
K x c =	0.50			Quantity =	20.9 cfs
25 Year Return Period			K=	1.10	
Intensity =	6.05	"/hr.			
K x c =	0.55			Quantity =	26.6 cfs
50 Year Return Period			K=	1.20	
Intensity =	6.94	"/hr.			
K x c =	0.60			Quantity =	33.3 cfs
100 Year Return Period			K=	1.25	
Intensity =	7.63	"/hr.			
K x c =	0.63			Quantity =	38.1 cfs

A-2

Fairway Estates Subdivision

Lansing, Kansas

CP 4/28/95
C,F&S
f: fairway

Area "C"

Areas:

Acres	Surface	"C"	Acres	Surface	"C"
0	pavement	0.85	38.2	residential	0.50
0	roof	0.90	0	commercial	0.80
0	turf	0.15	0	unimproved	0.30
0	total	ERR	38.2	total	0.50

38.2 Total Acres c= 0.50 (composite)
c x A= 19.1

Inlet Time:

D	S	C	Ti (min)	Say
300	6.5	0.5	10.1	10.1
(300 max.)			(5 to 15 min.)	

Travel Time:

L	V	Tt (min)
1300	10	2.2

Time of Concentration:
Tc = 12.3 min.

Flowrate:

10 Year Return Period		K=	1.00	
Intensity =	5.64	"/hr.		
K x c =	0.50		Quantity =	107.6 cfs
25 Year Return Period		K=	1.10	
Intensity =	6.54	"/hr.		
K x c =	0.55		Quantity =	137.3 cfs
50 Year Return Period		K=	1.20	
Intensity =	7.50	"/hr.		
K x c =	0.60		Quantity =	172.0 cfs
100 Year Return Period		K=	1.25	
Intensity =	8.24	"/hr.		
K x c =	0.63		Quantity =	196.8 cfs

Fairway Estates Subdivision
Lansing, Kansas

CP 4/28/95
C,F&S
f: fairway

Area "D"

Areas:

Acres	Surface	"C"	Acres	Surface	"C"
0	pavement	0.85	15.5	residential	0.50
0	roof	0.90	0	commercial	0.80
0	turf	0.15	0	unimproved	0.30
0	total	ERR	15.5	total	0.50

15.5 Total Acres c= 0.50 (composite)
c x A= 7.75

Inlet Time:

D	S	C	Ti (min)	Say
300	7	0.5	9.8	9.8
(300 max.)			(5 to 15 min.)	

Travel Time:

L	V	Tt (min)
425	10	0.7

Time of Concentration:
Tc = 10.6 min.

Flowrate:

10 Year Return Period		K= 1.00		
Intensity =	5.96 "/hr.			
K x c =	0.50		Quantity =	46.2 cfs
25 Year Return Period		K= 1.10		
Intensity =	6.92 "/hr.			
K x c =	0.55		Quantity =	59.0 cfs
50 Year Return Period		K= 1.20		
Intensity =	7.94 "/hr.			
K x c =	0.60		Quantity =	73.8 cfs
100 Year Return Period		K= 1.25		
Intensity =	8.72 "/hr.			
K x c =	0.63		Quantity =	84.5 cfs

Fairway Estates Subdivision
Lansing, Kansas

CP 4/28/95
C,F&S
f: fairway

Area "S"

Areas:

Acres	Surface	"C"	Acres	Surface	"C"
0	pavement	0.85	2.3	residential	0.50
0	roof	0.90	0	commercial	0.80
0	turf	0.15	0	unimproved	0.30
0	total	ERR	2.3	total	0.50

2.3 Total Acres c= 0.50 (composite)
c x A= 1.15

Inlet Time:

D	S	C	Ti (min)	Say
200	7	0.5	8.0	8.0
(300 max.)			(5 to 15 min.)	

Travel Time:

L	V	Tt (min)
350	10	0.6

Time of Concentration:
Tc = 8.6 min.

Flowrate:

10 Year Return Period		K= 1.00		
Intensity =	6.38 "/hr.			
K x c =	0.50		Quantity =	7.3 cfs
25 Year Return Period		K= 1.10		
Intensity =	7.40 "/hr.			
K x c =	0.55		Quantity =	9.4 cfs
50 Year Return Period		K= 1.20		
Intensity =	8.50 "/hr.			
K x c =	0.60		Quantity =	11.7 cfs
100 Year Return Period		K= 1.25		
Intensity =	9.34 "/hr.			
K x c =	0.63		Quantity =	13.4 cfs

Fairway Estates Subdivision
Lansing, Kansas

CP 4/28/95
C,F&S
f: fairway

Area "B+E"

Areas:

Acres	Surface	"C"	Acres	Surface	"C"
0	pavement	0.85	13	residential	0.50
0	roof	0.90	0	commercial	0.80
0	turf	0.15	0	unimproved	0.30
0	total	ERR	13	total	0.50

13.0 Total Acres c= 0.50 (composite)
c x A= 6.5

Inlet Time:

D	S	C	Ti (min)	Say
300	3	0.5	13.0	13.0
(300 max.)			(5 to 15 min.)	

Travel Time:

L	V	Tt (min)
1930	10	3.2

Time of Concentration:
Tc = 16.2 min.

Flowrate:

10 Year Return Period		K= 1.00		
Intensity =	5.00 "/hr.			
K x c =	0.50		Quantity =	32.5 cfs
25 Year Return Period		K= 1.10		
Intensity =	5.79 "/hr.			
K x c =	0.55		Quantity =	41.4 cfs
50 Year Return Period		K= 1.20		
Intensity =	6.65 "/hr.			
K x c =	0.60		Quantity =	51.9 cfs
100 Year Return Period		K= 1.25		
Intensity =	7.31 "/hr.			
K x c =	0.63		Quantity =	59.4 cfs

A-6

Fairway Estates Subdivision
Lansing, Kansas

CP 4/28/95
C,F&S
f: fairway

Area "I"

Areas:

Acres	Surface	"C"	Acres	Surface	"C"
0	pavement	0.85	1.2	residential	0.50
0	roof	0.90	0	commercial	0.80
0	turf	0.15	0	unimproved	0.30
0	total	ERR	1.2	total	0.50

1.2 Total Acres c= 0.50 (composite)
c x A= 0.6

Inlet Time:

D	S	C	Ti (min)	Say
200	5	0.5	9.0	9.0
(300 max.)			(5 to 15 min.)	

Travel Time:

L	V	Tt (min)
170	7	0.4

Time of Concentration:
Tc = 9.4 min.

Flowrate:

10 Year Return Period		K= 1.00		
Intensity =	6.21 "/hr.			
K x c =	0.50		Quantity =	3.7 cfs
25 Year Return Period		K= 1.10		
Intensity =	7.20 "/hr.			
K x c =	0.55		Quantity =	4.8 cfs
50 Year Return Period		K= 1.20		
Intensity =	8.27 "/hr.			
K x c =	0.60		Quantity =	6.0 cfs
100 Year Return Period		K= 1.25		
Intensity =	9.08 "/hr.			
K x c =	0.63		Quantity =	6.8 cfs

Fairway Estates

Lansing, Kansas

CP 4/27/
CF&S
f: fairway

INLETS

Struct.	Area	Contrib. Area (Ac.)	Run. Coef. (c)	Inlet Dist. (ft.)	Basin Slope (%)	(5-15) Inlet Time (min.)	Travel Length (ft.)	Travel Vel. (fps)	Travel Time (min.)	Time Con. (min.)	Freq. Factor (K)	Rainfall Inten. ("/hr.)	Runoff (cfs)	Sum Runoff (cfs)	Gutter Slope (%)	Spread (ft.)	Inlet Size (ft.)	Inlet Cap. (cfs)	Inter. 80% (cfs)	Bypass (cfs)	Bypass to
CI 2-4	G	2.4	0.50	290	5.5%	10.5	320	7.0	0.8	11.2	1	5.83	7.0	7.0	3.0%	10.5	5	7.2	5.8	1.2	CI 2-3
CI 2-3	M	2.9	0.50	300	4.5%	11.4	400	7.0	1.0	12.3	1	5.62	8.1	9.4	3.0%	11.0	8	9.4	7.5	0.6	CI 7-4
CI 2-2	F	1.3	0.80	250	3.0%	5.8	540	7.0	1.3	7.2	1	6.72	7.0	7.0	3.0%	10.5	5	7.2	5.8	1.2	CI 6-3
CI 7-4	N	2.7	0.50	300	6.7%	10.0	350	7.0	0.8	10.8	1	5.91	8.0	8.6	2.7%	11.2	5	7.4	5.9	2.1	CI 6-2
CI 7-3	O	0.8	0.50	130	5.0%	7.2	275	7.0	0.7	7.9	1	6.56	2.6	2.6	(sag)	gutter	5	15.0	12.0	0.0	-
CI 7-2	P	0.6	0.50	100	3.0%	7.5	350	7.0	0.8	8.3	1	6.45	1.9	1.9	(sag)	gutter	5	15.0	12.0	0.0	-
CI 5-3	K	1.1	0.50	200	3.0%	10.6	320	7.0	0.8	11.4	1	5.80	3.2	3.2	(sag)	gutter	5	15.0	12.0	0.0	-
CI 5-2	L	0.6	0.50	100	3.0%	7.5	360	7.0	0.9	8.4	1	6.44	1.9	1.9	(sag)	gutter	5	15.0	12.0	0.0	-
CI 6-3	Q	0.7	0.80	100	5.0%	5.0	370	7.0	0.9	5.9	1	7.09	4.0	5.2	(sag)	gutter	5	15.0	12.0	0.0	-
CI 6-2	R	0.7	0.80	100	5.0%	5.0	370	7.0	0.9	5.9	1	7.09	4.0	6.0	(sag)	gutter	5	15.0	12.0	0.0	-
FI 3-2	H	1.3	0.50	300	4.0%	11.8	375	7.0	0.9	12.7	1	5.55	3.6	3.6	(sag)	-	4	-	-	-	-
GI 4-2	J	0.7	0.80	100	5.0%	3.2	370	7.0	0.9	4.1	1	7.66	4.3	4.3	(sag)	-	4	-	-	-	-

STORM SEWERS

Struct.	Struct.	Pipe Flow (cfs)	Pipe Size (in.)	Pipe Slope (%)	Vel. (fps)	Pipe Cap. (cfs)	Top Elev.	Open (elev.)	Pipe Elev. (out)	"h" V2/2g	Hyd. Grad. (elev.)	Inlet Freeb. (ft.)
CI 2-4	CI 2-3	7.0	15	3.00%	9.1	11.2	877.41	876.03	872.90	1.30	875.45	0.58
CI 2-3	CI 2-2	16.4	21	1.25%	7.4	17.7	867.17	865.79	862.40	0.85	865.00	0.79
CI 2-2	FE 2-1	23.4	24	1.20%	7.9	24.8	867.17	865.79	861.68	0.97	864.65	1.14
CI 7-4	CI 7-3	8.6	15	2.00%	7.5	9.2	862.68	861.30	858.50	0.86	860.61	0.69
CI 7-3	CI 7-2	11.2	18	2.00%	8.4	14.9	861.50	860.12	857.00	1.10	859.60	0.52
CI 2-2	FE 2-1	13.1	18	2.00%	8.4	14.9	861.50	860.12	853.54	1.10	856.14	3.98
FE 5-4	CI 5-3	112.9	36	3.57%	17.9	126.3	-	-	-	-	-	-
CI 5-3	CI 5-2	116.1	42	1.50%	12.8	123.5	864.01	862.63	856.00	2.56	862.06	0.57
CI 5-2	FE 5-1	118.0	48	0.77%	10.1	126.3	864.01	862.63	855.55	1.57	861.12	1.51
FE 6-4	CI 6-3	237.2	54	1.50%	15.2	241.4	-	-	-	-	-	-
CI 6-3	CI 6-2	242.4	60	0.90%	12.6	247.8	862.41	861.03	853.24	2.47	860.71	0.32
CI 6-2	FE 6-1	248.4	60	1.00%	13.3	261.0	862.41	861.03	852.70	2.75	860.45	0.58
FI 3-2	FE 3-1	3.6	15	3.00%	9.1	11.2	875.00	875.00	870.00	1.30	872.55	2.45
GI 4-2	FE 4-1	111.9	42	1.50%	12.8	123.5	875.50	875.50	866.80	2.56	872.86	2.64
MH 1-3	MH 1-2	53.6	36	1.00%	9.5	66.8	886.00	886.00	878.65	1.39	883.04	2.96
MH 1-2	FE 1-1	53.6	36	0.70%	7.9	55.9	882.50	882.50	877.17	0.97	881.14	1.36

B-1

COOK, FLATT AND STROBEL
ENGINEERS, P.A.

Subject Fairway Estates Sheet No. 1 of 1
Job No.
By CP Date Chkd By Date

Size FI 3-2 L = 4' min.

$Q = C L H^{3/2}$

$C = 2.67$

$Q = 3.6$ cfs

$3.6 = 2.67(4) H^{3/2}$

$H^{3/2} = 0.3371$

$H = 0.48'$ ok

Size GI 4-2

try 4'x4' $P = 8'(.8) = 6.4'$

$A = 4'(.8) = 3.2^{\#}$

$Q = 4.3$ cfs

$P \rightarrow d = 0.37'$ o/c

$A \rightarrow d = < 0.37'$

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: felch25

Comment: Tract A Channel (25yr)

Solve For Depth

Given Input Data:

Bottom Width.....	10.00 ft
Left Side Slope..	3.00:1 (H:V)
Right Side Slope.	3.00:1 (H:V)
Manning's n.....	0.030
Channel Slope....	0.0080 ft/ft
Discharge.....	109.40 cfs

Computed Results:

Depth.....	1.54 ft
Velocity.....	4.84 fps
Flow Area.....	22.59 sf
Flow Top Width...	19.26 ft
Wetted Perimeter.	19.76 ft
Critical Depth...	1.34 ft
Critical Slope...	0.0134 ft/ft
Froude Number....	0.79 (flow is Subcritical)

Open Channel Flow Module, Version 3.21 (c) 1990
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

C-1

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: felch25

Comment: Tract A Channel (25yr)

Solve For Depth

Given Input Data:

Bottom Width.....	10.00 ft
Left Side Slope..	3.00:1 (H:V)
Right Side Slope.	3.00:1 (H:V)
Manning's n.....	0.030
Channel Slope....	0.0087 ft/ft
Discharge.....	109.40 cfs

Computed Results:

Depth.....	1.51 ft
Velocity.....	4.99 fps
Flow Area.....	21.93 sf
Flow Top Width...	19.06 ft
Wetted Perimeter.	19.55 ft
Critical Depth...	1.34 ft
Critical Slope...	0.0134 ft/ft
Froude Number....	0.82 (flow is Subcritical)

Open Channel Flow Module, Version 3.21 (c) 1990
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

C-2

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: felch100

Comment: Tract A Channel (100yr)

Solve For Depth

Given Input Data:

Bottom Width.....	10.00 ft
Left Side Slope..	3.00:1 (H:V)
Right Side Slope.	3.00:1 (H:V)
Manning's n.....	0.030
Channel Slope....	0.0087 ft/ft
Discharge.....	154.20 cfs

Computed Results:

Depth.....	1.81 ft
Velocity.....	5.51 fps
Flow Area.....	27.97 sf
Flow Top Width...	20.87 ft
Wetted Perimeter.	21.46 ft
Critical Depth...	1.64 ft
Critical Slope...	0.0127 ft/ft
Froude Number....	0.84 (flow is Subcritical)

Open Channel Flow Module, Version 3.21 (c) 1990
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: bch100

Comment: Tract B Channel (100yr)

Solve For Depth

Given Input Data:

Bottom Width.....	8.00 ft
Left Side Slope..	3.00:1 (H:V)
Right Side Slope.	3.00:1 (H:V)
Manning's n.....	0.030
Channel Slope....	0.0060 ft/ft
Discharge.....	210.20 cfs

Computed Results:

Depth.....	2.53 ft
Velocity.....	5.34 fps
Flow Area.....	39.37 sf
Flow Top Width...	23.16 ft
Wetted Perimeter.	23.98 ft
Critical Depth...	2.12 ft
Critical Slope...	0.0121 ft/ft
Froude Number....	0.72 (flow is Subcritical)

Open Channel Flow Module, Version 3.21 (c) 1990
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

C-4

Fairway Estates Subdivision

Lansing, Kansas

CP 4/28/95
C,F&S
f: fairway

Watershed Pre-development

Areas:

Acres	Surface	"C"	Acres	Surface	"C"
0	pavement	0.85	92.1	residential	0.50
0	roof	0.90	0	commercial	0.80
0	turf	0.15	64.2	unimproved	0.30
0	total	ERR	156.3	total	0.42

156.3 Total Acres c= 0.42 (composite)
c x A= 65.31

Inlet Time:

D	S	C	Ti (min)	Say
300	5	0.42	12.5	12.5
(300 max.)			(5 to 15 min.)	

Travel Time:

L	V	Tt (min)
3400	10	5.7

Time of Concentration:
Tc = 18.2 min.

Flowrate:

10 Year Return Period		K=	1.00	
Intensity =	4.73	"/hr.		
K x c =	0.42		Quantity =	309.1 cfs
25 Year Return Period		K=	1.10	
Intensity =	5.49	"/hr.		
K x c =	0.46		Quantity =	394.5 cfs
50 Year Return Period		K=	1.20	
Intensity =	6.30	"/hr.		
K x c =	0.50		Quantity =	493.9 cfs
100 Year Return Period		K=	1.25	
Intensity =	6.92	"/hr.		
K x c =	0.52		Quantity =	565.3 cfs

D-1

Fairway Estates Subdivision
Lansing, Kansas

CP 4/28/95
C,F&S
f: fairway

Watershed Post-development

Areas:

Acres	Surface	"C"	Acres	Surface	"C"
0	pavement	0.85	156.3	residential	0.50
0	roof	0.90	0	commercial	0.80
0	turf	0.15	0	unimproved	0.30
0	total	ERR	156.3	total	0.50

156.3 Total Acres c= 0.50 (composite)
c x A= 78.15

Inlet Time:

D	S	C	Ti (min)	Say
300	5	0.50	11.0	11.0
(300 max.)			(5 to 15 min.)	

Travel Time:

L	V	Tt (min)
3400	10	5.7

Time of Concentration:
Tc = 16.7 min.

Flowrate:

10 Year Return Period		K=	1.00	
Intensity =	4.93	"/hr.		
K x c =	0.50		Quantity =	385.6 cfs
25 Year Return Period		K=	1.10	
Intensity =	5.72	"/hr.		
K x c =	0.55		Quantity =	492.1 cfs
50 Year Return Period		K=	1.20	
Intensity =	6.57	"/hr.		
K x c =	0.60		Quantity =	616.1 cfs
100 Year Return Period		K=	1.25	
Intensity =	7.22	"/hr.		
K x c =	0.63		Quantity =	705.1 cfs

D-2

Executed 04-29-1995 10:36:48
Constructed file:
FAIR10 .HYD

Input Data for Hydrograph

VOLUME = 465,034 cu.ft. = 10.68 ac-ft

Warning: Right side of hydrograph truncated. Hydrograph volume incomplete.

Time (hrs)	Flow (cfs)
0.00	0.0
0.28	385.6
0.67	0.0

Executed 04-29-1995 10:36:48
Constructed file:
FAIR10 .HYD

File Summary for Constructed Hydrograph

VOLUME = 465,034 cu.ft. = 10.68 ac-ft

Warning: Right side of hydrograph truncated. Hydrograph volume incomplete.

Time (hrs)	Flow (cfs)
0.00	0.0
0.02	22.9
0.03	45.7
0.05	68.6
0.07	91.4
0.08	114.3
0.10	137.2
0.12	160.0
0.13	182.9
0.15	205.7
0.17	228.6
0.18	251.5
0.20	274.3
0.22	297.2
0.23	320.0
0.25	342.9
0.27	365.8
0.28	383.4
0.30	367.0
0.32	350.6
0.33	334.2
0.35	317.8
0.37	301.4
0.38	284.9
0.40	268.5
0.41	252.1
0.43	235.7
0.45	219.3
0.46	202.9
0.48	186.5
0.50	170.1
0.51	153.6
0.53	137.2
0.55	120.8
0.56	104.4
0.58	88.0
0.60	71.6
0.61	55.2

Executed 04-29-1995 10:36:48
Constructed file:
FAIR10 .HYD

File Summary for Constructed Hydrograph

VOLUME = 465,034 cu.ft. = 10.68 ac-ft

Warning: Right side of hydrograph truncated. Hydrograph volume incomplete.

Time (hrs)	Flow (cfs)
0.63	38.8
0.65	22.3
0.66	5.9

>>>>>>>>>>>>>>>>> WARNING MESSAGES <<<<<<<<<<<<<<<<<

Peak flow in hydrograph does not match peak flow input point.

Executed 04-29-1995 10:44:14
Constructed file:
FAIR100 .HYD

Input Data for Hydrograph

VOLUME = 850,351 cu.ft. = 19.52 ac-ft

Warning: Right side of hydrograph truncated. Hydrograph volume incomplete.

Time (hrs)	Flow (cfs)
0.00	0.0
0.28	705.1
0.67	0.0

Executed 04-29-1995 10:44:14
Constructed file:
FAIR100 .HYD

File Summary for Constructed Hydrograph

VOLUME = 850,351 cu.ft. = 19.52 ac-ft

Warning: Right side of hydrograph truncated. Hydrograph volume incomplete.

Time (hrs)	Flow (cfs)
0.00	0.0
0.02	41.8
0.03	83.6
0.05	125.4
0.07	167.2
0.08	209.0
0.10	250.8
0.12	292.6
0.13	334.4
0.15	376.2
0.17	418.0
0.18	459.8
0.20	501.6
0.22	543.4
0.23	585.2
0.25	627.0
0.27	668.8
0.28	701.1
0.30	671.1
0.32	641.1
0.33	611.1
0.35	581.1
0.37	551.1
0.38	521.1
0.40	491.0
0.41	461.0
0.43	431.0
0.45	401.0
0.46	371.0
0.48	341.0
0.50	311.0
0.51	281.0
0.53	250.9
0.55	220.9
0.56	190.9
0.58	160.9
0.60	130.9
0.61	100.9

F-2

Executed 04-29-1995 10:44:14
Constructed file:
FAIR100 .HYD

File Summary for Constructed Hydrograph

VOLUME = 850,351 cu.ft. = 19.52 ac-ft

Warning: Right side of hydrograph truncated. Hydrograph volume incomplete.

Time (hrs)	Flow (cfs)
0.63	70.9
0.65	40.9
0.66	10.8

>>>>>>>>>>>>>>>>> WARNING MESSAGES <<<<<<<<<<<<<<<<<

Peak flow in hydrograph does not match peak flow input point.

Outlet Structure File: FAIR2 .STR

POND-2 Version: 5.14 S/N: 1220510459
Date Executed: Time Executed:

Outlet Structure File: FAIR2 .STR
Planimeter Input File: FAIR .VOL
Rating Table Output File: FAIR2 .PND

Min. Elev.(ft) = 852 Max. Elev.(ft) = 857.1 Incr.(ft) = .25

Additional elevations (ft) to be included in table:
* *

****
SYSTEM CONNECTIVITY
****

Structure	No.	Q Table		Q Table
WEIR-VR	1		->	1
WEIR-VR	2	+ 1	->	3

Outflow rating table summary was stored in file:
FAIR2 .PND

G-1

Outlet Structure File: FAIR2 .STR

POND-2 Version: 5.14 S/N: 1220510459
Date Executed: Time Executed:

>>>>>> Structure No. 1 <<<<<<
(Input Data)

WEIR-VR
Weir - Vertical Rectangular

E1 elev.(ft)? 852
E2 elev.(ft)? 857.1
Weir coefficient? 2.98
Weir elev.(ft)? 852
Length (ft)? 11
Contracted/Suppressed (C/S)? C

G-2

Outlet Structure File: FAIR2 .STR

POND-2 Version: 5.14 S/N: 1220510459
Date Executed: Time Executed:

>>>>>> Structure No. 2 <<<<<<
(Input Data)

WEIR-VR
Weir - Vertical Rectangular

E1 elev.(ft)?	852
E2 elev.(ft)?	857.1
Weir coefficient?	2.98
Weir elev.(ft)?	855.0
Length (ft)?	20
Contracted/Suppressed (C/S)?	C

G-3

Outlet Structure File: FAIR2 .STR

POND-2 Version: 5.14 S/N: 1220510459
Date Executed: Time Executed:

***** COMPOSITE OUTFLOW SUMMARY ****

Elevation (ft)	Q (cfs)	Contributing Structures
852.00	0.0	1
852.25	4.1	1
852.50	11.5	1
852.75	21.0	1
853.00	32.2	1
853.25	44.8	1
853.50	58.6	1
853.75	73.5	1
854.00	89.3	1
854.25	106.1	1
854.50	123.7	1
854.75	142.0	1
855.00	161.0	1 +2
855.25	188.1	1 +2
855.50	221.9	1 +2
855.75	260.2	1 +2
856.00	302.2	1 +2
856.25	347.3	1 +2
856.50	395.2	1 +2
856.75	445.6	1 +2
857.00	498.4	1 +2
857.10	0.0	

Outlet Structure File: FAIR2 .STR

POND-2 Version: 5.14 S/N: 1220510459
Date Executed: Time Executed:

Outflow Rating Table for Structure #1
WEIR-VR Weir - Vertical Rectangular

***** INLET CONTROL ASSUMED *****

Elevation (ft)	Q (cfs)	Computation Messages
852.00	0.0	H =0.0
852.25	4.1	H =.25
852.50	11.5	H =.5
852.75	21.0	H =.750
853.00	32.2	H =1.0
853.25	44.8	H =1.25
853.50	58.6	H =1.5
853.75	73.5	H =1.75
854.00	89.3	H =2.0
854.25	106.1	H =2.25
854.50	123.7	H =2.5
854.75	142.0	H =2.75
855.00	161.0	H =3.0
855.25	180.7	H =3.25
855.50	201.0	H =3.5
855.75	221.8	H =3.75
856.00	243.2	H =4.0
856.25	265.0	H =4.25
856.50	287.3	H =4.5
856.75	310.0	H =4.75
857.00	333.2	H =5.0
857.10	0.0	E = or > E2=857.1

C = 2.98 L (ft) = 11
H (ft) = Table elev. - Invert elev. (852 ft)
Q (cfs) = C * (L-.2H) * (H**1.5) -- Contracted Weir

Outlet Structure File: FAIR2 .STR

POND-2 Version: 5.14 S/N: 1220510459
Date Executed: Time Executed:

Outflow Rating Table for Structure #2
WEIR-VR Weir - Vertical Rectangular

***** INLET CONTROL ASSUMED *****

Elevation (ft)	Q (cfs)	Computation Messages
852.00	0.0	E < Inv.El.= 855
852.25	0.0	E < Inv.El.= 855
852.50	0.0	E < Inv.El.= 855
852.75	0.0	E < Inv.El.= 855
853.00	0.0	E < Inv.El.= 855
853.25	0.0	E < Inv.El.= 855
853.50	0.0	E < Inv.El.= 855
853.75	0.0	E < Inv.El.= 855
854.00	0.0	E < Inv.El.= 855
854.25	0.0	E < Inv.El.= 855
854.50	0.0	E < Inv.El.= 855
854.75	0.0	E < Inv.El.= 855
855.00	0.0	H =0.0
855.25	7.4	H =.25
855.50	21.0	H =.5
855.75	38.4	H =.750
856.00	59.0	H =1.0
856.25	82.3	H =1.25
856.50	107.8	H =1.5
856.75	135.6	H =1.75
857.00	165.2	H =2.0
857.10	0.0	E = or > E2=857.1

C = 2.98 L (ft) = 20
H (ft) = Table elev. - Invert elev. (855 ft)
Q (cfs) = C * (L-.2H) * (H**1.5) -- Contracted Weir

G-6

Outlet Structure File: FAIR2 .STR

POND-2 Version: 5.14 S/N: 1220510459
Date Executed: Time Executed:

Outflow Rating Table 3
Table 3 = 1 + 2

Elevation (ft)	Q (cfs)	Contributing Structures
852.00	0.0	1
852.25	4.1	1
852.50	11.5	1
852.75	21.0	1
853.00	32.2	1
853.25	44.8	1
853.50	58.6	1
853.75	73.5	1
854.00	89.3	1
854.25	106.1	1
854.50	123.7	1
854.75	142.0	1
855.00	161.0	1 +2
855.25	188.1	1 +2
855.50	221.9	1 +2
855.75	260.2	1 +2
856.00	302.2	1 +2
856.25	347.3	1 +2
856.50	395.2	1 +2
856.75	445.6	1 +2
857.00	498.4	1 +2
857.10	0.0	-

POND-2 Version: 5.14 S/N: 1220510459
EXECUTED: 05-01-1995 15:15:15

```
**********************
*                    *
* Fairway Estates    *
* 10 Year Routing    *
*                    *
*                    *
*                    *
**********************
```

Inflow Hydrograph: FAIR10 .HYD
Rating Table file: FAIR2 .PND

----INITIAL CONDITIONS----
Elevation = 852.00 ft
Outflow = 0.00 cfs
Storage = 0 cu-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + O (cfs)
852.00	0.0	0	0.0	0.0
852.25	4.1	27,167	754.6	758.7
852.50	11.5	54,794	1522.1	1533.6
852.75	21.0	82,886	2302.4	2323.4
853.00	32.2	111,447	3095.7	3127.9
853.25	44.8	140,479	3902.2	3947.0
853.50	58.6	169,989	4721.9	4780.5
853.75	73.5	199,977	5554.9	5628.4
854.00	89.3	230,451	6401.4	6490.7
854.25	106.1	261,412	7261.4	7367.5
854.50	123.7	292,865	8135.1	8258.8
854.75	142.0	324,813	9022.6	9164.6
855.00	161.0	357,261	9923.9	10084.9
855.25	188.1	390,213	10839.2	11027.3
855.50	221.9	423,671	11768.6	11990.5
855.75	260.2	457,641	12712.2	12972.4
856.00	302.2	492,126	13670.2	13972.4
856.25	347.3	527,129	14642.5	14989.8
856.50	395.2	562,655	15629.3	16024.5
856.75	445.6	598,709	16630.8	17076.4
857.00	498.4	635,292	17647.0	18145.4

Time increment (t) = 1.2 min.

H-1

POND-2 Version: 5.14 S/N: 1220510459 Page 2
EXECUTED: 05-01-1995 15:15:15

Pond File: FAIR2 .PND
Inflow Hydrograph: FAIR10 .HYD
Outflow Hydrograph: OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.0	0.00	-----	0.0	0.0	0.00	852.00
1.2	22.90	22.9	22.7	22.9	0.12	852.01
2.4	45.70	68.6	90.3	91.3	0.49	852.03
3.6	68.60	114.3	202.4	204.6	1.11	852.07
4.8	91.40	160.0	358.4	362.4	1.96	852.12
6.0	114.30	205.7	558.0	564.1	3.05	852.19
7.2	137.20	251.5	800.4	809.5	4.59	852.27
8.4	160.00	297.2	1082.9	1097.6	7.34	852.36
9.6	182.90	342.9	1404.9	1425.8	10.47	852.47
10.8	205.70	388.6	1764.2	1793.5	14.63	852.58
12.0	228.60	434.3	2159.5	2198.5	19.50	852.71
13.2	251.50	480.1	2588.8	2639.6	25.40	852.85
14.4	274.30	525.8	3050.6	3114.6	32.01	853.00
15.6	297.20	571.5	3542.5	3622.1	39.80	853.15
16.8	320.00	617.2	4063.0	4159.7	48.32	853.31
18.0	342.90	662.9	4610.5	4725.9	57.70	853.48
19.2	365.80	708.7	5183.1	5319.2	68.07	853.66
20.4	383.40	749.2	5774.2	5932.3	79.07	853.84
21.6	367.00	750.4	6344.7	6524.6	89.95	854.01
22.8	350.60	717.6	6861.8	7062.3	100.25	854.16
24.0	334.20	684.8	7327.3	7546.6	109.64	854.30
25.2	317.80	652.0	7742.9	7979.3	118.18	854.42
26.4	301.40	619.2	8110.6	8362.1	125.79	854.53
27.6	284.90	586.3	8431.8	8696.9	132.55	854.62
28.8	268.50	553.4	8708.4	8985.2	138.37	854.70
30.0	252.10	520.6	8942.4	9229.0	143.33	854.77
31.2	235.70	487.8	9135.2	9430.2	147.48	854.82
32.4	219.30	455.0	9288.6	9590.2	150.79	854.87
33.6	202.90	422.2	9404.3	9710.8	153.28	854.90
34.8	186.50	389.4	9483.7	9793.7	154.99	854.92
36.0	170.10	356.6	9528.4	9840.3	155.95	854.93
37.2	153.60	323.7	9539.7	9852.1	156.19	854.94
38.4	137.20	290.8	9519.0	9830.5	155.75	854.93
39.6	120.80	258.0	9467.7	9777.0	154.64	854.92
40.8	104.40	225.2	9387.1	9692.9	152.91	854.89
42.0	88.00	192.4	9278.4	9579.5	150.57	854.86
43.2	71.60	159.6	9142.7	9438.0	147.64	854.82
44.4	55.20	126.8	8981.2	9269.5	144.17	854.78
45.6	38.80	94.0	8794.8	9075.2	140.19	854.73
46.8	22.30	61.1	8584.3	8855.9	135.76	854.66
48.0	5.90	28.2	8350.9	8612.5	130.85	854.60

H-2

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: FAIR2 .PND
Inflow Hydrograph: FAIR10 .HYD
Outflow Hydrograph: OUT .HYD

Starting Pond W.S. Elevation = 852.00 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow	=	383.40 cfs
Peak Outflow	=	156.19 cfs
Peak Elevation	=	854.94 ft

***** Summary of Approximate Peak Storage *****

Initial Storage	=	0 cu-ft
Peak Storage From Storm	=	349,054 cu-ft
Total Storage in Pond	=	349,054 cu-ft

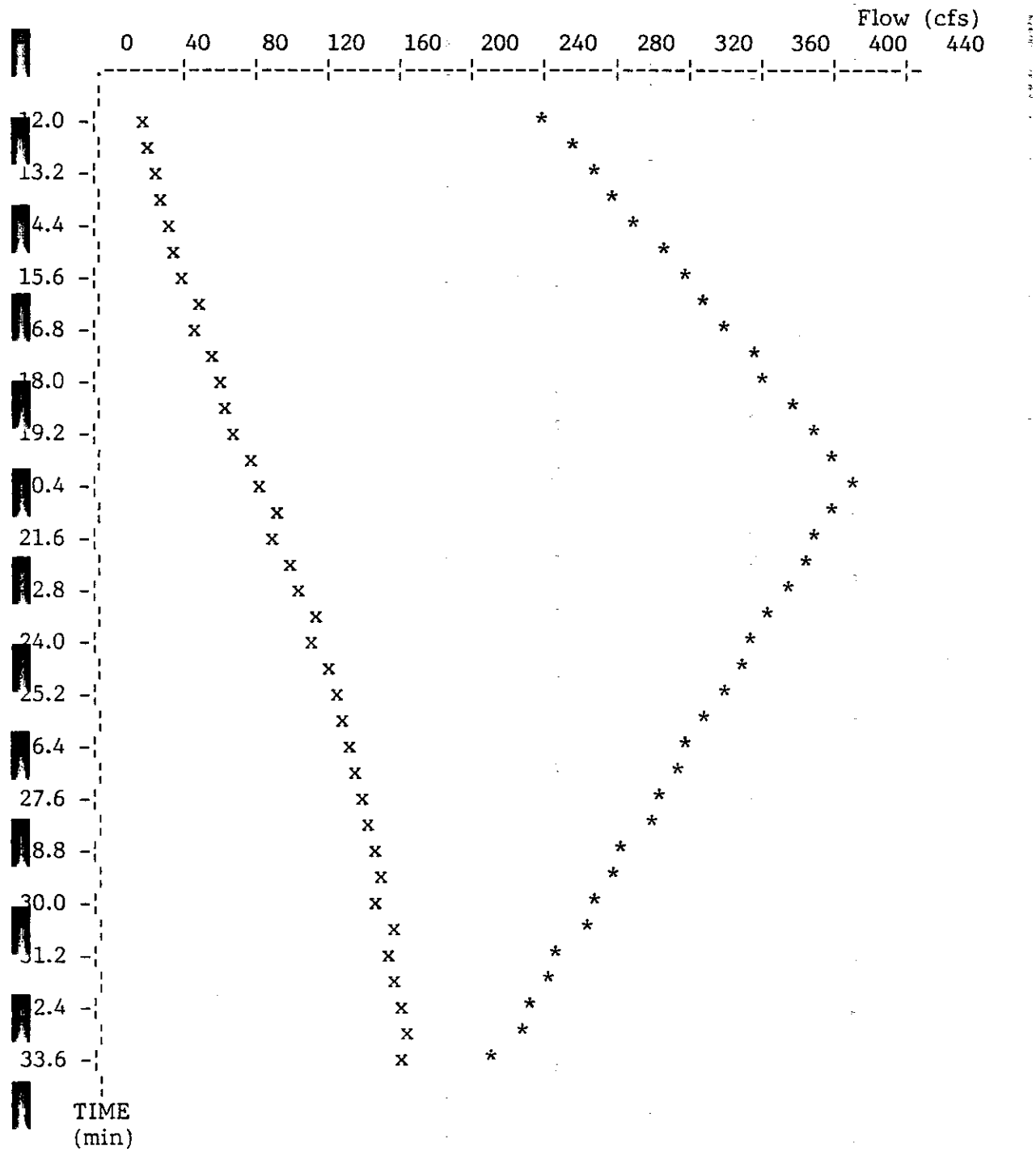
Warning: Inflow hydrograph truncated on right side.

POND-2 Version: 5.14 S/N: 1220510459 Page 4

Pond File: FAIR2 .PND
Inflow Hydrograph: FAIR10 .HYD
Outflow Hydrograph: OUT .HYD

EXECUTED: 05-01-1995
15:15:15

Peak Inflow = 383.40 cfs
Peak Outflow = 156.19 cfs
Peak Elevation = 854.94 ft



* File: FAIR10 .HYD Qmax = 383.4 cfs
x File: OUT .HYD Qmax = 156.2 cfs

17-4

POND-2 Version: 5.14 S/N: 1220510459
EXECUTED: 05-01-1995 15:07:30

****
* *
* Fairway Estates *
* 100 Year Routing *
* *
* *
* *
****

Inflow Hydrograph: FAIR100 .HYD
Rating Table file: FAIR2 .PND

----INITIAL CONDITIONS----
Elevation = 852.00 ft
Outflow = 0.00 cfs
Storage = 0 cu-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + O (cfs)
852.00	0.0	0	0.0	0.0
852.25	4.1	27,167	754.6	758.7
852.50	11.5	54,794	1522.1	1533.6
852.75	21.0	82,886	2302.4	2323.4
853.00	32.2	111,447	3095.7	3127.9
853.25	44.8	140,479	3902.2	3947.0
853.50	58.6	169,989	4721.9	4780.5
853.75	73.5	199,977	5554.9	5628.4
854.00	89.3	230,451	6401.4	6490.7
854.25	106.1	261,412	7261.4	7367.5
854.50	123.7	292,865	8135.1	8258.8
854.75	142.0	324,813	9022.6	9164.6
855.00	161.0	357,261	9923.9	10084.9
855.25	188.1	390,213	10839.2	11027.3
855.50	221.9	423,671	11768.6	11990.5
855.75	260.2	457,641	12712.2	12972.4
856.00	302.2	492,126	13670.2	13972.4
856.25	347.3	527,129	14642.5	14989.8
856.50	395.2	562,655	15629.3	16024.5
856.75	445.6	598,709	16630.8	17076.4
857.00	498.4	635,292	17647.0	18145.4

Time increment (t) = 1.2 min.

POND-2 Version: 5.14 S/N: 1220510459
EXECUTED: 05-01-1995 15:07:30

Pond File: FAIR2 .PND
Inflow Hydrograph: FAIR100 .HYD
Outflow Hydrograph: OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.0	0.00	-----	0.0	0.0	0.00	852.00
1.2	41.80	41.8	41.3	41.8	0.23	852.01
2.4	83.60	125.4	164.9	166.7	0.90	852.05
3.6	125.40	209.0	369.9	373.9	2.02	852.12
4.8	167.20	292.6	655.3	662.5	3.58	852.22
6.0	209.00	376.2	1018.1	1031.5	6.71	852.34
7.2	250.80	459.8	1456.0	1477.9	10.97	852.48
8.4	292.60	543.4	1965.2	1999.4	17.10	852.65
9.6	334.40	627.0	2542.7	2592.2	24.74	852.83
10.8	376.20	710.6	3185.0	3253.3	34.13	853.04
12.0	418.00	794.2	3888.6	3979.2	45.33	853.26
13.2	459.80	877.8	4649.6	4766.4	58.37	853.50
14.4	501.60	961.4	5464.7	5611.0	73.19	853.74
15.6	543.40	1045.0	6330.3	6509.7	89.66	854.01
16.8	585.20	1128.6	7243.1	7458.9	107.90	854.28
18.0	627.00	1212.2	8200.0	8455.3	127.67	854.55
19.2	668.80	1295.8	9198.1	9495.8	148.84	854.84
20.4	701.10	1369.9	10218.2	10568.0	174.89	855.13
21.6	671.10	1372.2	11174.7	11590.4	207.86	855.40
22.8	641.10	1312.2	12004.4	12486.9	241.26	855.63
24.0	611.10	1252.2	12712.3	13256.6	272.13	855.82
25.2	581.10	1192.2	13305.8	13904.5	299.35	855.98
26.4	551.10	1132.2	13792.3	14438.0	322.84	856.11
27.6	521.10	1072.2	14181.0	14864.5	341.75	856.22
28.8	491.00	1012.1	14479.7	15193.1	356.71	856.30
30.0	461.00	952.0	14696.2	15431.7	367.76	856.36
31.2	431.00	892.0	14838.2	15588.2	375.00	856.39
32.4	401.00	832.0	14912.6	15670.2	378.80	856.41
33.6	371.00	772.0	14925.7	15684.6	379.46	856.42
34.8	341.00	712.0	14883.1	15637.7	377.29	856.41
36.0	311.00	652.0	14790.0	15535.1	372.54	856.38
37.2	281.00	592.0	14651.1	15382.0	365.46	856.34
38.4	250.90	531.9	14470.5	15183.0	356.24	856.30
39.6	220.90	471.8	14251.9	14942.3	345.20	856.24
40.8	190.90	411.8	13998.0	14663.7	332.85	856.17
42.0	160.90	351.8	13711.9	14349.8	318.93	856.09
43.2	130.90	291.8	13396.6	14003.7	303.59	856.01
44.4	100.90	231.8	13052.9	13628.4	287.75	855.91
45.6	70.90	171.8	12683.1	13224.7	270.79	855.81
46.8	40.90	111.8	12288.3	12794.9	253.27	855.70
48.0	10.80	51.7	11869.0	12340.0	235.53	855.59

E-2

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: FAIR2 .PND
Inflow Hydrograph: FAIR100 .HYD
Outflow Hydrograph: OUT .HYD

Starting Pond W.S. Elevation = 852.00 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow	=	701.10 cfs
Peak Outflow	=	379.46 cfs
Peak Elevation	=	856.42 ft

***** Summary of Approximate Peak Storage *****

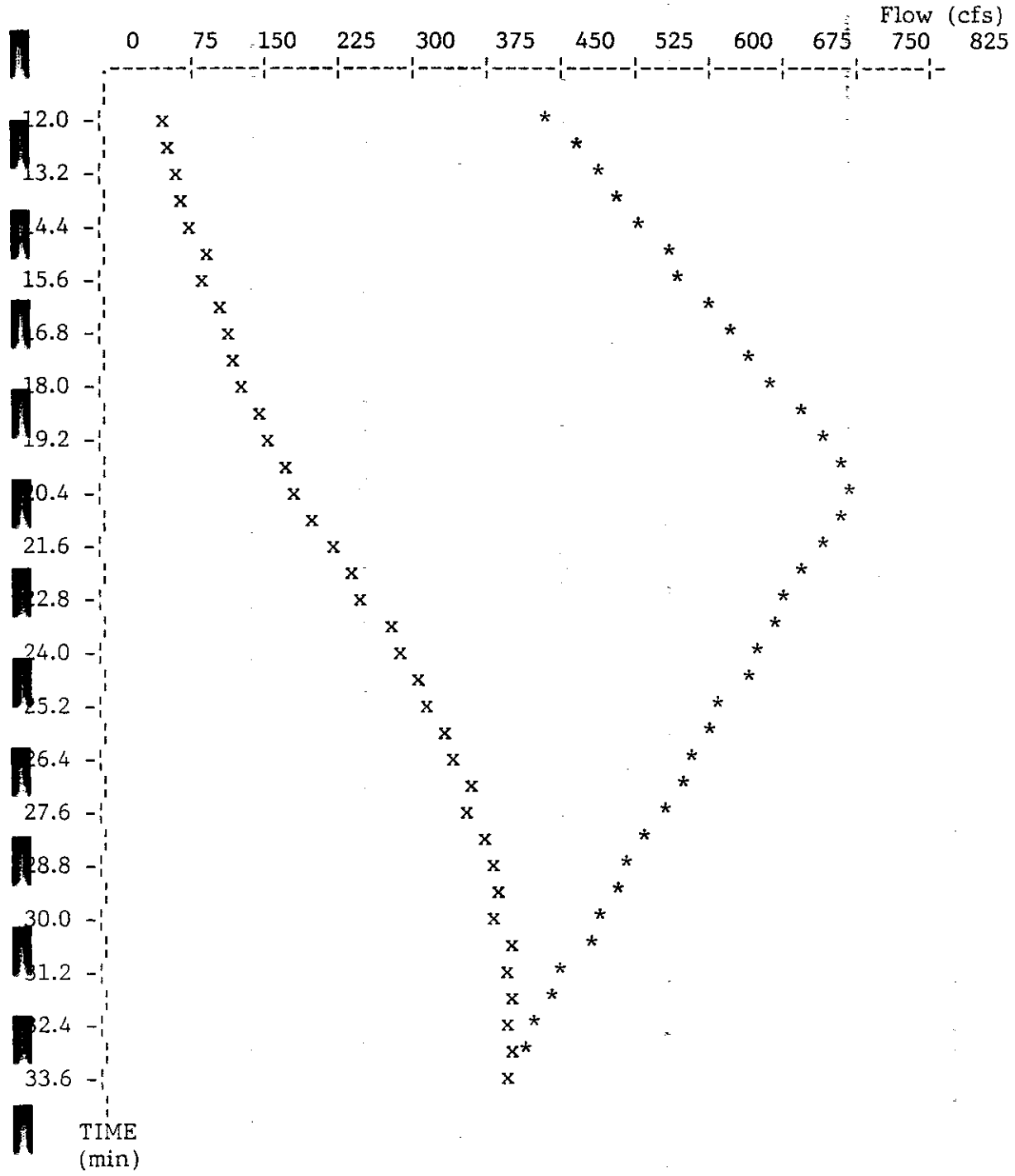
Initial Storage	=	0 cu-ft
Peak Storage From Storm	=	550,981 cu-ft
Total Storage in Pond	=	550,981 cu-ft

Warning: Inflow hydrograph truncated on right side.

Pond File: FAIR2 .PND
Inflow Hydrograph: FAIR100 .HYD
Outflow Hydrograph: OUT .HYD

EXECUTED: 05-01-1995
15:07:30

Peak Inflow = 701.10 cfs
Peak Outflow = 379.46 cfs
Peak Elevation = 856.42 ft



* File: FAIR100 .HYD Qmax = 701.1 cfs
x File: OUT .HYD Qmax = 379.5 cfs

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: Outpipe

Comment: Pond Outlet Pipe

Solve For Actual Depth

Given Input Data:

Diameter.....	8.00 ft
Slope.....	0.0025 ft/ft
Manning's n.....	0.013
Discharge.....	379.46 cfs

Computed Results:

Depth.....	5.57 ft
Velocity.....	10.15 fps
Flow Area.....	37.39 sf
Critical Depth....	4.95 ft
Critical Slope....	0.0035 ft/ft
Percent Full.....	69.67 %
Full Capacity.....	456.04 cfs
QMAX @.94D.....	490.56 cfs
Froude Number.....	0.79 (flow is Subcritical)

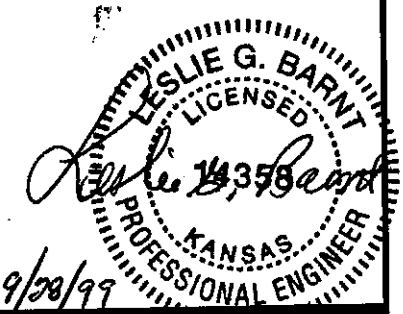
Open Channel Flow Module, Version 3.21 (c) 1990
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

J-1

FAIRWAY ESTATES
PHASE II

LAKE RE-STUDY

September 24, 1999



GBA NO. 8813

GBA GEORGE BUTLER ASSOCIATES, INC.
Engineers · Architects

GBA GEORGE BUTLER ASSOCIATES, INC.

celebrating 30 years
Engineers • Architects
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8207 Melrose Drive
Lenexa, Kansas 66214-3621
Telephone (913) 492-0400
FAX (913) 894-1878
gba@gbutler.com
http://www.gbutler.com

September 24, 1999

Mr. William Schrandt
Director of Public Works
City of Lansing
Lansing, KS 66043

SUBJECT: Fairway Estates Lake Study

Dear Mr. Schrandt:

We are submitting for your review and approval, a "Lake Re-Study" for Fairway Estates. We were compelled to conduct our own study of the Fairway Estates Lake after field investigations conducted by our firm revealed the following:

1. The existing outlet box was not constructed in accordance with plans prepared by Cook, Flatt and Strobel (dated July 10, 1995.) More specifically, the outlet box was constructed with no "lower" 5 foot weir as shown on those plans.

2. The existing home on Lot 37 was found to have a lowest finish floor elevation below the 100 year pool as calculated by Cook, Flatt and Strobel.

Typically, City of Lansing storm design criteria requires the analysis for drainage areas less than 200 acres to be completed using the Rational Method. In order to review the drainage data more quickly, we utilized the HEC-1 program to conduct our detailed drainage study. To obtain similar results to the rational method using the HEC-1 program, we increased the curve number and percent impervious to obtain results similar to those obtained using the rational method and as published in the previous drainage report by Cook, Flatt and Strobel. City of Lansing Technical Specifications and Design Criteria call for a curve number of 83 and a percent impervious of 35% for single-family developments. We modified the curve number to 90 and the percent impervious to 45%. We utilized the areas and time of concentrations from the previous study and modified as necessary to incorporate into the HEC-1 analysis. Using this methodology, we believe we have obtained results comparable to the conservatism of the rational method. The storm duration used was 6 hours and rainfall depths for the 2, 10, 25, 50 and 100-year events were taken from Technical Paper 40 (TP-40).

The drainage area being routed to the lake is approximately 142 acres. Our study takes into account the two existing on-site detention facilities upstream. Thus, stage/storage and stage/discharge were included in the routing for our re-study. There are also two detention facilities upstream and off site which were **not included** within our analysis.

GBA GEORGE BUTLER ASSOCIATES, INC.

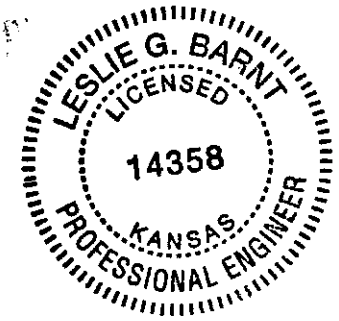
The following modifications are being proposed to maintain a 100-year storm event below the lowest existing finish floor elevation of 858.32.

- Re-route 14.7 acres of drainage area to bypass the lake from the south to the east .
- Existing lake outlet box will be being upsized from 8.5'x4' to 10'x10'.
- Provide an emergency spillway at Elevation 857.0 with 10 foot flat bottom ditch.
- Provide an additional 7,200± sq. ft. surface area to the lake.

According to the owner, since the construction of the lake in 1995, no flooding has occurred within any of the constructed homes. By not taking into account off-site detention upstream and increasing the curve number and percent impervious to a higher number than what is typically used, we feel we have an analysis that is very conservative in nature. Should you have any questions or comments please feel free to call me or Harland Russell at (913) 492-0400.

Respectfully yours,

GEORGE BUTLER ASSOCIATES, INC.



Leslie G. Barnt, P.E.
Project Engineer

Harland T. Russell
Project Manager

cc: Ed Schlagel, P.E. Lansing City Engineer
Brad Burton, P.E. George Butler Associates

O:\Proj\8813\schrandt1.wpd

Lake Storage Volume for Fairway Estates Development 9/10/99

ELEVATION (ft)	AREA (acres)	AVERAGE AREA (acres)	VOLUME (acre-ft)	ACCUMULATIVE VOLUME (acre-ft)	TYPE OF STORAGE (1)
854.8	2.664			0.000	
		2.691	0.538		
855.0	2.718			0.538	
		2.786	1.393		
855.5	2.853			1.931	
		2.918	1.459		
856.0	2.983			3.390	
		3.062	1.531		
856.5	3.141			4.921	
		3.219	1.610		
857.0	3.297			6.530	
		3.395	1.697		
857.5	3.492			8.228	
		3.589	1.795		
858.0	3.686			10.022	
		3.824	1.912		
858.5	3.961			11.934	
		4.098	2.049		
859.0	4.235			13.983	

(1) At the given Elevation and Below

Page 1

10'X10 ' Riser w/ 72" CSP

9/15/99

Hydraulic Calculations w/10 foot Emergency Spillway @ Elevation 857

Elevation	H_1	L_T	Q_W	Q_O	H_2	Q_P	$Q_{cont.}$	$H_{E.S.}$	$Q_{E.S.}$	$Q_{total.}$
854.8	0.0	40.0	0.0	0.0	6.3	262.6	0.0			0.0
855.0	0.2	39.8	10.7	172.3	6.5	266.7	10.7			10.7
855.5	0.7	39.4	69.3	322.3	7.0	276.8	69.3			69.3
856.0	1.2	39.0	154.0	422.0	7.5	286.5	154.0			154.0
856.5	1.7	38.6	256.9	502.2	8.0	295.9	256.9			256.9
857.0	2.2	38.2	374.3	571.3	8.5	305.0	305.0	0.0	0.0	305.0
857.5	2.7	37.8	503.6	632.9	9.0	313.8	313.8	0.5	9.5	323.3
858.0	3.2	37.4	643.0	689.1	9.5	322.4	322.4	1.0	26.5	348.9
858.5	3.7	37.0	790.9	740.9	10.0	330.8	330.8	1.5	48.1	378.9
859.0	4.2	36.6	946.1	789.4	10.5	339.0	339.0	2.0	73.3	412.3

H_1	The depth of water above 10'x10' box.
L_T	The true length of the 10'x10' box weir ($L_T = (L - n*0.1*H_1)$
Q_w	Weir Flow over Box, $Q_W = 3.0 L_T H_1^{3/2}$
Q_O	Orifice Flow in Box, $Q_o = 0.6*A*(2*g*H_1)^{1/2}$, assumed also 20% clogging factor for grate over box.
H_2	The depth of water above crown of pipe at outlet.
Q_P	Pipe Flow of 72" CMP $Q_p = A_p(2*g*H_2/k_e + k_o + (29.1*n^2 L_p/R^{4/3}))^{1/2}$
$Q_{cont.}$	Controlling flow between weir, orifice and pipe.
$H_{E.S.}$	The depth of water above invert of Emergency Spillway.
$Q_{E.S.}$	Flow through Emergency Spillway. C factor of 2.7 was used in formula
$Q_{total.}$	Accumlative Flow from Principal and Emergency Spillways.

(1) At the given Elevation and Below

APPENDICES

```
1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE (HEC-1)*
*         SEPTEMBER 1990            *
*          VERSION 4.0              *
*                                   *
*  RUN DATE  09/10/1999  TIME  14:10:45 *
*                                   *
*************************************
```

```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
*************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  1           ID   FAIRWAY ESTATES DEVELOPMENT (P.N. 8813.00)
  2           ID   LAKE ELEVATIONS FOR IMPACTS TO DEVELOPMENT (LEAVENWORTH, KS)
  3           ID   HEC-1 6-HOUR DURATION STORM
  4           ID   2,25,50,6 100 STORM EVENTS
  5           ID   FILE NAME "8813EX15.DAT" ALTERNATIVE 2 (KEEPING POOL ELEV @ 854.8)
  6           ID   PROPOSED SYSTEM 10'X10' BOX W/72" CSP @ ELEV 854.80
  7           ID   AREA REDUCED BY 14.65 ACRES DUE TO BEING ROUTED AWAY AND DOWNSTREAM OF LAKE
  8           ID   EMERGENCY SPILLWAY AT 857.0 (10' RECTANGULAR CHANNEL)
              * **********
              * **********
              *  ( 8 hrs)(60min/hr)/2min interval= 240 ordinates + 1 to get 241 ordinates
              *  2 hrs were added to 6 hr duration to allow hydrograph to close.
  9           IT       2       0       1     241
 10           IO       3       0
 11           IN      15
              *            2-YR   10-YR   25-YR   50-YR   100-YR
 12           JR    PREC   0.095   0.142   0.168   0.186   0.212
              * **********
              * WATERSHED A
              * **********

 13           KK       A
 14           KM   RUNOFF FOR A
 15           BA   0.057
 16           PB    27.4
 17           PC       0       2       4       6       9      12      15      19      27      46
 18           PC      62      68      72      76      79      82      85      87      90      92
 19           PC      94      96      98      99     100
 20           LS       0      90      45
 21           UD    0.18
              * **********
              * **********

 22           KK   DET-A
 23           KM   STORAGE/DISCHARGE FOR DETENTION A
 24           KO       3       0
 25           RS       1    ELEV
 26           SV   0.000   0.071   0.147   0.231   0.323   0.426   0.544
 27           SE   863.0   863.5   864.0   864.5   865.0   865.5   866.0
 28           SQ       0     1.6     8.4    18.4    24.6    29.6    33.8
 29           SE   863.0   863.5   864.0   864.5   865.0   865.5   866.0
 30           SS   863.0
 31           ST   866.0      80     3.0     1.5
              * **********
              * **********
              * WATERSHED B
              * **********

 32           KK       B
 33           KM   RUNOFF FOR B
```

```
                BA   0.077
                PB    27.4
                LS       0       90       45
                UD    0.12
                * **********
                * **********
1                                                HEC-1 INPUT                                                PAGE  2

          LINE  ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

                KK   COMB1
                KM   COMBINE RUNOFF FROM DETENTION A AND B
                HC       2
                * **********
                * **********

                KK   DET-B
                KM   STORAGE/DISCHARGE FOR DETENTION B
                KO       3       0
                RS       1    ELEV
                SV   0.000   0.039   0.093   0.152   0.218   0.291   0.373   0.475   0.610   0.785
                SV   1.011   1.286   1.611   2.008
                SE   858.1   858.5   859.0   859.5   860.0   860.5   861.0   861.5   862.0   862.5
                SE   863.0   863.5   864.0   864.5
                SQ       0     6.1    20.5    39.8    62.9    89.2   109.0   121.0   135.0     145
                SQ     150     165     170     180
                SE   858.1   858.5   859.0   859.5   860.0   860.5   861.0   861.5   862.0   862.5
                SE   863.0   863.5   864.0   864.5
                SS   858.1
                ST   864.5      85     3.0     1.5
                * **********
                * WATERSHED C
                * **********

                KK       C
                KM   RUNOFF FOR C
                BA   0.088
                PB    27.4
                LS       0       90       45
                UD    0.21
                * **********
                * **********

                KK   COMB2
                KM   COMBINE RUNOFF FROM DETENTION B AND C
                HC       2
                * **********
                * **********

                KK    LAKE
                KM   STORAGE/DISCHARGE FOR LAKE
                KO       3       0
                RS       1    ELEV
                SV   0.000   0.538   1.931   3.390   4.921   6.530   8.228  10.022  11.934  13.983
                SE   854.8   855.0   855.5   856.0   856.5   857.0   857.5   858.0   858.5   859.0
                SQ       0    10.7    69.3   154.0   256.9   305.0   323.3   348.9   378.9   412.3
                SE   854.8   855.0   855.5   856.0   856.5   857.0   857.5   858.0   858.5   859.0
                SS   854.8
                ST   859.0     100     3.0     1.5
                ZZ
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*         SEPTEMBER 1990                *
*          VERSION 4.0                  *
*                                       *
*  RUN DATE  09/10/1999  TIME  14:10:45 *
*                                       *
*****************************************

*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
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*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************

  FAIRWAY ESTATES DEVELOPMENT (P.N. 8813.00)
  LAKE ELEVATIONS FOR IMPACTS TO DEVELOPMENT (LEAVENWORTH, KS)
  HEC-1 6-HOUR DURATION STORM
  2,25,50,& 100 STORM EVENTS
  FILE NAME "8813EX15.DAT" ALTERNATIVE 2 (KEEPING POOL ELEV @ 854.8)
  PROPOSED SYSTEM 10'X10' BOX W/72" CSP @ ELEV 854.80
  AREA REDUCED BY 14.65 ACRES DUE TO BEING ROUTED AWAY AND DOWNSTREAM OF LAKE
  EMERGENCY SPILLWAY AT 857.0 (10' RECTANGULAR CHANNEL)

 10 IO          OUTPUT CONTROL VARIABLES
                      IPRNT          3  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
```

```
IT          HYDROGRAPH TIME DATA
                 NMIN            2  MINUTES IN COMPUTATION INTERVAL
                IDATE       1    0  STARTING DATE
                ITIME         0001  STARTING TIME
                   NQ          241  NUMBER OF HYDROGRAPH ORDINATES
               NDDATE       1    0  ENDING DATE
               NDTIME         0801  ENDING TIME
               ICENT           19  CENTURY MARK

             COMPUTATION INTERVAL      .03 HOURS
                 TOTAL TIME BASE     8.00 HOURS

        ENGLISH UNITS
             DRAINAGE AREA          SQUARE MILES
             PRECIPITATION DEPTH    INCHES
             LENGTH, ELEVATION      FEET
             FLOW                   CUBIC FEET PER SECOND
             STORAGE VOLUME         ACRE-FEET
             SURFACE AREA           ACRES
             TEMPERATURE            DEGREES FAHRENHEIT

JP           MULTI-PLAN OPTION
                 NPLAN           1  NUMBER OF PLANS

JR           MULTI-RATIO OPTION
                RATIOS OF PRECIPITATION
                .09       .14       .17       .19       .21

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

             **************
             *            *
13 KK        *        A   *
             *            *
             **************
                       RUNOFF FOR A

11 IN           TIME DATA FOR INPUT TIME SERIES
                     JXMIN          15  TIME INTERVAL IN MINUTES
                    JXDATE       1    0  STARTING DATE
                    JXTIME            1  STARTING TIME

                SUBBASIN RUNOFF DATA

15 BA           SUBBASIN CHARACTERISTICS
                     TAREA         .06  SUBBASIN AREA

                PRECIPITATION DATA

16 PB                STORM       27.40  BASIN TOTAL PRECIPITATION

17 PI             INCREMENTAL PRECIPITATION PATTERN
                    .27       .27       .27       .27       .27       .27       .27       .27       .27       .27
                    .27       .27       .27       .27       .27       .27       .27       .27       .27       .27
                    .27       .27       .33       .40       .40       .40       .40       .40       .40       .40
                    .40       .40       .40       .40       .40       .40       .40       .40       .40       .40
                    .40       .40       .40       .40       .40       .53       .53       .53       .53       .53
                    .53       .53       .80      1.07      1.07      1.07      1.07      1.07      1.07      1.07
                   2.53      2.53      2.53      2.53      2.53      2.53      2.53      2.33      2.13      2.13
                   2.13      2.13      2.13      2.13      2.13       .80       .80       .80       .80       .80
                    .80       .80       .67       .53       .53       .53       .53       .53       .53       .53
                    .53       .53       .53       .53       .53       .53       .53       .47       .40       .40
                    .40       .40       .40       .40       .40       .40       .40       .40       .40       .40
                    .40       .40       .40       .40       .40       .40       .40       .40       .40       .40
                    .27       .27       .27       .27       .27       .27       .27       .33       .40       .40
                    .40       .40       .40       .40       .40       .27       .27       .27       .27       .27
                    .27       .27       .27       .27       .27       .27       .27       .27       .27       .27
                    .27       .27       .27       .27       .27       .27       .27       .27       .27       .27
                    .27       .27       .27       .27       .27       .13       .13       .13       .13       .13
                    .13       .13       .13       .13       .13       .13       .13       .13       .13       .13

20 LS           SCS LOSS RATE
                     STRTL         .22  INITIAL ABSTRACTION
                    CRVNBR       90.00  CURVE NUMBER
                     RTIMP       45.00  PERCENT IMPERVIOUS AREA

21 UD           SCS DIMENSIONLESS UNITGRAPH
                     TLAG         .18  LAG

                                                  ***

                                              UNIT HYDROGRAPH
                                          29 END-OF-PERIOD ORDINATES
                   11.       33.       68.      110.      134.      140.      132.      114.       91.       65.
```

49.	38.	29.	22.	17.	13.	10.	7.	5.	4.
3.	2.	2.	1.	1.	1.	1.	0.	0.	

TOTAL RAINFALL = 27.40, TOTAL LOSS = .71, TOTAL EXCESS = 26.69

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	8.00-HR
+ (CFS)	(HR)				
		(CFS) 163.	123.	123.	123.
+ 681.	2.40	(INCHES) 26.586	26.691	26.691	26.691
		(AC-FT) 81.	81.	81.	81.

CUMULATIVE AREA = .06 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION A
FOR PLAN 1, RATIO = .09

TOTAL RAINFALL = 2.60, TOTAL LOSS = .54, TOTAL EXCESS = 2.06

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	8.00-HR
+ (CFS)	(HR)				
		(CFS) 13.	9.	9.	9.
+ 54.	2.50	(INCHES) 2.055	2.064	2.064	2.064
		(AC-FT) 6.	6.	6.	6.

CUMULATIVE AREA = .06 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION A
FOR PLAN 1, RATIO = .14

TOTAL RAINFALL = 3.89, TOTAL LOSS = .59, TOTAL EXCESS = 3.30

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	8.00-HR
+ (CFS)	(HR)				
		(CFS) 20.	15.	15.	15.
+ 86.	2.43	(INCHES) 3.285	3.300	3.300	3.300
		(AC-FT) 10.	10.	10.	10.

CUMULATIVE AREA = .06 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION A
FOR PLAN 1, RATIO = .17

TOTAL RAINFALL = 4.60, TOTAL LOSS = .61, TOTAL EXCESS = 3.99

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	8.00-HR
+ (CFS)	(HR)				
		(CFS) 24.	18.	18.	18.
+ 104.	2.43	(INCHES) 3.976	3.994	3.994	3.994
		(AC-FT) 12.	12.	12.	12.

CUMULATIVE AREA = .06 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION A
FOR PLAN 1, RATIO = .19

TOTAL RAINFALL = 5.10, TOTAL LOSS = .62, TOTAL EXCESS = 4.48

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	8.00-HR
+ (CFS)	(HR)				
		(CFS) 27.	21.	21.	21.
+ 117.	2.43	(INCHES) 4.458	4.477	4.477	4.477
		(AC-FT) 14.	14.	14.	14.

CUMULATIVE AREA = .06 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION A
FOR PLAN 1, RATIO = .21

TOTAL RAINFALL = 5.81, TOTAL LOSS = .63, TOTAL EXCESS = 5.18

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	8.00-HR
+ (CFS)	(HR)					
		(CFS)	32.	24.	24.	24.
+ 135.	2.43	(INCHES)	5.155	5.177	5.177	5.177
		(AC-FT)	16.	16.	16.	16.

CUMULATIVE AREA = .06 SQ MI

*** ***

22 KK
****
* *
* DET-A *
* *
****

STORAGE/DISCHARGE FOR DETENTION A

24 KO OUTPUT CONTROL VARIABLES
IPRNT 3 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

HYDROGRAPH ROUTING DATA

25 RS STORAGE ROUTING
NSTPS 1 NUMBER OF SUBREACHES
ITYP ELEV TYPE OF INITIAL CONDITION
RSVRIC .00 INITIAL CONDITION
X .00 WORKING R AND D COEFFICIENT

26 SV	STORAGE	.0	.1	.1	.2	.3	.4	.5
27 SE	ELEVATION	863.00	863.50	864.00	864.50	865.00	865.50	866.00
28 SQ	DISCHARGE	0.	2.	8.	18.	25.	30.	34.
29 SE	ELEVATION	863.00	863.50	864.00	864.50	865.00	865.50	866.00

30 SS SPILLWAY
CREL 863.00 SPILLWAY CREST ELEVATION
SPWID .00 SPILLWAY WIDTH
COQW .00 WEIR COEFFICIENT
EXPW 1.50 EXPONENT OF HEAD

31 ST TOP OF DAM
TOPEL 866.00 ELEVATION AT TOP OF DAM
DAMWID 80.00 DAM WIDTH
COQD 3.00 WEIR COEFFICIENT
EXPD 1.50 EXPONENT OF HEAD

***

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

(INCLUDING FLOW OVER DAM)

STORAGE	.00	.07	.15	.23	.32	.43	.54
OUTFLOW	.00	1.60	8.40	18.40	24.60	29.60	33.80
ELEVATION	863.00	863.50	864.00	864.50	865.00	865.50	866.00

*** *** *** *** ***

HYDROGRAPH AT STATION DET-A
FOR PLAN 1, RATIO = .09

PEAK OUTFLOW IS 53. AT TIME 2.50 HOURS

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	8.00-HR
+ (CFS)	(HR)					
		(CFS)	12.	9.	9.	9.
+ 53.	2.50	(INCHES)	2.037	2.064	2.064	2.064
		(AC-FT)	6.	6.	6.	6.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	8.00-HR
+ (AC-FT)	(HR)				
1.	2.47	0.	0.	0.	0.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	8.00-HR
+ (FEET)	(HR)				
866.18	2.50	864.22	862.15	862.15	862.15

CUMULATIVE AREA = .06 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION DET-A
FOR PLAN 1, RATIO = .14

PEAK OUTFLOW IS 86. AT TIME 2.47 HOURS

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	8.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 86.	2.47		20.	15.	15.	15.
		(INCHES)	3.269	3.300	3.300	3.300
		(AC-FT)	10.	10.	10.	10.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	8.00-HR
+ (AC-FT)	(HR)				
1.	2.40	0.	0.	0.	0.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	8.00-HR
+ (FEET)	(HR)				
866.35	2.47	864.53	862.40	862.40	862.40

CUMULATIVE AREA = .06 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION DET-A
FOR PLAN 1, RATIO = .17

PEAK OUTFLOW IS 104. AT TIME 2.43 HOURS

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	8.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 104.	2.43		24.	18.	18.	18.
		(INCHES)	3.960	3.994	3.994	3.994
		(AC-FT)	12.	12.	12.	12.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	8.00-HR
+ (AC-FT)	(HR)				
1.	2.40	0.	0.	0.	0.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	8.00-HR
+ (FEET)	(HR)				
866.43	2.43	864.69	862.52	862.52	862.52

CUMULATIVE AREA = .06 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION DET-A
FOR PLAN 1, RATIO = .19

PEAK OUTFLOW IS 117. AT TIME 2.43 HOURS

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	8.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 117.	2.43		27.	21.	21.	21.
		(INCHES)	4.439	4.476	4.476	4.476
		(AC-FT)	13.	14.	14.	14.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	8.00-HR
(AC-FT)	(HR)				
1.	2.40	0.	0.	0.	0.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	8.00-HR
(FEET)	(HR)				
866.48	2.43	864.80	862.60	862.60	862.60

CUMULATIVE AREA = .06 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION DET-A
FOR PLAN 1, RATIO = .21

PEAK OUTFLOW IS 135. AT TIME 2.43 HOURS

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	8.00-HR
(CFS)	(HR)					
		(CFS)				
135.	2.43		32.	24.	24.	24.
		(INCHES)	5.140	5.180	5.180	5.180
		(AC-FT)	16.	16.	16.	16.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	8.00-HR
(AC-FT)	(HR)				
1.	2.40	0.	0.	0.	0.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	8.00-HR
(FEET)	(HR)				
866.55	2.43	864.96	862.72	862.72	862.72

CUMULATIVE AREA = .06 SQ MI

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37 UD SCS DIMENSIONLESS UNITGRAPH
TLAG .12 LAG

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UNIT HYDROGRAPH
20 END-OF-PERIOD ORDINATES

38. 123. 233. 272. 250. 196. 124. 83. 57. 38.
26. 17. 12. 8. 5. 4. 3. 2. 1. 0.

TOTAL RAINFALL = 27.40, TOTAL LOSS = .71, TOTAL EXCESS = 26.69

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	8.00-HR
+ (CFS)	(HR)	(CFS)				
+ 972.	2.30		220.	166.	166.	166.
		(INCHES)	26.618	26.691	26.691	26.691
		(AC-FT)	109.	110.	110.	110.

CUMULATIVE AREA = .08 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION B
FOR PLAN 1, RATIO = .09

TOTAL RAINFALL = 2.60, TOTAL LOSS = .54, TOTAL EXCESS = 2.06

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	8.00-HR
+ (CFS)	(HR)	(CFS)				
+ 76.	2.33		17.	13.	13.	13.
		(INCHES)	2.058	2.064	2.064	2.064
		(AC-FT)	8.	8.	8.	8.

CUMULATIVE AREA = .08 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION B
FOR PLAN 1, RATIO = .14

TOTAL RAINFALL = 3.89, TOTAL LOSS = .59, TOTAL EXCESS = 3.30

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	8.00-HR
+ (CFS)	(HR)	(CFS)				
+ 122.	2.33		27.	20.	20.	20.
		(INCHES)	3.289	3.300	3.300	3.300
		(AC-FT)	14.	14.	14.	14.

CUMULATIVE AREA = .08 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION B
FOR PLAN 1, RATIO = .17

TOTAL RAINFALL = 4.60, TOTAL LOSS = .61, TOTAL EXCESS = 3.99

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	8.00-HR
+ (CFS)	(HR)	(CFS)				
+ 148.	2.33		33.	25.	25.	25.
		(INCHES)	3.982	3.994	3.994	3.994
		(AC-FT)	16.	16.	16.	16.

CUMULATIVE AREA = .08 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION B
FOR PLAN 1, RATIO = .19

TOTAL RAINFALL = 5.10, TOTAL LOSS = .62, TOTAL EXCESS = 4.48

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	8.00-HR
+ (CFS)	(HR)	(CFS)				

+	166.	2.33		37.	28.	28.	28.
			(INCHES)	4.463	4.477	4.477	4.477
			(AC-FT)	18.	18.	18.	18.

CUMULATIVE AREA = .08 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION B
FOR PLAN 1, RATIO = .21

TOTAL RAINFALL = 5.81, TOTAL LOSS = .63, TOTAL EXCESS = 5.18

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	8.00-HR
+	(CFS)	(HR)					
			(CFS)				
+	193.	2.33		43.	32.	32.	32.
			(INCHES)	5.162	5.177	5.177	5.177
			(AC-FT)	21.	21.	21.	21.

CUMULATIVE AREA = .08 SQ MI

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      ***           ***           ***           ***           ***

                    HYDROGRAPH AT STATION    COMB1
                      FOR PLAN 1, RATIO =  .19

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                  6-HR        24-HR        72-HR       8.00-HR
+   (CFS)       (HR)
                  (CFS)
+     279.      2.37               64.          48.          48.          48.
                (INCHES)        4.443        4.476        4.476        4.476
                (AC-FT)            32.          32.          32.          32.

                CUMULATIVE AREA =     .13 SQ MI

      ***           ***           ***           ***           ***

                    HYDROGRAPH AT STATION    COMB1
                      FOR PLAN 1, RATIO =  .21

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                  6-HR        24-HR        72-HR       8.00-HR
+   (CFS)       (HR)
                  (CFS)
+     323.      2.37               74.          56.          56.          56.
                (INCHES)        5.142        5.178        5.178        5.178
                (AC-FT)            37.          37.          37.          37.

                CUMULATIVE AREA =     .13 SQ MI

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          **************
          *            *
  41 KK   *     DET-B  *
          *            *
          **************
                    STORAGE/DISCHARGE FOR DETENTION B

  43 KO         OUTPUT CONTROL VARIABLES
                     IPRNT          3  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE

               HYDROGRAPH ROUTING DATA

  44 RS         STORAGE ROUTING
                     NSTPS          1  NUMBER OF SUBREACHES
                      ITYP       ELEV  TYPE OF INITIAL CONDITION
                    RSVRIC        .00  INITIAL CONDITION
                         X        .00 WORKING R AND D COEFFICIENT

  45 SV           STORAGE          .0         .0         .1         .2         .2         .3         .4         .5         .6         .8
                                  1.0        1.3        1.6        2.0

  47 SE           ELEVATION     858.10     858.50     859.00     859.50     860.00     860.50     861.00     861.50     862.00     862.50
                                863.00     863.50     864.00     864.50

  49 SQ           DISCHARGE        0.         6.        21.        40.        63.        89.       109.       121.       135.       145.
                                 150.       165.       170.       180.

  51 SE           ELEVATION     858.10     858.50     859.00     859.50     860.00     860.50     861.00     861.50     862.00     862.50
                                863.00     863.50     864.00     864.50

  53 SS           SPILLWAY
                     CREL       858.10  SPILLWAY CREST ELEVATION
                    SPWID          .00  SPILLWAY WIDTH
                     COQW          .00  WEIR COEFFICIENT
                     EXPW         1.50  EXPONENT OF HEAD

  54 ST           TOP OF DAM
                    TOPEL       864.50  ELEVATION AT TOP OF DAM
                   DAMWID        85.00  DAM WIDTH
                     COQD         3.00  WEIR COEFFICIENT
                     EXPD         1.50  EXPONENT OF HEAD

                                   ***

                    COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

                    (INCLUDING FLOW OVER DAM)
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STORAGE	.00	.04	.09	.15	.22	.29	.37	.47	.61	.79
OUTFLOW	.00	6.10	20.50	39.80	62.90	89.20	109.00	121.00	135.00	145.00
ELEVATION	858.10	858.50	859.00	859.50	860.00	860.50	861.00	861.50	862.00	862.50

STORAGE	1.01	1.29	1.61	2.01
OUTFLOW	150.00	165.00	170.00	180.00
ELEVATION	863.00	863.50	864.00	864.50

*** *** *** *** ***

HYDROGRAPH AT STATION DET-B
FOR PLAN 1, RATIO = .09

PEAK OUTFLOW IS 121. AT TIME 2.57 HOURS

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	8.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 121.	2.57		29.	22.	22.	22.
		(INCHES)	2.042	2.064	2.064	2.064
		(AC-FT)	15.	15.	15.	15.

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
			6-HR	24-HR	72-HR	8.00-HR
+ (AC-FT)	(HR)					
0.	2.57		0.	0.	0.	0.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
			6-HR	24-HR	72-HR	8.00-HR
+ (FEET)	(HR)					
861.51	2.57		859.16	857.13	857.13	857.13

CUMULATIVE AREA = .13 SQ MI

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HYDROGRAPH AT STATION DET-B
FOR PLAN 1, RATIO = .14

PEAK OUTFLOW IS 172. AT TIME 2.60 HOURS

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	8.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 172.	2.60		47.	36.	36.	36.
		(INCHES)	3.271	3.300	3.300	3.300
		(AC-FT)	23.	24.	24.	24.

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
			6-HR	24-HR	72-HR	8.00-HR
+ (AC-FT)	(HR)					
2.	2.60		0.	0.	0.	0.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
			6-HR	24-HR	72-HR	8.00-HR
+ (FEET)	(HR)					
864.11	2.60		859.74	857.56	857.56	857.56

CUMULATIVE AREA = .13 SQ MI

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HYDROGRAPH AT STATION DET-B
FOR PLAN 1, RATIO = .17

PEAK OUTFLOW IS 236. AT TIME 2.57 HOURS

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	8.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 236.	2.57		57.	43.	43.	43.
		(INCHES)	3.962	3.994	3.994	3.994
		(AC-FT)	28.	29.	29.	29.

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
			6-HR	24-HR	72-HR	8.00-HR
+ (AC-FT)	(HR)					
2.	2.53		0.	0.	0.	0.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
			6-HR	24-HR	72-HR	8.00-HR
+ (FEET)	(HR)					
864.83	2.57		860.01	857.77	857.77	857.77

CUMULATIVE AREA = .13 SQ MI

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HYDROGRAPH AT STATION DET-B
FOR PLAN 1, RATIO = .19

PEAK OUTFLOW IS 272. AT TIME 2.50 HOURS

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	8.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 272.	2.50		64.	48.	48.	48.
		(INCHES)	4.443	4.478	4.478	4.478
		(AC-FT)	32.	32.	32.	32.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	8.00-HR
+ (AC-FT)	(HR)				
2.	2.50	0.	0.	0.	0.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
			6-HR	24-HR	72-HR	8.00-HR
+ (FEET)	(HR)					
864.97	2.50		860.16	857.88	857.88	857.88

CUMULATIVE AREA = .13 SQ MI

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HYDROGRAPH AT STATION DET-B
FOR PLAN 1, RATIO = .21

PEAK OUTFLOW IS 319. AT TIME 2.43 HOURS

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	8.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 319.	2.43		74.	56.	56.	56.
		(INCHES)	5.142	5.180	5.180	5.180
		(AC-FT)	37.	37.	37.	37.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	8.00-HR
+ (AC-FT)	(HR)				
3.	2.43	0.	0.	0.	0.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
			6-HR	24-HR	72-HR	8.00-HR
+ (FEET)	(HR)					
865.13	2.43		860.36	858.03	858.03	858.03

CUMULATIVE AREA = .13 SQ MI

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.27	.27	.27	.27	.27	.27	.27	.27	.27	.27
.27	.27	.27	.27	.27	.27	.27	.27	.27	.27
.27	.27	.33	.40	.40	.40	.40	.40	.40	.40
.40	.40	.40	.40	.40	.40	.40	.40	.40	.40
.40	.40	.40	.40	.40	.53	.53	.53	.53	.53
.53	.53	.80	1.07	1.07	1.07	1.07	1.07	1.07	1.07
2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.33	2.13	2.13
2.13	2.13	2.13	2.13	2.13	.80	.80	.80	.80	.80
.80	.80	.67	.53	.53	.53	.53	.53	.53	.53
.53	.53	.53	.53	.53	.53	.53	.47	.40	.40
.40	.40	.40	.40	.40	.40	.40	.40	.40	.40
.40	.40	.40	.40	.40	.40	.40	.40	.40	.40
.27	.27	.27	.27	.27	.27	.27	.33	.40	.40
.40	.40	.40	.40	.40	.27	.27	.27	.27	.27
.27	.27	.27	.27	.27	.27	.27	.27	.27	.27
.27	.27	.27	.27	.27	.27	.27	.27	.27	.27
.27	.27	.27	.27	.27	.13	.13	.13	.13	.13
.13	.13	.13	.13	.13	.13	.13	.13	.13	.13

59 LS SCS LOSS RATE

STRTL	.22	INITIAL ABSTRACTION
CRVNBR	90.00	CURVE NUMBER
RTIMP	45.00	PERCENT IMPERVIOUS AREA

60 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.21	LAG

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UNIT HYDROGRAPH
33 END-OF-PERIOD ORDINATES

12.	35.	71.	120.	161.	184.	187.	177.	158.	133.
102.	78.	61.	49.	39.	30.	24.	19.	15.	12.
9.	7.	6.	4.	4.	3.	2.	2.	1.	1.
1.	1.	0.							

TOTAL RAINFALL = 27.40, TOTAL LOSS = .71, TOTAL EXCESS = 26.69

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	8.00-HR
+	(CFS)	(HR)	(CFS)			
+	1028.	2.47	251.	189.	189.	189.
			(INCHES) 26.570	26.691	26.691	26.691
			(AC-FT) 125.	125.	125.	125.

CUMULATIVE AREA = .09 SQ MI

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HYDROGRAPH AT STATION C
FOR PLAN 1, RATIO = .09

TOTAL RAINFALL = 2.60, TOTAL LOSS = .54, TOTAL EXCESS = 2.06

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	8.00-HR
+	(CFS)	(HR)	(CFS)			
+	81.	2.50	19.	15.	15.	15.
			(INCHES) 2.053	2.064	2.064	2.064
			(AC-FT) 10.	10.	10.	10.

CUMULATIVE AREA = .09 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION C
FOR PLAN 1, RATIO = .14

TOTAL RAINFALL = 3.89, TOTAL LOSS = .59, TOTAL EXCESS = 3.30

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	8.00-HR
+	(CFS)	(HR)	(CFS)			
+	131.	2.50	31.	23.	23.	23.
			(INCHES) 3.283	3.300	3.300	3.300
			(AC-FT) 15.	15.	15.	15.

CUMULATIVE AREA = .09 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION C

FOR PLAN 1, RATIO = .17

TOTAL RAINFALL = 4.60, TOTAL LOSS = .61, TOTAL EXCESS = 3.99

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	8.00-HR
+ (CFS)	(HR)				
		(CFS)			
+ 158.	2.50	38.	28.	28.	28.
		(INCHES) 3.974	3.994	3.994	3.994
		(AC-FT) 19.	19.	19.	19.

CUMULATIVE AREA = .09 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION C
FOR PLAN 1, RATIO = .19

TOTAL RAINFALL = 5.10, TOTAL LOSS = .62, TOTAL EXCESS = 4.48

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	8.00-HR
+ (CFS)	(HR)				
		(CFS)			
+ 177.	2.50	42.	32.	32.	32.
		(INCHES) 4.455	4.477	4.477	4.477
		(AC-FT) 21.	21.	21.	21.

CUMULATIVE AREA = .09 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION C
FOR PLAN 1, RATIO = .21

TOTAL RAINFALL = 5.81, TOTAL LOSS = .63, TOTAL EXCESS = 5.18

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	8.00-HR
+ (CFS)	(HR)				
		(CFS)			
+ 205.	2.50	49.	37.	37.	37.
		(INCHES) 5.152	5.177	5.177	5.177
		(AC-FT) 24.	24.	24.	24.

CUMULATIVE AREA = .09 SQ MI

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  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                 6-HR        24-HR        72-HR       8.00-HR
+   (CFS)       (HR)
                  (CFS)
+    300.       2.53              78.          59.          59.          59.
                (INCHES)        3.275        3.300        3.300        3.300
                (AC-FT)           39.          39.          39.          39.

                CUMULATIVE AREA =     .22 SQ MI

      ***           ***             ***          ***          ***

                HYDROGRAPH AT STATION    COMB2
                  FOR PLAN 1, RATIO =  .17

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                 6-HR        24-HR        72-HR       8.00-HR
+   (CFS)       (HR)
                  (CFS)
+    393.       2.53              95.          72.          72.          72.
                (INCHES)        3.966        3.994        3.994        3.994
                (AC-FT)           47.          47.          47.          47.

                CUMULATIVE AREA =     .22 SQ MI

      ***           ***             ***          ***          ***

                HYDROGRAPH AT STATION    COMB2
                  FOR PLAN 1, RATIO =  .19

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                 6-HR        24-HR        72-HR       8.00-HR
+   (CFS)       (HR)
                  (CFS)
+    449.       2.50             106.          80.          80.          80.
                (INCHES)        4.447        4.477        4.477        4.477
                (AC-FT)           53.          53.          53.          53.

                CUMULATIVE AREA =     .22 SQ MI

      ***           ***             ***          ***          ***

                HYDROGRAPH AT STATION    COMB2
                  FOR PLAN 1, RATIO =  .21

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                 6-HR        24-HR        72-HR       8.00-HR
+   (CFS)       (HR)
                  (CFS)
+    523.       2.47             123.          93.          93.          93.
                (INCHES)        5.146        5.179        5.179        5.179
                (AC-FT)           61.          61.          61.          61.

                CUMULATIVE AREA =     .22 SQ MI


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
  64 KK     *      LAKE  *
            *            *
            **************
                  STORAGE/DISCHARGE FOR LAKE

  66 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          3  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

               HYDROGRAPH ROUTING DATA

  67 RS          STORAGE ROUTING
                      NSTPS          1  NUMBER OF SUBREACHES
                       ITYP       ELEV  TYPE OF INITIAL CONDITION
                     RSVRIC        .00  INITIAL CONDITION
                          X        .00 WORKING R AND D COEFFICIENT

  68 SV            STORAGE         .0       .5      1.9      3.4      4.9      6.5      8.2     10.0     11.9     14.0
```

69 SE	ELEVATION	854.80	855.00	855.50	856.00	856.50	857.00	857.50	858.00	858.50	859.00
70 SQ	DISCHARGE	0.	11.	69.	154.	257.	305.	323.	349.	379.	412.
71 SE	ELEVATION	854.80	855.00	855.50	856.00	856.50	857.00	857.50	858.00	858.50	859.00

72 SS SPILLWAY

CREL	854.80	SPILLWAY CREST ELEVATION
SPWID	.00	SPILLWAY WIDTH
COQW	.00	WEIR COEFFICIENT
EXPW	1.50	EXPONENT OF HEAD

73 ST TOP OF DAM

TOPEL	859.00	ELEVATION AT TOP OF DAM
DAMWID	100.00	DAM WIDTH
COQD	3.00	WEIR COEFFICIENT
EXPD	1.50	EXPONENT OF HEAD

***

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

(INCLUDING FLOW OVER DAM)

STORAGE	.00	.54	1.93	3.39	4.92	6.53	8.23	10.02	11.93	13.98
OUTFLOW	.00	10.70	69.30	154.00	256.90	305.00	323.30	348.90	378.90	412.30
ELEVATION	854.80	855.00	855.50	856.00	856.50	857.00	857.50	858.00	858.50	859.00

*** *** *** *** ***

HYDROGRAPH AT STATION LAKE
FOR PLAN 1, RATIO = .09

PEAK OUTFLOW IS 178. AT TIME 2.67 HOURS

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	8.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 178.	2.67		48.	37.	37.	37.
		(INCHES)	2.019	2.060	2.060	2.060
		(AC-FT)	24.	24.	24.	24.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	8.00-HR
+ (AC-FT)	(HR)				
4.	2.67	1.	1.	1.	1.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	8.00-HR
+ (FEET)	(HR)				
856.12	2.67	855.29	853.40	853.40	853.40

CUMULATIVE AREA = .22 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION LAKE
FOR PLAN 1, RATIO = .14

PEAK OUTFLOW IS 268. AT TIME 2.70 HOURS

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	8.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 268.	2.70		77.	59.	59.	59.
		(INCHES)	3.242	3.296	3.296	3.296
		(AC-FT)	38.	39.	39.	39.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	8.00-HR
+ (AC-FT)	(HR)				
5.	2.70	2.	1.	1.	1.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	8.00-HR
+ (FEET)	(HR)				
856.61	2.70	855.48	853.55	853.55	853.55

CUMULATIVE AREA = .22 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION LAKE
FOR PLAN 1, RATIO = .17

PEAK OUTFLOW IS 307. AT TIME 2.70 HOURS

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	8.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 307.	2.70		94.	71.	71.	71.
		(INCHES)	3.929	3.990	3.990	3.990
		(AC-FT)	47.	47.	47.	47.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	8.00-HR
+ (AC-FT)	(HR)				
7.	2.70	2.	2.	2.	2.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	8.00-HR
+ (FEET)	(HR)				
857.05	2.70	855.61	853.64	853.64	853.64

CUMULATIVE AREA = .22 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION LAKE
FOR PLAN 1, RATIO = .19

PEAK OUTFLOW IS 322. AT TIME 2.73 HOURS

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	8.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 322.	2.73		105.	80.	80.	80.
		(INCHES)	4.407	4.472	4.472	4.472
		(AC-FT)	52.	53.	53.	53.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	8.00-HR
+ (AC-FT)	(HR)				
8.	2.73	3.	2.	2.	2.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	8.00-HR
+ (FEET)	(HR)				
857.46	2.73	855.71	853.72	853.72	853.72

CUMULATIVE AREA = .22 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION LAKE
FOR PLAN 1, RATIO = .21

PEAK OUTFLOW IS 353. AT TIME 2.73 HOURS

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	8.00-HR
+ (CFS)	(HR)					
		(CFS)				
+ 353.	2.73		122.	93.	93.	93.
		(INCHES)	5.101	5.172	5.172	5.172
		(AC-FT)	60.	61.	61.	61.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	8.00-HR
+ (AC-FT)	(HR)				
10.	2.73	3.	2.	2.	2.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	8.00-HR
+ (FEET)	(HR)				
858.08	2.73	855.86	853.84	853.84	853.84

CUMULATIVE AREA = .22 SQ MI

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 .09	RATIO 2 .14	RATIO 3 .17	RATIO 4 .19	RATIO 5 .21
HYDROGRAPH AT									
+	A	.06	1	FLOW	54.	86.	104.	117.	135.
				TIME	2.50	2.43	2.43	2.43	2.43
ROUTED TO									
+	DET-A	.06	1	FLOW	53.	86.	104.	117.	135.
				TIME	2.50	2.47	2.43	2.43	2.43
			** PEAK STAGES IN FEET **						
			1	STAGE	866.18	866.35	866.43	866.48	866.55
				TIME	2.50	2.47	2.43	2.43	2.43
HYDROGRAPH AT									
+	B	.08	1	FLOW	76.	122.	148.	166.	193.
				TIME	2.33	2.33	2.33	2.33	2.33
2 COMBINED AT									
+	COMB1	.13	1	FLOW	126.	205.	249.	279.	323.
				TIME	2.50	2.37	2.37	2.37	2.37
ROUTED TO									
+	DET-B	.13	1	FLOW	121.	172.	236.	272.	319.
				TIME	2.57	2.60	2.57	2.50	2.43
			** PEAK STAGES IN FEET **						
			1	STAGE	861.51	864.11	864.83	864.97	865.13
				TIME	2.57	2.60	2.57	2.50	2.43
HYDROGRAPH AT									
+	C	.09	1	FLOW	81.	131.	158.	177.	205.
				TIME	2.50	2.50	2.50	2.50	2.50
2 COMBINED AT									
+	COMB2	.22	1	FLOW	202.	300.	393.	449.	523.
				TIME	2.53	2.53	2.53	2.50	2.47
ROUTED TO									
+	LAKE	.22	1	FLOW	178.	268.	307.	322.	353.
				TIME	2.67	2.70	2.70	2.73	2.73
			** PEAK STAGES IN FEET **						
			1	STAGE	856.12	856.61	857.05	857.46	858.08
				TIME	2.67	2.70	2.70	2.73	2.73

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION DET-A
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	863.00	866.00
STORAGE	0.	0.	1.
OUTFLOW	0.	0.	34.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.09	866.18	.18	1.	53.	.40	2.50	.00
.14	866.35	.35	1.	86.	.73	2.47	.00
.17	866.43	.43	1.	104.	.90	2.43	.00
.19	866.48	.48	1.	117.	1.00	2.43	.00
.21	866.55	.55	1.	135.	1.33	2.43	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION DET-B
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	858.10	864.50
STORAGE	0.	0.	2.
OUTFLOW	0.	0.	180.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.09	861.51	.00	0.	121.	.00	2.57	.00

.14	864.11	.00	2.	172.	.00	2.60	.00
.17	864.83	.33	2.	236.	.30	2.57	.00
.19	864.97	.47	2.	272.	.40	2.50	.00
.21	865.13	.63	3.	319.	.50	2.43	.00

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION LAKE
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	.00	854.80	859.00
STORAGE	0.	0.	14.
OUTFLOW	0.	0.	412.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.09	856.12	.00	4.	178.	.00	2.67	.00
.14	856.61	.00	5.	268.	.00	2.70	.00
.17	857.05	.00	7.	307.	.00	2.70	.00
.19	857.46	.00	8.	322.	.00	2.73	.00
.21	858.08	.00	10.	353.	.00	2.73	.00

*** NORMAL END OF HEC-1 ***

Curve
Plotted Curves for Trapezoidal Channel

Project Description	
Project File	untitled.fm2
Worksheet	dfjg
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Constant Data		
Mannings Coefficient	0.040	
Channel Slope	0.056000	ft/ft
Left Side Slope	3.000000	H : V
Right Side Slope	3.000000	H : V
Discharge	135.00	cfs

Input Data			
	Minimum	Maximum	Increment
Bottom Width	2.00	6.00	0.50 ft

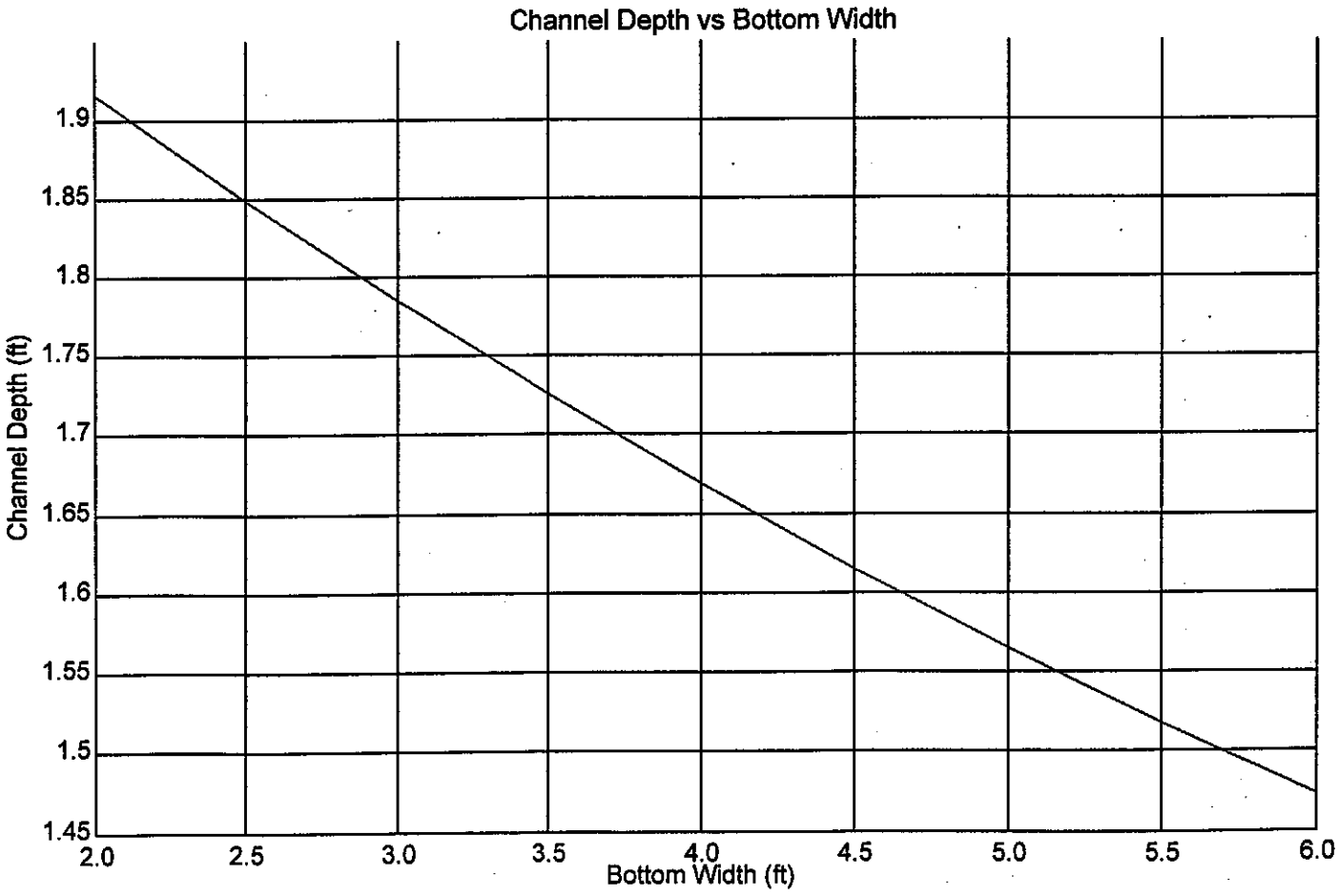


Table
Rating Table for Trapezoidal Channel

Project Description	
Project File	untitled.fm2
Worksheet	asfd
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Constant Data		
Channel Slope	0.056000	ft/ft
Left Side Slope	3.000000	H : V
Right Side Slope	3.000000	H : V
Bottom Width	6.00	ft
Discharge	135.00	cfs

Input Data			
	Minimum	Maximum	Increment
Mannings Coefficient	0.030	0.050	0.005

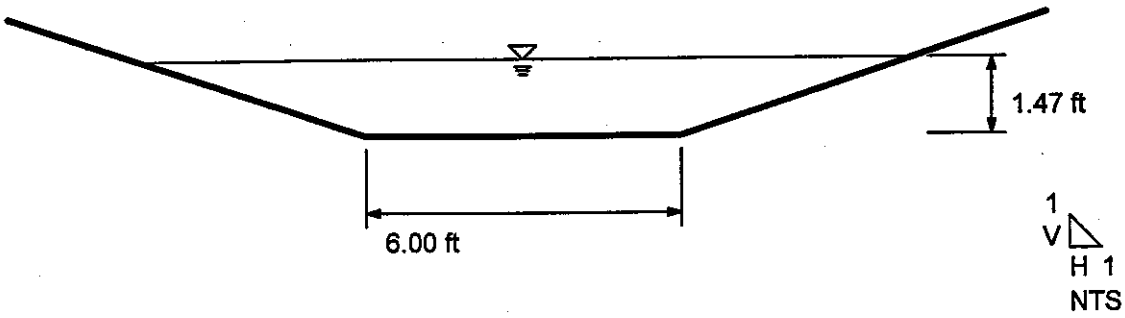
Rating Table

Mannings Coefficient	Depth (ft)	Velocity (ft/s)
0.030	1.27	10.83
0.035	1.38	9.69
0.040	1.47	8.80
0.045	1.56	8.08
0.050	1.65	7.49

Cross Section
Cross Section for Trapezoidal Channel

Project Description	
Project File	untitled.fm2
Worksheet	dfjg
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.040	
Channel Slope	0.056000	ft/ft
Depth	1.47	ft
Left Side Slope	3.000000	H : V
Right Side Slope	3.000000	H : V
Bottom Width	6.00	ft
Discharge	135.00	cfs



NAPIER
ENGINEERING, LLC
207 South 5th Street
Leavenworth, KS 66048

Rev. – August 2, 2018

Jeff Rupp
Director of Public Works
City of Lansing
730 First Terrace, Suite 3
(913) 727-2400
jrupp@lansing.ks.us

RE: Final Drainage Memo – Fairway Estates Drainage Study– Phase 5 & 6

Two drainage studies for the Fairway Estates Subdivision (all phases) have been presented to the City of Lansing. The original drainage study and report was prepared by Cook, Flatt and Strobel Engineers, P.A. (May 11, 1995) and a lake restudy was prepared by George Butler Associates, Inc. (GBA) (September 24, 1999).

The following modifications were proposed by GBA in the Lake Restudy form 1999 in order to alleviate future drainage issues:

1. Re-route 14.7 acres of drainage to bypass the lake from the south to the east.
2. Upsize the existing lake outlet box from 8.5'x4' to 10'x10'.
3. Provide an emergency spillway at Elevation 857.0 with a 10-foot flat bottom ditch.
4. Provide an additional 7,200 sq. ft. surface are to the lake.

Items 2 through 4 have been built or installed.

For item #1 - approximately 5.54 acres of drainage from Phase 2 has been redirected according to GBA construction documents. The GBA documents indicated that an additional 9.04 acres from our future phase would also be redirected, for a lump sum total of 14.58 acres. We have estimated that approximately 9.10 acres of drainage will be redirected from the proposed phase for a total of 14.64 acres. This amount substantially meets the requirement of item #1 of 14.7 acres.

The 9.10 acres of drainage area flows to an existing 30" HDPE storm line that has a design capacity of 36.79 cubic feet per second (cfs) (GBA – 1999). The runoff from the 9.10 acres for the 10-year design storm is 27.66 cfs (C=1.0; Tc=10 min). The existing down stream pipe has the capacity to convey the runoff from the 9.10 acres.

Storm drainage detention for all land in the Fairway Estates has been provided by the detention basin built and modified in Fairway Estates 1st Plat.

In addition, the owner plans on installing a series of storm water quality features to treat the runoff from the Phase 5 & 6. These will be in the proposed Tract B. The main purpose will be to intercept and treat 2-year design storms and keep sediment from entering the lake.

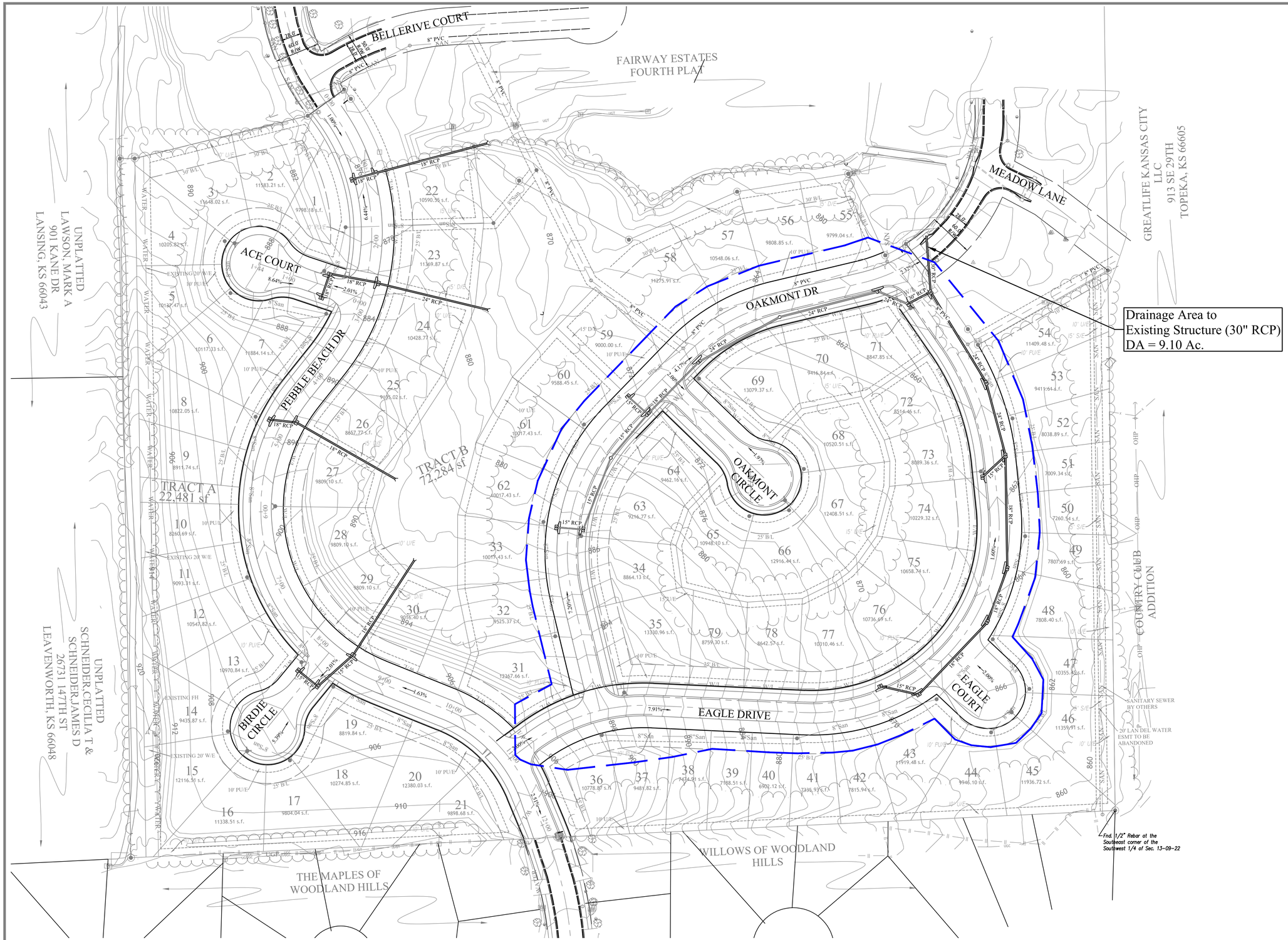
Summary – The existing lake built in Fairway Estates 1st Plat will adequately handle the additional runoff generated by Phase 5 and 6 of Fairway Estates. Please refer to the original drainage studies submitted by Cook, Flatt and Strobel Engineers, P.A, and George Butler Associates, Inc.

Please feel free to contact me for additional information at (913) 682-8600.

Sincerely,

Brett Napier

Brett A. Napier, P.E.



Sheet - 4

Drainage Area Exhibit

2017-66
Fairway Estates
5th Plat

Final Development Plan

PREPARED FOR:
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Date of Preparation:
August 3, 2018

Revised Date:
-
-
-
-

1st Submittal

BRETT A. NAPIER LICENSED 17507 KANSAS PROFESSIONAL ENGINEER

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Leavenworth County, Kansas

March 25, 2025

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:4,380 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Leavenworth County, Kansas
Survey Area Data: Version 19, Sep 5, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 30, 2022—Sep 16, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
7211	Bremer silty clay loam, rarely flooded	1.5	3.1%
7254	Grundy silty clay loam, 3 to 7 percent slopes, eroded	17.4	36.9%
7302	Martin silty clay loam, 3 to 7 percent slopes	1.1	2.4%
7542	Sharpsburg silty clay loam, 4 to 8 percent slopes, eroded	13.8	29.2%
7659	Vinland-Sibleyville complex, 5 to 12 percent slopes	13.4	28.4%
Totals for Area of Interest		**47.2**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Leavenworth County, Kansas

7211—Bremer silty clay loam, rarely flooded

Map Unit Setting

National map unit symbol: 20hy2
Elevation: 500 to 1,400 feet
Mean annual precipitation: 31 to 47 inches
Mean annual air temperature: 43 to 66 degrees F
Frost-free period: 175 to 215 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Bremer and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bremer

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty and clayey alluvium

Typical profile

Ap - 0 to 9 inches: silty clay loam
BA - 9 to 13 inches: silty clay loam
Bt - 13 to 34 inches: silty clay
BC - 34 to 50 inches: silty clay loam
C - 50 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Ecological site: R106XY065NE - Wet Subirrigated
Hydric soil rating: Yes

Minor Components

Judson

Percent of map unit: 5 percent
Landform: Terraces

Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

7254—Grundy silty clay loam, 3 to 7 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2v90d
Elevation: 730 to 1,700 feet
Mean annual precipitation: 28 to 40 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 160 to 205 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Grundy, eroded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Grundy, Eroded

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess

Typical profile

Ap - 0 to 6 inches: silty clay loam
BA - 6 to 11 inches: silty clay loam
Btg1 - 11 to 17 inches: silty clay
Btg2 - 17 to 42 inches: silty clay
BC - 42 to 51 inches: silty clay loam
C - 51 to 79 inches: silty clay loam

Properties and qualities

Slope: 3 to 7 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 9 to 16 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C/D
Ecological site: R106XY074NE - Clayey Upland
Hydric soil rating: No

Minor Components

Pawnee, eroded

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R106XY074NE - Clayey Upland
Hydric soil rating: No

Sharpsburg, eroded

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R106XY075NE - Loamy Upland
Hydric soil rating: No

Shelby, eroded

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R106XY075NE - Loamy Upland
Hydric soil rating: No

7302—Martin silty clay loam, 3 to 7 percent slopes

Map Unit Setting

National map unit symbol: 2v8zn
Elevation: 730 to 1,700 feet
Mean annual precipitation: 28 to 40 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 160 to 205 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Martin and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Martin

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Colluvium derived from limestone and shale

Typical profile

Ap - 0 to 6 inches: silty clay loam
BA - 6 to 14 inches: silty clay loam
Bt1 - 14 to 19 inches: silty clay
Bt2 - 19 to 56 inches: silty clay
BC - 56 to 65 inches: silty clay loam
C - 65 to 79 inches: silty clay loam

Properties and qualities

Slope: 3 to 7 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 12 to 17 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C/D
Ecological site: R106XY075NE - Loamy Upland
Hydric soil rating: No

Minor Components

Pawnee

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R106XY074NE - Clayey Upland
Hydric soil rating: No

Elmont

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R106XY075NE - Loamy Upland
Hydric soil rating: No

Vinland

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R106XY075NE - Loamy Upland
Hydric soil rating: No

7542—Sharpsburg silty clay loam, 4 to 8 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2q4rx
Elevation: 980 to 1,660 feet
Mean annual precipitation: 28 to 39 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 158 to 203 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Sharpsburg, eroded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sharpsburg, Eroded

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess

Typical profile

Ap - 0 to 6 inches: silty clay loam
A - 6 to 10 inches: silty clay loam
Bt1 - 10 to 14 inches: silty clay loam
Bt2 - 14 to 46 inches: silty clay loam

BC - 46 to 58 inches: silty clay loam
C - 58 to 79 inches: silty clay loam

Properties and qualities

Slope: 4 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 45 to 50 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R106XY075NE - Loamy Upland
Forage suitability group: Loam (G106XY100NE)
Other vegetative classification: Loam (G106XY100NE)
Hydric soil rating: No

Minor Components

Sarcoxie, eroded

Percent of map unit: 8 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R106XY075NE - Loamy Upland
Other vegetative classification: Loam (G106XY100NE)
Hydric soil rating: No

Shelby, eroded

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R106XY075NE - Loamy Upland
Other vegetative classification: Loam (G106XY100NE)
Hydric soil rating: No

Grundy, eroded

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear

Ecological site: R106XY074NE - Clayey Upland
Other vegetative classification: Clayey Subsoil (G106XY210NE)
Hydric soil rating: No

7659—Vinland-Sibleyville complex, 5 to 12 percent slopes

Map Unit Setting

National map unit symbol: 2yrvv
Elevation: 730 to 1,700 feet
Mean annual precipitation: 28 to 40 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 160 to 205 days
Farmland classification: Not prime farmland

Map Unit Composition

Vinland and similar soils: 45 percent
Sibleyville and similar soils: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Vinland

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy and silty residuum weathered from shale

Typical profile

A - 0 to 8 inches: silt loam
Bw - 8 to 12 inches: silty clay loam
C - 12 to 16 inches: silty clay loam

Properties and qualities

Slope: 5 to 10 percent
Depth to restrictive feature: 15 to 18 inches to paralithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: D
Ecological site: R106XY031NE - Shallow Savannah
Hydric soil rating: No

Description of Sibleyville

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from sandstone and shale

Typical profile

A - 0 to 6 inches: loam
BA - 6 to 10 inches: loam
Bt - 10 to 29 inches: clay loam
BC - 29 to 35 inches: clay loam
Cr - 35 to 79 inches: bedrock

Properties and qualities

Slope: 4 to 12 percent
Depth to restrictive feature: 33 to 36 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R106XY075NE - Loamy Upland
Hydric soil rating: No

Minor Components

Shelby

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R106XY075NE - Loamy Upland
Hydric soil rating: No

Elmont

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R106XY075NE - Loamy Upland
Hydric soil rating: No

Martin

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R106XY075NE - Loamy Upland
Hydric soil rating: No

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NOAA Atlas 14, Volume 8, Version 2
Location name: Lansing, Kansas, USA*
Latitude: 39.261°, Longitude: -94.9182°
Elevation: 886 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**4.74** (3.79-6.02)	**5.62** (4.48-7.13)	**7.07** (5.63-9.00)	**8.32** (6.58-10.6)	**10.1** (7.72-13.2)	**11.5** (8.57-15.1)	**13.0** (9.30-17.2)	**14.5** (9.94-19.5)	**16.5** (10.9-22.6)	**18.2** (11.6-25.0)
10-min	**3.47** (2.78-4.42)	**4.11** (3.28-5.22)	**5.17** (4.12-6.59)	**6.09** (4.82-7.76)	**7.39** (5.65-9.64)	**8.42** (6.28-11.0)	**9.49** (6.81-12.6)	**10.6** (7.27-14.3)	**12.1** (7.97-16.6)	**13.3** (8.50-18.3)
15-min	**2.82** (2.26-3.59)	**3.34** (2.67-4.24)	**4.21** (3.35-5.36)	**4.95** (3.92-6.31)	**6.01** (4.59-7.83)	**6.85** (5.10-8.98)	**7.72** (5.54-10.3)	**8.62** (5.92-11.6)	**9.85** (6.48-13.5)	**10.8** (6.91-14.9)
30-min	**1.99** (1.59-2.53)	**2.36** (1.88-3.00)	**2.98** (2.37-3.79)	**3.52** (2.78-4.49)	**4.28** (3.28-5.59)	**4.90** (3.65-6.43)	**5.53** (3.97-7.35)	**6.19** (4.25-8.35)	**7.10** (4.67-9.71)	**7.80** (4.99-10.7)
60-min	**1.30** (1.04-1.65)	**1.56** (1.24-1.98)	**1.99** (1.59-2.54)	**2.37** (1.87-3.02)	**2.90** (2.21-3.78)	**3.32** (2.47-4.35)	**3.75** (2.69-4.98)	**4.20** (2.88-5.66)	**4.81** (3.16-6.58)	**5.29** (3.38-7.27)
2-hr	**0.803** (0.650-1.01)	**0.969** (0.784-1.22)	**1.25** (1.01-1.57)	**1.49** (1.19-1.87)	**1.82** (1.41-2.35)	**2.09** (1.58-2.71)	**2.36** (1.72-3.10)	**2.65** (1.84-3.53)	**3.04** (2.03-4.11)	**3.34** (2.16-4.54)
3-hr	**0.602** (0.491-0.748)	**0.730** (0.595-0.909)	**0.946** (0.767-1.18)	**1.13** (0.910-1.41)	**1.39** (1.08-1.77)	**1.59** (1.21-2.05)	**1.80** (1.32-2.35)	**2.02** (1.42-2.67)	**2.31** (1.56-3.11)	**2.54** (1.66-3.44)
6-hr	**0.363** (0.300-0.446)	**0.440** (0.363-0.540)	**0.569** (0.467-0.700)	**0.680** (0.555-0.837)	**0.836** (0.660-1.06)	**0.961** (0.740-1.22)	**1.09** (0.809-1.40)	**1.22** (0.869-1.60)	**1.40** (0.958-1.87)	**1.54** (1.03-2.07)
12-hr	**0.214** (0.179-0.259)	**0.255** (0.213-0.309)	**0.326** (0.271-0.395)	**0.388** (0.320-0.471)	**0.476** (0.381-0.595)	**0.547** (0.428-0.688)	**0.621** (0.468-0.793)	**0.699** (0.505-0.907)	**0.806** (0.559-1.06)	**0.891** (0.600-1.18)
24-hr	**0.125** (0.105-0.149)	**0.147** (0.124-0.175)	**0.185** (0.156-0.221)	**0.219** (0.183-0.262)	**0.267** (0.217-0.329)	**0.306** (0.243-0.380)	**0.347** (0.266-0.438)	**0.391** (0.286-0.501)	**0.451** (0.317-0.588)	**0.498** (0.341-0.654)
2-day	**0.072** (0.061-0.084)	**0.084** (0.071-0.098)	**0.104** (0.089-0.123)	**0.122** (0.103-0.144)	**0.147** (0.121-0.179)	**0.168** (0.135-0.206)	**0.189** (0.147-0.236)	**0.212** (0.158-0.269)	**0.243** (0.174-0.314)	**0.268** (0.186-0.348)
3-day	**0.052** (0.045-0.061)	**0.060** (0.052-0.070)	**0.074** (0.064-0.086)	**0.086** (0.073-0.101)	**0.103** (0.086-0.124)	**0.117** (0.095-0.142)	**0.132** (0.103-0.163)	**0.147** (0.110-0.185)	**0.168** (0.121-0.216)	**0.185** (0.130-0.239)
4-day	**0.042** (0.036-0.049)	**0.048** (0.042-0.056)	**0.058** (0.051-0.068)	**0.068** (0.058-0.079)	**0.081** (0.067-0.097)	**0.091** (0.074-0.110)	**0.102** (0.080-0.126)	**0.114** (0.086-0.143)	**0.130** (0.094-0.166)	**0.143** (0.101-0.184)
7-day	**0.028** (0.025-0.033)	**0.032** (0.028-0.037)	**0.038** (0.034-0.044)	**0.044** (0.038-0.051)	**0.052** (0.044-0.061)	**0.058** (0.048-0.069)	**0.065** (0.051-0.079)	**0.072** (0.055-0.089)	**0.081** (0.059-0.103)	**0.089** (0.063-0.113)
10-day	**0.023** (0.020-0.026)	**0.025** (0.022-0.029)	**0.030** (0.027-0.035)	**0.035** (0.030-0.040)	**0.041** (0.034-0.048)	**0.045** (0.038-0.054)	**0.050** (0.040-0.061)	**0.055** (0.043-0.068)	**0.062** (0.046-0.079)	**0.068** (0.049-0.086)
20-day	**0.015** (0.013-0.017)	**0.017** (0.015-0.019)	**0.020** (0.018-0.023)	**0.023** (0.021-0.026)	**0.027** (0.023-0.031)	**0.030** (0.025-0.035)	**0.033** (0.027-0.040)	**0.037** (0.028-0.044)	**0.041** (0.030-0.051)	**0.044** (0.032-0.055)
30-day	**0.012** (0.011-0.013)	**0.014** (0.012-0.015)	**0.016** (0.015-0.018)	**0.019** (0.017-0.021)	**0.022** (0.019-0.025)	**0.024** (0.020-0.028)	**0.026** (0.022-0.031)	**0.029** (0.022-0.035)	**0.032** (0.024-0.039)	**0.034** (0.025-0.042)
45-day	**0.010** (0.009-0.011)	**0.011** (0.010-0.012)	**0.013** (0.012-0.015)	**0.015** (0.013-0.017)	**0.017** (0.015-0.019)	**0.019** (0.016-0.022)	**0.021** (0.017-0.024)	**0.022** (0.017-0.026)	**0.024** (0.018-0.029)	**0.025** (0.019-0.032)
60-day	**0.008** (0.008-0.009)	**0.010** (0.009-0.010)	**0.011** (0.010-0.012)	**0.013** (0.011-0.014)	**0.014** (0.013-0.016)	**0.016** (0.013-0.018)	**0.017** (0.014-0.020)	**0.018** (0.014-0.021)	**0.019** (0.015-0.024)	**0.020** (0.015-0.025)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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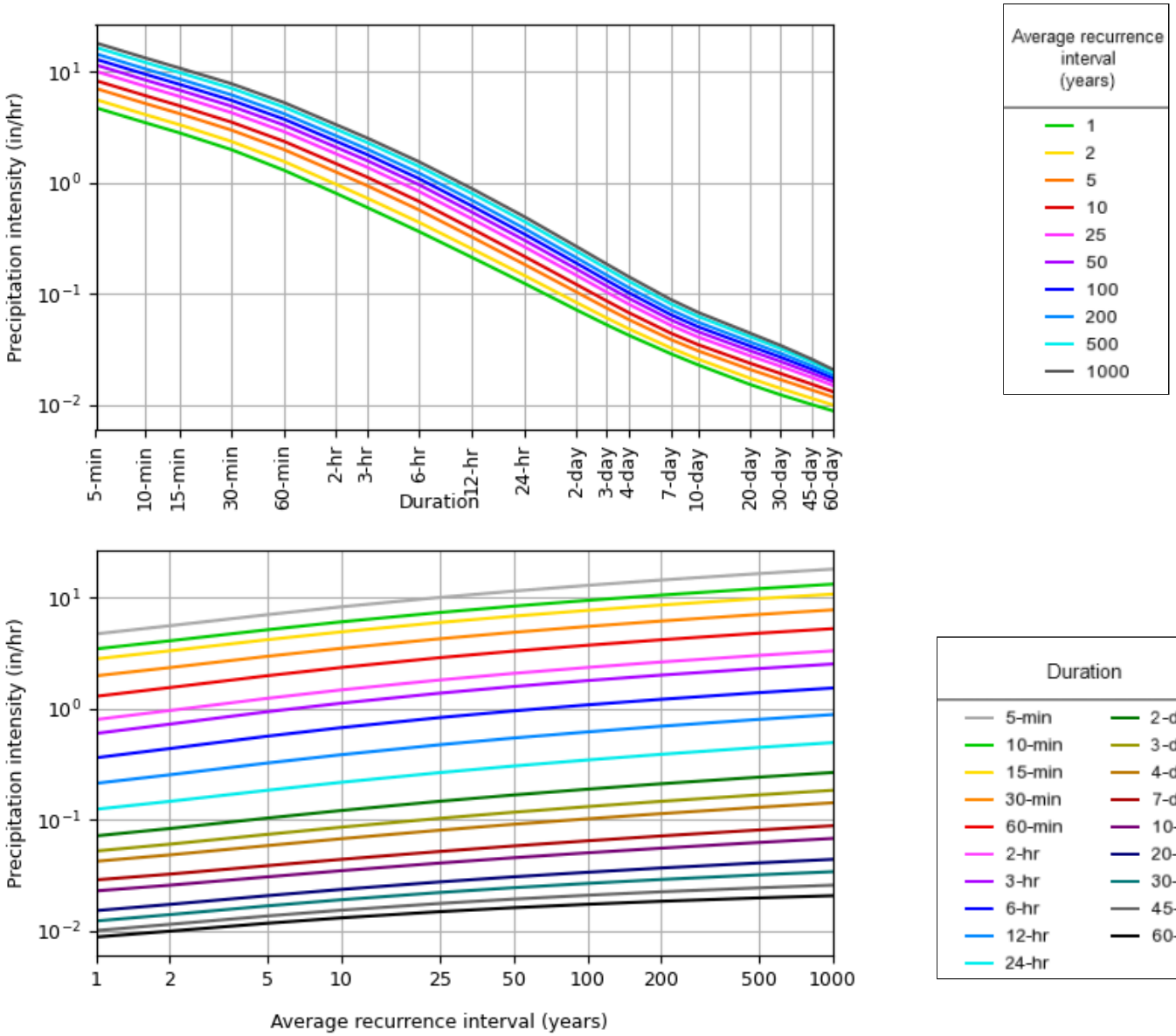
PF graphical

PDS-based intensity-duration-frequency (IDF) curves
Latitude: 39.2610°, Longitude: -94.9182°



NOAA Atlas 14, Volume 8, Version 2

Created (GMT): Tue Jun 10 19:54:55 2025

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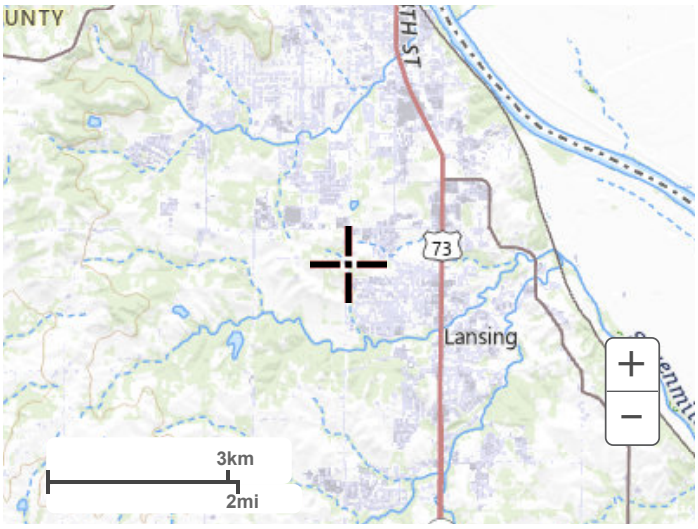
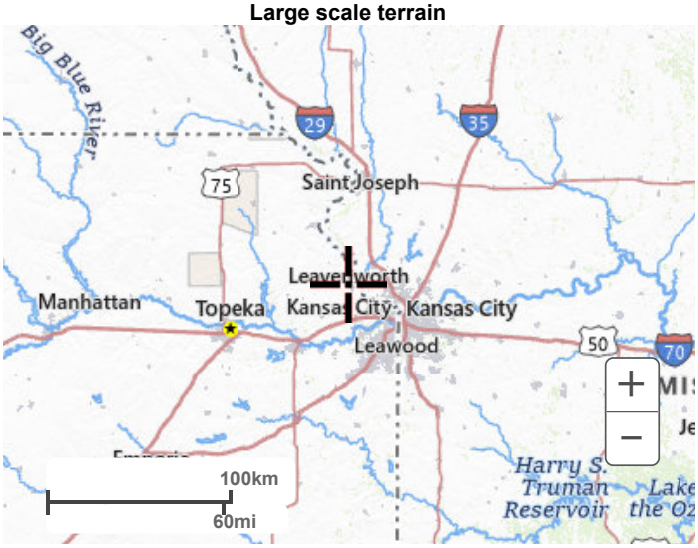
Maps & aerials

Small scale terrain



Large scale terrain



Large scale map

Large scale aerial

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National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025

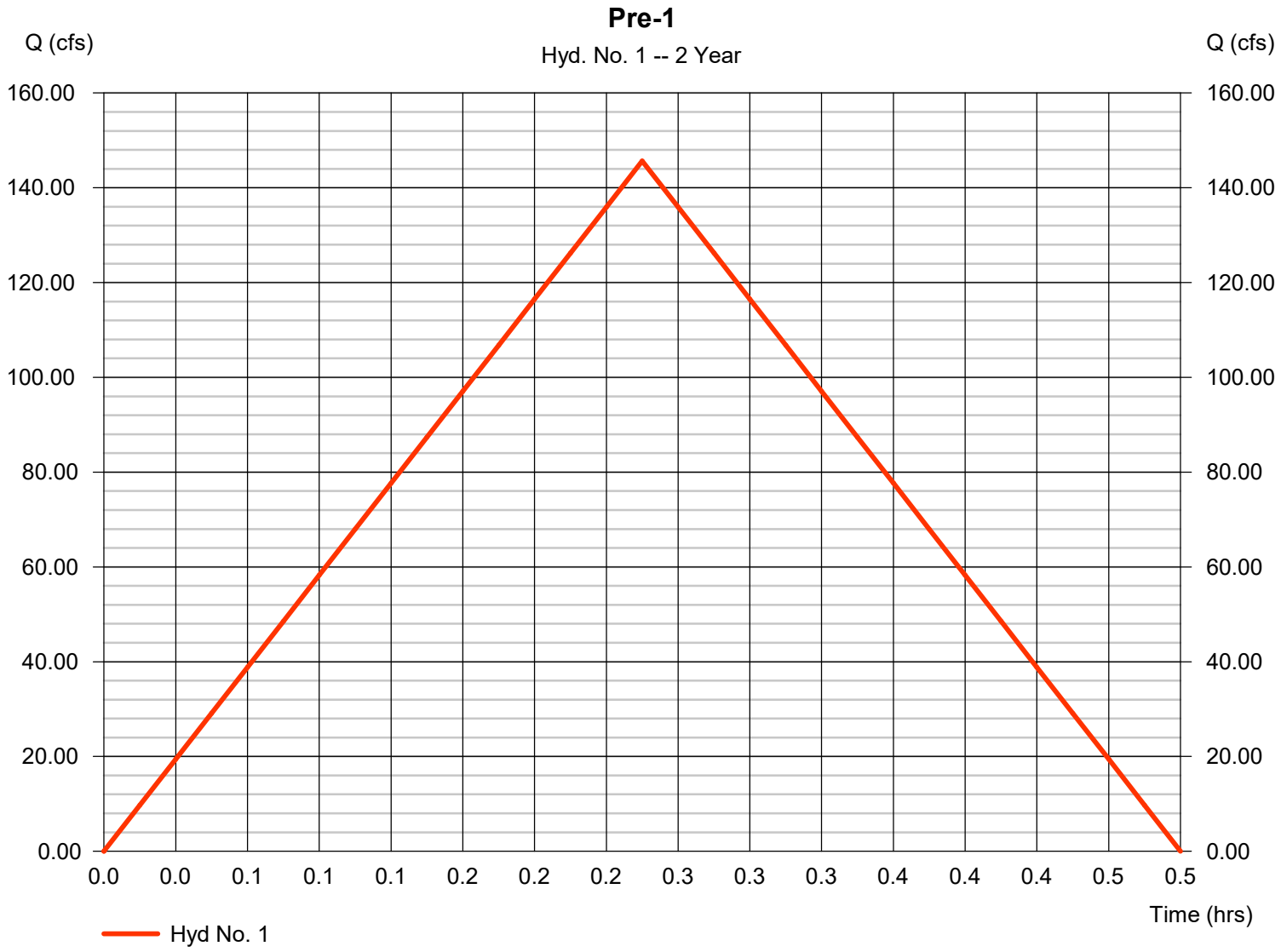
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	145.63	1	15	131,066	------	------	------	Pre-1
2	Rational	18.45	1	10	11,070	------	------	------	Pre-2
3	Rational	1.897	1	11	1,252	------	------	------	Pre-3
4	Rational	27.06	1	11	17,860	------	------	------	Pre-4
5	Rational	8.662	1	11	5,717	------	------	------	Pre-5
6	Combine	154.85	1	15	142,136	1, 2,	------	------	Pre-POC #1
7	Rational	145.44	1	15	130,899	------	------	------	Post-1
8	Rational	38.21	1	7	16,048	------	------	------	Post-2
9	Rational	2.012	1	8	966	------	------	------	Post-3
10	Rational	45.59	1	8	21,882	------	------	------	Post-4
11	Reservoir	21.95	1	12	21,874	10	868.67	13,116	Pond Rational - Post 4
12	Rational	6.874	1	9	3,712	------	------	------	Post-5
13	Rational	23.18	1	8	11,128	------	------	------	Post-6
14	Combine	145.44	1	15	146,947	7, 8,	------	------	POC #1
15	SCS Runoff	37.04	2	720	84,842	------	------	------	Pre 4
16	SCS Runoff	49.82	2	716	102,205	------	------	------	Post 4
17	Reservoir	37.92	2	720	102,197	16	869.28	18,952	Pond SCS - Post 4

Hydrograph Report

Hyd. No. 1

Pre-1

Hydrograph type	=	Rational	Peak discharge	=	145.63 cfs
Storm frequency	=	2 yrs	Time to peak	=	0.25 hrs
Time interval	=	1 min	Hyd. volume	=	131,066 cuft
Drainage area	=	93.760 ac	Runoff coeff.	=	0.45
Intensity	=	3.452 in/hr	Tc by User	=	15.00 min
IDF Curve	=	Lansing, Kansas - With K-Values 2025.IDF	Asc/Rec limb fact	=	1/1

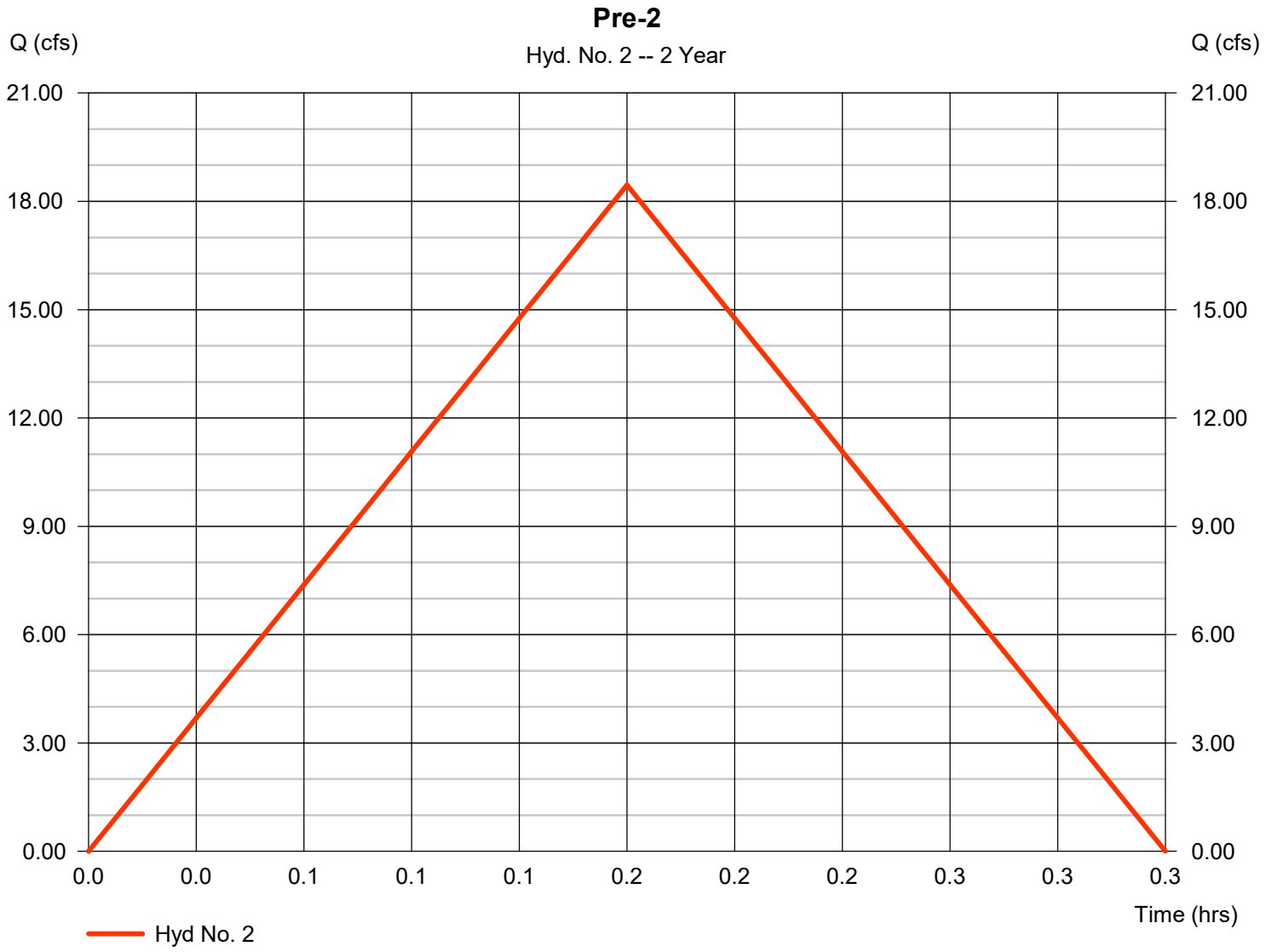


Hydrograph Report

Hyd. No. 2

Pre-2

Hydrograph type	=	Rational	Peak discharge	=	18.45 cfs
Storm frequency	=	2 yrs	Time to peak	=	0.17 hrs
Time interval	=	1 min	Hyd. volume	=	11,070 cuft
Drainage area	=	14.130 ac	Runoff coeff.	=	0.31
Intensity	=	4.212 in/hr	Tc by User	=	10.00 min
IDF Curve	=	Lansing, Kansas - With K-Values 2025.IDF	Asc/Rec limb fact	=	1/1

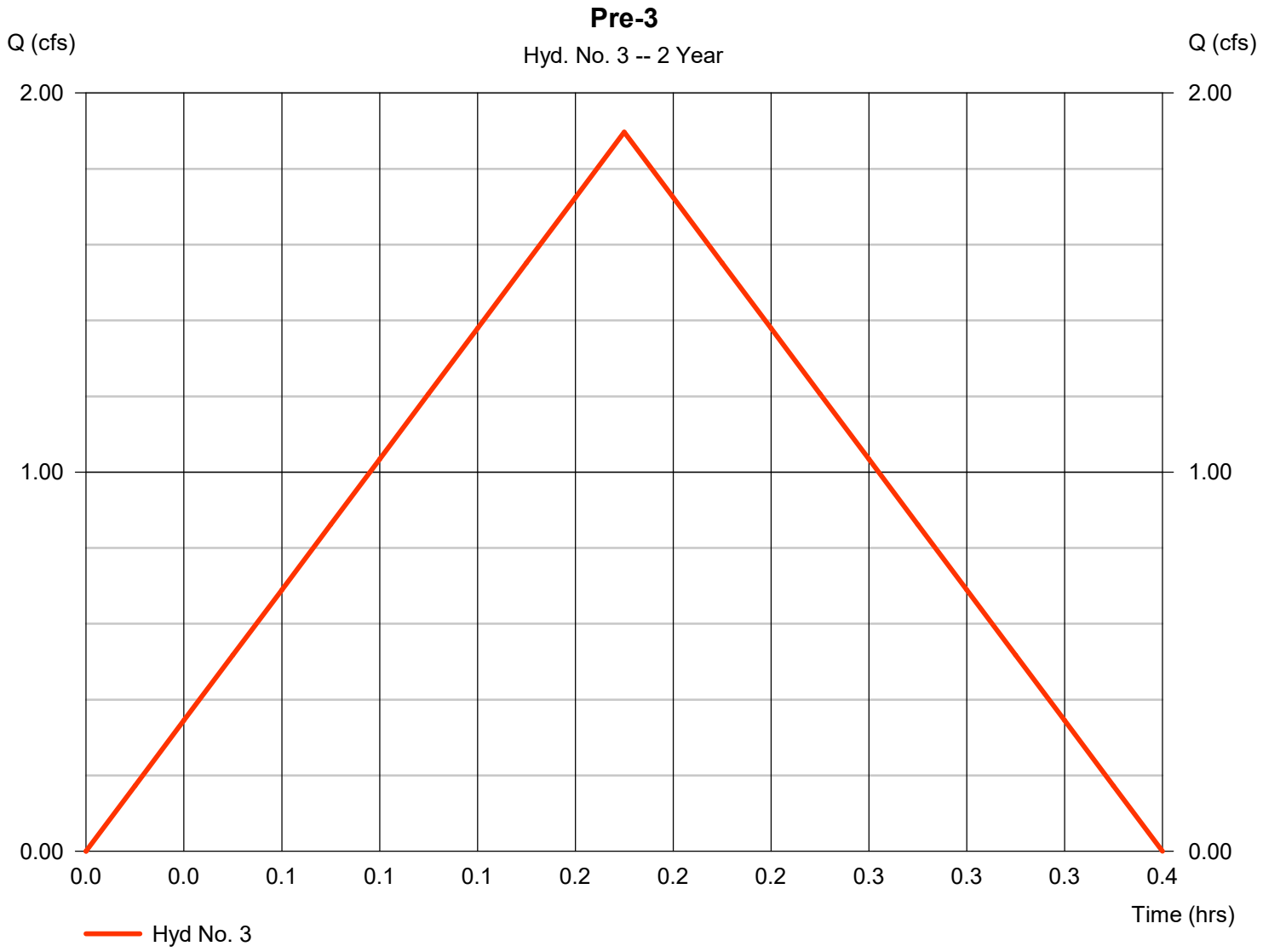


Hydrograph Report

Hyd. No. 3

Pre-3

Hydrograph type	=	Rational	Peak discharge	=	1.897 cfs
Storm frequency	=	2 yrs	Time to peak	=	0.18 hrs
Time interval	=	1 min	Hyd. volume	=	1,252 cuft
Drainage area	=	1.570 ac	Runoff coeff.	=	0.3
Intensity	=	4.027 in/hr	Tc by User	=	11.00 min
IDF Curve	=	Lansing, Kansas - With K-Values 2025.IDF	Asc/Rec limb fact	=	1/1

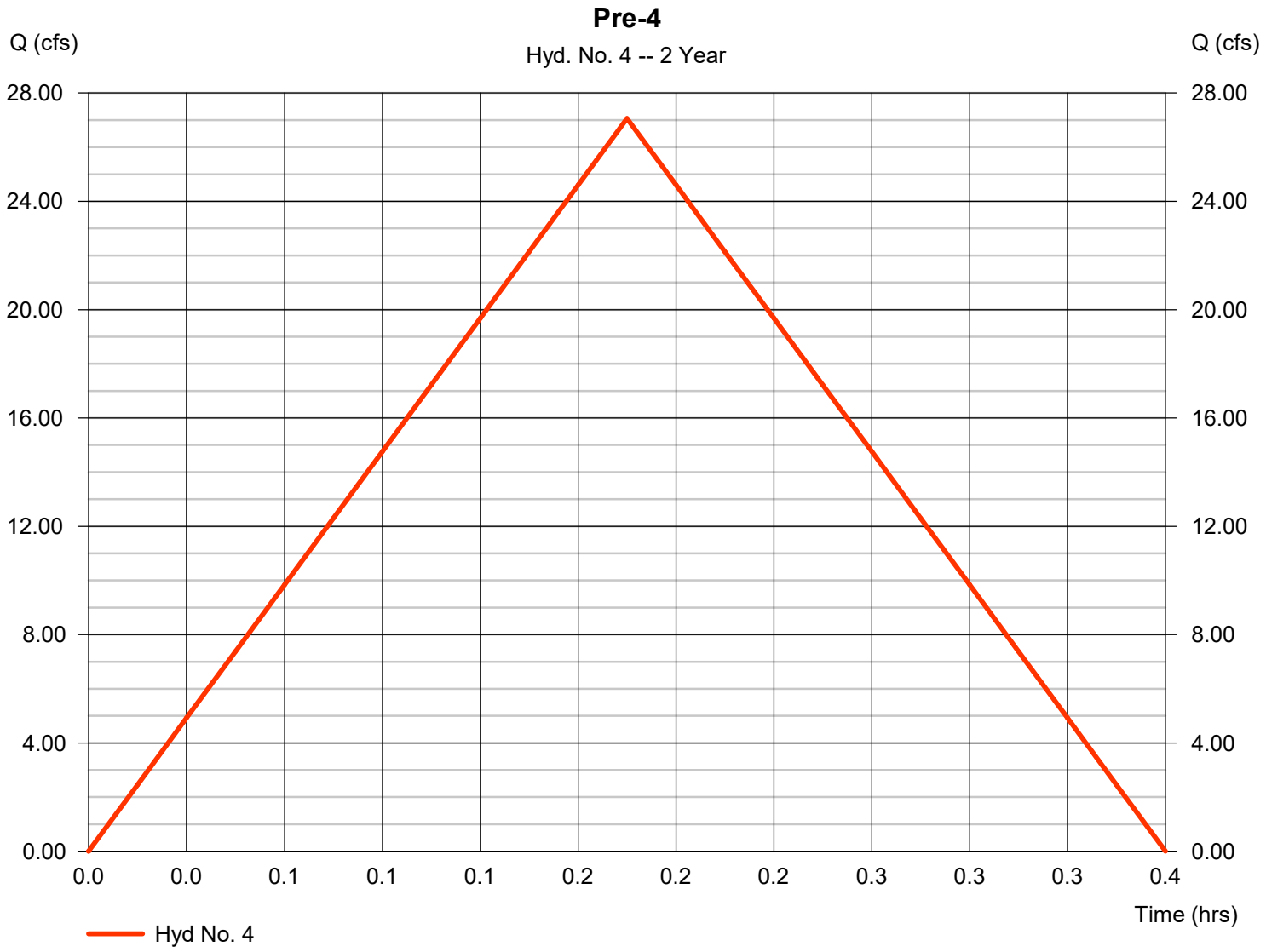


Hydrograph Report

Hyd. No. 4

Pre-4

Hydrograph type	=	Rational	Peak discharge	=	27.06 cfs
Storm frequency	=	2 yrs	Time to peak	=	0.18 hrs
Time interval	=	1 min	Hyd. volume	=	17,860 cuft
Drainage area	=	22.400 ac	Runoff coeff.	=	0.3
Intensity	=	4.027 in/hr	Tc by User	=	11.00 min
IDF Curve	=	Lansing, Kansas - With K-Values 2025.IDF	Asc/Rec limb fact	=	1/1

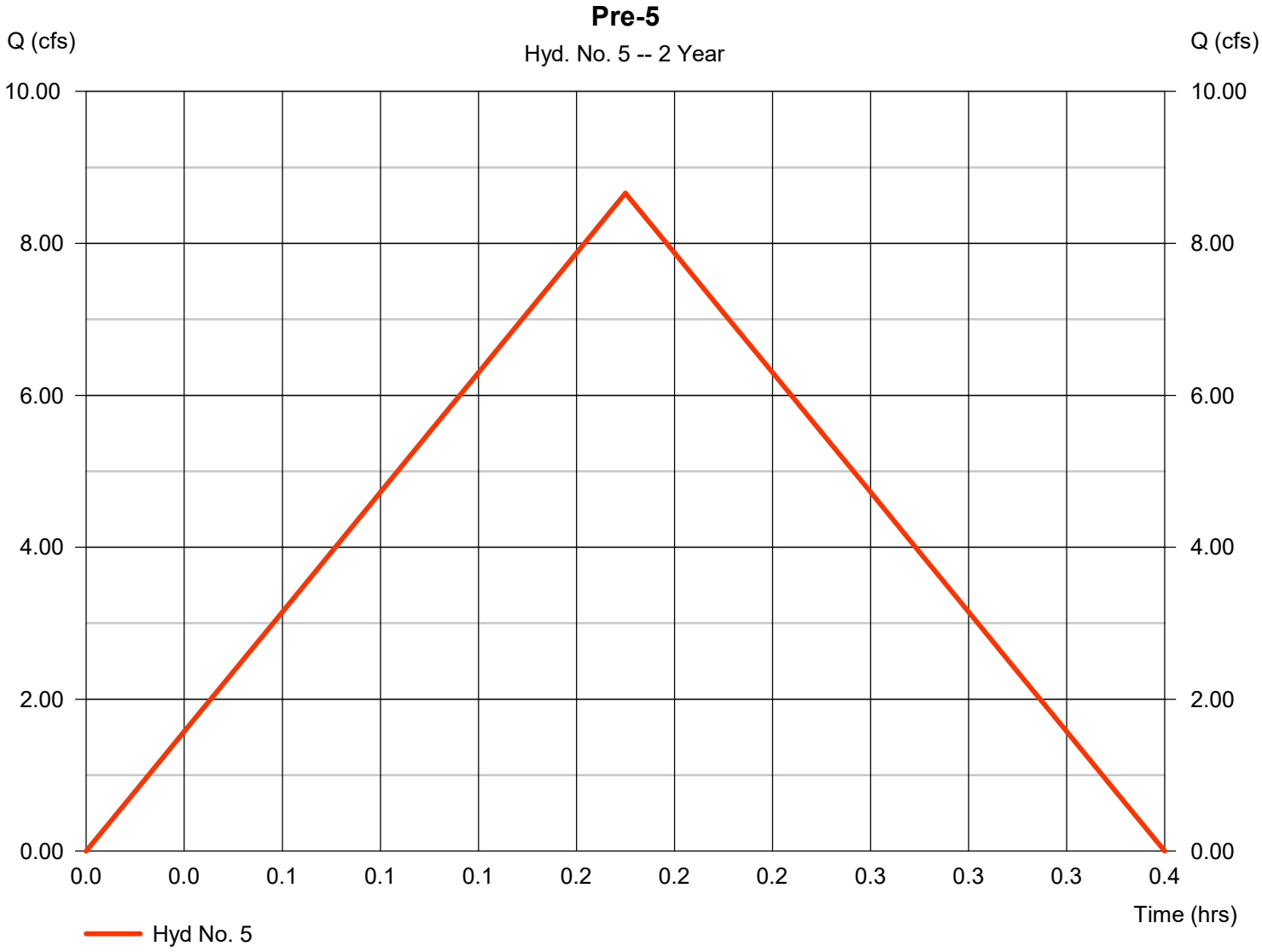


Hydrograph Report

Hyd. No. 5

Pre-5

Hydrograph type	=	Rational	Peak discharge	=	8.662 cfs
Storm frequency	=	2 yrs	Time to peak	=	0.18 hrs
Time interval	=	1 min	Hyd. volume	=	5,717 cuft
Drainage area	=	7.170 ac	Runoff coeff.	=	0.3
Intensity	=	4.027 in/hr	Tc by User	=	11.00 min
IDF Curve	=	Lansing, Kansas - With K-Values 2025.IDF	Asc/Rec limb fact	=	1/1

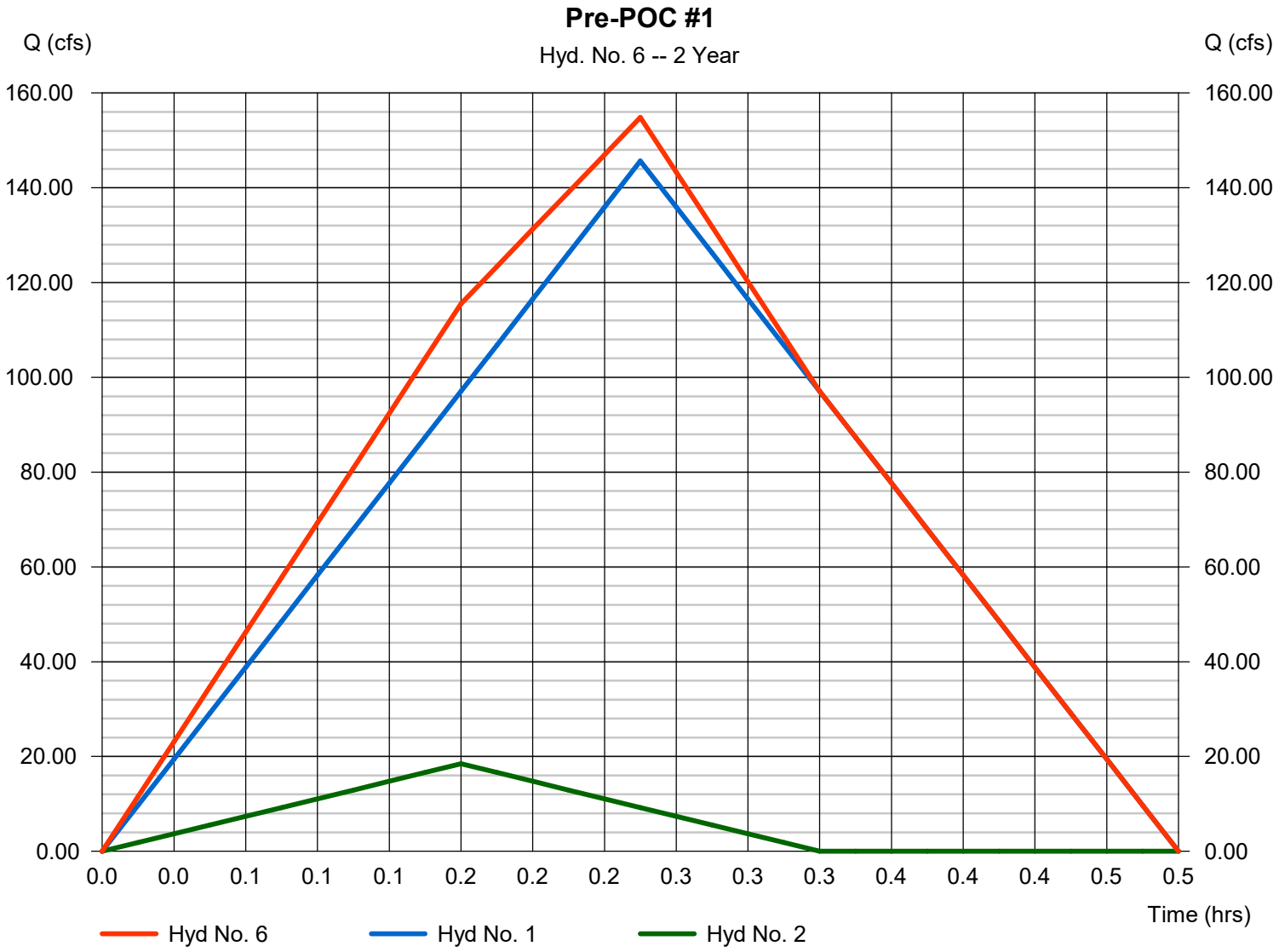


Hydrograph Report

Hyd. No. 6

Pre-POC #1

Hydrograph type	=	Combine	Peak discharge	=	154.85 cfs
Storm frequency	=	2 yrs	Time to peak	=	0.25 hrs
Time interval	=	1 min	Hyd. volume	=	142,136 cuft
Inflow hyds.	=	1, 2	Contrib. drain. area	=	107.890 ac

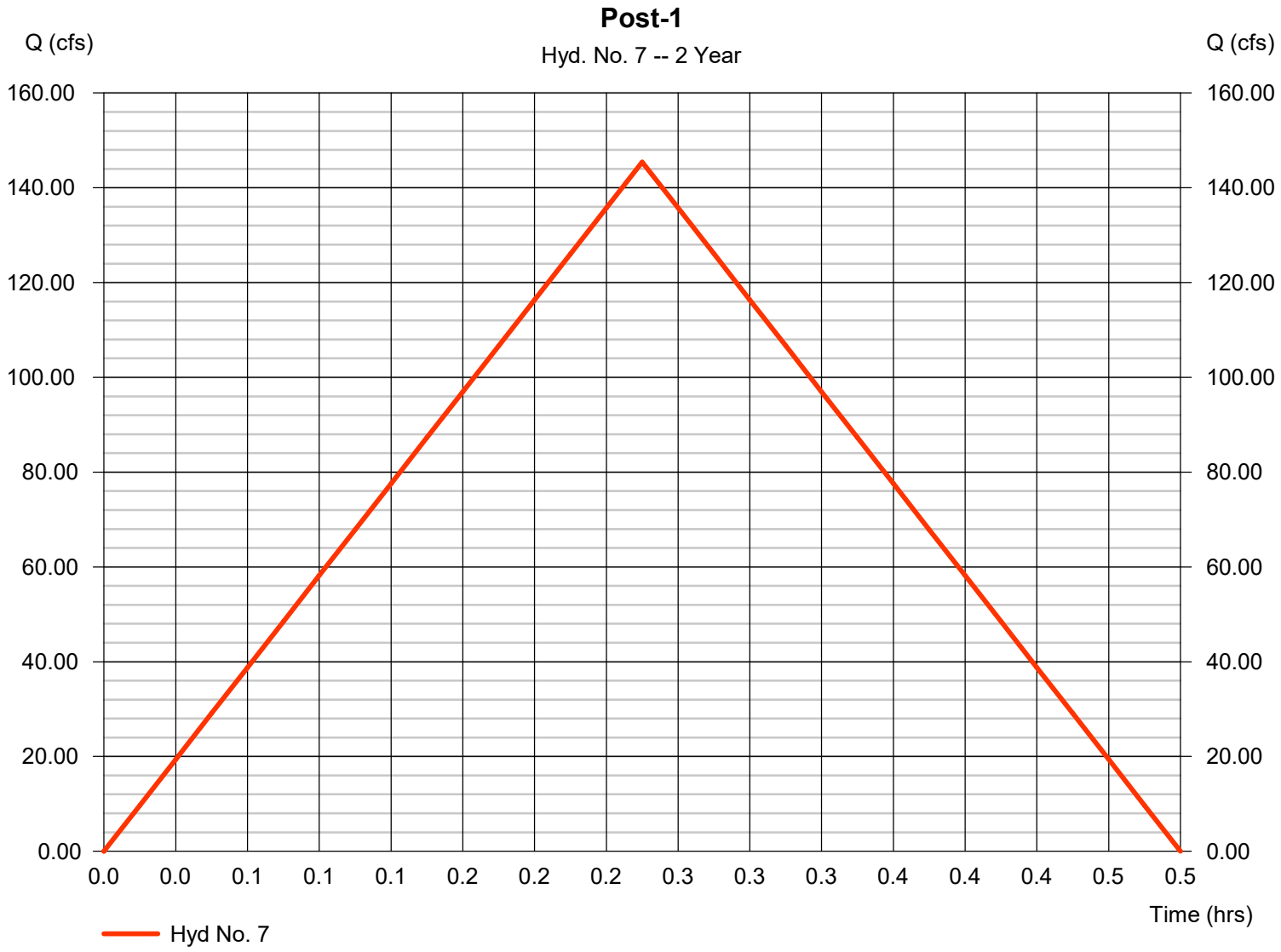


Hydrograph Report

Hyd. No. 7

Post-1

Hydrograph type	=	Rational	Peak discharge	=	145.44 cfs
Storm frequency	=	2 yrs	Time to peak	=	0.25 hrs
Time interval	=	1 min	Hyd. volume	=	130,899 cuft
Drainage area	=	93.640 ac	Runoff coeff.	=	0.45
Intensity	=	3.452 in/hr	Tc by User	=	15.00 min
IDF Curve	=	Lansing, Kansas - With K-Values 2025.IDF	Asc/Rec limb fact	=	1/1



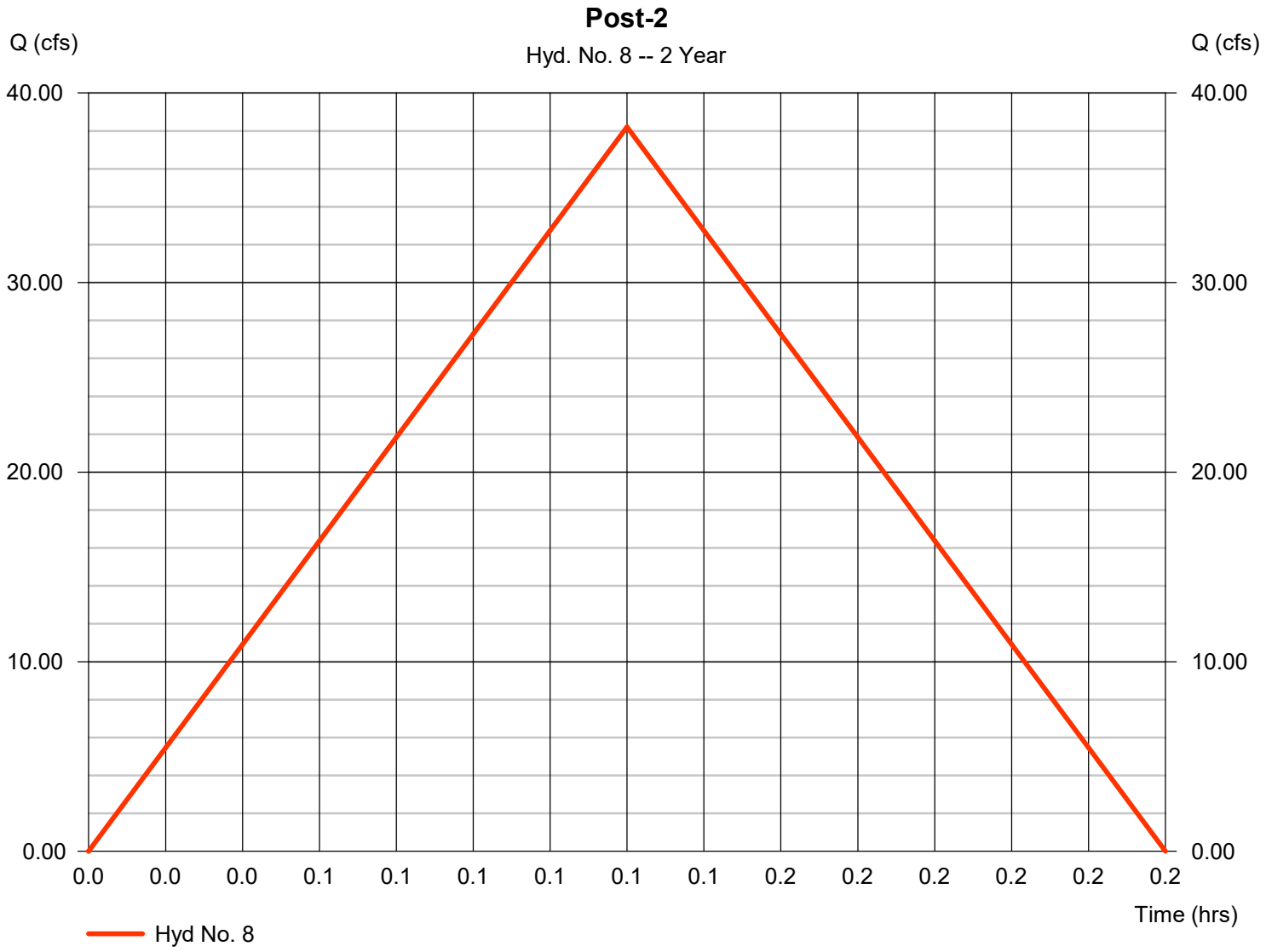
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025 Wednesday, 06 / 11 / 2025

Hyd. No. 8

Post-2

Hydrograph type	=	Rational	Peak discharge	=	38.21 cfs
Storm frequency	=	2 yrs	Time to peak	=	0.12 hrs
Time interval	=	1 min	Hyd. volume	=	16,048 cuft
Drainage area	=	14.360 ac	Runoff coeff.	=	0.54
Intensity	=	4.927 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Lansing, Kansas - With K-Values 2025.IDF	Asc/Rec limb fact	=	1/1

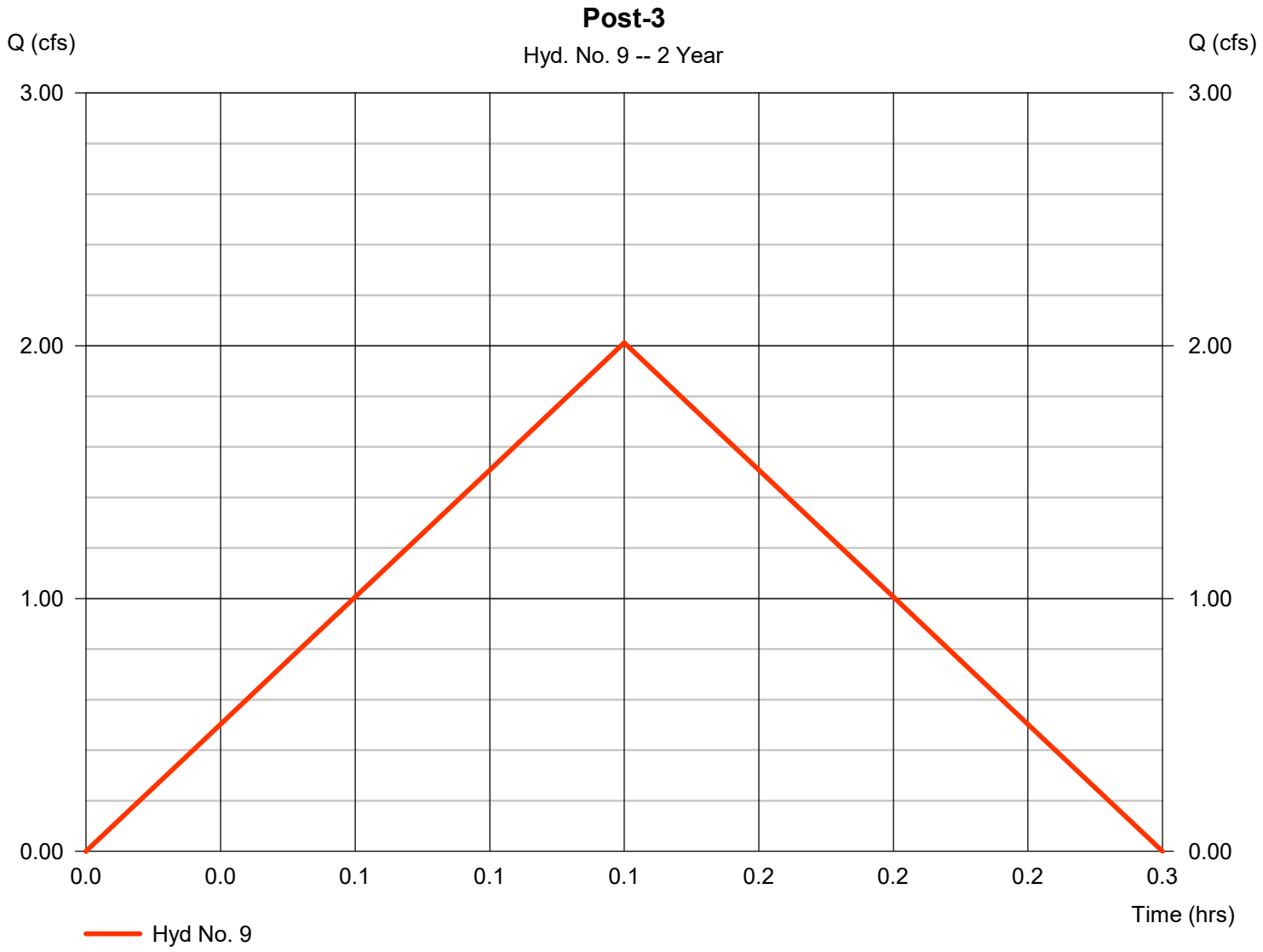


Hydrograph Report

Hyd. No. 9

Post-3

Hydrograph type	=	Rational	Peak discharge	=	2.012 cfs
Storm frequency	=	2 yrs	Time to peak	=	0.13 hrs
Time interval	=	1 min	Hyd. volume	=	966 cuft
Drainage area	=	0.800 ac	Runoff coeff.	=	0.54
Intensity	=	4.656 in/hr	Tc by User	=	8.00 min
IDF Curve	=	Lansing, Kansas - With K-Values 2025.IDF	Asc/Rec limb fact	=	1/1

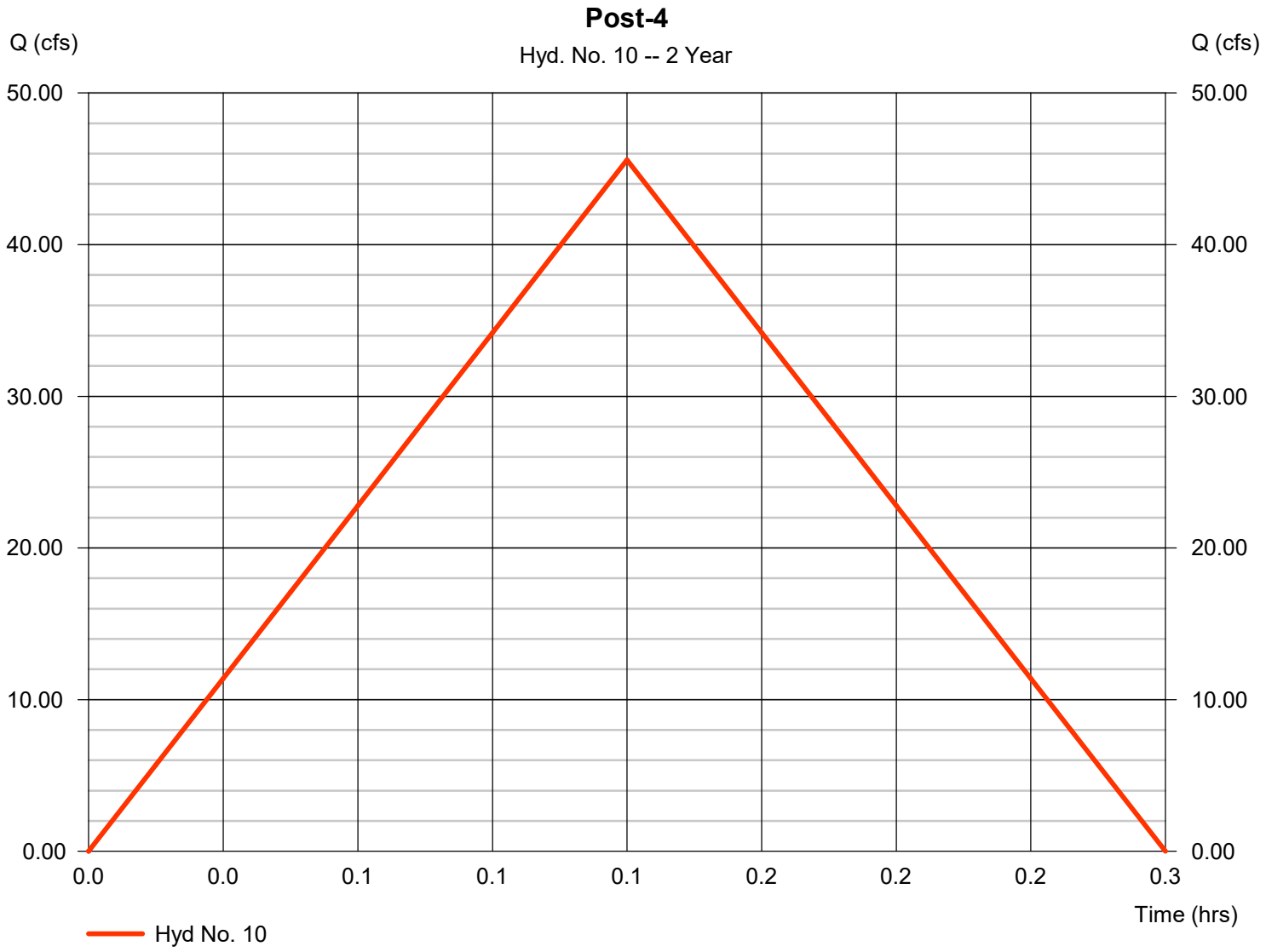


Hydrograph Report

Hyd. No. 10

Post-4

Hydrograph type	=	Rational	Peak discharge	=	45.59 cfs
Storm frequency	=	2 yrs	Time to peak	=	0.13 hrs
Time interval	=	1 min	Hyd. volume	=	21,882 cuft
Drainage area	=	18.130 ac	Runoff coeff.	=	0.54
Intensity	=	4.656 in/hr	Tc by User	=	8.00 min
IDF Curve	=	Lansing, Kansas - With K-Values 2025.IDF	Asc/Rec limb fact	=	1/1



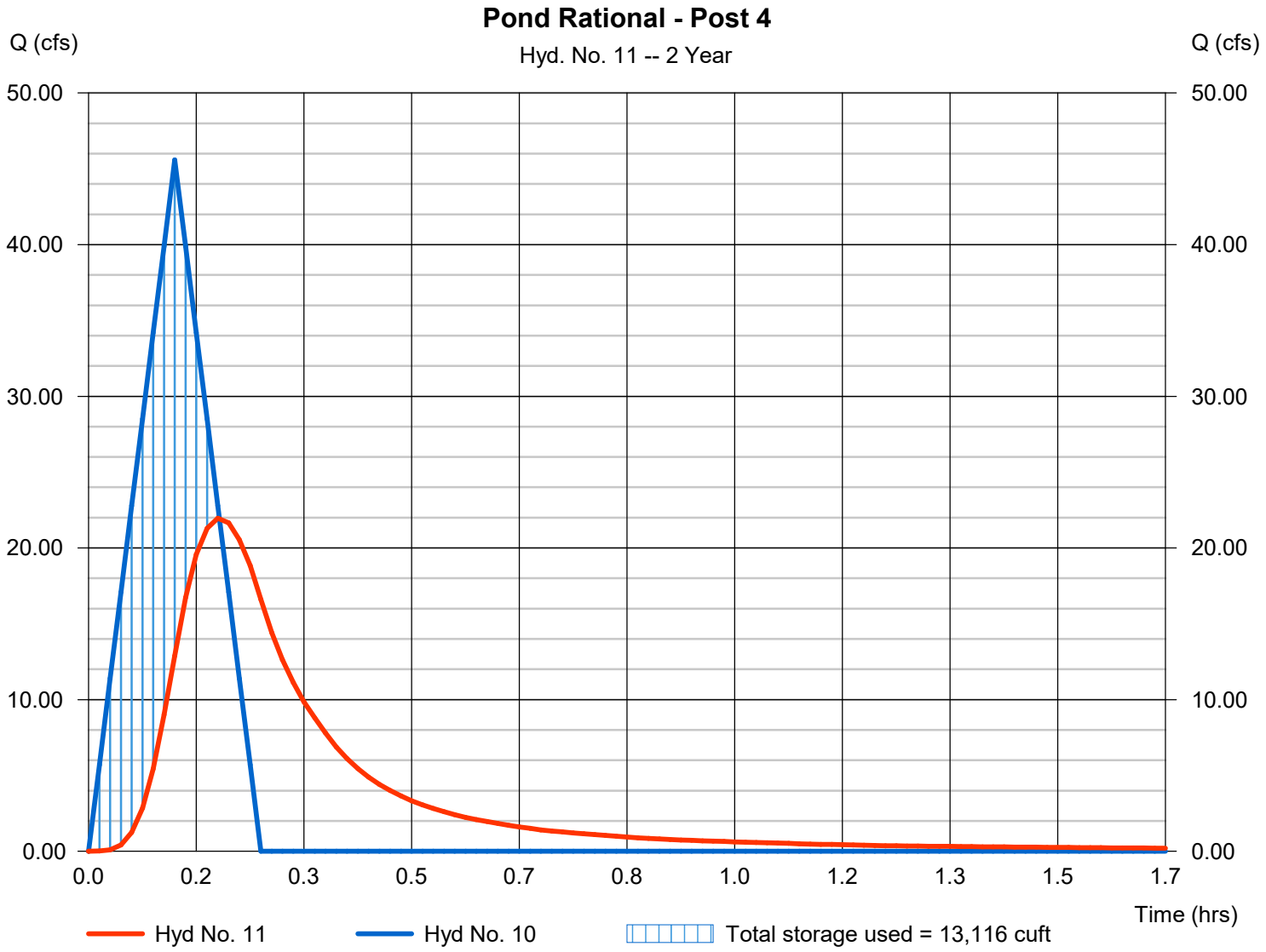
Hydrograph Report

Hyd. No. 11

Pond Rational - Post 4

Hydrograph type	=	Reservoir	Peak discharge	=	21.95 cfs
Storm frequency	=	2 yrs	Time to peak	=	0.20 hrs
Time interval	=	1 min	Hyd. volume	=	21,874 cuft
Inflow hyd. No.	=	10 - Post-4	Max. Elevation	=	868.67 ft
Reservoir name	=	Small Pond	Max. Storage	=	13,116 cuft

Storage Indication method used.



Pond No. 1 - Small Pond

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 867.00 ft. Voids = 95.00%

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	867.00	6,679	0	0
1.00	868.00	8,408	7,166	7,166
2.00	869.00	10,239	8,857	16,024
3.00	870.00	12,170	10,644	26,668
4.00	871.00	14,201	12,526	39,194
5.00	872.00	16,333	14,504	53,698
6.00	873.00	18,566	16,577	70,275
7.00	874.00	20,899	18,746	89,021

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 48.00	Inactive	0.00	0.00
Span (in)	= 48.00	48.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 867.00	867.00	0.00	0.00
Length (ft)	= 100.00	0.00	0.00	0.00
Slope (%)	= 2.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

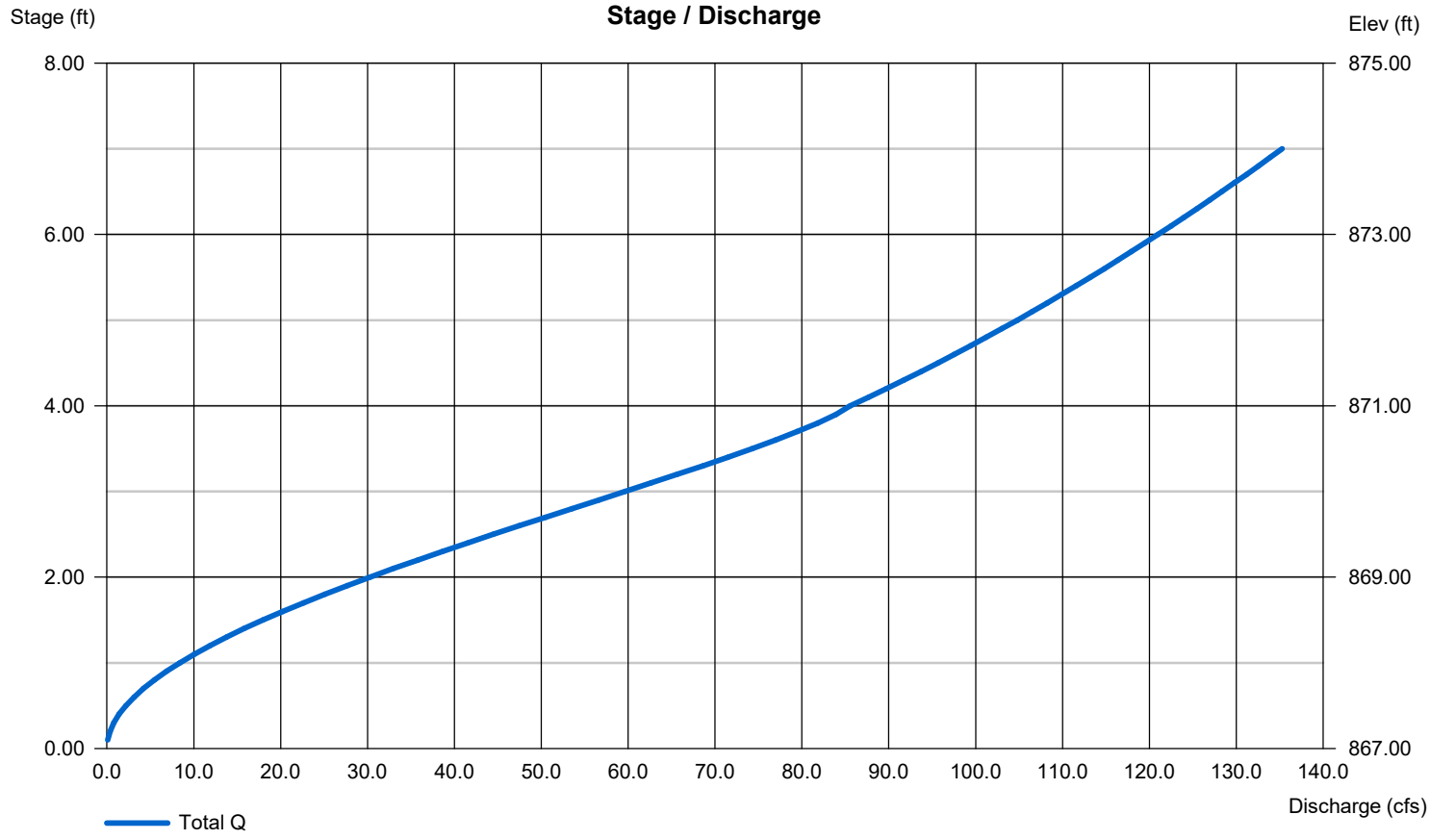
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	Inactive	0.00	0.00	0.00
Crest El. (ft)	= 872.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

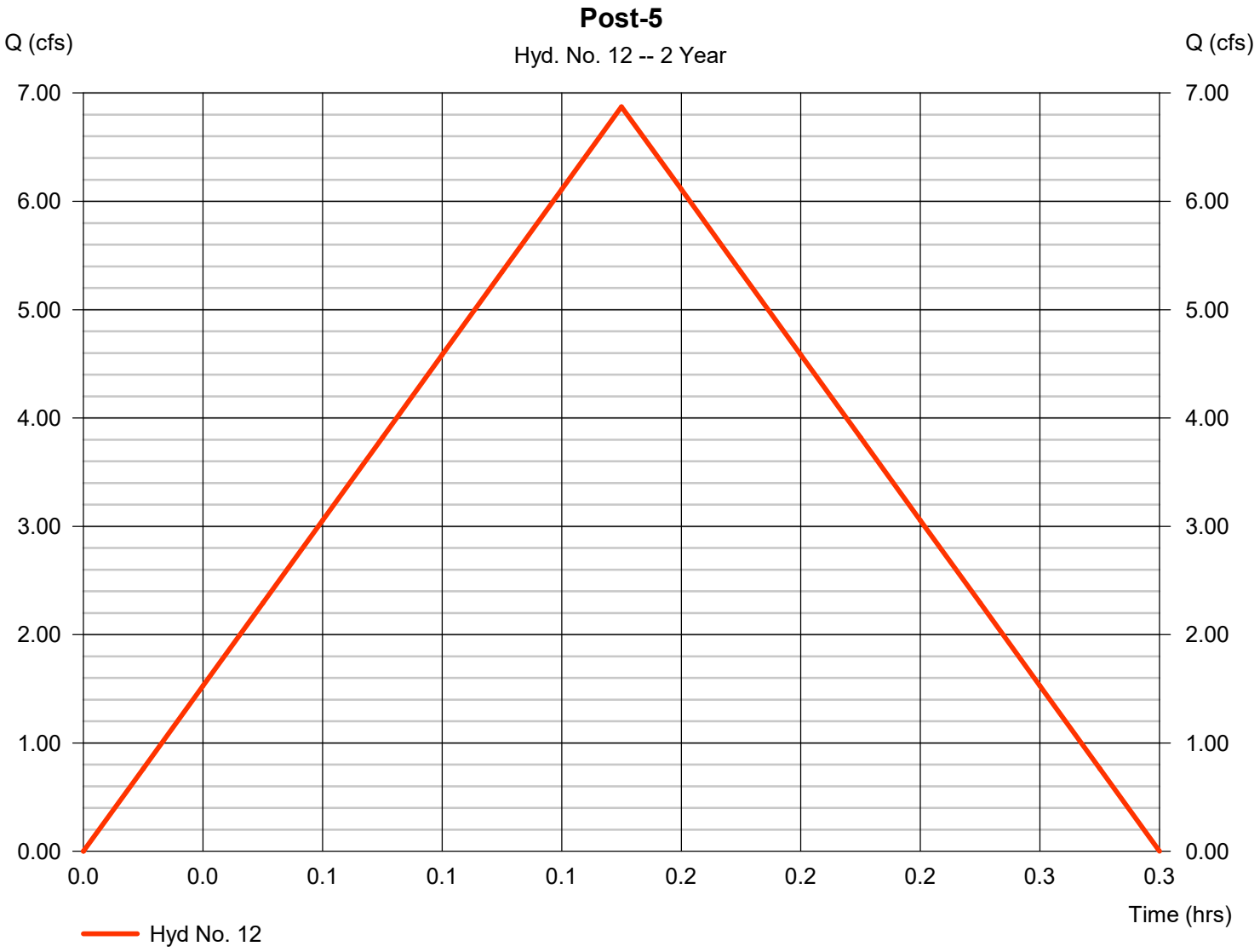


Hydrograph Report

Hyd. No. 12

Post-5

Hydrograph type	=	Rational	Peak discharge	=	6.874 cfs
Storm frequency	=	2 yrs	Time to peak	=	0.15 hrs
Time interval	=	1 min	Hyd. volume	=	3,712 cuft
Drainage area	=	2.880 ac	Runoff coeff.	=	0.54
Intensity	=	4.420 in/hr	Tc by User	=	9.00 min
IDF Curve	=	Lansing, Kansas - With K-Values 2025.IDF	Asc/Rise/Dur fact	=	1/1

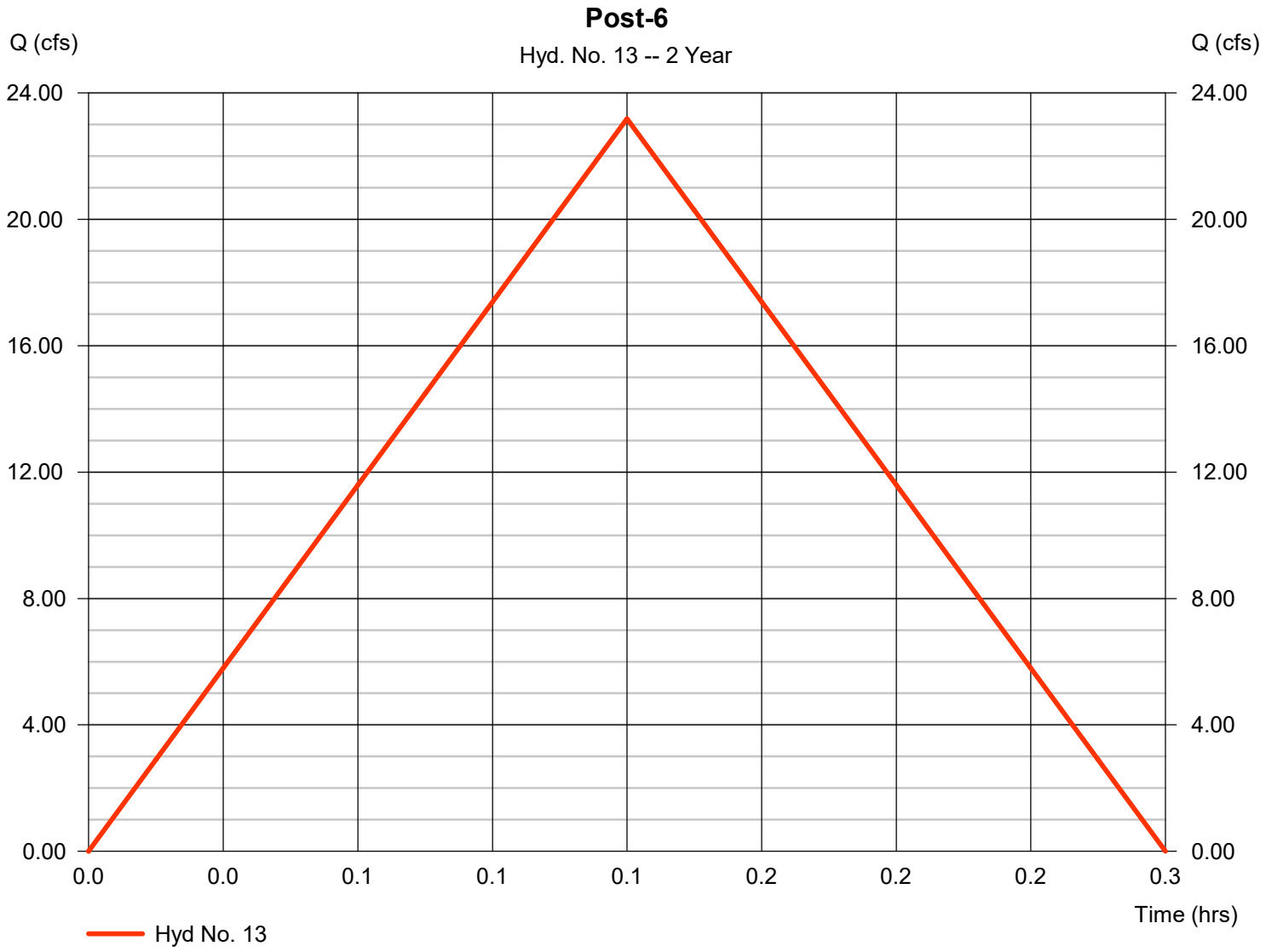


Hydrograph Report

Hyd. No. 13

Post-6

Hydrograph type	=	Rational	Peak discharge	=	23.18 cfs
Storm frequency	=	2 yrs	Time to peak	=	0.13 hrs
Time interval	=	1 min	Hyd. volume	=	11,128 cuft
Drainage area	=	9.220 ac	Runoff coeff.	=	0.54
Intensity	=	4.656 in/hr	Tc by User	=	8.00 min
IDF Curve	=	Lansing, Kansas - With K-Values 2025.IDF	Asc/Rise/Clmb fact	=	1/1

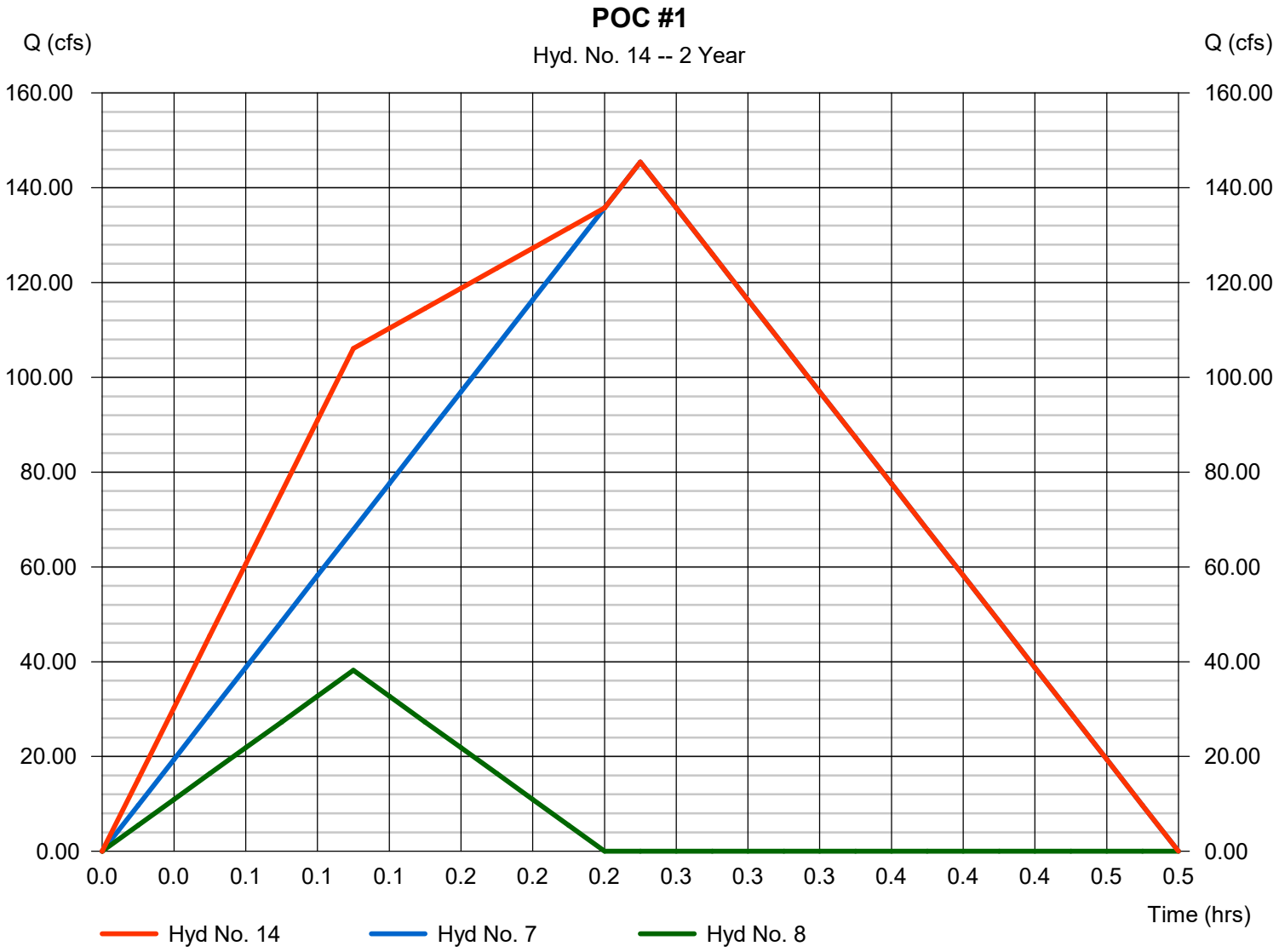


Hydrograph Report

Hyd. No. 14

POC #1

Hydrograph type	=	Combine	Peak discharge	=	145.44 cfs
Storm frequency	=	2 yrs	Time to peak	=	0.25 hrs
Time interval	=	1 min	Hyd. volume	=	146,947 cuft
Inflow hyds.	=	7, 8	Contrib. drain. area	=	108.000 ac

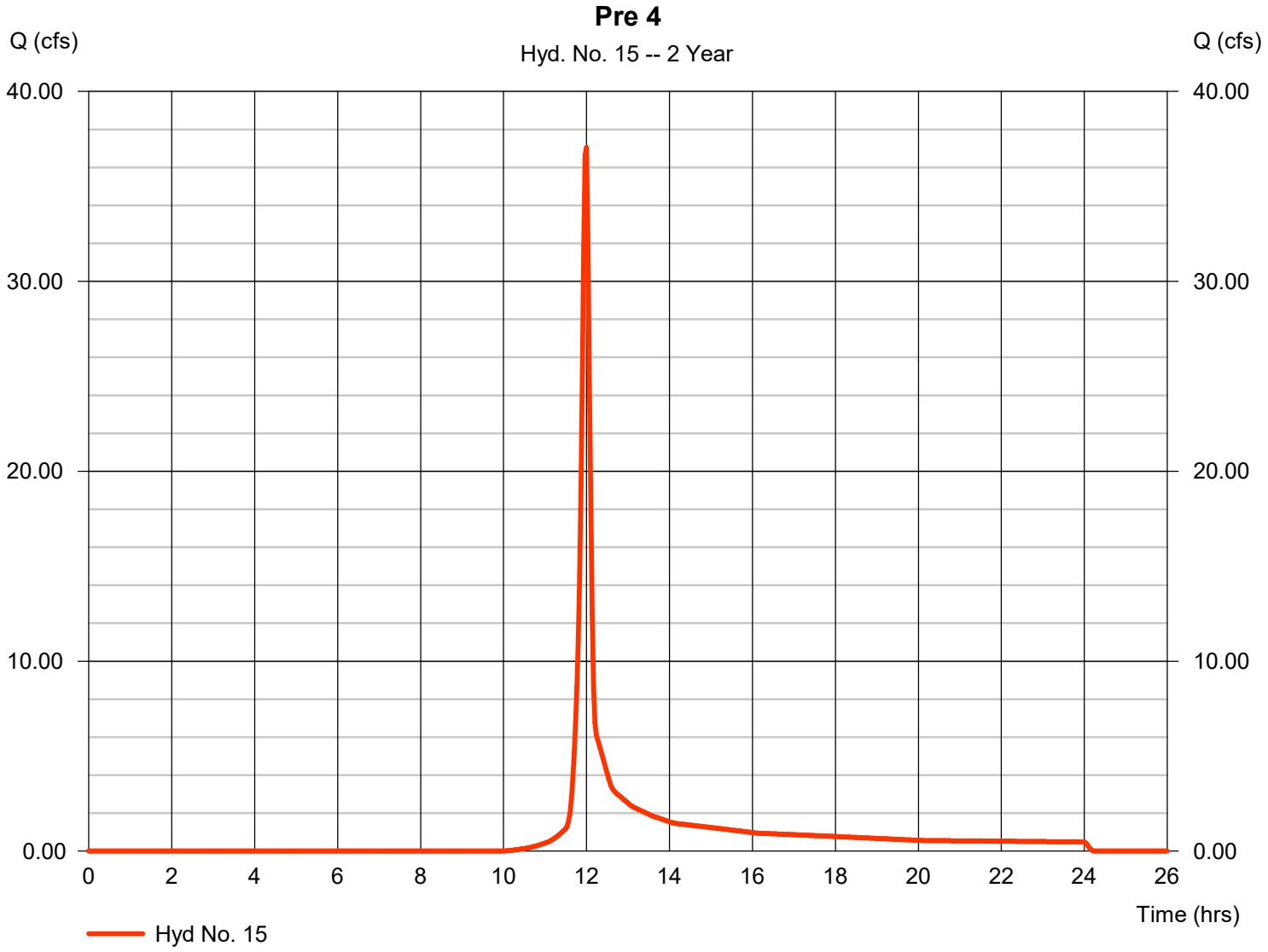


Hydrograph Report

Hyd. No. 15

Pre 4

Hydrograph type	= SCS Runoff	Peak discharge	= 37.04 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 84,842 cuft
Drainage area	= 22.400 ac	Curve number	= 81
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.88 min
Total precip.	= 2.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

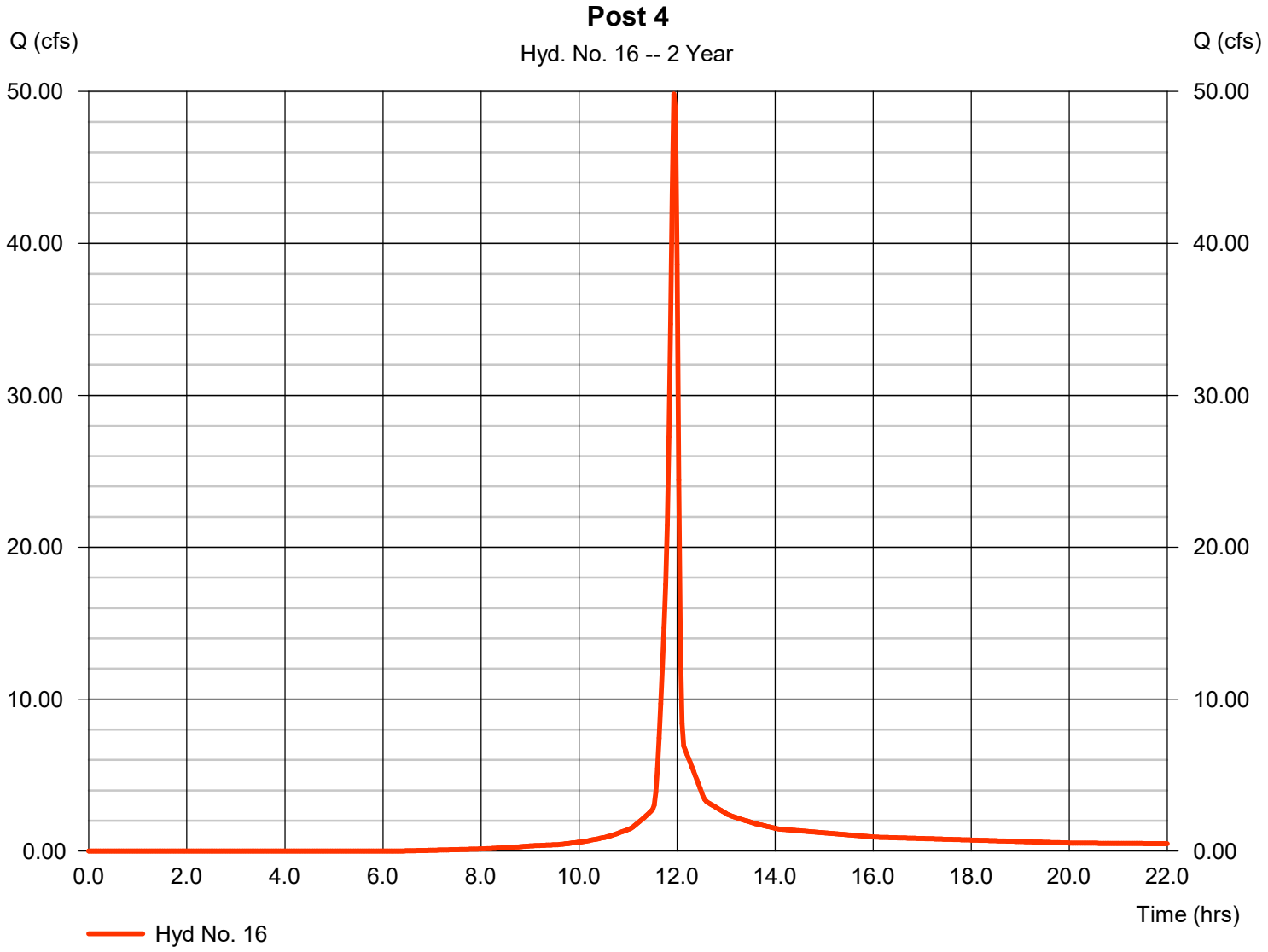


Hydrograph Report

Hyd. No. 16

Post 4

Hydrograph type	=	SCS Runoff	Peak discharge	=	49.82 cfs
Storm frequency	=	2 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	102,205 cuft
Drainage area	=	18.130 ac	Curve number	=	90
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	4.82 min
Total precip.	=	2.64 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



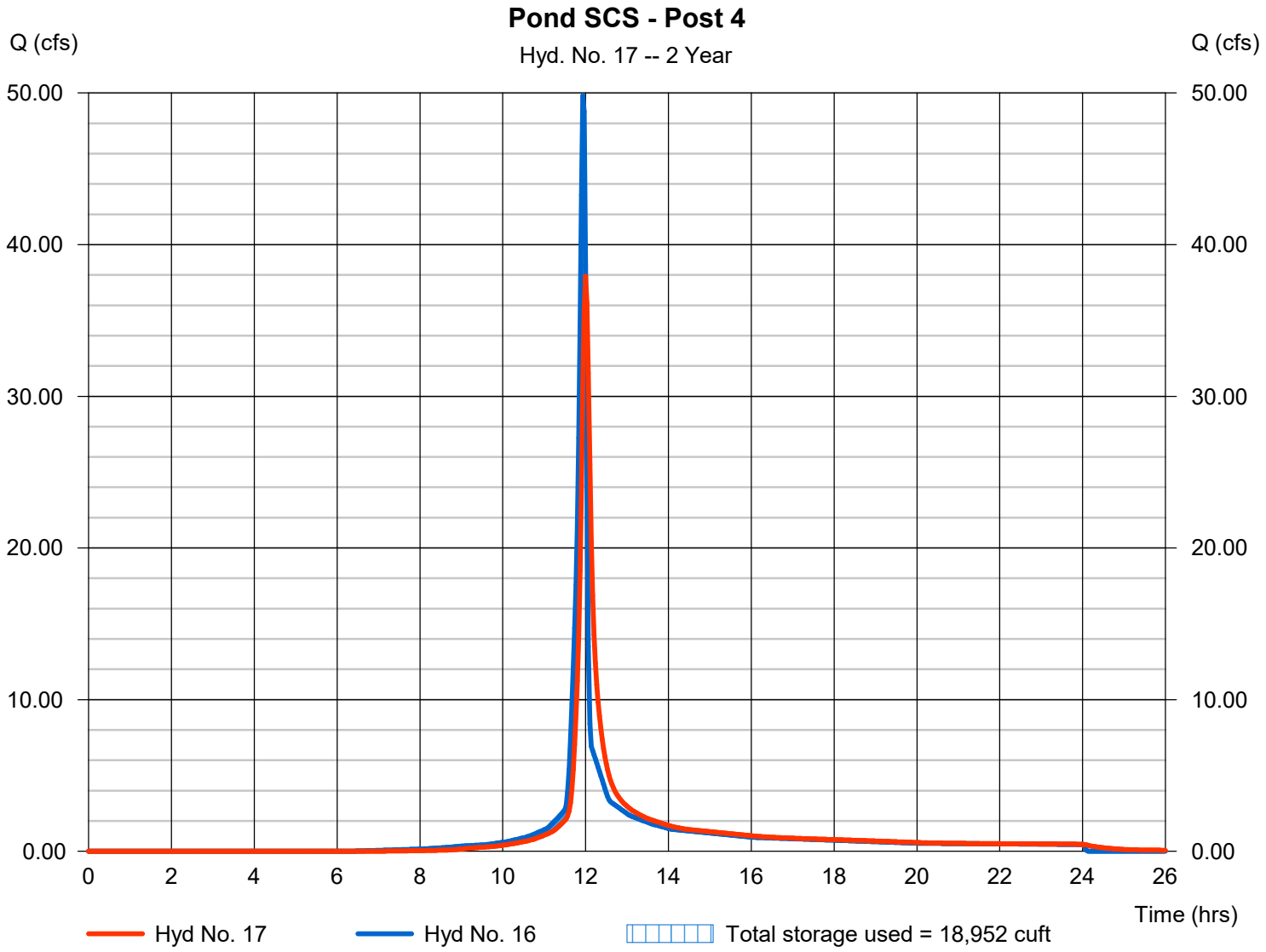
Hydrograph Report

Hyd. No. 17

Pond SCS - Post 4

Hydrograph type	=	Reservoir	Peak discharge	=	37.92 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	102,197 cuft
Inflow hyd. No.	=	16 - Post 4	Max. Elevation	=	869.28 ft
Reservoir name	=	Small Pond	Max. Storage	=	18,952 cuft

Storage Indication method used.



Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025 Wednesday, 06 / 11 / 2025

Pond No. 1 - Small Pond

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 867.00 ft. Voids = 95.00%

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	867.00	6,679	0	0
1.00	868.00	8,408	7,166	7,166
2.00	869.00	10,239	8,857	16,024
3.00	870.00	12,170	10,644	26,668
4.00	871.00	14,201	12,526	39,194
5.00	872.00	16,333	14,504	53,698
6.00	873.00	18,566	16,577	70,275
7.00	874.00	20,899	18,746	89,021

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 48.00	Inactive	0.00	0.00
Span (in)	= 48.00	48.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 867.00	867.00	0.00	0.00
Length (ft)	= 100.00	0.00	0.00	0.00
Slope (%)	= 2.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

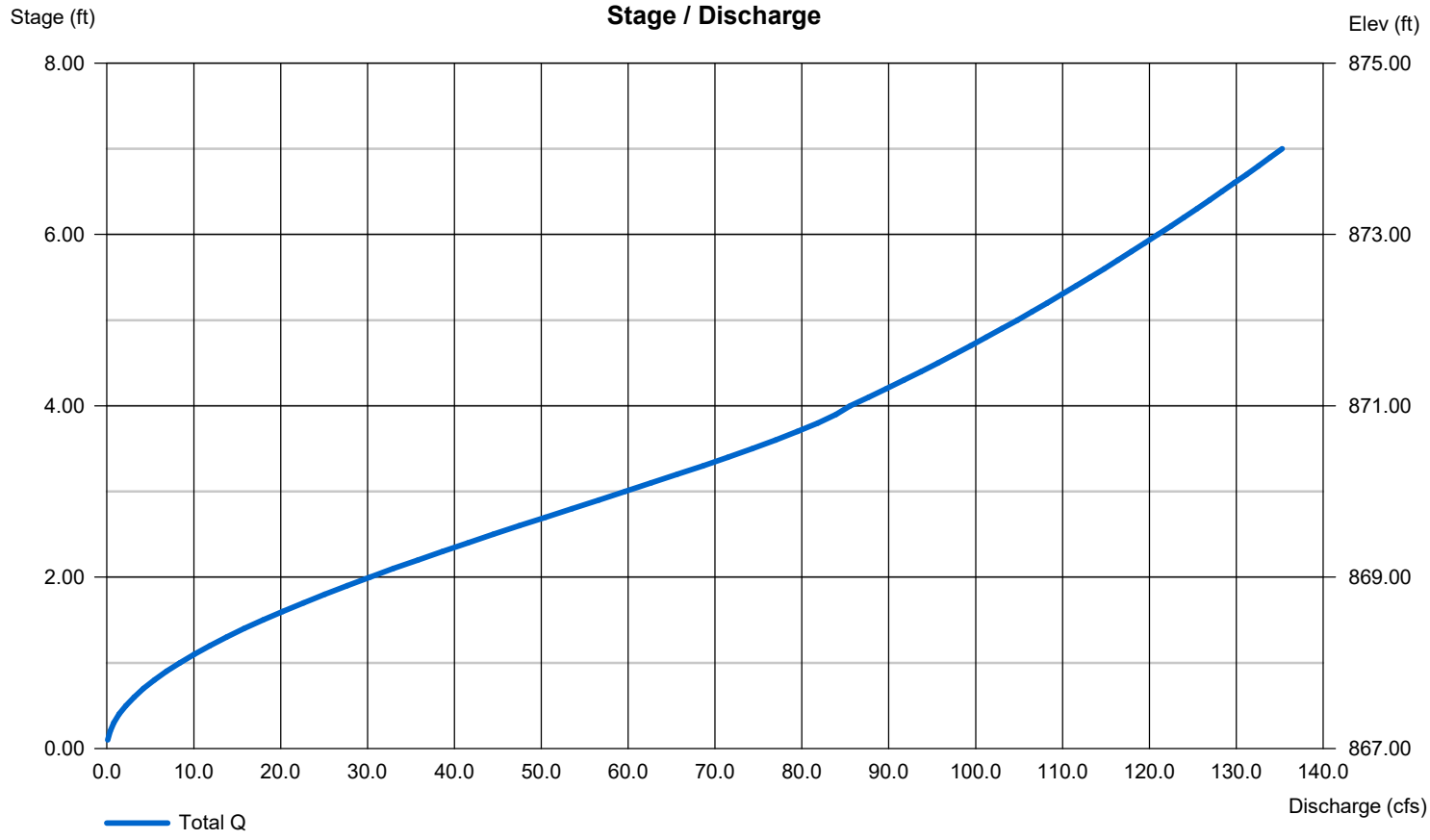
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	Inactive	0.00	0.00	0.00
Crest El. (ft)	= 872.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025

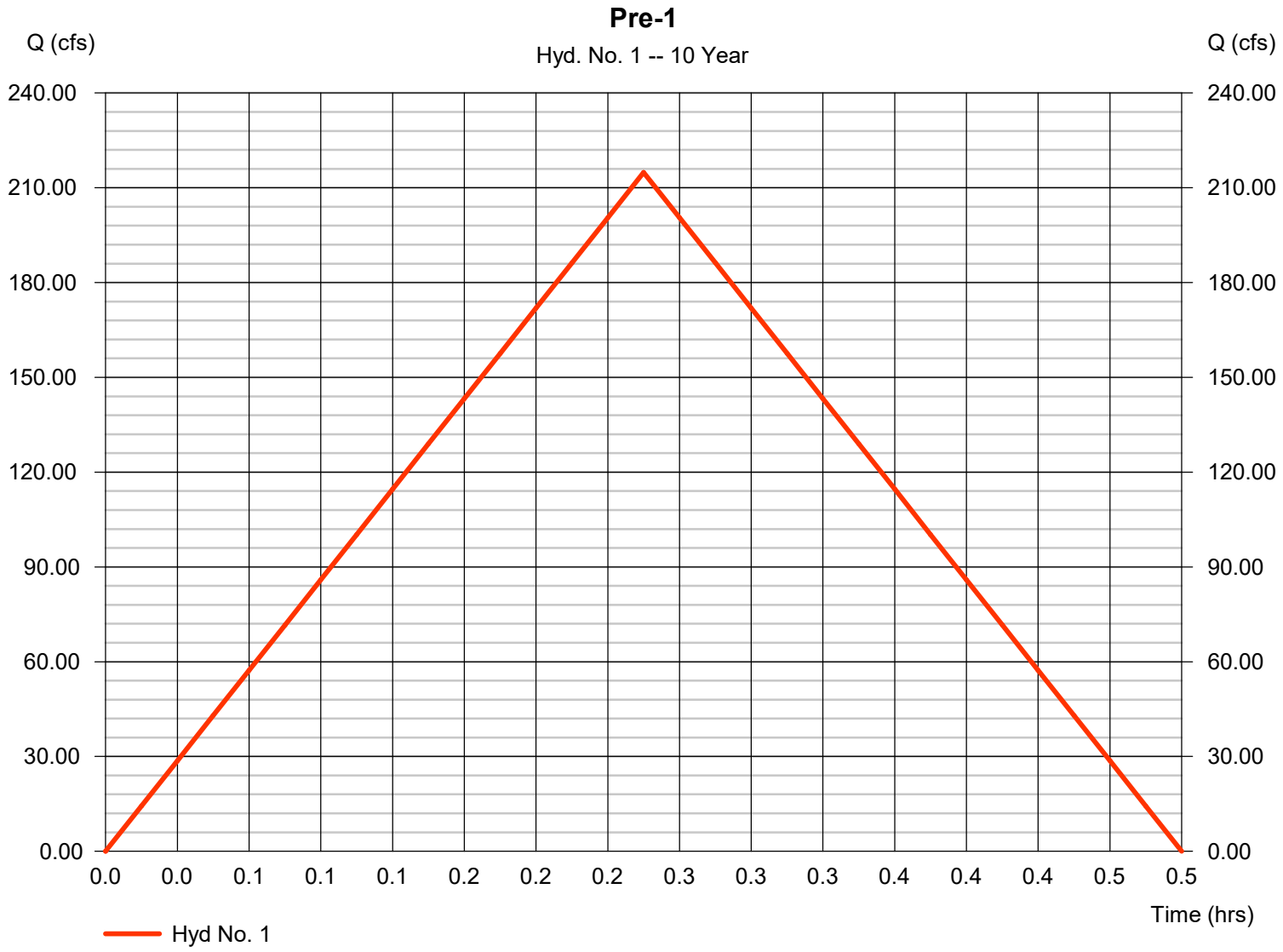
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	214.88	1	15	193,390	------	------	------	Pre-1
2	Rational	27.18	1	10	16,306	------	------	------	Pre-2
3	Rational	2.794	1	11	1,844	------	------	------	Pre-3
4	Rational	39.86	1	11	26,309	------	------	------	Pre-4
5	Rational	12.76	1	11	8,421	------	------	------	Pre-5
6	Combine	228.47	1	15	209,696	1, 2,	------	------	Pre-POC #1
7	Rational	214.60	1	15	193,143	------	------	------	Post-1
8	Rational	56.37	1	7	23,675	------	------	------	Post-2
9	Rational	2.965	1	8	1,423	------	------	------	Post-3
10	Rational	67.19	1	8	32,252	------	------	------	Post-4
11	Reservoir	35.13	1	12	32,244	10	869.18	17,906	Pond Rational - Post 4
12	Rational	10.13	1	9	5,469	------	------	------	Post-5
13	Rational	34.17	1	8	16,402	------	------	------	Post-6
14	Combine	214.60	1	15	216,817	7, 8,	------	------	POC #1
15	SCS Runoff	77.46	2	718	177,298	------	------	------	Pre 4
16	SCS Runoff	87.23	2	716	184,209	------	------	------	Post 4
17	Reservoir	67.23	2	720	184,201	16	870.25	29,839	Pond SCS - Post 4

Hydrograph Report

Hyd. No. 1

Pre-1

Hydrograph type	=	Rational	Peak discharge	=	214.88 cfs
Storm frequency	=	10 yrs	Time to peak	=	0.25 hrs
Time interval	=	1 min	Hyd. volume	=	193,390 cuft
Drainage area	=	93.760 ac	Runoff coeff.	=	0.45
Intensity	=	5.093 in/hr	Tc by User	=	15.00 min
IDF Curve	=	Lansing, Kansas - With K-Values 2025.IDF	Asc/Rec limb fact	=	1/1



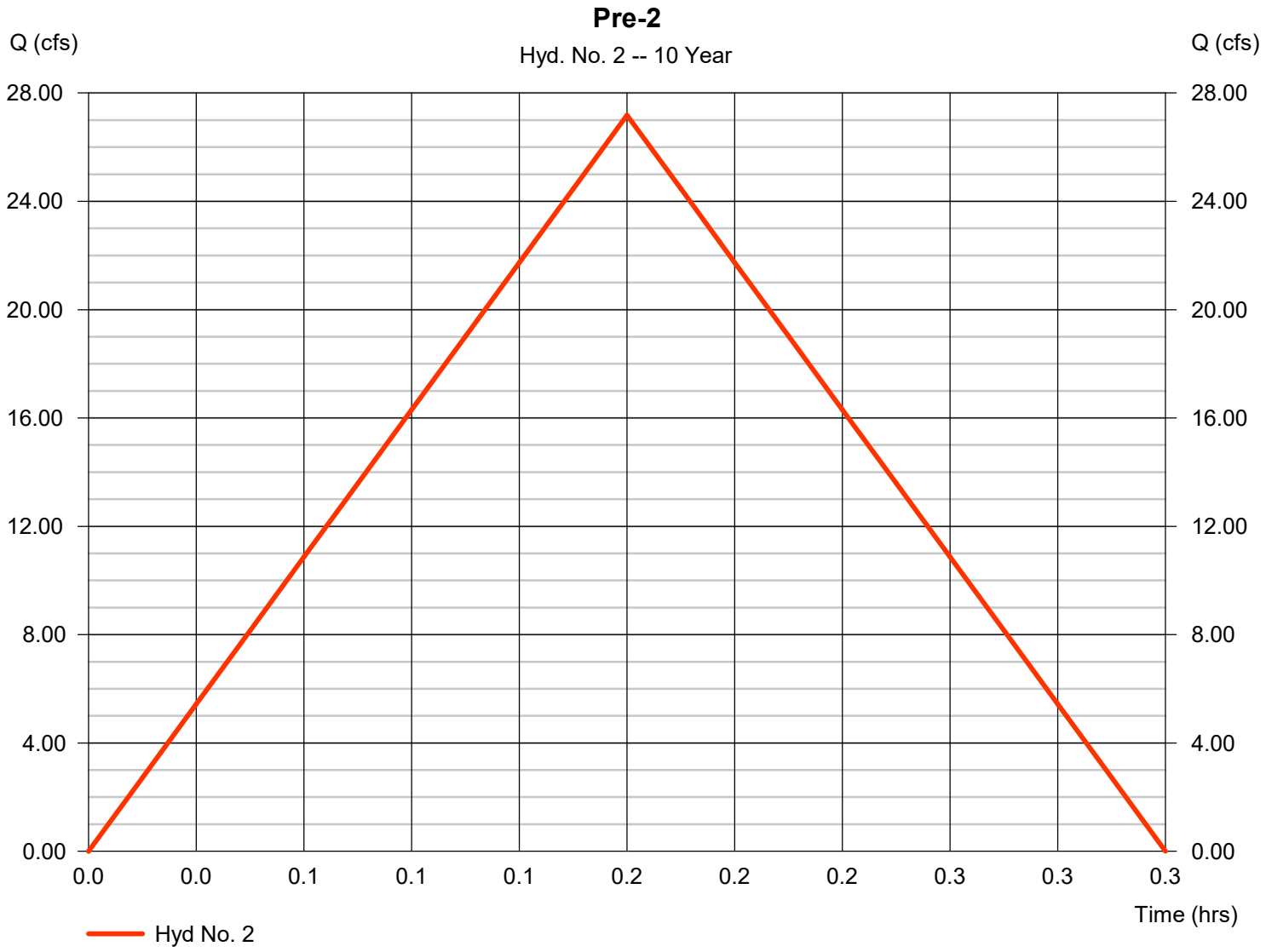
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025 Wednesday, 06 / 11 / 2025

Hyd. No. 2

Pre-2

Hydrograph type	=	Rational	Peak discharge	=	27.18 cfs
Storm frequency	=	10 yrs	Time to peak	=	0.17 hrs
Time interval	=	1 min	Hyd. volume	=	16,306 cuft
Drainage area	=	14.130 ac	Runoff coeff.	=	0.31
Intensity	=	6.204 in/hr	Tc by User	=	10.00 min
IDF Curve	=	Lansing, Kansas - With K-Values 2025.IDF	Asc/Rec limb fact	=	1/1



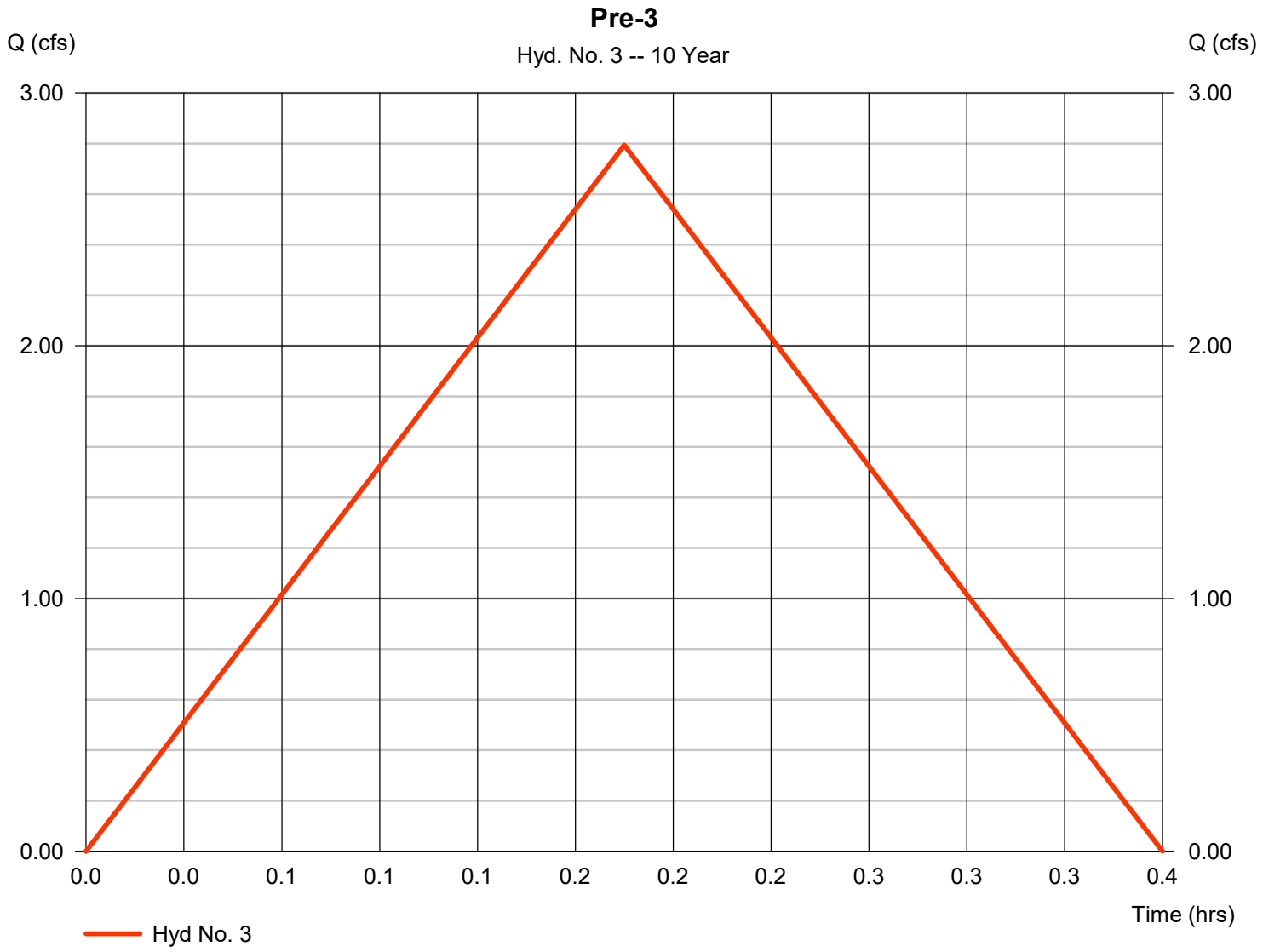
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025 Wednesday, 06 / 11 / 2025

Hyd. No. 3

Pre-3

Hydrograph type	=	Rational	Peak discharge	=	2.794 cfs
Storm frequency	=	10 yrs	Time to peak	=	0.18 hrs
Time interval	=	1 min	Hyd. volume	=	1,844 cuft
Drainage area	=	1.570 ac	Runoff coeff.	=	0.3
Intensity	=	5.932 in/hr	Tc by User	=	11.00 min
IDF Curve	=	Lansing, Kansas - With K-Values 2025.IDF	Asc/Rise/Dur fact	=	1/1

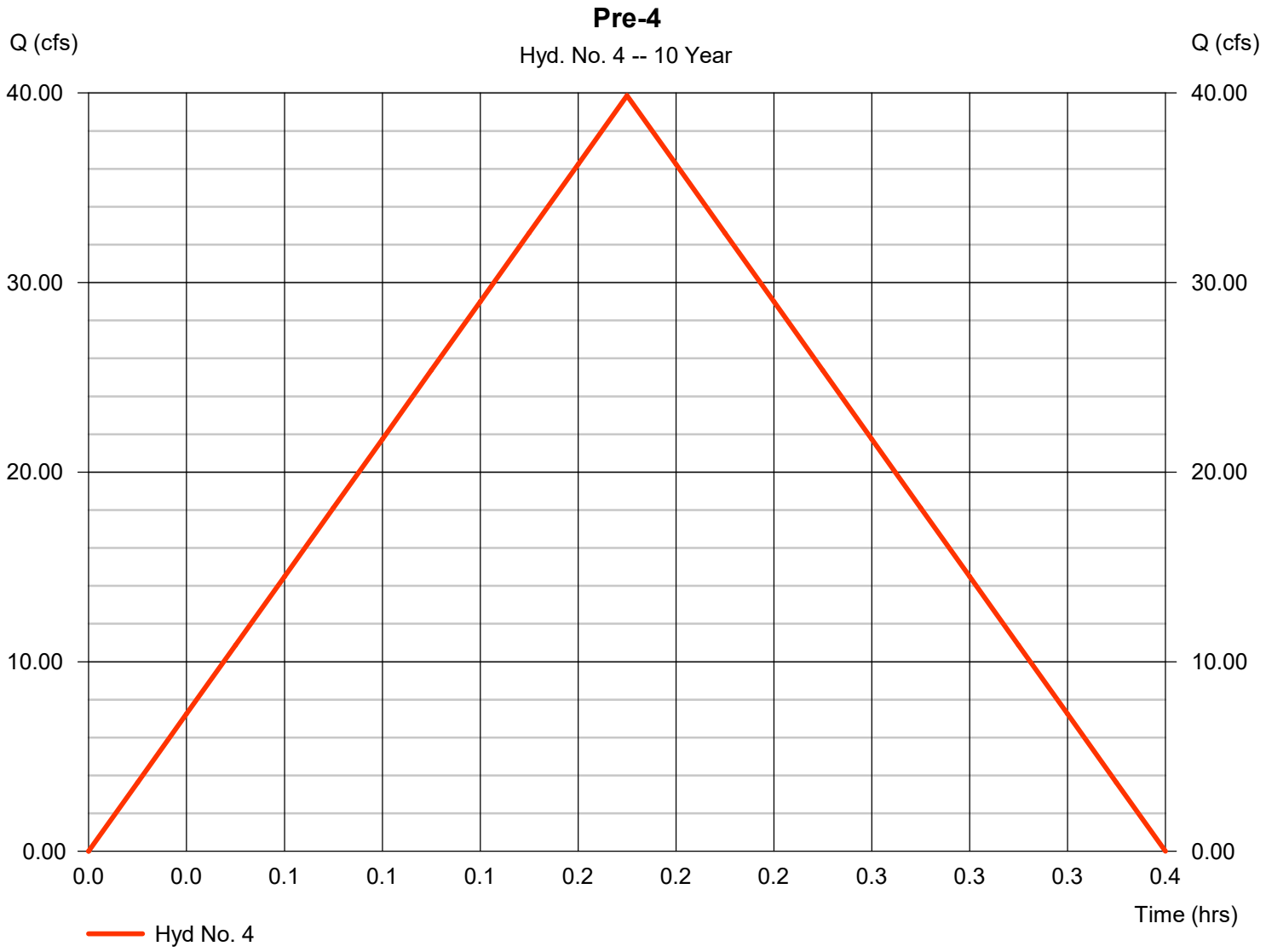


Hydrograph Report

Hyd. No. 4

Pre-4

Hydrograph type	=	Rational	Peak discharge	=	39.86 cfs
Storm frequency	=	10 yrs	Time to peak	=	0.18 hrs
Time interval	=	1 min	Hyd. volume	=	26,309 cuft
Drainage area	=	22.400 ac	Runoff coeff.	=	0.3
Intensity	=	5.932 in/hr	Tc by User	=	11.00 min
IDF Curve	=	Lansing, Kansas - With K-Values 2025.IDF	Asc/Rec limb fact	=	1/1

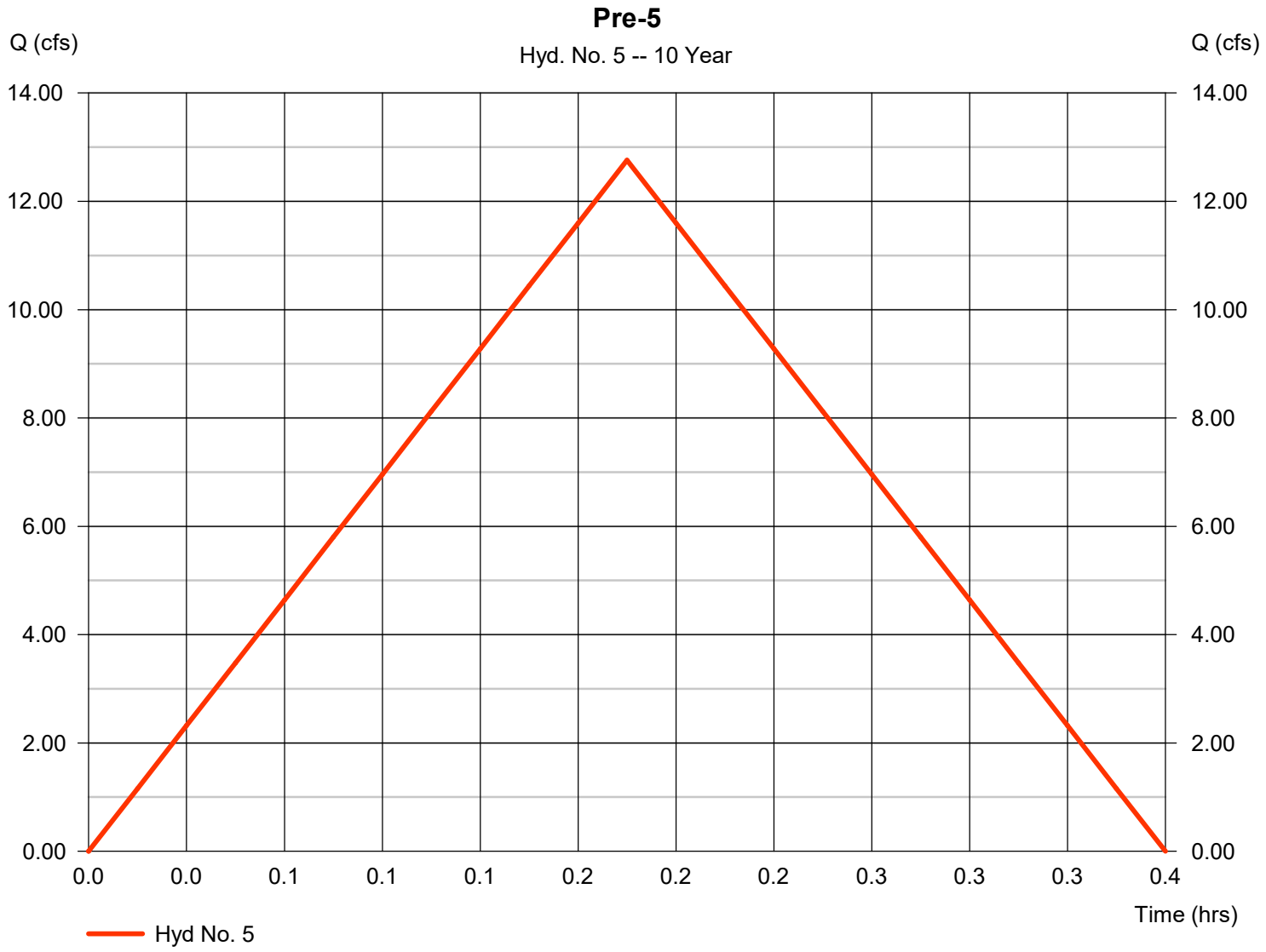


Hydrograph Report

Hyd. No. 5

Pre-5

Hydrograph type	=	Rational	Peak discharge	=	12.76 cfs
Storm frequency	=	10 yrs	Time to peak	=	0.18 hrs
Time interval	=	1 min	Hyd. volume	=	8,421 cuft
Drainage area	=	7.170 ac	Runoff coeff.	=	0.3
Intensity	=	5.932 in/hr	Tc by User	=	11.00 min
IDF Curve	=	Lansing, Kansas - With K-Value 2025.IDF	Asc/Rec limb fact	=	1/1

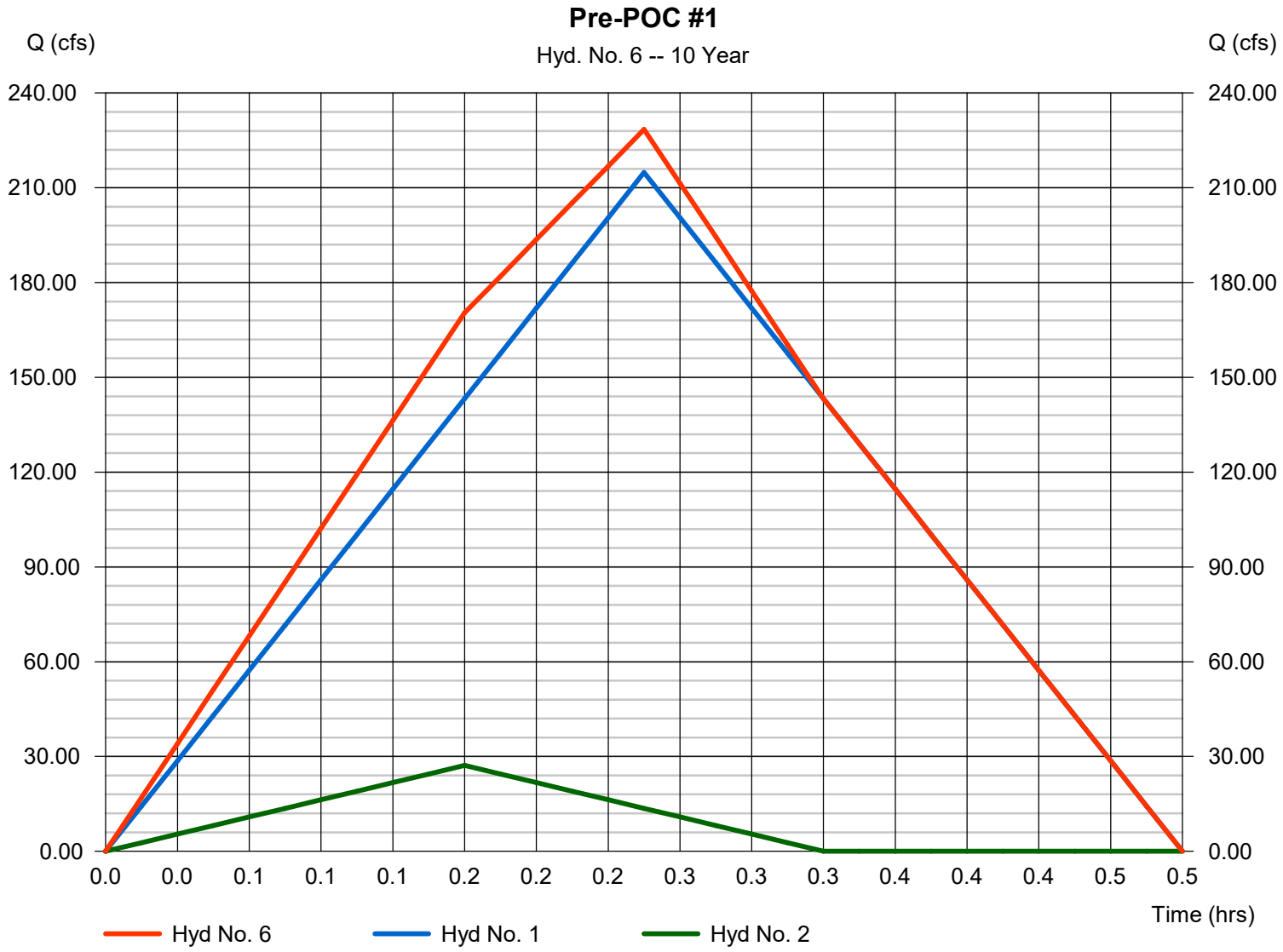


Hydrograph Report

Hyd. No. 6

Pre-POC #1

Hydrograph type	= Combine	Peak discharge	= 228.47 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 209,696 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 107.890 ac

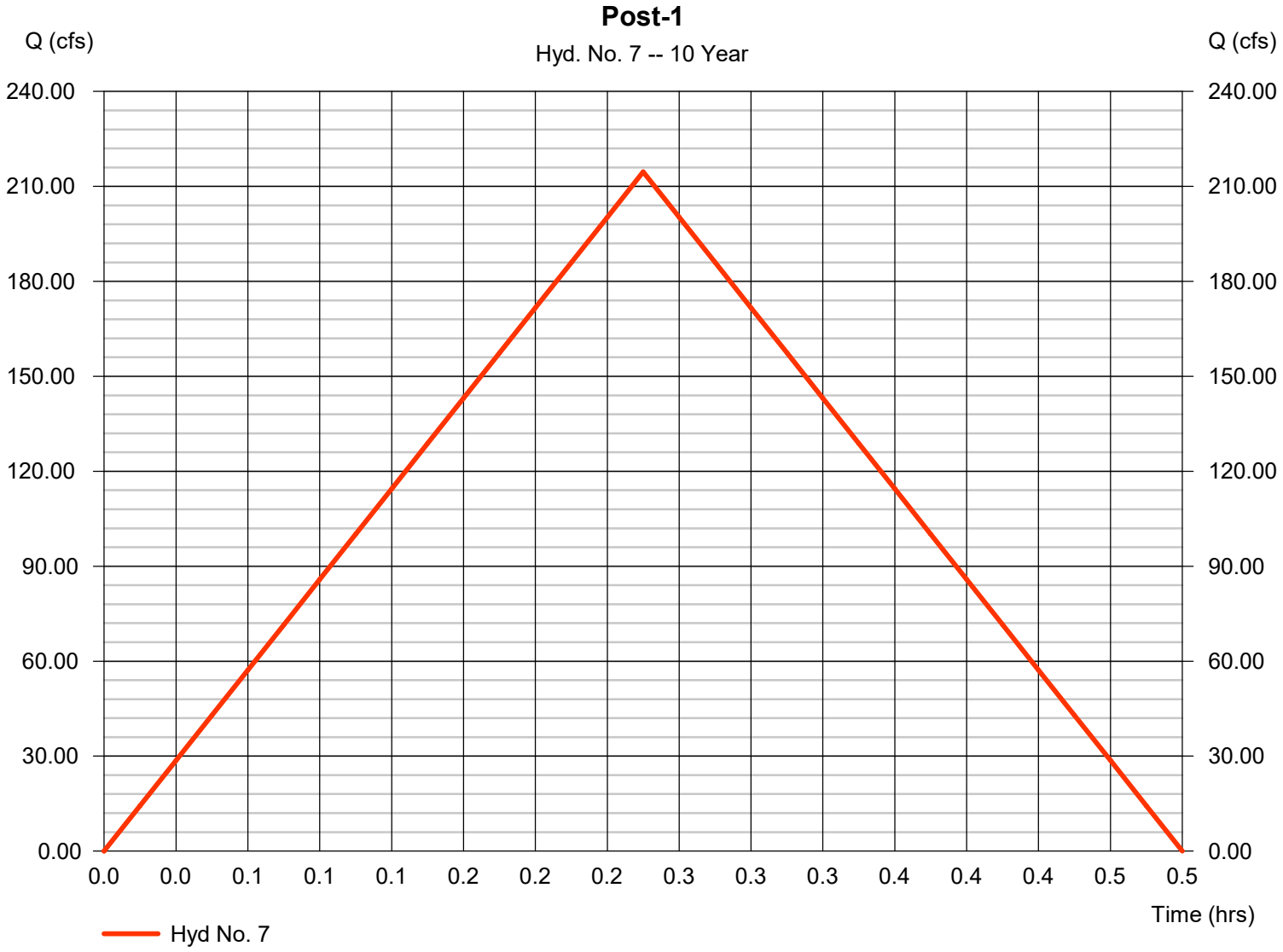


Hydrograph Report

Hyd. No. 7

Post-1

Hydrograph type	=	Rational	Peak discharge	=	214.60 cfs
Storm frequency	=	10 yrs	Time to peak	=	0.25 hrs
Time interval	=	1 min	Hyd. volume	=	193,143 cuft
Drainage area	=	93.640 ac	Runoff coeff.	=	0.45
Intensity	=	5.093 in/hr	Tc by User	=	15.00 min
IDF Curve	=	Lansing, Kansas - With K-Value.idf	Asc/Rec limb fact	=	1/1

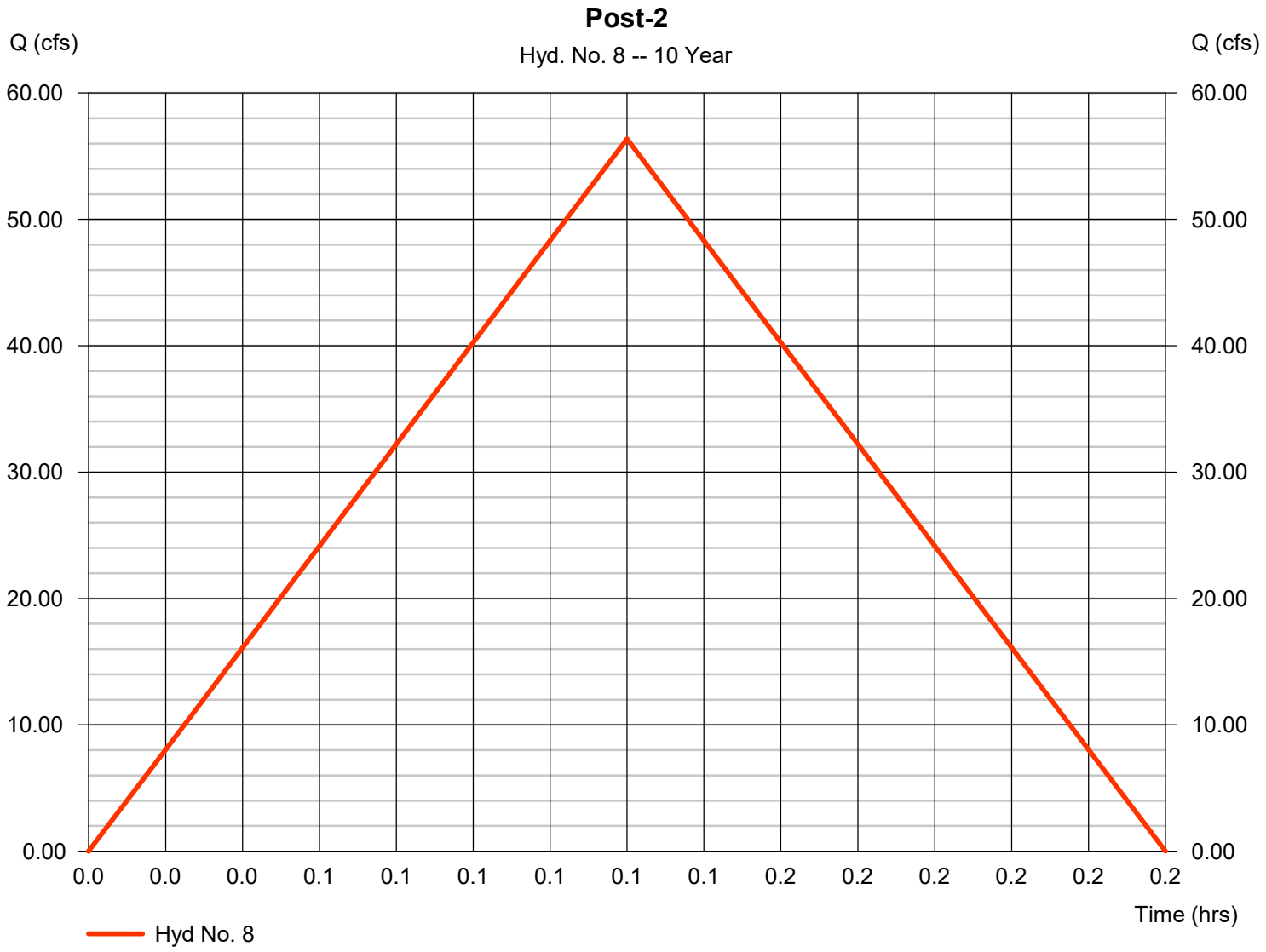


Hydrograph Report

Hyd. No. 8

Post-2

Hydrograph type	=	Rational	Peak discharge	=	56.37 cfs
Storm frequency	=	10 yrs	Time to peak	=	0.12 hrs
Time interval	=	1 min	Hyd. volume	=	23,675 cuft
Drainage area	=	14.360 ac	Runoff coeff.	=	0.54
Intensity	=	7.269 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Lansing, Kansas - With K-Value 2025.IDF	Asc/Rec limb fact	=	1/1

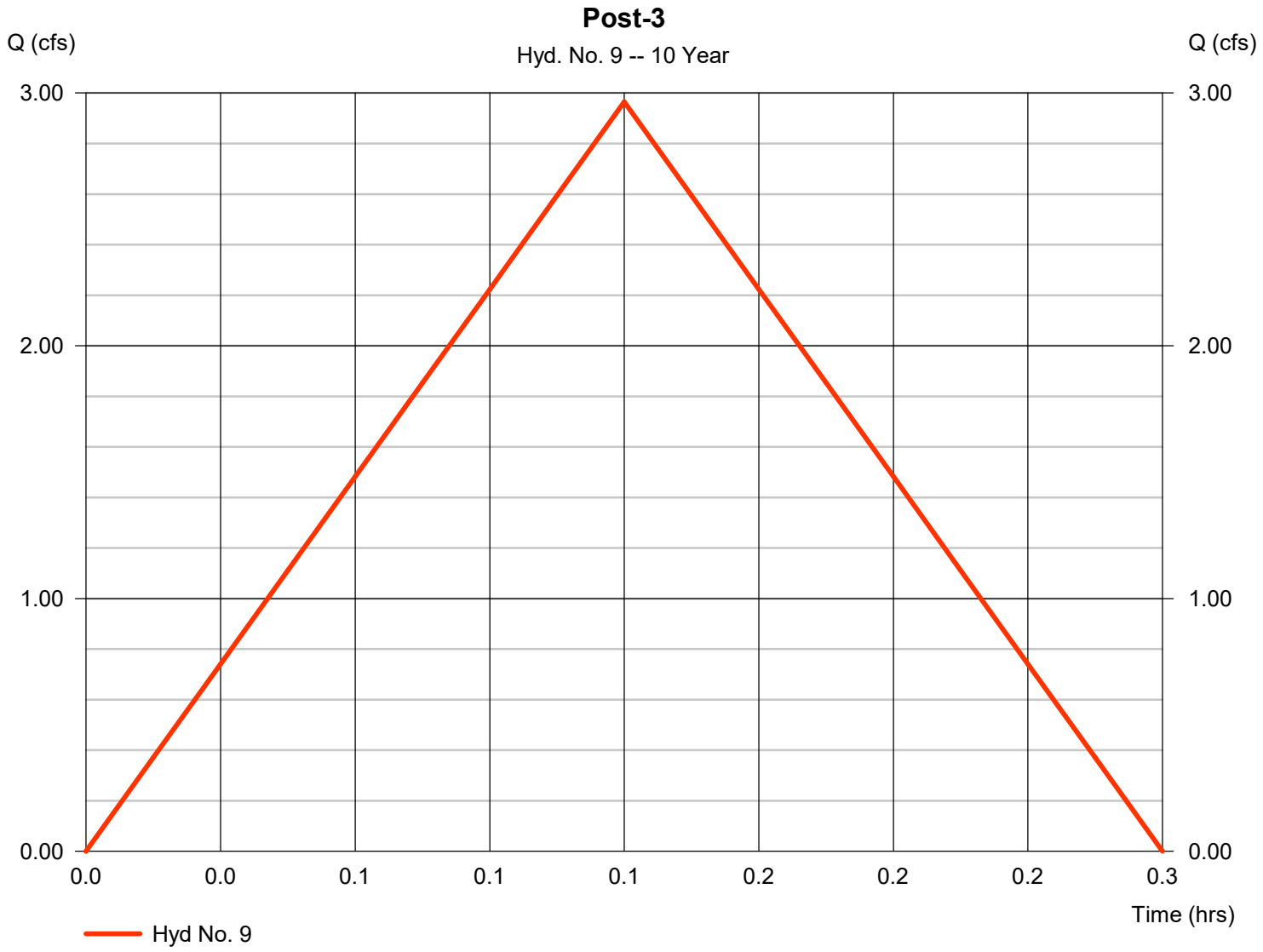


Hydrograph Report

Hyd. No. 9

Post-3

Hydrograph type	=	Rational	Peak discharge	=	2.965 cfs
Storm frequency	=	10 yrs	Time to peak	=	0.13 hrs
Time interval	=	1 min	Hyd. volume	=	1,423 cuft
Drainage area	=	0.800 ac	Runoff coeff.	=	0.54
Intensity	=	6.863 in/hr	Tc by User	=	8.00 min
IDF Curve	=	Lansing, Kansas - With K-Values 2025.IDF	Asc/Rec limb fact	=	1/1



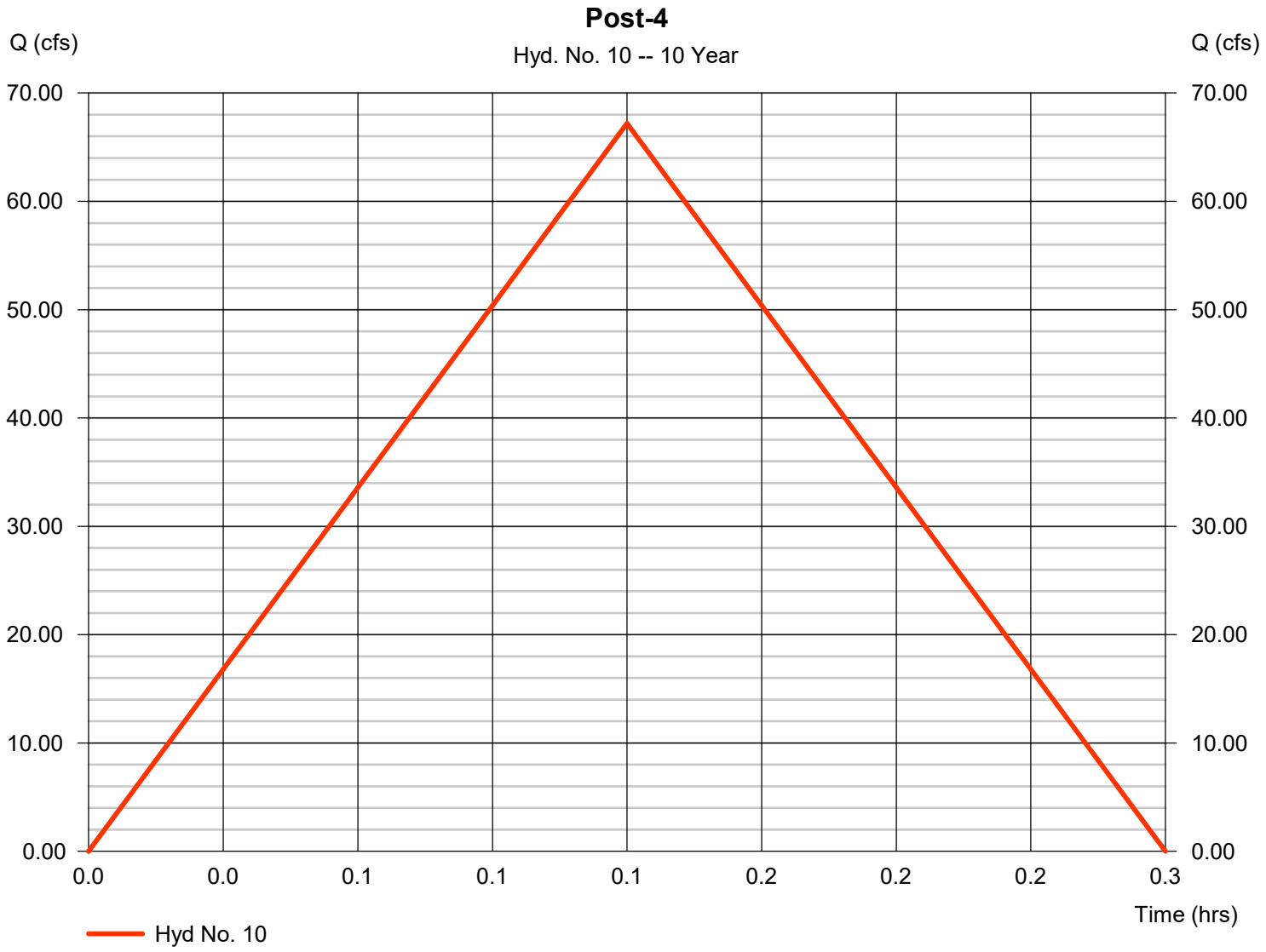
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025 Wednesday, 06 / 11 / 2025

Hyd. No. 10

Post-4

Hydrograph type	=	Rational	Peak discharge	=	67.19 cfs
Storm frequency	=	10 yrs	Time to peak	=	0.13 hrs
Time interval	=	1 min	Hyd. volume	=	32,252 cuft
Drainage area	=	18.130 ac	Runoff coeff.	=	0.54
Intensity	=	6.863 in/hr	Tc by User	=	8.00 min
IDF Curve	=	Lansing, Kansas - With K-Value.idf	Asc/Rise/Clmb fact	=	1/1



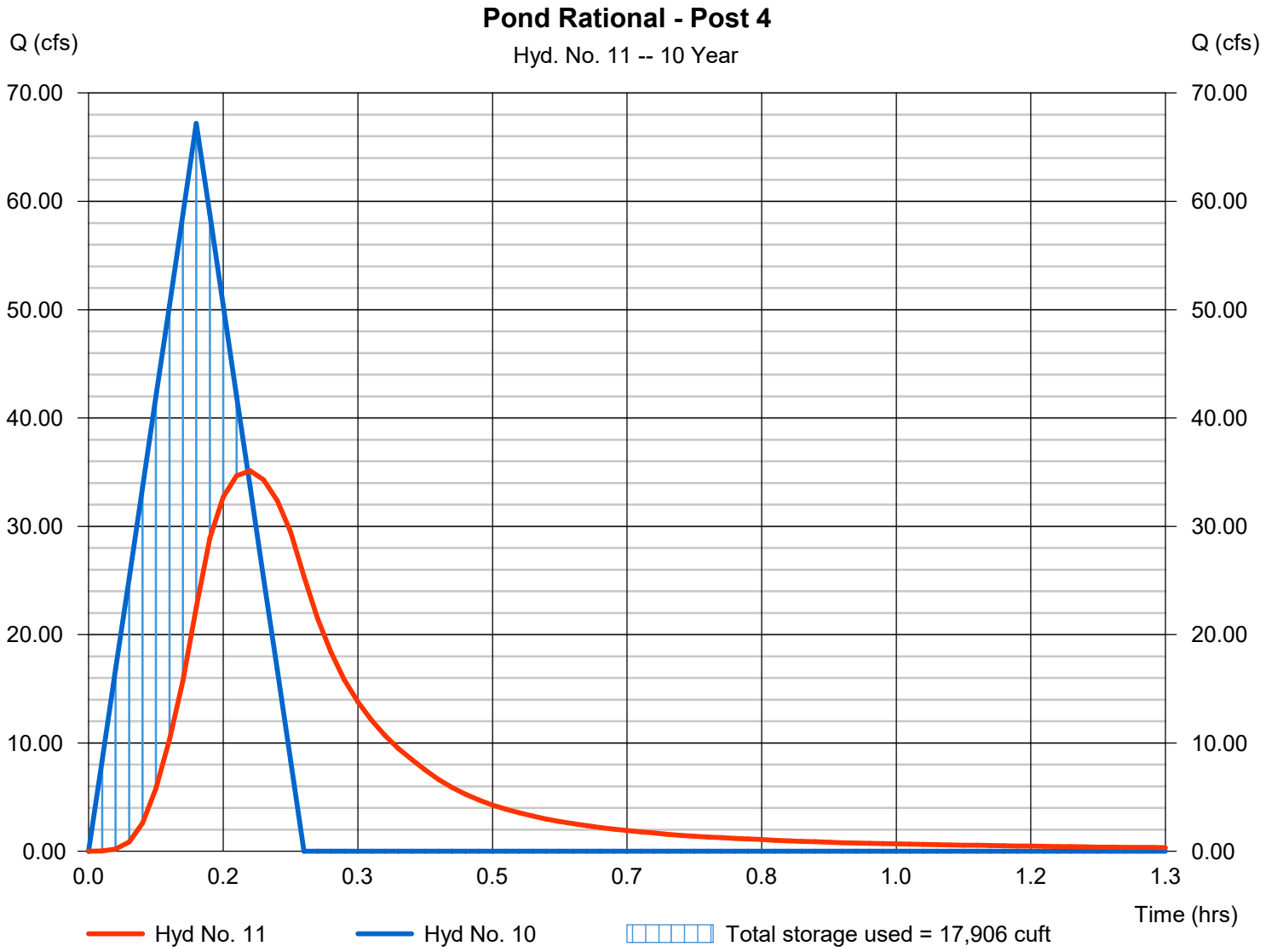
Hydrograph Report

Hyd. No. 11

Pond Rational - Post 4

Hydrograph type	=	Reservoir	Peak discharge	=	35.13 cfs
Storm frequency	=	10 yrs	Time to peak	=	0.20 hrs
Time interval	=	1 min	Hyd. volume	=	32,244 cuft
Inflow hyd. No.	=	10 - Post-4	Max. Elevation	=	869.18 ft
Reservoir name	=	Small Pond	Max. Storage	=	17,906 cuft

Storage Indication method used.

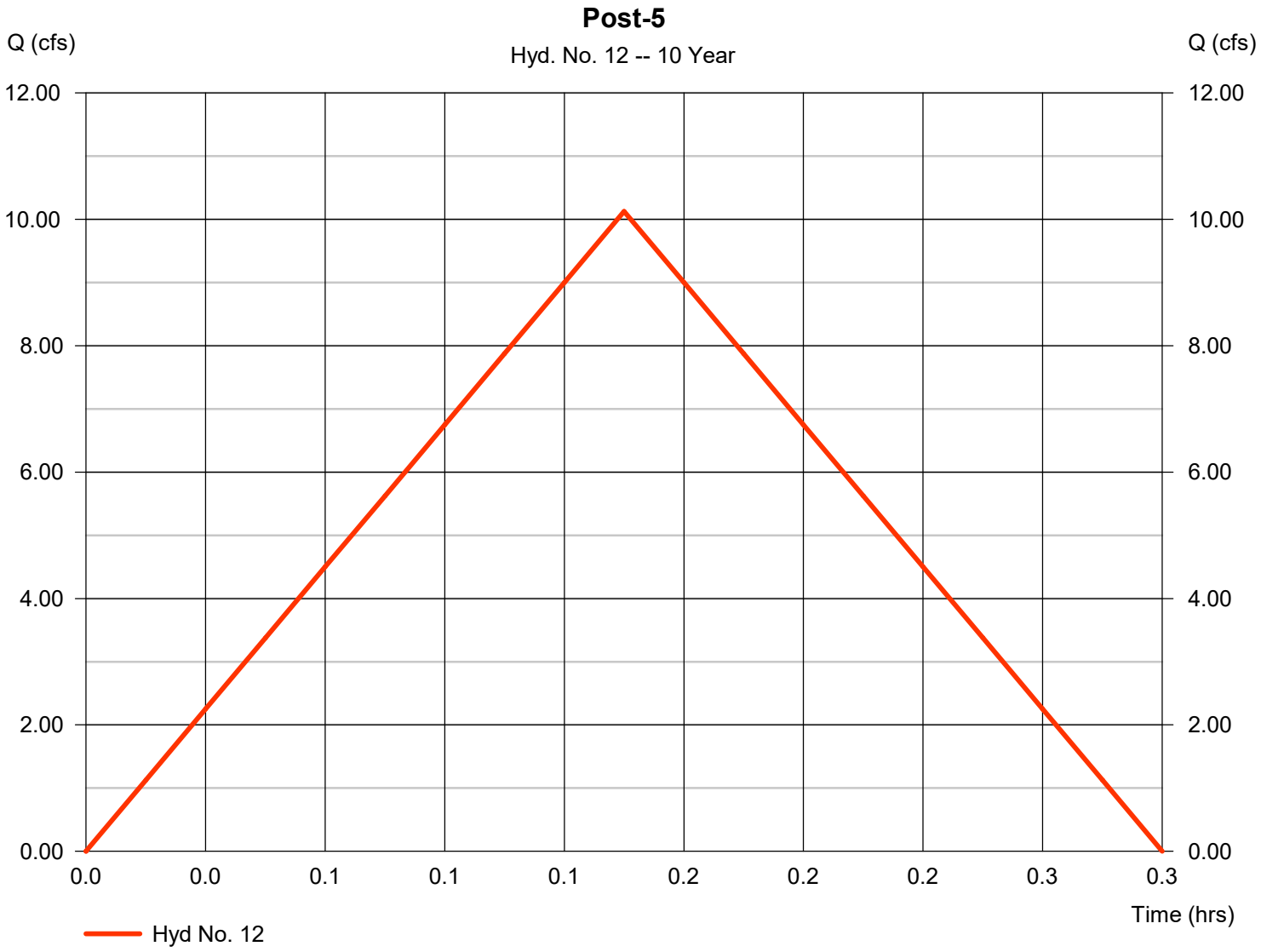


Hydrograph Report

Hyd. No. 12

Post-5

Hydrograph type	=	Rational	Peak discharge	=	10.13 cfs
Storm frequency	=	10 yrs	Time to peak	=	0.15 hrs
Time interval	=	1 min	Hyd. volume	=	5,469 cuft
Drainage area	=	2.880 ac	Runoff coeff.	=	0.54
Intensity	=	6.512 in/hr	Tc by User	=	9.00 min
IDF Curve	=	Lansing, Kansas - With K-Value 2025.IDF	Asc/Rec limb fact	=	1/1

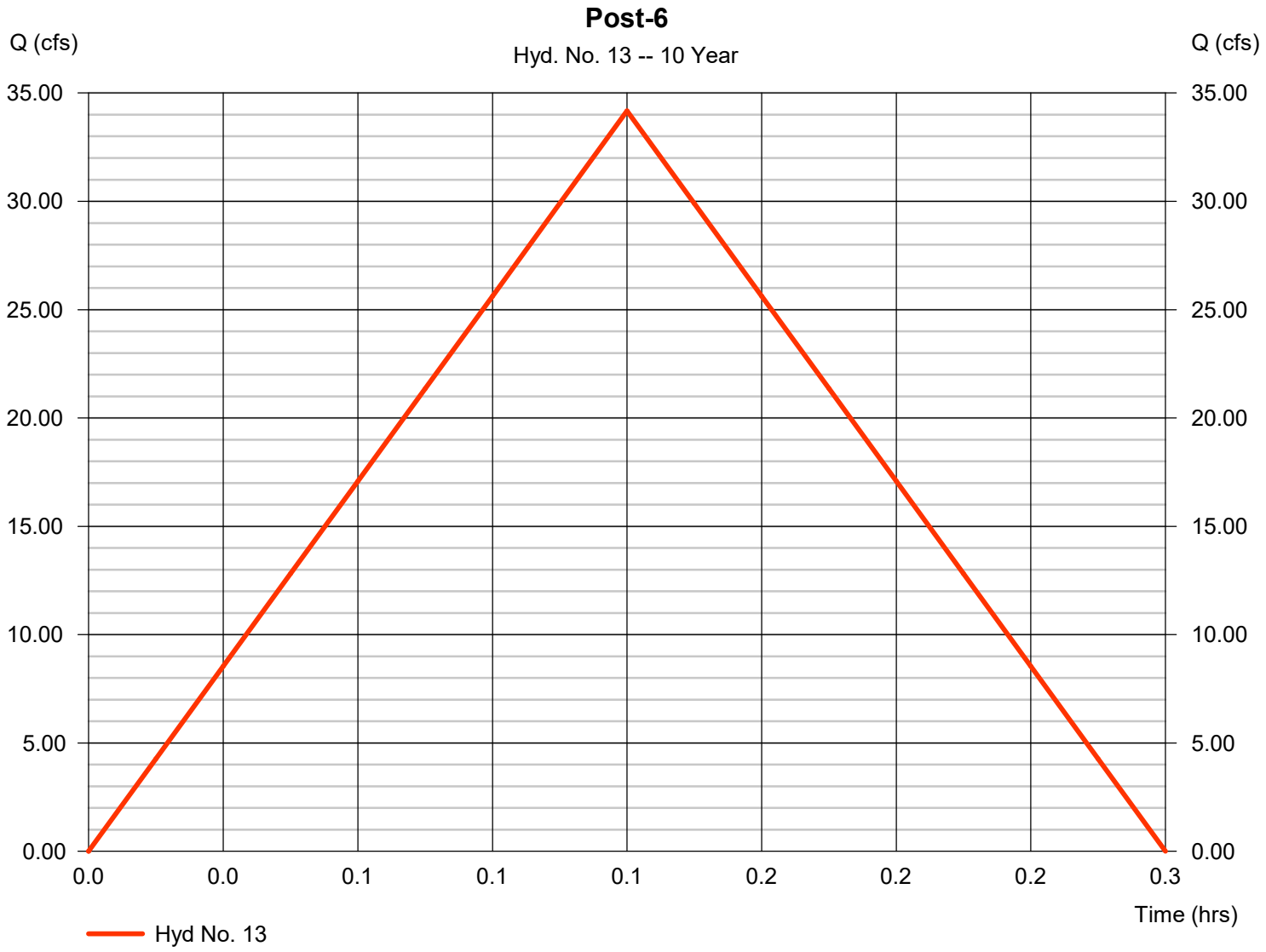


Hydrograph Report

Hyd. No. 13

Post-6

Hydrograph type	=	Rational	Peak discharge	=	34.17 cfs
Storm frequency	=	10 yrs	Time to peak	=	0.13 hrs
Time interval	=	1 min	Hyd. volume	=	16,402 cuft
Drainage area	=	9.220 ac	Runoff coeff.	=	0.54
Intensity	=	6.863 in/hr	Tc by User	=	8.00 min
IDF Curve	=	Lansing, Kansas - With K-Value 2025.IDF	Asc/Rise/Climb fact	=	1/1

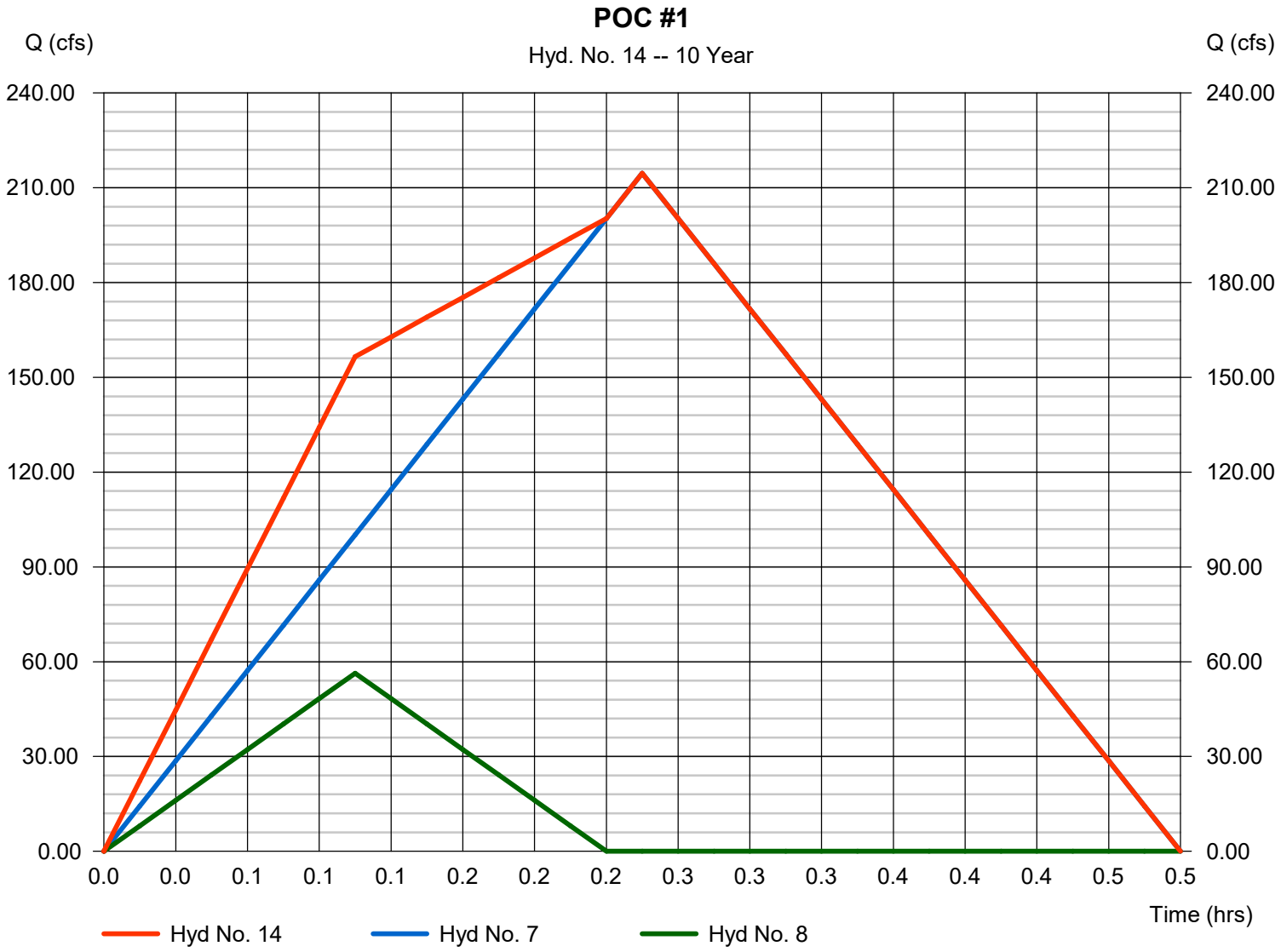


Hydrograph Report

Hyd. No. 14

POC #1

Hydrograph type	= Combine	Peak discharge	= 214.60 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 216,817 cuft
Inflow hyds.	= 7, 8	Contrib. drain. area	= 108.000 ac

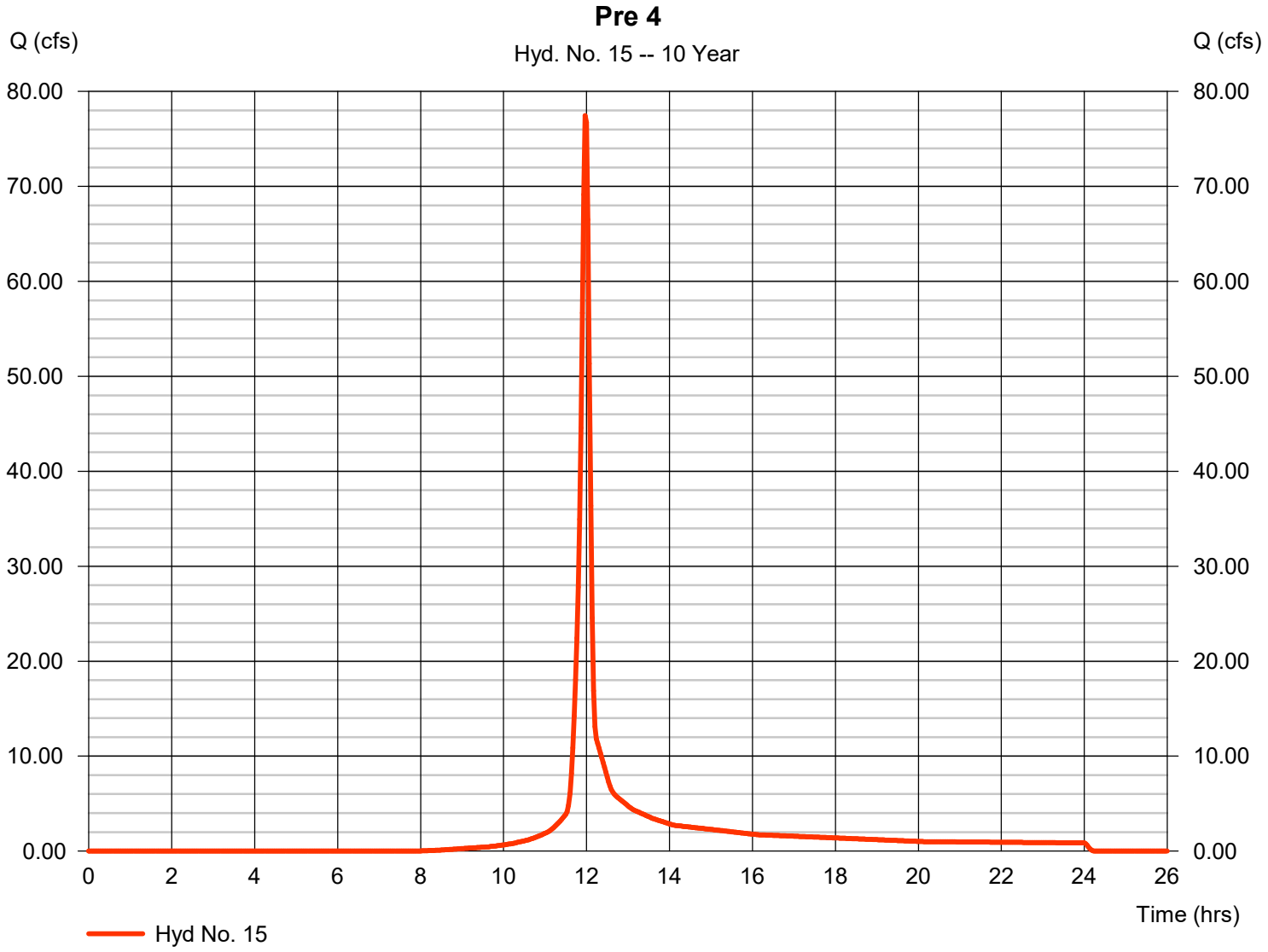


Hydrograph Report

Hyd. No. 15

Pre 4

Hydrograph type	= SCS Runoff	Peak discharge	= 77.46 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 177,298 cuft
Drainage area	= 22.400 ac	Curve number	= 81
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.88 min
Total precip.	= 4.07 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

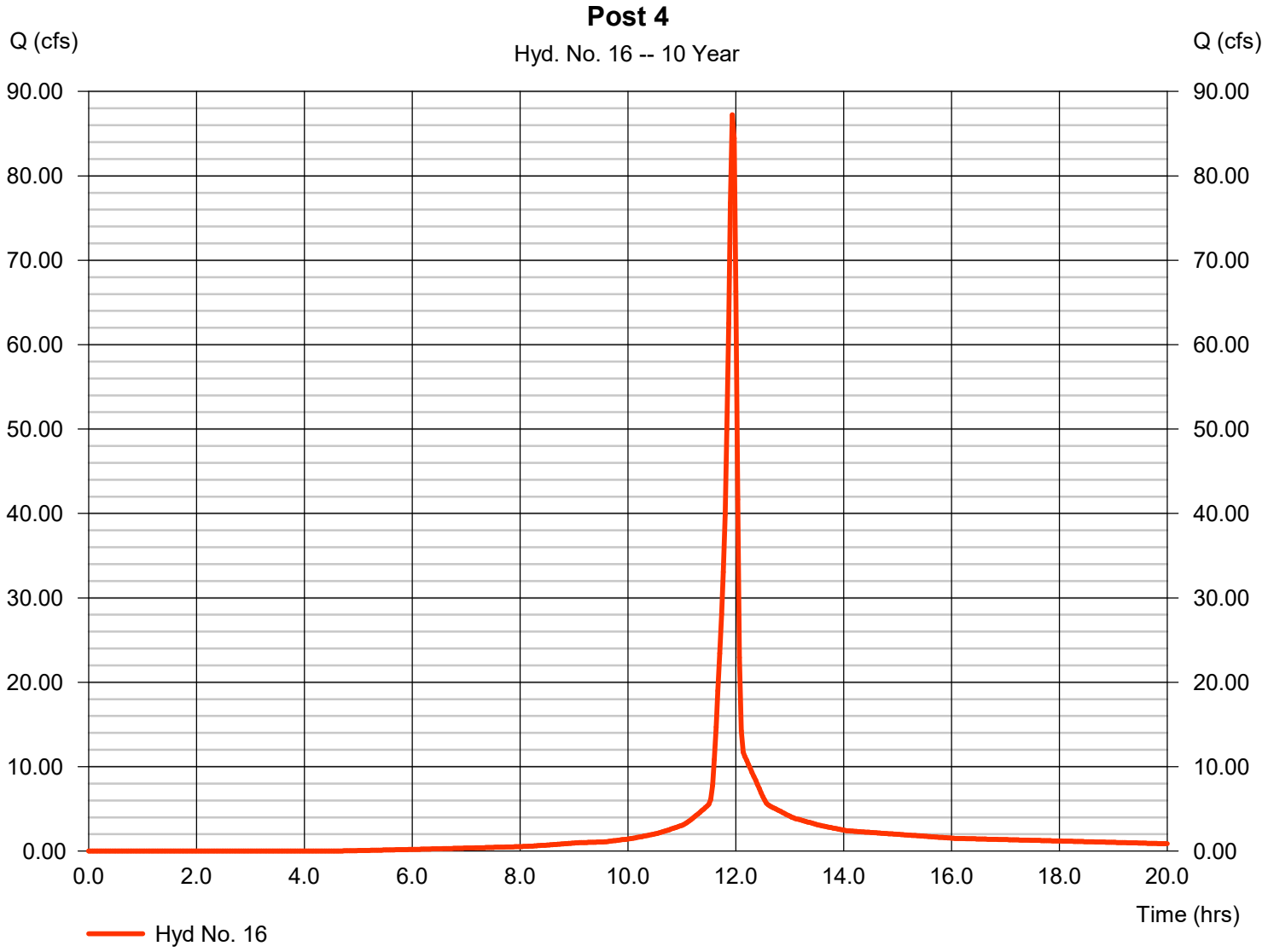


Hydrograph Report

Hyd. No. 16

Post 4

Hydrograph type	=	SCS Runoff	Peak discharge	=	87.23 cfs
Storm frequency	=	10 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	184,209 cuft
Drainage area	=	18.130 ac	Curve number	=	90
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	4.82 min
Total precip.	=	4.07 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



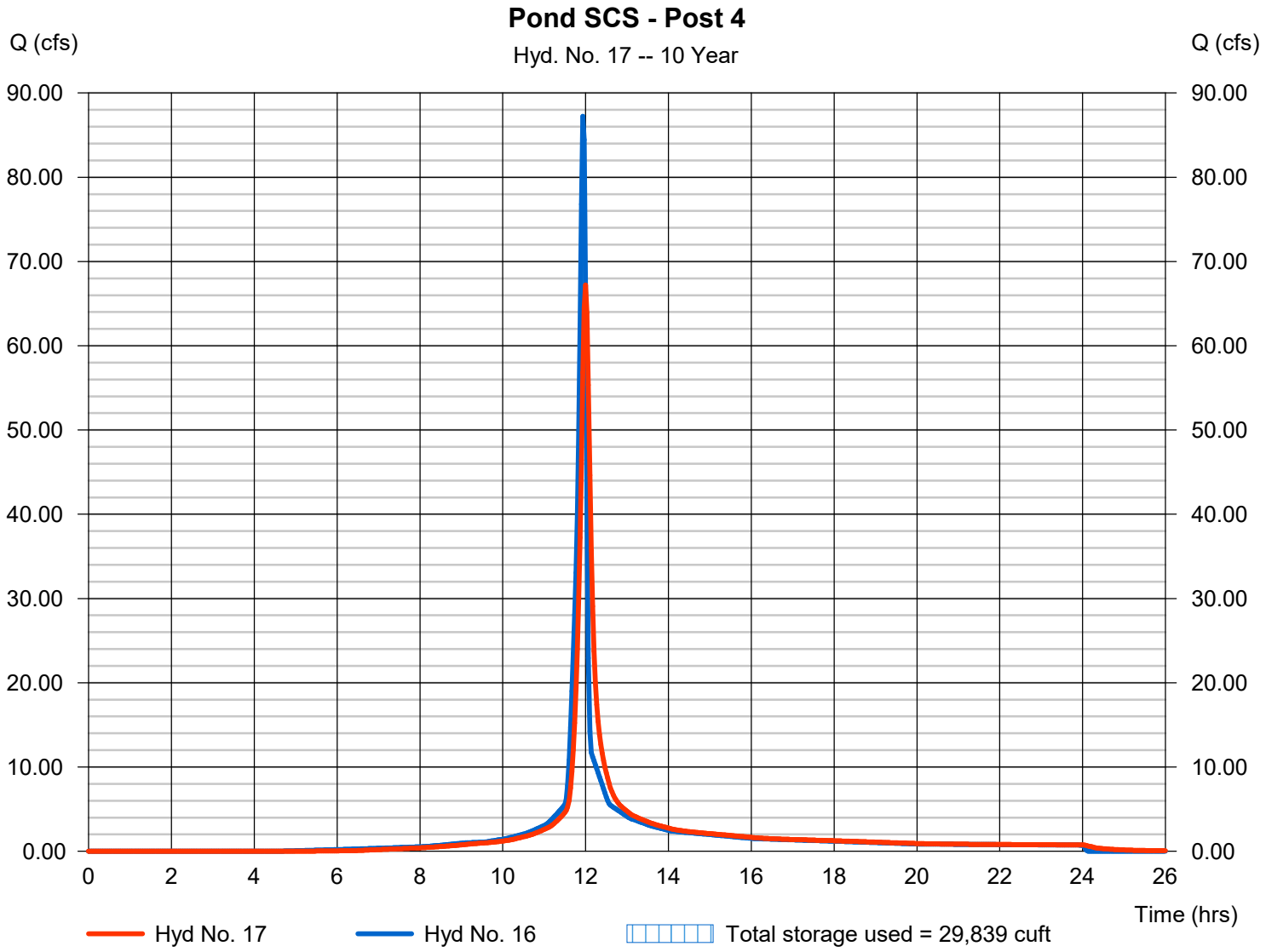
Hydrograph Report

Hyd. No. 17

Pond SCS - Post 4

Hydrograph type	= Reservoir	Peak discharge	= 67.23 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 184,201 cuft
Inflow hyd. No.	= 16 - Post 4	Max. Elevation	= 870.25 ft
Reservoir name	= Small Pond	Max. Storage	= 29,839 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025

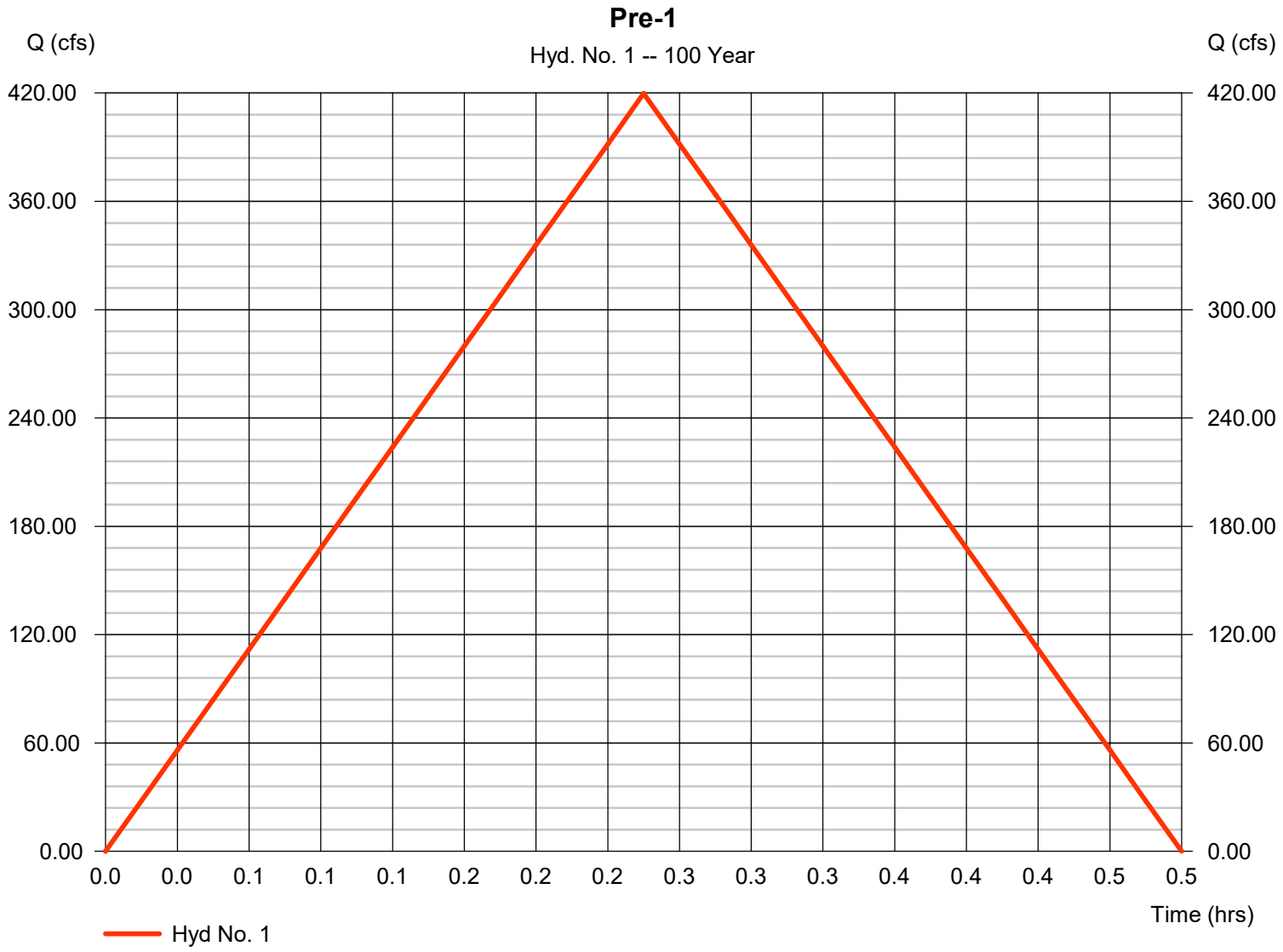
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	419.75	1	15	377,779	------	------	------	Pre-1
2	Rational	52.99	1	10	31,792	------	------	------	Pre-2
3	Rational	5.449	1	11	3,597	------	------	------	Pre-3
4	Rational	77.75	1	11	51,315	------	------	------	Pre-4
5	Rational	24.89	1	11	16,425	------	------	------	Pre-5
6	Combine	446.25	1	15	409,571	1, 2,	------	------	Pre-POC #1
7	Rational	419.22	1	15	377,296	------	------	------	Post-1
8	Rational	109.81	1	7	46,122	------	------	------	Post-2
9	Rational	5.777	1	8	2,773	------	------	------	Post-3
10	Rational	130.93	1	8	62,846	------	------	------	Post-4
11	Reservoir	71.68	1	12	62,838	10	870.41	31,767	Pond Rational - Post 4
12	Rational	19.74	1	9	10,659	------	------	------	Post-5
13	Rational	66.58	1	8	31,960	------	------	------	Post-6
14	Combine	419.22	1	15	423,418	7, 8,	------	------	POC #1
15	SCS Runoff	152.50	2	718	355,309	------	------	------	Pre 4
16	SCS Runoff	151.04	2	716	330,895	------	------	------	Post 4
17	Reservoir	103.24	2	720	330,887	16	871.91	52,429	Pond SCS - Post 4

Hydrograph Report

Hyd. No. 1

Pre-1

Hydrograph type	=	Rational	Peak discharge	=	419.75 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.25 hrs
Time interval	=	1 min	Hyd. volume	=	377,779 cuft
Drainage area	=	93.760 ac	Runoff coeff.	=	0.45
Intensity	=	9.949 in/hr	Tc by User	=	15.00 min
IDF Curve	=	Lansing, Kansas - With K-Values 2025.IDF	Asc/Rec limb fact	=	1/1

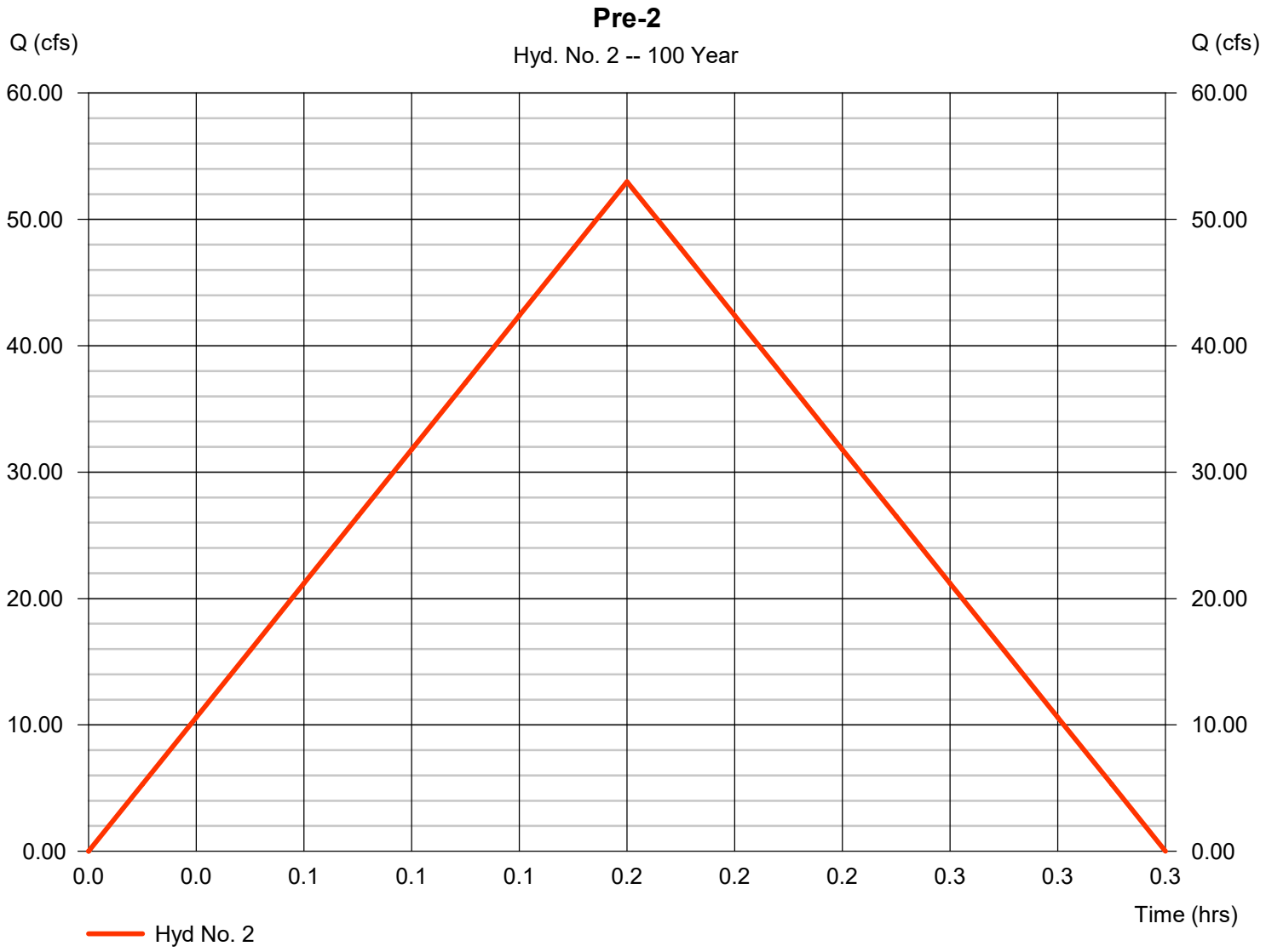


Hydrograph Report

Hyd. No. 2

Pre-2

Hydrograph type	=	Rational	Peak discharge	=	52.99 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.17 hrs
Time interval	=	1 min	Hyd. volume	=	31,792 cuft
Drainage area	=	14.130 ac	Runoff coeff.	=	0.31
Intensity	=	12.097 in/hr	Tc by User	=	10.00 min
IDF Curve	=	Lansing, Kansas - With K-Values 2025.IDF	Asc/Rec limb fact	=	1/1

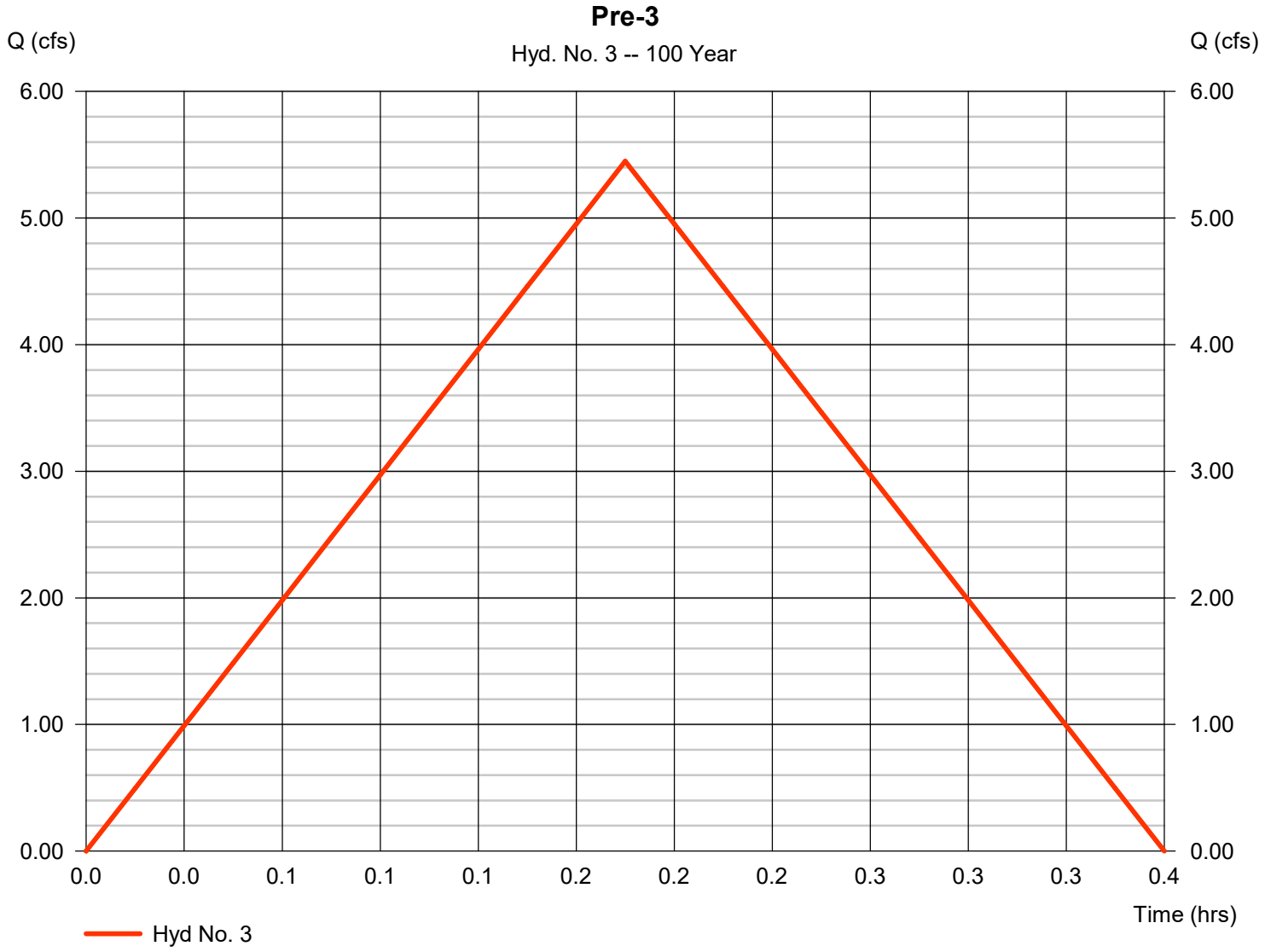


Hydrograph Report

Hyd. No. 3

Pre-3

Hydrograph type	=	Rational	Peak discharge	=	5.449 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.18 hrs
Time interval	=	1 min	Hyd. volume	=	3,597 cuft
Drainage area	=	1.570 ac	Runoff coeff.	=	0.3
Intensity	=	11.570 in/hr	Tc by User	=	11.00 min
IDF Curve	=	Lansing, Kansas - With K-Values 2025.IDF	Asc/Rise/Dur fact	=	1/1

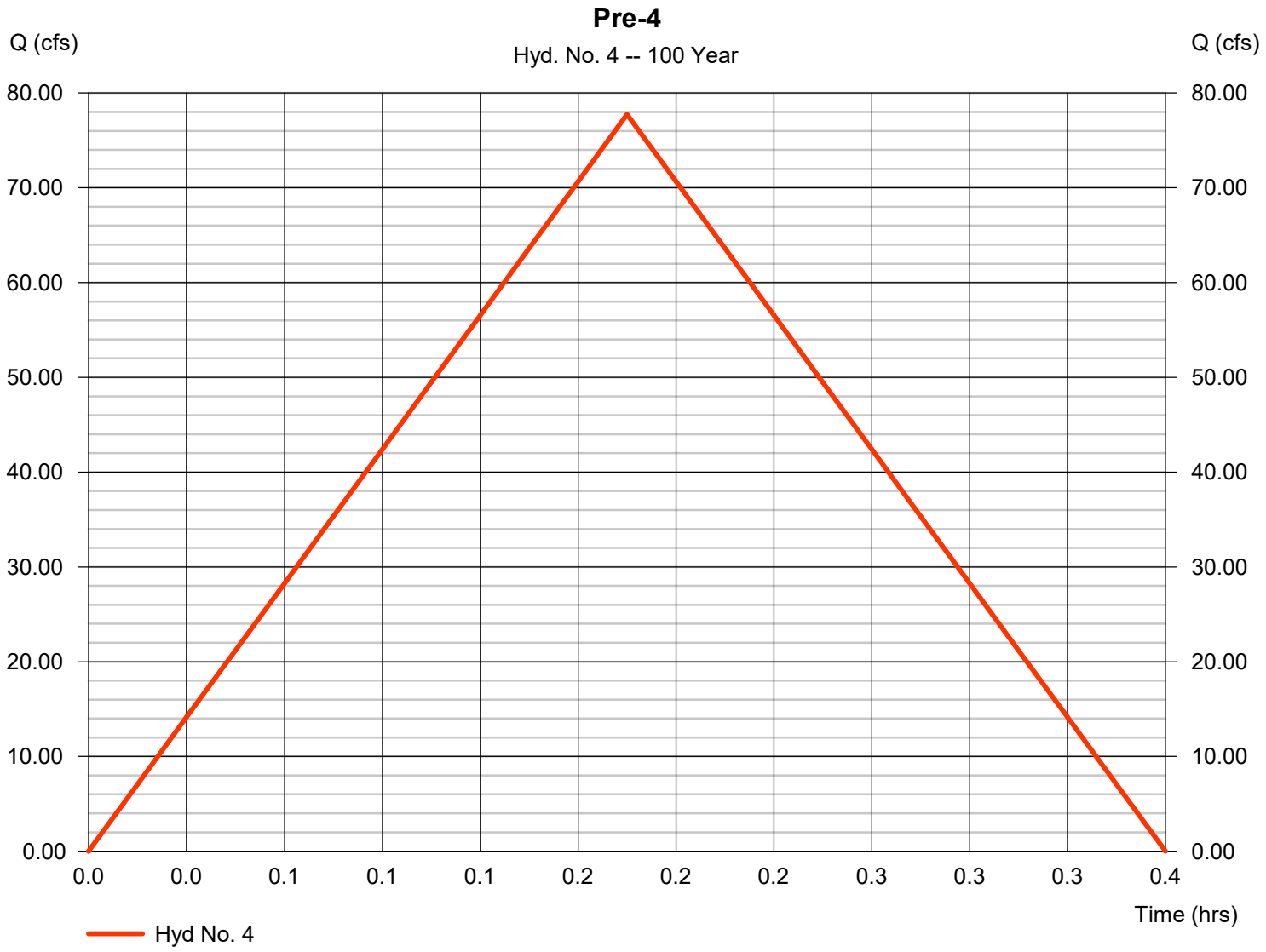


Hydrograph Report

Hyd. No. 4

Pre-4

Hydrograph type	=	Rational	Peak discharge	=	77.75 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.18 hrs
Time interval	=	1 min	Hyd. volume	=	51,315 cuft
Drainage area	=	22.400 ac	Runoff coeff.	=	0.3
Intensity	=	11.570 in/hr	Tc by User	=	11.00 min
IDF Curve	=	Lansing, Kansas - With K-Values 2025.IDF	Asc/Rec limb fact	=	1/1

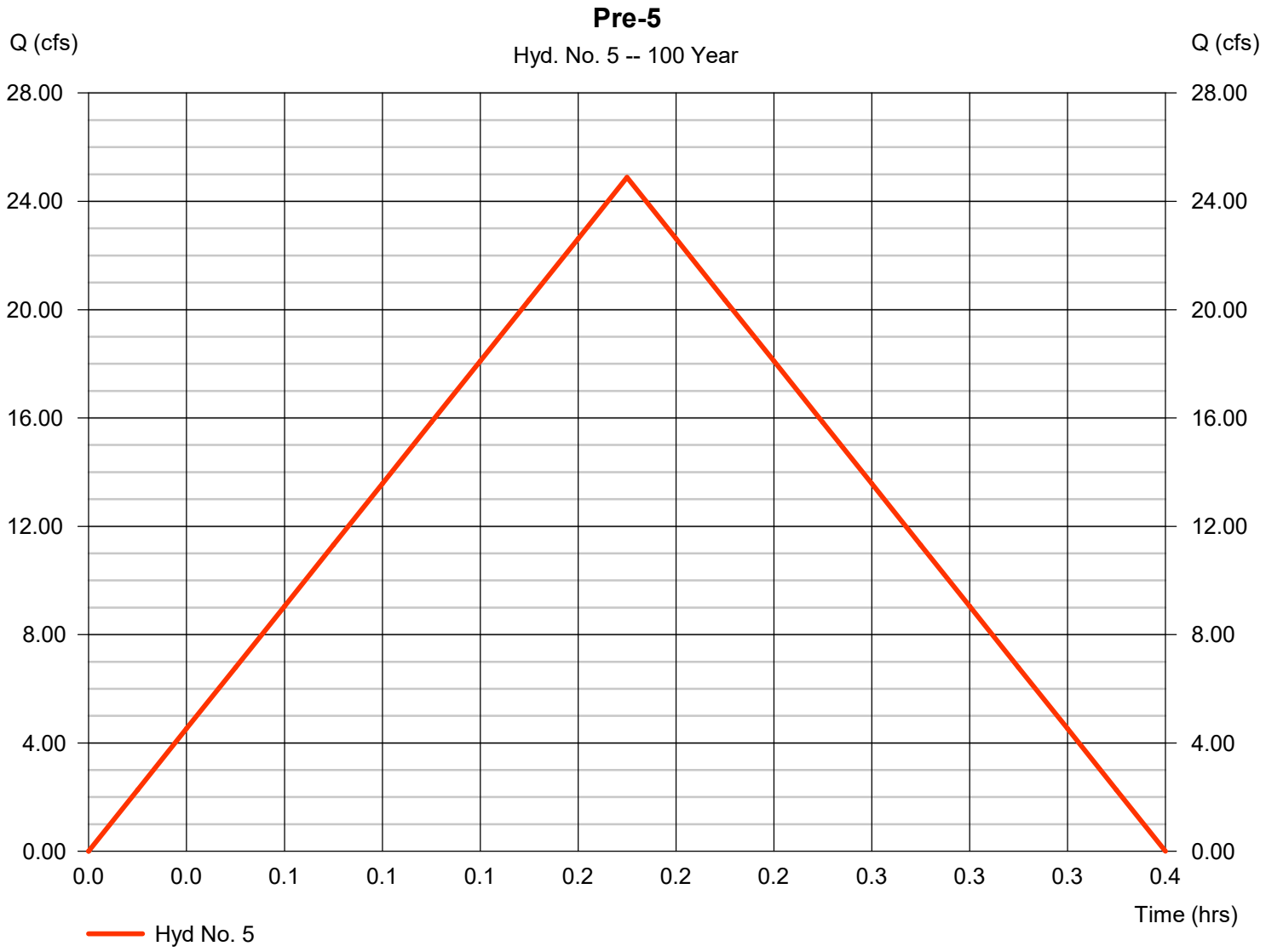


Hydrograph Report

Hyd. No. 5

Pre-5

Hydrograph type	=	Rational	Peak discharge	=	24.89 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.18 hrs
Time interval	=	1 min	Hyd. volume	=	16,425 cuft
Drainage area	=	7.170 ac	Runoff coeff.	=	0.3
Intensity	=	11.570 in/hr	Tc by User	=	11.00 min
IDF Curve	=	Lansing, Kansas - With K-Values 2025.IDF	Asc/Rise/Dip fact	=	1/1

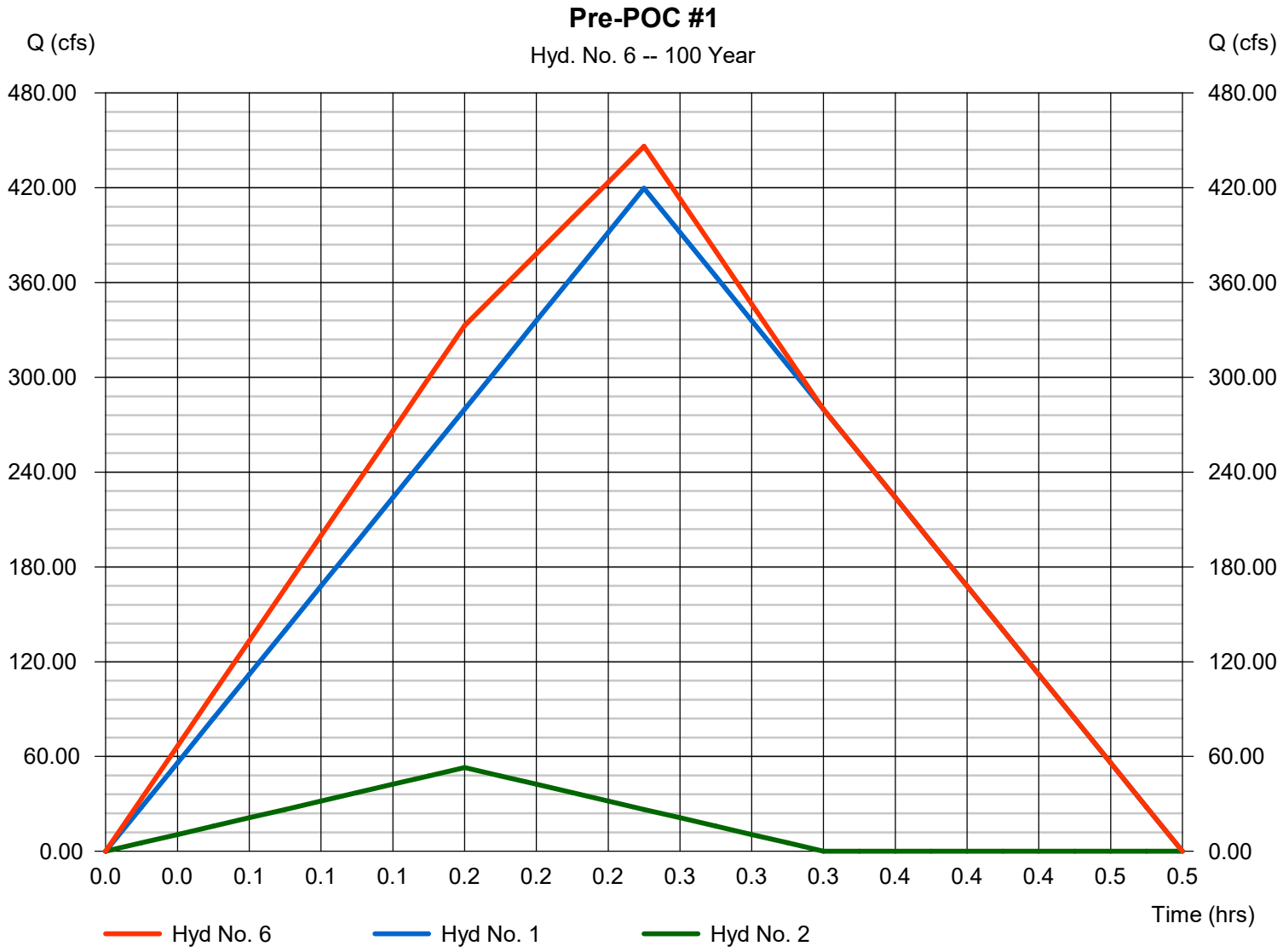


Hydrograph Report

Hyd. No. 6

Pre-POC #1

Hydrograph type	= Combine	Peak discharge	= 446.25 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 409,571 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 107.890 ac

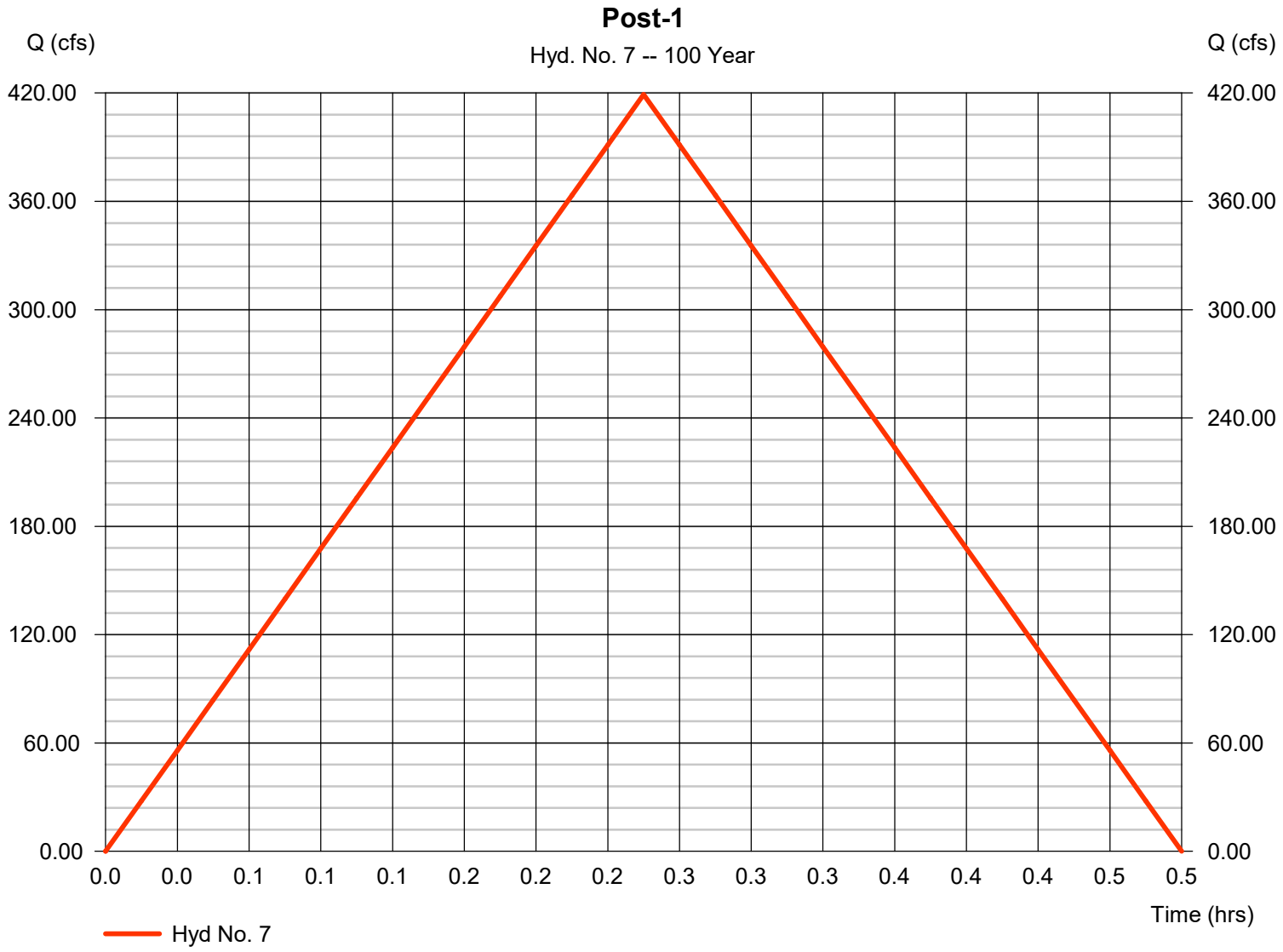


Hydrograph Report

Hyd. No. 7

Post-1

Hydrograph type	=	Rational	Peak discharge	=	419.22 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.25 hrs
Time interval	=	1 min	Hyd. volume	=	377,296 cuft
Drainage area	=	93.640 ac	Runoff coeff.	=	0.45
Intensity	=	9.949 in/hr	Tc by User	=	15.00 min
IDF Curve	=	Lansing, Kansas - With K-Values 2025.IDF	Asc/Rec limb fact	=	1/1



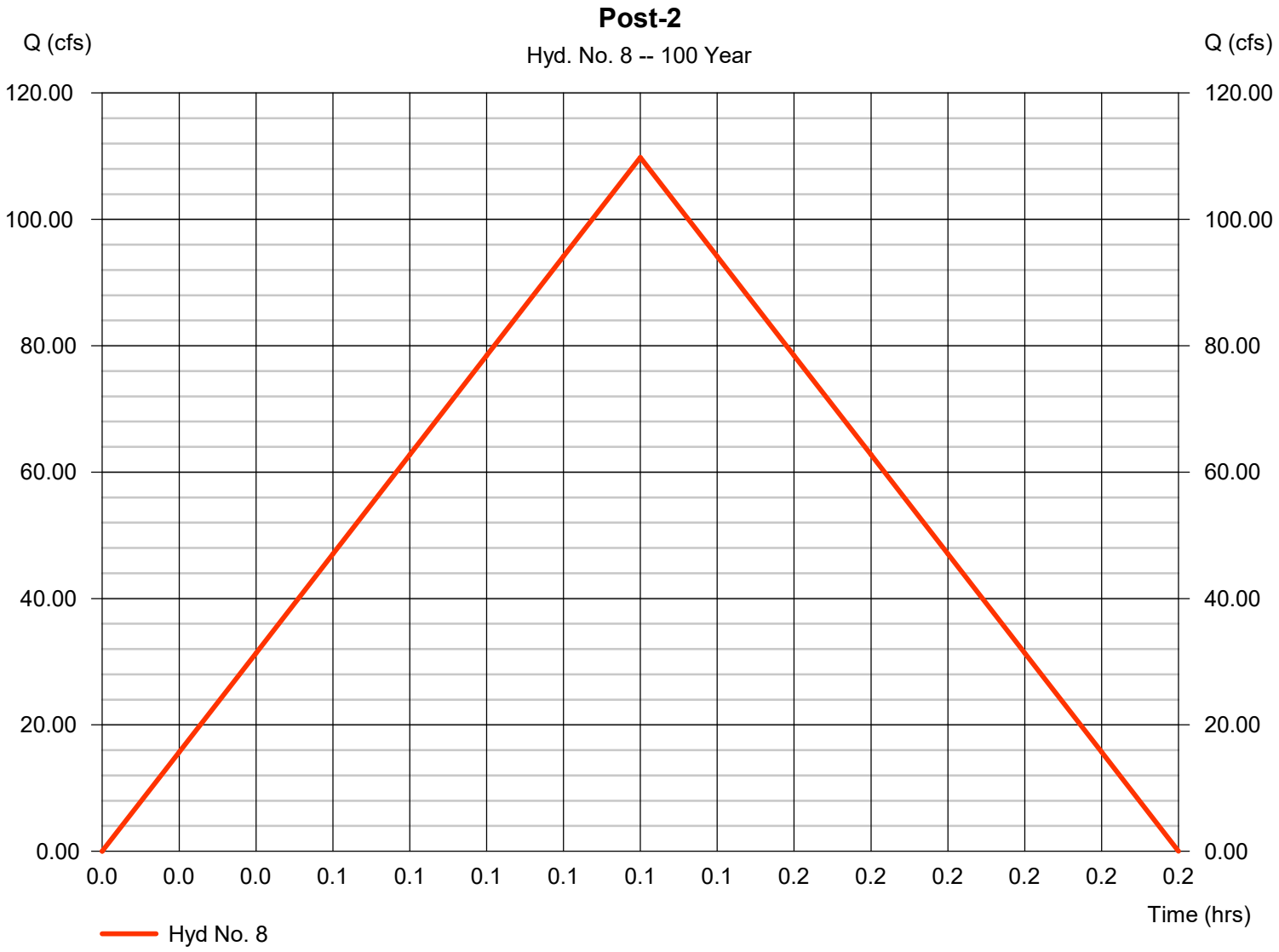
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025 Wednesday, 06 / 11 / 2025

Hyd. No. 8

Post-2

Hydrograph type	=	Rational	Peak discharge	=	109.81 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.12 hrs
Time interval	=	1 min	Hyd. volume	=	46,122 cuft
Drainage area	=	14.360 ac	Runoff coeff.	=	0.54
Intensity	=	14.161 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Lansing, Kansas - With K-Values 2025.IDF	Asc/Rec limb fact	=	1/1

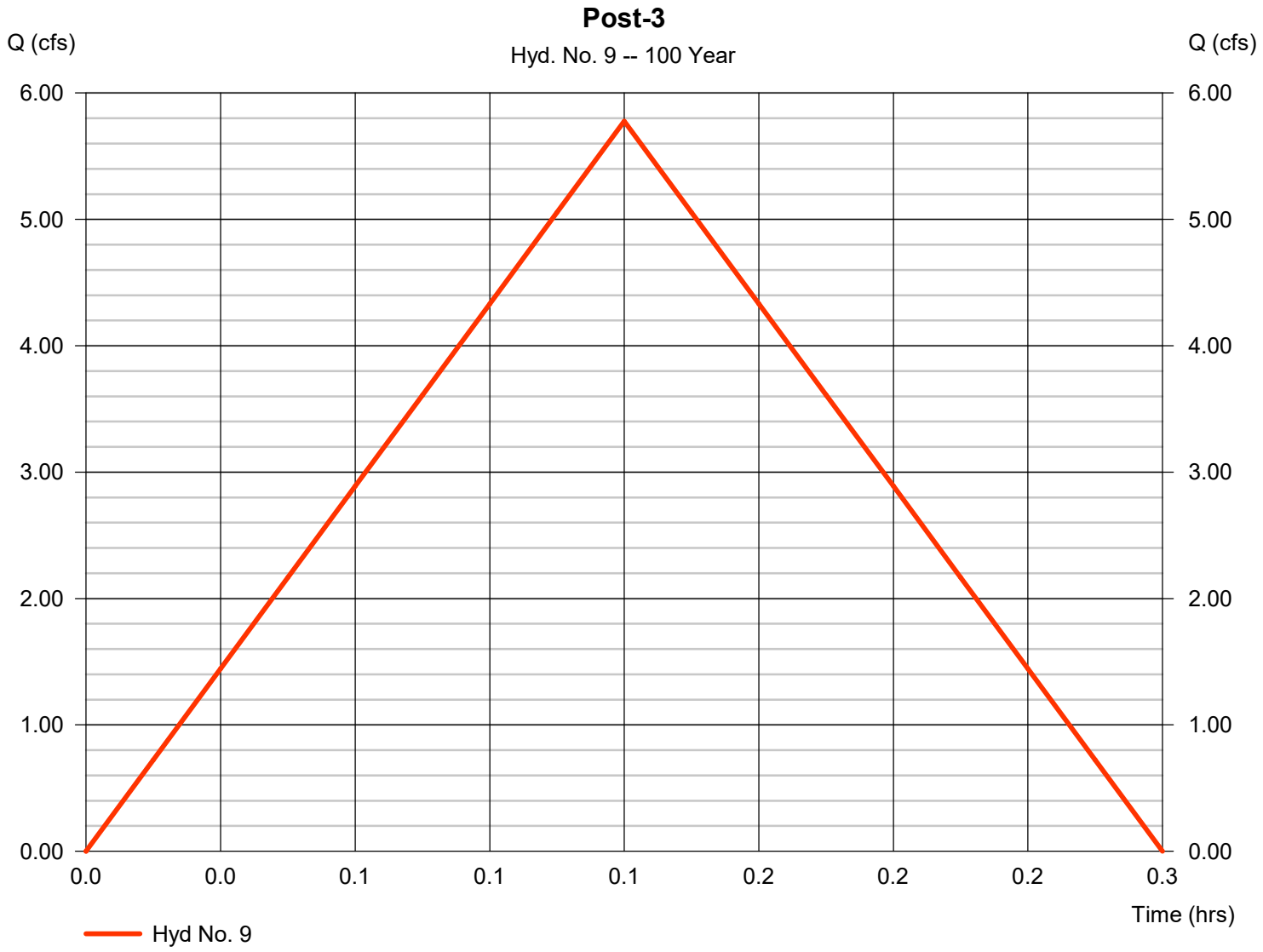


Hydrograph Report

Hyd. No. 9

Post-3

Hydrograph type	=	Rational	Peak discharge	=	5.777 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.13 hrs
Time interval	=	1 min	Hyd. volume	=	2,773 cuft
Drainage area	=	0.800 ac	Runoff coeff.	=	0.54
Intensity	=	13.373 in/hr	Tc by User	=	8.00 min
IDF Curve	=	Lansing, Kansas - With K-Values 2025.IDF	Asc/Rise/Clmb fact	=	1/1



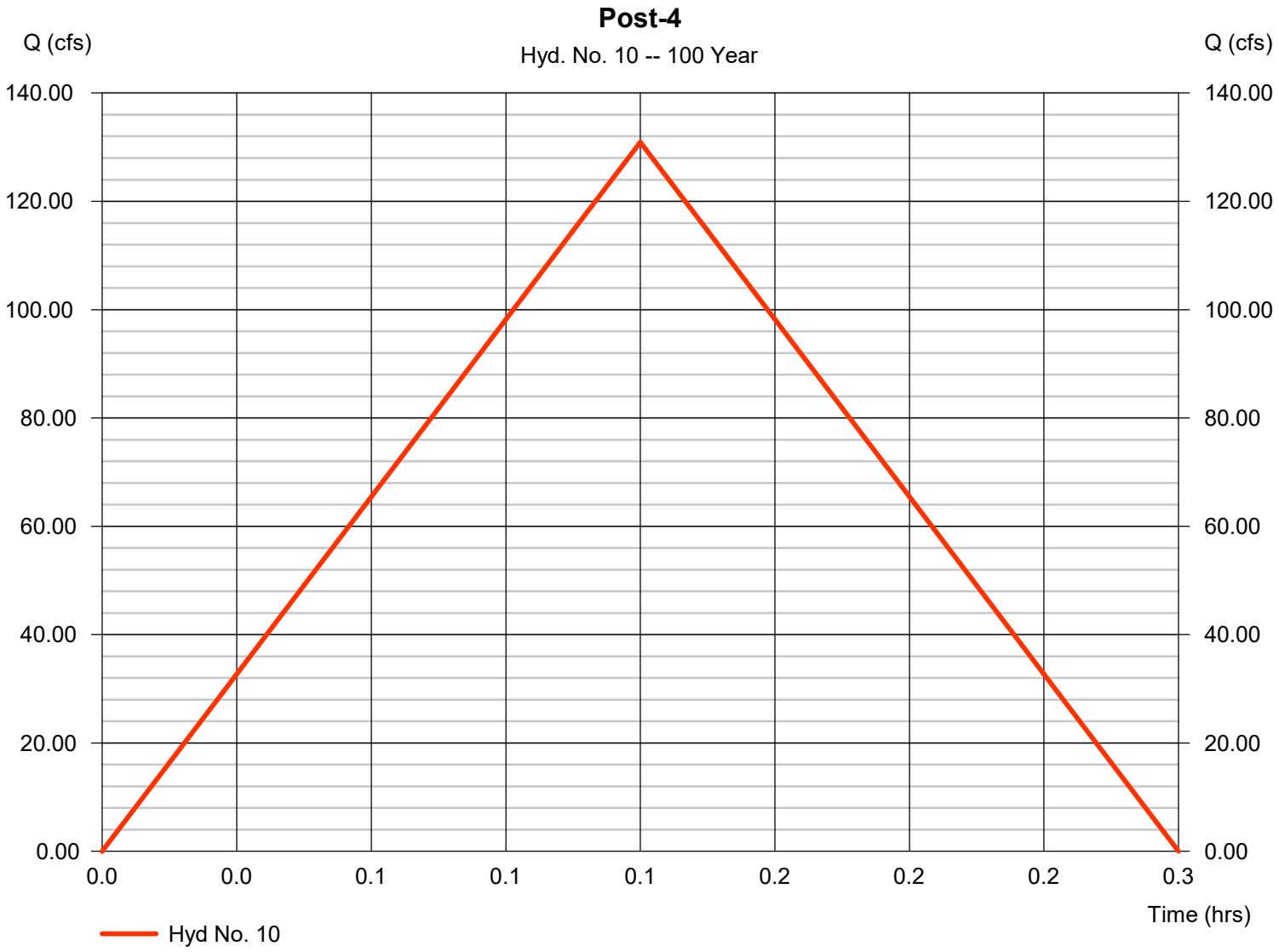
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025 Wednesday, 06 / 11 / 2025

Hyd. No. 10

Post-4

Hydrograph type	=	Rational	Peak discharge	=	130.93 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.13 hrs
Time interval	=	1 min	Hyd. volume	=	62,846 cuft
Drainage area	=	18.130 ac	Runoff coeff.	=	0.54
Intensity	=	13.373 in/hr	Tc by User	=	8.00 min
IDF Curve	=	Lansing, Kansas - With K-Values 2025.IDF	Asc/Rec limb fact	=	1/1



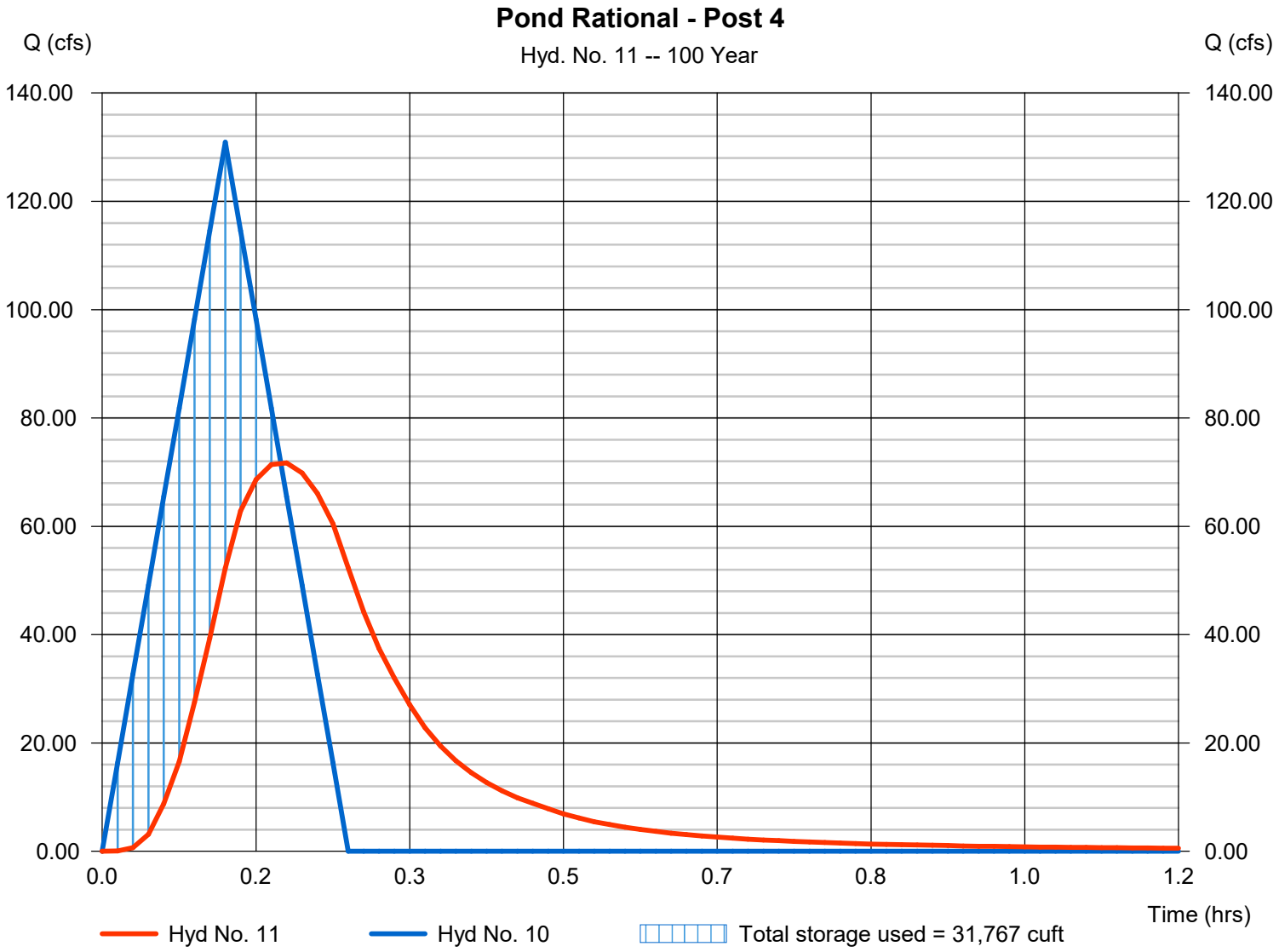
Hydrograph Report

Hyd. No. 11

Pond Rational - Post 4

Hydrograph type	=	Reservoir	Peak discharge	=	71.68 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.20 hrs
Time interval	=	1 min	Hyd. volume	=	62,838 cuft
Inflow hyd. No.	=	10 - Post-4	Max. Elevation	=	870.41 ft
Reservoir name	=	Small Pond	Max. Storage	=	31,767 cuft

Storage Indication method used.



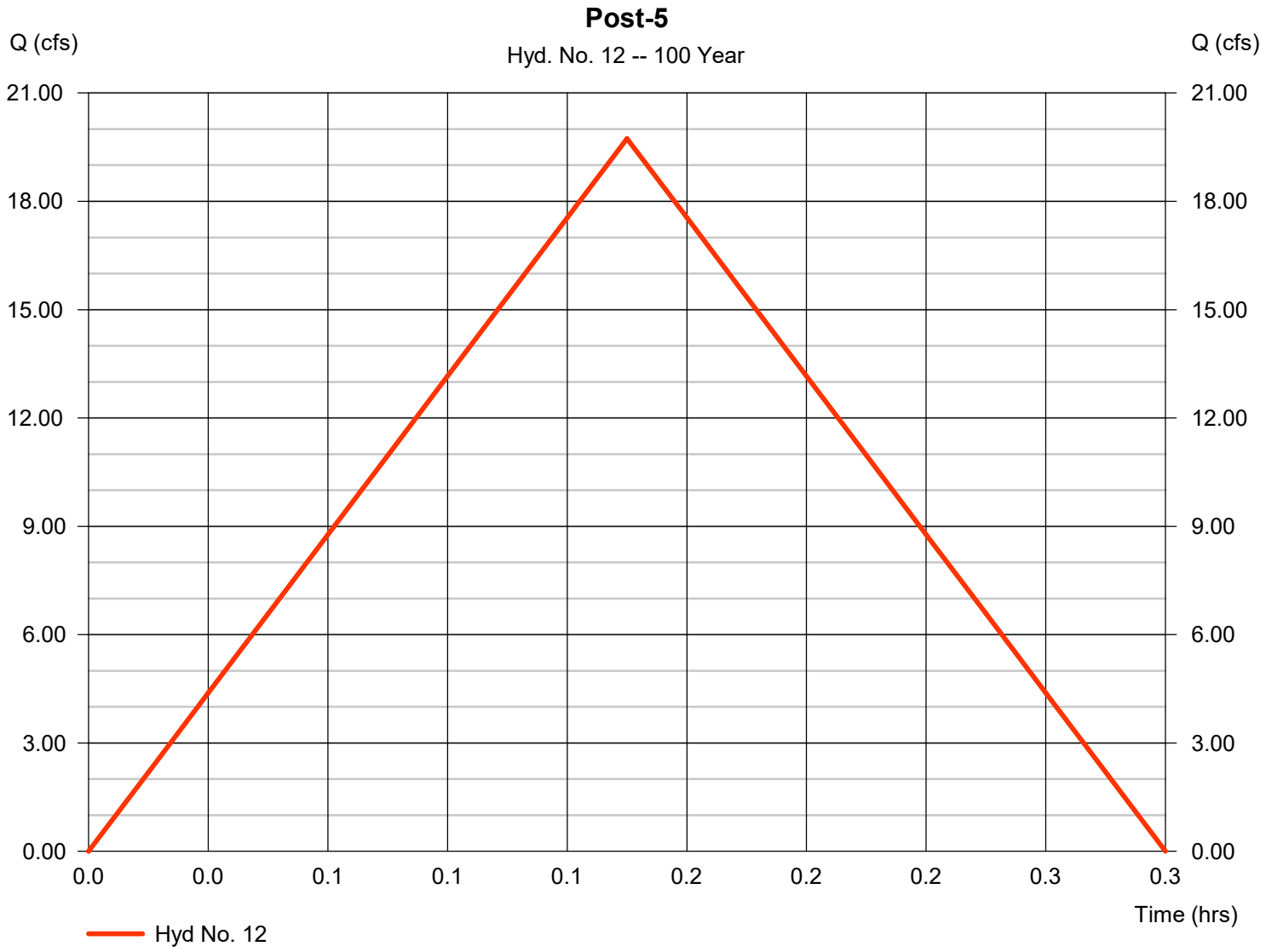
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025 Wednesday, 06 / 11 / 2025

Hyd. No. 12

Post-5

Hydrograph type	=	Rational	Peak discharge	=	19.74 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.15 hrs
Time interval	=	1 min	Hyd. volume	=	10,659 cuft
Drainage area	=	2.880 ac	Runoff coeff.	=	0.54
Intensity	=	12.692 in/hr	Tc by User	=	9.00 min
IDF Curve	=	Lansing, Kansas - With K-Values 2025.IDF	Asc/Rise/Clmb fact	=	1/1



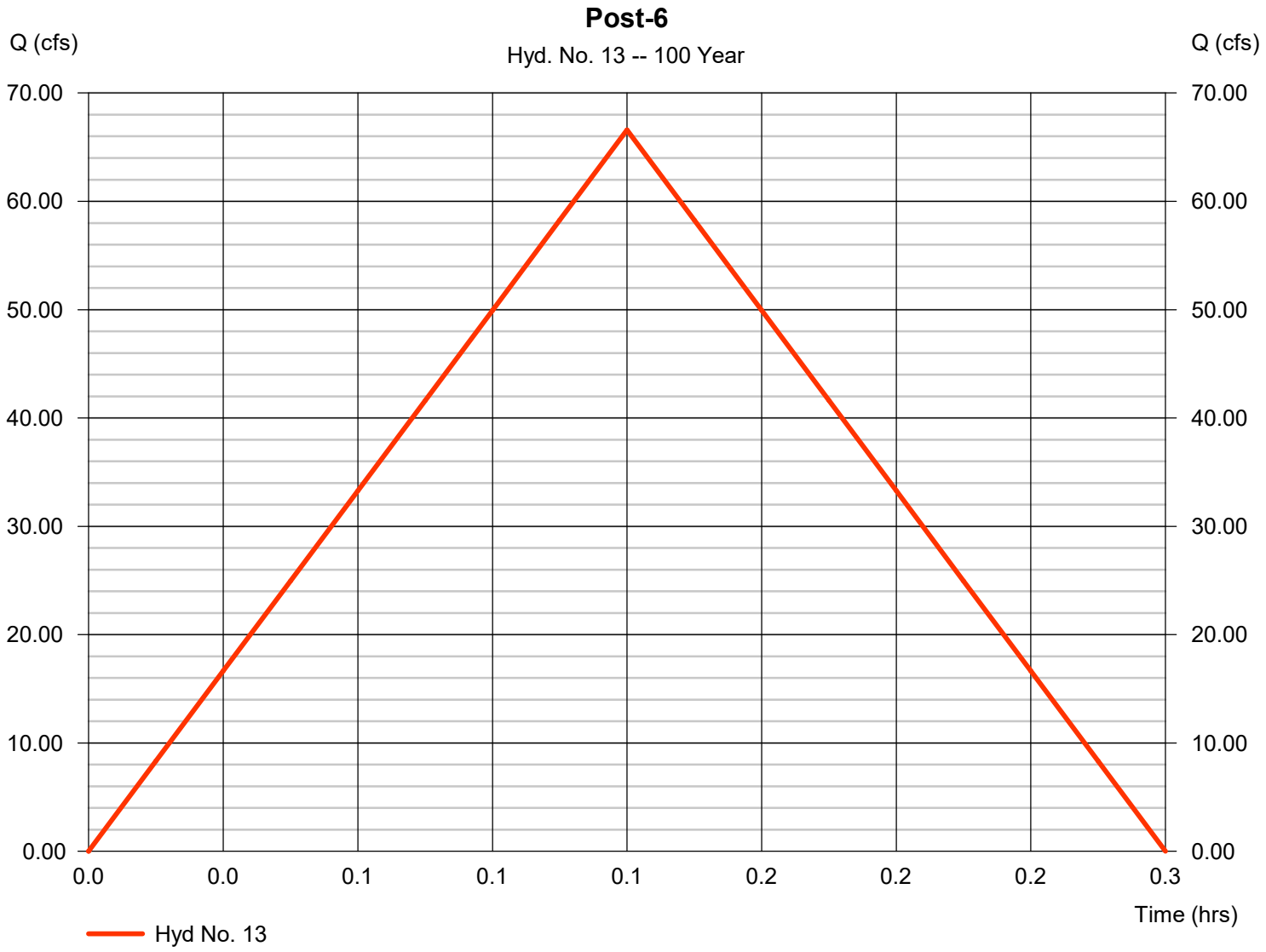
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025 Wednesday, 06 / 11 / 2025

Hyd. No. 13

Post-6

Hydrograph type	=	Rational	Peak discharge	=	66.58 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.13 hrs
Time interval	=	1 min	Hyd. volume	=	31,960 cuft
Drainage area	=	9.220 ac	Runoff coeff.	=	0.54
Intensity	=	13.373 in/hr	Tc by User	=	8.00 min
IDF Curve	=	Lansing, Kansas - With K-Values 2025.IDF	Asc/Rise/Dip fact	=	1/1

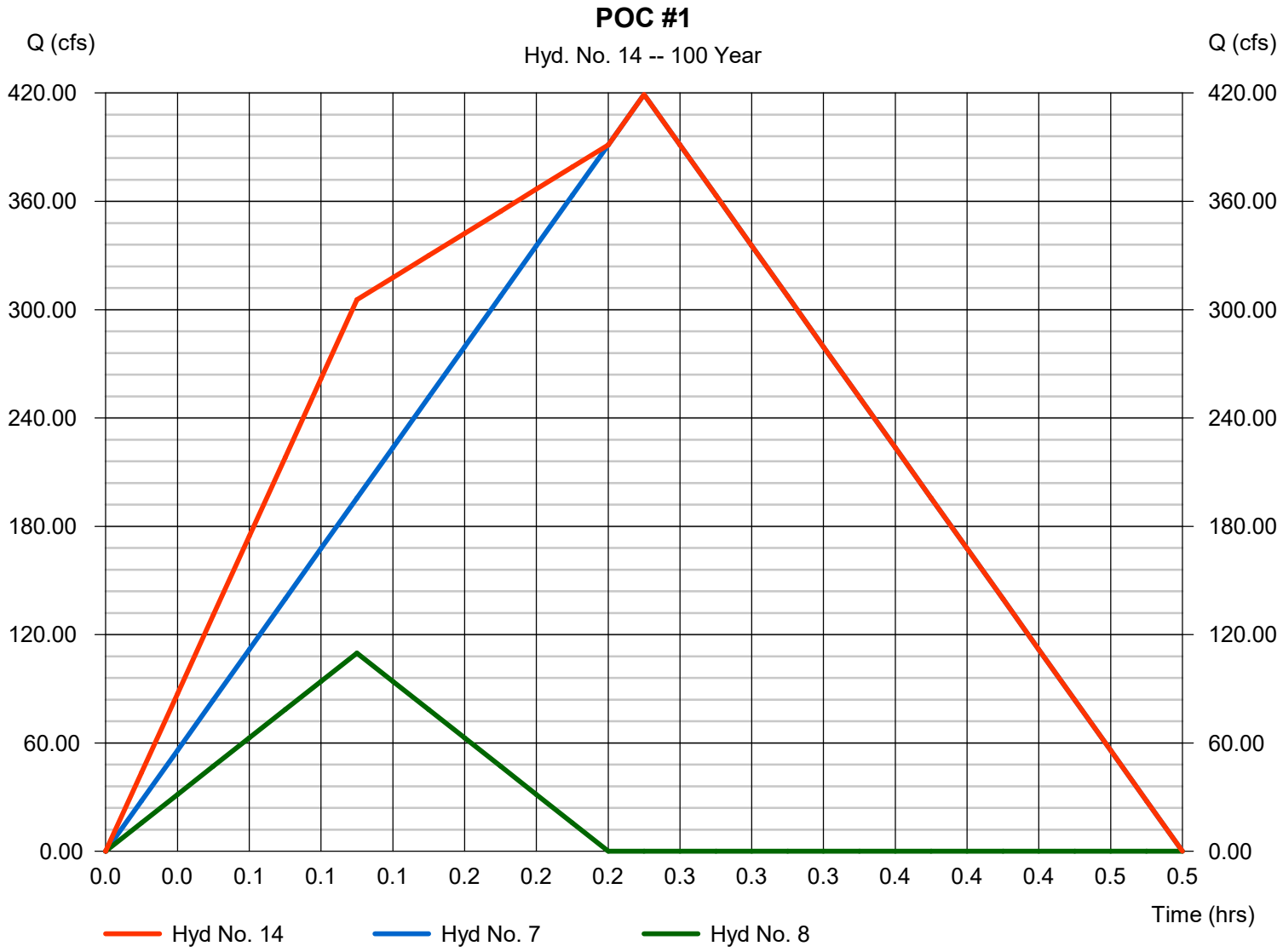


Hydrograph Report

Hyd. No. 14

POC #1

Hydrograph type	= Combine	Peak discharge	= 419.22 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 423,418 cuft
Inflow hyds.	= 7, 8	Contrib. drain. area	= 108.000 ac

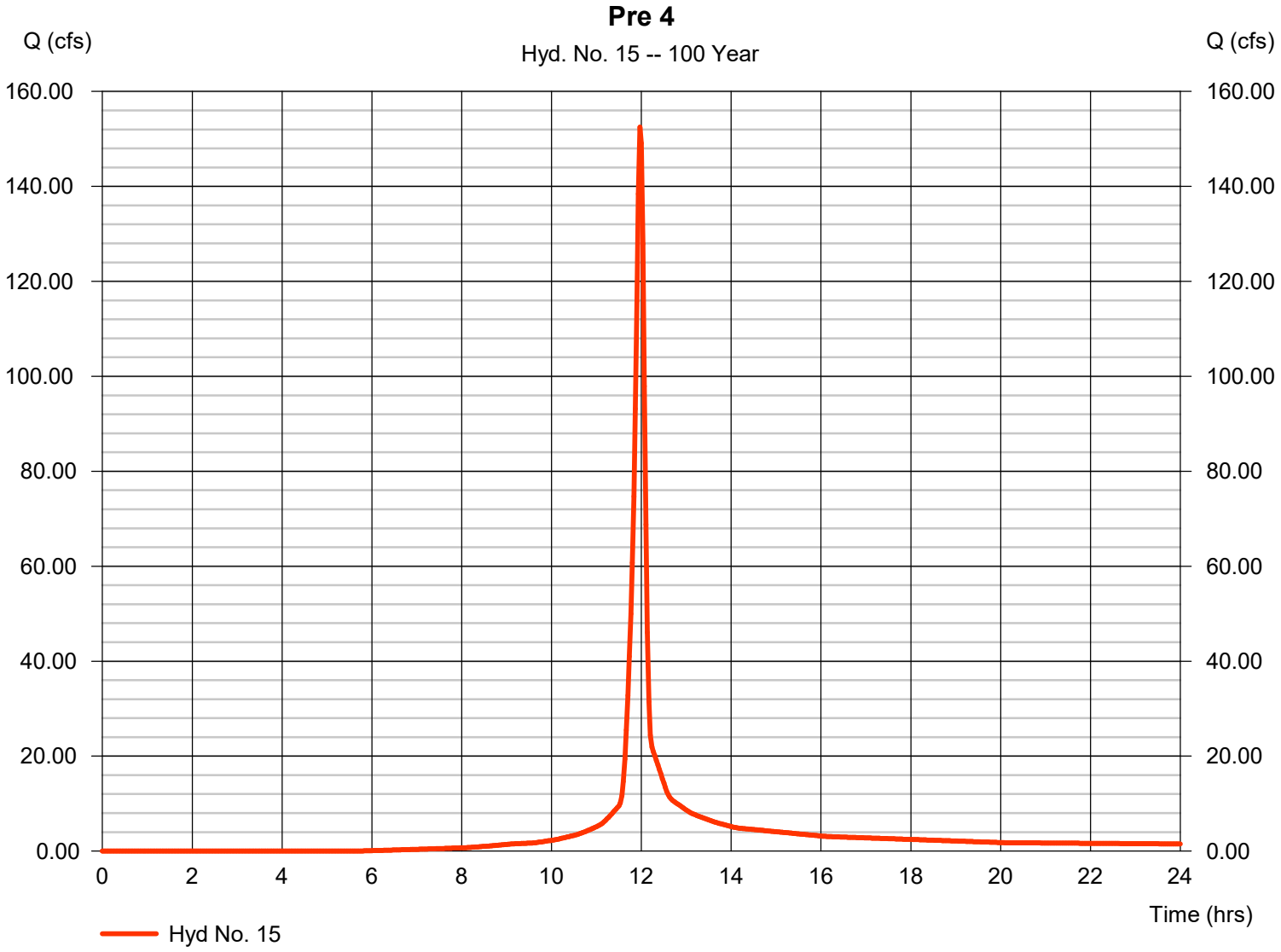


Hydrograph Report

Hyd. No. 15

Pre 4

Hydrograph type	=	SCS Runoff	Peak discharge	=	152.50 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	355,309 cuft
Drainage area	=	22.400 ac	Curve number	=	81
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.88 min
Total precip.	=	6.53 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

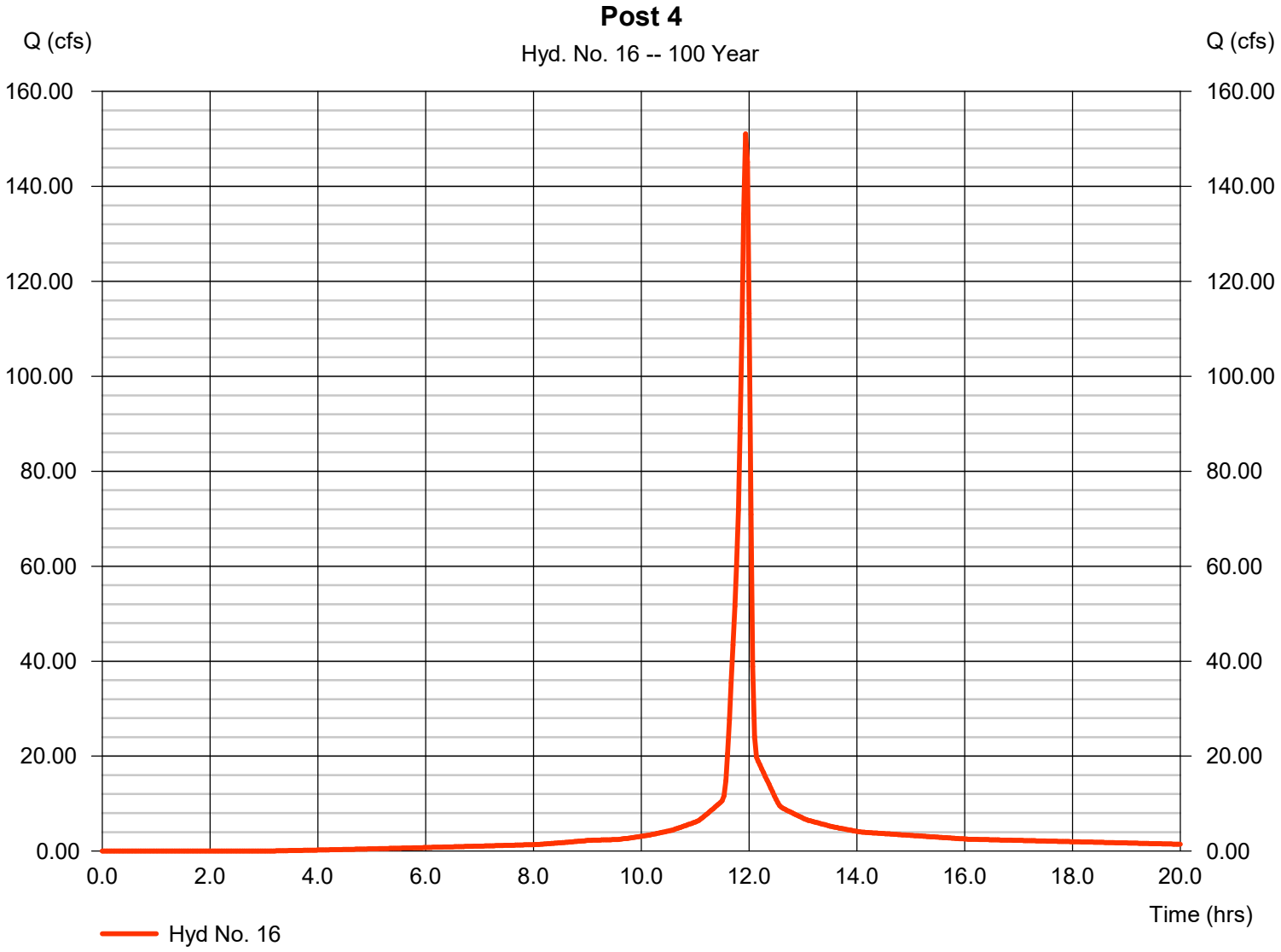


Hydrograph Report

Hyd. No. 16

Post 4

Hydrograph type	=	SCS Runoff	Peak discharge	=	151.04 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	330,895 cuft
Drainage area	=	18.130 ac	Curve number	=	90
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	4.82 min
Total precip.	=	6.53 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



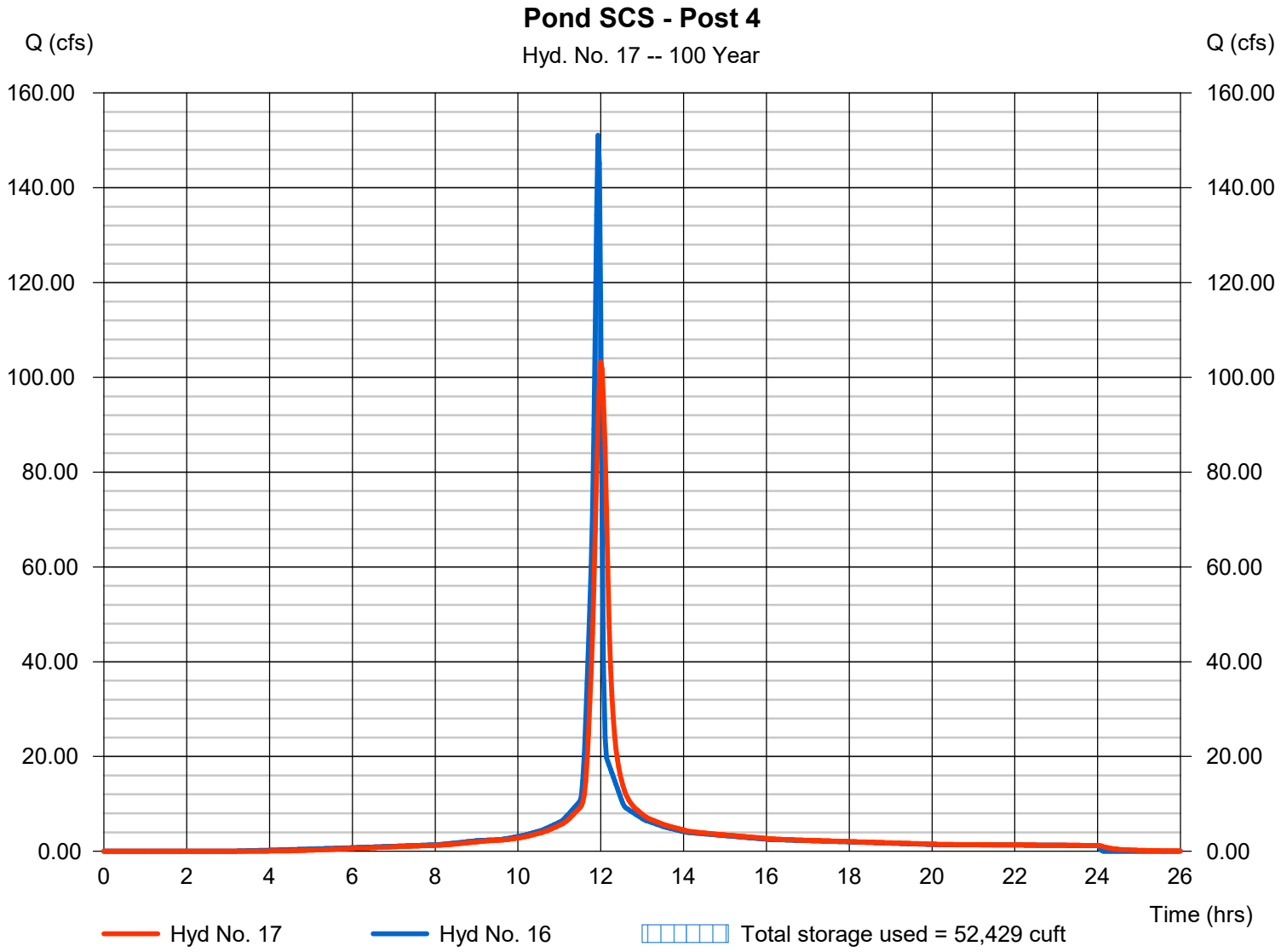
Hydrograph Report

Hyd. No. 17

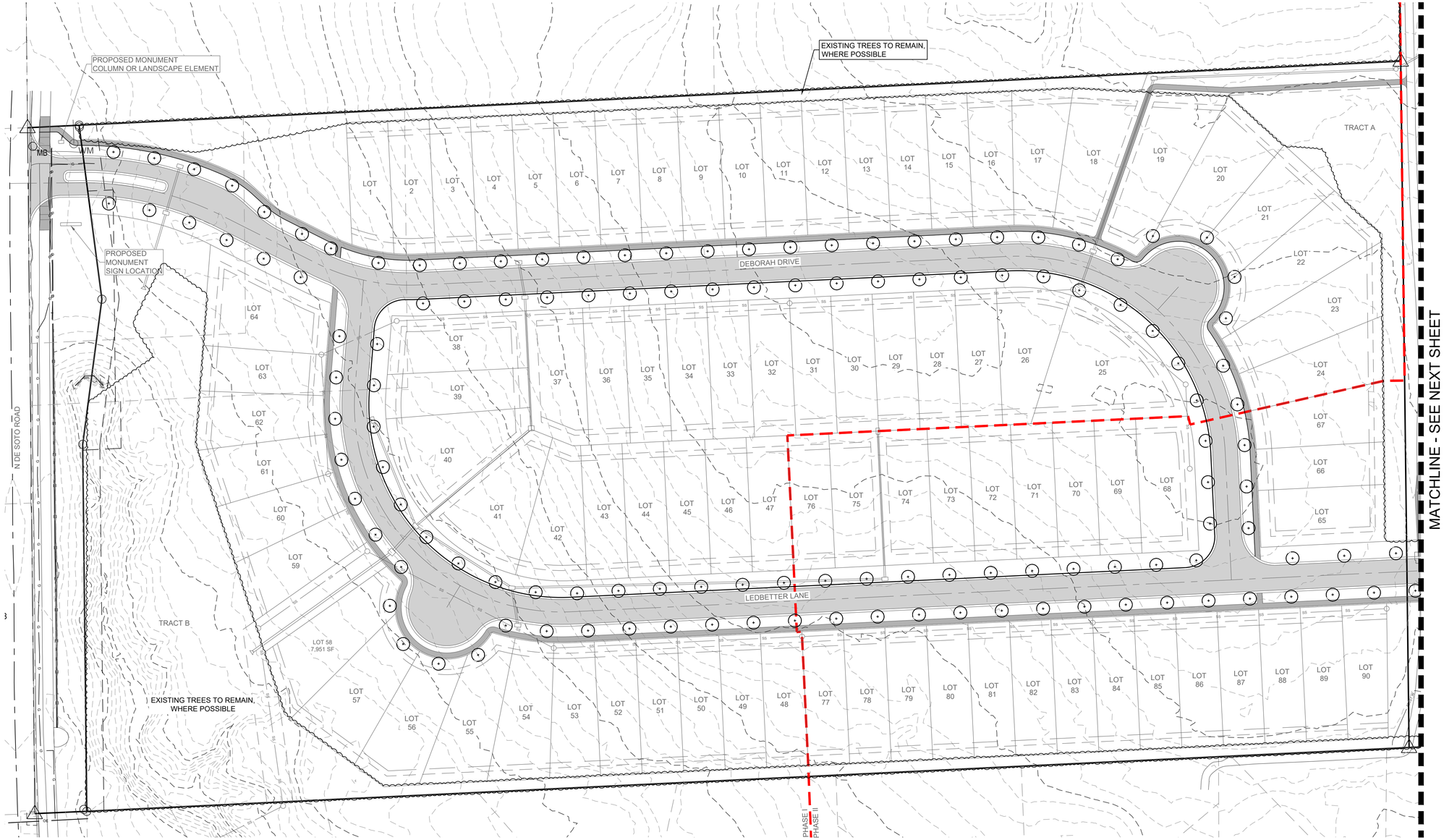
Pond SCS - Post 4

Hydrograph type	=	Reservoir	Peak discharge	=	103.24 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	330,887 cuft
Inflow hyd. No.	=	16 - Post 4	Max. Elevation	=	871.91 ft
Reservoir name	=	Small Pond	Max. Storage	=	52,429 cuft

Storage Indication method used.



NOTE:
STREET TREE LOCATIONS WILL NEED TO BE ADJUSTED IN THE FIELD BASED ON UTILITY & DRIVEWAY LOCATIONS.



LEGEND

TREE, 40' MAX SPACING

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(620) 255-1952
Kansas City
(913) 444-9615
Colorado Springs, CO
(719) 465-2145

MONROE MANOR

PROGRESS DOCUMENTS - NOT FOR CONSTRUCTION

LANSING, KANSAS

REVISION DATE		REVISION DESCRIPTION (DESCRIPTION)
00/00/00		

STREET TREE PLAN

NORTH

SCALE: 1" = 50'

PROJECT #: 2501-0018
CHECKED BY: BCG
DRAWN BY: BMS

DATE: 07/03/2025

SHEET # 1

TOTAL SHEETS 2

NOTE:
STREET TREE LOCATIONS WILL NEED TO BE ADJUSTED IN THE FIELD BASED ON UTILITY & DRIVEWAY LOCATIONS.

LEGEND

TREE, 40' MAX SPACING

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MONROE MANOR

PROGRESS DOCUMENTS - NOT FOR CONSTRUCTION

LANSING, KANSAS

REVISION DATE		REVISION DESCRIPTION
00/00/00	△	(DESCRIPTION)

STREET TREE PLAN

NORTH

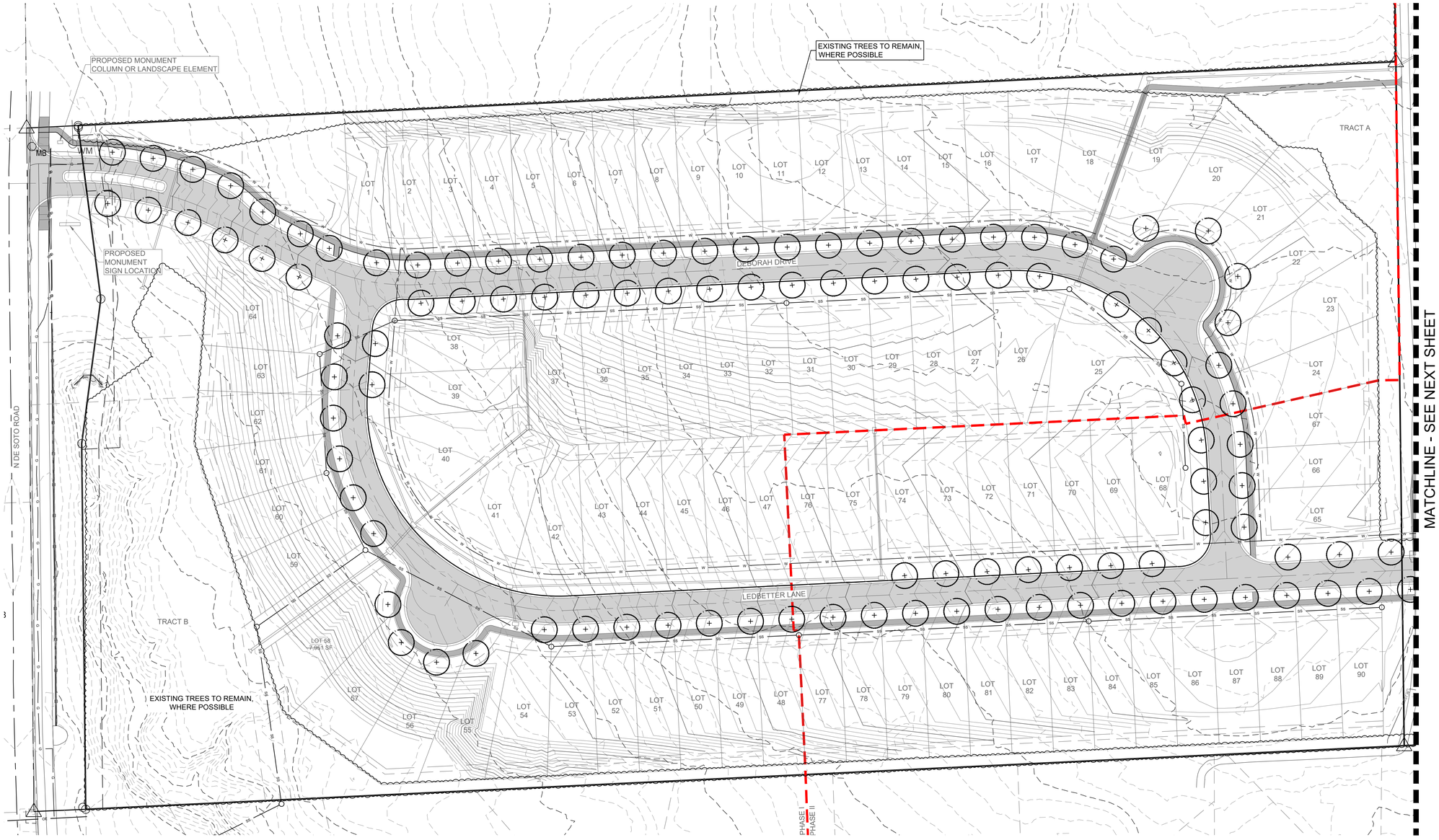
SCALE: 1" = 50'

PROJECT #: 2501-0018
CHECKED BY: BCG
DRAWN BY: BMS

DATE: 07/03/2025

SHEET # 2

TOTAL SHEETS 2



LEGEND

STREET TREE

NOTE:
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(719) 465-2145

MONROE MANOR

PROGRESS DOCUMENTS - NOT FOR CONSTRUCTION

LANSING, KANSAS

REVISION DATE		REVISION DESCRIPTION
00/00/00		(DESCRIPTION)

STREET TREE PLAN

NORTH

50' 25' 0' 50'
SCALE: 1" = 50'

PROJECT #: 2501-0018
CHECKED BY: BCG
DRAWN BY: BMS

DATE: 07/03/2025

SHEET # 1

TOTAL SHEETS 2

LEGEND

STREET TREE

NOTE:
STREET TREE LOCATIONS WILL NEED TO BE ADJUSTED IN THE FIELD BASED ON UTILITY & DRIVEWAY LOCATIONS.

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(785) 776-0541
Dodge City, KS
(620) 255-1952
Kansas City
(913) 444-9615
Colorado Springs, CO
(719) 465-2145

MONROE MANOR

PROGRESS DOCUMENTS - NOT FOR CONSTRUCTION

LANSING, KANSAS

REVISION DATE	(DESCRIPTION)
00/00/00	

STREET TREE PLAN

NORTH

50' 25' 0' 50'
SCALE: 1" = 50'

PROJECT #: 2501-0018
CHECKED BY: BCG
DRAWN BY: BMS

DATE: 07/03/2025

SHEET # 2

TOTAL SHEETS 2

TRAFFIC IMPACT STUDY

MONROE MANOR SUBDIVISION

LANSING, KANSAS

Prepared For:
Circle H Land Holdings, LLC

Prepared By:
Michael Hare, PE, PTOE

July 2025

MERGE MIDWEST ENGINEERING

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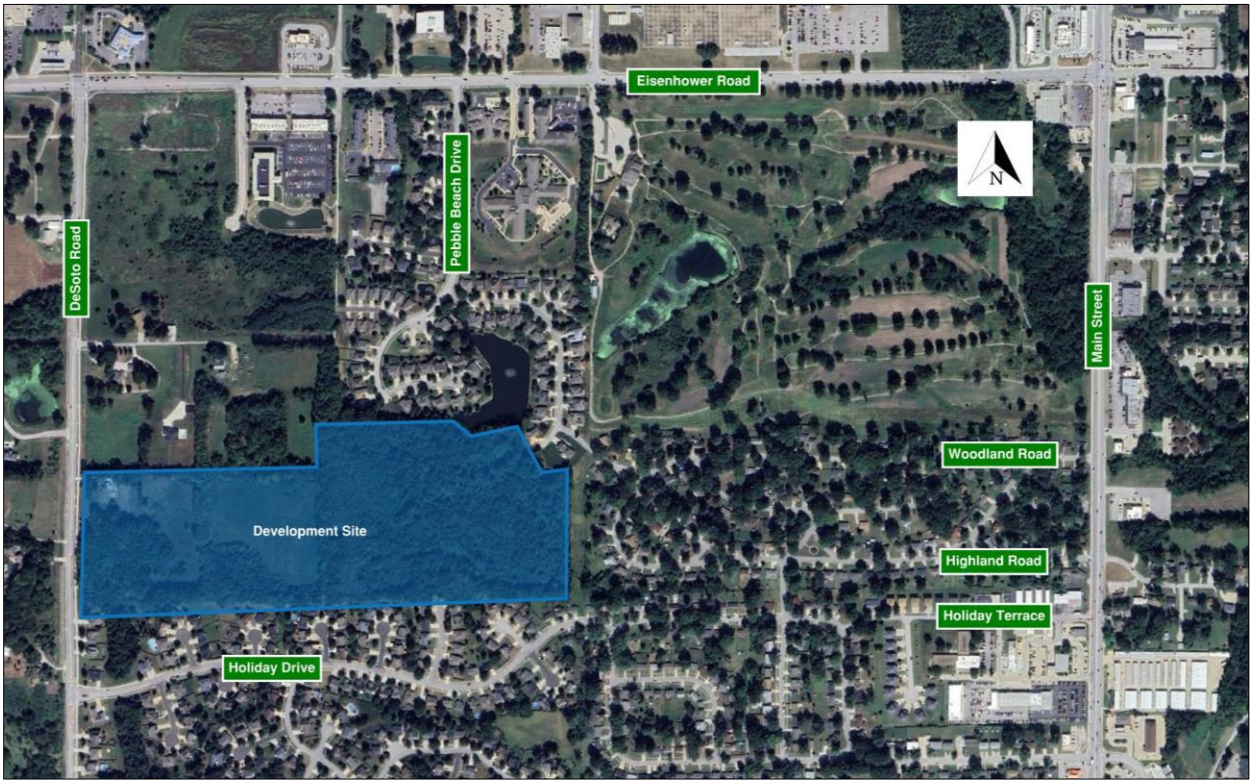
INTRODUCTION

This traffic impact study has been completed for the proposed single-family residential neighborhood to be located along the east side of DeSoto Road just north of Holiday Drive in Lansing, Kansas. The location of the proposed development relative to major streets in the area is shown below on ***Figure 1.*** This study includes a description of the proposed development, existing and future conditions, intersection capacity analyses, and a summary of findings.

Figure 1: Location Map



Source: Google Earth

EXISTING CONDITIONS

Existing Traffic Volumes: Existing weekday turning-movement traffic-volume counts were collected at the following study intersections via video camera:

- DeSoto Road & Holiday Drive
- Eisenhower Road & Pebble Beach Drive
- Main Street & Woodland Road
- Main Street & Highland Road
- Main Street & Holiday Terrace

Peak-period counts were collected at the study intersections during the hours of 7:00 A.M. to 9:00 A.M. and 4:00 P.M. to 6:00 P.M. on Thursday, May 15, 2025. Based on the data, the AM peak hour occurs between 7:15 and 8:15 A.M. At the study intersections along DeSoto Road and

Eisenhower Road, the PM peak hour occurs between 4:30 and 5:30 P.M. The PM peak hour at the study intersections along Main Street occur between 4:00 and 5:00 P.M.. The existing AM and PM peak-hour volumes are shown in ***Appendix A*** on ***Figure A-1.*** The raw traffic counts were processed by Miovision Technologies, Inc. and can be found in ***Appendix B***.

Daily traffic counts and speed data were recorded along DeSoto Road adjacent to the proposed development site on Thursday, May 15, 2025. The recorded daily traffic (ADT) on DeSoto Road was 8,650 vehicles per day (vpd): 3,246 vpd northbound and 5,404 vpd southbound. These counts are also included in ***Appendix B.***

Existing Land Use: The existing property consists of mostly vacant land and one single-family residential home. Currently, the home appears to be vacant and will be removed as part of this development. On the north side of the site are some large-lot single-family homes and a residential neighborhood. To the east and south of the site are residential neighborhoods. To the west, across DeSoto Road, are some large-lot single-family homes.

Existing Roadway Network: Current roadway characteristics near the study area are summarized below in ***Table 1*****.**

Table 1: Existing Roadway Characteristics

Roadway	Classification[1]	Section	Median Type	Posted Speed Limit
DeSoto Road	Minor Arterial	3-lane w/ curb and gutter	TWLTL	40 mph
Holiday Drive	Collector	2-lane w/ curb and gutter	Undivided	20 mph
Eisenhower Road	Minor Arterial	4-lane w/ curb and gutter	Undivided	40 mph
Pebble Beach Drive	Collector	2-lane w/ curb and gutter	Undivided	20 mph
Main Street	Major Arterial	5-lane w/ curb and gutter	TWLTL	40 mph
Woodland Road	Local	2-lane w/ curb and gutter	Undivided	20 mph
Highland Road	Local	2-lane w/ curb and gutter	Undivided	20 mph
Holiday Terrace	Local	2-lane w/ curb and gutter	Undivided	20 mph

1 – Classification as listed on City of Lansing Maps and Open Data Portal
TWLTL – Two-way left-turn lane

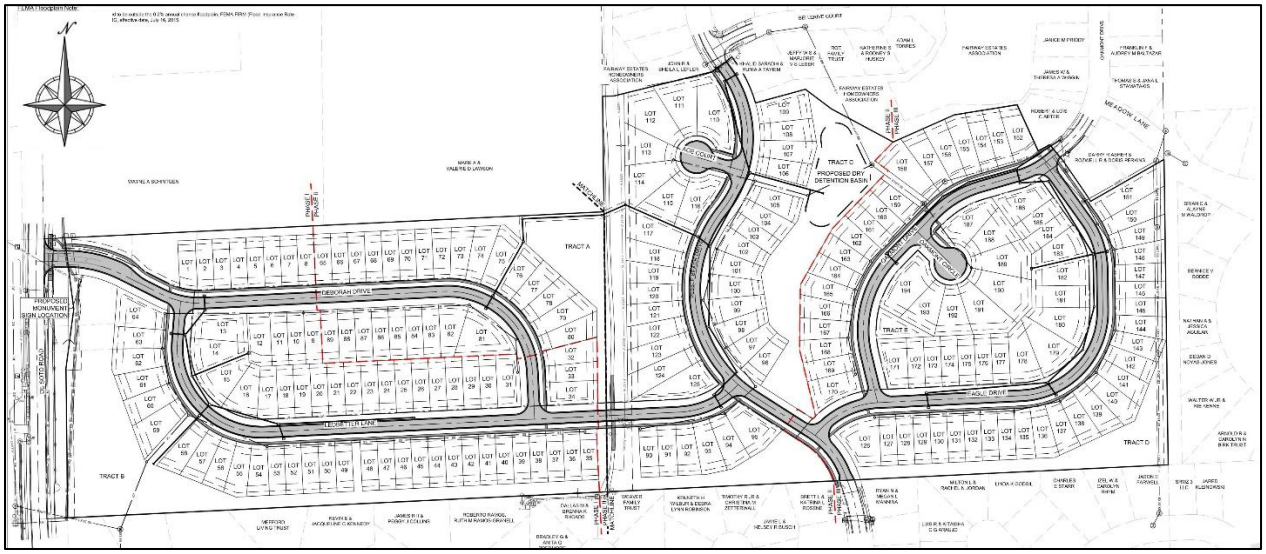
Each of the study intersections operates under stop control on the minor intersection approaches. A center two-way left-turn lane is present along DeSoto Road and Main Street. A left-turn lane is not included at the Eisenhower Road & Pebble Beach Drive intersection. No right-turn lanes are included at any of the study intersections.

A 10’ multi-use path runs along the east side of DeSoto Road and a 5’ sidewalk runs along the west side of DeSoto Road adjacent to the proposed development site.

PROPOSED CONDITIONS

Proposed Land Use: The proposed Monroe Manor residential development includes 194 single-family homes. A copy of the proposed site plan is included below on ***Figure 2.*** A full-size version is included at the end of this report**.**

Figure 2: Proposed Site Plan



Proposed Access Plan: One new access is proposed on the west side of the development along DeSoto Road. ***Table 2*** summarizes the new access location. Additionally, the development will be accessed from current street connections surrounding the proposed site. Currently, Pebble Beach Drive north of the site, Pebble Beach Drive south of the site, and Oakmont Drive all end at the property line of the proposed development. These roadways will be extended into the proposed development, and they will provide access to the new homes.

Table 2: Proposed Site Access

Access Name	Intersecting Roadway	Access Type	Access Location[1]
Site Drive	DeSoto Road	Full Access	Approx. 1,100’ north of Holiday Drive

1 - Distances are taken from the center of the intersection.

The location of the Site Drive was reviewed in accordance with Leavenworth County guidelines outlined in Resolution 2021-18, Article 41 – Access Management. This resolution amends articles of the 2006 Zoning and Subdivision Regulations. Based on these guidelines, minimum road spacing along an arterial is 660’. The minimum residential entrance spacing along a minor arterial is 300’. Both of these spacing requirements are to be met only along the side of the roadway that is being accessed. In addition, the minimum spacing between roadways on opposite sides of the street should be no less than 100’.

The Site Drive is on the east side of DeSoto Road, and it is located approximately 1,100' north of Holiday Drive and approximately 715' south of Kane Drive. The nearest residential entrance to the Site Drive is located approximately 720' to the south. No residential entrances are located to the north of the Site Drive. Sycamore Ridge Drive is located approximately 270' north of the Site Drive on the west side of DeSoto Road. The location of the Site Drive meets the spacing criteria outlined above.

Intersection Sight Distance: Intersection sight-distance measurements were taken in the field for the site-drive approach to DeSoto Road, which has a posted speed limit of 40 mph adjacent to the development site. However, the speed data that was collected for this project indicates that the 85th-percentile speed along this roadway is 50 mph. Based on the American Association of State Highway and Transportation Officials (AASHTO) *A Policy on Geometric Design of Highways and Streets* 7th Edition, the amount of sight distance that is desirable for a stop-sign controlled approach intersecting DeSoto Road, which has a 50-mph 85th-percentile speed, is 590' for a left-turning vehicle (Case B1) and 480' for a right-turning vehicle (Case B2). The results of the intersection sight distances recorded in the field are summarized below.

DeSoto Road & Site Drive

	AASHTO Recommended	Field Measured
Left-Turning Vehicle	590'	900'
Right-Turning Vehicle	480'	685'

DeSoto Road & WB Site Drive
Looking Left (S) – Right-Turn

DeSoto Road & WB Site Drive
Looking Right (N) – Left-Turn

A cursory review of the sight distance at the existing intersections along DeSoto Road, Eisenhower Road, and Main Street that will be used to access the proposed development was

also completed. This review indicated that adequate sight distance is provided in both directions at each location along these roadways except when looking to the right (east) along Eisenhower Road from Pebble Beach Drive. The crest curve to the east of Pebble Beach Drive limits the sight distance at this location. A Cross Road (W2-1) warning sign is posted for westbound traffic in advance of the Eisenhower Road & Pebble Beach Drive intersection to warn oncoming drivers of the approaching intersection.

Trip Generation: The estimated trip generation for the proposed subdivision was based upon the 11th Edition of the Institute of Transportation Engineers (ITE) *Trip Generation Manual* and is shown below in ***Table 3.*** Outputs from this manual are included in ***Appendix C.***

Table 3: Trip Generation

Land Use	Qty	Unit	Weekday ADT (VPD)	AM Peak Hour (VPH)			PM Peak Hour (VPH)		
				TOTAL	IN	OUT	TOTAL	IN	OUT
210 – Single-Family Detached Housing	194	D.U.	1,856	136	34	102	185	117	68

Trip Distribution: The estimated trips generated by the proposed development were distributed onto the surrounding street system based on the trip distributions summarized in ***Table 4***. The distributions are based primarily on existing traffic flow and engineering judgement. The detailed distributions through the study intersections are included in ***Appendix C***.

Table 4: Trip Distribution

Direction To/From	Percentage
North on Main Street	20%
South on Main Street	20%
North on DeSoto Road	30%
South on DeSoto Road	15%
East on Eisenhower Rd	10%
West on Eisenhower Rd	5%
Total	**100%**

Existing + Site Traffic Volumes: The expected development-related traffic volumes were assigned to the existing street system based on the trip distributions discussed above and then added to the existing traffic volumes to develop the *Existing + Site* AM and PM peak-hour volumes. These volumes are shown in ***Appendix A*** on ***Figures A-2*** and ***A-3***, respectively.

Future Year 2045 + Site Traffic Volumes: To account for potential traffic-volume growth at the study intersections, traffic projections were developed using an estimated 0.7% annual growth rate. This growth rate is based on traffic-volume outputs from the base year (2016) and future year (2050) Mid-America Regional Council (MARC) travel demand models (TDM). The growth rate

was applied to the existing traffic counts to develop base traffic volumes for future year 2045. These volumes were added to the site traffic to develop the *Future Year 2045 + Site* AM and PM peak-hour traffic volumes. The volumes are shown in ***Appendix A*** on ***Figures A-4*** and ***A-5***, respectively.

ANALYSES

This study analyzes the traffic impacts of the proposed residential development on the surrounding roadway network for the following scenarios:

- Existing Conditions
- Existing + Site Conditions
- Future Year 2045 + Site Conditions

Intersection capacity analyses were completed using the Synchro 12 traffic analysis software package based on methodologies outlined in the Transportation Research Board's (TRB) *Highway Capacity Manual (HCM),* 7th Edition. The operating conditions at an intersection are evaluated by the level of service (LOS) experienced by drivers, with LOS "A" representing little or no delay and LOS "F" representing excessive delays. LOS B, C, D, and E reflect incremental increases in delay per vehicle. The control delay thresholds in seconds-per-vehicle for the varying LOS for signalized and unsignalized intersections are shown below in ***Table 5.***

Table 5: Level of Service Delay Thresholds

Level of Service (LOS)	Signalized Intersection Average Control Delay (sec/veh)	Unsignalized Intersection Average Control Delay (sec/veh)
A	<10	<10
B	<20	<15
C	<35	<25
D	<55	<35
E	<80	<50
F	≥80	≥50

Source: HCM 7th Edition

Queues were also evaluated as part of this study. The 95th-percentile queue, or the queue that has only a 5% chance of being exceeded during the peak hour, was used for this analysis. All capacity analysis output files are included in ***Appendix D***.

Existing Conditions: The results of the *Existing* analysis scenario are shown in ***Appendix A*** on ***Figures A-6*** and ***A-7*** for the AM and PM peak-hour traffic volumes, respectively. As shown on the figures, most of the individual movements at the unsignalized study intersections currently operate at LOS "D" or better during the AM and PM peak hours with 95th-percentile queues of one vehicle or less. However, the eastbound movements at the Main Street & Holiday Terrace intersection currently operate at LOS "E" with 41 seconds of delay and just over a one-vehicle queue during the PM peak hour. It should be noted that the two-way left-turn lane along Main Street provides storage for vehicles making an eastbound or westbound left-turn. This reflects

vehicles making a two-stage maneuver when turning onto Main Street from Woodland Road, Highland Road, or Holiday Terrace. This type of vehicle activity was confirmed from the traffic count videos, and it is reflected in the analysis results.

Existing + Site Conditions: The results of the *Existing + Site* analysis scenario are shown in ***Appendix A*** on ***Figures A-8*** and ***A-9*** for the AM and PM peak-hour traffic volumes, respectively.

Turn-lane warrants were analyzed for this scenario in conjunction with KDOT's *Access Management Policy*, dated January 2013, at the study intersections using the *Existing + Site* AM and PM peak-hour traffic volumes. Based on this analysis, the following turn lanes are warranted under this scenario. The detailed results of this analysis are included in ***Appendix E.***

Eisenhower Road & Pebble Beach Drive

- Westbound left-turn lane is warranted during the AM and PM peak hours. It should be noted that this turn lane is warranted under the *Existing* conditions as well. Due to existing right-of-way constraints, and the northern half of Eisenhower Road being within the City of Leavenworth city limits, a westbound left-turn lane with adequate storage cannot be easily constructed at this location. As indicated in the analysis results, the westbound movements are projected to operate acceptably without the left-turn lane. This location should be monitored in the future, and if operational or safety concerns arise, the need for a left-turn lane should be re-evaluated.

Main Street & Woodland Road

- Southbound right-turn lane is warranted during the PM peak hour. However, due to the existing topography along the west side of Main Street, including a large retaining wall, a southbound right-turn lane with adequate deceleration and storage cannot be constructed at this location. As indicated in the analysis results, the southbound movements are projected to operate acceptably without the right-turn lane.

Main Street & Holiday Terrace

- Southbound right-turn lane is warranted during the PM peak hour. However, due to the close proximity of an existing drive along Main Street north of Holiday Terrace, there is not enough space to construct a southbound right-turn lane with adequate deceleration and storage at this location. As indicated in the analysis results, the southbound movements are projected to operate acceptably without the right-turn lane.

In addition to the turn lane discussed above, the existing center two-way left-turn lane pavement markings should be removed at the DeSoto Road & Site Drive intersection. This will provide a break in the center pavement markings where vehicles will be turning to and from the Site Drive.

As shown on ***Figures A-8*** and ***A-9***, most of the individual movements at the unsignalized study intersections are projected to operate at LOS "D" or better during the AM and PM peak hours with 95th-percentile queues of one vehicle or less. However, the eastbound movements at the Main Street & Holiday Terrace intersection are projected to operate at LOS "E" with 43 seconds of delay and a two-vehicle queue during the PM peak hour. It is not uncommon for stop-controlled movements on side-street approaches to operate at lower levels of service.

Furthermore, alternate routes are available at this location if delays and queues become unacceptable to drivers.

Future Year 2045 + Site Conditions: The results of the *Future Year 2045 + Site* analysis scenario are shown in ***Appendix A*** on ***Figures A-10*** and ***A-11*** for the AM and PM peak-hour traffic volumes, respectively. This analysis scenario included the westbound left-turn lane at the Eisenhower Road & Pebble Beach Drive intersection.

As shown on ***Figures A-10*** and ***A-11***, most of the individual movements at the unsignalized study intersections are projected to operate at LOS "D" or better during the AM and PM peak hours with 95th-percentile queues of one vehicle or less. However, the following movements are projected to operate at lower levels of service during the PM peak hour:

DeSoto Road & Holiday Drive

- Westbound left-turn movement is projected to operate at LOS "E" with 36 seconds of delay and a one-vehicle queue.

Main Street & Woodland Street

- Eastbound movements are projected to operate at LOS "E" with 42 seconds of delay and a one-vehicle queue.

Main Street & Holiday Terrace

- Eastbound movements are projected to operate at LOS "F" with less than 75 seconds of delay and just over a three-vehicle queue.

No additional improvements were identified at the study intersections to mitigate the lower levels of service since the delays are less than 75 seconds and queues are relatively short at just over three vehicles or less. It is not uncommon for stop-controlled movements on side-street approaches to operate at lower levels of service. Furthermore, alternate routes are available for eastbound drivers at the Main Street & Holiday Terrace intersection if delays and queues become unacceptable.

SUMMARY & RECOMMENDATIONS

This traffic study summarizes the anticipated traffic impacts of the proposed Monroe Manor single-family residential neighborhood on the surrounding transportation system.

The results of the *Existing* analysis scenario indicate that most of the individual movements at the unsignalized study intersections currently operate acceptably during both peak hours with 95th-percentile queues of one vehicle or less. However, the eastbound movements at the Main Street & Holiday Terrace intersection currently operate at lower levels of service during the PM peak hour.

Traffic volumes at the Eisenhower Road & Pebble Beach Drive intersection satisfy warrant criteria for a westbound left-turn lane at this location under the *Existing* and *Existing + Site* conditions. However, due to existing right-of-way constraints, and the northern half of Eisenhower Road

being within the City of Leavenworth city limits, a westbound left-turn lane with adequate storage cannot be easily constructed at this location. As indicated in the analysis results, the westbound movements are projected to operate acceptably without the left-turn lane. This location should be monitored in the future, and if operational or safety concerns arise, the need for a left-turn lane should be re-evaluated.

The existing center two-way left-turn lane pavement markings should be removed at the DeSoto Road & Site Drive intersection. This will provide a break in the center pavement markings where vehicles will be turning to and from the Site Drive.

The results of the *Existing + Site* analysis scenario indicate that most of the individual movements at the unsignalized study intersections are projected to operate acceptably during both peak hours with 95th-percentile queues of one vehicle or less. However, the eastbound movements at the Main Street & Holiday Terrace intersection are projected to operate at lower levels of service during the PM peak hour with about a two-vehicle queue.

The results of the *Future Year 2045 + Site* analysis scenario indicate most of the individual movements at the unsignalized study intersections are projected to operate acceptably during both hours with 95th-percentile queues of one vehicle or less. However, some of the side-street movements are projected to operate at lower levels of service in the future. No additional improvements were included to accommodate the future traffic volumes, since the delays are less than 75 seconds and queues are relatively short at just over three vehicles or less.

We appreciate the opportunity to serve you on this very important project. Please feel free to contact us if you should have any questions.

Respectfully submitted,

Merge Midwest Engineering, LLC

Michael Hare, P.E., PTOE
Sr. Engineer

Janelle M. Clayton, P.E., PTOE
Manager / Co-Owner

Preliminary Plat

MONROE MANOR

Part of the SW 1/4, Section 13, Township 9 South, Range 22 East
City of Lansing, Leavenworth County, Kansas

GENERAL NOTES:

1. PLAN SCALE IS 1"=100' (THIS SHEET).
2. EXISTING AND PROPOSED TOPOGRAPHY IS AS INDICATED ON PLAN.
3. LEGAL DESCRIPTION IS AS SHOWN ON PLAN.
4. EXISTING AND PROPOSED ZONING IS AS SHOWN ON PLAN.
5. PROPERTY BOUNDARY IS AS SHOWN ON PLAN.
6. EXISTING AND PROPOSED RIGHT-OF-WAYS ARE AS SHOWN ON PLAN.
7. APPROXIMATE LOCATION OF PROPOSED UTILITIES ARE AS SHOWN ON PLAN.
8. PHASING IS AS SHOWN ON PLAN.
9. GENERAL CONFIGURATION OF LOTS AS INDICATED ON PLAN.
10. 10' LANDSCAPE EASEMENT AS SHOWN ON PLAN.
11. ALL UTILTIY EASEMENTS AS SHOWN ON PLAN.
12. ALL PROPOSED STREETS ARE TO BE PUBLIC.
13. CUL-DE-SAC RADII'S ARE AS SHOWN ON PLAN.
14. TOPOGRAPHIC INFORMATION WAS PROVIDED BY SMH CONSULTANTS INC. CONTOURS ARE AT 2' INTERVALS.
15. UTILITY EASEMENTS SHALL BE PROVIDED ALONG SIDE AND REAR LOTS AT TIME OF PLATTING AS REQUIRED. EASEMENTS SHALL BE A MINIMUM WIDTH OF 10 FEET ALONG SIDE AND REAR LOT LINES. EASEMENTS OF ADDITIONAL WIDTH SHALL BE PROVIDED TO ENCOMPASS UTILITIES AS NEEDED.
16. ALL BUILDING LINES SHOWN ON PLAN ARE 25 FEET FROM RIGHT-OF-WAY LINE.
17. RESIDENTIAL UNIT TYPES ARE SINGLE FAMILY.
18. STREET NAMES SHALL BE SUBJECT TO CHANGE UNTIL FINAL PLAT RECORDING.

SITE DATA TABLE:

EXISTING LAND USE:	VACANT/AGRICULTURAL
EXISTING ZONING:	R-2/R-2-P
PROPOSED ZONING:	R-2/R-2-P
GROSS SITE AREA:	45.28 ACRES
TRACT AREA:	9.26 ACRES (20.45% OF TOTAL AREA)
RIGHT-OF-WAY AREA:	8.73 ACRES (19.28% OF TOTAL AREA)
LOT AREA:	27.29 ACRES (60.27% OF TOTAL AREA)
PROPOSED NUMBER OF LOTS:	194
MINIMUM LOT SIZE:	4,800 SF
AVERAGE LOT SIZE:	6,154 SF
MAXIMUM LOT SIZE:	13,312 SF
BUILDING SETBACKS:	FRONT YARD: 25 FEET REAR YARD: 25 FEET SIDE YARD: 5 FEET
BUILDING SETBACKS CORNER LOT:	FRONT YARD: 25 & 15 FEET REAR YARD: 25 FEET SIDE YARD: 5 FEET

LAND AREA LEGEND	
LOTS	27.29 ACRES
TRACTS	9.26 ACRES
RIGHT-OF-WAY	8.73 ACRES
TOTAL	45.28 ACRES

PHASE LEGEND		
PHASE NUMBER	ACREAGE	LOTS
PHASE I	14.20 ACRES	64
PHASE II	16.60 ACRES	61
PHASE III	14.48 ACRES	69
TOTAL	45.28 ACRES	194

FEMA Floodplain Note:
Flood Plain: Flood Zone X, an area determined to be outside the 0.2% annual chance floodplain, FEMA FIRM (Flood Insurance Rate Map) Community Panel Number 20103C0143G, effective date, July 16, 2015.

LEGAL DESCRIPTION:

Tract 1:
The South 1/2 of the Southwest 1/4 of the Southwest 1/4 of Section 13, Township 9 South, Range 22 East of the 6th P.M., Leavenworth County, Kansas EXCEPT: A tract of land in the South Half of the Southwest Quarter of the Southwest Quarter of Section 13, Township 9, Range 22, East of the 6th Principal Meridian, described as follows: Beginning at a point on the West line of Section 13, said point being 662.91 feet North of the Southwest corner of said Section; thence North 87°43'00" East 208.71 feet to a point; thence South and parallel to the West line of said Section 208.71 feet to a point; thence South 87°43'00" West 208.71 feet to a point on the West line of said Section; thence North along said West line 208.71 feet to the point of beginning, Leavenworth County, Kansas. less that part taken for road purposes

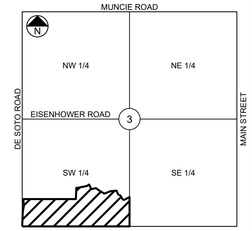
ALSO EXCEPT: A tract of land in the Northwest Quarter of the Southwest Quarter of the Southwest Quarter of the Southwest Quarter of Section 13, Township 9 South, Range 22 East of the 6th P.M., City of Lansing, Leavenworth County, Kansas, described as follows; Commencing at the Southwest corner of said Section 13; thence North 01°20'07" East (assumed), 394.07 feet along the West line of Section 13 to the point of beginning of this tract; thence, North 01°20'07" East 60.00 feet along said West line; thence, North 89°11'24" East 208.71 feet parallel with the North line of the South half of the Southwest Quarter of Section 13; thence, North 01°20'07" East, 208.71 feet to the North line of the South half of the Southwest Quarter of Section 13; thence North 89°11'24" East, 156.00 feet along said North line; thence South 01°20'07" West, 268.71 feet; thence, South 89°11'24" West, 364.71 feet to the point of beginning, Leavenworth County, Kansas. less part taken or used for road purposes

Tract 2:
All the part of the East 1/2 of the Southwest 1/4 of Section 13, Township 9, Range 22 that lies South of Fairway Estates, 4th Plat, in Lansing, Leavenworth County, Kansas, subject to that part of any, in streets, roadways, highways or other public rights-of-ways.

Tract 3:
A tract of land in the South Half of the Southwest Quarter of the Southwest Quarter of Section 13, Township 9, Range 22, East of the 6th Principal Meridian, described as follows: Beginning at a point on the West line of Section 13, said point being 662.91 feet North of the Southwest corner of said Section; thence North 87°43'00" East 208.71 feet to a point; thence South and parallel to the West line of said Section 208.71 feet to a point; thence South 87°43'00" West 208.71 feet to a point on the West line of said Section; thence North along said West line 208.71 feet to the point of beginning, Leavenworth County, Kansas. less that part taken for road purposes

AND

A tract of land in the Northwest Quarter of the Southwest Quarter of the Southwest Quarter of the Southwest Quarter of Section 13, Township 9 South, Range 22 East of the 6th P.M., City of Lansing, Leavenworth County, Kansas, described as follows; Commencing at the Southwest corner of said Section 13; thence North 01°20'07" East (assumed), 394.07 feet along the West line of Section 13 to the point of beginning of this tract; thence, North 01°20'07" East 60.00 feet along said West line; thence, North 89°11'24" East 208.71 feet parallel with the North line of the South half of the Southwest Quarter of Section 13; thence, North 01°20'07" East, 208.71 feet to the North line of the South half of the Southwest Quarter of Section 13; thence North 89°11'24" East, 156.00 feet along said North line; thence South 01°20'07" West, 268.71 feet; thence, South 89°11'24" West, 364.71 feet to the point of beginning, Leavenworth County, Kansas. less part taken or used for road purposes

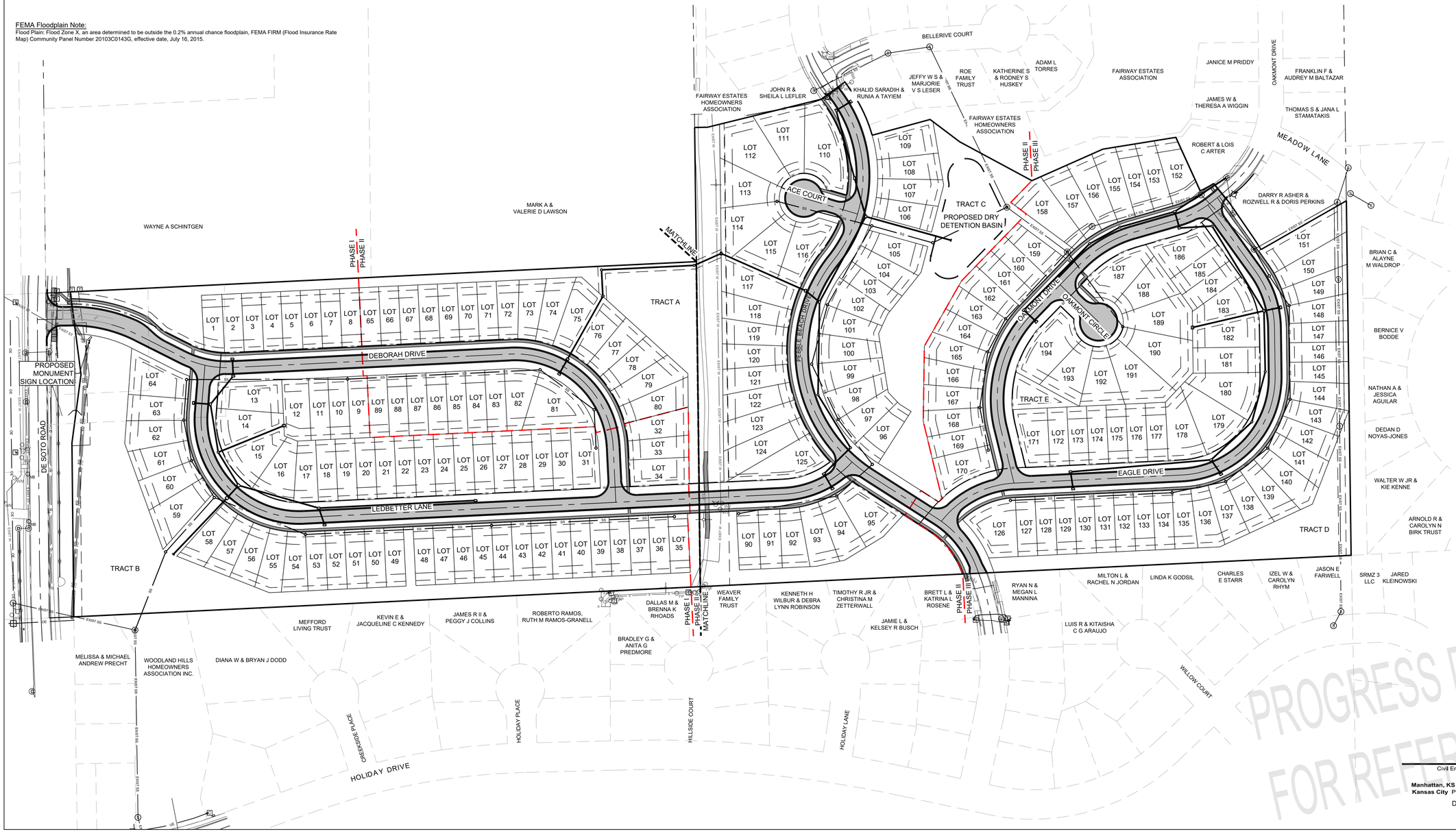


VICINITY MAP
Section 13, T09S, R22E
Leavenworth County, Kansas

SHEET INDEX:
1 - Overall Layout
2 - Subdivision Plan (West)
3 - Subdivision Plan (East)

OWNER/DEVELOPER:
CIRCLE H HOLDINGS, LLC
ROMAN HAEHN
5858 NAPLES DR.
FLOWER MOUND, TX 75028

ENGINEER/SURVEYOR:
SMH CONSULTANTS
5201 JOHNSON DRIVE, SUITE 405
MISSION, KS 66205



PROGRESS DOCUMENT FOR REFERENCE ONLY

SMH CONSULTANTS
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Drawn By:JMT Project #2501-0018 TDS:101

JUNE 2025

APPENDIX A

TRAFFIC VOLUME AND LEVEL OF SERVICE FIGURES

Figure A-1: Existing Traffic Volumes
Figure A-2: Existing + Site Traffic Volumes AM Peak Hour
Figure A-3: Existing + Site Traffic Volumes PM Peak Hour
Figure A-4: Future + Site Traffic Volumes AM Peak Hour
Figure A-5: Future + Site Traffic Volumes PM Peak Hour
Figure A-6: Existing Levels of Service AM Peak Hour
Figure A-7: Existing Levels of Service PM Peak Hour
Figure A-8: Existing + Site Levels of Service AM Peak Hour
Figure A-9: Existing + Site Levels of Service PM Peak Hour
Figure A-10: Future + Site Levels of Service AM Peak Hour
Figure A-11: Future + Site Levels of Service PM Peak Hour

EXISTING TRAFFIC VOLUMES

FIGURE A-1

PROJECT NUMBER 25043

DATE JULY 2025

MERGE MIDWEST ENGINEERING

Eisenhower Rd

347 (7)
12 (3)
690 (20)
14 (2)
24 (5)
32 (10)

DeSoto Rd

Pebble Beach Dr

Main St

506 (0)
10 (10)
32 (32)
10 (10)

Site Dr

503 (0)
3 (3)

Woodland Rd

8 (5)
840 (2)
27 (15)
13 (2)
5 (1)
1,069 (5)

489 (10)
27 (0)
79 (0)
29 (5)

Holiday Dr

427 (3)
20 (2)

Highland Rd

1 (0)
842 (4)
10 (0)
17 (0)
0 (0)
6 (0)
10 (0)
0 (0)
15 (3)
11 (1)
1,047 (6)
4 (0)

Holiday Terr

22 (2)
840 (5)
1 (0)
1 (0)
0 (0)
0 (0)
15 (5)
0 (0)
27 (15)
12 (5)
1,046 (2)
18 (0)

LEGEND

Site Generated Volume (vph)

500 (500)

Total Peak Volume (vph)

icle Movement

N

N.T.S.

EXISTING + SITE
TRAFFIC VOLUMES
AM PEAK HOUR

FIGURE A-2

PROJECT NUMBER
25043

DATE
JULY 2025

MERGE MIDWEST ENGINEERING

Eisenhower Rd

942 (23)
59 (12)
476 (14)
44 (6)
19 (3)
25 (7)

DeSoto Rd

Pebble Beach Dr

Main St

573 (0)
35 (35)
21 (21)
7 (7)

Site Dr

520 (0)
12 (12)

484 (7)
96 (0)
76 (0)
20 (4)

Holiday Dr

456 (12)
19 (6)

Woodland Rd

27 (17)
1,301 (6)
20 (10)
9 (1)
16 (2)
1,101 (3)

Highland Rd

8 (0)
1,287 (7)
15 (0)
17 (0)
0 (0)
3 (0)
5 (0)
0 (0)
14 (2)
10 (3)
1,095 (5)
10 (0)

Holiday Terr

63 (6)
1,238 (3)
3 (0)
2 (0)
0 (0)
1 (0)
34 (3)
1 (0)
27 (10)
39 (17)
1,079 (5)
8 (0)

LEGEND

Site Generated Volume (vph)

500 (500)

Total Peak Volume (vph)

icle Movement

N

N.T.S.

EXISTING + SITE
TRAFFIC VOLUMES
PM PEAK HOUR

FIGURE A-3

PROJECT NUMBER
25043

DATE
JULY 2025

MERGE MIDWEST ENGINEERING

FUTURE + SITE
TRAFFIC VOLUMES
AM PEAK HOUR

FIGURE A-4

PROJECT NUMBER
25043

DATE
JULY 2025

MERGE MIDWEST ENGINEERING

Eisenhower Rd

1,081 (23)
66 (12)
546 (14)
50 (6)
21 (3)
28 (7)

DeSoto Rd

Pebble Beach Dr

Main St

660 (0)
35 (35)
21 (21)
7 (7)

Site Dr

599 (0)
12 (12)

Woodland Rd

29 (17)
1,497 (6)
22 (10)
10 (1)
18 (2)
1,268 (3)

556 (7)
111 (0)
88 (0)
22 (4)

Holiday Dr

523 (12)
21 (6)

Highland Rd

9 (0)
1,481 (7)
17 (0)
20 (0)
0 (0)
3 (0)
6 (0)
0 (0)
16 (2)
11 (3)
1,260 (5)
12 (0)

Holiday Terr

72 (6)
1,425 (3)
3 (0)
2 (0)
0 (0)
1 (0)
39 (3)
1 (0)
30 (10)
42 (17)
1,242 (5)
9 (0)

LEGEND

Site Generated Volume (vph)

500 (500)

Total Peak Volume (vph)

icle Movement

N

N.T.S.

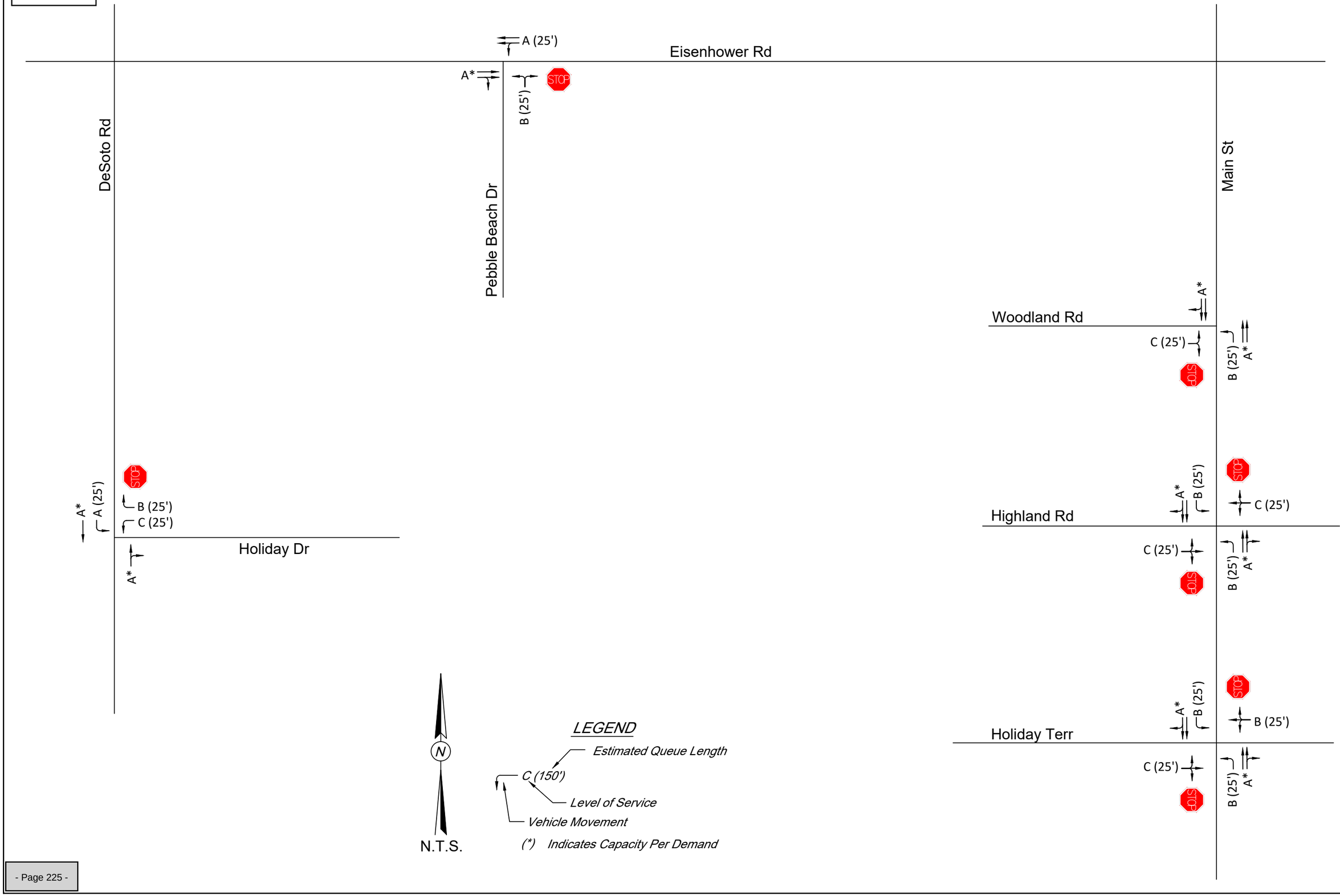
FUTURE + SITE
TRAFFIC VOLUMES
PM PEAK HOUR

FIGURE A-5

PROJECT NUMBER
25043

DATE
JULY 2025

MERGE MIDWEST ENGINEERING



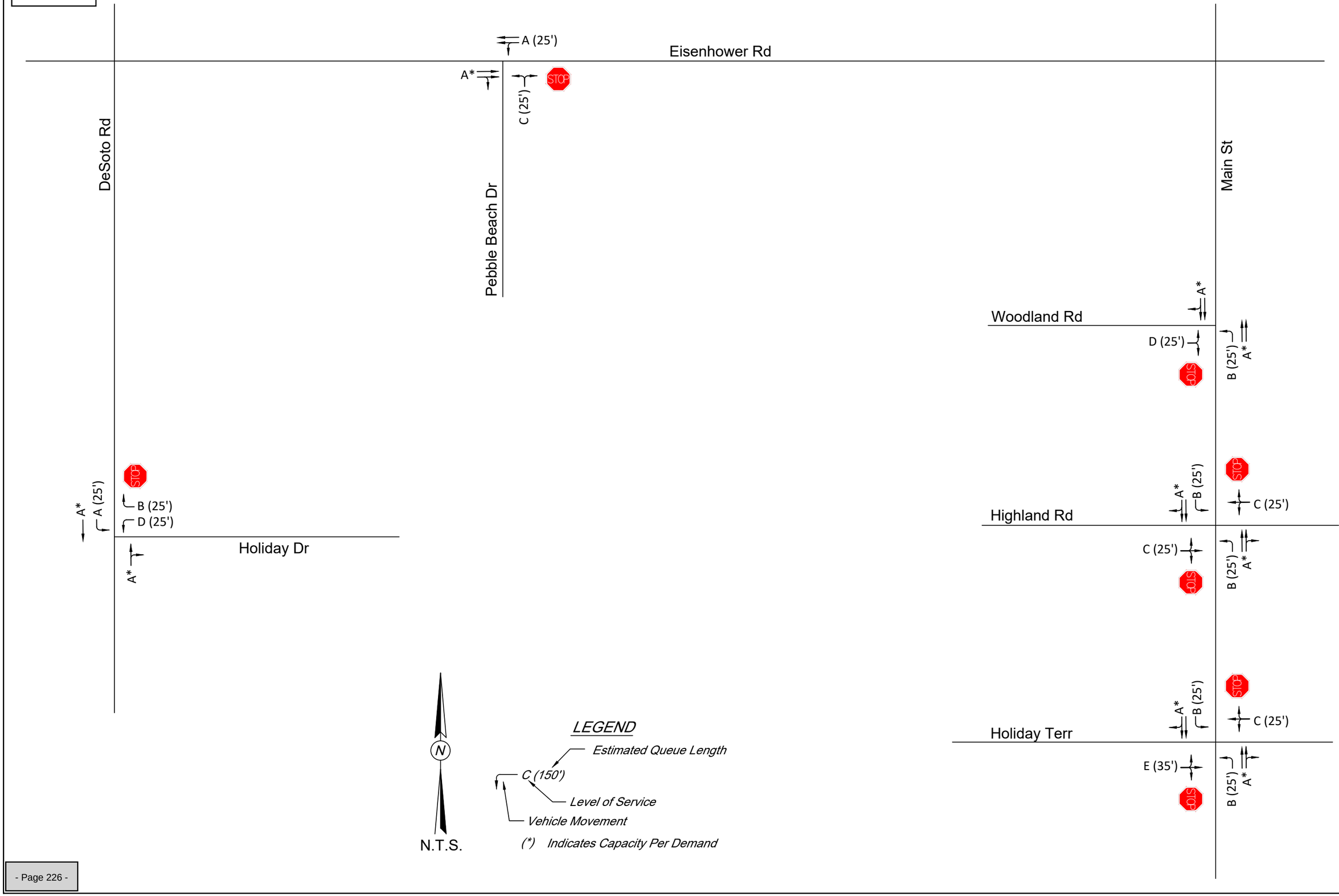
EXISTING
LEVELS OF SERVICE
AM PEAK HOUR

FIGURE A-6

PROJECT NUMBER
25043

DATE
JULY 2025

MERGE MIDWEST ENGINEERING



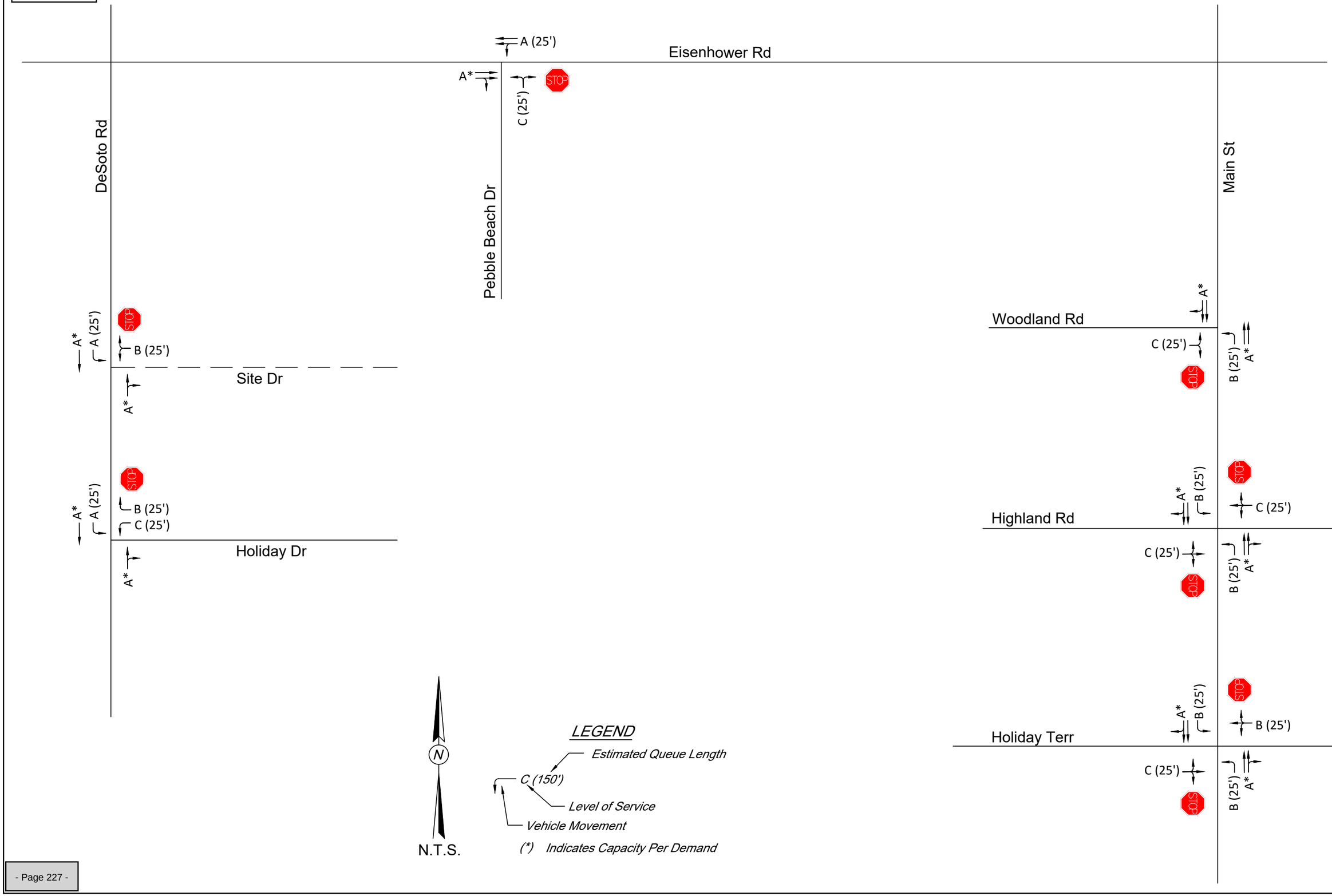
EXISTING
LEVELS OF SERVICE
PM PEAK HOUR

FIGURE A-7

PROJECT NUMBER
25043

DATE
JULY 2025

MERGE MIDWEST ENGINEERING



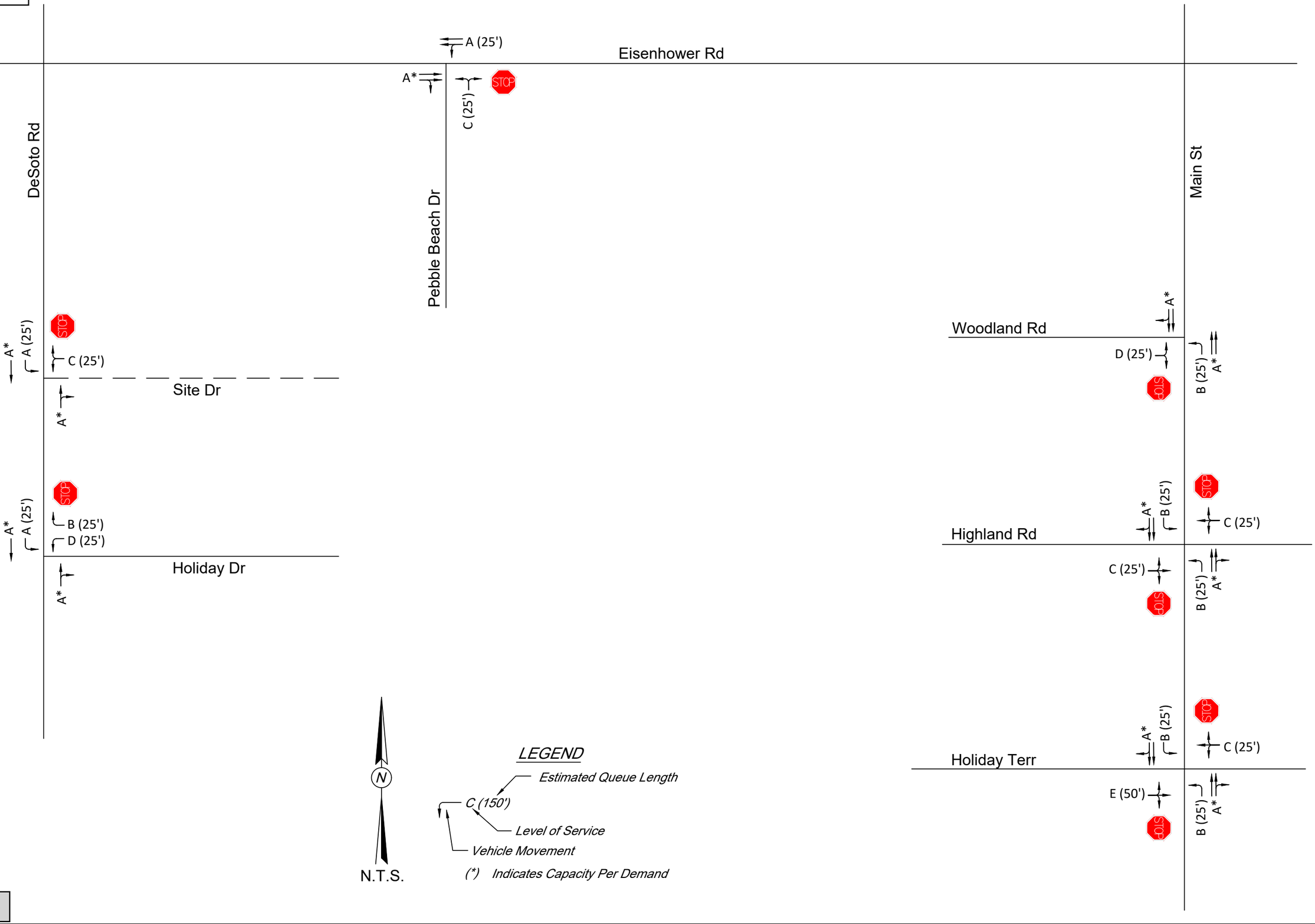
EXISTING + SITE
LEVELS OF SERVICE
AM PEAK HOUR

FIGURE A-8

PROJECT NUMBER
25043

DATE
JULY 2025

MERGE MIDWEST ENGINEERING



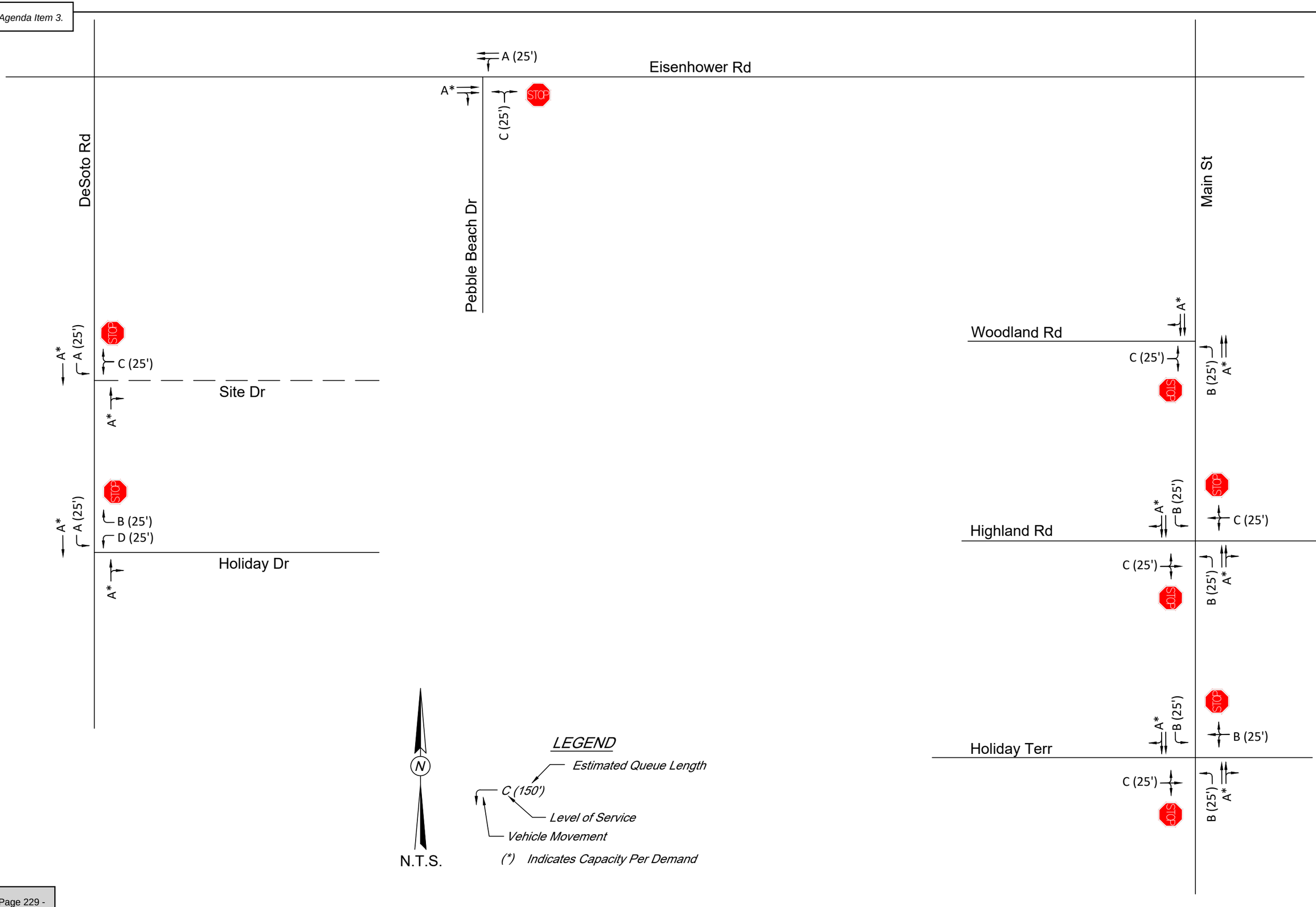
EXISTING + SITE
LEVELS OF SERVICE
PM PEAK HOUR

FIGURE A-9

PROJECT NUMBER
25043

DATE
JULY 2025

MERGE MIDWEST ENGINEERING



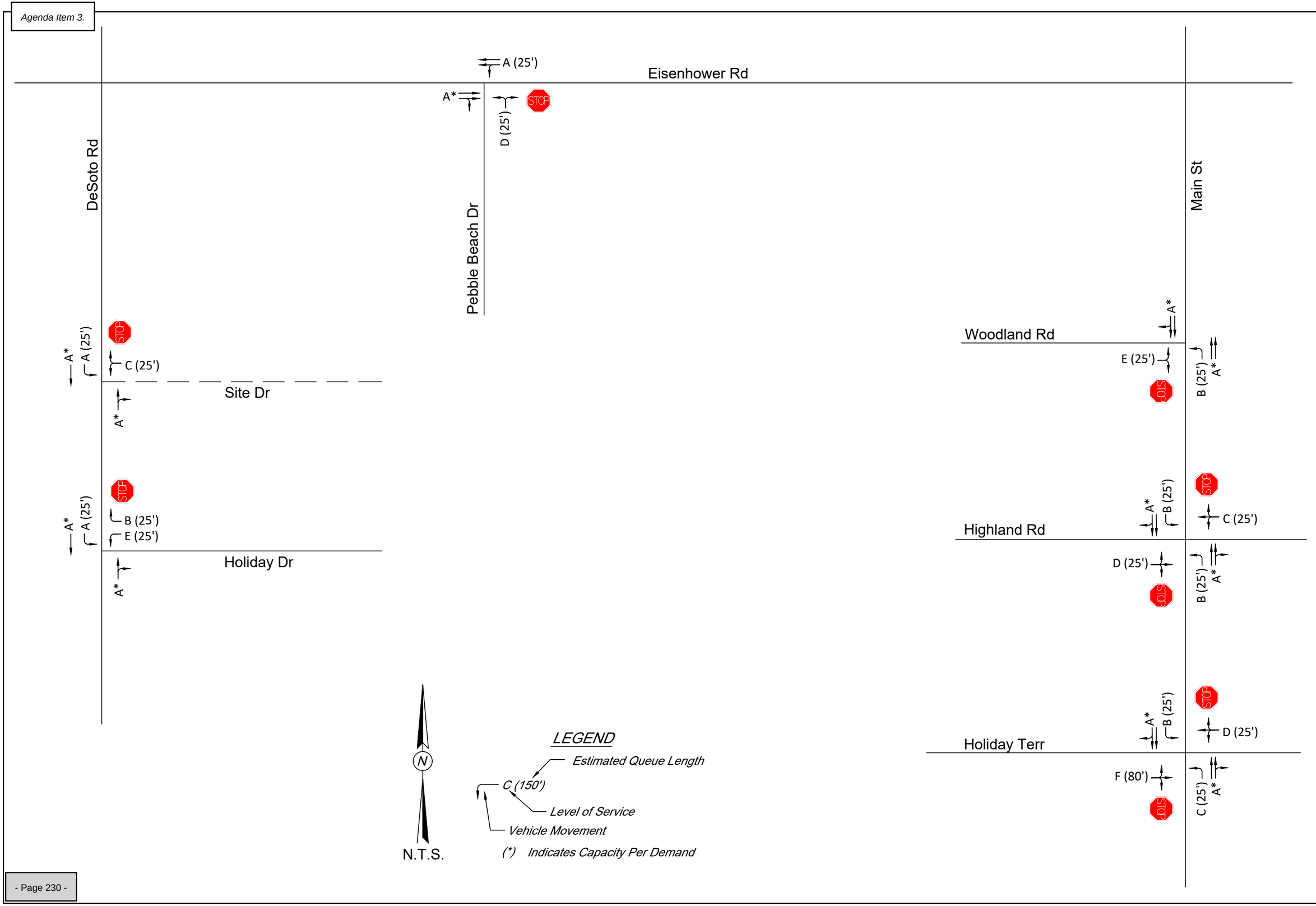
FUTURE + SITE
LEVELS OF SERVICE
AM PEAK HOUR

FIGURE A-10

PROJECT NUMBER
25043

DATE
JULY 2025

MERGE MIDWEST ENGINEERING



FUTURE + SITE
LEVELS OF SERVICE
PM PEAK HOUR

FIGURE A-11

PROJECT NUMBER
25043

DATE
JULY 2025

MERGE MIDWEST ENGINEERING

APPENDIX B

RAW TURNING MOVEMENT TRAFFIC COUNTS

DeSoto Road & Holiday Drive - TMC

Thu May 15, 2025
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1297568, Location: 39.258154, -94.918798

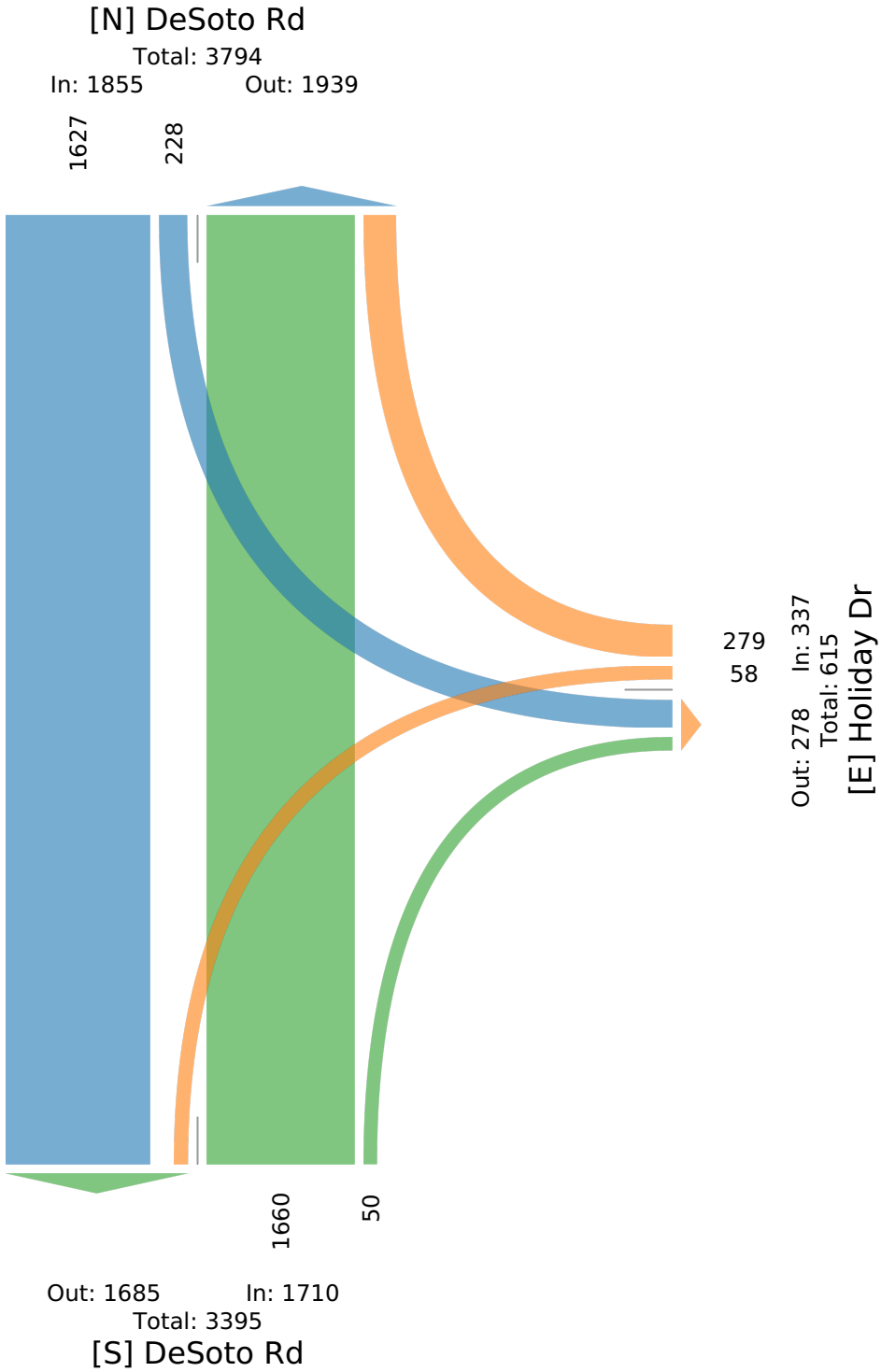
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	DeSoto Rd				Holiday Dr				DeSoto Rd				
Direction	Southbound				Westbound				Northbound				
Time	T	L	U	**App**	R	L	U	**App**	R	T	U	**App**	**Int**
2025-05-15 7:00AM	73	6	0	**79**	22	2	0	**24**	1	96	0	**97**	**200**
7:15AM	115	4	0	**119**	22	5	0	**27**	4	104	0	**108**	**254**
7:30AM	124	6	0	**130**	19	7	0	**26**	1	102	0	**103**	**259**
7:45AM	126	8	0	**134**	16	8	0	**24**	8	102	0	**110**	**268**
Hourly Total	438	24	0	**462**	79	22	0	**101**	14	404	0	**418**	**981**
8:00AM	114	9	0	**123**	22	4	0	**26**	5	116	0	**121**	**270**
8:15AM	72	9	0	**81**	13	1	0	**14**	4	90	0	**94**	**189**
8:30AM	65	8	0	**73**	18	2	0	**20**	0	69	0	**69**	**162**
8:45AM	48	7	0	**55**	9	5	0	**14**	1	60	0	**61**	**130**
Hourly Total	299	33	0	**332**	62	12	0	**74**	10	335	0	**345**	**751**
4:00PM	123	20	0	**143**	13	2	0	**15**	5	129	0	**134**	**292**
4:15PM	105	19	0	**124**	17	2	0	**19**	3	118	0	**121**	**264**
4:30PM	106	23	0	**129**	15	3	0	**18**	3	111	0	**114**	**261**
4:45PM	136	27	0	**163**	21	3	0	**24**	3	104	0	**107**	**294**
Hourly Total	470	89	0	**559**	66	10	0	**76**	14	462	0	**476**	**1111**
5:00PM	124	19	0	**143**	20	5	0	**25**	5	108	0	**113**	**281**
5:15PM	111	27	0	**138**	20	5	0	**25**	2	121	0	**123**	**286**
5:30PM	98	23	0	**121**	13	1	0	**14**	1	111	0	**112**	**247**
5:45PM	87	13	0	**100**	19	3	0	**22**	4	119	0	**123**	**245**
Hourly Total	420	82	0	**502**	72	14	0	**86**	12	459	0	**471**	**1059**
Total	1627	228	0	**1855**	279	58	0	**337**	50	1660	0	**1710**	**3902**
% Approach	87.7%	12.3%	0%	**-**	82.8%	17.2%	0%	**-**	2.9%	97.1%	0%	**-**	-
% Total	41.7%	5.8%	0%	**47.5%**	7.2%	1.5%	0%	**8.6%**	1.3%	42.5%	0%	**43.8%**	-
Lights	1609	228	0	**1837**	277	57	0	**334**	46	1647	0	**1693**	3864
% Lights	98.9%	100%	0%	**99.0%**	99.3%	98.3%	0%	**99.1%**	92.0%	99.2%	0%	**99.0%**	99.0%
Articulated Trucks	2	0	0	**2**	0	0	0	**0**	0	2	0	**2**	4
% Articulated Trucks	0.1%	0%	0%	**0.1%**	0%	0%	0%	**0%**	0%	0.1%	0%	**0.1%**	0.1%
Buses and Single-Unit Trucks	16	0	0	**16**	2	1	0	**3**	4	11	0	**15**	34
% Buses and Single-Unit Trucks	1.0%	0%	0%	**0.9%**	0.7%	1.7%	0%	**0.9%**	8.0%	0.7%	0%	**0.9%**	0.9%

*L: Left, R: Right, T: Thru, U: U-Turn

DeSoto Road & Holiday Drive - TMC
Thu May 15, 2025
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1297568, Location: 39.258154, -94.918798

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



DeSoto Road & Holiday Drive - TMC

Thu May 15, 2025
AM Peak (7:15 AM - 8:15 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1297568, Location: 39.258154, -94.918798

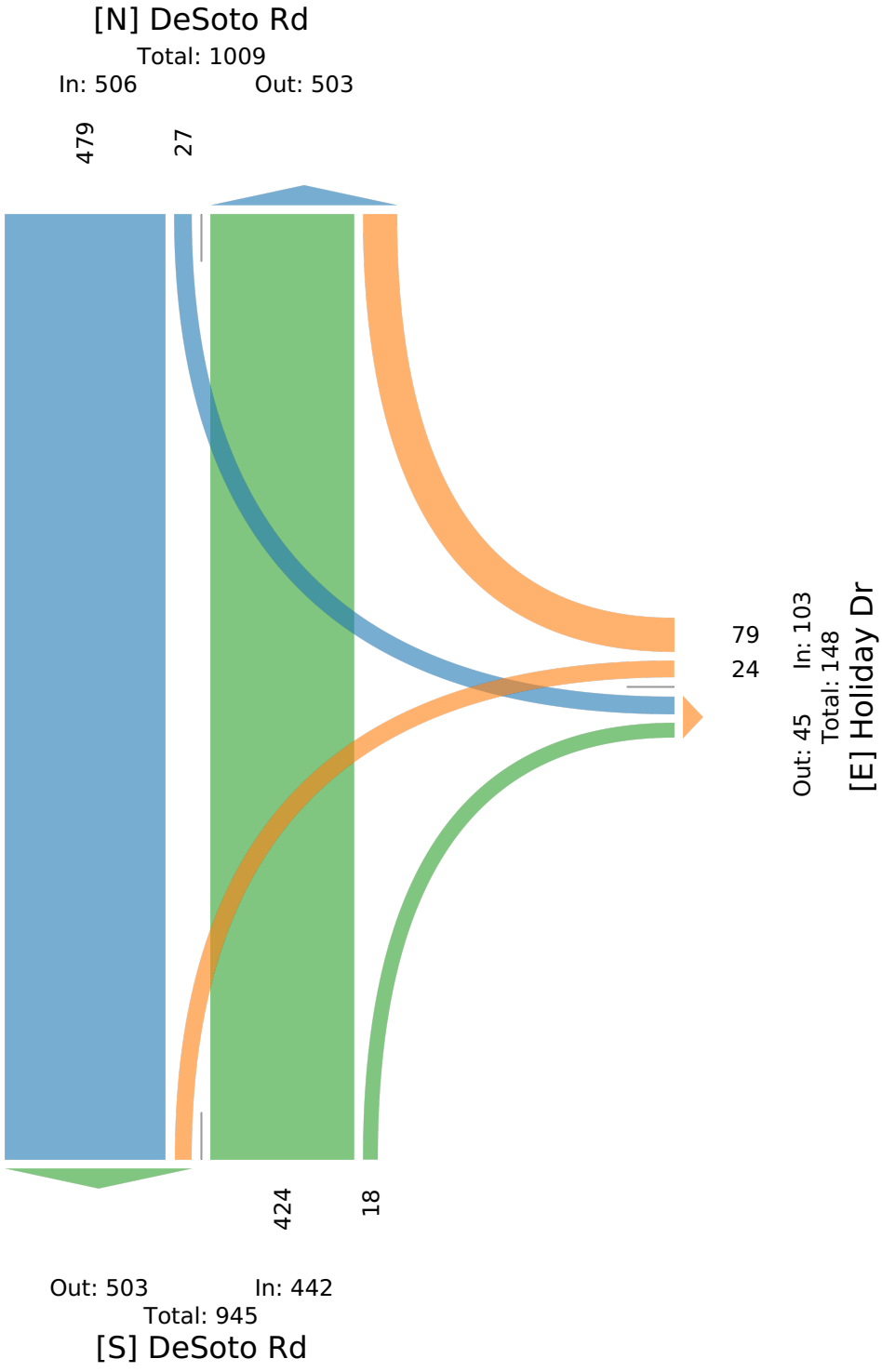
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	DeSoto Rd				Holiday Dr				DeSoto Rd				
Direction	Southbound				Westbound				Northbound				
Time	T	L	U	**App**	R	L	U	**App**	R	T	U	**App**	**Int**
2025-05-15 7:15AM	115	4	0	**119**	22	5	0	**27**	4	104	0	**108**	**254**
7:30AM	124	6	0	**130**	19	7	0	**26**	1	102	0	**103**	**259**
7:45AM	126	8	0	**134**	16	8	0	**24**	8	102	0	**110**	**268**
8:00AM	114	9	0	**123**	22	4	0	**26**	5	116	0	**121**	**270**
Total	479	27	0	**506**	79	24	0	**103**	18	424	0	**442**	**1051**
% Approach	94.7%	5.3%	0%	**-**	76.7%	23.3%	0%	**-**	4.1%	95.9%	0%	**-**	-
% Total	45.6%	2.6%	0%	**48.1%**	7.5%	2.3%	0%	**9.8%**	1.7%	40.3%	0%	**42.1%**	-
PHF	0.950	0.750	-	**0.944**	0.898	0.750	-	**0.954**	0.563	0.914	-	**0.913**	0.973
Lights	468	27	0	**495**	77	24	0	**101**	15	420	0	**435**	1031
% Lights	97.7%	100%	0%	**97.8%**	97.5%	100%	0%	**98.1%**	83.3%	99.1%	0%	**98.4%**	98.1%
Articulated Trucks	1	0	0	**1**	0	0	0	**0**	0	1	0	**1**	2
% Articulated Trucks	0.2%	0%	0%	**0.2%**	0%	0%	0%	**0%**	0%	0.2%	0%	**0.2%**	0.2%
Buses and Single-Unit Trucks	10	0	0	**10**	2	0	0	**2**	3	3	0	**6**	18
% Buses and Single-Unit Trucks	2.1%	0%	0%	**2.0%**	2.5%	0%	0%	**1.9%**	16.7%	0.7%	0%	**1.4%**	1.7%

*L: Left, R: Right, T: Thru, U: U-Turn

DeSoto Road & Holiday Drive - TMC
Thu May 15, 2025
AM Peak (7:15 AM - 8:15 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1297568, Location: 39.258154, -94.918798

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



DeSoto Road & Holiday Drive - TMC

Thu May 15, 2025
PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1297568, Location: 39.258154, -94.918798

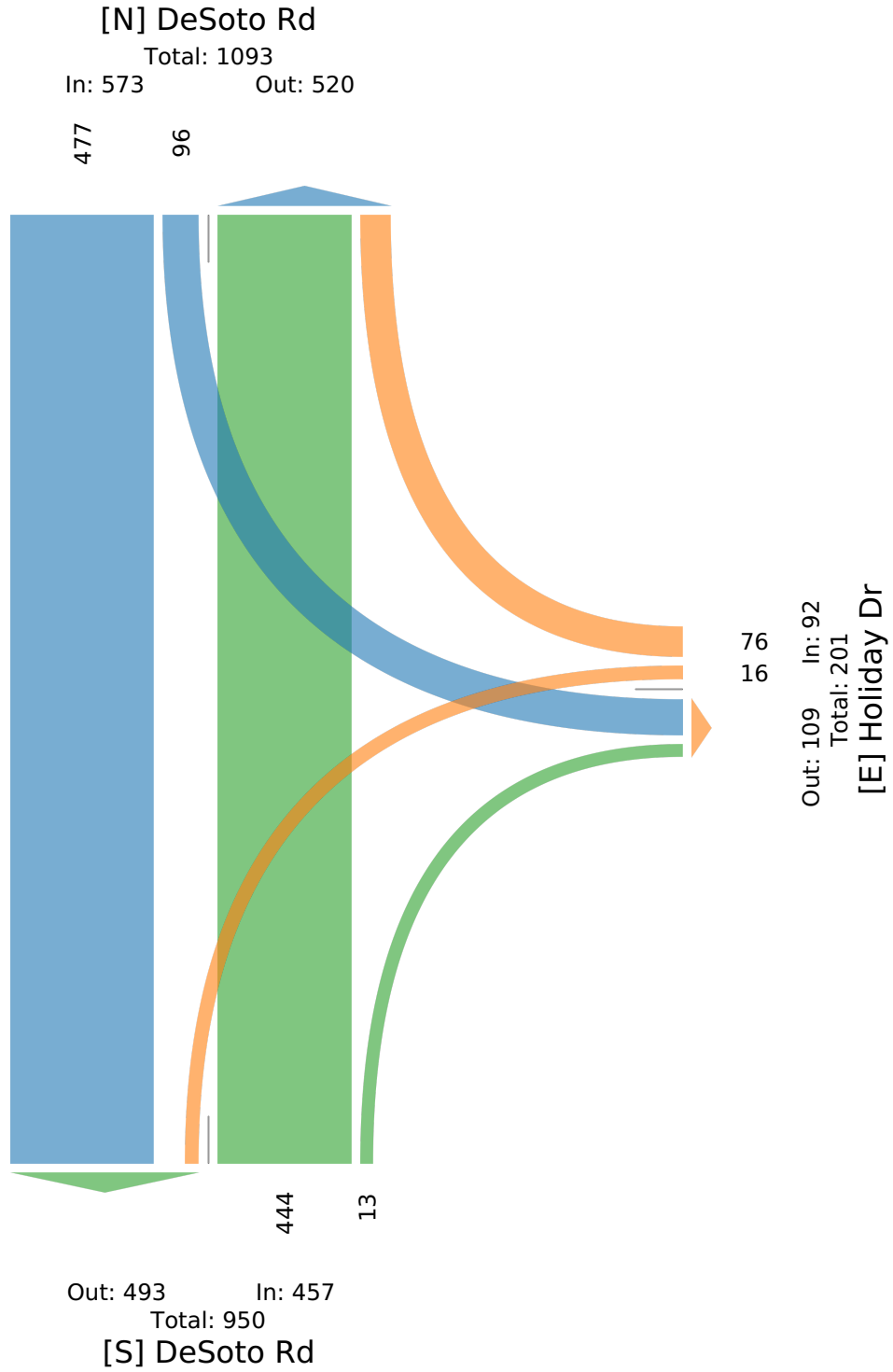
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	DeSoto Rd Southbound				Holiday Dr Westbound				DeSoto Rd Northbound				
Time	T	L	U	**App**	R	L	U	**App**	R	T	U	**App**	**Int**
2025-05-15 4:30PM	106	23	0	**129**	15	3	0	**18**	3	111	0	**114**	**261**
4:45PM	136	27	0	**163**	21	3	0	**24**	3	104	0	**107**	**294**
5:00PM	124	19	0	**143**	20	5	0	**25**	5	108	0	**113**	**281**
5:15PM	111	27	0	**138**	20	5	0	**25**	2	121	0	**123**	**286**
Total	477	96	0	**573**	76	16	0	**92**	13	444	0	**457**	**1122**
% Approach	83.2%	16.8%	0%	**-**	82.6%	17.4%	0%	**-**	2.8%	97.2%	0%	**-**	-
% Total	42.5%	8.6%	0%	**51.1%**	6.8%	1.4%	0%	**8.2%**	1.2%	39.6%	0%	**40.7%**	-
PHF	0.877	0.889	-	**0.879**	0.905	0.800	-	**0.920**	0.650	0.917	-	**0.929**	0.954
Lights	474	96	0	**570**	76	16	0	**92**	13	440	0	**453**	1115
% Lights	99.4%	100%	0%	**99.5%**	100%	100%	0%	**100%**	100%	99.1%	0%	**99.1%**	99.4%
Articulated Trucks	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
% Articulated Trucks	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%
Buses and Single-Unit Trucks	3	0	0	**3**	0	0	0	**0**	0	4	0	**4**	7
% Buses and Single-Unit Trucks	0.6%	0%	0%	**0.5%**	0%	0%	0%	**0%**	0%	0.9%	0%	**0.9%**	0.6%

*L: Left, R: Right, T: Thru, U: U-Turn

DeSoto Road & Holiday Drive - TMC
Thu May 15, 2025
PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1297568, Location: 39.258154, -94.918798

GHA GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Eisenhower Road & Pebble Beach Drive - TMC

Thu May 15, 2025
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1297569, Location: 39.266823, -94.911764

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

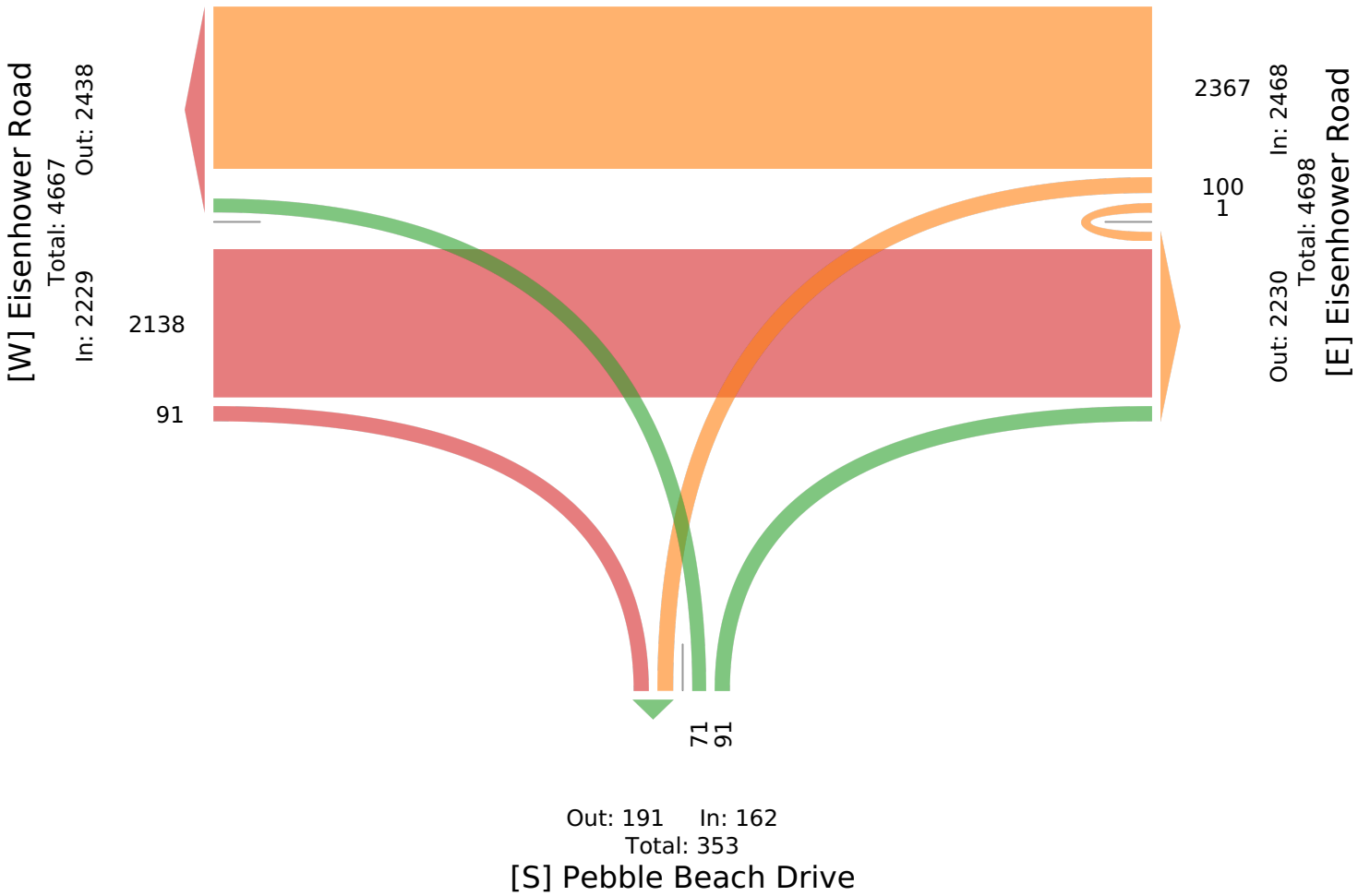
Leg	Eisenhower Road				Pebble Beach Drive				Eisenhower Road				
Direction	Westbound				Northbound				Eastbound				
Time	T	L	U	**App**	R	L	U	**App**	R	T	U	**App**	**Int**
2025-05-15 7:00AM	58	0	0	**58**	1	6	0	**7**	8	144	0	**152**	**217**
7:15AM	86	2	0	**88**	3	4	0	**7**	2	172	0	**174**	**269**
7:30AM	72	2	1	**75**	9	6	0	**15**	3	168	0	**171**	**261**
7:45AM	86	3	0	**89**	8	6	0	**14**	1	165	0	**166**	**269**
Hourly Total	302	7	1	**310**	21	22	0	**43**	14	649	0	**663**	**1016**
8:00AM	96	2	0	**98**	2	3	0	**5**	6	165	0	**171**	**274**
8:15AM	83	3	0	**86**	6	2	0	**8**	4	141	0	**145**	**239**
8:30AM	87	2	0	**89**	6	9	0	**15**	2	109	0	**111**	**215**
8:45AM	106	2	0	**108**	3	5	0	**8**	1	123	0	**124**	**240**
Hourly Total	372	9	0	**381**	17	19	0	**36**	13	538	0	**551**	**968**
4:00PM	234	15	0	**249**	7	3	0	**10**	12	132	0	**144**	**403**
4:15PM	203	11	0	**214**	12	2	0	**14**	4	121	0	**125**	**353**
4:30PM	220	17	0	**237**	4	2	0	**6**	10	114	0	**124**	**367**
4:45PM	211	5	0	**216**	8	4	0	**12**	9	115	0	**124**	**352**
Hourly Total	868	48	0	**916**	31	11	0	**42**	35	482	0	**517**	**1475**
5:00PM	266	13	0	**279**	4	7	0	**11**	13	119	0	**132**	**422**
5:15PM	222	12	0	**234**	2	3	0	**5**	6	114	0	**120**	**359**
5:30PM	186	5	0	**191**	9	6	0	**15**	5	119	0	**124**	**330**
5:45PM	151	6	0	**157**	7	3	0	**10**	5	117	0	**122**	**289**
Hourly Total	825	36	0	**861**	22	19	0	**41**	29	469	0	**498**	**1400**
Total	2367	100	1	**2468**	91	71	0	**162**	91	2138	0	**2229**	**4859**
% Approach	95.9%	4.1%	0%	**-**	56.2%	43.8%	0%	**-**	4.1%	95.9%	0%	**-**	-
% Total	48.7%	2.1%	0%	**50.8%**	1.9%	1.5%	0%	**3.3%**	1.9%	44.0%	0%	**45.9%**	-
Lights	2318	98	1	**2417**	91	71	0	**162**	89	2096	0	**2185**	4764
% Lights	97.9%	98.0%	100%	**97.9%**	100%	100%	0%	**100%**	97.8%	98.0%	0%	**98.0%**	98.0%
Articulated Trucks	2	0	0	**2**	0	0	0	**0**	0	8	0	**8**	10
% Articulated Trucks	0.1%	0%	0%	**0.1%**	0%	0%	0%	**0%**	0%	0.4%	0%	**0.4%**	0.2%
Buses and Single-Unit Trucks	47	2	0	**49**	0	0	0	**0**	2	34	0	**36**	85
% Buses and Single-Unit Trucks	2.0%	2.0%	0%	**2.0%**	0%	0%	0%	**0%**	2.2%	1.6%	0%	**1.6%**	1.7%

*L: Left, R: Right, T: Thru, U: U-Turn

Eisenhower Road & Pebble Beach Drive - TMC

Thu May 15, 2025
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1297569, Location: 39.266823, -94.911764

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Eisenhower Road & Pebble Beach Drive - TMC

Thu May 15, 2025
AM Peak (7:15 AM - 8:15 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1297569, Location: 39.266823, -94.911764

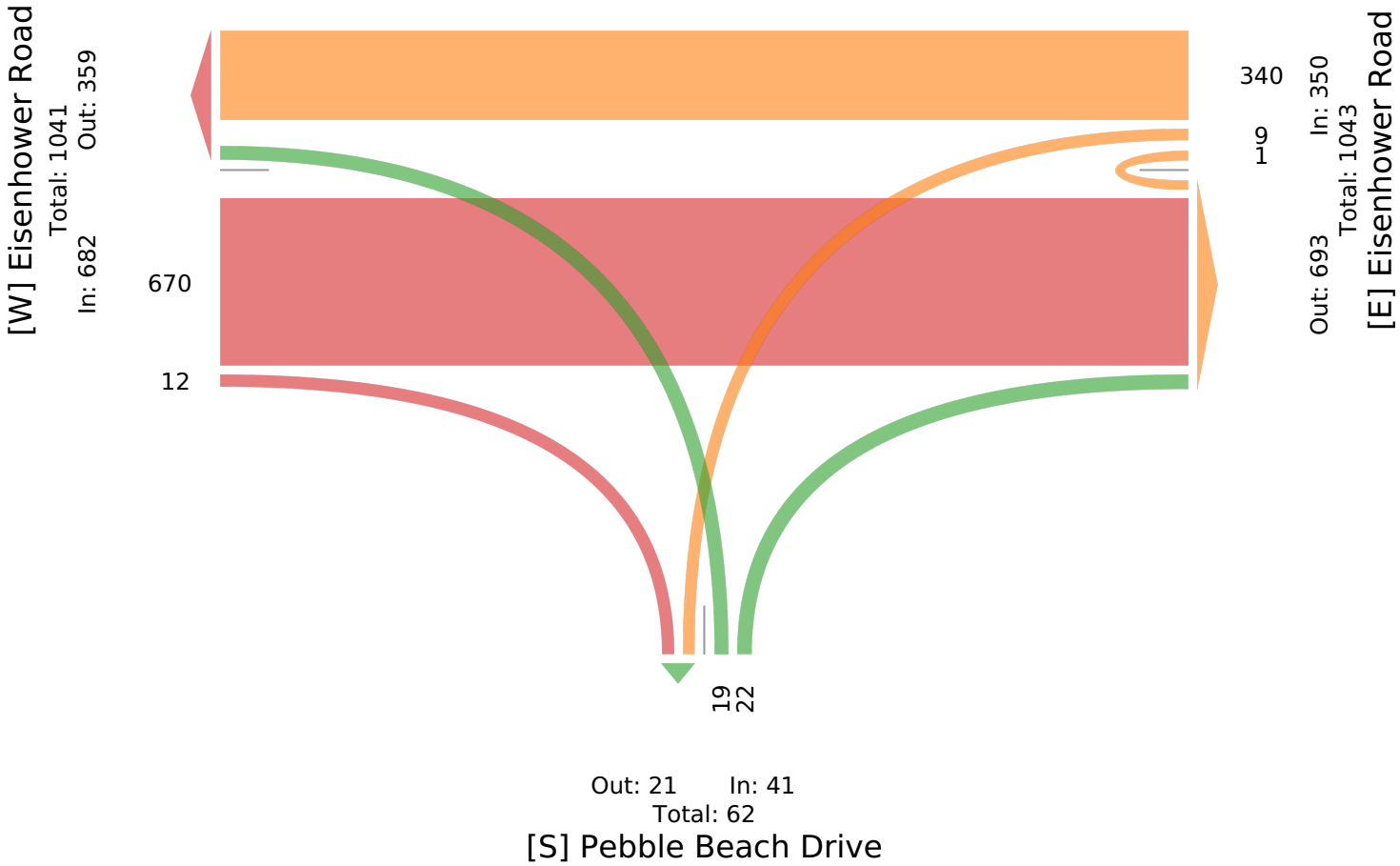
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Eisenhower Road				Pebble Beach Drive				Eisenhower Road				
Direction	Westbound				Northbound				Eastbound				
Time	T	L	U	**App**	R	L	U	**App**	R	T	U	**App**	**Int**
2025-05-15 7:15AM	86	2	0	**88**	3	4	0	**7**	2	172	0	**174**	**269**
7:30AM	72	2	1	**75**	9	6	0	**15**	3	168	0	**171**	**261**
7:45AM	86	3	0	**89**	8	6	0	**14**	1	165	0	**166**	**269**
8:00AM	96	2	0	**98**	2	3	0	**5**	6	165	0	**171**	**274**
Total	340	9	1	**350**	22	19	0	**41**	12	670	0	**682**	**1073**
% Approach	97.1%	2.6%	0.3%	**-**	53.7%	46.3%	0%	**-**	1.8%	98.2%	0%	**-**	-
% Total	31.7%	0.8%	0.1%	**32.6%**	2.1%	1.8%	0%	**3.8%**	1.1%	62.4%	0%	**63.6%**	-
PHF	0.885	0.750	0.250	**0.893**	0.611	0.792	-	**0.683**	0.500	0.974	-	**0.980**	0.979
Lights	329	8	1	**338**	22	19	0	**41**	11	655	0	**666**	1045
% Lights	96.8%	88.9%	100%	**96.6%**	100%	100%	0%	**100%**	91.7%	97.8%	0%	**97.7%**	97.4%
Articulated Trucks	0	0	0	**0**	0	0	0	**0**	0	3	0	**3**	3
% Articulated Trucks	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%	0.4%	0%	**0.4%**	0.3%
Buses and Single-Unit Trucks	11	1	0	**12**	0	0	0	**0**	1	12	0	**13**	25
% Buses and Single-Unit Trucks	3.2%	11.1%	0%	**3.4%**	0%	0%	0%	**0%**	8.3%	1.8%	0%	**1.9%**	2.3%

*L: Left, R: Right, T: Thru, U: U-Turn

Eisenhower Road & Pebble Beach Drive - TMC
Thu May 15, 2025
AM Peak (7:15 AM - 8:15 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1297569, Location: 39.266823, -94.911764

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Eisenhower Road & Pebble Beach Drive - TMC

Thu May 15, 2025
PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1297569, Location: 39.266823, -94.911764

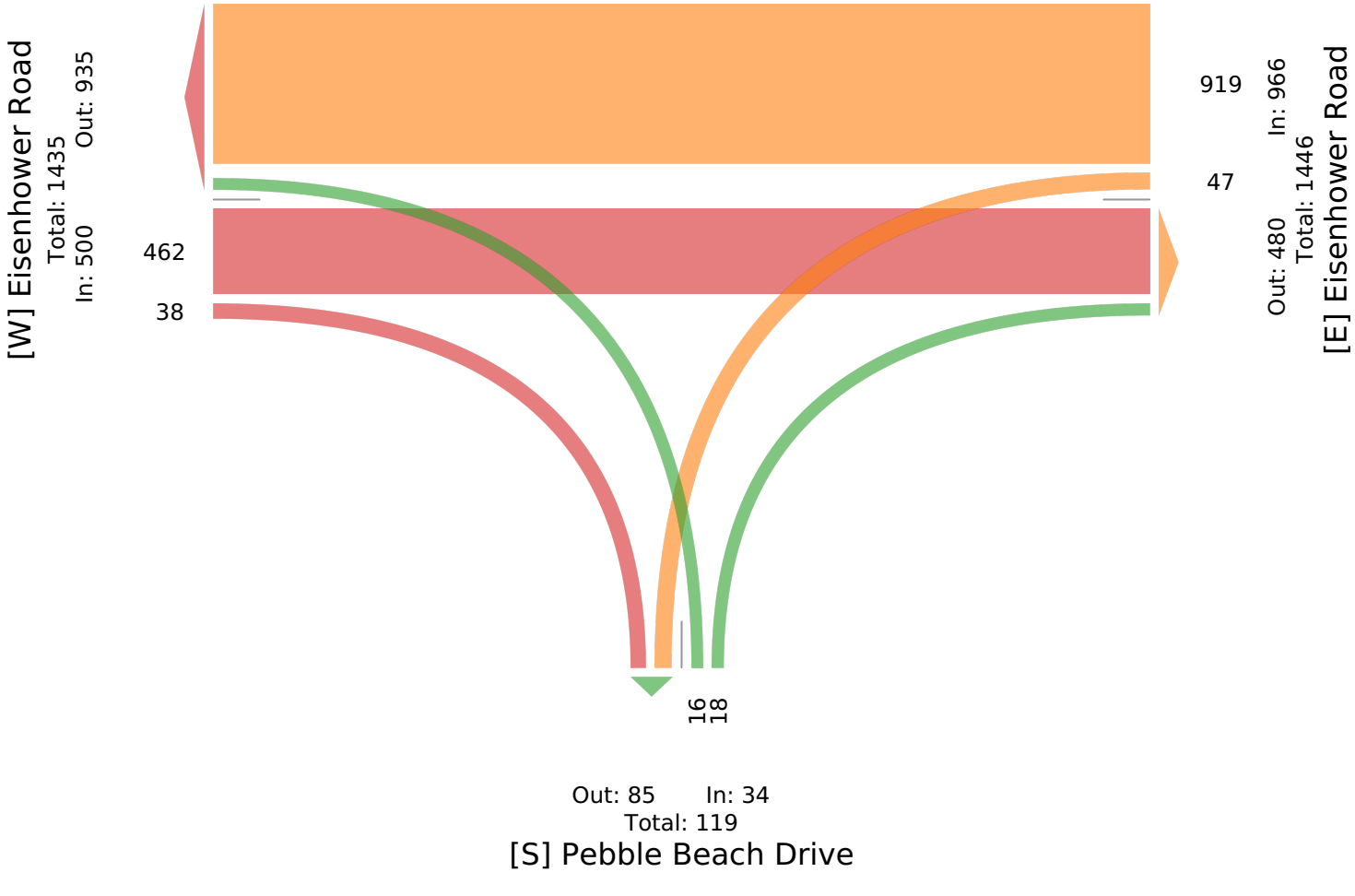
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Eisenhower Road				Pebble Beach Drive				Eisenhower Road				
Direction	Westbound				Northbound				Eastbound				
Time	T	L	U	**App**	R	L	U	**App**	R	T	U	**App**	**Int**
2025-05-15 4:30PM	220	17	0	**237**	4	2	0	**6**	10	114	0	**124**	**367**
4:45PM	211	5	0	**216**	8	4	0	**12**	9	115	0	**124**	**352**
5:00PM	266	13	0	**279**	4	7	0	**11**	13	119	0	**132**	**422**
5:15PM	222	12	0	**234**	2	3	0	**5**	6	114	0	**120**	**359**
Total	919	47	0	**966**	18	16	0	**34**	38	462	0	**500**	**1500**
% Approach	95.1%	4.9%	0%	**-**	52.9%	47.1%	0%	**-**	7.6%	92.4%	0%	**-**	-
% Total	61.3%	3.1%	0%	**64.4%**	1.2%	1.1%	0%	**2.3%**	2.5%	30.8%	0%	**33.3%**	-
PHF	0.864	0.691	-	**0.866**	0.563	0.571	-	**0.708**	0.731	0.971	-	**0.947**	0.889
Lights	911	47	0	**958**	18	16	0	**34**	38	456	0	**494**	1486
% Lights	99.1%	100%	0%	**99.2%**	100%	100%	0%	**100%**	100%	98.7%	0%	**98.8%**	99.1%
Articulated Trucks	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
% Articulated Trucks	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%
Buses and Single-Unit Trucks	8	0	0	**8**	0	0	0	**0**	0	6	0	**6**	14
% Buses and Single-Unit Trucks	0.9%	0%	0%	**0.8%**	0%	0%	0%	**0%**	0%	1.3%	0%	**1.2%**	0.9%

*L: Left, R: Right, T: Thru, U: U-Turn

Eisenhower Road & Pebble Beach Drive - TMC
Thu May 15, 2025
PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1297569, Location: 39.266823, -94.911764

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Main Street & Woodland Road - TMC

Thu May 15, 2025
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1297570, Location: 39.261546, -94.899957

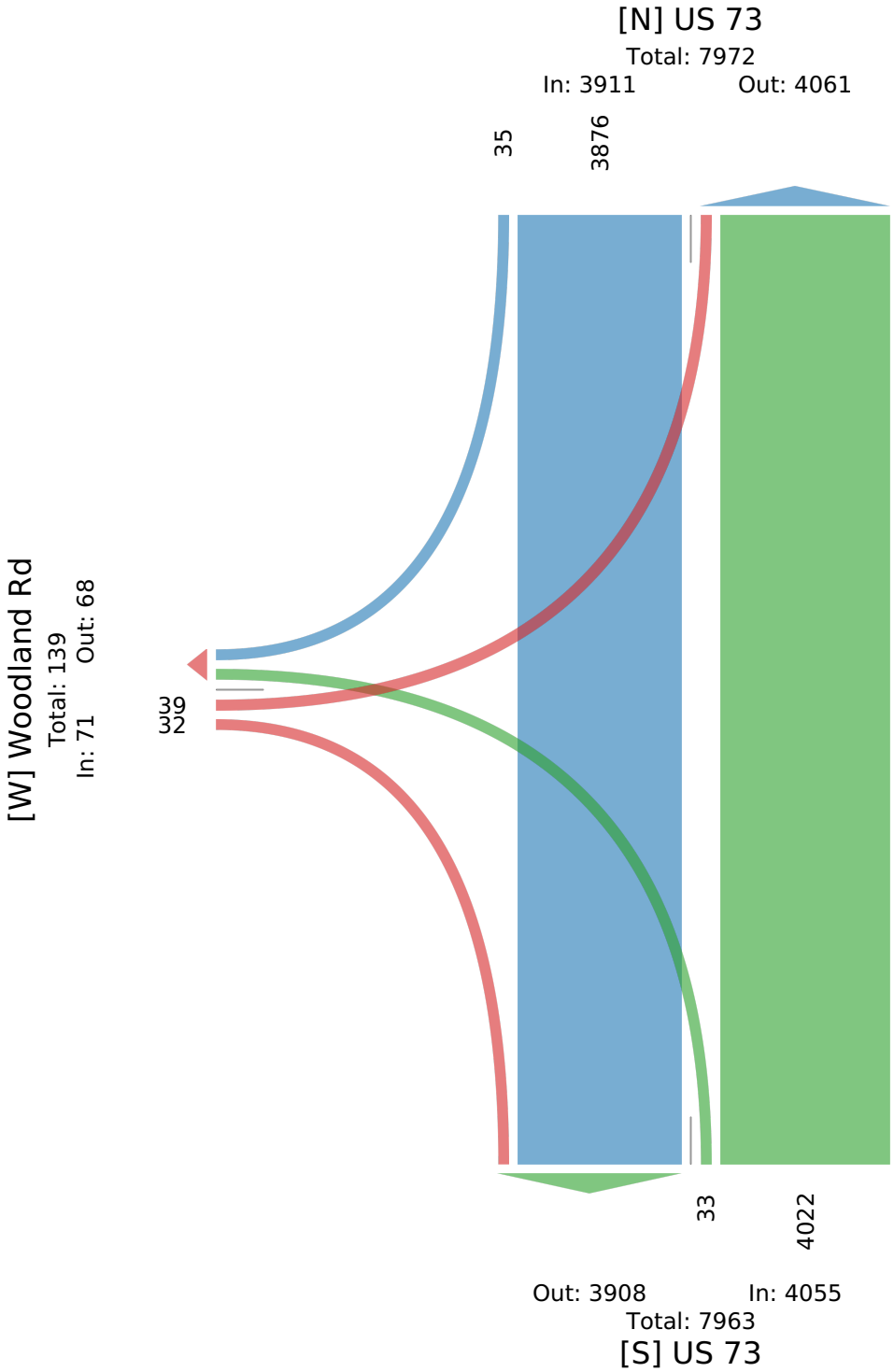
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	US 73				US 73				Woodland Rd				
Direction	Southbound				Northbound				Eastbound				
Time	R	T	U	**App**	T	L	U	**App**	R	L	U	**App**	**Int**
2025-05-15 7:00AM	1	175	0	**176**	237	0	0	**237**	2	2	0	**4**	**417**
7:15AM	0	223	0	**223**	255	1	0	**256**	3	4	0	**7**	**486**
7:30AM	2	202	0	**204**	274	0	0	**274**	3	2	0	**5**	**483**
7:45AM	0	229	0	**229**	268	1	0	**269**	4	3	0	**7**	**505**
Hourly Total	3	829	0	**832**	1034	2	0	**1036**	12	11	0	**23**	**1891**
8:00AM	1	175	0	**176**	258	2	0	**260**	1	3	0	**4**	**440**
8:15AM	1	218	0	**219**	222	0	0	**222**	1	0	0	**1**	**442**
8:30AM	2	165	0	**167**	186	1	0	**187**	2	2	0	**4**	**358**
8:45AM	0	176	0	**176**	241	2	0	**243**	1	1	0	**2**	**421**
Hourly Total	4	734	0	**738**	907	5	0	**912**	5	6	0	**11**	**1661**
4:00PM	2	365	0	**367**	278	2	0	**280**	2	1	0	**3**	**650**
4:15PM	2	324	0	**326**	280	6	0	**286**	1	4	0	**5**	**617**
4:30PM	5	320	0	**325**	250	4	0	**254**	3	4	0	**7**	**586**
4:45PM	1	286	0	**287**	264	2	0	**266**	2	1	0	**3**	**556**
Hourly Total	10	1295	0	**1305**	1072	14	0	**1086**	8	10	0	**18**	**2409**
5:00PM	5	314	0	**319**	292	2	0	**294**	2	5	0	**7**	**620**
5:15PM	6	269	0	**275**	241	3	0	**244**	2	3	0	**5**	**524**
5:30PM	3	208	0	**211**	253	5	0	**258**	3	2	0	**5**	**474**
5:45PM	4	227	0	**231**	223	2	0	**225**	0	2	0	**2**	**458**
Hourly Total	18	1018	0	**1036**	1009	12	0	**1021**	7	12	0	**19**	**2076**
Total	35	3876	0	**3911**	4022	33	0	**4055**	32	39	0	**71**	**8037**
% Approach	0.9%	99.1%	0%	**-**	99.2%	0.8%	0%	**-**	45.1%	54.9%	0%	**-**	-
% Total	0.4%	48.2%	0%	**48.7%**	50.0%	0.4%	0%	**50.5%**	0.4%	0.5%	0%	**0.9%**	-
Lights	34	3751	0	**3785**	3888	32	0	**3920**	29	39	0	**68**	7773
% Lights	97.1%	96.8%	0%	**96.8%**	96.7%	97.0%	0%	**96.7%**	90.6%	100%	0%	**95.8%**	96.7%
Articulated Trucks	0	54	0	**54**	49	0	0	**49**	0	0	0	**0**	103
% Articulated Trucks	0%	1.4%	0%	**1.4%**	1.2%	0%	0%	**1.2%**	0%	0%	0%	**0%**	1.3%
Buses and Single-Unit Trucks	1	71	0	**72**	85	1	0	**86**	3	0	0	**3**	161
% Buses and Single-Unit Trucks	2.9%	1.8%	0%	**1.8%**	2.1%	3.0%	0%	**2.1%**	9.4%	0%	0%	**4.2%**	2.0%

*L: Left, R: Right, T: Thru, U: U-Turn

Main Street & Woodland Road - TMC
Thu May 15, 2025
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1297570, Location: 39.261546, -94.899957

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Main Street & Woodland Road - TMC

Thu May 15, 2025
AM Peak (7:15 AM - 8:15 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1297570, Location: 39.261546, -94.899957

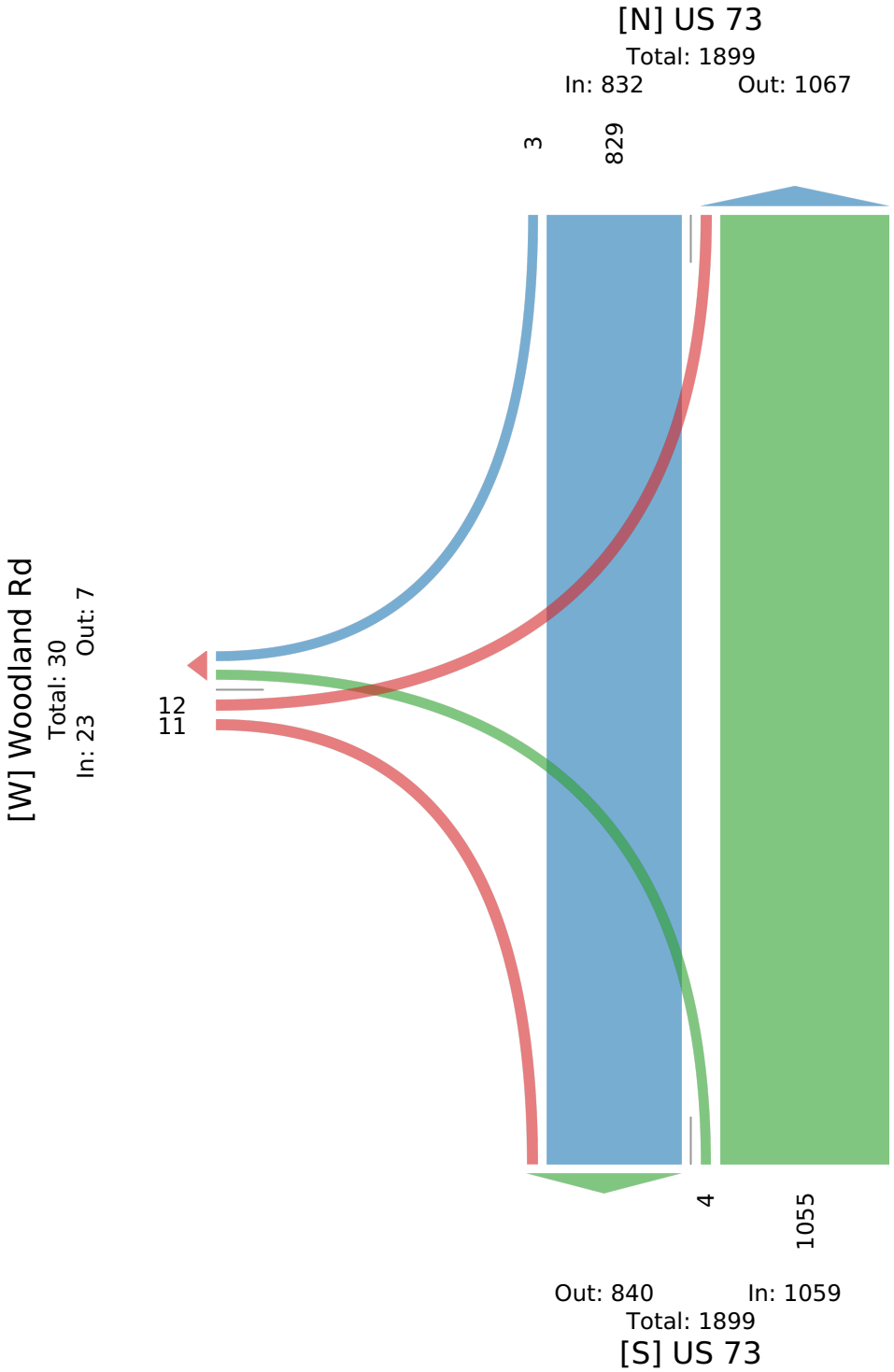
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	US 73				US 73				Woodland Rd				
Direction	Southbound				Northbound				Eastbound				
Time	R	T	U	**App**	T	L	U	**App**	R	L	U	**App**	**Int**
2025-05-15 7:15AM	0	223	0	**223**	255	1	0	**256**	3	4	0	**7**	**486**
7:30AM	2	202	0	**204**	274	0	0	**274**	3	2	0	**5**	**483**
7:45AM	0	229	0	**229**	268	1	0	**269**	4	3	0	**7**	**505**
8:00AM	1	175	0	**176**	258	2	0	**260**	1	3	0	**4**	**440**
Total	3	829	0	**832**	1055	4	0	**1059**	11	12	0	**23**	**1914**
% Approach	0.4%	99.6%	0%	**-**	99.6%	0.4%	0%	**-**	47.8%	52.2%	0%	**-**	-
% Total	0.2%	43.3%	0%	**43.5%**	55.1%	0.2%	0%	**55.3%**	0.6%	0.6%	0%	**1.2%**	-
PHF	0.375	0.905	-	**0.908**	0.963	0.500	-	**0.966**	0.688	0.750	-	**0.821**	0.948
Lights	3	781	0	**784**	1010	3	0	**1013**	10	12	0	**22**	1819
% Lights	100%	94.2%	0%	**94.2%**	95.7%	75.0%	0%	**95.7%**	90.9%	100%	0%	**95.7%**	95.0%
Articulated Trucks	0	20	0	**20**	19	0	0	**19**	0	0	0	**0**	39
% Articulated Trucks	0%	2.4%	0%	**2.4%**	1.8%	0%	0%	**1.8%**	0%	0%	0%	**0%**	2.0%
Buses and Single-Unit Trucks	0	28	0	**28**	26	1	0	**27**	1	0	0	**1**	56
% Buses and Single-Unit Trucks	0%	3.4%	0%	**3.4%**	2.5%	25.0%	0%	**2.5%**	9.1%	0%	0%	**4.3%**	2.9%

*L: Left, R: Right, T: Thru, U: U-Turn

Main Street & Woodland Road - TMC
Thu May 15, 2025
AM Peak (7:15 AM - 8:15 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1297570, Location: 39.261546, -94.899957

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Main Street & Woodland Road - TMC

Thu May 15, 2025
PM Peak (4 PM - 5 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1297570, Location: 39.261546, -94.899957

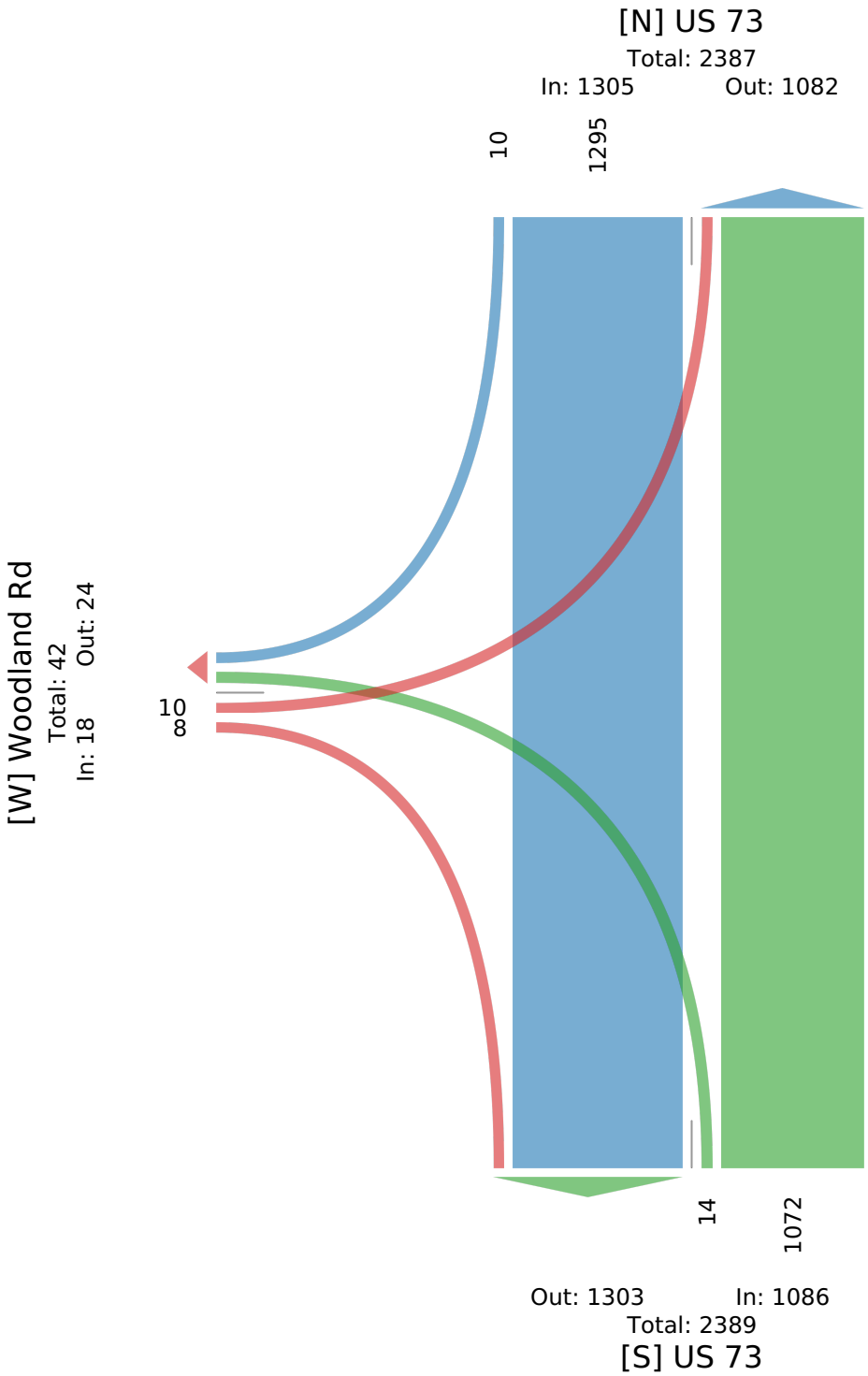
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	US 73				US 73				Woodland Rd				
Direction	Southbound				Northbound				Eastbound				
Time	R	T	U	**App**	T	L	U	**App**	R	L	U	**App**	**Int**
2025-05-15 4:00PM	2	365	0	**367**	278	2	0	**280**	2	1	0	**3**	**650**
4:15PM	2	324	0	**326**	280	6	0	**286**	1	4	0	**5**	**617**
4:30PM	5	320	0	**325**	250	4	0	**254**	3	4	0	**7**	**586**
4:45PM	1	286	0	**287**	264	2	0	**266**	2	1	0	**3**	**556**
Total	10	1295	0	**1305**	1072	14	0	**1086**	8	10	0	**18**	**2409**
% Approach	0.8%	99.2%	0%	**-**	98.7%	1.3%	0%	**-**	44.4%	55.6%	0%	**-**	-
% Total	0.4%	53.8%	0%	**54.2%**	44.5%	0.6%	0%	**45.1%**	0.3%	0.4%	0%	**0.7%**	-
PHF	0.500	0.887	-	**0.889**	0.957	0.583	-	**0.949**	0.667	0.625	-	**0.643**	0.927
Lights	10	1270	0	**1280**	1049	14	0	**1063**	7	10	0	**17**	2360
% Lights	100%	98.1%	0%	**98.1%**	97.9%	100%	0%	**97.9%**	87.5%	100%	0%	**94.4%**	98.0%
Articulated Trucks	0	8	0	**8**	8	0	0	**8**	0	0	0	**0**	16
% Articulated Trucks	0%	0.6%	0%	**0.6%**	0.7%	0%	0%	**0.7%**	0%	0%	0%	**0%**	0.7%
Buses and Single-Unit Trucks	0	17	0	**17**	15	0	0	**15**	1	0	0	**1**	33
% Buses and Single-Unit Trucks	0%	1.3%	0%	**1.3%**	1.4%	0%	0%	**1.4%**	12.5%	0%	0%	**5.6%**	1.4%

*L: Left, R: Right, T: Thru, U: U-Turn

Main Street & Woodland Road - TMC
Thu May 15, 2025
PM Peak (4 PM - 5 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1297570, Location: 39.261546, -94.899957

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Main Street & Highland Road - TMC

Thu May 15, 2025
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1297571, Location: 39.26005, -94.899946

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

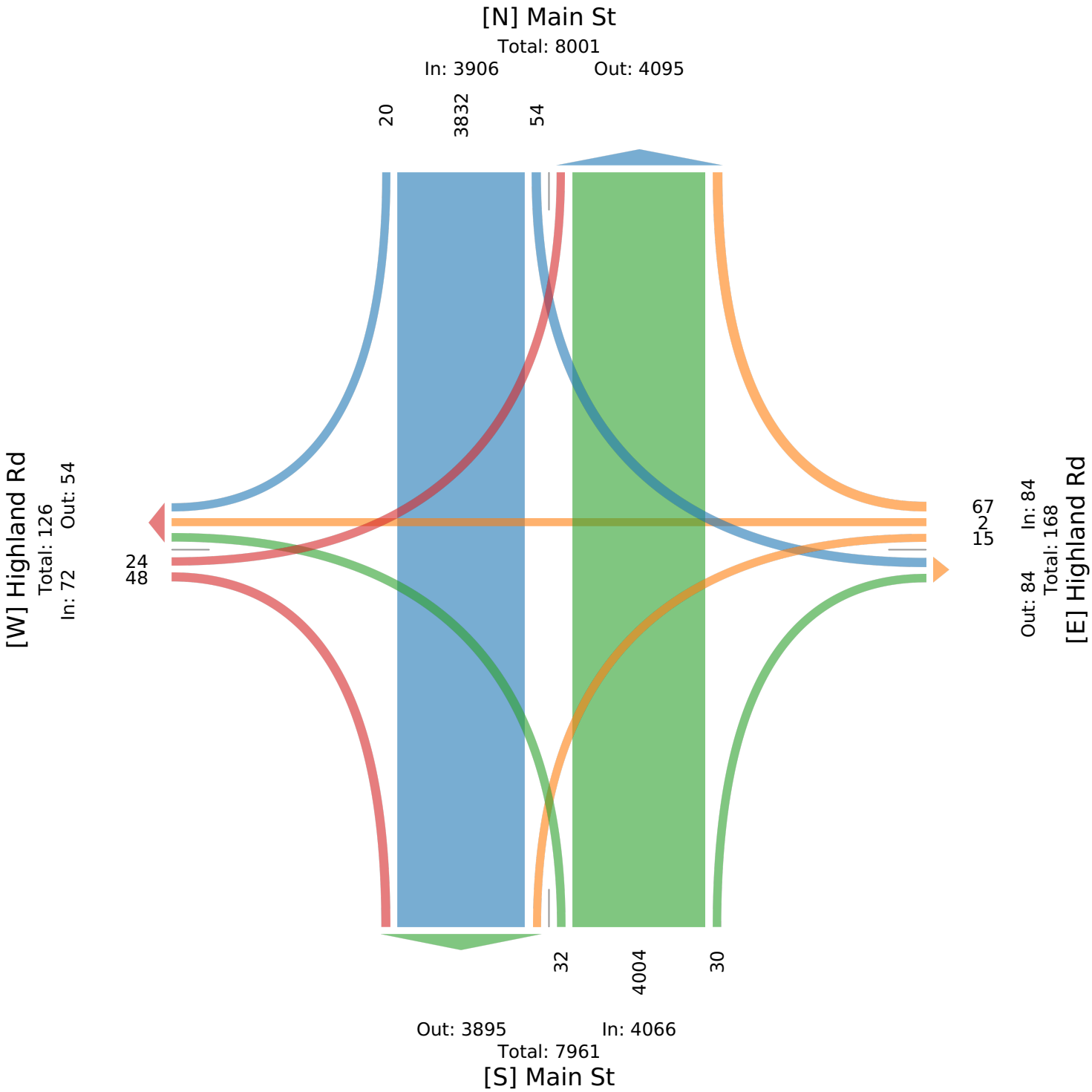
Leg	Main St					Highland Rd					Main St					Highland Rd					
Direction	Southbound					Westbound					Northbound					Eastbound					
Time	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	Int
2025-05-15 7:00AM	0	171	2	0	**173**	2	0	0	0	**2**	0	234	2	0	**236**	3	0	0	0	**3**	**414**
7:15AM	1	229	4	0	**234**	6	0	2	0	**8**	0	249	1	0	**250**	2	0	4	0	**6**	**498**
7:30AM	0	203	3	0	**206**	5	0	2	0	**7**	1	274	3	0	**278**	5	0	3	0	**8**	**499**
7:45AM	0	231	3	0	**234**	4	0	2	0	**6**	2	271	3	0	**276**	4	0	1	0	**5**	**521**
Hourly Total	1	834	12	0	**847**	17	0	6	0	**23**	3	1028	9	0	**1040**	14	0	8	0	**22**	**1932**
8:00AM	0	175	0	0	**175**	2	0	0	0	**2**	1	247	3	0	**251**	1	0	2	0	**3**	**431**
8:15AM	0	214	4	0	**218**	2	0	0	0	**2**	2	213	0	0	**215**	2	0	1	0	**3**	**438**
8:30AM	1	162	3	0	**166**	2	1	1	0	**4**	1	184	3	0	**188**	4	0	0	0	**4**	**362**
8:45AM	1	170	3	0	**174**	5	0	0	0	**5**	1	241	1	0	**243**	1	0	0	0	**1**	**423**
Hourly Total	2	721	10	0	**733**	11	1	1	0	**13**	5	885	7	0	**897**	8	0	3	0	**11**	**1654**
4:00PM	1	361	3	0	**365**	4	0	0	0	**4**	2	279	1	0	**282**	4	0	1	0	**5**	**656**
4:15PM	2	315	2	0	**319**	6	0	2	0	**8**	5	285	2	0	**292**	3	0	1	0	**4**	**623**
4:30PM	3	301	7	0	**311**	2	0	0	0	**2**	2	259	2	0	**263**	3	0	3	0	**6**	**582**
4:45PM	2	282	3	0	**287**	5	0	1	0	**6**	1	267	2	0	**270**	2	0	0	0	**2**	**565**
Hourly Total	8	1259	15	0	**1282**	17	0	3	0	**20**	10	1090	7	0	**1107**	12	0	5	0	**17**	**2426**
5:00PM	1	319	5	0	**325**	10	0	2	0	**12**	4	273	4	0	**281**	3	0	1	0	**4**	**622**
5:15PM	4	265	3	0	**272**	3	0	0	0	**3**	3	239	1	0	**243**	5	0	5	0	**10**	**528**
5:30PM	3	207	6	0	**216**	5	0	0	0	**5**	4	260	1	0	**265**	5	0	1	0	**6**	**492**
5:45PM	1	227	3	0	**231**	4	1	3	0	**8**	1	229	3	0	**233**	1	0	1	0	**2**	**474**
Hourly Total	9	1018	17	0	**1044**	22	1	5	0	**28**	12	1001	9	0	**1022**	14	0	8	0	**22**	**2116**
Total	20	3832	54	0	**3906**	67	2	15	0	**84**	30	4004	32	0	**4066**	48	0	24	0	**72**	**8128**
% Approach	0.5%	98.1%	1.4%	0%	**-**	79.8%	2.4%	17.9%	0%	**-**	0.7%	98.5%	0.8%	0%	**-**	66.7%	0%	33.3%	0%	**-**	-
% Total	0.2%	47.1%	0.7%	0%	**48.1%**	0.8%	0%	0.2%	0%	**1.0%**	0.4%	49.3%	0.4%	0%	**50.0%**	0.6%	0%	0.3%	0%	**0.9%**	-
Lights	20	3696	52	0	**3768**	64	2	15	0	**81**	29	3861	30	0	**3920**	47	0	23	0	**70**	7839
% Lights	100%	96.5%	96.3%	0%	**96.5%**	95.5%	100%	100%	0%	**96.4%**	96.7%	96.4%	93.8%	0%	**96.4%**	97.9%	0%	95.8%	0%	**97.2%**	96.4%
Articulated Trucks	0	49	0	0	**49**	0	0	0	0	**0**	0	57	0	0	**57**	0	0	0	0	**0**	106
% Articulated Trucks	0%	1.3%	0%	0%	**1.3%**	0%	0%	0%	0%	**0%**	0%	1.4%	0%	0%	**1.4%**	0%	0%	0%	0%	**0%**	1.3%
Buses and Single-Unit Trucks	0	87	2	0	**89**	3	0	0	0	**3**	1	86	2	0	**89**	1	0	1	0	**2**	183
% Buses and Single-Unit Trucks	0%	2.3%	3.7%	0%	**2.3%**	4.5%	0%	0%	0%	**3.6%**	3.3%	2.1%	6.3%	0%	**2.2%**	2.1%	0%	4.2%	0%	**2.8%**	2.3%

*L: Left, R: Right, T: Thru, U: U-Turn

Main Street & Highland Road - TMC

Thu May 15, 2025
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1297571, Location: 39.26005, -94.899946

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Main Street & Highland Road - TMC

Thu May 15, 2025
AM Peak (7:15 AM - 8:15 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1297571, Location: 39.26005, -94.899946

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

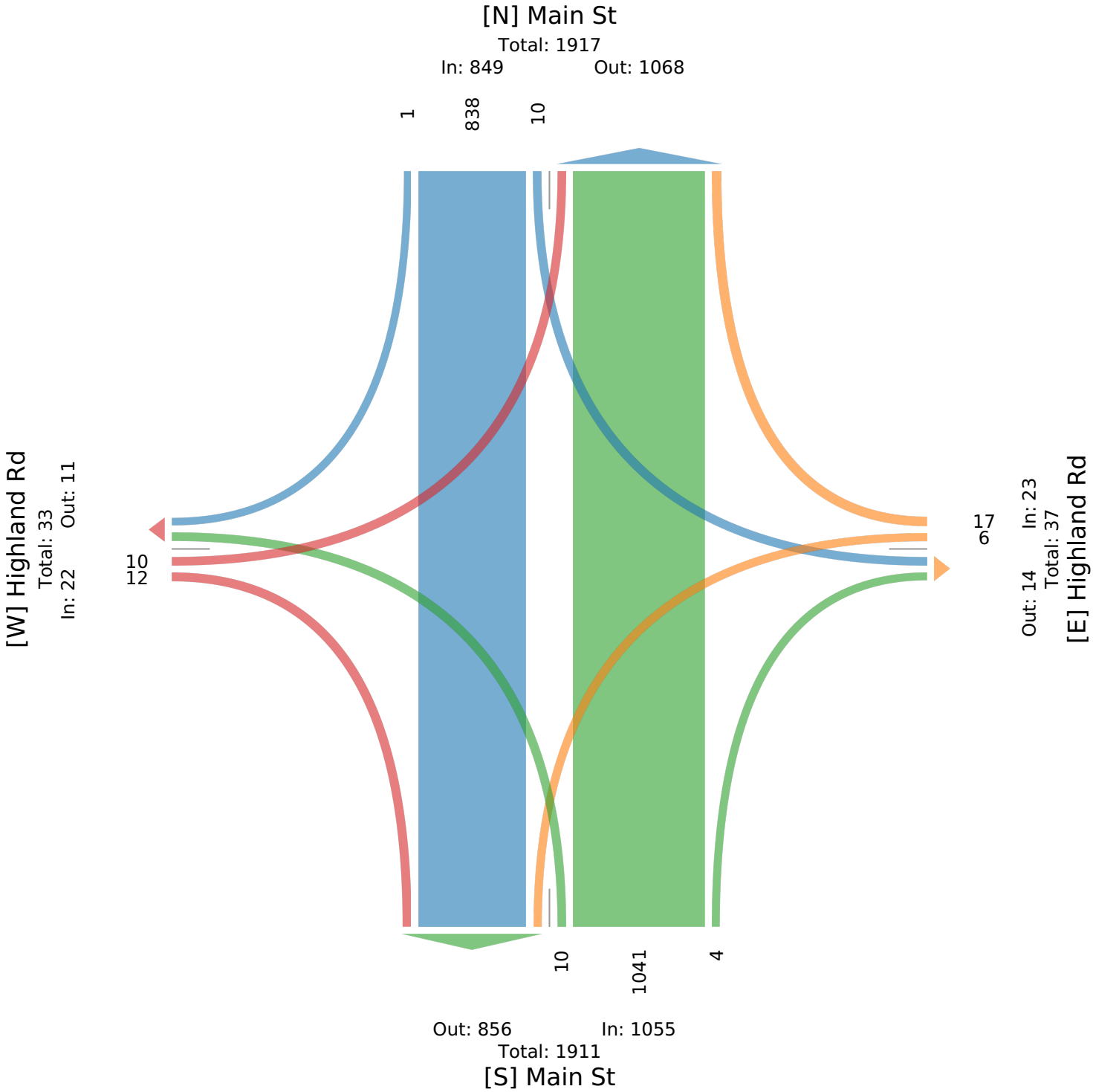
Leg	Main St					Highland Rd					Main St					Highland Rd					
Direction	Southbound					Westbound					Northbound					Eastbound					
Time	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	Int
2025-05-15 7:15AM	1	229	4	0	**234**	6	0	2	0	**8**	0	249	1	0	**250**	2	0	4	0	**6**	**498**
7:30AM	0	203	3	0	**206**	5	0	2	0	**7**	1	274	3	0	**278**	5	0	3	0	**8**	**499**
7:45AM	0	231	3	0	**234**	4	0	2	0	**6**	2	271	3	0	**276**	4	0	1	0	**5**	**521**
8:00AM	0	175	0	0	**175**	2	0	0	0	**2**	1	247	3	0	**251**	1	0	2	0	**3**	**431**
Total	1	838	10	0	**849**	17	0	6	0	**23**	4	1041	10	0	**1055**	12	0	10	0	**22**	**1949**
% Approach	0.1%	98.7%	1.2%	0%	**-**	73.9%	0%	26.1%	0%	**-**	0.4%	98.7%	0.9%	0%	**-**	54.5%	0%	45.5%	0%	**-**	-
% Total	0.1%	43.0%	0.5%	0%	**43.6%**	0.9%	0%	0.3%	0%	**1.2%**	0.2%	53.4%	0.5%	0%	**54.1%**	0.6%	0%	0.5%	0%	**1.1%**	-
PHF	0.250	0.907	0.625	-	**0.907**	0.708	-	0.750	-	**0.719**	0.500	0.950	0.833	-	**0.949**	0.600	-	0.625	-	**0.688**	0.935
Lights	1	790	10	0	**801**	15	0	6	0	**21**	3	991	9	0	**1003**	12	0	9	0	**21**	1846
% Lights	100%	94.3%	100%	0%	**94.3%**	88.2%	0%	100%	0%	**91.3%**	75.0%	95.2%	90.0%	0%	**95.1%**	100%	0%	90.0%	0%	**95.5%**	94.7%
Articulated Trucks	0	20	0	0	**20**	0	0	0	0	**0**	0	24	0	0	**24**	0	0	0	0	**0**	44
% Articulated Trucks	0%	2.4%	0%	0%	**2.4%**	0%	0%	0%	0%	**0%**	0%	2.3%	0%	0%	**2.3%**	0%	0%	0%	0%	**0%**	2.3%
Buses and Single-Unit Trucks	0	28	0	0	**28**	2	0	0	0	**2**	1	26	1	0	**28**	0	0	1	0	**1**	59
% Buses and Single-Unit Trucks	0%	3.3%	0%	0%	**3.3%**	11.8%	0%	0%	0%	**8.7%**	25.0%	2.5%	10.0%	0%	**2.7%**	0%	0%	10.0%	0%	**4.5%**	3.0%

*L: Left, R: Right, T: Thru, U: U-Turn

Main Street & Highland Road - TMC

Thu May 15, 2025
AM Peak (7:15 AM - 8:15 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1297571, Location: 39.26005, -94.899946

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Main Street & Highland Road - TMC

Thu May 15, 2025
PM Peak (4 PM - 5 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1297571, Location: 39.26005, -94.899946

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

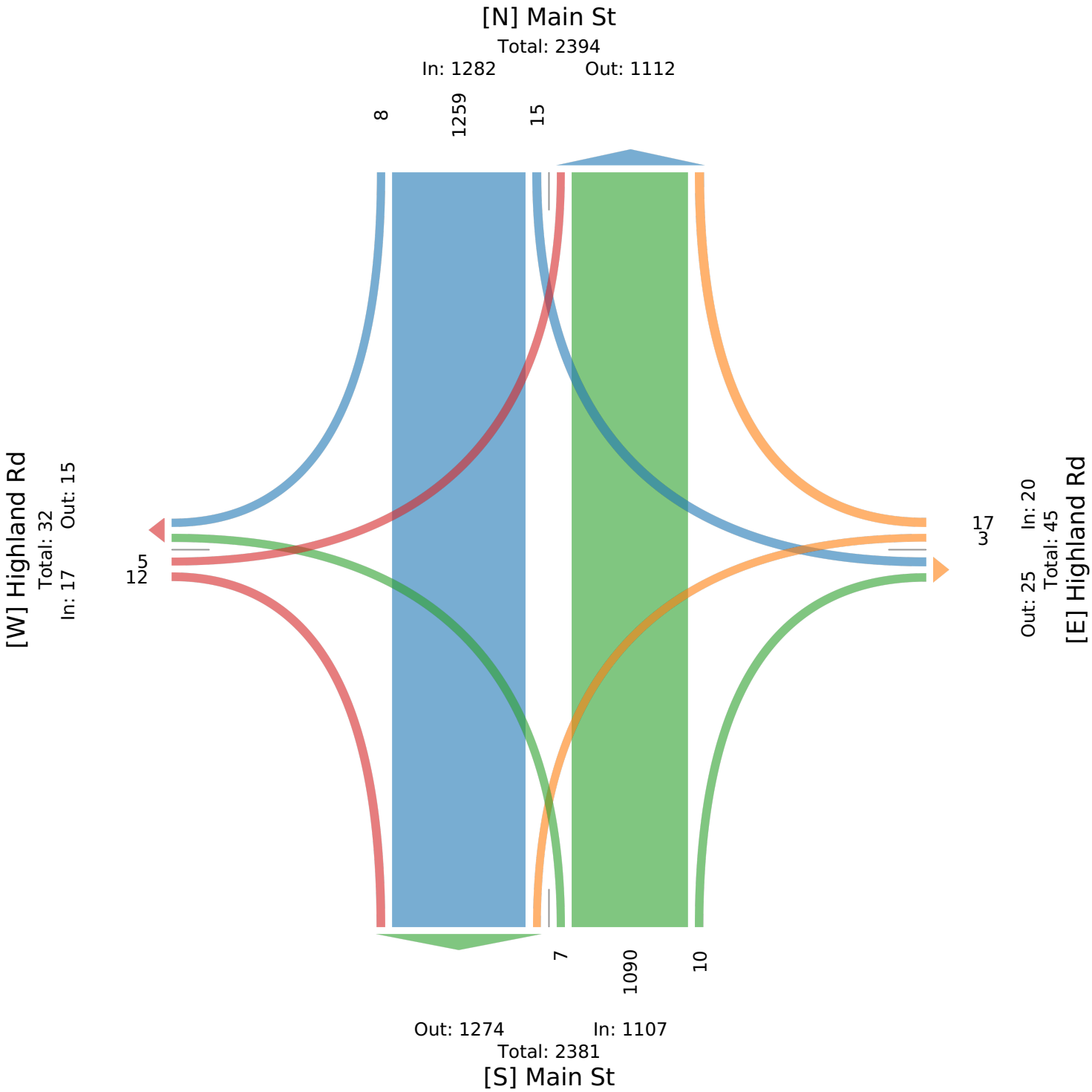
Leg	Main St					Highland Rd					Main St					Highland Rd					
Direction	Southbound					Westbound					Northbound					Eastbound					
Time	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	Int
2025-05-15 4:00PM	1	361	3	0	**365**	4	0	0	0	**4**	2	279	1	0	**282**	4	0	1	0	**5**	**656**
4:15PM	2	315	2	0	**319**	6	0	2	0	**8**	5	285	2	0	**292**	3	0	1	0	**4**	**623**
4:30PM	3	301	7	0	**311**	2	0	0	0	**2**	2	259	2	0	**263**	3	0	3	0	**6**	**582**
4:45PM	2	282	3	0	**287**	5	0	1	0	**6**	1	267	2	0	**270**	2	0	0	0	**2**	**565**
Total	8	1259	15	0	**1282**	17	0	3	0	**20**	10	1090	7	0	**1107**	12	0	5	0	**17**	**2426**
% Approach	0.6%	98.2%	1.2%	0%	**-**	85.0%	0%	15.0%	0%	**-**	0.9%	98.5%	0.6%	0%	**-**	70.6%	0%	29.4%	0%	**-**	-
% Total	0.3%	51.9%	0.6%	0%	**52.8%**	0.7%	0%	0.1%	0%	**0.8%**	0.4%	44.9%	0.3%	0%	**45.6%**	0.5%	0%	0.2%	0%	**0.7%**	-
PHF	0.667	0.872	0.536	-	**0.878**	0.708	-	0.375	-	**0.625**	0.500	0.956	0.875	-	**0.948**	0.750	-	0.417	-	**0.708**	0.925
Lights	8	1234	15	0	**1257**	17	0	3	0	**20**	10	1065	7	0	**1082**	12	0	5	0	**17**	2376
% Lights	100%	98.0%	100%	0%	**98.0%**	100%	0%	100%	0%	**100%**	100%	97.7%	100%	0%	**97.7%**	100%	0%	100%	0%	**100%**	97.9%
Articulated Trucks	0	6	0	0	**6**	0	0	0	0	**0**	0	9	0	0	**9**	0	0	0	0	**0**	15
% Articulated Trucks	0%	0.5%	0%	0%	**0.5%**	0%	0%	0%	0%	**0%**	0%	0.8%	0%	0%	**0.8%**	0%	0%	0%	0%	**0%**	0.6%
Buses and Single-Unit Trucks	0	19	0	0	**19**	0	0	0	0	**0**	0	16	0	0	**16**	0	0	0	0	**0**	35
% Buses and Single-Unit Trucks	0%	1.5%	0%	0%	**1.5%**	0%	0%	0%	0%	**0%**	0%	1.5%	0%	0%	**1.4%**	0%	0%	0%	0%	**0%**	1.4%

*L: Left, R: Right, T: Thru, U: U-Turn

Main Street & Highland Road - TMC

Thu May 15, 2025
PM Peak (4 PM - 5 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1297571, Location: 39.26005, -94.899946

GHA GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Main Street & Holiday Terrace - TMC

Thu May 15, 2025
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1297572, Location: 39.259235, -94.899978

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

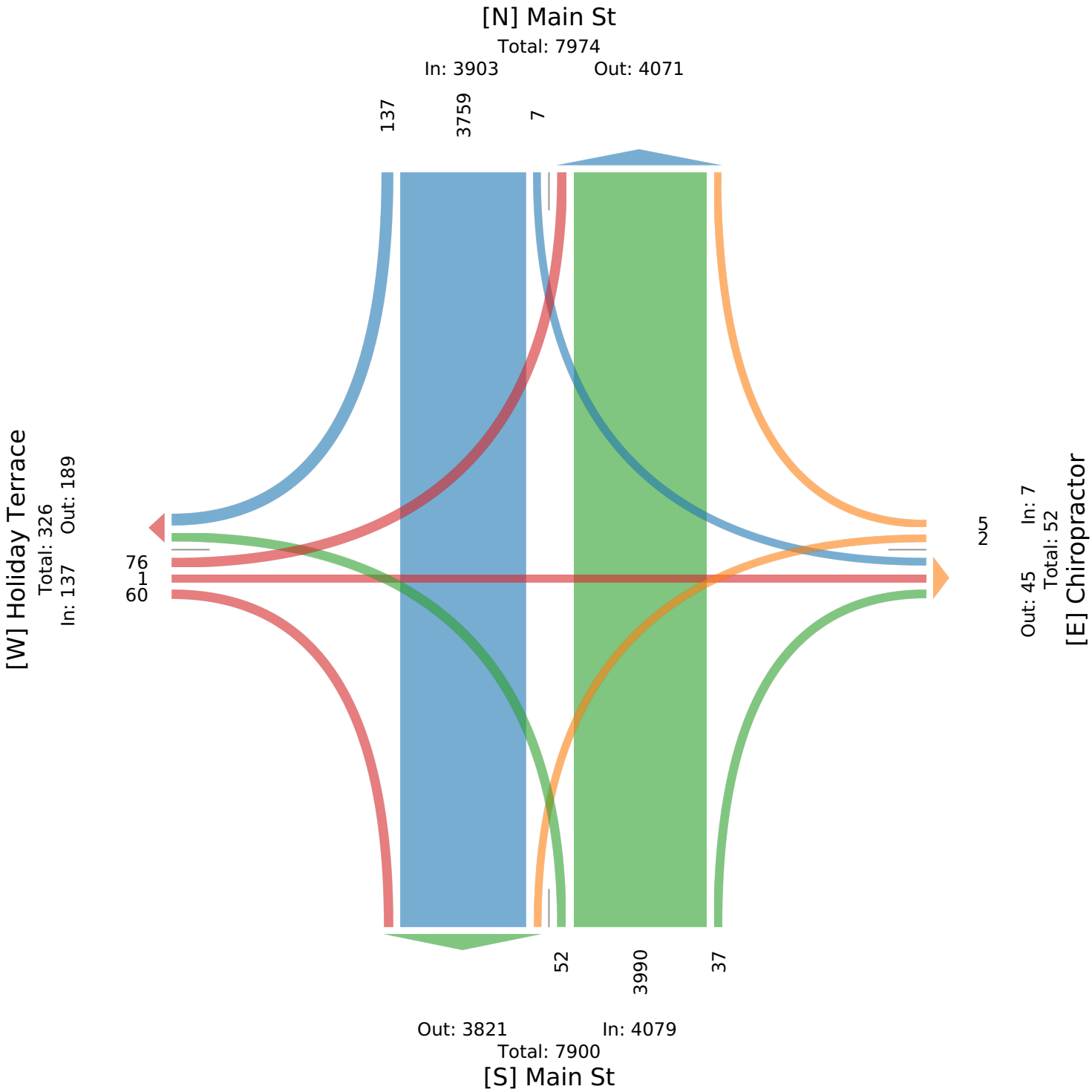
Leg	Main St					Chiropractor					Main St					Holiday Terrace					
Direction	Southbound					Westbound					Northbound					Eastbound					
Time	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	Int
2025-05-15 7:00AM	2	173	0	0	**175**	0	0	0	0	**0**	3	238	0	0	**241**	1	0	0	0	**1**	**417**
7:15AM	2	229	0	0	**231**	1	0	0	0	**1**	4	244	3	0	**251**	4	0	4	0	**8**	**491**
7:30AM	4	203	1	0	**208**	0	0	0	0	**0**	3	280	1	0	**284**	2	0	2	0	**4**	**496**
7:45AM	6	229	0	0	**235**	0	0	0	0	**0**	6	261	2	0	**269**	4	0	2	0	**6**	**510**
Hourly Total	14	834	1	0	**849**	1	0	0	0	**1**	16	1023	6	0	**1045**	11	0	8	0	**19**	**1914**
8:00AM	8	168	0	0	**176**	0	0	0	0	**0**	5	259	1	0	**265**	2	0	2	0	**4**	**445**
8:15AM	7	210	0	0	**217**	0	0	0	0	**0**	2	214	0	0	**216**	3	0	1	0	**4**	**437**
8:30AM	5	160	0	0	**165**	0	0	0	0	**0**	0	183	4	0	**187**	0	0	2	0	**2**	**354**
8:45AM	5	162	0	0	**167**	1	0	0	0	**1**	3	237	1	0	**241**	2	0	7	0	**9**	**418**
Hourly Total	25	700	0	0	**725**	1	0	0	0	**1**	10	893	6	0	**909**	7	0	12	0	**19**	**1654**
4:00PM	16	351	0	0	**367**	1	0	0	0	**1**	2	274	6	0	**282**	5	0	2	0	**7**	**657**
4:15PM	14	307	0	0	**321**	0	0	0	0	**0**	1	282	4	0	**287**	3	1	11	0	**15**	**623**
4:30PM	18	290	1	0	**309**	0	0	0	0	**0**	3	251	6	0	**260**	3	0	8	0	**11**	**580**
4:45PM	9	278	2	0	**289**	1	0	1	0	**2**	2	256	6	0	**264**	6	0	10	0	**16**	**571**
Hourly Total	57	1226	3	0	**1286**	2	0	1	0	**3**	8	1063	22	0	**1093**	17	1	31	0	**49**	**2431**
5:00PM	20	303	1	0	**324**	0	0	0	0	**0**	0	285	5	0	**290**	9	0	5	0	**14**	**628**
5:15PM	6	266	1	0	**273**	1	0	0	0	**1**	0	233	5	0	**238**	3	0	8	0	**11**	**523**
5:30PM	8	206	0	0	**214**	0	0	0	0	**0**	3	261	6	0	**270**	8	0	6	0	**14**	**498**
5:45PM	7	224	1	0	**232**	0	0	1	0	**1**	0	232	2	0	**234**	5	0	6	0	**11**	**478**
Hourly Total	41	999	3	0	**1043**	1	0	1	0	**2**	3	1011	18	0	**1032**	25	0	25	0	**50**	**2127**
Total	137	3759	7	0	**3903**	5	0	2	0	**7**	37	3990	52	0	**4079**	60	1	76	0	**137**	**8126**
% Approach	3.5%	96.3%	0.2%	0%	-	71.4%	0%	28.6%	0%	-	0.9%	97.8%	1.3%	0%	-	43.8%	0.7%	55.5%	0%	-	-
% Total	1.7%	46.3%	0.1%	0%	**48.0%**	0.1%	0%	0%	0%	**0.1%**	0.5%	49.1%	0.6%	0%	**50.2%**	0.7%	0%	0.9%	0%	**1.7%**	-
Lights	136	3627	7	0	**3770**	5	0	2	0	**7**	36	3846	49	0	**3931**	57	1	75	0	**133**	7841
% Lights	99.3%	96.5%	100%	0%	**96.6%**	100%	0%	100%	0%	**100%**	97.3%	96.4%	94.2%	0%	**96.4%**	95.0%	100%	98.7%	0%	**97.1%**	96.5%
Articulated Trucks	0	52	0	0	**52**	0	0	0	0	**0**	1	57	0	0	**58**	0	0	0	0	**0**	110
% Articulated Trucks	0%	1.4%	0%	0%	**1.3%**	0%	0%	0%	0%	**0%**	2.7%	1.4%	0%	0%	**1.4%**	0%	0%	0%	0%	**0%**	1.4%
Buses and Single-Unit Trucks	1	80	0	0	**81**	0	0	0	0	**0**	0	87	3	0	**90**	3	0	1	0	**4**	175
% Buses and Single-Unit Trucks	0.7%	2.1%	0%	0%	**2.1%**	0%	0%	0%	0%	**0%**	0%	2.2%	5.8%	0%	**2.2%**	5.0%	0%	1.3%	0%	**2.9%**	2.2%

*L: Left, R: Right, T: Thru, U: U-Turn

Main Street & Holiday Terrace - TMC

Thu May 15, 2025
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1297572, Location: 39.259235, -94.899978

GHA GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Main Street & Holiday Terrace - TMC

Thu May 15, 2025
AM Peak (7:15 AM - 8:15 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1297572, Location: 39.259235, -94.899978

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

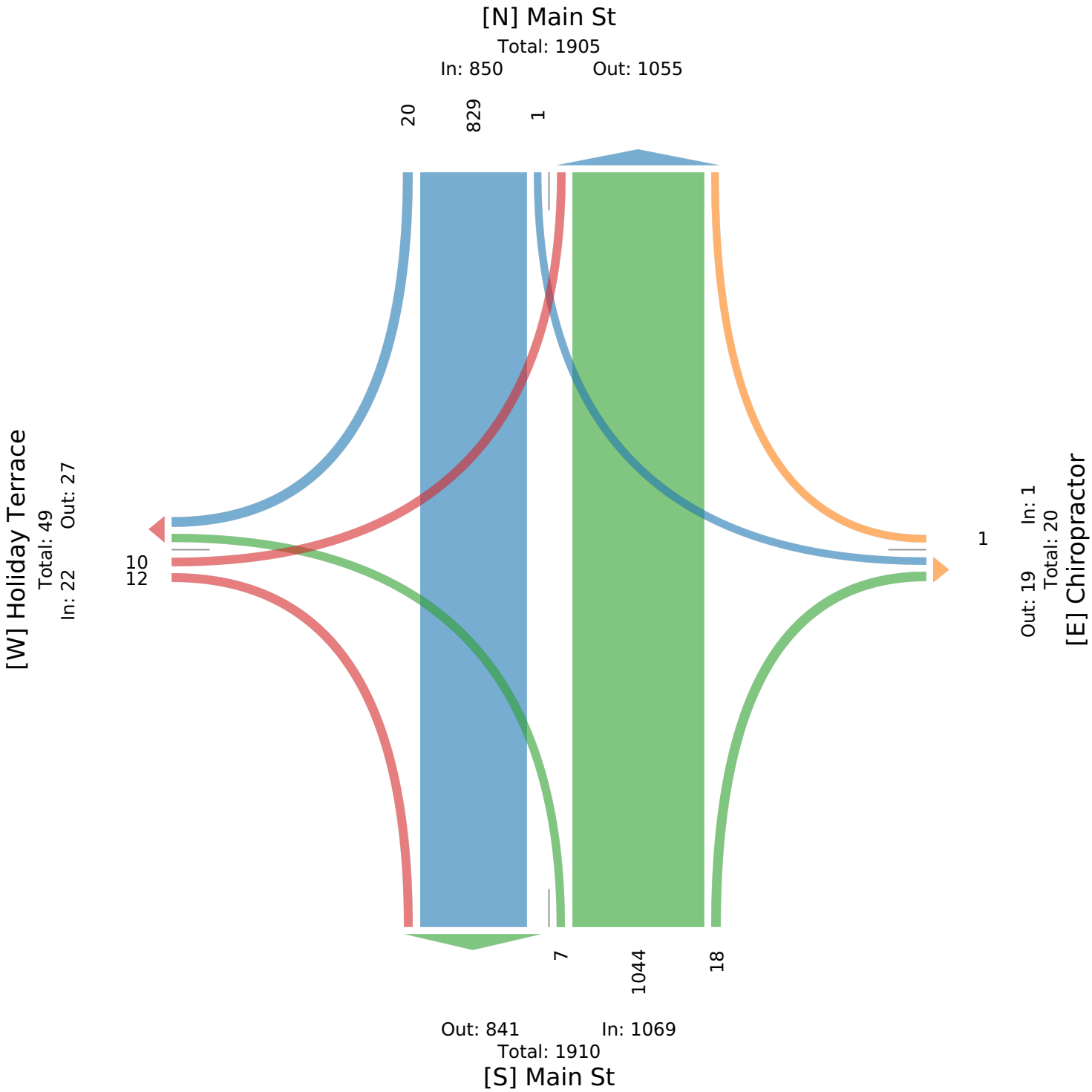
Leg	Main St					Chiropractor					Main St					Holiday Terrace					
Direction	Southbound					Westbound					Northbound					Eastbound					
Time	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	Int
2025-05-15 7:15AM	2	229	0	0	**231**	1	0	0	0	**1**	4	244	3	0	**251**	4	0	4	0	**8**	**491**
7:30AM	4	203	1	0	**208**	0	0	0	0	**0**	3	280	1	0	**284**	2	0	2	0	**4**	**496**
7:45AM	6	229	0	0	**235**	0	0	0	0	**0**	6	261	2	0	**269**	4	0	2	0	**6**	**510**
8:00AM	8	168	0	0	**176**	0	0	0	0	**0**	5	259	1	0	**265**	2	0	2	0	**4**	**445**
Total	20	829	1	0	**850**	1	0	0	0	**1**	18	1044	7	0	**1069**	12	0	10	0	**22**	**1942**
% Approach	2.4%	97.5%	0.1%	0%	**-**	100%	0%	0%	0%	**-**	1.7%	97.7%	0.7%	0%	**-**	54.5%	0%	45.5%	0%	**-**	-
% Total	1.0%	42.7%	0.1%	0%	**43.8%**	0.1%	0%	0%	0%	**0.1%**	0.9%	53.8%	0.4%	0%	**55.0%**	0.6%	0%	0.5%	0%	**1.1%**	-
PHF	0.625	0.905	0.250	-	**0.904**	0.250	-	-	-	**0.250**	0.750	0.932	0.583	-	**0.941**	0.750	-	0.625	-	**0.688**	0.952
Lights	20	779	1	0	**800**	1	0	0	0	**1**	17	995	5	0	**1017**	10	0	10	0	**20**	1838
% Lights	100%	94.0%	100%	0%	**94.1%**	100%	0%	0%	0%	**100%**	94.4%	95.3%	71.4%	0%	**95.1%**	83.3%	0%	100%	0%	**90.9%**	94.6%
Articulated Trucks	0	20	0	0	**20**	0	0	0	0	**0**	1	23	0	0	**24**	0	0	0	0	**0**	44
% Articulated Trucks	0%	2.4%	0%	0%	**2.4%**	0%	0%	0%	0%	**0%**	5.6%	2.2%	0%	0%	**2.2%**	0%	0%	0%	0%	**0%**	2.3%
Buses and Single-Unit Trucks	0	30	0	0	**30**	0	0	0	0	**0**	0	26	2	0	**28**	2	0	0	0	**2**	60
% Buses and Single-Unit Trucks	0%	3.6%	0%	0%	**3.5%**	0%	0%	0%	0%	**0%**	0%	2.5%	28.6%	0%	**2.6%**	16.7%	0%	0%	0%	**9.1%**	3.1%

*L: Left, R: Right, T: Thru, U: U-Turn

Main Street & Holiday Terrace - TMC

Thu May 15, 2025
AM Peak (7:15 AM - 8:15 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1297572, Location: 39.259235, -94.899978

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Main Street & Holiday Terrace - TMC

Thu May 15, 2025
PM Peak (4 PM - 5 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1297572, Location: 39.259235, -94.899978

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Main St					Chiropractor					Main St					Holiday Terrace					
Direction	Southbound					Westbound					Northbound					Eastbound					
Time	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	Int
2025-05-15 4:00PM	16	351	0	0	**367**	1	0	0	0	**1**	2	274	6	0	**282**	5	0	2	0	**7**	**657**
4:15PM	14	307	0	0	**321**	0	0	0	0	**0**	1	282	4	0	**287**	3	1	11	0	**15**	**623**
4:30PM	18	290	1	0	**309**	0	0	0	0	**0**	3	251	6	0	**260**	3	0	8	0	**11**	**580**
4:45PM	9	278	2	0	**289**	1	0	1	0	**2**	2	256	6	0	**264**	6	0	10	0	**16**	**571**
Total	57	1226	3	0	**1286**	2	0	1	0	**3**	8	1063	22	0	**1093**	17	1	31	0	**49**	**2431**
% Approach	4.4%	95.3%	0.2%	0%	**-**	66.7%	0%	33.3%	0%	**-**	0.7%	97.3%	2.0%	0%	**-**	34.7%	2.0%	63.3%	0%	**-**	-
% Total	2.3%	50.4%	0.1%	0%	**52.9%**	0.1%	0%	0%	0%	**0.1%**	0.3%	43.7%	0.9%	0%	**45.0%**	0.7%	0%	1.3%	0%	**2.0%**	-
PHF	0.792	0.873	0.375	-	**0.876**	0.500	-	0.250	-	**0.375**	0.667	0.942	0.917	-	**0.952**	0.708	0.250	0.705	-	**0.766**	0.925
Lights	57	1201	3	0	**1261**	2	0	1	0	**3**	8	1036	22	0	**1066**	17	1	31	0	**49**	2379
% Lights	100%	98.0%	100%	0%	**98.1%**	100%	0%	100%	0%	**100%**	100%	97.5%	100%	0%	**97.5%**	100%	100%	100%	0%	**100%**	97.9%
Articulated Trucks	0	8	0	0	**8**	0	0	0	0	**0**	0	8	0	0	**8**	0	0	0	0	**0**	16
% Articulated Trucks	0%	0.7%	0%	0%	**0.6%**	0%	0%	0%	0%	**0%**	0%	0.8%	0%	0%	**0.7%**	0%	0%	0%	0%	**0%**	0.7%
Buses and Single-Unit Trucks	0	17	0	0	**17**	0	0	0	0	**0**	0	19	0	0	**19**	0	0	0	0	**0**	36
% Buses and Single-Unit Trucks	0%	1.4%	0%	0%	**1.3%**	0%	0%	0%	0%	**0%**	0%	1.8%	0%	0%	**1.7%**	0%	0%	0%	0%	**0%**	1.5%

*L: Left, R: Right, T: Thru, U: U-Turn

Main Street & Holiday Terrace - TMC

Thu May 15, 2025
PM Peak (4 PM - 5 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1297572, Location: 39.259235, -94.899978

GEWALT HAMILTON ASSOCIATES, INC.
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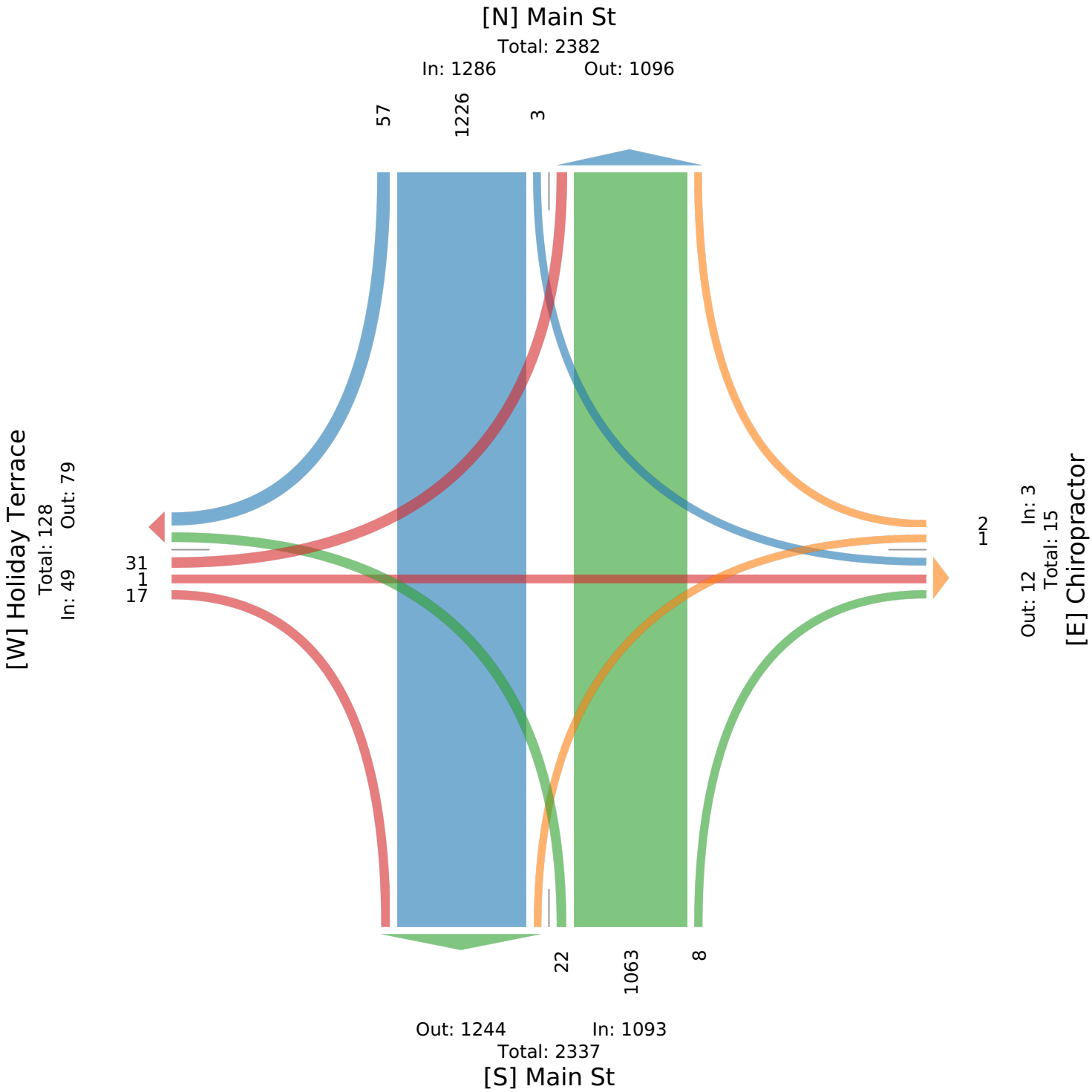
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Traffic Data Report - Speed

Study Name: 6 - Desoto 24-hr ADT with Speed
Location: 6 - Desoto 24-hr ADT with Speed
Coordinates: 39.260592, -94.918836
Site Code:
Start Date: 05/15/2025

Classification Summary		
Classification	Count	Mean Speed (mph)
Motorcycles	28	47
Cars	6803	46
Pickup Trucks	1629	46
Buses	26	45
Single Unit Trucks	74	44
Vans	88	45
Articulated Trucks	2	37
Other Vehicles	0	0
Total	8650	46

Speed Summary (mph)	
15th Percentile Speed	42
50th Percentile Speed	46
85th Percentile Speed	50
95th Percentile Speed	53
Mean Speed	46
Min Speed	4
Max Speed	101

Direction	Northbound

Traffic Count by Speed: Daily Total																
Date	Speed (mph)															
	0-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	> 70	Total
05/15/2025	1	3	3	5	3	9	36	478	1620	922	146	19	1	0	0	3246
05/16/2025	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Study Total	1	3	3	5	3	9	36	478	1620	922	146	19	1	0	0	3246

Traffic Count by Speed: 15 minute bins																
Date: 05/15/2025	Speed (mph)															
Time	0-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	> 70	Total
00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
00:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
00:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
00:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

03:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45	0	0	0	0	0	0	0	0	6	10	1	0	0	0	0	17
Hourly Total	0	0	0	0	0	0	0	0	6	10	1	0	0	0	0	17
06:00	0	0	0	0	0	0	0	1	6	4	0	0	0	0	0	11
06:15	0	0	0	0	0	0	0	6	15	5	0	0	0	0	0	26
06:30	0	0	0	0	0	0	0	2	26	19	4	0	0	0	0	51
06:45	0	0	0	0	0	0	0	2	29	18	3	0	0	0	0	52
Hourly Total	0	0	0	0	0	0	0	11	76	46	7	0	0	0	0	140
07:00	0	0	0	0	0	0	0	9	40	23	2	1	0	0	0	75
07:15	0	0	0	0	0	0	1	11	43	23	3	1	0	0	0	82
07:30	1	3	2	5	1	2	1	11	37	19	3	0	0	0	0	85
07:45	0	0	0	0	0	0	0	5	47	17	3	0	0	0	0	72
Hourly Total	1	3	2	5	1	2	2	36	167	82	11	2	0	0	0	314
08:00	0	0	0	0	0	0	0	15	41	17	4	0	0	0	0	77
08:15	0	0	0	0	0	1	0	19	30	14	4	0	0	0	0	68
08:30	0	0	0	0	0	0	1	9	31	17	2	0	0	0	0	60
08:45	0	0	0	0	0	0	0	10	29	10	2	0	0	0	0	51
Hourly Total	0	0	0	0	0	1	1	53	131	58	12	0	0	0	0	256
09:00	0	0	0	0	0	0	0	1	24	12	3	2	1	0	0	43

09:15	0	0	0	0	0	0	2	5	19	11	1	0	0	0	0	38
09:30	0	0	0	0	1	0	1	5	17	18	1	0	0	0	0	43
09:45	0	0	0	0	0	0	0	6	24	9	4	0	0	0	0	43
Hourly Total	0	0	0	0	1	0	3	17	84	50	9	2	1	0	0	167
10:00	0	0	0	0	0	0	0	10	20	6	0	0	0	0	0	36
10:15	0	0	0	0	0	0	0	6	22	11	2	0	0	0	0	41
10:30	0	0	0	0	0	0	3	14	15	6	0	0	0	0	0	38
10:45	0	0	0	0	0	0	0	8	23	11	0	1	0	0	0	43
Hourly Total	0	0	0	0	0	0	3	38	80	34	2	1	0	0	0	158
11:00	0	0	0	0	0	0	1	8	25	12	1	1	0	0	0	48
11:15	0	0	0	0	0	0	1	8	25	11	5	0	0	0	0	50
11:30	0	0	0	0	0	0	1	11	31	13	5	0	0	0	0	61
11:45	0	0	0	0	0	1	3	6	32	10	2	0	0	0	0	54
Hourly Total	0	0	0	0	0	1	6	33	113	46	13	1	0	0	0	213
12:00	0	0	0	0	0	0	0	6	19	10	3	0	0	0	0	38
12:15	0	0	0	0	0	0	1	14	19	17	0	0	0	0	0	51
12:30	0	0	0	0	0	1	2	8	15	12	5	0	0	0	0	43
12:45	0	0	0	0	0	0	0	6	27	9	1	1	0	0	0	44
Hourly Total	0	0	0	0	0	1	3	34	80	48	9	1	0	0	0	176
13:00	0	0	0	0	0	0	1	12	19	13	0	0	0	0	0	45
13:15	0	0	0	0	0	0	1	15	21	6	4	0	0	0	0	47
13:30	0	0	0	0	0	0	0	4	18	10	1	1	0	0	0	34
13:45	0	0	0	0	0	0	0	3	19	13	4	1	0	0	0	40
Hourly Total	0	0	0	0	0	0	2	34	77	42	9	2	0	0	0	166
14:00	0	0	0	0	0	1	3	10	15	16	0	0	0	0	0	45
14:15	0	0	0	0	0	0	0	6	17	16	1	0	0	0	0	40
14:30	0	0	0	0	0	0	0	6	30	11	2	1	0	0	0	50
14:45	0	0	0	0	0	0	0	6	22	15	6	1	0	0	0	50
Hourly Total	0	0	0	0	0	1	3	28	84	58	9	2	0	0	0	185

15:00	0	0	0	0	0	0	1	5	29	12	8	0	0	0	0	55
15:15	0	0	0	0	0	0	0	6	33	23	5	1	0	0	0	68
15:30	0	0	0	0	0	0	1	17	54	28	1	0	0	0	0	101
15:45	0	0	0	0	0	0	0	23	33	22	3	1	0	0	0	82
Hourly Total	0	0	0	0	0	0	2	51	149	85	17	2	0	0	0	306
16:00	0	0	1	0	1	3	1	11	36	26	3	0	0	0	0	82
16:15	0	0	0	0	0	0	1	11	44	29	1	1	0	0	0	87
16:30	0	0	0	0	0	0	0	10	36	23	6	1	0	0	0	76
16:45	0	0	0	0	0	0	1	11	40	30	3	0	0	0	0	85
Hourly Total	0	0	1	0	1	3	3	43	156	108	13	2	0	0	0	330
17:00	0	0	0	0	0	0	0	4	30	32	8	0	0	0	0	74
17:15	0	0	0	0	0	0	1	16	48	20	0	1	0	0	0	86
17:30	0	0	0	0	0	0	0	6	44	22	2	0	0	0	0	74
17:45	0	0	0	0	0	0	0	6	46	32	4	2	0	0	0	90
Hourly Total	0	0	0	0	0	0	1	32	168	106	14	3	0	0	0	324
18:00	0	0	0	0	0	0	0	11	32	19	1	0	0	0	0	63
18:15	0	0	0	0	0	0	1	10	38	17	2	0	0	0	0	68
18:30	0	0	0	0	0	0	2	10	31	20	2	0	0	0	0	65
18:45	0	0	0	0	0	0	0	5	21	15	4	0	0	0	0	45
Hourly Total	0	0	0	0	0	0	3	36	122	71	9	0	0	0	0	241
19:00	0	0	0	0	0	0	1	2	22	14	3	1	0	0	0	43
19:15	0	0	0	0	0	0	1	3	16	15	1	0	0	0	0	36
19:30	0	0	0	0	0	0	0	2	19	11	1	0	0	0	0	33
19:45	0	0	0	0	0	0	0	8	12	14	2	0	0	0	0	36
Hourly Total	0	0	0	0	0	0	2	15	69	54	7	1	0	0	0	148
20:00	0	0	0	0	0	0	0	8	16	12	1	0	0	0	0	37
20:15	0	0	0	0	0	0	1	2	31	5	2	0	0	0	0	41
20:30	0	0	0	0	0	0	1	5	11	5	1	0	0	0	0	23
20:45	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	4

Hourly Total	0	0	0	0	0	0	2	17	58	24	4	0	0	0	0	105
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Study Total	1	3	3	5	3	9	36	478	1620	922	146	19	1	0	0	3246

Direction	Southbound

Traffic Count by Speed: Daily Total																
Date	Speed (mph)															
	0-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	> 70	Total
05/15/2025	0	0	0	1	8	7	18	266	1780	2491	715	102	9	3	4	5404
05/16/2025	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Study Total	0	0	0	1	8	7	18	266	1780	2491	715	102	9	3	4	5404

Traffic Count by Speed: 15 minute bins																
Date: 05/15/2025	Speed (mph)															
Time	0-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	> 70	Total
00:00	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
00:15	0	0	0	0	0	0	0	1	1	0	2	1	0	0	0	5
00:30	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
00:45	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
Hourly Total	0	0	0	0	1	0	0	1	4	0	2	1	0	0	0	9
01:00	0	0	0	0	0	0	0	1	0	1	1	0	0	0	1	4
01:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
01:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hourly Total	0	0	0	0	0	0	0	1	0	1	1	1	0	0	1	5
02:00	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
02:15	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	3
02:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
Hourly Total	0	0	0	0	0	0	0	2	1	1	1	1	0	0	0	6
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1

03:30	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
03:45	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Hourly Total	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	3
04:00	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	4
04:15	0	0	0	0	0	0	0	0	1	1	2	1	0	0	0	5
04:30	0	0	0	0	0	0	0	3	4	0	1	0	0	0	0	8
04:45	0	0	0	0	0	0	0	0	4	2	1	0	0	0	0	7
Hourly Total	0	0	0	0	0	0	0	3	12	4	4	1	0	0	0	24
05:00	0	0	0	0	0	0	0	0	0	3	1	1	0	0	0	5
05:15	0	0	0	0	0	0	0	0	3	8	1	3	0	0	0	15
05:30	0	0	0	0	0	0	0	4	9	13	6	0	0	0	0	32
05:45	0	0	0	0	0	0	0	1	8	12	5	1	0	0	0	27
Hourly Total	0	0	0	0	0	0	0	5	20	36	13	5	0	0	0	79
06:00	0	0	0	0	0	0	0	0	11	20	9	0	0	0	0	40
06:15	0	0	0	0	0	0	0	0	13	29	13	0	0	0	0	55
06:30	0	0	0	0	6	2	2	1	8	23	8	0	0	0	0	50
06:45	0	0	0	0	0	0	0	1	18	40	8	2	0	0	0	69
Hourly Total	0	0	0	0	6	2	2	2	50	112	38	2	0	0	0	214
07:00	0	0	0	0	0	0	0	0	22	36	17	4	1	0	0	80
07:15	0	0	0	0	0	1	1	2	32	65	19	1	0	0	0	121
07:30	0	0	0	0	0	0	1	13	38	56	16	2	1	1	0	128
07:45	0	0	0	0	0	0	0	3	41	68	20	2	0	0	0	134
Hourly Total	0	0	0	0	0	1	2	18	133	225	72	9	2	1	0	463
08:00	0	0	0	0	0	0	1	7	43	54	16	1	0	0	0	122
08:15	0	0	0	0	0	0	1	1	34	34	9	1	0	0	0	80
08:30	0	0	0	0	0	0	0	2	26	39	4	2	0	0	0	73
08:45	0	0	0	0	0	0	0	0	16	27	10	2	0	0	0	55
Hourly Total	0	0	0	0	0	0	2	10	119	154	39	6	0	0	0	330
09:00	0	0	0	0	0	0	0	3	13	28	11	1	0	0	0	56

09:15	0	0	0	0	0	0	0	3	16	29	13	2	0	0	0	63
09:30	0	0	0	0	0	0	0	2	13	14	16	1	0	0	0	46
09:45	0	0	0	0	0	0	0	2	13	32	9	2	0	0	0	58
Hourly Total	0	0	0	0	0	0	0	10	55	103	49	6	0	0	0	223
10:00	0	0	0	0	0	0	0	2	15	29	8	3	0	0	0	57
10:15	0	0	0	0	0	0	0	2	15	28	7	1	0	0	0	53
10:30	0	0	0	0	0	0	0	1	15	20	14	0	0	0	0	50
10:45	0	0	0	0	0	1	0	6	27	22	6	2	0	0	0	64
Hourly Total	0	0	0	0	0	1	0	11	72	99	35	6	0	0	0	224
11:00	0	0	0	0	0	0	0	4	23	28	9	1	0	0	0	65
11:15	0	0	0	0	0	0	0	0	19	39	7	1	0	0	0	66
11:30	0	0	0	0	0	0	0	8	25	44	13	2	0	0	0	92
11:45	0	0	0	0	0	0	0	8	20	34	5	1	0	0	0	68
Hourly Total	0	0	0	0	0	0	0	20	87	145	34	5	0	0	0	291
12:00	0	0	0	0	0	0	1	3	38	35	10	0	0	0	0	87
12:15	0	0	0	0	0	0	0	4	21	36	17	0	1	0	0	79
12:30	0	0	0	0	0	1	1	5	23	47	6	2	0	0	0	85
12:45	0	0	0	0	0	0	0	2	25	29	9	0	0	0	0	65
Hourly Total	0	0	0	0	0	1	2	14	107	147	42	2	1	0	0	316
13:00	0	0	0	1	1	0	1	7	38	24	2	1	0	0	0	75
13:15	0	0	0	0	0	0	0	9	40	26	4	0	0	0	0	79
13:30	0	0	0	0	0	0	1	14	35	24	1	0	0	0	0	75
13:45	0	0	0	0	0	0	0	5	16	36	8	3	2	0	0	70
Hourly Total	0	0	0	1	1	0	2	35	129	110	15	4	2	0	0	299
14:00	0	0	0	0	0	0	0	1	17	43	6	1	0	0	0	68
14:15	0	0	0	0	0	0	0	1	20	38	15	3	0	0	0	77
14:30	0	0	0	0	0	0	0	3	36	42	12	1	0	0	0	94
14:45	0	0	0	0	0	0	0	5	50	44	21	2	0	0	0	122
Hourly Total	0	0	0	0	0	0	0	10	123	167	54	7	0	0	0	361

15:00	0	0	0	0	0	0	0	2	33	46	19	2	0	0	0	102
15:15	0	0	0	0	0	0	1	12	36	65	11	1	0	0	0	126
15:30	0	0	0	0	0	0	0	5	43	57	15	0	0	1	0	121
15:45	0	0	0	0	0	0	0	2	57	66	11	2	0	0	0	138
Hourly Total	0	0	0	0	0	0	1	21	169	234	56	5	0	1	0	487
16:00	0	0	0	0	0	0	1	14	46	70	13	1	0	0	0	145
16:15	0	0	0	0	0	0	3	10	39	51	19	1	0	0	0	123
16:30	0	0	0	0	0	0	0	2	41	64	22	5	0	0	0	134
16:45	0	0	0	0	0	0	0	9	55	75	16	4	1	0	0	160
Hourly Total	0	0	0	0	0	0	4	35	181	260	70	11	1	0	0	562
17:00	0	0	0	0	0	0	0	1	52	75	11	0	0	0	1	140
17:15	0	0	0	0	0	0	0	4	42	74	15	1	1	0	0	137
17:30	0	0	0	0	0	0	0	5	45	67	4	2	0	0	0	123
17:45	0	0	0	0	0	0	0	5	27	46	20	3	0	0	0	101
Hourly Total	0	0	0	0	0	0	0	15	166	262	50	6	1	0	1	501
18:00	0	0	0	0	0	0	0	3	19	65	14	1	0	0	0	102
18:15	0	0	0	0	0	0	0	1	19	58	11	4	0	0	0	93
18:30	0	0	0	0	0	0	0	1	28	40	11	3	0	0	0	83
18:45	0	0	0	0	0	1	0	7	27	26	6	4	0	0	0	71
Hourly Total	0	0	0	0	0	1	0	12	93	189	42	12	0	0	0	349
19:00	0	0	0	0	0	0	0	0	36	30	8	3	2	0	0	79
19:15	0	0	0	0	0	0	1	2	21	23	8	2	0	0	0	57
19:30	0	0	0	0	0	0	0	4	20	23	7	0	0	0	0	54
19:45	0	0	0	0	0	0	0	5	19	23	10	0	0	0	0	57
Hourly Total	0	0	0	0	0	0	1	11	96	99	33	5	2	0	0	247
20:00	0	0	0	0	0	0	0	2	21	27	15	0	0	0	0	65
20:15	0	0	0	0	0	0	0	0	18	24	13	2	0	0	0	57
20:30	0	0	0	0	0	0	0	6	30	20	3	1	0	0	0	60
20:45	0	0	0	0	0	0	0	5	12	16	4	1	0	1	0	39

Hourly Total	0	0	0	0	0	0	0	13	81	87	35	4	0	1	0	221
21:00	0	0	0	0	0	0	0	4	19	8	4	0	0	0	1	36
21:15	0	0	0	0	0	0	0	1	18	17	4	0	0	0	1	41
21:30	0	0	0	0	0	0	0	0	11	8	2	1	0	0	0	22
21:45	0	0	0	0	0	0	1	1	10	8	1	0	0	0	0	21
Hourly Total	0	0	0	0	0	0	1	6	58	41	11	1	0	0	2	120
22:00	0	0	0	0	0	0	0	2	8	4	4	1	0	0	0	19
22:15	0	0	0	0	0	0	0	3	6	3	3	0	0	0	0	15
22:30	0	0	0	0	0	0	0	0	1	2	2	0	0	0	0	5
22:45	0	0	0	0	0	1	1	2	1	2	3	0	0	0	0	10
Hourly Total	0	0	0	0	0	1	1	7	16	11	12	1	0	0	0	49
23:00	0	0	0	0	0	0	0	3	2	1	2	0	0	0	0	8
23:15	0	0	0	0	0	0	0	1	2	1	1	1	0	0	0	6
23:30	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	4
23:45	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	3
Hourly Total	0	0	0	0	0	0	0	4	6	3	7	1	0	0	0	21
Study Total	0	0	0	1	8	7	18	266	1780	2491	715	102	9	3	4	5404

APPENDIX C

TRIP GENERATION AND DISTRIBUTION

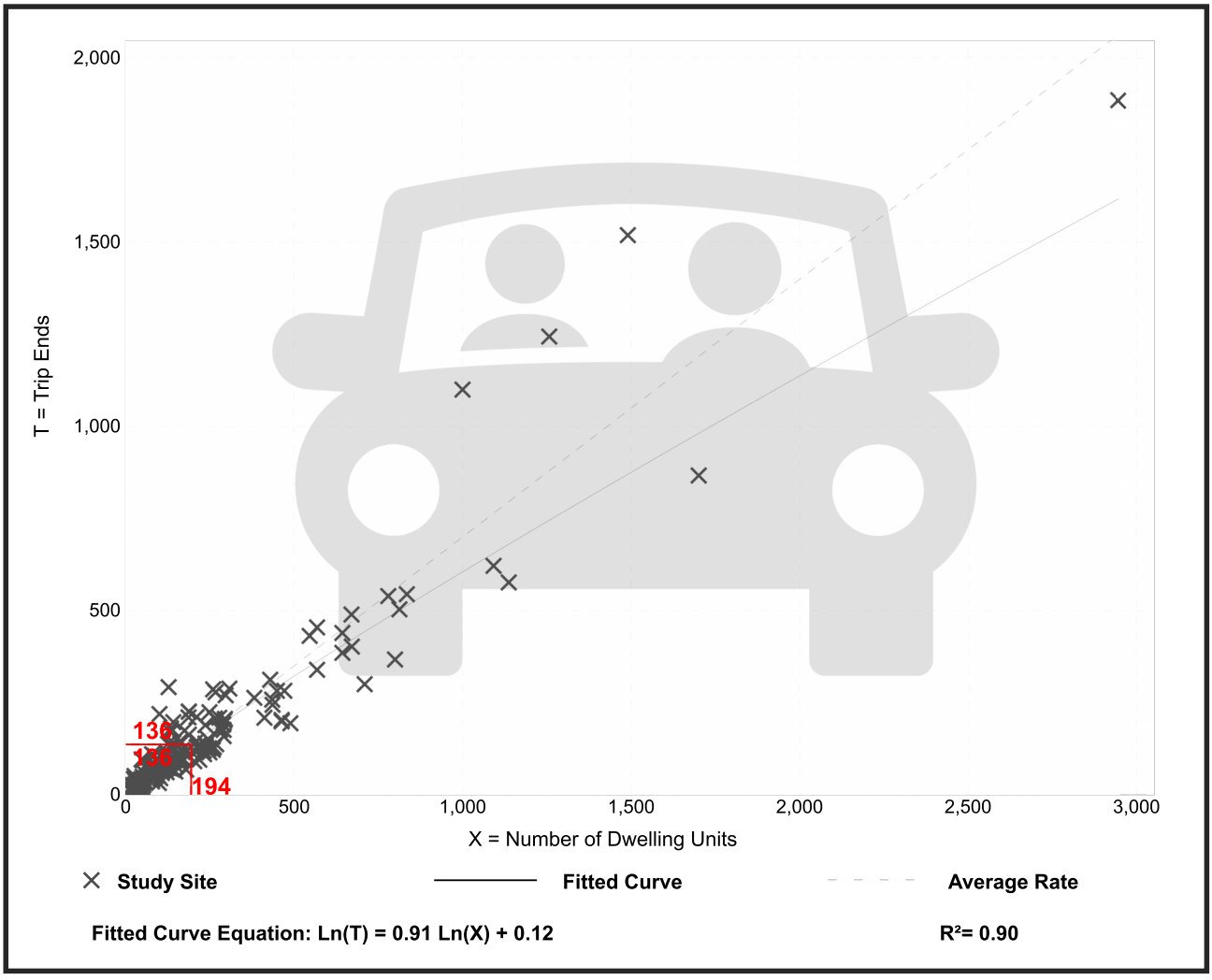
Single-Family Detached Housing
(210)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 192
Avg. Num. of Dwelling Units: 226
Directional Distribution: 25% entering, 75% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.70	0.27 - 2.27	0.24

Data Plot and Equation



Trip Gen Manual, 11th Edition ● Institute of Transportation Engineers

Calculated Trip Ends:
Average Rate: 136 (Total), 34 (Entry), 102 (Exit)
Fitted Curve: 136 (Total), 34 (Entry), 102 (Exit)

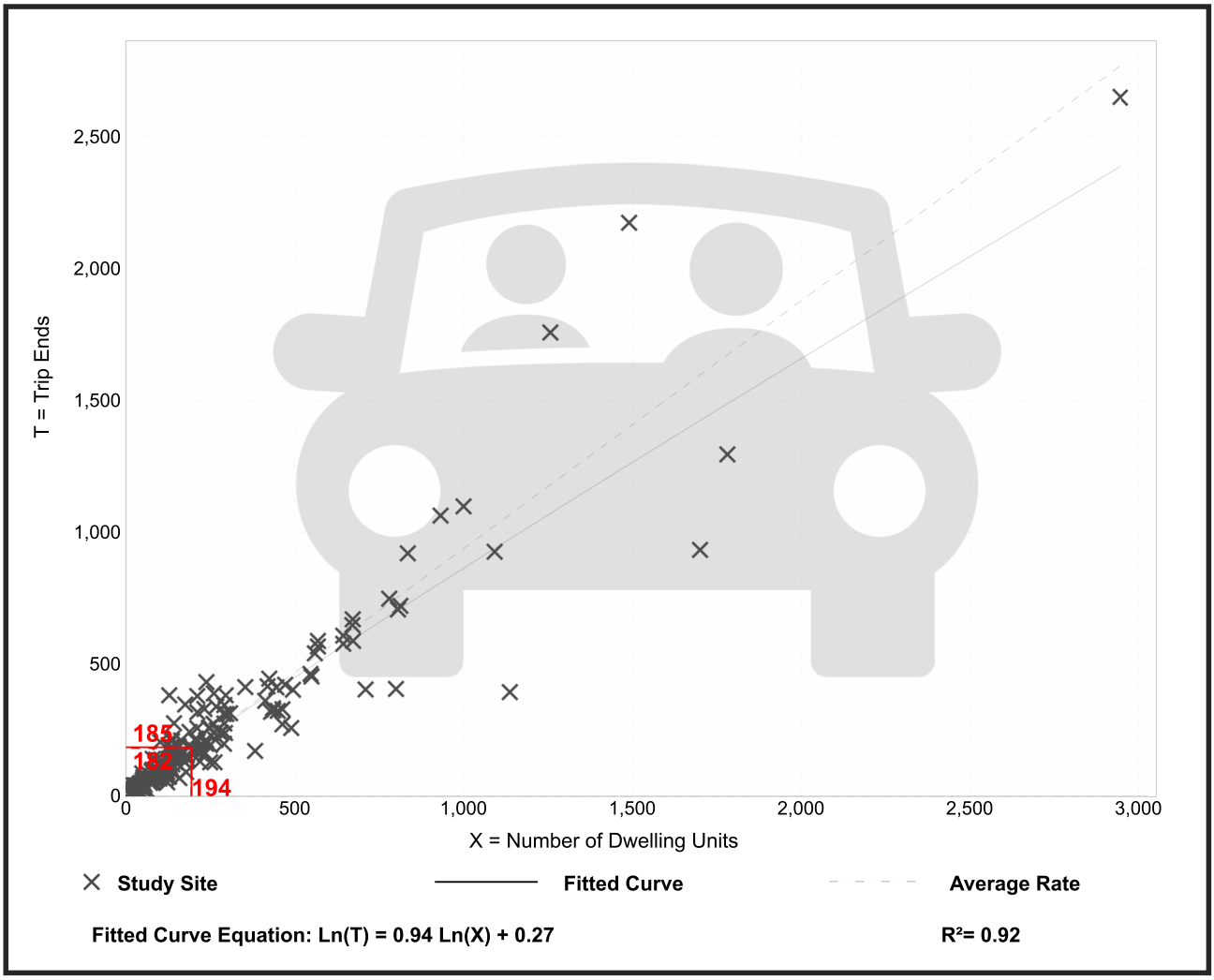
Single-Family Detached Housing
(210)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 208
Avg. Num. of Dwelling Units: 248
Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.94	0.35 - 2.98	0.31

Data Plot and Equation



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Calculated Trip Ends:
Average Rate: 182 (Total), 115 (Entry), 67 (Exit)
Fitted Curve: 185 (Total), 117 (Entry), 68 (Exit)

Single-Family Detached Housing
(210)

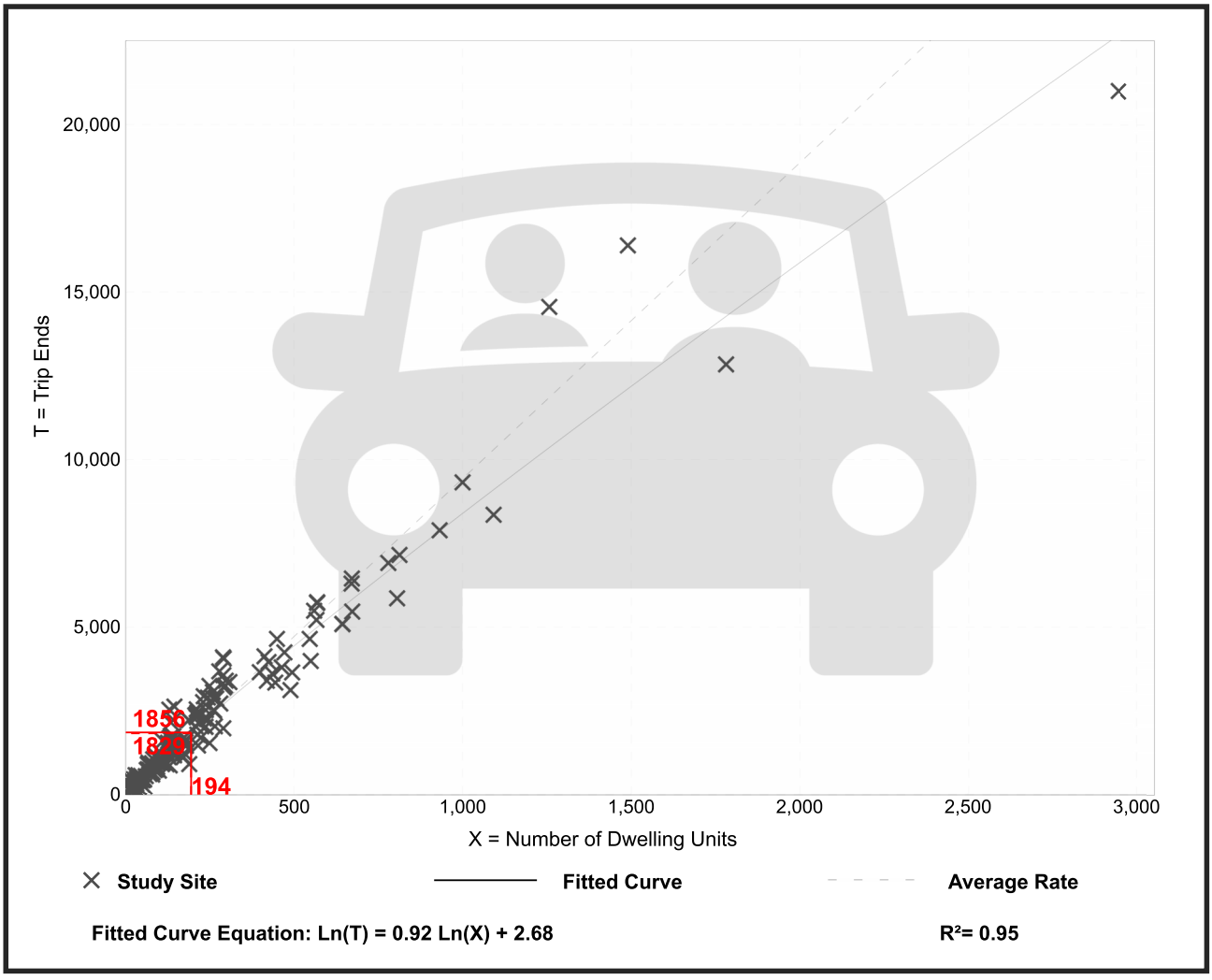
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 174
Avg. Num. of Dwelling Units: 246
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
9.43	4.45 - 22.61	2.13

Data Plot and Equation

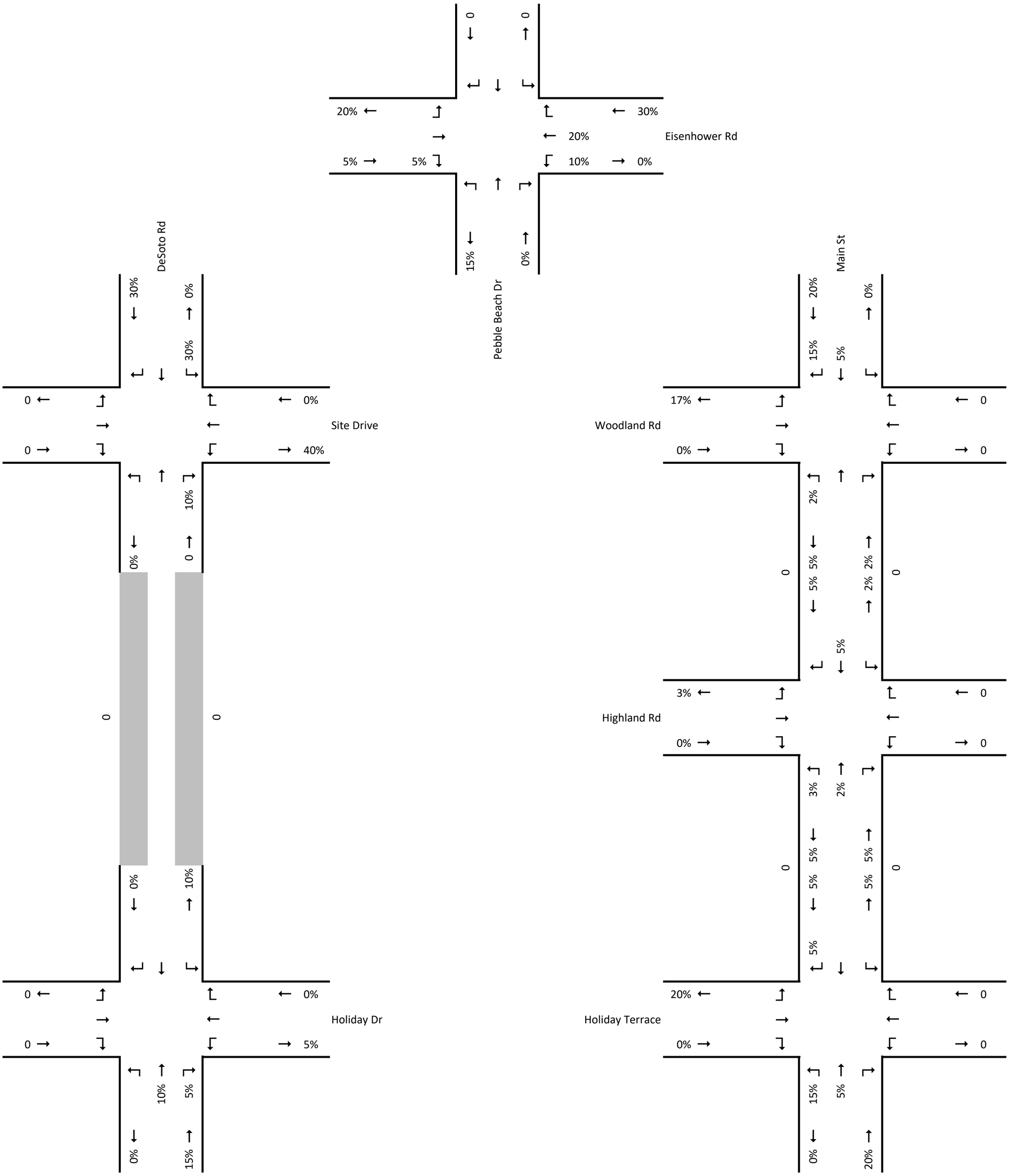


Trip Gen Manual, 11th Edition ● Institute of Transportation Engineers

Calculated Trip Ends:
Average Rate: 1829 (Total), 915 (Entry), 914 (Exit)
Fitted Curve: 1856 (Total), 928 (Entry), 928 (Exit)

Monroe Manor
Lansing, Kansas

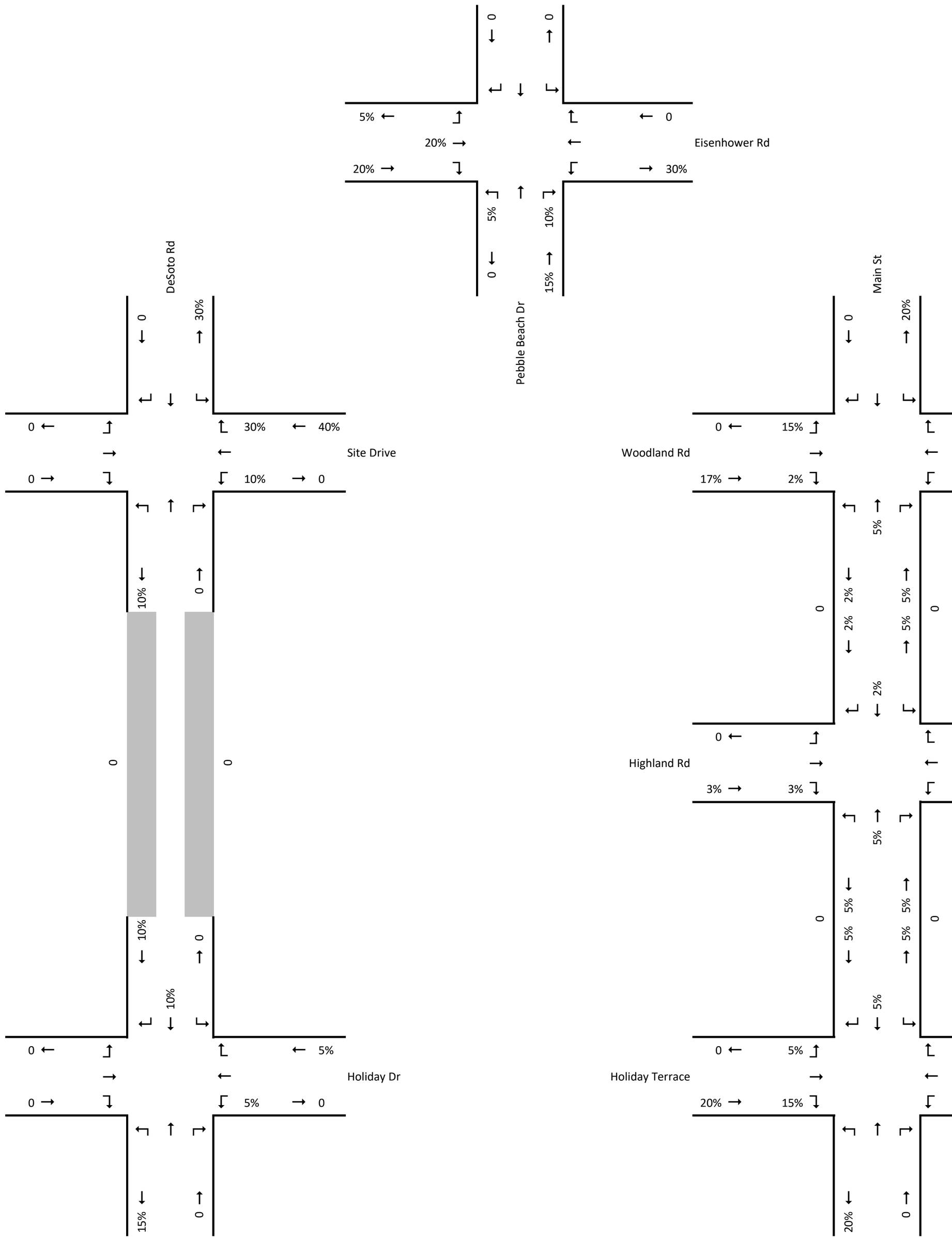
Trip Distribution
Inbound



Monroe Manor

Lansing, Kansas

Trip Distribution
Outbound



APPENDIX D

CAPACITY ANALYSIS OUTPUT FILES

Intersection	
Int Delay, s/veh	1.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	24	79	424	18	27	479
Future Vol, veh/h	24	79	424	18	27	479
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	-	175	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	3	2	17	2	2
Mvmt Flow	25	81	437	19	28	494

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	996	446	0	0	456	0
Stage 1	446	-	-	-	-	-
Stage 2	549	-	-	-	-	-
Critical Hdwy	6.42	6.23	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.327	-	-	2.218	-
Pot Cap-1 Maneuver	271	610	-	-	1105	-
Stage 1	645	-	-	-	-	-
Stage 2	578	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	264	610	-	-	1105	-
Mov Cap-2 Maneuver	264	-	-	-	-	-
Stage 1	645	-	-	-	-	-
Stage 2	564	-	-	-	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	13.73	0	0.45
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	264	610	1105	-
HCM Lane V/C Ratio	-	-	0.094	0.134	0.025	-
HCM Ctrl Dly (s/v)	-	-	20	11.8	8.3	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0.5	0.1	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	670	12	9	340	19	22
Future Vol, veh/h	670	12	9	340	19	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	2	8	11	3	2	2
Mvmt Flow	684	12	9	347	19	22

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	696	0	882	348
Stage 1	-	-	-	-	690	-
Stage 2	-	-	-	-	192	-
Critical Hdwy	-	-	4.32	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.31	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	838	-	286	648
Stage 1	-	-	-	-	459	-
Stage 2	-	-	-	-	822	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	838	-	282	648
Mov Cap-2 Maneuver	-	-	-	-	282	-
Stage 1	-	-	-	-	459	-
Stage 2	-	-	-	-	812	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.35	14.91
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	405	-	-	93	-
HCM Lane V/C Ratio	0.103	-	-	0.011	-
HCM Ctrl Dly (s/v)	14.9	-	-	9.3	0.1
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	11	4	1064	838	3
Future Vol, veh/h	12	11	4	1064	838	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	9	25	4	6	2
Mvmt Flow	13	12	4	1120	882	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1452	443	885	0	-	0
Stage 1	884	-	-	-	-	-
Stage 2	568	-	-	-	-	-
Critical Hdwy	6.84	7.08	4.6	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.39	2.45	-	-	-
Pot Cap-1 Maneuver	121	544	631	-	-	-
Stage 1	364	-	-	-	-	-
Stage 2	530	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	121	544	631	-	-	-
Mov Cap-2 Maneuver	249	-	-	-	-	-
Stage 1	362	-	-	-	-	-
Stage 2	530	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	16.55	0.04	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	631	-	336	-	-
HCM Lane V/C Ratio	0.007	-	0.072	-	-
HCM Ctrl Dly (s/v)	10.7	-	16.6	-	-
HCM Lane LOS	B	-	C	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	0	12	6	0	17	10	1041	4	10	838	1
Future Vol, veh/h	10	0	12	6	0	17	10	1041	4	10	838	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	10	2	2	2	2	12	10	5	25	2	6	2
Mvmt Flow	11	0	13	6	0	18	11	1107	4	11	891	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1488	2046	446	1598	2045	556	893	0	0	1112	0	0
Stage 1	913	913	-	1131	1131	-	-	-	-	-	-	-
Stage 2	575	1133	-	467	914	-	-	-	-	-	-	-
Critical Hdwy	7.7	6.54	6.94	7.54	6.54	7.14	4.3	-	-	4.14	-	-
Critical Hdwy Stg 1	6.7	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.7	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.6	4.02	3.32	3.52	4.02	3.42	2.3	-	-	2.22	-	-
Pot Cap-1 Maneuver	80	55	560	71	55	450	707	-	-	624	-	-
Stage 1	279	350	-	217	277	-	-	-	-	-	-	-
Stage 2	451	276	-	545	350	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	74	54	560	67	54	450	707	-	-	624	-	-
Mov Cap-2 Maneuver	183	160	-	162	161	-	-	-	-	-	-	-
Stage 1	274	344	-	213	273	-	-	-	-	-	-	-
Stage 2	426	272	-	524	344	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	18.56	17.73	0.1	0.13
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	707	-	-	289	307	624	-	-
HCM Lane V/C Ratio	0.015	-	-	0.081	0.08	0.017	-	-
HCM Ctrl Dly (s/v)	10.2	-	-	18.6	17.7	10.9	-	-
HCM Lane LOS	B	-	-	C	C	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.3	0.1	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	0	12	0	0	1	7	1044	18	1	835	20
Future Vol, veh/h	10	0	12	0	0	1	7	1044	18	1	835	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	50	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	17	2	2	2	29	5	6	2	6	2
Mvmt Flow	11	0	13	0	0	1	7	1099	19	1	879	21

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1456	2024	450	1565	2025	559	900	0	0	1118	0	0
Stage 1	892	892	-	1123	1123	-	-	-	-	-	-	-
Stage 2	564	1133	-	442	902	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	7.24	7.54	6.54	6.94	4.68	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.47	3.52	4.02	3.32	2.49	-	-	2.22	-	-
Pot Cap-1 Maneuver	91	57	517	75	57	472	603	-	-	621	-	-
Stage 1	303	359	-	219	279	-	-	-	-	-	-	-
Stage 2	477	276	-	565	355	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	89	56	517	72	56	472	603	-	-	621	-	-
Mov Cap-2 Maneuver	206	166	-	167	165	-	-	-	-	-	-	-
Stage 1	303	358	-	216	276	-	-	-	-	-	-	-
Stage 2	471	273	-	550	354	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	17.68	12.64	0.07	0.01
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	603	-	-	307	472	621	-	-
HCM Lane V/C Ratio	0.012	-	-	0.075	0.002	0.002	-	-
HCM Ctrl Dly (s/v)	11	-	-	17.7	12.6	10.8	-	-
HCM Lane LOS	B	-	-	C	B	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0	0	-	-

Intersection	
Int Delay, s/veh	1.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	16	76	444	13	96	477
Future Vol, veh/h	16	76	444	13	96	477
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	-	175	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	80	467	14	101	502

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1178	474	0	0	481	0
Stage 1	474	-	-	-	-	-
Stage 2	704	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	211	590	-	-	1081	-
Stage 1	626	-	-	-	-	-
Stage 2	490	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	191	590	-	-	1081	-
Mov Cap-2 Maneuver	191	-	-	-	-	-
Stage 1	626	-	-	-	-	-
Stage 2	444	-	-	-	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	14.42	0	1.45
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	191	590	1081	-
HCM Lane V/C Ratio	-	-	0.088	0.136	0.093	-
HCM Ctrl Dly (s/v)	-	-	25.7	12.1	8.7	-
HCM Lane LOS	-	-	D	B	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0.5	0.3	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	462	38	47	919	16	18
Future Vol, veh/h	462	38	47	919	16	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	519	43	53	1033	18	20

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	562	0	1162	281
Stage 1	-	-	-	-	540	-
Stage 2	-	-	-	-	622	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1006	-	188	716
Stage 1	-	-	-	-	548	-
Stage 2	-	-	-	-	498	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1006	-	174	716
Mov Cap-2 Maneuver	-	-	-	-	174	-
Stage 1	-	-	-	-	548	-
Stage 2	-	-	-	-	461	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.98	19.25
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	291	-	-	175	-
HCM Lane V/C Ratio	0.131	-	-	0.053	-
HCM Ctrl Dly (s/v)	19.3	-	-	8.8	0.6
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0.2	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	8	14	1098	1295	10
Future Vol, veh/h	10	8	14	1098	1295	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	13	2	2	2	2
Mvmt Flow	11	9	15	1181	1392	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2018	702	1403	0	-	0
Stage 1	1398	-	-	-	-	-
Stage 2	620	-	-	-	-	-
Critical Hdwy	6.84	7.16	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.43	2.22	-	-	-
Pot Cap-1 Maneuver	51	357	483	-	-	-
Stage 1	194	-	-	-	-	-
Stage 2	499	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	49	357	483	-	-	-
Mov Cap-2 Maneuver	142	-	-	-	-	-
Stage 1	188	-	-	-	-	-
Stage 2	499	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	25.65	0.16	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	483	-	194	-	-
HCM Lane V/C Ratio	0.031	-	0.1	-	-
HCM Ctrl Dly (s/v)	12.7	-	25.6	-	-
HCM Lane LOS	B	-	D	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	12	3	0	17	7	1090	10	15	1280	8
Future Vol, veh/h	5	0	12	3	0	17	7	1090	10	15	1280	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	0	13	3	0	18	8	1172	11	16	1376	9

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2014	2611	692	1913	2610	591	1385	0	0	1183	0	0
Stage 1	1413	1413	-	1192	1192	-	-	-	-	-	-	-
Stage 2	601	1198	-	720	1417	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	34	24	386	41	24	450	490	-	-	586	-	-
Stage 1	145	202	-	199	259	-	-	-	-	-	-	-
Stage 2	454	257	-	385	201	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	32	23	386	38	23	450	490	-	-	586	-	-
Mov Cap-2 Maneuver	106	109	-	131	109	-	-	-	-	-	-	-
Stage 1	141	197	-	195	255	-	-	-	-	-	-	-
Stage 2	429	253	-	362	196	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	23.04	16.7	0.08	0.13
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	490	-	-	218	329	586	-	-
HCM Lane V/C Ratio	0.015	-	-	0.084	0.065	0.028	-	-
HCM Ctrl Dly (s/v)	12.5	-	-	23	16.7	11.3	-	-
HCM Lane LOS	B	-	-	C	C	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.2	0.1	-	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	31	1	17	1	0	2	22	1074	8	3	1235	57
Future Vol, veh/h	31	1	17	1	0	2	22	1074	8	3	1235	57
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	50	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	33	1	18	1	0	2	24	1155	9	3	1328	61

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1990	2576	695	1877	2602	582	1389	0	0	1163	0	0
Stage 1	1365	1365	-	1206	1206	-	-	-	-	-	-	-
Stage 2	625	1211	-	671	1396	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	36	25	385	44	24	456	489	-	-	596	-	-
Stage 1	155	214	-	195	255	-	-	-	-	-	-	-
Stage 2	439	253	-	412	206	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	34	24	385	39	23	456	489	-	-	596	-	-
Mov Cap-2 Maneuver	114	113	-	128	105	-	-	-	-	-	-	-
Stage 1	154	212	-	185	242	-	-	-	-	-	-	-
Stage 2	416	241	-	389	205	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	41.03	19.85	0.25	0.03
HCM LOS	E	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	489	-	-	151	246	596	-	-
HCM Lane V/C Ratio	0.048	-	-	0.348	0.013	0.005	-	-
HCM Ctrl Dly (s/v)	12.7	-	-	41	19.8	11.1	-	-
HCM Lane LOS	B	-	-	E	C	B	-	-
HCM 95th %tile Q(veh)	0.2	-	-	1.4	0	0	-	-

Intersection	
Int Delay, s/veh	1.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	29	79	427	20	27	489
Future Vol, veh/h	29	79	427	20	27	489
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	-	175	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	3	2	17	2	2
Mvmt Flow	30	81	440	21	28	504

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1010	451	0	0	461	0
Stage 1	451	-	-	-	-	-
Stage 2	560	-	-	-	-	-
Critical Hdwy	6.42	6.23	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.327	-	-	2.218	-
Pot Cap-1 Maneuver	266	607	-	-	1100	-
Stage 1	642	-	-	-	-	-
Stage 2	572	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	259	607	-	-	1100	-
Mov Cap-2 Maneuver	259	-	-	-	-	-
Stage 1	642	-	-	-	-	-
Stage 2	557	-	-	-	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	14.23	0	0.44
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	259	607	1100	-
HCM Lane V/C Ratio	-	-	0.115	0.134	0.025	-
HCM Ctrl Dly (s/v)	-	-	20.7	11.9	8.4	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	0.4	0.5	0.1	-

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	32	503	3	10	506
Future Vol, veh/h	10	32	503	3	10	506
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	33	519	3	10	522

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1062	520	0	0	522	0
Stage 1	520	-	-	-	-	-
Stage 2	542	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	247	556	-	-	1045	-
Stage 1	597	-	-	-	-	-
Stage 2	583	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	245	556	-	-	1045	-
Mov Cap-2 Maneuver	245	-	-	-	-	-
Stage 1	597	-	-	-	-	-
Stage 2	577	-	-	-	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	14.38	0	0.16
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	427	1045	-
HCM Lane V/C Ratio	-	-	0.101	0.01	-
HCM Ctrl Dly (s/v)	-	-	14.4	8.5	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	690	14	12	347	24	32
Future Vol, veh/h	690	14	12	347	24	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	2	8	11	3	2	2
Mvmt Flow	704	14	12	354	24	33

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	718	0	913	359
Stage 1	-	-	-	-	711	-
Stage 2	-	-	-	-	202	-
Critical Hdwy	-	-	4.32	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.31	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	821	-	273	637
Stage 1	-	-	-	-	448	-
Stage 2	-	-	-	-	813	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	821	-	268	637
Mov Cap-2 Maneuver	-	-	-	-	268	-
Stage 1	-	-	-	-	448	-
Stage 2	-	-	-	-	799	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.46	15.46
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	401	-	-	120	-
HCM Lane V/C Ratio	0.142	-	-	0.015	-
HCM Ctrl Dly (s/v)	15.5	-	-	9.4	0.1
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	27	13	5	1069	840	8
Future Vol, veh/h	27	13	5	1069	840	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	9	25	4	6	2
Mvmt Flow	28	14	5	1125	884	8

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1462	446	893	0	-	0
Stage 1	888	-	-	-	-	-
Stage 2	573	-	-	-	-	-
Critical Hdwy	6.84	7.08	4.6	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.39	2.45	-	-	-
Pot Cap-1 Maneuver	120	541	627	-	-	-
Stage 1	362	-	-	-	-	-
Stage 2	527	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	119	541	627	-	-	-
Mov Cap-2 Maneuver	246	-	-	-	-	-
Stage 1	359	-	-	-	-	-
Stage 2	527	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	18.98	0.05	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	627	-	299	-	-
HCM Lane V/C Ratio	0.008	-	0.141	-	-
HCM Ctrl Dly (s/v)	10.8	-	19	-	-
HCM Lane LOS	B	-	C	-	-
HCM 95th %tile Q(veh)	0	-	0.5	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	0	15	6	0	17	11	1047	4	10	842	1
Future Vol, veh/h	10	0	15	6	0	17	11	1047	4	10	842	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	10	2	2	2	2	12	10	5	25	2	6	2
Mvmt Flow	11	0	16	6	0	18	12	1114	4	11	896	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1498	2059	448	1609	2057	559	897	0	0	1118	0	0
Stage 1	918	918	-	1139	1139	-	-	-	-	-	-	-
Stage 2	580	1141	-	469	918	-	-	-	-	-	-	-
Critical Hdwy	7.7	6.54	6.94	7.54	6.54	7.14	4.3	-	-	4.14	-	-
Critical Hdwy Stg 1	6.7	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.7	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.6	4.02	3.32	3.52	4.02	3.42	2.3	-	-	2.22	-	-
Pot Cap-1 Maneuver	78	54	558	70	54	448	704	-	-	620	-	-
Stage 1	277	349	-	214	274	-	-	-	-	-	-	-
Stage 2	448	274	-	544	349	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	73	53	558	66	53	448	704	-	-	620	-	-
Mov Cap-2 Maneuver	181	158	-	159	159	-	-	-	-	-	-	-
Stage 1	272	343	-	210	270	-	-	-	-	-	-	-
Stage 2	422	269	-	519	343	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	17.96	17.86	0.11	0.13
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	704	-	-	304	304	620	-	-
HCM Lane V/C Ratio	0.017	-	-	0.087	0.08	0.017	-	-
HCM Ctrl Dly (s/v)	10.2	-	-	18	17.9	10.9	-	-
HCM Lane LOS	B	-	-	C	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	0.3	0.1	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	0	27	0	0	1	12	1046	18	1	840	22
Future Vol, veh/h	15	0	27	0	0	1	12	1046	18	1	840	22
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	50	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	17	2	2	2	29	5	6	2	6	2
Mvmt Flow	16	0	28	0	0	1	13	1101	19	1	884	23

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1474	2043	454	1580	2045	560	907	0	0	1120	0	0
Stage 1	898	898	-	1136	1136	-	-	-	-	-	-	-
Stage 2	576	1145	-	444	909	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	7.24	7.54	6.54	6.94	4.68	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.47	3.52	4.02	3.32	2.49	-	-	2.22	-	-
Pot Cap-1 Maneuver	88	56	514	73	55	472	598	-	-	619	-	-
Stage 1	301	356	-	215	275	-	-	-	-	-	-	-
Stage 2	470	272	-	563	352	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	86	54	514	68	54	472	598	-	-	619	-	-
Mov Cap-2 Maneuver	203	163	-	161	161	-	-	-	-	-	-	-
Stage 1	300	356	-	211	269	-	-	-	-	-	-	-
Stage 2	459	267	-	531	351	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	17.51	12.65	0.12	0.01
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	598	-	-	332	472	619	-	-
HCM Lane V/C Ratio	0.021	-	-	0.133	0.002	0.002	-	-
HCM Ctrl Dly (s/v)	11.1	-	-	17.5	12.6	10.8	-	-
HCM Lane LOS	B	-	-	C	B	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.5	0	0	-	-

Intersection	
Int Delay, s/veh	2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	76	456	19	96	484
Future Vol, veh/h	20	76	456	19	96	484
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	-	175	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	21	80	480	20	101	509

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1202	490	0	0	500	0
Stage 1	490	-	-	-	-	-
Stage 2	712	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	204	578	-	-	1064	-
Stage 1	616	-	-	-	-	-
Stage 2	486	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	185	578	-	-	1064	-
Mov Cap-2 Maneuver	185	-	-	-	-	-
Stage 1	616	-	-	-	-	-
Stage 2	440	-	-	-	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	15.3	0	1.45
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	185	578	1064	-
HCM Lane V/C Ratio	-	-	0.114	0.138	0.095	-
HCM Ctrl Dly (s/v)	-	-	27	12.2	8.7	-
HCM Lane LOS	-	-	D	B	A	-
HCM 95th %tile Q(veh)	-	-	0.4	0.5	0.3	-

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	21	520	12	35	573
Future Vol, veh/h	7	21	520	12	35	573
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	22	547	13	37	603

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1231	554	0	0	560	0
Stage 1	554	-	-	-	-	-
Stage 2	677	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	196	532	-	-	1011	-
Stage 1	576	-	-	-	-	-
Stage 2	505	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	189	532	-	-	1011	-
Mov Cap-2 Maneuver	189	-	-	-	-	-
Stage 1	576	-	-	-	-	-
Stage 2	486	-	-	-	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	15.7	0	0.5
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	366	1011	-
HCM Lane V/C Ratio	-	-	0.081	0.036	-
HCM Ctrl Dly (s/v)	-	-	15.7	8.7	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0.1	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	476	44	59	942	19	25
Future Vol, veh/h	476	44	59	942	19	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	535	49	66	1058	21	28

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	584	0	1221	292
Stage 1	-	-	-	-	560	-
Stage 2	-	-	-	-	662	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	986	-	172	704
Stage 1	-	-	-	-	536	-
Stage 2	-	-	-	-	475	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	986	-	156	704
Mov Cap-2 Maneuver	-	-	-	-	156	-
Stage 1	-	-	-	-	536	-
Stage 2	-	-	-	-	430	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	1.23	20.64
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	279	-	-	212	-
HCM Lane V/C Ratio	0.177	-	-	0.067	-
HCM Ctrl Dly (s/v)	20.6	-	-	8.9	0.8
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.6	-	-	0.2	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	9	16	1101	1301	27
Future Vol, veh/h	20	9	16	1101	1301	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	13	2	2	2	2
Mvmt Flow	22	10	17	1184	1399	29

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2040	714	1428	0	-	0
Stage 1	1413	-	-	-	-	-
Stage 2	626	-	-	-	-	-
Critical Hdwy	6.84	7.16	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.43	2.22	-	-	-
Pot Cap-1 Maneuver	49	350	472	-	-	-
Stage 1	191	-	-	-	-	-
Stage 2	495	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	47	350	472	-	-	-
Mov Cap-2 Maneuver	139	-	-	-	-	-
Stage 1	184	-	-	-	-	-
Stage 2	495	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	30.79	0.18	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	472	-	170	-	-
HCM Lane V/C Ratio	0.036	-	0.183	-	-
HCM Ctrl Dly (s/v)	12.9	-	30.8	-	-
HCM Lane LOS	B	-	D	-	-
HCM 95th %tile Q(veh)	0.1	-	0.6	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	14	3	0	17	10	1095	10	15	1287	8
Future Vol, veh/h	5	0	14	3	0	17	10	1095	10	15	1287	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	0	15	3	0	18	11	1177	11	16	1384	9

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2031	2630	696	1928	2629	594	1392	0	0	1188	0	0
Stage 1	1420	1420	-	1204	1204	-	-	-	-	-	-	-
Stage 2	610	1210	-	724	1425	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	33	23	384	40	23	448	487	-	-	583	-	-
Stage 1	143	201	-	195	255	-	-	-	-	-	-	-
Stage 2	448	254	-	383	200	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	31	22	384	37	22	448	487	-	-	583	-	-
Mov Cap-2 Maneuver	105	107	-	127	106	-	-	-	-	-	-	-
Stage 1	139	195	-	191	250	-	-	-	-	-	-	-
Stage 2	420	248	-	358	194	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	22.53	16.85	0.11	0.13
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	487	-	-	226	325	583	-	-
HCM Lane V/C Ratio	0.022	-	-	0.091	0.066	0.028	-	-
HCM Ctrl Dly (s/v)	12.6	-	-	22.5	16.8	11.3	-	-
HCM Lane LOS	B	-	-	C	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	0.2	0.1	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	34	1	27	1	0	2	39	1079	8	3	1238	63
Future Vol, veh/h	34	1	27	1	0	2	39	1079	8	3	1238	63
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	50	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	37	1	29	1	0	2	42	1160	9	3	1331	68

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2035	2624	699	1921	2654	584	1399	0	0	1169	0	0
Stage 1	1372	1372	-	1248	1248	-	-	-	-	-	-	-
Stage 2	664	1253	-	673	1405	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	~ 33	24	382	41	23	455	484	-	-	593	-	-
Stage 1	154	212	-	183	243	-	-	-	-	-	-	-
Stage 2	416	242	-	411	204	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 30	21	382	34	20	455	484	-	-	593	-	-
Mov Cap-2 Maneuver	110	108	-	115	94	-	-	-	-	-	-	-
Stage 1	153	211	-	167	222	-	-	-	-	-	-	-
Stage 2	378	221	-	376	203	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	42.89	20.91	0.45	0.03
HCM LOS	E	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	484	-	-	159	229	593	-	-
HCM Lane V/C Ratio	0.087	-	-	0.418	0.014	0.005	-	-
HCM Ctrl Dly (s/v)	13.1	-	-	42.9	20.9	11.1	-	-
HCM Lane LOS	B	-	-	E	C	B	-	-
HCM 95th %tile Q(veh)	0.3	-	-	1.9	0	0	-	-

Notes	
~: Volume exceeds capacity	$: Delay exceeds 300s
+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	1.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	33	91	491	23	31	562
Future Vol, veh/h	33	91	491	23	31	562
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	-	175	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	3	2	17	2	2
Mvmt Flow	34	94	506	24	32	579

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1161	518	0	0	530	0
Stage 1	518	-	-	-	-	-
Stage 2	643	-	-	-	-	-
Critical Hdwy	6.42	6.23	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.327	-	-	2.218	-
Pot Cap-1 Maneuver	216	556	-	-	1037	-
Stage 1	598	-	-	-	-	-
Stage 2	523	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	209	556	-	-	1037	-
Mov Cap-2 Maneuver	209	-	-	-	-	-
Stage 1	598	-	-	-	-	-
Stage 2	507	-	-	-	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	16.18	0	0.45
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	209	556	1037	-
HCM Lane V/C Ratio	-	-	0.163	0.169	0.031	-
HCM Ctrl Dly (s/v)	-	-	25.5	12.8	8.6	-
HCM Lane LOS	-	-	D	B	A	-
HCM 95th %tile Q(veh)	-	-	0.6	0.6	0.1	-

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	32	579	3	10	583
Future Vol, veh/h	10	32	579	3	10	583
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	33	597	3	10	601

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1220	598	0	0	600	0
Stage 1	598	-	-	-	-	-
Stage 2	622	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	199	502	-	-	977	-
Stage 1	549	-	-	-	-	-
Stage 2	536	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	197	502	-	-	977	-
Mov Cap-2 Maneuver	197	-	-	-	-	-
Stage 1	549	-	-	-	-	-
Stage 2	530	-	-	-	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	16.13	0	0.15
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	367	977	-
HCM Lane V/C Ratio	-	-	0.118	0.011	-
HCM Ctrl Dly (s/v)	-	-	16.1	8.7	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.4	0	-

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	792	16	13	399	27	35
Future Vol, veh/h	792	16	13	399	27	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	2	8	11	3	2	2
Mvmt Flow	808	16	13	407	28	36

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	824	0	1046	412
Stage 1	-	-	-	-	816	-
Stage 2	-	-	-	-	230	-
Critical Hdwy	-	-	4.32	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.31	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	746	-	224	589
Stage 1	-	-	-	-	395	-
Stage 2	-	-	-	-	786	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	746	-	219	589
Mov Cap-2 Maneuver	-	-	-	-	219	-
Stage 1	-	-	-	-	395	-
Stage 2	-	-	-	-	771	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.49	18.01
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	340	-	-	114	-
HCM Lane V/C Ratio	0.186	-	-	0.018	-
HCM Ctrl Dly (s/v)	18	-	-	9.9	0.2
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.7	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	29	15	6	1231	967	8
Future Vol, veh/h	29	15	6	1231	967	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	9	25	4	6	2
Mvmt Flow	31	16	6	1296	1018	8

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1683	513	1026	0	-	0
Stage 1	1022	-	-	-	-	-
Stage 2	661	-	-	-	-	-
Critical Hdwy	6.84	7.08	4.6	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.39	2.45	-	-	-
Pot Cap-1 Maneuver	85	488	550	-	-	-
Stage 1	308	-	-	-	-	-
Stage 2	475	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	84	488	550	-	-	-
Mov Cap-2 Maneuver	206	-	-	-	-	-
Stage 1	305	-	-	-	-	-
Stage 2	475	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	22.13	0.06	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	550	-	256	-	-
HCM Lane V/C Ratio	0.011	-	0.181	-	-
HCM Ctrl Dly (s/v)	11.6	-	22.1	-	-
HCM Lane LOS	B	-	C	-	-
HCM 95th %tile Q(veh)	0	-	0.6	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	0	17	7	0	20	13	1205	5	12	969	1
Future Vol, veh/h	12	0	17	7	0	20	13	1205	5	12	969	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	10	2	2	2	2	12	10	5	25	2	6	2
Mvmt Flow	13	0	18	7	0	21	14	1282	5	13	1031	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1726	2372	516	1853	2370	644	1032	0	0	1287	0	0
Stage 1	1057	1057	-	1312	1312	-	-	-	-	-	-	-
Stage 2	669	1315	-	541	1057	-	-	-	-	-	-	-
Critical Hdwy	7.7	6.54	6.94	7.54	6.54	7.14	4.3	-	-	4.14	-	-
Critical Hdwy Stg 1	6.7	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.7	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.6	4.02	3.32	3.52	4.02	3.42	2.3	-	-	2.22	-	-
Pot Cap-1 Maneuver	52	34	504	46	34	393	623	-	-	535	-	-
Stage 1	227	300	-	167	227	-	-	-	-	-	-	-
Stage 2	395	226	-	493	300	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	47	33	504	42	33	393	623	-	-	535	-	-
Mov Cap-2 Maneuver	144	125	-	124	127	-	-	-	-	-	-	-
Stage 1	221	293	-	164	221	-	-	-	-	-	-	-
Stage 2	365	221	-	464	293	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	21.56	21.17	0.12	0.15
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	623	-	-	248	251	535	-	-
HCM Lane V/C Ratio	0.022	-	-	0.124	0.114	0.024	-	-
HCM Ctrl Dly (s/v)	10.9	-	-	21.6	21.2	11.9	-	-
HCM Lane LOS	B	-	-	C	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.4	0.1	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	0	29	0	0	1	13	1205	21	1	967	25
Future Vol, veh/h	17	0	29	0	0	1	13	1205	21	1	967	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	50	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	17	2	2	2	29	5	6	2	6	2
Mvmt Flow	18	0	31	0	0	1	14	1268	22	1	1018	26

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1695	2351	522	1818	2353	645	1044	0	0	1291	0	0
Stage 1	1033	1033	-	1307	1307	-	-	-	-	-	-	-
Stage 2	662	1318	-	511	1046	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	7.24	7.54	6.54	6.94	4.68	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.47	3.52	4.02	3.32	2.49	-	-	2.22	-	-
Pot Cap-1 Maneuver	60	35	462	49	35	415	522	-	-	533	-	-
Stage 1	249	308	-	169	228	-	-	-	-	-	-	-
Stage 2	418	225	-	514	303	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	58	34	462	44	34	415	522	-	-	533	-	-
Mov Cap-2 Maneuver	165	132	-	126	130	-	-	-	-	-	-	-
Stage 1	248	307	-	164	222	-	-	-	-	-	-	-
Stage 2	406	219	-	479	303	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	20.69	13.7	0.13	0.01
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	522	-	-	278	415	533	-	-
HCM Lane V/C Ratio	0.026	-	-	0.174	0.003	0.002	-	-
HCM Ctrl Dly (s/v)	12.1	-	-	20.7	13.7	11.8	-	-
HCM Lane LOS	B	-	-	C	B	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.6	0	0	-	-

Intersection	
Int Delay, s/veh	2.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	22	88	523	21	111	556
Future Vol, veh/h	22	88	523	21	111	556
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	-	175	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	93	551	22	117	585

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1381	562	0	0	573	0
Stage 1	562	-	-	-	-	-
Stage 2	819	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	159	527	-	-	1000	-
Stage 1	571	-	-	-	-	-
Stage 2	433	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	140	527	-	-	1000	-
Mov Cap-2 Maneuver	140	-	-	-	-	-
Stage 1	571	-	-	-	-	-
Stage 2	383	-	-	-	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	17.76	0	1.51
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	140	527	1000	-
HCM Lane V/C Ratio	-	-	0.165	0.176	0.117	-
HCM Ctrl Dly (s/v)	-	-	35.6	13.3	9.1	-
HCM Lane LOS	-	-	E	B	A	-
HCM 95th %tile Q(veh)	-	-	0.6	0.6	0.4	-

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	21	599	12	35	660
Future Vol, veh/h	7	21	599	12	35	660
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	22	631	13	37	695

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1405	637	0	0	643	0
Stage 1	637	-	-	-	-	-
Stage 2	768	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	154	477	-	-	942	-
Stage 1	527	-	-	-	-	-
Stage 2	458	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	148	477	-	-	942	-
Mov Cap-2 Maneuver	148	-	-	-	-	-
Stage 1	527	-	-	-	-	-
Stage 2	440	-	-	-	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	18.01	0	0.45
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	306	942	-
HCM Lane V/C Ratio	-	-	0.096	0.039	-
HCM Ctrl Dly (s/v)	-	-	18	9	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0.1	-

Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	546	50	66	1081	21	28
Future Vol, veh/h	546	50	66	1081	21	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	613	56	74	1215	24	31

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	670	0	1397	335
Stage 1	-	-	-	-	642	-
Stage 2	-	-	-	-	756	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	916	-	132	661
Stage 1	-	-	-	-	486	-
Stage 2	-	-	-	-	425	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	916	-	116	661
Mov Cap-2 Maneuver	-	-	-	-	116	-
Stage 1	-	-	-	-	486	-
Stage 2	-	-	-	-	373	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	1.48	26.87
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	219	-	-	207	-
HCM Lane V/C Ratio	0.251	-	-	0.081	-
HCM Ctrl Dly (s/v)	26.9	-	-	9.3	1
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	1	-	-	0.3	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	22	10	18	1268	1497	29
Future Vol, veh/h	22	10	18	1268	1497	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	13	2	2	2	2
Mvmt Flow	24	11	19	1363	1610	31

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2346	820	1641	0	-	0
Stage 1	1625	-	-	-	-	-
Stage 2	720	-	-	-	-	-
Critical Hdwy	6.84	7.16	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.43	2.22	-	-	-
Pot Cap-1 Maneuver	30	296	391	-	-	-
Stage 1	146	-	-	-	-	-
Stage 2	443	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	29	296	391	-	-	-
Mov Cap-2 Maneuver	106	-	-	-	-	-
Stage 1	139	-	-	-	-	-
Stage 2	443	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	41.52	0.21	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	391	-	132	-	-
HCM Lane V/C Ratio	0.05	-	0.26	-	-
HCM Ctrl Dly (s/v)	14.7	-	41.5	-	-
HCM Lane LOS	B	-	E	-	-
HCM 95th %tile Q(veh)	0.2	-	1	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	0	16	3	0	20	11	1260	12	17	1481	9
Future Vol, veh/h	6	0	16	3	0	20	11	1260	12	17	1481	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	0	17	3	0	22	12	1355	13	18	1592	10

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2335	3025	801	2218	3024	684	1602	0	0	1368	0	0
Stage 1	1634	1634	-	1385	1385	-	-	-	-	-	-	-
Stage 2	701	1391	-	833	1639	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	20	13	327	24	13	391	404	-	-	498	-	-
Stage 1	105	158	-	151	209	-	-	-	-	-	-	-
Stage 2	395	207	-	329	157	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	17	12	327	21	12	391	404	-	-	498	-	-
Mov Cap-2 Maneuver	77	81	-	97	81	-	-	-	-	-	-	-
Stage 1	101	152	-	146	203	-	-	-	-	-	-	-
Stage 2	363	201	-	301	151	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	29.03	19.07	0.12	0.14
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	404	-	-	173	281	498	-	-
HCM Lane V/C Ratio	0.029	-	-	0.136	0.088	0.037	-	-
HCM Ctrl Dly (s/v)	14.2	-	-	29	19.1	12.5	-	-
HCM Lane LOS	B	-	-	D	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.5	0.3	0.1	-	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	39	1	30	1	0	2	42	1242	9	3	1425	72
Future Vol, veh/h	39	1	30	1	0	2	42	1242	9	3	1425	72
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	50	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	42	1	32	1	0	2	45	1335	10	3	1532	77

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2335	3013	805	2204	3047	673	1610	0	0	1345	0	0
Stage 1	1577	1577	-	1431	1431	-	-	-	-	-	-	-
Stage 2	758	1435	-	773	1616	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	~ 20	13	326	25	12	398	402	-	-	508	-	-
Stage 1	114	168	-	141	198	-	-	-	-	-	-	-
Stage 2	365	197	-	358	161	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 17	12	326	19	11	398	402	-	-	508	-	-
Mov Cap-2 Maneuver	82	83	-	86	68	-	-	-	-	-	-	-
Stage 1	114	167	-	125	176	-	-	-	-	-	-	-
Stage 2	323	175	-	318	160	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	74.29	25.36	0.49	0.02
HCM LOS	F	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	402	-	-	121	180	508	-	-
HCM Lane V/C Ratio	0.112	-	-	0.621	0.018	0.006	-	-
HCM Ctrl Dly (s/v)	15.1	-	-	74.3	25.4	12.1	-	-
HCM Lane LOS	C	-	-	F	D	B	-	-
HCM 95th %tile Q(veh)	0.4	-	-	3.2	0.1	0	-	-

Notes	
~: Volume exceeds capacity	$: Delay exceeds 300s
+: Computation Not Defined	*: All major volume in platoon

APPENDIX E

TURN LANE WARRANTS

DeSoto Road & Holiday Drive - 40 MPH

NB Right-Turn Lane

Volume Scenario	Major Road Volume	Right-Turn Volume	Lane Warranted?
AM Ex + Site	447	20	NO
PM Ex + Site	475	19	NO
AM Fut + Site	514	23	NO
PM Fut + Site	544	21	NO

DeSoto Road & Site Drive - 40 MPH

NB Right-Turn Lane

Volume Scenario	Major Road Volume	Right-Turn Volume	Lane Warranted?
AM Ex + Site	506	3	NO
PM Ex + Site	520	12	NO
AM Fut + Site	582	3	NO
PM Fut + Site	611	12	NO

Eisenhower Road & Pebble Beach Drive - 40 MPH

WB Left-Turn Lane

Volume Scenario	Advancing Volume	Opposing Volume	Left Turn Volume	Lane Warranted?
AM Ex	349	682	9	YES
PM Ex	966	500	47	YES
AM Ex + Site	359	704	12	YES
PM Ex + Site	1001	520	59	YES
AM Fut + Site	412	808	13	YES
PM Fut + Site	1147	596	66	YES

EB Right-Turn Lane

Volume Scenario	Major Road Volume	Right-Turn Volume	Lane Warranted?
AM Ex + Site	704	14	NO
PM Ex + Site	520	44	NO
AM Fut + Site	792	16	NO
PM Fut + Site	546	50	NO

Main Street & Woodland Road - 40 MPH

SB Right-Turn Lane

Volume Scenario	Major Road Volume	Right-Turn Volume	Lane Warranted?
AM Ex + Site	848	8	NO
PM Ex + Site	1328	27	YES
AM Fut + Site	975	8	NO
PM Fut + Site	1526	29	YES

Main Street & Holiday Terrace - 40 MPH

SB Right-Turn Lane

Volume Scenario	Major Road Volume	Right-Turn Volume	Lane Warranted?
AM Ex + Site	863	22	NO
PM Ex + Site	1304	63	YES
AM Fut + Site	993	25	NO
PM Fut + Site	1500	72	YES

Preliminary Plat

MONROE MANOR

Part of the SW 1/4, Section 13, Township 9 South, Range 22 East
City of Lansing, Leavenworth County, Kansas

GENERAL NOTES:

1. PLAN SCALE IS 1"=100' (THIS SHEET).
2. EXISTING AND PROPOSED TOPOGRAPHY IS AS INDICATED ON PLAN.
3. LEGAL DESCRIPTION IS AS SHOWN ON PLAN.
4. EXISTING AND PROPOSED ZONING IS AS SHOWN ON PLAN.
5. PROPERTY BOUNDARY IS AS SHOWN ON PLAN.
6. EXISTING AND PROPOSED RIGHT-OF-WAYS ARE AS SHOWN ON PLAN.
7. APPROXIMATE LOCATION OF PROPOSED UTILITIES ARE AS SHOWN ON PLAN.
8. PHASING IS AS SHOWN ON PLAN.
9. GENERAL CONFIGURATION OF LOTS AS INDICATED ON PLAN.
10. ALL UTILITY EASEMENTS AS SHOWN ON PLAN.
11. ALL PROPOSED STREETS ARE TO BE PUBLIC.
12. CUL-DE-SAC RADII'S ARE AS SHOWN ON PLAN.
13. TOPOGRAPHIC INFORMATION WAS PROVIDED BY SMH CONSULTANTS INC. CONTOURS ARE AT 2' INTERVALS.
14. UTILITY EASEMENTS SHALL BE PROVIDED ALONG SIDE AND REAR LOTS AT TIME OF PLATTING AS REQUIRED. EASEMENTS SHALL BE A MINIMUM WIDTH OF 10 FEET ALONG SIDE AND REAR LOT LINES. EASEMENTS OF ADDITIONAL WIDTH SHALL BE PROVIDED TO ENCOMPASS UTILITIES AS NEEDED.
15. ALL BUILDING LINES SHOWN ON PLAN ARE 15 FEET FROM RIGHT-OF-WAY LINE.
16. RESIDENTIAL UNIT TYPES ARE SINGLE FAMILY.
17. STREET NAMES SHALL BE SUBJECT TO CHANGE UNTIL FINAL PLAT RECORDING.

SITE DATA TABLE:

EXISTING LAND USE:	VACANT/AGRICULTURAL
EXISTING ZONING:	R-2/R-2-P
PROPOSED ZONING:	R-2/R-2-P
GROSS SITE AREA:	45.28 ACRES
TRACT AREA:	6.97 ACRES (15.39% OF TOTAL AREA)
RIGHT-OF-WAY AREA:	9.01 ACRES (19.90% OF TOTAL AREA)
LOT AREA:	29.30 ACRES (64.71% OF TOTAL AREA)
PROPOSED NUMBER OF LOTS:	194
MINIMUM LOT SIZE:	4,800 SF
AVERAGE LOT SIZE:	6,578 SF
MAXIMUM LOT SIZE:	13,336 SF
BUILDING SETBACKS:	FRONT YARD: 15 FEET REAR YARD: 15 FEET SIDE YARD: 5 FEET

LAND AREA LEGEND	
LOTS	29.30 ACRES
TRACTS	6.97 ACRES
RIGHT-OF-WAY	9.01 ACRES
TOTAL	45.28 ACRES

PHASE LEGEND		
PHASE NUMBER	ACREAGE	LOTS
PHASE I	14.86 ACRES	64
PHASE II	16.25 ACRES	63
PHASE III	14.17 ACRES	67
TOTAL	45.28 ACRES	194

LEGAL DESCRIPTION:

Tract 1:
The South 1/2 of the Southwest 1/4 of the Southwest 1/4 of Section 13, Township 9 South, Range 22 East of the 6th P.M., Leavenworth County, Kansas EXCEPT: A tract of land in the South Half of the Southwest Quarter of the Southwest Quarter of Section 13, Township 9, Range 22, East of the 6th Principal Meridian, described as follows: Beginning at a point on the West line of Section 13, said point being 662.91 feet North of the Southwest corner of said Section; thence North 87°43'00" East 208.71 feet to a point; thence South and parallel to the West line of said Section 208.71 feet to a point; thence South 87°43'00" West 208.71 feet to a point on the West line of said Section; thence North along said West line 208.71 feet to the point of beginning, Leavenworth County, Kansas. less that part taken for road purposes

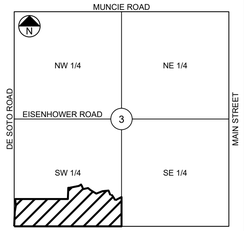
ALSO EXCEPT: A tract of land in the Northwest Quarter of the Southwest Quarter of the Southwest Quarter of Section 13, Township 9 South, Range 22 East of the 6th P.M., City of Lansing, Leavenworth County, Kansas, described as follows; Commencing at the Southwest corner of said Section 13; thence North 01°20'07" East (assumed), 394.07 feet along the West line of Section 13 to the point of beginning of this tract; thence, North 01°20'07" East 60.00 feet along said West line; thence, North 89°11'24" East 208.71 feet parallel with the North line of the South half of the Southwest Quarter of Section 13; thence, North 01°20'07" East, 208.71 feet to the North line of the South half of the Southwest Quarter of Section 13; thence North 89°11'24" East, 156.00 feet along said North line; thence South 01°20'07" West, 268.71 feet; thence, South 89°11'24" West, 364.71 feet to the point of beginning, Leavenworth County, Kansas. less part taken or used for road purposes

Tract 2:
All the part of the East 1/2 of the Southwest 1/4 of Section 13, Township 9, Range 22 that lies South of Fairway Estates, 4th Plat, in Lansing, Leavenworth County, Kansas, subject to that part of any, in streets, roadways, highways or other public rights-of-ways.

Tract 3:
A tract of land in the South Half of the Southwest Quarter of the Southwest Quarter of Section 13, Township 9, Range 22, East of the 6th Principal Meridian, described as follows: Beginning at a point on the West line of Section 13, said point being 662.91 feet North of the Southwest corner of said Section; thence North 87°43'00" East 208.71 feet to a point; thence South and parallel to the West line of said Section 208.71 feet to a point; thence South 87°43'00" West 208.71 feet to a point on the West line of said Section; thence North along said West line 208.71 feet to the point of beginning, Leavenworth County, Kansas. less that part taken for road purposes

AND

A tract of land in the Northwest Quarter of the Southwest Quarter of the Southwest Quarter of the Southwest Quarter of Section 13, Township 9 South, Range 22 East of the 6th P.M., City of Lansing, Leavenworth County, Kansas, described as follows; Commencing at the Southwest corner of said Section 13; thence North 01°20'07" East (assumed), 394.07 feet along the West line of Section 13 to the point of beginning of this tract; thence, North 01°20'07" East 60.00 feet along said West line; thence, North 89°11 '24" East 208.71 feet parallel with the North line of the South half of the Southwest Quarter of Section 13; thence, North 01°20'07" East, 208.71 feet to the North line of the South half of the Southwest Quarter of Section 13; thence North 89°11'24" East, 156.00 feet along said North line; thence South 01°20'07" West, 268.71 feet; thence, South 89°11'24" West, 364.71 feet to the point of beginning, Leavenworth County, Kansas. less part taken or used for road purposes



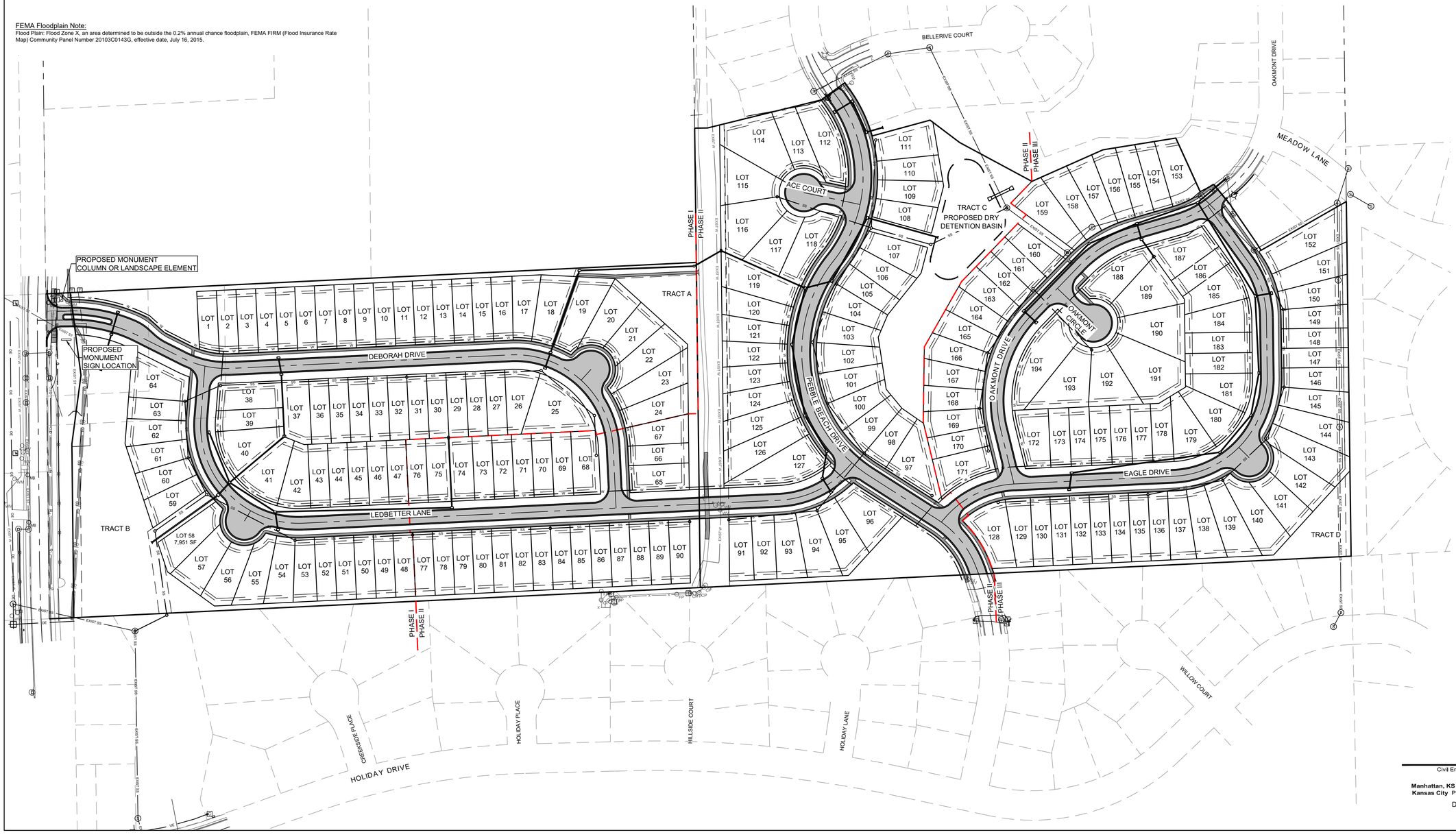
VICINITY MAP
Section 13, T09S, R22E
Leavenworth County, Kansas

SHEET INDEX:
1 - Overall Layout
2 - Subdivision Plan (West)
3 - Subdivision Plan (East)

OWNER/DEVELOPER:
CIRCLE H HOLDINGS, LLC
5858 NAPLES DR.
FLOWER MOUND, TX 75028

ENGINEER/SURVEYOR:
SMH CONSULTANTS
5201 JOHNSON DRIVE, SUITE 405
MISSION, KS 66205

FEMA Floodplain Note:
Flood Plain: Flood Zone X, an area determined to be outside the 0.2% annual chance floodplain, FEMA FIRM (Flood Insurance Rate Map) Community Panel Number 20103C0143G, effective date, July 16, 2015.



NORTH
100' 50' 0' 100'
SCALE: 1" = 100'

SMH CONSULTANTS
Civil Engineering • Land Surveying • Landscape Architecture
www.smhconsultants.com
Manhattan, KS - HQ P: (785) 776-0541 • **Dodge City, KS** P: (620) 255-1952
Kansas City P: (913) 444-9615 • **Colorado Springs, CO** P: (719) 428-8677

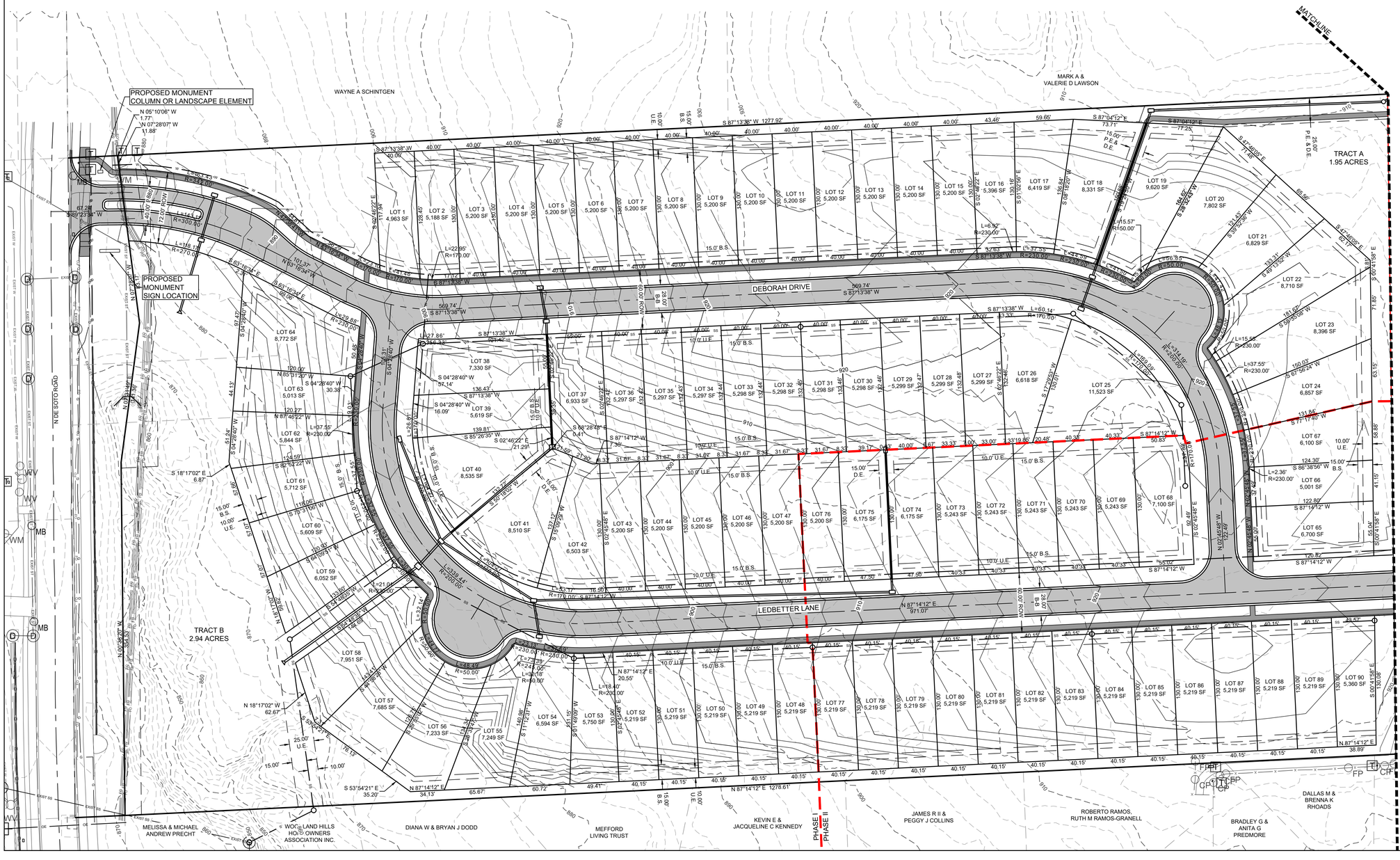
Drawn By:JMT Project #2501-0018 TDS:101

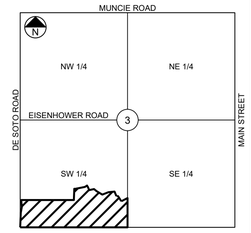
JULY 2025

Preliminary Plat

MONROE MANOR

Part of the SW 1/4, Section 13, Township 9 South, Range 22 East
City of Lansing, Leavenworth County, Kansas





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NORTH
SCALE: 1" = 50'

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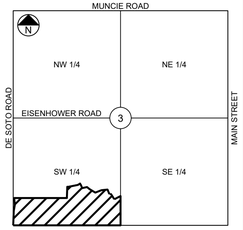

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Drawn By:JMT Project #2501-0018 TDS:101

JULY 2025

EXCERPT OF MINUTES OF A MEETING
OF THE GOVERNING BODY OF
THE CITY OF LANSING, KANSAS
HELD ON JUNE 5, 2025

The City Council (the "Governing Body") met in regular session at the usual meeting place in the City at 7:00 p.m., the following members being present and participating, to-wit:

Council Members Gardner, Kirby, Kowalewski, Garvey, Robinson, Clemons, Brungardt, Studnicka

Absent: None

The Mayor declared that a quorum was present and called the meeting to order.

* * * * * * * * * * * * * *

(Other Proceedings)

There was presented a Resolution entitled:

A RESOLUTION OF THE GOVERNING BODY OF THE CITY OF LANSING, KANSAS DETERMINING THAT THE CITY IS CONSIDERING ESTABLISHING A REINVESTMENT HOUSING INCENTIVE DISTRICT WITHIN THE CITY AND ADOPTING A PLAN FOR THE DEVELOPMENT OF HOUSING AND PUBLIC FACILITIES IN SUCH PROPOSED DISTRICT; ESTABLISHING THE DATE AND TIME OF A PUBLIC HEARING ON SUCH MATTER, AND PROVIDING FOR THE GIVING OF NOTICE OF SUCH PUBLIC HEARING (RIVERBEND HEIGHTS REINVESTMENT HOUSING INCENTIVE DISTRICT)

Councilmember Robinson moved that the Resolution be adopted. The motion was seconded by Councilmember Clemons. The Resolution was duly read and considered, and upon being put, the motion for the adoption of the Resolution was carried by the vote of the governing body as follows:

Yea: Councilmembers Gardner, Kirby, Kowalewski, Garvey, Robinson, Clemons, Brungardt and Studnicka

Nay: None

The Mayor declared the Resolution duly adopted and the Resolution was then duly numbered Resolution No. 6-5-2025 and was signed by the Mayor and attested by the Clerk. The Clerk was directed to arrange for the publication of the Resolution one time in the official newspaper of the City not less than one week or more than two weeks preceding the date fixed for the public hearing.

* * * * * * * * * * * * * *

(Other Proceedings)

[BALANCE OF THIS PAGE INTENTIONALLY LEFT BLANK]

CERTIFICATE

I hereby certify that the foregoing Excerpt of Minutes is a true and correct excerpt of the proceedings of the Governing Body of the City of Lansing, Kansas held on the date stated therein, and that the official minutes of such proceedings are on file in my office.

(SEAL)

Tish Sims

Tish Sims, City Clerk

(Signature Page to Excerpt of Minutes)

(Published in the ***Leavenworth Times*** on June __, 2025)

RESOLUTION NO. B-5-2025

A RESOLUTION OF THE GOVERNING BODY OF THE CITY OF LANSING, KANSAS DETERMINING THAT THE CITY IS CONSIDERING ESTABLISHING A REINVESTMENT HOUSING INCENTIVE DISTRICT WITHIN THE CITY AND ADOPTING A PLAN FOR THE DEVELOPMENT OF HOUSING AND PUBLIC FACILITIES IN SUCH PROPOSED DISTRICT; ESTABLISHING THE DATE AND TIME OF A PUBLIC HEARING ON SUCH MATTER, AND PROVIDING FOR THE GIVING OF NOTICE OF SUCH PUBLIC HEARING (RIVERBEND HEIGHTS REINVESTMENT HOUSING INCENTIVE DISTRICT)

WHEREAS, the Kansas Reinvestment Housing Incentive District Act, K.S.A. 12-5241 *et seq.* (the "Act") authorizes cities incorporated in accordance with the laws of the state of Kansas (the "State") to designate reinvestment housing incentive districts within such city; and

WHEREAS, the City of Lansing, Kansas (the "City") constitutes a city as said term is defined in the Act; and

WHEREAS, a housing needs analysis titled Housing Lansing (the "Analysis") has been performed with regard to the City, a copy of which is on file in the office of the City Clerk; and

WHEREAS, Resolution No. B-2-2025 adopted by the City Council (the "Governing Body") made certain findings relating to the need for financial incentives for the construction of quality housing within the City, declared it advisable to establish a reinvestment housing incentive district pursuant to the Act and authorized the submission of such Resolution and the Analysis to the Kansas Department of Commerce in accordance with the Act; and

WHEREAS, the Secretary of the Kansas Department of Commerce, pursuant to a letter dated February 28, 2025, authorized the City to proceed with the establishment of a reinvestment housing incentive district pursuant to the Act; and

WHEREAS, the City has caused to be prepared a plan (the "Plan") for the development or redevelopment of housing and public facilities in the proposed Riverbend Heights Reinvestment Housing Incentive District (the "District") in accordance with the provisions of the Act; and

WHEREAS, the Plan includes:

1. The legal description and map required by K.S.A. 12-5244(a);
2. The existing assessed valuation of the real estate in the proposed District listing the land and improvement values separately;
3. A list of the names and addresses of the owners of record of all real estate parcels within the proposed District;
4. A description of the housing and public facilities project or projects that are proposed to be constructed or improved in the proposed District, and the location thereof;
5. A listing of the names, addresses and specific interests in real estate in the proposed District of the developers responsible for development of the housing and public facilities in the proposed District;

6. The contractual assurances, if any, the Governing Body has received from such developer or developers, guaranteeing the financial feasibility of specific housing tax incentive projects in the proposed District;

7. A comprehensive analysis of the feasibility of providing housing tax incentives in the proposed District as provided in the Act, which shows that the public benefits derived from such District will exceed the costs and that the income therefrom, together with all public and private sources of funding, will be sufficient to pay for the public improvements that may be undertaken in the District.

WHEREAS, the Governing Body proposes to continue proceedings necessary to create the District and adopt the Plan by the calling of a public hearing on such matters in accordance with the provisions of the Act.

THERFORE BE IT RESOLVED BY THE GOVERNING BODY OF THE CITY OF LANSING, KANSAS AS FOLLOWS:

Section 1. Proposed Reinvestment Housing Incentive District. The Governing Body hereby declares an intent to consider establishing the District. The District is proposed to be formed within the boundaries of the real estate legally described in ***Exhibit A*** attached hereto, and shown on the map depicting the existing parcels of land attached hereto as ***Exhibit B***. A list of the names and addresses of the owners of record of all real estate parcels within the proposed District and the existing assessed valuation of said real estate, listing the land and improvement values separately, is attached hereto as ***Exhibit C***.

Section 2. Proposed Plan. The Governing Body hereby further declares its intent to adopt the Plan in substantially the form presented to the Governing Body on this date, with such changes or supplements as may be approved by the City. A copy of the Plan shall be filed in the office of the City Clerk and be available for public inspection during normal business hours. A description of the housing and public facilities projects that are proposed to be constructed or improved in the proposed District, and the location thereof are described in ***Exhibit D*** attached hereto. A summary of the contractual assurances by the developer and the comprehensive feasibility analysis is contained in ***Exhibit E*** attached hereto.

Section 3. Public Hearing. Notice is hereby given that a public hearing will be held by the Governing Body of the City to consider the establishment of the District and adoption of the Plan on **July 17, 2025** at City Hall, located at 800 First Terrace, Lansing, Kansas 66043; the public hearing to commence at 7:00 p.m. or as soon thereafter as the Governing Body can hear the matter. At the public hearing, the Governing Body will receive public comment on such matters, and may, after the conclusion of such public hearing, consider the findings necessary for establishment of the District and adoption of the Plan, all pursuant to the Act.

Section 4. Notice of Public Hearing. The City Clerk is hereby authorized and directed to provide for notice of the public hearing by taking the following actions;

A. A certified copy of this Resolution shall be delivered to:

i. The Board of County Commissioners of Leavenworth County, Kansas;
ii. The Board of Education of Unified School District No. 469, Leavenworth County, Kansas (Lansing); and
iii. The Planning Commission of the City of Lansing, Kansas.

B. This Resolution, including ***Exhibits A*** through ***E*** attached hereto, shall be published at least once in the official newspaper of the City not less than one week or more than two weeks preceding the date of the public hearing.

C. This Resolution, including ***Exhibits A*** through ***E*** attached hereto, is available for inspection at the office of the clerk of the City at normal business hours. Members of the public are invited to review the plan and attend the public hearing on the date announced in this Resolution.

Section 5. Further Action. The Mayor, City Administrator, City Clerk and the officials and employees of the City, including the City Attorney and Gilmore & Bell, P.C., as counsel to the City, are hereby further authorized and directed to take such other actions as may be appropriate or desirable to accomplish the purposes of this Resolution.

Section 6. Effective Date. This Resolution shall take effect after its adoption by the Governing Body.

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ADOPTED by the Governing Body of the City of Lansing, Kansas on June 5, 2025.

(SEAL)

Anthony R. McNeill, Mayor

ATTEST:

SEAL OF CITY CORPORATE SEAL OF LANSING, KANSAS

Tish Sims, City Clerk

(Signature Page to Resolution Calling Hearing)

EXHIBIT A

LEGAL DESCRIPTION OF PROPOSED
RIVERBEND HEIGHTS REINVESTMENT HOUSING INCENTIVE DISTRICT

PROPERTY A
13209 McIntyre Rd Leavenworth, KS 66048
Approximately 34.24 acres

Tract 1:

A tract of land in the Northeast 1/4 of Section 6, Township 10 South, Range 23 East of the 6th P.M. in Leavenworth County, Kansas being more fully described as follows: Beginning at a point that is (N 90° 00' 00" W) 660.60 feet from the Northeast corner of the Northeast 1/4 of said Section 6, said point of beginning also being on the North line of the said Northeast 1/4; thence (S 00° 00' 00" W) 441.64 feet; thence (N 90° 00' 00" W) 690.42 feet; thence (N 00° 00' 00" E) 441.64 feet to a point on the North line of said Northeast 1/4; thence (S 90° 00' 00" E) 690.42 feet to the point of beginning, less any part thereof taken or used for road purposes.(hereinafter referred to as "Tract 1").

AND

Tract 2:

A tract of land in the Northeast 1/4 of Section 6, Township 10 South, Range 23 East of the 6th P.M., in Leavenworth County, Kansas being more fully described as follows: Beginning at a point that is (N 90° 00' 00" W) 418.98 feet from the Northeast corner of the Northeast 1/4 of said Section 6, said point of beginning also being on the North line of said Northeast 1/4; thence (S 05° 52' 20" W) 579.76 feet; thence (S 39° 08' 57" W) 100.80 feet; thence (S 00° 30' 34" W) 195.55 feet; thence (S 74° 41' 26" W) 1402.72 feet; thence (N 02° 30' 47" W) 1221.97 feet to a point on the North line of said Northeast 1/4; thence (N 90° 00' 00" E) 599.18 feet; thence (S 00° 00' 00" W) 441.64 feet; thence (N 90° 00' 00" E) 690.42 feet; thence (N 00° 00' 00" E) 441.64 feet to a point on the North line of said Northeast 1/4; thence (N 90° 00' 00" E) 241.62 feet to the point of beginning, less any part thereof taken or used for road purposes. (hereinafter referred to as "Tract 2")

ALSO DESCRIBED AS:

A tract of land in the Northeast Quarter of Fractional Section 6, Township 10 South, Range 23 East of the 6th P.M., in Leavenworth County, Kansas being more fully described as follows: Beginning at a point that is S 90° 00' 00" W 418.98 feet from the Northeast corner of the Northeast Quarter of said Section 6, said point of beginning also being on the North line of said Northeast Quarter; thence South 05° 52' 20" West 579.76 feet; thence South 39° 08' 57" West 100.80 feet; thence South 00° 30' 34" West 195.55 feet; thence South 74° 41' 26" West 1402.72 feet; thence North 02° 30' 47" West 1221.97 feet to a point on the North line of said Northeast Quarter; thence North 90° 00' 00" East 1531.22 feet to the point of beginning, less any part thereof taken or used for road purposes.

PROPERTY B
00000 131st St Leavenworth, KS 66048
Approximately 99.86 acres

All of the Northeast Quarter of Fractional Section 6, Township 10 South, Range 23 East of the 6th P.M., Leavenworth County, Kansas, less any part thereof taken or used for road or street purposes,

AND ALSO LESS AND EXCEPT:

A tract of land in the Northeast Quarter of Section 6, Township 10 South, Range 23 East of the 6th P.M., Leavenworth County, Kansas, more fully described as follows: Beginning at a point that is South 90° 00' 00" West 418.98 feet from the Northeast corner of the Northeast Quarter of said Section 6, said point of beginning also being on the North line of the Northeast Quarter; thence South 05° 52' 20" West 579.76 feet; thence South 39° 08' 57" West 100.80 feet; thence South 00° 30' 34" West 195.55 feet; thence South 74° 41' 26" West 1402.72 feet; thence North 02° 30' 47" West 1221.97 feet to a point on the North line of said Northeast Quarter; thence North 90° 00' 00" East 1531.22 feet to the point of beginning,

AND ALSO LESS AND EXCEPT:

A tract of land in the Southeast Quarter of the Northeast Quarter of Fractional Section 6, Township 10 South, Range 23 East of the 6th P.M., Leavenworth County, Kansas, more fully described as follows: Beginning at the East Quarter corner of said Section 6; thence South 88° 27' 20" West 485.00 feet along the South line of the Northeast Quarter of said Section 6; thence North 01° 53' 43" West 450.00 feet; thence North 88° 27' 20" East 485.00 feet to the East line of the Northeast Quarter of said Section 6; thence South 01° 53' 43" East 450.00 feet along said East line to the point of beginning, according to the Tract Split Survey dated June 29, 2010 by Hahn Surveying, as recorded on July 16, 2010 as Document No. 2010S023.

AND ALSO LESS AND EXCEPT:

Lots 1, 2, 3, 4 and 5, MILLS WOODS, a subdivision in Leavenworth County, Kansas.

PROPERTY C
24303 131st St Leavenworth, KS 66048
Approximately 11.16 acres

Lot 1, MILLS WOODS, a subdivision in Leavenworth County, Kansas.

Together with public rights-of-way adjacent thereto.

EXHIBIT B

MAP OF PROPOSED
RIVERBEND HEIGHTS REINVESTMENT HOUSING INCENTIVE DISTRICT

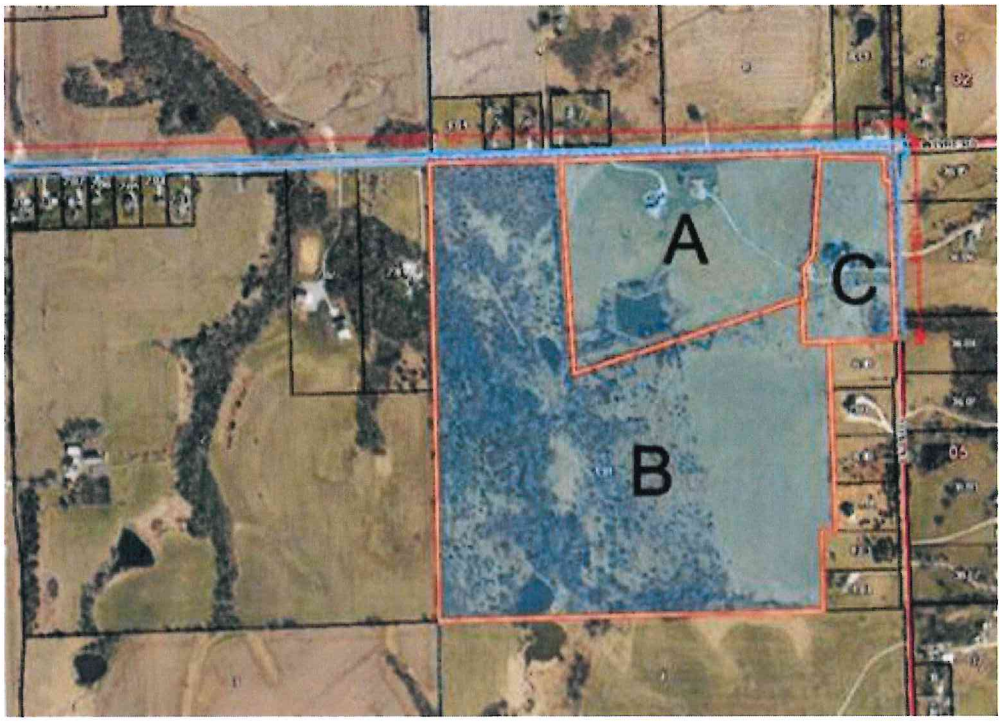

EXHIBIT C

NAMES AND ADDRESSES OF THE OWNERS OF RECORD OF ALL REAL ESTATE PARCELS WITHIN THE PROPOSED RIVERBEND HEIGHTS REINVESTMENT HOUSING INCENTIVE DISTRICT AND THE EXISTING ASSESSED VALUATION OF SAID REAL ESTATE PARCELS AND NAMES AND ADDRESSES OF THE DEVELOPERS

Owners of Real Property:	Charles D. Engelhardt Trust 13209 McIntyre Road Leavenworth, Kansas, 66048
Developer:	Ad Astra Lansing Development, LLC 5701 Mission Drive Mission Hills, Kansas 66208
Individuals with specific interest:	Ad Astra Land Holdings, LLC, has obtained an option to purchase the real estate proposed to be within the boundaries of the District.
Existing Assessed Valuation of the District:	Land: $26,097 Improvements: $93,887

EXHIBIT D

DESCRIPTION OF THE HOUSING AND PUBLIC FACILITIES PROJECT OR PROJECTS THAT ARE PROPOSED TO BE CONSTRUCTED OR IMPROVED IN THE PROPOSED RIVERBEND HEIGHTS REINVESTMENT HOUSING INCENTIVE DISTRICT

The housing and public facility project that will include the acquisition of real property within the District and the construction and extension of certain infrastructure and utility improvements needed to develop a single-family residential development within the District, which is currently anticipated to include approximately 417 single family homes. The infrastructure and utility improvements constructed within the boundaries of the District are anticipated to include, but not be limited to the following:

Site preparation, construction of streets and roadways, grading, paving, curbing, guttering, and surfacing, sidewalk, parking, water mains and extensions, sanitary sewer, storm sewer, detention basins, gas, electric improvements, signage, erosion control, right-of-way improvements, and other related infrastructure, utility improvements and related expenses. Infrastructure improvements may be constructed prior to or concurrently with the housing facilities in the project.

EXHIBIT E

SUMMARY OF THE CONTRACTUAL ASSURANCES BY THE DEVELOPER AND OF THE COMPREHENSIVE FEASIBILITY ANALYSIS

Contractual Assurances

The Governing Body of the City of Lansing will enter into a development agreement with Ad Astra Lansing Development, LLC, and/or Ad Astra Land Holdings, LLC, the developer. This agreement will include the project construction schedule, a description of projects to be constructed, financial obligations of the developer and administrative support from the City of Lansing, Kansas.

Feasibility Study

Polsinelli PC has conducted a study to determine whether the public benefits derived from the District will exceed the costs and that the income from the District, together with other sources of revenue provided by the developer, would be sufficient to pay for the public improvements to be undertaken in the District. The analysis estimates the property tax revenues that will be generated from the development of the District, less existing property taxes and certain unavailable property tax revenues to determine the revenue stream available to support the costs of the public infrastructure. The estimates indicate that the revenue realized from the project together with other sources of Developer funds would be adequate to pay the eligible costs.