

**APPLICATION  
FOR  
CONDITIONAL USE PERMIT**

Parcel ID# 038280000001000 S 28 T 15 R 23  
 Name of Development: Always & Furever Midwest Animal Sanctuary  
 Vicinity of Development (address): West of 223rd Street & Columbia Road  
 Proposed Use: Please see attached Project Narrative

PROPERTY OWNER	APPLICANT (if different than owner)
<b>NAME:</b> Always & Furever Midwest Animal Sanctuary	<b>NAME:</b> Phelps Engineering, Inc.
<b>ADDRESS:</b> c/o Jennifer Dulski 23595 W 223rd St Spring Hill, KS 66083	<b>ADDRESS:</b> c/o Doug Ubben, Jr. 1270 N. Winchester Olathe, KS 66061
<b>PHONE:</b>	<b>PHONE:</b> 913-538-5806
<b>EMAIL:</b> jdulski@yahoo.com	<b>EMAIL:</b> dougubben@phelpsengineering.com

SURVEYOR / ENGINEER	CONTACT PERSON
<b>NAME:</b> Bell/Knott & Associates	<b>NAME:</b> Polsinelli PC
<b>ADDRESS:</b> c/o Kerry Knott 12730 State Line Road, Suite 100, Leawood, KS 66209	<b>ADDRESS:</b> c/o Curtis Holland 900 W. 48th Place, Suite 900, Kansas City, MO 64112
<b>PHONE:</b> 913-378-1606	<b>PHONE:</b> 913-234-7411
<b>EMAIL:</b> kknott@bellknott.com	<b>EMAIL:</b> cholland@polsinelli.com

I/we, the (owner(s)/duly authorized agent), do hereby make application for a Conditional Use Permit described with this application.

Owner's Signature (all owners must sign): Jennifer Dulski Date: 2/17/23  
 Owner's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

\*\*\*\*\*  
OFFICE USE ONLY

Date application filed: FEB 17 2023 PC Hearing Date: April 4, 2023

**Fees:**  
 Application amount: \$ 954.85 Application # 23002-cup  
 Stormwater Review: \*\* \$ \_\_\_\_\_ Parcel ID # 038-28-0-00-00-001-00-0  
 Receipt # 509543 S 28 T 15 R 23 Twp. Marysville

\*\* The applicant is responsible for all costs associated with a 3<sup>rd</sup> party review of a Stormwater Plan/Report. The amount collected at the time of the application is an estimated cost for the Stormwater review. Additional amounts above this amount are still the responsibility of the applicant. All excess fees above the actual cost of the review will be refunded. \*\*



PLANNING  
ENGINEERING  
IMPLEMENTATION

## LETTER OF TRANSMITTAL

DATE: February 17, 2023
ATTENTION: Kenny Cook
JOB NO.: 220597
RE: Always and Furever

**TO:** Miami County Administration Bldg.  
Planning and Zoning Dept.  
201 S. Pearl Street, Suite 201  
Paola, KS 66071

WE ARE SENDING YOU  Attached Sent Via \_\_\_\_\_

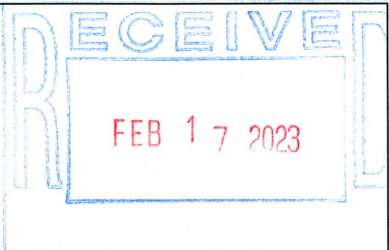
Shop drawings  Prints  Plans  Samples  Specifications

Copy of letter  Change order  \_\_\_\_\_

COPIES	DATE	NO.	DESCRIPTION
1			CUP application
2		Sets	Development Plans (Arch., Civil, Landscape, Lighting)
2			Stormwater Management Reports
2			Traffic Studies
2			CUP Narrative
1			List of Property Owners
1			Lighting Cut Sheets
1			Flash drive with PDF of Report

THESE ARE TRANSMITTED as checked below:

- |  |   |   |
|--|---|---|
| <input checked="" type="checkbox"/> For approval | <input type="checkbox"/> Approved as submitted    | <input type="checkbox"/> Resubmit _____ copies for approval   |
| <input type="checkbox"/> For your use            | <input type="checkbox"/> Approved as noted        | <input type="checkbox"/> Submit _____ copies for distribution |
| <input type="checkbox"/> As requested            | <input type="checkbox"/> Returned for corrections | <input type="checkbox"/> Return _____ corrected prints        |
| <input type="checkbox"/> For review and comment  | <input type="checkbox"/>                          |   |
| <input type="checkbox"/> FOR BIDS DUE _____      | 20 _____  | <input type="checkbox"/> PRINTS RETURNED AFTER LOAN TO US     |

REMARKS	
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COPIES TO File SIGNED: Doug Ubben, Jr., P.E.

PHELPS ENGINEERING, INC.

1270 N. Winchester - Olathe, Kansas 66061 - (913) 393-1155 - Fax (913) 393-1166 - www.phelpsengineering.com

## **ALWAYS & FUREVER MIDWEST ANIMAL SANCTUARY HOMESTEAD CUP NARRATIVE**

### **General Description of Proposed Use:**

Always & Furever Midwest Animal Sanctuary ("A&F") is a 501(c)(3) animal rescue network licensed by the Kansas Department of Agriculture and currently located on 5 acres at 23595 W. 223rd St., Spring Hill, Kansas. In the early days, A&F was nothing more than a converted barn for up to 19 senior dogs to live out the rest of their days surrounded by love, a true senior sanctuary (the "Little Red Barn"). Founded by Jennifer Dulski in 2018, A&F has since transformed into a professional rescue network and licensed animal shelter in Missouri to which we have a network of over 300 fosters throughout Kansas and Missouri and over the past 4+ years has saved more than 3,000 animal lives with the assistance of a small, dedicated staff and many passionate and wonderful volunteers. In 2022, A&F acquired a 40-acre tract immediately east of its current location with the intent to develop and operate an expanded rescue network/kennel operation to be called the "Homestead." This new location will be used to save the lives of all the homeless and surrendered dogs and cats of Miami County and beyond. The Homestead will also be a licensed "animal shelter" by the Kansas Department of Agriculture and our Little Red Barn will continue to run as a separate licensed animal rescue network on the existing 5 acres.

The Homestead is designed to be one of, if not the, premier animal shelter facility in the United States. The large acreage of the Homestead allows ample space for the construction of several shelters ("barns") to house all types of pets and personalities – puppies, hospice cats, only-pet dogs, in secure and safe environments. The Homestead will look nothing like a stereotypical "kennel." A&F's standard of care is unquestionably the highest in the industry. Animals are not locked in cages unattended all day or put into runs to come and go without supervision. Instead, each barn on the Homestead will do it's best to model a home-like environment inside and out, and will have outdoor fenced yards where the dogs are allowed to play during the day under careful supervision of trained staff.

Each dog barn on the property will also have six-foot, double gated privacy (wood) fenced in yards surrounding them so that when a dog is walked out the back it is straight into a yard. There will be no indoor/outdoor runs or dog doors. The yards give each barn an outdoor play area specific for their groups and there will be other six-foot (wood) fenced in play yards throughout the Homestead. Every fence will have two gates for safety. Additionally, the barns will also have specific rooms where staff or, if permitted-as-scheduled, volunteers can visit certain barns which will be equipped with couches, TVs and toys. These "cuddle rooms" will further human and dog socialization skills and create

a homelike environment to help prepare them for adoptions. When dogs are walked on one of the trails in the Homestead trails, they will always be double-leashed. No dog will ever be loose or run free on the Homestead, except in the fenced-in yards with trained staff. Moreover, A&F invests significantly in trained handlers to teach animal social skills. No dog is ever left outdoors at night. All animals will be kept indoors to sleep in comfort and safety in a secure setting.

The Homestead's operating hours will be 7 am to 7 pm. The morning shift will begin with quick walks, clean ups, and breakfast and then their day will be filled with human and animal socialization and training. The evening shift ends with last walks and tuck-ins and most importantly allows our staff to safely drive home and have quiet hours. The Homestead will have security measures in place to ensure no animals can escape the property, including a 6-foot black chain-link fence surrounding the perimeter and two secured gated entries.

The Homestead contains significant natural landscaping which will be preserved as much as possible except for the barn structures, numerous walking paths, and several pavilions (covered areas with picnic tables for humans and animals to rest and enjoy the scenery). This will help provide a buffer area for adjacent properties and provide fewer distractions for our animals.

In the first phase, A&F will construct a building to serve as the new official Miami County Shelter and replace the current Osawatomie Pound (the "Pound") that presently takes in the strays, homeless or surrendered dogs and cats from Miami County, Paola, and Osawatomie. For the past four years, A&F has been the sole caretaker of the animals at the Pound, providing all staffing and medical needs without charge. Before A&F's involvement, the majority of the animals at the Pound were mass-euthanized for space, but since A&F took over operations not a single animal has been put to sleep for lack of space. The new Miami County Shelter on the Homestead will continue to be run by A&F, supported through donations at no cost to Miami County or any participating cities (currently anticipating Paola, Osawatomie, Spring Hill and Louisburg).

There will also be several "Big Red Barns" constructed on the Homestead grouped for various ages, sizes, temperament and play style. Each of these barns will be designed/constructed similarly. However, younger dogs may be sectioned off in wings in each of the buildings to allow for controlled, and safe play. Puppies need other puppies or dogs to teach each other and learn how to play and interact with humans and dogs. Another barn will be dedicated to "little" dogs only ("Little Pups Barn"). A 14-year-old Chihuahua and a 10-year-old Great Dane might be best friends in a home they have lived in together, but if exposed to a new environment they should be separated to eliminate

any uncertainty or accidents. Other structures at the Homestead, include the new "Little Red Barn", which will be modeled after the current Little Red Barn where senior dogs can live out their days surrounded by love, care and respect. A new concept to be developed at the Homestead will feature 7 Retirement Home Dog Villas, which are comprised of 4 "tiny homes" for dogs that may need longer or specialized care and training in an individualized setting. Each tiny home will have its own fenced-in yard, with one dog per tiny home which allows for a calmer environment.

A new Feline Family Facility will be constructed on the Homestead to provide a safe and secure temporary and forever home for our cats. It will consist of various wings, segregated for new-born kittens, pregnant mamas, those in need of medical separate spaces, and a senior feline area. The cats will not be allowed outside to protect them from the elements. Double-gated entries will be used to protect against human error. The only feral cats that will be on the Homestead are those brought in by animal control to the Miami County Shelter which would all be spayed/neutered, vaccinated, and then placed through our adoption process to live in barns. No A&F cats will be roaming free on the Homestead.

The Homestead will also include an Administration Building for office administrative purposes for our financial, adoption and foster teams. This building will also allow for small, scheduled gatherings for community events, as well as a space to allow pets to socialize, learn, and train. It will also be frequently used for, scheduled meet & greets with respect to potential foster or adoption placement for the families to meet our animals. These appointments will vary depending on the degree of interest in our pets. Scheduled monthly community events such as inviting senior citizens over for pancakes on Sundays to socialize with our senior dogs will occur in the communal area of the Administration Building and will be invitation/RSVP only.

A single-family residence will be constructed on the Homestead to allow an A&F Team member to live on-site, so there is always a person on the Homestead in case of an emergency.

The Homestead will be a private facility and visitors will be by appointment only. Visitors will be allowed to bring their dogs to the Administration Building for scheduled meet and greets, dog intros or as predetermined by staff. The Homestead also will have a Veterinary Barn to serve the needs of the Miami County Shelter animals and A&F animals in our care. Please refer to the charts below for detailed information on the phases of construction, animal capacity, staffing and traffic utilization.

The ultimate goal for every animal on the Homestead is to find them a safe, loving, forever home. Most go through our foster program while we advocate for them and tell their stories on our website and social media platforms. If a foster/adopter cannot be secured, they will stay on the Homestead. Knowing and appreciating the precious life and future of every animal in our custody drives our standard of care to be as impeccable as possible. Our dream is to wake up to a world where every animal is treated with kindness, dignity, respect and most importantly their lives have been touched by love, even if only for a moment. We know this is a big request and change is not easy, but this is a journey we are whole-heartedly committed to, one which we are not only improving the lives of the animals in our care, but also for the lives of people involved and the community around us. If along the way we have motivated just one person to change and treat an animal better, then together we are changing the world - one soul at a time.

If you're an animal lover please look at our website or visit us on Facebook so you can see firsthand how we treat our animals. We will always believe with all our hearts it really is never too late for happily ever after. We welcome the opportunity to answer any further questions about our operations so that everyone will feel comfortable and proud to have Always & Furever be the model for other rescues and shelters, demonstrating how one dream really can change the world.

Jennifer Dulski

Always & Furever

Website: <https://www.alwaysandfurever.org/>

# Staffing, Barn Capacities, & Traffic Utilization

## Phase 1

		<b>Phase 1</b>				
		<b>Administration Building</b>	<b>Big Red Barn</b>	<b>Dog Villas (1)</b>	<b>Miami County Barn Shelter</b>	<b>HOMESTEAD TOTAL</b>
<b>Daily Staffing - 2 Shifts (Morning &amp; Afternoon)</b>						
	<b>Staff</b>	1 per shift / 2 total	3 per shift / 6 total	1 per shift / 2 total	2 per shift/4 total	7 per shift / 14 total
	<b>Volunteer</b>	0	1 per shift / 2 total	0	1 per shift/2 total	2 per shift / 4total
<b>Dog/Cat Capacity Per Building</b>						
	<b>Dog/Cat Capacity</b>	0	24	4 per Villa / 4 total	30	58
<b>Operational Traffic</b>						
	<b>Deliveries</b>	1 per day				1 per day
	<b>Donations</b>	1-2 per day				1-2 per day
	<b>Foster Supplies Pick Up</b>	2 per day				2 per day
	<b>Maintenance</b>	3 per week				3 per week
	<b>Trash Pick Up</b>	2 per month				2 per month
<b>Pup / Cat Movement</b>						
	<b>Vet Rides</b>		3 per day		1 per day	4 per day
	<b>Freedom Rides</b>		1 per day		3 per week	1 per day
	<b>Doggy Dates</b>		2 per day			2 per day
	<b>Off Campus Community Events</b>	1 per week				1 per week
	<b>Off Campus Adoption Events</b>	1 per week				1 per week
<b>Volunteer Events &amp; Frequency</b>						
	<b>Orientation Training</b>	8 people - twice monthly				8 people - twice monthly
	<b>Staff/Volunteer Training/Team Building</b>	20 people - once monthly				20 people - once monthly
	<b>Volunteer Special Events (David's Day, Pupsgiving, etc.)</b>	50 people - once per quarter				50 people - once per quarter
	<b>Anniversary Celebration</b>	150 people - once per year				150 people - once per year
<b>Public Events (By Reservation/Pre-Registration) &amp; Frequency</b>						
	<b>Meet &amp; Greets - Adoption Appointments</b>	2-3 per week				2-3 per week
	<b>Adoption Events (Pre-Registration Required)</b>	20 people - once per quarter				20 people - once per quarter
	<b>Community Events (Pre-Registration Required)</b>	15 people - once per month				15 people - once per month

## Phase 2

		<b>Phase 2</b>					
		Administration Building	Veterinary Hospital/ Decompression Facility	Big Red Barn	Dog Villas (2)	Miami County Barn Shelter	HOMESTEAD TOTAL
<b>Daily Staffing - 2 Shifts (Morning &amp; Afternoon)</b>							
	Staff	1 per shift / 2 total	2 per shift / 4 total	3 per shift / 6 total	3 per shift / 6 total	2 per shift/4 total	9 per shift / 18 total
	Volunteer	0	0	1 per shift / 2 total	0	1 per shift/2 total	1 per shift / 2 total
<b>Dog/Cat Capacity Per Building</b>							
	Dog/Cat Capacity	0	10	24	4 per Villa/8 total	30	72
<b>Operational Traffic</b>							
	Deliveries	1-2 per day					1-2 per day
	Donations	2 per day					2 per day
	Foster Supplies Pick Up	2 per day					2 per day
	Maintenance	3-4 per week					3-4 per week
	Trash Pick Up	2 per month					2 per month
<b>Pup / Cat Movement</b>							
	Vet Rides		1 per day	2 per day	1 per day		4 per day
	Freedom Rides		1 per day			3 per week	1 per day
	Doggy Dates			2 per day			2 per day
	Off Campus Community Events	1 per week					1 per week
	Off Campus Adoption Events	1 per week					1 per week
<b>Volunteer Events &amp; Frequency</b>							
	Orientation Training	8 people - twice monthly					8 people - twice monthly
	Staff/Volunteer Training/Team Building	20 people - once monthly					20 people - once monthly
	Volunteer Special Events (David's Day, Pupsgiving, etc.)	50 people - once per quarter					50 people - once per quarter
	Anniversary Celebration	150 people - once per year					150 people - once per year
<b>Public Events (By Reservation/Pre-Registration) &amp; Frequency</b>							
	Meet & Greets - Adoption Appointments	3 per week					3 per week
	Adoption Events (Pre-Registration Required)	20 people - once per quarter					20 people - once per quarter
	Community Events (Pre-Registration Required)	15 people - once per month					15 people - once per month
<b>Medical - Veterinary Hospital</b>							
	Foster Services		4 per day				4 per day
	Public Services						

## Phase 3

Phase 3									
	Administration Building	Veterinary Hospital / Decompression Facility	Big Red Barns (3)	Little Red Barn	Little Puppies Barn	Feline Family Facility	Dog Villas (7)	Miami County Barn Shelter	HOMESTEAD TOTAL
<b>Daily Staffing - 2 Shifts (Morning &amp; Afternoon)</b>									
Staff	1 per shift / 2 total	2 per shift / 4 total	7 per shift / 14 total	2 per shift / 4 total	1 per shift / 2 total	1 per shift / 2 total	7 per shift / 14 total	2 per shift / 4 total	21 per shift / 42 total
Volunteer	0	0	1 per shift / 2 total	1 per shift / 2 total	0	0	0	1 per shift / 2 total	2 per shift / 4 total
<b>Dog/Cat Capacity Per Building</b>									
Dog/Cat Capacity	0	10	58	24	20	20	4 per Villa / 28 total	30	190
<b>Operational Traffic</b>									
Deliveries	2 per day								2 per day
Donations	2-3 per day								2-3 per day
Foster Supplies Pick Up	2-3 per day								2-3 per day
Maintenance	4 per week								4 per week
Trash Pick Up	2 per month								2 per month
<b>Pup / Cat Movement</b>									
Vet Rides		1 per day	1 per day	1 per day	.5 per day	.5 per day	1 per day		5 per day
Freedom Rides		1 per day						3 per week	1-2 per day
Doggy Dates			1 per day	1 per day	1 per day				3 per day
Off Campus Community Events	1-2 per week								1-2 per week
Off Campus Adoption Events	1 per week								1 per week
<b>Volunteer Events &amp; Frequency</b>									
Orientation Training	8 people - twice monthly								8 people - twice monthly
Staff/Volunteer Training/Team Building	20 people - once monthly								20 people - once monthly
Volunteer Special Events (David's Day, Pups'giving, etc.)	50 people - once per quarter								50 people - once per quarter
Anniversary Celebration	150-200 people - once per year								150-200 people - once per year
<b>Public Events (By Reservation/Pre-Registration) &amp; Frequency</b>									
Meet & Greets - Adoption Appointments	4 per week								4 per week
Adoption Events (Pre-Registration Required)	20 people - once per quarter								20 people - once per quarter
Community Events (Pre-Registration Required)	15 people - once per month								15 people - once per month
<b>Medical - Veterinary Hospital</b>									
Foster Services		6 per day							6 per day
Public Services		1-2 per day							1-2 per day

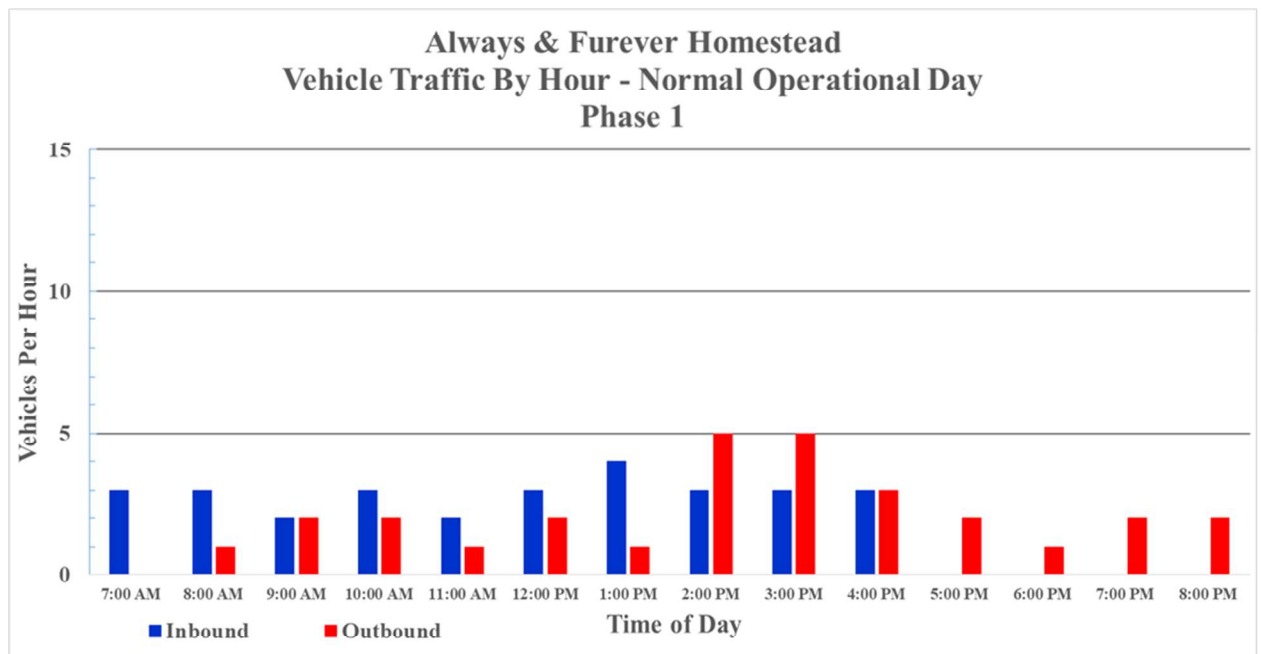
## Certified Traffic Impact Study Summary

Per the request from Miami County to have a Certified Traffic Impact Study, Always & Furever engaged Priority Engineering, Inc. This study documents the impact of the full build-out of the proposed Always & Furever Midwest Animal Sanctuary on the surrounding roadway network. In addition to the AM and PM Peak Hours used for design hours, additional more conservative scenarios were included. These scenarios are not to be considered as design peak hours, but were supplied as additional information to demonstrate the magnitude of traffic that could be added to W 223rd Street without adversely impacting levels of service or requiring a turn lane. Even based on the most conservative estimates for this development, a left turn lane is not warranted.

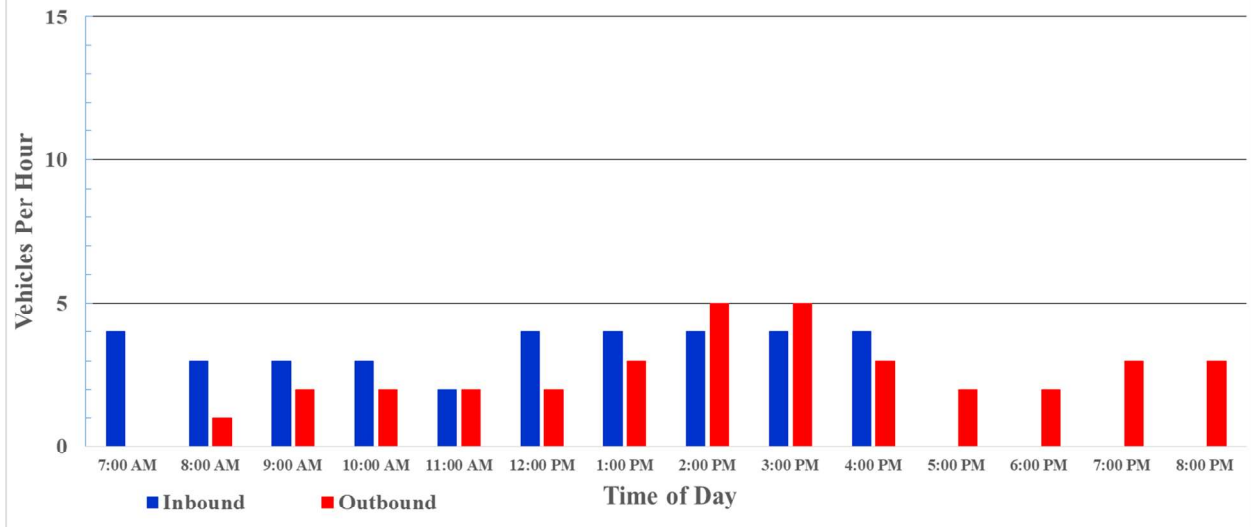
Right turning vehicles would need to be present in the peak hour to warrant a right turn lane. The traffic volumes at this location fall far below these volumes.

Overall, the traffic anticipated to be generated by this site is minor, and will not result in lowered levels of service, queueing, or increased delays. The proposed drive and service road should be constructed to the standards of Miami County. No additional improvements are recommended as a result of this development.

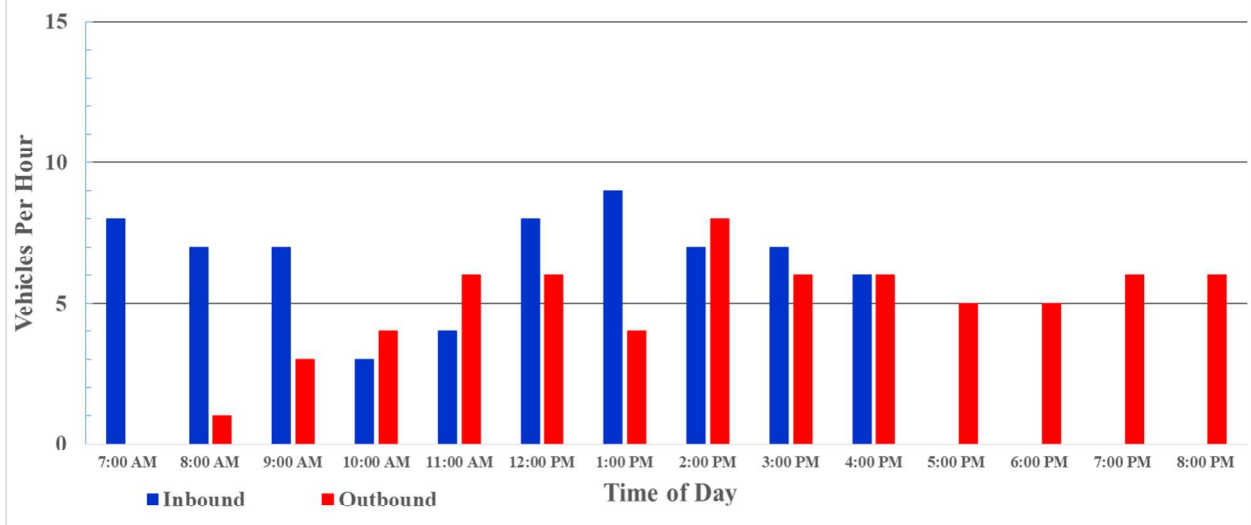
Phase 1																
	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM	Total	Right Turns
Inbound	3	3	2	3	2	3	4	3	3	3					29	3 - 6
Outbound		1	2	2	1	2	1	5	5	3	2	1	2	2	29	23 - 26
Phase 2																
	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM	Total	Right Turns
Inbound	4	3	3	3	2	4	4	4	4	4					35	4 - 7
Outbound		1	2	2	2	2	3	5	5	3	2	2	3	3	35	28 - 31
Phase 3																
	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM	Total	Right Turns
Inbound	8	7	7	3	4	8	9	7	7	6					66	7 - 13
Outbound		1	3	4	6	6	4	8	6	6	5	5	6	6	66	53 - 59



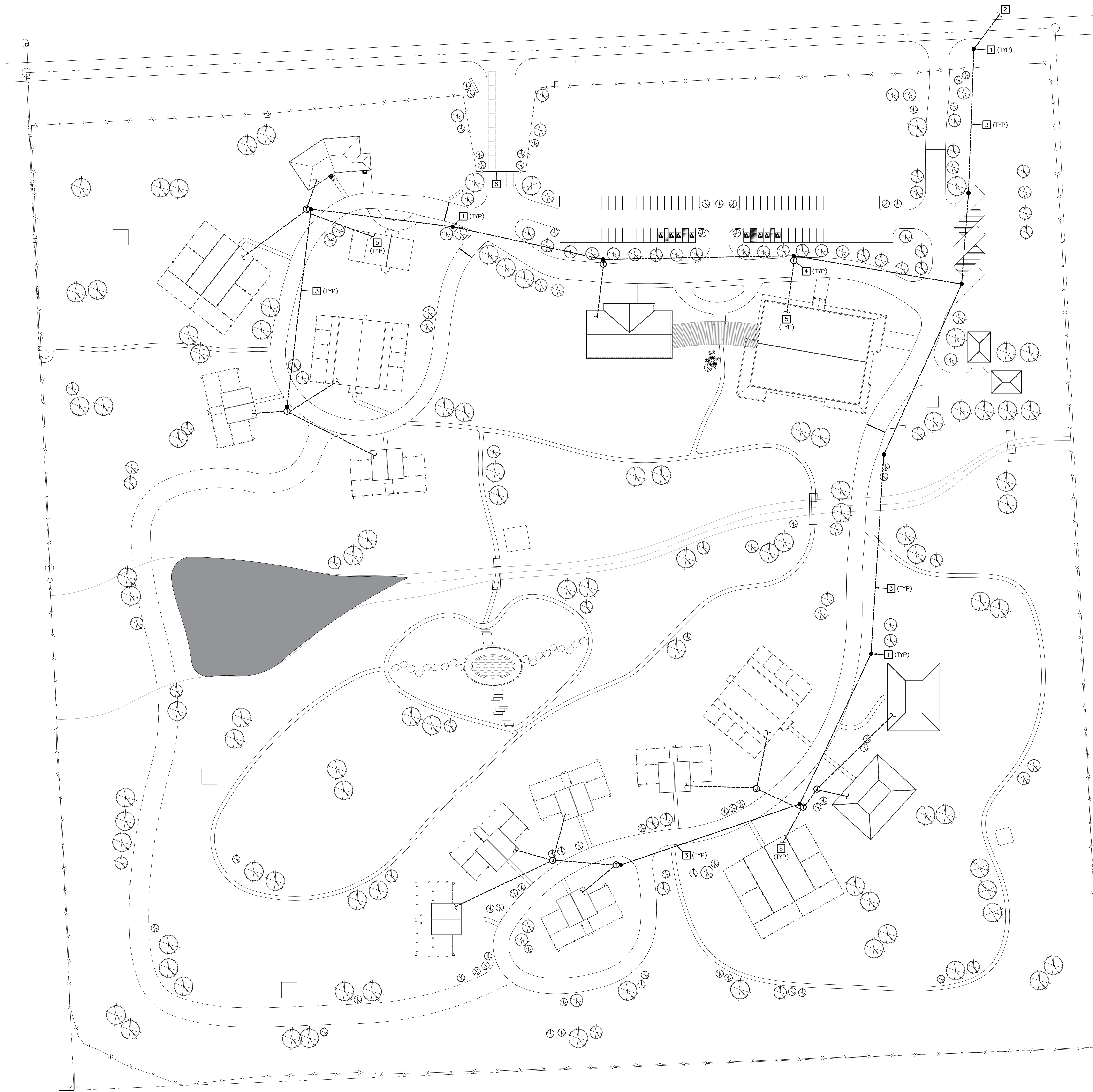
**Always & Furever Homestead  
Vehicle Traffic By Hour - Normal Operational Day  
Phase 2**



**Always & Furever Homestead  
Vehicle Traffic By Hour - Normal Operational Day  
Phase 3**







**ELECTRICAL PLAN NOTES**

- 1 PROPOSED LOCATION OF ELECTRIC UTILITY POLE TO SUPPORT THE INDICATED MEDIUM VOLTAGE OVERHEAD CABLING. EXACT LOCATIONS ARE TO BE DETERMINED BY THE UTILITY COMPANY. PROVIDE UTILITY COMPANY EASEMENT AS REQUIRED. (TYPICAL)
- 2 MEDIUM VOLTAGE UTILITY SERVICE FEEDER EXTENDED BY THE ELECTRIC UTILITY COMPANY FROM THE EXISTING OVERHEAD LINES IN THIS AREA. EXACT LOCATIONS ARE TO BE DETERMINED BY THE UTILITY COMPANY. PROVIDE UTILITY COMPANY EASEMENT AS REQUIRED WHERE LOCATED OVER OWNER'S PROPERTY.
- 3 PROPOSED LOCATION OF MEDIUM VOLTAGE OVERHEAD ELECTRIC UTILITY CABLING. EXACT SIZES AND LOCATIONS ARE TO BE DETERMINED BY THE UTILITY COMPANY. PROVIDE UTILITY COMPANY EASEMENT AS REQUIRED. (TYPICAL)
- 4 PROPOSED LOCATION OF 1-PHASE, 7.62 KV: 240/120V POLE-MOUNTED ELECTRICAL UTILITY TRANSFORMER. EXACT SIZE AND LOCATIONS ARE TO BE DETERMINED BY THE UTILITY COMPANY. (TYPICAL)
- 5 PRELIMINARY PROPOSED SERVICE FEEDER TO BUILDING. DESIGN INTENT IS TO FEED THE BUILDING (OR STRUCTURE) INDICATED WITH A 240/120V, 1-PHASE SERVICE TO A SERVICE ENTRANCE PANELBOARD INSIDE THE BUILDING INDICATED. SERVICE CONDUCTOR SIZES, MAIN CIRCUIT BREAKER SIZES, GROUNDING ELECTRODE SYSTEM DESIGN AND EXACT LOCATIONS ARE YET TO BE DETERMINED.
- 6 ELECTRIC UTILITY GATE. POWER CONNECTION REQUIREMENTS ARE YET TO BE DETERMINED. PRELIMINARY DESIGN INTENT IS TO PROVIDE A 240V, 1-PHASE CIRCUIT FROM THE VETERINARY HOSPITAL BUILDING PANELBOARD.

**ELECTRICAL SITE PLAN**  
SCALE 1/60"=1'-0"



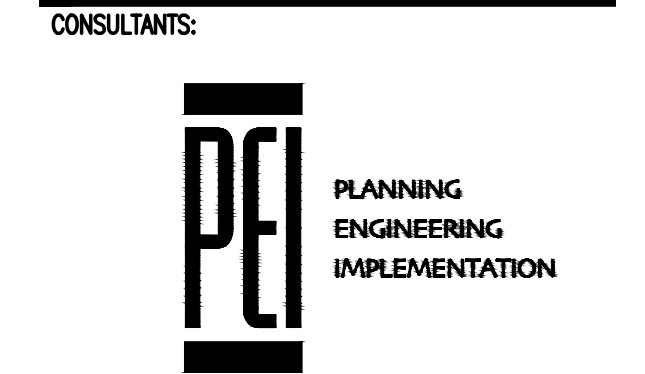
THIS DRAWING IS A SINGLE PART OF AN INTEGRATED SET OF CONSTRUCTION CONTRACT DOCUMENTS. REFER TO DRAWING AND SPECIFICATION SHEETS INCLUDING, BUT NOT LIMITED TO, ALL "GENERAL CONDITIONS," "SUMMARY OF WORK," AND APPLICABLE SPECIFICATION SECTIONS WHICH APPLY TO THIS DRAWING. REFER TO ALL DOCUMENTS FOR THE COMPLETE SCOPE OF WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL INFORMATION CONTAINED IN THE "NOTES" OF DOCUMENTS ISSUED. THIS DRAWING IS A CONTRACT DOCUMENT AND IS NOT TO BE USED AS A SHOP DRAWING. VARIATIONS FROM THAT WHICH IS REQUIRED TO CONFORM WITH OTHER TYPED OR TO CONFORM TO ACTUAL SITE CONDITIONS ARE THE CONTRACTOR'S RESPONSIBILITY. VERIFY THE LOCATIONS OR DIMENSIONS OF ALL ARCHITECTURAL AND STRUCTURAL ELEMENTS WITH THE ARCHITECTURAL AND STRUCTURAL DRAWINGS ISSUED. THE SHOWING OF THESE ELEMENTS ARE FOR REFERENCE ONLY AND ARE TO BE VERIFIED PRIOR TO DESIGN OR CONSTRUCTION. NO LIABILITY IS ASSUMED BY THE INDICATOR OF ELEMENTS IN THESE DRAWINGS. THE ACCOMPANYING PROFESSIONAL SEAL INDICATES THAT THE PERSON WHOSE NAME APPEARS ON THE SEAL HAS PREPARED OR SUPERVISED PREPARATION OF THE DOCUMENT IN WHICH THE SEAL APPEARS. THAT PERSON AND THE FIRM FOR WHICH THAT PERSON IS EMPLOYED BY SHALL BE RESPONSIBLE FOR ANY PORTIONS OF THE WORK ON WHICH THEIR SEAL DOES NOT APPEAR.

THIS DOCUMENT SHALL NOT BE USED FOR ANY OTHER PROJECTS. FOR ADDITION TO THIS PROJECT, OR FOR COMPLETION OF THIS PROJECT BY OTHER MEANS, THE REVISION NUMBER OF GIBBENS DRAKE SCOTT, INC. MUST BE MAINTAINED AND/OR CHANGED. THE REVISION NUMBER UNAUTHORIZED, AGENCY TO THE FULLEST EXTENT OF THE LAW, TO INDUSTRY AND HOLD HARMLESS GIBBENS DRAKE SCOTT, INC., ITS OFFICES, DIRECTORS AND EMPLOYEES AGAINST ANY DAMAGES, LIABILITIES OR COSTS, INCLUDING REASONABLE ATTORNEY'S FEES AND COSTS OF DEFENSE, ARISING OUT OF THE ISSUE OF THIS DOCUMENT.

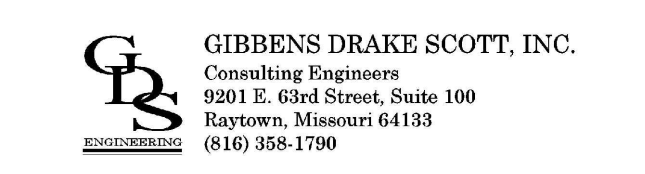
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CLIENT:  
**ALWAYS & FUREVER**  
MIDWEST ANIMAL SANCTUARY  
PROJECT HOMESTEAD

23595 W. 223RD ST.,  
SPRING HILL, KS 66208



**PHELPS ENGINEERING, INC.**  
1370 N. Winchester  
Olathe, Kansas 66061  
(913) 393-1155  
Fax (913) 393-1166  
www.phelpsengineering.com

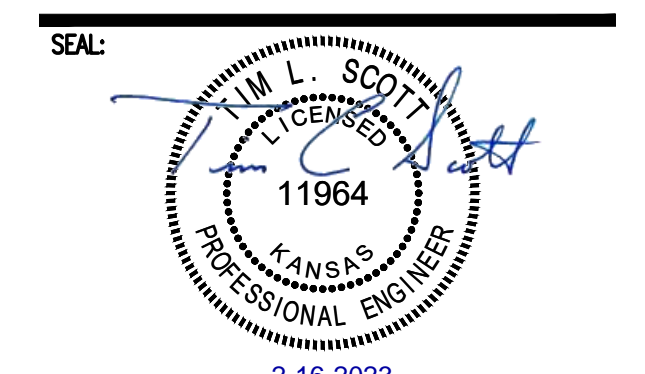


**GIBBENS DRAKE SCOTT, INC.**  
Consulting Engineers  
9301 E. 68th Street, Suite 100  
Raytown, Missouri 64133  
(816) 355-1790



02/16/2022  
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ARCHITECT:  
**Bell / Knott & Associates**  
CORPORATE ARCHITECTS, P.C.  
12730 State Line Road Voice: 913.378.1600  
Suite 100 Fax: 913.378.1601  
Leawood, KS 66209 www.bellknott.com

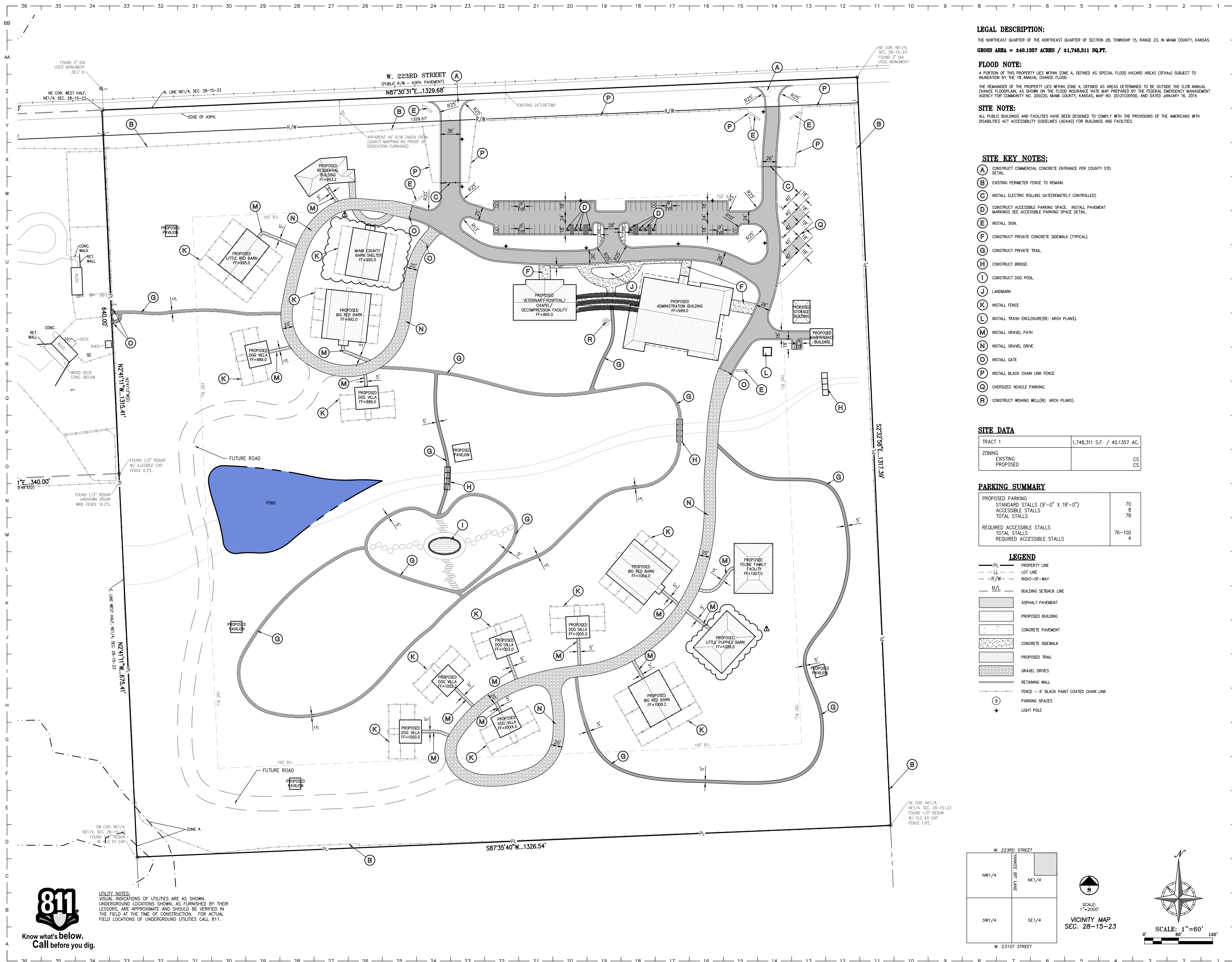


REVISIONS:

NO.	DATE	DESCRIPTION

ISSUE DATE: 02/17/2023  
REASON FOR ISSUE: CONDITIONAL USE APPLICATION  
PROJECT NUMBER: 22-050  
PROJECT PHASE: CD

SHEET TITLE:  
**ELECTRICAL SITE PLAN**  
SHEET NUMBER:  
**E020**



**LEGAL DESCRIPTION:**  
 THE NORTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 28, TOWNSHIP 15, RANGE 23, IN MIAMI COUNTY, KANSAS.  
**GROSS AREA = ±40.1357 ACRES / ±1,748,311 SQ.FT.**

**FLOOD NOTE:**  
 A PORTION OF THIS PROPERTY LIES WITHIN ZONE A, DEFINED AS SPECIAL FLOOD HAZARD AREAS (SFHA) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD.

**SITE NOTE:**  
 ALL PUBLIC BUILDINGS AND FACILITIES HAVE BEEN DESIGNED TO COMPLY WITH THE PROVISIONS OF THE AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES (ADAAG) FOR BUILDINGS AND FACILITIES.

- SITE KEY NOTES:**
- (A) CONSTRUCT COMMERCIAL CONCRETE ENTRANCE PER COUNTY STD. DETAIL.
  - (B) EXISTING PERIMETER FENCE TO REMAIN.
  - (C) INSTALL ELECTRIC ROLLING GATE (REMOVELY CONTROLLED)
  - (D) CONSTRUCT ACCESSIBLE PARKING SPACE. INSTALL PAVEMENT MARKINGS SEE ACCESSIBLE PARKING SPACE DETAIL.
  - (E) INSTALL SIGN.
  - (F) CONSTRUCT PRIVATE CONCRETE SIDEWALK (TYPICAL).
  - (G) CONSTRUCT PRIVATE TRAIL.
  - (H) CONSTRUCT BRIDGE.
  - (I) CONSTRUCT DOG POOL.
  - (J) LANDMARK
  - (K) INSTALL FENCE
  - (L) INSTALL TRASH ENCLOSURE(RE: ARCH PLANS).
  - (M) INSTALL GRAVEL PATH
  - (N) INSTALL GRAVEL DRIVE
  - (O) INSTALL GATE
  - (P) INSTALL BLACK CHAIN LINK FENCE
  - (Q) OVERSIZED VEHICLE PARKING.
  - (R) CONSTRUCT WASHING WELL(RE: ARCH PLANS).

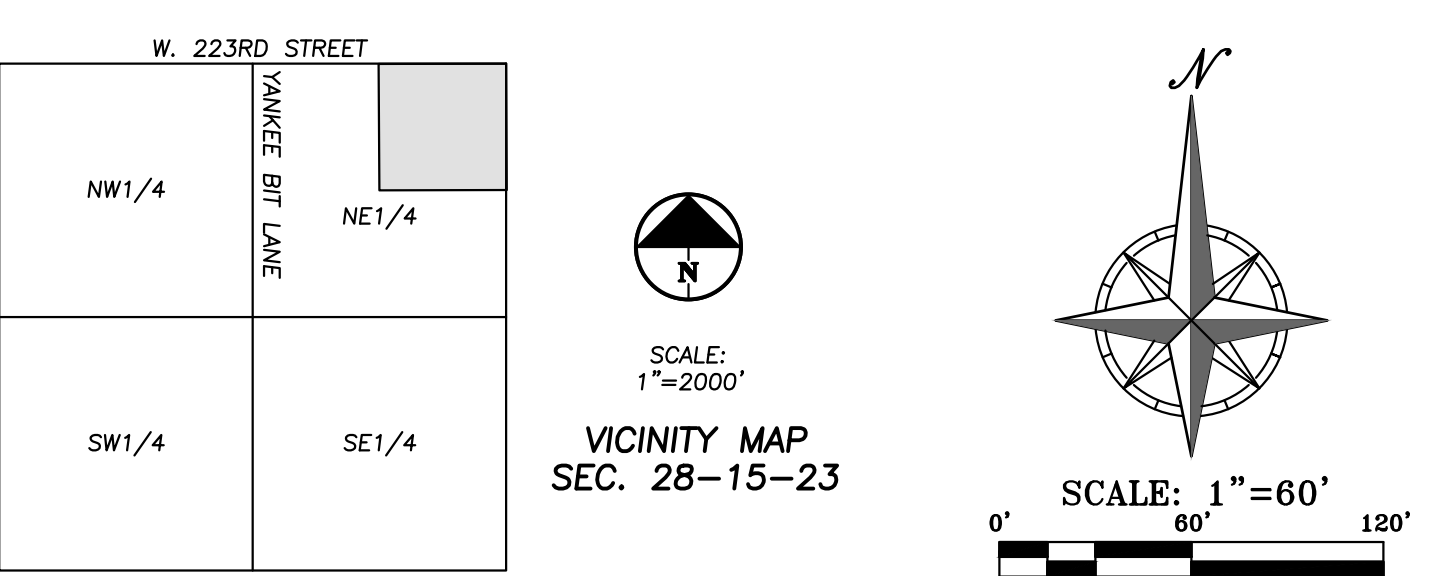
**SITE DATA**

TRACT 1	1,748,311 S.F. / 40.1357 AC.
ZONING	CS
EXISTING	CS
PROPOSED	CS

**PARKING SUMMARY**

PROPOSED PARKING	
STANDARD STALLS (9'-0" X 18'-0")	70
ACCESSIBLE STALLS	8
TOTAL STALLS	78
REQUIRED ACCESSIBLE STALLS	76-100
TOTAL STALLS	76-100
REQUIRED ACCESSIBLE STALLS	4

- LEGEND**
- PL — PROPERTY LINE
  - LL — LOT LINE
  - R/W — RIGHT-OF-WAY
  - B/L — BUILDING SETBACK LINE
  - ASPHALT PAVEMENT
  - PROPOSED BUILDING
  - CONCRETE PAVEMENT
  - CONCRETE SIDEWALK
  - PROPOSED TRAIL
  - GRAVEL DRIVES
  - RETAINING WALL
  - FENCE - 6" BLACK PAINT COATED CHAIN LINK
  - PARKING SPACES
  - LIGHT POLE



**CLIENT:**  
**ALWAYS & FUREVER**  
 MIDWEST ANIMAL SANCTUARY  
 PROJECT HOMESTEAD

23595 W. 223RD ST.,  
 SPRING HILL, KS 66208



**PHELPS ENGINEERING, INC.**  
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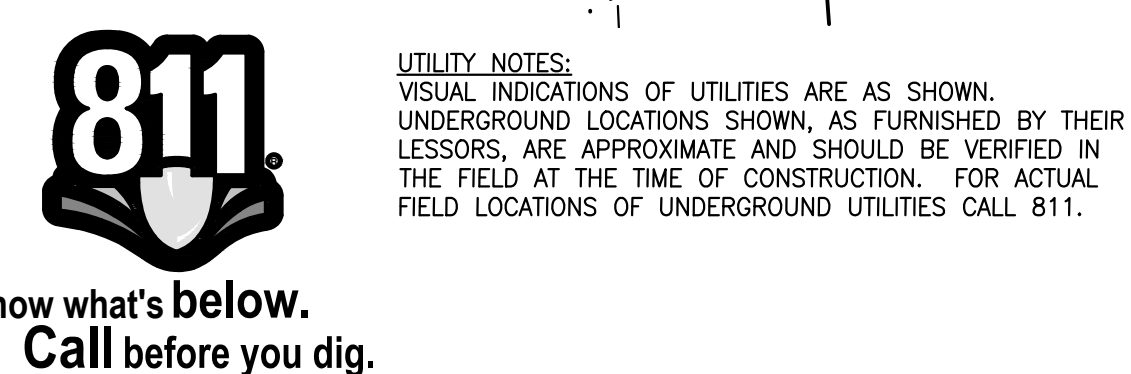
**ARCHITECT:**  
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 12730 State Line Road Suite 100  
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**REVISIONS:**

REVISIONS: #1 - 03/03/23
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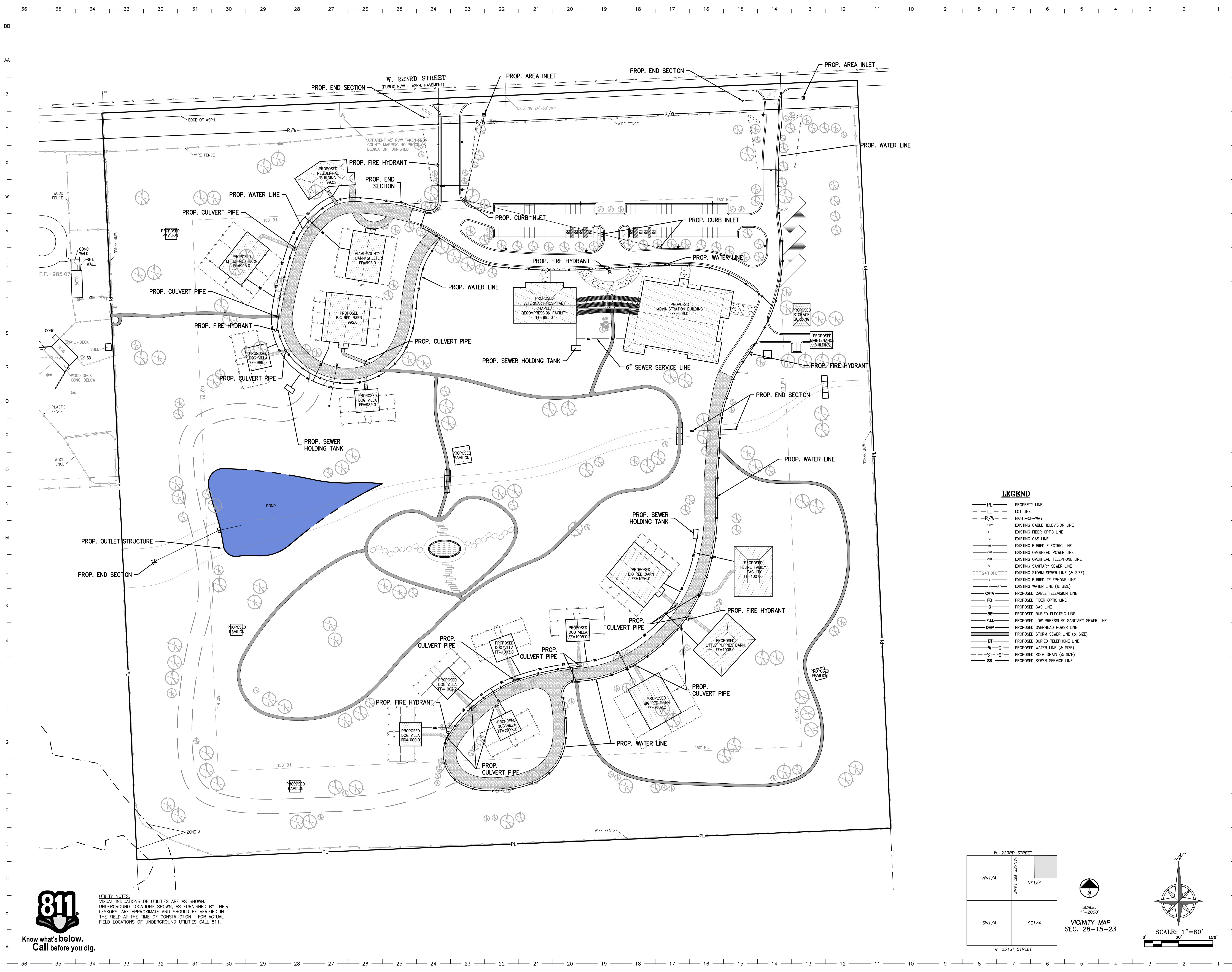
**ISSUE DATE:** 02/17/2023  
**REASON FOR ISSUE:** CONDITIONAL USE APPLICATION  
**PROJECT NUMBER:** 22-050  
**PROJECT PHASE:** CD

**SITE PLAN**  
 SHEET NUMBER: **C1**



UTILITY NOTES:  
 VISUAL INDICATIONS OF UTILITIES ARE AS SHOWN. UNDERGROUND LOCATIONS SHOWN, AS FURNISHED BY THEIR LESSORS, ARE APPROXIMATE AND SHOULD BE VERIFIED IN THE FIELD AT THE TIME OF CONSTRUCTION. FOR ACTUAL FIELD LOCATIONS OF UNDERGROUND UTILITIES CALL 811.





**LEGEND**

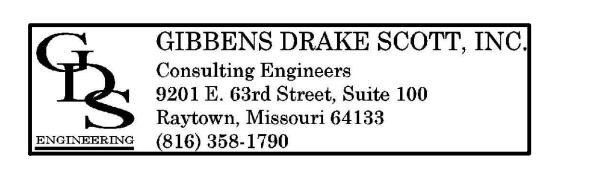
- PL — PROPERTY LINE
- LL — LOT LINE
- R/W — RIGHT-OF-WAY
- CATV — EXISTING CABLE TELEVISION LINE
- FO — EXISTING FIBER OPTIC LINE
- G — EXISTING GAS LINE
- BE — EXISTING BURIED ELECTRIC LINE
- OHP — EXISTING OVERHEAD POWER LINE
- OHT — EXISTING OVERHEAD TELEPHONE LINE
- SS — EXISTING SANITARY SEWER LINE
- SSS — EXISTING STORM SEWER LINE (& SIZE)
- BT — EXISTING BURIED TELEPHONE LINE
- W-6" — EXISTING WATER LINE (& SIZE)
- CATV — PROPOSED CABLE TELEVISION LINE
- FO — PROPOSED FIBER OPTIC LINE
- G — PROPOSED GAS LINE
- BE — PROPOSED BURIED ELECTRIC LINE
- F.M. — PROPOSED LOW PRESSURE SANITARY SEWER LINE
- OHP — PROPOSED OVERHEAD POWER LINE
- SSS — PROPOSED STORM SEWER LINE (& SIZE)
- BT — PROPOSED BURIED TELEPHONE LINE
- W-6" — PROPOSED WATER LINE (& SIZE)
- ST-6" — PROPOSED STORM DRAIN (& SIZE)
- SS — PROPOSED SEWER SERVICE LINE

CLIENT:  
**ALWAYS & FUREVER**  
MIDWEST ANIMAL SANCTUARY  
PROJECT HOMESTEAD

23595 W. 223RD ST.,  
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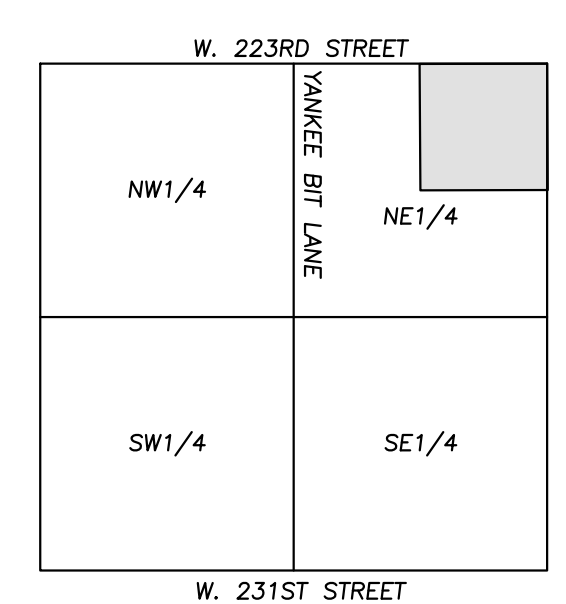
SEAL:  
  
REVISIONS:  
REVISIONS: #1 - 03/03/23

ISSUE DATE: 02/17/2023  
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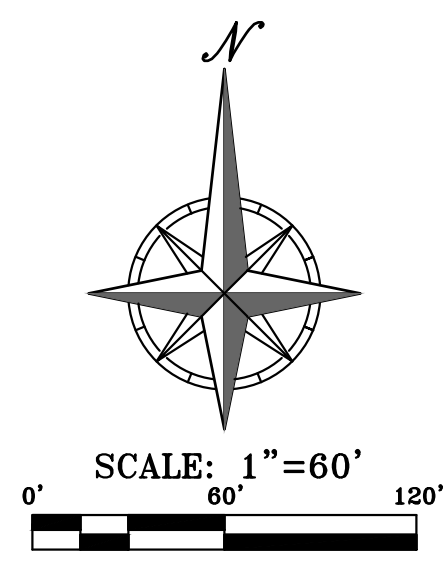
**UTILITY PLAN**  
SHEET NUMBER: **C3**

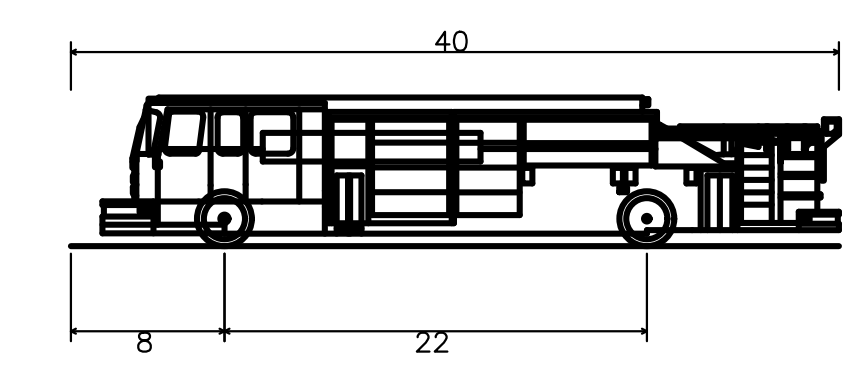
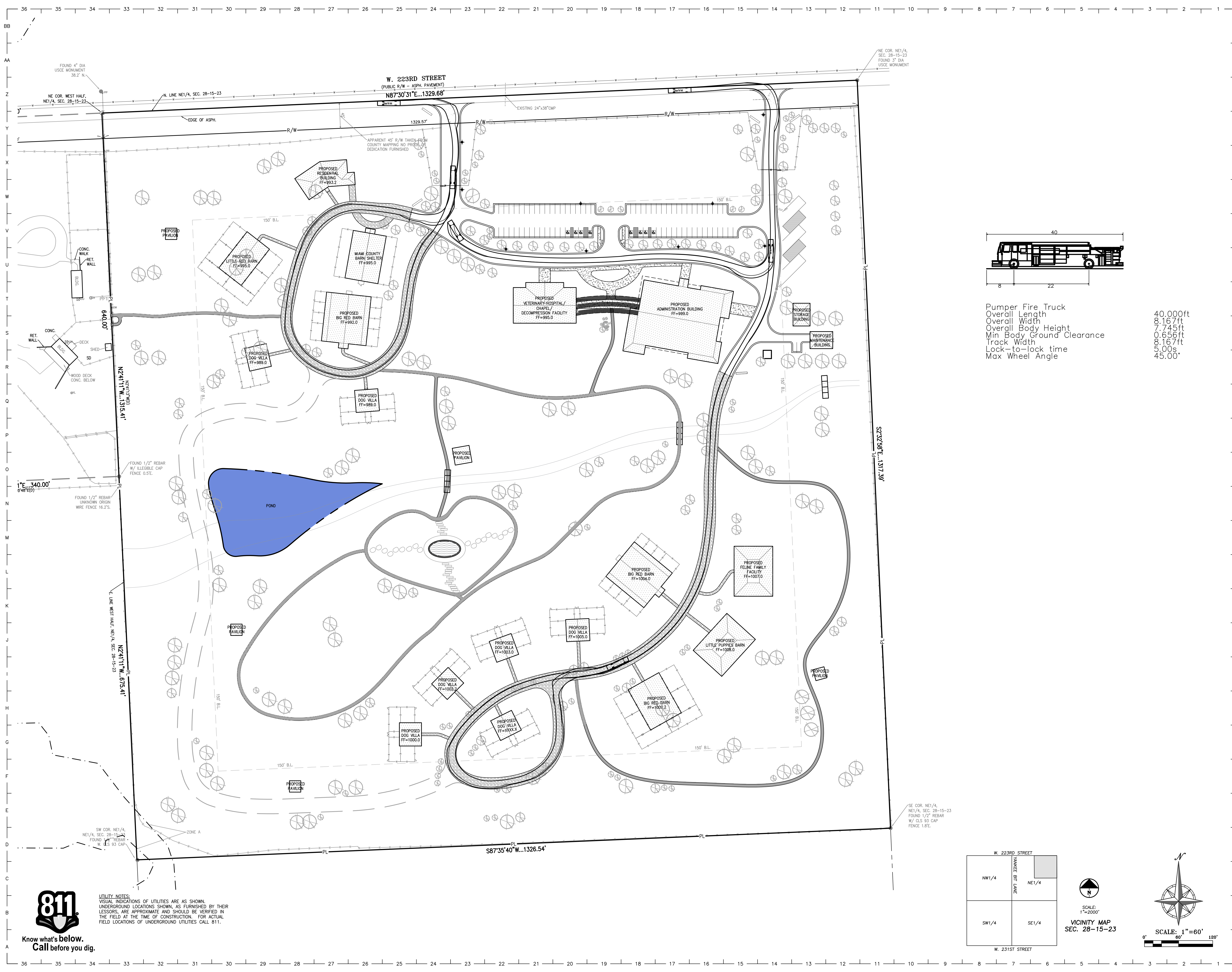
**811**  
Know what's below.  
Call before you dig.

UTILITY NOTES:  
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SCALE: 1"=2500'  
VICINITY MAP  
SEC. 28-15-23

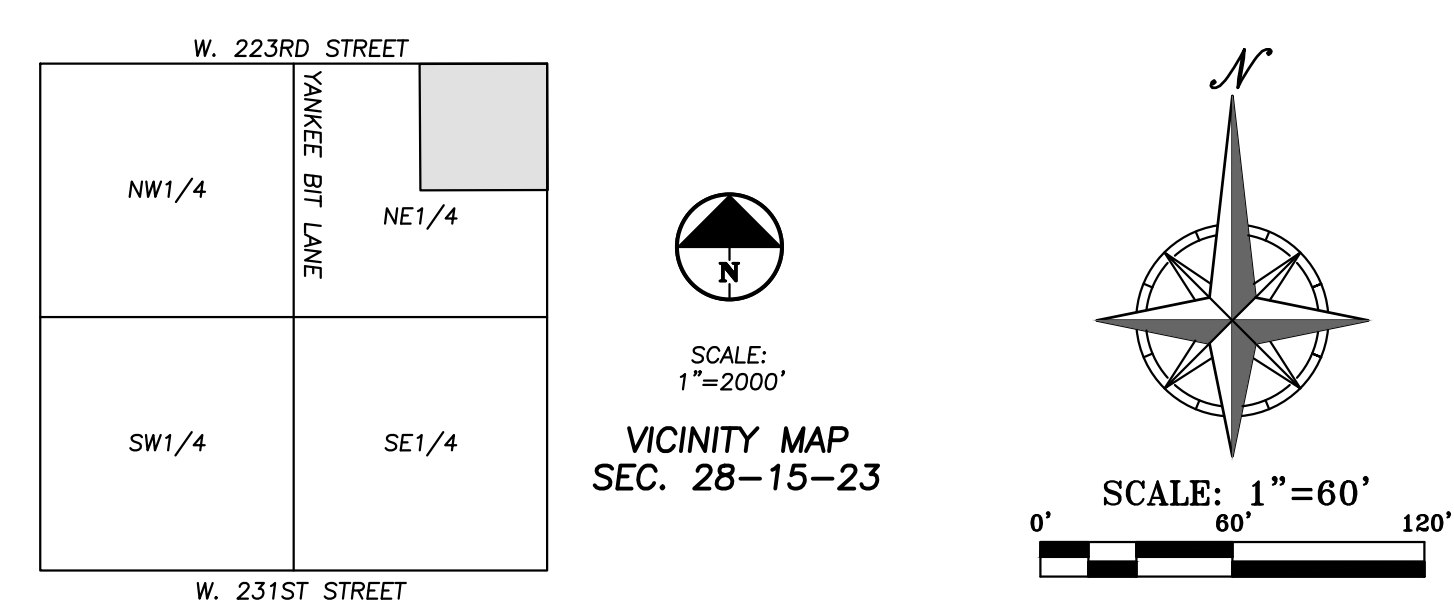




Pumper Fire Truck  
 Overall Length 40.00ft  
 Overall Width 8.167ft  
 Overall Body Height 7.745ft  
 Min Body Ground Clearance 0.656ft  
 Track Width 8.167ft  
 Lock-to-lock time 5.00s  
 Max Wheel Angle 45.00°

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

UTILITY NOTES:  
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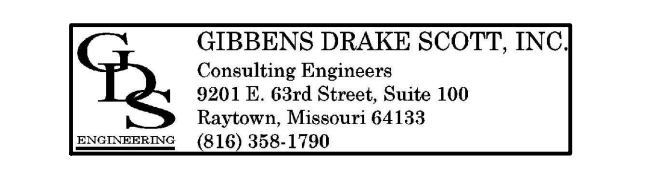


CLIENT:  
**ALWAYS & FUREVER**  
 MIDWEST ANIMAL SANCTUARY  
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 Leawood, KS 66209 www.bellknott.com

SEAL:

REVISIONS:  
 REVISIONS: #1 - 03/03/23

ISSUE DATE: 02/17/2023  
 REASON FOR ISSUE: CONDITIONAL USE APPLICATION  
 PROJECT NUMBER: 22-050  
 PROJECT PHASE: CD

SHEET TITLE:  
**TRUCK TURN PLAN**

SHEET NUMBER:  
**C4**

CLIENT:

# Always & Furever

PROJECT TITLE:

# Project Homestead

PROJECT ADDRESS:

23595 W. 223rd St.  
Spring Hill, KS 66208



ARCHITECT:

**Bell/Knott & Associates**  
CORPORATE ARCHITECTS, P.C.  
12730 State Line Suite 100 Leawood, Kansas 66209 Ph:913/378-1600 Fax:913/378-1601

CONSULTANTS:

**PEI**  
PLANNING  
ENGINEERING  
IMPLEMENTATION

**PHELPS ENGINEERING, INC.**  
1270 N. Winchester  
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**landworks**  
STUDIO

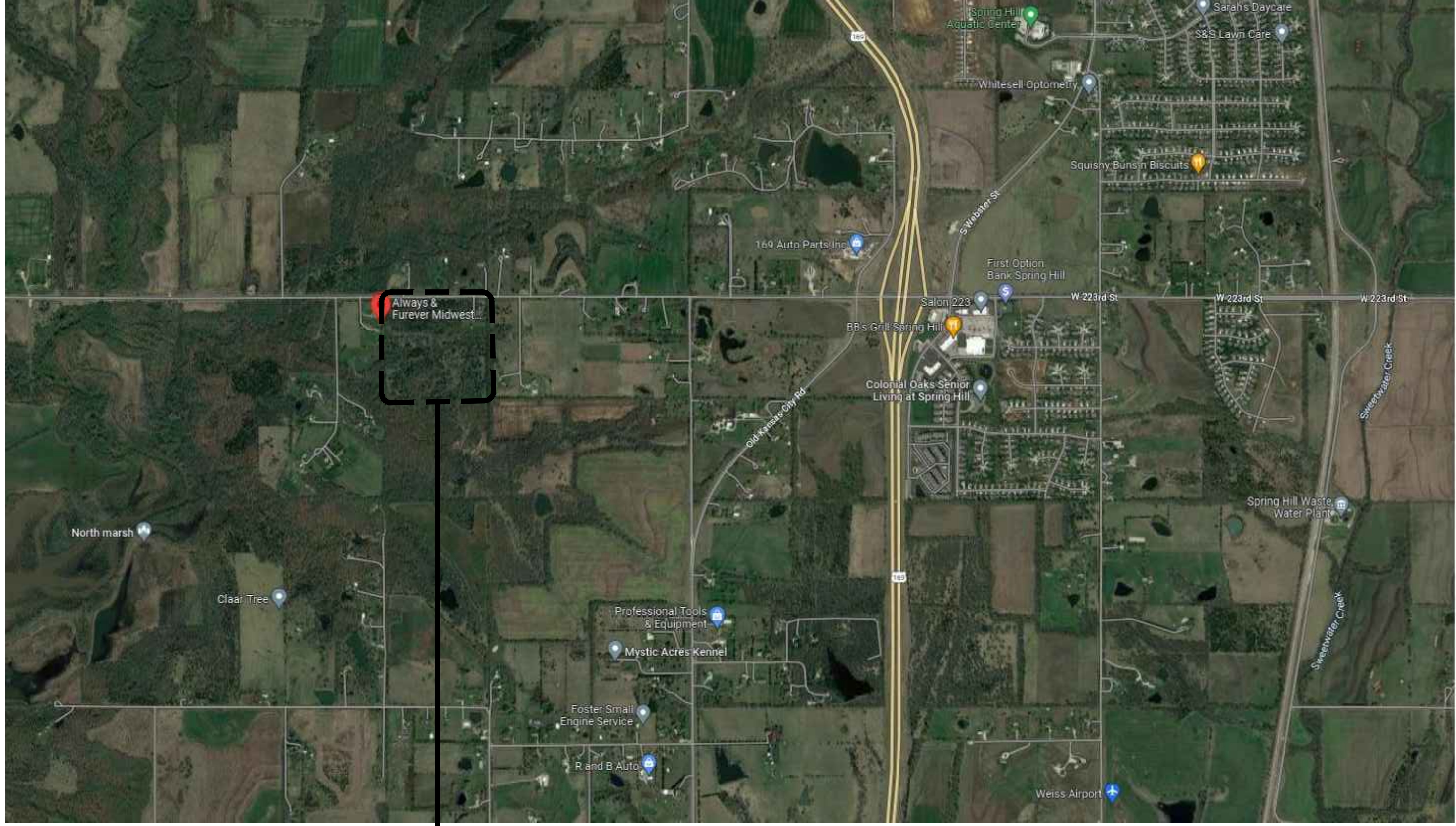
**priority**  
ENGINEERS

PROJECT INFORMATION:

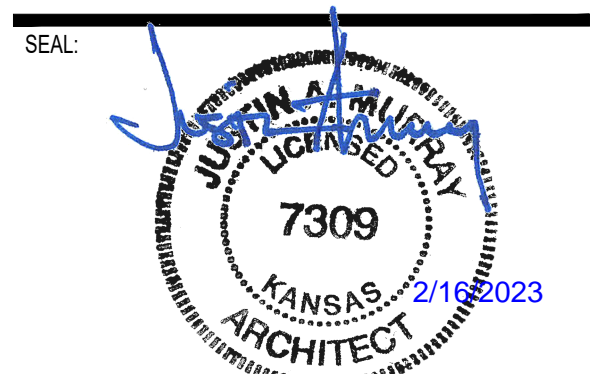
**INDEX OF DRAWINGS:**

<b>COVER</b>	
<b>CIVIL</b>	
C1	SITE PLAN
C2	GRADING PLAN
C3	UTILITY PLAN
C4	TRUCK TURN PLAN
<b>LANDSCAPE</b>	
L100	LANDSCAPE PLAN
<b>ARCHITECTURAL</b>	
A010	SITE PLAN
A600	MONUMENT SIGNAGE
<b>MEP</b>	
E010	SITE PHOTOMETRIC CALCULATION PLAN
E020	ELECTRICAL SITE PLAN

PROJECT LOCATION:



PROJECT SITE



REVISIONS:


ISSUE DATE:	02/17/2023
REASON FOR ISSUE:	CONDITIONAL USE APPLICATION
PROJECT NUMBER:	22-050
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SHEET TITLE:

Cover

SHEET NUMBER:

# CVR



ARCHITECTURAL EXTERIOR INSPIRATION PHOTO - RESIDENTIAL BUILDING W/ SINGLE CAR GARAGE  
• WOOD FRAME CONSTRUCTION



ARCHITECTURAL EXTERIOR INSPIRATION PHOTO - DOG VILLA  
• WOOD FRAME CONSTRUCTION



ARCHITECTURAL EXTERIOR INSPIRATION PHOTO - VETERINARY HOSPITAL / CHAPEL / DECOMP. FACILITY  
• WOOD/TIMBER-FRAME CONSTRUCTION



ARCHITECTURAL EXTERIOR INSPIRATION PHOTO - ADMINISTRATION BUILDING  
• METAL BUILDING



ARCHITECTURAL EXTERIOR INSPIRATION PHOTO - BARN  
• BARN-STYLE ARCHITECTURE

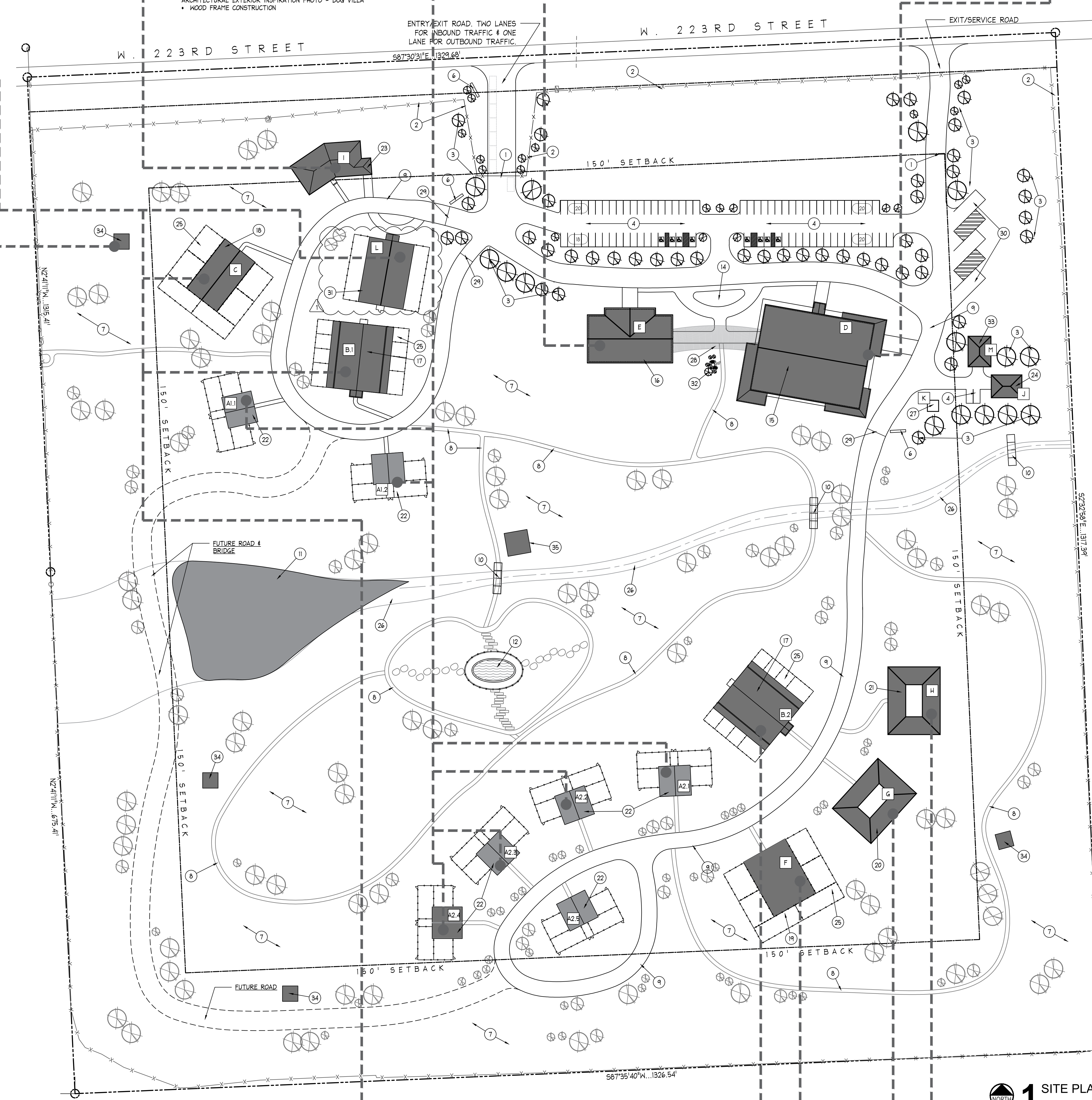


ARCHITECTURAL EXTERIOR INSPIRATION PHOTO - PAVILION  
WOOD/TIMBER FRAME CONSTRUCTION

BUILDING SCHEDULE (A, B)			
LEGEND	BUILDING	SQUARE FOOTAGE	PHASE
A1.1	DOG VILLA	1,257 SF	PHASE 1
A1.2	DOG VILLA	1,257 SF	PHASE 2
SUBTOTAL		2,514 SF	
A2.1	DOG VILLA	1,257 SF	PHASE 3
A2.2	DOG VILLA	1,257 SF	PHASE 3
A2.3	DOG VILLA	1,257 SF	PHASE 3
A2.4	DOG VILLA	1,257 SF	PHASE 3
A2.5	DOG VILLA	1,257 SF	PHASE 3
SUBTOTAL		6,205 SF	
B.1	BIG RED BARN	6,000 SF	PHASE 1
B.2	BIG RED BARN	6,000 SF	PHASE 3
SUBTOTAL		12,000 SF	
C	LITTLE RED BARN	5,000 SF	PHASE 3
D	ADMINISTRATION BUILDING	16,000 SF	PHASE 1
E	VETERINARY HOSP./CLINIC / DECOMP.	8,000 SF	PHASE 2
F	BIG RED BARN	5,000 SF	PHASE 3
G	LITTLE PUPPIES BARN	5,000 SF	PHASE 3
H	FELINE FAMILY FACILITY	5,000 SF	PHASE 3
I	RESIDENTIAL W/ SINGLE CAR GARAGE	4,200 SF	PHASE 4
J	MAINTENANCE BUILDING	1,800 SF	PHASE 1
K	TRASH ENCLOSURE	250 SF	PHASE 1
L	MIAMI COUNTY BARN SHELTER	5,000 SF	PHASE 1
M	STORAGE BUILDING	1,800 SF	PHASE 2
SUBTOTAL		57,050 SF	
GRAND TOTAL		77,849 SF	

SITE IMPROVEMENTS SCHEDULE			
I	DESCRIPTION	PHASE	
1	SITE GRADING-NORTH	PHASE 1	
2	SITE GRADING-SOUTH	PHASE 3	
3	PARKING-NORTH END	PHASE 1	81 PARKING SLOTS
4	SITE WALKING TRAILS & PAVILIONS	PHASE 4	

NOTE:  
ALL PUBLIC BUILDINGS AND FACILITIES HAVE BEEN DESIGNED TO COMPLY WITH THE PROVISIONS OF THE AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES (ADAAG) FOR BUILDINGS AND FACILITIES.



### Construction Notes:

- 1 ELECTRIC GATE.
- 2 PERIMETER FENCE.
- 3 NEW LANDSCAPING, REFER TO LANDSCAPE PLAN.
- 4 PARKING.
- 5 PAVILION.
- 6 SIGNAGE.
- 7 OPEN LANDSCAPING AREA.
- 8 WALKING TRAIL.
- 9 NEW ROAD.
- 10 BRIDGE.
- 11 MAN-MADE POND.
- 12 DOG POOL WITH FENCING AROUND THE POOL.
- 13 NOT USED.
- 14 LANDMARK.
- 15 ADMINISTRATION BUILDING (16,000 SF).
- 16 VETERINARY HOSPITAL / CHAPEL / DECOMPRESSION FACILITY (8,000 SF).
- 17 BIG RED BARN (6,000 SF).
- 18 LITTLE RED BARN (5,000 SF).
- 19 BIG RED BARN (5,000 SF).
- 20 LITTLE PUPPIES BARN (5,000 SF).
- 21 FELINE FAMILY FACILITY (5,000 SF).
- 22 DOG VILLA (1,257 SF).
- 23 RESIDENTIAL BUILDING W/ SINGLE CAR GARAGE (4,200 SF).
- 24 MAINTENANCE/UTILITY BUILDING (1,800 SF).
- 25 #7,200 SF FENCED AREA.
- 26 EXISTING CREEK. FIELD VERIFY.
- 27 TRASH ENCLOSURE (#250 SF).
- 28 PERGOLA.
- 29 ENTRY GATE.
- 30 OVERSIZED VEHICLE PARKING.
- 31 MIAMI COUNTY BARN SHELTER (5,000 SF).
- 32 WISHING WELL.
- 33 STORAGE BUILDING (1,800 SF).
- 34 SMALL PAVILION (400 SF).
- 35 LARGE PAVILION (900 SF).

### Parking Count:

- 70 STANDARD PARKING
- 8 ADA PARKING
- 3 OVERSIZED VEHICLE PARKING

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Olathe, Kansas 66041  
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SEAL:  
  
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SHEET TITLE: **SITE PLAN**

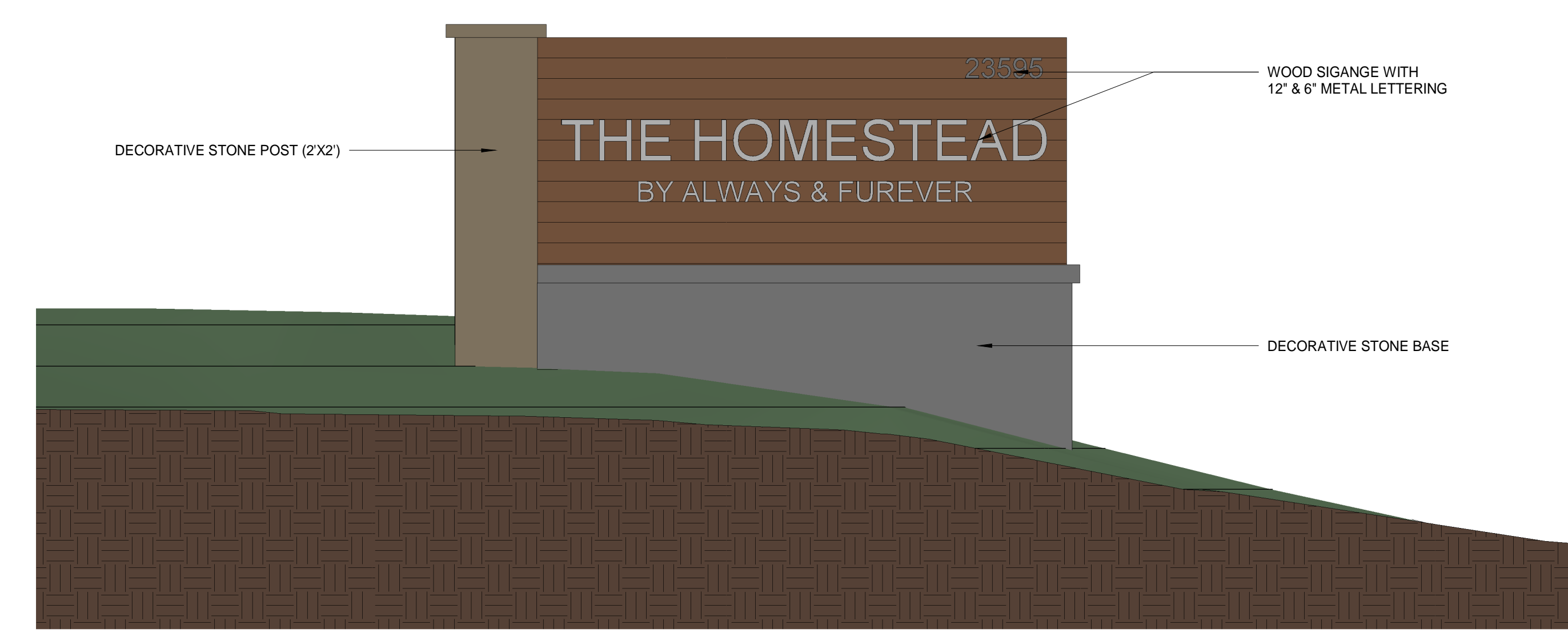
CLIENT:  
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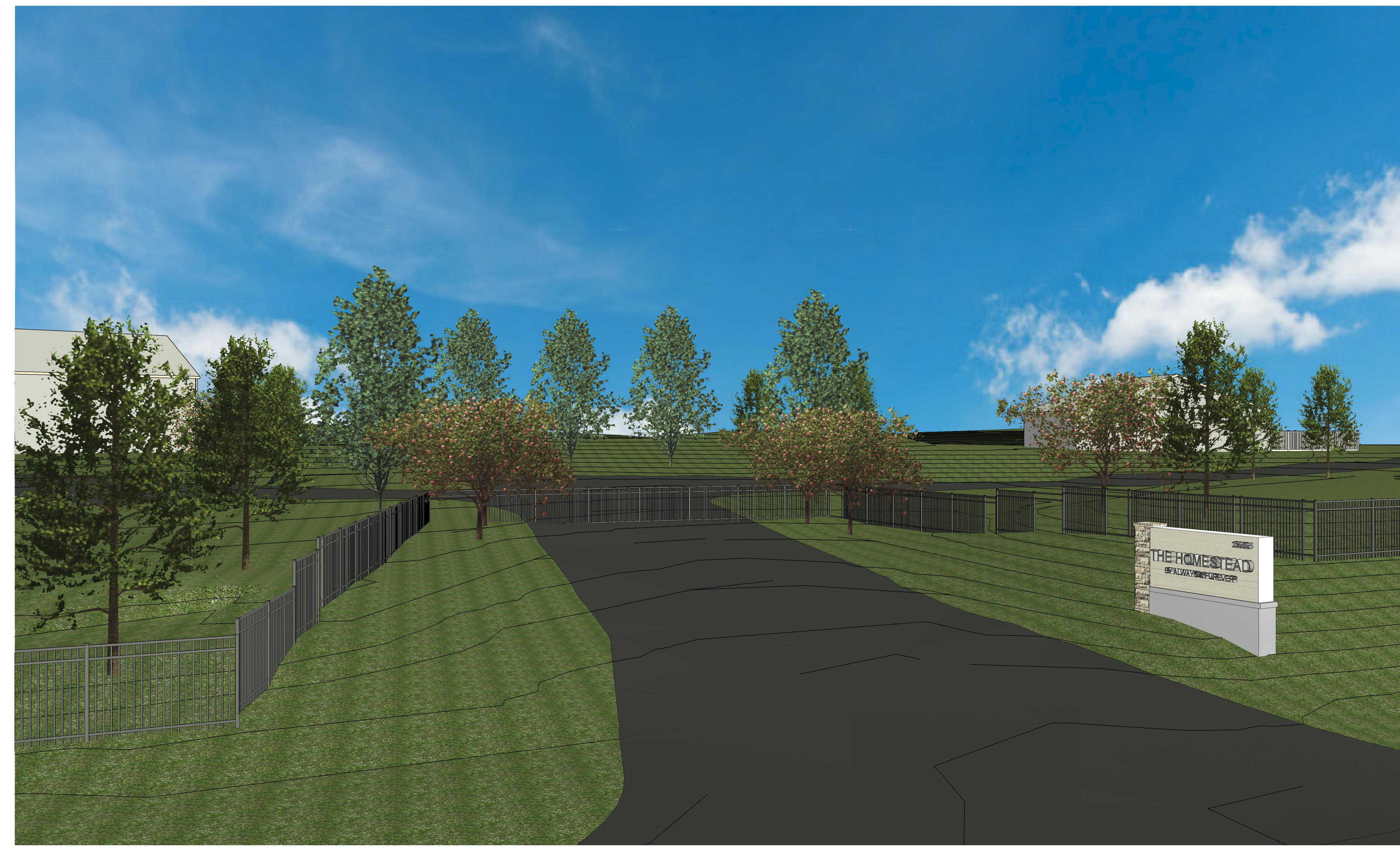
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 (816) 358-1790

  
**landworks  
STUDIO**

  
**Priority  
ENGINEERS**




**2** Monument Signage - Main Entrance  
 3/8" = 1'-0"



**1** Perspective

ARCHITECT:  
 **Bell / Knott  
& Associates**  
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SEAL:  
  
 Revisions

ISSUE DATE: 02/17/2023  
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 PROJECT PHASE: SD  
 SHEET TITLE:

Monument Signage Details

PHASE: SHEET NUMBER:  
**A600**



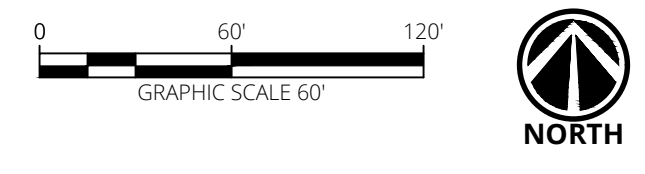
**LANDSCAPE NOTES**

- CONTRACTOR SHALL LOCATE ALL UTILITIES BEFORE COMMENCING WORK. CONTACT KANSAS 811 AT 1-800-DIG-SAFE OR 811 TO FILE A LOCATE REQUEST PRIOR TO ANY EXCAVATION. CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR OF ANY DAMAGE TO UTILITIES RESULTING FROM LANDSCAPE OPERATIONS. ANY UTILITIES SHOWN ON THIS PLAN ARE FOR REFERENCE ONLY AND MAY OR MAY NOT DEPICT THE ACTUAL LOCATION OF SERVICES.
- QUANTITIES OF MATERIALS SHOWN ON THE LANDSCAPE PLAN TAKE PRECEDENCE OVER QUANTITIES SHOWN ON THE PLANT SCHEDULE. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING ALL QUANTITIES ON THE LANDSCAPE PLAN PRIOR TO BIDDING.
- REPORT ANY DISCREPANCIES IN THE LANDSCAPE PLAN TO THE LANDSCAPE ARCHITECT, PRIOR TO PURCHASING MATERIALS OR STARTING CONSTRUCTION.
- ALL DISTURBED AREAS NOT COVERED BY BUILDINGS OR PAVEMENT SHALL BE BROUGHT TO FINISH GRADE AND SODDED IN TURF-TYPE TALL FESCUE OR OTHER APPROPRIATE GROUND COVERS, AS DEPICTED ON SHEET L1.01.
- ALL PLANT MATERIAL SHALL BE WELL-FORMED AND DEVELOPED IN GOOD CONDITION, HEALTHY AND DISEASE-FREE, AND BE TYPICAL OF THE SPECIES. PLANTS SHALL COMPLY WITH ACCEPTABLE STANDARDS AS SET FORTH IN THE LATEST EDITION OF THE "AMERICAN STANDARD FOR NURSERY STOCK."
- TURF SEED SHALL COMPLY WITH U.S. DEPARTMENT OF AGRICULTURE RULES AND REGULATIONS UNDER THE FEDERAL SEED ACT AND BE EQUAL IN QUALITY TO STANDARDS FOR CERTIFIED SEED. SEED SHALL BE A TURF-TYPE FESCUE BLEND CONSISTING OF 85% TURF-TYPE TALL FESCUE, 10% KENTUCKY BLUEGRASS, AND 5% ANNUAL RYEGRASS. ALL SEEDED AREAS SHALL BE MULCHED WITH STRAW OR HYDROMULCH AT TIME OF INSTALLATION UNTIL SEED HAS ESTABLISHED.
- NATIVE VEGETATION SEED MIX SHALL CONSIST OF A MINIMUM OF FIFTEEN (15) DIFFERENT SPECIES OF GRASSES AND WILDFLOWERS NATIVE TO THE STATE OF KANSAS. SEED MIX SHALL BE DESIGNED TO INCLUDE SPECIES NATIVE TO WESTERN SHORTGRASS PRAIRIES WITH MAXIMUM HEIGHTS AT FULL GROWTH RANGING BETWEEN 1' AND 4' FEET TALL. SEED TO BE BROADCAST BY HAND PER NURSERY DIRECTIONS BETWEEN THE DATES OF DECEMBER 1 AND MAY 1. SOW EVENLY ACROSS THE SITE IN TWO DIRECTIONS PERPENDICULAR TO ONE ANOTHER AT A RATE NOT LESS THAN 10 POUNDS PURE LIVE SEED (PLS) PER ACRE. PRIOR TO SOWING, MIX THE SEED WITH A WEED-FREE "CARRIER" OF MOIST SAND OR SAWDUST AT A 4:1 RATIO TO THE SEED. AFTER SOWING, RAKE THE AREA LIGHTLY AND THEN FIRM WITH A HAND ROLLER. MULCH THE AREA WITH WEED-FREE STRAW TO A LOOSE DEPTH OF 1 INCH. PROVIDE ONE OF THE FOLLOWING SEED MIXES, OR APPROVED EQUAL: "LOW GROWING PRAIRIE FOR CLAY SOILS" BY PRAIRIE NURSERY, INC., OR "PRETTY PRAIRIE SHORTGRASS MIX" BY STAR SEED, INC.
- MAINTAIN AND ESTABLISH NATIVE GRASSES IN FIRST YEAR BY WATERING, MOWING, AND PERFORMING OTHER OPERATIONS AS REQUIRED TO ESTABLISH HEALTHY, VIABLE NATIVE GRASS. ROLL, REGRADE, AND REPLANT BARE OR ERODED AREAS AND REMULCH TO PRODUCE A UNIFORMLY SMOOTH TURF. PROVIDE MATERIALS AND INSTALLATION THE SAME AS THOSE USED IN THE ORIGINAL INSTALLATION. CONTROL WEEDS BY MOWING TO A HEIGHT OF 6-12 INCHES THROUGHOUT THE FIRST GROWING SEASON. DO NOT MANUALLY WEED. MOW ALL GROWTH AS SOON AS IT REACHES A HEIGHT OF 6 INCHES IN THE FIRST YEAR TO PREVENT COOL SEASON WEEDS FROM SHADING OUT PRAIRIE SEEDLINGS. MOW ALL GROWTH AT A HEIGHT OF 12 INCHES IN THE SECOND GROWTH SEASON.

**LANDSCAPE SCHEDULE**

DECIDUOUS TREES	CODE	QTY	COMMON NAME	CONT	CAL
	AM	6	STATE STREET MIYABE MAPLE	B & B	2" CAL
	AJ	6	JOHN PAIR SUGAR MAPLE	B & B	2" CAL
	QN	14	NUTTALL OAK	B & B	2" CAL
EVERGREEN TREES	CODE	QTY	COMMON NAME	CONT	CAL
	JK	12	KETELEERI EASTERN REDCEDAR	B & B	
	JT	18	TAYLOR EASTERN REDCEDAR	B & B	
	PG	18	BLACK HILLS SPRUCE	B & B	
ORNAMENTAL TREES	CODE	QTY	COMMON NAME	CONT	CAL
	AG	6	AUTUMN BRILLIANCE SERVICEBERRY	B & B	2" CAL
	CC	3	EASTERN REDBUD	B & B	2" CAL
GROUND COVERS	CODE	QTY	COMMON NAME	CONT	
	TE	525,205 SF	TURF SEED	SEED	
	NG	266,090 SF	NATIVE VEGETATION SEED MIX	SEED	

1 | LANDSCAPE PLAN  
SCALE = 1" = 20'



CLIENT:  
**ALWAYS & FUREVER**  
MIDWEST ANIMAL SANCTUARY  
PROJECT HOMESTEAD

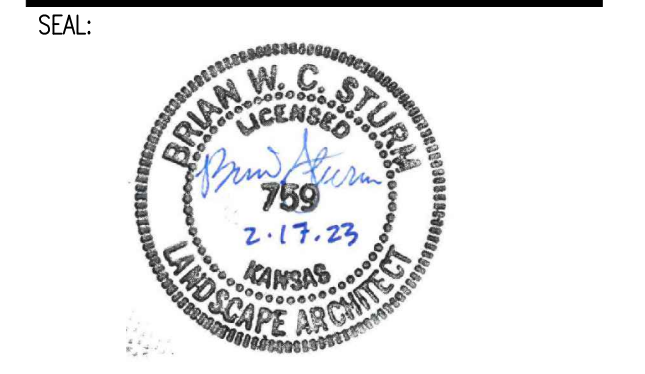
23595 W. 223RD ST.,  
SPRING HILL, KS 66208

CONSULTANTS:  
**PEI** PLANNING  
ENGINEERING  
IMPLEMENTATION  
**PHELPS ENGINEERING, INC.**  
1370 N. Winchester  
Olathe, Kansas 66061  
(913) 393-1155  
Fax: (913) 393-1166  
www.phelpsengineering.com

**GIBBENS DRAKE SCOTT, INC.**  
Consulting Engineers  
8901 E. 63rd Street, Suite 100  
Raytown, Missouri 64133  
(816) 958-1798



ARCHITECT:  
**Bell / Knott & Associates**  
CORPORATE ARCHITECTS, P.C.  
12730 State Line Road Voice: 913.378.1600  
Suite 100 Fax: 913.378.1601  
Leawood, KS 66209 www.bellknott.com



REVISIONS:


ISSUE DATE: 2/17/2023  
REASON FOR ISSUE: CONDITIONAL USE APPLICATION  
PROJECT NUMBER: 22-050  
PROJECT PHASE: CD

SHEET TITLE:  
**LANDSCAPE PLAN**

SHEET NUMBER:  
**L-100**

Preliminary Stormwater  
Management Plan

Always & Furever  
Midwest Animal  
Sanctuary

One mile west of US 169 Hwy at W. 223<sup>rd</sup> Street  
Section: NW ¼ Sec. 28-15-23  
Miami County, Kansas

Prepared by:



PHELPS ENGINEERING, INC

**1270 N. Winchester  
Olathe, KS 66061  
(913)363-1155**

**PEI #'s 220597  
July 29, 2022  
Revised February 17, 2023**

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Appendix "B"	NRCS County Soils Map
Appendix "C"	Existing Drainage Map
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Appendix "G"	Flood Map

## **1.0 Introduction**

Phelps Engineering, Inc. is pleased to submit this Preliminary Stormwater Study for Always & Forever Midwest Animal Sanctuary. The proposed project is a 38.8-acre animal care, boarding, and recreation complex located approximately one mile west of US 169 Highway on W 223<sup>rd</sup> Street in Miami County, Kansas. The project is bounded by the developer's residence and undeveloped property to the west, by wooded undeveloped property to the south, by a single 13+ acre residential property to the east, and by W. 223<sup>rd</sup> Street to the north. North of W 223<sup>rd</sup> Street are four large lot residential properties.

## **2.0 Methodology**

Drainage calculations were prepared in accordance with the Miami County's Street and Storm Drainage Standards for New Subdivisions, 1997 Edition. Specifically, Chapter 5 Storm Water Drainage Standards, Section A. states the adopted Design Criteria is based on the American Public Works Association, Kansas City Metropolitan Area (APWA) Section 5600 Storm Drainage Systems and Facilities, 1990 edition with amendments. Hydrographs were developed using the Natural Resource Conservation Service (NRCS) TR-55 method within HydroCAD's stormwater modeling program for a 24-hour storm event and a Type 2 distribution.

## **3.0 Existing Conditions**

The 38.8-acre site is undeveloped except for remnants of an old farmhouse and barn and is currently covered in a mix of pasture and woods. Approximately 32.1 acres of the runoff generally flows as sheet, shallow concentrated, and channel flow from east to west through a natural draw that bi-sects the site. The remaining 6.7 acres drains north and northwest to the W 223<sup>rd</sup> Street ditch at the north project limits. The 223<sup>rd</sup> Street drainage is split at the ditch with about 2.6 acres crossing under 223<sup>rd</sup> Street via a 24" x 38" Corrugated Metal Pipe Arch (CMPA) culvert, and the remaining 4.1 acres drains west along the ditch. Before reaching the tributary, most of the west runoff enters an off-site farm pond immediately west of the project, and all the runoff reaches an unnamed tributary to Hillsdale Reservoir less than ¼ mile downstream.

According to the Flood Insurance Rate Map (FIRM) by the Federal Emergency Management Agency (FEMA) panel 20121C0055D dated January 16, 2014, a Special Flood Hazard Area (SFHA) Zone A (elevations undetermined) clips the extreme southwest corner of the site (see Appendix G of this report).

Soil data for the site was obtained from the NRCS Web Soil Survey for Miami County. The site watershed consists of 5 different soil types which all belong to the Hydrologic Soils Groups (HSG) "B", "C", or "D" as shown in Table 3.1 – Soil Summary table below. The dominant soil group is HSG "D" and comprises about

83% of the site. For more details of the on-site soil, refer to the NRCS Web Soil Survey in Appendix “B” of this report.

Soil Name	Site Area (Ac.)	Coverage	HSG Type
Verdigris Silt Loam, 0-1 percent slopes, frequently flooded	2.9	4%	B
Bucyrus Silt Clay Loam, 1-3 percent slopes	1.2	3%	C
Bucyrus Silt Clay Loam, 3-8 percent slopes	4.5	11%	C
Clareson-Rock outcrop complex, 3-15 percent slopes	17.3	44%	D
Eram-Shidler complex, 4-15 percent slopes	14.7	38%	D

Stormwater runoff from the existing site was modeled to determine the peak discharge at each of the three site outfalls for the 2-year, 10-year, and 100-year (50%, 10%, and 1% chance) storm events. Table 4.1 Runoff Summary in the next section of this report summarizes the runoff at the key locations, and Appendix F includes the HydroCAD existing runoff schematic model and output. Appendix “C” of the report includes the existing conditions drainage map.

#### **4.0 Proposed Conditions**

Runoff from the proposed 38.8-acre development will maintain the existing overall drainage patterns of the site. In the proposed condition, the buildings, parking, drives, walks and future impervious improvements will cover 7.9 acres or about 20% of the site. The drives and parking will be constructed utilizing Low Impact Development techniques, which means the onsite runoff will generally be routed first to open grass-lined swales leading to area inlets and culverts that will convey the runoff northerly to the 223<sup>rd</sup> Street ditch or westwardly to and through the natural draw that bi-sects the center of the site. The culverts and pipes will only be placed where needed and will generally be sized for the 10-year storm event. A system of overflow weirs and swales will also be sized and constructed where needed to safely route the 100-year storm event passed the lowest openings of any adjacent building and will have a minimum of one-foot freeboard above the 100-year water surface.

Table 4.1 below summarizes the peak runoff from the site for the 2-year, 10-year and 100-year storm events for the Existing vs Developed condition. Appendix “D” of this report includes a proposed conditions drainage map and Appendix “E” includes the HydroCAD model outputs.

Watershed	Existing					Developed w/out Detention				
	Tc	Area (ac.)	2 yr cfs	10 yr cfs	100 yr cfs	Tc	Area (ac.)	2 yr cfs	10 yr cfs	100 yr cfs
223 <sup>rd</sup> CMPA	11.4	2.6	10.0	19.4	37.4	8.4	1.6	10.2	17.3	30.6
Northwest	13.0	4.1	11.6	21.0	38.6	10.8	6.3	21.5	36.1	62.5
West	12.5	32.4	74.2	146	284	9.8	30.9	76.9	146	279
Confluence	12.4	38.8	90.5	176	342	9.3	38.8	101	188	353

The summary above indicates the project, without detention, would cause a slight increase for the 2-yr and 10-yr events at the West outfall; a significant increase for all three studied storms at the Northwest outfall; and a slight increase again for all three studied storms at the downstream confluence.

The steep slopes in the northwest watershed near 223<sup>rd</sup> street make an on-site detention basin impractical in that area of the site. Given the results above, an additional analysis was warranted for the existing storm sewer system downstream of the northwest watershed.

**5.0 Downstream Analysis**

Generally, downstream analysis is required to a point where the development area is 10% or less of the area within the watershed. Approximately 300 feet downstream of the northwest watershed is the developer’s entrance with a 24” x 36” (30” equivalent) CMPA driveway culvert to convey the ditch flows. An additional 300 feet downstream of the driveway is a 36” x 49” (42” equivalent) CMPA culvert under the private Yankee Bit Lane chip-seal roadway serving five residential properties. The Yankee Bit Lane crossing is near a sag vertical curve which we’ve estimated to be about 200’ long. There are no additional improvements for the next ¼ mile downstream until the receiving streams converge in the upper marsh of Hillsdale Lake.

Utilizing the Rational Method  $Q=kc_iA$  where  $Q$ =runoff in cubic feet per second (cfs),  $k$ =antecedent factor,  $i$ =rainfall intensity in./hr., and  $A$ =area in acres, the existing vs developed results are as follows in Tables 5.1 through 5.3:

Condition	Tc	Area (ac.)	C	I10 In/hr	I100 In/hr	Q10 cfs	Q100 cfs	Overtopping Depth (in)
Existing	11.4	5.9	.33	5.79	8.21	11.3	20.0	NA
Developed	8.4	4.9	.36	6.43	9.08	11.3	20.0	NA

Condition	Tc	Area (ac.)	C	I10 In/hr	I100 In/hr	Q10 cfs	Q100 cfs	*Overtopping Depth (in)
Existing	13.0	6.0	.33	5.50	7.80	9.9	17.6	NA
Developed	10.8	8.2	.42	5.91	8.37	20.4	36.0	1

Condition	Tc	Area (ac.)	C	I10 In/hr	I100 In/hr	Q10 cfs	Q100 cfs	*Overtopping Depth (in)
Existing	13.2	10.6	.33	5.47	7.76	17.4	30.8	NA
Developed	11.0	12.8	.42	5.87	8.31	31.6	55.8	NA

\* See rating tables in the appendix

The results indicate roadway overtopping does not occur at two of the three downstream locations studied with only location 2 showing a minor overtopping of the drive at a depth of 1 inch. While the developed peak runoff at locations 2 and 3 would increase with the development, there are no downstream flooding problems as defined by APWA. There are no further improvements downstream within the required study area, therefore no further downstream analysis is included in this report.

**6.0 Stormwater Detention**

Under the developed condition without detention, a minor overall increase in peak runoff is projected to occur at the confluence off-site. The section 5.C. of the design criteria states the stormwater design intention is to attain a “zero net gain in storm water runoff between the tract in its natural state and the proposed developed state”. With this intention, the west sub watershed of the site was modeled with a wet bottom detention basin to serve as a site amenity and to control stormwater runoff. The proposed basin will capture 21.5 acres of the site runoff as well as the 24.5 acres upstream to the east. The basin is designed for a bottom elevation of 952 and a permanent pool elevation of 961 which makes a nine-foot-deep permanent pool. It will have a top of dam elevation of 968.5 and will have an 8’x4’ control structure with a compound outlet. The outlet will be a 60” wide by 15” high rectangular orifice at 961 and an open top at 964. The basin will have an 80’ wide emergency overflow weir at elevation 966.2.

The side slopes of the basin were designed at 4H:1V around the perimeter for ease of access and mowing. Results of the modeling show the detention basin would perform as follows in Table 6.1:

**Table 6.1 –Detention Basin Summary**

Storm Event	Peak Inflow cfs	Peak Stage ft	Peak Storage Ac-ft	Peak Outflow cfs
2 yr	58.5	963.2	1.569	37.4
10 yr	114	964.6	2.773	88.8
100 yr	221	965.5	3.621	203

With stormwater detention as planned, the existing vs proposed runoff for the 2-year, 10-year, and 100-year return events will be as follows in Table 6.2:

**Table 6.2 – Existing vs Developed w/ Detention Runoff Summary**

Watershed	Existing					Developed w/ Detention				
	Tc	Area (ac.)	2 yr cfs	10 yr cfs	100 yr cfs	Tc	Area (ac.)	2 yr cfs	10 yr cfs	100 yr cfs
223 <sup>rd</sup> CMPA	11.4	2.6	10.0	19.4	37.4	8.4	1.6	9.7	16.5	29.4
Northwest	13.0	4.1	11.6	21.0	38.6	10.8	6.3	21.5	36.1	62.5
West	12.5	32.4	74.2	146	284	9.8	30.9	41.2	97.3	228
Confluence	12.4	38.8	90.5	176	342	9.3	38.8	66.3	121	272

The results indicate the site would benefit with detention as proposed. The peak runoff at the downstream confluence will be less than existing peak runoff rates for each of the studied storm events.

## 7.0 Permitting Requirements

FIRM Map Panel 20121C0055D indicates a Zone A floodplain clips the extreme southwest corner of the site. There are no improvements or grading proposed within the designated SFHA. However, if changes are made that cause fill in the SFHA, a Flood Plain Development permit will be required by the county and FEMA.

The Kansas Department of Agriculture (KDA) Division of Water Resources (DWR) requires permits for obstructions in streams with contributing drainage areas greater than 640-acres. There are no waterways on-site which contain a drainage area of 640 acres or more.

The U.S. Army Corps of Engineers regulates the placement of fill in all jurisdictional Waters of the U.S.

### 8.0 Conclusion and Recommendations

This report summarizes PEI's stormwater analysis for the Always and Forever Midwest Animal Sanctuary development in Miami County, Kansas. The analysis indicates a wet bottom detention basin with a compound control structure will control peak runoff from the site for the 2-year, 10-year and 100-year storm events to less than the existing conditions at the downstream confluence. We recommend construction of the site with detention as planned.

Please feel free to contact PEI at (913) 393-1155 if you require further questions.

Sincerely,

PHELPS ENGINEERING, INC.



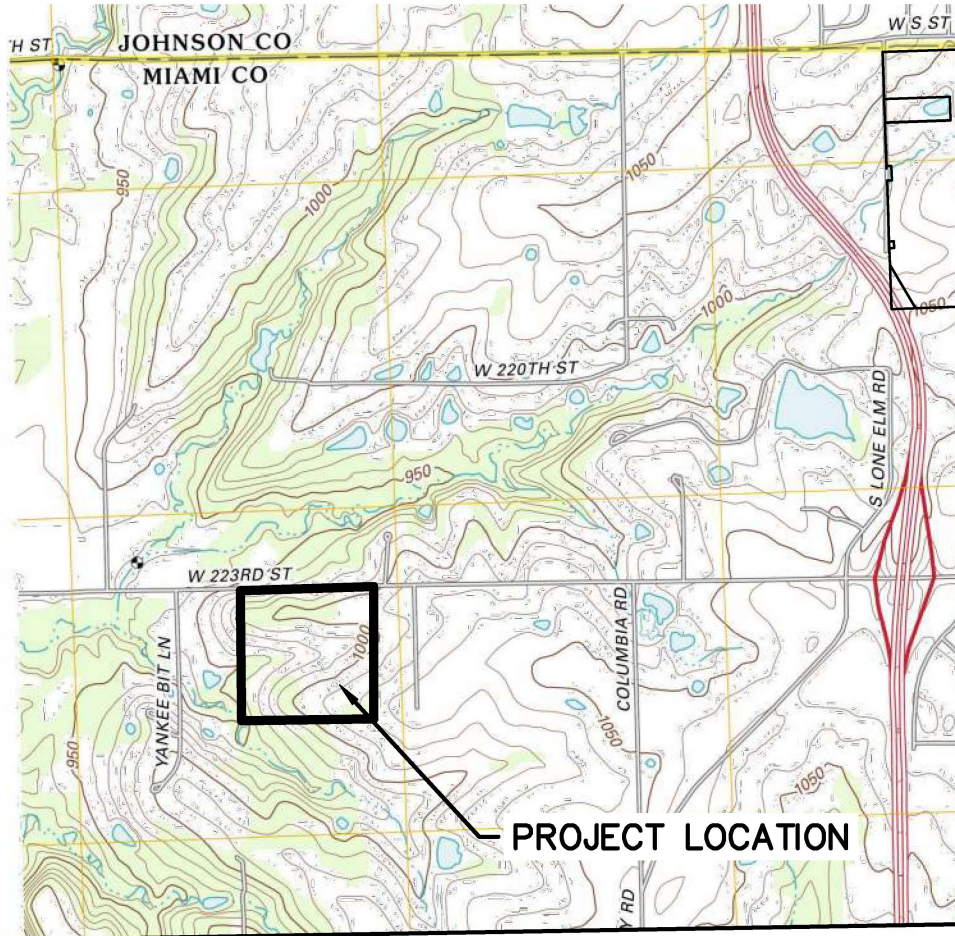
Jason Logsdon., P.E.

**Appendix A**

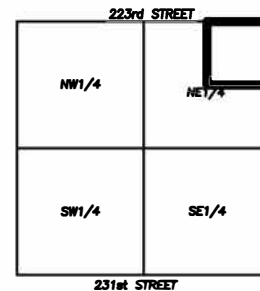
**Project Location Map**

# ALWAYS & FUREVER

NE 1/4, NE 1/4 OF SECTION 28, T. 15 S., R. 23 E.,  
MIAMI COUNTY, KANSAS.



SCALE:  
1"=2000'



**LOCATION MAP**  
**SECTION 28-14-24**

SOURCE: USGS QUADRANGLE – SPRING HILL, KS 2012



**PHELPS ENGINEERING, INC**  
1270 N. Winchester  
Olathe, Kansas 66061

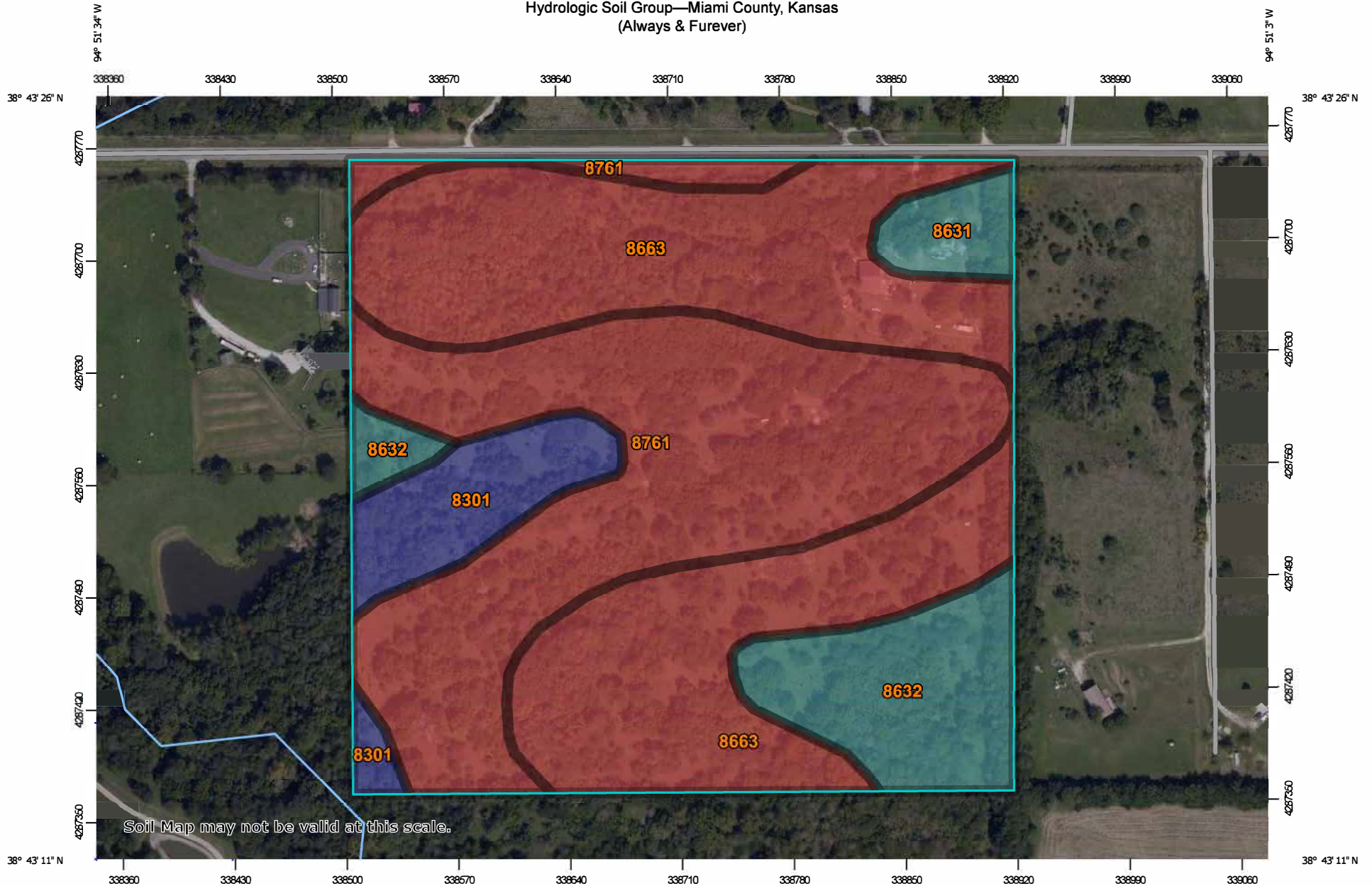
(913) 393-1155  
Fax (913) 393-1166  
www.phelpsengineering.com

PROJECT NO. 220597  
DATE: 7/29/22  
BY: JEL

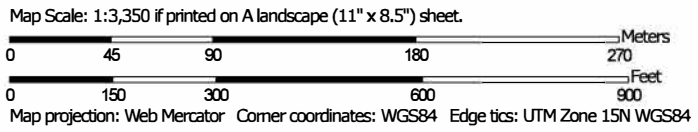
## Appendix B

# NRCS County Soils Map
































Hydrologic Soil Group—Miami County, Kansas  
(Always & Forever)



Soil Map may not be valid at this scale.



## MAP LEGEND

<b>Area of Interest (AOI)</b>		 C	C
Area of Interest (AOI)		 C/D	C/D
<b>Soils</b>		 D	D
<b>Soil Rating Polygons</b>		 Not rated or not available	Not rated or not available
 A	A	<b>Water Features</b>	
 A/D	A/D	 Streams and Canals	Streams and Canals
 B	B	<b>Transportation</b>	
 B/D	B/D	 Rails	Rails
 C	C	 Interstate Highways	Interstate Highways
 C/D	C/D	 US Routes	US Routes
 D	D	 Major Roads	Major Roads
 Not rated or not available	Not rated or not available	 Local Roads	Local Roads
<b>Soil Rating Lines</b>		<b>Background</b>	
 A	A	 Aerial Photography	Aerial Photography
 A/D	A/D		
 B	B		
 B/D	B/D		
 C	C		
 C/D	C/D		
 D	D		
 Not rated or not available	Not rated or not available		
<b>Soil Rating Points</b>			
 A	A		
 A/D	A/D		
 B	B		
 B/D	B/D		

## 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: Miami County, Kansas  
Survey Area Data: Version 22, Sep 14, 2021

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

Date(s) aerial images were photographed: Jul 16, 2019—Sep 23, 2019

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.

## Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
8301	Verdigris silt loam, 0 to 1 percent slopes, frequently flooded	B	2.9	7.2%
8631	Bucyrus silty clay loam, 1 to 3 percent slopes	C	1.2	2.9%
8632	Bucyrus silty clay loam, 3 to 8 percent slopes	C	4.5	11.2%
8663	Clareson-Rock outcrop complex, 3 to 15 percent slopes	D	17.3	42.5%
8761	Eram-Shidler complex, 4 to 15 percent slopes	D	14.7	36.2%
<b>Totals for Area of Interest</b>			<b>40.6</b>	<b>100.0%</b>

## Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

## Rating Options

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff:* None Specified

*Tie-break Rule:* Higher

## Appendix C

# Existing Conditions/Drainage Plan



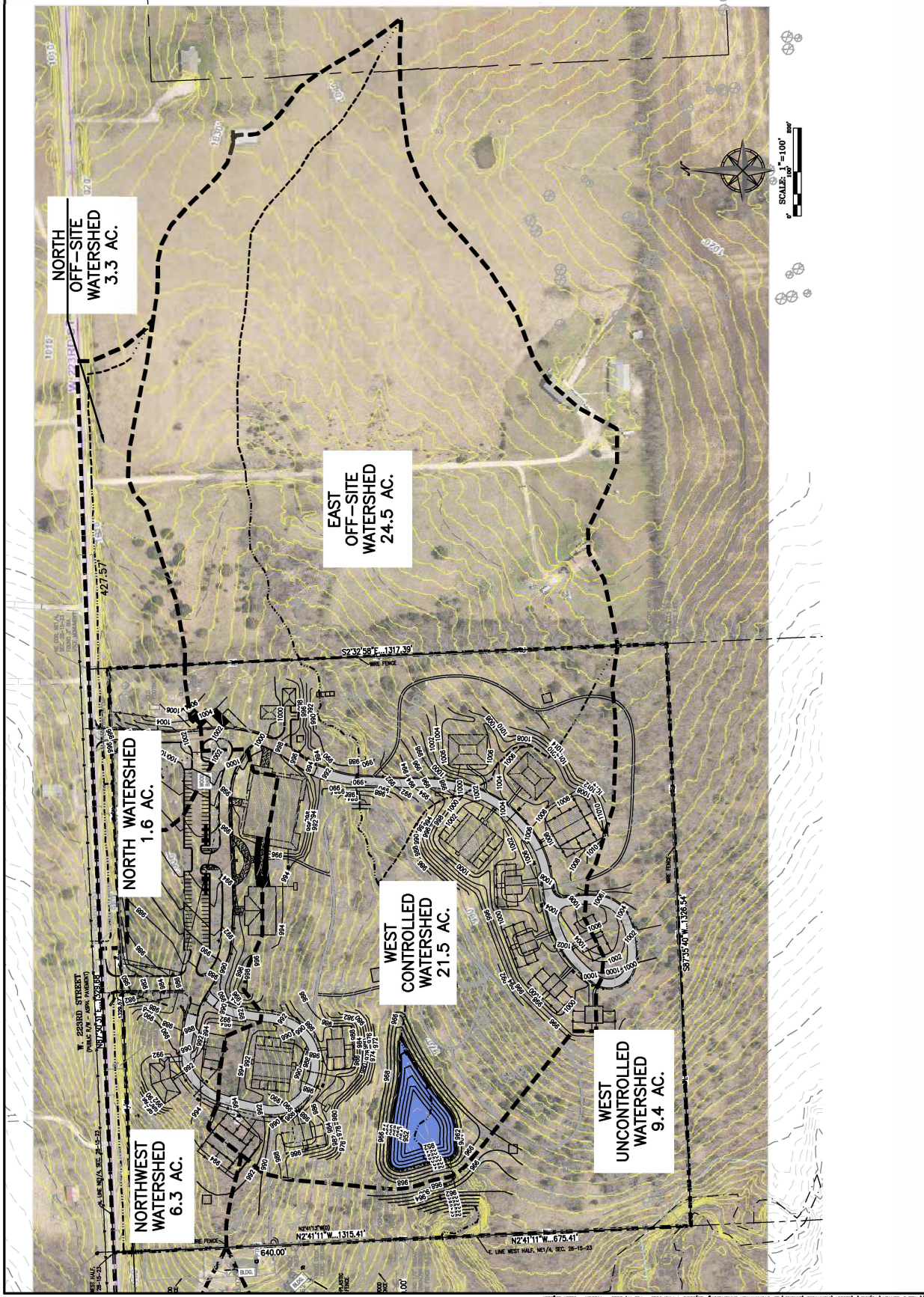
## Appendix D

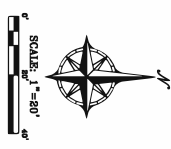
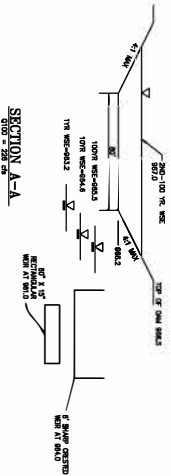
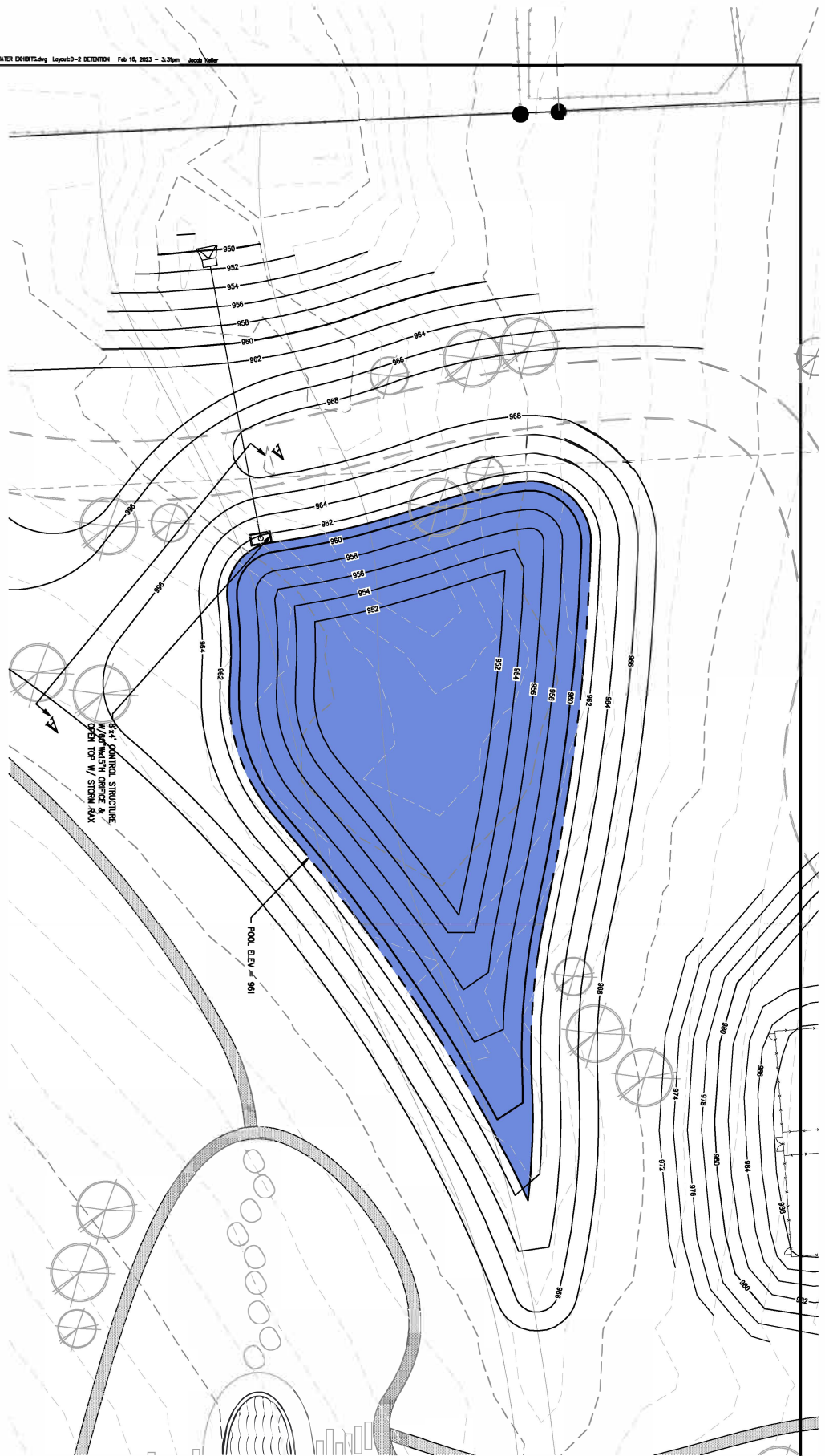
# Proposed Conditions/Drainage Plan

PROJECT NO. 210289	DATE 2/15/23	BY APP
DATE 2/15/23	PER CITY COMMENTS	REV
NO. DATE	REVISIONS	
1	2/15/23	REV CITY COMMENTS
2		
3		
4		
5		
6		
7		
8		
9		
10		

**PROPOSED DRAINAGE MAP**  
ALWAYS & FOREVER ANIMAL SANCTUARY  
23595 W. 223RD STREET

**PEE**  
PLANNING  
ENGINEERING  
CONSULTING  
23595 W. 223RD STREET  
SUITE 100  
DENVER, CO 80233  
TEL: (303) 755-1100  
WWW.PEEENGINEERING.COM





D-2

SHEET

PROJECT NO.	No.	Date	Revisions	By	App.
210299	1	2/16/23	PER CITY COMMENTS	JEL	DEU
CHECKED: DEU APPROVED: DEU DATE: 7/26/19 DRAWN: JEL DATE: 11-19-20 CHECKED: DEU APPROVED: DEU DATE: 06-29-2022					

**DETENTION PLAN**  
 ALWAYS & FOREVER ANIMAL SANCTUARY  
 23595 W. 223RD STREET



## Appendix E

# Downstream Drainage Maps & Calcs



# Culvert Report

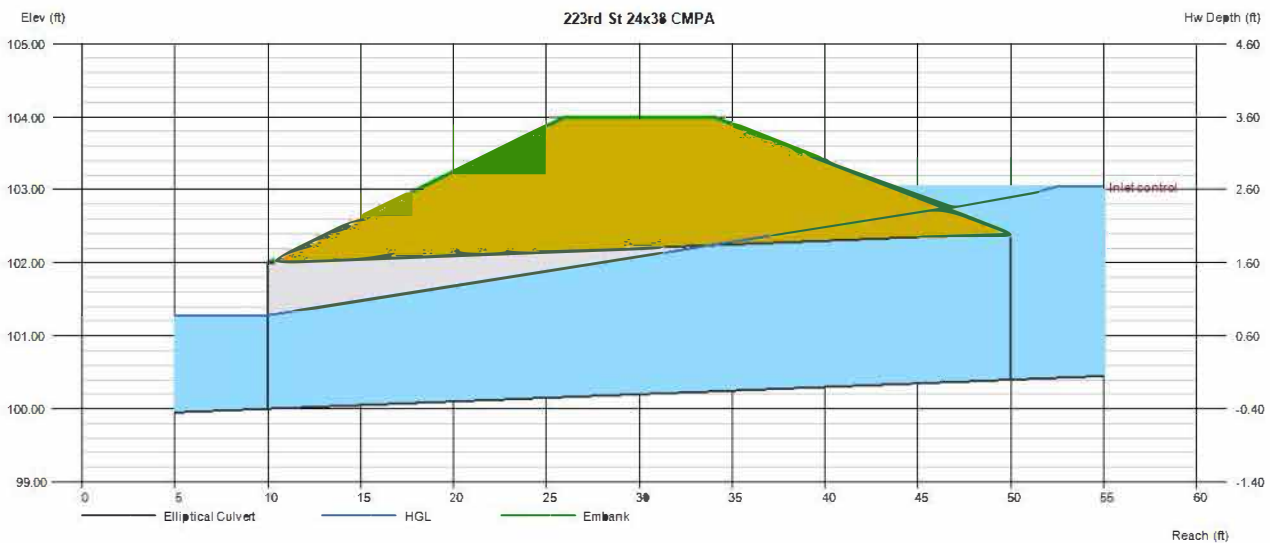
## 223rd St 24x38 CMPA

Invert Elev Dn (ft)	=	100.00
Pipe Length (ft)	=	40.00
Slope (%)	=	1.00
Invert Elev Up (ft)	=	100.40
Rise (in)	=	24.0
Shape	=	Elliptical
Span (in)	=	38.0
No. Barrels	=	1
n-Value	=	0.024
Culvert Type	=	Horizontal Ellipse Concrete
Culvert Entrance	=	Groove end projecting (H)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

<b>Embankment</b>	
Top Elevation (ft)	= 104.00
Top Width (ft)	= 8.00
Crest Width (ft)	= 20.00

<b>Calculations</b>	
Qmin (cfs)	= 10.20
Qmax (cfs)	= 31.00
Tailwater Elev (ft)	= Critical

<b>Highlighted</b>	
Qtotal (cfs)	= 30.60
Qpipe (cfs)	= 30.60
Qovertop (cfs)	= 0.00
Veloc Dn (ft/s)	= 8.79
Veloc Up (ft/s)	= 6.15
HGL Dn (ft)	= 101.28
HGL Up (ft)	= 102.89
Hw Elev (ft)	= 103.04
Hw/D (ft)	= 1.32
Flow Regime	= Inlet Control



# Culvert Report

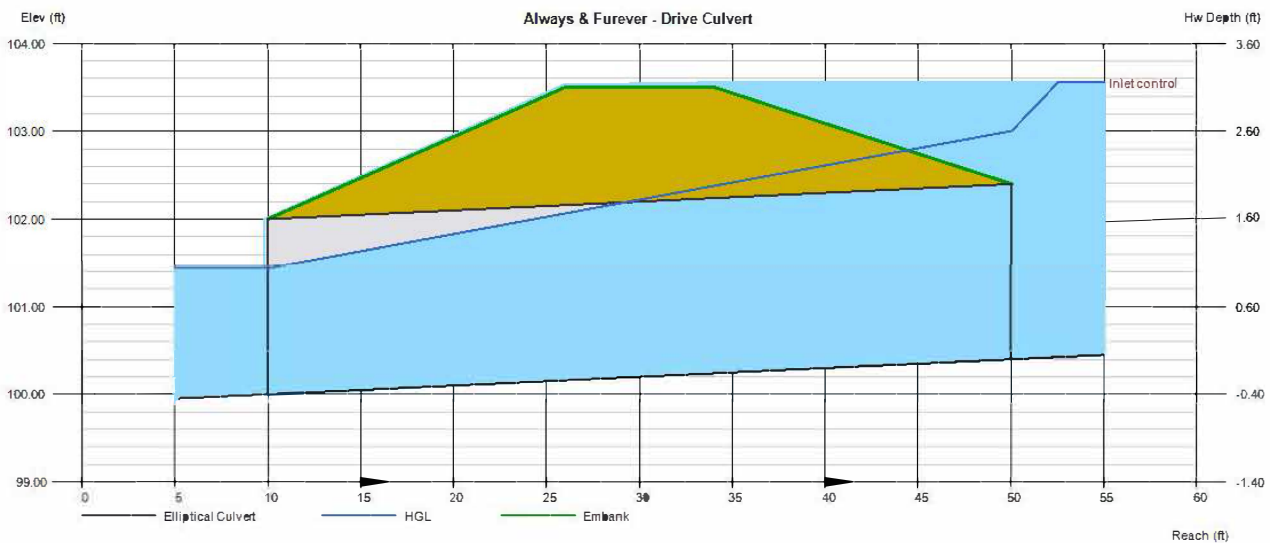
## Always & Furever - Drive Culvert

Invert Elev Dn (ft)	= 100.00
Pipe Length (ft)	= 40.00
Slope (%)	= 1.00
Invert Elev Up (ft)	= 100.40
Rise (in)	= 24.0
Shape	= Elliptical
Span (in)	= 36.0
No. Barrels	= 1
n-Value	= 0.024
Culvert Type	= Horizontal Ellipse Concrete
Culvert Entrance	= Groove end projecting (H)
Coeff. K,M,c,Y,k	= 0.0045, 2, 0.0317, 0.69, 0.2

<b>Embankment</b>	
Top Elevation (ft)	= 103.50
Top Width (ft)	= 8.00
Crest Width (ft)	= 20.00

<b>Calculations</b>	
Qmin (cfs)	= 20.00
Qmax (cfs)	= 37.00
Tailwater Elev (ft)	= Critical

<b>Highlighted</b>	
Qtotal (cfs)	= 36.00
Qpipe (cfs)	= 35.37
Qovertop (cfs)	= 0.63
Veloc Dn (ft/s)	= 8.99
Veloc Up (ft/s)	= 7.51
HGL Dn (ft)	= 101.44
HGL Up (ft)	= 103.00
Hw Elev (ft)	= 103.56
Hw/D (ft)	= 1.58
Flow Regime	= Inlet Control



# Culvert Report

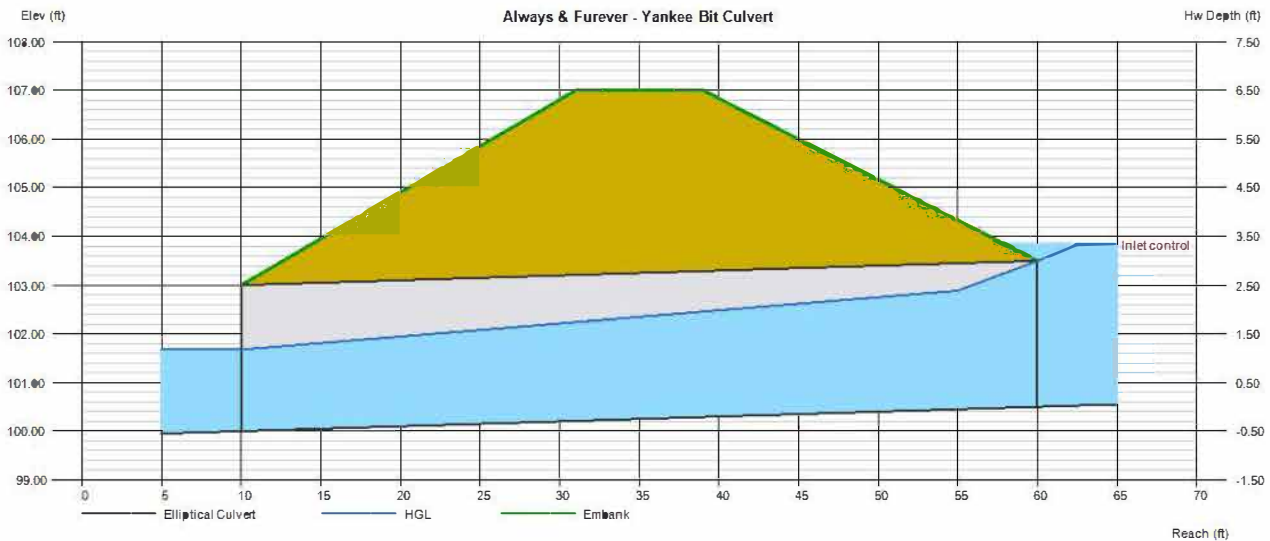
## Always & Furever - Yankee Bit Culvert

Invert Elev Dn (ft)	= 100.00
Pipe Length (ft)	= 50.00
Slope (%)	= 1.00
Invert Elev Up (ft)	= 100.50
Rise (in)	= 36.0
Shape	= Elliptical
Span (in)	= 49.0
No. Barrels	= 1
n-Value	= 0.024
Culvert Type	= Horizontal Ellipse Concrete
Culvert Entrance	= Groove end projecting (H)
Coeff. K,M,c,Y,k	= 0.0045, 2, 0.0317, 0.69, 0.2

<b>Embankment</b>	
Top Elevation (ft)	= 107.00
Top Width (ft)	= 8.00
Crest Width (ft)	= 20.00

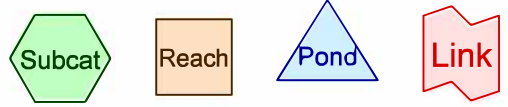
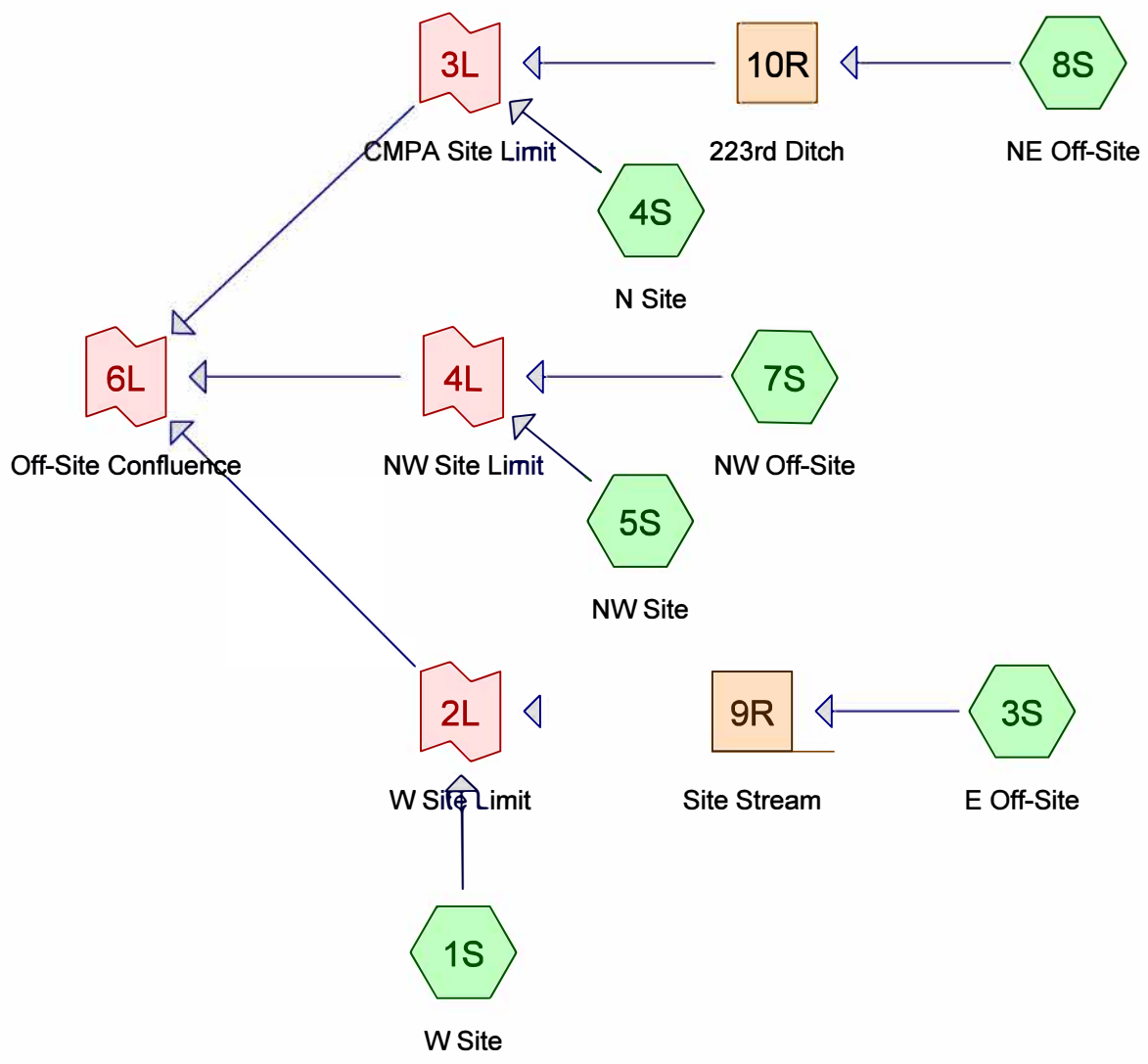
<b>Calculations</b>	
Qmin (cfs)	= 50.00
Qmax (cfs)	= 60.00
Tailwater Elev (ft)	= Critical

<b>Highlighted</b>	
Qtotal (cfs)	= 55.80
Qpipe (cfs)	= 55.80
Qovertop (cfs)	= 0.00
Veloc Dn (ft/s)	= 8.99
Veloc Up (ft/s)	= 6.41
HGL Dn (ft)	= 101.68
HGL Up (ft)	= 103.02
Hw Elev (ft)	= 103.84
Hw/D (ft)	= 1.11
Flow Regime	= Inlet Control



## Appendix F

# HydroCAD Model Outputs



**Routing Diagram for AF Existing Condition**  
 Prepared by {enter your company name here}, Printed 7/29/2022  
 HydroCAD® 10.10-5a s/n 09856 © 2020 HydroCAD Software Solutions LLC

**AF Existing Condition**

MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

Prepared by {enter your company name here}

Printed 7/29/2022

HydroCAD® 10.10-5a s/n 09856 © 2020 HydroCAD Software Solutions LLC

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

<b>Subcatchment 1S: W Site</b>	Runoff Area=32.100 ac 0.00% Impervious Runoff Depth=1.66" Flow Length=1,845' Tc=15.6 min CN=79 Runoff=59.94 cfs 4.440 af
<b>Subcatchment 3S: E Off-Site</b>	Runoff Area=24.500 ac 0.00% Impervious Runoff Depth=1.73" Flow Length=1,615' Tc=24.6 min CN=80 Runoff=37.75 cfs 3.536 af
<b>Subcatchment 4S: N Site</b>	Runoff Area=2.600 ac 0.00% Impervious Runoff Depth=1.66" Flow Length=620' Tc=9.7 min CN=79 Runoff=5.97 cfs 0.360 af
<b>Subcatchment 5S: NW Site</b>	Runoff Area=4.100 ac 0.00% Impervious Runoff Depth=1.66" Flow Length=815' Tc=8.1 min CN=79 Runoff=10.10 cfs 0.567 af
<b>Subcatchment 7S: NW Off-Site</b>	Runoff Area=0.700 ac 50.00% Impervious Runoff Depth=2.85" Flow Length=630' Tc=1.4 min CN=93 Runoff=3.39 cfs 0.166 af
<b>Subcatchment 8S: NE Off-Site</b>	Runoff Area=3.300 ac 0.00% Impervious Runoff Depth=1.73" Flow Length=880' Tc=15.3 min CN=80 Runoff=6.50 cfs 0.476 af
<b>Reach 9R: Site Stream</b>	Avg. Flow Depth=1.22' Max Vel=5.39 fps Inflow=37.75 cfs 3.536 af n=0.040 L=1,690.0' S=0.0290 '/ Capacity=770.07 cfs Outflow=35.86 cfs 3.536 af
<b>Reach 10R: 223rd Ditch</b>	Avg. Flow Depth=0.85' Max Vel=4.36 fps Inflow=6.50 cfs 0.476 af n=0.030 L=640.0' S=0.0280 '/ Capacity=181.48 cfs Outflow=6.32 cfs 0.476 af
<b>Link 2L: W Site Limit</b>	Inflow=74.22 cfs 7.976 af Primary=74.22 cfs 7.976 af
<b>Link 3L: CMPA Site Limit</b>	Inflow=10.05 cfs 0.836 af Primary=10.05 cfs 0.836 af
<b>Link 4L: NW Site Limit</b>	Inflow=11.56 cfs 0.733 af Primary=11.56 cfs 0.733 af
<b>Link 6L: Off-Site Confluence</b>	Inflow=90.46 cfs 9.546 af Primary=90.46 cfs 9.546 af

**Total Runoff Area = 67.300 ac Runoff Volume = 9.546 af Average Runoff Depth = 1.70"**  
**99.48% Pervious = 66.950 ac 0.52% Impervious = 0.350 ac**

**AF Existing Condition**

MSE 24-hr 4 10-Yr Miami KS Rainfall=5.37"

Prepared by {enter your company name here}

Printed 7/29/2022

HydroCAD® 10.10-5a s/n 09856 © 2020 HydroCAD Software Solutions LLC

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

<b>Subcatchment 1S: W Site</b>	Runoff Area=32.100 ac 0.00% Impervious Runoff Depth=3.12" Flow Length=1,845' Tc=15.6 min CN=79 Runoff=113.05 cfs 8.353 af
<b>Subcatchment 3S: E Off-Site</b>	Runoff Area=24.500 ac 0.00% Impervious Runoff Depth=3.22" Flow Length=1,615' Tc=24.6 min CN=80 Runoff=70.38 cfs 6.570 af
<b>Subcatchment 4S: N Site</b>	Runoff Area=2.600 ac 0.00% Impervious Runoff Depth=3.12" Flow Length=620' Tc=9.7 min CN=79 Runoff=11.20 cfs 0.677 af
<b>Subcatchment 5S: NW Site</b>	Runoff Area=4.100 ac 0.00% Impervious Runoff Depth=3.12" Flow Length=815' Tc=8.1 min CN=79 Runoff=18.88 cfs 1.067 af
<b>Subcatchment 7S: NW Off-Site</b>	Runoff Area=0.700 ac 50.00% Impervious Runoff Depth=4.56" Flow Length=630' Tc=1.4 min CN=93 Runoff=5.23 cfs 0.266 af
<b>Subcatchment 8S: NE Off-Site</b>	Runoff Area=3.300 ac 0.00% Impervious Runoff Depth=3.22" Flow Length=880' Tc=15.3 min CN=80 Runoff=12.07 cfs 0.885 af
<b>Reach 9R: Site Stream</b>	Avg. Flow Depth=1.67' Max Vel=6.38 fps Inflow=70.38 cfs 6.570 af n=0.040 L=1,690.0' S=0.0290 '/ Capacity=770.07 cfs Outflow=67.76 cfs 6.570 af
<b>Reach 10R: 223rd Ditch</b>	Avg. Flow Depth=1.08' Max Vel=5.09 fps Inflow=12.07 cfs 0.885 af n=0.030 L=640.0' S=0.0280 '/ Capacity=181.48 cfs Outflow=11.81 cfs 0.885 af
<b>Link 2L: W Site Limit</b>	Inflow=145.94 cfs 14.923 af Primary=145.94 cfs 14.923 af
<b>Link 3L: CMPA Site Limit</b>	Inflow=19.43 cfs 1.562 af Primary=19.43 cfs 1.562 af
<b>Link 4L: NW Site Limit</b>	Inflow=20.97 cfs 1.333 af Primary=20.97 cfs 1.333 af
<b>Link 6L: Off-Site Confluence</b>	Inflow=176.35 cfs 17.818 af Primary=176.35 cfs 17.818 af

**Total Runoff Area = 67.300 ac Runoff Volume = 17.818 af Average Runoff Depth = 3.18"**  
**99.48% Pervious = 66.950 ac 0.52% Impervious = 0.350 ac**

**AF Existing Condition**

MSE 24-hr 4 100-Yr Miami KS Rainfall=8.52"

Prepared by {enter your company name here}

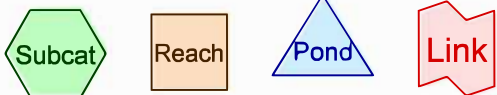
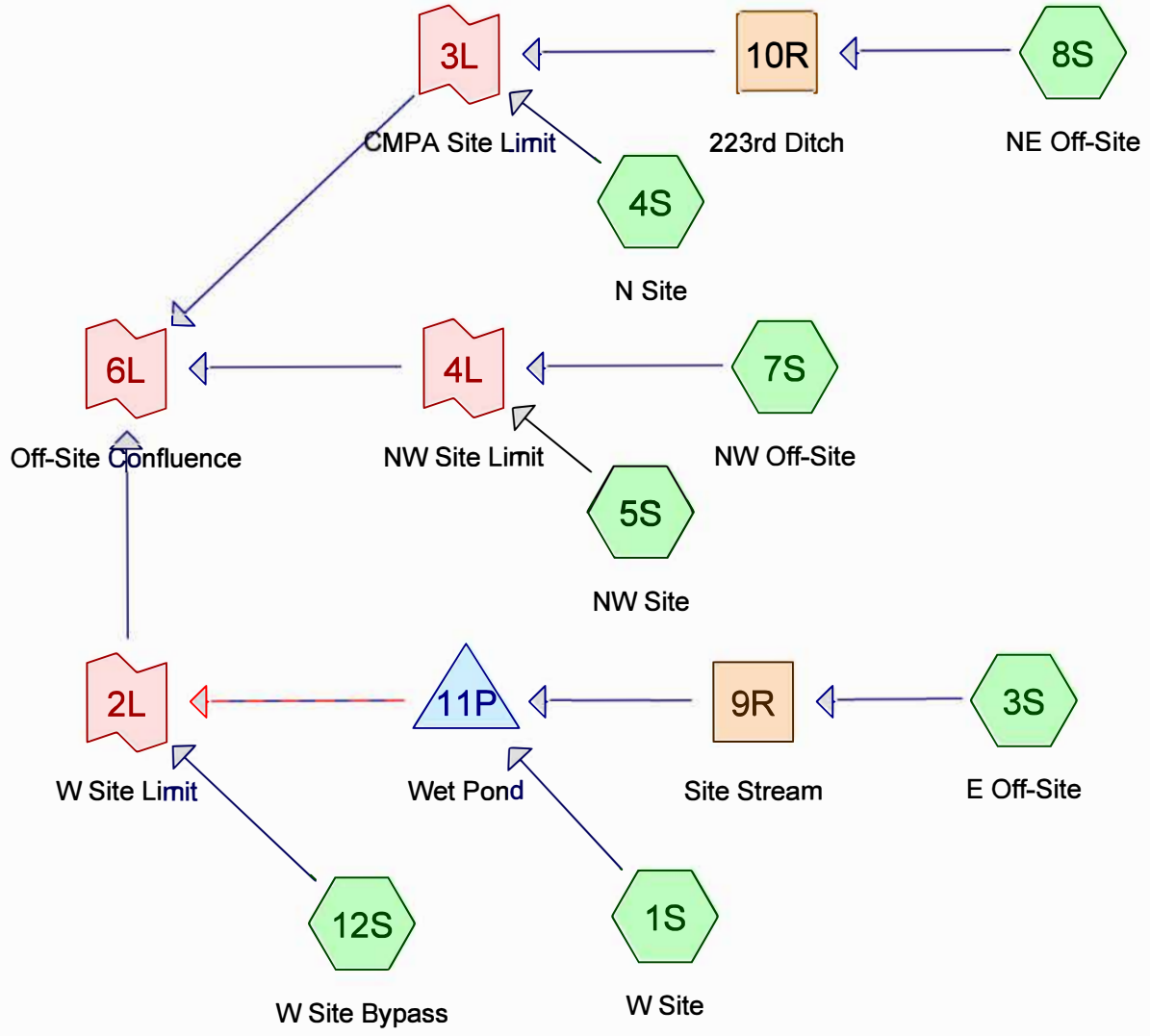
Printed 7/29/2022

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Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

<b>Subcatchment 1S: W Site</b>	Runoff Area=32.100 ac 0.00% Impervious Runoff Depth=5.99" Flow Length=1,845' Tc=15.6 min CN=79 Runoff=213.20 cfs 16.033 af
<b>Subcatchment 3S: E Off-Site</b>	Runoff Area=24.500 ac 0.00% Impervious Runoff Depth=6.11" Flow Length=1,615' Tc=24.6 min CN=80 Runoff=131.63 cfs 12.483 af
<b>Subcatchment 4S: N Site</b>	Runoff Area=2.600 ac 0.00% Impervious Runoff Depth=5.99" Flow Length=620' Tc=9.7 min CN=79 Runoff=21.01 cfs 1.299 af
<b>Subcatchment 5S: NW Site</b>	Runoff Area=4.100 ac 0.00% Impervious Runoff Depth=5.99" Flow Length=815' Tc=8.1 min CN=79 Runoff=35.33 cfs 2.048 af
<b>Subcatchment 7S: NW Off-Site</b>	Runoff Area=0.700 ac 50.00% Impervious Runoff Depth=7.68" Flow Length=630' Tc=1.4 min CN=93 Runoff=8.49 cfs 0.448 af
<b>Subcatchment 8S: NE Off-Site</b>	Runoff Area=3.300 ac 0.00% Impervious Runoff Depth=6.11" Flow Length=880' Tc=15.3 min CN=80 Runoff=22.49 cfs 1.681 af
<b>Reach 9R: Site Stream</b>	Avg. Flow Depth=2.26' Max Vel=7.52 fps Inflow=131.63 cfs 12.483 af n=0.040 L=1,690.0' S=0.0290 '/ Capacity=770.07 cfs Outflow=128.03 cfs 12.483 af
<b>Reach 10R: 223rd Ditch</b>	Avg. Flow Depth=1.36' Max Vel=5.96 fps Inflow=22.49 cfs 1.681 af n=0.030 L=640.0' S=0.0280 '/ Capacity=181.48 cfs Outflow=22.14 cfs 1.681 af
<b>Link 2L: W Site Limit</b>	Inflow=284.47 cfs 28.516 af Primary=284.47 cfs 28.516 af
<b>Link 3L: CMPA Site Limit</b>	Inflow=37.40 cfs 2.980 af Primary=37.40 cfs 2.980 af
<b>Link 4L: NW Site Limit</b>	Inflow=38.58 cfs 2.496 af Primary=38.58 cfs 2.496 af
<b>Link 6L: Off-Site Confluence</b>	Inflow=341.55 cfs 33.992 af Primary=341.55 cfs 33.992 af

**Total Runoff Area = 67.300 ac Runoff Volume = 33.992 af Average Runoff Depth = 6.06"**  
**99.48% Pervious = 66.950 ac 0.52% Impervious = 0.350 ac**



**Routing Diagram for AF Proposed Condition**  
 Prepared by {enter your company name here}, Printed 7/29/2022  
 HydroCAD® 10.10-5a s/n 09856 © 2020 HydroCAD Software Solutions LLC

**AF Proposed Condition**

MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

Prepared by Phelps Engineering, Inc.

Printed 2/16/2023

HydroCAD® 10.10-5a s/n 09856 © 2020 HydroCAD Software Solutions LLC

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: W Site** Runoff Area=21.500 ac 16.28% Impervious Runoff Depth=1.81"  
 Flow Length=1,135' Tc=14.6 min UI Adjusted CN=81 Runoff=45.23 cfs 3.236 af

**Subcatchment 3S: E Off-Site** Runoff Area=24.500 ac 0.00% Impervious Runoff Depth=1.73"  
 Flow Length=1,615' Tc=24.6 min CN=80 Runoff=37.75 cfs 3.536 af

**Subcatchment 4S: N Site** Runoff Area=1.700 ac 64.71% Impervious Runoff Depth=2.75"  
 Flow Length=720' Tc=2.6 min CN=92 Runoff=7.96 cfs 0.390 af

**Subcatchment 5S: NW Site** Runoff Area=6.300 ac 34.92% Impervious Runoff Depth=2.20"  
 Flow Length=815' Tc=8.1 min CN=86 Runoff=20.40 cfs 1.158 af

**Subcatchment 7S: NW Off-Site** Runoff Area=0.700 ac 50.00% Impervious Runoff Depth=2.85"  
 Flow Length=630' Tc=1.4 min CN=93 Runoff=3.39 cfs 0.166 af

**Subcatchment 8S: NE Off-Site** Runoff Area=3.300 ac 0.00% Impervious Runoff Depth=1.73"  
 Flow Length=880' Tc=15.3 min CN=80 Runoff=6.50 cfs 0.476 af

**Subcatchment 12S: W Site Bypass** Runoff Area=9.400 ac 12.77% Impervious Runoff Depth=1.81"  
 Flow Length=530' Tc=9.5 min UI Adjusted CN=81 Runoff=23.78 cfs 1.415 af

**Reach 9R: Site Stream** Avg. Flow Depth=1.22' Max Vel=5.39 fps Inflow=37.75 cfs 3.536 af  
 n=0.040 L=1,690.0' S=0.0290 '/ Capacity=770.07 cfs Outflow=35.86 cfs 3.536 af

**Reach 10R: 223rd Ditch** Avg. Flow Depth=0.85' Max Vel=4.36 fps Inflow=6.50 cfs 0.476 af  
 n=0.030 L=640.0' S=0.0280 '/ Capacity=181.48 cfs Outflow=6.32 cfs 0.476 af

**Pond 11P: Wet Pond** Inflow=58.51 cfs 6.773 af  
 Primary=58.51 cfs 6.773 af

**Link 2L: W Site Limit** Inflow=76.86 cfs 8.187 af  
 Primary=76.86 cfs 8.187 af

**Link 3L: CMPA Site Limit** Inflow=10.17 cfs 0.866 af  
 Primary=10.17 cfs 0.866 af

**Link 4L: NW Site Limit** Inflow=21.48 cfs 1.324 af  
 Primary=21.48 cfs 1.324 af

**Link 6L: Off-Site Confluence** Inflow=101.12 cfs 10.377 af  
 Primary=101.12 cfs 10.377 af

**Total Runoff Area = 67.400 ac Runoff Volume = 10.377 af Average Runoff Depth = 1.85"**  
**87.61% Pervious = 59.050 ac 12.39% Impervious = 8.350 ac**

**AF Proposed Condition**

MSE 24-hr 4 10-Yr Miami KS Rainfall=5.37"

Prepared by Phelps Engineering, Inc.

Printed 2/16/2023

HydroCAD® 10.10-5a s/n 09856 © 2020 HydroCAD Software Solutions LLC

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: W Site** Runoff Area=21.500 ac 16.28% Impervious Runoff Depth=3.31"  
 Flow Length=1,135' Tc=14.6 min UI Adjusted CN=81 Runoff=82.70 cfs 5.938 af

**Subcatchment 3S: E Off-Site** Runoff Area=24.500 ac 0.00% Impervious Runoff Depth=3.22"  
 Flow Length=1,615' Tc=24.6 min CN=80 Runoff=70.38 cfs 6.570 af

**Subcatchment 4S: N Site** Runoff Area=1.700 ac 64.71% Impervious Runoff Depth=4.45"  
 Flow Length=720' Tc=2.6 min CN=92 Runoff=12.43 cfs 0.631 af

**Subcatchment 5S: NW Site** Runoff Area=6.300 ac 34.92% Impervious Runoff Depth=3.81"  
 Flow Length=815' Tc=8.1 min CN=86 Runoff=34.47 cfs 2.002 af

**Subcatchment 7S: NW Off-Site** Runoff Area=0.700 ac 50.00% Impervious Runoff Depth=4.56"  
 Flow Length=630' Tc=1.4 min CN=93 Runoff=5.23 cfs 0.266 af

**Subcatchment 8S: NE Off-Site** Runoff Area=3.300 ac 0.00% Impervious Runoff Depth=3.22"  
 Flow Length=880' Tc=15.3 min CN=80 Runoff=12.07 cfs 0.885 af

**Subcatchment 12S: W Site Bypass** Runoff Area=9.400 ac 12.77% Impervious Runoff Depth=3.31"  
 Flow Length=530' Tc=9.5 min UI Adjusted CN=81 Runoff=43.22 cfs 2.596 af

**Reach 9R: Site Stream** Avg. Flow Depth=1.67' Max Vel=6.38 fps Inflow=70.38 cfs 6.570 af  
 n=0.040 L=1,690.0' S=0.0290 '/ Capacity=770.07 cfs Outflow=67.76 cfs 6.570 af

**Reach 10R: 223rd Ditch** Avg. Flow Depth=1.08' Max Vel=5.09 fps Inflow=12.07 cfs 0.885 af  
 n=0.030 L=640.0' S=0.0280 '/ Capacity=181.48 cfs Outflow=11.81 cfs 0.885 af

**Pond 11P: Wet Pond** Inflow=113.93 cfs 12.509 af  
 Primary=113.93 cfs 12.509 af

**Link 2L: W Site Limit** Inflow=146.44 cfs 15.105 af  
 Primary=146.44 cfs 15.105 af

**Link 3L: CMPA Site Limit** Inflow=17.28 cfs 1.516 af  
 Primary=17.28 cfs 1.516 af

**Link 4L: NW Site Limit** Inflow=36.14 cfs 2.268 af  
 Primary=36.14 cfs 2.268 af

**Link 6L: Off-Site Confluence** Inflow=188.25 cfs 18.889 af  
 Primary=188.25 cfs 18.889 af

**Total Runoff Area = 67.400 ac Runoff Volume = 18.889 af Average Runoff Depth = 3.36"**  
**87.61% Pervious = 59.050 ac 12.39% Impervious = 8.350 ac**

**AF Proposed Condition**

MSE 24-hr 4 100-Yr Miami KS Rainfall=8.52"

Prepared by Phelps Engineering, Inc.

Printed 2/16/2023

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Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: W Site** Runoff Area=21.500 ac 16.28% Impervious Runoff Depth=6.23"  
 Flow Length=1,135' Tc=14.6 min UI Adjusted CN=81 Runoff=152.18 cfs 11.170 af

**Subcatchment 3S: E Off-Site** Runoff Area=24.500 ac 0.00% Impervious Runoff Depth=6.11"  
 Flow Length=1,615' Tc=24.6 min CN=80 Runoff=131.63 cfs 12.483 af

**Subcatchment 4S: N Site** Runoff Area=1.700 ac 64.71% Impervious Runoff Depth=7.56"  
 Flow Length=720' Tc=2.6 min CN=92 Runoff=20.35 cfs 1.071 af

**Subcatchment 5S: NW Site** Runoff Area=6.300 ac 34.92% Impervious Runoff Depth=6.84"  
 Flow Length=815' Tc=8.1 min CN=86 Runoff=59.73 cfs 3.589 af

**Subcatchment 7S: NW Off-Site** Runoff Area=0.700 ac 50.00% Impervious Runoff Depth=7.68"  
 Flow Length=630' Tc=1.4 min CN=93 Runoff=8.49 cfs 0.448 af

**Subcatchment 8S: NE Off-Site** Runoff Area=3.300 ac 0.00% Impervious Runoff Depth=6.11"  
 Flow Length=880' Tc=15.3 min CN=80 Runoff=22.49 cfs 1.681 af

**Subcatchment 12S: W Site Bypass** Runoff Area=9.400 ac 12.77% Impervious Runoff Depth=6.23"  
 Flow Length=530' Tc=9.5 min UI Adjusted CN=81 Runoff=79.13 cfs 4.884 af

**Reach 9R: Site Stream** Avg. Flow Depth=2.26' Max Vel=7.52 fps Inflow=131.63 cfs 12.483 af  
 n=0.040 L=1,690.0' S=0.0290 '/ Capacity=770.07 cfs Outflow=128.03 cfs 12.483 af

**Reach 10R: 223rd Ditch** Avg. Flow Depth=1.36' Max Vel=5.96 fps Inflow=22.49 cfs 1.681 af  
 n=0.030 L=640.0' S=0.0280 '/ Capacity=181.48 cfs Outflow=22.14 cfs 1.681 af

**Pond 11P: Wet Pond** Inflow=220.75 cfs 23.653 af  
 Primary=220.75 cfs 23.653 af

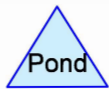
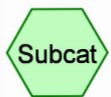
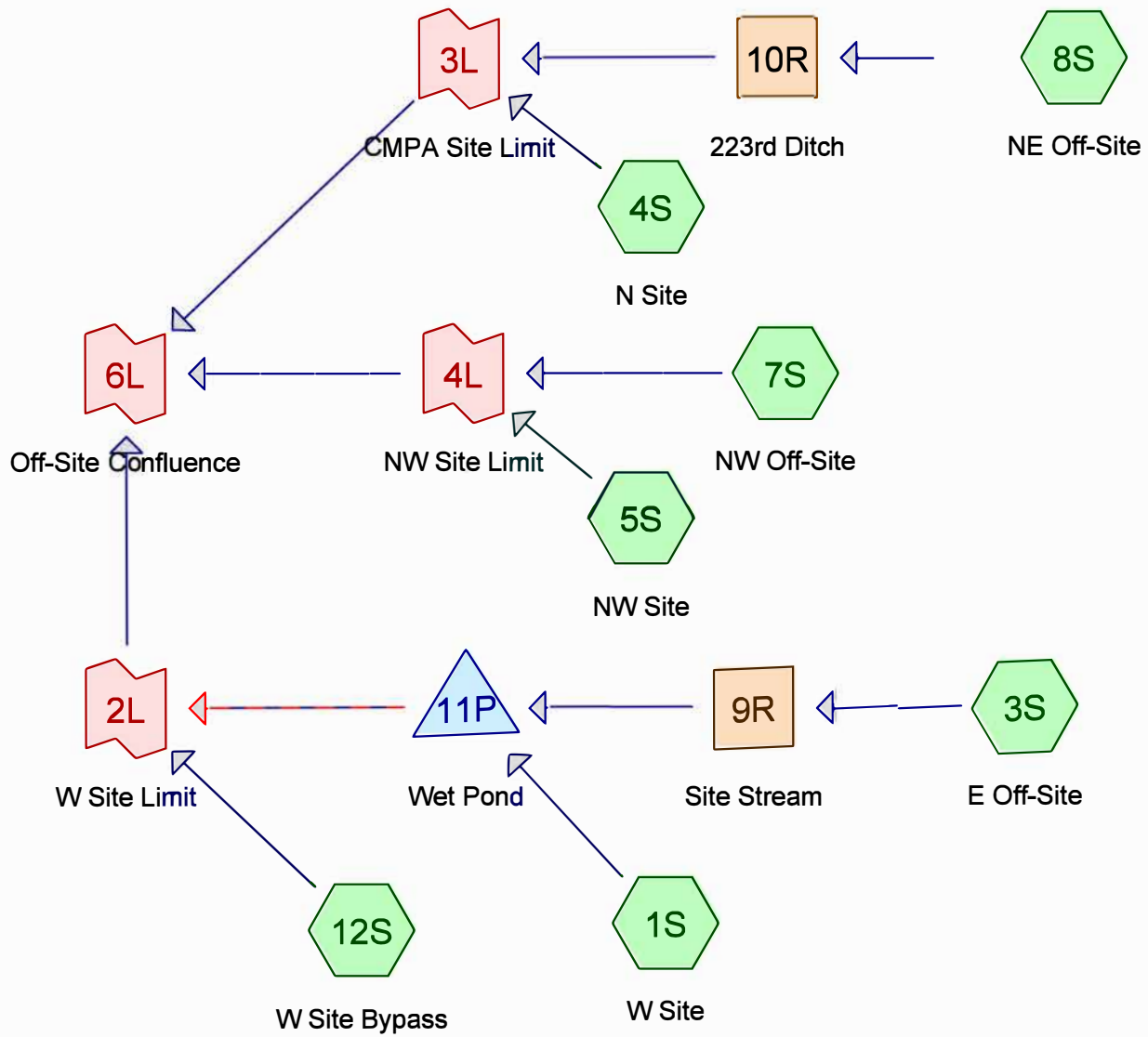
**Link 2L: W Site Limit** Inflow=279.28 cfs 28.537 af  
 Primary=279.28 cfs 28.537 af

**Link 3L: CMPA Site Limit** Inflow=30.55 cfs 2.752 af  
 Primary=30.55 cfs 2.752 af

**Link 4L: NW Site Limit** Inflow=62.45 cfs 4.037 af  
 Primary=62.45 cfs 4.037 af

**Link 6L: Off-Site Confluence** Inflow=353.23 cfs 35.326 af  
 Primary=353.23 cfs 35.326 af

**Total Runoff Area = 67.400 ac Runoff Volume = 35.326 af Average Runoff Depth = 6.29"**  
**87.61% Pervious = 59.050 ac 12.39% Impervious = 8.350 ac**



**Routing Diagram for AF Prop w Det Condition**  
 Prepared by {enter your company name here}, Printed 7/28/2022  
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# AF Prop w Det Condition

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Page 1

## Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Yr Miami KS	MSE 24-hr	4	Default	24.00	1	3.62	2
2	10-Yr Miami KS	MSE 24-hr	4	Default	24.00	1	5.37	2
3	100-Yr Miami KS	MSE 24-hr	4	Default	24.00	1	8.52	2

# AF Prop w Det Condition

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## Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
30.800	80	>75% Grass cover, Good, HSG D (1S, 4S, 5S, 12S)
27.800	80	Pasture/grassland/range, Good, HSG D (3S, 8S)
0.700	93	Paved roads w/open ditches, 50% imp, HSG D (7S)
8.000	98	Unconnected pavement, HSG D (1S, 4S, 5S, 12S)
<b>67.300</b>	<b>82</b>	<b>TOTAL AREA</b>

# AF Prop w Det Condition

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## Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
67.300	HSG D	1S, 3S, 4S, 5S, 7S, 8S, 12S
0.000	Other	
<b>67.300</b>		<b>TOTAL AREA</b>

# AF Prop w Det Condition

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## Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatch Numbers
0.000	0.000	0.000	30.800	0.000	30.800	>75% Grass cover, Good	
0.000	0.000	0.000	27.800	0.000	27.800	Pasture/grassland/range, Good	
0.000	0.000	0.000	0.700	0.000	0.700	Paved roads w/open ditches, 50% imp	
0.000	0.000	0.000	8.000	0.000	8.000	Unconnected pavement	
<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>67.300</b>	<b>0.000</b>	<b>67.300</b>	<b>TOTAL AREA</b>	

# AF Prop w Det Condition

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MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

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## Summary for Subcatchment 1S: W Site

Runoff = 45.23 cfs @ 12.23 hrs, Volume= 3.236 af, Depth= 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

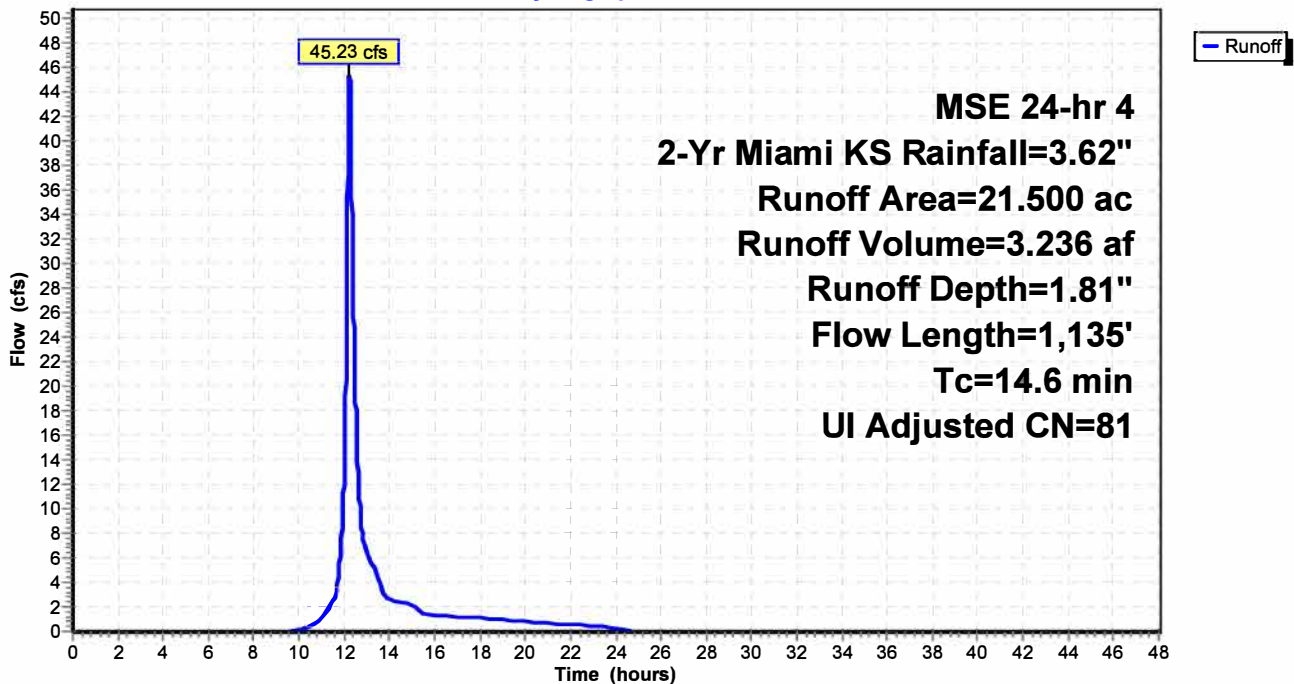
Area (ac)	CN	Adj	Description
18.000	80		>75% Grass cover, Good, HSG D
3.500	98		Unconnected pavement, HSG D
21.500	83	81	Weighted Average, UI Adjusted
18.000			83.72% Pervious Area
3.500			16.28% Impervious Area
3.500			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	100	0.0400	0.24		<b>Sheet Flow, Sheet</b> Grass: Short n= 0.150 P2= 3.60"
7.2	745	0.0600	1.71		<b>Shallow Concentrated Flow, Shallow</b> Short Grass Pasture Kv= 7.0 fps
0.4	290	0.0300	12.05	783.31	<b>Trap/Vee/Rect Channel Flow, Channel</b> Bot.W=3.00' D=5.00' Z= 2.0 '/' Top.W=23.00' n= 0.040
14.6	1,135	Total			

## Subcatchment 1S: W Site

### Hydrograph



**AF Prop w Det Condition**

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MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

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**Summary for Subcatchment 3S: E Off-Site**

Runoff = 37.75 cfs @ 12.36 hrs, Volume= 3.536 af, Depth= 1.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

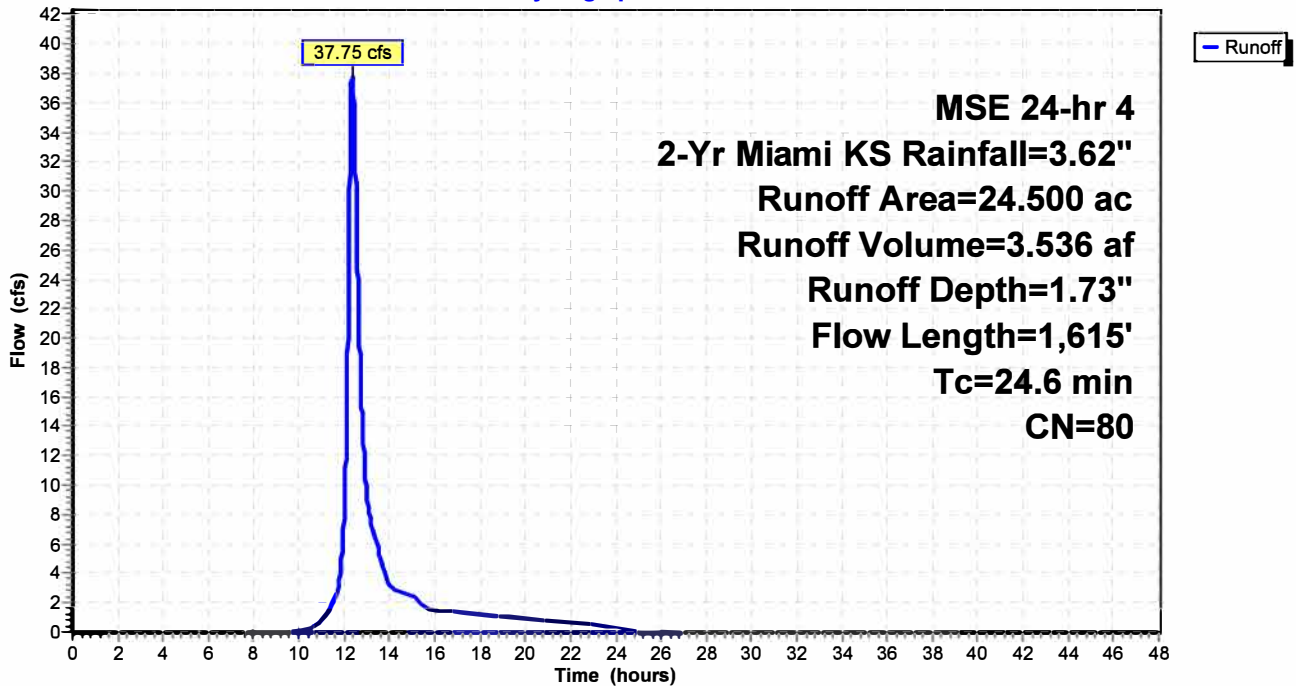
Area (ac)	CN	Description
24.500	80	Pasture/grassland/range, Good, HSG D
24.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	100	0.0220	0.19		<b>Sheet Flow, Sheet</b> Grass: Short n= 0.150 P2= 3.60"
14.6	1,060	0.0300	1.21		<b>Shallow Concentrated Flow, Shallow</b> Short Grass Pasture Kv= 7.0 fps
1.1	455		7.00		<b>Direct Entry, LxV 1</b>
24.6	1,615	Total			

**Subcatchment 3S: E Off-Site**

Hydrograph



**AF Prop w Det Condition**

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MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

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**Summary for Subcatchment 4S: N Site**

Runoff = 7.49 cfs @ 12.10 hrs, Volume= 0.367 af, Depth= 2.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

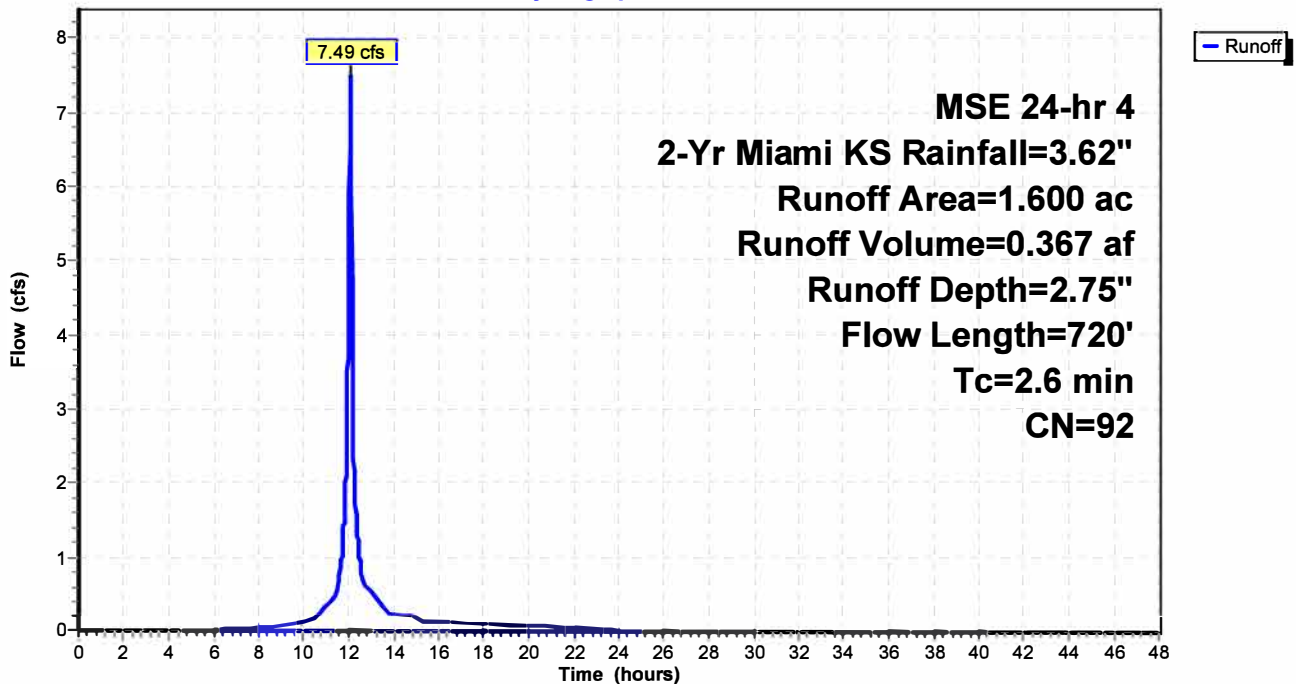
Area (ac)	CN	Description
0.500	80	>75% Grass cover, Good, HSG D
1.100	98	Unconnected pavement, HSG D
1.600	92	Weighted Average
0.500		31.25% Pervious Area
1.100		68.75% Impervious Area
1.100		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	100	0.0300	1.72		<b>Sheet Flow, Sheet</b> Smooth surfaces n= 0.011 P2= 3.60"
1.0	240	0.0400	4.06		<b>Shallow Concentrated Flow, Shallow</b> Paved Kv= 20.3 fps
0.6	380	0.0280	10.08	181.48	<b>Trap/Vee/Rect Channel Flow, Ditch</b> Bot.W=0.00' D=3.00' Z= 2.0 '/' Top.W=12.00' n= 0.030
2.6	720	Total			

**Subcatchment 4S: N Site**

Hydrograph



**AF Prop w Det Condition**

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MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

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**Summary for Subcatchment 5S: NW Site**

Runoff = 20.40 cfs @ 12.15 hrs, Volume= 1.158 af, Depth= 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

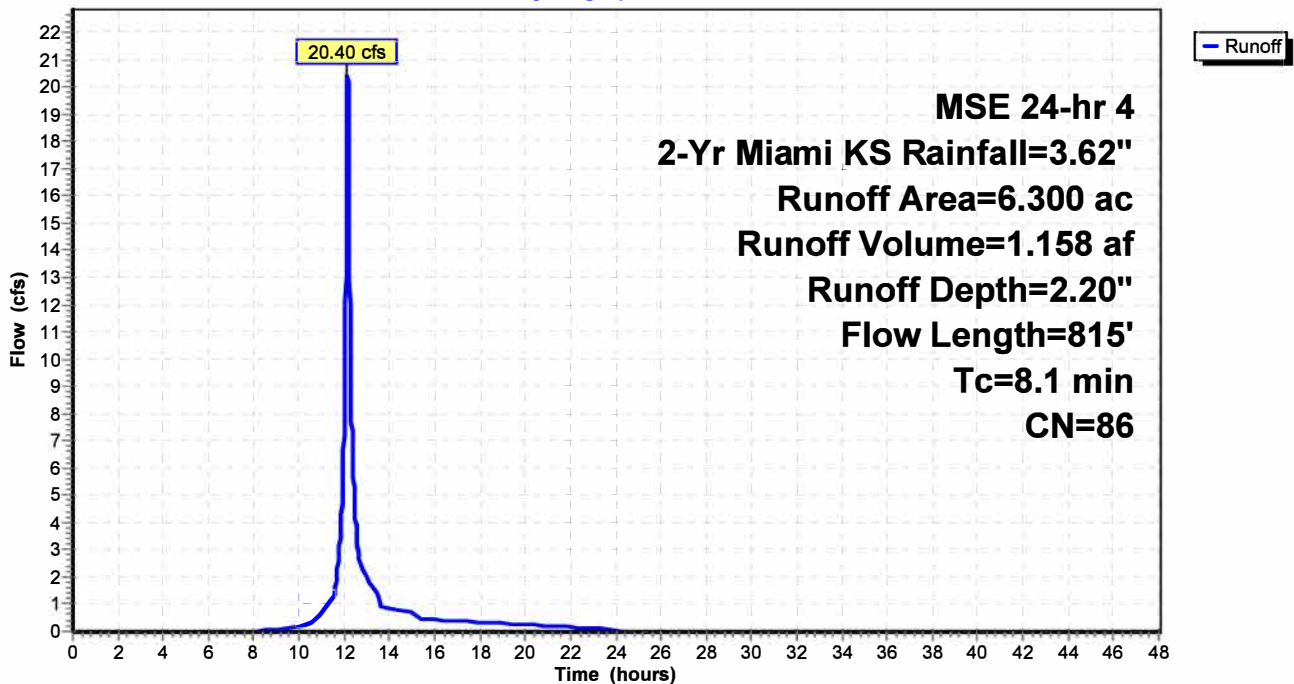
Area (ac)	CN	Description
2.200	98	Unconnected pavement, HSG D
4.100	80	>75% Grass cover, Good, HSG D
6.300	86	Weighted Average
4.100		65.08% Pervious Area
2.200		34.92% Impervious Area
2.200		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	100	0.0500	0.26		<b>Sheet Flow, Sheet</b> Grass: Short n= 0.150 P2= 3.60"
0.8	125	0.1500	2.71		<b>Shallow Concentrated Flow, Shallow</b> Short Grass Pasture Kv= 7.0 fps
0.9	590	0.0320	10.78	194.02	<b>Trap/Vee/Rect Channel Flow, Ditch</b> Bot.W=0.00' D=3.00' Z= 2.0 '/' Top.W=12.00' n= 0.030
8.1	815	Total			

**Subcatchment 5S: NW Site**

Hydrograph



**AF Prop w Det Condition**

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MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

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**Summary for Subcatchment 7S: NW Off-Site**

Runoff = 3.39 cfs @ 12.10 hrs, Volume= 0.166 af, Depth= 2.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
 MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

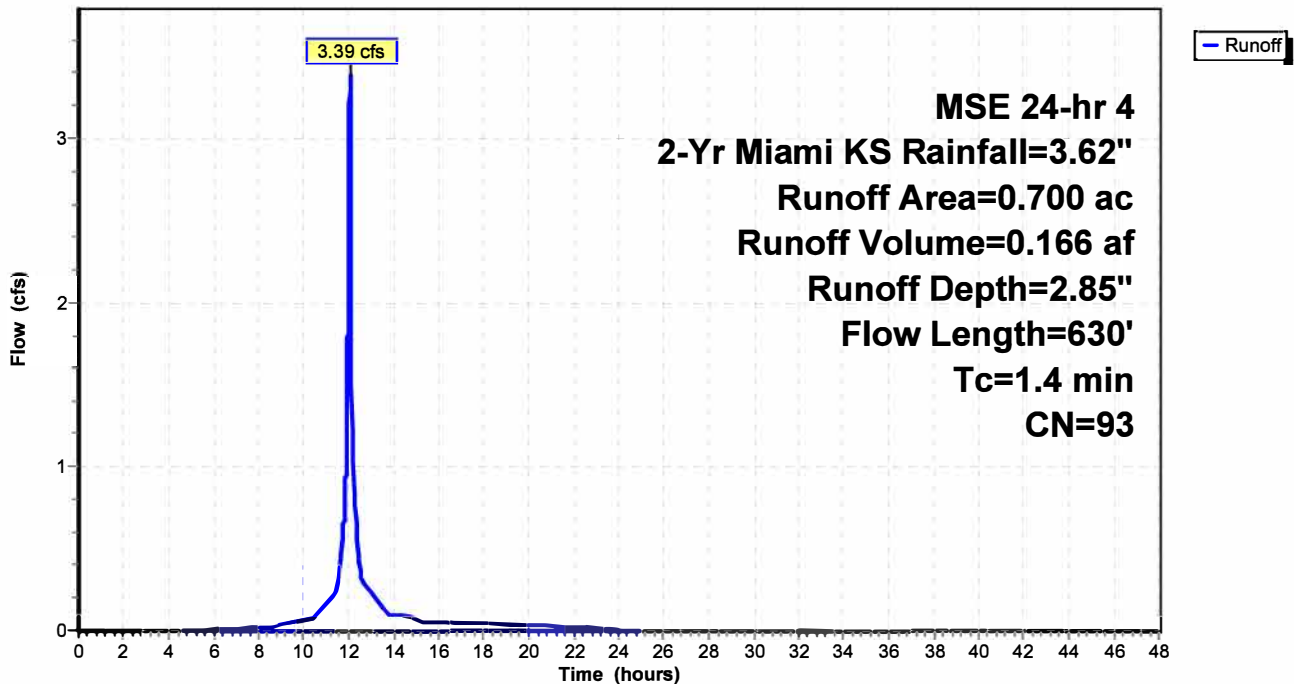
Area (ac)	CN	Description
0.700	93	Paved roads w/open ditches, 50% imp, HSG D
0.350		50.00% Pervious Area
0.350		50.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	40	0.0300	1.43		<b>Sheet Flow, Sheet</b> Smooth surfaces n= 0.011 P2= 3.60"
0.9	590	0.0320	10.78	194.02	<b>Trap/Vee/Rect Channel Flow, Ditch</b> Bot.W=0.00' D=3.00' Z= 2.0 '/' Top.W=12.00' n= 0.030
1.4	630	Total			

**Subcatchment 7S: NW Off-Site**

Hydrograph



# AF Prop w Det Condition

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MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

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## Summary for Subcatchment 8S: NE Off-Site

Runoff = 6.50 cfs @ 12.24 hrs, Volume= 0.476 af, Depth= 1.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

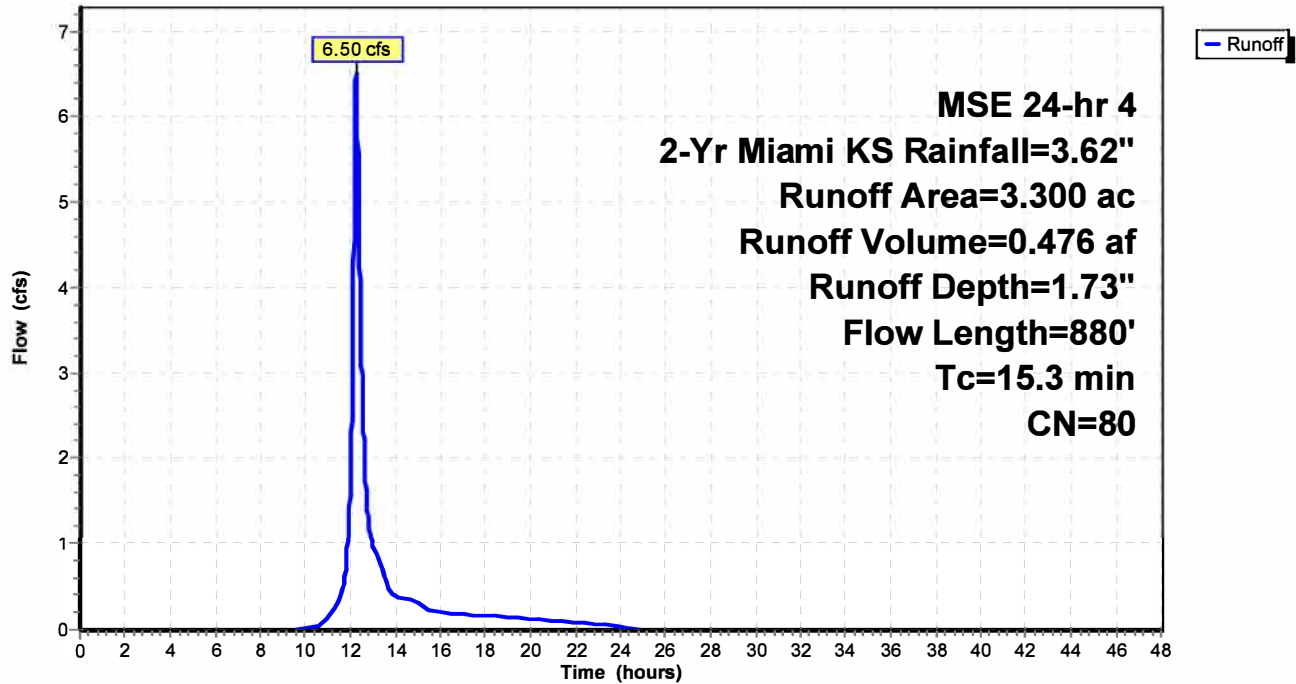
Area (ac)	CN	Description
3.300	80	Pasture/grassland/range, Good, HSG D
3.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.0200	0.18		<b>Sheet Flow, Sheet</b> Grass: Short n= 0.150 P2= 3.60"
5.5	350	0.0230	1.06		<b>Shallow Concentrated Flow, Shallow</b> Short Grass Pasture Kv= 7.0 fps
0.6	430	0.0370	11.59	208.62	<b>Trap/Vee/Rect Channel Flow, Ditch</b> Bot.W=0.00' D=3.00' Z= 2.0 ' Top.W=12.00' n= 0.030
15.3	880	Total			

## Subcatchment 8S: NE Off-Site

Hydrograph



**AF Prop w Det Condition**

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MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

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**Summary for Subcatchment 12S: W Site Bypass**

Runoff = 23.78 cfs @ 12.17 hrs, Volume= 1.415 af, Depth= 1.81"

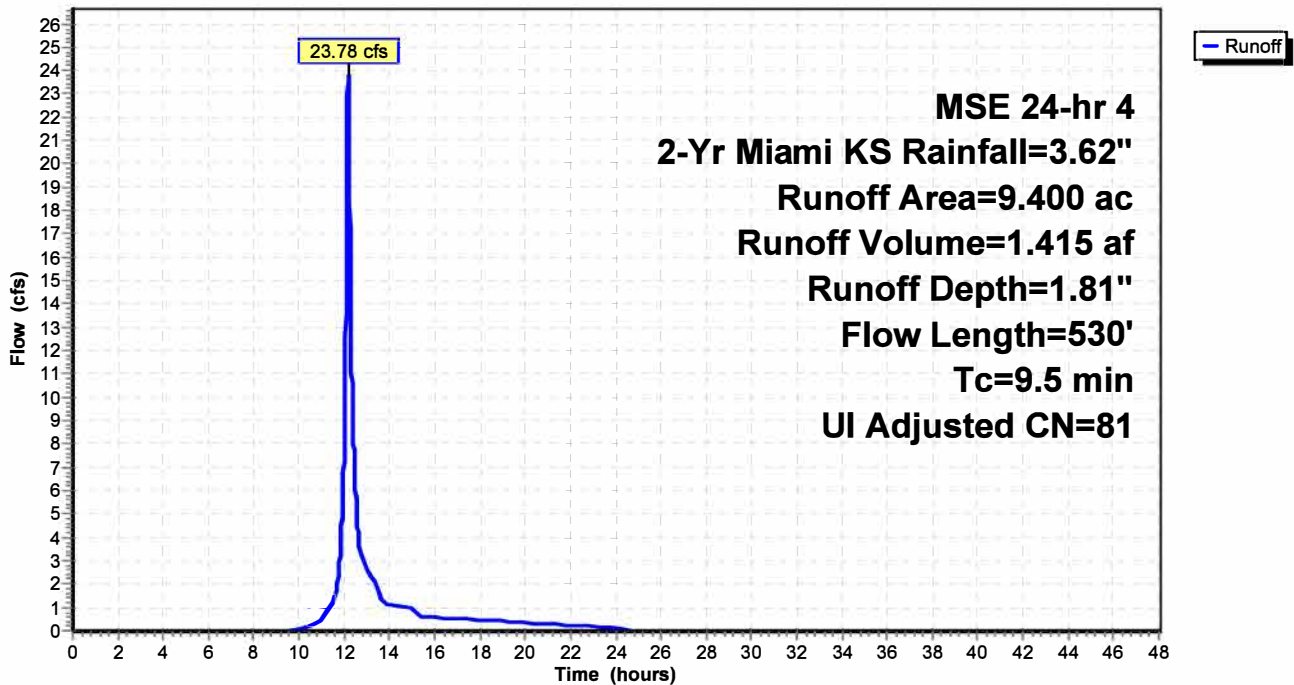
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
 MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

Area (ac)	CN	Adj	Description
8.200	80		>75% Grass cover, Good, HSG D
1.200	98		Unconnected pavement, HSG D
9.400	82	81	Weighted Average, UI Adjusted
8.200			87.23% Pervious Area
1.200			12.77% Impervious Area
1.200			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	100	0.0480	0.26		<b>Sheet Flow, Sheet</b> Grass: Short n= 0.150 P2= 3.60"
3.0	430	0.1200	2.42		<b>Shallow Concentrated Flow, Shallow</b> Short Grass Pasture Kv= 7.0 fps
9.5	530	Total			

**Subcatchment 12S: W Site Bypass**

Hydrograph



# AF Prop w Det Condition

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MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

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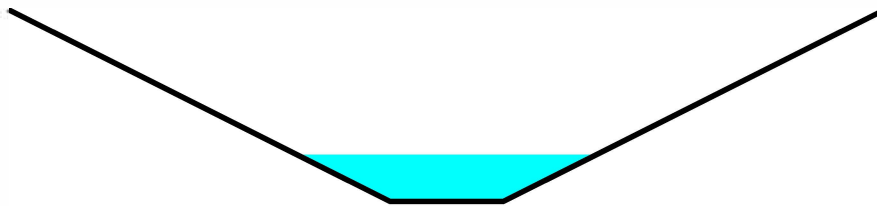
## Summary for Reach 9R: Site Stream

Inflow Area = 24.500 ac, 0.00% Impervious, Inflow Depth = 1.73" for 2-Yr Miami KS event  
Inflow = 37.75 cfs @ 12.36 hrs, Volume= 3.536 af  
Outflow = 35.86 cfs @ 12.52 hrs, Volume= 3.536 af, Atten= 5%, Lag= 9.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Max. Velocity= 5.39 fps, Min. Travel Time= 5.2 min  
Avg. Velocity = 1.78 fps, Avg. Travel Time= 15.8 min

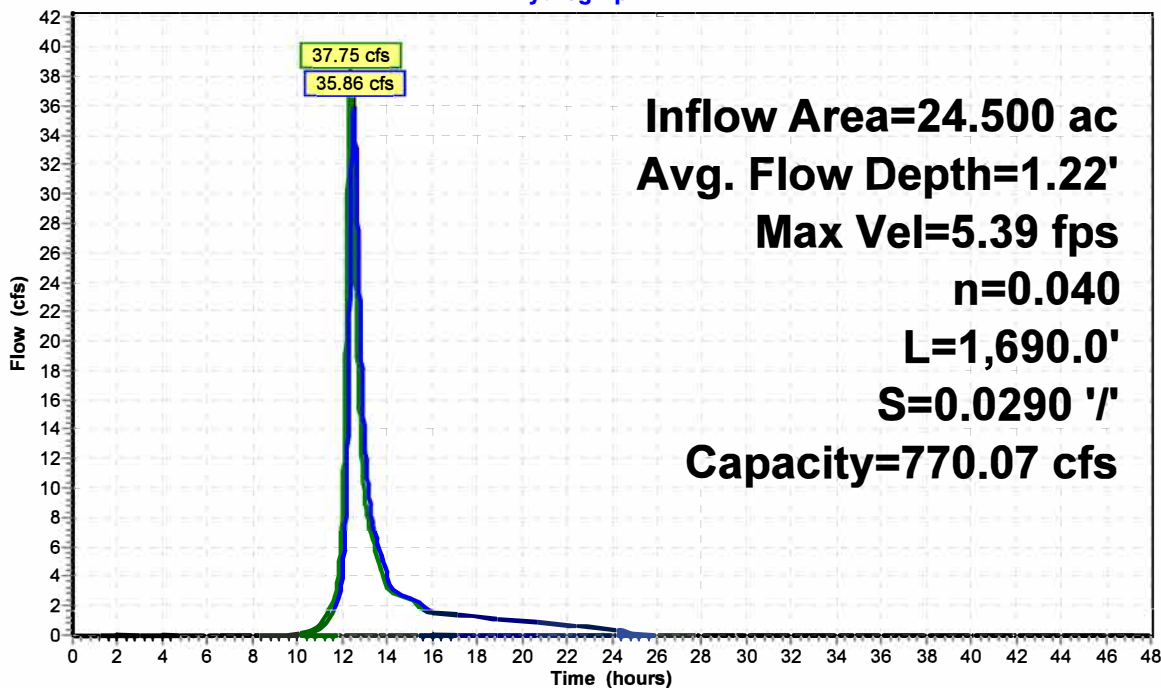
Peak Storage= 11,247 cf @ 12.43 hrs  
Average Depth at Peak Storage= 1.22' , Surface Width= 7.89'  
Bank-Full Depth= 5.00' Flow Area= 65.0 sf, Capacity= 770.07 cfs

3.00' x 5.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides  
Side Slope Z-value= 2.0 ' / ' Top Width= 23.00'  
Length= 1,690.0' Slope= 0.0290 ' / '  
Inlet Invert= 996.00', Outlet Invert= 947.00'

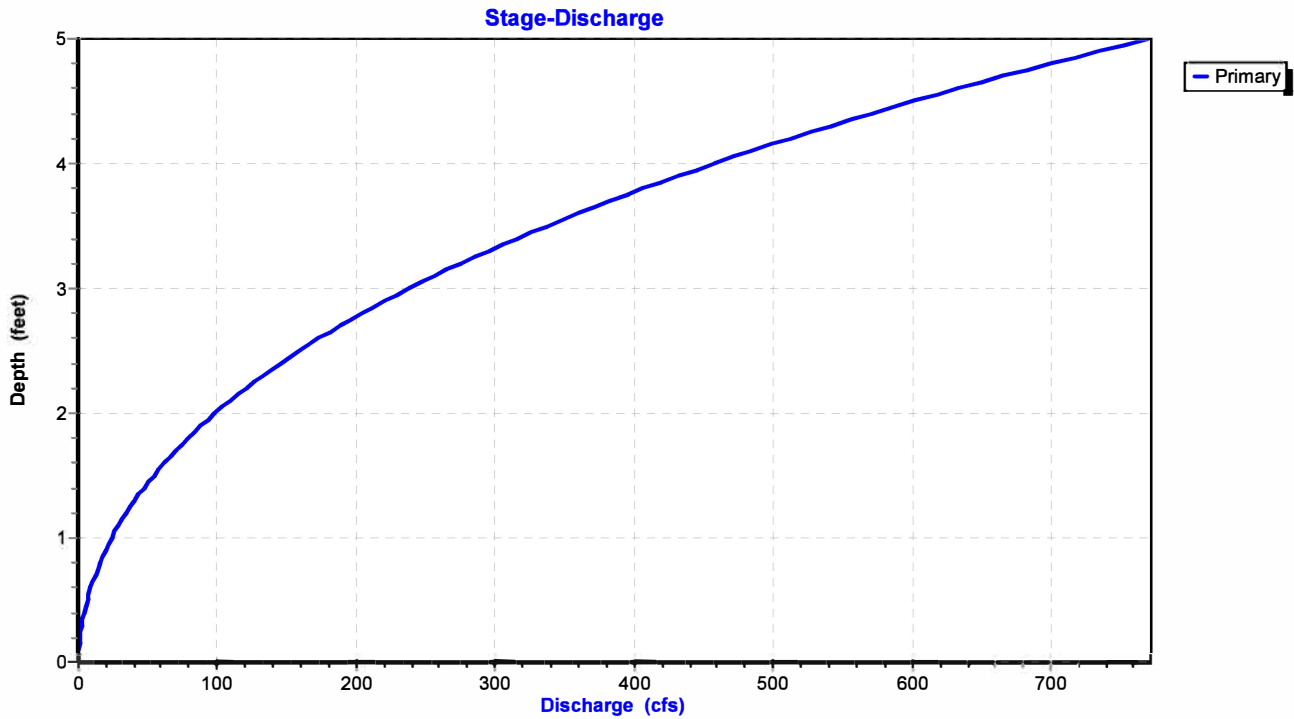


## Reach 9R: Site Stream

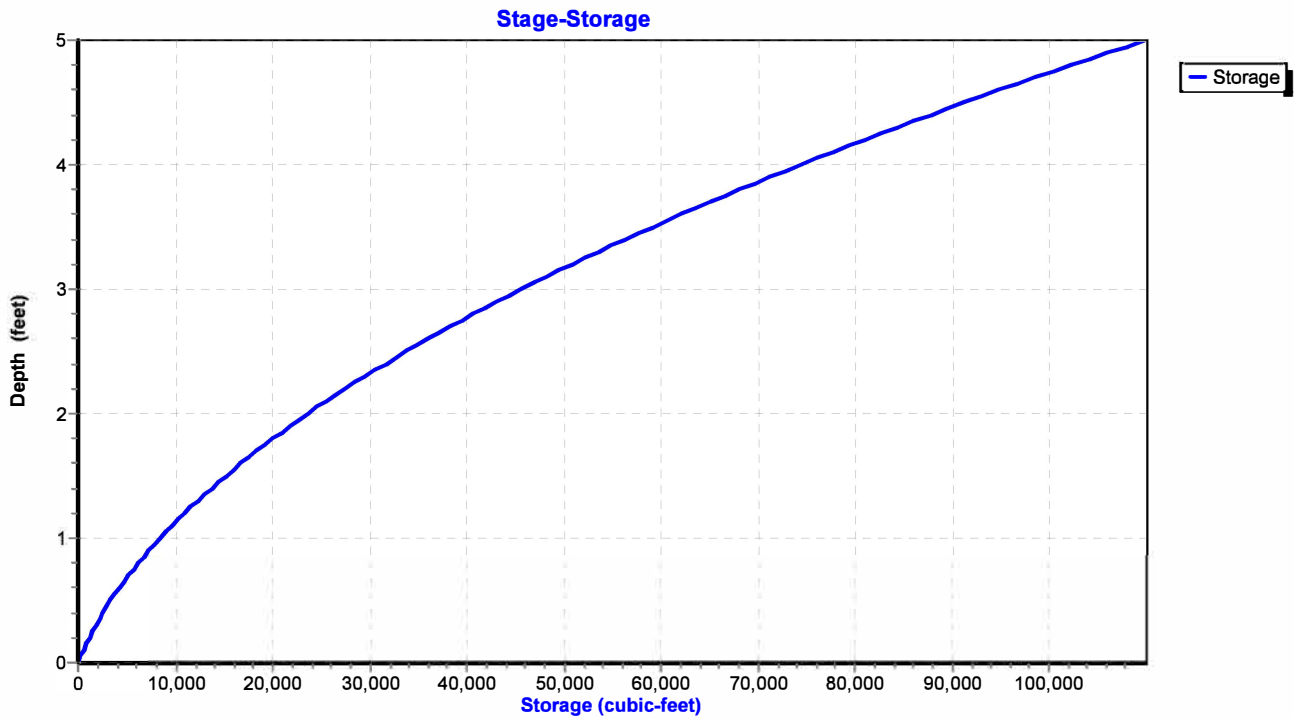
### Hydrograph



### Reach 9R: Site Stream



### Reach 9R: Site Stream



# AF Prop w Det Condition

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MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

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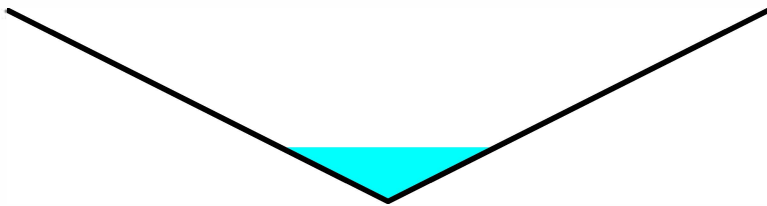
## Summary for Reach 10R: 223rd Ditch

Inflow Area = 3.300 ac, 0.00% Impervious, Inflow Depth = 1.73" for 2-Yr Miami KS event  
Inflow = 6.50 cfs @ 12.24 hrs, Volume= 0.476 af  
Outflow = 6.32 cfs @ 12.31 hrs, Volume= 0.476 af, Atten= 3%, Lag= 4.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Max. Velocity= 4.36 fps, Min. Travel Time= 2.4 min  
Avg. Velocity = 1.69 fps, Avg. Travel Time= 6.3 min

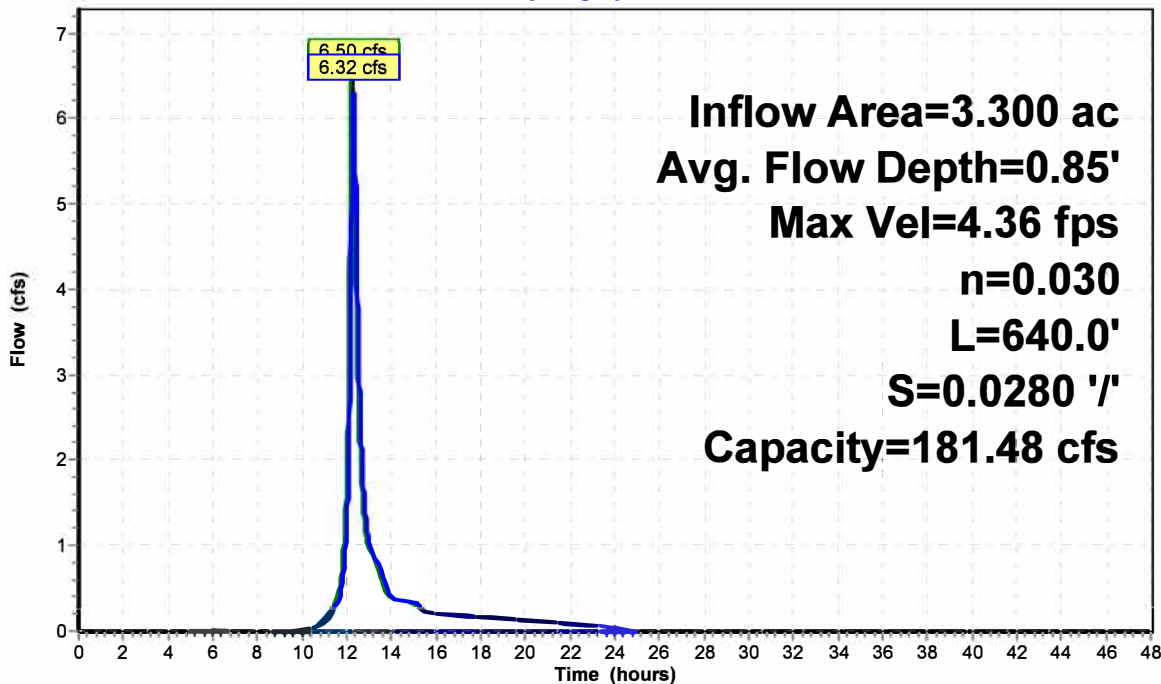
Peak Storage= 928 cf @ 12.27 hrs  
Average Depth at Peak Storage= 0.85' , Surface Width= 3.41'  
Bank-Full Depth= 3.00' Flow Area= 18.0 sf, Capacity= 181.48 cfs

0.00' x 3.00' deep channel, n= 0.030  
Side Slope Z-value= 2.0 '/' Top Width= 12.00'  
Length= 640.0' Slope= 0.0280 '/'  
Inlet Invert= 999.00', Outlet Invert= 981.08'

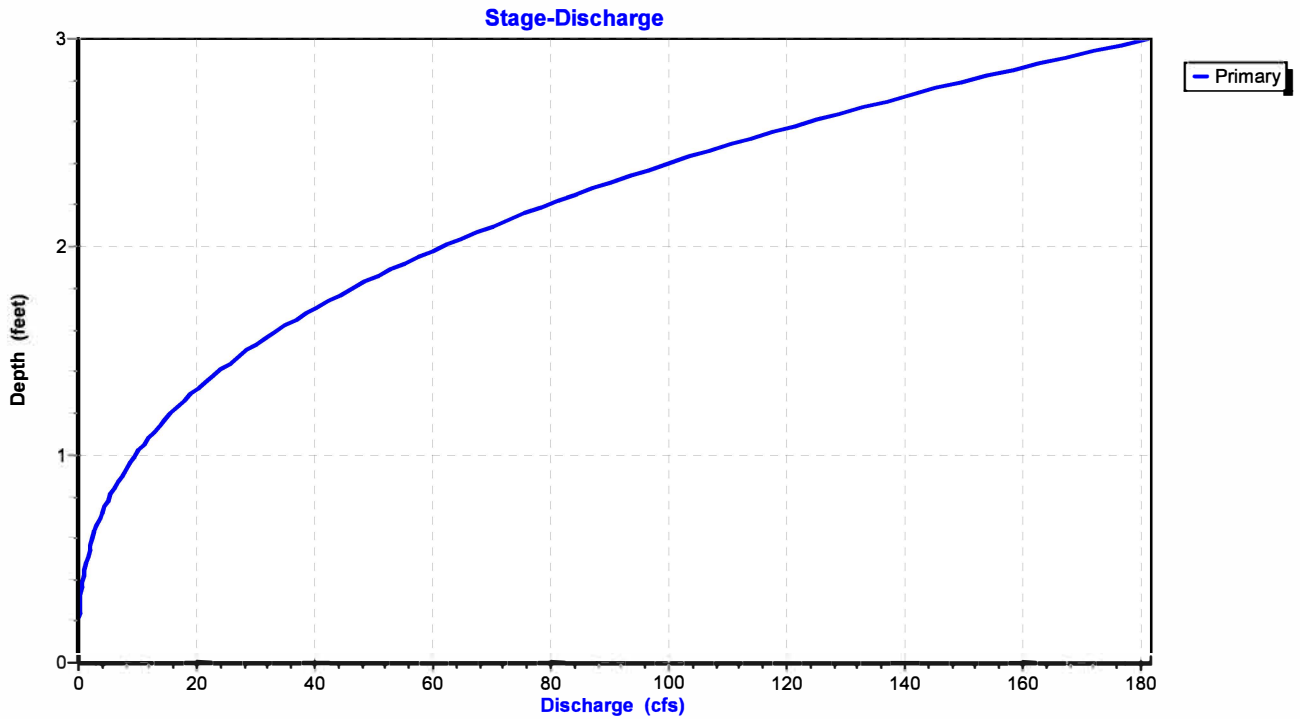


## Reach 10R: 223rd Ditch

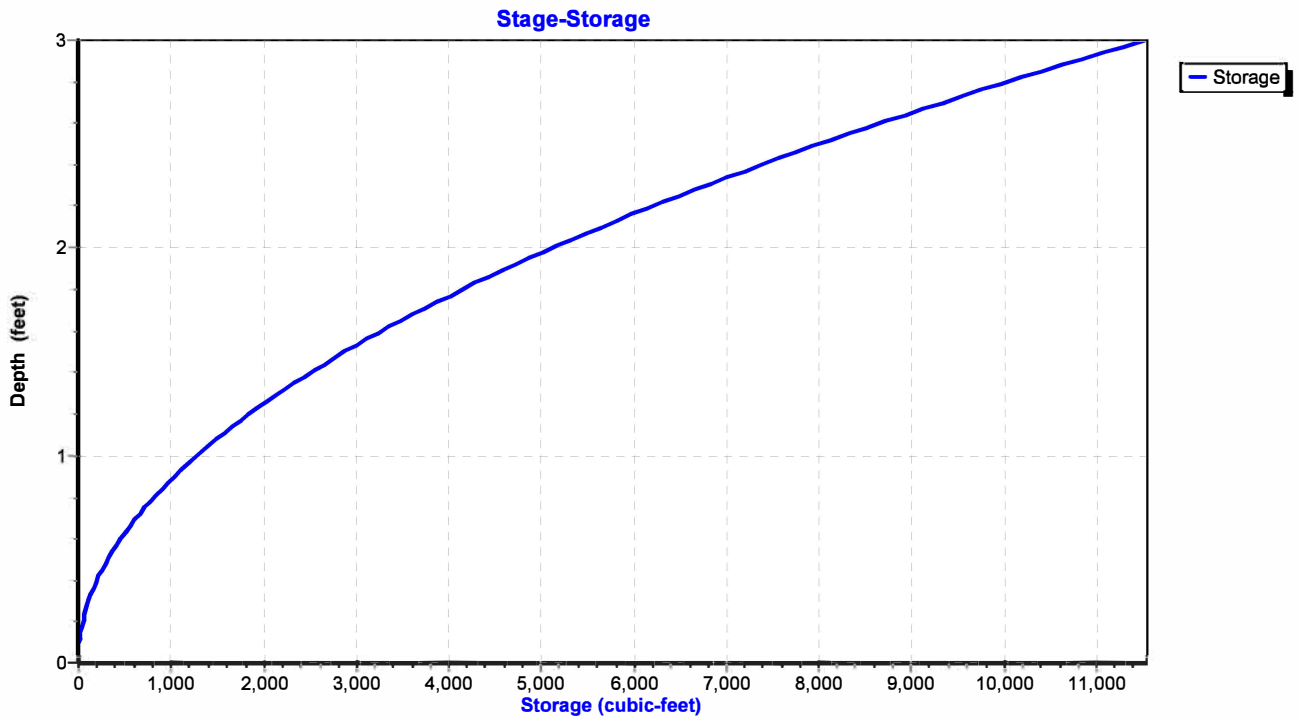
### Hydrograph



### Reach 10R: 223rd Ditch



### Reach 10R: 223rd Ditch



**AF Prop w Det Condition**

MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

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**Summary for Pond 11P: Wet Pond**

Inflow Area = 46.000 ac, 7.61% Impervious, Inflow Depth = 1.77" for 2-Yr Miami KS event  
 Inflow = 58.51 cfs @ 12.27 hrs, Volume= 6.773 af  
 Outflow = 37.43 cfs @ 12.70 hrs, Volume= 6.773 af, Atten= 36%, Lag= 25.5 min  
 Primary = 37.43 cfs @ 12.70 hrs, Volume= 6.773 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
 Peak Elev= 963.19' @ 12.70 hrs Storage= 1.569 af

Plug-Flow detention time= 37.6 min calculated for 6.771 af (100% of inflow)  
 Center-of-Mass det. time= 37.7 min ( 878.5 - 840.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	961.00'	6.317 af	<b>Custom Stage Data</b> Listed below

Elevation (feet)	Cum.Store (acre-feet)
961.00	0.000
962.00	0.635
964.00	2.200
966.00	4.087
968.00	6.317

Device	Routing	Invert	Outlet Devices
#1	Primary	961.00'	<b>60.0" W x 15.0" H Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#2	Primary	964.00'	<b>24.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s)
#3	Secondary	966.00'	<b>70.0' long x 15.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

**Primary OutFlow** Max=37.43 cfs @ 12.70 hrs HW=963.19' (Free Discharge)

- ↑1=Orifice/Grate (Orifice Controls 37.43 cfs @ 5.99 fps)
- ↑2=Sharp-Crested Rectangular Weir ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=961.00' (Free Discharge)

- ↑3=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

# AF Prop w Det Condition

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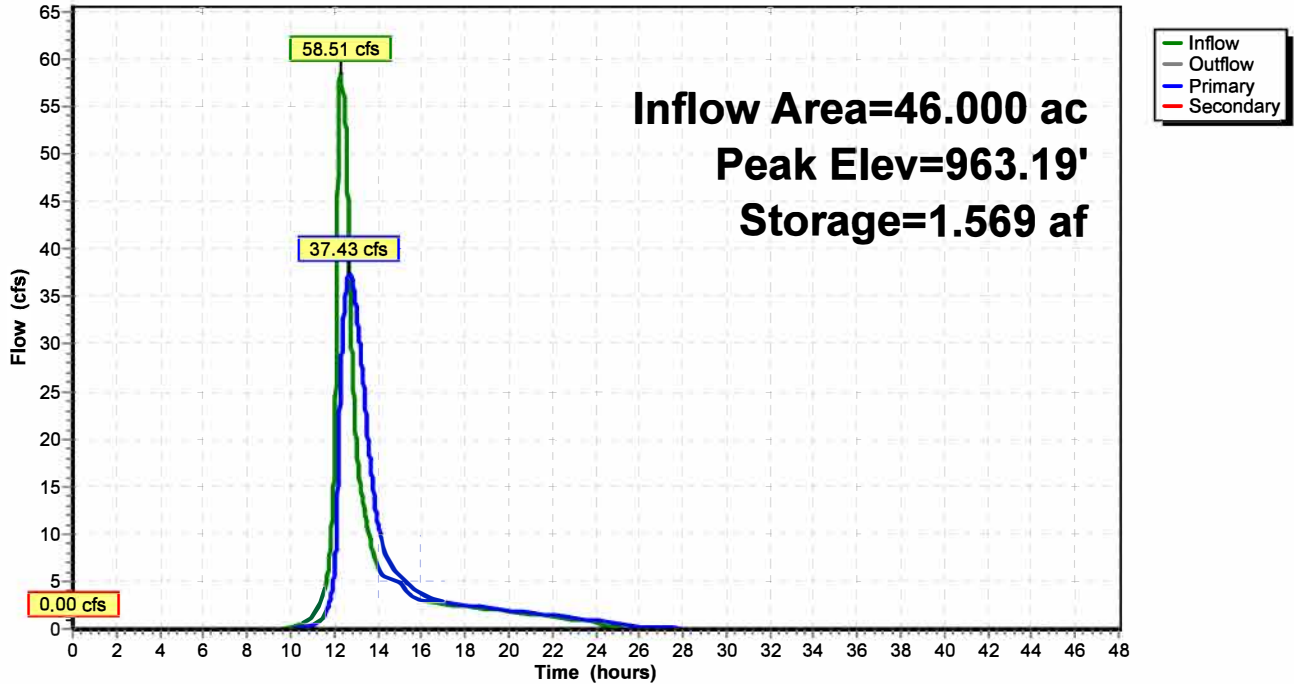
MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

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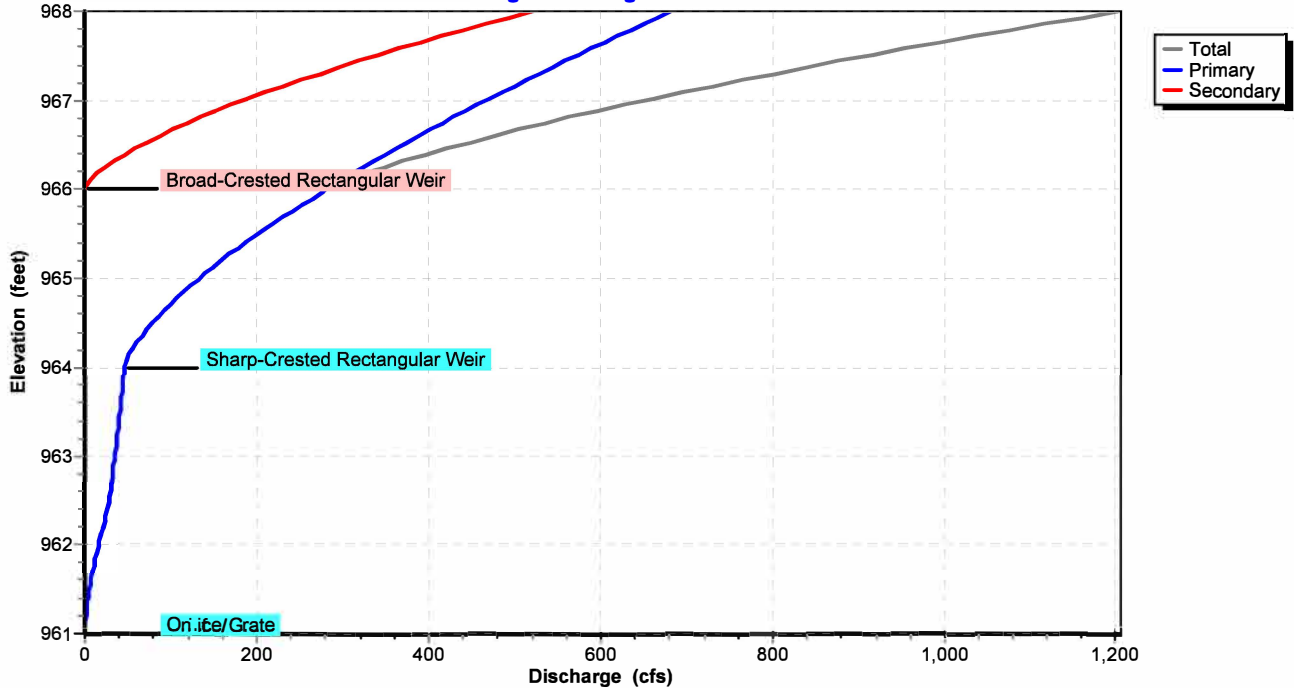
## Pond 11P: Wet Pond

Hydrograph



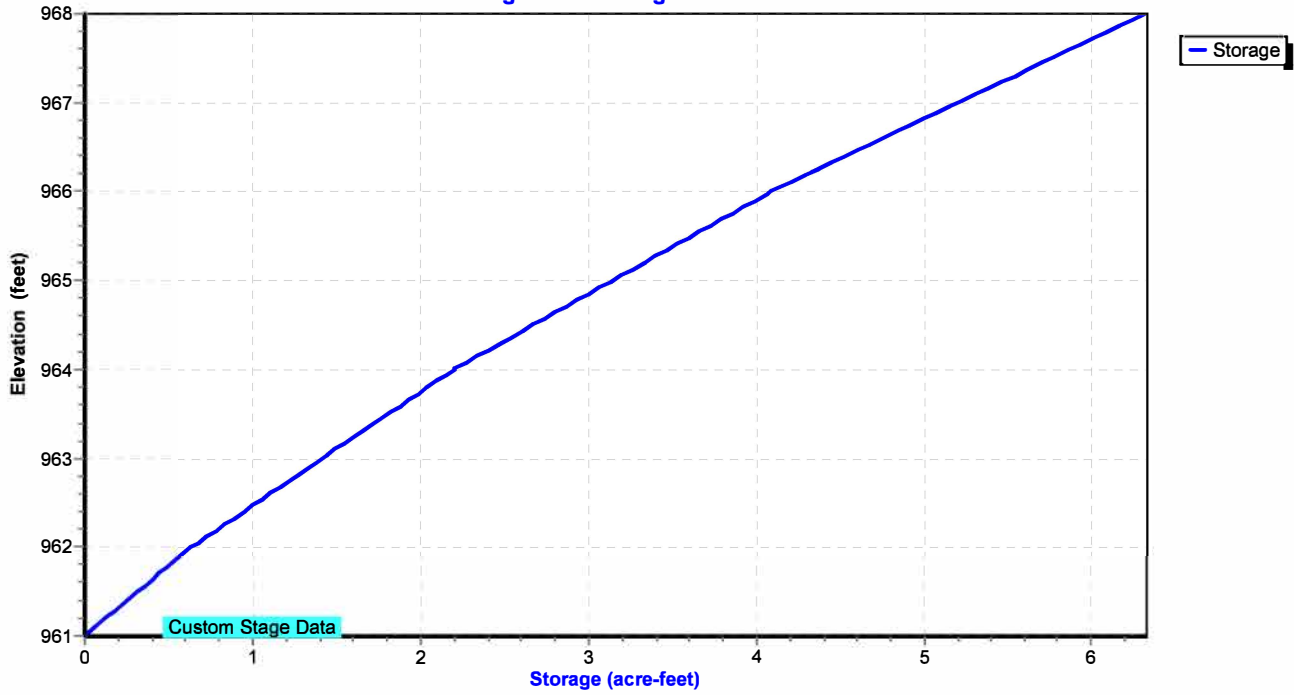
## Pond 11P: Wet Pond

Stage-Discharge



Pond 11P: Wet Pond

Stage-Area-Storage



# AF Prop w Det Condition

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MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

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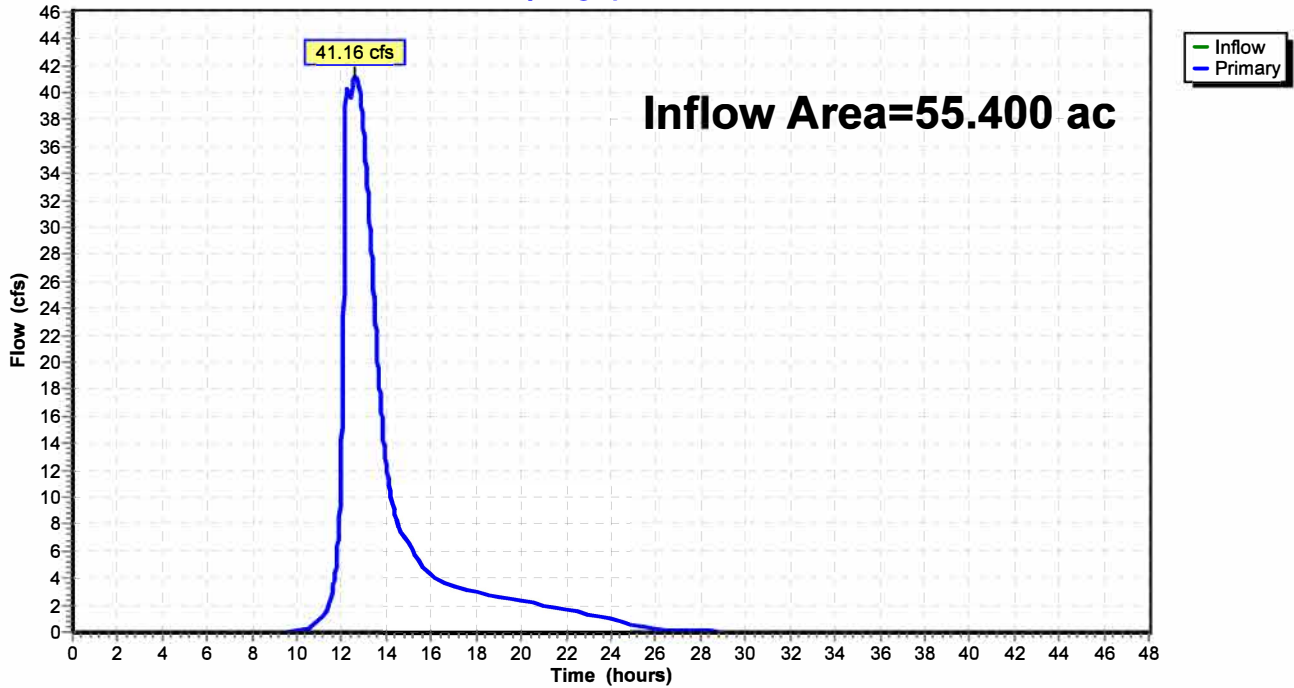
## Summary for Link 2L: W Site Limit

Inflow Area = 55.400 ac, 8.48% Impervious, Inflow Depth = 1.77" for 2-Yr Miami KS event  
Inflow = 41.16 cfs @ 12.59 hrs, Volume= 8.187 af  
Primary = 41.16 cfs @ 12.59 hrs, Volume= 8.187 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Link 2L: W Site Limit

### Hydrograph



**AF Prop w Det Condition**

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MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

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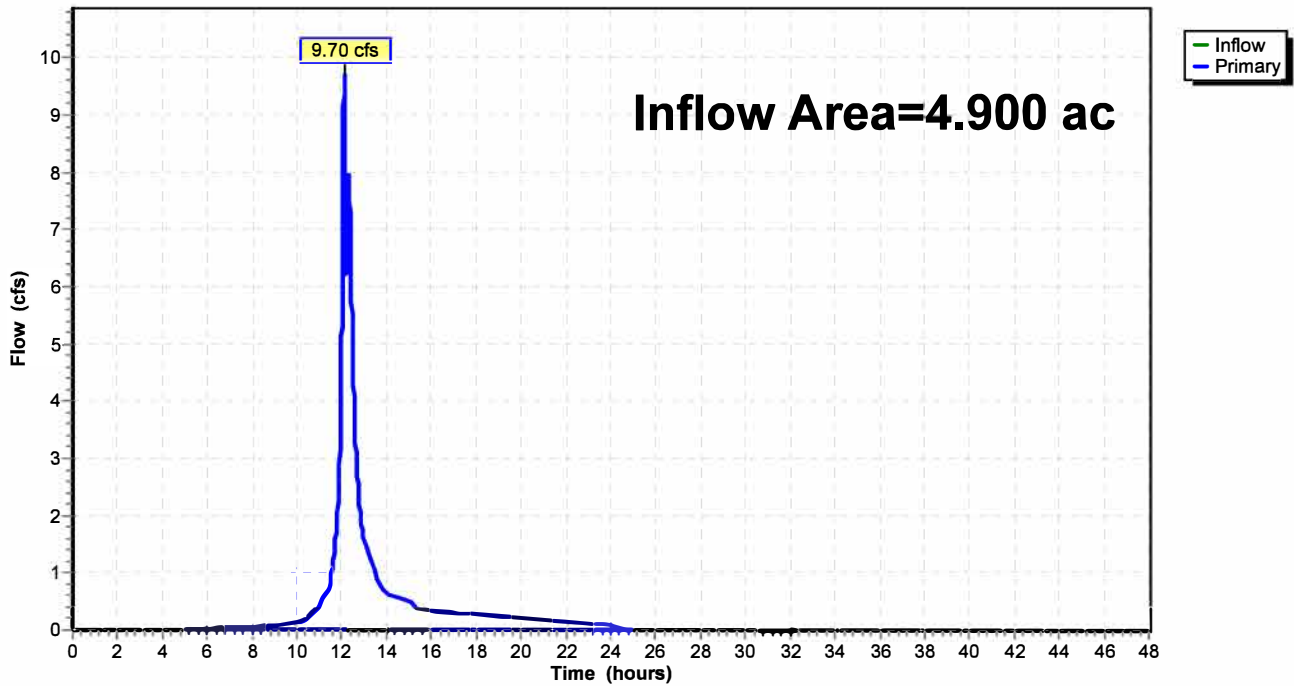
**Summary for Link 3L: CMPA Site Limit**

Inflow Area = 4.900 ac, 22.45% Impervious, Inflow Depth = 2.07" for 2-Yr Miami KS event  
Inflow = 9.70 cfs @ 12.11 hrs, Volume= 0.843 af  
Primary = 9.70 cfs @ 12.11 hrs, Volume= 0.843 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

**Link 3L: CMPA Site Limit**

Hydrograph



# AF Prop w Det Condition

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MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

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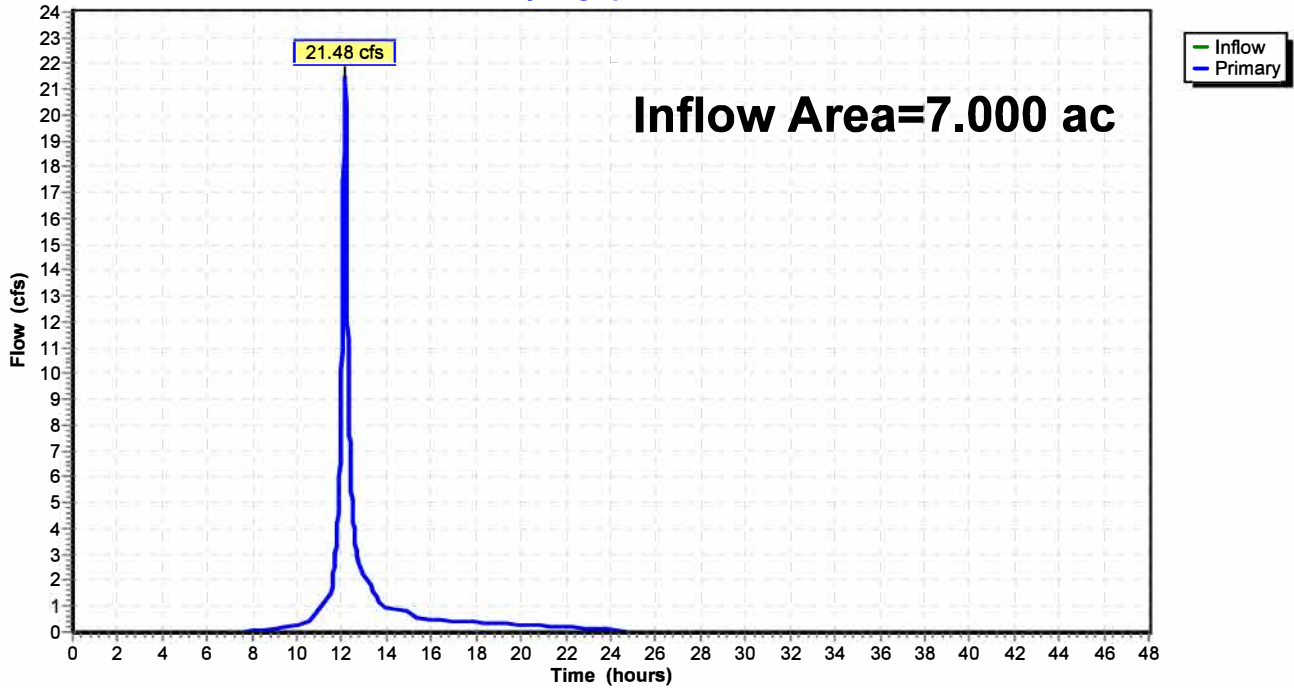
## Summary for Link 4L: NW Site Limit

Inflow Area = 7.000 ac, 36.43% Impervious, Inflow Depth = 2.27" for 2-Yr Miami KS event  
Inflow = 21.48 cfs @ 12.15 hrs, Volume= 1.324 af  
Primary = 21.48 cfs @ 12.15 hrs, Volume= 1.324 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

### Link 4L: NW Site Limit

Hydrograph



**AF Prop w Det Condition**

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MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

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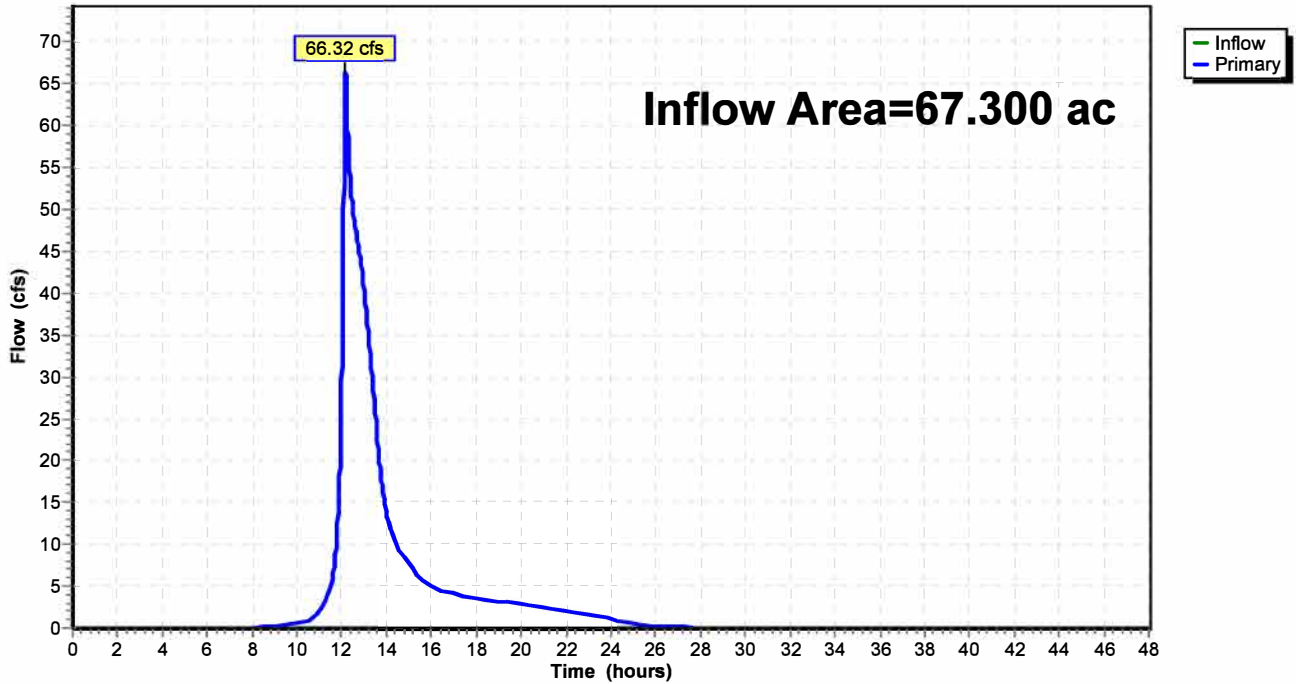
**Summary for Link 6L: Off-Site Confluence**

Inflow Area = 67.300 ac, 12.41% Impervious, Inflow Depth = 1.85" for 2-Yr Miami KS event  
Inflow = 66.32 cfs @ 12.18 hrs, Volume= 10.354 af  
Primary = 66.32 cfs @ 12.18 hrs, Volume= 10.354 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

**Link 6L: Off-Site Confluence**

Hydrograph



**AF Prop w Det Condition**

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MSE 24-hr 4 10-Yr Miami KS Rainfall=5.37"

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**Summary for Subcatchment 1S: W Site**

Runoff = 82.70 cfs @ 12.22 hrs, Volume= 5.938 af, Depth= 3.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
 MSE 24-hr 4 10-Yr Miami KS Rainfall=5.37"

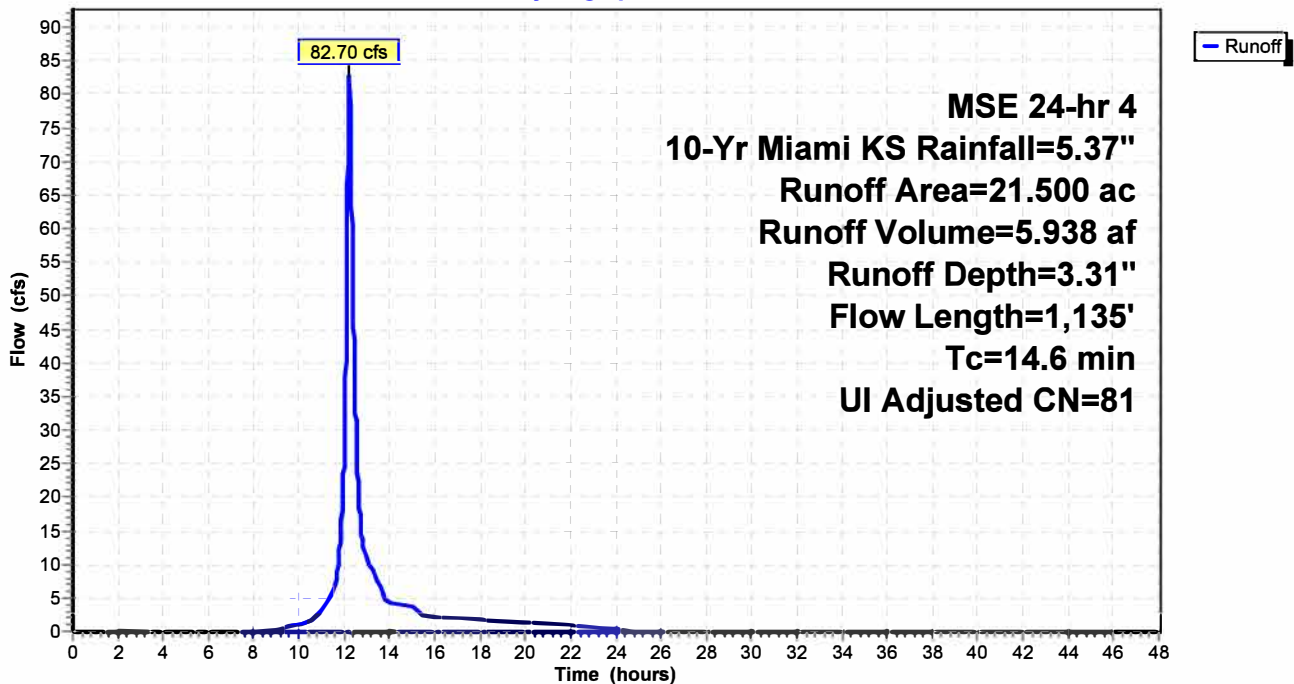
Area (ac)	CN	Adj	Description
18.000	80		>75% Grass cover, Good, HSG D
3.500	98		Unconnected pavement, HSG D
21.500	83	81	Weighted Average, UI Adjusted
18.000			83.72% Pervious Area
3.500			16.28% Impervious Area
3.500			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	100	0.0400	0.24		<b>Sheet Flow, Sheet</b> Grass: Short n= 0.150 P2= 3.60"
7.2	745	0.0600	1.71		<b>Shallow Concentrated Flow, Shallow</b> Short Grass Pasture Kv= 7.0 fps
0.4	290	0.0300	12.05	783.31	<b>Trap/Vee/Rect Channel Flow, Channel</b> Bot.W=3.00' D=5.00' Z= 2.0 '/' Top.W=23.00' n= 0.040
14.6	1,135	Total			

**Subcatchment 1S: W Site**

Hydrograph



**AF Prop w Det Condition**

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MSE 24-hr 4 10-Yr Miami KS Rainfall=5.37"

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**Summary for Subcatchment 3S: E Off-Site**

Runoff = 70.38 cfs @ 12.35 hrs, Volume= 6.570 af, Depth= 3.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
MSE 24-hr 4 10-Yr Miami KS Rainfall=5.37"

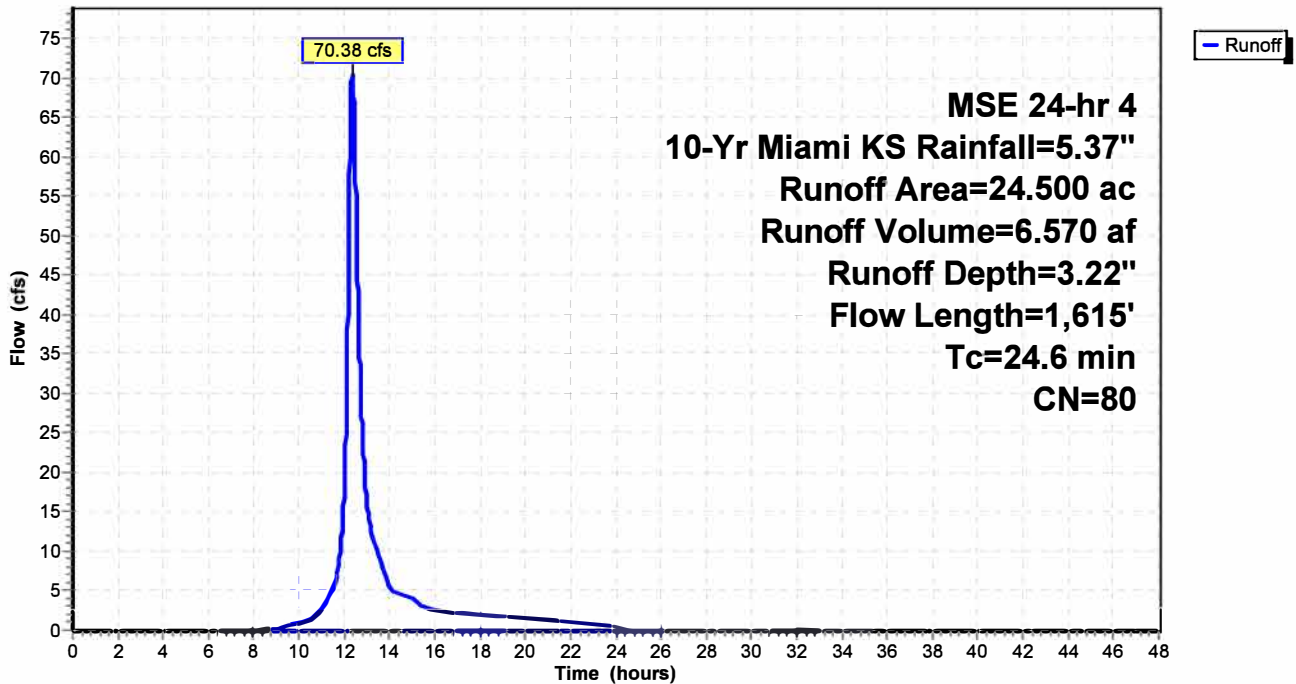
Area (ac)	CN	Description
24.500	80	Pasture/grassland/range, Good, HSG D
24.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	100	0.0220	0.19		<b>Sheet Flow, Sheet</b> Grass: Short n= 0.150 P2= 3.60"
14.6	1,060	0.0300	1.21		<b>Shallow Concentrated Flow, Shallow</b> Short Grass Pasture Kv= 7.0 fps
1.1	455		7.00		<b>Direct Entry, LxV 1</b>
24.6	1,615	Total			

**Subcatchment 3S: E Off-Site**

Hydrograph



**AF Prop w Det Condition**

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MSE 24-hr 4 10-Yr Miami KS Rainfall=5.37"

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**Summary for Subcatchment 4S: N Site**

Runoff = 11.70 cfs @ 12.10 hrs, Volume= 0.593 af, Depth= 4.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
MSE 24-hr 4 10-Yr Miami KS Rainfall=5.37"

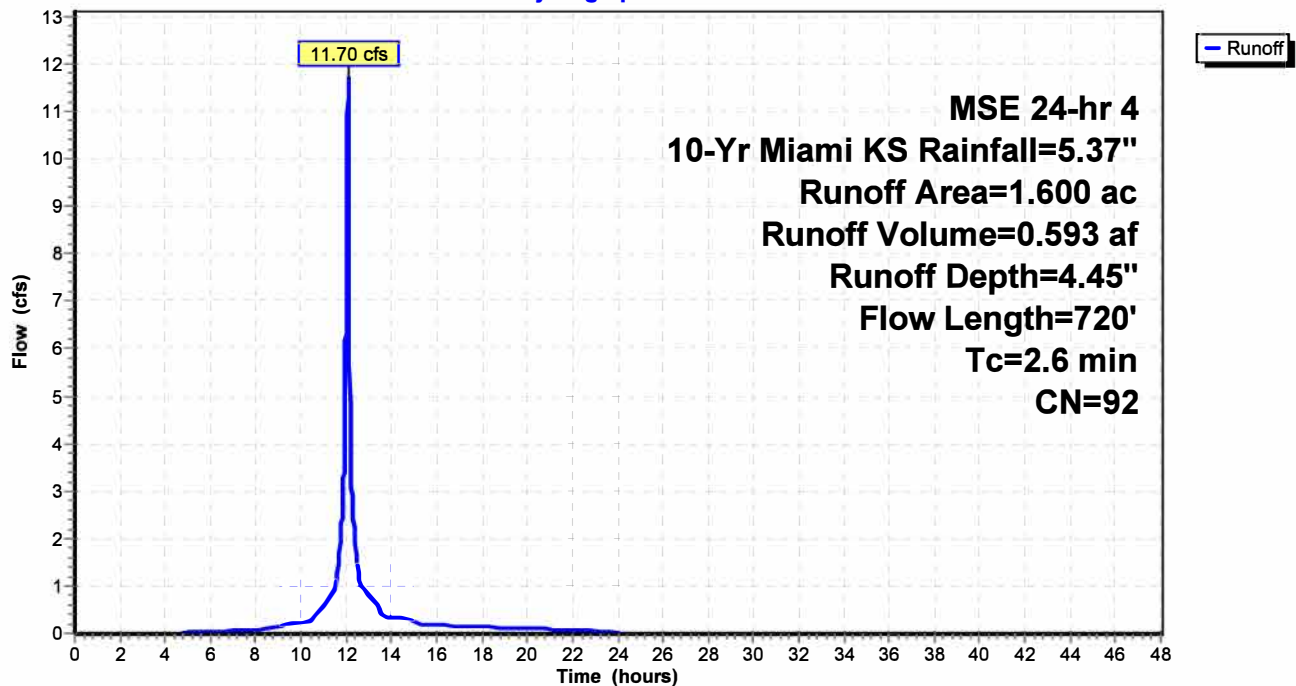
Area (ac)	CN	Description
0.500	80	>75% Grass cover, Good, HSG D
1.100	98	Unconnected pavement, HSG D
1.600	92	Weighted Average
0.500		31.25% Pervious Area
1.100		68.75% Impervious Area
1.100		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	100	0.0300	1.72		<b>Sheet Flow, Sheet</b> Smooth surfaces n= 0.011 P2= 3.60"
1.0	240	0.0400	4.06		<b>Shallow Concentrated Flow, Shallow</b> Paved Kv= 20.3 fps
0.6	380	0.0280	10.08	181.48	<b>Trap/Vee/Rect Channel Flow, Ditch</b> Bot.W=0.00' D=3.00' Z= 2.0 '/' Top.W=12.00' n= 0.030
2.6	720	Total			

**Subcatchment 4S: N Site**

Hydrograph



**AF Prop w Det Condition**

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MSE 24-hr 4 10-Yr Miami KS Rainfall=5.37"

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**Summary for Subcatchment 5S: NW Site**

Runoff = 34.47 cfs @ 12.15 hrs, Volume= 2.002 af, Depth= 3.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
MSE 24-hr 4 10-Yr Miami KS Rainfall=5.37"

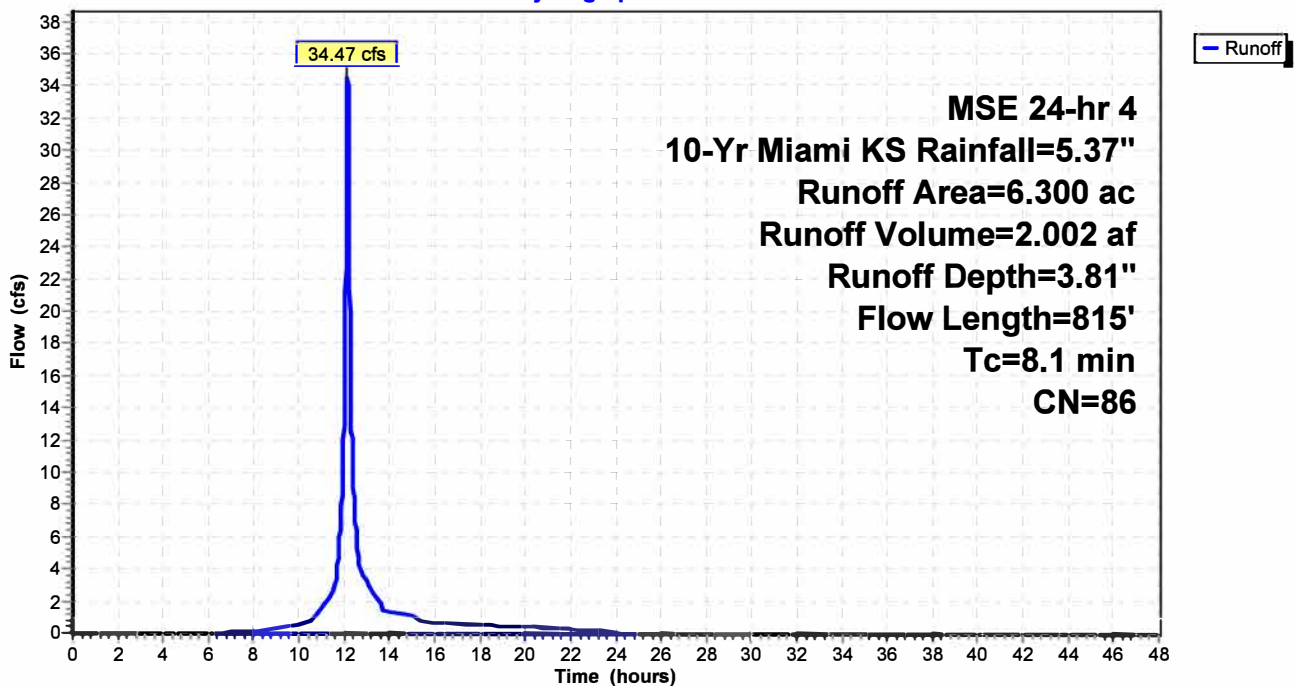
Area (ac)	CN	Description
2.200	98	Unconnected pavement, HSG D
4.100	80	>75% Grass cover, Good, HSG D
6.300	86	Weighted Average
4.100		65.08% Pervious Area
2.200		34.92% Impervious Area
2.200		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	100	0.0500	0.26		<b>Sheet Flow, Sheet</b> Grass: Short n= 0.150 P2= 3.60"
0.8	125	0.1500	2.71		<b>Shallow Concentrated Flow, Shallow</b> Short Grass Pasture Kv= 7.0 fps
0.9	590	0.0320	10.78	194.02	<b>Trap/Vee/Rect Channel Flow, Ditch</b> Bot.W=0.00' D=3.00' Z= 2.0 '/' Top.W=12.00' n= 0.030
8.1	815	Total			

**Subcatchment 5S: NW Site**

Hydrograph



**AF Prop w Det Condition**

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MSE 24-hr 4 10-Yr Miami KS Rainfall=5.37"

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**Summary for Subcatchment 7S: NW Off-Site**

Runoff = 5.23 cfs @ 12.10 hrs, Volume= 0.266 af, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
MSE 24-hr 4 10-Yr Miami KS Rainfall=5.37"

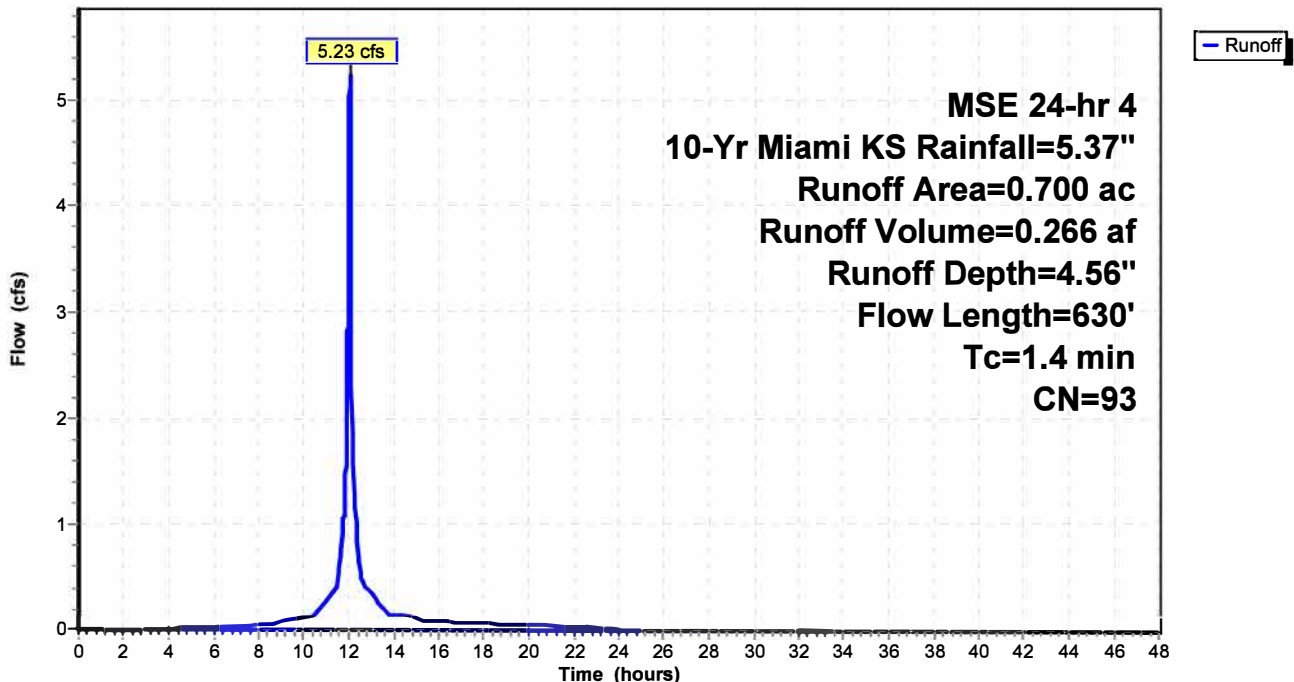
Area (ac)	CN	Description
0.700	93	Paved roads w/open ditches, 50% imp, HSG D
0.350		50.00% Pervious Area
0.350		50.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	40	0.0300	1.43		<b>Sheet Flow, Sheet</b> Smooth surfaces n= 0.011 P2= 3.60"
0.9	590	0.0320	10.78	194.02	<b>Trap/Vee/Rect Channel Flow, Ditch</b> Bot.W=0.00' D=3.00' Z= 2.0 ' /' Top.W=12.00' n= 0.030
1.4	630	Total			

**Subcatchment 7S: NW Off-Site**

Hydrograph



# AF Prop w Det Condition

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MSE 24-hr 4 10-Yr Miami KS Rainfall=5.37"

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## Summary for Subcatchment 8S: NE Off-Site

Runoff = 12.07 cfs @ 12.23 hrs, Volume= 0.885 af, Depth= 3.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
MSE 24-hr 4 10-Yr Miami KS Rainfall=5.37"

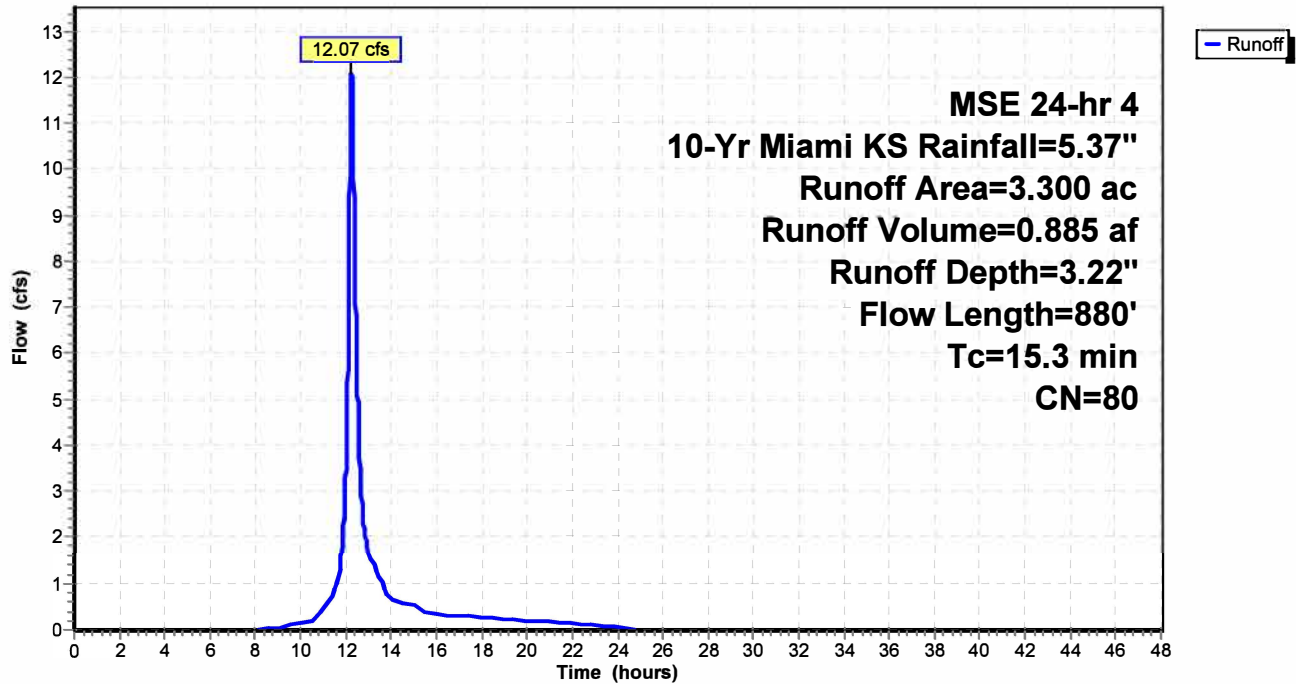
Area (ac)	CN	Description
3.300	80	Pasture/grassland/range, Good, HSG D
3.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.0200	0.18		<b>Sheet Flow, Sheet</b> Grass: Short n= 0.150 P2= 3.60"
5.5	350	0.0230	1.06		<b>Shallow Concentrated Flow, Shallow</b> Short Grass Pasture Kv= 7.0 fps
0.6	430	0.0370	11.59	208.62	<b>Trap/Vee/Rect Channel Flow, Ditch</b> Bot.W=0.00' D=3.00' Z= 2.0 ' Top.W=12.00' n= 0.030
15.3	880	Total			

## Subcatchment 8S: NE Off-Site

Hydrograph



**AF Prop w Det Condition**

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MSE 24-hr 4 10-Yr Miami KS Rainfall=5.37"

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**Summary for Subcatchment 12S: W Site Bypass**

Runoff = 43.22 cfs @ 12.17 hrs, Volume= 2.596 af, Depth= 3.31"

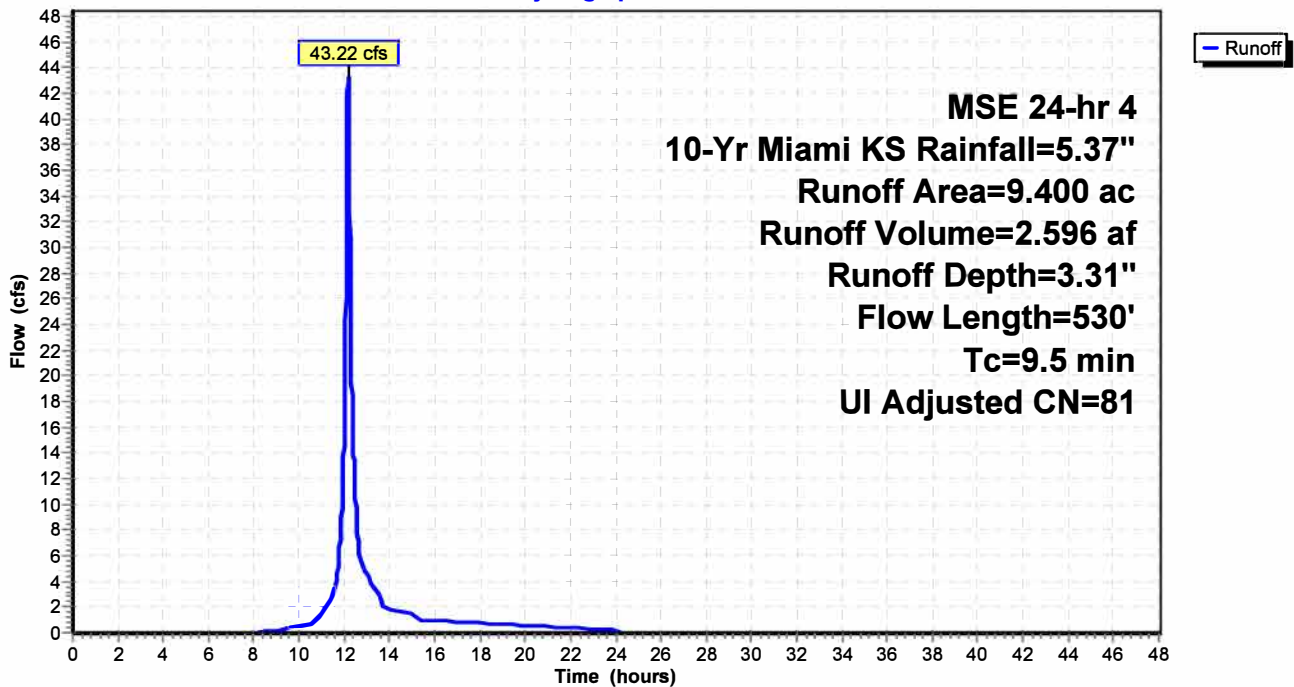
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
 MSE 24-hr 4 10-Yr Miami KS Rainfall=5.37"

Area (ac)	CN	Adj	Description
8.200	80		>75% Grass cover, Good, HSG D
1.200	98		Unconnected pavement, HSG D
9.400	82	81	Weighted Average, UI Adjusted
8.200			87.23% Pervious Area
1.200			12.77% Impervious Area
1.200			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	100	0.0480	0.26		<b>Sheet Flow, Sheet</b> Grass: Short n= 0.150 P2= 3.60"
3.0	430	0.1200	2.42		<b>Shallow Concentrated Flow, Shallow</b> Short Grass Pasture Kv= 7.0 fps
9.5	530	Total			

**Subcatchment 12S: W Site Bypass**

Hydrograph



**AF Prop w Det Condition**

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MSE 24-hr 4 10-Yr Miami KS Rainfall=5.37"

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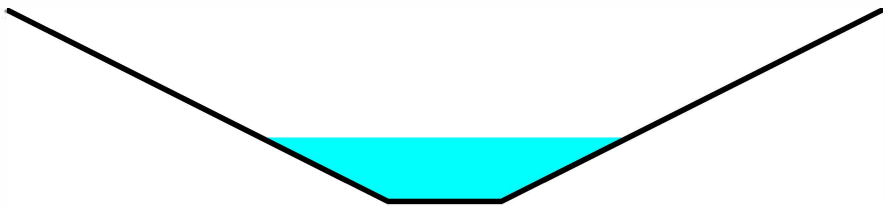
**Summary for Reach 9R: Site Stream**

Inflow Area = 24.500 ac, 0.00% Impervious, Inflow Depth = 3.22" for 10-Yr Miami KS event  
Inflow = 70.38 cfs @ 12.35 hrs, Volume= 6.570 af  
Outflow = 67.76 cfs @ 12.48 hrs, Volume= 6.570 af, Atten= 4%, Lag= 7.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Max. Velocity= 6.38 fps, Min. Travel Time= 4.4 min  
Avg. Velocity = 2.04 fps, Avg. Travel Time= 13.8 min

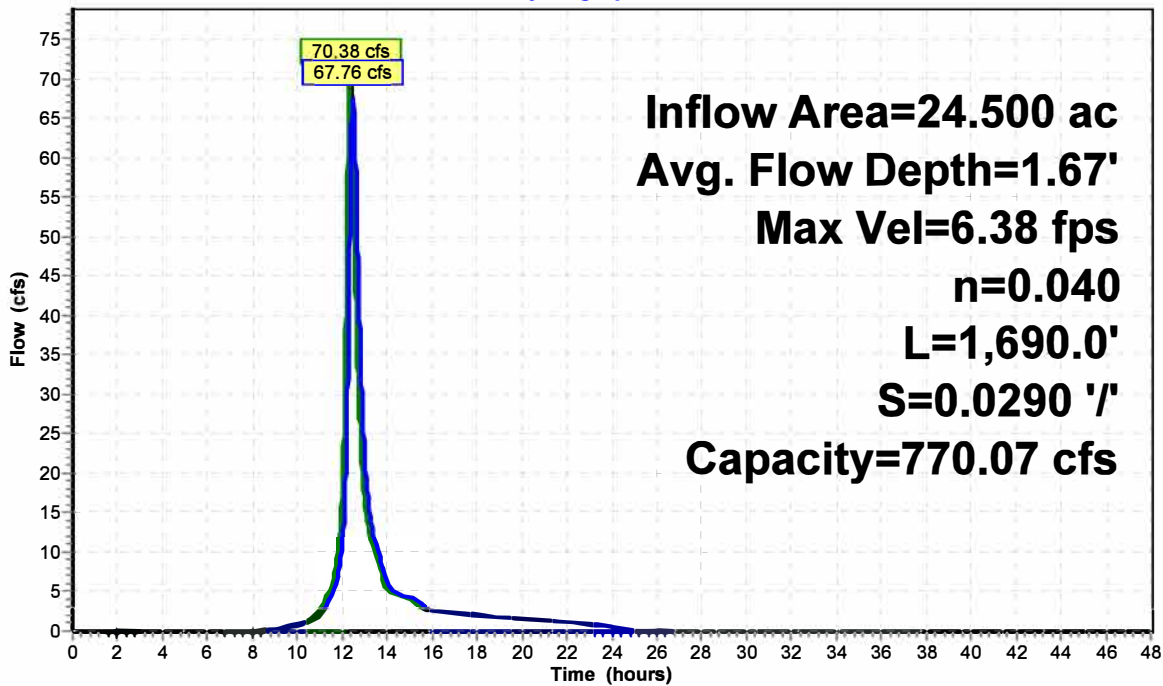
Peak Storage= 17,949 cf @ 12.41 hrs  
Average Depth at Peak Storage= 1.67' , Surface Width= 9.69'  
Bank-Full Depth= 5.00' Flow Area= 65.0 sf, Capacity= 770.07 cfs

3.00' x 5.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides  
Side Slope Z-value= 2.0 ' / ' Top Width= 23.00'  
Length= 1,690.0' Slope= 0.0290 ' / '  
Inlet Invert= 996.00', Outlet Invert= 947.00'

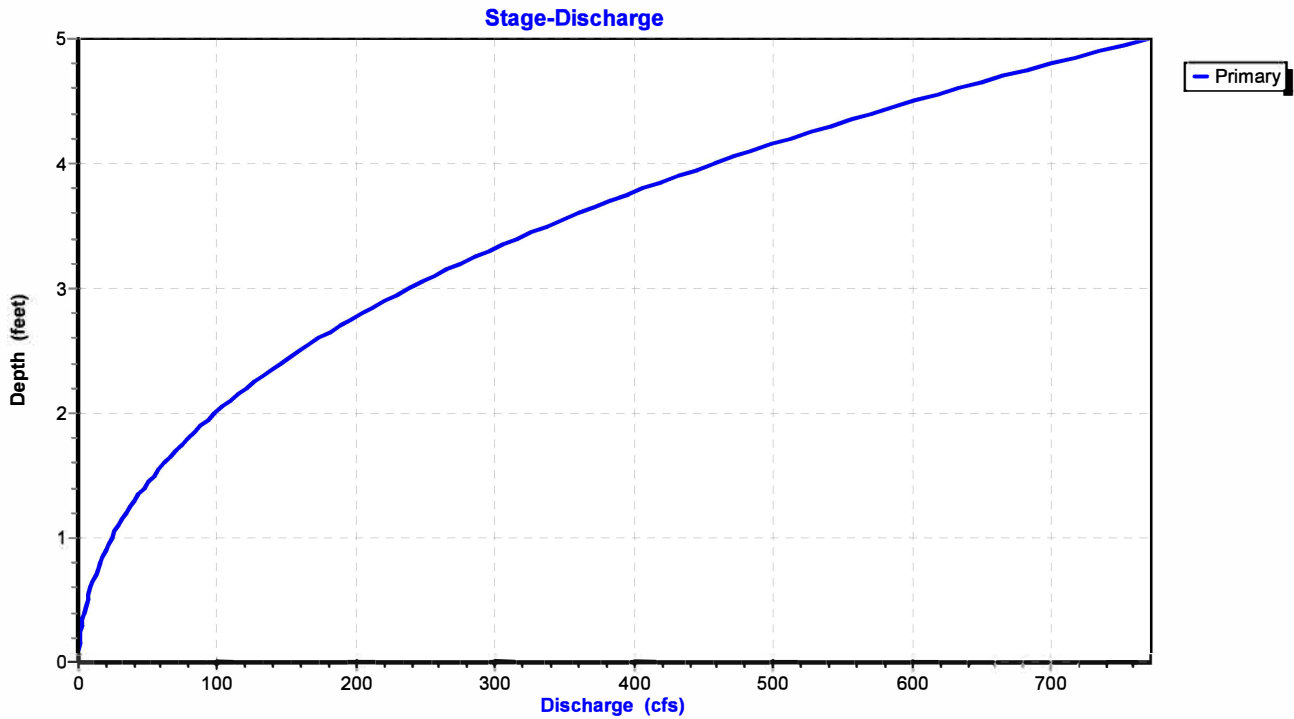


**Reach 9R: Site Stream**

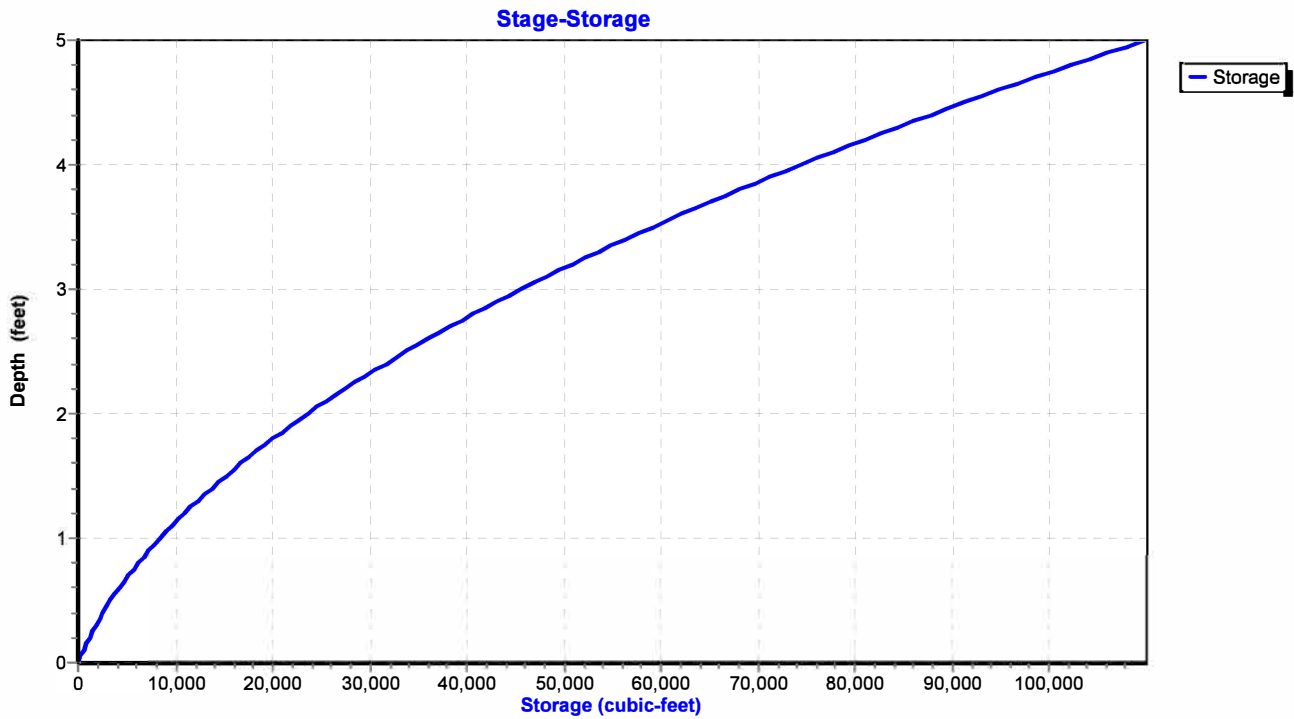
Hydrograph



### Reach 9R: Site Stream



### Reach 9R: Site Stream



# AF Prop w Det Condition

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MSE 24-hr 4 10-Yr Miami KS Rainfall=5.37"

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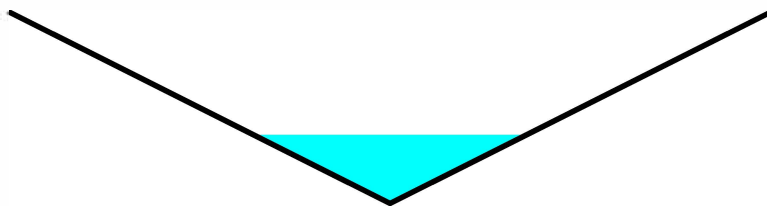
## Summary for Reach 10R: 223rd Ditch

Inflow Area = 3.300 ac, 0.00% Impervious, Inflow Depth = 3.22" for 10-Yr Miami KS event  
Inflow = 12.07 cfs @ 12.23 hrs, Volume= 0.885 af  
Outflow = 11.81 cfs @ 12.30 hrs, Volume= 0.885 af, Atten= 2%, Lag= 3.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Max. Velocity= 5.09 fps, Min. Travel Time= 2.1 min  
Avg. Velocity = 1.89 fps, Avg. Travel Time= 5.6 min

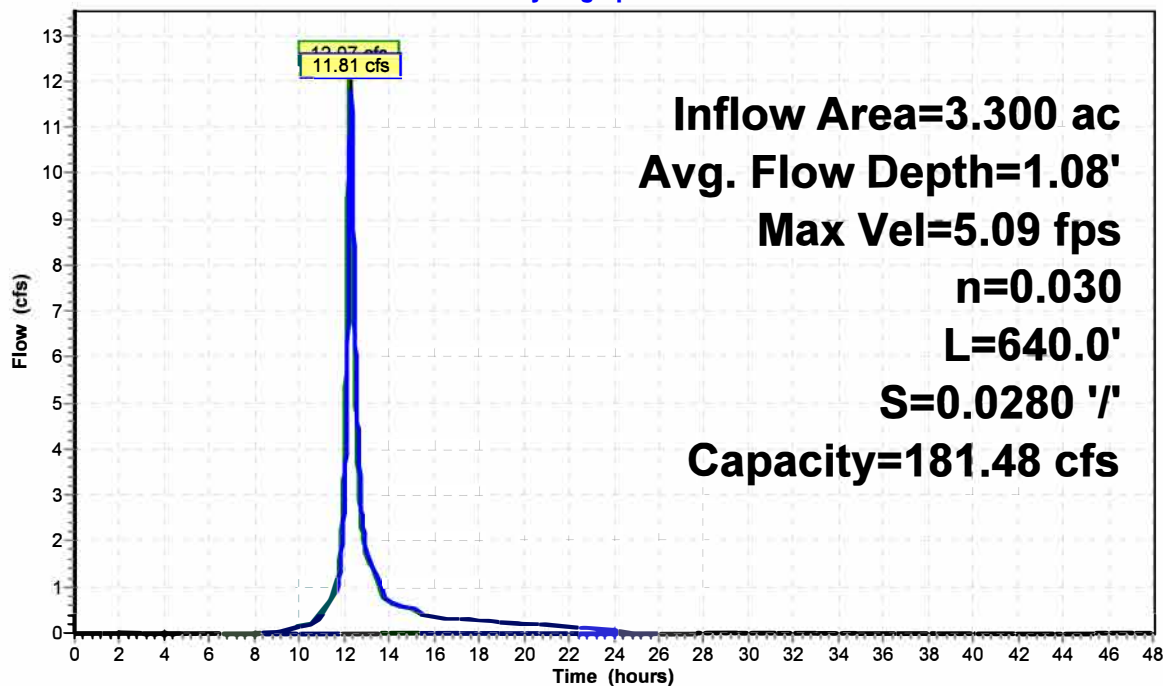
Peak Storage= 1,485 cf @ 12.26 hrs  
Average Depth at Peak Storage= 1.08' , Surface Width= 4.31'  
Bank-Full Depth= 3.00' Flow Area= 18.0 sf, Capacity= 181.48 cfs

0.00' x 3.00' deep channel, n= 0.030  
Side Slope Z-value= 2.0 ' / ' Top Width= 12.00'  
Length= 640.0' Slope= 0.0280 ' / '  
Inlet Invert= 999.00', Outlet Invert= 981.08'

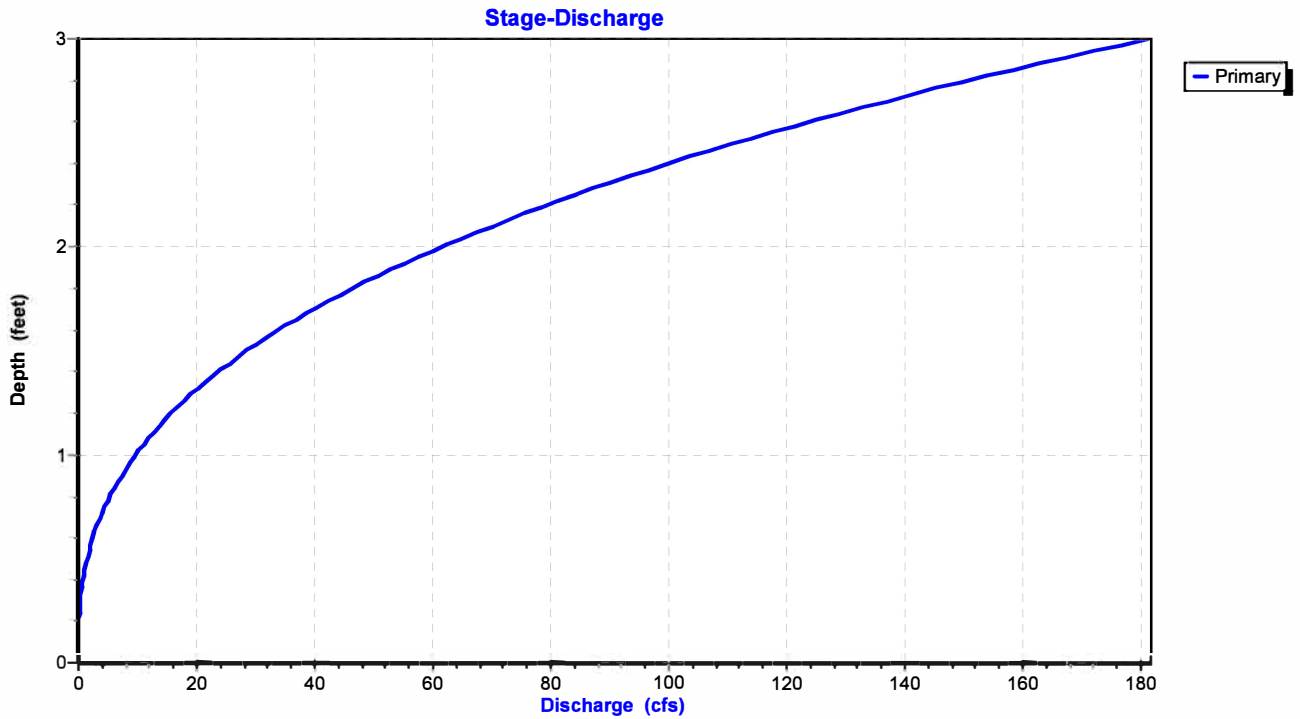


## Reach 10R: 223rd Ditch

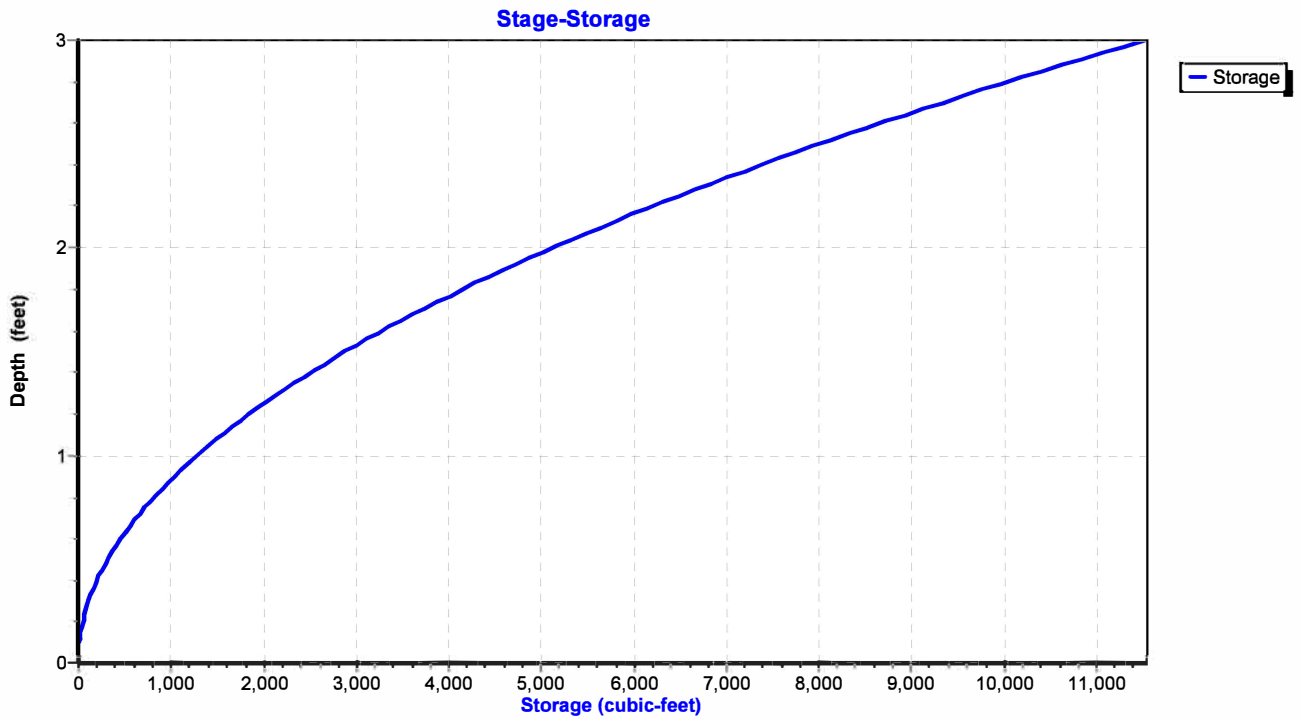
### Hydrograph



### Reach 10R: 223rd Ditch



### Reach 10R: 223rd Ditch



**AF Prop w Det Condition**

MSE 24-hr 4 10-Yr Miami KS Rainfall=5.37"

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**Summary for Pond 11P: Wet Pond**

Inflow Area = 46.000 ac, 7.61% Impervious, Inflow Depth = 3.26" for 10-Yr Miami KS event  
 Inflow = 113.93 cfs @ 12.28 hrs, Volume= 12.509 af  
 Outflow = 88.84 cfs @ 12.57 hrs, Volume= 12.509 af, Atten= 22%, Lag= 17.5 min  
 Primary = 88.84 cfs @ 12.57 hrs, Volume= 12.509 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
 Peak Elev= 964.61' @ 12.57 hrs Storage= 2.773 af

Plug-Flow detention time= 34.0 min calculated for 12.506 af (100% of inflow)  
 Center-of-Mass det. time= 34.1 min ( 859.2 - 825.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	961.00'	6.317 af	<b>Custom Stage Data</b> Listed below

Elevation (feet)	Cum.Store (acre-feet)
961.00	0.000
962.00	0.635
964.00	2.200
966.00	4.087
968.00	6.317

Device	Routing	Invert	Outlet Devices
#1	Primary	961.00'	<b>60.0" W x 15.0" H Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#2	Primary	964.00'	<b>24.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s)
#3	Secondary	966.00'	<b>70.0' long x 15.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

**Primary OutFlow** Max=88.78 cfs @ 12.57 hrs HW=964.61' (Free Discharge)

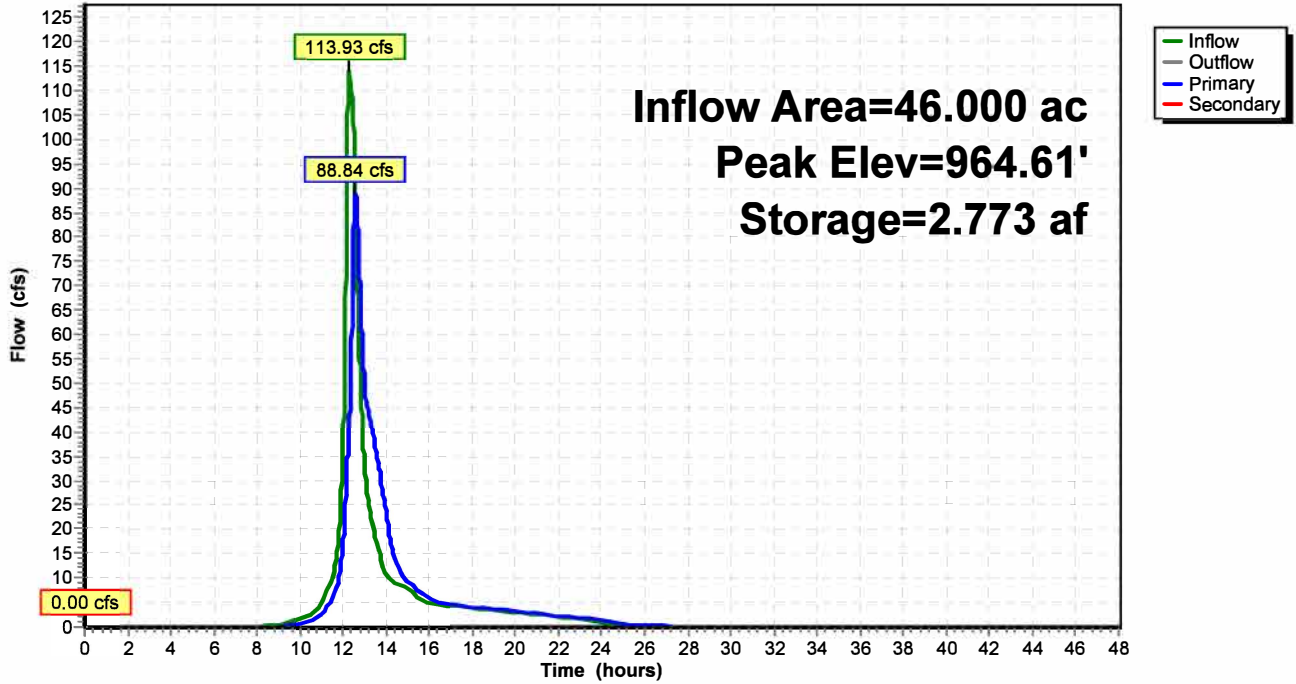
- ↑1=Orifice/Grate (Orifice Controls 51.87 cfs @ 8.30 fps)
- ↑2=Sharp-Crested Rectangular Weir (Weir Controls 36.91 cfs @ 2.55 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=961.00' (Free Discharge)

- ↑3=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

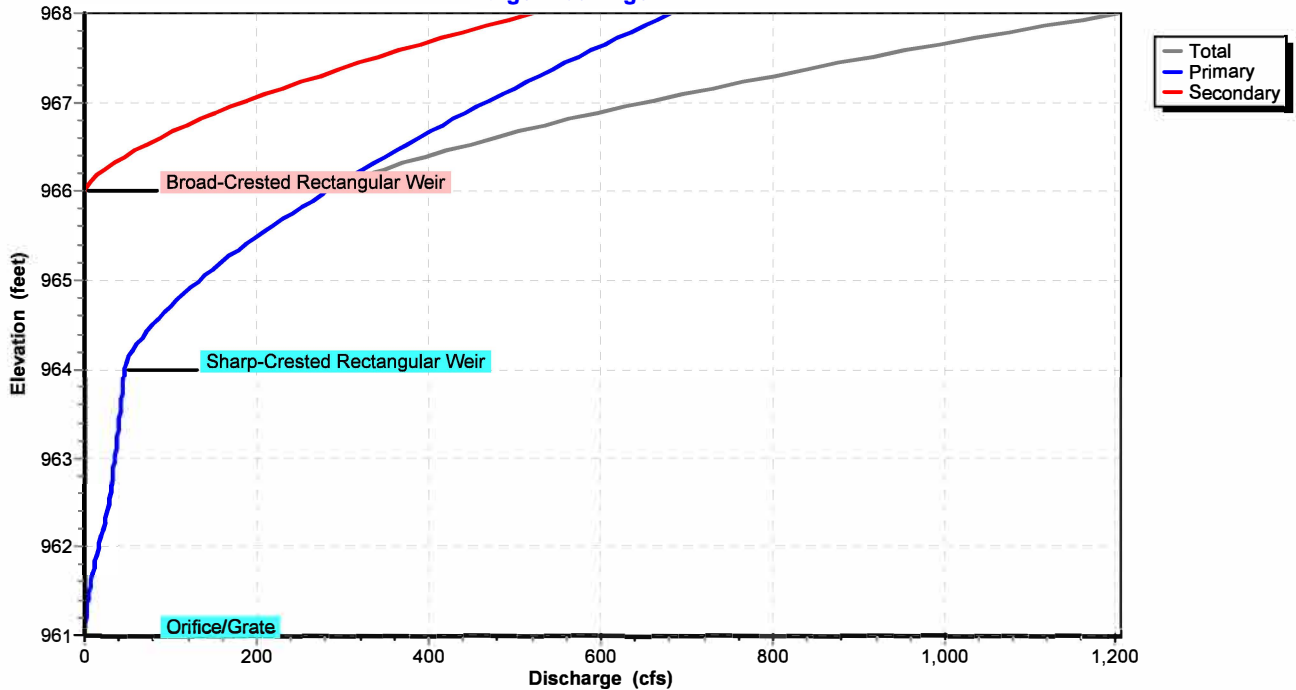
### Pond 11P: Wet Pond

Hydrograph



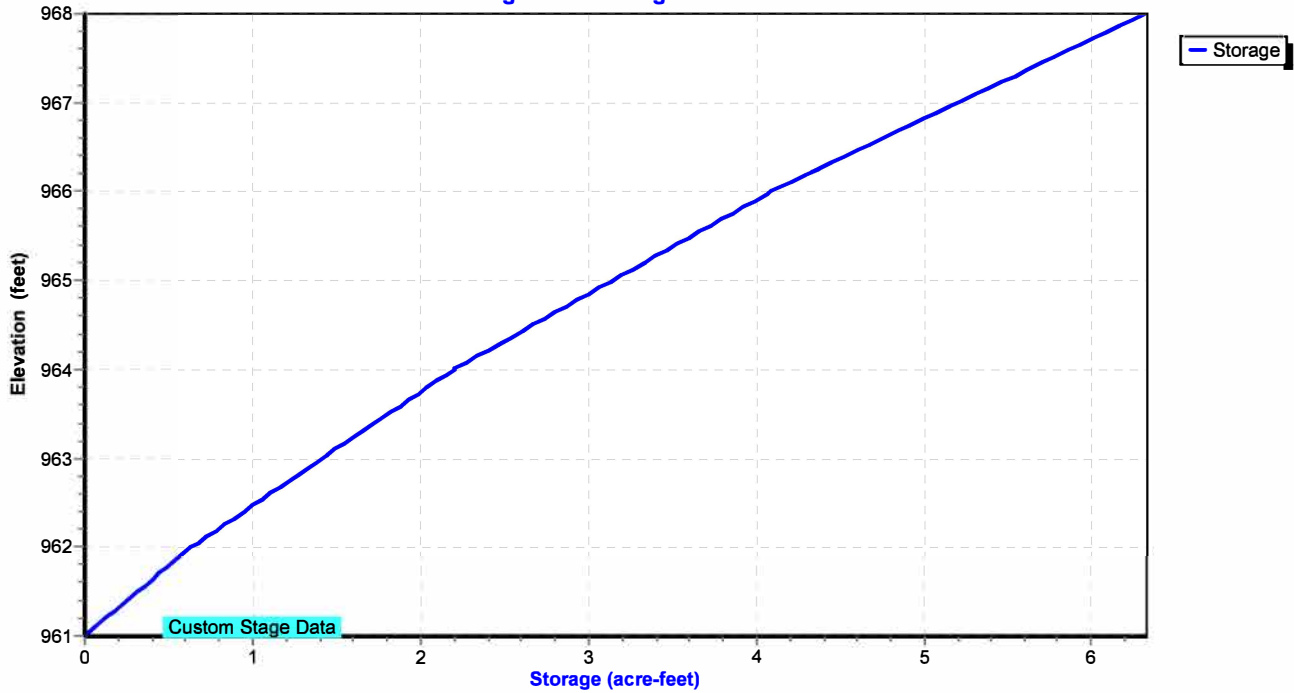
### Pond 11P: Wet Pond

Stage-Discharge



### Pond 11P: Wet Pond

Stage-Area-Storage



# AF Prop w Det Condition

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MSE 24-hr 4 10-Yr Miami KS Rainfall=5.37"

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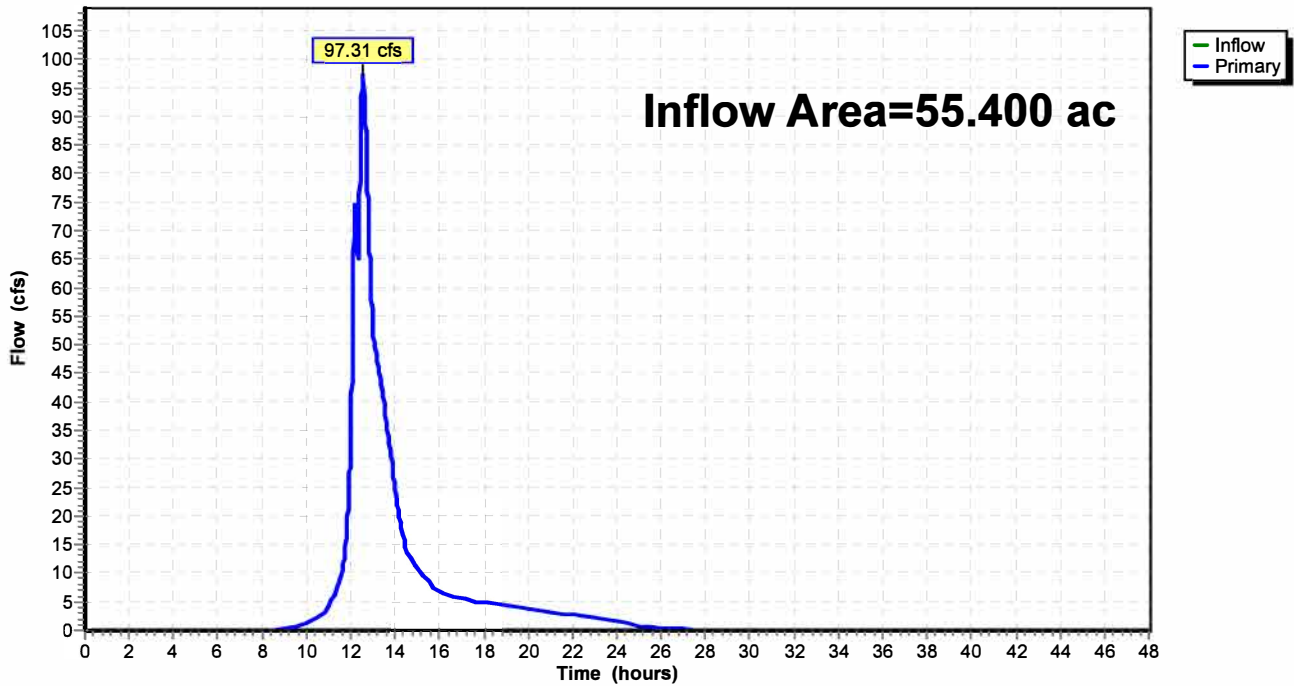
## Summary for Link 2L: W Site Limit

Inflow Area = 55.400 ac, 8.48% Impervious, Inflow Depth = 3.27" for 10-Yr Miami KS event  
Inflow = 97.31 cfs @ 12.55 hrs, Volume= 15.105 af  
Primary = 97.31 cfs @ 12.55 hrs, Volume= 15.105 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Link 2L: W Site Limit

### Hydrograph



**AF Prop w Det Condition**

MSE 24-hr 4 10-Yr Miami KS Rainfall=5.37"

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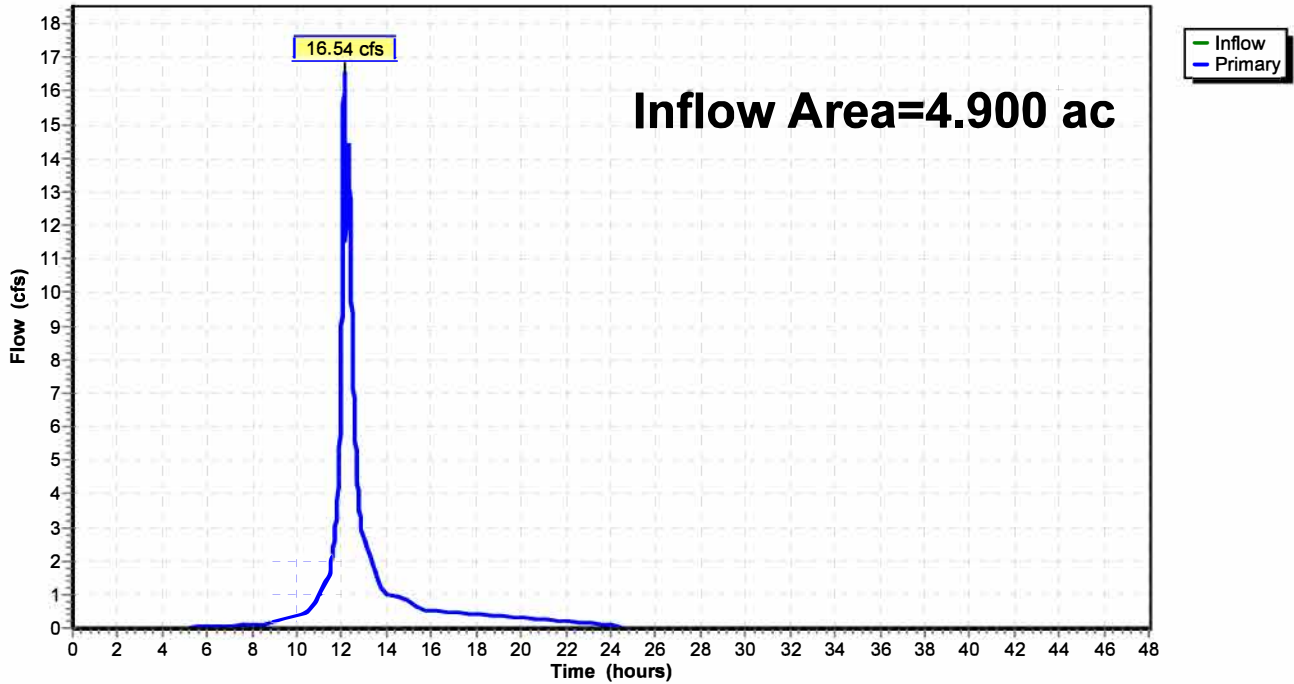
**Summary for Link 3L: CMPA Site Limit**

Inflow Area = 4.900 ac, 22.45% Impervious, Inflow Depth = 3.62" for 10-Yr Miami KS event  
Inflow = 16.54 cfs @ 12.11 hrs, Volume= 1.478 af  
Primary = 16.54 cfs @ 12.11 hrs, Volume= 1.478 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

**Link 3L: CMPA Site Limit**

Hydrograph



# AF Prop w Det Condition

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MSE 24-hr 4 10-Yr Miami KS Rainfall=5.37"

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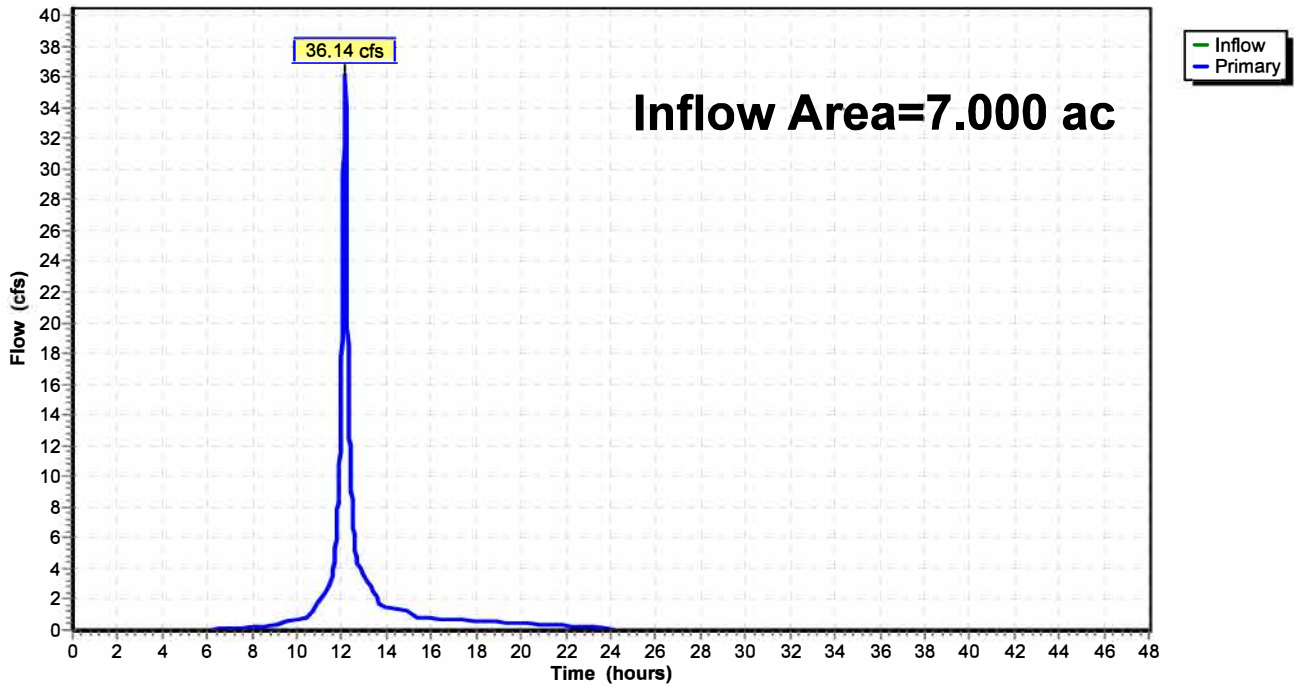
## Summary for Link 4L: NW Site Limit

Inflow Area = 7.000 ac, 36.43% Impervious, Inflow Depth = 3.89" for 10-Yr Miami KS event  
Inflow = 36.14 cfs @ 12.15 hrs, Volume= 2.268 af  
Primary = 36.14 cfs @ 12.15 hrs, Volume= 2.268 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

### Link 4L: NW Site Limit

Hydrograph



**AF Prop w Det Condition**

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MSE 24-hr 4 10-Yr Miami KS Rainfall=5.37"

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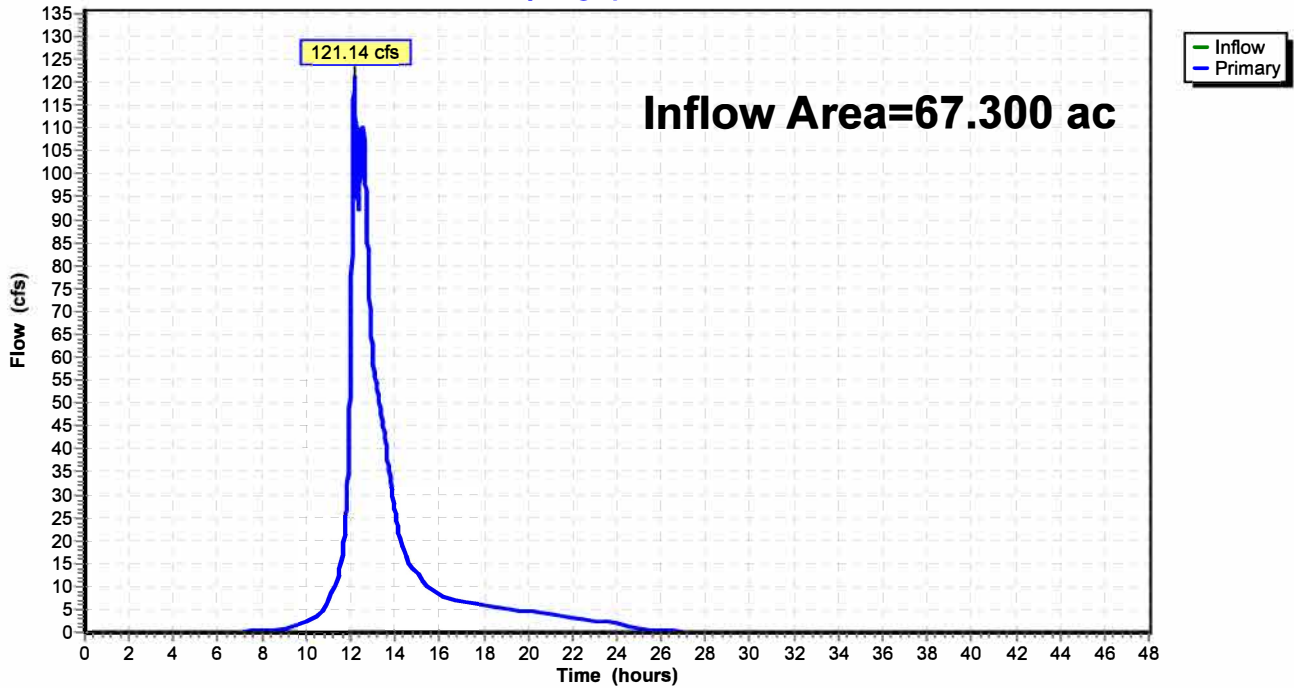
**Summary for Link 6L: Off-Site Confluence**

Inflow Area = 67.300 ac, 12.41% Impervious, Inflow Depth = 3.36" for 10-Yr Miami KS event  
Inflow = 121.14 cfs @ 12.17 hrs, Volume= 18.852 af  
Primary = 121.14 cfs @ 12.17 hrs, Volume= 18.852 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

**Link 6L: Off-Site Confluence**

Hydrograph



**AF Prop w Det Condition**

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MSE 24-hr 4 100-Yr Miami KS Rainfall=8.52"

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**Summary for Subcatchment 1S: W Site**

Runoff = 152.18 cfs @ 12.22 hrs, Volume= 11.170 af, Depth= 6.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
MSE 24-hr 4 100-Yr Miami KS Rainfall=8.52"

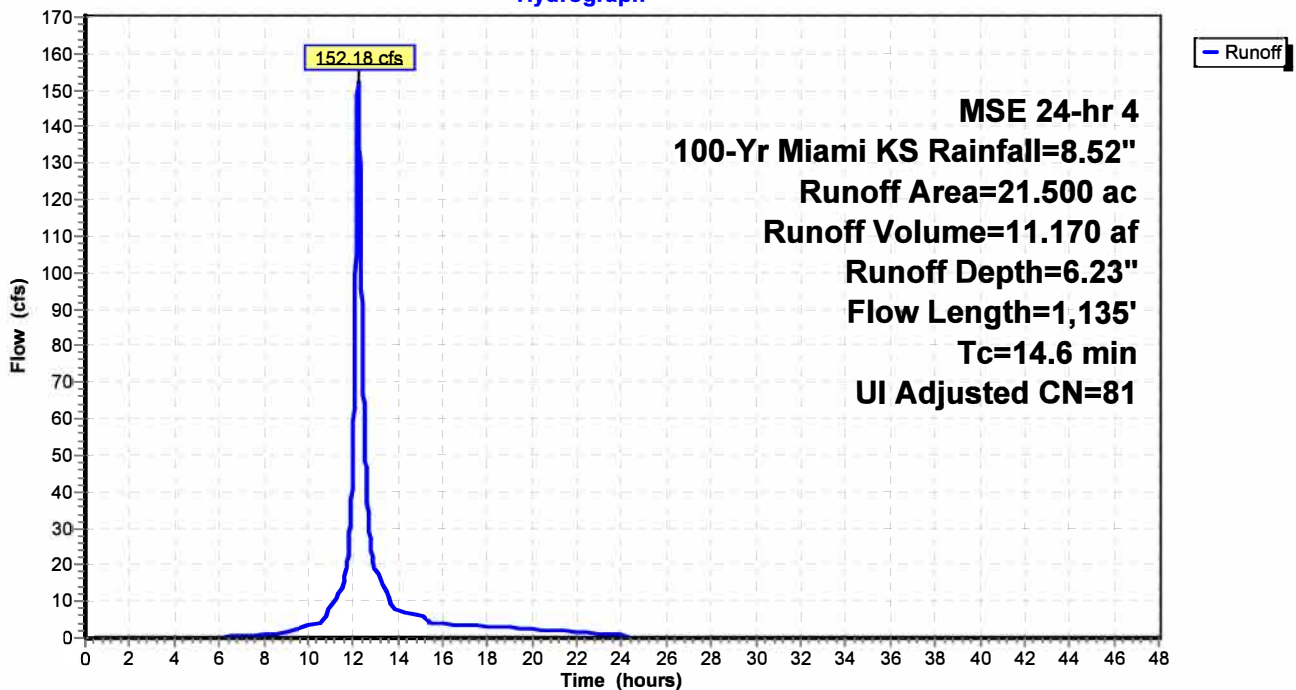
Area (ac)	CN	Adj	Description
18.000	80		>75% Grass cover, Good, HSG D
3.500	98		Unconnected pavement, HSG D
21.500	83	81	Weighted Average, UI Adjusted
18.000			83.72% Pervious Area
3.500			16.28% Impervious Area
3.500			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	100	0.0400	0.24		<b>Sheet Flow, Sheet</b> Grass: Short n= 0.150 P2= 3.60"
7.2	745	0.0600	1.71		<b>Shallow Concentrated Flow, Shallow</b> Short Grass Pasture Kv= 7.0 fps
0.4	290	0.0300	12.05	783.31	<b>Trap/Vee/Rect Channel Flow, Channel</b> Bot.W=3.00' D=5.00' Z= 2.0 '/' Top.W=23.00' n= 0.040
14.6	1,135	Total			

**Subcatchment 1S: W Site**

Hydrograph



**AF Prop w Det Condition**

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MSE 24-hr 4 100-Yr Miami KS Rainfall=8.52"

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**Summary for Subcatchment 3S: E Off-Site**

Runoff = 131.63 cfs @ 12.35 hrs, Volume= 12.483 af, Depth= 6.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
MSE 24-hr 4 100-Yr Miami KS Rainfall=8.52"

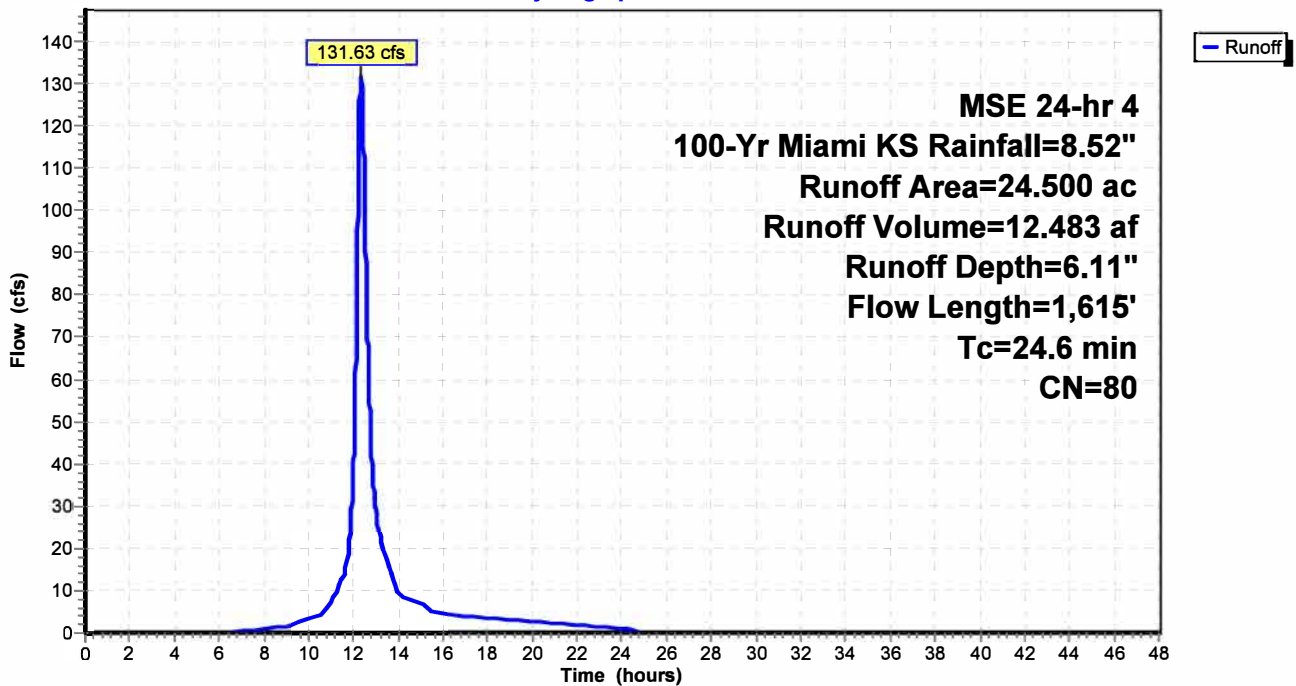
Area (ac)	CN	Description
24.500	80	Pasture/grassland/range, Good, HSG D
24.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	100	0.0220	0.19		<b>Sheet Flow, Sheet</b> Grass: Short n= 0.150 P2= 3.60"
14.6	1,060	0.0300	1.21		<b>Shallow Concentrated Flow, Shallow</b> Short Grass Pasture Kv= 7.0 fps
1.1	455		7.00		<b>Direct Entry, LxV 1</b>
24.6	1,615	Total			

**Subcatchment 3S: E Off-Site**

Hydrograph



**AF Prop w Det Condition**

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MSE 24-hr 4 100-Yr Miami KS Rainfall=8.52"

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**Summary for Subcatchment 4S: N Site**

Runoff = 19.15 cfs @ 12.10 hrs, Volume= 1.008 af, Depth= 7.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
MSE 24-hr 4 100-Yr Miami KS Rainfall=8.52"

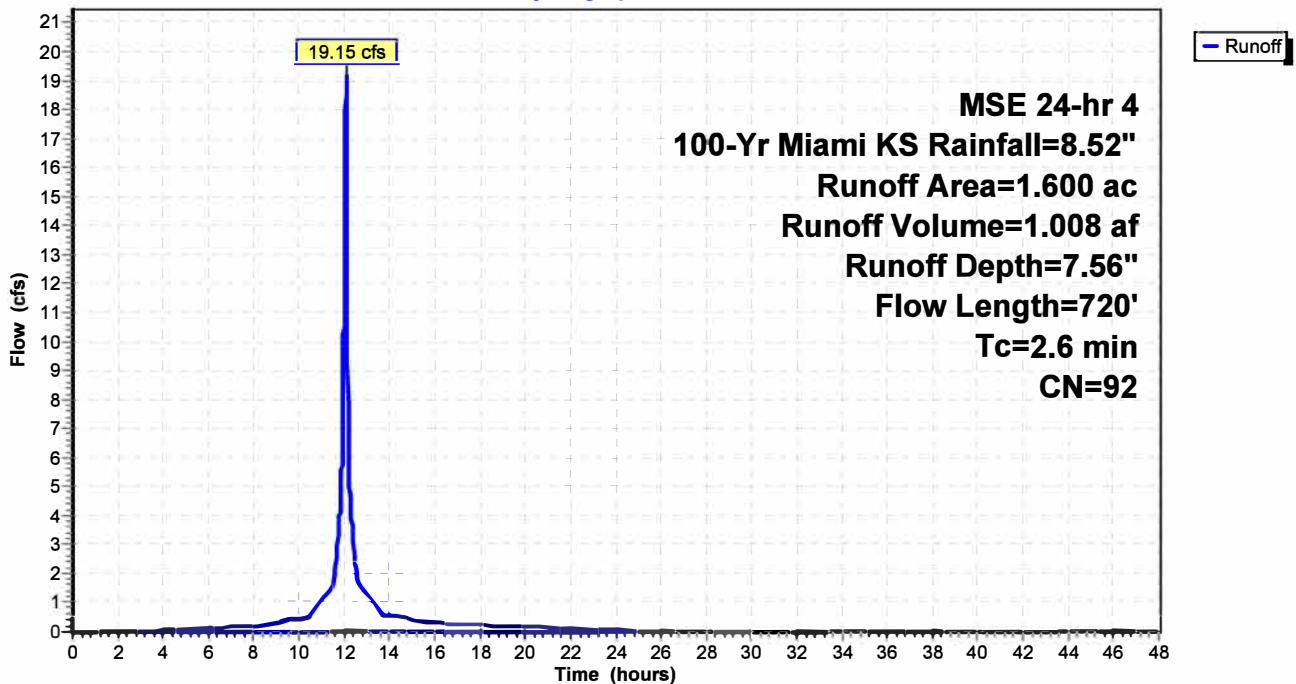
Area (ac)	CN	Description
0.500	80	>75% Grass cover, Good, HSG D
1.100	98	Unconnected pavement, HSG D
1.600	92	Weighted Average
0.500		31.25% Pervious Area
1.100		68.75% Impervious Area
1.100		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	100	0.0300	1.72		<b>Sheet Flow, Sheet</b> Smooth surfaces n= 0.011 P2= 3.60"
1.0	240	0.0400	4.06		<b>Shallow Concentrated Flow, Shallow</b> Paved Kv= 20.3 fps
0.6	380	0.0280	10.08	181.48	<b>Trap/Vee/Rect Channel Flow, Ditch</b> Bot.W=0.00' D=3.00' Z= 2.0 '/' Top.W=12.00' n= 0.030
2.6	720	Total			

**Subcatchment 4S: N Site**

Hydrograph



**AF Prop w Det Condition**

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MSE 24-hr 4 100-Yr Miami KS Rainfall=8.52"

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**Summary for Subcatchment 5S: NW Site**

Runoff = 59.73 cfs @ 12.15 hrs, Volume= 3.589 af, Depth= 6.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
MSE 24-hr 4 100-Yr Miami KS Rainfall=8.52"

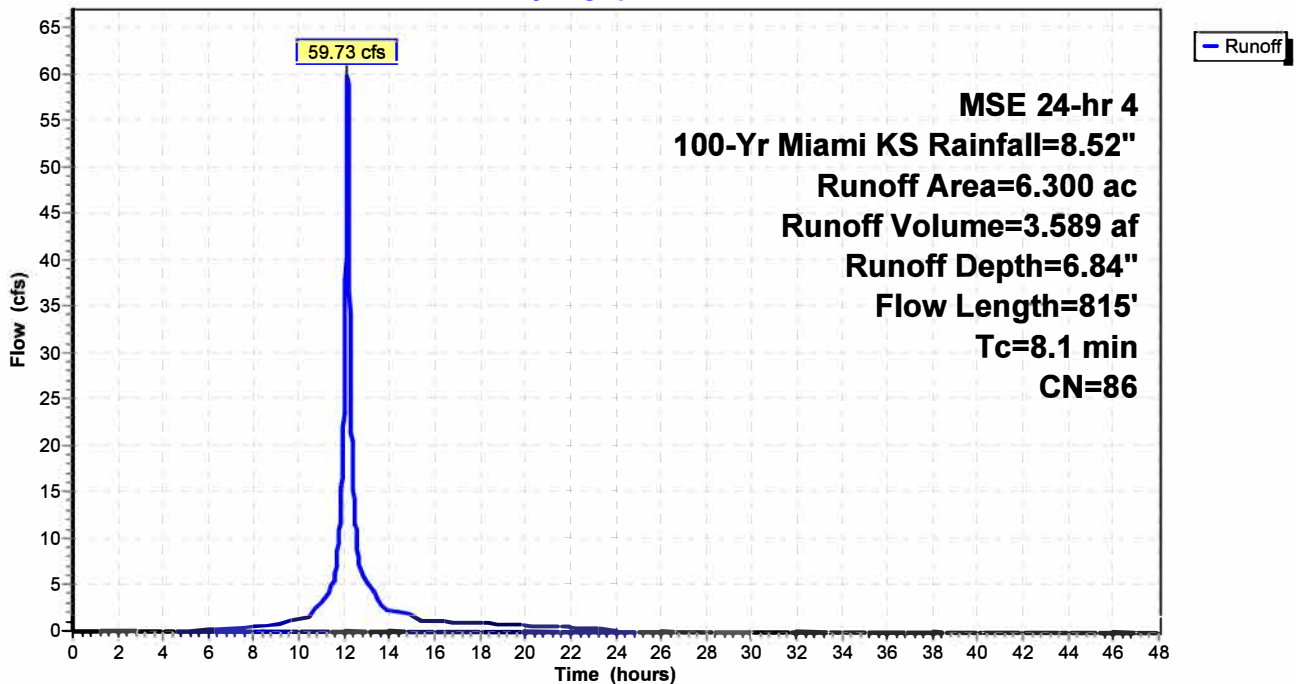
Area (ac)	CN	Description
2.200	98	Unconnected pavement, HSG D
4.100	80	>75% Grass cover, Good, HSG D
6.300	86	Weighted Average
4.100		65.08% Pervious Area
2.200		34.92% Impervious Area
2.200		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	100	0.0500	0.26		<b>Sheet Flow, Sheet</b> Grass: Short n= 0.150 P2= 3.60"
0.8	125	0.1500	2.71		<b>Shallow Concentrated Flow, Shallow</b> Short Grass Pasture Kv= 7.0 fps
0.9	590	0.0320	10.78	194.02	<b>Trap/Vee/Rect Channel Flow, Ditch</b> Bot.W=0.00' D=3.00' Z= 2.0 '/' Top.W=12.00' n= 0.030
8.1	815	Total			

**Subcatchment 5S: NW Site**

Hydrograph



**AF Prop w Det Condition**

MSE 24-hr 4 100-Yr Miami KS Rainfall=8.52"

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**Summary for Subcatchment 7S: NW Off-Site**

Runoff = 8.49 cfs @ 12.10 hrs, Volume= 0.448 af, Depth= 7.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
 MSE 24-hr 4 100-Yr Miami KS Rainfall=8.52"

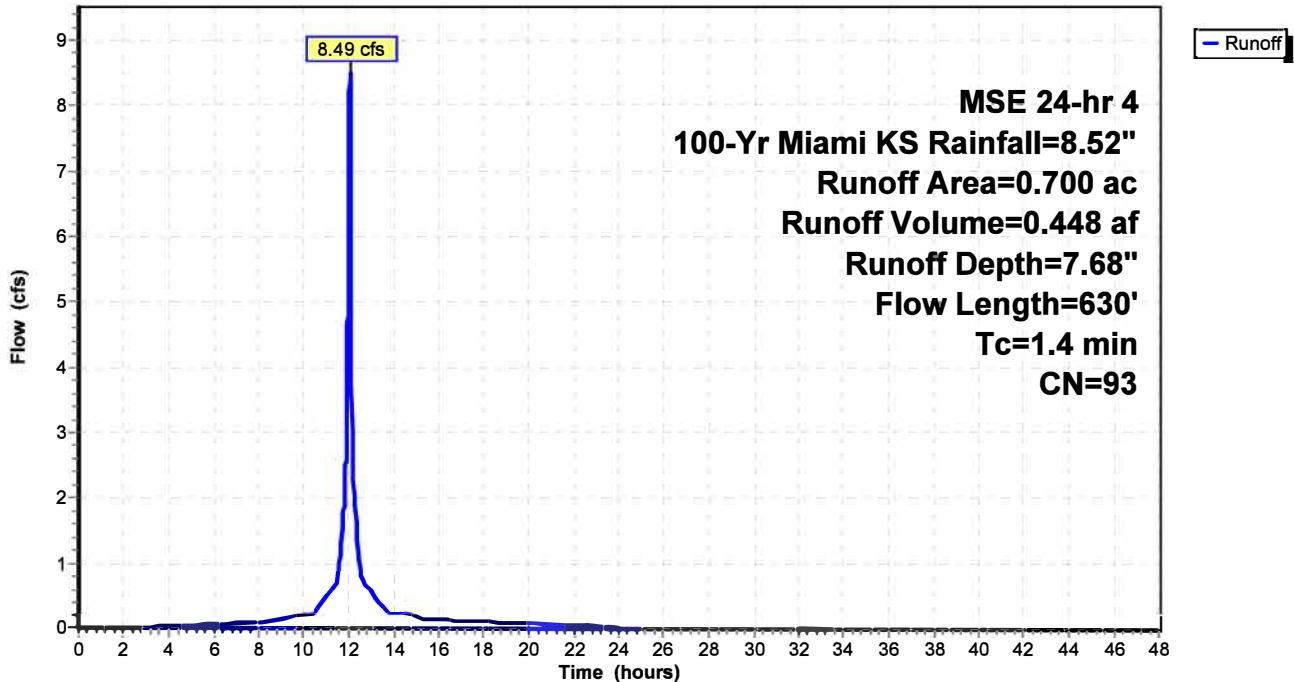
Area (ac)	CN	Description
0.700	93	Paved roads w/open ditches, 50% imp, HSG D
0.350		50.00% Pervious Area
0.350		50.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	40	0.0300	1.43		<b>Sheet Flow, Sheet</b> Smooth surfaces n= 0.011 P2= 3.60"
0.9	590	0.0320	10.78	194.02	<b>Trap/Vee/Rect Channel Flow, Ditch</b> Bot.W=0.00' D=3.00' Z= 2.0 ' / Top.W=12.00' n= 0.030
1.4	630	Total			

**Subcatchment 7S: NW Off-Site**

Hydrograph



**AF Prop w Det Condition**

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MSE 24-hr 4 100-Yr Miami KS Rainfall=8.52"

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**Summary for Subcatchment 8S: NE Off-Site**

Runoff = 22.49 cfs @ 12.23 hrs, Volume= 1.681 af, Depth= 6.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
MSE 24-hr 4 100-Yr Miami KS Rainfall=8.52"

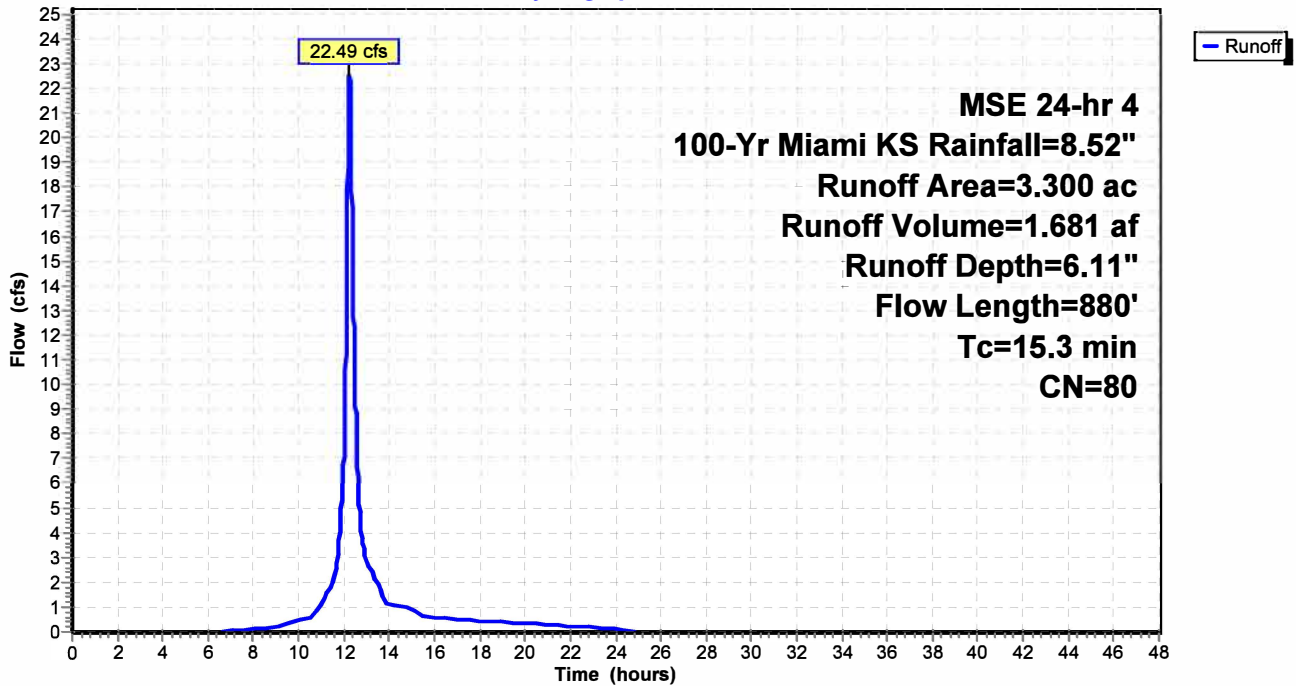
Area (ac)	CN	Description
3.300	80	Pasture/grassland/range, Good, HSG D
3.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.0200	0.18		<b>Sheet Flow, Sheet</b> Grass: Short n= 0.150 P2= 3.60"
5.5	350	0.0230	1.06		<b>Shallow Concentrated Flow, Shallow</b> Short Grass Pasture Kv= 7.0 fps
0.6	430	0.0370	11.59	208.62	<b>Trap/Vee/Rect Channel Flow, Ditch</b> Bot.W=0.00' D=3.00' Z= 2.0 ' Top.W=12.00' n= 0.030
15.3	880	Total			

**Subcatchment 8S: NE Off-Site**

Hydrograph



**AF Prop w Det Condition**

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MSE 24-hr 4 100-Yr Miami KS Rainfall=8.52"

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**Summary for Subcatchment 12S: W Site Bypass**

Runoff = 79.13 cfs @ 12.17 hrs, Volume= 4.884 af, Depth= 6.23"

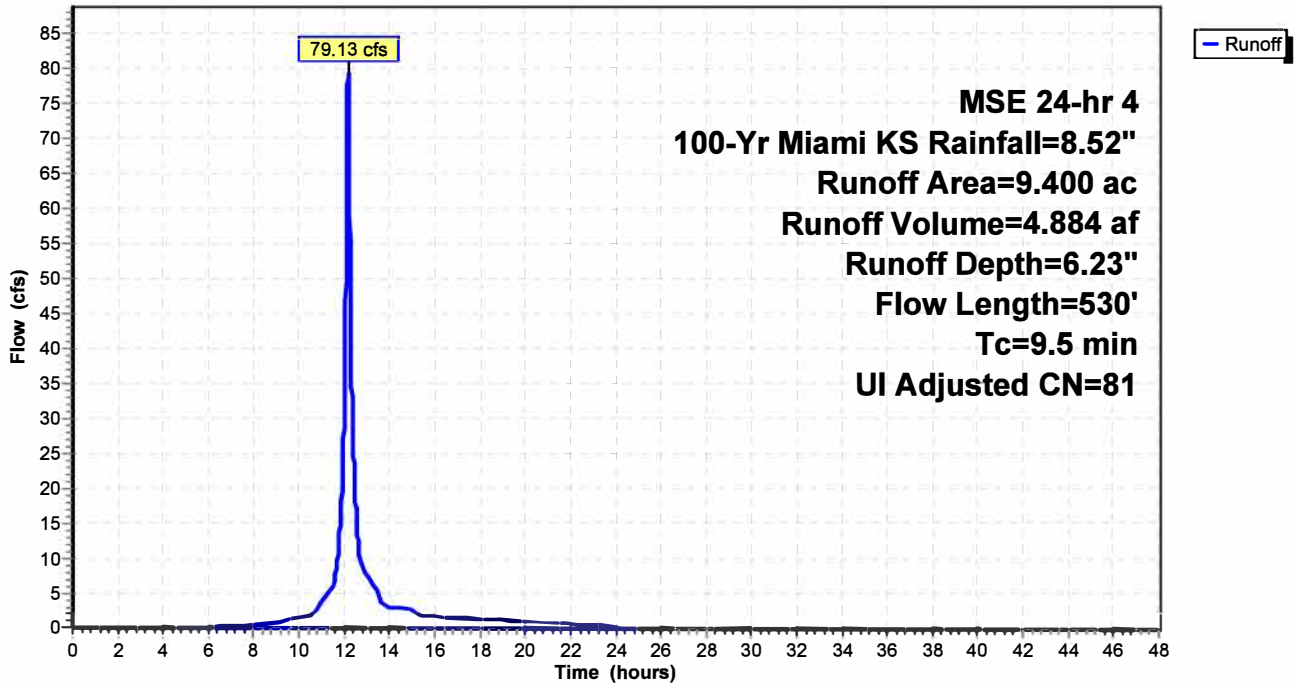
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
MSE 24-hr 4 100-Yr Miami KS Rainfall=8.52"

Area (ac)	CN	Adj	Description
8.200	80		>75% Grass cover, Good, HSG D
1.200	98		Unconnected pavement, HSG D
9.400	82	81	Weighted Average, UI Adjusted
8.200			87.23% Pervious Area
1.200			12.77% Impervious Area
1.200			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	100	0.0480	0.26		<b>Sheet Flow, Sheet</b> Grass: Short n= 0.150 P2= 3.60"
3.0	430	0.1200	2.42		<b>Shallow Concentrated Flow, Shallow</b> Short Grass Pasture Kv= 7.0 fps
9.5	530	Total			

**Subcatchment 12S: W Site Bypass**

Hydrograph



**AF Prop w Det Condition**

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MSE 24-hr 4 100-Yr Miami KS Rainfall=8.52"

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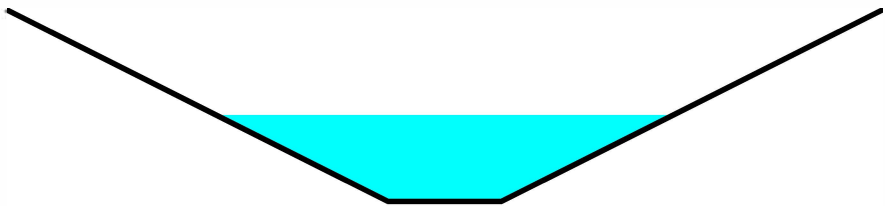
**Summary for Reach 9R: Site Stream**

Inflow Area = 24.500 ac, 0.00% Impervious, Inflow Depth = 6.11" for 100-Yr Miami KS event  
Inflow = 131.63 cfs @ 12.35 hrs, Volume= 12.483 af  
Outflow = 128.03 cfs @ 12.46 hrs, Volume= 12.483 af, Atten= 3%, Lag= 6.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Max. Velocity= 7.52 fps, Min. Travel Time= 3.7 min  
Avg. Velocity = 2.38 fps, Avg. Travel Time= 11.8 min

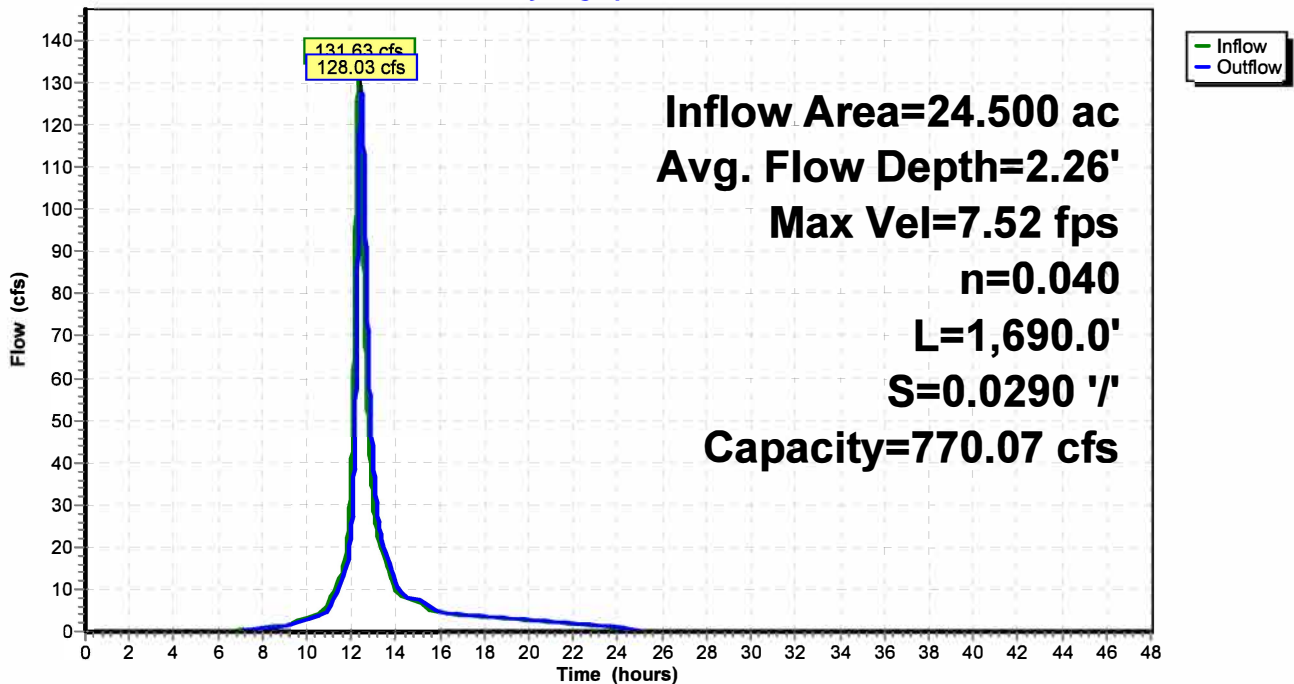
Peak Storage= 28,758 cf @ 12.39 hrs  
Average Depth at Peak Storage= 2.26' , Surface Width= 12.05'  
Bank-Full Depth= 5.00' Flow Area= 65.0 sf, Capacity= 770.07 cfs

3.00' x 5.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides  
Side Slope Z-value= 2.0 ' / ' Top Width= 23.00'  
Length= 1,690.0' Slope= 0.0290 ' / '  
Inlet Invert= 996.00', Outlet Invert= 947.00'

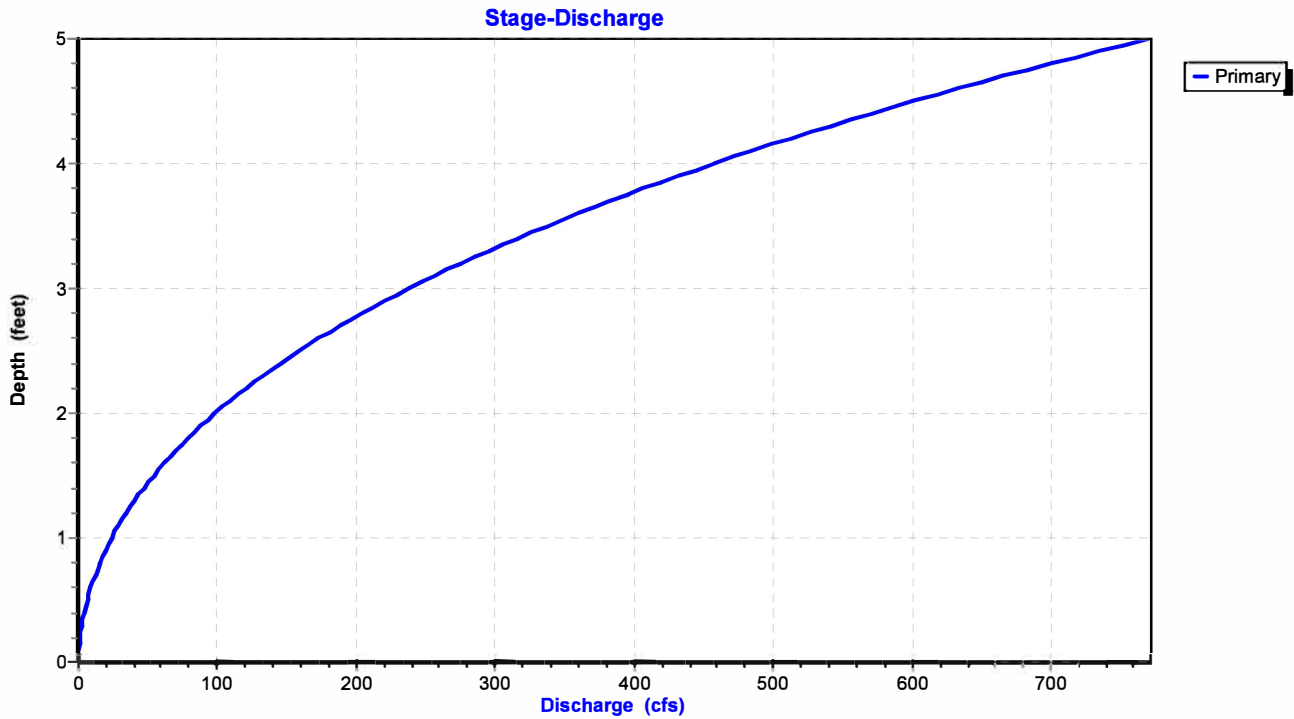


**Reach 9R: Site Stream**

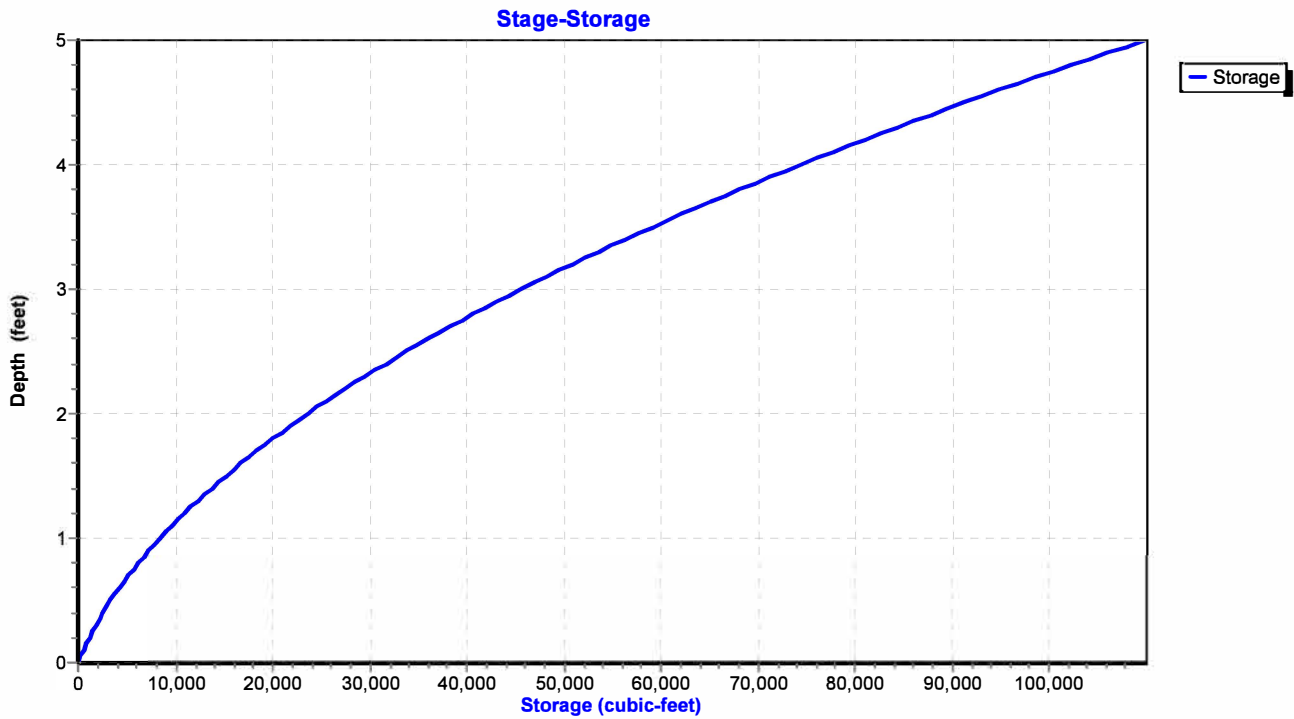
Hydrograph



### Reach 9R: Site Stream



### Reach 9R: Site Stream



**AF Prop w Det Condition**

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MSE 24-hr 4 100-Yr Miami KS Rainfall=8.52"

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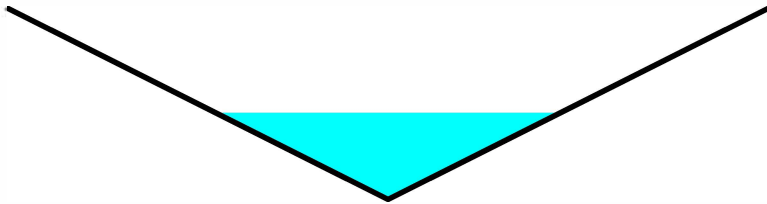
**Summary for Reach 10R: 223rd Ditch**

Inflow Area = 3.300 ac, 0.00% Impervious, Inflow Depth = 6.11" for 100-Yr Miami KS event  
Inflow = 22.49 cfs @ 12.23 hrs, Volume= 1.681 af  
Outflow = 22.14 cfs @ 12.29 hrs, Volume= 1.681 af, Atten= 2%, Lag= 3.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
Max. Velocity= 5.96 fps, Min. Travel Time= 1.8 min  
Avg. Velocity = 2.15 fps, Avg. Travel Time= 5.0 min

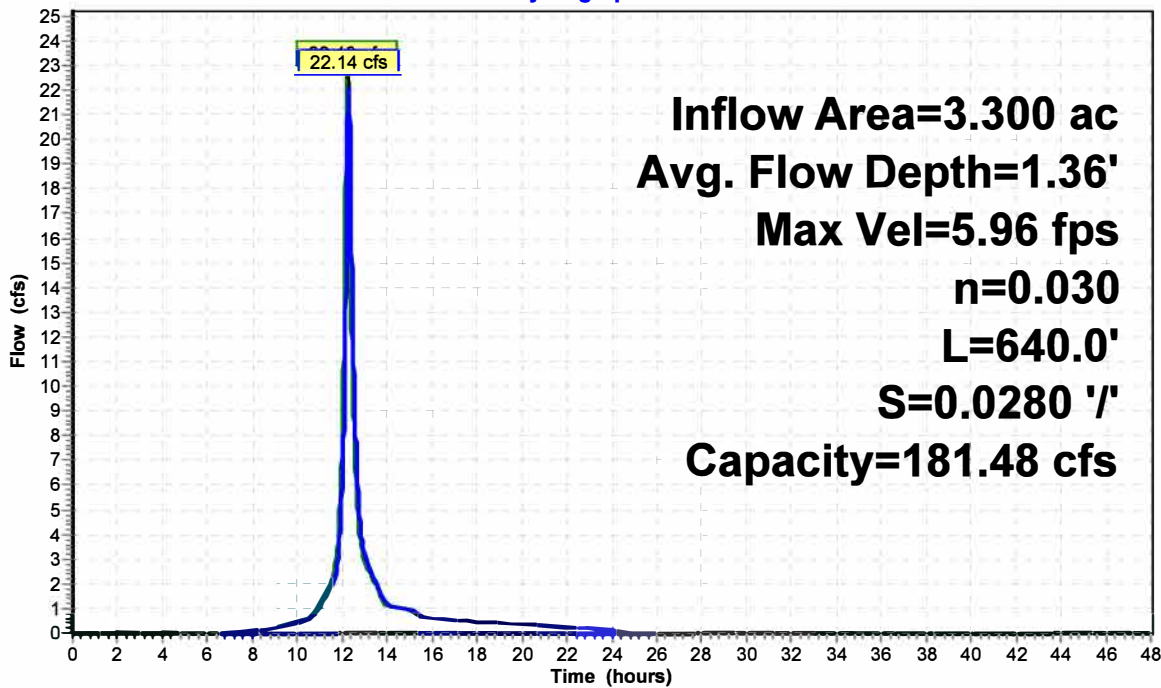
Peak Storage= 2,378 cf @ 12.26 hrs  
Average Depth at Peak Storage= 1.36' , Surface Width= 5.45'  
Bank-Full Depth= 3.00' Flow Area= 18.0 sf, Capacity= 181.48 cfs

0.00' x 3.00' deep channel, n= 0.030  
Side Slope Z-value= 2.0 ' / ' Top Width= 12.00'  
Length= 640.0' Slope= 0.0280 ' / '  
Inlet Invert= 999.00', Outlet Invert= 981.08'



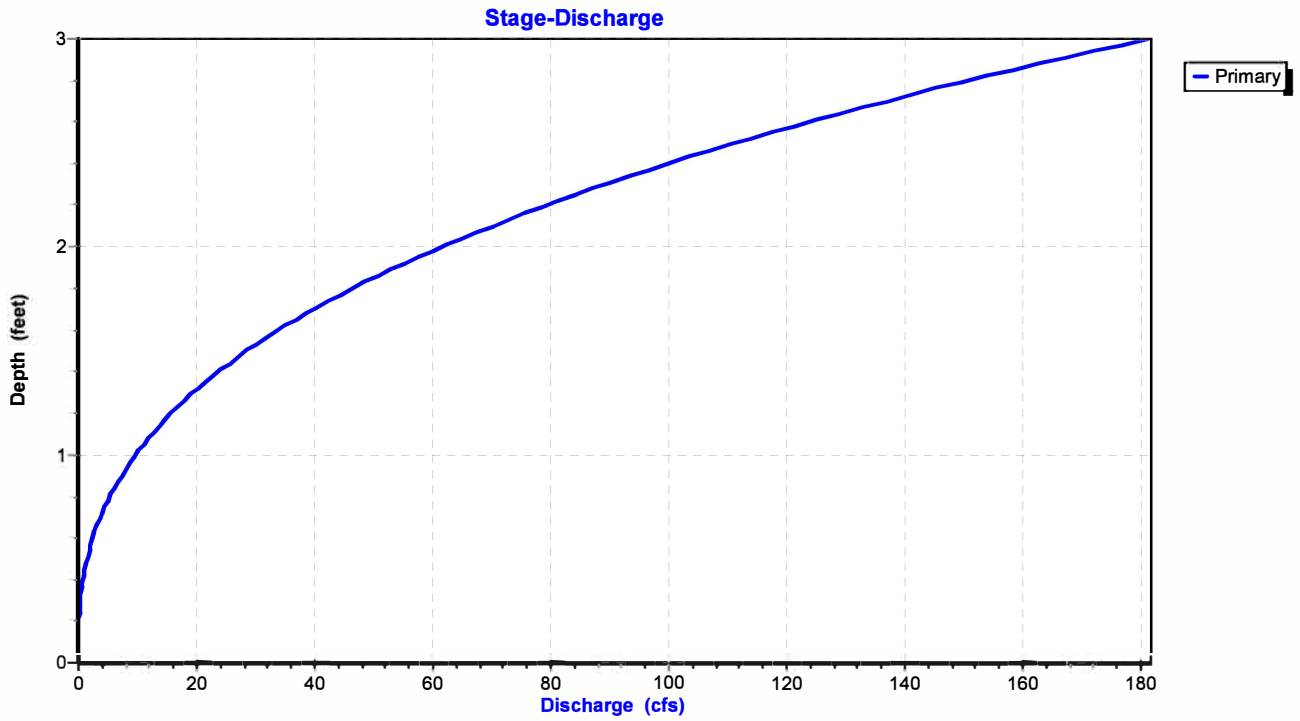
**Reach 10R: 223rd Ditch**

Hydrograph

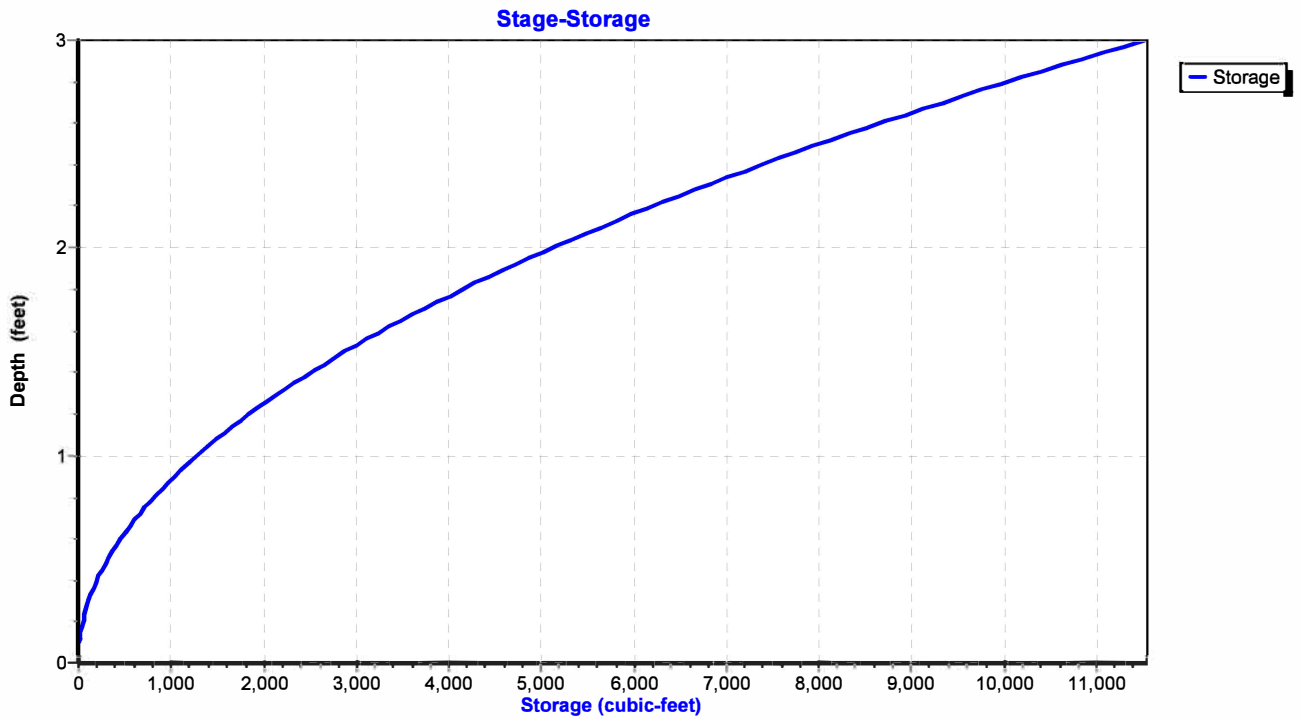


Inflow  
Outflow

### Reach 10R: 223rd Ditch



### Reach 10R: 223rd Ditch



**AF Prop w Det Condition**

MSE 24-hr 4 100-Yr Miami KS Rainfall=8.52"

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**Summary for Pond 11P: Wet Pond**

Inflow Area = 46.000 ac, 7.61% Impervious, Inflow Depth = 6.17" for 100-Yr Miami KS event  
 Inflow = 220.75 cfs @ 12.28 hrs, Volume= 23.653 af  
 Outflow = 202.56 cfs @ 12.42 hrs, Volume= 23.653 af, Atten= 8%, Lag= 8.8 min  
 Primary = 202.56 cfs @ 12.42 hrs, Volume= 23.653 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs  
 Peak Elev= 965.51' @ 12.42 hrs Storage= 3.621 af

Plug-Flow detention time= 26.9 min calculated for 23.648 af (100% of inflow)  
 Center-of-Mass det. time= 27.0 min ( 836.1 - 809.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	961.00'	6.317 af	<b>Custom Stage Data</b> Listed below

Elevation (feet)	Cum.Store (acre-feet)
961.00	0.000
962.00	0.635
964.00	2.200
966.00	4.087
968.00	6.317

Device	Routing	Invert	Outlet Devices
#1	Primary	961.00'	<b>60.0" W x 15.0" H Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#2	Primary	964.00'	<b>24.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s)
#3	Secondary	966.00'	<b>70.0' long x 15.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

**Primary OutFlow** Max=202.50 cfs @ 12.42 hrs HW=965.51' (Free Discharge)

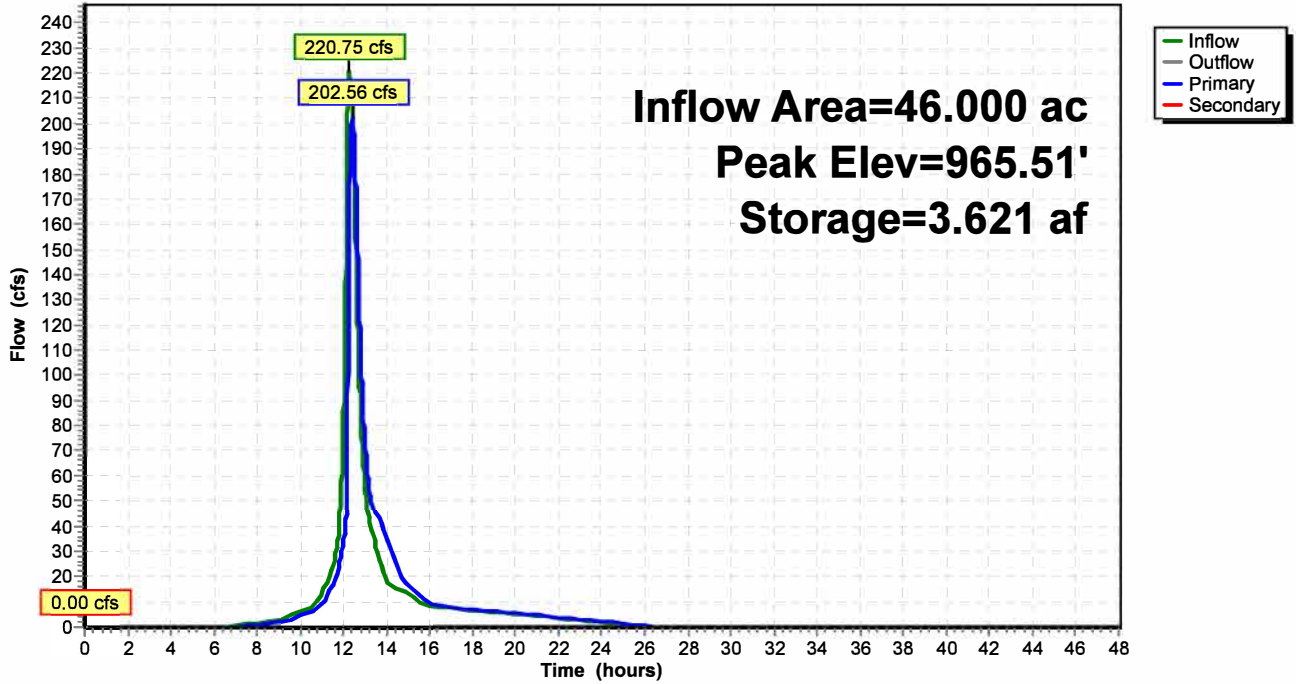
- ↑1=Orifice/Grate (Orifice Controls 59.22 cfs @ 9.48 fps)
- ↑2=Sharp-Crested Rectangular Weir (Weir Controls 143.28 cfs @ 4.01 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=961.00' (Free Discharge)

- ↑3=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

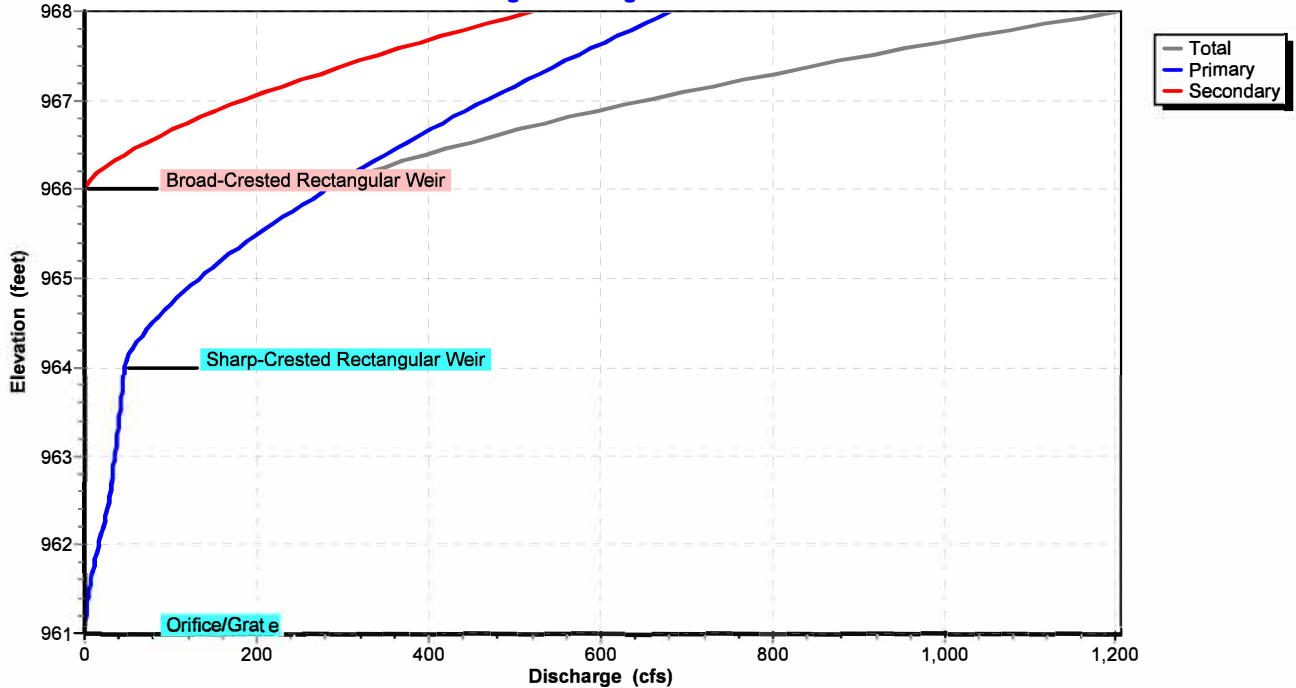
### Pond 11P: Wet Pond

Hydrograph



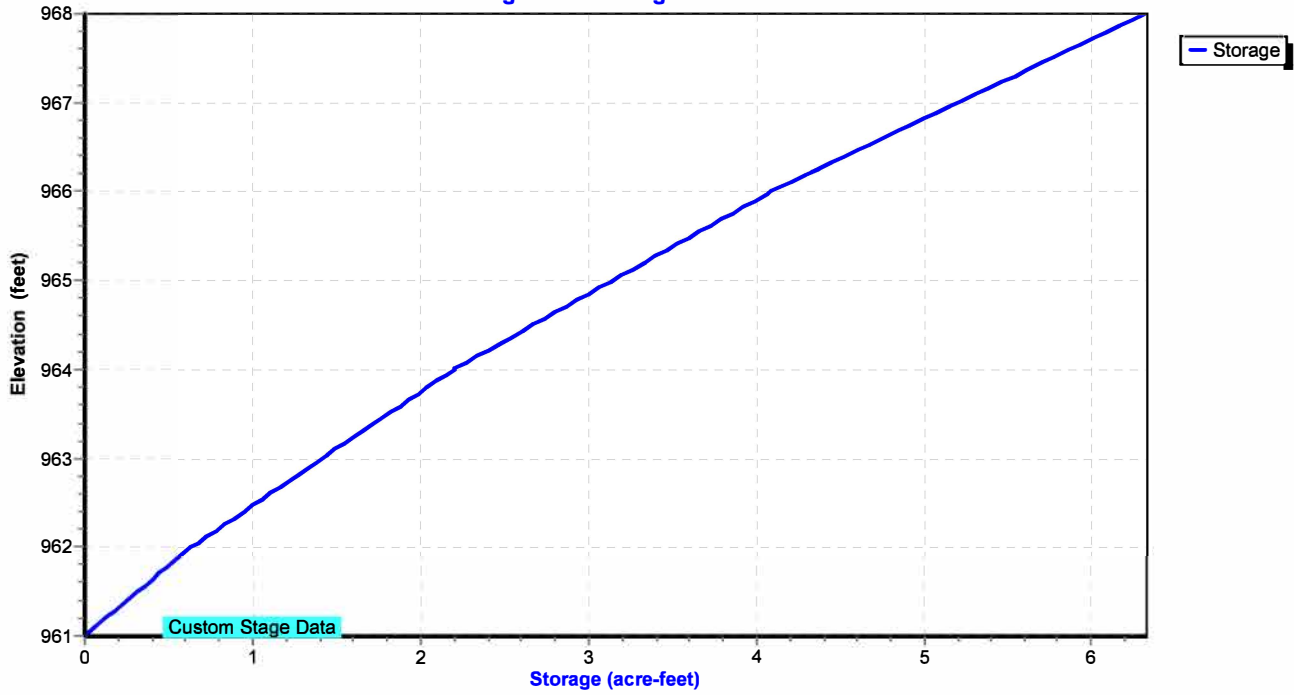
### Pond 11P: Wet Pond

Stage-Discharge



### Pond 11P: Wet Pond

Stage-Area-Storage



**AF Prop w Det Condition**

MSE 24-hr 4 100-Yr Miami KS Rainfall=8.52"

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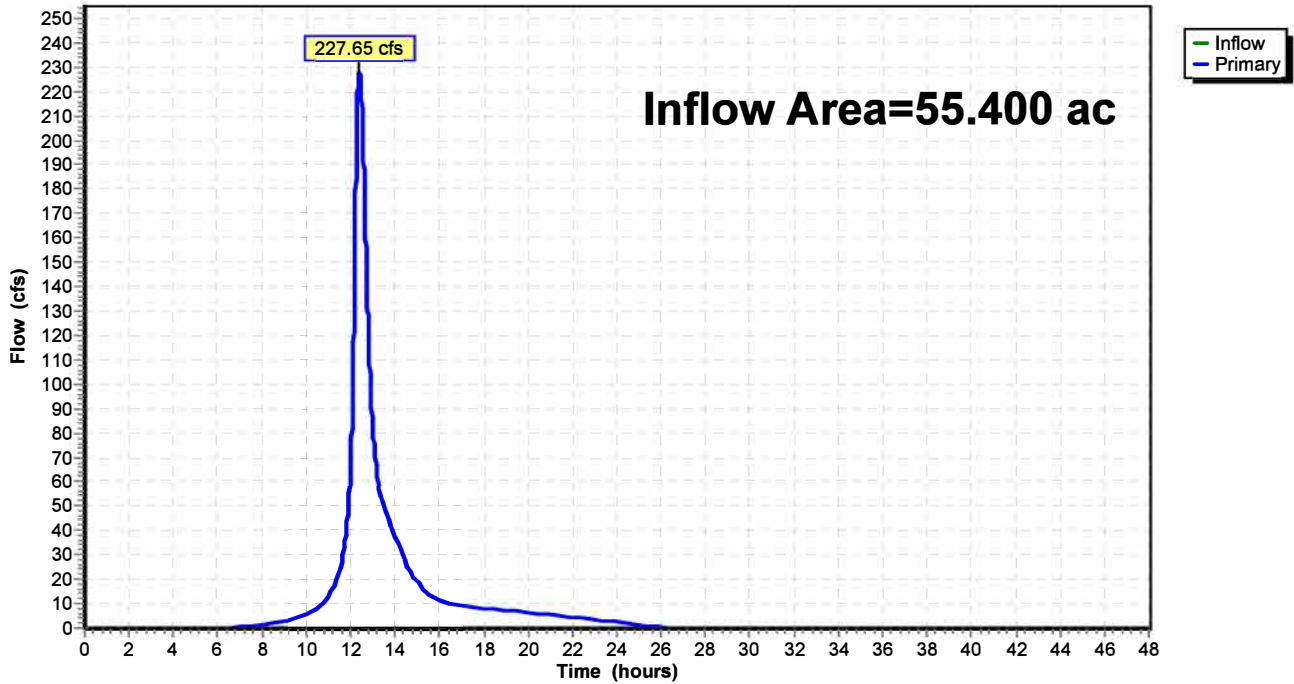
**Summary for Link 2L: W Site Limit**

Inflow Area = 55.400 ac, 8.48% Impervious, Inflow Depth = 6.18" for 100-Yr Miami KS event  
Inflow = 227.65 cfs @ 12.38 hrs, Volume= 28.537 af  
Primary = 227.65 cfs @ 12.38 hrs, Volume= 28.537 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

**Link 2L: W Site Limit**

Hydrograph



# AF Prop w Det Condition

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MSE 24-hr 4 100-Yr Miami KS Rainfall=8.52"

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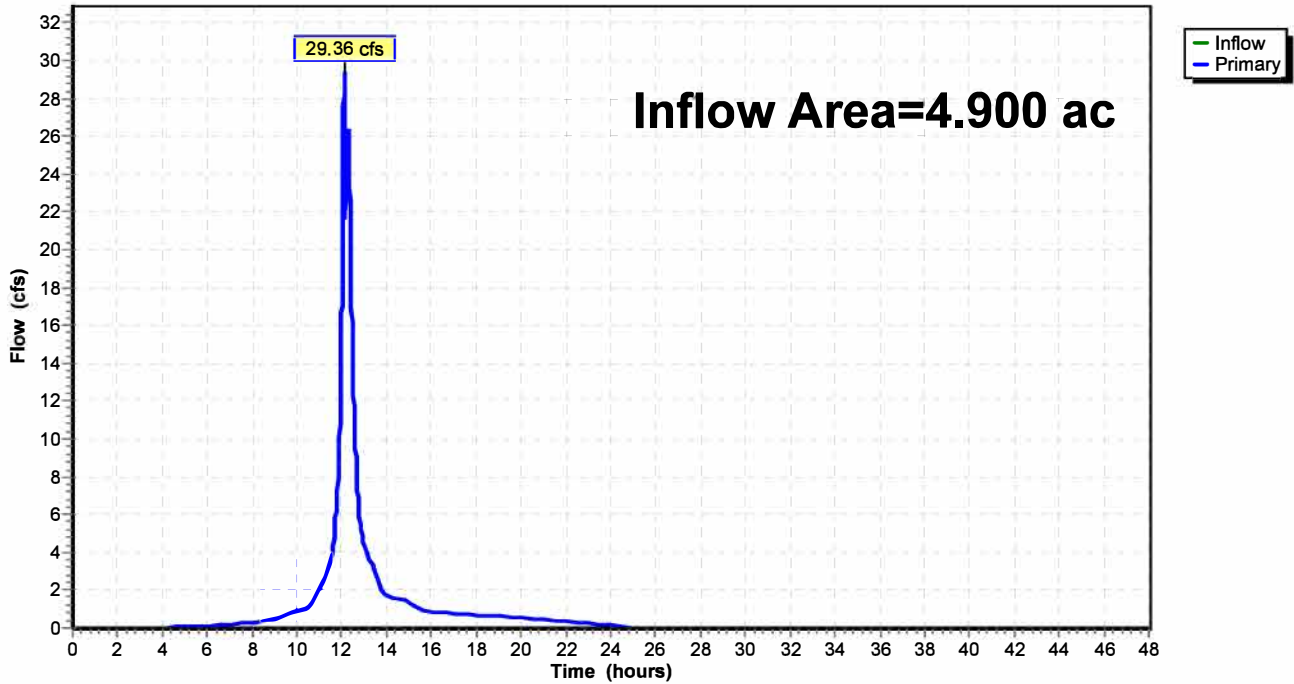
## Summary for Link 3L: CMPA Site Limit

Inflow Area = 4.900 ac, 22.45% Impervious, Inflow Depth = 6.59" for 100-Yr Miami KS event  
Inflow = 29.36 cfs @ 12.11 hrs, Volume= 2.689 af  
Primary = 29.36 cfs @ 12.11 hrs, Volume= 2.689 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Link 3L: CMPA Site Limit

Hydrograph



**AF Prop w Det Condition**

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MSE 24-hr 4 100-Yr Miami KS Rainfall=8.52"

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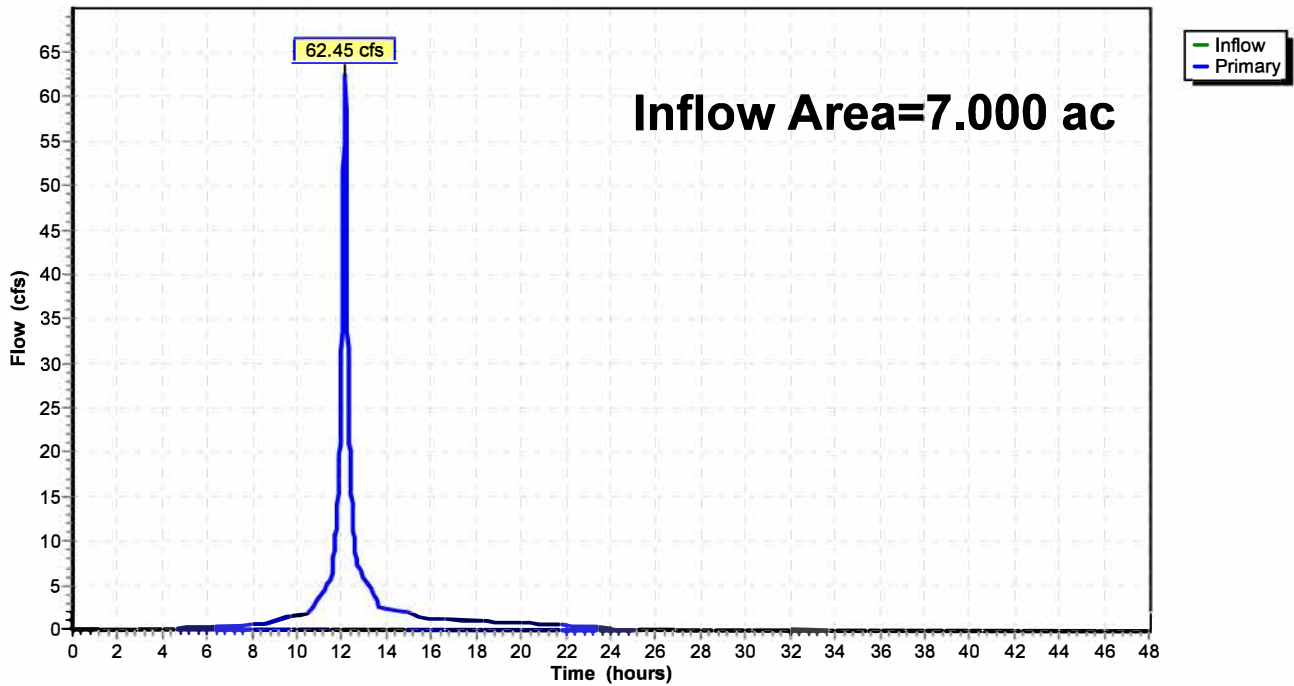
**Summary for Link 4L: NW Site Limit**

Inflow Area = 7.000 ac, 36.43% Impervious, Inflow Depth = 6.92" for 100-Yr Miami KS event  
Inflow = 62.45 cfs @ 12.15 hrs, Volume= 4.037 af  
Primary = 62.45 cfs @ 12.15 hrs, Volume= 4.037 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

**Link 4L: NW Site Limit**

Hydrograph



**AF Prop w Det Condition**

MSE 24-hr 4 100-Yr Miami KS Rainfall=8.52"

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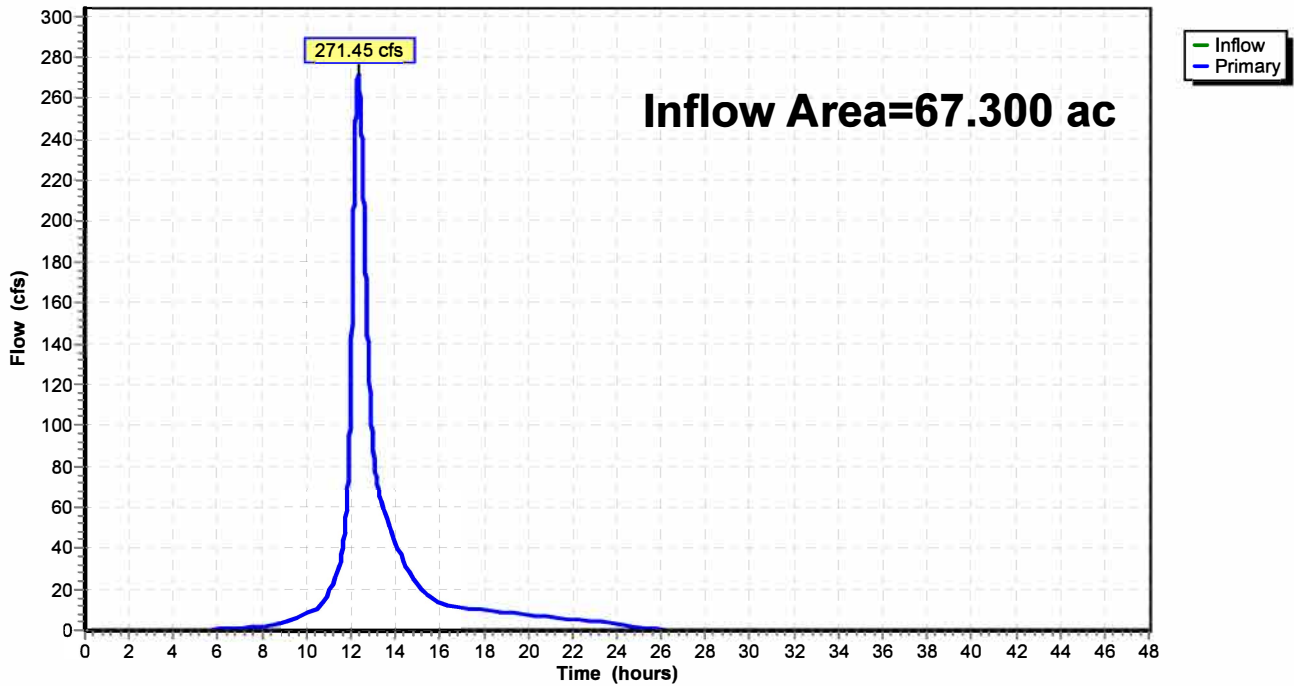
**Summary for Link 6L: Off-Site Confluence**

Inflow Area = 67.300 ac, 12.41% Impervious, Inflow Depth = 6.29" for 100-Yr Miami KS event  
Inflow = 271.45 cfs @ 12.32 hrs, Volume= 35.263 af  
Primary = 271.45 cfs @ 12.32 hrs, Volume= 35.263 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

**Link 6L: Off-Site Confluence**

Hydrograph



# AF Prop w Det Condition

Prepared by Phelps Engineering, Inc.

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## **AF Prop w Det Condition**

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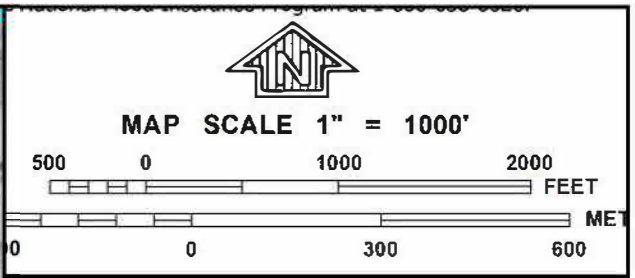
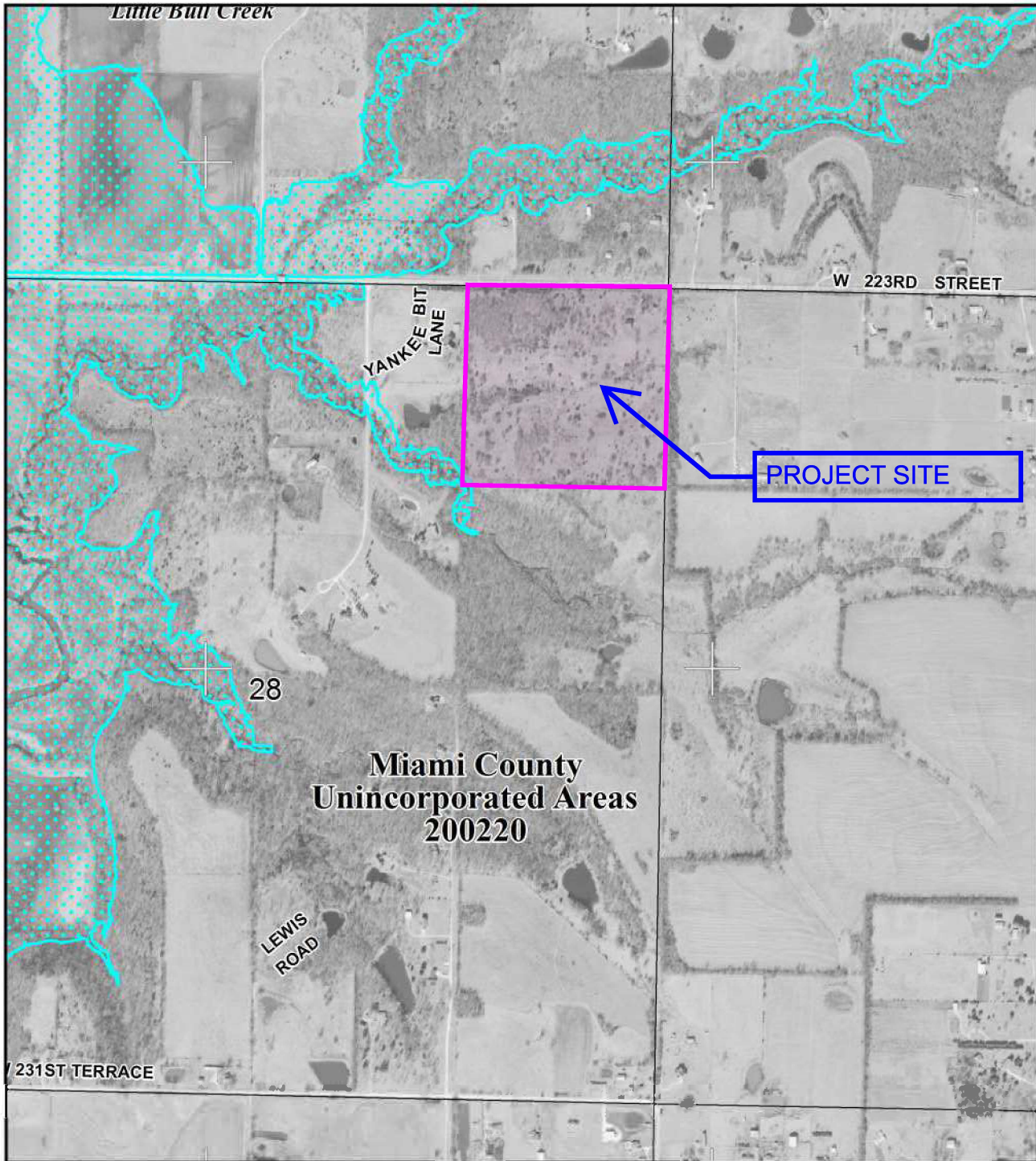
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## Flood Map



**NFIP**

**NATIONAL FLOOD INSURANCE PROGRAM**

PANEL 0055D

**FIRM**  
FLOOD INSURANCE RATE MAP

MIAMI COUNTY,  
KANSAS  
AND INCORPORATED AREAS

PANEL 55 OF 375  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

**CONTAINS:**


COMMUNITY	NUMBER	PANEL	SUFFIX
MIAMI COUNTY	200220	0055	D

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used in insurance applications for the subject community.

**MAP NUMBER**  
20121C0055D

**MAP REVISED**  
JANUARY 16, 2014

Federal Emergency Management Agency



This is an official FIRMette showing a portion of the above-referenced flood map created from the MSC FIRMette Web tool. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For additional information about how to make sure the map is current, please see the Flood Hazard Mapping Updates Overview Fact Sheet available on the FEMA Flood Map Service Center home page at <https://msc.fema.gov>.

**Always & Furever**  
**Midwest Animal Sanctuary**  
**Miami County, KS**  
**TRAFFIC IMPACT STUDY**

February 16, 2023

Prepared For:  
Bell/Knott & Associates  
12730 State Line Road, Suite 100  
Leawood, Kansas 66209

Prepared By:  
Priority Engineers, Inc.  
PO Box 563  
Garden City, MO 64747



2-16-23



February 16, 2023

Mr. Kerry Knott  
Bell/Knott & Associates  
12730 State Line Road, Suite 100  
Leawood, Kansas 66209

RE: Always & Furever Traffic Impact Study – Miami County, KS

Dear Mr. Knott,

In response to your request, Priority Engineers, Inc. has completed a traffic impact study for the above referenced project. This study documents the calculations used to determine the potential traffic impacts associated with this development on the intersections and streets surrounding this site, during the AM, noon and PM peak hours. The following report documents our analysis and recommendations.

We appreciate the opportunity to work with you on this project. Please contact us with any questions or if you require additional information.

Sincerely,

PRIORITY ENGINEERS, INC.

A handwritten signature in blue ink that reads "Kristin L. Skinner".

Kristin L. Skinner, P.E., PTOE  
President

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## 1) INTRODUCTION

The purpose of this study is to examine the potential traffic impacts associated with the proposed Always & Furever Midwest Animal Sanctuary to be located on W 223<sup>rd</sup> Street in Miami County, Kansas. The site is to be located on 40 acres to the east of 23595 West 223<sup>rd</sup> Street.

The study area is shown in Figure 1. The site layout is shown in Figure 2.

## 2) EXISTING CONDITIONS

The existing site is located in Miami County, KS and is outside of the municipal limits of the City of Spring Hill. The site is mostly wooded, with a single agricultural building. The site is bordered to the north by W 223<sup>rd</sup> Street. W 223<sup>rd</sup> Street is a two-lane roadway with graded shoulders and a posted speed limit of 45 MPH.

According to the Miami County Road Classification Map, W 223<sup>rd</sup> Street is classified as an Arterial roadway with 120' right-of-way width and a driveway separation of 500'.

Turning movement counts were collected on Wednesday, October 12<sup>th</sup>, 2022 for a period of 24 hours at the intersection of W 223<sup>rd</sup> Street with Yankee Bit Lane. The daily traffic on W 223<sup>rd</sup> Street adjacent to the site was found to be 1667 vehicles. The AM Peak Hour was from 7:00-8:00 AM and the PM Peak Hour was from 4:45-5:45 PM.

The AM, Noon, and PM Peak Hour traffic volumes are shown in Figure 3.

## 3) PROPOSED DEVELOPMENT

The proposed development is expected to be constructed in up to three phases. For the purposes of this traffic study, the full build-out of the project was analyzed.

Two access points will be provided to the site, both of which will be gated. The main entrance will be located near the center of the property and will have two entering lanes and two exiting lanes. The two inbound lanes will allow for a total of 14 vehicles to be stored prior to the gate, 7 in each lane. The eastern access is located at the same location as the existing drive to the property and will be used as a service road.

The full build out will include a 16,000 square foot administration building to be used for offices, training, and adoption appointments, a 8,000 square foot veterinary clinic which will not be open to the public, a single family residence, 8,799 square feet of dog villas spread over seven different buildings, and 26,850 square feet of "barn" facilities to be used for felines, puppies, maintenance, and the Miami county animal shelter.

## 4) TRIP GENERATION

Typically, development trips are estimated using the latest edition of using the Institute of Transportation Engineers' (ITE) [Trip Generation Manual](#). The Always & Furever site is unique and a comparable ITE Land Use Code was not available for the site as a whole.

### **Always & Furever Estimates**

An Always & Furever volunteer familiar with both the volunteer activities and transportation demands of the organization compiled a detailed estimate of the number of people to be visiting

the site on a daily basis. A typical day was considered, along with events expected to occur only quarterly and annually. According to these estimates, the noon hour is expected to be the peak hour for the site. These estimates are depicted in Table 1 below. The complete data provided is attached in Appendix II.

<b>Table 1: Trip Generation - Proposed Site (Provided by Always &amp; Furever)</b>										
<i>Land Use</i>	<i>Daily</i>	<i>AM Peak</i>			<i>Noon Peak Hour</i>			<i>PM Peak</i>		
		<i>Total</i>	<i>In</i>	<i>Out</i>	<i>Total</i>	<i>In</i>	<i>Out</i>	<i>Total</i>	<i>In</i>	<i>Out</i>
Phase 3 - Full Buildout	132	8	7	1	14	8	6	12	6	6
<b>Total</b>	<b>132</b>	<b>8</b>	<b>7</b>	<b>1</b>	<b>14</b>	<b>8</b>	<b>6</b>	<b>12</b>	<b>6</b>	<b>6</b>

**Existing Facility Counts**

In addition to the data provided by Always & Furever, 24 hour counts were collected at the entrances to three of the existing Always & Furever sites. Table 2 below illustrates the peak hour activity at these three sites. The building sizes have been estimated based on aerial photos.

<b>Table 2: Trip Generation - Existing Sites</b>											
<i>Land Use</i>	<i>Intensity</i>	<i>Daily</i>	<i>AM Peak</i>			<i>Noon Peak Hour</i>			<i>PM Peak</i>		
			<i>Total</i>	<i>In</i>	<i>Out</i>	<i>Total</i>	<i>In</i>	<i>Out</i>	<i>Total</i>	<i>In</i>	<i>Out</i>
Little Gray Barn	5500 SF	25	2	1	1	0	0	0	3	1	2
Always & Furever Midwest Animal Sanctuary	2000 SF	40	2	2	0	3	2	1	5	3	2
Osawatomie Pound	1200 SF	24	4	3	1	0	1	0	2	2	0
<b>Total</b>	<b>8700 SF</b>	<b>89</b>	<b>8</b>	<b>6</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>10</b>	<b>6</b>	<b>4</b>

The combination of the existing three sites is comparable to that estimated by Always & Furever during the AM and PM Peak Hours. During the Noon Peak Hour, the proposed estimates are higher. Although the proposed site is significantly larger than the existing uses, it is reasonable to assume that some of the existing site trips are generated by transporting the animals to and from veterinary appointments, which will no longer be necessary on the proposed site. Additionally, some staff members may be traveling between facilities, which also will not be necessary with the proposed sanctuary.

**Unrealistically Conservative Trip Generation**

In order to illustrate a conservative depiction of the proposed site, a combination of the existing site data collected and the Trip Generation Manual, 11<sup>th</sup> Edition data was used. The trips were generated in this way not because this amount of traffic is expected, but to depict the impact on W 223<sup>rd</sup> Street if the site were to function in a way that was more open to the public.

For this scenario, the proposed dog villas, barns, and miscellaneous buildings were estimated proportionately based on the data collected from the existing Always & Furever sites as illustrated in Table 2. As previously discussed, it is expected that some of the trips observed at the existing sites included trips to a veterinarian or other trips that may be consolidated with the proposed sanctuary. The veterinary clinic was estimated based on ITE Land Use 640, Veterinary Hospital, which would be a facility open to the public. The administration building was estimated based on Land Use 710, Office Building, and the single family home on Land Use 210, Single Family Residential. These volumes are shown in Table 3 below.

<b>Table 3: Trip Generation - Unrealistically Conservative</b>								
<i>Land Use</i>	<i>Intensity</i>	<i>Daily</i>	<i>AM Peak</i>			<i>PM Peak</i>		
			<i>Total</i>	<i>In</i>	<i>Out</i>	<i>Total</i>	<i>In</i>	<i>Out</i>
Dog Villas (7)	11,799 SF	89	8	6	2	10	6	4
Barns & Misc Buildings	26,850 SF	267	24	18	6	30	18	12
Administration building (Office Building)	16,000 SF	236	35	30	5	36	6	30
Veterinary Hospital	8,000 SF	172	30	20	10	31	12	19
Single Family Residential	1 Unit	15	1	0	1	1	1	0
<b>Total</b>		<b>187</b>	<b>98</b>	<b>74</b>	<b>24</b>	<b>108</b>	<b>43</b>	<b>65</b>

**Annual Event Traffic**

The data provided by Always & Furever included an estimate for an annual Anniversary Celebration event which could include 150-200 people. Typically, traffic impact studies focus on average weekdays and designs are not based on events that only occur once annually. However, in order to illustrate the impact of such an event on W 223<sup>rd</sup> Street, a scenario was estimated for an event which would have both 100 entering and 100 exiting vehicles.

**5) TRIP DISTRIBUTION AND ASSIGNMENT**

The US 169 interchange with W 223<sup>rd</sup> Street lies about one mile to the east of the site. It was assumed that 90 percent of the proposed trips would be traveling to and from the east, with the remaining 10 percent traveling to and from the west.

The trips for each of the scenarios analyzed were added to the existing traffic volumes on W 223<sup>rd</sup> Street and can be seen in Figures 6-8, 11-12, and 15.

## 6) LEVEL OF SERVICE AND VOLUME/CAPACITY ANALYSES

Capacity analysis was used to quantify the impacts of the increased traffic on the intersections studied. The methodology outlined in the Highway Capacity Manual, 6th Edition, was used as a basis to perform the analysis for this study. Capacity analysis defines the quality of traffic operation for an intersection using a grading system called Level of Service (LOS). The LOS is defined in terms of average vehicle delay. Levels of service A through F have been established with A representing the best and F the worst.

<b>Table 4: Level of Service Definitions</b>		
<b>Level of Service</b>	<b>Unsignalized Intersection</b>	<b>Signalized Intersection</b>
A	< 10 Seconds	< 10 Seconds
B	< 15 Seconds	< 20 Seconds
C	< 25 Seconds	< 35 Seconds
D	< 35 Seconds	< 55 Seconds
E	< 50 Seconds	< 80 Seconds
F	≥ 50 Seconds	≥ 80 Seconds

The study intersections were evaluated using Synchro software, which is based in part on Highway Capacity Manual methods. The analysis reports are included in Appendix II.

### **Existing Conditions**

The levels of service, lane configuration, and queue lengths for existing conditions are shown in Figure 4 of Appendix I. The intersection of W 223<sup>rd</sup> Street and Yankee Bit Lane (a private drive that is signed “no trespassing”) was analyzed as the closest intersection. The level of service on Yankee Bit Lane and westbound on W 223<sup>rd</sup> Street is an A with less than one vehicle in the design queue.

### **Proposed Conditions**

The levels of service, lane configuration, and queue lengths for this scenario are shown in Figures 8-10 of Appendix I. With the addition of the traffic projected by the proposed development, the level of service at the site drive and at Yankee Bit Lane is an A with a design queue of less than one vehicle.

### **Unrealistically Conservative Conditions**

The levels of service, lane configuration, and queue lengths for this scenario are shown in Figures 13-14 of Appendix I. If the site were to function in this way, with the veterinary clinic open to the public, the level of service at the site drive and at Yankee Bit Lane remains an A with a design queue of less than one vehicle.

### **Annual Event Traffic**

As noted previously, annual events are not typically considered as a design scenario. The levels of service, lane configuration, and queue lengths for such a scenario are shown in Figure 15 of Appendix I. During such an event, with both arriving and exiting vehicles, the level of service at the site drive and at Yankee Bit Lane remains an A with a design queue of less than one vehicle.

## 7) ACCESS MANAGEMENT & TURN LANES

The Miami County Road Classification Map identifies W 223<sup>rd</sup> Street as an Arterial roadway with 120' right-of-way width and a driveway separation of 500'. Along the south side of West 223<sup>rd</sup> Street, the main entrance into the Always & Forever Sanctuary is more than 900' from the nearest drive to the west. Within the site, the main drive and the service road are approximately 550' apart. The service road is located approximately 600' from the next drive to the east. Driveways on the north side of the street are within 500' of the proposed access.

Table 4-27 of the KDOT Access Management Policy was consulted to determine if a left turn lane was warranted on W 223<sup>rd</sup> Street. W 223<sup>rd</sup> Street is posted as a 45 MPH roadway, and a 50 MPH design speed was assumed. KDOT Access Management Policy Table 4-27, for a 50 MPH design speed, has been summarized below. The volumes from each of the scenarios in this study are summarized in Table 5 below.

<b>KDOT Access Management Policy Table 4-27 (50-mph speed)</b>				
<b>Opposing Volume <math>V_o</math> (vph)</b>	<b>Advancing Volume <math>V_a</math> (vph)</b>			
	<b>5% Left Turns</b>	<b>10% Left Turns</b>	<b>20% Left Turns</b>	<b>30% Left Turns</b>
800	118	86	64	56
700	138	100	75	66
600	161	117	88	77
500	188	137	103	90
400	221	161	120	105
300	260	189	142	124
200	309	224	168	147
100	369	268	201	175

<b>Table 5: Left Turn Lane Warrant</b>			
<b>Scenario</b>	<b><math>V_o</math></b>	<b><math>V_a</math></b>	<b>% Left Turns</b>
Proposed AM Peak Hour	96	60	12%
Proposed Noon Peak Hour	49	49	14%
Proposed PM Peak Hour	89	86	7%
Unrealistically Conservative AM Peak Hour	102	120	56%
Unrealistically Conservative PM Peak Hour	92	119	33%

Even based on the most conservative estimates for this development, a left turn lane is not warranted.

Table 4-25 of the KDOT Access Management Policy, Right-turn treatment guidelines for two-lane highways, was also consulted to determine if a right turn lane would be necessary. For a 50 MPH roadway, 200 eastbound vehicles and 30 right turning vehicles would need to be present in a peak hour to warrant a right turn taper. 73 right turning vehicles would need to be

present in the peak hour to warrant a right turn lane. The traffic volumes at this location fall far below these volumes.

**8) SIGHT DISTANCE**

Stopping sight distance and Intersection sight distance was measured at the proposed access points onto W 223<sup>rd</sup> Street. At both access points, the available stopping and intersection sight distance exceeded 700' to the east and to the west. Table 6 below illustrates the required AASHTO sight distance values for a 50 MPH design speed.

<b>Table 6: Sight Distance Values</b>			
	Measured Distances	AASHTO Stopping Sight Distance (50 mph)	AASHTO Intersection Sight Distance (50 mph)
<b>Main Entrance</b>			
To the East	>700'	425'	555'
To the West	>700'	425'	480'
<b>Service Road</b>			
To the East	>700'	425'	555'
To the West	>700'	425'	480'

**9) RECOMMENDATIONS & CONCLUSIONS**

This study documents the impact of the full build-out of the proposed Always & Forever Midwest Animal Sanctuary on the surrounding roadway network. In addition to the AM and PM Peak Hours used for design hours, additional more conservative scenarios were included. These scenarios are not to be considered as design peak hours, but were supplied as additional information to demonstrate the magnitude of traffic that could be added to W 223<sup>rd</sup> Street without adversely impacting levels of service or requiring a turn lane.

Overall, the traffic anticipated to be generated by this site is minor, and will not result in lowered levels of service, queueing, or increase delays. The proposed drive and service road should be constructed to the standards of Miami County. No additional improvements are recommended as a result of this development.

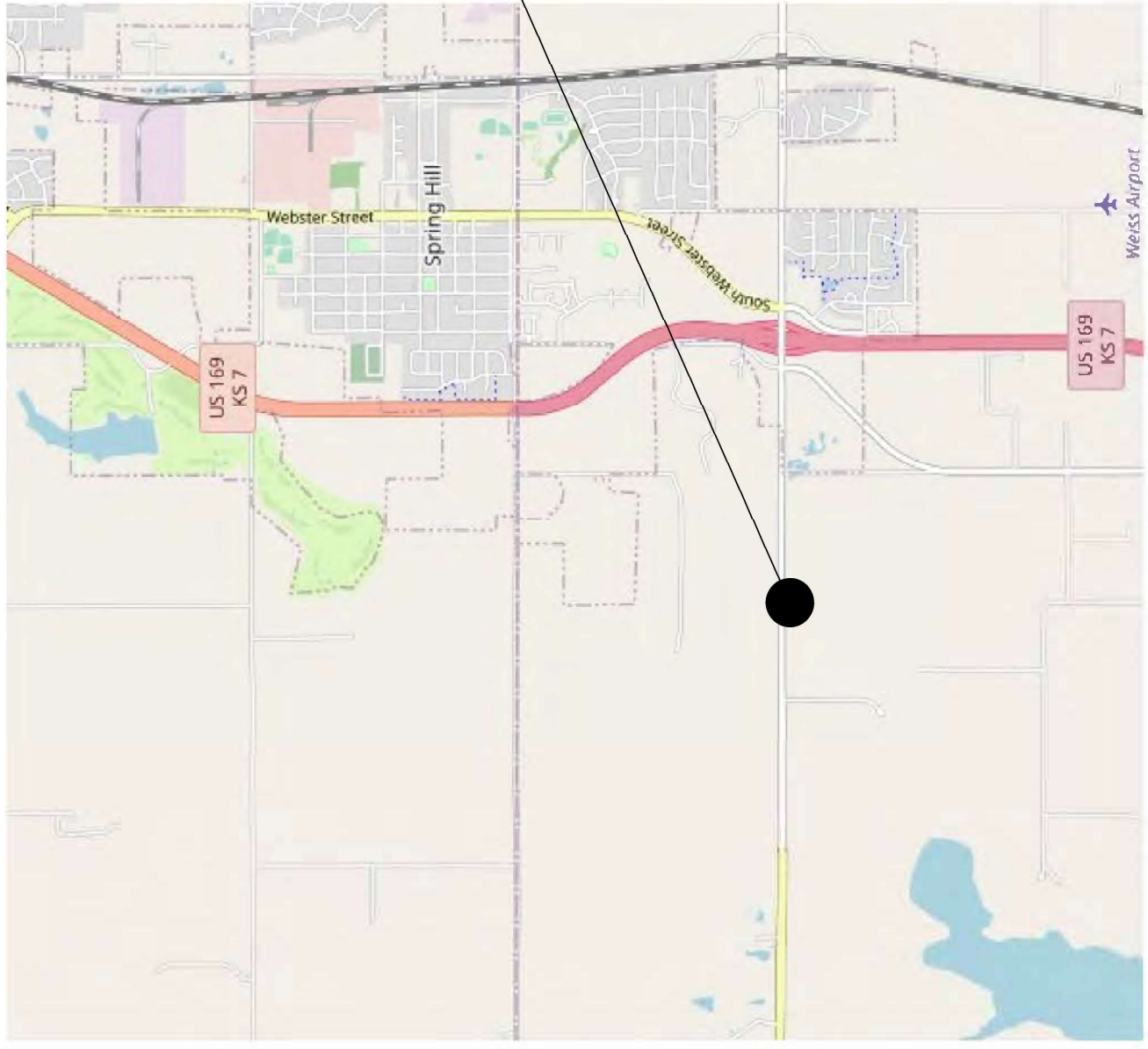
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Priority  
ENGINEERS

PO Box 563  
Garden City, MO 64747  
816.738.4400



*Project Location*

copyright OpenStreet Map Contributors

No Scale

Figure 1

Always & Forever  
Stillwell, KS

Project Location



**PHILIPS ENGINEERING, INC.**  
 1370 N. Winchester  
 Olathe, Kansas 66061  
 (913) 393-1155  
 Fax (913) 393-1166  
 www.philipsengineering.com

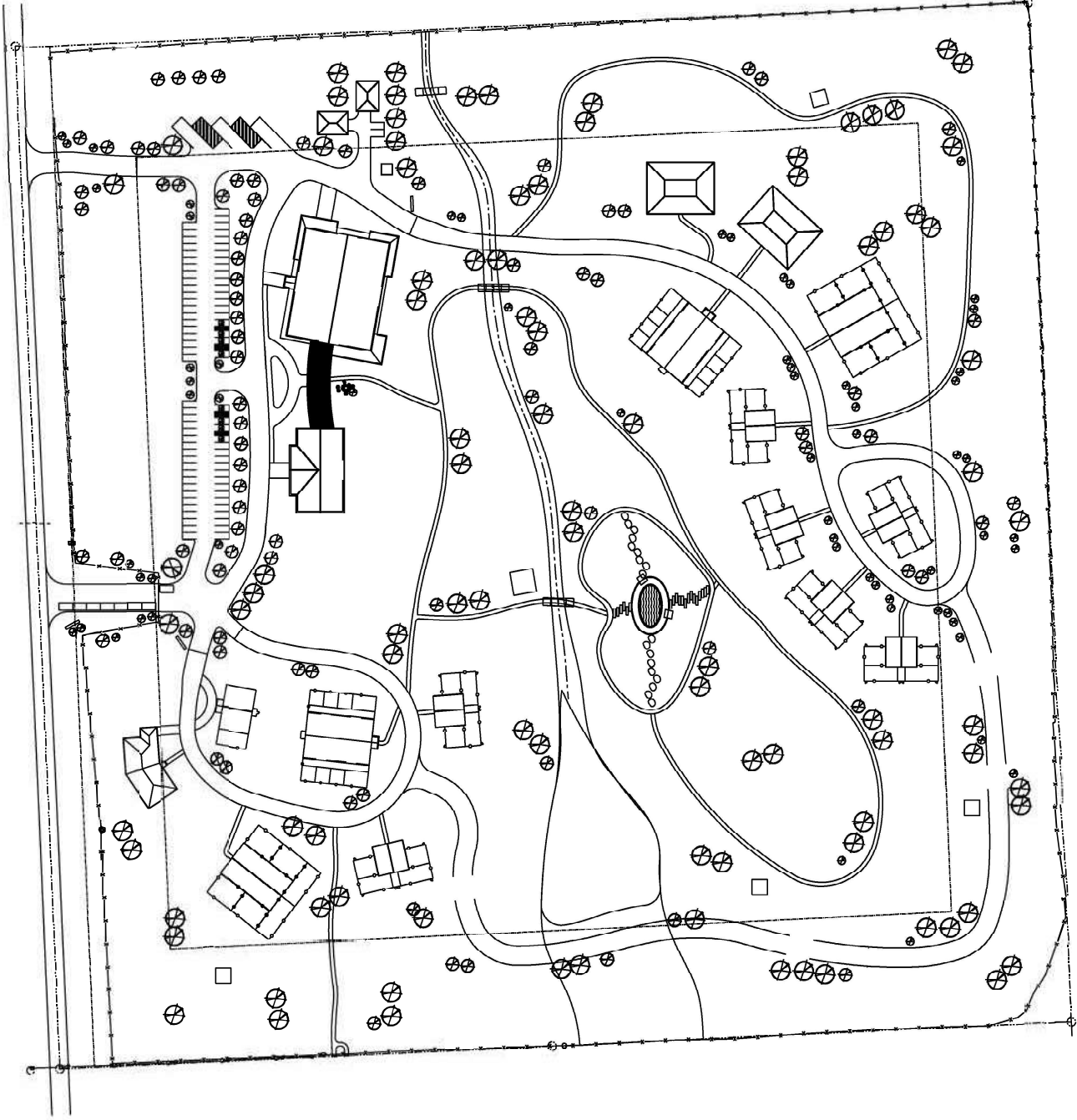


**ARCHITECT**  
**Bell/Knott & Associates**  
**CORPORATE ARCHITECTS, P.C.**  
 12738 State Line Road Voice: 913.378.1600  
 Suite 100 Fax: 913.378.1601  
 Lenexa, KS 66209 www.bellknott.com

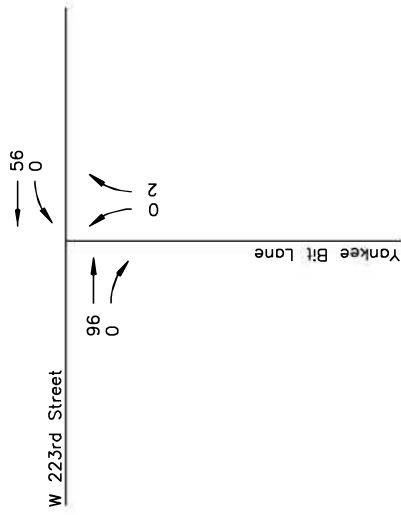


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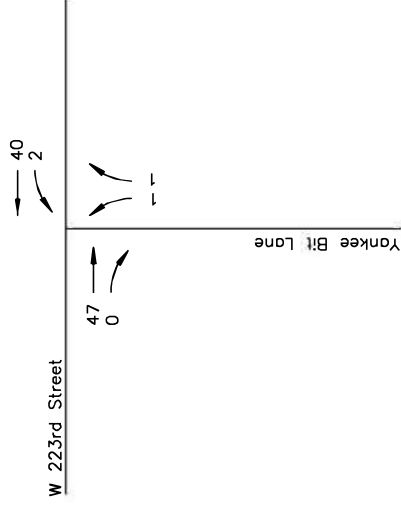
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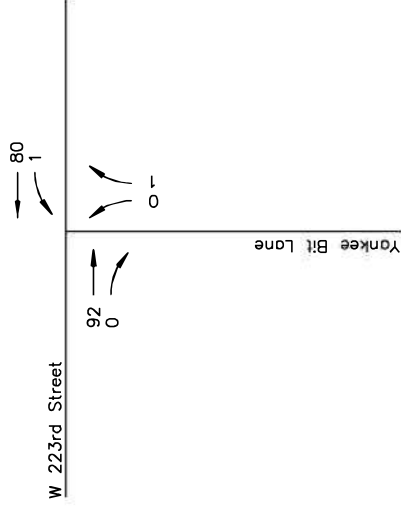
No Scale	Always & Forever Stillwell, KS	Site Plan
Figure 2		



AM Peak Hour

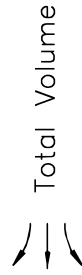


Noon Peak Hour



PM Peak Hour

LEGEND



Total Volume

Existing Peak Hour  
Traffic Volumes

Always & Furever  
Stillwell, KS

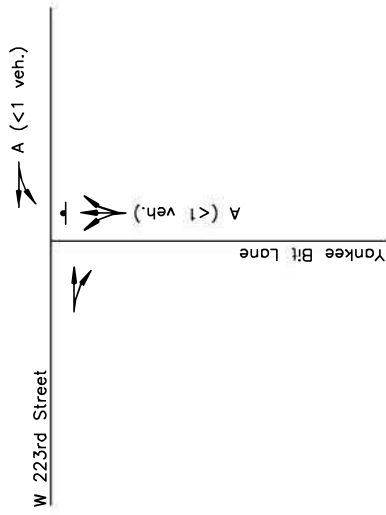
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Figure 3

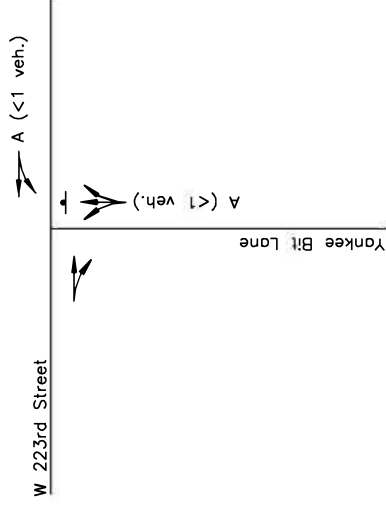


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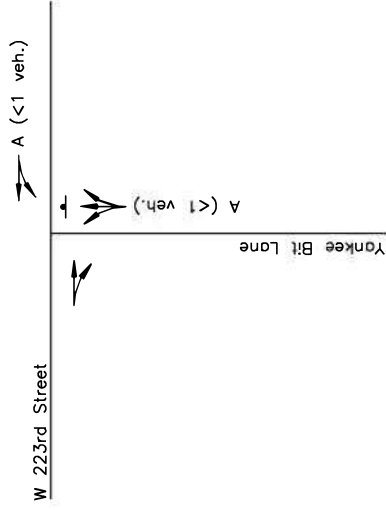
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AM Peak Hour



Noon Peak Hour



PM Peak Hour

LEGEND

▶ HCM LOS (95th Percentile Queue)

⊥ Stop Sign

Peak Hour  
Lane Configuration &  
Levels of Service

Always & Forever  
Stillwell, KS

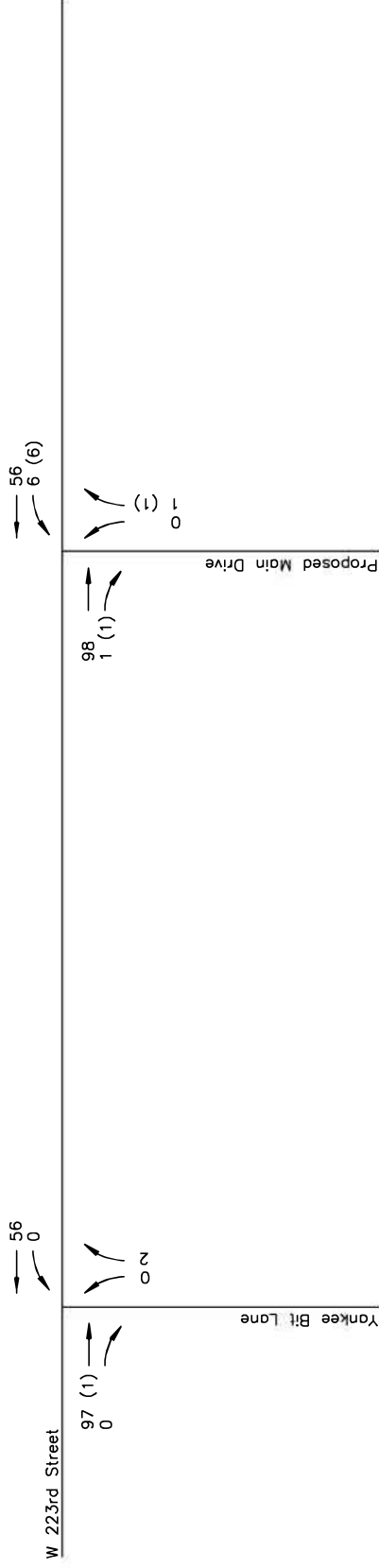
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Figure 5

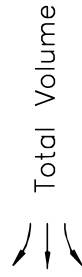


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LEGEND



Proposed AM Peak Hour  
Traffic Volumes

Always & Forever  
Stillwell, KS

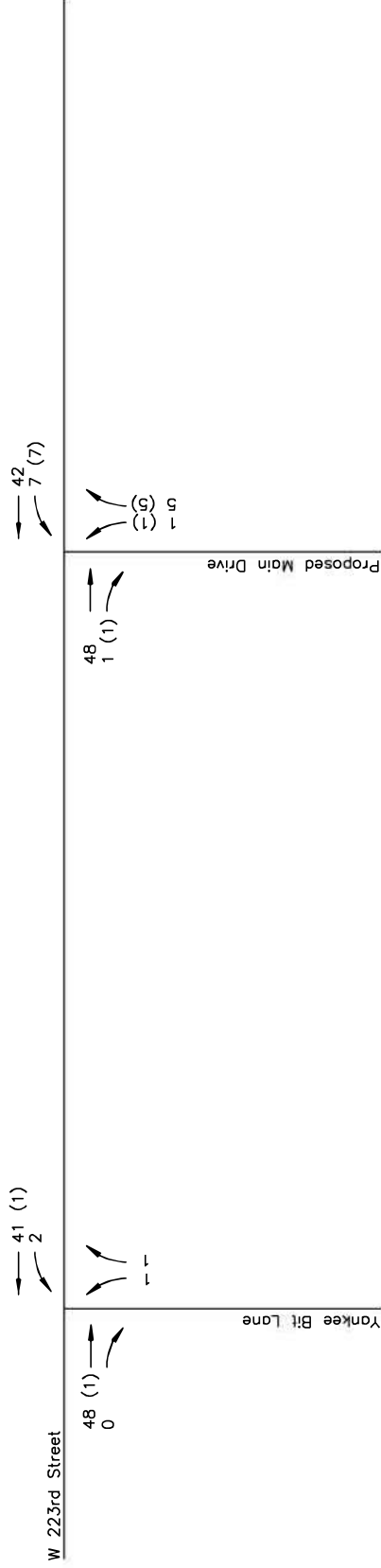
No Scale

Figure 5

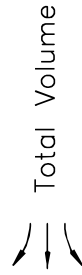


Priority  
ENGINEERS

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Garden City, MO 64747  
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LEGEND



Priority  
ENGINEERS

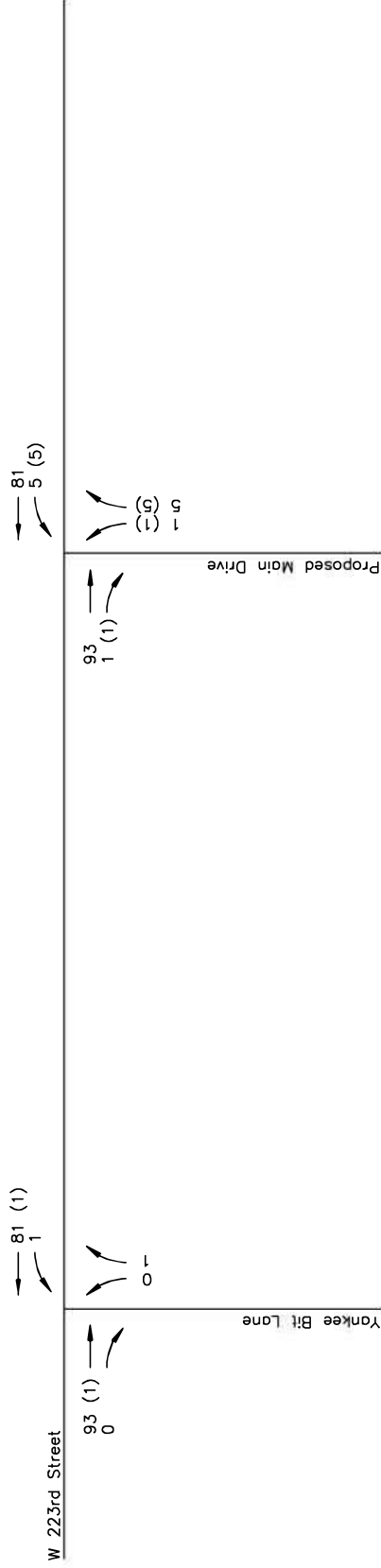
PO Box 563  
Garden City, MO 64747  
816.738.4400

Proposed Noon Peak Hour  
Traffic Volumes

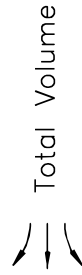
Always & Furever  
Stillwell, KS

No Scale

Figure 6



LEGEND



Proposed PM Peak Hour  
Traffic Volumes

Always & Furever  
Stillwell, KS

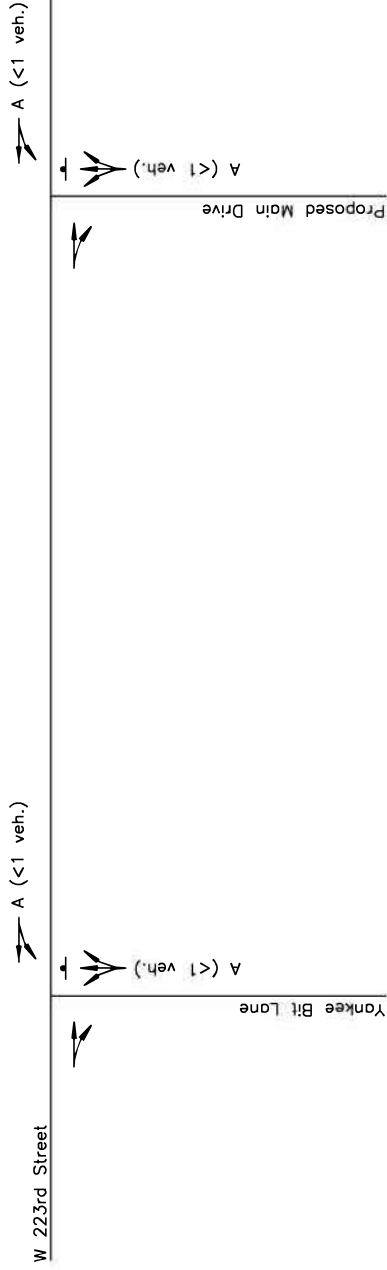
No Scale

Figure 7



Priority  
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LEGEND



Total Volume

Proposed AM Peak Hour  
Lane Configuration &  
Levels of Service

Always & Furever  
Stillwell, KS

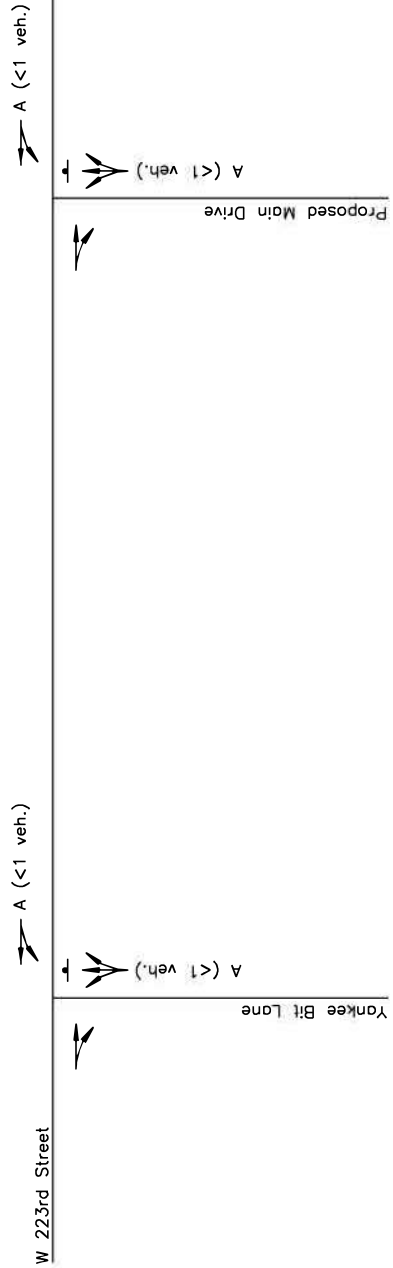
No Scale

Figure 8



Priority  
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LEGEND



Total Volume

Proposed Noon Peak Hour  
Lane Configuration &  
Levels of Service

Always & Forever  
Stillwell, KS

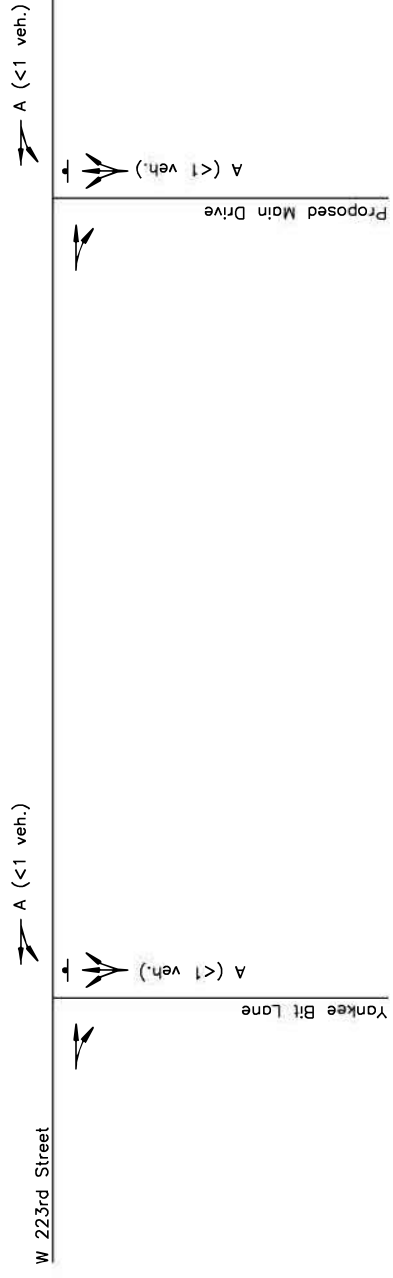
No Scale

Figure 9



Priority  
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LEGEND



Total Volume

Proposed PM Peak Hour  
Lane Configuration &  
Levels of Service

Always & Forever  
Stillwell, KS

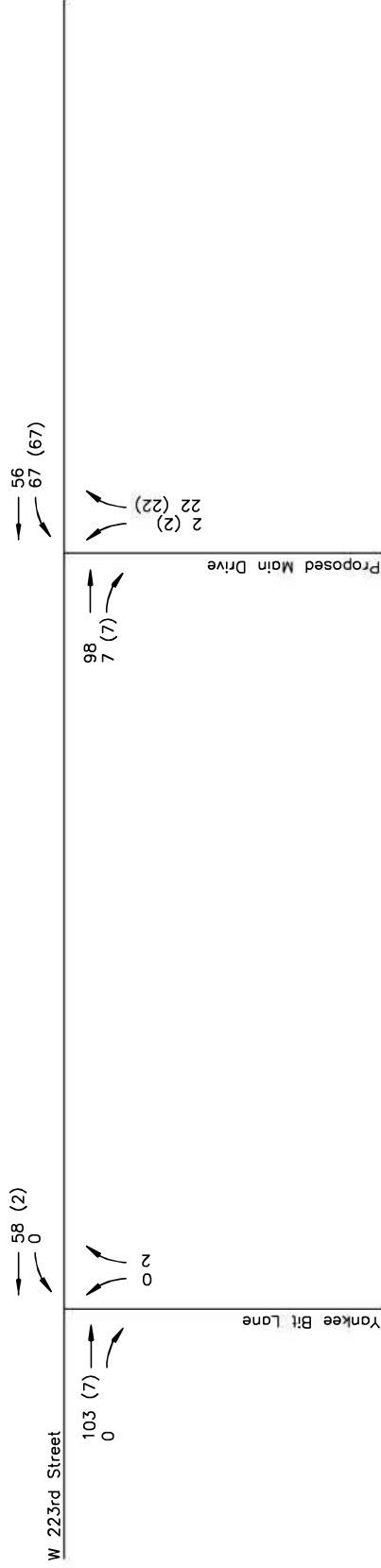
No Scale

Figure 10

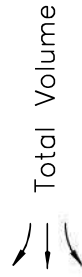


Priority  
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LEGEND



Total Volume

Proposed AM Peak Hour  
(Open Vet Office & Office Space)  
Traffic Volumes

Always & Forever  
Stillwell, KS

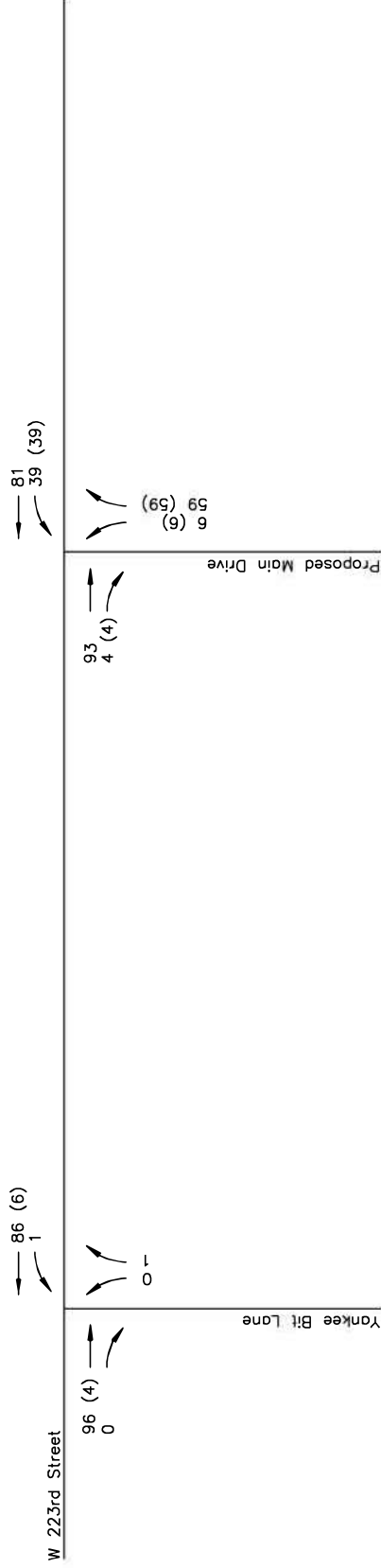
No Scale

Figure 11

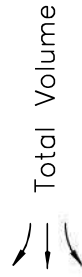


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LEGEND



Total Volume

Proposed PM Peak Hour  
(Open Vet Office & Office Space)  
Traffic Volumes

Always & Forever  
Stillwell, KS

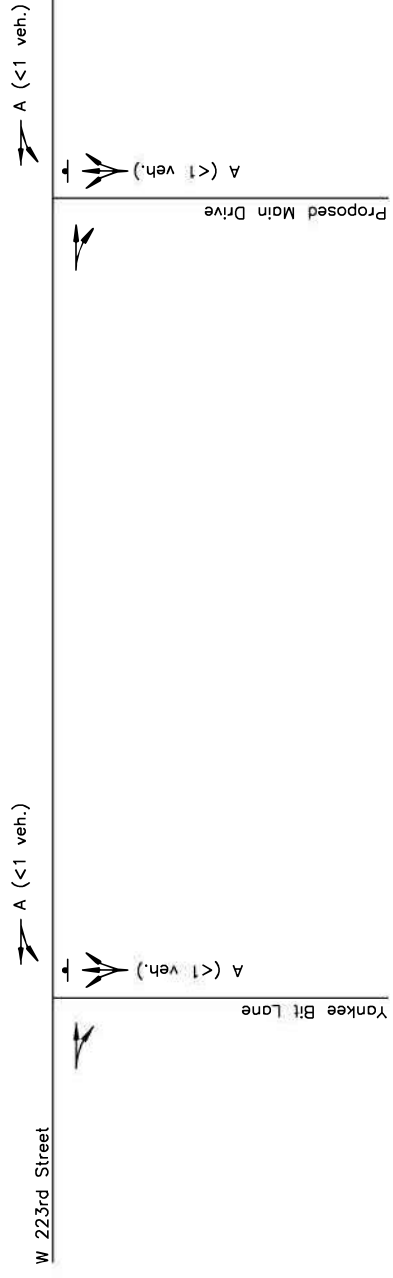
No Scale

Figure 12



Priority  
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LEGEND



Total Volume

Proposed AM Peak Hour  
(Open Vet Office & Office Space)  
Lane Configuration &  
Levels of Service

Always & Forever  
Stillwell, KS

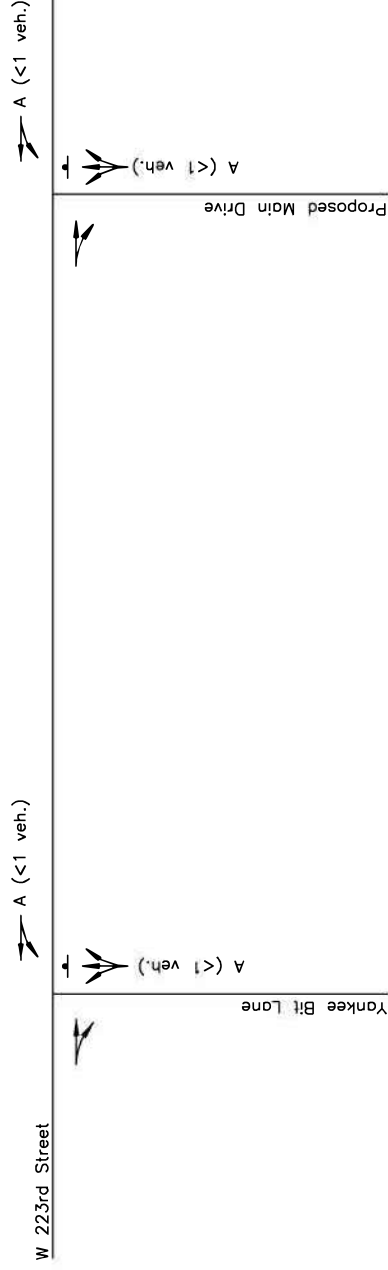
No Scale

Figure 13

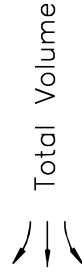


Priority  
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Proposed PM Peak Hour  
(Open Vet Office & Office Space)  
Lane Configuration &  
Levels of Service

Always & Forever  
Stillwell, KS

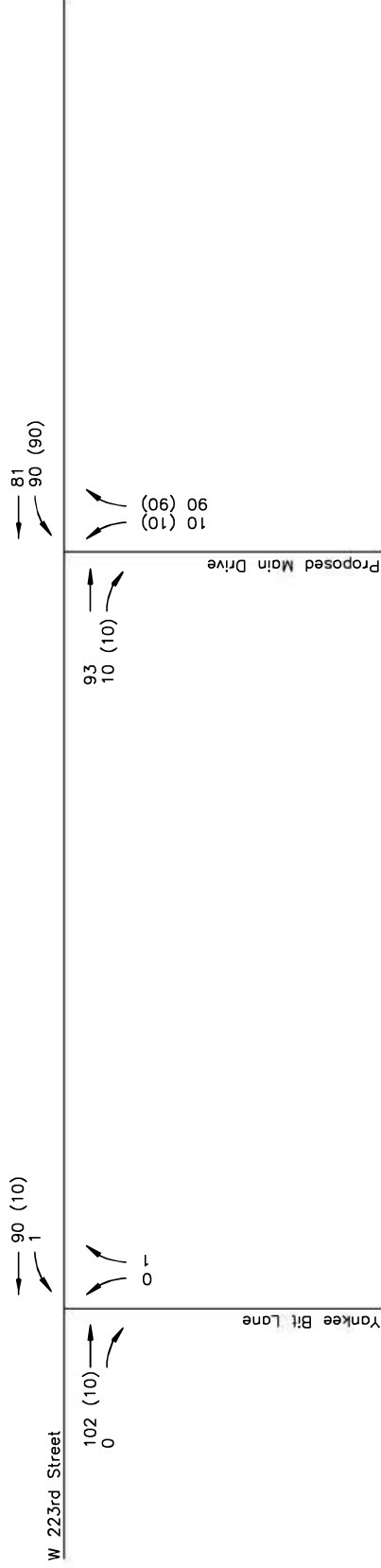
No Scale

Figure 14

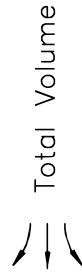


Priority  
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LEGEND



Proposed Anniversary Celebration  
PM Peak Hour  
Traffic Volumes

Always & Forever  
Stillwell, KS

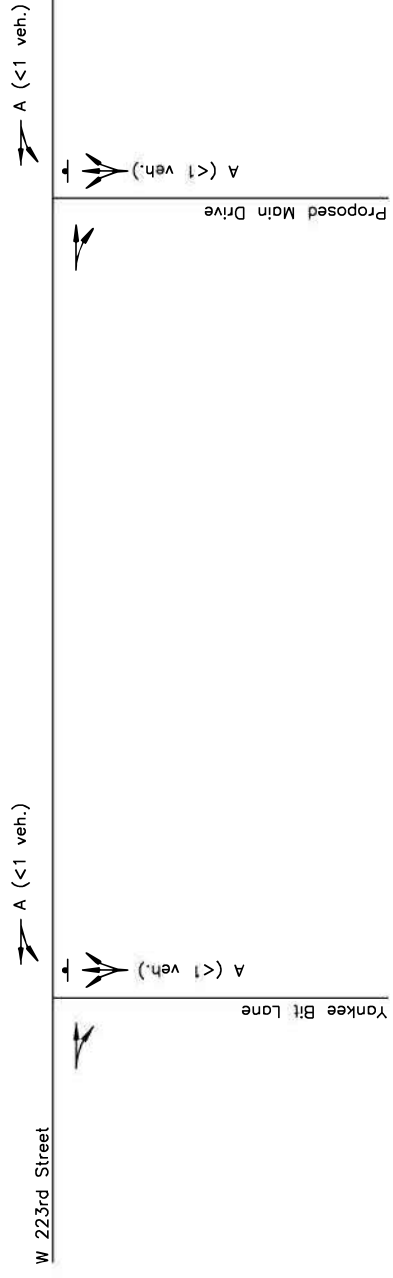
No Scale

Figure 15

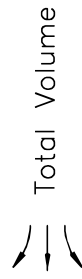


Priority  
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LEGEND



Proposed Anniversary Celebration  
 PM Peak Hour  
 Lane Configuration &  
 Levels of Service

Always & Forever  
 Stillwell, KS

No Scale

Figure 16



Priority  
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## APPENDIX II

Always & Furever provided trip generation

Traffic Counts

Synchro Reports

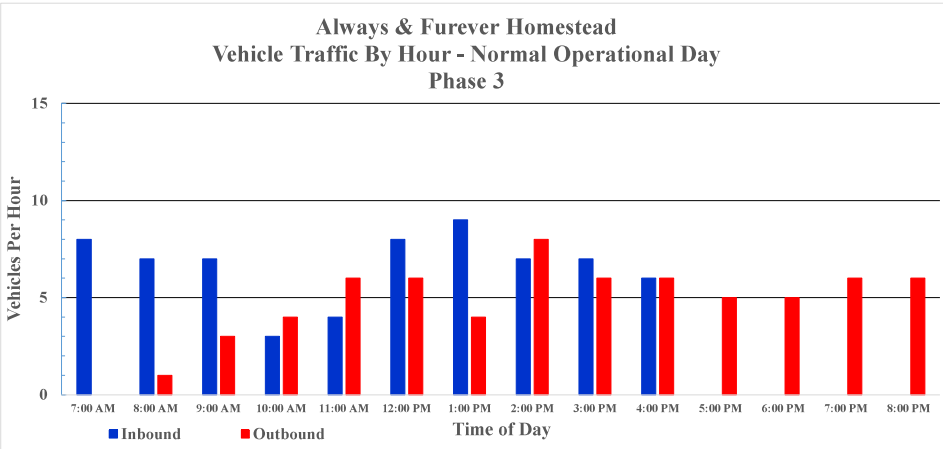
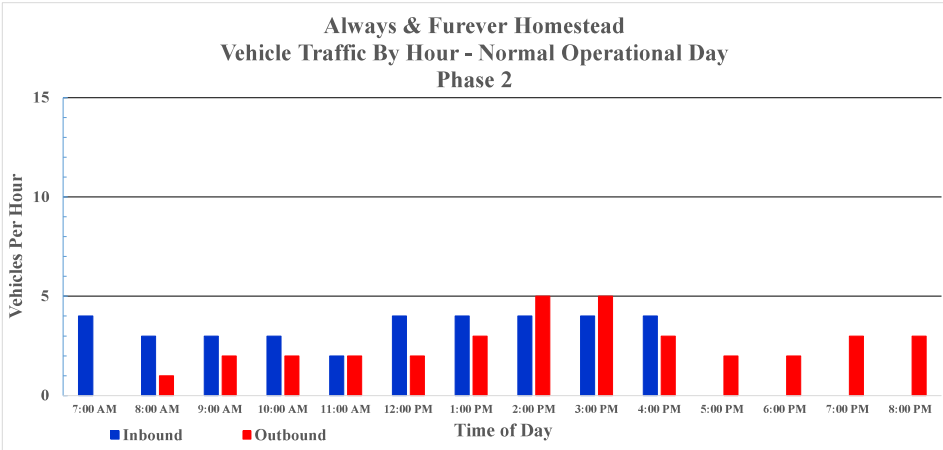
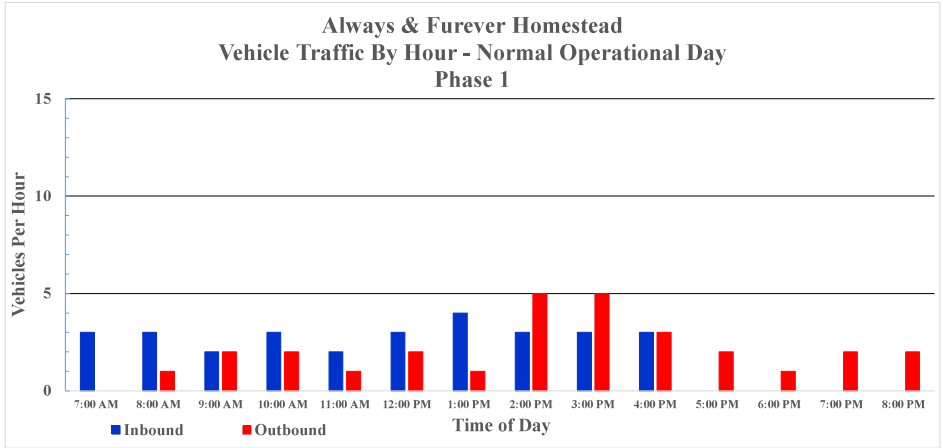
Existing AM Peak Hour	Page 1
Existing Noon Peak Hour	Page 2
Existing PM Peak Hour	Page 3
Proposed AM Peak Hour	Pages 4-5
Proposed Noon Peak Hour	Pages 6-7
Proposed PM Peak Hour	Pages 8-9
Proposed AM Peak Hour (Conservative Use)	Pages 10-11
Proposed PM Peak Hour (Conservative Use)	Pages 12-13
Proposed Anniversary Celebration PM Peak Hour	Pages 14-15



Phase 1		7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM	Total	Right Turns
Inbound		3	3	2	3	2	3	4	3	3	3					29	3 - 6
Outbound		1	2	2	2	1	2	1	5	5	3	2	1	2	2	29	23 - 26

Phase 2		7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM	Total	Right Turns
Inbound		4	3	3	3	2	4	4	4	4	4					35	4 - 7
Outbound		1	2	2	2	2	2	3	5	5	3	2	2	3	3	35	28 - 31

Phase 3		7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM	Total	Right Turns
Inbound		8	7	7	3	4	8	9	7	7	6					66	7 - 13
Outbound		1	3	4	6	6	6	4	8	6	6	5	5	6	6	66	53 - 59



<b>Administration Building</b>	0
<b>Veterinary Hospital / Decompression Facility</b>	10
<b>Big Red Barn 1</b>	24
<b>Big Red Barn 2</b>	24
<b>Big Red Barn 3</b>	10
<b>Little Red Barn</b>	24
<b>Little Pups Barn</b>	20
<b>Feline Family Facility</b>	20
<b>Dog Villas</b>	28
<b>Miami County Shelter</b>	30
<b>HOMESTEAD TOTAL</b>	190

Time	Peds	SB Right	SB Thru	SB Left	SB UTm	Peds	WB Right	WB Thru	WB Left	WB UTm	Peds	NB Right	NB Thru	NB Left	NB UTm	Peds	EB Right	EB Thru	EB Left	EB UTm	
00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
00:15	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	3
00:30	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	2
00:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
01:15	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3
01:30	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
01:45	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	4
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
02:15	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	4
02:30	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	4
02:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	4
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
03:15	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	4
03:30	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	6
03:45	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	8
04:00	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	11
04:15	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	1	0	0	18
04:30	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	2	0	0	26
04:45	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	3	0	0	29
05:00	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	1	0	0	30
05:15	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	3	0	0	28
05:30	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	3	0	0	26
05:45	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	5	0	0	29
06:00	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	7	0	0	41
06:15	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	7	0	0	50
06:30	0	0	0	0	0	0	10	0	0	0	1	0	0	0	0	0	0	8	0	0	60
06:45	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	15	0	0	80
07:00	0	0	0	0	0	0	10	0	0	0	1	0	0	0	0	0	0	23	0	0	98
07:15	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	27	0	0	125
07:30	0	0	0	0	0	0	12	0	0	0	1	0	0	0	0	0	0	27	0	0	146
07:45	0	0	0	0	0	0	19	0	0	0	0	0	0	0	0	0	0	19	0	0	154
08:00	0	0	0	0	0	0	16	0	0	0	2	0	0	0	0	0	0	12	0	0	150
08:15	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	13	0	0	131
08:30	0	0	0	0	0	0	13	1	0	0	0	0	0	0	0	0	0	15	0	0	120
08:45	0	0	0	0	0	0	13	0	0	0	0	0	0	0	0	0	0	12	0	0	107
09:00	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	13	0	0	96
09:15	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	9	0	0	87
09:30	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	4	0	0	67
09:45	0	0	0	0	0	0	13	0	0	0	1	0	0	0	0	0	0	4	0	0	60
10:00	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	5	0	0	49
10:15	0	0	0	0	0	0	6	1	0	0	1	0	0	0	0	0	0	10	0	0	53
10:30	0	0	0	0	0	0	8	0	0	0	1	0	0	0	0	0	0	13	0	0	66
10:45	0	0	0	0	0	0	12	3	0	0	0	0	0	0	0	0	0	13	0	0	76
11:00	0	0	0	0	0	0	7	1	0	0	0	0	0	0	0	0	0	6	0	0	82
11:15	0	0	0	0	0	0	13	0	0	0	0	0	0	0	0	0	0	10	0	0	87
11:30	0	0	0	0	0	0	10	0	0	0	1	0	0	0	0	0	0	8	0	0	84
11:45	0	0	0	0	0	0	7	1	0	0	0	0	0	0	0	0	0	4	0	0	69
12:00	0	0	0	0	0	0	9	0	0	0	0	0	1	0	0	0	0	12	0	0	76
12:15	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	14	0	0	79
12:30	0	0	0	0	0	0	9	1	0	0	0	0	0	0	0	0	0	11	0	0	21
12:45	0	0	0	0	0	0	10	1	0	0	1	0	0	0	0	0	0	10	0	0	81
13:00	0	0	0	0	0	0	9	1	0	0	2	0	0	0	0	0	0	7	0	0	40
13:15	0	0	0	0	0	0	14	0	0	0	1	0	0	0	0	0	0	10	0	0	2
13:30	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	11	0	0	1
13:45	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	11	0	0	47
14:00	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	14	0	0	25
14:15	0	0	0	0	0	0	10	1	0	0	1	0	0	0	0	0	0	11	0	0	87
14:30	0	0	0	0	0	0	19	0	0	0	0	0	0	0	0	0	0	15	0	0	34
14:45	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	11	0	0	104
15:00	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	21	0	0	30
15:15	0	0	0	0	0	0	17	0	0	0	0	0	0	0	0	0	0	9	0	0	116
15:30	0	0	0	0	0	0	27	0	0	0	0	0	0	0	0	0	0	17	0	0	126
15:45	0	0	0	0	0	0	29	0	0	0	0	0	0	0	0	0	0	17	0	0	146
16:00	0	0	0	0	0	0	28	0	0	0	0	0	0	0	0	0	3	15	0	0	160
16:15	0	0	0	0	0	0	15	1	0	0	1	0	1	0	0	0	1	17	0	0	170
16:30	0	0	0	0	0	0	22	0	0	0	0	0	0	0	0	0	0	14	0	0	162
16:45	0	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0	25	0	0	166
17:00	0	0	0	0	0	0	21	0	0	0	1	0	0	0	0	0	0	18	0	0	162
17:15	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	30	0	0	45
17:30	0	0	0	0	0	0	19	1	0	0	0	0	0	0	0	0	0	19	0	0	174
17:45	0	0	0	0	0	0	31	1	0	0	0	0	0	0	0	0	0	16	0	0	172
18:00	0	0	0	0	0	0	19	2	0	0	0	1	0	0	0	0	0	10	0	0	164
18:15	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	13	0	0	146
18:30	0	0	0	0	0	0	17	0	0	0	1	0	0	0	0	0	0	6	0	0	131
18:45	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	9	0	0	100
19:00	0	0	0	0	0	0	11	1	0	0	0	0	0	0	0	0	0	5	0	0	85
19:15	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	5	0	0	74
19:30	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	6	0	0	67
19:45	0	0	0	0	0	0	10	0	0	0	1	0	0	0	0	0	0	5	0	0	86
20:00	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	1	0	0	55
20:15	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	5	0	0	51
20:30	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	7	0	0	44
20:45	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	4	0	0	35
21:00	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	3	0	0	34
21:15</																					

3: Yankee Bit Lane & 223rd Street

Existing AM Peak Hour

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	96	0	0	56	0	2
Future Vol, veh/h	96	0	0	56	0	2
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	92	92	92	92	92	92
Heavy Vehicles, %	3	2	2	5	2	2
Mvmt Flow	104	0	0	61	0	2

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	104	0	165
Stage 1	-	-	-	-	104
Stage 2	-	-	-	-	61
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1488	-	826
Stage 1	-	-	-	-	920
Stage 2	-	-	-	-	962
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1488	-	826
Mov Cap-2 Maneuver	-	-	-	-	826
Stage 1	-	-	-	-	920
Stage 2	-	-	-	-	962

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	951	-	-	1488	-
HCM Lane V/C Ratio	0.002	-	-	-	-
HCM Control Delay (s)	8.8	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	47	0	2	40	1	1
Future Vol, veh/h	47	0	2	40	1	1
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	51	0	2	43	1	1

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	51	0	98 51
Stage 1	-	-	-	-	51 -
Stage 2	-	-	-	-	47 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1555	-	901 1017
Stage 1	-	-	-	-	971 -
Stage 2	-	-	-	-	975 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1555	-	900 1017
Mov Cap-2 Maneuver	-	-	-	-	900 -
Stage 1	-	-	-	-	971 -
Stage 2	-	-	-	-	974 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	8.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	955	-	-	1555	-
HCM Lane V/C Ratio	0.002	-	-	0.001	-
HCM Control Delay (s)	8.8	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	87	0	1	79	0	1
Future Vol, veh/h	87	0	1	79	0	1
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	92	92	92	92	92	92
Heavy Vehicles, %	6	2	2	2	2	2
Mvmt Flow	95	0	1	86	0	1

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	95	0	183
Stage 1	-	-	-	-	95
Stage 2	-	-	-	-	88
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1499	-	806
Stage 1	-	-	-	-	929
Stage 2	-	-	-	-	935
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1499	-	805
Mov Cap-2 Maneuver	-	-	-	-	805
Stage 1	-	-	-	-	929
Stage 2	-	-	-	-	934

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	8.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	962	-	-	1499	-
HCM Lane V/C Ratio	0.001	-	-	0.001	-
HCM Control Delay (s)	8.7	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	97	0	0	56	0	2
Future Vol, veh/h	97	0	0	56	0	2
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	92	92	92	92	92	92
Heavy Vehicles, %	3	2	2	3	2	2
Mvmt Flow	105	0	0	61	0	2

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	105	0	166
Stage 1	-	-	-	-	105
Stage 2	-	-	-	-	61
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1486	-	824
Stage 1	-	-	-	-	919
Stage 2	-	-	-	-	962
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1486	-	824
Mov Cap-2 Maneuver	-	-	-	-	824
Stage 1	-	-	-	-	919
Stage 2	-	-	-	-	962

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	949	-	-	1486	-
HCM Lane V/C Ratio	0.002	-	-	-	-
HCM Control Delay (s)	8.8	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	98	1	6	56	0	1
Future Vol, veh/h	98	1	6	56	0	1
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	92	92	92	92	92	92
Heavy Vehicles, %	3	2	2	3	2	2
Mvmt Flow	107	1	7	61	0	1
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	108	0	183	108
Stage 1	-	-	-	-	108	-
Stage 2	-	-	-	-	75	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1483	-	806	946
Stage 1	-	-	-	-	916	-
Stage 2	-	-	-	-	948	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1483	-	802	946
Mov Cap-2 Maneuver	-	-	-	-	802	-
Stage 1	-	-	-	-	916	-
Stage 2	-	-	-	-	943	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0.7	8.8			
HCM LOS			A			
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	946	-	-	1483	-	
HCM Lane V/C Ratio	0.001	-	-	0.004	-	
HCM Control Delay (s)	8.8	-	-	7.4	0	
HCM Lane LOS	A	-	-	A	A	
HCM 95th %tile Q(veh)	0	-	-	0	-	

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	48	0	2	41	1	1
Future Vol, veh/h	48	0	2	41	1	1
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	52	0	2	45	1	1

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	52	0	101
Stage 1	-	-	-	-	52
Stage 2	-	-	-	-	49
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1554	-	898
Stage 1	-	-	-	-	970
Stage 2	-	-	-	-	973
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1554	-	897
Mov Cap-2 Maneuver	-	-	-	-	897
Stage 1	-	-	-	-	970
Stage 2	-	-	-	-	972

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	8.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	953	-	-	1554	-
HCM Lane V/C Ratio	0.002	-	-	0.001	-
HCM Control Delay (s)	8.8	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection						
Int Delay, s/veh	1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	48	1	7	42	1	5
Future Vol, veh/h	48	1	7	42	1	5
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	52	1	8	46	1	5

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	53	0	115
Stage 1	-	-	-	-	53
Stage 2	-	-	-	-	62
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1553	-	881
Stage 1	-	-	-	-	970
Stage 2	-	-	-	-	961
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1553	-	877
Mov Cap-2 Maneuver	-	-	-	-	877
Stage 1	-	-	-	-	970
Stage 2	-	-	-	-	956

Approach	EB	WB	NB
HCM Control Delay, s	0	1	8.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	988	-	-	1553	-
HCM Lane V/C Ratio	0.007	-	-	0.005	-
HCM Control Delay (s)	8.7	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	93	0	1	81	0	1
Future Vol, veh/h	93	0	1	81	0	1
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	92	92	92	92	92	92
Heavy Vehicles, %	6	2	2	2	2	2
Mvmt Flow	101	0	1	88	0	1

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	101	0	191
Stage 1	-	-	-	-	101
Stage 2	-	-	-	-	90
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1491	-	798
Stage 1	-	-	-	-	923
Stage 2	-	-	-	-	934
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1491	-	797
Mov Cap-2 Maneuver	-	-	-	-	797
Stage 1	-	-	-	-	923
Stage 2	-	-	-	-	933

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	8.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	954	-	-	1491	-
HCM Lane V/C Ratio	0.001	-	-	0.001	-
HCM Control Delay (s)	8.8	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection						
Int Delay, s/veh	0.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	93	1	5	81	1	5
Future Vol, veh/h	93	1	5	81	1	5
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	92	92	92	92	92	92
Heavy Vehicles, %	6	2	2	2	2	2
Mvmt Flow	101	1	5	88	1	5

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	102	0	200
Stage 1	-	-	-	-	102
Stage 2	-	-	-	-	98
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1490	-	789
Stage 1	-	-	-	-	922
Stage 2	-	-	-	-	926
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1490	-	786
Mov Cap-2 Maneuver	-	-	-	-	786
Stage 1	-	-	-	-	922
Stage 2	-	-	-	-	922

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	8.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	920	-	-	1490	-
HCM Lane V/C Ratio	0.007	-	-	0.004	-
HCM Control Delay (s)	8.9	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

3: Yankee Bit Lane & 223rd Street

Proposed AM Peak Hour (Conservative Use)

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	103	0	0	58	0	2
Future Vol, veh/h	103	0	0	58	0	2
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	92	92	92	92	92	92
Heavy Vehicles, %	3	2	2	3	2	2
Mvmt Flow	112	0	0	63	0	2

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	112	0	175
Stage 1	-	-	-	-	112
Stage 2	-	-	-	-	63
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1478	-	815
Stage 1	-	-	-	-	913
Stage 2	-	-	-	-	960
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1478	-	815
Mov Cap-2 Maneuver	-	-	-	-	815
Stage 1	-	-	-	-	913
Stage 2	-	-	-	-	960

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	941	-	-	1478	-
HCM Lane V/C Ratio	0.002	-	-	-	-
HCM Control Delay (s)	8.8	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

5: Proposed Main Drive & 223rd Street

Proposed AM Peak Hour (Conservative Use)

Intersection						
Int Delay, s/veh	2.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	98	7	67	56	2	22
Future Vol, veh/h	98	7	67	56	2	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	92	92	92	92	92	92
Heavy Vehicles, %	3	2	2	3	2	2
Mvmt Flow	107	8	73	61	2	24

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	115	0	318
Stage 1	-	-	-	-	111
Stage 2	-	-	-	-	207
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1474	-	675
Stage 1	-	-	-	-	914
Stage 2	-	-	-	-	828
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1474	-	641
Mov Cap-2 Maneuver	-	-	-	-	641
Stage 1	-	-	-	-	914
Stage 2	-	-	-	-	786

Approach	EB	WB	NB
HCM Control Delay, s	0	4.1	9.1
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	907	-	-	1474	-
HCM Lane V/C Ratio	0.029	-	-	0.049	-
HCM Control Delay (s)	9.1	-	-	7.6	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.2	-

3: Yankee Bit Lane & 223rd Street

Proposed PM Peak Hour (Conservative Use)

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	96	0	1	86	0	1
Future Vol, veh/h	96	0	1	86	0	1
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	92	92	92	92	92	92
Heavy Vehicles, %	6	2	2	2	2	2
Mvmt Flow	104	0	1	93	0	1

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	104	0	199
Stage 1	-	-	-	-	104
Stage 2	-	-	-	-	95
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1488	-	790
Stage 1	-	-	-	-	920
Stage 2	-	-	-	-	929
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1488	-	789
Mov Cap-2 Maneuver	-	-	-	-	789
Stage 1	-	-	-	-	920
Stage 2	-	-	-	-	928

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	8.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	951	-	-	1488	-
HCM Lane V/C Ratio	0.001	-	-	0.001	-
HCM Control Delay (s)	8.8	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

5: Proposed Main Drive & 223rd Street

Proposed PM Peak Hour (Conservative Use)

Intersection						
Int Delay, s/veh	3.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	93	4	39	81	6	59
Future Vol, veh/h	93	4	39	81	6	59
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	92	92	92	92	92	92
Heavy Vehicles, %	6	2	2	2	2	2
Mvmt Flow	101	4	42	88	7	64

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	105	0	275 103
Stage 1	-	-	-	-	103 -
Stage 2	-	-	-	-	172 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1486	-	715 952
Stage 1	-	-	-	-	921 -
Stage 2	-	-	-	-	858 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1486	-	694 952
Mov Cap-2 Maneuver	-	-	-	-	694 -
Stage 1	-	-	-	-	921 -
Stage 2	-	-	-	-	832 -

Approach	EB	WB	NB
HCM Control Delay, s	0	2.4	9.2
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	920	-	-	1486	-
HCM Lane V/C Ratio	0.077	-	-	0.029	-
HCM Control Delay (s)	9.2	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

3: Yankee Bit Lane & 223rd Street

Proposed Anniversary Celebration PM Peak Hour

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	102	0	1	90	0	1
Future Vol, veh/h	102	0	1	90	0	1
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	92	92	92	92	92	92
Heavy Vehicles, %	6	2	2	2	2	2
Mvmt Flow	111	0	1	98	0	1

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	111	0	211
Stage 1	-	-	-	-	111
Stage 2	-	-	-	-	100
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1479	-	777
Stage 1	-	-	-	-	914
Stage 2	-	-	-	-	924
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1479	-	776
Mov Cap-2 Maneuver	-	-	-	-	776
Stage 1	-	-	-	-	914
Stage 2	-	-	-	-	923

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	8.8
HCM LOS			A

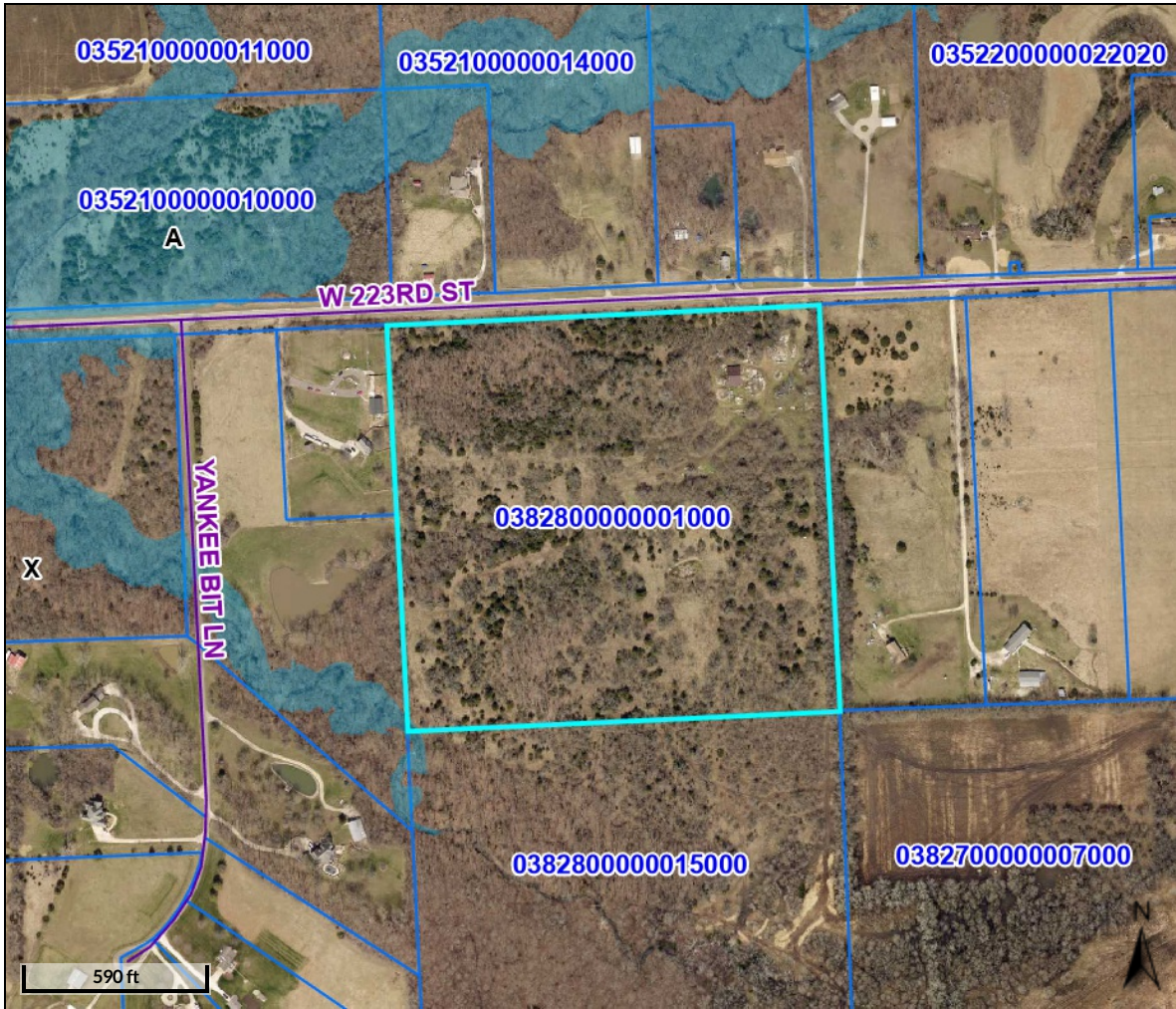
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	942	-	-	1479	-
HCM Lane V/C Ratio	0.001	-	-	0.001	-
HCM Control Delay (s)	8.8	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection						
Int Delay, s/veh	4.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	93	10	90	81	10	90
Future Vol, veh/h	93	10	90	81	10	90
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	92	92	92	92	92	92
Heavy Vehicles, %	6	2	2	2	2	2
Mvmt Flow	101	11	98	88	11	98

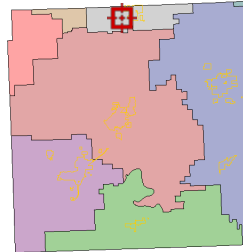
Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	112	0	391
Stage 1	-	-	-	-	107
Stage 2	-	-	-	-	284
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1478	-	613
Stage 1	-	-	-	-	917
Stage 2	-	-	-	-	764
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1478	-	570
Mov Cap-2 Maneuver	-	-	-	-	570
Stage 1	-	-	-	-	917
Stage 2	-	-	-	-	711

Approach	EB	WB	NB
HCM Control Delay, s	0	4	9.6
HCM LOS			A








Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	888	-	-	1478	-
HCM Lane V/C Ratio	0.122	-	-	0.066	-
HCM Control Delay (s)	9.6	-	-	7.6	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0.2	-



Overview



Legend

-  City Limits
-  Centerlines
-  Parcels
-  Lakes
- Flood Zones**
-  0.2 PCT ANNUAL CHANCE FLOOD HAZARD
-  A
-  AE

Parcel ID= 038280000001000  
Acres= 38.790037859999998

Date created: 2/21/2023  
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