

**APPLICATION
FOR
CONDITIONAL USE PERMIT**

Parcel ID# 0382800000001000 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)
NAME: Always & Furever Midwest Animal Sanctuary	NAME: Phelps Engineering, Inc.
ADDRESS: c/o Jennifer Dulski 23595 W 223rd St Spring Hill, KS 66083	ADDRESS: c/o Doug Ubben, Jr. 1270 N. Winchester Olathe, KS 66061
PHONE:	PHONE: 913-538-5806
EMAIL: jdulski@yahoo.com	EMAIL: dougubben@phelpsenengineering.com

SURVEYOR / ENGINEER	CONTACT PERSON
NAME: Bell/Knott & Associates	NAME: Polsinelli PC
ADDRESS: c/o Kerry Knott 12730 State Line Road, Suite 100, Leawood, KS 66209	ADDRESS: c/o Curtis Holland 900 W. 48th Place, Suite 900, Kansas City, MO 64112
PHONE: 913-378-1606	PHONE: 913-234-7411
EMAIL: kknott@bellknott.com	EMAIL: 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: 6/21/23

Owner's Signature: _____ Date: _____

 RECEIVED

OFFICE USE ONLY

Date application filed: JUN 22 2023 PC Hearing Date: _____

Fees:
 Application amount: \$ 954.85 Application # 23007

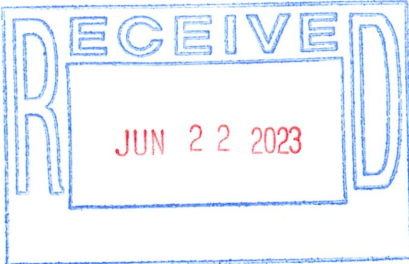
Stormwater Review: ** \$ _____ Parcel ID # 038-28-0-00-00-006000

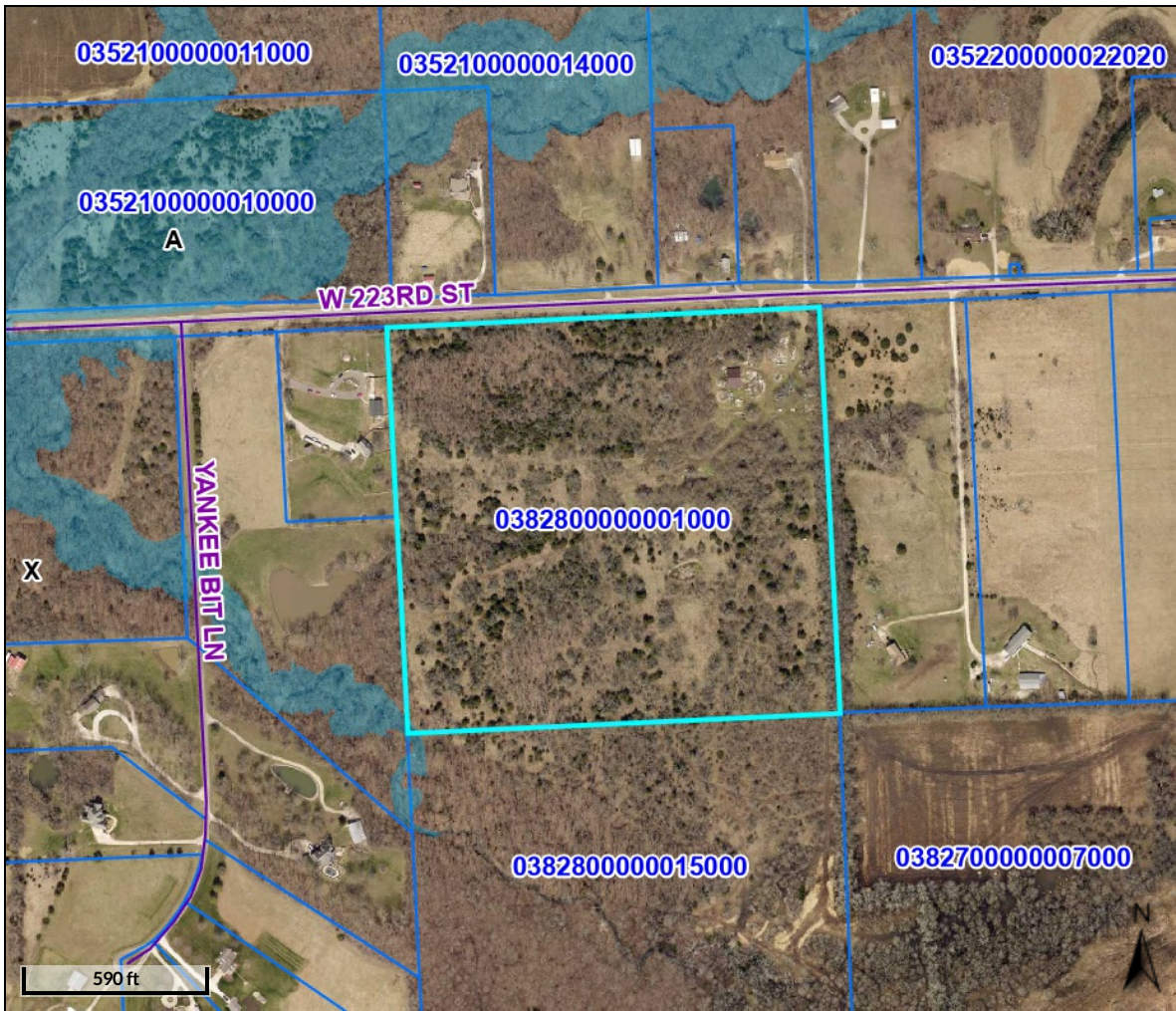
Receipt # 509595 S 28 T 15 R 23 Twp. _____

** The applicant is responsible for all costs associated with a 3rd 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. **

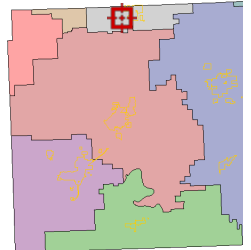
LEGAL DESCRIPTION:

THE NORTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 28,
TOWNSHIP 15, RANGE 23, IN MIAMI COUNTY, KANSAS.












Overview



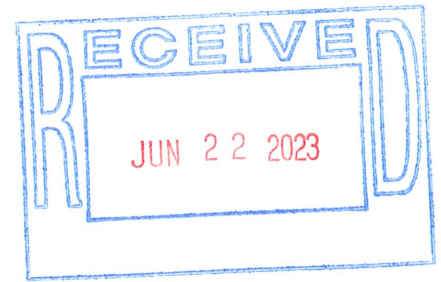
Legend

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

Parcel ID= 0382800000001000
Acres= 38.790037859999998

Date created: 2/21/2023
Last Data Uploaded: 2/20/2023 9:31:59 PM

Developed by  Schneider
GEOSPATIAL



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 headquartered 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 senior dogs to live out the rest of their days surrounded by love, a true senior sanctuary. Founded by Jennifer Dulski in 2018, A&F has since transformed into a professional rescue network with a licensed animal shelter in the state of Missouri and a network of over 300 fosters throughout Kansas and Missouri. Over the past 5+ years, the organization has saved close to 4,000 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 a one of a kind/state of the art kennel operation to be called the “Homestead.” This new location will be used to save the lives of 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. Since our doors have been open, we have and will continue to maintain adequate insurance, we have an annual audit of our financial statements, we obtain all required licenses and follow rules to maintain them. In applying for a shelter license, we commit to a set number of dogs and cats as our shelter capacity. Every animal is entered into a web-based record management system, and are tracked from intake through adoption. We are routinely inspected by the Kansas Department of Agriculture as well as the Missouri Department of Agriculture with no advance notice. They assess our facility, animal welfare, recordkeeping, and verify that we are within our approved capacity. Our annual license renewals require that we have an on-site inspection by a veterinarian who assesses our standards of care and animal inventory. These inspections as well as our state inspections have consistently been satisfactory.

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 eight (8) buildings to care for and house our animals. All buildings and all primary activities will be located on the north 20 acres of the property (adjacent to 223rd). The south 20 acres will only be used for walking or exercising the dogs, and otherwise will remain as an open natural space which is heavily treed. 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 eight buildings on the Homestead will allow for maximum capacity of **120 dogs and 40 cats** and designed as follows: four dog barns, (one barn dedicated to the A&F veterinary clinic that will share space with our cat haven as well), and three dog villas to house and rehabilitate all ages of pets in a secure and safe environment, and one administrative building. Our goal is to always move our animals to foster or forever homes as quickly as possible. Our intent is to have capacity for urgent situations, **not** to house the 120 dogs and 40 cats maximum on a consistent basis. 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 model a home-like environment inside and out, each barn 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 have six-foot tall, double gated privacy (wood) fenced in yards surrounding the supervised runs. There will be no indoor/outdoor runs or dog doors. There will be other six-foot tall (wood) fenced in play yards throughout the Homestead. Every fence will have doubled gates for safety. Each barn will have visitation rooms equipped with couches, TVs and toys which will further human and dog socialization skills and create a homelike environment to help prepare them for adoptions.

When dogs are walked 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.

All forms of dog waste will be manually picked up daily and disposed of in dumpsters throughout the Homestead. Waste and other trash from these dumpsters will be picked up and taken off-site by a waste management company. All remains for any animal that passes on the Homestead will be sent to a facility (either external veterinary office or crematorium).

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 contains significant natural landscaping which will be preserved as much as possible except for the barn structures and 20 acres of the property will be literally untouched other than walking paths for our animals and humans to enjoy. This will help provide a buffer area for adjacent properties and provide fewer distractions for our animals.

Each of the barns will be designed/constructed similarly but will be tailored to specific group needs. A new concept to be developed at the Homestead will feature 3 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.

With respect to social gatherings, small, scheduled organizational gatherings, will be by appointment only and take place in the meet and greet rooms in each barn for potential foster or adoptive families to meet our animals. These appointments will vary depending on the degree of interest in our pets. Scheduled activities such as inviting senior citizens over for visits with our senior dogs will be invitation/RSVP only and limited to a certain number of people. **The Homestead will be a private facility and visitors will be by appointment only.** Visitors will be allowed to bring their dogs for scheduled meet and greets

The Homestead also will have a veterinary clinic, the Homestead Health Clinic, to serve the needs of the A&F animals in our care. Please refer to the chart below for detailed information on animal capacity and staffing. The Health Clinic will share the space with a Cat Haven to provide a safe and secure temporary and forever home for our cats. It will consist of various wings, segregated for specific needs. 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 that may be brought in by animal control should a contract be reached between Miami County, or other local municipalities, to utilize our services. Note, should such agreement be made it would not affect the maximum number of animals housed on the Homestead at any time. All cats would be spayed/neutered, vaccinated, and then appropriately placed through our adoption process. No A&F cats will be roaming free on the Homestead.

Homestead Facilities	Max Square Footage
Red Barn 1	12,000
Red Barn 2	5,000
Red Barn 3	5,000
Red Barn 4	5,000
Homestead Health Clinic / Cat Haven	6,000
Dog Villa 1	1,260
Dog Villa 2	1,260
Dog Villa 3	1,260
Maintenance Building	1,800
Storage Building	1,800
Trash Enclosure	250
	40,630

	Red Barn 1	Red Barn 2	Red Barn 3	Red Barn 4	Homestead Health Clinic / Cat Haven	Dog Villa 1	Dog Villa 2	Dog Villa 3	HOMESTEAD TOTAL
Daily Staffing - 2 Shifts (Morning & Afternoon)									
Staff	3 per shift / 6 total	3 per shift / 6 total	3 per shift / 6 total	2 per shift/4 total	2 per shift / 4 total	1 per shift / 2 total	1 per shift / 2 total	1 per shift / 2 total	16 per shift / 32 total
Volunteer	1 per shift / 2 total	1 per shift / 2 total	1 per shift / 2 total	1 per shift/2 total	0	0	0	0	4 per shift / 8 total
Dog/Cat Capacity Per Building									
Dog Capacity	24	34	24	24	2	4	4	4	120
Cat Capacity	0	10	0	0	30	0	0	0	40

With respect to potential concerns that could be identified by the staff, we have also proposed thoughtful operational details that further support low impact conditions that are consistent with rural character and address each such potential concern.

RURAL FARM AESTHETIC CONCERNS

Like the neighbors and the current zoning, the A&F team also wants to maintain the rural farm aesthetic feel for The Homestead and the community. To that end, the following are Farm/Homestead Architectural Inspiration photos for the buildings on The Homestead.

Architectural Inspirations – Barns, Shelter, & Dog Villas



ARCHITECTURAL EXTERIOR INSPIRATION PHOTO - BARN
 • BARN-STYLE ARCHITECTURE

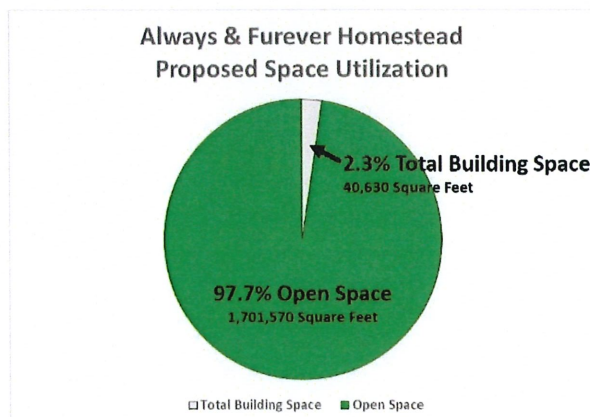


ARCHITECTURAL EXTERIOR INSPIRATION PHOTO - DOG VILLA
 • WOOD FRAME CONSTRUCTION

We are very excited about the architectural inspirations being a perfect fit for the Rural Farm Aesthetic of the neighborhood.

In addition, The Homestead site plan calls for retaining as many of the trees and natural vegetation as possible. This is especially true on the perimeter of the property to ensure we maintain visual screening for our neighbors. We plan to place a 6' black chain link fence around the perimeter of the property, but again, the intent is to install this inside the tree line making it invisible and maintaining the natural Farm/Rural Aesthetic of the neighborhood. The Landscaping Plan will provide additional visual breaks and enhance the rural feel of The Homestead.

Even at 100% completion of the buildings, The Homestead maintains **97.7% Open Space** which will maintain the desired Rural Farm Aesthetic of the neighborhood and also only proposing to build on the 20 acres north of the property furthest away from our neighbors.



AESTHETIC/VISUAL IMPACT SUMMARY

- Farm/Homestead Architectural Inspiration of Buildings
- Retention of as Many Trees and Natural Vegetation as Possible
- Perimeter Tree & Vegetation Buffer
- 6' Black Chain Link Border Fence Hidden in Trees and Vegetation
- Landscaping Plan
- **97.7% Open Space** with Much of This Covered by Trees and Vegetation
- Signage Consistent with Farm/Homestead Architectural Inspiration and Meets All Miami County Regulations
- **All buildings and all primary activities will be located on the north 20 acres of the property**

ENVIRONMENTAL IMPACT MITIGATION

A&F recognizes that addressing any potential odor, sanitation, and environmental impacts is an essential component for the successful and sustained operation of this Homestead. Good animal husbandry is key for physical animal rehabilitation and the protection of staff and volunteers, and for creating clean habits and behaviors that help animals adapt to home environments. An unclean facility will not pass State inspections and will not create a positive impression for potential adopters.

A&F currently picks up dog waste multiple times per day in the play yards, and staff is instructed to carry “poop bags” to pick up dog waste as needed while on walks with dogs. This process will continue on The Homestead. Dog waste will be picked up multiple times per day in the play yards associated with each barn, placed in plastic bags, and put in sealed trash containers at each barn. All waste will then be picked up from those containers and moved to the dumpster daily. Staff that will be responsible for walking dogs on The Homestead will continue to carry “poop bags” and pick up the dog waste as needed on walks. No dog will ever be allowed to run free on The Homestead so this will ensure there is never unattended dog waste on the grounds.

The same is true for cleaning the inside of each barn, shelter, or dog villa. Dog suites will be cleaned and sanitized throughout the day, with dog waste being disposed of in the same way as waste picked up in the play yards.

Another major change to the A&F operation which will minimize the environmental impact on The Homestead property is the decision to **contract all laundry to an off-site laundry cleaning service**. This is similarly done by other large shelters in the Kansas City area with great success and will be implemented for the operation of The Homestead. **This dramatically reduces the amount of wastewater the on-site septic systems need to handle.**

A&F and our engineering and design partners are working with Miami County staff to ensure all waste management systems meet and exceed all requirements.

ENVIRONMENTAL IMPACT MITIGATION SUMMARY

- **97.7% Open Space** with Much of This Covered by Trees and Vegetation
 - Total Square Footage of Buildings at 100% buildout – 40,630 square feet
 - Property - 1,742,400+ Square Feet
 - **Open Space – 97.7% Under Roof – 2.3%**
- Retention of as Many Trees and Natural Vegetation as Possible
- Landscaping Plan
- **Laundry Washing to Be Contracted with Off-Site Laundry Service**
- Dog Poop Picked Up Multiple Times Per Day from Play Yards & Placed in Sealed Trash Bin at each Barn
- Staff Picks Up/Bags Poop While Walking Individual Dogs on Homestead Campus
- Daily Cleaning of All Dog Barns, Cat Barn, and Miami County Shelter
- Bagged and Placed in Dumpster Daily
- Regularly Scheduled Dumpster Pick Up\
- **All buildings and all primary activities will be located on the north 20 acres of the property.**

NOISE MITIGATION:

There is ample evidence that based on the proposed operational practices (consistent with current practices), the enhanced building design, the extensive landscape buffering and the ample separation distance, this concern is limited strictly to daytime operating hours and minimized by thoughtful supervision and management of the animals. These solutions not only benefit the neighbors, but create a calmer environment supporting animal rehabilitation and training and staff well-being.

A&F has had zero noise complaints from the current operation of the nearby Little Red Barn over the past 5 Years due to the way A&F manages the dogs in our care. With Miami County having no leash laws, the only dogs we hear barking after hours are not from the dogs on our property, as all A&F dogs are safely secured inside the Little Red Barn with no free access outside the building. This proactive management practice will continue on The Homestead property.

We have learned from our experience operating the existing facility, as well as ideas and experiences in working with dozens of Animal Shelters across the Midwest, and incorporated these lessons into the design of the buildings on The Homestead. Many shelters and kennels have indoor/outdoor runs where the dogs have unfettered access to the outdoors. This is NOT the case with the design of every building on The Homestead where dogs or cats will be housed. Dogs will not have access to outside play yards unless they are accompanied by A&F staff. There are no “pet doors” allowing our dogs to freely come and go into the open yard areas as they desire. All dogs will also be accompanied by A&F staff whenever they are walked on The Homestead trails. There is never any time when dogs or cats in our care will have unmanaged access to outside spaces. Dog barking is significantly minimized or eliminated altogether when they are properly managed and accompanied by trained staff like we have here at A&F.

All buildings are designed with sound proofing to mitigate sounds from within the building using insulated exterior and interior walls. The current design plans show multiple Suite Rooms with calming classical music playing throughout each building which will minimize dog barking. Dogs will always be secured in their individual suites from 7:00 PM to 7:00 AM and will only have managed access outside their respective barn from 7:00 AM to 7:00 PM.

BARKING/NOISE MITIGATION SUMMARY

- Barn/Shelter Design
 - Sound proofing of Exterior and Interior Wall using Designed Insulation
 - 4-6 Suite Rooms per Barn/Shelter
 - 4-5 Dog Suites/Kennels per Room
 - Soothing Classical Music Played 24/7 Throughout Building
- Hours of Operation – 7:00 AM to 7:00 PM
 - All Dogs Secured in their Individual Suites from 7:00 PM – 7:00 AM
 - No Exterior Access 7:00 PM – 7:00 AM
 - Staff Managed Access to Play Yards and Trails – 7:00 AM – 7:00 PM
- Individual Play Yards per Suite Room – 6' Privacy Fence
 - Dogs Managed by Staff Individually or Small Groups in Designated Play Yards
 - Dogs Never Allowed to Roam Homestead Unattended
- Retention of as Many Trees and Natural Vegetation as Possible
- **All buildings and all primary activities will be located on the north 20 acres of the property**
- **97.7% Open Space** with Much of This Covered by Trees and Vegetation

LIGHT POLLUTION MITIGATION

With respect to the potential for light pollution making the area feel more like a commercial property and less like a rural farm property, there is ample evidence from the Photometric lighting plan that light will not spread beyond property boundaries or skyward, and that the use of lighting will be minimized after close of early evening hours. Certainly outdoor sports recreational facilities, outdoor riding arenas, and outdoor commercial uses would have much greater impact than this facility which has limited hours, one-story buildings, and has retained mature trees as buffers between uses.

In working with our design and engineering partners, a Photometric lighting plan was designed to minimize any light pollution from The Homestead. The Photometric Plan calls for ZERO Foot Candles at all property lines. Exterior lighting on The Homestead will be minimized outside of operational hours from 7:00 PM to 7:00 AM. The remaining lighting is for security and directional purposes only. The main lights in the parking lot will follow hours of operation and will be turned off by 7:00 PM. Lights on all the buildings will use motion sensors for security reasons, especially at night. They are designed to minimize light pollution by directing all of its light downward. This prevents light from being emitted above the horizontal plane, ensuring that no light is wasted or

directed upwards into the sky, which contributes to skyglow. Full cutoff fixtures have a flat lens and a housing that extends beyond the light source, which helps prevent light from spilling upwards or sideways. This design not only reduces light pollution and glare but also increases the efficiency and effectiveness of the lighting by directing light only where it is needed. The only other lighting on-site will be near the Knox Box and ground-level lighting in the parking lot in order to provide easy access to emergency personnel.

The Photometric plan calls for lighting in each play yard connected to each building where dogs will be housed. However, these particular lights will be off between the hours of 7:00 PM to 7:00 AM. Even while lights are on in the play yards during hours of operation until 7:00 PM, the 6' privacy fence for each play yard will minimize any light that escapes the area. Again, after 7:00 PM those lights will be turned off.

The operational plan is to turn off as many of the exterior lights as possible after 7:00 PM. The following exterior lights will be turned off at 7:00 PM:

- Main Parking Lot Lights
- Driveway Lights – as allowed by Fire & Law Enforcement agencies
- Pathway Lights
- Individual Play Yard Lights
- Barn & Villa – Front Entrance Lights – as allowed by **Fire & Law Enforcement agencies**
- **All buildings and all primary activities will be located on the north 20 acres of the property**

The Landscaping Plan for The Homestead calls for retention of as many trees and natural vegetation as possible, and additional natural landscaping which will also help mitigate direct view of any lighting.

The net impact is there should be very minimal exterior lighting on The Homestead between 7:00 PM and 7:00 AM maintaining the existing rural farm property feel.

LIGHT POLLUTION MITIGATION SUMMARY

- Homestead Hours of Operation – 7:00 AM – 7:00 PM
- Minimal Homestead Lighting – 7:00 PM – 7:00 AM
 - Shielded Down Lighting at Barn/Shelter Entrances Only
 - Individual Play Yard Lights Off After Hours
 - 6' Privacy Fences Around Each Play Yard
 - Use of Shielded Down Lighting
 - Retention of as Many Trees and Natural Vegetation as Possible
 - Landscaping Plan
 - Photometric Plan - ZERO Foot Candles at All Property Lines
 - **All buildings and all primary activities with lighting will be located on the north 20 acres of the property**

SAFETY/SECURITY CONCERNS

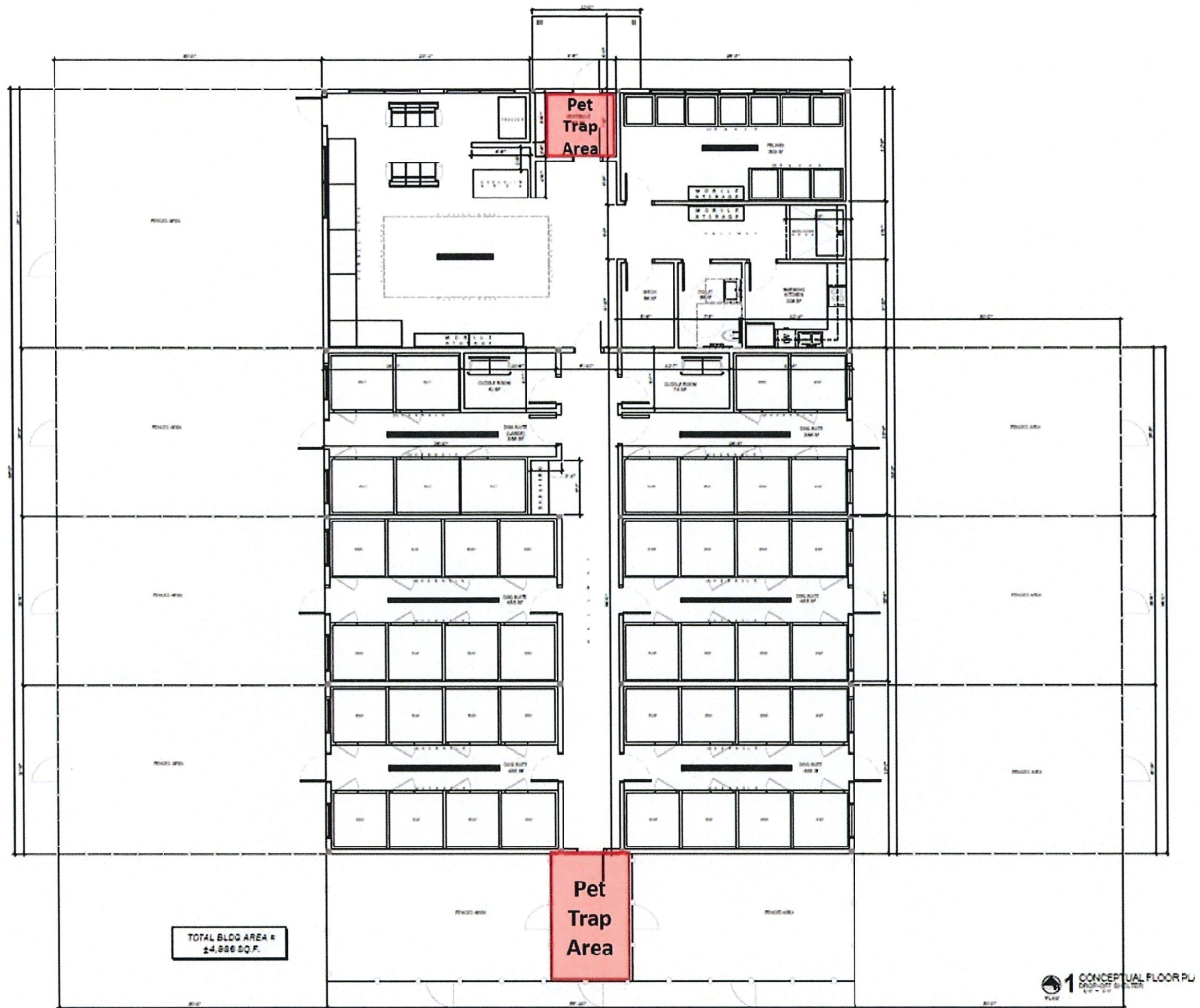
A&F agrees that safety and security is an essential component to a successful animal rescue and rehabilitation facility. There is ample evidence that the design and operational practices previously mentioned will protect against the escape of animals kept within the property boundaries, and prevent the encroachment of people or animals from outside property boundaries. There are multiple layers of safety and security involved in protecting the neighbors, staff and animals, from the physical to the operational. These measures are detailed below.

Through double leashing, installing double gates, and pet traps being added to all play yards which are also used for entry and exit into the each barn safety is a key concept in the design of the proposed barns, shelter, and dog villas to provide a physical pet trap to eliminate any accidental escapes. No accidental escapes at the current property have occurred since these changes were made, the last of which occurred in June of 2021 and not one incident of an A&F dog escaping and biting anyone outside our property has occurred.

As you can see in the illustrative diagram below for one of our proposed barns, access out of The Homestead buildings will require going through an inner vestibule with double entry on the front of the building, or an outer pet trap and gated and fenced area at the rear of the building. These are the only ingress and egress points that will be utilized for dogs entering or exiting the barns or shelter buildings. The other doors provide access to the play yards which are all fenced with a 6' wood privacy fence and managed by A&F staff.

The Homestead property will be secured with a 6' black chain link fence with electronically secured and gated access surrounding the entire property. All dogs will be secured in their individual suites from 7:00 PM – 7:00 AM. Dog access to play yards will be managed by A&F staff. No dogs will have free access to The Homestead grounds but will be taken for walks by A&F personnel exiting their respective buildings through the secured rear entrance with Pet Trap. All dogs are double leashed with a clip leash secured to their collar or harness in addition to the use of a slip lead to ensure each dog is 100% secured. Please see photos below for examples.

This focus on safety and dog management protocols when designing The Homestead ensure the concerns of the neighbors are fully addressed.



SAFETY/SECURITY SUMMARY

- Barn/Shelter Design
 - Pet Traps/Vestibule at Controlled Entrances/Exits Used to Access Homestead
 - No Access Used From Individual Play Yards Per Suite Room – 6’ Privacy Fenced
 - Secured Doors On Each Suite Room
- Homestead Campus
 - 6’ Black Chain Link Fence Inside Tree Vegetation Line Around Entire Homestead
 - Electronic Secure Gated Access to Homestead Campus
 - Homestead Campus Not Open to the Public – Appointment Only
- Dog/Cat Management
 - Cats Never Allowed Outside Cat Haven – Secured in Crates for Transport
 - No Feral Cats loose on the Homestead
 - Dogs Double Leashed (Clip Leash & Slip Leash) When Outside Barn/Shelter or Play Yard

- Only Pet Trap Secured Front & Rear Entrance Access Used from Barn/Shelter Building
 - Individual Dog Walks on Homestead Trails
 - Transport
- Dogs Never Allowed to Roam Homestead Unattended
- All Dogs Secured in their Individual Suite/Kennel from 7:00 PM – 7:00 AM
- No Exterior Access 7:00 PM – 7:00 AM
- Staff Managed Access to Play Yards – 7:00 AM – 7:00 PM

TRAFFIC IMPACT ON 223RD STREET

The Homestead would generate minimal additional traffic on 223rd Street and as well as additional safety impacts. At the direction of Miami County Planning staff, we engaged a certified traffic engineer for an impact study and evaluation. There is ample evidence that The Homestead operations will not create a negative impact on 223rd street. Additional traffic is to be expected with any new development of the property, but the proposed traffic does not necessitate any redesign of the existing roadway for safety or capacity concerns.

SUMMARY OF CERTIFIED TRAFFIC IMPACT STUDY

At the direction of Miami County to have a Certified Traffic Impact Study completed, A&F engaged Priority Engineering, Inc. This study documents the impact of the full build-out of The Homestead 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. The estimated traffic volume at our location is well below volume required to trigger additional improvements such as adding turn lanes.

Always & Furever Homestead																
Vehicle Traffic By Hour - Normal Operational Day																
	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	5	5	3	4	6	6	5	5	4	1				52	5 - 8
Outbound		1	2	4	4	4	5	6	5	4	4	4	6	3	52	43 - 46

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

Finally, it is important to clarify that 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
<https://www.alwaysandfurever.org>

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
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landworks
STUDIO

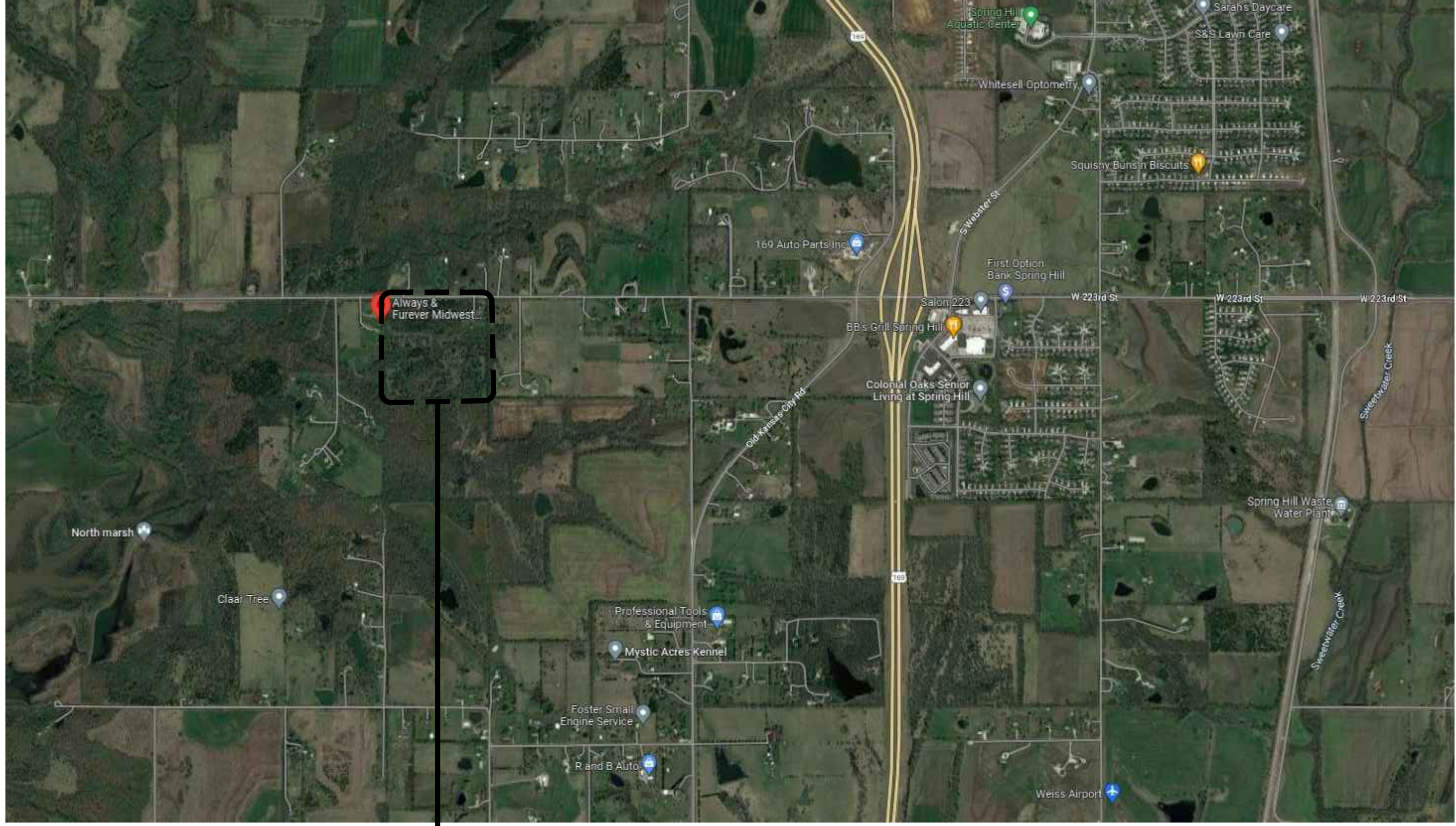
priority
ENGINEERS

PROJECT INFORMATION:

INDEX OF DRAWINGS:

COVER	
CIVIL	
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C2	GRADING PLAN
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ARCHITECTURAL	
A010	SITE PLAN
MEP	
E010	SITE PHOTOMETRIC CALCULATION PLAN
E020	ELECTRICAL SITE PLAN

PROJECT LOCATION:



PROJECT SITE

SEAL:

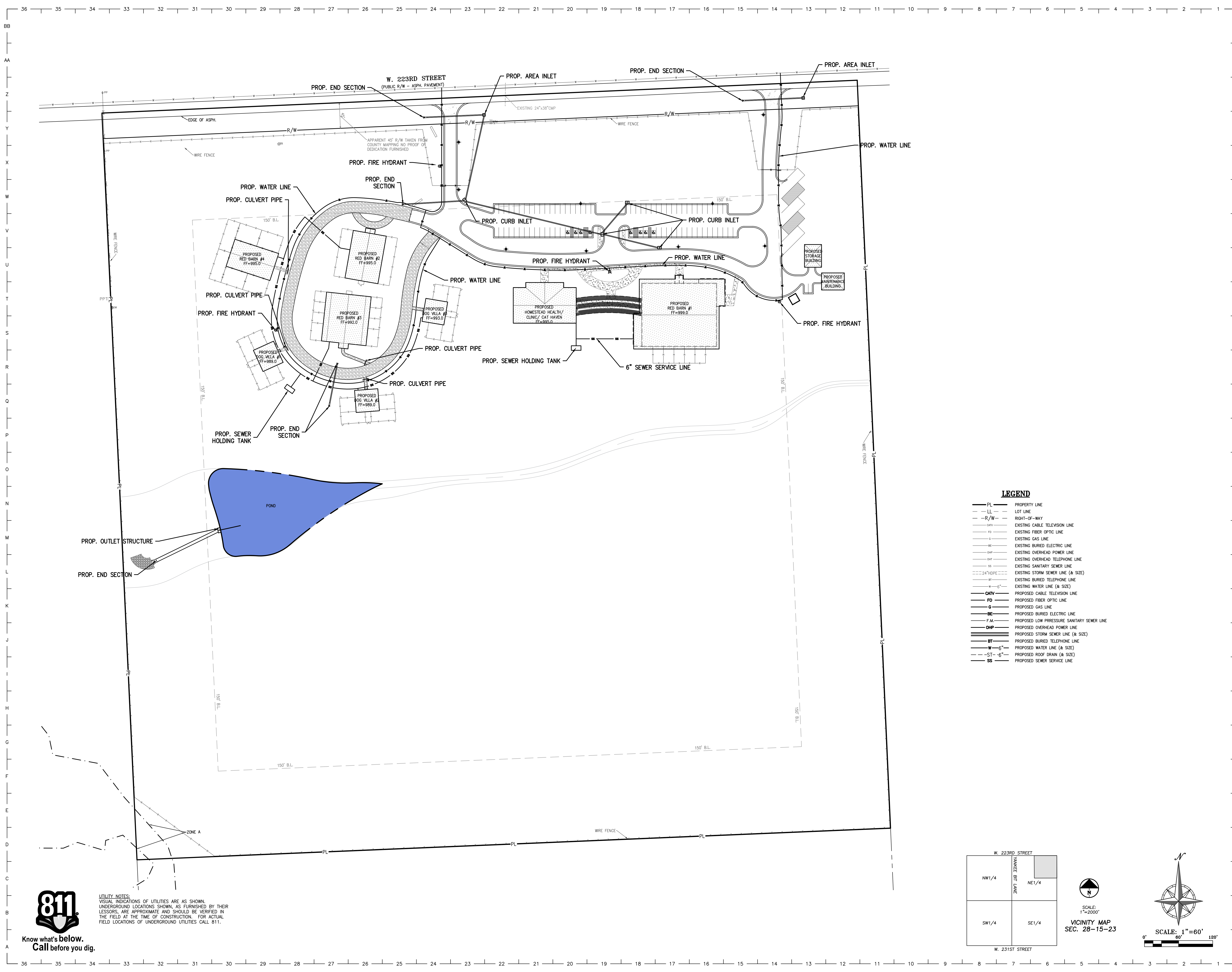
REVISIONS:

ISSUE DATE: 06/22/2023
REASON FOR ISSUE: CONDITIONAL USE APPLICATION
PROJECT NUMBER: 22-050
PROJECT PHASE: CD

SHEET TITLE: **Cover**

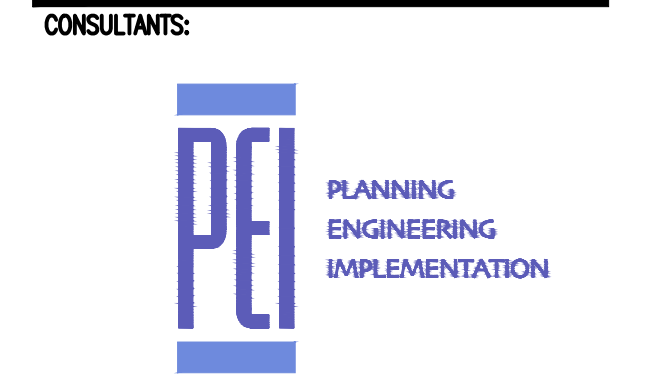
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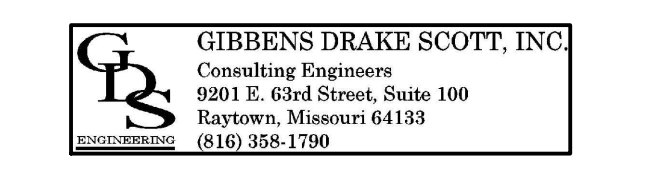


CLIENT:
ALWAYS & FUREVER
 MIDWEST ANIMAL SANCTUARY
 PROJECT HOMESTEAD

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



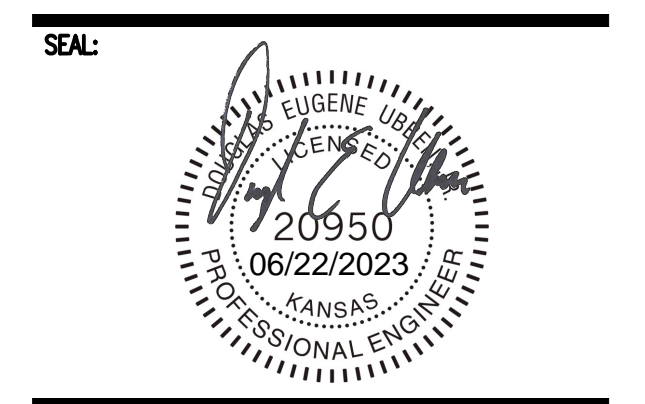
PHELPS ENGINEERING, INC.
 1370 N. Winchester
 Olathe, Kansas 66061
 (913) 393-1155
 Fax: (913) 393-1166
 www.phelpsengineering.com



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
- 24"HOPE — EXISTING 24" HOPE SANITARY 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
- BT — PROPOSED BURIED TELEPHONE LINE
- W-6" — PROPOSED WATER LINE (& SIZE)
- ST-6" — PROPOSED 6" ROOF DRAIN (& SIZE)
- SS — PROPOSED SEWER SERVICE LINE

ARCHITECT:
Bell / Knott & Associates
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 12730 State Line Road Voice: 913.378.1600
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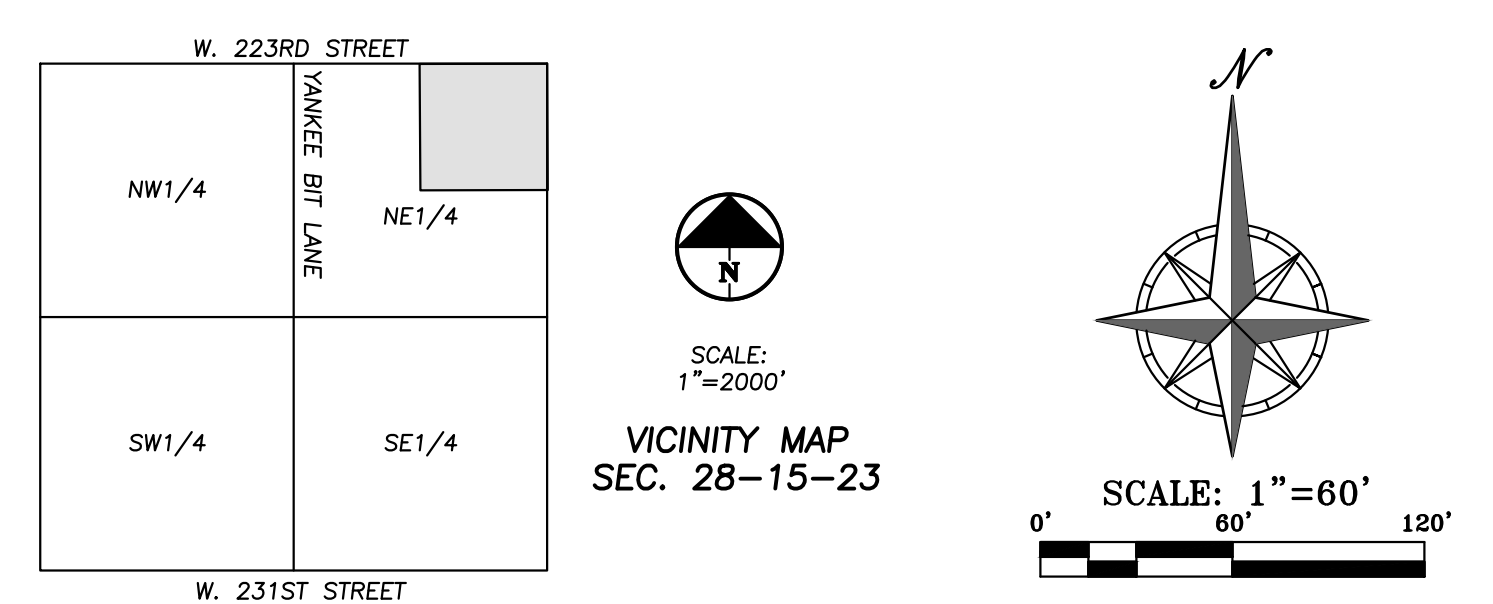
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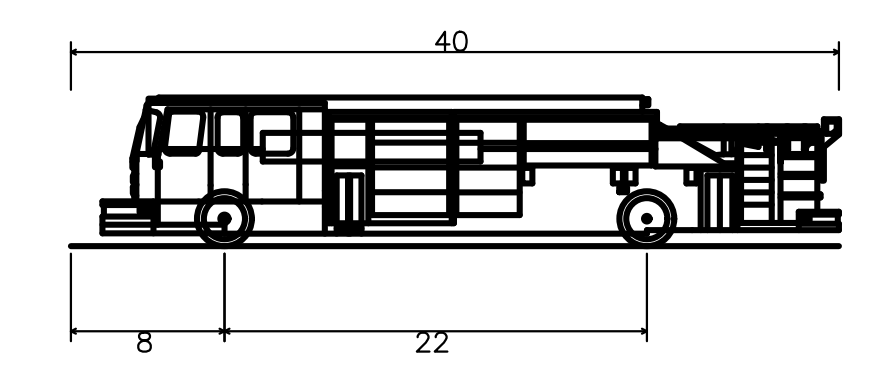
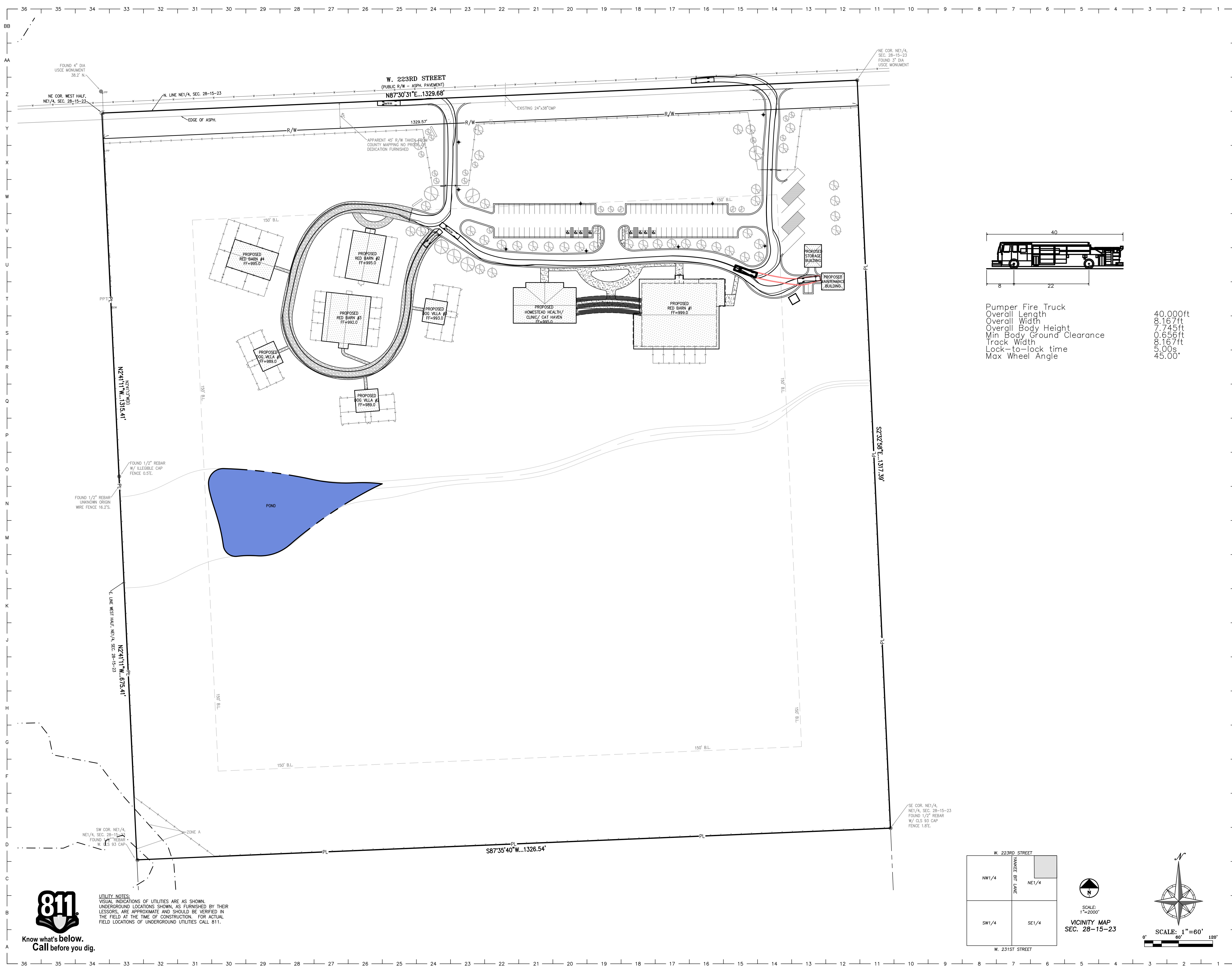
ISSUE DATE: 06/22/2023
REASON FOR ISSUE:
PROJECT NUMBER: 22-050
PROJECT PHASE: CD
SHEET TITLE:

UTILITY PLAN
 SHEET NUMBER: **C3**

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

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.

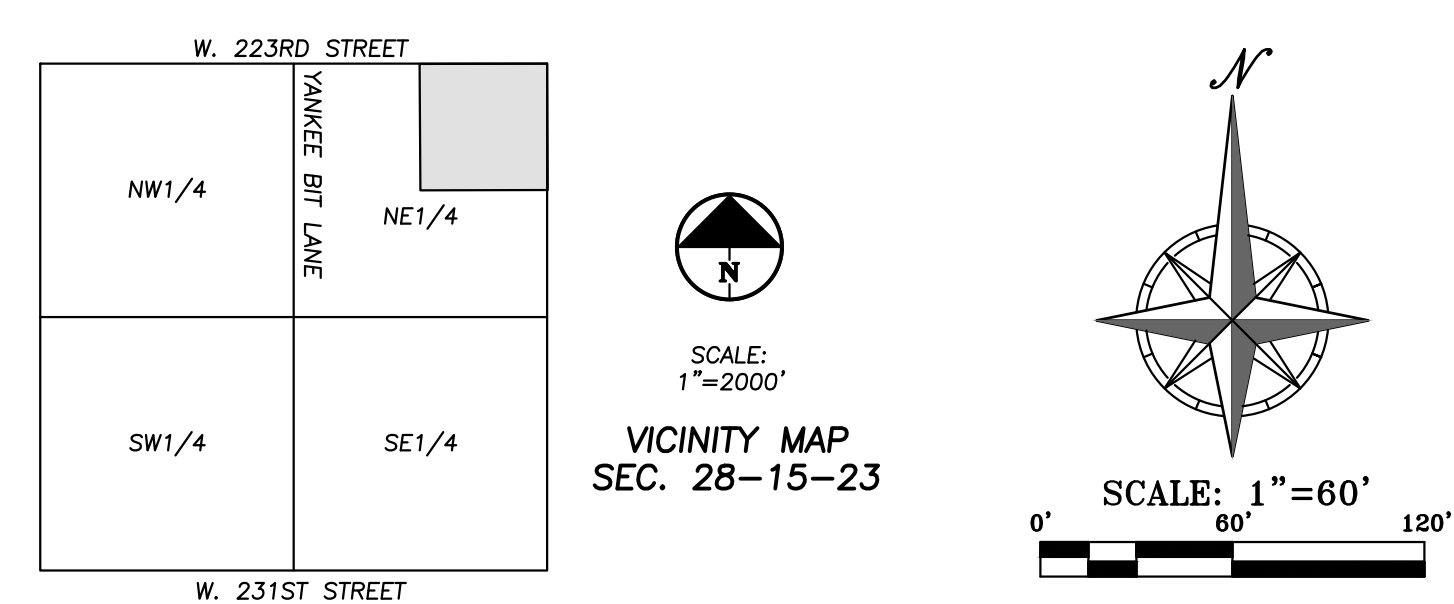




Pumper Fire Truck
 Overall Length 40.000ft
 Overall Width 8.167ft
 Overall Body Height 7.745ft
 Min Body Ground Clearance 0.656ft
 Track Width 8.167ft
 Lock-to-lock time 5.00s
 Max Wheel Angle 45.00°

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

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 VISUAL INDICATIONS OF UTILITIES ARE AS SHOWN.
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CLIENT:
ALWAYS & FUREVER
 MIDWEST ANIMAL SANCTUARY
 PROJECT HOMESTEAD

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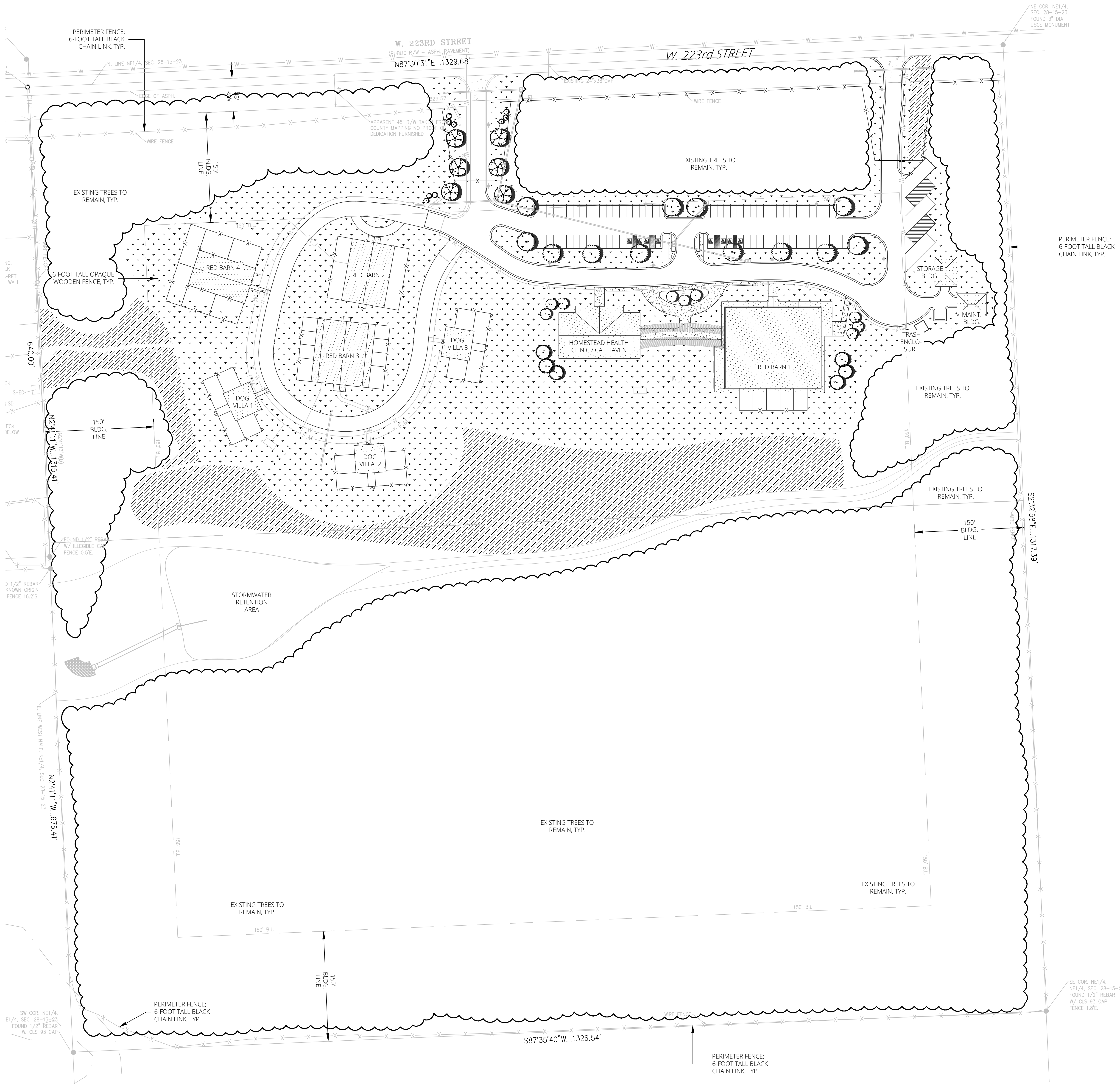


REVISIONS:

NO.	DATE	DESCRIPTION

ISSUE DATE: 06/22/2023
 REASON FOR ISSUE:
 PROJECT NUMBER: 22-050
 PROJECT PHASE: CD
 SHEET TITLE:

TRUCK TURN PLAN
 SHEET NUMBER:
C4



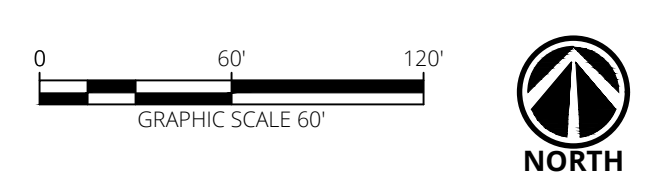
LANDSCAPE NOTES

- 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 SODDING 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 MOST 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 UNIFORM 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	6	NUTTALL OAK	B & B	2" CAL
EVERGREEN TREES	CODE	QTY	COMMON NAME	CONT	CAL
	JK	6	KETELEERI EASTERN REDCEDAR	B & B	
	JT	9	TAYLOR EASTERN REDCEDAR	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	207,869 SF	TURF SEED	SEED	
	NG	129,911 SF	NATIVE VEGETATION SEED MIX	SEED	

1 | LANDSCAPE PLAN
SCALE = 1" = 20'



CLIENT:
ALWAYS & FUREVER
MIDWEST ANIMAL SANCTUARY
PROJECT HOMESTEAD

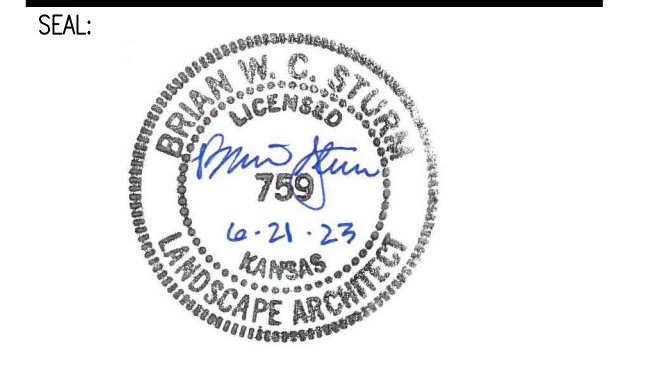
23695 W. 223RD ST.,
SPRING HILL, KS 66208

CONSULTANTS:
PEI PLANNING
ENGINEERING
IMPLEMENTATION
PHELPS ENGINEERING, INC.
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PROJECT NUMBER: 22-050
PROJECT PHASE: CD

SHEET TITLE:
LANDSCAPE PLAN

SHEET NUMBER:
L-100

CONSULTANTS:



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 1370 N. Winchester
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 Consulting Engineers
 9201 E. 43rd Street, Suite 100
 Raytown, Missouri 64133
 (816) 656-1700

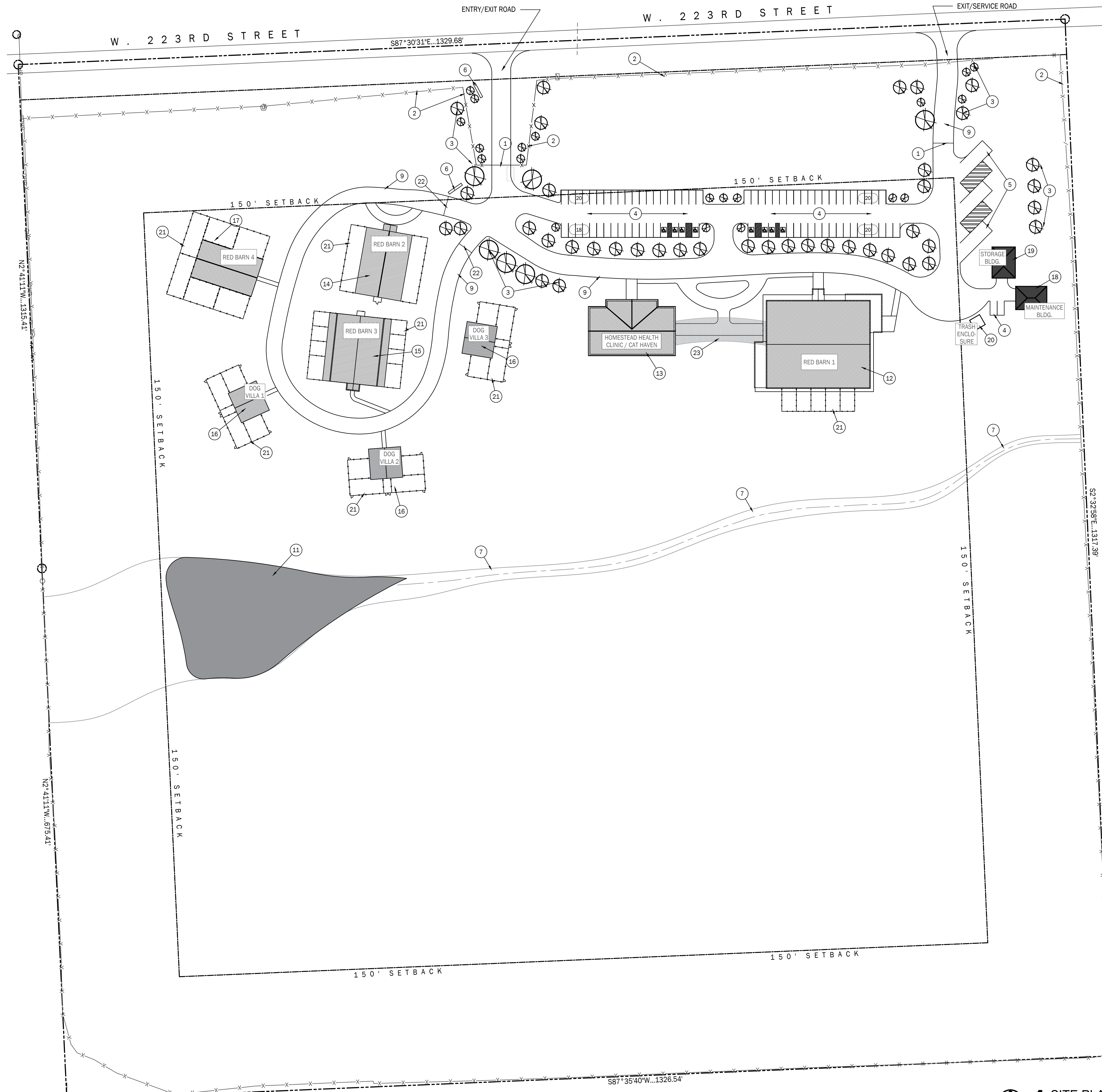


Construction Notes:

- 1 ELECTRIC GATE.
- 2 PERIMETER FENCE.
- 3 NEW LANDSCAPING, REFER TO LANDSCAPE PLAN.
- 4 PARKING.
- 5 OVERSIZED VEHICLE PARKING.
- 6 SIGNAGE.
- 7 EXISTING CREEK, FIELD VERIFY.
- 8 WALKING TRAIL.
- 9 NEW ROAD, RE: CIVIL PLANS.
- 10 WALKING BRIDGE.
- 11 STORM WATER RETENTION AREA.
- 12 RED BARN 1, RE: BUILDING SCHEDULE.
- 13 SHELTER HEALTH FELINE FACILITY, RE: BUILDING SCHEDULE.
- 14 RED BARN 2, RE: BUILDING SCHEDULE.
- 15 RED BARN 3, RE: BUILDING SCHEDULE.
- 16 DOG VILLA, RE: BUILDING SCHEDULE.
- 17 RED BARN 4, RE: BUILDING SCHEDULE.
- 18 MAINTENANCE BUILDING, RE: BUILDING SCHEDULE.
- 19 STORAGE BUILDING, RE: BUILDING SCHEDULE.
- 20 TRASH ENCLOSURE, RE: BUILDING SCHEDULE.
- 21 FENCED AREA.
- 22 ENTRY GATE.
- 23 PERGOLA.

Parking Count:

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



ARCHITECTURAL EXTERIOR INSPIRATION PHOTO - RED BARN
 • BARN STYLE ARCHITECTURE



ARCHITECTURAL EXTERIOR INSPIRATION PHOTO - DOG VILLA
 • WOOD FRAME CONSTRUCTION



ARCHITECTURAL EXTERIOR INSPIRATION PHOTO - HOMESTEAD HEALTH CLINIC / CAT HAVEN
 • WOOD/TIMBER-FRAME CONSTRUCTION

BUILDING SCHEDULE		
LEGEND	BUILDING	SQUARE FOOTAGE
12	RED BARN 1	12,000 SF
13	HOMESTEAD HEALTH CLINIC / CAT HAVEN	6,000 SF
14	RED BARN 2	5,000 SF
15	RED BARN 3	5,000 SF
16	DOG VILLA	1,250 SF
16	DOG VILLA	1,250 SF
16	DOG VILLA	1,250 SF
17	RED BARN 4	5,000 SF
18	MAINTENANCE BUILDING	1,800 SF
19	STORAGE BUILDING	1,800 SF
20	TRASH ENCLOSURE	250 SF
TOTAL BUILDING FOOTPRINT		40,600 SF

SITE IMPROVEMENTS SCHEDULE		
LEGEND	DESCRIPTION	QUANTITY
4	PARKING-NORTH END	81 PARKING SLOTS
8	SITE WALKING TRAILS & PAVILIONS	-

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.

ARCHITECT:
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 PROJECT PHASE: CD

SHEET TITLE:
SITE PLAN

SHEET NUMBER:
A010



Symbol	Qty	Label	Arrangement	Total Lamp Lumens	LLF	Description	Mounting Height
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LF074	1	SP	SINGLE	N/A	0.900	2000 LUM PS 100 8000K 7MM BK HOLLOW GL	10
LF075	1	SP	SINGLE	N/A	0.900	2000 LUM PS 100 8000K 7MM BK HOLLOW GL	10
LF076	1	SP	SINGLE	N/A	0.900	2000 LUM PS 100 8000K 7MM BK HOLLOW GL	10
LF077	1	SP	SINGLE	N/A	0.900	2000 LUM PS 100 8000K 7MM BK HOLLOW GL	10
LF078	1	SP	SINGLE	N/A	0.900	2000 LUM PS 100 8000K 7MM BK HOLLOW GL	10
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LF083	1	SP	SINGLE	N/A	0.900	2000 LUM PS 100 8000K 7MM BK HOLLOW GL	10
LF084	1	SP	SINGLE	N/A	0.900	2000 LUM PS 100 8000K 7MM BK HOLLOW GL	10
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LF090	1	SP	SINGLE	N/A	0.900	2000 LUM PS 100 8000K 7MM BK HOLLOW GL	10
LF091	1	SP	SINGLE	N/A	0.900	2000 LUM PS 100 8000K 7MM BK HOLLOW GL	10
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LF096	1	SP	SINGLE	N/A	0.900	2000 LUM PS 100 8000K 7MM BK HOLLOW GL	10
LF097	1	SP	SINGLE	N/A	0.900	2000 LUM PS 100 8000K 7MM BK HOLLOW GL	10
LF098	1	SP	SINGLE	N/A	0.900	2000 LUM PS 100 8000K 7MM BK HOLLOW GL	10
LF099	1	SP	SINGLE	N/A	0.900	2000 LUM PS 100 8000K 7MM BK HOLLOW GL	10
LF100	1	SP	SINGLE	N/A	0.900	2000 LUM PS 100 8000K 7MM BK HOLLOW GL	10

CalcType	Units	Min	Max	Min	Max	Avg/Min	Max/Min
ENTRANCE AREA 1 PARKING LOOP	illumiance	PC	10.4	0.2	15.25	52.00	52.00
BLANK PERGOLA	illumiance	PC	0.00	0.0	0.0	0.00	0.00
BETWEEN BARN 2 AND 3	illumiance	PC	0.00	0.0	0.0	0.00	0.00
DOG VILLA 2 FENCED AREA	illumiance	PC	3.81	1.8	3.8	2.93	3.85
DOG VILLA 2 WALKWAY AREA	illumiance	PC	0.05	0.0	0.0	0.00	0.00
DOG VILLA 3 FENCED AREA	illumiance	PC	4.03	1.0	0.0	4.48	11.87
DOG VILLA WALKWAY	illumiance	PC	0.00	0.0	0.0	0.00	0.00
DOG VILLA FENCED AREA	illumiance	PC	0.00	0.0	0.0	0.00	0.00
FLAG POLE AREA 24	illumiance	PC	2.04	0.0	0.0	4.08	10.40
HONEY BEE HOUSE AND VILLAS	illumiance	PC	1.00	0.0	0.0	0.00	0.00
HORSEHEAD BEARER CLINIC DAY HALL	illumiance	PC	0.00	0.0	0.0	0.00	0.00
HORSEHEAD BEARER WALKWAY	illumiance	PC	0.00	0.0	0.0	0.00	0.00
POD BARN 1	illumiance	PC	0.12	0.0	0.0	0.24	0.20
POD BARN 2	illumiance	PC	0.17	0.0	0.0	0.30	0.30
POD BARN 2 WALKWAY	illumiance	PC	0.00	0.0	0.0	0.00	0.00
POD BARN 3 FENCED AREA	illumiance	PC	0.30	0.0	0.0	0.60	0.60
POD BARN 3 WALKWAY	illumiance	PC	0.00	0.0	0.0	0.00	0.00
POD BARN 4 ENTRANCE	illumiance	PC	0.00	0.0	0.0	0.00	0.00
POD BARN 4 FENCED AREA	illumiance	PC	0.15	0.0	0.0	0.30	0.30

SITE PHOTOMETRIC CALCULATION PLAN
SCALE 1/60"=1'-0"

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PROJECT HOMESTEAD

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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 HOMESTEAD HEALTH CLINIC/CAT HAVEN PANELBOARD.

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



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CLIENT:
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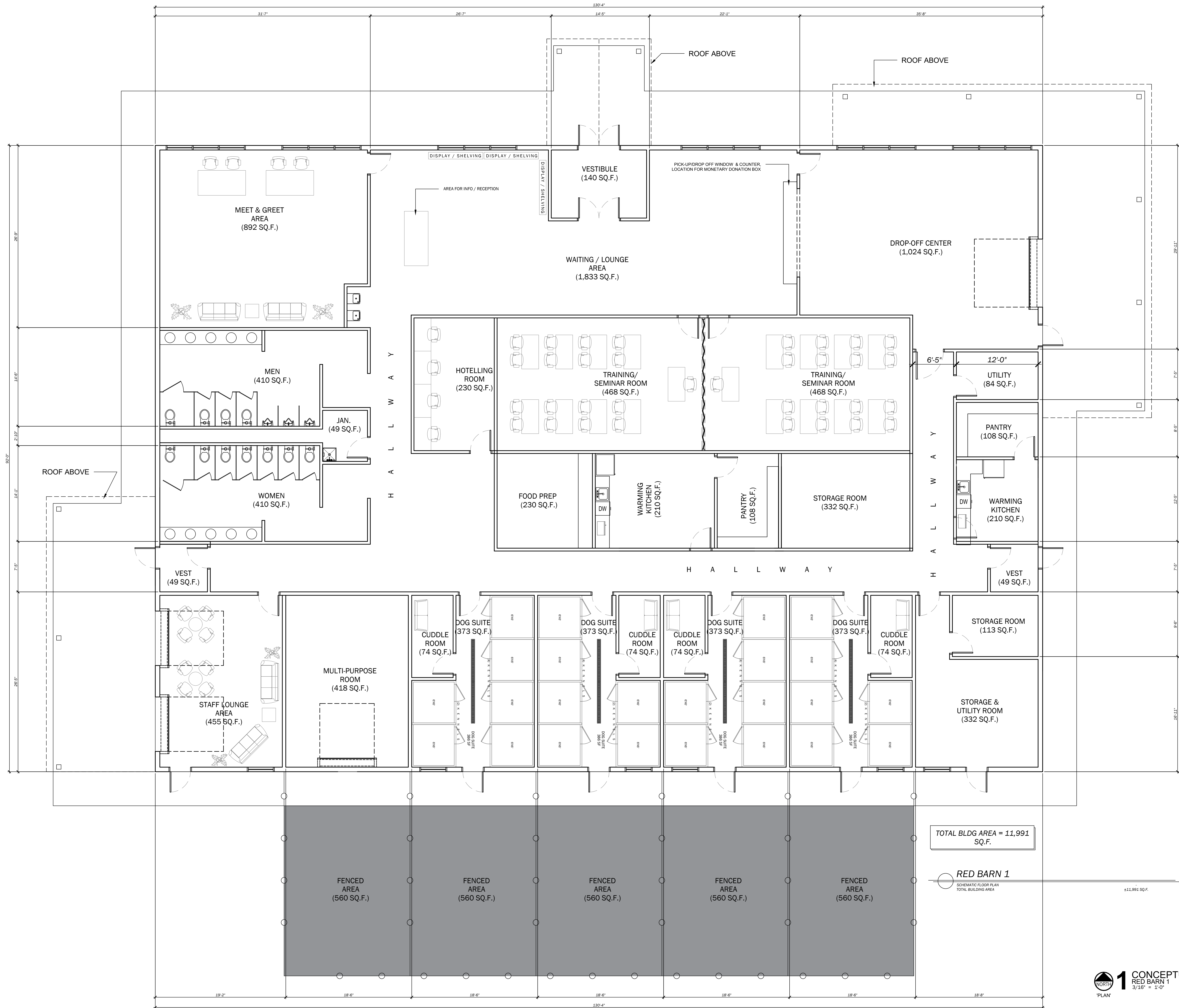
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REVISIONS:

NO.	DATE	DESCRIPTION

ISSUE DATE: 06/22/2023
REASON FOR ISSUE: CONSTRUCTION USE APPLICATION
PROJECT NUMBER: 22-050
PROJECT PHASE: CD
SHEET TITLE: ELECTRICAL SITE PLAN
SHEET NUMBER: E020



TOTAL BLDG AREA = 11,991 SQ.F.

RED BARN 1
SCHEMATIC FLOOR PLAN
TOTAL BUILDING AREA

111,991 SQ.F.

1 CONCEPTUAL FLOOR PLAN
RED BARN 1
3/16" = 1'-0"

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ISSUE DATE: 05/24/23
REASON FOR ISSUE: REVIEW
PROJECT NUMBER: 22-050
PROJECT PHASE: SD

SHEET TITLE:
NEW WORK FLOOR PLAN - RED BARN 1

SHEET NUMBER:
2-A100



TOTAL BLDG AREA = 4,986 SQ.F.

RED BARN 2

SCHEMATIC FLOOR PLAN
TOTAL BUILDING AREA



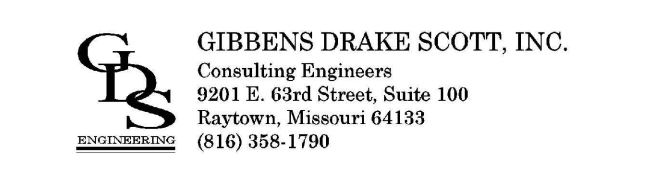
1 CONCEPTUAL FLOOR PLAN
RED BARN 2
1/4" = 1'-0"

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REVISIONS:

ISSUE DATE: 05/24/23
REASON FOR ISSUE: REVIEW
PROJECT NUMBER: 22-050
PROJECT PHASE: SD

SHEET TITLE:
NEW WORK FLOOR PLAN - RED BARN 2
SHEET NUMBER:
1-A100

Preliminary Stormwater
Management Plan

Always & Furever
Midwest Animal
Sanctuary

One mile west of US 169 Hwy at W. 223rd Street
Section: NW $\frac{1}{4}$ Sec. 28-15-23
Miami County, Kansas

Prepared by:



PHELPS ENGINEERING, INC

**1270 N. Winchester
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(913)363-1155**

PEI #'s 220597

July 29, 2022

Revised February 17, 2023

Revised June 22, 2023

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Appendix "B"	NRCS County Soils Map
Appendix "C"	Existing Drainage Map
Appendix "D"	Proposed Drainage Map
Appendix "E"	Downstream Analysis
Appendix "F"	HydroCAD Model Outputs
Appendix "G"	Flood Map

1.0 Introduction

Phelps Engineering, Inc. is pleased to submit this Preliminary Stormwater Study for Always & Furever 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 223rd Street in the NW ¼ of Sec. 28-15-23 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. 223rd Street to the north. North of W 223rd 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 bisects the site. The remaining 6.7 acres drains north and northwest to the W 223rd Street ditch at the north project limits. The 223rd Street drainage is split at the ditch with about 2.6 acres crossing under 223rd 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 essentially maintain the existing overall drainage patterns of the site. In the proposed condition, the buildings, parking, drives, walks and future impervious improvements will cover 3.9 acres or about 10% 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 223rd Street ditch or centrally to and through the natural draw that flows westerly bisecting 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 rd CMPA	11.4	2.6	10.0	19.4	37.4	8.4	1.6	7.8	14.6	27.7
Northwest	13.0	4.1	11.6	21.0	38.6	10.8	6.3	19.4	33.9	60.3
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	98.7	186	351

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 223rd 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 open ditch 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 ln/hr	I100 ln/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 ln/hr	I100 ln/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. Section 5.C. of the stormwater design criteria states the 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:

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:

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 rd CMPA	11.4	2.6	10.0	19.4	37.4	8.4	1.6	7.8	14.6	27.7
Northwest	13.0	4.1	11.6	21.0	38.6	10.8	6.3	19.4	33.9	60.3
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	63.8	118	271

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.

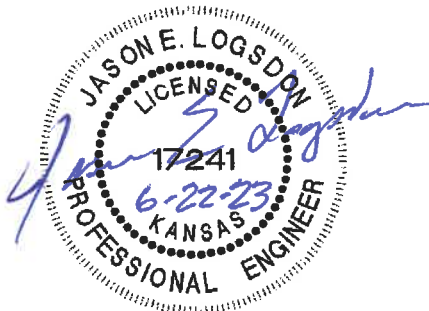
8.0 Conclusion and Recommendations

This report summarizes PEI's stormwater analysis for the Always and Furever 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.



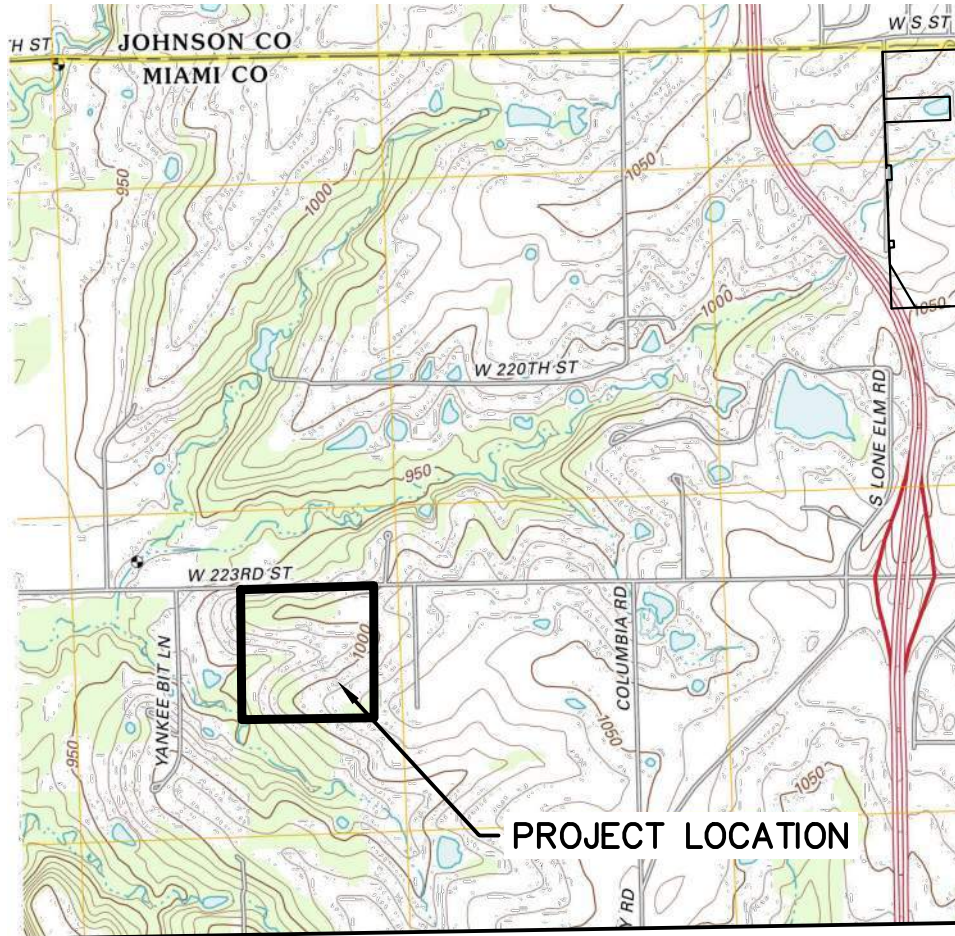
Jason Logsdon., P.E.

Appendix A

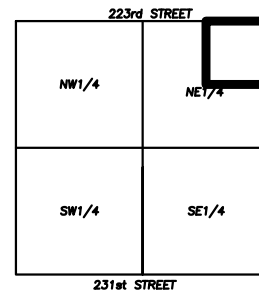
Project Location Map

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



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Olathe, Kansas 66061

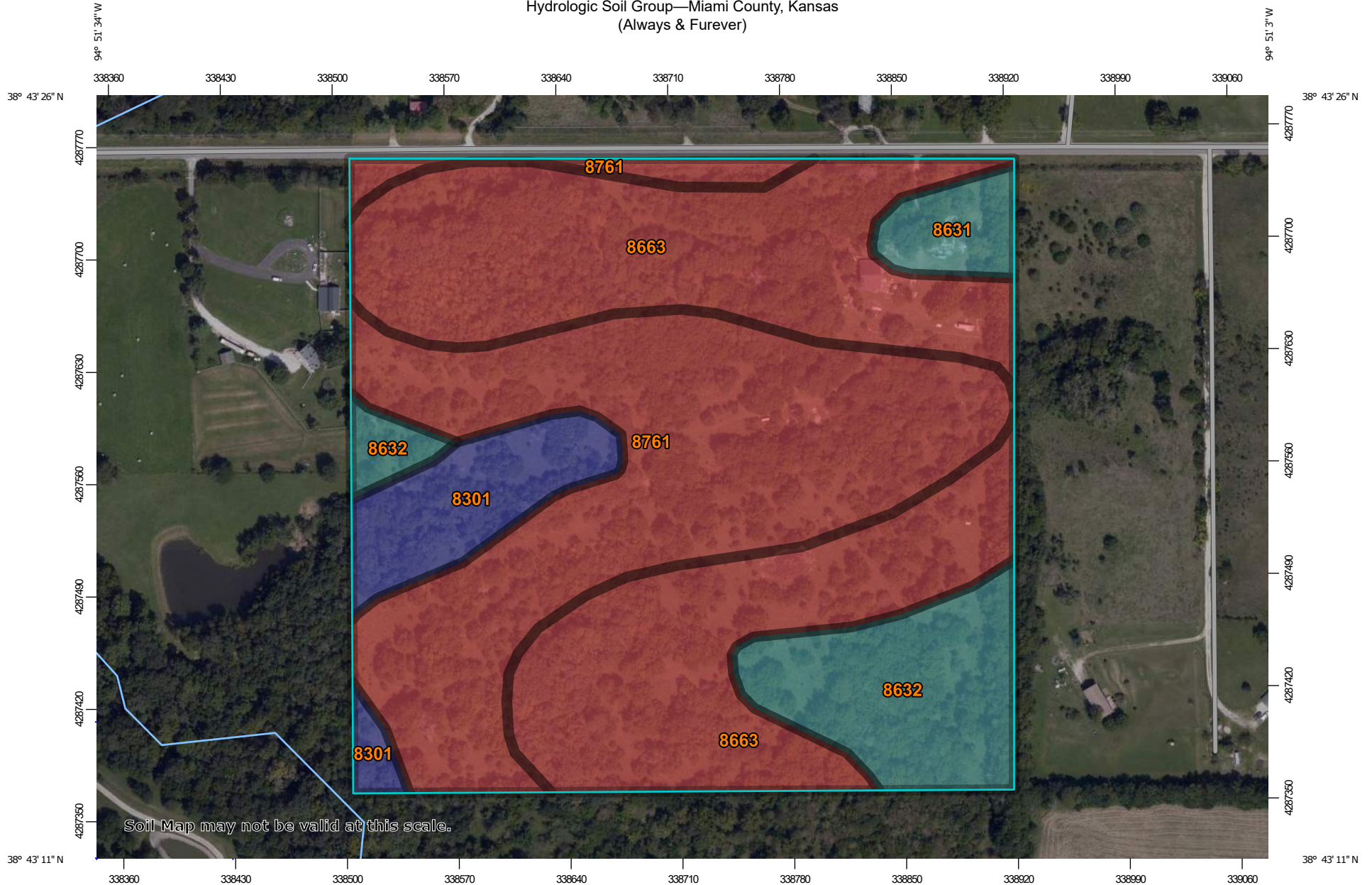
(913) 393-1155
Fax (913) 393-1166
www.phelpsengineering.com

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

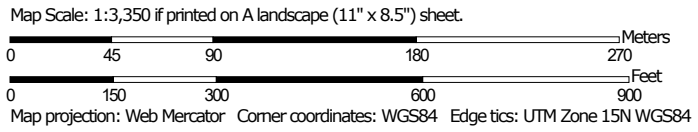
Appendix B

NRCS County Soils Map

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



Soil Map may not be valid at this scale.



MAP LEGEND

Area of Interest (AOI)









Area of Interest (AOI)

Soils

Soil Rating Polygons





-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

Soil Rating Lines


-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

Soil Rating Points






-  A
-  A/D
-  B
-  B/D

-  C
-  C/D
-  D
-  Not rated or not available


Water Features

 Streams and Canals

Transportation

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

Background

 Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: 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%
Totals for Area of Interest			40.6	100.0%

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

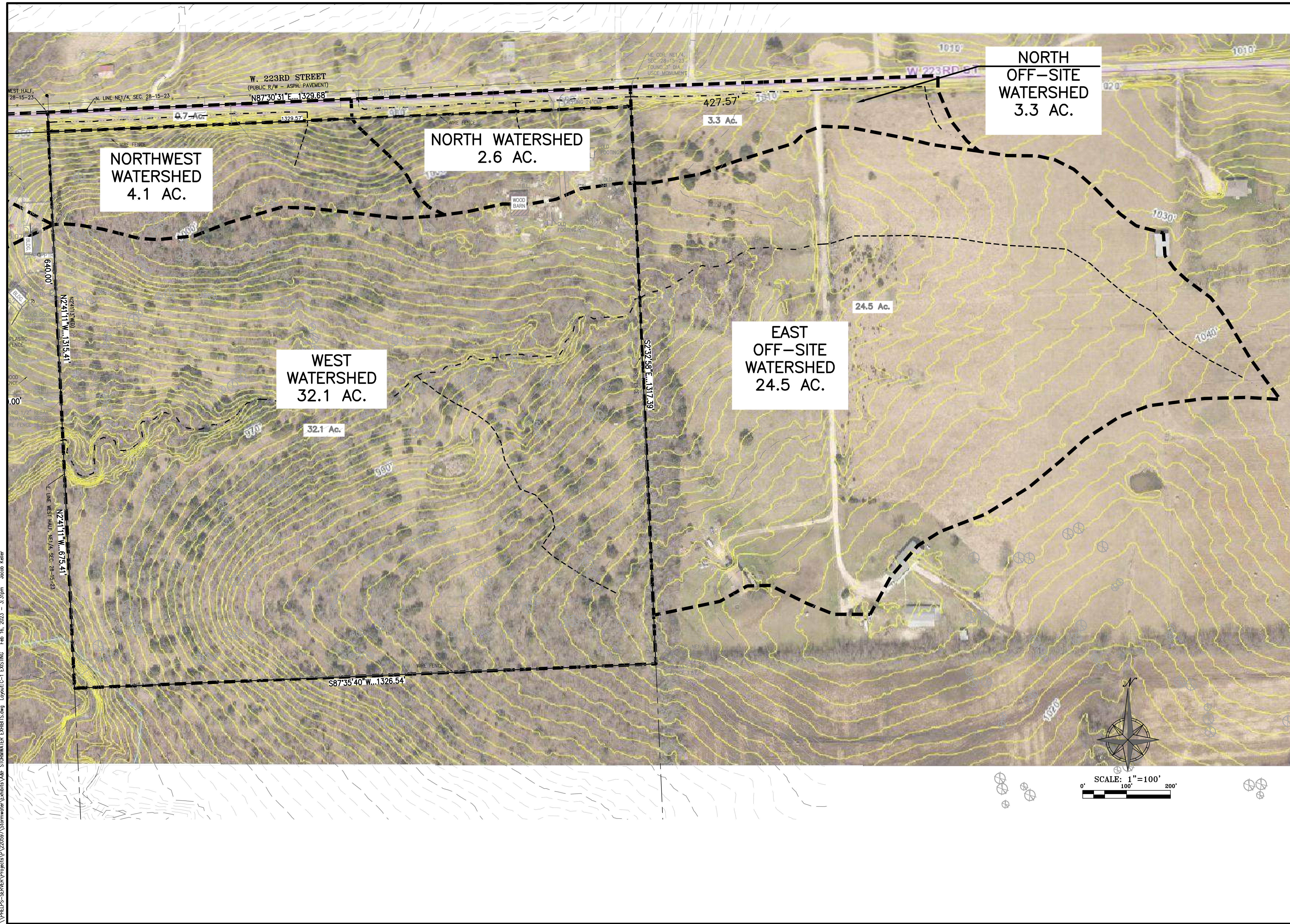
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Appendix C

Existing Conditions/Drainage Plan



\PHILIPS-SERVER\Projects\226597\Stormwater\Exhibits\Map STORMWATER EXHIBIT'S.dwg Layout: C-1 EXISTING Feb 16, 2023 - 3:30pm Jacob Keller

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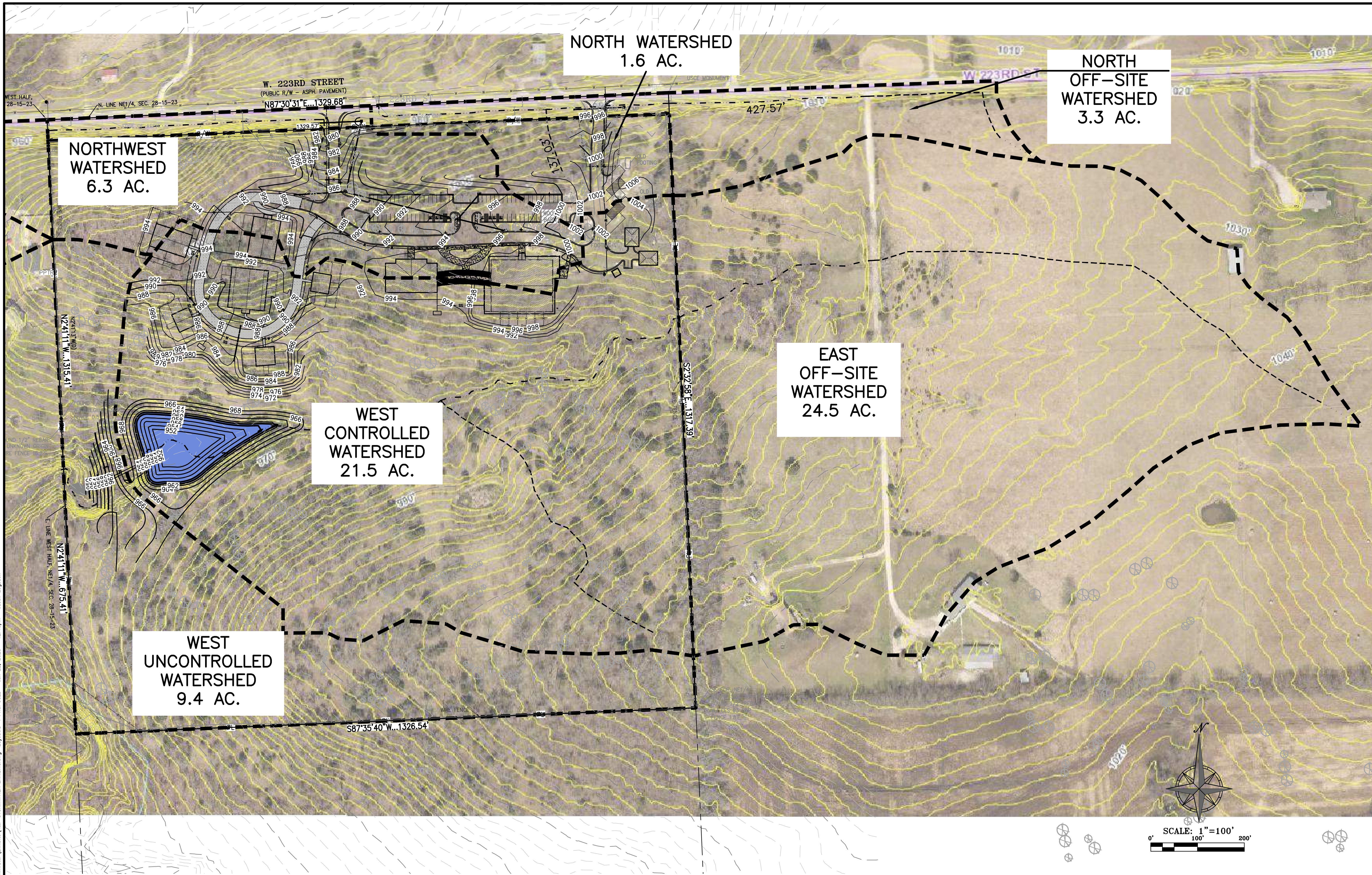
EXISTING DRAINAGE MAP
 ALWAYS & FOREVER ANIMAL SANCTUARY
 23595 W. 223RD STREET

PROJECT NO.	DATE	BY	REVISIONS
210299	2/16/23	JEL	1
DATE	BY	REVISIONS	PER CITY COMMENTS

SHEET
C-1

Appendix D

Proposed Conditions/Drainage Plan

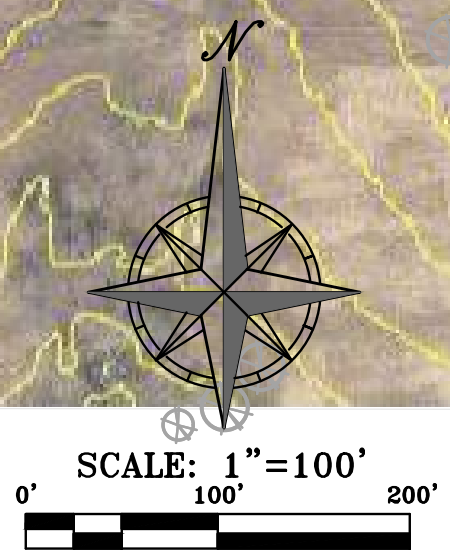


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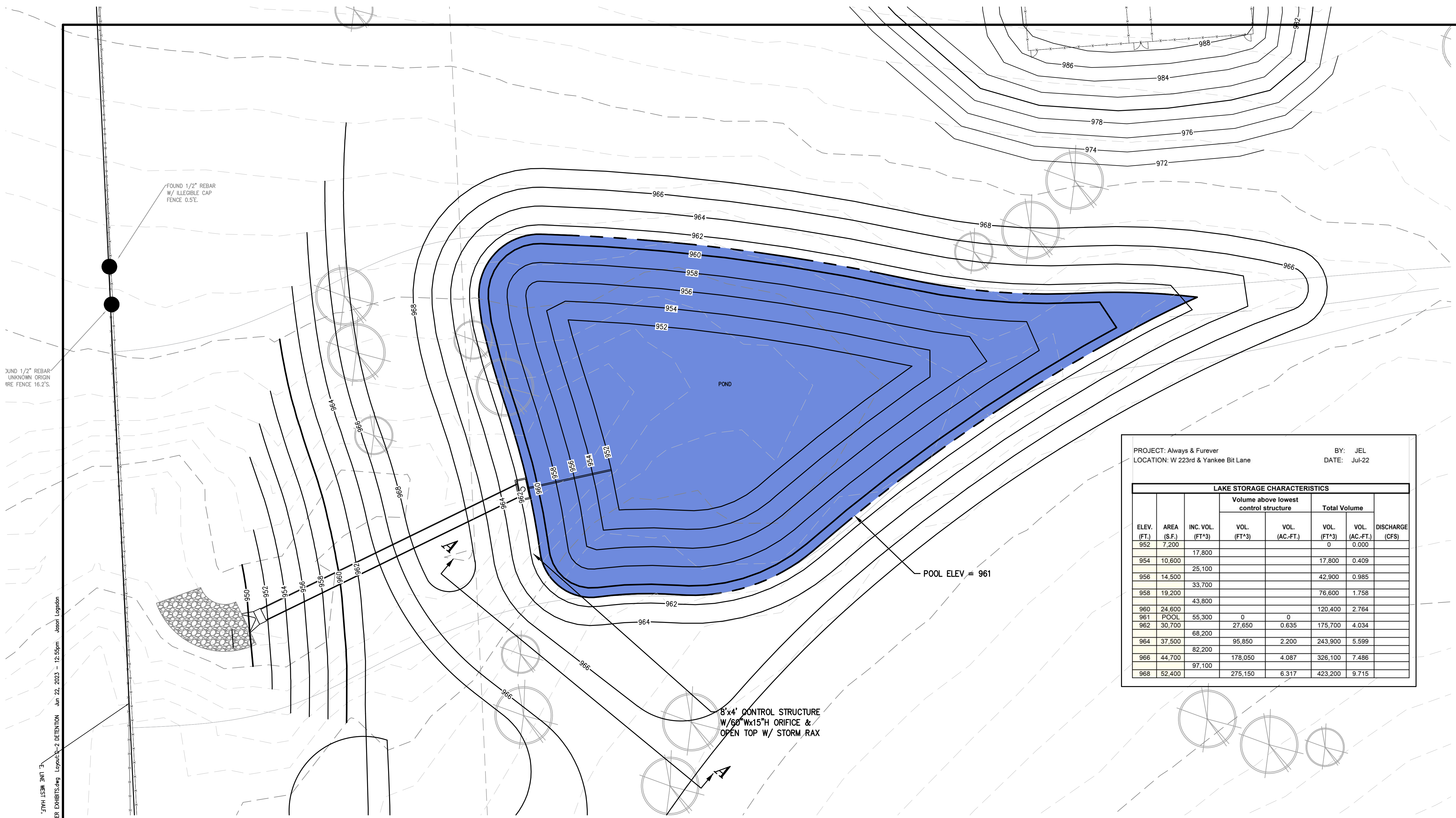


PROPOSED DRAINAGE MAP
 ALWAYS & FUREVER ANIMAL SANCTUARY
 23595 W. 223RD STREET

PROJECT NO.	DATE	BY	REVISIONS
210289	2/16/23	JEL	1
210289	6/22/23	JEL	2



\PHelps-Server\Projects\226597\Stormwater\Exhibits\Map Stormwater Exhibit.dwg Layout: D-1 PROPOSED Jun 22, 2023 - 12:49pm Jason Logsdon



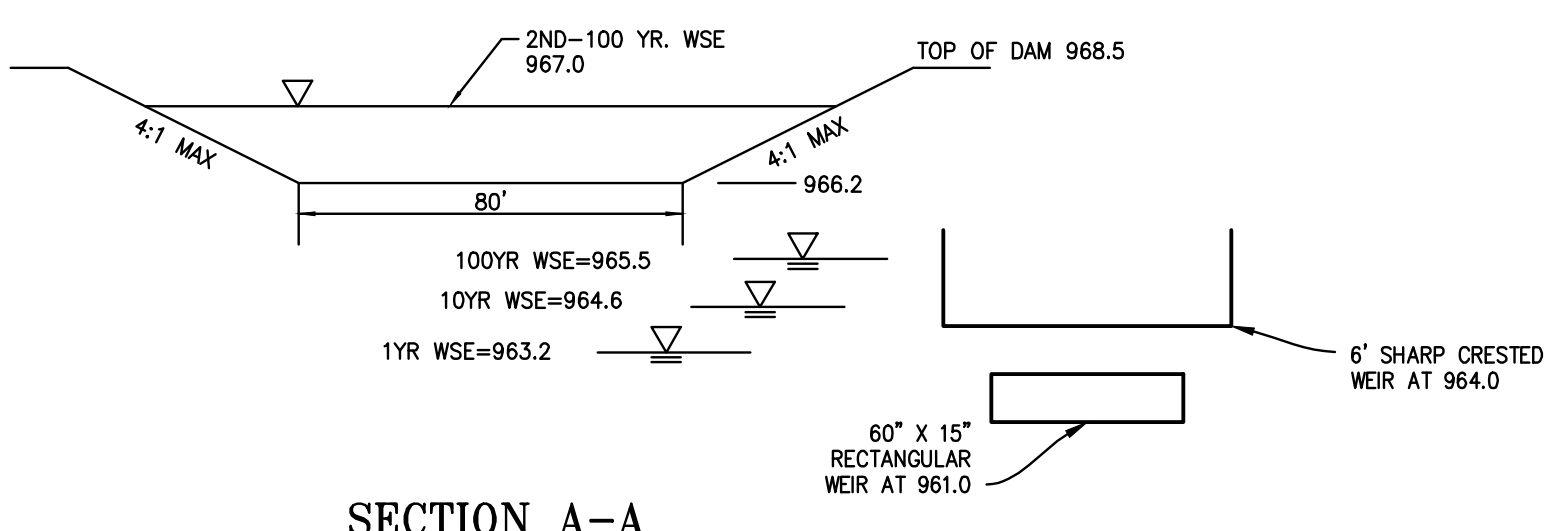
PROJECT: Always & Forever
 LOCATION: W 223rd & Yankee Bit Lane

BY: JEL
 DATE: Jul-22

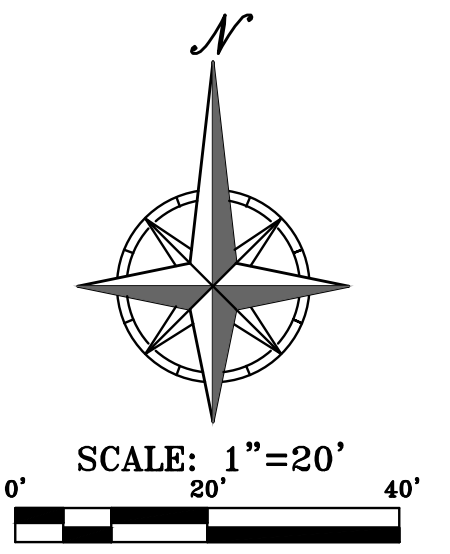
LAKE STORAGE CHARACTERISTICS							
ELEV. (FT.)	AREA (S.F.)	INC. VOL. (FT ³)	Volume above lowest control structure		Total Volume		DISCHARGE (CFS)
			VOL. (FT ³)	VOL. (AC-FT.)	VOL. (FT ³)	VOL. (AC-FT.)	
952	7,200				0	0.000	
954	10,600	17,800			17,800	0.409	
956	14,500	25,100			42,900	0.985	
958	19,200	33,700			76,600	1.758	
960	24,600	43,800			120,400	2.764	
961	POOL	55,300	0	0			
962	30,700	27,650	0.635	175,700	4.034		
964	37,500	68,200	95.850	2.200	243,900	5.599	
966	44,700	82,200	178,050	4.087	326,100	7.486	
968	52,400	97,100	275,150	6.317	423,200	9.715	

POOL ELEV = 961

8'x4' CONTROL STRUCTURE
 W/60"Wx15"H ORIFICE &
 OPEN TOP W/ STORM RAX



SECTION A-A
 Q100 = 226 cfs



\\PHELPS-SERVER\Projects\226597\Stormwater Exhibits\A&F\Stormwater Exhibits.dwg Layout 2 DETENTION Jun 22, 2023 - 12:55pm Jason Logsdon
 JYH LSH JMT E LMT

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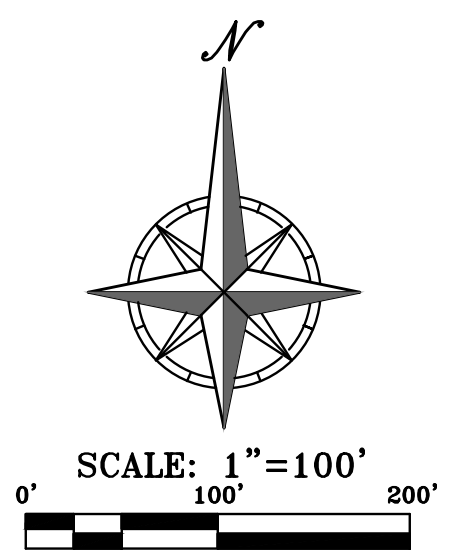
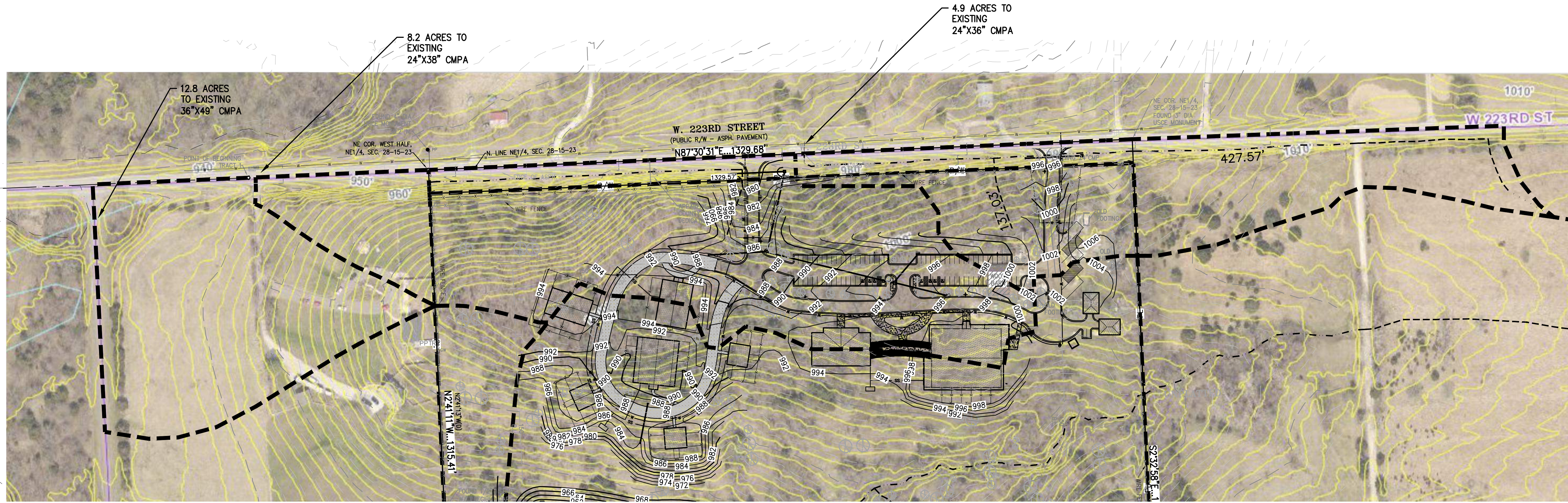
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DETENTION PLAN
ALWAYS & FUREVER ANIMAL SANCTUARY
 23555 W. 223RD STREET

No.	Date	By	App.	Revisions:
1	2/16/23	JEL	DEU	PER CITY COMMENTS
2	6/22/23	JEL	DEU	PER CITY COMMENTS

Appendix E

Downstream Drainage Maps & Calcs



PROJECT NO.	DATE	BY	REVISIONS
210289	2/16/23	JEL	1
210289	6/22/23	JEL	2

DOWNSTREAM DRAINAGE MAP
 ALWAYS & FOREVER ANIMAL SANCTUARY
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Culvert Report

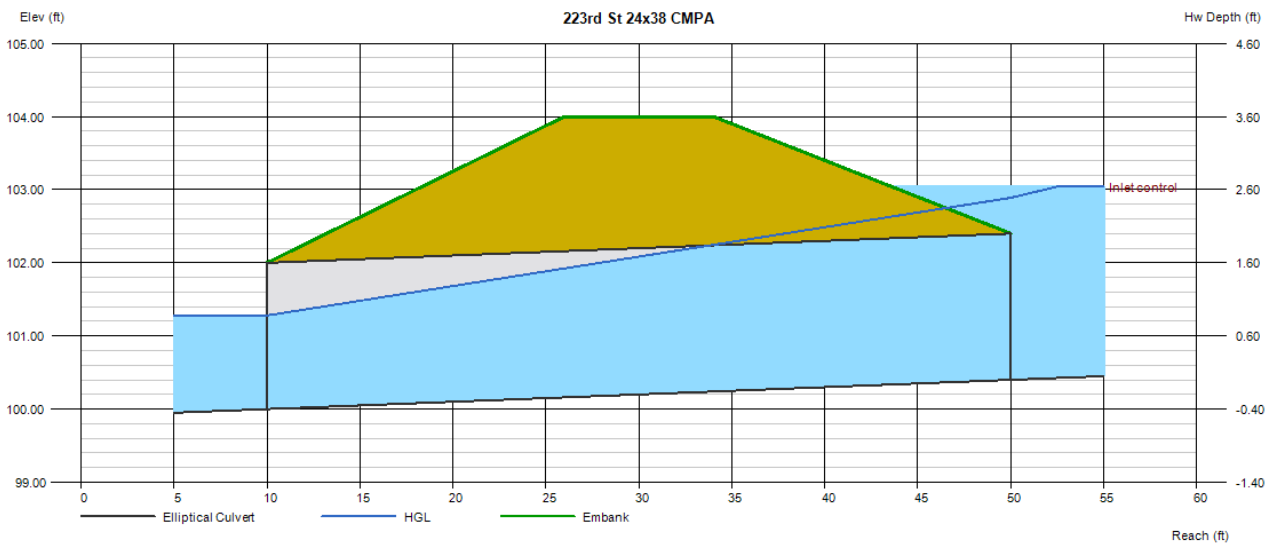
223rd St 24x38 CMPA

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

Embankment	
Top Elevation (ft)	= 104.00
Top Width (ft)	= 8.00
Crest Width (ft)	= 20.00

Calculations	
Qmin (cfs)	= 10.20
Qmax (cfs)	= 31.00
Tailwater Elev (ft)	= Critical

Highlighted	
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

Embankment

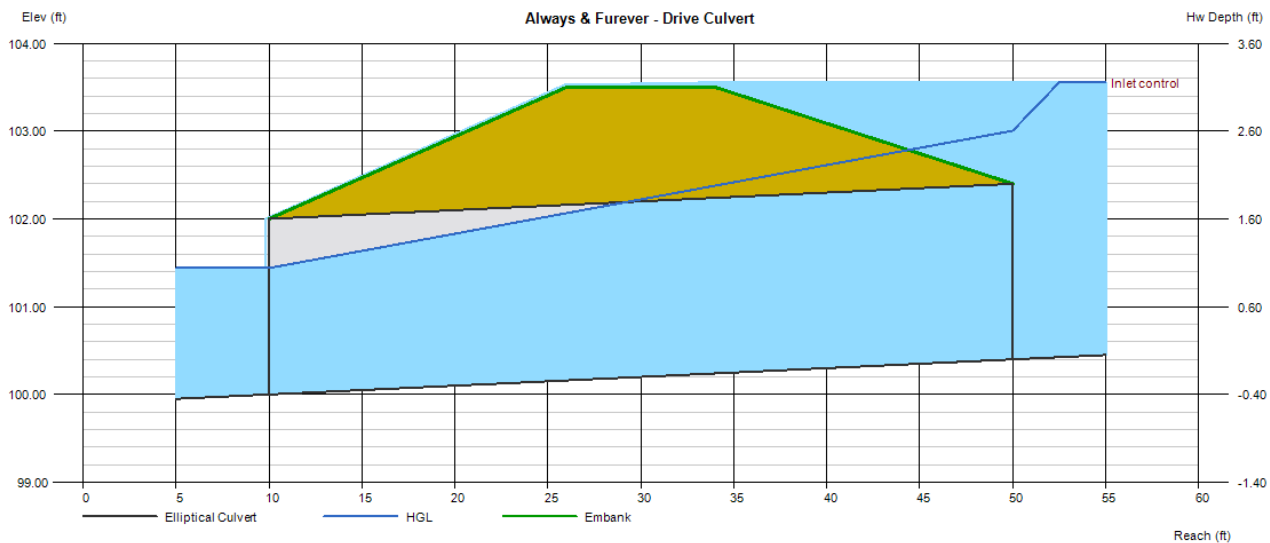
Top Elevation (ft)	= 103.50
Top Width (ft)	= 8.00
Crest Width (ft)	= 20.00

Calculations

Qmin (cfs)	= 20.00
Qmax (cfs)	= 37.00
Tailwater Elev (ft)	= Critical

Highlighted

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

Embankment

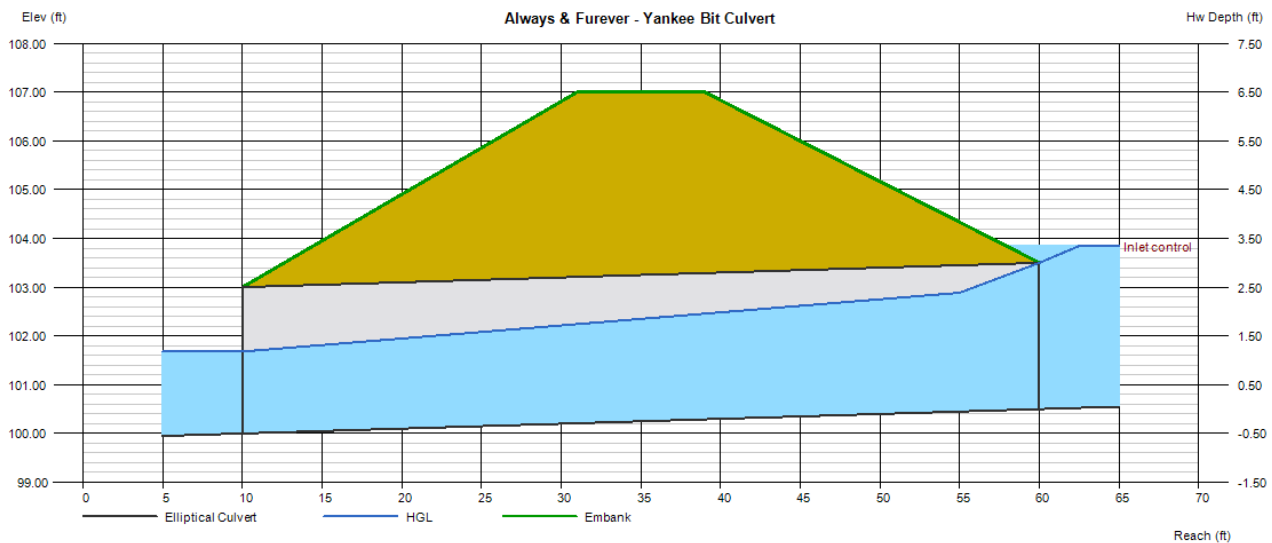
Top Elevation (ft)	= 107.00
Top Width (ft)	= 8.00
Crest Width (ft)	= 20.00

Calculations

Qmin (cfs)	= 50.00
Qmax (cfs)	= 60.00
Tailwater Elev (ft)	= Critical

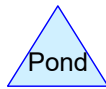
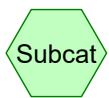
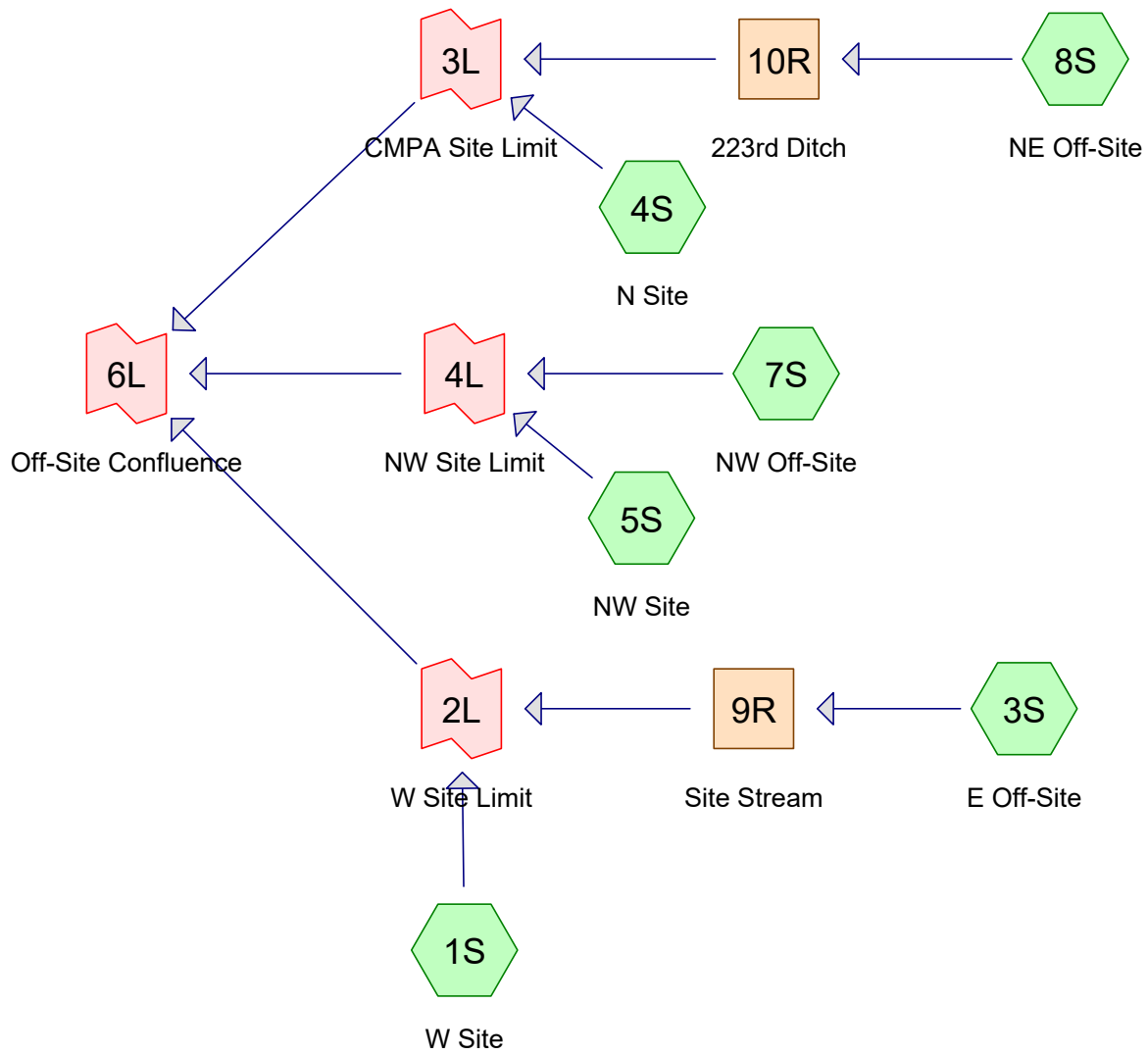
Highlighted

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

Subcatchment 1S: W Site 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

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=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

Subcatchment 5S: NW Site 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

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

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

Link 2L: W Site Limit Inflow=74.22 cfs 7.976 af
Primary=74.22 cfs 7.976 af

Link 3L: CMPA Site Limit Inflow=10.05 cfs 0.836 af
Primary=10.05 cfs 0.836 af

Link 4L: NW Site Limit Inflow=11.56 cfs 0.733 af
Primary=11.56 cfs 0.733 af

Link 6L: Off-Site Confluence 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

Subcatchment 1S: W Site	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
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=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
Subcatchment 5S: NW Site	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
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
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
Link 2L: W Site Limit	Inflow=145.94 cfs 14.923 af Primary=145.94 cfs 14.923 af
Link 3L: CMPA Site Limit	Inflow=19.43 cfs 1.562 af Primary=19.43 cfs 1.562 af
Link 4L: NW Site Limit	Inflow=20.97 cfs 1.333 af Primary=20.97 cfs 1.333 af
Link 6L: Off-Site Confluence	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

Subcatchment 1S: W Site 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

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=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

Subcatchment 5S: NW Site 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

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

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

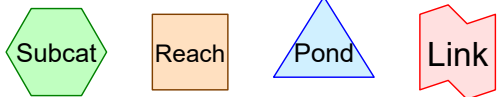
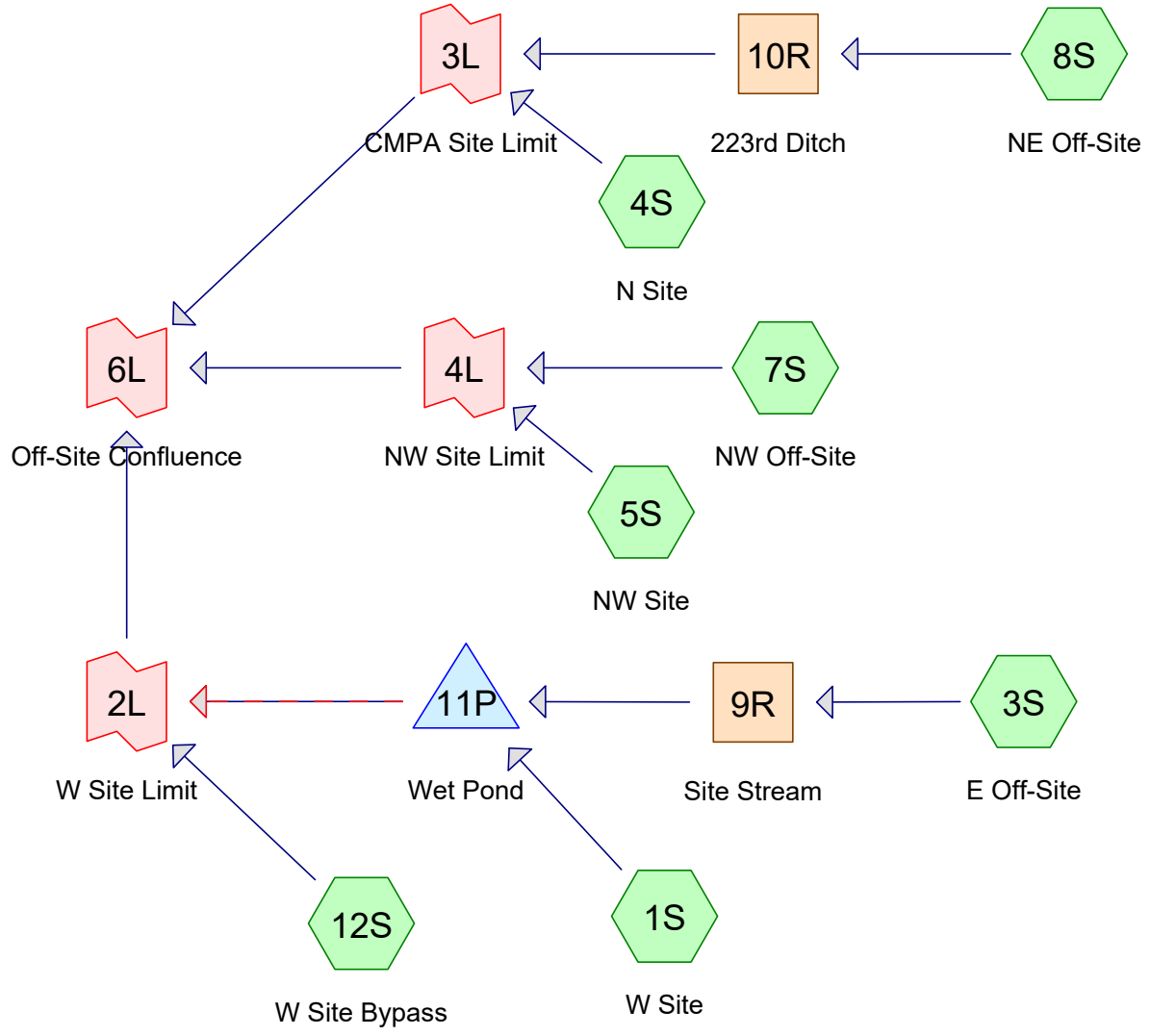
Link 2L: W Site Limit Inflow=284.47 cfs 28.516 af
Primary=284.47 cfs 28.516 af

Link 3L: CMPA Site Limit Inflow=37.40 cfs 2.980 af
Primary=37.40 cfs 2.980 af

Link 4L: NW Site Limit Inflow=38.58 cfs 2.496 af
Primary=38.58 cfs 2.496 af

Link 6L: Off-Site Confluence 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
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AF Proposed Condition

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

Prepared by Phelps Engineering, Inc.

Printed 6/22/2023

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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 8.37% 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=1.600 ac 19.38% Impervious Runoff Depth=1.88"
 Flow Length=720' Tc=2.6 min UI Adjusted CN=82 Runoff=5.57 cfs 0.251 af

Subcatchment 5S: NW Site Runoff Area=6.300 ac 27.94% Impervious Runoff Depth=1.96"
 Flow Length=815' Tc=8.1 min UI Adjusted CN=83 Runoff=18.30 cfs 1.029 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=7.77 cfs 0.727 af
 Primary=7.77 cfs 0.727 af

Link 4L: NW Site Limit Inflow=19.36 cfs 1.195 af
 Primary=19.36 cfs 1.195 af

Link 6L: Off-Site Confluence Inflow=98.74 cfs 10.110 af
 Primary=98.74 cfs 10.110 af

Total Runoff Area = 67.300 ac Runoff Volume = 10.110 af Average Runoff Depth = 1.80"
91.95% Pervious = 61.880 ac 8.05% Impervious = 5.420 ac

AF Proposed Condition

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

Prepared by Phelps Engineering, Inc.

Printed 6/22/2023

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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 8.37% 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=1.600 ac 19.38% Impervious Runoff Depth=3.41"
 Flow Length=720' Tc=2.6 min UI Adjusted CN=82 Runoff=9.80 cfs 0.455 af

Subcatchment 5S: NW Site Runoff Area=6.300 ac 27.94% Impervious Runoff Depth=3.51"
 Flow Length=815' Tc=8.1 min UI Adjusted CN=83 Runoff=32.20 cfs 1.843 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=14.63 cfs 1.340 af
 Primary=14.63 cfs 1.340 af

Link 4L: NW Site Limit Inflow=33.86 cfs 2.109 af
 Primary=33.86 cfs 2.109 af

Link 6L: Off-Site Confluence Inflow=185.72 cfs 18.554 af
 Primary=185.72 cfs 18.554 af

Total Runoff Area = 67.300 ac Runoff Volume = 18.554 af Average Runoff Depth = 3.31"
91.95% Pervious = 61.880 ac 8.05% Impervious = 5.420 ac

AF Proposed Condition

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

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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 8.37% 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=1.600 ac 19.38% Impervious Runoff Depth=6.35"
 Flow Length=720' Tc=2.6 min UI Adjusted CN=82 Runoff=17.41 cfs 0.847 af

Subcatchment 5S: NW Site Runoff Area=6.300 ac 27.94% Impervious Runoff Depth=6.48"
 Flow Length=815' Tc=8.1 min UI Adjusted CN=83 Runoff=57.56 cfs 3.399 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

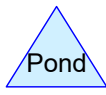
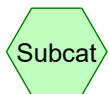
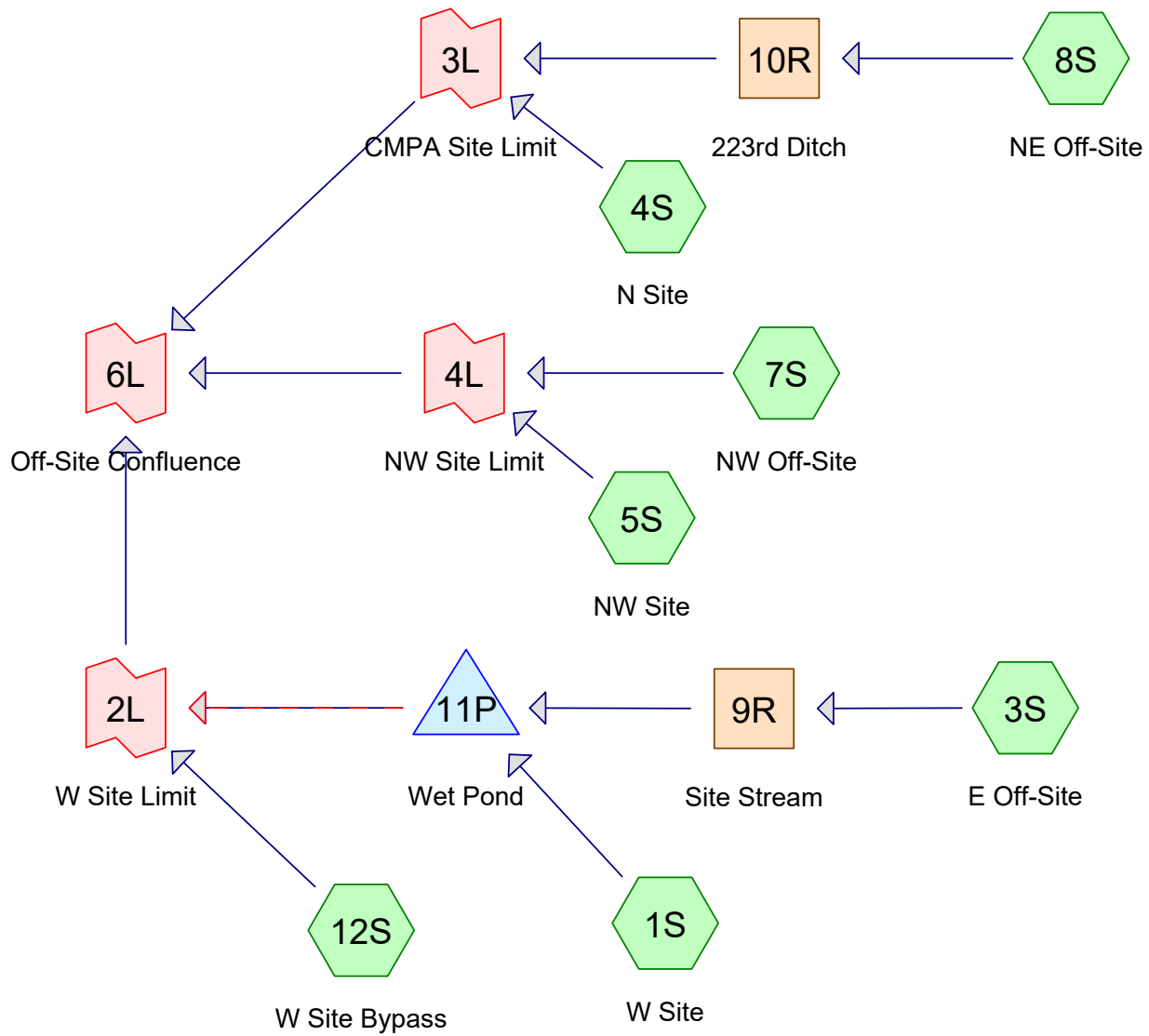
Link 2L: W Site Limit Inflow=279.28 cfs 28.537 af
 Primary=279.28 cfs 28.537 af

Link 3L: CMPA Site Limit Inflow=27.67 cfs 2.529 af
 Primary=27.67 cfs 2.529 af

Link 4L: NW Site Limit Inflow=60.27 cfs 3.847 af
 Primary=60.27 cfs 3.847 af

Link 6L: Off-Site Confluence Inflow=350.74 cfs 34.913 af
 Primary=350.74 cfs 34.913 af

Total Runoff Area = 67.300 ac Runoff Volume = 34.913 af Average Runoff Depth = 6.23"
91.95% Pervious = 61.880 ac 8.05% Impervious = 5.420 ac



Routing Diagram for AF Prop w Det Condition
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AF Prop w Det Condition

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Page 2

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

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Page 3

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
33.730	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)
5.070	98	Unconnected pavement, HSG D (1S, 4S, 5S, 12S)
67.300	81	TOTAL AREA

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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	
67.300		TOTAL AREA

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	33.730	0.000	33.730	>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	5.070	0.000	5.070	Unconnected pavement	
0.000	0.000	0.000	67.300	0.000	67.300	TOTAL AREA	

AF Prop w Det Condition

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Always & Forever

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

Printed 6/22/2023

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Summary for Subcatchment 1S: W Site

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

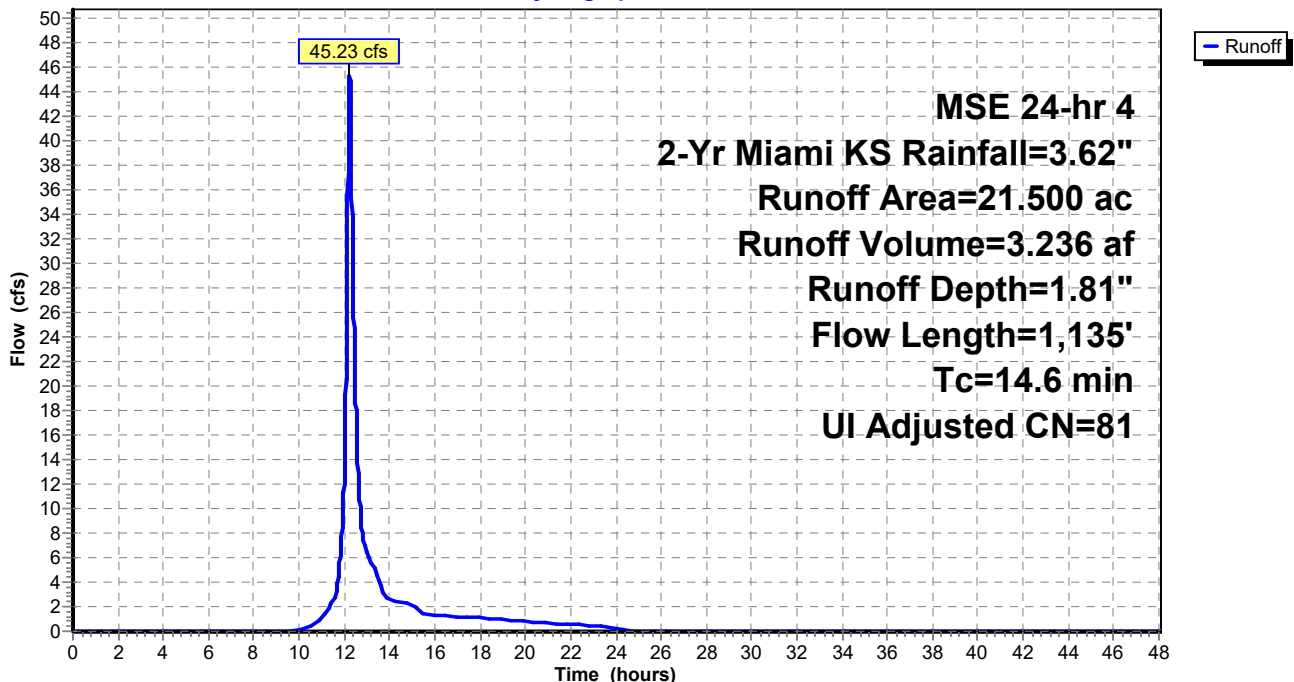
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

Area (ac)	CN	Adj	Description
19.700	80		>75% Grass cover, Good, HSG D
1.800	98		Unconnected pavement, HSG D
21.500	82	81	Weighted Average, UI Adjusted
19.700			91.63% Pervious Area
1.800			8.37% Impervious Area
1.800			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	100	0.0400	0.24		Sheet Flow, Sheet Grass: Short n= 0.150 P2= 3.60"
7.2	745	0.0600	1.71		Shallow Concentrated Flow, Shallow Short Grass Pasture Kv= 7.0 fps
0.4	290	0.0300	12.05	783.31	Trap/Vee/Rect Channel Flow, Channel 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"

Printed 6/22/2023

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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"

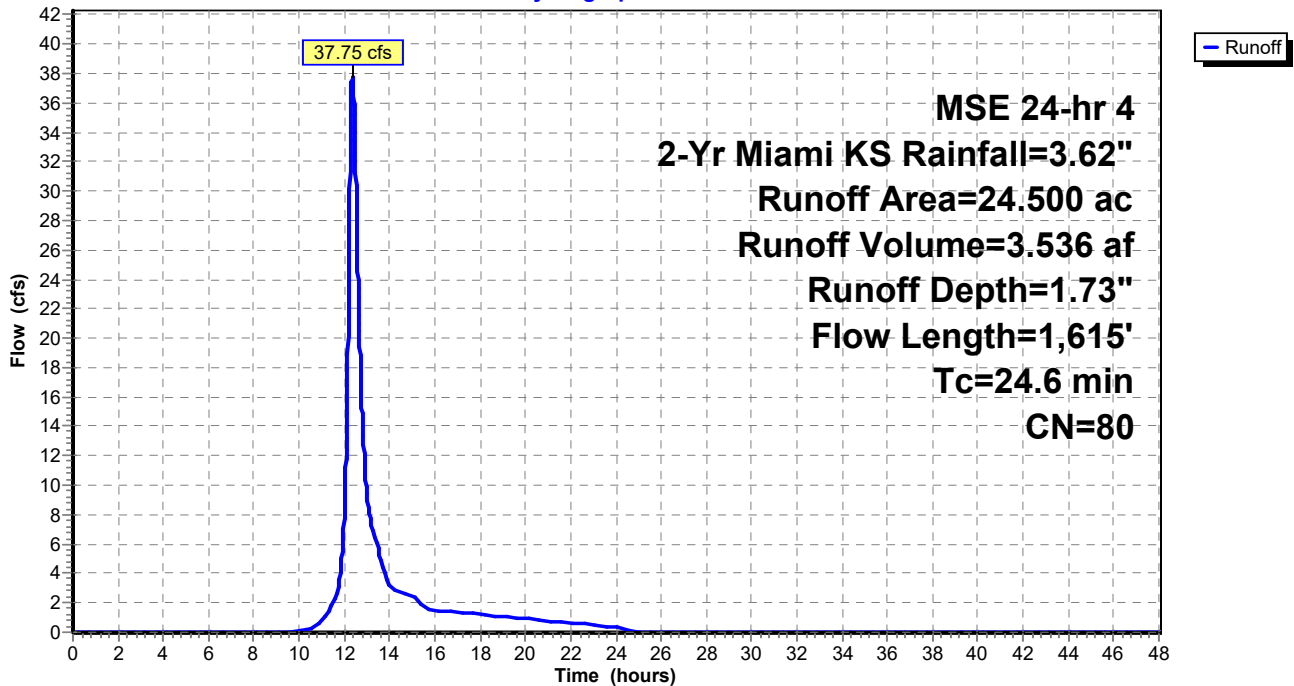
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

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		Sheet Flow, Sheet Grass: Short n= 0.150 P2= 3.60"
14.6	1,060	0.0300	1.21		Shallow Concentrated Flow, Shallow Short Grass Pasture Kv= 7.0 fps
1.1	455		7.00		Direct Entry, LxV 1
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"

Printed 6/22/2023

Page 8

Summary for Subcatchment 4S: N Site

Runoff = 5.57 cfs @ 12.11 hrs, Volume= 0.251 af, Depth= 1.88"

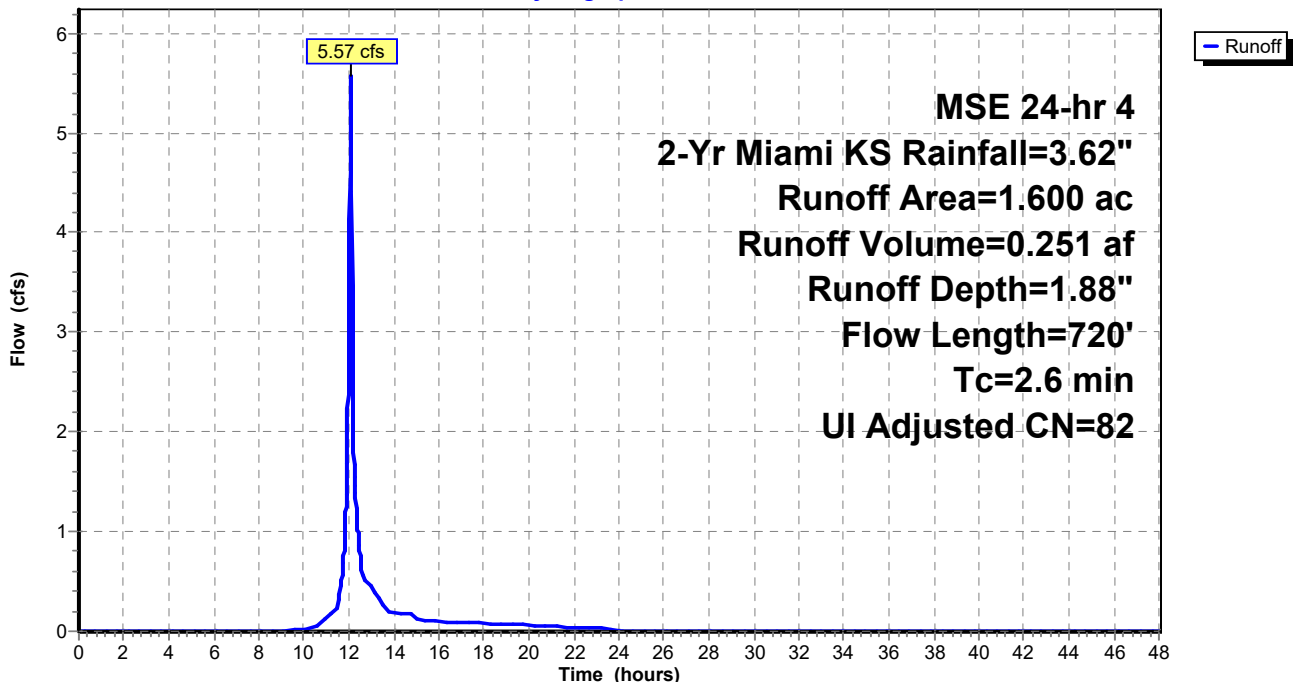
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

Area (ac)	CN	Adj	Description
1.290	80		>75% Grass cover, Good, HSG D
0.310	98		Unconnected pavement, HSG D
1.600	83	82	Weighted Average, UI Adjusted
1.290			80.63% Pervious Area
0.310			19.38% Impervious Area
0.310			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	100	0.0300	1.72		Sheet Flow, Sheet Smooth surfaces n= 0.011 P2= 3.60"
1.0	240	0.0400	4.06		Shallow Concentrated Flow, Shallow Paved Kv= 20.3 fps
0.6	380	0.0280	10.08	181.48	Trap/Vee/Rect Channel Flow, Ditch 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"

Printed 6/22/2023

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Summary for Subcatchment 5S: NW Site

Runoff = 18.30 cfs @ 12.16 hrs, Volume= 1.029 af, Depth= 1.96"

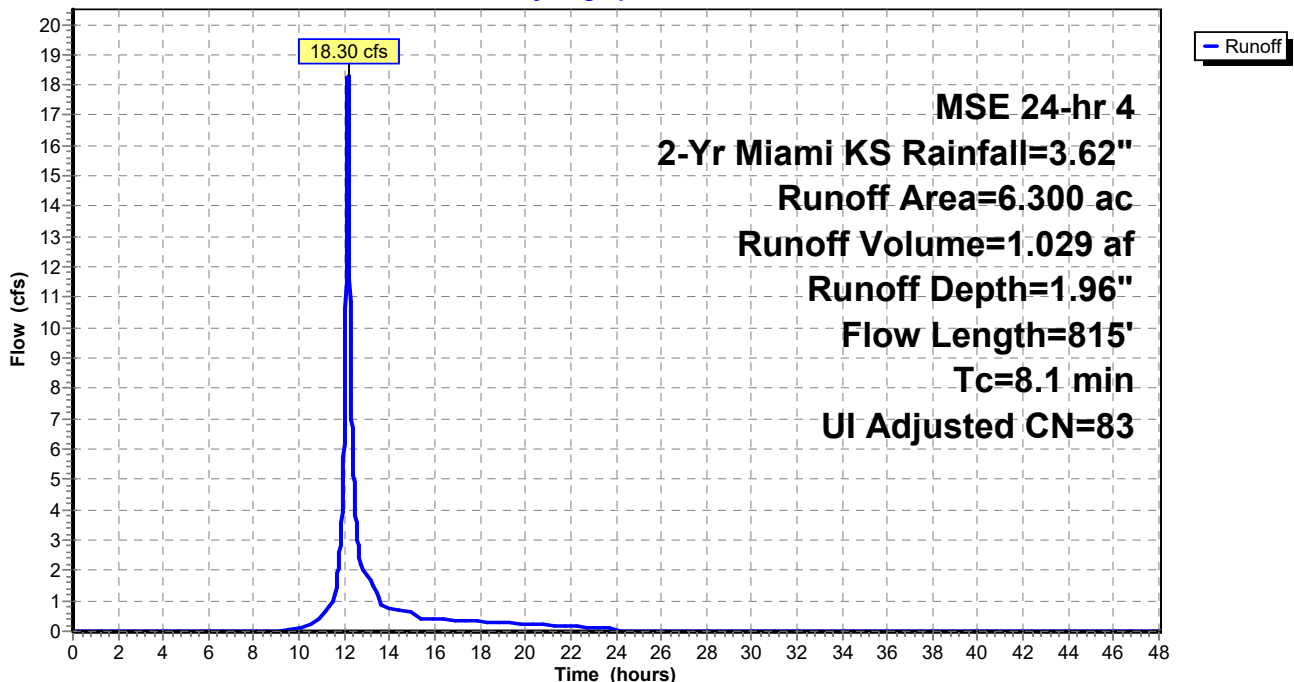
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

Area (ac)	CN	Adj	Description
1.760	98		Unconnected pavement, HSG D
4.540	80		>75% Grass cover, Good, HSG D
6.300	85	83	Weighted Average, UI Adjusted
4.540			72.06% Pervious Area
1.760			27.94% Impervious Area
1.760			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	100	0.0500	0.26		Sheet Flow, Sheet Grass: Short n= 0.150 P2= 3.60"
0.8	125	0.1500	2.71		Shallow Concentrated Flow, Shallow Short Grass Pasture Kv= 7.0 fps
0.9	590	0.0320	10.78	194.02	Trap/Vee/Rect Channel Flow, Ditch 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"

Printed 6/22/2023

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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"

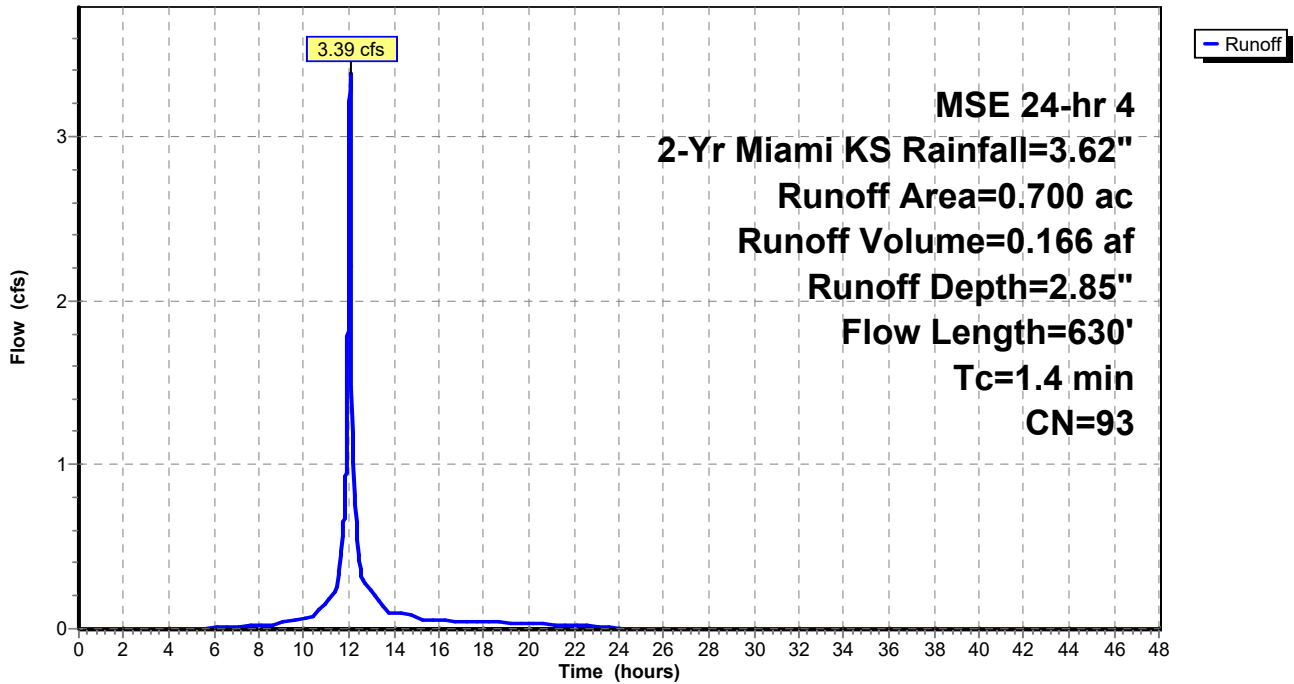
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

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		Sheet Flow, Sheet Smooth surfaces n= 0.011 P2= 3.60"
0.9	590	0.0320	10.78	194.02	Trap/Vee/Rect Channel Flow, Ditch 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"

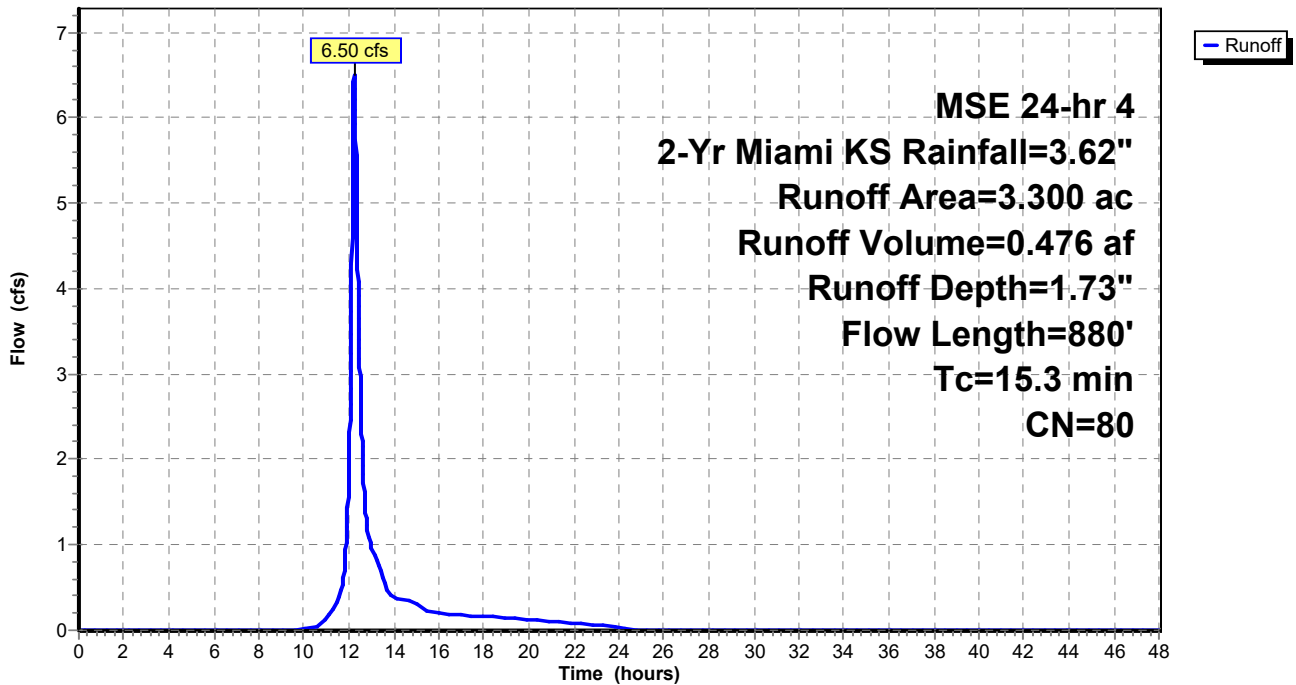
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

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		Sheet Flow, Sheet Grass: Short n= 0.150 P2= 3.60"
5.5	350	0.0230	1.06		Shallow Concentrated Flow, Shallow Short Grass Pasture Kv= 7.0 fps
0.6	430	0.0370	11.59	208.62	Trap/Vee/Rect Channel Flow, Ditch 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"

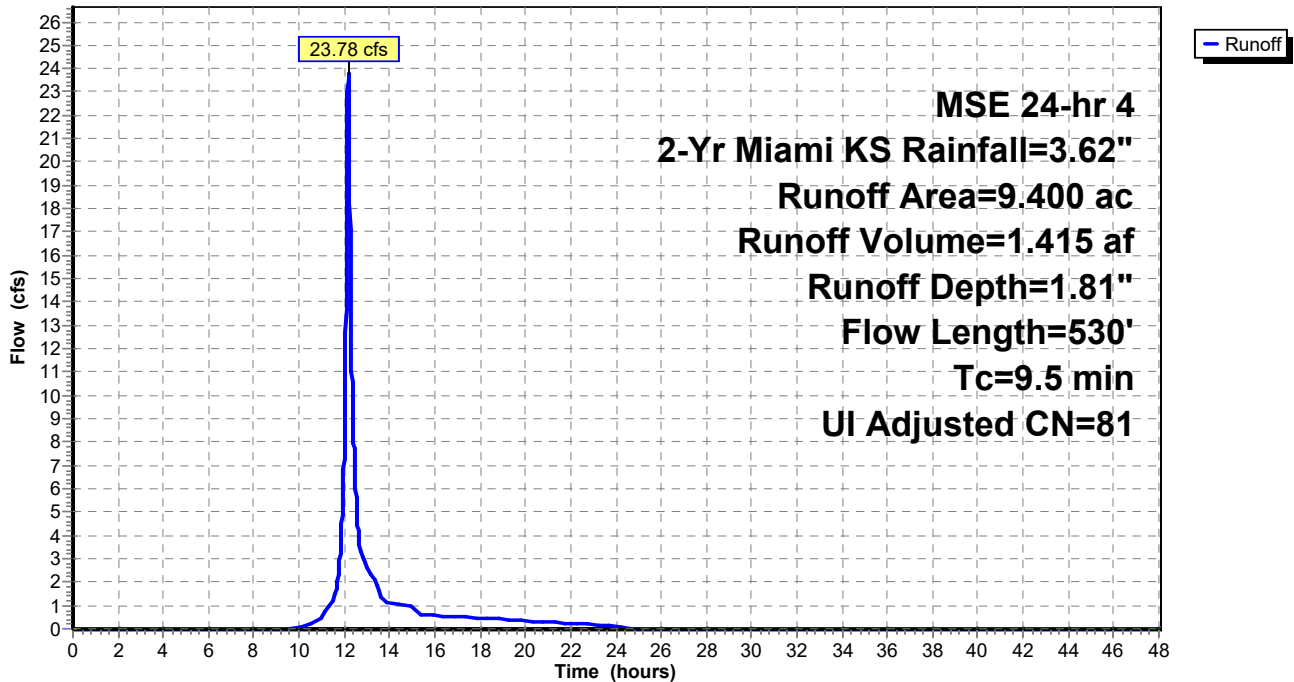
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

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		Sheet Flow, Sheet Grass: Short n= 0.150 P2= 3.60"
3.0	430	0.1200	2.42		Shallow Concentrated Flow, Shallow Short Grass Pasture Kv= 7.0 fps
9.5	530	Total			

Subcatchment 12S: W Site Bypass

Hydrograph



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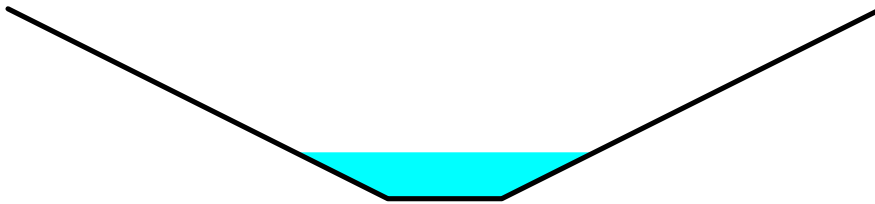
Summary for Reach 9R: Site Stream

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

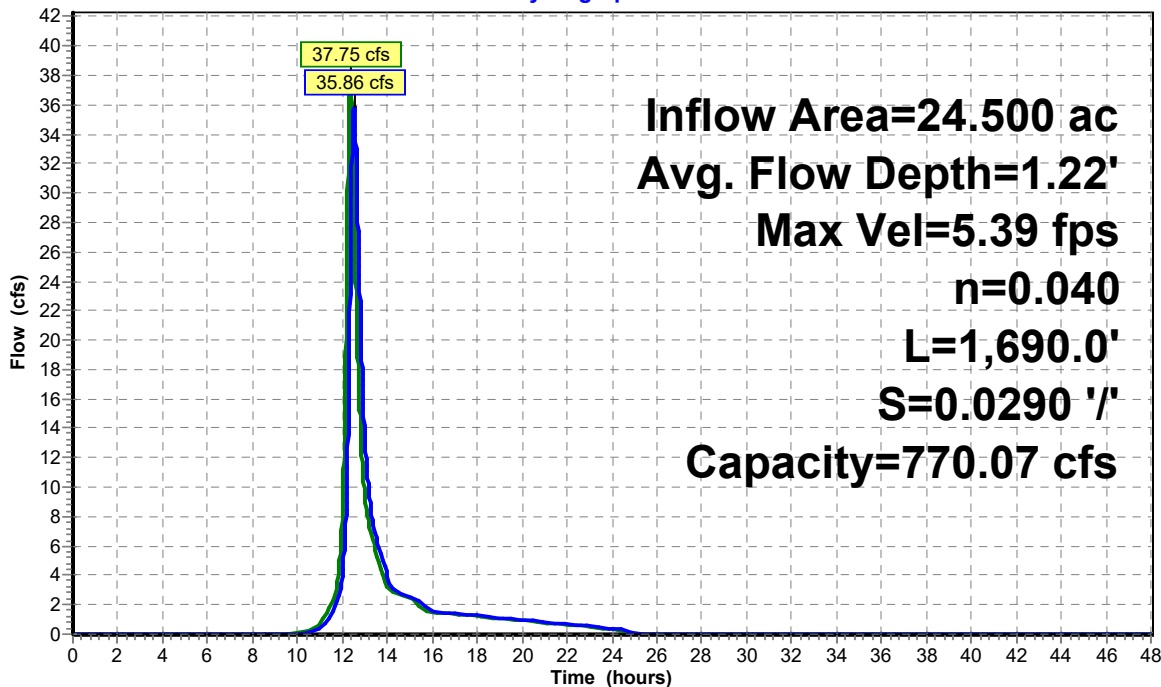
Peak Storage= 11,247 cf @ 12.43 hrs
Average Depth at Peak Storage= 1.22', Surface Width= 7.89'
Bank-Full Depth= 5.00' Flow Area= 65.0 sf, Capacity= 770.07 cfs

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



AF Prop w Det Condition

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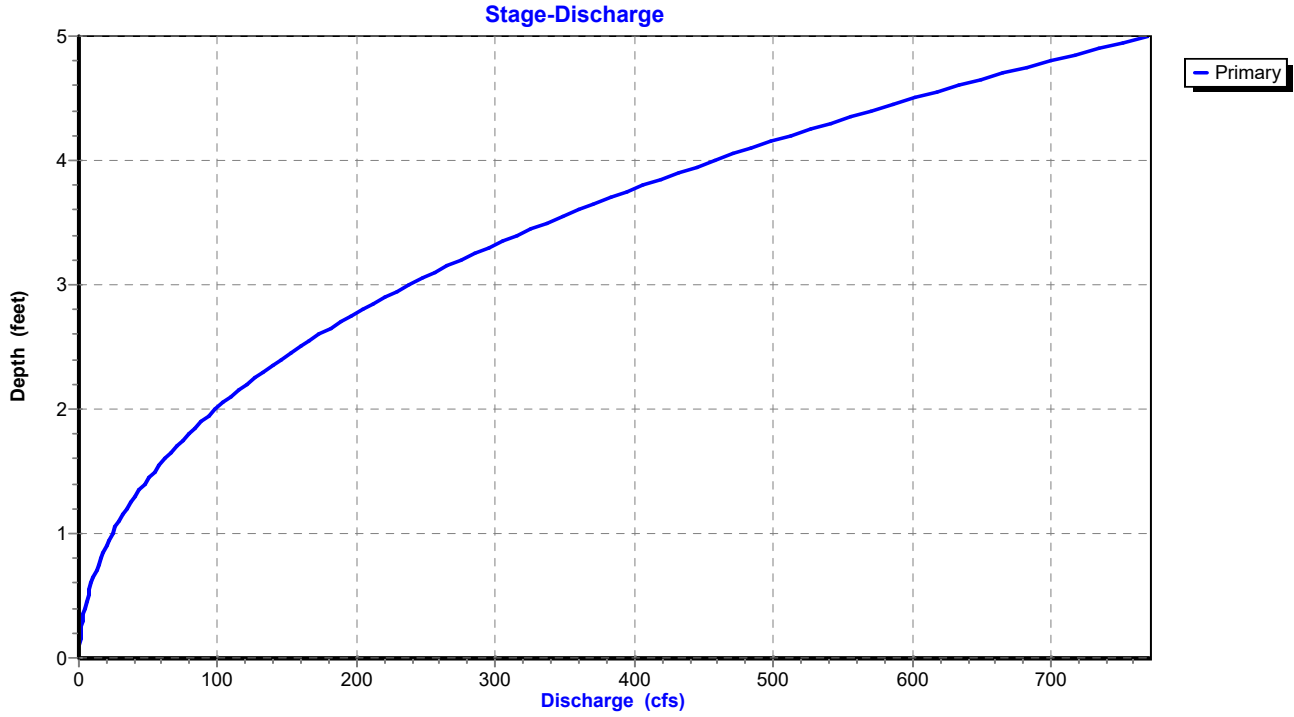
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MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

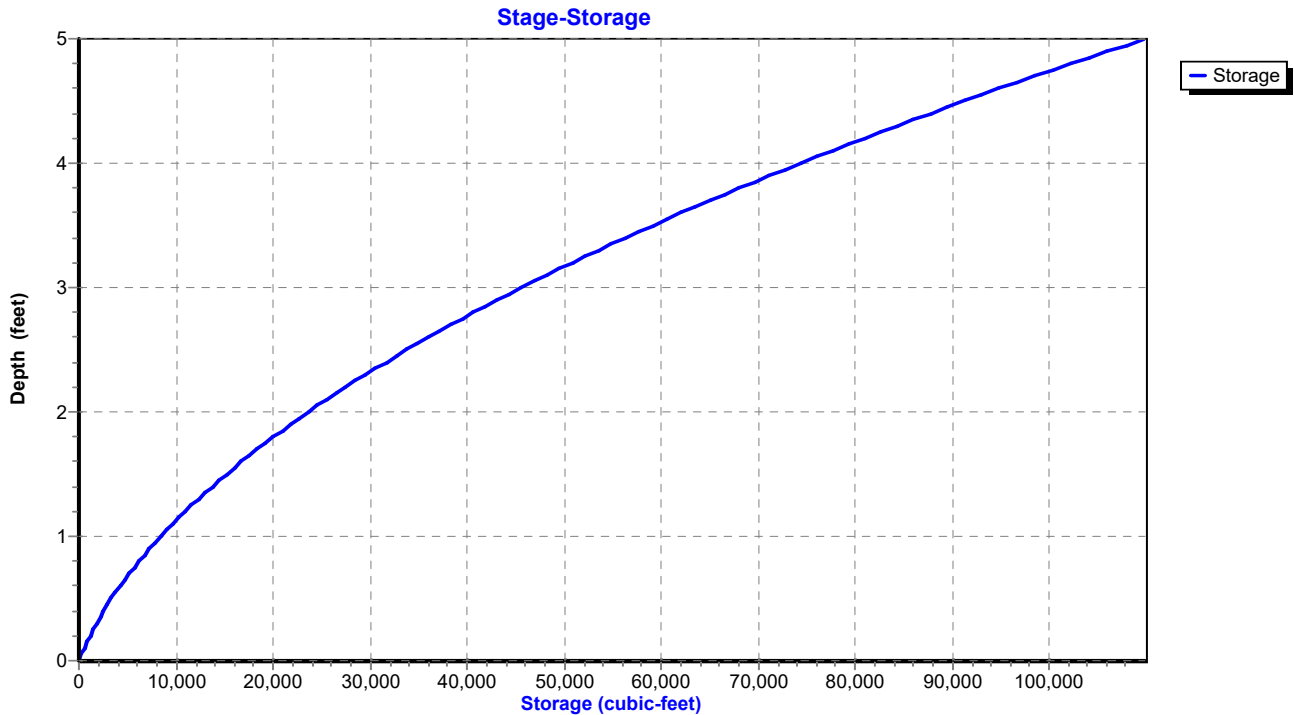
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Reach 9R: Site Stream



Reach 9R: Site Stream



AF Prop w Det Condition

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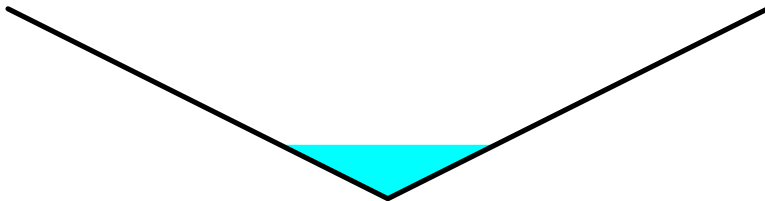
Summary for Reach 10R: 223rd Ditch

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

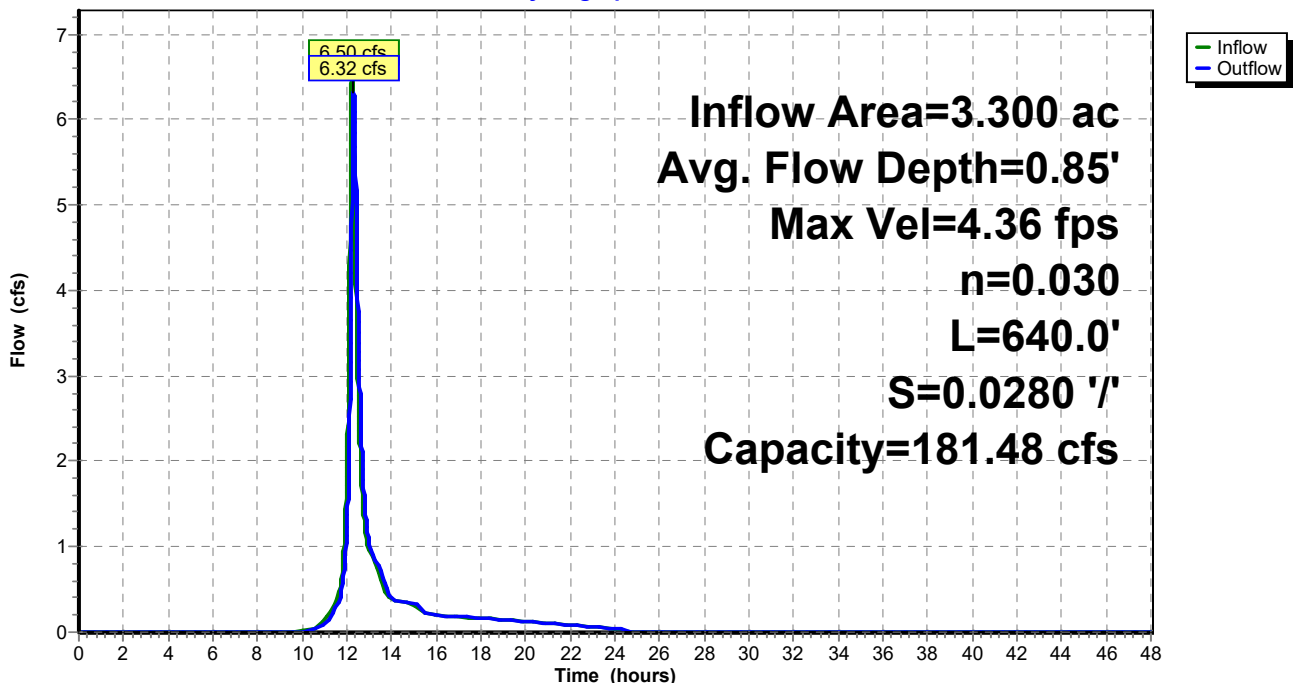
Peak Storage= 928 cf @ 12.27 hrs
Average Depth at Peak Storage= 0.85' , Surface Width= 3.41'
Bank-Full Depth= 3.00' Flow Area= 18.0 sf, Capacity= 181.48 cfs

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



AF Prop w Det Condition

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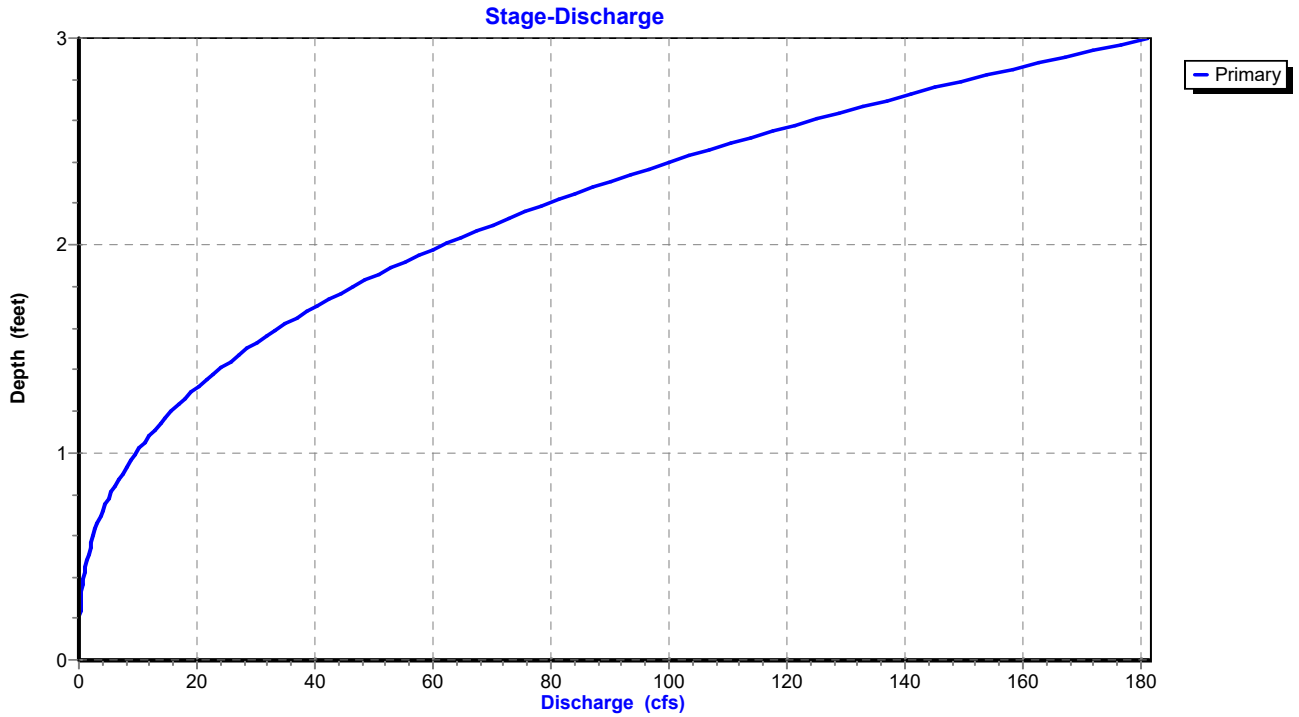
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MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

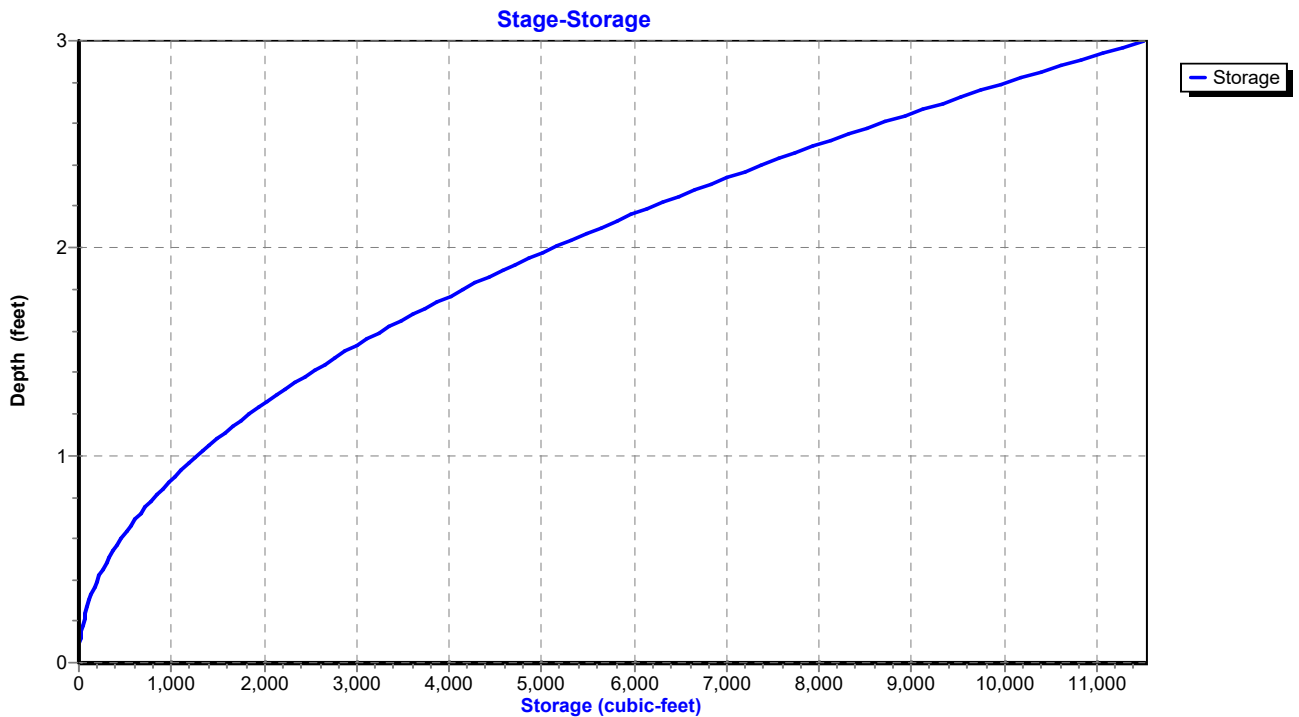
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Reach 10R: 223rd Ditch



Reach 10R: 223rd Ditch



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 Pond 11P: Wet Pond

Inflow Area = 46.000 ac, 3.91% 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	Custom Stage Data 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'	60.0" W x 15.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	964.00'	24.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#3	Secondary	966.00'	70.0' long x 15.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=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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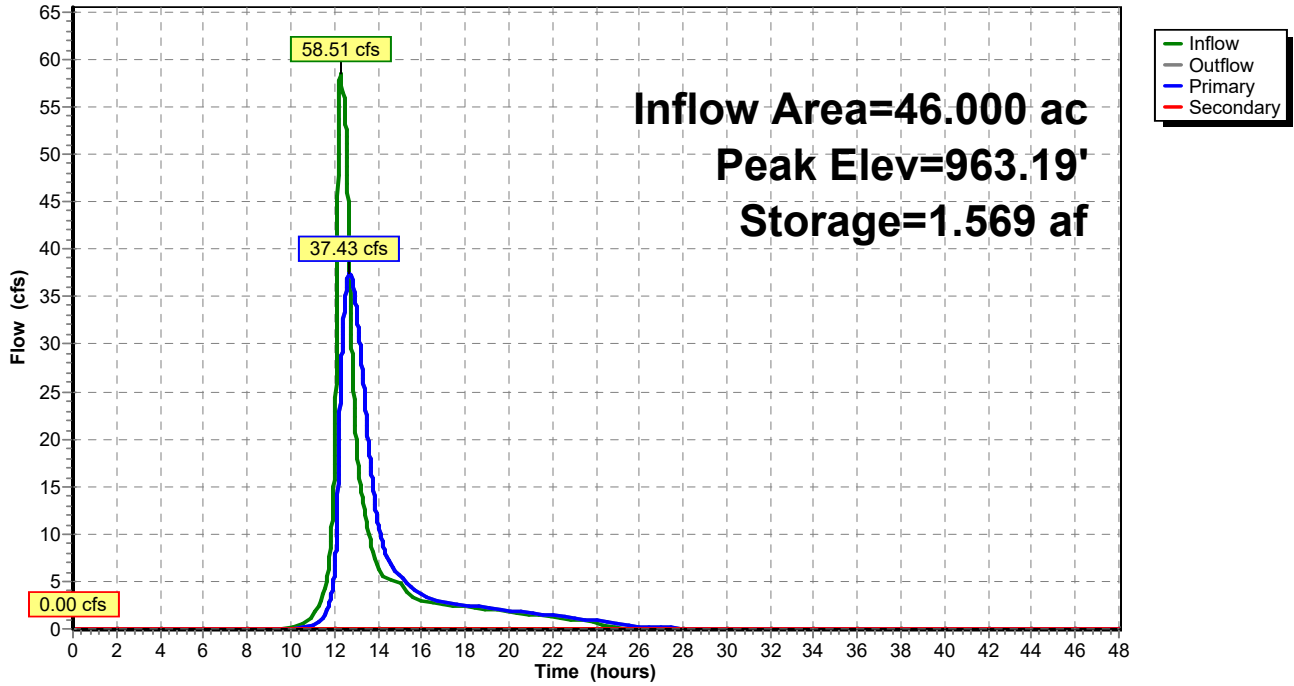
Always & Forever
MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

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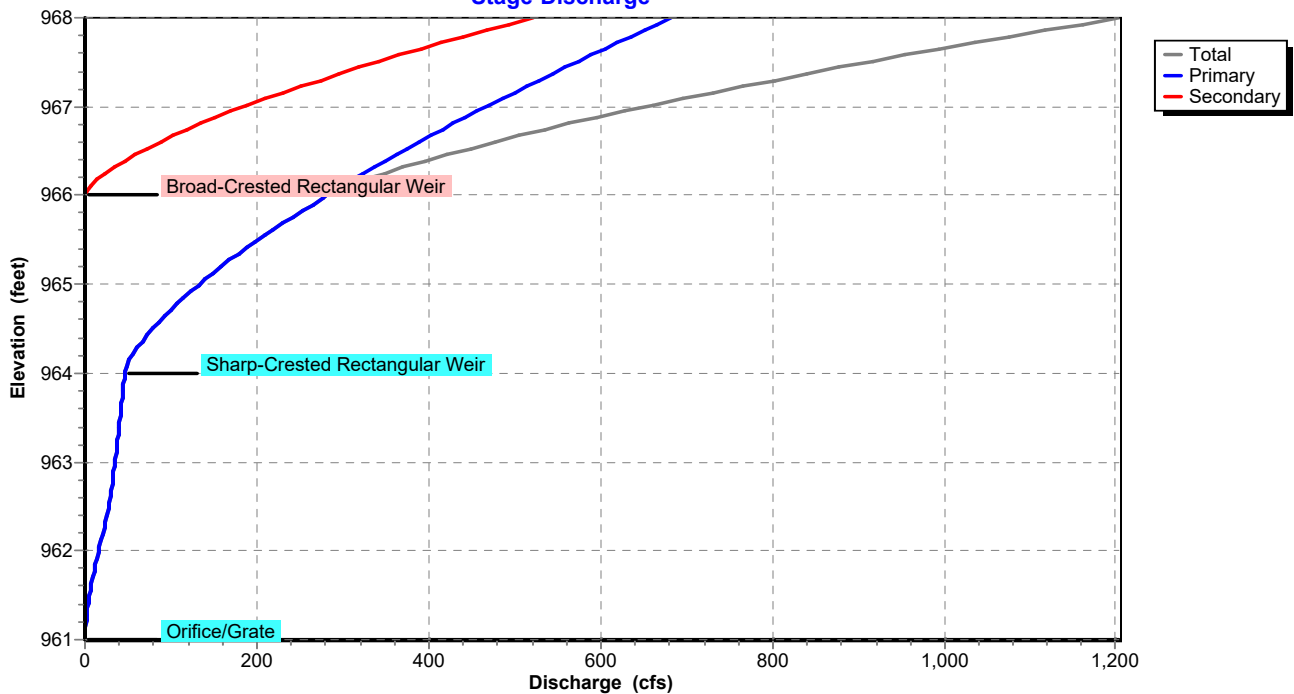
Pond 11P: Wet Pond

Hydrograph



Pond 11P: Wet Pond

Stage-Discharge



AF Prop w Det Condition

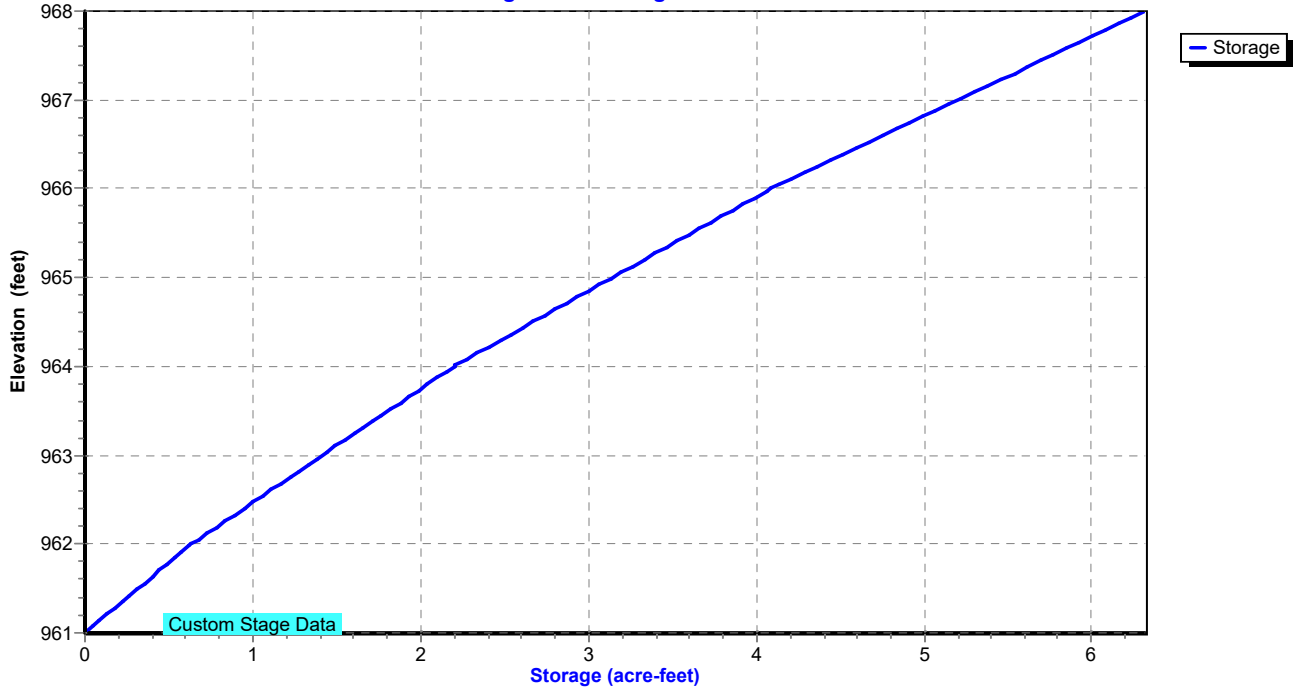
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MSE 24-hr 4 2-Yr Miami KS Rainfall=3.62"

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Pond 11P: Wet Pond

Stage-Area-Storage



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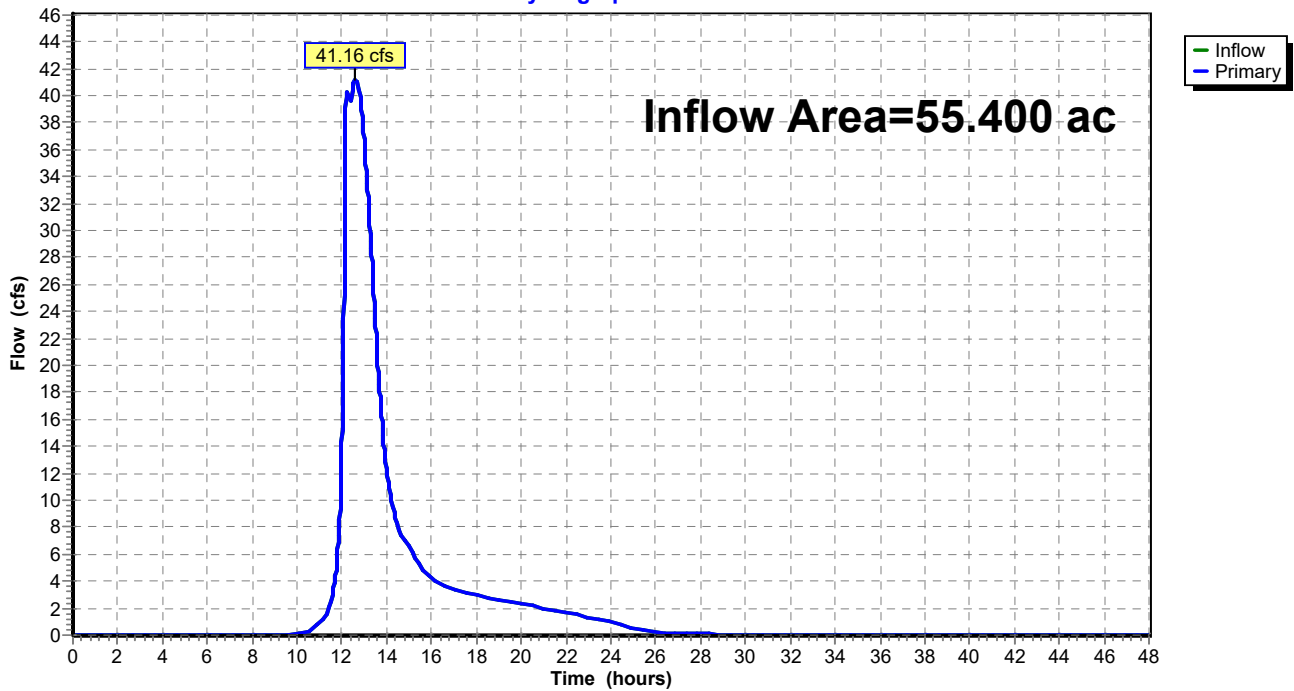
Summary for Link 2L: W Site Limit

Inflow Area = 55.400 ac, 5.42% 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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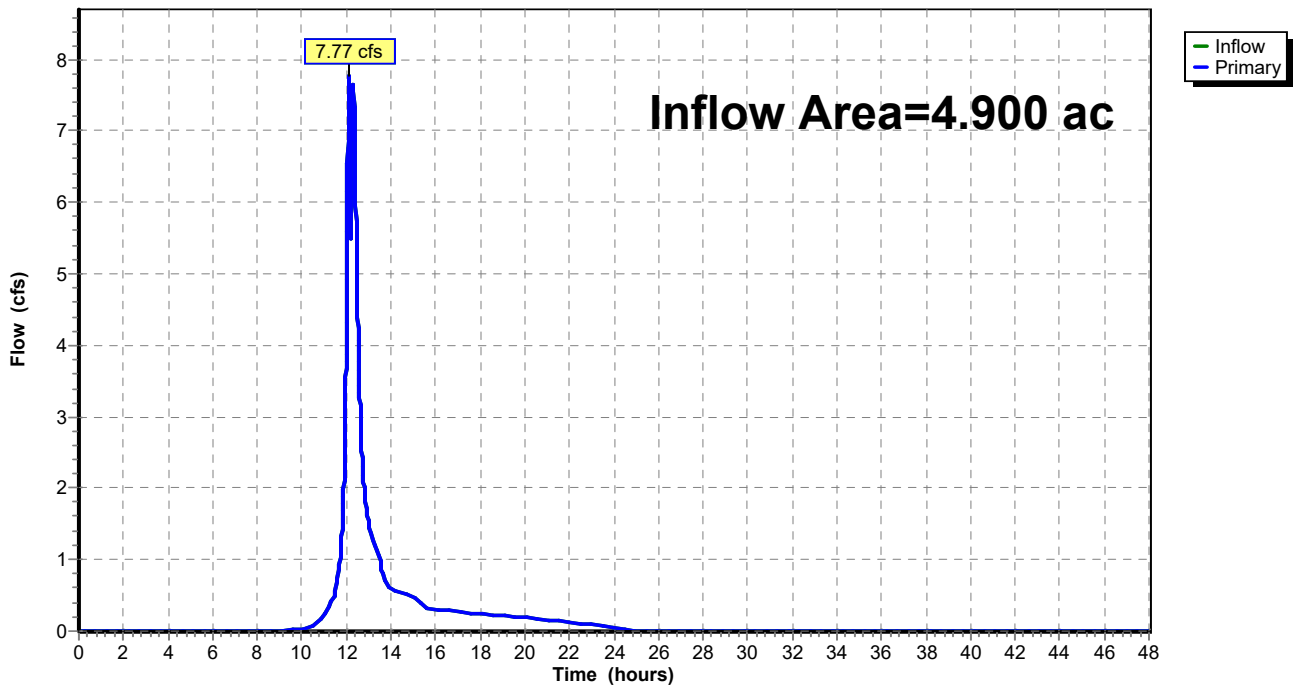
Summary for Link 3L: CMPA Site Limit

Inflow Area = 4.900 ac, 6.33% Impervious, Inflow Depth = 1.78" for 2-Yr Miami KS event
Inflow = 7.77 cfs @ 12.11 hrs, Volume= 0.727 af
Primary = 7.77 cfs @ 12.11 hrs, Volume= 0.727 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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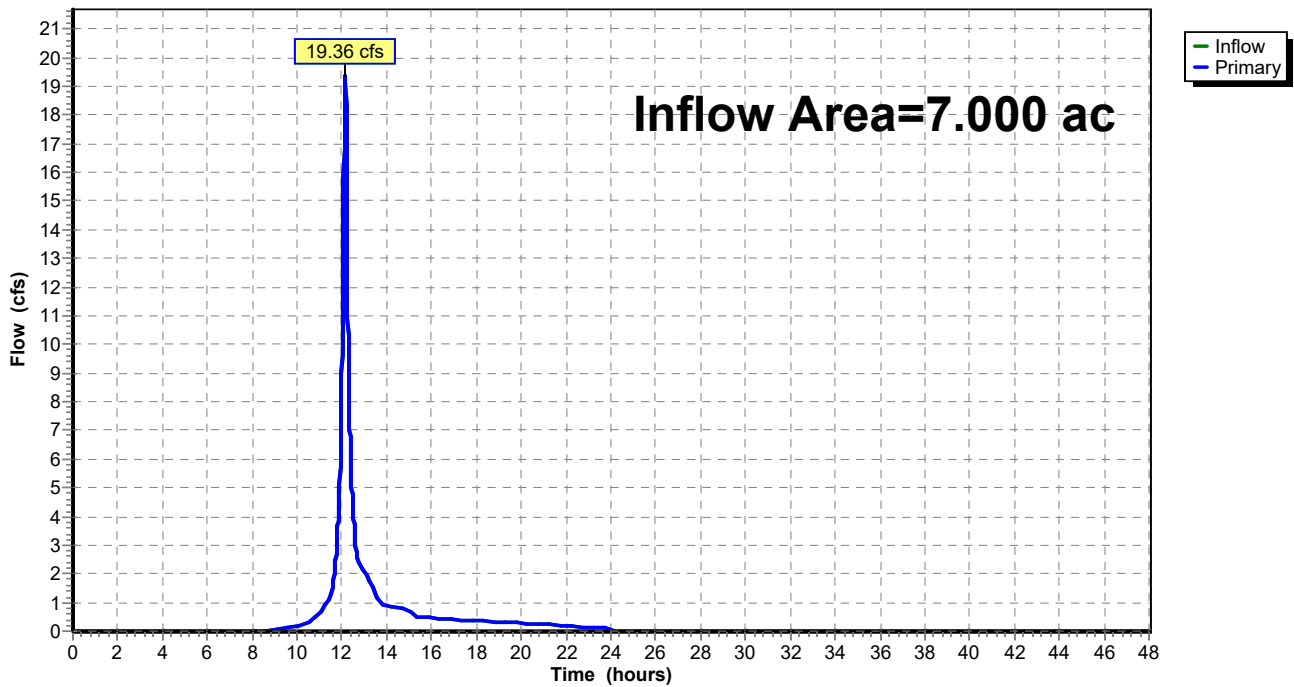
Summary for Link 4L: NW Site Limit

Inflow Area = 7.000 ac, 30.14% Impervious, Inflow Depth = 2.05" for 2-Yr Miami KS event
Inflow = 19.36 cfs @ 12.15 hrs, Volume= 1.195 af
Primary = 19.36 cfs @ 12.15 hrs, Volume= 1.195 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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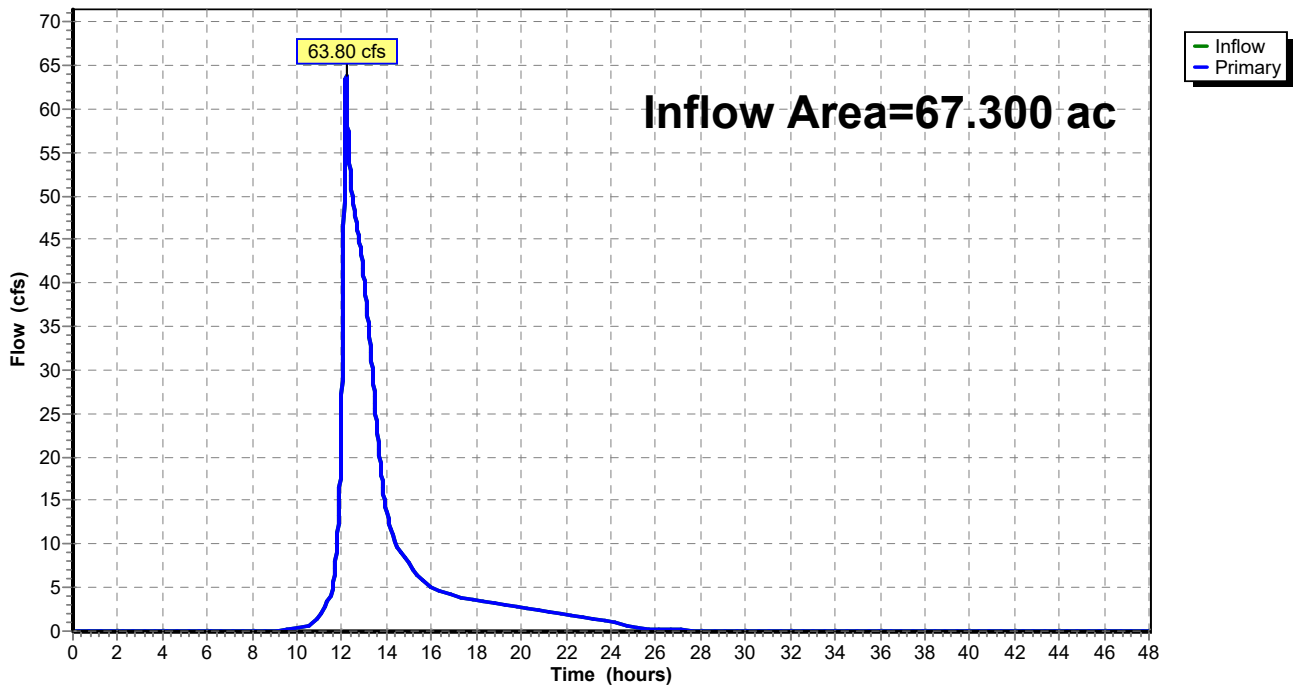
Summary for Link 6L: Off-Site Confluence

Inflow Area = 67.300 ac, 8.05% Impervious, Inflow Depth = 1.80" for 2-Yr Miami KS event
Inflow = 63.80 cfs @ 12.18 hrs, Volume= 10.110 af
Primary = 63.80 cfs @ 12.18 hrs, Volume= 10.110 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"

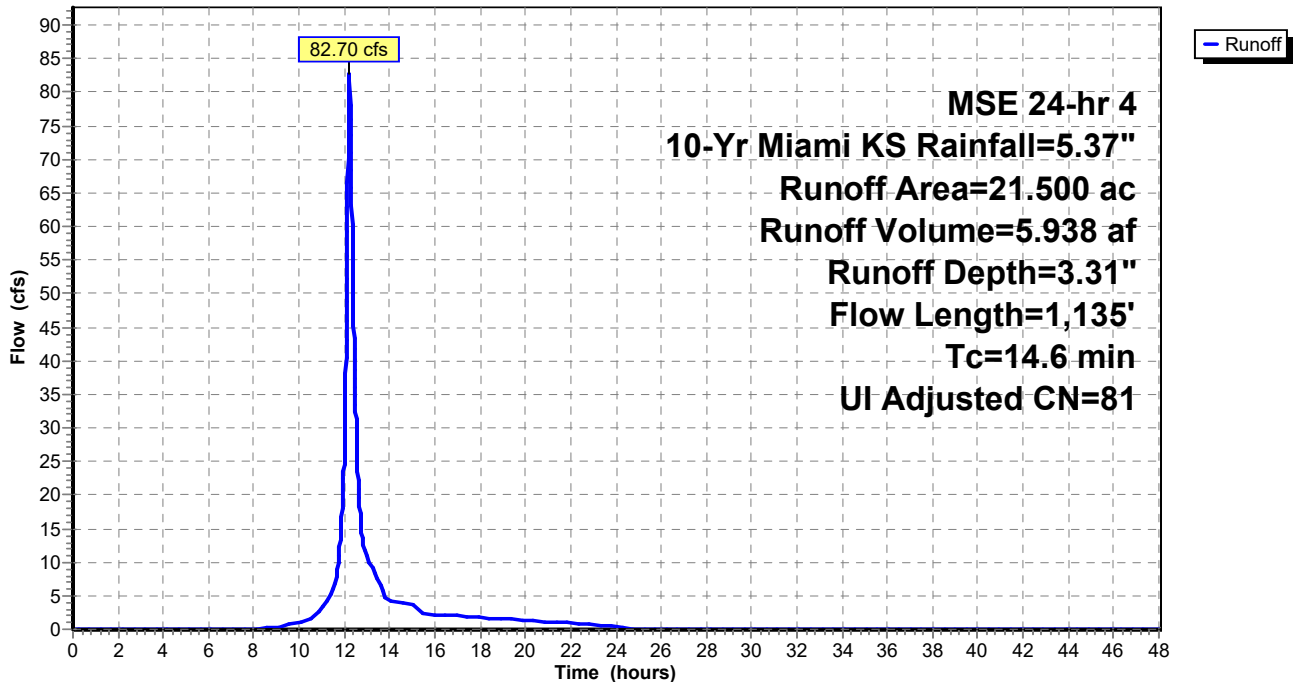
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10-Yr Miami KS Rainfall=5.37"

Area (ac)	CN	Adj	Description
19.700	80		>75% Grass cover, Good, HSG D
1.800	98		Unconnected pavement, HSG D
21.500	82	81	Weighted Average, UI Adjusted
19.700			91.63% Pervious Area
1.800			8.37% Impervious Area
1.800			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	100	0.0400	0.24		Sheet Flow, Sheet Grass: Short n= 0.150 P2= 3.60"
7.2	745	0.0600	1.71		Shallow Concentrated Flow, Shallow Short Grass Pasture Kv= 7.0 fps
0.4	290	0.0300	12.05	783.31	Trap/Vee/Rect Channel Flow, Channel 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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Summary for Subcatchment 3S: E Off-Site

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

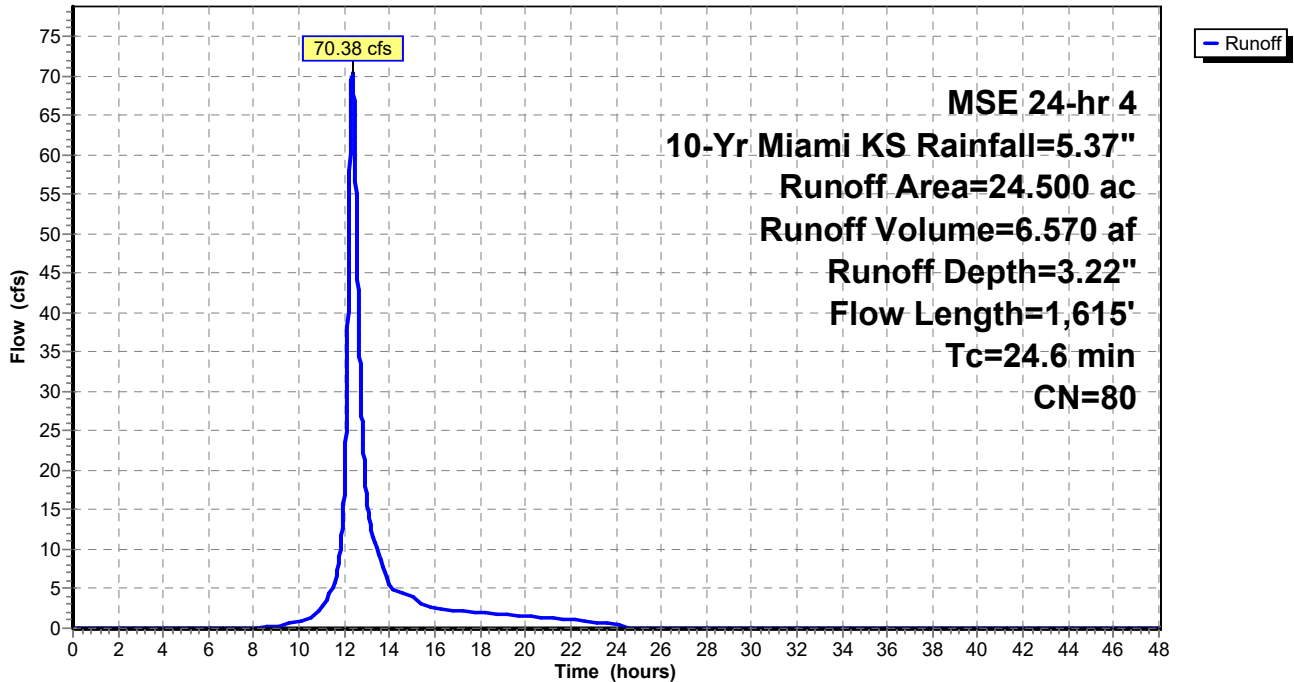
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10-Yr Miami KS Rainfall=5.37"

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		Sheet Flow, Sheet Grass: Short n= 0.150 P2= 3.60"
14.6	1,060	0.0300	1.21		Shallow Concentrated Flow, Shallow Short Grass Pasture Kv= 7.0 fps
1.1	455		7.00		Direct Entry, LxV 1
24.6	1,615	Total			

Subcatchment 3S: E Off-Site

Hydrograph



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Summary for Subcatchment 4S: N Site

Runoff = 9.80 cfs @ 12.11 hrs, Volume= 0.455 af, Depth= 3.41"

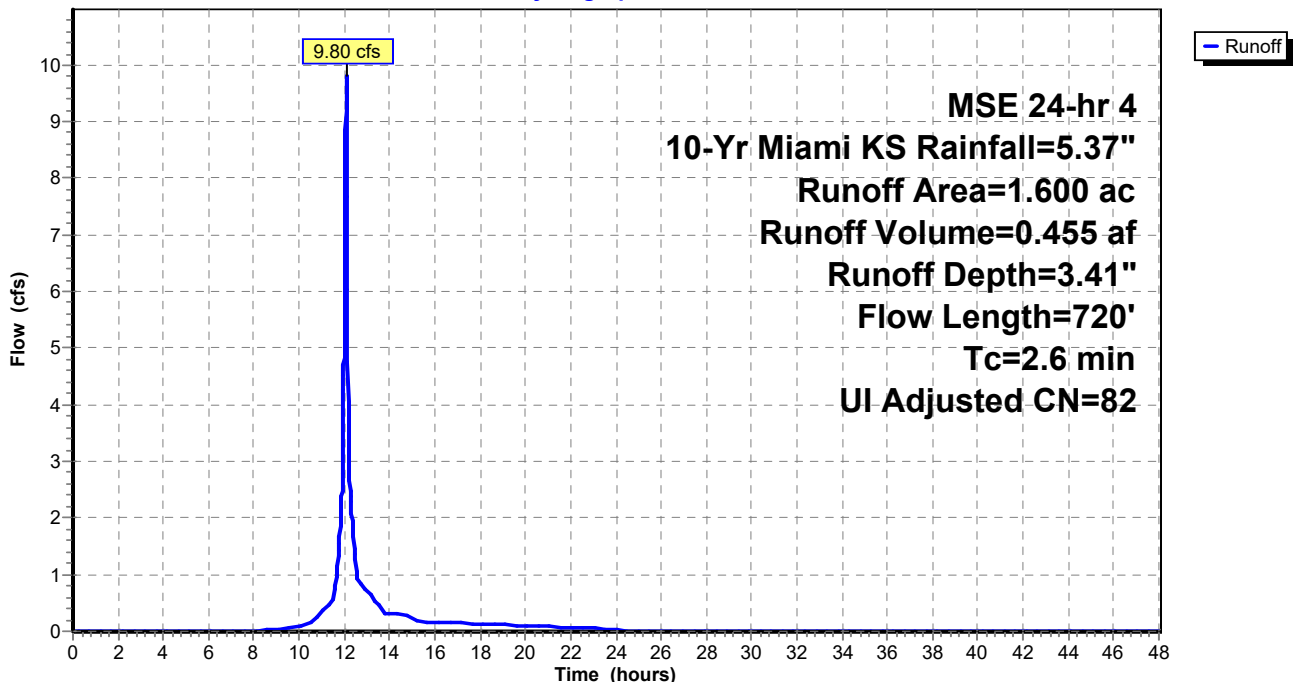
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10-Yr Miami KS Rainfall=5.37"

Area (ac)	CN	Adj	Description
1.290	80		>75% Grass cover, Good, HSG D
0.310	98		Unconnected pavement, HSG D
1.600	83	82	Weighted Average, UI Adjusted
1.290			80.63% Pervious Area
0.310			19.38% Impervious Area
0.310			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	100	0.0300	1.72		Sheet Flow, Sheet Smooth surfaces n= 0.011 P2= 3.60"
1.0	240	0.0400	4.06		Shallow Concentrated Flow, Shallow Paved Kv= 20.3 fps
0.6	380	0.0280	10.08	181.48	Trap/Vee/Rect Channel Flow, Ditch 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 = 32.20 cfs @ 12.15 hrs, Volume= 1.843 af, Depth= 3.51"

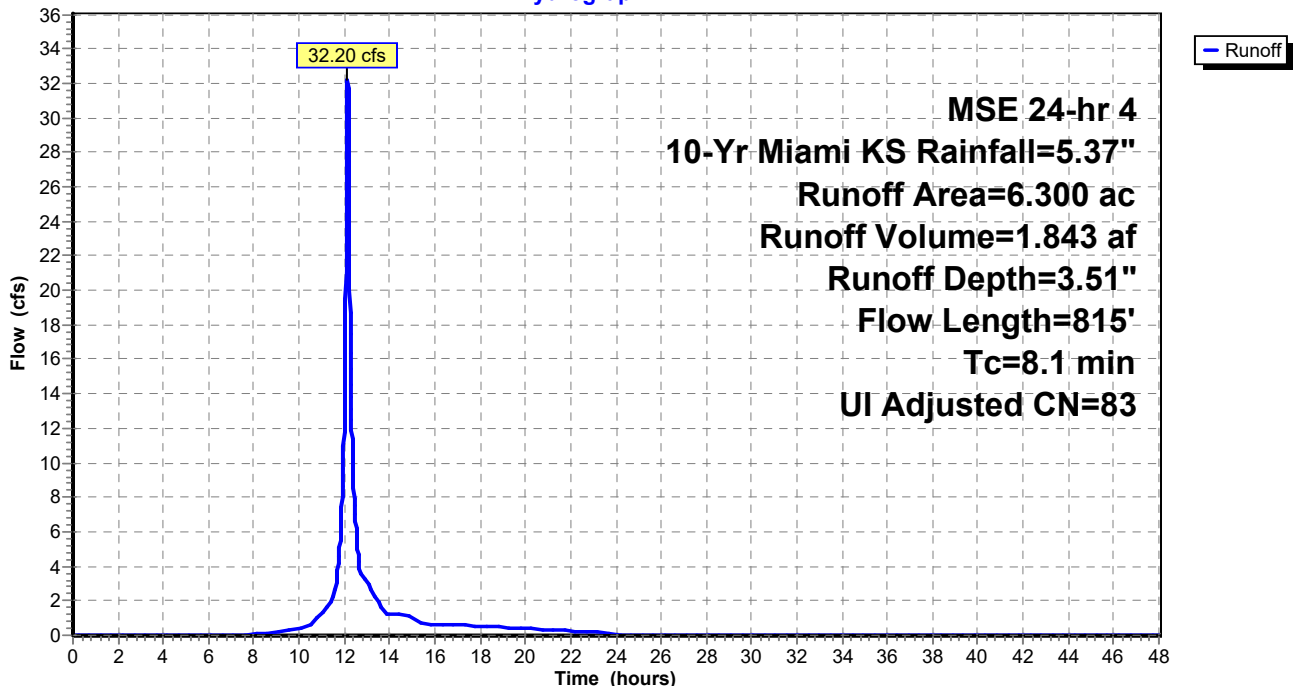
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10-Yr Miami KS Rainfall=5.37"

Area (ac)	CN	Adj	Description
1.760	98		Unconnected pavement, HSG D
4.540	80		>75% Grass cover, Good, HSG D
6.300	85	83	Weighted Average, UI Adjusted
4.540			72.06% Pervious Area
1.760			27.94% Impervious Area
1.760			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	100	0.0500	0.26		Sheet Flow, Sheet Grass: Short n= 0.150 P2= 3.60"
0.8	125	0.1500	2.71		Shallow Concentrated Flow, Shallow Short Grass Pasture Kv= 7.0 fps
0.9	590	0.0320	10.78	194.02	Trap/Vee/Rect Channel Flow, Ditch 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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Summary for Subcatchment 7S: NW Off-Site

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

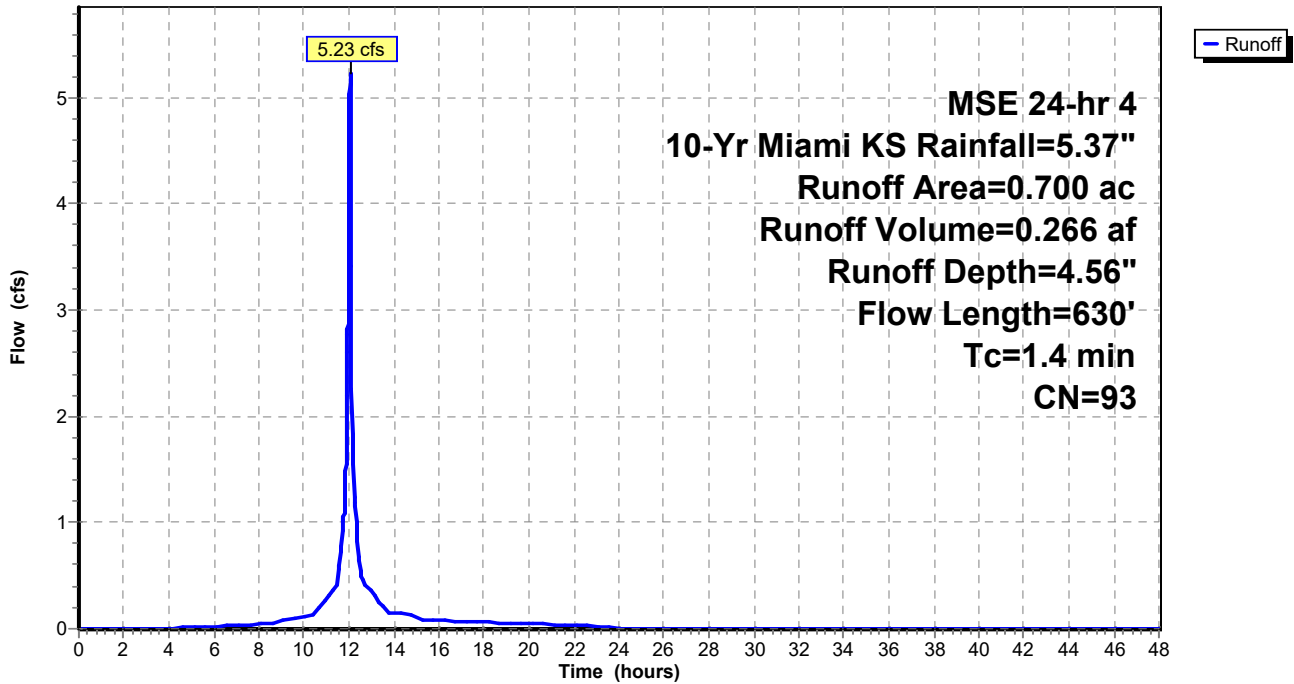
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10-Yr Miami KS Rainfall=5.37"

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		Sheet Flow, Sheet Smooth surfaces n= 0.011 P2= 3.60"
0.9	590	0.0320	10.78	194.02	Trap/Vee/Rect Channel Flow, Ditch 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"

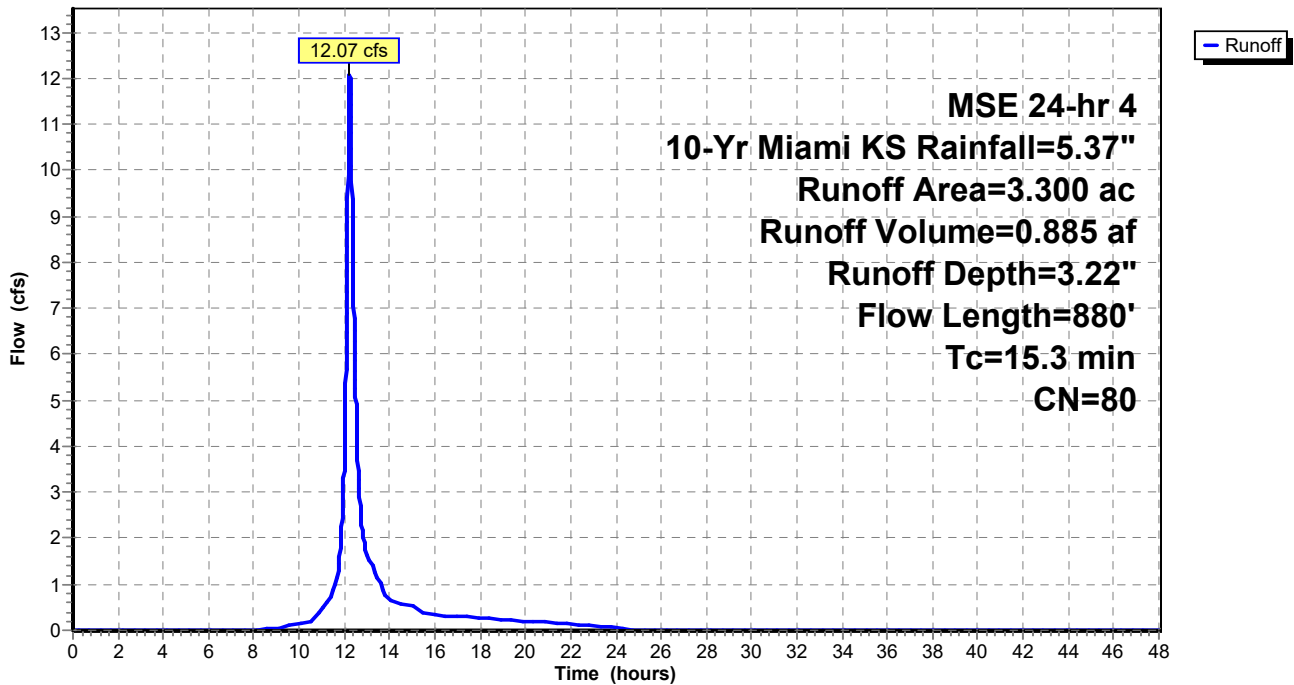
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10-Yr Miami KS Rainfall=5.37"

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		Sheet Flow, Sheet Grass: Short n= 0.150 P2= 3.60"
5.5	350	0.0230	1.06		Shallow Concentrated Flow, Shallow Short Grass Pasture Kv= 7.0 fps
0.6	430	0.0370	11.59	208.62	Trap/Vee/Rect Channel Flow, Ditch 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"

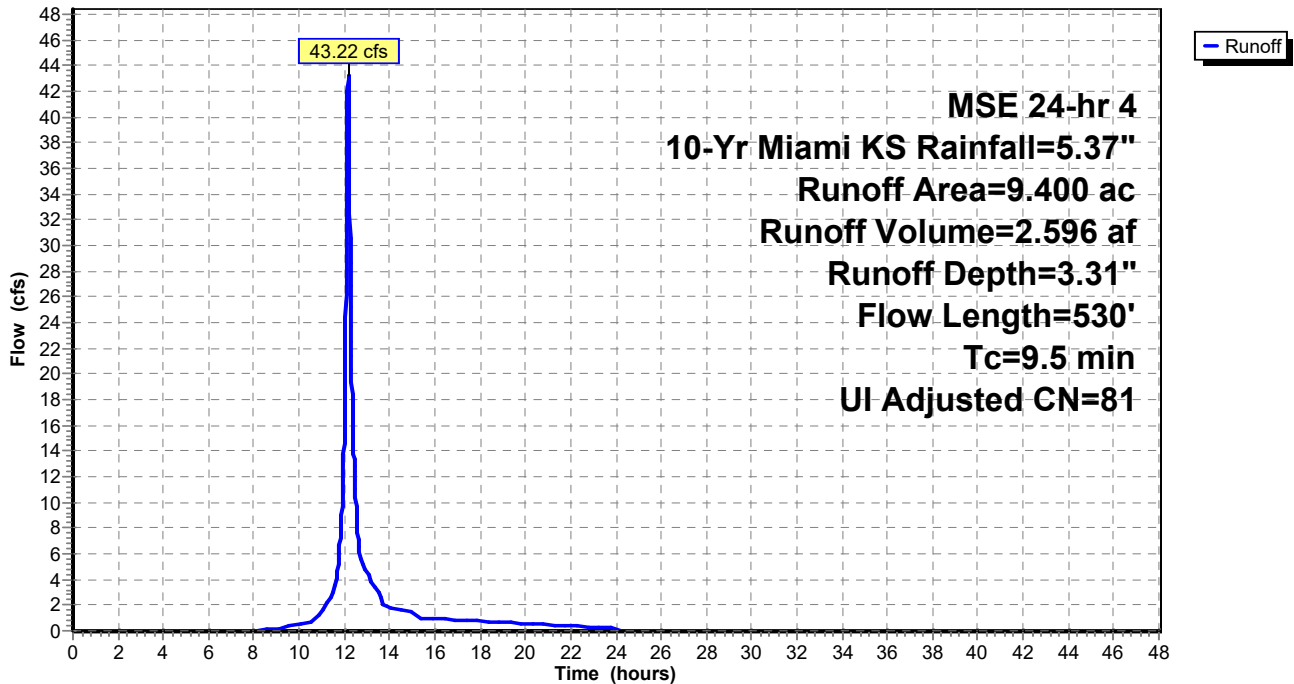
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10-Yr Miami KS Rainfall=5.37"

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		Sheet Flow, Sheet Grass: Short n= 0.150 P2= 3.60"
3.0	430	0.1200	2.42		Shallow Concentrated Flow, Shallow Short Grass Pasture Kv= 7.0 fps
9.5	530	Total			

Subcatchment 12S: W Site Bypass

Hydrograph



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

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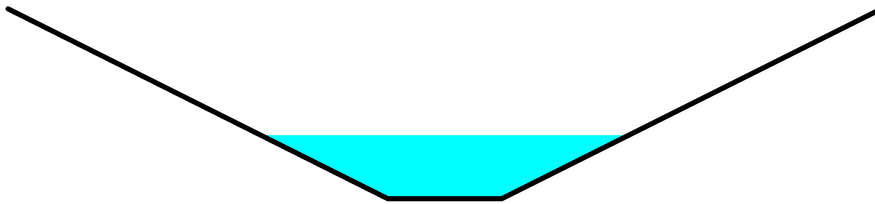
Summary for Reach 9R: Site Stream

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

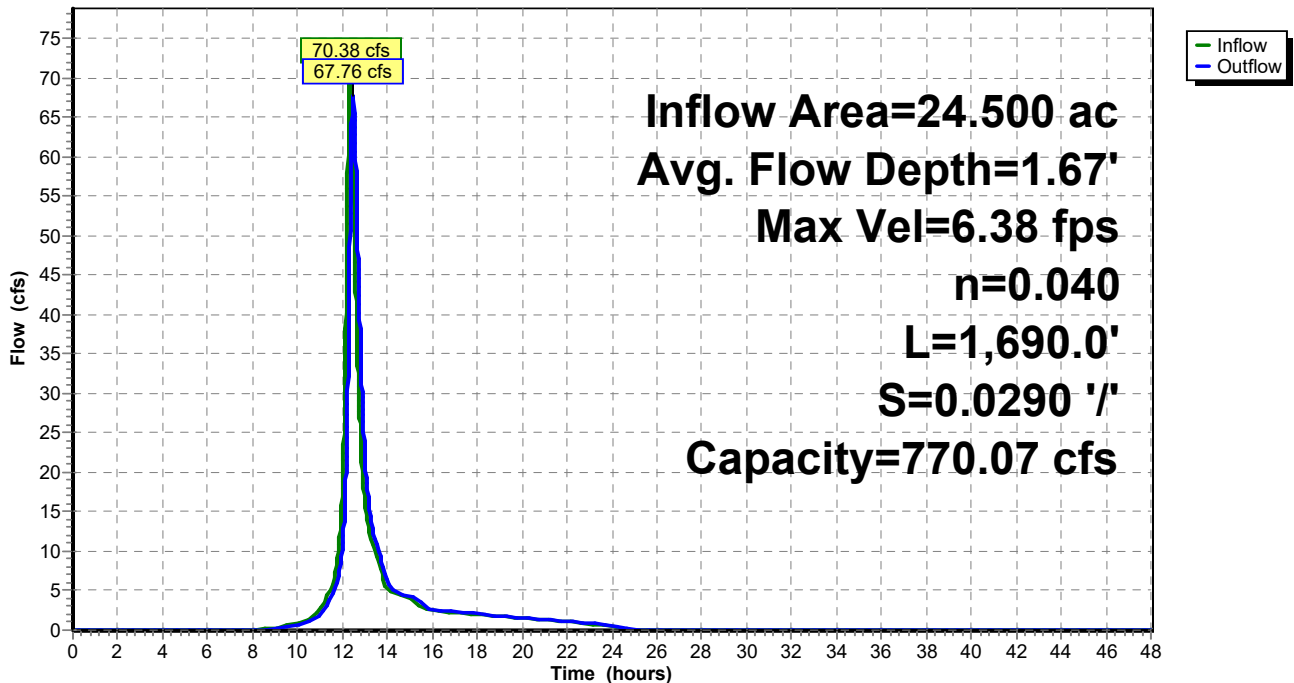
Peak Storage= 17,949 cf @ 12.41 hrs
Average Depth at Peak Storage= 1.67' , Surface Width= 9.69'
Bank-Full Depth= 5.00' Flow Area= 65.0 sf, Capacity= 770.07 cfs

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



AF Prop w Det Condition

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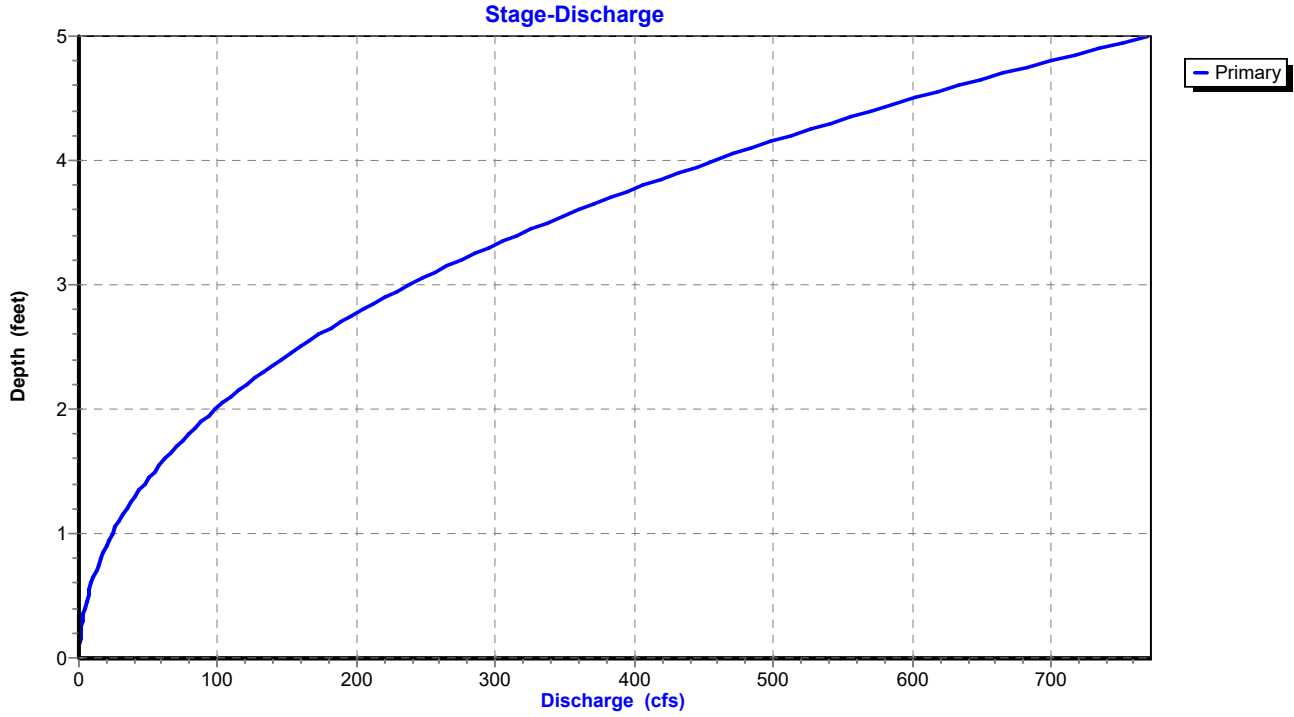
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MSE 24-hr 4 10-Yr Miami KS Rainfall=5.37"

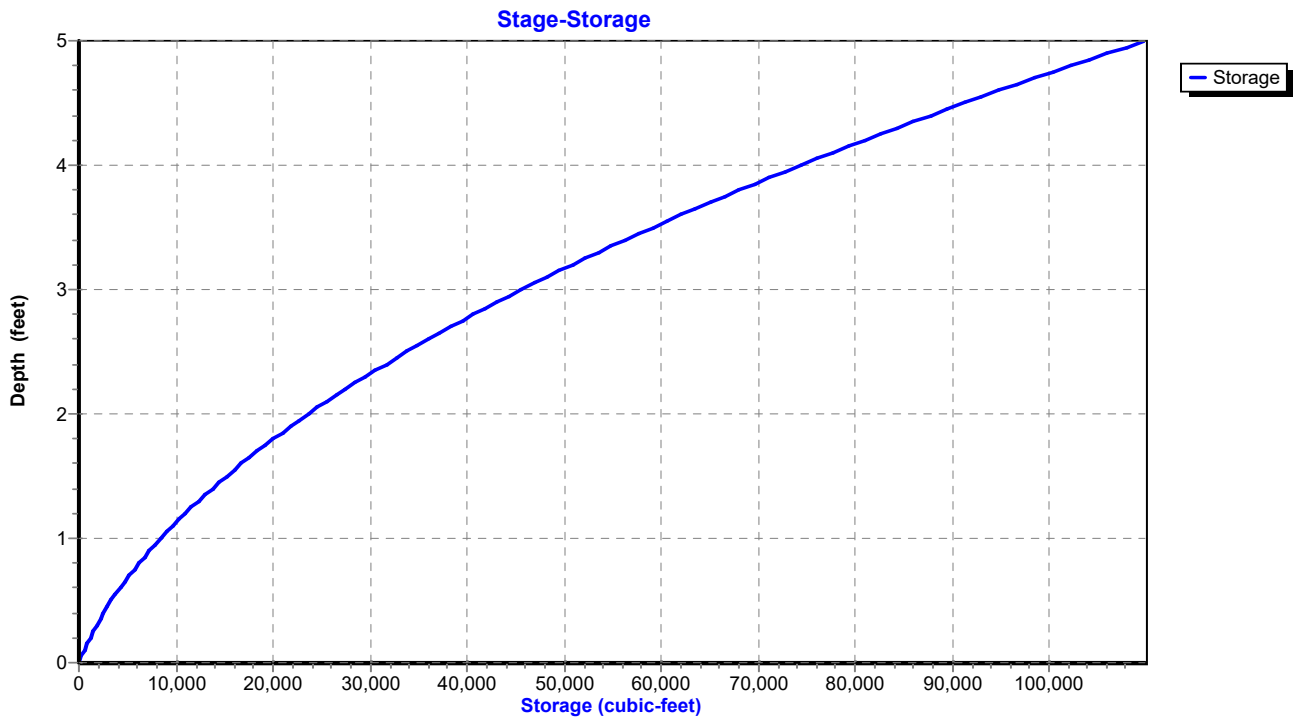
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Reach 9R: Site Stream



Reach 9R: Site Stream



AF Prop w Det Condition

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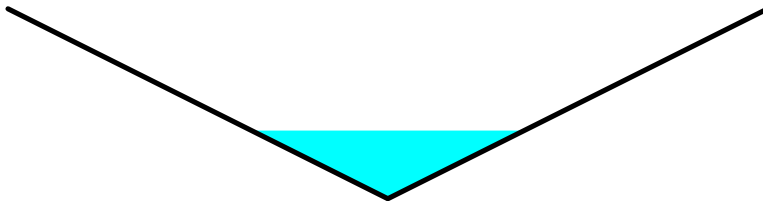
Summary for Reach 10R: 223rd Ditch

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

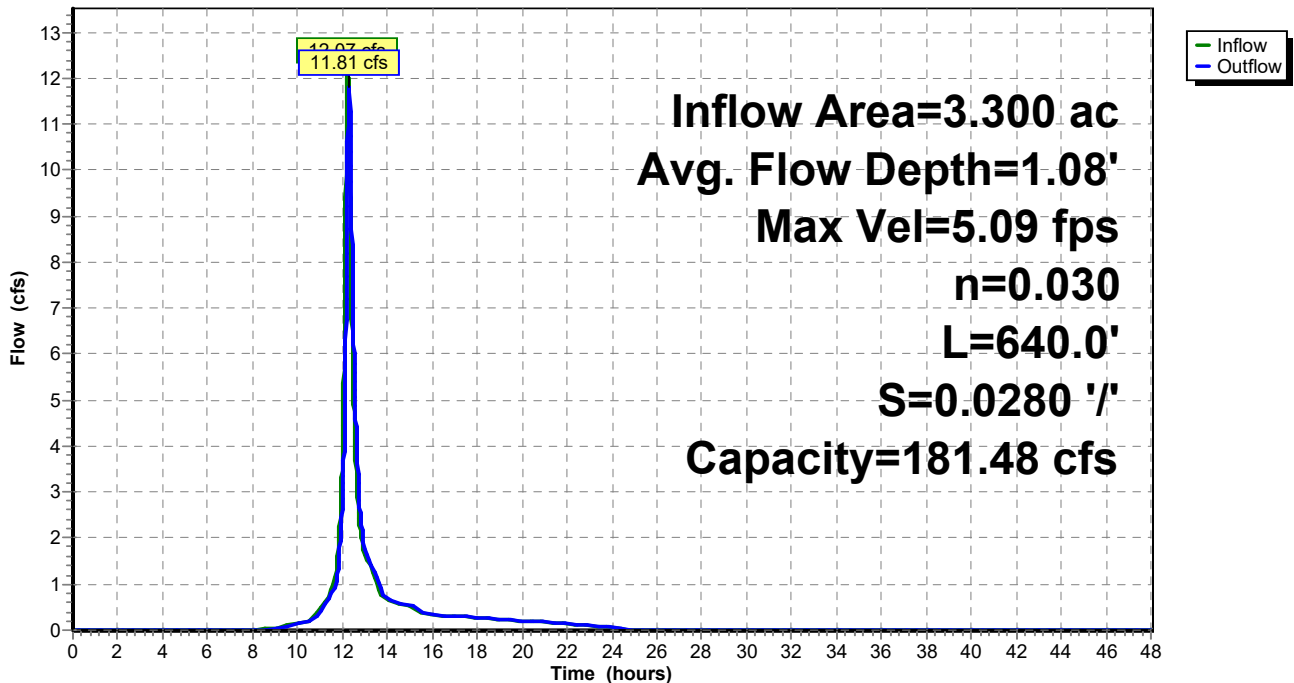
Peak Storage= 1,485 cf @ 12.26 hrs
Average Depth at Peak Storage= 1.08' , Surface Width= 4.31'
Bank-Full Depth= 3.00' Flow Area= 18.0 sf, Capacity= 181.48 cfs

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



AF Prop w Det Condition

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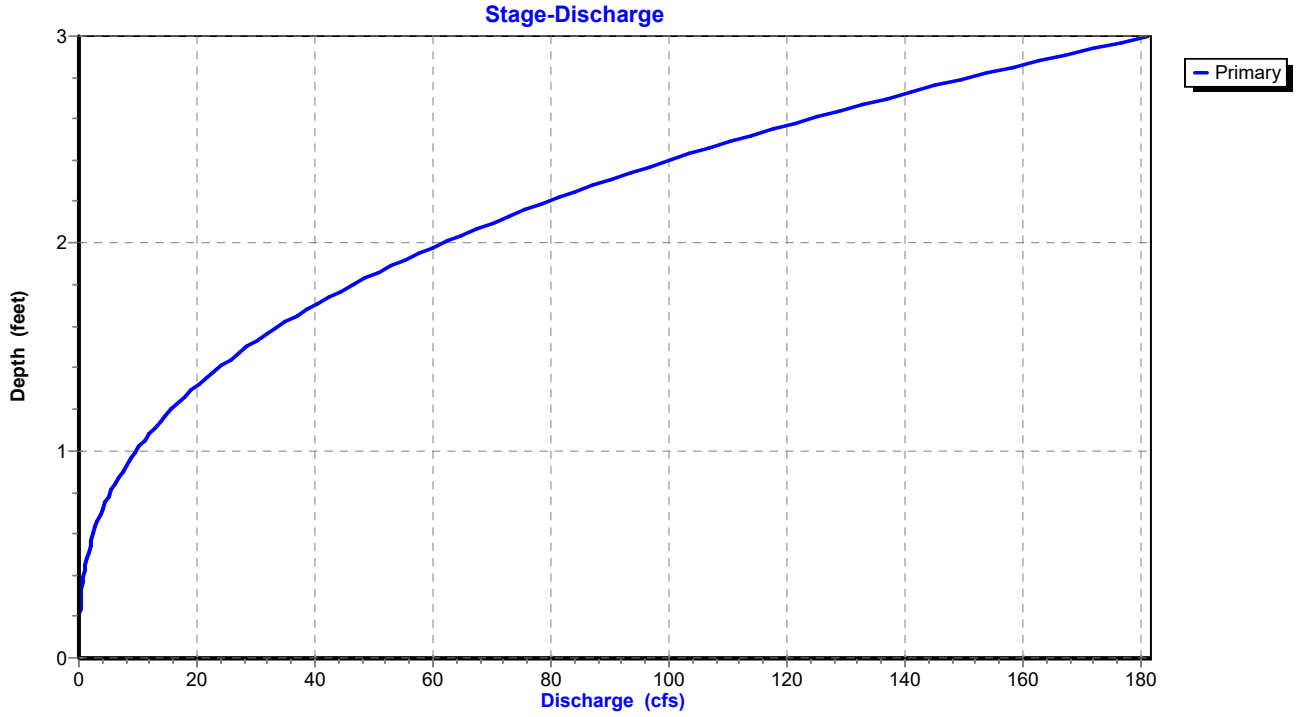
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MSE 24-hr 4 10-Yr Miami KS Rainfall=5.37"

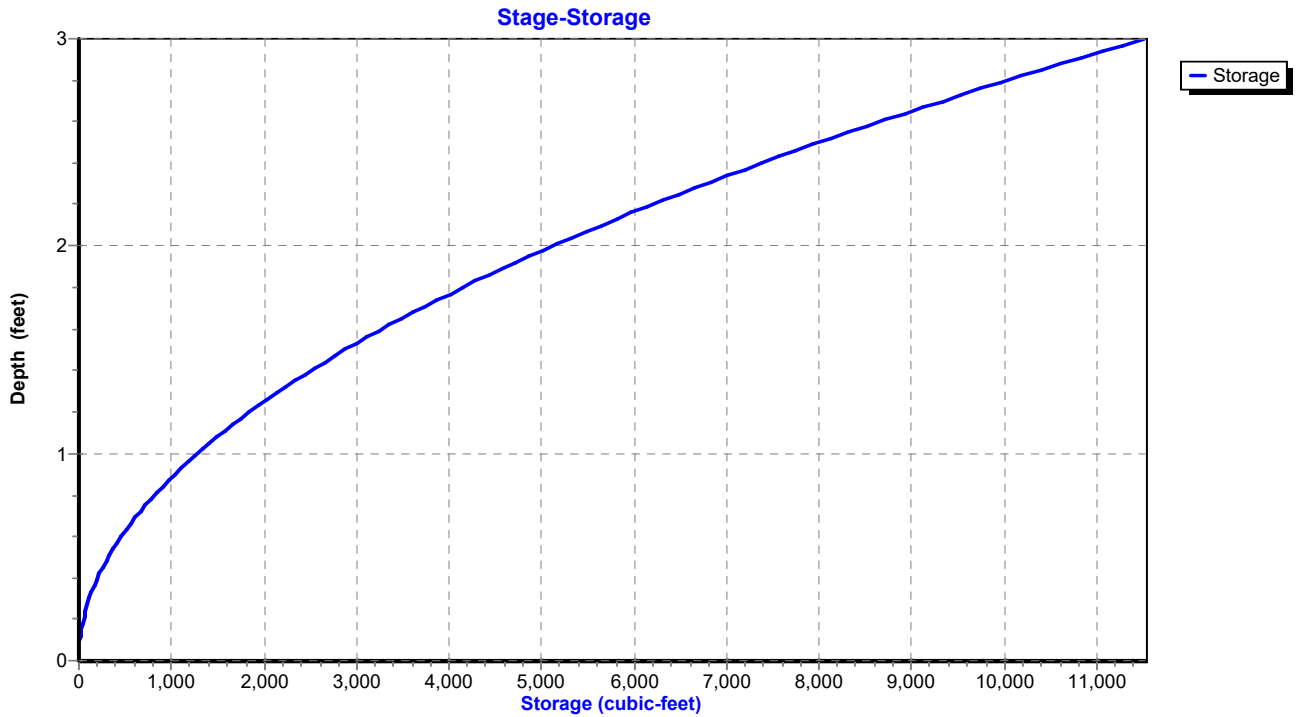
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Reach 10R: 223rd Ditch



Reach 10R: 223rd Ditch



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 Pond 11P: Wet Pond

Inflow Area = 46.000 ac, 3.91% 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	Custom Stage Data 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'	60.0" W x 15.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	964.00'	24.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#3	Secondary	966.00'	70.0' long x 15.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=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)

AF Prop w Det Condition

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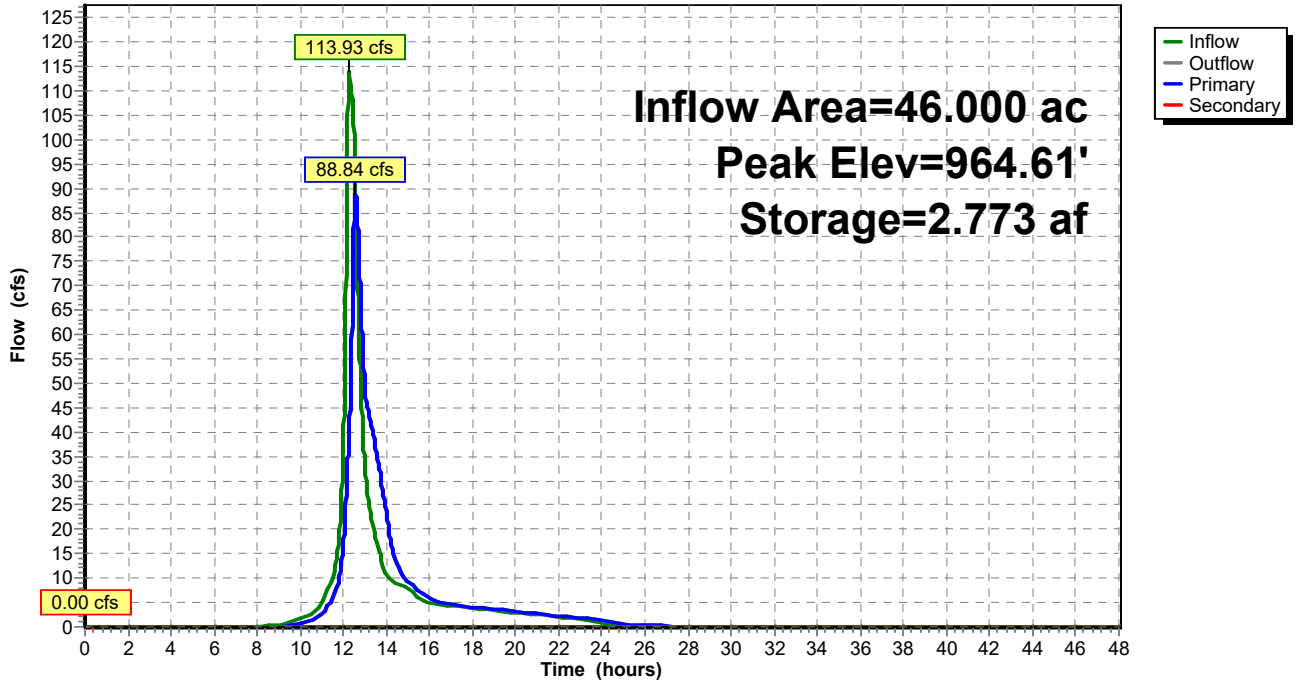
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MSE 24-hr 4 10-Yr Miami KS Rainfall=5.37"

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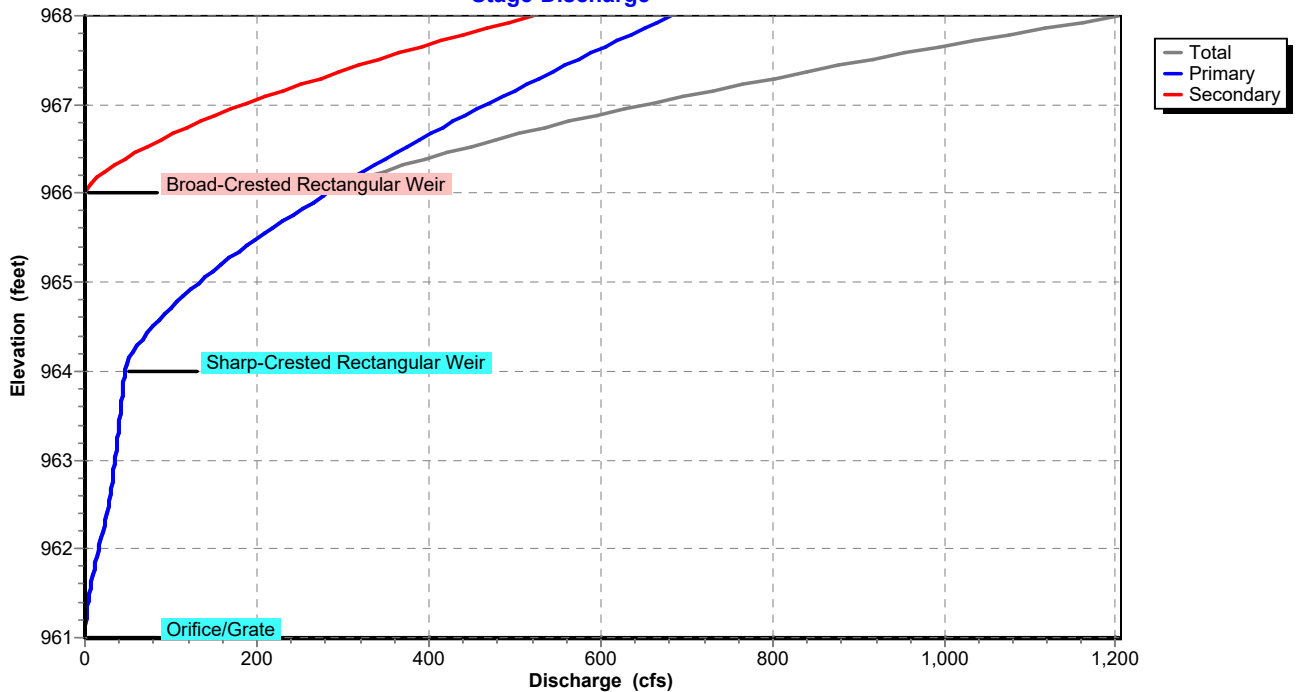
Pond 11P: Wet Pond

Hydrograph



Pond 11P: Wet Pond

Stage-Discharge



AF Prop w Det Condition

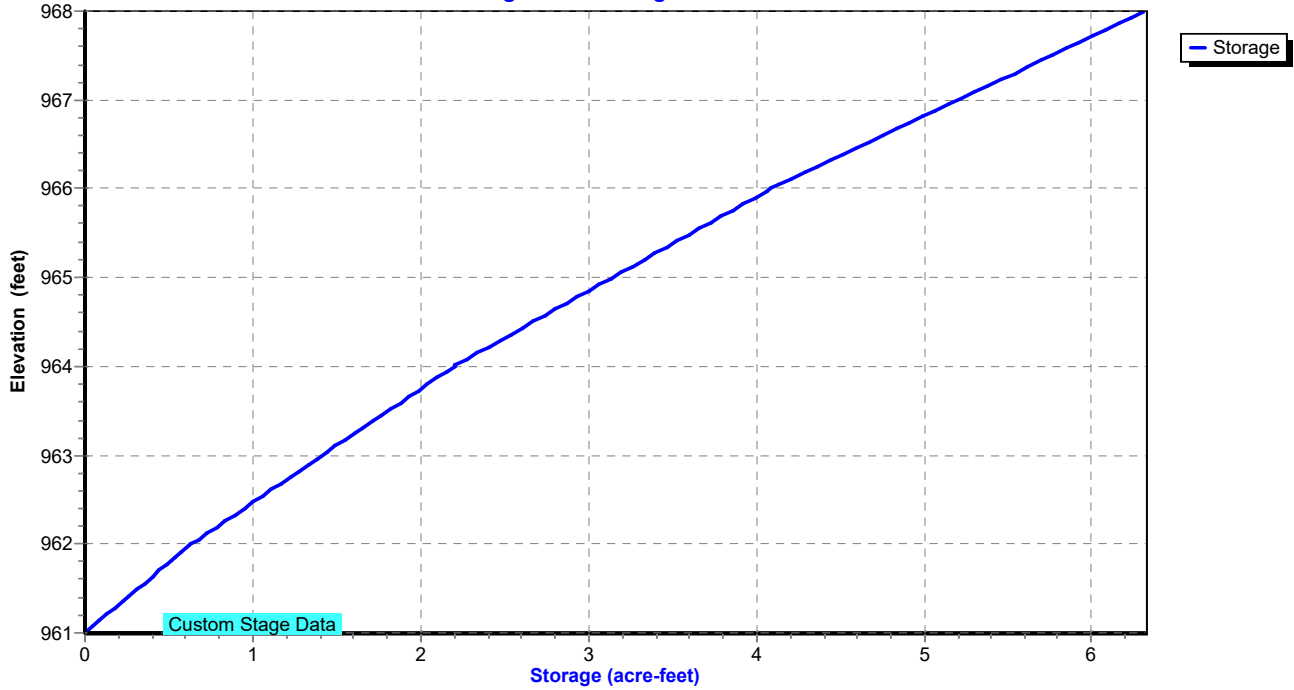
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Pond 11P: Wet Pond

Stage-Area-Storage



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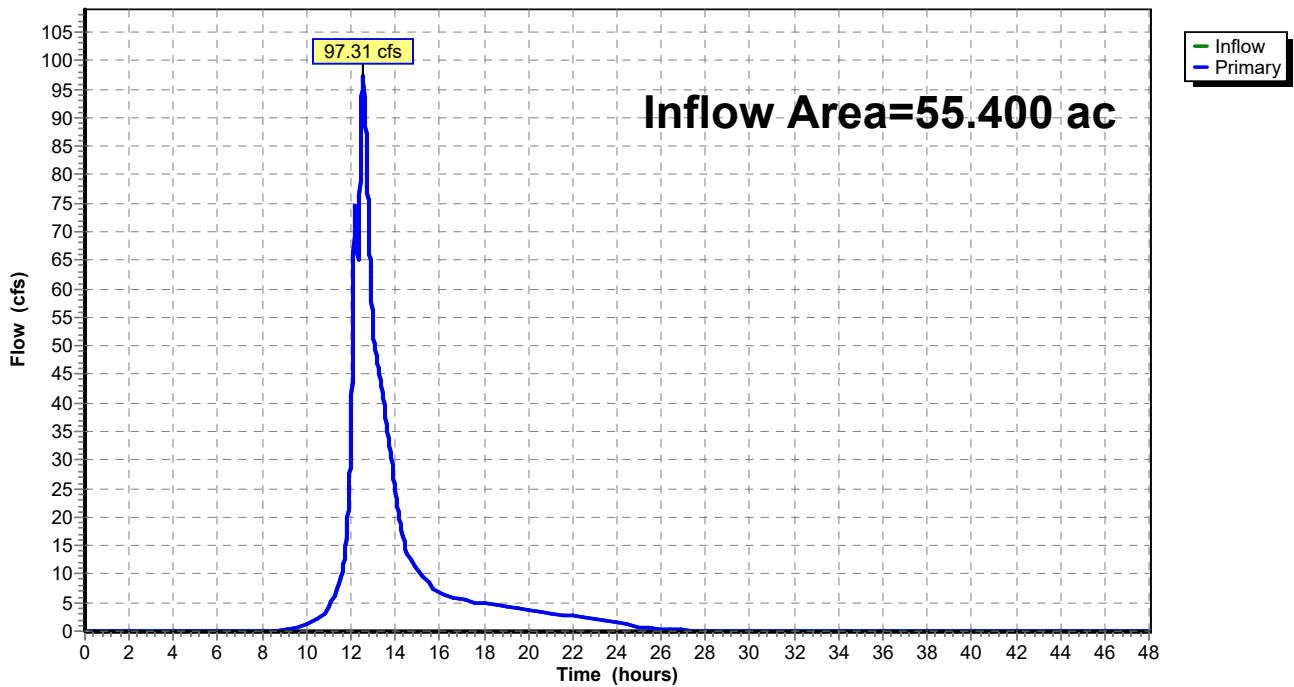
Summary for Link 2L: W Site Limit

Inflow Area = 55.400 ac, 5.42% 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



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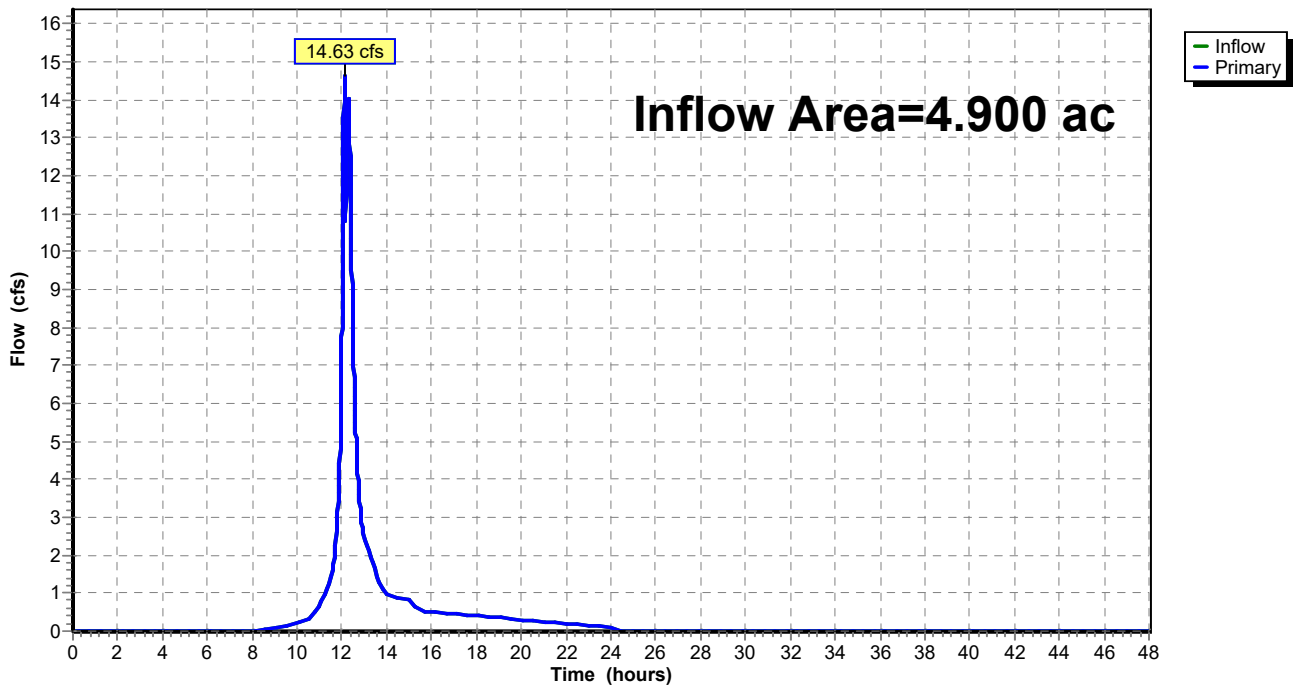
Summary for Link 3L: CMPA Site Limit

Inflow Area = 4.900 ac, 6.33% Impervious, Inflow Depth = 3.28" for 10-Yr Miami KS event
Inflow = 14.63 cfs @ 12.11 hrs, Volume= 1.340 af
Primary = 14.63 cfs @ 12.11 hrs, Volume= 1.340 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



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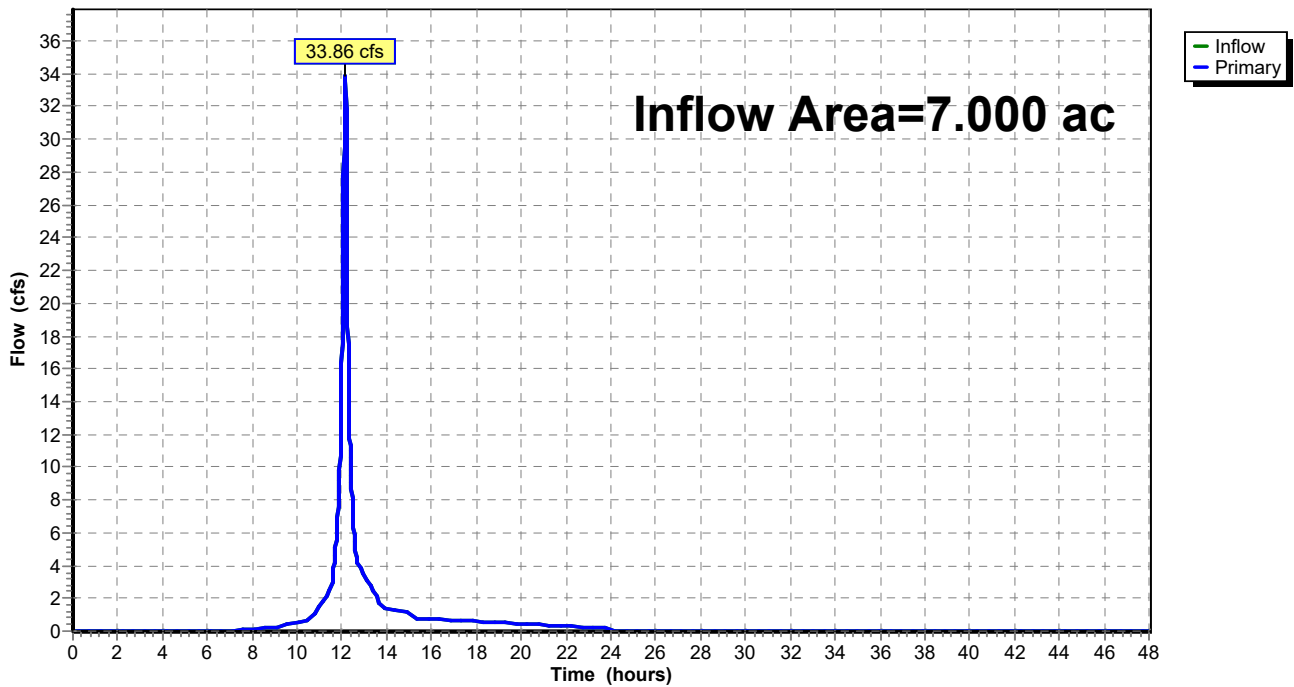
Summary for Link 4L: NW Site Limit

Inflow Area = 7.000 ac, 30.14% Impervious, Inflow Depth = 3.62" for 10-Yr Miami KS event
Inflow = 33.86 cfs @ 12.15 hrs, Volume= 2.109 af
Primary = 33.86 cfs @ 12.15 hrs, Volume= 2.109 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



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

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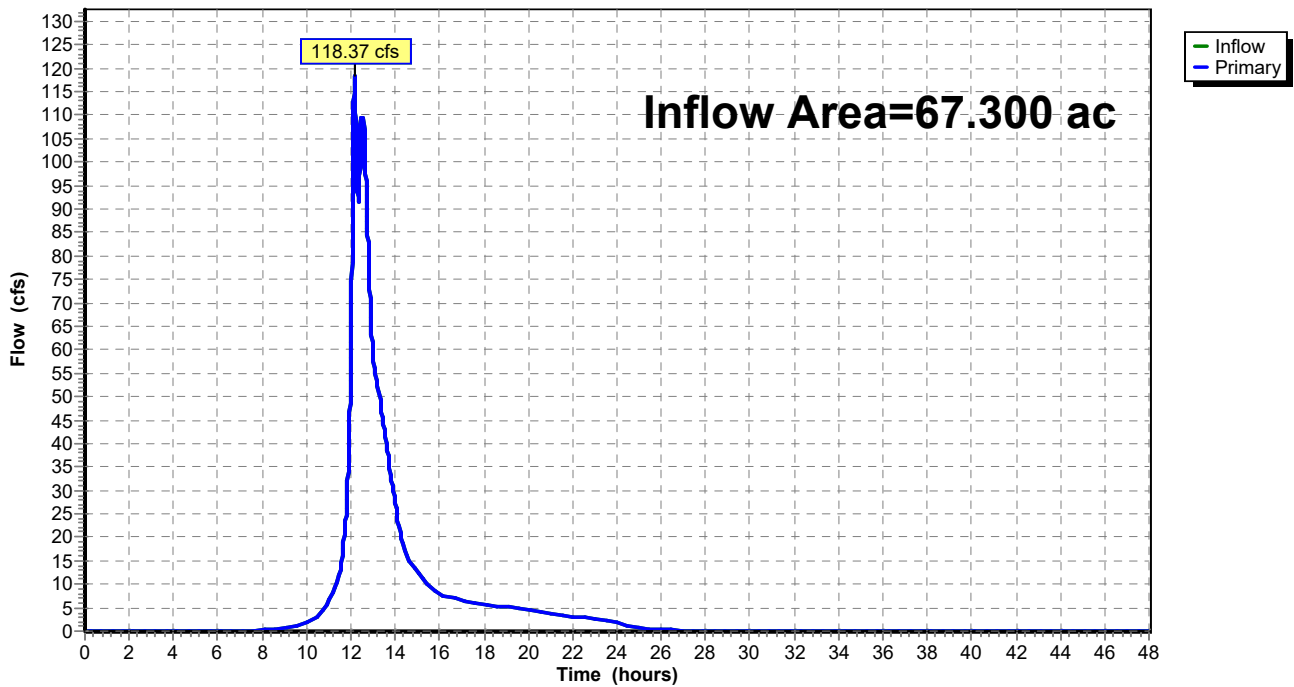
Summary for Link 6L: Off-Site Confluence

Inflow Area = 67.300 ac, 8.05% Impervious, Inflow Depth = 3.31" for 10-Yr Miami KS event
Inflow = 118.37 cfs @ 12.17 hrs, Volume= 18.554 af
Primary = 118.37 cfs @ 12.17 hrs, Volume= 18.554 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



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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"

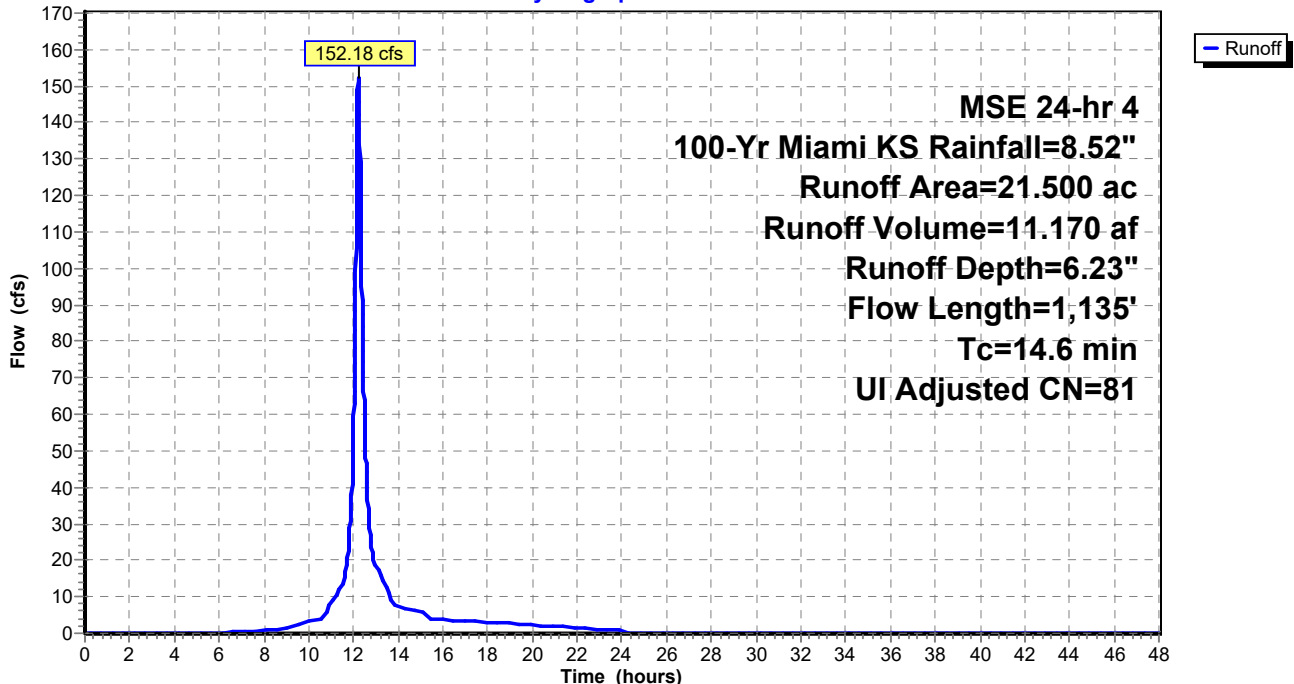
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-Yr Miami KS Rainfall=8.52"

Area (ac)	CN	Adj	Description
19.700	80		>75% Grass cover, Good, HSG D
1.800	98		Unconnected pavement, HSG D
21.500	82	81	Weighted Average, UI Adjusted
19.700			91.63% Pervious Area
1.800			8.37% Impervious Area
1.800			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	100	0.0400	0.24		Sheet Flow, Sheet Grass: Short n= 0.150 P2= 3.60"
7.2	745	0.0600	1.71		Shallow Concentrated Flow, Shallow Short Grass Pasture Kv= 7.0 fps
0.4	290	0.0300	12.05	783.31	Trap/Vee/Rect Channel Flow, Channel 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"

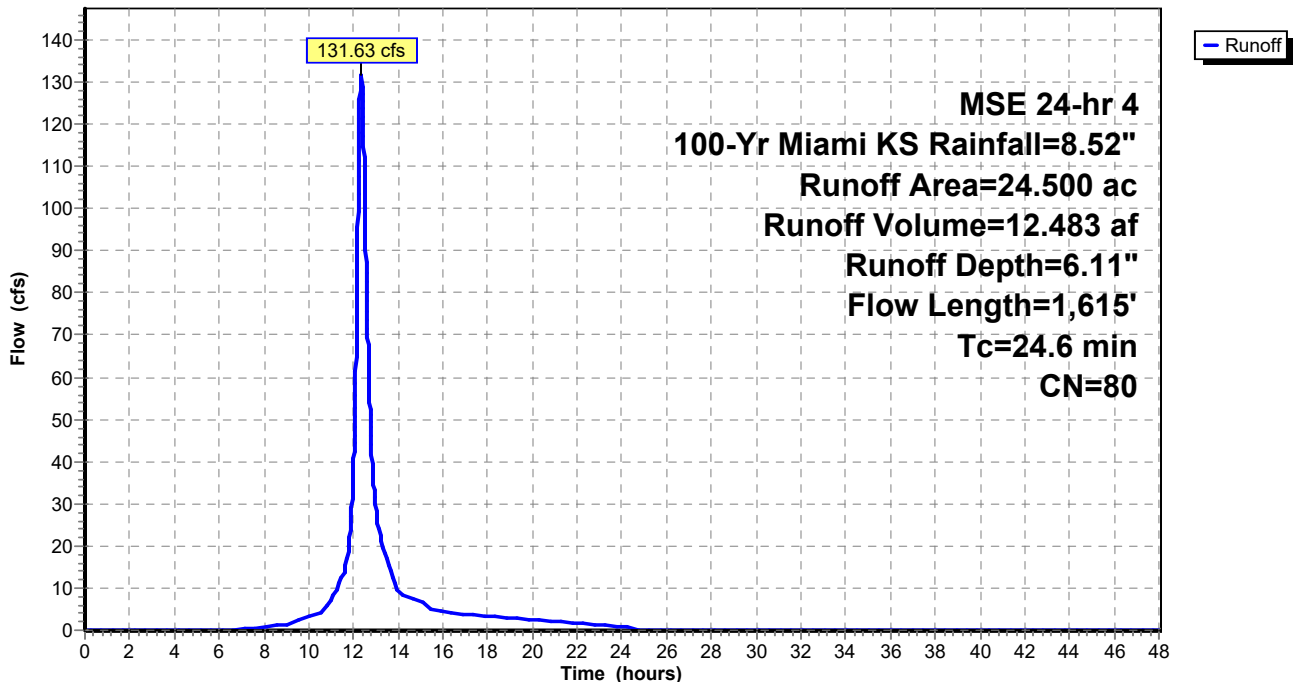
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-Yr Miami KS Rainfall=8.52"

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		Sheet Flow, Sheet Grass: Short n= 0.150 P2= 3.60"
14.6	1,060	0.0300	1.21		Shallow Concentrated Flow, Shallow Short Grass Pasture Kv= 7.0 fps
1.1	455		7.00		Direct Entry, LxV 1
24.6	1,615	Total			

Subcatchment 3S: E Off-Site

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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 = 17.41 cfs @ 12.10 hrs, Volume= 0.847 af, Depth= 6.35"

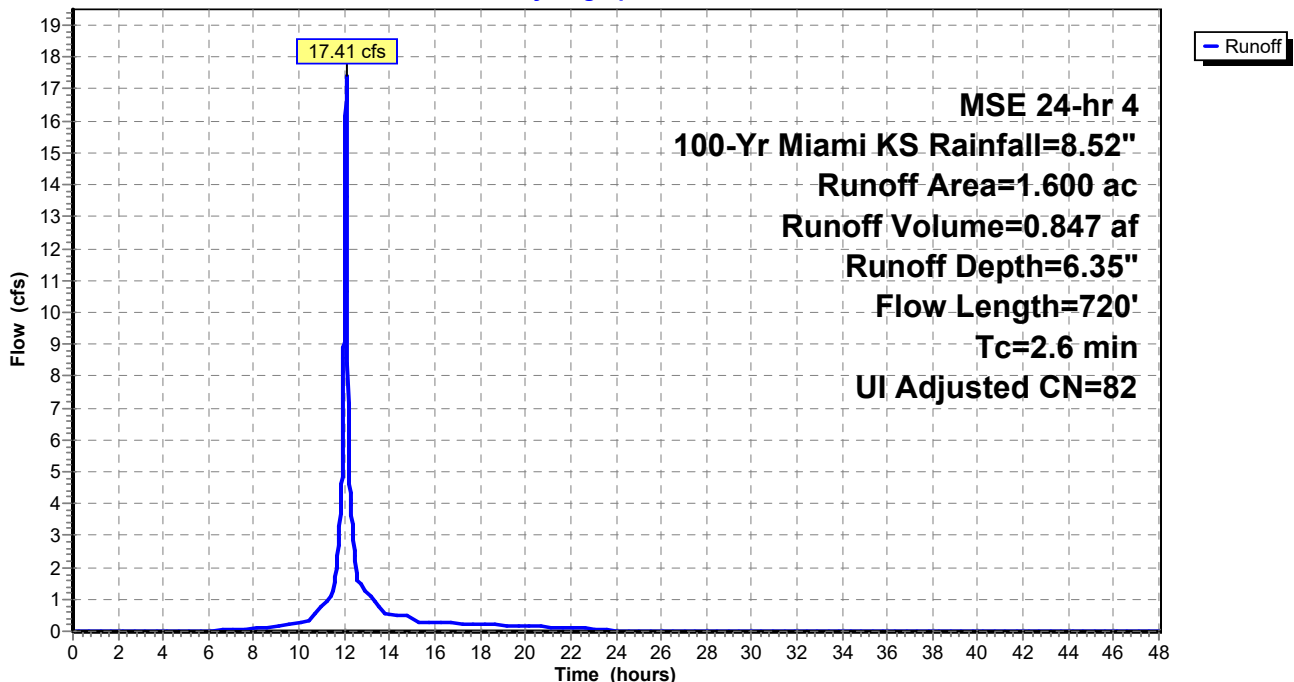
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-Yr Miami KS Rainfall=8.52"

Area (ac)	CN	Adj	Description
1.290	80		>75% Grass cover, Good, HSG D
0.310	98		Unconnected pavement, HSG D
1.600	83	82	Weighted Average, UI Adjusted
1.290			80.63% Pervious Area
0.310			19.38% Impervious Area
0.310			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	100	0.0300	1.72		Sheet Flow, Sheet Smooth surfaces n= 0.011 P2= 3.60"
1.0	240	0.0400	4.06		Shallow Concentrated Flow, Shallow Paved Kv= 20.3 fps
0.6	380	0.0280	10.08	181.48	Trap/Vee/Rect Channel Flow, Ditch 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 = 57.56 cfs @ 12.15 hrs, Volume= 3.399 af, Depth= 6.48"

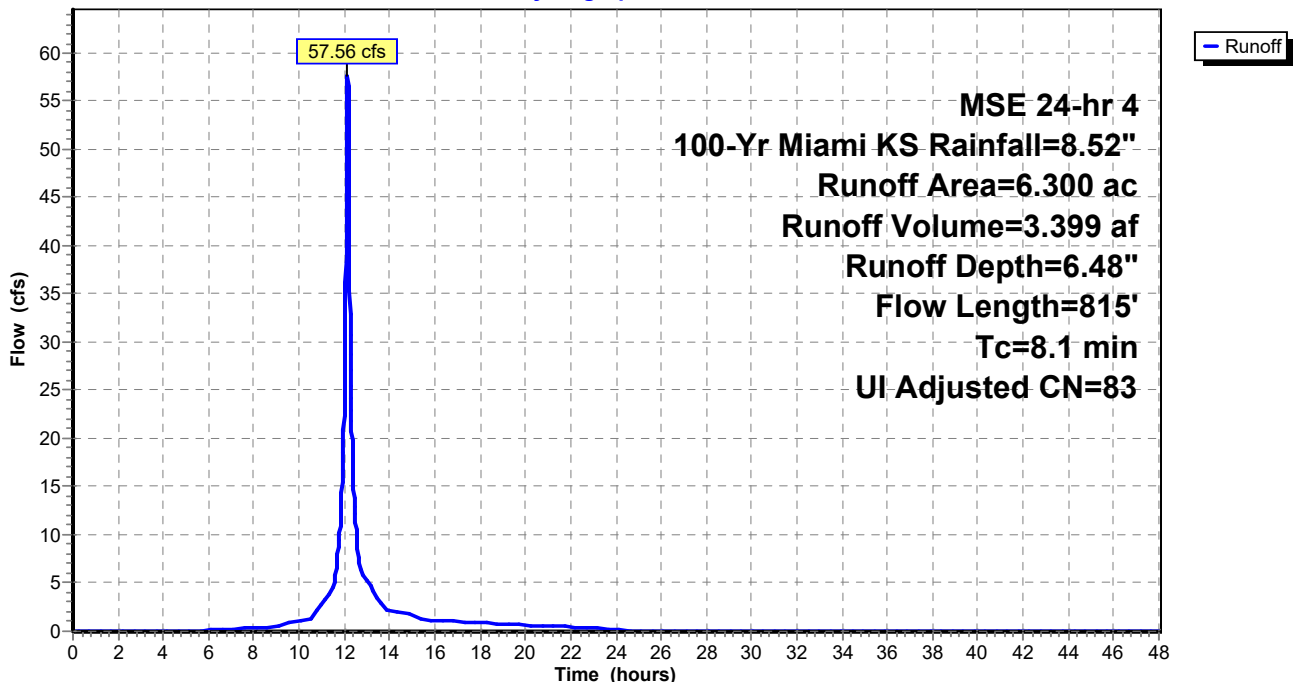
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-Yr Miami KS Rainfall=8.52"

Area (ac)	CN	Adj	Description
1.760	98		Unconnected pavement, HSG D
4.540	80		>75% Grass cover, Good, HSG D
6.300	85	83	Weighted Average, UI Adjusted
4.540			72.06% Pervious Area
1.760			27.94% Impervious Area
1.760			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	100	0.0500	0.26		Sheet Flow, Sheet Grass: Short n= 0.150 P2= 3.60"
0.8	125	0.1500	2.71		Shallow Concentrated Flow, Shallow Short Grass Pasture Kv= 7.0 fps
0.9	590	0.0320	10.78	194.02	Trap/Vee/Rect Channel Flow, Ditch 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 4 100-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"

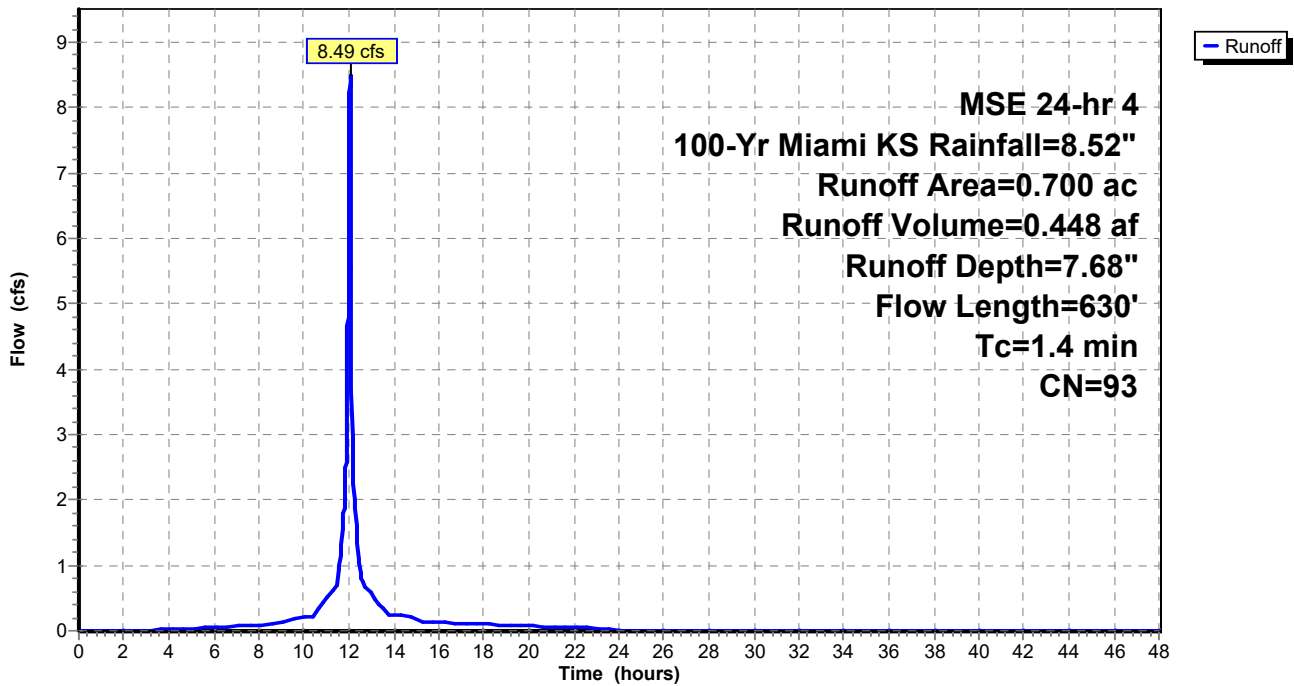
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-Yr Miami KS Rainfall=8.52"

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		Sheet Flow, Sheet Smooth surfaces n= 0.011 P2= 3.60"
0.9	590	0.0320	10.78	194.02	Trap/Vee/Rect Channel Flow, Ditch 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"

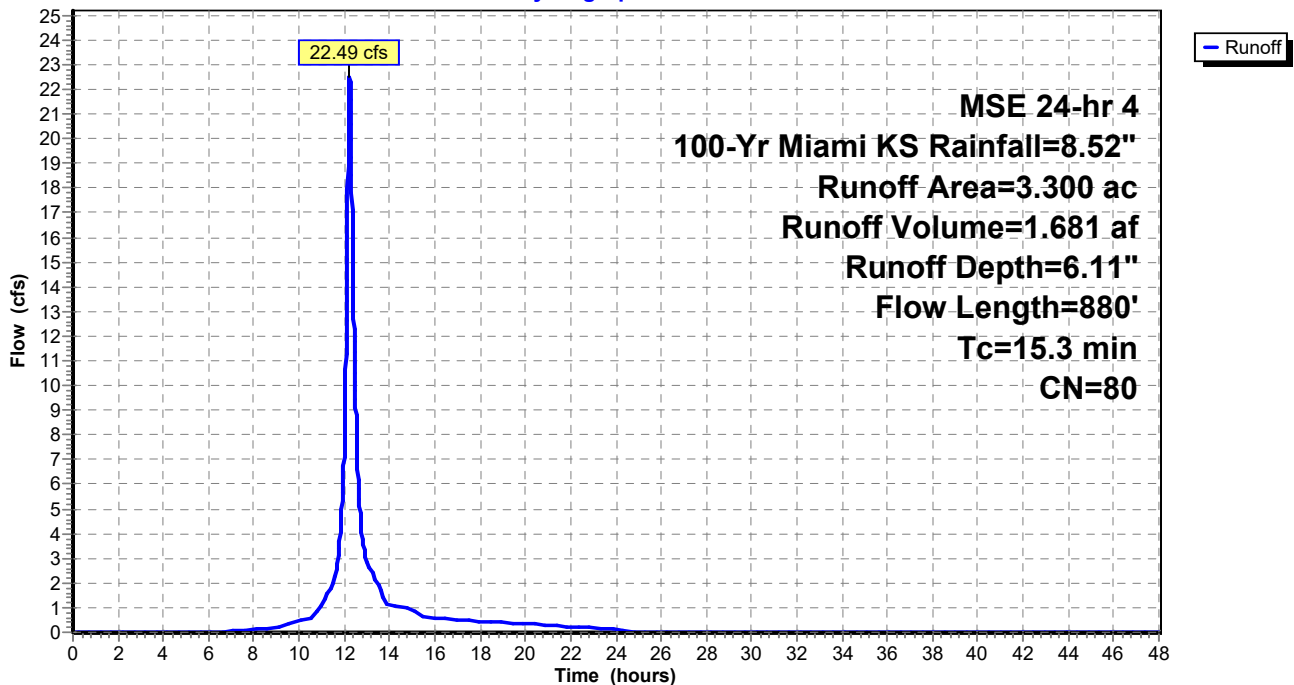
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-Yr Miami KS Rainfall=8.52"

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		Sheet Flow, Sheet Grass: Short n= 0.150 P2= 3.60"
5.5	350	0.0230	1.06		Shallow Concentrated Flow, Shallow Short Grass Pasture Kv= 7.0 fps
0.6	430	0.0370	11.59	208.62	Trap/Vee/Rect Channel Flow, Ditch 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



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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"

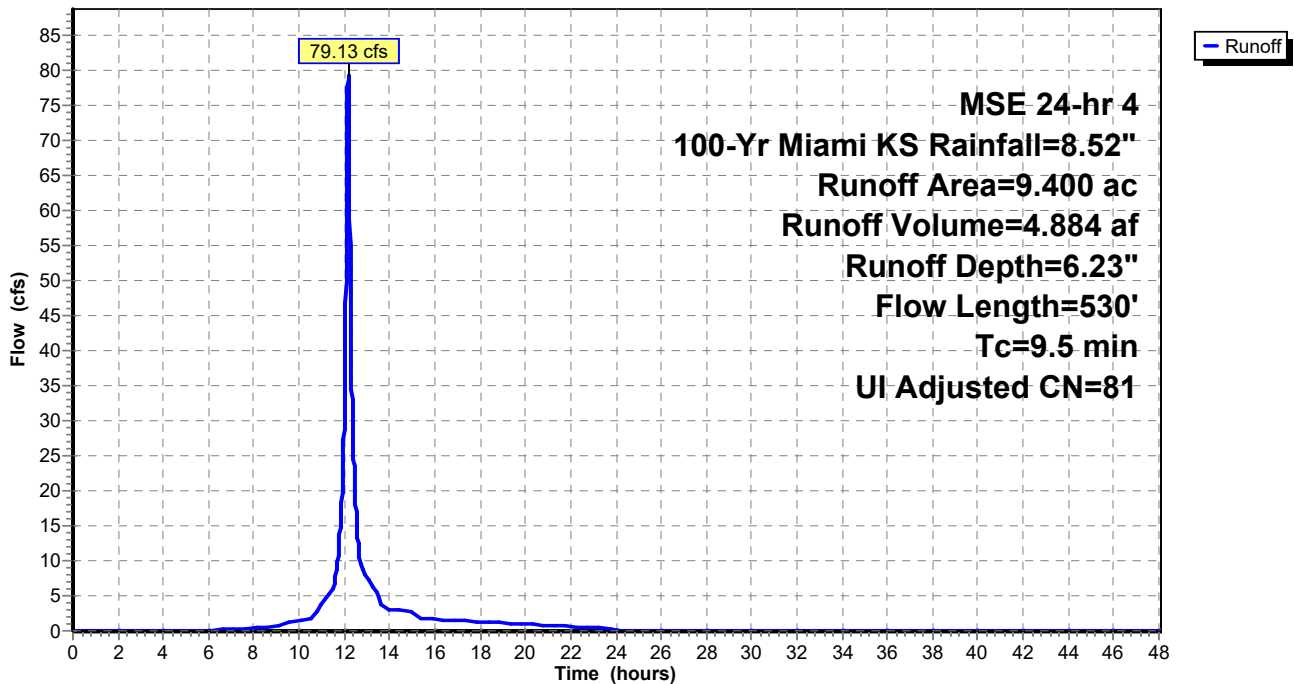
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100-Yr Miami KS Rainfall=8.52"

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		Sheet Flow, Sheet Grass: Short n= 0.150 P2= 3.60"
3.0	430	0.1200	2.42		Shallow Concentrated Flow, Shallow 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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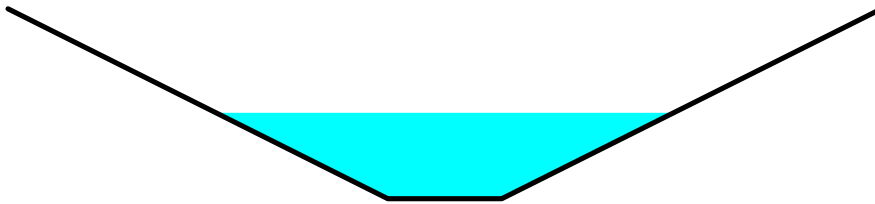
Summary for Reach 9R: Site Stream

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

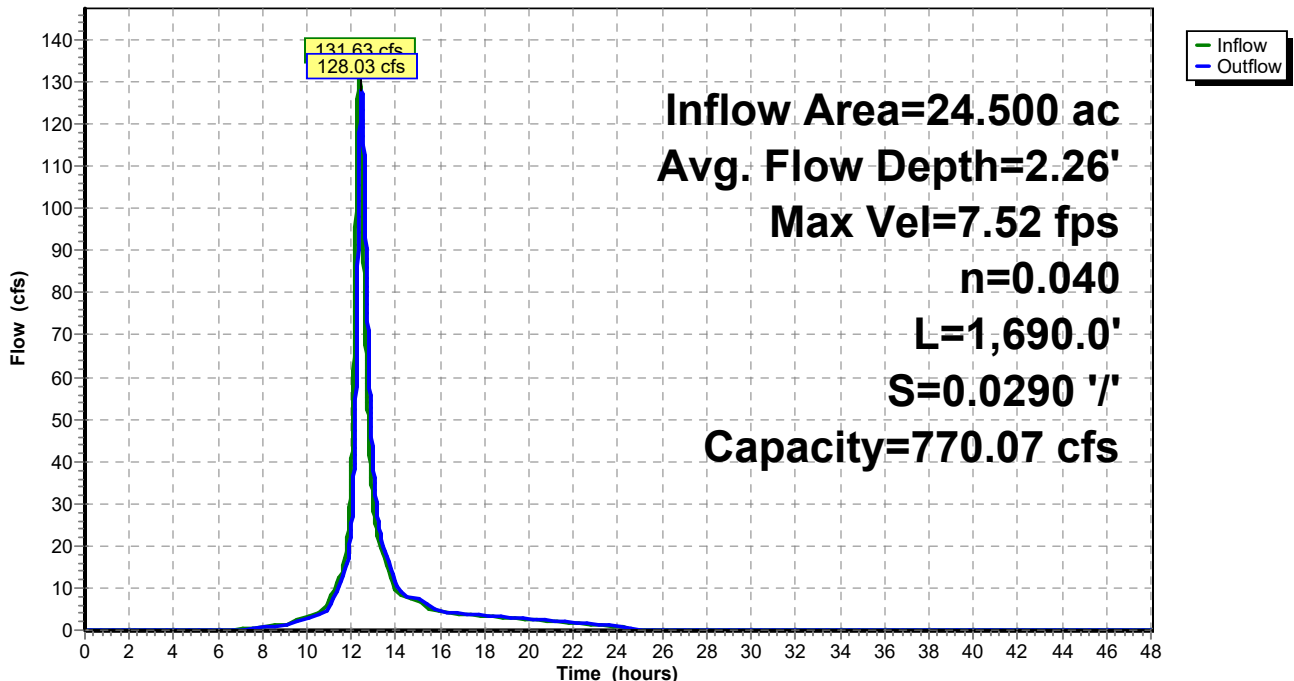
Peak Storage= 28,758 cf @ 12.39 hrs
Average Depth at Peak Storage= 2.26' , Surface Width= 12.05'
Bank-Full Depth= 5.00' Flow Area= 65.0 sf, Capacity= 770.07 cfs

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



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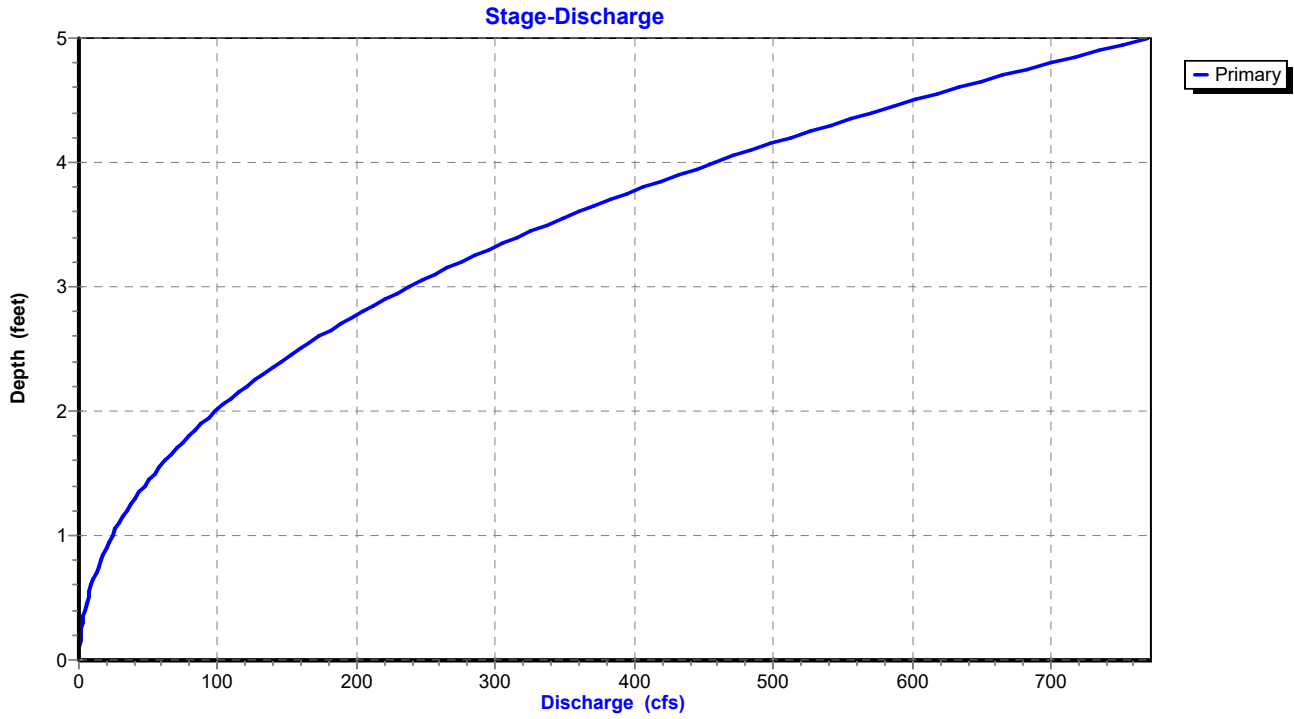
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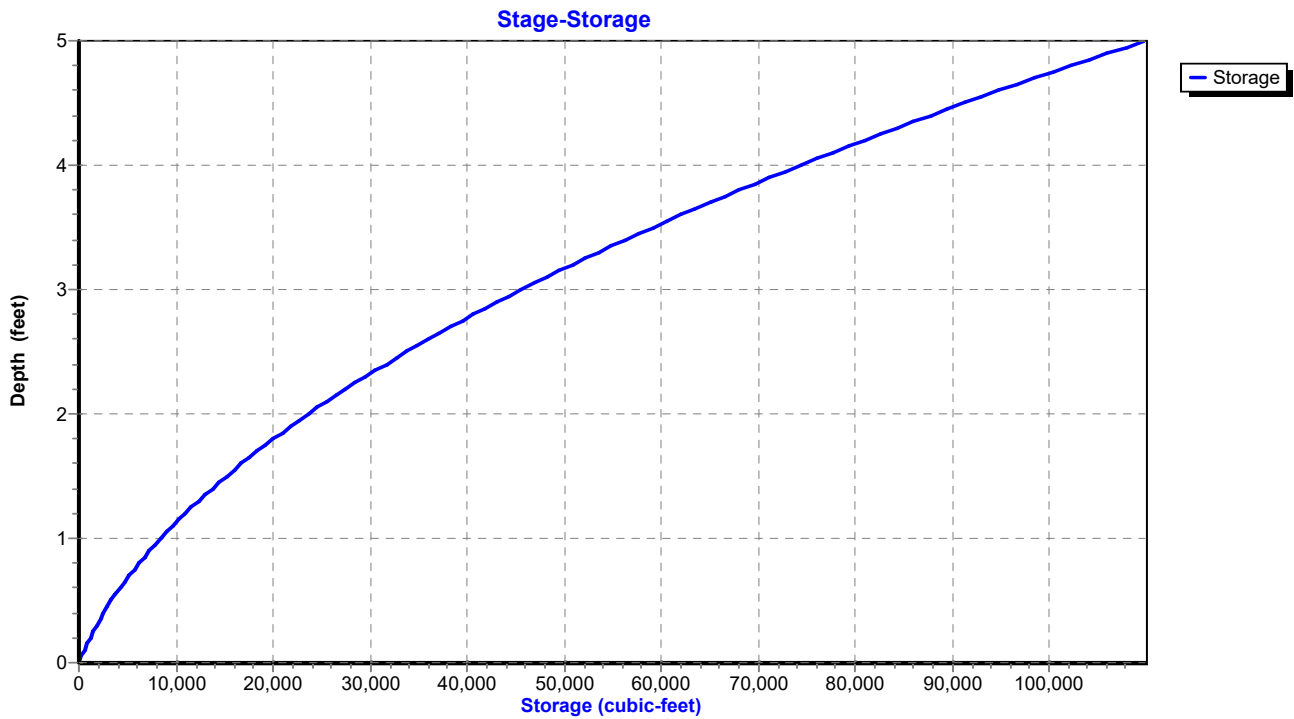
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Reach 9R: Site Stream



Reach 9R: Site Stream



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

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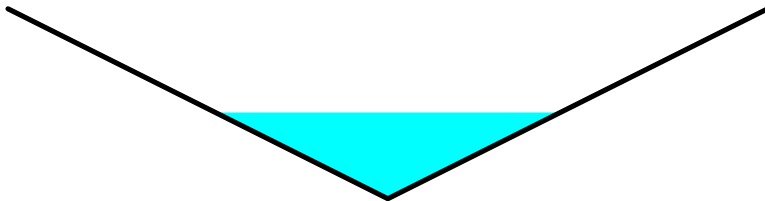
Summary for Reach 10R: 223rd Ditch

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

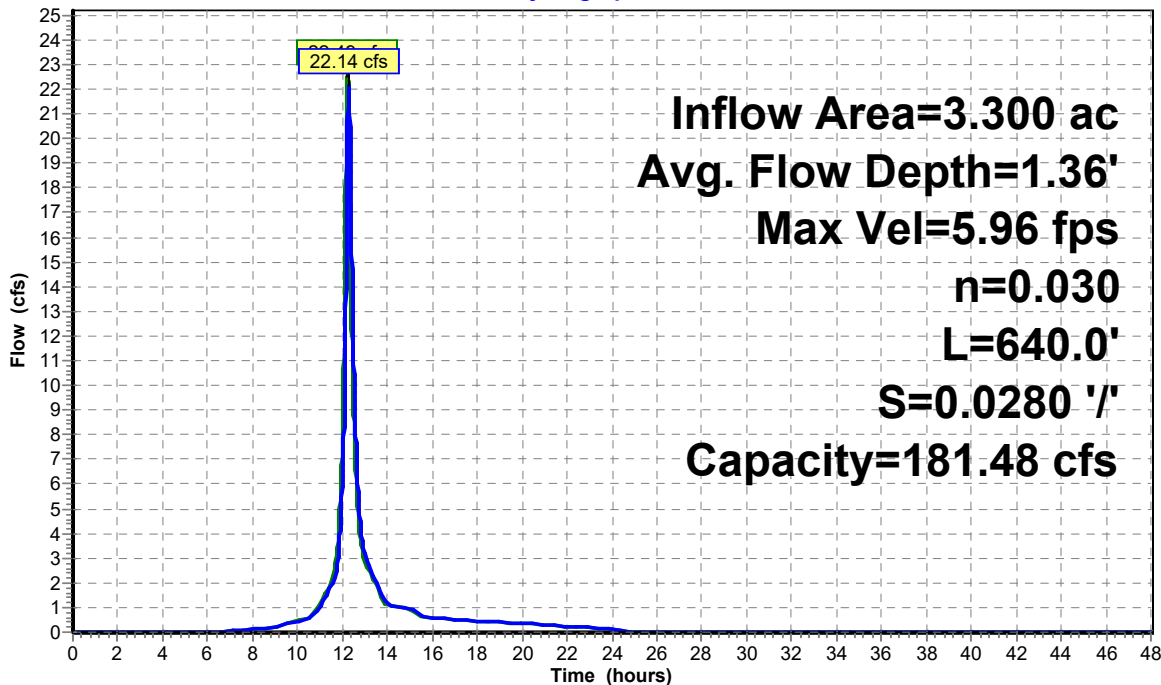
Peak Storage= 2,378 cf @ 12.26 hrs
Average Depth at Peak Storage= 1.36' , Surface Width= 5.45'
Bank-Full Depth= 3.00' Flow Area= 18.0 sf, Capacity= 181.48 cfs

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



AF Prop w Det Condition

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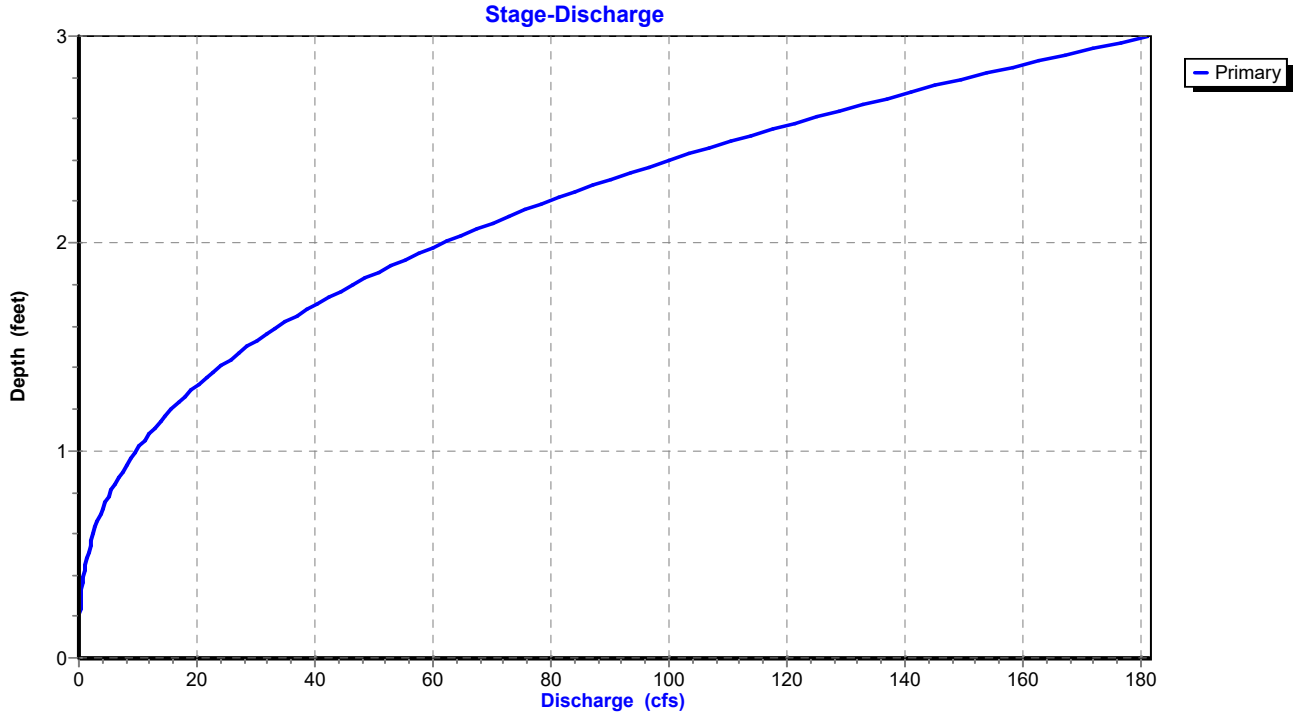
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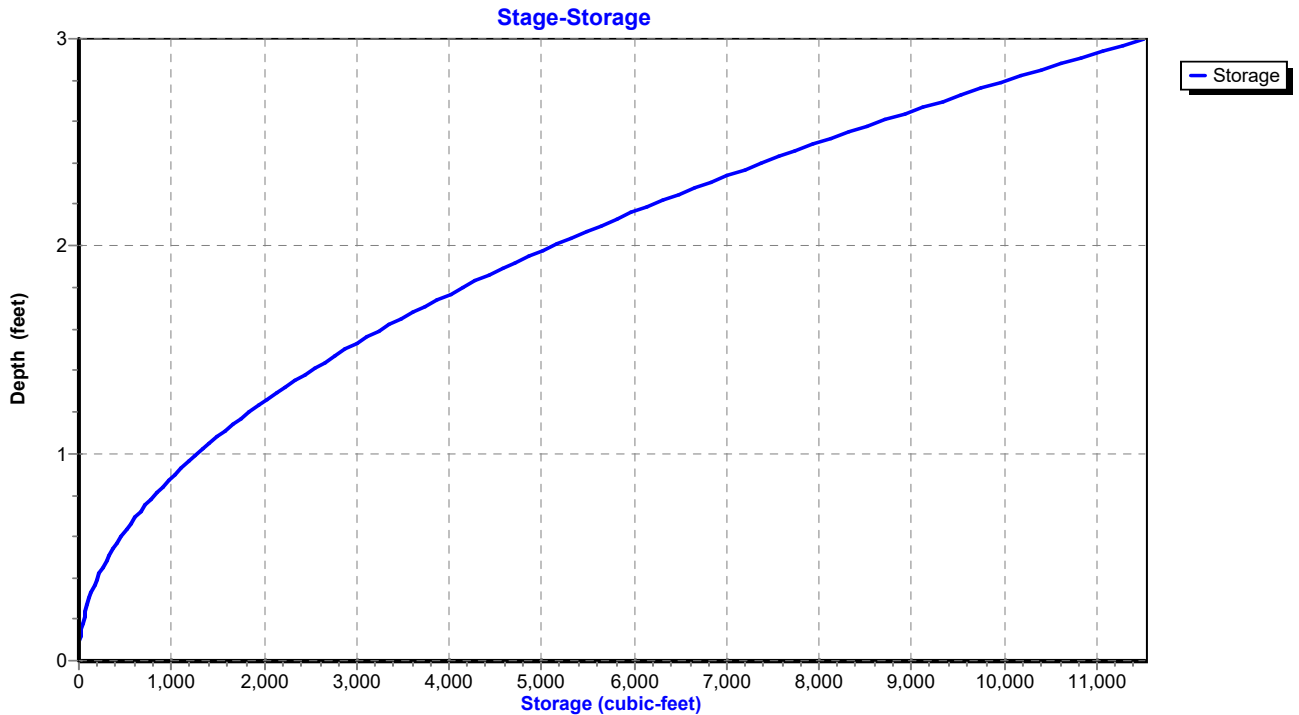
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Reach 10R: 223rd Ditch



Reach 10R: 223rd Ditch



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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, 3.91% 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	Custom Stage Data 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'	60.0" W x 15.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	964.00'	24.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#3	Secondary	966.00'	70.0' long x 15.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=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)

AF Prop w Det Condition

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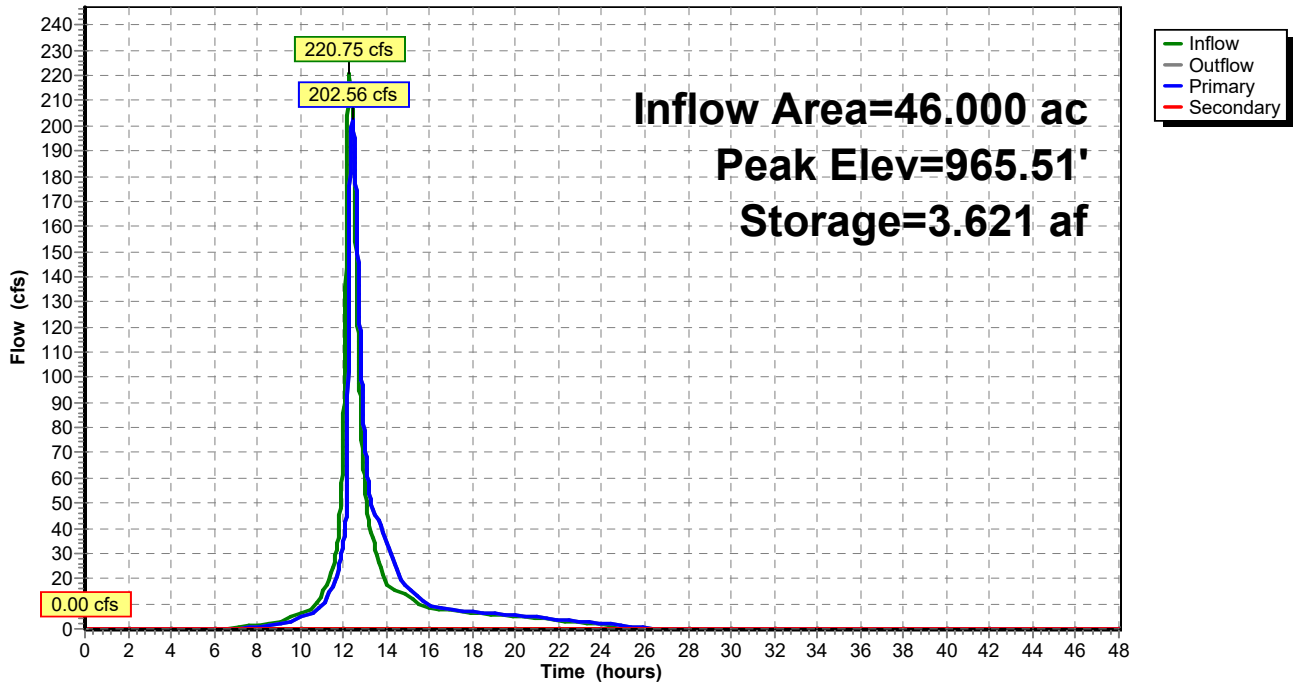
Always & Forever
MSE 24-hr 4 100-Yr Miami KS Rainfall=8.52"

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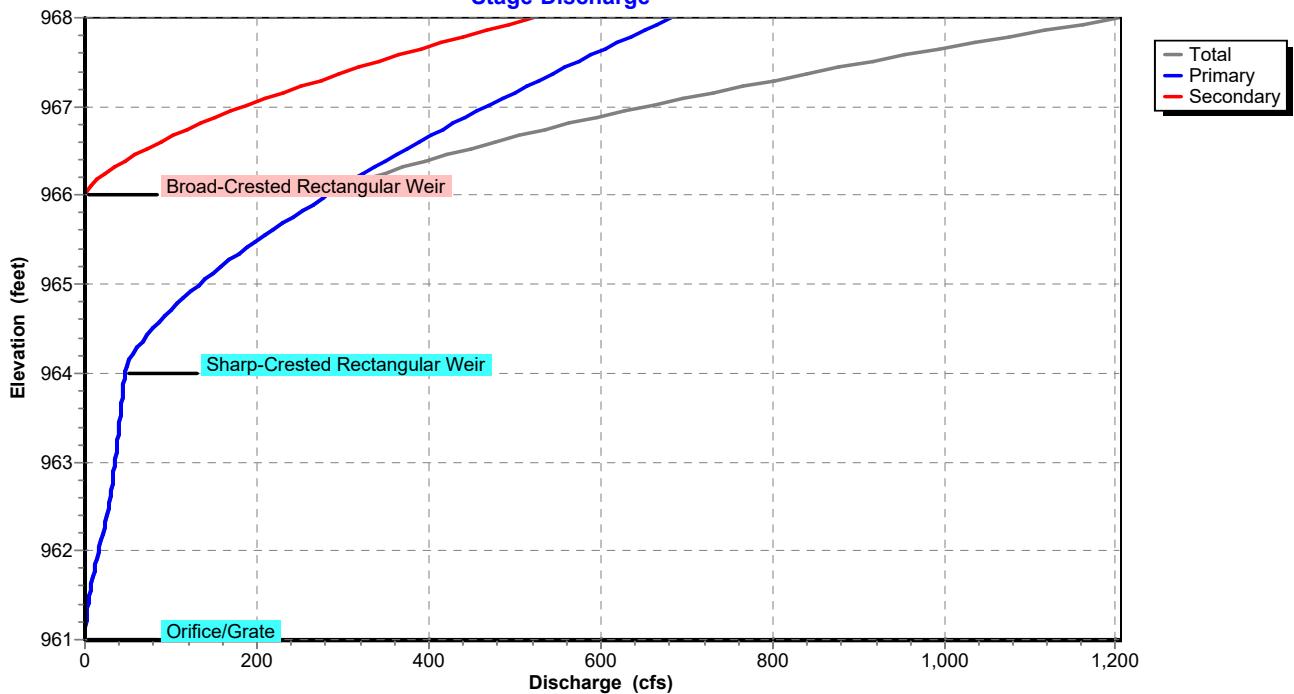
Pond 11P: Wet Pond

Hydrograph



Pond 11P: Wet Pond

Stage-Discharge



AF Prop w Det Condition

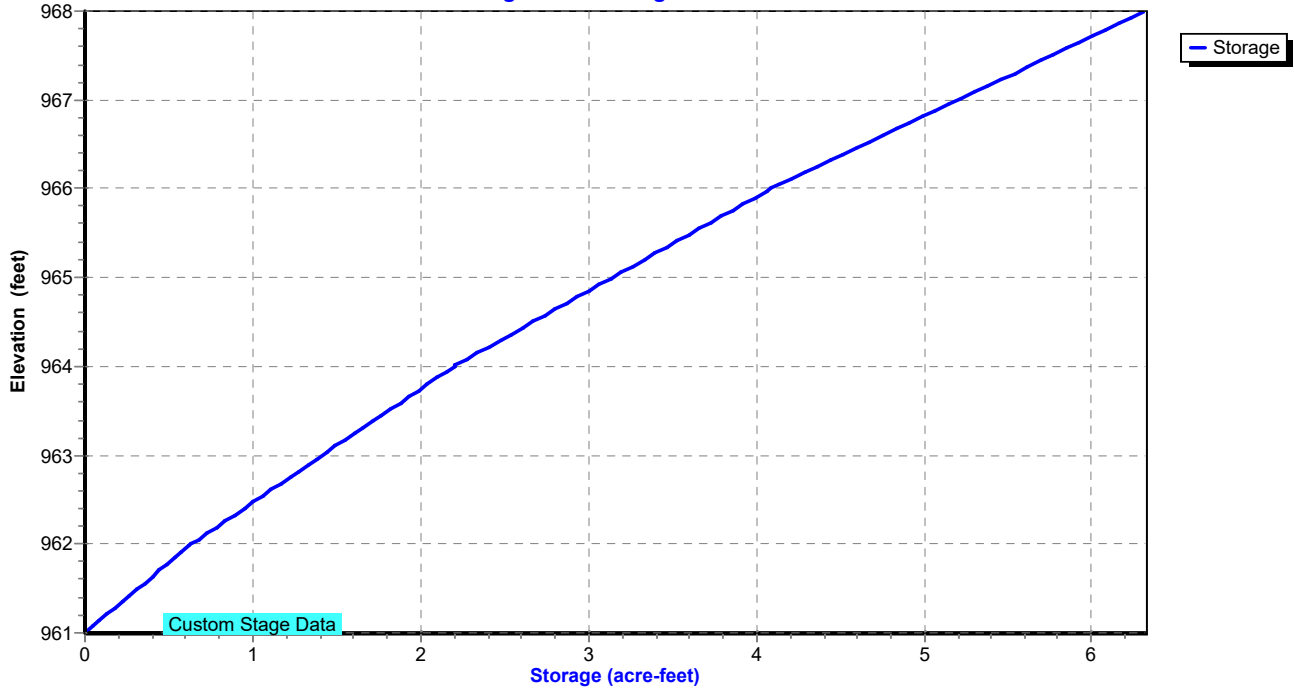
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Pond 11P: Wet Pond

Stage-Area-Storage



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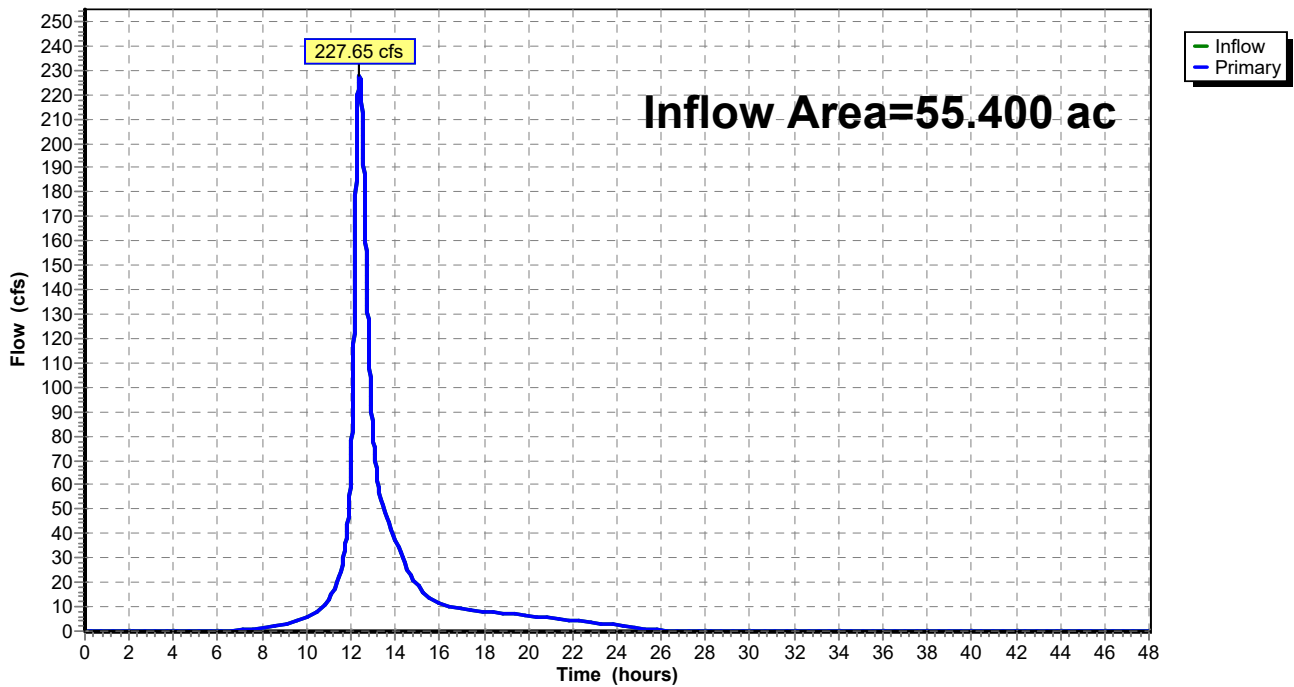
Summary for Link 2L: W Site Limit

Inflow Area = 55.400 ac, 5.42% 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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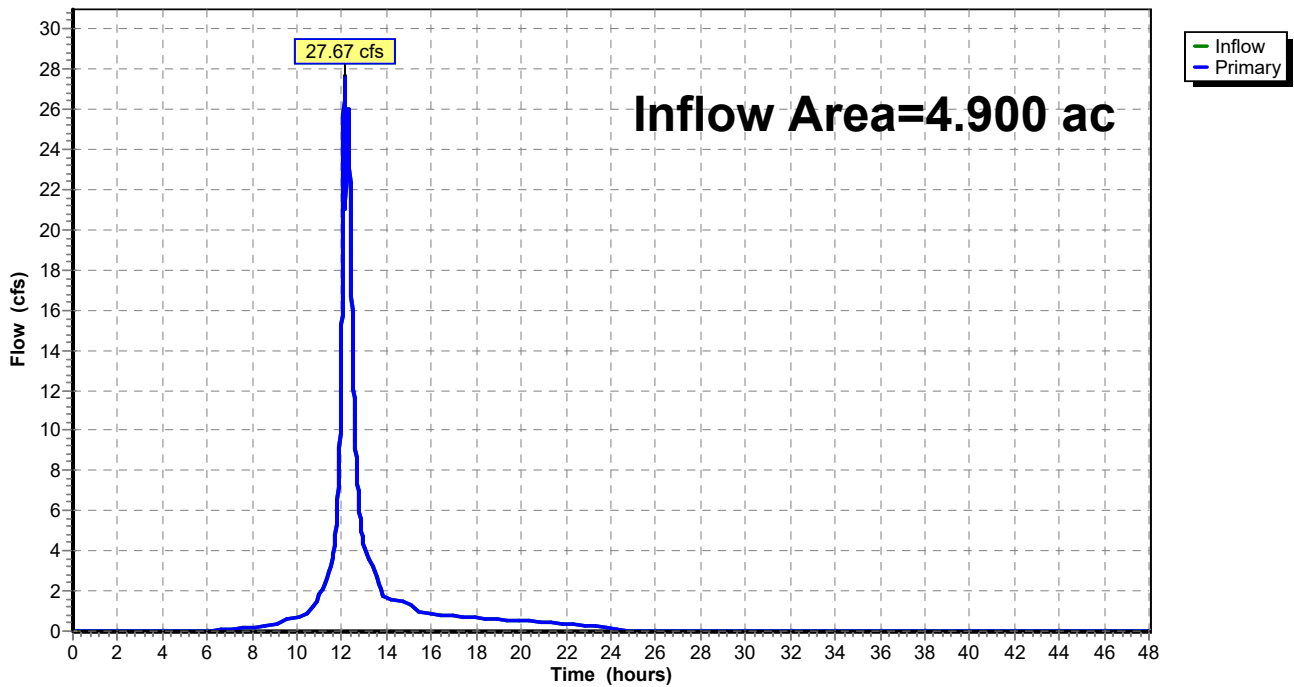
Summary for Link 3L: CMPA Site Limit

Inflow Area = 4.900 ac, 6.33% Impervious, Inflow Depth = 6.19" for 100-Yr Miami KS event
Inflow = 27.67 cfs @ 12.11 hrs, Volume= 2.529 af
Primary = 27.67 cfs @ 12.11 hrs, Volume= 2.529 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



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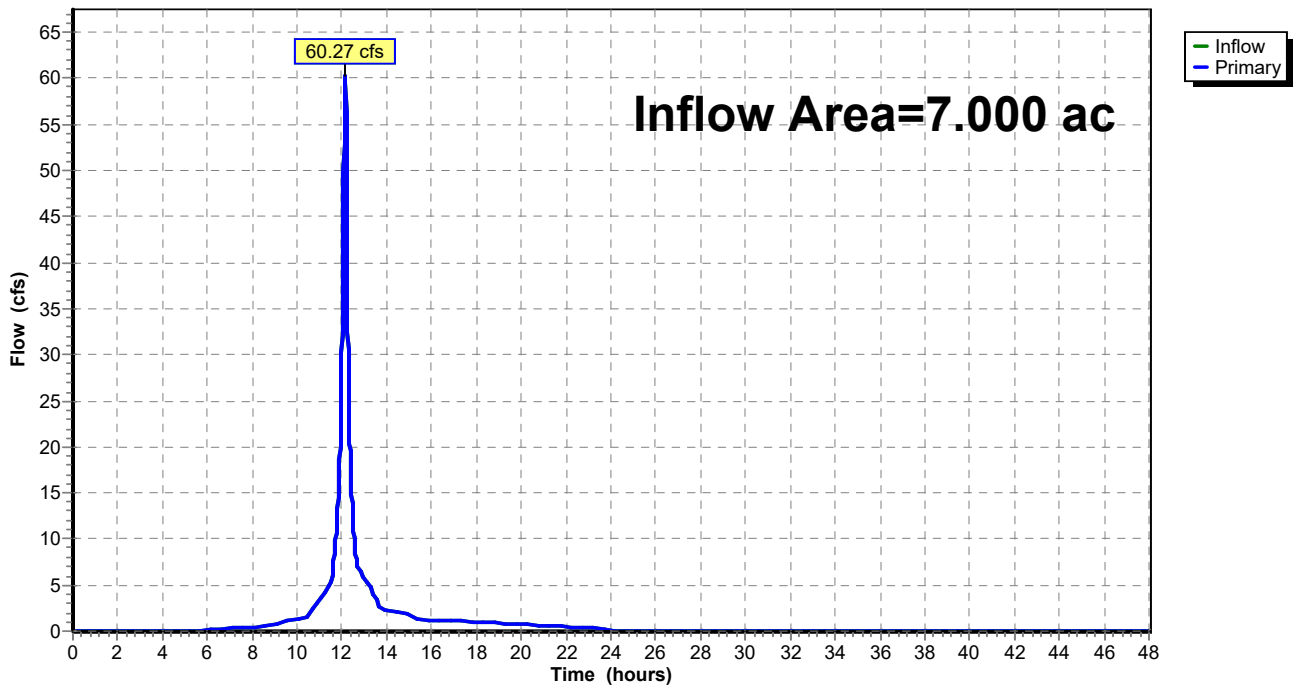
Summary for Link 4L: NW Site Limit

Inflow Area = 7.000 ac, 30.14% Impervious, Inflow Depth = 6.60" for 100-Yr Miami KS event
Inflow = 60.27 cfs @ 12.15 hrs, Volume= 3.847 af
Primary = 60.27 cfs @ 12.15 hrs, Volume= 3.847 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



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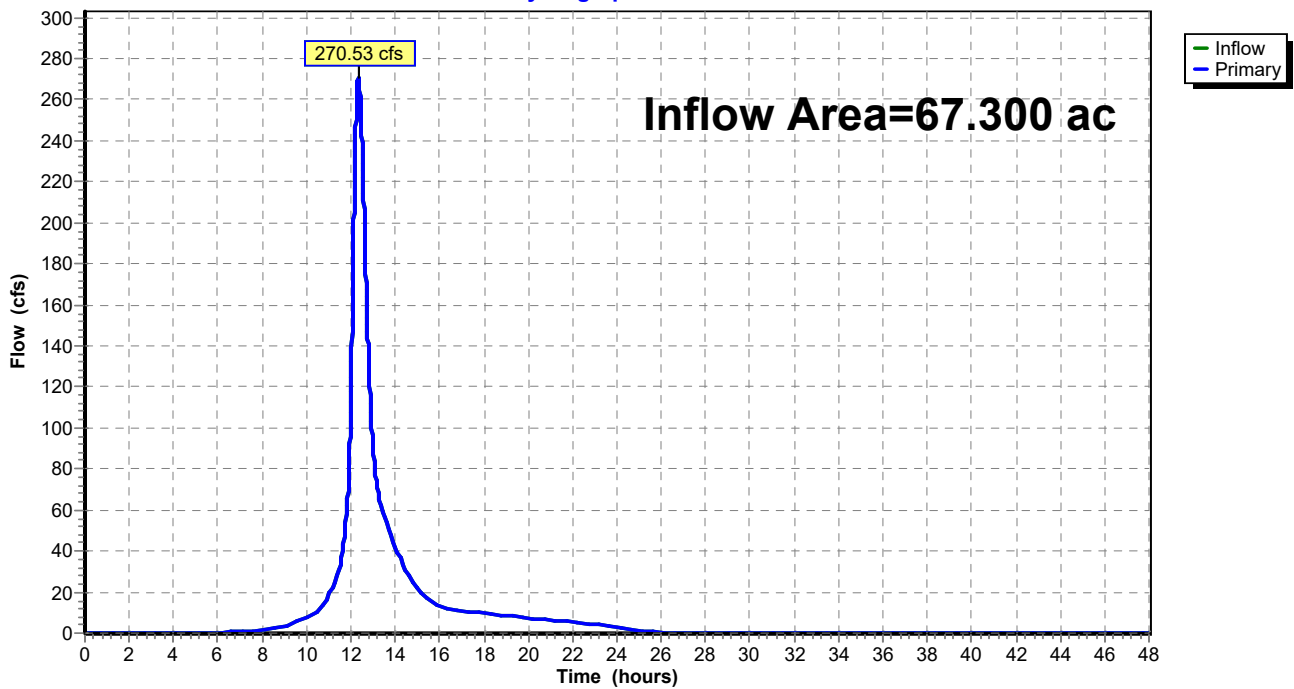
Summary for Link 6L: Off-Site Confluence

Inflow Area = 67.300 ac, 8.05% Impervious, Inflow Depth = 6.23" for 100-Yr Miami KS event
Inflow = 270.53 cfs @ 12.33 hrs, Volume= 34.913 af
Primary = 270.53 cfs @ 12.33 hrs, Volume= 34.913 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



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Always & Furever

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AF Prop w Det Condition

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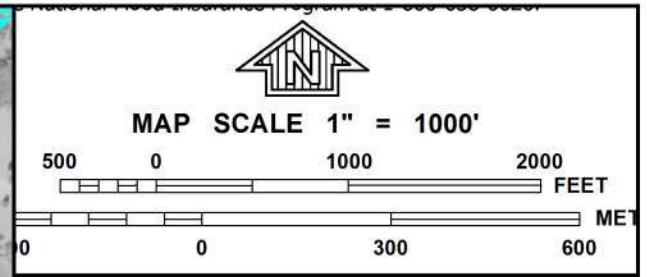
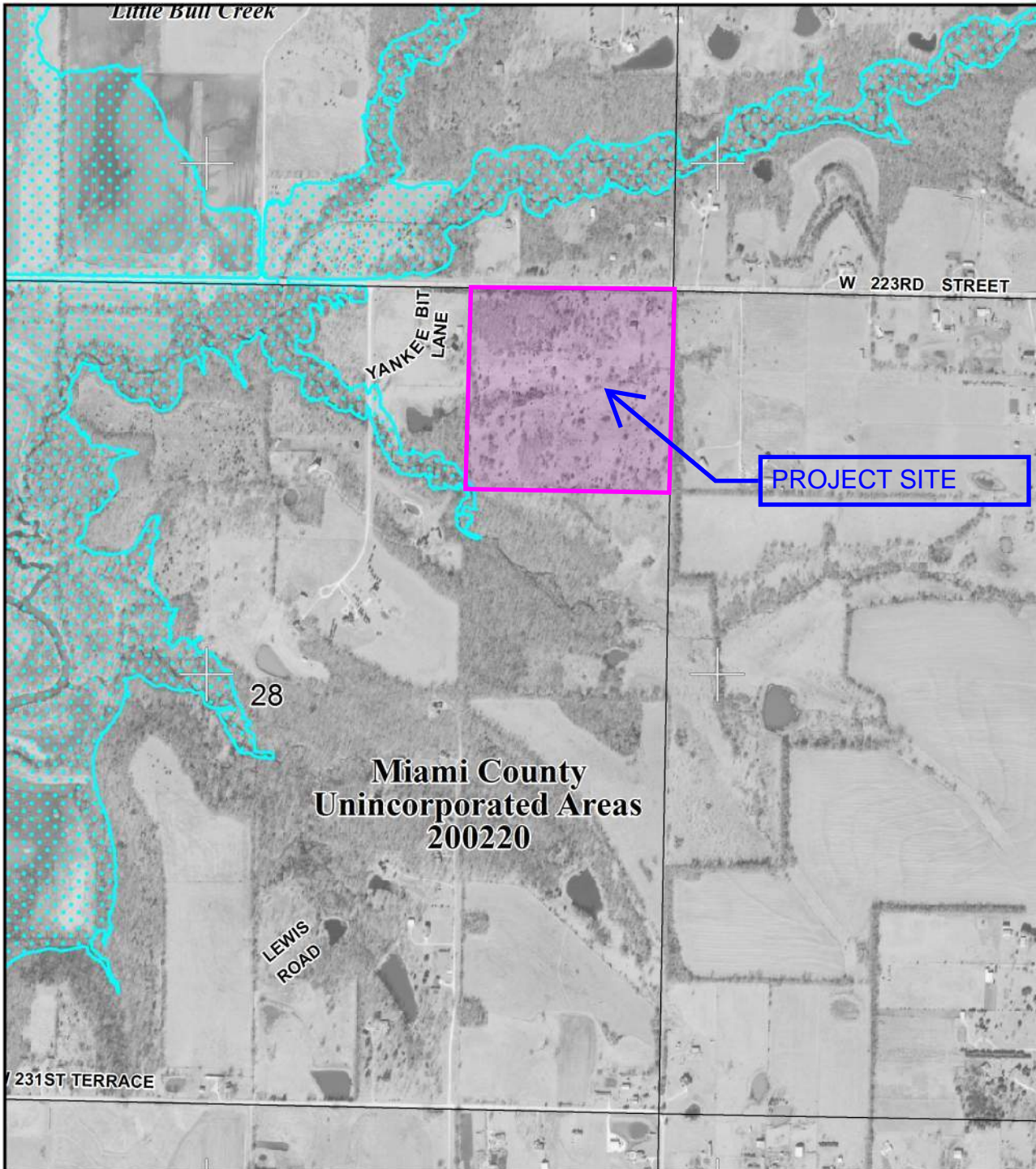
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Appendix G

Flood Map



NATIONAL FLOOD INSURANCE PROGRAM

NTIP

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:

<u>COMMUNITY</u>	<u>NUMBER</u>	<u>PANEL</u>	<u>SUFFIX</u>
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 on 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>.

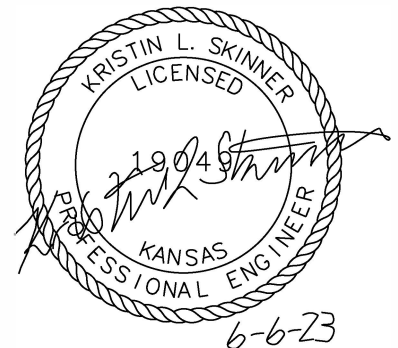
Received
06/22/2023

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

June 6, 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





June 6, 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 223rd Street in Miami County, Kansas. The site is to be located on 40 acres to the east of 23595 West 223rd 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 223rd Street. W 223rd 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 223rd 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 12th, 2022 for a period of 24 hours at the intersection of W 223rd Street with Yankee Bit Lane. The daily traffic on W 223rd 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 animal sanctuary is now expected to be constructed in a single phase with all buildings to be located in the northern half of the property. The site will include three small dog villas, four barns, and the Homestead Health Clinic, which will not be open to the public. The villas and barns are expected to have a maximum capacity of 120 dogs and 40 cats and will include a building dedicated to house up to use as the Miami County Animal Shelter.

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.

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.

Table 1: Trip Generation - Proposed Site (Provided by Always & Furever)										
<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	104	6	5	1	10	6	4	8	4	4
Total	104	6	5	1	10	6	4	8	4	4

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.

Table 2: Trip Generation - Existing Sites											
<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
Total	8700 SF	89	8	6	2	3	3	1	10	6	4

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, 11th 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 223rd 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. These volumes are shown in Table 3 below.

Table 3: Trip Generation - Unrealistically Conservative								
Land Use	Intensity	Daily	AM Peak			PM Peak		
			Total	In	Out	Total	In	Out
Red Barns, Dog Villas, & Miami County Shelter	30,750 SF	315	28	21	7	35	21	14
Veterinary Hospital	6,000 SF	129	22	15	7	22	9	13
Total		444	50	36	14	57	30	27

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 223rd 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 223rd 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 223rd 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.

Table 4: Level of Service Definitions		
Level of Service	Unsignalized Intersection	Signalized Intersection
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 223rd 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 223rd 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 223rd Street as an Arterial roadway with 120’ right-of-way width and a driveway separation of 500’. Along the south side of West 223rd Street, the main entrance into the Always & Furever 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 223rd Street. W 223rd 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.

KDOT Access Management Policy Table 4-27 (50-mph speed)				
Opposing Volume V_o (vph)	Advancing Volume V_a (vph)			
	5% Left Turns	10% Left Turns	20% Left Turns	30% Left Turns
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

Table 5: Left Turn Lane Warrant			
Scenario	V_o	V_a	% Left Turns
Proposed AM Peak Hour	99	61	8%
Proposed Noon Peak Hour	49	47	11%
Proposed PM Peak Hour	93	85	5%
Unrealistically Conservative AM Peak Hour	102	88	36%
Unrealistically Conservative PM Peak Hour	96	125	25%

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 223rd 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.

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

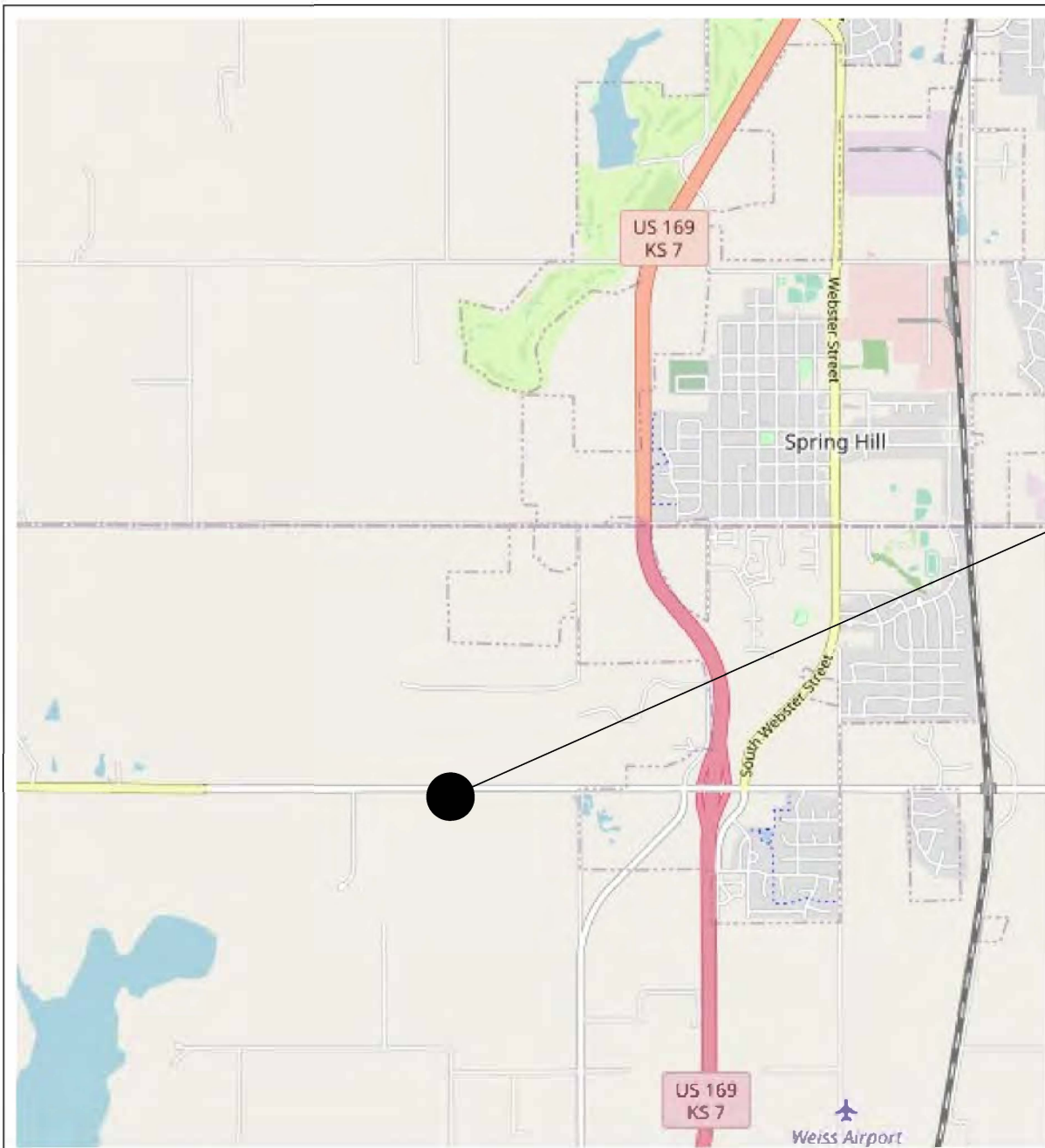
9) RECOMMENDATIONS & CONCLUSIONS

This study documents the impact of the full build-out of the proposed Always & 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.

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.

APPENDIX I

Project Location	Figure 1
Site Plan	Figure 2
Existing Peak Hour Traffic Volumes	Figure 3
Existing Peak Hour Lane Configurations & Levels of Service	Figure 4
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Proposed Anniversary Celebration PM Peak Hour Traffic Volumes	Figure 15
Proposed Anniversary Celebration Lane Configurations & Levels of Service	Figure 16



Project Location

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Project Location

Always & Furever
Stillwell, KS

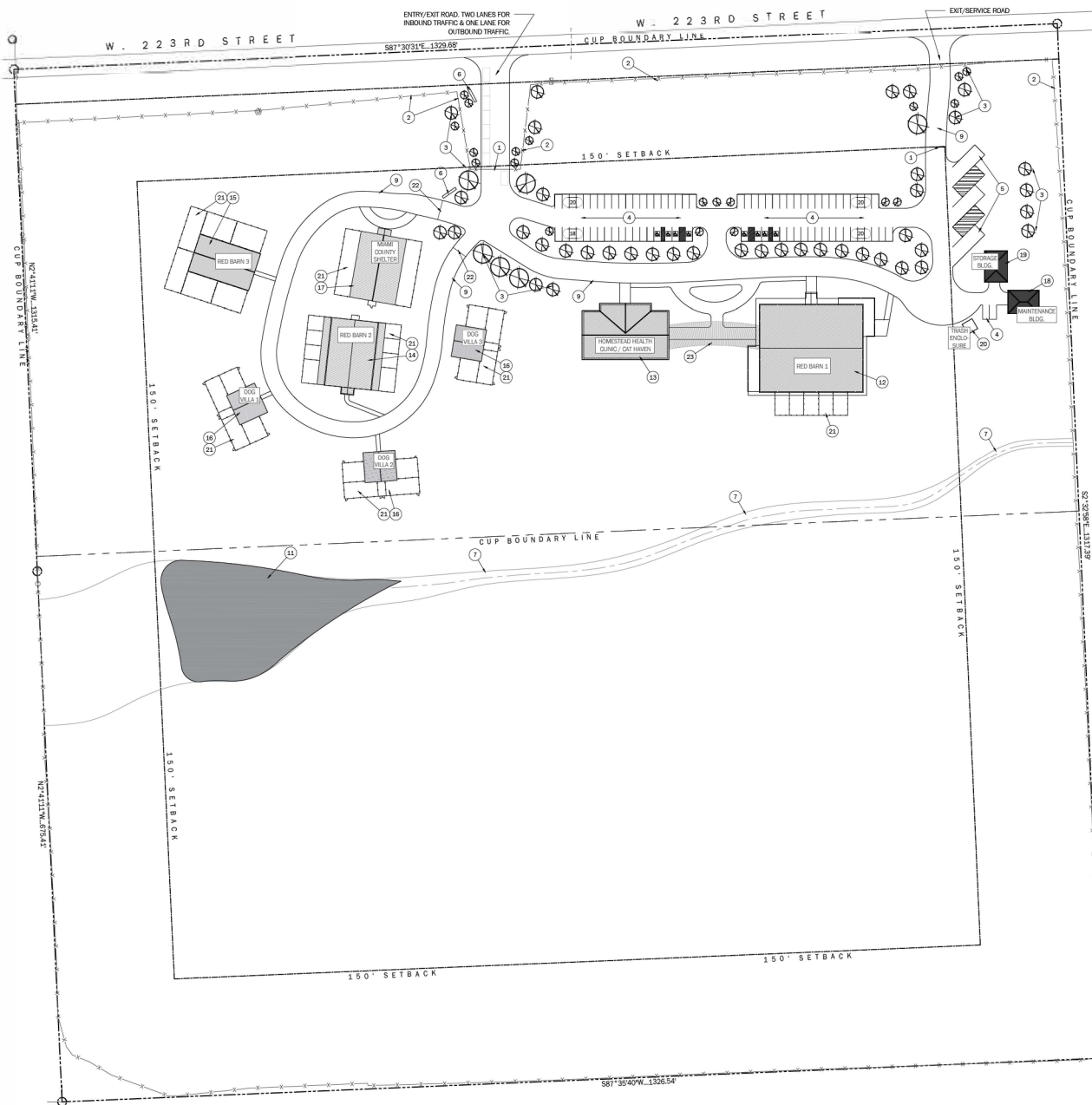
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Figure 1



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Construction Notes:

- 1 ELECTRIC GATE.
- 2 PERIMETER FENCE.
- 3 NEW LANDSCAPING, REFER TO LANDSCAPE PLAN.
- 4 PARKING.
- 5 OVERSIZED VEHICLE PARKING.
- 6 SIGNAGE.
- 7 EXISTING CREEK, FIELD VEREY.
- 8 WALKING TRAIL.
- 9 NEW ROAD RE: CIVIL PLANS.
- 10 WALKING BRIDGE.
- 11 STORM WATER RETENTION AREA.
- 12 RED BARN 1, RE: BUILDING SCHEDULE.
- 13 SHELTER HEALTHLINE FACILITY, RE: BUILDING SCHEDULE.
- 14 RED BARN 2, RE: BUILDING SCHEDULE.
- 15 RED BARN 3, RE: BUILDING SCHEDULE.
- 16 DOG VELLA, RE: BUILDING SCHEDULE.
- 17 MIAMI COUNTY BURN SHELTER, RE: BUILDING SCHEDULE.
- 18 MAINTENANCE BUILDING, RE: BUILDING SCHEDULE.
- 19 STORAGE BUILDING, RE: BUILDING SCHEDULE.
- 20 TRASH ENCLOSURE, RE: BUILDING SCHEDULE.
- 21 FENCED AREA.
- 22 ENTRY GATE.
- PERKOLA.

Parking Count:

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



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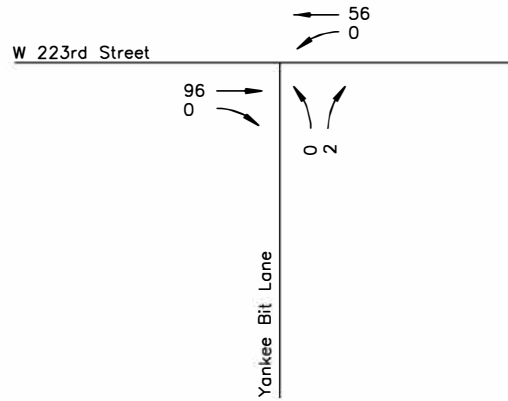
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Site Plan

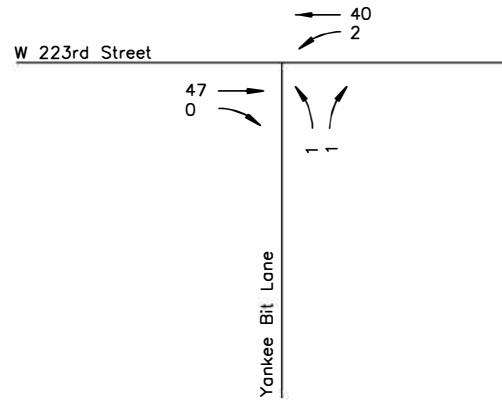
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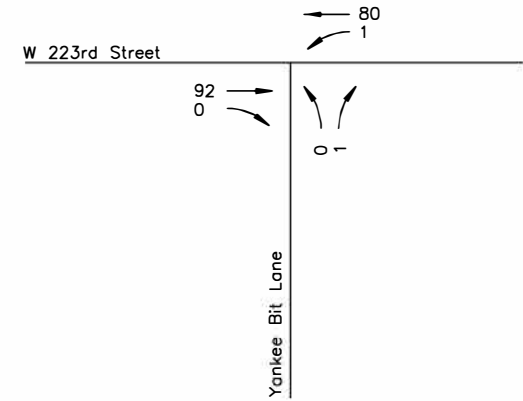
Figure 2



AM Peak Hour



Noon Peak Hour



PM Peak Hour

LEGEND

 Total Volume

Existing Peak Hour
Traffic Volumes

Always & Furever
Stillwell, KS

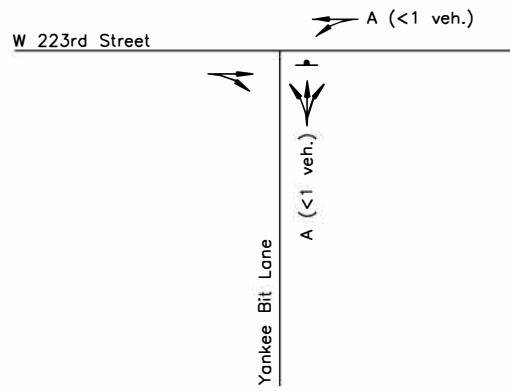
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Figure 3

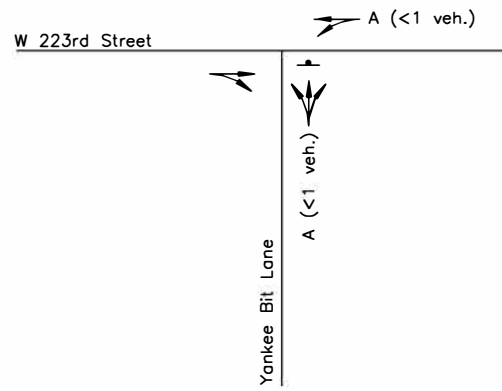


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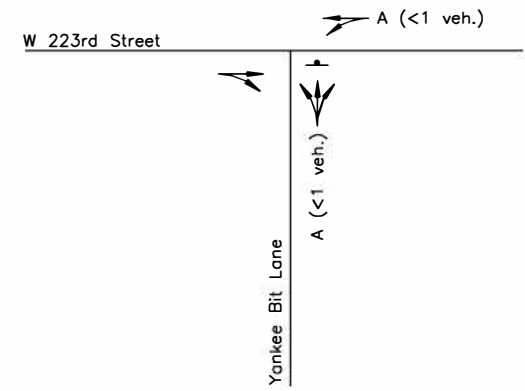
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AM Peak Hour





Noon Peak Hour



PM Peak Hour

LEGEND

-  HCM LOS (95th Percentile Queue)
-  Stop Sign



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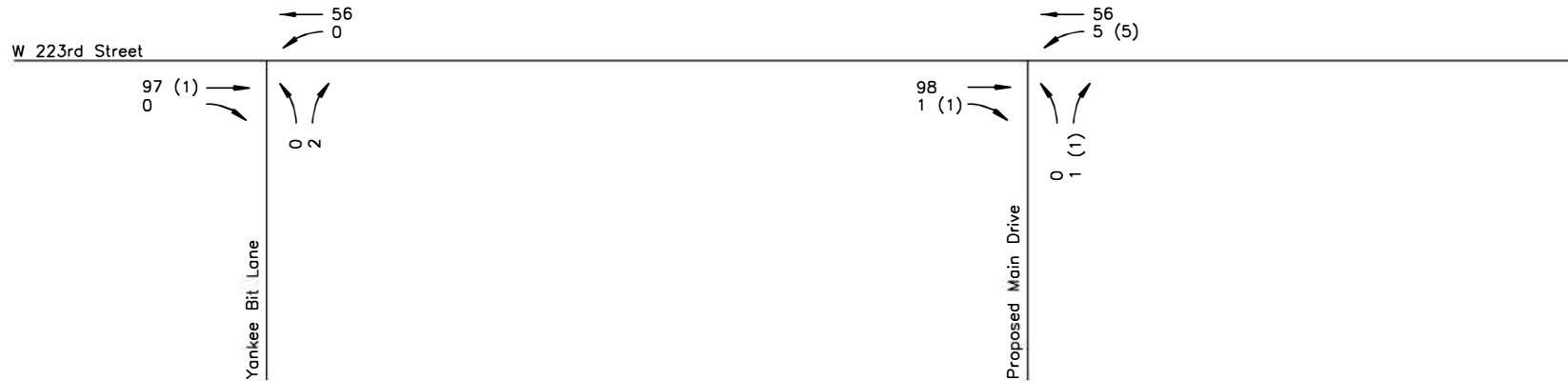
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Existing Peak Hour
Lane Configuration &
Levels of Service

Always & Forever
Stillwell, KS

No Scale

Figure 4



LEGEND

 Total Volume

Proposed AM Peak Hour
Traffic Volumes

Always & Furever
Stillwell, KS

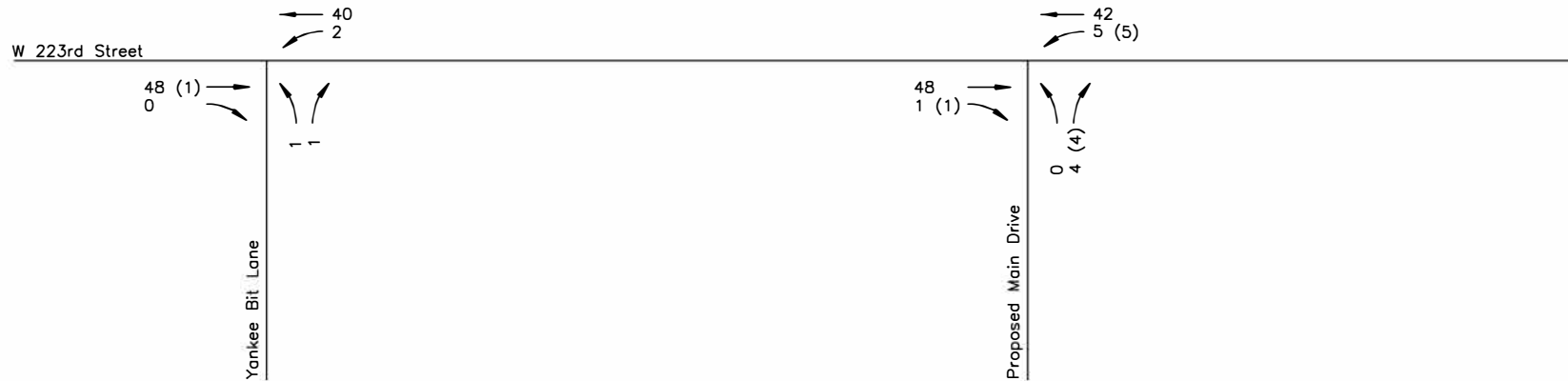
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Figure 5



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LEGEND

 Total Volume

Proposed Noon Peak Hour
Traffic Volumes

Always & Furever
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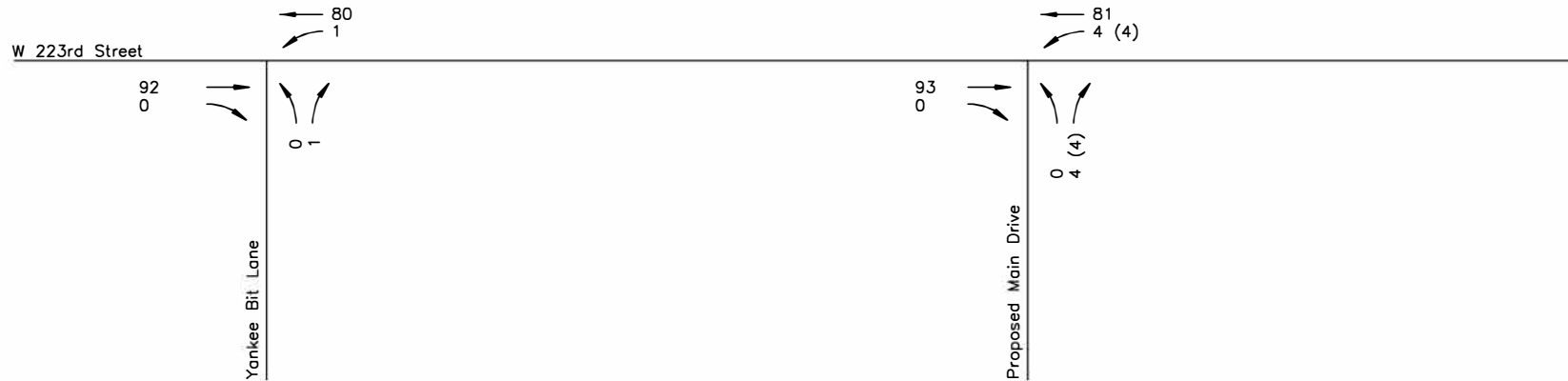
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Figure 6



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LEGEND

 Total Volume

Proposed PM Peak Hour
Traffic Volumes

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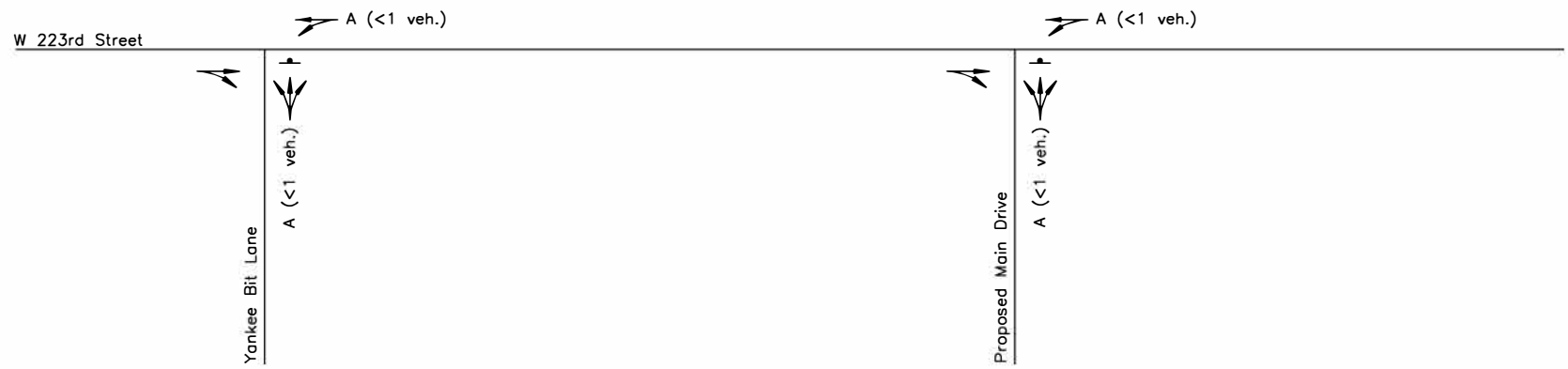
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Figure 7



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LEGEND

 Total Volume

Proposed AM Peak Hour
Lane Configuration &
Levels of Service

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Figure 8



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LEGEND

 Total Volume

Proposed Noon Peak Hour
Lane Configuration &
Levels of Service

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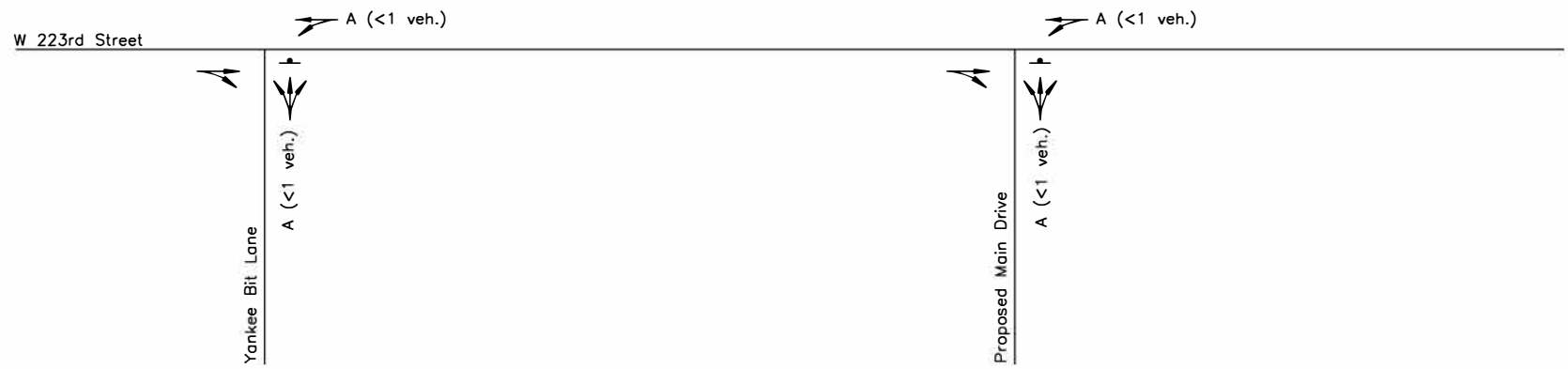
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Figure 9



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LEGEND

 Total Volume

Proposed PM Peak Hour
Lane Configuration &
Levels of Service

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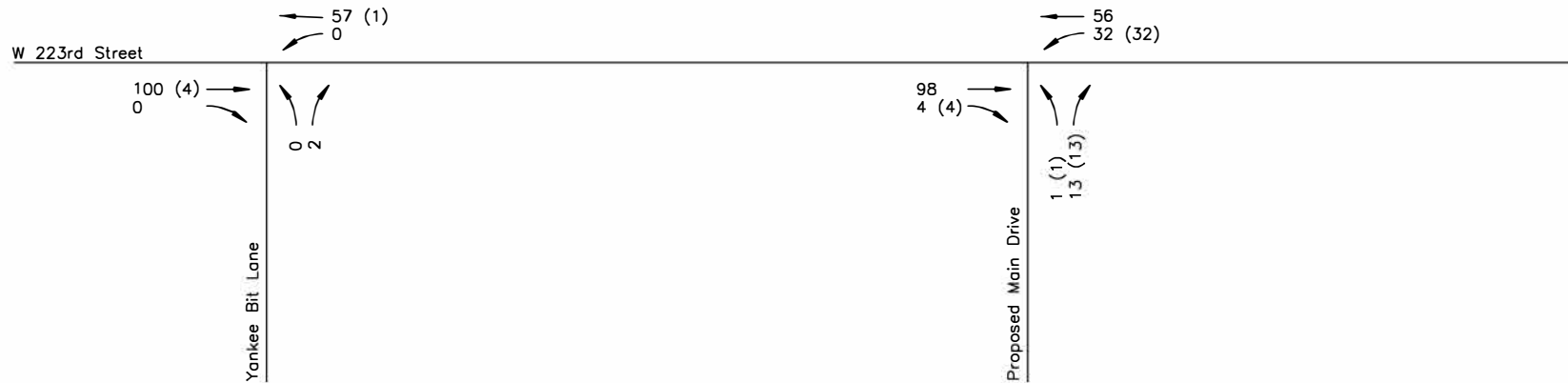
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Figure 10



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LEGEND

 Total Volume

Proposed AM Peak Hour
(Open Vet Office)
Traffic Volumes

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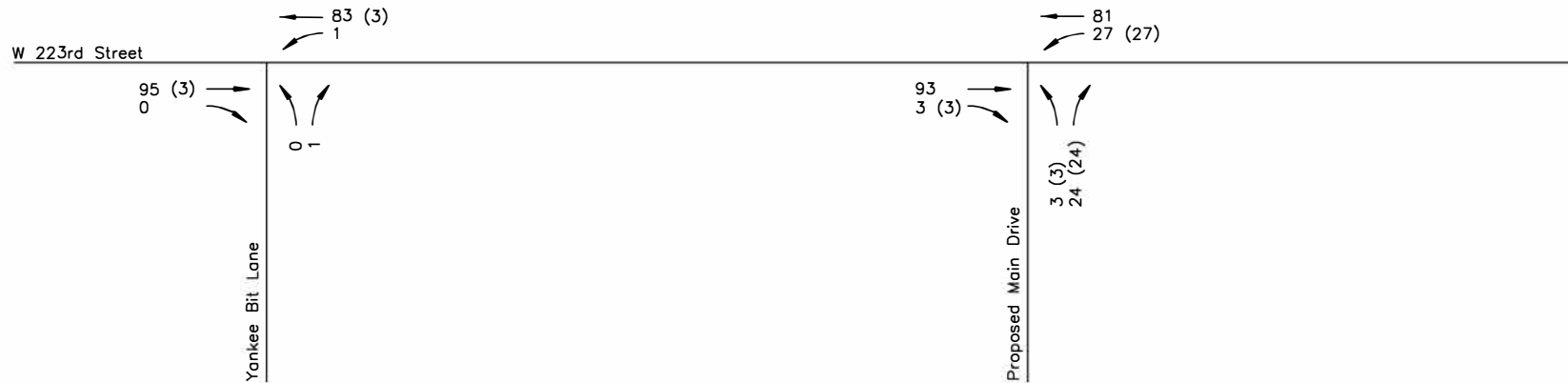
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Figure 11



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LEGEND

 Total Volume

Proposed PM Peak Hour
(Open Vet Office)
Traffic Volumes

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No Scale

Figure 12



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LEGEND

 Total Volume

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

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No Scale

Figure 13



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LEGEND

 Total Volume

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

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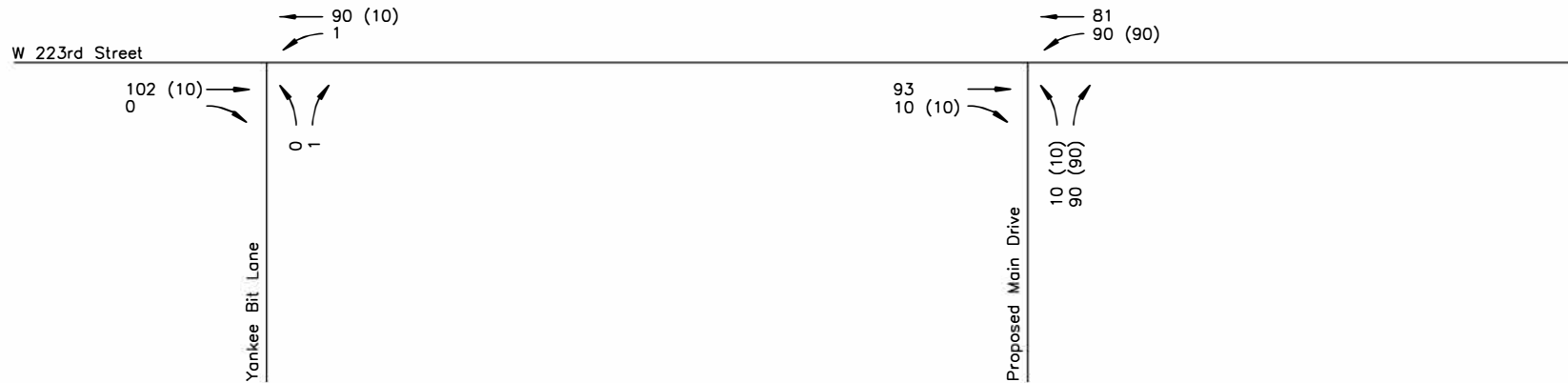
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Figure 14



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LEGEND

 Total Volume

Proposed Anniversary Celebration
PM Peak Hour
Traffic Volumes

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No Scale

Figure 15



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LEGEND

 Total Volume

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

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No Scale

Figure 16



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APPENDIX II

Always & Furever provided trip generation

Traffic Counts

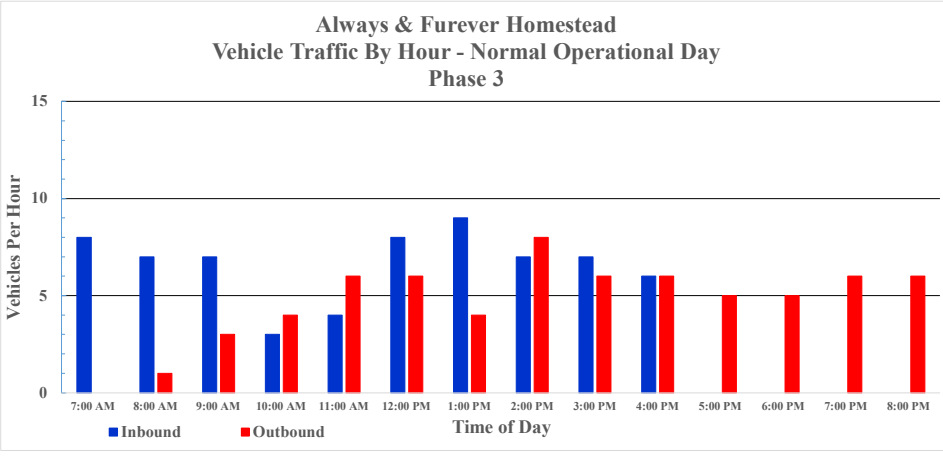
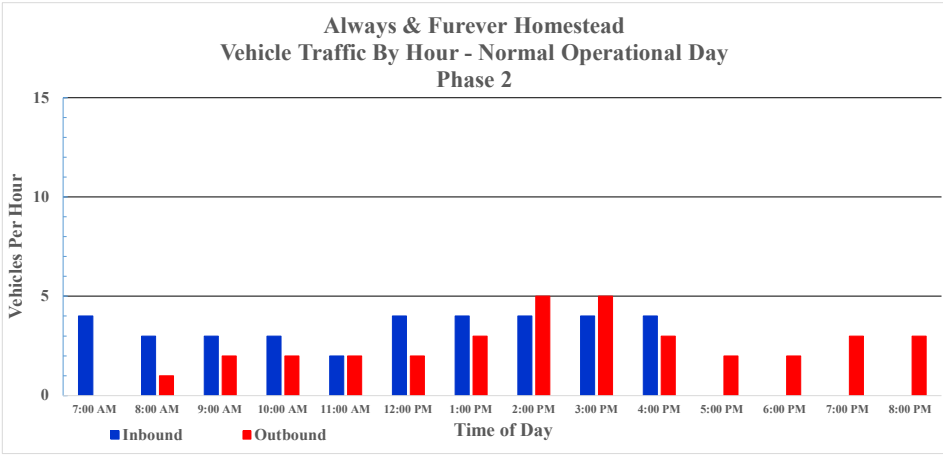
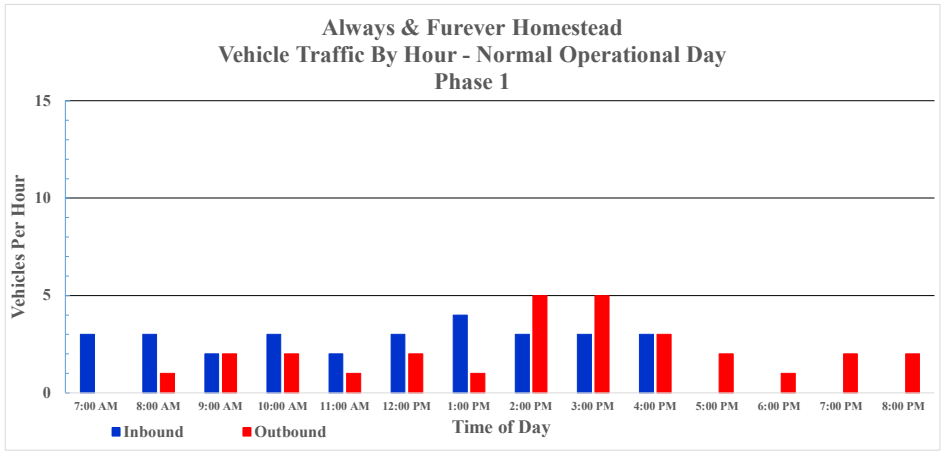
Synchro Reports

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



Administration Building	0
Veterinary Hospital / Decompression Facility	10
Big Red Barns (3)	58
Little Red Barn	24
Little Puppies Barn	20
Feline Family Facility	20
Dog Villas (7)	4 per Villa / 28 total
Miami County Barn Shelter	30
HOMESTEAD TOTAL	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	0	1	0	3
00:30	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	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	0	1	0	0	0	0	0	0	0	0	0	0	0	0	3
01:30	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2
01:45	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	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	0	1	0	0	0	0	0	0	0	0	0	0	0	0	4
02:30	0	0	0	0	0	0	0	1	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	0	2	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	0	1	0	0	0	0	0	0	0	0	0	0	0	0	4
03:30	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	6
03:45	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	8
04:00	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	11
04:15	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	1	0	18
04:30	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	2	0	26
04:45	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	3	0	29
05:00	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	1	0	30
05:15	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	3	0	28
05:30	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	3	0	26
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06:00	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	7	0	41
06:15	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	7	0	50
06:30	0	0	0	0	0	0	0	10	0	0	0	1	0	0	0	0	0	0	8	0	60
06:45	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	15	0	80
07:00	0	0	0	0	0	0	0	10	0	0	0	1	0	0	0	0	0	0	23	0	98
07:15	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	27	0	125
07:30	0	0	0	0	0	0	0	12	0	0	0	1	0	0	0	0	0	0	27	0	146
07:45	0	0	0	0	0	0	0	19	0	0	0	0	0	0	0	0	0	0	19	0	154
08:00	0	0	0	0	0	0	0	16	0	0	0	2	0	0	0	0	0	0	12	0	150
08:15	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	13	0	131
08:30	0	0	0	0	0	0	0	13	1	0	0	0	0	0	0	0	0	0	15	0	120
08:45	0	0	0	0	0	0	0	13	0	0	0	0	0	0	0	0	0	0	12	0	107
09:00	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	13	0	96
09:15	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	9	0	87
09:30	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	4	0	67
09:45	0	0	0	0	0	0	0	13	0	0	0	1	0	0	0	0	0	0	4	0	60
10:00	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	5	0	49
10:15	0	0	0	0	0	0	0	6	1	0	0	1	0	0	0	0	0	0	10	0	53
10:30	0	0	0	0	0	0	0	8	0	0	0	1	0	0	0	0	0	0	13	0	66
10:45	0	0	0	0	0	0	0	12	3	0	0	0	0	0	0	0	0	0	13	0	76
11:00	0	0	0	0	0	0	0	7	1	0	0	0	0	0	0	0	0	0	6	0	82
11:15	0	0	0	0	0	0	0	13	0	0	0	0	0	0	0	0	0	0	10	0	87
11:30	0	0	0	0	0	0	0	10	0	0	0	1	0	0	0	0	0	0	8	0	84
11:45	0	0	0	0	0	0	0	7	1	0	0	0	0	0	0	0	0	0	4	0	68
12:00	0	0	0	0	0	0	0	9	0	0	0	0	0	1	0	0	0	0	12	0	76
12:15	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	14	0	79
12:30	0	0	0	0	0	0	0	9	1	0	0	0	0	0	0	0	0	0	11	0	21
12:45	0	0	0	0	0	0	0	10	1	0	0	1	0	0	0	0	0	0	10	0	22
13:00	0	0	0	0	0	0	0	9	1	0	0	2	0	0	0	0	0	0	7	0	19
13:15	0	0	0	0	0	0	0	14	0	0	0	1	0	0	0	0	0	0	10	0	25
13:30	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	11	0	17
13:45	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	11	0	26
14:00	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	14	0	21
14:15	0	0	0	0	0	0	0	10	1	0	0	1	0	0	0	0	0	0	11	0	23
14:30	0	0	0	0	0	0	0	19	0	0	0	0	0	0	0	0	0	0	15	0	34
14:45	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	11	0	26
15:00	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	21	0	30
15:15	0	0	0	0	0	0	0	17	0	0	0	0	0	0	0	0	0	0	9	0	26
15:30	0	0	0	0	0	0	0	27	0	0	0	0	0	0	0	0	0	0	17	0	44
15:45	0	0	0	0	0	0	0	29	0	0	0	0	0	0	0	0	0	0	17	0	46
16:00	0	0	0	0	0	0	0	26	0	0	0	0	0	0	0	0	0	3	15	0	44
16:15	0	0	0	0	0	0	0	15	1	0	0	1	0	1	0	0	0	0	17	0	36
16:30	0	0	0	0	0	0	0	22	0	0	0	0	0	0	0	0	0	0	14	0	36
16:45	0	0	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0	25	0	50
17:00	0	0	0	0	0	0	0	21	0	0	0	1	0	0	0	0	0	0	18	0	40
17:15	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	30	0	45
17:30	0	0	0	0	0	0	0	19	1	0	0	0	0	0	0	0	0	0	19	0	39
17:45	0	0	0	0	0	0	0	31	1	0	0	0	0	0	0	0	0	0	16	0	48
18:00	0	0	0	0	0	0	0	19	2	0	0	0	0	1	0	0	0	0	10	0	32
18:15	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	13	0	27
18:30	0	0	0	0	0	0	0	17	0	0	0	1	0	0	0	0	0	0	6	0	24
18:45	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	9	0	17
19:00	0	0	0	0	0	0	0	11	1	0	0	0	0	0	0	0	0	0	5	0	17
19:15	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	5	0	16
19:30	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	6	0	17
19:45	0	0	0	0	0	0	0	10	0	0	0	1	0	0	0	0	0	0	5	0	16
20:00	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	1	0	6
20:15	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	5	0	12
20:30	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	7	0	10
20:45	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	4	0	7
21:00	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	3	0	5
21:15	0	0																			

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	104
Stage 1	-	-	-	-	104	-
Stage 2	-	-	-	-	61	-
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	-	-	1488	-	826	951
Stage 1	-	-	-	-	920	-
Stage 2	-	-	-	-	962	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1488	-	826	951
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	-	

3: Yankee Bit Lane & 223rd Street

Existing Noon Peak Hour

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	Minor2	Minor3
Conflicting Flow All	0	0	51	0	98
Stage 1	-	-	-	-	51
Stage 2	-	-	-	-	47
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	-	-	1555	-	901
Stage 1	-	-	-	-	971
Stage 2	-	-	-	-	975
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1555	-	900
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	-

3: Yankee Bit Lane & 223rd Street

Existing PM Peak Hour

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	Minor2	Minor3
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	Minor2	Minor3
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	-

5: Proposed Main Drive & 223rd Street

Proposed AM Peak Hour

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	98	1	5	56	0	1
Future Vol, veh/h	98	1	5	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	5	61	0	1
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	108	0	179	108
Stage 1	-	-	-	-	108	-
Stage 2	-	-	-	-	71	-
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	-	811	946
Stage 1	-	-	-	-	916	-
Stage 2	-	-	-	-	952	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1483	-	809	946
Mov Cap-2 Maneuver	-	-	-	-	809	-
Stage 1	-	-	-	-	916	-
Stage 2	-	-	-	-	949	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0.6	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	40	1	1
Future Vol, veh/h	48	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	52	0	2	43	1	1
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	52	0	99	52
Stage 1	-	-	-	-	52	-
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	-	-	1554	-	900	1016
Stage 1	-	-	-	-	970	-
Stage 2	-	-	-	-	975	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1554	-	899	1016
Mov Cap-2 Maneuver	-	-	-	-	899	-
Stage 1	-	-	-	-	970	-
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)	954	-	-	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	-	

5: Proposed Main Drive & 223rd Street

Proposed Noon Peak Hour

Intersection						
Int Delay, s/veh	0.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	48	1	5	42	0	4
Future Vol, veh/h	48	1	5	42	0	4
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	5	46	0	4
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	53	0	109	53
Stage 1	-	-	-	-	53	-
Stage 2	-	-	-	-	56	-
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	-	-	1553	-	888	1014
Stage 1	-	-	-	-	970	-
Stage 2	-	-	-	-	967	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1553	-	885	1014
Mov Cap-2 Maneuver	-	-	-	-	885	-
Stage 1	-	-	-	-	970	-
Stage 2	-	-	-	-	964	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0.8	8.6			
HCM LOS				A		
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	1014	-	-	1553	-	
HCM Lane V/C Ratio	0.004	-	-	0.003	-	
HCM Control Delay (s)	8.6	-	-	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	92	0	1	80	0	1
Future Vol, veh/h	92	0	1	80	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	100	0	1	87	0	1

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	0	0	100	0
Stage 1	-	-	-	100
Stage 2	-	-	-	89
Critical Hdwy	-	-	4.12	-
Critical Hdwy Stg 1	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-
Pot Cap-1 Maneuver	-	-	1493	-
Stage 1	-	-	-	924
Stage 2	-	-	-	934
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	-	-	1493	-
Mov Cap-2 Maneuver	-	-	-	799
Stage 1	-	-	-	924
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)	956	-	-	1493	-
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

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	93	0	4	81	0	4
Future Vol, veh/h	93	0	4	81	0	4
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	4	88	0	4
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	101	0	197	101
Stage 1	-	-	-	-	101	-
Stage 2	-	-	-	-	96	-
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	-	-	1491	-	792	954
Stage 1	-	-	-	-	923	-
Stage 2	-	-	-	-	928	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1491	-	790	954
Mov Cap-2 Maneuver	-	-	-	-	790	-
Stage 1	-	-	-	-	923	-
Stage 2	-	-	-	-	925	-
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)	954	-	-	1491	-	
HCM Lane V/C Ratio	0.005	-	-	0.003	-	
HCM Control Delay (s)	8.8	-	-	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	100	0	0	57	0	2
Future Vol, veh/h	100	0	0	57	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	109	0	0	62	0	2

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	109	0	171
Stage 1	-	-	-	-	109
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	-	-	1481	-	819
Stage 1	-	-	-	-	916
Stage 2	-	-	-	-	961
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1481	-	819
Mov Cap-2 Maneuver	-	-	-	-	819
Stage 1	-	-	-	-	916
Stage 2	-	-	-	-	961

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)	945	-	-	1481	-
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	1.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	98	4	32	56	1	13
Future Vol, veh/h	98	4	32	56	1	13
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	4	35	61	1	14
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	111	0	240	109
Stage 1	-	-	-	-	109	-
Stage 2	-	-	-	-	131	-
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	-	-	1479	-	748	945
Stage 1	-	-	-	-	916	-
Stage 2	-	-	-	-	895	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1479	-	730	945
Mov Cap-2 Maneuver	-	-	-	-	730	-
Stage 1	-	-	-	-	916	-
Stage 2	-	-	-	-	874	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	2.7	9			
HCM LOS				A		
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	926	-	-	1479	-	
HCM Lane V/C Ratio	0.016	-	-	0.024	-	
HCM Control Delay (s)	9	-	-	7.5	0	
HCM Lane LOS	A	-	-	A	A	
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-	

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	95	0	1	83	0	1
Future Vol, veh/h	95	0	1	83	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	103	0	1	90	0	1
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	103	0	195	103
Stage 1	-	-	-	-	103	-
Stage 2	-	-	-	-	92	-
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	-	-	1489	-	794	952
Stage 1	-	-	-	-	921	-
Stage 2	-	-	-	-	932	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1489	-	793	952
Mov Cap-2 Maneuver	-	-	-	-	793	-
Stage 1	-	-	-	-	921	-
Stage 2	-	-	-	-	931	-
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)	952	-	-	1489	-	
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	1.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	93	3	27	81	3	24
Future Vol, veh/h	93	3	27	81	3	24
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	3	29	88	3	26
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	104	0	249	103
Stage 1	-	-	-	-	103	-
Stage 2	-	-	-	-	146	-
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	-	-	1488	-	739	952
Stage 1	-	-	-	-	921	-
Stage 2	-	-	-	-	881	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1488	-	724	952
Mov Cap-2 Maneuver	-	-	-	-	724	-
Stage 1	-	-	-	-	921	-
Stage 2	-	-	-	-	863	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	1.9	9			
HCM LOS					A	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	920	-	-	1488	-	
HCM Lane V/C Ratio	0.032	-	-	0.02	-	
HCM Control Delay (s)	9	-	-	7.5	0	
HCM Lane LOS	A	-	-	A	A	
HCM 95th %tile Q(veh)	0.1	-	-	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	-

5: Proposed Main Drive & 223rd Street

Proposed Anniversary Celebration PM Peak Hour

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		
Conflicting Flow All	0	0	112	0	391	107
Stage 1	-	-	-	-	107	-
Stage 2	-	-	-	-	284	-
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	-	-	1478	-	613	947
Stage 1	-	-	-	-	917	-
Stage 2	-	-	-	-	764	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1478	-	570	947
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	-