Bloomsburg to Lime Ridge Corridor

Stormwater Study

December 2020

EXECUTIVE SUMMARY

In December of 2019, SEDA-COG Joint Rail Authority and a group of stakeholders from Columbia County began a process to evaluate ongoing stormwater and flooding issues along the State Route 11 corridor from Bloomsburg to Lime Ridge. The triggering point for this study was significant damage to major industries, commercial development, municipal infrastructure and private property caused by intense flooding in 2018.

McTish, Kunkel and Associates was chosen as the engineering consultant to perform this study with the primary goal of identifying specific projects that could help to alleviate stormwater damage could threaten the viability of businesses located within flood prone areas. Stakeholders were clear in their guidance that they did not desire another study to put on a shelf. They wanted an actionable plan and tangible solutions to problems that have been on-going for decades.

Over a year-long process, stakeholders met with the consulting team on a regular basis to identify problem areas, offer feedback and get updates on the status of the study.

The overall approach to the project was as follows:

- Obtain initial feedback from stakeholders to identify study areas
- Meet with or interview key individuals
- Collect mapping and historic information
- Conduct preliminary site observation of all locations
- Field survey all problem areas
- Create a stormwater model to analyze flows and determine the impact of improvements
- Identify projects to correct or improve stormwater management
- Develop cost estimates for each project
- Rank all projects from high to low priority based on overall impact
- Hold a final review meeting and prepare a summary report

As the process neared completion and several high-priority projects were identified, additional investigation and conceptual designs were completed to better define the projects and estimate their costs. These projects included the construction of a berm near Sekisui, a new storm sewer system on Low Street and clearing and grading swales between SR 11 and the railroad in South Centre Township.

Within the Town of Bloomsburg, Scott Township and South Centre Township, a total of 27 projects were identified by the consulting team and project stakeholders.

The recommended project list prioritized from high to how by municipality is as follows:

TOWN OF BLOOMSBURG	
Kinney Run Diversion	HIGH
Patterson Drive Culvert	HIGH
Walnut Street Culvert	HIGH
SR 11 to Kinney Run	LOW
Dillon Floral	LOW

PRIORITY

SCOTT TOWNSHIP	
Tractor Supply	HIGH
Seiple Drive to Central Road	HIGH
Seiple Drive Culvert	HIGH
Shaffer Road Stormsewer	HIGH
Tributary 10 RR Culvert	HIGH
5th Street and Bentley Dr	MEDIUM
Central Road Culvert	MEDIUM
White Birch Lane	MEDIUM
Edgar Avenue	MEDIUM
Bissett's Lane RR Culvert	MEDIUM
5th Street and Crestwood	MEDIUM
Central Avenue	MEDIUM
Ridge Street	LOW
Bentley Drive	LOW
Stormwater Basin	LOW

PRIORITY

SOUTH CENTRE TWP	
Berm	HIGH
Railroad/SR 11 Swales	HIGH
Low Street Stormsewer	HIGH
Wolf Hollow RR Culverts	HIGH
Wolf Hollow SR 11 Culvert	HIGH
Low Street Stormwater Basin	MEDIUM
SR 11 Culverts and Swales	LOW

PRIORITY

FINDINGS

Town of Bloomsburg

Only the eastern portion of the Town of Bloomsburg is included within the study corridor. This includes Kinney Run and its tributaries.

Kinney Run – Main Channel

Kinney Run begins in Scott Township and is a large drainage area of more than 2 square miles extending as far east as Central Road and Seiple Drive and as far north as Interstate 80.

As Kinney Run enters the Town of Bloomsburg, it first flows through a 48" culvert under Walnut Street then makes a sharp turn to the south and flows under Old Berwick Road via a 3.5' high by 12' wide box culvert. After a short distance, the stream makes a 90-degree bend to the west. At this location, an overflow weir has been constructed. Once flows reach a high enough level that they overtop the weir, water is diverted south through a vegetated channel and then under the airport runway to the Susquehanna River through an 84" culvert. This diversion system was constructed following the 1972 Hurricane Agnes flood event.

Stormwater that has not been diverted through the weir continues to the west and passes under Patterson Drive (the access to the Recycling Center) through a 60" reinforced concrete pipe. The next structure is a large box culvert under the emergency access roadway to the rear of the Kawneer site. Continuing to the east, there is a large box culvert under SR 487, then a 60" concrete culvert under Catherine Street and finally a 72" concrete culvert below the Town Park lagoon that ultimately outlets to the Susquehanna River.

Walnut Street Culvert – 48"

The box culverts under SR 487 and the Kawneer access roadway are sufficient and do not contribute to flooding within the Town. The culverts at the Town Park and under Catherine Street are severely undersized, but because of their location and elevation relative to Patterson Drive and the diversion structure, replacing one or both culverts have no impact on flood

elevation levels as far upstream as Patterson Drive. Flood elevations below SR 487 are primarily driven by the Susquehanna River, therefore there is no real need to replace either of these two undersized culverts since the overall benefit is minimal. If either the Catherine Street or Town Park culverts ever need to be replaced out of necessity, it is recommended that they be appropriately designed to handle anticipated design flows.

There are many issues with the Kinney Run channel between Walnut Street and the emergency access road to Kawneer.

Patterson Drive Culvert – 60”

1. The Walnut Street 48” culvert is severely undersized. That is immediately obvious when you consider that the next downstream culvert is a 3.5’ high by 12’ wide box culvert and even the bypass culvert just a short distance farther downstream which is only intended to take a portion of the total stream flow is 84” in diameter.
2. The box culvert under Old Berwick Road is undersized and due to the extreme angle of how the stream enters the culvert, is inefficient to the point that it probably cannot carry its full capacity.
3. The overflow channel between the weir structure and the 84” culvert under the airport runway is overgrown and obstructed to the point that it cannot carry flows as originally designed.
4. The Patterson Drive 60” culvert is undersized and is increasing upstream water surface elevations.
5. The entire stream profile between Walnut Street and Patterson Drive is essentially flat.

Recommendation:

- Clean the overflow channel between the weir and the 84” culvert under the airport runway. This will allow the overflow to function as designed and divert an increased amount of stormwater to the Susquehanna River before it reaches other downstream obstructions.
- Replace or eliminate the culvert under Walnut Street. We estimate that at least a 4’ high by 12’ wide culvert would be required. As an alternative, we recommend that the Town consider removing the culvert all together. Turn arounds could be constructed on either side of the road or else the road could be vacated in some fashion. Since this is such a short section of road, can be accessed from either end and serves few properties, this seems like it could be a less expensive and more effective solution.

- Replace the culvert under Patterson Drive. We estimate that a 7' high by 12' wide culvert would be required. A pre-cast box culvert should be considered to reduce the time that the access roadway to the Recycling Center is shut down.

It needs to be noted that none of these recommendations are a silver bullet that can solve all the problems along Kinney Run. Even if all the recommendations are completed AND the box culvert under Old Berwick Road is replaced AND the entire stream profile is adjusted from Walnut Street to the Kawneer access roadway AND the weir structure is widened, the water surface elevation at Walnut Street is only reduced by less than one foot. That is quite a bit of investment for only a modest reduction in flood elevations even if they do carry upstream into Scott Township for a short distance.

Kinney Run Diversion Channel

Kinney Run – Unnamed Tributary

At one of our later steering committee meetings, the Town of Bloomsburg asked us to investigate stormwater issues in the area near the Dillon Floral Corporation.

Dillon Floral Corp. Culvert

Stormwater originates high on the hill near Bloomsburg University and flows down through the steep hollow above Dillon Floral Corporation. At some point in time, Dillon Floral Corporation constructed a building on the north side of East Fifth Street and filled in the bottom end of the hollow. They installed a small 12"-15"

culvert underneath the building that captures flows coming down the hollow and connects them to the Town's storm sewer system under East Fifth Street. This culvert is undersized and clogs frequently resulting in stormwater flowing around the building and overtopping East Fifth Street.

The Town's system under East Fifth Street discharges to another private storm sewer system that flows through the Dillon Floral Corporation property before discharging at a box culvert under SR 11. The private storm sewer on the Dillon Floral Corporation property is undersized and when it overtops, stormwater flows down through their driveway between the greenhouses and parking lot before reaching the box culvert under SR 11.

After flowing under SR 11, the tributary flows through a series of small culverts and channels, many through private property before ultimately discharging to Kinney Run just above Old Berwick Road. This section sees frequent flooding because the stream channel has been encroached upon and restricted and most of the private culverts are severely undersized.

Recommendation:

- A new culvert should be installed above East Fifth Street. This culvert needs to be sized to accept all the flows coming down the steep hollow without overwhelming the new culvert that the Town recently installed under the roadway. A new culvert would reduce the number of times East Fifth Street needs to be closed due to flooding. Nearly all this work will be on private property.
- New culverts and channel improvements should be constructed between SR 11 and Old Berwick Road. Because this tributary was not a part of our model, a more detailed analysis of this area will be required to determine what specific improvements are necessary. Much of this work will be on private property.

Scott Township

All stormwater and flooding issues identified and analyzed as a part of this study within Scott Township are associated with either Kinney Run, Tributary 10 or one of their tributaries. The only other drainage areas within the Township discharge directly to the Susquehanna River and no problem areas were identified there.

<u>Kinney Run</u>

The two square mile drainage area has a branch that extends up Fifth Street Hollow, one that flows east to west from Seiple Drive, Central Road and Bentley Drive, and another that flows east to west from Central Road through the Espy bog. Additionally, there are many small subdrainage areas that flow north to south above Fifth Street and SR 11.

Most of the northern drainage areas exhibit similar drainage patterns – steeply sloped channels that have become unstable due to increased runoff caused by development. As the channels

erode, they carry a high sediment load that quickly drops out once the streams reach flat areas south of Fifth Street and Bentley Drive. This sediment blocks both natural and artificial stream channels already constricted by years of development. The result is flooding that occurs more frequently and more intensely as stream conditions worsen, maintenance is neglected, and development and rainfall intensity increases.

Description of Problem Areas

On Fifth Street just east of Crestwood Drive two small drainage areas meet. One flows directly down Crestwood Drive and the other is just to the east. At Crestwood Drive, a 30" polyethylene pipe discharges to a swale on the north side of Fifth Street. This channel makes a 90-degree turn and flows under Fifth Street through a 24" high by 36" wide oval culvert. Another culvert flows under Fifth Street at the drainage area just to the east but the size could not be determined because the inlet end is filled with debris. During a field observation after a storm event, the stormwater backed up at this culvert, partially blocked the westbound lane of Fifth Street and flowed west to the larger, unobstructed culvert. Both culverts angle toward each other and discharge to a single headwall on the south side of Fifth Street. This stormwater is the source of stormwater and flooding problems near Marley's and Dark Side Tanning. Both culverts are undersized and are not being maintained.

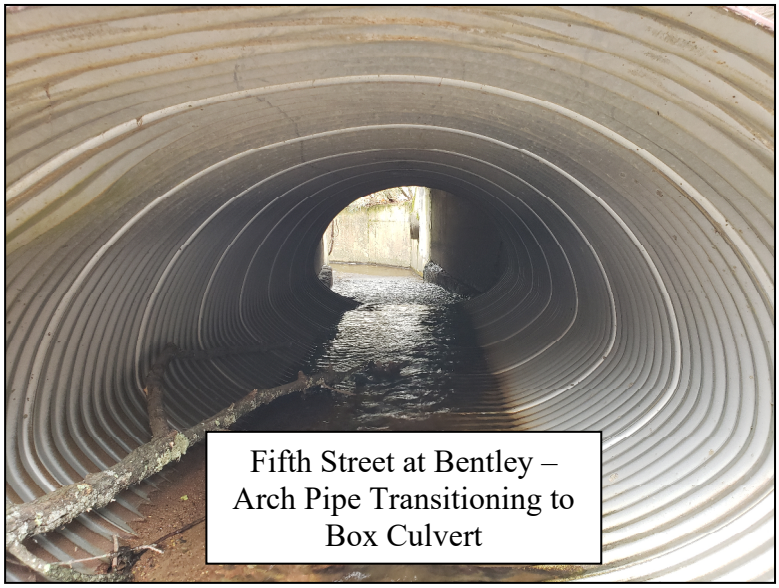
Fifth Street/Crestwood Dr.

Recommendation:

- Replace both culverts. Modeling recommends 30" by 60" box culverts. This work will require acquisition of right-of-way/easements upstream and downstream along with stream stabilization on each end.

The location where Kinney Run crosses Fifth Street near Bentley Drive is a well-established flooding problem. When Fifth Street was constructed, the stream was relocated and now crosses the road farther west than the original location. As a result, the stream is nearly level with Fifth Street as it winds around to the new culvert location and the low point of Fifth Street is east of the culvert crossing. The culvert under Fifth Street is also a problem. The inlet end is a 4' high by 6' wide arch metal pipe but the outlet end is a large 6' high by 6.5' wide box culvert. The capacity is limited by the inlet end pipe which is at a severe angle to the actual stream channel, even further reducing its efficiency. When large storm events occur, the stream quickly jumps

its banks as it rounds the curve of Fifth Street and overtops the road. The Township has attempted to construct a small berm to prevent this from happening. Debris washed down the stream tends to clog the inlet end of the culvert due to the small size of the pipe and the poor angle of the culvert crossing.



Fifth Street at Bentley – Arch Pipe Transitioning to Box Culvert

Recommendation:

- Install a new larger box culvert with adjusted alignment to increase efficiency. Upstream stabilization and potentially a retaining wall may be required to reduce overtopping of Fifth Street. Easements from adjacent property owners will likely be required.

At Bentley Drive close to Central Road, a pair of small culverts convey the stormwater that flows down the drainage area west of Central Road. These culverts clog frequently, and appear to be slightly crushed as well as undersized resulting in frequent overtopping of Bentley Drive.

Recommendation:

- Replace the double pipes with a new concrete box culvert. Modeling estimates the required size as 24" high by 60" wide. Headwalls and rip-rap will be required. Easements from adjacent property owners may be required.

The area between Tractor Supply, Marley's and the Dark Side Tanning/Venus Day Spa building is an extremely complex and difficult situation. As noted previously, stormwater from two small drainage areas flows south through a wooded area toward SR 11. At the rear of the Dark Side Tanning/Venus Day Spa building, the stream takes a sharp 90-degree bend to the east and travels through a narrow channel where it meets a stormwater collection system that again turns the flow 90-degrees to the south between Marley's and the Dark Side Tanning/Venus Day Spa building until it

Inlet at Tractor Supply

reaches SR 11. Here, a set of triple 24" culverts take the water under SR 11 to the swale between the road and SR 11. Once again, the flow is diverted 90-degrees to the east until it meets the main stem of Kinney Run and flows under the railroad. To make matters worse, the entire parking area in front of Tractor Supply discharges to the same culvert system via a single inlet behind Marley's. If that wasn't bad enough, all the commercial area along SR 11 from Coles Hardware to the Tractor Supply entrance including half of the SR 11 pavement drains to the same system as well.

Triple 24" Culverts

Channel Behind Dark Side Tanning

Virtually every piece of this complex network is broken. The stream in the wooded area west of Tractor Supply is braided and clogged with debris. From time to time, it overflows and runs into the Tractor Supply parking lot. The channel behind Dark Side Tanning/Venus Day Spa is too small as is the 24" culvert between this building and Marley's. The single inlet behind Marley's cannot handle even minor storm events and frequently floods the Tractor Supply parking lot along with areas farther to the south. The three PennDOT culverts under SR 11 are severely undersized and the channel between SR 11 and the Railroad is overgrown and creates a significant tailwater for the culverts further decreasing their carrying capacity.

Recommendation:

- Replace the triple PennDOT culverts with one large box culvert. Until this project is complete, all upstream improvements will have little impact on
- Clean and restore the channel between SR 11 and the railroad.
- Restore the stream channel in the wooded area west of Tractor Supply.
- Add new inlets in the Tractor Supply parking lot and replace the piping system between Tractor Supply and SR 11.
- Install a new pipe/culvert to collect stormwater flowing through the wooded area west of Tractor Supply and connect it directly to the new storm sewer collection system.

- Much of this work is on private property and will require extensive coordination and planning. While it is possible for this effort to be spearheaded by the various local property owners, success would be more likely if they received assistance from an overarching body such as a Township, County or Stormwater Authority.
- In the long-term, plan for a regional detention facility in the vacant lot east of Tractor Supply. This facility can temporarily store diverted stormwater from both Tractor Supply and Kinney Run. Property acquisition will be required.
- Completion of these projects should significantly reduce but not eliminate flooding in the area. The Dark Side Tanning/Venus Day Spa building sits very low and the channel from SR 11 to Kinney Run is very flat so periodic flooding and backwater can still be expected.

Ponded Water Behind the Former Moose

Another almost equally complex area is between the Mahindra building (former Walmart) and Central Road. This area has always been wet and flat, but in recent years the area on either side of Seiple Drive has seen extended periods of standing water to the point where a driving range had to close because the field was flooded for more than a year. Historic mapping shows that the area midway behind the Mahindra building flowed west under Seiple Road, then under Central Road and eventually to the main channel of Kinney Run. That pattern has recently changed and there appears to be a high point midway between Central Road and Seiple Drive that pushing water from west to east, 180 degrees opposite of how it used to flow. During our field investigation, the small clay pipe under Seiple Drive was crushed but water could be observed slowly flowing from west to east. The water surface west of Seiple Drive was several feet higher than the water on the east side. This high water extended west to the rear of the Geisinger building but the culvert under Central Road was dry. We believe that a combination of construction between Central Road and Seiple Drive along with severe erosion resulting from increased stormwater discharging from the Lions Gate apartment complex have altered the drainage pattern. The result is that the former Moose Building, the former driving range, and the Master Lube on Shaffer Road are seeing increased flooding.

Recommendation:

- Replace the culvert under Seiple Drive. A 24" polyethylene pipe would be sufficient. This section of roadway appears to be private so an easement or right-of-way might be required. This project should not be completed until the Central Road culvert is replaced and the channel between Seiple Drive and Central Road is restored. Otherwise, replacement of the Seiple Drive culvert will only increase flooding issues behind Mahindra as far east as Master Lube.
- Restore the channel between Seiple Drive and Central Road. It is possible that there are multiple channels that need to be restored – one coming down from Lions Gate and the other from Seiple Drive. This section is overgrown with invasive Reed Canary Grass so consideration should be given to restoring this section of wetlands and planting native species less prone to clogging the channel. This area is all private property so easements will be required.
- Replace the culvert under Central Road. The existing culvert is crushed and/or collapsing. A 3' high by 10' wide box is estimated by modeling. This work can all be completed within the existing right-of-way.
- Completion of this work should reduce flooding in the Mahindra/Moose area.

Tributary 10

Tributary 10 is mainly considered the stream that flows down Shaffer Hollow and crosses under SR 11 at Independence Honda then south west under Edgar Avenue and then to the Susquehanna River, but it also includes a few important subdrainage areas.

The first starts at the front of the Mahindra building. Drainage from Mahindra flows west and collects drainage from Sheetz before crossing under SR 11. The stream then slowing turns 180-degrees flowing east along the Scott Township building, Tenny Street Apartments and Skatetown before crossing under White Birch Lane and meeting the main branch of Tributary 10 just west of Edgar Avenue.

The final branch of Tributary 10 begins north of SR 11 along Bissett's Lane. This stream flows under SR 11 and the railroad then turning west crossing Ridge Street, then flowing through two small, impounded ponds along Central Avenue before ultimately discharging to the main branch of Tributary 10.

Tributary 10 – Main Branch

Tributary 10 is probably most notorious for the frequent flooding that occurs between SR 11 at the Independence Honda Dealership and Shaffer Road. In this area, the stream has been diverted and realigned to make way for residential construction. The new channel is shorter and extremely flat. During extreme storm events, the stream jumps its banks floods homes and buildings along this section. Also, within this stream segment, an old 15" terracotta pipe that collects water behind the Master Lube flows from west to east into Tributary 10. It is a well-

known fact that this culvert is partially blocked and crushed, but since it is on private property, it has not been repaired.

Recommendation:

- Replace the existing terracotta pipe with a new outlet structure and culvert that will run down Shaffer road and connect to PennDOT facilities. The goal of this project is to slowly release stormwater from the area behind Mahindra which should be greatly reduced once the Seiple Drive/Central Road projects are complete. The capacity of PennDOT's facilities is not known but it should be possible to design an outlet structure that slowly meters out stormwater without overwhelming their system.

Tributary 10 crosses under SR 11 through a large 3.5' high by 14' wide box culvert but then is forced to flow under the railroad through a small 3.3' high by 5' wide culvert, barely 1/3 the size of the PennDOT culvert. As stormwater backs up at the railroad culvert, it increases flood elevations upstream of SR 11.

Recommendation:

- Replace the railroad culvert on Tributary 10. Modeling indicates that a 3.5' high by 14' box culvert will be required.
- Based on topography of the relocated stream, there is little that can be done to improve flooding for property owners between SR 11 and Shaffer Road, however replacement of the railroad culvert should allow water to flow out of this section of stream more freely. Additionally, once the Seiple Drive/Central Road projects along with the Shaffer Hollow storm sewer are completed, the amount of additional stormwater reaching Tributary 10 from areas farther to the west will have been minimized.

After crossing under the railroad, the stream flows through wooded and agricultural areas before flowing under Edgar Avenue through a 43" high by 63" wide oval culvert. The inlet end of this culvert is partially obstructed, and the stream frequently overtops the road because the culvert is undersized as well. For comparison, the culvert under Old Berwick Road just downstream of Edgar Avenue is 9.5' high and 16' wide.

Edgar Avenue Culvert

Recommendation:

- Replace the oval pipe with a new box culvert. Modeling indicates that at least a 3.5' high by 8' wide box culvert will be required. We also recommend elevating the roadway in this area to increase head over the pipe to reduce overtopping. Guiderail will most likely be required.

Tributary 10 – West Branch

Although there are numerous small culverts and stream channels that are most likely undersized along this branch, the primary obstruction is a confusing system of culverts rumored to include old sections of tanks along with actual pipes between White Birch Lane and the main branch of Tributary 10. This storm sewer system is most likely partially collapsed at certain points, further reducing its capacity, and increasing upstream flood elevations at least as far as Tenny Street. Some of this section includes properties that were a part of a flood buyout by Scott Township.

Recommendation:

- Replace the existing pipe with a larger culvert. We recommend only installing this new larger culvert under White Birch Lane and then reopening the channel down to the main branch of Tributary 10. This will be a less expensive option and will reduce maintenance. Since these properties were flood buyouts, the Township will need to verify that this work is permitted. This branch was not a separate subdrainage area in our model so that required pipe size has not been estimated.
- At the junction with Tributary 10 adjacent to Edgar Avenue are a series of gabion baskets. They appear to be collapsing and failing. They will either need to be replaced or removed as a part of this project.

Tributary 10 – East Branch

The east branch begins north of SR 11 along Bissett's Lane. The stream flows under SR 11 west of Bissett's lane through a 3.5' high by 8' wide box culvert. Immediately downstream is a railroad structure that is almost filled to the top with sediment. It is apparent that the railroad has been overtopped in this location as debris has accumulated along the railroad as far east as Bissett's Lane.

Bissett's Lane Culvert Under Railroad

Recommendation:

- Replace the structure under the railroad. Modeling estimates that at least a 3' high by 10' wide box culvert will be required. Due to severe erosion in the area, upstream and downstream restoration of the stream channel may be required to keep it stable in the future so that the new culvert does not fill in.

After crossing under the railroad, the stream bends west through a wetland area before crossing under Ridge Street in a 48" culvert and then immediately flows through two small impoundments on either side of Central Avenue. The eastern most pond elevation is controlled by a 36" culvert under Central Avenue that drops roughly two feet into the westerly impoundment that is controlled by a weir type outlet structure before the stream finally flows into the main stem of Tributary 10. It appears that the adjoining property owners along the ponds view them as an asset to the local community.

Central Avenue Culvert

Weir – Lower Pond

Recommendation:

- Restore the culvert under Ridge Street with a larger structure. Modeling estimates that a 4' high by 10' wide box culvert is required. This work may require elevating the approaches of Ridge Street on either end.
- Replace the culvert under Central Avenue. Three – 36" culverts are recommended. These should be installed at a lower elevation to reduce the surface elevation of the upstream pond which will improve flooding conditions as far upstream at Ridge Street.
- Once the Central Avenue culvert has been replaced, the weir structure of the downstream pond will control water surface elevations. The best-case scenario would be to remove the downstream outlet structure altogether, drain the pond, and install a larger culvert under Central Avenue. This would significantly reduce flooding issues all along this section of stream. However, we understand this appears to be a private pond and negotiating removal of one or both ponds could be difficult.

South Centre Township

Three drainages within South Centre Township were identified as problem areas during our study. These include Tributary 11 near Wolf Hollow Road, Tributary 12 between Interstate 80 and the Susquehanna River and the small drainage area along Low Street north of SR 11.

Railroad Culverts below 5'x20' PennDOT Structure

<u>Tributary 11</u>

Tributary 11 drains the area north of SR 11 in the area west of the Columbia Montour Vo-tech School. Previous flooding history and input from the steering committee allowed us to focus on the area immediately adjacent to SR 11 and Wolf Hollow Road. Much of the upper drainage area is undeveloped. The lower section below SR 11 has a relatively wide floodplain and the PennDOT structure under Old Berwick Road is large and no major problems have been reported.

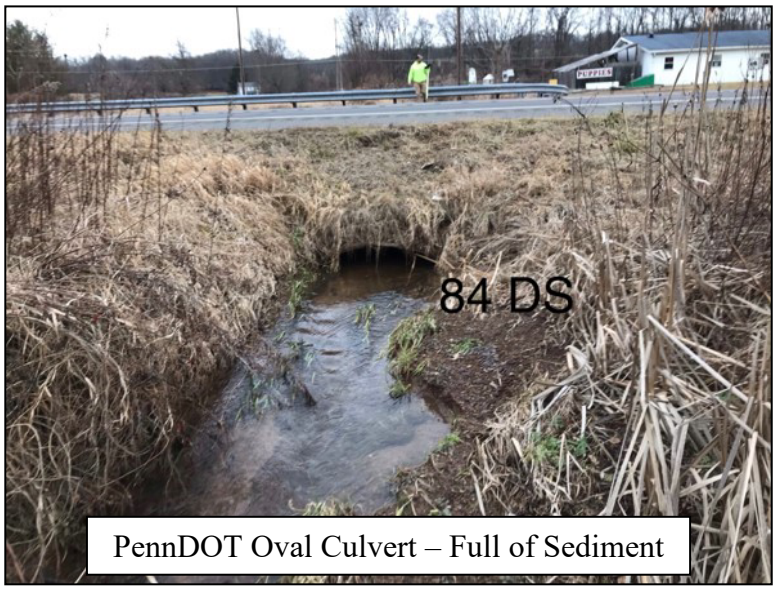
There are two culverts under SR 11 near Wolf Hollow Road. The largest is a 5' high by 20' wide concrete box culvert just east of Wolf Hollow Road. The other is a 54" wide by 34" high oval concrete pipe closer to the old go cart track. Under the railroad below the large box culvert are two 54" culverts. Farther to the east, there are several other culverts under the railroad including one 24" pipe, two 18" pipes, two 16" culverts and one 30" culvert.

As Tributary 11 drains toward SR 11 and nears the old Wolfey's Miniature Golf Course, it bends east toward the smaller oval concrete pipe under SR 11 rather than the larger box culvert. Historic photos show that at some point in the past, the stream was diverted from its original path, most likely for the construction of the mini golf course. During flash flood events, the oval culvert (which was half full of sediment at the time of our investigation) is quickly overwhelmed and stormwater flows west parallel to SR 11 until it reaches the larger box culvert. During significant events, the capacity of each culvert is exceeded, and the stream overtops SR 11.

To make matters worse, the culverts under the railroad immediately below SR 11 have even less capacity and back up creating tailwater for the culverts under SR 11 which is one of the other reason's stormwater overtops the road.

Recommendation:

- Replace the 54" by 34" concrete oval culvert under SR 11 with a larger box culvert. Modeling indicates that at least a 3' high by 12' wide culvert is required.
- Replace the railroad culverts adjacent to each of the two larger PennDOT culverts. Modeling indicates that a 5' high by 20' wide box culvert is required at the western most location and a 3' high by 12' culvert is required at the eastern most location.



PennDOT Oval Culvert – Full of Sediment

By replacing these three culverts, the frequency of overtopping of SR 11 can be significantly reduced. But the projects do not correct the original issue of the relocated stream channel. Long-term, it would be beneficial to restore the stream to its original location so that it discharges directly to the larger box culvert under SR 11. During significant rainfall events stormwater will still flow parallel to SR 11 to the larger culvert closer to Wolf Hollow Road even after all three culverts are replaced.

Low Street Drainage

The stream that flows east of Low Street to SR 11 has always been more than a little confusing. Old aerial photographs do not depict any stream channel south of SR 11. It is possible that this stream formerly discharged farther to the east joining Tributary 12 but that cannot be determined at this point.

Currently, the stream flows north to south on the east side of Low Street, around a small hill and then south east toward the intersection of Low Street and SR 11. A 36" culvert crosses under Low Street and then south under SR 11 discharging on the north side of the railroad. During our field investigation of the area, water was observed in the stream until it wrapped around the small hill. At this point, the stream channel is very undefined and obstructed. Stormwater jumps the banks of the stream and flows due south to SR 11. Water was never getting to the 36" culvert. PennDOT has a smaller 18" culvert several hundred feet east of Low Street. Water was ponding in front of this pipe and flowing under SR 11 to the north side of the railroad.

As more development has occurred along Low Street north of SR 11, stormwater has increased. During high intensity flash flooding, water flowing down this small drainage area completely floods the small field north of SR 11. In some years, the field cannot be farmed because it is full of water. This water either slowly flows through the 18" PennDOT culvert, or if it gets high enough, finds its way to the 36" culvert under Low Street and SR 11 where it should flow west ultimately ending up in Tributary 11. However, the channel between SR 11 and the railroad is severely obstructed and stormwater can never get to Tributary 11. In some instances, stormwater overtops the railroad impacting 84 Lumber and J.M. Smuckers.

36" Low St Culvert - Dry

Overgrown Railroad/PennDOT Swales

Recommendation:

- Clear, grade and stabilize the swale between SR 11 and the railroad both east and west of Low Street. Detailed plans have been developed for this work. It will need to be a combined effort between the Joint Rail Authority and PennDOT since the work is in both rights-of-way.
- Consider the creation of a regional stormwater basin north of SR 11 in the field area. This area is partially wetlands and cannot be developed. Managing stormwater in this location could substantially reduce stormwater flows discharging to areas south of SR 11 that are already severely strained. This project will require the acquisition of private property.

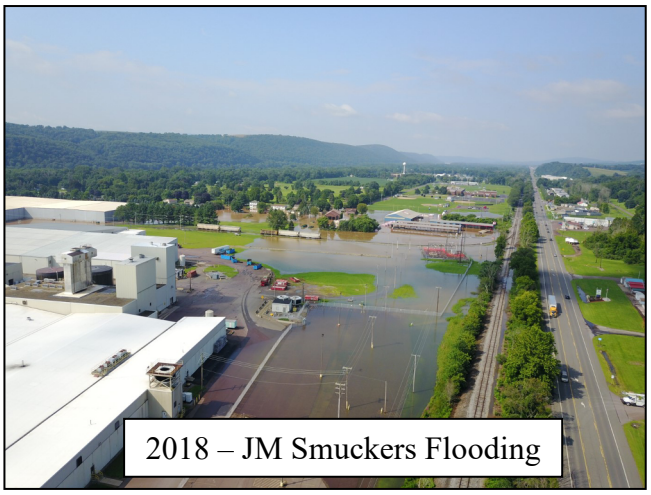
<u>Tributary 12</u>

Only the lower reaches of Tributary 12 fall within the study corridor. After the stream crosses under Interstate 80, it flows through the Fort Jenkins/trailer park area before winding south under Old Berwick Road and discharging to the Susquehanna River at Columbia Park. The stream section between Interstate 80 and Old Berwick Road was the source of some of the most severe flooding in 2018.

An intense rainfall event occurred during an extremely wet year when the ground was already saturated. As Tributary 12 began to flood, it overtopped its banks and flowed north and west

into a large depression called the sand pit. During most storm events, the sand pit is large enough to contain this excess flooding, but in this instance, there was already some water in the sand pit and the amount of new flooding entering the sand pit was extreme. Once the sand pit was filled to capacity, it began to overtop and flow to lower areas to the west. This flooding damaged many businesses and residential areas. Most notably, Sekisui, JM Smucker and 84 Lumber were impacted. Because there is no natural outlet to these areas, flood waters had to be pumped to an existing storm sewer system on Low Street or else infiltrate into the ground.

2018 – Sekisui Flooding


2018 – JM Smuckers Flooding

The conditions of this flood very closely match FEMA floodplain mapping for the area. The sand pit is depicted as 100-year flood plain and a small "neck" of shallow flooding north of Metropolitan Trucking links the sand pit and other flooded areas to the west. FEMA calculations indicate that during the 10-year storm event, 50% of the flow of Tributary 12 is diverted to the sand pit and 80% is diverted during the 100-year event. Even though the sand pit can hold nearly 8 million cubic feet of water, it can fill in roughly 2 hours during the 100-year event, so it is only a matter of time before this scenario repeats itself. Each major storm causes Tributary 12 to overtop into the sand pit. Because the area north of Metropolitan Trucking is lower than the stream bank where the overtopping occurs as soon as the sand pit is filled water simply cascades west into lower elevation areas.

We recommend that a berm be constructed across the Metropolitan trucking property to link higher areas to the north at the railroad grade to naturally higher ground to the south. Because flooding in this "neck" is shallow, a berm roughly 5' high and 300' long would protect areas to the west. We believe it is likely that Tributary 12 never flooded areas as far west as Low Street until the sand pit was excavated, allowing an artificially low area to be created putting new properties in a flood hazard zone. Detailed plans and profiles are included within this report.

Tributary 12 Near the Trailer Park – Showing Extremely Shallow Stream and Low North Bank Falling Into Sand Pit

Following the 2018 flooding, the Township made improvements to the stream channel north of Old Berwick Road. Although this work was beneficial, the stream channel itself is relatively small and floods quickly. The northern bank is only a few feet high and, in some locations, only a few feet wide before the slope drops steeply into the sand pit. As a result, we believe that flooding will continue to occur as depicted within the FEMA mapping and a berm is the safest, most cost-effective method of protection. Prior to construction, the stream will need to be studied in detail to verify that no residential properties north of Old Berwick Road are impacted by berm construction. After an initial review of topography in the immediate area, we believe it is likely that water surface elevations will not be increased by construction of the berm.

Additionally, we recommend that a new, larger, and more extensive storm sewer system be installed in Low Street. A new system should extend from the Susquehanna River to the railroad. This system will improve local stormwater flooding problems and have the flexibility to collect some of the stormwater discharge generated north of SR 11. Detailed plans are included within this report.

Localized Drainage Concerns

During one of our later steering committee meetings, an additional area was identified as a concern. This included the segment of SR 11 between Bissett's Lane and Wolf Hollow Road. During a field investigation, we determined that the primary issue within this section was a lack of maintenance including roadside swales and PennDOT cross-pipes. In most locations, we had a difficult time even locating cross pipes because the swales were overgrown with vegetation.

Unmaintained and Overgrown Swales

Recommendation:

- Notify PennDOT maintenance crews so that they can clean their facilities which should almost immediately improve local drainage.

Corridor-Wide Findings

Maintenance

Throughout our field investigation, lack of maintenance of stormwater facilities was a constant theme. This included overgrown channels and silted in pipes and swales. In some instances, debris from the 2018 flooding event was still present and reducing flow capacity.

Proper maintenance is critical from both private and public stormwater facilities so that they can function at their original design capacity. In many cases, maintenance crews scramble to recover from significant flood events but do not follow through to inspect and clean all their facilities unless there is an ongoing issue. We recommend that crews try to implement schedule to routinely inspect and maintain all facilities after each significant rainfall event and in dry years, at least annually.

Stormwater Management Ordinances

The ultimate solution to the prevention of flooding is mandating appropriate stormwater controls so that future development does not worsen flooding issues. When possible, our ordinances should help to alleviate existing stormwater issues.

We recommend that the Town of Bloomsburg, Scott Township and South Centre Township work with their consultants to update their stormwater management ordinances to include:

- Treat all existing impervious areas as meadow in pre-development runoff calculations.
- Include rate control for the 1 through 100-year events.
- No volume increases for the 2-year, 24-hour storm event.
- Pre-development to post-development hydrograph matching for certain storm events.
- Riparian buffers – to include all of the 100-year flood plain or at least 35' from the top of bank of all streams.
- Calculation of 100-year floodplains for streams not included within the FEMA Flood Insurance Study.
- Downstream impact analysis to demonstrate no significant impact.
- Easement for private storm sewer facilities so the municipalities can intervene if necessary.
- As-built plans based on actual survey.
- Adequate provisions to allow the Township and their consultants to review construction of storm sewer facilities and verify their function before financial security is released.

PA DEP maintains model ordinances for reference. Lancaster County has an excellent stormwater ordinance that closely matches the model ordinance as well.

Project Implementation

Many of the most significant and impactful projects involve private property. It will be difficult for private property owners to independently initiate these projects and equally as difficult for municipal governments to force action by them.

The most successful projects are going to result from cooperative efforts involving both municipalities and private property owners with assistance from the County and SEDA COG. For some of the larger projects that will require an entity to be responsible for operation and maintenance following construction, Columbia County's Water Mitigation Authority could be a valuable resource. To date, the Authority has primarily been responsible for large flood control projects in the Town of Bloomsburg, but its organization allows it to take on other types of stormwater management projects such as those recommended within this study. As a County-wide entity, they can bring together and organize large scale efforts and serve as the applicant to pursue grant funding to make completion of projects like these viable.

MODELING METHODOLOGY

Data Sources

Rainfall

Rainfall depths for the various return periods of interest were obtained from NOAA Atlas 14 rainfall data as presented on Hydrometeorological Design National Weather Service webpage.

Base Mapping

Land surface elevation data was determined using LIDAR information obtained from the PASDA website. Field survey was used to determine critical structure (pipes) information which cannot be determined from LIDAR surface data.

The location of roadways and tax parcels are represented according to GIS data, obtained from Columbia County. PennDOT and Railroad drawings were referenced to identify possible pipe locations, and then field reconnaissance was conducted for verification.

Soils

Soil classifications and corresponding hydrologic soil group (HSG) were determined from USDA NRCS GIS data, available for download through the PASDA website. The study area consists of type A through D hydrologic soil groups (HSGs), with A soils dominating in the area between SR 11 and Susquehanna River. Type B and C soils are most prevalent in the area between SR 11 and Interstate 80.

Watershed Boundaries

Major tributary drainage areas and nomenclature were extracted from the Act 167 Plan. Sub-watershed boundaries for the drainage area contributing to each individual conveyance feature used in hydraulic modeling, was determined from topographic information.

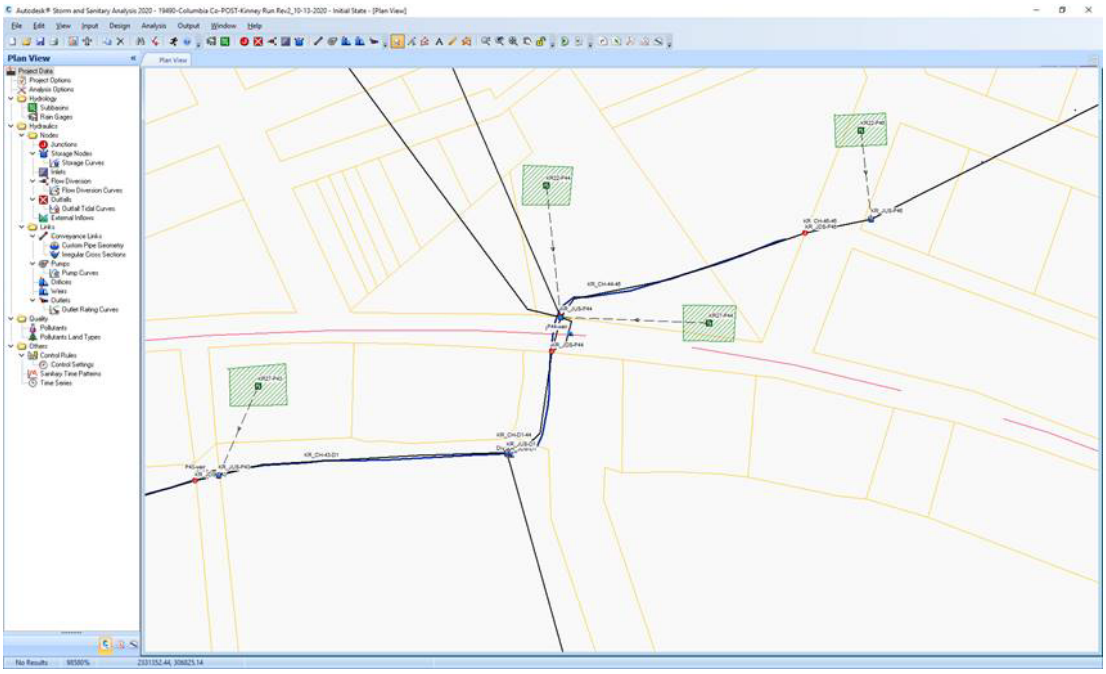
Landcover

Surface coverage, for the purposes of determining soil conservation service (SCS) curve numbers was determined using aerial imagery obtained from PASDA. For simplicity, landcover was broken down as residential, industrial/commercial, or vegetated (crop land, woods, meadow). Rural residential (lots > 1 acre) areas were generally considered to fall within vegetated category.

Modeling Methodology

Software

The stormwater modeling software *Storm and Sanitary Analysis* (SSA), by Autodesk, was utilized for generating hydrographs and routing runoff from storm events of interest. This software is a link-node based model that performs comprehensive hydrology and hydraulic simulations similar to the EPA SWMM model. Hydrology calculations are completed utilizing methods equivalent to WinTR-55 / TR-20. Hydraulic flow routing is completed using dynamic equations to simulate backwater, surcharging and pressure flow.



Calibration

After the initial model setup, peak flows were compared to Act 167 values. Where appropriate modifications were made by adjusting the time of concentration or storage volumes above structures.

Model Connectivity Setup

A model framework was created consisting of nodes and links corresponding to the study area and conveyance features of interest. Nodes consist of junction points within the model used for storage and / or to provide a point of connection between conveyance features (links). Drainage areas may be assigned to specific nodes allowing computed runoff to be hydraulically routed through the conveyance system.

Storage volumes attributed to specific nodes were established according to stage / area information extracted from base mapping and entered during model setup. In general, storage nodes were provided at the upstream end of each pipe or channel. Drainage areas were generally broken down according to the conveyance feature receiving flow and assigned to the associated upstream node.

Model input data for each link (pipe or channel) was determined either from LIDAR (channel dimensions & elevations) or field reconnaissance (pipe sizes, lengths, & inverts). At each pipe (culvert) location, a weir was included to carry overtopping flow from upstream to downstream node when pipe capacity and storage were exceeded. Friction coefficients used for hydraulic routing were determined based on pipe material or land cover in the channel. Weir inverts were generally determined from field survey of pipes which also collected roadway and railroad elevations at each location.

The entire study area was included within a single model, which allowed connectivity between watersheds contributing to different tributaries. For example, overflow between Kinney Run and Tributary 10 could be evaluated when adjacent components (storage nodes) overtopped. Under proposed conditions, this methodology allowed the effects of rerouted flows to be evaluated.

Hydrologic Methods

Runoff calculations were completed using methods described in the National Engineering Handbook, Part 630 and NRCS TR-55 Urban Hydrology Manual as follows:

- Sub-watershed boundaries for each conveyance feature were identified from topographic base mapping.
- Weighted curve numbers for each sub-watershed were calculated based upon soil type, HSG and land cover.
- Time of concentration (TOC) values were calculated from the "most hydraulically remote" location within contributing watershed according to the Watershed Lag Method, Chapter 15, Part 630 of National Engineering Handbook.

Once drainage areas, landcover, and TOC values were determined, hydrologic calculations were completed using *SSA* software. Runoff values were computed by SSA using the Soil Conservation (SCS) Method, with Type II 24-hour distribution.

Hydraulic Methods

Runoff computed by hydrologic components of the model is imposed at assigned nodes and then hydraulic aspects of the model compute routing calculations for flow through the network of storage and conveyance features. SSA utilizes dynamic wave routing with one-dimensional Saint Venant flow equations to account for storage, backwater, entrance / exit losses, and flow reversal. SSA employs Manning's equation to determine the relationship between flow rate, depth and frictional effects when completing hydraulic routing.

Modeling Results Evaluation

Existing Conditions Model

A model of existing conditions was created according to the methodology described above. Using various rainfall events (2, 10, 25, 50 and 100 year), model results were generated and reviewed for comparison with reported flooding problems. Although the frequency of flooding (structure overtopping) varied somewhat from reported problems, the model does not take into account deviations in duration or intensity which may occur during actual rainfall conditions. Likewise, the model does not account for obstructions that may result from debris or sediment accumulations.

Proposed Scenario Modeling

After reviewing results of the existing conditions model and identifying structural deficiencies within the existing stormwater management system, a separate model was generated to evaluate alternative actions for correcting flood problems. Using the existing condition model as a base scenario, successive changes were made to evaluate the benefits of numerous corrective alternatives. As the model was updated with each corrective action, results could be evaluated to determine the impact on downstream areas within affected watershed.

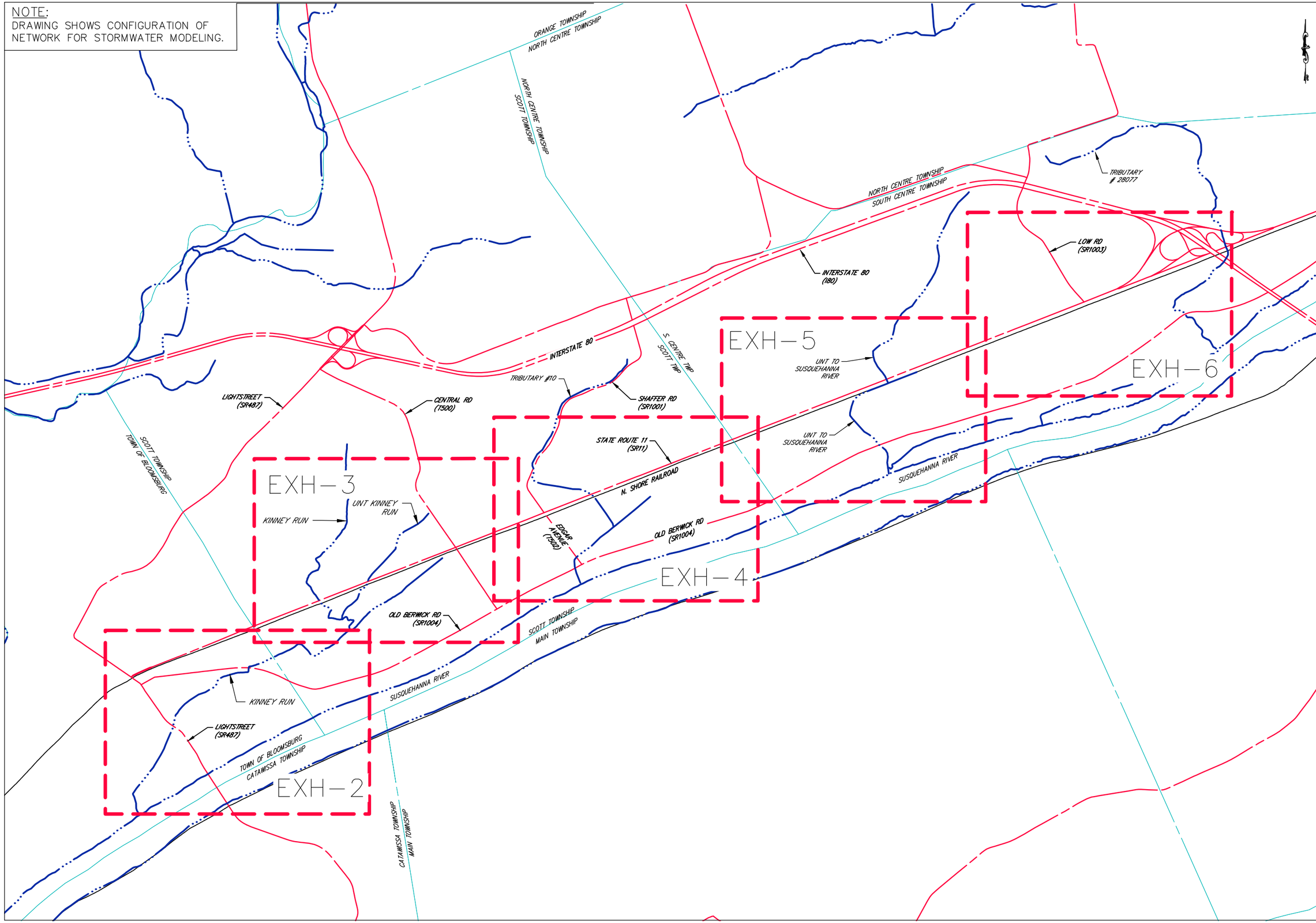
In general, corrective actions consisted of channel modifications, flow rerouting, and pipe / culvert replacement. For simplicity, pipe / culvert replacements were made using box culverts, which allow flow area to be increased without major impacts to the stream or road elevation. The final design of any future structure replacements should include a detailed analysis of the specific watershed and structure.

Channel modifications were typically made by adjusting the Manning's coefficient to represent a clean, smoothly graded channel versus existing overgrown channels.

APPENDIX A

MODEL SCHEMATICS

NOTE:
DRAWING SHOWS CONFIGURATION OF NETWORK FOR STORMWATER MODELING.



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TRJ	JAF	ADK

DATE	PROJECT NO.	SHEET
12-14-20	19490-00	EXH-1

MCTISH-KUNKEL and associates

BLOOMSBURG - LIMERIDGE CORRIDOR
FLOOD STUDY

MODEL SCHEMATIC
INDEX SHEET

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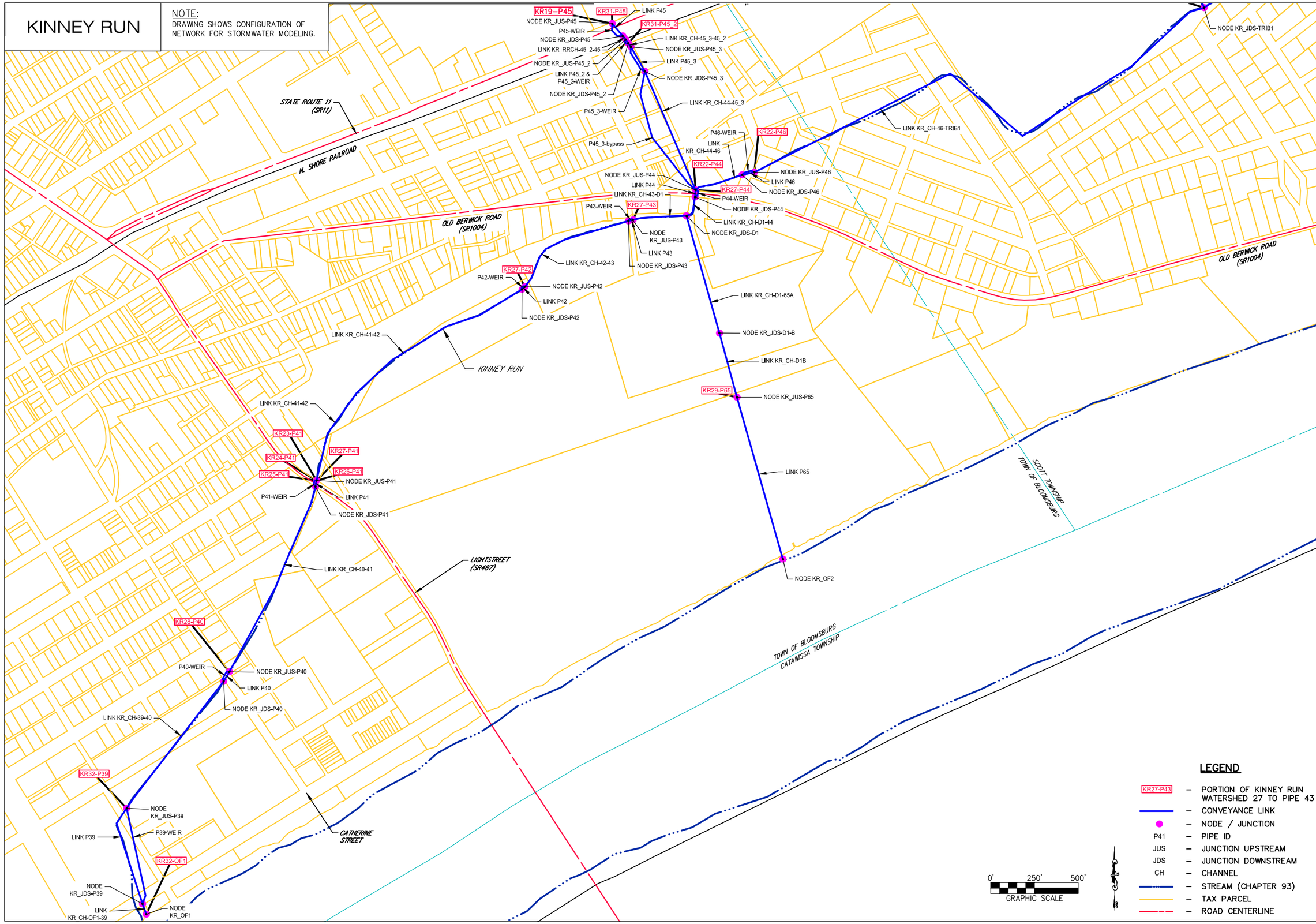
W:\19\19490\DWGS\Civil\Permit DWGs\Drainage Drawings (SSA Refrenced)\Cad Export\19490-Columbia Co-PRE-10-2-2020-1.dwg PDF created: 12/15/2020 7:42 AM By:TJOHNSON

KINNEY RUN

NOTE:
DRAWING SHOWS CONFIGURATION OF NETWORK FOR STORMWATER MODELING.



LEGEND

KR27-P43	–	PORTION OF KINNEY RUN WATERSHED 27 TO PIPE 43
	–	CONVEYANCE LINK
●	–	NODE / JUNCTION
P41	–	PIPE ID
JUS	–	JUNCTION UPSTREAM
JDS	–	JUNCTION DOWNSTREAM
CH	–	CHANNEL
	–	STREAM (CHAPTER 93)
	–	TAX PARCEL
	–	ROAD CENTERLINE

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DATE	PROJECT NO.	SHEET
12-14-20	19490-00	EXH-2

MCTISH-KUNKEL and associates

BLOOMSBURG - LIMERIDGE CORRIDOR
FLOOD STUDY

MODEL SCHEMATIC
KINNEY RUN

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KINNEY RUN

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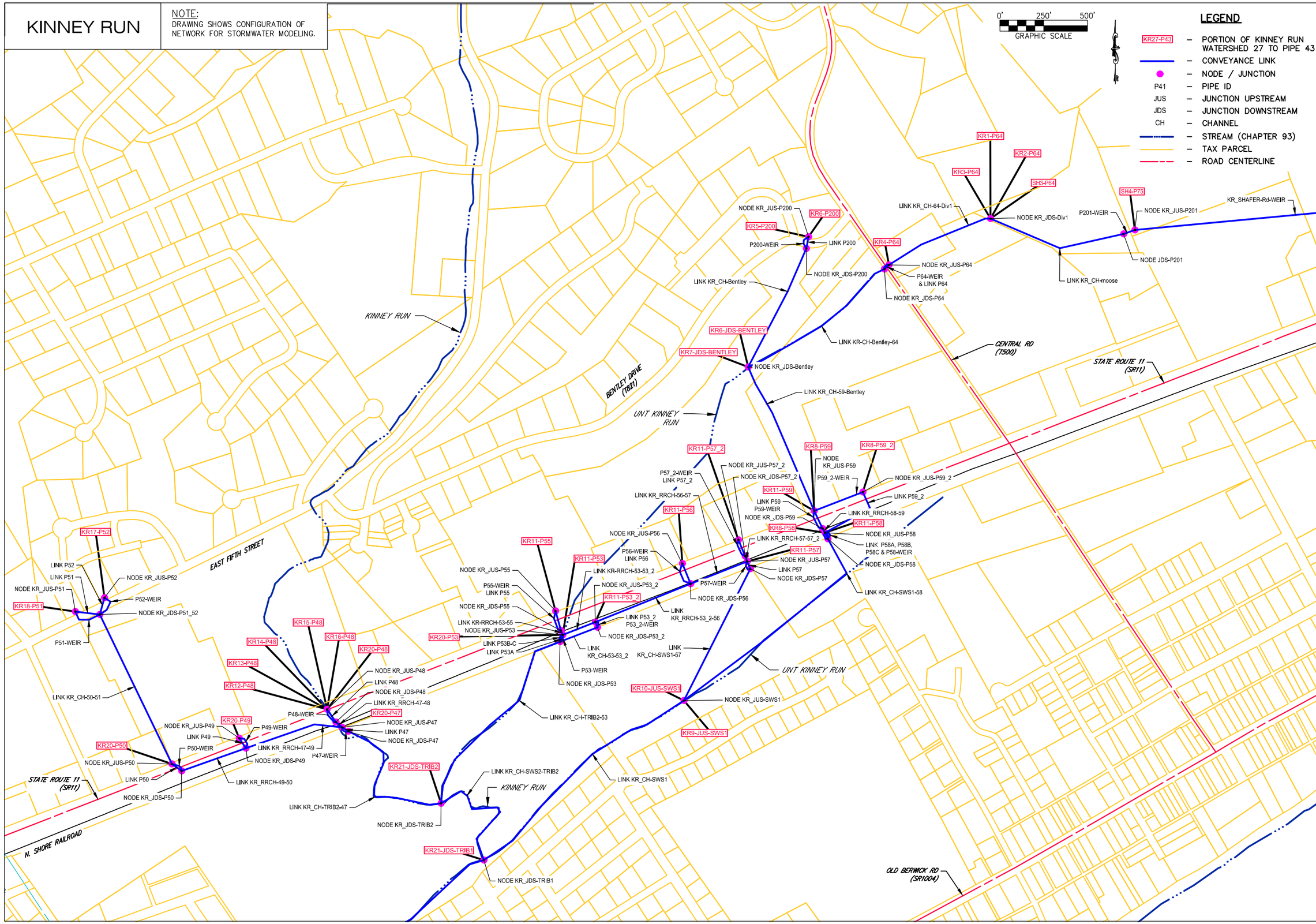

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12-14-20	19490-00	EXH-3

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BLOOMSBURG - LIMERIDGE CORRIDOR
FLOOD STUDY
MODEL SCHEMATIC
KINNEY RUN

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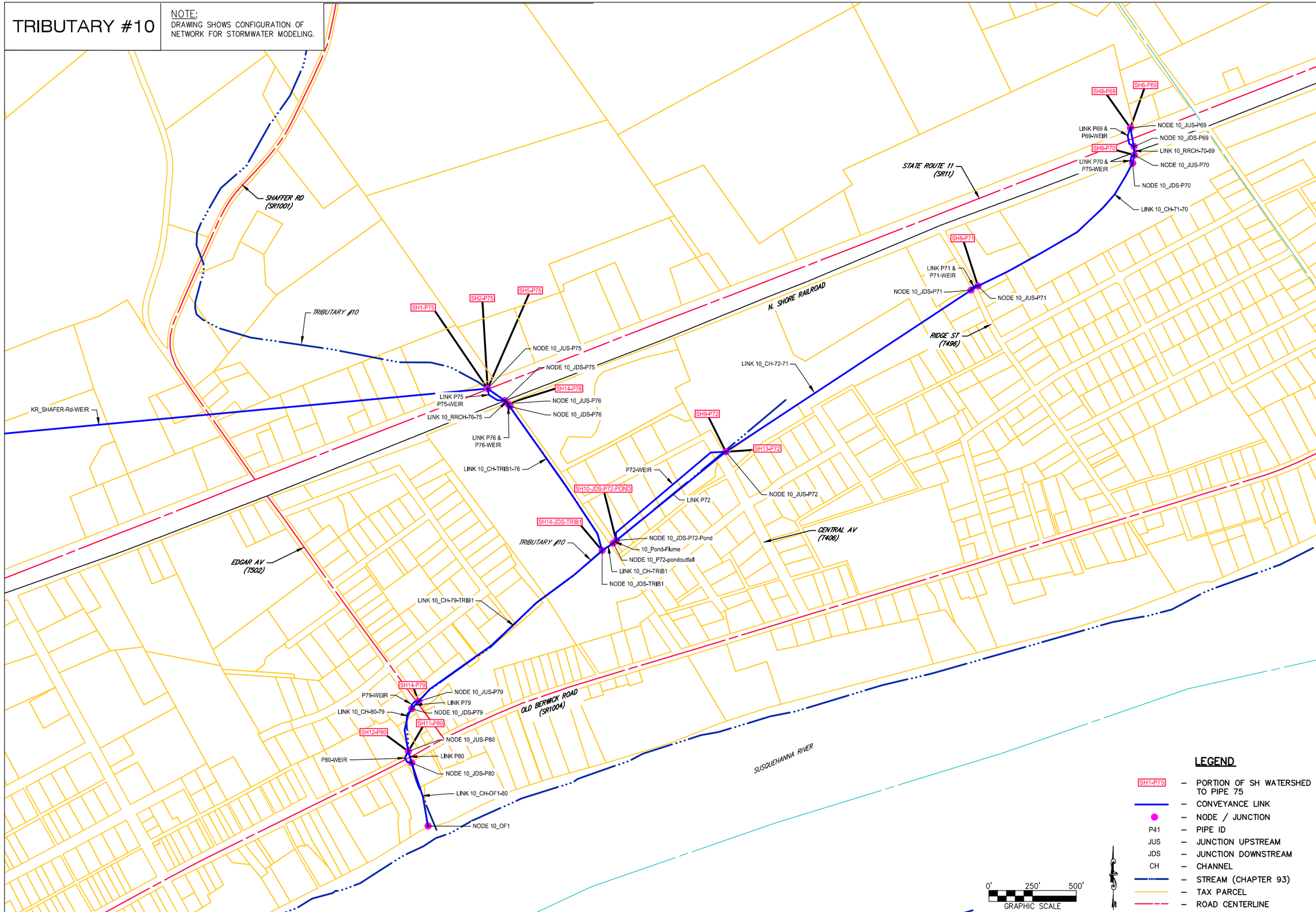
TRIBUTARY #10

NOTE:
DRAWING SHOWS CONFIGURATION OF NETWORK FOR STORMWATER MODELING.



LEGEND

SH1-P75	–	PORTION OF SH WATERSHED 1 TO PIPE 75
	–	CONVEYANCE LINK
●	–	NODE / JUNCTION
P41	–	PIPE ID
JUS	–	JUNCTION UPSTREAM
JDS	–	JUNCTION DOWNSTREAM
CH	–	CHANNEL
	–	STREAM (CHAPTER 93)
	–	TAX PARCEL
	–	ROAD CENTERLINE

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DATE	PROJECT NO.	SHEET
12-14-20	19490-00	EXH-4

MCTISH-KUNKEL and associates

BLOOMSBURG - LIMERIDGE CORRIDOR
FLOOD STUDY

MODEL SCHEMATIC
TRIBUTARY #10

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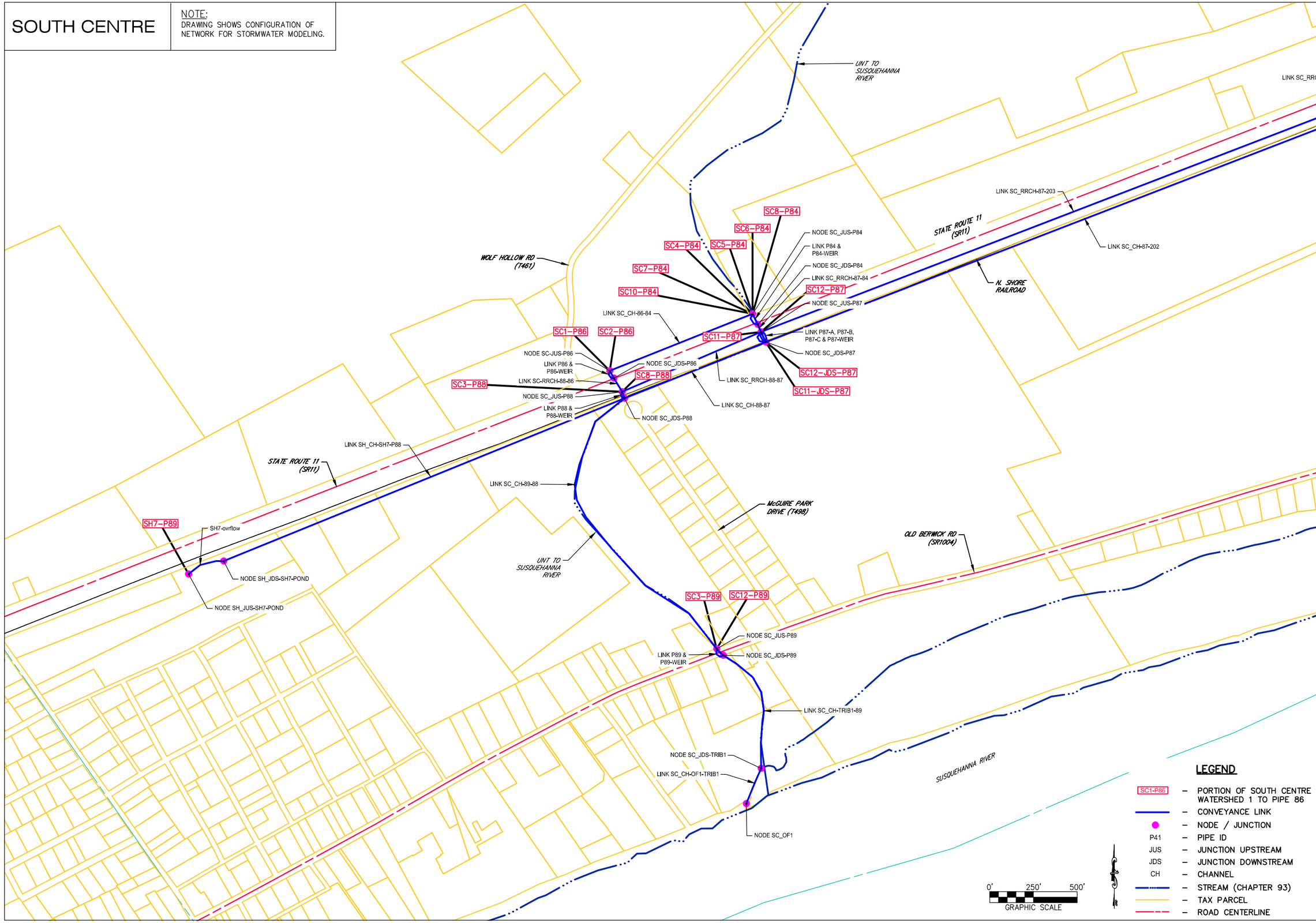
SOUTH CENTRE

NOTE:
DRAWING SHOWS CONFIGURATION OF NETWORK FOR STORMWATER MODELING.



DATE	PROJECT NO.	SHEET
12-14-20	19490-00	EXH-5
PREPARED BY	CHECKED BY	APPROVED BY
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BLOOMSBURG - LIMERIDGE CORRIDOR
FLOOD STUDY

MODEL SCHEMATIC
SOUTH CENTRE

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SOUTH CENTRE

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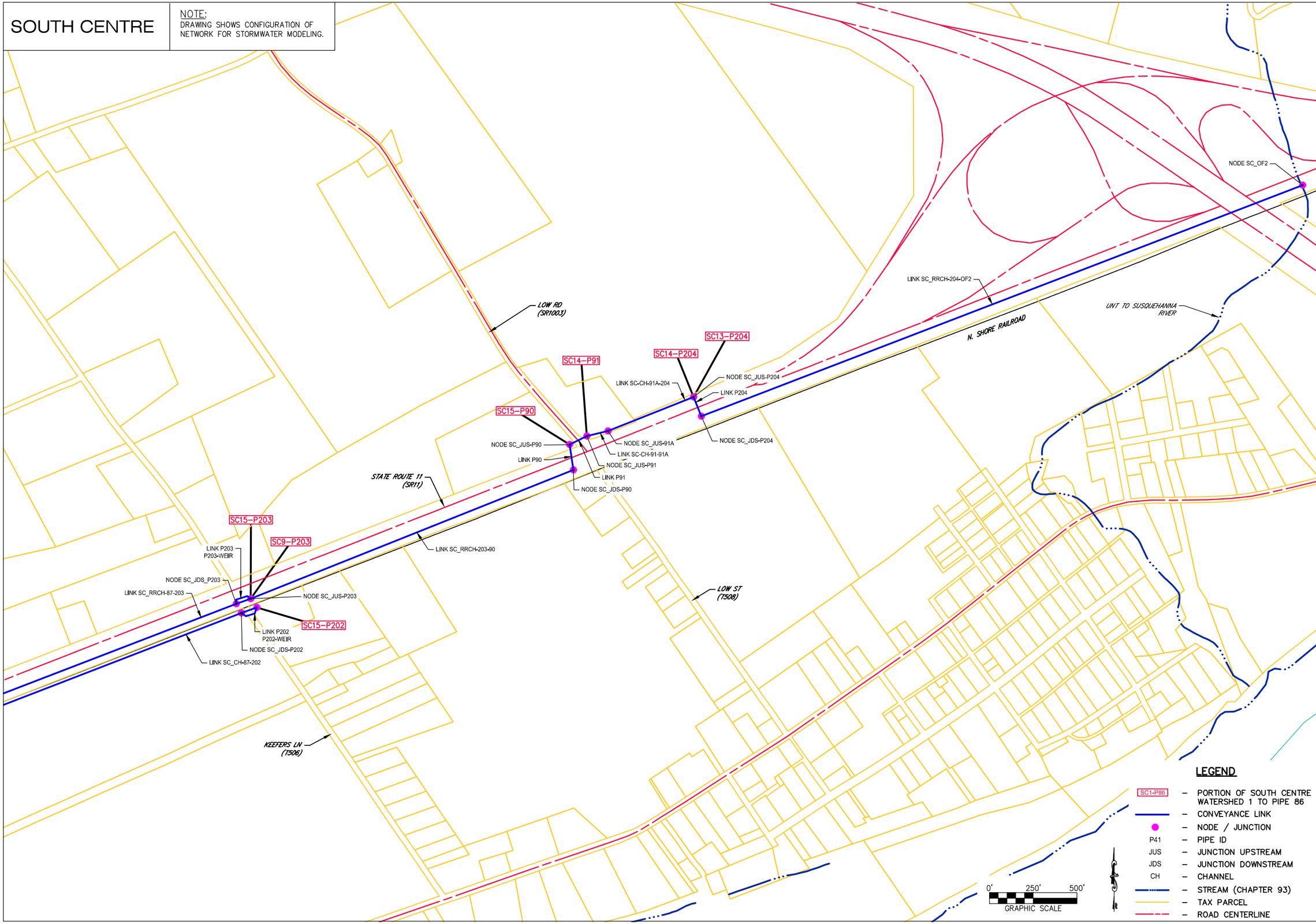

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DATE	PROJECT NO.	SHEET
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BLOOMSBURG - LIMERIDGE CORRIDOR
FLOOD STUDY

MODEL SCHEMATIC
SOUTH CENTRE

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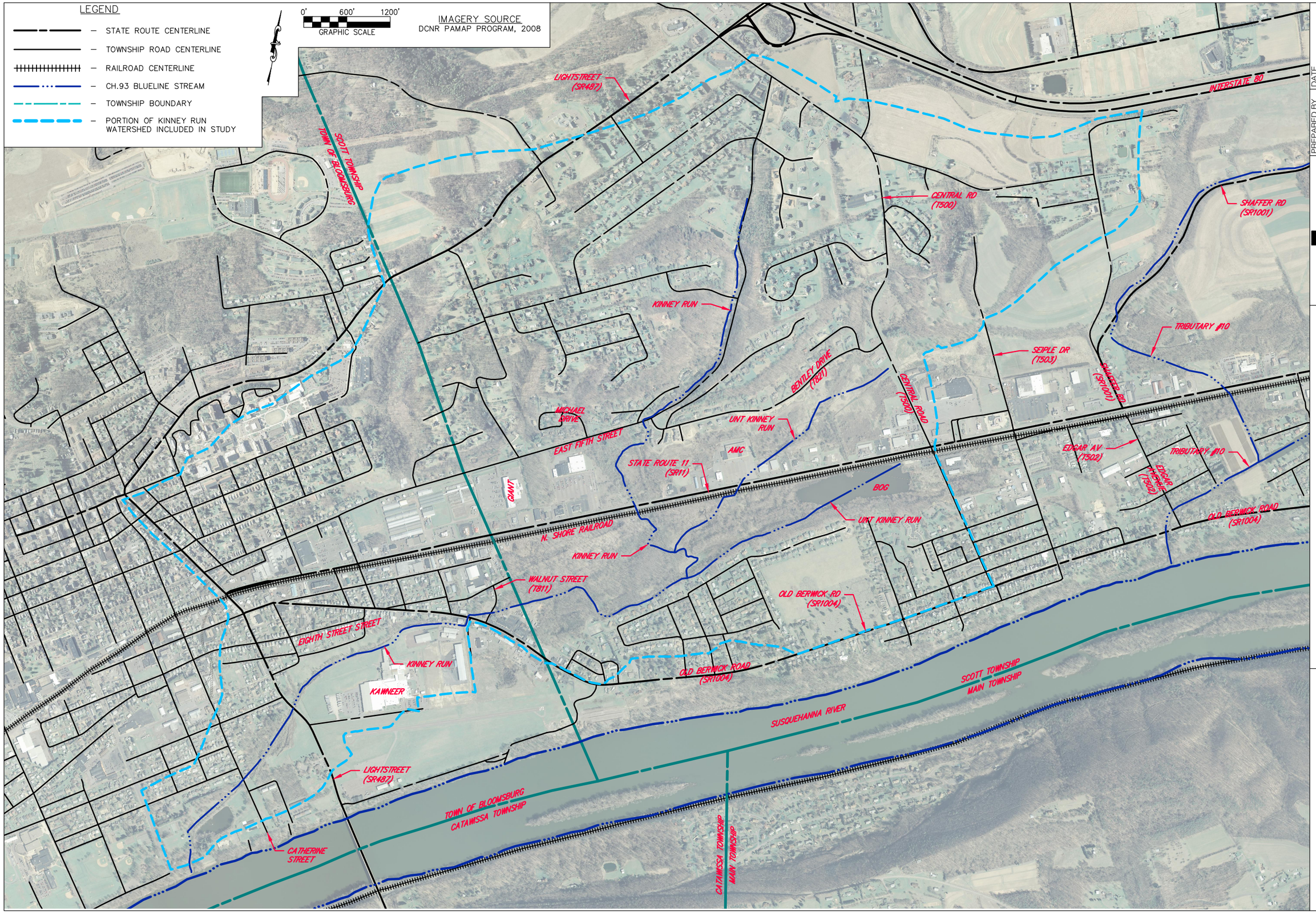
APPENDIX B

MODEL MAPPING EXHIBITS



DATE	PROJECT NO.	SHEET
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BLOOMSBURG - LIMERIDGE CORRIDOR FLOOD STUDY

KINNEY RUN BASE MAP

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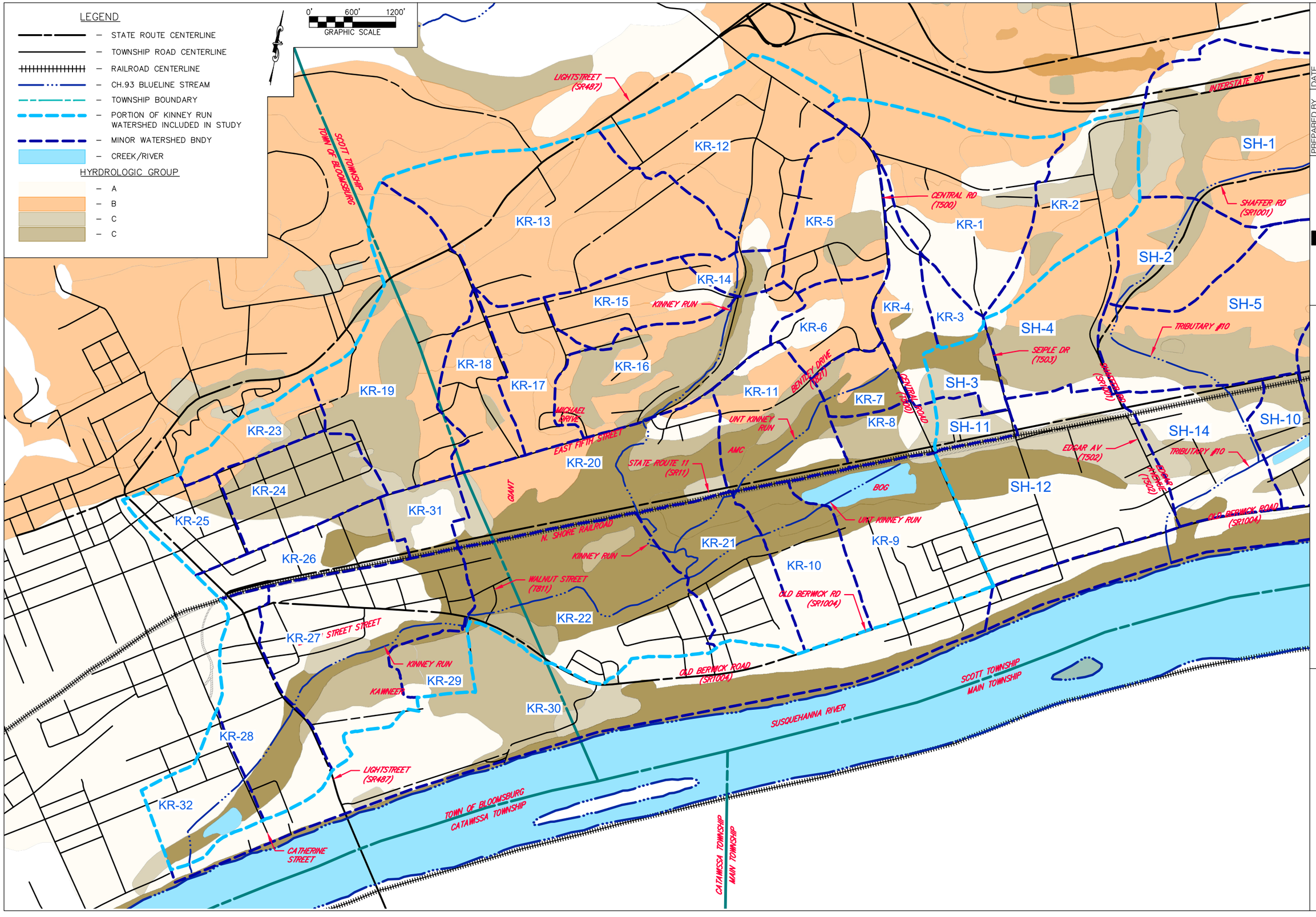

DATE	PROJECT NO.	SHEET
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BLOOMSBURG - LIMERIDGE CORRIDOR FLOOD STUDY

KINNEY RUN SOILS MAP

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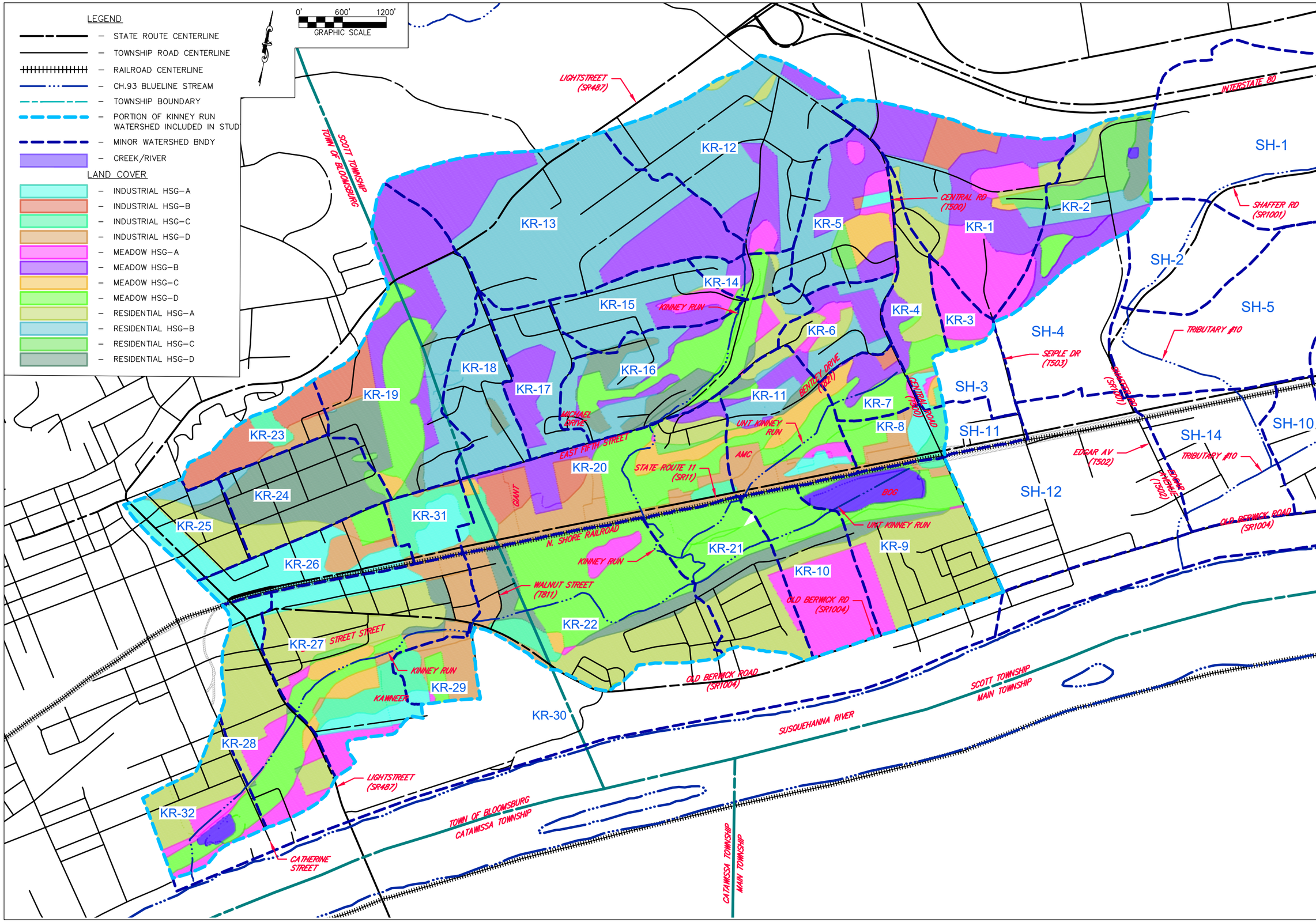

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BLOOMSBURG - LIMERIDGE CORRIDOR
FLOOD STUDY
KINNEY RUN
LANDCOVER MAP

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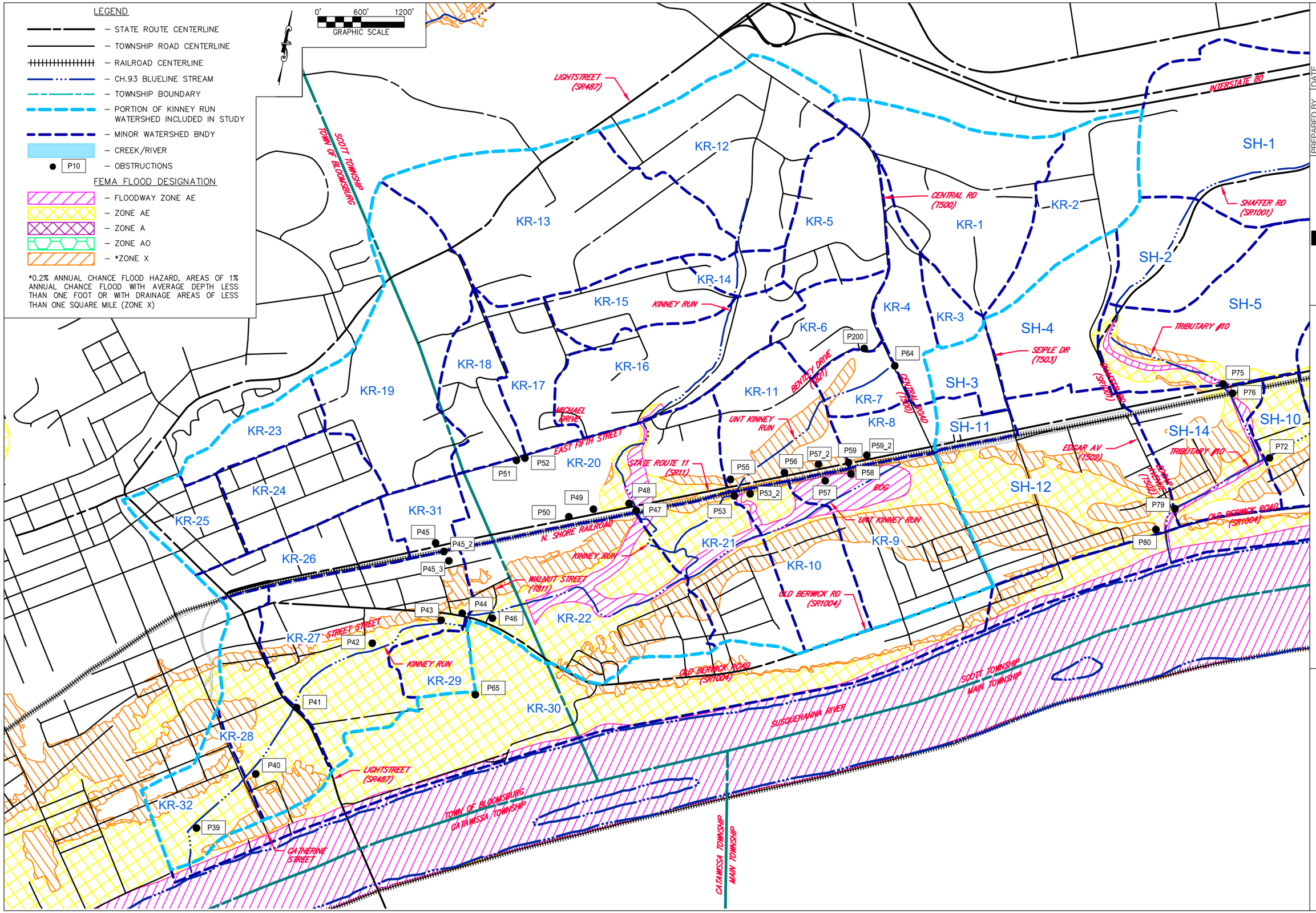

DATE	PROJECT NO.	SHEET
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BLOOMSBURG - LIMERIDGE CORRIDOR

FLOOD STUDY

KINNEY RUN

FLOOD MAP

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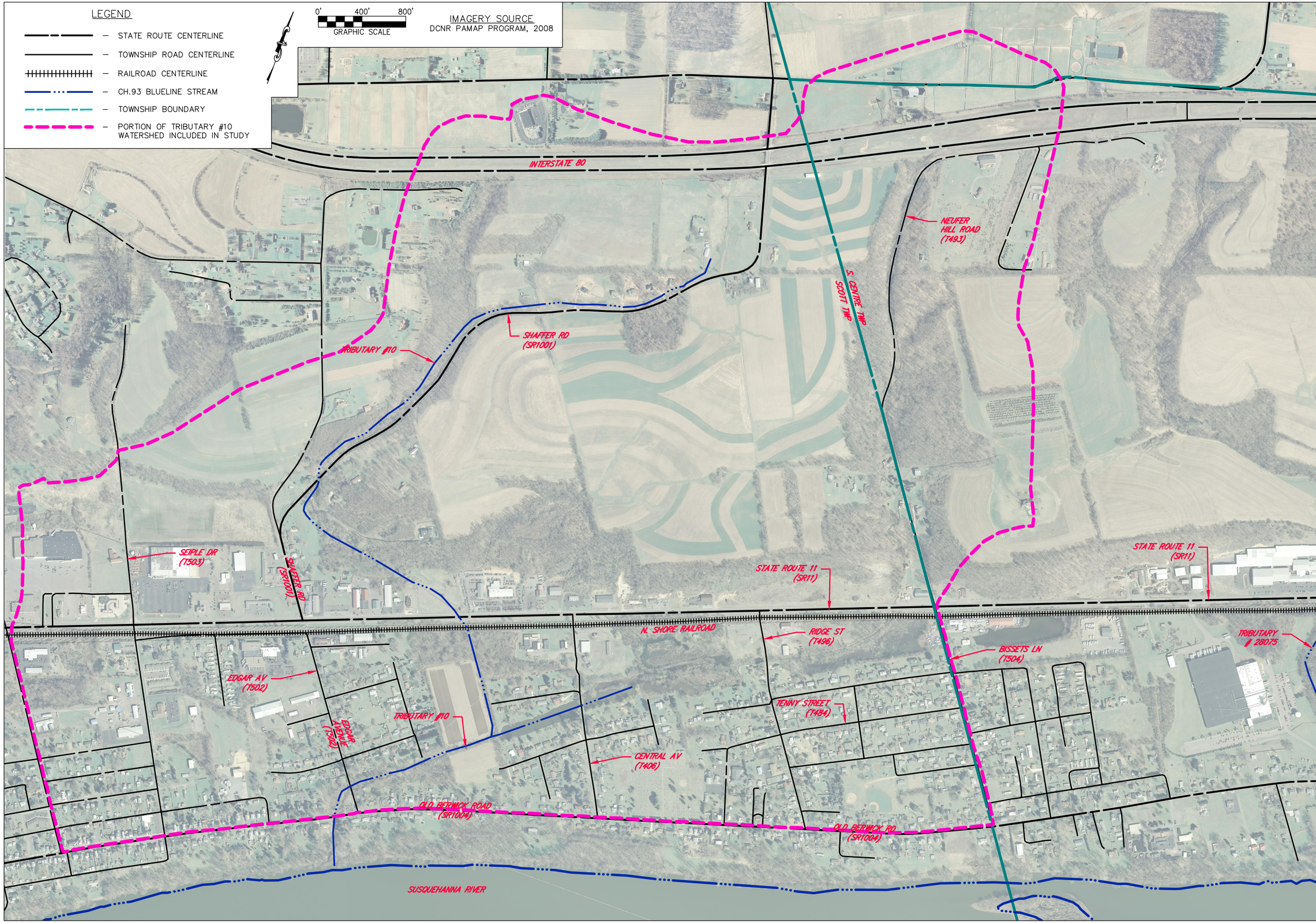

DATE	PROJECT NO.	SHEET
12-4-20	19490-00	EXH-2A
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BLOOMSBURG - LIMERIDGE CORRIDOR FLOOD STUDY

TRIBUTARY #10 BASE MAP

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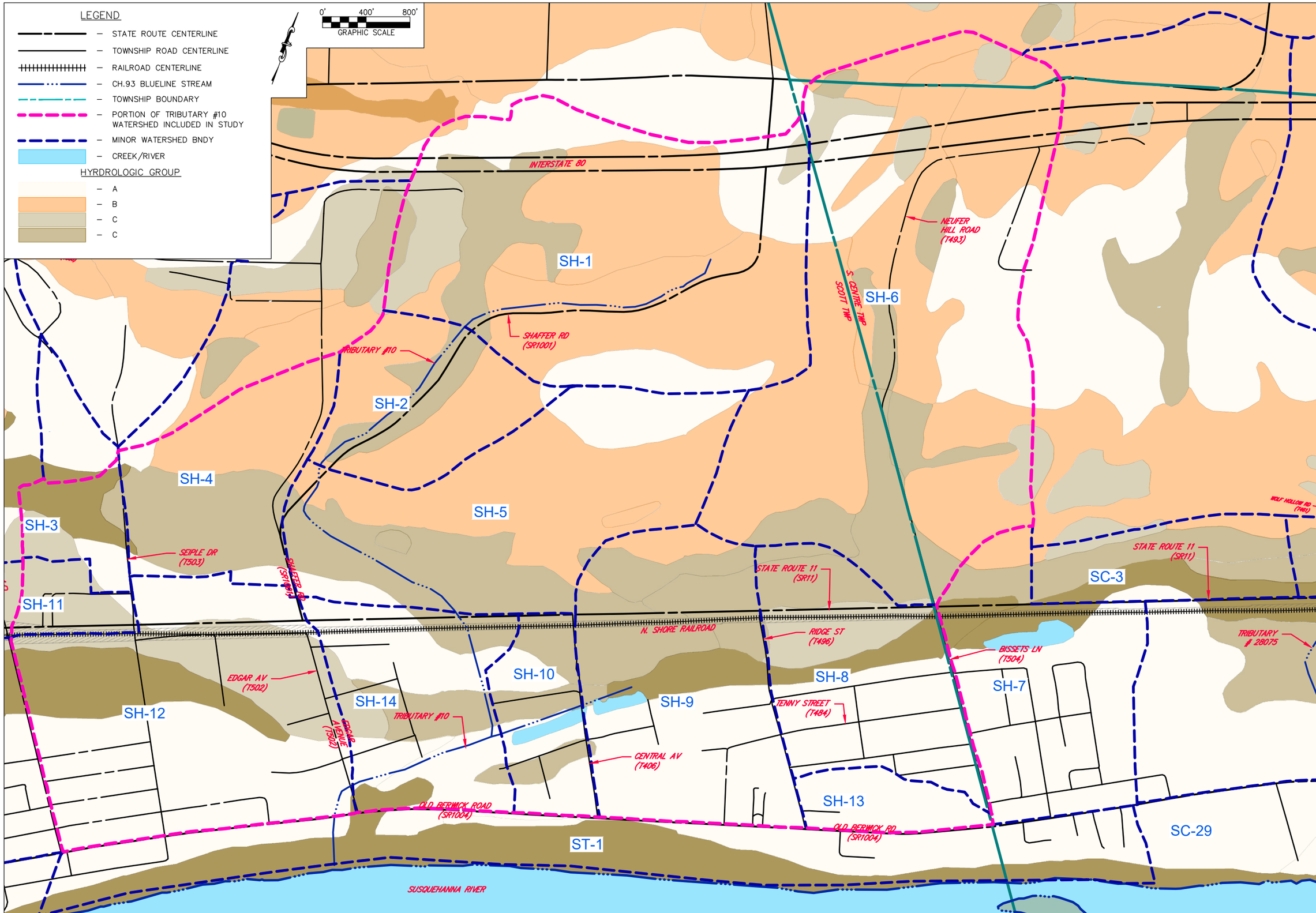

DATE	PROJECT NO.	SHEET
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MCTISH-KUNKEL and associates

BLOOMSBURG - LIMERIDGE CORRIDOR FLOOD STUDY

TRIBUTARY #10 SOILS MAP

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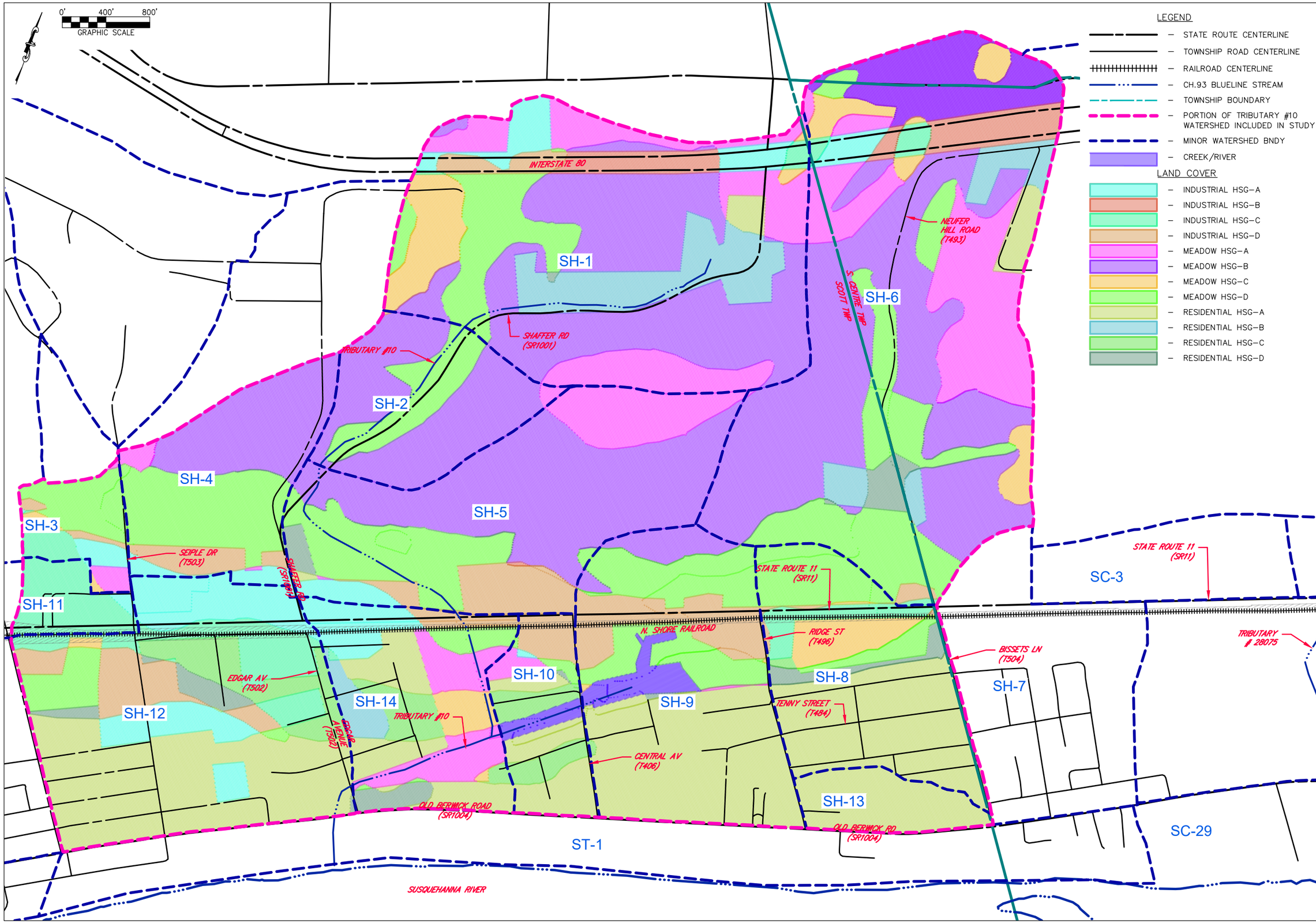

LEGEND

- STATE ROUTE CENTERLINE
- TOWNSHIP ROAD CENTERLINE
- RAILROAD CENTERLINE
- CH.93 BLUELINE STREAM
- TOWNSHIP BOUNDARY
- PORTION OF TRIBUTARY #10 WATERSHED INCLUDED IN STUDY
- MINOR WATERSHED BNDY
- CREEK/RIVER

LAND COVER

- INDUSTRIAL HSG-A
- INDUSTRIAL HSG-B
- INDUSTRIAL HSG-C
- INDUSTRIAL HSG-D
- MEADOW HSG-A
- MEADOW HSG-B
- MEADOW HSG-C
- MEADOW HSG-D
- RESIDENTIAL HSG-A
- RESIDENTIAL HSG-B
- RESIDENTIAL HSG-C
- RESIDENTIAL HSG-D

DATE	PROJECT NO.	SHEET
12-4-20	19490-00	EXH-2C

PREPARED BY	CHECKED BY	APPROVED BY
TRJ	JAF	ADK

MCTISH-KUNKEL and associates

BLOOMSBURG - LIMERIDGE CORRIDOR
FLOOD STUDY
TRIBUTARY #10
LANDCOVER MAP

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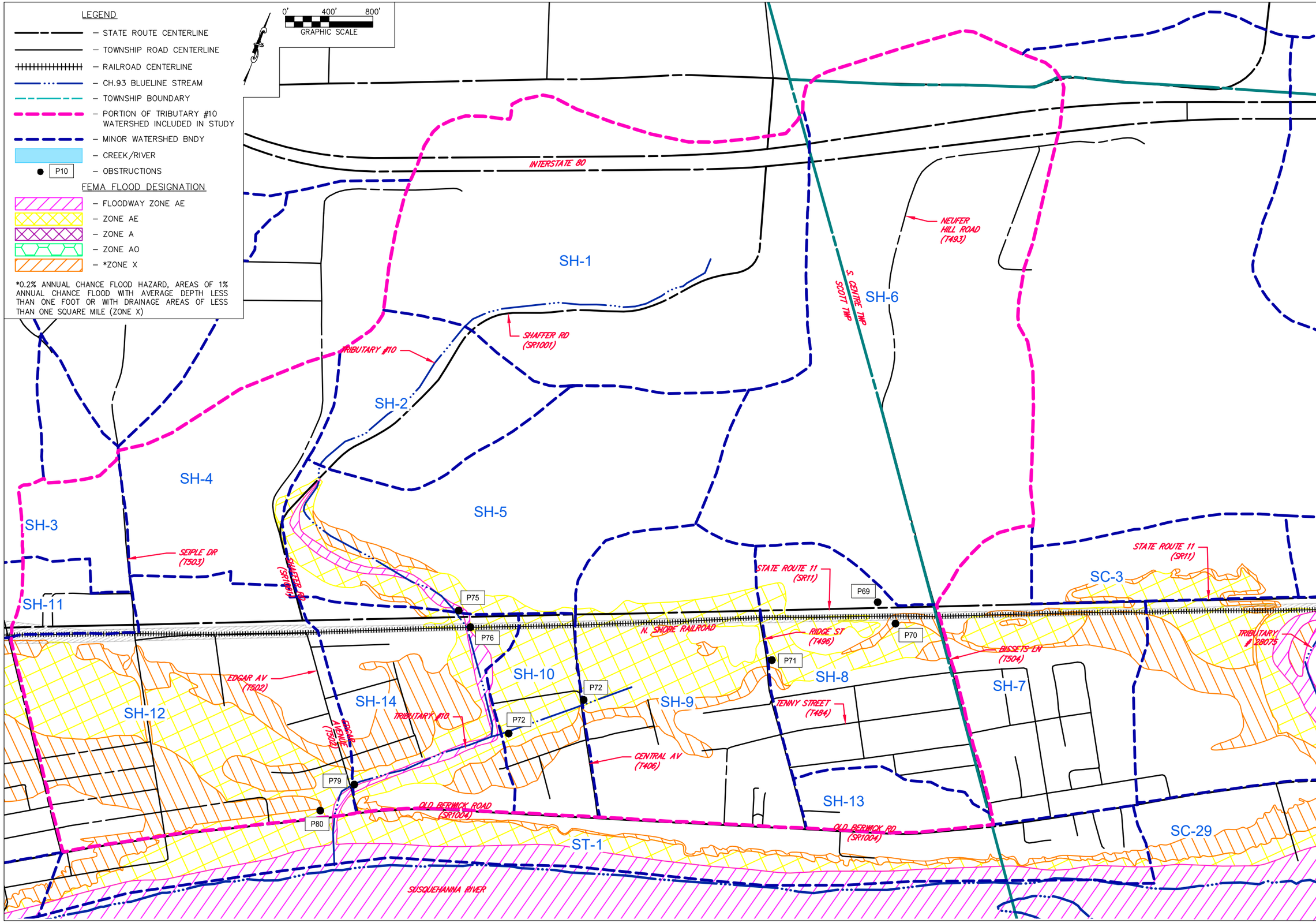

DATE	PROJECT NO.	SHEET
12-4-20	19490-00	EXH-2D

PREPARED BY	CHECKED BY	APPROVED BY
TRJ	JAF	ADK

MCTISH-KUNKEL and associates

BLOOMSBURG - LIMERIDGE CORRIDOR FLOOD STUDY

TRIBUTARY #10 FLOOD MAP

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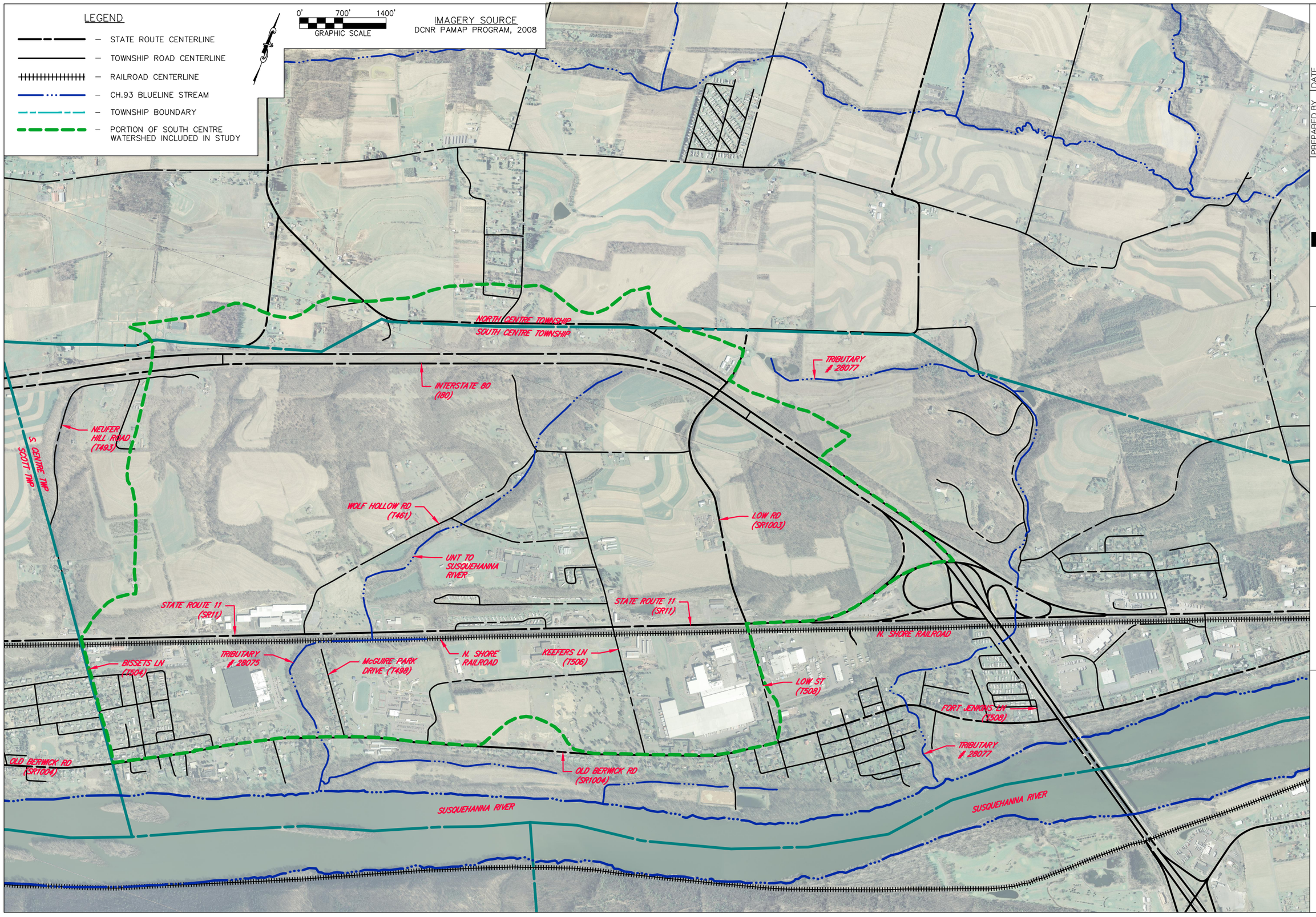

PREPARED BY	CHECKED BY	APPROVED BY	DATE	PROJECT NO.	SHEET
TRJ	JAF	ADK	12-4-20	19490-00	EXH-3A

MCTISH-KUNKEL and associates

BLOOMSBURG - LIMERIDGE CORRIDOR FLOOD STUDY

SOUTH CENTRE WATERSHED BASE MAP

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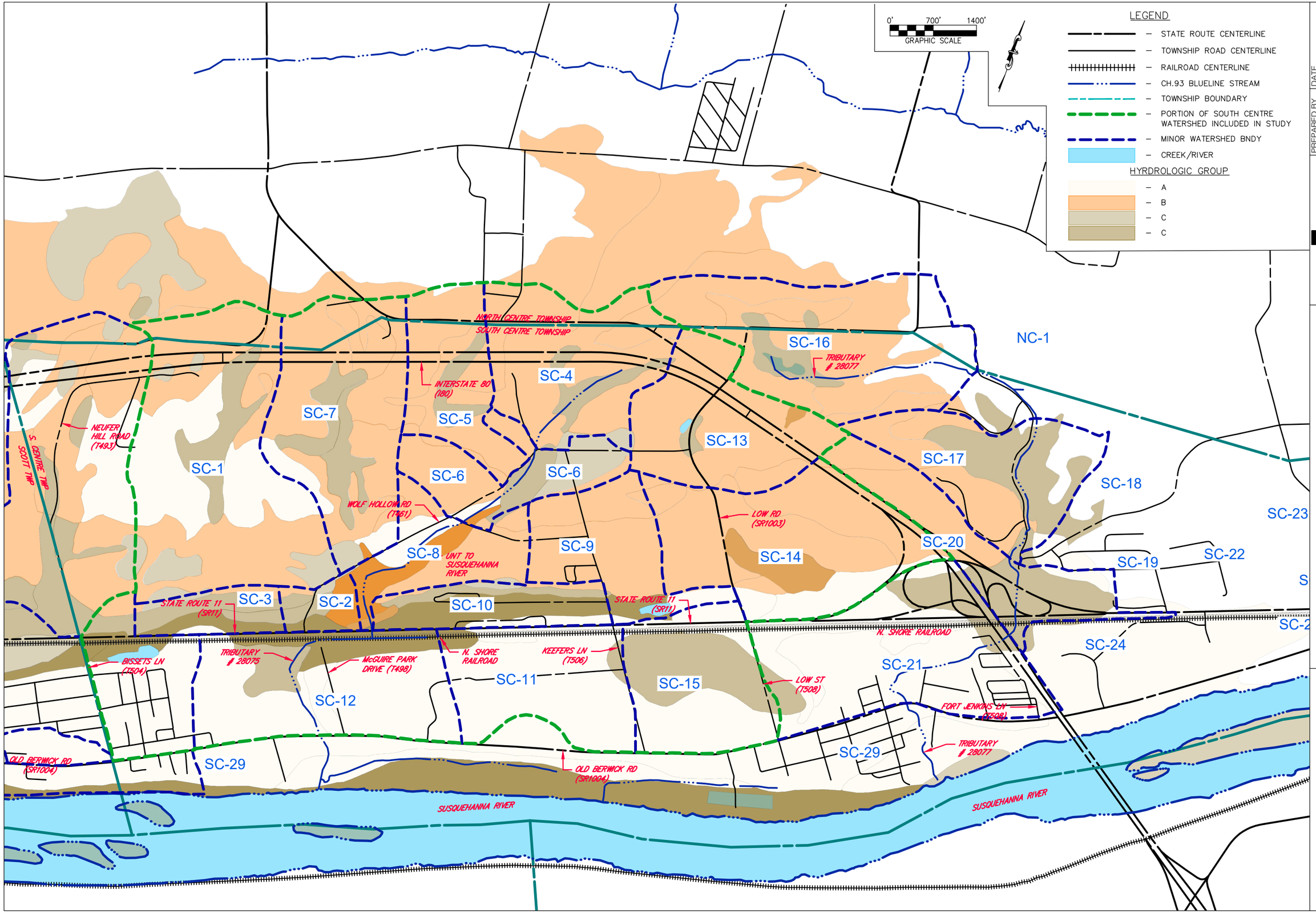

DATE	PROJECT NO.	SHEET
12-4-20	19490-00	EXH-3B

PREPARED BY	CHECKED BY	APPROVED BY
TRJ	JAF	ADK

MCTISH-KUNKEL and associates

BLOOMSBURG - LIMERIDGE CORRIDOR
FLOOD STUDY
SOUTH CENTRE WATERSHED
SOILS MAP

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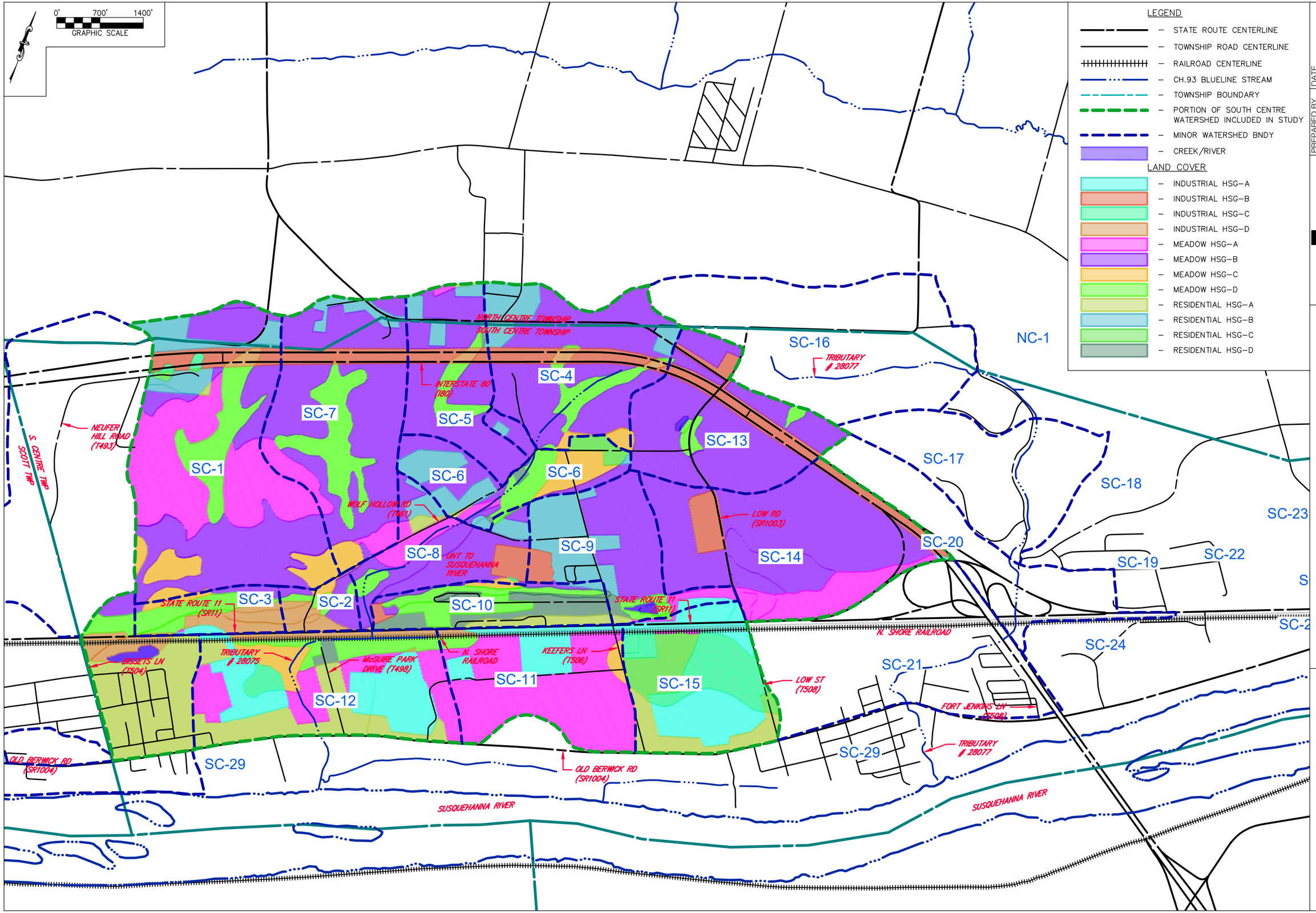

DATE	PROJECT NO.	SHEET
12-4-20	19490-00	EXH-3C

PREPARED BY	CHECKED BY	APPROVED BY
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BLOOMSBURG - LIMERIDGE CORRIDOR FLOOD STUDY

SOUTH CENTRE WATERSHED LANDCOVER MAP

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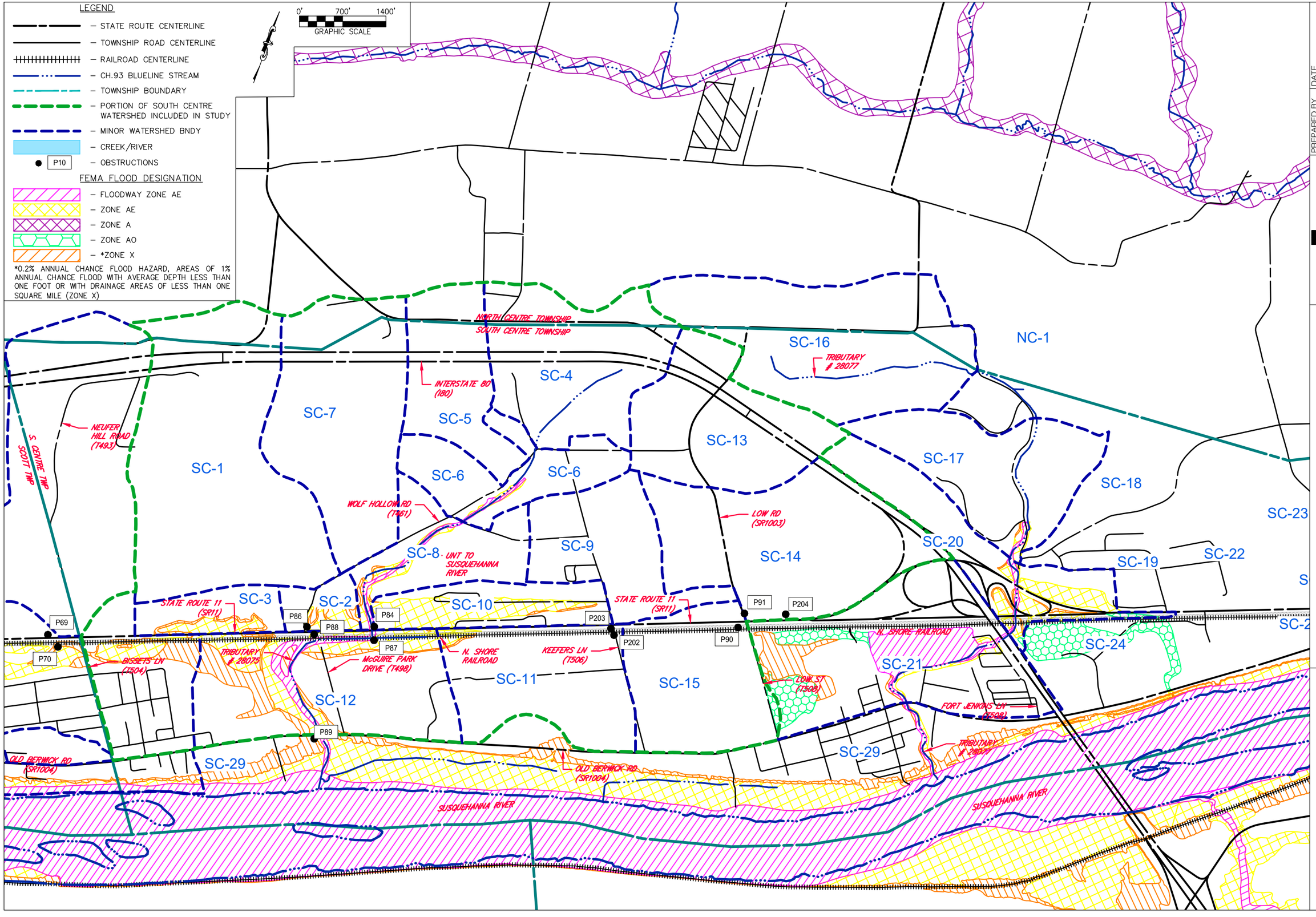

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TRJ	JAF	ADK	12-4-20	19490-00	EXH-3D

MCTISH-KUNKEL and associates

BLOOMSBURG - LIMERIDGE CORRIDOR FLOOD STUDY

SOUTH CENTRE WATERSHED FLOOD MAP

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APPENDIX C

KINNEY RUN
TIME OF CONCENTRATION
LAND USE

Landcover and TOC Calculations

Kinney Run Watersheds

Junction ID	Watershed ID	Landcover	HSG type	Area sq ft	Area ac	CN	Product Area X CN	Weighted CN	Average Slope %	Potential Retention	Flow Length (ft)	Time of Concentration (hr)	Time of Concentration (min)	Additional TOC Travel Dist. To Pipe (ft)	Additional TOC (min)
KR_OF-1															
	KR32-OF1	Meadow	A	188,008.5	4.3	30.0	129.5		1.7						
		Meadow	B	0.0	0.0	58.0	0.0		1.4						
		Meadow	C	2,415.6	0.1	71.0	3.9		0.4						
		Meadow	D	306,080.1	7.0	78.0	548.1		4.5						
		Residential	A	307,554.3	7.1	57.0	402.4								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	0.0	0.0	93.0	0.0								
check		Water	N/A	120,512.9	2.8	100.0	276.7								
21.23		Total		924,571.3	21.2		1,360.6	64.1	2.0	5.6	962.9	0.6	34.0		
KR_JUS-P39															
	KR32-P39	Meadow	A	169,273.5	3.9	30.0	116.6		1.4						
		Meadow	B	0.0	0.0	58.0	0.0		1.5						
		Meadow	C	0.0	0.0	71.0	0.0		1.5						
		Meadow	D	0.0	0.0	78.0	0.0		0.6						
		Residential	A	698,637.2	16.0	57.0	914.2								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	0.0	0.0	93.0	0.0								
check		Water	N/A	0.0	0.0	100.0	0.0								
19.92		Total		867,910.6	19.9		1,030.8	51.7	1.3	9.3	932.9	1.0	57.3		
KR_JUS-P40															
	KR28-P40	Meadow	A	508,305.4	11.7	30.0	350.1		0.3						
		Meadow	B	0.0	0.0	58.0	0.0		1						
		Meadow	C	40,443.8	0.9	71.0	65.9		0.8						
		Meadow	D	536,929.1	12.3	78.0	961.4		0.1						
		Residential	A	1,267,681.6	29.1	57.0	1,658.8								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	16,673.1	0.4	86.0	32.9								
		Industrial	A	264,718.7	6.1	81.0	492.2								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	0.0	0.0	93.0	0.0								
check		Water	N/A	0.0	0.0	100.0	0.0								
60.49		Total		2,634,751.7	60.5		3,561.4	58.9	0.6	7.0	1625.4	1.9	112.6		

Junction ID	Watershed ID	Landcover	HSG type	Area sq ft	Area ac	CN	Product Area X CN	Weighted CN	Average Slope %	Potential Retention	Flow Length (ft)	Time of Concentration (hr)	Time of Concentration (min)	Additional TOC Travel Dist. To Pipe (ft)	Additional TOC (min)
KR_JUS-P41															
	KR27-P41	Meadow	A	325,060.8	7.5	30.0	223.9		1.4						
		Meadow	B	0.0	0.0	58.0	0.0		0.9						
		Meadow	C	374,885.0	8.6	71.0	611.0		0.2						
		Meadow	D	319,181.2	7.3	78.0	571.5		0.7						
		Residential	A	1,147,920.1	26.4	57.0	1,502.1								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	57,731.6	1.3	81.0	107.3								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	569,101.3	13.1	81.0	1,058.2								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	292,182.8	6.7	91.0	610.4								
area		Industrial	D	16,456.3	0.4	93.0	35.1								
check		Water	N/A	0.0	0.0	100.0	0.0								
71.22		Total		3,102,519.1	71.2		4,719.7	66.3	0.8	5.1	1763.8	1.4	82.4		
	KR23-P41	Meadow	A	0.0	0.0	30.0	0.0		5.7						
		Meadow	B	0.0	0.0	58.0	0.0		5.7						
		Meadow	C	0.0	0.0	71.0	0.0		4.4						
		Meadow	D	0.0	0.0	78.0	0.0		0.1						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	774,926.7	17.8	88.0	1,565.5								
		Industrial	C	170,476.2	3.9	91.0	356.1								
area		Industrial	D	204,604.6	4.7	93.0	436.8								
check		Water	N/A	0.0	0.0	100.0	0.0								
26.40		Total		1,150,007.5	26.4		2,358.5	89.3	4.0	1.2	1073.9	0.2	12.2		
	KR24-P41	Meadow	A	0.0	0.0	30.0	0.0		-4.1						
		Meadow	B	0.0	0.0	58.0	0.0		-10						
		Meadow	C	0.0	0.0	71.0	0.0		-15.3						
		Meadow	D	0.0	0.0	78.0	0.0		4.3						
		Residential	A	338,049.1	7.8	57.0	442.3								
		Residential	B	65,551.5	1.5	72.0	108.4								
		Residential	C	85,050.6	2.0	81.0	158.2								
		Residential	D	1,848,097.7	42.4	86.0	3,648.7								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	0.0	0.0	93.0	0.0								
check		Water	N/A	0.0	0.0	100.0	0.0								
53.64		Total		2,336,748.9	53.6		4,357.5	81.2	6.3	2.3	1530.8	0.3	17.2		

Junction ID	Watershed ID	Landcover	HSG type	Area sq ft	Area ac	CN	Product Area X CN	Weighted CN	Average Slope %	Potential Retention	Flow Length (ft)	Time of Concentration (hr)	Time of Concentration (min)	Additional TOC Travel Dist. To Pipe (ft)	Additional TOC (min)
	KR25-P41	Meadow	A	0.0	0.0	30.0	0.0		2.4						
		Meadow	B	0.0	0.0	58.0	0.0		5.8						
		Meadow	C	0.0	0.0	71.0	0.0		3.7						
		Meadow	D	0.0	0.0	78.0	0.0		7.2						
		Residential	A	561,376.2	12.9	57.0	734.6								
		Residential	B	223,211.9	5.1	72.0	368.9								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	128,449.3	2.9	86.0	253.6								
		Industrial	A	479,147.4	11.0	81.0	891.0								
		Industrial	B	2,810.8	0.1	88.0	5.7								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	0.0	0.0	93.0	0.0								
check		Water	N/A	0.0	0.0	100.0	0.0								
32.02		Total		1,394,995.6	32.0		2,253.8	70.4	4.8	4.2	1182.7	0.4	22.0		
	KR26-P41	Meadow	A	0.0	0.0	30.0	0.0		1.1						
		Meadow	B	0.0	0.0	58.0	0.0		0.2						
		Meadow	C	0.0	0.0	71.0	0.0		0.5						
		Meadow	D	218,024.3	5.0	78.0	390.4		0.1						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	1,165,910.4	26.8	81.0	2,168.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	24,929.3	0.6	91.0	52.1								
area		Industrial	D	349,496.1	8.0	93.0	746.2								
check		Water	N/A	0.0	0.0	100.0	0.0								
40.37		Total		1,758,360.1	40.4		3,356.7	83.2	0.5	2.0	1327.9	0.9	52.2		
KR_JUS-P42															
	KR27-P42	Meadow	A	9,604.7	0.2	30.0	6.6		1.7						
		Meadow	B	0.0	0.0	58.0	0.0		1.4						
		Meadow	C	4,613.2	0.1	71.0	7.5		0.5						
		Meadow	D	70,604.4	1.6	78.0	126.4		0.4						
		Residential	A	606,078.0	13.9	57.0	793.1								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	156,499.8	3.6	86.0	309.0								
		Industrial	A	286,022.4	6.6	81.0	531.9								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	148,385.9	3.4	91.0	310.0								
area		Industrial	D	214,617.1	4.9	93.0	458.2								
check		Water	N/A	0.0	0.0	100.0	0.0								
34.35		Total		1,496,425.5	34.4		2,542.7	74.0	1.0	3.5	1225.0	0.7	44.6		

Junction ID	Watershed ID	Landcover	HSG type	Area sq ft	Area ac	CN	Product Area X CN	Weighted CN	Average Slope %	Potential Retention	Flow Length (ft)	Time of Concentration (hr)	Time of Concentration (min)	Additional TOC Travel Dist. To Pipe (ft)	Additional TOC (min)
KR_JUS-P43															
	KR27-P43	Meadow	A	0.0	0.0	30.0	0.0		0						
		Meadow	B	0.0	0.0	58.0	0.0		1.2						
		Meadow	C	0.0	0.0	71.0	0.0		1.1						
		Meadow	D	0.0	0.0	78.0	0.0		0.8						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	70,642.9	1.6	93.0	150.8								
check		Water	N/A	0.0	0.0	100.0	0.0								
1.62		Total		70,642.9	1.6		150.8	93.0	0.8	0.8	266.2	0.1	7.7		
KR_JUS-P65															
	KR29-P65	Meadow	A	9,303.4	0.2	30.0	6.4		0.8						
		Meadow	B	0.0	0.0	58.0	0.0		0.1						
		Meadow	C	283.3	0.0	71.0	0.5		0.1						
		Meadow	D	158,402.4	3.6	78.0	283.6		0						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	56,227.3	1.3	81.0	104.6								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	185,703.2	4.3	91.0	388.0								
area		Industrial	D	451,930.6	10.4	93.0	964.9								
check		Water	N/A	0.0	0.0	100.0	0.0								
19.79		Total		861,850.3	19.8		1,747.9	88.3	0.3	1.3	929.6	0.7	44.9		
KR_JUS-P44															
	KR27-P44	Meadow	A	0.0	0.0	30.0	0.0		1.8						
		Meadow	B	0.0	0.0	58.0	0.0		1.4						
		Meadow	C	0.0	0.0	71.0	0.0		1.5						
		Meadow	D	0.0	0.0	78.0	0.0		0.3						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	334,168.7	7.7	93.0	713.4								
check		Water	N/A	0.0	0.0	100.0	0.0								
7.67		Total		334,168.7	7.7		713.4	93.0	1.3	0.8	578.9	0.2	11.3		

Junction ID	Watershed ID	Landcover	HSG type	Area sq ft	Area ac	CN	Product Area X CN	Weighted CN	Average Slope %	Potential Retention	Flow Length (ft)	Time of Concentration (hr)	Time of Concentration (min)	Additional TOC Travel Dist. To Pipe (ft)	Additional TOC (min)
	KR22-P44	Meadow	A	0.0	0.0	30.0	0.0		1.7						
		Meadow	B	0.0	0.0	58.0	0.0		1.8						
		Meadow	C	0.0	0.0	71.0	0.0		0.1						
		Meadow	D	0.0	0.0	78.0	0.0		0.1						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	3,612.5	0.1	91.0	7.5								
area		Industrial	D	336,930.2	7.7	93.0	719.3								
check		Water	N/A	0.0	0.0	100.0	0.0								
7.82		Total		340,542.7	7.8		726.9	93.0	0.9	0.8	584.4	0.2	13.3		
KR_JUS-P45_2															
	KR31-P45_2	Meadow	A	0.0	0.0	30.0	0.0		0.3						
		Meadow	B	0.0	0.0	58.0	0.0		0.1						
		Meadow	C	0.0	0.0	71.0	0.0		7.6						
		Meadow	D	0.0	0.0	78.0	0.0		4.4						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	57,784.7	1.3	93.0	123.4								
check		Water	N/A	0.0	0.0	100.0	0.0								
1.33		Total		57,784.7	1.3		123.4	93.0	3.1	0.8	240.7	0.1	3.6		
KR_JUS-P45															
	KR31-P45	Meadow	A	0.0	0.0	30.0	0.0		2.7						
		Meadow	B	0.0	0.0	58.0	0.0		2.4						
		Meadow	C	0.0	0.0	71.0	0.0		1.8						
		Meadow	D	0.0	0.0	78.0	0.0		0.1						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	366,156.7	8.4	81.0	680.9								
		Industrial	B	16,558.6	0.4	88.0	33.4								
		Industrial	C	424,935.2	9.8	91.0	887.7								
area		Industrial	D	56,294.9	1.3	93.0	120.2								
check		Water	N/A	0.0	0.0	100.0	0.0								
19.83		Total		863,945.4	19.8		1,722.2	86.8	1.8	1.5	930.8	0.3	18.0		

Junction ID	Watershed ID	Landcover	HSG type	Area sq ft	Area ac	CN	Product Area X CN	Weighted CN	Average Slope %	Potential Retention	Flow Length (ft)	Time of Concentration (hr)	Time of Concentration (min)	Additional TOC Travel Dist. To Pipe (ft)	Additional TOC (min)
	KR19-P45	Meadow	A	0.0	0.0	30.0	0.0		0.1						
		Meadow	B	1,666,238.9	38.3	58.0	2,218.6		10						
		Meadow	C	62,854.1	1.4	71.0	102.4		11.1						
		Meadow	D	1,165,976.7	26.8	78.0	2,087.8		12.3						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	1,230,702.6	28.3	72.0	2,034.2								
		Residential	C	39,600.6	0.9	81.0	73.6								
		Residential	D	656,092.9	15.1	86.0	1,295.3								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	426,170.2	9.8	88.0	860.9								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	24,333.8	0.6	93.0	51.9								
check		Water	N/A	0.0	0.0	100.0	0.0								
121.03		Total		5,271,969.7	121.0		8,724.9	72.1	8.4	3.9	2,299.3	0.4	26.9		
KR_JUS-P46															
	KR22-P46	Meadow	A	218,800.8	5.0	30.0	150.7		0.2						
		Meadow	B	0.0	0.0	58.0	0.0		0.2						
		Meadow	C	51,775.3	1.2	71.0	84.4		0.5						
		Meadow	D	2,565,529.6	58.9	78.0	4,593.9		0.8						
		Residential	A	1,377,542.1	31.6	57.0	1,802.6								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	5,739.3	0.1	81.0	10.7								
		Residential	D	584,422.5	13.4	86.0	1,153.8								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	244,766.4	5.6	91.0	511.3								
area		Industrial	D	67,293.7	1.5	93.0	143.7								
check		Water	N/A	0.0	0.0	100.0	0.0								
117.44		Total		5,115,869.7	117.4		8,451.1	72.0	0.4	3.9	2,265.0	2.0	118.6		
KR_JDS-TRIB1															
	KR21-JDS-TRIB1	Meadow	A	115,394.6	2.6	30.0	79.5		1						
		Meadow	B	0.0	0.0	58.0	0.0		0.9						
		Meadow	C	0.0	0.0	71.0	0.0		0.2						
		Meadow	D	522,472.2	12.0	78.0	935.6		0						
		Residential	A	1,060,906.1	24.4	57.0	1,388.2								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	307,848.1	7.1	86.0	607.8								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	0.0	0.0	93.0	0.0								
check		Water	N/A	0.0	0.0	100.0	0.0								
46.07		Total		2,006,620.9	46.1		3,011.0	65.4	0.5	5.3	1418.5	1.5	87.5		

Junction ID	Watershed ID	Landcover	HSG type	Area sq ft	Area ac	CN	Product Area X CN	Weighted CN	Average Slope %	Potential Retention	Flow Length (ft)	Time of Concentration (hr)	Time of Concentration (min)	Additional TOC Travel Dist. To Pipe (ft)	Additional TOC (min)
KR_JUS-SWS1															
	KR10-JUS-SWS1	Meadow	A	1,256,758.2	28.9	30.0	865.5		0.4						
		Meadow	B	0.0	0.0	58.0	0.0		0						
		Meadow	C	0.0	0.0	71.0	0.0		0.2						
		Meadow	D	681,945.6	15.7	78.0	1,221.1		0.9						
		Residential	A	141,960.5	3.3	57.0	185.8								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	168,883.7	3.9	86.0	333.4								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	0.0	0.0	93.0	0.0								
check		Water	N/A	181.8	0.0	100.0	0.4								
51.65		Total		2,249,729.8	51.6		2,606.3	50.5	0.4	9.8	1502.0	2.6	158.3		
	KR9-JUS-SWS1	Meadow	A	283,602.7	6.5	30.0	195.3		0.8						
		Meadow	B	0.0	0.0	58.0	0.0		0.8						
		Meadow	C	0.0	0.0	71.0	0.0		0.5						
		Meadow	D	557,253.8	12.8	78.0	997.8		0.9						
		Residential	A	2,058,419.4	47.3	57.0	2,693.5								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	171,522.9	3.9	86.0	338.6								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	41,410.8	1.0	91.0	86.5								
area		Industrial	D	54,206.9	1.2	93.0	115.7								
check		Water	N/A	644,630.0	14.8	100.0	1,479.9								
87.49		Total		3,811,046.4	87.5		5,907.4	67.5	0.8	4.8	1954.9	1.5	89.4		
KR_JUS-P58															
	KR11-P58	Meadow	A	0.0	0.0	30.0	0.0		11.1						
		Meadow	B	0.0	0.0	58.0	0.0		0.7						
		Meadow	C	0.0	0.0	71.0	0.0		0.5						
		Meadow	D	0.0	0.0	78.0	0.0		2						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	13,148.1	0.3	93.0	28.1								
check		Water	N/A	0.0	0.0	100.0	0.0								
0.30		Total		13,148.1	0.3		28.1	93.00	3.58	0.75	114.82	0.03	1.8		

Junction ID	Watershed ID	Landcover	HSG type	Area sq ft	Area ac	CN	Product Area X CN	Weighted CN	Average Slope %	Potential Retention	Flow Length (ft)	Time of Concentration (hr)	Time of Concentration (min)	Additional TOC Travel Dist. To Pipe (ft)	Additional TOC (min)
	KR8-P58	Meadow	A	0.0	0.0	30.0	0.0		0.3						
		Meadow	B	0.0	0.0	58.0	0.0		1.8						
		Meadow	C	0.0	0.0	71.0	0.0		1.7						
		Meadow	D	0.0	0.0	78.0	0.0		0.5						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	165,705.6	3.8	81.0	308.1								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	172,009.6	3.9	91.0	359.3								
area		Industrial	D	92,983.0	2.1	93.0	198.5								
check		Water	N/A	0.0	0.0	100.0	0.0								
9.89		Total		430,698.2	9.9		866.0	87.6	1.1	1.4	657.2	0.3	16.9		
KR_JUS-P59_2															
	KR8-P59_2	Meadow	A	0.0	0.0	30.0	0.0		0.6						
		Meadow	B	0.0	0.0	58.0	0.0		0						
		Meadow	C	0.0	0.0	71.0	0.0		0.3						
		Meadow	D	0.0	0.0	78.0	0.0		0.1						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	101,729.5	2.3	93.0	217.2								
check		Water	N/A	0.0	0.0	100.0	0.0								
2.34		Total		101,729.5	2.3		217.2	93.0	0.3	0.8	319.4	0.3	15.7		
KR_JUS-P59															
	KR8-P59	Meadow	A	3,040.7	0.1	30.0	2.1		0.3						
		Meadow	B	0.0	0.0	58.0	0.0		0.2						
		Meadow	C	0.0	0.0	71.0	0.0		0.5						
		Meadow	D	296,892.1	6.8	78.0	531.6		0.7						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	129,158.5	3.0	93.0	275.8								
check		Water	N/A	0.0	0.0	100.0	0.0								
9.85		Total		429,091.3	9.9		809.5	82.2	0.4	2.2	656.0	0.5	32.4		

Junction ID	Watershed ID	Landcover	HSG type	Area sq ft	Area ac	CN	Product Area X CN	Weighted CN	Average Slope %	Potential Retention	Flow Length (ft)	Time of Concentration (hr)	Time of Concentration (min)	Additional TOC Travel Dist. To Pipe (ft)	Additional TOC (min)
	KR11-P59	Meadow	A	90,716.3	2.1	30.0	62.5		8.6						
		Meadow	B	198,418.4	4.6	58.0	264.2		1.1						
		Meadow	C	205,742.0	4.7	71.0	335.3		1						
		Meadow	D	403,682.9	9.3	78.0	722.8		0.1						
		Residential	A	124,141.2	2.8	57.0	162.4								
		Residential	B	173,906.6	4.0	72.0	287.4								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	77,861.8	1.8	86.0	153.7								
		Industrial	A	47,454.9	1.1	81.0	88.2								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	32,800.8	0.8	93.0	70.0								
check		Water	N/A	0.0	0.0	100.0	0.0								
31.10		Total		1,354,724.7	31.1		2,146.8	69.0	2.7	4.5	1165.5	0.5	29.9		
KR_JDS-BENTLEY															
	KR6-JDS-BENTLEY	Meadow	A	60,911.6	1.4	30.0	41.9		10.6						
		Meadow	B	29,083.5	0.7	58.0	38.7		19.1						
		Meadow	C	0.0	0.0	71.0	0.0		16.9						
		Meadow	D	0.0	0.0	78.0	0.0		3.5						
		Residential	A	249,349.0	5.7	57.0	326.3								
		Residential	B	264,165.2	6.1	72.0	436.6								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	24,585.1	0.6	86.0	48.5								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	0.0	0.0	93.0	0.0								
check		Water	N/A	0.0	0.0	100.0	0.0								
14.42		Total		628,094.3	14.4		892.1	61.9	12.5	6.2	793.6	0.2	12.3		
	KR7-JDS-BENTLEY	Meadow	A	27,816.8	0.6	30.0	19.2		1.2						
		Meadow	B	262,627.0	6.0	58.0	349.7		0.1						
		Meadow	C	111,855.6	2.6	71.0	182.3		0.4						
		Meadow	D	457,985.2	10.5	78.0	820.1		1.1						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	58,373.9	1.3	88.0	117.9								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	0.0	0.0	93.0	0.0								
check		Water	N/A	0.0	0.0	100.0	0.0								
21.09		Total		918,658.6	21.1		1,489.2	70.6	0.7	4.2	959.8	0.8	48.2		

Junction ID	Watershed ID	Landcover	HSG type	Area sq ft	Area ac	CN	Product Area X CN	Weighted CN	Average Slope %	Potential Retention	Flow Length (ft)	Time of Concentration (hr)	Time of Concentration (min)	Additional TOC Travel Dist. To Pipe (ft)	Additional TOC (min)
KR_JUS-P64															
	KR4-P64	Meadow	A	17,760.8	0.4	30.0	12.2		0.8						
		Meadow	B	259,432.0	6.0	58.0	345.4		0.8						
		Meadow	C	34,381.8	0.8	71.0	56.0		11.4						
		Meadow	D	220,301.8	5.1	78.0	394.5		6.7						
		Residential	A	737,467.3	16.9	57.0	965.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	93,838.7	2.2	81.0	174.5								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	30,889.3	0.7	91.0	64.5								
area		Industrial	D	18,181.6	0.4	93.0	38.8								
check		Water	N/A	0.0	0.0	100.0	0.0								
32.42		Total		1,412,253.2	32.4		2,051.0	63.3	4.9	5.8	1190.0	0.4	26.2		
KR_JDS-Div1															
	KR3-P64	Meadow	A	492,412.6	11.3	30.0	339.1		11.6						
		Meadow	B	0.0	0.0	58.0	0.0		2						
		Meadow	C	0.0	0.0	71.0	0.0		11.9						
		Meadow	D	57,043.0	1.3	78.0	102.1		8.5						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	0.0	0.0	93.0	0.0								
check		Water	N/A	0.0	0.0	100.0	0.0								
12.61		Total		549,455.6	12.6		441.3	35.0	8.5	18.6	742.3	0.5	28.7		
	KR1-P64	Meadow	A	1,265,230.6	29.0	30.0	871.4		1.2						
		Meadow	B	1,684,233.5	38.7	58.0	2,242.6		7.5						
		Meadow	C	34,219.3	0.8	71.0	55.8		8.8						
		Meadow	D	0.0	0.0	78.0	0.0		5.4						
		Residential	A	392,514.4	9.0	57.0	513.6								
		Residential	B	769,469.4	17.7	72.0	1,271.9								
		Residential	C	125,467.8	2.9	81.0	233.3								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	432,681.5	9.9	88.0	874.1								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	0.0	0.0	93.0	0.0								
check		Water	N/A	0.0	0.0	100.0	0.0								
107.98		Total		4,703,816.5	108.0		6,062.6	56.1	5.7	7.8	2171.8	0.8	47.1		

Junction ID	Watershed ID	Landcover	HSG type	Area sq ft	Area ac	CN	Product Area X CN	Weighted CN	Average Slope %	Potential Retention	Flow Length (ft)	Time of Concentration (hr)	Time of Concentration (min)	Additional TOC Travel Dist. To Pipe (ft)	Additional TOC (min)
	KR2-P64	Meadow	A	154,913.8	3.6	30.0	106.7		9.8						
		Meadow	B	626,263.8	14.4	58.0	833.9		7.4						
		Meadow	C	0.0	0.0	71.0	0.0		6						
		Meadow	D	151,242.3	3.5	78.0	270.8		5.2						
		Residential	A	259,705.2	6.0	57.0	339.8								
		Residential	B	398,394.3	9.1	72.0	658.5								
		Residential	C	691,491.1	15.9	81.0	1,285.8								
		Residential	D	269,200.3	6.2	86.0	531.5								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	0.0	0.0	93.0	0.0								
check		Water	N/A	17,995.9	0.4	100.0	41.3								
58.98		Total		2,569,206.7	59.0		4,068.3	69.0	7.1	4.5	1605.1	0.4	23.9		
KR_JUS-P200															
	KR6-P200	Meadow	A	87,960.0	2.0	30.0	60.6		7.6						
		Meadow	B	353,891.7	8.1	58.0	471.2		7.1						
		Meadow	C	0.0	0.0	71.0	0.0		16.1						
		Meadow	D	0.0	0.0	78.0	0.0		13.8						
		Residential	A	71,067.0	1.6	57.0	93.0								
		Residential	B	232,719.9	5.3	72.0	384.7								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	0.0	0.0	93.0	0.0								
check		Water	N/A	0.0	0.0	100.0	0.0								
17.12		Total		745,638.7	17.1		1,009.4	59.0	11.2	7.0	864.7	0.3	15.1		
	KR5-P200	Meadow	A	231,911.2	5.3	30.0	159.7		6.1						
		Meadow	B	864,095.3	19.8	58.0	1,150.5		10.1						
		Meadow	C	310,184.5	7.1	71.0	505.6		10.2						
		Meadow	D	0.0	0.0	78.0	0.0		0.5						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	801,730.0	18.4	72.0	1,325.2								
		Residential	C	129,840.7	3.0	81.0	241.4								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	68,205.7	1.6	81.0	126.8								
		Industrial	B	19,228.3	0.4	88.0	38.8								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	0.0	0.0	93.0	0.0								
check		Water	N/A	0.0	0.0	100.0	0.0								
55.67		Total		2,425,195.6	55.7		3,548.1	63.7	6.7	5.7	1559.5	0.5	27.5	1272	21.2

Junction ID	Watershed ID	Landcover	HSG type	Area sq ft	Area ac	CN	Product Area X CN	Weighted CN	Average Slope %	Potential Retention	Flow Length (ft)	Time of Concentration (hr)	Time of Concentration (min)	Additional TOC Travel Dist. To Pipe (ft)	Additional TOC (min)
KR_JDS-TRIB2															
	KR21-JDS-TRIB2	Meadow	A	0.0	0.0	30.0	0.0		0.5						
		Meadow	B	0.0	0.0	58.0	0.0		1.6						
		Meadow	C	0.0	0.0	71.0	0.0		0.1						
		Meadow	D	664,667.3	15.3	78.0	1,190.2		0.9						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	0.0	0.0	93.0	0.0								
check		Water	N/A	0.0	0.0	100.0	0.0								
15.26		Total		664,667.3	15.3		1,190.2	78.0	0.8	2.8	816.4	0.5	32.6		
KR_JUS-P53															
	KR20-P53	Meadow	A	0.0	0.0	30.0	0.0		0.5						
		Meadow	B	0.0	0.0	58.0	0.0		0.4						
		Meadow	C	0.0	0.0	71.0	0.0		6.4						
		Meadow	D	1,031.6	0.0	78.0	1.8		4.3						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	401.5	0.0	91.0	0.8								
area		Industrial	D	74,235.4	1.7	93.0	158.5								
check		Water	N/A	0.0	0.0	100.0	0.0								
1.74		Total		75,668.5	1.7		161.2	92.8	2.9	0.8	275.5	0.1	4.1		
	KR11-P53	Meadow	A	0.0	0.0	30.0	0.0		1.8						
		Meadow	B	0.0	0.0	58.0	0.0		0						
		Meadow	C	0.0	0.0	71.0	0.0		7.2						
		Meadow	D	0.0	0.0	78.0	0.0		1.4						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	9,105.3	0.2	93.0	19.4								
check		Water	N/A	0.0	0.0	100.0	0.0								
0.21		Total		9,105.3	0.2		19.4	93.0	2.6	0.8	95.5	0.0	1.9		

Junction ID	Watershed ID	Landcover	HSG type	Area sq ft	Area ac	CN	Product Area X CN	Weighted CN	Average Slope %	Potential Retention	Flow Length (ft)	Time of Concentration (hr)	Time of Concentration (min)	Additional TOC Travel Dist. To Pipe (ft)	Additional TOC (min)
KR_JUS-P55															
	KR11-P55	Meadow	A	0.0	0.0	30.0	0.0		7.9						
		Meadow	B	39,049.3	0.9	58.0	52.0		0.8						
		Meadow	C	97,167.8	2.2	71.0	158.4		1						
		Meadow	D	202,543.1	4.6	78.0	362.7		0.2						
		Residential	A	13,327.3	0.3	57.0	17.4								
		Residential	B	171,447.8	3.9	72.0	283.4								
		Residential	C	1,377.9	0.0	81.0	2.6								
		Residential	D	50,720.1	1.2	86.0	100.1								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	4,987.7	0.1	91.0	10.4								
area		Industrial	D	331,260.3	7.6	93.0	707.2								
check		Water	N/A	0.0	0.0	100.0	0.0								
20.93		Total		911,881.3	20.9		1,694.2	80.9	2.5	2.4	956.2	0.3	18.9		
KR_JUS-P53_2															
	KR11-P53_2	Meadow	A	0.0	0.0	30.0	0.0		0.3						
		Meadow	B	0.0	0.0	58.0	0.0		0.4						
		Meadow	C	0.0	0.0	71.0	0.0		11.1						
		Meadow	D	0.0	0.0	78.0	0.0		1.4						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	73,906.8	1.7	93.0	157.8								
check		Water	N/A	0.0	0.0	100.0	0.0								
1.70		Total		73,906.8	1.7		157.8	93.0	3.3	0.8	272.2	0.1	3.8		
KR_JUS-P56															
	KR11-P56	Meadow	A	0.0	0.0	30.0	0.0		0.1						
		Meadow	B	0.0	0.0	58.0	0.0		0.1						
		Meadow	C	0.0	0.0	71.0	0.0		0.1						
		Meadow	D	4,482.2	0.1	78.0	8.0		0.5						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	18,783.1	0.4	81.0	34.9								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	61,481.6	1.4	93.0	131.3								
check		Water	N/A	0.0	0.0	100.0	0.0								
1.95		Total		84,746.9	1.9		174.2	89.5	0.2	1.2	291.5	0.3	18.9		

Junction ID	Watershed ID	Landcover	HSG type	Area sq ft	Area ac	CN	Product Area X CN	Weighted CN	Average Slope %	Potential Retention	Flow Length (ft)	Time of Concentration (hr)	Time of Concentration (min)	Additional TOC Travel Dist. To Pipe (ft)	Additional TOC (min)
KR_JUS-P57															
	KR11-P57	Meadow	A	0.0	0.0	30.0	0.0		0.1						
		Meadow	B	0.0	0.0	58.0	0.0		0						
		Meadow	C	0.0	0.0	71.0	0.0		13.2						
		Meadow	D	0.0	0.0	78.0	0.0		11.2						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	32,919.6	0.8	93.0	70.3								
check		Water	N/A	0.0	0.0	100.0	0.0								
0.76		Total		32,919.6	0.8		70.3	93.0	6.1	0.8	181.7	0.0	2.0		
KR_JUS-P57_2															
	KR11-P57_2	Meadow	A	5,479.5	0.1	30.0	3.8		1.1						
		Meadow	B	0.0	0.0	58.0	0.0		1						
		Meadow	C	0.0	0.0	71.0	0.0		2.4						
		Meadow	D	0.0	0.0	78.0	0.0		0.5						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	65,854.3	1.5	81.0	122.5								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	43,788.4	1.0	93.0	93.5								
check		Water	N/A	0.0	0.0	100.0	0.0								
2.64		Total		115,122.2	2.6		219.7	83.1	1.3	2.0	339.8	0.2	10.8		
KR_JUS-P47															
	KR20-P47	Meadow	A	0.0	0.0	30.0	0.0		2.8						
		Meadow	B	32,000.4	0.7	58.0	42.6		1.8						
		Meadow	C	42,378.4	1.0	71.0	69.1		0.2						
		Meadow	D	0.0	0.0	78.0	0.0		0.2						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	31,223.2	0.7	81.0	58.1								
		Industrial	B	208,814.4	4.8	88.0	421.8								
		Industrial	C	210,769.5	4.8	91.0	440.3								
area		Industrial	D	369,819.2	8.5	93.0	789.6								
check		Water	N/A	0.0	0.0	100.0	0.0								
20.55		Total		895,005.2	20.5		1,821.5	88.7	1.3	1.3	947.4	0.3	20.2		

Junction ID	Watershed ID	Landcover	HSG type	Area sq ft	Area ac	CN	Product Area X CN	Weighted CN	Average Slope %	Potential Retention	Flow Length (ft)	Time of Concentration (hr)	Time of Concentration (min)	Additional TOC Travel Dist. To Pipe (ft)	Additional TOC (min)
KR_JUS-P48															
	KR20-P48	Meadow	A	3,069.8	0.1	30.0	2.1		2.9						
		Meadow	B	207,856.4	4.8	58.0	276.8		2.2						
		Meadow	C	260,100.7	6.0	71.0	423.9		5.9						
		Meadow	D	1,069,946.5	24.6	78.0	1,915.9		0.2						
		Residential	A	291,000.3	6.7	57.0	380.8								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	65,806.8	1.5	81.0	122.4								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	41,037.7	0.9	88.0	82.9								
		Industrial	C	98,473.3	2.3	91.0	205.7								
area		Industrial	D	225,307.6	5.2	93.0	481.0								
check		Water	N/A	0.0	0.0	100.0	0.0								
51.94		Total		2,262,599.0	51.9		3,891.5	74.9	2.8	3.3	1506.3	0.5	30.7		
	KR16-P48	Meadow	A	88,821.3	2.0	30.0	61.2		11.8						
		Meadow	B	233,652.5	5.4	58.0	311.1		11.4						
		Meadow	C	0.0	0.0	71.0	0.0		2.5						
		Meadow	D	1,206,731.3	27.7	78.0	2,160.8		9.9						
		Residential	A	196,067.5	4.5	57.0	256.6								
		Residential	B	988,163.2	22.7	72.0	1,633.3								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	725,278.2	16.7	86.0	1,431.9								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	0.0	0.0	93.0	0.0								
check		Water	N/A	0.0	0.0	100.0	0.0								
78.94		Total		3,438,714.1	78.9		5,854.9	74.2	8.9	3.5	1857.0	0.3	20.8	1270	21.2

Junction ID	Watershed ID	Landcover	HSG type	Area sq ft	Area ac	CN	Product Area X CN	Weighted CN	Average Slope %	Potential Retention	Flow Length (ft)	Time of Concentration (hr)	Time of Concentration (min)	Additional TOC Travel Dist. To Pipe (ft)	Additional TOC (min)
	KR15-P48	Meadow	A	221,021.0	5.1	30.0	152.2		1.1						
		Meadow	B	240,243.5	5.5	58.0	319.9		2.7						
		Meadow	C	0.0	0.0	71.0	0.0		5.3						
		Meadow	D	25,932.0	0.6	78.0	46.4		8						
		Residential	A	16,545.8	0.4	57.0	21.6								
		Residential	B	1,307,817.9	30.0	72.0	2,161.7								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	19,870.0	0.5	86.0	39.2								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	0.0	0.0	93.0	0.0								
check		Water	N/A	0.0	0.0	100.0	0.0								
42.04		Total		1,831,430.1	42.0		2,741.1	65.2	4.3	5.3	1355.2	0.5	29.7	3537	59.0
	KR14-P48	Meadow	A	30,649.7	0.7	30.0	21.1		1.6						
		Meadow	B	118,791.1	2.7	58.0	158.2		0.1						
		Meadow	C	0.0	0.0	71.0	0.0		13.1						
		Meadow	D	155,816.1	3.6	78.0	279.0		14.2						
		Residential	A	34,808.1	0.8	57.0	45.5								
		Residential	B	255,701.7	5.9	72.0	422.6								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	53,469.7	1.2	86.0	105.6								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	0.0	0.0	93.0	0.0								
check		Water	N/A	0.0	0.0	100.0	0.0								
14.90		Total		649,236.3	14.9		1,032.0	69.2	7.3	4.4	806.9	0.2	13.5	3596	59.9
	KR13-P48	Meadow	A	0.0	0.0	30.0	0.0		0.2						
		Meadow	B	2,247,520.1	51.6	58.0	2,992.6		4.4						
		Meadow	C	0.0	0.0	71.0	0.0		7.7						
		Meadow	D	0.0	0.0	78.0	0.0		8.5						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	4,492,823.0	103.1	72.0	7,426.2								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	0.0	0.0	93.0	0.0								
check		Water	N/A	0.0	0.0	100.0	0.0								
154.74		Total		6,740,343.1	154.7		10,418.7	67.3	5.2	4.9	2599.8	0.7	42.9	4246	70.8

Junction ID	Watershed ID	Landcover	HSG type	Area sq ft	Area ac	CN	Product Area X CN	Weighted CN	Average Slope %	Potential Retention	Flow Length (ft)	Time of Concentration (hr)	Time of Concentration (min)	Additional TOC Travel Dist. To Pipe (ft)	Additional TOC (min)
	KR12-P48	Meadow	A	133,853.4	3.1	30.0	92.2		8.6						
		Meadow	B	721,766.7	16.6	58.0	961.0		4						
		Meadow	C	0.0	0.0	71.0	0.0		9.8						
		Meadow	D	7,312.5	0.2	78.0	13.1		0.4						
		Residential	A	97,981.0	2.2	57.0	128.2								
		Residential	B	3,891,484.6	89.3	72.0	6,432.2								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	0.0	0.0	93.0	0.0								
check		Water	N/A	0.0	0.0	100.0	0.0								
111.40		Total		4,852,398.3	111.4		7,626.7	68.5	5.7	4.6	2205.9	0.6	34.9	4246	70.8
KR_JUS-P49															
	KR20-P49	Meadow	A	0.0	0.0	30.0	0.0		0.5						
		Meadow	B	0.0	0.0	58.0	0.0		0.8						
		Meadow	C	0.0	0.0	71.0	0.0		1						
		Meadow	D	4,517.8	0.1	78.0	8.1		1.4						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	85,204.0	2.0	93.0	181.9								
check		Water	N/A	0.0	0.0	100.0	0.0								
2.06		Total		89,721.8	2.1		190.0	92.2	0.9	0.8	299.9	0.1	8.0		
KR_JUS-P50															
	KR20-P50	Meadow	A	0.0	0.0	30.0	0.0		3.7						
		Meadow	B	344,348.0	7.9	58.0	458.5		1.7						
		Meadow	C	0.0	0.0	71.0	0.0		1.7						
		Meadow	D	0.0	0.0	78.0	0.0		0.3						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	302,120.2	6.9	88.0	610.3								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	378,515.8	8.7	93.0	808.1								
check		Water	N/A	0.0	0.0	100.0	0.0								
23.53		Total		1,024,984.0	23.5		1,877.0	79.8	1.9	2.5	1013.8	0.4	23.8		

Junction ID	Watershed ID	Landcover	HSG type	Area sq ft	Area ac	CN	Product Area X CN	Weighted CN	Average Slope %	Potential Retention	Flow Length (ft)	Time of Concentration (hr)	Time of Concentration (min)	Additional TOC Travel Dist. To Pipe (ft)	Additional TOC (min)
KR_JUS-P60															
	KR17-P60	Meadow	A	0.0	0.0	30.0	0.0		3.2						
		Meadow	B	579,395.1	13.3	58.0	771.5		10.1						
		Meadow	C	0.0	0.0	71.0	0.0		12.9						
		Meadow	D	0.0	0.0	78.0	0.0		9.6						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	1,133,255.4	26.0	72.0	1,873.2								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	5,129.3	0.1	86.0	10.1								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	0.0	0.0	93.0	0.0								
check		Water	N/A	0.0	0.0	100.0	0.0								
39.43		Total		1,717,779.7	39.4		2,654.7	67.3	9.0	4.9	1312.5	0.3	18.9		
	KR18-P60	Meadow	A	0.0	0.0	30.0	0.0		15.1						
		Meadow	B	0.0	0.0	58.0	0.0		11.1						
		Meadow	C	0.0	0.0	71.0	0.0		7						
		Meadow	D	0.0	0.0	78.0	0.0		10.8						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	1,586,459.4	36.4	72.0	2,622.2								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	85,025.4	2.0	86.0	167.9								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	0.0	0.0	93.0	0.0								
check		Water	N/A	0.0	0.0	100.0	0.0								
38.37		Total		1,671,484.9	38.4		2,790.1	72.7	11.0	3.8	1294.7	0.2	14.6		

Notes

1) Time of concentration has been calculated using Watershed Lag Method (NEH Chapt 15, 630.1502). A minimum TOC of 6 min was used for modelling.
2) In cases where the watershed boundary is a considerable distance from receiving pipe, and runoff must travel through other watersheds and / or stream channel before reaching pipe of interest, additional travel time may be added to time of concentration. The additional time accounts for travel that was not otherwise part of modeling. Travel time has been estimated using assumed speed of 1 ft / sec.

APPENDIX D

SOUTH CENTRE TOWNSHIP
TIME OF CONCENTRATION
LAND USE

Landcover and TOC Calculations

So. Centre Twp Watersheds

Junction ID	Watershed ID	Landcover	HSG type	Area sq ft	Area ac	CN	Product Area X CN	Weighted CN	Average Slope %	Potential Retention	Flow Length (ft)	Time of Concentration (hr)	Time of Concentration (min)	Additional TOC Travel Dist. To Pipe (ft)	Additional TOC (min)
SC_JUS-P89															
	SC12-P89	Meadow	A	997303.6	22.9	30.0	686.8		0.1						
		Meadow	B	0.0	0.0	58.0	0.0		0.6						
		Meadow	C	439488.0	10.1	71.0	716.3		1.4						
		Meadow	D	413435.0	9.5	78.0	740.3		0.8						
		Residential	A	1510847.5	34.7	57.0	1977.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	122402.9	2.8	86.0	241.7								
		Industrial	A	907100.2	20.8	81.0	1686.8								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	259426.3	6.0	91.0	542.0								
area		Industrial	D	71466.4	1.6	93.0	152.6								
check		Water	n/a	0.0	0.0	100.0	0.0								
108.39		Total		4721469.88	108.4		6743.5	62.2	0.7	6.1	2175.9	1.9	113.7		
	SH7-P89	Meadow	A	0.0	0.0	30.0	0.0		0.7						
		Meadow	B	170188.5	3.9	58.0	226.6		0.5						
		Meadow	C	0.0	0.0	71.0	0.0		0.1						
		Meadow	D	216834.4	5.0	78.0	388.3		18.6						
		Residential	A	2566692.4	58.9	57.0	3358.6								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	514.0	0.0	91.0	1.1								
area		Industrial	D	427185.9	9.8	93.0	912.0								
check		Water	n/a	132699.7	3.0	100.0	304.6								
80.67		Total		3514114.81	80.7		5191.2	64.3	5.0	5.5	1877.2	0.6	36.5		
	SC3-P89	Meadow	A	4705.6	0.1	30.0	3.2		32.4						
		Meadow	B	19634.4	0.5	58.0	26.1		26.4						
		Meadow	C	84469.8	1.9	71.0	137.7		0.4						
		Meadow	D	388235.8	8.9	78.0	695.2		14.7						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	35165.2	0.8	81.0	65.4								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	60852.6	1.4	93.0	129.9								
check		Water	n/a	0.0	0.0	100.0	0.0								
13.61		Total		593063.36	13.6		1057.6	77.7	18.5	2.9	771.2	0.1	6.4		

Junction ID	Watershed ID	Landcover	HSG type	Area sq ft	Area ac	CN	Product Area X CN	Weighted CN	Average Slope %	Potential Retention	Flow Length (ft)	Time of Concentration (hr)	Time of Concentration (min)	Additional TOC Travel Dist. To Pipe (ft)	Additional TOC (min)
SC_JUS-P88															
	SC12-P88	Meadow	A	0.0	0.0	30.0	0.0		0.2						
		Meadow	B	0.0	0.0	58.0	0.0		9.9						
		Meadow	C	0.0	0.0	71.0	0.0		6.5						
		Meadow	D	0.0	0.0	78.0	0.0		0.1						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	29195.1	0.7	81.0	54.3								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	183686.0	4.2	93.0	392.2								
check		Water	n/a	0.0	0.0	100.0	0.0								
4.89		Total		212881.07	4.9		446.5	91.4	4.2	0.9	462.0	0.1	5.6		
	SC3-P88	Meadow	A	0.0	0.0	30.0	0.0		27.1						
		Meadow	B	151306.7	3.5	58.0	201.5		19.1						
		Meadow	C	16634.3	0.4	71.0	27.1		13.2						
		Meadow	D	286317.5	6.6	78.0	512.7		0.6						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	49814.6	1.1	81.0	92.6								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	512466.5	11.8	93.0	1094.1								
check		Water	n/a	0.0	0.0	100.0	0.0								
23.34		Total		1016539.57	23.3		1928.0	82.6	15.0	2.1	1009.6	0.1	7.6		
SC_JUS-P86															
	SC2-P86	Meadow	A	0.0	0.0	30.0	0.0		0.2						
		Meadow	B	367275.1	8.4	58.0	489.0		1.5						
		Meadow	C	65616.8	1.5	71.0	107.0		1.2						
		Meadow	D	175347.6	4.0	78.0	314.0		10.5						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	356124.1	8.2	93.0	760.3								
check		Water	n/a	0.0	0.0	100.0	0.0								
22.14		Total		964363.55	22.1		1670.3	75.4	3.4	3.3	983.4	0.3	19.6		

Junction ID	Watershed ID	Landcover	HSG type	Area sq ft	Area ac	CN	Product Area X CN	Weighted CN	Average Slope %	Potential Retention	Flow Length (ft)	Time of Concentration (hr)	Time of Concentration (min)	Additional TOC Travel Dist. To Pipe (ft)	Additional TOC (min)
	SC1-P86	Meadow	A	3632480.9	83.4	30.0	2501.7		5.9						
		Meadow	B	4070726.4	93.5	58.0	5420.2		9.4						
		Meadow	C	869973.6	20.0	71.0	1418.0		6.8						
		Meadow	D	1146901.6	26.3	78.0	2053.7		4.1						
		Residential	A	18513.9	0.4	57.0	24.2								
		Residential	B	943835.1	21.7	72.0	1560.1								
		Residential	C	45116.7	1.0	81.0	83.9								
		Residential	D	2506.5	0.1	86.0	4.9								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	479128.8	11.0	88.0	967.9								
		Industrial	C	69802.0	1.6	91.0	145.8								
area		Industrial	D	108669.0	2.5	93.0	232.0								
check		Water	n/a	0.0	0.0	100.0	0.0								
261.42		Total		11387654.25	261.4		14412.4	55.1	6.6	8.1	3379.2	1.1	64.4	757	12.6
SC_JDS-P87															
	SC12-JDS-P87	Meadow	A	572436.6	13.1	30.0	394.2		0.9						
		Meadow	B	0.0	0.0	58.0	0.0		0.8						
		Meadow	C	0.0	0.0	71.0	0.0		0.6						
		Meadow	D	244658.4	5.6	78.0	438.1		0.3						
		Residential	A	239118.9	5.5	57.0	312.9								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	1033047.4	23.7	81.0	1921.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	36712.8	0.8	93.0	78.4								
check		Water	n/a	0.0	0.0	100.0	0.0								
48.81		Total		2125974.16	48.8		3144.6	64.4	0.7	5.5	1460.1	1.4	82.5		
	SC11-JDS-P87	Meadow	A	3847547.2	88.3	30.0	2649.8		0.1						
		Meadow	B	0.0	0.0	58.0	0.0		0.2						
		Meadow	C	141516.6	3.2	71.0	230.7		0.3						
		Meadow	D	116753.6	2.7	78.0	209.1		0.4						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	757720.4	17.4	81.0	1409.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	20200.6	0.5	93.0	43.1								
check		Water	n/a	0.0	0.0	100.0	0.0								
112.12		Total		4883738.27	112.1		4541.7	40.5	0.3	14.7	2213.0	5.7	342.9		

Junction ID	Watershed ID	Landcover	HSG type	Area sq ft	Area ac	CN	Product Area X CN	Weighted CN	Average Slope %	Potential Retention	Flow Length (ft)	Time of Concentration (hr)	Time of Concentration (min)	Additional TOC Travel Dist. To Pipe (ft)	Additional TOC (min)
SC_JUS-P87															
	SC12-P87	Meadow	A	0.0	0.0	30.0	0.0		3.6						
		Meadow	B	0.0	0.0	58.0	0.0		0.6						
		Meadow	C	0.0	0.0	71.0	0.0		0.2						
		Meadow	D	0.0	0.0	78.0	0.0		12.1						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	102326.2	2.3	93.0	218.5								
check		Water	n/a	0.0	0.0	100.0	0.0								
2.35		Total		102326.2	2.3		218.5	93.0	4.1	0.8	320.3	0.1	3.9		
	SC11-P87	Meadow	A	0.0	0.0	30.0	0.0		19.7						
		Meadow	B	0.0	0.0	58.0	0.0		0.2						
		Meadow	C	0.0	0.0	71.0	0.0		1.8						
		Meadow	D	0.0	0.0	78.0	0.0		5						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	229952.7	5.3	81.0	427.6								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	49069.3	1.1	93.0	104.8								
check		Water	n/a	0.0	0.0	100.0	0.0								
6.41		Total		279022.02	6.4		532.4	83.1	6.7	2.0	529.0	0.1	6.7		
SC_JUS-P84															
	SC8-P84	Meadow	A	442647.6	10.2	30.0	304.9		3.4						
		Meadow	B	1845087.9	42.4	58.0	2456.7		2.1						
		Meadow	C	40578.7	0.9	71.0	66.1		4.9						
		Meadow	D	184112.7	4.2	78.0	329.7		12.6						
		Residential	A	83400.5	1.9	57.0	109.1								
		Residential	B	371748.0	8.5	72.0	614.5								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	296695.1	6.8	88.0	599.4								
		Industrial	C	4200.2	0.1	91.0	8.8								
area		Industrial	D	9728.8	0.2	93.0	20.8								
check		Water	n/a	0.0	0.0	100.0	0.0								
75.26		Total		3278199.68	75.3		4509.9	59.9	5.8	6.7	1813.1	0.6	37.0		

Junction ID	Watershed ID	Landcover	HSG type	Area sq ft	Area ac	CN	Product Area X CN	Weighted CN	Average Slope %	Potential Retention	Flow Length (ft)	Time of Concentration (hr)	Time of Concentration (min)	Additional TOC Travel Dist. To Pipe (ft)	Additional TOC (min)
	SC10-P84	Meadow	A	0.0	0.0	30.0	0.0		9.1						
		Meadow	B	167250.2	3.8	58.0	222.7		14.5						
		Meadow	C	76465.1	1.8	71.0	124.6		0.1						
		Meadow	D	900699.1	20.7	78.0	1612.8		7.9						
		Residential	A	353528.1	8.1	57.0	462.6								
		Residential	B	62130.4	1.4	72.0	102.7								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	970083.9	22.3	86.0	1915.2								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	68686.1	1.6	88.0	138.8								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	0.0	0.0	93.0	0.0								
check		Water	n/a	0.0	0.0	100.0	0.0								
59.66		Total		2598842.94	59.7		4579.4	76.8	7.9	3.0	1614.3	0.3	18.3		
	SC7-P84	Meadow	A	607726.5	14.0	30.0	418.5		1						
		Meadow	B	4623315.4	106.1	58.0	6155.9		6						
		Meadow	C	196069.7	4.5	71.0	319.6		10.2						
		Meadow	D	1380057.2	31.7	78.0	2471.2		12.5						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	333374.1	7.7	72.0	551.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	511077.1	11.7	88.0	1032.5								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	3686.7	0.1	93.0	7.9								
check		Water	n/a	0.0	0.0	100.0	0.0								
175.74		Total		7655306.75	175.7		10956.6	62.3	7.4	6.0	2770.7	0.7	43.0	1069	17.8
	SC6-P84	Meadow	A	95421.6	2.2	30.0	65.7		8.3						
		Meadow	B	1096027.8	25.2	58.0	1459.4		15.6						
		Meadow	C	513806.4	11.8	71.0	837.5		6.2						
		Meadow	D	471771.5	10.8	78.0	844.8		1.2						
		Residential	A	16907.0	0.4	57.0	22.1								
		Residential	B	817603.8	18.8	72.0	1351.4								
		Residential	C	251396.5	5.8	81.0	467.5								
		Residential	D	49209.5	1.1	86.0	97.2								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	0.0	0.0	93.0	0.0								
check		Water	n/a	0.0	0.0	100.0	0.0								
76.04		Total		3312144.12	76.0		5145.5	67.7	7.8	4.8	1822.5	0.4	26.1		

Junction ID	Watershed ID	Landcover	HSG type	Area sq ft	Area ac	CN	Product Area X CN	Weighted CN	Average Slope %	Potential Retention	Flow Length (ft)	Time of Concentration (hr)	Time of Concentration (min)	Additional TOC Travel Dist. To Pipe (ft)	Additional TOC (min)
	SC5-P84	Meadow	A	38331.3	0.9	30.0	26.4		14.4						
		Meadow	B	2570770.2	59.0	58.0	3423.0		7						
		Meadow	C	0.0	0.0	71.0	0.0		9.5						
		Meadow	D	433421.7	9.9	78.0	776.1		0.8						
		Residential	A	18422.1	0.4	57.0	24.1								
		Residential	B	341129.2	7.8	72.0	563.8								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	19933.5	0.5	86.0	39.4								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	248834.9	5.7	88.0	502.7								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	72939.9	1.7	93.0	155.7								
check		Water	n/a	0.0	0.0	100.0	0.0								
85.95		Total		3743782.67	85.9		5511.2	64.1	7.9	5.6	1937.6	0.5	29.9	3890	64.8
	SC4-P84	Meadow	A	0.0	0.0	30.0	0.0		0.5						
		Meadow	B	3891010.1	89.3	58.0	5180.9		6.1						
		Meadow	C	167272.4	3.8	71.0	272.6		10.3						
		Meadow	D	569408.8	13.1	78.0	1019.6		11.3						
		Residential	A	2227.6	0.1	57.0	2.9								
		Residential	B	848402.8	19.5	72.0	1402.3								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	570758.1	13.1	88.0	1153.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	128092.2	2.9	93.0	273.5								
check		Water	n/a	0.0	0.0	100.0	0.0								
141.81		Total		6177172.1	141.8		9304.9	65.6	7.1	5.2	2488.8	0.6	37.2	4377	73.0
SC_JUS-P202															
	SC15-P202	Meadow	A	0.0	0.0	30.0	0.0		0						
		Meadow	B	0.0	0.0	58.0	0.0		0.1						
		Meadow	C	0.0	0.0	71.0	0.0		0.4						
		Meadow	D	0.0	0.0	78.0	0.0		1.2						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	22029.4	0.5	81.0	41.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	73643.8	1.7	91.0	153.8								
area		Industrial	D	0.0	0.0	93.0	0.0								
check		Water	n/a	0.0	0.0	100.0	0.0								
2.20		Total		95673.2	2.2		194.8	88.7	0.4	1.3	309.7	0.2	14.1		

Junction ID	Watershed ID	Landcover	HSG type	Area sq ft	Area ac	CN	Product Area X CN	Weighted CN	Average Slope %	Potential Retention	Flow Length (ft)	Time of Concentration (hr)	Time of Concentration (min)	Additional TOC Travel Dist. To Pipe (ft)	Additional TOC (min)
SC_JUS-P203															
	SC15-P203	Meadow	A	48320.3	1.1	30.0	33.3		0.7						
		Meadow	B	0.0	0.0	58.0	0.0		0.2						
		Meadow	C	0.0	0.0	71.0	0.0		0.4						
		Meadow	D	11415.7	0.3	78.0	20.4		0.3						
		Residential	A	804102.7	18.5	57.0	1052.2								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	873378.4	20.1	81.0	1624.1								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	1772177.0	40.7	81.0	3295.4								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	1305418.9	30.0	91.0	2727.1								
area		Industrial	D	0.0	0.0	93.0	0.0								
check		Water	n/a	0.0	0.0	100.0	0.0								
110.53		Total		4814813.0	110.5		8752.5	79.2	0.4	2.6	2197.3	1.6	96.7		
	SC9-P203	Meadow	A	180456.3	4.1	30.0	124.3		5.4						
		Meadow	B	1781601.5	40.9	58.0	2372.2		5.9						
		Meadow	C	0.0	0.0	71.0	0.0		1.5						
		Meadow	D	196910.2	4.5	78.0	352.6		0.6						
		Residential	A	39544.1	0.9	57.0	51.7								
		Residential	B	1455773.6	33.4	72.0	2406.2								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	76479.3	1.8	86.0	151.0								
		Industrial	A	109040.7	2.5	81.0	202.8								
		Industrial	B	200614.4	4.6	88.0	405.3								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	0.0	0.0	93.0	0.0								
check		Water	n/a	61558.5	1.4	100.0	141.3								
94.17		Total		4101978.6	94.2		6207.4	65.9	3.4	5.2	2028.1	0.8	45.5		
SC_JUS-P90															
	SC15-P90	Meadow	A	0.0	0.0	30.0	0.0		0.6						
		Meadow	B	0.0	0.0	58.0	0.0		2.6						
		Meadow	C	0.0	0.0	71.0	0.0								
		Meadow	D	0.0	0.0	78.0	0.0								
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	58955.2	1.4	81.0	109.6								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	0.0	0.0	93.0	0.0								
check		Water	n/a	0.0	0.0	100.0	0.0								
1.35		Total		58955.2	1.4		109.6	81.0	1.6	2.3	243.1	0.1	7.9		

Junction ID	Watershed ID	Landcover	HSG type	Area sq ft	Area ac	CN	Product Area X CN	Weighted CN	Average Slope %	Potential Retention	Flow Length (ft)	Time of Concentration (hr)	Time of Concentration (min)	Additional TOC Travel Dist. To Pipe (ft)	Additional TOC (min)
SC_JUS-P91															
	SC14-P91	Meadow	A	101103.3	2.3	30.0	69.6		1.8						
		Meadow	B	19754.6	0.5	58.0	26.3		8						
		Meadow	C	0.0	0.0	71.0	0.0		50.7						
		Meadow	D	0.0	0.0	78.0	0.0		6.3						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	0.0	0.0	93.0	0.0								
check		Water	n/a	0.0	0.0	100.0	0.0								
2.77		Total		120857.9	2.8		95.9	34.6	16.7	18.9	348.1	0.2	11.3		
SC_JUS-P204															
	SC14-P204	Meadow	A	1134985.2	26.1	30.0	781.7		5.5						
		Meadow	B	5881709.9	135.0	58.0	7831.5		6.8						
		Meadow	C	0.0	0.0	71.0	0.0		1.7						
		Meadow	D	0.0	0.0	78.0	0.0		5.8						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	13802.5	0.3	81.0	25.7								
		Industrial	B	871720.0	20.0	88.0	1761.1								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	0.0	0.0	93.0	0.0								
check		Water	n/a	0.0	0.0	100.0	0.0								
181.41		Total		7902217.5	181.4		10399.9	57.3	5.0	7.4	2815.0	1.0	60.5		
	SC13-P204	Meadow	A	0.0	0.0	30.0	0.0		6.6						
		Meadow	B	4420724.7	101.5	58.0	5886.2		7.8						
		Meadow	C	18543.9	0.4	71.0	30.2		6.8						
		Meadow	D	236566.8	5.4	78.0	423.6		11.6						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	839955.4	19.3	88.0	1696.9								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	947.0	0.0	93.0	2.0								
check		Water	n/a	25096.7	0.6	100.0	57.6								
127.22		Total		5541834.5	127.2		8096.5	63.6	8.2	5.7	2357.4	0.6	34.8	4377	73.0

Notes

1) Time of concentration has been calculated using Watershed Lag Method (NEH Chapt 15, 630.1502). A minimum TOC of 6 min was used for modelling.
2) In cases where the watershed boundary is a considerable distance from receiving pipe, and runoff must travel through other watersheds and / or stream channel before reaching pipe of interest, additional travel time may be added to time of concentration. The additional time accounts for travel that was not otherwise part of modeling. Travel time has been estimated using assumed speed of 1 ft / sec.

APPENDIX E

TRIBUTARY 10
TIME OF CONCENTRATION
LAND USE

Landcover and TOC Calculations

Tributary 10 Watersheds

Junction ID	Watershed ID	Landcover	HSG type	Area sq ft	Area ac	CN	Product Area X CN	Weighted CN	Average Slope %	Potential Retention	Flow Length (ft)	Time of Concentration (hr)	Time of Concentration (min)	Additional TOC Travel Dist. To Pipe (ft)	Additional TOC (min)
10_JUS-P80															
	SH12-P80	Meadow	A	0.0	0.0	30.0	0.0		0.1						
		Meadow	B	0.0	0.0	58.0	0.0		0.5						
		Meadow	C	26285.8	0.6	71.0	42.8		0.8						
		Meadow	D	313680.4	7.2	78.0	561.7		1.3						
		Residential	A	2400987.1	55.1	57.0	3141.8								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	547072.5	12.6	81.0	1017.3								
		Residential	D	200830.5	4.6	86.0	396.5								
		Industrial	A	1102358.5	25.3	81.0	2049.8								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	742216.7	17.0	91.0	1550.5								
area		Industrial	D	535444.1	12.3	93.0	1143.2								
check		Water	N/A	0.0	0.0	100.0	0.0								
134.73		Total		5868875.5	134.7		9903.6	73.5	0.7	3.6	2425.9	1.6	95.2		
	SH11-P80	Meadow	`	0.0	0.0	30.0	0.0		1.5						
		Meadow	B	0.0	0.0	58.0	0.0		0.9						
		Meadow	C	0.0	0.0	71.0	0.0		0.2						
		Meadow	D	0.0	0.0	78.0	0.0		0.6						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	33795.5	0.8	81.0	62.8								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	566654.9	13.0	91.0	1183.8								
area		Industrial	D	0.0	0.0	93.0	0.0								
check		Water	N/A	0.0	0.0	100.0	0.0								
13.78		Total		600450.4	13.8		1246.6	90.4	0.8	1.1	776.0	0.3	20.0		
KR_JDS-Div1															
	SH3-P64	Meadow	A	79391.6	1.8	30.0	54.7		0						
		Meadow	B	0.0	0.0	58.0	0.0		1.8						
		Meadow	C	58800.4	1.3	71.0	95.8		0.6						
		Meadow	D	405332.5	9.3	78.0	725.8		0.5						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	97189.7	2.2	81.0	180.7								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	129252.0	3.0	91.0	270.0								
area		Industrial	D	49672.3	1.1	93.0	106.0								
check		Water	N/A	0.0	0.0	100.0	0.0								
18.82		Total		819638.5	18.8		1433.1	76.2	0.7	3.1	906.6	0.6	38.7		

Junction ID	Watershed ID	Landcover	HSG type	Area sq ft	Area ac	CN	Product Area X CN	Weighted CN	Average Slope %	Potential Retention	Flow Length (ft)	Time of Concentration (hr)	Time of Concentration (min)	Additional TOC Travel Dist. To Pipe (ft)	Additional TOC (min)
10_JUS-P79															
	SH14-P79	Meadow	A	541009.1	12.4	30.0	372.6		1.6						
		Meadow	B	0.0	0.0	58.0	0.0		1.2						
		Meadow	C	183120.0	4.2	71.0	298.5		3.5						
		Meadow	D	72539.9	1.7	78.0	129.9		0.6						
		Residential	A	713227.4	16.4	57.0	933.3								
		Residential	B	206608.7	4.7	72.0	341.5								
		Residential	C	292268.2	6.7	81.0	543.5								
		Residential	D	138325.5	3.2	86.0	273.1								
		Industrial	A	370632.4	8.5	81.0	689.2								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	7405.8	0.2	91.0	15.5								
area		Industrial	D	60707.1	1.4	93.0	129.6								
check		Water	N/A	0.0	0.0	100.0	0.0								
59.36		Total		2585844.0	59.4		3726.6	62.8	1.7	5.9	1610.3	1.0	57.1		
10_JDS-TRIB1															
	SH14-JDS-TRIB1	Meadow	A	71099.2	1.6	30.0	49.0		0.3						
		Meadow	B	0.0	0.0	58.0	0.0		0.9						
		Meadow	C	20895.3	0.5	71.0	34.1		0.2						
		Meadow	D	91277.4	2.1	78.0	163.4		0.4						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	10281.6	0.2	93.0	21.9								
check		Water	N/A	2.2	0.0	100.0	0.0								
4.44		Total		193555.8	4.4		268.4	60.4	0.5	6.6	440.6	0.7	42.1		
10_JDS-P72-POND															
	SH10-JDS-P72-POND	Meadow	A	97868.7	2.2	30.0	67.4		0.8						
		Meadow	B	0.0	0.0	58.0	0.0		0						
		Meadow	C	0.0	0.0	71.0	0.0		2.1						
		Meadow	D	43593.7	1.0	78.0	78.1		2.1						
		Residential	A	544765.0	12.5	57.0	712.8								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	326427.3	7.5	81.0	607.0								
		Residential	D	5390.7	0.1	86.0	10.6								
		Industrial	A	8279.1	0.2	81.0	15.4								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	211705.9	4.9	93.0	452.0								
check		Water	N/A	122393.6	2.8	100.0	281.0								
31.23		Total		1360424.0	31.2		2224.3	71.2	1.3	4.0	1168.0	0.7	41.5		

Junction ID	Watershed ID	Landcover	HSG type	Area sq ft	Area ac	CN	Product Area X CN	Weighted CN	Average Slope %	Potential Retention	Flow Length (ft)	Time of Concentration (hr)	Time of Concentration (min)	Additional TOC Travel Dist. To Pipe (ft)	Additional TOC (min)
10_JUS-P72															
	SH9-P72	Meadow	A	8994.3	0.2	30.0	6.2		9.8						
		Meadow	B	295662.2	6.8	58.0	393.7		0						
		Meadow	C	6419.7	0.1	71.0	10.5		0.5						
		Meadow	D	1132041.0	26.0	78.0	2027.1		0.9						
		Residential	A	2116706.8	48.6	57.0	2769.8								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	7535.6	0.2	81.0	14.0								
		Residential	D	11048.3	0.3	86.0	21.8								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	686496.3	15.8	93.0	1465.7								
check		Water	N/A	282797.8	6.5	100.0	649.2								
104.40		Total		4547702.0	104.4		7357.9	70.5	2.8	4.2	2135.5	0.8	45.9		
	SH13-P72	Meadow	A	0.0	0.0	30.0	0.0		0.3						
		Meadow	B	0.0	0.0	58.0	0.0		0.3						
		Meadow	C	0.0	0.0	71.0	0.0		0.6						
		Meadow	D	0.0	0.0	78.0	0.0		0.4						
		Residential	A	803614.0	18.4	57.0	1051.6								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	0.0	0.0	93.0	0.0								
check		Water	N/A	0.0	0.0	100.0	0.0								
18.45		Total		803614.0	18.4		1051.6	57.0	0.4	7.5	897.7	1.4	86.1		
10_JUS-P71															
	SH8-P71	Meadow	A	0.0	0.0	30.0	0.0		0.9						
		Meadow	B	0.0	0.0	58.0	0.0		0						
		Meadow	C	363313.0	8.3	71.0	592.2		0.3						
		Meadow	D	678989.0	15.6	78.0	1215.8		15.9						
		Residential	A	1713025.0	39.3	57.0	2241.6								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	19199.5	0.4	81.0	35.7								
		Residential	D	165075.3	3.8	86.0	325.9								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	203858.9	4.7	91.0	425.9								
		Industrial	D	27447.9	0.6	93.0	58.6								
		Water	N/A	0.0	0.0	100.0	0.0								
		Total		3170908.6	72.8		4895.6	67.3	4.3	4.9	1783.2	0.6	35.1		

Junction ID	Watershed ID	Landcover	HSG type	Area sq ft	Area ac	CN	Product Area X CN	Weighted CN	Average Slope %	Potential Retention	Flow Length (ft)	Time of Concentration (hr)	Time of Concentration (min)	Additional TOC Travel Dist. To Pipe (ft)	Additional TOC (min)
10_JUS-P70															
	SH8-P70	Meadow	A	0.0	0.0	30.0	0.0		0.1						
		Meadow	B	0.0	0.0	58.0	0.0		0.4						
		Meadow	C	0.0	0.0	71.0	0.0		6.6						
		Meadow	D	0.0	0.0	78.0	0.0		0.4						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	39258.3	0.9	91.0	82.0								
area		Industrial	D	5143.8	0.1	93.0	11.0								
check		Water	N/A	0.0	0.0	100.0	0.0								
1.02		Total		44402.1	1.0		93.0	91.2	1.9	1.0	211.0	0.1	4.5		
10_JUS-P69															
	SH8-P69	Meadow	A	0.0	0.0	30.0	0.0		2.1						
		Meadow	B	0.0	0.0	58.0	0.0		1.2						
		Meadow	C	492.8	0.0	71.0	0.8		1.4						
		Meadow	D	25751.1	0.6	78.0	46.1		1.2						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	16306.3	0.4	91.0	34.1								
area		Industrial	D	845.4	0.0	93.0	1.8								
check		Water	N/A	0.0	0.0	100.0	0.0								
1.00		Total		43395.6	1.0		82.8	83.1	1.7	2.0	208.6	0.1	6.4		
	SH6-P69	Meadow	A	1717818.0	39.4	30.0	1183.1		8.1						
		Meadow	B	5521643.8	126.8	58.0	7352.1		9.5						
		Meadow	C	459317.7	10.5	71.0	748.7		5						
		Meadow	D	1763935.6	40.5	78.0	3158.6		1.2						
		Residential	A	196839.4	4.5	57.0	257.6								
		Residential	B	480114.2	11.0	72.0	793.6								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	173910.6	4.0	86.0	343.3								
		Industrial	A	142730.1	3.3	81.0	265.4								
		Industrial	B	433136.8	9.9	88.0	875.0								
		Industrial	C	132237.7	3.0	91.0	276.3								
area		Industrial	D	47804.1	1.1	93.0	102.1								
check		Water	N/A	0.0	0.0	100.0	0.0								
254.12		Total		11069487.9	254.1		15355.6	60.4	6.0	6.5	3331.7	1.0	58.4		

Junction ID	Watershed ID	Landcover	HSG type	Area sq ft	Area ac	CN	Product Area X CN	Weighted CN	Average Slope %	Potential Retention	Flow Length (ft)	Time of Concentration (hr)	Time of Concentration (min)	Additional TOC Travel Dist. To Pipe (ft)	Additional TOC (min)
10_JUS-P76															
	SH14-P76	Meadow	A	0.0	0.0	30.0	0.0		0						
		Meadow	B	0.0	0.0	58.0	0.0		4.2						
		Meadow	C	0.0	0.0	71.0	0.0		1.9						
		Meadow	D	0.0	0.0	78.0	0.0		0.1						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	58402.3	1.3	93.0	124.7								
check		Water	N/A	0.0	0.0	100.0	0.0								
1.34		Total		58402.3	1.3		124.7	93.0	1.6	0.8	242.0	0.1	5.1		
10_JUS-P75															
	SH5-P75	Meadow	A	682163.8	15.7	30.0	469.8		12.8						
		Meadow	B	2907135.8	66.7	58.0	3870.8		0.5						
		Meadow	C	0.0	0.0	71.0	0.0		0.3						
		Meadow	D	1043595.0	24.0	78.0	1868.7		6.8						
		Residential	A	17010.4	0.4	57.0	22.3								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	92094.8	2.1	86.0	181.8								
		Industrial	A	161268.3	3.7	81.0	299.9								
		Industrial	B	5407.9	0.1	88.0	10.9								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	518054.0	11.9	93.0	1106.0								
check		Water	N/A	0.0	0.0	100.0	0.0								
124.58		Total		5426729.9	124.6		7830.3	62.9	5.1	5.9	2332.8	0.7	44.6		
	SH4-P75	Meadow	A	64098.6	1.5	30.0	44.1		6.9						
		Meadow	B	1141324.3	26.2	58.0	1519.7		10.1						
		Meadow	C	0.0	0.0	71.0	0.0		0.4						
		Meadow	D	1042511.8	23.9	78.0	1866.8		0.1						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	153944.6	3.5	81.0	286.3								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	251761.8	5.8	93.0	537.5								
check		Water	N/A	0.0	0.0	100.0	0.0								
60.92		Total		2653641.1	60.9		4254.3	69.8	4.4	4.3	1631.3	0.5	30.1		

Junction ID	Watershed ID	Landcover	HSG type	Area sq ft	Area ac	CN	Product Area X CN	Weighted CN	Average Slope %	Potential Retention	Flow Length (ft)	Time of Concentration (hr)	Time of Concentration (min)	Additional TOC Travel Dist. To Pipe (ft)	Additional TOC (min)
	SH2-P75	Meadow	A	31540.4	0.7	30.0	21.7		3.3						
		Meadow	B	1687684.5	38.7	58.0	2247.1		10.2						
		Meadow	C	2017.7	0.0	71.0	3.3		14.9						
		Meadow	D	570896.6	13.1	78.0	1022.3		12.8						
		Residential	A	0.0	0.0	57.0	0.0								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	0.0	0.0	86.0	0.0								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	0.0	0.0	91.0	0.0								
area		Industrial	D	0.0	0.0	93.0	0.0								
check		Water	N/A	0.0	0.0	100.0	0.0								
52.62		Total		2292139.2	52.6		3294.4	62.6	10.3	6.0	1516.1	0.4	22.4	2174	36.2
	SH1-P75	Meadow	A	1440316.3	33.1	30.0	992.0		3.5						
		Meadow	B	3349062.2	76.9	58.0	4459.3		10.1						
		Meadow	C	549171.2	12.6	71.0	895.1		5.3						
		Meadow	D	918562.5	21.1	78.0	1644.8		8.8						
		Residential	A	110923.3	2.5	57.0	145.1								
		Residential	B	1082068.2	24.8	72.0	1788.5								
		Residential	C	0.0	0.0	81.0	0.0								
		Residential	D	7214.7	0.2	86.0	14.2								
		Industrial	A	399685.7	9.2	81.0	743.2								
		Industrial	B	294926.9	6.8	88.0	595.8								
		Industrial	C	61114.3	1.4	91.0	127.7								
area		Industrial	D	179997.3	4.1	93.0	384.3								
check		Water	N/A	0.0	0.0	100.0	0.0								
192.68		Total		8393042.6	192.7		11790.1	61.2	6.9	6.3	2901.1	0.8	47.6	4021	67.0
10_JUS-P71															
	SH8-P71	Meadow	A	0.0	0.0	30.0	0.0		0.9						
		Meadow	B	0.0	0.0	58.0	0.0		0						
		Meadow	C	363313.0	8.3	71.0	592.2		0.3						
		Meadow	D	678989.0	15.6	78.0	1215.8		15.9						
		Residential	A	1713025.0	39.3	57.0	2241.6								
		Residential	B	0.0	0.0	72.0	0.0								
		Residential	C	19199.5	0.4	81.0	35.7								
		Residential	D	165075.3	3.8	86.0	325.9								
		Industrial	A	0.0	0.0	81.0	0.0								
		Industrial	B	0.0	0.0	88.0	0.0								
		Industrial	C	203858.9	4.7	91.0	425.9								
		Industrial	D	27447.9	0.6	93.0	58.6								
		Water	N/A	0.0	0.0	100.0	0.0								
		Total		3170908.6	72.8		4895.6	67.3	4.3	4.9	1783.2	0.6	35.1		

Notes

1) Time of concentration has been calculated using Watershed Lag Method (NEH Chapt 15, 630.1502). A minimum TOC of 6 min was used for modelling.
2) In cases where the watershed boundary is a considerable distance from receiving pipe, and runoff must travel through other watersheds and / or stream channel before reaching pipe of interest, additional travel time may be added to time of concentration. The additional time accounts for travel that was not otherwise part of modeling. Travel time has been estimated using assumed speed of 1 ft / sec.

APPENDIX F

EXISTING CONDITIONS MODEL

 (Existing Condition)

Project Description

File Name 19490-Columbia Co-PRE-10-2-2020.SPF

Project Options

Flow Units ..... CFS
Elevation Type ..... Elevation
Hydrology Method ..... SCS TR-20
Time of Concentration (TOC) Method ..... SCS TR-55
Link Routing Method ..... Hydrodynamic
Enable Overflow Ponding at Nodes ..... YES
Skip Steady State Analysis Time Periods ... YES

Analysis Options

Start Analysis On ..... Nov 22, 2019 00:00:00
End Analysis On ..... Nov 23, 2019 00:00:00
Start Reporting On ..... Nov 22, 2019 00:00:00
Antecedent Dry Days ..... 0 days
Runoff (Dry Weather) Time Step ..... 0 01:00:00 days hh:mm:ss
Runoff (Wet Weather) Time Step ..... 0 00:05:00 days hh:mm:ss
Reporting Time Step ..... 0 00:05:00 days hh:mm:ss
Routing Time Step ..... 2 seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins	93
Nodes	109
Junctions	55
Outfalls	5
Flow Diversions	0
Inlets	0
Storage Nodes	49
Links	159
Channels	60
Pipes	51
Pumps	0
Orifices	0
Weirs	48
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1		Time Series	2yr-24hr	Cumulative	inches	Pennsylvania	Columbia	2	2.86	SCS Type II 24-hr

Subbasin Summary

SN	Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	KR10-JUS-SWS1	51.60	484.00	50.50	2.86	0.08	3.92	0.39	0 02:38:18
2	KR11-P53	0.20	484.00	93.00	2.86	2.12	0.42	0.63	0 00:06:00
3	KR11-P53_2	1.70	484.00	93.00	2.86	2.12	3.60	5.39	0 00:06:00
4	KR11-P55	20.90	484.00	80.90	2.86	1.20	25.10	28.06	0 00:18:54
5	KR11-P56	1.90	484.00	89.50	2.86	1.81	3.45	3.88	0 00:18:54
6	KR11-P57	0.80	484.00	93.00	2.86	2.12	1.70	2.53	0 00:06:00
7	KR11-P57_2	2.60	484.00	83.10	2.86	1.34	3.49	4.75	0 00:10:48
8	KR11-P58	0.30	484.00	93.00	2.86	2.12	0.64	0.95	0 00:06:00
9	KR11-P59	31.10	484.00	69.00	2.86	0.60	18.54	13.28	0 00:29:54
10	KR12-P48	111.40	484.00	68.50	2.86	0.58	64.17	18.31	0 01:45:36
11	KR13-P48	154.70	484.00	67.30	2.86	0.53	81.68	21.43	0 01:53:42
12	KR14-P48	14.90	484.00	69.20	2.86	0.60	9.00	3.42	0 01:13:30
13	KR15-P48	42.00	484.00	65.20	2.86	0.45	18.94	5.51	0 01:28:42
14	KR16-P48	78.90	484.00	74.20	2.86	0.83	65.49	41.96	0 00:41:54
15	KR17-P52	39.40	484.00	67.30	2.86	0.53	20.80	18.95	0 00:18:54
16	KR18-P51	38.40	484.00	72.70	2.86	0.76	29.11	33.98	0 00:14:36
17	KR19-P45	121.00	484.00	72.10	2.86	0.73	88.45	73.54	0 00:26:54
18	KR1-P64	108.00	484.00	56.10	2.86	0.18	19.87	4.54	0 00:47:06
19	KR20-P47	20.50	484.00	88.70	2.86	1.75	35.88	39.22	0 00:20:12
20	KR20-P48	51.90	484.00	74.90	2.86	0.87	44.89	36.01	0 00:30:42
21	kr20-p49	2.10	484.00	92.20	2.86	2.05	4.30	6.11	0 00:08:00
22	KR20-P50	23.50	484.00	79.80	2.86	1.13	26.65	26.28	0 00:23:48
23	KR20-P53	1.70	484.00	92.80	2.86	2.10	3.57	5.36	0 00:06:00
24	KR21-JDS-TRIB1	46.10	484.00	65.40	2.86	0.46	21.11	6.25	0 01:27:30
25	KR21-JDS-TRIB2	15.30	484.00	78.00	2.86	1.03	15.76	12.62	0 00:32:36
26	KR22-P44	7.80	484.00	93.00	2.86	2.12	16.54	20.68	0 00:13:18
27	KR22-P46	117.40	484.00	72.00	2.86	0.73	85.23	24.23	0 01:58:36
28	KR23-P41	26.40	484.00	89.30	2.86	1.80	47.47	20.91	0 01:22:24
29	KR24-P41	53.60	484.00	81.20	2.86	1.22	65.34	76.49	0 00:17:12
30	KR25-P41	32.00	484.00	70.40	2.86	0.66	20.96	19.02	0 00:22:00
31	KR26-P41	40.40	484.00	83.20	2.86	1.35	54.46	32.83	0 00:52:12
32	KR27-P41	71.20	484.00	66.30	2.86	0.49	34.96	11.17	0 01:22:24
33	KR27-P42	34.40	484.00	74.00	2.86	0.82	28.24	17.22	0 00:44:36
34	KR27-P43	1.60	484.00	93.00	2.86	2.12	3.39	4.83	0 00:07:42
35	KR27-P44	7.70	484.00	93.00	2.86	2.12	16.32	21.30	0 00:11:18
36	KR28-P40	60.50	484.00	58.90	2.86	0.25	15.37	2.90	0 01:52:36
37	KR29-P65	19.80	484.00	88.30	2.86	1.72	34.02	23.11	0 00:44:54
38	KR2-P64	59.00	484.00	69.00	2.86	0.60	35.16	29.26	0 00:23:54
39	KR31-P45	19.80	484.00	86.80	2.86	1.60	31.72	36.64	0 00:18:00
40	KR31-P45_2	1.30	484.00	93.00	2.86	2.12	2.76	4.12	0 00:06:00
41	KR32-OF1	21.20	484.00	64.10	2.86	0.41	8.73	4.70	0 00:34:00
42	KR32-P39	19.90	484.00	51.70	2.86	0.10	1.89	0.23	0 00:57:00
43	KR3-P64	12.60	484.00	35.00	2.86	0.00	0.00	0.00	0 00:28:42
44	KR4-P64	32.40	484.00	63.30	2.86	0.39	12.51	7.68	0 00:26:12
45	KR5-P200	55.70	484.00	63.70	2.86	0.40	22.22	9.17	0 00:48:42
46	KR6-JDS-BENTLEY	14.40	484.00	61.90	2.86	0.34	4.91	4.39	0 00:12:18
47	KR6-P200	17.10	484.00	59.00	2.86	0.26	4.39	2.72	0 00:15:06
48	KR7-JDS-BENTLEY	21.10	484.00	70.60	2.86	0.66	14.01	7.49	0 00:48:12
49	KR8-P58	0.09	484.00	87.60	2.86	1.66	0.15	0.18	0 00:16:53
50	KR8-P59	9.90	484.00	82.20	2.86	1.28	12.70	10.55	0 00:32:24
51	KR8-P59_2	2.30	484.00	93.00	2.86	2.12	4.88	5.77	0 00:15:42
52	KR9-JUS-SWS1	87.50	484.00	67.50	2.86	0.54	46.90	14.71	0 01:29:24
53	SC10-P84	59.70	484.00	37.00	2.86	0.00	0.00	0.00	0 00:18:18
54	SC11-JDS-P87	112.10	484.00	40.50	2.86	0.00	0.00	0.00	0 05:42:54
55	SC11-P87	6.40	484.00	83.10	2.86	1.34	8.58	12.93	0 00:06:42
56	SC12-JDS-P87	48.80	484.00	64.40	2.86	0.42	20.64	6.12	0 01:22:30
57	SC12-P87	2.30	484.00	93.00	2.86	2.12	4.88	7.28	0 00:06:00
58	SC12-P89	108.40	484.00	62.20	2.86	0.35	37.94	8.34	0 01:53:42
59	SC13-P204	127.20	484.00	63.60	2.86	0.40	50.37	12.11	0 01:47:42
60	SC14-P204	181.40	484.00	57.30	2.86	0.21	38.64	8.94	0 01:00:30
61	SC14-P91	1.40	484.00	81.00	2.86	1.21	1.69	2.45	0 00:07:54
62	SC15-P202	2.20	484.00	88.70	2.86	1.75	3.85	4.86	0 00:14:06
63	SC15-P203	110.50	484.00	79.20	2.86	1.10	121.44	44.94	0 01:36:42
64	SC15-P90	2.80	484.00	34.60	2.86	0.00	0.00	0.00	0 00:11:18
65	SC1-P86	261.40	484.00	55.10	2.86	0.16	42.09	7.02	0 01:17:00
66	SC2-P86	22.10	484.00	75.40	2.86	0.89	19.69	20.76	0 00:19:36
67	SC3-P88	23.30	484.00	82.60	2.86	1.31	30.48	44.67	0 00:07:36
68	SC3-P89	13.60	484.00	77.70	2.86	1.01	13.79	20.43	0 00:06:24
69	SC4-P84	141.80	484.00	65.60	2.86	0.47	65.94	16.80	0 01:50:12
70	SC5-P84	85.90	484.00	64.10	2.86	0.41	35.39	9.48	0 01:34:42
71	SC6-P84	76.00	484.00	67.70	2.86	0.54	41.34	31.11	0 00:26:06
72	SC7-P84	175.70	484.00	62.30	2.86	0.35	62.02	20.58	0 01:00:48
73	SC8-P84	75.30	484.00	59.90	2.86	0.28	21.23	8.16	0 00:37:00
74	SC8-P88	4.90	484.00	91.40	2.86	1.98	9.68	14.67	0 00:06:00
75	SC9-P203	94.20	484.00	65.90	2.86	0.48	44.84	21.41	0 00:45:30
76	SH10-JDS-P72-POND	31.20	484.00	71.20	2.86	0.69	21.53	13.01	0 00:41:30
77	SH11-P80	13.80	484.00	90.40	2.86	1.89	26.08	28.42	0 00:20:00
78	SH12-P80	134.70	484.00	73.50	2.86	0.80	107.22	36.99	0 01:35:12
79	SH13-P72	18.40	484.00	57.00	2.86	0.21	3.77	0.72	0 01:26:06
80	SH14-JDS-TRIB1	4.40	484.00	60.40	2.86	0.30	1.30	0.48	0 00:42:06

Subbasin Summary

SN	Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
81	SH14-P76	1.30	484.00	93.00	2.86	2.12	2.76	4.12	0 00:06:00
82	SH14-P79	59.40	484.00	62.80	2.86	0.37	21.92	7.78	0 00:57:06
83	SH1-P75	192.70	484.00	61.20	2.86	0.32	61.66	12.91	0 01:54:36
84	SH2-P75	52.60	484.00	62.60	2.86	0.36	19.09	6.59	0 00:58:36
85	SH3-P64	18.80	484.00	76.20	2.86	0.93	17.52	12.24	0 00:38:42
86	SH4-P75	60.90	484.00	69.80	2.86	0.63	38.31	28.00	0 00:30:06
87	SH5-P75	124.60	484.00	62.90	2.86	0.37	46.48	19.48	0 00:44:36
88	SH6-P69	254.10	484.00	60.40	2.86	0.30	75.21	22.77	0 00:58:24
89	SH7-P89	80.70	484.00	64.30	2.86	0.42	33.81	17.48	0 00:36:30
90	SH8-P69	1.00	484.00	83.10	2.86	1.34	1.34	2.04	0 00:06:24
91	SH8-P70	1.00	484.00	91.20	2.86	1.96	1.96	2.97	0 00:06:00
92	SH8-P71	72.80	484.00	67.30	2.86	0.53	38.44	23.34	0 00:35:06
93	SH9-P72	104.40	484.00	70.50	2.86	0.66	68.80	38.08	0 00:45:54

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Min Freeboard Attained (ft)
1	10_JDS-P69	Junction	489.95	494.90	489.95	22.87	490.40	4.94
2	10_JDS-P70	Junction	487.00	492.00	487.00	22.99	488.12	3.88
3	10_JDS-P71	Junction	481.00	489.00	481.00	28.83	484.14	4.86
4	10_JDS-P75	Junction	485.79	493.00	485.79	30.16	487.42	5.58
5	10_JDS-P76	Junction	483.40	492.50	483.40	37.46	486.44	6.06
6	10_JDS-P79	Junction	466.50	474.00	466.50	25.20	467.53	11.97
7	10_JDS-P80	Junction	464.20	478.17	464.20	52.34	466.34	11.83
8	10_JDS-Trib1	Junction	477.50	482.00	477.50	47.27	478.55	4.95
9	10_P72-pondoutfall	Junction	477.50	482.00	477.50	13.16	478.62	4.88
10	KR_JDS-D1	Junction	472.00	480.00	472.00	62.05	473.55	6.45
11	KR_JDS-D1-B	Junction	470.00	477.00	470.00	62.05	471.18	6.32
12	KR_JDS-Div1	Junction	495.00	497.50	495.00	40.79	496.53	2.47
13	KR_JDS-P200	Junction	498.00	501.86	498.00	11.02	499.19	3.31
14	KR_JDS-P39	Junction	458.00	465.00	458.99	84.87	459.84	9.15
15	KR_JDS-P40	Junction	461.26	476.00	461.26	90.67	464.59	11.41
16	KR_JDS-P41	Junction	464.22	472.16	464.22	137.08	468.25	5.67
17	KR_JDS-P42	Junction	465.81	475.85	465.81	30.69	468.61	7.82
18	KR_JDS-P43	Junction	471.41	479.00	471.41	29.20	472.80	6.49
19	KR_JDS-P44	Junction	471.21	480.00	471.21	91.11	474.72	5.28
20	KR_JDS-P45	Junction	488.76	495.40	488.76	102.12	492.47	2.93
21	KR_JDS-P45_2	Junction	487.91	492.31	487.91	87.75	491.07	1.98
22	KR_JDS-P45_3	Junction	484.96	489.96	484.96	87.74	488.10	3.15
23	KR_JDS-P46	Junction	471.93	480.00	471.93	81.80	475.48	5.28
24	KR_JDS-P47	Junction	482.01	492.01	482.01	138.95	485.23	6.78
25	KR_JDS-P48	Junction	484.55	493.00	484.55	87.96	486.10	6.90
26	KR_JDS-P49	Junction	486.52	493.00	486.52	34.54	488.18	4.82
27	KR_JDS-P50	Junction	487.95	496.00	487.95	33.91	490.90	5.10
28	KR_JDS-P51_52	Junction	514.67	521.00	514.67	51.62	516.87	4.69
29	KR_JDS-P53	Junction	480.39	486.82	480.39	21.54	482.45	4.68
30	KR_JDS-P53_2	Junction	482.00	486.00	482.00	1.66	482.45	4.05
31	KR_JDS-P55	Junction	480.87	488.60	480.87	27.91	482.86	5.74
32	KR_JDS-P56	Junction	480.58	487.40	480.56	6.90	481.27	6.13
33	KR_JDS-P57	Junction	478.29	482.00	478.29	8.02	479.02	6.09
34	KR_JDS-P57_2	Junction	480.94	486.90	480.94	4.72	481.40	5.50
35	KR_JDS-P58	Junction	478.92	484.50	478.92	32.51	480.24	4.44
36	KR_JDS-P59	Junction	480.97	486.71	480.97	33.45	482.05	5.29
37	KR_JDS-P64	Junction	492.03	495.89	492.03	21.16	493.44	3.83
38	KR_JUS-P200	Junction	499.90	504.40	499.90	10.25	501.44	2.96
39	KR_JUS-P51	Junction	514.94	521.83	514.94	33.39	517.61	4.22
40	KR_JUS-P52	Junction	517.48	521.85	517.48	18.27	518.99	2.86
41	KR_JUS-P59_2	Junction	482.33	488.00	482.33	5.53	483.97	4.03
42	KR_JUS-P65	Junction	466.93	476.50	466.93	65.87	469.52	6.98
43	SC_JDS_P203	Junction	495.06	501.90	495.06	53.56	497.68	4.38
44	SC_JDS-P202	Junction	497.07	500.00	497.07	2.40	497.30	4.27
45	SC_JDS-P204	Junction	502.20	509.20	502.20	7.72	503.70	5.50
46	SC_JDS-P84	Junction	488.34	497.00	488.34	54.94	492.78	5.26
47	SC_JDS-P86	Junction	489.60	496.80	489.74	21.45	490.56	6.24
48	SC_JDS-P87	Junction	487.86	497.00	487.86	57.28	489.48	7.78
49	SC_JDS-P88	Junction	486.50	493.50	486.50	77.98	488.02	6.48
50	SC_JDS-P89	Junction	473.34	483.50	473.34	78.47	474.34	9.16
51	SC_JDS-P90	Junction	503.02	509.00	503.02	0.28	503.17	5.83
52	SC_JDS-Trib1	Junction	464.00	472.00	464.00	78.47	465.17	6.83
53	SC_JUS-91A	Junction	506.00	509.20	506.00	0.00	506.00	3.20
54	SC_JUS-P90	Junction	503.34	509.00	503.34	0.28	503.53	5.47
55	SH_JDS-SH7-POND	Junction	487.00	489.00	487.00	0.00	487.00	4.50
56	10_OF1	Outfall	461.00			52.30	463.14	
57	KR_OF1	Outfall	458.00			85.94	458.85	
58	KR_OF2	Outfall	459.07			66.73	460.64	
59	SC_OF1	Outfall	462.00			78.46	463.17	
60	SC_OF2	Outfall	500.00			7.69	501.50	
61	10_JDS-P72-Pond	Storage Node	477.60	483.50	477.60	17.82	478.83	
62	10_JUS-P69	Storage Node	490.01	495.40	490.01	22.89	491.09	
63	10_JUS-P70	Storage Node	487.00	492.00	487.00	23.08	488.16	
64	10_JUS-P71	Storage Node	481.93	489.00	481.93	32.07	484.13	
65	10_JUS-P72	Storage Node	479.29	484.50	479.29	42.53	480.84	
66	10_JUS-P75	Storage Node	486.35	493.00	486.35	30.36	487.43	
67	10_JUS-P76	Storage Node	484.04	492.50	484.04	30.45	486.46	
68	10_JUS-P79	Storage Node	467.40	475.50	467.40	26.93	468.94	
69	10_JUS-P80	Storage Node	465.42	478.70	464.42	52.88	466.85	
70	JDS-P201	Storage Node	493.90	497.40	494.00	3.53	495.24	
71	KR_JDS-Bentley	Storage Node	490.00	494.00	490.00	30.82	491.65	
72	KR_JDS-Trib1	Storage Node	475.50	484.00	476.00	154.21	478.66	
73	KR_JDS-Trib2	Storage Node	477.00	485.00	477.00	182.83	480.32	
74	KR_JUS-D1	Storage Node	472.00	480.00	472.00	91.11	474.02	
75	KR_JUS-P201	Storage Node	492.00	497.50	494.00	27.83	494.64	
76	KR_JUS-P39	Storage Node	460.50	468.50	460.50	88.74	464.00	
77	KR_JUS-P40	Storage Node	461.95	476.00	461.95	110.66	465.77	
78	KR_JUS-P41	Storage Node	465.81	472.66	465.90	126.46	468.16	
79	KR_JUS-P42	Storage Node	465.73	476.35	465.73	37.58	468.62	

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Min Freeboard Attained (ft)
80	KR_JUS-P43	Storage Node	471.62	479.50	471.62	29.20	473.34	
81	KR_JUS-P44	Storage Node	471.93	480.00	471.93	95.51	474.72	
82	KR_JUS-P45	Storage Node	490.12	496.40	490.12	102.42	492.89	
83	KR_JUS-P45_2	Storage Node	488.17	493.31	488.17	101.52	492.47	
84	KR_JUS-P45_3	Storage Node	486.05	492.34	486.05	95.28	491.11	
85	KR_JUS-P46	Storage Node	471.17	480.00	471.17	126.64	475.80	
86	KR_JUS-P47	Storage Node	482.34	492.34	482.34	138.45	485.29	
87	KR_JUS-P48	Storage Node	485.05	492.30	485.55	88.36	486.61	
88	KR_JUS-P49	Storage Node	487.63	493.00	487.63	5.74	488.88	
89	KR_JUS-P50	Storage Node	488.25	496.00	488.25	67.71	491.29	
90	KR_JUS-P53	Storage Node	480.66	487.40	480.66	30.10	482.82	
91	KR_JUS-P53_2	Storage Node	482.00	486.50	482.00	11.17	482.55	
92	KR_JUS-P55	Storage Node	481.40	487.10	481.40	27.98	482.88	
93	KR_JUS-P56	Storage Node	481.72	487.90	481.72	3.87	482.63	
94	KR_JUS-P57	Storage Node	478.58	485.40	478.58	8.81	479.69	
95	KR_JUS-P57_2	Storage Node	481.90	487.40	481.90	4.75	482.51	
96	KR_JUS-P58	Storage Node	479.74	485.50	479.74	35.72	481.60	
97	KR_JUS-P59	Storage Node	481.43	487.80	481.43	34.20	483.16	
98	KR_JUS-P64	Storage Node	492.56	497.80	492.56	46.96	494.47	
99	KR_JUS-SWS1	Storage Node	477.50	484.00	478.00	49.29	478.95	
100	SC_JUS-P202	Storage Node	496.00	500.50	496.00	4.72	498.11	
101	SC_JUS-P203	Storage Node	495.55	501.90	495.55	58.10	499.05	
102	SC_JUS-P204	Storage Node	503.20	509.20	503.20	19.74	504.97	
103	SC_JUS-P84	Storage Node	489.26	497.00	489.26	55.93	492.83	
104	SC_JUS-P87	Storage Node	487.60	497.00	487.60	78.42	492.78	
105	SC_JUS-P88	Storage Node	488.20	494.75	488.20	75.86	490.51	
106	SC_JUS-P89	Storage Node	475.32	485.00	475.32	79.36	478.80	
107	SC_JUS-P91	Storage Node	503.87	509.20	503.87	2.38	504.12	
108	SC-JUS-P86	Storage Node	489.60	496.70	489.60	20.73	490.57	
109	SH_JUS-SH7-POND	Storage Node	485.00	489.50	486.00	17.48	486.53	

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)
1	P200	Pipe	KR_JUS-P200	KR_JDS-P200	100.00	500.40	498.80	1.6000	24.000	0.0240	11.02	31.00	0.36	3.84
2	P202	Pipe	SC_JUS-P202	SC_JDS-P202	43.00	497.20	497.10	0.2300	15.000	0.0150	2.40	2.70	0.89	3.06
3	P203	Pipe	SC_JUS-P203	SC_JDS_P203	49.00	495.55	495.06	1.0000	40.000	0.0130	53.56	88.34	0.61	8.05
4	P204	Pipe	SC_JUS-P204	SC_JDS-P204	103.00	503.20	502.20	0.9700	18.000	0.0120	7.72	11.21	0.69	5.16
5	P39	Pipe	KR_JUS-P39	KR_JDS-P39	556.00	460.47	458.99	0.2700	72.000	0.0120	84.87	239.10	0.35	6.40
6	P40	Pipe	KR_JUS-P40	KR_JDS-P40	210.00	461.95	461.26	0.3300	60.000	0.0120	90.67	161.73	0.56	6.52
7	P41	Pipe	KR_JUS-P41	KR_JDS-P41	61.00	465.81	464.22	2.6100	80.000	0.0200	137.08	2263.56	0.06	3.25
8	P42	Pipe	KR_JUS-P42	KR_JDS-P42	67.00	465.73	465.81	-0.1200	84.000	0.0200	30.69	365.96	0.08	0.92
9	P43	Pipe	KR_JUS-P43	KR_JDS-P43	50.00	471.62	471.41	0.4200	60.000	0.0120	29.20	182.85	0.16	6.23
10	P44	Pipe	KR_JUS-P44	KR_JDS-P44	44.30	471.93	471.21	1.6300	48.000	0.0200	91.11	595.78	0.15	2.41
11	P45	Pipe	KR_JUS-P45	KR_JDS-P45	82.20	490.12	488.76	1.6500	42.000	0.0150	102.12	432.33	0.24	3.93
12	P45_2	Pipe	KR_JUS-P45_2	KR_JDS-P45_2	25.30	488.17	487.91	1.0300	30.000	0.0130	60.87	41.58	1.46	12.40
13	P45_3	Pipe	KR_JUS-P45_3	KR_JDS-P45_3	199.00	486.05	484.96	0.5500	36.000	0.0240	45.94	26.74	1.72	7.09
14	P46	Pipe	KR_JUS-P46	KR_JDS-P46	42.00	471.17	471.93	-1.8100	48.000	0.0120	81.80	209.33	0.39	6.66
15	P47	Pipe	KR_JUS-P47	KR_JDS-P47	21.80	482.34	482.01	1.5100	55.000	0.0150	138.95	1102.17	0.13	3.38
16	P48	Pipe	KR_JUS-P48	KR_JDS-P48	71.70	485.05	484.55	0.7000	48.000	0.0150	87.96	844.31	0.10	3.09
17	P49	Pipe	KR_JDS-P49	KR_JUS-P49	89.60	487.63	486.52	1.2400	24.000	0.0120	5.74	0.82	7.01	3.44
18	P50	Pipe	KR_JUS-P50	KR_JDS-P50	87.20	488.25	487.95	0.3400	24.000	0.0150	33.91	34.50	0.98	3.60
19	P51	Pipe	KR_JUS-P51	KR_JDS-P51_52	31.00	514.94	514.67	0.8700	25.000	0.0120	35.76	47.17	0.76	6.49
20	P52	Pipe	KR_JUS-P52	KR_JDS-P51_52	48.00	517.48	515.14	4.8800	25.000	0.0120	18.26	111.59	0.16	4.18
21	P53_2	Pipe	KR_JDS-P53_2	KR_JUS-P53_2	90.40	482.20	482.00	0.2200	24.000	0.0120	0.95	23.05	0.04	1.10
22	P53A	Pipe	KR_JUS-P53	KR_JDS-P53	24.80	480.66	480.39	1.0900	36.000	0.0130	21.01	69.59	0.30	4.12
23	P53B-C	Pipe	KR_JUS-P53	KR_JDS-P53	20.30	482.40	482.90	-2.4600	24.000	0.0120	0.00	76.93	0.00	0.00
24	P55	Pipe	KR_JDS-P55	KR_JUS-P55	79.60	480.87	481.40	-0.6700	48.000	0.0200	27.91	235.02	0.12	2.02
25	P56	Pipe	KR_JUS-P56	KR_JDS-P56	82.20	481.72	480.58	1.3900	30.000	0.0130	3.86	48.30	0.08	3.59
26	P57	Pipe	KR_JUS-P57	KR_JDS-P57	27.80	478.58	478.29	1.0400	36.000	0.0120	8.02	73.80	0.11	5.15
27	P57_2	Pipe	KR_JUS-P57_2	KR_JDS-P57_2	79.40	481.90	480.94	1.2100	24.000	0.0120	4.72	53.90	0.09	3.64
28	P58A	Pipe	KR_JUS-P58	KR_JDS-P58	45.60	479.74	478.92	1.8000	36.000	0.0130	15.95	89.44	0.18	4.20
29	P58B	Pipe	KR_JDS-P58	KR_JUS-P58	30.60	480.28	479.56	2.3500	24.000	0.0120	8.02	32.56	0.25	3.82
30	P58C	Pipe	KR_JDS-P58	KR_JUS-P58	30.60	480.23	479.99	0.7800	24.000	0.0120	8.54	21.70	0.39	4.18
31	P59	Pipe	KR_JUS-P59	KR_JDS-P59	95.45	481.43	480.97	0.4800	48.000	0.0200	33.45	139.79	0.24	3.97
32	P59_2	Pipe	KR_JUS-P59_2	KR_JUS-P58	73.20	482.33	482.01	0.4400	15.000	0.0120	5.53	4.63	1.19	4.83
33	P64	Pipe	KR_JUS-P64	KR_JDS-P64	47.60	492.56	492.03	1.1100	26.000	0.0240	21.16	29.93	0.71	4.06
34	P65	Pipe	KR_JUS-P65	KR_OF2	1034.00	466.93	459.07	0.7600	84.000	0.0120	66.73	603.39	0.11	6.95
35	P69	Pipe	10_JUS-P69	10_JDS-P69	60.70	490.01	489.95	0.1000	36.000	0.0200	22.87	62.05	0.37	3.60
36	P70	Pipe	10_JUS-P70	10_JDS-P70	8.50	487.00	487.00	0.0000	18.000	0.0200	22.99	8.10	2.84	2.38
37	P71	Pipe	10_JUS-P71	10_JDS-P71	34.00	481.93	481.00	2.7400	48.000	0.0120	28.83	257.36	0.11	4.25
38	P72	Pipe	10_JUS-P72	10_JDS-P72-Pond	40.95	479.29	478.78	1.2500	36.000	0.0240	14.13	40.32	0.35	4.47
39	P75	Pipe	10_JUS-P75	10_JDS-P75	66.20	486.35	485.79	0.8500	42.000	0.0200	30.16	419.05	0.07	1.59
40	P76	Pipe	10_JUS-P76	10_JDS-P76	33.70	484.04	483.40	1.9000	39.600	0.0150	37.46	224.36	0.17	2.78
41	P79	Pipe	10_JUS-P79	10_JDS-P79	36.10	467.40	466.50	2.4900	43.000	0.0120	25.20	338.90	0.07	5.29
42	P80	Pipe	10_JUS-P80	10_JDS-P80	56.10	465.64	465.64	0.0000	99.600	0.0200	52.34	80.17	0.65	3.47
43	P84	Pipe	SC_JUS-P84	SC_JDS-P84	68.00	489.26	488.34	1.3500	34.000	0.0120	54.94	133.47	0.41	5.39
44	P86	Pipe	SC_JDS-P86	SC-JUS-P86	70.00	489.70	489.70	0.0000	73.000	0.0200	21.45	60.09	0.36	1.36
45	P87-A	Pipe	SC_JUS-P87	SC_JDS-P87	21.10	489.17	487.86	6.2100	30.000	0.0120	31.92	110.72	0.29	7.61
46	P87-B	Pipe	SC_JUS-P87	SC_JDS-P87	28.40	490.16	490.81	-2.2900	16.000	0.0130	10.58	11.61	0.91	8.17
47	P87-C	Pipe	SC_JUS-P87	SC_JDS-P87	27.90	489.24	489.03	0.7500	16.000	0.0130	11.40	6.66	1.71	8.24
48	P88	Pipe	SC_JUS-P88	SC_JDS-P88	40.50	488.20	486.60	3.9500	52.000	0.0240	76.93	382.89	0.20	6.56
49	P89	Pipe	SC_JUS-P89	SC_JDS-P89	43.30	475.32	475.20	0.2800	66.000	0.0240	78.47	95.76	0.82	6.12
50	P90	Pipe	SC_JUS-P90	SC_JDS-P90	82.60	503.34	503.02	0.3900	36.000	0.0130	0.28	41.51	0.01	3.09
51	P91	Pipe	SC_JUS-P91	SC_JUS-P90	81.90	503.87	503.44	0.5300	36.000	0.0150	0.28	41.89	0.01	1.44
52	10_CH-71-70	Channel	10_JDS-P70	10_JUS-P71	1209.00	487.00	481.93	0.4200	60.000	0.0320	19.97	1306.83	0.02	1.12
53	10_CH-72-71	Channel	10_JDS-P71	10_JUS-P72	1736.00	481.00	479.29	0.1000	72.000	0.0320	28.38	481.88	0.06	3.47
54	10_CH-79-Trib1	Channel	10_JDS-Trib1	10_JUS-P79	1363.00	477.50	467.40	0.7400	60.000	0.0320	23.82	1448.21	0.02	1.40
55	10_CH-80-79	Channel	10_JDS-P79	10_JUS-P80	246.00	466.50	465.42	0.4400	156.000	0.0320	25.20	4521.15	0.01	1.55
56	10_CH-OF1-80	Channel	10_JDS-P80	10_OF1	398.00	464.20	461.00	0.8000	117.600	0.0320	52.30	1389.84	0.04	3.42
57	10_CH-Trib1	Channel	10_P72-pondoutfall	10_JDS-Trib1	85.00	477.50	477.50	0.0000	54.000	0.0320	13.16	14.78	0.89	1.16

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)
58	10_CH-Trib1-76	Channel	10_JDS-P76	10_JDS-Trib1	1026.00	483.40	477.50	0.5800	72.000	0.0320	46.96	1025.45	0.05	6.10
59	10_RRCH-70-69	Channel	10_JDS-P69	10_JUS-P70	59.00	489.95	487.00	5.0000	60.000	0.0320	22.87	1866.97	0.01	2.14
60	10_RRCH-76-75	Channel	10_JDS-P75	10_JUS-P76	34.00	485.79	484.04	5.1500	84.000	0.0320	30.15	395.55	0.08	0.87
61	KR_CH-39-40	Channel	KR_JDS-P40	KR_JUS-P39	905.00	461.26	460.50	0.0800	93.000	0.0320	88.52	497.80	0.18	1.73
62	KR_CH-40-41	Channel	KR_JDS-P41	KR_JUS-P40	1031.00	464.22	461.95	0.2200	116.400	0.0320	108.96	719.91	0.15	2.94
63	KR_CH-41-42	Channel	KR_JDS-P42	KR_JUS-P41	1352.00	465.81	465.81	0.0000	81.120	0.0320	30.53	11.59	2.63	1.35
64	KR_CH-42-43	Channel	KR_JDS-P43	KR_JUS-P42	981.00	471.41	465.73	0.5800	76.200	0.0320	29.20	615.42	0.05	1.50
65	KR_CH-43-D1	Channel	KR_JUS-D1	KR_JUS-P43	292.00	472.00	471.62	0.1300	90.000	0.0320	29.06	478.76	0.06	1.77
66	KR_CH-44-45_3	Channel	KR_JDS-P45_3	KR_JUS-P44	738.85	484.96	472.06	1.7500	60.000	0.0450	85.66	247.40	0.35	6.11
67	KR_CH-44-46	Channel	KR_JDS-P46	KR_JUS-P44	312.00	471.93	471.93	0.0000	66.000	0.0320	81.80	8.37	9.77	2.90
68	KR_CH-45_3-45_2	Channel	KR_JDS-P45_2	KR_JUS-P45_3	24.86	487.91	486.05	7.4800	60.000	0.0320	95.28	1252.28	0.08	4.86
69	KR_CH-46-Trib1	Channel	KR_JDS-Trib1	KR_JUS-P46	2923.00	475.50	471.17	0.1500	72.000	0.0320	103.38	775.15	0.13	0.53
70	KR_CH-50-51	Channel	KR_JDS-P51_52	KR_JUS-P50	948.87	514.67	488.25	2.7800	48.000	0.0800	41.97	791.98	0.05	2.99
71	KR_CH-53-53_2	Channel	KR_JDS-P53_2	KR_JDS-P53	211.00	482.00	480.39	0.7600	18.000	0.0800	1.37	39.88	0.03	0.15
72	KR_CH-59-Bentley	Channel	KR_JDS-Bentley	KR_JUS-P59	669.00	490.00	481.43	1.2800	48.000	0.0320	24.06	332.77	0.07	3.57
73	KR_CH-64-Div1	Channel	KR_JDS-Div1	KR_JUS-P64	642.00	495.00	492.56	0.3800	48.000	0.0320	41.27	715.86	0.06	2.00
74	KR_CH-Bentley	Channel	KR_JDS-P200	KR_JDS-Bentley	995.00	498.00	490.00	0.8000	42.000	0.0320	10.14	173.19	0.06	2.25
75	KR_CH-D1-44	Channel	KR_JDS-P44	KR_JUS-D1	107.30	471.21	472.00	-0.7400	48.000	0.0320	91.11	292.00	0.31	2.98
76	KR_CH-D1-65A	Channel	KR_JDS-D1	KR_JDS-D1-B	500.00	472.00	470.00	0.4000	90.000	0.0320	62.05	1416.50	0.04	2.46
77	KR_CH-D1B	Channel	KR_JDS-D1-B	KR_JUS-P65	400.00	470.00	466.93	0.7700	90.000	0.0320	62.04	1962.11	0.03	1.69
78	KR_CH-moose	Channel	JDS-P201	KR_JDS-Div1	886.00	493.90	495.00	-0.1200	48.000	0.0320	3.53	409.15	0.01	1.04
79	KR_CH-OF1-39	Channel	KR_JDS-P39	KR_OF1	70.20	458.99	458.00	1.4100	120.000	0.0320	84.87	5759.30	0.01	3.39
80	KR_CH-SWS1	Channel	KR_JUS-SWS1	KR_JDS-Trib1	2362.00	477.50	475.50	0.0800	54.000	0.0320	4.20	217.18	0.02	0.56
81	KR_CH-SWS1-57	Channel	KR_JDS-P57	KR_JUS-SWS1	42.00	478.29	477.50	1.8800	48.000	0.0450	8.03	87.78	0.09	3.30
82	KR_CH-SWS1-58	Channel	KR_JDS-P58	KR_JUS-SWS1	76.00	478.92	477.50	1.8700	48.000	0.0320	32.51	292.08	0.11	6.49
83	KR_CH-SWS2-Trib2	Channel	KR_JDS-Trib2	KR_JDS-Trib1	470.00	477.00	475.50	0.3200	72.000	0.0320	148.20	933.31	0.16	2.42
84	KR_CH-Trib2-47	Channel	KR_JDS-P47	KR_JDS-Trib2	873.00	482.01	477.00	0.5700	72.000	0.0320	158.08	1179.07	0.13	3.11
85	KR_CH-Trib2-53	Channel	KR_JDS-P53	KR_JDS-Trib2	1194.00	480.39	477.00	0.2800	48.000	0.0450	14.88	266.85	0.06	1.02
86	KR_RRCH-45_2-45	Channel	KR_JDS-P45	KR_JUS-P45_2	40.00	488.76	488.17	1.4700	72.000	0.0320	101.52	681.99	0.15	3.69
87	KR_RRCH-47-48	Channel	KR_JDS-P48	KR_JUS-P47	45.00	484.55	482.34	4.9100	72.000	0.0320	87.95	1935.60	0.05	5.17
88	KR_RRCH-47-49	Channel	KR_JDS-P49	KR_JUS-P47	530.00	486.52	482.34	0.7900	72.000	0.0320	34.47	519.43	0.07	2.11
89	KR_RRCH-49-50	Channel	KR_JDS-P50	KR_JDS-P49	397.00	487.95	486.52	0.3600	72.000	0.0320	33.90	197.46	0.17	1.88
90	KR_RRCH-53_2-56	Channel	KR_JUS-P53_2	KR_JDS-P56	477.00	482.00	480.58	0.3000	48.000	0.0320	3.86	266.42	0.01	0.49
91	KR_RRCH-56-57	Channel	KR_JDS-P56	KR_JUS-P57	535.00	480.58	478.39	0.4100	66.000	0.0320	5.52	414.62	0.01	0.54
92	KR_RRCH-57-57_2	Channel	KR_JDS-P57_2	KR_JUS-P57	31.00	480.95	478.58	7.6500	36.000	0.0800	4.71	69.60	0.07	1.68
93	KR_RRCH-58-59	Channel	KR_JDS-P59	KR_JUS-P58	29.00	480.97	479.74	4.2400	54.000	0.0320	33.45	532.28	0.06	4.11
94	KR-CH-Bentley-64	Channel	KR_JDS-P64	KR_JDS-Bentley	1078.00	492.03	490.00	0.1900	48.000	0.0320	19.54	417.33	0.05	1.03
95	KR-RRCH-53-53_2	Channel	KR_JUS-P53_2	KR_JUS-P53	211.00	482.00	480.66	0.6400	54.000	0.0320	8.45	268.74	0.03	0.69
96	KR-RRCH-53-55	Channel	KR_JDS-P55	KR_JUS-P53	42.00	480.87	480.66	0.5000	80.400	0.0320	27.83	479.67	0.06	1.60
97	SC_CH-86-84	Channel	SC_JUS-P84	SC-JUS-P86	879.25	492.50	492.00	0.0600	48.000	0.0800	6.50	869.89	0.01	0.18
98	SC_CH-87-202	Channel	SC_JDS-P202	SC_JDS-P87	3875.00	497.07	487.86	0.2400	24.000	0.0320	1.11	48.45	0.02	0.20
99	SC_CH-88-87	Channel	SC_JDS-P87	SC_JDS-P88	1012.00	487.86	486.50	0.1300	96.000	0.0320	57.83	1387.20	0.04	1.22
100	SC_CH-89-88	Channel	SC_JDS-P88	SC_JUS-P89	1788.00	486.50	475.32	0.6300	96.000	0.0320	72.60	1670.56	0.04	1.72
101	SC_CH-OF1-Trib1	Channel	SC_JDS-Trib1	SC_OF1	140.00	464.00	462.00	1.4300	72.000	0.0450	78.46	1811.55	0.04	3.83
102	SC_CH-Trib1-89	Channel	SC_JDS-P89	SC_JDS-Trib1	748.00	473.34	464.00	1.2500	96.000	0.0320	78.47	3503.10	0.02	3.13
103	SC_RRCH-203-90	Channel	SC_JDS-P90	SC_JUS-P203	2014.00	503.02	495.55	0.3700	31.200	0.0320	0.22	38.51	0.01	0.04
104	SC_RRCH-204-OF2	Channel	SC_JDS-P204	SC_OF2	3680.98	502.20	500.00	0.0600	48.000	0.0320	7.69	72.35	0.11	1.03
105	SC_RRCH-87-203	Channel	SC_JDS_P203	SC_JUS-P87	3893.00	495.06	489.17	0.1500	84.000	0.0320	43.43	470.68	0.09	0.71
106	SC_RRCH-87-84	Channel	SC_JDS-P84	SC_JUS-P87	50.00	488.34	488.34	0.0000	116.400	0.0320	54.65	150.05	0.36	1.01
107	SC_RRCH-88-87	Channel	SC_JUS-P87	SC_JUS-P88	865.00	492.80	492.00	0.0900	48.000	0.0800	0.00	20.08	0.00	0.00
108	SC-CH-91-91A	Channel	SC_JUS-91A	SC_JUS-P91	178.41	506.00	503.87	1.1900	36.000	0.0450	0.00	127.17	0.00	0.00
109	SC-CH-91A-204	Channel	SC_JUS-P204	SC_JUS-91A	472.13	503.20	506.00	-0.5900	36.000	0.0450	0.00	89.63	0.00	0.00
110	SC-RRCH-88-86	Channel	SC_JDS-P86	SC_JUS-P88	45.00	489.74	488.20	3.4200	72.000	0.0450	21.98	1427.64	0.02	2.56
111	SH_CH-SH7-P88	Channel	SH_JDS-SH7-POND	SC_JDS-P88	2000.00	487.00	486.50	0.0300	48.000	0.0800	0.00	47.31	0.00	0.00
112	10_Pond-Flume	Weir	10_P72-pondoutfall	10_JDS-P72-Pond		477.50	477.60				13.16			
113	Div1	Weir	KR_JUS-D1	KR_JDS-D1		472.00	472.00				62.05			
114	KR_Shafer-Rd-weir	Weir	KR_JUS-P201	10_JUS-P75		492.00	486.35				0.00			

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)
115	P200-weir	Weir	KR_JUS-P200	KR_JDS-P200		499.90	498.00				0.00			
116	P201-weir	Weir	KR_JUS-P201	JDS-P201		492.00	493.90				0.00			
117	P202-weir	Weir	SC_JUS-P202	SC_JDS-P202		496.00	497.07				0.00			
118	P203-weir	Weir	SC_JUS-P203	SC_JDS_P203		495.55	495.06				0.00			
119	P39-weir	Weir	KR_JUS-P39	KR_JDS-P39		460.50	458.00				0.00			
120	P40-weir	Weir	KR_JUS-P40	KR_JDS-P40		461.95	461.26				0.00			
121	P41-weir	Weir	KR_JUS-P41	KR_JDS-P41		465.81	464.22				0.00			
122	P42-weir	Weir	KR_JUS-P42	KR_JDS-P42		465.73	465.81				0.00			
123	P43-weir	Weir	KR_JUS-P43	KR_JDS-P43		471.62	471.41				0.00			
124	P44-weir	Weir	KR_JUS-P44	KR_JDS-P44		471.93	471.21				0.00			
125	P45_2-weir	Weir	KR_JUS-P45_2	KR_JDS-P45_2		488.17	487.91				31.56			
126	P45_3-bypass	Weir	KR_JDS-P45_3	KR_JUS-P44		484.96	471.93				0.00			
127	P45_3-weir	Weir	KR_JUS-P45_3	KR_JDS-P45_3		486.05	484.96				46.57			
128	P45-weir	Weir	KR_JUS-P45	KR_JDS-P45		490.12	488.76				0.00			
129	P46-weir	Weir	KR_JUS-P46	KR_JDS-P46		471.17	471.93				0.00			
130	P47-weir	Weir	KR_JUS-P47	KR_JDS-P47		482.34	482.01				0.00			
131	P48-weir	Weir	KR_JUS-P48	KR_JDS-P48		485.05	484.55				0.00			
132	P49-weir	Weir	KR_JUS-P49	KR_JDS-P49		487.63	486.52				0.00			
133	P50-weir	Weir	KR_JUS-P50	KR_JDS-P50		488.25	487.95				0.00			
134	P51-weir	Weir	KR_JUS-P51	KR_JDS-P51_52		514.94	514.67				0.00			
135	P52-weir	Weir	KR_JUS-P52	KR_JDS-P51_52		517.48	514.67				0.00			
136	P53_2-weir	Weir	KR_JUS-P53_2	KR_JDS-P53_2		482.00	482.00				0.00			
137	P53-weir	Weir	KR_JUS-P53	KR_JDS-P53		480.66	480.39				0.00			
138	P55-weir	Weir	KR_JUS-P55	KR_JDS-P55		481.40	480.87				0.00			
139	P56-weir	Weir	KR_JUS-P56	KR_JDS-P56		481.72	480.58				0.00			
140	P57_2-weir	Weir	KR_JUS-P57_2	KR_JDS-P57_2		481.90	480.94				0.00			
141	P57-weir	Weir	KR_JUS-P57	KR_JDS-P57		478.58	478.29				0.00			
142	P58-weir	Weir	KR_JUS-P58	KR_JDS-P58		479.74	478.92				0.00			
143	P59_2-weir	Weir	KR_JUS-P59_2	KR_JUS-P59		482.33	481.43				0.00			
144	P59-weir	Weir	KR_JUS-P59	KR_JDS-P59		481.43	480.97				0.00			
145	P64-weir	Weir	KR_JUS-P64	KR_JDS-P64		492.56	492.03				0.00			
146	P69-weir	Weir	10_JUS-P69	10_JDS-P69		490.01	489.95				0.00			
147	P70-weir	Weir	10_JUS-P70	10_JDS-P70		487.00	487.00				0.00			
148	P71-weir	Weir	10_JUS-P71	10_JDS-P71		481.93	481.00				0.00			
149	P72-weir	Weir	10_JUS-P72	10_JDS-P72-Pond		479.29	477.60				0.00			
150	P75-weir	Weir	10_JUS-P75	10_JDS-P75		486.35	485.79				0.00			
151	P76-weir	Weir	10_JUS-P76	10_JDS-P76		484.04	483.40				0.00			
152	P79-weir	Weir	10_JUS-P79	10_JDS-P79		467.40	466.50				0.00			
153	P80-weir	Weir	10_JUS-P80	10_JDS-P80		465.42	464.20				0.00			
154	P84-weir	Weir	SC_JUS-P84	SC_JDS-P84		489.26	488.34				0.00			
155	P86-weir	Weir	SC-JUS-P86	SC_JDS-P86		489.60	489.60				0.00			
156	P87-weir	Weir	SC_JUS-P87	SC_JDS-P87		487.60	487.86				0.00			
157	P88-weir	Weir	SC_JUS-P88	SC_JDS-P88		488.20	486.50				0.00			
158	P89-weir	Weir	SC_JUS-P89	SC_JDS-P89		475.32	473.34				0.00			
159	SH7-ovrflow	Weir	SH_JUS-SH7-POND	SH_JDS-SH7-POND		485.00	487.00				0.00			

Project Description

File Name 19490-Columbia Co-PRE-10-2-2020.SPF

Project Options

Flow Units ..... CFS
Elevation Type ..... Elevation
Hydrology Method ..... SCS TR-20
Time of Concentration (TOC) Method ..... SCS TR-55
Link Routing Method ..... Hydrodynamic
Enable Overflow Ponding at Nodes ..... YES
Skip Steady State Analysis Time Periods ... YES

Analysis Options

Start Analysis On ..... Nov 22, 2019 00:00:00
End Analysis On ..... Nov 23, 2019 00:00:00
Start Reporting On ..... Nov 22, 2019 00:00:00
Antecedent Dry Days ..... 0 days
Runoff (Dry Weather) Time Step ..... 0 01:00:00 days hh:mm:ss
Runoff (Wet Weather) Time Step ..... 0 00:05:00 days hh:mm:ss
Reporting Time Step ..... 0 00:05:00 days hh:mm:ss
Routing Time Step ..... 2 seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins	93
Nodes	109
Junctions	55
Outfalls	5
Flow Diversions	0
Inlets	0
Storage Nodes	49
Links	159
Channels	60
Pipes	51
Pumps	0
Orifices	0
Weirs	48
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1		Time Series	10yr-24hr	Cumulative	inches	Pennsylvania	Columbia	10	4.15	SCS Type II 24-hr

Subbasin Summary

SN	Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	KR10-JUS-SWS1	51.60	484.00	50.50	4.15	0.40	20.64	3.34	0 02:38:18
2	KR11-P53	0.20	484.00	93.00	4.15	3.36	0.67	0.97	0 00:06:00
3	KR11-P53_2	1.70	484.00	93.00	4.15	3.37	5.72	8.35	0 00:06:00
4	KR11-P55	20.90	484.00	80.90	4.15	2.24	46.82	52.84	0 00:18:54
5	KR11-P56	1.90	484.00	89.50	4.15	3.01	5.72	6.32	0 00:18:54
6	KR11-P57	0.80	484.00	93.00	4.15	3.37	2.69	3.93	0 00:06:00
7	KR11-P57_2	2.60	484.00	83.10	4.15	2.43	6.31	8.56	0 00:10:48
8	KR11-P58	0.30	484.00	93.00	4.15	3.37	1.01	1.48	0 00:06:00
9	KR11-P59	31.10	484.00	69.00	4.15	1.37	42.45	35.31	0 00:29:54
10	KR12-P48	111.40	484.00	68.50	4.15	1.33	148.50	49.28	0 01:45:36
11	KR13-P48	154.70	484.00	67.30	4.15	1.26	194.46	60.12	0 01:53:42
12	KR14-P48	14.90	484.00	69.20	4.15	1.38	20.53	9.05	0 01:13:30
13	KR15-P48	42.00	484.00	65.20	4.15	1.13	47.38	17.09	0 01:28:42
14	KR16-P48	78.90	484.00	74.20	4.15	1.72	135.87	93.99	0 00:41:54
15	KR17-P52	39.40	484.00	67.30	4.15	1.26	49.53	52.95	0 00:18:54
16	KR18-P51	38.40	484.00	72.70	4.15	1.62	62.02	76.75	0 00:14:36
17	KR19-P45	121.00	484.00	72.10	4.15	1.57	190.33	173.83	0 00:26:54
18	KR1-P64	108.00	484.00	56.10	4.15	0.64	69.34	31.11	0 00:47:06
19	KR20-P47	20.50	484.00	88.70	4.15	2.94	60.17	64.89	0 00:20:12
20	KR20-P48	51.90	484.00	74.90	4.15	1.77	92.02	78.61	0 00:30:42
21	kr20-p49	2.10	484.00	92.20	4.15	3.28	6.89	9.58	0 00:08:00
22	KR20-P50	23.50	484.00	79.80	4.15	2.15	50.53	50.93	0 00:23:48
23	KR20-P53	1.70	484.00	92.80	4.15	3.35	5.69	8.32	0 00:06:00
24	KR21-JDS-TRIB1	46.10	484.00	65.40	4.15	1.14	52.55	19.27	0 01:27:30
25	KR21-JDS-TRIB2	15.30	484.00	78.00	4.15	2.01	30.71	25.56	0 00:32:36
26	KR22-P44	7.80	484.00	93.00	4.15	3.37	26.25	32.06	0 00:13:18
27	KR22-P46	117.40	484.00	72.00	4.15	1.57	183.85	57.88	0 01:58:36
28	KR23-P41	26.40	484.00	89.30	4.15	2.99	79.02	34.64	0 01:22:24
29	KR24-P41	53.60	484.00	81.20	4.15	2.27	121.40	143.00	0 00:17:12
30	KR25-P41	32.00	484.00	70.40	4.15	1.46	46.62	47.26	0 00:22:00
31	KR26-P41	40.40	484.00	83.20	4.15	2.43	98.33	60.33	0 00:52:12
32	KR27-P41	71.20	484.00	66.30	4.15	1.20	85.08	33.00	0 01:22:24
33	KR27-P42	34.40	484.00	74.00	4.15	1.71	58.72	38.82	0 00:44:36
34	KR27-P43	1.60	484.00	93.00	4.15	3.37	5.39	7.49	0 00:07:42
35	KR27-P44	7.70	484.00	93.00	4.15	3.37	25.92	32.97	0 00:11:18
36	KR28-P40	60.50	484.00	58.90	4.15	0.78	47.19	12.51	0 01:52:36
37	KR29-P65	19.80	484.00	88.30	4.15	2.90	57.36	38.92	0 00:44:54
38	KR2-P64	59.00	484.00	69.00	4.15	1.37	80.54	76.75	0 00:23:54
39	KR31-P45	19.80	484.00	86.80	4.15	2.76	54.57	62.36	0 00:18:00
40	KR31-P45_2	1.30	484.00	93.00	4.15	3.37	4.38	6.38	0 00:06:00
41	KR32-OF1	21.20	484.00	64.10	4.15	1.06	22.56	16.03	0 00:34:00
42	KR32-P39	19.90	484.00	51.70	4.15	0.45	8.92	2.82	0 00:57:00
43	KR3-P64	12.60	484.00	35.00	4.15	0.01	0.13	0.03	0 00:28:42
44	KR4-P64	32.40	484.00	63.30	4.15	1.02	32.98	27.51	0 00:26:12
45	KR5-P200	55.70	484.00	63.70	4.15	1.04	57.98	31.64	0 00:48:42
46	KR6-JDS-BENTLEY	14.40	484.00	61.90	4.15	0.94	13.52	16.23	0 00:12:18
47	KR6-P200	17.10	484.00	59.00	4.15	0.79	13.42	13.92	0 00:15:06
48	KR7-JDS-BENTLEY	21.10	484.00	70.60	4.15	1.47	31.04	18.91	0 00:48:12
49	KR8-P58	0.09	484.00	87.60	4.15	2.82	0.25	0.30	0 00:16:53
50	KR8-P59	9.90	484.00	82.20	4.15	2.35	23.26	19.63	0 00:32:24
51	KR8-P59_2	2.30	484.00	93.00	4.15	3.37	7.74	8.94	0 00:15:42
52	KR9-JUS-SWS1	87.50	484.00	67.50	4.15	1.27	111.04	41.22	0 01:29:24
53	SC10-P84	59.70	484.00	37.00	4.15	0.03	1.85	0.22	0 00:18:18
54	SC11-JDS-P87	112.10	484.00	40.50	4.15	0.09	10.31	0.90	0 05:42:54
55	SC11-P87	6.40	484.00	83.10	4.15	2.43	15.52	23.38	0 00:06:42
56	SC12-JDS-P87	48.80	484.00	64.40	4.15	1.08	52.75	19.88	0 01:22:30
57	SC12-P87	2.30	484.00	93.00	4.15	3.37	7.74	11.27	0 00:06:00
58	SC12-P89	108.40	484.00	62.20	4.15	0.96	103.63	29.43	0 01:53:42
59	SC13-P204	127.20	484.00	63.60	4.15	1.04	131.65	39.99	0 01:47:42
60	SC14-P204	181.40	484.00	57.30	4.15	0.70	126.98	49.90	0 01:00:30
61	SC14-P91	1.40	484.00	81.00	4.15	2.25	3.15	4.60	0 00:07:54
62	SC15-P202	2.20	484.00	88.70	4.15	2.94	6.46	8.01	0 00:14:06
63	SC15-P203	110.50	484.00	79.20	4.15	2.10	232.27	89.27	0 01:36:42
64	SC15-P90	2.80	484.00	34.60	4.15	0.01	0.02	0.01	0 00:11:18
65	SC1-P86	261.40	484.00	55.10	4.15	0.60	155.53	47.77	0 01:17:00
66	SC2-P86	22.10	484.00	75.40	4.15	1.81	39.98	44.04	0 00:19:36
67	SC3-P88	23.30	484.00	82.60	4.15	2.38	55.52	81.57	0 00:07:36
68	SC3-P89	13.60	484.00	77.70	4.15	1.98	26.98	40.99	0 00:06:24
69	SC4-P84	141.80	484.00	65.60	4.15	1.15	163.35	50.44	0 01:50:12
70	SC5-P84	85.90	484.00	64.10	4.15	1.06	91.40	30.87	0 01:34:42
71	SC6-P84	76.00	484.00	67.70	4.15	1.28	97.43	87.17	0 00:26:06
72	SC7-P84	175.70	484.00	62.30	4.15	0.96	168.85	76.23	0 01:00:48
73	SC8-P84	75.30	484.00	59.90	4.15	0.83	62.57	37.93	0 00:37:00
74	SC8-P88	4.90	484.00	91.40	4.15	3.20	15.68	23.23	0 00:06:00
75	SC9-P203	94.20	484.00	65.90	4.15	1.17	110.31	66.05	0 00:45:30
76	SH10-JDS-P72-POND	31.20	484.00	71.20	4.15	1.51	47.14	32.11	0 00:41:30
77	SH11-P80	13.80	484.00	90.40	4.15	3.10	42.79	45.86	0 00:20:00
78	SH12-P80	134.70	484.00	73.50	4.15	1.67	225.08	85.10	0 01:35:12
79	SH13-P72	18.40	484.00	57.00	4.15	0.69	12.60	3.83	0 01:26:06
80	SH14-JDS-TRIB1	4.40	484.00	60.40	4.15	0.86	3.78	2.12	0 00:42:06

Subbasin Summary

SN	Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
81	SH14-P76	1.30	484.00	93.00	4.15	3.37	4.38	6.38	0 00:06:00
82	SH14-P79	59.40	484.00	62.80	4.15	0.99	58.75	28.12	0 00:57:06
83	SH1-P75	192.70	484.00	61.20	4.15	0.90	173.62	48.00	0 01:54:36
84	SH2-P75	52.60	484.00	62.60	4.15	0.98	51.44	24.03	0 00:58:36
85	SH3-P64	18.80	484.00	76.20	4.15	1.87	35.14	25.99	0 00:38:42
86	SH4-P75	60.90	484.00	69.80	4.15	1.42	86.30	72.04	0 00:30:06
87	SH5-P75	124.60	484.00	62.90	4.15	1.00	123.98	71.05	0 00:44:36
88	SH6-P69	254.10	484.00	60.40	4.15	0.86	218.02	96.64	0 00:58:24
89	SH7-P89	80.70	484.00	64.30	4.15	1.08	86.75	59.05	0 00:36:30
90	SH8-P69	1.00	484.00	83.10	4.15	2.43	2.43	3.68	0 00:06:24
91	SH8-P70	1.00	484.00	91.20	4.15	3.18	3.18	4.71	0 00:06:00
92	SH8-P71	72.80	484.00	67.30	4.15	1.26	91.51	66.90	0 00:35:06
93	SH9-P72	104.40	484.00	70.50	4.15	1.46	152.84	96.35	0 00:45:54

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Min Freeboard Attained (ft)
1	10_JDS-P69	Junction	489.95	494.90	489.95	96.68	490.96	4.38
2	10_JDS-P70	Junction	487.00	492.00	487.00	134.63	488.70	3.30
3	10_JDS-P71	Junction	481.00	489.00	481.00	68.74	484.79	4.21
4	10_JDS-P75	Junction	485.79	493.00	485.79	107.26	489.31	3.69
5	10_JDS-P76	Junction	483.40	492.50	483.40	173.16	487.32	5.18
6	10_JDS-P79	Junction	466.50	474.00	466.50	94.33	468.45	11.05
7	10_JDS-P80	Junction	464.20	478.17	464.20	155.56	467.56	10.61
8	10_JDS-Trib1	Junction	477.50	482.00	477.50	113.33	479.05	4.45
9	10_P72-pondoutfall	Junction	477.50	482.00	477.50	36.35	479.12	4.38
10	KR_JDS-D1	Junction	472.00	480.00	472.00	129.56	474.31	5.69
11	KR_JDS-D1-B	Junction	470.00	477.00	470.00	129.56	471.80	5.70
12	KR_JDS-Div1	Junction	495.00	497.50	495.00	115.24	496.84	2.16
13	KR_JDS-P200	Junction	498.00	501.86	498.00	35.64	500.16	2.34
14	KR_JDS-P39	Junction	458.00	465.00	458.99	159.34	460.23	8.76
15	KR_JDS-P40	Junction	461.26	476.00	461.26	164.38	466.10	9.90
16	KR_JDS-P41	Junction	464.22	472.16	464.22	285.86	469.66	4.26
17	KR_JDS-P42	Junction	465.81	475.85	465.81	74.62	469.95	6.48
18	KR_JDS-P43	Junction	471.41	479.00	471.41	60.29	473.43	5.86
19	KR_JDS-P44	Junction	471.21	480.00	471.21	189.48	475.89	4.11
20	KR_JDS-P45	Junction	488.76	495.40	488.76	232.84	492.90	2.50
21	KR_JDS-P45_2	Junction	487.91	492.31	487.91	219.49	491.14	1.91
22	KR_JDS-P45_3	Junction	484.96	489.96	484.96	219.49	489.24	2.01
23	KR_JDS-P46	Junction	471.93	480.00	471.93	173.25	476.96	3.80
24	KR_JDS-P47	Junction	482.01	492.01	482.01	317.55	485.84	6.17
25	KR_JDS-P48	Junction	484.55	493.00	484.55	212.28	486.90	6.10
26	KR_JDS-P49	Junction	486.52	493.00	486.52	87.25	489.14	3.86
27	KR_JDS-P50	Junction	487.95	496.00	487.95	86.29	492.32	3.68
28	KR_JDS-P51_52	Junction	514.67	521.00	514.67	138.86	517.23	4.33
29	KR_JDS-P53	Junction	480.39	486.82	480.39	37.86	482.68	4.45
30	KR_JDS-P53_2	Junction	482.00	486.00	482.00	3.92	482.72	3.78
31	KR_JDS-P55	Junction	480.87	488.60	480.87	52.76	483.45	5.15
32	KR_JDS-P56	Junction	480.58	487.40	480.56	15.49	481.69	5.71
33	KR_JDS-P57	Junction	478.29	482.00	478.29	14.97	479.87	5.24
34	KR_JDS-P57_2	Junction	480.94	486.90	480.94	8.78	481.61	5.29
35	KR_JDS-P58	Junction	478.92	484.50	478.92	72.28	480.81	3.87
36	KR_JDS-P59	Junction	480.97	486.71	480.97	74.35	482.61	4.73
37	KR_JDS-P64	Junction	492.03	495.89	492.03	41.53	493.72	3.55
38	KR_JUS-P200	Junction	499.90	504.40	499.90	35.66	502.98	1.42
39	KR_JUS-P51	Junction	514.94	521.83	514.94	73.68	519.26	2.57
40	KR_JUS-P52	Junction	517.48	521.85	517.48	52.63	521.04	0.81
41	KR_JUS-P59_2	Junction	482.33	488.00	482.33	8.58	485.10	2.90
42	KR_JUS-P65	Junction	466.93	476.50	466.93	160.33	471.53	4.97
43	SC_JDS_P203	Junction	495.06	501.90	495.06	155.61	498.75	3.31
44	SC_JDS-P202	Junction	497.07	500.00	497.07	4.09	497.44	4.13
45	SC_JDS-P204	Junction	502.20	509.20	502.20	15.18	504.24	4.96
46	SC_JDS-P84	Junction	488.34	497.00	488.34	99.41	493.89	4.15
47	SC_JDS-P86	Junction	489.60	496.80	489.74	172.95	492.52	4.28
48	SC_JDS-P87	Junction	487.86	497.00	487.86	114.99	490.01	7.25
49	SC_JDS-P88	Junction	486.50	493.50	486.50	259.62	489.47	5.03
50	SC_JDS-P89	Junction	473.34	483.50	473.34	241.41	475.24	8.26
51	SC_JDS-P90	Junction	503.02	509.00	503.02	5.60	503.91	5.09
52	SC_JDS-Trib1	Junction	464.00	472.00	464.00	241.40	466.17	5.83
53	SC_JUS-91A	Junction	506.00	509.20	506.00	6.31	506.53	2.67
54	SC_JUS-P90	Junction	503.34	509.00	503.34	5.60	504.17	4.83
55	SH_JDS-SH7-POND	Junction	487.00	489.00	487.00	0.00	487.00	4.50
56	10_OF1	Outfall	461.00			155.09	464.36	
57	KR_OF1	Outfall	458.00			161.44	459.24	
58	KR_OF2	Outfall	459.07			152.97	461.47	
59	SC_OF1	Outfall	462.00			241.38	464.17	
60	SC_OF2	Outfall	500.00			15.16	502.04	
61	10_JDS-P72-Pond	Storage Node	477.60	483.50	477.60	46.19	479.73	
62	10_JUS-P69	Storage Node	490.01	495.40	490.01	96.94	492.74	
63	10_JUS-P70	Storage Node	487.00	492.00	487.00	97.02	489.63	
64	10_JUS-P71	Storage Node	481.93	489.00	481.93	127.35	485.71	
65	10_JUS-P72	Storage Node	479.29	484.50	479.29	109.98	482.57	
66	10_JUS-P75	Storage Node	486.35	493.00	486.35	112.75	489.32	
67	10_JUS-P76	Storage Node	484.04	492.50	484.04	107.63	488.02	
68	10_JUS-P79	Storage Node	467.40	475.50	467.40	108.80	471.13	
69	10_JUS-P80	Storage Node	465.42	478.70	464.42	164.50	468.16	
70	JDS-P201	Storage Node	493.90	497.40	494.00	30.58	495.83	
71	KR_JDS-Bentley	Storage Node	490.00	494.00	490.00	86.35	492.11	
72	KR_JDS-Trib1	Storage Node	475.50	484.00	476.00	341.78	479.51	
73	KR_JDS-Trib2	Storage Node	477.00	485.00	477.00	371.01	481.04	
74	KR_JUS-D1	Storage Node	472.00	480.00	472.00	189.48	474.89	
75	KR_JUS-P201	Storage Node	492.00	497.50	494.00	70.73	495.07	
76	KR_JUS-P39	Storage Node	460.50	468.50	460.50	164.64	465.69	
77	KR_JUS-P40	Storage Node	461.95	476.00	461.95	231.20	467.68	
78	KR_JUS-P41	Storage Node	465.81	472.66	465.90	245.23	469.53	
79	KR_JUS-P42	Storage Node	465.73	476.35	465.73	91.12	469.97	

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Min Freeboard Attained (ft)
80	KR_JUS-P43	Storage Node	471.62	479.50	471.62	60.16	474.37	
81	KR_JUS-P44	Storage Node	471.93	480.00	471.93	251.29	476.01	
82	KR_JUS-P45	Storage Node	490.12	496.40	490.12	223.04	493.65	
83	KR_JUS-P45_2	Storage Node	488.17	493.31	488.17	224.18	492.78	
84	KR_JUS-P45_3	Storage Node	486.05	492.34	486.05	219.49	491.51	
85	KR_JUS-P46	Storage Node	471.17	480.00	471.17	310.58	477.04	
86	KR_JUS-P47	Storage Node	482.34	492.34	482.34	320.16	486.52	
87	KR_JUS-P48	Storage Node	485.05	492.30	485.55	213.34	487.74	
88	KR_JUS-P49	Storage Node	487.63	493.00	487.63	9.10	489.23	
89	KR_JUS-P50	Storage Node	488.25	496.00	488.25	166.07	493.04	
90	KR_JUS-P53	Storage Node	480.66	487.40	480.66	56.22	483.40	
91	KR_JUS-P53_2	Storage Node	482.00	486.50	482.00	23.77	482.92	
92	KR_JUS-P55	Storage Node	481.40	487.10	481.40	52.82	483.49	
93	KR_JUS-P56	Storage Node	481.72	487.90	481.72	6.31	482.91	
94	KR_JUS-P57	Storage Node	478.58	485.40	478.58	16.74	480.31	
95	KR_JUS-P57_2	Storage Node	481.90	487.40	481.90	8.56	482.82	
96	KR_JUS-P58	Storage Node	479.74	485.50	479.74	77.47	482.42	
97	KR_JUS-P59	Storage Node	481.43	487.80	481.43	77.30	484.25	
98	KR_JUS-P64	Storage Node	492.56	497.80	492.56	114.46	496.07	
99	KR_JUS-SWS1	Storage Node	477.50	484.00	478.00	127.91	479.87	
100	SC_JUS-P202	Storage Node	496.00	500.50	496.00	7.84	498.48	
101	SC_JUS-P203	Storage Node	495.55	501.90	495.55	131.67	500.61	
102	SC_JUS-P204	Storage Node	503.20	509.20	503.20	81.45	506.64	
103	SC_JUS-P84	Storage Node	489.26	497.00	489.26	190.43	493.89	
104	SC_JUS-P87	Storage Node	487.60	497.00	487.60	148.51	493.89	
105	SC_JUS-P88	Storage Node	488.20	494.75	488.20	189.45	492.37	
106	SC_JUS-P89	Storage Node	475.32	485.00	475.32	279.73	483.11	
107	SC_JUS-P91	Storage Node	503.87	509.20	503.87	6.45	504.72	
108	SC-JUS-P86	Storage Node	489.60	496.70	489.60	150.13	492.31	
109	SH_JUS-SH7-POND	Storage Node	485.00	489.50	486.00	58.28	487.20	

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)
1	P200	Pipe	KR_JUS-P200	KR_JDS-P200	100.00	500.40	498.80	1.6000	24.000	0.0240	35.64	31.00	1.15	6.09
2	P202	Pipe	SC_JUS-P202	SC_JDS-P202	43.00	497.20	497.10	0.2300	15.000	0.0150	4.09	2.70	1.52	3.77
3	P203	Pipe	SC_JUS-P203	SC_JDS_P203	49.00	495.55	495.06	1.0000	40.000	0.0130	114.68	88.34	1.30	13.14
4	P204	Pipe	SC_JUS-P204	SC_JDS-P204	103.00	503.20	502.20	0.9700	18.000	0.0120	15.18	11.21	1.35	8.59
5	P39	Pipe	KR_JUS-P39	KR_JDS-P39	556.00	460.47	458.99	0.2700	72.000	0.0120	159.34	239.10	0.67	7.33
6	P40	Pipe	KR_JUS-P40	KR_JDS-P40	210.00	461.95	461.26	0.3300	60.000	0.0120	164.38	161.73	1.02	8.44
7	P41	Pipe	KR_JUS-P41	KR_JDS-P41	61.00	465.81	464.22	2.6100	80.000	0.0200	285.86	2263.56	0.13	3.96
8	P42	Pipe	KR_JUS-P42	KR_JDS-P42	67.00	465.73	465.81	-0.1200	84.000	0.0200	74.62	365.96	0.20	1.54
9	P43	Pipe	KR_JUS-P43	KR_JDS-P43	50.00	471.62	471.41	0.4200	60.000	0.0120	60.29	182.85	0.33	7.07
10	P44	Pipe	KR_JUS-P44	KR_JDS-P44	44.30	471.93	471.21	1.6300	48.000	0.0200	189.48	595.78	0.32	3.95
11	P45	Pipe	KR_JUS-P45	KR_JDS-P45	82.20	490.12	488.76	1.6500	42.000	0.0150	232.84	432.33	0.54	7.90
12	P45_2	Pipe	KR_JUS-P45_2	KR_JDS-P45_2	25.30	488.17	487.91	1.0300	30.000	0.0130	59.83	41.58	1.44	12.19
13	P45_3	Pipe	KR_JUS-P45_3	KR_JDS-P45_3	199.00	486.05	484.96	0.5500	36.000	0.0240	46.11	26.74	1.72	7.05
14	P46	Pipe	KR_JUS-P46	KR_JDS-P46	42.00	471.17	471.93	-1.8100	48.000	0.0120	109.82	209.33	0.52	8.74
15	P47	Pipe	KR_JUS-P47	KR_JDS-P47	21.80	482.34	482.01	1.5100	55.000	0.0150	317.55	1102.17	0.29	5.85
16	P48	Pipe	KR_JUS-P48	KR_JDS-P48	71.70	485.05	484.55	0.7000	48.000	0.0150	212.28	844.31	0.25	4.59
17	P49	Pipe	KR_JDS-P49	KR_JUS-P49	89.60	487.63	486.52	1.2400	24.000	0.0120	9.09	0.82	11.10	4.08
18	P50	Pipe	KR_JUS-P50	KR_JDS-P50	87.20	488.25	487.95	0.3400	24.000	0.0150	59.69	34.50	1.73	6.33
19	P51	Pipe	KR_JUS-P51	KR_JDS-P51_52	31.00	514.94	514.67	0.8700	25.000	0.0120	73.66	47.17	1.56	13.37
20	P52	Pipe	KR_JUS-P52	KR_JDS-P51_52	48.00	517.48	515.14	4.8800	25.000	0.0120	70.67	111.59	0.63	12.83
21	P53_2	Pipe	KR_JDS-P53_2	KR_JUS-P53_2	90.40	482.20	482.00	0.2200	24.000	0.0120	3.92	23.05	0.17	1.98
22	P53A	Pipe	KR_JUS-P53	KR_JDS-P53	24.80	480.66	480.39	1.0900	36.000	0.0130	32.11	69.59	0.46	5.22
23	P53B-C	Pipe	KR_JUS-P53	KR_JDS-P53	20.30	482.40	482.90	-2.4600	24.000	0.0120	3.39	76.93	0.04	1.95
24	P55	Pipe	KR_JDS-P55	KR_JUS-P55	79.60	480.87	481.40	-0.6700	48.000	0.0200	52.76	235.02	0.22	2.83
25	P56	Pipe	KR_JUS-P56	KR_JDS-P56	82.20	481.72	480.58	1.3900	30.000	0.0130	6.29	48.30	0.13	3.68
26	P57	Pipe	KR_JUS-P57	KR_JDS-P57	27.80	478.58	478.29	1.0400	36.000	0.0120	14.97	73.80	0.20	5.24
27	P57_2	Pipe	KR_JUS-P57_2	KR_JDS-P57_2	79.40	481.90	480.94	1.2100	24.000	0.0120	8.78	53.90	0.16	4.04
28	P58A	Pipe	KR_JUS-P58	KR_JDS-P58	45.60	479.74	478.92	1.8000	36.000	0.0130	31.00	89.44	0.35	5.36
29	P58B	Pipe	KR_JDS-P58	KR_JUS-P58	30.60	480.28	479.56	2.3500	24.000	0.0120	21.72	32.56	0.67	8.07
30	P58C	Pipe	KR_JDS-P58	KR_JUS-P58	30.60	480.23	479.99	0.7800	24.000	0.0120	19.56	21.70	0.90	6.73
31	P59	Pipe	KR_JUS-P59	KR_JDS-P59	95.45	481.43	480.97	0.4800	48.000	0.0200	74.35	139.79	0.53	5.56
32	P59_2	Pipe	KR_JUS-P59_2	KR_JUS-P58	73.20	482.33	482.01	0.4400	15.000	0.0120	8.56	4.63	1.85	7.09
33	P64	Pipe	KR_JUS-P64	KR_JDS-P64	47.60	492.56	492.03	1.1100	26.000	0.0240	41.53	29.93	1.39	7.04
34	P65	Pipe	KR_JUS-P65	KR_OF2	1034.00	466.93	459.07	0.7600	84.000	0.0120	152.97	603.39	0.25	8.07
35	P69	Pipe	10_JUS-P69	10_JDS-P69	60.70	490.01	489.95	0.1000	36.000	0.0200	96.68	62.05	1.56	6.23
36	P70	Pipe	10_JUS-P70	10_JDS-P70	8.50	487.00	487.00	0.0000	18.000	0.0200	134.63	8.10	16.61	9.97
37	P71	Pipe	10_JUS-P71	10_JDS-P71	34.00	481.93	481.00	2.7400	48.000	0.0120	68.74	257.36	0.27	5.60
38	P72	Pipe	10_JUS-P72	10_JDS-P72-Pond	40.95	479.29	478.78	1.2500	36.000	0.0240	35.13	40.32	0.87	5.66
39	P75	Pipe	10_JUS-P75	10_JDS-P75	66.20	486.35	485.79	0.8500	42.000	0.0200	107.26	419.05	0.26	2.38
40	P76	Pipe	10_JUS-P76	10_JDS-P76	33.70	484.04	483.40	1.9000	39.600	0.0150	173.16	224.36	0.77	10.49
41	P79	Pipe	10_JUS-P79	10_JDS-P79	36.10	467.40	466.50	2.4900	43.000	0.0120	94.33	338.90	0.28	7.71
42	P80	Pipe	10_JUS-P80	10_JDS-P80	56.10	465.64	465.64	0.0000	99.600	0.0200	155.56	80.17	1.94	4.43
43	P84	Pipe	SC_JUS-P84	SC_JDS-P84	68.00	489.26	488.34	1.3500	34.000	0.0120	99.41	133.47	0.74	9.76
44	P86	Pipe	SC_JDS-P86	SC-JUS-P86	70.00	489.70	489.70	0.0000	73.000	0.0200	172.95	60.09	2.88	3.38
45	P87-A	Pipe	SC_JUS-P87	SC_JDS-P87	21.10	489.17	487.86	6.2100	30.000	0.0120	38.78	110.72	0.35	8.37
46	P87-B	Pipe	SC_JUS-P87	SC_JDS-P87	28.40	490.16	490.81	-2.2900	16.000	0.0130	14.10	11.61	1.21	10.10
47	P87-C	Pipe	SC_JUS-P87	SC_JDS-P87	27.90	489.24	489.03	0.7500	16.000	0.0130	20.12	6.66	3.02	14.41
48	P88	Pipe	SC_JUS-P88	SC_JDS-P88	40.50	488.20	486.60	3.9500	52.000	0.0240	151.31	382.89	0.40	7.10
49	P89	Pipe	SC_JUS-P89	SC_JDS-P89	43.30	475.32	475.20	0.2800	66.000	0.0240	241.41	95.76	2.52	10.77
50	P90	Pipe	SC_JUS-P90	SC_JDS-P90	82.60	503.34	503.02	0.3900	36.000	0.0130	5.60	41.51	0.13	4.96
51	P91	Pipe	SC_JUS-P91	SC_JUS-P90	81.90	503.87	503.44	0.5300	36.000	0.0150	5.60	41.89	0.13	3.73
52	10_CH-71-70	Channel	10_JDS-P70	10_JUS-P71	1209.00	487.00	481.93	0.4200	60.000	0.0320	93.82	1306.83	0.07	1.19
53	10_CH-72-71	Channel	10_JDS-P71	10_JUS-P72	1736.00	481.00	479.29	0.1000	72.000	0.0320	76.61	481.88	0.16	3.08
54	10_CH-79-Trib1	Channel	10_JDS-Trib1	10_JUS-P79	1363.00	477.50	467.40	0.7400	60.000	0.0320	98.57	1448.21	0.07	1.41
55	10_CH-80-79	Channel	10_JDS-P79	10_JUS-P80	246.00	466.50	465.42	0.4400	156.000	0.0320	94.43	4521.15	0.02	2.30
56	10_CH-OF1-80	Channel	10_JDS-P80	10_OF1	398.00	464.20	461.00	0.8000	117.600	0.0320	155.09	1389.84	0.11	4.80
57	10_CH-Trib1	Channel	10_P72-pondoutfall	10_JDS-Trib1	85.00	477.50	477.50	0.0000	54.000	0.0320	36.35	14.78	2.46	2.33

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)
58	10_CH-Trib1-76	Channel	10_JDS-P76	10_JDS-Trib1	1026.00	483.40	477.50	0.5800	72.000	0.0320	102.03	1025.45	0.10	6.48
59	10_RRCH-70-69	Channel	10_JDS-P69	10_JUS-P70	59.00	489.95	487.00	5.0000	60.000	0.0320	96.68	1866.97	0.05	3.70
60	10_RRCH-76-75	Channel	10_JDS-P75	10_JUS-P76	34.00	485.79	484.04	5.1500	84.000	0.0320	107.18	395.55	0.27	1.40
61	KR_CH-39-40	Channel	KR_JDS-P40	KR_JUS-P39	905.00	461.26	460.50	0.0800	93.000	0.0320	163.10	497.80	0.33	2.06
62	KR_CH-40-41	Channel	KR_JDS-P41	KR_JUS-P40	1031.00	464.22	461.95	0.2200	116.400	0.0320	222.92	719.91	0.31	3.95
63	KR_CH-41-42	Channel	KR_JDS-P42	KR_JUS-P41	1352.00	465.81	465.81	0.0000	81.120	0.0320	68.86	11.59	5.94	1.63
64	KR_CH-42-43	Channel	KR_JDS-P43	KR_JUS-P42	981.00	471.41	465.73	0.5800	76.200	0.0320	60.14	615.42	0.10	1.89
65	KR_CH-43-D1	Channel	KR_JUS-D1	KR_JUS-P43	292.00	472.00	471.62	0.1300	90.000	0.0320	59.95	478.76	0.13	1.96
66	KR_CH-44-45_3	Channel	KR_JDS-P45_3	KR_JUS-P44	738.85	484.96	472.06	1.7500	60.000	0.0450	169.75	247.40	0.69	7.05
67	KR_CH-44-46	Channel	KR_JDS-P46	KR_JUS-P44	312.00	471.93	471.93	0.0000	66.000	0.0320	173.25	8.37	20.69	4.13
68	KR_CH-45_3-45_2	Channel	KR_JDS-P45_2	KR_JUS-P45_3	24.86	487.91	486.05	7.4800	60.000	0.0320	219.49	1252.28	0.18	5.73
69	KR_CH-46-Trib1	Channel	KR_JDS-Trib1	KR_JUS-P46	2923.00	475.50	471.17	0.1500	72.000	0.0320	253.00	775.15	0.33	0.72
70	KR_CH-50-51	Channel	KR_JDS-P51_52	KR_JUS-P50	948.87	514.67	488.25	2.7800	48.000	0.0800	116.85	791.98	0.15	2.93
71	KR_CH-53-53_2	Channel	KR_JDS-P53_2	KR_JDS-P53	211.00	482.00	480.39	0.7600	18.000	0.0800	3.62	39.88	0.09	0.25
72	KR_CH-59-Bentley	Channel	KR_JDS-Bentley	KR_JUS-P59	669.00	490.00	481.43	1.2800	48.000	0.0320	55.79	332.77	0.17	3.57
73	KR_CH-64-Div1	Channel	KR_JDS-Div1	KR_JUS-P64	642.00	495.00	492.56	0.3800	48.000	0.0320	91.75	715.86	0.13	1.86
74	KR_CH-Bentley	Channel	KR_JDS-P200	KR_JDS-Bentley	995.00	498.00	490.00	0.8000	42.000	0.0320	36.19	173.19	0.21	3.03
75	KR_CH-D1-44	Channel	KR_JDS-P44	KR_JUS-D1	107.30	471.21	472.00	-0.7400	48.000	0.0320	189.48	292.00	0.65	4.34
76	KR_CH-D1-65A	Channel	KR_JDS-D1	KR_JDS-D1-B	500.00	472.00	470.00	0.4000	90.000	0.0320	129.56	1416.50	0.09	3.17
77	KR_CH-D1B	Channel	KR_JDS-D1-B	KR_JUS-P65	400.00	470.00	466.93	0.7700	90.000	0.0320	129.55	1962.11	0.07	2.07
78	KR_CH-moose	Channel	JDS-P201	KR_JDS-Div1	886.00	493.90	495.00	-0.1200	48.000	0.0320	30.58	409.15	0.07	3.63
79	KR_CH-OF1-39	Channel	KR_JDS-P39	KR_OF1	70.20	458.99	458.00	1.4100	120.000	0.0320	159.34	5759.30	0.03	4.31
80	KR_CH-SWS1	Channel	KR_JUS-SWS1	KR_JDS-Trib1	2362.00	477.50	475.50	0.0800	54.000	0.0320	19.20	217.18	0.09	0.49
81	KR_CH-SWS1-57	Channel	KR_JDS-P57	KR_JUS-SWS1	42.00	478.29	477.50	1.8800	48.000	0.0450	14.96	87.78	0.17	4.84
82	KR_CH-SWS1-58	Channel	KR_JDS-P58	KR_JUS-SWS1	76.00	478.92	477.50	1.8700	48.000	0.0320	72.28	292.08	0.25	9.52
83	KR_CH-SWS2-Trib2	Channel	KR_JDS-Trib2	KR_JDS-Trib1	470.00	477.00	475.50	0.3200	72.000	0.0320	322.62	933.31	0.35	2.00
84	KR_CH-Trib2-47	Channel	KR_JDS-P47	KR_JDS-Trib2	873.00	482.01	477.00	0.5700	72.000	0.0320	322.26	1179.07	0.27	2.65
85	KR_CH-Trib2-53	Channel	KR_JDS-P53	KR_JDS-Trib2	1194.00	480.39	477.00	0.2800	48.000	0.0450	24.92	266.85	0.09	0.98
86	KR_RRCH-45_2-45	Channel	KR_JDS-P45	KR_JUS-P45_2	40.00	488.76	488.17	1.4700	72.000	0.0320	224.18	681.99	0.33	6.15
87	KR_RRCH-47-48	Channel	KR_JDS-P48	KR_JUS-P47	45.00	484.55	482.34	4.9100	72.000	0.0320	212.28	1935.60	0.11	5.81
88	KR_RRCH-47-49	Channel	KR_JDS-P49	KR_JUS-P47	530.00	486.52	482.34	0.7900	72.000	0.0320	85.54	519.43	0.16	2.61
89	KR_RRCH-49-50	Channel	KR_JDS-P50	KR_JDS-P49	397.00	487.95	486.52	0.3600	72.000	0.0320	86.11	197.46	0.44	2.54
90	KR_RRCH-53_2-56	Channel	KR_JUS-P53_2	KR_JDS-P56	477.00	482.00	480.58	0.3000	48.000	0.0320	10.52	266.42	0.04	0.69
91	KR_RRCH-56-57	Channel	KR_JDS-P56	KR_JUS-P57	535.00	480.58	478.39	0.4100	66.000	0.0320	13.03	414.62	0.03	0.70
92	KR_RRCH-57-57_2	Channel	KR_JDS-P57_2	KR_JUS-P57	31.00	480.95	478.58	7.6500	36.000	0.0800	8.53	69.60	0.12	2.03
93	KR_RRCH-58-59	Channel	KR_JDS-P59	KR_JUS-P58	29.00	480.97	479.74	4.2400	54.000	0.0320	74.35	532.28	0.14	5.37
94	KR-CH-Bentley-64	Channel	KR_JDS-P64	KR_JDS-Bentley	1078.00	492.03	490.00	0.1900	48.000	0.0320	41.15	417.33	0.10	1.04
95	KR-RRCH-53-53_2	Channel	KR_JUS-P53_2	KR_JUS-P53	211.00	482.00	480.66	0.6400	54.000	0.0320	19.50	268.74	0.07	1.03
96	KR-RRCH-53-55	Channel	KR_JDS-P55	KR_JUS-P53	42.00	480.87	480.66	0.5000	80.400	0.0320	52.73	479.67	0.11	2.25
97	SC_CH-86-84	Channel	SC_JUS-P84	SC-JUS-P86	879.25	492.50	492.00	0.0600	48.000	0.0800	116.43	869.89	0.13	0.70
98	SC_CH-87-202	Channel	SC_JDS-P202	SC_JDS-P87	3875.00	497.07	487.86	0.2400	24.000	0.0320	2.37	48.45	0.05	0.27
99	SC_CH-88-87	Channel	SC_JDS-P87	SC_JDS-P88	1012.00	487.86	486.50	0.1300	96.000	0.0320	109.24	1387.20	0.08	1.19
100	SC_CH-89-88	Channel	SC_JDS-P88	SC_JUS-P89	1788.00	486.50	475.32	0.6300	96.000	0.0320	254.03	1670.56	0.15	2.06
101	SC_CH-OF1-Trib1	Channel	SC_JDS-Trib1	SC_OF1	140.00	464.00	462.00	1.4300	72.000	0.0450	241.38	1811.55	0.13	5.41
102	SC_CH-Trib1-89	Channel	SC_JDS-P89	SC_JDS-Trib1	748.00	473.34	464.00	1.2500	96.000	0.0320	241.40	3503.10	0.07	4.62
103	SC_RRCH-203-90	Channel	SC_JDS-P90	SC_JUS-P203	2014.00	503.02	495.55	0.3700	31.200	0.0320	5.59	38.51	0.15	0.55
104	SC_RRCH-204-OF2	Channel	SC_JDS-P204	SC_OF2	3680.98	502.20	500.00	0.0600	48.000	0.0320	15.16	72.35	0.21	1.22
105	SC_RRCH-87-203	Channel	SC_JDS_P203	SC_JUS-P87	3893.00	495.06	489.17	0.1500	84.000	0.0320	107.21	470.68	0.23	1.07
106	SC_RRCH-87-84	Channel	SC_JDS-P84	SC_JUS-P87	50.00	488.34	488.34	0.0000	116.400	0.0320	103.12	150.05	0.69	1.61
107	SC_RRCH-88-87	Channel	SC_JUS-P87	SC_JUS-P88	865.00	492.80	492.00	0.0900	48.000	0.0800	0.94	20.08	0.05	0.48
108	SC-CH-91-91A	Channel	SC_JUS-91A	SC_JUS-P91	178.41	506.00	503.87	1.1900	36.000	0.0450	6.31	127.17	0.05	1.80
109	SC-CH-91A-204	Channel	SC_JUS-P204	SC_JUS-91A	472.13	503.20	506.00	-0.5900	36.000	0.0450	6.31	89.63	0.07	0.53
110	SC-RRCH-88-86	Channel	SC_JDS-P86	SC_JUS-P88	45.00	489.74	488.20	3.4200	72.000	0.0450	184.35	1427.64	0.13	4.55
111	SH_CH-SH7-P88	Channel	SH_JDS-SH7-POND	SC_JDS-P88	2000.00	487.00	486.50	0.0300	48.000	0.0800	0.00	47.31	0.00	0.00
112	10_Pond-Flume	Weir	10_P72-pondoutfall	10_JDS-P72-Pond		477.50	477.60				36.35			
113	Div1	Weir	KR_JUS-D1	KR_JDS-D1		472.00	472.00				129.56			
114	KR_Shafer-Rd-weir	Weir	KR_JUS-P201	10_JUS-P75		492.00	486.35				0.00			

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)
115	P200-weir	Weir	KR_JUS-P200	KR_JDS-P200		499.90	498.00				0.00			
116	P201-weir	Weir	KR_JUS-P201	JDS-P201		492.00	493.90				0.00			
117	P202-weir	Weir	SC_JUS-P202	SC_JDS-P202		496.00	497.07				0.00			
118	P203-weir	Weir	SC_JUS-P203	SC_JDS_P203		495.55	495.06				48.72			
119	P39-weir	Weir	KR_JUS-P39	KR_JDS-P39		460.50	458.00				0.00			
120	P40-weir	Weir	KR_JUS-P40	KR_JDS-P40		461.95	461.26				0.00			
121	P41-weir	Weir	KR_JUS-P41	KR_JDS-P41		465.81	464.22				0.00			
122	P42-weir	Weir	KR_JUS-P42	KR_JDS-P42		465.73	465.81				0.00			
123	P43-weir	Weir	KR_JUS-P43	KR_JDS-P43		471.62	471.41				0.00			
124	P44-weir	Weir	KR_JUS-P44	KR_JDS-P44		471.93	471.21				0.00			
125	P45_2-weir	Weir	KR_JUS-P45_2	KR_JDS-P45_2		488.17	487.91				159.24			
126	P45_3-bypass	Weir	KR_JDS-P45_3	KR_JUS-P44		484.96	471.93				49.71			
127	P45_3-weir	Weir	KR_JUS-P45_3	KR_JDS-P45_3		486.05	484.96				184.02			
128	P45-weir	Weir	KR_JUS-P45	KR_JDS-P45		490.12	488.76				0.00			
129	P46-weir	Weir	KR_JUS-P46	KR_JDS-P46		471.17	471.93				127.94			
130	P47-weir	Weir	KR_JUS-P47	KR_JDS-P47		482.34	482.01				0.00			
131	P48-weir	Weir	KR_JUS-P48	KR_JDS-P48		485.05	484.55				0.00			
132	P49-weir	Weir	KR_JUS-P49	KR_JDS-P49		487.63	486.52				0.00			
133	P50-weir	Weir	KR_JUS-P50	KR_JDS-P50		488.25	487.95				40.09			
134	P51-weir	Weir	KR_JUS-P51	KR_JDS-P51_52		514.94	514.67				0.00			
135	P52-weir	Weir	KR_JUS-P52	KR_JDS-P51_52		517.48	514.67				11.49			
136	P53_2-weir	Weir	KR_JUS-P53_2	KR_JDS-P53_2		482.00	482.00				0.00			
137	P53-weir	Weir	KR_JUS-P53	KR_JDS-P53		480.66	480.39				0.00			
138	P55-weir	Weir	KR_JUS-P55	KR_JDS-P55		481.40	480.87				0.00			
139	P56-weir	Weir	KR_JUS-P56	KR_JDS-P56		481.72	480.58				0.00			
140	P57_2-weir	Weir	KR_JUS-P57_2	KR_JDS-P57_2		481.90	480.94				0.00			
141	P57-weir	Weir	KR_JUS-P57	KR_JDS-P57		478.58	478.29				0.00			
142	P58-weir	Weir	KR_JUS-P58	KR_JDS-P58		479.74	478.92				0.00			
143	P59_2-weir	Weir	KR_JUS-P59_2	KR_JUS-P59		482.33	481.43				0.00			
144	P59-weir	Weir	KR_JUS-P59	KR_JDS-P59		481.43	480.97				0.00			
145	P64-weir	Weir	KR_JUS-P64	KR_JDS-P64		492.56	492.03				0.00			
146	P69-weir	Weir	10_JUS-P69	10_JDS-P69		490.01	489.95				0.00			
147	P70-weir	Weir	10_JUS-P70	10_JDS-P70		487.00	487.00				0.00			
148	P71-weir	Weir	10_JUS-P71	10_JDS-P71		481.93	481.00				0.00			
149	P72-weir	Weir	10_JUS-P72	10_JDS-P72-Pond		479.29	477.60				0.00			
150	P75-weir	Weir	10_JUS-P75	10_JDS-P75		486.35	485.79				0.00			
151	P76-weir	Weir	10_JUS-P76	10_JDS-P76		484.04	483.40				0.00			
152	P79-weir	Weir	10_JUS-P79	10_JDS-P79		467.40	466.50				0.00			
153	P80-weir	Weir	10_JUS-P80	10_JDS-P80		465.42	464.20				0.00			
154	P84-weir	Weir	SC_JUS-P84	SC_JDS-P84		489.26	488.34				0.00			
155	P86-weir	Weir	SC-JUS-P86	SC_JDS-P86		489.60	489.60				0.00			
156	P87-weir	Weir	SC_JUS-P87	SC_JDS-P87		487.60	487.86				28.65			
157	P88-weir	Weir	SC_JUS-P88	SC_JDS-P88		488.20	486.50				0.00			
158	P89-weir	Weir	SC_JUS-P89	SC_JDS-P89		475.32	473.34				0.00			
159	SH7-ovrflow	Weir	SH_JUS-SH7-POND	SH_JDS-SH7-POND		485.00	487.00				0.00			

Project Description

File Name 19490-Columbia Co-PRE-10-2-2020.SPF

Project Options

Flow Units ..... CFS
Elevation Type ..... Elevation
Hydrology Method ..... SCS TR-20
Time of Concentration (TOC) Method ..... SCS TR-55
Link Routing Method ..... Hydrodynamic
Enable Overflow Ponding at Nodes ..... YES
Skip Steady State Analysis Time Periods ... YES

Analysis Options

Start Analysis On ..... Nov 22, 2019 00:00:00
End Analysis On ..... Nov 23, 2019 00:00:00
Start Reporting On ..... Nov 22, 2019 00:00:00
Antecedent Dry Days ..... 0 days
Runoff (Dry Weather) Time Step ..... 0 01:00:00 days hh:mm:ss
Runoff (Wet Weather) Time Step ..... 0 00:05:00 days hh:mm:ss
Reporting Time Step ..... 0 00:05:00 days hh:mm:ss
Routing Time Step ..... 2 seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins	93
Nodes	109
Junctions	55
Outfalls	5
Flow Diversions	0
Inlets	0
Storage Nodes	49
Links	159
Channels	60
Pipes	51
Pumps	0
Orifices	0
Weirs	48
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1		Time Series	25yr-24hr	Cumulative	inches	Pennsylvania	Columbia	25	5.11	SCS Type II 24-hr

Subbasin Summary

SN	Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	KR10-JUS-SWS1	51.60	484.00	50.50	5.11	0.77	39.53	7.62	0 02:38:18
2	KR11-P53	0.20	484.00	93.00	5.11	4.31	0.86	1.23	0 00:06:00
3	KR11-P53_2	1.70	484.00	93.00	5.11	4.31	7.32	10.53	0 00:06:00
4	KR11-P55	20.90	484.00	80.90	5.11	3.07	64.23	72.50	0 00:18:54
5	KR11-P56	1.90	484.00	89.50	5.11	3.93	7.47	8.15	0 00:18:54
6	KR11-P57	0.80	484.00	93.00	5.11	4.31	3.44	4.95	0 00:06:00
7	KR11-P57_2	2.60	484.00	83.10	5.11	3.28	8.54	11.51	0 00:10:48
8	KR11-P58	0.30	484.00	93.00	5.11	4.31	1.29	1.86	0 00:06:00
9	KR11-P59	31.10	484.00	69.00	5.11	2.04	63.38	54.56	0 00:29:54
10	KR12-P48	111.40	484.00	68.50	5.11	2.00	222.58	77.05	0 01:45:36
11	KR13-P48	154.70	484.00	67.30	5.11	1.90	294.39	95.39	0 01:53:42
12	KR14-P48	14.90	484.00	69.20	5.11	2.05	30.60	14.03	0 01:13:30
13	KR15-P48	42.00	484.00	65.20	5.11	1.74	73.16	28.15	0 01:28:42
14	KR16-P48	78.90	484.00	74.20	5.11	2.47	194.80	137.44	0 00:41:54
15	KR17-P52	39.40	484.00	67.30	5.11	1.90	74.98	82.76	0 00:18:54
16	KR18-P51	38.40	484.00	72.70	5.11	2.34	89.93	112.54	0 00:14:36
17	KR19-P45	121.00	484.00	72.10	5.11	2.29	277.21	258.19	0 00:26:54
18	KR1-P64	108.00	484.00	56.10	5.11	1.11	119.34	63.08	0 00:47:06
19	KR20-P47	20.50	484.00	88.70	5.11	3.85	78.84	84.11	0 00:20:12
20	KR20-P48	51.90	484.00	74.90	5.11	2.53	131.31	113.44	0 00:30:42
21	kr20-p49	2.10	484.00	92.20	5.11	4.22	8.86	12.14	0 00:08:00
22	KR20-P50	23.50	484.00	79.80	5.11	2.97	69.80	70.29	0 00:23:48
23	KR20-P53	1.70	484.00	92.80	5.11	4.28	7.28	10.49	0 00:06:00
24	KR21-JDS-TRIB1	46.10	484.00	65.40	5.11	1.76	81.00	31.57	0 01:27:30
25	KR21-JDS-TRIB2	15.30	484.00	78.00	5.11	2.81	42.92	35.96	0 00:32:36
26	KR22-P44	7.80	484.00	93.00	5.11	4.31	33.59	40.42	0 00:13:18
27	KR22-P46	117.40	484.00	72.00	5.11	2.28	268.02	87.06	0 01:58:36
28	KR23-P41	26.40	484.00	89.30	5.11	3.91	103.20	44.91	0 01:22:24
29	KR24-P41	53.60	484.00	81.20	5.11	3.10	166.27	195.08	0 00:17:12
30	KR25-P41	32.00	484.00	70.40	5.11	2.15	68.83	71.39	0 00:22:00
31	KR26-P41	40.40	484.00	83.20	5.11	3.29	133.04	81.47	0 00:52:12
32	KR27-P41	71.20	484.00	66.30	5.11	1.83	130.01	53.37	0 01:22:24
33	KR27-P42	34.40	484.00	74.00	5.11	2.45	84.35	56.92	0 00:44:36
34	KR27-P43	1.60	484.00	93.00	5.11	4.31	6.89	9.45	0 00:07:42
35	KR27-P44	7.70	484.00	93.00	5.11	4.31	33.16	41.62	0 00:11:18
36	KR28-P40	60.50	484.00	58.90	5.11	1.29	78.05	23.04	0 01:52:36
37	KR29-P65	19.80	484.00	88.30	5.11	3.80	75.32	50.70	0 00:44:54
38	KR2-P64	59.00	484.00	69.00	5.11	2.04	120.24	118.35	0 00:23:54
39	KR31-P45	19.80	484.00	86.80	5.11	3.65	72.29	81.71	0 00:18:00
40	KR31-P45_2	1.30	484.00	93.00	5.11	4.31	5.60	8.04	0 00:06:00
41	KR32-OF1	21.20	484.00	64.10	5.11	1.66	35.19	26.77	0 00:34:00
42	KR32-P39	19.90	484.00	51.70	5.11	0.84	16.62	6.71	0 00:57:00
43	KR3-P64	12.60	484.00	35.00	5.11	0.10	1.23	0.13	0 00:28:42
44	KR4-P64	32.40	484.00	63.30	5.11	1.60	51.87	46.24	0 00:26:12
45	KR5-P200	55.70	484.00	63.70	5.11	1.63	90.79	53.67	0 00:48:42
46	KR6-JDS-BENTLEY	14.40	484.00	61.90	5.11	1.50	21.60	27.36	0 00:12:18
47	KR6-P200	17.10	484.00	59.00	5.11	1.30	22.18	25.30	0 00:15:06
48	KR7-JDS-BENTLEY	21.10	484.00	70.60	5.11	2.17	45.72	28.78	0 00:48:12
49	KR8-P58	0.09	484.00	87.60	5.11	3.73	0.33	0.39	0 00:16:53
50	KR8-P59	9.90	484.00	82.20	5.11	3.20	31.65	26.66	0 00:32:24
51	KR8-P59_2	2.30	484.00	93.00	5.11	4.31	9.90	11.28	0 00:15:42
52	KR9-JUS-SWS1	87.50	484.00	67.50	5.11	1.92	167.91	65.44	0 01:29:24
53	SC10-P84	59.70	484.00	37.00	5.11	0.16	9.25	1.16	0 00:18:18
54	SC11-JDS-P87	112.10	484.00	40.50	5.11	0.28	31.39	2.93	0 05:42:54
55	SC11-P87	6.40	484.00	83.10	5.11	3.28	21.01	31.45	0 00:06:42
56	SC12-JDS-P87	48.80	484.00	64.40	5.11	1.68	82.08	33.10	0 01:22:30
57	SC12-P87	2.30	484.00	93.00	5.11	4.31	9.90	14.21	0 00:06:00
58	SC12-P89	108.40	484.00	62.20	5.11	1.52	164.88	50.73	0 01:53:42
59	SC13-P204	127.20	484.00	63.60	5.11	1.62	206.45	67.37	0 01:47:42
60	SC14-P204	181.40	484.00	57.30	5.11	1.18	214.60	97.22	0 01:00:30
61	SC14-P91	1.40	484.00	81.00	5.11	3.08	4.32	6.28	0 00:07:54
62	SC15-P202	2.20	484.00	88.70	5.11	3.85	8.46	10.37	0 00:14:06
63	SC15-P203	110.50	484.00	79.20	5.11	2.92	322.11	125.32	0 01:36:42
64	SC15-P90	2.80	484.00	34.60	5.11	0.09	0.24	0.03	0 00:11:18
65	SC1-P86	261.40	484.00	55.10	5.11	1.04	272.38	98.22	0 01:17:00
66	SC2-P86	22.10	484.00	75.40	5.11	2.57	56.89	63.10	0 00:19:36
67	SC3-P88	23.30	484.00	82.60	5.11	3.24	75.38	110.05	0 00:07:36
68	SC3-P89	13.60	484.00	77.70	5.11	2.78	37.78	57.54	0 00:06:24
69	SC4-P84	141.80	484.00	65.60	5.11	1.77	251.41	82.33	0 01:50:12
70	SC5-P84	85.90	484.00	64.10	5.11	1.66	142.59	51.58	0 01:34:42
71	SC6-P84	76.00	484.00	67.70	5.11	1.94	147.06	136.25	0 00:26:06
72	SC7-P84	175.70	484.00	62.30	5.11	1.53	268.47	132.48	0 01:00:48
73	SC8-P84	75.30	484.00	59.90	5.11	1.36	102.33	69.57	0 00:37:00
74	SC8-P88	4.90	484.00	91.40	5.11	4.13	20.25	29.55	0 00:06:00
75	SC9-P203	94.20	484.00	65.90	5.11	1.80	169.09	107.02	0 00:45:30
76	SH10-JDS-P72-POND	31.20	484.00	71.20	5.11	2.22	69.14	48.44	0 00:41:30
77	SH11-P80	13.80	484.00	90.40	5.11	4.03	55.55	58.83	0 00:20:00
78	SH12-P80	134.70	484.00	73.50	5.11	2.41	324.63	125.57	0 01:35:12
79	SH13-P72	18.40	484.00	57.00	5.11	1.16	21.42	7.44	0 01:26:06
80	SH14-JDS-TRIB1	4.40	484.00	60.40	5.11	1.39	6.13	3.83	0 00:42:06

Subbasin Summary

SN	Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
81	SH14-P76	1.30	484.00	93.00	5.11	4.31	5.60	8.04	0 00:06:00
82	SH14-P79	59.40	484.00	62.80	5.11	1.56	92.90	48.33	0 00:57:06
83	SH1-P75	192.70	484.00	61.20	5.11	1.45	279.42	84.27	0 01:54:36
84	SH2-P75	52.60	484.00	62.60	5.11	1.55	81.53	41.50	0 00:58:36
85	SH3-P64	18.80	484.00	76.20	5.11	2.64	49.71	37.16	0 00:38:42
86	SH4-P75	60.90	484.00	69.80	5.11	2.10	128.01	110.30	0 00:30:06
87	SH5-P75	124.60	484.00	62.90	5.11	1.57	195.87	121.79	0 00:44:36
88	SH6-P69	254.10	484.00	60.40	5.11	1.39	354.22	174.84	0 00:58:24
89	SH7-P89	80.70	484.00	64.30	5.11	1.68	135.17	98.48	0 00:36:30
90	SH8-P69	1.00	484.00	83.10	5.11	3.28	3.28	4.95	0 00:06:24
91	SH8-P70	1.00	484.00	91.20	5.11	4.11	4.11	6.00	0 00:06:00
92	SH8-P71	72.80	484.00	67.30	5.11	1.90	138.54	106.31	0 00:35:06
93	SH9-P72	104.40	484.00	70.50	5.11	2.16	225.40	146.72	0 00:45:54

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Min Freeboard Attained (ft)
1	10_JDS-P69	Junction	489.95	494.90	489.95	173.61	491.33	4.01
2	10_JDS-P70	Junction	487.00	492.00	487.00	173.23	489.07	2.93
3	10_JDS-P71	Junction	481.00	489.00	481.00	245.81	485.63	3.37
4	10_JDS-P75	Junction	485.79	493.00	485.79	181.85	490.46	2.54
5	10_JDS-P76	Junction	483.40	492.50	483.40	203.20	487.82	4.68
6	10_JDS-P79	Junction	466.50	474.00	466.50	159.09	469.22	10.28
7	10_JDS-P80	Junction	464.20	478.17	464.20	252.27	468.40	9.77
8	10_JDS-Trib1	Junction	477.50	482.00	477.50	191.07	479.46	4.04
9	10_P72-pondoutfall	Junction	477.50	482.00	477.50	51.49	479.50	4.00
10	KR_JDS-D1	Junction	472.00	480.00	472.00	193.89	474.76	5.24
11	KR_JDS-D1-B	Junction	470.00	477.00	470.00	193.91	472.67	4.83
12	KR_JDS-Div1	Junction	495.00	497.50	495.00	188.18	497.14	1.86
13	KR_JDS-P200	Junction	498.00	501.86	498.00	60.40	500.73	1.77
14	KR_JDS-P39	Junction	458.00	465.00	458.99	209.23	460.46	8.53
15	KR_JDS-P40	Junction	461.26	476.00	461.26	245.66	467.05	8.95
16	KR_JDS-P41	Junction	464.22	472.16	464.22	307.55	470.39	3.53
17	KR_JDS-P42	Junction	465.81	475.85	465.81	112.77	470.75	5.68
18	KR_JDS-P43	Junction	471.41	479.00	471.41	79.84	473.70	5.59
19	KR_JDS-P44	Junction	471.21	480.00	471.21	273.48	476.60	3.40
20	KR_JDS-P45	Junction	488.76	495.40	488.76	321.85	493.29	2.11
21	KR_JDS-P45_2	Junction	487.91	492.31	487.91	319.46	491.63	1.42
22	KR_JDS-P45_3	Junction	484.96	489.96	484.96	319.46	489.47	1.78
23	KR_JDS-P46	Junction	471.93	480.00	471.93	252.91	478.06	2.70
24	KR_JDS-P47	Junction	482.01	492.01	482.01	469.38	486.24	5.77
25	KR_JDS-P48	Junction	484.55	493.00	484.55	316.79	487.62	5.38
26	KR_JDS-P49	Junction	486.52	493.00	486.52	159.32	490.03	2.97
27	KR_JDS-P50	Junction	487.95	496.00	487.95	157.54	493.49	2.51
28	KR_JDS-P51_52	Junction	514.67	521.00	514.67	189.76	517.43	4.13
29	KR_JDS-P53	Junction	480.39	486.82	480.39	51.56	482.82	4.31
30	KR_JDS-P53_2	Junction	482.00	486.00	482.00	6.49	482.91	3.59
31	KR_JDS-P55	Junction	480.87	488.60	480.87	72.26	483.77	4.83
32	KR_JDS-P56	Junction	480.58	487.40	480.56	22.63	481.94	5.46
33	KR_JDS-P57	Junction	478.29	482.00	478.29	20.62	480.35	4.76
34	KR_JDS-P57_2	Junction	480.94	486.90	480.94	11.43	481.75	5.15
35	KR_JDS-P58	Junction	478.92	484.50	478.92	102.94	481.12	3.56
36	KR_JDS-P59	Junction	480.97	486.71	480.97	109.00	483.08	4.26
37	KR_JDS-P64	Junction	492.03	495.89	492.03	47.63	493.79	3.48
38	KR_JUS-P200	Junction	499.90	504.40	499.90	60.40	503.67	0.73
39	KR_JUS-P51	Junction	514.94	521.83	514.94	107.34	521.01	0.82
40	KR_JUS-P52	Junction	517.48	521.85	517.48	82.57	521.11	0.74
41	KR_JUS-P59_2	Junction	482.33	488.00	482.33	10.88	486.25	1.75
42	KR_JUS-P65	Junction	466.93	476.50	466.93	214.83	472.53	3.97
43	SC_JDS_P203	Junction	495.06	501.90	495.06	224.12	499.46	2.60
44	SC_JDS-P202	Junction	497.07	500.00	497.07	5.03	497.52	4.05
45	SC_JDS-P204	Junction	502.20	509.20	502.20	17.39	504.37	4.83
46	SC_JDS-P84	Junction	488.34	497.00	488.34	94.58	494.07	3.97
47	SC_JDS-P86	Junction	489.60	496.80	489.74	266.08	494.04	2.76
48	SC_JDS-P87	Junction	487.86	497.00	487.86	285.02	491.40	5.86
49	SC_JDS-P88	Junction	486.50	493.50	486.50	529.92	490.77	3.73
50	SC_JDS-P89	Junction	473.34	483.50	473.34	570.79	476.36	7.14
51	SC_JDS-P90	Junction	503.02	509.00	503.02	14.25	504.51	4.49
52	SC_JDS-Trib1	Junction	464.00	472.00	464.00	570.65	467.41	4.59
53	SC_JUS-91A	Junction	506.00	509.20	506.00	17.53	506.98	2.22
54	SC_JUS-P90	Junction	503.34	509.00	503.34	14.11	504.79	4.21
55	SH_JDS-SH7-POND	Junction	487.00	489.00	487.00	0.00	487.00	4.50
56	10_OF1	Outfall	461.00			252.25	465.20	
57	KR_OF1	Outfall	458.00			212.18	459.47	
58	KR_OF2	Outfall	459.07			211.96	461.94	
59	SC_OF1	Outfall	462.00			570.46	465.41	
60	SC_OF2	Outfall	500.00			17.37	502.17	
61	10_JDS-P72-Pond	Storage Node	477.60	483.50	477.60	69.10	480.24	
62	10_JUS-P69	Storage Node	490.01	495.40	490.01	174.39	493.97	
63	10_JUS-P70	Storage Node	487.00	492.00	487.00	174.05	490.79	
64	10_JUS-P71	Storage Node	481.93	489.00	481.93	220.20	486.30	
65	10_JUS-P72	Storage Node	479.29	484.50	479.29	232.70	483.52	
66	10_JUS-P75	Storage Node	486.35	493.00	486.35	196.43	490.61	
67	10_JUS-P76	Storage Node	484.04	492.50	484.04	182.29	489.04	
68	10_JUS-P79	Storage Node	467.40	475.50	467.40	209.45	473.55	
69	10_JUS-P80	Storage Node	465.42	478.70	464.42	253.15	468.95	
70	JDS-P201	Storage Node	493.90	497.40	494.00	40.38	496.23	
71	KR_JDS-Bentley	Storage Node	490.00	494.00	490.00	130.47	492.35	
72	KR_JDS-Trib1	Storage Node	475.50	484.00	476.00	451.45	479.95	
73	KR_JDS-Trib2	Storage Node	477.00	485.00	477.00	520.66	481.38	
74	KR_JUS-D1	Storage Node	472.00	480.00	472.00	273.48	475.53	
75	KR_JUS-P201	Storage Node	492.00	497.50	494.00	108.95	495.38	
76	KR_JUS-P39	Storage Node	460.50	468.50	460.50	244.11	466.71	
77	KR_JUS-P40	Storage Node	461.95	476.00	461.95	315.82	468.69	
78	KR_JUS-P41	Storage Node	465.81	472.66	465.90	363.58	470.38	
79	KR_JUS-P42	Storage Node	465.73	476.35	465.73	126.37	470.78	

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Min Freeboard Attained (ft)
80	KR_JUS-P43	Storage Node	471.62	479.50	471.62	79.84	475.19	
81	KR_JUS-P44	Storage Node	471.93	480.00	471.93	361.12	476.85	
82	KR_JUS-P45	Storage Node	490.12	496.40	490.12	322.31	494.41	
83	KR_JUS-P45_2	Storage Node	488.17	493.31	488.17	321.87	492.96	
84	KR_JUS-P45_3	Storage Node	486.05	492.34	486.05	319.46	491.74	
85	KR_JUS-P46	Storage Node	471.17	480.00	471.17	428.10	478.08	
86	KR_JUS-P47	Storage Node	482.34	492.34	482.34	502.58	487.99	
87	KR_JUS-P48	Storage Node	485.05	492.30	485.55	325.51	488.59	
88	KR_JUS-P49	Storage Node	487.63	493.00	487.63	11.60	490.04	
89	KR_JUS-P50	Storage Node	488.25	496.00	488.25	249.12	493.56	
90	KR_JUS-P53	Storage Node	480.66	487.40	480.66	76.54	483.70	
91	KR_JUS-P53_2	Storage Node	482.00	486.50	482.00	33.14	483.14	
92	KR_JUS-P55	Storage Node	481.40	487.10	481.40	72.32	483.83	
93	KR_JUS-P56	Storage Node	481.72	487.90	481.72	8.12	483.09	
94	KR_JUS-P57	Storage Node	478.58	485.40	478.58	23.81	480.69	
95	KR_JUS-P57_2	Storage Node	481.90	487.40	481.90	11.48	483.09	
96	KR_JUS-P58	Storage Node	479.74	485.50	479.74	112.83	483.13	
97	KR_JUS-P59	Storage Node	481.43	487.80	481.43	113.29	485.09	
98	KR_JUS-P64	Storage Node	492.56	497.80	492.56	190.24	496.79	
99	KR_JUS-SWS1	Storage Node	477.50	484.00	478.00	200.82	480.35	
100	SC_JUS-P202	Storage Node	496.00	500.50	496.00	10.18	498.72	
101	SC_JUS-P203	Storage Node	495.55	501.90	495.55	196.38	500.76	
102	SC_JUS-P204	Storage Node	503.20	509.20	503.20	148.81	507.52	
103	SC_JUS-P84	Storage Node	489.26	497.00	489.26	328.92	494.20	
104	SC_JUS-P87	Storage Node	487.60	497.00	487.60	257.27	494.07	
105	SC_JUS-P88	Storage Node	488.20	494.75	488.20	297.58	493.95	
106	SC_JUS-P89	Storage Node	475.32	485.00	475.32	574.16	484.09	
107	SC_JUS-P91	Storage Node	503.87	509.20	503.87	17.71	505.55	
108	SC-JUS-P86	Storage Node	489.60	496.70	489.60	303.87	493.97	
109	SH_JUS-SH7-POND	Storage Node	485.00	489.50	486.00	97.81	487.73	

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)
1	P200	Pipe	KR_JUS-P200	KR_JDS-P200	100.00	500.40	498.80	1.6000	24.000	0.0240	41.80	31.00	1.35	6.91
2	P202	Pipe	SC_JUS-P202	SC_JDS-P202	43.00	497.20	497.10	0.2300	15.000	0.0150	5.03	2.70	1.86	4.46
3	P203	Pipe	SC_JUS-P203	SC_JDS_P203	49.00	495.55	495.06	1.0000	40.000	0.0130	118.51	88.34	1.34	13.58
4	P204	Pipe	SC_JUS-P204	SC_JDS-P204	103.00	503.20	502.20	0.9700	18.000	0.0120	17.39	11.21	1.55	9.84
5	P39	Pipe	KR_JUS-P39	KR_JDS-P39	556.00	460.47	458.99	0.2700	72.000	0.0120	209.23	239.10	0.88	8.35
6	P40	Pipe	KR_JUS-P40	KR_JDS-P40	210.00	461.95	461.26	0.3300	60.000	0.0120	245.66	161.73	1.52	12.51
7	P41	Pipe	KR_JUS-P41	KR_JDS-P41	61.00	465.81	464.22	2.6100	80.000	0.0200	307.55	2263.56	0.14	3.72
8	P42	Pipe	KR_JUS-P42	KR_JDS-P42	67.00	465.73	465.81	-0.1200	84.000	0.0200	112.77	365.96	0.31	1.92
9	P43	Pipe	KR_JUS-P43	KR_JDS-P43	50.00	471.62	471.41	0.4200	60.000	0.0120	79.84	182.85	0.44	7.29
10	P44	Pipe	KR_JUS-P44	KR_JDS-P44	44.30	471.93	471.21	1.6300	48.000	0.0200	273.48	595.78	0.46	5.70
11	P45	Pipe	KR_JUS-P45	KR_JDS-P45	82.20	490.12	488.76	1.6500	42.000	0.0150	321.85	432.33	0.74	10.93
12	P45_2	Pipe	KR_JUS-P45_2	KR_JDS-P45_2	25.30	488.17	487.91	1.0300	30.000	0.0130	59.86	41.58	1.44	12.20
13	P45_3	Pipe	KR_JUS-P45_3	KR_JDS-P45_3	199.00	486.05	484.96	0.5500	36.000	0.0240	46.31	26.74	1.73	7.03
14	P46	Pipe	KR_JUS-P46	KR_JDS-P46	42.00	471.17	471.93	-1.8100	48.000	0.0120	110.05	209.33	0.53	8.76
15	P47	Pipe	KR_JUS-P47	KR_JDS-P47	21.80	482.34	482.01	1.5100	55.000	0.0150	469.38	1102.17	0.43	7.75
16	P48	Pipe	KR_JUS-P48	KR_JDS-P48	71.70	485.05	484.55	0.7000	48.000	0.0150	316.79	844.31	0.38	5.30
17	P49	Pipe	KR_JDS-P49	KR_JUS-P49	89.60	487.63	486.52	1.2400	24.000	0.0120	11.59	0.82	14.15	4.51
18	P50	Pipe	KR_JUS-P50	KR_JDS-P50	87.20	488.25	487.95	0.3400	24.000	0.0150	61.51	34.50	1.78	6.53
19	P51	Pipe	KR_JUS-P51	KR_JDS-P51_52	31.00	514.94	514.67	0.8700	25.000	0.0120	98.79	47.17	2.09	17.93
20	P52	Pipe	KR_JUS-P52	KR_JDS-P51_52	48.00	517.48	515.14	4.8800	25.000	0.0120	82.56	111.59	0.74	14.99
21	P53_2	Pipe	KR_JDS-P53_2	KR_JUS-P53_2	90.40	482.20	482.00	0.2200	24.000	0.0120	6.49	23.05	0.28	2.42
22	P53A	Pipe	KR_JUS-P53	KR_JDS-P53	24.80	480.66	480.39	1.0900	36.000	0.0130	38.03	69.59	0.55	5.80
23	P53B-C	Pipe	KR_JUS-P53	KR_JDS-P53	20.30	482.40	482.90	-2.4600	24.000	0.0120	9.09	76.93	0.12	3.41
24	P55	Pipe	KR_JDS-P55	KR_JUS-P55	79.60	480.87	481.40	-0.6700	48.000	0.0200	72.26	235.02	0.31	3.39
25	P56	Pipe	KR_JUS-P56	KR_JDS-P56	82.20	481.72	480.58	1.3900	30.000	0.0130	8.10	48.30	0.17	3.74
26	P57	Pipe	KR_JUS-P57	KR_JDS-P57	27.80	478.58	478.29	1.0400	36.000	0.0120	20.62	73.80	0.28	5.25
27	P57_2	Pipe	KR_JUS-P57_2	KR_JDS-P57_2	79.40	481.90	480.94	1.2100	24.000	0.0120	11.43	53.90	0.21	4.03
28	P58A	Pipe	KR_JUS-P58	KR_JDS-P58	45.60	479.74	478.92	1.8000	36.000	0.0130	44.73	89.44	0.50	6.87
29	P58B	Pipe	KR_JDS-P58	KR_JUS-P58	30.60	480.28	479.56	2.3500	24.000	0.0120	29.83	32.56	0.92	10.22
30	P58C	Pipe	KR_JDS-P58	KR_JUS-P58	30.60	480.23	479.99	0.7800	24.000	0.0120	28.38	21.70	1.31	9.16
31	P59	Pipe	KR_JUS-P59	KR_JDS-P59	95.45	481.43	480.97	0.4800	48.000	0.0200	109.00	139.79	0.78	6.32
32	P59_2	Pipe	KR_JUS-P59_2	KR_JUS-P58	73.20	482.33	482.01	0.4400	15.000	0.0120	11.90	4.63	2.57	9.70
33	P64	Pipe	KR_JUS-P64	KR_JDS-P64	47.60	492.56	492.03	1.1100	26.000	0.0240	47.63	29.93	1.59	8.00
34	P65	Pipe	KR_JUS-P65	KR_OF2	1034.00	466.93	459.07	0.7600	84.000	0.0120	211.96	603.39	0.35	8.71
35	P69	Pipe	10_JUS-P69	10_JDS-P69	60.70	490.01	489.95	0.1000	36.000	0.0200	164.88	62.05	2.66	9.08
36	P70	Pipe	10_JUS-P70	10_JDS-P70	8.50	487.00	487.00	0.0000	18.000	0.0200	173.23	8.10	21.38	12.83
37	P71	Pipe	10_JUS-P71	10_JDS-P71	34.00	481.93	481.00	2.7400	48.000	0.0120	140.60	257.36	0.55	11.19
38	P72	Pipe	10_JUS-P72	10_JDS-P72-Pond	40.95	479.29	478.78	1.2500	36.000	0.0240	48.68	40.32	1.21	7.40
39	P75	Pipe	10_JUS-P75	10_JDS-P75	66.20	486.35	485.79	0.8500	42.000	0.0200	181.85	419.05	0.43	3.71
40	P76	Pipe	10_JUS-P76	10_JDS-P76	33.70	484.04	483.40	1.9000	39.600	0.0150	203.20	224.36	0.91	12.32
41	P79	Pipe	10_JUS-P79	10_JDS-P79	36.10	467.40	466.50	2.4900	43.000	0.0120	159.09	338.90	0.47	10.62
42	P80	Pipe	10_JUS-P80	10_JDS-P80	56.10	465.64	465.64	0.0000	99.600	0.0200	252.27	80.17	3.15	5.26
43	P84	Pipe	SC_JUS-P84	SC_JDS-P84	68.00	489.26	488.34	1.3500	34.000	0.0120	94.58	133.47	0.71	9.28
44	P86	Pipe	SC_JDS-P86	SC-JUS-P86	70.00	489.70	489.70	0.0000	73.000	0.0200	266.08	60.09	4.43	3.48
45	P87-A	Pipe	SC_JUS-P87	SC_JDS-P87	21.10	489.17	487.86	6.2100	30.000	0.0120	92.13	110.72	0.83	18.77
46	P87-B	Pipe	SC_JUS-P87	SC_JDS-P87	28.40	490.16	490.81	-2.2900	16.000	0.0130	14.79	11.61	1.27	10.59
47	P87-C	Pipe	SC_JUS-P87	SC_JDS-P87	27.90	489.24	489.03	0.7500	16.000	0.0130	20.51	6.66	3.08	14.69
48	P88	Pipe	SC_JUS-P88	SC_JDS-P88	40.50	488.20	486.60	3.9500	52.000	0.0240	228.97	382.89	0.60	8.18
49	P89	Pipe	SC_JUS-P89	SC_JDS-P89	43.30	475.32	475.20	0.2800	66.000	0.0240	268.73	95.76	2.81	11.81
50	P90	Pipe	SC_JUS-P90	SC_JDS-P90	82.60	503.34	503.02	0.3900	36.000	0.0130	14.25	41.51	0.34	5.35
51	P91	Pipe	SC_JUS-P91	SC_JUS-P90	81.90	503.87	503.44	0.5300	36.000	0.0150	14.08	41.89	0.34	4.48
52	10_CH-71-70	Channel	10_JDS-P70	10_JUS-P71	1209.00	487.00	481.93	0.4200	60.000	0.0320	169.23	1306.83	0.13	1.17
53	10_CH-72-71	Channel	10_JDS-P71	10_JUS-P72	1736.00	481.00	479.29	0.1000	72.000	0.0320	178.72	481.88	0.37	2.63
54	10_CH-79-Trib1	Channel	10_JDS-Trib1	10_JUS-P79	1363.00	477.50	467.40	0.7400	60.000	0.0320	188.66	1448.21	0.13	1.37
55	10_CH-80-79	Channel	10_JDS-P79	10_JUS-P80	246.00	466.50	465.42	0.4400	156.000	0.0320	159.28	4521.15	0.04	2.57
56	10_CH-OF1-80	Channel	10_JDS-P80	10_OF1	398.00	464.20	461.00	0.8000	117.600	0.0320	252.25	1389.84	0.18	5.47
57	10_CH-Trib1	Channel	10_P72-pondoutfall	10_JDS-Trib1	85.00	477.50	477.50	0.0000	54.000	0.0320	51.49	14.78	3.48	2.90

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)
58	10_CH-Trib1-76	Channel	10_JDS-P76	10_JDS-Trib1	1026.00	483.40	477.50	0.5800	72.000	0.0320	178.96	1025.45	0.17	6.49
59	10_RRCH-70-69	Channel	10_JDS-P69	10_JUS-P70	59.00	489.95	487.00	5.0000	60.000	0.0320	173.61	1866.97	0.09	3.91
60	10_RRCH-76-75	Channel	10_JDS-P75	10_JUS-P76	34.00	485.79	484.04	5.1500	84.000	0.0320	181.74	395.55	0.46	1.76
61	KR_CH-39-40	Channel	KR_JDS-P40	KR_JUS-P39	905.00	461.26	460.50	0.0800	93.000	0.0320	239.72	497.80	0.48	2.41
62	KR_CH-40-41	Channel	KR_JDS-P41	KR_JUS-P40	1031.00	464.22	461.95	0.2200	116.400	0.0320	300.03	719.91	0.42	4.45
63	KR_CH-41-42	Channel	KR_JDS-P42	KR_JUS-P41	1352.00	465.81	465.81	0.0000	81.120	0.0320	106.96	11.59	9.23	1.73
64	KR_CH-42-43	Channel	KR_JDS-P43	KR_JUS-P42	981.00	471.41	465.73	0.5800	76.200	0.0320	79.83	615.42	0.13	2.17
65	KR_CH-43-D1	Channel	KR_JUS-D1	KR_JUS-P43	292.00	472.00	471.62	0.1300	90.000	0.0320	79.60	478.76	0.17	2.04
66	KR_CH-44-45_3	Channel	KR_JDS-P45_3	KR_JUS-P44	738.85	484.96	472.06	1.7500	60.000	0.0450	199.06	247.40	0.80	7.01
67	KR_CH-44-46	Channel	KR_JDS-P46	KR_JUS-P44	312.00	471.93	471.93	0.0000	66.000	0.0320	252.90	8.37	30.20	5.22
68	KR_CH-45_3-45_2	Channel	KR_JDS-P45_2	KR_JUS-P45_3	24.86	487.91	486.05	7.4800	60.000	0.0320	319.46	1252.28	0.26	7.58
69	KR_CH-46-Trib1	Channel	KR_JDS-Trib1	KR_JUS-P46	2923.00	475.50	471.17	0.1500	72.000	0.0320	348.40	775.15	0.45	0.80
70	KR_CH-50-51	Channel	KR_JDS-P51_52	KR_JUS-P50	948.87	514.67	488.25	2.7800	48.000	0.0800	180.89	791.98	0.23	2.86
71	KR_CH-53-53_2	Channel	KR_JDS-P53_2	KR_JDS-P53	211.00	482.00	480.39	0.7600	18.000	0.0800	6.04	39.88	0.15	0.37
72	KR_CH-59-Bentley	Channel	KR_JDS-Bentley	KR_JUS-P59	669.00	490.00	481.43	1.2800	48.000	0.0320	78.98	332.77	0.24	3.59
73	KR_CH-64-Div1	Channel	KR_JDS-Div1	KR_JUS-P64	642.00	495.00	492.56	0.3800	48.000	0.0320	149.48	715.86	0.21	1.59
74	KR_CH-Bentley	Channel	KR_JDS-P200	KR_JDS-Bentley	995.00	498.00	490.00	0.8000	42.000	0.0320	62.08	173.19	0.36	3.05
75	KR_CH-D1-44	Channel	KR_JDS-P44	KR_JUS-D1	107.30	471.21	472.00	-0.7400	48.000	0.0320	273.48	292.00	0.94	5.42
76	KR_CH-D1-65A	Channel	KR_JDS-D1	KR_JDS-D1-B	500.00	472.00	470.00	0.4000	90.000	0.0320	193.91	1416.50	0.14	3.47
77	KR_CH-D1B	Channel	KR_JDS-D1-B	KR_JUS-P65	400.00	470.00	466.93	0.7700	90.000	0.0320	193.79	1962.11	0.10	2.10
78	KR_CH-moose	Channel	JDS-P201	KR_JDS-Div1	886.00	493.90	495.00	-0.1200	48.000	0.0320	40.38	409.15	0.10	3.15
79	KR_CH-OF1-39	Channel	KR_JDS-P39	KR_OF1	70.20	458.99	458.00	1.4100	120.000	0.0320	209.23	5759.30	0.04	4.77
80	KR_CH-SWS1	Channel	KR_JUS-SWS1	KR_JDS-Trib1	2362.00	477.50	475.50	0.0800	54.000	0.0320	44.73	217.18	0.21	0.49
81	KR_CH-SWS1-57	Channel	KR_JDS-P57	KR_JUS-SWS1	42.00	478.29	477.50	1.8800	48.000	0.0450	20.60	87.78	0.23	5.16
82	KR_CH-SWS1-58	Channel	KR_JDS-P58	KR_JUS-SWS1	76.00	478.92	477.50	1.8700	48.000	0.0320	102.94	292.08	0.35	10.87
83	KR_CH-SWS2-Trib2	Channel	KR_JDS-Trib2	KR_JDS-Trib1	470.00	477.00	475.50	0.3200	72.000	0.0320	420.20	933.31	0.45	1.91
84	KR_CH-Trib2-47	Channel	KR_JDS-P47	KR_JDS-Trib2	873.00	482.01	477.00	0.5700	72.000	0.0320	469.74	1179.07	0.40	2.62
85	KR_CH-Trib2-53	Channel	KR_JDS-P53	KR_JDS-Trib2	1194.00	480.39	477.00	0.2800	48.000	0.0450	34.89	266.85	0.13	0.89
86	KR_RRCH-45_2-45	Channel	KR_JDS-P45	KR_JUS-P45_2	40.00	488.76	488.17	1.4700	72.000	0.0320	321.87	681.99	0.47	7.97
87	KR_RRCH-47-48	Channel	KR_JDS-P48	KR_JUS-P47	45.00	484.55	482.34	4.9100	72.000	0.0320	316.60	1935.60	0.16	6.12
88	KR_RRCH-47-49	Channel	KR_JDS-P49	KR_JUS-P47	530.00	486.52	482.34	0.7900	72.000	0.0320	158.55	519.43	0.31	3.22
89	KR_RRCH-49-50	Channel	KR_JDS-P50	KR_JDS-P49	397.00	487.95	486.52	0.3600	72.000	0.0320	157.53	197.46	0.80	3.02
90	KR_RRCH-53_2-56	Channel	KR_JUS-P53_2	KR_JDS-P56	477.00	482.00	480.58	0.3000	48.000	0.0320	16.11	266.42	0.06	0.78
91	KR_RRCH-56-57	Channel	KR_JDS-P56	KR_JUS-P57	535.00	480.58	478.39	0.4100	66.000	0.0320	19.46	414.62	0.05	0.79
92	KR_RRCH-57-57_2	Channel	KR_JDS-P57_2	KR_JUS-P57	31.00	480.95	478.58	7.6500	36.000	0.0800	11.40	69.60	0.16	2.28
93	KR_RRCH-58-59	Channel	KR_JDS-P59	KR_JUS-P58	29.00	480.97	479.74	4.2400	54.000	0.0320	109.32	532.28	0.21	6.15
94	KR-CH-Bentley-64	Channel	KR_JDS-P64	KR_JDS-Bentley	1078.00	492.03	490.00	0.1900	48.000	0.0320	47.13	417.33	0.11	1.06
95	KR-RRCH-53-53_2	Channel	KR_JUS-P53_2	KR_JUS-P53	211.00	482.00	480.66	0.6400	54.000	0.0320	27.81	268.74	0.10	1.20
96	KR-RRCH-53-55	Channel	KR_JDS-P55	KR_JUS-P53	42.00	480.87	480.66	0.5000	80.400	0.0320	72.24	479.67	0.15	2.70
97	SC_CH-86-84	Channel	SC_JUS-P84	SC-JUS-P86	879.25	492.50	492.00	0.0600	48.000	0.0800	200.28	869.89	0.23	0.71
98	SC_CH-87-202	Channel	SC_JDS-P202	SC_JDS-P87	3875.00	497.07	487.86	0.2400	24.000	0.0320	3.26	48.45	0.07	0.30
99	SC_CH-88-87	Channel	SC_JDS-P87	SC_JDS-P88	1012.00	487.86	486.50	0.1300	96.000	0.0320	271.64	1387.20	0.20	1.61
100	SC_CH-89-88	Channel	SC_JDS-P88	SC_JUS-P89	1788.00	486.50	475.32	0.6300	96.000	0.0320	521.16	1670.56	0.31	2.89
101	SC_CH-OF1-Trib1	Channel	SC_JDS-Trib1	SC_OF1	140.00	464.00	462.00	1.4300	72.000	0.0450	570.46	1811.55	0.31	6.92
102	SC_CH-Trib1-89	Channel	SC_JDS-P89	SC_JDS-Trib1	748.00	473.34	464.00	1.2500	96.000	0.0320	570.65	3503.10	0.16	5.97
103	SC_RRCH-203-90	Channel	SC_JDS-P90	SC_JUS-P203	2014.00	503.02	495.55	0.3700	31.200	0.0320	14.10	38.51	0.37	0.93
104	SC_RRCH-204-OF2	Channel	SC_JDS-P204	SC_OF2	3680.98	502.20	500.00	0.0600	48.000	0.0320	17.37	72.35	0.24	1.26
105	SC_RRCH-87-203	Channel	SC_JDS_P203	SC_JUS-P87	3893.00	495.06	489.17	0.1500	84.000	0.0320	167.21	470.68	0.36	1.37
106	SC_RRCH-87-84	Channel	SC_JDS-P84	SC_JUS-P87	50.00	488.34	488.34	0.0000	116.400	0.0320	94.07	150.05	0.63	1.47
107	SC_RRCH-88-87	Channel	SC_JUS-P87	SC_JUS-P88	865.00	492.80	492.00	0.0900	48.000	0.0800	1.51	20.08	0.08	0.36
108	SC-CH-91-91A	Channel	SC_JUS-91A	SC_JUS-P91	178.41	506.00	503.87	1.1900	36.000	0.0450	17.53	127.17	0.14	2.81
109	SC-CH-91A-204	Channel	SC_JUS-P204	SC_JUS-91A	472.13	503.20	506.00	-0.5900	36.000	0.0450	17.53	89.63	0.20	1.26
110	SC-RRCH-88-86	Channel	SC_JDS-P86	SC_JUS-P88	45.00	489.74	488.20	3.4200	72.000	0.0450	286.35	1427.64	0.20	4.34
111	SH_CH-SH7-P88	Channel	SH_JDS-SH7-POND	SC_JDS-P88	2000.00	487.00	486.50	0.0300	48.000	0.0800	0.00	47.31	0.00	0.00
112	10_Pond-Flume	Weir	10_P72-pondoutfall	10_JDS-P72-Pond		477.50	477.60				51.49			
113	Div1	Weir	KR_JUS-D1	KR_JDS-D1		472.00	472.00				193.89			
114	KR_Shafer-Rd-weir	Weir	KR_JUS-P201	10_JUS-P75		492.00	486.35				0.00			

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)
115	P200-weir	Weir	KR_JUS-P200	KR_JDS-P200		499.90	498.00				18.96			
116	P201-weir	Weir	KR_JUS-P201	JDS-P201		492.00	493.90				0.00			
117	P202-weir	Weir	SC_JUS-P202	SC_JDS-P202		496.00	497.07				0.00			
118	P203-weir	Weir	SC_JUS-P203	SC_JDS_P203		495.55	495.06				109.87			
119	P39-weir	Weir	KR_JUS-P39	KR_JDS-P39		460.50	458.00				0.00			
120	P40-weir	Weir	KR_JUS-P40	KR_JDS-P40		461.95	461.26				0.00			
121	P41-weir	Weir	KR_JUS-P41	KR_JDS-P41		465.81	464.22				0.00			
122	P42-weir	Weir	KR_JUS-P42	KR_JDS-P42		465.73	465.81				0.00			
123	P43-weir	Weir	KR_JUS-P43	KR_JDS-P43		471.62	471.41				0.00			
124	P44-weir	Weir	KR_JUS-P44	KR_JDS-P44		471.93	471.21				0.00			
125	P45_2-weir	Weir	KR_JUS-P45_2	KR_JDS-P45_2		488.17	487.91				265.02			
126	P45_3-bypass	Weir	KR_JDS-P45_3	KR_JUS-P44		484.96	471.93				120.83			
127	P45_3-weir	Weir	KR_JUS-P45_3	KR_JDS-P45_3		486.05	484.96				284.01			
128	P45-weir	Weir	KR_JUS-P45	KR_JDS-P45		490.12	488.76				0.00			
129	P46-weir	Weir	KR_JUS-P46	KR_JDS-P46		471.17	471.93				229.79			
130	P47-weir	Weir	KR_JUS-P47	KR_JDS-P47		482.34	482.01				0.00			
131	P48-weir	Weir	KR_JUS-P48	KR_JDS-P48		485.05	484.55				0.00			
132	P49-weir	Weir	KR_JUS-P49	KR_JDS-P49		487.63	486.52				0.00			
133	P50-weir	Weir	KR_JUS-P50	KR_JDS-P50		488.25	487.95				143.00			
134	P51-weir	Weir	KR_JUS-P51	KR_JDS-P51_52		514.94	514.67				9.92			
135	P52-weir	Weir	KR_JUS-P52	KR_JDS-P51_52		517.48	514.67				17.57			
136	P53_2-weir	Weir	KR_JUS-P53_2	KR_JDS-P53_2		482.00	482.00				0.00			
137	P53-weir	Weir	KR_JUS-P53	KR_JDS-P53		480.66	480.39				0.00			
138	P55-weir	Weir	KR_JUS-P55	KR_JDS-P55		481.40	480.87				0.00			
139	P56-weir	Weir	KR_JUS-P56	KR_JDS-P56		481.72	480.58				0.00			
140	P57_2-weir	Weir	KR_JUS-P57_2	KR_JDS-P57_2		481.90	480.94				0.00			
141	P57-weir	Weir	KR_JUS-P57	KR_JDS-P57		478.58	478.29				0.00			
142	P58-weir	Weir	KR_JUS-P58	KR_JDS-P58		479.74	478.92				0.00			
143	P59_2-weir	Weir	KR_JUS-P59_2	KR_JUS-P59		482.33	481.43				0.00			
144	P59-weir	Weir	KR_JUS-P59	KR_JDS-P59		481.43	480.97				0.00			
145	P64-weir	Weir	KR_JUS-P64	KR_JDS-P64		492.56	492.03				0.00			
146	P69-weir	Weir	10_JUS-P69	10_JDS-P69		490.01	489.95				8.73			
147	P70-weir	Weir	10_JUS-P70	10_JDS-P70		487.00	487.00				0.00			
148	P71-weir	Weir	10_JUS-P71	10_JDS-P71		481.93	481.00				107.37			
149	P72-weir	Weir	10_JUS-P72	10_JDS-P72-Pond		479.29	477.60				0.52			
150	P75-weir	Weir	10_JUS-P75	10_JDS-P75		486.35	485.79				0.00			
151	P76-weir	Weir	10_JUS-P76	10_JDS-P76		484.04	483.40				0.00			
152	P79-weir	Weir	10_JUS-P79	10_JDS-P79		467.40	466.50				0.00			
153	P80-weir	Weir	10_JUS-P80	10_JDS-P80		465.42	464.20				0.00			
154	P84-weir	Weir	SC_JUS-P84	SC_JDS-P84		489.26	488.34				54.83			
155	P86-weir	Weir	SC-JUS-P86	SC_JDS-P86		489.60	489.60				0.00			
156	P87-weir	Weir	SC_JUS-P87	SC_JDS-P87		487.60	487.86				139.61			
157	P88-weir	Weir	SC_JUS-P88	SC_JDS-P88		488.20	486.50				29.76			
158	P89-weir	Weir	SC_JUS-P89	SC_JDS-P89		475.32	473.34				302.05			
159	SH7-ovrflow	Weir	SH_JUS-SH7-POND	SH_JDS-SH7-POND		485.00	487.00				0.00			

 (Existing Condition)

Project Description

File Name 19490-Columbia Co-PRE-10-2-2020.SPF

Project Options

Flow Units ..... CFS
Elevation Type ..... Elevation
Hydrology Method ..... SCS TR-20
Time of Concentration (TOC) Method ..... SCS TR-55
Link Routing Method ..... Hydrodynamic
Enable Overflow Ponding at Nodes ..... YES
Skip Steady State Analysis Time Periods ... YES

Analysis Options

Start Analysis On ..... Nov 22, 2019 00:00:00
End Analysis On ..... Nov 23, 2019 00:00:00
Start Reporting On ..... Nov 22, 2019 00:00:00
Antecedent Dry Days ..... 0 days
Runoff (Dry Weather) Time Step ..... 0 01:00:00 days hh:mm:ss
Runoff (Wet Weather) Time Step ..... 0 00:05:00 days hh:mm:ss
Reporting Time Step ..... 0 00:05:00 days hh:mm:ss
Routing Time Step ..... 2 seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins	93
Nodes	109
Junctions	55
Outfalls	5
Flow Diversions	0
Inlets	0
Storage Nodes	49
Links	159
Channels	60
Pipes	51
Pumps	0
Orifices	0
Weirs	48
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1		Time Series	50yr-24hr	Cumulative	inches	Pennsylvania	Columbia	50	6.00	SCS Type II 24-hr

Subbasin Summary

SN	Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	KR10-JUS-SWS1	51.60	484.00	50.50	6.00	1.18	60.84	12.88	0 02:38:18
2	KR11-P53	0.20	484.00	93.00	6.00	5.18	1.04	1.46	0 00:06:00
3	KR11-P53_2	1.70	484.00	93.00	6.00	5.18	8.81	12.53	0 00:06:00
4	KR11-P55	20.90	484.00	80.90	6.00	3.87	80.95	90.92	0 00:18:54
5	KR11-P56	1.90	484.00	89.50	6.00	4.79	9.10	9.84	0 00:18:54
6	KR11-P57	0.80	484.00	93.00	6.00	5.18	4.15	5.89	0 00:06:00
7	KR11-P57_2	2.60	484.00	83.10	6.00	4.10	10.67	14.26	0 00:10:48
8	KR11-P58	0.30	484.00	93.00	6.00	5.18	1.55	2.21	0 00:06:00
9	KR11-P59	31.10	484.00	69.00	6.00	2.71	84.37	73.57	0 00:29:54
10	KR12-P48	111.40	484.00	68.50	6.00	2.67	297.10	105.08	0 01:45:36
11	KR13-P48	154.70	484.00	67.30	6.00	2.56	395.57	131.30	0 01:53:42
12	KR14-P48	14.90	484.00	69.20	6.00	2.73	40.69	19.02	0 01:13:30
13	KR15-P48	42.00	484.00	65.20	6.00	2.37	99.50	39.49	0 01:28:42
14	KR16-P48	78.90	484.00	74.20	6.00	3.20	252.80	179.92	0 00:41:54
15	KR17-P52	39.40	484.00	67.30	6.00	2.56	100.75	112.78	0 00:18:54
16	KR18-P51	38.40	484.00	72.70	6.00	3.06	117.50	147.22	0 00:14:36
17	KR19-P45	121.00	484.00	72.10	6.00	3.00	363.36	340.68	0 00:26:54
18	KR1-P64	108.00	484.00	56.10	6.00	1.60	173.23	99.41	0 00:47:06
19	KR20-P47	20.50	484.00	88.70	6.00	4.70	96.39	101.84	0 00:20:12
20	KR20-P48	51.90	484.00	74.90	6.00	3.27	169.82	147.42	0 00:30:42
21	kr20-p49	2.10	484.00	92.20	6.00	5.09	10.69	14.49	0 00:08:00
22	KR20-P50	23.50	484.00	79.80	6.00	3.76	88.38	88.96	0 00:23:48
23	KR20-P53	1.70	484.00	92.80	6.00	5.16	8.77	12.50	0 00:06:00
24	KR21-JDS-TRIB1	46.10	484.00	65.40	6.00	2.39	110.04	44.21	0 01:27:30
25	KR21-JDS-TRIB2	15.30	484.00	78.00	6.00	3.58	54.76	46.07	0 00:32:36
26	KR22-P44	7.80	484.00	93.00	6.00	5.18	40.43	48.15	0 00:13:18
27	KR22-P46	117.40	484.00	72.00	6.00	2.99	351.38	115.74	0 01:58:36
28	KR23-P41	26.40	484.00	89.30	6.00	4.77	125.88	54.51	0 01:22:24
29	KR24-P41	53.60	484.00	81.20	6.00	3.90	209.25	244.13	0 00:17:12
30	KR25-P41	32.00	484.00	70.40	6.00	2.84	90.94	95.21	0 00:22:00
31	KR26-P41	40.40	484.00	83.20	6.00	4.11	166.12	101.68	0 00:52:12
32	KR27-P41	71.20	484.00	66.30	6.00	2.47	175.65	74.12	0 01:22:24
33	KR27-P42	34.40	484.00	74.00	6.00	3.19	109.56	74.71	0 00:44:36
34	KR27-P43	1.60	484.00	93.00	6.00	5.18	8.29	11.25	0 00:07:42
35	KR27-P44	7.70	484.00	93.00	6.00	5.18	39.91	49.51	0 00:11:18
36	KR28-P40	60.50	484.00	58.90	6.00	1.83	110.72	34.48	0 01:52:36
37	KR29-P65	19.80	484.00	88.30	6.00	4.66	92.25	61.70	0 00:44:54
38	KR2-P64	59.00	484.00	69.00	6.00	2.71	160.07	159.69	0 00:23:54
39	KR31-P45	19.80	484.00	86.80	6.00	4.50	89.02	99.71	0 00:18:00
40	KR31-P45_2	1.30	484.00	93.00	6.00	5.18	6.74	9.57	0 00:06:00
41	KR32-OF1	21.20	484.00	64.10	6.00	2.27	48.17	37.84	0 00:34:00
42	KR32-P39	19.90	484.00	51.70	6.00	1.27	25.21	11.49	0 00:57:00
43	KR3-P64	12.60	484.00	35.00	6.00	0.25	3.15	0.52	0 00:28:42
44	KR4-P64	32.40	484.00	63.30	6.00	2.20	71.34	65.79	0 00:26:12
45	KR5-P200	55.70	484.00	63.70	6.00	2.24	124.60	76.18	0 00:48:42
46	KR6-JDS-BENTLEY	14.40	484.00	61.90	6.00	2.08	29.98	38.83	0 00:12:18
47	KR6-P200	17.10	484.00	59.00	6.00	1.84	31.45	37.33	0 00:15:06
48	KR7-JDS-BENTLEY	21.10	484.00	70.60	6.00	2.86	60.37	38.56	0 00:48:12
49	KR8-P58	0.09	484.00	87.60	6.00	4.58	0.40	0.47	0 00:16:53
50	KR8-P59	9.90	484.00	82.20	6.00	4.01	39.68	33.39	0 00:32:24
51	KR8-P59_2	2.30	484.00	93.00	6.00	5.18	11.92	13.44	0 00:15:42
52	KR9-JUS-SWS1	87.50	484.00	67.50	6.00	2.58	225.31	90.10	0 01:29:24
53	SC10-P84	59.70	484.00	37.00	6.00	0.34	20.48	5.94	0 00:18:18
54	SC11-JDS-P87	112.10	484.00	40.50	6.00	0.53	59.19	6.15	0 05:42:54
55	SC11-P87	6.40	484.00	83.10	6.00	4.10	26.25	38.99	0 00:06:42
56	SC12-JDS-P87	48.80	484.00	64.40	6.00	2.30	112.14	46.77	0 01:22:30
57	SC12-P87	2.30	484.00	93.00	6.00	5.18	11.92	16.92	0 00:06:00
58	SC12-P89	108.40	484.00	62.20	6.00	2.11	228.51	73.19	0 01:53:42
59	SC13-P204	127.20	484.00	63.60	6.00	2.23	283.40	96.03	0 01:47:42
60	SC14-P204	181.40	484.00	57.30	6.00	1.70	308.38	150.22	0 01:00:30
61	SC14-P91	1.40	484.00	81.00	6.00	3.88	5.44	7.87	0 00:07:54
62	SC15-P202	2.20	484.00	88.70	6.00	4.70	10.34	12.54	0 00:14:06
63	SC15-P203	110.50	484.00	79.20	6.00	3.70	408.85	159.50	0 01:36:42
64	SC15-P90	2.80	484.00	34.60	6.00	0.23	0.65	0.11	0 00:11:18
65	SC1-P86	261.40	484.00	55.10	6.00	1.53	398.90	156.76	0 01:17:00
66	SC2-P86	22.10	484.00	75.40	6.00	3.32	73.39	81.46	0 00:19:36
67	SC3-P88	23.30	484.00	82.60	6.00	4.05	94.37	136.90	0 00:07:36
68	SC3-P89	13.60	484.00	77.70	6.00	3.55	48.27	73.30	0 00:06:24
69	SC4-P84	141.80	484.00	65.60	6.00	2.41	341.03	115.20	0 01:50:12
70	SC5-P84	85.90	484.00	64.10	6.00	2.27	195.16	73.15	0 01:34:42
71	SC6-P84	76.00	484.00	67.70	6.00	2.59	197.07	186.02	0 00:26:06
72	SC7-P84	175.70	484.00	62.30	6.00	2.12	371.78	190.89	0 01:00:48
73	SC8-P84	75.30	484.00	59.90	6.00	1.91	144.05	103.20	0 00:37:00
74	SC8-P88	4.90	484.00	91.40	6.00	5.00	24.51	35.39	0 00:06:00
75	SC9-P203	94.20	484.00	65.90	6.00	2.43	229.00	149.14	0 00:45:30
76	SH10-JDS-P72-POND	31.20	484.00	71.20	6.00	2.92	91.04	64.75	0 00:41:30
77	SH11-P80	13.80	484.00	90.40	6.00	4.89	67.48	70.76	0 00:20:00
78	SH12-P80	134.70	484.00	73.50	6.00	3.14	422.55	165.17	0 01:35:12
79	SH13-P72	18.40	484.00	57.00	6.00	1.68	30.84	11.48	0 01:26:06
80	SH14-JDS-TRIB1	4.40	484.00	60.40	6.00	1.96	8.60	5.66	0 00:42:06

Subbasin Summary

SN	Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
81	SH14-P76	1.30	484.00	93.00	6.00	5.18	6.74	9.57	0 00:06:00
82	SH14-P79	59.40	484.00	62.80	6.00	2.16	128.24	69.39	0 00:57:06
83	SH1-P75	192.70	484.00	61.20	6.00	2.02	389.64	123.18	0 01:54:36
84	SH2-P75	52.60	484.00	62.60	6.00	2.14	112.67	59.77	0 00:58:36
85	SH3-P64	18.80	484.00	76.20	6.00	3.40	63.92	48.06	0 00:38:42
86	SH4-P75	60.90	484.00	69.80	6.00	2.79	169.73	147.72	0 00:30:06
87	SH5-P75	124.60	484.00	62.90	6.00	2.17	270.13	174.49	0 00:44:36
88	SH6-P69	254.10	484.00	60.40	6.00	1.96	496.77	258.15	0 00:58:24
89	SH7-P89	80.70	484.00	64.30	6.00	2.29	184.80	138.45	0 00:36:30
90	SH8-P69	1.00	484.00	83.10	6.00	4.10	4.10	6.14	0 00:06:24
91	SH8-P70	1.00	484.00	91.20	6.00	4.98	4.98	7.19	0 00:06:00
92	SH8-P71	72.80	484.00	67.30	6.00	2.56	186.15	145.77	0 00:35:06
93	SH9-P72	104.40	484.00	70.50	6.00	2.85	297.75	196.73	0 00:45:54

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Min Freeboard Attained (ft)
1	10_JDS-P69	Junction	489.95	494.90	489.95	257.41	491.65	3.69
2	10_JDS-P70	Junction	487.00	492.00	487.00	257.88	489.40	2.60
3	10_JDS-P71	Junction	481.00	489.00	481.00	349.77	486.24	2.76
4	10_JDS-P75	Junction	485.79	493.00	485.79	247.53	491.40	1.60
5	10_JDS-P76	Junction	483.40	492.50	483.40	239.06	488.02	4.48
6	10_JDS-P79	Junction	466.50	474.00	466.50	416.76	470.72	8.78
7	10_JDS-P80	Junction	464.20	478.17	464.20	430.89	469.61	8.56
8	10_JDS-Trib1	Junction	477.50	482.00	477.50	266.98	479.75	3.75
9	10_P72-pondoutfall	Junction	477.50	482.00	477.50	93.65	479.96	3.54
10	KR_JDS-D1	Junction	472.00	480.00	472.00	248.48	475.10	4.90
11	KR_JDS-D1-B	Junction	470.00	477.00	470.00	248.47	473.44	4.06
12	KR_JDS-Div1	Junction	495.00	497.50	495.00	265.94	497.38	1.62
13	KR_JDS-P200	Junction	498.00	501.86	498.00	86.28	501.17	1.33
14	KR_JDS-P39	Junction	458.00	465.00	458.99	233.09	460.55	8.44
15	KR_JDS-P40	Junction	461.26	476.00	461.26	261.20	467.58	8.42
16	KR_JDS-P41	Junction	464.22	472.16	464.22	373.16	471.05	2.87
17	KR_JDS-P42	Junction	465.81	475.85	465.81	142.72	471.36	5.07
18	KR_JDS-P43	Junction	471.41	479.00	471.41	101.91	473.96	5.33
19	KR_JDS-P44	Junction	471.21	480.00	471.21	350.11	477.14	2.86
20	KR_JDS-P45	Junction	488.76	495.40	488.76	396.21	493.57	1.83
21	KR_JDS-P45_2	Junction	487.91	492.31	487.91	396.41	492.07	0.98
22	KR_JDS-P45_3	Junction	484.96	489.96	484.96	396.41	489.63	1.62
23	KR_JDS-P46	Junction	471.93	480.00	471.93	347.46	478.91	1.85
24	KR_JDS-P47	Junction	482.01	492.01	482.01	1007.33	487.32	4.69
25	KR_JDS-P48	Junction	484.55	493.00	484.55	514.44	488.98	4.02
26	KR_JDS-P49	Junction	486.52	493.00	486.52	202.78	490.45	2.55
27	KR_JDS-P50	Junction	487.95	496.00	487.95	201.29	494.16	1.84
28	KR_JDS-P51_52	Junction	514.67	521.00	514.67	252.33	517.61	3.95
29	KR_JDS-P53	Junction	480.39	486.82	480.39	67.23	482.95	4.18
30	KR_JDS-P53_2	Junction	482.00	486.00	482.00	8.33	483.06	3.44
31	KR_JDS-P55	Junction	480.87	488.60	480.87	90.57	483.96	4.64
32	KR_JDS-P56	Junction	480.58	487.40	480.56	28.76	482.13	5.27
33	KR_JDS-P57	Junction	478.29	482.00	478.29	25.71	480.74	4.37
34	KR_JDS-P57_2	Junction	480.94	486.90	480.94	14.17	481.88	5.02
35	KR_JDS-P58	Junction	478.92	484.50	478.92	132.99	481.48	3.20
36	KR_JDS-P59	Junction	480.97	486.71	480.97	142.86	483.73	3.61
37	KR_JDS-P64	Junction	492.03	495.89	492.03	79.14	494.05	3.22
38	KR_JUS-P200	Junction	499.90	504.40	499.90	86.28	503.90	0.50
39	KR_JUS-P51	Junction	514.94	521.83	514.94	140.47	521.28	0.55
40	KR_JUS-P52	Junction	517.48	521.85	517.48	112.52	521.16	0.69
41	KR_JUS-P59_2	Junction	482.33	488.00	482.33	12.94	486.61	1.39
42	KR_JUS-P65	Junction	466.93	476.50	466.93	261.54	473.30	3.20
43	SC_JDS_P203	Junction	495.06	501.90	495.06	268.59	500.09	1.97
44	SC_JDS-P202	Junction	497.07	500.00	497.07	5.80	497.57	4.00
45	SC_JDS-P204	Junction	502.20	509.20	502.20	19.13	504.46	4.74
46	SC_JDS-P84	Junction	488.34	497.00	488.34	216.23	494.29	3.75
47	SC_JDS-P86	Junction	489.60	496.80	489.74	428.24	494.10	2.70
48	SC_JDS-P87	Junction	487.86	497.00	487.86	480.77	492.65	4.61
49	SC_JDS-P88	Junction	486.50	493.50	486.50	842.18	491.97	2.53
50	SC_JDS-P89	Junction	473.34	483.50	473.34	906.84	477.21	6.29
51	SC_JDS-P90	Junction	503.02	509.00	503.02	22.21	504.94	4.06
52	SC_JDS-Trib1	Junction	464.00	472.00	464.00	906.69	468.30	3.70
53	SC_JUS-91A	Junction	506.00	509.20	506.00	27.31	507.27	1.93
54	SC_JUS-P90	Junction	503.34	509.00	503.34	22.21	505.27	3.73
55	SH_JDS-SH7-POND	Junction	487.00	489.00	487.00	4.36	488.15	3.35
56	10_OF1	Outfall	461.00			430.74	466.42	
57	KR_OF1	Outfall	458.00			236.39	459.56	
58	KR_OF2	Outfall	459.07			258.48	462.27	
59	SC_OF1	Outfall	462.00			906.51	466.30	
60	SC_OF2	Outfall	500.00			19.11	502.26	
61	10_JDS-P72-Pond	Storage Node	477.60	483.50	477.60	101.24	481.48	
62	10_JUS-P69	Storage Node	490.01	495.40	490.01	258.11	494.20	
63	10_JUS-P70	Storage Node	487.00	492.00	487.00	258.00	491.36	
64	10_JUS-P71	Storage Node	481.93	489.00	481.93	337.34	486.51	
65	10_JUS-P72	Storage Node	479.29	484.50	479.29	383.80	483.97	
66	10_JUS-P75	Storage Node	486.35	493.00	486.35	284.09	491.52	
67	10_JUS-P76	Storage Node	484.04	492.50	484.04	247.92	490.16	
68	10_JUS-P79	Storage Node	467.40	475.50	467.40	295.33	474.86	
69	10_JUS-P80	Storage Node	465.42	478.70	464.42	523.31	470.40	
70	JDS-P201	Storage Node	493.90	497.40	494.00	82.24	496.74	
71	KR_JDS-Bentley	Storage Node	490.00	494.00	490.00	178.52	492.67	
72	KR_JDS-Trib1	Storage Node	475.50	484.00	476.00	567.93	480.31	
73	KR_JDS-Trib2	Storage Node	477.00	485.00	477.00	811.96	481.75	
74	KR_JUS-D1	Storage Node	472.00	480.00	472.00	350.11	476.01	
75	KR_JUS-P201	Storage Node	492.00	497.50	494.00	146.63	495.68	
76	KR_JUS-P39	Storage Node	460.50	468.50	460.50	263.21	467.28	
77	KR_JUS-P40	Storage Node	461.95	476.00	461.95	397.65	469.65	
78	KR_JUS-P41	Storage Node	465.81	472.66	465.90	468.02	471.08	
79	KR_JUS-P42	Storage Node	465.73	476.35	465.73	158.46	471.39	

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Min Freeboard Attained (ft)
80	KR_JUS-P43	Storage Node	471.62	479.50	471.62	101.91	475.71	
81	KR_JUS-P44	Storage Node	471.93	480.00	471.93	448.31	477.33	
82	KR_JUS-P45	Storage Node	490.12	496.40	490.12	418.36	495.27	
83	KR_JUS-P45_2	Storage Node	488.17	493.31	488.17	396.20	493.09	
84	KR_JUS-P45_3	Storage Node	486.05	492.34	486.05	396.41	491.89	
85	KR_JUS-P46	Storage Node	471.17	480.00	471.17	534.00	478.93	
86	KR_JUS-P47	Storage Node	482.34	492.34	482.34	732.85	488.97	
87	KR_JUS-P48	Storage Node	485.05	492.30	485.55	437.43	489.22	
88	KR_JUS-P49	Storage Node	487.63	493.00	487.63	13.80	490.46	
89	KR_JUS-P50	Storage Node	488.25	496.00	488.25	330.46	494.19	
90	KR_JUS-P53	Storage Node	480.66	487.40	480.66	95.78	483.87	
91	KR_JUS-P53_2	Storage Node	482.00	486.50	482.00	41.24	483.28	
92	KR_JUS-P55	Storage Node	481.40	487.10	481.40	90.63	484.05	
93	KR_JUS-P56	Storage Node	481.72	487.90	481.72	9.81	483.24	
94	KR_JUS-P57	Storage Node	478.58	485.40	478.58	30.92	481.01	
95	KR_JUS-P57_2	Storage Node	481.90	487.40	481.90	14.22	483.26	
96	KR_JUS-P58	Storage Node	479.74	485.50	479.74	149.12	483.90	
97	KR_JUS-P59	Storage Node	481.43	487.80	481.43	150.03	485.83	
98	KR_JUS-P64	Storage Node	492.56	497.80	492.56	261.61	497.16	
99	KR_JUS-SWS1	Storage Node	477.50	484.00	478.00	282.31	480.74	
100	SC_JUS-P202	Storage Node	496.00	500.50	496.00	12.34	498.93	
101	SC_JUS-P203	Storage Node	495.55	501.90	495.55	262.14	500.89	
102	SC_JUS-P204	Storage Node	503.20	509.20	503.20	222.94	508.28	
103	SC_JUS-P84	Storage Node	489.26	497.00	489.26	478.29	494.48	
104	SC_JUS-P87	Storage Node	487.60	497.00	487.60	438.91	494.28	
105	SC_JUS-P88	Storage Node	488.20	494.75	488.20	440.22	494.19	
106	SC_JUS-P89	Storage Node	475.32	485.00	475.32	909.20	484.46	
107	SC_JUS-P91	Storage Node	503.87	509.20	503.87	27.54	506.09	
108	SC-JUS-P86	Storage Node	489.60	496.70	489.60	383.74	494.24	
109	SH_JUS-SH7-POND	Storage Node	485.00	489.50	486.00	138.43	488.15	

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)
1	P200	Pipe	KR_JUS-P200	KR_JDS-P200	100.00	500.40	498.80	1.6000	24.000	0.0240	42.60	31.00	1.37	7.00
2	P202	Pipe	SC_JUS-P202	SC_JDS-P202	43.00	497.20	497.10	0.2300	15.000	0.0150	5.80	2.70	2.15	5.03
3	P203	Pipe	SC_JUS-P203	SC_JDS_P203	49.00	495.55	495.06	1.0000	40.000	0.0130	120.53	88.34	1.36	13.81
4	P204	Pipe	SC_JUS-P204	SC_JDS-P204	103.00	503.20	502.20	0.9700	18.000	0.0120	19.13	11.21	1.71	10.82
5	P39	Pipe	KR_JUS-P39	KR_JDS-P39	556.00	460.47	458.99	0.2700	72.000	0.0120	233.09	239.10	0.97	9.12
6	P40	Pipe	KR_JUS-P40	KR_JDS-P40	210.00	461.95	461.26	0.3300	60.000	0.0120	261.20	161.73	1.62	13.30
7	P41	Pipe	KR_JUS-P41	KR_JDS-P41	61.00	465.81	464.22	2.6100	80.000	0.0200	373.16	2263.56	0.16	3.91
8	P42	Pipe	KR_JUS-P42	KR_JDS-P42	67.00	465.73	465.81	-0.1200	84.000	0.0200	142.72	365.96	0.39	2.17
9	P43	Pipe	KR_JUS-P43	KR_JDS-P43	50.00	471.62	471.41	0.4200	60.000	0.0120	101.91	182.85	0.56	7.67
10	P44	Pipe	KR_JUS-P44	KR_JDS-P44	44.30	471.93	471.21	1.6300	48.000	0.0200	290.12	595.78	0.49	6.04
11	P45	Pipe	KR_JUS-P45	KR_JDS-P45	82.20	490.12	488.76	1.6500	42.000	0.0150	396.21	432.33	0.92	13.45
12	P45_2	Pipe	KR_JUS-P45_2	KR_JDS-P45_2	25.30	488.17	487.91	1.0300	30.000	0.0130	60.52	41.58	1.46	12.33
13	P45_3	Pipe	KR_JUS-P45_3	KR_JDS-P45_3	199.00	486.05	484.96	0.5500	36.000	0.0240	46.61	26.74	1.74	6.99
14	P46	Pipe	KR_JUS-P46	KR_JDS-P46	42.00	471.17	471.93	-1.8100	48.000	0.0120	169.14	209.33	0.81	13.46
15	P47	Pipe	KR_JUS-P47	KR_JDS-P47	21.80	482.34	482.01	1.5100	55.000	0.0150	1007.33	1102.17	0.91	15.98
16	P48	Pipe	KR_JUS-P48	KR_JDS-P48	71.70	485.05	484.55	0.7000	48.000	0.0150	514.44	844.31	0.61	7.02
17	P49	Pipe	KR_JDS-P49	KR_JUS-P49	89.60	487.63	486.52	1.2400	24.000	0.0120	13.82	0.82	16.89	4.94
18	P50	Pipe	KR_JUS-P50	KR_JDS-P50	87.20	488.25	487.95	0.3400	24.000	0.0150	62.42	34.50	1.81	6.62
19	P51	Pipe	KR_JUS-P51	KR_JDS-P51_52	31.00	514.94	514.67	0.8700	25.000	0.0120	100.36	47.17	2.13	18.22
20	P52	Pipe	KR_JUS-P52	KR_JDS-P51_52	48.00	517.48	515.14	4.8800	25.000	0.0120	89.50	111.59	0.80	16.25
21	P53_2	Pipe	KR_JDS-P53_2	KR_JUS-P53_2	90.40	482.20	482.00	0.2200	24.000	0.0120	8.33	23.05	0.36	2.66
22	P53A	Pipe	KR_JUS-P53	KR_JDS-P53	24.80	480.66	480.39	1.0900	36.000	0.0130	41.23	69.59	0.59	6.19
23	P53B-C	Pipe	KR_JUS-P53	KR_JDS-P53	20.30	482.40	482.90	-2.4600	24.000	0.0120	19.69	76.93	0.26	5.70
24	P55	Pipe	KR_JDS-P55	KR_JUS-P55	79.60	480.87	481.40	-0.6700	48.000	0.0200	90.57	235.02	0.39	3.95
25	P56	Pipe	KR_JUS-P56	KR_JDS-P56	82.20	481.72	480.58	1.3900	30.000	0.0130	9.79	48.30	0.20	3.79
26	P57	Pipe	KR_JUS-P57	KR_JDS-P57	27.80	478.58	478.29	1.0400	36.000	0.0120	25.71	73.80	0.35	5.35
27	P57_2	Pipe	KR_JUS-P57_2	KR_JDS-P57_2	79.40	481.90	480.94	1.2100	24.000	0.0120	14.17	53.90	0.26	4.04
28	P58A	Pipe	KR_JUS-P58	KR_JDS-P58	45.60	479.74	478.92	1.8000	36.000	0.0130	61.65	89.44	0.69	9.07
29	P58B	Pipe	KR_JDS-P58	KR_JUS-P58	30.60	480.28	479.56	2.3500	24.000	0.0120	35.40	32.56	1.09	11.27
30	P58C	Pipe	KR_JDS-P58	KR_JUS-P58	30.60	480.23	479.99	0.7800	24.000	0.0120	35.94	21.70	1.66	11.44
31	P59	Pipe	KR_JUS-P59	KR_JDS-P59	95.45	481.43	480.97	0.4800	48.000	0.0200	142.86	139.79	1.02	7.32
32	P59_2	Pipe	KR_JUS-P59_2	KR_JUS-P58	73.20	482.33	482.01	0.4400	15.000	0.0120	12.91	4.63	2.79	10.52
33	P64	Pipe	KR_JUS-P64	KR_JDS-P64	47.60	492.56	492.03	1.1100	26.000	0.0240	50.46	29.93	1.69	8.32
34	P65	Pipe	KR_JUS-P65	KR_OF2	1034.00	466.93	459.07	0.7600	84.000	0.0120	258.48	603.39	0.43	9.22
35	P69	Pipe	10_JUS-P69	10_JDS-P69	60.70	490.01	489.95	0.1000	36.000	0.0200	177.17	62.05	2.86	9.13
36	P70	Pipe	10_JUS-P70	10_JDS-P70	8.50	487.00	487.00	0.0000	18.000	0.0200	192.24	8.10	23.72	14.24
37	P71	Pipe	10_JUS-P71	10_JDS-P71	34.00	481.93	481.00	2.7400	48.000	0.0120	148.08	257.36	0.58	11.78
38	P72	Pipe	10_JUS-P72	10_JDS-P72-Pond	40.95	479.29	478.78	1.2500	36.000	0.0240	52.72	40.32	1.31	7.91
39	P75	Pipe	10_JUS-P75	10_JDS-P75	66.20	486.35	485.79	0.8500	42.000	0.0200	231.59	419.05	0.55	4.73
40	P76	Pipe	10_JUS-P76	10_JDS-P76	33.70	484.04	483.40	1.9000	39.600	0.0150	230.01	224.36	1.03	13.94
41	P79	Pipe	10_JUS-P79	10_JDS-P79	36.10	467.40	466.50	2.4900	43.000	0.0120	346.18	338.90	1.02	21.24
42	P80	Pipe	10_JUS-P80	10_JDS-P80	56.10	465.64	465.64	0.0000	99.600	0.0200	430.89	80.17	5.37	6.25
43	P84	Pipe	SC_JUS-P84	SC_JDS-P84	68.00	489.26	488.34	1.3500	34.000	0.0120	96.38	133.47	0.72	9.46
44	P86	Pipe	SC_JDS-P86	SC-JUS-P86	70.00	489.70	489.70	0.0000	73.000	0.0200	428.24	60.09	7.13	4.86
45	P87-A	Pipe	SC_JUS-P87	SC_JDS-P87	21.10	489.17	487.86	6.2100	30.000	0.0120	92.80	110.72	0.84	18.91
46	P87-B	Pipe	SC_JUS-P87	SC_JDS-P87	28.40	490.16	490.81	-2.2900	16.000	0.0130	15.54	11.61	1.34	11.13
47	P87-C	Pipe	SC_JUS-P87	SC_JDS-P87	27.90	489.24	489.03	0.7500	16.000	0.0130	20.69	6.66	3.11	14.82
48	P88	Pipe	SC_JUS-P88	SC_JDS-P88	40.50	488.20	486.60	3.9500	52.000	0.0240	342.86	382.89	0.90	11.62
49	P89	Pipe	SC_JUS-P89	SC_JDS-P89	43.30	475.32	475.20	0.2800	66.000	0.0240	278.33	95.76	2.91	12.17
50	P90	Pipe	SC_JUS-P90	SC_JDS-P90	82.60	503.34	503.02	0.3900	36.000	0.0130	22.21	41.51	0.53	5.35
51	P91	Pipe	SC_JUS-P91	SC_JUS-P90	81.90	503.87	503.44	0.5300	36.000	0.0150	22.16	41.89	0.53	4.51
52	10_CH-71-70	Channel	10_JDS-P70	10_JUS-P71	1209.00	487.00	481.93	0.4200	60.000	0.0320	254.01	1306.83	0.19	1.06
53	10_CH-72-71	Channel	10_JDS-P71	10_JUS-P72	1736.00	481.00	479.29	0.1000	72.000	0.0320	285.91	481.88	0.59	2.45
54	10_CH-79-Trib1	Channel	10_JDS-Trib1	10_JUS-P79	1363.00	477.50	467.40	0.7400	60.000	0.0320	265.38	1448.21	0.18	1.35
55	10_CH-80-79	Channel	10_JDS-P79	10_JUS-P80	246.00	466.50	465.42	0.4400	156.000	0.0320	427.40	4521.15	0.09	3.94
56	10_CH-OF1-80	Channel	10_JDS-P80	10_OF1	398.00	464.20	461.00	0.8000	117.600	0.0320	430.74	1389.84	0.31	6.21
57	10_CH-Trib1	Channel	10_P72-pondoutfall	10_JDS-Trib1	85.00	477.50	477.50	0.0000	54.000	0.0320	93.65	14.78	6.34	4.06

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)
58	10_CH-Trib1-76	Channel	10_JDS-P76	10_JDS-Trib1	1026.00	483.40	477.50	0.5800	72.000	0.0320	242.16	1025.45	0.24	6.45
59	10_RRCH-70-69	Channel	10_JDS-P69	10_JUS-P70	59.00	489.95	487.00	5.0000	60.000	0.0320	257.41	1866.97	0.14	4.19
60	10_RRCH-76-75	Channel	10_JDS-P75	10_JUS-P76	34.00	485.79	484.04	5.1500	84.000	0.0320	247.27	395.55	0.63	1.97
61	KR_CH-39-40	Channel	KR_JDS-P40	KR_JUS-P39	905.00	461.26	460.50	0.0800	93.000	0.0320	253.82	497.80	0.51	2.53
62	KR_CH-40-41	Channel	KR_JDS-P41	KR_JUS-P40	1031.00	464.22	461.95	0.2200	116.400	0.0320	372.96	719.91	0.52	4.87
63	KR_CH-41-42	Channel	KR_JDS-P42	KR_JUS-P41	1352.00	465.81	465.81	0.0000	81.120	0.0320	135.29	11.59	11.67	1.77
64	KR_CH-42-43	Channel	KR_JDS-P43	KR_JUS-P42	981.00	471.41	465.73	0.5800	76.200	0.0320	101.90	615.42	0.17	2.40
65	KR_CH-43-D1	Channel	KR_JUS-D1	KR_JUS-P43	292.00	472.00	471.62	0.1300	90.000	0.0320	101.63	478.76	0.21	2.04
66	KR_CH-44-45_3	Channel	KR_JDS-P45_3	KR_JUS-P44	738.85	484.96	472.06	1.7500	60.000	0.0450	214.73	247.40	0.87	7.03
67	KR_CH-44-46	Channel	KR_JDS-P46	KR_JUS-P44	312.00	471.93	471.93	0.0000	66.000	0.0320	325.22	8.37	38.84	6.39
68	KR_CH-45_3-45_2	Channel	KR_JDS-P45_2	KR_JUS-P45_3	24.86	487.91	486.05	7.4800	60.000	0.0320	396.41	1252.28	0.32	8.69
69	KR_CH-46-Trib1	Channel	KR_JDS-Trib1	KR_JUS-P46	2923.00	475.50	471.17	0.1500	72.000	0.0320	433.42	775.15	0.56	0.91
70	KR_CH-50-51	Channel	KR_JDS-P51_52	KR_JUS-P50	948.87	514.67	488.25	2.7800	48.000	0.0800	243.83	791.98	0.31	2.73
71	KR_CH-53-53_2	Channel	KR_JDS-P53_2	KR_JDS-P53	211.00	482.00	480.39	0.7600	18.000	0.0800	7.63	39.88	0.19	0.43
72	KR_CH-59-Bentley	Channel	KR_JDS-Bentley	KR_JUS-P59	669.00	490.00	481.43	1.2800	48.000	0.0320	115.41	332.77	0.35	3.59
73	KR_CH-64-Div1	Channel	KR_JDS-Div1	KR_JUS-P64	642.00	495.00	492.56	0.3800	48.000	0.0320	202.61	715.86	0.28	1.58
74	KR_CH-Bentley	Channel	KR_JDS-P200	KR_JDS-Bentley	995.00	498.00	490.00	0.8000	42.000	0.0320	88.80	173.19	0.51	2.96
75	KR_CH-D1-44	Channel	KR_JDS-P44	KR_JUS-D1	107.30	471.21	472.00	-0.7400	48.000	0.0320	350.11	292.00	1.20	6.28
76	KR_CH-D1-65A	Channel	KR_JDS-D1	KR_JDS-D1-B	500.00	472.00	470.00	0.4000	90.000	0.0320	248.47	1416.50	0.18	3.54
77	KR_CH-D1B	Channel	KR_JDS-D1-B	KR_JUS-P65	400.00	470.00	466.93	0.7700	90.000	0.0320	248.49	1962.11	0.13	2.14
78	KR_CH-moose	Channel	JDS-P201	KR_JDS-Div1	886.00	493.90	495.00	-0.1200	48.000	0.0320	82.24	409.15	0.20	2.56
79	KR_CH-OF1-39	Channel	KR_JDS-P39	KR_OF1	70.20	458.99	458.00	1.4100	120.000	0.0320	233.09	5759.30	0.04	4.96
80	KR_CH-SWS1	Channel	KR_JUS-SWS1	KR_JDS-Trib1	2362.00	477.50	475.50	0.0800	54.000	0.0320	75.01	217.18	0.35	0.56
81	KR_CH-SWS1-57	Channel	KR_JDS-P57	KR_JUS-SWS1	42.00	478.29	477.50	1.8800	48.000	0.0450	25.69	87.78	0.29	5.63
82	KR_CH-SWS1-58	Channel	KR_JDS-P58	KR_JUS-SWS1	76.00	478.92	477.50	1.8700	48.000	0.0320	132.97	292.08	0.46	11.64
83	KR_CH-SWS2-Trib2	Channel	KR_JDS-Trib2	KR_JDS-Trib1	470.00	477.00	475.50	0.3200	72.000	0.0320	523.94	933.31	0.56	2.08
84	KR_CH-Trib2-47	Channel	KR_JDS-P47	KR_JDS-Trib2	873.00	482.01	477.00	0.5700	72.000	0.0320	747.71	1179.07	0.63	2.65
85	KR_CH-Trib2-53	Channel	KR_JDS-P53	KR_JDS-Trib2	1194.00	480.39	477.00	0.2800	48.000	0.0450	45.65	266.85	0.17	0.77
86	KR_RRCH-45_2-45	Channel	KR_JDS-P45	KR_JUS-P45_2	40.00	488.76	488.17	1.4700	72.000	0.0320	396.20	681.99	0.58	9.19
87	KR_RRCH-47-48	Channel	KR_JDS-P48	KR_JUS-P47	45.00	484.55	482.34	4.9100	72.000	0.0320	515.97	1935.60	0.27	6.93
88	KR_RRCH-47-49	Channel	KR_JDS-P49	KR_JUS-P47	530.00	486.52	482.34	0.7900	72.000	0.0320	202.44	519.43	0.39	3.43
89	KR_RRCH-49-50	Channel	KR_JDS-P50	KR_JDS-P49	397.00	487.95	486.52	0.3600	72.000	0.0320	200.64	197.46	1.02	3.29
90	KR_RRCH-53_2-56	Channel	KR_JUS-P53_2	KR_JDS-P56	477.00	482.00	480.58	0.3000	48.000	0.0320	20.53	266.42	0.08	0.84
91	KR_RRCH-56-57	Channel	KR_JDS-P56	KR_JUS-P57	535.00	480.58	478.39	0.4100	66.000	0.0320	24.99	414.62	0.06	0.84
92	KR_RRCH-57-57_2	Channel	KR_JDS-P57_2	KR_JUS-P57	31.00	480.95	478.58	7.6500	36.000	0.0800	14.13	69.60	0.20	2.51
93	KR_RRCH-58-59	Channel	KR_JDS-P59	KR_JUS-P58	29.00	480.97	479.74	4.2400	54.000	0.0320	144.81	532.28	0.27	6.60
94	KR-CH-Bentley-64	Channel	KR_JDS-P64	KR_JDS-Bentley	1078.00	492.03	490.00	0.1900	48.000	0.0320	74.12	417.33	0.18	1.06
95	KR-RRCH-53-53_2	Channel	KR_JUS-P53_2	KR_JUS-P53	211.00	482.00	480.66	0.6400	54.000	0.0320	33.11	268.74	0.12	1.30
96	KR-RRCH-53-55	Channel	KR_JDS-P55	KR_JUS-P53	42.00	480.87	480.66	0.5000	80.400	0.0320	90.56	479.67	0.19	3.15
97	SC_CH-86-84	Channel	SC_JUS-P84	SC-JUS-P86	879.25	492.50	492.00	0.0600	48.000	0.0800	224.51	869.89	0.26	0.63
98	SC_CH-87-202	Channel	SC_JDS-P202	SC_JDS-P87	3875.00	497.07	487.86	0.2400	24.000	0.0320	4.02	48.45	0.08	0.33
99	SC_CH-88-87	Channel	SC_JDS-P87	SC_JDS-P88	1012.00	487.86	486.50	0.1300	96.000	0.0320	464.19	1387.20	0.33	1.96
100	SC_CH-89-88	Channel	SC_JDS-P88	SC_JUS-P89	1788.00	486.50	475.32	0.6300	96.000	0.0320	832.83	1670.56	0.50	4.10
101	SC_CH-OF1-Trib1	Channel	SC_JDS-Trib1	SC_OF1	140.00	464.00	462.00	1.4300	72.000	0.0450	906.51	1811.55	0.50	7.85
102	SC_CH-Trib1-89	Channel	SC_JDS-P89	SC_JDS-Trib1	748.00	473.34	464.00	1.2500	96.000	0.0320	906.69	3503.10	0.26	6.66
103	SC_RRCH-203-90	Channel	SC_JDS-P90	SC_JUS-P203	2014.00	503.02	495.55	0.3700	31.200	0.0320	22.20	38.51	0.58	1.22
104	SC_RRCH-204-OF2	Channel	SC_JDS-P204	SC_OF2	3680.98	502.20	500.00	0.0600	48.000	0.0320	19.11	72.35	0.26	1.29
105	SC_RRCH-87-203	Channel	SC_JDS_P203	SC_JUS-P87	3893.00	495.06	489.17	0.1500	84.000	0.0320	228.47	470.68	0.49	1.65
106	SC_RRCH-87-84	Channel	SC_JDS-P84	SC_JUS-P87	50.00	488.34	488.34	0.0000	116.400	0.0320	216.15	150.05	1.44	1.43
107	SC_RRCH-88-87	Channel	SC_JUS-P87	SC_JUS-P88	865.00	492.80	492.00	0.0900	48.000	0.0800	1.62	20.08	0.08	0.36
108	SC-CH-91-91A	Channel	SC_JUS-91A	SC_JUS-P91	178.41	506.00	503.87	1.1900	36.000	0.0450	27.31	127.17	0.21	3.27
109	SC-CH-91A-204	Channel	SC_JUS-P204	SC_JUS-91A	472.13	503.20	506.00	-0.5900	36.000	0.0450	27.31	89.63	0.30	1.79
110	SC-RRCH-88-86	Channel	SC_JDS-P86	SC_JUS-P88	45.00	489.74	488.20	3.4200	72.000	0.0450	426.03	1427.64	0.30	5.30
111	SH_CH-SH7-P88	Channel	SH_JDS-SH7-POND	SC_JDS-P88	2000.00	487.00	486.50	0.0300	48.000	0.0800	0.00	47.31	0.00	0.00
112	10_Pond-Flume	Weir	10_P72-pondoutfall	10_JDS-P72-Pond		477.50	477.60				93.65			
113	Div1	Weir	KR_JUS-D1	KR_JDS-D1		472.00	472.00				248.48			
114	KR_Shafer-Rd-weir	Weir	KR_JUS-P201	10_JUS-P75		492.00	486.35				0.00			

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)
115	P200-weir	Weir	KR_JUS-P200	KR_JDS-P200		499.90	498.00				47.93			
116	P201-weir	Weir	KR_JUS-P201	JDS-P201		492.00	493.90				0.00			
117	P202-weir	Weir	SC_JUS-P202	SC_JDS-P202		496.00	497.07				0.00			
118	P203-weir	Weir	SC_JUS-P203	SC_JDS_P203		495.55	495.06				173.67			
119	P39-weir	Weir	KR_JUS-P39	KR_JDS-P39		460.50	458.00				0.00			
120	P40-weir	Weir	KR_JUS-P40	KR_JDS-P40		461.95	461.26				0.00			
121	P41-weir	Weir	KR_JUS-P41	KR_JDS-P41		465.81	464.22				0.00			
122	P42-weir	Weir	KR_JUS-P42	KR_JDS-P42		465.73	465.81				0.00			
123	P43-weir	Weir	KR_JUS-P43	KR_JDS-P43		471.62	471.41				0.00			
124	P44-weir	Weir	KR_JUS-P44	KR_JDS-P44		471.93	471.21				112.44			
125	P45_2-weir	Weir	KR_JUS-P45_2	KR_JDS-P45_2		488.17	487.91				348.56			
126	P45_3-bypass	Weir	KR_JDS-P45_3	KR_JUS-P44		484.96	471.93				181.67			
127	P45_3-weir	Weir	KR_JUS-P45_3	KR_JDS-P45_3		486.05	484.96				360.98			
128	P45-weir	Weir	KR_JUS-P45	KR_JDS-P45		490.12	488.76				0.00			
129	P46-weir	Weir	KR_JUS-P46	KR_JDS-P46		471.17	471.93				329.02			
130	P47-weir	Weir	KR_JUS-P47	KR_JDS-P47		482.34	482.01				0.00			
131	P48-weir	Weir	KR_JUS-P48	KR_JDS-P48		485.05	484.55				0.00			
132	P49-weir	Weir	KR_JUS-P49	KR_JDS-P49		487.63	486.52				0.00			
133	P50-weir	Weir	KR_JUS-P50	KR_JDS-P50		488.25	487.95				192.59			
134	P51-weir	Weir	KR_JUS-P51	KR_JDS-P51_52		514.94	514.67				41.05			
135	P52-weir	Weir	KR_JUS-P52	KR_JDS-P51_52		517.48	514.67				23.01			
136	P53_2-weir	Weir	KR_JUS-P53_2	KR_JDS-P53_2		482.00	482.00				0.00			
137	P53-weir	Weir	KR_JUS-P53	KR_JDS-P53		480.66	480.39				0.00			
138	P55-weir	Weir	KR_JUS-P55	KR_JDS-P55		481.40	480.87				0.00			
139	P56-weir	Weir	KR_JUS-P56	KR_JDS-P56		481.72	480.58				0.00			
140	P57_2-weir	Weir	KR_JUS-P57_2	KR_JDS-P57_2		481.90	480.94				0.00			
141	P57-weir	Weir	KR_JUS-P57	KR_JDS-P57		478.58	478.29				0.00			
142	P58-weir	Weir	KR_JUS-P58	KR_JDS-P58		479.74	478.92				0.00			
143	P59_2-weir	Weir	KR_JUS-P59_2	KR_JUS-P59		482.33	481.43				0.00			
144	P59-weir	Weir	KR_JUS-P59	KR_JDS-P59		481.43	480.97				0.00			
145	P64-weir	Weir	KR_JUS-P64	KR_JDS-P64		492.56	492.03				28.68			
146	P69-weir	Weir	10_JUS-P69	10_JDS-P69		490.01	489.95				80.24			
147	P70-weir	Weir	10_JUS-P70	10_JDS-P70		487.00	487.00				72.82			
148	P71-weir	Weir	10_JUS-P71	10_JDS-P71		481.93	481.00				216.69			
149	P72-weir	Weir	10_JUS-P72	10_JDS-P72-Pond		479.29	477.60				43.03			
150	P75-weir	Weir	10_JUS-P75	10_JDS-P75		486.35	485.79				76.98			
151	P76-weir	Weir	10_JUS-P76	10_JDS-P76		484.04	483.40				11.22			
152	P79-weir	Weir	10_JUS-P79	10_JDS-P79		467.40	466.50				72.42			
153	P80-weir	Weir	10_JUS-P80	10_JDS-P80		465.42	464.20				0.00			
154	P84-weir	Weir	SC_JUS-P84	SC_JDS-P84		489.26	488.34				175.99			
155	P86-weir	Weir	SC-JUS-P86	SC_JDS-P86		489.60	489.60				0.00			
156	P87-weir	Weir	SC_JUS-P87	SC_JDS-P87		487.60	487.86				337.45			
157	P88-weir	Weir	SC_JUS-P88	SC_JDS-P88		488.20	486.50				97.91			
158	P89-weir	Weir	SC_JUS-P89	SC_JDS-P89		475.32	473.34				628.51			
159	SH7-ovrflow	Weir	SH_JUS-SH7-POND	SH_JDS-SH7-POND		485.00	487.00				4.36			

Project Description

File Name 19490-Columbia Co-PRE-10-2-2020.SPF

Project Options

Flow Units ..... CFS
Elevation Type ..... Elevation
Hydrology Method ..... SCS TR-20
Time of Concentration (TOC) Method ..... SCS TR-55
Link Routing Method ..... Hydrodynamic
Enable Overflow Ponding at Nodes ..... YES
Skip Steady State Analysis Time Periods ... YES

Analysis Options

Start Analysis On ..... Nov 22, 2019 00:00:00
End Analysis On ..... Nov 23, 2019 00:00:00
Start Reporting On ..... Nov 22, 2019 00:00:00
Antecedent Dry Days ..... 0 days
Runoff (Dry Weather) Time Step ..... 0 01:00:00 days hh:mm:ss
Runoff (Wet Weather) Time Step ..... 0 00:05:00 days hh:mm:ss
Reporting Time Step ..... 0 00:05:00 days hh:mm:ss
Routing Time Step ..... 2 seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins	93
Nodes	109
Junctions	55
Outfalls	5
Flow Diversions	0
Inlets	0
Storage Nodes	49
Links	159
Channels	60
Pipes	51
Pumps	0
Orifices	0
Weirs	48
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1		Time Series	100yr-24hr	Cumulative	inches	Pennsylvania	Columbia	100	7.05	SCS Type II 24-hr

Subbasin Summary

SN	Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	KR10-JUS-SWS1	51.60	484.00	50.50	7.05	1.74	89.78	20.38	0 02:38:18
2	KR11-P53	0.20	484.00	93.00	7.05	6.22	1.24	1.74	0 00:06:00
3	KR11-P53_2	1.70	484.00	93.00	7.05	6.22	10.58	14.90	0 00:06:00
4	KR11-P55	20.90	484.00	80.90	7.05	4.84	101.16	112.71	0 00:18:54
5	KR11-P56	1.90	484.00	89.50	7.05	5.81	11.05	11.82	0 00:18:54
6	KR11-P57	0.80	484.00	93.00	7.05	6.22	4.98	7.00	0 00:06:00
7	KR11-P57_2	2.60	484.00	83.10	7.05	5.09	13.22	17.52	0 00:10:48
8	KR11-P58	0.30	484.00	93.00	7.05	6.22	1.87	2.63	0 00:06:00
9	KR11-P59	31.10	484.00	69.00	7.05	3.56	110.56	97.59	0 00:29:54
10	KR12-P48	111.40	484.00	68.50	7.05	3.50	390.23	140.31	0 01:45:36
11	KR13-P48	154.70	484.00	67.30	7.05	3.38	522.58	177.01	0 01:53:42
12	KR14-P48	14.90	484.00	69.20	7.05	3.58	53.28	25.19	0 01:13:30
13	KR15-P48	42.00	484.00	65.20	7.05	3.16	132.80	53.69	0 01:28:42
14	KR16-P48	78.90	484.00	74.20	7.05	4.11	324.04	230.81	0 00:41:54
15	KR17-P52	39.40	484.00	67.30	7.05	3.38	133.09	150.23	0 00:18:54
16	KR18-P51	38.40	484.00	72.70	7.05	3.95	151.53	189.87	0 00:14:36
17	KR19-P45	121.00	484.00	72.10	7.05	3.88	469.72	442.31	0 00:26:54
18	KR1-P64	108.00	484.00	56.10	7.05	2.26	244.08	148.03	0 00:47:06
19	KR20-P47	20.50	484.00	88.70	7.05	5.72	117.30	122.60	0 00:20:12
20	KR20-P48	51.90	484.00	74.90	7.05	4.18	217.10	189.06	0 00:30:42
21	kr20-p49	2.10	484.00	92.20	7.05	6.13	12.87	17.26	0 00:08:00
22	KR20-P50	23.50	484.00	79.80	7.05	4.72	110.87	111.12	0 00:23:48
23	KR20-P53	1.70	484.00	92.80	7.05	6.20	10.53	14.86	0 00:06:00
24	KR21-JDS-TRIB1	46.10	484.00	65.40	7.05	3.18	146.69	60.06	0 01:27:30
25	KR21-JDS-TRIB2	15.30	484.00	78.00	7.05	4.52	69.16	58.05	0 00:32:36
26	KR22-P44	7.80	484.00	93.00	7.05	6.22	48.52	57.21	0 00:13:18
27	KR22-P46	117.40	484.00	72.00	7.05	3.87	454.57	151.05	0 01:58:36
28	KR23-P41	26.40	484.00	89.30	7.05	5.79	152.88	65.63	0 01:22:24
29	KR24-P41	53.60	484.00	81.20	7.05	4.87	261.25	302.41	0 00:17:12
30	KR25-P41	32.00	484.00	70.40	7.05	3.70	118.46	124.49	0 00:22:00
31	KR26-P41	40.40	484.00	83.20	7.05	5.10	205.92	125.59	0 00:52:12
32	KR27-P41	71.20	484.00	66.30	7.05	3.28	233.18	100.36	0 01:22:24
33	KR27-P42	34.40	484.00	74.00	7.05	4.09	140.56	96.08	0 00:44:36
34	KR27-P43	1.60	484.00	93.00	7.05	6.22	9.95	13.36	0 00:07:42
35	KR27-P44	7.70	484.00	93.00	7.05	6.22	47.90	58.84	0 00:11:18
36	KR28-P40	60.50	484.00	58.90	7.05	2.53	153.13	49.75	0 01:52:36
37	KR29-P65	19.80	484.00	88.30	7.05	5.68	112.38	74.61	0 00:44:54
38	KR2-P64	59.00	484.00	69.00	7.05	3.56	209.75	210.01	0 00:23:54
39	KR31-P45	19.80	484.00	86.80	7.05	5.51	109.00	121.07	0 00:18:00
40	KR31-P45_2	1.30	484.00	93.00	7.05	6.22	8.09	11.37	0 00:06:00
41	KR32-OF1	21.20	484.00	64.10	7.05	3.05	64.66	51.81	0 00:34:00
42	KR32-P39	19.90	484.00	51.70	7.05	1.85	36.80	18.23	0 00:57:00
43	KR3-P64	12.60	484.00	35.00	7.05	0.51	6.40	2.08	0 00:28:42
44	KR4-P64	32.40	484.00	63.30	7.05	2.97	96.20	90.34	0 00:26:12
45	KR5-P200	55.70	484.00	63.70	7.05	3.01	167.60	104.86	0 00:48:42
46	KR6-JDS-BENTLEY	14.40	484.00	61.90	7.05	2.83	40.72	53.41	0 00:12:18
47	KR6-P200	17.10	484.00	59.00	7.05	2.54	43.45	52.71	0 00:15:06
48	KR7-JDS-BENTLEY	21.10	484.00	70.60	7.05	3.72	78.56	50.64	0 00:48:12
49	KR8-P58	0.09	484.00	87.60	7.05	5.59	0.49	0.57	0 00:16:53
50	KR8-P59	9.90	484.00	82.20	7.05	4.99	49.35	41.29	0 00:32:24
51	KR8-P59_2	2.30	484.00	93.00	7.05	6.22	14.31	15.95	0 00:15:42
52	KR9-JUS-SWS1	87.50	484.00	67.50	7.05	3.40	297.41	120.81	0 01:29:24
53	SC10-P84	59.70	484.00	37.00	7.05	0.64	38.39	21.35	0 00:18:18
54	SC11-JDS-P87	112.10	484.00	40.50	7.05	0.90	100.78	11.33	0 05:42:54
55	SC11-P87	6.40	484.00	83.10	7.05	5.09	32.55	47.96	0 00:06:42
56	SC12-JDS-P87	48.80	484.00	64.40	7.05	3.08	150.30	64.07	0 01:22:30
57	SC12-P87	2.30	484.00	93.00	7.05	6.22	14.31	20.10	0 00:06:00
58	SC12-P89	108.40	484.00	62.20	7.05	2.86	309.81	102.40	0 01:53:42
59	SC13-P204	127.20	484.00	63.60	7.05	3.00	381.47	131.91	0 01:47:42
60	SC14-P204	181.40	484.00	57.30	7.05	2.38	430.83	220.20	0 01:00:30
61	SC14-P91	1.40	484.00	81.00	7.05	4.85	6.79	9.76	0 00:07:54
62	SC15-P202	2.20	484.00	88.70	7.05	5.72	12.59	15.09	0 00:14:06
63	SC15-P203	110.50	484.00	79.20	7.05	4.65	514.05	200.61	0 01:36:42
64	SC15-P90	2.80	484.00	34.60	7.05	0.48	1.35	0.71	0 00:11:18
65	SC1-P86	261.40	484.00	55.10	7.05	2.17	565.93	235.92	0 01:17:00
66	SC2-P86	22.10	484.00	75.40	7.05	4.24	93.64	103.82	0 00:19:36
67	SC3-P88	23.30	484.00	82.60	7.05	5.03	117.20	168.64	0 00:07:36
68	SC3-P89	13.60	484.00	77.70	7.05	4.49	61.02	92.27	0 00:06:24
69	SC4-P84	141.80	484.00	65.60	7.05	3.20	454.19	156.16	0 01:50:12
70	SC5-P84	85.90	484.00	64.10	7.05	3.05	262.00	100.27	0 01:34:42
71	SC6-P84	76.00	484.00	67.70	7.05	3.42	259.84	247.66	0 00:26:06
72	SC7-P84	175.70	484.00	62.30	7.05	2.87	503.91	266.76	0 01:00:48
73	SC8-P84	75.30	484.00	59.90	7.05	2.63	197.96	146.78	0 00:37:00
74	SC8-P88	4.90	484.00	91.40	7.05	6.03	29.57	42.22	0 00:06:00
75	SC9-P203	94.20	484.00	65.90	7.05	3.23	304.55	201.93	0 00:45:30
76	SH10-JDS-P72-POND	31.20	484.00	71.20	7.05	3.79	118.15	84.65	0 00:41:30
77	SH11-P80	13.80	484.00	90.40	7.05	5.92	81.67	84.61	0 00:20:00
78	SH12-P80	134.70	484.00	73.50	7.05	4.03	543.11	213.89	0 01:35:12
79	SH13-P72	18.40	484.00	57.00	7.05	2.35	43.18	16.90	0 01:26:06
80	SH14-JDS-TRIB1	4.40	484.00	60.40	7.05	2.68	11.79	8.01	0 00:42:06

Subbasin Summary

SN	Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
81	SH14-P76	1.30	484.00	93.00	7.05	6.22	8.09	11.37	0 00:06:00
82	SH14-P79	59.40	484.00	62.80	7.05	2.92	173.33	96.41	0 00:57:06
83	SH1-P75	192.70	484.00	61.20	7.05	2.76	531.47	173.11	0 01:54:36
84	SH2-P75	52.60	484.00	62.60	7.05	2.90	152.43	82.79	0 00:58:36
85	SH3-P64	18.80	484.00	76.20	7.05	4.32	81.29	61.20	0 00:38:42
86	SH4-P75	60.90	484.00	69.80	7.05	3.64	221.62	194.70	0 00:30:06
87	SH5-P75	124.60	484.00	62.90	7.05	2.93	364.83	241.87	0 00:44:36
88	SH6-P69	254.10	484.00	60.40	7.05	2.68	680.73	366.21	0 00:58:24
89	SH7-P89	80.70	484.00	64.30	7.05	3.07	247.75	189.46	0 00:36:30
90	SH8-P69	1.00	484.00	83.10	7.05	5.09	5.09	7.55	0 00:06:24
91	SH8-P70	1.00	484.00	91.20	7.05	6.01	6.01	8.58	0 00:06:00
92	SH8-P71	72.80	484.00	67.30	7.05	3.38	245.92	195.03	0 00:35:06
93	SH9-P72	104.40	484.00	70.50	7.05	3.71	387.64	259.05	0 00:45:54

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Min Freeboard Attained (ft)
1	10_JDS-P69	Junction	489.95	494.90	489.95	365.25	491.99	3.35
2	10_JDS-P70	Junction	487.00	492.00	487.00	365.86	489.77	2.23
3	10_JDS-P71	Junction	481.00	489.00	481.00	438.97	486.82	2.18
4	10_JDS-P75	Junction	485.79	493.00	485.79	339.39	492.20	0.80
5	10_JDS-P76	Junction	483.40	492.50	483.40	340.41	488.46	4.04
6	10_JDS-P79	Junction	466.50	474.00	466.50	411.88	471.57	7.93
7	10_JDS-P80	Junction	464.20	478.17	464.20	565.75	470.37	7.80
8	10_JDS-Trib1	Junction	477.50	482.00	477.50	385.40	480.13	3.37
9	10_P72-pondoutfall	Junction	477.50	482.00	477.50	161.71	480.74	2.76
10	KR_JDS-D1	Junction	472.00	480.00	472.00	255.87	475.14	4.86
11	KR_JDS-D1-B	Junction	470.00	477.00	470.00	255.81	474.00	3.50
12	KR_JDS-Div1	Junction	495.00	497.50	495.00	366.63	497.66	1.34
13	KR_JDS-P200	Junction	498.00	501.86	498.00	119.01	501.81	0.69
14	KR_JDS-P39	Junction	458.00	465.00	458.99	258.35	460.65	8.34
15	KR_JDS-P40	Junction	461.26	476.00	461.26	287.45	468.15	7.85
16	KR_JDS-P41	Junction	464.22	472.16	464.22	453.83	471.74	2.18
17	KR_JDS-P42	Junction	465.81	475.85	465.81	171.14	472.06	4.37
18	KR_JDS-P43	Junction	471.41	479.00	471.41	104.93	474.00	5.29
19	KR_JDS-P44	Junction	471.21	480.00	471.21	362.20	477.27	2.73
20	KR_JDS-P45	Junction	488.76	495.40	488.76	466.84	493.78	1.62
21	KR_JDS-P45_2	Junction	487.91	492.31	487.91	465.40	492.39	0.66
22	KR_JDS-P45_3	Junction	484.96	489.96	484.96	465.40	489.76	1.49
23	KR_JDS-P46	Junction	471.93	480.00	471.93	857.57	480.02	0.74
24	KR_JDS-P47	Junction	482.01	492.01	482.01	1024.29	487.53	4.48
25	KR_JDS-P48	Junction	484.55	493.00	484.55	576.23	488.88	4.12
26	KR_JDS-P49	Junction	486.52	493.00	486.52	236.93	490.74	2.26
27	KR_JDS-P50	Junction	487.95	496.00	487.95	235.24	495.16	0.84
28	KR_JDS-P51_52	Junction	514.67	521.00	514.67	330.11	517.80	3.76
29	KR_JDS-P53	Junction	480.39	486.82	480.39	82.58	483.09	4.04
30	KR_JDS-P53_2	Junction	482.00	486.00	482.00	10.84	483.23	3.27
31	KR_JDS-P55	Junction	480.87	488.60	480.87	112.05	484.22	4.38
32	KR_JDS-P56	Junction	480.58	487.40	480.56	36.86	482.35	5.05
33	KR_JDS-P57	Junction	478.29	482.00	478.29	31.83	481.51	3.60
34	KR_JDS-P57_2	Junction	480.94	486.90	480.94	17.38	482.02	4.88
35	KR_JDS-P58	Junction	478.92	484.50	478.92	203.53	482.13	2.55
36	KR_JDS-P59	Junction	480.97	486.71	480.97	200.32	484.66	2.68
37	KR_JDS-P64	Junction	492.03	495.89	492.03	133.18	494.44	2.83
38	KR_JUS-P200	Junction	499.90	504.40	499.90	119.01	504.13	0.27
39	KR_JUS-P51	Junction	514.94	521.83	514.94	182.29	521.54	0.29
40	KR_JUS-P52	Junction	517.48	521.85	517.48	150.13	521.43	0.42
41	KR_JUS-P59_2	Junction	482.33	488.00	482.33	15.42	486.94	1.06
42	KR_JUS-P65	Junction	466.93	476.50	466.93	297.73	473.92	2.58
43	SC_JDS_P203	Junction	495.06	501.90	495.06	338.55	500.84	1.22
44	SC_JDS-P202	Junction	497.07	500.00	497.07	6.54	497.63	3.94
45	SC_JDS-P204	Junction	502.20	509.20	502.20	21.01	504.56	4.64
46	SC_JDS-P84	Junction	488.34	497.00	488.34	363.40	494.54	3.50
47	SC_JDS-P86	Junction	489.60	496.80	489.74	463.08	494.42	2.38
48	SC_JDS-P87	Junction	487.86	497.00	487.86	729.13	493.85	3.41
49	SC_JDS-P88	Junction	486.50	493.50	486.50	1167.97	493.04	1.46
50	SC_JDS-P89	Junction	473.34	483.50	473.34	1263.89	477.94	5.56
51	SC_JDS-P90	Junction	503.02	509.00	503.02	31.47	505.35	3.65
52	SC_JDS-Trib1	Junction	464.00	472.00	464.00	1263.77	469.05	2.95
53	SC_JUS-91A	Junction	506.00	509.20	506.00	39.09	507.56	1.64
54	SC_JUS-P90	Junction	503.34	509.00	503.34	31.47	505.78	3.22
55	SH_JDS-SH7-POND	Junction	487.00	489.00	487.00	17.25	488.61	2.89
56	10_OF1	Outfall	461.00			565.74	467.17	
57	KR_OF1	Outfall	458.00			262.09	459.66	
58	KR_OF2	Outfall	459.07			295.42	462.53	
59	SC_OF1	Outfall	462.00			1263.64	467.05	
60	SC_OF2	Outfall	500.00			20.99	502.36	
61	10_JDS-P72-Pond	Storage Node	477.60	483.50	477.60	208.36	483.26	
62	10_JUS-P69	Storage Node	490.01	495.40	490.01	366.20	494.40	
63	10_JUS-P70	Storage Node	487.00	492.00	487.00	365.95	491.67	
64	10_JUS-P71	Storage Node	481.93	489.00	481.93	481.56	486.97	
65	10_JUS-P72	Storage Node	479.29	484.50	479.29	569.87	484.50	
66	10_JUS-P75	Storage Node	486.35	493.00	486.35	398.54	492.25	
67	10_JUS-P76	Storage Node	484.04	492.50	484.04	340.08	490.38	
68	10_JUS-P79	Storage Node	467.40	475.50	467.40	427.14	474.97	
69	10_JUS-P80	Storage Node	465.42	478.70	464.42	568.59	471.37	
70	JDS-P201	Storage Node	493.90	497.40	494.00	137.51	497.11	
71	KR_JDS-Bentley	Storage Node	490.00	494.00	490.00	278.60	493.11	
72	KR_JDS-Trib1	Storage Node	475.50	484.00	476.00	733.16	481.05	
73	KR_JDS-Trib2	Storage Node	477.00	485.00	477.00	915.00	482.21	
74	KR_JUS-D1	Storage Node	472.00	480.00	472.00	361.13	476.07	
75	KR_JUS-P201	Storage Node	492.00	497.50	494.00	193.27	496.13	
76	KR_JUS-P39	Storage Node	460.50	468.50	460.50	292.34	467.88	
77	KR_JUS-P40	Storage Node	461.95	476.00	461.95	490.31	470.73	
78	KR_JUS-P41	Storage Node	465.81	472.66	465.90	596.88	471.85	
79	KR_JUS-P42	Storage Node	465.73	476.35	465.73	190.97	472.10	

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Min Freeboard Attained (ft)
80	KR_JUS-P43	Storage Node	471.62	479.50	471.62	105.37	475.78	
81	KR_JUS-P44	Storage Node	471.93	480.00	471.93	499.16	477.43	
82	KR_JUS-P45	Storage Node	490.12	496.40	490.12	535.92	495.68	
83	KR_JUS-P45_2	Storage Node	488.17	493.31	488.17	466.81	493.21	
84	KR_JUS-P45_3	Storage Node	486.05	492.34	486.05	465.40	492.02	
85	KR_JUS-P46	Storage Node	471.17	480.00	471.17	653.89	480.00	
86	KR_JUS-P47	Storage Node	482.34	492.34	482.34	842.09	489.05	
87	KR_JUS-P48	Storage Node	485.05	492.30	485.55	575.61	489.69	
88	KR_JUS-P49	Storage Node	487.63	493.00	487.63	16.47	490.76	
89	KR_JUS-P50	Storage Node	488.25	496.00	488.25	429.38	495.17	
90	KR_JUS-P53	Storage Node	480.66	487.40	480.66	118.19	484.11	
91	KR_JUS-P53_2	Storage Node	482.00	486.50	482.00	49.58	483.45	
92	KR_JUS-P55	Storage Node	481.40	487.10	481.40	112.40	484.46	
93	KR_JUS-P56	Storage Node	481.72	487.90	481.72	11.76	483.40	
94	KR_JUS-P57	Storage Node	478.58	485.40	478.58	40.00	481.51	
95	KR_JUS-P57_2	Storage Node	481.90	487.40	481.90	17.45	483.45	
96	KR_JUS-P58	Storage Node	479.74	485.50	479.74	203.19	484.65	
97	KR_JUS-P59	Storage Node	481.43	487.80	481.43	202.19	486.93	
98	KR_JUS-P64	Storage Node	492.56	497.80	492.56	349.08	497.48	
99	KR_JUS-SWS1	Storage Node	477.50	484.00	478.00	408.94	481.51	
100	SC_JUS-P202	Storage Node	496.00	500.50	496.00	14.86	499.17	
101	SC_JUS-P203	Storage Node	495.55	501.90	495.55	342.88	501.15	
102	SC_JUS-P204	Storage Node	503.20	509.20	503.20	320.43	509.17	
103	SC_JUS-P84	Storage Node	489.26	497.00	489.26	674.13	494.77	
104	SC_JUS-P87	Storage Node	487.60	497.00	487.60	662.46	494.51	
105	SC_JUS-P88	Storage Node	488.20	494.75	488.20	483.91	494.50	
106	SC_JUS-P89	Storage Node	475.32	485.00	475.32	1265.59	484.79	
107	SC_JUS-P91	Storage Node	503.87	509.20	503.87	39.35	506.62	
108	SC-JUS-P86	Storage Node	489.60	496.70	489.60	501.18	494.63	
109	SH_JUS-SH7-POND	Storage Node	485.00	489.50	486.00	189.36	488.61	

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)
1	P200	Pipe	KR_JUS-P200	KR_JDS-P200	100.00	500.40	498.80	1.6000	24.000	0.0240	43.09	31.00	1.39	7.06
2	P202	Pipe	SC_JUS-P202	SC_JDS-P202	43.00	497.20	497.10	0.2300	15.000	0.0150	6.54	2.70	2.42	5.57
3	P203	Pipe	SC_JUS-P203	SC_JDS_P203	49.00	495.55	495.06	1.0000	40.000	0.0130	121.72	88.34	1.38	13.95
4	P204	Pipe	SC_JUS-P204	SC_JDS-P204	103.00	503.20	502.20	0.9700	18.000	0.0120	21.01	11.21	1.87	11.89
5	P39	Pipe	KR_JUS-P39	KR_JDS-P39	556.00	460.47	458.99	0.2700	72.000	0.0120	258.35	239.10	1.08	9.92
6	P40	Pipe	KR_JUS-P40	KR_JDS-P40	210.00	461.95	461.26	0.3300	60.000	0.0120	287.45	161.73	1.78	14.64
7	P41	Pipe	KR_JUS-P41	KR_JDS-P41	61.00	465.81	464.22	2.6100	80.000	0.0200	453.83	2263.56	0.20	4.47
8	P42	Pipe	KR_JUS-P42	KR_JDS-P42	67.00	465.73	465.81	-0.1200	84.000	0.0200	171.14	365.96	0.47	2.32
9	P43	Pipe	KR_JUS-P43	KR_JDS-P43	50.00	471.62	471.41	0.4200	60.000	0.0120	104.93	182.85	0.57	7.72
10	P44	Pipe	KR_JUS-P44	KR_JDS-P44	44.30	471.93	471.21	1.6300	48.000	0.0200	290.43	595.78	0.49	6.05
11	P45	Pipe	KR_JUS-P45	KR_JDS-P45	82.20	490.12	488.76	1.6500	42.000	0.0150	418.00	432.33	0.97	14.19
12	P45_2	Pipe	KR_JUS-P45_2	KR_JDS-P45_2	25.30	488.17	487.91	1.0300	30.000	0.0130	60.74	41.58	1.46	12.37
13	P45_3	Pipe	KR_JUS-P45_3	KR_JDS-P45_3	199.00	486.05	484.96	0.5500	36.000	0.0240	46.55	26.74	1.74	6.95
14	P46	Pipe	KR_JUS-P46	KR_JDS-P46	42.00	471.17	471.93	-1.8100	48.000	0.0120	176.09	209.33	0.84	14.01
15	P47	Pipe	KR_JUS-P47	KR_JDS-P47	21.80	482.34	482.01	1.5100	55.000	0.0150	1024.29	1102.17	0.93	16.25
16	P48	Pipe	KR_JUS-P48	KR_JDS-P48	71.70	485.05	484.55	0.7000	48.000	0.0150	576.23	844.31	0.68	7.86
17	P49	Pipe	KR_JDS-P49	KR_JUS-P49	89.60	487.63	486.52	1.2400	24.000	0.0120	16.50	0.82	20.15	5.71
18	P50	Pipe	KR_JUS-P50	KR_JDS-P50	87.20	488.25	487.95	0.3400	24.000	0.0150	62.90	34.50	1.82	6.67
19	P51	Pipe	KR_JUS-P51	KR_JDS-P51_52	31.00	514.94	514.67	0.8700	25.000	0.0120	101.33	47.17	2.15	18.39
20	P52	Pipe	KR_JUS-P52	KR_JDS-P51_52	48.00	517.48	515.14	4.8800	25.000	0.0120	90.54	111.59	0.81	16.44
21	P53_2	Pipe	KR_JDS-P53_2	KR_JUS-P53_2	90.40	482.20	482.00	0.2200	24.000	0.0120	10.84	23.05	0.47	2.92
22	P53A	Pipe	KR_JUS-P53	KR_JDS-P53	24.80	480.66	480.39	1.0900	36.000	0.0130	45.73	69.59	0.66	6.75
23	P53B-C	Pipe	KR_JUS-P53	KR_JDS-P53	20.30	482.40	482.90	-2.4600	24.000	0.0120	28.00	76.93	0.36	6.64
24	P55	Pipe	KR_JDS-P55	KR_JUS-P55	79.60	480.87	481.40	-0.6700	48.000	0.0200	112.05	235.02	0.48	4.37
25	P56	Pipe	KR_JUS-P56	KR_JDS-P56	82.20	481.72	480.58	1.3900	30.000	0.0130	11.74	48.30	0.24	3.87
26	P57	Pipe	KR_JUS-P57	KR_JDS-P57	27.80	478.58	478.29	1.0400	36.000	0.0120	31.83	73.80	0.43	5.67
27	P57_2	Pipe	KR_JUS-P57_2	KR_JDS-P57_2	79.40	481.90	480.94	1.2100	24.000	0.0120	17.38	53.90	0.32	4.05
28	P58A	Pipe	KR_JUS-P58	KR_JDS-P58	45.60	479.74	478.92	1.8000	36.000	0.0130	101.24	89.44	1.13	14.32
29	P58B	Pipe	KR_JDS-P58	KR_JUS-P58	30.60	480.28	479.56	2.3500	24.000	0.0120	42.76	32.56	1.31	13.61
30	P58C	Pipe	KR_JDS-P58	KR_JUS-P58	30.60	480.23	479.99	0.7800	24.000	0.0120	43.21	21.70	1.99	13.75
31	P59	Pipe	KR_JUS-P59	KR_JDS-P59	95.45	481.43	480.97	0.4800	48.000	0.0200	194.09	139.79	1.39	8.68
32	P59_2	Pipe	KR_JUS-P59_2	KR_JUS-P58	73.20	482.33	482.01	0.4400	15.000	0.0120	13.53	4.63	2.92	11.02
33	P64	Pipe	KR_JUS-P64	KR_JDS-P64	47.60	492.56	492.03	1.1100	26.000	0.0240	58.05	29.93	1.94	9.49
34	P65	Pipe	KR_JUS-P65	KR_OF2	1034.00	466.93	459.07	0.7600	84.000	0.0120	295.42	603.39	0.49	9.59
35	P69	Pipe	10_JUS-P69	10_JDS-P69	60.70	490.01	489.95	0.1000	36.000	0.0200	187.29	62.05	3.02	9.14
36	P70	Pipe	10_JUS-P70	10_JDS-P70	8.50	487.00	487.00	0.0000	18.000	0.0200	195.25	8.10	24.09	14.46
37	P71	Pipe	10_JUS-P71	10_JDS-P71	34.00	481.93	481.00	2.7400	48.000	0.0120	153.19	257.36	0.60	12.19
38	P72	Pipe	10_JUS-P72	10_JDS-P72-Pond	40.95	479.29	478.78	1.2500	36.000	0.0240	67.02	40.32	1.66	9.48
39	P75	Pipe	10_JUS-P75	10_JDS-P75	66.20	486.35	485.79	0.8500	42.000	0.0200	234.89	419.05	0.56	4.79
40	P76	Pipe	10_JUS-P76	10_JDS-P76	33.70	484.04	483.40	1.9000	39.600	0.0150	240.37	224.36	1.07	14.57
41	P79	Pipe	10_JUS-P79	10_JDS-P79	36.10	467.40	466.50	2.4900	43.000	0.0120	330.14	338.90	0.97	20.26
42	P80	Pipe	10_JUS-P80	10_JDS-P80	56.10	465.64	465.64	0.0000	99.600	0.0200	565.75	80.17	7.06	6.84
43	P84	Pipe	SC_JUS-P84	SC_JDS-P84	68.00	489.26	488.34	1.3500	34.000	0.0120	92.15	133.47	0.69	9.04
44	P86	Pipe	SC_JDS-P86	SC-JUS-P86	70.00	489.70	489.70	0.0000	73.000	0.0200	463.08	60.09	7.71	5.06
45	P87-A	Pipe	SC_JUS-P87	SC_JDS-P87	21.10	489.17	487.86	6.2100	30.000	0.0120	93.46	110.72	0.84	19.04
46	P87-B	Pipe	SC_JUS-P87	SC_JDS-P87	28.40	490.16	490.81	-2.2900	16.000	0.0130	15.89	11.61	1.37	11.38
47	P87-C	Pipe	SC_JUS-P87	SC_JDS-P87	27.90	489.24	489.03	0.7500	16.000	0.0130	20.86	6.66	3.13	14.94
48	P88	Pipe	SC_JUS-P88	SC_JDS-P88	40.50	488.20	486.60	3.9500	52.000	0.0240	349.53	382.89	0.91	11.85
49	P89	Pipe	SC_JUS-P89	SC_JDS-P89	43.30	475.32	475.20	0.2800	66.000	0.0240	286.55	95.76	2.99	12.49
50	P90	Pipe	SC_JUS-P90	SC_JDS-P90	82.60	503.34	503.02	0.3900	36.000	0.0130	31.47	41.51	0.76	5.27
51	P91	Pipe	SC_JUS-P91	SC_JUS-P90	81.90	503.87	503.44	0.5300	36.000	0.0150	31.40	41.89	0.75	4.91
52	10_CH-71-70	Channel	10_JDS-P70	10_JUS-P71	1209.00	487.00	481.93	0.4200	60.000	0.0320	361.31	1306.83	0.28	1.30
53	10_CH-72-71	Channel	10_JDS-P71	10_JUS-P72	1736.00	481.00	479.29	0.1000	72.000	0.0320	415.75	481.88	0.86	2.57
54	10_CH-79-Trib1	Channel	10_JDS-Trib1	10_JUS-P79	1363.00	477.50	467.40	0.7400	60.000	0.0320	385.09	1448.21	0.27	1.35
55	10_CH-80-79	Channel	10_JDS-P79	10_JUS-P80	246.00	466.50	465.42	0.4400	156.000	0.0320	412.66	4521.15	0.09	3.09
56	10_CH-OF1-80	Channel	10_JDS-P80	10_OF1	398.00	464.20	461.00	0.8000	117.600	0.0320	565.74	1389.84	0.41	6.61
57	10_CH-Trib1	Channel	10_P72-pondoutfall	10_JDS-Trib1	85.00	477.50	477.50	0.0000	54.000	0.0320	161.73	14.78	10.94	5.45

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)
58	10_CH-Trib1-76	Channel	10_JDS-P76	10_JDS-Trib1	1026.00	483.40	477.50	0.5800	72.000	0.0320	346.58	1025.45	0.34	6.34
59	10_RRCH-70-69	Channel	10_JDS-P69	10_JUS-P70	59.00	489.95	487.00	5.0000	60.000	0.0320	365.25	1866.97	0.20	5.25
60	10_RRCH-76-75	Channel	10_JDS-P75	10_JUS-P76	34.00	485.79	484.04	5.1500	84.000	0.0320	339.39	395.55	0.86	2.24
61	KR_CH-39-40	Channel	KR_JDS-P40	KR_JUS-P39	905.00	461.26	460.50	0.0800	93.000	0.0320	285.36	497.80	0.57	2.59
62	KR_CH-40-41	Channel	KR_JDS-P41	KR_JUS-P40	1031.00	464.22	461.95	0.2200	116.400	0.0320	452.98	719.91	0.63	5.25
63	KR_CH-41-42	Channel	KR_JDS-P42	KR_JUS-P41	1352.00	465.81	465.81	0.0000	81.120	0.0320	163.14	11.59	14.08	1.88
64	KR_CH-42-43	Channel	KR_JDS-P43	KR_JUS-P42	981.00	471.41	465.73	0.5800	76.200	0.0320	104.92	615.42	0.17	2.51
65	KR_CH-43-D1	Channel	KR_JUS-D1	KR_JUS-P43	292.00	472.00	471.62	0.1300	90.000	0.0320	105.16	478.76	0.22	1.88
66	KR_CH-44-45_3	Channel	KR_JDS-P45_3	KR_JUS-P44	738.85	484.96	472.06	1.7500	60.000	0.0450	227.21	247.40	0.92	7.03
67	KR_CH-44-46	Channel	KR_JDS-P46	KR_JUS-P44	312.00	471.93	471.93	0.0000	66.000	0.0320	408.96	8.37	48.84	7.96
68	KR_CH-45_3-45_2	Channel	KR_JDS-P45_2	KR_JUS-P45_3	24.86	487.91	486.05	7.4800	60.000	0.0320	465.40	1252.28	0.37	9.67
69	KR_CH-46-Trib1	Channel	KR_JDS-Trib1	KR_JUS-P46	2923.00	475.50	471.17	0.1500	72.000	0.0320	502.98	775.15	0.65	1.02
70	KR_CH-50-51	Channel	KR_JDS-P51_52	KR_JUS-P50	948.87	514.67	488.25	2.7800	48.000	0.0800	321.06	791.98	0.41	2.52
71	KR_CH-53-53_2	Channel	KR_JDS-P53_2	KR_JDS-P53	211.00	482.00	480.39	0.7600	18.000	0.0800	9.96	39.88	0.25	0.51
72	KR_CH-59-Bentley	Channel	KR_JDS-Bentley	KR_JUS-P59	669.00	490.00	481.43	1.2800	48.000	0.0320	177.35	332.77	0.53	3.58
73	KR_CH-64-Div1	Channel	KR_JDS-Div1	KR_JUS-P64	642.00	495.00	492.56	0.3800	48.000	0.0320	266.55	715.86	0.37	1.57
74	KR_CH-Bentley	Channel	KR_JDS-P200	KR_JDS-Bentley	995.00	498.00	490.00	0.8000	42.000	0.0320	129.25	173.19	0.75	2.85
75	KR_CH-D1-44	Channel	KR_JDS-P44	KR_JUS-D1	107.30	471.21	472.00	-0.7400	48.000	0.0320	361.13	292.00	1.24	6.48
76	KR_CH-D1-65A	Channel	KR_JDS-D1	KR_JDS-D1-B	500.00	472.00	470.00	0.4000	90.000	0.0320	255.81	1416.50	0.18	3.60
77	KR_CH-D1B	Channel	KR_JDS-D1-B	KR_JUS-P65	400.00	470.00	466.93	0.7700	90.000	0.0320	255.95	1962.11	0.13	2.14
78	KR_CH-moose	Channel	JDS-P201	KR_JDS-Div1	886.00	493.90	495.00	-0.1200	48.000	0.0320	137.51	409.15	0.34	1.08
79	KR_CH-OF1-39	Channel	KR_JDS-P39	KR_OF1	70.20	458.99	458.00	1.4100	120.000	0.0320	258.35	5759.30	0.04	5.16
80	KR_CH-SWS1	Channel	KR_JUS-SWS1	KR_JDS-Trib1	2362.00	477.50	475.50	0.0800	54.000	0.0320	123.22	217.18	0.57	0.60
81	KR_CH-SWS1-57	Channel	KR_JDS-P57	KR_JUS-SWS1	42.00	478.29	477.50	1.8800	48.000	0.0450	31.84	87.78	0.36	5.92
82	KR_CH-SWS1-58	Channel	KR_JDS-P58	KR_JUS-SWS1	76.00	478.92	477.50	1.8700	48.000	0.0320	215.48	292.08	0.74	13.56
83	KR_CH-SWS2-Trib2	Channel	KR_JDS-Trib2	KR_JDS-Trib1	470.00	477.00	475.50	0.3200	72.000	0.0320	674.41	933.31	0.72	2.27
84	KR_CH-Trib2-47	Channel	KR_JDS-P47	KR_JDS-Trib2	873.00	482.01	477.00	0.5700	72.000	0.0320	836.67	1179.07	0.71	2.76
85	KR_CH-Trib2-53	Channel	KR_JDS-P53	KR_JDS-Trib2	1194.00	480.39	477.00	0.2800	48.000	0.0450	60.26	266.85	0.23	0.66
86	KR_RRCH-45_2-45	Channel	KR_JDS-P45	KR_JUS-P45_2	40.00	488.76	488.17	1.4700	72.000	0.0320	466.81	681.99	0.68	10.29
87	KR_RRCH-47-48	Channel	KR_JDS-P48	KR_JUS-P47	45.00	484.55	482.34	4.9100	72.000	0.0320	576.91	1935.60	0.30	7.63
88	KR_RRCH-47-49	Channel	KR_JDS-P49	KR_JUS-P47	530.00	486.52	482.34	0.7900	72.000	0.0320	236.61	519.43	0.46	3.70
89	KR_RRCH-49-50	Channel	KR_JDS-P50	KR_JDS-P49	397.00	487.95	486.52	0.3600	72.000	0.0320	234.51	197.46	1.19	3.67
90	KR_RRCH-53_2-56	Channel	KR_JUS-P53_2	KR_JDS-P56	477.00	482.00	480.58	0.3000	48.000	0.0320	26.92	266.42	0.10	0.90
91	KR_RRCH-56-57	Channel	KR_JDS-P56	KR_JUS-P57	535.00	480.58	478.39	0.4100	66.000	0.0320	32.52	414.62	0.08	0.90
92	KR_RRCH-57-57_2	Channel	KR_JDS-P57_2	KR_JUS-P57	31.00	480.95	478.58	7.6500	36.000	0.0800	17.35	69.60	0.25	2.75
93	KR_RRCH-58-59	Channel	KR_JDS-P59	KR_JUS-P58	29.00	480.97	479.74	4.2400	54.000	0.0320	200.30	532.28	0.38	7.08
94	KR-CH-Bentley-64	Channel	KR_JDS-P64	KR_JDS-Bentley	1078.00	492.03	490.00	0.1900	48.000	0.0320	124.12	417.33	0.30	1.05
95	KR-RRCH-53-53_2	Channel	KR_JUS-P53_2	KR_JUS-P53	211.00	482.00	480.66	0.6400	54.000	0.0320	41.98	268.74	0.16	1.39
96	KR-RRCH-53-55	Channel	KR_JDS-P55	KR_JUS-P53	42.00	480.87	480.66	0.5000	80.400	0.0320	112.05	479.67	0.23	3.56
97	SC_CH-86-84	Channel	SC_JUS-P84	SC-JUS-P86	879.25	492.50	492.00	0.0600	48.000	0.0800	269.15	869.89	0.31	0.66
98	SC_CH-87-202	Channel	SC_JDS-P202	SC_JDS-P87	3875.00	497.07	487.86	0.2400	24.000	0.0320	4.81	48.45	0.10	0.38
99	SC_CH-88-87	Channel	SC_JDS-P87	SC_JDS-P88	1012.00	487.86	486.50	0.1300	96.000	0.0320	718.12	1387.20	0.52	2.40
100	SC_CH-89-88	Channel	SC_JDS-P88	SC_JUS-P89	1788.00	486.50	475.32	0.6300	96.000	0.0320	1161.00	1670.56	0.69	5.20
101	SC_CH-OF1-Trib1	Channel	SC_JDS-Trib1	SC_OF1	140.00	464.00	462.00	1.4300	72.000	0.0450	1263.64	1811.55	0.70	8.58
102	SC_CH-Trib1-89	Channel	SC_JDS-P89	SC_JDS-Trib1	748.00	473.34	464.00	1.2500	96.000	0.0320	1263.77	3503.10	0.36	7.28
103	SC_RRCH-203-90	Channel	SC_JDS-P90	SC_JUS-P203	2014.00	503.02	495.55	0.3700	31.200	0.0320	31.47	38.51	0.82	1.55
104	SC_RRCH-204-OF2	Channel	SC_JDS-P204	SC_OF2	3680.98	502.20	500.00	0.0600	48.000	0.0320	20.99	72.35	0.29	1.33
105	SC_RRCH-87-203	Channel	SC_JDS_P203	SC_JUS-P87	3893.00	495.06	489.17	0.1500	84.000	0.0320	297.21	470.68	0.63	1.88
106	SC_RRCH-87-84	Channel	SC_JDS-P84	SC_JUS-P87	50.00	488.34	488.34	0.0000	116.400	0.0320	363.36	150.05	2.42	2.24
107	SC_RRCH-88-87	Channel	SC_JUS-P87	SC_JUS-P88	865.00	492.80	492.00	0.0900	48.000	0.0800	1.64	20.08	0.08	0.36
108	SC-CH-91-91A	Channel	SC_JUS-91A	SC_JUS-P91	178.41	506.00	503.87	1.1900	36.000	0.0450	39.09	127.17	0.31	3.65
109	SC-CH-91A-204	Channel	SC_JUS-P204	SC_JUS-91A	472.13	503.20	506.00	-0.5900	36.000	0.0450	39.09	89.63	0.44	2.35
110	SC-RRCH-88-86	Channel	SC_JDS-P86	SC_JUS-P88	45.00	489.74	488.20	3.4200	72.000	0.0450	461.21	1427.64	0.32	5.52
111	SH_CH-SH7-P88	Channel	SH_JDS-SH7-POND	SC_JDS-P88	2000.00	487.00	486.50	0.0300	48.000	0.0800	6.19	47.31	0.13	0.17
112	10_Pond-Flume	Weir	10_P72-pondoutfall	10_JDS-P72-Pond		477.50	477.60				161.71			
113	Div1	Weir	KR_JUS-D1	KR_JDS-D1		472.00	472.00				255.87			
114	KR_Shafer-Rd-weir	Weir	KR_JUS-P201	10_JUS-P75		492.00	486.35				0.00			

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)
115	P200-weir	Weir	KR_JUS-P200	KR_JDS-P200		499.90	498.00				83.70			
116	P201-weir	Weir	KR_JUS-P201	JDS-P201		492.00	493.90				11.61			
117	P202-weir	Weir	SC_JUS-P202	SC_JDS-P202		496.00	497.07				0.00			
118	P203-weir	Weir	SC_JUS-P203	SC_JDS_P203		495.55	495.06				273.73			
119	P39-weir	Weir	KR_JUS-P39	KR_JDS-P39		460.50	458.00				0.00			
120	P40-weir	Weir	KR_JUS-P40	KR_JDS-P40		461.95	461.26				0.00			
121	P41-weir	Weir	KR_JUS-P41	KR_JDS-P41		465.81	464.22				0.00			
122	P42-weir	Weir	KR_JUS-P42	KR_JDS-P42		465.73	465.81				0.00			
123	P43-weir	Weir	KR_JUS-P43	KR_JDS-P43		471.62	471.41				0.00			
124	P44-weir	Weir	KR_JUS-P44	KR_JDS-P44		471.93	471.21				144.36			
125	P45_2-weir	Weir	KR_JUS-P45_2	KR_JDS-P45_2		488.17	487.91				422.26			
126	P45_3-bypass	Weir	KR_JDS-P45_3	KR_JUS-P44		484.96	471.93				238.18			
127	P45_3-weir	Weir	KR_JUS-P45_3	KR_JDS-P45_3		486.05	484.96				429.99			
128	P45-weir	Weir	KR_JUS-P45	KR_JDS-P45		490.12	488.76				49.05			
129	P46-weir	Weir	KR_JUS-P46	KR_JDS-P46		471.17	471.93				835.76			
130	P47-weir	Weir	KR_JUS-P47	KR_JDS-P47		482.34	482.01				0.00			
131	P48-weir	Weir	KR_JUS-P48	KR_JDS-P48		485.05	484.55				0.00			
132	P49-weir	Weir	KR_JUS-P49	KR_JDS-P49		487.63	486.52				0.00			
133	P50-weir	Weir	KR_JUS-P50	KR_JDS-P50		488.25	487.95				230.27			
134	P51-weir	Weir	KR_JUS-P51	KR_JDS-P51_52		514.94	514.67				81.93			
135	P52-weir	Weir	KR_JUS-P52	KR_JDS-P51_52		517.48	514.67				59.59			
136	P53_2-weir	Weir	KR_JUS-P53_2	KR_JDS-P53_2		482.00	482.00				0.00			
137	P53-weir	Weir	KR_JUS-P53	KR_JDS-P53		480.66	480.39				0.00			
138	P55-weir	Weir	KR_JUS-P55	KR_JDS-P55		481.40	480.87				0.00			
139	P56-weir	Weir	KR_JUS-P56	KR_JDS-P56		481.72	480.58				0.00			
140	P57_2-weir	Weir	KR_JUS-P57_2	KR_JDS-P57_2		481.90	480.94				0.00			
141	P57-weir	Weir	KR_JUS-P57	KR_JDS-P57		478.58	478.29				0.00			
142	P58-weir	Weir	KR_JUS-P58	KR_JDS-P58		479.74	478.92				19.30			
143	P59_2-weir	Weir	KR_JUS-P59_2	KR_JUS-P59		482.33	481.43				1.89			
144	P59-weir	Weir	KR_JUS-P59	KR_JDS-P59		481.43	480.97				6.24			
145	P64-weir	Weir	KR_JUS-P64	KR_JDS-P64		492.56	492.03				76.23			
146	P69-weir	Weir	10_JUS-P69	10_JDS-P69		490.01	489.95				177.96			
147	P70-weir	Weir	10_JUS-P70	10_JDS-P70		487.00	487.00				183.79			
148	P71-weir	Weir	10_JUS-P71	10_JDS-P71		481.93	481.00				358.00			
149	P72-weir	Weir	10_JUS-P72	10_JDS-P72-Pond		479.29	477.60				135.80			
150	P75-weir	Weir	10_JUS-P75	10_JDS-P75		486.35	485.79				238.04			
151	P76-weir	Weir	10_JUS-P76	10_JDS-P76		484.04	483.40				123.52			
152	P79-weir	Weir	10_JUS-P79	10_JDS-P79		467.40	466.50				106.37			
153	P80-weir	Weir	10_JUS-P80	10_JDS-P80		465.42	464.20				0.00			
154	P84-weir	Weir	SC_JUS-P84	SC_JDS-P84		489.26	488.34				320.46			
155	P86-weir	Weir	SC-JUS-P86	SC_JDS-P86		489.60	489.60				0.00			
156	P87-weir	Weir	SC_JUS-P87	SC_JDS-P87		487.60	487.86				601.03			
157	P88-weir	Weir	SC_JUS-P88	SC_JDS-P88		488.20	486.50				215.76			
158	P89-weir	Weir	SC_JUS-P89	SC_JDS-P89		475.32	473.34				977.34			
159	SH7-ovrflow	Weir	SH_JUS-SH7-POND	SH_JDS-SH7-POND		485.00	487.00				17.25			

APPENDIX G

POST CONDITIONS MODEL

Bloom to Lime Ridge Study
2 yr - 24 hr Post-Dev Results (w/ select drainage improvements)

Project Description

File Name ..... 19490-Columbia Co-POST-Kinney Run Rev2_10-13-2020.SPF

Project Options

Flow Units ..... CFS
Elevation Type ..... Elevation
Hydrology Method ..... SCS TR-20
Time of Concentration (TOC) Method ..... SCS TR-55
Link Routing Method ..... Hydrodynamic
Enable Overflow Ponding at Nodes ..... YES
Skip Steady State Analysis Time Periods ... YES

Analysis Options

Start Analysis On ..... Nov 22, 2019 00:00:00
End Analysis On ..... Nov 23, 2019 00:00:00
Start Reporting On ..... Nov 22, 2019 00:00:00
Antecedent Dry Days ..... 0 days
Runoff (Dry Weather) Time Step ..... 0 01:00:00 days hh:mm:ss
Runoff (Wet Weather) Time Step ..... 0 00:05:00 days hh:mm:ss
Reporting Time Step ..... 0 00:05:00 days hh:mm:ss
Routing Time Step ..... 2 seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins	93
Nodes	109
Junctions	55
Outfalls	5
Flow Diversions	0
Inlets	0
Storage Nodes	49
Links	157
Channels	61
Pipes	49
Pumps	0
Orifices	0
Weirs	47
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1		Time Series	2yr-24hr	Cumulative	inches	Pennsylvania	Columbia	2	2.86	SCS Type II 24-hr

Bloom to Lime Ridge Study
10 yr - 24 hr Post-Dev Results (w/ select drainage improvements)

Project Description

File Name ..... 19490-Columbia Co-POST-Kinney Run Rev2_10-13-2020.SPF

Project Options

Flow Units ..... CFS
Elevation Type ..... Elevation
Hydrology Method ..... SCS TR-20
Time of Concentration (TOC) Method ..... SCS TR-55
Link Routing Method ..... Hydrodynamic
Enable Overflow Ponding at Nodes ..... YES
Skip Steady State Analysis Time Periods ... YES

Analysis Options

Start Analysis On ..... Nov 22, 2019 00:00:00
End Analysis On ..... Nov 23, 2019 00:00:00
Start Reporting On ..... Nov 22, 2019 00:00:00
Antecedent Dry Days ..... 0 days
Runoff (Dry Weather) Time Step ..... 0 01:00:00 days hh:mm:ss
Runoff (Wet Weather) Time Step ..... 0 00:05:00 days hh:mm:ss
Reporting Time Step ..... 0 00:05:00 days hh:mm:ss
Routing Time Step ..... 2 seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins	93
Nodes	109
Junctions	55
Outfalls	5
Flow Diversions	0
Inlets	0
Storage Nodes	49
Links	157
Channels	61
Pipes	49
Pumps	0
Orifices	0
Weirs	47
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1		Time Series	10yr-24hr	Cumulative	inches	Pennsylvania	Columbia	10	4.15	SCS Type II 24-hr

Subbasin Summary

Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
KR10-JUS-SWS1	51.60	484.00	50.50	4.15	0.40	20.640	3.34	0 02:38:18
KR11-P53	0.20	484.00	93.00	4.15	3.36	0.673	0.97	0 00:06:00
KR11-P53_2	1.70	484.00	93.00	4.15	3.37	5.722	8.35	0 00:06:00
KR11-P55	20.90	484.00	80.90	4.15	2.24	46.816	52.84	0 00:18:54
KR11-P56	1.90	484.00	89.50	4.15	3.01	5.725	6.32	0 00:18:54
KR11-P57	0.80	484.00	93.00	4.15	3.37	2.693	3.93	0 00:06:00
KR11-P57_2	2.60	484.00	83.10	4.15	2.43	6.305	8.56	0 00:10:48
KR11-P58	0.30	484.00	93.00	4.15	3.37	1.010	1.48	0 00:06:00
KR11-P59	31.10	484.00	69.00	4.15	1.37	42.452	35.31	0 00:29:54
KR12-P48	111.40	484.00	68.50	4.15	1.33	148.496	49.28	0 01:45:36
KR13-P48	154.70	484.00	67.30	4.15	1.26	194.458	60.12	0 01:53:42
KR14-P48	14.90	484.00	69.20	4.15	1.38	20.532	9.05	0 01:13:30
KR15-P48	42.00	484.00	65.20	4.15	1.13	47.376	17.09	0 01:28:42
KR16-P48	78.90	484.00	74.20	4.15	1.72	135.866	93.99	0 00:41:54
KR17-P52	39.40	484.00	67.30	4.15	1.26	49.526	52.95	0 00:18:54
KR18-P51	38.40	484.00	72.70	4.15	1.62	62.016	76.75	0 00:14:36
KR19-P45	121.00	484.00	72.10	4.15	1.57	190.333	173.83	0 00:26:54
KR1-P64	108.00	484.00	56.10	4.15	0.64	69.336	31.11	0 00:47:06
KR20-P47	20.50	484.00	88.70	4.15	2.94	60.168	64.89	0 00:20:12
KR20-P48	51.90	484.00	74.90	4.15	1.77	92.019	78.61	0 00:30:42
kr20-p49	2.10	484.00	92.20	4.15	3.28	6.894	9.58	0 00:08:00
KR20-P50	23.50	484.00	79.80	4.15	2.15	50.525	50.93	0 00:23:48
KR20-P53	1.70	484.00	92.80	4.15	3.35	5.687	8.32	0 00:06:00
KR21-JDS-TRIB1	46.10	484.00	65.40	4.15	1.14	52.554	19.27	0 01:27:30
KR21-JDS-TRIB2	15.30	484.00	78.00	4.15	2.01	30.707	25.56	0 00:32:36
KR22-P44	7.80	484.00	93.00	4.15	3.37	26.255	32.06	0 00:13:18
KR22-P46	117.40	484.00	72.00	4.15	1.57	183.848	57.88	0 01:58:36
KR23-41	26.40	484.00	89.30	4.15	2.99	79.015	34.64	0 01:22:24
KR24-P41	53.60	484.00	81.20	4.15	2.27	121.404	143.00	0 00:17:12
KR25-P41	32.00	484.00	70.40	4.15	1.46	46.624	47.26	0 00:22:00
KR26-P41	40.40	484.00	83.20	4.15	2.43	98.334	60.33	0 00:52:12
KR27-P41	71.20	484.00	66.30	4.15	1.20	85.084	33.00	0 01:22:24
KR27-P42	34.40	484.00	74.00	4.15	1.71	58.721	38.82	0 00:44:36
KR27-P43	1.60	484.00	93.00	4.15	3.37	5.386	7.49	0 00:07:42
KR27-P44	7.70	484.00	93.00	4.15	3.37	25.918	32.97	0 00:11:18
KR28-40	60.50	484.00	58.90	4.15	0.78	47.190	12.51	0 01:52:36
KR29-P65	19.80	484.00	88.30	4.15	2.90	57.361	38.92	0 00:44:54
KR2-P64	59.00	484.00	69.00	4.15	1.37	80.535	76.75	0 00:23:54
KR31-P45	19.80	484.00	86.80	4.15	2.76	54.569	62.36	0 00:18:00
KR31-P45_2	1.30	484.00	93.00	4.15	3.37	4.376	6.38	0 00:06:00
KR32-OF1	21.20	484.00	64.10	4.15	1.06	22.557	16.03	0 00:34:00
KR32-P39	19.90	484.00	51.70	4.15	0.45	8.915	2.82	0 00:57:00
KR3-P64	12.60	484.00	35.00	4.15	0.01	0.126	0.03	0 00:28:42
KR4-P64	32.40	484.00	63.30	4.15	1.02	32.983	27.51	0 00:26:12
KR5-P200	55.70	484.00	63.70	4.15	1.04	57.984	31.64	0 00:48:42
KR6-JDS-BENTLEY	14.40	484.00	61.90	4.15	0.94	13.522	16.23	0 00:12:18
KR6-P200	17.10	484.00	59.00	4.15	0.79	13.424	13.92	0 00:15:06
KR7-JDS-BENTLEY	21.10	484.00	70.60	4.15	1.47	31.038	18.91	0 00:48:12
KR8-P58	0.09	484.00	87.60	4.15	2.82	0.247	0.30	0 00:16:53
KR8-P59	9.90	484.00	82.20	4.15	2.35	23.255	19.63	0 00:32:24
KR8-P59_2	2.30	484.00	93.00	4.15	3.37	7.742	8.94	0 00:15:42
KR9-JUS-SWS1	87.50	484.00	67.50	4.15	1.27	111.038	41.22	0 01:29:24
SC10-P84	59.70	484.00	37.00	4.15	0.03	1.851	0.22	0 00:18:18
SC11-JDS-P87	112.10	484.00	40.50	4.15	0.09	10.313	0.90	0 05:42:54
SC11-P87	6.40	484.00	83.10	4.15	2.43	15.520	23.38	0 00:06:42
SC12-JDS-P87	48.80	484.00	64.40	4.15	1.08	52.753	19.88	0 01:22:30
SC12-P87	2.30	484.00	93.00	4.15	3.37	7.742	11.27	0 00:06:00
SC12-P89	108.40	484.00	62.20	4.15	0.96	103.630	29.43	0 01:53:42
SC13-P204	127.20	484.00	63.60	4.15	1.04	131.652	39.99	0 01:47:42
SC14-P204	181.40	484.00	57.30	4.15	0.70	126.980	49.90	0 01:00:30
SC14-P91	1.40	484.00	81.00	4.15	2.25	3.147	4.60	0 00:07:54
SC15-P202	2.20	484.00	88.70	4.15	2.94	6.457	8.01	0 00:14:06
SC15-P203	110.50	484.00	79.20	4.15	2.10	232.271	89.27	0 01:36:42
SC15-P90	2.80	484.00	34.60	4.15	0.01	0.020	0.01	0 00:11:18
SC1-P86	261.40	484.00	55.10	4.15	0.60	155.533	47.77	0 01:17:00
SC2-P86	22.10	484.00	75.40	4.15	1.81	39.979	44.04	0 00:19:36
SC3-P88	23.30	484.00	82.60	4.15	2.38	55.524	81.57	0 00:07:36
SC3-P89	13.60	484.00	77.70	4.15	1.98	26.982	40.99	0 00:06:24
SC4-P84	141.80	484.00	65.60	4.15	1.15	163.354	50.44	0 01:50:12
SC5-P84	85.90	484.00	64.10	4.15	1.06	91.398	30.87	0 01:34:42
SC6-P84	76.00	484.00	67.70	4.15	1.28	97.432	87.17	0 00:26:06
SC7-P84	175.70	484.00	62.30	4.15	0.96	168.848	76.23	0 01:00:48
SC8-P84	75.30	484.00	59.90	4.15	0.83	62.574	37.93	0 00:37:00
SC8-P88	4.90	484.00	91.40	4.15	3.20	15.685	23.23	0 00:06:00
SC9-P203	94.20	484.00	65.90	4.15	1.17	110.308	66.05	0 00:45:30
SH10-JDS-P72-POND	31.20	484.00	71.20	4.15	1.51	47.143	32.11	0 00:41:30
SH11-P80	13.80	484.00	90.40	4.15	3.10	42.794	45.86	0 00:20:00
SH12-P80	134.70	484.00	73.50	4.15	1.67	225.084	85.10	0 01:35:12
SH13-P72	18.40	484.00	57.00	4.15	0.69	12.604	3.83	0 01:26:06
SH14-JDS-TRIB1	4.40	484.00	60.40	4.15	0.86	3.775	2.12	0 00:42:06

Subbasin Summary

Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
SH14-P76	1.30	484.00	93.00	4.15	3.37	4.376	6.38	0 00:06:00
SH14-P79	59.40	484.00	62.80	4.15	0.99	58.747	28.12	0 00:57:06
SH1-P75	192.70	484.00	61.20	4.15	0.90	173.623	48.00	0 01:54:36
SH2-P75	52.60	484.00	62.60	4.15	0.98	51.443	24.03	0 00:58:36
SH3-P64	18.80	484.00	76.20	4.15	1.87	35.137	25.99	0 00:38:42
SH4-P75	60.90	484.00	69.80	4.15	1.42	86.295	72.04	0 00:30:06
SH5-P75	124.60	484.00	62.90	4.15	1.00	123.977	71.05	0 00:44:36
SH6-P69	254.10	484.00	60.40	4.15	0.86	218.018	96.64	0 00:58:24
SH7-P89	80.70	484.00	64.30	4.15	1.08	86.753	59.05	0 00:36:30
SH8-P69	1.00	484.00	83.10	4.15	2.43	2.425	3.68	0 00:06:24
SH8-P70	1.00	484.00	91.20	4.15	3.18	3.181	4.71	0 00:06:00
SH8-P71	72.80	484.00	67.30	4.15	1.26	91.510	66.90	0 00:35:06
SH9-P72	104.40	484.00	70.50	4.15	1.46	152.842	96.35	0 00:45:54

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Min Freeboard Attained (ft)
1	10_JDS-P69	Junction	489.95	494.90	489.95	96.68	490.88	4.46
2	10_JDS-P70	Junction	485.80	492.00	487.00	96.94	487.51	4.49
3	10_JDS-P71	Junction	480.80	489.00	481.00	79.65	484.57	4.43
4	10_JDS-P75	Junction	485.79	493.00	485.79	109.66	489.31	3.69
5	10_JDS-P76	Junction	483.40	492.50	483.40	103.74	487.26	5.24
6	10_JDS-P79	Junction	466.50	474.00	466.50	122.78	468.83	10.67
7	10_JDS-P80	Junction	464.20	478.17	464.20	195.12	467.90	10.27
8	10_JDS-Trib1	Junction	477.50	482.00	477.50	124.37	479.14	4.36
9	10_P72-pondoutfall	Junction	477.50	482.00	477.50	53.08	479.42	4.08
10	KR_JDS-D1	Junction	470.00	480.00	472.00	119.30	473.93	6.47
11	KR_JDS-D1-B	Junction	469.00	477.00	470.00	119.30	471.49	6.01
12	KR_JDS-Div1	Junction	493.50	497.50	495.00	115.24	495.82	1.68
13	KR_JDS-P200	Junction	498.00	501.86	496.65	35.66	500.12	2.38
14	KR_JDS-P39	Junction	458.00	465.00	458.99	201.34	460.42	8.57
15	KR_JDS-P40	Junction	461.26	476.00	461.26	233.18	466.88	9.12
16	KR_JDS-P41	Junction	464.22	472.16	464.22	289.43	469.96	3.96
17	KR_JDS-P42	Junction	465.81	475.85	465.81	131.94	470.72	5.71
18	KR_JDS-P43	Junction	468.40	479.00	468.40	126.85	473.79	5.41
19	KR_JDS-P44	Junction	470.00	480.00	470.00	245.92	475.63	4.37
20	KR_JDS-P45	Junction	488.76	495.40	488.76	233.17	492.91	2.49
21	KR_JDS-P45_2	Junction	487.91	492.31	487.91	219.54	491.12	1.93
22	KR_JDS-P45_3	Junction	484.96	489.96	484.96	219.54	489.27	1.98
23	KR_JDS-P46	Junction	471.00	480.00	471.00	225.94	476.47	3.53
24	KR_JDS-P47	Junction	482.01	492.01	482.01	317.47	485.86	6.15
25	KR_JDS-P48	Junction	484.55	493.00	484.55	212.28	486.90	6.10
26	KR_JDS-P49	Junction	486.52	493.00	486.52	87.18	489.14	3.86
27	KR_JDS-P50	Junction	487.95	496.00	487.95	86.22	492.32	3.68
28	KR_JDS-P51_52	Junction	514.67	521.00	514.67	126.20	517.22	4.34
29	KR_JDS-P53	Junction	480.39	486.82	480.39	37.87	482.68	4.45
30	KR_JDS-P53_2	Junction	482.00	486.00	482.00	3.92	482.72	3.78
31	KR_JDS-P55	Junction	480.87	488.60	480.87	52.76	483.45	5.15
32	KR_JDS-P56	Junction	480.58	487.40	480.56	15.49	481.69	5.71
33	KR_JDS-P57	Junction	478.29	482.00	478.29	14.97	479.90	5.21
34	KR_JDS-P57_2	Junction	480.94	486.90	480.94	8.78	481.61	5.29
35	KR_JDS-P58	Junction	478.92	484.50	478.92	85.53	480.96	3.72
36	KR_JDS-P59	Junction	480.97	486.71	480.97	86.01	482.77	4.57
37	KR_JDS-P64	Junction	492.03	495.89	492.03	93.55	494.18	3.09
38	KR_JUS-P200	Junction	499.90	504.40	499.90	35.66	501.43	2.97
39	KR_JUS-P51	Junction	514.94	521.83	514.94	73.68	517.84	3.99
40	KR_JUS-P52	Junction	517.48	521.85	517.48	52.63	518.41	3.44
41	KR_JUS-P59_2	Junction	482.33	488.00	482.33	8.58	485.10	2.90
42	KR_JUS-P65	Junction	466.93	476.50	466.93	122.95	470.95	5.55
43	SC_JDS_P203	Junction	495.06	501.90	495.06	158.80	499.38	2.68
44	SC_JDS-P202	Junction	497.07	500.00	497.07	4.09	497.43	4.14
45	SC_JDS-P204	Junction	502.20	509.20	502.20	15.18	504.24	4.96
46	SC_JDS-P84	Junction	488.34	497.00	488.34	190.03	491.65	6.39
47	SC_JDS-P86	Junction	489.60	496.80	489.74	59.66	491.91	4.89
48	SC_JDS-P87	Junction	487.40	497.00	487.40	266.53	490.89	6.11
49	SC_JDS-P88	Junction	486.50	493.50	486.50	326.18	489.82	4.68
50	SC_JDS-P89	Junction	473.34	483.50	473.34	331.46	475.60	7.90
51	SC_JDS-P90	Junction	503.02	509.00	503.02	5.60	503.91	5.09
52	SC_JDS-Trib1	Junction	464.00	472.00	464.00	331.34	466.57	5.43
53	SC_JUS-91A	Junction	506.00	509.20	506.00	6.31	506.53	2.67
54	SC_JUS-P90	Junction	503.34	509.00	503.34	5.60	504.17	4.83
55	SH_JDS-SH7-POND	Junction	487.00	489.00	487.00	0.00	487.00	4.50
56	10_OF1	Outfall	461.00			191.66	464.70	
57	KR_OF1	Outfall	458.00			203.12	459.43	
58	KR_OF2	Outfall	459.07			122.91	461.21	
59	SC_OF1	Outfall	462.00			331.14	464.57	
60	SC_OF2	Outfall	500.00			15.16	502.04	
61	10_JDS-P72-Pond	Storage Node	477.60	483.50	477.60	64.16	480.29	
62	10_JUS-P69	Storage Node	490.01	495.40	490.01	96.94	492.74	
63	10_JUS-P70	Storage Node	486.00	492.00	486.00	97.02	487.95	
64	10_JUS-P71	Storage Node	481.00	489.00	481.93	126.89	484.61	
65	10_JUS-P72	Storage Node	478.00	484.50	478.00	123.38	480.46	
66	10_JUS-P75	Storage Node	486.35	493.00	486.35	112.75	489.32	
67	10_JUS-P76	Storage Node	484.04	492.50	484.04	110.14	487.32	
68	10_JUS-P79	Storage Node	467.40	475.50	467.40	128.46	469.55	
69	10_JUS-P80	Storage Node	465.42	478.70	464.42	191.64	468.47	
70	JDS-P201	Storage Node	493.90	497.40	494.00	19.53	495.06	
71	KR_JDS-Bentley	Storage Node	490.00	494.00	490.00	140.08	492.33	
72	KR_JDS-Trib1	Storage Node	475.50	484.00	476.00	341.86	479.59	
73	KR_JDS-Trib2	Storage Node	477.00	485.00	477.00	372.45	481.03	
74	KR_JUS-D1	Storage Node	469.60	480.00	469.60	245.92	474.06	
75	KR_JUS-P201	Storage Node	492.00	497.50	494.00	70.73	495.06	
76	KR_JUS-P39	Storage Node	460.50	468.50	460.50	230.25	466.52	
77	KR_JUS-P40	Storage Node	461.95	476.00	461.95	266.07	468.34	
78	KR_JUS-P41	Storage Node	465.81	472.66	465.90	280.71	469.91	
79	KR_JUS-P42	Storage Node	465.73	475.85	465.73	131.78	470.77	

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Min Freeboard Attained (ft)
80	KR_JUS-P43	Storage Node	468.70	479.50	468.70	126.86	473.89	
81	KR_JUS-P44	Storage Node	470.30	480.00	470.30	250.39	475.70	
82	KR_JUS-P45	Storage Node	490.12	496.40	490.12	223.04	493.64	
83	KR_JUS-P45_2	Storage Node	488.17	493.31	488.17	224.61	492.78	
84	KR_JUS-P45_3	Storage Node	486.05	492.34	486.05	219.55	491.51	
85	KR_JUS-P46	Storage Node	471.20	480.00	472.00	298.23	476.48	
86	KR_JUS-P47	Storage Node	482.34	492.34	482.34	320.06	486.52	
87	KR_JUS-P48	Storage Node	485.05	492.30	485.55	213.34	487.74	
88	KR_JUS-P49	Storage Node	487.63	493.00	487.63	9.10	489.23	
89	KR_JUS-P50	Storage Node	488.25	496.00	488.25	165.69	493.04	
90	KR_JUS-P53	Storage Node	480.66	487.40	480.66	56.22	483.40	
91	KR_JUS-P53_2	Storage Node	482.00	486.50	482.00	23.77	482.92	
92	KR_JUS-P55	Storage Node	481.40	487.10	481.40	52.82	483.49	
93	KR_JUS-P56	Storage Node	481.72	487.90	481.72	6.31	482.91	
94	KR_JUS-P57	Storage Node	478.58	485.40	478.58	16.75	480.31	
95	KR_JUS-P57_2	Storage Node	481.90	487.40	481.90	8.56	482.82	
96	KR_JUS-P58	Storage Node	479.74	485.50	479.74	86.70	482.73	
97	KR_JUS-P59	Storage Node	481.43	487.80	481.43	86.27	484.54	
98	KR_JUS-P64	Storage Node	492.56	497.80	492.56	114.95	494.47	
99	KR_JUS-SWS1	Storage Node	477.50	484.00	478.00	150.12	479.90	
100	SC_JUS-P202	Storage Node	496.00	500.50	496.00	7.84	498.48	
101	SC_JUS-P203	Storage Node	495.55	501.90	495.55	131.67	500.61	
102	SC_JUS-P204	Storage Node	503.20	509.20	503.20	81.45	506.64	
103	SC_JUS-P84	Storage Node	489.26	497.00	489.26	190.43	491.93	
104	SC_JUS-P87	Storage Node	487.60	497.00	487.60	248.77	491.59	
105	SC_JUS-P88	Storage Node	488.20	494.75	488.20	134.29	491.90	
106	SC_JUS-P89	Storage Node	475.32	485.00	475.32	350.25	483.73	
107	SC_JUS-P91	Storage Node	503.87	509.20	503.87	6.45	504.72	
108	SC-JUS-P86	Storage Node	489.60	496.70	489.60	53.28	491.90	
109	SH_JUS-SH7-POND	Storage Node	485.00	489.50	486.00	58.28	487.20	

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)
1	P200	Pipe	KR_JUS-P200	KR_JDS-P200	100.00	500.40	498.80	1.6000	24.000	0.0150	35.66	100.13	0.36	6.37
2	P-201	Pipe	KR_JUS-P201	JDS-P201	30.00	494.50	494.30	0.6700	15.000	0.0150	1.29	4.57	0.28	2.27
3	P202	Pipe	SC_JUS-P202	SC_JDS-P202	43.00	497.20	497.10	0.2300	15.000	0.0150	4.09	2.70	1.52	3.77
4	P203	Pipe	SC_JUS-P203	SC_JDS_P203	49.00	495.55	495.06	1.0000	40.000	0.0130	114.68	88.34	1.30	13.14
5	P204	Pipe	SC_JUS-P204	SC_JDS-P204	103.00	503.20	502.20	0.9700	18.000	0.0120	15.18	11.21	1.35	8.59
6	P39	Pipe	KR_JUS-P39	KR_JDS-P39	556.00	460.47	458.99	0.2700	72.000	0.0120	201.34	239.10	0.84	8.09
7	P40	Pipe	KR_JUS-P40	KR_JDS-P40	210.00	461.95	461.26	0.3300	60.000	0.0120	233.18	161.73	1.44	11.88
8	P41	Pipe	KR_JUS-P41	KR_JDS-P41	61.00	465.81	464.22	2.6100	80.000	0.0200	289.43	2263.56	0.13	3.82
9	P42	Pipe	KR_JUS-P42	KR_JDS-P42	67.00	465.73	465.81	-0.1200	84.000	0.0200	131.94	365.96	0.36	2.24
10	P43	Pipe	KR_JUS-P43	KR_JDS-P43	50.00	468.70	468.40	0.6000	60.000	0.0120	126.85	674.19	0.19	2.54
11	P44	Pipe	KR_JUS-P44	KR_JDS-P44	44.30	470.30	470.00	0.6800	48.000	0.0200	245.92	687.60	0.36	3.07
12	P45	Pipe	KR_JUS-P45	KR_JDS-P45	82.20	490.12	488.76	1.6500	42.000	0.0150	233.17	432.33	0.54	7.92
13	P45_2	Pipe	KR_JUS-P45_2	KR_JDS-P45_2	25.30	488.17	487.91	1.0300	30.000	0.0130	59.82	41.58	1.44	12.19
14	P45_3	Pipe	KR_JUS-P45_3	KR_JDS-P45_3	199.00	486.05	484.96	0.5500	36.000	0.0240	46.05	26.74	1.72	7.07
15	P47	Pipe	KR_JUS-P47	KR_JDS-P47	21.80	482.34	482.01	1.5100	55.000	0.0150	317.47	1102.17	0.29	5.85
16	P48	Pipe	KR_JUS-P48	KR_JDS-P48	71.70	485.05	484.55	0.7000	48.000	0.0150	212.28	844.31	0.25	4.59
17	P49	Pipe	KR_JDS-P49	KR_JUS-P49	89.60	487.63	486.52	1.2400	24.000	0.0120	9.09	0.82	11.10	4.08
18	P50	Pipe	KR_JUS-P50	KR_JDS-P50	87.20	488.25	487.95	0.3400	24.000	0.0150	59.69	34.50	1.73	6.33
19	P51	Pipe	KR_JUS-P51	KR_JDS-P51_52	31.00	514.94	514.67	0.8700	30.000	0.0150	73.65	102.34	0.72	5.89
20	P52	Pipe	KR_JUS-P52	KR_JDS-P51_52	48.00	517.48	514.67	5.8500	30.000	0.0150	52.59	265.33	0.20	6.13
21	P53_2	Pipe	KR_JDS-P53_2	KR_JUS-P53_2	90.40	482.20	482.00	0.2200	24.000	0.0120	3.92	23.05	0.17	1.98
22	P53A	Pipe	KR_JUS-P53	KR_JDS-P53	24.80	480.66	480.39	1.0900	36.000	0.0130	32.11	69.59	0.46	5.21
23	P53B-C	Pipe	KR_JUS-P53	KR_JDS-P53	20.30	482.40	482.90	-2.4600	24.000	0.0120	3.39	76.93	0.04	1.95
24	P55	Pipe	KR_JDS-P55	KR_JUS-P55	79.60	480.87	481.40	-0.6700	48.000	0.0200	52.76	235.02	0.22	2.83
25	P56	Pipe	KR_JUS-P56	KR_JDS-P56	82.20	481.72	480.58	1.3900	30.000	0.0130	6.29	48.30	0.13	3.68
26	P57	Pipe	KR_JUS-P57	KR_JDS-P57	27.80	478.58	478.29	1.0400	36.000	0.0120	14.97	73.80	0.20	5.25
27	P57_2	Pipe	KR_JUS-P57_2	KR_JDS-P57_2	79.40	481.90	480.94	1.2100	24.000	0.0120	8.78	53.90	0.16	4.04
28	P58A	Pipe	KR_JUS-P58	KR_JDS-P58	45.60	479.74	478.92	1.8000	36.000	0.0130	37.13	89.44	0.42	5.88
29	P58B	Pipe	KR_JDS-P58	KR_JUS-P58	30.60	480.28	479.56	2.3500	24.000	0.0120	25.26	32.56	0.78	9.05
30	P58C	Pipe	KR_JDS-P58	KR_JUS-P58	30.60	480.23	479.99	0.7800	24.000	0.0120	23.14	21.70	1.07	7.62
31	P59	Pipe	KR_JUS-P59	KR_JDS-P59	95.45	481.43	480.97	0.4800	48.000	0.0200	86.01	139.79	0.62	5.83
32	P59_2	Pipe	KR_JUS-P59_2	KR_JUS-P58	73.20	482.33	482.01	0.4400	15.000	0.0120	8.56	4.63	1.85	7.09
33	P64	Pipe	KR_JUS-P64	KR_JDS-P64	47.60	492.56	492.03	1.1100	36.000	0.0150	93.55	345.00	0.27	4.97
34	P65	Pipe	KR_JUS-P65	KR_OF2	1034.00	466.93	459.07	0.7600	84.000	0.0120	122.91	603.39	0.20	8.07
35	P69	Pipe	10_JUS-P69	10_JDS-P69	60.70	490.01	489.95	0.1000	36.000	0.0200	96.68	62.05	1.56	6.36
36	P70	Pipe	10_JUS-P70	10_JDS-P70	8.50	486.00	485.80	2.3500	36.000	0.0150	96.94	501.52	0.19	5.38
37	P71	Pipe	10_JUS-P71	10_JDS-P71	34.00	481.00	480.80	0.5900	48.000	0.0120	79.65	481.88	0.17	8.04
38	P72	Pipe	10_JUS-P72	10_JDS-P72-Pond	40.95	478.00	477.60	0.9800	36.000	0.0240	54.75	107.12	0.51	3.93
39	P75	Pipe	10_JUS-P75	10_JDS-P75	66.20	486.35	485.79	0.8500	42.000	0.0200	109.66	419.05	0.26	2.42
40	P76	Pipe	10_JUS-P76	10_JDS-P76	33.70	484.04	483.40	1.9000	42.000	0.0120	103.74	1046.47	0.10	2.50
41	P79	Pipe	10_JUS-P79	10_JDS-P79	36.10	467.40	466.50	2.4900	42.000	0.0120	122.78	624.19	0.20	6.98
42	P80	Pipe	10_JUS-P80	10_JDS-P80	56.10	465.64	465.64	0.0000	99.600	0.0200	195.12	80.17	2.43	4.87
43	P84	Pipe	SC_JUS-P84	SC_JDS-P84	68.00	489.26	488.34	1.3500	36.000	0.0120	190.03	585.55	0.32	6.40
44	P86	Pipe	SC_JDS-P86	SC-JUS-P86	70.00	489.70	489.70	0.0000	73.000	0.0200	59.66	60.09	0.99	2.11
45	P87-A	Pipe	SC_JUS-P87	SC_JDS-P87	21.10	487.60	487.40	0.9500	36.000	0.0120	245.98	490.12	0.50	6.83
46	P88	Pipe	SC_JUS-P88	SC_JDS-P88	40.50	488.20	486.60	3.9500	52.000	0.0240	128.68	382.89	0.34	7.10
47	P89	Pipe	SC_JUS-P89	SC_JDS-P89	43.30	475.32	475.20	0.2800	66.000	0.0240	259.01	95.76	2.70	11.44
48	P90	Pipe	SC_JUS-P90	SC_JDS-P90	82.60	503.34	503.02	0.3900	36.000	0.0130	5.60	41.51	0.13	4.96
49	P91	Pipe	SC_JUS-P91	SC_JUS-P90	81.90	503.87	503.44	0.5300	36.000	0.0150	5.60	41.89	0.13	3.73
50	10_CH-71-70	Channel	10_JDS-P70	10_JUS-P71	1209.00	485.80	481.00	0.4000	60.000	0.0320	93.67	1271.55	0.07	1.61
51	10_CH-72-71	Channel	10_JDS-P71	10_JUS-P72	1736.00	480.80	478.00	0.1600	72.000	0.0320	74.37	616.62	0.12	3.51
52	10_CH-79-Trib1	Channel	10_JDS-Trib1	10_JUS-P79	1363.00	477.50	467.40	0.7400	60.000	0.0320	115.02	1448.21	0.08	1.96
53	10_CH-80-79	Channel	10_JDS-P79	10_JUS-P80	246.00	466.50	465.42	0.4400	156.000	0.0320	123.02	4521.15	0.03	2.37
54	10_CH-OF1-80	Channel	10_JDS-P80	10_OF1	398.00	464.20	461.00	0.8000	117.600	0.0320	191.66	1389.84	0.14	5.09
55	10_CH-Trib1	Channel	10_P72-pondoutfall	10_JDS-Trib1	85.00	477.50	477.50	0.0000	54.000	0.0320	53.08	14.78	3.59	2.94
56	10_CH-Trib1-76	Channel	10_JDS-P76	10_JDS-Trib1	1026.00	483.40	477.50	0.5800	72.000	0.0320	102.48	1025.45	0.10	5.88
57	10_RRCH-70-69	Channel	10_JDS-P69	10_JUS-P70	59.00	489.95	486.00	6.6900	60.000	0.0320	96.67	2160.35	0.04	4.23

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)
58	10_RRCH-76-75	Channel	10_JDS-P75	10_JUS-P76	34.00	485.79	484.04	5.1500	84.000	0.0320	109.69	395.55	0.28	1.61
59	KR_CH-39-40	Channel	KR_JDS-P40	KR_JUS-P39	905.00	461.26	460.50	0.0800	93.000	0.0320	228.56	497.80	0.46	2.31
60	KR_CH-40-41	Channel	KR_JDS-P41	KR_JUS-P40	1031.00	464.22	461.95	0.2200	116.400	0.0320	256.38	719.91	0.36	4.13
61	KR_CH-41-42	Channel	KR_JDS-P42	KR_JUS-P41	1352.00	465.81	465.81	0.0000	81.120	0.0320	132.30	11.59	11.42	1.88
62	KR_CH-42-43	Channel	KR_JDS-P43	KR_JUS-P42	981.00	470.90	465.73	0.5300	76.200	0.0320	126.84	587.14	0.22	2.73
63	KR_CH-43-D1	Channel	KR_JUS-D1	KR_JUS-P43	292.00	469.60	468.70	0.3100	90.000	0.0320	126.62	736.80	0.17	1.78
64	KR_CH-44-45_3	Channel	KR_JDS-P45_3	KR_JUS-P44	738.85	484.96	472.06	1.7500	60.000	0.0450	162.81	247.40	0.66	7.18
65	KR_CH-44-46	Channel	KR_JDS-P46	KR_JUS-P44	312.00	471.00	470.30	0.2200	66.000	0.0320	225.96	221.55	1.02	4.46
66	KR_CH-45_3-45_2	Channel	KR_JDS-P45_2	KR_JUS-P45_3	24.86	487.91	486.05	7.4800	60.000	0.0320	219.55	1252.28	0.18	5.73
67	KR_CH-46-46	Channel	KR_JUS-P46	KR_JDS-P46	42.00	471.20	471.00	0.4800	96.000	0.0350	225.94	1507.23	0.15	5.06
68	KR_CH-46-Trib1	Channel	KR_JDS-Trib1	KR_JUS-P46	2923.00	475.50	472.00	0.1200	72.000	0.0320	240.92	696.91	0.35	0.81
69	KR_CH-50-51	Channel	KR_JDS-P51_52	KR_JUS-P50	948.87	514.67	488.25	2.7800	48.000	0.0800	116.47	791.98	0.15	2.93
70	KR_CH-53-53_2	Channel	KR_JDS-P53_2	KR_JDS-P53	211.00	482.00	480.39	0.7600	18.000	0.0800	3.63	39.88	0.09	0.25
71	KR_CH-59-Bentley	Channel	KR_JDS-Bentley	KR_JUS-P59	669.00	490.00	481.43	1.2800	48.000	0.0320	77.25	332.77	0.23	3.56
72	KR_CH-64-Div1	Channel	KR_JDS-Div1	KR_JUS-P64	642.00	493.50	492.56	0.1500	48.000	0.0320	95.17	444.32	0.21	2.46
73	KR_CH-Bentley	Channel	KR_JDS-P200	KR_JDS-Bentley	995.00	498.00	490.00	0.8000	42.000	0.0320	37.43	173.19	0.22	3.01
74	KR_CH-D1-44	Channel	KR_JDS-P44	KR_JUS-D1	125.28	471.40	471.25	0.1200	90.000	0.0320	245.92	459.22	0.54	5.54
75	KR_CH-D1-65A	Channel	KR_JDS-D1	KR_JDS-D1-B	500.00	472.00	470.00	0.4000	90.000	0.0320	119.30	1608.55	0.07	3.64
76	KR_CH-D1B	Channel	KR_JDS-D1-B	KR_JUS-P65	400.00	470.00	466.93	0.7700	90.000	0.0320	119.30	2228.15	0.05	2.07
77	KR_CH-moose	Channel	JDS-P201	KR_JDS-Div1	886.00	493.90	493.50	0.0500	48.000	0.0320	19.53	246.72	0.08	0.70
78	KR_CH-OF1-39	Channel	KR_JDS-P39	KR_OF1	70.20	458.99	458.00	1.4100	120.000	0.0320	201.34	5759.30	0.03	4.70
79	KR_CH-SWS1	Channel	KR_JUS-SWS1	KR_JDS-Trib1	2362.00	477.50	475.50	0.0800	54.000	0.0320	21.93	217.18	0.10	0.49
80	KR_CH-SWS1-57	Channel	KR_JDS-P57	KR_JUS-SWS1	42.00	478.29	477.50	1.8800	48.000	0.0450	14.97	87.78	0.17	4.63
81	KR_CH-SWS1-58	Channel	KR_JDS-P58	KR_JUS-SWS1	76.00	478.92	477.50	1.8700	48.000	0.0320	85.53	292.08	0.29	9.48
82	KR_CH-SWS2-Trib2	Channel	KR_JDS-Trib2	KR_JDS-Trib1	470.00	477.00	475.50	0.3200	72.000	0.0320	322.76	933.31	0.35	1.81
83	KR_CH-Trib2-47	Channel	KR_JDS-P47	KR_JDS-Trib2	873.00	482.01	477.00	0.5700	72.000	0.0320	323.83	1179.07	0.27	2.66
84	KR_CH-Trib2-53	Channel	KR_JDS-P53	KR_JDS-Trib2	1194.00	480.39	477.00	0.2800	48.000	0.0450	24.99	266.85	0.09	0.99
85	KR_RRCH-45_2-45	Channel	KR_JDS-P45	KR_JUS-P45_2	40.00	488.76	488.17	1.4700	72.000	0.0320	224.61	681.99	0.33	6.15
86	KR_RRCH-47-48	Channel	KR_JDS-P48	KR_JUS-P47	45.00	484.55	482.34	4.9100	72.000	0.0320	212.28	1935.60	0.11	5.81
87	KR_RRCH-47-49	Channel	KR_JDS-P49	KR_JUS-P47	530.00	486.52	482.34	0.7900	72.000	0.0320	85.47	519.43	0.16	2.60
88	KR_RRCH-49-50	Channel	KR_JDS-P50	KR_JDS-P49	397.00	487.95	486.52	0.3600	72.000	0.0320	86.04	197.46	0.44	2.54
89	KR_RRCH-53_2-56	Channel	KR_JUS-P53_2	KR_JDS-P56	477.00	482.00	480.58	0.3000	48.000	0.0320	10.52	266.42	0.04	0.69
90	KR_RRCH-56-57	Channel	KR_JDS-P56	KR_JUS-P57	535.00	480.58	478.39	0.4100	66.000	0.0320	13.04	414.62	0.03	0.70
91	KR_RRCH-57-57_2	Channel	KR_JDS-P57_2	KR_JUS-P57	31.00	480.95	478.58	7.6500	36.000	0.0800	8.54	69.60	0.12	2.03
92	KR_RRCH-58-59	Channel	KR_JDS-P59	KR_JUS-P58	29.00	480.97	479.74	4.2400	54.000	0.0320	86.00	532.28	0.16	5.43
93	KR-CH-Bentley-64	Channel	KR_JDS-P64	KR_JDS-Bentley	1078.00	492.03	490.00	0.1900	48.000	0.0320	88.80	417.33	0.21	1.04
94	KR-RRCH-53-53_2	Channel	KR_JUS-P53_2	KR_JUS-P53	211.00	482.00	480.66	0.6400	54.000	0.0320	19.50	268.74	0.07	1.03
95	KR-RRCH-53-55	Channel	KR_JDS-P55	KR_JUS-P53	42.00	480.87	480.66	0.5000	80.400	0.0320	52.73	479.67	0.11	2.25
96	SC_CH-86-84	Channel	SC_JUS-P84	SC-JUS-P86	879.25	492.50	492.00	0.0600	48.000	0.0800	0.00	869.89	0.00	0.00
97	SC_CH-87-202	Channel	SC_JDS-P202	SC_JDS-P87	3875.00	497.07	487.40	0.2500	24.000	0.0320	2.29	49.65	0.05	0.20
98	SC_CH-88-87	Channel	SC_JDS-P87	SC_JDS-P88	1012.00	487.40	486.50	0.0900	96.000	0.0320	265.09	1128.47	0.23	1.81
99	SC_CH-89-88	Channel	SC_JDS-P88	SC_JUS-P89	1788.00	486.50	475.32	0.6300	96.000	0.0320	318.68	1670.56	0.19	2.22
100	SC_CH-OF1-Trib1	Channel	SC_JDS-Trib1	SC_OF1	140.00	464.00	462.00	1.4300	72.000	0.0450	331.14	1811.55	0.18	5.94
101	SC_CH-Trib1-89	Channel	SC_JDS-P89	SC_JDS-Trib1	748.00	473.34	464.00	1.2500	96.000	0.0320	331.34	3503.10	0.09	5.13
102	SC_RRCH-203-90	Channel	SC_JDS-P90	SC_JUS-P203	2014.00	503.02	495.55	0.3700	31.200	0.0320	5.58	38.51	0.14	0.42
103	SC_RRCH-204-OF2	Channel	SC_JDS-P204	SC_OF2	3680.98	502.20	500.00	0.0600	48.000	0.0320	15.16	72.35	0.21	1.22
104	SC_RRCH-87-203	Channel	SC_JDS_P203	SC_JUS-P87	3893.00	495.06	489.17	0.1500	84.000	0.0320	94.74	470.68	0.20	1.30
105	SC_RRCH-87-84	Channel	SC_JDS-P84	SC_JUS-P87	50.00	488.34	488.34	0.0000	116.400	0.0320	189.66	150.05	1.26	3.82
106	SC_RRCH-88-87	Channel	SC_JUS-P87	SC_JUS-P88	865.00	492.80	492.00	0.0900	60.000	0.0800	0.00	46.58	0.00	0.00
107	SC-CH-91-91A	Channel	SC_JUS-91A	SC_JUS-P91	178.41	506.00	503.87	1.1900	36.000	0.0450	6.31	127.17	0.05	1.80
108	SC-CH-91A-204	Channel	SC_JUS-P204	SC_JUS-91A	472.13	503.20	506.00	-0.5900	36.000	0.0450	6.31	89.63	0.07	0.53
109	SC-RRCH-88-86	Channel	SC_JDS-P86	SC_JUS-P88	45.00	489.74	488.20	3.4200	72.000	0.0450	62.63	1427.64	0.04	3.53
110	SH_CH-SH7-P88	Channel	SH_JDS-SH7-POND	SC_JDS-P88	2000.00	487.00	486.50	0.0300	48.000	0.0800	0.00	47.31	0.00	0.00
111	10_Pond-Flume	Weir	10_P72-pondoutfall	10_JDS-P72-Pond		477.50	477.60				53.08			
112	Div1	Weir	KR_JUS-D1	KR_JDS-D1		469.60	470.00				119.30			
113	KR_Shafer-Rd-weir	Weir	KR_JUS-P201	10_JUS-P75		492.00	486.35				0.00			
114	P200-weir	Weir	KR_JUS-P200	KR_JDS-P200		499.90	498.00				0.00			

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)
115	P201-weir	Weir	KR_JUS-P201	JDS-P201		492.00	493.90				0.00			
116	P202-weir	Weir	SC_JUS-P202	SC_JDS-P202		496.00	497.07				0.00			
117	P203-weir	Weir	SC_JUS-P203	SC_JDS_P203		495.55	495.06				48.71			
118	P39-weir	Weir	KR_JUS-P39	KR_JDS-P39		460.50	458.00				0.00			
119	P40-weir	Weir	KR_JUS-P40	KR_JDS-P40		461.95	461.26				0.00			
120	P41-weir	Weir	KR_JUS-P41	KR_JDS-P41		465.81	464.22				0.00			
121	P42-weir	Weir	KR_JUS-P42	KR_JDS-P42		465.73	465.81				0.00			
122	P43-weir	Weir	KR_JUS-P43	KR_JDS-P43		468.70	468.40				0.00			
123	P44-weir	Weir	KR_JUS-P44	KR_JDS-P44		470.30	470.00				0.00			
124	P45_2-weir	Weir	KR_JUS-P45_2	KR_JDS-P45_2		488.17	487.91				159.29			
125	P45_3-bypass	Weir	KR_JDS-P45_3	KR_JUS-P44		484.96	470.30				56.55			
126	P45_3-weir	Weir	KR_JUS-P45_3	KR_JDS-P45_3		486.05	484.96				184.26			
127	P45-weir	Weir	KR_JUS-P45	KR_JDS-P45		490.12	488.76				0.00			
128	P47-weir	Weir	KR_JUS-P47	KR_JDS-P47		482.34	482.01				0.00			
129	P48-weir	Weir	KR_JUS-P48	KR_JDS-P48		485.05	484.55				0.00			
130	P49-weir	Weir	KR_JUS-P49	KR_JDS-P49		487.63	486.52				0.00			
131	P50-weir	Weir	KR_JUS-P50	KR_JDS-P50		488.25	487.95				39.98			
132	P51-weir	Weir	KR_JUS-P51	KR_JDS-P51_52		514.94	514.67				0.00			
133	P52-weir	Weir	KR_JUS-P52	KR_JDS-P51_52		517.48	514.67				0.00			
134	P53_2-weir	Weir	KR_JUS-P53_2	KR_JDS-P53_2		482.00	482.00				0.00			
135	P53-weir	Weir	KR_JUS-P53	KR_JDS-P53		480.66	480.39				0.00			
136	P55-weir	Weir	KR_JUS-P55	KR_JDS-P55		481.40	480.87				0.00			
137	P56-weir	Weir	KR_JUS-P56	KR_JDS-P56		481.72	480.58				0.00			
138	P57_2-weir	Weir	KR_JUS-P57_2	KR_JDS-P57_2		481.90	480.94				0.00			
139	P57-weir	Weir	KR_JUS-P57	KR_JDS-P57		478.58	478.29				0.00			
140	P58-weir	Weir	KR_JUS-P58	KR_JDS-P58		479.74	478.92				0.00			
141	P59_2-weir	Weir	KR_JUS-P59_2	KR_JUS-P59		482.33	481.43				0.00			
142	P59-weir	Weir	KR_JUS-P59	KR_JDS-P59		481.43	480.97				0.00			
143	P64-weir	Weir	KR_JUS-P64	KR_JDS-P64		492.56	492.03				0.00			
144	P69-weir	Weir	10_JUS-P69	10_JDS-P69		490.01	489.95				0.00			
145	P70-weir	Weir	10_JUS-P70	10_JDS-P70		486.00	485.80				0.00			
146	P71-weir	Weir	10_JUS-P71	10_JDS-P71		481.00	480.80				0.00			
147	P72-weir	Weir	10_JUS-P72	10_JDS-P72-Pond		478.00	477.60				0.00			
148	P75-weir	Weir	10_JUS-P75	10_JDS-P75		486.35	485.79				0.00			
149	P76-weir	Weir	10_JUS-P76	10_JDS-P76		484.04	483.40				0.00			
150	P79-weir	Weir	10_JUS-P79	10_JDS-P79		467.40	466.50				0.00			
151	P80-weir	Weir	10_JUS-P80	10_JDS-P80		465.42	464.20				0.00			
152	P84-weir	Weir	SC_JUS-P84	SC_JDS-P84		489.26	488.34				0.00			
153	P86-weir	Weir	SC-JUS-P86	SC_JDS-P86		489.60	489.60				0.00			
154	P87-weir	Weir	SC_JUS-P87	SC_JDS-P87		487.60	487.40				0.00			
155	P88-weir	Weir	SC_JUS-P88	SC_JDS-P88		488.20	486.50				0.00			
156	P89-weir	Weir	SC_JUS-P89	SC_JDS-P89		475.32	473.34				72.45			
157	SH7-ovrflow	Weir	SH_JUS-SH7-POND	SH_JDS-SH7-POND		485.00	487.00				0.00			

Bloom to Lime Ridge Study
25 yr - 24 hr Post-Dev Results (w/ select drainage improvements)

Project Description

File Name ..... 19490-Columbia Co-POST-Kinney Run Rev2_10-13-2020.SPF

Project Options

Flow Units ..... CFS
Elevation Type ..... Elevation
Hydrology Method ..... SCS TR-20
Time of Concentration (TOC) Method ..... SCS TR-55
Link Routing Method ..... Hydrodynamic
Enable Overflow Ponding at Nodes ..... YES
Skip Steady State Analysis Time Periods ... YES

Analysis Options

Start Analysis On ..... Nov 22, 2019 00:00:00
End Analysis On ..... Nov 23, 2019 00:00:00
Start Reporting On ..... Nov 22, 2019 00:00:00
Antecedent Dry Days ..... 0 days
Runoff (Dry Weather) Time Step ..... 0 01:00:00 days hh:mm:ss
Runoff (Wet Weather) Time Step ..... 0 00:05:00 days hh:mm:ss
Reporting Time Step ..... 0 00:05:00 days hh:mm:ss
Routing Time Step ..... 2 seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins	93
Nodes	109
Junctions	55
Outfalls	5
Flow Diversions	0
Inlets	0
Storage Nodes	49
Links	157
Channels	61
Pipes	49
Pumps	0
Orifices	0
Weirs	47
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1		Time Series	25yr-24hr	Cumulative	inches	Pennsylvania	Columbia	25	5.11	SCS Type II 24-hr

Subbasin Summary

Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
KR10-JUS-SWS1	51.60	484.00	50.50	5.11	0.77	39.526	7.62	0 02:38:18
KR11-P53	0.20	484.00	93.00	5.11	4.31	0.861	1.23	0 00:06:00
KR11-P53_2	1.70	484.00	93.00	5.11	4.31	7.320	10.53	0 00:06:00
KR11-P55	20.90	484.00	80.90	5.11	3.07	64.226	72.50	0 00:18:54
KR11-P56	1.90	484.00	89.50	5.11	3.93	7.467	8.15	0 00:18:54
KR11-P57	0.80	484.00	93.00	5.11	4.31	3.445	4.95	0 00:06:00
KR11-P57_2	2.60	484.00	83.10	5.11	3.28	8.536	11.51	0 00:10:48
KR11-P58	0.30	484.00	93.00	5.11	4.31	1.292	1.86	0 00:06:00
KR11-P59	31.10	484.00	69.00	5.11	2.04	63.382	54.56	0 00:29:54
KR12-P48	111.40	484.00	68.50	5.11	2.00	222.577	77.05	0 01:45:36
KR13-P48	154.70	484.00	67.30	5.11	1.90	294.394	95.39	0 01:53:42
KR14-P48	14.90	484.00	69.20	5.11	2.05	30.605	14.03	0 01:13:30
KR15-P48	42.00	484.00	65.20	5.11	1.74	73.164	28.15	0 01:28:42
KR16-P48	78.90	484.00	74.20	5.11	2.47	194.804	137.44	0 00:41:54
KR17-P52	39.40	484.00	67.30	5.11	1.90	74.978	82.76	0 00:18:54
KR18-P51	38.40	484.00	72.70	5.11	2.34	89.933	112.54	0 00:14:36
KR19-P45	121.00	484.00	72.10	5.11	2.29	277.211	258.19	0 00:26:54
KR1-P64	108.00	484.00	56.10	5.11	1.11	119.340	63.08	0 00:47:06
KR20-P47	20.50	484.00	88.70	5.11	3.85	78.843	84.11	0 00:20:12
KR20-P48	51.90	484.00	74.90	5.11	2.53	131.307	113.44	0 00:30:42
kr20-p49	2.10	484.00	92.20	5.11	4.22	8.858	12.14	0 00:08:00
KR20-P50	23.50	484.00	79.80	5.11	2.97	69.795	70.29	0 00:23:48
KR20-P53	1.70	484.00	92.80	5.11	4.28	7.283	10.49	0 00:06:00
KR21-JDS-TRIB1	46.10	484.00	65.40	5.11	1.76	80.998	31.57	0 01:27:30
KR21-JDS-TRIB2	15.30	484.00	78.00	5.11	2.81	42.917	35.96	0 00:32:36
KR22-P44	7.80	484.00	93.00	5.11	4.31	33.587	40.42	0 00:13:18
KR22-P46	117.40	484.00	72.00	5.11	2.28	268.024	87.06	0 01:58:36
KR23-41	26.40	484.00	89.30	5.11	3.91	103.198	44.91	0 01:22:24
KR24-P41	53.60	484.00	81.20	5.11	3.10	166.267	195.08	0 00:17:12
KR25-P41	32.00	484.00	70.40	5.11	2.15	68.832	71.39	0 00:22:00
KR26-P41	40.40	484.00	83.20	5.11	3.29	133.037	81.47	0 00:52:12
KR27-P41	71.20	484.00	66.30	5.11	1.83	130.011	53.37	0 01:22:24
KR27-P42	34.40	484.00	74.00	5.11	2.45	84.349	56.92	0 00:44:36
KR27-P43	1.60	484.00	93.00	5.11	4.31	6.890	9.45	0 00:07:42
KR27-P44	7.70	484.00	93.00	5.11	4.31	33.156	41.62	0 00:11:18
KR28-40	60.50	484.00	58.90	5.11	1.29	78.045	23.04	0 01:52:36
KR29-P65	19.80	484.00	88.30	5.11	3.80	75.319	50.70	0 00:44:54
KR2-P64	59.00	484.00	69.00	5.11	2.04	120.242	118.35	0 00:23:54
KR31-P45	19.80	484.00	86.80	5.11	3.65	72.290	81.71	0 00:18:00
KR31-P45_2	1.30	484.00	93.00	5.11	4.31	5.598	8.04	0 00:06:00
KR32-OF1	21.20	484.00	64.10	5.11	1.66	35.192	26.77	0 00:34:00
KR32-P39	19.90	484.00	51.70	5.11	0.84	16.617	6.71	0 00:57:00
KR3-P64	12.60	484.00	35.00	5.11	0.10	1.235	0.13	0 00:28:42
KR4-P64	32.40	484.00	63.30	5.11	1.60	51.872	46.24	0 00:26:12
KR5-P200	55.70	484.00	63.70	5.11	1.63	90.791	53.67	0 00:48:42
KR6-JDS-BENTLEY	14.40	484.00	61.90	5.11	1.50	21.600	27.36	0 00:12:18
KR6-P200	17.10	484.00	59.00	5.11	1.30	22.179	25.30	0 00:15:06
KR7-JDS-BENTLEY	21.10	484.00	70.60	5.11	2.17	45.724	28.78	0 00:48:12
KR8-P58	0.09	484.00	87.60	5.11	3.73	0.327	0.39	0 00:16:53
KR8-P59	9.90	484.00	82.20	5.11	3.20	31.650	26.66	0 00:32:24
KR8-P59_2	2.30	484.00	93.00	5.11	4.31	9.904	11.28	0 00:15:42
KR9-JUS-SWS1	87.50	484.00	67.50	5.11	1.92	167.913	65.44	0 01:29:24
SC10-P84	59.70	484.00	37.00	5.11	0.16	9.254	1.16	0 00:18:18
SC11-JDS-P87	112.10	484.00	40.50	5.11	0.28	31.388	2.93	0 05:42:54
SC11-P87	6.40	484.00	83.10	5.11	3.28	21.011	31.45	0 00:06:42
SC12-JDS-P87	48.80	484.00	64.40	5.11	1.68	82.082	33.10	0 01:22:30
SC12-P87	2.30	484.00	93.00	5.11	4.31	9.904	14.21	0 00:06:00
SC12-P89	108.40	484.00	62.20	5.11	1.52	164.876	50.73	0 01:53:42
SC13-P204	127.20	484.00	63.60	5.11	1.62	206.446	67.37	0 01:47:42
SC14-P204	181.40	484.00	57.30	5.11	1.18	214.596	97.22	0 01:00:30
SC14-P91	1.40	484.00	81.00	5.11	3.08	4.316	6.28	0 00:07:54
SC15-P202	2.20	484.00	88.70	5.11	3.85	8.461	10.37	0 00:14:06
SC15-P203	110.50	484.00	79.20	5.11	2.92	322.108	125.32	0 01:36:42
SC15-P90	2.80	484.00	34.60	5.11	0.09	0.244	0.03	0 00:11:18
SC1-P86	261.40	484.00	55.10	5.11	1.04	272.379	98.22	0 01:17:00
SC2-P86	22.10	484.00	75.40	5.11	2.57	56.885	63.10	0 00:19:36
SC3-P88	23.30	484.00	82.60	5.11	3.24	75.376	110.05	0 00:07:36
SC3-P89	13.60	484.00	77.70	5.11	2.78	37.781	57.54	0 00:06:24
SC4-P84	141.80	484.00	65.60	5.11	1.77	251.411	82.33	0 01:50:12
SC5-P84	85.90	484.00	64.10	5.11	1.66	142.594	51.58	0 01:34:42
SC6-P84	76.00	484.00	67.70	5.11	1.94	147.060	136.25	0 00:26:06
SC7-P84	175.70	484.00	62.30	5.11	1.53	268.470	132.48	0 01:00:48
SC8-P84	75.30	484.00	59.90	5.11	1.36	102.333	69.57	0 00:37:00
SC8-P88	4.90	484.00	91.40	5.11	4.13	20.247	29.55	0 00:06:00
SC9-P203	94.20	484.00	65.90	5.11	1.80	169.089	107.02	0 00:45:30
SH10-JDS-P72-POND	31.20	484.00	71.20	5.11	2.22	69.139	48.44	0 00:41:30
SH11-P80	13.80	484.00	90.40	5.11	4.03	55.545	58.83	0 00:20:00
SH12-P80	134.70	484.00	73.50	5.11	2.41	324.627	125.57	0 01:35:12
SH13-P72	18.40	484.00	57.00	5.11	1.16	21.418	7.44	0 01:26:06
SH14-JDS-TRIB1	4.40	484.00	60.40	5.11	1.39	6.134	3.83	0 00:42:06

Subbasin Summary

Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
SH14-P76	1.30	484.00	93.00	5.11	4.31	5.598	8.04	0 00:06:00
SH14-P79	59.40	484.00	62.80	5.11	1.56	92.902	48.33	0 00:57:06
SH1-P75	192.70	484.00	61.20	5.11	1.45	279.415	84.27	0 01:54:36
SH2-P75	52.60	484.00	62.60	5.11	1.55	81.530	41.50	0 00:58:36
SH3-P64	18.80	484.00	76.20	5.11	2.64	49.707	37.16	0 00:38:42
SH4-P75	60.90	484.00	69.80	5.11	2.10	128.012	110.30	0 00:30:06
SH5-P75	124.60	484.00	62.90	5.11	1.57	195.871	121.79	0 00:44:36
SH6-P69	254.10	484.00	60.40	5.11	1.39	354.215	174.84	0 00:58:24
SH7-P89	80.70	484.00	64.30	5.11	1.68	135.173	98.48	0 00:36:30
SH8-P69	1.00	484.00	83.10	5.11	3.28	3.283	4.95	0 00:06:24
SH8-P70	1.00	484.00	91.20	5.11	4.11	4.110	6.00	0 00:06:00
SH8-P71	72.80	484.00	67.30	5.11	1.90	138.538	106.31	0 00:35:06
SH9-P72	104.40	484.00	70.50	5.11	2.16	225.400	146.72	0 00:45:54

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Min Freeboard Attained (ft)
1	10_JDS-P69	Junction	489.95	494.90	489.95	173.61	491.22	4.12
2	10_JDS-P70	Junction	485.80	492.00	487.00	173.89	487.89	4.11
3	10_JDS-P71	Junction	480.80	489.00	481.00	151.94	485.08	3.92
4	10_JDS-P75	Junction	485.79	493.00	485.79	184.91	490.45	2.55
5	10_JDS-P76	Junction	483.40	492.50	483.40	184.17	487.82	4.68
6	10_JDS-P79	Junction	466.50	474.00	466.50	226.15	469.92	9.58
7	10_JDS-P80	Junction	464.20	478.17	464.20	332.27	468.98	9.19
8	10_JDS-Trib1	Junction	477.50	482.00	477.50	213.92	479.55	3.95
9	10_P72-pondoutfall	Junction	477.50	482.00	477.50	88.48	479.91	3.59
10	KR_JDS-D1	Junction	470.00	480.00	472.00	136.05	474.06	6.34
11	KR_JDS-D1-B	Junction	469.00	477.00	470.00	136.05	471.92	5.58
12	KR_JDS-Div1	Junction	493.50	497.50	495.00	188.18	496.07	1.43
13	KR_JDS-P200	Junction	498.00	501.86	496.65	60.41	500.66	1.84
14	KR_JDS-P39	Junction	458.00	465.00	458.99	231.18	460.55	8.44
15	KR_JDS-P40	Junction	461.26	476.00	461.26	257.93	467.54	8.46
16	KR_JDS-P41	Junction	464.22	472.16	464.22	348.88	470.83	3.09
17	KR_JDS-P42	Junction	465.81	475.85	465.81	169.07	471.43	5.00
18	KR_JDS-P43	Junction	468.40	479.00	468.40	139.59	473.93	5.27
19	KR_JDS-P44	Junction	470.00	480.00	470.00	275.27	475.80	4.20
20	KR_JDS-P45	Junction	488.76	495.40	488.76	321.85	493.29	2.11
21	KR_JDS-P45_2	Junction	487.91	492.31	487.91	319.46	491.63	1.42
22	KR_JDS-P45_3	Junction	484.96	489.96	484.96	319.45	489.51	1.74
23	KR_JDS-P46	Junction	471.00	480.00	471.00	822.35	479.45	0.55
24	KR_JDS-P47	Junction	482.01	492.01	482.01	469.37	486.25	5.76
25	KR_JDS-P48	Junction	484.55	493.00	484.55	316.78	487.62	5.38
26	KR_JDS-P49	Junction	486.52	493.00	486.52	159.30	490.03	2.97
27	KR_JDS-P50	Junction	487.95	496.00	487.95	157.53	493.49	2.51
28	KR_JDS-P51_52	Junction	514.67	521.00	514.67	189.82	517.43	4.13
29	KR_JDS-P53	Junction	480.39	486.82	480.39	51.56	482.82	4.31
30	KR_JDS-P53_2	Junction	482.00	486.00	482.00	6.49	482.91	3.59
31	KR_JDS-P55	Junction	480.87	488.60	480.87	72.26	483.77	4.83
32	KR_JDS-P56	Junction	480.58	487.40	480.56	22.63	481.94	5.46
33	KR_JDS-P57	Junction	478.29	482.00	478.29	20.62	480.42	4.69
34	KR_JDS-P57_2	Junction	480.94	486.90	480.94	11.43	481.75	5.15
35	KR_JDS-P58	Junction	478.92	484.50	478.92	140.45	481.50	3.18
36	KR_JDS-P59	Junction	480.97	486.71	480.97	145.24	483.90	3.44
37	KR_JDS-P64	Junction	492.03	495.89	492.03	146.45	494.62	2.65
38	KR_JUS-P200	Junction	499.90	504.40	499.90	60.40	501.99	2.41
39	KR_JUS-P51	Junction	514.94	521.83	514.94	107.34	518.75	3.08
40	KR_JUS-P52	Junction	517.48	521.85	517.48	82.57	519.13	2.72
41	KR_JUS-P59_2	Junction	482.33	488.00	482.33	10.88	486.25	1.75
42	KR_JUS-P65	Junction	466.93	476.50	466.93	171.24	471.83	4.67
43	SC_JDS_P203	Junction	495.06	501.90	495.06	222.50	499.80	2.26
44	SC_JDS-P202	Junction	497.07	500.00	497.07	5.03	497.50	4.07
45	SC_JDS-P204	Junction	502.20	509.20	502.20	17.39	504.37	4.83
46	SC_JDS-P84	Junction	488.34	497.00	488.34	283.14	493.05	4.99
47	SC_JDS-P86	Junction	489.60	496.80	489.74	179.26	492.65	4.15
48	SC_JDS-P87	Junction	487.40	497.00	487.40	375.13	491.66	5.34
49	SC_JDS-P88	Junction	486.50	493.50	486.50	526.61	490.77	3.73
50	SC_JDS-P89	Junction	473.34	483.50	473.34	574.02	476.37	7.13
51	SC_JDS-P90	Junction	503.02	509.00	503.02	14.25	504.51	4.49
52	SC_JDS-Trib1	Junction	464.00	472.00	464.00	573.98	467.42	4.58
53	SC_JUS-91A	Junction	506.00	509.20	506.00	17.53	506.98	2.22
54	SC_JUS-P90	Junction	503.34	509.00	503.34	14.11	504.79	4.21
55	SH_JDS-SH7-POND	Junction	487.00	489.00	487.00	0.00	487.00	4.50
56	10_OF1	Outfall	461.00			332.26	465.78	
57	KR_OF1	Outfall	458.00			233.51	459.56	
58	KR_OF2	Outfall	459.07			170.54	461.62	
59	SC_OF1	Outfall	462.00			573.93	465.42	
60	SC_OF2	Outfall	500.00			17.37	502.17	
61	10_JDS-P72-Pond	Storage Node	477.60	483.50	477.60	105.36	481.34	
62	10_JUS-P69	Storage Node	490.01	495.40	490.01	174.39	493.97	
63	10_JUS-P70	Storage Node	486.00	492.00	486.00	174.05	488.64	
64	10_JUS-P71	Storage Node	481.00	489.00	481.93	222.67	485.30	
65	10_JUS-P72	Storage Node	478.00	484.50	478.00	212.96	481.83	
66	10_JUS-P75	Storage Node	486.35	493.00	486.35	196.42	490.60	
67	10_JUS-P76	Storage Node	484.04	492.50	484.04	185.46	488.04	
68	10_JUS-P79	Storage Node	467.40	475.50	467.40	236.77	470.95	
69	10_JUS-P80	Storage Node	465.42	478.70	464.42	333.93	469.63	
70	JDS-P201	Storage Node	493.90	497.40	494.00	40.48	495.30	
71	KR_JDS-Bentley	Storage Node	490.00	494.00	490.00	235.14	492.80	
72	KR_JDS-Trib1	Storage Node	475.50	484.00	476.00	448.10	480.05	
73	KR_JDS-Trib2	Storage Node	477.00	485.00	477.00	520.52	481.36	
74	KR_JUS-D1	Storage Node	469.60	480.00	469.60	275.27	474.22	
75	KR_JUS-P201	Storage Node	492.00	497.50	494.00	108.95	495.30	
76	KR_JUS-P39	Storage Node	460.50	468.50	460.50	256.07	467.23	
77	KR_JUS-P40	Storage Node	461.95	476.00	461.95	365.70	469.52	
78	KR_JUS-P41	Storage Node	465.81	472.66	465.90	408.50	470.85	
79	KR_JUS-P42	Storage Node	465.73	475.85	465.73	176.78	471.49	

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Min Freeboard Attained (ft)
80	KR_JUS-P43	Storage Node	468.70	479.50	468.70	139.65	474.05	
81	KR_JUS-P44	Storage Node	470.30	480.00	470.30	360.14	475.88	
82	KR_JUS-P45	Storage Node	490.12	496.40	490.12	322.32	494.41	
83	KR_JUS-P45_2	Storage Node	488.17	493.31	488.17	321.87	492.96	
84	KR_JUS-P45_3	Storage Node	486.05	492.34	486.05	319.46	491.74	
85	KR_JUS-P46	Storage Node	471.20	480.00	472.00	647.72	477.81	
86	KR_JUS-P47	Storage Node	482.34	492.34	482.34	502.55	487.99	
87	KR_JUS-P48	Storage Node	485.05	492.30	485.55	325.51	488.59	
88	KR_JUS-P49	Storage Node	487.63	493.00	487.63	11.60	490.04	
89	KR_JUS-P50	Storage Node	488.25	496.00	488.25	249.05	493.56	
90	KR_JUS-P53	Storage Node	480.66	487.40	480.66	76.54	483.70	
91	KR_JUS-P53_2	Storage Node	482.00	486.50	482.00	33.15	483.14	
92	KR_JUS-P55	Storage Node	481.40	487.10	481.40	72.31	483.83	
93	KR_JUS-P56	Storage Node	481.72	487.90	481.72	8.12	483.09	
94	KR_JUS-P57	Storage Node	478.58	485.40	478.58	23.82	480.69	
95	KR_JUS-P57_2	Storage Node	481.90	487.40	481.90	11.48	483.09	
96	KR_JUS-P58	Storage Node	479.74	485.50	479.74	146.05	484.09	
97	KR_JUS-P59	Storage Node	481.43	487.80	481.43	146.45	485.88	
98	KR_JUS-P64	Storage Node	492.56	497.80	492.56	189.58	495.12	
99	KR_JUS-SWS1	Storage Node	477.50	484.00	478.00	247.26	480.42	
100	SC_JUS-P202	Storage Node	496.00	500.50	496.00	10.18	498.72	
101	SC_JUS-P203	Storage Node	495.55	501.90	495.55	196.38	500.76	
102	SC_JUS-P204	Storage Node	503.20	509.20	503.20	148.81	507.52	
103	SC_JUS-P84	Storage Node	489.26	497.00	489.26	328.92	493.48	
104	SC_JUS-P87	Storage Node	487.60	497.00	487.60	364.09	493.03	
105	SC_JUS-P88	Storage Node	488.20	494.75	488.20	197.71	492.44	
106	SC_JUS-P89	Storage Node	475.32	485.00	475.32	574.85	484.09	
107	SC_JUS-P91	Storage Node	503.87	509.20	503.87	17.71	505.55	
108	SC-JUS-P86	Storage Node	489.60	496.70	489.60	160.62	492.40	
109	SH_JUS-SH7-POND	Storage Node	485.00	489.50	486.00	97.81	487.73	

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)
1	P200	Pipe	KR_JUS-P200	KR_JDS-P200	100.00	500.40	498.80	1.6000	24.000	0.0150	60.41	100.13	0.60	7.18
2	P-201	Pipe	KR_JUS-P201	JDS-P201	30.00	494.50	494.30	0.6700	15.000	0.0150	2.02	4.57	0.44	2.46
3	P202	Pipe	SC_JUS-P202	SC_JDS-P202	43.00	497.20	497.10	0.2300	15.000	0.0150	5.03	2.70	1.86	4.46
4	P203	Pipe	SC_JUS-P203	SC_JDS_P203	49.00	495.55	495.06	1.0000	40.000	0.0130	118.36	88.34	1.34	13.56
5	P204	Pipe	SC_JUS-P204	SC_JDS-P204	103.00	503.20	502.20	0.9700	18.000	0.0120	17.39	11.21	1.55	9.84
6	P39	Pipe	KR_JUS-P39	KR_JDS-P39	556.00	460.47	458.99	0.2700	72.000	0.0120	231.18	239.10	0.97	9.06
7	P40	Pipe	KR_JUS-P40	KR_JDS-P40	210.00	461.95	461.26	0.3300	60.000	0.0120	257.93	161.73	1.59	13.14
8	P41	Pipe	KR_JUS-P41	KR_JDS-P41	61.00	465.81	464.22	2.6100	80.000	0.0200	348.88	2263.56	0.15	3.75
9	P42	Pipe	KR_JUS-P42	KR_JDS-P42	67.00	465.73	465.81	-0.1200	84.000	0.0200	169.07	365.96	0.46	2.51
10	P43	Pipe	KR_JUS-P43	KR_JDS-P43	50.00	468.70	468.40	0.6000	60.000	0.0120	139.59	674.19	0.21	2.79
11	P44	Pipe	KR_JUS-P44	KR_JDS-P44	44.30	470.30	470.00	0.6800	48.000	0.0200	275.27	687.60	0.40	3.44
12	P45	Pipe	KR_JUS-P45	KR_JDS-P45	82.20	490.12	488.76	1.6500	42.000	0.0150	321.85	432.33	0.74	10.93
13	P45_2	Pipe	KR_JUS-P45_2	KR_JDS-P45_2	25.30	488.17	487.91	1.0300	30.000	0.0130	59.85	41.58	1.44	12.19
14	P45_3	Pipe	KR_JUS-P45_3	KR_JDS-P45_3	199.00	486.05	484.96	0.5500	36.000	0.0240	46.10	26.74	1.72	7.08
15	P47	Pipe	KR_JUS-P47	KR_JDS-P47	21.80	482.34	482.01	1.5100	55.000	0.0150	469.37	1102.17	0.43	7.74
16	P48	Pipe	KR_JUS-P48	KR_JDS-P48	71.70	485.05	484.55	0.7000	48.000	0.0150	316.78	844.31	0.38	5.30
17	P49	Pipe	KR_JDS-P49	KR_JUS-P49	89.60	487.63	486.52	1.2400	24.000	0.0120	11.59	0.82	14.15	4.51
18	P50	Pipe	KR_JUS-P50	KR_JDS-P50	87.20	488.25	487.95	0.3400	24.000	0.0150	61.50	34.50	1.78	6.53
19	P51	Pipe	KR_JUS-P51	KR_JDS-P51_52	31.00	514.94	514.67	0.8700	30.000	0.0150	107.31	102.34	1.05	8.58
20	P52	Pipe	KR_JUS-P52	KR_JDS-P51_52	48.00	517.48	514.67	5.8500	30.000	0.0150	82.55	265.33	0.31	7.95
21	P53_2	Pipe	KR_JDS-P53_2	KR_JUS-P53_2	90.40	482.20	482.00	0.2200	24.000	0.0120	6.49	23.05	0.28	2.42
22	P53A	Pipe	KR_JUS-P53	KR_JDS-P53	24.80	480.66	480.39	1.0900	36.000	0.0130	38.03	69.59	0.55	5.80
23	P53B-C	Pipe	KR_JUS-P53	KR_JDS-P53	20.30	482.40	482.90	-2.4600	24.000	0.0120	9.09	76.93	0.12	3.41
24	P55	Pipe	KR_JDS-P55	KR_JUS-P55	79.60	480.87	481.40	-0.6700	48.000	0.0200	72.26	235.02	0.31	3.39
25	P56	Pipe	KR_JUS-P56	KR_JDS-P56	82.20	481.72	480.58	1.3900	30.000	0.0130	8.10	48.30	0.17	3.74
26	P57	Pipe	KR_JUS-P57	KR_JDS-P57	27.80	478.58	478.29	1.0400	36.000	0.0120	20.62	73.80	0.28	5.25
27	P57_2	Pipe	KR_JUS-P57_2	KR_JDS-P57_2	79.40	481.90	480.94	1.2100	24.000	0.0120	11.43	53.90	0.21	4.03
28	P58A	Pipe	KR_JUS-P58	KR_JDS-P58	45.60	479.74	478.92	1.8000	36.000	0.0130	65.30	89.44	0.73	9.54
29	P58B	Pipe	KR_JDS-P58	KR_JUS-P58	30.60	480.28	479.56	2.3500	24.000	0.0120	37.32	32.56	1.15	11.88
30	P58C	Pipe	KR_JDS-P58	KR_JUS-P58	30.60	480.23	479.99	0.7800	24.000	0.0120	37.84	21.70	1.74	12.04
31	P59	Pipe	KR_JUS-P59	KR_JDS-P59	95.45	481.43	480.97	0.4800	48.000	0.0200	145.24	139.79	1.04	7.12
32	P59_2	Pipe	KR_JUS-P59_2	KR_JUS-P58	73.20	482.33	482.01	0.4400	15.000	0.0120	11.90	4.63	2.57	9.69
33	P64	Pipe	KR_JUS-P64	KR_JDS-P64	47.60	492.56	492.03	1.1100	36.000	0.0150	146.45	345.00	0.42	6.19
34	P65	Pipe	KR_JUS-P65	KR_OF2	1034.00	466.93	459.07	0.7600	84.000	0.0120	170.54	603.39	0.28	8.20
35	P69	Pipe	10_JUS-P69	10_JDS-P69	60.70	490.01	489.95	0.1000	36.000	0.0200	164.88	62.05	2.66	9.30
36	P70	Pipe	10_JUS-P70	10_JDS-P70	8.50	486.00	485.80	2.3500	36.000	0.0150	173.89	501.52	0.35	7.45
37	P71	Pipe	10_JUS-P71	10_JDS-P71	34.00	481.00	480.80	0.5900	48.000	0.0120	151.94	481.88	0.32	8.04
38	P72	Pipe	10_JUS-P72	10_JDS-P72-Pond	40.95	478.00	477.60	0.9800	36.000	0.0240	96.60	107.12	0.90	4.57
39	P75	Pipe	10_JUS-P75	10_JDS-P75	66.20	486.35	485.79	0.8500	42.000	0.0200	184.91	419.05	0.44	3.77
40	P76	Pipe	10_JUS-P76	10_JDS-P76	33.70	484.04	483.40	1.9000	42.000	0.0120	184.17	1046.47	0.18	3.76
41	P79	Pipe	10_JUS-P79	10_JDS-P79	36.10	467.40	466.50	2.4900	42.000	0.0120	226.15	624.19	0.36	8.38
42	P80	Pipe	10_JUS-P80	10_JDS-P80	56.10	465.64	465.64	0.0000	99.600	0.0200	332.27	80.17	4.14	5.74
43	P84	Pipe	SC_JUS-P84	SC_JDS-P84	68.00	489.26	488.34	1.3500	36.000	0.0120	283.14	585.55	0.48	7.86
44	P86	Pipe	SC_JDS-P86	SC-JUS-P86	70.00	489.70	489.70	0.0000	73.000	0.0200	179.26	60.09	2.98	3.38
45	P87-A	Pipe	SC_JUS-P87	SC_JDS-P87	21.10	487.60	487.40	0.9500	36.000	0.0120	343.53	490.12	0.70	9.54
46	P88	Pipe	SC_JUS-P88	SC_JDS-P88	40.50	488.20	486.60	3.9500	52.000	0.0240	154.99	382.89	0.40	7.10
47	P89	Pipe	SC_JUS-P89	SC_JDS-P89	43.30	475.32	475.20	0.2800	66.000	0.0240	268.84	95.76	2.81	11.81
48	P90	Pipe	SC_JUS-P90	SC_JDS-P90	82.60	503.34	503.02	0.3900	36.000	0.0130	14.25	41.51	0.34	5.35
49	P91	Pipe	SC_JUS-P91	SC_JUS-P90	81.90	503.87	503.44	0.5300	36.000	0.0150	14.08	41.89	0.34	4.48
50	10_CH-71-70	Channel	10_JDS-P70	10_JUS-P71	1209.00	485.80	481.00	0.4000	60.000	0.0320	169.44	1271.55	0.13	1.61
51	10_CH-72-71	Channel	10_JDS-P71	10_JUS-P72	1736.00	480.80	478.00	0.1600	72.000	0.0320	166.85	616.62	0.27	3.49
52	10_CH-79-Trib1	Channel	10_JDS-Trib1	10_JUS-P79	1363.00	477.50	467.40	0.7400	60.000	0.0320	211.27	1448.21	0.15	1.94
53	10_CH-80-79	Channel	10_JDS-P79	10_JUS-P80	246.00	466.50	465.42	0.4400	156.000	0.0320	226.64	4521.15	0.05	2.70
54	10_CH-OF1-80	Channel	10_JDS-P80	10_OF1	398.00	464.20	461.00	0.8000	117.600	0.0320	332.26	1389.84	0.24	5.85
55	10_CH-Trib1	Channel	10_P72-pondoutfall	10_JDS-Trib1	85.00	477.50	477.50	0.0000	54.000	0.0320	88.48	14.78	5.99	3.91
56	10_CH-Trib1-76	Channel	10_JDS-P76	10_JDS-Trib1	1026.00	483.40	477.50	0.5800	72.000	0.0320	190.11	1025.45	0.19	5.95
57	10_RRCH-70-69	Channel	10_JDS-P69	10_JUS-P70	59.00	489.95	486.00	6.6900	60.000	0.0320	173.61	2160.35	0.08	5.04

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)
58	10_RRCH-76-75	Channel	10_JDS-P75	10_JUS-P76	34.00	485.79	484.04	5.1500	84.000	0.0320	184.92	395.55	0.47	1.94
59	KR_CH-39-40	Channel	KR_JDS-P40	KR_JUS-P39	905.00	461.26	460.50	0.0800	93.000	0.0320	251.00	497.80	0.50	2.51
60	KR_CH-40-41	Channel	KR_JDS-P41	KR_JUS-P40	1031.00	464.22	461.95	0.2200	116.400	0.0320	347.85	719.91	0.48	4.67
61	KR_CH-41-42	Channel	KR_JDS-P42	KR_JUS-P41	1352.00	465.81	465.81	0.0000	81.120	0.0320	166.08	11.59	14.33	1.99
62	KR_CH-42-43	Channel	KR_JDS-P43	KR_JUS-P42	981.00	470.90	465.73	0.5300	76.200	0.0320	139.55	587.14	0.24	2.83
63	KR_CH-43-D1	Channel	KR_JUS-D1	KR_JUS-P43	292.00	469.60	468.70	0.3100	90.000	0.0320	139.21	736.80	0.19	1.87
64	KR_CH-44-45_3	Channel	KR_JDS-P45_3	KR_JUS-P44	738.85	484.96	472.06	1.7500	60.000	0.0450	182.72	247.40	0.74	7.39
65	KR_CH-44-46	Channel	KR_JDS-P46	KR_JUS-P44	312.00	471.00	470.30	0.2200	66.000	0.0320	290.59	221.55	1.31	5.66
66	KR_CH-45_3-45_2	Channel	KR_JDS-P45_2	KR_JUS-P45_3	24.86	487.91	486.05	7.4800	60.000	0.0320	319.46	1252.28	0.26	7.58
67	KR_CH-46-46	Channel	KR_JUS-P46	KR_JDS-P46	42.00	471.20	471.00	0.4800	96.000	0.0350	822.35	1507.23	0.55	5.73
68	KR_CH-46-Trib1	Channel	KR_JDS-Trib1	KR_JUS-P46	2923.00	475.50	472.00	0.1200	72.000	0.0320	335.03	696.91	0.48	0.90
69	KR_CH-50-51	Channel	KR_JDS-P51_52	KR_JUS-P50	948.87	514.67	488.25	2.7800	48.000	0.0800	180.82	791.98	0.23	2.85
70	KR_CH-53-53_2	Channel	KR_JDS-P53_2	KR_JDS-P53	211.00	482.00	480.39	0.7600	18.000	0.0800	6.04	39.88	0.15	0.37
71	KR_CH-59-Bentley	Channel	KR_JDS-Bentley	KR_JUS-P59	669.00	490.00	481.43	1.2800	48.000	0.0320	132.29	332.77	0.40	3.57
72	KR_CH-64-Div1	Channel	KR_JDS-Div1	KR_JUS-P64	642.00	493.50	492.56	0.1500	48.000	0.0320	149.92	444.32	0.34	2.31
73	KR_CH-Bentley	Channel	KR_JDS-P200	KR_JDS-Bentley	995.00	498.00	490.00	0.8000	42.000	0.0320	64.54	173.19	0.37	3.04
74	KR_CH-D1-44	Channel	KR_JDS-P44	KR_JUS-D1	125.28	471.40	471.25	0.1200	90.000	0.0320	275.27	459.22	0.60	5.75
75	KR_CH-D1-65A	Channel	KR_JDS-D1	KR_JDS-D1-B	500.00	472.00	470.00	0.4000	90.000	0.0320	136.05	1608.55	0.08	3.81
76	KR_CH-D1B	Channel	KR_JDS-D1-B	KR_JUS-P65	400.00	470.00	466.93	0.7700	90.000	0.0320	136.03	2228.15	0.06	2.08
77	KR_CH-moose	Channel	JDS-P201	KR_JDS-Div1	886.00	493.90	493.50	0.0500	48.000	0.0320	40.48	246.72	0.16	0.66
78	KR_CH-OF1-39	Channel	KR_JDS-P39	KR_OF1	70.20	458.99	458.00	1.4100	120.000	0.0320	231.18	5759.30	0.04	4.95
79	KR_CH-SWS1	Channel	KR_JUS-SWS1	KR_JDS-Trib1	2362.00	477.50	475.50	0.0800	54.000	0.0320	49.94	217.18	0.23	0.49
80	KR_CH-SWS1-57	Channel	KR_JDS-P57	KR_JUS-SWS1	42.00	478.29	477.50	1.8800	48.000	0.0450	20.61	87.78	0.23	5.03
81	KR_CH-SWS1-58	Channel	KR_JDS-P58	KR_JUS-SWS1	76.00	478.92	477.50	1.8700	48.000	0.0320	140.44	292.08	0.48	10.89
82	KR_CH-SWS2-Trib2	Channel	KR_JDS-Trib2	KR_JDS-Trib1	470.00	477.00	475.50	0.3200	72.000	0.0320	416.82	933.31	0.45	1.87
83	KR_CH-Trib2-47	Channel	KR_JDS-P47	KR_JDS-Trib2	873.00	482.01	477.00	0.5700	72.000	0.0320	471.62	1179.07	0.40	2.63
84	KR_CH-Trib2-53	Channel	KR_JDS-P53	KR_JDS-Trib2	1194.00	480.39	477.00	0.2800	48.000	0.0450	34.92	266.85	0.13	0.90
85	KR_RRCH-45_2-45	Channel	KR_JDS-P45	KR_JUS-P45_2	40.00	488.76	488.17	1.4700	72.000	0.0320	321.87	681.99	0.47	7.97
86	KR_RRCH-47-48	Channel	KR_JDS-P48	KR_JUS-P47	45.00	484.55	482.34	4.9100	72.000	0.0320	316.59	1935.60	0.16	6.12
87	KR_RRCH-47-49	Channel	KR_JDS-P49	KR_JUS-P47	530.00	486.52	482.34	0.7900	72.000	0.0320	158.53	519.43	0.31	3.22
88	KR_RRCH-49-50	Channel	KR_JDS-P50	KR_JDS-P49	397.00	487.95	486.52	0.3600	72.000	0.0320	157.52	197.46	0.80	3.02
89	KR_RRCH-53_2-56	Channel	KR_JUS-P53_2	KR_JDS-P56	477.00	482.00	480.58	0.3000	48.000	0.0320	16.11	266.42	0.06	0.78
90	KR_RRCH-56-57	Channel	KR_JDS-P56	KR_JUS-P57	535.00	480.58	478.39	0.4100	66.000	0.0320	19.46	414.62	0.05	0.79
91	KR_RRCH-57-57_2	Channel	KR_JDS-P57_2	KR_JUS-P57	31.00	480.95	478.58	7.6500	36.000	0.0800	11.40	69.60	0.16	2.28
92	KR_RRCH-58-59	Channel	KR_JDS-P59	KR_JUS-P58	29.00	480.97	479.74	4.2400	54.000	0.0320	145.15	532.28	0.27	6.21
93	KR-CH-Bentley-64	Channel	KR_JDS-P64	KR_JDS-Bentley	1078.00	492.03	490.00	0.1900	48.000	0.0320	143.80	417.33	0.34	1.04
94	KR-RRCH-53-53_2	Channel	KR_JUS-P53_2	KR_JUS-P53	211.00	482.00	480.66	0.6400	54.000	0.0320	27.81	268.74	0.10	1.20
95	KR-RRCH-53-55	Channel	KR_JDS-P55	KR_JUS-P53	42.00	480.87	480.66	0.5000	80.400	0.0320	72.24	479.67	0.15	2.70
96	SC_CH-86-84	Channel	SC_JUS-P84	SC-JUS-P86	879.25	492.50	492.00	0.0600	48.000	0.0800	67.22	869.89	0.08	0.50
97	SC_CH-87-202	Channel	SC_JDS-P202	SC_JDS-P87	3875.00	497.07	487.40	0.2500	24.000	0.0320	3.20	49.65	0.06	0.27
98	SC_CH-88-87	Channel	SC_JDS-P87	SC_JDS-P88	1012.00	487.40	486.50	0.0900	96.000	0.0320	372.27	1128.47	0.33	1.94
99	SC_CH-89-88	Channel	SC_JDS-P88	SC_JUS-P89	1788.00	486.50	475.32	0.6300	96.000	0.0320	521.64	1670.56	0.31	2.89
100	SC_CH-OF1-Trib1	Channel	SC_JDS-Trib1	SC_OF1	140.00	464.00	462.00	1.4300	72.000	0.0450	573.93	1811.55	0.32	6.93
101	SC_CH-Trib1-89	Channel	SC_JDS-P89	SC_JDS-Trib1	748.00	473.34	464.00	1.2500	96.000	0.0320	573.98	3503.10	0.16	5.97
102	SC_RRCH-203-90	Channel	SC_JDS-P90	SC_JUS-P203	2014.00	503.02	495.55	0.3700	31.200	0.0320	14.10	38.51	0.37	0.87
103	SC_RRCH-204-OF2	Channel	SC_JDS-P204	SC_OF2	3680.98	502.20	500.00	0.0600	48.000	0.0320	17.37	72.35	0.24	1.26
104	SC_RRCH-87-203	Channel	SC_JDS_P203	SC_JUS-P87	3893.00	495.06	489.17	0.1500	84.000	0.0320	167.27	470.68	0.36	1.55
105	SC_RRCH-87-84	Channel	SC_JDS-P84	SC_JUS-P87	50.00	488.34	488.34	0.0000	116.400	0.0320	282.67	150.05	1.88	4.34
106	SC_RRCH-88-87	Channel	SC_JUS-P87	SC_JUS-P88	865.00	492.80	492.00	0.0900	60.000	0.0800	0.19	46.58	0.00	0.17
107	SC-CH-91-91A	Channel	SC_JUS-91A	SC_JUS-P91	178.41	506.00	503.87	1.1900	36.000	0.0450	17.53	127.17	0.14	2.81
108	SC-CH-91A-204	Channel	SC_JUS-P204	SC_JUS-91A	472.13	503.20	506.00	-0.5900	36.000	0.0450	17.53	89.63	0.20	1.26
109	SC-RRCH-88-86	Channel	SC_JDS-P86	SC_JUS-P88	45.00	489.74	488.20	3.4200	72.000	0.0450	190.29	1427.64	0.13	4.51
110	SH_CH-SH7-P88	Channel	SH_JDS-SH7-POND	SC_JDS-P88	2000.00	487.00	486.50	0.0300	48.000	0.0800	0.00	47.31	0.00	0.00
111	10_Pond-Flume	Weir	10_P72-pondoutfall	10_JDS-P72-Pond		477.50	477.60				88.48			
112	Div1	Weir	KR_JUS-D1	KR_JDS-D1		469.60	470.00				136.05			
113	KR_Shafer-Rd-weir	Weir	KR_JUS-P201	10_JUS-P75		492.00	486.35				0.00			
114	P200-weir	Weir	KR_JUS-P200	KR_JDS-P200		499.90	498.00				0.00			

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)
115	P201-weir	Weir	KR_JUS-P201	JDS-P201		492.00	493.90				0.00			
116	P202-weir	Weir	SC_JUS-P202	SC_JDS-P202		496.00	497.07				0.00			
117	P203-weir	Weir	SC_JUS-P203	SC_JDS_P203		495.55	495.06				108.30			
118	P39-weir	Weir	KR_JUS-P39	KR_JDS-P39		460.50	458.00				0.00			
119	P40-weir	Weir	KR_JUS-P40	KR_JDS-P40		461.95	461.26				0.00			
120	P41-weir	Weir	KR_JUS-P41	KR_JDS-P41		465.81	464.22				0.00			
121	P42-weir	Weir	KR_JUS-P42	KR_JDS-P42		465.73	465.81				0.00			
122	P43-weir	Weir	KR_JUS-P43	KR_JDS-P43		468.70	468.40				0.00			
123	P44-weir	Weir	KR_JUS-P44	KR_JDS-P44		470.30	470.00				0.00			
124	P45_2-weir	Weir	KR_JUS-P45_2	KR_JDS-P45_2		488.17	487.91				265.03			
125	P45_3-bypass	Weir	KR_JDS-P45_3	KR_JUS-P44		484.96	470.30				136.61			
126	P45_3-weir	Weir	KR_JUS-P45_3	KR_JDS-P45_3		486.05	484.96				284.33			
127	P45-weir	Weir	KR_JUS-P45	KR_JDS-P45		490.12	488.76				0.00			
128	P47-weir	Weir	KR_JUS-P47	KR_JDS-P47		482.34	482.01				0.00			
129	P48-weir	Weir	KR_JUS-P48	KR_JDS-P48		485.05	484.55				0.00			
130	P49-weir	Weir	KR_JUS-P49	KR_JDS-P49		487.63	486.52				0.00			
131	P50-weir	Weir	KR_JUS-P50	KR_JDS-P50		488.25	487.95				142.99			
132	P51-weir	Weir	KR_JUS-P51	KR_JDS-P51_52		514.94	514.67				0.00			
133	P52-weir	Weir	KR_JUS-P52	KR_JDS-P51_52		517.48	514.67				0.00			
134	P53_2-weir	Weir	KR_JUS-P53_2	KR_JDS-P53_2		482.00	482.00				0.00			
135	P53-weir	Weir	KR_JUS-P53	KR_JDS-P53		480.66	480.39				0.00			
136	P55-weir	Weir	KR_JUS-P55	KR_JDS-P55		481.40	480.87				0.00			
137	P56-weir	Weir	KR_JUS-P56	KR_JDS-P56		481.72	480.58				0.00			
138	P57_2-weir	Weir	KR_JUS-P57_2	KR_JDS-P57_2		481.90	480.94				0.00			
139	P57-weir	Weir	KR_JUS-P57	KR_JDS-P57		478.58	478.29				0.00			
140	P58-weir	Weir	KR_JUS-P58	KR_JDS-P58		479.74	478.92				0.00			
141	P59_2-weir	Weir	KR_JUS-P59_2	KR_JUS-P59		482.33	481.43				0.00			
142	P59-weir	Weir	KR_JUS-P59	KR_JDS-P59		481.43	480.97				0.00			
143	P64-weir	Weir	KR_JUS-P64	KR_JDS-P64		492.56	492.03				0.00			
144	P69-weir	Weir	10_JUS-P69	10_JDS-P69		490.01	489.95				8.73			
145	P70-weir	Weir	10_JUS-P70	10_JDS-P70		486.00	485.80				0.00			
146	P71-weir	Weir	10_JUS-P71	10_JDS-P71		481.00	480.80				0.00			
147	P72-weir	Weir	10_JUS-P72	10_JDS-P72-Pond		478.00	477.60				0.00			
148	P75-weir	Weir	10_JUS-P75	10_JDS-P75		486.35	485.79				0.00			
149	P76-weir	Weir	10_JUS-P76	10_JDS-P76		484.04	483.40				0.00			
150	P79-weir	Weir	10_JUS-P79	10_JDS-P79		467.40	466.50				0.00			
151	P80-weir	Weir	10_JUS-P80	10_JDS-P80		465.42	464.20				0.00			
152	P84-weir	Weir	SC_JUS-P84	SC_JDS-P84		489.26	488.34				0.00			
153	P86-weir	Weir	SC-JUS-P86	SC_JDS-P86		489.60	489.60				0.00			
154	P87-weir	Weir	SC_JUS-P87	SC_JDS-P87		487.60	487.40				0.00			
155	P88-weir	Weir	SC_JUS-P88	SC_JDS-P88		488.20	486.50				0.00			
156	P89-weir	Weir	SC_JUS-P89	SC_JDS-P89		475.32	473.34				305.18			
157	SH7-ovrflow	Weir	SH_JUS-SH7-POND	SH_JDS-SH7-POND		485.00	487.00				0.00			

Bloom to Lime Ridge Study
50 yr - 24 hr Post-Dev Results (w/ select drainage improvements)

Project Description

File Name ..... 19490-Columbia Co-POST-Kinney Run Rev2_10-13-2020.SPF

Project Options

Flow Units ..... CFS
Elevation Type ..... Elevation
Hydrology Method ..... SCS TR-20
Time of Concentration (TOC) Method ..... SCS TR-55
Link Routing Method ..... Hydrodynamic
Enable Overflow Ponding at Nodes ..... YES
Skip Steady State Analysis Time Periods ... YES

Analysis Options

Start Analysis On ..... Nov 22, 2019 00:00:00
End Analysis On ..... Nov 23, 2019 00:00:00
Start Reporting On ..... Nov 22, 2019 00:00:00
Antecedent Dry Days ..... 0 days
Runoff (Dry Weather) Time Step ..... 0 01:00:00 days hh:mm:ss
Runoff (Wet Weather) Time Step ..... 0 00:05:00 days hh:mm:ss
Reporting Time Step ..... 0 00:05:00 days hh:mm:ss
Routing Time Step ..... 2 seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins	93
Nodes	109
Junctions	55
Outfalls	5
Flow Diversions	0
Inlets	0
Storage Nodes	49
Links	157
Channels	61
Pipes	49
Pumps	0
Orifices	0
Weirs	47
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1		Time Series	50yr-24hr	Cumulative	inches	Pennsylvania	Columbia	50	6.00	SCS Type II 24-hr

Subbasin Summary

Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
KR10-JUS-SWS1	51.60	484.00	50.50	6.00	1.18	60.836	12.88	0 02:38:18
KR11-P53	0.20	484.00	93.00	6.00	5.18	1.036	1.46	0 00:06:00
KR11-P53_2	1.70	484.00	93.00	6.00	5.18	8.811	12.53	0 00:06:00
KR11-P55	20.90	484.00	80.90	6.00	3.87	80.946	90.92	0 00:18:54
KR11-P56	1.90	484.00	89.50	6.00	4.79	9.101	9.84	0 00:18:54
KR11-P57	0.80	484.00	93.00	6.00	5.18	4.146	5.89	0 00:06:00
KR11-P57_2	2.60	484.00	83.10	6.00	4.10	10.665	14.26	0 00:10:48
KR11-P58	0.30	484.00	93.00	6.00	5.18	1.555	2.21	0 00:06:00
KR11-P59	31.10	484.00	69.00	6.00	2.71	84.374	73.57	0 00:29:54
KR12-P48	111.40	484.00	68.50	6.00	2.67	297.104	105.08	0 01:45:36
KR13-P48	154.70	484.00	67.30	6.00	2.56	395.568	131.30	0 01:53:42
KR14-P48	14.90	484.00	69.20	6.00	2.73	40.692	19.02	0 01:13:30
KR15-P48	42.00	484.00	65.20	6.00	2.37	99.498	39.49	0 01:28:42
KR16-P48	78.90	484.00	74.20	6.00	3.20	252.796	179.92	0 00:41:54
KR17-P52	39.40	484.00	67.30	6.00	2.56	100.746	112.78	0 00:18:54
KR18-P51	38.40	484.00	72.70	6.00	3.06	117.504	147.22	0 00:14:36
KR19-P45	121.00	484.00	72.10	6.00	3.00	363.363	340.68	0 00:26:54
KR1-P64	108.00	484.00	56.10	6.00	1.60	173.232	99.41	0 00:47:06
KR20-P47	20.50	484.00	88.70	6.00	4.70	96.391	101.84	0 00:20:12
KR20-P48	51.90	484.00	74.90	6.00	3.27	169.817	147.42	0 00:30:42
kr20-p49	2.10	484.00	92.20	6.00	5.09	10.693	14.49	0 00:08:00
KR20-P50	23.50	484.00	79.80	6.00	3.76	88.384	88.96	0 00:23:48
KR20-P53	1.70	484.00	92.80	6.00	5.16	8.772	12.50	0 00:06:00
KR21-JDS-TRIB1	46.10	484.00	65.40	6.00	2.39	110.041	44.21	0 01:27:30
KR21-JDS-TRIB2	15.30	484.00	78.00	6.00	3.58	54.759	46.07	0 00:32:36
KR22-P44	7.80	484.00	93.00	6.00	5.18	40.427	48.15	0 00:13:18
KR22-P46	117.40	484.00	72.00	6.00	2.99	351.378	115.74	0 01:58:36
KR23-41	26.40	484.00	89.30	6.00	4.77	125.875	54.51	0 01:22:24
KR24-P41	53.60	484.00	81.20	6.00	3.90	209.254	244.13	0 00:17:12
KR25-P41	32.00	484.00	70.40	6.00	2.84	90.944	95.21	0 00:22:00
KR26-P41	40.40	484.00	83.20	6.00	4.11	166.125	101.68	0 00:52:12
KR27-P41	71.20	484.00	66.30	6.00	2.47	175.650	74.12	0 01:22:24
KR27-P42	34.40	484.00	74.00	6.00	3.19	109.564	74.71	0 00:44:36
KR27-P43	1.60	484.00	93.00	6.00	5.18	8.293	11.25	0 00:07:42
KR27-P44	7.70	484.00	93.00	6.00	5.18	39.909	49.51	0 00:11:18
KR28-40	60.50	484.00	58.90	6.00	1.83	110.715	34.48	0 01:52:36
KR29-P65	19.80	484.00	88.30	6.00	4.66	92.248	61.70	0 00:44:54
KR2-P64	59.00	484.00	69.00	6.00	2.71	160.067	159.69	0 00:23:54
KR31-P45	19.80	484.00	86.80	6.00	4.50	89.021	99.71	0 00:18:00
KR31-P45_2	1.30	484.00	93.00	6.00	5.18	6.738	9.57	0 00:06:00
KR32-OF1	21.20	484.00	64.10	6.00	2.27	48.166	37.84	0 00:34:00
KR32-P39	19.90	484.00	51.70	6.00	1.27	25.213	11.49	0 00:57:00
KR3-P64	12.60	484.00	35.00	6.00	0.25	3.150	0.52	0 00:28:42
KR4-P64	32.40	484.00	63.30	6.00	2.20	71.345	65.79	0 00:26:12
KR5-P200	55.70	484.00	63.70	6.00	2.24	124.601	76.18	0 00:48:42
KR6-JDS-BENTLEY	14.40	484.00	61.90	6.00	2.08	29.981	38.83	0 00:12:18
KR6-P200	17.10	484.00	59.00	6.00	1.84	31.447	37.33	0 00:15:06
KR7-JDS-BENTLEY	21.10	484.00	70.60	6.00	2.86	60.367	38.56	0 00:48:12
KR8-P58	0.09	484.00	87.60	6.00	4.58	0.401	0.47	0 00:16:53
KR8-P59	9.90	484.00	82.20	6.00	4.01	39.679	33.39	0 00:32:24
KR8-P59_2	2.30	484.00	93.00	6.00	5.18	11.921	13.44	0 00:15:42
KR9-JUS-SWS1	87.50	484.00	67.50	6.00	2.58	225.313	90.10	0 01:29:24
SC10-P84	59.70	484.00	37.00	6.00	0.34	20.477	5.94	0 00:18:18
SC11-JDS-P87	112.10	484.00	40.50	6.00	0.53	59.189	6.15	0 05:42:54
SC11-P87	6.40	484.00	83.10	6.00	4.10	26.253	38.99	0 00:06:42
SC12-JDS-P87	48.80	484.00	64.40	6.00	2.30	112.142	46.77	0 01:22:30
SC12-P87	2.30	484.00	93.00	6.00	5.18	11.921	16.92	0 00:06:00
SC12-P89	108.40	484.00	62.20	6.00	2.11	228.507	73.19	0 01:53:42
SC13-P204	127.20	484.00	63.60	6.00	2.23	283.402	96.03	0 01:47:42
SC14-P204	181.40	484.00	57.30	6.00	1.70	308.380	150.22	0 01:00:30
SC14-P91	1.40	484.00	81.00	6.00	3.88	5.438	7.87	0 00:07:54
SC15-P202	2.20	484.00	88.70	6.00	4.70	10.344	12.54	0 00:14:06
SC15-P203	110.50	484.00	79.20	6.00	3.70	408.850	159.50	0 01:36:42
SC15-P90	2.80	484.00	34.60	6.00	0.23	0.652	0.11	0 00:11:18
SC1-P86	261.40	484.00	55.10	6.00	1.53	398.896	156.76	0 01:17:00
SC2-P86	22.10	484.00	75.40	6.00	3.32	73.394	81.46	0 00:19:36
SC3-P88	23.30	484.00	82.60	6.00	4.05	94.365	136.90	0 00:07:36
SC3-P89	13.60	484.00	77.70	6.00	3.55	48.266	73.30	0 00:06:24
SC4-P84	141.80	484.00	65.60	6.00	2.41	341.029	115.20	0 01:50:12
SC5-P84	85.90	484.00	64.10	6.00	2.27	195.165	73.15	0 01:34:42
SC6-P84	76.00	484.00	67.70	6.00	2.59	197.068	186.02	0 00:26:06
SC7-P84	175.70	484.00	62.30	6.00	2.12	371.781	190.89	0 01:00:48
SC8-P84	75.30	484.00	59.90	6.00	1.91	144.049	103.20	0 00:37:00
SC8-P88	4.90	484.00	91.40	6.00	5.00	24.510	35.39	0 00:06:00
SC9-P203	94.20	484.00	65.90	6.00	2.43	229.000	149.14	0 00:45:30
SH10-JDS-P72-POND	31.20	484.00	71.20	6.00	2.92	91.042	64.75	0 00:41:30
SH11-P80	13.80	484.00	90.40	6.00	4.89	67.482	70.76	0 00:20:00
SH12-P80	134.70	484.00	73.50	6.00	3.14	422.554	165.17	0 01:35:12
SH13-P72	18.40	484.00	57.00	6.00	1.68	30.838	11.48	0 01:26:06
SH14-JDS-TRIB1	4.40	484.00	60.40	6.00	1.96	8.602	5.66	0 00:42:06

Subbasin Summary

Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
SH14-P76	1.30	484.00	93.00	6.00	5.18	6.738	9.57	0 00:06:00
SH14-P79	59.40	484.00	62.80	6.00	2.16	128.245	69.39	0 00:57:06
SH1-P75	192.70	484.00	61.20	6.00	2.02	389.639	123.18	0 01:54:36
SH2-P75	52.60	484.00	62.60	6.00	2.14	112.669	59.77	0 00:58:36
SH3-P64	18.80	484.00	76.20	6.00	3.40	63.920	48.06	0 00:38:42
SH4-P75	60.90	484.00	69.80	6.00	2.79	169.728	147.72	0 00:30:06
SH5-P75	124.60	484.00	62.90	6.00	2.17	270.133	174.49	0 00:44:36
SH6-P69	254.10	484.00	60.40	6.00	1.96	496.766	258.15	0 00:58:24
SH7-P89	80.70	484.00	64.30	6.00	2.29	184.803	138.45	0 00:36:30
SH8-P69	1.00	484.00	83.10	6.00	4.10	4.102	6.14	0 00:06:24
SH8-P70	1.00	484.00	91.20	6.00	4.98	4.979	7.19	0 00:06:00
SH8-P71	72.80	484.00	67.30	6.00	2.56	186.150	145.77	0 00:35:06
SH9-P72	104.40	484.00	70.50	6.00	2.85	297.749	196.73	0 00:45:54

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Min Freeboard Attained (ft)
1	10_JDS-P69	Junction	489.95	494.90	489.95	257.41	491.52	3.82
2	10_JDS-P70	Junction	485.80	492.00	487.00	257.66	488.23	3.77
3	10_JDS-P71	Junction	480.80	489.00	481.00	240.12	485.45	3.55
4	10_JDS-P75	Junction	485.79	493.00	485.79	259.81	491.28	1.72
5	10_JDS-P76	Junction	483.40	492.50	483.40	261.77	488.13	4.37
6	10_JDS-P79	Junction	466.50	474.00	466.50	324.84	470.81	8.69
7	10_JDS-P80	Junction	464.20	478.17	464.20	455.16	469.76	8.41
8	10_JDS-Trib1	Junction	477.50	482.00	477.50	313.64	479.90	3.60
9	10_P72-pondoutfall	Junction	477.50	482.00	477.50	117.63	480.26	3.24
10	KR_JDS-D1	Junction	470.00	480.00	472.00	170.34	474.19	6.21
11	KR_JDS-D1-B	Junction	469.00	477.00	470.00	169.85	472.74	4.76
12	KR_JDS-Div1	Junction	493.50	497.50	495.00	265.94	496.31	1.19
13	KR_JDS-P200	Junction	498.00	501.86	496.65	86.32	501.09	1.41
14	KR_JDS-P39	Junction	458.00	465.00	458.99	253.02	460.63	8.36
15	KR_JDS-P40	Junction	461.26	476.00	461.26	279.20	468.03	7.97
16	KR_JDS-P41	Junction	464.22	472.16	464.22	425.70	471.53	2.39
17	KR_JDS-P42	Junction	465.81	475.85	465.81	209.31	472.06	4.37
18	KR_JDS-P43	Junction	468.40	479.00	468.40	156.29	474.09	5.11
19	KR_JDS-P44	Junction	470.00	480.00	470.00	326.34	476.07	3.93
20	KR_JDS-P45	Junction	488.76	495.40	488.76	396.21	493.57	1.83
21	KR_JDS-P45_2	Junction	487.91	492.31	487.91	396.40	492.07	0.98
22	KR_JDS-P45_3	Junction	484.96	489.96	484.96	396.40	489.66	1.59
23	KR_JDS-P46	Junction	471.00	480.00	471.00	790.75	480.00	0.00
24	KR_JDS-P47	Junction	482.01	492.01	482.01	994.83	487.31	4.70
25	KR_JDS-P48	Junction	484.55	493.00	484.55	522.72	488.98	4.02
26	KR_JDS-P49	Junction	486.52	493.00	486.52	202.77	490.45	2.55
27	KR_JDS-P50	Junction	487.95	496.00	487.95	201.27	494.16	1.84
28	KR_JDS-P51_52	Junction	514.67	521.00	514.67	252.30	517.61	3.95
29	KR_JDS-P53	Junction	480.39	486.82	480.39	67.23	482.95	4.18
30	KR_JDS-P53_2	Junction	482.00	486.00	482.00	8.33	483.06	3.44
31	KR_JDS-P55	Junction	480.87	488.60	480.87	90.57	483.96	4.64
32	KR_JDS-P56	Junction	480.58	487.40	480.56	28.76	482.13	5.27
33	KR_JDS-P57	Junction	478.29	482.00	478.29	25.71	480.97	4.14
34	KR_JDS-P57_2	Junction	480.94	486.90	480.94	14.17	481.88	5.02
35	KR_JDS-P58	Junction	478.92	484.50	478.92	212.85	482.20	2.48
36	KR_JDS-P59	Junction	480.97	486.71	480.97	207.38	484.74	2.60
37	KR_JDS-P64	Junction	492.03	495.89	492.03	186.51	494.89	2.38
38	KR_JUS-P200	Junction	499.90	504.40	499.90	86.28	503.28	1.12
39	KR_JUS-P51	Junction	514.94	521.83	514.94	140.47	519.85	1.98
40	KR_JUS-P52	Junction	517.48	521.85	517.48	112.52	519.60	2.25
41	KR_JUS-P59_2	Junction	482.33	488.00	482.33	12.94	486.61	1.39
42	KR_JUS-P65	Junction	466.93	476.50	466.93	221.79	472.68	3.82
43	SC_JDS_P203	Junction	495.06	501.90	495.06	264.40	500.34	1.72
44	SC_JDS-P202	Junction	497.07	500.00	497.07	5.80	497.56	4.01
45	SC_JDS-P204	Junction	502.20	509.20	502.20	19.13	504.46	4.74
46	SC_JDS-P84	Junction	488.34	497.00	488.34	302.33	493.92	4.12
47	SC_JDS-P86	Junction	489.60	496.80	489.74	340.47	493.78	3.02
48	SC_JDS-P87	Junction	487.40	497.00	487.40	454.67	492.33	4.67
49	SC_JDS-P88	Junction	486.50	493.50	486.50	749.63	491.65	2.85
50	SC_JDS-P89	Junction	473.34	483.50	473.34	820.07	477.01	6.49
51	SC_JDS-P90	Junction	503.02	509.00	503.02	22.21	504.94	4.06
52	SC_JDS-Trib1	Junction	464.00	472.00	464.00	819.97	468.09	3.91
53	SC_JUS-91A	Junction	506.00	509.20	506.00	27.31	507.27	1.93
54	SC_JUS-P90	Junction	503.34	509.00	503.34	22.21	505.27	3.73
55	SH_JDS-SH7-POND	Junction	487.00	489.00	487.00	4.36	488.15	3.35
56	10_OF1	Outfall	461.00			455.14	466.56	
57	KR_OF1	Outfall	458.00			255.88	459.64	
58	KR_OF2	Outfall	459.07			220.70	462.00	
59	SC_OF1	Outfall	462.00			819.86	466.09	
60	SC_OF2	Outfall	500.00			19.11	502.26	
61	10_JDS-P72-Pond	Storage Node	477.60	483.50	477.60	137.20	482.12	
62	10_JUS-P69	Storage Node	490.01	495.40	490.01	258.11	494.20	
63	10_JUS-P70	Storage Node	486.00	492.00	486.00	257.99	489.30	
64	10_JUS-P71	Storage Node	481.00	489.00	481.93	337.60	486.00	
65	10_JUS-P72	Storage Node	478.00	484.50	478.00	337.40	482.98	
66	10_JUS-P75	Storage Node	486.35	493.00	486.35	284.09	491.46	
67	10_JUS-P76	Storage Node	484.04	492.50	484.04	260.44	488.56	
68	10_JUS-P79	Storage Node	467.40	475.50	467.40	346.31	472.86	
69	10_JUS-P80	Storage Node	465.42	478.70	464.42	456.77	470.58	
70	JDS-P201	Storage Node	493.90	497.40	494.00	68.11	495.70	
71	KR_JDS-Bentley	Storage Node	490.00	494.00	490.00	319.74	493.22	
72	KR_JDS-Trib1	Storage Node	475.50	484.00	476.00	562.97	480.45	
73	KR_JDS-Trib2	Storage Node	477.00	485.00	477.00	804.87	481.73	
74	KR_JUS-D1	Storage Node	469.60	480.00	469.60	326.27	474.42	
75	KR_JUS-P201	Storage Node	492.00	497.50	494.00	146.66	495.52	
76	KR_JUS-P39	Storage Node	460.50	468.50	460.50	281.68	467.76	
77	KR_JUS-P40	Storage Node	461.95	476.00	461.95	451.79	470.48	
78	KR_JUS-P41	Storage Node	465.81	472.66	465.90	534.32	471.61	
79	KR_JUS-P42	Storage Node	465.73	475.85	465.73	230.04	472.12	

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Min Freeboard Attained (ft)
80	KR_JUS-P43	Storage Node	468.70	479.50	468.70	156.91	474.24	
81	KR_JUS-P44	Storage Node	470.30	480.00	470.30	448.42	476.19	
82	KR_JUS-P45	Storage Node	490.12	496.40	490.12	418.38	495.27	
83	KR_JUS-P45_2	Storage Node	488.17	493.31	488.17	396.19	493.09	
84	KR_JUS-P45_3	Storage Node	486.05	492.34	486.05	396.40	491.89	
85	KR_JUS-P46	Storage Node	471.20	480.00	472.00	848.92	479.51	
86	KR_JUS-P47	Storage Node	482.34	492.34	482.34	746.62	488.91	
87	KR_JUS-P48	Storage Node	485.05	492.30	485.55	437.43	489.23	
88	KR_JUS-P49	Storage Node	487.63	493.00	487.63	13.80	490.46	
89	KR_JUS-P50	Storage Node	488.25	496.00	488.25	330.42	494.19	
90	KR_JUS-P53	Storage Node	480.66	487.40	480.66	95.78	483.87	
91	KR_JUS-P53_2	Storage Node	482.00	486.50	482.00	41.24	483.28	
92	KR_JUS-P55	Storage Node	481.40	487.10	481.40	90.63	484.05	
93	KR_JUS-P56	Storage Node	481.72	487.90	481.72	9.81	483.24	
94	KR_JUS-P57	Storage Node	478.58	485.40	478.58	30.92	481.01	
95	KR_JUS-P57_2	Storage Node	481.90	487.40	481.90	14.22	483.26	
96	KR_JUS-P58	Storage Node	479.74	485.50	479.74	213.22	484.69	
97	KR_JUS-P59	Storage Node	481.43	487.80	481.43	212.30	486.99	
98	KR_JUS-P64	Storage Node	492.56	497.80	492.56	255.41	495.59	
99	KR_JUS-SWS1	Storage Node	477.50	484.00	478.00	375.47	480.97	
100	SC_JUS-P202	Storage Node	496.00	500.50	496.00	12.34	498.93	
101	SC_JUS-P203	Storage Node	495.55	501.90	495.55	262.14	500.91	
102	SC_JUS-P204	Storage Node	503.20	509.20	503.20	222.94	508.28	
103	SC_JUS-P84	Storage Node	489.26	497.00	489.26	478.29	494.17	
104	SC_JUS-P87	Storage Node	487.60	497.00	487.60	429.41	493.91	
105	SC_JUS-P88	Storage Node	488.20	494.75	488.20	353.85	493.88	
106	SC_JUS-P89	Storage Node	475.32	485.00	475.32	821.50	484.37	
107	SC_JUS-P91	Storage Node	503.87	509.20	503.87	27.54	506.09	
108	SC-JUS-P86	Storage Node	489.60	496.70	489.60	346.74	493.91	
109	SH_JUS-SH7-POND	Storage Node	485.00	489.50	486.00	138.43	488.15	

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)
1	P200	Pipe	KR_JUS-P200	KR_JDS-P200	100.00	500.40	498.80	1.6000	24.000	0.0150	86.32	100.13	0.86	8.63
2	P-201	Pipe	KR_JUS-P201	JDS-P201	30.00	494.50	494.30	0.6700	15.000	0.0150	3.42	4.57	0.75	3.26
3	P202	Pipe	SC_JUS-P202	SC_JDS-P202	43.00	497.20	497.10	0.2300	15.000	0.0150	5.80	2.70	2.15	5.03
4	P203	Pipe	SC_JUS-P203	SC_JDS_P203	49.00	495.55	495.06	1.0000	40.000	0.0130	120.34	88.34	1.36	13.79
5	P204	Pipe	SC_JUS-P204	SC_JDS-P204	103.00	503.20	502.20	0.9700	18.000	0.0120	19.13	11.21	1.71	10.82
6	P39	Pipe	KR_JUS-P39	KR_JDS-P39	556.00	460.47	458.99	0.2700	72.000	0.0120	253.02	239.10	1.06	9.75
7	P40	Pipe	KR_JUS-P40	KR_JDS-P40	210.00	461.95	461.26	0.3300	60.000	0.0120	279.20	161.73	1.73	14.22
8	P41	Pipe	KR_JUS-P41	KR_JDS-P41	61.00	465.81	464.22	2.6100	80.000	0.0200	425.70	2263.56	0.19	4.28
9	P42	Pipe	KR_JUS-P42	KR_JDS-P42	67.00	465.73	465.81	-0.1200	84.000	0.0200	209.31	365.96	0.57	2.87
10	P43	Pipe	KR_JUS-P43	KR_JDS-P43	50.00	468.70	468.40	0.6000	60.000	0.0120	156.29	674.19	0.23	3.13
11	P44	Pipe	KR_JUS-P44	KR_JDS-P44	44.30	470.30	470.00	0.6800	48.000	0.0200	326.34	687.60	0.47	4.08
12	P45	Pipe	KR_JUS-P45	KR_JDS-P45	82.20	490.12	488.76	1.6500	42.000	0.0150	396.21	432.33	0.92	13.45
13	P45_2	Pipe	KR_JUS-P45_2	KR_JDS-P45_2	25.30	488.17	487.91	1.0300	30.000	0.0130	59.95	41.58	1.44	12.21
14	P45_3	Pipe	KR_JUS-P45_3	KR_JDS-P45_3	199.00	486.05	484.96	0.5500	36.000	0.0240	46.56	26.74	1.74	7.01
15	P47	Pipe	KR_JUS-P47	KR_JDS-P47	21.80	482.34	482.01	1.5100	55.000	0.0150	994.83	1102.17	0.90	15.79
16	P48	Pipe	KR_JUS-P48	KR_JDS-P48	71.70	485.05	484.55	0.7000	48.000	0.0150	522.72	844.31	0.62	7.13
17	P49	Pipe	KR_JDS-P49	KR_JUS-P49	89.60	487.63	486.52	1.2400	24.000	0.0120	13.82	0.82	16.89	4.94
18	P50	Pipe	KR_JUS-P50	KR_JDS-P50	87.20	488.25	487.95	0.3400	24.000	0.0150	62.42	34.50	1.81	6.62
19	P51	Pipe	KR_JUS-P51	KR_JDS-P51_52	31.00	514.94	514.67	0.8700	30.000	0.0150	140.49	102.34	1.37	11.24
20	P52	Pipe	KR_JUS-P52	KR_JDS-P51_52	48.00	517.48	514.67	5.8500	30.000	0.0150	112.53	265.33	0.42	9.75
21	P53_2	Pipe	KR_JDS-P53_2	KR_JUS-P53_2	90.40	482.20	482.00	0.2200	24.000	0.0120	8.33	23.05	0.36	2.66
22	P53A	Pipe	KR_JUS-P53	KR_JDS-P53	24.80	480.66	480.39	1.0900	36.000	0.0130	41.23	69.59	0.59	6.19
23	P53B-C	Pipe	KR_JUS-P53	KR_JDS-P53	20.30	482.40	482.90	-2.4600	24.000	0.0120	19.69	76.93	0.26	5.70
24	P55	Pipe	KR_JDS-P55	KR_JUS-P55	79.60	480.87	481.40	-0.6700	48.000	0.0200	90.57	235.02	0.39	3.95
25	P56	Pipe	KR_JUS-P56	KR_JDS-P56	82.20	481.72	480.58	1.3900	30.000	0.0130	9.79	48.30	0.20	3.79
26	P57	Pipe	KR_JUS-P57	KR_JDS-P57	27.80	478.58	478.29	1.0400	36.000	0.0120	25.71	73.80	0.35	5.32
27	P57_2	Pipe	KR_JUS-P57_2	KR_JDS-P57_2	79.40	481.90	480.94	1.2100	24.000	0.0120	14.17	53.90	0.26	4.06
28	P58A	Pipe	KR_JUS-P58	KR_JDS-P58	45.60	479.74	478.92	1.8000	36.000	0.0130	101.25	89.44	1.13	14.32
29	P58B	Pipe	KR_JDS-P58	KR_JUS-P58	30.60	480.28	479.56	2.3500	24.000	0.0120	43.11	32.56	1.32	13.72
30	P58C	Pipe	KR_JDS-P58	KR_JUS-P58	30.60	480.23	479.99	0.7800	24.000	0.0120	43.55	21.70	2.01	13.86
31	P59	Pipe	KR_JUS-P59	KR_JDS-P59	95.45	481.43	480.97	0.4800	48.000	0.0200	196.54	139.79	1.41	8.45
32	P59_2	Pipe	KR_JUS-P59_2	KR_JUS-P58	73.20	482.33	482.01	0.4400	15.000	0.0120	12.91	4.63	2.79	10.52
33	P64	Pipe	KR_JUS-P64	KR_JDS-P64	47.60	492.56	492.03	1.1100	36.000	0.0150	186.51	345.00	0.54	6.96
34	P65	Pipe	KR_JUS-P65	KR_OF2	1034.00	466.93	459.07	0.7600	84.000	0.0120	220.70	603.39	0.37	8.81
35	P69	Pipe	10_JUS-P69	10_JDS-P69	60.70	490.01	489.95	0.1000	36.000	0.0200	177.17	62.05	2.86	9.37
36	P70	Pipe	10_JUS-P70	10_JDS-P70	8.50	486.00	485.80	2.3500	36.000	0.0150	257.66	501.52	0.51	9.54
37	P71	Pipe	10_JUS-P71	10_JDS-P71	34.00	481.00	480.80	0.5900	48.000	0.0120	240.12	481.88	0.50	8.04
38	P72	Pipe	10_JUS-P72	10_JDS-P72-Pond	40.95	478.00	477.60	0.9800	36.000	0.0240	125.46	107.12	1.17	5.92
39	P75	Pipe	10_JUS-P75	10_JDS-P75	66.20	486.35	485.79	0.8500	42.000	0.0200	233.17	419.05	0.56	4.76
40	P76	Pipe	10_JUS-P76	10_JDS-P76	33.70	484.04	483.40	1.9000	42.000	0.0120	261.77	1046.47	0.25	5.34
41	P79	Pipe	10_JUS-P79	10_JDS-P79	36.10	467.40	466.50	2.4900	42.000	0.0120	324.84	624.19	0.52	11.60
42	P80	Pipe	10_JUS-P80	10_JDS-P80	56.10	465.64	465.64	0.0000	99.600	0.0200	455.16	80.17	5.68	6.36
43	P84	Pipe	SC_JUS-P84	SC_JDS-P84	68.00	489.26	488.34	1.3500	36.000	0.0120	302.33	585.55	0.52	8.40
44	P86	Pipe	SC_JDS-P86	SC-JUS-P86	70.00	489.70	489.70	0.0000	73.000	0.0200	340.47	60.09	5.67	4.54
45	P87-A	Pipe	SC_JUS-P87	SC_JDS-P87	21.10	487.60	487.40	0.9500	36.000	0.0120	379.35	490.12	0.77	10.54
46	P88	Pipe	SC_JUS-P88	SC_JDS-P88	40.50	488.20	486.60	3.9500	52.000	0.0240	306.47	382.89	0.80	10.39
47	P89	Pipe	SC_JUS-P89	SC_JDS-P89	43.30	475.32	475.20	0.2800	66.000	0.0240	276.08	95.76	2.88	12.08
48	P90	Pipe	SC_JUS-P90	SC_JDS-P90	82.60	503.34	503.02	0.3900	36.000	0.0130	22.21	41.51	0.53	5.35
49	P91	Pipe	SC_JUS-P91	SC_JUS-P90	81.90	503.87	503.44	0.5300	36.000	0.0150	22.16	41.89	0.53	4.51
50	10_CH-71-70	Channel	10_JDS-P70	10_JUS-P71	1209.00	485.80	481.00	0.4000	60.000	0.0320	253.89	1271.55	0.20	1.61
51	10_CH-72-71	Channel	10_JDS-P71	10_JUS-P72	1736.00	480.80	478.00	0.1600	72.000	0.0320	262.03	616.62	0.42	3.45
52	10_CH-79-Trib1	Channel	10_JDS-Trib1	10_JUS-P79	1363.00	477.50	467.40	0.7400	60.000	0.0320	311.55	1448.21	0.22	2.06
53	10_CH-80-79	Channel	10_JDS-P79	10_JUS-P80	246.00	466.50	465.42	0.4400	156.000	0.0320	325.43	4521.15	0.07	2.88
54	10_CH-OF1-80	Channel	10_JDS-P80	10_OF1	398.00	464.20	461.00	0.8000	117.600	0.0320	455.14	1389.84	0.33	6.29
55	10_CH-Trib1	Channel	10_P72-pondoutfall	10_JDS-Trib1	85.00	477.50	477.50	0.0000	54.000	0.0320	117.64	14.78	7.96	4.62
56	10_CH-Trib1-76	Channel	10_JDS-P76	10_JDS-Trib1	1026.00	483.40	477.50	0.5800	72.000	0.0320	267.96	1025.45	0.26	5.85
57	10_RRCH-70-69	Channel	10_JDS-P69	10_JUS-P70	59.00	489.95	486.00	6.6900	60.000	0.0320	257.41	2160.35	0.12	5.71

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)
58	10_RRCH-76-75	Channel	10_JDS-P75	10_JUS-P76	34.00	485.79	484.04	5.1500	84.000	0.0320	259.81	395.55	0.66	2.26
59	KR_CH-39-40	Channel	KR_JDS-P40	KR_JUS-P39	905.00	461.26	460.50	0.0800	93.000	0.0320	277.26	497.80	0.56	2.59
60	KR_CH-40-41	Channel	KR_JDS-P41	KR_JUS-P40	1031.00	464.22	461.95	0.2200	116.400	0.0320	424.92	719.91	0.59	5.08
61	KR_CH-41-42	Channel	KR_JDS-P42	KR_JUS-P41	1352.00	465.81	465.81	0.0000	81.120	0.0320	203.24	11.59	17.54	2.11
62	KR_CH-42-43	Channel	KR_JDS-P43	KR_JUS-P42	981.00	470.90	465.73	0.5300	76.200	0.0320	155.59	587.14	0.26	2.96
63	KR_CH-43-D1	Channel	KR_JUS-D1	KR_JUS-P43	292.00	469.60	468.70	0.3100	90.000	0.0320	155.39	736.80	0.21	1.97
64	KR_CH-44-45_3	Channel	KR_JDS-P45_3	KR_JUS-P44	738.85	484.96	472.06	1.7500	60.000	0.0450	201.97	247.40	0.82	7.40
65	KR_CH-44-46	Channel	KR_JDS-P46	KR_JUS-P44	312.00	471.00	470.30	0.2200	66.000	0.0320	301.22	221.55	1.36	5.87
66	KR_CH-45_3-45_2	Channel	KR_JDS-P45_2	KR_JUS-P45_3	24.86	487.91	486.05	7.4800	60.000	0.0320	396.40	1252.28	0.32	8.69
67	KR_CH-46-46	Channel	KR_JUS-P46	KR_JDS-P46	42.00	471.20	471.00	0.4800	96.000	0.0350	790.75	1507.23	0.52	5.56
68	KR_CH-46-Trib1	Channel	KR_JDS-Trib1	KR_JUS-P46	2923.00	475.50	472.00	0.1200	72.000	0.0320	424.07	696.91	0.61	0.94
69	KR_CH-50-51	Channel	KR_JDS-P51_52	KR_JUS-P50	948.87	514.67	488.25	2.7800	48.000	0.0800	243.81	791.98	0.31	2.73
70	KR_CH-53-53_2	Channel	KR_JDS-P53_2	KR_JDS-P53	211.00	482.00	480.39	0.7600	18.000	0.0800	7.63	39.88	0.19	0.43
71	KR_CH-59-Bentley	Channel	KR_JDS-Bentley	KR_JUS-P59	669.00	490.00	481.43	1.2800	48.000	0.0320	193.14	332.77	0.58	3.59
72	KR_CH-64-Div1	Channel	KR_JDS-Div1	KR_JUS-P64	642.00	493.50	492.56	0.1500	48.000	0.0320	195.60	444.32	0.44	2.25
73	KR_CH-Bentley	Channel	KR_JDS-P200	KR_JDS-Bentley	995.00	498.00	490.00	0.8000	42.000	0.0320	92.57	173.19	0.53	2.97
74	KR_CH-D1-44	Channel	KR_JDS-P44	KR_JUS-D1	125.28	471.40	471.25	0.1200	90.000	0.0320	326.27	459.22	0.71	6.09
75	KR_CH-D1-65A	Channel	KR_JDS-D1	KR_JDS-D1-B	500.00	472.00	470.00	0.4000	90.000	0.0320	169.85	1608.55	0.11	3.84
76	KR_CH-D1B	Channel	KR_JDS-D1-B	KR_JUS-P65	400.00	470.00	466.93	0.7700	90.000	0.0320	165.10	2228.15	0.07	2.08
77	KR_CH-moose	Channel	JDS-P201	KR_JDS-Div1	886.00	493.90	493.50	0.0500	48.000	0.0320	68.11	246.72	0.28	0.76
78	KR_CH-OF1-39	Channel	KR_JDS-P39	KR_OF1	70.20	458.99	458.00	1.4100	120.000	0.0320	253.02	5759.30	0.04	5.12
79	KR_CH-SWS1	Channel	KR_JUS-SWS1	KR_JDS-Trib1	2362.00	477.50	475.50	0.0800	54.000	0.0320	96.28	217.18	0.44	0.49
80	KR_CH-SWS1-57	Channel	KR_JDS-P57	KR_JUS-SWS1	42.00	478.29	477.50	1.8800	48.000	0.0450	25.69	87.78	0.29	5.47
81	KR_CH-SWS1-58	Channel	KR_JDS-P58	KR_JUS-SWS1	76.00	478.92	477.50	1.8700	48.000	0.0320	224.25	292.08	0.77	13.19
82	KR_CH-SWS2-Trib2	Channel	KR_JDS-Trib2	KR_JDS-Trib1	470.00	477.00	475.50	0.3200	72.000	0.0320	519.01	933.31	0.56	2.03
83	KR_CH-Trib2-47	Channel	KR_JDS-P47	KR_JDS-Trib2	873.00	482.01	477.00	0.5700	72.000	0.0320	739.05	1179.07	0.63	2.65
84	KR_CH-Trib2-53	Channel	KR_JDS-P53	KR_JDS-Trib2	1194.00	480.39	477.00	0.2800	48.000	0.0450	45.65	266.85	0.17	0.77
85	KR_RRCH-45_2-45	Channel	KR_JDS-P45	KR_JUS-P45_2	40.00	488.76	488.17	1.4700	72.000	0.0320	396.19	681.99	0.58	9.19
86	KR_RRCH-47-48	Channel	KR_JDS-P48	KR_JUS-P47	45.00	484.55	482.34	4.9100	72.000	0.0320	524.26	1935.60	0.27	6.94
87	KR_RRCH-47-49	Channel	KR_JDS-P49	KR_JUS-P47	530.00	486.52	482.34	0.7900	72.000	0.0320	202.42	519.43	0.39	3.43
88	KR_RRCH-49-50	Channel	KR_JDS-P50	KR_JDS-P49	397.00	487.95	486.52	0.3600	72.000	0.0320	200.63	197.46	1.02	3.29
89	KR_RRCH-53_2-56	Channel	KR_JUS-P53_2	KR_JDS-P56	477.00	482.00	480.58	0.3000	48.000	0.0320	20.53	266.42	0.08	0.84
90	KR_RRCH-56-57	Channel	KR_JDS-P56	KR_JUS-P57	535.00	480.58	478.39	0.4100	66.000	0.0320	24.99	414.62	0.06	0.84
91	KR_RRCH-57-57_2	Channel	KR_JDS-P57_2	KR_JUS-P57	31.00	480.95	478.58	7.6500	36.000	0.0800	14.13	69.60	0.20	2.51
92	KR_RRCH-58-59	Channel	KR_JDS-P59	KR_JUS-P58	29.00	480.97	479.74	4.2400	54.000	0.0320	207.36	532.28	0.39	6.85
93	KR-CH-Bentley-64	Channel	KR_JDS-P64	KR_JDS-Bentley	1078.00	492.03	490.00	0.1900	48.000	0.0320	189.28	417.33	0.45	1.08
94	KR-RRCH-53-53_2	Channel	KR_JUS-P53_2	KR_JUS-P53	211.00	482.00	480.66	0.6400	54.000	0.0320	33.11	268.74	0.12	1.30
95	KR-RRCH-53-55	Channel	KR_JDS-P55	KR_JUS-P53	42.00	480.87	480.66	0.5000	80.400	0.0320	90.56	479.67	0.19	3.15
96	SC_CH-86-84	Channel	SC_JUS-P84	SC-JUS-P86	879.25	492.50	492.00	0.0600	48.000	0.0800	182.11	869.89	0.21	0.55
97	SC_CH-87-202	Channel	SC_JDS-P202	SC_JDS-P87	3875.00	497.07	487.40	0.2500	24.000	0.0320	3.98	49.65	0.08	0.33
98	SC_CH-88-87	Channel	SC_JDS-P87	SC_JDS-P88	1012.00	487.40	486.50	0.0900	96.000	0.0320	447.42	1128.47	0.40	1.92
99	SC_CH-89-88	Channel	SC_JDS-P88	SC_JUS-P89	1788.00	486.50	475.32	0.6300	96.000	0.0320	744.65	1670.56	0.45	3.78
100	SC_CH-OF1-Trib1	Channel	SC_JDS-Trib1	SC_OF1	140.00	464.00	462.00	1.4300	72.000	0.0450	819.86	1811.55	0.45	7.64
101	SC_CH-Trib1-89	Channel	SC_JDS-P89	SC_JDS-Trib1	748.00	473.34	464.00	1.2500	96.000	0.0320	819.97	3503.10	0.23	6.50
102	SC_RRCH-203-90	Channel	SC_JDS-P90	SC_JUS-P203	2014.00	503.02	495.55	0.3700	31.200	0.0320	22.20	38.51	0.58	1.22
103	SC_RRCH-204-OF2	Channel	SC_JDS-P204	SC_OF2	3680.98	502.20	500.00	0.0600	48.000	0.0320	19.11	72.35	0.26	1.29
104	SC_RRCH-87-203	Channel	SC_JDS_P203	SC_JUS-P87	3893.00	495.06	489.17	0.1500	84.000	0.0320	233.78	470.68	0.50	1.73
105	SC_RRCH-87-84	Channel	SC_JDS-P84	SC_JUS-P87	50.00	488.34	488.34	0.0000	116.400	0.0320	301.45	150.05	2.01	4.18
106	SC_RRCH-88-87	Channel	SC_JUS-P87	SC_JUS-P88	865.00	492.80	492.00	0.0900	60.000	0.0800	1.49	46.58	0.03	0.27
107	SC-CH-91-91A	Channel	SC_JUS-91A	SC_JUS-P91	178.41	506.00	503.87	1.1900	36.000	0.0450	27.31	127.17	0.21	3.27
108	SC-CH-91A-204	Channel	SC_JUS-P204	SC_JUS-91A	472.13	503.20	506.00	-0.5900	36.000	0.0450	27.31	89.63	0.30	1.79
109	SC-RRCH-88-86	Channel	SC_JDS-P86	SC_JUS-P88	45.00	489.74	488.20	3.4200	72.000	0.0450	340.63	1427.64	0.24	5.31
110	SH_CH-SH7-P88	Channel	SH_JDS-SH7-POND	SC_JDS-P88	2000.00	487.00	486.50	0.0300	48.000	0.0800	1.37	47.31	0.03	0.05
111	10_Pond-Flume	Weir	10_P72-pondoutfall	10_JDS-P72-Pond		477.50	477.60				117.63			
112	Div1	Weir	KR_JUS-D1	KR_JDS-D1		469.60	470.00				170.34			
113	KR_Shafer-Rd-weir	Weir	KR_JUS-P201	10_JUS-P75		492.00	486.35				0.00			
114	P200-weir	Weir	KR_JUS-P200	KR_JDS-P200		499.90	498.00				0.00			

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)
115	P201-weir	Weir	KR_JUS-P201	JDS-P201		492.00	493.90				0.00			
116	P202-weir	Weir	SC_JUS-P202	SC_JDS-P202		496.00	497.07				0.00			
117	P203-weir	Weir	SC_JUS-P203	SC_JDS_P203		495.55	495.06				182.33			
118	P39-weir	Weir	KR_JUS-P39	KR_JDS-P39		460.50	458.00				0.00			
119	P40-weir	Weir	KR_JUS-P40	KR_JDS-P40		461.95	461.26				0.00			
120	P41-weir	Weir	KR_JUS-P41	KR_JDS-P41		465.81	464.22				0.00			
121	P42-weir	Weir	KR_JUS-P42	KR_JDS-P42		465.73	465.81				0.00			
122	P43-weir	Weir	KR_JUS-P43	KR_JDS-P43		468.70	468.40				0.00			
123	P44-weir	Weir	KR_JUS-P44	KR_JDS-P44		470.30	470.00				0.00			
124	P45_2-weir	Weir	KR_JUS-P45_2	KR_JDS-P45_2		488.17	487.91				348.57			
125	P45_3-bypass	Weir	KR_JDS-P45_3	KR_JUS-P44		484.96	470.30				195.55			
126	P45_3-weir	Weir	KR_JUS-P45_3	KR_JDS-P45_3		486.05	484.96				361.23			
127	P45-weir	Weir	KR_JUS-P45	KR_JDS-P45		490.12	488.76				0.00			
128	P47-weir	Weir	KR_JUS-P47	KR_JDS-P47		482.34	482.01				0.00			
129	P48-weir	Weir	KR_JUS-P48	KR_JDS-P48		485.05	484.55				0.00			
130	P49-weir	Weir	KR_JUS-P49	KR_JDS-P49		487.63	486.52				0.00			
131	P50-weir	Weir	KR_JUS-P50	KR_JDS-P50		488.25	487.95				192.57			
132	P51-weir	Weir	KR_JUS-P51	KR_JDS-P51_52		514.94	514.67				0.00			
133	P52-weir	Weir	KR_JUS-P52	KR_JDS-P51_52		517.48	514.67				0.00			
134	P53_2-weir	Weir	KR_JUS-P53_2	KR_JDS-P53_2		482.00	482.00				0.00			
135	P53-weir	Weir	KR_JUS-P53	KR_JDS-P53		480.66	480.39				0.00			
136	P55-weir	Weir	KR_JUS-P55	KR_JDS-P55		481.40	480.87				0.00			
137	P56-weir	Weir	KR_JUS-P56	KR_JDS-P56		481.72	480.58				0.00			
138	P57_2-weir	Weir	KR_JUS-P57_2	KR_JDS-P57_2		481.90	480.94				0.00			
139	P57-weir	Weir	KR_JUS-P57	KR_JDS-P57		478.58	478.29				0.00			
140	P58-weir	Weir	KR_JUS-P58	KR_JDS-P58		479.74	478.92				27.24			
141	P59_2-weir	Weir	KR_JUS-P59_2	KR_JUS-P59		482.33	481.43				4.69			
142	P59-weir	Weir	KR_JUS-P59	KR_JDS-P59		481.43	480.97				10.84			
143	P64-weir	Weir	KR_JUS-P64	KR_JDS-P64		492.56	492.03				0.00			
144	P69-weir	Weir	10_JUS-P69	10_JDS-P69		490.01	489.95				80.24			
145	P70-weir	Weir	10_JUS-P70	10_JDS-P70		486.00	485.80				0.00			
146	P71-weir	Weir	10_JUS-P71	10_JDS-P71		481.00	480.80				0.00			
147	P72-weir	Weir	10_JUS-P72	10_JDS-P72-Pond		478.00	477.60				0.00			
148	P75-weir	Weir	10_JUS-P75	10_JDS-P75		486.35	485.79				60.88			
149	P76-weir	Weir	10_JUS-P76	10_JDS-P76		484.04	483.40				0.00			
150	P79-weir	Weir	10_JUS-P79	10_JDS-P79		467.40	466.50				0.00			
151	P80-weir	Weir	10_JUS-P80	10_JDS-P80		465.42	464.20				0.00			
152	P84-weir	Weir	SC_JUS-P84	SC_JDS-P84		489.26	488.34				45.54			
153	P86-weir	Weir	SC-JUS-P86	SC_JDS-P86		489.60	489.60				0.00			
154	P87-weir	Weir	SC_JUS-P87	SC_JDS-P87		487.60	487.40				38.25			
155	P88-weir	Weir	SC_JUS-P88	SC_JDS-P88		488.20	486.50				14.89			
156	P89-weir	Weir	SC_JUS-P89	SC_JDS-P89		475.32	473.34				543.99			
157	SH7-ovrflow	Weir	SH_JUS-SH7-POND	SH_JDS-SH7-POND		485.00	487.00				4.36			

Bloom to Lime Ridge Study
100 yr - 24 hr Post-Dev Results (w/ select drainage improvements)

Project Description

File Name ..... 19490-Columbia Co-POST-Kinney Run Rev2_10-13-2020.SPF

Project Options

Flow Units ..... CFS
Elevation Type ..... Elevation
Hydrology Method ..... SCS TR-20
Time of Concentration (TOC) Method ..... SCS TR-55
Link Routing Method ..... Hydrodynamic
Enable Overflow Ponding at Nodes ..... YES
Skip Steady State Analysis Time Periods ... YES

Analysis Options

Start Analysis On ..... Nov 22, 2019 00:00:00
End Analysis On ..... Nov 23, 2019 00:00:00
Start Reporting On ..... Nov 22, 2019 00:00:00
Antecedent Dry Days ..... 0 days
Runoff (Dry Weather) Time Step ..... 0 01:00:00 days hh:mm:ss
Runoff (Wet Weather) Time Step ..... 0 00:05:00 days hh:mm:ss
Reporting Time Step ..... 0 00:05:00 days hh:mm:ss
Routing Time Step ..... 2 seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins	93
Nodes	109
Junctions	55
Outfalls	5
Flow Diversions	0
Inlets	0
Storage Nodes	49
Links	157
Channels	61
Pipes	49
Pumps	0
Orifices	0
Weirs	47
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1		Time Series	100yr-24hr	Cumulative	inches	Pennsylvania	Columbia	100	7.05	SCS Type II 24-hr

Subbasin Summary

Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
KR10-JUS-SWS1	51.60	484.00	50.50	7.05	1.74	89.784	20.38	0 02:38:18
KR11-P53	0.20	484.00	93.00	7.05	6.22	1.244	1.74	0 00:06:00
KR11-P53_2	1.70	484.00	93.00	7.05	6.22	10.576	14.90	0 00:06:00
KR11-P55	20.90	484.00	80.90	7.05	4.84	101.156	112.71	0 00:18:54
KR11-P56	1.90	484.00	89.50	7.05	5.81	11.047	11.82	0 00:18:54
KR11-P57	0.80	484.00	93.00	7.05	6.22	4.977	7.00	0 00:06:00
KR11-P57_2	2.60	484.00	83.10	7.05	5.09	13.224	17.52	0 00:10:48
KR11-P58	0.30	484.00	93.00	7.05	6.22	1.866	2.63	0 00:06:00
KR11-P59	31.10	484.00	69.00	7.05	3.56	110.561	97.59	0 00:29:54
KR12-P48	111.40	484.00	68.50	7.05	3.50	390.234	140.31	0 01:45:36
KR13-P48	154.70	484.00	67.30	7.05	3.38	522.577	177.01	0 01:53:42
KR14-P48	14.90	484.00	69.20	7.05	3.58	53.282	25.19	0 01:13:30
KR15-P48	42.00	484.00	65.20	7.05	3.16	132.804	53.69	0 01:28:42
KR16-P48	78.90	484.00	74.20	7.05	4.11	324.042	230.81	0 00:41:54
KR17-P52	39.40	484.00	67.30	7.05	3.38	133.093	150.23	0 00:18:54
KR18-P51	38.40	484.00	72.70	7.05	3.95	151.526	189.87	0 00:14:36
KR19-P45	121.00	484.00	72.10	7.05	3.88	469.722	442.31	0 00:26:54
KR1-P64	108.00	484.00	56.10	7.05	2.26	244.080	148.03	0 00:47:06
KR20-P47	20.50	484.00	88.70	7.05	5.72	117.301	122.60	0 00:20:12
KR20-P48	51.90	484.00	74.90	7.05	4.18	217.098	189.06	0 00:30:42
kr20-p49	2.10	484.00	92.20	7.05	6.13	12.867	17.26	0 00:08:00
KR20-P50	23.50	484.00	79.80	7.05	4.72	110.873	111.12	0 00:23:48
KR20-P53	1.70	484.00	92.80	7.05	6.20	10.535	14.86	0 00:06:00
KR21-JDS-TRIB1	46.10	484.00	65.40	7.05	3.18	146.690	60.06	0 01:27:30
KR21-JDS-TRIB2	15.30	484.00	78.00	7.05	4.52	69.156	58.05	0 00:32:36
KR22-P44	7.80	484.00	93.00	7.05	6.22	48.524	57.21	0 00:13:18
KR22-P46	117.40	484.00	72.00	7.05	3.87	454.573	151.05	0 01:58:36
KR23-41	26.40	484.00	89.30	7.05	5.79	152.882	65.63	0 01:22:24
KR24-P41	53.60	484.00	81.20	7.05	4.87	261.246	302.41	0 00:17:12
KR25-P41	32.00	484.00	70.40	7.05	3.70	118.464	124.49	0 00:22:00
KR26-P41	40.40	484.00	83.20	7.05	5.10	205.919	125.59	0 00:52:12
KR27-P41	71.20	484.00	66.30	7.05	3.28	233.180	100.36	0 01:22:24
KR27-P42	34.40	484.00	74.00	7.05	4.09	140.558	96.08	0 00:44:36
KR27-P43	1.60	484.00	93.00	7.05	6.22	9.954	13.36	0 00:07:42
KR27-P44	7.70	484.00	93.00	7.05	6.22	47.902	58.84	0 00:11:18
KR28-40	60.50	484.00	58.90	7.05	2.53	153.126	49.75	0 01:52:36
KR29-P65	19.80	484.00	88.30	7.05	5.68	112.385	74.61	0 00:44:54
KR2-P64	59.00	484.00	69.00	7.05	3.56	209.745	210.01	0 00:23:54
KR31-P45	19.80	484.00	86.80	7.05	5.51	108.999	121.07	0 00:18:00
KR31-P45_2	1.30	484.00	93.00	7.05	6.22	8.087	11.37	0 00:06:00
KR32-OF1	21.20	484.00	64.10	7.05	3.05	64.660	51.81	0 00:34:00
KR32-P39	19.90	484.00	51.70	7.05	1.85	36.795	18.23	0 00:57:00
KR3-P64	12.60	484.00	35.00	7.05	0.51	6.401	2.08	0 00:28:42
KR4-P64	32.40	484.00	63.30	7.05	2.97	96.196	90.34	0 00:26:12
KR5-P200	55.70	484.00	63.70	7.05	3.01	167.601	104.86	0 00:48:42
KR6-JDS-BENTLEY	14.40	484.00	61.90	7.05	2.83	40.723	53.41	0 00:12:18
KR6-P200	17.10	484.00	59.00	7.05	2.54	43.451	52.71	0 00:15:06
KR7-JDS-BENTLEY	21.10	484.00	70.60	7.05	3.72	78.555	50.64	0 00:48:12
KR8-P58	0.09	484.00	87.60	7.05	5.59	0.490	0.57	0 00:16:53
KR8-P59	9.90	484.00	82.20	7.05	4.99	49.352	41.29	0 00:32:24
KR8-P59_2	2.30	484.00	93.00	7.05	6.22	14.308	15.95	0 00:15:42
KR9-JUS-SWS1	87.50	484.00	67.50	7.05	3.40	297.413	120.81	0 01:29:24
SC10-P84	59.70	484.00	37.00	7.05	0.64	38.387	21.35	0 00:18:18
SC11-JDS-P87	112.10	484.00	40.50	7.05	0.90	100.778	11.33	0 05:42:54
SC11-P87	6.40	484.00	83.10	7.05	5.09	32.550	47.96	0 00:06:42
SC12-JDS-P87	48.80	484.00	64.40	7.05	3.08	150.304	64.07	0 01:22:30
SC12-P87	2.30	484.00	93.00	7.05	6.22	14.308	20.10	0 00:06:00
SC12-P89	108.40	484.00	62.20	7.05	2.86	309.807	102.40	0 01:53:42
SC13-P204	127.20	484.00	63.60	7.05	3.00	381.473	131.91	0 01:47:42
SC14-P204	181.40	484.00	57.30	7.05	2.38	430.825	220.20	0 01:00:30
SC14-P91	1.40	484.00	81.00	7.05	4.85	6.791	9.76	0 00:07:54
SC15-P202	2.20	484.00	88.70	7.05	5.72	12.588	15.09	0 00:14:06
SC15-P203	110.50	484.00	79.20	7.05	4.65	514.046	200.61	0 01:36:42
SC15-P90	2.80	484.00	34.60	7.05	0.48	1.350	0.71	0 00:11:18
SC1-P86	261.40	484.00	55.10	7.05	2.17	565.931	235.92	0 01:17:00
SC2-P86	22.10	484.00	75.40	7.05	4.24	93.638	103.82	0 00:19:36
SC3-P88	23.30	484.00	82.60	7.05	5.03	117.199	168.64	0 00:07:36
SC3-P89	13.60	484.00	77.70	7.05	4.49	61.023	92.27	0 00:06:24
SC4-P84	141.80	484.00	65.60	7.05	3.20	454.185	156.16	0 01:50:12
SC5-P84	85.90	484.00	64.10	7.05	3.05	261.995	100.27	0 01:34:42
SC6-P84	76.00	484.00	67.70	7.05	3.42	259.844	247.66	0 00:26:06
SC7-P84	175.70	484.00	62.30	7.05	2.87	503.908	266.76	0 01:00:48
SC8-P84	75.30	484.00	59.90	7.05	2.63	197.964	146.78	0 00:37:00
SC8-P88	4.90	484.00	91.40	7.05	6.03	29.567	42.22	0 00:06:00
SC9-P203	94.20	484.00	65.90	7.05	3.23	304.549	201.93	0 00:45:30
SH10-JDS-P72-POND	31.20	484.00	71.20	7.05	3.79	118.154	84.65	0 00:41:30
SH11-P80	13.80	484.00	90.40	7.05	5.92	81.668	84.61	0 00:20:00
SH12-P80	134.70	484.00	73.50	7.05	4.03	543.110	213.89	0 01:35:12
SH13-P72	18.40	484.00	57.00	7.05	2.35	43.185	16.90	0 01:26:06
SH14-JDS-TRIB1	4.40	484.00	60.40	7.05	2.68	11.788	8.01	0 00:42:06

Subbasin Summary

Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
SH14-P76	1.30	484.00	93.00	7.05	6.22	8.087	11.37	0 00:06:00
SH14-P79	59.40	484.00	62.80	7.05	2.92	173.329	96.41	0 00:57:06
SH1-P75	192.70	484.00	61.20	7.05	2.76	531.467	173.11	0 01:54:36
SH2-P75	52.60	484.00	62.60	7.05	2.90	152.435	82.79	0 00:58:36
SH3-P64	18.80	484.00	76.20	7.05	4.32	81.291	61.20	0 00:38:42
SH4-P75	60.90	484.00	69.80	7.05	3.64	221.615	194.70	0 00:30:06
SH5-P75	124.60	484.00	62.90	7.05	2.93	364.829	241.87	0 00:44:36
SH6-P69	254.10	484.00	60.40	7.05	2.68	680.734	366.21	0 00:58:24
SH7-P89	80.70	484.00	64.30	7.05	3.07	247.749	189.46	0 00:36:30
SH8-P69	1.00	484.00	83.10	7.05	5.09	5.086	7.55	0 00:06:24
SH8-P70	1.00	484.00	91.20	7.05	6.01	6.011	8.58	0 00:06:00
SH8-P71	72.80	484.00	67.30	7.05	3.38	245.918	195.03	0 00:35:06
SH9-P72	104.40	484.00	70.50	7.05	3.71	387.637	259.05	0 00:45:54

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Min Freeboard Attained (ft)
1	10_JDS-P69	Junction	489.95	494.90	489.95	365.24	491.84	3.50
2	10_JDS-P70	Junction	485.80	492.00	487.00	364.98	488.60	3.40
3	10_JDS-P71	Junction	480.80	489.00	481.00	398.55	486.12	2.88
4	10_JDS-P75	Junction	485.79	493.00	485.79	346.78	492.09	0.91
5	10_JDS-P76	Junction	483.40	492.50	483.40	349.34	488.38	4.12
6	10_JDS-P79	Junction	466.50	474.00	466.50	436.82	471.66	7.84
7	10_JDS-P80	Junction	464.20	478.17	464.20	576.37	470.43	7.74
8	10_JDS-Trib1	Junction	477.50	482.00	477.50	438.71	480.29	3.21
9	10_P72-pondoutfall	Junction	477.50	482.00	477.50	156.35	480.65	2.85
10	KR_JDS-D1	Junction	470.00	480.00	472.00	210.30	474.46	5.94
11	KR_JDS-D1-B	Junction	469.00	477.00	470.00	209.72	473.59	3.91
12	KR_JDS-Div1	Junction	493.50	497.50	495.00	366.64	496.61	0.89
13	KR_JDS-P200	Junction	498.00	501.86	496.65	119.02	501.54	0.96
14	KR_JDS-P39	Junction	458.00	465.00	458.99	282.26	460.75	8.24
15	KR_JDS-P40	Junction	461.26	476.00	461.26	312.28	468.52	7.48
16	KR_JDS-P41	Junction	464.22	472.16	464.22	509.42	472.23	1.69
17	KR_JDS-P42	Junction	465.81	475.85	465.81	252.07	472.80	3.63
18	KR_JDS-P43	Junction	468.40	479.00	468.40	183.93	474.36	4.84
19	KR_JDS-P44	Junction	470.00	480.00	470.00	393.88	476.39	3.61
20	KR_JDS-P45	Junction	488.76	495.40	488.76	466.85	493.78	1.62
21	KR_JDS-P45_2	Junction	487.91	492.31	487.91	465.39	492.39	0.66
22	KR_JDS-P45_3	Junction	484.96	489.96	484.96	465.39	489.78	1.47
23	KR_JDS-P46	Junction	471.00	480.00	471.00	589.14	480.00	0.00
24	KR_JDS-P47	Junction	482.01	492.01	482.01	1016.59	487.54	4.47
25	KR_JDS-P48	Junction	484.55	493.00	484.55	575.60	488.87	4.13
26	KR_JDS-P49	Junction	486.52	493.00	486.52	236.93	490.74	2.26
27	KR_JDS-P50	Junction	487.95	496.00	487.95	235.24	495.16	0.84
28	KR_JDS-P51_52	Junction	514.67	521.00	514.67	328.73	517.79	3.77
29	KR_JDS-P53	Junction	480.39	486.82	480.39	82.58	483.09	4.04
30	KR_JDS-P53_2	Junction	482.00	486.00	482.00	10.84	483.23	3.27
31	KR_JDS-P55	Junction	480.87	488.60	480.87	112.04	484.22	4.38
32	KR_JDS-P56	Junction	480.58	487.40	480.56	36.86	482.35	5.05
33	KR_JDS-P57	Junction	478.29	482.00	478.29	31.83	481.84	3.27
34	KR_JDS-P57_2	Junction	480.94	486.90	480.94	17.38	482.02	4.88
35	KR_JDS-P58	Junction	478.92	484.50	478.92	289.87	482.82	1.86
36	KR_JDS-P59	Junction	480.97	486.71	480.97	290.09	485.32	2.02
37	KR_JDS-P64	Junction	492.03	495.89	492.03	225.83	495.08	2.19
38	KR_JUS-P200	Junction	499.90	504.40	499.90	119.01	503.77	0.63
39	KR_JUS-P51	Junction	514.94	521.83	514.94	182.29	521.03	0.80
40	KR_JUS-P52	Junction	517.48	521.85	517.48	150.15	520.71	1.14
41	KR_JUS-P59_2	Junction	482.33	488.00	482.33	15.42	487.18	0.82
42	KR_JUS-P65	Junction	466.93	476.50	466.93	276.95	473.54	2.96
43	SC_JDS_P203	Junction	495.06	501.90	495.06	337.35	500.95	1.11
44	SC_JDS-P202	Junction	497.07	500.00	497.07	6.54	497.62	3.95
45	SC_JDS-P204	Junction	502.20	509.20	502.20	21.01	504.56	4.64
46	SC_JDS-P84	Junction	488.34	497.00	488.34	363.53	494.39	3.65
47	SC_JDS-P86	Junction	489.60	496.80	489.74	395.54	494.30	2.50
48	SC_JDS-P87	Junction	487.40	497.00	487.40	730.34	493.70	3.30
49	SC_JDS-P88	Junction	486.50	493.50	486.50	1126.13	492.91	1.59
50	SC_JDS-P89	Junction	473.34	483.50	473.34	1223.64	477.86	5.64
51	SC_JDS-P90	Junction	503.02	509.00	503.02	31.47	505.42	3.58
52	SC_JDS-Trib1	Junction	464.00	472.00	464.00	1223.51	468.97	3.03
53	SC_JUS-91A	Junction	506.00	509.20	506.00	39.09	507.56	1.64
54	SC_JUS-P90	Junction	503.34	509.00	503.34	31.47	505.83	3.17
55	SH_JDS-SH7-POND	Junction	487.00	489.00	487.00	20.16	488.59	2.91
56	10_OF1	Outfall	461.00			576.36	467.23	
57	KR_OF1	Outfall	458.00			285.83	459.76	
58	KR_OF2	Outfall	459.07			274.93	462.39	
59	SC_OF1	Outfall	462.00			1223.38	466.97	
60	SC_OF2	Outfall	500.00			20.99	502.36	
61	10_JDS-P72-Pond	Storage Node	477.60	483.50	477.60	173.32	483.11	
62	10_JUS-P69	Storage Node	490.01	495.40	490.01	366.21	494.40	
63	10_JUS-P70	Storage Node	486.00	492.00	486.00	365.95	490.76	
64	10_JUS-P71	Storage Node	481.00	489.00	481.93	478.00	486.64	
65	10_JUS-P72	Storage Node	478.00	484.50	478.00	545.05	483.96	
66	10_JUS-P75	Storage Node	486.35	493.00	486.35	398.54	492.15	
67	10_JUS-P76	Storage Node	484.04	492.50	484.04	347.48	489.15	
68	10_JUS-P79	Storage Node	467.40	475.50	467.40	481.21	474.76	
69	10_JUS-P80	Storage Node	465.42	478.70	464.42	578.21	471.44	
70	JDS-P201	Storage Node	493.90	497.40	494.00	109.80	496.21	
71	KR_JDS-Bentley	Storage Node	490.00	494.00	490.00	408.17	493.67	
72	KR_JDS-Trib1	Storage Node	475.50	484.00	476.00	726.43	481.27	
73	KR_JDS-Trib2	Storage Node	477.00	485.00	477.00	912.43	482.19	
74	KR_JUS-D1	Storage Node	469.60	480.00	469.60	393.78	474.75	
75	KR_JUS-P201	Storage Node	492.00	497.50	494.00	193.96	495.79	
76	KR_JUS-P39	Storage Node	460.50	468.50	460.50	316.44	468.25	
77	KR_JUS-P40	Storage Node	461.95	476.00	461.95	548.18	471.56	
78	KR_JUS-P41	Storage Node	465.81	472.66	465.90	673.51	472.43	
79	KR_JUS-P42	Storage Node	465.73	475.85	465.73	274.66	472.87	

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Min Freeboard Attained (ft)
80	KR_JUS-P43	Storage Node	468.70	479.50	468.70	184.42	474.57	
81	KR_JUS-P44	Storage Node	470.30	480.00	470.30	499.21	476.56	
82	KR_JUS-P45	Storage Node	490.12	496.40	490.12	535.93	495.68	
83	KR_JUS-P45_2	Storage Node	488.17	493.31	488.17	466.81	493.21	
84	KR_JUS-P45_3	Storage Node	486.05	492.34	486.05	465.40	492.02	
85	KR_JUS-P46	Storage Node	471.20	480.00	472.00	785.38	480.00	
86	KR_JUS-P47	Storage Node	482.34	492.34	482.34	844.73	489.01	
87	KR_JUS-P48	Storage Node	485.05	492.30	485.55	575.62	489.69	
88	KR_JUS-P49	Storage Node	487.63	493.00	487.63	16.47	490.76	
89	KR_JUS-P50	Storage Node	488.25	496.00	488.25	429.10	495.17	
90	KR_JUS-P53	Storage Node	480.66	487.40	480.66	118.19	484.11	
91	KR_JUS-P53_2	Storage Node	482.00	486.50	482.00	49.58	483.45	
92	KR_JUS-P55	Storage Node	481.40	487.10	481.40	112.40	484.46	
93	KR_JUS-P56	Storage Node	481.72	487.90	481.72	11.76	483.40	
94	KR_JUS-P57	Storage Node	478.58	485.40	478.58	40.01	481.84	
95	KR_JUS-P57_2	Storage Node	481.90	487.40	481.90	17.45	483.45	
96	KR_JUS-P58	Storage Node	479.74	485.50	479.74	303.63	484.99	
97	KR_JUS-P59	Storage Node	481.43	487.80	481.43	289.96	487.20	
98	KR_JUS-P64	Storage Node	492.56	497.80	492.56	332.44	496.10	
99	KR_JUS-SWS1	Storage Node	477.50	484.00	478.00	501.65	481.84	
100	SC_JUS-P202	Storage Node	496.00	500.50	496.00	14.86	499.17	
101	SC_JUS-P203	Storage Node	495.55	501.90	495.55	342.89	501.21	
102	SC_JUS-P204	Storage Node	503.20	509.20	503.20	320.43	509.17	
103	SC_JUS-P84	Storage Node	489.26	497.00	489.26	674.13	494.60	
104	SC_JUS-P87	Storage Node	487.60	497.00	487.60	668.24	494.36	
105	SC_JUS-P88	Storage Node	488.20	494.75	488.20	408.71	494.39	
106	SC_JUS-P89	Storage Node	475.32	485.00	475.32	1225.51	484.75	
107	SC_JUS-P91	Storage Node	503.87	509.20	503.87	39.35	506.62	
108	SC-JUS-P86	Storage Node	489.60	496.70	489.60	477.84	494.48	
109	SH_JUS-SH7-POND	Storage Node	485.00	489.50	486.00	189.35	488.59	

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)
1	P200	Pipe	KR_JUS-P200	KR_JDS-P200	100.00	500.40	498.80	1.6000	24.000	0.0150	93.98	100.13	0.94	9.40
2	P-201	Pipe	KR_JUS-P201	JDS-P201	30.00	494.50	494.30	0.6700	15.000	0.0150	5.69	4.57	1.24	4.95
3	P202	Pipe	SC_JUS-P202	SC_JDS-P202	43.00	497.20	497.10	0.2300	15.000	0.0150	6.54	2.70	2.42	5.57
4	P203	Pipe	SC_JUS-P203	SC_JDS_P203	49.00	495.55	495.06	1.0000	40.000	0.0130	121.27	88.34	1.37	13.90
5	P204	Pipe	SC_JUS-P204	SC_JDS-P204	103.00	503.20	502.20	0.9700	18.000	0.0120	21.01	11.21	1.87	11.89
6	P39	Pipe	KR_JUS-P39	KR_JDS-P39	556.00	460.47	458.99	0.2700	72.000	0.0120	273.70	239.10	1.14	10.41
7	P40	Pipe	KR_JUS-P40	KR_JDS-P40	210.00	461.95	461.26	0.3300	60.000	0.0120	312.28	161.73	1.93	15.90
8	P41	Pipe	KR_JUS-P41	KR_JDS-P41	61.00	465.81	464.22	2.6100	80.000	0.0200	502.29	2263.56	0.22	4.76
9	P42	Pipe	KR_JUS-P42	KR_JDS-P42	67.00	465.73	465.81	-0.1200	84.000	0.0200	252.07	365.96	0.69	3.08
10	P43	Pipe	KR_JUS-P43	KR_JDS-P43	50.00	468.70	468.40	0.6000	60.000	0.0120	183.93	674.19	0.27	3.68
11	P44	Pipe	KR_JUS-P44	KR_JDS-P44	44.30	470.30	470.00	0.6800	48.000	0.0200	393.88	687.60	0.57	4.92
12	P45	Pipe	KR_JUS-P45	KR_JDS-P45	82.20	490.12	488.76	1.6500	42.000	0.0150	418.00	432.33	0.97	14.19
13	P45_2	Pipe	KR_JUS-P45_2	KR_JDS-P45_2	25.30	488.17	487.91	1.0300	30.000	0.0130	60.63	41.58	1.46	12.35
14	P45_3	Pipe	KR_JUS-P45_3	KR_JDS-P45_3	199.00	486.05	484.96	0.5500	36.000	0.0240	46.55	26.74	1.74	6.95
15	P47	Pipe	KR_JUS-P47	KR_JDS-P47	21.80	482.34	482.01	1.5100	55.000	0.0150	1016.59	1102.17	0.92	16.13
16	P48	Pipe	KR_JUS-P48	KR_JDS-P48	71.70	485.05	484.55	0.7000	48.000	0.0150	575.60	844.31	0.68	7.85
17	P49	Pipe	KR_JDS-P49	KR_JUS-P49	89.60	487.63	486.52	1.2400	24.000	0.0120	16.50	0.82	20.15	5.71
18	P50	Pipe	KR_JUS-P50	KR_JDS-P50	87.20	488.25	487.95	0.3400	24.000	0.0150	62.90	34.50	1.82	6.67
19	P51	Pipe	KR_JUS-P51	KR_JDS-P51_52	31.00	514.94	514.67	0.8700	30.000	0.0150	170.72	102.34	1.67	13.66
20	P52	Pipe	KR_JUS-P52	KR_JDS-P51_52	48.00	517.48	514.67	5.8500	30.000	0.0150	150.00	265.33	0.57	12.00
21	P53_2	Pipe	KR_JDS-P53_2	KR_JUS-P53_2	90.40	482.20	482.00	0.2200	24.000	0.0120	10.84	23.05	0.47	2.92
22	P53A	Pipe	KR_JUS-P53	KR_JDS-P53	24.80	480.66	480.39	1.0900	36.000	0.0130	45.73	69.59	0.66	6.75
23	P53B-C	Pipe	KR_JUS-P53	KR_JDS-P53	20.30	482.40	482.90	-2.4600	24.000	0.0120	28.00	76.93	0.36	6.64
24	P55	Pipe	KR_JDS-P55	KR_JUS-P55	79.60	480.87	481.40	-0.6700	48.000	0.0200	112.04	235.02	0.48	4.37
25	P56	Pipe	KR_JUS-P56	KR_JDS-P56	82.20	481.72	480.58	1.3900	30.000	0.0130	11.74	48.30	0.24	3.87
26	P57	Pipe	KR_JUS-P57	KR_JDS-P57	27.80	478.58	478.29	1.0400	36.000	0.0120	31.83	73.80	0.43	5.65
27	P57_2	Pipe	KR_JUS-P57_2	KR_JDS-P57_2	79.40	481.90	480.94	1.2100	24.000	0.0120	17.38	53.90	0.32	4.05
28	P58A	Pipe	KR_JUS-P58	KR_JDS-P58	45.60	479.74	478.92	1.8000	36.000	0.0130	99.25	89.44	1.11	14.04
29	P58B	Pipe	KR_JDS-P58	KR_JUS-P58	30.60	480.28	479.56	2.3500	24.000	0.0120	43.53	32.56	1.34	13.86
30	P58C	Pipe	KR_JDS-P58	KR_JUS-P58	30.60	480.23	479.99	0.7800	24.000	0.0120	43.84	21.70	2.02	13.96
31	P59	Pipe	KR_JUS-P59	KR_JDS-P59	95.45	481.43	480.97	0.4800	48.000	0.0200	260.85	139.79	1.87	10.87
32	P59_2	Pipe	KR_JUS-P59_2	KR_JUS-P58	73.20	482.33	482.01	0.4400	15.000	0.0120	13.53	4.63	2.92	11.02
33	P64	Pipe	KR_JUS-P64	KR_JDS-P64	47.60	492.56	492.03	1.1100	36.000	0.0150	225.83	345.00	0.65	7.53
34	P65	Pipe	KR_JUS-P65	KR_OF2	1034.00	466.93	459.07	0.7600	84.000	0.0120	274.93	603.39	0.46	9.42
35	P69	Pipe	10_JUS-P69	10_JDS-P69	60.70	490.01	489.95	0.1000	36.000	0.0200	187.29	62.05	3.02	9.37
36	P70	Pipe	10_JUS-P70	10_JDS-P70	8.50	486.00	485.80	2.3500	36.000	0.0150	364.98	501.52	0.73	12.63
37	P71	Pipe	10_JUS-P71	10_JDS-P71	34.00	481.00	480.80	0.5900	48.000	0.0120	286.45	481.88	0.59	8.04
38	P72	Pipe	10_JUS-P72	10_JDS-P72-Pond	40.95	478.00	477.60	0.9800	36.000	0.0240	142.93	107.12	1.33	6.74
39	P75	Pipe	10_JUS-P75	10_JDS-P75	66.20	486.35	485.79	0.8500	42.000	0.0200	231.67	419.05	0.55	4.73
40	P76	Pipe	10_JUS-P76	10_JDS-P76	33.70	484.04	483.40	1.9000	42.000	0.0120	349.34	1046.47	0.33	7.13
41	P79	Pipe	10_JUS-P79	10_JDS-P79	36.10	467.40	466.50	2.4900	42.000	0.0120	405.17	624.19	0.65	14.47
42	P80	Pipe	10_JUS-P80	10_JDS-P80	56.10	465.64	465.64	0.0000	99.600	0.0200	576.37	80.17	7.19	6.89
43	P84	Pipe	SC_JUS-P84	SC_JDS-P84	68.00	489.26	488.34	1.3500	36.000	0.0120	313.87	585.55	0.54	8.72
44	P86	Pipe	SC_JDS-P86	SC-JUS-P86	70.00	489.70	489.70	0.0000	73.000	0.0200	395.54	60.09	6.58	4.54
45	P87-A	Pipe	SC_JUS-P87	SC_JDS-P87	21.10	487.60	487.40	0.9500	36.000	0.0120	399.83	490.12	0.82	11.11
46	P88	Pipe	SC_JUS-P88	SC_JDS-P88	40.50	488.20	486.60	3.9500	52.000	0.0240	325.38	382.89	0.85	11.03
47	P89	Pipe	SC_JUS-P89	SC_JDS-P89	43.30	475.32	475.20	0.2800	66.000	0.0240	285.69	95.76	2.98	12.45
48	P90	Pipe	SC_JUS-P90	SC_JDS-P90	82.60	503.34	503.02	0.3900	36.000	0.0130	31.47	41.51	0.76	5.24
49	P91	Pipe	SC_JUS-P91	SC_JUS-P90	81.90	503.87	503.44	0.5300	36.000	0.0150	31.40	41.89	0.75	4.88
50	10_CH-71-70	Channel	10_JDS-P70	10_JUS-P71	1209.00	485.80	481.00	0.4000	60.000	0.0320	360.77	1271.55	0.28	1.61
51	10_CH-72-71	Channel	10_JDS-P71	10_JUS-P72	1736.00	480.80	478.00	0.1600	72.000	0.0320	407.07	616.62	0.66	3.38
52	10_CH-79-Trib1	Channel	10_JDS-Trib1	10_JUS-P79	1363.00	477.50	467.40	0.7400	60.000	0.0320	436.71	1448.21	0.30	2.48
53	10_CH-80-79	Channel	10_JDS-P79	10_JUS-P80	246.00	466.50	465.42	0.4400	156.000	0.0320	437.40	4521.15	0.10	3.10
54	10_CH-OF1-80	Channel	10_JDS-P80	10_OF1	398.00	464.20	461.00	0.8000	117.600	0.0320	576.36	1389.84	0.41	6.64
55	10_CH-Trib1	Channel	10_P72-pondoutfall	10_JDS-Trib1	85.00	477.50	477.50	0.0000	54.000	0.0320	156.37	14.78	10.58	5.36
56	10_CH-Trib1-76	Channel	10_JDS-P76	10_JDS-Trib1	1026.00	483.40	477.50	0.5800	72.000	0.0320	354.34	1025.45	0.35	5.53
57	10_RRCH-70-69	Channel	10_JDS-P69	10_JUS-P70	59.00	489.95	486.00	6.6900	60.000	0.0320	365.24	2160.35	0.17	5.91

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)
58	10_RRCH-76-75	Channel	10_JDS-P75	10_JUS-P76	34.00	485.79	484.04	5.1500	84.000	0.0320	346.78	395.55	0.88	2.60
59	KR_CH-39-40	Channel	KR_JDS-P40	KR_JUS-P39	905.00	461.26	460.50	0.0800	93.000	0.0320	310.09	497.80	0.62	2.62
60	KR_CH-40-41	Channel	KR_JDS-P41	KR_JUS-P40	1031.00	464.22	461.95	0.2200	116.400	0.0320	508.26	719.91	0.71	5.47
61	KR_CH-41-42	Channel	KR_JDS-P42	KR_JUS-P41	1352.00	465.81	465.81	0.0000	81.120	0.0320	242.76	11.59	20.95	2.10
62	KR_CH-42-43	Channel	KR_JDS-P43	KR_JUS-P42	981.00	470.90	465.73	0.5300	76.200	0.0320	183.23	587.14	0.31	3.14
63	KR_CH-43-D1	Channel	KR_JUS-D1	KR_JUS-P43	292.00	469.60	468.70	0.3100	90.000	0.0320	183.10	736.80	0.25	2.13
64	KR_CH-44-45_3	Channel	KR_JDS-P45_3	KR_JUS-P44	738.85	484.96	472.06	1.7500	60.000	0.0450	218.18	247.40	0.88	7.32
65	KR_CH-44-46	Channel	KR_JDS-P46	KR_JUS-P44	312.00	471.00	470.30	0.2200	66.000	0.0320	283.68	221.55	1.28	5.52
66	KR_CH-45_3-45_2	Channel	KR_JDS-P45_2	KR_JUS-P45_3	24.86	487.91	486.05	7.4800	60.000	0.0320	465.40	1252.28	0.37	9.67
67	KR_CH-46-46	Channel	KR_JUS-P46	KR_JDS-P46	42.00	471.20	471.00	0.4800	96.000	0.0350	589.14	1507.23	0.39	5.06
68	KR_CH-46-Trib1	Channel	KR_JDS-Trib1	KR_JUS-P46	2923.00	475.50	472.00	0.1200	72.000	0.0320	515.84	696.91	0.74	1.01
69	KR_CH-50-51	Channel	KR_JDS-P51_52	KR_JUS-P50	948.87	514.67	488.25	2.7800	48.000	0.0800	320.79	791.98	0.41	2.52
70	KR_CH-53-53_2	Channel	KR_JDS-P53_2	KR_JDS-P53	211.00	482.00	480.39	0.7600	18.000	0.0800	9.96	39.88	0.25	0.51
71	KR_CH-59-Bentley	Channel	KR_JDS-Bentley	KR_JUS-P59	669.00	490.00	481.43	1.2800	48.000	0.0320	263.86	332.77	0.79	3.91
72	KR_CH-64-Div1	Channel	KR_JDS-Div1	KR_JUS-P64	642.00	493.50	492.56	0.1500	48.000	0.0320	248.23	444.32	0.56	2.29
73	KR_CH-Bentley	Channel	KR_JDS-P200	KR_JDS-Bentley	995.00	498.00	490.00	0.8000	42.000	0.0320	127.30	173.19	0.73	2.83
74	KR_CH-D1-44	Channel	KR_JDS-P44	KR_JUS-D1	125.28	471.40	471.25	0.1200	90.000	0.0320	393.78	459.22	0.86	6.52
75	KR_CH-D1-65A	Channel	KR_JDS-D1	KR_JDS-D1-B	500.00	472.00	470.00	0.4000	90.000	0.0320	209.72	1608.55	0.13	4.02
76	KR_CH-D1B	Channel	KR_JDS-D1-B	KR_JUS-P65	400.00	470.00	466.93	0.7700	90.000	0.0320	210.15	2228.15	0.09	2.11
77	KR_CH-moose	Channel	JDS-P201	KR_JDS-Div1	886.00	493.90	493.50	0.0500	48.000	0.0320	109.80	246.72	0.45	0.89
78	KR_CH-OF1-39	Channel	KR_JDS-P39	KR_OF1	70.20	458.99	458.00	1.4100	120.000	0.0320	282.26	5759.30	0.05	5.32
79	KR_CH-SWS1	Channel	KR_JUS-SWS1	KR_JDS-Trib1	2362.00	477.50	475.50	0.0800	54.000	0.0320	130.83	217.18	0.60	0.56
80	KR_CH-SWS1-57	Channel	KR_JDS-P57	KR_JUS-SWS1	42.00	478.29	477.50	1.8800	48.000	0.0450	31.83	87.78	0.36	5.79
81	KR_CH-SWS1-58	Channel	KR_JDS-P58	KR_JUS-SWS1	76.00	478.92	477.50	1.8700	48.000	0.0320	303.05	292.08	1.04	15.07
82	KR_CH-SWS2-Trib2	Channel	KR_JDS-Trib2	KR_JDS-Trib1	470.00	477.00	475.50	0.3200	72.000	0.0320	667.52	933.31	0.72	2.22
83	KR_CH-Trib2-47	Channel	KR_JDS-P47	KR_JDS-Trib2	873.00	482.01	477.00	0.5700	72.000	0.0320	834.88	1179.07	0.71	2.76
84	KR_CH-Trib2-53	Channel	KR_JDS-P53	KR_JDS-Trib2	1194.00	480.39	477.00	0.2800	48.000	0.0450	60.26	266.85	0.23	0.66
85	KR_RRCH-45_2-45	Channel	KR_JDS-P45	KR_JUS-P45_2	40.00	488.76	488.17	1.4700	72.000	0.0320	466.81	681.99	0.68	10.29
86	KR_RRCH-47-48	Channel	KR_JDS-P48	KR_JUS-P47	45.00	484.55	482.34	4.9100	72.000	0.0320	576.28	1935.60	0.30	7.63
87	KR_RRCH-47-49	Channel	KR_JDS-P49	KR_JUS-P47	530.00	486.52	482.34	0.7900	72.000	0.0320	236.60	519.43	0.46	3.70
88	KR_RRCH-49-50	Channel	KR_JDS-P50	KR_JDS-P49	397.00	487.95	486.52	0.3600	72.000	0.0320	234.51	197.46	1.19	3.67
89	KR_RRCH-53_2-56	Channel	KR_JUS-P53_2	KR_JDS-P56	477.00	482.00	480.58	0.3000	48.000	0.0320	26.92	266.42	0.10	0.90
90	KR_RRCH-56-57	Channel	KR_JDS-P56	KR_JUS-P57	535.00	480.58	478.39	0.4100	66.000	0.0320	32.51	414.62	0.08	0.90
91	KR_RRCH-57-57_2	Channel	KR_JDS-P57_2	KR_JUS-P57	31.00	480.95	478.58	7.6500	36.000	0.0800	17.35	69.60	0.25	2.75
92	KR_RRCH-58-59	Channel	KR_JDS-P59	KR_JUS-P58	29.00	480.97	479.74	4.2400	54.000	0.0320	292.48	532.28	0.55	9.11
93	KR-CH-Bentley-64	Channel	KR_JDS-P64	KR_JDS-Bentley	1078.00	492.03	490.00	0.1900	48.000	0.0320	225.69	417.33	0.54	1.14
94	KR-RRCH-53-53_2	Channel	KR_JUS-P53_2	KR_JUS-P53	211.00	482.00	480.66	0.6400	54.000	0.0320	41.98	268.74	0.16	1.39
95	KR-RRCH-53-55	Channel	KR_JDS-P55	KR_JUS-P53	42.00	480.87	480.66	0.5000	80.400	0.0320	112.04	479.67	0.23	3.56
96	SC_CH-86-84	Channel	SC_JUS-P84	SC-JUS-P86	879.25	492.50	492.00	0.0600	48.000	0.0800	235.97	869.89	0.27	0.61
97	SC_CH-87-202	Channel	SC_JDS-P202	SC_JDS-P87	3875.00	497.07	487.40	0.2500	24.000	0.0320	4.80	49.65	0.10	0.38
98	SC_CH-88-87	Channel	SC_JDS-P87	SC_JDS-P88	1012.00	487.40	486.50	0.0900	96.000	0.0320	720.00	1128.47	0.64	2.37
99	SC_CH-89-88	Channel	SC_JDS-P88	SC_JUS-P89	1788.00	486.50	475.32	0.6300	96.000	0.0320	1119.28	1670.56	0.67	5.07
100	SC_CH-OF1-Trib1	Channel	SC_JDS-Trib1	SC_OF1	140.00	464.00	462.00	1.4300	72.000	0.0450	1223.38	1811.55	0.68	8.51
101	SC_CH-Trib1-89	Channel	SC_JDS-P89	SC_JDS-Trib1	748.00	473.34	464.00	1.2500	96.000	0.0320	1223.51	3503.10	0.35	7.21
102	SC_RRCH-203-90	Channel	SC_JDS-P90	SC_JUS-P203	2014.00	503.02	495.55	0.3700	31.200	0.0320	31.51	38.51	0.82	1.52
103	SC_RRCH-204-OF2	Channel	SC_JDS-P204	SC_OF2	3680.98	502.20	500.00	0.0600	48.000	0.0320	20.99	72.35	0.29	1.33
104	SC_RRCH-87-203	Channel	SC_JDS_P203	SC_JUS-P87	3893.00	495.06	489.17	0.1500	84.000	0.0320	300.45	470.68	0.64	1.91
105	SC_RRCH-87-84	Channel	SC_JDS-P84	SC_JUS-P87	50.00	488.34	488.34	0.0000	116.400	0.0320	363.41	150.05	2.42	3.72
106	SC_RRCH-88-87	Channel	SC_JUS-P87	SC_JUS-P88	865.00	492.80	492.00	0.0900	60.000	0.0800	2.47	46.58	0.05	0.39
107	SC-CH-91-91A	Channel	SC_JUS-91A	SC_JUS-P91	178.41	506.00	503.87	1.1900	36.000	0.0450	39.09	127.17	0.31	3.65
108	SC-CH-91A-204	Channel	SC_JUS-P204	SC_JUS-91A	472.13	503.20	506.00	-0.5900	36.000	0.0450	39.09	89.63	0.44	2.35
109	SC-RRCH-88-86	Channel	SC_JDS-P86	SC_JUS-P88	45.00	489.74	488.20	3.4200	72.000	0.0450	395.46	1427.64	0.28	5.01
110	SH_CH-SH7-P88	Channel	SH_JDS-SH7-POND	SC_JDS-P88	2000.00	487.00	486.50	0.0300	48.000	0.0800	6.29	47.31	0.13	0.18
111	10_Pond-Flume	Weir	10_P72-pondoutfall	10_JDS-P72-Pond		477.50	477.60				156.35			
112	Div1	Weir	KR_JUS-D1	KR_JDS-D1		469.60	470.00				210.30			
113	KR_Shafer-Rd-weir	Weir	KR_JUS-P201	10_JUS-P75		492.00	486.35				0.00			
114	P200-weir	Weir	KR_JUS-P200	KR_JDS-P200		499.90	498.00				30.40			

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)
115	P201-weir	Weir	KR_JUS-P201	JDS-P201		492.00	493.90				0.00			
116	P202-weir	Weir	SC_JUS-P202	SC_JDS-P202		496.00	497.07				0.00			
117	P203-weir	Weir	SC_JUS-P203	SC_JDS_P203		495.55	495.06				275.63			
118	P39-weir	Weir	KR_JUS-P39	KR_JDS-P39		460.50	458.00				8.55			
119	P40-weir	Weir	KR_JUS-P40	KR_JDS-P40		461.95	461.26				0.00			
120	P41-weir	Weir	KR_JUS-P41	KR_JDS-P41		465.81	464.22				9.09			
121	P42-weir	Weir	KR_JUS-P42	KR_JDS-P42		465.73	465.81				0.00			
122	P43-weir	Weir	KR_JUS-P43	KR_JDS-P43		468.70	468.40				0.00			
123	P44-weir	Weir	KR_JUS-P44	KR_JDS-P44		470.30	470.00				0.00			
124	P45_2-weir	Weir	KR_JUS-P45_2	KR_JDS-P45_2		488.17	487.91				422.26			
125	P45_3-bypass	Weir	KR_JDS-P45_3	KR_JUS-P44		484.96	470.30				247.45			
126	P45_3-weir	Weir	KR_JUS-P45_3	KR_JDS-P45_3		486.05	484.96				430.15			
127	P45-weir	Weir	KR_JUS-P45	KR_JDS-P45		490.12	488.76				49.05			
128	P47-weir	Weir	KR_JUS-P47	KR_JDS-P47		482.34	482.01				0.00			
129	P48-weir	Weir	KR_JUS-P48	KR_JDS-P48		485.05	484.55				0.00			
130	P49-weir	Weir	KR_JUS-P49	KR_JDS-P49		487.63	486.52				0.00			
131	P50-weir	Weir	KR_JUS-P50	KR_JDS-P50		488.25	487.95				230.27			
132	P51-weir	Weir	KR_JUS-P51	KR_JDS-P51_52		514.94	514.67				11.97			
133	P52-weir	Weir	KR_JUS-P52	KR_JDS-P51_52		517.48	514.67				0.00			
134	P53_2-weir	Weir	KR_JUS-P53_2	KR_JDS-P53_2		482.00	482.00				0.00			
135	P53-weir	Weir	KR_JUS-P53	KR_JDS-P53		480.66	480.39				0.00			
136	P55-weir	Weir	KR_JUS-P55	KR_JDS-P55		481.40	480.87				0.00			
137	P56-weir	Weir	KR_JUS-P56	KR_JDS-P56		481.72	480.58				0.00			
138	P57_2-weir	Weir	KR_JUS-P57_2	KR_JDS-P57_2		481.90	480.94				0.00			
139	P57-weir	Weir	KR_JUS-P57	KR_JDS-P57		478.58	478.29				0.00			
140	P58-weir	Weir	KR_JUS-P58	KR_JDS-P58		479.74	478.92				115.44			
141	P59_2-weir	Weir	KR_JUS-P59_2	KR_JUS-P59		482.33	481.43				9.15			
142	P59-weir	Weir	KR_JUS-P59	KR_JDS-P59		481.43	480.97				33.49			
143	P64-weir	Weir	KR_JUS-P64	KR_JDS-P64		492.56	492.03				0.00			
144	P69-weir	Weir	10_JUS-P69	10_JDS-P69		490.01	489.95				177.95			
145	P70-weir	Weir	10_JUS-P70	10_JDS-P70		486.00	485.80				0.00			
146	P71-weir	Weir	10_JUS-P71	10_JDS-P71		481.00	480.80				162.06			
147	P72-weir	Weir	10_JUS-P72	10_JDS-P72-Pond		478.00	477.60				41.89			
148	P75-weir	Weir	10_JUS-P75	10_JDS-P75		486.35	485.79				232.19			
149	P76-weir	Weir	10_JUS-P76	10_JDS-P76		484.04	483.40				0.00			
150	P79-weir	Weir	10_JUS-P79	10_JDS-P79		467.40	466.50				43.60			
151	P80-weir	Weir	10_JUS-P80	10_JDS-P80		465.42	464.20				0.00			
152	P84-weir	Weir	SC_JUS-P84	SC_JDS-P84		489.26	488.34				235.30			
153	P86-weir	Weir	SC-JUS-P86	SC_JDS-P86		489.60	489.60				0.00			
154	P87-weir	Weir	SC_JUS-P87	SC_JDS-P87		487.60	487.40				419.36			
155	P88-weir	Weir	SC_JUS-P88	SC_JDS-P88		488.20	486.50				170.60			
156	P89-weir	Weir	SC_JUS-P89	SC_JDS-P89		475.32	473.34				937.95			
157	SH7-ovrflow	Weir	SH_JUS-SH7-POND	SH_JDS-SH7-POND		485.00	487.00				20.16			

Subbasin Summary

Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
KR10-JUS-SWS1	51.60	484.00	50.50	2.86	0.08	3.922	0.39	0 02:38:18
KR11-P53	0.20	484.00	93.00	2.86	2.12	0.424	0.63	0 00:06:00
KR11-P53_2	1.70	484.00	93.00	2.86	2.12	3.604	5.39	0 00:06:00
KR11-P55	20.90	484.00	80.90	2.86	1.20	25.101	28.06	0 00:18:54
KR11-P56	1.90	484.00	89.50	2.86	1.81	3.447	3.88	0 00:18:54
KR11-P57	0.80	484.00	93.00	2.86	2.12	1.696	2.53	0 00:06:00
KR11-P57_2	2.60	484.00	83.10	2.86	1.34	3.487	4.75	0 00:10:48
KR11-P58	0.30	484.00	93.00	2.86	2.12	0.636	0.95	0 00:06:00
KR11-P59	31.10	484.00	69.00	2.86	0.60	18.536	13.28	0 00:29:54
KR12-P48	111.40	484.00	68.50	2.86	0.58	64.166	18.31	0 01:45:36
KR13-P48	154.70	484.00	67.30	2.86	0.53	81.682	21.43	0 01:53:42
KR14-P48	14.90	484.00	69.20	2.86	0.60	9.000	3.42	0 01:13:30
KR15-P48	42.00	484.00	65.20	2.86	0.45	18.942	5.51	0 01:28:42
KR16-P48	78.90	484.00	74.20	2.86	0.83	65.487	41.96	0 00:41:54
KR17-P52	39.40	484.00	67.30	2.86	0.53	20.803	18.95	0 00:18:54
KR18-P51	38.40	484.00	72.70	2.86	0.76	29.107	33.98	0 00:14:36
KR19-P45	121.00	484.00	72.10	2.86	0.73	88.451	73.54	0 00:26:54
KR1-P64	108.00	484.00	56.10	2.86	0.18	19.872	4.54	0 00:47:06
KR20-P47	20.50	484.00	88.70	2.86	1.75	35.875	39.22	0 00:20:12
KR20-P48	51.90	484.00	74.90	2.86	0.87	44.894	36.01	0 00:30:42
kr20-p49	2.10	484.00	92.20	2.86	2.05	4.299	6.11	0 00:08:00
KR20-P50	23.50	484.00	79.80	2.86	1.13	26.649	26.28	0 00:23:48
KR20-P53	1.70	484.00	92.80	2.86	2.10	3.573	5.36	0 00:06:00
KR21-JDS-TRIB1	46.10	484.00	65.40	2.86	0.46	21.114	6.25	0 01:27:30
KR21-JDS-TRIB2	15.30	484.00	78.00	2.86	1.03	15.759	12.62	0 00:32:36
KR22-P44	7.80	484.00	93.00	2.86	2.12	16.536	20.68	0 00:13:18
KR22-P46	117.40	484.00	72.00	2.86	0.73	85.232	24.23	0 01:58:36
KR23-41	26.40	484.00	89.30	2.86	1.80	47.467	20.91	0 01:22:24
KR24-P41	53.60	484.00	81.20	2.86	1.22	65.338	76.49	0 00:17:12
KR25-P41	32.00	484.00	70.40	2.86	0.66	20.960	19.02	0 00:22:00
KR26-P41	40.40	484.00	83.20	2.86	1.35	54.459	32.83	0 00:52:12
KR27-P41	71.20	484.00	66.30	2.86	0.49	34.959	11.17	0 01:22:24
KR27-P42	34.40	484.00	74.00	2.86	0.82	28.242	17.22	0 00:44:36
KR27-P43	1.60	484.00	93.00	2.86	2.12	3.392	4.83	0 00:07:42
KR27-P44	7.70	484.00	93.00	2.86	2.12	16.324	21.30	0 00:11:18
KR28-40	60.50	484.00	58.90	2.86	0.25	15.367	2.90	0 01:52:36
KR29-P65	19.80	484.00	88.30	2.86	1.72	34.016	23.11	0 00:44:54
KR2-P64	59.00	484.00	69.00	2.86	0.60	35.164	29.26	0 00:23:54
KR31-P45	19.80	484.00	86.80	2.86	1.60	31.720	36.64	0 00:18:00
KR31-P45_2	1.30	484.00	93.00	2.86	2.12	2.756	4.12	0 00:06:00
KR32-OF1	21.20	484.00	64.10	2.86	0.41	8.734	4.70	0 00:34:00
KR32-P39	19.90	484.00	51.70	2.86	0.10	1.891	0.23	0 00:57:00
KR3-P64	12.60	484.00	35.00	2.86	0.00	0.000	0.00	0 00:28:42
KR4-P64	32.40	484.00	63.30	2.86	0.39	12.506	7.68	0 00:26:12
KR5-P200	55.70	484.00	63.70	2.86	0.40	22.224	9.17	0 00:48:42
KR6-JDS-BENTLEY	14.40	484.00	61.90	2.86	0.34	4.910	4.39	0 00:12:18
KR6-P200	17.10	484.00	59.00	2.86	0.26	4.395	2.72	0 00:15:06
KR7-JDS-BENTLEY	21.10	484.00	70.60	2.86	0.66	14.010	7.49	0 00:48:12
KR8-P58	0.09	484.00	87.60	2.86	1.66	0.145	0.18	0 00:16:53
KR8-P59	9.90	484.00	82.20	2.86	1.28	12.702	10.55	0 00:32:24
KR8-P59_2	2.30	484.00	93.00	2.86	2.12	4.876	5.77	0 00:15:42
KR9-JUS-SWS1	87.50	484.00	67.50	2.86	0.54	46.900	14.71	0 01:29:24
SC10-P84	59.70	484.00	37.00	2.86	0.00	0.000	0.00	0 00:18:18
SC11-JDS-P87	112.10	484.00	40.50	2.86	0.00	0.000	0.00	0 05:42:54
SC11-P87	6.40	484.00	83.10	2.86	1.34	8.582	12.93	0 00:06:42
SC12-JDS-P87	48.80	484.00	64.40	2.86	0.42	20.642	6.12	0 01:22:30
SC12-P87	2.30	484.00	93.00	2.86	2.12	4.876	7.28	0 00:06:00
SC12-P89	108.40	484.00	62.20	2.86	0.35	37.940	8.34	0 01:53:42
SC13-P204	127.20	484.00	63.60	2.86	0.40	50.371	12.11	0 01:47:42
SC14-P204	181.40	484.00	57.30	2.86	0.21	38.638	8.94	0 01:00:30
SC14-P91	1.40	484.00	81.00	2.86	1.21	1.690	2.45	0 00:07:54
SC15-P202	2.20	484.00	88.70	2.86	1.75	3.850	4.86	0 00:14:06
SC15-P203	110.50	484.00	79.20	2.86	1.10	121.440	44.94	0 01:36:42
SC15-P90	2.80	484.00	34.60	2.86	0.00	0.000	0.00	0 00:11:18
SC1-P86	261.40	484.00	55.10	2.86	0.16	42.085	7.02	0 01:17:00
SC2-P86	22.10	484.00	75.40	2.86	0.89	19.691	20.76	0 00:19:36
SC3-P88	23.30	484.00	82.60	2.86	1.31	30.476	44.67	0 00:07:36
SC3-P89	13.60	484.00	77.70	2.86	1.01	13.790	20.43	0 00:06:24
SC4-P84	141.80	484.00	65.60	2.86	0.47	65.937	16.80	0 01:50:12
SC5-P84	85.90	484.00	64.10	2.86	0.41	35.391	9.48	0 01:34:42
SC6-P84	76.00	484.00	67.70	2.86	0.54	41.344	31.11	0 00:26:06
SC7-P84	175.70	484.00	62.30	2.86	0.35	62.022	20.58	0 01:00:48
SC8-P84	75.30	484.00	59.90	2.86	0.28	21.235	8.16	0 00:37:00
SC8-P88	4.90	484.00	91.40	2.86	1.98	9.682	14.67	0 00:06:00
SC9-P203	94.20	484.00	65.90	2.86	0.48	44.839	21.41	0 00:45:30
SH10-JDS-P72-POND	31.20	484.00	71.20	2.86	0.69	21.528	13.01	0 00:41:30
SH11-P80	13.80	484.00	90.40	2.86	1.89	26.082	28.42	0 00:20:00
SH12-P80	134.70	484.00	73.50	2.86	0.80	107.221	36.99	0 01:35:12
SH13-P72	18.40	484.00	57.00	2.86	0.21	3.772	0.72	0 01:26:06
SH14-JDS-TRIB1	4.40	484.00	60.40	2.86	0.30	1.302	0.48	0 00:42:06

Subbasin Summary

Subbasin ID	Area (ac)	Peak Rate Factor	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
SH14-P76	1.30	484.00	93.00	2.86	2.12	2.756	4.12	0 00:06:00
SH14-P79	59.40	484.00	62.80	2.86	0.37	21.919	7.78	0 00:57:06
SH1-P75	192.70	484.00	61.20	2.86	0.32	61.664	12.91	0 01:54:36
SH2-P75	52.60	484.00	62.60	2.86	0.36	19.094	6.59	0 00:58:36
SH3-P64	18.80	484.00	76.20	2.86	0.93	17.522	12.24	0 00:38:42
SH4-P75	60.90	484.00	69.80	2.86	0.63	38.306	28.00	0 00:30:06
SH5-P75	124.60	484.00	62.90	2.86	0.37	46.476	19.48	0 00:44:36
SH6-P69	254.10	484.00	60.40	2.86	0.30	75.214	22.77	0 00:58:24
SH7-P89	80.70	484.00	64.30	2.86	0.42	33.813	17.48	0 00:36:30
SH8-P69	1.00	484.00	83.10	2.86	1.34	1.341	2.04	0 00:06:24
SH8-P70	1.00	484.00	91.20	2.86	1.96	1.958	2.97	0 00:06:00
SH8-P71	72.80	484.00	67.30	2.86	0.53	38.438	23.34	0 00:35:06
SH9-P72	104.40	484.00	70.50	2.86	0.66	68.800	38.08	0 00:45:54

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Min Freeboard Attained (ft)
1	10_JDS-P69	Junction	489.95	494.90	489.95	22.87	490.36	4.98
2	10_JDS-P70	Junction	485.80	492.00	487.00	23.00	487.00	5.00
3	10_JDS-P71	Junction	480.80	489.00	481.00	54.24	483.57	5.43
4	10_JDS-P75	Junction	485.79	493.00	485.79	30.16	487.42	5.58
5	10_JDS-P76	Junction	483.40	492.50	483.40	35.56	486.25	6.25
6	10_JDS-P79	Junction	466.50	474.00	466.50	26.54	467.56	11.94
7	10_JDS-P80	Junction	464.20	478.17	464.20	59.53	466.44	11.73
8	10_JDS-Trib1	Junction	477.50	482.00	477.50	39.28	479.10	4.40
9	10_P72-pondoutfall	Junction	477.50	482.00	477.50	14.31	479.11	4.39
10	KR_JDS-D1	Junction	470.00	480.00	472.00	56.99	473.29	7.11
11	KR_JDS-D1-B	Junction	469.00	477.00	470.00	56.99	470.97	6.53
12	KR_JDS-Div1	Junction	493.50	497.50	495.00	40.79	495.36	2.14
13	KR_JDS-P200	Junction	498.00	501.86	496.65	10.25	499.19	3.31
14	KR_JDS-P39	Junction	458.00	465.00	458.99	119.10	460.03	8.96
15	KR_JDS-P40	Junction	461.26	476.00	461.26	121.03	465.27	10.73
16	KR_JDS-P41	Junction	464.22	472.16	464.22	172.66	468.65	5.27
17	KR_JDS-P42	Junction	465.81	475.85	465.81	79.27	469.78	6.65
18	KR_JDS-P43	Junction	468.40	479.00	468.40	75.63	473.18	6.02
19	KR_JDS-P44	Junction	470.00	480.00	470.00	132.44	474.78	5.22
20	KR_JDS-P45	Junction	488.76	495.40	488.76	102.12	492.47	2.93
21	KR_JDS-P45_2	Junction	487.91	492.31	487.91	87.80	491.08	1.97
22	KR_JDS-P45_3	Junction	484.96	489.96	484.96	87.78	488.10	3.15
23	KR_JDS-P46	Junction	471.00	480.00	471.00	119.13	475.24	4.76
24	KR_JDS-P47	Junction	482.01	492.01	482.01	138.85	485.25	6.76
25	KR_JDS-P48	Junction	484.55	493.00	484.55	87.96	486.10	6.90
26	KR_JDS-P49	Junction	486.52	493.00	486.52	34.51	488.18	4.82
27	KR_JDS-P50	Junction	487.95	496.00	487.95	33.88	490.89	5.11
28	KR_JDS-P51_52	Junction	514.67	521.00	514.67	51.62	516.87	4.69
29	KR_JDS-P53	Junction	480.39	486.82	480.39	21.53	482.45	4.68
30	KR_JDS-P53_2	Junction	482.00	486.00	482.00	1.66	482.45	4.05
31	KR_JDS-P55	Junction	480.87	488.60	480.87	27.91	482.86	5.74
32	KR_JDS-P56	Junction	480.58	487.40	480.56	6.90	481.27	6.13
33	KR_JDS-P57	Junction	478.29	482.00	478.29	8.02	479.10	6.01
34	KR_JDS-P57_2	Junction	480.94	486.90	480.94	4.72	481.40	5.50
35	KR_JDS-P58	Junction	478.92	484.50	478.92	32.73	480.25	4.43
36	KR_JDS-P59	Junction	480.97	486.71	480.97	33.56	482.05	5.29
37	KR_JDS-P64	Junction	492.03	495.89	492.03	24.30	493.47	3.80
38	KR_JUS-P200	Junction	499.90	504.40	499.90	10.25	500.79	3.61
39	KR_JUS-P51	Junction	514.94	521.83	514.94	33.38	516.98	4.85
40	KR_JUS-P52	Junction	517.48	521.85	517.48	18.27	517.82	4.03
41	KR_JUS-P59_2	Junction	482.33	488.00	482.33	5.53	483.97	4.03
42	KR_JUS-P65	Junction	466.93	476.50	466.93	61.75	469.52	6.98
43	SC_JDS_P203	Junction	495.06	501.90	495.06	53.57	498.10	3.96
44	SC_JDS-P202	Junction	497.07	500.00	497.07	2.40	497.30	4.27
45	SC_JDS-P204	Junction	502.20	509.20	502.20	7.72	503.70	5.50
46	SC_JDS-P84	Junction	488.34	497.00	488.34	55.92	489.69	8.35
47	SC_JDS-P86	Junction	489.60	496.80	489.74	21.55	490.56	6.24
48	SC_JDS-P87	Junction	487.40	497.00	487.40	70.44	489.31	7.69
49	SC_JDS-P88	Junction	486.50	493.50	486.50	86.59	488.13	6.37
50	SC_JDS-P89	Junction	473.34	483.50	473.34	88.43	474.41	9.09
51	SC_JDS-P90	Junction	503.02	509.00	503.02	0.28	503.17	5.83
52	SC_JDS-Trib1	Junction	464.00	472.00	464.00	88.42	465.25	6.75
53	SC_JUS-91A	Junction	506.00	509.20	506.00	0.00	506.00	3.20
54	SC_JUS-P90	Junction	503.34	509.00	503.34	0.28	503.53	5.47
55	SH_JDS-SH7-POND	Junction	487.00	489.00	487.00	0.00	487.00	4.50
56	10_OF1	Outfall	461.00			59.47	463.25	
57	KR_OF1	Outfall	458.00			119.93	459.04	
58	KR_OF2	Outfall	459.07			66.23	460.64	
59	SC_OF1	Outfall	462.00			88.40	463.25	
60	SC_OF2	Outfall	500.00			7.69	501.50	
61	10_JDS-P72-Pond	Storage Node	477.60	483.50	477.60	28.20	479.20	
62	10_JUS-P69	Storage Node	490.01	495.40	490.01	22.89	491.09	
63	10_JUS-P70	Storage Node	486.00	492.00	486.00	29.29	487.06	
64	10_JUS-P71	Storage Node	481.00	489.00	481.93	31.58	483.58	
65	10_JUS-P72	Storage Node	478.00	484.50	478.00	41.78	479.25	
66	10_JUS-P75	Storage Node	486.35	493.00	486.35	30.36	487.43	
67	10_JUS-P76	Storage Node	484.04	492.50	484.04	30.45	486.26	
68	10_JUS-P79	Storage Node	467.40	475.50	467.40	26.99	467.95	
69	10_JUS-P80	Storage Node	465.42	478.70	464.42	60.24	466.96	
70	JDS-P201	Storage Node	493.90	497.40	494.00	4.95	494.76	
71	KR_JDS-Bentley	Storage Node	490.00	494.00	490.00	35.27	491.67	
72	KR_JDS-Trib1	Storage Node	475.50	484.00	476.00	153.42	479.06	
73	KR_JDS-Trib2	Storage Node	477.00	485.00	477.00	182.30	480.28	
74	KR_JUS-D1	Storage Node	469.60	480.00	469.60	132.44	473.35	
75	KR_JUS-P201	Storage Node	492.00	497.50	494.00	27.83	494.66	
76	KR_JUS-P39	Storage Node	460.50	468.50	460.50	120.65	464.77	
77	KR_JUS-P40	Storage Node	461.95	476.00	461.95	144.21	466.54	
78	KR_JUS-P41	Storage Node	465.81	472.66	465.90	140.85	468.56	
79	KR_JUS-P42	Storage Node	465.73	475.85	465.73	80.43	469.80	

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Min Freeboard Attained (ft)
80	KR_JUS-P43	Storage Node	468.70	479.50	468.70	75.64	473.22	
81	KR_JUS-P44	Storage Node	470.30	480.00	470.30	132.45	474.80	
82	KR_JUS-P45	Storage Node	490.12	496.40	490.12	102.42	492.89	
83	KR_JUS-P45_2	Storage Node	488.17	493.31	488.17	101.52	492.47	
84	KR_JUS-P45_3	Storage Node	486.05	492.34	486.05	95.57	491.11	
85	KR_JUS-P46	Storage Node	471.20	480.00	472.00	124.58	475.25	
86	KR_JUS-P47	Storage Node	482.34	492.34	482.34	138.42	485.32	
87	KR_JUS-P48	Storage Node	485.05	492.30	485.55	88.36	486.61	
88	KR_JUS-P49	Storage Node	487.63	493.00	487.63	5.74	488.88	
89	KR_JUS-P50	Storage Node	488.25	496.00	488.25	67.66	491.28	
90	KR_JUS-P53	Storage Node	480.66	487.40	480.66	30.10	482.82	
91	KR_JUS-P53_2	Storage Node	482.00	486.50	482.00	11.17	482.55	
92	KR_JUS-P55	Storage Node	481.40	487.10	481.40	27.98	482.88	
93	KR_JUS-P56	Storage Node	481.72	487.90	481.72	3.87	482.63	
94	KR_JUS-P57	Storage Node	478.58	485.40	478.58	8.81	479.69	
95	KR_JUS-P57_2	Storage Node	481.90	487.40	481.90	4.75	482.51	
96	KR_JUS-P58	Storage Node	479.74	485.50	479.74	35.84	481.60	
97	KR_JUS-P59	Storage Node	481.43	487.80	481.43	34.30	483.16	
98	KR_JUS-P64	Storage Node	492.56	497.80	492.56	28.99	493.50	
99	KR_JUS-SWS1	Storage Node	477.50	484.00	478.00	50.18	479.10	
100	SC_JUS-P202	Storage Node	496.00	500.50	496.00	4.72	498.11	
101	SC_JUS-P203	Storage Node	495.55	501.90	495.55	58.10	499.05	
102	SC_JUS-P204	Storage Node	503.20	509.20	503.20	19.74	504.97	
103	SC_JUS-P84	Storage Node	489.26	497.00	489.26	55.93	490.05	
104	SC_JUS-P87	Storage Node	487.60	497.00	487.60	63.85	489.43	
105	SC_JUS-P88	Storage Node	488.20	494.75	488.20	75.78	490.52	
106	SC_JUS-P89	Storage Node	475.32	485.00	475.32	91.17	479.07	
107	SC_JUS-P91	Storage Node	503.87	509.20	503.87	2.38	504.12	
108	SC-JUS-P86	Storage Node	489.60	496.70	489.60	20.73	490.57	
109	SH_JUS-SH7-POND	Storage Node	485.00	489.50	486.00	17.48	486.53	

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)
1	P200	Pipe	KR_JUS-P200	KR_JDS-P200	100.00	500.40	498.80	1.6000	24.000	0.0150	10.25	100.13	0.10	5.42
2	P-201	Pipe	KR_JUS-P201	JDS-P201	30.00	494.50	494.30	0.6700	15.000	0.0150	0.22	4.57	0.05	0.89
3	P202	Pipe	SC_JUS-P202	SC_JDS-P202	43.00	497.20	497.10	0.2300	15.000	0.0150	2.40	2.70	0.89	3.06
4	P203	Pipe	SC_JUS-P203	SC_JDS_P203	49.00	495.55	495.06	1.0000	40.000	0.0130	53.57	88.34	0.61	8.57
5	P204	Pipe	SC_JUS-P204	SC_JDS-P204	103.00	503.20	502.20	0.9700	18.000	0.0120	7.72	11.21	0.69	5.16
6	P39	Pipe	KR_JUS-P39	KR_JDS-P39	556.00	460.47	458.99	0.2700	72.000	0.0120	119.10	239.10	0.50	6.71
7	P40	Pipe	KR_JUS-P40	KR_JDS-P40	210.00	461.95	461.26	0.3300	60.000	0.0120	121.03	161.73	0.75	6.88
8	P41	Pipe	KR_JUS-P41	KR_JDS-P41	61.00	465.81	464.22	2.6100	80.000	0.0200	172.66	2263.56	0.08	3.28
9	P42	Pipe	KR_JUS-P42	KR_JDS-P42	67.00	465.73	465.81	-0.1200	84.000	0.0200	79.27	365.96	0.22	1.64
10	P43	Pipe	KR_JUS-P43	KR_JDS-P43	50.00	468.70	468.40	0.6000	60.000	0.0120	75.63	674.19	0.11	1.63
11	P44	Pipe	KR_JUS-P44	KR_JDS-P44	44.30	470.30	470.00	0.6800	48.000	0.0200	132.44	687.60	0.19	1.66
12	P45	Pipe	KR_JUS-P45	KR_JDS-P45	82.20	490.12	488.76	1.6500	42.000	0.0150	102.12	432.33	0.24	3.93
13	P45_2	Pipe	KR_JUS-P45_2	KR_JDS-P45_2	25.30	488.17	487.91	1.0300	30.000	0.0130	59.26	41.58	1.43	12.07
14	P45_3	Pipe	KR_JUS-P45_3	KR_JDS-P45_3	199.00	486.05	484.96	0.5500	36.000	0.0240	45.93	26.74	1.72	7.11
15	P47	Pipe	KR_JUS-P47	KR_JDS-P47	21.80	482.34	482.01	1.5100	55.000	0.0150	138.85	1102.17	0.13	3.35
16	P48	Pipe	KR_JUS-P48	KR_JDS-P48	71.70	485.05	484.55	0.7000	48.000	0.0150	87.96	844.31	0.10	3.09
17	P49	Pipe	KR_JDS-P49	KR_JUS-P49	89.60	487.63	486.52	1.2400	24.000	0.0120	5.74	0.82	7.01	3.44
18	P50	Pipe	KR_JUS-P50	KR_JDS-P50	87.20	488.25	487.95	0.3400	24.000	0.0150	33.88	34.50	0.98	3.60
19	P51	Pipe	KR_JUS-P51	KR_JDS-P51_52	31.00	514.94	514.67	0.8700	30.000	0.0150	33.36	102.34	0.33	3.18
20	P52	Pipe	KR_JUS-P52	KR_JDS-P51_52	48.00	517.48	514.67	5.8500	30.000	0.0150	18.26	265.33	0.07	2.93
21	P53_2	Pipe	KR_JDS-P53_2	KR_JUS-P53_2	90.40	482.20	482.00	0.2200	24.000	0.0120	0.95	23.05	0.04	1.10
22	P53A	Pipe	KR_JUS-P53	KR_JDS-P53	24.80	480.66	480.39	1.0900	36.000	0.0130	21.01	69.59	0.30	4.11
23	P53B-C	Pipe	KR_JUS-P53	KR_JDS-P53	20.30	482.40	482.90	-2.4600	24.000	0.0120	0.00	76.93	0.00	0.00
24	P55	Pipe	KR_JDS-P55	KR_JUS-P55	79.60	480.87	481.40	-0.6700	48.000	0.0200	27.91	235.02	0.12	2.02
25	P56	Pipe	KR_JUS-P56	KR_JDS-P56	82.20	481.72	480.58	1.3900	30.000	0.0130	3.86	48.30	0.08	3.59
26	P57	Pipe	KR_JUS-P57	KR_JDS-P57	27.80	478.58	478.29	1.0400	36.000	0.0120	8.02	73.80	0.11	5.16
27	P57_2	Pipe	KR_JUS-P57_2	KR_JDS-P57_2	79.40	481.90	480.94	1.2100	24.000	0.0120	4.72	53.90	0.09	3.51
28	P58A	Pipe	KR_JUS-P58	KR_JDS-P58	45.60	479.74	478.92	1.8000	36.000	0.0130	16.04	89.44	0.18	4.21
29	P58B	Pipe	KR_JDS-P58	KR_JUS-P58	30.60	480.28	479.56	2.3500	24.000	0.0120	8.08	32.56	0.25	3.84
30	P58C	Pipe	KR_JDS-P58	KR_JUS-P58	30.60	480.23	479.99	0.7800	24.000	0.0120	8.61	21.70	0.40	4.19
31	P59	Pipe	KR_JUS-P59	KR_JDS-P59	95.45	481.43	480.97	0.4800	48.000	0.0200	33.56	139.79	0.24	3.98
32	P59_2	Pipe	KR_JUS-P59_2	KR_JUS-P58	73.20	482.33	482.01	0.4400	15.000	0.0120	5.53	4.63	1.19	4.83
33	P64	Pipe	KR_JUS-P64	KR_JDS-P64	47.60	492.56	492.03	1.1100	36.000	0.0150	24.30	345.00	0.07	2.57
34	P65	Pipe	KR_JUS-P65	KR_OF2	1034.00	466.93	459.07	0.7600	84.000	0.0120	66.23	603.39	0.11	6.92
35	P69	Pipe	10_JUS-P69	10_JDS-P69	60.70	490.01	489.95	0.1000	36.000	0.0200	22.87	62.05	0.37	3.69
36	P70	Pipe	10_JUS-P70	10_JDS-P70	8.50	486.00	485.80	2.3500	36.000	0.0150	29.29	501.52	0.06	3.42
37	P71	Pipe	10_JUS-P71	10_JDS-P71	34.00	481.00	480.80	0.5900	48.000	0.0120	54.24	481.88	0.11	8.04
38	P72	Pipe	10_JUS-P72	10_JDS-P72-Pond	40.95	478.00	477.60	0.9800	36.000	0.0240	13.68	107.12	0.13	3.01
39	P75	Pipe	10_JUS-P75	10_JDS-P75	66.20	486.35	485.79	0.8500	42.000	0.0200	30.16	419.05	0.07	1.59
40	P76	Pipe	10_JUS-P76	10_JDS-P76	33.70	484.04	483.40	1.9000	42.000	0.0120	35.56	1046.47	0.03	1.01
41	P79	Pipe	10_JUS-P79	10_JDS-P79	36.10	467.40	466.50	2.4900	42.000	0.0120	26.54	624.19	0.04	4.14
42	P80	Pipe	10_JUS-P80	10_JDS-P80	56.10	465.64	465.64	0.0000	99.600	0.0200	59.53	80.17	0.74	3.55
43	P84	Pipe	SC_JUS-P84	SC_JDS-P84	68.00	489.26	488.34	1.3500	36.000	0.0120	55.92	585.55	0.10	4.39
44	P86	Pipe	SC_JDS-P86	SC-JUS-P86	70.00	489.70	489.70	0.0000	73.000	0.0200	21.55	60.09	0.36	1.37
45	P87-A	Pipe	SC_JUS-P87	SC_JDS-P87	21.10	487.60	487.40	0.9500	36.000	0.0120	63.86	490.12	0.13	4.35
46	P88	Pipe	SC_JUS-P88	SC_JDS-P88	40.50	488.20	486.60	3.9500	52.000	0.0240	77.09	382.89	0.20	6.56
47	P89	Pipe	SC_JUS-P89	SC_JDS-P89	43.30	475.32	475.20	0.2800	66.000	0.0240	88.43	95.76	0.92	6.23
48	P90	Pipe	SC_JUS-P90	SC_JDS-P90	82.60	503.34	503.02	0.3900	36.000	0.0130	0.28	41.51	0.01	3.09
49	P91	Pipe	SC_JUS-P91	SC_JUS-P90	81.90	503.87	503.44	0.5300	36.000	0.0150	0.28	41.89	0.01	1.44
50	10_CH-71-70	Channel	10_JDS-P70	10_JUS-P71	1209.00	485.80	481.00	0.4000	60.000	0.0320	19.90	1271.55	0.02	1.61
51	10_CH-72-71	Channel	10_JDS-P71	10_JUS-P72	1736.00	480.80	478.00	0.1600	72.000	0.0320	11.26	616.62	0.02	1.51
52	10_CH-79-Trib1	Channel	10_JDS-Trib1	10_JUS-P79	1363.00	477.50	467.40	0.7400	60.000	0.0320	25.29	1448.21	0.02	2.79
53	10_CH-80-79	Channel	10_JDS-P79	10_JUS-P80	246.00	466.50	465.42	0.4400	156.000	0.0320	26.54	4521.15	0.01	1.56
54	10_CH-OF1-80	Channel	10_JDS-P80	10_OF1	398.00	464.20	461.00	0.8000	117.600	0.0320	59.47	1389.84	0.04	3.56
55	10_CH-Trib1	Channel	10_P72-pondoutfall	10_JDS-Trib1	85.00	477.50	477.50	0.0000	54.000	0.0320	14.31	14.78	0.97	1.05
56	10_CH-Trib1-76	Channel	10_JDS-P76	10_JDS-Trib1	1026.00	483.40	477.50	0.5800	72.000	0.0320	38.93	1025.45	0.04	5.04
57	10_RRCH-70-69	Channel	10_JDS-P69	10_JUS-P70	59.00	489.95	486.00	6.6900	60.000	0.0320	22.87	2160.35	0.01	2.65

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)
58	10_RRCH-76-75	Channel	10_JDS-P75	10_JUS-P76	34.00	485.79	484.04	5.1500	84.000	0.0320	30.15	395.55	0.08	0.88
59	KR_CH-39-40	Channel	KR_JDS-P40	KR_JUS-P39	905.00	461.26	460.50	0.0800	93.000	0.0320	120.42	497.80	0.24	1.84
60	KR_CH-40-41	Channel	KR_JDS-P41	KR_JUS-P40	1031.00	464.22	461.95	0.2200	116.400	0.0320	142.02	719.91	0.20	3.23
61	KR_CH-41-42	Channel	KR_JDS-P42	KR_JUS-P41	1352.00	465.81	465.81	0.0000	81.120	0.0320	79.25	11.59	6.84	1.75
62	KR_CH-42-43	Channel	KR_JDS-P43	KR_JUS-P42	981.00	470.90	465.73	0.5300	76.200	0.0320	75.63	587.14	0.13	2.30
63	KR_CH-43-D1	Channel	KR_JUS-D1	KR_JUS-P43	292.00	469.60	468.70	0.3100	90.000	0.0320	75.45	736.80	0.10	1.34
64	KR_CH-44-45_3	Channel	KR_JDS-P45_3	KR_JUS-P44	738.85	484.96	472.06	1.7500	60.000	0.0450	85.88	247.40	0.35	6.11
65	KR_CH-44-46	Channel	KR_JDS-P46	KR_JUS-P44	312.00	471.00	470.30	0.2200	66.000	0.0320	119.15	221.55	0.54	2.98
66	KR_CH-45_3-45_2	Channel	KR_JDS-P45_2	KR_JUS-P45_3	24.86	487.91	486.05	7.4800	60.000	0.0320	95.57	1252.28	0.08	4.16
67	KR_CH-46-46	Channel	KR_JUS-P46	KR_JDS-P46	42.00	471.20	471.00	0.4800	96.000	0.0350	119.13	1507.23	0.08	5.06
68	KR_CH-46-Trib1	Channel	KR_JDS-Trib1	KR_JUS-P46	2923.00	475.50	472.00	0.1200	72.000	0.0320	101.38	696.91	0.15	0.59
69	KR_CH-50-51	Channel	KR_JDS-P51_52	KR_JUS-P50	948.87	514.67	488.25	2.7800	48.000	0.0800	41.93	791.98	0.05	2.99
70	KR_CH-53-53_2	Channel	KR_JDS-P53_2	KR_JDS-P53	211.00	482.00	480.39	0.7600	18.000	0.0800	1.37	39.88	0.03	0.15
71	KR_CH-59-Bentley	Channel	KR_JDS-Bentley	KR_JUS-P59	669.00	490.00	481.43	1.2800	48.000	0.0320	25.58	332.77	0.08	3.56
72	KR_CH-64-Div1	Channel	KR_JDS-Div1	KR_JUS-P64	642.00	493.50	492.56	0.1500	48.000	0.0320	23.22	444.32	0.05	2.58
73	KR_CH-Bentley	Channel	KR_JDS-P200	KR_JDS-Bentley	995.00	498.00	490.00	0.8000	42.000	0.0320	10.14	173.19	0.06	2.23
74	KR_CH-D1-44	Channel	KR_JDS-P44	KR_JUS-D1	125.28	471.40	471.25	0.1200	90.000	0.0320	132.44	459.22	0.29	4.52
75	KR_CH-D1-65A	Channel	KR_JDS-D1	KR_JDS-D1-B	500.00	472.00	470.00	0.4000	90.000	0.0320	56.99	1608.55	0.04	2.79
76	KR_CH-D1B	Channel	KR_JDS-D1-B	KR_JUS-P65	400.00	470.00	466.93	0.7700	90.000	0.0320	56.99	2228.15	0.03	1.66
77	KR_CH-moose	Channel	JDS-P201	KR_JDS-Div1	886.00	493.90	493.50	0.0500	48.000	0.0320	4.95	246.72	0.02	0.70
78	KR_CH-OF1-39	Channel	KR_JDS-P39	KR_OF1	70.20	458.99	458.00	1.4100	120.000	0.0320	119.10	5759.30	0.02	3.86
79	KR_CH-SWS1	Channel	KR_JUS-SWS1	KR_JDS-Trib1	2362.00	477.50	475.50	0.0800	54.000	0.0320	3.67	217.18	0.02	0.49
80	KR_CH-SWS1-57	Channel	KR_JDS-P57	KR_JUS-SWS1	42.00	478.29	477.50	1.8800	48.000	0.0450	8.02	87.78	0.09	3.23
81	KR_CH-SWS1-58	Channel	KR_JDS-P58	KR_JUS-SWS1	76.00	478.92	477.50	1.8700	48.000	0.0320	32.73	292.08	0.11	6.41
82	KR_CH-SWS2-Trib2	Channel	KR_JDS-Trib2	KR_JDS-Trib1	470.00	477.00	475.50	0.3200	72.000	0.0320	147.47	933.31	0.16	2.14
83	KR_CH-Trib2-47	Channel	KR_JDS-P47	KR_JDS-Trib2	873.00	482.01	477.00	0.5700	72.000	0.0320	157.61	1179.07	0.13	3.16
84	KR_CH-Trib2-53	Channel	KR_JDS-P53	KR_JDS-Trib2	1194.00	480.39	477.00	0.2800	48.000	0.0450	14.97	266.85	0.06	1.04
85	KR_RRCH-45_2-45	Channel	KR_JDS-P45	KR_JUS-P45_2	40.00	488.76	488.17	1.4700	72.000	0.0320	101.52	681.99	0.15	3.69
86	KR_RRCH-47-48	Channel	KR_JDS-P48	KR_JUS-P47	45.00	484.55	482.34	4.9100	72.000	0.0320	87.95	1935.60	0.05	5.15
87	KR_RRCH-47-49	Channel	KR_JDS-P49	KR_JUS-P47	530.00	486.52	482.34	0.7900	72.000	0.0320	34.45	519.43	0.07	2.10
88	KR_RRCH-49-50	Channel	KR_JDS-P50	KR_JDS-P49	397.00	487.95	486.52	0.3600	72.000	0.0320	33.88	197.46	0.17	1.88
89	KR_RRCH-53_2-56	Channel	KR_JUS-P53_2	KR_JDS-P56	477.00	482.00	480.58	0.3000	48.000	0.0320	3.86	266.42	0.01	0.49
90	KR_RRCH-56-57	Channel	KR_JDS-P56	KR_JUS-P57	535.00	480.58	478.39	0.4100	66.000	0.0320	5.52	414.62	0.01	0.54
91	KR_RRCH-57-57_2	Channel	KR_JDS-P57_2	KR_JUS-P57	31.00	480.95	478.58	7.6500	36.000	0.0800	4.71	69.60	0.07	1.68
92	KR_RRCH-58-59	Channel	KR_JDS-P59	KR_JUS-P58	29.00	480.97	479.74	4.2400	54.000	0.0320	33.56	532.28	0.06	4.11
93	KR-CH-Bentley-64	Channel	KR_JDS-P64	KR_JDS-Bentley	1078.00	492.03	490.00	0.1900	48.000	0.0320	21.46	417.33	0.05	1.04
94	KR-RRCH-53-53_2	Channel	KR_JUS-P53_2	KR_JUS-P53	211.00	482.00	480.66	0.6400	54.000	0.0320	8.45	268.74	0.03	0.69
95	KR-RRCH-53-55	Channel	KR_JDS-P55	KR_JUS-P53	42.00	480.87	480.66	0.5000	80.400	0.0320	27.83	479.67	0.06	1.60
96	SC_CH-86-84	Channel	SC_JUS-P84	SC-JUS-P86	879.25	492.50	492.00	0.0600	48.000	0.0800	0.00	869.89	0.00	0.00
97	SC_CH-87-202	Channel	SC_JDS-P202	SC_JDS-P87	3875.00	497.07	487.40	0.2500	24.000	0.0320	1.07	49.65	0.02	0.11
98	SC_CH-88-87	Channel	SC_JDS-P87	SC_JDS-P88	1012.00	487.40	486.50	0.0900	96.000	0.0320	70.61	1128.47	0.06	1.20
99	SC_CH-89-88	Channel	SC_JDS-P88	SC_JUS-P89	1788.00	486.50	475.32	0.6300	96.000	0.0320	81.65	1670.56	0.05	1.87
100	SC_CH-OF1-Trib1	Channel	SC_JDS-Trib1	SC_OF1	140.00	464.00	462.00	1.4300	72.000	0.0450	88.40	1811.55	0.05	3.98
101	SC_CH-Trib1-89	Channel	SC_JDS-P89	SC_JDS-Trib1	748.00	473.34	464.00	1.2500	96.000	0.0320	88.42	3503.10	0.03	3.27
102	SC_RRCH-203-90	Channel	SC_JDS-P90	SC_JUS-P203	2014.00	503.02	495.55	0.3700	31.200	0.0320	0.22	38.51	0.01	0.02
103	SC_RRCH-204-OF2	Channel	SC_JDS-P204	SC_OF2	3680.98	502.20	500.00	0.0600	48.000	0.0320	7.69	72.35	0.11	1.03
104	SC_RRCH-87-203	Channel	SC_JDS_P203	SC_JUS-P87	3893.00	495.06	489.17	0.1500	84.000	0.0320	23.98	470.68	0.05	0.90
105	SC_RRCH-87-84	Channel	SC_JDS-P84	SC_JUS-P87	50.00	488.34	488.34	0.0000	116.400	0.0320	55.89	150.05	0.37	2.88
106	SC_RRCH-88-87	Channel	SC_JUS-P87	SC_JUS-P88	865.00	492.80	492.00	0.0900	60.000	0.0800	0.00	46.58	0.00	0.00
107	SC-CH-91-91A	Channel	SC_JUS-91A	SC_JUS-P91	178.41	506.00	503.87	1.1900	36.000	0.0450	0.00	127.17	0.00	0.00
108	SC-CH-91A-204	Channel	SC_JUS-P204	SC_JUS-91A	472.13	503.20	506.00	-0.5900	36.000	0.0450	0.00	89.63	0.00	0.00
109	SC-RRCH-88-86	Channel	SC_JDS-P86	SC_JUS-P88	45.00	489.74	488.20	3.4200	72.000	0.0450	21.97	1427.64	0.02	2.19
110	SH_CH-SH7-P88	Channel	SH_JDS-SH7-POND	SC_JDS-P88	2000.00	487.00	486.50	0.0300	48.000	0.0800	0.00	47.31	0.00	0.00
111	10_Pond-Flume	Weir	10_P72-pondoutfall	10_JDS-P72-Pond		477.50	477.60				14.31			
112	Div1	Weir	KR_JUS-D1	KR_JDS-D1		469.60	470.00				56.99			
113	KR_Shafer-Rd-weir	Weir	KR_JUS-P201	10_JUS-P75		492.00	486.35				0.00			
114	P200-weir	Weir	KR_JUS-P200	KR_JDS-P200		499.90	498.00				0.00			

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)
115	P201-weir	Weir	KR_JUS-P201	JDS-P201		492.00	493.90				0.00			
116	P202-weir	Weir	SC_JUS-P202	SC_JDS-P202		496.00	497.07				0.00			
117	P203-weir	Weir	SC_JUS-P203	SC_JDS_P203		495.55	495.06				0.00			
118	P39-weir	Weir	KR_JUS-P39	KR_JDS-P39		460.50	458.00				0.00			
119	P40-weir	Weir	KR_JUS-P40	KR_JDS-P40		461.95	461.26				0.00			
120	P41-weir	Weir	KR_JUS-P41	KR_JDS-P41		465.81	464.22				0.00			
121	P42-weir	Weir	KR_JUS-P42	KR_JDS-P42		465.73	465.81				0.00			
122	P43-weir	Weir	KR_JUS-P43	KR_JDS-P43		468.70	468.40				0.00			
123	P44-weir	Weir	KR_JUS-P44	KR_JDS-P44		470.30	470.00				0.00			
124	P45_2-weir	Weir	KR_JUS-P45_2	KR_JDS-P45_2		488.17	487.91				31.61			
125	P45_3-bypass	Weir	KR_JDS-P45_3	KR_JUS-P44		484.96	470.30				0.00			
126	P45_3-weir	Weir	KR_JUS-P45_3	KR_JDS-P45_3		486.05	484.96				46.68			
127	P45-weir	Weir	KR_JUS-P45	KR_JDS-P45		490.12	488.76				0.00			
128	P47-weir	Weir	KR_JUS-P47	KR_JDS-P47		482.34	482.01				0.00			
129	P48-weir	Weir	KR_JUS-P48	KR_JDS-P48		485.05	484.55				0.00			
130	P49-weir	Weir	KR_JUS-P49	KR_JDS-P49		487.63	486.52				0.00			
131	P50-weir	Weir	KR_JUS-P50	KR_JDS-P50		488.25	487.95				0.00			
132	P51-weir	Weir	KR_JUS-P51	KR_JDS-P51_52		514.94	514.67				0.00			
133	P52-weir	Weir	KR_JUS-P52	KR_JDS-P51_52		517.48	514.67				0.00			
134	P53_2-weir	Weir	KR_JUS-P53_2	KR_JDS-P53_2		482.00	482.00				0.00			
135	P53-weir	Weir	KR_JUS-P53	KR_JDS-P53		480.66	480.39				0.00			
136	P55-weir	Weir	KR_JUS-P55	KR_JDS-P55		481.40	480.87				0.00			
137	P56-weir	Weir	KR_JUS-P56	KR_JDS-P56		481.72	480.58				0.00			
138	P57_2-weir	Weir	KR_JUS-P57_2	KR_JDS-P57_2		481.90	480.94				0.00			
139	P57-weir	Weir	KR_JUS-P57	KR_JDS-P57		478.58	478.29				0.00			
140	P58-weir	Weir	KR_JUS-P58	KR_JDS-P58		479.74	478.92				0.00			
141	P59_2-weir	Weir	KR_JUS-P59_2	KR_JUS-P59		482.33	481.43				0.00			
142	P59-weir	Weir	KR_JUS-P59	KR_JDS-P59		481.43	480.97				0.00			
143	P64-weir	Weir	KR_JUS-P64	KR_JDS-P64		492.56	492.03				0.00			
144	P69-weir	Weir	10_JUS-P69	10_JDS-P69		490.01	489.95				0.00			
145	P70-weir	Weir	10_JUS-P70	10_JDS-P70		486.00	485.80				0.00			
146	P71-weir	Weir	10_JUS-P71	10_JDS-P71		481.00	480.80				0.00			
147	P72-weir	Weir	10_JUS-P72	10_JDS-P72-Pond		478.00	477.60				0.00			
148	P75-weir	Weir	10_JUS-P75	10_JDS-P75		486.35	485.79				0.00			
149	P76-weir	Weir	10_JUS-P76	10_JDS-P76		484.04	483.40				0.00			
150	P79-weir	Weir	10_JUS-P79	10_JDS-P79		467.40	466.50				0.00			
151	P80-weir	Weir	10_JUS-P80	10_JDS-P80		465.42	464.20				0.00			
152	P84-weir	Weir	SC_JUS-P84	SC_JDS-P84		489.26	488.34				0.00			
153	P86-weir	Weir	SC-JUS-P86	SC_JDS-P86		489.60	489.60				0.00			
154	P87-weir	Weir	SC_JUS-P87	SC_JDS-P87		487.60	487.40				0.00			
155	P88-weir	Weir	SC_JUS-P88	SC_JDS-P88		488.20	486.50				0.00			
156	P89-weir	Weir	SC_JUS-P89	SC_JDS-P89		475.32	473.34				0.00			
157	SH7-ovrflow	Weir	SH_JUS-SH7-POND	SH_JDS-SH7-POND		485.00	487.00				0.00			

APPENDIX H

MODEL COMPONENTS INVENTORY

Inventory of Model Components

ID	Type	From	To	Contributing Drainage Areas	Comment
KR_OF1	Outfall			KR32-OF1	Kinney Run Outfall
KR_CH-OF1-39	Channel	OF1	P39		
KR_JDS-P39	Junction				
P39	Pipe	CH-OF1-39	CH-39-40		through Town Park
P39-weir	Weir	CH-OF1-39	CH-39-40		allowance for overtopping
KR_JUS-P39	Junction			KR32-P39	
KR_CH-39-40	Channel	P39	P40		
KR_JDS-P40	Junction				
P40	Pipe	CH-39-40	CH-40-41		OB-4 Catherine St
P40-weir	Weir	CH-39-40	CH-40-41		allowance for overtopping
KR_JUS-P40	Junction			KR28-P40	
KR_CH-40-41	Channel	P40	P41		
KR_JDS-P41	Junction				
P41	Pipe	CH-40-41	CH-41-42		at 487
P41-weir	Weir	CH-40-41	CH-41-42		allowance for overtopping
KR_JUS-P41	Junction			KR23-P41	
				KR24-P41	
				KR25-P41	
				KR26-P41	
				KR27-P41	
KR_CH-41-42	Channel	P41	P42		
KR_JDS-P42	Junction				
P42	Pipe	CH-41-42	CH-42-43		at Kawneer driveway
P42-weir	Weir	CH-41-42	CH-42-43		allowance for overtopping
KR_JUS-P42	Junction			KR27-P42	
KR_CH-42-43	Channel	P42	P43		
KR_JDS-P43	Junction				
P43	Pipe	CH-42-43	CH-43-44		Patterson Dr / Recycle Center
P42-weir	Weir	CH-42-43	CH-43-44		allowance for overtopping
KR_JUS-P43	Junction			KR27-P43	
KR_CH-43-D1	Channel	P43	Div1		btwn Patterson & diversion
KR_JDS-D1	Junction				
Div1	Weir	JUS-D1	CH-D1-65A		Diversion structure
KR_JUS-D1	Junction				
KR_CH-D1-65A	Channel	Div1	JDS-D1-B		flat section of swale
KR_JDS-D1-B	Junction				
KR_CH-D1B	Channel	JDS-D1-B	P65	KR29-P65	remainder of div. swale
KR_JUS-P65	Junction				
P65	Pipe	CH-D1B	OF2		to river outfall
KR_OF2	Outfall				

ID	Type	From	To	Contributing Drainage Areas	Comment
KR_CH-D1-44	Channel	Div1	P44		
KR_JDS-P44	Junction				
P44	Pipe	CH-D1-44	CH-44-46		at Old Berwick Rd
P44-weir	Weir	CH-D1-44	CH-44-46		allowance for overtopping
KR_JUS-P44	Junction			KR27-P44	
KR_CH-44-45_3	Channel	P44	P45_3		btwn Maple & Hazel St
P45_3-bypass	Weir	CH-D1-44	CH-44-46		allowance for overtopping
KR_JDS-P45_3	Junction				
Pipe45_3	Pipe	CH-44-45_3	CH-45_3-45_2		through yard
P45_3-weir	Weir	CH-44-45_3	CH-45_3-45_2		allowance for overtopping
KR_JUS-P45_3	Junction				
KR_CH-45_3-45_2	Channel	P45_3	P45_2		
KR_JDS-P45_2	Junction			KR31-P45_2	
P45_2	Pipe	CH-45_3-45_2	RRCH-45_2-45		under RR
KR_JUS-P45_2	Junction				
KR_RRCH-45_2-45	Channel	P45_2	P45		
KR-JDS-P45	Junction				
P45	Pipe	RRCH-45_2-45	JUS-P45		under Rt 11
KR_JUS-P45	Junction			KR31-P45	at Applebee's
				KR19-P45	
KR_CH-44-46	Channel	P44	P46		
KR_JDS-P46	Junction				
P46	Pipe	CH-44-46	CH-46-trib1		at Walnut St
KR_JUS-P46	Junction			KR22-P46	SWS-2
KR_CH-46-Trib1	Channel	P46	JDS-Trib1		
KR_JDS-Trib1	Junction			KR21-JDS-Trib1	Convergence of streams
KR_CH-SWS1	Channel	Trib1	JUS-SWS1		ESPY Bog SWS 1
KR_JUS-SWS1	Junction			KR9-JUS-SWS1	
				KR10-JUS-SWS1	
KR_CH-SWS1-58	Channel	JUS-SWS1	P58		
KR_JDS-P58	Junction				
P58	Pipe	SWS1	RRCH-58-59		3 pipes under RR
P58-weir	Weir	SWS1	RRCH-58-59		
KR_JUS-P58	Junction			KR11-P58	
				KR8-P58	
KR_P59_2	Pipe				under Rt 11 at uhaul
KR_JUS-P59_2	Junction				
P59_2-weir	Weir	JUS-P59_2	JUS-P59		surface flow to P59
KR_RRCH-58-59	Channel	P58	P59		
KR_JDS-P59	Junction				
P59	Pipe	RRCH-58-59	CH-59-Bentley		under Rt 11 W or uhaul
P59-weir	Weir	RRCH-58-59	CH-59-Bentley		allowance for overtopping
KR_JUS-P59	Junction			KR11-P59	
				KR8-P59	
KR_CH-59-Bentley	Channel	P59	JDS Bentley		
KR_JDS-Bentley	Junction			KR7-JDS-Bentley	
				KR6-JDS-Bentley	

ID	Type	From	To	Contributing Drainage Areas	Comment
KR_CH-Bentley	Channel	JDS Bentley	P200		
KR_JDS-P200	Junction				
P200	Pipe	CH Bentley	JUS-P200		under Bentley Drive
P200-weir	Weir	CH Bentley	JUS-P200		allowance for overtopping
KR-JUS-P200	Junction			KR5-P200	
				KR6-P200	
KR_CH-Bentley-P64	Channel	JDS Bentley	P64		
KR_JDS-P64	Junction				
P64	Pipe	CH-Bent-64	CH-64-Div1A		under Central Road
P64-weir	Weir	CH-Bent-64	CH-64-Div1A		allowance for overtopping
KR_JUS-P64	Junction			KR4-P64	
KR_CH-64-Div1	Channel	P64	JDS Div1		
KR_JDS-Div1	Junction			KR3-P64	
				KR1-P64	
				KR2-P64	
				SH3-P64	
KR_CH-moose	Channel	JDS Div1	P201		
KR_JDS-P201	Junction				
P201	Pipe	CH-moose	JUS-P201		no existing pipe found
P201-weir	Weir	CH-moose	JUS-P201		allowance for overtopping
KR_JUS-P201	Junction			SH4-P75	former driving range
KR_Shafer-Rd-weir	Weir	JUS-P201	JUS-P75		overflow to Shaffer Rd
KR_CH-SWS2-Trib2	Channel	JDS-Trib1	JDS-Trib2		
KR_JDS-Trib2	Junction			KR21-JDS-Trib2	convergence of streams
KR_CH-Trib2-P53	Channel	JDS Trib2	P53		
KR_JDS-P53	Junction				
P53	Pipe	CH-Trib2-53	RRCH-53-55		Under RR - near AMC
P53-weir	Weir				allowance for overtopping
KR_JUS-P53	Junction			KR20-P53	
KR-RRCH-53-55	Channel	P53	P55		
KR_JDS-P55	Junction				
KR-P55	Pipe	RRCH-53-55	JUS-P55		Under Rt11 - near AMC
KR_JUS-P55	Junction			KR11-P55	
KR_CH-53-53_2	Channel	JDS-P53	JDS-P53_2		south side of RR
KR_JDS-P53_2	Junction				
P53_2	Pipe	CH-53-53_2	JUS-53_2		Under RR east of P53
P53_2-weir	Weir	CH-53-53_2	JUS-53_2		allowance for overtopping
KR_JUS-P53_2	Junction			KR11-P53_2	
KR_RRCH-53-53_2	Channel	JUS-P53	JUS-P53_2		north side of RR
KR_RRCH-53_2-56	Channel	JUS-P53_2	JDS-P56		north side of RR
KR_JDS-P56	Junction				near Wendy's
P56	Pipe	RRCH-53_2-56	JUS-P56		under Rt11 - near Wendy's
P56-weir	Pipe	RRCH-53_2-56	JUS-P56		allowance for overtopping
KR_JUS-P56	Junction	RRCH-53_2-56		KR11-P56	
KR_RRCH-56-57	Channel	JDS-P56	JUS-P57		north side of RR
KR_JUS-P57	Junction			KR11-P57	
KR_RRCH-57-57_2	Channel	JUS-P57	JDS-P57_2		
KR_JDS_P57_2	Junction				

ID	Type	From	To	Contributing Drainage Areas	Comment
P57_2	Pipe	RRCH-57-57_2	JUS-P57_2		under Rt11 - at Bayada
P57_2-weir	Weir	RRCH-57-57_2	JUS-P57_2		allowance for overtopping
KR_JUS-P57_2	Junction			KR11-P57_2	
P57	Pipe	RRCH-57-57_2	CH-SWS1-57		
KR_JDS-P57	Junction				
KR_CH-SWS1-57	Channel	SWS1	P57		Espy Bog
KR_CH-Trib2-47	Channel	JDS Trib2	P47		
KR_JDS-P47	Junction				
P47	Pipe	CH-Trib2-47	RRCH-47-48		under RR east of Tract Sup
P47-weir	Weir	CH-Trib2-47	RRCH-47-48		allowance for overtopping
KR_JUS-P47	Junction			KR20-P47	
KR_RRCH-47-48	Channel	P47	P48		
KR_JDS-P48	Junction				
P48	Pipe	RRCH-47-48	JUS-P48		under Rt11 east of Tract Sup
P48-weir	Weir	RRCH-47-48	JUS-P48		
KR_JUS-P48	Junction			KR12-P48	
				KR13-P48	
				KR14-P48	
				KR15-P48	
				KR16-P48	
				KR20-P48	
KR_CH-47-49	Channel	JUS-P47	JDS-P49		north side of RR
KR_JDS-P49	Junction				
P49	Pipe	RRCH-47-49	JUS-P49		under Rt11 at Tractor Supply
P49-weir	Weir	RRCH-47-49	JUS-P49		
KR_JUS-P49	Junction			KR20-P49	
KR_RRCH-49-50	Channel	JDS-P49	JDS-P50		
KR_JDS-P50	Junction				
P50	Pipe	RRCH-49-50	JUS-P50		under Rt 11 at Marley's
P50-weir	Weir	RRCH-49-50	JUS-P50		
KR_JUS-P50	Junction			KR20-P50	
KR_CH-50-51	Channel	JUS-P50	JDS-P51_52		behind Giant
KR_JDS-P51_52	Junction				
P51	Pipe	KR_CH-50-51	JUS-P51		under 5th St Hollow @ Crestwood
P51-weir	Weir	KR_CH-50-51	JUS-P51		allowance for overtopping
KR_JUS-P51	Junction			KR18-P51	
P52	Pipe	KR_CH-50-51	JUS-P52		under 5th St Hollow East of Crestwood
P52-weir	Weir	KR_CH-50-51	JUS-P52		
KR_JUS-P52	Junction			KR17-P52	

ID	Type	From	To	Contributing Drainage Areas	Comment
10_OF1	Outfall				Trib 10 discharge
10_CH-OF1-80	Channel	OF1	P80		
10_JDS-P80	Junction				
P80	Pipe	CH-OF1-80	CH-80-79		Old Berwick Rd
P80-weir	Weir	CH-OF1-80	CH-80-79		allowance for overtopping
10_JUS-P80	Junction			SH12-P80	
				SH11-P80	
10_CH-80-79	Channel	P80	P79		
10_JDS-P79	Junction				
P79	Pipe	CH-80-79	CH-79-Trib1		under Edgar Ave
10_JUS-P79	Junction			SH14-P79	
10_CH-79-Trib1	Channel	P79	JDS-Trib1		
10_JDS-Trib1	Juction				convergence of streams
10_CH-Trib1	Channel	JDS-Trib1	Pond outfall		
10_P72-pondoutfall	Junction				downstream end of flume
10_Pond-Flume	Weir	P72-outfall	JDS-P72-pond		Pond discharge - flume
10_JDS-P72-Pond	Junction			SH10-JDS-P72-Pond	Pond W of Central
P72	Pipe	P72-pond	JUS-P72		under Central Ave
P72-weir	Weir	P72-pond	JUS-P72		
10_JUS-P72	Junction			SH9-P72	Pond E of Central (SWS-4)
				SH13-P72	
10_CH-72-71	Channel	JUS-P72	JDS-P71		
10_JDS-P71	Junction				
P71	Pipe	CH-72-71	CH-71-70		under Ridge St
P71-weir	Weir	CH-72-71	CH-71-70		allowance for overtopping
10_JUS-P71	Junction			SH8-P71	Pond E of Ridge (SWS-3)
10_CH-71-70	Channel	P71	P70		
10_JDS-P70	Junction				
P70	Pipe	CH-71-70	RRCH-70-69		under RR
P70-weir	Weir	CH-71-70	RRCH-70-69		
10_JUS-P70	Junction			SH8-P70	
10_RRCH-70-69	Channel	P70	P69		
10_JDS-P69	Junction				
P69	Pipe	RRCH-70-69	JUS-P69		
10_JUS-P69	Junction			SH8-P69	

ID	Type	From	To	Contributing Drainage Areas	Comment
10_CH-Trib1-76	Channel	JDS-Trib1	JDS-P76		
10_JDS-P76	Junction				
P76	Pipe	CH-Trib1-76	RRCH76-75		Under RR
P76-weir	Weir	CH-Trib1-76	RRCH76-75		allowance for overtopping
10_JUS-P76	Junction			SH14-P76	
10_RRCH-76-75	Channel	P76	P75		
10_JDS-P75	Junction				
P75	Pipe	RRCH-76-75	JUS-P75		Under Rt11 W of Honda
10_JUS-P75	Junction			SH1-P75	
				SH2-P75	
				SH5-P75	
SC_OF1					Unt discharge to river
SC_CH-OF1-Trib1	Channel	OF1	JDS-Trib1		
SC_JDS-Trib1	Junction				convergence of streams
SC_CH-Trib1-89	Channel	JDS-Trib1	P89		
SC_JDS-P89	Junction				
P89	Pipe	CH-Trib1-89	CH-89-88		under Old Berwick Road
P89-weir	Weir	CH-Trib1-89	CH-89-88		allowance for overtopping
SC_JUS-P89	Junction			SC3-P89	
				SC12-P89	
SC_CH-89-88	Channel	P89	P88		
SC_JDS-P88	Junction				
SH_CH-SH7-P88	Channel	JDS-P88	JDS-SH7-Pond		overflow path from adjacent drainage area
SH_JDS-SH7-Pond	Junction				
SH7-ovrflow	Weir	JDS-SH7-Pond	JUS-SH7-Pond		
SH_JUS-SH7-Pond	Junction			SH7-P89	pond behind Towne Marine
P88	Pipe	CH-89-88	RRCH-88-86		2 exist pipes under RR at wolf hollow
P88-weir	Weir	CH-89-88	RRCH-88-86		allowance for overtopping
SC_JUS-P88	Junction			SC3-P88	
				SC8-P88	
SC_RRCH-88-86	Channel	P88	P86		
SC_JDS-P86	Junction				
P86	Pipe	RRCH-88-86	JUS-P86		
P86-weir	Weir	RRCH-88-86	JUS-P86		allowance for overtopping
SC_JUS-P86	Junction			SC1-P86	
				SC2-P86	
SC_CH-86-84	Channel	P86	P84		flood area N side of Rt 11

ID	Type	From	To	Contributing Drainage Areas	Comment
SC_CH-88-87	Channel	JDS-P88	JDS-P87		south side of RR
SC_JDS-P87	Junction			SC11-JDS-P87	
				SC12-JDS-P87	
P87	Pipe	CH-88-87	RRCH-87-84		3 exist pipes under RR by go kart track
P87-weir	Weir	CH-88-87	RRCH-87-84		allowance for overtopping
SC_JUS-P87	Junction			SC11-P87	
				SC12-P87	
SC_RRCH-87-84	Channel	P87	P84		
SC_JDS-P84	Junction				
P84	Pipe	RRCH-87-84	JUS-P84		under Rt11 by go kart track
P84-weir	Weir	RRCH-87-84	JUS-P84		allowance for overtopping
SC_JUS-P84	Junction			SC10-P84	
				SC7-P84	
				SC4-P84	
				SC5-P84	
				SC6-P84	
				SC8-P84	
SC_CH-87-202	Channel	P87	P202		south side of RR
SC_JDS-P202	Junction				
P202	Pipe	CH-87-202	JUS-P202		under Keefers Lane
P202-weir	Weir	CH-87-202	JUS-P202		allowance for overtopping
SC_JUS-P202	Junction			SC15-P202	
SC_RRCH-87-203	Channel	P87	P203		north side of RR
SC_JDS-P203	Junction				
P203	Pipe	RRCH87-203	RRCH-203-90		under Keefers Lane
SC_JUS-P203	Junction				
SC_RRCH-203-90	Channel	P203	P90		north side of RR
SC_JDS-P90	Junction				at Low St
P90	Pipe	RRCH-203-90	JUS-P90		under Rt11 at Low St
SC_JUS-P90	Junction			SC15-P90	Inlet
P91	Pipe	JUS-P90	JUS-P91		
SC_JUS-P91	Junction			SC14-P91	N side of Rt11
SC-CH-91-91A	Channel	P91	JUS-91A		path for field overflow
SC_JUS-P91A	Junction				
SC-CH-91A-204	Channel	JUS-91A	P204		path for field overflow
SC_JUS-P204	Junction			SC14-P204	
				SC13-P204	
P204	Pipe	JUS-P204	JDS-P204		under Rt11 east of Low St
SC_JDS-P204	Junction				
SC-RRCH-204-OF2	Channel	P204	OF2		flow on north side of RR to study boundary

Notes:

1) All channels assume unobstructed flow path from end to end. Detailed survey of all channels was beyond the scope of this study.

APPENDIX I

MODEL CHANGES
PRE TO POST

Modeling Changes Made to Reflect Proposed Conveyance Improvements

Pipe 43 at Patterson: changed to 5' x 10' box culvert.

Regraded channels between Patterson and Walnut Street to provide uniform slope
Lowered diversion weir to 1-foot above new stream channel.
Widened diversion weir to 25 feet.
Lowered "n" value of diversion channel to represent clean, uniform bottom

Pipe 44 at Old Berwick: lowered bottom elevation to match new stream channel.
Replaced with 4' x 20' box culvert

Pipe 46 at Walnut: removed pipe and replaced with open channel.

Pipes 51 and 52 west of Crestwood: replace both with 2.5' x 5' box culverts.

Pipe 200 at Bentley: replaced with 2' x 5' box culvert

Pipe 64 at Central Rd: replaced with 3' x 10' box culvert.

Pipe 201 at Seiple: added 15" culvert.
Modified channel between P201 and P64 to provide positive discharge.

Pipe 79 at Edgar Ave: replaced with 3.5' x 8' box culvert.

Pipe 76 under RR near Honda Dealer: replaced with 3.5' x 14' box culvert.

Pipe 72 at Central Ave: replaced with 3 x 36" culverts. Inverts lowered approximately 1.2-ft

Pipe 71 at Ridge St: replaced with 4' x 10' box culvert.

Pipe 70 under RR west of Bissets Ln: replaced with 3' x 10' box culvert.

Pipe 87 under RR east of Wolf Hollow by go-kart track: replaced with 3' x 12' box culvert.

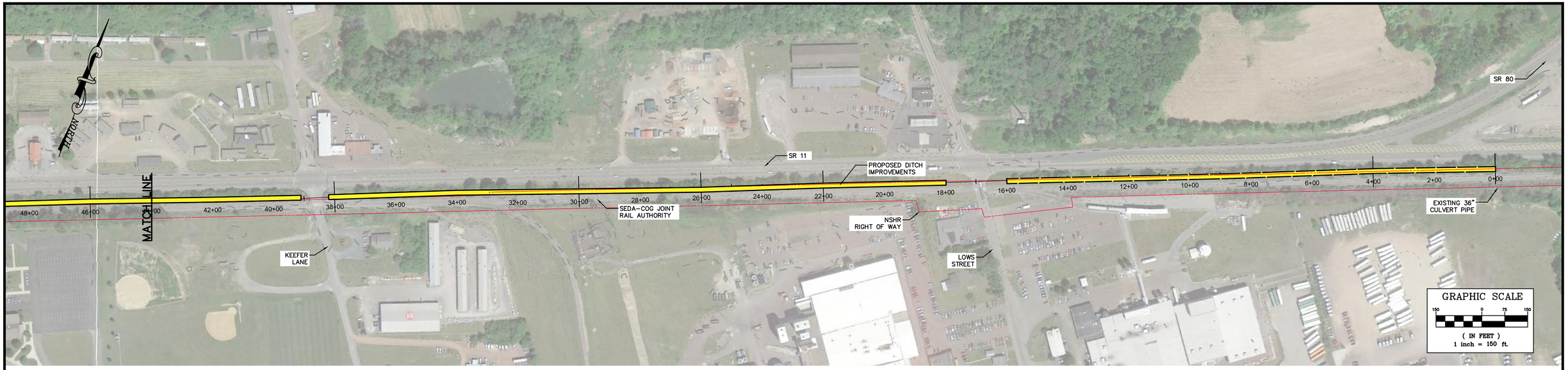
Pipe 84 under Rt11 east of Wolf Hollow by go-kart track: replaced with 3' x 12' box culvert

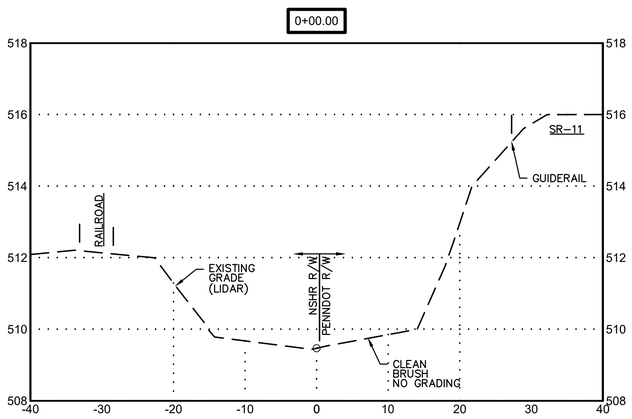
Notes:

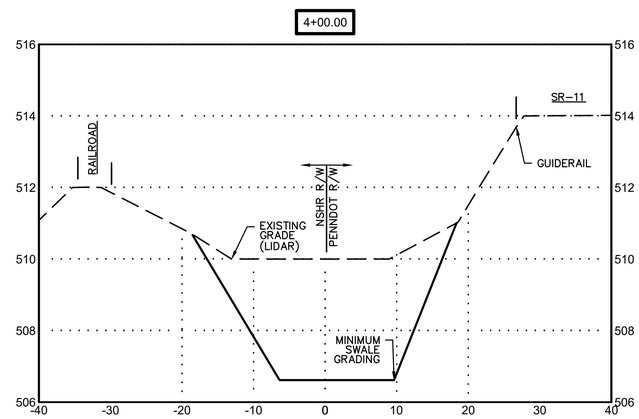
1) All culvert replacements may include minor elevation adjustments to provide positive slope.
2) Modeling does not include pipe embedment as required by Chapt 105 for streams.
3) Final design of replacement pipes should include detailed evaluation of headwall and endwall features.

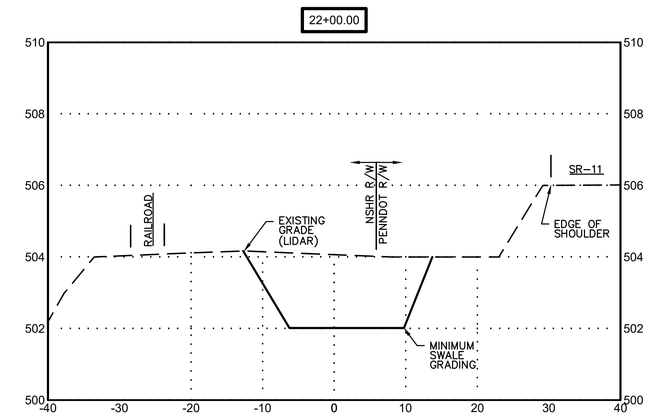
APPENDIX J

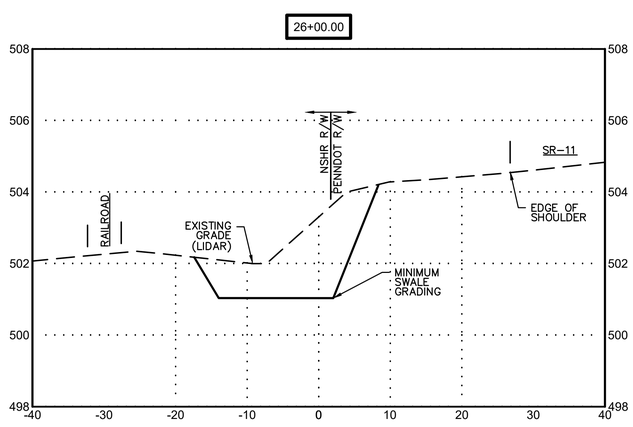
SWALE PLANS

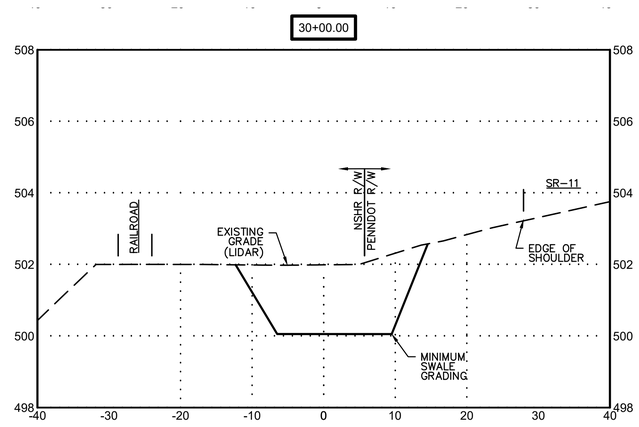


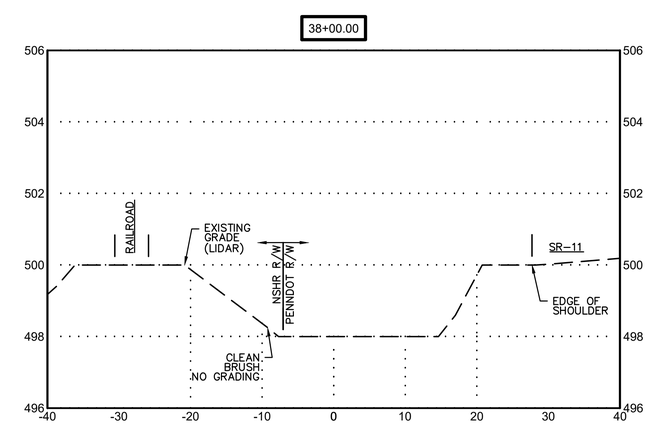












SECTION VIEWS

HORIZ. SCALE 1" = 10'
VERT. SCALE 1" = 2'

REVISIONS			
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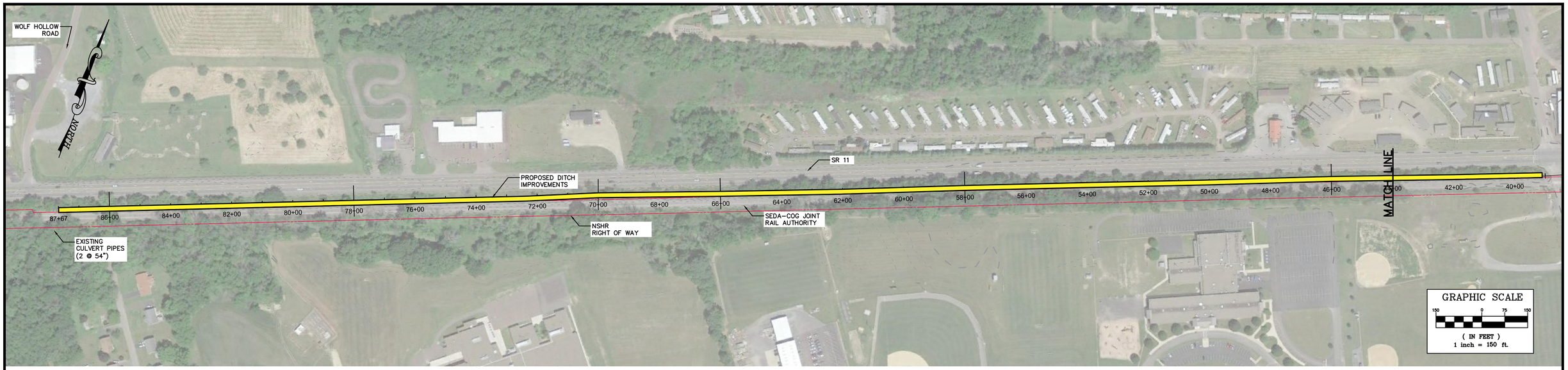
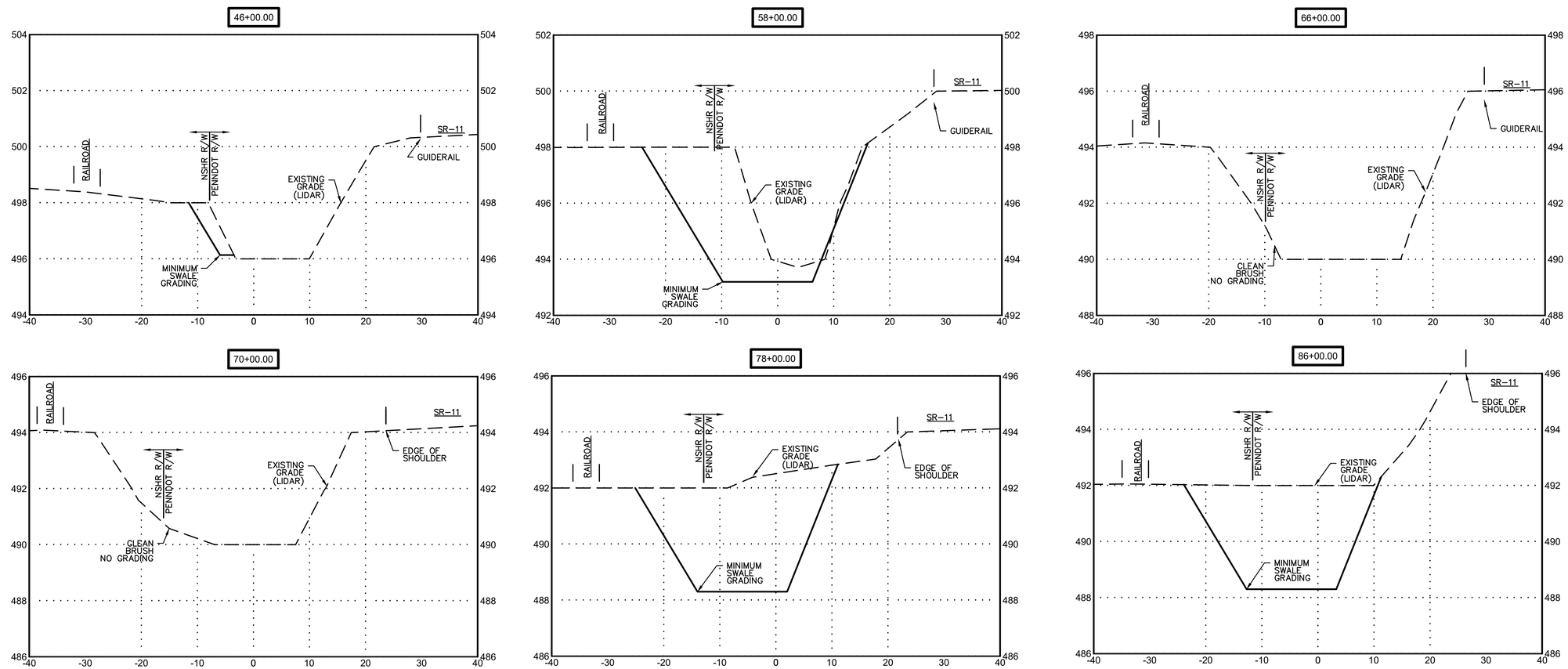
DATE: 07/22/2020
CHECKED BY JAF
DATE: 07/24/2020
APPROVED BY ADK
DATE: 10/15/2020

SOUTH CENTRE TOWNSHIP
COLUMBIA COUNTY
COMMONWEALTH OF PENNSYLVANIA

PROJECT NO. 19490
SHEET: SHEET 1
REV:





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SOUTH CENTRE TOWNSHIP
COLUMBIA COUNTY
COMMONWEALTH OF PENNSYLVANIA

PROJECT NO. 19490
SHEET: SHEET 2
REV:

APPENDIX K

LOW STREET PLANS

NORTH

GRAPHIC SCALE

30 0 15 30 60

(IN FEET)
1 inch = 30 ft.

PIPE TABLE					
PIPE NAME	SIZE	LENGTH	SLOPE	US INV. EL.	DS INV. EL.
PIPE-29	24"	30.00'	0.85%	502.00'	501.70'
PIPE-11	48"	150.00'	0.89%	500.00'	498.60'
PIPE-10	48"	390.00'	0.35%	498.60'	497.20'
PIPE-9	48"	390.00'	0.35%	497.20'	495.80'
PIPE-26	24"	20.47'	0.79%	503.00'	502.80'
PIPE-27	24"	10.15'	1.32%	501.60'	501.40'
PIPE-12	29"x45"	40.00'	0.68%	503.00'	502.70'
PIPE-28	24"	10.77'	1.27%	503.00'	502.80'

LEGEND:

- PROPOSED STORM SEWER ALIGNMENT
- PROPOSED STORM MANHOLE
- PROPOSED STORM INLET
- EXISTING SEWER ALIGNMENT
- EXISTING WATER MAIN
- EXISTING ELECTRIC OVERHEAD WIRES
- EXISTING TELEPHONE OVERHEAD WIRES
- EXISTING GAS LINES
- UTILITIES ROW LINES
- TAX PARCEL LINES
- EDGE OF PAVEMENT
- EXISTING BUILDING
- EXISTING FENCE
- EXISTING STORM WATER CULVERT
- EXISTING BITUMINOUS CURB
- EXISTING STORM MANHOLE
- EXISTING UTILITY POLE
- CO – CO CLEANOUT
- CS – CURB STOP
- ER – ELECTRICAL BOX
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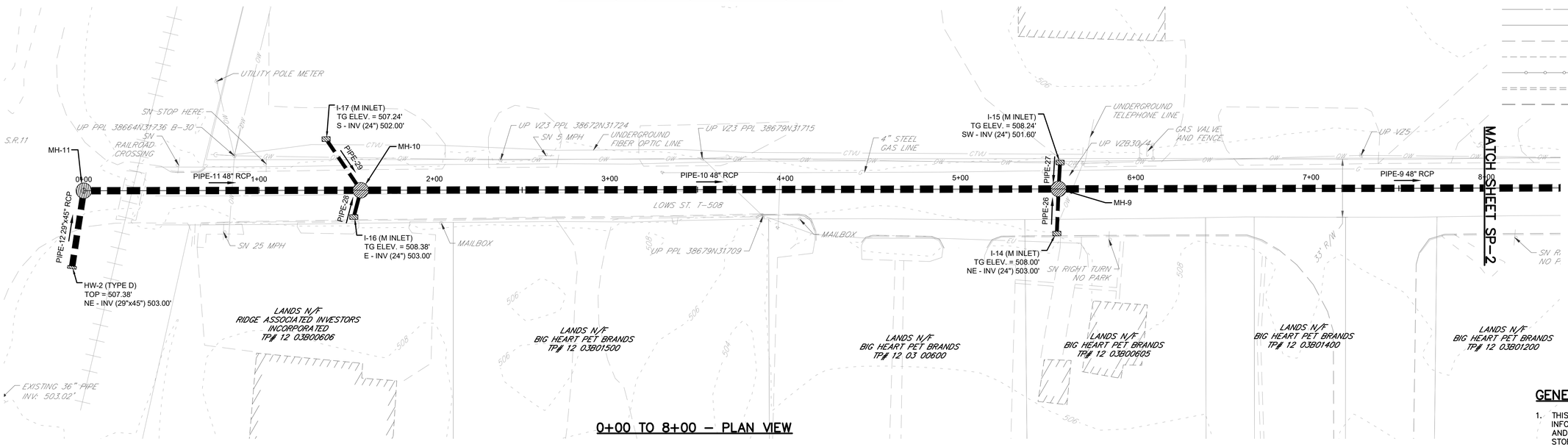
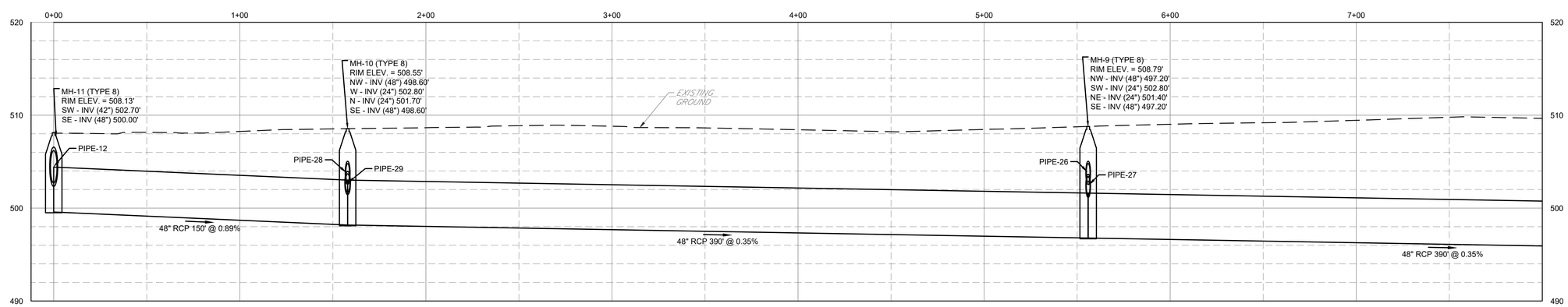
- TV – CABLE TV BOX
- WV – WATER VALVE
- M – WATER SERVICE METER PIT



0+00 TO 8+00 – PLAN VIEW



0+00 TO 8+00 – PROFILE VIEW

HORIZ. SCALE 1" = 30'
VERT. SCALE 1" = 6'

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   NAD 83 PA STATE PLANE COORDINATES
   NORTH ZONE
   VERTICAL DATUM
   NAVD 88

REVISIONS			
REV	DATE	BY	DESCRIPTION

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CHECKED BY JAF DATE: 07/24/2020
APPROVED BY ADK DATE: 07/31/2020

LOWS STREET
STORM SEWER IMPROVEMENTS
SOUTH CENTRE TOWNSHIP

COLUMBIA COUNTY
COMMONWEALTH OF PENNSYLVANIA

PROJECT NO. 19490
SHEET: SP-1
REV:

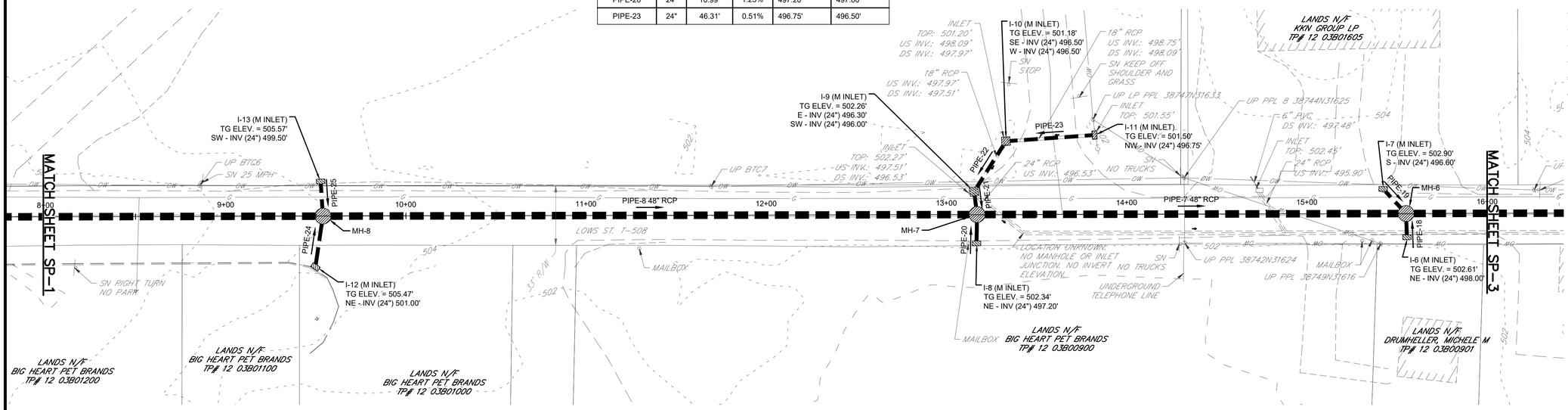
GRAPHIC SCALE

30 0 15 30 60

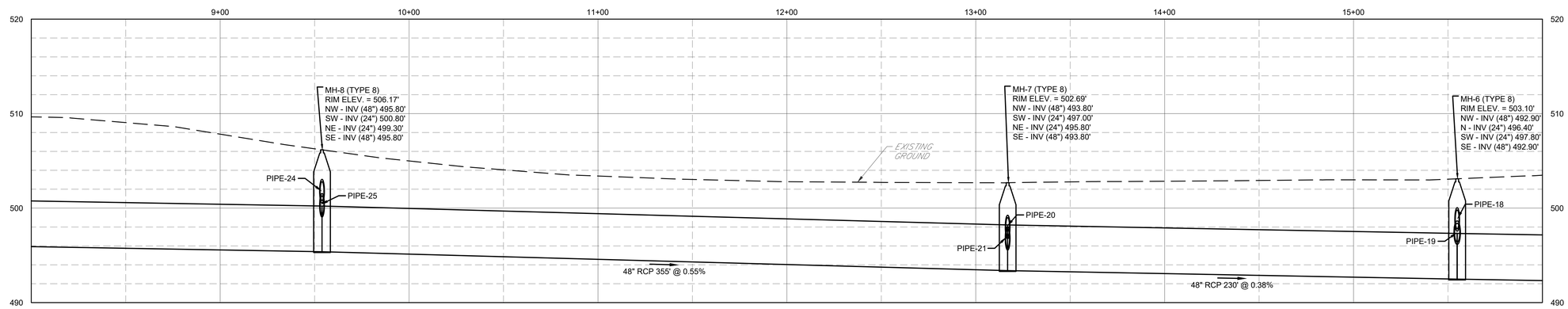
(IN FEET)
1 inch = 30 ft.

NORTH

PIPE TABLE					
PIPE NAME	SIZE	LENGTH	SLOPE	US INV. EL.	DS INV. EL.
PIPE-8	48"	355.00'	0.55%	495.80'	493.80'
PIPE-7	48"	230.00'	0.38%	493.80'	492.90'
PIPE-22	24"	27.75'	0.61%	496.50'	496.30'
PIPE-21	24"	6.88'	1.56%	496.00'	495.80'
PIPE-19	24"	13.08'	1.08%	496.60'	496.40'
PIPE-18	24"	8.22'	1.52%	498.00'	497.80'
PIPE-24	24"	23.25'	0.70%	501.00'	500.80'
PIPE-25	24"	14.27'	1.04%	499.50'	499.30'
PIPE-20	24"	10.99'	1.25%	497.20'	497.00'
PIPE-23	24"	46.31'	0.51%	496.75'	496.50'



8+00 TO 16+00 – PLAN VIEW



8+00 TO 16+00 – PROFILE VIEW

HORIZ. SCALE 1" = 30'
VERT. SCALE 1" = 6'

LEGEND:

- PROPOSED STORM SEWER ALIGNMENT
- PROPOSED STORM MANHOLE
- PROPOSED STORM INLET
- EXISTING SEWER ALIGNMENT
- EXISTING WATER MAIN
- EXISTING ELECTRIC OVERHEAD WIRES
- EXISTING TELEPHONE OVERHEAD WIRES
- EXISTING GAS LINES
- UTILITIES ROW LINES
- TAX PARCEL LINES
- EDGE OF PAVEMENT
- EXISTING BUILDING
- EXISTING FENCE
- EXISTING STORM WATER CULVERT
- EXISTING BITUMINOUS CURB
- EXISTING STORM MANHOLE
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- MB – MAIL BOX
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- M – WATER SERVICE METER PIT

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8. HORIZONTAL DATUM
   NAD 83 PA STATE PLANE COORDINATES
   NORTH ZONE
   VERTICAL DATUM
   NAVD 88

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LOWS STREET
STORM SEWER IMPROVEMENTS
SOUTH CENTRE TOWNSHIP

COLUMBIA COUNTY
COMMONWEALTH OF PENNSYLVANIA

PROJECT NO. 19490
REV:
SHEET: SP-2

GRAPHIC SCALE

30 0 15 30 60

(IN FEET)
1 inch = 30 ft.

NORTH

PIPE TABLE					
PIPE NAME	SIZE	LENGTH	SLOPE	US INV. EL.	DS INV. EL.
PIPE-6	48"	400.00'	0.34%	492.90'	491.50'
PIPE-5	48"	400.00'	0.40%	491.50'	489.87'
PIPE-17	24"	30.16'	0.62%	502.10'	501.90'
PIPE-16	24"	23.91'	0.66%	501.90'	501.70'
PIPE-15	24"	15.77'	0.96%	502.70'	502.50'
PIPE-13	24"	3.84'	2.28%	497.80'	497.60'
PIPE-14	24"	40.40'	0.65%	496.80'	496.50'

LEGEND:

- PROPOSED STORM SEWER ALIGNMENT
- PROPOSED STORM MANHOLE
- PROPOSED STORM INLET
- EXISTING SEWER ALIGNMENT
- EXISTING WATER MAIN
- EXISTING ELECTRIC OVERHEAD WIRES
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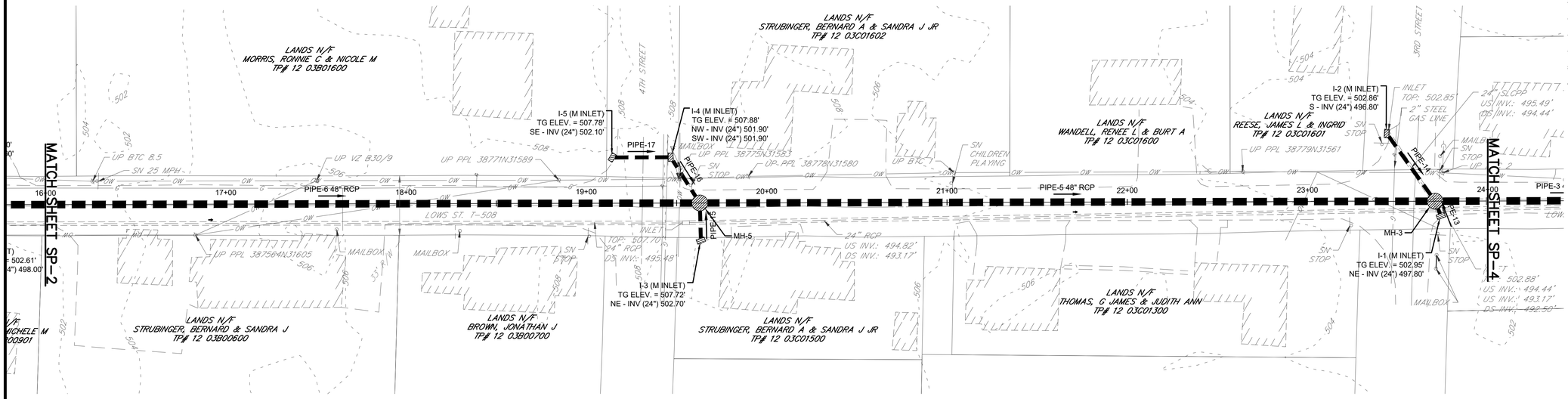
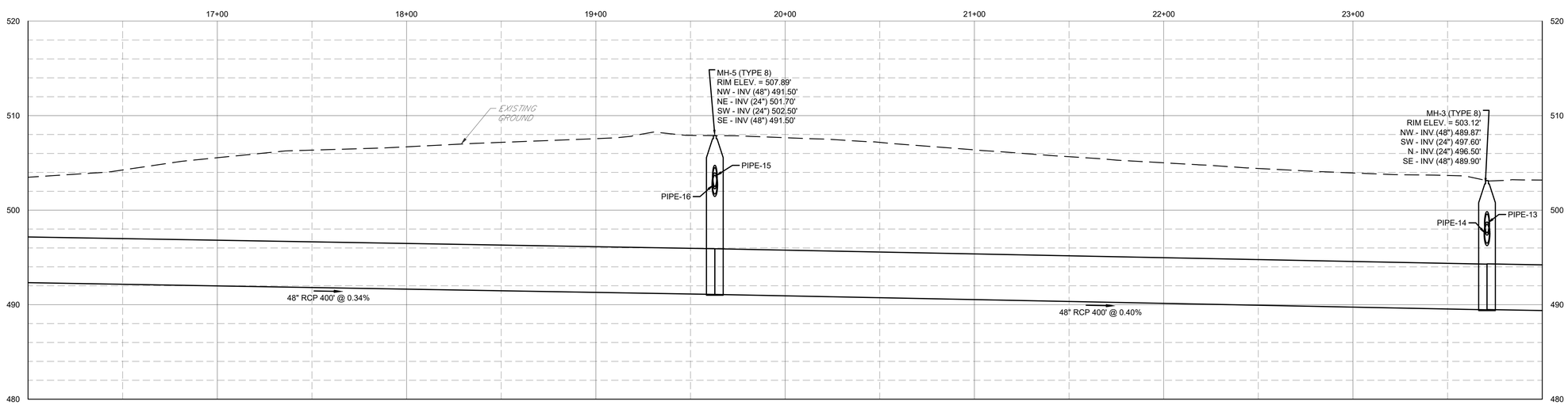


16+00 TO 24+00 – PLAN VIEW



16+00 – 24+00 – PROFILE VIEW

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VERT. SCALE 1" = 6'

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8. HORIZONTAL DATUM
   NAD 83 PA STATE PLANE COORDINATES
   NORTH ZONE
   VERTICAL DATUM
   NAVD 88

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LOWS STREET
STORM SEWER IMPROVEMENTS
SOUTH CENTRE TOWNSHIP

COLUMBIA COUNTY
COMMONWEALTH OF PENNSYLVANIA

PROJECT NO. 19490
SHEET: SP-3
REV:

GRAPHIC SCALE

30 0 15 30 60

(IN FEET)
1 inch = 30 ft.

NORTH

PIPE TABLE					
PIPE NAME	SIZE	LENGTH	SLOPE	US INV. EL.	DS INV. EL.
PIPE-3	48"	135.00'	0.35%	489.90'	489.40'
PIPE-2	48"	170.00'	10.71%	489.40'	470.50'
PIPE-1	48"	480.00'	1.09%	470.50'	465.25'

LEGEND:

- PROPOSED STORM SEWER ALIGNMENT
- PROPOSED STORM MANHOLE
- PROPOSED STORM INLET
- EXISTING SEWER ALIGNMENT
- EXISTING WATER MAIN
- EXISTING ELECTRIC OVERHEAD WIRES
- EXISTING TELEPHONE OVERHEAD WIRES
- EXISTING GAS LINES
- UTILITIES ROW LINES
- TAX PARCEL LINES
- EDGE OF PAVEMENT
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- EXISTING FENCE
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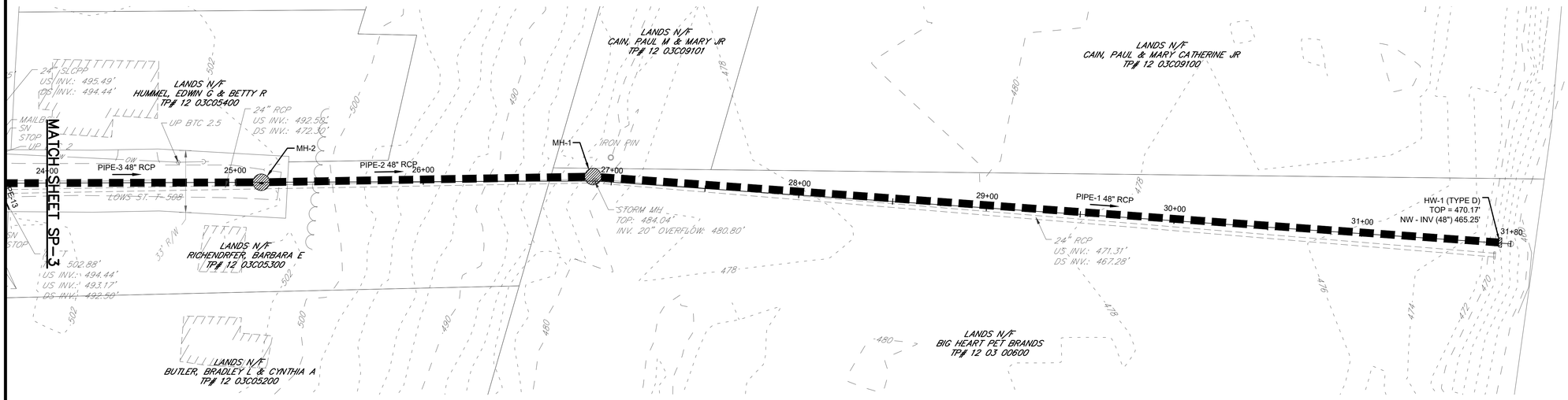
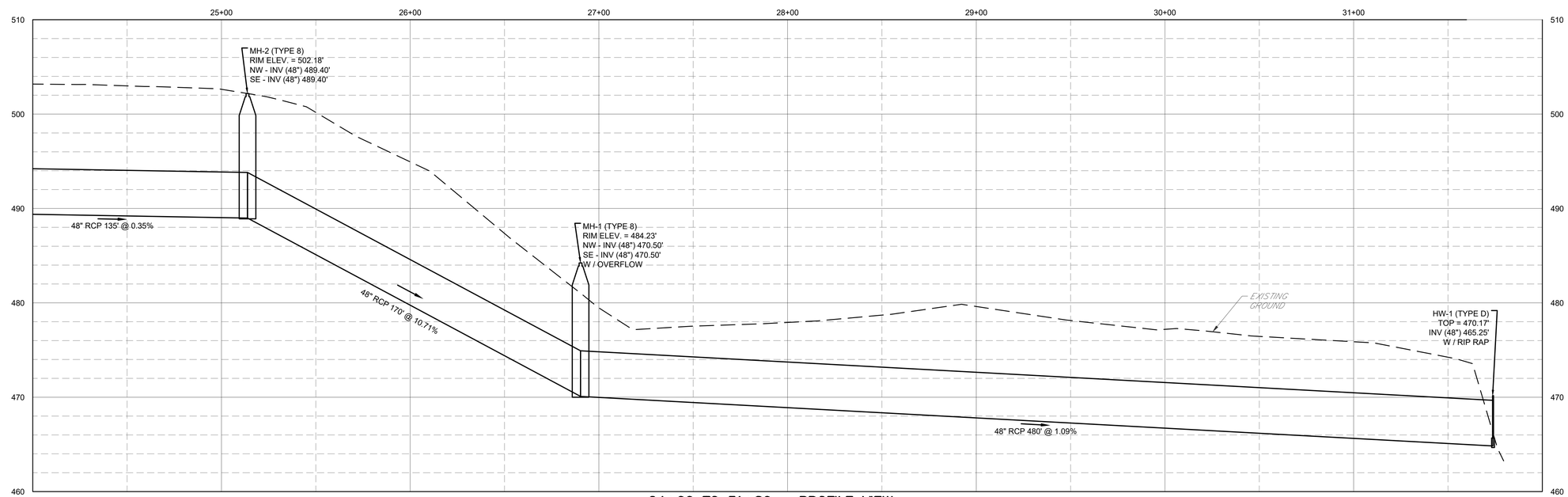


24+00 TO 31+80 – PLAN VIEW



24+00 TO 31+80 – PROFILE VIEW

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VERT. SCALE 1" = 6'

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PRELIMINARY NOT FOR CONSTRUCTION

PREPARED BY JJB DATE: 07/22/2020
CHECKED BY JAF DATE: 07/24/2020
APPROVED BY ADK DATE: 07/31/2020

LOWS STREET
STORM SEWER IMPROVEMENTS
SOUTH CENTRE TOWNSHIP

COLUMBIA COUNTY
COMMONWEALTH OF PENNSYLVANIA

PROJECT NO. 19490
SHEET: SP-4
REV:

APPENDIX L

BERM PLANS

LEGEND

- PROPOSED CONTOUR
- EXISTING CONTOUR
- TAX PARCEL LINE
- STREAM

0' 20' 40'
GRAPHIC SCALE
1" = 40'

36" CULVERT PIPE

SEDA-COG JOINT RAIL AUTHORITY

REPLACE CULVERT PIPE AND INSTALL FLAP GATE ON OUTLET END

0+00

510 508 506

STREAM

CLEARING AND GRUBBING LIMITS

UTILITY POLE AND OVERHEAD WIRE

504

OW

505 506 507 508 509

1+00

PROPOSED TOP OF BERM ELEVATION 508' WIDTH 10'

FEMA 100 YEAR FLOOD

506 508

2+00

REFER TO SHEET 2 FOR PROFILE AND TYPICAL SECTION

3+00

508

510

3+64

DATE:	07/06/2020
DRAWN BY:	JJB
CHECKED BY:	ADK
SCALE:	1"=40'
PROJECT NO.:	19490
	SHEET 1 OF 2

SEDA-COG JOINT RAIL AUTHORITY

S. CENTRE TOWNSHIP, COLUMBIA COUNTY
COMMONWEALTH OF PENNSYLVANIA

SEKISUI SITE PLAN

McTISH, KUNKEL & ASSOCIATES
1500 Sycamore Road, Suite 320
Montoursville, PA 17754
570.368.3040 fax 570.368.3166

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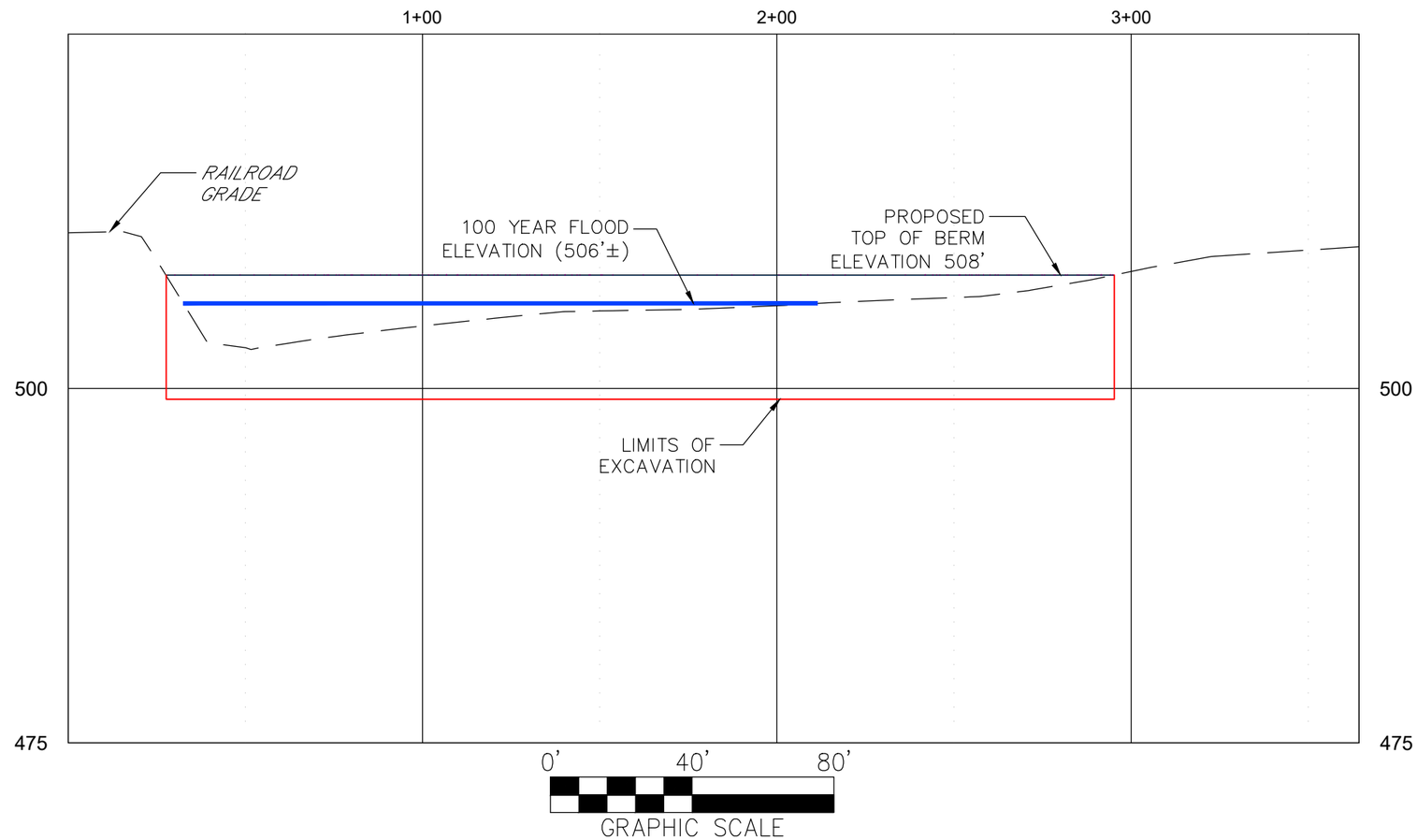
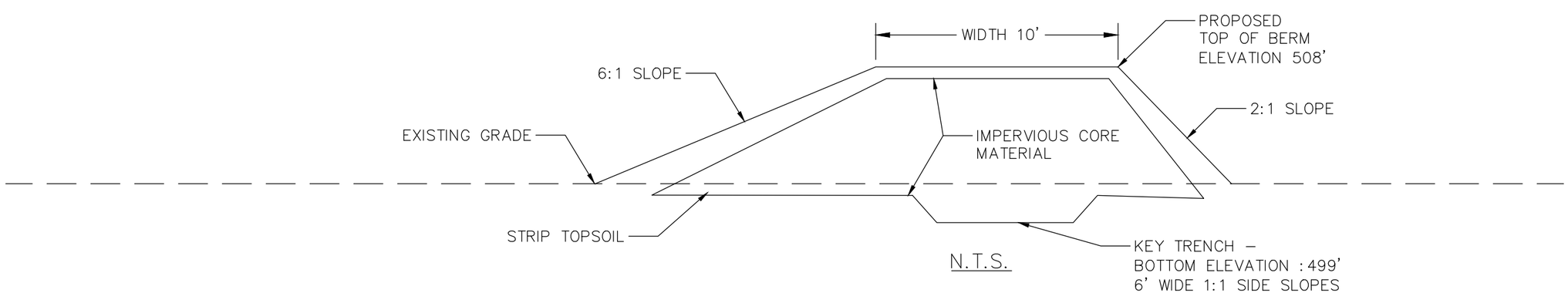
LEGEND

- PROPOSED TOP OF BERM
- 100 YEAR FLOOD
- EXISTING GROUND



HORIZONTAL 1" = 40'
VERTICAL 1" = 10'



N.T.S.

DATE:	07/06/2020
DRAWN BY:	JJB
CHECKED BY:	ADK
SCALE:	AS NOTED
PROJECT NO.:	19490
	SHEET 2 OF 2

SEDA-COG JOINT RAIL AUTHORITY

S. CENTRE TOWNSHIP, COLUMBIA COUNTY
COMMONWEALTH OF PENNSYLVANIA

SEKISUI BERM PROFILE

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APPENDIX M

COST ESTIMATES

PRELIMINARY COST ESTIMATE
BERM - SEKISUI
4-Dec-20

SOUTH CENTRE TOWNSHIP BERM - SEKISUI						
			UNIT	QUANTITY	UNIT PRICE	TOTAL
1		**ADMINISTRATIVE COSTS**				
	A.	MOBILIZATION	LS	1	$ 50,000.00	$ 50,000.00
	B.	ROW ACQUISITION	LS	1	$ 4,000.00	$ 4,000.00
2		**DEMOLITION, E&S CONTROLS**				
	A.	E&S CONTROLS	LS	1	$ 20,000.00	$ 20,000.00
3		**STORM WATER MANAGEMENT**				
	A.	FLAP GATE	EA	1	$ 3,500.00	$ 3,500.00
	B.	TOE DRAIN	LF	350	$ 125.00	$ 43,750.00
	C.	MISC STORMWATER	LS	1	$ 50,000.00	$ 50,000.00
4		**EARTHWORK**				
	A.	EXCAVATE/INSPECTION TRENCH	CY	1700.0	$ 25.00	$ 42,500.00
	B.	IMPORT FILL	CY	1700.0	$ 40.00	$ 68,000.00
	C.	TOPSOIL	CY	200.0	$ 20.00	$ 4,000.00
5		**MISC.**				
	A.	GEOTECHNICAL	LS	1.0	$ 20,000.00	$ 20,000.00
	B.	RAILROAD WORK	LS	1.0	$ 125,000.00	$ 125,000.00
7		**LANDSCAPING**				
	A.	SEED/MULCH	SY	3500.0	$ 2.00	$ 7,000.00
		SUBTOTAL				**$ 437,750**
		CONTINGENCY				**$ 87,550**
		ENGINEERING/PERMITTING				**$ 78,795**

PRELIMINARY COST ESTIMATE **$ 604,095**

PRELIMINARY COST ESTIMATE
RAILROAD/SR11 SWALES
4-Dec-20

SR11 and SEDA-COG JRA DRAINAGE IMPROVEMENTS						
			UNIT	QUANTITY	UNIT PRICE	TOTAL
1		**ADMINISTRATIVE COSTS**				
	A.	MOBILIZATION	LS	1	$ 50,000.00	$ 50,000.00
2		**EARTHWORK**				
	A.	CLEAR/GRUB	ACRE	7.9	$ 5,100.00	$ 40,290.00
	B	TOPSOIL STOCKPILE (Assume 1/2 foot of topsoil)	CY	6373	$ 3.50	$ 22,304.33
	C.	CUT/FILL	CY	25741	$ 15.00	$ 386,115.00
3		**LANDSCAPING**				
	A.	SEEDING	AC	7.9	$ 1,250.00	$ 9,875.00
	B	MULCH	M.S.F.	344.1	$ 70.00	$ 24,088.68
		SUBTOTAL				**$ 532,673**
		CONTINGENCY				**$ 106,535**
		ENGINEERING/PERMITTING				**$ 95,881**

PRELIMINARY COST ESTIMATE **$ 735,089**

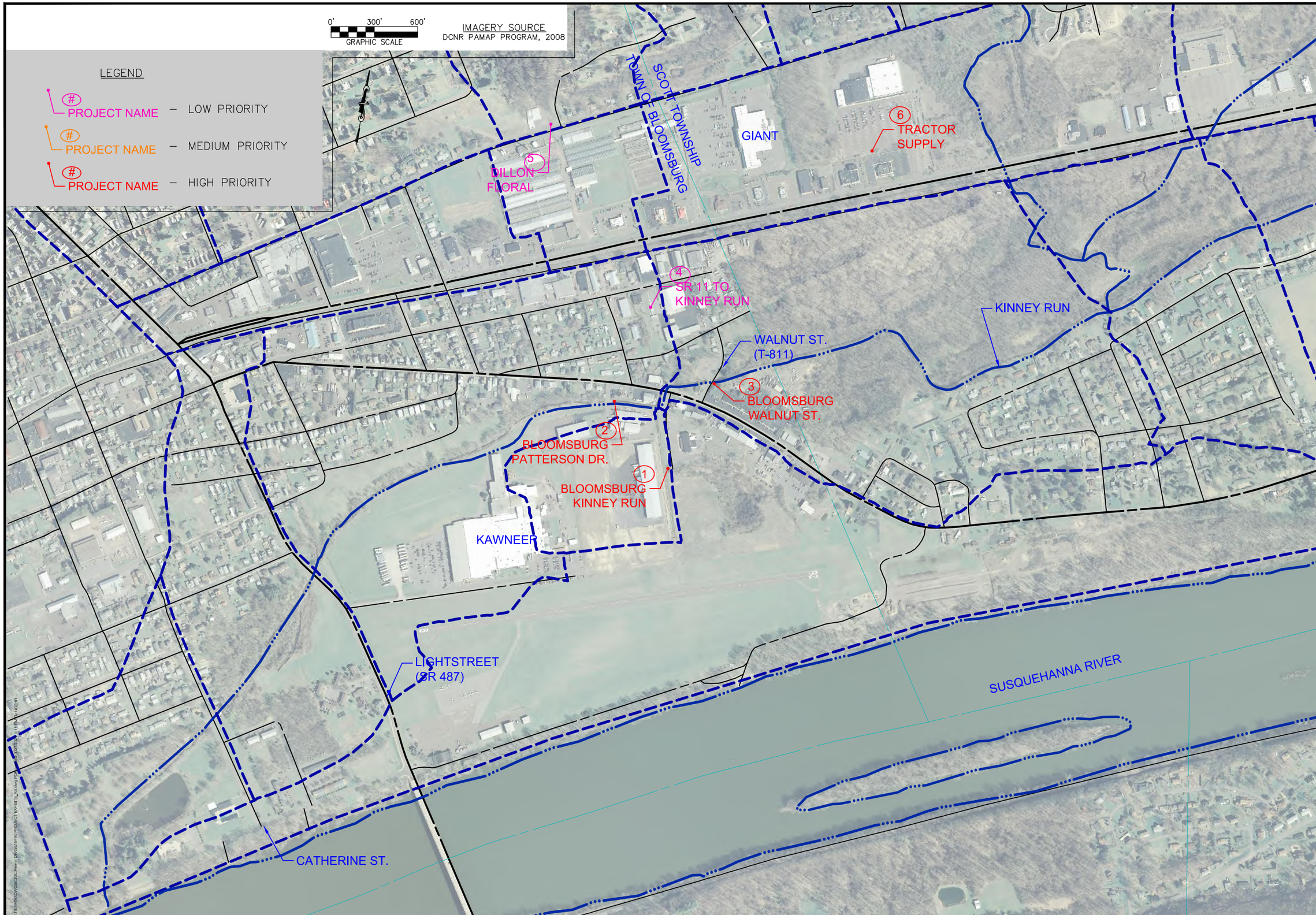
PRELIMINARY COST ESTIMATE
LOW STREET STORM SEWER
4-Dec-20

		LOW STREET DRAINAGE IMPROVEMENTS				
			UNIT	QUANTITY	UNIT PRICE	TOTAL
1		**ADMINISTRATIVE COSTS**				
	A.	BOND / INSURANCE	LS	1		$ -
	B.	MOBILIZATION	LS	1	$ 100,000.00	$ 100,000.00
2		**DEMOLITION, E&S CONTROLS**				
	A.	COMPOST FILTER SOCK	LF	6000	$ 4.00	$ 24,000.00
	B.	CONCRETE WASH OUT	EA	1	$ 600.00	$ 600.00
	C.	STORM PIPE REMOVE & DISPOSAL	LF	1100	$ 60.00	$ 66,000.00
2		**STORM WATER MANAGEMENT**				
	A.	TYPE M INLET	EA	17	$ 2,500.00	$ 42,500.00
	B.	24-INCH RCP	LF	350	$ 125.00	$ 43,750.00
	C	TYPE 8 MANHOLE	LF	10	$ 6,000.00	$ 60,000.00
	D	48-INCH RCP	LF	3100	$ 250.00	$ 775,000.00
	E	29X45 ERCP	LF	40	$ 125.00	$ 5,000.00
	F	TYPE D HEADWALL	EA	2	$ 5,000.00	$ 10,000.00
	G	RIP RAP	SY	200	$ 80.00	$ 16,000.00
3		**EARTHWORK**				
	A.	CLEAR/GRUB (Lows St. to River)	ACRE	0.5	$ 5,100.00	$ 2,550.00
4		**ROADWAY RESTORATION**				
	A.	PAVING SUBBASE AGGREGATE (8") Assume 1.35 Ton/CY	TON	2400	$ 26.00	$ 62,400.00
	B.	PAVING BASE COURSE (6.0") Assume 145 lb/ft^3 in place	TON	2700	$ 74.00	$ 199,800.00
	C.	PAVING WEARING COURSE (1.5") Assume 145 lb/ft^3 in place	TON	750	$ 115.00	$ 86,250.00
	D.	LINE PAINTING	LF	6000	$ 1.10	$ 6,600.00
5		**UTILITIES**				
	A	RELOCATION		1	$ 60,000.00	$ 60,000.00
6		**MISC.**				
	A					
7		**LANDSCAPING**				
	A.	SEEDING (Low St. to River)	AC	0.5	$ 1,250.00	$ 625.00
	B	MULCH (Low St. to River)	M.S.F.	21.8	$ 70.00	$ 1,524.60
		SUBTOTAL				**$ 1,562,600**
		CONTINGENCY				**$ 312,520**
		ENGINEERING/PERMITTING				**$ 281,268**

PRELIMINARY COST ESTIMATE **$ 2,156,387**

APPENDIX N

PROJECT LOCATION MAPS



NO.	DATE	DESCRIPTION	BY

McTISH, KUNKEL & ASSOCIATES
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Montoursville, PA 17754
570.368.3040 fax 570.368.3166

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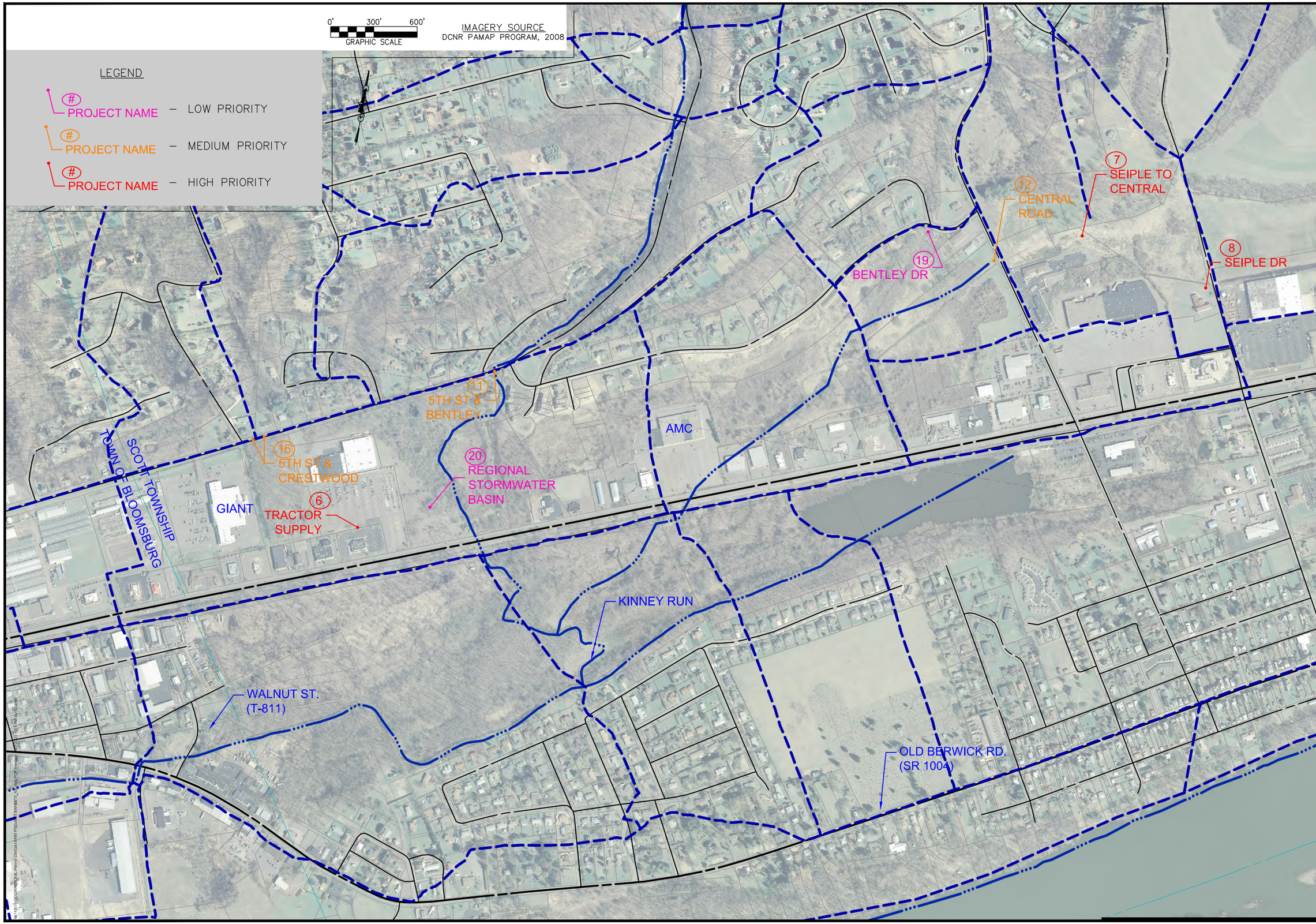
SEDA-COG JOINT AUTH.
SCOTT TOWNSHIP, COLUMBIA COUNTY
COMMONWEALTH OF PENNSYLVANIA

EXHIBIT

DATE 01/27/2021	PREPARED BY JJB	
SHEET SHT1	CHECKED BY JAF	
PROJECT NO. 19490	APPROVED BY ADK	



NO.	DATE	DESCRIPTION	BY

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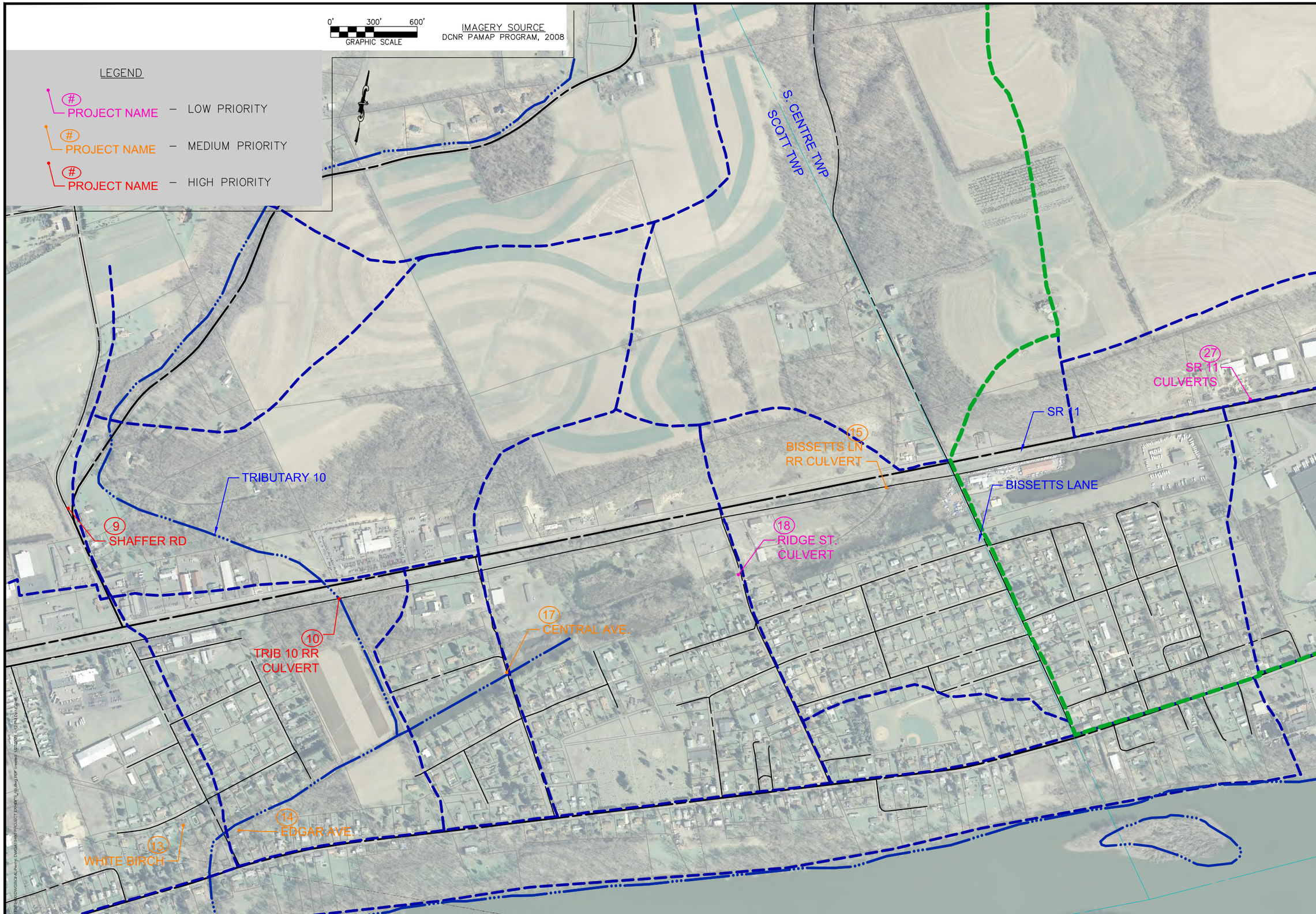
COMMONWEALTH OF PENNSYLVANIA

EXHIBIT

DATE	10/23/2020
SHEET	SHT2
PROJECT NO.	19490
PREPARED BY	JJB
CHECKED BY	JAF
APPROVED BY	ADK



NO.	DATE	DESCRIPTION	BY

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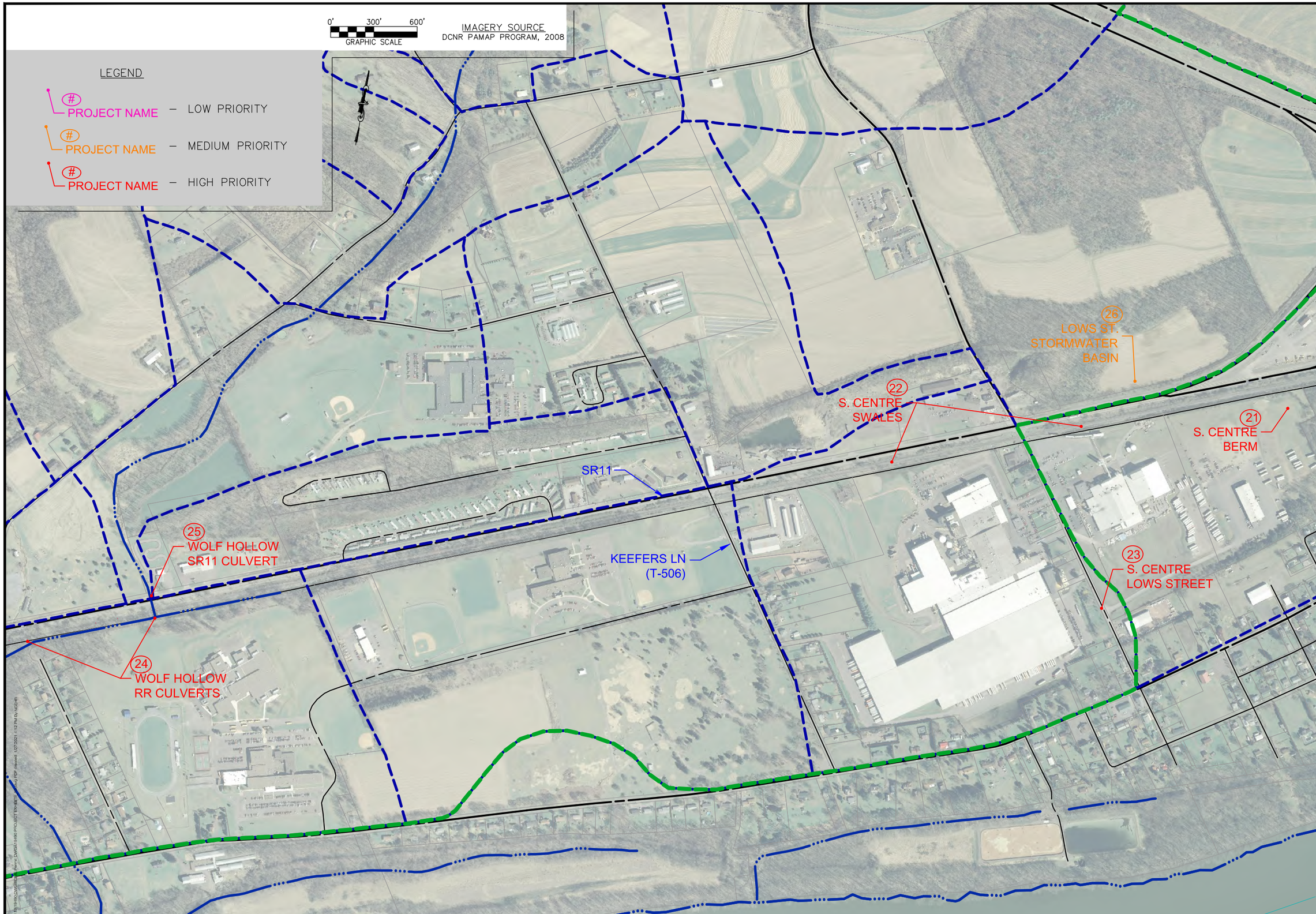
COMMONWEALTH OF PENNSYLVANIA

EXHIBIT

DATE	10/23/2020
SHEET	SHT3
PROJECT NO.	19490
PREPARED BY	JJB
CHECKED BY	JAF
APPROVED BY	ADK



NO.	DATE	DESCRIPTION	BY

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COMMONWEALTH OF PENNSYLVANIA

EXHIBIT

DATE 10/23/2020	PREPARED BY JJB		
SHEET SHT4	CHECKED BY JAF		
PROJECT NO. 19490	APPROVED BY ADK		

APPENDIX O

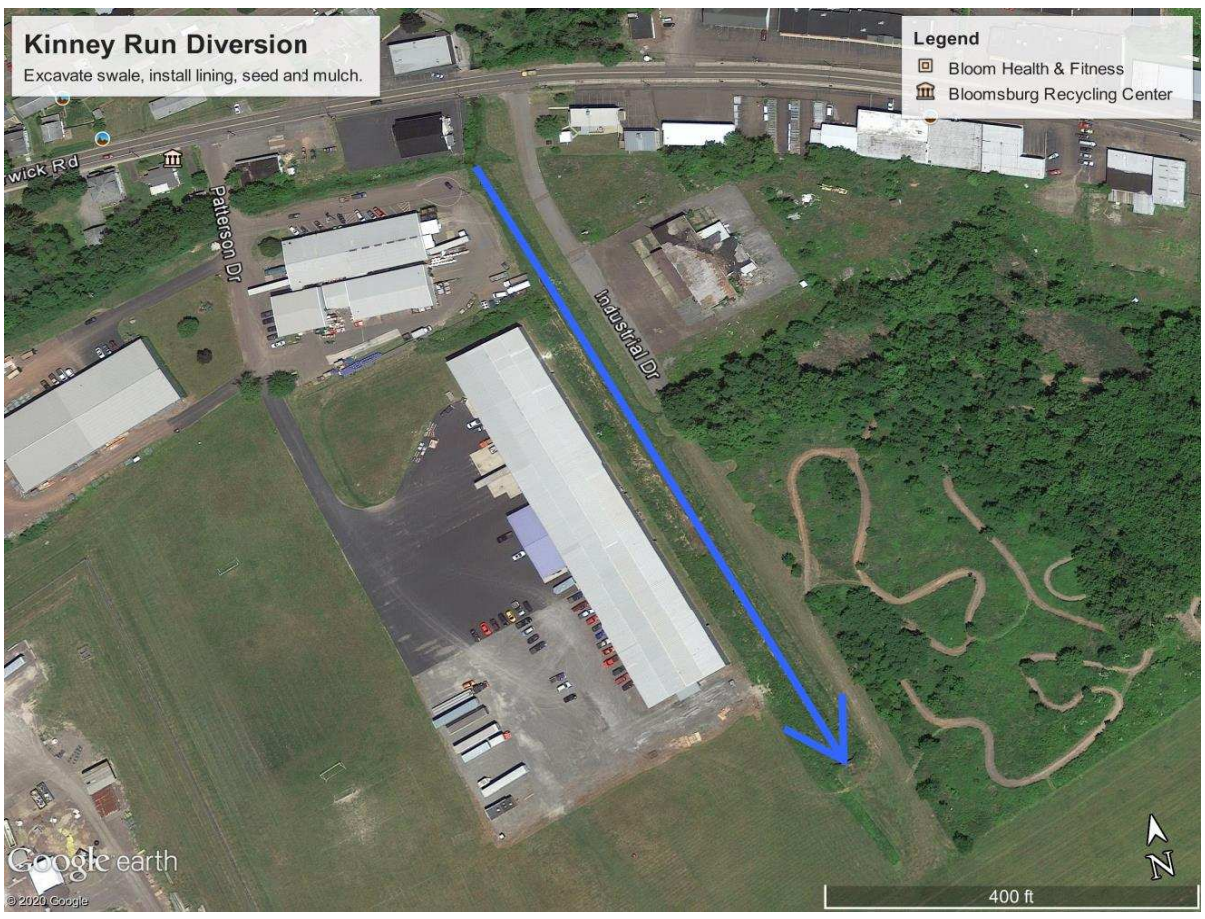
PROJECT SHEETS

STORMWATER STUDY

BLOOMSBURG TO LIME RIDGE CORRIDOR

KINNEY RUN DIVERSION

TOWN OF BLOOMSBURG



Construction Cost Estimate

$90,000

Location

Industrial Drive/Old Berwick Road
41.001535, -76.435915 to
40.999155, -76.434975

Public/Private Property

Public

Priority

High

Overview

Kinney Run, which begins in Scott Township and discharges to the Susquehanna River at the Bloomsburg Town Park, has been an ongoing flooding issue for decades. The watershed is characterized by steep upslope areas that discharge to a nearly flat lower section. Within the Town of Bloomsburg, there are three primary structures that restrict flow and back up stormwater into Scott Township. These include a 48" culvert under Walnut Street, a 60" culvert under Patterson Drive and the overgrown bypass channel below Old Berwick Road.

This project includes clearing and reconstruction of the bypass channel. The bypass channel was constructed following the Agnes flood event in 1972 to divert a portion of the Kinney Run flow directly to the river in order to reduce downstream flooding. Over the years, the bottom of the channel has eroded, the cross-section has narrowed at certain locations and it has become overgrown with vegetation. As a result, the capacity is reduced, and upstream water surface elevations are increasing.

Work includes excavating the channel, forming a stable and consistent cross-section, installing a permanent lining and seeding and mulching.

During the design, we also recommend that the Town consider a backflow preventer on the end of the 84" culvert where it discharges to the Susquehanna River. Analysis of the need for a backflow preventer is beyond the scope of this study.

Impact

The goal of this project is to increase the flow capacity of the bypass channel that discharges to the 84-inch culvert under the airport runway. The project is prioritized as high because it will improve the function of all downstream structures and reduce the water surface elevation of the stream east into Scott Township.

Key Issues

- A detailed topographic survey will be required to determine the optimum stream cross-section and bottom slope.
- PA DEP permit may be required for the proposed work; however, this should be considered maintenance of a swale, not a stream channel.
- A permanent erosion control matting is recommended to allow for a more stable bottom and easier ongoing maintenance.
- During design, removal of debris from the upstream end of the box culvert under Old Berwick Road should be considered. Since this is a PennDOT culvert, it would be their responsibility to maintain.

STORMWATER STUDY

BLOOMSBURG TO LIME RIDGE CORRIDOR

PATTERSON DRIVE CULVERT

TOWN OF BLOOMSBURG

Construction Cost Estimate

$150,000

Location

Bloomsburg Recycling Center
41.001556, -76.437096

Public/Private Property

Public

Priority

High

Overview

Kinney Run, which begins in Scott Township and discharges to the Susquehanna River at the Bloomsburg Town Park, has been an ongoing flooding issue for decades. The watershed is characterized by steep upslope areas that discharge to a nearly flat lower section. Within the Town of Bloomsburg, there are three primary structures that restrict flow and back up stormwater into Scott Township. These include a 48" culvert under Walnut Street, a 60" culvert under Patterson Drive and the overgrown bypass channel below Old Berwick Road.

This project includes the replacement of a culvert under Patterson Drive that accesses the Recycling Center. The existing culvert is only 60" in diameter. For comparison, the upstream culvert under Old Berwick Road is 12 feet wide by nearly 4 feet high and the next downstream culvert is 12 feet wide by 7 feet high. A specific design analysis will be required to determine the required size of the culvert; however, our initial routing indicates that at least a 5 foot high by 10 foot wide box culvert will be required.

Work includes the removal of the existing culvert, installation of a new culvert, pavement restoration and guiderail.

Impact

The goal of this project is to increase the capacity of the culvert so that it is no longer a significant bottleneck to stormwater flow in Kinney Run. Allowing free flow of stormwater to the Susquehanna River will reduce the water surface elevation upstream into Scott Township and as a result, the project is prioritized as high.

Key Issues

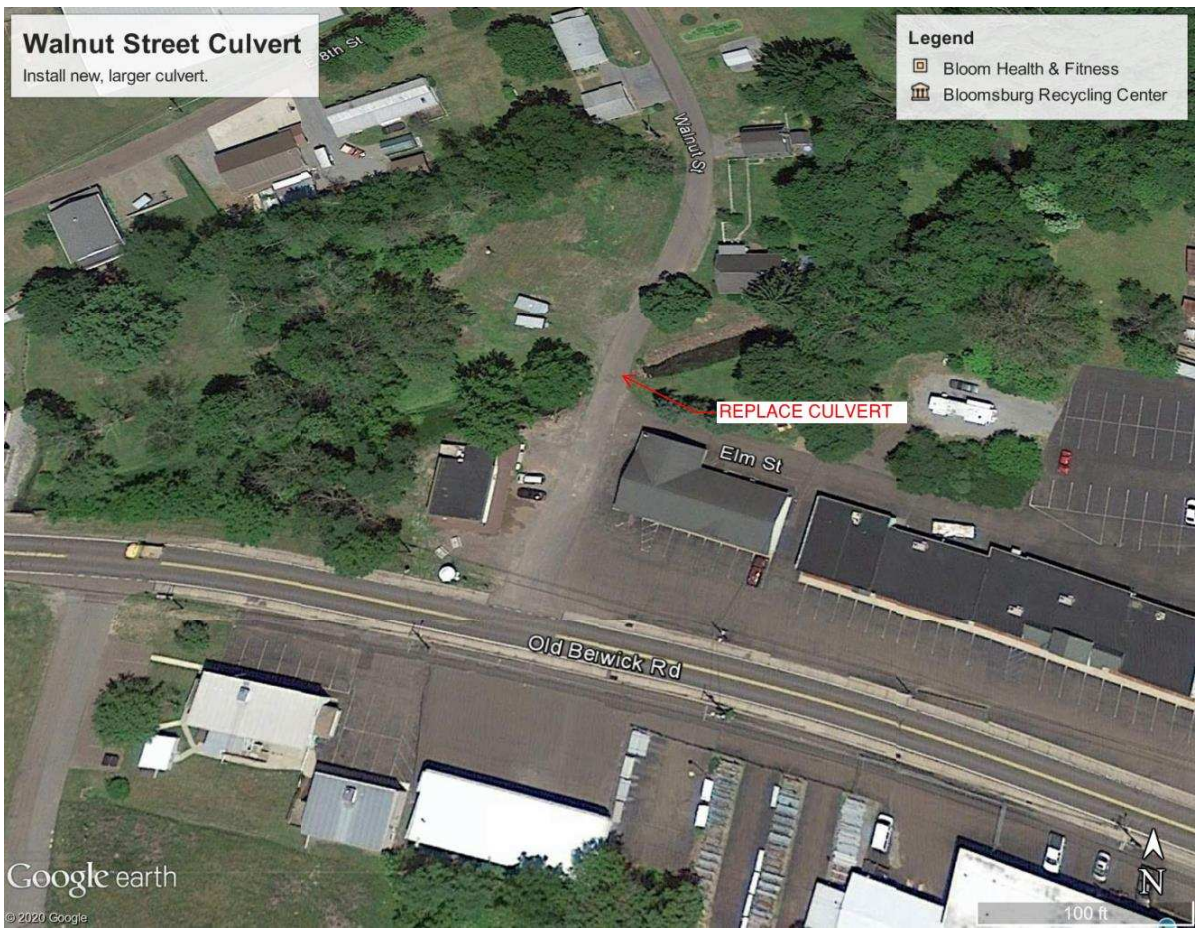
- A detailed hydrologic and hydraulic study will be required to determine the specific culvert size.
- A PA DEP permit will be required prior to construction.
- Guiderail will most likely be necessary at the top of the slope.
- A boundary survey is recommended to determine if any easements are required for construction or long-term maintenance.
- Traffic control will be required, and it may be necessary to temporarily close access to the Recycling Center while the culvert is installed.

STORMWATER STUDY

BLOOMSBURG TO LIME RIDGE CORRIDOR

WALNUT STREET CULVERT

TOWN OF BLOOMSBURG



Construction Cost Estimate

$90,000

Location

Walnut St. North of Old Berwick Road
41.002198, -76.434651

Public/Private Property

Public

Priority

High

Overview

Kinney Run, which begins in Scott Township and discharges to the Susquehanna River at the Bloomsburg Town Park, has been an ongoing flooding issue for decades. The watershed is characterized by steep upslope areas that discharge to a nearly flat lower section. Within the Town of Bloomsburg, there are three primary structures that restrict flow and back up stormwater into Scott Township. These include a 48" culvert under Walnut Street, a 60" culvert under Patterson Drive and the overgrown bypass channel below Old Berwick Road.

This project includes the replacement of a culvert under Walnut Street between Old Berwick Road and East 8th Street. The existing culvert is only 48" in diameter. Initial modeling indicates that a 4 foot high by 12 foot wide box culvert is required which matches the size of the existing PennDOT structure under Old Berwick Road. Another less costly and even more effective option would include removing the culvert entirely and dead ending Walnut Street with a "T" type turnaround on either side of the stream.

The scope of work includes the removal of the existing culvert, installation of a new culvert and pavement restoration. The estimated construction cost would also cover removal of the culvert and the creation of two turnarounds on either side of the stream if that is preferred.

Impact

The goal of this project is to either increase the capacity of the culvert or else remove it entirely so that it is no longer a bottleneck to stormwater flow within Kinney Run. Allowing free flow of stormwater to the Susquehanna River will reduce the water surface elevation upstream into Scott Township. The project is prioritized as high.

Key Issues

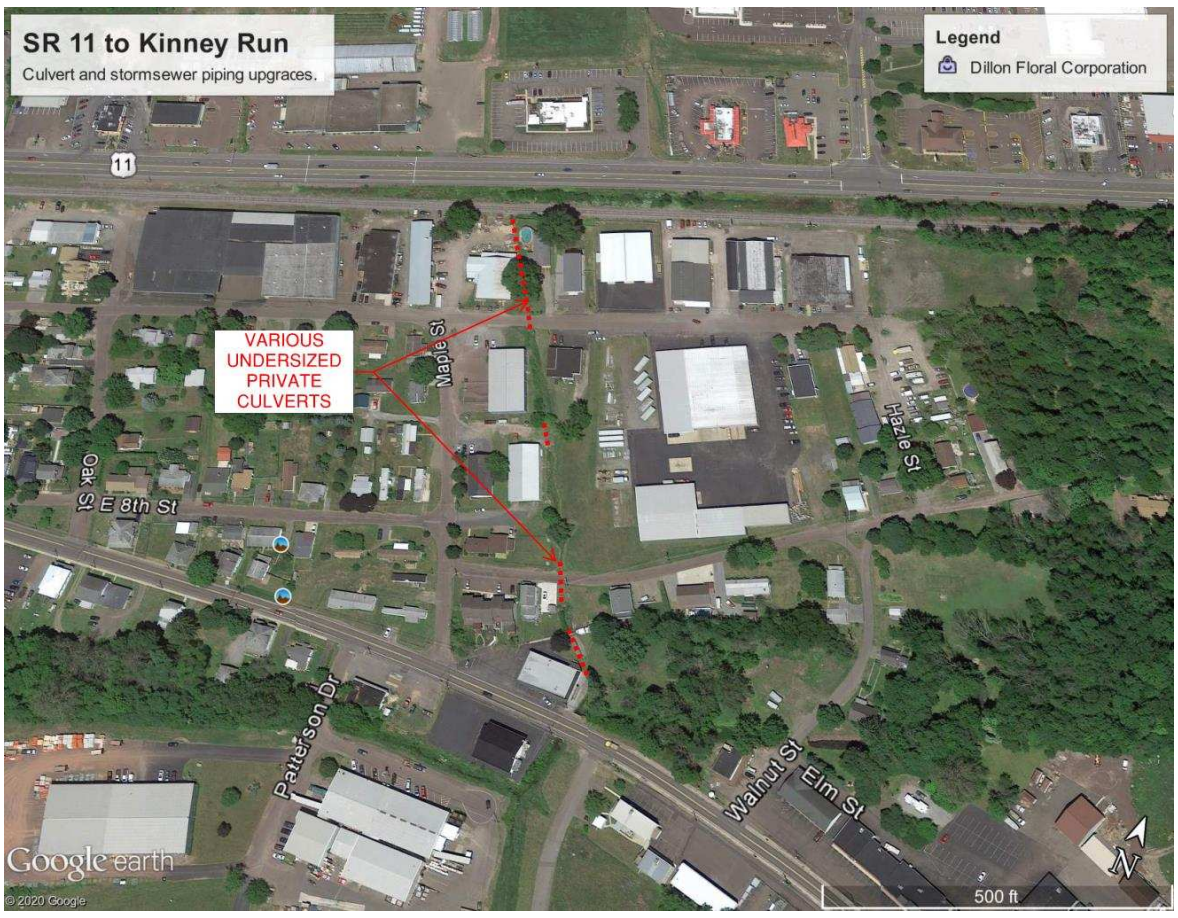
- A detailed hydrologic and hydraulic study will be required to determine the specific culvert size.
- A PA DEP permit will be required prior to construction.
- A boundary survey is recommended to determine if any easements are required for construction or long-term maintenance. Easements will most likely be necessary if the culvert is to be removed and "T" type turnarounds provided.

STORMWATER STUDY

BLOOMSBURG TO LIME RIDGE CORRIDOR

SR 11 TO KINNEY RUN

TOWN OF BLOOMSBURG



Construction Cost Estimate

$190,000

Location

East 7TH and 8th Streets
41.004131, -76.437546 to
41.002117, -76.435833

Public/Private Property

Private

Priority

Low

Overview

The steep hollow upslope of Dillon Floral Corporation north of 5th Street has a long history of flooding. The area drains a section of Bloomsburg University as well as residential areas to the west. As the University has developed, flooding frequency within this drainage area has increased.

Once stormwater flows through the Dillon Floral Corporation property and under SR 11, numerous private storm sewer systems have been constructed, all of which are undersized and inadequate. As a result, stormwater flow is obstructed, pipes surcharge, back up and flooding occurs.

This project proposes new, larger storm sewers that will reduce the frequency of flooding and damage to private property. It should be noted that it might not be possible to solve all the issues within this section, so the goal is to maximize capacity and reduce the overall scope and frequency of damage.

Work includes larger culverts and rip-rap lined channels.

Impact

The goal of this project is to increase the capacity of stormwater management facilities between SR 11 and Kinney Run in the drainage area downslope of Dillon Floral Corporation. Although the stormwater facilities under SR 11 and the Railroad appear to be sufficient, downstream facilities frequently flood and cause damage to private property. The priority has been set as low since flooding is mostly limited to the immediate properties and the threat to public safety is minimal.

Key Issues

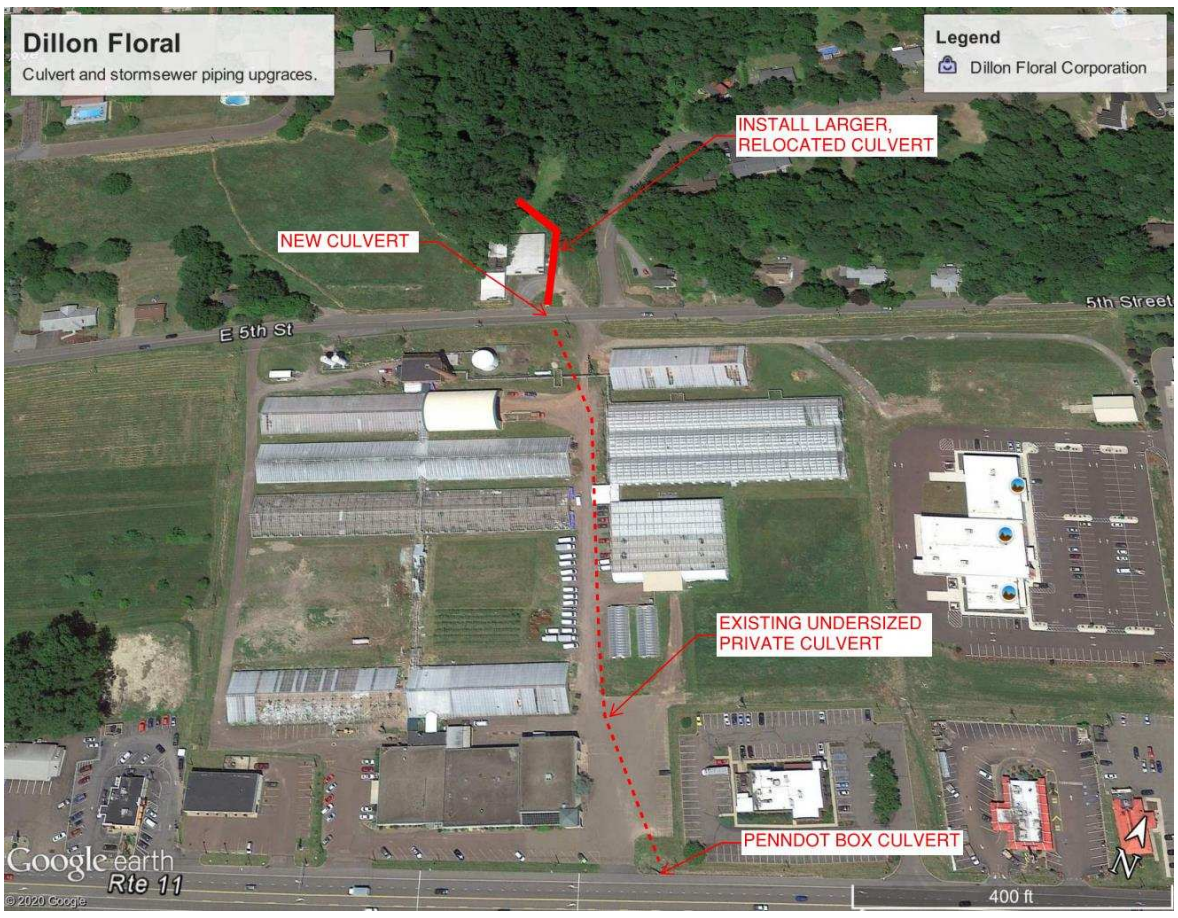
- A detailed hydrologic and hydraulic study will be required to determine the specific culvert sizes.
- A PA DEP permit will be required prior to construction. Some of the pipes may be considered stream enclosures.
- Easements and long-term maintenance agreements will be required since many of these facilities are on private property.

STORMWATER STUDY

BLOOMSBURG TO LIME RIDGE CORRIDOR

DILLON FLORAL CORP CULVERT

TOWN OF BLOOMSBURG



Construction Cost Estimate
$75,000

Location
East Fifth Street
41.006679, -76.439751

Public/Private Property
Private

Priority
Low

Overview

The steep hollow upslope of Dillon Floral Corporation north of 5th Street has a long history of flooding. The area drains a section of Bloomsburg University as well as residential areas to the west. As the University has developed, flooding frequency has increased.

Although a majority of Dillon Floral Corporation facilities are located between SR 11 and 5th Street, the company filled in the lower end of the hollow to install a building. During this construction, the area was filled in and a culvert was installed. The culvert is severely undersized and a portion of it is located under the building making it inaccessible. During storm events, debris washing down the hollow clogs the pipe inlet and water backs up, bypasses the culvert and floods 5th Street. The Town of Bloomsburg recently installed a new culvert under 5th Street however it connects to existing undersized facilities on both the upstream and downstream ends.

This project proposes a new, larger culvert to connect to the Town's new storm inlet on the north side of 5th Street. This work will all be on private property and an easement will be required. No work is proposed on the undersized stormwater facilities south of 5th Street on the Dillon Floral Corporation property since even though they flood frequently, the flooding typically does not impact the general public or pose a threat to public safety.

Impact

The goal of this project is to increase the capacity of the culvert upslope of 5th Street to reduce the number of times the road must be closed due to periodic flooding. The priority of this project is low since 5th Street can be accessed from either end and the typical length of road closure is short.

Key Issues

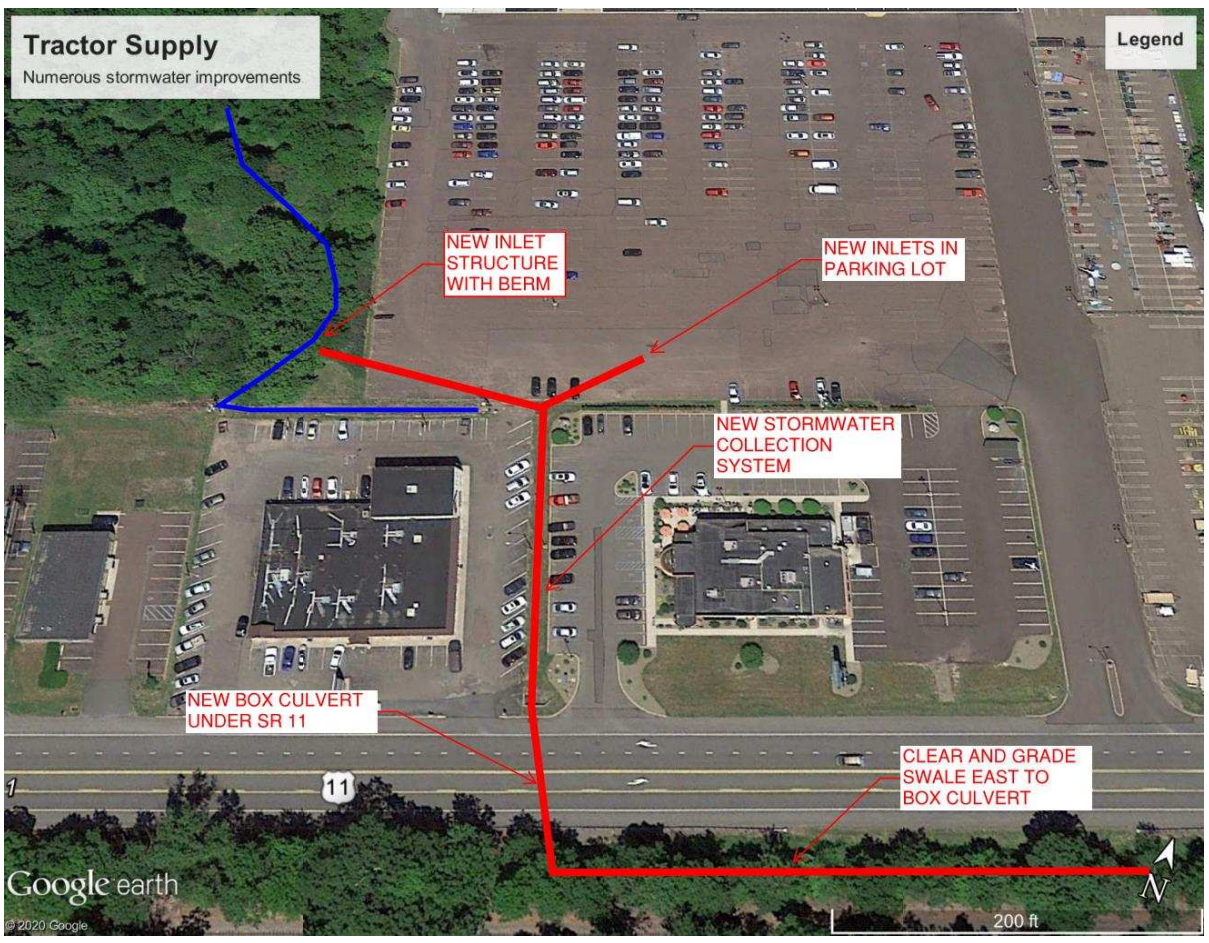
- A detailed hydrologic and hydraulic study will be required to determine the specific culvert size.
- A PA DEP permit will be required prior to construction. The pipe may be considered a stream enclosure.
- An easement and long-term maintenance agreement will be required since this culvert is located on private property.

STORMWATER STUDY

BLOOMSBURG TO LIME RIDGE CORRIDOR

TRACTOR SUPPLY

SCOTT TOWNSHIP



Construction Cost Estimate

$300,000 (PennDOT)
$350,000 (Private Work)

Location

Dark Side Tanning/Marley's/Tractor Supply
41.006559, -76.431742

Public/Private Property

Public/Private

Priority

High

Overview

The area between Dark Side Tanning, Marley's and Tractor Supply is the collection point for several drainage areas. West of Tractor Supply is a wooded area that contains a small stream channel that drains the residential areas north of Fifth Street along Crestwood Drive. This channel flows south until it meets the parking area behind Dark Side Tanning. The stream turns 90 degrees to the east and flows for a short distance before it turns 90 degrees again and is piped to a headwall on the north side of SR 11. The pipe between Dark Side Tanning and Marley's also collects all the runoff from both sites along with all the runoff from the large parking area in front of Tractor Supply.

All facilities within this network are undersized including the channel behind Dark Side Tanning, the culvert between Dark Side Tanning and Marley's, inlets and piping in the Tractor Supply parking lot, and the culverts under SR 11.

Anticipated work includes a new headwall and large culvert to collect the drainage area west of Tractor Supply, a larger channel behind Dark Side Tanning, new inlets and piping in front of Tractor Supply, a new larger culvert between Dark Side Tanning and Marley's, and a new box culvert under SR 11.

Impact

The goal of this project is to reduce flooding to commercial properties along SR 11 between the Tractor Supply site and SR 11. There are two parts to this project – PennDOT improvements and stormwater improvements on private property north of SR 11. The two parts complement each other. All the work on private property can be completed however improvements will be marginal until PennDOT completes its work. There will be immediate improvements once PennDOT replaces their culverts and clears the drainage swale. This is a high priority project due to the number of properties impacted.

Key Issues

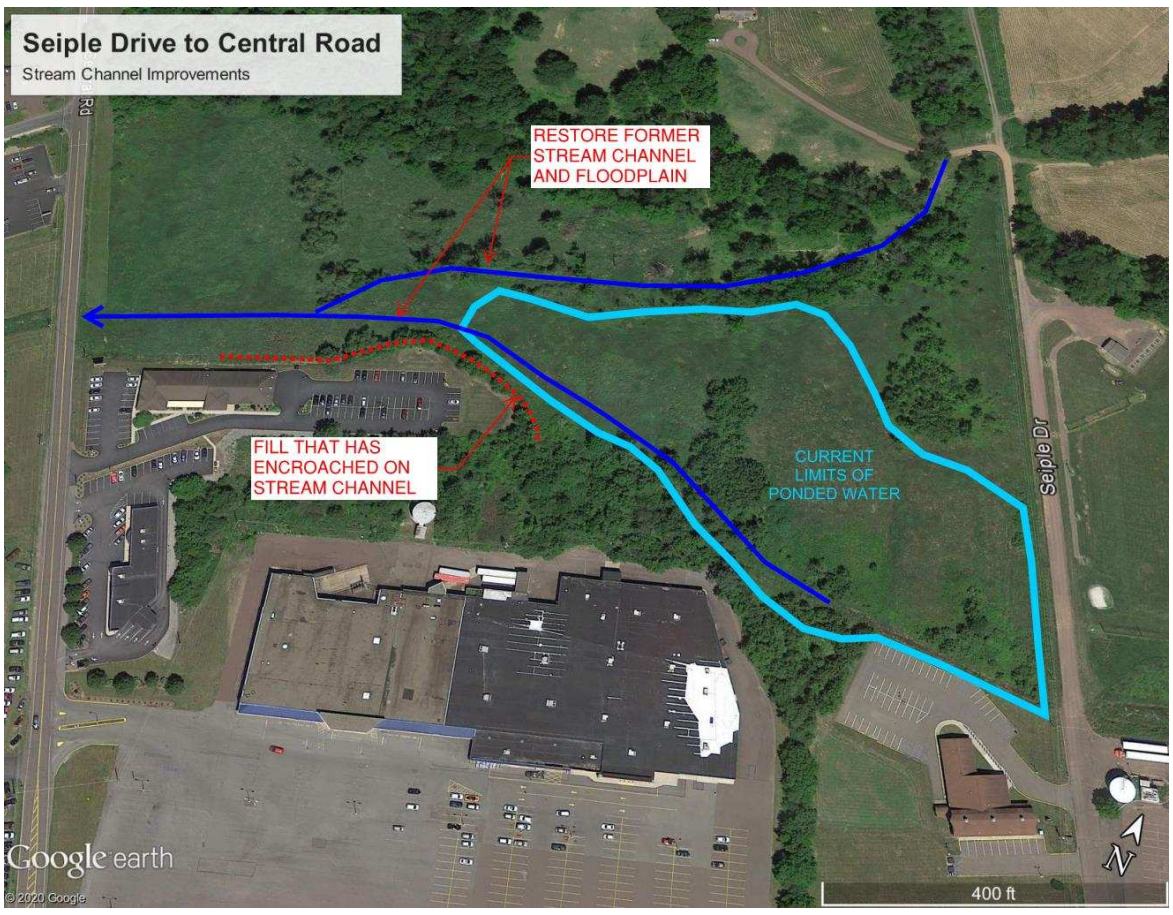
- A boundary survey will be required. Temporary and permanent easements will need to be obtained from all properties on the north side of SR 11.
- Since portions of this project will be constructed on different properties, a long-term maintenance and operation agreement should be developed and executed between all property owners.
- A detailed hydrologic and hydraulic study will be required to size all the stormwater components
- A PA DEP permit will be required prior to construction – a Joint Permit is anticipated.
- Cleaning of the swale on the south side of SR 11 should be considered maintenance work since it is within the state right-of-way.

STORMWATER STUDY

BLOOMSBURG TO LIME RIDGE CORRIDOR

STREAM RESTORATION
SEIPLE DRIVE TO
CENTRAL ROAD

SCOTT TOWNSHIP



Construction Cost Estimate
$150,000

Location
Seiple Drive to Central Road
41.014384, -76.414960

Public/Private Property
Private

Priority
High

Overview

The area between Shaffer Hollow Road and Central Road is a complex drainage system. Historic soil maps from Scott Township show that most of the area behind Mahindra drained west under Seiple Drive toward Central Road and only a small portion drained east to Tributary 10.

Due to changes of the drainage patterns west of Seiple Drive, stormwater runoff is now ponding against the road embankment and backflowing through a small crushed pipe under the private road rather than continuing west to Central Road. Based on field observations, it appears as though the Geisinger Facility, which was constructed on fill between Seiple Drive and Central Road has blocked the old stream channel and is not allowing stormwater to flow west to Central Road. During field investigations for our study, the entire field east of the Geisinger site was flooded while the east side of the field was completely dry.

We recommend that the stream channel be reconstructed so that historic drainage patterns can be restored. Work will primarily include excavation of a channel along with wetland and flood plain restoration. Much of this flood plain is overgrown by invasive Reed Canary Grass so a vegetation management plan can be a part of the project as well.

Impact

This project is given high priority since restoration of this stream channel can reduce flooding to the Tributary 10 area, the driving range behind Mahindra and the old Moose site.

Key Issues

- A joint permit from PA DEP and the US Army Corps of Engineers will be required. PA DEP has already viewed the site and expressed the opinion that permitting will be difficult without proof that drainage patterns have been changed.
- A boundary survey and permanent easement will be required. If grants are secured, a government entity will need to take the lead.

STORMWATER STUDY

BLOOMSBURG TO LIME RIDGE CORRIDOR

SEIPLE DRIVE CULVERT

SCOTT TOWNSHIP

Construction Cost Estimate

$45,000

Location

Seiple Drive behind Mahindra
41.013957, -76.411320

Public/Private Property

Public/Private

Priority

High

Overview

The area behind the Mahindra assembly facility (former Walmart) has a long history of flooding. Most recently, the site was used as a driving range, however it had to be shut down since the field remained flooded for more than one year. This is a complex drainage system that divides just east of Seiple Drive. Historic soil maps from Scott Township show that most the area behind Mahindra drained west under Seiple Drive and Central Road and only a small portion drained east to Tributary 10.

Due to changes of the drainage patterns west of Seiple Drive, stormwater runoff is now ponding against the road embankment and backflowing through a small crushed pipe under the private road instead of continuing west to Central Road. This diverted stormwater overwhelms the stormwater system to the east along Shaffer Hollow Road and floods the property behind Mahindra. This outlet system consists of a small inlet and a 15" terra cotta pipe that flows east under Shaffer Hollow Road to Tributary 10. This terra cotta pipe is crushed, clogged and severely undersized.

It is our recommendation that a majority of the area behind Mahindra should flow to the west as naturally occurred prior to development. Tributary 10 has severe stormwater runoff and flooding problems and diverting drainage in this direction only makes issues worse. Furthermore, significant wetlands exist in the areas to the west that can be used to mitigate stormwater runoff.

This project includes the removal of the crushed pipe under Seiple Drive, replacement with a new larger culvert and restoration of the roadway. We recommend that this project not be completed until the stream channel between Seiple Drive and Central Road is restored since diverted stormwater will overwhelm the 15" terra cotta outlet pipe near Shaffer Hollow Road and may flood commercial and residential properties in this area.

Impact

The goal of this project is to replace the crushed pipe under Seiple Drive with a larger culvert in order to restore east to west flow through this drainage area.

Key Issues

- A detailed hydrologic and hydraulic study will be required to determine the specific culvert size. An arch or elliptical culvert are likely required.
- A PA DEP permit will be required prior to construction – most likely a GP-11
- A boundary survey is recommended to determine if any easements are required for construction or long-term maintenance. Mapping made available to us during the course of our study does not clearly depict if the culvert is on public or private property.

STORMWATER STUDY

BLOOMSBURG TO LIME RIDGE CORRIDOR

SHAFFER ROAD STORMSEWER

SCOTT TOWNSHIP

Construction Cost Estimate

$260,000

Location

Shaffer Road from Neufer Hill Road to SR 11
41.015265, -76.406520 to
41.013741, -76.405045

Public/Private Property

Public/Private

Priority

High

Overview

The area behind the Mahindra assembly facility (former Walmart) has a long history of flooding. Most recently, the site was used as a driving range, however it had to be shut down since the field remained flooded for more than one year. This is a complex drainage system that divides just east of Seiple Drive. Historic soil maps from Scott Township show that most of the area behind Mahindra drained west under Seiple Drive and Central Road and only a small portion drained east to Tributary 10.

Stormwater flowing to the eastern end of the drainage area near Shaffer Road was historically conveyed to Tributary 10 via a terra cotta pipe that began in the field behind Master Lube, ran under Shaffer Road through several residential properties to the stream. This pipe is in poor condition and barely functions. Since most of the pipe is on private property, no individual is responsible for maintenance and it has been neglected.

We recommend that a new inlet structure be constructed in roughly the same location as the end of the old terra cotta pipe and that a new storm sewer system be installed along Shaffer Road to connect to existing PennDOT inlets along SR 11. This storm sewer system will serve as an overflow since the existing PennDOT system has limited capacity and only discharges to a roadside swale. This project should be constructed after the improvements to the Central Road and Seiple Drive culverts as well as the stream restoration between Seiple Drive and Central Road have been completed.

This project includes a new inlet structure, piping and inlets from the area north of Master Lube to SR 11.

Impact

The goal of this project is to create a permanent, maintained outlet for stormwater behind Master Lube to reduce the frequency of flooding in the area. This is a high priority project due to the frequency of flooding at this location.

Key Issues

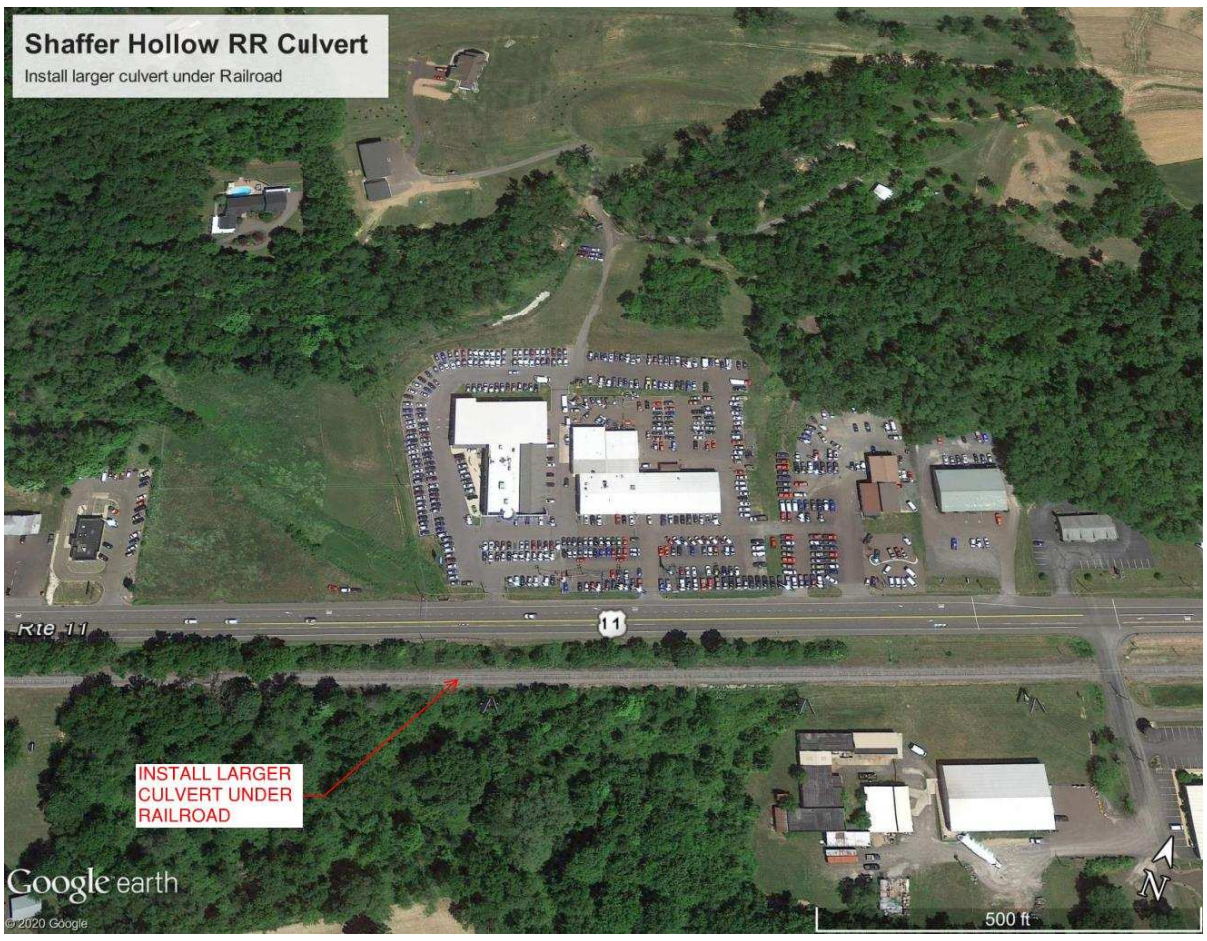
- A detailed hydrologic and hydraulic study will be required to determine the specific storm sewer size so that PennDOT facilities are not surcharged.
- A PA DEP permit will be required prior to construction.
- A PennDOT HOP will be required to connect to the inlets along SR 11.
- A boundary survey will be required in order to establish a permanent easement through private property.
- Scott Township will need to assume maintenance responsibility for the facilities.

STORMWATER STUDY

BLOOMSBURG TO LIME RIDGE CORRIDOR

TRIBUTARY 10
RAILROAD CULVERT

SCOTT TOWNSHIP



Construction Cost Estimate
$100,000

Location
Tributary 10 at Independence Honda
41.014880, -76.399678

Public/Private Property
Public

Priority
High

Overview

Tributary 10 drains through Shaffer Hollow along Shaffer Road and crosses under SR 11 near Independence Honda. Many years ago, the stream was relocated between Shaffer Road and SR 11 to accommodate residential development. The modifications to the channel have contributed to frequent and severe flooding. Without a major stream relocation project that may require the buyout and demolition of several structures, there may not be a feasible solution to the problem.

However, one obstruction that contributes to flooding north of SR 11 is the undersized railroad culvert. Currently, the drainage structure under the railroad is 5 feet wide by 3.3 feet high while the PennDOT culvert just 35 feet away is 14 feet wide by 3.5 feet high – nearly three times larger. The railroad creates a bottle neck that restricts flow and creates backwater north of SR 11 into the adjacent commercial and residential areas.

Work includes the replacement of the existing railroad culvert with a 3.5 foot high by 14 foot wide concrete box culvert.

Impact

The goal of this project is to increase the capacity of the culvert so that it is no longer a significant bottleneck to stormwater flow in Kinney Run. Allowing free flow of stormwater to the Susquehanna River will reduce the water surface elevation upstream into Scott Township. The project is prioritized as high since it will help to alleviate the frequent flooding of businesses and residential properties north of SR 11.

Key Issues

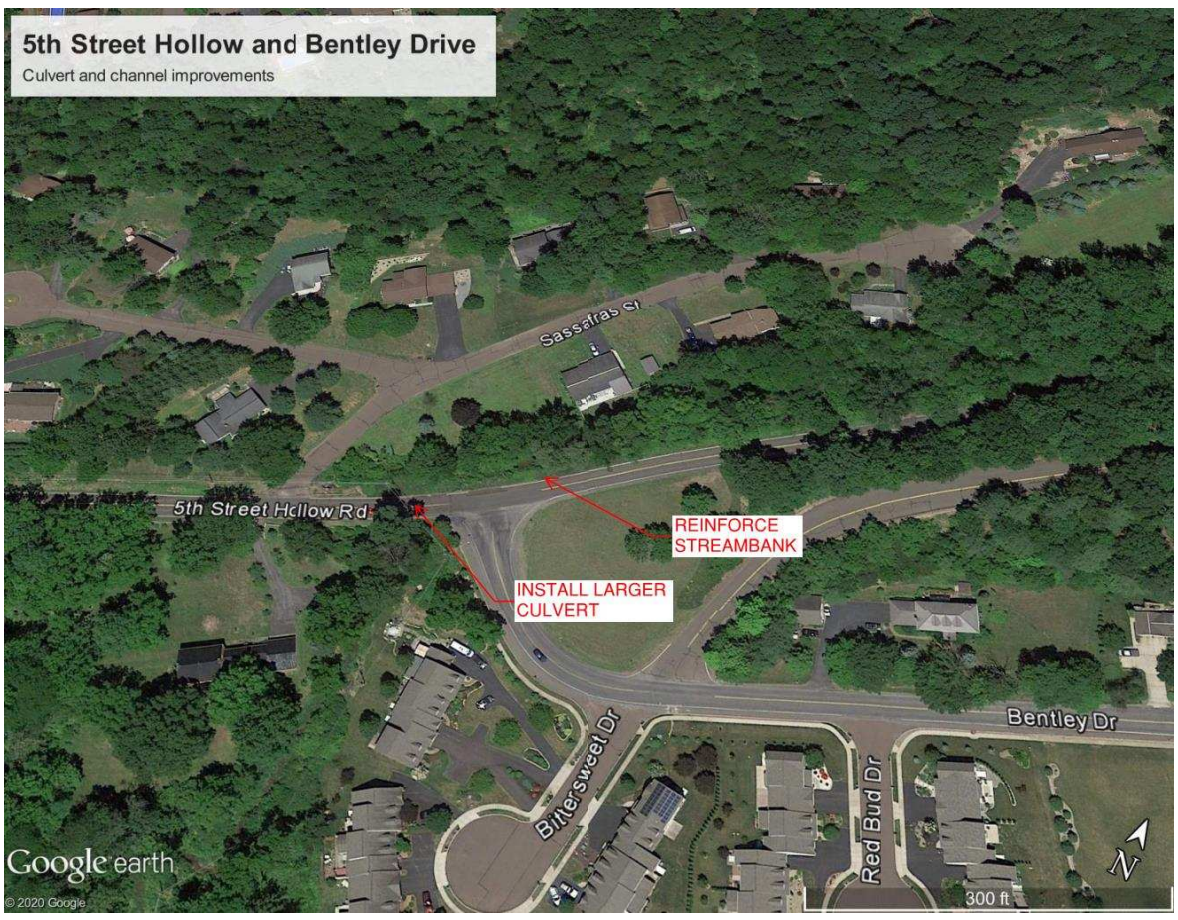
- A detailed hydrologic and hydraulic study will be required to verify the culvert size.
- Since this work is for the railroad, DEP permitting may not be required.

STORMWATER STUDY

BLOOMSBURG TO LIME RIDGE CORRIDOR

5TH STREET AND BENTLEY DRIVE

SCOTT TOWNSHIP



Construction Cost Estimate

$270,000

Location

5th Street at Bentley Drive
41.010244, -76.428677

Public/Private Property

Public/Private

Priority

Medium

Overview

Kinney Run crosses under 5th Street Hollow Road just west of Bentley Drive. This is a large watershed that notoriously floods. Previous modeling indicates that it will flood during a 2-year storm event. As the stream flows down the valley, it meets the embankment of 5th Street Hollow Road and follows it around a slight bend until it meets the culvert that carries it underneath the roadway.

The geometry of the stream crossing is unusual for several reasons:

1. 5th Street Hollow Road is actually lower in elevation upstream of the culvert which causes more frequent flooding. The Township has constructed a small berm in this area as a means to keep the stream within its banks.
2. The inlet end of the culvert is a 4 foot high by 6 foot wide arch metal pipe but the outlet end is a 6.5 foot wide by 6 foot high box culvert. The metal culvert limits the capacity of the crossing.
3. The stream intersects 5th Street Hollow Road at a sharp angle further restricting how much water can flow through the culvert.

This project will be extensive due to the size of the upstream drainage area. We recommend straightening the culvert to align it more closely with the natural stream channel, construction of an upslope wingwall to keep the stream from overtopping 5th Street Hollow Road and restoration of the roadway. The new culvert will be a concrete box.

Impact

The goal of this project is to increase the capacity of the culvert so that 5th Street Hollow Road does not flood as frequently and to reduce the amount of maintenance required to keep the culverts open following storm events. The project importance is listed as medium since flooding impact is limited to the road and adjacent properties. The roadway is heavily used and there is a threat to public safety if vehicles would attempt to drive through a flooded roadway and since flooding can limit access to nearby residential areas such as Sassafras Street.

Key Issues

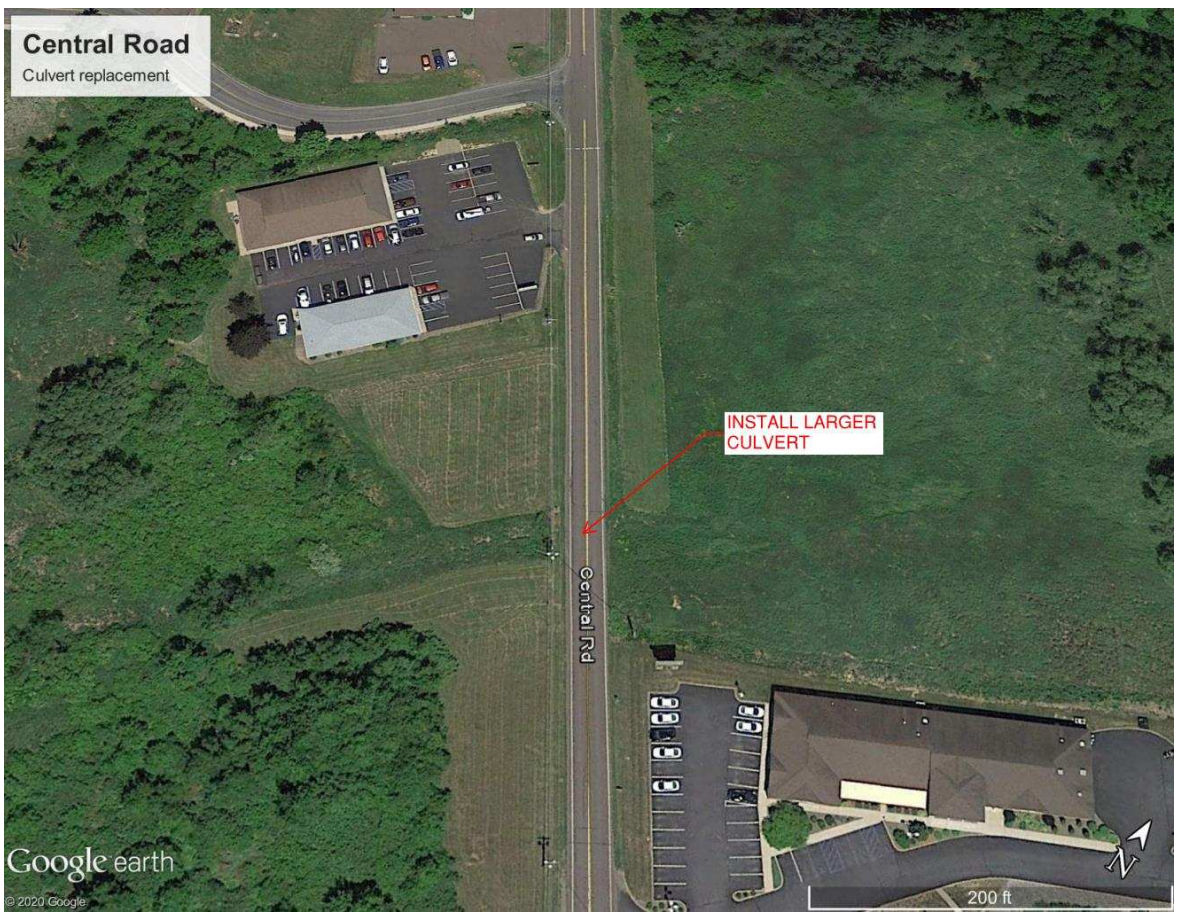
- A detailed hydrologic and hydraulic study will be required to determine the specific culvert size.
- A PA DEP permit will be required prior to construction. This will most likely be a Joint Permit.
- A boundary survey will be required since temporary and permanent easements will need to be obtained from both the upstream and downstream property owners.
- Traffic control measures will be required, and 5th Street Hollow Road will need to be temporarily closed.

STORMWATER STUDY

BLOOMSBURG TO LIME RIDGE CORRIDOR

CENTRAL ROAD CULVERT

SCOTT TOWNSHIP



Construction Cost Estimate

$75,000

Location

Central Road South of Bentley Drive
41.013784, -76.416575

Public/Private Property

Public

Priority

Medium

Overview

The culvert under Central Road just south of Bentley Drive is part of a large drainage system that collects stormwater as far east as Seiple Drive and as far north as Interstate 80. Stormwater from the Lion's Gate Development flows south down a steep hollow and into a large wetland complex east of Central Road. This runoff can cause extensive flooding between Shaffer Hollow Road and Central Road. In some years, this area can be inundated with standing water for months at a time.

Although numerous stormwater improvements are needed in the area, the small 24" high by 42" wide metal culvert under Central Road appears to be crushed and the downstream end is collapsing, as depicted in the attached photo. By replacing the culvert, it will no longer be a restriction of stormwater flow. A 3 foot high by 10 foot wide box culvert would eliminate overtopping of Central Road.

This project includes removal of the existing culvert and replacement with a new arch or oval culvert and restoration of the roadway. Construction and permitting should be relatively straight forward.

Impact

The goal of this project is to increase the capacity of the culvert under Central Road in order to allow stormwater to freely discharge from the wetland areas east as far as Shaffer Hollow Road. Other recommended projects include replacement of the culvert under Seiple Drive and the reconstruction of the stream channel between Seiple Drive and Central Road. This project can be completed independently from the others. However, once the Seiple Drive and stream restoration projects are completed, Central Road will continue to be an obstruction unless it is replaced.

Key Issues

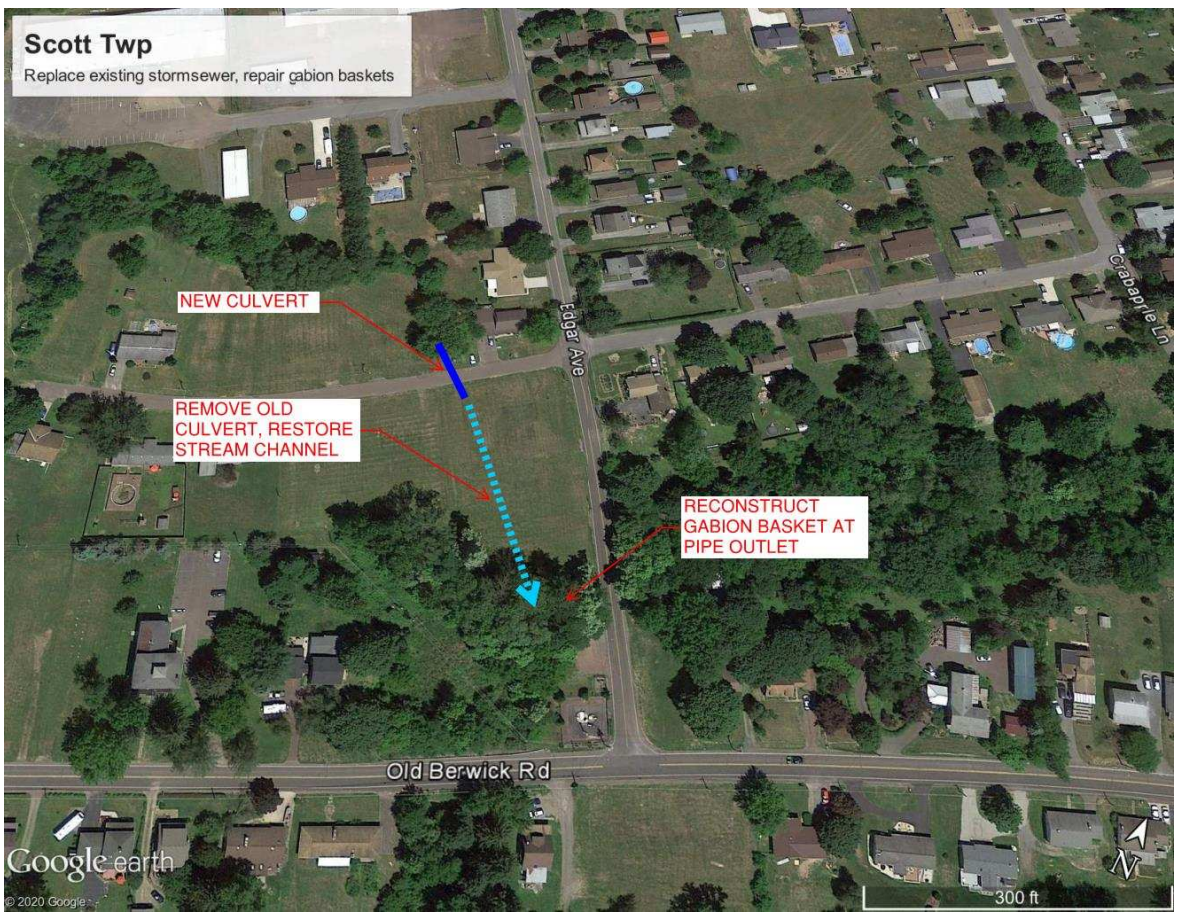
- A detailed hydrologic and hydraulic study will be required to determine the specific culvert size. An arch or elliptical culvert are likely required.
- A PA DEP permit will be required prior to construction – most likely a GP-11
- A boundary survey is recommended to determine if any easements are required for construction or long-term maintenance.

STORMWATER STUDY

BLOOMSBURG TO LIME RIDGE CORRIDOR

SCOTT TOWNSHIP
CULVERT

SCOTT TOWNSHIP



Construction Cost Estimate
$300,000

Location
Edgar Avenue & White Birch Lane
41.010216, -76.402284

Public/Private Property
Public/Private

Priority
Medium

Overview

The low, flat area between Central Road and Edgar Avenue has a long history of flooding. Areas north of SR 11 near Mahindra and Sheetz drain from east to west before being conveyed under the state road in front of the Arby's restaurant. Water then drains toward the Susquehanna River and then back toward the east beside the Scott Township building where it becomes enclosed by a culvert and conveyed under Tenny Street. The stream then continues in an easterly direction toward the old Skatetown building and Edgar Avenue. When the stream meets White Birch Lane, it enters a culvert and eventually discharges into Tributary 10 just west of Edgar Avenue. The section between White Birch Lane and Tributary 10 consists of a series of old pipes and culvert that range in size and condition.

Although there are many undersized culverts and pipes within this drainage system, one of the primary constraints is the old culvert from White Birch Lane to Edgar Avenue. Since this section of pipe is undersized, it causes water to back up for quite a distance upstream increasing flood elevations. Recently, Scott Township has purchased many properties in this area as a part of a flood buyout program.

This project proposes a new, larger culvert under White Birch Lane and then restoration of the old channel between White Birch Lane and Edgar Avenue. Since the entire area is open yard, it makes more sense to remove the old culvert and restore the stream rather than installing an additional 275 feet of culvert that will be more expensive and require ongoing maintenance. This work would also include reconstruction or possibly removal of the gabion baskets at Edgar Avenue which are currently undermined and beginning to fail.

Impact

The goal of this project is to reduce flooding between Edgar Avenue and Central Road. It is important to note that this project will not completely solve the flooding problem in this area since there are many other small pipes and stream constrictions that contribute to flooding as well. Additionally, backwater from the Susquehanna River also impacts flooding in this area.

Key Issues

- A detailed hydrologic and hydraulic study will be required to determine the specific culvert size and stream dimensions.
- A PA DEP permit will be required prior to construction.

STORMWATER STUDY

BLOOMSBURG TO LIME RIDGE CORRIDOR

EDGAR AVENUE

SCOTT TOWNSHIP

Construction Cost Estimate

$200,000

Location

Edgar Avenue 200' N of
Old Berwick Rd.
41.009967, -76.401570

Public/Private Property

Public

Priority

Medium

Overview

Tributary #10 to the Susquehanna River flows down Shaffer Hollow, crosses under SR 11 and the railroad and then joins the stream that outlets from the ponds near Central Avenue. The stream then crosses under Edgar Avenue and Old Berwick Road before it discharges to the Susquehanna River.

The box culvert under Old Berwick Road is 9.5 feet high by 16 feet wide with the Township culvert under Edgar Avenue, just 200 feet upstream only being a small 43" high by 63" wide concrete oval culvert. The inlet end of this small culvert is partially obstructed by rip-rap further decreasing its capacity. Modeling indicates that at least a 3.5 foot high by 8 foot wide box culvert is required.

The scope of work includes removal and replacement of the existing culvert, filling the roadway approaches on both ends to ramp up to the new culvert, paving the new roadway and installing guiderail. The gabion baskets at the downstream end of the culvert are undermined and are slumping but replacement of the baskets has been included under the Scott Township White Birch Lane project.

Impact

By installing a larger culvert and elevating the roadway, the Township can reduce the frequency of flooding, road closure and ongoing maintenance. This project is given a medium priority because it reduces the flood frequency of Edgar Avenue.

Key Issues

- A detailed hydrologic and hydraulic study will be required to determine the specific culvert size.
- A PA DEP permit will be required prior to construction – most likely a Joint Permit.
- Elevating the roadway and installing a larger culvert will most likely require temporary and permanent easements from the adjacent property owners.
- Edgar Avenue will need to be closed while the work is completed. Traffic control and detours will be required.

STORMWATER STUDY

BLOOMSBURG TO LIME RIDGE CORRIDOR

BISSETT'S LANE RAILROAD CULVERT

SCOTT TOWNSHIP

Construction Cost Estimate
$100,000

Location
Railroad 380' west of Bissett's Lane
41.018500, -76.386571

Public/Private Property
Public

Priority
Medium

Overview

The drainage area flowing along Bissett's Lane is steep and frequently floods during brief and intense storm events. As flooding is occurring, a large amount of sediment and debris is moved down the valley, through the larger box culvert under SR 11 until it meets the railroad. Here, the channel slope quickly flattens. As a result, the velocity of stormwater decreases, and the sediment and debris are dropped out and deposited in the channel.

The debris blocks the culvert under the railroad and water backs up and overtops the tracks. It backs up and ponds as far east as Bissett's Lane. At the time of our field investigation, the culvert was almost completely blocked, and debris was still present from flooding in 2018.

This project includes the replacement of a culvert under the railroad with a larger box culvert similar in size to the box culvert under SR 11. A 3 foot high by 10 foot wide box culvert is anticipated. Work will also need to include work on the stream channel between SR 11 and the railroad and downstream from the railroad in order to clear the channel to allow for free flow.

Work includes the removal of the existing culvert, installation of a new culvert, and a rip-rap lined channel.

Impact

The goal of this project is to increase the capacity of the culvert under the railroad in order to reduce the frequency of flooding over SR 11, the railroad and flooding onto Bissett's Lane. The project is listed as medium priority since there is relatively little impact to adjacent properties and the project will not significantly increase safety at the site.

Key Issues

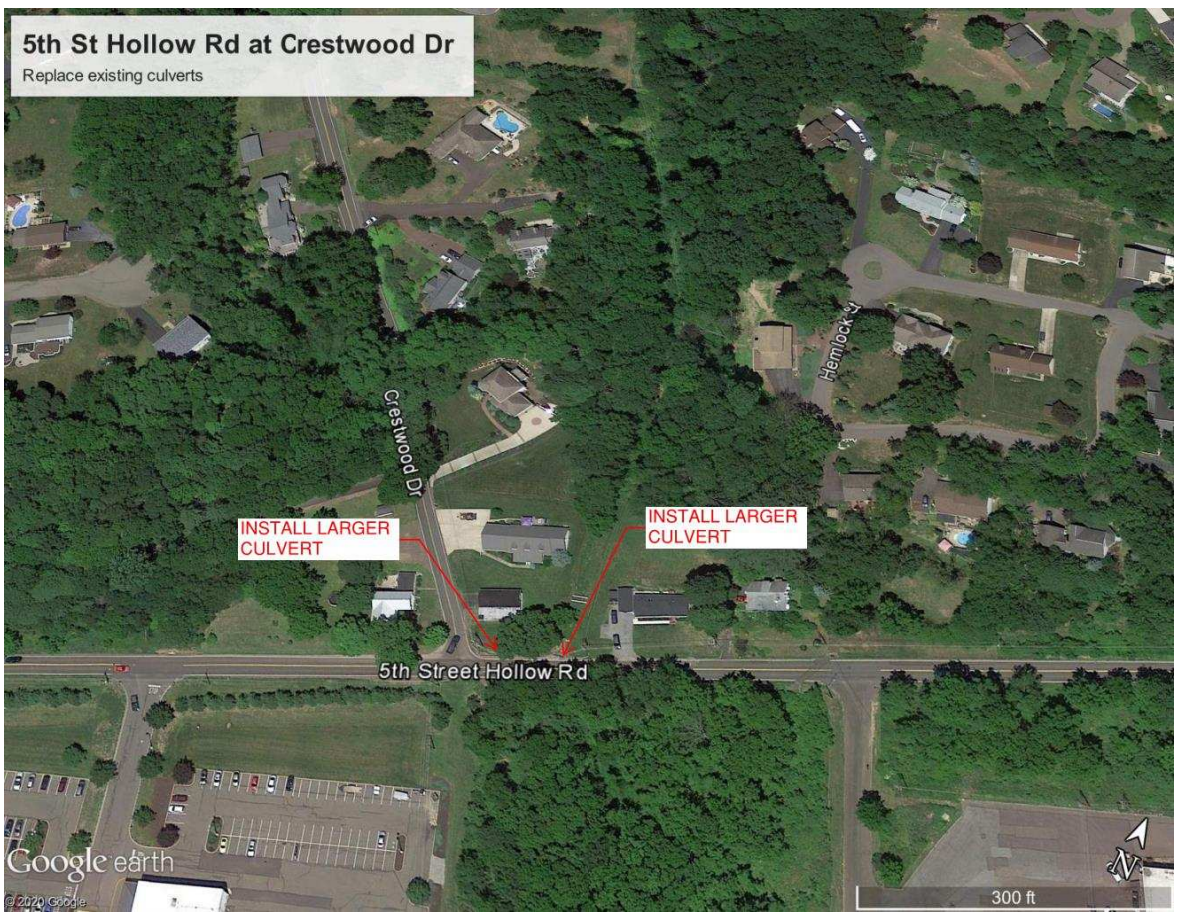
- A detailed hydrologic and hydraulic study will be required to determine the specific culvert size and configuration.
- Since this work is for a railroad, DEP permits should not be required.
- The railroad in this location sits relatively low in relationship to the culvert under SR 11 and the downstream channel. It may be only possible to install a culvert that slightly improves flooding at the site rather than permanently correct the issues present.

STORMWATER STUDY

BLOOMSBURG TO LIME RIDGE CORRIDOR

5TH STREET AND CRESTWOOD DRIVE

SCOTT TOWNSHIP



Construction Cost Estimate

$170,000

Location

5th Street East of Crestwood Drive
41.008240, -76.434282

Public/Private Property

Public/Private

Priority

Medium

Overview

Two small drainage areas meet just east of Crestwood Drive at 5th Street. The first is conveyed by a storm sewer system that flows down Crestwood Drive, discharges to a roadside swale, wraps around the intersection and then under 5th Street at a headwall. The geometry of the discharge of this pipe, including the 90 degree bend that the water must make is inefficient and contributes to the flooding of 5th Street.

The second drainage area is smaller and intersects 5th Street 60 feet farther to the east. The culvert under 5th Street is entirely blocked and not long after we visited this site in January of 2020 stormwater ponded onto 5th Street because of this blockage. The amount of rain received on that date was less than one and one half inches.

These two drainage areas discharge to the woods west of Tractor Supply and are the source of much of the stormwater that floods the Marley's/Venus Day Spa area.

This project includes the replacement of both culverts with 30" by 60" box culverts, improvements to the inlet ends including stream/swale stabilization and the restoration of 5th Street including the guiderail.

Impact

The goal of this project is to increase the capacity of the culverts so that 5th Street does not flood as frequently and to reduce the amount of maintenance required to keep the culverts open following storm events. The project priority is medium since flooding impact is limited to the road and adjacent properties. The roadway is heavily used and there is a threat to public safety if vehicles would attempt to drive through a flooded roadway.

Key Issues

- A detailed hydrologic and hydraulic study will be required to determine the specific culvert sizes.
- A PA DEP permit will be required prior to construction.
- Guiderail will need to be replaced.
- A boundary survey will be required since temporary and permanent easements will need to be obtained from both the upstream and downstream property owners.
- Traffic control will be required, and 5th Street will need to be temporarily closed.

STORMWATER STUDY

BLOOMSBURG TO LIME RIDGE CORRIDOR

CENTRAL AVENUE CULVERT

SCOTT TOWNSHIP

Construction Cost Estimate
$35,000

Location
Central Avenue between the ponds
41.014008, -76.395313

Public/Private Property
Public/Private

Priority
Medium

Overview

The Central Avenue culvert is unique in that it links two ponds within a residential development. The 36" diameter culvert frequently becomes obstructed at the upslope end. A trash rack has been installed to limit how often this happens. The downstream end of the culvert hangs in midair several feet above the lower pond. This culvert acts as an outlet structure and Central Avenue is a dam. Water is impounded from Central Avenue upstream beyond Ridge Street which is 1,700 feet to the east. By lowering the culvert and increasing its capacity, you effectively reduce flooding within a 1/3 mile section of stream.

Once the Central Avenue culvert is replaced, the concrete spillway from the lower pond will limit water surface elevation and flooding within this area. In order to achieve maximum impact from this project, the Township should work with the owners of lower pond to either eliminate the pond entirely or else to lower the water surface elevation. Since the local property owners appear to be enjoying this pond, we believe that they will not be open to removal of the pond, therefore work on the Central Avenue culvert might be the best possible outcome.

This project includes removal of the existing culvert and replacement with a new culvert at a lower elevation. Three – 36" culverts are proposed.

Impact

This project differs from many of the other projects since capacity is not the primary issue. Although the culvert is only 36" in diameter and is undersized, the critical design consideration is elevation. The culvert should be lowered since it is setting the upstream water surface elevations as far east as Ridge Street. A new lower culvert would reduce residential flooding in the area and also reduce periodic flooding to Ridge Street.

Key Issues

- A detailed hydrologic and hydraulic study will be required to determine the specific culvert size. Even replacing it with the same size culvert but lowering the elevation would substantially improve the situation.
- A PA DEP permit will be required prior to construction – most likely a GP-11
- A boundary survey is recommended to determine if any easements are required for construction or long-term maintenance.

STORMWATER STUDY

BLOOMSBURG TO LIME RIDGE CORRIDOR

RIDGE STREET CULVERT

SCOTT TOWNSHIP

Construction Cost Estimate

$65,000

Location

Ridge Street 450' South of SR 11
41.016409, -76.389970

Public/Private Property

Public

Priority

Low

Overview

The culvert under Ridge Street is a part of the same drainage area that flows through the ponds on the either side of Central Avenue before meeting Tributary 10 and eventually discharging to the Susquehanna River near Edgar Avenue. The 48" concrete culvert is undersized, partially silted shut and roughly half filled with water that backs up from the culvert under Central Avenue.

If both the Central Avenue and Ridge Street projects are completed, water surface elevations and consequently flooding can be reduced from Central Avenue east to Bissett's Lane.

This project includes removal of the existing culvert and replacement with a new 4 foot high by 10 foot wide box culvert. Construction and permitting should be relatively straight forward.

Impact

The goal of this project is to increase the carrying capacity of the culvert under Ridge Street to reduce the number of times the road is closed to flooding, reduce upstream backwater that impacts the residential area north of Red Maple Lane and reduce the required maintenance of the culvert. The project is prioritized as low.

While this project can be completed independently of the culvert under Central Avenue, replacing the culvert under Ridge Street will not significantly reduce flooding until the Central Avenue project is also complete.

Key Issues

- A detailed hydrologic and hydraulic study will be required to determine the specific culvert size.
- A PA DEP permit will be required prior to construction – most likely a GP-11
- A boundary survey is recommended to determine if any easements are required for construction or long-term maintenance.

STORMWATER STUDY

BLOOMSBURG TO LIME RIDGE CORRIDOR

BENTLEY DRIVE

SCOTT TOWNSHIP

Construction Cost Estimate

$65,000

Location

275' West of Central Road
41.014329, -76.418268

Public/Private Property

Public

Priority

Low

Overview

Like much of the area covered by this study, steep upslope drainage areas have seen an increase in residential development. Even though municipalities have stormwater management ordinances in effect, runoff is increasing in intensity.

The existing storm sewer system includes twin 24" CMP's that are severely corroded on the bottom and appear to be deforming. The culverts are partially blocked by debris and sediment. The downstream end is very flat and a portion of the end of the culverts is submerged. The culverts discharge to a large wetland area that is tributary to Kinney Run.

This project proposes a 24" by 60" box culvert to increase the flow capacity to reduce the frequency of flooding and road closure. Work will include removal of the old culverts, replacement with new culverts, installation of a new headwall, rip-rap at the upstream and downstream ends, and restoration of pavement and sidewalk.

Impact

The goal of this project is to increase the capacity of the culvert under Bentley Drive. The priority of this project is low since Bentley Drive can be accessed from either end even when the road does flood, the duration is typically short.

Key Issues

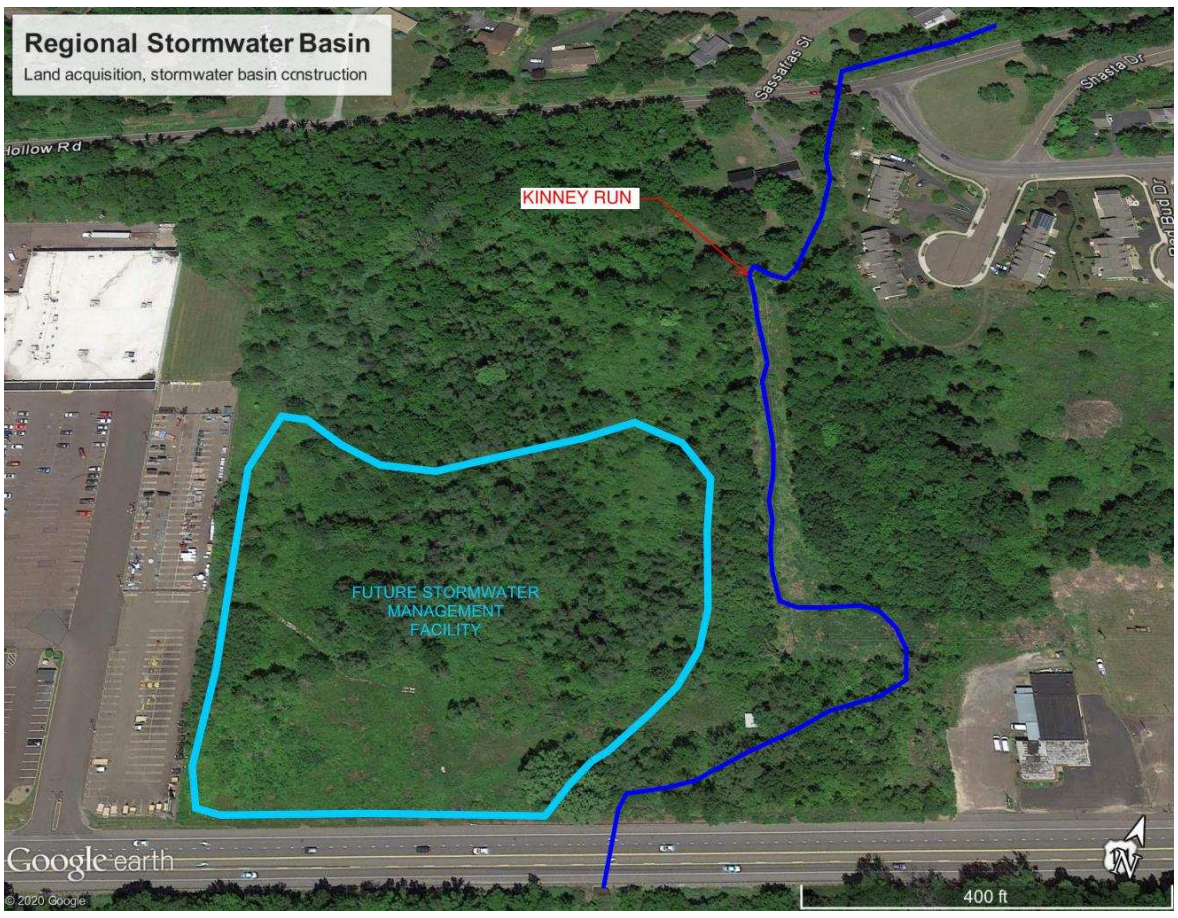
- A detailed hydrologic and hydraulic study will be required to determine the specific culvert size.
- A PA DEP permit will be required prior to construction – most likely a GP-11
- A boundary survey is recommended to determine the limits of the public right-of-way. Easements may be required.

STORMWATER STUDY

BLOOMSBURG TO LIME RIDGE CORRIDOR

REGIONAL
STORMWATER BASIN

SCOTT TOWNSHIP



Construction Cost Estimate

$300,000
$20,000 (Land Acquisition)

Location

Scott Twp. – between Tractor Supply and Bentley Drive
41.007388, -76.429062

Public/Private Property

Private

Priority

Low

Overview

After Kinney Run crosses 5th Street Hollow Road, it drains through a wooded wetland area before it reaches SR 11. It occasionally floods commercial properties along the north side of SR 11 as the stream channel flattens near the railroad. Stormwater also backs up due to obstructions near the Bloomsburg Recycling Center and three projects have been identified to help to reduce backwater. These projects include the Kinney Run Diversion Channel, Patterson Drive culvert and the Walnut Street culvert.

Kinney Run is a very large drainage area and the construction of a regional stormwater management basin in this location will have little impact on major storm events, however it could be valuable during smaller, more frequent events. A large basin constructed in this undeveloped lot could either store water diverted from Kinney Run or else runoff collected from the drainage area flowing south from Crestwood Drive that frequently floods the Marley's and Venus Day Spa area.

The goal of this project, is to create a large stormwater basin on the site that will capture excess stormwater runoff, retain it and release it in a controlled manner to the large box culvert under SR 11.

Work will include site clearing, grading, installation of an outlet structure, storm sewer piping, fencing, seeding and mulching.

Impact

The goal of this project is to mitigate stormwater runoff discharging to SR 11 and Kinney Run. The basin can be designed to collect stormwater from the Crestwood Drive area and the main Kinney Run drainage. Since Kinney Run is such a large drainage area, the basin will have a larger impact on smaller, more frequent storm events and is given a low priority.

Key Issues

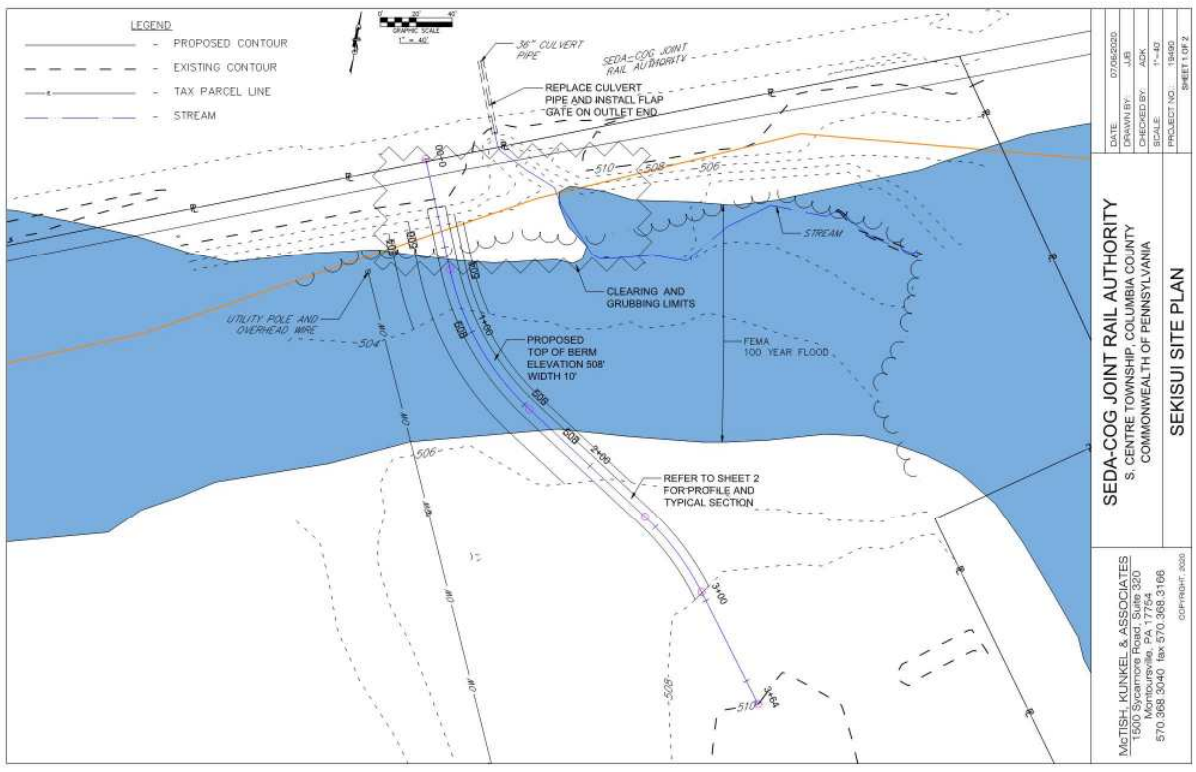
- Much of the site is considered wetlands. A Joint Permit will be required.
- The property is privately owned. Either outright purchase or an easement will be required.
- If public funding is obtained, PHMC/SHPO clearance will be required.
- An NPDES permit will be required for earth disturbance activities.

STORMWATER STUDY

BLOOMSBURG TO LIME RIDGE CORRIDOR

EARTHEN BERM/LEVEE

SOUTH CENTRE TWP



Construction Cost Estimate

$600,000

Location

JM Holdings, LLC
(Metropolitan Trucking)
41.030318, -76.342377

Public/Private Property

Private

Priority

High

Overview

On several occasions, flash flooding events have overwhelmed the small stream that drains from the Scenic Knolls area under State Route 11 and Interstate 80 and discharges to the Susquehanna River at Columbia Park. When the water surface elevation is high enough, the stream overtops its bank and cascades into the old sand and gravel pit between the stream, State Route 11 and Metropolitan trucking. In some instances, this flooding has occurred long enough that water eventually filled the sand and gravel pit and continued to drain to areas of lower elevation farther to the west. This flooding significantly impacted Sekisui, Metropolitan Trucking, JM Smuckers, 84 Lumber and several other small businesses and residential areas.

This project includes the construction of a berm/levee that will tie to adjacent areas of high ground at the railroad track and on Metropolitan Trucking property to cut off the narrow area of low elevation that allows stormwater to flood areas farther to the west. Considering the 100-year flood elevation is only 506 feet and the existing grade is approximately 503 feet, the berm does not need to be very high. It is proposed to provide 2 feet of freeboard, so the top elevation of the berm will be set at 508 feet.

The project will include a berm/levee with an impervious core. The bottom depth and key trench dimensions will be determined by the results of a geotechnical investigation. The wet side of the berm is proposed to be 2:1 slope however the dry side can be flatter if needed to provide a longer path of flow to reduce seepage.

The railroad bed will need to be evaluated to determine impervious material needs to be provided to reduce seepage. It is also proposed to replace the 36" culvert under the railroad and to provide a flap gate to eliminate any backflow to the north side of the tracks.

Impact

The goal of this project is to eliminate the catastrophic flooding of the industrial and residential areas to the west of the stream and sandpit. Once the stream bank is overtopped and the sand and gravel pit fills with water, the area cannot drain back to the stream since the stream bank is roughly 5 feet lower than the low point on the Metropolitan trucking site. Construction of this berm is the most straight-forward, cost effective method to protect these areas up to the 100-year flood event.

Key Issues

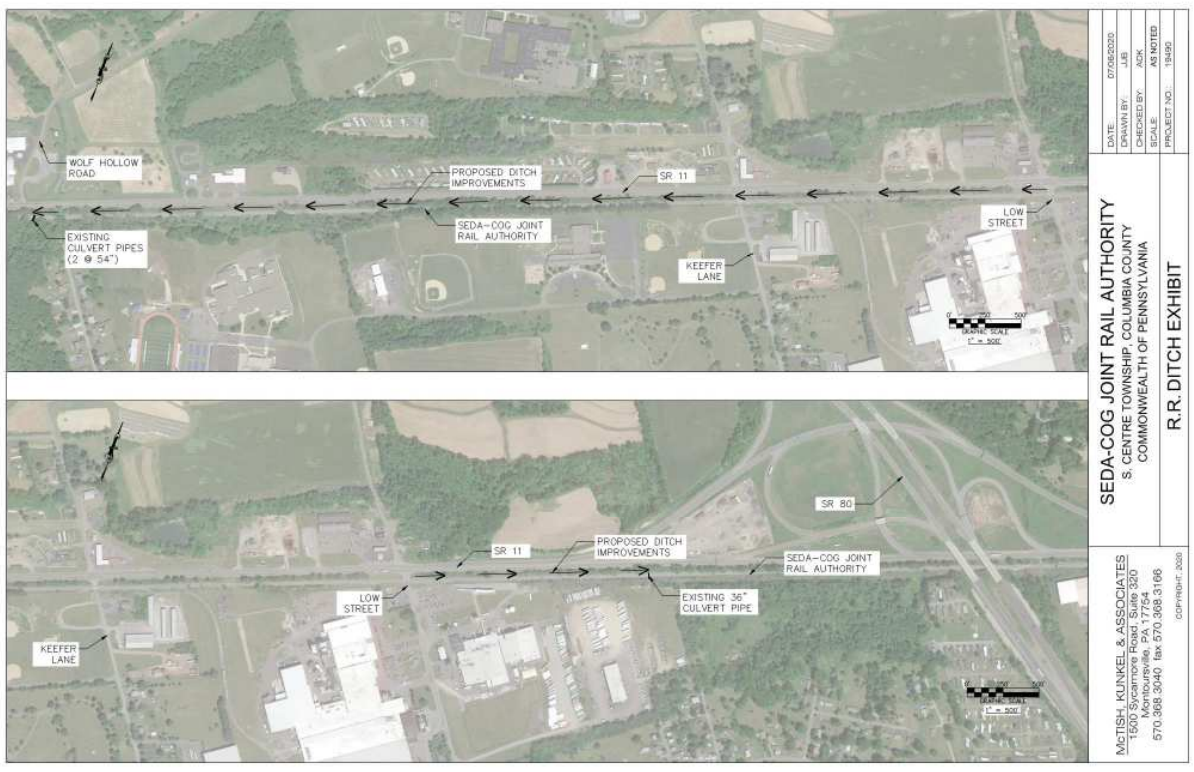
- Hydrologic and Hydraulic study to verify that construction of a berm will not significantly impact flood elevations in the residential areas to the east and south east. The study will need to verify that construction will not increase the level of damage to an existing structure or flood structures that are not currently within the flood plain.
- Geotechnical analysis to confirm that seepage under the levee or through the railroad bed will not be an issue.
- Easement required for construction, maintenance and repair.
- Since the project is on private property, the party responsible for long-term maintenance must be identified.

STORMWATER STUDY

BLOOMSBURG TO LIME RIDGE CORRIDOR

SR 11/SEDA COG JRA SWALE

SOUTH CENTRE TWP



Construction Cost Estimate

$700,000

Location

SR 11 between Central Columbia School District and Interstate 80
41.022846, -76.371957 to
41.031297, -76.341955

Public/Private Property

Public

Priority

High

Overview

The distance from the former Wolf Hollow Mini Golf Course to the PennDOT maintenance facility near Interstate 80 is approximately 1.5 miles. Within this corridor, there are no stormwater drainage facilities crossing under the railroad even though there are several culverts and pipes that drain under SR 11 within this same area.

The most significant drainage area is near Low Street where a 36" culvert drains under SR 11 and discharges to the swale on the north side of the railroad. This stormwater and all additional runoff from the area north of SR 11 west of Low Street is intended to flow west under Keefer's Lane via a 42" culvert and eventually to the Wolf Hollow Road area. The swale throughout this section is overgrown, obstructed with debris and even filled in at some locations. As a result, stormwater never gets to Wolf Hollow Road and instead overtops the railroad and floods businesses and homes.

A similar condition exists to the east of Low Street where trees and channel blockages restrict water from flowing to a 36" culvert under the railroad opposite the PennDOT maintenance facility.

This project includes clearing of all trees and brush within this 1.5 mile corridor, grading the bottom and side slopes to create a consistent cross-section and stabilizing with erosion control matting. Once completed, the channel can be periodically mowed and kept clear of woody vegetation so that it can function at maximum capacity.

Impact

The goal of this project is to clear obstructions that limit the drainage from areas to the north of SR 11 between Interstate 80 and the Wolf Hollow Road area of South Centre Township. Cutting trees, clearing vegetation and creating a stable swale will help to reduce flooding and backwater that results from upslope runoff. This drainage floods areas near 84 Lumber and Sekisui since it has no place to go and essentially backs up until it can either infiltrate into the ground or find areas to bypass the obstructions.

Key Issues

- Ownership/maintenance responsibility will need to be determined. PennDOT has indicated that anything within the state right-of-way is their responsibility however PennDOT maintenance staff are reluctant to take action.
- The only access is via the SR 11 right-of-way or else the railroad. Traffic control along SR 11 will be required in addition to coordination with the JRA and their operator.
- Coordination with PA DEP will be necessary to clear any wetland impacts; however, this is a roadside swale and this work should be considered 'maintenance'.

STORMWATER STUDY

BLOOMSBURG TO LIME RIDGE CORRIDOR

LOW STREET
STORMSEWER

SOUTH CENTRE TWP

Construction Cost Estimate

$2,100,000

Location

Low Street, Lime Ridge
41.026886, -76.346216

Public/Private Property

Public

Priority

High

Overview

A large drainage area north of SR 11 and east of Low Street discharges to the north side of the railroad via a 36" culvert at the southeast quadrant of the Low Street and SR 11 intersection. There is also a smaller culvert that flows under SR 11 east of Low Street. This runoff backs up and ponds after it crosses under SR 11. In extreme flood events, it can either overtop the railroad near 84 Lumber or else seep through the railroad bed at Sekisui. As more development occurs within this drainage area, flooding will become more frequent and more intense.

This project proposes the construction of a new 48" culvert to replace the smaller 24" culvert that ends at the entrance to Metropolitan Trucking. The new culvert will extend the entire length from the railroad to the Susquehanna River. In addition to collecting runoff at critical points along the alignment from strategically placed inlets, the end of the culvert at the railroad will collect a portion of the runoff crossing under SR 11 in order to lessen the flooding in the swale that runs between SR 11 and the railroad embankment. The inlet end can be constructed with a control structure to limit the flow that can access the storm sewer on Low Street so that it does not cause additional flooding along the Low Street corridor.

Work will include a 48" culvert, inlets, cross-piping, manholes, an inlet control structure and an outlet headwall. Due to the size and depth of the culvert, a substantial portion of Low Street will need to be reconstructed. This will require heavy duty pavement as far south as Old Berwick Road due to the amount of truck traffic that this section receives.

Impact

The goal of this project is to extend the storm sewer north on Low Street and increase its capacity to convey runoff along the roadway and to collect a portion of the stormwater flowing under SR 11 via a 36" culvert. As development continues to occur north of SR 11, more runoff is anticipated, and construction of this storm sewer will help to reduce existing and future flooding.

Key Issues

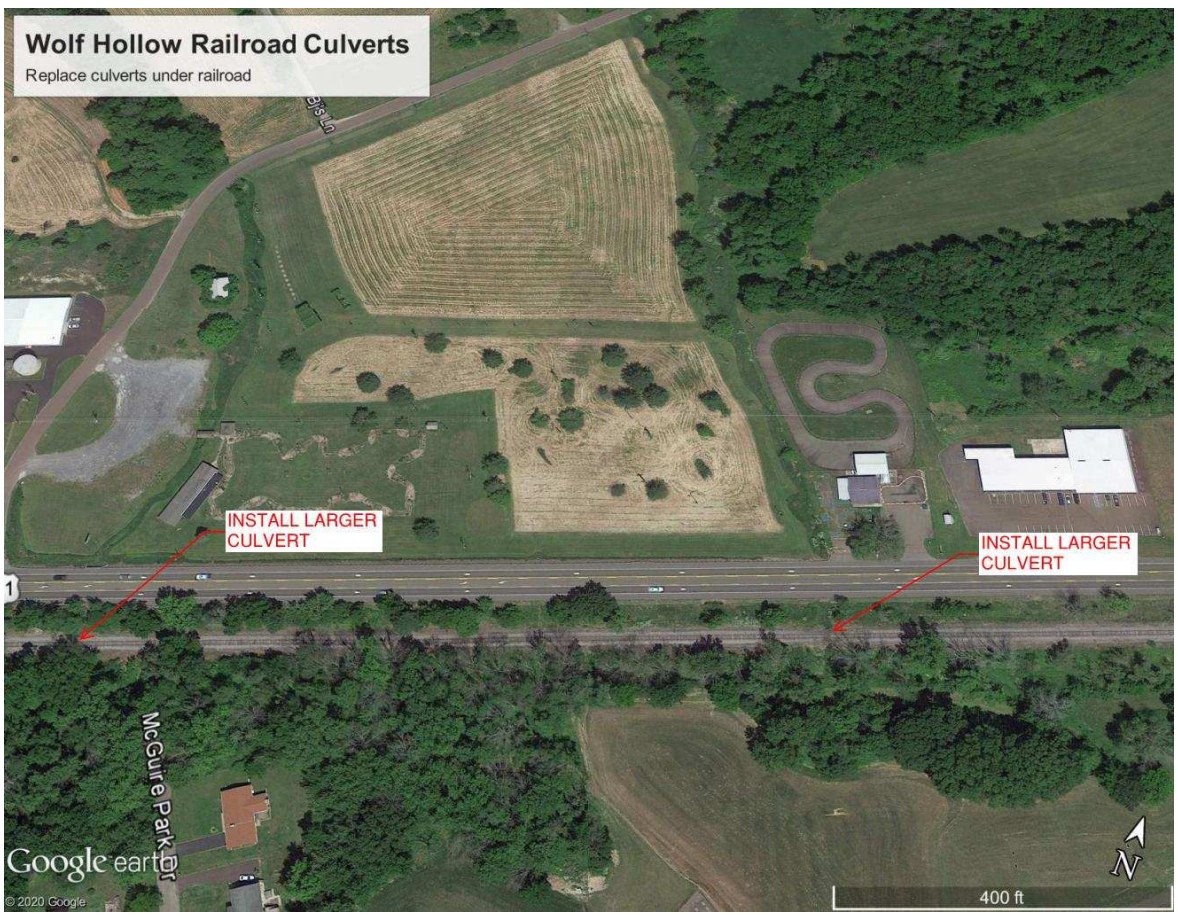
- A General Permit will be required for the discharge/outfall at the Susquehanna River.
- An easement may be required for the outfall. South Centre Township already has a pipe in this location so an easement may already exist however it was not found during the research for this study.
- Several other utilities exist within the right-of-way of Low Street. Subsurface utility investigation is recommended during design to reduce utility conflicts.
- The culvert will be deep in some locations including near Old Berwick Road where houses are constructed close to the edge of the road. Design will need to consider the structural stability of these buildings.

STORMWATER STUDY

BLOOMSBURG TO LIME RIDGE CORRIDOR

WOLF HOLLOW
RAILROAD CULVERTS

SOUTH CENTRE TWP



Construction Cost Estimate
$200,000 combined

Location
Railroad between Wolf Hollow Road and former Go-Cart Track
41.022581, -76.372360 and
41.023509, -76.369066

Public/Private Property
Public

Priority
High

Overview

Several drainage areas converge new Wolf Hollow Road in the vicinity of the old Wolfey's Miniature Golf Course. Nearest Wolf Hollow Road is a large box culvert under SR 11 (20'x6') and a pair of 54" culverts under the railroad and closer to the old Go Cart track is a 36"x48" arch culvert under SR 11 and two 15" diameter steel culverts along with a 30" HDPE culvert under the railroad. The larger drainage area discharges at the east end while the larger stormwater facilities are on the west end.

During large storm events, facilities on the east end are quickly overwhelmed and stormwater flows west along the berm of SR 11 to the larger box culvert. Frequently, the entire field and miniature golf course are flooded until stormwater either dissipates through the culverts or overtops SR 11.

Even though the railroad has improved drainage by installing two 54" culverts at the western drainage point, these facilities are still undersized and restrict flow. Modeling indicates a 5 foot high by 20 foot wide box culvert is required.

The railroad facilities at the eastern drainage point consist of a 30" HDPE culvert and two – 15" steel culverts. Modeling indicates a 3 foot high by 12 foot wide box culvert is required.

This project includes the removal of existing culverts and the installation of new box culverts at each drainage point.

Impact

The goal of this project is to increase the capacity of stormwater facilities draining under the railroad at two drainage points between Wolf Hollow Road and Keefer's Lane. Existing facilities restrict flow and cause flooding on the north side of SR 11 that overtops SR 11 and causes a threat to public safety. This is a high priority project since it will reduce the frequency of flooding of SR 11 and improve the function of the swales between the railroad and SR 11 east to Low Street.

Key Issues

- A detailed hydrologic and hydraulic study will be required to verify the culvert sizes.
- Since this work is for the railroad, DEP permitting may not be required.

STORMWATER STUDY

BLOOMSBURG TO LIME RIDGE CORRIDOR

WOLF HOLLOW SR 11 CULVERT

SOUTH CENTRE TWP

Construction Cost Estimate

$300,000

Location

SR 11 at former Go-Cart Track
41.023727, -76.369172

Public/Private Property

Public

Priority

High

Overview

Several drainage areas converge new Wolf Hollow Road in the vicinity of the old Wolfey's Miniature Golf Course. Nearest Wolf Hollow Road is a large box culvert under SR 11 (20'x6') and a pair of 54" culverts under the railroad and closer to the old Go Cart track is a 36"x48" arch culvert under SR 11 and two 15" diameter steel culverts along with a 30" HDPE culvert under the railroad. The larger drainage area discharges at the east end while the larger stormwater facilities are on the west end.

During large storm events, facilities on the east end are quickly overwhelmed and stormwater flows west along the berm of SR 11 to the larger box culvert. Frequently, the entire field and miniature golf course are flooded until stormwater either dissipates through the culverts or overtops SR 11.

The 36"x48" arch culvert under SR 11 is clearly undersized and was half filled with sediment during the time of our field investigation. Modeling indicates that at least a 3 foot high by 12 foot wide box culvert is required.

This project includes removal of the old arch culvert and installation of a new box culvert.

Impact

The goal of this project is to increase the capacity of stormwater facilities draining under SR 11 in order to reduce flooding on the north side of the road along with overtopping of SR 11 which is a significant safety concern.

Key Issues

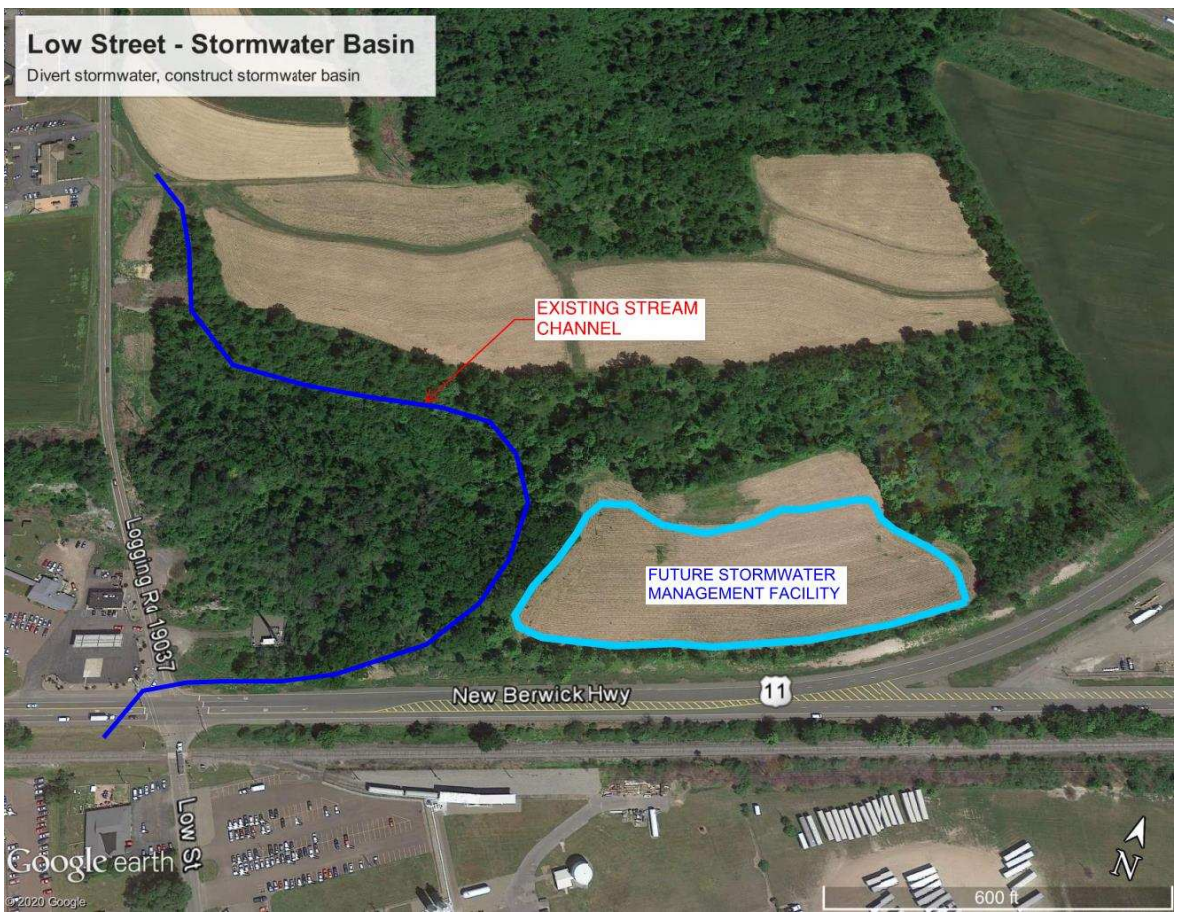
- A detailed hydrologic and hydraulic study will be required to determine the specific culvert size. A box culvert will be required.
- A PA DEP permit will be required prior to construction – either a Joint Permit or GP-11.

STORMWATER STUDY

BLOOMSBURG TO LIME RIDGE CORRIDOR

LOW STREET
STORMWATER BASIN

SOUTH CENTRE TWP



Construction Cost Estimate

$325,000
$50,000 (Land Acquisition)

Location

Lime Ridge, NE of Low Street/SR 11
41.030979, -76.345376

Public/Private Property

Private

Priority

Medium

Overview

A large drainage area north of SR 11 and east of Low Street discharges to the north side of the railroad via a 36" culvert at the southeast quadrant of the Low Street and SR 11 intersection. There is also a smaller 18" culvert that flows under SR 11 east of Low Street that discharges to the north side of the railroad. The natural stream channel north of SR 11 is small in size and becomes braided toward the lower end closer to SR 11. On a regular basis, the capacity of this channel is exceeded, and stormwater overflows the streambank and diverts to the agricultural field where it ponds until it can flow under SR 11 at the small 18" PennDOT culvert. Unless this water gets extremely high, it cannot flow to the larger 36" culvert under SR 11 at Low Street.

Since the smaller PennDOT culvert does not have enough capacity and the swales on the north side of the road are blocked with debris and ineffective, the agricultural field can remain ponded with standing water for months at a time. This provides a steady source of water for the swale along the railroad which in turn impacts the Sekisui site near their railroad siding.

The goal of this project, in conjunction with the swale clearing project, is to create a large stormwater basin on the site of the agricultural field that will capture excess stormwater runoff, retain it and release it in a controlled manner to either culvert under SR 11 to reduce the stress on those stormwater facilities and to reduce the number of flood events associated with those systems. As development continues to occur within this watershed, the need for this facility will increase.

Work will include grading, installation of an outlet structure, storm sewer piping, fencing, seeding and mulching.

Impact

The goal of this project is to reduce the volume of stormwater flowing under SR 11 which subsequently floods industries south of the railroad. By creating a larger stormwater basin in an area where stormwater naturally ponds on a regular basis, discharge can be better controlled and directed to facilities that have adequate capacity to handle it.

Key Issues

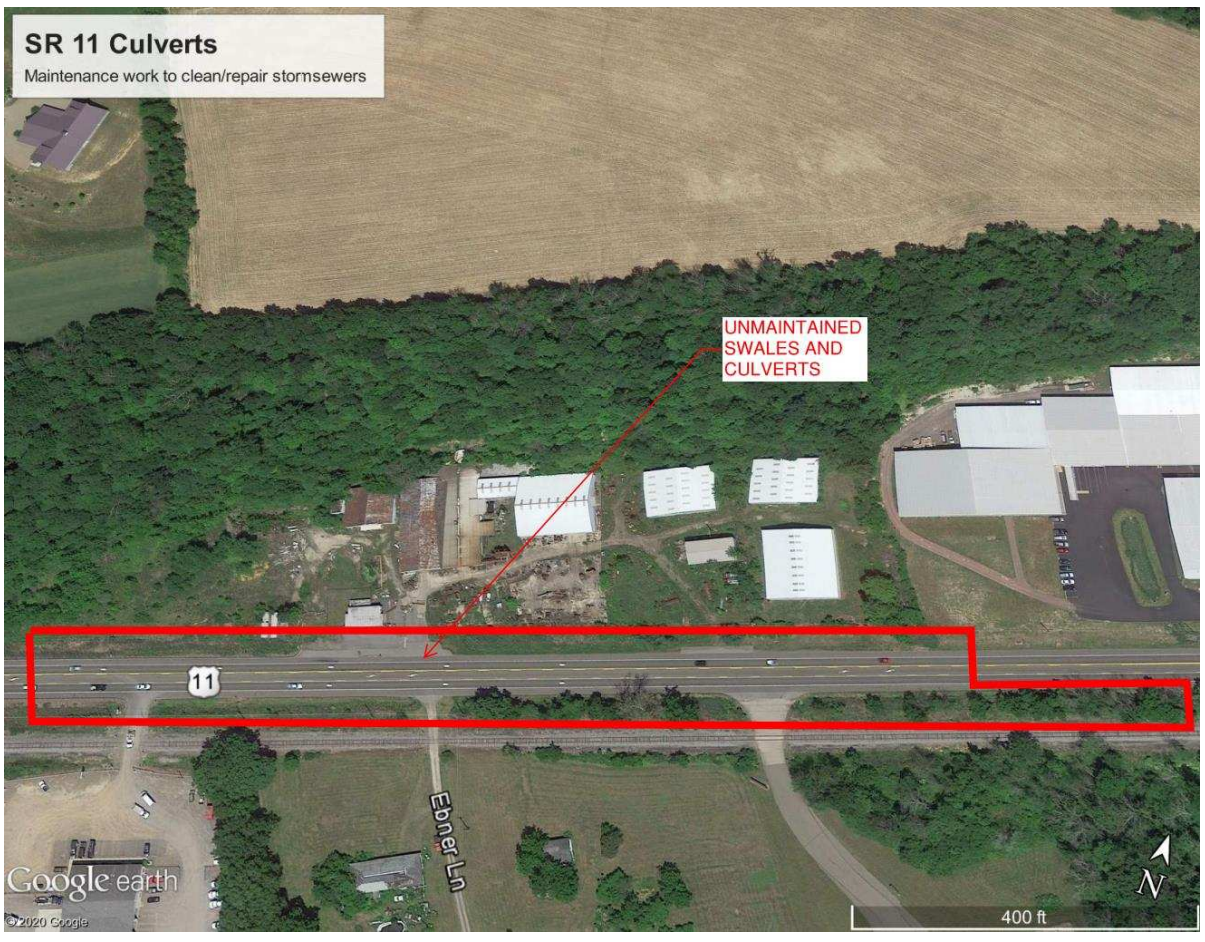
- A portion of the site could now be considered wetlands. A Joint Permit may be required.
- The property is privately owned. Either outright purchase or else an easement will be required. Since the project could benefit the property owner if they develop the site in the future, they might be willing to negotiate for a lower property acquisition cost. Briar Meadows (Don E. Bower) is the current owner.
- If public funding is obtained, PHMC/SHPO clearance will be required.
- An NPDES permit will be required for earth disturbance activities.

STORMWATER STUDY

BLOOMSBURG TO LIME RIDGE CORRIDOR

SR 11 CULVERTS AND SWALES

SOUTH CENTRE TWP



Construction Cost Estimate

$0 – PennDOT required maintenance

Location

SR 11 from Vision Home Builders to Bloomsburg Carpet
41.020378, -76.380897 to
41.021645, -76.376483

Public/Private Property

Public

Priority

Low

Overview

During public meetings that were held as a part of this stormwater study, the corridor between Vision Home Builders and Bloomsburg Carpet was identified as a stormwater management problem area. It was noted that stormwater draining from north to south under SR 11 is backing up and ponding on properties on the north side of the public right-of-way.

As part of our field investigation, engineers walked this area and determined that roadside swales are overgrown, and the location and condition of cross-pipes was difficult to determine since the inlets and outlets were covered by vegetation.

Although maintenance of stormwater management facilities was a contributing factor for many of the drainage issues that were investigated, this particular section of roadway was among the worst areas that were observed.

Roadside swales should be cleaned and restored to their original design cross-sections, pipe inlets and outlets should be cleared, and culverts should be flushed if any blockages are found.

Impact

This maintenance work will reduce periodic, small-scale flooding along this section of SR 11. The project is given a low priority since the impact of this work is extremely localized.

Key Issues

- None.