



CITY OF WASHINGTON, ILLINOIS
Committee of the Whole Agenda Communication

Meeting Date: April 12, 2022

Prepared By: Dennis Carr, P.E. – City Engineer
Sam LaHood – Austin Engineering

Agenda Item: Trails Edge Section 9 and 10 Alternate Typical Section

Explanation: Potential developers for the Trails Edge Section 9&10 property have recently been in contact with City Staff about drainage concerns. With the topography of this property, the existing drainage, and the increase in rainfall intensity design guidelines, the 100-year flood route was exceeding the curb line in a few low areas of the proposed roadway. The City's Stormwater ordinance allows for the 100-year flood route to be in the roadway, but it cannot exceed the height of the curb. To keep the water inside the curb, the cross slope of the roadway was reduced from 2% to 1% and the curb height was increased from 6" to 8".

Fiscal Impact: 8" curb is slightly more expensive to the developer than 6" curb.

Recommendation Summary: Staff requests that City Council discuss

Action Requested: Discussion and Approval



AUSTIN ENGINEERING CO., INC.

Consulting Engineers / Surveyors

Peoria, Illinois - Davenport, Iowa

austinengineeringcompany.com

March 29th, 2021
City of Washington
301 Walnut St.
Washington, IL 61571

Re: Trails Edge Sec. 9 Alternate Typ. Section Request

To City of Washington Public Works Committee:

We are requesting an alternate typical section be allowed for the connection of Debate Street and the intersection of Debates Street and Stephanie Court in order for Section 9 of Trails Edge Subdivision to be compliant with Section 53.005 (B) of the City of Washington Code of Ordinances on the maximum height of the flood waters when conveying the 100YR flood through the street.

Trails Edge Subdivision Section 9 & 10 are located on the last remaining portion of Trails Edge Subdivision that would complete the construction of Debate Street and Stephanie Court. Section 9 is a 17 Lot development located between the two existing dead-ends of Debate Street and Section 10 would connect Stephanie Court to Debate Street adding another 13 lots. The existing farm is a low-lying area, all neighboring property is fully developed, and all surrounding stormwater runoff flows to our site with the exaction of the north boundary line at the Debate Street connection.

Since all the surrounding area is fully developed, we cannot raise the road profile without pushing water into neighboring back yards and the Debate Street connection does not have enough fall to meet the minimum longitudinal slope requirements. The section of the City of Washington Code of Ordinances that is placing a hardship on our development is as follows:

- Section 53.005 (B): Existing natural waterways in subdivisions shall be preserved or improved as part of the flood route channel system. The use of streets, parking areas, permanent open spaces and utility easements may be employed as part of the flood route channel system. **Where streets are used for the lateral passage of flood waters, depth of water in the streets shall not exceed the top of curb at the one hundred (100) year rainfall event.**
 - Requiring the depth of the water during a 100YR flood to not exceed the top of the curb has caused us to request an alternate typical section.

The existing 20' storm sewer and stormwater drainage easement that abuts our eastern property boundary but is not feasible for us to use as a 100YR flood route due to the existing grades of the neighboring homes that were built in that area. The storm sewer system that currently exists on the site was constructed to divert water from these neighboring homes to the northern connection of Debates Street.

The proposed profile of Debate Street and the proposed intersection of Debate Street and Stephanie Court were designed to minimize the depth of water at the curb. This being the case, the standard typical City of Washington Typical Section would have water at a depth of 10" at the curb and by reducing the cross-slope from 2% to 1% and by increasing the curb height from 6" to 8" we can convey the 100YR flood water without exceeding the top of curb.

Sincerely,

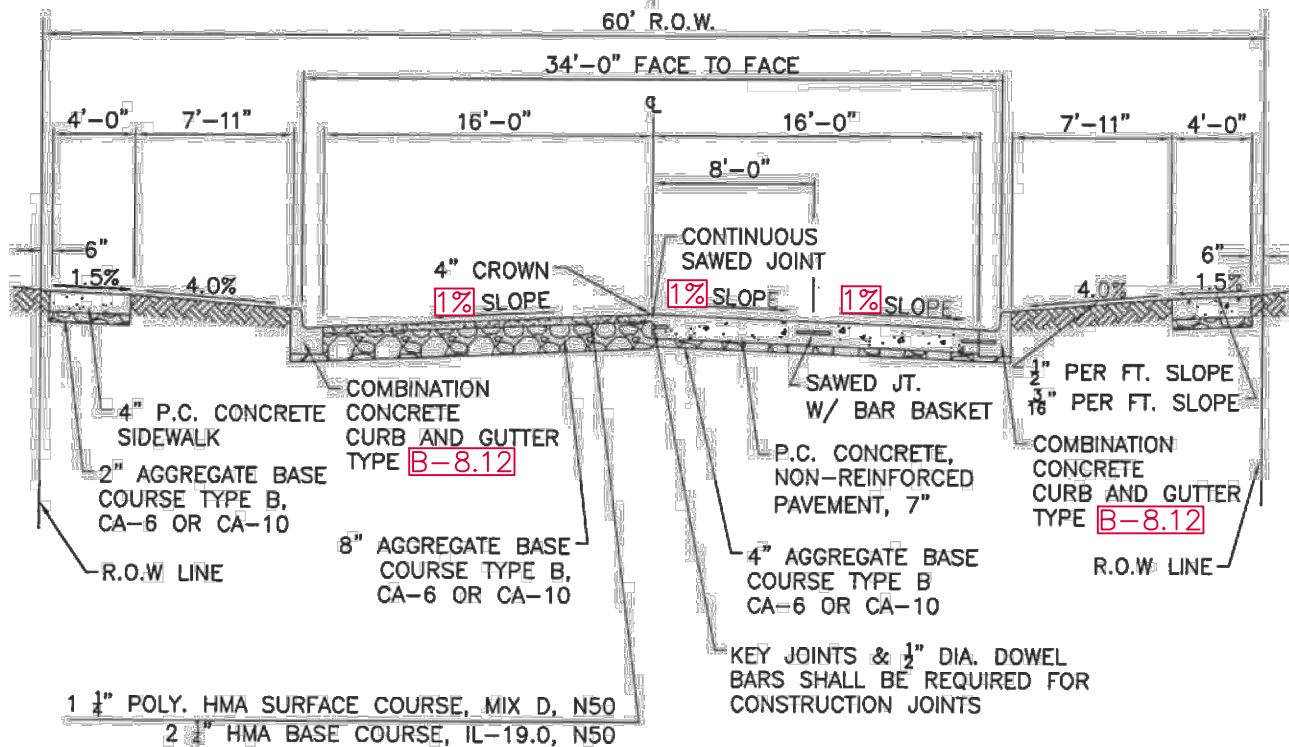
Sam LaHood, E.I.

311 SW Water St., Suite 215, Peoria, IL 61602
220 Emerson Pl., Suite 101-c, Davenport, IA 52801
P 1 (844) 691-AECI

Incorporated August 18, 1947

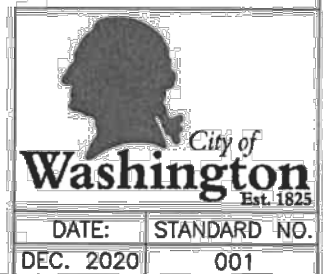
ROADWAY TYPICAL SECTION RESIDENTIAL STREET (MINOR)

ASPHALT ALTERNATIVE CONCRETE ALTERNATIVE



GENERAL NOTES:

1. CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE STATE OF ILLINOIS "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" CURRENT EDITION AND SUPPLEMENTAL SPECIFICATIONS, UNLESS OTHERWISE DIRECTED BY THE CITY ENGINEER.
2. EXPANSION JOINTS SHALL BE INSTALLED IN SIDEWALKS AT ALL PROPERTY LINES.
3. PROOF-ROLL SUBGRADE AND AGGREGATE BASE COURSE IN THE PRESENCE OF THE CITY ENGINEER OR CITY ENGINEER'S DESIGNEE.
4. SIDEWALKS SHALL NOT EXCEED 2% CROSS SLOPE. ANY SIDEWALKS EXCEEDING SHALL BE REMOVED AND REPLACED AT THE EXPENSE OF THE CONTRACTOR.
5. P.C. CONCRETE PAVEMENT JOINTS SHALL BE IN ACCORDANCE WITH IDOT STANDARD BLR 10-7.



2007 Site

A ditch drained to a 18" storm sewer located on a rear lot line of Grandyle Drive.

Legend

 SECTION 9 & 10 BOUNDARY

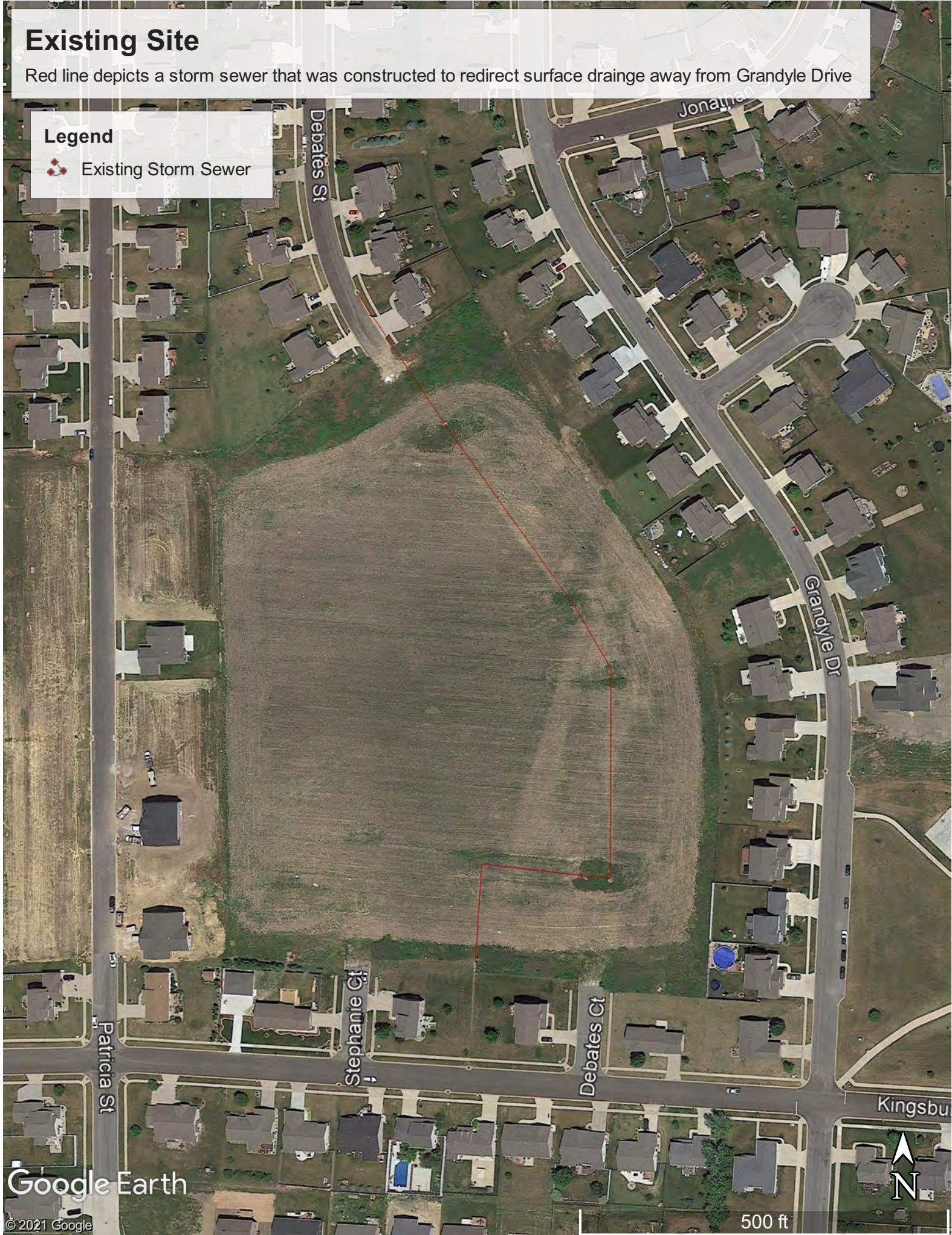


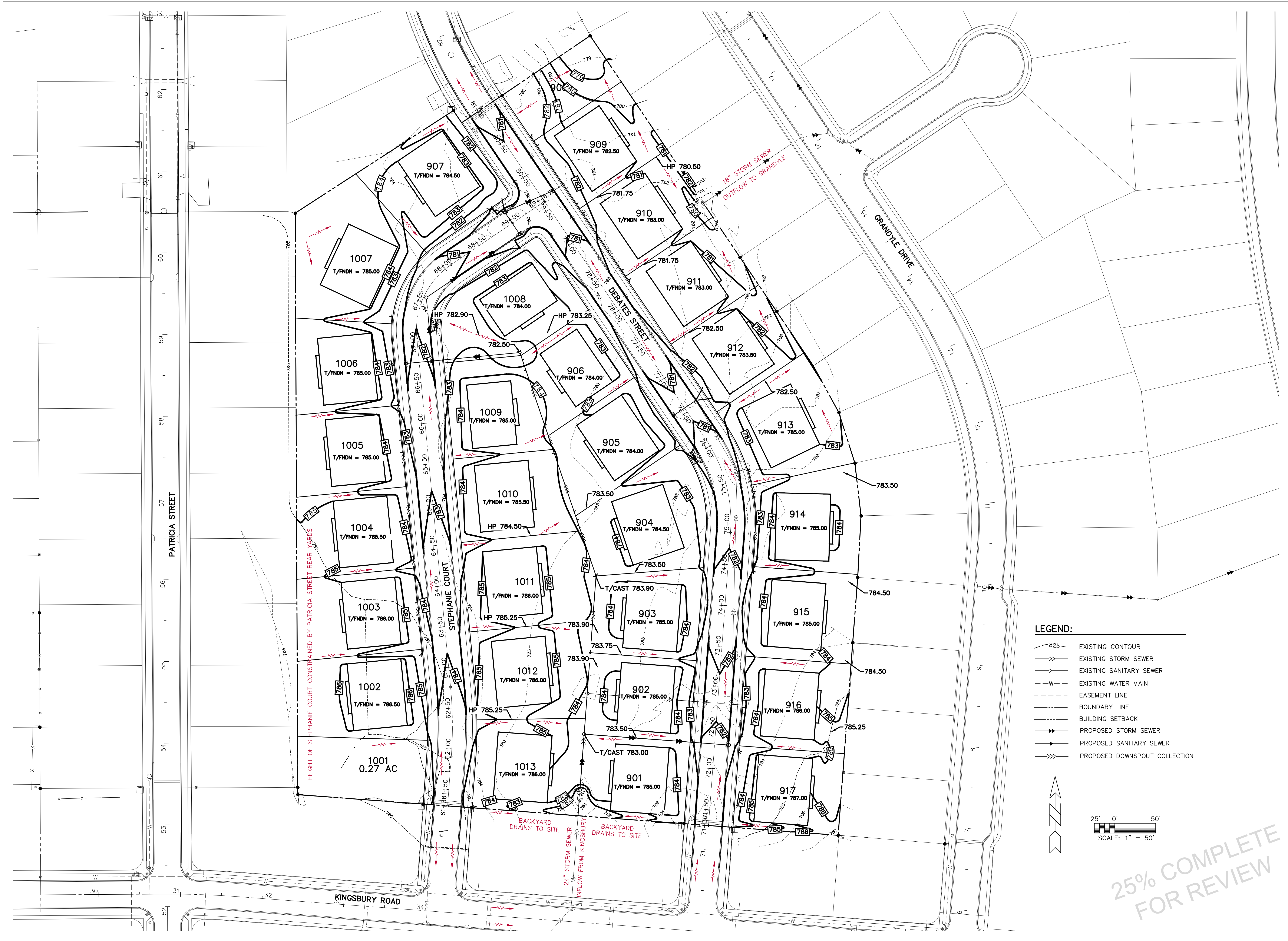
Existing Site

Red line depicts a storm sewer that was constructed to redirect surface drainage away from Grandyle Drive

Legend

 Existing Storm Sewer





CONSTRUCTION PLANS

TRAILS EDGE SECTION 9 & 10

DEBATES ST. (SEC. 9) & STEPHANIE CT. (SEC. 10)
WASHINGTON, ILLINOIS 61571
CLIENT: TRAILS EDGE DEVELOPERS LLC

ISSUED
03-23-2021 25% COMPLETE SET
03-24-2021 REVISED TYPICAL SECTION

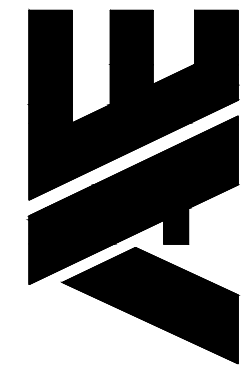
FOR REVIEW ONLY
NOT FOR CONSTRUCTION

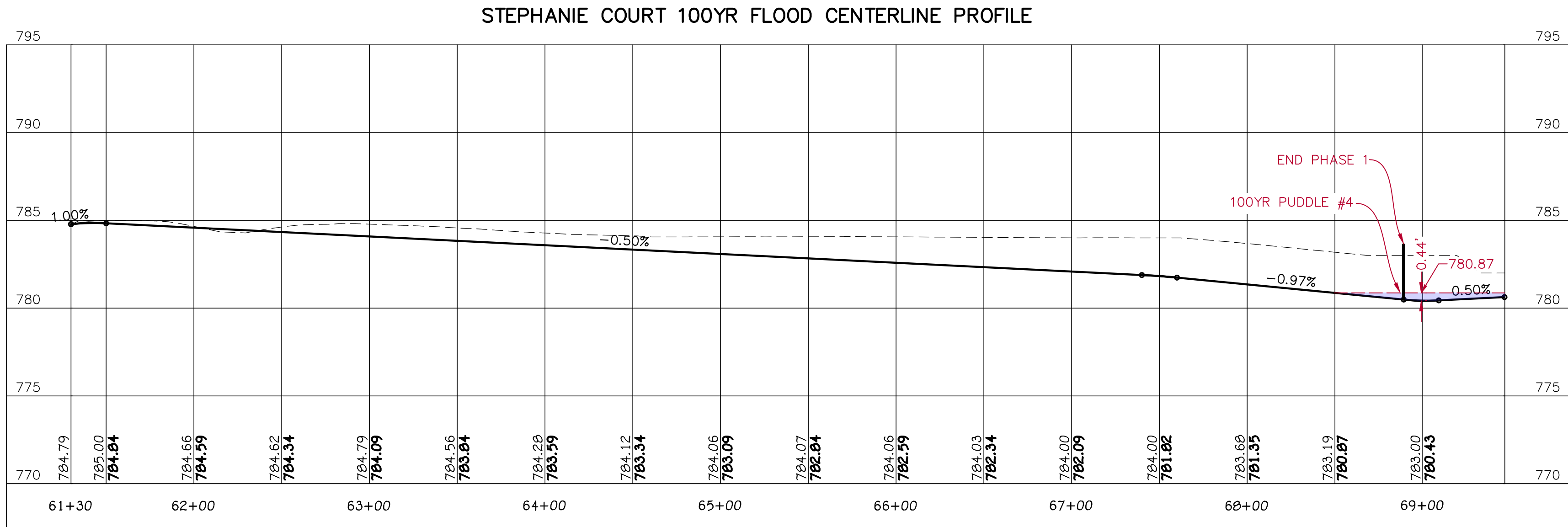
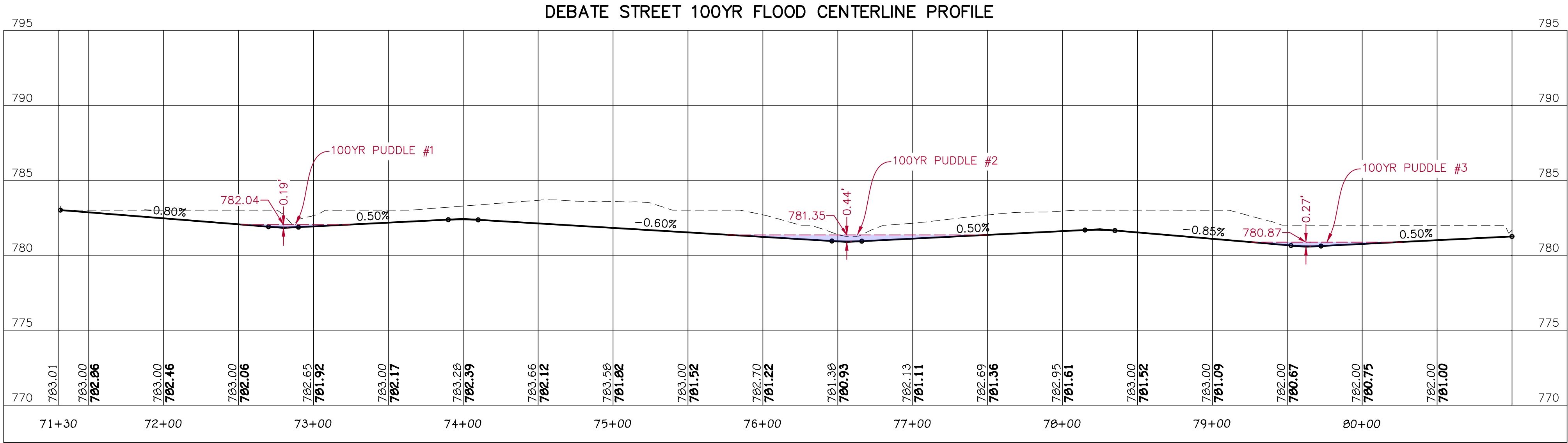
ULTIMATE GRADING PLAN

PROJECT NO. XX-XX-XXX
DATE 03-24-2021
SURVEYED DESIGNED
N/A SML
DRAWN APPROVED
SML DLB

SHEET

AUSTIN ENGINEERING CO., INC.
Consulting Engineers / Surveyors
220 Emerson Place, Suite 101A
Davenport, Iowa 52801
Certificate No. CS131338





100YR FLOOD SUMMARY:

- 100YR PUDDLE #1:
TOP OF WATER ELEVATION = 782.04
DEBATE STREET CENTERLINE ELEVATION = 781.85
DEBATE STREET ELEVATION AT FLOW LINE = 781.63
HEIGHT OF WATER AT CENTERLINE = 0.19' = 2.28"
HEIGHT OF WATER AT FLOW LINE = 0.41' = 4.92"
- 100YR PUDDLE #2:
TOP OF WATER ELEVATION = 781.53
DEBATE STREET CENTERLINE ELEVATION = 781.09
DEBATE STREET ELEVATION AT FLOW LINE = 780.87
HEIGHT OF WATER AT CENTERLINE = 0.44' = 5.28"
HEIGHT OF WATER AT FLOW LINE = 0.66' = 7.92"
- 100YR PUDDLE #3:
TOP OF WATER ELEVATION = 780.87
DEBATE STREET CENTERLINE ELEVATION = 780.60
DEBATE STREET ELEVATION AT FLOW LINE = 780.38
HEIGHT OF WATER AT CENTERLINE = 0.27' = 3.24"
HEIGHT OF WATER AT FLOW LINE = 0.49' = 5.88"
- 100YR PUDDLE #4:
TOP OF WATER ELEVATION = 780.87
STEPHANIE COURT CENTERLINE ELEVATION = 780.43
STEPHANIE COURT ELEVATION AT FLOW LINE = 780.21
HEIGHT OF WATER AT CENTERLINE = 0.44' = 5.28"
HEIGHT OF WATER AT FLOW LINE = 0.66' = 7.92"

25% COMPLETE
FOR REVIEW

CONSTRUCTION PLANS

TRAILS EDGE SECTION 9 & 10

DEBATES ST. (SEC. 9) & STEPHANIE CT. (SEC. 10)
WASHINGTON, ILLINOIS 61571
CLIENT: TRAILS EDGE DEVELOPERS LLC

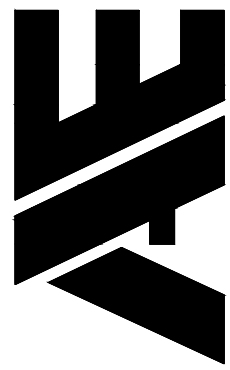
ISSUED
03-23-2021 25% COMPLETE SET
03-24-2021 REVISED TYPICAL SECTION

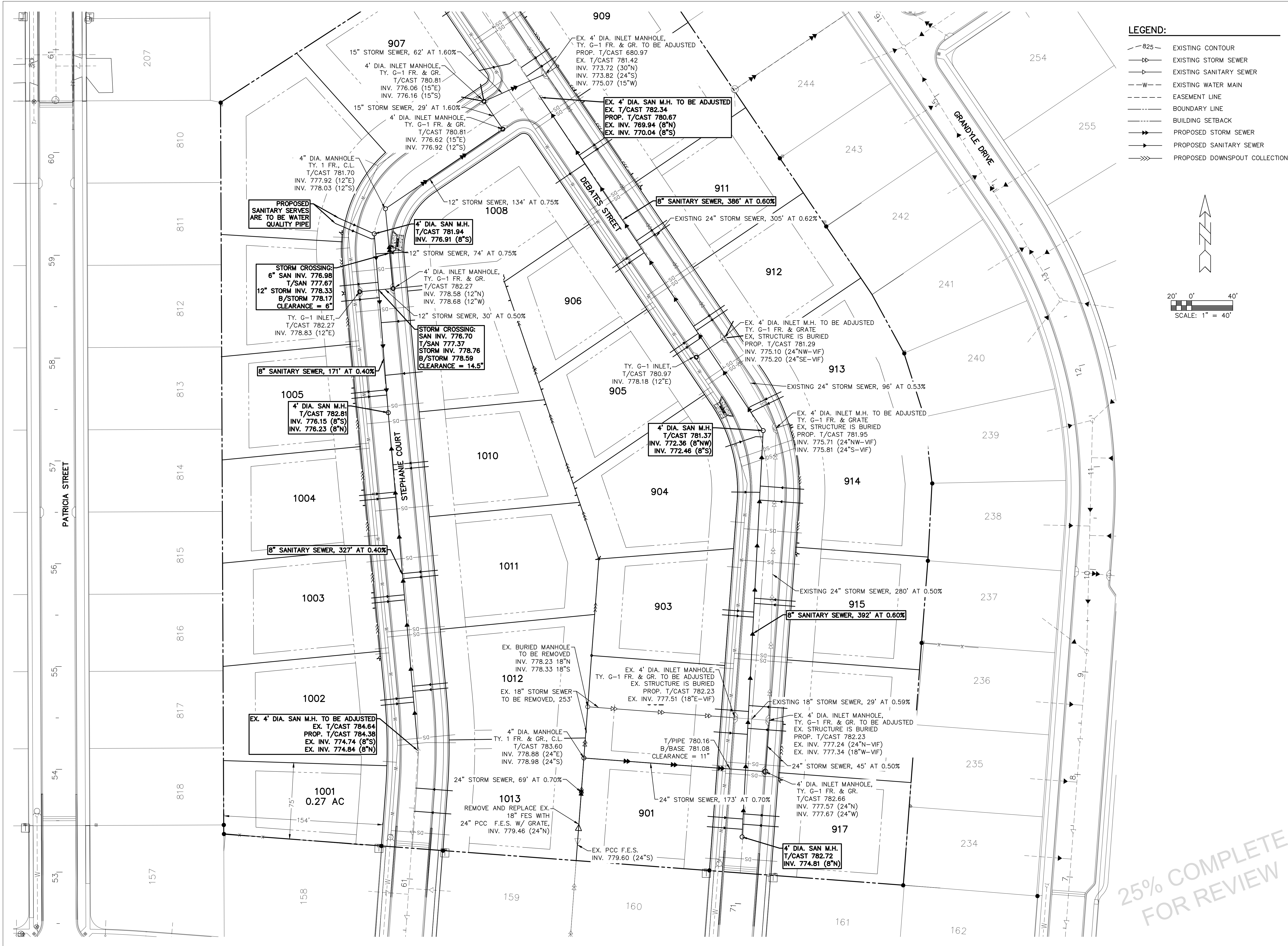
FOR REVIEW ONLY
NOT FOR CONSTRUCTION

PROFILES

PROJECT NO	XX-XX-XXX
DATE	03-24-2021
SURVEYED	DESIGNED
N/A	SML
DRAWN	APPROVED
SML	DLB

SHEET

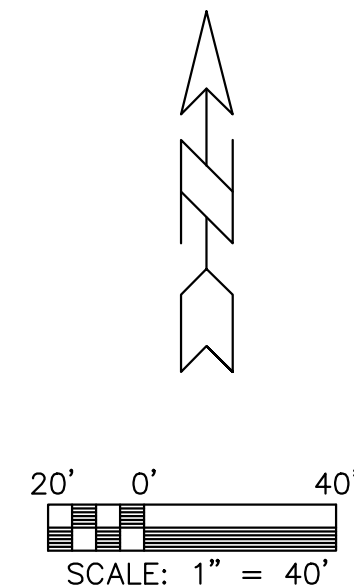




25% COMPLETE
FOR REVIEW

LEGEND:

- 825 EXISTING CONTOUR
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATER MAIN
- EASEMENT LINE
- BOUNDARY LINE
- BUILDING SETBACK
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED DOWNSPOUT COLLECTION



CONSTRUCTION PLANS

TRAILS EDGE SECTION 9 & 10

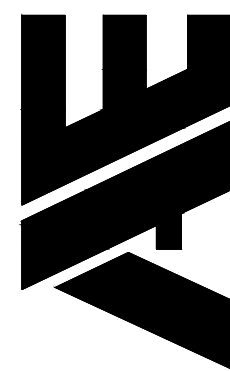
DEBATES ST. (SEC. 9) & STEPHANIE CT. (SEC. 10)
WASHINGTON, ILLINOIS 61571
CLIENT: TRAILS EDGE DEVELOPERS LLC

ISSUED	03-23-2021	25% COMPLETE SET
	03-24-2021	REVISED TYPICAL SECTION

FOR REVIEW ONLY
NOT FOR CONSTRUCTION

SANITARY AND STORM PLAN

PROJECT NO	XX-XX-XXX
DATE	03-24-2021
SURVEYED	DESIGNED
N/A	SML
DRAWN	APPROVED
SML	DLB
SHEET	





AUSTIN ENGINEERING CO., INC.

Consulting Engineers / Surveyors
Peoria, Illinois - Davenport, Iowa
austinengineeringcompany.com

April 9th, 2021
City of Washington
301 Walnut St.
Washington, IL 61571

Re: Trails Edge Sec. 9 100YR Flood Option Analysis

To City of Washington Committee of the Whole:

As requested by the Public Works Committee, included in this submission are all known options available to convey the 100YR flood in the proposed Trails Edge Section 9 development along with a 100YR Flood Analysis of the known problem areas throughout all Trails Edge Subdivision.

The options to convey the 100YR Flood being presented to the committee are as follows:

1. Modified Typical Section (proposed)
2. Reconstructing the existing storm sewer system
3. Constructing a detention basin
4. Increasing the size of the existing storm sewer stub from Grandyle Drive

The known problem areas investigated in the 100YR Flood Analysis are as follows:

1. Gillman Avenue
2. Rear yards on the North side of Kelsey Street between Grandyle Drive and Agnes Street

Sincerely,

Sam LaHood, E.I.

Option 1: Modified Typical Section

By using a combination of a 1% cross slope for the proposed road and 8" tall curb we are able to meet the 100YR flood requirements set forth by the City of Washington.

The current elevation difference between the north and south connection points of Debates Street is 1.75 feet and the proposed section is 970 feet long. This would result in a natural longitudinal slope of 0.18%.

The minimum longitudinal slope of a road is 0.5% and the proposed Debates Street extension is designed to minimize the depth of the 100YR puddles in the street profiling lower lows and lower highs as the street progress from south to north.

Utilizing the modified typical section allows us to use the existing storm sewer onsite and will require approximately 15 yards of extra concrete to build an 8" curb. It is estimated that this will increase the cost of the project by \$1,750.

Option 2: Reconstructing The Existing Storm Sewer System

A storm sewer system currently exists on this site and was constructed in 2008 to divert surface drainage away from the rear yards of homes built on the west side Grandyle Drive. This storm sewer was designed and constructed as to be used in the future Debates Street extension.

The majority of the existing 24"-to-30" diameter grouted RCP storm sewer is not constructed along the curb line. This portion would need to be removed and replaced with a storm sewer along the curb line.

The reconstruction of the existing storm sewer would allow us to place additional intermediate storm inlets and thus lower the depth of ponding in the street. The existing storm pipe is grouted RCP so we will not be able to salvage and reuse it as it will be destroyed by the removal. Most inlets will be able to be salvaged but will require modification as the depth and angle of the pipe at the curb line will change.

This reconstruction of the existing storm sewer would not increase the amount of storm water conveyed by the system as the pipe size that exists now has already been maximized at 30" diameter and the maximum height of water at the curb line will still remain 6" in accordance with Washington Code.

The estimated reconstruction costs for this option are as follows:

Removal of 406 feet of existing RCP storm sewer at \$30/ft =	\$13,180
Removing, salvaging and modifying of 4 storm structures at \$1,800 each =	\$ 7,200
Installation of 496 feet of new RCP storm sewer at \$40/ft =	\$19,840
Installation of 6 intermediate storm sewer inlets at \$3,400 each =	\$20,400
Total estimated additional cost =	\$61,250

Option 3: Constructing A Detention Basin

It is estimated that a total of 21 Acres drains to our site. Using the rational method, it is estimated a 320,000 CF detention basin would be required to store the 100YR flood with minimal release and approximately 225,000 CF detention basin would be required to store the 100YR flood event while releasing the 2YR event.

If we were to release the 25YR event the volume required to detain the 100YR storm would be approximately 150,000 CF.

The existing site is considerably flat, so the maximum achievable depth of water detained would be approximately 2.5 feet. The resultant estimated footprint of a detention basin that detains the 100YR storm event is detailed below:

- Store the 100YR with minimal release: 128,000 SF Footprint (approximately 10 100'x130' lots)
- Store the 100YR and release the 2YR: 90,000 SF Footprint (approximately 7 100'x130' lots)
- Store the 100YR and release the 25YR: 60,000 SF Footprint (approximately 5 100'x130' lots)

Since this area is the last section in Trails Edge to be developed the extra cut generated from constructing the detention basin would need to be hauled offsite. The historical costs that we have on file that this work would incur is \$12.00/CY and the resultant estimated costs of all three examples of this are listed below:

- 320,000 CF Detention = 11,852 CY of estimated excess fill costing \$142,222.00
- 225,000 CF Detention = 8,334 CY of estimated excess fill costing \$100,008.00
- 150,000 CF Detention = 5,556 CY of estimated excess fill costing \$66,667.00

There would also be an increase in relative cost for Phase 1 due to the loss of between 5 and 10 lots. Since Phase 1 currently has 17 lots proposed, the increase in relative cost is estimated below:

- Loss of 10 lots = a 143% relative cost increase
- Loss of 7 lots = a 70% relative cost increase
- Loss of 5 lots = a 41% relative cost increase

Option 4: Increasing Size of Existing Storm Sewer Stub from Grandyle Drive

An existing 18" storm sewer stubs into our site and drains to the northwest along the shared property line of Lots 244 and 245 of Trails Edge Section 6. This storm sewer then discharges into the Grandyle Drive storm sewer system.

There also exists a surface drainage easement and a storm sewer easement in this location that will allow us to remove this storm sewer and replace it with a large diameter storm sewer that would equalize the 100YR high water level across both Debates Street and Grandyle Drive. The existing curb inlet structure along Grandyle Drive would need to be replaced with a larger structure to allow a large diameter storm sewer to connect.

The existing homes located on Lot 244 and 245 have landscaped near this easement area. Any damages to this would need to be replaced as part of this option.

The estimated reconstruction costs for this option are as follows:

Removal of 135 feet of existing RCP storm sewer at \$30/ft =	\$ 4,050
Removal of 2 storm structures at \$600 each =	\$ 1,200
Installation of 265 feet of new large diameter RCP storm sewer at \$80/ft =	\$21,200
Installation of 4 large storm structures at \$4,000 each =	\$16,000
Removal and reinstallation of existing landscaping =	\$ 6,000
Total estimated additional cost =	\$48,450



DRAINAGE INVESTIGATION

TRAILS EDGE FLOOD ANALYSIS

TRAILS EDGE DRAINAGE INVESTIGATION
WASHINGTON, ILLINOIS 61571

ISSUED
04-08-2021 25% COMPLETE SET

FOR REVIEW ONLY
NOT FOR CONSTRUCTION

OPTIONS #2, #3
& #4 EXHIBIT

PROJECT NO.	XX-XX-XXX
DATE	04-08-2021
SURVEYED	DESIGNED
N/A	SML
DRAWN	APPROVED
SML	DLB

SHEET

AUSTIN ENGINEERING CO., INC.
Consulting Engineers / Surveyors
220 Emerson Place, Suite 101A
Davenport, Iowa 52801
Certificate No. CS131338

