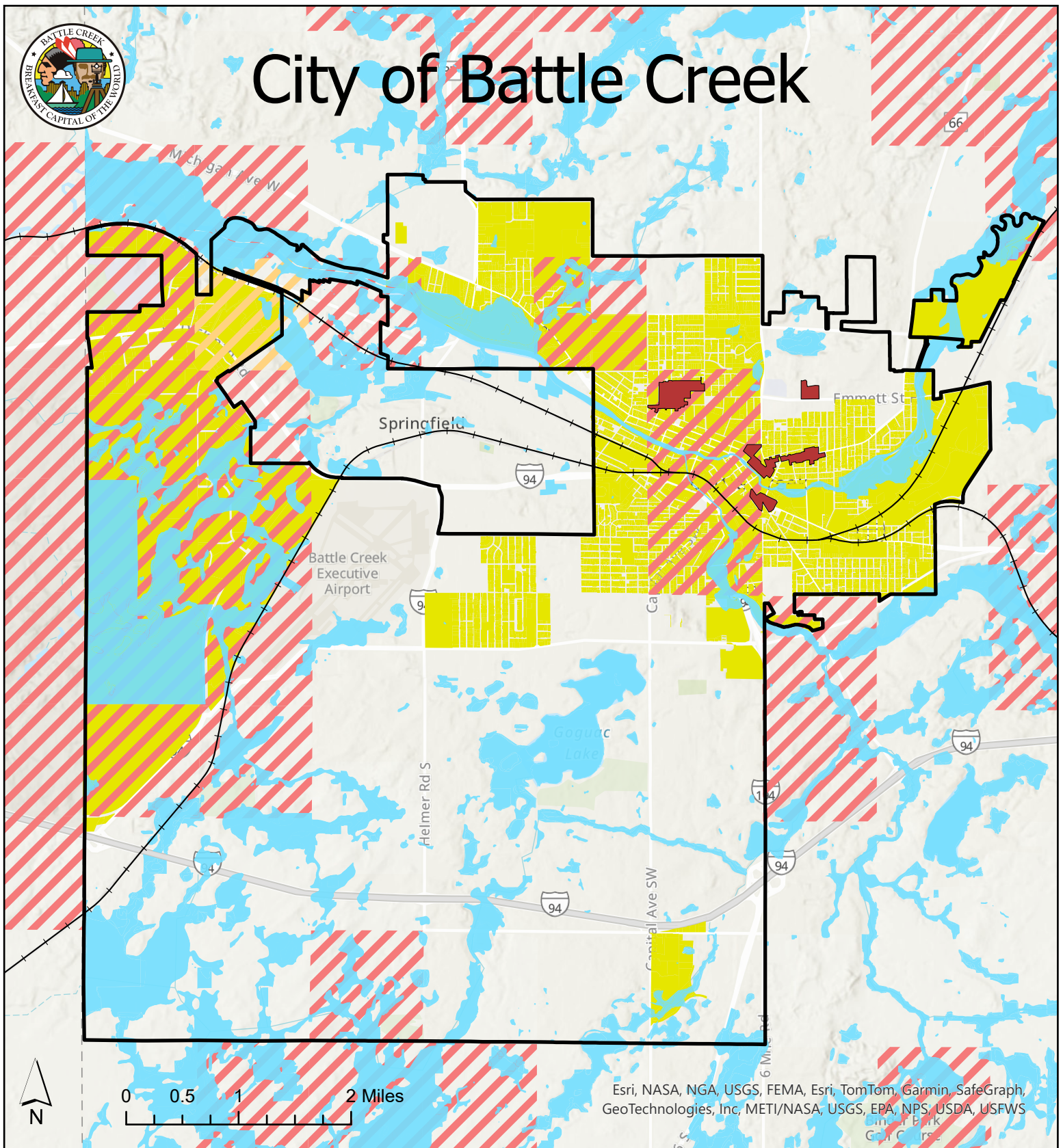




City of Battle Creek



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Biorarity Probability is designed to highlight those areas with known occurrences of rare species or high quality natural communities. The biological rarity index is designed to help prioritize the known occurrence areas for conservation.

Based on Michigan Natural Features Inventory (MNFI) database

- Railroads
 - ▭ Battle Creek
 - National Historic Areas
 - Wetlands
 - 2025 Low Moderate Income
- ### Biorarity Probability
- ▨ High
 - ▨ Moderate



RE: Michigan DOT Office of Rail Battle Creek Connection Track Project

From Hoensheid, Ryan <Ryan.Hoensheid@wsp.com>

Date Tue 9/8/2026 11:34 PM

To krtribbett@battlecreekmi.gov <krtribbett@battlecreekmi.gov>; Stephen Skalski <saskalski@battlecreekmi.gov>; Darren J. Campbell <DJCampbell@battlecreekmi.gov>; Tad J. McCrumb <tjmccrumb@battlecreekmi.gov>

Cc DLamaterJ@michigan.gov <dlamaterj@michigan.gov>

 2 attachments (17 MB)

212504_Bridge_V2.pdf; 212504_Rail_Road_V3.pdf;

Good evening Stephen, Tad, Darren, and Kurt,

Hope you all had a great Labor Day weekend. Just wanted to bump the below email up in our inboxes.

Does the City of Battle Creek have any concerns with issuing a conditional concurrence letter to the MDOT Office of Rail for the subject project?

Please let me know if you have any questions.

Regards,

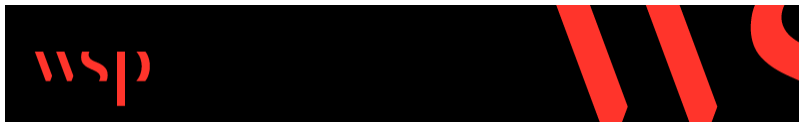
Ryan Hoensheid, PE*

Senior Project Manager

*Licensed in MI

T +1 517-886-7473

M +1 231-499-3795



From: Hoensheid, Ryan

Sent: Wednesday, September 2, 2026 2:43 PM

To: krtribbett@battlecreekmi.gov; Stephen Skalski <saskalski@battlecreekmi.gov>; Darren J. Campbell <djcampbell@battlecreekmi.gov>; Tad J. McCrumb <tjmccrumb@battlecreekmi.gov>

Cc: DLamaterJ@michigan.gov

Subject: Michigan DOT Office of Rail Battle Creek Connection Track Project

Good afternoon Stephen, Tad, Darren, and Kurt,

Hope this email finds you well. I know that it has been a while, but I wanted to circle back with this team regarding the Michigan DOT Office of Rail Battle Creek Connection Track Project. The Michigan DOT

Office of Rail has received conditional concurrence letters from Amtrak and CN on the proposed 30% preliminary engineering plans. On May 19, 2025, a Bluebeam review session was released to Amtrak, CN, and City of Battle Creek. All comments received were addressed and the attached revised plans were issued on November 6, 2025.

Between the issuance of the attached revised plans on November 6, 2025, and today, Michigan DOT Office of Rail has been in active discussion with Amtrak and CN regarding rail operations.

To close out the Federal Railroad Administration grant, a conditional concurrence letter from the City of Battle Creek is needed. If acceptable, would the City of Battle Creek be willing to issue a conditional concurrence letter for this project? Below is some sample language for your consideration.

- Date: MM DD, YYYY
- To: Mr. James L. D'Lamater, P.E.
Railroad Infrastructure Engineer – Manager
Michigan Department of Transportation
Office of Rail
P.O. BOX 30050, Lansing, MI 48909
Cell: 517-648-2194
Email: dlamaterj@michigan.gov
- Subject: Michigan DOT Office of Rail Battle Creek Connection Track Project, Battle Creek, MI
- Mr. D'Lamater,

The City of Battle Creek Engineering Division (City) has reviewed the 30% Engineering Plan documents received May 19, 2025, and has no further comment on the design as it currently stands today. If the information in the submittal changes, revised documents must be submitted to the City for review and approval. It is the City's understanding that this project may proceed to the 60% design. The City will issue further comments on the submission and acceptance of the 60% design package.

Sincerely,

[City of Battle Creek Engineering Division Signature]

Printed Name

Title

City of Battle Creek Engineering Division

If you have any questions, comments, or concerns please feel free to contact me.

Regards

Ryan Hoensheid, PE*

Senior Project Manager

*Licensed in MI

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Grand Trunk Drainage Study Engineering Report



Prepared for:
City of Battle Creek
March 20, 2023
DRAFT

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- Appendix 2 – Hydrologic & Hydraulic Modeling Results and Calculations
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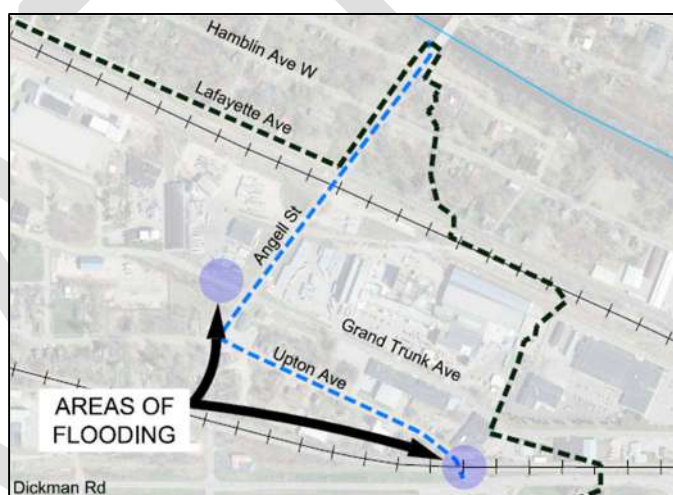
Survey Drawings

- CS – Cover Sheet
- C1 – Plan & Profile (Sta. 0+00 – 23+50)
- C2 – Plan & Profile (Sta. 23+50 – 36+00)

INTRODUCTION

Purpose of Study

Chronic flooding is affecting Grand Trunk Avenue near the Angell Street intersection, as well as Upton Avenue at Dickman Road in the City of Battle Creek. This area is serviced by an extensive drainage network consisting of storm sewer and open channels that ultimately outlet to the North Branch of the Kalamazoo River near the Angell Street bridge. The flooding events are flashy in nature, occurring during high intensity storm events and receding quickly thereafter. The City of Battle Creek (City) is concerned that the current storm sewer system does not have adequate capacity to service the contributing watershed.



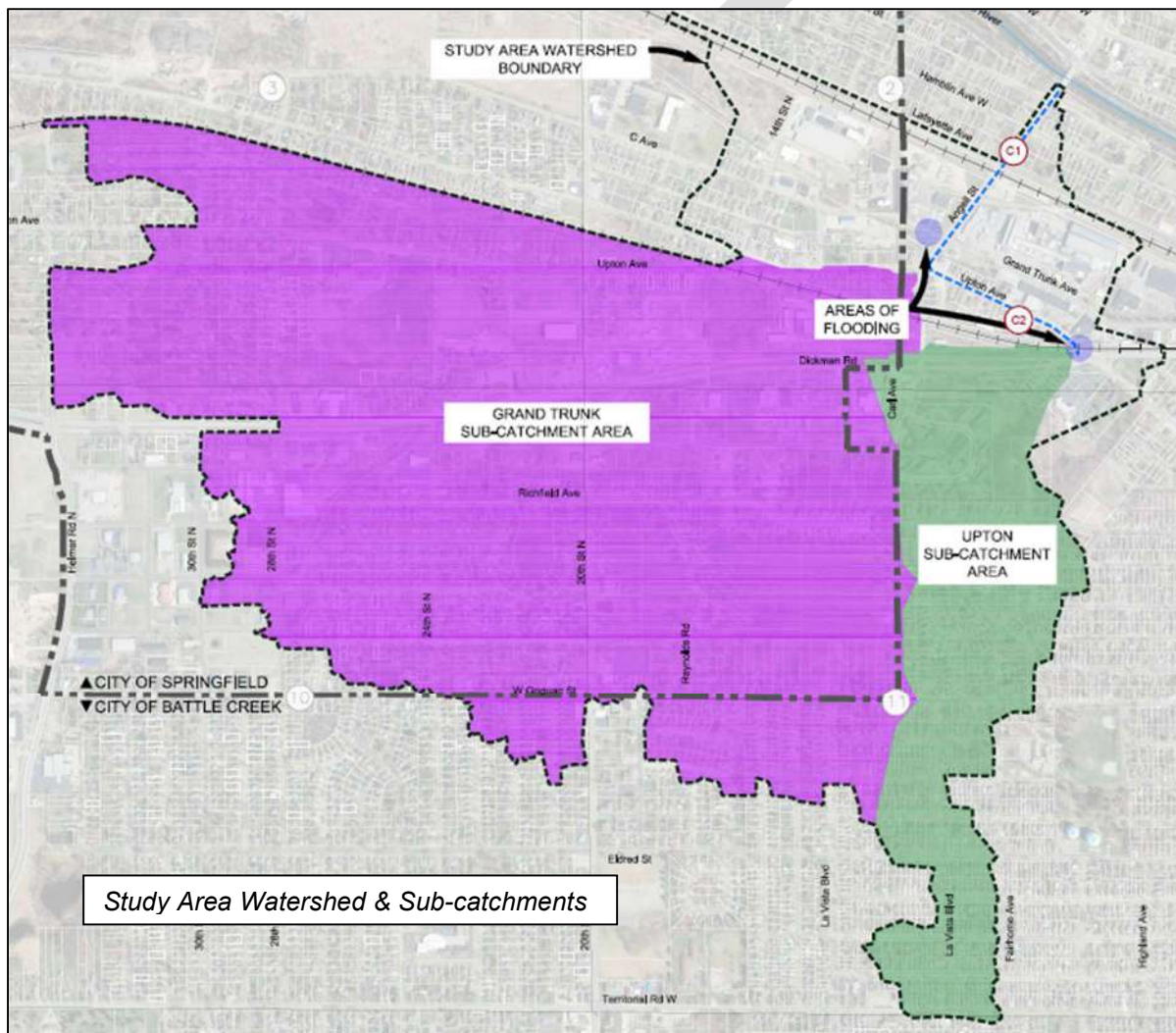
Land & Resource Engineering (LRE) was retained by the City in the Spring of 2022 to conduct an engineering study to further evaluate flooding issues and develop specific maintenance / improvement recommendations. The findings of our engineering study are presented in this report, including a brief summary of the history and existing condition of the storm sewer, hydrologic and hydraulic analysis results, an evaluation of alternatives, preliminary cost estimates, and recommendations.

Watershed Description

The study area watershed encompasses approximately 929 acres in the City of Battle Creek (282 acres) and the City of Springfield (647 acres) as shown on the *Cover Sheet* of the [Survey Drawings](#) and proceeding map. The watershed ultimately outlets to the North Branch of the Kalamazoo River. LRE subdivided the study area watershed into two major sub-catchments for analysis, which are referred to as the Grand Trunk and Upton as shown in the map below. The Grand Trunk sub-catchment consists of approximately 645 acres and the Upton sub-catchment consists of approximately 156 acres. Each of

these sub-catchments have storm sewer systems, which combine at the Upton Avenue and Angell Street intersection.

The land use is varied throughout the watershed. Generally, the upper reaches consist of approximately $\frac{1}{4}$ acre residential lots, while the downstream areas consist of larger commercial and industrial developments. There are also natural woods and grassed parks dispersed throughout the watershed. Soils consist of mostly sandy loam with varying infiltration rates (hydrologic soil group ratings of A, B, & D). The topography of the watershed gently slopes toward the river with some natural depressions as well as constructed detention / retention basins and swales.



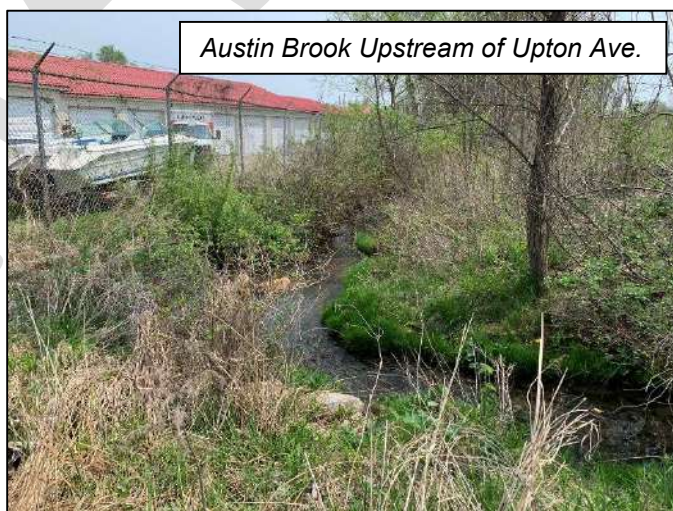
History

Many of the storm sewer systems within the study area watershed date back to the early 1900s. LRE conducted an in-depth review of as-built construction drawings, focused on the storm sewer systems within Grand Trunk Avenue, Upton Avenue, Dickman Road, and Angell Street.

Historically, the sewer system in this area contained sections of combined sanitary and storm sewer and combined sewer overflows. It appears that all the sewers have been separated; however, there are several locations where the storm and sanitary sewers conflict. One location is on Upton Avenue at Ada Street, where the sanitary sewer runs perpendicular through a storm sewer manhole near the invert elevation of the pipes. This is shown in an undated *As-Built Plan by the Battle Creek Department of Public Works*, included in [Appendix 3](#). Another location is along Angell Street at Parish Street, where the storm sewer intersects the 54-inch diameter sanitary interceptor, thus reducing the capacity of the storm sewer. This is shown in *Construction Plans by Fuller & McClintock dated March 1927*, included in [Appendix 3](#). These issues and all other sanitary-storm sewer conflicts may not have a significant impact on the capacity of the storm sewer, but they should be considered from a constructability and environmental standpoint when evaluating final alternatives.

The intersection of Dickman Road and Upton Avenue is plagued by frequent flooding. *MDOT As-Built Construction Plans from 1963* show the newly constructed 36-inch diameter storm sewer along Dickman Road tying into the existing Upton Avenue storm sewer system, which is shown as 36-inch diameter. However, field survey measurements taken by City of Battle Creek staff indicate that the outlet pipe from the Dickman Road and Upton Avenue storm sewer connection has only a 24-inch diameter, which creates a potential pinch point in the storm sewer system. *As-Built Plans of the Dickman Road and Upton Avenue intersection* are included in [Appendix 3](#).

Another key location with some historical significance is the area along Grand Trunk Avenue about 300 feet west of the intersection with Angell Street. An Improvement Plan from the Battle Creek Department of Public Works from October 1962 shows that the 48-inch diameter storm sewer at this location was already in-place with the upstream inlet at Upton Avenue. Also, the contributing open channel tributary at this location is labeled as



Austin Brook Upstream of Upton Ave.

“Austin Brook”, meaning that this was likely an open channel waterway at some point that has been mostly forgotten (enclosed) due to development in the area. Furthermore, an *Improvement Plan from the Engineering Department of Battle Creek dated January 1990* indicates that Conrail Railroad crushed and filled the historic 36-inch storm sewer that served as the outlet for the 48-inch storm sewer to the open channel downstream of the railroad (Lafayette Ave.). This plan outlines a proposed 54-inch diameter storm sewer to

cross the railroad and follow the existing open channel alignment, eventually discharging into the North Branch of the Kalamazoo River. However, this project was never completed. Lastly, a *Civil Demolition Plan* by Driesenga & Associates dated May 2014 shows the historic 48-inch diameter storm sewer to be removed directly north of Grand Trunk Avenue. The result of these removals now force the runoff from the entire Grand Trunk sub-catchment through the 24-inch diameter storm sewer along Grand Trunk Avenue to the east, connecting to Angell Street. This combined the contributing drainage area from the Grand Trunk and Upton sub-catchments without upsizing the downstream infrastructure to handle the increased flow. *As-Built Plans* are included in [Appendix 3](#).

Additionally, the drainage area was analyzed as part of a 2018 Stormwater, Asset Management, and Wastewater (SAW) Program. The analyzed drainage area in the SAW plan is approximately 320 acres, as shown in the map on the right. However, this area only accounts for the Upton sub-catchment and the downstream area; it neglects the Grand Trunk sub-catchment to the west. Therefore, this study does not include a large portion of the runoff impacting the flooded sections of storm sewer. An XP-Storm Water Management Model (SWMM) of the drainage area was developed as part of the SAW grant. The model revealed that the current storm sewer system has only a 2-year level of service near the intersections of concern, beyond which surcharging of the storm sewer system and inundation of the roadways would be expected. The study concluded that the existing storm sewer trunkline is undersized for the drainage area, even without the additional drainage area from the Grand Trunk sub-catchment that was not accounted for.



FIELD RECONNAISSANCE & EXISTING SYSTEM ANALYSIS

LRE conducted two field reconnaissance trips, on May 11, 2022 and August 22, 2022. In addition, City of Battle Creek staff conducted survey investigations of the storm sewer. **Survey Drawings** of the storm sewer from the Dickman Road and Upton Avenue intersection to the outlet at the North Branch of the Kalamazoo River are enclosed. These survey drawings are based on as-builts, City of Battle Creek GIS data, and survey measurements from the City of Battle Creek staff. Below is a summary of problem areas for each sub-catchment.

Upton Sub-Catchment

One potential issue observed in the Upton sub-catchment is that the pipe connecting the 36-inch diameter storm sewer along Dickman Road to the 36-inch storm sewer along Upton Avenue is only 24-inches in diameter. This likely contributes to the flooding at this location by backing up flow and not allowing the rest of the sewer to function to its full capacity. Additionally, the manhole rim at this intersection is at the same elevation as the downstream manhole at the intersection of Angell Street and Grand Trunk Avenue (approximately 1,800 feet further downstream). This is where the Grand Trunk sub-catchment converges with the Upton sub-catchment, meaning that the low point at the Dickman Road and Upton Avenue intersection will be the one of first places to surcharge (flood) in the system, which correlates with observations by the City of Battle Creek.

Grand Trunk Sub-Catchment

Another potential issue is the lack of adequate outlet for the Grand Trunk sub-catchment. As documented in the History section of the report, the 48-inch diameter storm sewer, which runs west of and parallel to Angell Street no longer has a direct outlet to the North Branch of Kalamazoo River. Instead, there are two storm sewer routes, both of which are undersized, that divert stormwater runoff from the Grand Trunk sub-catchment to the receiving storm sewer under Angell Street. The first route is a 21-inch diameter storm sewer that flows east along Upton Avenue and intersects the main line at the Upton Avenue and Angell Street intersection. Similarly, the second route is a 24-inch diameter storm sewer that flows east along Grand Trunk Avenue and intersects the main line at the Grand Trunk Avenue and Angell Street intersection. The combination of these two smaller storm sewers still has significantly less capacity than the upstream 48-inch diameter storm sewer and likely contribute to the reported flooding near the Grand Trunk Avenue and Angell Street intersection.

Downstream Sub-Catchment

Downstream of the convergence of the Grand Trunk and Upton sub-catchments, the mainline storm sewer along Angell Street consists of a 36-inch block storm sewer that increases to a 42-inch block storm sewer near Lafayette Avenue. This storm sewer is likely undersized to handle the flows from both sub-catchments, which are conveyed via 48-inch and 36-inch diameter storm sewers respectively. This pinch point likely causes flooding at the intersections of Angell Street with Grand Trunk Avenue and Upton Avenue. In addition, the storm sewer likely surcharges causing flooding further upstream near the intersection of Upton Avenue and Dickman Road.

HYDROLOGIC AND HYDRAULIC ANALYSIS

A hydrologic and hydraulic analysis was performed to evaluate existing conditions as well as proposed conveyance improvement alternatives to alleviate flooding in several key intersections and allow the storm sewer system to function properly. Data from our hydrologic and hydraulic analysis are provided in [Appendix 2](#).

The study area was broken down into three sub-catchments for hydrologic analysis purposes, specifically the Grand Trunk, Upton and Combined (downstream) sub-catchments. Peak discharges at critical design locations for a range of 24-hour rainfall events including the 1-, 2-, 5-, 10-, 25-, 50- and 100-year storm (100%, 50%, 20%, 10%, 4%, 2% and 1% return frequencies) were calculated using the SCS UD-21 Hydrologic Method as described in *Computing Flood Discharges for Small Ungaged Watersheds*¹. Rainfall data was obtained from the NOAA Atlas 14 Precipitation Frequency Server. Calculations are provided in [Appendix 2](#) and a summary of the results are provided below in [Table 1](#).

Table 1. Peak Discharges for the Study Area Watershed

Location	Drainage Area (Acres)	Peak Discharge Rate (cfs)					
		Return Period and 24-Hour Precipitation Depth					
		2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
		2.54 inches	3.06 inches	3.56 inches	4.32 inches	4.98 inches	5.7 inches
Upton	156	44	59	76	102	132	166
Grand Trunk	645	74	104	136	194	249	313
Combined	929	93	129	167	229	300	378

cfs-cubic feet per second

¹ Sorrell, Richard C. (2010, June 22). *Computing Flood Discharges for Small Ungaged Watersheds*. Michigan Department of Environmental Quality, Water Resources Division.

To better analyze flow dynamics, LRE developed a hydraulic model of the study area watershed using Storm Water Management Model (SWMM) computer software developed by the United States Environmental Protection Agency (EPA). EPA SWMM is a dynamic rainfall-runoff simulation model used for simulation of runoff quantity from primarily urban areas. It also has a routing capability which transports the runoff through a system of pipes, channels, and storage devices as necessary. The results include water surface elevation, pipe flow velocities, structure flood time, among other variables, and can be presented in graphical or tabular format. The SWMM model was especially helpful for this project as it allowed us to accurately model the interwoven storm sewer network while accounting for the different time of concentrations of the contributing sub-catchments. Modeling efforts were focused on the 2-, 5-, and 10-year storms as these are a realistic level-of-service for this system when considering cost-effective improvements.

Existing Conditions: For the two-year storm event (50% return frequency), the model shows that the existing system has significant flooding issues. Specific locations of flooding include the Dickman Road and Upton Avenue intersection, a low-point in Upton Avenue approximately 1,000 feet downstream of the aforementioned intersection, a low-point in Grand Trunk Avenue just upstream (west) of the Grand Trunk Avenue and Angell Street intersection, and a low-point at the intersection of Angell Street and Hamblin Avenue. Additionally, the model indicates the potential for surcharging of the Angell Street storm sewer, downstream of the intersection with Grand Trunk Avenue, which would cause stormwater to flow down Angell Street. For the 5- and 10-year storms (20% and 10% return frequencies), all the previously described flooding issues are further exacerbated, with higher flooding elevations, longer durations of flooding, and more flow surcharging to the road.

Proposed Conditions: Our goal was to develop proposed storm sewer system improvement alternatives that could convey at a minimum the 2-year storm and up to a 10-year storm. While hydraulically possible, the conveyance of larger storm events would not be cost-effective or fiscally viable. The proposed measures include strategic pipe upsizing in key areas, upsizing the entire system under Angell Street downstream of Grand Trunk Avenue, and/or separating the Grand Trunk sub-catchment by constructing a new system along the historic drainage alignment parallel to Angell Street either by storm sewer or an open channel with culverts. The evaluated improvements are described in the five alternatives presented below, which include preliminary cost estimates, and levels of conveyance.

EVALUATION OF ALTERNATIVES

Numerous alternatives were evaluated to provide conveyance for the 2-, 5-, or 10-year storm events and reduce flooding along Grand Trunk Avenue, Upton Avenue and Angell Street. Following are the five alternatives that we evaluated in detail. Tables 2 and 3 at the end of this section provide a summary of the hydraulic capacity and cost estimates for each alternative.

Alternative 1A – New Enclosed Drain

Alternative 1A consists of extending the 48-inch diameter storm sewer from Grand Trunk Avenue approximately 1,800 linear feet northeast to outlet at the North Branch of the Kalamazoo River. The alignment would approximately follow the historic storm sewer and open channel west of Angell Street. [Figure 1](#) provides a conceptual schematic of the proposed alignment and improvements associated with Alternative 1A. Below is a list of major elements included in Alternative 1A.

- **Grand Trunk Storm Sewer Improvements:** Approximately 1,800 linear feet of 48-inch diameter storm sewer with eight drainage structures are proposed. The railroad crossing will likely need to be installed via bore and jack. There are also three road crossings and a parking lot that will need to be restored as well. The proposed alignment is located within existing road right-of-way, City owned property, or Calhoun County Land Bank Authority property except 200 Grand Trunk Ave., 170 Angell St., and parcel number 9280-00-003.0 along Lafayette Ave.
- **Upton Avenue Storm Sewer Replacement:** The undersized 24-inch diameter storm sewer at the Dickman Road and Upton Avenue intersection will be replaced with a 36-inch diameter pipe. Restoration of the roadway intersection will be required as well.

Hydraulic Capacity: The improvements associated with Alternative 1A will significantly increase the hydraulic capacity of the storm sewer system. The improved system will be able to convey the 2-year storm event with no surcharge or ponding. In addition, the number of surcharge locations and ponding duration in these locations will be reduced by roughly 50% during the 5- and 10-year storm events. EPA SWMM profiles showing the water surface elevation at the peak discharge are provided in [Appendix 2](#).

Estimated Project Cost: The preliminary estimate of probable cost to implement the improvements associated with Alternative 1A is approximately \$1,570,000. Please note that this estimated cost does not include administrative, land/easement acquisition or financing costs. A detailed project cost breakdown is provided in [Appendix 1](#).

Alternative 1B – New Enclosed Drain / Open Channel

Alternative 1B consists of extending the 48-inch diameter storm sewer from Grand Trunk Avenue to the north side of Lafayette Avenue, then re-constructing the open channel to the North Branch of the Kalamazoo River. The alignment would approximately follow the historic storm sewer and open channel west of Angell Street. [Figure 2](#) provides a conceptual schematic of the proposed alignment and improvements associated with Alternative 1B. Major differences from Alternative 1A include the following:

- Grand Trunk Storm Sewer Improvements:** Approximately 860 linear feet of 48" storm sewer with four new drainage structures are proposed upstream (south) of Lafayette Avenue. The railroad crossing will likely need to be installed via bore and jack. From Lafayette Avenue to the outlet at the river, approximately 760 linear feet of open channel will be re-constructed or cleaned out as necessary along with culverts at two road crossings. The proposed alignment is located within existing road right-of-way, City owned property, or Calhoun County Land Bank Authority property except 200 Grand Trunk Ave., 170 Angell St., and parcel number 9280-00-003.0 along Lafayette Ave.
 
- Upton Avenue Storm Sewer Replacement:** This improvement consists of replacing the one section of undersized storm sewer along Upton Avenue as previously described.

Hydraulic Capacity: Alternative 1B was deemed to be similar enough to Alternative 1A to not warrant additional modeling. It would likely have slightly greater hydraulic capacity due to the larger cross-section through the open channel as well as the opportunity for infiltration.

Estimated Project Cost: The preliminary estimate of probable cost to implement the improvements associated with Alternative 1B is approximately \$1,280,000. Please note that this estimated cost does not include administrative, land/easement acquisition or financing costs. A detailed project cost breakdown is provided in [Appendix 1](#).

Alternative 1C – New Enclosed Drain / Open Channel Alternate

Alternative 1C consists of extending the 48-inch diameter storm sewer from Grand Trunk Avenue to the north side of the railroad along an alternate alignment, then constructing an open channel to the North Branch of the Kalamazoo River. **Figure 3** provides a conceptual schematic of the proposed alignment and improvements associated with Alternative 1C. Major differences from previous alternatives include the following.

- Grand Trunk Storm Sewer Improvements:** Approximately 1,000 linear feet of 48-inch diameter storm sewer with four new drainage structures are proposed upstream (south) of Lafayette Avenue. The railroad crossing will likely need to be installed via bore and jack. Open channel will be constructed along the north railroad ROW, then would cross Lafayette Avenue and join the existing open channel, which be re-constructed or cleaned-out as necessary. In addition, three road crossings culverts will be required. The proposed alignment is located within existing road right-of-way, City owned property, or Calhoun County Land Bank Authority property except parcel number 9280-00-003.0 along Lafayette Ave, which would require an easement.
- Upton Avenue Storm Sewer Replacement:** This improvement consists of replacing the one section of undersized storm sewer along Upton Avenue as previously described.

Hydraulic Capacity: Alternative 1C was deemed to be similar enough to Alternative 1A to not warrant additional modeling. It would likely have slightly greater hydraulic capacity due to the larger cross-section through the open channel as well as the opportunity for infiltration.

Estimated Project Cost: The preliminary estimate of probable cost to implement the improvements associated with Alternative 1C is approximately \$1,360,000. Please note that this estimated cost does not include administrative, land/easement acquisition or financing costs. A detailed project cost breakdown is provided in **Appendix 1**.



Alternative 1C Storm Sewer Alignment

Alternative 2 – Angell Concrete Box

Alternative 2 consists of upsizing the storm sewer along Angell Street from the junction of the Grand Trunk and Upton systems to the North Branch of the Kalamazoo River as well as replacing undersized sections of storm sewer as shown in [Figure 4](#). Major differences from previous alternatives include the following.

- Angell Street Storm Sewer Replacement:** Approximately 1,600 linear feet of 8-foot x 4-foot concrete box with 12 new structures and 15 inlet connections from the Grand Trunk Avenue and Angell Street intersection to the North Branch of the Kalamazoo River. There is a section of railroad that would need to be crossed, which will make construction difficult. Based on the as-built review, it appears that there is currently room for the proposed box culvert along the existing alignment; however, there will likely be some conflict, especially with sanitary sewer laterals. Also, the existing storm sewer intersects and partially obstructs the sanitary interceptor at Parrish Street, which will still be a conflict for this new storm sewer as well. The proposed improvements will require the replacement of at least a portion of the roadway.
- Grand Trunk Avenue Storm Sewer Replacement:** This improvement consists of approximately 360 linear feet of 48-inch diameter storm sewer between the existing 48-inch diameter storm sewer and Angell Street, where there is currently a 24-inch diameter storm sewer. At least one new drainage structure and road restoration will also be required.
- Upton Avenue Storm Sewer Replacement:** This improvement consists of replacing the one section of undersized storm sewer along Upton Avenue as previously described. The proposed improvements will require the replacement of at least a portion of the roadway.

Hydraulic Capacity: These improvements result in even greater hydraulic capacity than Alternative 1. The 2-year storm event has no flooding, while the 5- and 10-year storm events only cause flooding in one location, at the intersection of Dickman Road and Upton Avenue. The duration of ponding is about one third of the existing condition. SWMM profiles showing the water surface elevation at the peak discharge are provided in [Appendix 2](#).

Estimated Project Cost: The preliminary estimate of probable cost to implement the improvements associated with Alternative 2 is approximately \$4,910,000. Please note that this estimated cost does not include administrative, land/easement acquisition or financing costs. A detailed project cost breakdown is provided in [Appendix 1](#).

Alternative 3 – Angell Concrete Box and Upton Upsizing

Alternative 3 consists of upsizing the entire stretch of storm sewer along Upton Avenue and Angell Street from Dickman Road to the North Branch of the Kalamazoo River as well as a section along Grand Trunk Avenue as shown in [Figure 5](#). Below is a list of major elements included in Alternative 3.

- **Angell Street Storm Sewer Replacement:** This alternative consists of replacing the Angell Street storm sewer with concrete box as previously described in Alternative 2.
- **Upton Avenue Storm Sewer Replacement:** Approximately, 1,950 linear feet of existing 36-inch diameter storm sewer along Upton Avenue, between Angell Street and Dickman Road, will be upsized to 48-inch diameter. In addition, 12 drainage structures and 16 inlet connections will be replaced. The proposed improvements will require the replacement of at least a portion of the roadway.
- **Grand Trunk Avenue Storm Sewer Replacement:** This alternative consists of replacing undersized storm sewer along Grand Trunk Avenue as previously described in Alternative 2.

Hydraulic Capacity: These improvements have the greatest hydraulic capacity of the evaluated alternatives, with no ponding during the 2- and 5- year storm events, and the 10-year storm event causing flooding in only one manhole for approximately one hour (less than one tenth of the duration of flooding compared to existing condition). SWMM profiles showing the water surface elevation at the peak discharge are provided in [Appendix 2](#).

Estimated Project Cost: The preliminary estimate of probable cost to implement the improvements associated with Alternative 3 is approximately \$7,350,000. Please note that this estimated cost does not include administrative, land/easement acquisition or financing costs. A detailed project cost breakdown is provided in [Appendix 1](#).

Table 2. Alternative Flooding Comparison

		2-year				5-year				10-year			
	Sub-catchment	Existing	Alt. 1	Alt. 2	Alt. 3	Existing	Alt. 1	Alt. 2	Alt. 3	Existing	Alt. 1	Alt. 2	Alt. 3
Points of Flooding	Upton (East)	15	0	0	0	17	3	3	0	19	3	3	1
	Grand Trunk (West)	14	0	0	0	15	4	0	0	15	8	0	0
Max Duration of Flood (hrs)	Upton (East)	11.33	0	0	0	13.68	4.67	4.3	0	14.93	6.75	6.17	1.25
	Grand Trunk (West)	13.54	0	0	0	15.38	6.67	0	0	16.74	9.71	0	0

Table 3. Level of Service and Cost Estimate Summary

Grand Trunk Drainage Study - Table 2							
	Sub-catchment	Existing	Alternative 1A	Alternative 1B	Alternative 1C	Alternative 2	Alternative 3
Level of Service	Upton (East)	< 2-year	2-year	2-year	2-year	2-year	10-year +/-
	Grand Trunk (West)	< 2-year	2-year	2-year	2-year	10-year	10-year
Cost Estimate	-	-	\$1,570,000	\$1,280,000	\$1,360,000	\$4,910,000	\$7,350,000

RECOMMENDATIONS & IMPLEMENTATION

We tentatively recommend proceeding with Alternative 1B as the most cost-effective way to alleviate flooding in the study area watershed. LRE will work with the City to develop a final project scope, should the City decide to move forward with a project. Implementation of the recommended scope of improvements to the storm sewer system, as presented in this report, requires consideration of the following:

Easement/Land Acquisition: The majority of the proposed improvements will be made within existing road right-of-way or property owned by the City. Several properties are owned by the Calhoun County Land Bank Authority, but it is assumed that easement acquisition will not be an issue for these properties. However, easements will likely be required through the privately owned properties at 200 Grand Trunk Ave., 170 Angell St., and parcel number 9280-00-003.0 along Lafayette Ave. The first two properties are owned by Reconservé of Michigan Inc., and an easement would be required through the existing parking lot that spans both properties. If easement acquisition becomes an issue, Alternative 1C could be considered. The last property is a vacant parcel owned by an individual. Either an easement or the land itself will have to be acquired for any property not owned by the City.

Permitting: The proposed Drain extension may require an Environment Great Lakes and Energy permit pursuant to Part 301, Inland Lakes and Streams, and/or Part 303, Wetlands Protection, of the Natural Resources and Environmental Protection Act, PA 451 of 1994 (NREPA) for work within the historic open channel drainage way and outlet to the North Branch of the Kalamazoo River.

Funding: If the project is found necessary, LRE will work with the City to develop a project funding and apportionment strategy. We will provide a breakdown of contributing drainage area by jurisdiction that may be used for cost apportionment discussion with the City of Springfield and MDOT. LRE reached out to the MDOT hydraulics unit, and they have verbally committed to forming a cost-share agreement. An additional option may be to petition the Calhoun County Water Resources Commissioner to establish a county drain over the City storm sewer (pursuant to either Chapter 4 or 20 of the Michigan Drain Code). This would provide the City with a mechanism to fund the project and assess other municipalities including Springfield and MDOT.

Figures

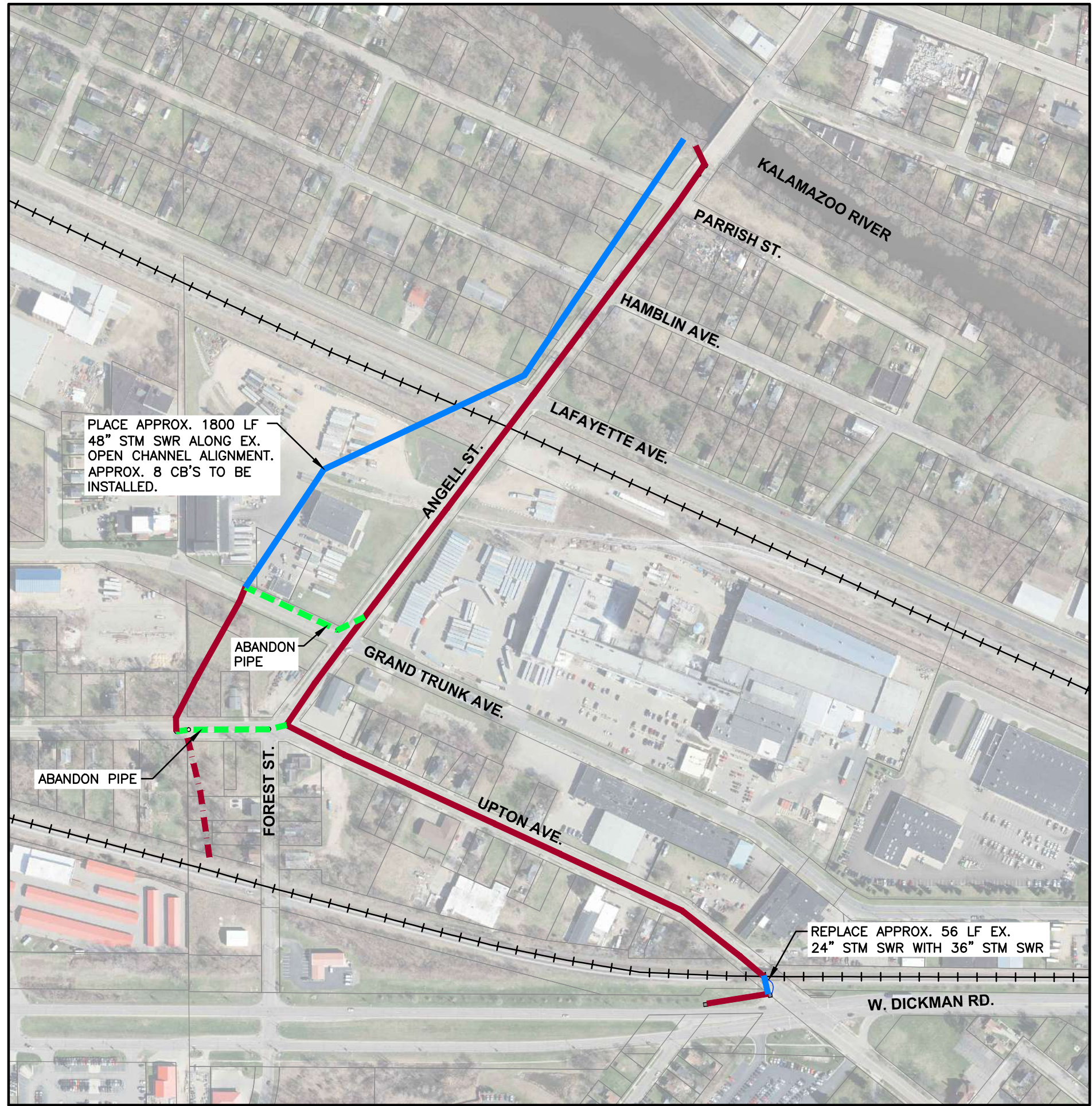


2121 3 Mile Rd.

Walker, Michigan 49544

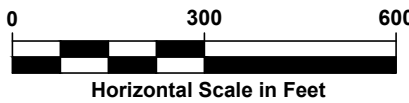
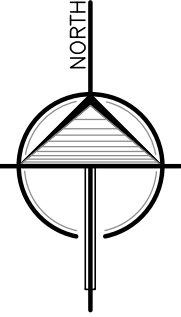
Phone: 616.301.7888

www.LREMI.com



LEGEND

- EXISTING STORM SEWER
- EXISTING OPEN CHANNEL
- PROPOSED STORM SEWER
- EXISTING STORM SEWER TO BE ABANDONED



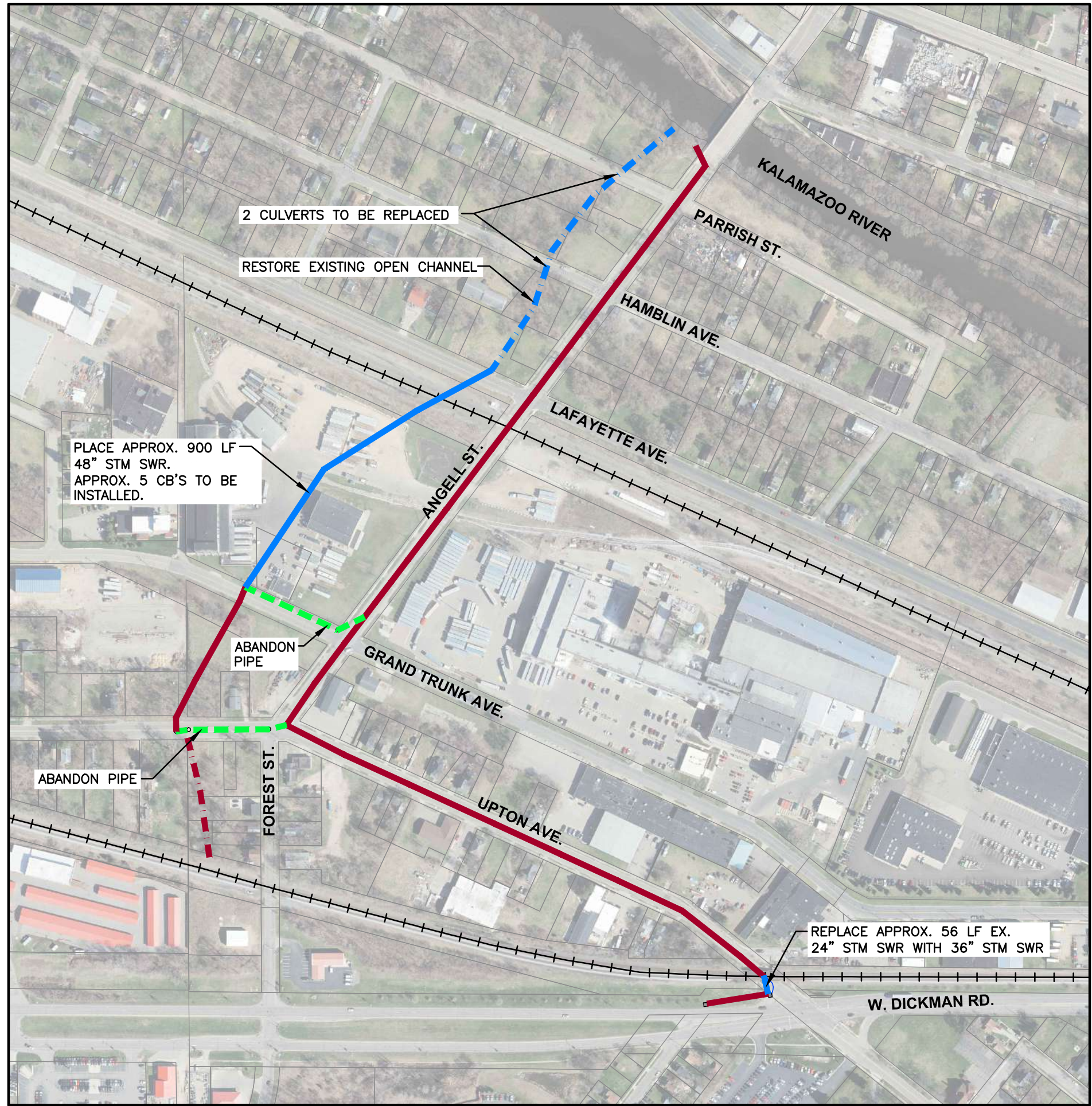
PLAN VIEW

ALTERNATIVE 1A	
PROJECT NUMBER: 22-072	DATE: 3/20/2023
DESIGNED BY: RJB	FIGURE 1
DRAFTED BY: NDJ	



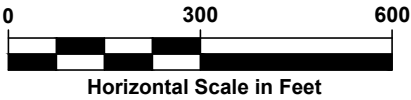
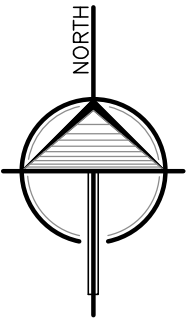
ENGINEERS & SURVEYORS

2121 3 Mile Rd. NW
Walker, MI 49544
Ph: 616-301-7888
www.LREMI.com



LEGEND

- EXISTING STORM SEWER
- EXISTING OPEN CHANNEL
- PROPOSED STORM SEWER
- PROPOSED OPEN CHANNEL DRAIN
- EXISTING STORM SEWER TO BE ABANDONED

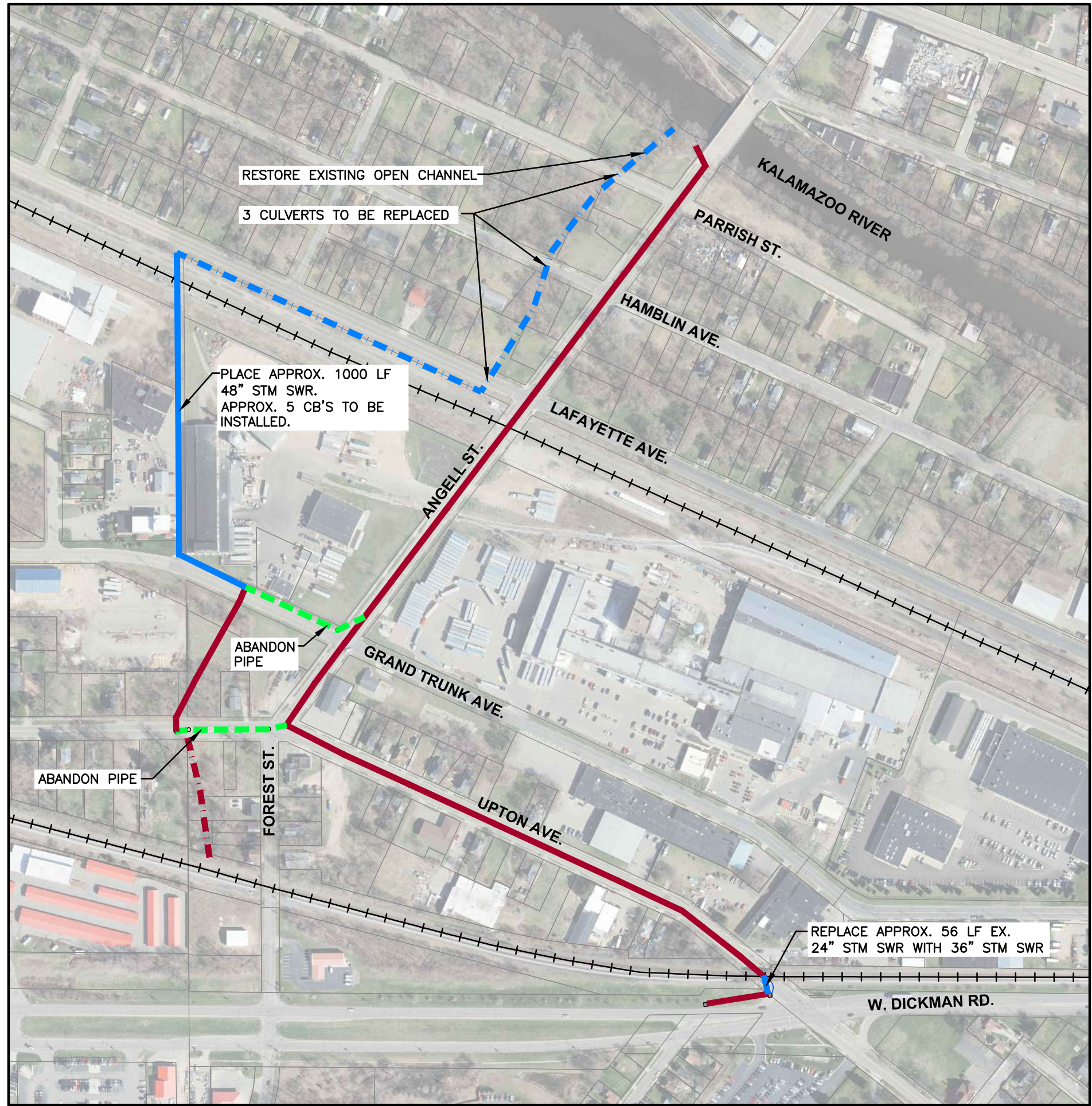


PLAN VIEW

ALTERNATIVE 1B	
PROJECT NUMBER: 22-072	DATE: 3/20/2023
DESIGNED BY: RJB	FIGURE 2
DRAFTED BY: NDJ	

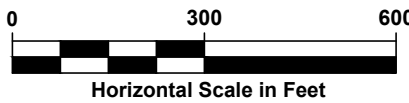
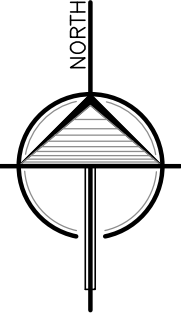


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LEGEND

-  EXISTING STORM SEWER
-  EXISTING OPEN CHANNEL
-  PROPOSED STORM SEWER
-  PROPOSED OPEN CHANNEL DRAIN
-  EXISTING STORM SEWER TO BE ABANDONED



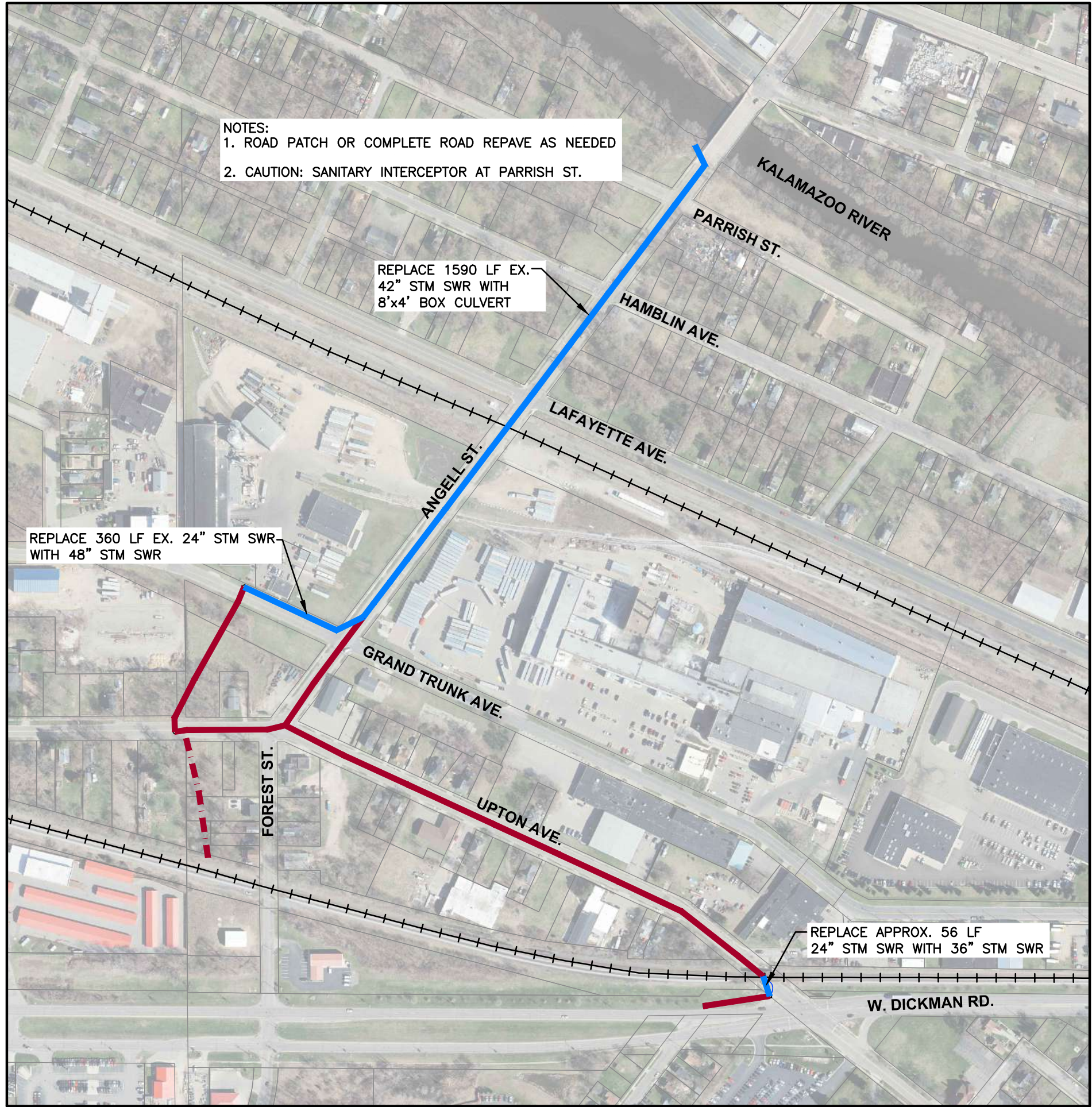
PLAN VIEW

ALTERNATIVE 1C	
PROJECT NUMBER: 22-072	DATE: 3/20/2023
DESIGNED BY: RJB	FIGURE 3
DRAFTED BY: NDJ	



ENGINEERS & SURVEYORS

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Walker, MI 49544
Ph: 616-301-7888
www.LREMI.com



NOTES:
1. ROAD PATCH OR COMPLETE ROAD REPAVE AS NEEDED
2. CAUTION: SANITARY INTERCEPTOR AT PARRISH ST.

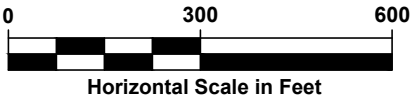
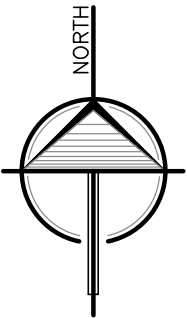
REPLACE 1590 LF EX.
42" STM SWR WITH
8'x4' BOX CULVERT

REPLACE 360 LF EX. 24" STM SWR
WITH 48" STM SWR

REPLACE APPROX. 56 LF
24" STM SWR WITH 36" STM SWR

LEGEND

- EXISTING STORM SEWER
- EXISTING OPEN CHANNEL
- PROPOSED STORM SEWER

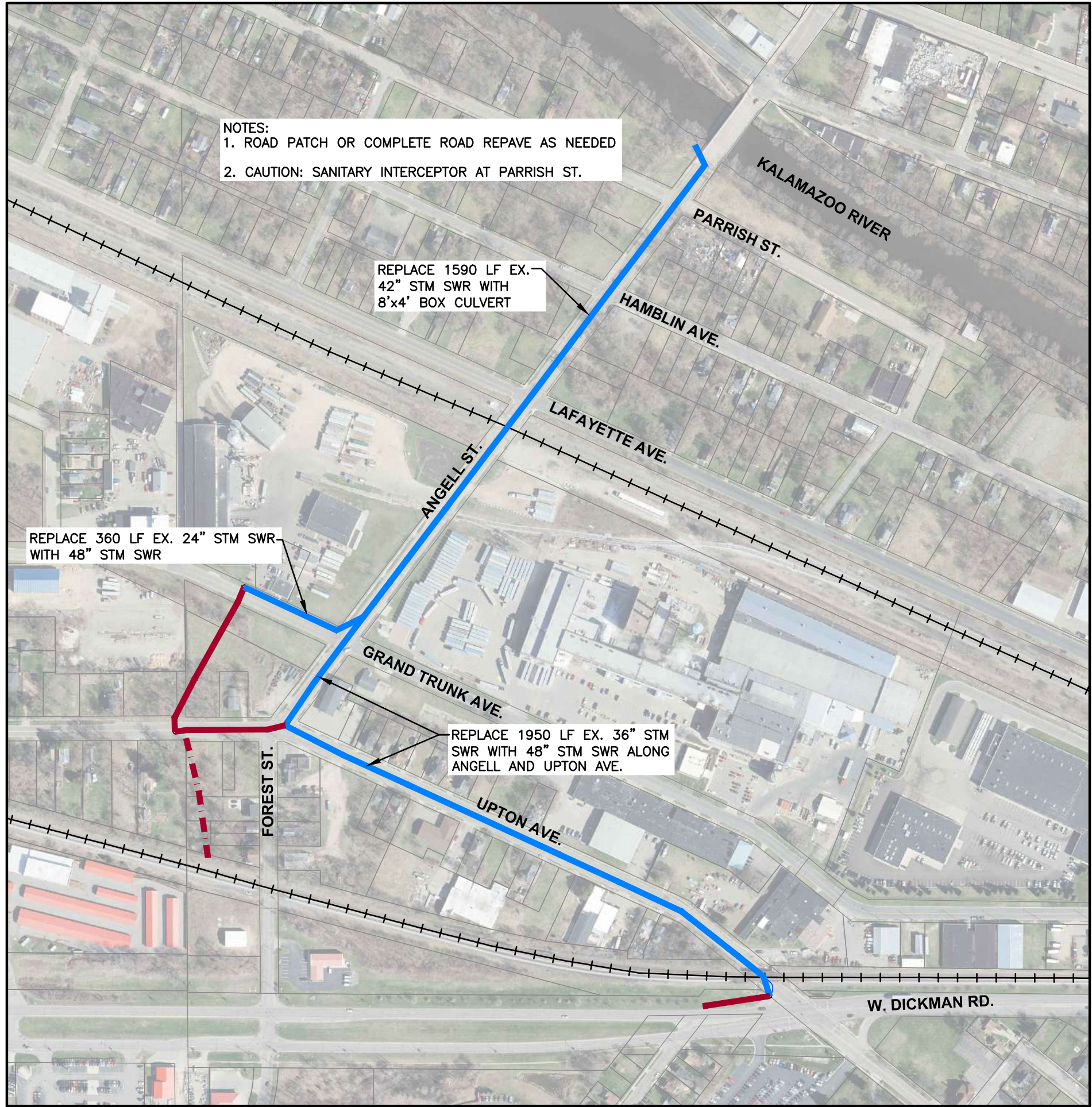


PLAN VIEW

ALTERNATIVE 2	
PROJECT NUMBER: 22-072	DATE: 3/20/2023
DESIGNED BY: RJB	FIGURE 4
DRAFTED BY: NDJ	



2121 3 Mile Rd. NW
Walker, MI 49544
Ph: 616-301-7888
www.LREMI.com



NOTES:
1. ROAD PATCH OR COMPLETE ROAD REPAVE AS NEEDED
2. CAUTION: SANITARY INTERCEPTOR AT PARRISH ST.

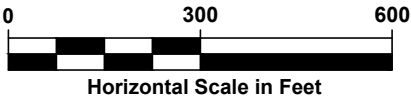
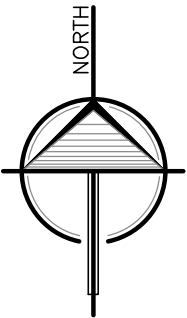
REPLACE 1590 LF EX. 42" STM SWR WITH 8'x4' BOX CULVERT

REPLACE 360 LF EX. 24" STM SWR WITH 48" STM SWR

REPLACE 1950 LF EX. 36" STM SWR WITH 48" STM SWR ALONG ANGELL AND UPTON AVE.

LEGEND

- EXISTING STORM SEWER
- EXISTING OPEN CHANNEL
- PROPOSED STORM SEWER



PLAN VIEW

ALTERNATIVE 3	
PROJECT NUMBER: 22-072	DATE: 3/20/2023
DESIGNED BY: RJB	FIGURE 5
DRAFTED BY: NDJ	



2121 3 Mile Rd. NW
Walker, MI 49544
Ph: 616-301-7888
www.LREMI.com

Appendix 1

Preliminary Estimates of Project Cost



GRAND TRUNK STORM SEWER STUDY

ALTERNATIVE 1A - PRELIMINARY ESTIMATE OF PROJECT COST

Prepared By: Land & Resource Engineering 3/6/2023



Alternative 1A: Project Scope

- 48-inch diameter storm sewer from Grand Trunk Avenue to the North Branch of the Kalamazoo River
- 36-inch diameter storm sewer replacement at Dickman Road and Upton Avenue intersection
- Eight new drainage structures
- Three road crossings (Lafayette Ave, Hamblin Ave, and Parrish St) and one railroad crossing
- Associated parking lot and road restoration

No.	Item Description	Quantity	Unit	Unit Cost	Total Cost
1	Mobilization (10% Max)	1	LS	\$ 90,000.00	\$ 90,000.00
2	36" Storm Sewer, Class E	56	LF	\$ 200.00	\$ 11,200.00
3	48" Storm Sewer Class A	1,800	LF	\$ 260.00	\$ 468,000.00
4	48" Flared End Section w/ Grate	1	EA	\$ 5,000.00	\$ 5,000.00
5	Bore & Jack Under Railroad	50	LF	\$ 4,000.00	\$ 200,000.00
6	Drainage Structure, 72 inch	8	EA	\$ 7,000.00	\$ 56,000.00
7	HMA Surface Removal	625	SY	\$ 10.00	\$ 6,250.00
8	8" Aggregate Base	625	SY	\$ 15.00	\$ 9,375.00
9	6" HMA 13A	205	TON	\$ 200.00	\$ 41,000.00
10	Flowable Fill	205	CY	\$ 200.00	\$ 41,000.00

Subtotal	\$ 928,000.00
Engineering Study	\$ 60,000.00
Estimated Engineering (Design & Construction)	\$ 250,000.00
Permitting	\$ 50,000.00
Railroad Inspection Fee	\$ 50,000.00
~25% Contingency	\$ 232,000.00
Preliminary Estimate of Construction Costs	\$ 1,570,000.00

GRAND TRUNK STORM SEWER STUDY

ALTERNATIVE 1B - PRELIMINARY ESTIMATE OF PROJECT COST

Prepared By: Land & Resource Engineering 3/6/2023



Alternative 1B: Project Scope

- 48-inch diameter storm sewer from Grand Trunk Avenue to the north side of Lafayette Ave
- 36-inch diameter storm sewer replacement at Dickman Road and Upton Avenue intersection
- Four new drainage structures
- Open channel excavation from Lafayette Ave to the North Branch of the Kalamazoo River
- Three road crossings (Lafayette Ave, Hamblin Ave, and Parrish St) and one railroad crossing
- Associated parking lot and road restoration

No.	Item Description	Quantity	Unit	Unit Cost	Total Cost
1	Mobilization (10% Max)	1	LS	\$ 70,000.00	\$ 70,000.00
2	36" Storm Sewer, Class E	56	LF	\$ 200.00	\$ 11,200.00
3	48" Storm Sewer Class A	860	LF	\$ 260.00	\$ 223,600.00
4	48" Storm Sewer Class E	160	LF	\$ 300.00	\$ 48,000.00
5	48" Flared End Section w/ Grate	1	EA	\$ 5,000.00	\$ 5,000.00
6	Bore & Jack Under Railroad	50	LF	\$ 4,000.00	\$ 200,000.00
7	Drainage Structure, 72 inch	4	EA	\$ 7,000.00	\$ 28,000.00
8	Open Channel Excavation	760	LF	\$ 20.00	\$ 15,200.00
9	HMA Surface Removal	625	SY	\$ 10.00	\$ 6,250.00
10	8" Aggregate Base	625	SY	\$ 15.00	\$ 9,375.00
11	6" HMA 13A	205	TON	\$ 200.00	\$ 41,000.00
12	Flowable Fill	205	CY	\$ 200.00	\$ 41,000.00

Subtotal	\$ 699,000.00
Engineering Study	\$ 60,000.00
Estimated Engineering (Design & Construction)	\$ 250,000.00
Permitting	\$ 50,000.00
Railroad Inspection Fee	\$ 50,000.00
~25% Contingency	\$ 171,000.00
Preliminary Estimate of Construction Costs	\$ 1,280,000.00

GRAND TRUNK STORM SEWER STUDY

ALTERNATIVE 1C - PRELIMINARY ESTIMATE OF PROJECT COST

Prepared By: Land & Resource Engineering 3/6/2023



Alternative 1C: Project Scope

- 48-inch diameter storm sewer from Grand Trunk Avenue to the north side of the railroad
- 36-inch diameter storm sewer replacement at Dickman Road and Upton Avenue intersection
- Four new drainage structures
- Open channel excavation along railroad, then from Lafayette Ave to the North Branch of the Kalamazoo River
- Three road crossings (Lafayette Ave, Hamblin Ave, and Parrish St) and one railroad crossing
- Associated road restoration

No.	Item Description	Quantity	Unit	Unit Cost	Total Cost
1	Mobilization (10% Max)	1	LS	\$ 75,000.00	\$ 75,000.00
2	36" Storm Sewer, Class E	56	LF	\$ 200.00	\$ 11,200.00
3	48" Storm Sewer Class A	1,000	LF	\$ 260.00	\$ 260,000.00
4	48" Storm Sewer Class E	160	LF	\$ 300.00	\$ 48,000.00
5	48" Flared End Section w/ Grate	1	EA	\$ 5,000.00	\$ 5,000.00
6	Bore & Jack Under Railroad	50	LF	\$ 4,000.00	\$ 200,000.00
7	Drainage Structure, 72 inch	4	EA	\$ 7,000.00	\$ 28,000.00
8	Open Channel Excavation	1,700	LF	\$ 20.00	\$ 34,000.00
9	HMA Surface Removal	625	SY	\$ 10.00	\$ 6,250.00
10	8" Aggregate Base	625	SY	\$ 15.00	\$ 9,375.00
11	6" HMA 13A	205	TON	\$ 200.00	\$ 41,000.00
12	Flowable Fill	205	CY	\$ 200.00	\$ 41,000.00

Subtotal	\$ 759,000.00
Engineering Study	\$ 60,000.00
Contingency Estimated Engineering (Design & Construction)	\$ 250,000.00
Permitting	\$ 50,000.00
Railroad Inspection Fee	\$ 50,000.00
~25% Contingency	\$ 191,000.00
Preliminary Estimate of Construction Costs	\$ 1,360,000.00

GRAND TRUNK STORM SEWER STUDY

ALTERNATIVE 2 - PRELIMINARY ESTIMATE OF PROJECT COST

Prepared By: Land & Resource Engineering 3/6/2023



Alternative 2: Project Scope

- 48-inch diameter storm sewer replacement along Grand Trunk Avenue to Angell Street
- 36-inch diameter storm sewer replacement at Dickman Road and Upton Avenue intersection
- 4'x8' Precast Box Culvert from the Grant Trunk Avenue and Angell Street intersection to the outlet
- 12 drainage structures and 15 inlet connections
- Associated road restoration

No.	Item Description	Quantity	Unit	Unit Cost	Total Cost
1	Mobilization (10% Max)	1	LS	\$ 320,000.00	\$ 320,000.00
2	36" Storm Sewer, Class E	56	LF	\$ 200.00	\$ 11,200.00
3	48" Storm Sewer Class E	360	LF	\$ 300.00	\$ 108,000.00
4	4'x8' Precast Box Culvert	1,590	LF	\$ 1,500.00	\$ 2,385,000.00
5	Bore & Jack Under Railroad	50	LF	\$ 8,000.00	\$ 400,000.00
6	Drainage Structure, 48 inch	12	EA	\$ 4,000.00	\$ 48,000.00
7	Tap & Pipe	12	EA	\$ 2,000.00	\$ 24,000.00
8	Inlet Connections	15	EA	\$ 1,000.00	\$ 15,000.00
9	HMA Surface Removal	2,300	SY	\$ 10.00	\$ 23,000.00
10	8" Aggregate Base	2,300	SY	\$ 15.00	\$ 34,500.00
11	6" HMA 13A	760	TON	\$ 150.00	\$ 114,000.00
12	Curb & Gutter	1,590	LF	\$ 20.00	\$ 31,800.00

Subtotal	\$ 3,515,000.00
Engineering Study	\$ 60,000.00
~10% Estimated Engineering (Design & Construction)	\$ 352,000.00
Permitting	\$ 50,000.00
Railroad Inspection Fee	\$ 50,000.00
~25% Contingency	\$ 883,000.00
Preliminary Estimate of Construction Costs	\$ 4,910,000.00

GRAND TRUNK STORM SEWER STUDY

ALTERNATIVE 3 - PRELIMINARY ESTIMATE OF PROJECT COST

Prepared By: Land & Resource Engineering 3/6/2023



Alternative 3: Project Scope

- 48-inch diameter storm sewer replacement along Grand Trunk Avenue to Angell Street
- 48-inch diameter storm sewer replacement from Angell Street and Grand Trunk Avenue intersection to the Upton Avenue and Dickman Road intersection
- 4'x8' Precast Box Culvert from the Grant Trunk Avenue and Angell Street intersection to the outlet.
- 24 drainage structures and 27 inlet connections
- Associated road restoration

No.	Item Description	Quantity	Unit	Unit Cost	Total Cost
1	Mobilization (10% Max)	1	LS	\$ 400,000.00	\$ 400,000.00
3	48" Storm Sewer Class E	2,310	LF	\$ 300.00	\$ 693,000.00
4	4'x8' Precast Box Culvert	1,590	LF	\$ 1,500.00	\$ 2,385,000.00
5	Bore & Jack Under Railroad	50	LF	\$ 8,000.00	\$ 400,000.00
6	Drainage Structure, 48 inch	12	EA	\$ 4,000.00	\$ 48,000.00
7	Drainage Structure, 72 inch	12	EA	\$ 7,000.00	\$ 84,000.00
8	Tap & Pipe	24	EA	\$ 2,000.00	\$ 48,000.00
9	Inlet Connections	31	EA	\$ 1,000.00	\$ 31,000.00
10	HMA Surface Removal	4,400	SY	\$ 10.00	\$ 44,000.00
11	8" Aggregate Base	4,400	SY	\$ 15.00	\$ 66,000.00
12	6" HMA 13A	1,500	TON	\$ 150.00	\$ 225,000.00
13	Curb & Gutter	3,540	LF	\$ 20.00	\$ 70,800.00

Subtotal	\$ 4,495,000.00
Engineering Study	\$ 60,000.00
~10% Estimated Engineering (Design & Construction)	\$ 450,000.00
Permitting	\$ 50,000.00
Railroad Inspection Fee	\$ 50,000.00
~25% Contingency	\$ 2,245,000.00
Preliminary Estimate of Construction Costs	\$ 7,350,000.00

Appendix 2

Hydrologic & Hydraulic Modeling Results and Calculations



Project: Grand Trunk Drainage Study - Grand Trunk Sub-Catchment

No: 22-072

Date: 11/17/2022

Engineer: R. Betts

Method: SCS UD-21 HYDROLOGIC METHOD - ATLAS 14 BY COUNTY

Title: Grand Trunk Sub-Catchment

MDOT Grid Method

LOCATION = Calhoun County

Fill In
Results
Headings

- [1] **DRAINAGE BASIN AREA (A) =** 645 Acres
1.01 SQ. MI.
- [2] **ADJUSTMENT FACTOR (R) =** 1
- [3] **TIME OF CONCENTRATION:**

Flow Type	K	Upstream STA	Downstream STA	Length (FT)	Upstream El. (FT)	am El. (FT)	Δ Elevation (FT)	Slope (%)
Sheet Flow	0.48			300	932.00	922.00	10.00	3.33
Waterway	1.2			193	922.00	918.00	4.00	2.07
Waterway	1.2			342	918.00	898.00	20.00	5.85
Waterway	1.2			1297	898.00	890.00	8.00	0.62
Waterway	1.2			877	890.00	880.00	10.00	1.14
Waterway	1.2			965	880.00	874.00	6.00	0.62
Waterway	1.2			864	874.00	866.00	8.00	0.93
Waterway	1.2			180	866.00	860.00	6.00	3.33
Waterway	1.2			237	860.00	856.00	4.00	1.69
Waterway	1.2			1229	856.00	852.00	4.00	0.33
Waterway	1.2			1372	852.00	850.00	2.00	0.15
Small Trib	2.1			626	850.00	842.00	8.00	1.28
Small Trib	2.1			603	842.00	829.00	13.00	2.16

- [4] **UNIT PEAK (qp) =** $238.6 T_c^{-0.82} =$ 104.23 CFS/IN/SQMI

- [5] **WEIGHTED CN:**

Land Use	Soil Type	CN (II)	Area (Acres)	% of Total Drainage Area	Partial CN
	A	54	3.67	1%	0.308
	A	39	2.27	0%	0.138
	A	89	1.71	0%	0.236
	A	51	6.32	1%	0.500
	A	54	2.39	0%	0.200
	B	66	3.67	1%	0.376
	B	66	3.67	1%	0.376
	B	55	3.67	1%	0.314
	B	88	3.35	1%	0.458
	B	61	7.67	1%	0.727
	B	88	21.30	3%	2.910
	B	70	3.67	1%	0.399
	D	93	14.00	2%	2.022
	D	77	40.41	6%	4.832
	D	77	7.35	1%	0.878
	D	93	15.00	2%	2.166
	D	80	40.53	6%	5.035
	D	80	25.71	4%	3.194
	D	85	197.40	31%	26.056
	D	84	58.09	9%	7.577
	D	85	56.90	9%	7.511
	D	85	25.71	4%	3.394
	D	87	82.63	13%	11.163
	D	87	9.52	1%	1.286
	D	84	7.35	1%	0.958
Total =			643.97	CN =	83

[6] **SURFACE RUNOFF (SRO) = $(P - 0.2S)^2 / (P + 0.8S)$**
 WHERE S = (1000/CN) - 10
 S = **2.05**

[7] **ADJUSTMENTS FOR SURFACE PONDING**

30	Area (acres)
5	%
Spread Throughout	Watershed

Percentage of Ponding and Swampy Area =
 Location of Ponding Occurs =
 Adjustment Factor =

[8] **DESIGN DISCHARGE (Q) = A x SRO x qp x R**

Guage Location	RECURRENC E INTERVAL	P (IN)	SRO (IN)	Q (CFS)	ADJ. FOR PONDING	Qadj. (CFS)
ALBION (20-0094)	1-Year	2.26	0.879	92.33	0.63	58.17
ALBION (20-0094)	1.5-Year	2.40	0.982	103.12	0.63	64.96
ALBION (20-0094)	2-Year	2.54	1.087	114.17	0.65	74.21
ALBION (20-0094)	5-Year	3.06	1.496	157.13	0.66	103.71
ALBION (20-0094)	10-Year	3.56	1.910	200.64	0.68	136.44
ALBION (20-0094)	25-Year	4.32	2.568	269.67	0.72	194.16
ALBION (20-0094)	50-Year	4.98	3.157	331.62	0.75	248.72
ALBION (20-0094)	100-Year	5.70	3.815	400.72	0.78	312.56

Project: Grand Trunk Drainage Study - Upton Sub-Catchment
 No: 22-072
 Date: 11/17/2022
 Engineer: R. Betts

Method: SCS UD-21 HYDROLOGIC METHOD - ATLAS 14 BY COUNTY
 Title: Upton Sub-Catchment
 MDOT Grid Method
 LOCATION = Calhoun County

Fill In
Results
Headings

- [1] DRAINAGE BASIN AREA (A) = 156 Acres
 [2] ADJUSTMENT FACTOR (R) = 0.24 SQ. MI.
 [3] TIME OF CONCENTRATION: 1

Flow Type	K	Upstream STA	Downstream STA	Length (FT)	Upstream El. (FT)	am El. (FT)	Δ Elevation (FT)	Slope (%)	Velocity (FPS)	Tc (Hours)
Sheet Flow	0.48			300	951.00	949.00	2.00	0.67	0.39	0.21
Waterway	1.2			198	949.00	948.00	1.00	0.51	0.85	0.06
Small Trib	2.1			40	943.50	943.01	0.49	1.22	2.32	0.00
Small Trib	2.1			263	943.01	941.92	1.09	0.41	1.35	0.05
Small Trib	2.1			495	941.90	939.42	2.48	0.50	1.49	0.09
Small Trib	2.1			164	939.42	937.99	1.43	0.87	1.96	0.02
Small Trib	2.1			185	937.99	936.13	1.86	1.01	2.11	0.02
Small Trib	2.1			179	936.13	935.59	0.54	0.30	1.15	0.04
Small Trib	2.1			329	935.59	933.32	2.27	0.69	1.75	0.05
Small Trib	2.1			487	933.32	930.77	2.55	0.52	1.52	0.09
Small Trib	2.1			479	925.77	908.53	17.24	3.60	3.98	0.03
Small Trib	2.1			249	908.53	902.50	6.03	2.42	3.27	0.02
Small Trib	2.1			342	902.50	891.84	10.66	3.11	3.71	0.03
Small Trib	2.1			1016	891.84	876.91	14.93	1.47	2.55	0.11
Small Trib	2.1			304	876.91	875.69	1.22	0.40	1.33	0.06
Small Trib	2.1			340	875.69	871.01	4.68	1.38	2.47	0.04
Small Trib	2.1			227	871.01	868.30	2.71	1.19	2.30	0.03
Small Trib	2.1			299	868.30	862.31	5.99	2.00	2.97	0.03
Small Trib	2.1			247.01	862.31	852.45	9.86	3.99	4.20	0.02
Small Trib	2.1			135.4	848.50	843.80	4.70	3.47	3.91	0.01
Small Trib	2.1			106.75	843.80	841.75	2.05	1.92	2.91	0.01
Small Trib	2.1			1008.98	841.75	822.43	19.32	1.91	2.91	0.10
Small Trib	2.1			425.11	822.43	819.58	2.85	0.67	1.72	0.07
Total =										1.21

- [4] UNIT PEAK (qp) = $238.6 T_c^{-0.82} = 204.10$ CFS/IN/SQMI

Minimum Tc = 0.15

- [5] WEIGHTED CN:

Land Use	Soil Type	CN (II)	Area (Acres)	% of Total Drainage Area	Partial CN
Open fair	B	69	2.0	1%	0.887
Forest Good	D	77	10.8	7%	5.365
Open fair	D	84	37.7	24%	20.343
Res 1/4	D	87	100.9	65%	56.436
Industrial	D	93	4.1	3%	2.475
Total =			156	CN =	86

- [6] SURFACE RUNOFF (SRO) = $(P - 0.2S)^2 / (P + 0.8S)$
 WHERE S = $(1000/CN) - 10$
 S = 1.70

- [7] ADJUSTMENTS FOR SURFACE PONDING
 Percentage of Ponding and Swampy Area = 4 Area (acres)
 Location of Ponding Occurs = 3 %
 Adjustment Factor = Spread Throughout Watershed

- [8] DESIGN DISCHARGE (Q) = A x SRO x qp x R

Guage Location	RECURRENT INTERVAL	P (IN)	SRO (IN)	Q (CFS)	ADJ. FOR PONDING	Qadj. (CFS)
ALBION (20-0094)	1-Year	2.26	1.020	50.64	0.70	35.32
ALBION (20-0094)	1.5-Year	2.40	1.131	56.12	0.70	39.35
ALBION (20-0094)	2-Year	2.54	1.243	61.70	0.71	43.50
ALBION (20-0094)	5-Year	3.06	1.676	83.19	0.72	59.48
ALBION (20-0094)	10-Year	3.56	2.110	104.72	0.73	76.32
ALBION (20-0094)	25-Year	4.32	2.792	138.55	0.74	102.01
ALBION (20-0094)	50-Year	4.98	3.399	168.69	0.79	132.42
ALBION (20-0094)	100-Year	5.70	4.073	202.12	0.82	165.99

Project: Grand Trunk Drainage Study - Combined Sub-Catchment
 No: 22-072
 Date: 11/17/2022
 Engineer: R. Betts

Method: SCS UD-21 HYDROLOGIC METHOD - ATLAS 14 BY COUNTY
 Title: Combined Sub-Catchment
 MDOT Grid Method
 LOCATION = Calhoun County

Fill In
Results
Headings

- [1] DRAINAGE BASIN AREA (A) = 929 Acres
 [2] ADJUSTMENT FACTOR (R) = 1.45 SQ. MI.
 [3] TIME OF CONCENTRATION: 1

Flow Type	K	Upstream STA	Downstream STA	Length (FT)	Upstream El. (FT)	am El. (FT)	Δ Elevation (FT)	Slope (%)	Velocity (FPS)	Tc (Hours)
Sheet Flow	0.48			300	932.00	922.00	10.00	3.33	0.88	0.10
Waterway	1.2			193	922.00	918.00	4.00	2.07	1.73	0.03
Waterway	1.2			342	918.00	898.00	20.00	5.85	2.90	0.03
Waterway	1.2			1297	898.00	890.00	8.00	0.62	0.94	0.38
Waterway	1.2			877	890.00	880.00	10.00	1.14	1.28	0.19
Waterway	1.2			965	880.00	874.00	6.00	0.62	0.95	0.28
Waterway	1.2			864	874.00	866.00	8.00	0.93	1.15	0.21
Waterway	1.2			180	866.00	860.00	6.00	3.33	2.19	0.02
Waterway	1.2			237	860.00	856.00	4.00	1.69	1.56	0.04
Waterway	1.2			1229	856.00	852.00	4.00	0.33	0.68	0.50
Waterway	1.2			1372	852.00	850.00	2.00	0.15	0.46	0.83
Small Trib	2.1			626	850.00	842.00	8.00	1.28	2.37	0.07
Small Trib	2.1			603	842.00	829.00	13.00	2.16	3.08	0.05
Small Trib	2.1			251	821.54	820.03	1.51	0.60	1.63	0.04
Small Trib	2.1			49	819.90	818.67	1.23	2.51	3.33	0.00
Small Trib	2.1			140	815.33	814.37	0.96	0.69	1.74	0.02
Small Trib	2.1			224	814.37	812.95	1.42	0.63	1.67	0.04
Small Trib	2.1			121	812.94	812.91	0.03	0.02	0.33	0.10
Small Trib	2.1			76	812.83	812.13	0.70	0.92	2.02	0.01
Small Trib	2.1			174	812.13	811.14	0.99	0.57	1.58	0.03
Small Trib	2.1			202	811.03	810.74	0.29	0.14	0.80	0.07
Small Trib	2.1			189	810.64	810.27	0.37	0.20	0.93	0.06
Small Trib	2.1			163	810.27	809.95	0.32	0.20	0.93	0.05
Small Trib	2.1			183	809.90	809.62	0.28	0.15	0.82	0.06
Small Trib	2.1			153	809.62	809.61	0.01	0.01	0.17	0.25
Small Trib	2.1			147	809.55	809.04	0.51	0.35	1.24	0.03
Small Trib	2.1			103	809.01	808.84	0.17	0.17	0.85	0.03
Small Trib	2.1			79	808.84	808.52	0.32	0.41	1.34	0.02
										Total = 3.57

- [4] UNIT PEAK (qp) = 238.6 T_c^{-0.82} = 84.13 CFS/IN/SQMI Minimum Tc = 0.15

[5] WEIGHTED CN:

Land Use	Soil Type	CN (II)	Area (Acres)	% of Total Drainage Area	Partial CN
Res 1/2	A	54	3.67	0%	0.214
Open Good	A	39	2.27	0%	0.095
Commercial	A	89	1.71	0%	0.164
Res 1	A	51	6.32	1%	0.347
Res 1/2	A	54	2.39	0%	0.139
Woods Poor	B	66	3.67	0%	0.261
Woods Poor	B	66	3.67	0%	0.261
Forest Good	B	55	3.67	0%	0.218
Industrial	B	88	3.35	0%	0.317
Open good	B	61	7.67	1%	0.504
Industrial	B	88	21.30	2%	2.018
Res 1/2	B	70	3.67	0%	0.277
Industrial	D	93	14.00	2%	1.402
Forest Good	D	77	40.41	4%	3.350
Forest Good	D	77	7.35	1%	0.609
Industrial	D	93	15.00	2%	1.502
Open Good	D	80	40.53	4%	3.491
Open Good	D	80	25.71	3%	2.215
Res 1/2	D	85	197.40	21%	18.065
Res 1	D	84	58.09	6%	5.253
Res 1/2	D	85	56.90	6%	5.208
Res 1/2	D	85	25.71	3%	2.353
Res 1/4	D	87	82.63	9%	7.739
Res 1/4	D	87	9.52	1%	0.892
Open Fair	D	84	7.35	1%	0.664
Open Fair	B	69	2.00	0%	0.149
Forest Good	D	77	10.84	1%	0.899
Open fair	D	84	37.68	4%	3.408
Res 1/4	D	87	100.93	11%	9.454
Industrial	D	93	4.14	0%	0.415
Open Fair	A	49	14.62	2%	0.771

Open Fair	D	84	34.72	4%	3.140
Res 1/4	D	87	14.75	2%	1.382
Industrial	D	93	65.17	7%	6.525
Total =			929	CN =	84

[6] SURFACE RUNOFF (SRO) = $(P - 0.2S)^2 / (P + 0.8S)$

WHERE S = $(1000/CN) - 10$

S = 1.95

[7] ADJUSTMENTS FOR SURFACE PONDING

Percentage of Ponding and Swampy Area = 39 Area (acres)

4 %

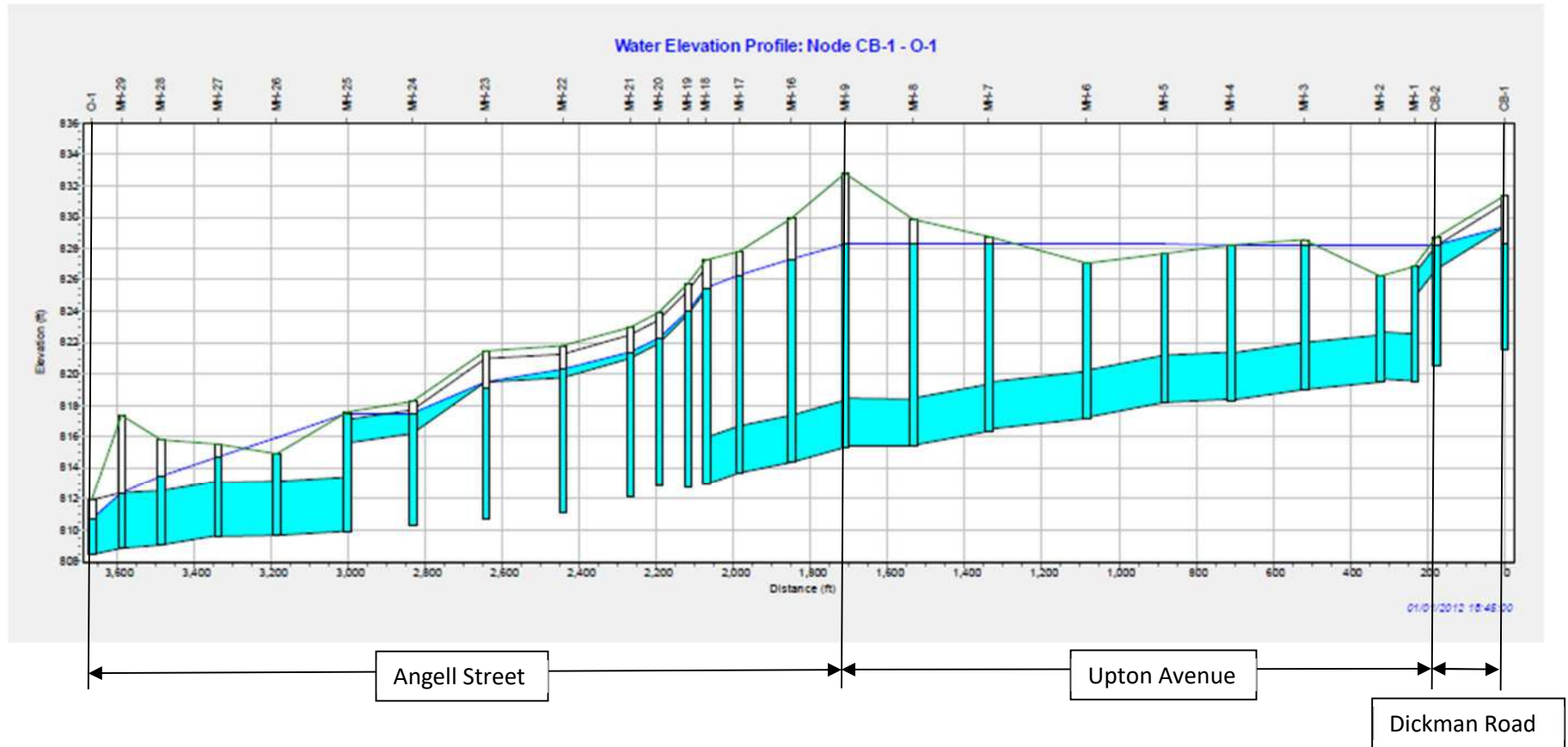
Location of Ponding Occurs Spread Throughout Watershed

Adjustment Factor =

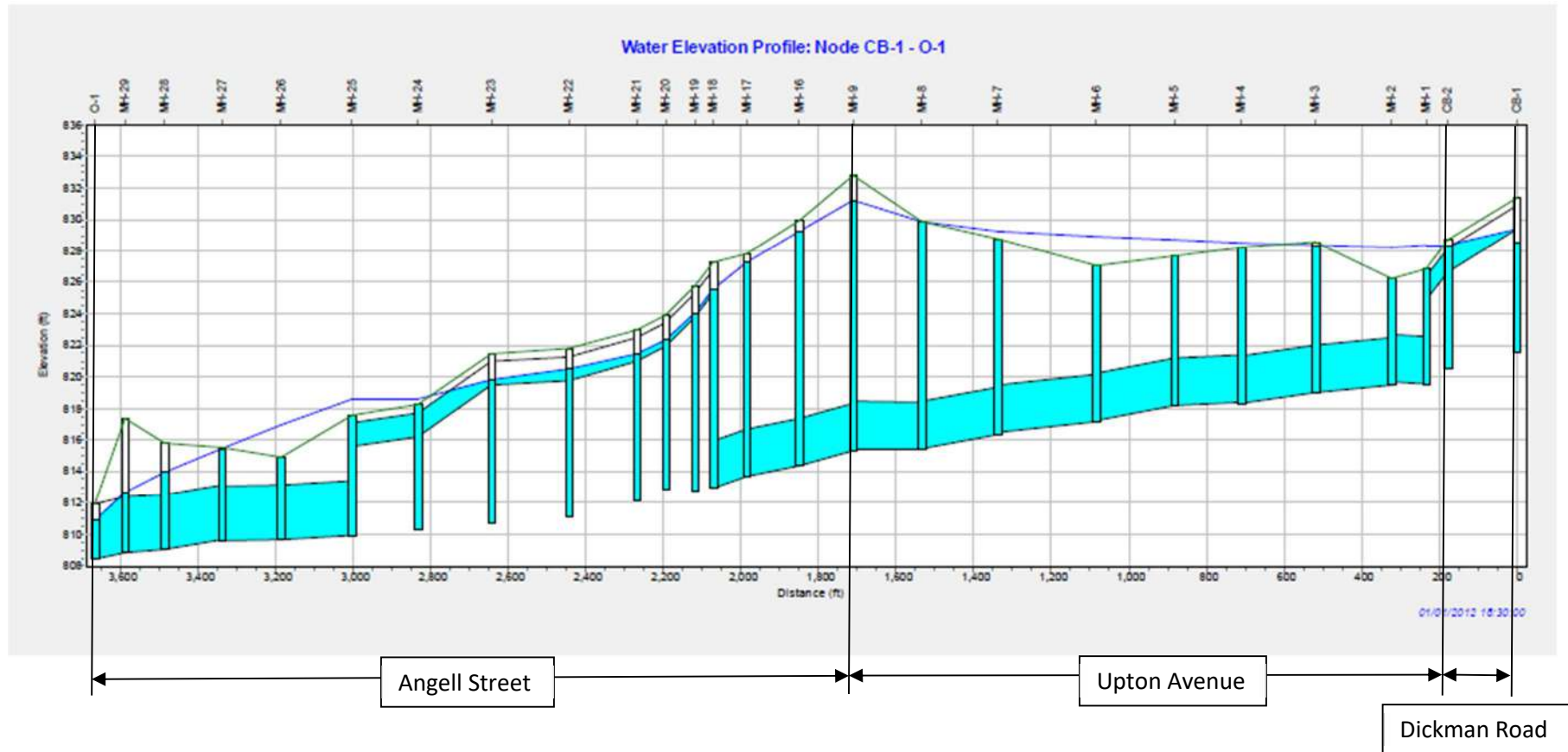
[8] DESIGN DISCHARGE (Q) = A x SRO x qp x R

Guage Location	RECURRENT INTERVAL	P (IN)	SRO (IN)	Q (CFS)	ADJ. FOR PONDING	Qadj. (CFS)
ALBION (20-0094)	1-Year	2.26	0.916	111.89	0.67	74.44
ALBION (20-0094)	1.5-Year	2.40	1.021	124.70	0.67	82.96
ALBION (20-0094)	2-Year	2.54	1.128	137.80	0.67	92.81
ALBION (20-0094)	5-Year	3.06	1.544	188.57	0.68	128.89
ALBION (20-0094)	10-Year	3.56	1.964	239.82	0.70	167.31
ALBION (20-0094)	25-Year	4.32	2.628	320.93	0.71	229.18
ALBION (20-0094)	50-Year	4.98	3.223	393.57	0.76	299.81
ALBION (20-0094)	100-Year	5.70	3.885	474.46	0.80	378.45

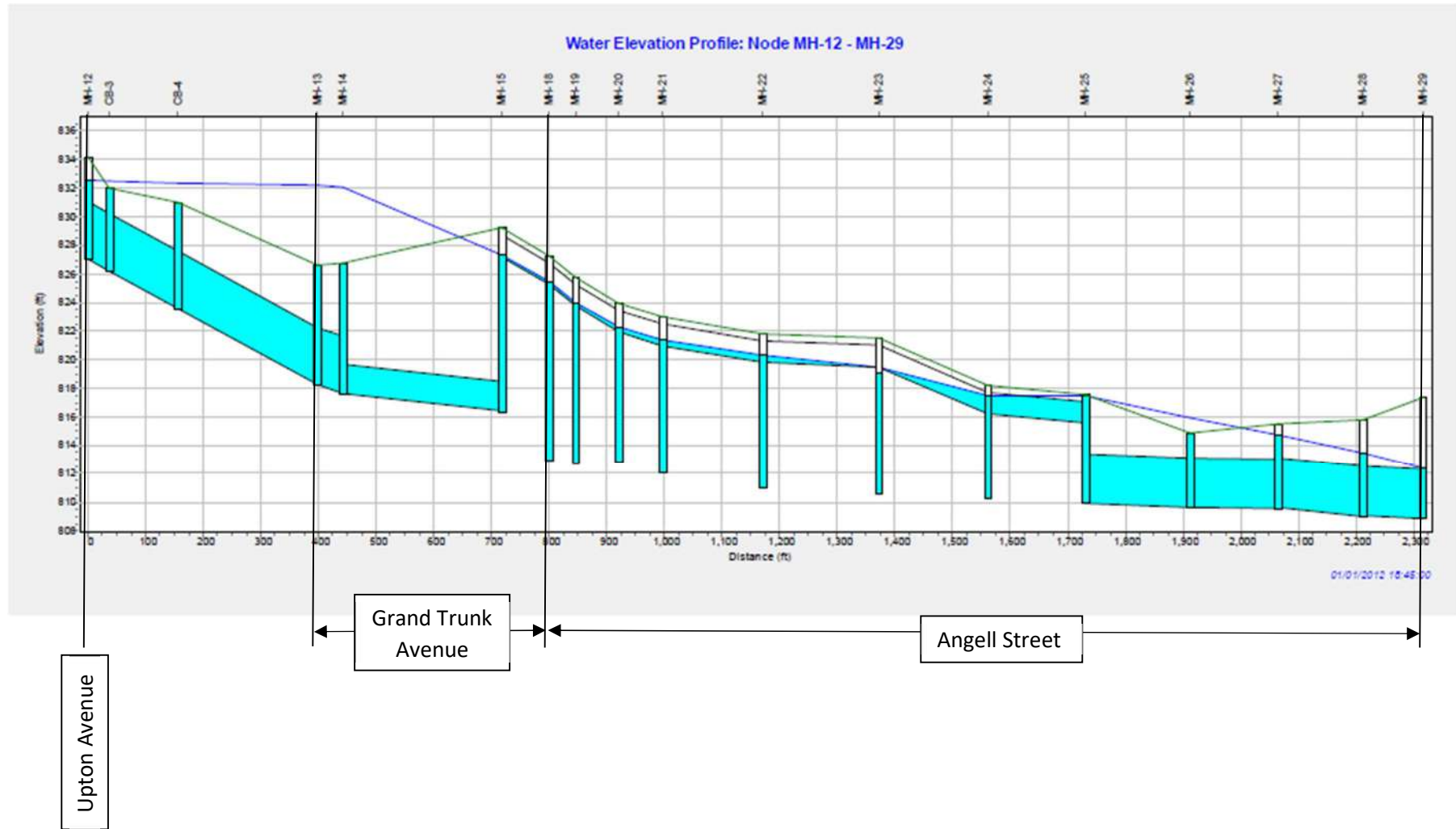
Existing Condition – Upton Sub-Catchment, 2-year Storm Event



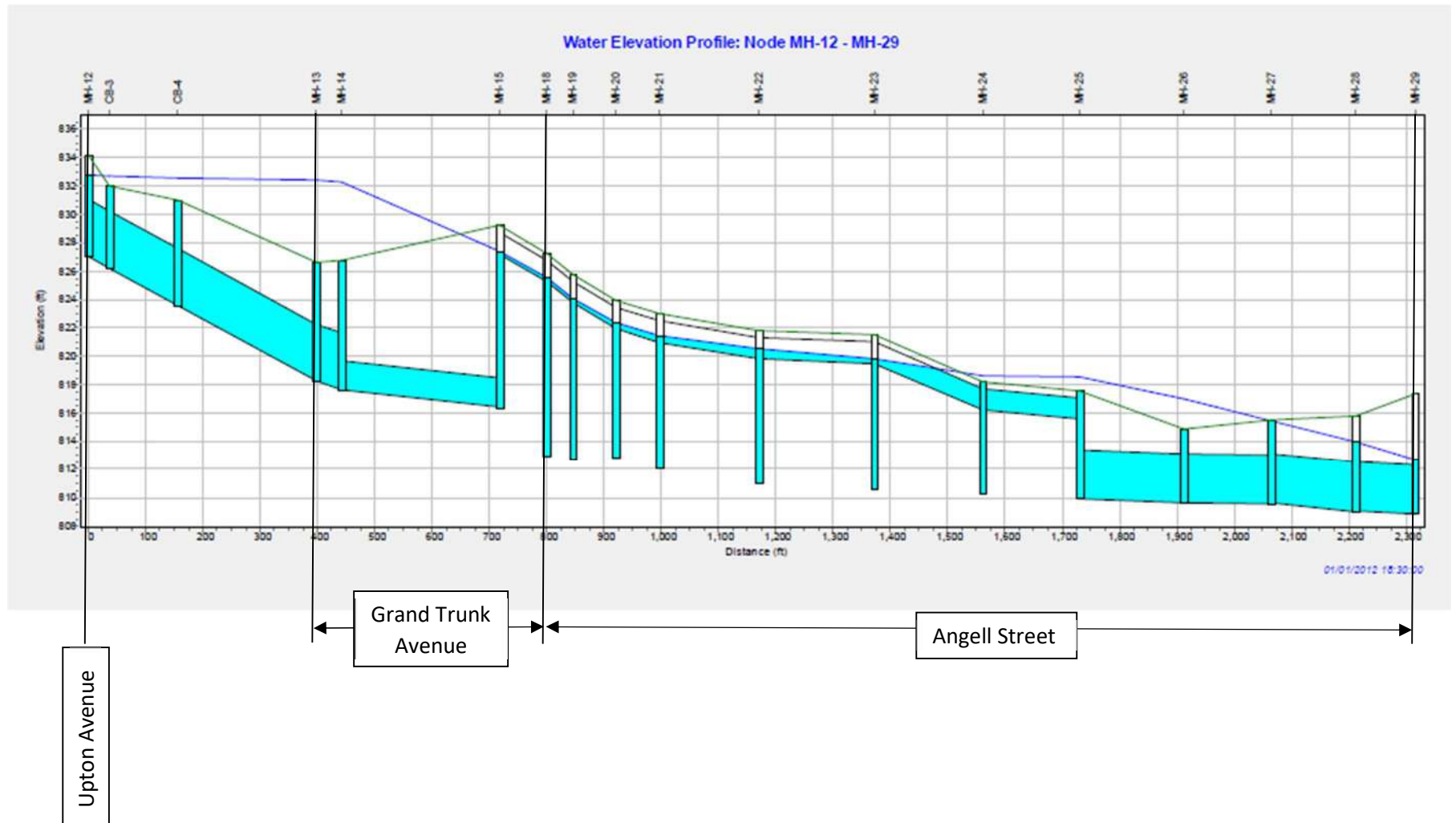
Existing Condition – Upton Sub-Catchment, 10-year Storm Event



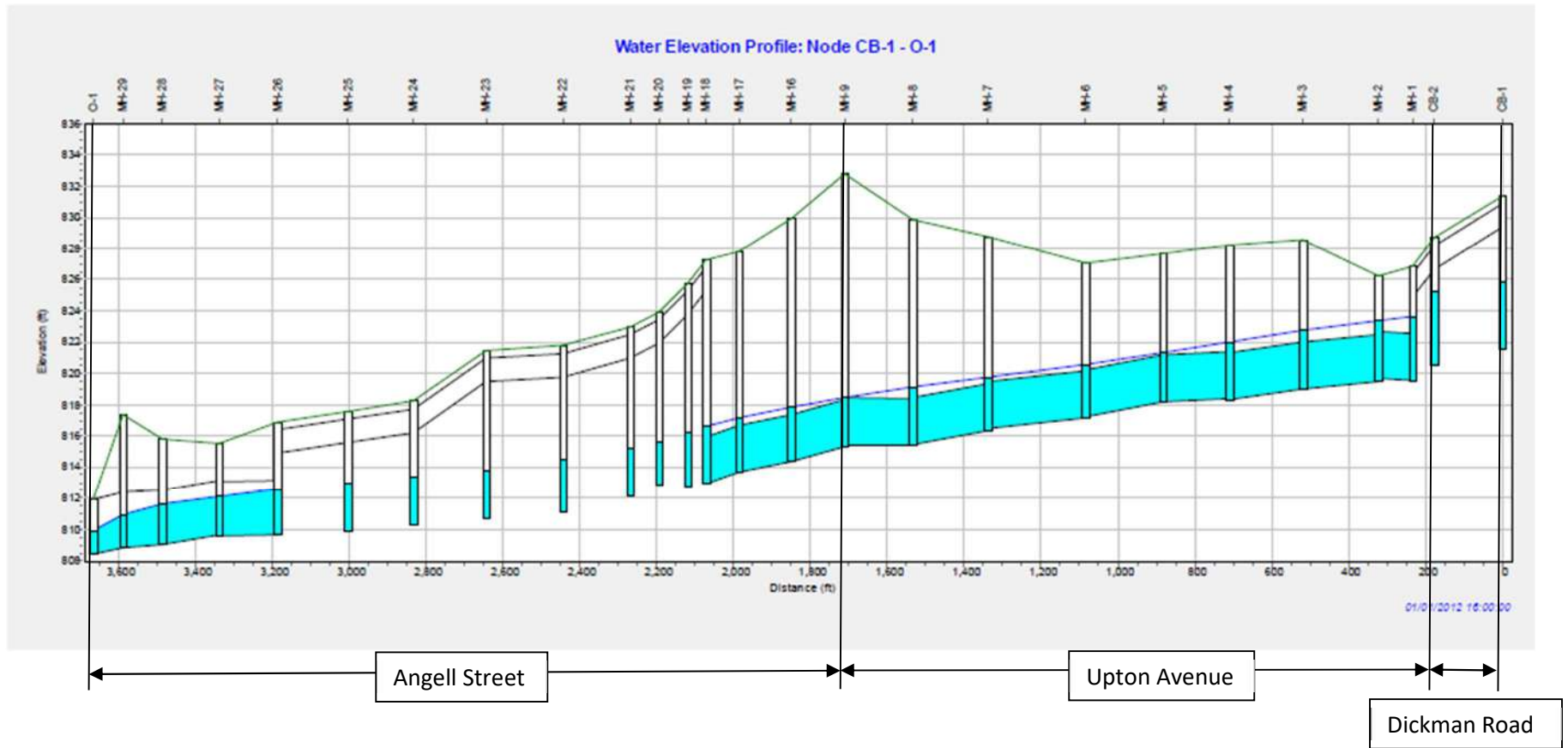
Existing Condition – Grand Trunk Sub-Catchment, 2-year Storm Event



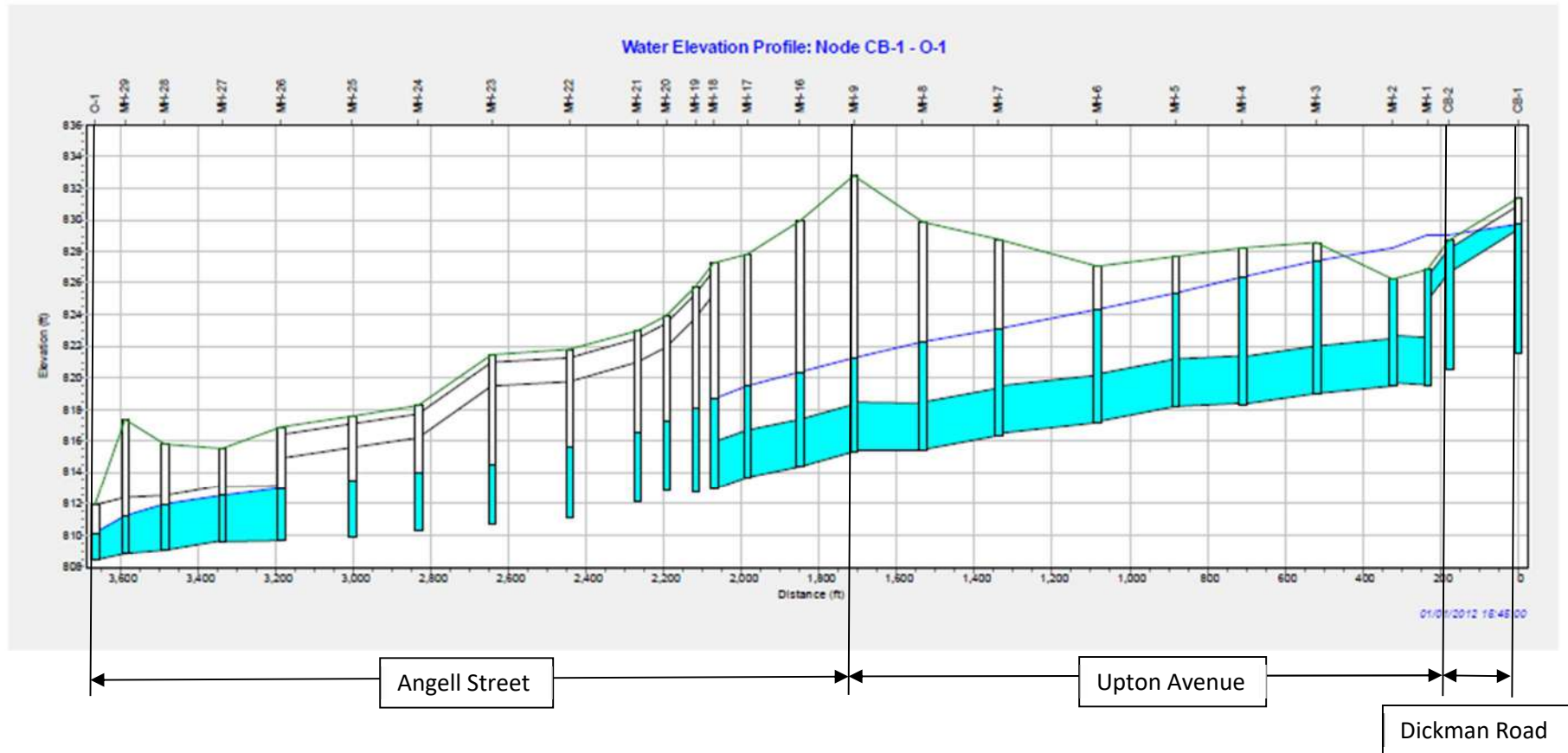
Existing Condition – Grand Trunk Sub-Catchment, 10-year Storm Event



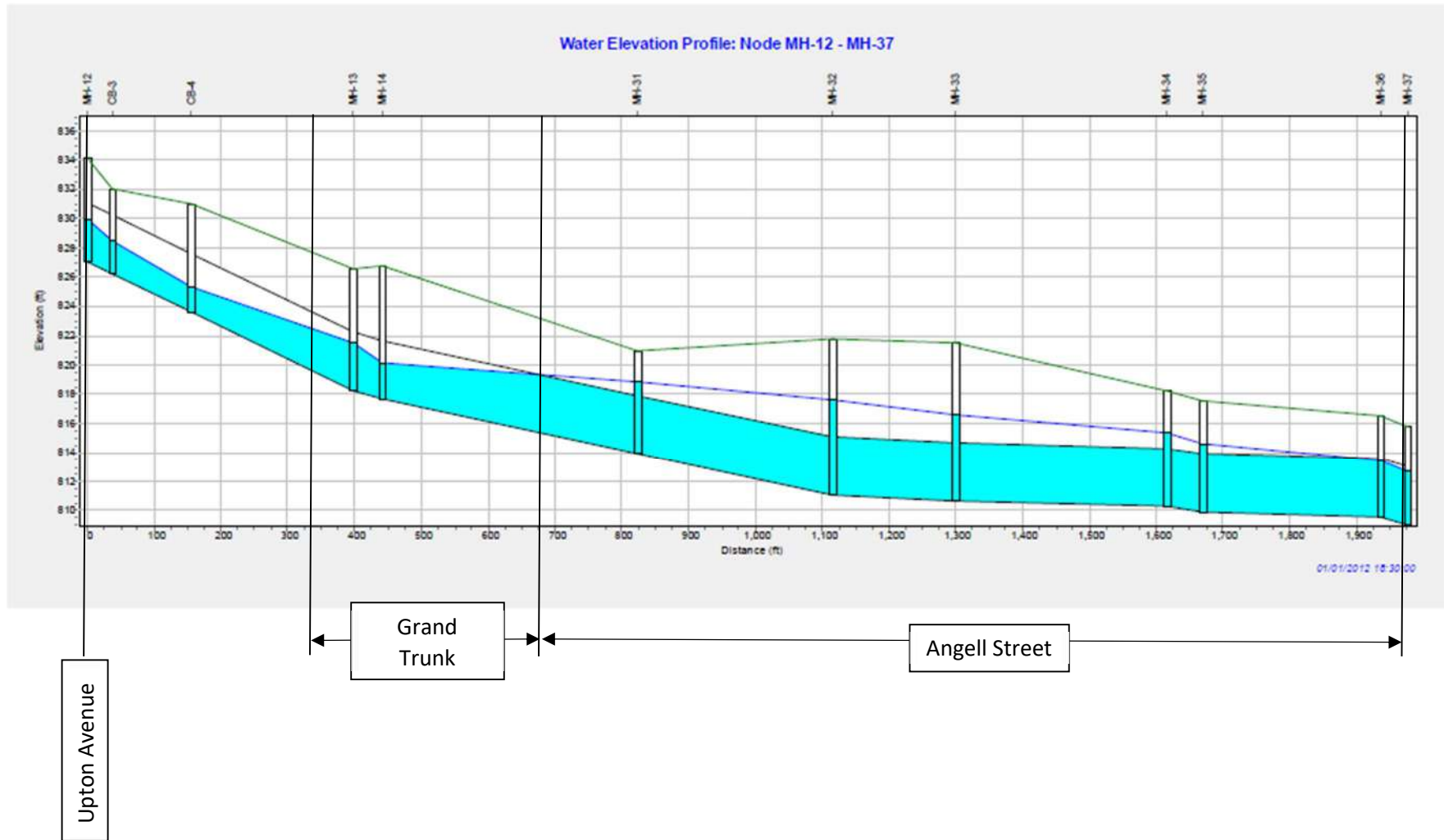
Alternative 1 – Upton Sub-Catchment, 2-year Storm Event



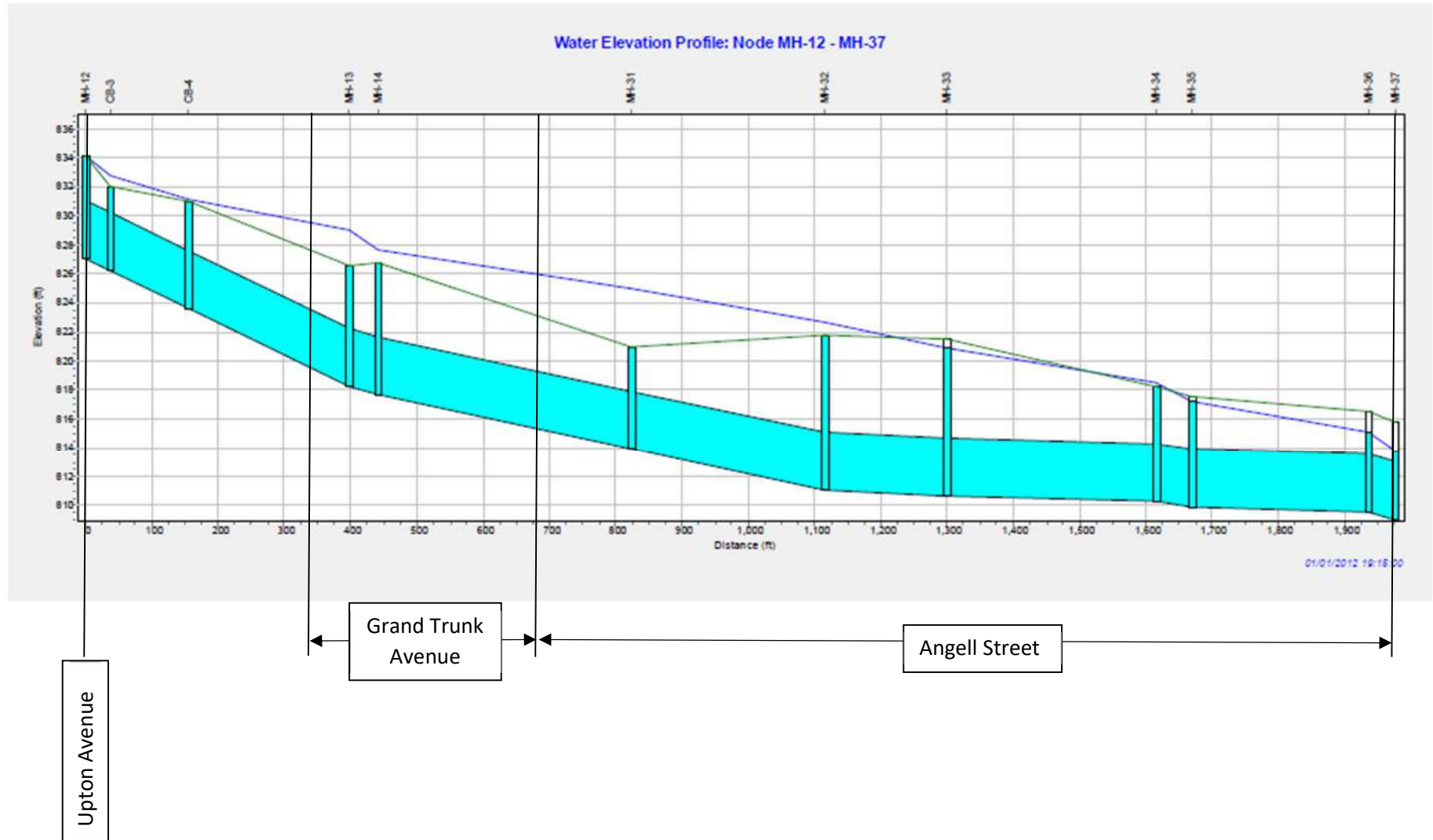
Alternative 1 – Upton Sub-Catchment, 10-year Storm Event



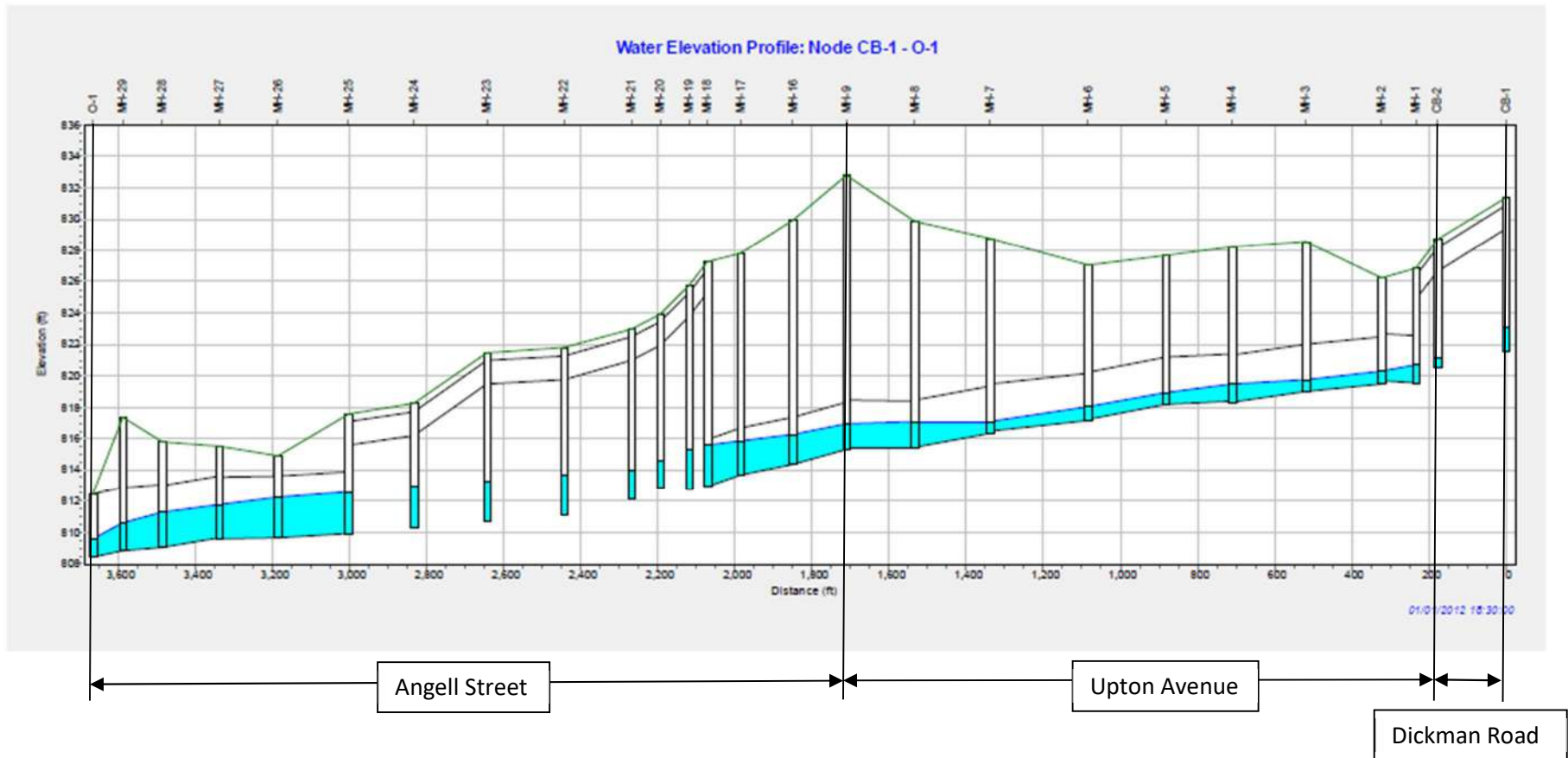
Alternative 1 – Grand Trunk Sub-Catchment, 2-year Storm Event



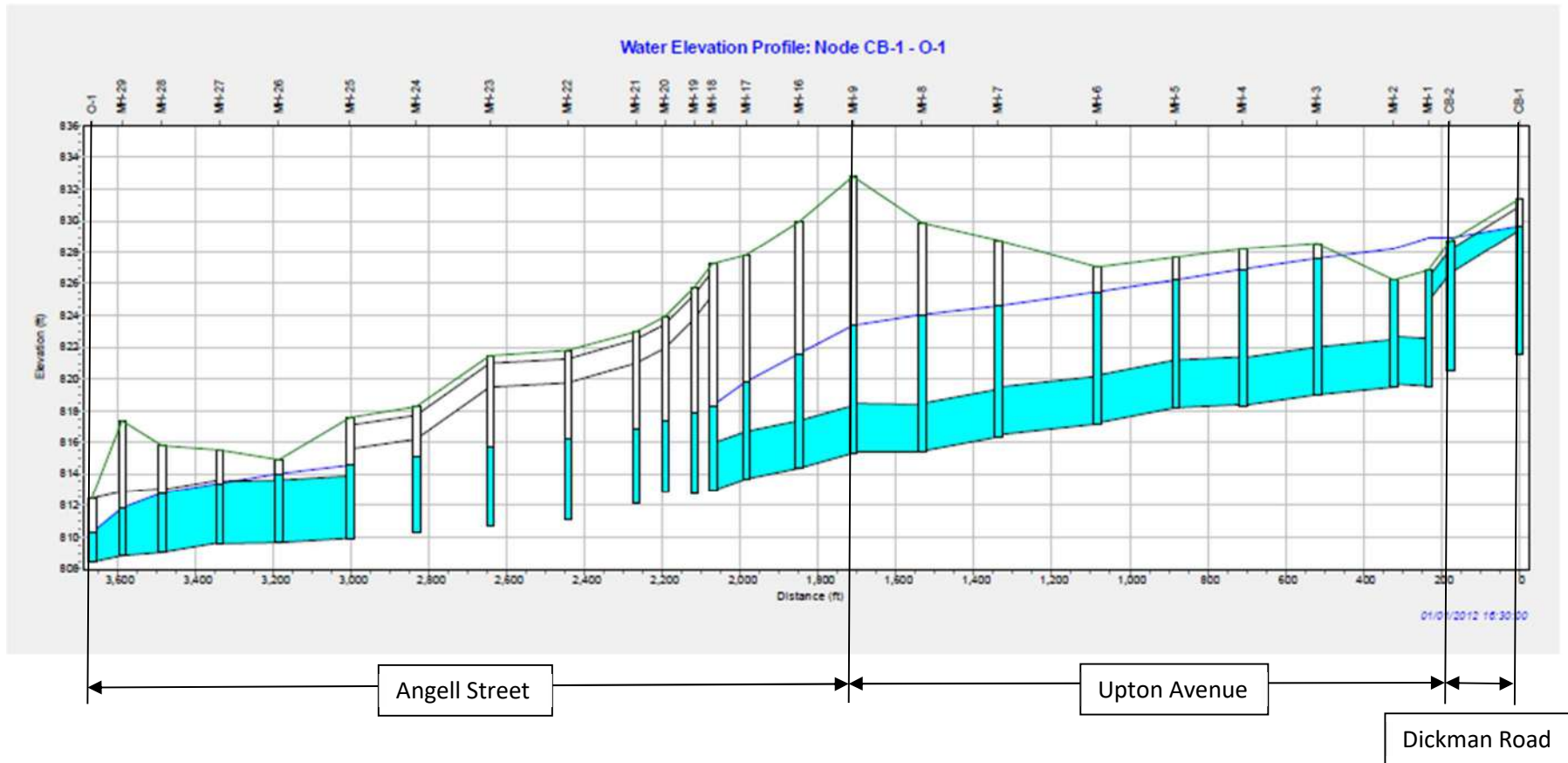
Alternative 1 – Grand Trunk Sub-Catchment, 10-year Storm Event



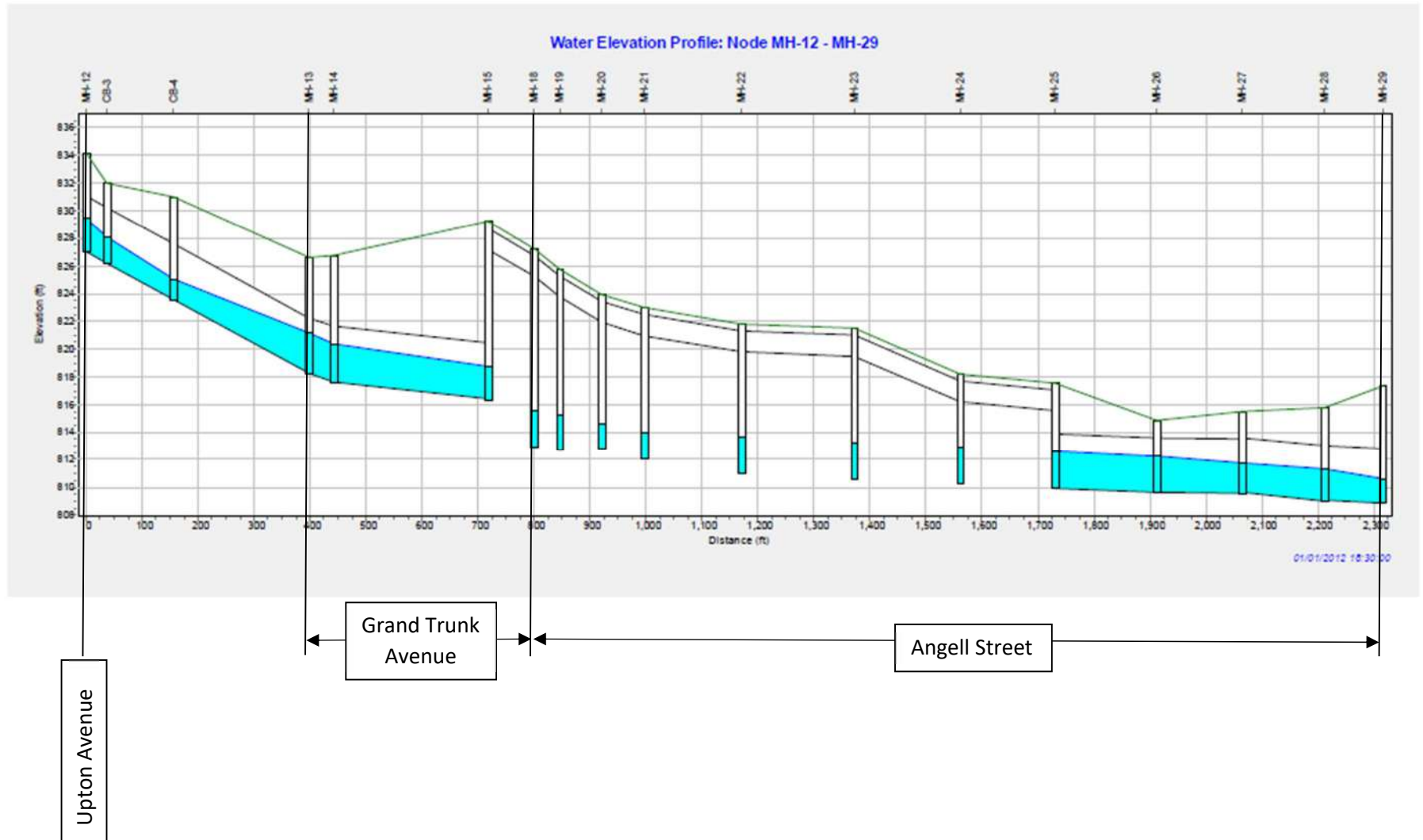
Alternative 2 – Upton Sub-Catchment, 2-year Storm Event



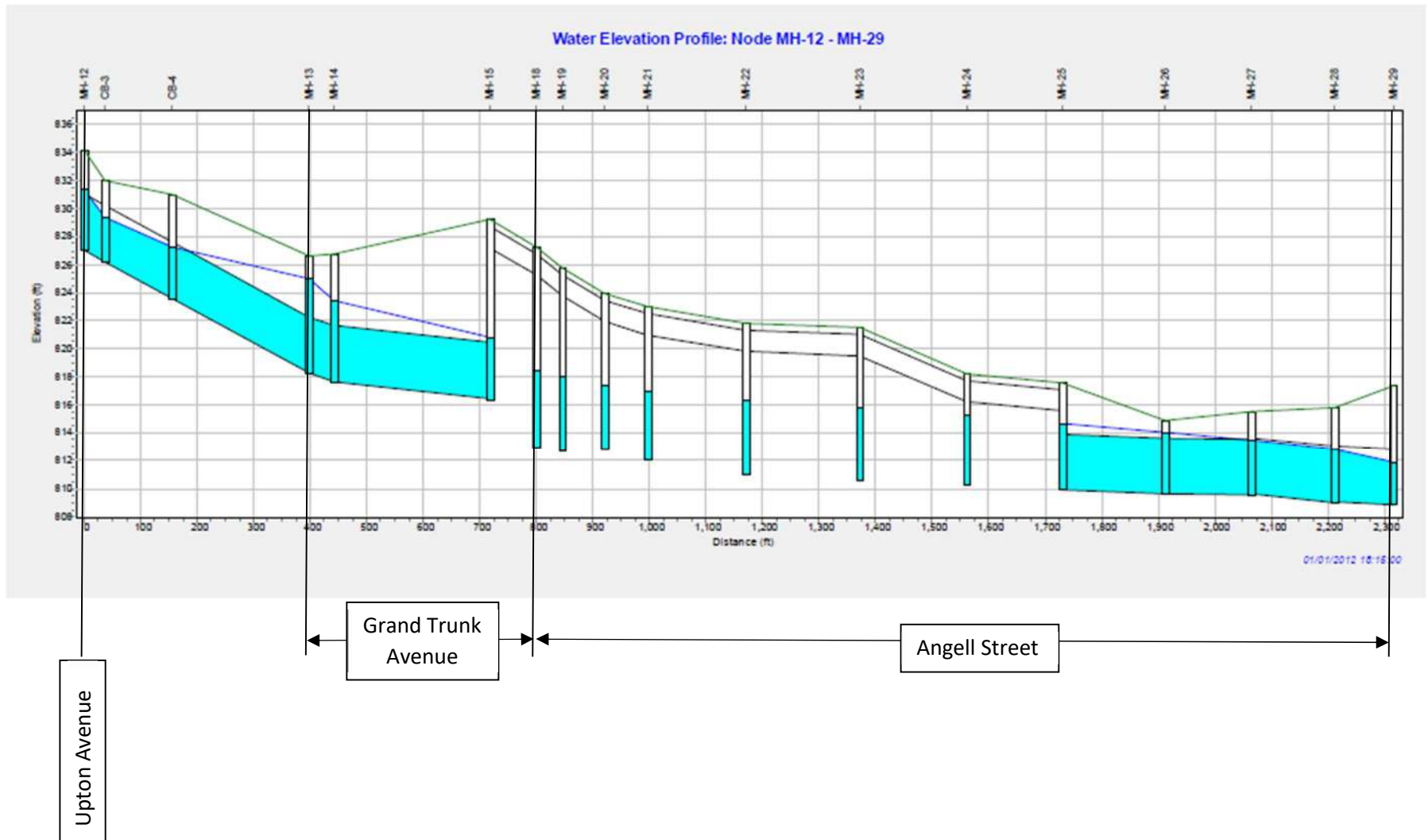
Alternative 2 – Upton Sub-Catchment, 10-year Storm Event



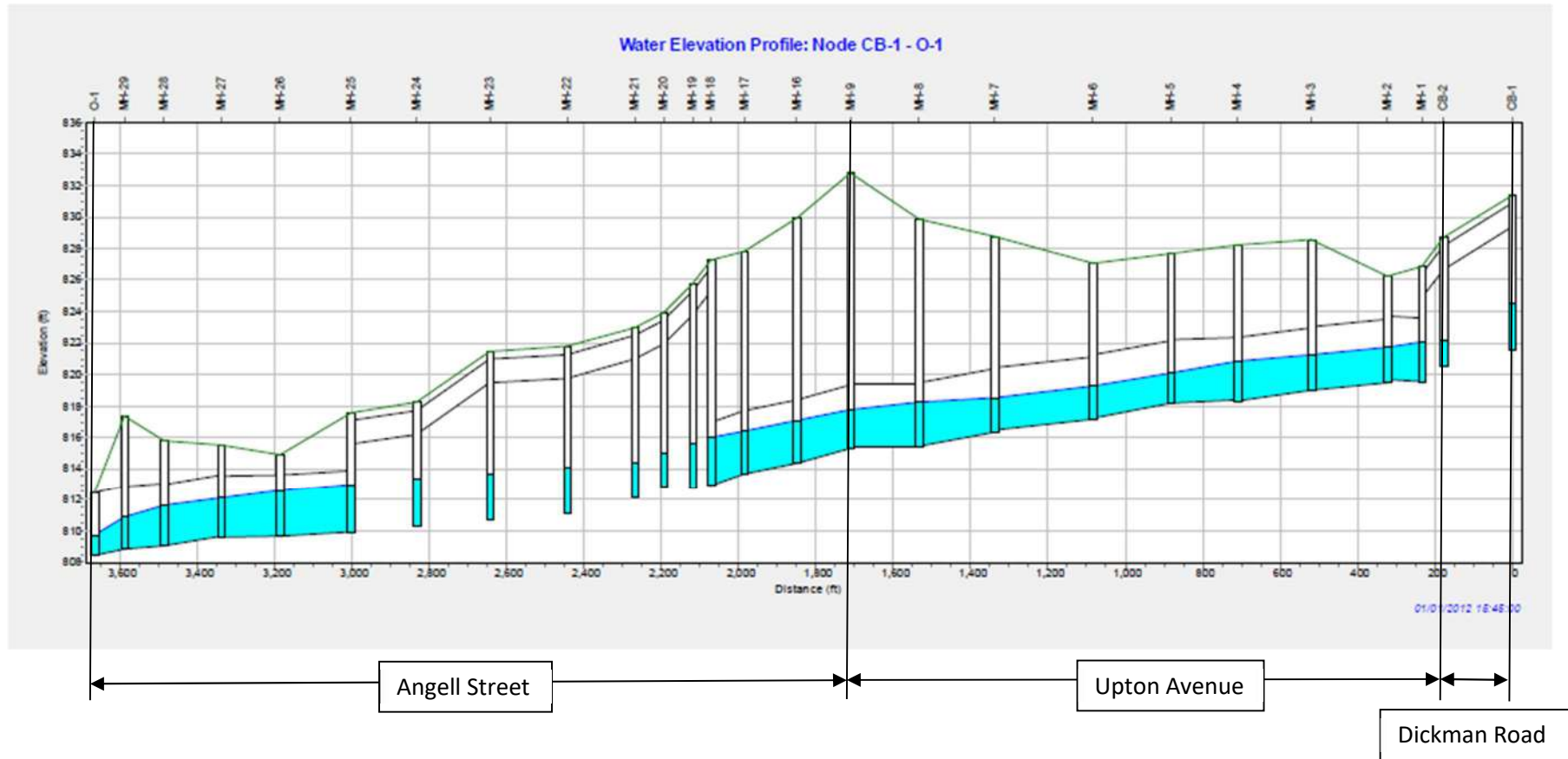
Alternative 2 – Grand Trunk Sub-Catchment, 2-year Storm Event



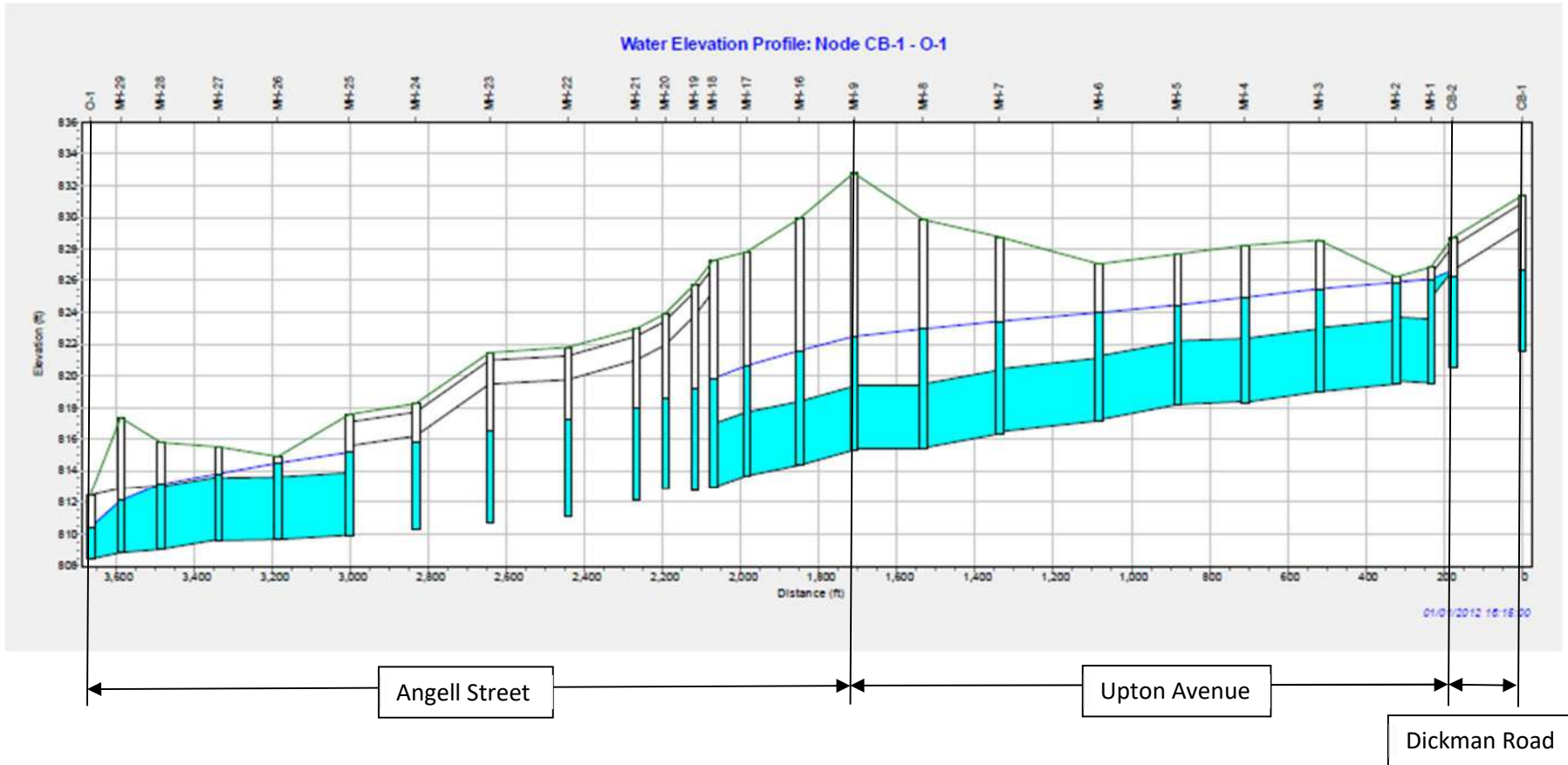
Alternative 2 – Grand Trunk Sub-Catchment, 10-year Storm Event



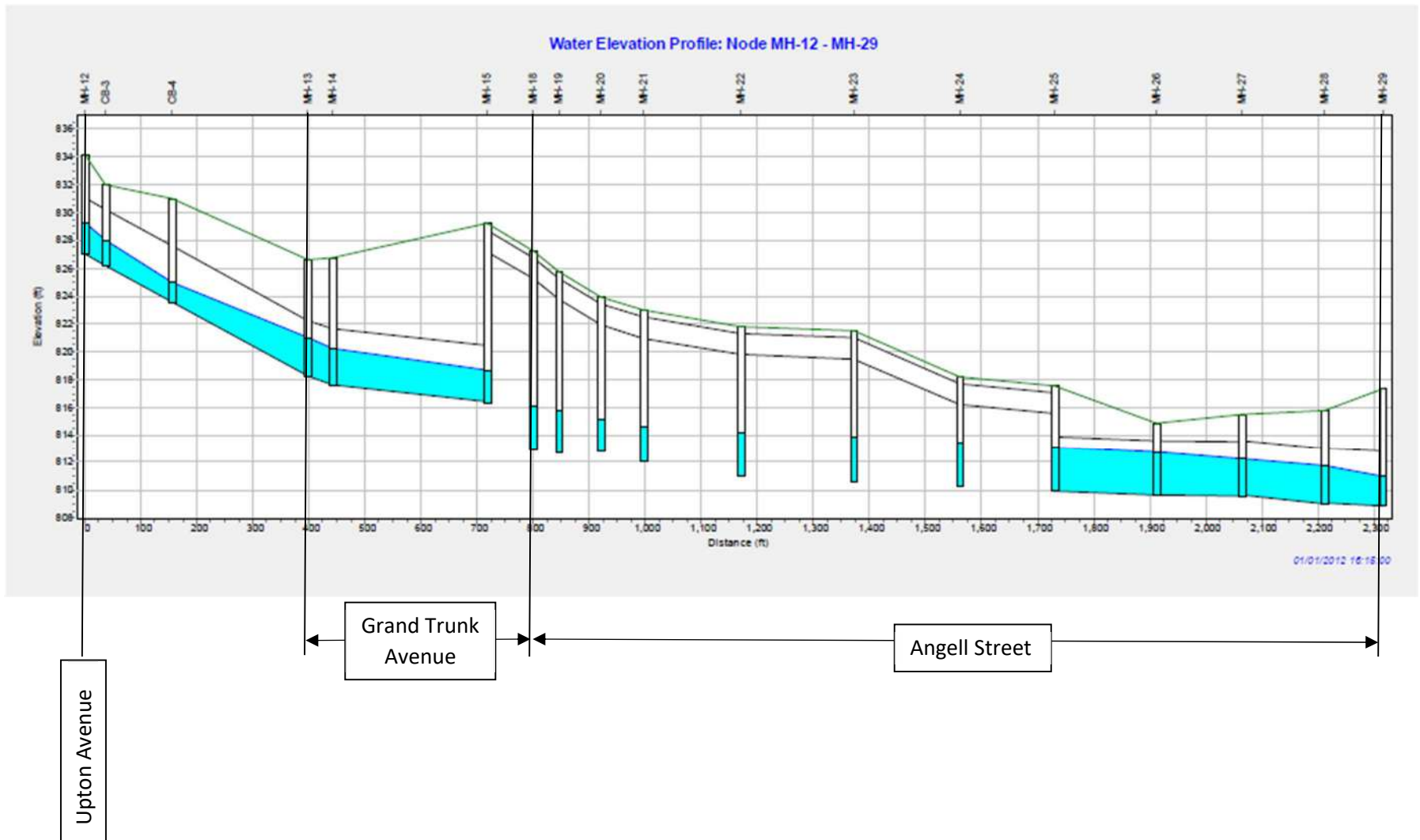
Alternative 3 – Upton Sub-Catchment, 2-year Storm Event



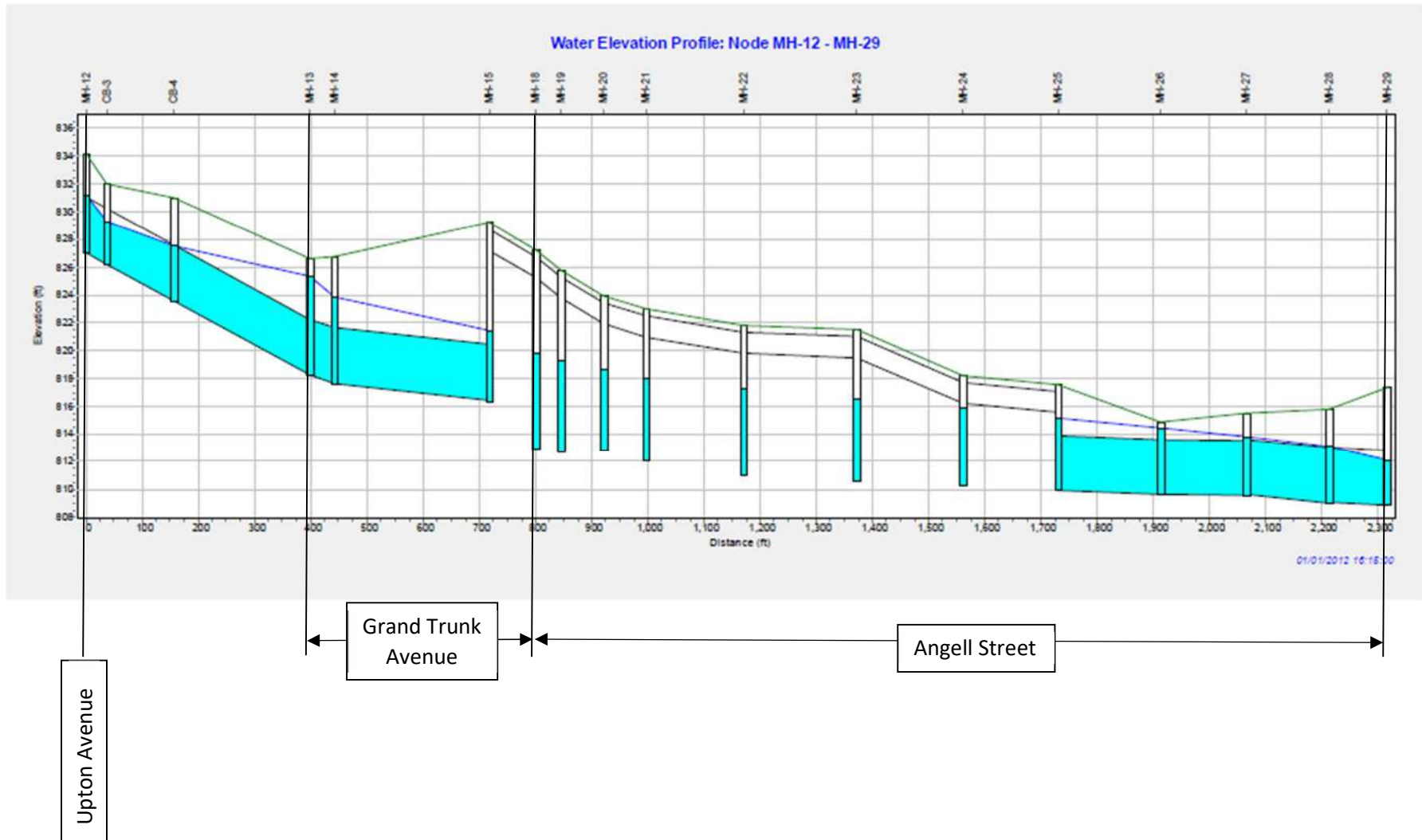
Alternative 3 – Upton Sub-Catchment, 10-year Storm Event



Alternative 3 – Grand Trunk Sub-Catchment, 2-year Storm Event



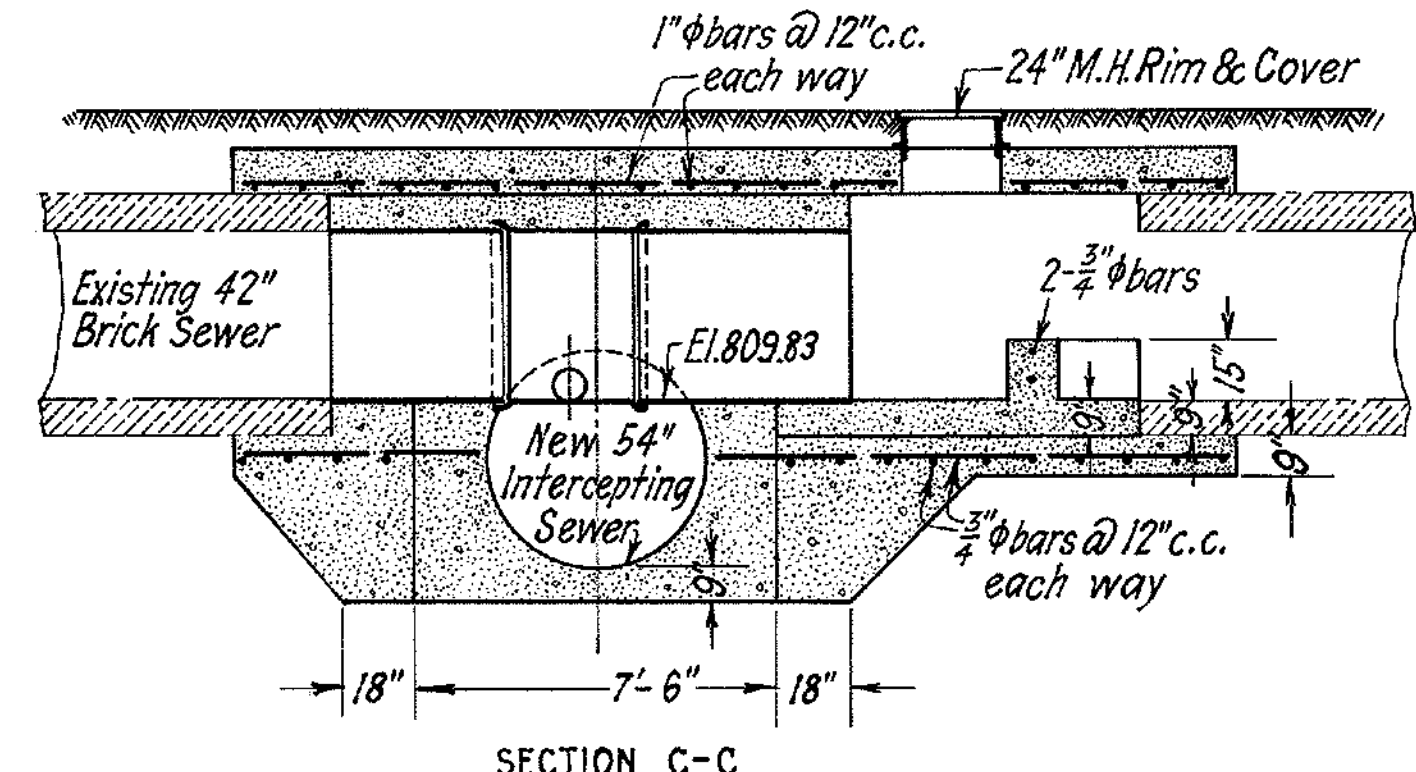
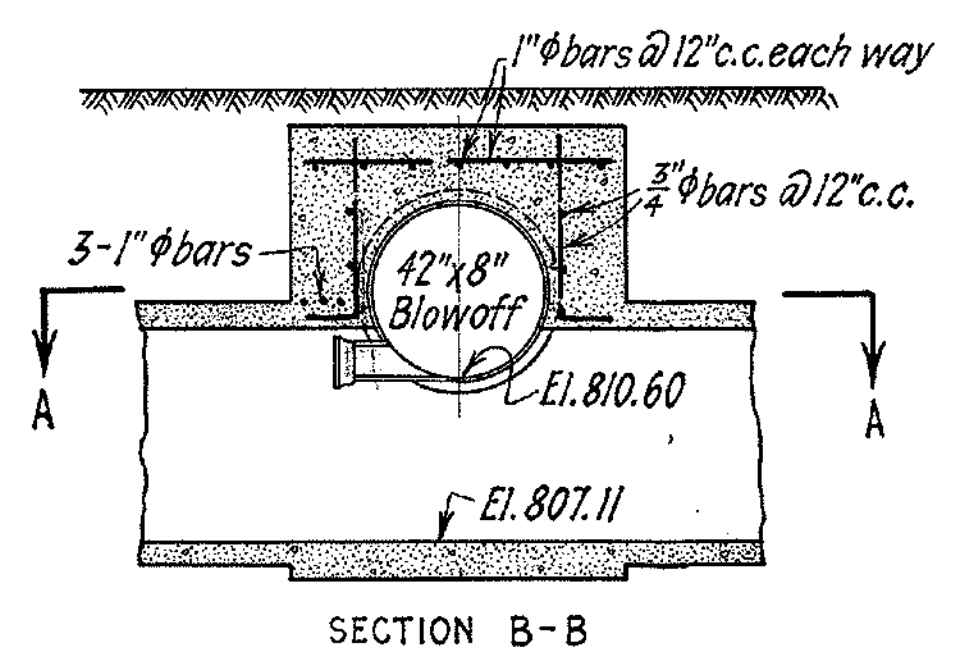
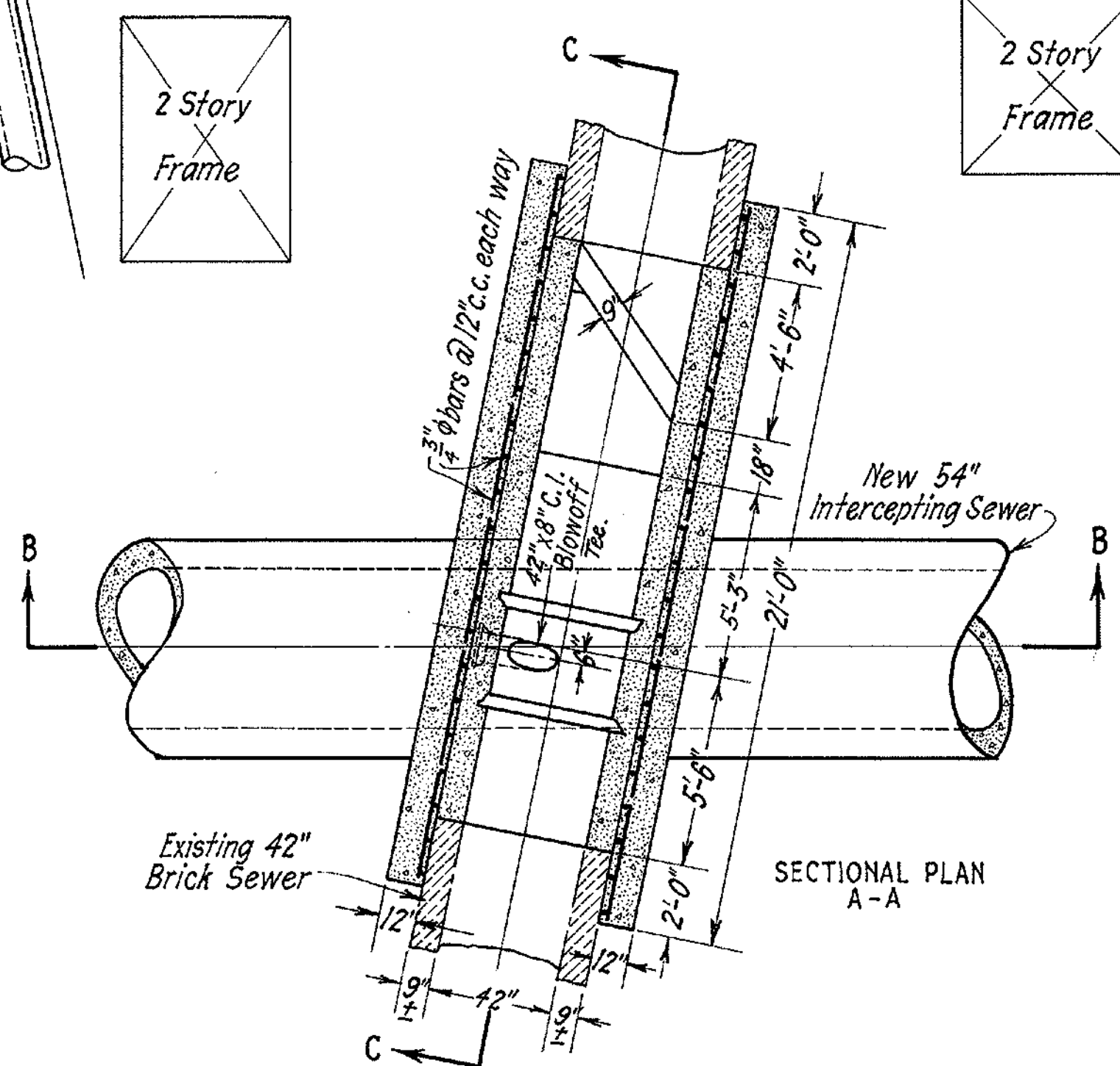
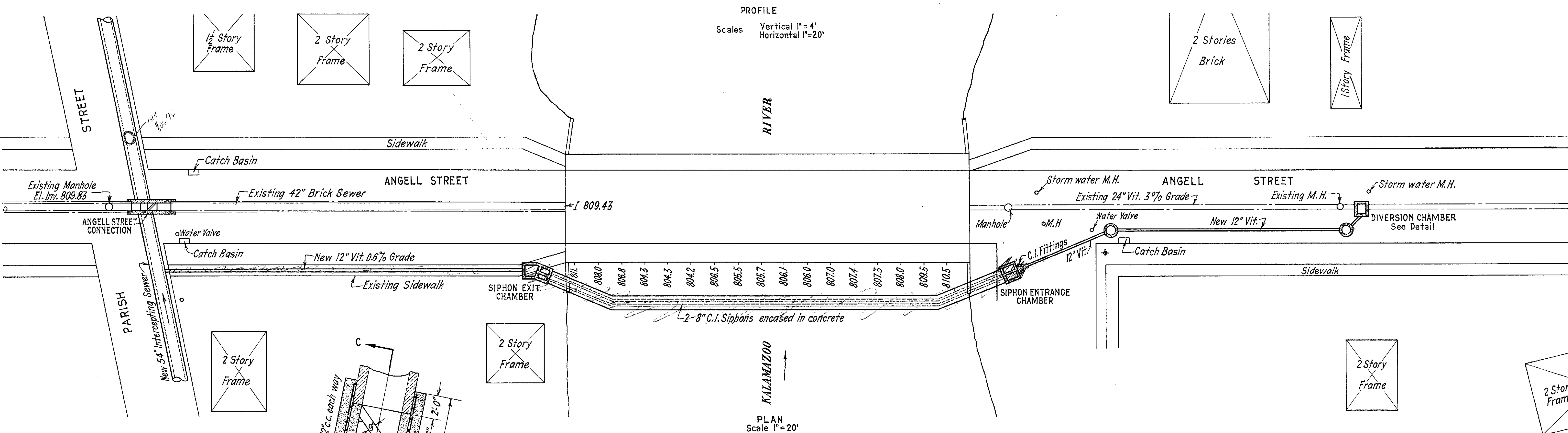
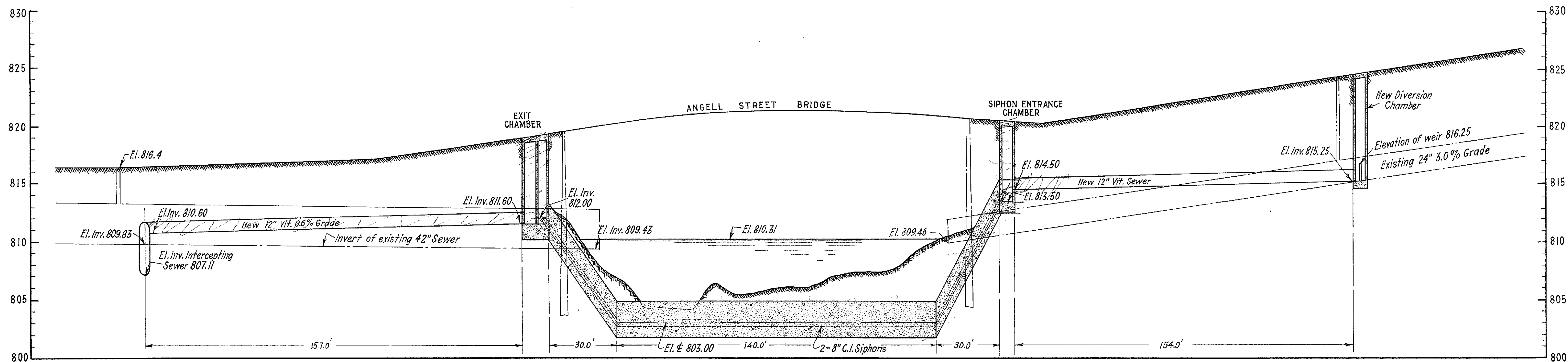
Alternative 3 – Grand Trunk Sub-Catchment, 10-year Storm Event



Appendix 3

As-Built Plan Excerpts





ANGELL STREET SEWER CONNECTION

CONTRACT NO. 1
CITY OF BATTLE CREEK, MICH.
MAIN INTERCEPTING SEWER
ANGELL STREET SIPHON
MAP, PROFILE & SEWER CONNECTION

SCALES As indicated MARCH 1927

CURVE DATA 4
CONST. & W. B.D. EDWY CONST. & W. B.D. EDWY
Δ = 6°55'02" E
D = 730.00'
T = 128.48'
E = 3.60'
L = 256.69'
PC = 415+71.52
PI = 417+00.00
PT = 418+28.81

CURVE DATA 5
Δ = 6°55'02" E
D = 730.00'
T = 128.48'
E = 3.60'
L = 256.69'
PC = 421+13.60
PI = 421+50.43
PT = 421+99.16 Back = Sta 422+00.67 Ahead

CURVE DATA 6
CONST. & E. B.D. EDWY CONST. & E. B.D. EDWY
Δ = 8°19'19" E
D = 1153.00'
T = 453.66'
E = 12.11'
L = 665.76'
PC = 410+19.32
PI = 413+52.78
PT = 416+85.00

CURVE DATA 7
CONST. & E. B.D. EDWY CONST. & E. B.D. EDWY
Δ = 8°19'19" E
D = 1153.00'
T = 453.66'
E = 12.11'
L = 665.76'
PC = 420+90.89
PI = 421+46.47
PT = 422+01.85 Back = Sta 422+13.42 Ahead

* PI Shown Above = 25' E of Survey & Sta 413+67.36

CONCRETE SIDEWALK (This Sta.)
Sta 410+00 to Sta 415+00 (E. Bd. Rt.)
E. & W. of Magnor
Magnor to Sta 418+00 (E. Bd. Rt.)
Walk to E. Bd. @ 418+60 Rt.
Median (E. of Upton)
Upton (NW & NE quadrant)
4" Concrete Sidewalk 4891 Sq. Ft.

Clearing & Grubbing to R.O.W.
Sta 410+00 to Sta 413+30 (Survey & Lt.)
Clearing 0.19 Acres
Grubbing 30 Sq. Eds.

NOTE:
Michigan Bell Telephones to place
location Marker for pressure valve at
Sta 411+50.

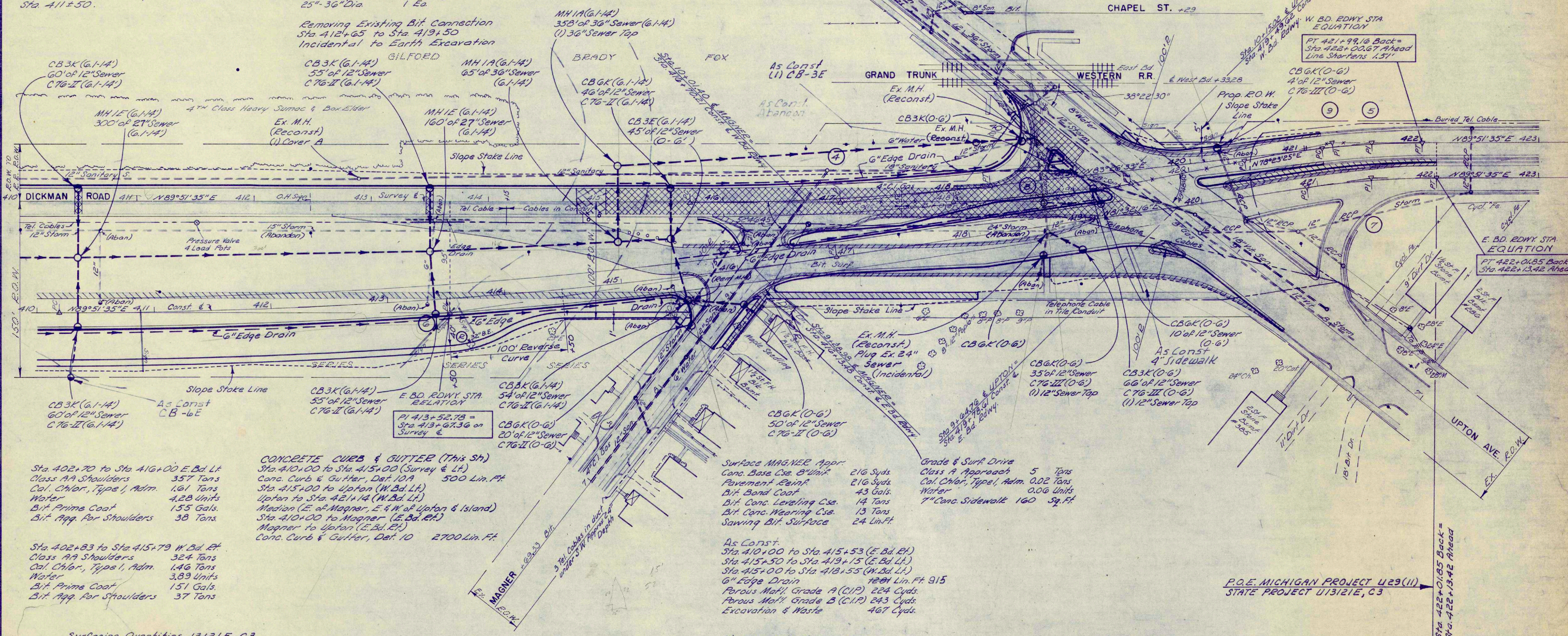
Removing Old Pavement
Shown 1392 Syds.

Removing Sidewalk
Shown 562 Syds.

Removing Curb & Gutter
Shown 1536 Lin. Ft.

Removing Trees Shown (E)
25" 36" Dia 1 Ea.

Removing Existing Bit Connection
Sta 412+65 to Sta 419+50
Incidental to Earth Excavation



Sta. 402+70 to Sta. 416+00 E. Bd. Lt.
Class AA Shoulders 357 Tons
Cal. Chlor., Type I, Adm. 1.61 Tons
Water 4.28 Units
Bit. Prime Coat 155 Gals.
Bit. App. For Shoulders 38 Tons

Sta. 402+83 to Sta. 415+79 W. Bd. Rt.
Class AA Shoulders 324 Tons
Cal. Chlor., Type I, Adm. 1.46 Tons
Water 3.89 Units
Bit. Prime Coat 151 Gals.
Bit. App. For Shoulders 37 Tons

CONCRETE CURB & GUTTER (This Sta.)
Sta. 410+00 to Sta. 415+00 (Survey & Lt.)
Conc. Curb & Gutter, Def. 10A 500 Lin. Ft.
Sta. 415+00 to Upton (W. Bd. Lt.)
Upton to Sta. 421+14 (W. Bd. Lt.)
Median (E. of Magnor, E. & W. of Upton & Island)
Sta. 410+00 to Magnor (E. Bd. Rt.)
Magnor to Upton (E. Bd. Rt.)
Conc. Curb & Gutter, Def. 10 2700 Lin. Ft.

Surface MAGNER Appr.
Conc. Base Cse. 8" Unif. 216 Syds.
Pavement Reinf. 216 Syds.
Bit. Bond Coat 43 Gals.
Bit. Conc. Leveling Cse. 14 Tons
Bit. Conc. Wearing Cse. 13 Tons
Sawing Bit. Surface 24 Lin. Ft.

Grade & Surf. Drive
Class A Approach 5 Tons
Cal. Chlor., Type I, Adm. 0.02 Tons
Water 0.06 Units
7" Conc. Sidewalk 160 Sq. Ft.

As Const.
Sta. 410+00 to Sta. 415+53 (E. Bd. Rt.)
Sta. 415+50 to Sta. 419+15 (E. Bd. Lt.)
Sta. 415+00 to Sta. 418+55 (W. Bd. Lt.)
6" Edge Drain 1000 Lin. Ft. 915
Perous Mat'l. Grade A (C.I.P.) 224 Cyds.
Perous Mat'l. Grade B (C.I.P.) 243 Cyds.
Excavation & Waste 467 Cyds.

Sta. 410+00 to Sta. 423+00
Abandon Catch Basins 9 Ea.
Abandon Manholes 3 Ea.
Removing Manholes 1 Ea.
Reconstructing Manholes 4 Ea.

Surfacing Quantities 13121E, C3

LOCATION	CONC. PAVT 9" UNIF.	CONC. BASE CSE. 8" UNIF.	PAVT. REINF.	BIT. BOND COAT	BIT. CONC. LEVELING CSE.	BIT. CONC. WEARING CSE.	SELECTED SUBBASE 2A	CAL. CHLOR. TYPE I, ADM.	WATER	STEEL REINF.	CONC. BASE COURSE WIDENING
Turning Lane's Crossover @ Forrest	SYDS.	SYDS.	SYDS.	GALS.	TONS	TONS	TONS	TONS	UNITS	LBS.	SYDS
Sta. 402+70 to 419+45 E. Bd.	824		824				187	0.84	2.24		
Sta. 402+83 to 415+00 W. Bd.	4780		4780				1249	5.62	14.99		
Sta. 415+00 to 419+15 W. Bd.		1636	1636	649	211	195	414	1.86	4.97	1626	270
Patching (Exist. Pavt. For Sewers)		59		327	106	98					

AS CONSTRUCTED
ACCORDING TO MARKED PLANS
PREPARED BY PROJECT ENGINEER

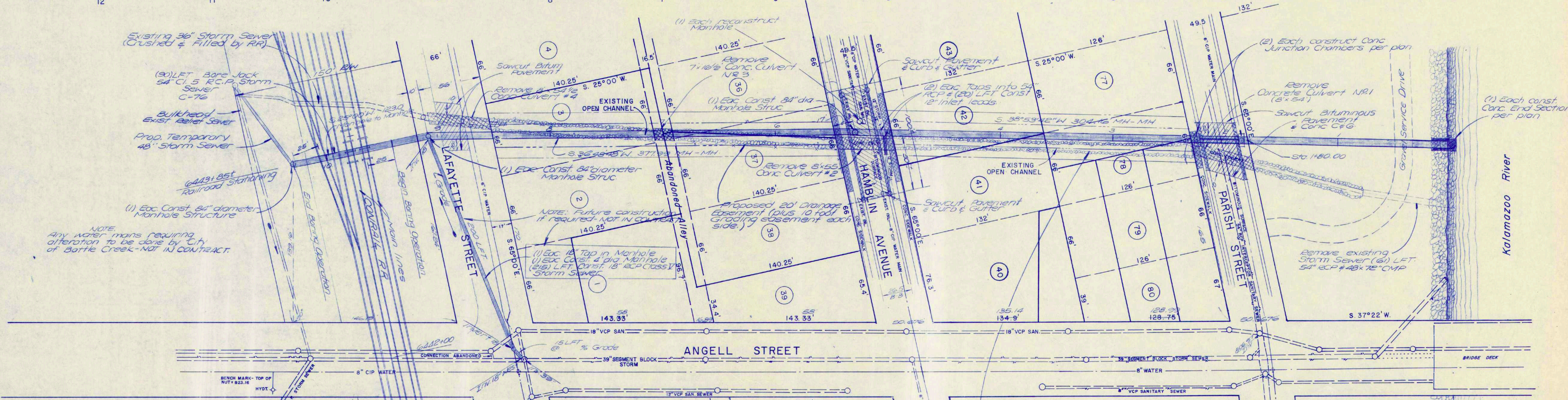
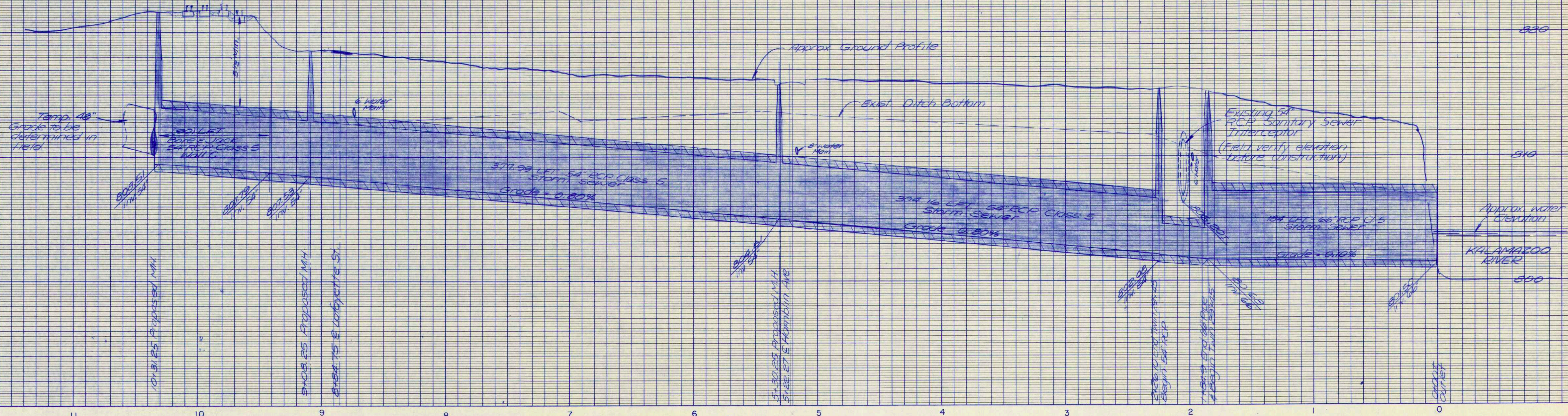
CSR 9-19-3 #5-2nd. CON LT. of 919+25 - 920+35
CSR 6-27-43 #2 Revised Alignment & Added R.O.W. in N.E. Quad.
CSR 9-28-42

S.P.R. DIV. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
4	MICH.	13121	1942	17	17

S.P.R. DIV. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
4	MICH.	13121	1942	17	17

Surface Islands
Sta. 418+79 to Sta. 418+93 (Lt. of W. Bd. Const. & Sta. 416+47 to Sta. 419+25 (Lt. of E. Bd. Const. & Bit. Prime Coat 58 Gals.
Bit. Concrete Wearing Cse. 1.9 Tons
Cl. AA Shoulders 52 Tons
Cal. Chloride, Type I, Adm. 0.16 Tons
Temporary Cross Over
Approach Sta. 421 as Directed
by the Engineer.
For Quantities See Sheet 6

P.O.E. MICHIGAN PROJECT 13121E, C3
STATE PROJECT 13121E, C3



DESCRIPTION OF IMPROVEMENTS	REVISION DATES	
	PROPOSED	AS BUILT
Excavate & Fill exist Channel	190	100
Const. Storm Sewer & Appur.	190	100

- LEGEND**
- Remove Bituminous materials.
 - Remove Concrete Materials.
 - Construct Concrete Items

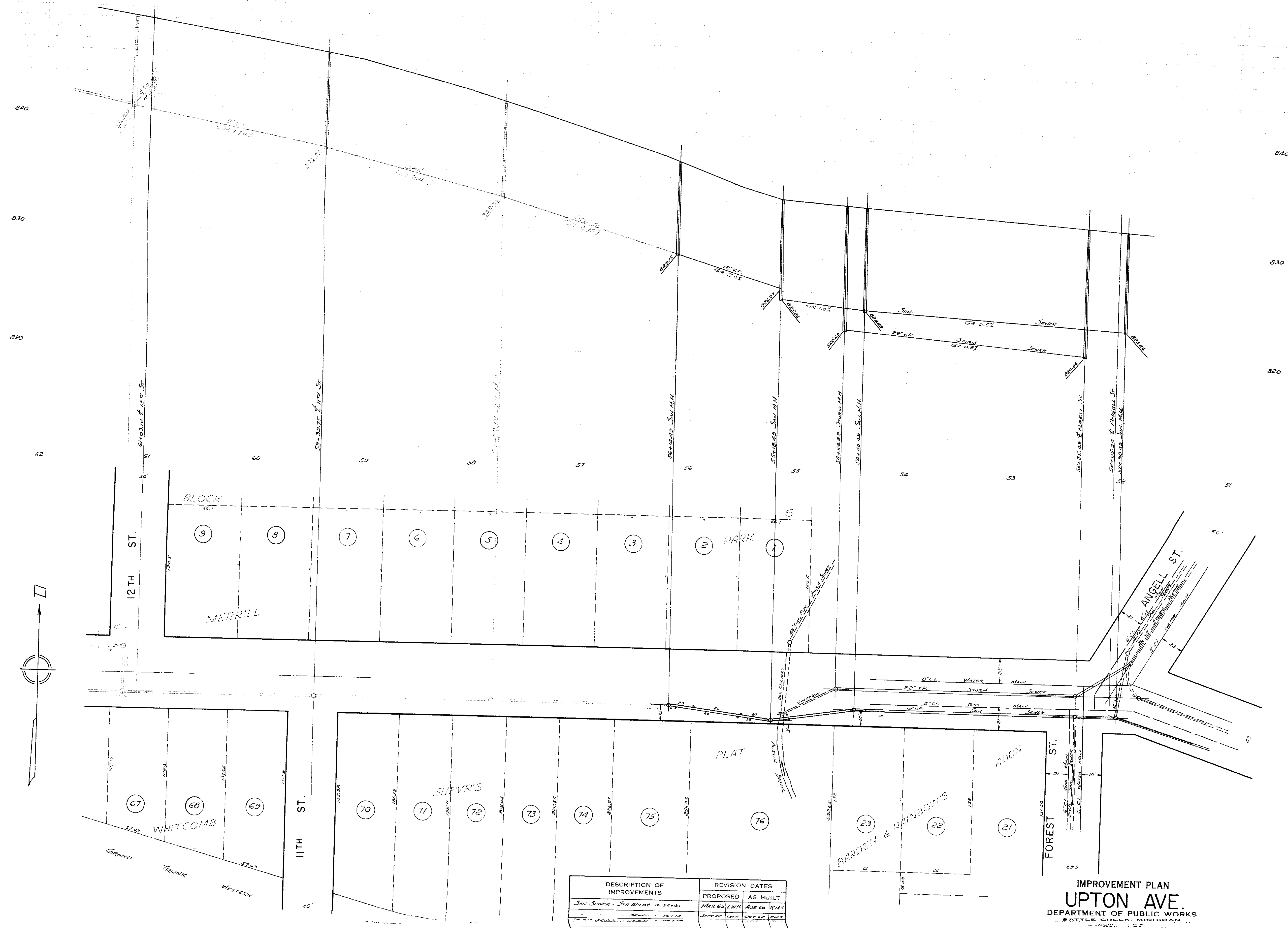
NOTE:
Completely remove existing channel rip-rap, culverts and all appurtenances & fill with approved fill material. Place 4" Tapsail and Class A hydroseeding after pipe is in place.

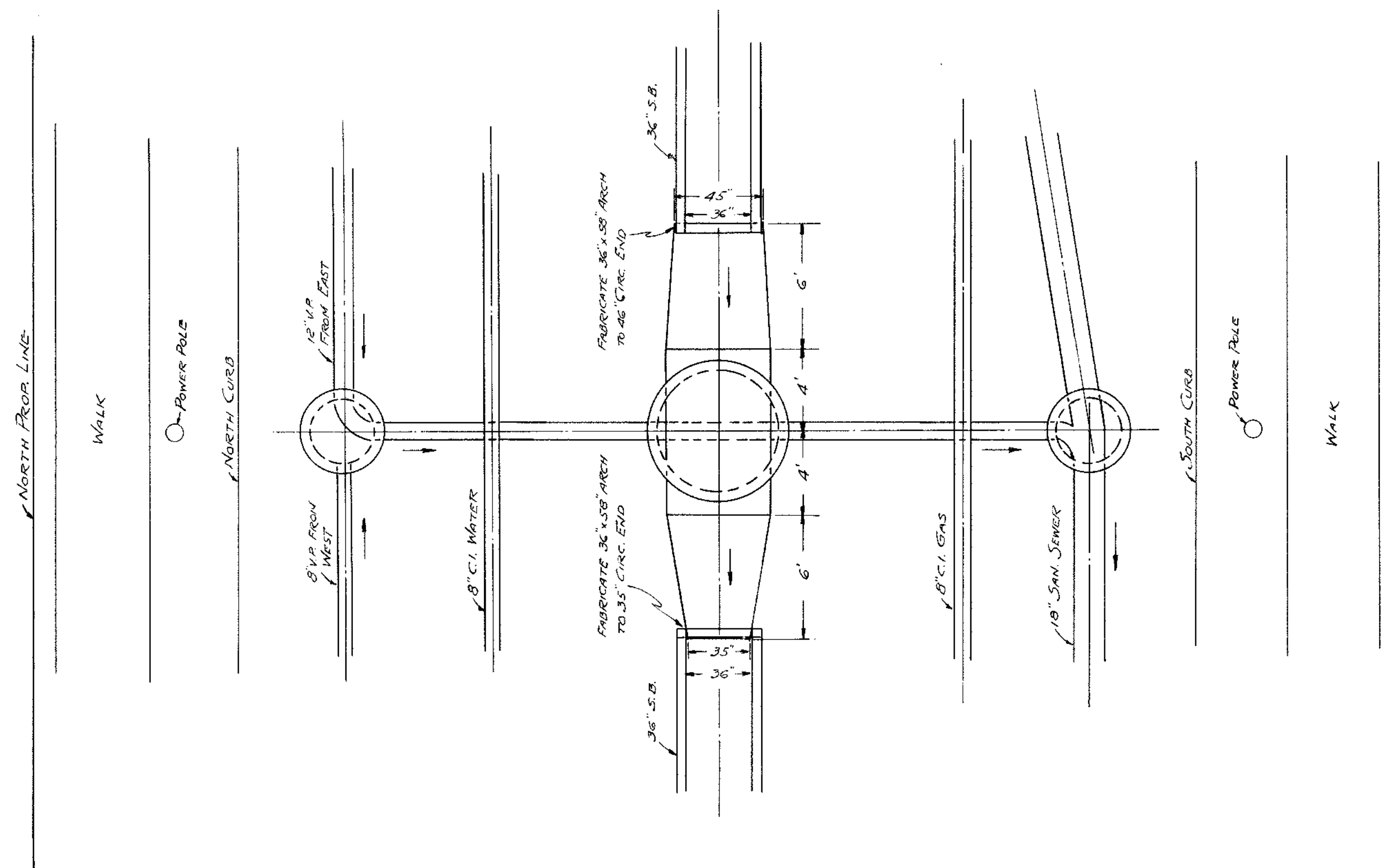
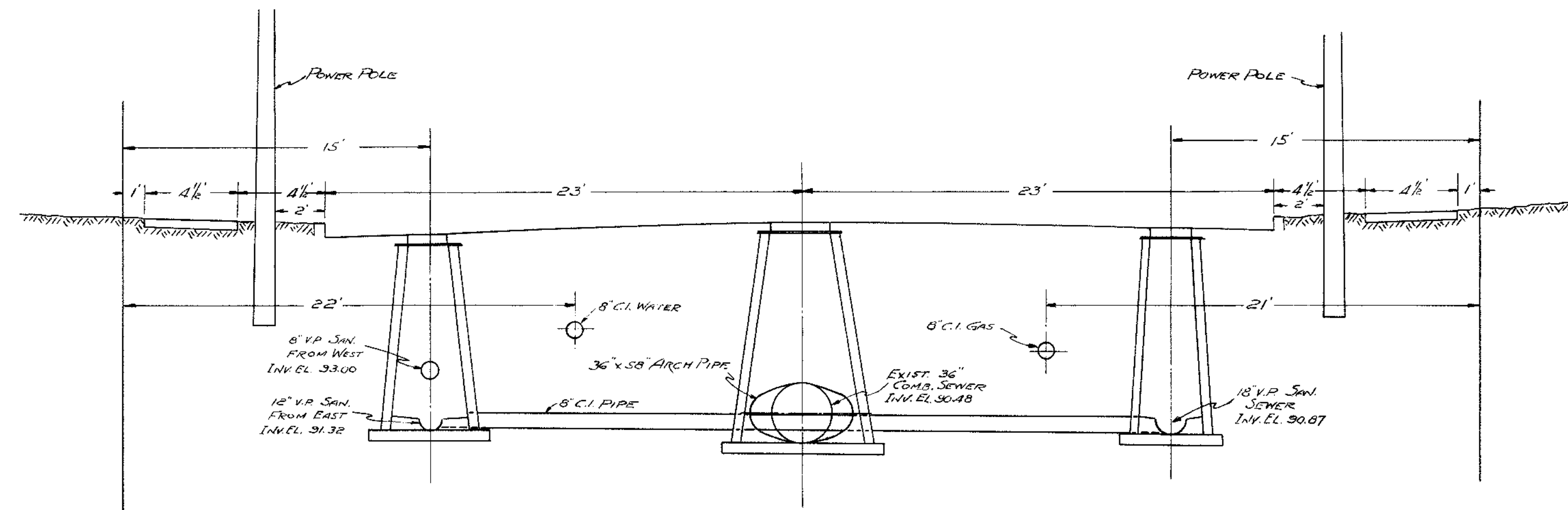
IMPROVEMENT PLAN

ENGINEERING DEPARTMENT
CITY OF BATTLE CREEK, MICHIGAN

AUSTIN BROOK

DRAWN BY K.C.B.	APPROVED	DATE 1/80
SCALE 1"=40'	SHEET OF SHEETS	DWG. NO.





SPECIAL CROSSOVER
 FROM
 12" SAN. SEWER ON NORTH SIDE
 TO
 18" SAN. SEWER ON SOUTH SIDE
 THRU
 36" STORM SEWER
 UPTON AVE AT ADA ST.
 DEPARTMENT OF PUBLIC WORKS

Survey Drawings



2121 3 Mile Rd.

Walker, Michigan 49544

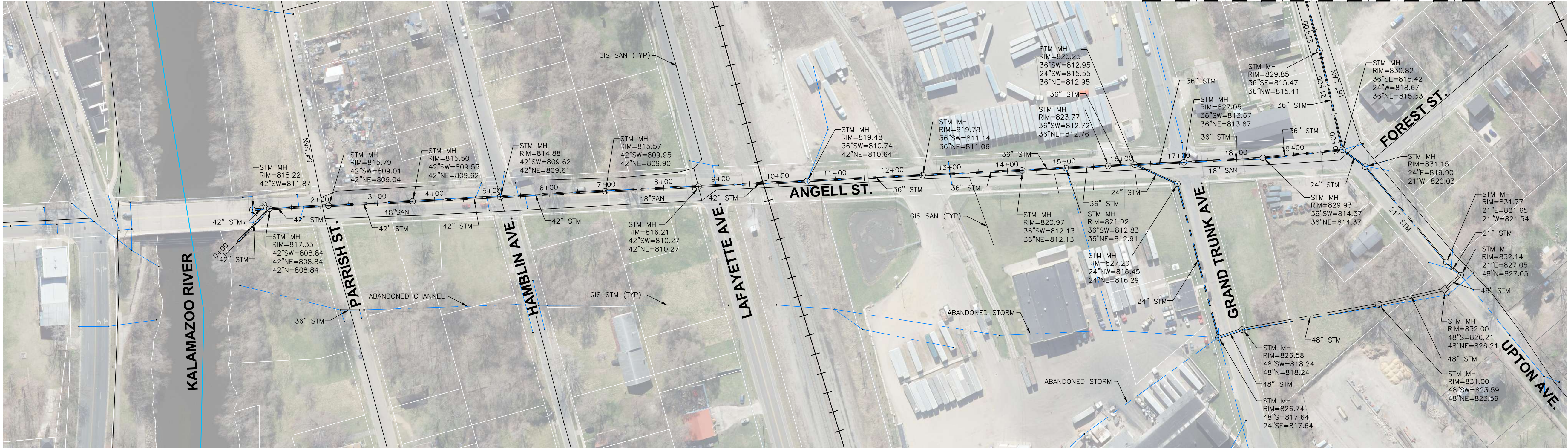
Phone: 616.301.7888

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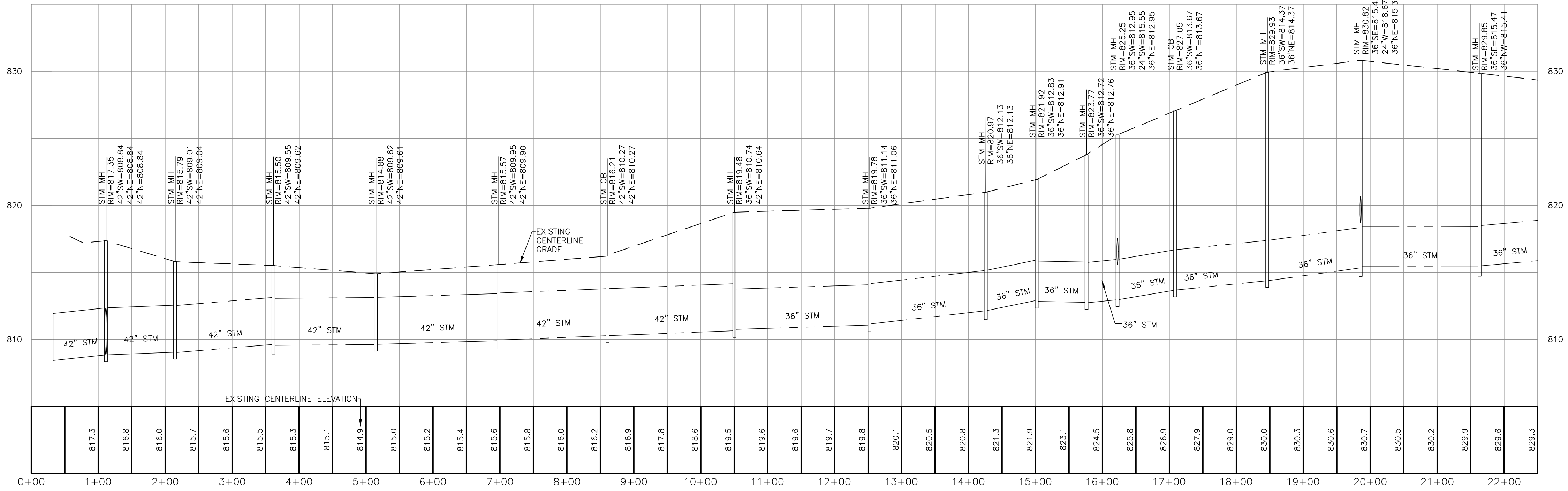


This map illustrates the study area watershed boundary for the City of Battle Creek and the City of Springfield in Calhoun County, Michigan. The map is divided into two main sub-catchment areas: the Grand Trunk Sub-Catchment Area, highlighted in purple, and the Upton Sub-Catchment Area, highlighted in green. The Grand Trunk Sub-Catchment Area is bounded by a dashed black line and includes major roads such as Upton Ave, C Ave, 14th St N, 20th St N, 24th St N, 28th St N, 30th St N, and Helmer Rd N. The Upton Sub-Catchment Area is bounded by a dashed black line and includes major roads such as Dickman Rd, Carl Ave, Reynolds Rd, W Goguc St, 11th St N, 12th St N, 13th St N, 14th St N, 15th St N, 16th St N, 17th St N, 18th St N, 19th St N, 20th St N, 21st St N, 22nd St N, 23rd St N, 24th St N, 25th St N, 26th St N, 27th St N, 28th St N, 29th St N, 30th St N, 31st St N, 32nd St N, 33rd St N, 34th St N, 35th St N, 36th St N, 37th St N, 38th St N, 39th St N, 40th St N, 41st St N, 42nd St N, 43rd St N, 44th St N, 45th St N, 46th St N, 47th St N, 48th St N, 49th St N, 50th St N, 51st St N, 52nd St N, 53rd St N, 54th St N, 55th St N, 56th St N, 57th St N, 58th St N, 59th St N, 60th St N, 61st St N, 62nd St N, 63rd St N, 64th St N, 65th St N, 66th St N, 67th St N, 68th St N, 69th St N, 70th St N, 71st St N, 72nd St N, 73rd St N, 74th St N, 75th St N, 76th St N, 77th St N, 78th St N, 79th St N, 80th St N, 81st St N, 82nd St N, 83rd St N, 84th St N, 85th St N, 86th St N, 87th St N, 88th St N, 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505th St N, 506th

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PLAN VIEW



CENTERLINE PROFILE

SCALE: HORIZONTAL: 1" = 100'
VERTICAL: 1" = 5'



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Walker, MI 49544
Ph: 616-301-7888
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NO.	ISSUED FOR	DATE
1.	ENGINEERING REPORT	3/2023

CITY OF BATTLE CREEK
10 N. DIVISION STREET, BATTLE CREEK, MICHIGAN 49014
PROJECT: GRAND TRUNK DRAINAGE STUDY
BATTLE CREEK, MICHIGAN

PROJECT NUMBER: 22-072		DATE
SURVEYED BY: CITY OF B.C.		9/2022
DESIGNED BY: RJB		12/2022
DRAFTED BY: NDJ		10/2022
		10/2022

CLIENT:	
PROJECT:	

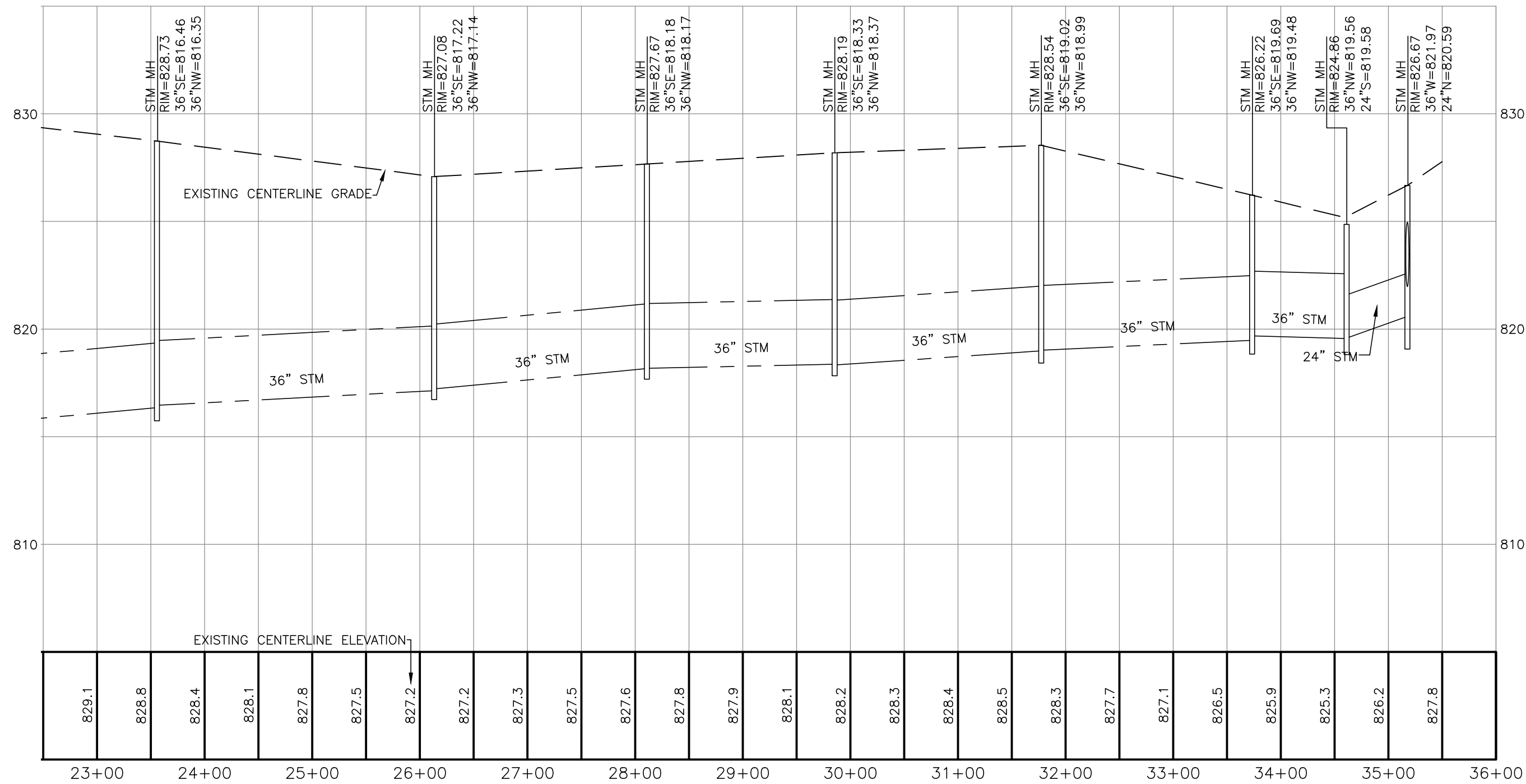
PLAN & PROFILE
STA: 0+00 - 22+50

SHEET NUMBER

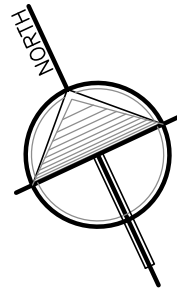
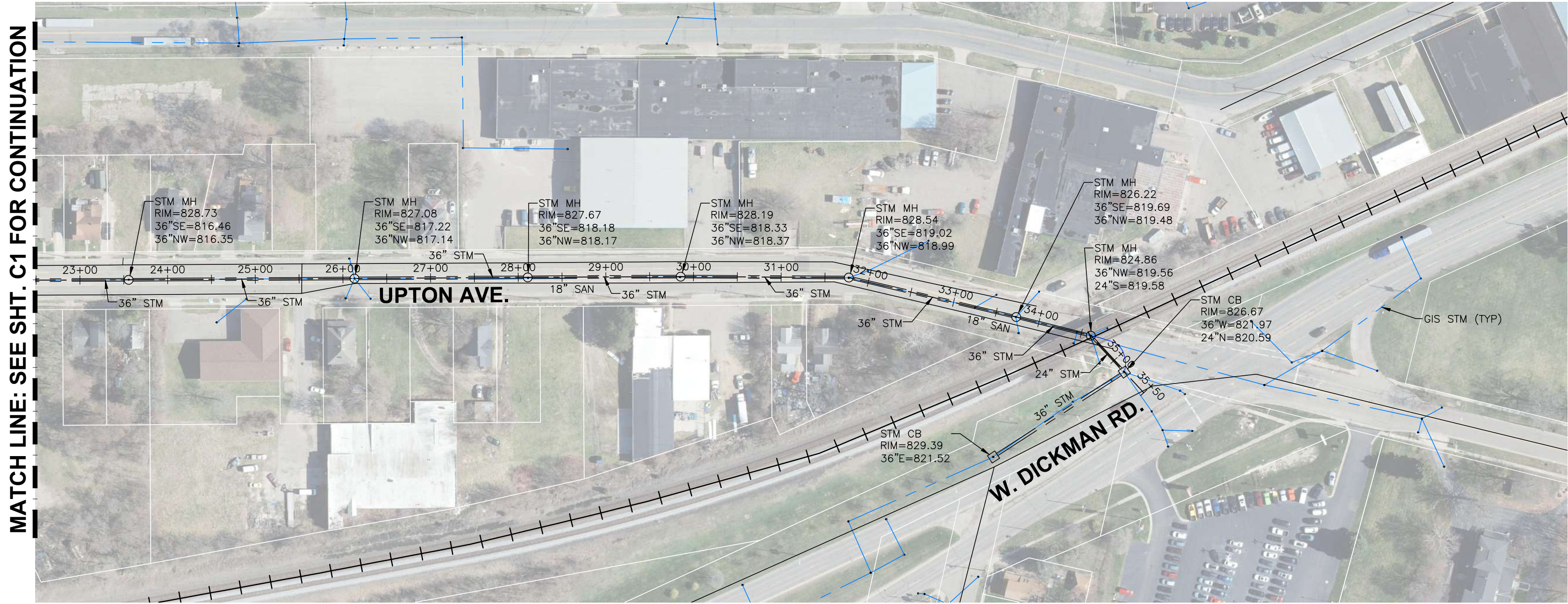
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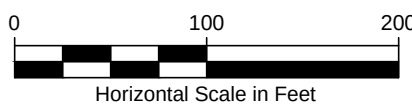
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VERTICAL: 1" = 5'



PLAN VIEW



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PLAN & PROFILE
STA: 22+50 - 36+00

SHEET NUMBER

C2

PROJECT NUMBER: 22-072
SURVEYED BY: CITY OF B.C.
DESIGNED BY: RJB
DRAFTED BY: NDJ
QA/QC: DJF

DATE

9/2022
12/2022
10/2022
12/2022

CLIENT:

CITY OF BATTLE CREEK
10 N. DIVISION STREET, BATTLE CREEK, MICHIGAN 49014
PROJECT:
GRAND TRUNK DRAINAGE STUDY
BATTLE CREEK, MICHIGAN

REVISIONS:

NO. | ISSUED FOR | ENGINEERING REPORT

1. |

DATE

3/2023

LRE
ENGINEERS & SURVEYORS

2121 3 Mile Rd NW
Walker, MI 49544
Ph: 616-301-7886
www.LREMll.com

Grand Trunk Flooding Meeting

October 9, 2025 @ 1pm

Department of Public Works

Attendees: Ron Caldwell (Reconserve); Steve Skalski (City of Battle Creek, DPW); Todd Everson (City of Battle Creek, DPW), Tad McCrumb (City of Battle Creek, DPW), Patty Hoch-Melluish (City of Battle Creek, DPW)

Summary:

Tad provided history of the flooding issue at Grand Trunk, Upton, Angell Streets.

- The original storm sewer system in the Grand Trunk area consisted of a 48" line running from the south to Grand Trunk where it ran under the properties at 200 Grand Trunk and 170 Angell (the current Reconserve), under the railroad track that parallels Lafayette and discharged to the Kalamazoo River just west of Angell Street.
- Back in the 1980s, the culvert under the Conrail Railroad tracks on the north side of Lafayette was filled as it was starting to collapse, compromising the integrity of the tracks. With the connection under the railroad track filled, the 48" storm sewer line coming from the south was rerouted and diverted into a 12" pipe along Grand Trunk which connects to the 36" stormwater running along Angell St. and discharging into the Kalamazoo River at Angell and Parish. **This was meant to be a temporary measure.**
- Numerous attempts were made to coordinate with the railroad to repair the filled culvert under the tracks to reconnect this storm sewer conveyance, but to date, the culvert remains blocked and the stormwater from the 48" line from the south continues to be transported to an undersized 12" connector pipe. This, in combination with the storm flow coming from the east via Upton Avenue, results in flooding on Upton Avenue at Dickman Road under the railroad overpass, and also creates surcharging and flooding of stormwater along Grand Trunk and Angell Streets.
- The City of Battle Creek has contracted studies over the years to determine options to alleviate the flooding issues. The most recent of these studies was completed in March 2023 by LRE, titled "Grand Trunk Drainage Study." The findings show that the drainage area encompasses 929 acres with 282 acres in Battle Creek and 647 acres in Springfield. Michigan Department of Transportation (MDOT) roadways also contribute to the stormwater volumes. In addition, there is a natural stream, Austin Brook, that is flowing continuously into the system from the south.
- LRE provided five different design options ranging from 2-year to 10-year storm designs. These storm designs will not eliminate flooding in the area, rather it will help to lessen the impacts and frequency.
- In 2023 dollars, these designs range from \$1.28 to 7.35 million dollars. This is a multi-jurisdictional issue that will require funding from various sources.

Discussion:

- The City of Battle Creek recognizes this area is a flooding issue, but lack of designated stormwater funding limits resources to address this. In addition, Battle Creek's portion of the runoff is around 30% of the contributing volume, with Springfield, MDOT and Austin Brook also contributing.

- The City will devote staff in the next couple of months to clear out the drain upstream of Grand Trunk to help with conveyance and flooding.
- The City will schedule a meeting with the Calhoun County Water Resources Commissioner to discuss options regarding establishing this area as a county drain considering the Austin Brook flow into the system.
- The City will continue to work with the multiple entities to consider feasible options.