

To:	Matt Doss	From:	Sarah Harding
	Great Lakes and St. Lawrence Cities Initiative		Stantec
Project/File:	Buchanan St. Joseph Riverfront Restoration (227707082)	Date:	April 18, 2025

Reference: Buchanan St Joseph Riverfront Restoration - Proposed Trail Analysis**Introduction**

The City, along with Abonmarche, stakeholders, and the public, recently completed a Waterfront Master Plan for approximately 50 acres along the St Joseph River. This planning effort inspired a vision to reconnect with the river and create a 'Buchanan waterfront experience reminiscent of our national parks, but on a smaller scale' as noted in the Waterfront Master Plan. One of the master plan's objectives is to enhance access and connectivity between the Landing and the Bluffs by linking the approximately 20 acres and 2,000 linear feet of shoreline owned by the City of Buchanan.

The Great Lakes-St. Lawrence Cities Initiative, in partnership with the City of Buchanan, retained Stantec to conduct a proposed trail analysis, among other plans aimed at resiliency of the natural community processes along the St Joseph River. This analysis focuses on evaluating the Master Plan trail concepts within and between the City parcels, using accessible trail design parameters and sustainable trail design guidance similar to that used for hiking trails within the National Park System.

Existing Site Conditions

Stantec conducted field visits in September 2024 collecting site photos and noting site conditions present at the time. A natural surface foot path exists from the Landing area through the Library Services parcel to the Bluffs parcel, which was walked as part of this analysis. A photo summary log from this field visit is included as Attachment A.

Our team compiled a base map of publicly available GIS datasets including LiDAR, floodplain, soils, and parcel boundaries and GPS data collected including visible infrastructure, utilities, and upland and wetland vegetation communities.

Proposed Conceptual Trails

The attached proposed trail layouts are conceptual, so detailed design has not been completed. In general, sustainable trails traverse slopes rather than directly descending or ascending a slope. This allows for water

Reference: Buchanan St Joseph Riverfront - Proposed Trail Analysis

to sheet flow off the trail, which can result in less erosion and minimize formation of gullies and negative impacts for users, maintenance, and the surrounding environment.

In determining grades for potential trails, Stantec took existing ground slopes, based on LiDAR, along the proposed alignments to generate proposed trail profiles. The trail tread widths are assumed to be 3- to 5-feet wide with 1-foot shoulders or clear zones on either side. Based on the below trail design parameters, the proposed trail profiles in Attachment B: Figures 1 through 8, identify where existing ground slopes exceed the proposed trail running slope.

Trails evaluated and their proposed design parameters include the following:

Trail	Trail Description	Minimum Trail Tread Width	Trail Grade (Running Slope)
Access Drive Trail	Paved, adjacent/at back of curb of reconstructed access drive	5-ft with 1-ft clear zones/shoulders	Follows road grade at about 5% +/-
Parking Lot Trails	Stable, soft-surface or paved; boardwalk / crossing at select locations	4- to 5-ft with 1-ft clear zones / shoulders	<8%
Shoreline Trail	Stable, soft surface; boardwalk or crossings at select locations	3- to 4-ft with 1-ft clear zones / shoulders	<8%
Switchback Trail	Stable, soft surface; steps and boardwalk or crossings at select locations	3- to 4-ft minimum with 1-ft clear zones / shoulders	<12%

Access Drive Trail

The Waterfront Master Plan proposes a trail connecting the Landing and Bluffs parcels along River Front Drive to Robert Street. This trail is depicted in Attachment B: Figures 1, 3, and 4. Findings and recommendations include:

Site Constraints:

- Private ownership of the Library Services parcel will require easements or property acquisition for continuous public trail access along River Front Drive.
- Poor condition of road with unstable channelized stormwater flow.
- Chain link fence along portion of access drive near Library Services parcel constricts proposed trail improvements as well as snow removal and road maintenance.
- Steep slopes between Red Bud Trail and Riverfront Drive.
- Steep slopes along portion of Riverfront Drive.

Improvement Options:

- Improve access road by paving and installing curb and gutter to direct stormwater.
- Designate, clear, and separate a pedestrian trail along the north edge of River Front Drive using a vegetated buffer or curb and striped trail clear zone.

Reference: Buchanan St Joseph Riverfront - Proposed Trail Analysis

- Adjust snow removal practices to minimize negative impacts on proposed pedestrian trail.
- Install slope stabilization practices such as retaining walls, guardrails, and/or safety rails, especially if River Front Drive is widened for a pedestrian trail.
- Implement trail signage and wayfinding for trail user safety and orientation.

Parking Lot, Shoreline and Switchback Trails

The Waterfront Master Plan proposes a nature trail loop and amenity trails through the Landing, a boardwalk shoreline trail along the St Joseph riverfront connecting the Landing and Bluffs parcels, and a sloped switchback trail with overlooks connecting the shoreline trail to the upper, access drive trail near Richards Street. These proposed trails are depicted in Attachment B: Figures 1-5.

A natural surface trail exists between the Landing and Bluffs parcels which is also evaluated as part of this analysis, as shown in Attachment B: Figures 6-8. Findings and recommendations include:

Site Constraints:

- Private ownership of the Library Services parcel will require easements or property acquisition for continuous public trail access between the City-owned parcels.
- Mature trees may need clearing if the trail is wider than 3 to 4 feet.
- Low crossings are needed at wetland seeps, the outfall waterways from these seeps, and one stream/ravine outlet to allow for continuous access.
- Approximately 60-feet of elevation difference must be traversed for the switchback trail between the shoreline trail and Richard Street. Steep slopes may require reinforcement and/or stabilization.
- Existing concrete and rubble piles found in this area may be an obstacle for infrastructure improvements, such as footings, steps, or slope stabilization methods.

Improvement Options:

- Clear and grade existing concrete rubble found to conflict with proposed improvements. This may require additional geotechnical evaluation and soil borings, regrading and slope stabilization.
- Shift proposed shoreline trail alignment further from the shoreline in areas to minimize steep trail grades (running slope) and side slopes, maintain safe clear zones, and shorten low crossing extents.
- Construct low crossings or boardwalk to span sensitive areas (wetland plant communities), seeps, and channelized/ravine drainage flow.
- Construct timber/stone steps or switchback walking paths to traverse steep slopes and reduce reinforced sideslope stabilization or retaining walls.
- Shift proposed switchback trail route outside of the ravine to avoid excessive trail maintenance and maintain user safety due to ravine erosion.
- Implement trail signage and wayfinding for trail user safety and orientation.

Reference: Buchanan St Joseph Riverfront - Proposed Trail Analysis

Resources and References

For further detailed accessibility and design parameters refer to the following resources:

- *Accessibility Guidelines for Outdoor Developed Areas*
- *ADA/ABA Accessibility Guidelines for the Public Right-of-Way (PROWAG)*
- Excerpts from the *CUVA National Park Sustainable Trail Guidelines*, for Soft-Surface Hiking Trail Design and Construction guidance including soil conditions, drainage sheet flow and outslope, and trail climbs and switchbacks.

Field Visit September 2024 - Trail Photo Log Summary

ACCESS ROAD TO THE LANDING (PARKING LOT)



Photo 1: River Front Drive, facing stormwater inlet on south side of River Front Drive and base of slope from Red Bud Trail. This inlet ties to inlet on south side of River Front Drive below.



Photo 2: River Front Drive, facing west along north edge of River Front Drive at stormwater inlet (drains to Tributary 2).

Reference: Buchanan St Joseph Riverfront Restoration – Field Summary



Photo 3: River Front Drive, facing east along River Front Drive toward Red Bud Trail adjacent to the private parcel. The Tributary 2 branch is on left.



Photo 4: River Front Drive, facing west along south side of River Front Drive at fill material encroaching into adjacent wetland.



Photo 5: River Front Drive, facing east along south side of River Front Drive.



Photo 6: Facing north from River Front Drive at CMP outfall. Gully erosion issues were identified at this outfall to Tributary 2.



Photo 7: Second CMP outfall draining from north of River Front Drive into the wetland on the south side of the road.



Photo 8: River Front Drive, facing west along south side of access road. Fill encroachment into adjacent wetland was noted in the field.

Reference: Buchanan St Joseph Riverfront Restoration – Field Summary



Photo 9: Third CMP outfall under River Front Drive draining from north slope of Red Bud Trail into the wetland on south side of the River Front Drive.



Photo 10: Stormwater inlet on River Front Drive draining to CMP outfall.



Photo 11: Cattail marsh at CMP outfall on south side of River Front Drive.

Reference: Buchanan St Joseph Riverfront Restoration – Field Summary



Photo 12: Fourth CMP outfall from River Front Drive into wetland on north side of road.



Photo 13: Facing northwest at the beginning of the divided entrance road from River Front Drive to the boat launch.

EXISTING TRAIL BETWEEN THE LANDING AND THE BLUFFS PARCELS



Photo 14: Start of existing trail, facing west into boat launch parking area.



Photo 15: Start of existing trail, facing east from parking area.



Photo 16: Facing west along the existing trail from approximately 100 feet beyond the parking area.



Photo 17: Facing east along the existing trail from approximately 100 feet beyond the parking area.



Photo 18: Facing east approximately 50 feet west of the Tributary 2 outlet to the St. Joseph River.



Photo 19: Facing west approximately 50 feet west of the Tributary 2 outlet to the St. Joseph River.



Photo 20: Facing east across the mouth of Tributary 2.



Photo 21: Facing east on the trail east of Tributary 2. East of Tributary 2, the trail follows an embankment along the St. Joseph River top of bank.



Photo 22: Facing west on the trail east of Tributary 2. East of Tributary 2, the trail follows an embankment along the St. Joseph River top of bank.



Photo 23: Facing west along trail and river embankment just west of maintained lawn area on the Library Services private property.



Photo 24: Facing east along riverbank into maintained lawn of Library Services private property.



Photo 25: Facing west along riverbank from Library Services private property.



Photo 26: Facing east along riverbank from center of Library Services private property.



Photo 27: First waterway crossing on Library Services private property.



Photo 28: Facing south at waterway from parking area on Library Services private property.



Photo 29: Facing east at eastern portion of Library Services private property.

Photo 30: Facing east at woodland slope on eastern portion of Library Services private property.



Photo 31: Second waterway/wetland on eastern edge of Library Services private property.



Photo 32: Third waterway/wetland drainage on east side of Library services private property.



Photo 33: Facing north at wetland seep area uphill from third waterway.



Photo 34: Facing east into East Park parcel noting steep slopes above top of riverbank.



Photo 35: Facing east along top of riverbank at potential trail location.



Photo 36: Facing west along top of riverbank showing steep slopes.



Photo 37: Facing northwest toward river showing steep bank.



Photo 38: Facing east along potential top of bank trail.



Photo 39: Facing west along potential top of bank trail.



Photo 40: Facing east along potential top of bank trail.



Photo 41: Facing east along potential top of bank trail.



Photo 42: Facing south along existing lightly used trail to top of bank on steep slope.



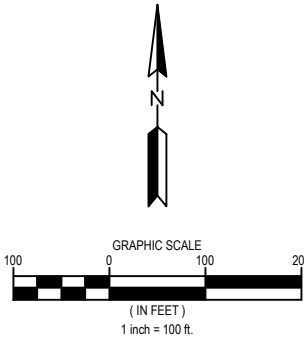
Photo 43: Facing south (uphill) along drainage near east end of park.



Photo 44: Facing east along top of bank at east end of park.

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LEGEND

- PROPERTY LINE
- EXISTING MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- EXISTING RAVINE
- WETLAND PLANT COMMUNITY
- PROPOSED WALKING TRAIL
- PROPOSED BOARDWALK



ONE CARLSON PARKWAY N
SUITE 100
PLYMOUTH, MN 55447
(P): 763-252-6800

CLIENT:



GREAT LAKES AND ST. LAWRENCE
CITIES INITIATIVE

ST. JOSEPH RIVERFRONT
RESTORATION - TRAIL ANALYSIS

THE CITY OF BUCHANAN
BERRIEN COUNTY, MICHIGAN

PROJECT TITLE:

ISSUE NO.:

1

DESCRIPTION:

TRAIL ANALYSIS EXHIBITS

DATE:

04/14/2025

CERTIFICATION:

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

LICENSE NO.:

PROJECT NO.:

227707082

DWN BY:

JRP

CHKD BY:

SEH

ISSUE DATE:

04/14/2025

ISSUE NO.:

1

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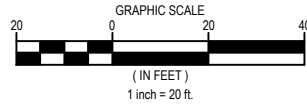
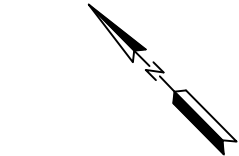
MASTERPLAN TRAILS

ANALYSIS OVERVIEW

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FIGURE 1

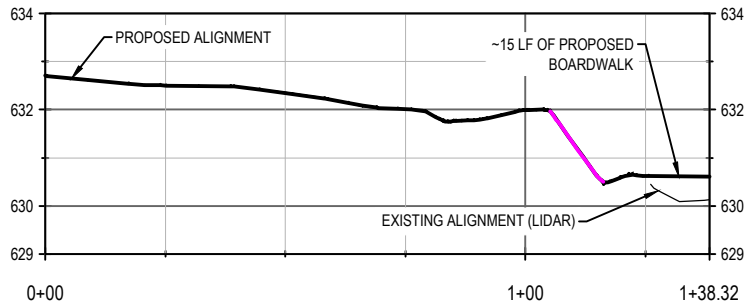
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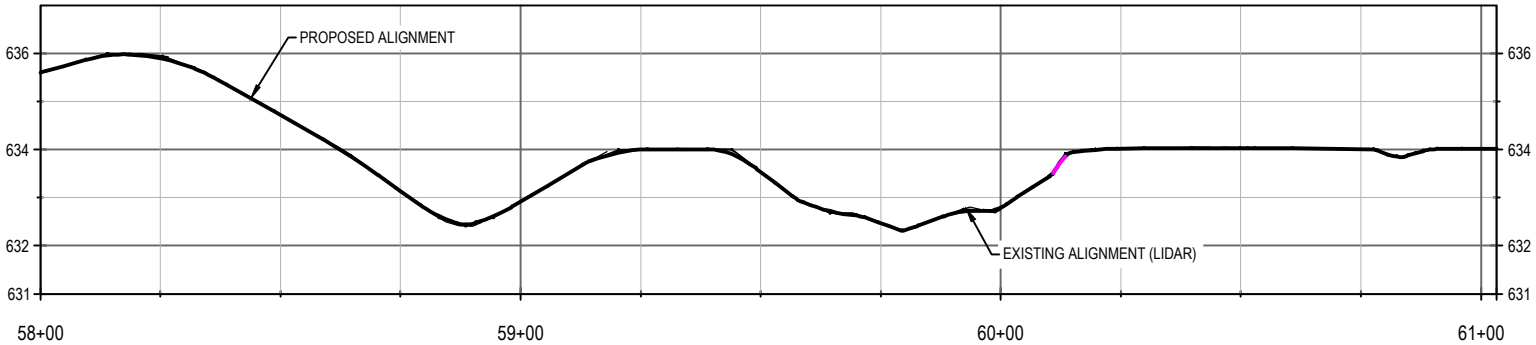
LEGEND

- PROPERTY LINE
- EXISTING MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- EXISTING RAVINE
- WETLAND PLANT COMMUNITY
- PROPOSED WALKING TRAIL
- PROPOSED WALKING TRAIL (FOCUS OF SHEET)
- PROPOSED BOARDWALK
- TRAIL SLOPE GREATER THAN 8%

PARKING LOT TRAIL PROFILE



PARKING LOT LOOP TRAIL PROFILE



ONE CARLSON PARKWAY N
SUITE 100
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(P): 763-252-6800

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ST. JOSEPH RIVERFRONT
RESTORATION - TRAIL ANALYSIS

THE CITY OF BUCHANAN
BERRIEN COUNTY, MICHIGAN

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ISSUE NO.:

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SHEET TITLE:

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ANALYSIS (1 OF 4)

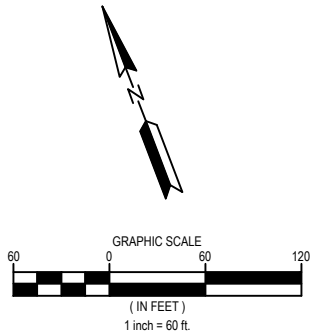
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FIGURE 2

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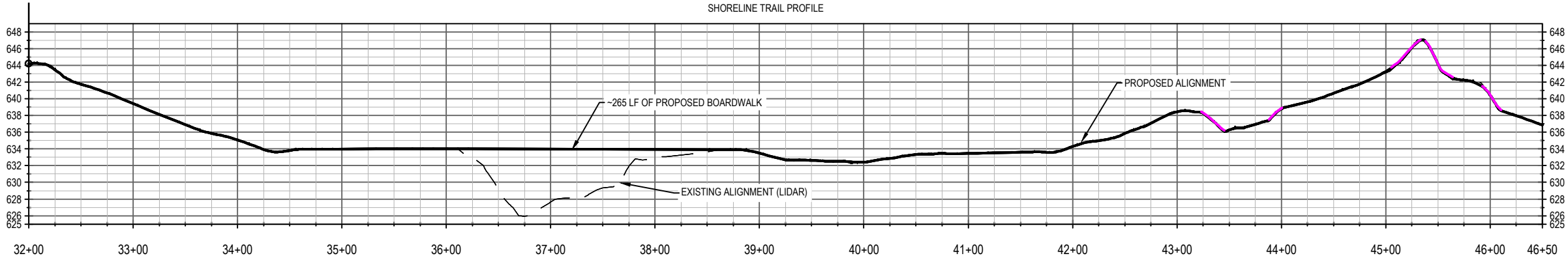
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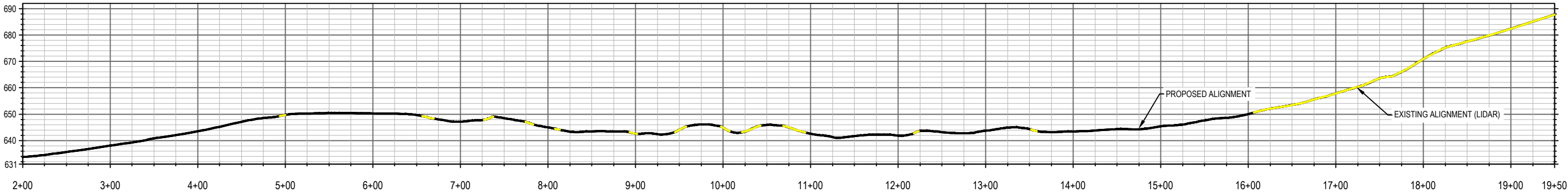
LEGEND

- PROPERTY LINE
- EXISTING MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- EXISTING RAVINE
- WETLAND PLANT COMMUNITY
- PROPOSED WALKING TRAIL
- PROPOSED WALKING TRAIL (FOCUS OF SHEET)
- PROPOSED BOARDWALK
- TRAIL SLOPE GREATER THAN 5%
- TRAIL SLOPE GREATER THAN 8%

SHORELINE TRAIL PROFILE



ACCESS DRIVE TRAIL PROFILE



ONE CARLSON PARKWAY N
SUITE 100
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CLIENT:



GREAT LAKES AND ST. LAWRENCE
CITIES INITIATIVE

ST. JOSEPH RIVERFRONT
RESTORATION - TRAIL ANALYSIS

THE CITY OF BUCHANAN
BERRIEN COUNTY, MICHIGAN

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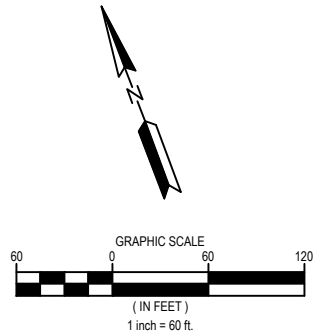
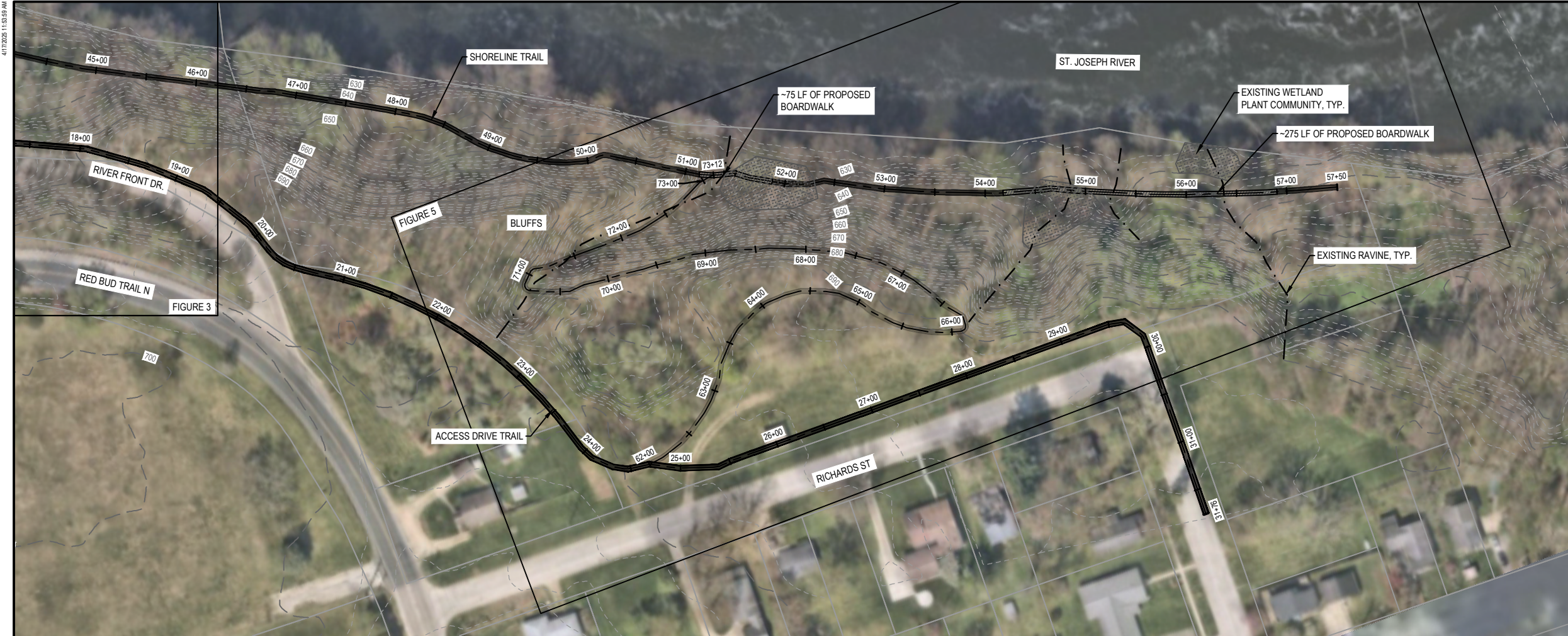
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ISSUE NO.: 1

SHEET TITLE:
MASTERPLAN TRAILS
ANALYSIS (2 OF 4)

SHEET NO.:
FIGURE 3

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- LEGEND**
- PROPERTY LINE
 - EXISTING MINOR CONTOUR
 - EXISTING MAJOR CONTOUR
 - EXISTING RAVINE
 - WETLAND PLANT COMMUNITY
 - PROPOSED WALKING TRAIL
 - PROPOSED WALKING TRAIL (FOCUS OF SHEET)
 - PROPOSED BOARDWALK
 - TRAIL SLOPE GREATER THAN 5%
 - TRAIL SLOPE GREATER THAN 8%

ONE CARLSON PARKWAY N
SUITE 100
PLYMOUTH, MN 55447
(P): 763-252-6800

CLIENT:

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**ST. JOSEPH RIVERFRONT
RESTORATION - TRAIL ANALYSIS**

THE CITY OF BUCHANAN
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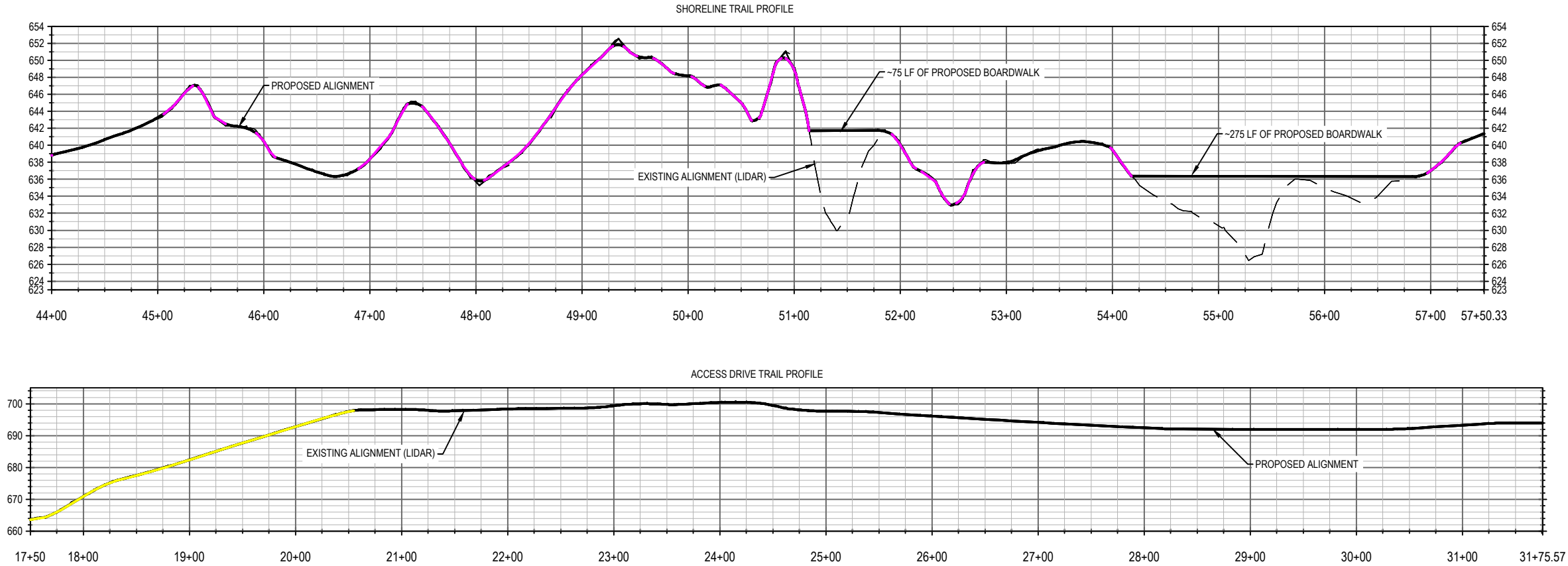
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MASTERPLAN TRAILS
ANALYSIS (3 OF 4)

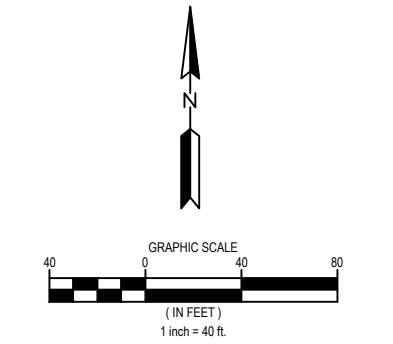
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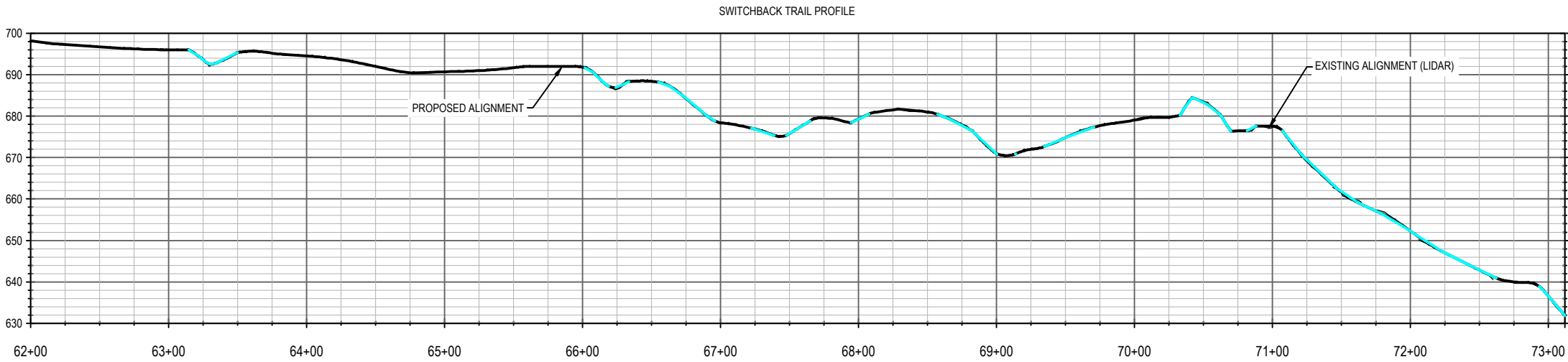
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- LEGEND**
- PROPERTY LINE
 - EXISTING MINOR CONTOUR
 - EXISTING MAJOR CONTOUR
 - EXISTING RAVINE
 - WETLAND PLANT COMMUNITY
 - PROPOSED WALKING TRAIL
 - PROPOSED WALKING TRAIL (FOCUS OF SHEET)
 - PROPOSED BOARDWALK
 - SWITCHBACK SLOPE GREATER THAN 12%



ONE CARLSON PARKWAY N
SUITE 100
PLYMOUTH, MN 55447
(P): 763-252-6800

CLIENT:

GREAT LAKES AND ST. LAWRENCE
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RESTORATION - TRAIL ANALYSIS**

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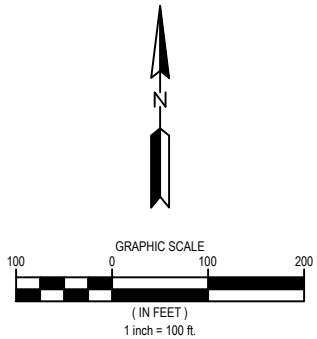
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MASTERPLAN TRAILS
ANALYSIS (4 OF 4)

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FIGURE 5

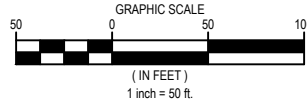
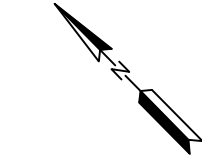


LEGEND

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| | PROPERTY LINE |
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|  | EXISTING MAJOR CONTOUR |
|  | CITY MASTER PLAN TRAIL |
|  | PROPOSED BOARDWALK |

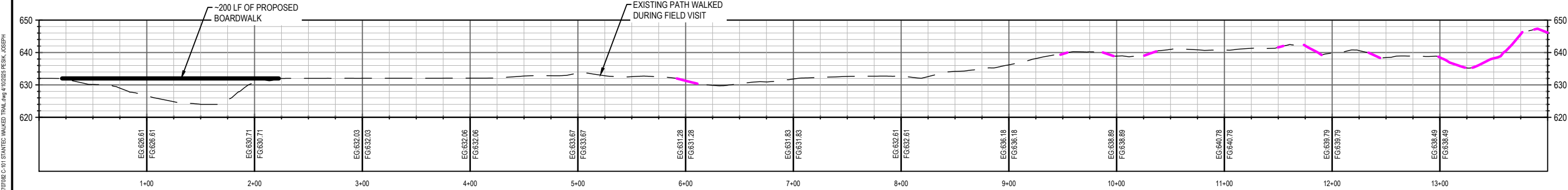
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ONE CARLSON PARKWAY N SUITE 100 PLYMOUTH, MN 55447 (P): 763-252-6800			
CLIENT:			
GREAT LAKES AND ST. LAWRENCE CITIES INITIATIVE			
GREAT LAKES AND ST. LAWRENCE CITIES INITIATIVE			
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PROJECT TITLE:			
ISSUE NO.:			
DESCRIPTION:			
DATE:			
CERTIFICATION:			
I HEREBY CERTIFY THAT THIS PLAN SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.			
LICENSE NO.: _____			
PROJECT NO.: 227707082			
DWN BY: JRP CHKD BY: APPD BY: SEH			
ISSUE DATE: 04/10/2025			
ISSUE NO.: 1			
SHEET TITLE:			
EXISTING ONSITE PATH ANALYSIS OVERVIEW			
SHEET NO.:			
FIGURE 6			

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LEGEND

- PROPERTY LINE
- EXISTING MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- CITY MASTER PLAN TRAIL
- PROPOSED BOARDWALK
- TRAIL SLOPE GREATER THAN 8%



ONE CARLSON PARKWAY N
SUITE 100
PLYMOUTH, MN 55447
(P): 763-252-6800

CLIENT:



GREAT LAKES AND ST. LAWRENCE
CITIES INITIATIVE

ST. JOSEPH RIVERFRONT
RESTORATION - TRAIL ANALYSIS

THE CITY OF BUCHANAN
BERRIEN COUNTY, MICHIGAN

PROJECT TITLE

ISSUE NO.:	1
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DESCRIPTION:	TRAIL ANALYSIS EXHIBITS
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DATE:	04/10/2025
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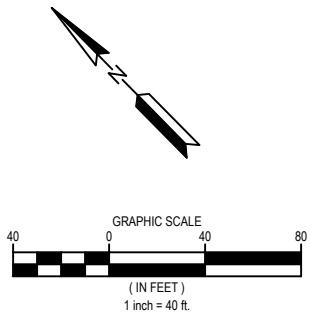
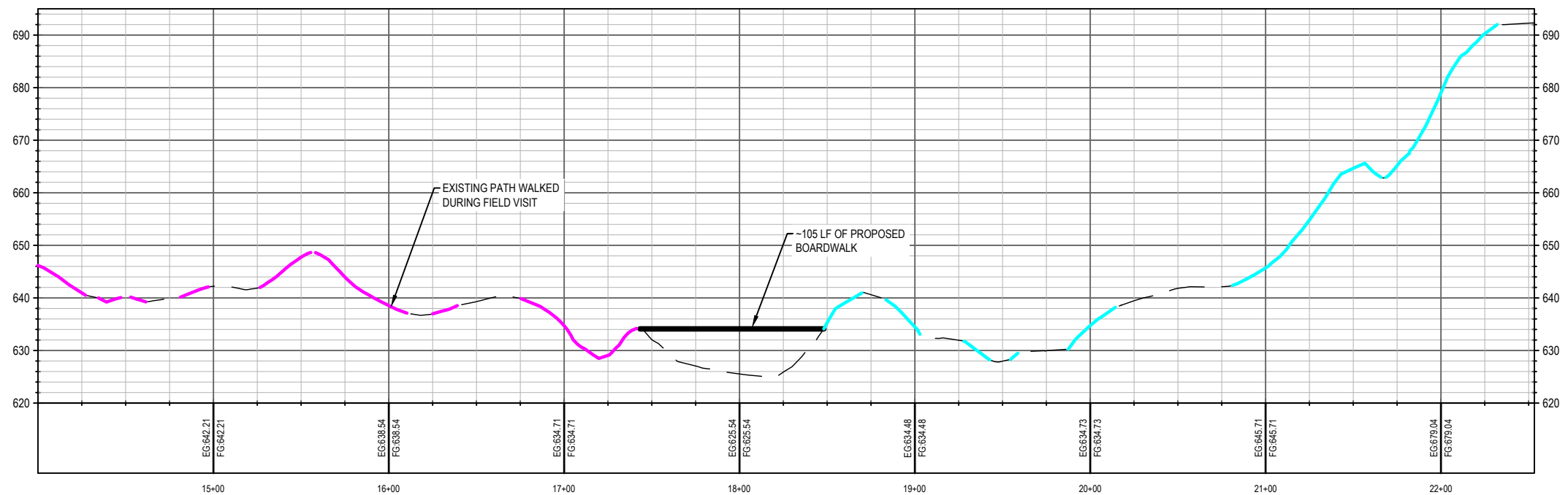
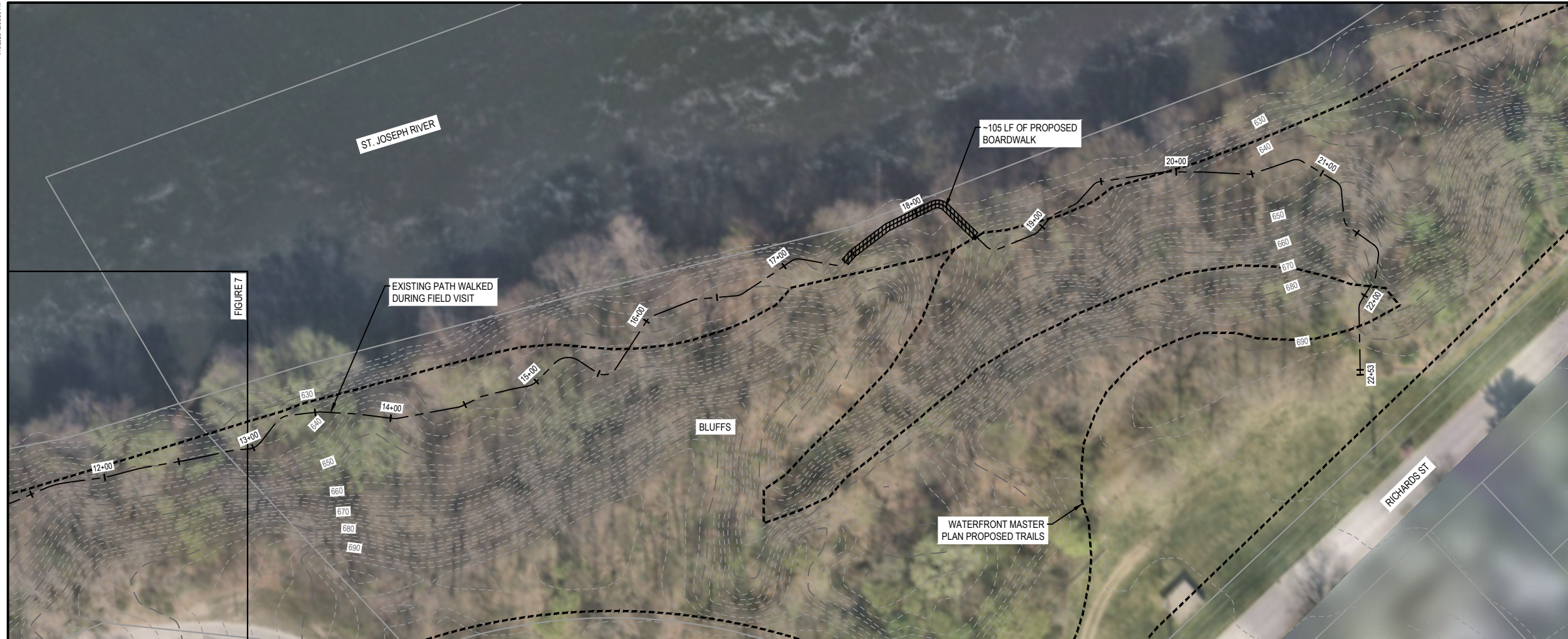
DWN BY: JRP
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APPD BY: SEH

ISSUE DATE: 04/10/2025








ISSUE NO.: 1

SHEET TITLE:
EXISTING ONSITE PATH
ANALYSIS (1 OF 2)

SHEET NO.:
FIGURE 7



LEGEND

- | | |
|---|-----------------------------------|
|  | PROPERTY LINE |
|  | EXISTING MINOR CONTOUR |
|  | EXISTING MAJOR CONTOUR |
|  | CITY MASTER PLAN TRAIL |
|  | PROPOSED BOARDWALK |
|  | TRAIL SLOPE GREATER THAN 8% |
|  | SWITCHBACK SLOPE GREATER THAN 12% |



ONE CARLSON PARKWAY N
SUITE 100
PLYMOUTH, MN 55447
(P): 763-252-6800

CLIENT:



GREAT LAKES AND ST. LAWRENCE
CITIES INITIATIVE

ST. JOSEPH RIVERFRONT
RESTORATION - TRAIL ANALYSIS

THE CITY OF BUCHANAN
BERRIEN COUNTY, MICHIGAN

[illegible]

CERTIFICATION:

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

LICENSE NO.: _____

PROJECT NO.: 2277070

DWN BY:	CHK'D BY:	APP'D
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JRF		SEP
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ANALYSIS (2 OF 2)

FLUIDE A

FIGURE 6