

ENGINEERING STUDY
FOR THE
BOARDMAN LAKE
NON-MOTORIZED TRAIL

PREPARED FOR THE
CITY OF TRAVERSE CITY
BY
GOURDIE/FRASER & ASSOCIATES, INC.

SEPTEMBER 2000



City of
Traverse City



PURPOSE

As requested by the City of Traverse City, Gourdie/Fraser and Associates is providing the following preliminary study and recommendations for a proposed non-motorized trailway from 10th street to the new District Library on Woodmere Avenue. A routing concept and opinion of probable cost has been prepared based on information gathered from the City, the Michigan Department of Transportation (MDOT), the American Association of State Highway and Transportation Officials (AASHTO), and the Americans with Disabilities Act (ADA).

The proposed trailway would proceed westerly from 10th Street (at Lake Avenue), across the existing MDOT railway and the Boardman River, continue along the northerly edge of Boardman Lake and terminate at Hannah Avenue east of the Regional Wastewater Treatment Plant. The concept considers alternatives to accommodate the proposed Boardman Lake Avenue project, the existing MDOT railway and railway bridge.

FORWARD

Various sources provided information for this study. Mapping, property ownership, engineering input and the Grand Traverse County Master Trail Plan were provided by the City of Traverse City. The MDOT Railroad Safety Section provided information for the railway crossing. The Traverse City TALUS office provided information for the railway crossing. Tuscola & Saginaw Bay Railway Co. provided input on use of the existing railway. On-site investigation has provided additional insight in preparation of this study.



**City of
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I. INTRODUCTION

With the opening of the new District Library on Woodmere Avenue, and aided by the input of the neighborhood residents, the City of Traverse City has recognized a need to investigate an alternate route for pedestrian travel over the Boardman River. The proposed trailway would offer safer travel, with respect to vehicle traffic, from the Old Towne and Central Neighborhoods to the new District Library and Hull Park. The pedestrian walkway would accommodate travel by walkers, joggers, roller-bladers and cyclists.

Currently, the most direct route for these residents is to use 8th Street. This route is not the most desirable for pedestrian traffic due to the close proximity of the sidewalk to the road and a relatively high vehicle volume.

Two separate route options are evaluated in this report. The first employs a separate bridge for the trailway crossing over the river. The second relies on abandonment of the existing railway and railway bridge to be modified and used as the trailway. Figure 1 is provided to illustrate the proposed route for Alternate I; Figure 2 is provided to illustrate the proposed route for Alternate II.

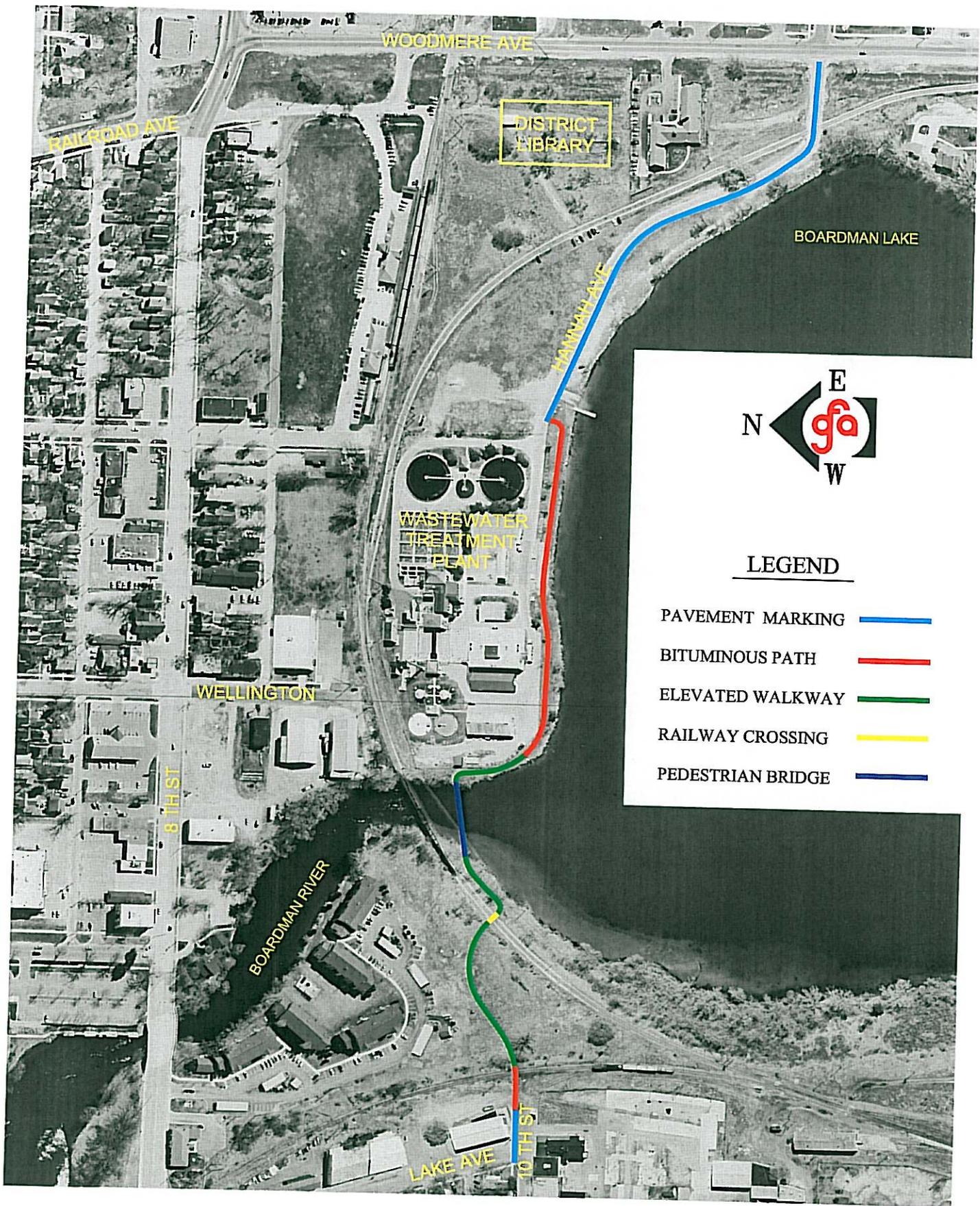
The latest MDOT and AASHTO guidelines were employed to develop a practical means for creating the trailway. Alternate scenarios are discussed to accommodate various projects currently being considered by the City, (i.e. the Boardman Lake Avenue project).

The report assumes that all property upon which the route lies is either owned by or could be obtained by the City for trailway use. The actual route may be different based on availability of property or easements. Figure 3 is provided to show the current property ownership configuration for the walkway.

This study is based on preliminary information. Much more investigation and detail must be pursued to provide actual engineering and construction data. The trailway, as proposed, appears to be feasible based on current available information.



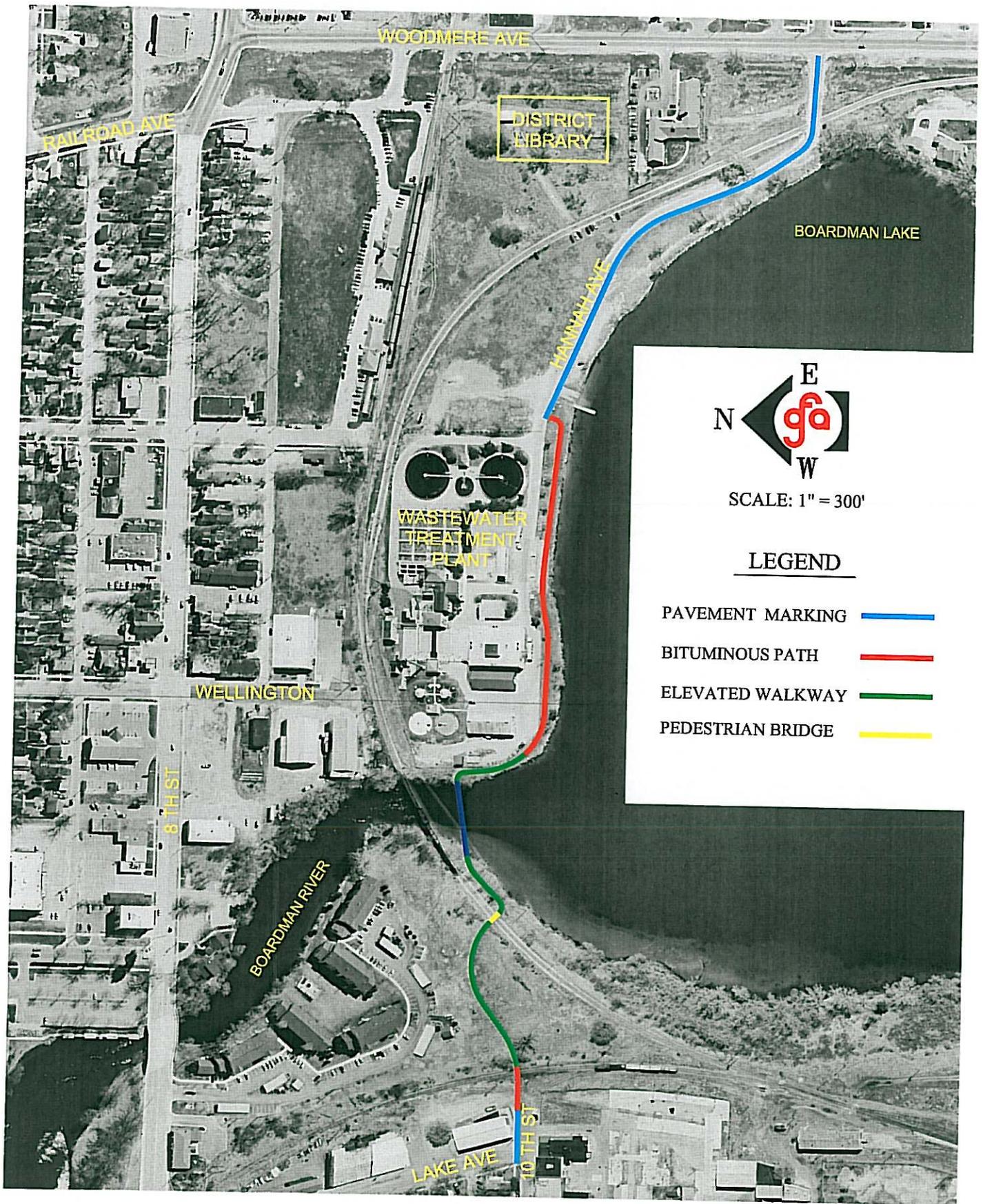
City of
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BOARDMAN LAKE
 NON-MOTORIZED TRAILWAY
 TRAILWAY MAP - ALTERNATE I

FIGURE 1



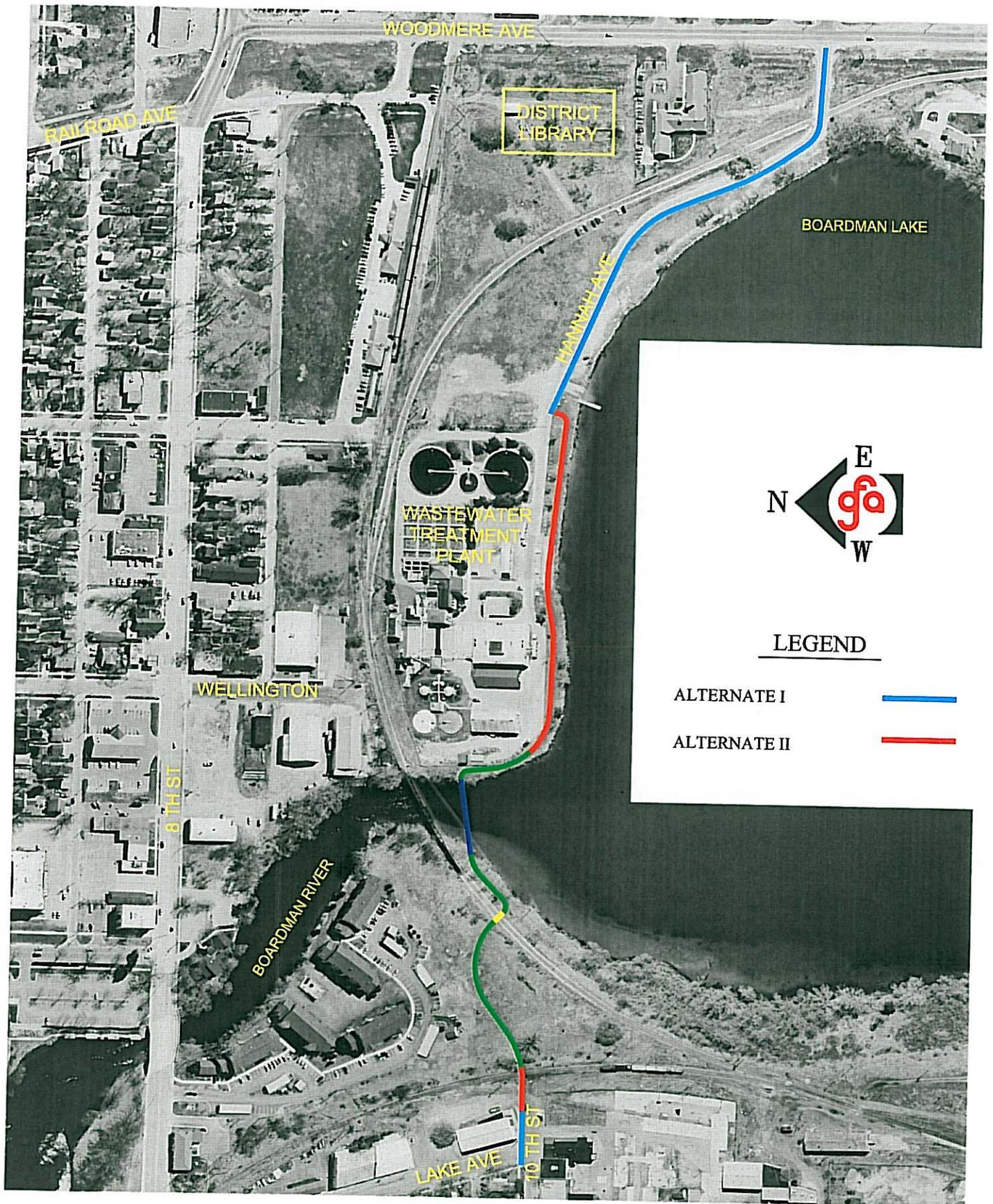


BOARDMAN LAKE
 NON-MOTORIZED TRAIL
 TRAILWAY MAP - ALTERNATE II



FIGURE 2





BOARDMAN LAKE
 NON-MOTORIZED TRAIL
 PROPERTY OWNERSHIP

FIGURE 3



II. RECOMMENDATION FOR ROUTE

The following recommendations are provided for individual segments along the trailway:

1. Trailway between 10th Street to the existing railway crossing.

Construction of the trailway from 10th Street to the existing active railway consists of three different treatments. The first segment would require pavement marking and signage, the second segment would require construction of new bituminous pathway and the third segment would require construction of an elevated boardwalk to accommodate substantial differences in existing grade.

The boardwalk would be constructed to comply with ADA requirements. This segment of the walkway would descend from the existing grade near 10th street to a low point then ascend up to the existing railway grade. (See Photo Number 1, Figure 4 and Figure 5).

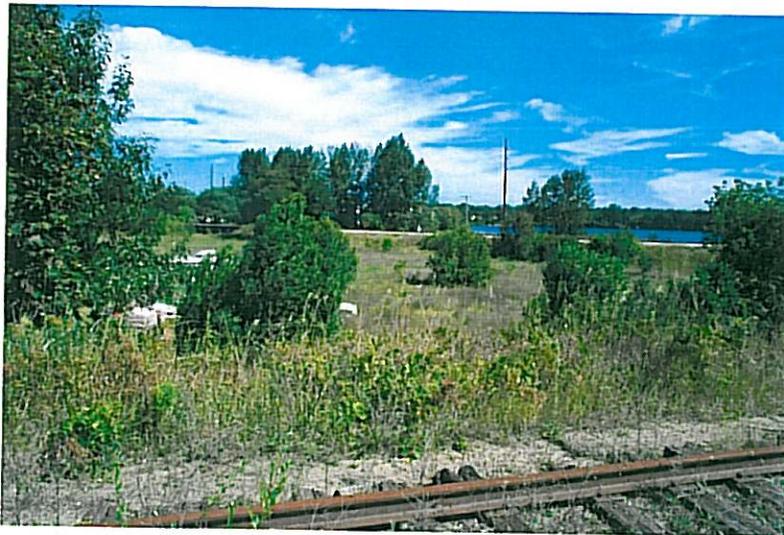


Photo Number 1: Looking Southeasterly from termination of 10th Street toward railway bridge and Boardman Lake



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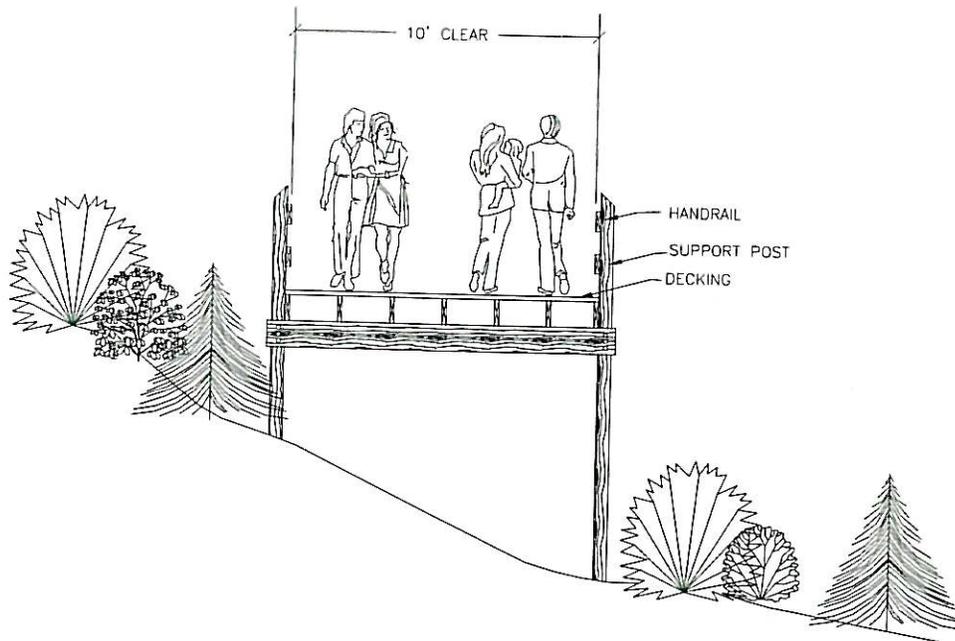


FIGURE 4
ELEVATED BOARDWALK

Elevated Boardwalks would be used in various locations on the project to accommodate vertical differences in grade of up to 15 feet.

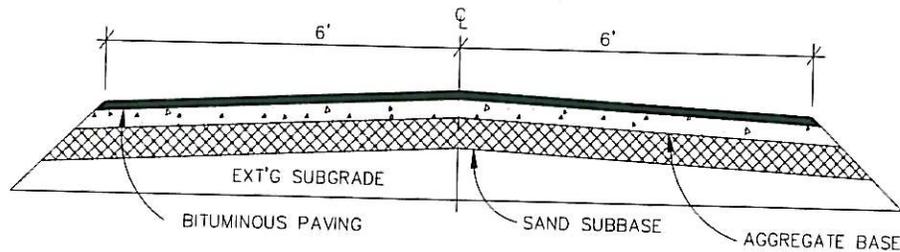


FIGURE 5
BITUMINOUS PATH

Bituminous Path would be used in various locations on the project where the trailway is to be constructed on existing grade.

2. Existing railway crossing.

Based on information provided by the MDOT Railroad Safety Section, crossing at the existing railway line would be an at-grade non-motorized crossing. An “at-grade” crossing implies the trailway would cross the railway at its existing grade. An “at-grade” non-motorized crossing requires MDOT approved signage and standard street lighting along with typical “at-grade” crossing surface treatments. Adequate sight distance for pedestrians must be verified. The crossing must be made at a 90-degree angle to the rail line. (See Photo Number 2).



Photo Number 2: Looking Easterly toward railway bridge near the railway crossing location.

The MDOT Railroad Safety Section has indicated that a tunnel or bridge will not be required to cross the railway line at this location. This crossing will be similar in design to the railway crossing of the TART Trail along Parsons Avenue west of the Airport entrance.

3. Boardman River Crossing

An elevated boardwalk would be constructed between the trail railway crossing and the Boardman River crossing to accommodate steep grades of



the railway embankment. Upon reaching the river, the bridge would provide a minimum of 10 feet of vertical clearance from the river water surface to the bottom of the bridge. The existing railway bridge has a vertical clearance of 11.8 feet; the existing bridge at 8th Street has a vertical clearance of 9.5 feet. The new bridge would be cambered to accommodate ADA requirements and vertical clearances. (See Photo Number 3).

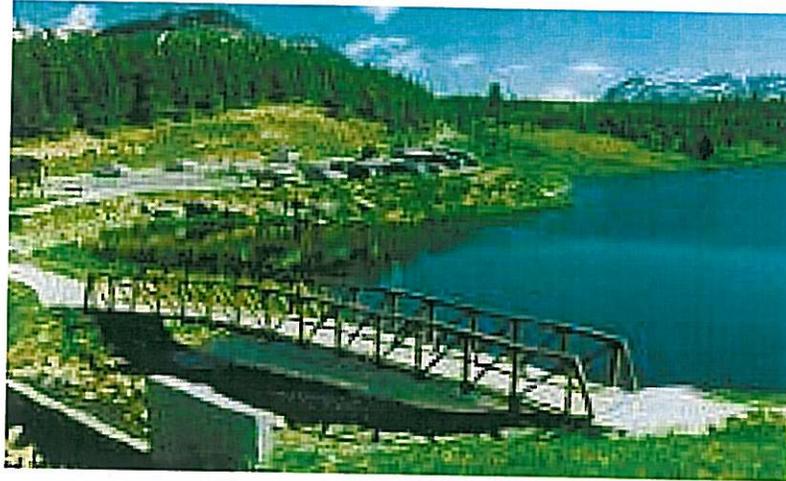


Photo Number 3: Example of a prefabricated bridge spanning a river.

4. Trailway along Boardman Lake

The trailway from the bridge to existing grade along the northerly edge of Boardman Lake would be an elevated boardwalk to comply with ADA requirements. From this point a 12 foot wide bituminous pathway would be constructed along Boardman Lake and terminate at Hannah Avenue. A portion of the security fence around the wastewater treatment facility would be relocated to provide adequate width of the walkway on existing grade. Appropriate signage would be placed at Hannah Avenue for pedestrian safety and trail guidance.

5. Proposed connection to the TART Trail.

Connection to the TART Trail system could be made from this location. Appropriate signage for maps and user guidance is recommended.



III. ALTERNATE ROUTE CONSIDERATIONS

1. Alternate II - Railway Route

If the existing railway were abandoned, available information indicates that the trailway could make use of the existing railway grade and bridge. The elevated boardwalk from 10th street would tie in at an appropriate angle and would make use of the existing girder/trestle bridge over the Boardman River. Figure 2 of this report illustrates this alternate route. The estimated cost for this alternate route is provided in the ESTIMATES section.

2. Proposed Boardman Lake Avenue Crossing

If the proposed Boardman Lake Avenue project were constructed, MDOT and AASHTO pedestrian walkway requirements would be employed for a pedestrian crossing.

3. Attaching the pedestrian bridge to the existing railway bridge.

Attaching the pedestrian bridge to the existing railway bridge would introduce numerous hazards to public safety. Based on safety issues, this is not the recommended option. Tuscola & Saginaw Bay Railway Company, the company currently leasing the railway from MDOT, discouraged pursuit of attaching a pedestrian bridge to the existing railway bridge in favor of other available alternatives, (i.e. abandonment of this segment of railway and creation of the Beitner Road bypass).

4. Elevated Boardwalk

It may be possible to decrease the project cost through a reduction in the amount of elevated boardwalk. Utilizing switch-backs or other routing alternatives may provide adequate grade changes while still complying with ADA requirements. However, land availability may impact this option. Additional topographical survey information will aid in final determination of the practicality of this option.



IV. COST ESTIMATES

Cost estimates have been prepared for each of the two route alternatives. The first outlines costs associated with a new bridge and railway crossing, see Figure 1 for layout. The second outlines costs associated with making use of the existing railway, see Figure 2 for layout.



City of
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OPINION OF PROBABLE COST**
BOARDMAN LAKE
NON-MOTORIZED TRAILWAY

NEW PEDESTRIAN BRIDGE - ALTERNATE I

SEPTEMBER 2000
GFA NO. 001322

Item No.	Description	Estimated Quantity	Unit Used	Unit Price	Total Price
1	Mobilization	1	LS	4,000.00	4,000.00
2	Bridge Cost (3-60 ft spans)	180	LF	*800.00	144,000.00
3	Barrier Free Ramping (Delivered on site with support towers)	750	LF	*250.00	187,500.00
4	Bituminous Pathway (12 foot width)	1000	LF	50.00	50,000.00
5	Permanent signs and pavement markings	1	LS	18,000.00	18,000.00
6	Soil erosion control measures	1	LS	6,000.00	6,000.00
7	Street lighting	6	EA	2,000.00	12,000.00
8	Clearing	1500	SY	2.00	3,000.00
9	Topsoil, seed, & mulch	1	LS	40,000.00	40,000.00
10	Railway crossing surface treatment	1	LS	7,000.00	7,000.00
11	Right of way acquisition (Estimated)	4000	SF	3.00	12,000.00
Estimated Subtotal Construction Cost					483,500.00
10% Contingencies					48,500.00
Estimated Total Construction Cost					532,000.00
Design Engineering					65,000.00
Construction Engineering					80,000.00
TOTAL ESTIMATED PROJECT COST					677,000.00

* Includes costs for: columns, supports, placement, bridge decking

** These costs are based on the available, preliminary information. More accurate costs would be provided in subsequent phases of design.



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OPINION OF PROBABLE COST**
BOARDMAN LAKE
NON-MOTORIZED TRAILWAY

EXISTING RAILWAY BRIDGE - ALTERNATE II

SEPTEMBER 2000
GFA NO. 001322

Item No.	Description	Estimated Quantity	Unit Used	Unit Price	Total Price
1	Mobilization	1	LS	3,000.00	3,000.00
2	Bridge Reconstruction	250	LF	*250.00	62,500.00
3	Barrier Free Elevated Boardwalk (Delivered on site with supports)	550	LF	*250.00	137,500.00
4	Bituminous Pathway (12 foot width)	1150	LF	50.00	57,500.00
5	Permanent signs	1	LS	15,000.00	15,000.00
6	Soil erosion control measures	1	LS	5,000.00	5,000.00
7	Street lighting	4	EA	2,000.00	8,000.00
8	Clearing	1500	SY	2.00	3,000.00
9	Topsoil, seed & mulch	1	LS	35,000.00	35,000.00
10	Right of way acquisition (Estimated)	4000	SF	3.00	12,000.00
Estimated Subtotal Construction Cost					338,500.00
10% Contingencies					32,500.00
Estimated Total Construction Cost					371,000.00
Design Engineering					40,000.00
Construction Engineering					54,000.00
TOTAL ESTIMATED PROJECT COST					465,000.00

* Includes costs for complete reconstruction for trailway

** These costs are based on the available, preliminary information. More accurate costs would be provided in subsequent phases of design.



City of
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V. PROCESS FOR PERMITTING

1. MDOT-Railway Crossing

Requirements for the railway crossing are set by MDOT, the owner of the railway property. After preliminary design has been completed and submitted, a field analysis is requested. The field analysis will determine permitting requirements for the proposed crossing.

2. MDEQ-Boardman River Crossing

A new bridge will require an MDEQ permit for placement of bridge abutments. A hydraulic analysis of flows under the proposed bridge is typically an application requirement.

VI. POSSIBLE OBSTACLES TO THE WALKWAY

Acquisition of right of way by the City from property owners along 10th Street.

VII. TRAILWAY LIFE SPAN

The anticipated life spans of trailway components vary due to construction materials and scheduled maintenance. The table below reflects estimated life spans.

Bridge Structure	20 to 30 years
Elevated Walkways	15 to 20 years
Bituminous Path	20 to 25 years
Pavement Markings	5 to 8 years
Railway Crossing	15 to 20 years

VIII. PROJECT CONTINUATION

This study provides preliminary data for construction and engineering. More detailed information must be pursued to continue the project.

The following list outlines the next steps to be taken to move closer to actual construction:

- Explore options for railway abandonment
- Right of way acquisition
- Financing
- Permits
- Engineering design

