

US 2/US 81 SKEWED INTERSECTION STUDY

Name _____

Please rank the following alternatives based on long-term desirability, assuming funding for each alternative would eventually be viable. Do NOT rank any alternatives you believe are not feasible.

- _____ Alt EF: Existing Footprint
- _____ Alt NRC: New Roadway Connection
- _____ Alt SM: Skewed Movement
- _____ Alt EF+R: Existing Footprint with Realignment
- _____ Alt SM+R: Skewed Movement with Realignment
- _____ Alt R+R: Washington Street and Mill Road Roundabouts
- _____ Alt ST+R: Separated T-Intersections at Washington Street
- _____ Alt GS-1: Grade Separation of Washington Street and Mill Spur
- _____ Alt GS-2: Grade Separation of Washington Street, Mill Spur, and Mill Road
- _____ Do Nothing

Please rank the following alternatives based on short-term desirability factoring in short-term funding limitations. Do NOT rank any alternatives you believe are not feasible.

- _____ Alt EF: Existing Footprint
- _____ Alt NRC: New Roadway Connection
- _____ Alt SM: Skewed Movement
- _____ Alt EF+R: Existing Footprint with Realignment
- _____ Alt SM+R: Skewed Movement with Realignment
- _____ Alt R+R: Washington Street and Mill Road Roundabouts
- _____ Alt ST+R: Separated T-Intersections at Washington Street
- _____ Alt GS-1: Grade Separation of Washington Street and Mill Spur
- _____ Alt GS-2: Grade Separation of Washington Street, Mill Spur, and Mill Road
- _____ Do Nothing

Are there any alternatives that are infeasible or should be discarded from further consideration?

- _____ Alt EF: Existing Footprint
- _____ Alt NRC: New Roadway Connection
- _____ Alt SM: Skewed Movement
- _____ Alt EF+R: Existing Footprint with Realignment
- _____ Alt SM+R: Skewed Movement with Realignment
- _____ Alt R+R: Washington Street and Mill Road Roundabouts
- _____ Alt ST+R: Separated T-Intersections at Washington Street
- _____ Alt GS-1: Grade Separation of Washington Street and Mill Spur
- _____ Alt GS-2: Grade Separation of Washington Street, Mill Spur, and Mill Road
- _____ Do Nothing



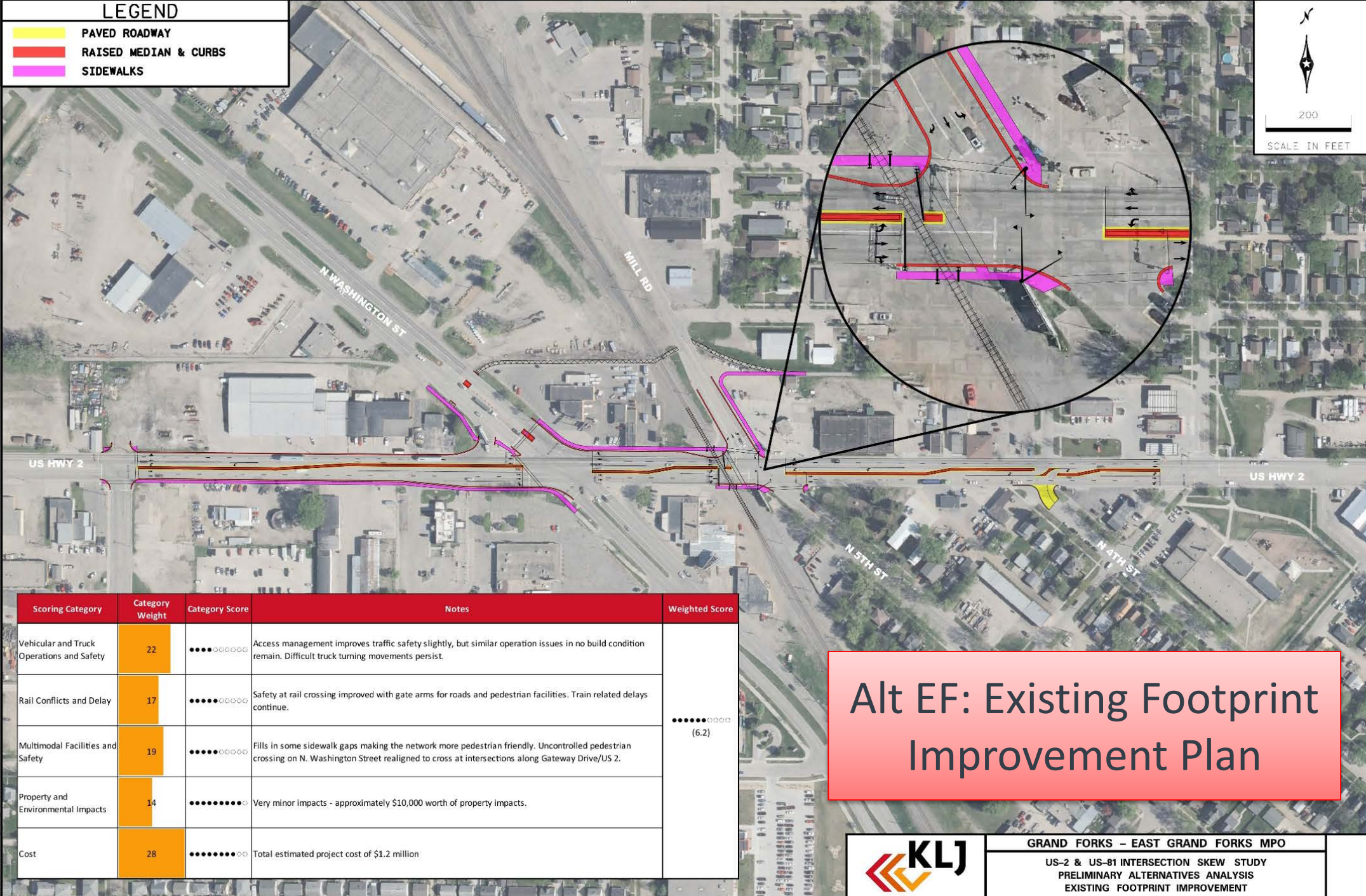
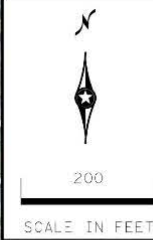
Alternatives with No Changes to the Mill Spur

N 20TH ST

N WASHINGTON ST

LEGEND

- PAVED ROADWAY
- RAISED MEDIAN & CURBS
- SIDEWALKS



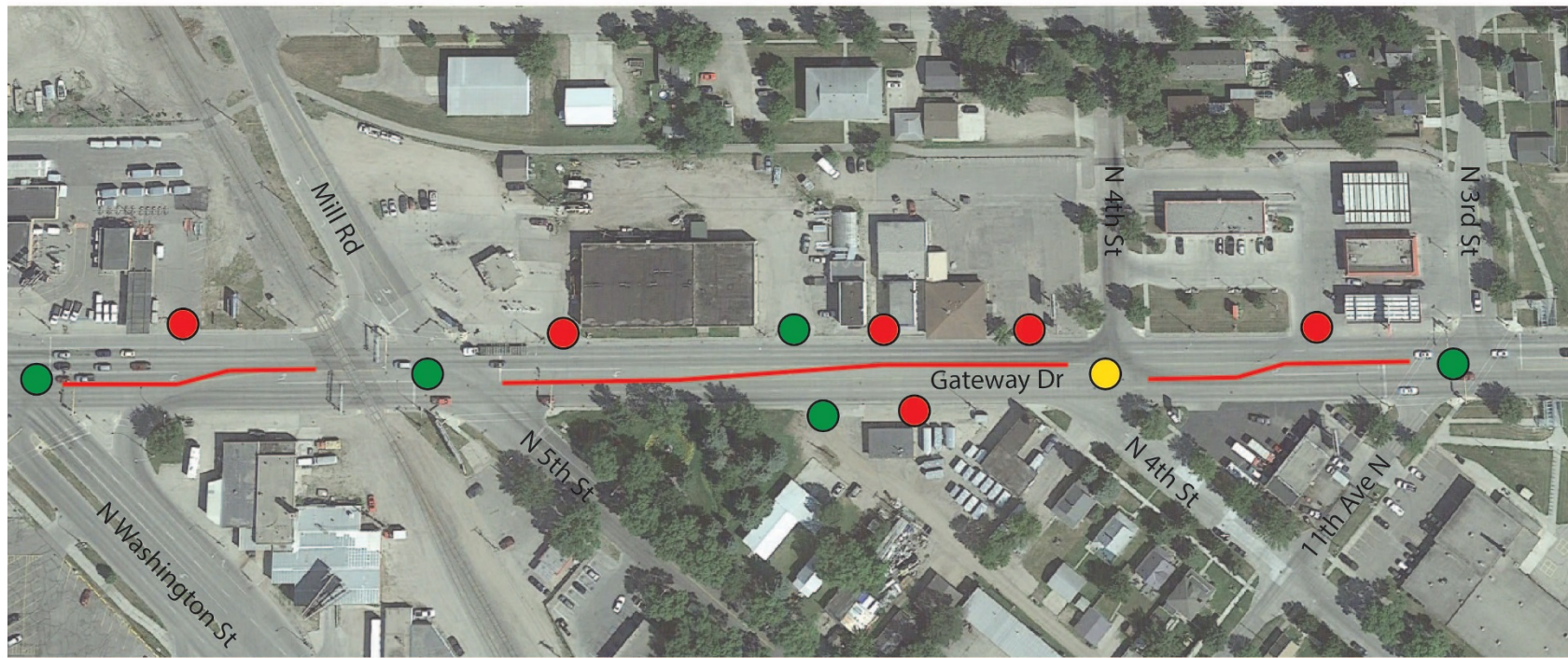
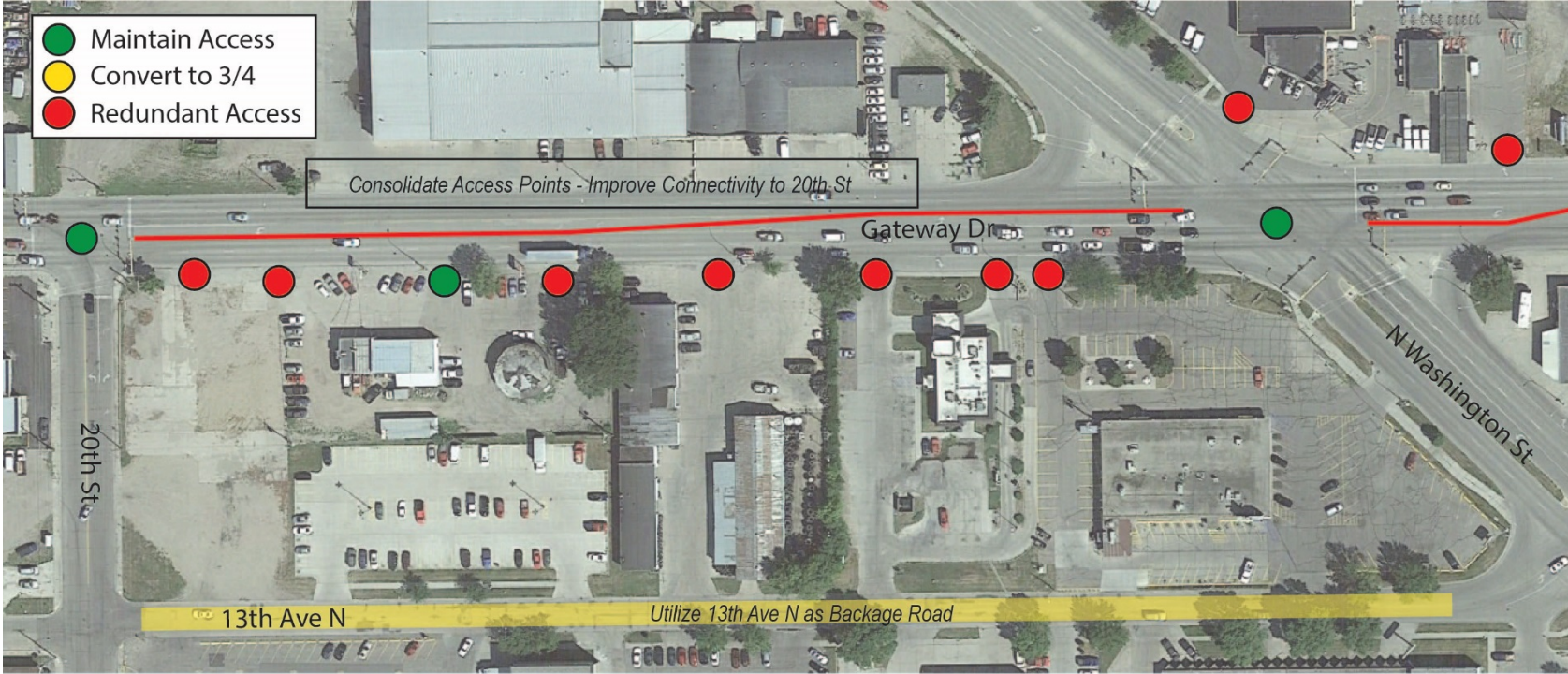
Scoring Category	Category Weight	Category Score	Notes	Weighted Score
Vehicular and Truck Operations and Safety	22	●●●●○	Access management improves traffic safety slightly, but similar operation issues in no build condition remain. Difficult truck turning movements persist.	●●●●○ (6.2)
Rail Conflicts and Delay	17	●●●●○	Safety at rail crossing improved with gate arms for roads and pedestrian facilities. Train related delays continue.	
Multimodal Facilities and Safety	19	●●●●○	Fills in some sidewalk gaps making the network more pedestrian friendly. Uncontrolled pedestrian crossing on N. Washington Street realigned to cross at intersections along Gateway Drive/US 2.	
Property and Environmental Impacts	14	●●●●●	Very minor impacts - approximately \$10,000 worth of property impacts.	
Cost	28	●●●●○	Total estimated project cost of \$1.2 million.	

Alt EF: Existing Footprint Improvement Plan



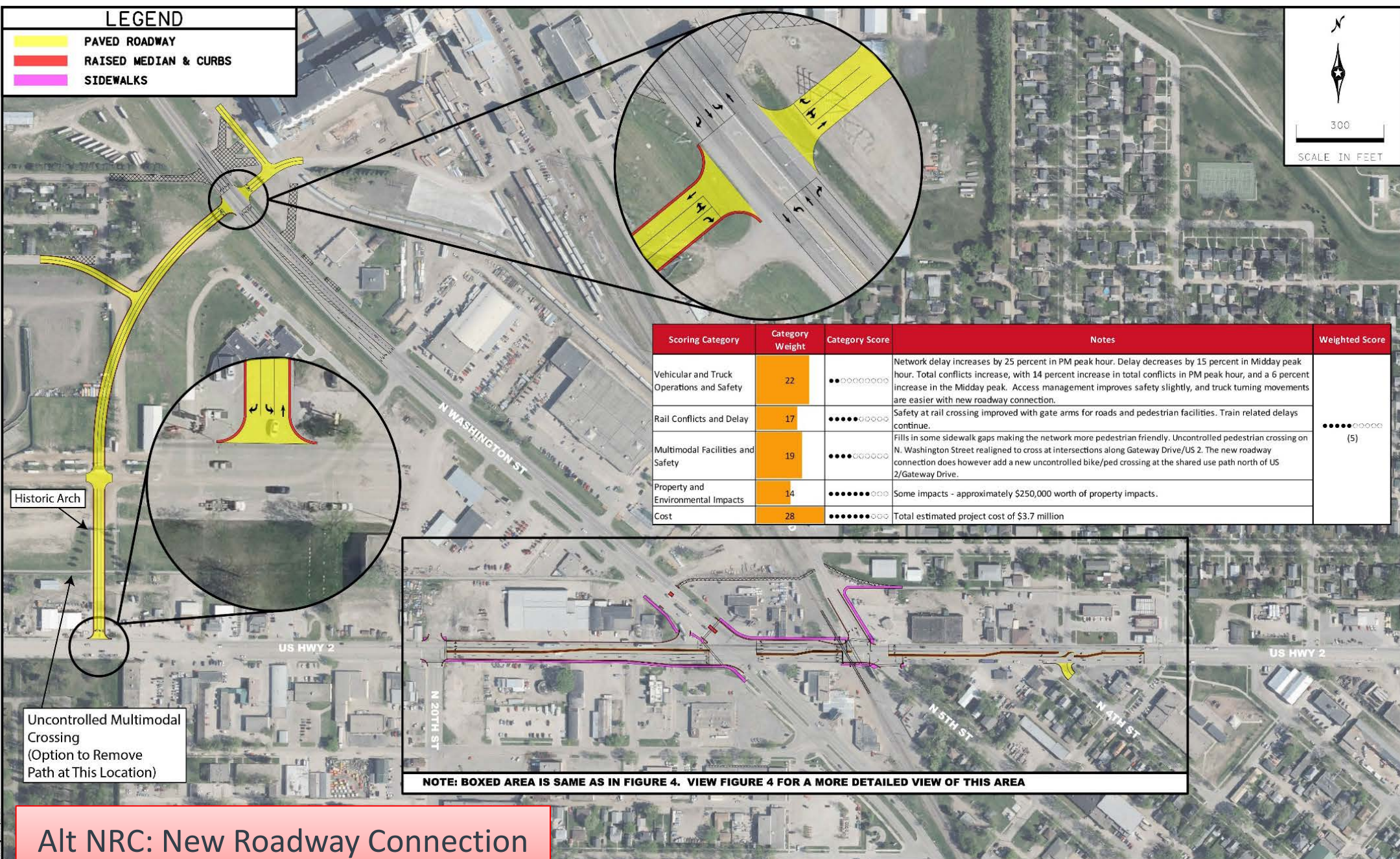
GRAND FORKS - EAST GRAND FORKS MPO
 US-2 & US-81 INTERSECTION SKEW STUDY
 PRELIMINARY ALTERNATIVES ANALYSIS
 EXISTING FOOTPRINT IMPROVEMENT

Optional
Access
Management



LEGEND

- PAVED ROADWAY
- RAISED MEDIAN & CURBS
- SIDEWALKS



Scoring Category	Category Weight	Category Score	Notes	Weighted Score
Vehicular and Truck Operations and Safety	22	●●○○○○○○	Network delay increases by 25 percent in PM peak hour. Delay decreases by 15 percent in MIDDAY peak hour. Total conflicts increase, with 14 percent increase in total conflicts in PM peak hour, and a 6 percent increase in the MIDDAY peak. Access management improves safety slightly, and truck turning movements are easier with new roadway connection.	●●●●○○○○ (5)
Rail Conflicts and Delay	17	●●●●○○○○	Safety at rail crossing improved with gate arms for roads and pedestrian facilities. Train related delays continue.	
Multimodal Facilities and Safety	19	●●●●○○○○	Fills in some sidewalk gaps making the network more pedestrian friendly. Uncontrolled pedestrian crossing on N. Washington Street realigned to cross at intersections along Gateway Drive/US 2. The new roadway connection does however add a new uncontrolled bike/ped crossing at the shared use path north of US 2/Gateway Drive.	
Property and Environmental Impacts	14	●●●●○○○○	Some impacts - approximately \$250,000 worth of property impacts.	
Cost	28	●●●●○○○○	Total estimated project cost of \$3.7 million	

Alt NRC: New Roadway Connection Improvement Plan

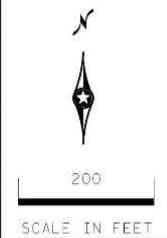


GRAND FORKS – EAST GRAND FORKS MPO
 US-2 & US-81 INTERSECTION SKEW STUDY
 PRELIMINARY ALTERNATIVES ANALYSIS
 NEW CONNECTION IMPROVEMENT

6/16/2016 11:31:59 AM Jaramona\qlj\st

Alt SM: Skewed Movement Improvement Plan

LEGEND	
	PAVED ROADWAY
	RAISED MEDIAN & CURBS
	GRASS MEDIAN
	PAVED SHOULDERS
	SIDEWALKS



Option to Remove Path At This Location

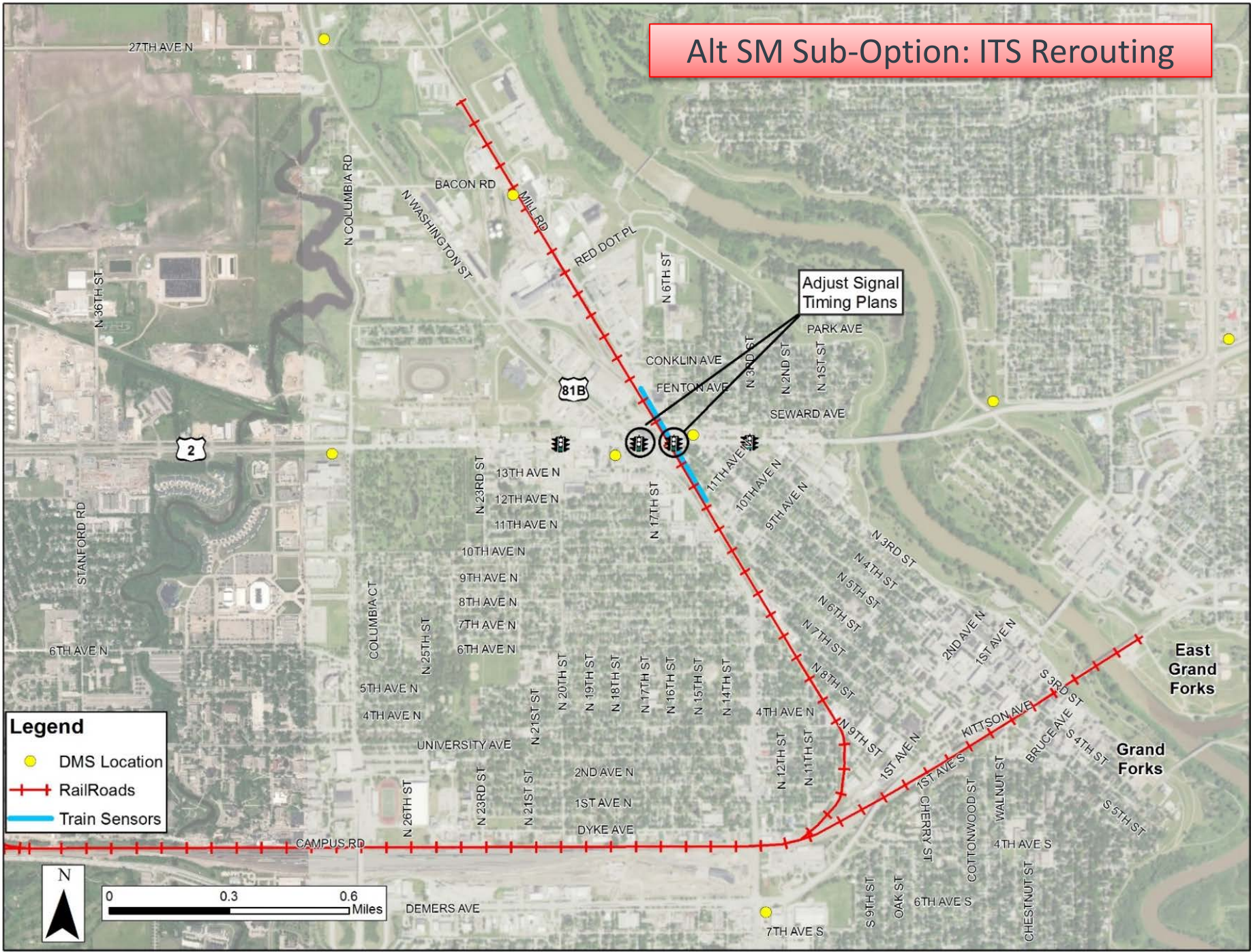
Potential for unintended through traffic past elementary school

Scoring Category	Category Weight	Category Score	Notes	Weighted Score
Vehicular and Truck Operations and Safety	22	●●●○○○○○	Network delay decreases by 13 percent in PM peak hour and by 12 percent in Midday peak hour. Intersection operations are improved to LOS D in the PM peak at the Gateway Drive/Washington Street intersection. Conflicts increase, with 80 percent increase in total conflicts in PM peak hour, and a 16 percent increase in the Midday peak. Access management improves safety slightly, and truck turning movements are less difficult at new intersections compared to existing skewed intersections.	●●●○○○○○ (4.4)
Rail Conflicts and Delay	17	●●●●○○○○	Safety at rail crossing improved with gate arms for roads and pedestrian facilities. Train related delays continue.	
Multimodal Facilities and Safety	19	●●●●○○○○	Fills in some sidewalk gaps making the network more pedestrian friendly. Uncontrolled pedestrian crossing on N. Washington Street realigned to cross at intersections along Gateway Drive/US 2. This option however could add traffic to 11th Avenue N in front of Wilder Elementary, even though this is not the intended route.	
Property and Environmental Impacts	14	●●●●○○○○	Moderate impacts - approximately \$790,000 worth of property impacts	
Cost	28	●●●●○○○○	Total estimated project cost of \$8.6 million	



GRAND FORKS – EAST GRAND FORKS MPO
US-2 & US-81 INTERSECTION SKEW STUDY
PRELIMINARY ALTERNATIVES ANALYSIS
MOVEMENT REROUTING CONCEPT

Alt SM Sub-Option: ITS Rerouting





Base Alternatives with Railroad Realignment

N 20TH ST

N WASHINGTON ST

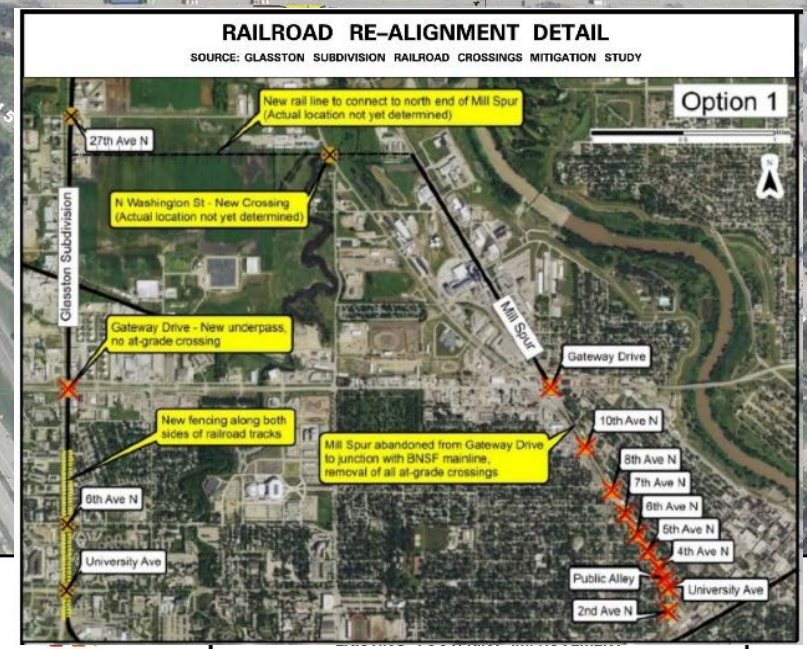
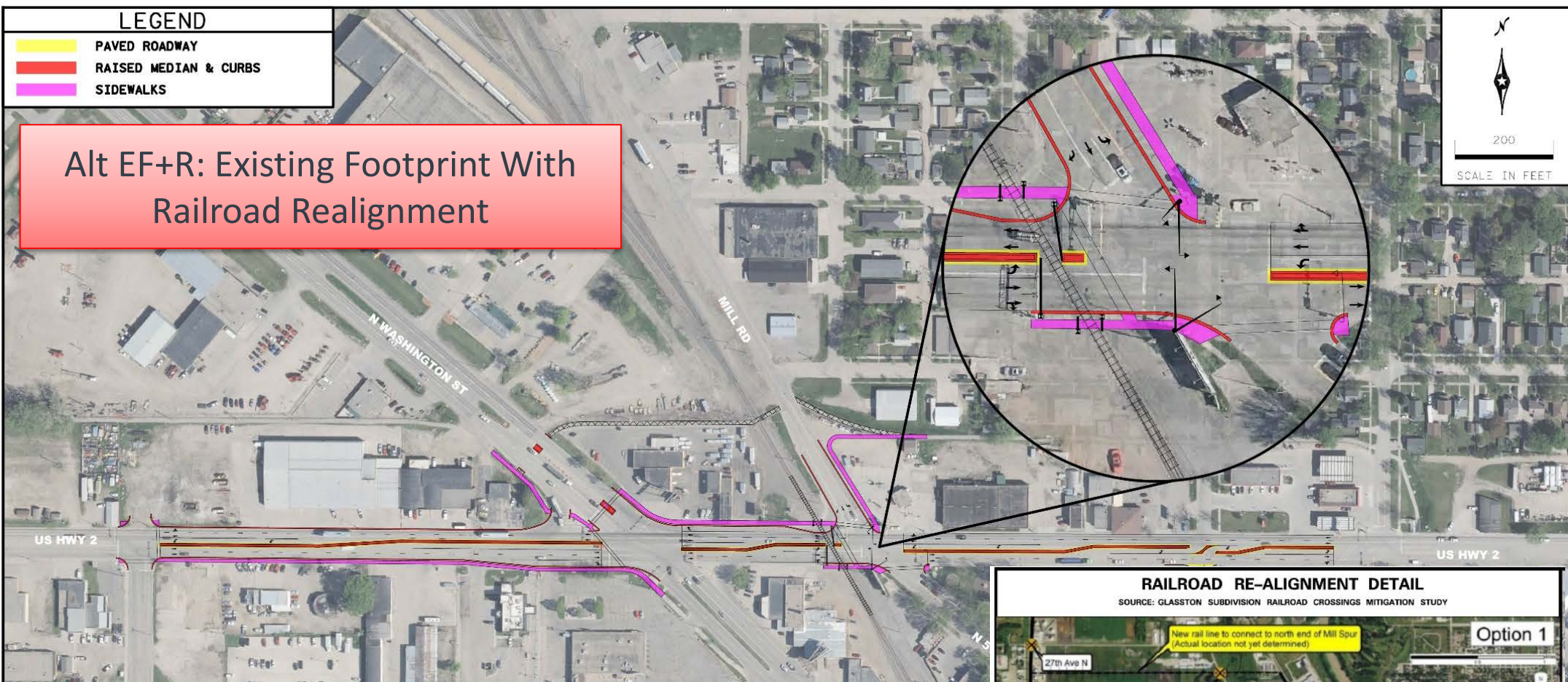


LEGEND

- PAVED ROADWAY
- RAISED MEDIAN & CURBS
- SIDEWALKS

Alt EF+R: Existing Footprint With Railroad Realignment

200
SCALE IN FEET



Scoring Category	Category Weight	Category Score	Notes	Weighted Score
Vehicular and Truck Operations and Safety	22	●●●●○○○○	Access management improves traffic safety slightly, but similar operation issues in no build condition remain. Difficult truck turning movements persist.	●●●●○○○○ (6.5)
Rail Conflicts and Delay	17	●●●●●●●●	Railroad realignment eliminates railroad crossing exposure and delay in the study area.	
Multimodal Facilities and Safety	19	●●●●○○○○	Fills in some sidewalk gaps making the network more pedestrian friendly. Uncontrolled pedestrian crossing on N. Washington Street realigned to cross at intersections along Gateway Drive/US 2.	
Property and Environmental Impacts	14	●●●●●●●○	Very minor impacts - approximately \$10,000 worth of property impacts.	
Cost	28	●●●●○○○○	Total estimated project cost of \$5.6 million	

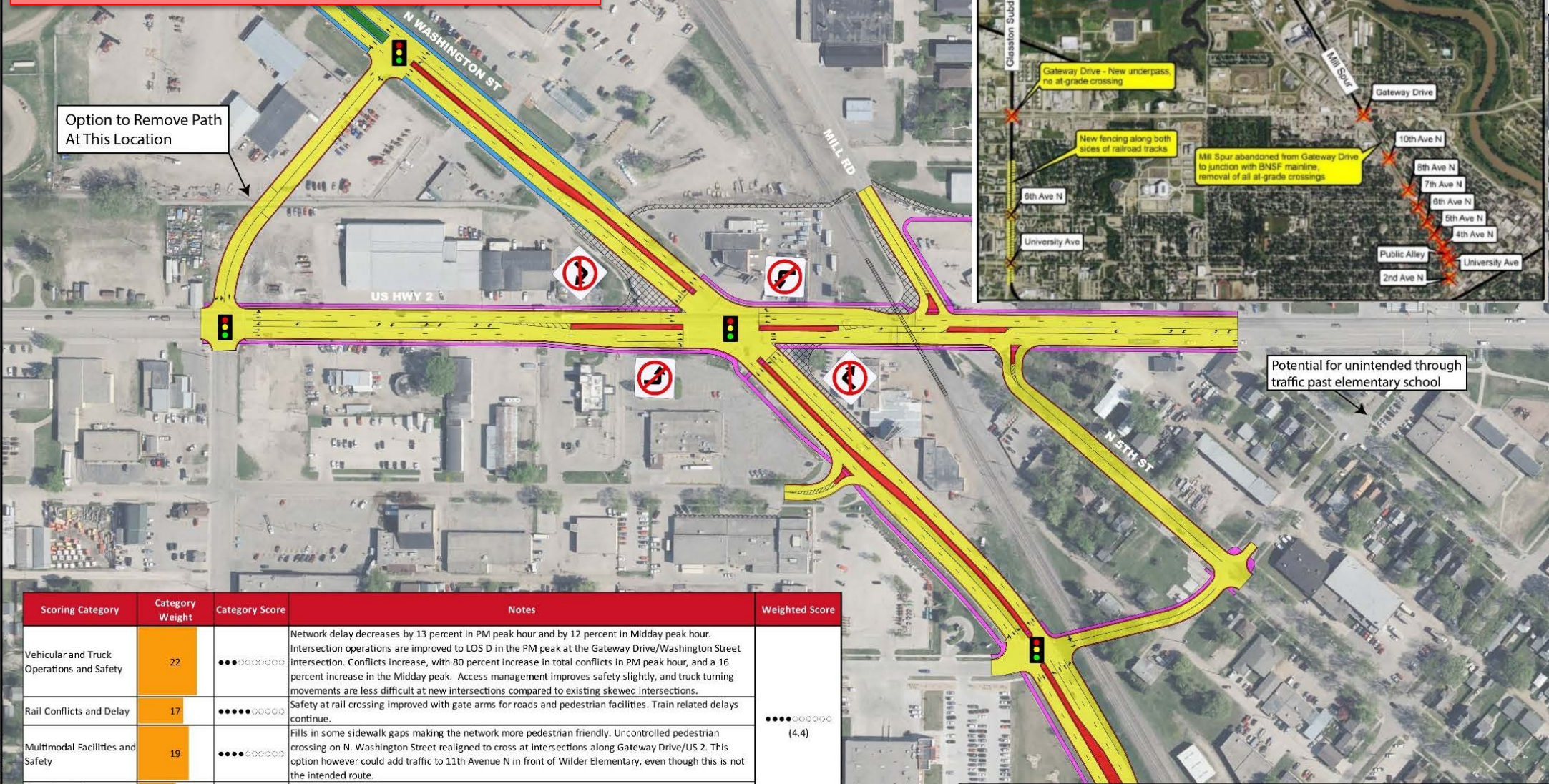
Alt SM+R: Skewed Movement Rerouting With Railroad Realignment

LEGEND

- PAVED ROADWAY
- RAISED MEDIAN & CURBS
- GRASS MEDIAN
- PAVED SHOULDERS
- SIDEWALKS

RAILROAD RE-ALIGNMENT DETAIL
SOURCE: GLASSTON SUBDIVISION RAILROAD CROSSINGS MITIGATION STUDY

Option 1



Scoring Category	Category Weight	Category Score	Notes	Weighted Score
Vehicular and Truck Operations and Safety	22	●●●○○○○○	Network delay decreases by 13 percent in PM peak hour and by 12 percent in Midday peak hour. Intersection operations are improved to LOS D in the PM peak at the Gateway Drive/Washington Street intersection. Conflicts increase, with 80 percent increase in total conflicts in PM peak hour, and a 16 percent increase in the Midday peak. Access management improves safety slightly, and truck turning movements are less difficult at new intersections compared to existing skewed intersections.	●●●○○○○○ (4.4)
Rail Conflicts and Delay	17	●●●●○○○○	Safety at rail crossing improved with gate arms for roads and pedestrian facilities. Train related delays continue.	
Multimodal Facilities and Safety	19	●●●●○○○○	Fills in some sidewalk gaps making the network more pedestrian friendly. Uncontrolled pedestrian crossing on N. Washington Street realigned to cross at intersections along Gateway Drive/US 2. This option however could add traffic to 11th Avenue N in front of Wilder Elementary, even though this is not the intended route.	
Property and Environmental Impacts	14	●●●●○○○○	Moderate impacts - approximately \$790,000 worth of property impacts	
Cost	28	●●●●○○○○	Total estimated project cost of \$8.6 million	

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GRAND FORKS – EAST GRAND FORKS MPO

US-2 & US-81 INTERSECTION SKEW STUDY
PRELIMINARY ALTERNATIVES ANALYSIS
MOVEMENT REROUTING CONCEPT

6/6/2019 11:20:34 AM jermey@klj.net



Railroad Realignment with Intersection Consolidation

N 20TH ST



N WASHINGTON ST

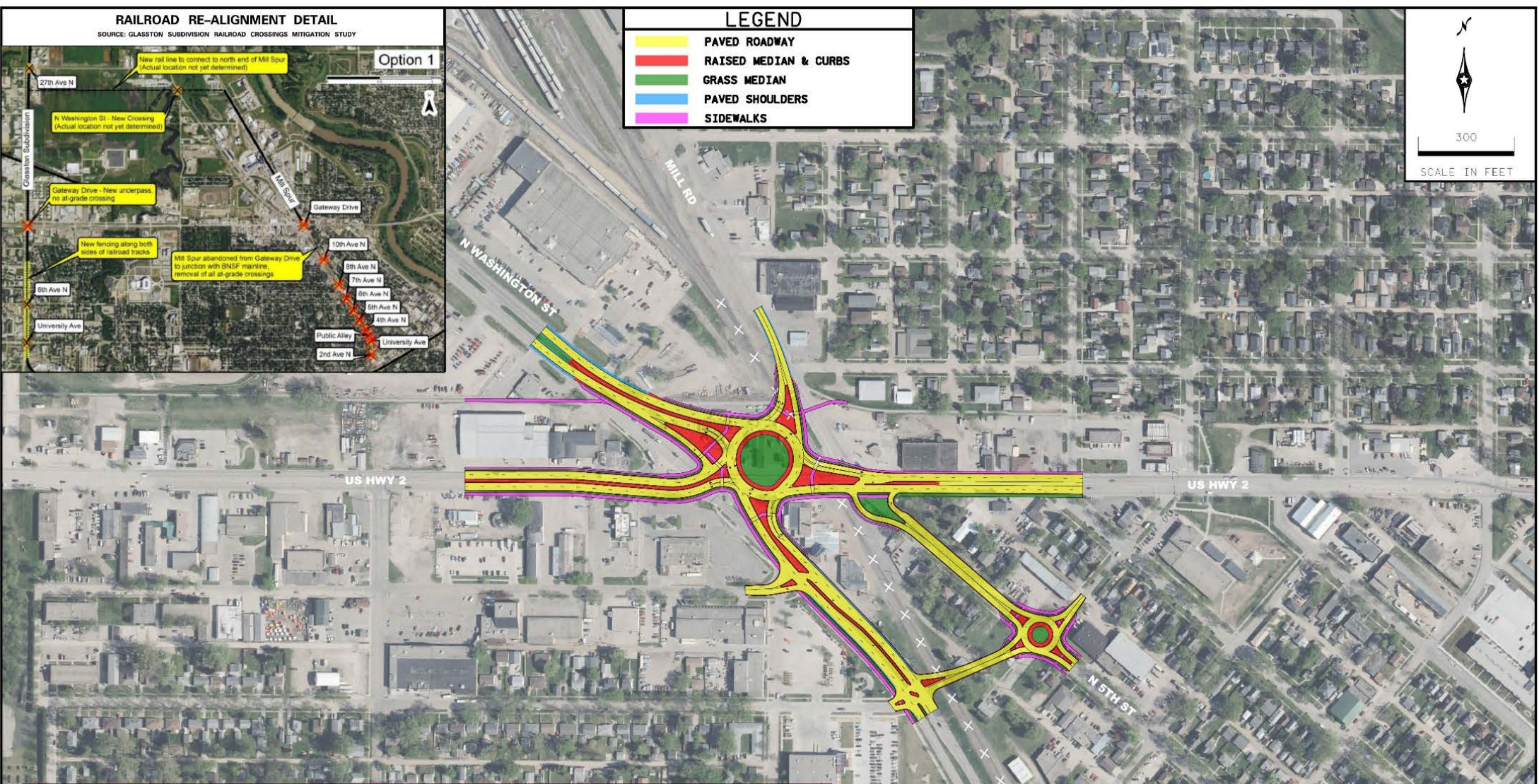
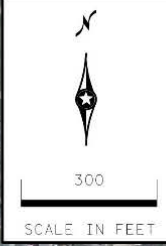
RAILROAD RE-ALIGNMENT DETAIL

SOURCE: GLASSTON SUBDIVISION RAILROAD CROSSINGS MITIGATION STUDY



LEGEND

- PAVED ROADWAY
- RAISED MEDIAN & CURBS
- GRASS MEDIAN
- PAVED SHOULDERS
- SIDEWALKS



Scoring Category	Category Weight	Category Score	Notes	Weighted Score
Vehicular and Truck Operations and Safety	22	○○○○○○○○○○	Breakdown of traffic flow in PM peak with delays over 500 percent higher than no build. Midday delays also increase by 33 percent.	●●○○○○○○○○ (3)
Rail Conflicts and Delay	17	●●●●●●●●	Railroad realignment eliminates railroad crossing exposure and delay in the study area.	
Multimodal Facilities and Safety	19	●●●○○○○○	Fills in some sidewalk gaps making the network more pedestrian friendly. Uncontrolled pedestrian crossing on N. Washington Street realigned to cross at intersections along Gateway Drive/US 2, but nonmotorized movements at a multilane roundabout can be confusing for some users.	
Property and Environmental Impacts	14	●●○○○○○○	Major impacts - \$2.3 million worth of property impacts	
Cost	28	●○○○○○○○○	Total estimated project cost of \$16 million	

Alt R+R: Washington Street/Mill Road Roundabout With Railroad Realignment



GRAND FORKS - EAST GRAND FORKS MPO
 US-2 & US-81 INTERSECTION SKEW STUDY
 PRELIMINARY ALTERNATIVES ANALYSIS
 RAILROAD REALIGNMENT - ROUNDABOUT OPTION

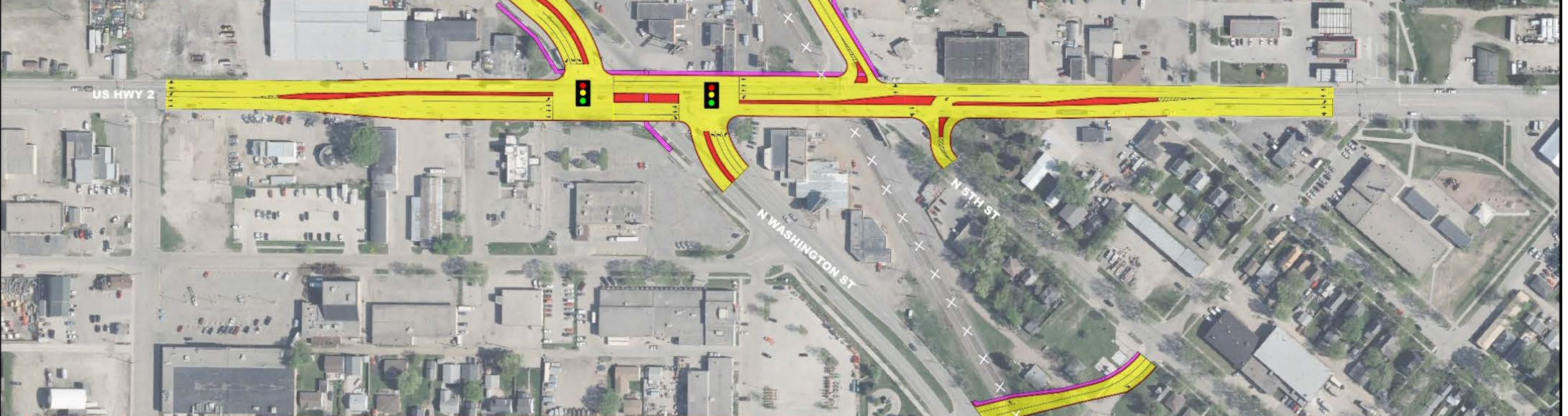
RAILROAD RE-ALIGNMENT DETAIL
SOURCE: GLASSTON SUBDIVISION RAILROAD CROSSINGS MITIGATION STUDY



LEGEND

- PAVED ROADWAY
- RAISED MEDIAN & CURBS
- SIDEWALKS

200
SCALE IN FEET



Scoring Category	Category Weight	Category Score	Notes	Weighted Score
Vehicular and Truck Operations and Safety	22	○○○○○○○○○○	100 percent increased delay in PM peak hour, but 7 percent decrease in delay in the Midday peak. Total conflicts increase by 13 percent in the PM peak, but crossing conflicts decrease by 64 percent. Total conflicts reduce by 2 percent in the Midday peak, with crossing conflicts reduced by 15 percent.	●●●●○○○○ (3.9)
Rail Conflicts and Delay	17	●●●●●●●●	Railroad realignment eliminates railroad crossing exposure and delay in the study area.	
Multimodal Facilities and Safety	19	●●●●○○○○	Fills in some sidewalk gaps making the network more pedestrian friendly. Uncontrolled pedestrian crossing on N. Washington Street realigned to cross at intersections along Gateway Drive/US 2.	
Property and Environmental Impacts	14	●●●●○○○○	Moderate impacts - approximately \$650,000 worth of property impacts	
Cost	28	●●○○○○○○○○	Total estimated project cost of \$11.1 million	

**Alt ST+R: Separated T-Intersection
With Railroad Realignment**



GRAND FORKS – EAST GRAND FORKS MPO
US-2 & US-81 INTERSECTION SKEW STUDY
PRELIMINARY ALTERNATIVES ANALYSIS
RAILROAD REALIGNMENT – OFFSET T OPTION

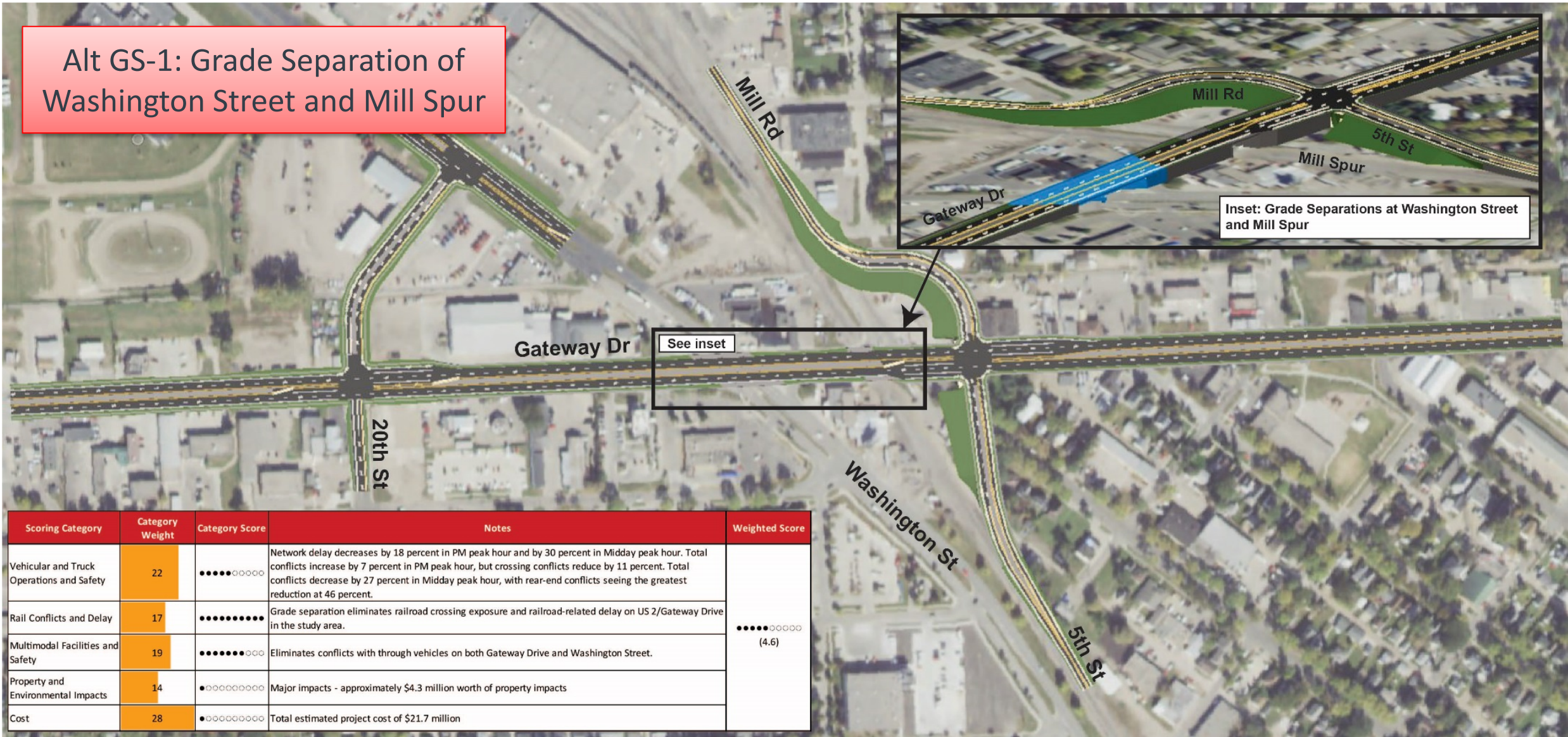


Railroad Grade Separated Alternatives

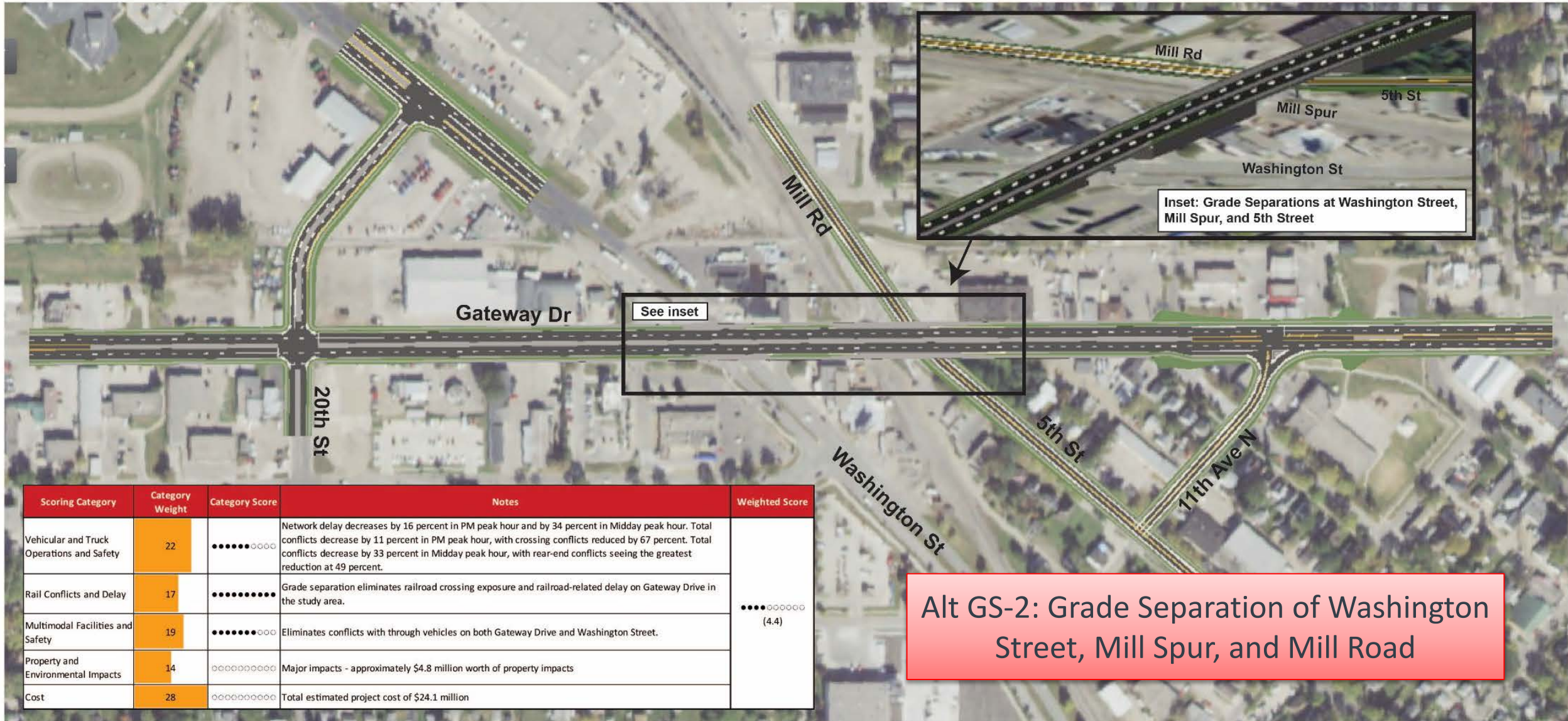
N 20TH ST

N WASHINGTON ST

Alt GS-1: Grade Separation of Washington Street and Mill Spur



Scoring Category	Category Weight	Category Score	Notes	Weighted Score
Vehicular and Truck Operations and Safety	22	●●●●○○○○	Network delay decreases by 18 percent in PM peak hour and by 30 percent in Midday peak hour. Total conflicts increase by 7 percent in PM peak hour, but crossing conflicts reduce by 11 percent. Total conflicts decrease by 27 percent in Midday peak hour, with rear-end conflicts seeing the greatest reduction at 46 percent.	●●●●○○○○ (4.6)
Rail Conflicts and Delay	17	●●●●●●●●	Grade separation eliminates railroad crossing exposure and railroad-related delay on US 2/Gateway Drive in the study area.	
Multimodal Facilities and Safety	19	●●●●●●○○	Eliminates conflicts with through vehicles on both Gateway Drive and Washington Street.	
Property and Environmental Impacts	14	●○○○○○○○○	Major impacts - approximately \$4.3 million worth of property impacts	
Cost	28	●○○○○○○○○	Total estimated project cost of \$21.7 million	



Inset: Grade Separations at Washington Street, Mill Spur, and 5th Street

See inset

Scoring Category	Category Weight	Category Score	Notes	Weighted Score
Vehicular and Truck Operations and Safety	22	●●●●●○○○○	Network delay decreases by 16 percent in PM peak hour and by 34 percent in Midday peak hour. Total conflicts decrease by 11 percent in PM peak hour, with crossing conflicts reduced by 67 percent. Total conflicts decrease by 33 percent in Midday peak hour, with rear-end conflicts seeing the greatest reduction at 49 percent.	●●●●○○○○○○ (4.4)
Rail Conflicts and Delay	17	●●●●●●●●	Grade separation eliminates railroad crossing exposure and railroad-related delay on Gateway Drive in the study area.	
Multimodal Facilities and Safety	19	●●●●●●○○	Eliminates conflicts with through vehicles on both Gateway Drive and Washington Street.	
Property and Environmental Impacts	14	○○○○○○○○○○	Major impacts - approximately \$4.8 million worth of property impacts	
Cost	28	○○○○○○○○○○	Total estimated project cost of \$24.1 million	

Alt GS-2: Grade Separation of Washington Street, Mill Spur, and Mill Road



Summary

N WASHINGTON ST



N 20TH ST

Alternatives Summary – Technical Score

Alternative	Scoring Category	Category Weight	Category Score	Weighted Score
EF: Existing Footprint Improvement Plan	Vehicular and Truck Operations and Safety	22	●●●●○○○○○○	●●●●●○○○○○ (6.2)
	Rail Conflicts and Delay	17	●●●●●○○○○○	
	Multimodal Facilities and Safety	19	●●●●●○○○○○	
	Property and Environmental Impacts	14	●●●●●●●○○○	
	Cost	28	●●●●●●●○○○	
NRC: New Roadway Connection Improvement Plan	Vehicular and Truck Operations and Safety	22	●●○○○○○○○○	●●●●●○○○○○ (5)
	Rail Conflicts and Delay	17	●●●●●○○○○○	
	Multimodal Facilities and Safety	19	●●●●●○○○○○	
	Property and Environmental Impacts	14	●●●●●●●○○○	
	Cost	28	●●●●●●●○○○	
SM: Skewed Movement Rerouting Improvement Plan	Vehicular and Truck Operations and Safety	22	●●●○○○○○○○	●●●●○○○○○○○ (4.4)
	Rail Conflicts and Delay	17	●●●●●○○○○○	
	Multimodal Facilities and Safety	19	●●●●●○○○○○	
	Property and Environmental Impacts	14	●●●●●○○○○○	
	Cost	28	●●●●●○○○○○	
EF+R: Railroad Realignment with Existing Footprint Improvement Plan	Vehicular and Truck Operations and Safety	22	●●●●○○○○○○	●●●●●○○○○○ (6.5)
	Rail Conflicts and Delay	17	●●●●●●●○○○	
	Multimodal Facilities and Safety	19	●●●●●○○○○○	
	Property and Environmental Impacts	14	●●●●●●●○○○	
	Cost	28	●●●●●●●○○○	
SM+R: Railroad Realignment with Skewed Movement Rerouting Improvement Plan	Vehicular and Truck Operations and Safety	22	●●●○○○○○○○	●●●●○○○○○○○ (4.4)
	Rail Conflicts and Delay	17	●●●●●●●○○○	
	Multimodal Facilities and Safety	19	●●●●●○○○○○	
	Property and Environmental Impacts	14	●●●●●○○○○○	
	Cost	28	●●○○○○○○○○	

Alternative	Scoring Category	Category Weight	Category Score	Weighted Score
R+R: Railroad Realignment with Roundabout	Vehicular and Truck Operations and Safety	22	○○○○○○○○○○	●●●○○○○○○○ (3)
	Rail Conflicts and Delay	17	●●●●●●●○○○	
	Multimodal Facilities and Safety	19	●●●●○○○○○○	
	Property and Environmental Impacts	14	●○○○○○○○○○	
	Cost	28	●○○○○○○○○○	
ST+R: Railroad Realignment with Separated T-Intersection	Vehicular and Truck Operations and Safety	22	○○○○○○○○○○	●●●●○○○○○○○ (3.9)
	Rail Conflicts and Delay	17	●●●●●●●○○○	
	Multimodal Facilities and Safety	19	●●●●●○○○○○	
	Property and Environmental Impacts	14	●●●●●○○○○○	
	Cost	28	●●○○○○○○○○	
GS-1: Grade Separation of US 81/Washington Street and Mill Spur	Vehicular and Truck Operations and Safety	22	●●●●●○○○○○	●●●●○○○○○○○ (4.6)
	Rail Conflicts and Delay	17	●●●●●●●○○○	
	Multimodal Facilities and Safety	19	●●●●●○○○○○	
	Property and Environmental Impacts	14	●○○○○○○○○○	
	Cost	28	●○○○○○○○○○	
GS-2: Grade Separation of US 81/Washington Street, Mill Spur, and Mill Road/5th Street	Vehicular and Truck Operations and Safety	22	●●●●●○○○○○	●●●●○○○○○○○ (4.4)
	Rail Conflicts and Delay	17	●●●●●●●○○○	
	Multimodal Facilities and Safety	19	●●●●●○○○○○	
	Property and Environmental Impacts	14	○○○○○○○○○○	
	Cost	28	○○○○○○○○○○	

Alternatives Summary – Rankings

Alternative	Category	Category Rank	Overall Rank
EF: Existing Footprint Improvement Plan	Vehicular and Truck Operations and Safety	3	2
	Rail Conflicts and Delay	7	
	Multimodal Facilities and Safety	3	
	Property and Environmental Impacts	1	
	Cost	1	
NRC: New Roadway Connection Improvement Plan	Vehicular and Truck Operations and Safety	7	7
	Rail Conflicts and Delay	7	
	Multimodal Facilities and Safety	6	
	Property and Environmental Impacts	3	
	Cost	2	
SM: Skewed Movement Rerouting Improvement Plan	Vehicular and Truck Operations and Safety	5	8
	Rail Conflicts and Delay	7	
	Multimodal Facilities and Safety	6	
	Property and Environmental Impacts	4	
	Cost	4	
EF+R: Railroad Realignment with Existing Footprint Improvement Plan	Vehicular and Truck Operations and Safety	3	1
	Rail Conflicts and Delay	1	
	Multimodal Facilities and Safety	3	
	Property and Environmental Impacts	1	
	Cost	3	
SM+R: Railroad Realignment with Skewed Movement Rerouting Improvement Plan	Vehicular and Truck Operations and Safety	5	5
	Rail Conflicts and Delay	1	
	Multimodal Facilities and Safety	6	
	Property and Environmental Impacts	4	
	Cost	5	

Alternative	Category	Category Rank	Overall Rank
R+R: Railroad Realignment with Roundabout	Vehicular and Truck Operations and Safety	8	9
	Rail Conflicts and Delay	1	
	Multimodal Facilities and Safety	6	
	Property and Environmental Impacts	7	
	Cost	7	
ST+R: Railroad Realignment with Separated T-Intersection	Vehicular and Truck Operations and Safety	8	6
	Rail Conflicts and Delay	1	
	Multimodal Facilities and Safety	3	
	Property and Environmental Impacts	4	
	Cost	5	
GS-1: Grade Separation of US 81/Washington Street and Mill Spur	Vehicular and Truck Operations and Safety	2	3
	Rail Conflicts and Delay	1	
	Multimodal Facilities and Safety	1	
	Property and Environmental Impacts	8	
	Cost	7	
GS-2: Grade Separation of US 81/Washington Street, Mill Spur, and Mill Road/5th Street	Vehicular and Truck Operations and Safety	1	4
	Rail Conflicts and Delay	1	
	Multimodal Facilities and Safety	1	
	Property and Environmental Impacts	9	
	Cost	9	