City of Saint Paul

DESIGN VARIANCE REQUEST #1

FOR

SP 164-020-109
Minn Proj # TEAX 6212 (276)

ROUTE NAME: Raymond Avenue
FROM: University Avenue/C.S.A.H. 34
TO: Hampden Avenue

OVER/UNDER: N/A
IN THE CITY OF: Saint Paul

PROPOSED IMPROVEMENT:
The Raymond Avenue Reconstruction Project includes roadway reconstruction, curb and gutter, storm water quality improvements, street lighting, installation of traffic calming devices, bicycle infrastructure and minor sidewalk improvements installed to match the new geometry of the corridor and landscaping.

Recommended:

_____ _____
City of Saint Paul Engineer Date

Reviewed and Recommended:

_____ _____
District State Aid Engineer Date

Approved:

_____ _____
State Aid Engineer Date
State Aid For Local Transportation

The purpose of this document is to request a variance for a design element that does not meet the criteria set forth in the standards. A design variance is hereby requested with the following justification and considerations.

The MnDOT Road Design Manual figure 3-3.02A requires that a roadway with a horizontal curve radius below 280' radius should be superelevated when the design speed is 30 mph.

The City is requesting a variance to construct the curve without superelevation.

There are several reasons why we cannot and should not meet the requirements.

> The proposed design matches the existing curve radius of 262'. We cannot propose a larger radius because we are constrained by existing right-of-way and existing infrastructure.
>
> In order to meet watershed regulations, we have designed a rain garden adjacent to the curve. It is intuitive to slant the road toward the garden in order to direct surface water to the garden. If the roadway were to be superelevated, surface water would be directed away from the garden. If that side of the roadway were raised, more property would be required for slopes in the garden, thereby decreasing the size and storage capacity of the garden. The reduced storage capacity would not meet watershed regulations.
>
> We are redesigning the alignment of the existing, skewed Bayless/Raymond intersection. The new intersection is near the north end of the curve. Superelevating the curve would force a steeper uphill grade on Bayless Avenue as a vehicle approaches the new intersection with Raymond Avenue.
>
> We do not wish to reduce the design speed of the entire roadway in order to accommodate one small segment of the project.

Design Standard the Variance is from: MnDOT Road Design Manual Uniform Design Guide, chapter 3 "Alignment and Superelevation".

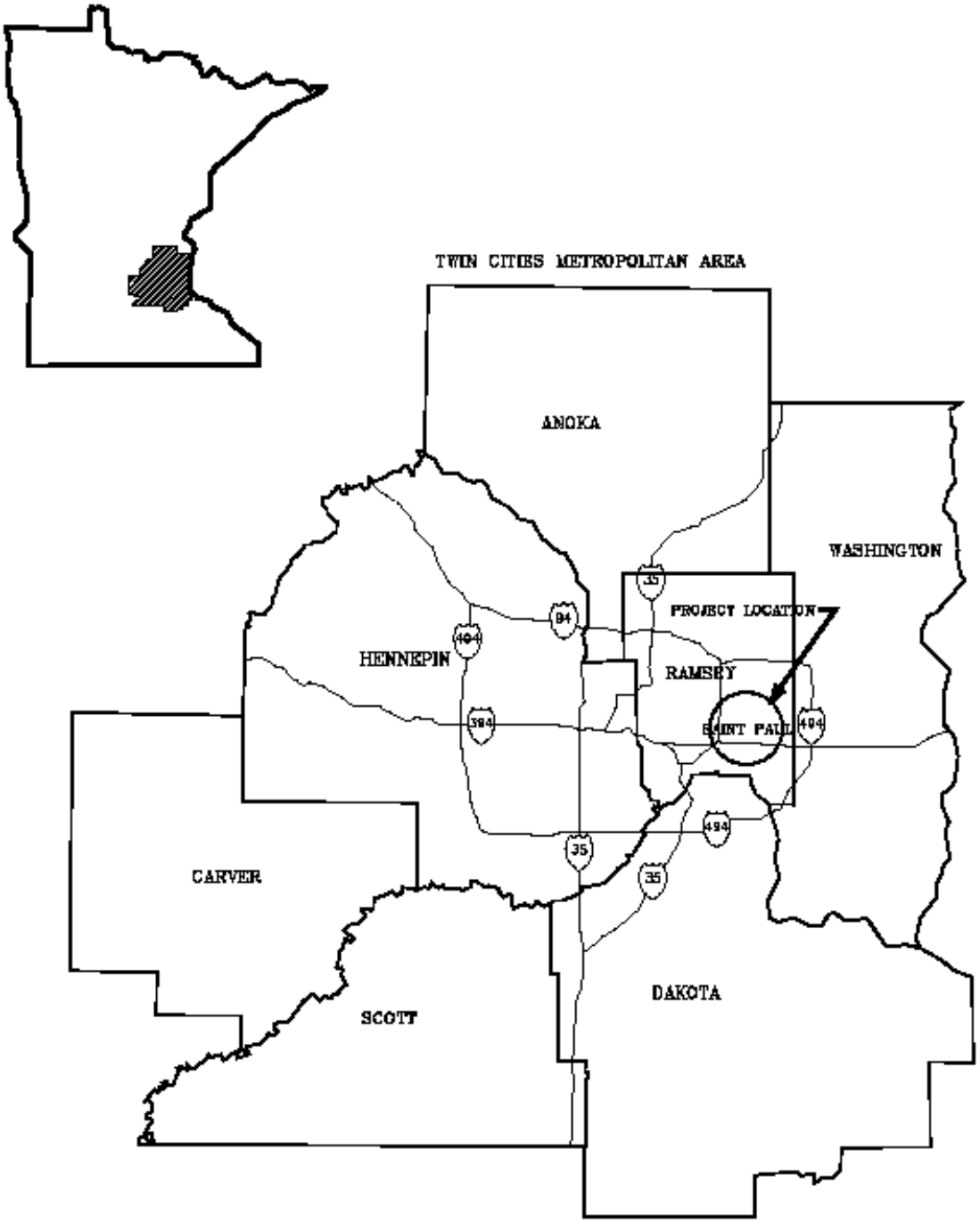
Design Element Involved: Horizontal Curve

Required Standard: Superelevation emax = 0.06/0.06

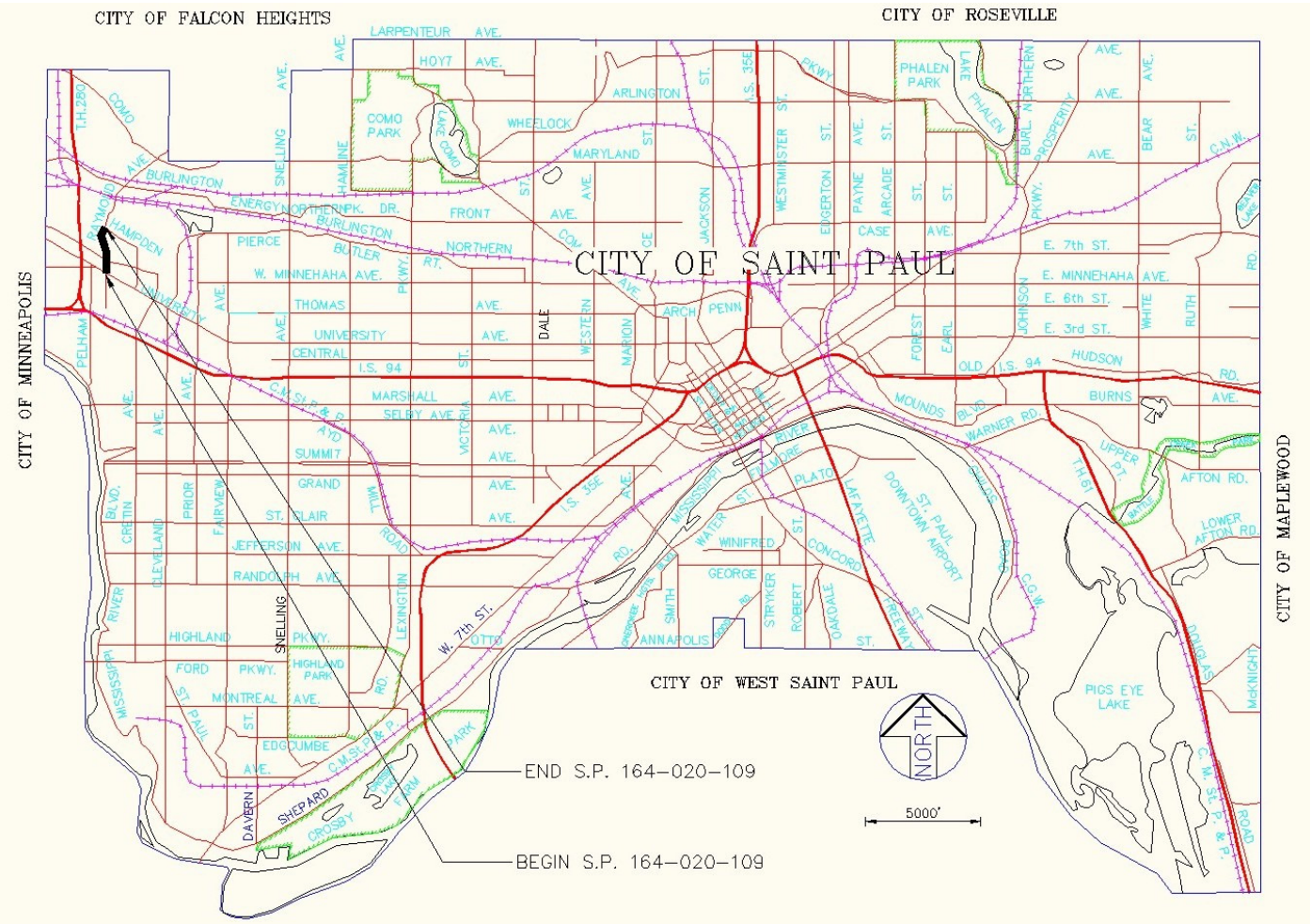
Proposed "in lieu of" Design: curve with adverse superelevation.

Location: Raymond Avenue between Long Avenue and Hampden Avenue in City of Saint Paul.

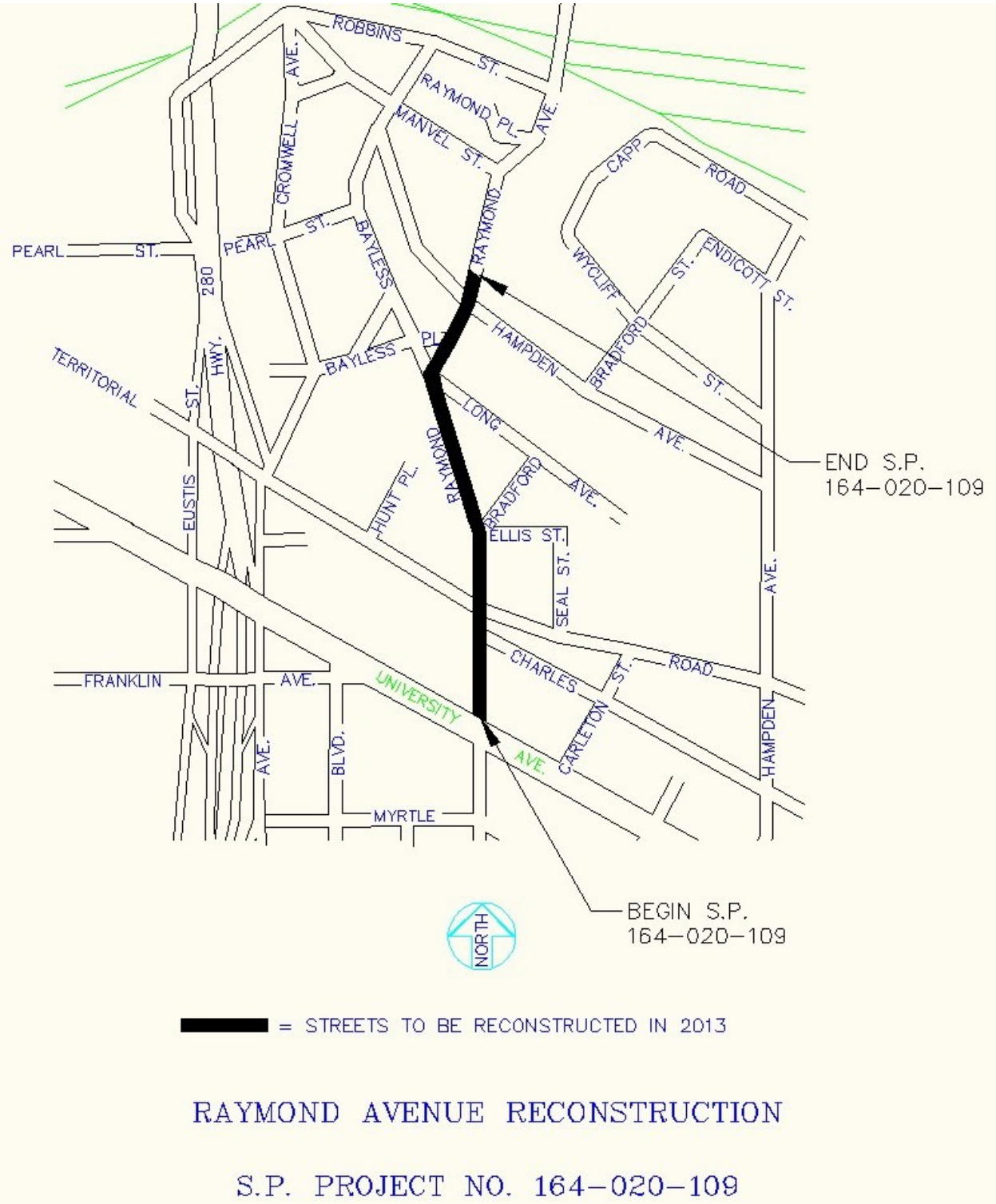
STATE MAP


TWIN CITIES METROPOLITAN AREA
ANOKA
WASHINGTON
PROJECT LOCATION
HENNEPIN
RAMSEY
SAINT PAUL
CARVER
SCOTT
DAKOTA
35
94
494
694

LOCATION MAP



LOCATION MAP



Social Impacts

- No adverse economic impacts will result with implementation of the requested variance.
- No adverse social impacts will result with implementation of the requested variance.
- With respect to safety, superelevation helps to counteract the centrifugal force a vehicle is subject to when navigating a curve. However, as stated in the MnDOT Road Design Manual, "drivers, through conditioning, have developed a higher threshold of discomfort when reacting to centrifugal force on horizontal curves on low-speed streets". This would be especially true on 90 year old roadway with an existing adverse superelevation.
- No adverse Environmental impacts will result with implementation of the requested variance. It is the desire of the neighborhood to increase green space as much as possible. Maximizing the size and functionality of the adjacent rain garden will help attain the neighborhood goals.

Degree to which the standard is reduced: a curve radius of 280' is required to avoid the superelevation requirement, the proposed centerline curve radius is 262' The adverse super elevation only affects the south bound lane. The centerline curve radius for the southbound lane is 276'.

Affect on other standards: No other standards are affected.

Driver expectation/Conformance/compatibility with rest of the road:

Future Compatibility: No future work is currently proposed for this segment of Raymond Avenue. Future work on Raymond north of Hampden has been awarded federal funding. This variance will have no impact on that possible future project.

Existing & Projected ADT & vehicle mix: Existing ADT is 8600. Projected ADT is 9800 vpd.

Safety/Accidents: There have been 16 recorded accidents on Raymond Avenue between University Avenue and Hampden Avenue in the 3 year time period between 10/31/09 to 10/31/12. Accident data is enclosed.

Economics: Constructing to the standard would have minimal effect on the total cost of the project. Constructing to the standard would have greater costs in detriments to the users of roadway, as in decreased stormwater treatment and a less desirable intersection at Bayless Avenue and Raymond Avenue.

Environmental Impacts/Encroachments:

- The project will not impact farmland.
- The project will not involve placement of fill into waters of the U.S. (defined in 33 CFR 328).
- The project will disturb 1 or more acres of land (including clearing, grading and excavation). An MPCA NPDES permit will be submitted prior to project authorization.
- The project will not encroach into a floodplain.
- The project will not impact or encroach into a wetland.
- The project is not a Type I project. Procedures for abatement of highway traffic noise do not apply, in accordance with 23 CFR 772.
- Construction Noise has been considered and no impact is anticipated.
- The CRU has determined that there are historic properties with the APE, but the project will have "No Adverse Effect" on the properties.
- The project will have no effect on federally listed threatened or endangered species or critical habitat.

Mitigation

No safety mitigations for the adverse superelevated curve are appropriate and none will be utilized

Lighting: Lantern style street lighting will be installed as part of this project.

Conclusion: As stated in the MnDOT Road Design Manual, section 3-3.02, “For urban streets with design speeds of 30 mph or less, superelevation is rarely necessary. Most of the time, the side friction factor is adequate. If the maximum allowable friction factor is exceeded, consider doing the following activities:
1. Do not use superelevation on curves if it would increase drainage problems.
2. Make sure to meet the grades of the surrounding properties, entrances, and cross streets without introducing grades on the main roadway that exceed the maximum longitudinal grade.”
Superelevating the curve in question would increase drainage problems and would make it difficult to impossible to meet the grades of the surrounding properties and cross streets. The City believes this variance request to be justified.