



This project memo is intended to examine proposed raised crossings on Grand Avenue and the appropriateness of this design choice. Below the existing conditions of Grand Avenue are examined, and MnDOT and relevant cities' standards are considered. Weighing the existing conditions of Grand Avenue through Macalester College's Campus, the overwhelming public desire for raised crossings and other treatments to slow motor vehicles, particularly at high volume pedestrian crossings, with MnDOT standards and policies within relevant city examples, raised crossings have been deemed appropriate to be proposed on Grand Avenue through the Macalester College campus and are recommended to be implemented with the reconstruction of the street in 2024.

### **Grand Avenue details:**

- Grand Avenue is classified a Minor Arterial (B-Minor)
- Grand Avenue is a MSA route and will be using MSA funds for reconstruction
- Grand Avenue is a bus route
- Grand Avenue is NOT a truck route, but does see truck traffic
- Grand Avenue is used by emergency vehicles
- Grand Avenue AADT: 6,800 VPD – 2022
- Grand Avenue pedestrian crossings 1,000 – 1,900 per day, per crossing point, during school semester on Macalester College campus block (total ~5,000 mid-block crossings per day)

Local, national and international references would indicate that Grand Avenue may not be appropriate for raised crossings. However, Grand Avenue meets most criteria for raised crossing considerations – AADT less than 9,000 VPD, only two traffic lanes, speed limit of 25 MPH, and a desire to calm traffic and see greater vehicle yielding to significant pedestrian activity midblock. The unique conditions and history of Grand Avenue through Macalester Campus indicate that raised crossings are appropriate for the campus setting of Grand Avenue.

Issues present for a Grand Avenue raised crossing is the street serves high frequency transit with articulated buses, frequent truck traffic for businesses, emergency vehicle access and the street is currently identified as a (B-Minor/Other) Minor Arterial and is on the Municipal State Aid System. However, there are examples of raised crossings in many cities in the country that are located along transit routes, facilitate emergency vehicle movements and have higher AADT than Grand Avenue.

Relevant examples of other streets with raised crossings:

- W Harrison St – Chicago IL: raised crossing across major street that runs through University of Illinois Chicago – high AADT (over 15,000), bus route, emergency route.
- Commonwealth Ave – Harrisburg PA: raised crossing across street in front of state capitol. Bus route.





- Lime St – Lakeland FL: raised crossing in front of convention center. Bus route. AADT: 6,100.
- Granite St – Cambridge MA: tabled intersection in front of elementary school. Bus route. AADT: 3,240.
- Prospect St – New Haven CT: multiple speed tables through Yale University. Bus route. AADT: 7,200.
- Vassar St – Cambridge MA: Raised crossing in front of large dorm building on MIT campus. Bus route. AADT: 5,677.

### **Raised crossing standards – examples:**

#### **MnDOT best practices**

##### Raised Crossing:

- Local and collector streets – does not meet
- 2- or 3- lane roadways – meets
- Speeds of 30 mph or less – meets
- AADT less than 9,000 – meets
- Regional trail crossing – *while this is not a regional trail crossing, this is a pedestrian crossing with significant pedestrian traffic, much more so than most, if not all, regional trail crossings in the state.*
- Drivers not yielding to pedestrians in the crosswalk – *driving yielding has been observed to be inconsistent.*
- Vehicle speeds causing problems – *Grand Avenue is a 25 MPH street, St Paul Public Works is anticipating constructing the street to that design speed, raised crossings facilitate that decision.*
- Inadequate visibility of pedestrians – *there are visibility issues related to visual clutter and vegetation, raised crossings would mitigate visibility issues.*
- Avoid truck routes, bus transit routes, emergency routes and arterial streets – *Raised crossings have been installed at a plethora of bus routes across the country without issue. St Paul emergency services have expressed little issue with the proposed raised crossings and indicated ability to mitigate any issues which may arise. While Grand Avenue is designated as a Minor Arterial, the characteristics of the street are more consistent with Collector roadways than Arterial roadways.*
- Ensure appropriate width (typically 10 feet to allow front and rear wheels of a passenger vehicle to be on the table at the same time) – *top of the crossings will be 20 feet wide to facilitate heavy pedestrian traffic and larger vehicles.*
- Consider snowplowing needs – *Ramp taper will be adequate for plowing needs and will be consulted with Public Works maintenance division to ensure compatibility.*

##### **Minneapolis:**

- Raised pedestrian and bicycle crossings should generally be included with street reconstruction projects at busy pedestrian crossings, sidewalk-level protected bike lanes, or shared use paths when they cross an Urban Neighborhood street.
- Raised crossings can be used at intersections or at midblock crossings.
- Raised crossings generally should not be included across street types other than Urban Neighborhood and Parkway.



- Raised pedestrian and bicycle crossings should typically be designed with a 25 mph design speed. To encourage slower speeds, drivers should notice a vertical difference when crossing over the raised crossing.
- Raised crossings should generally be designed to minimize the vertical difference of the pedestrian and bicycle crossing. The height of a specific raised crossing should be determined based on local factors, including drainage and nearby street grades.
- It's important that the raised crossing is designed to ensure that fire truck access is maintained.

#### **Seattle:**

- Raised crossings or intersections may be used to create a "gateway" or transition, such as the transition from an arterial street to a residential street.
- Appropriate at trail crossings and local streets when intersecting higher volume roadways. May not be appropriate on "Urban Center Connector" streets – these streets are ID'd as ones which are freight routes, transit routes or high-volume streets which connect major nodes.
- Raised crosswalks are discouraged on streets with main fire truck access.
- Typical ramp lengths are 6 feet. Ramp length may be increased up to 9 feet in order to accommodate freight and emergency vehicles. However, such designs should be weighed against the diminished traffic calming effect for standard vehicles.
- Consider stormwater drainage when designing raised crosswalks. Additional drainage structures (e.g.inlets or catch basins) may be needed to prevent stormwater ponding on the roadway.

#### **New York City:**

- Enhances access for people with ambulatory disabilities by providing level crossing
- Compels drivers to travel at speeds no higher than the street's design speed
- Improves drivers' awareness of presence of pedestrian crossing, particularly at mid-block crossing locations
- Can alert drivers that they are entering a slower-speed, pedestrian-oriented street environment
- Encourages motorists to yield to pedestrians

#### Things to consider:

- May impact street drainage or require catch basin relocation
- Attention should be given to accommodation of and navigation by people with vision disabilities

#### Application:

- Consider at areas of particularly high pedestrian crossing demand on narrower streets(maximum of two moving lanes), such as locations with pedestrian generators, particularly for children and seniors (e.g., major commercial or cultural destinations, transit entrances, parks, schools) on opposite sides of the street
- Consider as a more robust option for mid-block crossings, particularly enhanced crossings
- Consider on the outer roadways of multi-lane boulevards at crossings
- Not appropriate for arterial roadways



- Speed humps are not appropriate on "local" or "through" truck routes or MTA bus routes, emergency vehicle response routes, or street blocks with FDNY houses or hospitals located on them

#### **Toronto:**

- Speed: Less than 50 KPH (31 MPH)
- Grade: Less than 8%

#### Location:

- Where low compliance with stop control is posing a collision hazard;
- Where drivers are failing to yield to pedestrians;
- Where poor sightlines toward a pedestrian crossing would be best improved by raising the crossing;
- Where children frequently cross (i.e. at the frontages of schools), particularly if unaccompanied by adults.

#### Vehicle and Pedestrian Control

- The installation of raised crosswalks at an intersection should be restricted to where vehicles are already coming to a stop
- The installation of a raised crosswalk at a PXO (at an intersection or mid block) should be part of a traffic calming strategy, as the raised crosswalk will act like a speed-hump when pedestrians are not present in the crosswalk.

#### Emergency Response Routes

- Raised crosswalk treatments near hospitals and fire stations should involve consultation with the Toronto Paramedic Services and Toronto Fire Services.

#### Heavy Vehicles

- Raised crosswalk treatments are not recommended on routes frequently used by heavy vehicles; engineering judgement should be applied in evaluating surrounding land uses and identifying roadways with frequent heavy vehicles.

#### Transit Service

- Locations with regularly scheduled TTC bus service should be evaluated on a site-specific basis, and concerns regarding service efficiency and ride quality mitigated (e.g. with a gentler ramp grade).

#### Sidewalks

- The presence of sidewalks leading to raised crosswalks should be considered and sidewalks or connections to sidewalks should be installed if appropriate.

#### Cycling Facilities

- Existing or planned cycling facilities should be identified. Consult with the Cycling & Pedestrian Projects unit to ensure any proposed raised crossings provide a positive net benefit to road users.

#### On-Street Parking



- On-street parking restrictions, permit parking, and metered parking should be identified to assess the impact of a raised crossing (if any).

#### Roadway Material

- Unless other materials are typical at the location, raised crosswalks are to be constructed of asphalt pavement for ease of maintenance and visibility of pavement markings. A concrete base should be considered for long term durability.

#### Traffic Calming

- As raised crossings have traffic calming effects, any local traffic calming initiatives should be considered.

#### Curb Extensions

- For additional visibility of waiting pedestrians, raised crossings should be combined with curb extensions when possible.