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Seventh Street Speed Management Study

City of Ann Arbor, Michigan

June 8, 2017

Background

The residents of the City of Ann Arbor have raised concerns regarding traffic safety and control within their neighborhoods, particularly along Seventh Street from Stadium Drive to Miller Avenue. Public meetings were held on December 11, 2013 and June 4, 2014 to gather community feedback regarding these concerns. Based on the public feedback, the City decided to perform an engineering analysis to study and find ways to manage speeds along Seventh Street, as contained in the present document.

Each year, the City receives many requests from residents for help in addressing traffic problems in their neighborhoods. While most requests pertain to local streets, some are also received regarding major roads. There are a number of traffic calming techniques the City considers for local street issues. However, for major roads, the response typically involves redistributing police resources to provide enforcement in the problem areas. When applicable, the City will install radar signs for real-time feedback to drivers on their speed. Along Seventh Street, the City has responded with numerous countermeasure installations including pedestrian refuge island, bike lanes, mid-block crossings, but these installations have been limited by near-term opportunity.

Seventh Street is one of the City Major roads with a history of resident concerns. It is an urban minor arterial which runs North-South approximately a half-mile west of downtown Ann Arbor. The corridor section under investigation in this study is the approximately 1.5 miles of Seventh Street between Stadium Boulevard to the south and Miller Avenue to the North. Within this corridor segment, there are minor-stop controlled intersections at Snyder Avenue, Franklin Boulevard, Potter Avenue, Sunnyside Boulevard, W Davis Avenue, Princeton Avenue, W Madison Street, Lutz Avenue, Jefferson Court, W Jefferson Street, Keppler Court, Murray Court, W Washington Street, Bath Street, and Willow Street. Signalized intersections are present at W Stadium Boulevard, Pauline Boulevard, W Liberty Street, W Huron Street, and Miller Avenue.

The surrounding land-use is residential. Notable landmarks include West Side United Methodist Church on the west side of the street located just south of W Davis Avenue, Waterworks Park on the west side of the street located adjacent to Murray Court and provides a pathway to Slauson Middle School to the west, and West Park on the east side of the street adjacent to Willow Street.

The speed limit on Seventh Street is 30 MPH for the majority of the study segment, however the posted speed limit drops to 25 MPH from just south of Murray Court to just north of Huron Street in the northbound direction and from just north of Murray Court to just south of Liberty Street in the southbound direction, as indicated in . The Traffic Control Order establishes a 25 MPH speed limit from a point 345’ south of Washington to a point 548’ south of Washington, which aligns with the adjacent Waterworks Park. Marked pedestrian crossing locations are present just north of Franklin Boulevard, just south of W Davis Avenue, just south of Princeton Avenue, just north of Lutz Avenue, approximately 300’ north of W Jefferson Street, just north of Murray Court, on the north and south legs at the W Washington Street intersection, just south of Bath Street, just north of Willow Street, and at all signalized intersections. Rectangular rapid flashing

beacons are present at the marked pedestrian crossing on the south-leg of the intersection at W Washington Street. AAATA bus stop locations exist at Franklin Boulevard, Pauline Boulevard, W Davis Avenue, and Princeton Avenue.

A significant portion of the corridor has on-street bike lanes. The lanes are provided for both directions from Huron Street to Stadium Boulevard. The segment north of Huron Street to Miller Street also has an on-street bike lane, but only for northbound movements. The southbound direction expects cyclists to share the travel lane with motorists. The bike lanes are not continuous throughout the corridor. Rather, where left turn lanes are needed for operational reasons, the bike lanes are terminated until the cross section returns to just two travel lanes, where the bike lanes resume. Where on-street bike lanes terminate, motorists are prompted to SHARE THE ROAD via W11-1 and W16-1P signs.

As a response to the public meetings held regarding the corridor, the City is preparing for a project in 2018 that will reduce the width of the travel lanes to 10' to be able to add a buffer to the bike lanes. Buffered bike lanes are proposed to provide lateral separation between vehicles' traveled way and the path of cyclists. Additionally, pavement width allocated for buffer space will further narrow the roadway with the intended effect to reduce vehicle speed. This work will stretch from Huron Street southwards to Scio Church Road.

Why Speed Management?

According to the 2017 "Global Street Design Guide" published by Island Press in conjunction with NACTO and the Global Designing Cities Initiative, "Speed is the single most important factor in the safety of a street…" While Seventh Street has yet to demonstrate a significant crash history, the wide width and other existing features of the roadway may represent a potential for a speeding problem, and thus a safety deficiency. For speed management solutions to be effective, they must be based on objective, measurable data of driver behavior. This report is intended to identify where prevailing speeds are above posted speed limits and work to resolve the underlying causes for excessive vehicle speeds. While there have been a variety of speed studies over time, it was thought that a fresh, comprehensive review of driver behavior was merited.

Speed and Volume Collection

Speed and volume data has been collected on Seventh Street at five locations, as indicated in Figure 1. These locations were selected to provide a comprehensive portrayal of the prevailing speeds along the study corridor. An entire week of data was continuously collected beginning on 4/17/2017 and concluding on 4/24/2017. The data has been processed and summarized in Table 1 below. Attached in Appendix 1 is the raw traffic data collected for both speed and volumes.

Table 1 summarizes the speed statistics. The mean speed is the point where ½ of the vehicles are faster or slower than value noted. The 85th percentile speed represents the point where 85 percent of all drivers are at or slower than the value. The 10 MPH pace speed represents the speed range in which the majority of vehicles are traveling. The top of this range is generally close to value for the 85th percentile speed. More

importantly, the percent of vehicles within the pace range is a measure of how much speeds vary between vehicles. The higher the percentage, the less likelihood of collisions between faster and slower vehicles.

As can be seen from the data, the 85th percentile speed is higher than the posted speed limit for both directions at all locations except at the Willow Street data station. Large variations in vehicle speed are undesirable as it may exacerbate the potential for vehicle collisions. There is cause for concern when the percentage of vehicles in pace falls below 70%, as seen in the southbound direction at the Murray Court and Davis Avenue locations. The percentage of vehicles traveling above the speed limit is highest in the northbound direction at the Murray Court location (92.8% violation rate), which is within the 25 MPH area established by the aforementioned TCO. Locations with high violation rates will require speed management countermeasures to maintain a safe travel-way for all users.

Vehicle traffic volumes were collected along with the speed data. The average annual daily traffic (AADT) by segment is shown in Table 1 below with the raw volume data included in Appendix 1. The AADT along the corridor varies from between 5,000 – 9,000 vehicles, with the heaviest traffic near the middle of the corridor at Jefferson Street. As seen, the data station that observed the highest AADT (150' north of Jefferson Street) corresponds with the lowest speed limit violation rates in the corridor.

Research performed in 2011 by AAA's Foundation for Traffic Safety demonstrated that 47% of pedestrians struck at 30 MPH suffered an injury with an Abbreviated Injury Scale (AIS, a scale created to describe the severity of injuries in ascending order) of '4' (severe injury) or higher and 20% of such collisions were fatal. Proposed design solutions will follow the protocol established by the National Association of City Transportation Official's (NACTO) "Urban Street Design Guide" to design streets to a desired target speed of 30 MPH or less. While Seventh Street will not be completely reconstructed to meet this standard, it can be retrofitted with proven traffic calming countermeasures to achieve an operating speed of 30 MPH or less, as will be discussed in the following sections of this report.

Table 1: Speed and Volume Data Summary

Speed Study Summary Statistics												
Data Station	Speed Limit, MPH	Mean Speed, MPH		85%-ile Speed, MPH		Top of 10 MPH Pace Speed, MPH		% in Pace		Violation Rate, %		AADT, veh
		NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	
300' N of Willow St	30	25	27	29	32	30	35	71.2	75.7	12.6	29.8	5,077
Just S of Murray Ct	25	32	27	36	33	35	35	72.5	62.7	92.8	68.5	8,629
150' N of Jefferson St	30	28	28	33	33	35	35	76.0	78.8	38.8	33.7	8,824
Just N of Davis Ave	30	31	32	35	36	35	40	74.7	68.6	68.2	71.2	7,485
200' S of Potter	30	33	30	38	34	40	35	70.3	83.7	76.1	53.5	6,393

Figure 1: Speed Study Locations and Speed Limits

Driver Behavior and Its Influence on Speed

In part, a driver's speed is the reflection of their comfort level. Comfort in both the mental and physical sense, in the driving environment and their confidence in their ability to react to problems. Influencing factors include the car, its ability to accelerate and brake, its handling, and sensations fed back to the driver by way of noise levels and the vehicle's suspension. Outside the vehicle, a driver's speed is influenced by weather conditions, obstructions next to the road, impediments in the road, sight distance, pedestrian activity, other vehicles, and the physical condition of the roadway.

Unfortunately, modern street design increases driver comfort level by providing fewer obstructions in the right-of-way, greater setbacks of homes and structures, and limiting landscaping along the edge of the roadway. These are a necessity for safety as they allow an errant driver the ability to recover from a mistake. An undesirable consequence is that vulnerable non-motorized travelers are more prone to severe collisions with vehicles traveling at higher speeds. A vehicle traveling in excess of the posted speed limit may be traveling at a speed that feels appropriate. However, the law in the State of Michigan and the City of Ann Arbor dictate the speed limit, resulting in a conflict between what is a prevailing or safe speed and what is the legal speed.

Seventh Street is classified as a minor urban arterial. This type of street connects the major urban principal arterials, such as Washington Street and Stadium Boulevard. By definition, minor arterials are meant to provide more access than principal arterials and less emphasis on mobility, comparatively. Most of the City of Ann Arbor's speed management efforts to data have occurred on local roads whose primary role is to provide access to adjacent land uses while offering the minimum level of mobility. Given that Seventh Street acts as an arterial street rather than a local street, a priority is given to mobility conventionally by means of higher speed limits and less accessibility to adjoining properties. However, urban facilities experience more frequent use by non-motorized travelers compared to rural facilities, so there is reasonable justification to reduce vehicle speed in an effort to increase non-motorized safety.

So we have evaluated speed management measures, focusing on long-term solutions to speeding. While the City's current methods to manage speed have proven effective primarily on local streets, the present report introduces new and innovative alternatives that are designed to resolve traffic problems on arterial roads, such as Seventh Street. Some of these alternatives may be viewed as impactful, as they have not been used in this area before. However, all of the treatments proposed have been evaluated for their effectiveness, associated risks and liability, and have proven successful in other areas of Michigan and the United States.

Goals and Objectives

There are specific goals and objectives we expect from a speed management program, whether for local streets or major roads:

- The existing level of safety (minimal crash history) will be preserved or improved in the neighborhood.

- The City can prioritize multiple requests and allocate limited resources to neighborhoods based on the severity of their problem.
- Residents will be educated in traffic safety issues and the possible solutions for their neighborhoods.
- Step-by-step, incremental changes in a neighborhood will achieve acceptable results at the lowest cost.
- Changes in traffic flow will not divert significant amounts of traffic to other local streets.
- Individual problem streets will be brought in-line with city-wide averages for speed and volume.
- The average vehicle speed will be lowered for the treated streets and roads.
- The changes will not result in unreasonable tort liability exposure to the City.

Process

We recommend a systematic approach for identifying traffic problems and incrementally applying a variety of alternatives to provide solutions. The choices are graduated from the simplest to the most restrictive solution, with the understanding that if one method does not resolve a particular traffic problem, then a more restrictive approach may be necessary.

Speed Management Toolbox

Various speed management methods are categorically summarized below. A wide-range of potential countermeasures were considered, as described in Appendices 3-5, however given physical, geographic and jurisdictional constraints, only the tools described below have been recommended as suitable treatments to effectively manage vehicle speeds on the Seventh Street corridor.

Enforcement Measures

Targeted enforcement activities includes the selective enforcement of specific traffic controls by the Police Department. Using traffic data and analysis, the City would identify specific time periods and locations that the officers would target for selective ordinance enforcement. This may include: speeding, disobeying stop signs, improper parking, etc. Enforcement measures are further detailed in Appendix 3.

Education Measures

Speed Monitoring and Awareness Campaign

This provides residents with a tool to monitor speeds on the streets in their neighborhood. It consists of either a portable, unmanned trailer equipped with radar speed detection equipment, or a permanently installed radar speed sign. The units obtain speeds of oncoming vehicles and displays them on a digital display board visible to the passing motorist. The intent is to show motorists their actual travel speed. This is a valuable approach as it allows residents to directly observe the speeds and be involved in, as well as take ownership of, the

speed management process. Education measures are further detailed in Appendix 3.

Neighborhood Traffic Safety Education Campaign

A comprehensive volunteer neighborhood traffic safety education campaign will disseminate important information regarding safe vehicle and non-motorized behaviors and interactions by way of posters, safety flyers, fence banners, and seminars at local schools and senior centers. The idea is that children and the elderly will act as conduits for information about traffic safety and regulations to the motoring, walking and bicycling public within the surrounding community.

These methods can be combined with police enforcement activities.

Engineering Measures

In conjunction with the other components, the targeted areas should be subject to a complete engineering review. This review will include:

- the condition of all existing traffic control signs and pavement markings for routine maintenance,
- consideration of new traffic controls or modifying existing ones. If the installation of actual physical speed control device(s) in the roadway is planned, then these devices should be designed to make it less comfortable for the motorist to speed.

Appendices 4 and 5 describes the various traffic control devices and the criteria for their use. The engineering controls and physical measures described include:

A. On-street parking
B. Additional speed limit signs
C. Speed limit pavement markings
D. Speeding penalty awareness signs
E. R1-6 Gateway treatments for pedestrian crossings
F. On-street bike lane signs and pavement markings
G. Raised intersections / pedestrian crossings
H. Curb extensions / neckdowns
I. Median islands
J. Neighborhood Gateway treatments
K. Roundabouts

Requirements

To minimize the City's liability, there are specific installation and location criteria that must be followed. Also, proper engineering analysis must be performed and engineering judgement followed prior to installation of any physical devices. Appendix 5 describes the various physical devices, their likely effectiveness, the construction cost, and the criteria for their use.

Specific Recommendations

The City has indicated that they wished us to consider targeted measures for the only intersection of two major roads in the study corridor that was not already controlled by a traffic signal, Seventh Street at Madison Street. We were then to propose additional measures through the balance of the corridor to address the speeding concerns. Any proposed redesign meant to reduce vehicle speeds must preserve the continuity of existing bike lanes while also maintaining the existing level of (or improving) pedestrian safety.

❖ Seventh Street at Madison Street

Previous reviews of this location determined that it does not meet traffic signal warrants. Therefore, the intersection of Seventh Street and Madison Street was reviewed to determine whether an all-way STOP or single-lane roundabout could be implemented. The subject intersection is a T-intersection located approximately 1,500 feet south of W Liberty Street. The speed limit on Seventh Street is 30 MPH on Seventh Street and 25 MPH on Madison Street. The intersection is presently one-way STOP-controlled on the Madison Street approach. 24-hour turning movement and automatic traffic recorder (ATR) data was collected using a video feed at each approach by Traffic Data Collection, Inc (TDC) on 4/18/2017.

Background on Traffic Control Determination:

Based on the Michigan Manual of Uniform Traffic Control Devices (MMUTCD) there are four conditions where **all-way** STOP signs may be warranted:

A. *Where traffic control signals are justified, the multi-way stop is an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.*

   Status: There are no plans to install a traffic signal at the location, thus Criterion A is not satisfied.

B. *Five or more reported crashes in a 12-month period that are susceptible to correction by a multi-way stop installation. Such crashes include right-turn and left-turn collisions as well as right-angle collisions.*

   Status: Based on information obtained through the Traffic Improvement Association (TIA) of Michigan, there were nine crashes recorded in the past five years within a 250' radius of the intersection. The two angle collisions would be considered susceptible to correction by an all-way STOP conversion. However, the frequency of crashes falls well below the requirements to constitute a compelling case for modifying the existing controls.

C. *Minimum volumes:*

   1. *The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day; and*
   2. *The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average*

delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour; but

3. *If the 85th-percentile approach speed of the major-street traffic exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the values provided in Items 1 and 2.*

Status: The minimum total volume threshold of at least 300 vehicles per hour on Seventh Street in Criterion C.1 is met as the total volumes exceed 300 vehicles per hour from 7 AM – 8 PM. However, the combined vehicular, pedestrian and bicycle volume on Madison Street only exceeds the 200 units per hour threshold from Criterion C.2 for two of the same hours met in Criterion C.1, thus Criterion C is not met at the intersection.

D. *Where no single criterion is satisfied, but where Criteria B, C.1, and C.2 are all satisfied to 80 percent of the minimum values. Criterion C.3 is excluded from this condition.*

Status: Even when discounted to 80% of the minimum values for Criteria B, C.1 and C.2, this condition is not met.

There is also an explicit restriction in the MMUTCD that STOP signs are not to be used for speed control, in Section 2B.04.

Given that none of the MMUTCD criteria are met, OHM would not recommend implementing an all-way STOP at the intersection.

Roundabout Analysis:

We performed a Rodel roundabout analysis to investigate the feasibility of constructing a single-lane roundabout at the intersection. Both the AM and PM peak periods were analyzed. We determined that the roundabout would comfortably operate at level-of-service (LOS) A at an 85% confidence level during both periods. In fact, the average delay at any approach is not expected to exceed ten seconds in the AM peak period or nine seconds in the PM peak period. The results of the Rodel analyses are attached in Appendix 2.

Roundabout Design:

The key consideration is whether adequate geometry can be developed that will be capable of controlling speed, without too great an impact on right-of-way (ROW). An initial geometric alignment was created. Given the existing road ROW, we have determined that there is not enough room for an urban compact roundabout. However, a mini-roundabout is possible. The key difference involves the central island of the circulating roadway. An urban compact roundabout has a larger central island that can hold landscaping elements. A mini-roundabout, on the other hand has a smaller diameter island and it is wholly paved with a mountable curb to allow traversal of large wheelbase vehicles.

In the case of Seventh and Madison Streets, AAATA busses are routed through the intersection as it serves as part of TheRide System Route 27. Figure 2 provides a

depiction of the potential geometry. Please note that this concept will require physical changes that extend a small amount beyond the existing ROW line. This occurs on the west side of Seventh Street and involves the relocation of the sidewalk. Depending on the City's policies, this could be accomplished by way of purchasing either a sidewalk easement or fee simple ROW from the impacted parcel(s). Other potential impacts to the surrounding area include:

- Northeast corner of intersection
  - Relocation of the utility pole
  - Possible landscaping impacts
  - Removal of tree(s)
- Southeast corner of intersection
  - Removal of tree(s)
- West side of Seventh Street
  - Possible retaining wall needed
  - Stairway impacts
  - Relocation of a minimum of two utility poles

Regarding existing topography at the site, according to a Google Earth inspection, the existing longitudinal grade of Seventh Street is approximately 7%. To comply with roundabout guidelines published in the National Cooperative Highway Research Program's (NCHRP) "Report 672: Roundabouts: An Informational Guide" and the "Americans with Disabilities Act" (ADA), we recommend matching the existing grade south of Madison Street. Additionally, a "flat spot" (2% maximum grade) on Seventh Street will be needed to flatten out the ADA-compliant crosswalk. Finally, Seventh Street would be tied back into the grade to the north. The vertical adjustments to achieve ADA-compliance could take the form of a table top crosswalk, or even the entire mini-roundabout. Details would be worked out at time of design.

Recommendation:

- ✓ Although there will be design difficulties related to the topography at this intersection as mentioned above, we recommend that the City consider a mini-roundabout be constructed at Seventh Street and Madison Street. If a mini-roundabout is pursued at this location, the final design would consider the most appropriate manner in which to accommodate cyclists through the roundabout, whether by means of a shared-use path or diverter lanes.

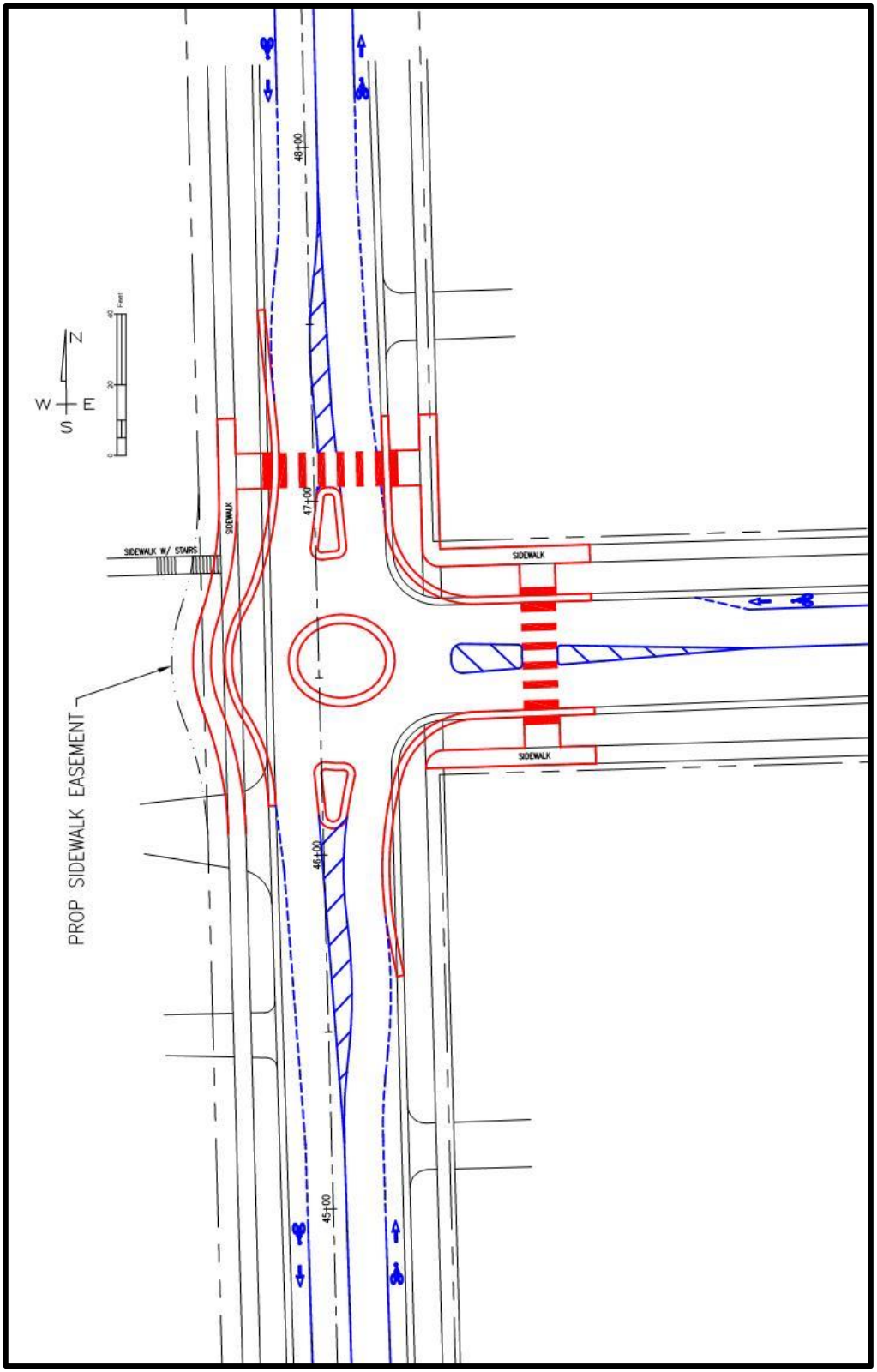


Figure 2: Concept Alignment for Mini-Roundabout

- **Seventh Street between Stadium Boulevard and Pauline Boulevard**
  This section has the second-highest speed limit violation rates in the corridor, especially for NB movements. This may be due to traffic coming across from the portion of Seventh Street that has a higher speed limit posting, or traffic turning off of the higher speeds of Stadium Boulevard. In any case, we need to emphasize the change in character of the area.

  - ✓ Recommend installing additional speed limit sign (R2-1) north of Potter Avenue for northbound movements, and south of Potter Avenue for southbound movements.
  - ✓ Recommend placing speed limit pavement markings adjacent to existing speed limit signs south of Pauline Boulevard for southbound movements and north of Stadium Boulevard for northbound movements.
  - ✓ Recommend installing a radar speed assembly adjacent to the existing speed limit sign north of Stadium Boulevard for northbound movements.
  - ✓ Additionally, install pedestrian gateways at crosswalks north of Snyder Avenue as well as north of Franklin Boulevard.

- **Seventh Street between Pauline Boulevard and Madison Street**
  The violation rates for this segment are particularly poor, especially for southbound movements. The marked pedestrian crossings in the segment are at Princeton Avenue and Davis Avenue.
  - ✓ Recommend installing an additional speed limit sign (R2-1) between Princeton Avenue and Davis Avenue for southbound movements. There is already one for northbound movements in this area.
  - ✓ Recommend constructing a median island for a chokepoint and pedestrian crossing refuge south of Davis Avenue. Incorporate the existing pedestrian crossing into this new feature. This location will facilitate relocating the curb lines if the City wishes the bike lanes continue through the feature. Potential impacts of widening the curb line at this location may be relocation of utility poles and/or removing trees on either side of the road. Additionally, install a pedestrian gateway at this location.
  - ✓ Recommend placing speed limit pavement markings adjacent to the existing speed limit sign north of Pauline Boulevard for northbound movements.
  - ✓ Install a pedestrian gateway at the marked crosswalk south of Princeton Avenue.

- **Seventh Street between Madison Street and Liberty Street**
  While its violation rate is not as low as the segment north of Huron Street, this portion of the corridor has a reasonable speed profile. This segment has one of the few marked pedestrian crossings of Seventh that is truly midblock and not adjacent to a minor intersection.
  - ✓ Recommend placing speed limit pavement markings adjacent to the existing speed limit sign south of Liberty Street for southbound movements.

- ✓ Recommend installing an additional speed limit sign (R2-1) north of Jefferson Court for southbound movements. There is already a sign for northbound movements in this area.
- ✓ Recommend constructing a median island for a chokepoint and pedestrian crossing refuge south of Keppler Court. Incorporate the existing pedestrian crossing into this new feature. This location will facilitate relocating the curb lines if the City wishes the bike lanes continue through the feature. Potential impacts of widening the curb line at this location may be removal or replacement of trees, signs and/or sidewalk on either side of the road. Additionally, install a pedestrian gateway at this location.
- ✓ Install a pedestrian gateway at the marked crosswalk north of Lutz Avenue.

❖ Seventh Street between Liberty Street and Huron Street

This segment has the worst violation rate of the corridor. In part, this may result from the approximately 200' 25 MPH speed zone in a corridor that is otherwise 30 MPH. Also, the beginning and end of this 25 MPH zone is ill-defined. Our recommendations are based on the City wishing to retain the reduced speed zone.

- ✓ Recommend installing SPEED REDUCTION 25 warning signs (W3-5) in each direction of Seventh Street from 125' to 150' in advance of the legal points of change in the limit.
- ✓ Recommend constructing a median island for a chokepoint and pedestrian crossing refuge just north of Murray Court. Incorporate the existing pedestrian crossing into this new feature. This location will facilitate relocating the curb lines if the City wishes that the bike lanes continue through the feature. Potential impacts of widening the curb line at this location may be removal or replacement of trees, signs, utility poles, drainage features and/or sidewalk on either side of the road. Additionally, install a pedestrian gateway at this location.

❖ Seventh Street between Huron Street and Miller Avenue

This segment has the most modest violation rates for the posted 30 mph speed limit, so drastic countermeasures are not likely needed.

- ✓ Recommend installing additional speed limit sign (R2-1) north of Willow Street for northbound movements, and south of Willow Street for southbound movements.
- ✓ Recommend placing speed limit pavement markings adjacent to existing speed limit signs south of Miller Avenue for southbound movements and north of Huron Street for northbound movements.
- ✓ Install pedestrian gateways at marked crosswalks south of Bath Street and north of Willow Street.

To illustrate these recommendations and help place them in the context of the neighborhood, we have provided Figures 3 - 7. This shows some of the existing signs

and control features related to traffic and pedestrian safety and the approximate locations for the recommended new installations. A general recommendation is that the City should inspect all crosswalk markings as part of its routine maintenance and "refresh" the markings as necessary.

Conclusion

In 2013, the City of Ann Arbor begin a public engagement campaign to address resident concerns regarding vehicle speeds and the corresponding effect on safety and livability on Seventh Street, a minor urban arterial connecting Stadium Boulevard and Miller Avenue. In response, the City hired OHM Advisors to perform a comprehensive speed analysis to assess the gravity of the speeding problem and, if necessary, recommend context sensitive speed management solutions. The vehicle speed data gathered in April 2017 revealed that certain segments of the corridor indeed experienced violations of the posted speed limit which were in excess of what is deemed safe considering the residential nature of the corridor.

Given that Seventh Street is classified as a minor arterial by convention, any speed management methods included in an overall countermeasure "toolbox" would need to preserve the arterial qualities of the corridor whose primary responsibility is mobility. However, efforts to maintain vehicle mobility cannot supersede the responsibility of the City to protect the more vulnerable road users of the surrounding neighborhood who choose to walk or bike along the corridor. Numerous peer-reviewed studies have shown that vehicle speeds in excess of 30 MPH represent a high safety risk to pedestrians in the unfortunate event of a collision with a vehicle. This research prompted NACTO to recommend transportation professionals design city streets to a desired "target speed" of 30 MPH or less.

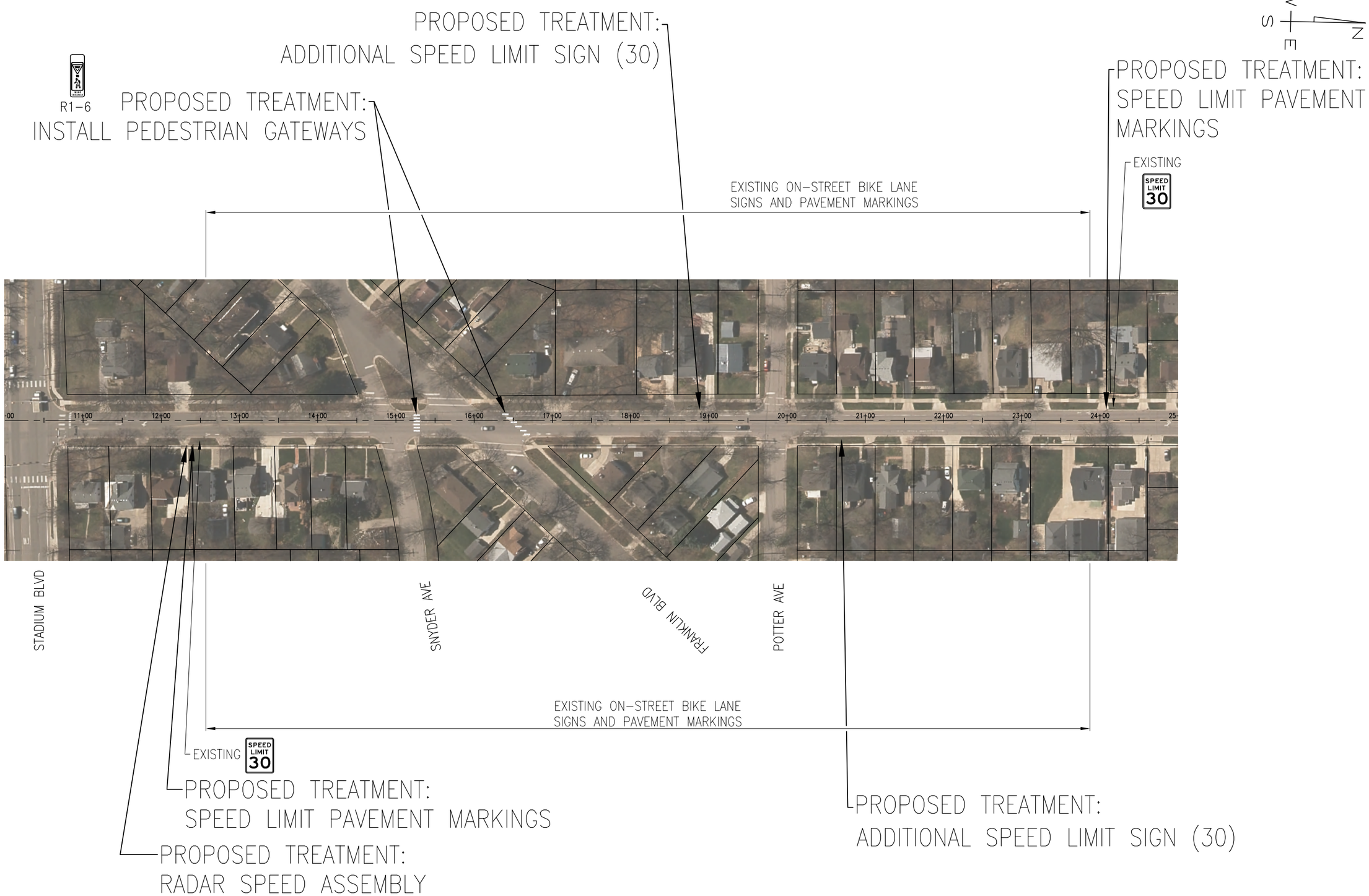
Speed data gathered by OHM indicated multiple segments of Seventh Street that experienced 85th-percentile speeds at or above 35 MPH, eliciting a need for targeted and effective speed management measures that act in concert with the City's plan to narrow the vehicle traveled-way by introducing buffered bike lanes in both directions along the entire length of road. However, the intention of the proposed speed management toolbox is not to convert Seventh Street to a "bicycle boulevard" or discourage motorists, but rather consider and incorporate the implications of "place, people, and impact" on any design recommendations, as outlined in NACTO's 2017 "Global Street Design Guide". With this in mind, a brief summary of the recommended speed management solutions is provided below, with more detailed discussion at specific locations provided in the preceding body of this report.

- Education/Enforcement Tools (global)
    - Targeted Police Department enforcement activities
    - Neighborhood speed monitoring and awareness campaign
    - Neighborhood traffic safety education campaign
- Engineering Tools (various locations as indicated in Figures 3 – 7)
    - Additional speed limit and speed limit reduction signs
    - Radar speed assemblies

- Speed limit pavement markings
- R1-6 Gateway treatments for pedestrian crossings
- On-street bike lane signs and pavement markings
- Median islands
- Roundabout at Madison Street

Ultimately, the City of Ann Arbor, along with its constituents, must decide the breadth and timeline of implementation of these features to best serve the community in both the near-term and long-term horizon, while considering any physical, geographic and jurisdictional constraints or opportunities.

FIGURE 3 - SEVENTH STREET



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REVISIONS:

DATE	PROJ NUMBER	ENG	PROJ MGR	CADD	COUNTY	CITY/VILLAGE/TOWNSHIP	SCALE	HORIZ DATUM	VERT DATUM
	0026-17-0030	Value	Value	Value	Value	Value	H: 1"=40' V: 1"=4'	Value	Value

CITY OF ANN ARBOR
SEVENTH STREET TRAFFIC CALMING

SHEET FIGURE 3

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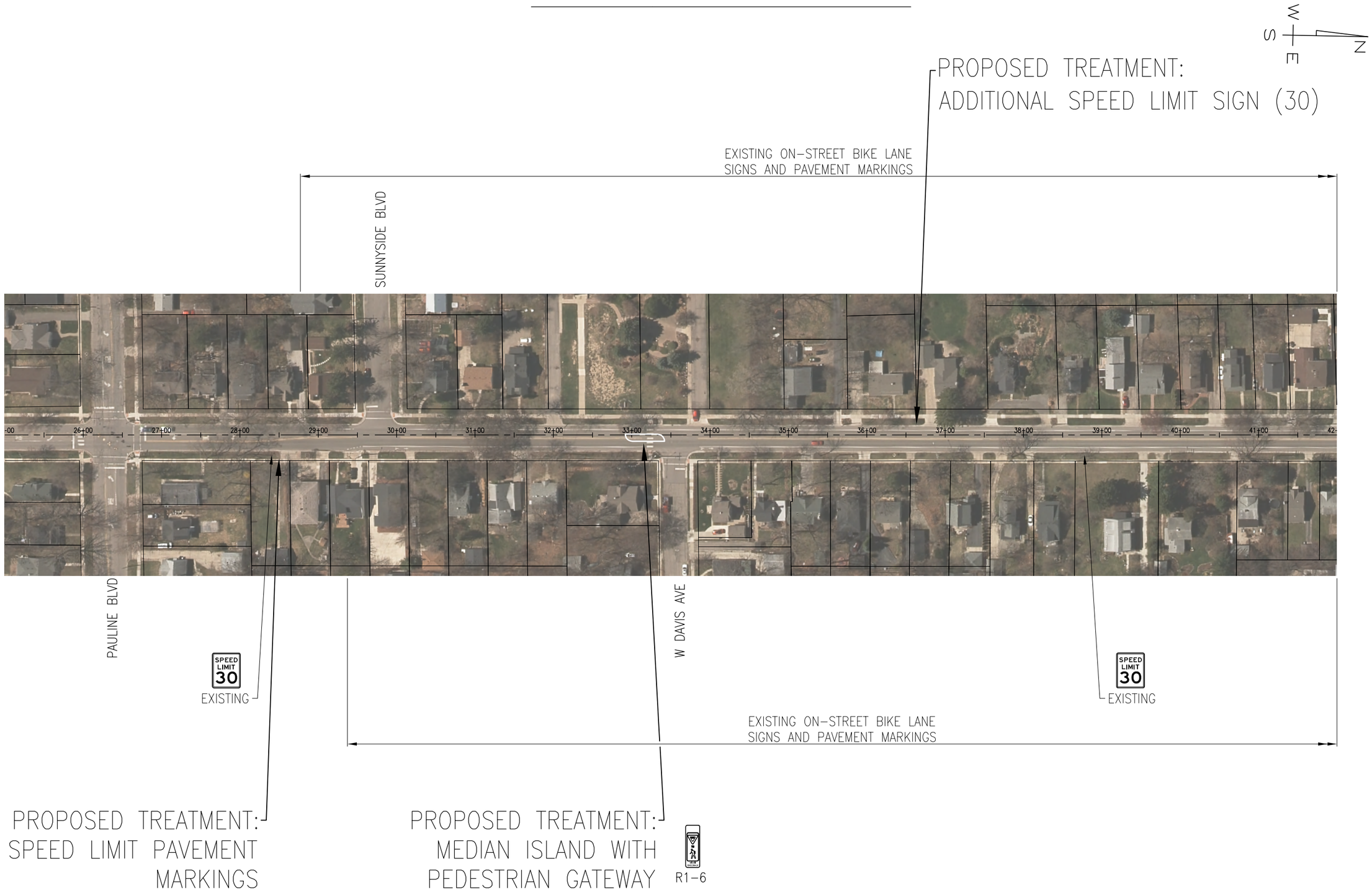
FIGURE 4 - SEVENTH STREET



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CITY OF ANN ARBOR
SEVENTH STREET TRAFFIC CALMING

SHEET FIGURE 4

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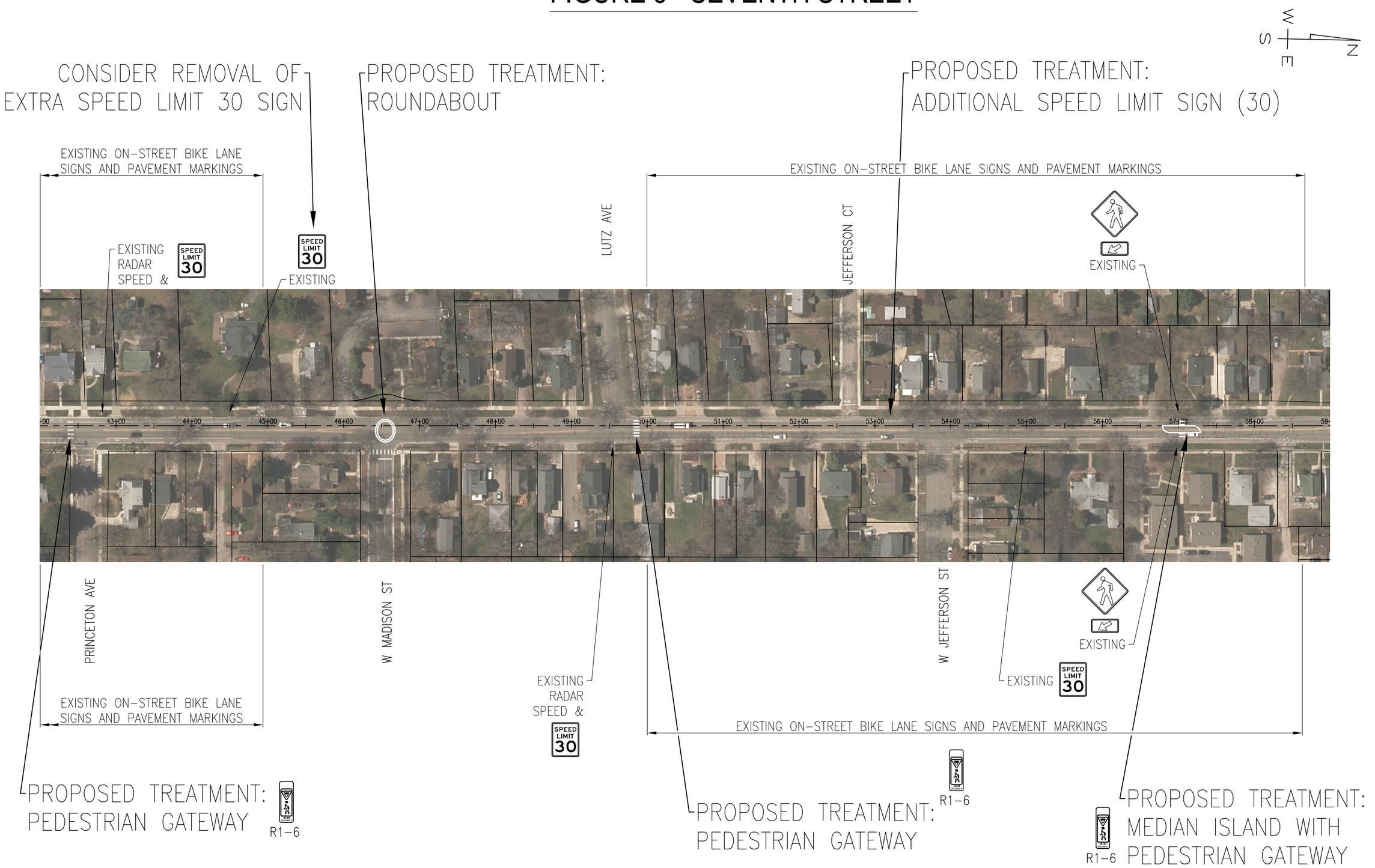
FIGURE 5 - SEVENTH STREET



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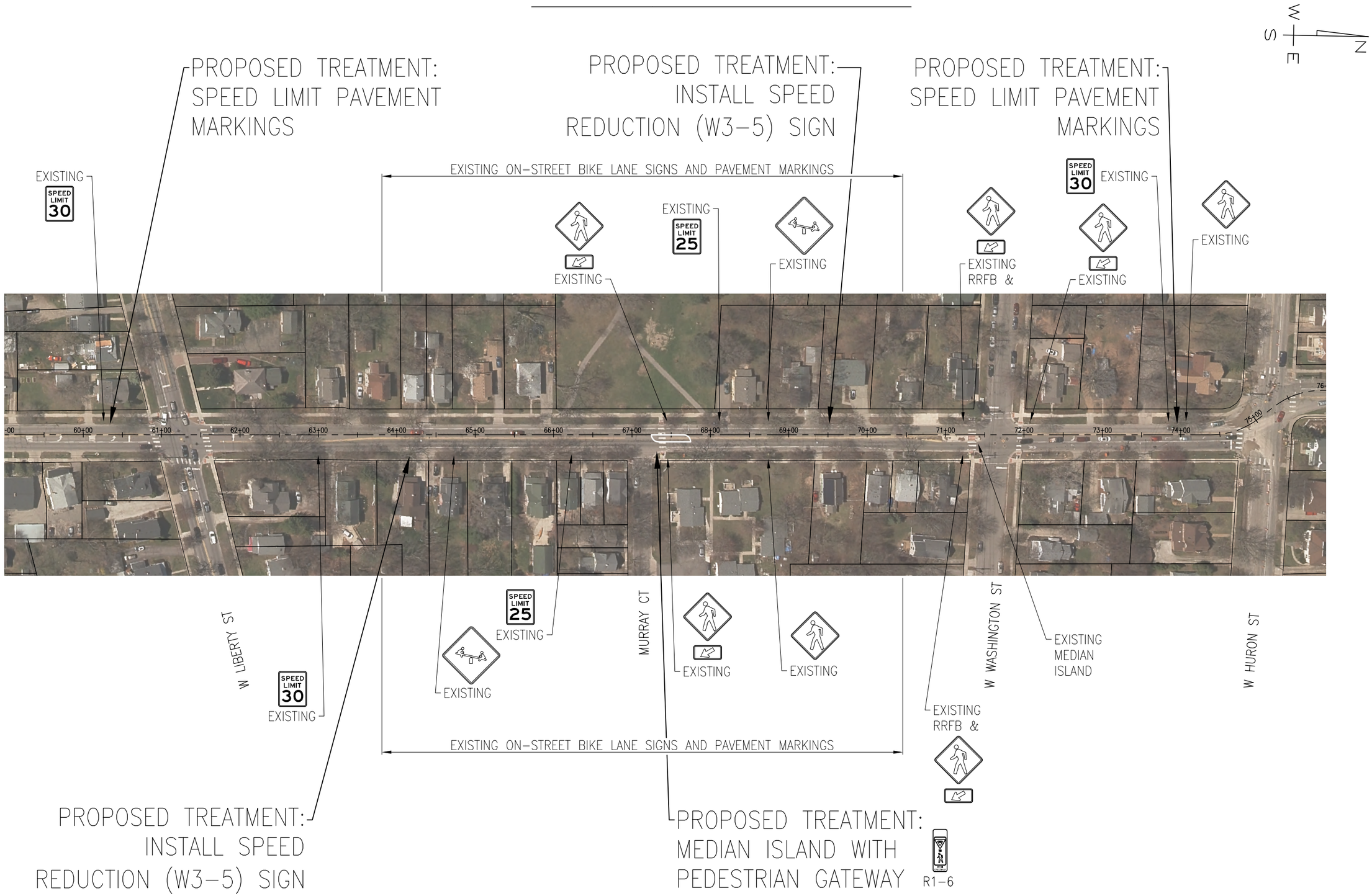
DATE	PROJ NUMBER	EHS	PROJ MGR	CADD	COUNTY	CITY/VILLAGE/TOWNSHIP	SCALE	HORIZ DATUM	VERT DATUM
	0026-17-0030	Value	Value	Value	Value	Value	H: 1"=40' V: 1"=4'	Value	Value

CITY OF ANN ARBOR
SEVENTH STREET TRAFFIC CALMING

SHEET FIGURE 5

DRAWING PATH: P:\0000_0100\0026170030_7th_Street_Traffic_Calming\Drawings\Civil\Misc\170030_exhibit sheets.dwg Jun 07, 2017 - 3:05pm

FIGURE 6 - SEVENTH STREET



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SHEET FIGURE 6

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FIGURE 7 - SEVENTH STREET

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CITY OF ANN ARBOR
SEVENTH STREET TRAFFIC CALMING

SHEET FIGURE 7

DRAWING PATH: P:\0000_0100\0028170030_7th_Street_Traffic_Calming\Drawings\Civil\Misc\170030_exhibit sheets.dwg Jun 07, 2017 - 3:05pm