

Appendix A: Meeting Summaries



County Highway 61/Highway 41 Improvements Carver County

Open House #1

April 19th, 2016 – 5:30 to 7:30 PM
Chaska Events Center

Purpose:

The purpose of the County Highway 61/Highway 41 Improvements Public Information Meeting was to introduce the project and to solicit input on issues, needs and opportunities in the Downtown Chaska subarea.

Attendees:

Approximately 60 people signed-in at the open house. The following agency representatives were also in attendance: Lyndon Robjont and Darin Mielke, Carver County; Jon Solberg and Diane Langenbach, MnDOT; Bill Monk, Kevin Ringwald and Matt Clark, City of Chaska.

Materials Presented:

The meeting was set up in an open house format giving attendees the opportunity to view materials and visit with project staff at their leisure. A brief presentation began at 6:00 PM. The following information was available for public review and input:

- Project Purpose
- Project Area Map
- Project Schedule
- Future Projects Map
- Downtown Road Network
- Traffic Operations
- Crash History
- Pedestrian/Bicycle Connections
- Land Use Context and Historic Considerations
- Chaska Downtown Master Plan Vision and Guiding Principles
- Comment Forms
- Sign-In Sheets

Comments Received:

Public input was collected throughout the duration of the open house through discussions with staff and written comments. The following summarizes public comments collected:

Written Comments (Comment Forms and Map Notes)

- One participant suggested a pedestrian crossing on the CSAH 61 Bridge over Chaska Creek.



- A few attendees expressed concerns about the future width of the CSAH 61 Bridge and the potential for land acquisition in the surrounding area due to bridge reconstruction.
- One homeowner residing near the CSAH 61 Bridge over West Chaska Creek suggested converting the properties southeast of the bridge to a parking lot for Firemen's Park/Chaska Event Center/Curling Center. She offered to discuss the sale of her property for this purpose. This resident stated it is difficult getting onto CSAH 61 during the day.
- One participant suggested that CSAH 61 between TH 41 and CSAH 140 should be a two-lane roadway with on-street parking.
- There was a request for the intersection of CSAH 61/ Pine Street to be kept open as a full access with a flasher system at the CSAH 61 crossing that stops traffic with a red signal when operated. Also, pedestrian traffic should be directed toward the alley at CSAH 61/ Pine Street.
- A few noted left turns onto Pine and Cedar from CSAH 61 are difficult.
- Several felt access is important on TH 41 through the downtown and suggested left turn access to all roads is necessary.
- It was recommended that overflow parking for Firemen's Park/Chaska Events Center/Curling Center be directed to the Cooper Foods parking lot with a pedestrian flasher at the Walnut Street extension to TH 41.
- Many expressed interest in on-street parking on both sides of TH 41 through downtown Chaska.
- Concerns were expressed regarding the amount of traffic on TH 41 in the Downtown. One participant mentioned heavy truck traffic through the downtown is intimidating and trucks should be rerouted to TH 101.
- One participant acknowledged positives and negatives to heavy traffic in the downtown; noise is an issue but businesses benefit from traffic exposure. Realignment of TH 41 not supported by this participant.
- There were safety concerns expressed at the TH 41 and 3rd Street intersection.
- Concerns were expressed for speeding traffic along TH 41 between 2nd Street and the Minnesota River Bridge. Many said it is difficult to walk across TH 41 in this area.
- One participant expressed a desire to have the crossing of TH 41 improved near Tommy's Malt Shop and the Landing Apartments.
- One participant suggested a signal timing issue at TH 41/ 4th Street.
- Some expressed interest in a roundabout at the junction of CSAH 61/Cedar Street.
- Maintenance and enhancements to the historic district including lighting improvements, banner poles, and plantings are important.
- One participant suggested a broader communications for future meetings to include those who drive through the area.
- A resident on Pine Street would like to have marking in front of driveway that deters drivers from parking there. This participant also recommended that staff consider the type of crosswalks used in downtown Anoka when planning TH 41 improvements in downtown.
- One participant expressed that speed is an issue on Parallel Street and that a speed bump is needed.
- One business property owner expressed a desire for more stop lights to break up traffic at rush hour; one on TH 41 at the access to Cooper's Foods and one at the CSAH 61/Yellow Brick Road intersection.

Verbal Comments (Staff/Public Discussion)

- One participant said the upcoming projects are more than just transportation projects and the project team should be considering them as such.
- Generally, participants acknowledged that the project will require compromise to achieve desired improvements.
- Participants expressed that they were generally glad to see something being done in the area to improve the roadways.
- The majority expressed it is difficult to walk around downtown, both along and across TH 41. Some suggested it is easier to drive across TH 41 than walk. There was a particular concern crossing TH 41 at 4th Street due to vehicles not looking for pedestrians when turning right onto northbound TH 41.
- Some expressed that crossing locations need improvements as it feels unsafe to cross both CSAH 61 and TH 41.
- There was concern for the senior living facilities in downtown as many of the residents are without vehicles and it is difficult for them to walk downtown.
- Business owners expressed concerns related to additional access restrictions and on-street parking.
- Many expressed concern with parking in the downtown – both concerns relating to maintaining what is there today and adding additional, particularly in the areas surrounding the Chaska Events Center/Curling Center.
- A few participants provided additional perspectives on Chaska's Downtown Master Plan and continuing initiatives:
 - The Fireman's Park/Chaska Events Center/Curling Center redevelopment is meant to be a catalyst spurring additional redevelopment and downtown enhancements. The goal is to encourage visitors to the Events Center/Curling Center to visit other businesses in the downtown. Many fear current conditions give the perception that walking is difficult and unsafe. The goal is to change that perception and make people (residents and visitors) feel more comfortable walking and spending time in the downtown Chaska.
 - Additional redevelopment is planned in the downtown and the City is actively pursuing the new library/parking structure/mixed-use redevelopment as the second catalyst site.
 - There is a desire to enhance the historic district as part of the overall downtown redevelopment efforts.



County Highway 61/Highway 41 Improvements Carver County

Open House #2

September 15, 2016 – 5:30 to 7:30 PM
Chaska Events Center

Purpose:

The purpose of the County Highway 61/Highway 41 Improvements Public Information Meeting was to report project status and to solicit input on a range of improvement options under consideration for CSAH 61 and TH 41 in the Downtown Chaska subarea.

Attendees:

Approximately 35 people signed-in at the open house. The following agency representatives were also in attendance: Lyndon Robjent, Darin Mielke, and Dan McCormick Carver County; Molly Kline and Diane Langenbach, MnDOT; Kevin Ringwald and Matt Clark, City of Chaska.

Materials Presented:

The meeting was set up in an open house format giving attendees the opportunity to view materials and visit with project staff. A project video began at 6:00 PM. The following information was available for public review and input:

- Project Purpose and Project Area Map
- Project Schedule
- Project Goals and Objectives
- Pedestrian/Bicycle Connections
- Downtown Chaska Access and Circulation
- TH 41 Business Pedestrian Access Points
- Decision-Making Graphic
- Chaska Downtown Master Plan Vision and Guiding Principles
- Comment Forms
- Sign-In Sheets

Comments Received:

Public input was collected throughout the duration of the open house through discussions with staff and written comments. The following summarizes public comments collected:

Written Comments (Comment Forms)

- I like TH 41 Concept #2 (3-lane median, no parking) as long as both left and right turn lanes are long at 4th Street. As for 61 west of 41 the roundabout seems better as cars seem to take off when the light changes at 41. There would be real reason for racing to a roundabout. This should slow traffic past the park. There are many reasons I do not like roundabouts, but this might work there.
- Need for a light or pedestrian bridge from Pine Street to the Curling Center and across 41 to just north of Walgreens. People are crossing to access parking. Ideal would be a pedestrian bridge to parking ramp. Pedestrian tunnel under the roadway could be another possibility.
- Thank you for your time and detailed presentation at the information meeting this evening. Below are some additional thoughts for your consideration. My wife and I purchased a 125 year-old home in historic downtown Chaska eight years ago and have grown our family to three kids 10 and under since that time. We've spent more than \$50,000 investing in our home and have also invested our time and hearts into Chaska's schools, scouts, sports, churches and more. We love Chaska's historic district and strongly believe in this community's future.

Pedestrian safety is our number one priority in our downtown neighborhood of growing children, vibrant diversity and increasing traffic. Crossing any street with even a baby stroller was harrowing before the downtown street reconstruction projects, but it's gotten so much better in the years post-project. Our neighborhood was also deeply saddened when it took Jerome Meuwissen's death at 2nd St. to finally prioritize pedestrian safety at that intersection with a stoplight. For those of us who cross these busy highways through our neighborhood, we are intimately aware with the dangers and need for infrastructure to provide safety.

As part of my role as the resident advisor on the Downtown Master Plan Task Force in 2010, I would often voice concern for the resident pedestrians and walkers in historic downtown Chaska in those planning sessions. One of my chief concerns with the Firemen's Park redevelopment -- which I wholeheartedly supported -- was how MnDOT, the County and the City would approach the significant demand for pedestrian crossings on County Highway 61.

On April 30, 2012 I appeared before the City Council and specifically raised our neighborhood's concerns about how the crosswalk would function, in the spirit of creating a safe environment for children and families wanting to visit their new park. Firemen's Park is our primary local park in downtown Chaska, and it should have always been a priority for the residents to have safe access. Today, it's 2016 and four years later, and the solution in place is not safe. It's reckless. And it's another fatal accident waiting to happen.

The 15-minute Bolton & Menk, Inc. presentation video at the County Highway 61 / Highway 41 Open House on September 15th utilized edited video clips of downtown Chaska traffic to demonstrate their case in lane reduction and prioritizing pushing the maximum amount of traffic down Highway 41. It was a compelling case. However, that video did not accurately highlight the experience of pedestrians walking down Hwy 41's sidewalks, trying to cross Hwy 41

with such short signal length and unenforced crosswalks, and certainly not crossing Cty Hwy 61 to the park. It also does not factor the significant amount of overflow parking that the Chaska Curling Center's tiny parking lot cannot support, which means hundreds of people are parking off Pine and crossing 61 each week. And this demand will only increase as park activities become more popular.

By continuing to prioritize traffic over pedestrians, MnDOT may be harming the walkability of historic downtown Chaska -- which in turn could harm local businesses, resident quality of life and the safety for children, seniors and people with special needs. This is a significant issue that wasn't given enough attention at your meeting tonight. And the answers to questions about this topic ("We have some options we're considering") were hardly clear nor specific.

In the last week, I've personally been filming my experiencing crossing Cty Hwy 61 with my children at the "rectangular beacon" crossing at Pine Street. This experience -- completely unscripted -- captures an entirely different and dangerous point of view of what it's like for small people with small legs to try to walk around this community that should have been better represented in your presentation. VIDEO

LINK: <https://www.youtube.com/watch?v=pdiUyTKzvjl>

After the 41/61 meeting this week, I was told by Bolton-Menk that a hawk beacon stoplight crosswalk to replace the rectangular beacon is not a realistic solution. Apparently MnDOT won't approve a pedestrian stoplight so close to the 41/61 stoplight. This is obviously concerning, as it seems a raised crosswalk and/or hawk beacon crosswalk solution would be extremely helpful in addressing the danger of crossing to the park. However, no actual solutions were proposed, so we are left to just trust there is a solution coming -- after years of waiting and poor, unsafe solutions.

With that said, given the increasing traffic estimates for both vehicles and demand for Firemen's Park, it seems an optimal solution here is a pedestrian bridge or tunnel. We realize pedestrian bridges and tunnels are a substantial cost, but given the complex traffic patterns, the increased pedestrian demands, and MnDOT's estimates of 41/61 traffic returning to and surpassing previous counts, it seems prudent to invest in infrastructure that provides pedestrians with a 100 percent safe way for cross these busy streets. Especially for children, who are increasingly headed to Firemen's Park without adult supervision thanks to the welcoming playground, concession stand, splash pad, beach and more.

To be clear, I'm not a planner and present these facts for an alternative point of view to MnDOT's apparent priority toward expedited traffic through our highly urban downtown. I'm sure you'll have better solutions in mind than the failed technology currently in place and my amateur suggestions above. Thank you for the opportunity to share this perspective. I look forward to partnering together to find a solution that will work for everyone involved.



Verbal Comments

Pedestrian Concerns

- Several participants suggested that crossings to the Chaska Events Center are hazardous on CSAH 61 from Pine Street and on TH 41 from Walnut Street. Several suggested the need for an overhead pedestrian signal system or pedestrian bridge or underpass at these locations. One participant suggested the existing flashers located at Pine Street are not noticed by drivers and are unsafe. This person felt parking is inadequate for the Chaska Events Center forcing patrons to park across the highways generating increased pedestrian crossings. This participant further suggested that pedestrian demand to the facility will only increase as activities at the Center become more popular.
- One attendee commented that the curvature on the eastbound approach to the flasher on CSAH 61 makes the device and crossing very difficult to see in time to stop for crossing pedestrians.

CSAH 61 Comments

- Many commented that the roundabout was very impactful to both surrounding properties and business access, especially to Pine Street and the Fireman's Park area.
- Many attendees showed support for the Creek Road realignment concept since it improves intersection spacing and provides access to a future redevelopment property.
- One attendee felt full access at both driveways on CSAH 61 to the Fireman's Park/Events Center property was critical.
- A few attendees liked the idea of a realigned Fireman's Park access to Creek Road, seeing the potential to perhaps expand the parking lot.
- Several suggested that altering Pine Street to a right-in/right-out and leaving Cedar Street a full access intersection would increase vehicular traffic along Cedar Street in an area dominated by residential development which would adversely change this environment. Participants suggested leaving Pine Street a full access and altering Cedar to a right-in/right-out intersection would keep heavier traffic near the Mill building, the Public Library and other commercial uses.
- Concern if Pine Street remains a full access it will be difficult to take a left out onto westbound CSAH 61. A few asked if a traffic signal could be added to the CSAH 61/Pine Street intersection.
- One resident mentioned existing issues with queuing of eastbound CSAH 61 that blocks Pine St which would make a full access at Pine St & CSAH 61 difficult for vehicles to use in any direction. This person also felt turning right from Pine St to CSAH 61 eastbound is currently difficult in the morning.

TH 41 Comments

- Two residents who live in downtown Chaska felt parking on TH 41 would be difficult to continue in the future with a 3-lane roadway. They felt with additional parking lots, like the recent city lot that was constructed east of TH 41 and with a potential parking ramp at the downtown redevelopment site, the parking loss on TH 41 would be adequately mitigated.
- Several attendees questioned how a 3-lane would function in downtown as TH 41 is being expanded to four lanes to the north and the TH 169/TH 41 interchange will be built to the south, funneling more traffic into downtown Chaska.
- One attendee noted the proposed median over the Minnesota River Bridge would be a good addition as drivers often enter into downtown traveling much too fast.
- One business property owner felt additional sidewalk space was an acceptable trade-off for losing on-street parking with the 3-lane no median concept. This property owner also indicated he is willing to sell his parking lot to the City for use as a public lot to offset losses in on-street parking.

- One couple asked if the signal at 2nd Street could be re-timed to recognize a vehicle on the side street during the early morning hours when traffic is low on TH 41. They said they wait several minutes each morning with very little traffic present.
- One resident mentioned that the signal timers for pedestrians at the 2nd St/TH41 intersection are too short for the young and elderly to cross.
- One attendee commented on the progress of the paseos being installed that parallel TH 41 and questioned if/how the proposed project would impact these plans.



County Highway 61/Highway 41 Improvements Carver County

Open House #3

October 11, 2017 – 5:30 to 7:30 PM
Chaska Community Center

Purpose:

The purpose of the County Highway 61/Highway 41 Improvements Public Open House was to gather public input on improvement options under consideration for both Highway 41 and County Highway 61 in Carver, Chaska and Chanhassen.

Attendees:

Approximately 25 people signed-in at the open house. The following agency representatives were also in attendance: Darin Mielke and Dan McCormick, Carver County; Molly Kline and Diane Langenbach, MnDOT; Matt Clark, City of Chaska; Bob Generous, City of Chanhassen.

Materials Presented:

The meeting was set up in an open house format giving attendees the opportunity to view materials and visit with project staff. The following information was available for public review and input:

- Project Purpose and Project Area Map
- Corridor Goals
- Next Steps
- Western Subarea – Issues, Trails, Proposed Improvements
- TH 41 North – Issues, Trails, Proposed Improvements
- Chaska East – Issues, Trails, Proposed Improvements
- Eastern – Issues, Trails, Range of Alternatives, Proposed Improvement Options
- TH 41 Downtown Chaska Layout with Pedestrian Underpass Rendering
- CSAH 61 Downtown Chaska Project (under construction) with Pedestrian Crossing Rendering
- Implementation Plan
- TH 41 Video

Comments Received:

Public input was collected throughout the duration of the open house through discussions with staff and written comments. The following summarizes public comments collected:



Written Comments (Comment Forms)

- The owner of 511 Pine Street submitted the following comment, “I live on N Pine Street in the middle of a very busy area. I am looking into moving into a Senior Living Center and would be willing to sell my house for a fair price so you can make it a parking lot.”

Verbal Comments

Western Subarea

- Several residents near the proposed Lano Lane options were present and expressed concern with land impacts associated with roadway/access changes in this area. The property owner on the south side of CSAH 61 opposed moving Lano Lane to the west since it would use most of their property leaving little for future development.

TH 41 North

- Many attendees acknowledged the safety and congestion issues at TH 41/CSAH 10.
- Many residents are looking forward to the future study on CSAH 10 to address traffic operations and safety issues on that roadway.

Chaska East

- Many attendees expressed support for the development of a future trail on the former railroad property.

Eastern Subarea

- The owner of the Dungey property was present and reviewed alignment options in this subarea. He had no major concerns with any of the options. His property will likely remain agricultural until city utilities are extended to this area.

Downtown Chaska

- The owner of an existing parking lot east of TH 41 did not support the city’s plans to purchase additional land and construct off-street parking in downtown Chaska. He would like to see the City purchase his lot for these purposes.
- A property owner along the 2017 CSAH 61 Project was grateful for the smooth construction project and praised the project team and City/County staff for keeping him updated and answering questions in a timely manner.

Appendix B: Traffic Conditions Memorandums



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MEMORANDUM

Date: March 31, 2016
To: Darin Mielke, P.E., Carver County, Deputy County Engineer
Molly Klien, P.E., MnDOT, South Area Support Engineer
From: Jacob Bongard, P.E.
Michael Narow, E.I.T.
Subject: Existing Traffic Conditions Memorandum
CSAH 61/TH41 Corridor Improvements Project

Introduction

In collaboration with the Cities of Carver, Chanhassen, and Chaska, the Minnesota Department of Transportation (MnDOT) and Carver County are completing the CSAH 61/TH 41 Corridor Improvements Project. The County State Aid Highway (CSAH) 61 corridor extends approximately 5.75 miles from CSAH 11 in Carver, MN to Bluff Creek Drive in Chanhassen, MN. The Trunk Highway (TH) 41 corridor covers approximately 1.5 miles with the Minnesota River acting as the southern terminus and extending north through the CSAH 10 (Engler Boulevard) intersection. The TH 41 corridor is contained entirely within the City of Chaska. These corridors are important for providing access to the southwest metro region as a whole but also serve a local need in providing access to the downtown Chaska business and residential community.

This memorandum will serve to detail the existing traffic operations and recent crash history in the CSAH 61/TH 41 Corridor Improvement Project area. These measures become essential in the identification of existing deficiencies within the corridor prior to developing alternatives that serve the operational and safety needs of all users now and in the future. The existing traffic operations will be used as a baseline for potential improvements.

Data Collection

Turning movement counts were completed at 22 intersections in April of 2015. Traffic data was collected in the month of April to ensure that the results were not skewed by a construction project being completed on the river crossing immediately to the east on TH 101 which included lane closures, intermittent full roadway closures, and increased truck traffic. A 24 hour traffic count was completed at the intersection of TH 41/CSAH 61 and 13 hour traffic counts from 6:00 am to 7:00 pm were completed for all other intersections. The AM and PM peak hours were established as 7:00 am to 8:00 am and 4:30 pm to 5:30 pm. AM and PM traffic volume figures can be found in **Appendix A**. The following lists the 22 intersections where traffic counts were completed.



CSAH 61 Turning Movement Counts:

- CSAH 61 & CSAH 11 (Jonathan Carver Parkway)
- CSAH 61 & CSAH 40
- CSAH 61 & CSAH 140
- CSAH 61 & Creek Road
- CSAH 61 & Cedar Street
- CSAH 61 & Pine Street
- CSAH 61 & TH 41
- CSAH 61 & North Walnut Street
- CSAH 61 & Yellowbrick Road
- CSAH 61 & Crosstown Boulevard
- CSAH 61 & State Street
- CSAH 61 & CSAH 15 (Audubon Road)
- CSAH 61 & CSAH 10 (Engler Boulevard)
- CSAH 61 & Stoughton Avenue
- CSAH 10 (Engler Boulevard) & CSAH 15 (Audubon Road)

TH 41 Turning Movement Counts:

- TH 41 & 1st Street
- TH 41 & 2nd Street
- TH 41 & 3rd Street
- TH 41 & 4th Street
- TH 41 & 5th Street
- TH 41 & Victoria Drive/Crosstown Boulevard
- TH 41 & CSAH 10 (Engler Boulevard)

Tube counts were also completed throughout the study area to establish average daily traffic (ADT) volumes, heavy vehicle percentages, and vehicle speeds. Daily traffic volume data can be found in **Appendix A**. The following lists the seven segments where traffic tube counts were completed.

- CSAH 61, west of CSAH 40
- CSAH 61, between CSAH 140 and Creek Road
- CSAH 61, between Yellowbrick Road and Crosstown Boulevard
- CSAH 61, west of Audubon Road
- CSAH 61, east of CSAH 10
- TH 41, between Victoria Drive and CSAH 10
- TH 41, south of the Minnesota River

Additional ADT counts were attained in February 2016 to verify the tube counts collected in April 2015. This was completed to determine whether the expansion of the CSAH 101 from a 2-lane to a 4-lane facility influenced regional trip paths through the project area. Daily traffic volume data can be found in **Appendix A**. The following lists the two segments where traffic tube counts were completed.

- CSAH 61, east of CSAH 10
- TH 41, south of the Minnesota River

The findings below indicate that while a 12.5% reduction in daily traffic was observed on TH 41 in 2016, the CSAH 61 ADT, east of CSAH 10, was within 2% of that collected in April 2015. While not



conclusive, the consistency of the daily traffic volumes on CSAH 61, east of CSAH 10, indicates that a substantial shift in traffic volumes did not occur with the expansion of the CSAH 101 facility.

- CSAH 61, east of CSAH 10
 - April, 2015: 5,911 vpd
 - February, 2016: 5,810 vpd
 - 2012 MnDOT AADT volumes: 5,900 vpd
- TH 41, south of the Minnesota River
 - April, 2015: 17,725 vpd
 - February, 2016: 15,504 vpd
 - 2012 MnDOT AADT volumes: 18,400 vpd

Turning movement counts and tube counts were used to determine heavy vehicle percentages. Tube counts attained in February 2016 displayed the following percentages of heavy vehicles:

- CSAH 61, east of CSAH 10: 5.31%
- CSAH 61, west of CSAH 140: 7.72%
- TH 41, south of Minnesota River : 9.60%

24 hour turning movement counts at the intersection of TH 41 and CSAH 61 displayed heavy vehicle percentages ranging from 6.4% to 10.4% depending on the approach leg. Therefore, a heavy vehicle percentage of 7% was used for the existing conditions analysis.

Safety Analysis

A crash review was completed for the 22 intersections identified above using the Minnesota Crash Mapping Analysis Tool (MnCMAT) for the previous five years (2010-2014). MnDOT uses a comparison of the crash rate and the critical crash rate when determining whether or not there is a safety issue at an intersection. The crash rate is the number of crashes per million entering vehicles (MEV). The severity rate takes into account the crash severity. The critical rate (not shown) is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside of the expected, normal range. The critical index reports the magnitude of this difference and a critical index of less than one shows that the intersection is operating within the normal range.

Crash rates were determined using 13-hour turning movement counts that were adjusted to represent average daily traffic (ADT). Statewide average crash rates, severity rates and critical crash rates were attained from MnDOT using the 2014 version of the State Aid for Local Transportation (SALT) Intersection Green Sheets.

Summary figures of the existing safety conditions for both the Downtown and greater project area can be found in **Appendix B**.

CSAH 61 Safety Analysis

Over the five year period analyzed, a total of 81 crashes occurred along the CSAH 61 corridor including the five crashes at the CSAH 10/CSAH 15 intersection. Two fatal crashes, one incapacitating crash, and five non-incapacitating crashes were documented during this time period. The remaining crashes involved possible injury or property damage only. The number of crashes and their severity by intersection are shown in **Figure 1**.

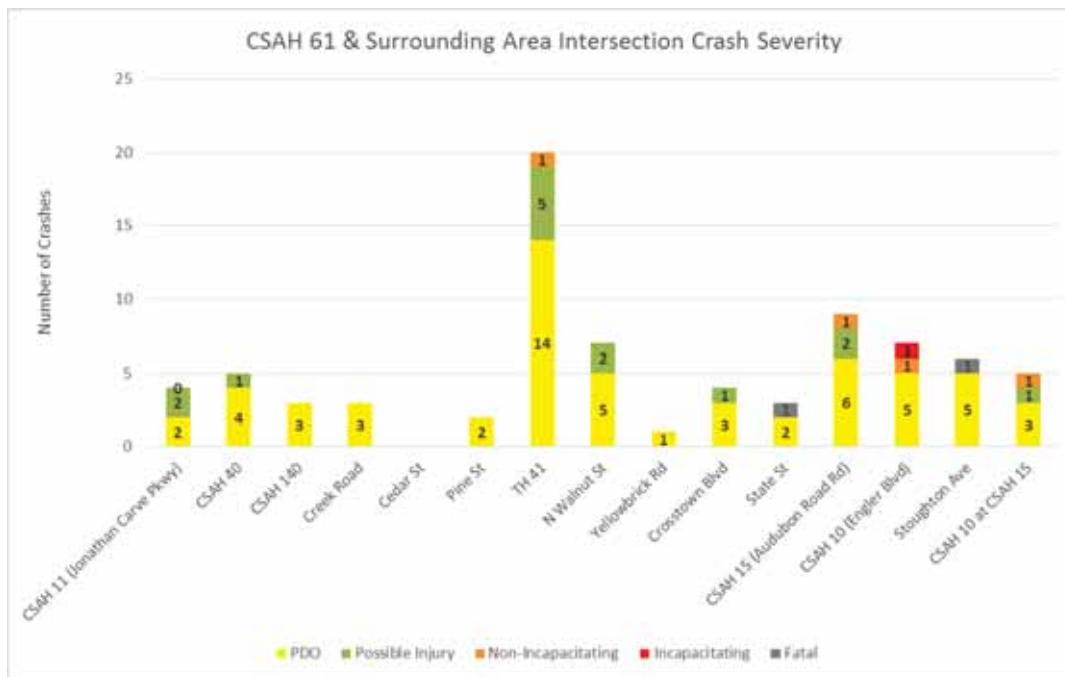
**Figure 1: Intersection Crash Frequency and Severity (2010-2014)**

Table 1 details the traffic control and total number of crashes observed at each intersection from 2010-2014. Comparisons are also developed between intersection crash rates vs. statewide average crash rates, severity rate vs. statewide average severity rates, and lastly, the critical crash index and critical severity index.

Table 1: Intersection Crash Rates (2010-2014)

Intersection	Traffic Control	Total Crashes	Crash Rate	Statewide Average	Severity Rate	Statewide Average	Critical Crash Index	Severity Crash Index
CSAH 61 at CSAH 11 (Jonathan Carver Pkwy) (2010-12)	Thru-Stop	4	0.38	0.36	0.57	0.51	0.43	0.50
CSAH 61 at CSAH 11 (Jonathan Carver Pkwy) (2012-14)	Traffic Signal	2	0.19	0.54	0.47	0.74	0.16	0.32
CSAH 61 at CSAH 40	Thru-Stop	5	0.38	0.26	0.45	0.42	0.57	0.49
CSAH 61 at CSAH 140	Traffic Signal	3	0.14	0.53	0.14	0.73	0.14	0.11
CSAH 61 at Creek Road	Thru-Stop	3	0.15	0.18	0.15	0.27	0.33	0.26
CSAH 61 at Cedar Street	Thru-Stop	0	0.00	0.18	0.00	0.27	0.00	0.00
CSAH 61 at Pine Street	Thru-Stop	2	0.08	0.18	0.08	0.27	0.19	0.15
CSAH 61 at TH 41	Traffic Signal	20	0.38	0.68	0.51	0.95	0.38	0.39
CSAH 61 at North Walnut Street	Traffic Signal	7	0.33	0.53	0.42	0.73	0.34	0.34
CSAH 61 at Yellowbrick Road	Thru-Stop	1	0.05	0.18	0.05	0.27	0.12	0.09
CSAH 61 at Crosstown Boulevard	Thru-Stop	4	0.24	0.26	0.30	0.42	0.39	0.35
CSAH 61 at State Street	Thru-Stop	3	0.20	0.26	0.46	0.42	0.31	0.52
CSAH 61 at CSAH 15 (Audubon Road)	Traffic Signal	9	0.51	0.43	0.73	0.60	0.59	0.67
CSAH 61 at CSAH 10 (Engler Boulevard)	Thru-Stop	7	0.62	0.26	1.07	0.42	0.90	1.11
CSAH 61 at Stoughton Avenue	Thru-Stop	6	0.49	0.26	0.81	0.42	0.73	0.87
CSAH 10 (Engler Boulevard) at CSAH 15 (Audubon Road)	Traffic Signal	5	0.22	0.53	0.35	0.73	0.23	0.28

The intersections of CSAH 61 at CSAH 11, CSAH 40, CSAH 15, CSAH 10 and Stoughton Avenue have crash and severity rates greater than statewide averages. Additionally, the intersection of CSAH 61 at State Street has a severity rate greater than the statewide average. The severity crash index at the intersection of CSAH 61 at CSAH 10 was found to be 1.11 which shows that the intersection is experiencing more severe resulting injuries than intersections statewide. All other critical indices were found to be less than 1.0 indicating that the intersections are within normal range.



The traffic control at the intersection of CSAH 61 at CSAH 11 changed in 2012. Therefore, crash data was pulled before and after the traffic control change and are shown in **Table 1**. The amount and severity of crashes that have occurred since the traffic control change is below the statewide average

Table 2 details the frequency of crash type per intersection occurring along the CSAH 61 corridor. The following text documents trends in the vehicle approach direction, high severity crashes, pedestrian crashes, and other details of note.

Table 2: Intersection Crash Types (2010-2014)

Intersection	Traffic Control	Total Crashes	Crash Type								
			Right Angle	Rear End	ROR	Left-Turn	Sideswipe	Bicycle	Pedestrian	Deer	Other
CSAH 61 at CSAH 11 (Jonathan Carver Pkwy) (2010-12)	Thru-Stop	4	1	1	1	1					
CSAH 61 at CSAH 11 (Jonathan Carver Pkwy) (2012-14)	Traffic Signal	2	2								
CSAH 61 at CSAH 40	Thru-Stop	5		2						2	1
CSAH 61 at CSAH 140	Traffic Signal	3	1			1				1	
CSAH 61 at Creek Road	Thru-Stop	3			1	1	1				
CSAH 61 at Cedar Street	Thru-Stop	0									
CSAH 61 at Pine Street	Thru-Stop	2	2								
CSAH 61 at TH 41	Traffic Signal	20	7	6		4		1			2
CSAH 61 at North Walnut Street	Traffic Signal	7	4	2							1
CSAH 61 at Yellowbrick Road	Thru-Stop	1	1								
CSAH 61 at Crosstown Boulevard	Thru-Stop	4	1	1	1						1
CSAH 61 at State Street	Thru-Stop	3			2				1		
CSAH 61 at CSAH 15 (Audubon Road)	Traffic Signal	9	2	5		1					1
CSAH 61 at CSAH 10 (Engler Boulevard)	Thru-Stop	7			5	1				1	
CSAH 61 at Stoughton Avenue	Thru-Stop	6	1	1			1			2	1
CSAH 10 (Engler Boulevard) at CSAH 15 (Audubon Road)	Traffic Signal	5	1	3						1	

Overall:

- One crash occurred on CSAH 61 at a driveway just west of Stoughton Ave. This crash is not represented in **Figure 1**.
- One vehicle ran off the road on CSAH 61 between Stoughton and CSAH 10. This crash is not represented in **Figure 1**.
- Four crashes occurred along CSAH 61 between Crosstown Blvd. and Yellowbrick Rd. These crashes are not represented in **Figure 1**.
- There were seven collisions with deer at these locations over the time period.

CSAH 61 at CSAH 11 (Jonathan Carver Pkwy)

- Five of six crashes involved westbound traffic.
- Intersection traffic control changed from side-street stop control to a traffic signal in 2012. Two of the reported six crashes occurred following the installation of the traffic signal.

CSAH 61 at TH 41

- One crash involved a collision with a bicycle.
- Two crashes involved unsafe backing of a truck/semi.
- All four left-turn crashes involved northbound left turning vehicles.

CSAH 61 at State Street

- One fatal crash occurred when a pedestrian attempted to cross CSAH 61. There are no crosswalks located at this intersection.



CSAH 61 at CSAH 10

- Five of seven crashes involved vehicles running off the road. The roadways intersect at a 90° angle, but three of the four approaches have curves leading into the intersection.
- One non-incapacitating injury occurred when a motorcyclist ran off the road and struck the median.
- One incapacitating injury occurred when a vehicle ran off the road into the ditch. This driver was under the influence at the time of the crash.

CSAH 61 at Stoughton Blvd

- One fatal crashed occurred when an eastbound vehicle failed to follow the curve of the road. The westbound vehicle struck the guardrail and deflected into the westbound lane striking a westbound vehicle. The driver in the westbound vehicle was killed.

TH 41 Safety Analysis

Over the five year period analyzed, a total of 81 crashes occurred along the TH 41 corridor. Three non-incapacitating crashes were documented during this time period. The remaining crashes involved possible injury or property damage only. The number of crashes and their severity by intersection are shown in **Figure 2**.

Figure 2: Intersection Crash Frequency and Severity (2010-2014)

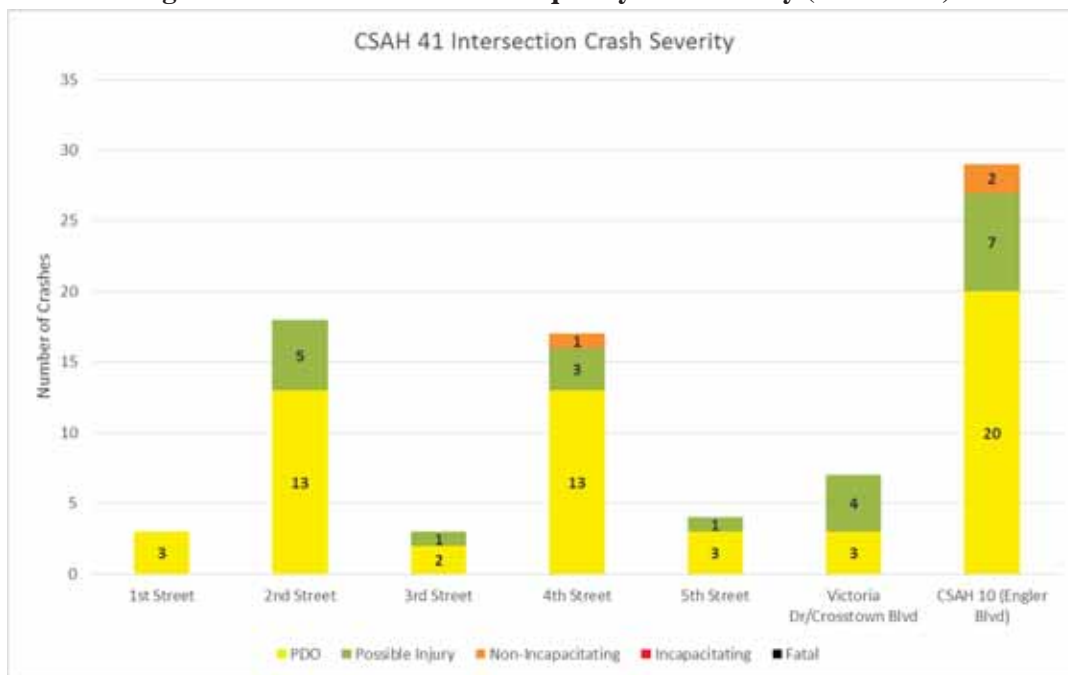


Table 3 details the traffic control and total number of crashes observed at each intersection from 2010-2014. Comparisons are also developed between intersection crash rates vs. statewide average crash rates, severity rate vs. statewide average severity rates, and lastly, the critical crash index and critical severity index.

**Table 3: Intersection Crash Rates (2010-2014)**

Intersection	Traffic Control	Total Crashes	Crash Rate	Statewide Average	Severity Rate	Statewide Average	Critical Crash Index	Severity Crash Index
TH 41 at 1st Street	Thru-Stop	3	0.09	0.18	0.18	0.27	0.24	0.18
TH 41 at 2nd Street	Traffic Signal	18	0.53	0.53	0.68	0.73	0.62	0.61
TH 41 at 3rd Street	Thru-Stop	3	0.09	0.18	0.12	0.27	0.23	0.23
TH 41 at 4th Street	Traffic Signal	17	0.45	0.53	0.59	0.73	0.54	0.53
TH 41 at 5th Street	Thru-Stop	4	0.11	0.18	0.14	0.27	0.13	0.12
TH 41 at Victoria Dr/Crosstown Blvd	Traffic Signal	7	0.14	0.18	0.22	0.27	0.40	0.47
TH 41 at CSAH 10 (Engler Blvd)	Traffic Signal	29	0.76	0.53	1.05	0.73	0.90	0.95

Crash rates are greater than or equal to statewide averages at the intersections of TH 41 at 2nd Street and CSAH 10. Additionally, the severity rate at TH 41 and CSAH 10 is greater than the statewide average. However, all of the crash indices are less than 1.0 indicating that these intersections are within the normal range. The crash indices at the intersection of TH 41 at CSAH 10 are currently close to 1.0 and should be monitored in the years to come.

Table 4 details the frequency of crash type per intersection occurring along the TH 41 corridor. The following text documents trends in the vehicle approach direction, high severity crashes, pedestrian crashes, and other details of note.

Table 4: Intersection Crash Types (2010-2014)

Intersection	Traffic Control	Total Crashes	Crash Type								
			Right Angle	Rear End	ROR	Left-Turn	Sideswipe	Head On	Bicycle	Pedestrian	Other
TH 41 at 1st Street	Thru-Stop	3	2	1							
TH 41 at 2nd Street	Traffic Signal	18	1	4	1	8	3				1
TH 41 at 3rd Street	Thru-Stop	3		1			1				1
TH 41 at 4th Street	Traffic Signal	17	4	6		5	1		1		
TH 41 at 5th Street	Thru-Stop	4		3					1		
TH 41 at Victoria Dr/Crosstown Blvd	Traffic Signal	7	1	5		1					
TH 41 at CSAH 10 (Engler Blvd)	Traffic Signal	29	9	9	2		3	2	2	1	1

TH 41 at 2nd Street

- All eight left turn crashes involved northbound and southbound traffic.

TH 41 at 4th Street

- All five left turn crashes involved northbound and southbound traffic.
- One crash involved a bicyclist riding in the improper lane.
- One non-incapacitating injury crash occurred as a result of a rear end crash.

TH 41 at 5th Street

- One crashed involved a collision with a bicyclist riding in the crosswalk. The crash report indicates that the bicyclist was at fault.

TH 41 at CSAH 10

- One non-incapacitating injury occurred when a pedestrian was hit crossing at the traffic signal.
- Two crashes involved bicycles, both crashes were a results of improper right turns on red.
- Two head on collisions occurred with southbound right turning vehicles colliding with eastbound stopped vehicles.



Segment Crash Analysis

Segment crash analysis considers the previously analyzed crashes as well as those occurring between intersections. The typical section, length of corridor, ADT and number of crashes are considered within the analysis. The segment crash rate is the number of crashes per million vehicle miles (MVM). The critical rate is a statistical comparison based on similar roadway segments statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside of the expected, normal range. The critical index reports the magnitude of this difference and a critical index of less than one shows that the intersection is operating within the normal range.

TH 41 - Minnesota River to CSAH 61

- Segment length is 0.4 miles.
- 49 crashes occurred in the last 5 years.
- Critical index of 0.91, which is within normal range but nearing an elevated level.

TH 41 - CSAH 61 to CSAH 10 (Engler Blvd)

- Segment length is 1.09 miles.
- 30 crashes occurred in the last 5 years.
- Critical index of 0.30.

CSAH 61 – CSAH 140 to Yellowbrick Rd.

- Segment length is 0.63 miles.
- 38 crashes occurred in the last 5 years.
- Critical index of 0.88, which is within normal range but nearing an elevated level.



Existing Operational Analysis

A level of service (LOS) analysis of the peak hours was completed using the existing turning movement counts in collaboration with the microsimulation software, Trafficware SimTraffic. The LOS results are based on average delay per vehicle as calculated by the 2010 Highway Capacity Manual (HCM), which defines the level of service, based on control delay. Control delay is the delay experienced by vehicles slowing down as they are approaching the intersection, the wait time at the intersection, and the time for the vehicle to speed up through the intersection and enter into the traffic stream. The average intersection control delay is a volume weighted average of delay experienced by all motorists entering the intersection on all intersection approaches. Intersections and each intersection approach are given a ranking from LOS A through LOS F. LOS A indicates the best traffic operation, with vehicles experiencing minimal delays. LOS A through D is generally perceived to be acceptable to drivers, however LOS D can be considered unacceptable in non-metro areas of the state. LOS E indicates that an intersection is operating at, or very near, its capacity and that drivers experience considerable delays. LOS F indicates an intersection where demand exceeds capacity and drivers experience substantial delays.

AM and PM peak hour traffic operations analysis using traffic volumes collected in April of 2015 and existing roadway geometry are shown in **Table 5**. Intersection delay and maximum delay are shown in seconds per vehicle. The limiting movement refers to the highest delay movement at the intersection. The maximum approach queue is based upon the movement with the longest maximum queue. The maximum queue refers to the 95th percentile queue. Detailed SimTraffic Reports can be found in **Appendix B**.

Table 5: 2015 Existing Traffic Operations Analysis

Intersection	Peak Hour	Intersection Delay*		Maximum Delay-LOS**		Limiting Movement***	Max Approach Queue		
							Direction	Average Queue (ft)	Max Queue (ft)****
CSAH 61 at CSAH 11 (Jonathan Carver Pkwy) <i>Signal</i>	AM	9	A	33	C	EBL	WBL	35	75
	PM	17	B	34	C	SBL	WBL	90	150
CSAH 61 at CSAH 40 <i>Side Street Stop Control</i>	AM	2	A	6	A	WBL	WBL	15	50
	PM	4	A	7	A	WBL	WBL	40	95
CSAH 61 at CSAH 140 <i>Signal</i>	AM	26	C	39	D	SBT	EB T	230	370
	PM	15	B	47	D	SBT	WB T	125	275
CSAH 61 at Creek Road <i>Side Street Stop Control</i>	AM	2	A	9	A	SBL	SB	25	55
	PM	1	A	14	B	SBL	SB	25	60
CSAH 61 at Cedar Street <i>Side Street Stop Control</i>	AM	0	A	4	A	WBL	NB R	20	50
	PM	1	A	15	B	NBL	NB R	15	45
CSAH 61 at Pine Street <i>Side Street Stop Control</i>	AM	2	A	10	A	NBL	NB R	35	70
	PM	2	A	17	C	NBL	NB LT	20	50
TH 41 at CSAH 61 <i>Signal</i>	AM	26	C	47	D	EBT	EB TR	185	295
	PM	29	C	48	D	EBT	NB T	170	340
CSAH 61 at North Walnut Street <i>Signal</i>	AM	9	A	22	C	WBL	EB TR	65	150
	PM	16	B	24	C	EBT	EB T	125	195
CSAH 61 at Yellowbrick Road <i>Side Street Stop Control</i>	AM	2	A	8	A	SBL	SB R	25	50
	PM	3	A	13	B	SBL	EB L	25	65
CSAH 61 at Crosstown Boulevard <i>Side Street Stop Control</i>	AM	3	A	7	A	SBL	SB L	25	45
	PM	2	A	10	A	SBL	SB R	20	45
CSAH 61 at State Street <i>Side Street Stop Control</i>	AM	2	A	7	A	SBL	SB R	10	25
	PM	3	A	14	B	SBL	SB R	10	35
CSAH 61 at CSAH 15 (Audubon Road) <i>Signal</i>	AM	24	C	48	D	WBL	EB L	145	255
	PM	21	C	42	D	WBL	WB T	100	180
CSAH 61 at CSAH 10 (Engler Boulevard) <i>Side Street Stop Control</i>	AM	5	A	9	A	SBL	SB L	50	85
	PM	3	A	7	A	SBL	SB L	35	65
CSAH 61 at Stoughton Avenue <i>Side Street Stop Control</i>	AM	2	A	5	A	NBR	NB R	25	55
	PM	1	A	3	A	NBL	NB R	20	40
CSAH 10 (Engler Boulevard) at CSAH 15 (Audubon Road) <i>Signal</i>	AM	9	A	14	B	SBL	EB L	60	110
	PM	10	A	24	C	NBL	SB TR	90	160


Table 5 Continued: 2015 Existing Traffic Operations Analysis

Intersection	Peak Hour	Intersection Delay*		Maximum Delay-LOS**		Limiting Movement ***	Max Approach Queue		
							Direction	Average Queue (ft)	Max Queue (ft) ****
TH 41 at 1st Street <i>Side Street Stop Control</i>	AM	1	A	6	A	WBR	WB R	40	70
	PM	1	A	4	A	WBR	WB R	25	50
TH 41 at 2nd Street <i>Signal</i>	AM	5	A	118	F	WBT	NB LT	75	190
	PM	7	A	57	E	WBL	NB LT	100	195
TH 41 at 3rd Street <i>Side Street Stop Control</i>	AM	1	A	6	A	WBR	WB R	15	45
	PM	1	A	5	A	WBR	EB R	25	50
TH 41 at 4th Street <i>Signal</i>	AM	5	A	59	E	EBL	NB TR	55	140
	PM	9	A	56	E	WBT	WB LT	85	175
TH 41 at 5th Street <i>Side Street Stop Control</i>	AM	1	A	7	A	WBR	EB R	15	40
	PM	2	A	9	A	WBR	NB T	25	115
TH 41 at Victoria Dr/Crosstown Blvd <i>Signal</i>	AM	13	B	158	F	NBL	NB T	65	135
	PM	18	B	86	F	SBL	SB T	140	240
TH 41 at CSAH 10 (Engler Blvd) <i>Signal</i>	AM	34	C	73	E	WBL	EB T	245	455
	PM	50	D	111	F	NBL	SB R	345	880

Yellow = LOS D, Orange = LOS E, Red = LOS F

*Delay in seconds per vehicle

**Maximum delay and LOS on any approach and/or movement

***Limiting Movement is the highest delay movement.

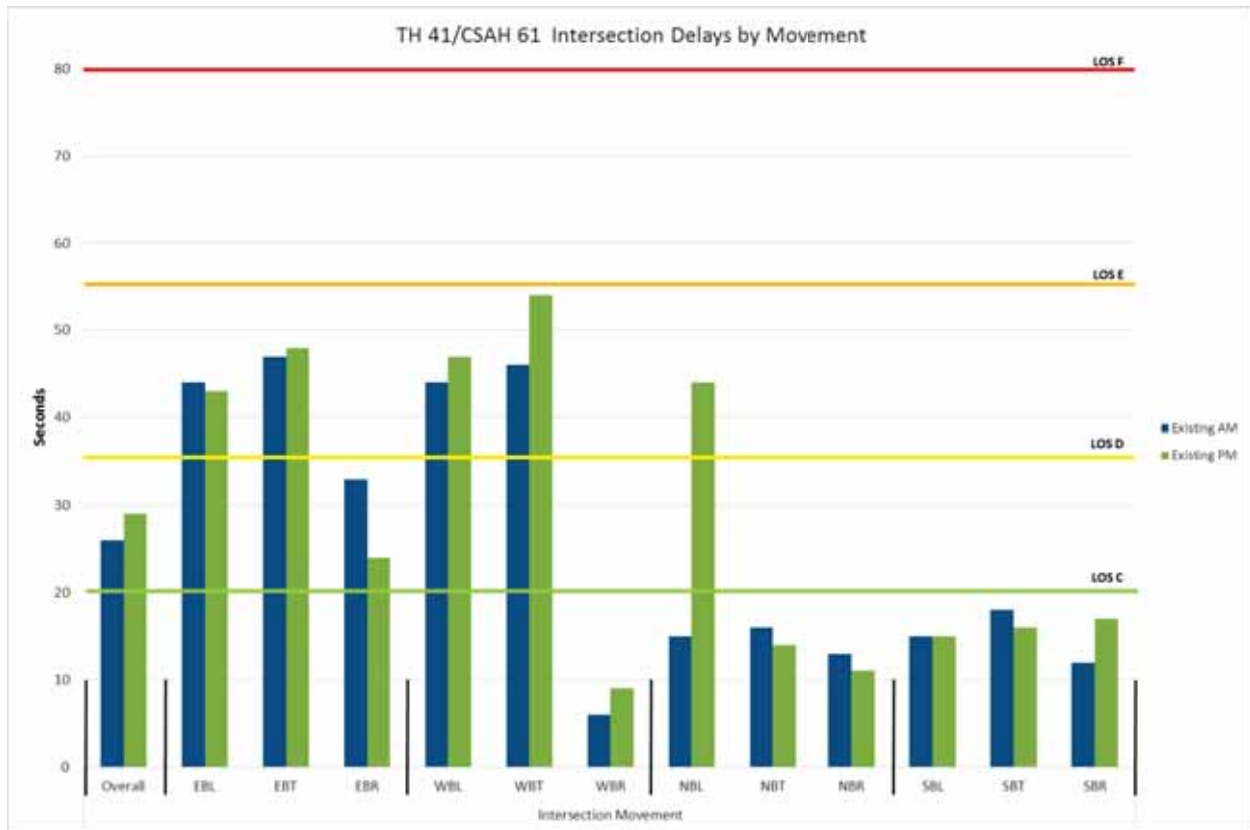
****Max Queue refers to the 95% Queue (Passenger car stored length = 25 ft, Heavy vehicle stored length = 45 ft)

Of the intersections analyzed, only TH 41/CSAH 10 (Engler Blvd) has an overall intersection delay of LOS D, all other intersections operate at LOS C or better during the AM and PM peak hours. There are some instances where minor street movement delays may be problematic for users. For example northbound and southbound movements at CR 140/CSAH 61, eastbound and westbound movements at TH 41/2nd Street and TH 41/4th Street, and eastbound and westbound movements on Victoria Dr/Crosstown Blvd and TH 41/CSAH 10. In addition to minor street delays at the TH 41/Victoria Drive and TH 41/CSAH 10 intersections, northbound and southbound left-turn movements have delays at or approaching capacity during peak hours. The minor street and the left-turn movement delays occurring at signalized intersections are anticipated as the majority of “green time” is provided to the primary movements on the major roadways to reduce the overall intersection delay.

A more comprehensive analysis was completed at the TH 41/CSAH 61 intersection as it accommodates the highest daily entering traffic volumes of any intersection in the study area. **Figure 3** shows the AM and PM peak hour delays by individual movement.

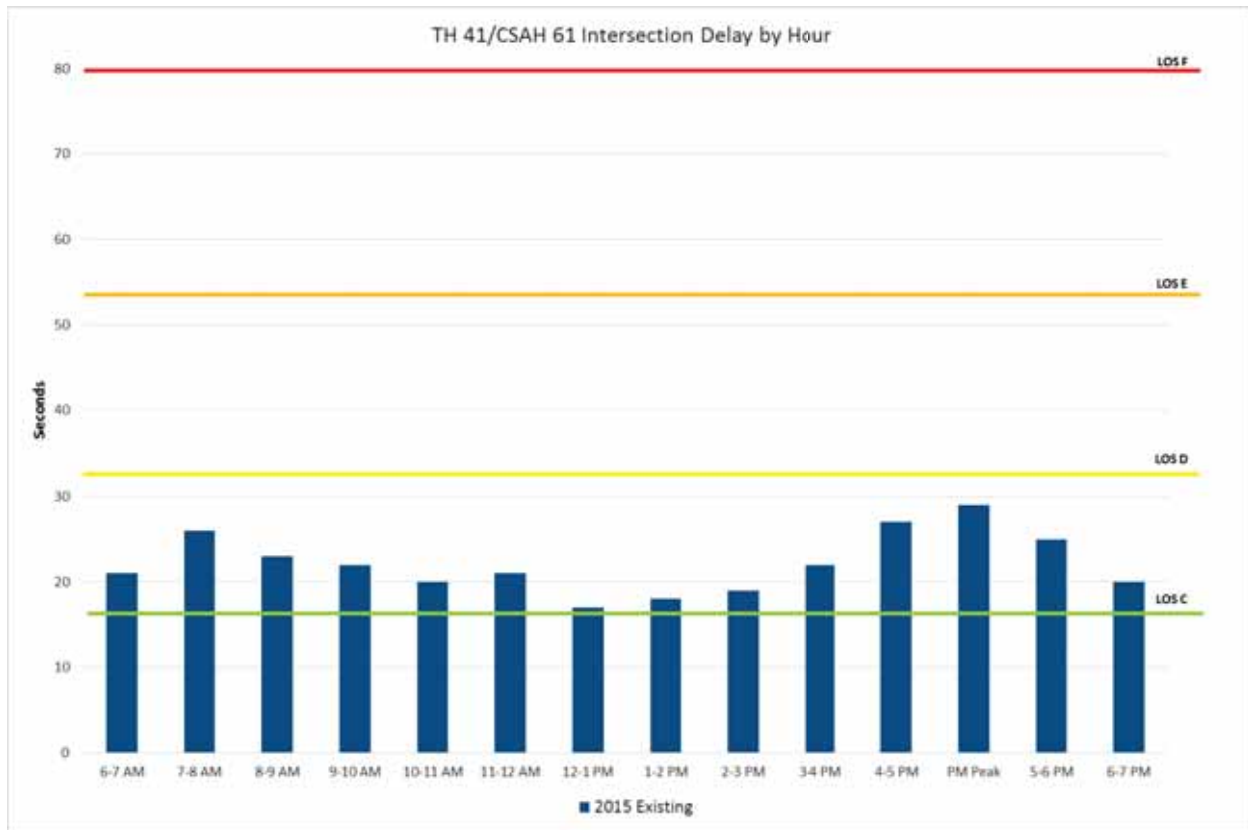


Figure 3: TH 41 and CSAH 61 Peak Hour Movement delays



The overall intersection delay for the AM and PM peak hour produces a LOS C. Eastbound and westbound through and left-turn movements are within an acceptable range but are nearing LOS E during both the AM and PM peak hours. The northbound left-turn movement during the PM peak displays a level of delay consistent with a LOS D. All other movements currently operate with LOS C or better.

Additional operational analysis was completed for each hour from 6:00 am to 7:00 pm to investigate the LOS throughout a typical weekday. **Figure 4** shows the overall intersection LOS for each hour, and the PM peak hour, at the TH 41/CSAH 61 intersection.

**Figure 4: TH 41 and CSAH 61 Intersection Delay by Hour**

The intersection of TH 41/CSAH 61 currently operates with LOS C throughout a typical weekday.

Figure 4 clearly displays the AM and PM peak hours of the day having the most delay in comparison to adjacent time periods. The AM and PM peak hours will become the standard comparison for mitigation options.

Summary figures of existing traffic operations for both the Downtown and greater project area can be found in **Appendix C**.

Curling Center and Restaurant Development Traffic

Additional vehicle trips were added to the corridor to account for development at Fireman's Park located in the northwest quadrant of the TH 41/CSAH 61 intersection. Access to the corridor is provided on CSAH 61 opposite the existing Cedar Street and Pine Street intersections. The development consists of a restaurant, event center and a six rink curling center. To estimate the number of trips developed by the facility, ITE Trip Generation Manual, 8th Edition was used. Trip Generation rates for the restaurant were evaluated using data for a High Turnover Restaurant (ITE 932) with 200 available seats. Events may occur on occasion, but the majority of trips generated by the event center would likely arrive later in the evening. Trip generation for the curling rink was based on data collected by Novatech Engineering Consultants at an existing curling rink facility located in Ottawa, Canada. A reduction of 20 percent was applied to the generated trips to account for multi-purpose trips (using both the restaurant and curling rink in the same trip). Trips were distributed throughout the corridor based on the most Average Daily Traffic (ADT) volumes and engineering judgement. Detailed trip generation information can be found in the **Appendix D**.

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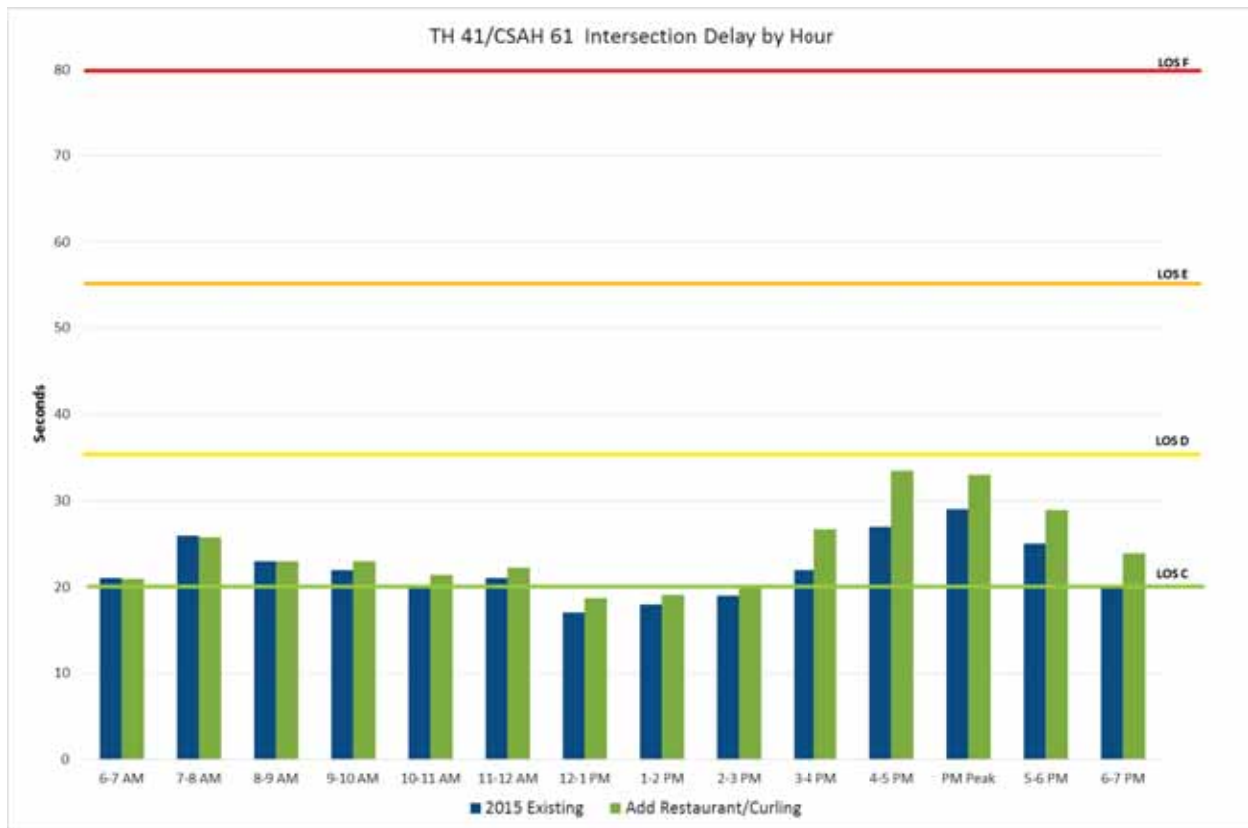


AM vehicle trips were not generated for the development as the facility is not open to customers during the period of peak AM traffic. It is known that the restaurant operates from 11 am-midnight, and curling leagues generally begin at 6:00 pm and 8:00 pm on a typical weekday.

The additional trips generated by the facility are expected to have a minor impact on the TH 41/CSAH 61 intersection during the PM peak hour, but is anticipated to have little to no effect on the overall corridor.

Figure 5 compares the 2015 existing overall intersection delay at TH 41 and CSAH 61 with the overall intersection delay anticipated with the added trips from the Fireman's Park development.

Figure 5: TH 41 and CSAH 61 Intersection Delay by Hour with Development Trips



The development is expected to have only minor implications to the LOS during the morning and midday hours. An increase of four to seven seconds per vehicle on average is anticipated for each hour between 3:00 and 7:00 pm. The PM peak overall LOS increases from 29 seconds per vehicle to 33 seconds per vehicle with the additional trips. The intersection operates with LOS C or better for the entire analysis period.

2015 Existing Queuing

Traffic backups (queues) are also used to indicate how well certain types of traffic control and intersection configurations are able to accommodate existing and future levels of traffic. Average and 95th percentile queues were reported in this analysis. The 95th percentile queue is commonly used for designing turn lane lengths as it corresponds to a queue length that is only exceeded 5% of the time.

Queuing was investigated in detail at the TH 41 and CSAH 61 intersection. Existing queue lengths, with the development trips included, are shown in **Table 5**. Cells in gray indicated the available storage length



for each movement. Cells highlighted in yellow indicate queue backups reach 75% of available capacity. Cells highlighted in red indicates that the queue is longer than the available storage length.

Table 6: Queue Table

Intersection		Movements											
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
TH 41 & CSAH 61 Signal	Storage Length (ft)	160	310^	310^	160	300^	125	140	310^	310^	450	600^	600^
	AM Average Queue (ft)	115	160	220	55	45	30	60	120	140	35	105	85
	AM Max Queue (ft)*	215	310	340	110	90	75	120	200	225	75	180	170
	Storage Length (ft)	160	310^	310^	160	300^	125	140	310^	310^	450	600^	600^
	PM Average Queue (ft)	145	110	160	130	165	35	180	155	135	30	200	210
	PM Max Queue (ft)*	225	205	250	225	250	85	260	305	225	65	305	325

Red indicates queue is longer than storage length. Yellow indicates queue backups reach 75% capacity.

*Max Queue refers to the 95% Queue (Passenger car stored length = 25 ft, Heavy vehicle stored length = 45 ft)

^Indicates distance to adjacent intersection

The maximum queue for eastbound traffic on CSAH 61 extends into the adjacent intersection of Pine Street during the AM peak hour. During the PM peak hour, the maximum queue for westbound traffic on CSAH 61 extends into the adjacent intersection of Walnut Street. Northbound left-turn queues approach capacity during the AM peak hour and exceed capacity during the PM peak hour. The northbound left-turn queue extends into the northbound through lane during the PM peak period resulting in extended queues for northbound through and right-turn movements traffic as well. This extended northbound queue is a safety concern for vehicles approaching the intersection on TH 41 as it creates a situation in which the driver may be required to come to an immediate stop when a green light is provided for the movement.

Warrant Analysis

Traffic signal warrants have been developed as national guidelines to promote continuity of traffic control devices to ensure that traffic signals are installed at intersections that would benefit from their use.

The MnMUTCD states that the investigation of the need for a traffic control signal shall include an analysis of the applicable factors contained in the following traffic signal warrants:

- Warrant 1: Eight-Hour Vehicular Volume
- Warrant 2: Four-Hour Vehicular Volume
- Warrant 3: Peak Hour
- Warrant 4: Pedestrian Volume
- Warrant 5: School Crossing
- Warrant 6: Coordinated Signal System
- Warrant 7: Crash Experience
- Warrant 8: Roadway Network
- Warrant 9: Intersection Near a Grade Crossing

A traffic signal shall not be installed unless one or more of the warrants can be met. Furthermore, a signal shall not be installed unless an engineering study indicates that the signal will improve the overall safety and operations of the intersection. Finally, the signal should not disrupt the progressive flow of traffic.

Table 7 below summarizes the warrants met at each signalized intersection in the downtown area with existing 2015 traffic volumes.

**Table 7: Warrant Analysis**

Intersection	Warrants Met
TH 41 at CSAH 61	Warrants 1A, 1B, 2, and 3
TH 41 at 4 th Street	Warrants 1B, 2, 3 and 7
TH 41 at 2 nd Street	No Warrants Met
CSAH 61 at CSAH 140	No Warrants Met
CSAH 61 at Walnut Street	No Warrants Met

The traffic signals at the intersections of TH 41 at CSAH 61 and TH 41 at 4th Street are warranted with 2015 traffic counts. At the intersection of TH 41 at 4th Street Warrant 7 is met with respect to both volume thresholds as well as crash history. For existing traffic signals, 60% traffic volume warrants were completed to investigate the need for a traffic signal with current traffic volumes. Results of the 60% traffic volumes can be seen in **Table 8**.

Table 8: Warrant Analysis

Intersection	Warrant 1A Hours Met	Warrant 1B Hours Met	Hours Required to Meet Warrants
TH 41 at 2 nd Street	0	4	8
CSAH 61 at CSAH 140	3	7	8
CSAH 61 at Walnut Street	0	8	8

TH 41 at 2nd Street meets Warrant 1B for 60% traffic volume warrants. Signal warrant analysis details can be found in **Appendix E**.

Pedestrian Analysis

An evaluation was completed to understand the performance of the downtown Chaska area in terms of its service to pedestrians. This analysis provides measures that seek to describe how the study area performs from a pedestrian's perspective. The first measure is the amount of sidewalk/crosswalk area available for pedestrians. A second measure is the pedestrian delay experienced at crossing locations. The final measure is a LOS Score that is an indication of the pedestrian overall travel experience.

Numerous parking locations on the cross streets of TH 41 are available for persons to park their vehicles and access the various shops and businesses within the downtown area via the sidewalks. Sidewalks are available on both the east and west side of TH 41 and at least one crossing location is available per intersection. Currently, TH 41 acts as a barrier that many pedestrians do not feel safe crossing. In fact, some users would prefer to go back to their vehicles, drive across TH 41 and find a new parking spot, rather than cross TH 41 by foot. Furthermore, there is no sidewalk provided on the south side of CSAH 61 and pedestrians are expected to use the sidewalk on the north side. Therefore, crossing locations on TH 41 and CSAH 61 are of primary concern in downtown Chaska.

Pedestrian street crossing locations were analyzed on an individual basis. The signalized intersection crossing analysis considers vehicle speeds, traffic flow rates, pedestrian flow rates, geometric conditions and signal phase timings. Available area, pedestrian delay and a LOS Scores were calculated for each crosswalk of the intersection. Uncontrolled intersection crossing are analyzed differently than signalized intersections. The uncontrolled crossing analysis considers the traffic flow rates, geometric conditions, pedestrian characteristics and driver behavior.



The sidewalks analysis between intersections considers traffic flow rates, traffic travel times, pedestrian flow rates, pedestrian travel times, on-street parking, geometric conditions, and effective sidewalk width. The effective sidewalk width is calculated based on fixed objects located in the surrounding area of the sidewalks in question. Fixed objects on the inside and/or outside of the sidewalk, for example, trees, low walls or fences, and buildings, all are considered when calculating the effective width of the sidewalk.

Pedestrian volumes were collected at seven intersections in the downtown area. Data collection efforts occurred in conjunction with 2015 13-hour vehicle turning movement counts. **Table 9** details the pedestrian volumes at crossing locations in downtown Chaska on TH 41 and CSAH 61.

Table 9: Downtown Chaska Pedestrian Volumes

Intersection	Crossing				Total
	West leg	East Leg	North Leg	South Leg	
TH 41 at 1st Street	9	1	10	2	22
TH 41 at 2nd Street	20	30	15	25	90
TH 41 at 3rd Street	42	19	14	3	78
TH 41 at 4th Street	8	14	22	11	55
TH 41 at 5th Street	15	15	5	17	52
TH 41 at CSAH 61*	11	37	17	22	87
CSAH 61 at Walnut Street	28	26	26	11	91

*24hr pedestrian Count

The pedestrian volumes at the intersections were used to determine the sidewalk/crosswalk area available for pedestrians as it is designed to use pedestrian flow rates on a per hour basis. The pedestrian flow rate per hour in downtown Chaska is too small to obtain measures of any significance where reasonable comparisons could be made. Therefore, a proportional scale of pedestrian volumes was used for analysis. It was determined that there is more than adequate space for pedestrians on the sidewalks and within the crosswalks for pedestrians in all the locations studied. Pedestrian volumes are not used in determining pedestrian delay and LOS Scores.

The pedestrian delay has an associated LOS for a signalized and unsignalized crossing. The thresholds are presented in **Table 10**. The delay threshold for signalized crossings are only divided into two sections because the delay experienced is largely due to signal timings and pedestrians will typically comply with the signal indications knowing that they will be given an opportunity to cross eventually. On the contrary, pedestrians at uncontrolled crossings are more likely to take on risk if they become impatient.

Table 10: Pedestrian Delay Level of Service Criteria

LOS	Unsignalized Crossings	Signalized Crossing	Comments
	Seconds per Pedestrian	Seconds per Pedestrian	
A	≤ 5	≤ 30	Usually no conflicting traffic
B	>5 and ≤ 10		Occasional delay due to traffic
C	>10 and ≤ 20		Noticeable delay, not inconveniencing
D	>20 and ≤ 30		Noticeable delay and irritating
E	>30 and ≤ 45	>30	Approached tolerance level
F	>45		Exceeds tolerance level

Pedestrian delay results for signalized and uncontrolled crossing locations are shown in **Table 11** and **Table 12**, respectively. The uncontrolled crossing delay refers to pedestrians crossing TH 41. Delay

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experienced for crossing parallel to TH 41 at uncontrolled intersections are considered negligible.

Table 11: Signalized Intersection Crossing Pedestrian Delay

Signalized Intersection	Pedestrian Delay (s/p)							
	West Leg		East Leg		North Leg		South Leg	
CSAH 61 at TH 41	21.2	A-D	21.2	A-D	47.0	E-F	47.0	E-F
TH 41 at 4th Street	10.7	A-D	10.7	A-D	46.4	E-F	46.4	E-F
TH 41 at 2nd Street	10.7	A-D	10.7	A-D	44.4	E-F	44.4	E-F
CSAH 61 at North Walnut Street	31.6	E-F	31.6	E-F	16.7	A-D	16.7	A-D

Table 12: Uncontrolled Intersection Crossing Pedestrian Delay

Uncontrolled intersection	Delay (sec/ped)	LOS
TH 41 at 5th Street	72	F
TH 41 at 3rd Street	80	F
TH 41 at 1st Street	49.5	F

Signalized crossing locations experience problematic levels of pedestrian delay across the north and south legs of the intersections of TH 41 at CSAH 61, 4th Street, and 2nd Street and across the west and east legs of the intersection of CSAH 61 at North Walnut Street. This is a result of the majority of the phase time being allocated to the major street, TH 41 or CSAH 61 due to the higher traffic volumes. The LOS at the uncontrolled intersections also exceeds acceptable levels at the three crossings analyzed. Pedestrians must find gaps in traffic on TH 41 large enough to allow them to safely use the uncontrolled crossing. This may be difficult with the amount of traffic that uses TH 41 daily. However, if a pedestrian were to arrive at an uncontrolled crossing at a time when a red light at the adjacent intersections is provided, it is likely that the pedestrian would be able to find an adequate gap in traffic with less delay.

A LOS Score is calculated for each signalized crosswalk and for each sidewalk segment between intersections. The LOS Score is a factored value that represents a pedestrian's experience and perception of service quality while traveling on the sidewalk or crosswalk in question. Cross-section, vehicle volume, vehicle speed, and pedestrian delay adjustment factors are used in calculating the LOS Score. The association between LOS and LOS Score is based on pedestrian's perception research where pedestrians were asked to rate the quality of service associated with specific trips along an urban street. The thresholds are presented in **Table 13**.

Table 13: Pedestrian LOS Score Criteria

LOS	LOS Score
A	≤ 2.00
B	>2.00 and ≤ 2.75
C	>2.75 and ≤ 3.50
D	>3.50 and ≤ 4.25
E	>4.25 and ≤ 5.00
F	>5.00



The signalized crosswalk LOS Score results are shown in **Table 14**. The sidewalks LOS Score results are shown in **Table 15**. The results for the sidewalk analysis are calculated for each side of the road separately. No sidewalk is present on the south side of CSAH 61 and therefore no results are shown as it was assumed pedestrians would use the sidewalk on the north side of CSAH 61. The results shown in **Table 14** are for the sidewalk segment only and do not consider adjacent crossing locations. LOS Scores are not used when evaluated uncontrolled intersections.

Table 14: Signalized Crossing LOS Scores

Signalized Intersection	Crosswalk LOS Score							
	West Leg		East Leg		North Leg		South Leg	
CSAH 61 at TH 41	2.68	B	2.61	B	2.75	B	2.80	C
TH 41 at 4th Street	1.75	A	1.81	A	2.62	B	2.65	B
TH 41 at 2nd Street	1.76	A	1.76	A	2.59	B	2.63	B
CSAH 61 at North Walnut Street	2.50	B	2.50	B	2.16	B	2.03	B

Table 15: Sidewalk Segment LOS Scores

Sidewalk	Sidewalk LOS Score			
TH 41	West Side		East Side	
CSAH 61 to 5th Street	2.68	B	2.46	B
5th Street to 4th Street	2.62	B	2.28	B
4th Street to 3rd Street	2.70	B	2.25	B
3rd Street to 2nd Street	2.65	B	2.19	B
2nd Street to 1st Street	2.70	B	2.10	B
CSAH 61	North Side		South Side	
TH 41 to North Walnut Street	1.65	A	-	-
North Walnut Street	West Side		East Side	
CSAH 61 to 5th Street	1.18	A	1.40	A

The sidewalks/crosswalks analyzed operate with a LOS C or better with current traffic demand, roadway geometry, and sidewalk geometry. As expected, LOS Scores are higher at crossing locations that traverse TH 41 or CSAH 61. The east side of TH 41 has slightly lower scores compared to the west side. This is due to the shoulder and on-street parking available on the east side of TH 41. The extra buffer space between pedestrians and moving traffic improves the perceived LOS that pedestrian's experience.

Pedestrian travel times can be estimated using an assumed walking speed and the pedestrian delay experienced at crossing locations. According to the Highway Capacity Manual 2010, if 0% to 20% of the pedestrians traveling along the subject segment are elderly, an average free-flow walking speed of 4.0 feet per second is recommended for segment evaluation. A free-flow walking speed is assumed based upon the previous calculations regarding available space for pedestrians on the sidewalks/crosswalks. Pedestrian travel times will be used for comparisons between the existing conditions and potential mitigation options.



As an example, the pedestrian travel time can be calculated for a pedestrian walking from City Hall to Dunn Brothers Coffee. Assuming the pedestrian starts at the northwest corner of TH 41 and 4th Street, and finishes at the southeast corner of TH 41 and 2nd Street, it would take a pedestrian approximately 4.5 minutes to navigate the sidewalks and crossing locations. See **Table 16** for a detailed breakdown of the pedestrian travel time.

Table 16: Pedestrian Travel Time Calculation

Pedestrian Action	Length	Time
Wait at NW corner of 4th Street	-	10.7 sec
Walk from 4th to 3rd Street	320 ft	80 sec
Wait at NW corner of 3rd Street	-	0 sec
Cross 3rd Street	50 ft	12.5 sec
Walk from 3rd to 2nd Street	340 ft	85 sec
Wait at NW corner of 2nd Street	-	44.4 sec
Cross TH 41	60 ft	15 sec
Wait at NE corner of 2nd Street	-	10.7 sec
Cross 2nd Street	35 ft	8.75 sec
TOTAL	805 ft	267.1 sec
		4.45 min
		~4.5 min

2015 Existing Arterial Evaluation

In addition to the evaluation of individual intersections, an analysis was also completed to better understand vehicle operations on a corridor or arterial level. The TH 41 corridor from the Minnesota River to CSAH 61 contains three coordinated traffic signals that influence the progression of vehicles through the corridor. For example, congestion occurring at the CSAH 61 intersection may influence the delay, travel times, and vehicle speeds upstream at the intersections of 5th Street, 4th Street, etc. The findings within this section will serve as a baseline in the comparison of future roadway mitigations and build scenarios.

Two roadway segments within the Downtown Chaska Subarea have been identified as having a high priority as each serve significant levels of traffic within a constricted right-of-way environment. Total arterial delay (seconds/vehicle), arterial travel time (seconds/vehicle) and average speed (miles/hour) will be evaluated for the following segments:

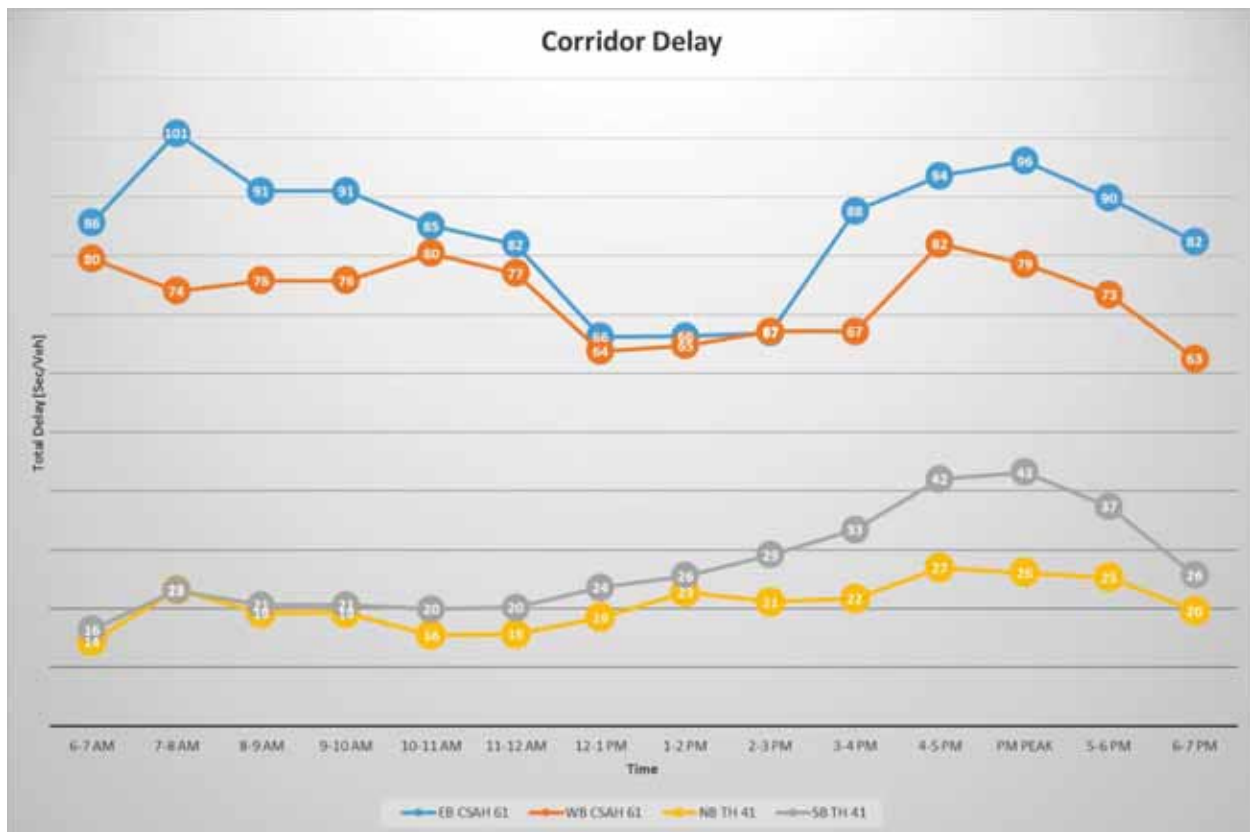
- TH 41 from the Minnesota River bridge to Walnut Street
- CSAH 61 from west of CSAH 140 to Yellowbrick Road

Total Delay

Total arterial delay by hour is shown in **Figure 6**. The eastbound and westbound total delay on CSAH 61 is shown in blue and orange. The northbound and southbound total delay on TH 41 is shown in yellow and gray.



Figure 6: Total Delay by Hour



Eastbound CSAH 61 traffic consistently has a higher total delay than westbound traffic. Eastbound traffic on CSAH 61 reaches a peak delay of 101 seconds per vehicle during the AM peak hour and westbound traffic reaches a peak delay of 82 seconds per vehicle between 4:00 and 5:00 pm. The levels of delay are fairly similar during the midday hours but wait times increase significantly for eastbound traffic when traffic levels increase.

Southbound traffic on TH 41 experiences a higher total delay than northbound traffic. Northbound and southbound both reach peak delays between 4:00 and 5:30 pm. Northbound and southbound traffic currently reach a peak delay of 27 seconds per vehicle and 43 seconds per vehicle, respectively.

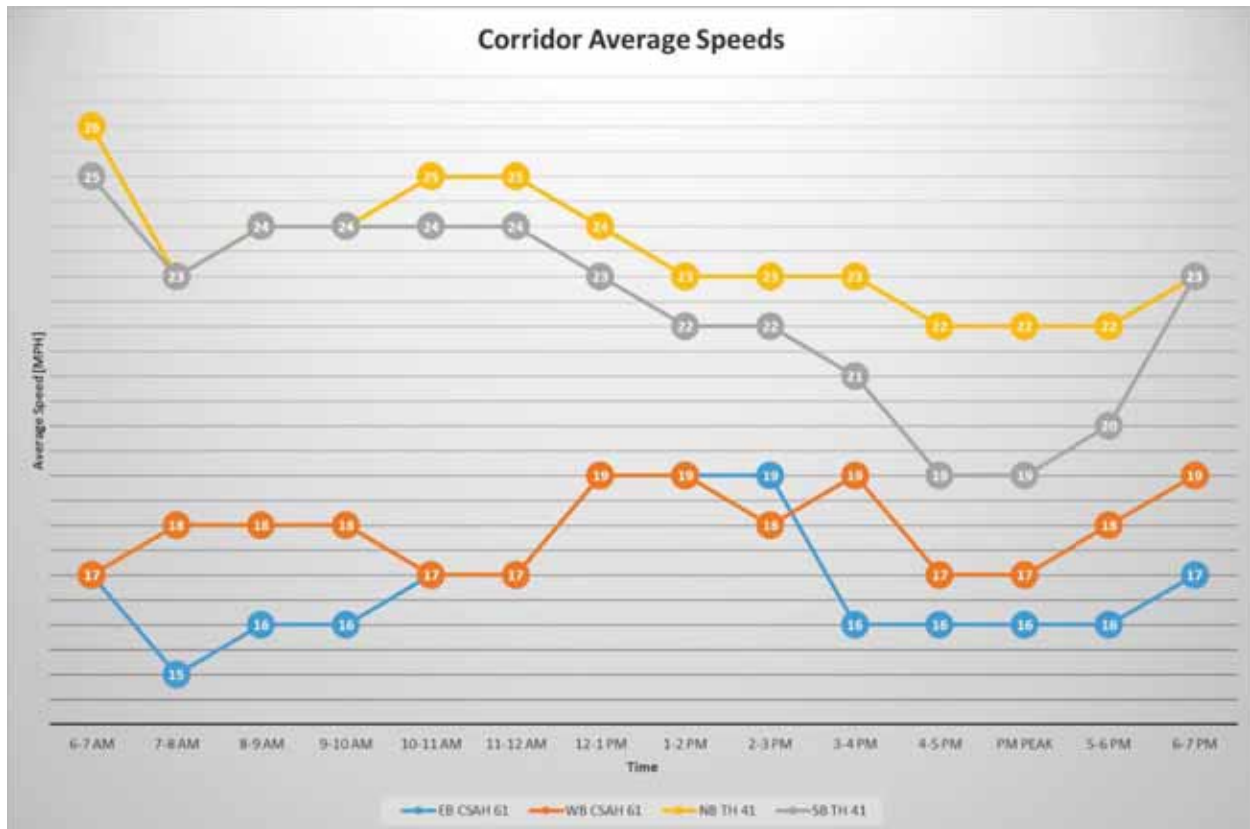
The majority of delay experienced by users occurs at the intersection of TH 41 and CSAH 61.



Average Speed

The average vehicle speed by hour is shown in **Figure 7**. The eastbound and westbound average speed on CSAH 61 is shown in blue and orange. The northbound and southbound average speed on TH 41 is shown in yellow and gray.

Figure 7: Average Speed by Hour



Average speeds on CSAH 61 range from 15 to 19 miles per hour. Average speeds on TH 41 range from 19 to 26 miles per hour. In general, average speeds are lowest during the peak traffic periods of the day.

The average speed is largely dependent on where along the corridor a user is located. Intersections with traffic signals frequently require vehicles to slow or come to a complete stop reducing the average vehicle speed, while other intersections have uncontrolled movements that do not at all impede the progression of a vehicle through the corridor. It is with these variations in traffic control that an overall average speed is developed for each corridor.

The greatest impedance in the average vehicle speeds traveling through the corridor is found at the intersection of TH 41 and CSAH 61.



Travel Time

Travel time by hour is shown in **figure 8**. The eastbound and westbound travel time on CSAH 61 is shown in blue and orange. The northbound and southbound travel time on TH 41 is shown in yellow and gray.

Figure 8: Travel Time by Hour



Eastbound traffic on CSAH 61 has a higher travel time than westbound traffic. Eastbound traffic on CSAH 61 is anticipated to have the longest travel time of 184 seconds during the AM peak hour and westbound traffic on CSAH 61 is expected to incur the longest travel time of 162 seconds between 4:00 and 5:00 pm.

Southbound traffic on TH 41 has a higher travel time than northbound traffic. Northbound traffic on TH 41 is anticipated to have the longest travel time of 119 seconds during the PM peak hour. Southbound traffic on TH 41 is expected to have the longest travel time of 91 seconds between 4:00 and 5:00 pm.

In order to verify the findings produced within the microsimulation software, field tests were completed to measure travel times during the week of February 8th, 2016. Multiple travel time runs were completed for each arterial roadway between the hours of 1:00 and 2:00 pm as well as during the PM Peak hour of 4:30 to 5:30 pm. **Table 17** compares the travel time runs completed in the field with the output from the existing conditions model used to develop the findings for average corridor delay, vehicle speeds, and travel time.

**Table 17: Field vs. Model Travel Times**

EB CSAH 61									
	1-2 pm			PM Peak Hour					
	Field Test Times	Average	Model Time	Field Run Times	Average	Model Time	Units		
Travel Time	107	98	103	148	93	128	174	132	178 [sec]

WB CSAH 61									
	1-2 pm			PM Peak Hour					
	Field Test Times	Average	Model Time	Field Run Times	Average	Model Time	Units		
Travel Time	120	128	124	144	206	109	-	158	157 [sec]

NB TH 41									
	1-2 pm			PM Peak Hour					
	Field Test Times	Average	Model Time	Field Run Times	Average	Model Time	Units		
Travel Time	75	83	79	86	88	-	-	88	89 [sec]

SB TH 41									
	1-2 pm			PM Peak Hour					
	Field Test Times	Average	Model Time	Field Run Times	Average	Model Time	Units		
Travel Time	82	98	90	98	120	-	-	120	119 [sec]

Average travel time for each of the identified corridors was assembled and compared to the output of the microsimulation model. Travel times through the various corridors are largely influenced by the traffic control implemented, primarily the traffic signals within the TH 41 and CSAH 61 corridors. For example, three traffic signals are present within the eastbound CSAH 61 corridor, and depending on whether a motorist is required to stop at one, two, or three of the intersections greatly influences the travel time. The field test travel times vary from 93 seconds to 174 seconds during the PM peak hour with a calculated average travel time of 132 seconds. The average field run travel time is roughly half a minute less than the model time for eastbound CSAH 61. The other three segments investigated resulted in very similar average field run times compared to the results of the model. The westbound CSAH 61 segment field test travel times for the PM peak hour vary from 109 seconds to 206 seconds resulting in an average travel time of 158 seconds which is very similar to the model time of 157 seconds. Field results and model results along TH 41 are very similar for both northbound and southbound directions. It is believed larger sample size of field run times should reduce the gap between field and model times for eastbound CSAH 61 and reassure the model is calibrated accurately to represent the existing conditions throughout the corridor.

Summary and Conclusions

The existing conditions memorandum details the existing traffic operations and recent crash history throughout the CSAH 61/TH 41 Corridor Improvement Project area. The analysis indicates that while all project area intersections currently operate at an acceptable level, problematic movements do exist. The intersection delay, queuing, corridor delay, vehicle speed, and travel time evaluations documented within this memorandum will be essential in establishing a basis for the development of future alternatives that serve the operational and safety needs of all users now and in the future.

Appendices Available Upon Request



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MEMORANDUM

Date: December 21, 2016
To: Darin Mielke, P.E., Carver County, Deputy County Engineer
Molly Klien, P.E., MnDOT, South Area Support Engineer
From: Jacob Bongard, P.E., PTOE
Michael Narow, E.I.T.
Subject: Future Traffic Conditions Memorandum
CSAH 61/TH 41 Corridor Improvements Project

Introduction

In collaboration with the Cities of Carver, Chanhassen, and Chaska, the Minnesota Department of Transportation (MnDOT) and Carver County are completing the CSAH 61/TH 41 Corridor Improvements Project. The County State Aid Highway (CSAH) 61 corridor extends approximately 5.75 miles from CSAH 11 in Carver, MN to Bluff Creek Drive in Chanhassen, MN. The Trunk Highway (TH) 41 corridor covers approximately 1.5 miles with the Minnesota River acting as the southern terminus and extending north through the CSAH 10 (Engler Boulevard) intersection. The TH 41 corridor is contained entirely within the City of Chaska. These corridors are important for providing access to the southwest metro region as a whole but also serve a local need in providing access to the downtown Chaska business and residential community.

This memorandum will serve to detail the future traffic operations for the CSAH 61/TH 41 Corridor Improvement Project area. These measures become essential in the identification of potential deficiencies within the corridor prior to developing alternatives that serve the operational and safety needs of all users now and in the future.

Traffic Forecasting

A traffic forecast was developed for the CSAH 61 and TH 41 corridors beginning with the land use and network assumptions established in the Carver County Amendment to the Roadway System Plan developed in July 2014. The 2014 amendment anticipates an ADT on TH 41 of 26,000. Upon discussion with MnDOT, Metropolitan Council, Carver County, and Scott County, the anticipated ADT of 26,000 on TH 41 through downtown Chaska was considered high. It was decided that the ADT on TH 41 should be reduced from the anticipated 26,000 vehicles per day (vpd) to a volume of 22,000 vpd. Therefore, two future volumes scenarios were established for analysis:

- Baseline Scenario: ADT of 22,000 vpd on TH 41 through downtown Chaska
- Upper Scenario: ADT of 26,000 vpd on TH 41 through downtown Chaska

The ADTs proposed in the Carver County Amendment were reduced to establish the Baseline future traffic volumes for the entire network. The reduction of 4,000 vpd on TH 41 was distributed between the other three remaining legs of the TH 41 and CSAH 61 intersection based on the anticipated growth patterns. This continued to the west, east and north of the TH 41 and CSAH 61 intersection until all road segments in the network were accounted for. The following Table summarizes the reduction anticipated on each leg of the TH 41 and CSAH 61 intersection between the Upper and Baseline scenarios.

Segment	Upper Volume	Baseline Volume	Reduction
---------	--------------	-----------------	-----------

TH 41 – South	26,000	22,000	-4,000
CSAH 61 - West	20,000	17,200	-2,800
CSAH 61 - East	12,100	11,600	-500
TH 41 – North	22,000	21,300	-700

The ADT on CSAH 61 west of TH 41 absorbed the greatest reduction as the ADT on this leg is expected to incur the most growth. The ADT on the west leg was reduced 2,800 vpd. The 2,800 vpd reduction was then distributed in the same fashion between the ADTs on CSAH 140, CSAH 40 and CSAH 11. The ADT on CSAH 61 east of TH 41 was reduced 500 vpd. This reduction was distributed between the ADT on CSAH 15 to the north and CSAH 61 to the east. Finally, the remaining 700 vpd was reduced from the ADT on TH 41 north of CSAH 61. The entire 700 vpd was reduced from the ADT on CSAH 10 west of TH 41 because there is little growth anticipated on TH 41 north of CSAH 10 and traveling on CSAH 10 east of TH 41 was considered a reverse or redundant movement within the network. The resulting ADTs in the network developed the 2040 Baseline ADTs. The ADTs in the Carver County Amendment to the Roadway System Plan developed the 2040 Upper ADTs. The resulting 2040 Baseline and Upper ADTs can be found on the figures in **Appendix A**.

2040 Baseline and Upper ADTs were used to determine growth rates for each road segment in the network. Growth rates were calculated based on the most recent traffic counts taken in 2015. In locations where only 13 hour traffic counts were completed, the ADT was calculated assuming that the 13 hours counted were 85% of the daily traffic volume. This assumption was supported by the 24 hour traffic count completed at the intersection of TH 41 and CSAH 61. The calculated growth rates were applied to the existing AM and PM peak hour approach and departure volumes at key intersections within the project area. A traffic distribution software, TurnsW32, was used to calculate turning movements at each intersection based on existing turning movements and the future approach and departure volumes for each leg of the intersection in question. 2040 Baseline and Upper AM and PM peak hour turning movements were established for each intersection studied. The AM and PM peak hour turning movements were balanced between consecutive intersections where appropriate.

The anticipated 2040 AM and PM peak hour turning movements will be the basis for determining design concepts. 2040 Baseline and Upper AM and PM peak hour turning movements can be found on the figures in **Appendix A**.

13 Hour Future Traffic Distribution

The 2040 AM and PM peak hour turning movements were used to predict future traffic volumes throughout the 13 hour period between 6 am and 7 pm. Thirteen hour forecasts were developed using primarily existing traffic patterns with engineering judgement at project area intersections. Using the existing traffic counts completed in 2015, the percentage of the 13 hour traffic volumes occurring during the AM and PM peak hours for each intersection was determined. For example, of the traffic counted between 6 am and 7 pm at the intersection of TH 41 and CSAH 61, 9.3% of the total traffic occurs during the AM peak hour and 11.3% of the total traffic occurs during the PM peak hour. Therefore, assuming that the distribution of trips occurring during the peak hours will remain constant in the future, 13 hour future traffic volume totals can be estimated using the future AM and PM peak hour traffic volumes. The values were then further refined using the existing and future 13 hour trip distributions to develop turning movements for the 13 hour period in 15 minute increments.

The future 13 hour traffic volumes will be used for additional sensitivity analysis for time periods surrounding the AM and PM peak hours and during the midday.

Traffic Operations

The following subsections will detail the anticipated traffic operations for the CSAH 61/TH 41 Corridor Improvement Project area. The various measures used in the traffic operations analysis are generally explained in the paragraphs below.

A level of service (LOS) analysis of the peak hours was completed using the forecasted turning movement counts in collaboration with the microsimulation software, Trafficware SimTraffic. The LOS results are based on average delay per vehicle as calculated by the 2010 Highway Capacity Manual (HCM), which defines the level of service, based on control delay. Control delay is the delay experienced by vehicles slowing down as they are approaching the intersection, the wait time at the intersection, and the time for the vehicle to speed up through the intersection and enter into the traffic stream. The average intersection control delay is a volume weighted average of delay experienced by all motorists entering the intersection on all intersection approaches. Intersections and each intersection approach are given a ranking from LOS A through LOS F. LOS A indicates the best traffic operation, with vehicles experiencing minimal delays. LOS A through D is generally perceived to be acceptable to drivers, however LOS D can be considered unacceptable in non-metro areas of the state. LOS E indicates that an intersection is operating at, or very near, its capacity and that drivers experience considerable delays. LOS F indicates an intersection where demand exceeds capacity and drivers experience substantial delays.

In addition to a LOS analysis, Trafficware SimTraffic can be used to determine average and maximum queues. The maximum approach queue is based upon the movement with the longest maximum queue. The maximum queue refers to the 95th percentile queue which is a calculated value that refers to the back of the queue with 95th percentile traffic volumes.

The volume to capacity (v/c) ratio indicates the available capacity at the most congested movement of an intersection. The max v/c ratio refers to the highest approach or lane v/c ratio at that intersection. A v/c greater than or equal to 1.0 indicates that the intersection or movement is over capacity.

The intersection capacity utilization (ICU) is similar to, but not exactly the same as the intersection v/c. The ICU compares the input traffic volume to the intersection's ultimate capacity. An ICU greater than 100% indicates that the intersection is over capacity.

2040 Baseline No Build Operational Analysis

Baseline AM and PM peak hour traffic operations analysis using forecasted baseline traffic volumes and existing roadway geometry are shown in **Table 1**. Intersection delay and maximum delay are shown in seconds per vehicle. The limiting movement refers to the highest delay movement at the intersection. Detailed SimTraffic Reports can be found in **Appendix B**.

Table 1: Baseline No Build Traffic Operations Analysis

Intersection	Peak Hour	Intersection Delay*		Maximum Delay-LOS**		Limiting Movement***	Max v/c Ratio****	Max Approach Queue		
								Direction	Average Queue (ft)	Max Queue (ft)
CSAH 61 at CSAH 11 (Jonathan Carver Pkwy) <i>Signal</i>	AM	30	C	92	F	NBL	0.91	NB L	195	410
	PM	34	C	55	D	NBL	0.92	NB L	260	385
CSAH 61 at CSAH 40 <i>Side Street Stop Control</i>	AM	2	A	7	A	WBL	0.47	WB L	10	40
	PM	4	A	9	A	WBL	0.44	WB L	55	110
CSAH 61 at CSAH 140 <i>Signal</i>	AM	36	D	72	E	SBL	0.87	SB L	445	735
	PM	25	C	56	E	NBT	0.88	EB T	215	390
CSAH 61 at Creek Road <i>Side Street Stop Control</i>	AM	2	A	11	B	SBL	0.37	SB LR	25	60
	PM	9	A	74	F	SBL	0.43	EB LT	85	355
CSAH 61 at Cedar Street <i>Side Street Stop Control</i>	AM	0	A	8	A	WBL	0.29	NB R	20	55
	PM	3	A	53	F	SBL	0.34	EB LT	40	125
CSAH 61 at Pine Street <i>Side Street Stop Control</i>	AM	2	A	38	E	SBL	0.38	EB T	15	85
	PM	38	E	554	F	SBR	0.46	NB LT	270	665
TH 41 at CSAH 61 <i>Signal</i>	AM	28	C	35	C	NBT	0.86	NB TR	220	395
	PM	69	E	132	F	EBL	1.06	NB T	325	495
CSAH 61 at North Walnut Street <i>Signal</i>	AM	9	A	42	D	EBL	0.33	EB T	80	190
	PM	47	D	78	E	NBL	0.33	WB T	285	590
CSAH 61 at Yellowbrick Road <i>Side Street Stop Control</i>	AM	2	A	15	B	SBL	0.19	SB L	15	45
	PM	12	B	68	F	SBR	0.29	WB T	65	275
CSAH 61 at Crosstown Boulevard <i>Side Street Stop Control</i>	AM	3	A	9	A	SBL	0.36	SB L	25	50
	PM	2	A	14	B	SBL	0.42	SB R	20	50
CSAH 61 at State Street <i>Side Street Stop Control</i>	AM	2	A	8	A	SBL	0.38	SB L	10	30
	PM	4	A	19	C	SBL	0.43	EB L	10	35
CSAH 61 at CSAH 15 (Audubon Road) <i>Signal</i>	AM	17	B	51	D	WBL	0.46	EB L	120	235
	PM	27	C	53	D	WBL	0.59	WB T	180	305
CSAH 61 at CSAH 10 (Engler Boulevard) <i>Side Street Stop Control</i>	AM	126	F	271	F	SBL	1.76	SB L	1200	1800
	PM	18	C	59	F	SBL	1.12	SB L	255	505
CSAH 61 at Stoughton Avenue <i>Side Street Stop Control</i>	AM	2	A	12	B	NBR	0.73	NB R	30	65
	PM	2	A	6	A	NBR	0.65	WB L	25	55
CSAH 10 (Engler Boulevard) at CSAH 15 (Audubon Road) <i>Signal</i>	AM	73	E	162	F	EBT	0.89	EB T	635	1415
	PM	24	C	31	C	WBT	0.82	SB TR	150	275
TH 41 at 1st Street <i>Side Street Stop Control</i>	AM	1	A	8	A	WBR	0.43	WB R	45	75
	PM	10	A	48	E	WBR	0.43	NB T	80	455
TH 41 at 2nd Street <i>Signal</i>	AM	6	A	34	C	WBT	0.47	NB LT	90	195
	PM	16	B	32	C	EBT	0.56	NB LT	185	400
TH 41 at 3rd Street <i>Side Street Stop Control</i>	AM	1	A	8	A	WBR	0.47	EB T	15	45
	PM	13	B	287	F	WBR	0.44	NB T	90	335
TH 41 at 4th Street <i>Signal</i>	AM	7	A	30	C	EBL	0.47	NB TR	85	200
	PM	22	C	36	D	NBT	0.54	NB LT	215	440
TH 41 at 5th Street <i>Side Street Stop Control</i>	AM	4	A	36	E	WBR	0.44	NB TR	35	180
	PM	18	C	304	F	WBR	0.49	NB T	175	430
TH 41 at Victoria Dr/Crosstown Blvd <i>Signal</i>	AM	12	B	160	F	SBL	0.63	SB T	130	295
	PM	155	F	335	F	NBT	0.96	NB T	990	1055
TH 41 at CSAH 10 (Engler Blvd) <i>Signal</i>	AM	97	F	204	F	NBL	1.27	WB T	765	1455
	PM	235	F	802	F	NBL	1.67	NB T	2150	2225

Yellow = LOS D, Orange = LOS E, Red = LOS F

*Delay in seconds per vehicle

**Maximum delay and LOS on any approach and/or movement

***Limiting Movement is the highest delay movement.

****Max v/c Ratio is the highest individual movement or lane group v/c ratio

*****Max Queue refers to the 95% Queue (Passenger car stored length = 25 ft, Heavy vehicle stored length = 45 ft)

The following details the 2040 Baseline No Build traffic operation results:

- The anticipated growth in traffic is expected to increase the overall intersection delay at the majority of intersections studied when compared to the 2015 existing traffic operations.
- Several intersections are anticipated to operate with a LOS D or worse during the AM and PM peak hours.
- Existing traffic issues where minor street movement delays may be problematic are expected to continue or worsen with the 2040 Baseline future traffic volumes.

The following details the 2040 Baseline No Build traffic operations by specific intersection:

TH 41 at CSAH 10 (Engler Blvd)

CSAH 10 (Engler Blvd) currently has an ADT approximately 10,000 vpd west of TH 41. This segment of road is expected to reach 27,000 vpd according to the Carver County Amendment. Similarly, the ADT to the east of TH 41 on CSAH 10 (Engler Blvd) is expected to grow from roughly 7,400 to 16,200 vpd. Some growth is expected on TH 41 at this intersection, but much less than that expected on CSAH 10 (Engler Blvd). This signalized intersection is anticipated to operate with a LOS F for both the AM and PM peak hours. The volume to capacity ratio of 1.27 during the AM peak hour and 1.67 during the PM peak hour suggests that the existing geometry will not be sufficient in handling the anticipated traffic growth at this intersection. Northbound queuing is anticipated to extend over 2,000 feet during the PM peak hour along TH 41 resulting in operational issues at the adjacent intersection of TH 41 and Victoria Dr/Crosstown Blvd. During the AM peak hour, westbound traffic is anticipated to regularly back up into the adjacent intersection 525 feet to the east.

CSAH 61 at CSAH 10 (Engler Blvd)

This intersection is currently side street stop controlled with traffic on CSAH 10 (Engler Blvd) having to stop at CSAH 61. The anticipated growth in traffic greatly increases the amount of vehicles making southbound left turns from CSAH 10 to eastbound CSAH 61. The eastbound and westbound through movement on CSAH 61 conflicts with this movement resulting in failing LOS for southbound movements and an overall LOS F for the intersections during the AM peak hour. Additionally, the volume to capacity ratio of 1.76 during the AM peak hour and 1.12 during the PM peak hour suggests that the existing geometry will not be sufficient to handle the anticipated traffic growth at this intersection. The southbound queuing at this intersection extends into the CSAH 10 and CSAH 15 intersection and influences the LOS E present at the intersection. It is expected to operate better if operations at the intersection of CSAH 61 and CSAH 10 (Engler Blvd) were improved.

2040 Baseline No Build with Corridor Improvements Operational Analysis

Although additional operational issues are apparent from the Baseline No Build Traffic Operations Analysis, corridor improvements were incorporated into the model and further analysis was performed. The corridor improvements are as follows:

TH 41

- Additional southbound lane from CSAH 10 to CSAH 61 resulting in two lanes northbound and two lanes southbound. Right turn lanes were provided where existing right turn lanes are located.

CSAH 10 (Engler Blvd)

- Expansion from two to four through lanes west of TH 41.
- Expansion from two to four through lanes east of TH 41. Reduce typical section to two through lanes 850 feet east of TH 41.

TH 41 at CSAH 10 (Engler Blvd)

- Add northbound left turn lane to provide dual 450' left turn lanes.
- Add eastbound left turn lane to provide dual 350' left turn lanes.

CSAH 61 at CSAH 10 (Engler Blvd)

- Mitigation to roundabout
 - Free westbound right turn from CSAH 61 to CSAH 10

- Free eastbound lane on CSAH 61 around south side of roundabout
- Additional lane around south side of roundabout for southbound left turns from CSAH 10
- Merge two eastbound lanes into single through lane 550 feet east of CSAH 10.

2040 Baseline AM and PM peak hour traffic operations analysis with corridor improvements are shown in **Table 2**.

Table 2: 2040 Baseline No Build with Corridor Improvements Operation Analysis

Intersection	Peak Hour	Intersection Delay*		Maximum Delay-LOS**		Limiting Movement***	Max v/c Ratio****	Max Approach Queue		
								Direction	Average Queue (ft)	Max Queue (ft)*****
CSAH 61 at CSAH 11 (Jonathan Carver Pkwy) <i>Signal</i>	AM	28	C	86	F	NBL	0.91	NB L	190	380
	PM	34	C	54	D	NBL	0.92	NB L	255	400
CSAH 61 at CSAH 40 <i>Side Street Stop Control</i>	AM	2	A	8	A	WBL	0.47	WB L	15	50
	PM	4	A	9	A	WBL	0.44	WB L	55	105
CSAH 61 at CSAH 140 <i>Signal</i>	AM	22	C	55	D	NBT	0.87	SB L	220	345
	PM	22	C	42	D	NBT	0.87	WB T	230	415
CSAH 61 at Creek Road <i>Side Street Stop Control</i>	AM	2	A	14	B	SBL	0.37	SB LR	30	60
	PM	1	A	22	C	SBL	0.43	SB LR	30	70
CSAH 61 at Cedar Street <i>Side Street Stop Control</i>	AM	0	A	16	C	NBL	0.29	NB R	20	45
	PM	1	A	27	D	NBL	0.34	EB LT	20	70
CSAH 61 at Pine Street <i>Side Street Stop Control</i>	AM	2	A	27	D	SBL	0.38	EB TR	15	90
	PM	24	C	212	F	SBL	0.46	NB LT	220	620
TH 41 at CSAH 61 <i>Signal</i>	AM	24	C	30	C	EBL	0.78	NB TR	180	340
	PM	82	F	143	F	SBR	1.09	SB TR	660	1205
CSAH 61 at North Walnut Street <i>Signal</i>	AM	8	A	49	D	EBL	0.30	EB T	55	125
	PM	78	E	148	F	WBT	0.33	WB TR	405	690
CSAH 61 at Yellowbrick Road <i>Side Street Stop Control</i>	AM	2	A	12	B	SBL	0.19	SB R	20	50
	PM	32	D	127	F	SBR	0.29	WB T	205	485
CSAH 61 at Crosstown Boulevard <i>Side Street Stop Control</i>	AM	3	A	11	B	SBL	0.36	SB L	25	55
	PM	3	A	16	C	SBL	0.42	SB L	20	50
CSAH 61 at State Street <i>Side Street Stop Control</i>	AM	2	A	9	A	SBL	0.38	SB L	10	30
	PM	4	A	19	C	SBL	0.43	EB L	10	35
CSAH 61 at CSAH 15 (Audubon Road) <i>Signal</i>	AM	16	B	42	D	WBL	0.46	EB L	100	220
	PM	27	C	68	E	WBL	0.63	WB T	190	325
CSAH 61 at CSAH 10 (Engler Boulevard) <i>Roundabout</i>	AM	21	C	25	C	SB	0.66	SB	255	325
	PM	7	A	10	A	SB	0.43	SB	100	185
CSAH 61 at Stoughton Avenue <i>Side Street Stop Control</i>	AM	4	A	29	D	NBR	0.73	NB R	40	85
	PM	2	A	8	A	NBR	0.65	WB L	20	55
CSAH 10 (Engler Boulevard) at CSAH 15 (Audubon Road) <i>Signal</i>	AM	25	C	37	D	SBL	0.89	EB T	355	675
	PM	16	B	22	C	EBL	0.82	SB TR	125	205
TH 41 at 1st Street <i>Side Street Stop Control</i>	AM	1	A	7	A	WBR	0.43	WB R	45	75
	PM	2	A	7	A	EBR	0.43	NB T	10	95
TH 41 at 2nd Street <i>Signal</i>	AM	5	A	41	D	EBL	0.47	NB LT	85	205
	PM	9	A	29	C	WBL	0.56	NB LT	145	275
TH 41 at 3rd Street <i>Side Street Stop Control</i>	AM	1	A	8	A	WBR	0.47	EB R	15	50
	PM	3	A	83	F	WBR	0.44	NB T	20	145
TH 41 at 4th Street <i>Signal</i>	AM	5	A	42	D	EBL	0.47	NB TR	60	135
	PM	9	A	30	C	WBT	0.54	NB LT	125	280
TH 41 at 5th Street <i>Side Street Stop Control</i>	AM	2	A	10	A	WBR	0.44	NB TR	10	80
	PM	7	A	93	F	WBR	0.49	NB T	150	355
TH 41 at Victoria Dr/Crosstown Blvd <i>Signal</i>	AM	10	A	147	F	SBL	0.52	NB T	60	135
	PM	16	B	90	F	SBL	0.64	NB T	115	250
TH 41 at CSAH 10 (Engler Blvd) <i>Signal</i>	AM	63	E	123	F	EBL	0.95	EB T	760	1355
	PM	39	D	73	E	EBL	0.86	SB T	280	410

Yellow = LOS D, Orange = LOS E, Red = LOS F

*Delay in seconds per vehicle

**Maximum delay and LOS on any approach and/or movement

***Limiting Movement is the highest delay movement.

****Max v/c Ratio is the highest individual movement or lane group v/c ratio

*****Max Queue refers to the 95% Queue (Passenger car stored length = 25 ft, Heavy vehicle stored length = 45 ft)

The following details the 2040 Baseline No Build with Corridor Improvements Traffic Operation results:

- The mitigation to CSAH 61 at CSAH 10 (Engler Blvd) is expected to reduce LOS to acceptable levels at the intersection and at the adjacent intersection of CSAH 10 (Engler Blvd) and CSAH 15 (Audubon Rd).

- The mitigation to TH 41 and at the intersection of TH 41 at CSAH 10 (Engler Blvd) results in a LOS E during the AM peak hour and LOS D during the PM peak hour. The proposed corridor improvements alleviate the northbound queuing on TH 41 at CSAH 10 (Engler Blvd) that backed up into the intersection of TH 41 at Victoria Dr/Crosstown Blvd.

As a result mitigations included in the 2040 Baseline No Build with Corridor Improvements, traffic operations at the intersection of TH 41 and CSAH 61 degrade. However, the traffic operations shown at TH 41 and CSAH 61, and the surrounding downtown intersections better represent what is expected with the 2040 Baseline traffic volumes.

The following summarizes the Baseline No Build with Corridor Improvements traffic operations by specific intersection:

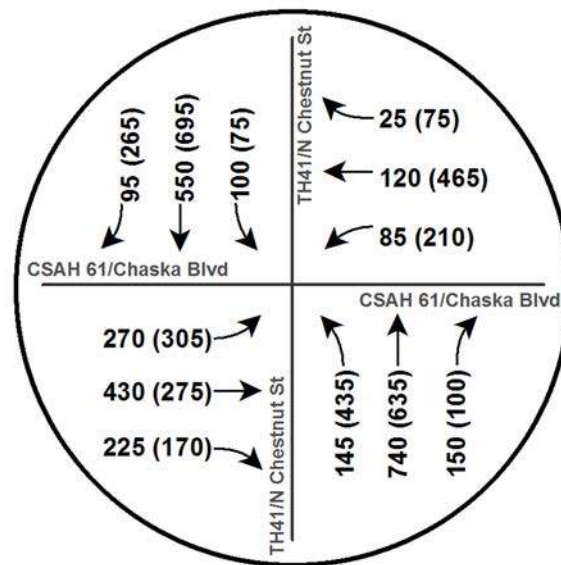
CSAH 61 at CSAH 140

The ADT on CSAH 140 is expected to increase from about 3,200 vpd to 10,500 vpd. This increase in traffic, specifically an increase in southbound left turns, is expected to lengthen the southbound queue to an average of 220 feet and a maximum of 345 feet. There is currently not enough storage space to accommodate this amount of traffic at the intersection.

CSAH 61 at TH 41

The volume to capacity ratio with the PM peak hour traffic volumes is 1.06 suggesting that the existing geometry will not be sufficient to handle the anticipated traffic growth at this intersection. The anticipated growth is expected to result in a LOS F during the PM peak hour at this intersection. **Figure 1** shows the 2040 Baseline Turning movements for the intersection of CSAH 61 and TH 41.

Figure 1: CSAH 61 and TH 41 2040 Baseline Turning Movements



The intersection has several high volume movements that conflict with each other. Specifically, the large amount of northbound left turns conflict with the southbound through and right turn movements. Additionally, the large amount of eastbound and westbound left turns conflict with the eastbound and westbound through movements. The amount of anticipated traffic and the limited amount of available storage space results in operational issues at this intersection that directly affect adjacent intersections.

With the current southbound approach lanes, the southbound right turns are the limiting movement for the intersection and the southbound through-right lane is expected to have the longest average queue of 660 feet and maximum queue of about 1205 feet. Additionally, the northbound, eastbound and westbound lefts frequently exceed the available storage space and extend into the through lanes.

Downtown Chaska Area

The majority of operational issues are anticipated for minor street movements in the downtown project area. On CSAH 61, excessive minor street delays and queues are expected at Creek Rd, Cedar St, Pine St, Walnut St and Yellowbrick Rd. In all these instances, southbound left turning vehicles cannot find sufficient gaps in traffic on CSAH 61 to traverse the through lanes and make the left turn during peak hours. On TH 41, excessive minor street delays and queues are expected from 1st Street to 5th Street. The worst delays are anticipated at the right-in/right-out intersections of 1st, 3rd, and 5th Street. The current 4-lane geometry on TH 41 does not provide left turn lanes at 2nd and 4th street and left turning vehicles must wait in the inside through lane for a gap in oncoming traffic. This results in unexpected stops for through moving traffic and limits TH 41 movements to a single lane at times.

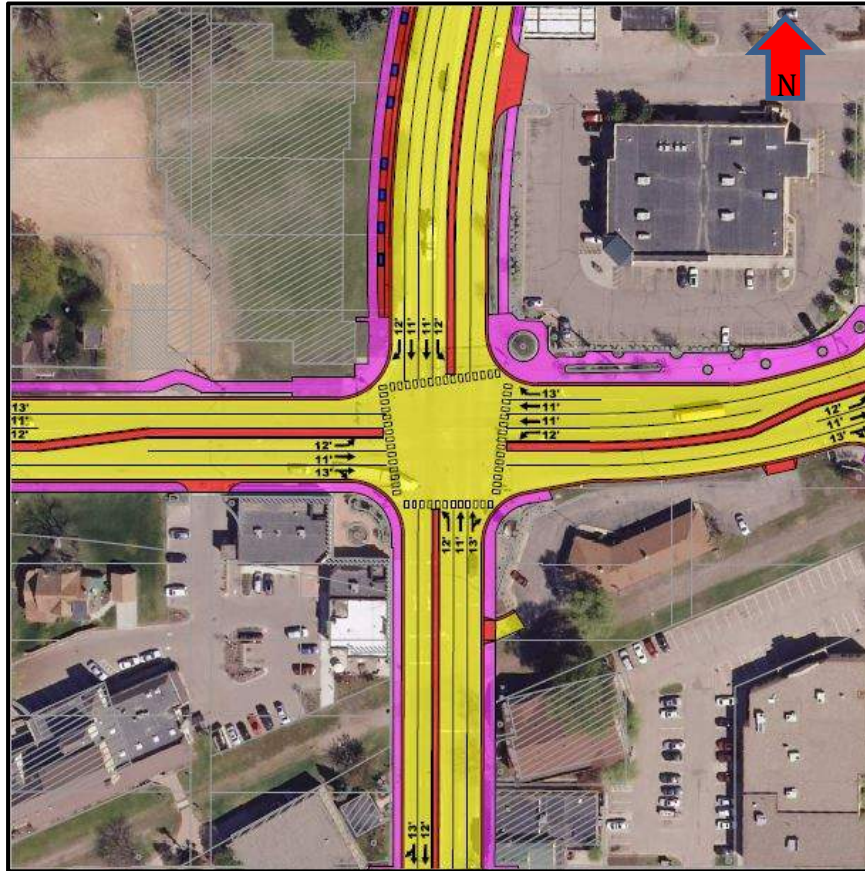
TH 41 and CSAH 61 Intersection Evaluation

The intersection of TH 41 and CSAH 61 is key component in providing acceptable movement to traffic in Downtown Chaska. Currently, eastbound and westbound through and left turn movements are near failing levels of service and maximum queue lengths occasionally extend beyond the adjacent intersections of Pine Street and Walnut Street. Additionally, vehicle queue lengths in the 140 foot northbound left turn lane frequently exceed capacity during peak hours resulting in an unsafe situation with traffic extending into the through lanes. The intersection currently has an entering ADT of about 27,000. The 2040 traffic forecasts anticipate an ADT of about 36,000 for the Baseline scenario and about 40,000 for the Upper Scenario. As traffic volumes increase, these existing issues are expected to worsen. Three concepts are evaluated and compared to the existing geometric conditions. The following details the concepts analyzed:

- Concept A: Single Left Turn Lanes
- Concept B: Dual Northbound Left Turn Lanes
- Concept C: Dual Eastbound and Westbound Left Turn Lanes

Concept A: Single Left Turn Lanes

Figure 2: TH 41 and CSAH 61 Concept A

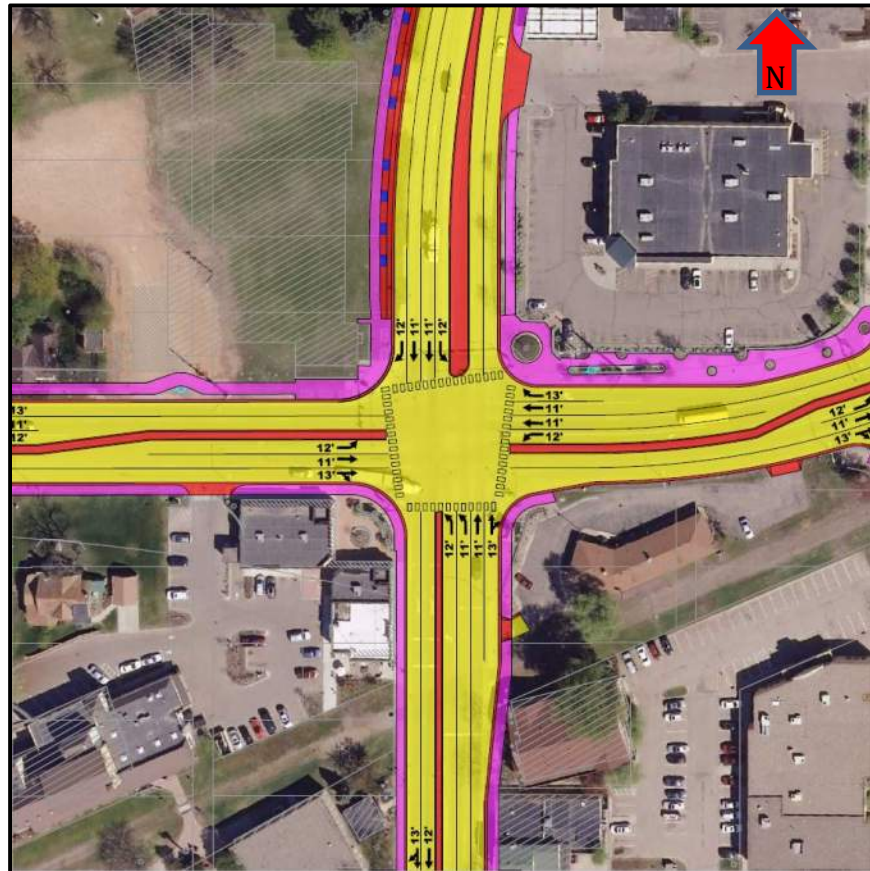


The following details TH 41 and CSAH 61 Concept A:

- Add 450' southbound right lane
- Extend northbound left lane from 140' to 450'
- Extend eastbound left lane from 160' to 180'
- Extend westbound left lane from 160' to 190'

Concept B: Dual Northbound Left Turn Lanes

Figure 3: TH 41 and CSAH 61 Concept B

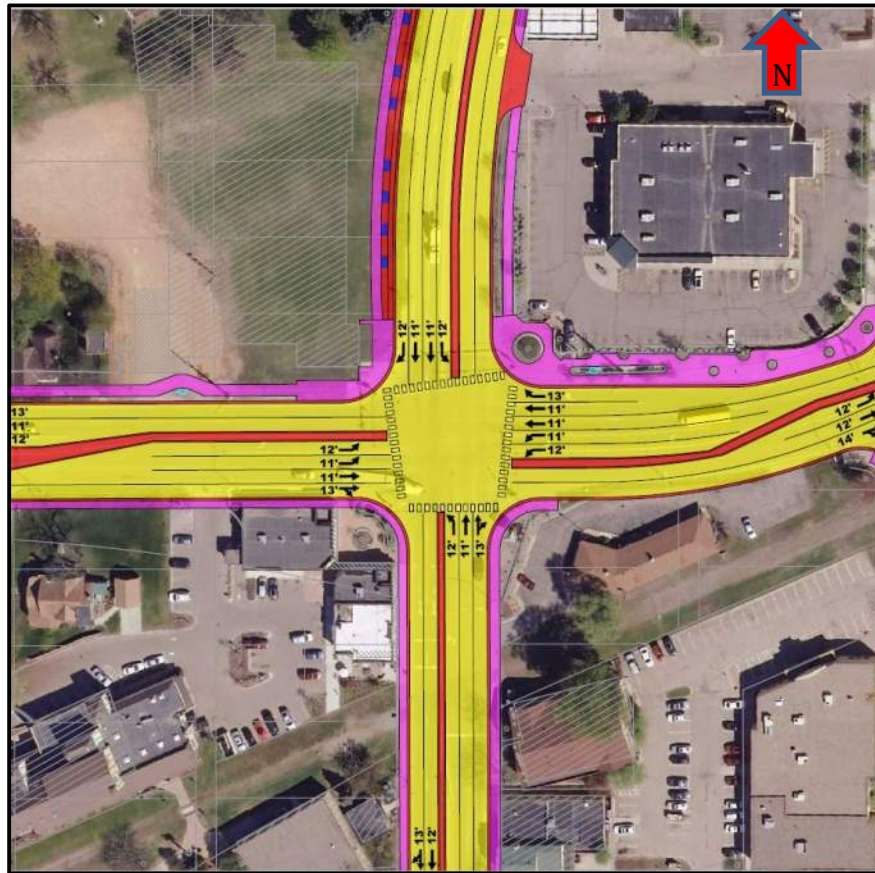


The following details TH 41 and CSAH 61 Concept B:

- Add 450' southbound right lane
- Expansion from 140' single left turn lane to dual 400' northbound left lane
- Add 130' northbound thru-right lane
 - Widen median on north leg of intersection to align through lanes
- Extend eastbound left lane from 160' to 180'
- Extend westbound left lane from 160' to 190'

Concept C: Dual Eastbound and Westbound Left Turn Lanes

Figure 4: TH 41 and CSAH 61 Concept C:



The following details TH 41 and CSAH 61 Concept C:

- Add 450' southbound right lane
- Extend northbound left lane from 140' to 450'
- Expansion from 160' single left turn lane to dual 180' eastbound left lane
- Expansion from 160' single left turn lane to dual 190' westbound left lane

Concept Evaluation

Table 3 and **Table 4** detail the traffic operations comparison between the No Build and Concepts A, B, and C. The Tables below only shows the traffic operations for the movements of most concern, additional operational details can be found in **appendix B**. The delay and queue length in **Table 3** and **Table 4** are the traffic operations results using the 2040 Baseline traffic volumes during the PM peak hour. **Table 3** includes the Intersection Capacity Utilization (ICU) for each geometric condition using the 2040 Baseline and 2040 Upper traffic volume scenarios.

Table 3: 2040 Baseline Traffic Operations – TH 41 and CSAH 61 Delay Comparison

Geometric Design	Overall		NBL		SBT		SBR		WBL		WBT		EBL		EBT		Walnut St		Pine St		ICU	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	2040 Baseline	2040 Upper
No Build	82	F	77	E	108	F	143	F	107	F	135	F	96	F	50	D	78	E	24	C	100%	113%
Concept A	65	E	56	E	86	F	30	C	109	F	131	F	86	F	53	D	66	E	27	C	92%	104%
Concept B	43	D	60	E	49	D	17	B	53	D	69	E	50	D	41	D	9	A	5	A	80%	88%
Concept C	37	D	26	C	32	C	11	B	83	F	52	D	73	E	46	D	9	A	4	A	72%	98%

Delay in seconds per vehicle

ICU - Intersection Capacity Utilization

Table 4: 2040 Baseline Traffic Operations – TH 41 and CSAH 61 Queue Comparison

Geometric Design	NBL		SBT		SBR		WBL		WBT		EBL		EBT	
	Ave	Max	Ave	Max	Ave	Max	Ave	Max	Ave	Max	Ave	Max	Ave	Max
No Build	345	480	620	1160	660	1205	205	270	310	375	250	304	295	405
Concept A	305	435	405	980	140	410	215	320	310	375	225	280	265	390
Concept B	180	275	255	420	90	195	185	295	225	350	200	280	195	345
Concept C	130	195	210	390	80	210	135	250	195	310	170	265	165	275

Max Queue refers to the 95% Queue (Passenger car stored length = 25 ft, Heavy vehicle stored length = 45 ft)

In addition to the overall and specific movement operations at the intersection of TH 41 and CSAH 61, the overall intersection delay at the intersection of CSAH 61 at Walnut Street and Pine Street are shown in **Table 3**. The colors displayed in the ICU columns of **Table 3** and all the columns of **Table 4** show the comparisons between the concepts. Red indicates the worst operations and green indicates the best operations between the concepts.

The following details the TH 41 and CSAH 61 Intersection Evaluation Traffic Operation results:

- Each build concept shows improved traffic operations compared to the existing geometry. Concept A is anticipated to improve the overall intersection delay to LOS E and Concepts B and C are anticipated to improve the overall intersection delay to LOS D.
- The no build concept is expected to have a failing southbound right turn movement. The benefits of the southbound right turn lane is shown in the operational results of the no build and Concept A evaluation. The southbound right delay is anticipated to improve to LOS C in Concept A and is improved greater in Concepts B and C. Additionally, the southbound right maximum queue is reduced from 1205 feet to 410 feet with concept A and is improved greater in Concepts B and C.
- In addition to the operation of the southbound movements shown, the no build and Concept A is anticipated to result in failing levels of service for westbound and eastbound left turns and westbound through movements. Concept B, in addition to extending eastbound and westbound turn lanes, provides dual northbound left turn lanes. Dual left turn lanes increase capacity and lessen green time required for the northbound left turn movement allowing for additional green time to be allocated to CSAH 61 (eastbound and westbound). Concept B is anticipated to have LOS E or better for all movements.
- Concept C is anticipated to have the least delay overall and for all movements except for eastbound and westbound lefts. Concept C has dual eastbound and westbound left turn lanes and longer delays should be expected for these movements as a result of improving operations for other movements.
- An ICU comparison is shown in **Table 3** for the 2040 Baseline and Upper traffic volumes. The no build analysis has an ICU of 100% with the Baseline volumes, indicating that the existing geometry is not sufficient for the expected traffic. Concept C has the lowest ICU of 72% with the Baseline volumes, however, Concept B has the lowest ICU of 88% with the Upper volumes.

Concept B is more apt to accommodate the Upper traffic volumes because the dual northbound left turn lanes are needed for the increase in traffic on TH 41.

- The northbound left queue is expected to extend past the available storage and into the through lane in the No Build scenario. This trend is anticipated to continue with Concept A. The dual northbound left turn lanes in Concept B reduce the maximum queue roughly eight passenger cars which is sufficient to keep vehicles out of the through lanes. Although Concept C only has a single northbound left turn lane the maximum queue length is reduced roughly 11 passenger cars. The additional capacity on CSAH 61 allows for more green time for northbound movements, resulting in shorter queues.
- The maximum southbound queues are expected to reduce from 1205 feet to approximately 400 feet with Concepts B and C. As a result, the southbound queue with Concepts B and C is not expected to extend to the adjacent intersection of Victoria Dr/Crosstown Blvd to the north, but would be expected to reach this intersection with the no build or Concept A.
- The intersection of CSAH 61 and Pine Street is located 320 feet west of TH 41. The average eastbound queue is anticipated to nearly reach Pine Street and the maximum eastbound queue is past Pine Street by about three passenger cars with the no build analysis. Concept A is anticipated to provide little improvement with regard to eastbound queuing and Concept B is expected to have a maximum queue extending past Pine Street by about one passenger car on occasion. Concept C is anticipated to reduce the maximum queue to a length shorter than the distance from TH 41 to Pine Street.
- The eastbound left turn queue is anticipated to extend past the length of the available storage lane. The eastbound left turn lane is 180 feet in Concepts A, B and C. The maximum eastbound left turn queue is anticipated to extend three or four passenger car lengths past the available storage for all the concepts on occasion. The spillover of traffic into the through lane is a safety concern. Lengthening the eastbound left turn lane would potentially require reduction of access at Pine Street or realignment of CSAH 61 to create additional storage space.
- The signalized intersection of CSAH 61 and Walnut Street is 300 feet east of TH 41. The average peak hour westbound queue at TH 41 is anticipated to reach Walnut Street and the maximum westbound queue is expected to extend into the Walnut Street intersection by approximately three passenger cars with the no build analysis. Concept A is anticipated to provide little improvement with regard to westbound queuing. Concept B is expected to provide a minor reduction from three passenger cars to two passenger cars extending into the Walnut Street intersection. Concept C is anticipated to reduce the maximum queues to nearly accommodate all vehicle queueing.
- The westbound left turn queue is anticipated to extend past the length of the available storage lane. The westbound left turn lane is 190 feet in Concepts A, B and C. The maximum westbound left queue is anticipated to extend two to five passenger car lengths past the available storage for all the concepts during the periods of highest traffic. The spillover of traffic into the through lane is a safety concern. Lengthening the westbound left turn lane would potentially require reduction of access at Walnut Street or require the realignment of CSAH 61 to create additional storage space.

TH 41 Downtown Chaska Evaluation

TH 41 through Downtown Chaska from the Minnesota River to CSAH 61 has been identified as having a high priority serving a significant level of traffic within a constricted right-of-way environment. Traffic Operations Analysis was performed on the TH 41 through Downtown Chaska to evaluate the LOS per intersection and arterial report results of the corridor for the following options:

- 4-Lane Divided Section – Northbound Parking (Existing Roadway Geometry)
- 5-Lane Divided Section with Left Turn Lanes – No Parking
- 3-Lane Divided Section with Left and Right Turn Lanes – No Parking
- 3-Lane Divided Section with Left and Right Turn Lanes – Northbound Parking Only
- 3-Lane Divided Section with Left and Right Turn Lanes – Northbound and Southbound Parking
- 3-Lane Undivided Section with Left and Right Turn Lanes – Center Two-Way Left Turn Lane (TWLTL) – Northbound and Southbound Parking

The above mentioned typical sections are evaluated with 2040 Baseline and Upper traffic forecast scenarios. The following sections and subsections will document this analysis as well as other measures applicable to the downtown Chaska corridor.

2040 Baseline Traffic Operations Analysis Comparison by Intersection

2040 Baseline traffic operations LOS results for the TH 41 options are shown in **Table 5. PM peak hour** traffic volumes are used for this analysis. Concept B: Dual Northbound Left Turn Lanes was assumed at the intersection of CSAH 61 and TH 41 for all scenarios to maintain consistency and improve traffic operations at this intersection to more accurately represent the traffic flow on TH 41 through Downtown Chaska.

Table 5: 2040 Baseline Scenario - TH 41 Downtown Chaska Operational Analysis

Intersection	Peak Hour	Intersection Delay*		Maximum Delay-LOS**	Limiting Movement ***	Max Approach Queue			
						Direction	Average Queue (ft)	Max Queue (ft) ****	
TH 41 & CSAH 61	4-Lane - NB Parking	45	D	76	E	WBT	NB T	245	385
	5-Lane - No Parking	45	D	86	F	EBL	EB T	275	390
	3-Lane - No Parking	51	D	81	F	WBT	SB T	305	560
	3-Lane - NB Parking	48	D	79	E	EBL	SB T	250	460
	3-Lane - NB & SB Parking	47	D	79	E	EBL	SB T	280	520
	3-Lane TWLTL - NB & SB Parking	47	D	72	E	EBL	SB T	280	450
TH 41 & 1st Street	4-Lane - NB Parking	2	A	8	A	EBR	SB TR	20	75
	5-Lane - No Parking	2	A	8	A	EBR	SB TR	20	75
	3-Lane - No Parking	4	A	37	E	WBR	NB T	45	190
	3-Lane - NB Parking	7	A	113	F	WBR	NB T	90	325
	3-Lane - NB & SB Parking	6	A	83	F	WBR	NB T	85	270
	3-Lane TWLTL - NB & SB Parking	9	A	226	F	WBL	WB LTR	90	215
TH 41 & 2nd Street	4-Lane - NB Parking	10	A	51	D	EBL	NB TR	140	245
	5-Lane - No Parking	7	A	50	D	EBL	NB TR	125	215
	3-Lane - No Parking	12	B	59	E	WBT	NB T	260	440
	3-Lane - NB Parking	14	B	70	E	SBL	NB T	295	485
	3-Lane - NB & SB Parking	15	B	70	E	SBL	NB T	305	495
	3-Lane TWLTL - NB & SB Parking	14	B	60	E	SBL	NB T	300	470
TH 41 & 3rd Street	4-Lane - NB Parking	2	A	11	B	EBR	NB TR	20	85
	5-Lane - No Parking	2	A	11	B	WBR	NB TR	25	90
	3-Lane - No Parking	4	A	26	D	WBR	NB T	55	180
	3-Lane - NB Parking	5	A	56	F	WBR	NB T	50	170
	3-Lane - NB & SB Parking	6	A	59	F	WBR	NB T	65	195
	3-Lane TWLTL - NB & SB Parking	13	B	328	F	WBL	WB LTR	90	240
TH 41 & 4th Street	4-Lane - NB Parking	14	B	114	F	EBT	WB LT	130	285
	5-Lane - No Parking	11	B	109	F	WBT	WB LT	120	270
	3-Lane - No Parking	14	B	105	F	WBT	NB T	195	330
	3-Lane - NB Parking	13	B	93	F	WBT	NB T	215	365
	3-Lane - NB & SB Parking	15	B	137	F	WBT	NB T	215	350
	3-Lane TWLTL - NB & SB Parking	12	B	92	F	WBT	NB T	215	360
TH 41 & 5th Street	4-Lane - NB Parking	3	A	17	C	WBR	NB TR	40	145
	5-Lane - No Parking	3	A	19	C	WBR	NB TR	50	155
	3-Lane - No Parking	6	A	23	C	WBR	SB TR	185	420
	3-Lane - NB Parking	6	A	28	D	WBR	SB TR	180	410
	3-Lane - NB & SB Parking	6	A	23	C	WBR	SB T	210	415
	3-Lane TWLTL - NB & SB Parking	6	A	23	C	WBR	SB T	235	430

For Delay - Yellow = LOS D, Orange = LOS E, Red = LOS F

For Volume to Capacity - Red indicates over 1.0

*Delay in seconds per vehicle

**Maximum delay and LOS on any approach and/or movement

***Limiting Movement is the highest delay movement.

****MaxQueue refers to the 95% Queue (Passenger car stored length = 25 ft, Heavy vehicle stored length = 45 ft)

The following details the 2040 Baseline TH 41 Downtown Chaska Traffic Operations results:

- The overall intersection delay from 1st Street to 5th Street is LOS B or better for all the options with the 2040 Baseline traffic volumes.
- Side street delay is anticipated to be approximately one to two minutes when the 3-lane options are implemented, except with the TWLTL option where side street delay at 1st Street and 3rd Street is nearly 4 minutes or more.
- Queuing is not expected to be a concern at 1st Street and 3rd Street, however, the maximum queue on TH 41 at 2nd Street and 4th Street is expected to extend into the adjacent right-in/right-out intersections when the 3-lane options are implemented.
- Parking scenarios have little effect on the intersection operations with the Baseline Traffic Volumes.

2040 Upper Traffic Operations Analysis Comparison by Intersection

2040 Upper traffic operations LOS results for the TH 41 options are shown in **Table 6. PM peak hour** traffic volumes are used for this analysis. Concept B: Dual Northbound Left Turn Lanes was assumed at the intersection of CSAH 61 and TH 41 for all scenarios to maintain consistency and improve traffic operations at this intersection to more accurately represent the traffic flow on TH 41 through Downtown Chaska.

Table 6: 2040 Upper Scenario - TH 41 Downtown Chaska Operational Analysis

Intersection	Peak Hour	Intersection Delay*		Maximum Delay-LOS**		Limiting Movement ***	Max Approach Queue		
							Direction	Average Queue (ft)	Max Queue (ft) ****
TH 41 & CSAH 61	4-Lane - NB Parking	62	E	117	F	NBL	NB L	345	465
	5-Lane - No Parking	62	E	139	F	NBL	NB L	345	460
	3-Lane - No Parking	59	E	110	F	NBL	NB L	335	455
	3-Lane - NB Parking	56	E	92	F	NBL	NB L	295	440
	3-Lane - NB & SB Parking	73	E	104	F	WBT	SB T	455	900
TH 41 & 1st Street	4-Lane - NB Parking	3	A	18	C	WBR	NB TR	30	155
	5-Lane - No Parking	2	A	36	E	WBR	NB TR	15	100
	3-Lane - No Parking	37	E	936	F	WBR	NB T	550	1155
	3-Lane - NB Parking	55	F	2246	F	WBR	NB T	855	1260
	3-Lane - NB & SB Parking	49	E	2148	F	WBR	NB T	800	1220
TH 41 & 2nd Street	4-Lane - NB Parking	17	B	52	D	WBL	NB LT	215	390
	5-Lane - No Parking	11	B	57	E	WBT	NB TR	155	340
	3-Lane - No Parking	21	C	87	F	SBL	SB T	290	500
	3-Lane - NB Parking	23	C	136	F	SBL	SB T	345	525
	3-Lane - NB & SB Parking	25	C	125	F	NBL	SB T	380	495
TH 41 & 3rd Street	4-Lane - NB Parking	8	A	85	F	WBR	NB TR	100	315
	5-Lane - No Parking	8	A	364	F	WBR	NB TR	75	285
	3-Lane - No Parking	13	B	246	F	WBR	NB T	230	420
	3-Lane - NB Parking	15	B	430	F	EBR	NB T	180	380
	3-Lane - NB & SB Parking	20	C	739	F	EBR	EB R	160	375
TH 41 & 4th Street	4-Lane - NB Parking	24	C	87	F	EBL	NB TR	255	470
	5-Lane - No Parking	21	C	99	F	EBT	NB TR	240	455
	3-Lane - No Parking	22	C	91	F	EBT	SB T	255	460
	3-Lane - NB Parking	21	C	84	F	WBT	SB T	255	445
	3-Lane - NB & SB Parking	36	D	107	F	WBT	SB TR	340	510
TH 41 & 5th Street	4-Lane - NB Parking	13	B	443	F	WBR	NB T	215	460
	5-Lane - No Parking	13	B	121	F	WBR	NB T	170	420
	3-Lane - No Parking	10	A	248	F	WBR	NB T	170	405
	3-Lane - NB Parking	5	A	82	F	WBR	NB T	80	265
	3-Lane - NB & SB Parking	14	B	618	F	EBR	SB TR	155	380

For Delay - Yellow = LOS D, Orange = LOS E, Red = LOS F

For Volume to Capacity - Red indicates over 1.0

*Delay in seconds per vehicle

**Maximum delay and LOS on any approach and/or movement

***Limiting Movement is the highest delay movement.

****Max Queue refers to the 95% Queue (Passenger car stored length = 25 ft, Heavy vehicle stored length = 45 ft)

The following details the results of the TH 41 Downtown Chaska Upper Scenario results:

- The overall intersection delay from 1st Street to 5th Street is LOS C or better for the 4 and 5 lane options with the Upper traffic volumes.
- The 3-lane options do not perform effectively at 1st Street with Upper traffic volume scenarios. The anticipated northbound traffic on TH 41 slows down and queues as vehicles approach 1st Street. The constant stream of vehicles on TH 41, and queuing at the 2nd Street signal, does not allow gaps to develop for users entering from 1st street on to TH 41 resulting in long delays at the 1st Street intersection.
- Failing side street delays are expected at most of the intersections with the Upper traffic volumes.
- The maximum queues on TH 41 are expected to reach adjacent intersections for most options from 2nd Street to 5th Street.
- Parking scenarios have little effect on the intersection operations with the Upper traffic volumes.

3-Lane - Center TWLTL Option

As noted previously, a 3-lane center TWLTL alternative was evaluated to better understand the potential mainline and side street traffic operations along TH 41 corridor. This section expands upon this analysis and review the delays anticipated for side street traffic entering or crossing TH 41. Unlike the other options, full access was provided at 1st and 3rd Street with the side streets stop controlled. It was assumed that 25% of the traffic entering and exiting the side streets at 2nd and 4th Street would be shifted to 1st and 3rd Street. Left turns are allowed to and from 1st and 3rd Street resulting in long delays and queuing at these intersections. **Table 7** details the expected side street delays at 1st and 3rd Street with the TWLTL versus that anticipated with only right-in/right-out movements allowed.

Table 7: Side Street Delay Impacts

TH 41 Intersection	Restricted Access	Full Access
1 st Street	180 sec/vehicle	250 sec/vehicle
3 rd Street	59 sec/vehicle	390 sec/vehicle

The increased delay paired with the allowance of left turns from the side streets is a greater safety concern with the full access, stop controlled intersections. Drivers on the side street may become impatient and could potentially make a bad decision if forced to wait extended amounts of time. In addition to the increase in side street delay, the maximum northbound queue at 2nd Street (480 feet) and 4th Street (365 feet) during the PM peak hour extend beyond the length of a city block. This would likely cause sight restrictions for the full access movements attempting to enter or cross TH 41 from the side streets.

The 3-Lane Undivided Section with Left and Right Turn Lanes – Center TWLTL – Northbound and Southbound Parking option was only considered for analysis with the Baseline traffic volumes because it was determined to not be an acceptable option based upon traffic operations.

Parking and Pedestrians

Currently, parallel parking is allowed for northbound traffic on TH 41 from 1st Street to 5th Street. Parking was only included from 1st Street to 4th Street for northbound traffic and from 4th Street to 2nd Street for southbound traffic when applicable in the options listed above. It was assumed that five parking maneuvers occurred per hour per block for analysis. **Figure 5** details where existing buildings front TH 41.

Figure 5: Existing Buildings Fronting TH 41



The most concentrate segments location for buildings fronting TH 41 is between 2nd Street and 3rd Street and between 4th Street and 5th Street. Parking was not allowed north of 4th Street for any of the options. The existing roadway and parking area was reallocated to expand the storage capacity of the northbound left turn lane at the TH 41 and CSAH 61 intersection. The buildings located north of 4th Street have multiple parking lots in close proximity that can be used. Parking was not allowed for southbound traffic between 1st Street and 2nd Street. No businesses abut TH 41 in this location and the residences in this location are provided with off-street parking. Parallel parking was included in the analysis in the remaining locations when applicable to understand the operational impacts.

In addition to parking, pedestrian crossing maneuvers were included in the analysis. Pedestrian volume details are shown in the Pedestrian Analysis section of the *Existing Traffic Conditions Memorandum CSAH 61/TH 41 Corridor Improvements Project*.

TH 41 Southbound Lane Drop Location

Two southbound receiving lanes must be maintained at the TH 41 and CSAH 61 intersection. One of these lanes must be dropped for the 3-Lane options. The operations of TH 41 and at the intersections of TH 41 at CSAH 61, 5th Street and 4th Street are all effected by the location of this lane drop. Depending on the volume scenario analyzed, the lane drop location was in one of two places: between 4th Street and 5th Street or between 3rd Street and 4th Street.

Lane drop between 4th Street and 5th Street:

- This location provides acceptable operations with the Baseline scenario.
- Transitioning TH 41 to a single southbound lane north of 4th Street limits the weaving and vehicle interaction near the City Park located between 3rd Street and 4th Street.
- Allows for the presence of a bump-out on the southwest corner of the intersection of TH 41 and 4th Street. A bump-out would reduce the crossing distance for pedestrians.
- Parking could be implemented between 3rd Street and 4th Street for southbound traffic.

Lane drop between 3rd Street and 4th Street:

- The location is anticipated to provide significant benefits in operations with the Upper scenario and there is no noticeable difference in operations with the Baseline scenario.
- Transitioning TH 41 to a single southbound lane south of 4th Street is expected to alleviate some weaving and vehicle interaction within the TH 41 and CSAH 61 intersection and provide additional capacity for southbound traffic at 4th Street.
- This option creates potential weaving and vehicle interaction where driveways are located on the west side of TH 41 between 3rd Street and 4th Street, in addition to the lane drops proximity to the City Park.

Moving the lane drop location to between 3rd Street and 4th Street is expected to reduce the intersection delay at TH 41 and CSAH 61 by 25 to 50 seconds and the southbound maximum queue by 30 to 40 vehicles with the Upper traffic volumes when compared to having the lane drop location between 4th Street and 5th Street.

The lane drop for all Baseline traffic operation scenarios is located between 4th Street and 5th Street. The lane drop for all Upper traffic operation scenarios is located between 3rd Street and 4th Street.

Side-Street Lane Configuration

Analysis was completed to investigate alternative side-street lane configurations for the eastbound and westbound approaches at the intersections of TH 41 at 2nd Street and 4th Street. Currently, a single thru-left-right lane is used for both eastbound and westbound approaches at 2nd Street and for the eastbound approach at 4th Street. The westbound approach at 4th street has a thru-left lane and an exclusive right turn lane. Alternate lane configurations that fit within the existing footprint of the roadway were considered; mitigation to an exclusive left turn lane and a thru-right lane resulted in a minor improvement in operations on the minor approaches at 2nd Street and 4th Street. **Table 8** details the eastbound and westbound queues using the 2040 Baseline traffic volumes and alternate lane configurations:

Table 8: Side Street Queue Comparison

Intersection	Side Street Lane Configuration		Movements					
			EBL	EBT	EBR	WBL	WBT	WBR
TH 41 & 4th Street <i>Signal</i>	Existing Lanes	Average Queue (ft)	95			120		45
		Max Queue (ft)*	205			255		85
	Left, Thru-Right Lanes	Average Queue (ft)	45	45		75		90
		Max Queue (ft)*	100	100		160		180
TH 41 & 2nd Street <i>Signal</i>	Existing Lanes	Average Queue (ft)	30			65		
		Max Queue (ft)*	75			135		
	Left, Thru-Right Lanes	Average Queue (ft)	20	10		45		25
		Max Queue (ft)*	55	35		115		55

Red indicates queue is longer than storage length. Yellow indicates queue backups reach 75% capacity.

*Max Queue refers to the 95% Queue (Passenger car stored length = 25 ft, Heavy vehicle stored length = 45 ft)

Mitigation to an exclusive left turn lane for both approaches at 2nd Street and for the eastbound approach at 4th Street reduces the average and max queue as expected. Eastbound queues at 4th Street are reduced over 50%, reducing the average queue length by roughly two car lengths and the maximum queue length by roughly four car lengths. Vehicle queues at 2nd street are reduced with the additional approach lane, but the max queue is only reduced by roughly one car length.

The switch in lane configuration for the westbound approach at 4th Street results in a more even distribution of queues between the approach lanes and overall reduces the average and max queue. The maximum westbound queue length is expected to reduce by roughly three car lengths, but the westbound right turn queue is anticipated to double when the right lane is shared with the through lane.

Mitigation to include an exclusive left turn lane, with the exception of the westbound approach at 4th Street, would require additional road and would eliminate some parking spaces located on 2nd Street and 4th street. Although some operational improvements are shown by this analysis, **the analysis of TH 41 Downtown Chaska assumed the existing lane configuration at 2nd Street and 4th Street for the eastbound and westbound approaches.**

A similar analysis was performed using the 2040 Upper traffic volumes. Similar results were achieved. This information can be found in **Appendix B**.

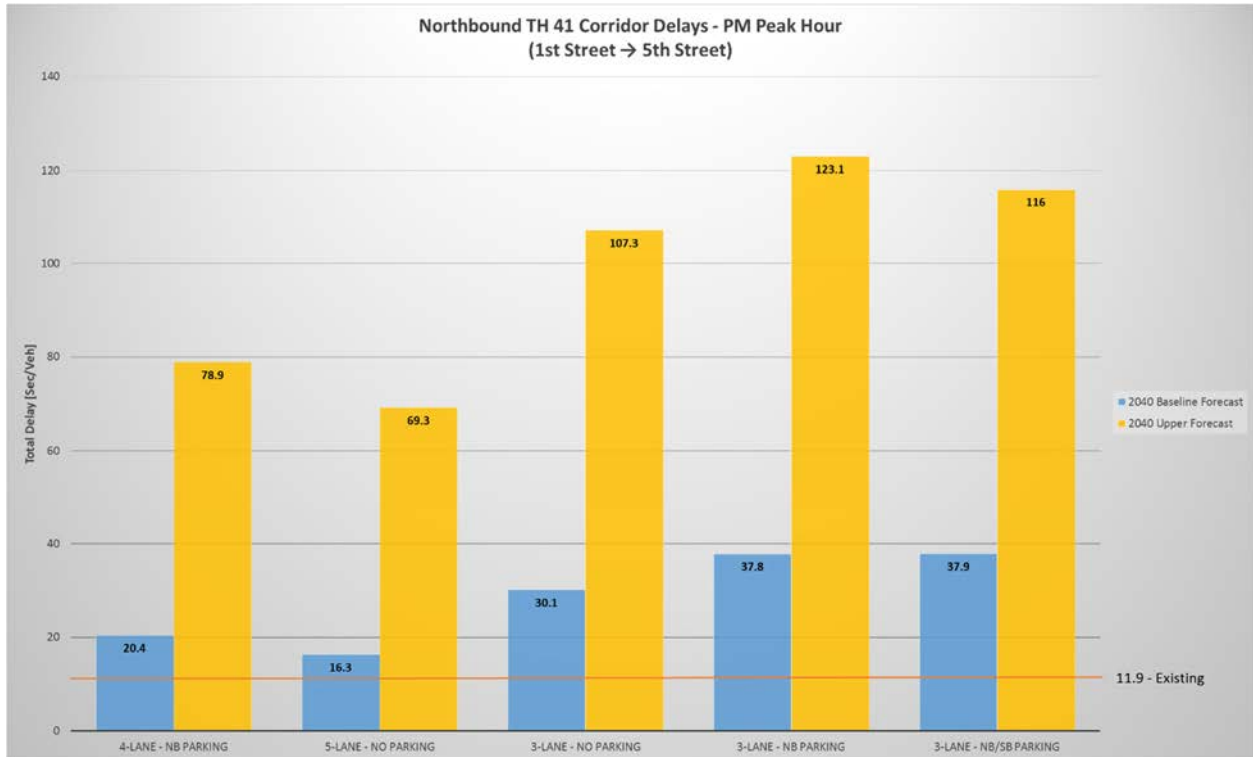
2040 Arterial Report Results

In addition to the evaluation of individual intersections, an analysis was also completed to better understand vehicle operations on a corridor or arterial level. The TH 41 corridor from the Minnesota River to CSAH 61 contains three coordinated traffic signals that influence the progression of vehicles through the corridor. Total delay (seconds/vehicle), travel time (seconds/vehicle) and average speed (miles/hour) are evaluated on TH 41 from Minnesota River bridge through 5th Street.

Total Delay

The total delay (seconds/vehicle) on TH 41 from the Minnesota River through 5th Street was evaluated for the Baseline and Upper PM peak hour traffic volumes. The northbound and southbound total delay for each option can be seen in **Figure 6** and **Figure 7** respectively. The existing delay is shown as a horizontal line for comparison.

Figure 6: Northbound TH 41 Corridor Delays – PM Peak Hour

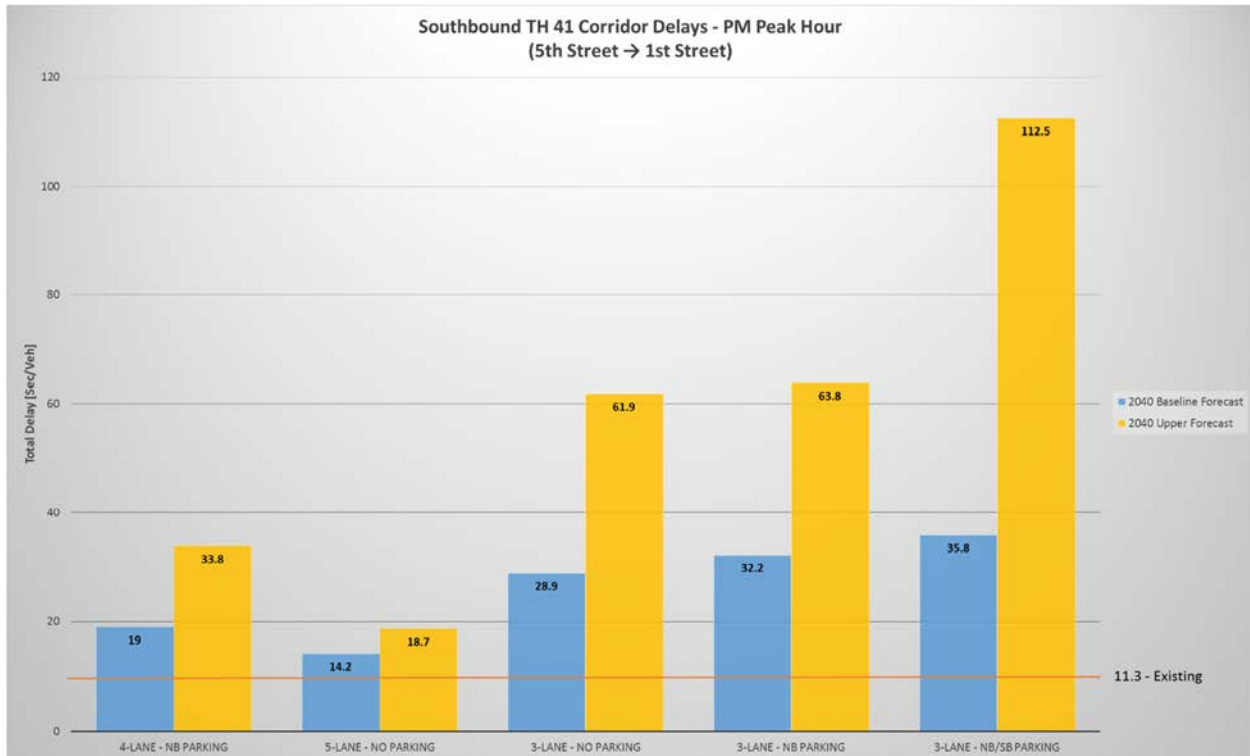


The following details the total delay results for northbound traffic on TH 41:

- All 2040 scenarios are expected to have more total delay than today for both traffic volume scenarios.
- Northbound delays for the 3-lane options are expected to be approximately twice that of the 5-lane option.
- In general, the presence of parking increases the total delay on TH 41 through downtown Chaska. However, with the Upper traffic volumes, the total delay is lower for the 3-lane section with northbound and southbound parking when compared to the 3-lane section with northbound parking only. This is most likely because of the greater amount of variability between models when a significant amount of delay is experienced.

- The majority of the northbound delay with the 3-lane options and Upper traffic volumes occurs at 1st Street. The delay at 1st Street accounts for nearly half the total delay shown for the 3-lane options.
- The 4 and 5-lane section has higher delays near CSAH 61 with the Upper traffic volumes compared to the 3-lane sections. This is most likely because vehicles are being restricted at 1st Street and not reaching CSAH 61 with the 3-lane sections, while the pinch-point in the corridor is

Figure 7: Southbound TH 41 Corridor Delays – PM Peak Hour



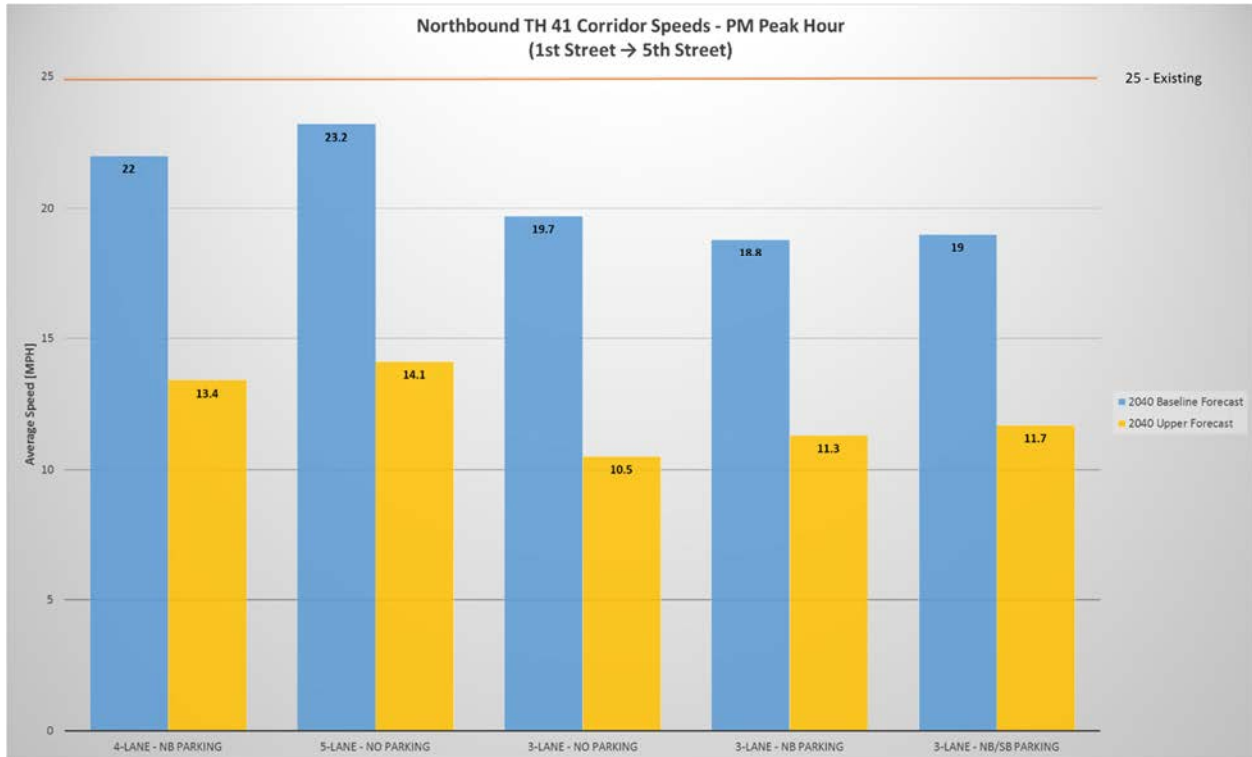
The following details the total delay results for southbound traffic on TH 41:

- All of the options operate worse than today for both traffic volume scenarios.
- The 3-lane sections are expected to have about twice the southbound delays as the 5-lane section with Baseline traffic volumes. The southbound delay is expected to be three to six times worse with the Upper traffic volumes.
- The majority of southbound delay for the 3-lane section occurs at 4th Street where traffic must merge from two southbound through lanes to a single southbound lane. The delay at 4th Street accounts for slightly less than half of the total delay anticipated for the 3-lane options.
- The addition of southbound parking from 4th Street to 2nd Street nearly doubles the southbound total delay in the upper scenario.

Average Speed

The average speed (miles/hour) on TH 41 from the Minnesota River to CSAH 61 was evaluated for the Baseline and Upper PM peak hour traffic volumes. The northbound and southbound average speeds for each option can be seen in **Figure 8** and **Figure 9** respectively. The existing average speed is shown as a horizontal line for comparison.

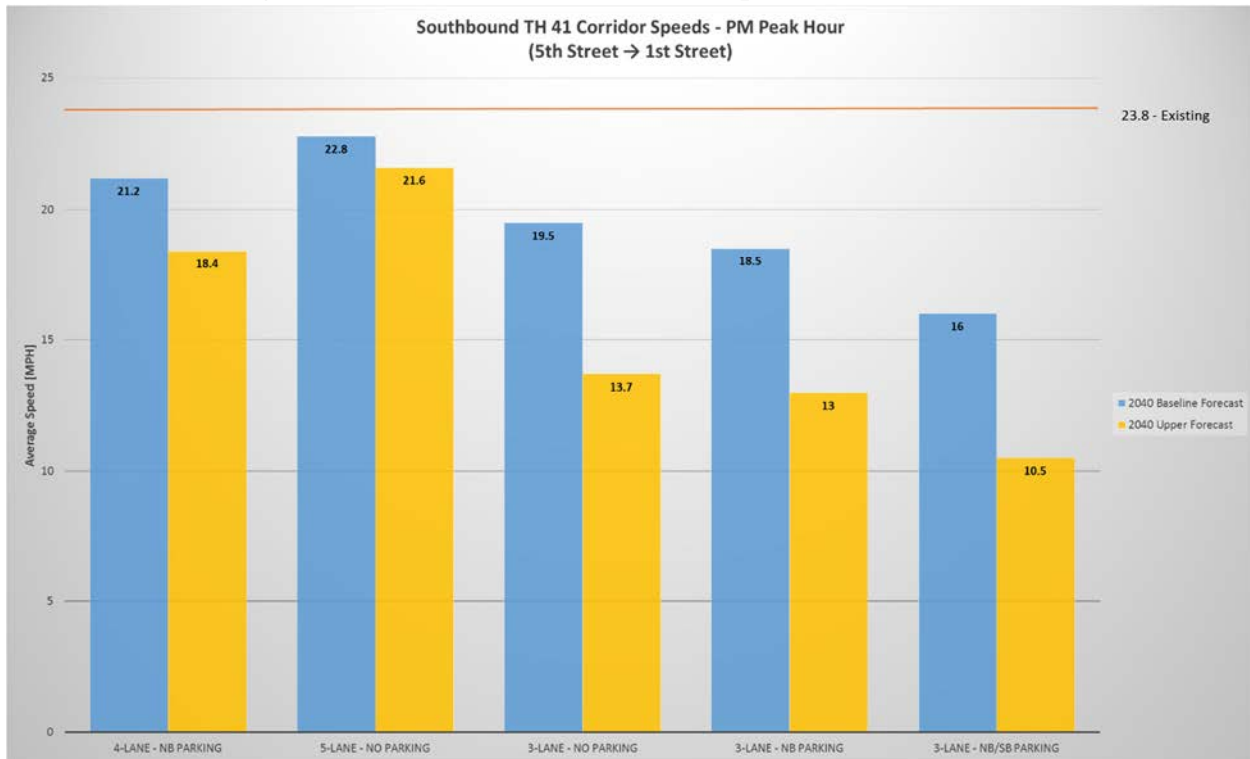
Figure 8: Northbound TH 41 Corridor Speeds – PM Peak Hour



The following details the average speed results for northbound traffic on TH 41:

- The increase in traffic volume results in a reduction in average speed, even when additional turn lanes are added for the 5-lane section.
- The average speed is expected to be approximately three to four mph slower with a 3-lane section when compared to a 5-lane section.
- The average speed is expected to be eight to nine mph slower with the Upper traffic volumes when compared to the Baseline traffic volumes for each TH 41 option.
- Additional parking has a relatively small effect on the average speed through the corridor.

Figure 9: Southbound TH 41 Corridor Speeds – PM Peak Hour



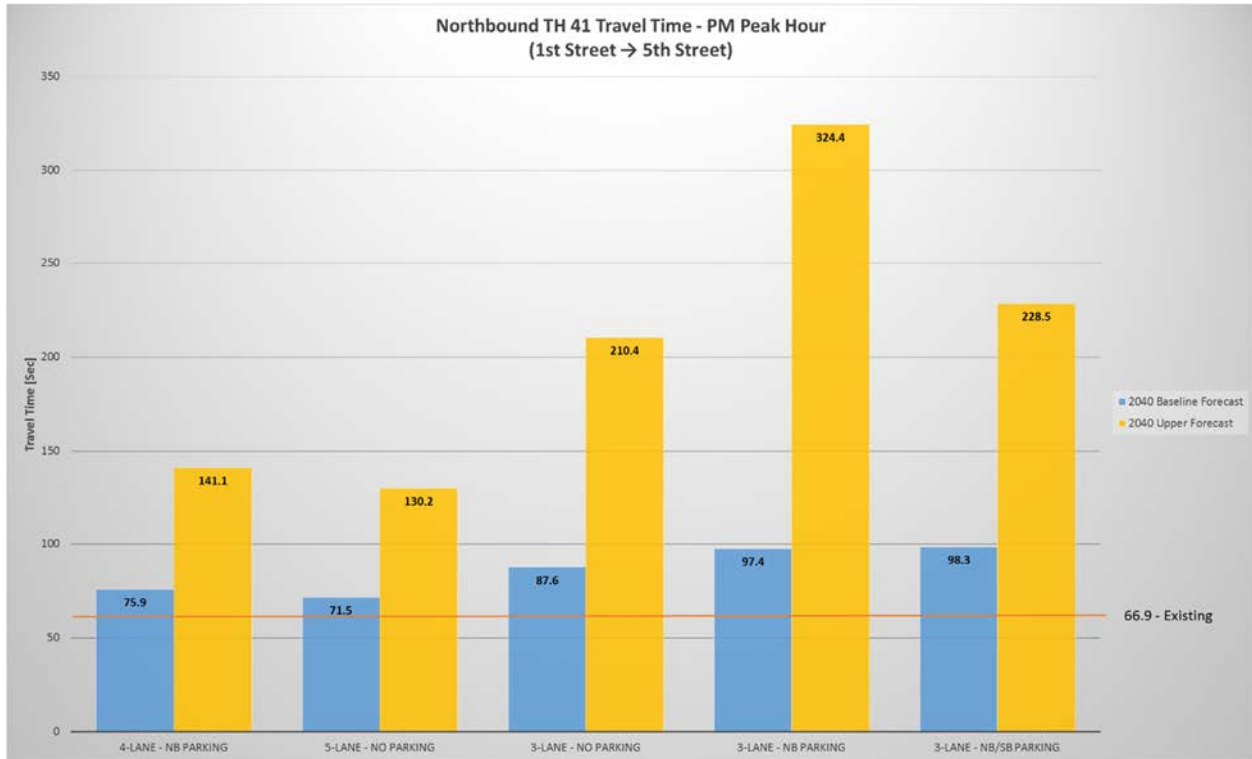
The following details the average speed results for southbound traffic on TH 41:

- The increase in traffic volume results in a reduction in average speed, even when additional turn lanes are added for the 5-lane section.
- The average speed is expected to reduce three to seven mph, depending on parking, with the 3-lane section when compared to a 5-lane section with the Baseline traffic volumes.
- The average speed is expected to reduce eight to eleven mph, depending on parking, with the 3-lane section when compared to a 5-lane section with the Upper traffic volumes.
- The average speed is expected to be approximately six mph slower with the Upper traffic volumes when compared to the Baseline traffic volumes for each 3-lane option. Less variability in average speed is anticipated with the 4 and 5 lane options.

Travel Time

The travel time (seconds) on TH 41 from the Minnesota River to CSAH 61 was evaluated for the Baseline and Upper PM Peak hour traffic volumes. The northbound and southbound travel time for each option can be seen in **Figure 10** and **Figure 11** respectively. The existing travel time is shown as a horizontal line for comparison.

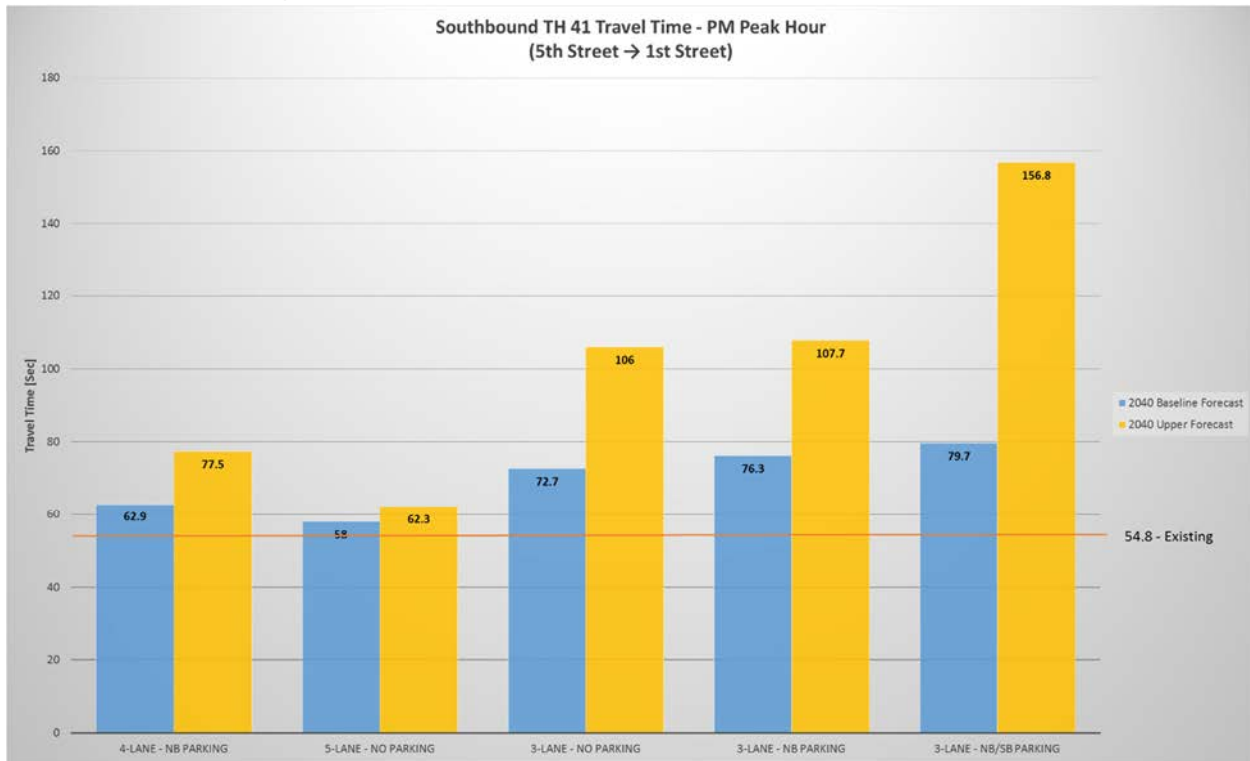
Figure 10: Northbound TH 41 Travel Time – PM Peak Hour



The following details the travel time results for northbound traffic on TH 41:

- All of the options are expected to have an increased travel time compared to today.
- With the Baseline traffic volumes, the northbound travel time is expected to increase about 16 seconds when comparing the 5-lane section to the 3-lane section. An additional 10 seconds of travel time is expected when northbound parking is implemented to the 3-lane section.
- With the Upper traffic volumes, the travel time is expected to increase from about two minutes to nearly 5 1/2 minutes with the 3-lane section and northbound parking.
- Similar to the northbound total delay, the majority of the northbound travel time with the 3-lane options and the Upper traffic volumes occurs at 1st Street. The travel time at 1st Street account for nearly half the total travel time with no parking, and is over half the total travel time when parking is implemented.

Figure 11: Southbound TH 41 Travel Time – PM Peak Hour



The following details the travel time results for southbound traffic on TH 41:

- All of the options are expected to have an increased travel time when compared to today.
- With the Baseline traffic volumes, the southbound travel time is expected to increase about 15 to 18 seconds when comparing the 5-lane section to the 3-lane section. Approximately three additional seconds of travel time is expected when southbound parking is implemented within the 3-lane section.
- With the Upper traffic volumes, southbound travel times are expected to increase from approximately 45 seconds with the 3-lane sections when compared to the 5-lane section. About 50 more seconds of travel time is expected when southbound parking is implemented within the 3-lane section.
- Similar to the southbound total delay, the majority of the southbound travel time with the 3-lane options and Upper traffic volumes occurs at 4th Street where traffic must merge from two southbound lanes to a single southbound lane.

CSAH 61 Downtown Chaska Evaluation

The CSAH 61 Downtown Chaska evaluation includes the intersections on CSAH 61 from CSAH 140 to Yellowbrick Road. Traffic operations at these intersections depend heavily on the traffic operations at the intersection of TH 41 and CSAH 61. The intersections of CSAH 61 at Creek Road, Cedar Street, Pine Street and Yellowbrick Road are anticipated to operate with LOS A for most of the day. However, during the AM and PM peak period, back-ups at TH 41 and CSAH 61 affect adjacent intersections. Eastbound traffic queues on CSAH 61 occasionally back up and block Pine Street resulting in increased delay. Similarly, westbound traffic queues on CSAH 61 occasionally extend into Walnut Street and Yellowbrick Road resulting in increased delay. Excessive minor street delay and queues are experienced at Creek Rd, Cedar St, Pine St, Walnut St and Yellowbrick Rd during the PM Peak period of the day. The signal at CSAH 61 and CSAH 140 currently operates at LOS C during the controlling AM Peak hour.

The 2040 Baseline traffic operations, after corridor improvements were implemented, are shown in **Table 2**. No geometric changes have been made to the above mentioned intersections to produce the results shown in **Table 2**.

The intersections on CSAH 61 through downtown Chaska are all within close proximity to each other and changes to one intersection may have a direct effect on one or more of the adjacent intersections. Although these intersections seem to have few operational concerns, alternatives could be implemented to better improve the overall operations of the corridor and improve safety for all users of the downtown Chaska area. The following sections will analysis each intersection individually, with the understanding that a combination of options could be implemented at the CSAH 61 downtown Chaska intersections.

CSAH 140 at CSAH 61

Average daily traffic volumes on CSAH 140 are expected to increase by approximately 7,000 vpd with the 2040 Baseline traffic volumes. As a result, the southbound queue is anticipated to reach an average queue of 220 feet and a maximum queue of 345 feet. There is currently not enough storage space to accommodate this amount of traffic at the intersection. The current southbound approach on CSAH 140 consists of a thru-right lane and a left turn lane. A shoulder currently is provided along the southbound approach. Extending the southbound left turn lane to 400 feet and mitigating the existing shoulder to a through lane would create enough storage space to accommodate the anticipated Baseline traffic volumes. If possible, a 50' southbound right turn lane could be constructed to further reduce delays at this intersection. With the exception of the 50 foot southbound right turn lane, this proposed mitigation would fit inside the existing roadway footprint.

Creek Road

Creek Road is located immediately east of the Chaska Creek Bridge and west of the Cedar Street access to the Curling Center parking lot. Access spacing between the intersections of CSAH 61 at Creek Road and Cedar Street are a safety and operational concern. Figures 12 -15 show the four concepts analyzed at Creek Road.

Figure 12: Creek Rd Tee



Figure 13: Creek Rd Realigned – 25 mph



Figure 14: Creek Rd Realigned – 30 mph



Figure 15: Creek Rd 3-Legged Roundabout



The Creek Road Tee in Figure 12 maintains the existing intersection location; therefore, if this concept is to be implemented, access at Cedar Street would most likely be reduced with a median and access to the Curling Center could be eliminated. A new driveway connecting the Curling Center parking lot to Creek Road and a U-turn lane are shown in Figure 12 that would alleviate these potential issues.

Two concepts involve realigning Creek Road to the West to separate the accesses along CSAH 61. The first realignment concept shown in **Figure 13** uses a 25 mph curve, reducing the proposed impacts to the surrounding area. The second realignment concept shown in **Figure 14** maintains the 30 mph design speed on Creek Road but would require more impacts to the surrounding area. The realignment of Creek Road would require an additional bridge, shown in orange, over the West Chaska Creek. These concepts could be designed to easily incorporate an access point to a future development south of CSAH 61 in this area. The potential south leg of the intersection is shown in the realignment figures above. Property acquisition would be required with both realignment concepts.

The 3-legged roundabout concept maintains the existing intersection location; therefore, if this concept is to be implemented, access at Cedar Street would most likely be reduced with a median and access to the Curling Center could be eliminated. Access to CSAH 61 from the south on Cedar Street would be eliminated. A new driveway connecting the Curling Center parking lot to Creek Road and a turnaround area on cedar are shown in **Figure 15** that would alleviate these potential issues. Property acquisition would be required with the 3-legged roundabout concept.

Table 9 details the evaluation measures at the intersection of CSAH 61 and Creek Rd. The vehicle measure results shown in **Table 9** were determined using Synchro, which calculates delay based on the 2010 HCM. Operations were calculated based on the individual intersection geometry and the 2040 Baseline turning movement volumes. Turning movements were adjusted for each concept depending on expected access at Cedar Street. It was assumed that traffic using the western entrance and exit of the Curling Center parking lot would use creek road and the proposed driveway with the Tee and 3-legged roundabout concepts. The pedestrian delay was calculated using the uncontrolled crossing location equations from the 2010 HCM.

Table 9: Creek Road Evaluation Measures

Measure		Units	Creek Road Concepts									
			No Build		Tee		Realignment (25 mph)		Realignment (30 mph)		3-Leg Roundabout	
Vehicle Analysis	Volume to Capacity Ratio (v/c)	-	0.43		0.43		0.43		0.43		0.91	
	Intersection Capacity Utilization (ICU)	-	0.4		0.4		0.4		0.4		0.61	
	Intersection Delay	Sec/veh	1.2	A	1.8	A	1.6	A	1.6	A	11	A
	Eastbound Delay	Sec/veh	0	A	0	A	0	A	0	A	8	A
	Westbound Delay	Sec/veh	0	A	0	A	0	A	0	A	13	A
	Southbound Delay During Peak Traffic	Sec/veh	60	F	60	F	55	F	55	F	17	C
	Southbound Delay During Off-Peak	Sec/veh	15	B	15	B	15	B	15	B	6	A
	Vehicle Conflict Points	-	36		36		36		36		16	
Pedestrian Analysis	Forecasted Crash Rates	-	0.15		0.15		0.15		0.15		0.1	
	Pedestrian Crossing Distance	Feet	61		61		54		54		54	
	Number of Lanes to Cross	Lanes	4		5		4		4		1 or 2	
	Pedestrian Delay	Seconds	90	F	49	F	49	F	49	F	37	E
		Pedestrian Conflict Points	9		9		14		14		6	

The Creek Road Tee and both Realignments are anticipated to have similar traffic operations; all three concepts are anticipated to have an overall LOS A with southbound movements experiencing about a minute of delay. The 3-legged roundabout increase the intersection delay but decrease the side street delay for southbound traffic; the overall intersection delay with the 3-legged roundabout is still anticipated to be LOS A. Pedestrian safety is increased with all the Creek Road options with the addition of a center median pedestrian refuge areas that create a two-staged pedestrian crossing. In addition to center island medians, the 3-legged roundabout reduces the vehicle and pedestrian conflict points, reduces the crossing distance for pedestrians and has the lowest forecasted crash rate.

Cedar Street

Cedar Street currently has full access to CSAH 61 and is aligned with the western access to the Curling Center parking lot. Access spacing between the intersections of CSAH 61 at Creek Road and Cedar Street are a safety and operational concern. **Figures 16 - 18** show the four concepts analyzed at Cedar Street.

Figure 16: Cedar Street Full Access



Figure 17: Cedar Street Three - Quarter Access



Figure 18: Cedar Street Right-in/Right-out



The Cedar Street analysis assumed access to the Curling Center parking lot was maintained. The 3 concepts are similar in size and each concept includes a sidewalk on the south side of CSAH 61.

Table 10 details the evaluation measures at the intersection of CSAH 61 and Cedar Street. The vehicle measure results shown in **Table 10** were determined using Synchro, which calculates delay based on the 2010 HCM. Operations were calculated based on the individual intersection

geometry and the 2040 Baseline turning movement volumes. Turning movements were adjusted and distributed between Creek Road and Pine Street when access was reduced with the three-quarter and right-in/right-out concepts. The pedestrian delay was calculated using the uncontrolled crossing location equations from the 2010 HCM.

Table 10: Cedar Street Evaluation Measures

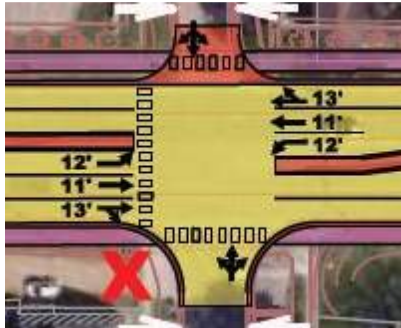
Measure		Units	Cedar Street Concepts							
			No Build		Full Access		3/4 Access		Right-in/Right-Out	
Vehicle Analysis	Volume to Capacity Ratio (v/c)	-	0.35		0.44		0.44		0.45	
	Intersection Capacity Utilization (ICU)	-	0.55		0.47		0.4		0.4	
	Intersection Delay	Sec/veh	0.8	A	0.7	A	0.4	A	0.3	A
	Eastbound Delay	Sec/veh	0	A	0	A	0	A	0	A
	Westbound Delay	Sec/veh	0	A	0	A	0	A	0	A
	Northbound Delay During Peak Traffic	Sec/veh	15	B	15	B	13	B	13	B
	Northbound Delay During Off-Peak	Sec/veh	11	B	11	B	11	B	11	B
	Southbound Delay During Peak Traffic	Sec/veh	36	E	36	E	13	B	13	B
	Southbound Delay During Off-Peak	Sec/veh	15	B	15	B	10	B	8	A
	Vehicle Conflict Points	-	32		32		12		4	
	Forecasted Crash Rates	-	0		0		0		0	
Pedestrian Analysis	Pedestrian Crossing Distance	Feet	61		61		71		61	
	Number of Lanes to Cross	Lanes	4		5		5		5	
	Pedestrian Delay	Seconds	90	F	49	F	110	F	49	F
	Pedestrian Conflict Points	-	14		14		12		10	

All three concepts are anticipated to have an overall LOS A with little to no interruption on CSAH 61. The side street delay is decreased when access restrictions are in place with the three-quarter and right-in/right-out concepts. Vehicle conflict points are reduced with the three-quarter and right-in/right-out concepts. Pedestrian safety is increases with the full access and right-in/right-out concepts because of the addition of a center median pedestrian refuge areas that create a two-staged pedestrian crossing. The median in the three-quarter access concepts does not meet the 6 foot median width to be classified as a pedestrian refuge area, therefore, this crossing is still considered a one-stage crossing. A crossing location at a three-quarter intersection would not be recommended.

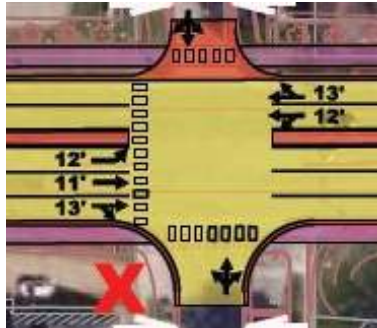
Pine Street

Pine Street currently has full access to CSAH 61 and is aligned with the eastern access to the Curling Center parking lot. Access spacing between the intersections of CSAH 61 at Cedar Street and TH 41 are a safety and operational concern. Figures 19 - 23 show the four concepts analyzed at Pine Street.

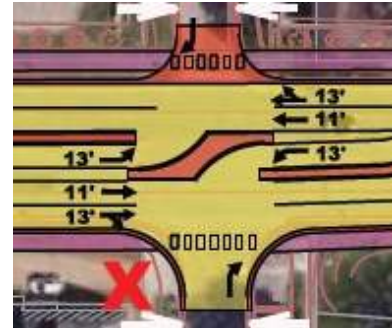
**Figure 19: Pine Street
Full Access**



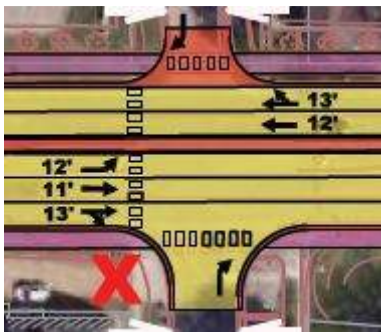
**Figure 20: Pine Street Full
Access (Restricted)**



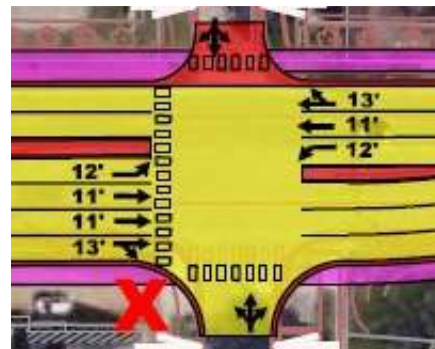
**Figure 21: Pine Street
Three-Quarter**



**Figure 22: Pine Street Right-
In/Right-Out**



**Figure 23: Pine Street Realign
Eastbound CSAH 61**



The first four Pine Street concepts are similar in size and are comparable to the existing roadway footprint. The Pine Street Realign CSAH 61 Eastbound concept expands CSAH 61 south widening the roadway footprint. A sidewalk is included on the south side of CSAH 61 in all the Pine Street concepts.

Table 11 details the evaluation measures at the intersection of CSAH 61 and Pine Street. The vehicle measure results shown in **Table 11** were determined using Synchro, which calculates delay based on the 2010 HCM. Operations were calculated based on the individual intersection geometry and the 2040 Baseline turning movement volumes. Turning movements were adjusted and distributed between Cedar Street and TH 41 when access was reduced with the three-quarter and right-in/right-out concepts. The pedestrian delay was calculated using the uncontrolled crossing location equations from the 2010 HCM.

Table 11: Pine Street Evaluation Measures

Measure		Units	Pine Street Concepts											
			No Build		Full Access		Full Access (Restricted)		3/4 Access		Right-in/Right-Out		Realign EB CSAH 61	
Vehicle Analysis	Volume to Capcity Ratio (v/c)	-	0.46		0.46		0.47		0.46		0.47		0.46	
	Intersection Capacity Utilization (ICU)	-	0.52		0.52		0.46		0.41		0.41		0.52	
	Intersection Delay	Sec/veh	4.1	A	4.1	A	3	A	1.5	A	1.3	A	3.6	A
	Eastbound Delay	Sec/veh	0	A	0	A	0	A	0	A	0	A	0	A
	Westbound Delay	Sec/veh	1	A	1	A	0	A	1	A	0	A	1	A
	Northbound Delay During Peak Traffic	Sec/veh	20	C	20	C	17	C	12	B	14	B	20	C
	Northbound Delay During Off-Peak	Sec/veh	11	B	11	B	11	B	11	B	12	B	12	B
	Southbound Delay During Peak Traffic	Sec/veh	147	F	147	F	105	F	14	B	14	B	105	F
	Southbound Delay During Off-Peak	Sec/veh	19	C	19	C	15	B	10	A	10	A	18	C
Vehicle Conflict Points	-	36		36		36		24		12		24		
Forecasted Crash Rates	-	0.08		0.08		0.12		0.08		0.04		0.08		
Pedestrian Analysis	Pedestrian Crossing Distance	Feet	67		61		61		71		61		72	
	Number of Lanes to Cross	Lanes	5		5		5		5		5		6	
	Pedestrian Delay	Seconds	45	E	14	C	14	C	110	F	14	C	20	D
	Pedestrian Conflict Points	-	13		13		13		11		9		12	

The delay shown in **Table 11** indicates that the all the Pine Street concepts are anticipated to have an overall LOS A. However, this measure does not consider the traffic operations at the adjacent signalized intersection at TH 41 and CSAH 61. Eastbound traffic back-ups are expected on CSAH 61 as vehicles wait for the signal at TH 41. Occasionally, the eastbound traffic will extend and block Pine Street. **Table 12** details the percentage of the PM Peak hour that Pine Street is blocked as a result of eastbound queuing at the TH 41 and CSAH 61 signal.

Table 12: Blocking Percentage depending on Pine Street Concept

Concept	Percent of PM Peak hour Pine Street is Blocked
Full Access	40%
Full Access (Restricted)	12%
¾ Access	40%
Right-In/Right-Out	63%
Realign EB CSAH 61	15%

A higher blocking percentage will be associated with higher northbound and southbound delays on Pine Street and the eastern Curling Center parking lot access. The Full Access (Restricted) and Realign EB CSAH 61 have the lowest blocking percentage at Pine Street and are anticipated to perform the best operationally. This is a result of extending the eastbound left turn lane at TH 41 to Pine Street, creating more storage space for eastbound traffic on CSAH 61. Although the Right-In/Right-Out concept also extend the eastbound left turn lane through Pine Street the blocking percentage is the highest of the concepts at 63% of the PM Peak hour. When the median is maintained through Pine Street, the users have no obligation to keep this intersection clear and will continue to block the intersection, excessive northbound delay would be expected on Pine Street with this concept. The other concepts at Pine Street are expected to be blocked 40% of the PM Peak hour and users on the side street may have difficulty accessing CSAH 61 during the PM Peak hour.

Vehicle conflict points are reduced with the three-quarter and right-in/right-out concepts. Pedestrian safety is increases with the full access and right-in/right-out concepts because of the

addition of a center median pedestrian refuge areas that create a two-staged pedestrian crossing. The median in the three-quarter access concepts does not meet the 6 foot median width to be classified as a pedestrian refuge area, therefore, this crossing is still considered a one-stage crossing. A crossing location at a three-quarter intersection would not be recommended.

The crosswalk across CSAH 61 shown in **Figure 23** crosses six lanes of traffic. The eastbound left turn lane at Pine Street in the realign eastbound CSAH 61 concept could be eliminated and eastbound left turns could use the inside lane to turn. Therefore, the eastbound left turn lane could become a larger pedestrian refuge area for pedestrians crossing CSAH 61. The pedestrian delay would be similar to the results of the Full Access or Right-In/Right-Out concepts but the pedestrian refugee area would be larger.

Walnut Street

The intersection of CSAH 61 at Walnut Street is currently a coordinated signal with the signalized intersection of TH 41 and CSAH 61. Access spacing between these two signalized intersections are a safety and operational concern. **Figures 24 - 27** show the four concepts analyzed at Walnut Street.

Figure 24: Walnut Street Full Access



Figure 25: Walnut Street Full Access (Restricted)



Figure 26: Walnut Street Right-In/Right-Out



Figure 27: Walnut Street Expanded



The first three Walnut Street concepts are similar in size and are comparable to the existing roadway footprint. The Walnut Street Expanded concept widens the roadway footprint.

Table 13 details the evaluation measures at the intersection of CSAH 61 and Walnut Street. The vehicle measure results shown in **Table 13** were determined using Synchro, which calculates delay based on the 2010 HCM. Operations were calculated based on the individual intersection geometry and the 2040 Baseline turning movement volumes. Turning movements were adjusted and distributed between TH 41 and Yellowbrick Road when access was reduced with the right-in/right-out concept. The pedestrian delay was not included and is anticipated to be very similar for all the Walnut Street Concepts.

Table 13: Walnut Street Evaluation Measures

Measure		Units	Walnut Street Concepts									
			No Build		Full Access		Full Access (Restricted)		Right-in/Right-Out*		Expanded	
Vehicle Analysis	Volume to Capacity Ratio (v/c)	-	0.57		0.33		0.31		0.52		0.33	
	Intersection Capacity Utilization (ICU)	-	0.49		0.49		0.49		0.26		0.49	
	Intersection Delay	Sec/veh	20	B	14	B	14	B	1	A	14	B
	Eastbound Delay	Sec/veh	21	C	1	A	1	A	0	A	1	A
	Westbound Delay	Sec/veh	17	B	19	B	19	B	0	A	19	B
	Northbound Delay During Peak Traffic	Sec/veh	25	C	25	C	25	C	10	B	25	C
	Northbound Delay During Off-Peak	Sec/veh	25	C	25	C	25	C	10	B	25	C
	Southbound Delay During Peak Traffic	Sec/veh	25	C	25	C	25	C	14	B	25	C
	Southbound Delay During Off-Peak	Sec/veh	25	C	25	C	25	C	11	B	25	C
	Vehicle Conflict Points	-	68		53		53		29		53	
	Forecasted Crash Rates	-	0.33		0.28		0.42		0.19		0.23	
Pedestrian Analysis	Pedestrian Crossing Distance (West Leg)	Feet	89		80		80		80		96	
	Pedestrian Crossing Distance (East Leg)	Feet	85		84		84		84		96	
	Number of Lanes to Cross	Lanes	5		5		5		5		5 or 6	
	Pedestrian Conflict Points	-	22		22		22		16		23	

The Right-In/Right-Out concept is the only concept that is not signalized and eastbound and westbound traffic would not have to stop. The right-in/right-out concept is anticipated to have an overall LOS A and side street delay is anticipated to have a LOS B as only right turns would be allowed. The other three concepts are anticipated to have similar traffic operations; all three concepts are anticipated to have an overall LOS B and side street delay is anticipated to have a LOS C. The crash rate for the full access (restricted) is slightly higher than the other concepts because there is not exclusive left turn lane for eastbound traffic resulting in left turns coming from the through lane. Vehicle conflict points are reduced with the right-in/right-out concept. Pedestrian safety is increased with all the concepts because of the addition of a center median pedestrian refuge areas that create a two-staged pedestrian crossing.

Further Walnut Street Expanded Analysis

As shown in the Warrant Analysis section of the *Existing Traffic Conditions Memorandum CSAH 61/TH 41 Corridor Improvements Project*, the intersection of CSAH 61 at Walnut Street does not meet signal warrants with existing traffic volumes. However, because there is an existing traffic signal, 60% traffic volume warrants were completed and it was determined that Warrant 1B was met for 8 of the required 8 hours. Further SimTraffic analysis was completed for the intersection of CSAH 61 at Walnut Street to investigate the need for a traffic signal. TH 41 and CSAH 61 Concept B was used for analysis purposes.

Table 14 and **Table 15** detail the traffic operations comparison between signalized control and side street stop control at the intersection of CSAH 61 and Walnut Street. The Tables below only shows the traffic operations for the movements of most concern, additional operational details can be found in **appendix B**. The delay and queue length in **Table 14** and **Table 15** are the traffic operations results using the 2040 Baseline traffic volumes during the AM and PM peak hour.

Table 14: 2040 Baseline Traffic Operations – CSAH 61 and Walnut Street Delay Comparison

Peak Hour	Control	Overall		NBL		NBT		NBR		SBL		SBT		SBR		WBL		WBT		EBL		EBT	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
AM	Signal	6	A	41	D	33	C	4	A	34	C	34	C	4	A	14	B	3	A	6	A	4	A
	Side Street Stop Control	8	A	72	F	40	E	17	C	26	D	91	F	6	A	15	B	1	A	5	A	3	A
PM	Signal	9	A	51	D	31	C	4	A	26	C	26	C	10	A	13	B	7	A	10	A	5	A
	Side Street Stop Control	17	C	140	F	39	E	5	A	69	F	60	F	78	F	7	A	10	A	9	A	2	A

Delay in seconds per vehicle

Table 15: 2040 Baseline Traffic Operations – CSAH 61 and Walnut Street Queue Comparison

Peak Hour	Control	NB LT		NBR		SB LT		SBR		WB LT		WBT		EBL		EBT	
		Ave	Max	Ave	Max	Ave	Max	Ave	Max	Ave	Max	Ave	Max	Ave	Max	Ave	Max
AM	Signal	15	45	20	45	25	70	5	15	20	55	10	25	5	15	45	110
	Side Street Stop Control	20	55	30	70	40	130	10	45	20	60	0	5	5	10	5	15
PM	Signal	55	125	25	85	30	75	20	50	55	140	55	145	5	25	40	90
	Side Street Stop Control	75	200	40	140	70	250	40	120	40	170	50	205	10	30	0	10

Max Queue refers to the 95% Queue (Passenger car stored length = 25 ft, Heavy vehicle stored length = 45 ft)

The existing signal is anticipated to operate with LOS A during the AM and PM peak hour with the 2040 Baseline traffic volumes. Removing the signal, allowing eastbound and westbound traffic to travel freely, is expected to result in LOS A during the AM peak hour but result in LOS C during the PM Peak hour.

In general, the eastbound and westbound delay and queue remain the same or improve with the side street stop control. However, the northbound and southbound delay and queues worsen with the side street stop control. During the PM peak hour, the northbound left turning movement is anticipated to increase from 51 seconds of delay per vehicle to 140 seconds of delay per vehicle. Additionally, during the PM peak hour, all southbound movements increase from under 30 seconds of delay per vehicle to over a minute of delay per vehicle. All northbound and southbound average and maximum queue lengths increase with the side street stop control.

Further analysis was completed with the assumption that the intersection of CSAH 61 and Yellowbrick Road was mitigated to a full intersection with a south leg providing another access to the downtown Chaska area. It was assumed that 25% of traffic entering and exiting Walnut Street south of CSAH 61 would use the new access at Yellowbrick Road. **Table 16** and **Table 17** detail the traffic operations comparison between signalized control and side street stop control at the intersection of CSAH 61 and Walnut Street when 25% of the traffic entering and exiting Walnut Street south of CSAH 61 are moved to Yellowbrick Road.

Table 16: 2040 Baseline Traffic Operations – CSAH 61 and Walnut Street Delay Comparison

Peak Hour	Control	Overall		NBL		NBT		NBR		SBL		SBT		SBR		WBL		WBT		EBL		EBT	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
AM	Signal	5	A	31	C	23	C	4	A	36	D	33	C	4	A	11	B	2	A	6	A	4	A
	Side Street Stop Control	3	A	15	B	14	B	3	A	18	C	22	C	3	A	7	A	1	A	5	A	2	A
PM	Signal	9	A	31	C	28	C	3	A	24	C	24	C	12	B	10	A	9	A	10	A	4	A
	Side Street Stop Control	5	A	32	D	27	D	3	A	24	C	25	C	10	A	6	A	3	A	8	A	2	A

Delay in seconds per vehicle

Table 17: 2040 Baseline Traffic Operations – CSAH 61 and Walnut Street Queue Comparison

Peak Hour	Control	NB LT		NBR		SB LT		SBR		WB LT		WBT		EBL		EBT	
		Ave	Max	Ave	Max	Ave	Max	Ave	Max	Ave	Max	Ave	Max	Ave	Max	Ave	Max
AM	Signal	10	35	20	45	25	70	5	20	15	45	10	30	5	25	40	100
	Side Street Stop Control	10	35	20	45	20	55	5	20	10	40	0	5	5	10	0	5
PM	Signal	40	85	15	45	25	60	20	55	50	125	60	165	10	30	40	80
	Side Street Stop Control	40	100	25	65	30	65	20	45	20	75	15	75	10	25	0	5

Max Queue refers to the 95% Queue (Passenger car stored length = 25 ft, Heavy vehicle stored length = 45 ft)

The side street stop control is anticipated to have less overall delay than the signalized control

when an additional access at Yellowbrick Road is assumed. During the AM peak hour, the northbound and southbound delay and queue either remains the same or improves with the side street stop control. During the PM peak hour, the northbound and southbound delay and queue generally remain constant. Eastbound and westbound delay and queue are anticipated to improve with the side street stop control and the additional access at Yellowbrick Road.

The signal timing used at the intersection of TH 41 and CSAH 61 is important for the operation at CSAH 61 and Walnut Street. The signal timing used in the above analysis provided enough time for eastbound traffic as to not allow back-ups into Walnut Street. If less time was provided for eastbound traffic at the intersection of TH 41 and CSAH 61, it is possible traffic would back-up into Walnut Street more frequently resulting in worse traffic operations with both the signalized and side street stop control analysis.

Summary

This memorandum evaluates and summarizes the work completed for the Downtown Subarea of the CSAH 61 and TH 41 Corridor Improvement project. The analysis completed includes anticipated traffic operations and potential options where mitigation is expected to be necessary. The analysis in the memorandum assumed improvements to the Greater Corridor Subareas, these improvements are further analysis in the *Greater Subarea Traffic Conditions Memorandum*.

Existing traffic operations analysis and results can be found in the *Existing Traffic Conditions Memorandum*.

2040 traffic volumes were developed based on existing traffic volumes and assumptions established in the Carver County Roadway System Plan. This memorandum identifies potential operation problems as a result of the anticipated traffic growth. Multiple options were analyzed at the intersections and at roadway segments within the study area. The following summarizes the analysis completed within the memorandum:

CSAH 61 and TH 41

- Extending left turn lanes
- Adding exclusive southbound right turn lane
- Dual northbound left turn lanes
- Dual eastbound and westbound left turn lanes

TH 41 through Downtown Chaska

- Converting to 5-lane divided roadway with left turn lanes
- Converting to 3-lane divided roadway with left turn lanes
 - No parking
 - One sided parking
 - Two sided parking
- Converting to 3-lane undivided roadway with center two-way left turn lane

CSAH 61 and CSAH 140

- Expanding the available storage space for the southbound approach on CSAH 140

CSAH 61 at Creek Rd, Pine St and Walnut St

- Maintain full access for all approaches
- Restrict access by time of day
- Restrict minor street approaches to right-in/right-out only with no restrictions to CSAH 61 traffic
- Restrict all approaches to right-in/right out with center median

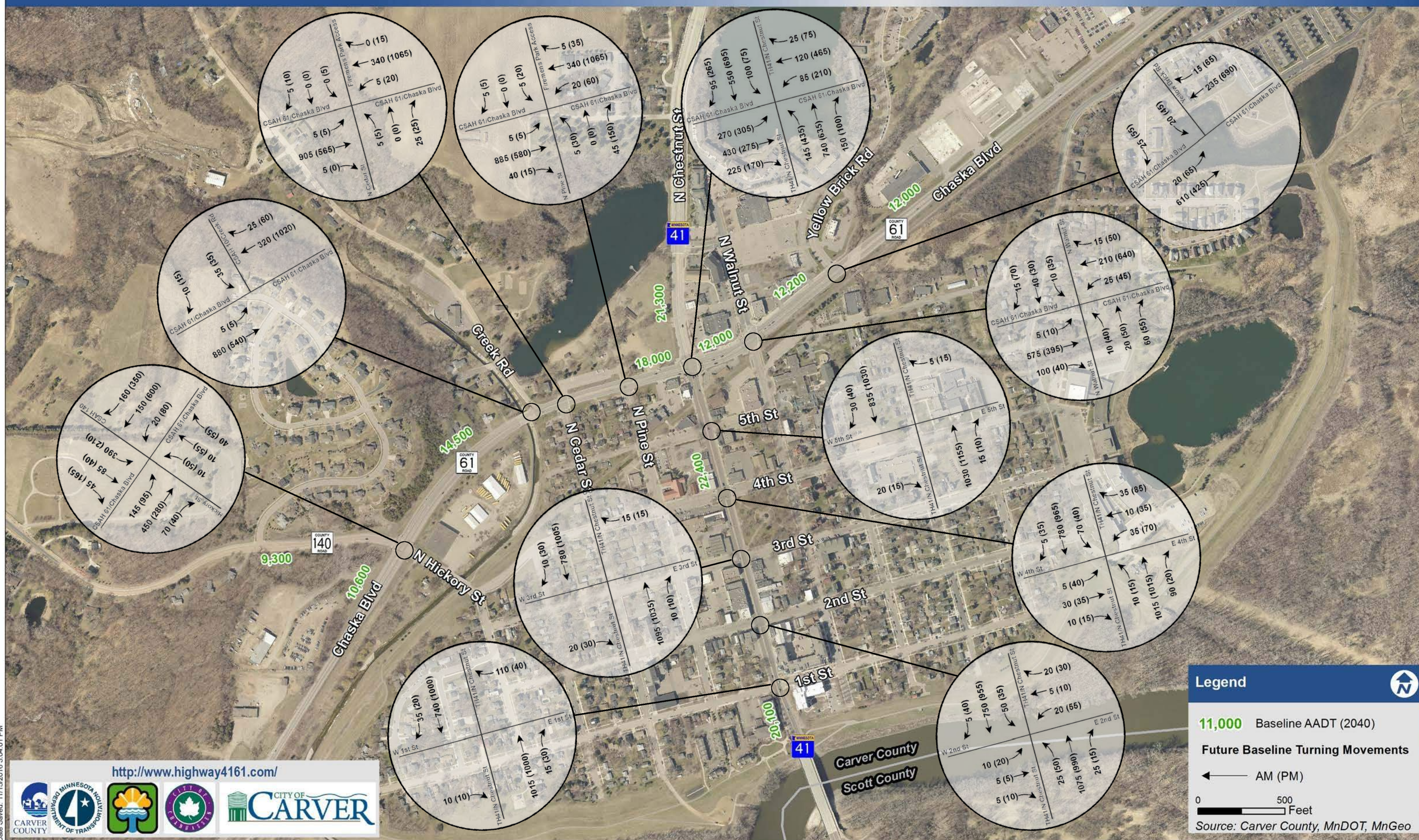
Appendix A

Traffic Volumes

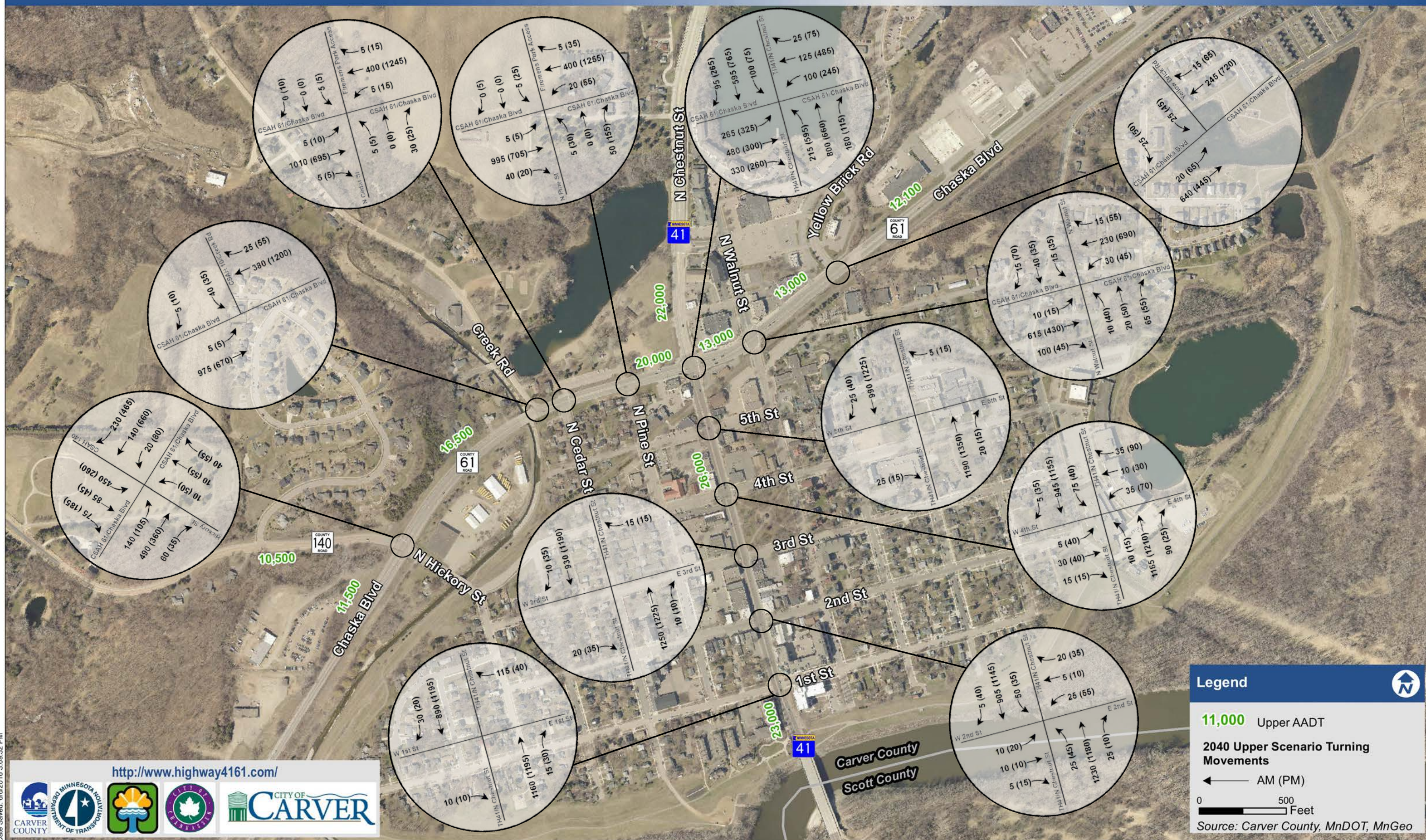
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Appendix B

SimTraffic Reports

(Available upon Request)

Appendix C: Findings of Fact



Downtown Chaska Subarea

FINDINGS OF FACTS

FINAL

DOWNTOWN CHASKA:

Chaska was founded in 1852 and provides a historic setting, containing many 19th century structures. It continues to be an active and evolving economic center and regional attraction. Today, Downtown Chaska is home to more than 175 businesses.

Two major roadways traverse Downtown Chaska, Trunk Highway (TH) 41 (Chestnut Street) and County State Aid Highway (CSAH) 61 (Chaska Boulevard). These provide local access and circulation as well as connections to the greater Twin Cities metro area and beyond. The existing transportation network needs multimodal improvements in order to continue to serve both the local and regional demands.

The City of Chaska is acting to strengthen its downtown as a destination based on the traditional and historic character of the area. As summarized in the City's 2012 *Downtown Master Plan*, the City's downtown vision includes "revitalizing downtown Chaska as the hub of community destinations and gathering places that reflect and celebrate its historic character, traditional small town atmosphere and values". Key elements of the plan include redevelopment strategies, an enhanced walking and biking environment, and ensuring sufficient parking is available.



County Highway 61 / Highway 41 Improvements

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PURPOSE:

The CSAH 61 / TH 41 Improvements Project will identify corridor improvements meeting the local and regional goals. These improvements will consider the overall roadway network serving downtown, not just the TH 41 (Chestnut Street) and CSAH 61 (Chaska Blvd) corridors themselves. This evaluation will include downtown access, circulation, and parking. There is also a need to plan for pedestrian and bicycle accommodations through downtown. Recommendations will be sensitive to the built environment, space limitations, economic development goals, maintaining an inviting downtown, and natural and historic considerations. Improvements identified will be constructed as soon as 2017 on CSAH 61 (Chaska Blvd) west of TH 41 (Chestnut Street) and in 2019 on TH 41 (Chestnut Street) south of CSAH 61 (Chaska Blvd).

The project seeks to broadly understand the needs and opportunities, establish goals and objectives, develop and evaluate alternatives, reach a consensus on a recommended concept, and develop an implementation plan allowing the plan to be achieved in increments. As such, a higher level of understanding is required to include measurements of land use, pedestrian and bicycle usage, environmental and cultural resources, and traffic and safety operations. The analysis has uncovered several key findings that are discussed below. This Findings of Fact will serve as the basis for guiding the development of goals and objectives as well as the development and evaluation of alternatives.

CORRIDOR IMPORTANCE / FUNCTION:

1. TH 41 (Chestnut Street) is an important transportation corridor for the region and for the City of Chaska.

- TH 41 (Chestnut Street) is a principal arterial roadway providing a connection between two other principal arterials, TH 212 on the north and TH 169 on the south. Typically, principal arterial roadways are intended to serve high traffic volumes and carry a major portion of vehicular trips throughout the region. These roadways typically are characterized by limited access and higher mobility.
- TH 41 (Chestnut Street) is a unique principal arterial as it also serves a local function by providing the primary access through Chaska's downtown with a connection to CSAH 61 (Chaska Blvd). Due to the Minnesota River crossing, TH 41 (Chestnut Street) through downtown Chaska is just one of a few low speed principal arterial roadways directly traversing a downtown in the Twin Cities Metropolitan Region.
- TH 41 (Chestnut Street) provides one of four Minnesota River crossings in the southwestern metro area which increases its importance from a regional standpoint. Currently, the TH 41 river crossing carries an average of 18,400 vehicles per day. Other river crossings are located on CSAH 9 in Jordan (9 miles south – 4,750 Annual Average Daily Traffic (AADT)), TH 101 (4 miles east – 18,900 AADT) and TH 169 (8 miles east – 89,000 AADT) in Shakopee. Note: all AADTs noted are from years 2012-2014.
- In 2014, MnDOT completed a Tier I Final Environmental Impact Statement identifying a corridor of a future Minnesota River crossing. The crossing will connect TH 169 and TH 212,



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near TH 41. The preferred alignment crosses the river near existing TH 41 and travels west, south of downtown Chaska, to connect to TH 212 at CSAH 11, north of the City of Carver. This would allow regional connections between these two highways to occur outside of downtown Chaska.

- The construction of the new Minnesota River crossing remains a priority for the City of Chaska, Carver County, Scott County and MnDOT; however, funding is not included in MnDOT's 20-year fiscally-constrained transportation plan. It is unlikely this new crossing would be built in the next 20 years. Therefore, this project assumes the existing TH 41 Minnesota River crossing will be the only river crossing in this area within the current planning timeframe. Project partners will continue to look for opportunities to be consistent with the Minnesota River Crossing Tier I Final Environmental Impact Statement working towards a new river crossing in this area.
- Heavy traffic volumes on TH 41 (Chestnut Street) are identified in the City of Chaska's Downtown Master Plan as one of the downtown's strongest assets and biggest challenges. The Master Plan identifies the importance of maintaining local and destination-oriented trips in the downtown to support the local economy. The Plan also supports the premise of relocating regional trips out of the downtown to the new Minnesota River crossing. Without a new river crossing outside of downtown Chaska, TH 41 (Chestnut Street) is going to continue to serve high regional volumes of traffic into the future.
- An interchange is programmed for 2018 construction at TH 41/TH 169 which will remove the signal from TH 169. Although not a system-to-system (free-flow) interchange, this project will enhance the connection between these two principal arterials, 1.5 miles south of downtown Chaska. The TH 41/TH 169 interchange location is inconsistent with the Minnesota River crossing FEIS; however, it will not preclude a new Minnesota River crossing in the future. MnDOT and Scott County are currently looking at completing right-of-way preservation that could occur with the TH 41/TH 169 interchange project to support a future Minnesota River crossing.
- In late 2015, a new four-lane CSAH 101 river bridge was completed between CSAH 101 in Shakopee and CSAH 61 in Chanhassen. This project increased the capacity of the CSAH 101 river bridge, elevated the roadway above the 100-year floodplain and realigned its intersection with CSAH 61 with a new multi-lane roundabout. In addition, an official map has been adopted for a future project to realign TH 101 from CSAH 61 to CSAH 14 (Pioneer Trail). This project would continue the 4-lane section from the new CSAH 101 river bridge to CSAH 14, providing a continuous 4-lane roadway from CSAH 101 in Shakopee, across the Minnesota River and up the river bluff to TH 212 in Chanhassen.
- TH 41 (Chestnut Street) serves significant trucking movements accommodating over 1,300 trucks per day. The majority of truck movements on TH 41 (Chestnut Street) are a result of the river crossing, regional freight demands, gravel and sand mining, landfill, and seasonal grain deliveries from western Minnesota to the Ports of Savage.



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- In 2012, the Chaska Downtown Master Plan identified the city's vision for TH 41 (Chestnut Street) in the future. The vision in this plan is to "Revitalize downtown Chaska as the hub of community destinations and gathering places that reflect and celebrate our historic character, traditional small town atmosphere and values." This vision included a complete streets approach to better accommodate walkers, bicyclists and drivers visiting downtown Chaska; aesthetic/streetscape improvements, and a 3-lane TH 41 (Chestnut Street) facility with parking on both sides. The Downtown Master Plan states "the desired future Chestnut Street/MN Highway 41 is contingent upon many factors, including MnDOT approval, a reduction in projected traffic counts due to a new MN Highway 41 river crossing, and a change in the type of traffic from regional (through traffic) to downtown destination type traffic."
- The City of Chaska and MnDOT convened a TH 41 (Chestnut Street) Task Force in 2005-2007 to create a corridor vision for the roadway through downtown. A Memorandum of Understanding (MOU) was adopted by both agencies in 2009 identifying the intentions of each agency to implement the corridor vision. MnDOT and the City negotiated Phase I of the improvements to include the installation of an unwarranted traffic signal on TH 41 (Chestnut Street) at 2nd Street in exchange for a raised median along TH 41 (Chestnut Street) to prohibit left turns to and from the highway at 1st, 3rd and 5th Streets. Phase I improvements were constructed in 2010. Phase II improvements were planned to be completed in 2014, but have not yet been constructed. The CSAH 61/TH 41 Improvements Project will identify improvements to TH 41 (Chestnut Street) through downtown for implementation in conjunction with MnDOT's 2019 pavement project.

2. CSAH 61 (Chaska Boulevard) is an important transportation corridor for the region and for the City of Chaska.

- In 2008, TH 212 was relocated approximately two miles north as it was converted to a freeway. This relocation had major impacts to the businesses that fronted the original alignment, now known as CSAH 61 (Chaska Blvd), as traffic volumes dropped from approximately 12,000-19,000 ADT in the year 2000 to 7,000 to 9,000 ADT in 2012.
- Today, CSAH 61 (Chaska Blvd) is an A-Minor Arterial roadway with an average daily traffic in the range of 8,300 and 13,600 in the downtown subarea. CSAH 61 (Chaska Blvd) is a four-lane undivided highway with turn lanes in this area from the bridge over West Chaska Creek through Yellow Brick Road where it then transitions to three lanes.
- CSAH 61 (Chaska Boulevard) is also an important regional freight corridor serving gravel and sand mining and seasonal grain deliveries from western Minnesota to the Ports of Savage through connections to both the TH 41 and CSAH 101 river crossings. Within the downtown subarea, approximately 1,350 trucks per day use CSAH 61 (Chaska Boulevard) west of TH 41 (Chestnut Street) and over 800 trucks per day use CSAH 61 (Chaska Boulevard) east of TH 41 (Chestnut Street).
- CSAH 61 (Chaska Boulevard) is a turnback corridor eligible for MnDOT turnback funds. Turnback funds may be used on released trunk highway routes that have been added to a county's state aid system. Turnback funds may pay for any costs that are eligible for regular



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state aid funding including: road or bridge construction, right-of-way (ROW), engineering, and utility relocation.

- Approval of plans for the construction of a turnback project is limited to a period of 15 years from the date of reversion. The CSAH 61 turnback was initiated in 2010; therefore, all eligible turnback projects must be completed by 2025.
- CSAH 61 (Chaska Boulevard) provides the only full movement access to the northerly edge of downtown Chaska.

OPERATIONS AND SAFETY:

1. TH 41 (Chestnut Street) operations and safety within downtown Chaska:

- From the Minnesota River Bridge to CSAH 61, TH 41 currently carries an average of 18,400 vehicles per day. In 2010, the TH 41 median project through Chaska removed full accesses at many locations. Full accesses remain at the existing signals at CSAH 61, 4th Street and 2nd Street.
- The directional distribution of daily vehicle movements on TH 41 (Chestnut Street), south of CSAH 61 (Chaska Blvd), is nearly an even 50-50 split between northbound and southbound traffic. This directional split is also represented throughout the day with the difference in northbound/southbound trips never varying by more than 10% in a given hour.
- Today, the four-lane divided roadway acts similarly to a four-lane undivided section due to the lack of turn lanes. The lack of turn-lanes is a safety concern as vehicles stop in the through lane to wait to make a turn.
- The medians installed in the Phase I improvements block access across TH 41 (Chestnut Street) at 1st, 3rd, and 5th Streets. The lack of access to those streets has had negative financial consequences for the businesses and property owners located on those streets. These streets have the highest long-term vacancy rates in the downtown.
- The intersections on TH 41 (Chestnut Street) currently operate at an acceptable Level of Service (LOS) per commonly accepted engineering guidance. This means there is a reasonably stable flow on TH 41 (Chestnut Street) but at major intersections, such as the TH 41/CSAH 61 intersection, the ability to maneuver through lanes is noticeably restricted and lane changes require more driver awareness. Because of the traffic volumes on TH 41 (Chestnut Street), the side streets intersecting with it in the downtown experience delays during the heaviest traffic periods of the day. These side street delays are considered unacceptable per engineering guidance on LOS.
- 49 crashes occurred along the TH 41 (Chestnut Street) corridor from CSAH 61 (Chaska Blvd) and the river between 2010 and 2014. The majority of these crashes occurred at the existing traffic signals at 4th Street and 2nd Street. None of the crash locations exceed statewide averages. The critical crash index for this segment of road is 0.91 which is near the threshold of 1.0. The critical crash rate provides an indication of the statistical significance of crashes occurring at a given location. It accounts for the design of the facility, type of intersection control, amount of exposure, and the random nature of



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crashes. Additional study is recommended for intersections or segments with critical crash rates greater than 1.0 since it is likely a geometric change could improve safety.

- One fatal pedestrian crash occurred in 2008 at the intersection of TH 41 (Chestnut Street) and 2nd Street prior to the traffic signal installation. Two non-incapacitating injury crashes involving a pedestrian/bicycle occurred at 4th Street in 2009 and 2015 with a traffic signal in-place.
- The existing right-of-way on TH 41 (Chestnut Street) through the downtown area is limited to 80 feet. There are no setbacks from buildings to the roadway in the downtown commercial area, therefore limiting the potential for additional right-of-way acquisition.
- From CSAH 61 to CSAH 10 (Engler Blvd), TH 41 currently carries an average of 19,500 vehicles per day. Today, TH 41 has two northbound through lanes and one southbound lane for the majority of this segment. A trail/sidewalk is provided along both sides of the roadway and boulevards vary in width where ROW is available. ROW is limited where TH 41 navigates between Fireman's Clayhole Lake and Brickyard Clayhole Lake.

2. The CSAH 61/TH 41 intersection is a limiting factor when considering overall mobility through the downtown Chaska subarea.

- The intersections on CSAH 61(Chaska Blvd) currently operate at an acceptable LOS according to commonly accepted engineering standards. During the heaviest travel periods of the day, vehicle delays are observed for both the eastbound and westbound CSAH 61 approaches to the TH 41 traffic signal. Backups at the TH 41 and CSAH 61 intersection occasionally extend into adjacent intersections on the east, west, and south legs of approach.
- Traffic volumes through the TH 41/CSAH 61 intersection are relatively stable throughout all hours of a typical weekday (6 am to 7 pm). The morning (7-9 am) and evening (3-6 pm) hours are the heaviest traffic periods of the day with traffic volumes increasing by 60 to 100 percent through the intersection compared with off-peak conditions.
- There were 20 crashes at the TH 41 and CSAH 61 intersection between 2010 and 2014. The majority of crashes were rear end and right angle crashes. One crash involved a bicycle. Crash rates were below statewide averages at this intersection.
- At the intersection of TH 41, CSAH 61 is a four-lane undivided highway with eastbound and westbound left turn lanes and a westbound right turn lane. The existing ROW on CSAH 61 at the intersection of TH 41 is 84' on the west approach and varies from 84-90' on the east side.
- The TH 41/CSAH 61 intersection services the highest entering traffic volumes of all intersections in the downtown subarea. Constraints on all four quadrants of this intersection will make it a challenge to address operational issues without impacts to existing buildings and a historic property (Dolce Vita Wine Shop).



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PEDESTRIAN/BICYCLE TRANSPORTATION:

1. Both TH 41 (Chestnut Street) and CSAH 61 (Chaska Blvd) are challenges to pedestrians and bicyclists in downtown Chaska.

- TH 41 (Chestnut Street) and CSAH 61 (Chaska Blvd) in downtown Chaska are high volume corridors with four-lanes of traffic creating challenges to east-west and north-south movements of pedestrians and bicyclists.
- Land use within downtown Chaska is conducive to pedestrian trips. The close proximity of multiple businesses, services and residential complexes encourage foot traffic along and across the business district and both TH 41 (Chestnut Street) and CSAH 61 (Chaska Blvd).
- Both TH 41 (Chestnut Street) and CSAH 61 (Chaska Blvd) have two-lanes in each direction within the downtown area which requires vehicles in both lanes to stop for pedestrians to cross at unsignalized locations. This is a safety concern if the first vehicle stops to wait for the pedestrian to cross and the vehicle in the second lane does not stop.
- Pedestrian crosswalks on TH 41 (Chestnut Street) are located at each of the traffic signals (CSAH 61, 4th Street and 2nd Street) and at the following unsignalized locations: 5th Street, 3rd Street and 1st Street. The unsignalized locations do not provide the necessary 6-feet of width between the back of curb and back of curb as required by the Americans with Disabilities Act (ADA) for a safe pedestrian refuge within the roadway median.
- Sidewalks are located along both sides of TH 41 (Chestnut Street) in downtown Chaska. The width of these existing sidewalks varies between 6 and 9 feet. The parking lane serves as a buffer to the sidewalk on the east side of the roadway between 1st and 5th Streets. There is no parking or buffer to the sidewalk on the west side of TH 41 (Chestnut Street).
- Chaska's Downtown Master Plan recommends parking on both sides of TH 41 (Chestnut Street) which also serves as a buffer for pedestrians on the sidewalks.
- The Downtown Master Plan recommends development of paseos, or walkways along current mid-block alleys, to provide north-south connections in the downtown area off of TH 41 (Chestnut Street) linking parking with alternative business entrances.
- The City of Chaska does not allow bicycles on sidewalks. Their policy discourages bicycles on concrete (sidewalks) and encourages their use on city paths/trails to separate bicycles from pedestrians. There are no separated bicycle facilities on TH 41 (Chestnut Street).
- There were 7 crashes involving pedestrians and/or bicyclist between 2010 and 2014 in the downtown subarea.
- The Firemen's Park/Chaska Curling Center/Chaska Event Center redevelopment has increased pedestrian crossings of TH 41 (Chestnut Street) and CSAH 61 (Chaska Blvd) due to overflow parking areas located across these roadways. The City has requested MnDOT consider a HAWK (high intensity activated cross walk) system on TH 41 (Chestnut Street) near Walnut Street to accommodate pedestrians crossing in that area. The CSAH 61 (Chaska Blvd) RRFB (Rectangular Rapid Flashing Beacon) that was recently installed has



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raised concern as some vehicles have been observed not stopping. This location will continue to be monitored and evaluated in this study.

2. Several local and regional trails converge in downtown Chaska.

- Carver County Regional Rail Authority owns the former railroad that runs parallel to CSAH 61 (Chaska Blvd) through the downtown Chaska subarea. The City has plans to pursue a local trail connection on this right-of-way in the future if a logical connection across TH 41 (Chestnut Street) can be identified. Currently, this former railroad right-of-way crosses TH 41 150' south of the CSAH 61/TH 41 intersection. Both the City and MnDOT agree this location is not desirable for a future at-grade trail crossing due to its proximity to the CSAH 61/TH 41 signalized intersection.
- TH 41 is designated as a proposed Regional Bicycle Transportation Network (RBTN) - Tier 2 Alignment in the Metropolitan Council's Regional Bicycle System Study. Regional bikeways are corridors that serve as the backbone arterial system connecting city and county bikeways with regional destinations. The Metropolitan Council notes that due to the physical constraints of TH 41 right of way through downtown Chaska, a parallel alternative alignment for the bikeway may be desired in the downtown area. Proposed changes to the RBTN through downtown Chaska would be eligible for consideration during the next update to the Metropolitan Council's Transportation Policy Plan. That process is scheduled to begin in 2017.
- TH 41 and CSAH 61 form the nexus of three RBTN corridors (where alignments have not been designated). A Tier 1 corridor connection downtown Chaska to the Southwest Regional Trail (to the northeast); a Tier 2 corridor connects downtown Chaska to Scott County via the future Minnesota River crossing (to the southwest); and a Tier 2 corridor connects downtown Chaska to Waconia (to the northwest).
- Carver County's goal is to identify a north-south connection in downtown Chaska to connect the Southwest Regional Trail to the Levee Trail. The County recognizes this future connection does not need to be on TH 41 (Chestnut Street).

DOWNTOWN CHASKA CONTEXT:

1. Land use and redevelopment context:

- Chaska was founded in 1852 as a free-standing City. It continues to be an active and evolving economic center and regional attraction. Chaska is home to more than 175 businesses.
- Chaska has experienced strong population growth over the past two decades. The city grew from a population of 11,513 in 1990 to 24,749 in 2010. The city's population is expected to continue to grow into the future.
- The Chaska Downtown Master Plan set a vision for future downtown Chaska to "revitalize downtown Chaska as the hub of community destinations and gathering places that reflect and celebrate the city's historic character, traditional small town atmosphere and values."

- Existing land uses along TH 41 (Chestnut Street) within the downtown subarea include commercial/retail, residential, mixed-use, and institutional. Existing land use on CSAH 61 in the downtown subarea is a mix of commercial/retail, industrial, recreational, and residential.
- The Downtown Master Plan includes future downtown land use patterns dominated by mixed-use blocks along TH 41 (Chestnut Street), business/industrial employment redevelopment on downtown's edges, and additional higher density residential along the riverfront and near the downtown core.
- There are several properties that are intended for redevelopment within the downtown subarea. These include:
 - a. City Square West Site – planned as mixed-use “Main Street” block including a potential public library, public parking structure, retail, office, residential, Brick City Paseo connection and transit park and ride facility.
 - b. Previous Lumber Yard Site – a potential industrial development is currently under consideration
 - c. School Bus Garage Redevelopment Site – future office space and multi-family residential
 - d. Total Loss Redevelopment Site – future high density residential
- The Firemen's Park location is the site of a recent redevelopment including large municipal recreation building housing a banquet center, restaurant, and a curling facility. Since its recent opening, this facility has been highly successful in attracting both daily business and large events.

2. The historic context is important in downtown Chaska.

- Downtown Chaska provides a historic setting containing many 19th century structures.
- The Walnut Street National Historic District is located along the east side of TH 41 (Chestnut Street) and contains several properties listed on the National Register, eligible for the National Register and locally designated as historic.
- Several properties surrounding TH 41 (Chestnut Street) in the downtown are listed or eligible for listing on the National Register of Historic Places. This includes the former railroad depot in the southeast corner of the TH 41/CSAH 61 intersection.
- City Square Park, part of the Walnut Street National Historic District, is located east of TH 41 (Chestnut Street) between 3rd and 4th Streets and contains burial mounds.
- The City of Chaska's Historic Preservation Committee has identified several other properties within the downtown Chaska subarea as locally significant. These include several properties along TH 41 (Chestnut Street) in downtown, outside of the Walnut Street National Historic District, as well as the Clayhole Lakes along TH 41 north of CSAH 61.

3. The ambience of a small town downtown is challenging in Chaska due to vehicular traffic on TH 41 (Chestnut Street) and CSAH 61 (Chaska Blvd).

- TH 41 (Chestnut Street) is Chaska's Main Street. Generally, Main Streets are characterized by:
 - Compact mixed-use buildings which are spaced closely together;
 - Buildings which are historic or have unique character;
 - Short block lengths with access every block;
 - Interconnected local street networks;
 - Wide sidewalks;
 - Convenient on-street parking; and
 - Pedestrian friendly (particularly the young and the elderly)
- The City of Chaska has concerns with truck traffic having a negative impact on downtown Chaska. These concerns relate to: safety, traffic congestion, noise, odor and dust and particulate matter.
- The air quality in the TH 41 (Chestnut Street) corridor is a concern to the City of Chaska. The City has had difficulty growing flowers adjacent to the corridor. The City has identified a noticeable difference between the wear and color of historic brick buildings on TH 41 (Chestnut Street) compared to those off of the corridor. "Chaska" brick is a relatively soft cream colored brick, indigenous to the Chaska area. The City suspects exhaust and particulate matter from truck and vehicle traffic on TH 41 (Chestnut Street) has had a negative impact on the historic brick. Their concerns with air quality also extend to City Square Park (including its Native American Burial Mounds), Firemen's Park/Veteran's Park, Mount Pleasant Cemetery, and adjacent sidewalks where large groups congregate.
- MnDOT's Cultural Resource Unit (CRU) reports that air quality is generally not something they take into account when assessing historic effects because there are multiple other factors that may contribute to degrading brick such as acid rain, water infiltration, freeze/thaw cycles and improper maintenance.
- The noise in the TH 41 (Chestnut Street) corridor is a concern to the City of Chaska. The City identifies noise negatively impacts the downtown pedestrian setting and the ability of downtown to effectively function as an outdoor gathering space.

DOWNTOWN VEHICULAR CIRCULATION, ACCESS, AND PARKING:

1. Downtown Subarea Circulation and Access:

- TH 41 (Chestnut Street) is a major barrier to east-west movements of local traffic in downtown Chaska. Existing full access intersections on TH 41 are located at CSAH 61, 4th Street and 2nd Street.
- Access into downtown Chaska from CSAH 61 (Chaska Blvd) is provided at Walnut Street, Pine Street and Cedar Street.
- Chaska's Downtown Master Plan identifies potential roadway alignments and connections to enhance the permeability of access into and out of downtown on roads other than TH 41 (Chestnut Street) and CSAH 61 (Chaska Blvd). These include joining Oak Street to Yellow



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Brick Road; Stoughton Avenue with Fire Lane and extending Fire Lane to Yellow Brick Road; Cedar Street to Creek Road; and a direct connection of Hickory Street to West 4th Street; and eliminating the median on TH 41 (Chestnut Street).

- The addition of roadway connections into and out of downtown Chaska, along with continued use of the in-place grid network, is important for both circulation through downtown, supporting efficient traffic operations on TH 41 and in order to access the downtown businesses.
- The Firemen's Park/Chaska Curling Center/Chaska Event Center has two access points onto CSAH 61 (Chaska Blvd) which align with both the Pine Street and Cedar Street intersections. The eastern access aligns with Pine Street where eastbound vehicle queues at TH 41 (Chestnut Street) frequently extend through the intersection during peak traffic periods. Pedestrians are generally most prevalent between the Firemen's Park/Chaska Curling Center/Chaska Event Center and overflow parking areas south of CSAH 61 (Chaska Blvd) during non-peak periods. The number of crossing, turning and through vehicle and pedestrian movements occurring on CSAH 61 (Chaska Blvd) between Cedar Street and TH 41 (Chestnut Street) is substantial.

2. Parking:

- Parallel parking spaces are located on the east side of TH 41 (Chestnut Street) from 1st Street to 5th Street. There is no parking on CSAH 61 (Chaska Blvd) in the downtown sub-area.
- Many of the downtown streets offer diagonal on-street parking while the rest of the streets offer parallel parking. In total, there are approximately 620 public on-street parking spaces today in the downtown core area (defined by the Downtown Master Plan).
- Off-street parking in downtown is provided by both public and private surface parking lots. There are approximately 100 public parking spaces between two public surface lots downtown and 450 parking spaces provided by the private sector.
- As part of the Downtown Master Planning process, a high-level parking analysis was undertaken that looked at four quadrants in the downtown core, with TH 41 (Chestnut Street) and 3rd Street as the dividing lines. The analysis found all four quadrants have sufficient parking available to meet the needs of existing development. The City notes convenient on-street parking is important for downtown retail businesses and is currently in short supply, but in high demand. Other findings were issues with business owner/employee vs. customer parking needs, inadequate signage/enforcement of the 2-hour parking program, additional diagonal parking opportunities, and lack of parking on the west side of TH 41 (Chestnut Street).
- The Downtown Master Plan recommends development of a Downtown Parking Management Plan to manage parking to ensure adequate quantity, convenience, and quality of parking areas. The Downtown Master Plan also recommends negotiating with MnDOT to redesign TH 41 (Chestnut Street) with on-street parking on both sides through downtown.



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- The City of Chaska's Firemen's Park/Chaska Curling Center/Chaska Event Center opened in late 2015 in the northwest quadrant of TH 41 (Chestnut Street) /CSAH 61 (Chaska Blvd). This development has an off-street parking lot on site; however, large events require use of nearby on-street parking for overflow, typically during evening events outside of peak traffic hours. Common overflow parking areas are located south of CSAH 61 (Chaska Blvd) on Pine Street, Cedar Street, and in the public parking lot adjacent to City Hall. Recently it has been observed some are using Cooper's Country Market parking lot, east of TH 41 (Chestnut Street), for overflow parking.

INFRASTRUCTURE CONDITION:

1. Infrastructure Condition:

- Due to the aging pavements on TH 41 (Chestnut Street), MnDOT has programmed a pavement improvement project on TH 41 (Chestnut Street) from CSAH 61 (Chaska Blvd) to the Minnesota River in 2019. The last bituminous overlay was completed in 1998 and is now requiring more than routine maintenance to repair cracks, potholes and rutting issues.
- MnDOT anticipates the 2019 pavement improvements on TH 41 (Chestnut Street) will be adequate for 15-17 years with regular mill and overlays planned every 17 years.
- The CSAH 61 (Chaska Blvd) pavement condition is serviceable, but is beginning to show wear and minor deterioration throughout the project area. MnDOT last completed a mill and overlay project on this segment of the CSAH 61 corridor in 2007.
- The City of Chaska has both sanitary sewer and main water within the TH 41 and CSAH 61 corridors. The condition of these utilities will be evaluated to identify improvement needs.
- The CSAH 61 Bridge (Bridge No. 10002) spanning Chaska Creek was initially designed and installed by MnDOT in 1975. The channel underneath the roadway was constructed by the US Army Corps of Engineers in 1996 as part of a flood control project. The roadway was turned over to Carver County in 2010. Today the bridge is classified as structurally deficient. Factors in this rating include cracks in the bridge deck, moisture leakage causing slab panels to rust, broken and rusted prestressing strands, and lack of load transfer between joints.
- Due to the bridge condition, in 2014 Carver County implemented interim safety measures by eliminating traffic over the north side of the structure and reducing lanes across the structure. This measure will remain in place until a replacement structure can be planned and constructed unless the bridge condition degrades further and requires load posting to reduce further wear on the structure. Project partners are working together to identify a replacement project in 2017 while the bridge continues to be closely monitored.
- The condition of the sidewalks along both sides of TH 41 (Chestnut Street) was recently evaluated by MnDOT during an Americans with Disabilities Act (ADA) field walk. This revealed deteriorated sidewalk conditions in some locations with inconsistencies in the pedestrian access route caused by heaving of existing pavers. Many curb ramps throughout the corridor also require replacement due to lack of an adequate landing area or presence of attributes (slope, trip hazards, etc.) not in compliance with ADA requirements.



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TRANSIT CONSIDERATIONS:

1. Transit Considerations:

- SouthWest Transit provides an on-demand service called SouthWest Prime within Chaska, Chanhassen, and Eden Prairie. Users may request a shared ride to/from any location within these communities.
- There are currently two SouthWest Transit routes that go through Downtown Chaska including the 691 and 699D routes. These routes travel on Stoughton Avenue to Beech Street, on to E 4th Street and north on Walnut Street to Yellow Brick Road.
- Transit stops are located at the following locations along these routes within the downtown:
 - a. Audubon Road and Stoughton Avenue
 - b. Zemble Street and Stoughton Avenue
 - c. Ringenbach Street and Stoughton Avenue
 - d. Boldt Street and Stoughton Avenue
 - e. E 7th Street and Stoughton
 - f. E 6th Street and Stoughton
 - g. Beech Street and E 4th Street
 - h. Maple Street and E 4th Street
 - i. Ash Street and E 4th Street
 - j. Walnut Street and E 4th Street
 - k. Oak Street and E 4th Street
 - l. Walnut Street and CSAH 61
 - m. CSAH 61 and Yellow Brick Road.
- A transit park and ride facility is located between 5th Street and CSAH 61 on N Walnut Street. This is a surface lot with parking for 40 vehicles.
- The City of Chaska's Downtown Master Plan proposes a future transit park and ride facility on the City Square West redevelopment site.
- SouthWest Transit does not have current plans to expand transit service within Chaska. The only exception to this is current discussions between the City and SouthWest Transit to provide shuttle service between the East Creek Transit Station and the Firemen's Park/Chaska Curling Center/Chaska Event Center during events.
- There are currently no bus pull-off areas located on CSAH 61 near the Firemen's Park/Chaska Curling Center/Chaska Event Center. If traffic on CSAH 61 increases and transit



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ridership increases and/or shuttle service to the Firemen's Park/Chaska Curling Center/Chaska Event Center becomes real, bus pull-offs may need to be considered.

ENVIRONMENTAL CONSIDERATIONS:

1. Environmental considerations in the downtown subarea:

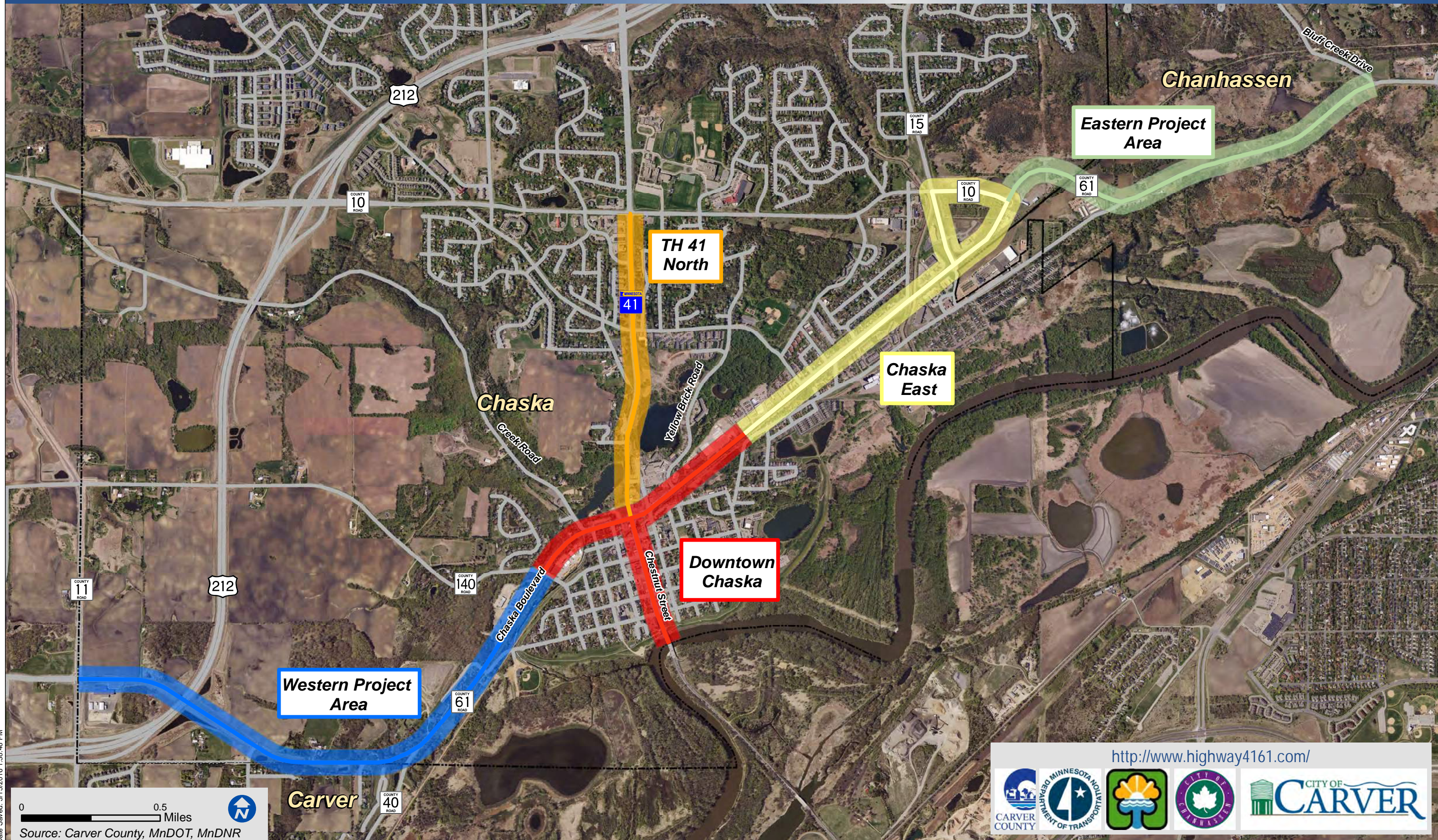
- The majority of the downtown subarea is located within the Lower Minnesota Watershed District. Areas north of CSAH 61 and west of TH 41 (Chestnut Street) are located within Carver County Watershed Management Organization.
- There is currently no stormwater treatment along CSAH 61. Existing CSAH 61 stormwater primarily includes ditches draining from the road system to the Minnesota River.
- TH 41 (Chestnut Street) stormwater is collected and is directed to the Minnesota River (an impaired waterway) untreated.
- A thorough investigation of stormwater issues and opportunities has not been completed for the project area. As roadway improvement alternatives are developed, an analysis of stormwater treatment options and opportunities will be discussed with the watershed management organizations, watershed districts, and local agencies.
- Roadway improvements will need to meet or exceed stormwater management requirements. Next steps in the project include a meeting with the project's water resources team to discuss resources, jurisdiction, requirements, and opportunities. All stormwater related discussions including jurisdiction and requirements will be documented through meeting minutes, goals and objectives, and in the final project documentation.



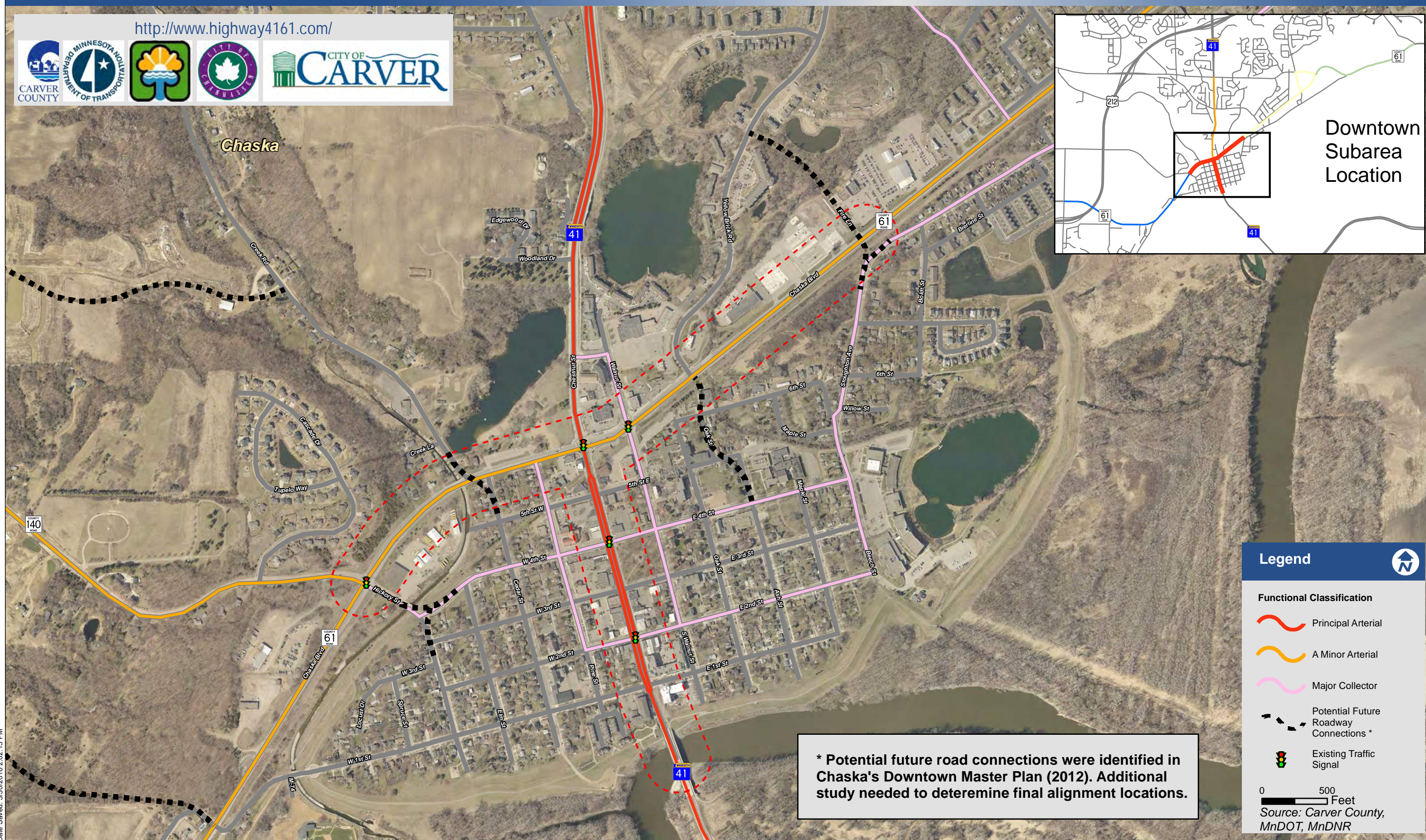
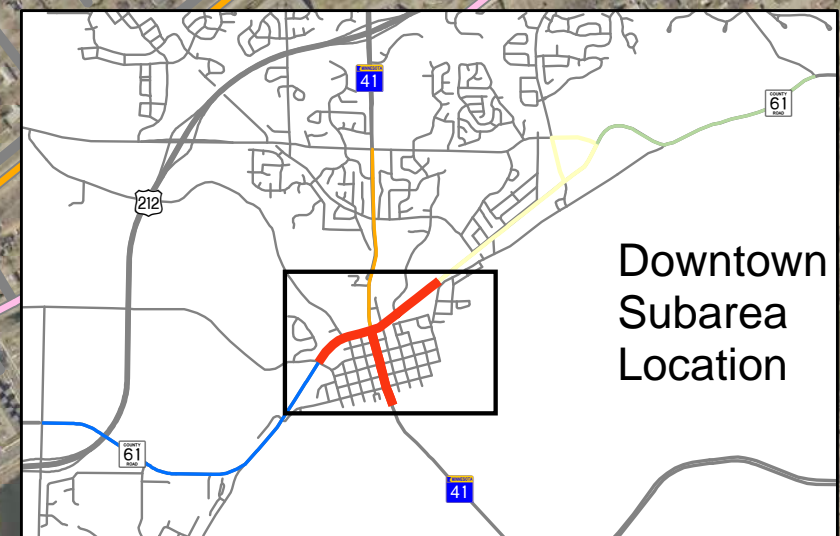
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* Potential future road connections were identified in Chaska's Downtown Master Plan (2012). Additional study needed to determine final alignment locations.

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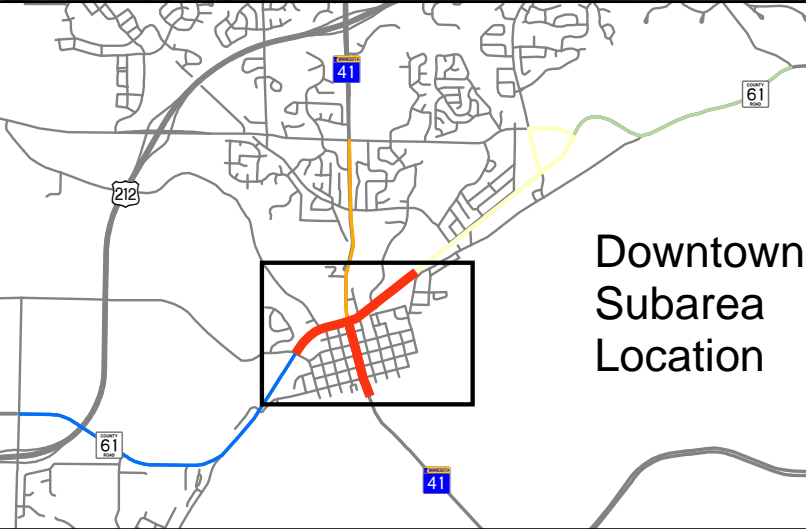
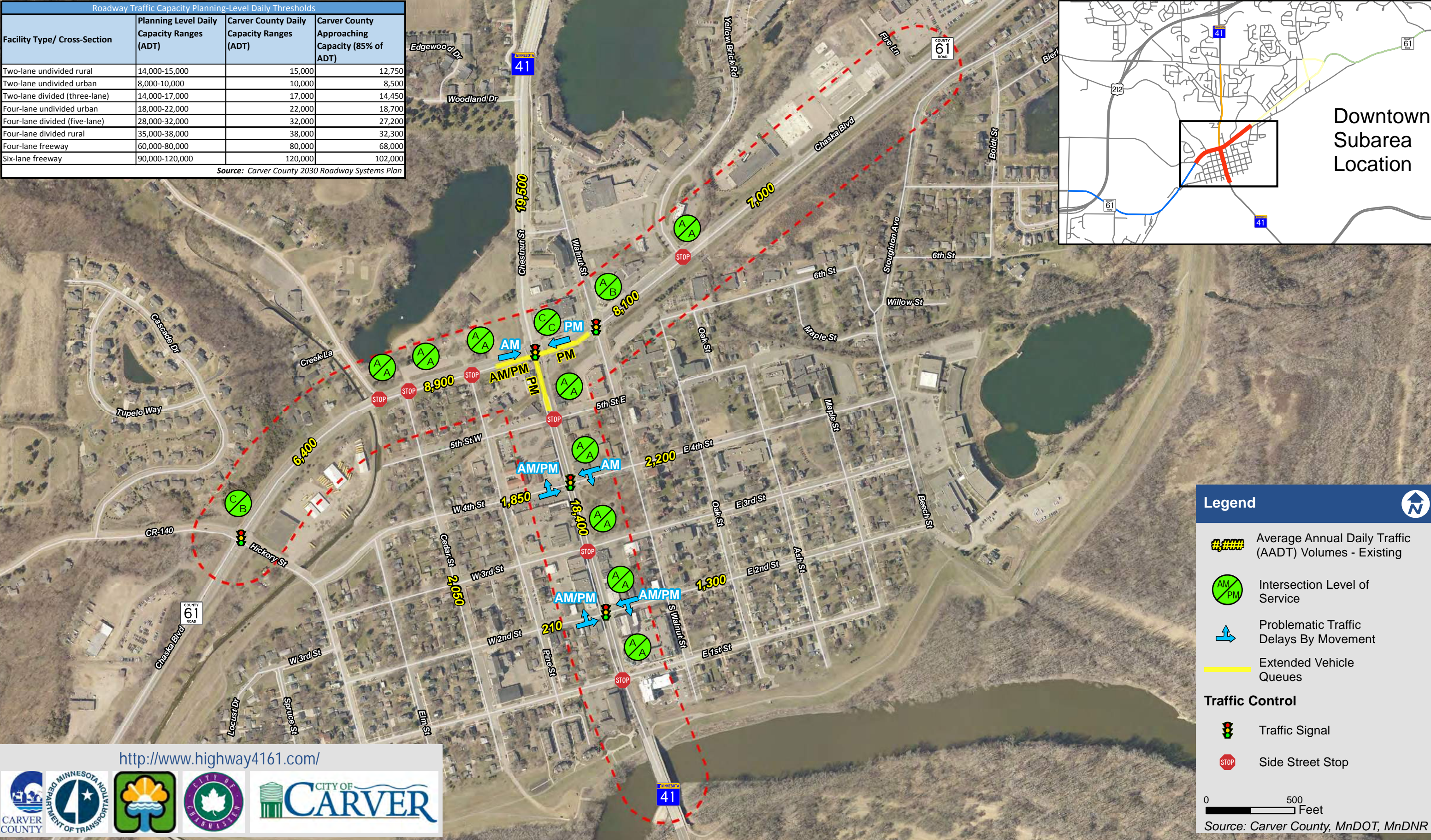
Functional Classification

- Principal Arterial
- A Minor Arterial
- Major Collector
- Potential Future Roadway Connections *
- Existing Traffic Signal

0 500 Feet
Source: Carver County, MnDOT, MnDNR

Roadway Traffic Capacity Planning-Level Daily Thresholds			
Facility Type/ Cross-Section	Planning Level Daily Capacity Ranges (ADT)	Carver County Daily Capacity Ranges (ADT)	Carver County Approaching Capacity (85% of ADT)
Two-lane undivided rural	14,000-15,000	15,000	12,750
Two-lane undivided urban	8,000-10,000	10,000	8,500
Two-lane divided (three-lane)	14,000-17,000	17,000	14,450
Four-lane undivided urban	18,000-22,000	22,000	18,700
Four-lane divided (five-lane)	28,000-32,000	32,000	27,200
Four-lane divided rural	35,000-38,000	38,000	32,300
Four-lane freeway	60,000-80,000	80,000	68,000
Six-lane freeway	90,000-120,000	120,000	102,000

Source: Carver County 2030 Roadway Systems Plan



Legend

- Average Annual Daily Traffic (AADT) Volumes - Existing
- Intersection Level of Service
- Problematic Traffic Delays By Movement
- Extended Vehicle Queues

Traffic Control

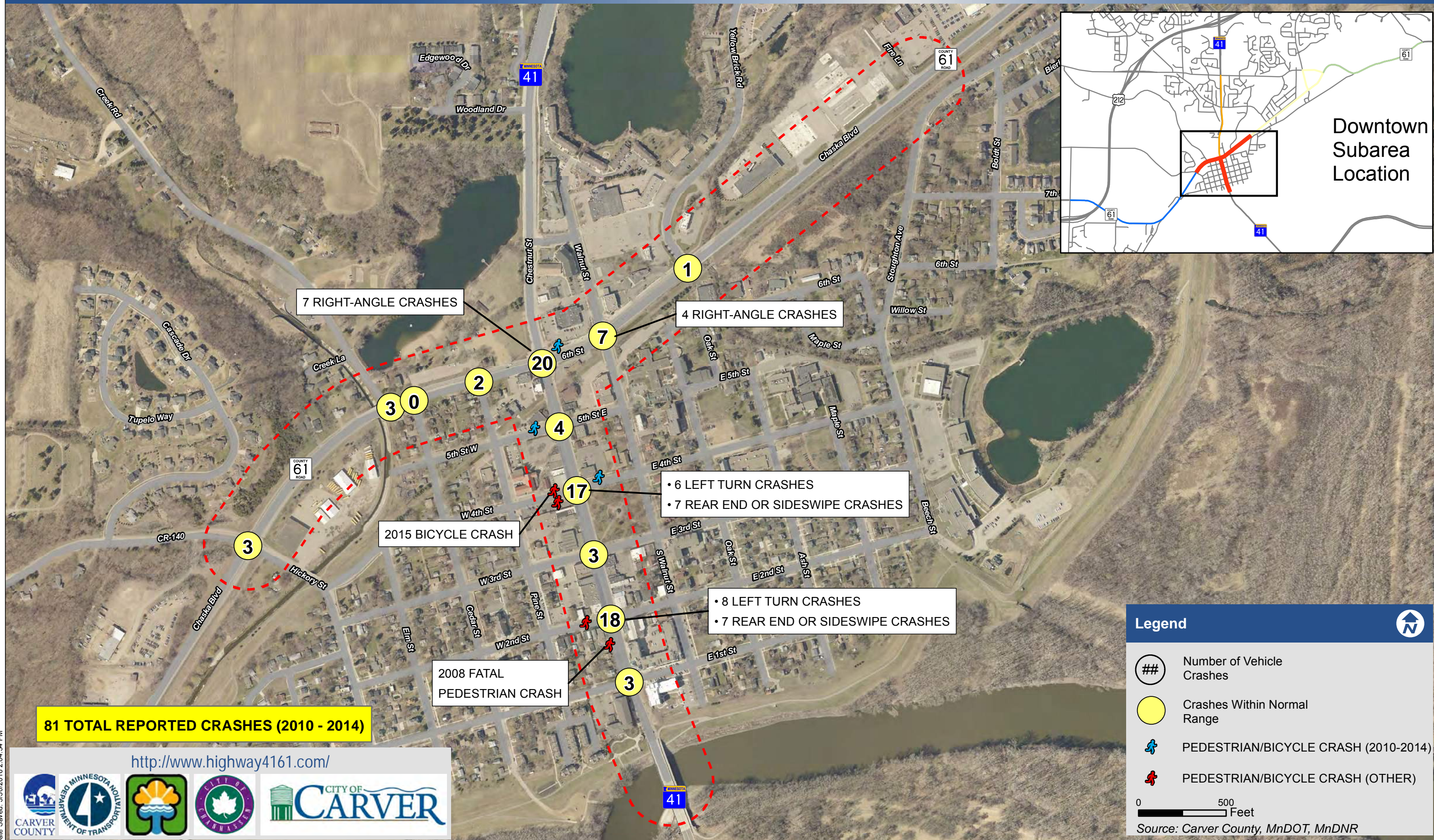
- Traffic Signal
- Side Street Stop

0 500 Feet

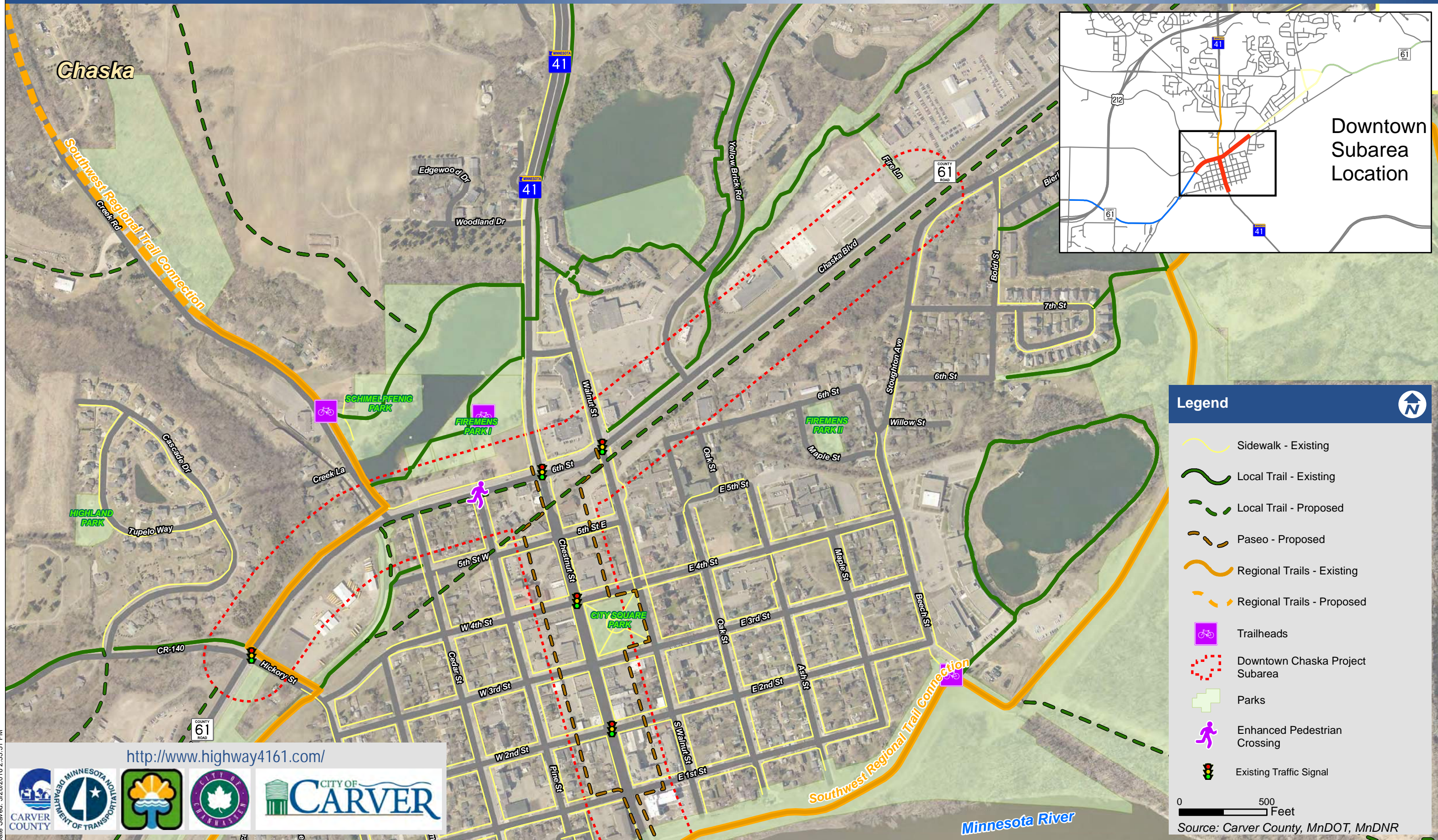
Source: Carver County, MnDOT, MnDNR

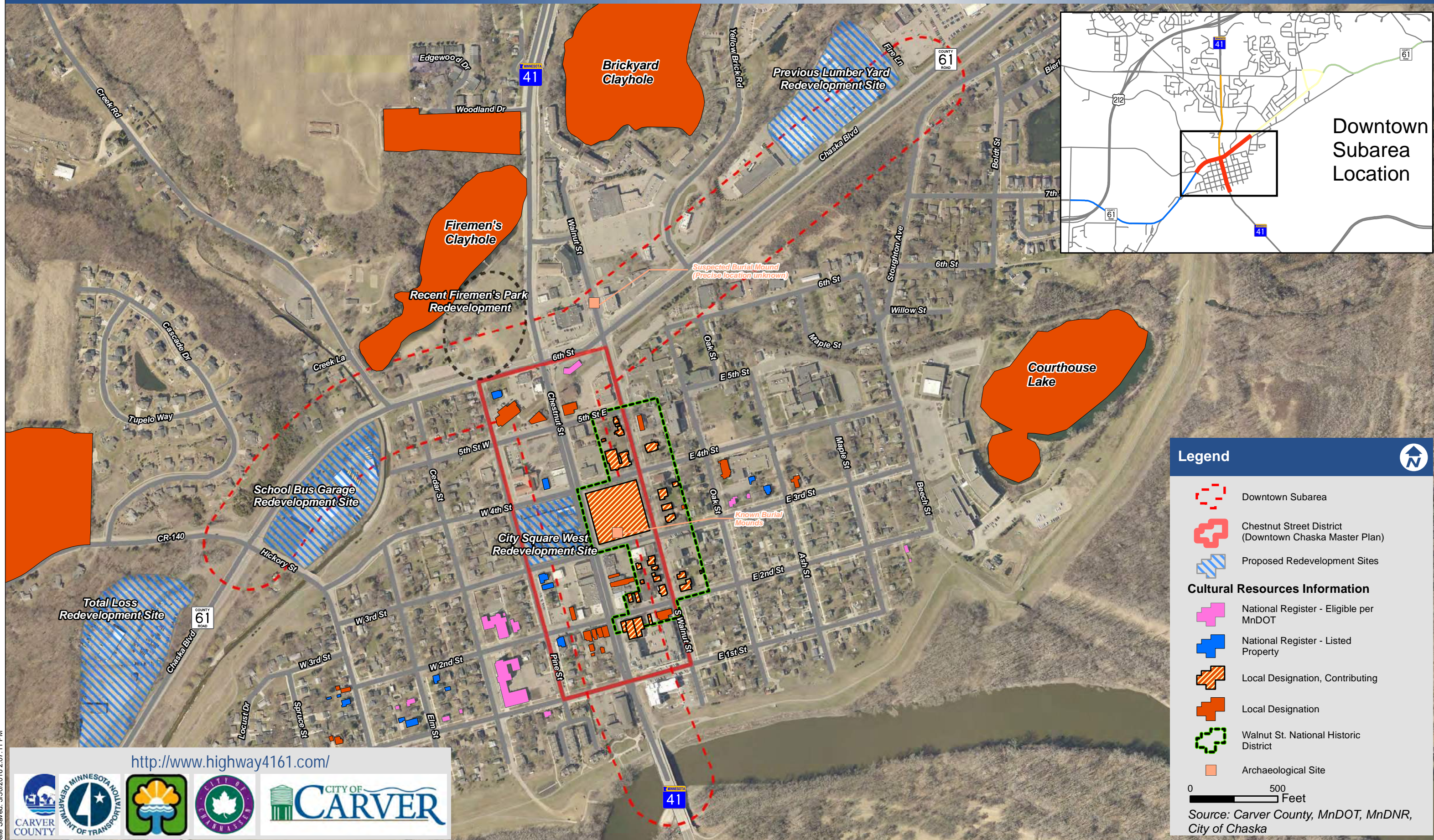
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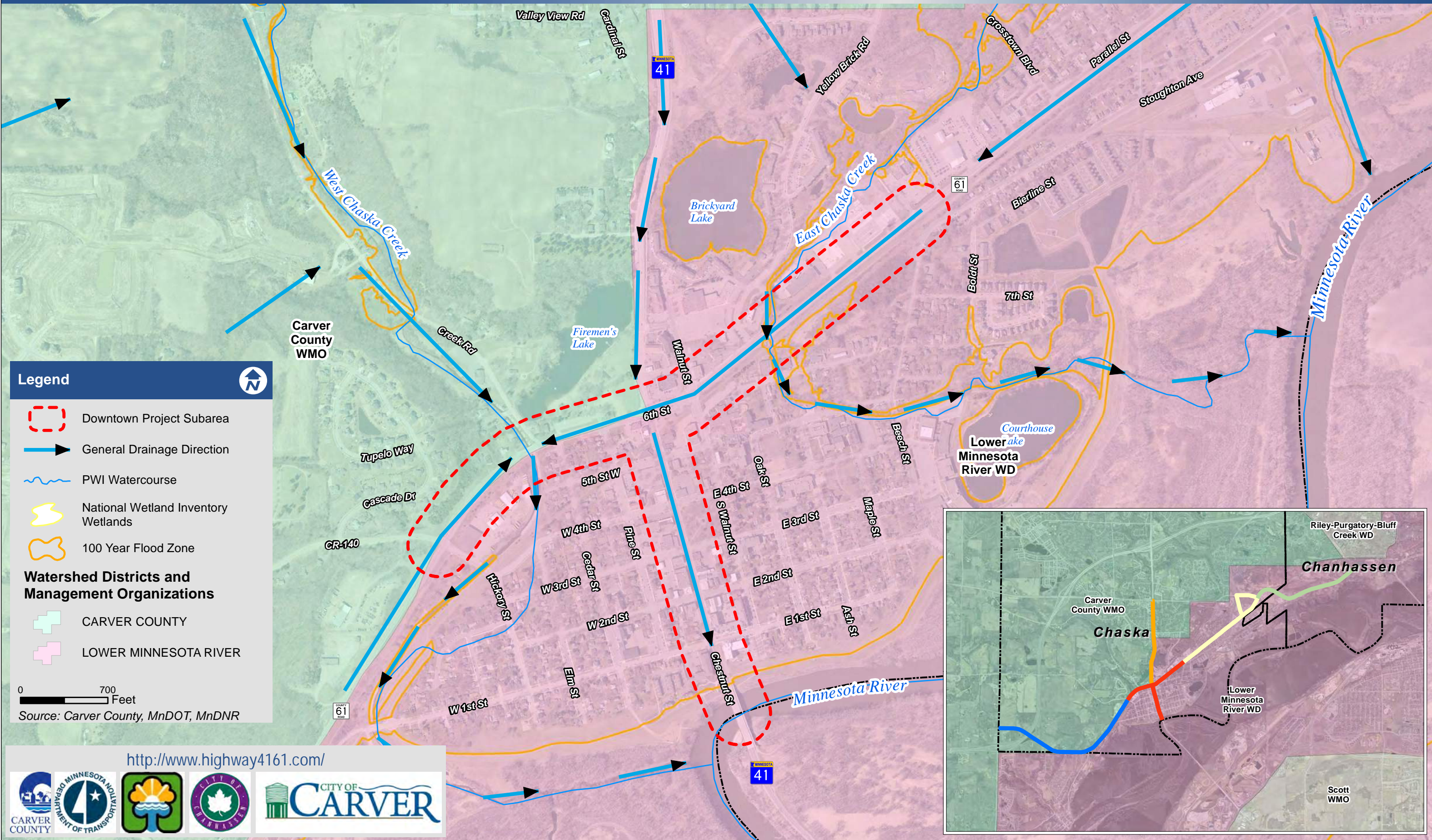


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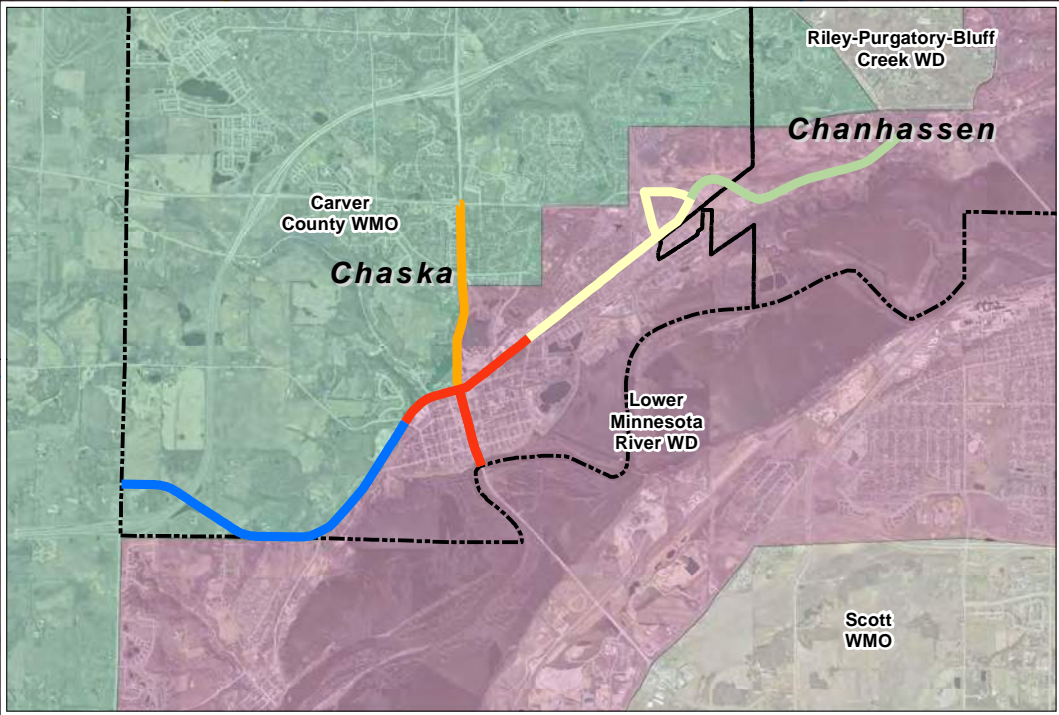
- Downtown Project Subarea
- General Drainage Direction
- PWI Watercourse
- National Wetland Inventory Wetlands
- 100 Year Flood Zone

Watershed Districts and Management Organizations

- CARVER COUNTY
- LOWER MINNESOTA RIVER

0 700 Feet

Source: Carver County, MnDOT, MnDNR



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CORRIDOR FINDINGS OF FACT

December 2016 FINAL

Carver County and the Minnesota Department of Transportation (MnDOT), in partnership with the cities of Carver, Chaska, and Chanhassen, are working together to identify transportation system improvements on County State Aid Highway (CSAH) 61 and Minnesota Trunk Highway (TH) 41. These corridors serve important roles in connecting the southwest metro area and providing access and connectivity within the local communities they serve to move pedestrians, automobile, transit and freight users alike. The project area includes CSAH 61 from CSAH 11 on the Carver/Chaska city boundaries to Bluff Creek Drive in Chanhassen; and TH 41 from CSAH 10 to the Minnesota River. The purpose of this project is to identify long-term corridor improvements needed to serve the transportation needs of the region and the communities they serve.

PURPOSE:

The project seeks to broadly understand the needs and opportunities, establish goals and objectives, develop and evaluate alternatives, reach a consensus on a recommended concept, and develop an implementation plan allowing the recommendations to be achieved in increments. As such, a higher level of understanding is required to include measurements of land use, pedestrian and bicycle usage, environmental and cultural resources, and traffic and safety operations. The analysis has uncovered several key findings for four of the five project subareas. The Downtown Chaska subarea is not included



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in this document but is examined in a separate document specific to the downtown area. This Findings of Fact will serve as the basis for guiding the development of goals and objectives as well as the development and evaluation of alternatives.

WESTERN PROJECT AREA (CSAH 44 to CSAH 11):

1. CORRIDOR IMPORTANCE/FUNCTION

- A. In 2008, TH 212 was relocated north of existing CSAH 61 as it was converted to a freeway. CSAH 61 traffic volumes, east of CSAH 40, dropped from approximately 16,000 ADT in the year 2000 to 5,700 ADT in 2010 before rebounding to approximately 9,000 in the year 2013. A similar trend in daily traffic volumes was observed throughout the remainder of the western project area.
- B. CSAH 61 currently serves as an A-Minor Arterial with existing average annual daily traffic (AADT) ranging from 6,600 to 9,000 vehicles per day (2013) in this segment of the corridor. CSAH 61 is a two-lane rural highway with turn lanes at key intersections such as CSAH 44, CSAH 40, Mt. Hope Road, and CSAH 11. An overpass exists on CSAH 61 at TH 212. The speed limit on CSAH 61 in this segment is 50 mph.
- C. Minor arterials are roadways of regional importance because they relieve, expand or complement the principal arterial system. Typically, minor arterials serve trips of moderate length providing connections to principal arterials, other minor arterials, or collectors. Minor arterials interconnect rural growth centers and urban areas inside and outside the metropolitan region. The emphasis of minor arterials remains on mobility as opposed to land access.
- D. CSAH 61 is an important regional freight corridor serving gravel and sand mining and seasonal grain deliveries from Western Minnesota to the Ports of Savage through connections to both the TH 41 and CSAH 101 river crossings that provide access to TH 169. Within the Western Project Area, Heavy Commercial Average Daily Traffic (HCADT) totals approximately 400-800 trucks per day on CSAH 61.
- E. CSAH 61 is a turnback corridor eligible for MnDOT turnback funds. Turnback funds may be used on released trunk highway routes that have been added to a county's state aid system. Turnback funds may pay for any costs that are eligible for regular state aid funding including: road or bridge construction, right-of-way (ROW), engineering, and utility relocation to improve the roadway to a state of good repair.
- F. Approval of plans for the construction of a turnback project is limited to a period of 15 years from the date of reversion. The CSAH 61 turnback was initiated in 2010; therefore, all eligible turnback projects must be completed by 2025.
- G. CSAH 61 provides the most direct east-west connection for surrounding communities to access the northerly edge of downtown Chaska.



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2. OPERATIONS AND SAFETY

- A. The intersections along CSAH 61 in the Western Project Area currently operate at acceptable Levels of Service (LOS) per commonly accepted engineering guidance. All three of the highest volume intersections with CSAH 61 including CSAH 44, CSAH 40 and CSAH 11 in this segment operate at or near free flow conditions during the heaviest travel periods of the day.
- B. There is an approximate 250 foot drop in elevation on CSAH 61 between CSAH 11 and CSAH 44. Due to the topography of the area, many horizontal and vertical curves exist on CSAH 61 and the surrounding roadway network. This results in steep ditch grades, requiring guard rail be implemented in many instances, as well as multiple skewed intersections with sight distance concerns. One particular intersection of concern is:
 - i. CSAH 61/CSAH 40 – CSAH 40 intersects CSAH 61 at an extreme skew making it difficult for users on CSAH 40 to see eastbound traffic approaching on CSAH 61. While the crash frequency for the intersection is currently within the normal range compared with similar roadway facilities throughout the state, it presents a safety issue that will likely worsen as traffic volumes continue to increase.
- C. CSAH 61 is generally a high speed, 2-lane rural roadway lined with guardrail. There are multiple horizontal curves that have speed warning signs and limited sight distance within this subarea.
- D. There were 18 total crashes within this segment from 2010 to 2014. This indicates that the segment operates within the expected, normal range when compared to similar statewide corridors.
- E. The breakdown of individual crashes at corridor intersections includes:
 - i. Six crashes at CSAH 11. Intersection traffic control changed from side-street stop control to a traffic signal in 2012. Three of six crashes were right-angle crashes with only one occurring after the installation of the traffic signal.
 - ii. Five crashes at CSAH 40
 - iii. Three crashes at Edgehill Road
 - iv. Three crashes at CSAH 44

3. PEDESTRIAN/BICYCLE TRANSPORTATION AND TRANSIT CONSIDERATIONS

- A. Currently there are no trails along CSAH 61 in the Western Project Area. CSAH 61 in this area is a 2-lane roadway with roughly 8-9 foot paved shoulders.
- B. The Southwest Chaska Preferred Growth and Development Plan looks to:
 - i. Provide a future trail along the north side of CSAH 61 between CSAH 11 and CSAH 44. This plan also identifies a potential future trail extension from Mt Hope Road across CSAH 61 and into the Southwest Growth Area development.



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- ii. Establish a greenway system that loops around the Southwest Chaska Growth Area, including the West Chaska Creek ravine, Chaska Greenbelt and proposed Big Woods Greenway.
 - iii. Connect the neighborhoods and employment districts to community destinations, commercial areas, parks and open spaces with a comprehensive trail network.
 - iv. Create identifiable and walkable residential neighborhoods in the core area between downtown and TH 212 that are well connected to downtown, neighborhood commercial nodes, civic facilities and recreational facilities.
 - v. Provide a pedestrian-oriented neighborhood commercial node along CSAH 44 with convenient connections from surrounding neighborhoods.
- C. The City of Chaska has plans to continue the existing City trail west on CSAH 44 to the Chaska City Limits where it will intersect with a proposed Carver County Bikeway.
- D. The CSAH 44 bridge over TH 212 is currently a 2-lane section with shoulders and a separated trail section for future trail connections and accommodations across the bridge.
- E. The Southwest Regional Trail Connection is proposed to continue along Creek Road through the northern portions of the southwest development area. This trail is planned to extend north at Clover Ridge Drive and eventually connect to Victoria.
- F. A trailhead exists north of Athletic Park off of 1st Street. This is the closest trailhead to the Western Project Area. Access to this trailhead is currently provided through the existing Southwest Regional Trail connection which crosses CSAH 61 at CSAH 44 and travels to the south of Chaska Creek using the Hickory Street bridge.
- G. SouthWest Transit provide an on-demand service called SouthWest Prime within Chaska, Chanhassen and Eden Prairie. Users may request a shared ride to/from any location within these communities.
- H. There are no transit stops or routes along CSAH 61 within this segment. There are no current plans to expand transit service within Chaska.
- I. The Carver Transit Station is located ¾ of a mile south of the western project terminus on CSAH 11 at Ironwood Drive. This station includes a surface lot with parking for 400 vehicles. The station is accessed by transit routes 697, 698T and 699 roughly eight times a day.

4. LAND USE – CITY OF CARVER

- A. Existing Land Use:
- i. Carver has experienced strong population growth over the past two decades as well. The city grew from a population of 744 in 1990 to 3,724 in 2010. The city's population is expected to continue to grow into the future.
 - ii. CSAH 61 borders the City of Carver in this segment. South of CSAH 61, existing land uses include medium density residential, residential unsewered,



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agricultural/vacant, low density residential, and public use.

- iii. Mills Fleet Farm was recently constructed just west of the intersection of CSAH 61 and CSAH 11.

B. Proposed Future Land Use:

- i. Planned land uses in Carver along CSAH 61 and east of CSAH 11 include primarily low and medium-density residential. Additional residential development in this area will complement mixed residential development across CSAH 61 within Chaska's Southwest Growth Area. West of CSAH 11, Carver's future land use plan calls for commercial and industrial development both north and south of TH 212.
- ii. Levi Griffin Road continues across CSAH 11 where CSAH 61 terminates and provides ample land resources for additional commercial/industrial development. It is anticipated that development will increase in this area and this will create a demand for extending Levi Griffin Road west to provide a connection to CR 43 in the future. The land both north and south of Levi Griffin Road is guided for multi-optional development and was part of The Carver Freeway Commercial District Alternative Urban Areawide Review (AUAR) discussed further in this section.
- iii. The Carver Freeway Commercial District AUAR was completed in February of 2010. This outlined two scenarios for proposed land uses for 164 acres in Dahlgren Township, adjacent to the northwestern Carver city limits. The subject property is located in the northwestern quadrant of the CSAH 11/TH 212 intersection. Scenario 1 guides proposed uses to continue as agricultural uses under the Carver County 2020 Comprehensive Plan with the land remaining largely unchanged. Scenario 2 guides proposed uses to commercial/industrial uses consistent with the City's Comprehensive Plan, bringing in approximately 920,000 square feet of commercial/industrial development. Fleet Farm was recently constructed in this area beginning the development of the commercial/industrial land uses studied in the AUAR.
- iv. A new elementary school is now being constructed in the area west of CSAH 11 and north of the Carver Transit Station, off of Ironwood Drive. The new school will open in September 2017.
- v. Additional commercial and residential land uses are planned for the area to the south of TH 212 and west of CSAH 11.

5. LAND USE – CITY OF CHAKSA

A. Existing Land Use:

- i. Chaska has experienced strong population growth over the past two decades. The city grew from a population of 11,513 in 1990 to 24,749 in 2010. The city's



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population is expected to continue to grow into the future.

- ii. Existing land uses along CSAH 61 in the Western Project Area consist primarily of agricultural, undeveloped, rural residential uses, and a few industrial uses.
- iii. The Lano Sand and Gravel pit (extractive mining use) is located near Edgehill Road along the north side of CSAH 61 across from CSAH 40.
- iv. Chaska Historical Marker, a historic MnDOT Rest Area, is located on the north side of CSAH 61 just south of the City's Total Loss Redevelopment Site. This historic Rest Area is listed on the National Register of Historic Places. This site includes a stone monument with informational plaque.

B. Proposed Future Land Use:

- i. The City of Chaska has completed extensive master planning to define future land use plans for a 1,000 acre area called the Southwest Growth Area, located between Creek Road and CSAH 61, east of TH 212. The City's plan for the Southwest Growth Area includes two neighborhoods with small retail centers containing up to 3,600 households and approximately 70,000 sq. ft. of retail. The plan calls for a mix of housing types and community facilities such as an elementary school, playfields, daycare centers, and churches. The development is planned to integrate with an extensive network of open space resources taking advantage of green corridors, a greenway loop, chain of lakes, and wooded bluffs. Residential development has begun within this growth area along CSAH 44.
- ii. The City of Chaska identified two properties intended for redevelopment within and near this subarea. The first is called the "Total Loss Redevelopment Site" located south of CSAH 44 along CSAH 61. This site is guided for future multi-family residential. The second site is called the "School Bus Garage Redevelopment Site" located south of CSAH 61 between CSAH 44 and Creek Road. This site is guided for future office space and multi-family residential.

6. ACCESS AND CIRCULATION

- A. CSAH 61 provides a connection to CSAH 11, also a minor arterial, at its western terminus. A quarter mile south of this intersection is the CSAH 11/TH 212 interchange. CSAH 11 also provides access to the City of Carver and a Minnesota River crossing turning into CSAH 9 in Scott County.
- B. The CSAH 9 river crossing in Scott County currently carries 4,750 Average Annual Daily Traffic (AADT) and is located approximately 7 miles south of the CSAH 61/CSAH 11 intersection. This crossing is one of four Minnesota River crossings in the southwestern metro area. Other river crossings include TH 41 (9 miles north of the CSAH 9 crossing – 18,400 AADT), CSAH 101 (4 miles east of TH 41 – 18,900 AADT) and TH 169 (8 miles east of TH 41 – 89,000 AADT). Note: all AADTs noted are from years 2012-2014.
- C. CSAH 61 provides access to CSAH 40, a major collector roadway, which carries 3,550 AADT



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- (2013) and provides access into the City of Carver.
- D. Carver County and the City of Carver have negotiated the turnback of CSAH 40 to the City of Carver. A Joint Powers Agreement was completed in 2009 between the City and Carver County for the design and reconstruction of CSAH 40 between CSAH 11 and Lime Street. This agreement outlined the following agency responsibilities:
- i. When the City reaches and exceeds a population of 5,000, the City will apply for Municipal State Aid (MSA) status.
 - ii. Upon receiving MSA status, the City will take over jurisdiction of existing CSAH 40 from CSAH 61 to CSAH 11 within the current city limits as a Municipal State Aid Street.
 - iii. The City and County will be jointly responsible for construction costs associated with the project as mentioned in the agreement.
- E. CSAH 61 also provides a connection to CSAH 44, a minor arterial which carries 3,300 AADT (2015). CSAH 44 connects CSAH 61 to CSAH 11 with an overpass at TH 212. The City of Chaska's Southwest Growth Plan calls for the design of CSAH 44 as a major new gateway into the community and historic downtown Chaska. The City of Chaska is also working to obtain funding for a CSAH 44 partial interchange at TH 212 that would provide access to the east.
- F. The Carver Freeway Commercial District AUAR identified extension of Levi Griffin Road to CR 43 along with a southern TH 212 frontage road between CSAH 11 and CR 43.
- G. Although not within the Western Project Area, Creek Road also connects to CSAH 61 and is an important roadway for local circulation within the west Chaska growth area. Creek Road is a local roadway and currently carries 2,100 AADT (2014). Creek Road passes underneath TH 212, connecting to CSAH 10 with no direct access to the highway.
- H. The City of Chaska's Downtown Master Plan identifies the need to provide better access into the downtown area from all directions. From the west, the City's plan proposes enhancing traffic flow between Hickory Street and 4th Street to accomplish this.
- I. CSAH 44 is planned to serve as a major new gateway and primary spine connecting downtown Chaska, CSAH 61 and the Southwest Growth Area's future residential neighborhoods and business parks.
- J. The Southwest Chaska Plan identifies phased roadway construction of future collector streets and local roadways within the Southwest Growth Area. This phased plan generally begins on the north end near TH 212 and moves south as development occurs towards CSAH 61.
- K. Another important consideration of the future roadway network in the Western Project Area is the future Minnesota River Crossing. In 2014, MnDOT completed a Tier I Final Environmental Impact Statement identifying a corridor for a future Minnesota River crossing. The crossing will connect TH 169 and TH 212, near TH 41 (Chestnut Street). The



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preferred alignment crosses the river near existing TH 41 (Chestnut Street) and travels west, south of downtown Chaska, to connect to TH 212 at CSAH 11, north of the City of Carver. The new river crossing would allow regional connections between TH 212 and TH 169..

- L. The construction of the new Minnesota River crossing remains a priority for the City of Chaska, Carver County, Scott County and MnDOT; however, funding is not included in MnDOT's 20-year fiscally-constrained transportation plan. It is unlikely this new crossing would be built in the next 20 years. Therefore, this project assumes the existing TH 41 (Chestnut Street) Minnesota River crossing will be the only river crossing in this area within the current planning timeframe. Project partners will continue to look for consistency in this project's recommendations with the Minnesota River Crossing Tier I Final Environmental Impact Statement (FEIS).

7. INFRASTRUCTURE

- A. A comprehensive analysis was completed in 2012 documenting the existing pavement condition on CSAH 61 between CSAH 11 and CSAH 44. The findings indicated that the overall condition of the pavement is good with few defects in the pavement surface. The segment from CSAH 11 to a point between Mount Hope Road and CSAH 40 was constructed from 2006-2007. The build year of the remaining segment from this point to CSAH 44 is not known, but is beginning to show minor wear and deterioration.
- B. CSAH 61 is a two-lane roadway with shoulders and rural drainage system (i.e., ditches). The topography within this subarea includes significant elevation changes and ravines directly adjacent to the roadway corridor. Changes to stormwater treatment along CSAH 61 in this area will be a challenge from both an infrastructure design and environmental regulations standpoint.

8. ENVIRONMENTAL CONSIDERATIONS

- A. This area has several small wetlands along CSAH 61 with most clustered near the TH 212 corridor.
- B. Development within Chaska's Southwest Growth Area is designed to preserve the area's sensitive and attractive natural resource features, including creek ravines, steep slopes, wetlands and woodlands. This includes:
 - i. Preserving public access to the remnant "Big Woods" area as a unique element of the community's natural landscape and heritage.
 - ii. Maintain and improve Creek Road/West Chaska Creek ravine as a unique element of the community's natural and rural landscape heritage as well as an important connection to historic downtown.
- C. The Chaska Historical Marker, a historic MnDOT Rest Area, is located on the north side of CSAH 61, just south of the City's Total Loss Redevelopment Site. The site was designed by



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Arthur R. Nichols in the 1930s. It was constructed in 1938 and has the distinction of being constructed without federal assistance. The site is listed on the National Register of Historic Places. Maintaining the two existing access points to this site off of CSAH 61 is important to its historical designation.

- D. Archaeologists recovered more than 4,000 artifacts through multiple field investigations that preceded the construction of the CSAH 101 Minnesota River Bridge project in 2014. Researchers discovered clues to how residents of the Minnesota River Valley lived, what they ate and how they networked about 7,000 years ago. Bones, stone tools and evidence of a hearth that indicated the remains of an ancient campsite were among the findings. Although this is just one recent and well publicized example, many other significant and sensitive archaeological sites representing various periods of human occupation are known, or likely exist, along the Minnesota River Valley in this vicinity.
- E. The proximity of this significant archaeological finding and others, and the similarity of context adjacent to the Minnesota River, point towards a high likelihood of archaeological resources within this portion of the CSAH 61 corridor as well. Roadway expansion or excavation outside of intensively disturbed areas will likely require archaeological studies to investigate the potential for resources in the area.
- F. There are two stormwater ponds located on the east side of TH 212 near the CSAH 61 overpass of TH 212. Beyond this, there is currently little stormwater treatment along CSAH 61. Existing CSAH 61 stormwater primarily includes ditches draining from the road system to the Minnesota River, an impaired water. Roadway improvements will need to meet or exceed stormwater management requirements.



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TH 41 NORTH – (CSAH 61 to CSAH 10):

1. CORRIDOR IMPORTANCE/FUNCTION

- A. TH 41 (Chestnut Street) is a principal arterial roadway providing a connection between two other principal arterials, TH 169 on the south and TH 212 on the north. Typically, principal arterial roadways are intended to serve high traffic volumes and carry a major portion of vehicular trips throughout the region. These roadways typically are characterized by limited access and higher mobility.
- B. TH 41 (Chestnut Street) is a unique principal arterial as it also serves a local function by providing the primary access through Chaska's downtown. Due to its Minnesota River crossing, TH 41 (Chestnut Street) through downtown Chaska is just one of a few low speed principal arterial roadways directly traversing a downtown in the Twin Cities Metropolitan Region.
- C. TH 41 (Chestnut Street) provides one of four Minnesota River crossings in the southwestern metro area which increases its importance from a regional standpoint. Currently, the TH 41 river crossing carries an average of 18,400 vehicles per day. Other river crossings are located on CSAH 9 in Jordan (9 miles south – 4,750 Annual Average Daily Traffic (AADT)), TH 101 (4 miles east – 18,900 AADT) and TH 169 (8 miles east – 89,000 AADT) in Shakopee. Note: all AADTs noted are from years 2012-2014.
- D. From CSAH 61 to CSAH 10, TH 41 currently carries an average of 19,500 vehicles per day. Today, TH 41 (Chestnut Street) has two northbound through lanes and one southbound lane. A trail/sidewalk is provided along both sides of the roadway and boulevards vary in width where right-of-way (ROW) is available. ROW is limited where TH 41 (Chestnut Street) navigates between Fireman's Clayhole Lake and Brickyard Clayhole Lake and at the TH 41/CSAH 61 intersection.
- E. TH 41 serves significant trucking movements accommodating over 920 heavy commercial trucks per day in this segment (2012 HCADT). The majority of the truck movements on TH 41 are a result of the river crossing, regional freight demands, gravel and sand mining, landfill, and seasonal grain deliveries from western Minnesota to the Ports of Savage.
- F. The posted speed on TH 41 is 40 mph between CSAH 10 and the access to North Walnut Street where it then transitions to 30 mph.
- G. TH 41 (Chestnut Street) is divided by a center median between Walnut Court and CSAH 10.

2. OPERATIONS AND SAFETY

- A. There are two signalized intersections on TH 41 within this segment at Crosstown Boulevard and CSAH 10. These signals operate acceptably during peak hours. The CSAH 10 (Engler Boulevard) intersection is currently operating at a LOS D during the PM peak hour which is approaching unacceptable levels per commonly accepted engineering standards.



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This means the intersection is approaching an unstable flow during the peak periods and the freedom to maneuver within the traffic stream is limited.

- B. Northbound and southbound left turns onto CSAH 10 and onto Crosstown Boulevard/Victoria Drive from TH 41 have been identified to have elevated traffic delays for these specific movements. This means that delays (greater than 80 seconds, with some exceeding two minutes) occur frequently for vehicles making these movements during peak traffic periods.
- C. There were 59 total crashes within this segment of TH 41 between 2010 and 2014. This indicates that the segment operates within the expected, normal range when compared to similar statewide corridors.
- D. The breakdown of individual crashes at corridor intersections includes:
 - i. Twenty-nine crashes at CSAH 10 including: nine right-angle crashes, nine rear-end crashes, three head-on crashes, three sideswiping crashes, two run-off-the-road crashes, one right turn into traffic, and two other (unknown) type crashes. The observed crash rate at the TH 41/CSAH 10 intersection is above the normal, expected range for similar intersections statewide.
 - ii. Seven crashes at Crosstown Boulevard
 - iii. One crash at Walnut Court
 - iv. Six crashes at Woodland Drive
 - v. Five crashes at Walnut Street
- E. Three pedestrian crashes occurred at the TH 41/CSAH 10 intersection between 2010 and 2014. While this five-year timeframe serves as the basis for significant crashes in the project context, it is important to recognize other pedestrian crash occurrences that have been documented in the history of the intersection. An additional five pedestrian crashes occurred at the TH 41/CSAH 10 intersection between 2005 and 2009. An understanding of crash history at this intersection is also important due to school proximity in the northeast quadrant discussed later in this document.
- F. A broader historical perspective of TH 41 within this subarea reveals that three pedestrian crashes also occurred between Firemen's Park and Walnut Court dating back to 2005.

3. PEDESTRIAN/BICYCLE TRANSPORTATION AND TRANSIT CONSIDERATIONS

- A. TH 41 is a challenge to pedestrians and bicyclists in downtown Chaska. TH 41 is a high volume corridor with multiple lanes of traffic creating challenges to east-west movements of pedestrians and bicyclists.
- B. Land use within downtown Chaska is conducive to pedestrian trips. The close proximity of multiple businesses, services and residential complexes encourage foot traffic along and across the business district on TH 41.
- C. Northbound TH 41 has two-lanes of traffic which requires vehicles in both lanes to stop



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for pedestrians crossing at unsignalized locations. This is a safety concern if one lane of traffic stops to wait for the pedestrian to cross and a vehicle in the second lane continues through the crossing.

- D. Trails exist on both sides of TH 41 from CSAH 61 to CSAH 10. Both trails are off-road paths. The western path is roughly 8-feet wide concrete and the eastern path is concrete through the bridge north of Walnut Court and continues as 8-foot bituminous path traveling north.
- E. TH 41 is designated as a proposed Regional Bicycle Transportation Network (RBTN) - Tier 2 Alignment in the Metropolitan Council's Regional Bicycle System Study. Regional bikeways are corridors that serve as the backbone arterial system connecting city and county bikeways with regional destinations. The 2040 Transportation Policy Plan adopted by the Metropolitan Council in 2015 maintains that this designation is given to routes where specific route alignments have been designated through the Regional Bicycle System Study process that included discussions with local agency staff. The designated RBTN alignments are based on local bicycle plans and in many cases already exist in some form requiring little to no improvement for the regional network.
- F. TH 41 and CSAH 61 form the nexus of three RBTN corridors (where alignments have not been designated). A Tier 1 corridor connection from downtown Chaska to the Southwest Regional Trail (to the northeast); a Tier 2 corridor connects downtown Chaska to Scott County via the future Minnesota River crossing (to the southwest); and a Tier 2 corridor connects downtown Chaska to Waconia (to the northwest).
- G. The TH 41 corridor is also recognized as a Regional Linking Trail on the Metropolitan Council's Parks Policy Plan; meant to serve a recreational/scenic purpose to the extent possible.
- H. The Firemen's Park/Chaska Curling Center/Chaska Event Center has increased pedestrian crossings of TH 41 due to patrons utilizing Cooper's Food parking lots on the east side of TH 41 for overflow parking during events. In January 2016 the City requested MnDOT to consider a HAWK (high intensity activated cross walk) system on TH 41 near Walnut Street to accommodate pedestrians crossing in that area.
- I. A trailhead exists north of this subarea at the East Creek Transit Station located on TH 41 just south of TH 212. No additional trailheads are planned for this segment of roadway.
- J. The eight pedestrian crashes at the TH 41/CSAH 10 intersection identified previously are a concern as multiple schools are located in the northeast quadrant including Chaska Middle School East, Chaska Middle School West, and Chaska Elementary School. The Chaska Community Center is also located in close proximity.
- K. The pedestrian crashes create a primary issue for the school district regarding safe routes to school access for their facilities off of TH 41/CSAH 10. The school/community center sites are surrounded by neighborhoods but many students are not allowed to walk due to



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roadway hazards. Carver County has plans to study CSAH 10 from CSAH 61 to Waconia in the near future. Enhancing pedestrian safety will be a part of that study.

- L. SouthWest Transit provides an on-demand service called SouthWest Prime within Chaska, Chanhassen and Eden Prairie. Users may request a shared ride to/from any location within these communities.
- M. The East Creek Transit Station is located in the southwest quadrant of the TH 41/TH 212 interchange. This station is a park and ride with 750 total parking stalls. SouthWest Transit representatives estimated this facility is at approximately half-capacity today. The station provides the closest transit stop facility to this subarea just to the north of the subarea terminus and is accessed by transit routes 695, 697, 698, and 699.
- N. Transit travels south on TH 41 from the East Creek Station, then east onto Crosstown Boulevard, and then turns south onto Yellow Brick Road to CSAH 61 where it continues into the downtown. The next stop is at the junction of Crosstown Boulevard/Parkview Avenue, east of TH 41. There are no current plans to expand transit service within Chaska.

4. LAND USE

- A. The land surrounding TH 41 in this subarea is mostly developed. One property, located north of Woodland Drive on the west side of TH 41 contains a farmstead with agricultural land that is guided for future single-family residential in Chaska's 2030 Planned Land Use map. The City intends to require this property to access the local street system when developed. Direct access to TH 41 from this development is not intended.
- B. The area surrounding the TH 41 North subarea contains several land uses but is dominated by mostly residential developments. Uses include single and multi-family residential, institutional, commercial, recreational, and office.
- C. There are several schools located around the intersection of TH 41/CSAH 10. The northeast quadrant of this intersection contains the Chaska Middle School West and Chaska Middle School East as well as the Chaska Elementary School. The Step by Step Montessori School of Chaska is located in the southwest quadrant of the intersection. The Chaska Community Center and the Chaska City Office share a building to the east of the schools, also in the northeast quadrant.
- D. The City of Chaska's Downtown Master Plan established several downtown districts based on major land use patterns, landscape features, and circulation routes. Two of these districts fall within the TH 41 North subarea:
 - i. The Brickyard Clayhole District is located in the quadrant northeast of the TH 41/CSAH 61 intersection and includes Brickyard Clayhole Lake. Its eastern border is Yellow Brick Road and East Chaska Creek. The Brickyard Clayhole District is a former brickyards site that has redeveloped as an extension of downtown Chaska with higher density housing in both mixed-use buildings and townhomes, a mix of commercial businesses including downtown's grocery store, and some



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professional offices/services. The City's vision for this district is a mixed-use downtown district that offers higher density housing options with convenient access to downtown shopping, services and natural amenities. The district's strategic location at the intersection of two highways and downtown gateway potential create opportunities for destination commercial businesses along TH 41 and CSAH 61.

- ii. Firemen's Clayhole District encompasses the quadrant northwest of the TH 41/CSAH 61 intersection. This district contains the Firemen's Park redevelopment including the new Curling Club and Chaska Events Center. Schmelpfenig Park occupies the northern portion of the district and provides open space and natural amenities.

5. ACCESS AND CIRCULATION

- A. There are two signalized intersections on TH 41 (Chestnut Street) within this subarea located at CSAH 10 and Victoria Drive/Crosstown Boulevard.
- B. CSAH 10 is an A-Minor Arterial providing connections to TH 212 and CSAH 11 to the west and CSAH 15 and CSAH 61 to the east. The road continues west and on to the north passing through Waconia.
- C. Victoria Drive is a Major Collector on the west side of TH 41 connecting to CSAH 10 providing access to the residential neighborhoods off of White Oak Drive, Cardinal Lane, Stephen Lane, Meadow Lane, and Independence Drive.
- D. Crosstown Boulevard is a Major Collector on the east side of TH 41 connecting to CSAH 61 and providing access to residential neighborhoods off of Broadview Avenue, Valleyview Road, Crest Drive, Yellow Brick Road, and Ravoux Road. Access to Chaska's Lions Park is also on this roadway.
- E. The City of Chaska and MnDOT worked together to close and/or consolidate several access points on TH 41 between CSAH 61 and CSAH 10 as part of the 2002 TH 41 improvement project. The City of Chaska assumes that the current access configurations in this area are still adequate and will not require further modification at this time.

6. INFRASTRUCTURE

- A. TH 41 (Chestnut Street) pavement is in good condition. The existing concrete surface was installed in 2002 and there are no planned improvements for at least ten years.
- B. TH 41 is currently a three lane roadway with two northbound lanes of traffic and one southbound. The southbound section was constructed with a 14-foot wide outside shoulder which could be considered for conversion into an additional southbound thru lane with restriping and the addition of right-turn lanes at key intersections. It is likely a noise study would be required to convert this shoulder to a thru-lane due to the length of the lane addition and the proximity of existing residential properties to the highway.



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7. ENVIRONMENTAL CONSIDERATIONS

- A. Multiple wetlands are present in this subarea. Much of area east of TH 41 near the Brickyard Clayhole Lake and following Chaska Creek is in the FEMA designated floodplain.
- B. The Brickyard Clayhole Lake, Fireman's Clayhole Lake and Mount Pleasant Cemetery are all located adjacent to TH 41 and are locally designated historic sites.
- C. The intersection of TH 41 (Chestnut Street) is almost completely impervious. Stormwater is collected and is directed to the Minnesota River (an impaired waterway) untreated. Roadway improvements will need to meet or exceed stormwater management requirements. Innovative best practices for improving water quality in highly impervious areas include underground filtration/infiltration, tree trenches, and perched bio-retention among others.



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CHASKA EAST – (FIRE LANE TO CSAH 10):

1. CORRIDOR IMPORTANCE/FUNCTION

- A. In 2008, TH 212 was relocated approximately two miles north as it was converted to a freeway. Traffic volumes dropped from approximately 17,000 ADT in the year 2002 to 3,350 ADT in the year 2010.
- B. 2011 average daily traffic in this segment ranges from 7,000 AADT between Fire Lane and CSAH 15 to 3,450 AADT between CSAH 15 and CSAH 10.
- C. CSAH 61 is also an important regional freight corridor. Within the Chaska East subarea, approximately 800 trucks per day use CSAH 61 (2011).
- D. CSAH 61 is a 3-lane section through this subarea and continues as an A-Minor Arterial roadway providing a connection between Chaska's historic downtown and CSAH 15 (Audubon Road) and TH 101.
- E. Both CSAH 15 and CSAH 10 are also A-Minor Arterial roadways in this subarea. The intersection of these three roadways are closely spaced, forming a triangle, and serving duplicative functions. The resulting three short roadway segments between the intersections of CSAH 61, CSAH 15 and CSAH 10 each carry similar AADTs in the range of 2,850 to 3,900 vehicles per day.
- F. CSAH 61 is a turnback corridor eligible for MnDOT turnback funds. Turnback funds may be used on released trunk highway routes that have been added to a county's state aid system. Turnback funds may pay for any costs that are eligible for regular state aid funding including: road or bridge construction, right-of-way (ROW), engineering, and utility relocation to improve the roadway to a state of good repair.
- G. Approval of plans for the construction of a turnback project is limited to a period of 15 years from the date of reversion. The CSAH 61 turnback was initiated in 2010; therefore, all eligible turnback projects must be completed by 2025.

2. OPERATIONS AND SAFETY

- A. Each of the intersections along CSAH 61 in the Chaska East subarea operate at an acceptable LOS per commonly accepted engineering guidance. This means these intersections are operating at or very near free flow conditions with no significant delay present during the heaviest travel periods of the day. The CSAH 61/CSAH 15 intersection is signalized. All other intersections with CSAH 61 in this segment are side-street stop controlled.
- B. There were a total of 28 crashes reported in this segment between 2010 and 2014. This indicates that the segment operates within the expected, normal range when compared to similar statewide corridors.
- C. The breakdown of individual crashes at corridor intersections includes:



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- i. Four crashes at Crosstown Boulevard
 - ii. Three crashes at State Street. A fatal vehicle/pedestrian crash occurred in October of 2013 at this intersection.
 - iii. Nine crashes at CSAH 15
 - iv. Seven crashes at CSAH 10. Five of these crashes were run-off-the-road crashes. One of the seven crashes resulted in an incapacitating injury.
- D. Speed limits on CSAH 61 in this subarea range from 45 to 50 mph.

3. PEDESTRIAN/BICYCLE TRANSPORTATION AND TRANSIT CONSIDERATIONS

- A. The Southwest LRT Trail is a system of bicycle trails that extends through several western suburbs and is operated by the Three Rivers Park District. The Southwest LRT Regional Trail is located on the north side of CSAH 61 and CSAH 10 until just west of CSAH 15 where it turns south and travels under CSAH 61 and into downtown. The section of this trail from Chanhassen to the CSAH 61/CSAH 10 intersection is also known as the Minnesota River Bluffs LRT Regional Trail.
- B. A trailhead is located at the CSAH 10/Old Audubon Street intersection.
- C. The City of Chaska proposes the addition of local trails along CSAH 15 between CSAH 61 and CSAH 10 and also along the former railroad that runs parallel to CSAH 61 on the south side owned by the Carver County Regional Rail Authority.
- D. A fatal vehicle/pedestrian crash occurred at the CSAH 61/State Street intersection in October of 2013.
- E. There are currently no transit routes on CSAH 61 within the Chaska East subarea.
- F. SouthWest Transit line 699 and 691 travel Stoughton Avenue from CSAH 15 toward Chaska's Downtown.
- G. Transit stops are located at the intersection of Stoughton Avenue/Audubon Road and Stoughton Avenue/Zemble Street within this subarea.

4. LAND USE

- A. The Chaska East Subarea is dominated by low and medium-density residential uses with some office, industrial, and commercial uses present. Highway commercial uses are present in the western end of this segment near downtown and surrounding the CSAH 61/CSAH 15 intersection.
- B. Southwest of Fire Lane is the City of Chaska's Lumber Yard Redevelopment Site.
- C. The area surrounding the CSAH 61, CSAH 15, CSAH 10 triangle is guided for a mix of industrial and commercial uses.
- D. The City of Chanhassen has guided land south of CSAH 61 between the intersections of CSAH 15 and CSAH 10 for office/industrial uses through a 2015 Comprehensive Plan amendment.



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- E. The northeastern portion of Chaska East subarea (north of CSAH 10 between CSAH 15 and CSAH 61) is undeveloped and in the vicinity of rare, calcareous fen features, part of the larger Seminary Fen Wetland Complex west of the Seminary Fen Scientific and Natural Area. The majority of this land is currently designated as open space or restricted use property and this designation remains unchanged in future land use plans. The presence of calcareous fens in this area garners protection from development due to this type of rare wetland feature. The Fen Study Area is discussed more in the Environmental section of the Eastern subarea.

5. ACCESS AND CIRCULATION

- A. Carver County access management guidelines dictate the required spacing for primary full movement intersections ($\frac{1}{4}$ -mile), secondary intersections ($\frac{1}{8}$ -mile), and private accesses (by exception or deviation only) on urban/urbanizing minor arterial roadways.
- B. Access spacing between primary intersections is $\frac{1}{8}$ -mile between several intersections which is short of the recommended $\frac{1}{4}$ -mile spacing. This segment also contains multiple driveways to scattered highway commercial developments.
- C. CSAH 61 within the Chaska East subarea lacks direct access into downtown Chaska. A new roadway connection is planned to connect Stoughton Avenue to Fire Lane and Yellow Brick Road. This connection will increase access to the downtown with hopes of providing an alternate route for local traffic into and out of downtown outside of CSAH 61 and TH 41.

6. INFRASTRUCTURE

- A. A comprehensive analysis was completed in 2012 documenting the existing pavement condition on CSAH 61 within the Chaska East subarea. The findings indicated that the overall condition of the pavement is good with few defects in the pavement surface.
- B. Bridge number 10043 is located southwest of the junction of CSAH 61/CSAH 15 in this subarea. The bridge spans the East Chaska Creek. This bridge was built in 1995, carries 7,000 vehicles per day, and currently has a sufficiency rating of 98.4. Sufficiency ratings represent a relative measure of a bridge's deterioration, load capacity deficiency, or functional obsolescence. A rating of less than 80 dictates a bridge must be under contract for repair or replacement. In this case, the bridge is functioning soundly.

7. ENVIRONMENTAL CONSIDERATIONS

- A. There is no stormwater treatment along CSAH 61. Existing CSAH 61 stormwater treatment primarily includes ditches draining from the road system to the Minnesota River, an impaired water. The East Chaska Creek is channelized prior to entering the Minnesota River and is a key drainage feature on the eastern end of the project corridor. Roadway improvements will need to meet or exceed stormwater management requirements.



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- B. See Eastern Project Area for description of the Seminary Fen Wetlands Complex.
- B. Archaeologists recovered more than 4,000 artifacts through multiple field investigations that proceeded the construction of the CSAH 101 Minnesota River Bridge project in 2014. Researchers discovered clues to how residents of the Minnesota River Valley lived, what they ate and how they networked about 7,000 years ago. Bones, stone tools and evidence of a hearth that indicated the remains of an ancient campsite were among the findings. Although this is just one recent and well publicized example, many other significant and sensitive archaeological sites representing various periods of human occupation are known, or likely exist, along the Minnesota River Valley in this vicinity.
- C. The proximity of this significant archaeological finding and others, and the similarity of context adjacent to the Minnesota River, point towards a high likelihood of archaeological resources within this portion of the CSAH 61 corridor as well. Roadway expansion or excavation outside of intensively disturbed areas will likely require archaeological studies to investigate the potential for resources in the area.



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EASTERN PROJECT AREA – (CSAH 10 to BLUFF CREEK DRIVE):

1. CORRIDOR IMPORTANCE/FUNCTION

- A. In 2008, TH 212 was relocated approximately two miles north as it was converted to a freeway. Traffic volumes dropped from approximately 16,000 ADT in the year 2006 to 6,000 in 2012 climbing slowly to approximately 7,000 in 2013.
- B. Today, CSAH 61 in this subarea is an A-Minor Arterial roadway with an average daily traffic volume of 7,000-9,000. CSAH 61 is a 2-lane rural roadway with turn lanes at the intersection with Stoughton Avenue. A roundabout was also recently constructed at the intersection of Bluff Creek Drive in 2015.
- C. This portion of CSAH 61 continues as an important regional freight corridor with its connections to the CSAH 101 Minnesota River crossing providing access to the Ports of Savage. Within the Eastern Project Area, approximately 300 trucks per day use CSAH 61.
- D. In late 2015, a new four-lane CSAH 101 river bridge was completed between CSAH 101 in Shakopee and CSAH 61 in Chanhassen. This project increased the capacity of CSAH 101 over the Minnesota River, elevated the roadway above the 100-year floodplain and realigned its intersection with CSAH 61 with a new multi-lane roundabout.
- E. TH 101 from CSAH 61 to CSAH 14 is proposed for reconstruction to better align the roadway and to connect to the recently constructed roundabout at the CSAH 61/TH 101 intersection. This project remains unfunded and is considered an emerging project by Carver County.
- F. CSAH 61 is a turnback corridor eligible for MnDOT turnback funds. Turnback funds may be used on released trunk highway routes that have been added to a county's state aid system. Turnback funds may pay for any costs that are eligible for regular state aid funding including: road or bridge construction, right-of-way (ROW), engineering, and utility relocation to improve the roadway to a state of good repair.
- G. Approval of plans for the construction of a turnback project is limited to a period of 15 years from the date of reversion. The CSAH 61 turnback was initiated in 2010; therefore, all eligible turnback projects must be completed by 2025.

2. OPERATIONS AND SAFETY

- A. CSAH 61 is generally a high speed, 2-lane rural roadway lined with guardrail. There are multiple horizontal curves that have speed warning signs and limited sight distance within this subarea.
- B. The intersections on CSAH 61 in this subarea are operating with an acceptable LOS per commonly accepted engineering guidance. This means these intersections are operating at or near free flow condition during the heaviest traffic periods of the day. The intersection of CSAH 61 with Stoughton Avenue is side street stop controlled while a roundabout was recently construction at Bluff Creek Drive.



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- C. Six crashes occurred at the CSAH 61/Stoughton Avenue intersection between 2010 and 2014. A fatal crash occurred in May of 2014 at this location. The crash involved an eastbound vehicle that veered to the right, struck the guardrail, and ricocheted into the westbound lane colliding with an oncoming westbound vehicle. The driver was found to have lost control of his vehicle due to impairment from pharmaceutical drug use. While not a contributor to the fatal crash, this intersection has been identified as having poor geometrics. Stoughton Avenue intersects CSAH 61 at a 65° skew making it difficult for motorists on the side street to see westbound traffic approaching on CSAH 61.
- D. Speed limits on CSAH 61 in this subarea vary between 50 and 55 mph.

3. PEDESTRIAN/BICYCLE TRANSPORTATION AND TRANSIT CONSIDERATIONS

- A. The Southwest Regional Trail Connection converges with CSAH 61 near its intersection with CSAH 10 and continues into Chaska along East Chaska Creek.
- B. A future trail is planned along Bluff Creek Drive extending from CSAH 61 to the northwest.
- C. A future trail is planned along the proposed TH 101 expansion up the bluff to TH 212. The recent construction of the new CSAH 101 bridge and intersection realignment with CSAH 61 included trail accommodations and preparation for this future connection north of the CSAH 61 corridor.
- D. There are no transit facilities or routes located on the CSAH 61 corridor within the Eastern Project Area subarea.

4. LAND USE

- A. Barriers of topography, natural and environmental features, pose challenges to development of the areas along the CSAH 61 corridor. The Seminary Fen Wetland Complex including the Seminary Fen Scientific and Natural Area is located on the northern side of the corridor. The area south of CSAH 61 contains the Raguet Wildlife Management Area. This extends from Chanhassen's westerly border, east to TH 101 and south to the Minnesota River.
- B. In February of 2015, the City of Chanhassen amended the Land Use Chapter of the City's 2030 Comprehensive Plan based on findings and initiatives derived from the CSAH 61 Corridor Land Use and Utility Study completed in 2014. The City envisions future development along the northern side of the CSAH 61 corridor to include office, industrial, medium-density residential, and parks and open space uses within this project subarea. To the east of the Bluff Creek Drive commercial development is planned adjacent to the intersection of CSAH 61 and TH 101.
- C. The City completed a framework plan to guide future public and private-sector decision-making. The City also initiated the CSAH 61 Corridor Land Use and Utility Study to investigate viable land uses in the area. These initiatives led to land use amendments for the City's Comprehensive Plan. Details on the City of Chanhassen's amended land use plan



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for this area include:

- i. The Eastern Project Area is almost entirely contained within Chanhassen's Southwest Growth Area which is dominated by extensive wetland resources. Five parcels located along the northern edge of CSAH 61 in this section are guided for residential development. Assumption Creek segments all parcels in this area, which is a Minnesota DNR designated trout stream that plays a key role in the health of the Seminary Fen Wetland Complex. Any structured crossings of the creek would require approval by the DNR. The Comprehensive Plan amendment suggests that the land north of Assumption Creek would be preserved as permanent open space with density transferred to the south of the creek to avoid the need to cross the creek.
 - ii. Most of the adjacent parcels to the northeast of the aforementioned five parcels extending to Bluff Creek Road combine to make up the Seminary Fen SNA and are planned for parks and open space use. This is the area containing portions of the Seminary Fen Wetlands Complex described below in more detail. All but the most easterly parcel are owned by public agencies.
 - iii. The Northwest Growth Area contains the properties bordering Chaska on the west from the intersection of the city boundary and the Minnesota River Bluffs LRT Regional Trail to TH 212 extending east to Bluff Creek.
 - iv. Two parcels are located north of the Seminary Fen SNA, south of the Minnesota River Bluffs LRT Regional Trail, and represent the southern portion of the Northwest Growth Area. Parcels within this growth area are planned for medium-density residential. The western portion of this area consists of wetlands and portions of the Seminary Fen Wetland Complex.
 - v. The Shared West Area extends from Bluff Creek Drive on the west to TH 101 on the east. The area also extends to the south of CSAH 61. The two westerly parcels in this growth area are planned for medium-density residential land uses. The three easterly parcels are planned for mixed use to include multi-family residential and commercial uses. The Comprehensive Plan amendment mentions that the intent of this is to create an urban village with convenience-type commercial uses.
- D. The south side of CSAH 61 is dominated by a vast wetland complex and the Raguet Wildlife Management Area. One parcel bordering the corridor to the south currently contains a golf driving range and is guided for office use in the Comprehensive Plan amendment.
- E. The area south of CSAH 61, between CSAH 15 and the Stoughton Avenue/CSAH 61 intersection is guided as multi-optional development in the 2030 Land Use Plan. The future development of this area would require the extension of utilities. The City of Chanhassen has suggested that the extension of utilities to this area is planned for 10 or



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more years in the future.

5. ACCESS AND CIRCULATION

- A. The City of Chanhassen has adopted an official map for a future project to realign TH 101 from CSAH 61 to CSAH 14 (Pioneer Trail). This project would continue the four-lane section from the new CSAH 101 river bridge to CSAH 14, providing a continuous four-lane roadway from CSAH 101 in Shakopee, across the Minnesota River and up the river bluff to TH 212 in Chanhassen.

6. INFRASTRUCTURE

- A. Chanhassen is planning for water/sewer utility extensions to support development near CSAH 61.
- B. A comprehensive analysis was completed in 2012 documenting the existing pavement condition on CSAH 61 within the Eastern Project Area. The findings indicated that the overall condition of the pavement is good with few defects in the pavement surface.

7. ENVIRONMENTAL CONSIDERATIONS

- A. A 600-acre wetland complex called the Seminary Fen Wetlands Complex exists in Chaska and Chanhassen transcending the boundaries of this project's Chaska East and Eastern Project Areas. The Seminary Fen Wetland Complex is located north of CSAH 10 and east of CSAH 15 and extends eastward on both the north and south sides of CSAH 61 in this area.
- B. The site was named Seminary Fen from its prior roots as the location of Assumption Seminary, tied to the Colleges of St. Catherine and St. Thomas in St. Paul, and functioned as an active Seminary between 1951 and 1970.
- C. The Seminary Fen Wetland Complex has areas of special classification and ultimately protection from direct and indirect impacts related to land development and roadway expansion. The Seminary Fen Wetland Complex includes the presence of calcareous fens and designation of a portion of the complex as a Scientific and Natural Area.
- D. Calcareous fens are present within the Seminary Fen Wetland Complex. The term calcareous fen is used to describe the rarest type of wetlands that are dominated by several threatened plant species. The soils in these systems are typically saturated year-round, resulting in the accumulation of organic matter. Calcareous fens are a type of rich fen distinguishable from other fens in that the ground water discharge is rich in calcium carbonate. The chemistry of these systems influence the species composition allowing a rare and protected species called calciphiles to flourish. Calciphiles are protected under the Minnesota Endangered Species Statute.
- E. The occurrence of calcareous fens is also a rarity and as such they are protected and regulated under State Statute 103G.223, which prohibits any activity that directly or indirectly impacts these systems by means of filling, draining, or other action that results



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in the degradation of the system, except when approved by the Commissioner of the Minnesota Department of Natural Resources. It is estimated there may be only about 500 calcareous fens in the world, and Minnesota lays claim to almost 200 of them.

- F. A portion of the calcareous fen in this area is also protected through its designation as a Seminary Fen Scientific and Natural Area (SNA). This designation is located in the northeastern portion of the wetland complex, north of CSAH 61. The Seminary Fen SNA is owned by the state of Minnesota and is regulated by the Minnesota DNR. By definition, an SNA is a nature reserve, a protected environment – rich in a natural heritage of plants and animals, fossils, and geologic formations – that scientists can study and citizens too can visit for health and inspiration.
- G. In the case of the Seminary Fen, the groundwater drains into Assumption Creek. The cold, clear waters of the creek, which form one of the metro's last surviving trout streams, flow from the fen to the Minnesota River.
- H. The wetland complex, calcareous fens and Seminary Fen SNA in this area have been studied extensively. Below is a summary of each study and its findings:
 - i. **Phase 1 Characterization, Seminary Fen Wetland Complex (2006): TH 41 over the Minnesota Highway Project** – MnDOT conducted a Phase 1 Characterization of the Seminary Calcareous Fen as part of their Tier 1 Environmental Impact Statement evaluating alternatives for a new TH 41 Minnesota River crossing. The Phase I Characterization provided verification and detailed delineation of significant fen resources in this area. Key findings from this effort indicated the extent of calcareous fen features in the Seminary Fen Wetland Complex were larger than previously recognized. The Phase I Characterization recommended further study through a Phase 2 assessment.
 - ii. **Seminary Fen Wetland Complex Phase 2 Study and Hydrologic and Ecological Assessment of Alternative TH 41 Minnesota River Crossing Corridors (2007)** –The focus of this phase of study was to delineate additional calcareous fen areas and assess potential hydrologic and ecological impacts to the Seminary Fen Wetland Complex from potential TH 41 river crossing alignment alternatives. Key Phase 2 Study findings included:
 - a. The entire Phase 2 study area satisfies all of the physical parameters utilized to determine calcareous fen resources. Satisfied parameters pertain to hydrology, soils, water chemistry, and vegetation.
 - b. Substantial portions of the Phase 2 Study area are ecologically degraded due to altered hydrology. Some areas that do not support fen vegetation may have in the past or could if restored through an active restoration plan.
 - c. Protected species occur throughout all areas mapped as calcareous fen



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within the study areas.

Care must be taken to avoid direct impacts to the land where fen resources exist as well as indirect impacts, such as to the hydrologic conditions into and out of these sites. The most common threat of either direct or indirect impacts to fen resources is through urbanization including land development and roadway expansions.

- I. The 100-year floodplain delineation provided by the Federal Emergency Management Agency (FEMA) shows the floodplain boundary approaching the southern edge of CSAH 61 and eventually overlapping the corridor from the area near the Seminary Fen SNA to Bluff Creek Drive and beyond.
- J. The Raquet Wildlife Management Area (WMA) is located on the south side of CSAH 61 near the Seminary Fen Wetland Complex area and covers 315 acres between CSAH 61 and CSAH 101. This WMA contains floodplain forest, wetland areas, and grassland. The management emphasis for this WMA is directed towards maintaining and improving habitat for wetland species.
- K. Archaeologists recovered more than 4,000 artifacts through multiple field investigations that preceded the construction of the CSAH 101 Minnesota River Bridge project in 2014. Researchers discovered clues to how residents of the Minnesota River Valley lived, what they ate and how they networked about 7,000 years ago. Bones, stone tools and evidence of a hearth that indicated the remains of an ancient campsite were among the findings. Although this is just one recent and well publicized example, many other significant and sensitive archaeological sites representing various periods of human occupation are known, or likely exist, along the Minnesota River Valley in this vicinity.
- L. The proximity of this significant archaeological finding and others, and the similarity of context adjacent to the Minnesota River, point towards a high likelihood of archaeological resources within this portion of the CSAH 61 corridor as well. Roadway expansion or excavation outside of intensively disturbed areas will likely require archaeological studies to investigate the potential for resources in the area. There is no stormwater treatment along CSAH 61. Stormwater management is sensitive due to its interaction with rare wetland features including the Seminary Fen Scientific Natural Area consisting of calcareous fens and trout streams. Existing CSAH 61 stormwater treatment primarily includes ditches draining from the road system to the Minnesota River, an impaired water. Roadway improvements will need to meet or exceed stormwater management requirements.

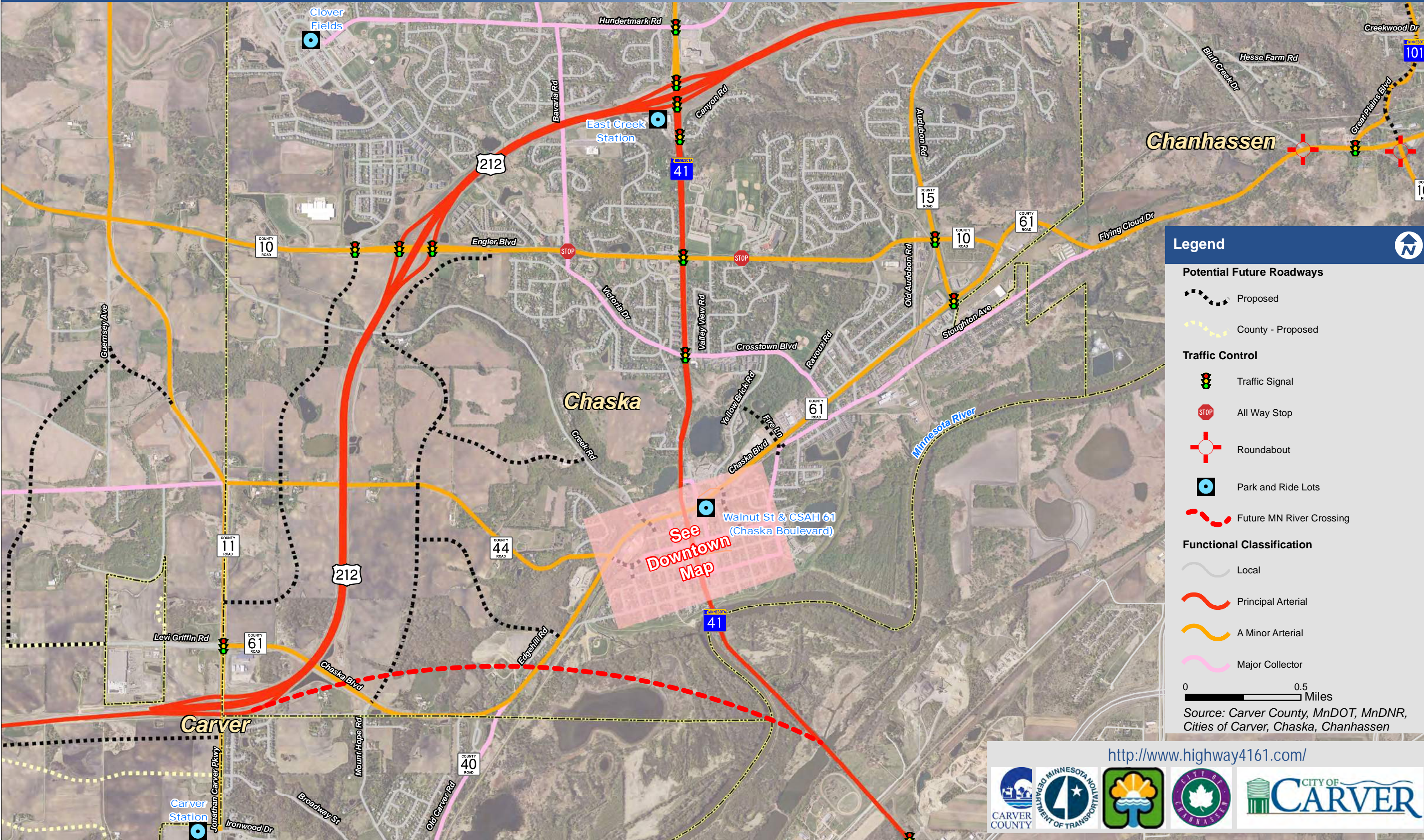


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Legend

Potential Future Roadways

- Proposed
- County - Proposed

Traffic Control

- Traffic Signal
- All Way Stop
- Roundabout
- Park and Ride Lots
- Future MN River Crossing

Functional Classification

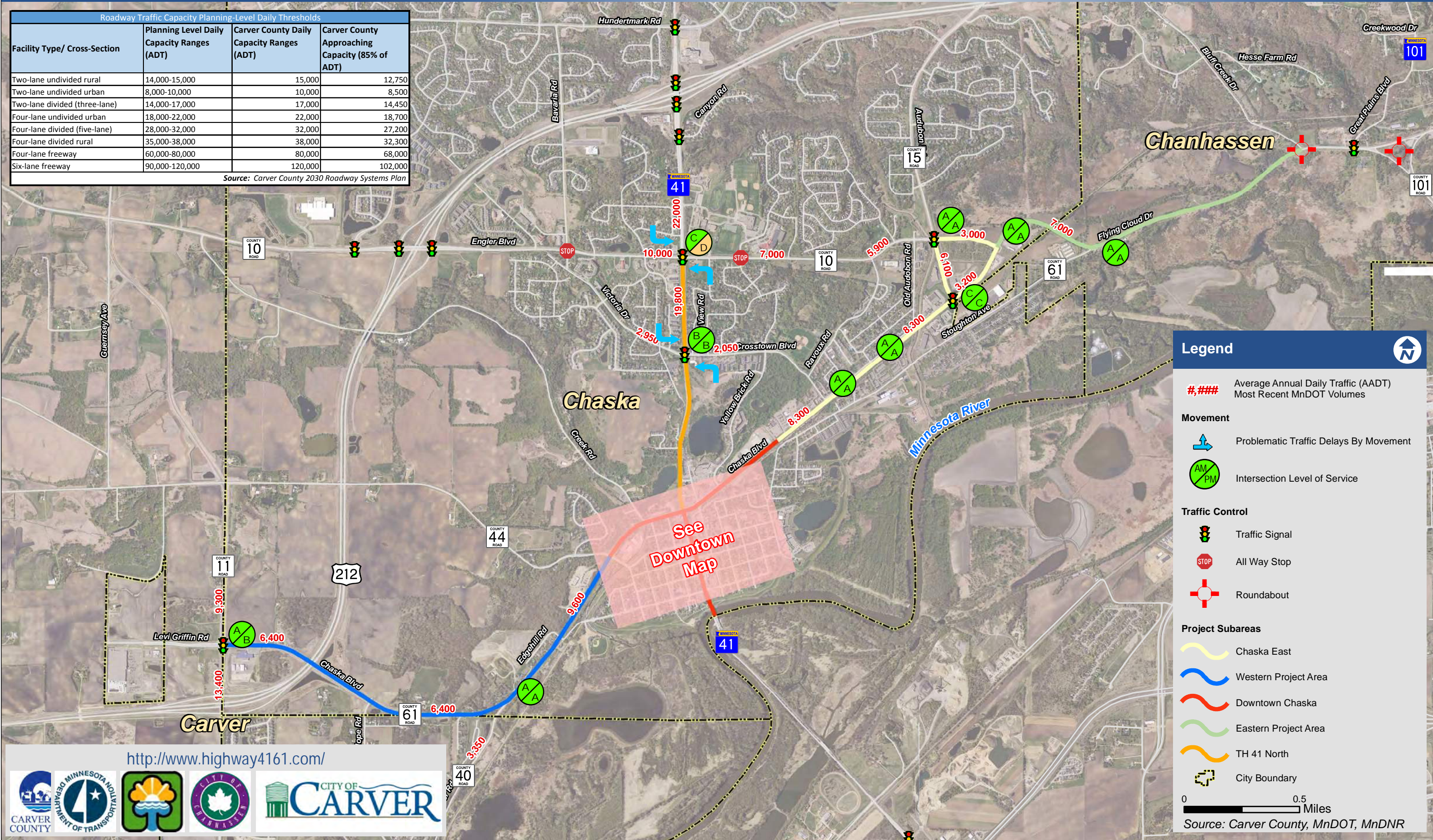
- Local
- Principal Arterial
- A Minor Arterial
- Major Collector

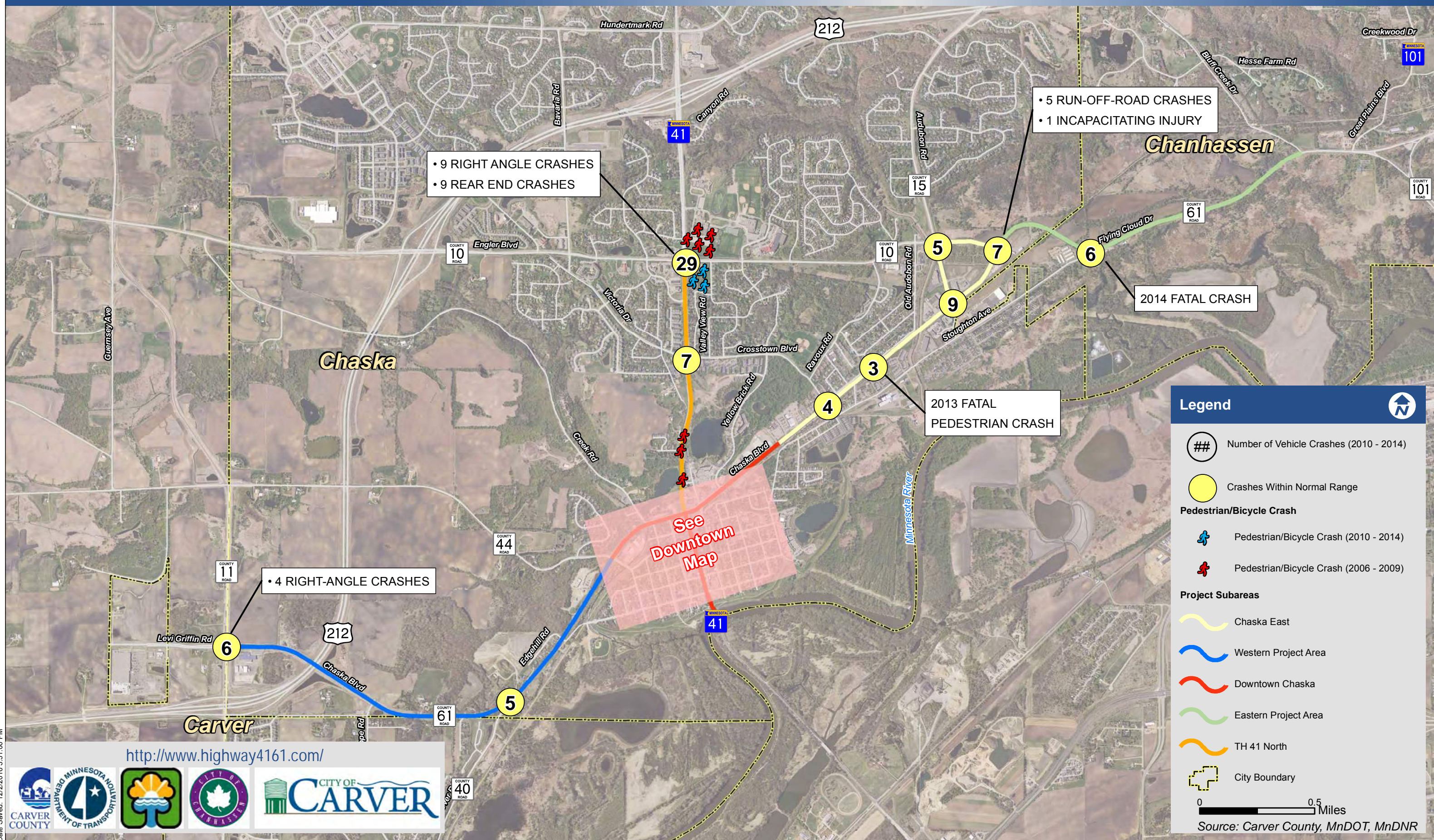
0 0.5 Miles

Source: Carver County, MnDOT, MnDNR, Cities of Carver, Chaska, Chanhassen

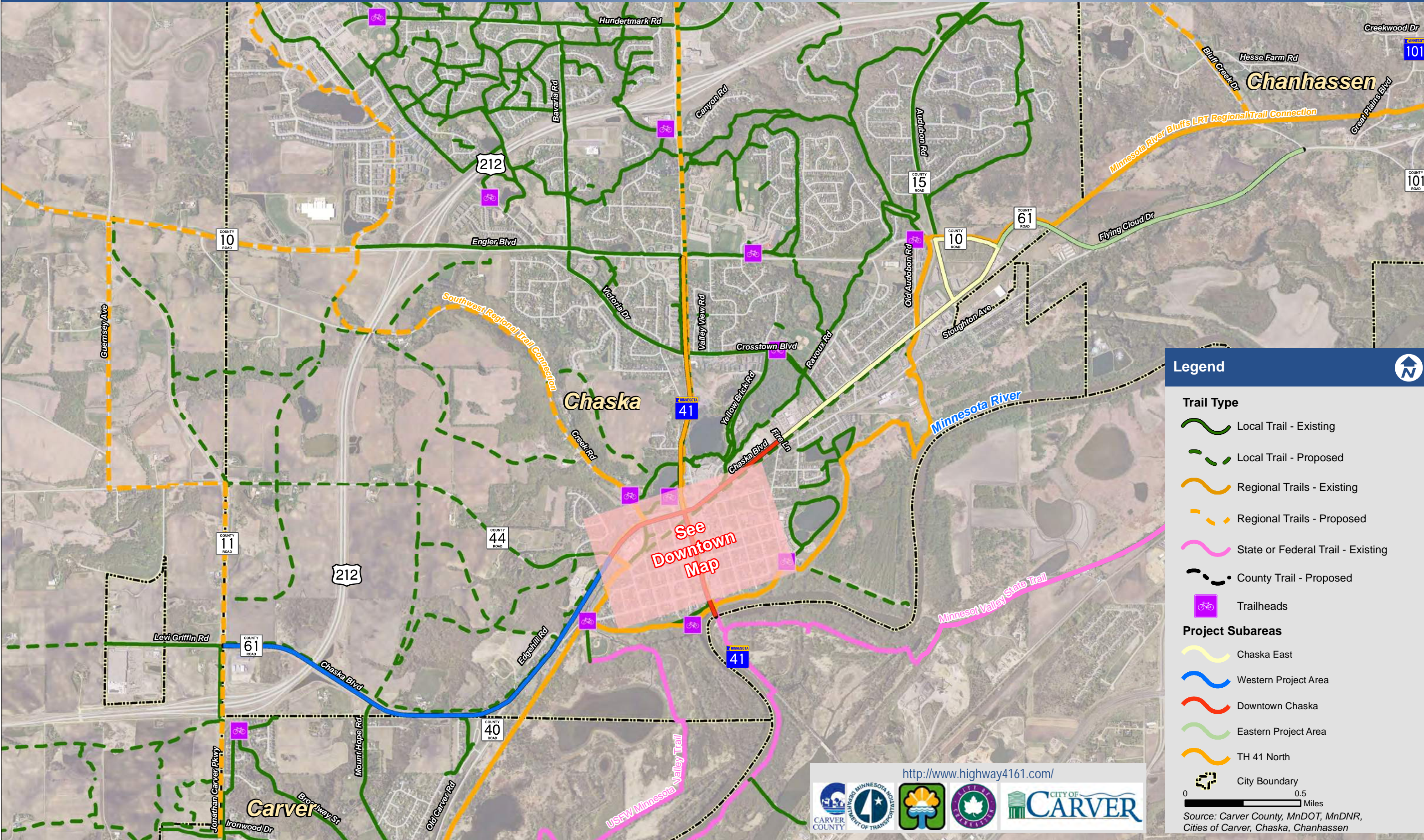
Roadway Traffic Capacity Planning-Level Daily Thresholds			
Facility Type/ Cross-Section	Planning Level Daily Capacity Ranges (ADT)	Carver County Daily Capacity Ranges (ADT)	Carver County Approaching Capacity (85% of ADT)
Two-lane undivided rural	14,000-15,000	15,000	12,750
Two-lane undivided urban	8,000-10,000	10,000	8,500
Two-lane divided (three-lane)	14,000-17,000	17,000	14,450
Four-lane undivided urban	18,000-22,000	22,000	18,700
Four-lane divided (five-lane)	28,000-32,000	32,000	27,200
Four-lane divided rural	35,000-38,000	38,000	32,300
Four-lane freeway	60,000-80,000	80,000	68,000
Six-lane freeway	90,000-120,000	120,000	102,000

Source: Carver County 2030 Roadway Systems Plan





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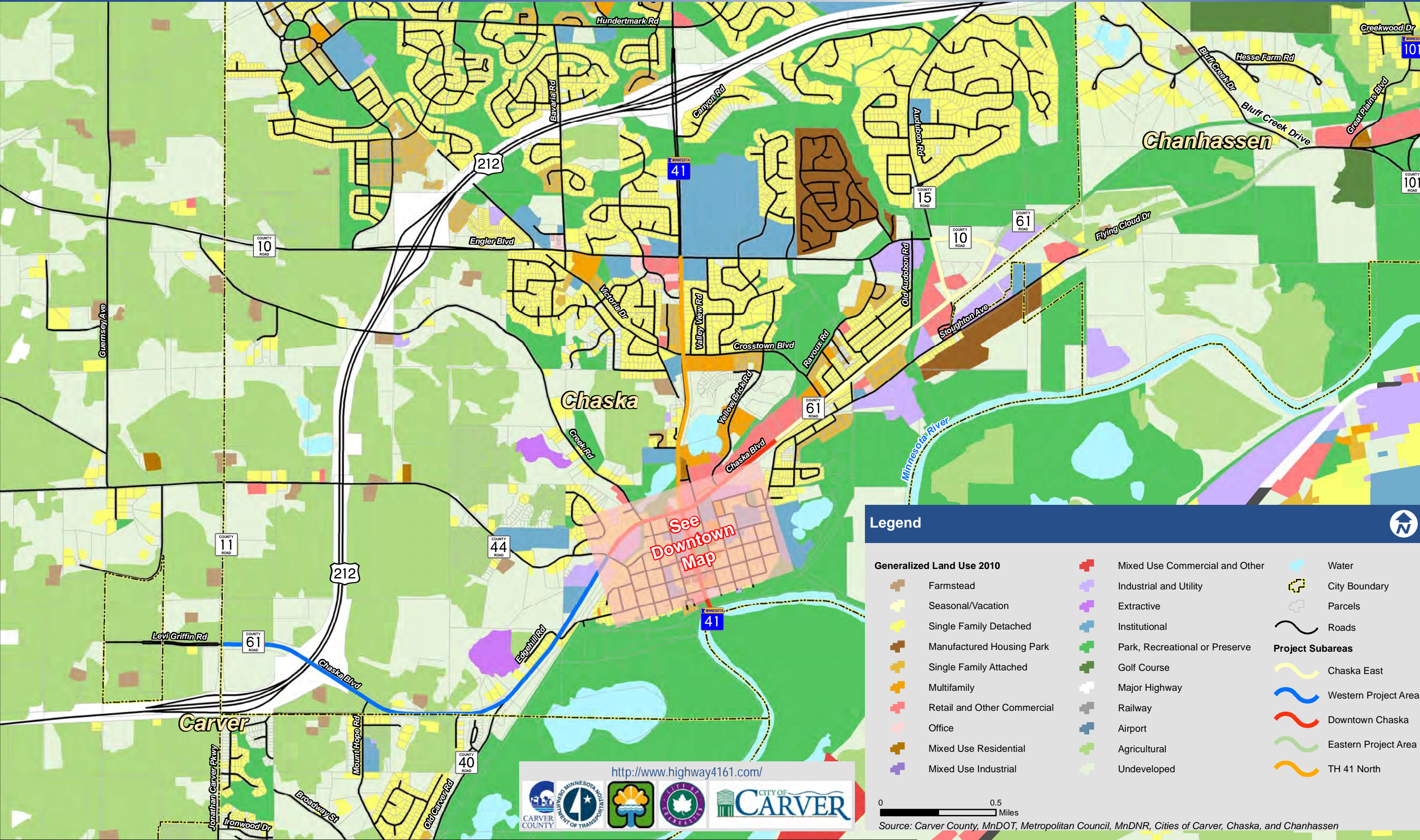


Legend

- Trail Type**
- Local Trail - Existing
 - Local Trail - Proposed
 - Regional Trails - Existing
 - Regional Trails - Proposed
 - State or Federal Trail - Existing
 - County Trail - Proposed
 - Trailheads

- Project Subareas**
- Chaska East
 - Western Project Area
 - Downtown Chaska
 - Eastern Project Area
 - TH 41 North
 - City Boundary

0 0.5 Miles
Source: Carver County, MnDOT, MnDNR, Cities of Carver, Chaska, Chanhassen



Legend

Generalized Land Use 2010

- Farmstead
- Seasonal/Vacation
- Single Family Detached
- Manufactured Housing Park
- Single Family Attached
- Multifamily
- Retail and Other Commercial
- Office
- Mixed Use Residential
- Mixed Use Industrial

Mixed Use Commercial and Other

- Industrial and Utility
- Extractive
- Institutional
- Park, Recreational or Preserve
- Golf Course
- Major Highway
- Railway
- Airport
- Agricultural
- Undeveloped

Water

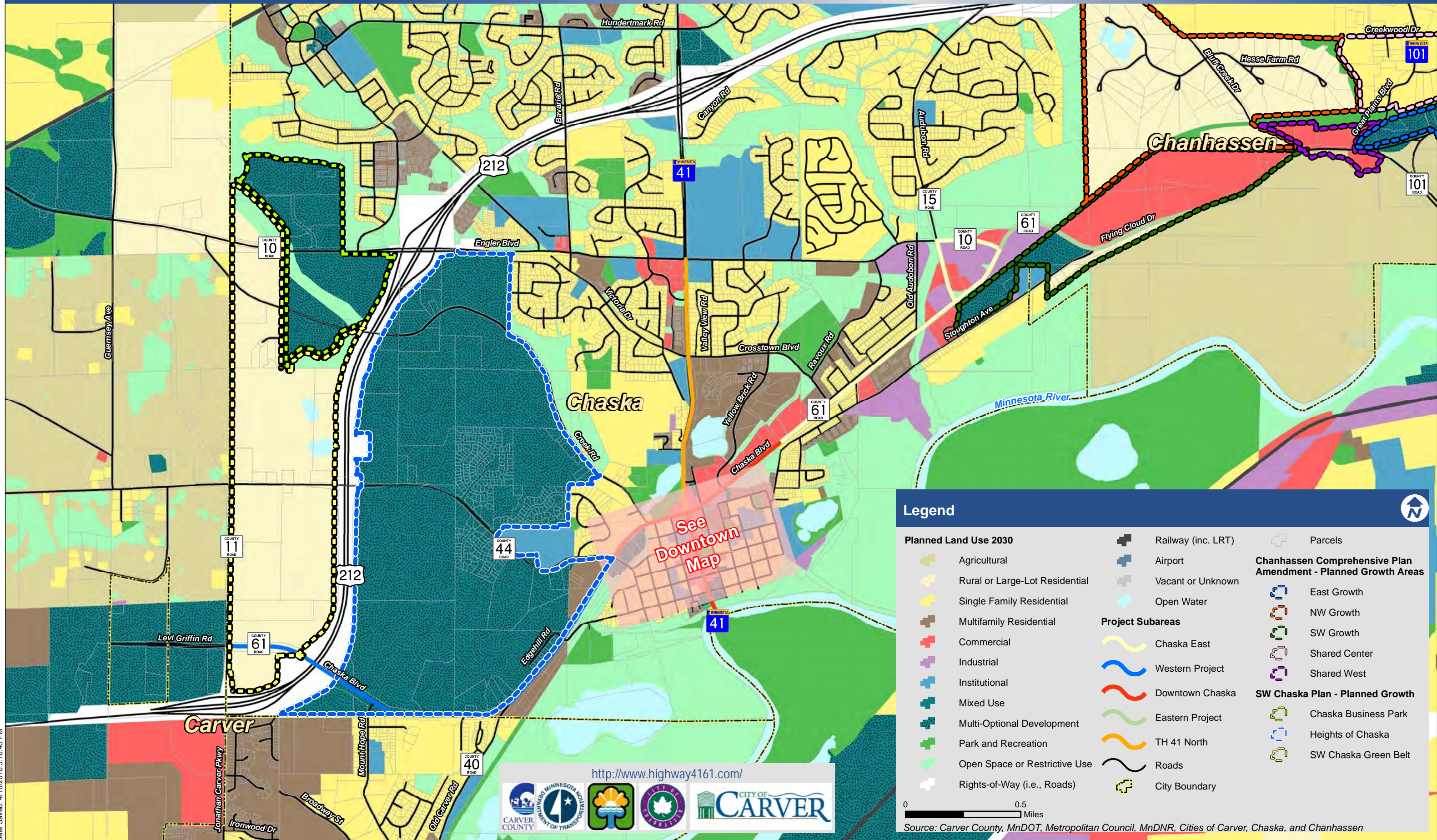
- City Boundary
- Parcels
- Roads

Project Subareas

- Chaska East
- Western Project Area
- Downtown Chaska
- Eastern Project Area
- TH 41 North

0 0.5 Miles

Source: Carver County, MnDOT, Metropolitan Council, MnDNR, Cities of Carver, Chaska, and Chanhassen



Information



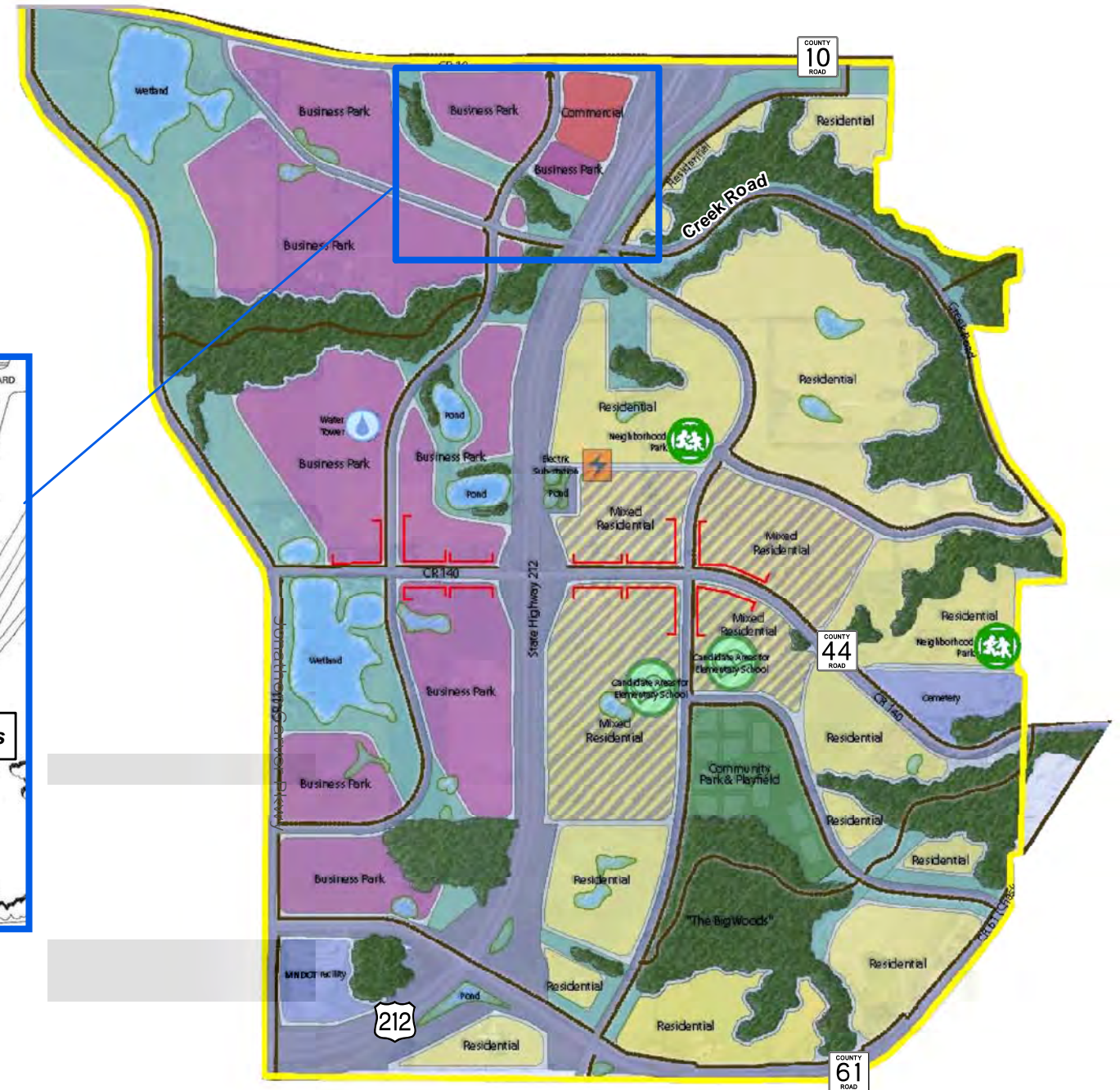
LEGEND

- Electric Sub-station
- Water Tower
- Neighborhood Park
- Candidate Areas for Elementary School
- Trails
- Wetlands
- Open Space
- Park
- Low-Density Residential
- Mixed Residential
- Neighborhood Commercial
- Business Park
- Commercial Build-To Line
- Site Boundary

0 0.5
Miles

Source: Carver County, MnDOT, MnDNR

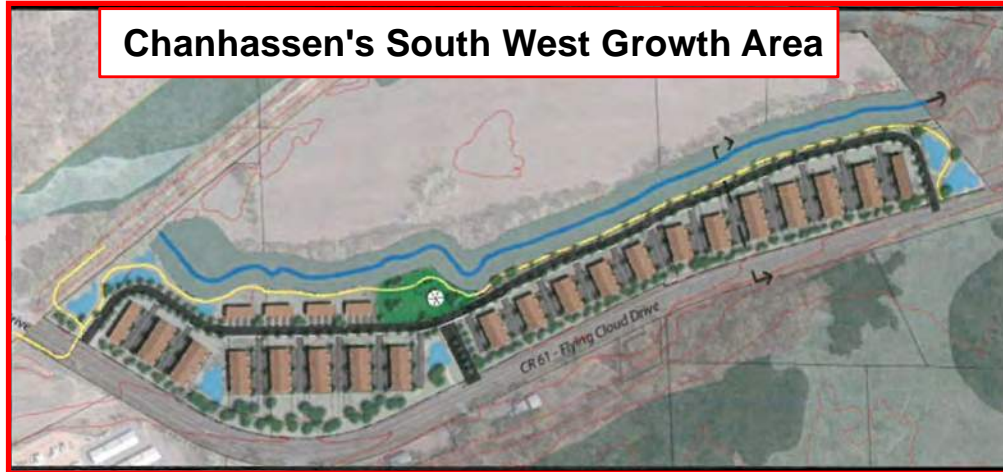
Chaska Business Park



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Chanhassen's South West Growth Area

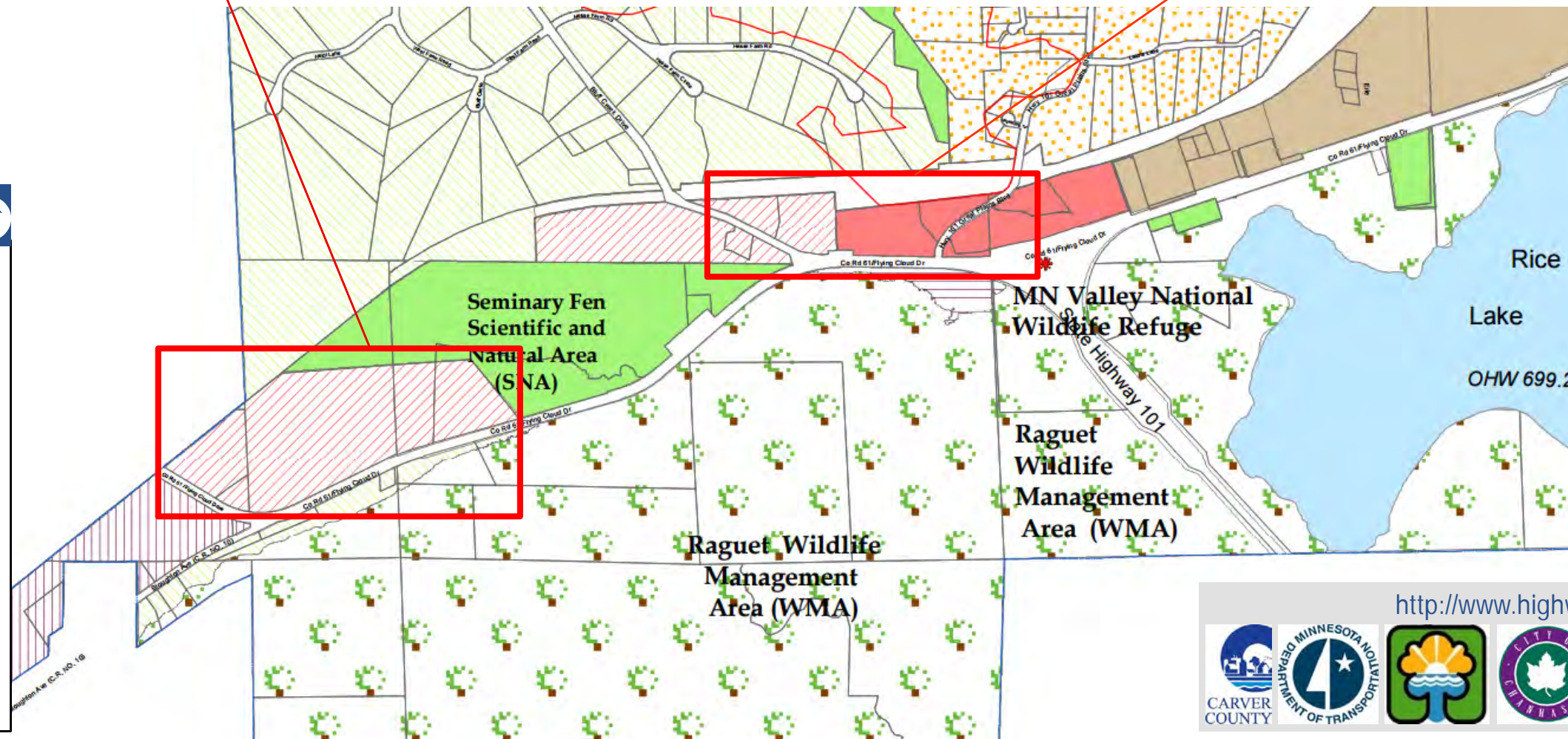


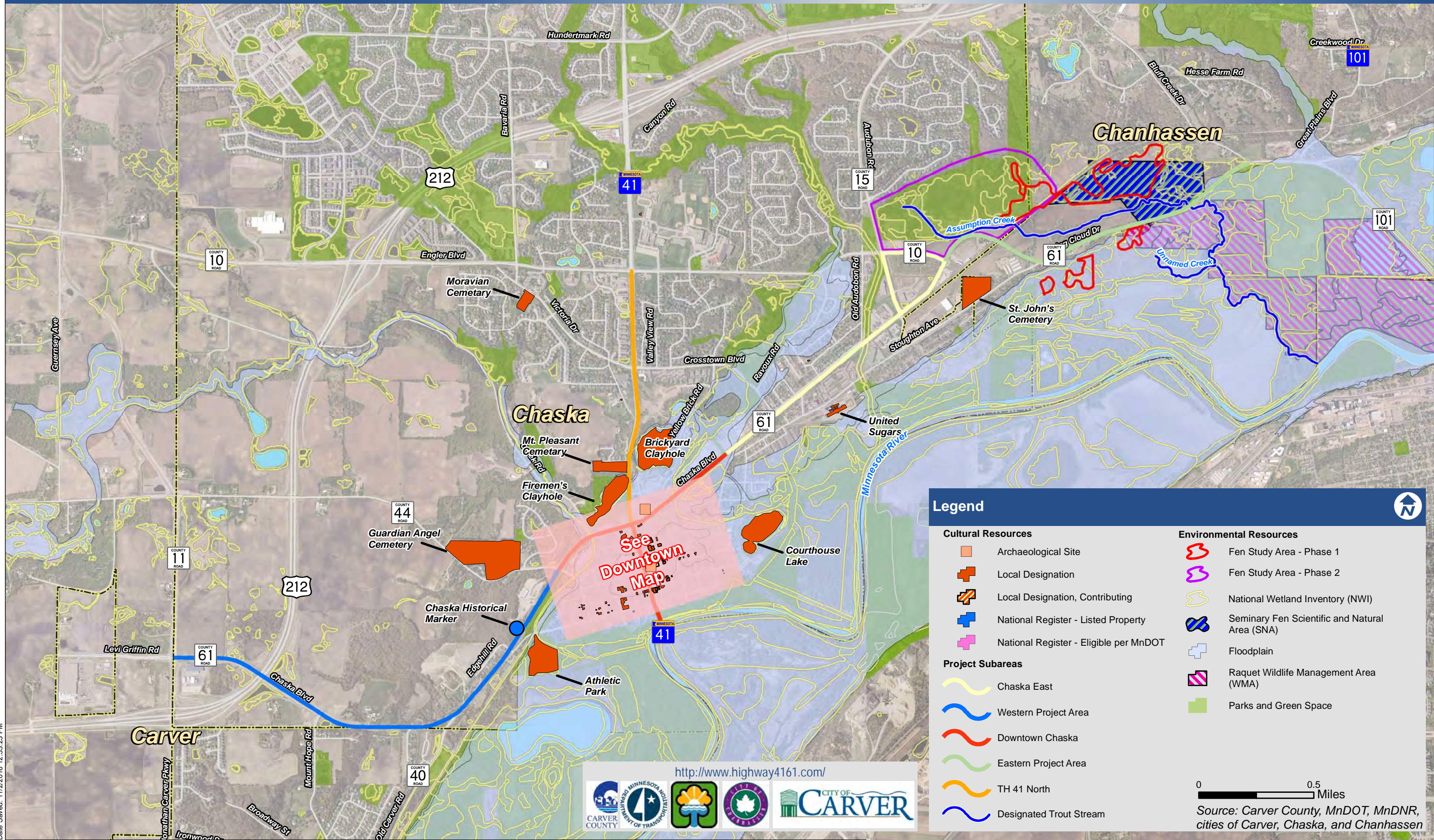
Legend

Legend	
	COMMERICAL
	OFFICE
	OFFICE INDUSTRIAL
	MIXED
	RESIDENTIAL LARGE LOT
	RESIDENTIAL LOW DENSITY
	RESIDENTIAL MEDIUM DENSITY
	RESIDENTIAL HIGH DENSITY
	AGRICULTURE
	PARKS OPEN SPACE
	PUBLIC SEMI PUBLIC

0 0.5 Miles

Source: Carver County, MnDOT, MnDNR





Legend

Cultural Resources

- Archaeological Site
- Local Designation
- Local Designation, Contributing
- National Register - Listed Property
- National Register - Eligible per MnDOT

Project Subareas

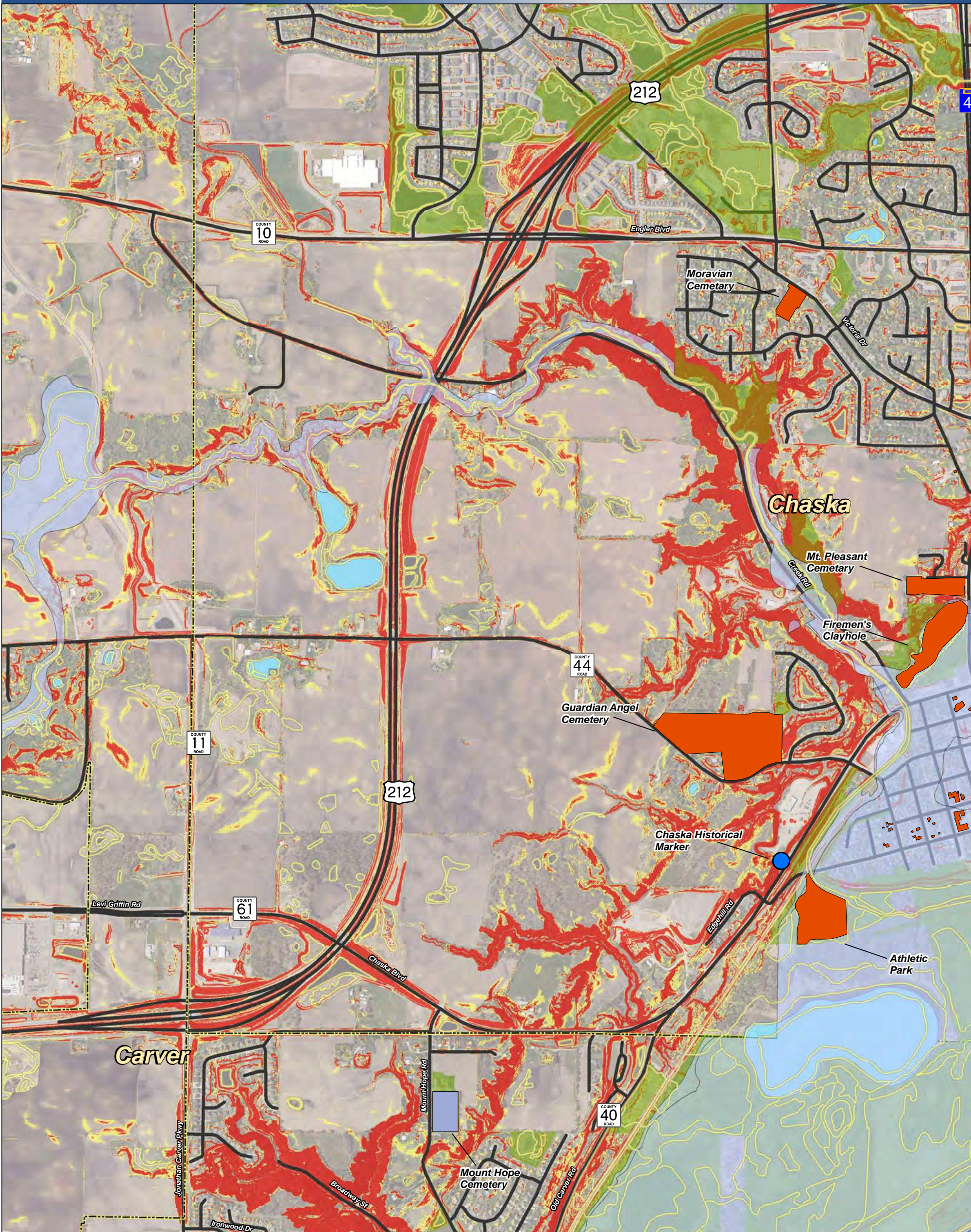
- Chaska East
- Western Project Area
- Downtown Chaska
- Eastern Project Area
- TH 41 North
- Designated Trout Stream

Environmental Resources

- Fen Study Area - Phase 1
- Fen Study Area - Phase 2
- National Wetland Inventory (NWI)
- Seminary Fen Scientific and Natural Area (SNA)
- Floodplain
- Raquet Wildlife Management Area (WMA)
- Parks and Green Space

0 0.5
Miles

Source: Carver County, MnDOT, MnDNR, cities of Carver, Chaska, and Chanhassen



Legend

Cultural Resources

- Archaeological Site
- Local Designation
- Local Designation, Contributing
- National Register - Listed Property
- National Register - Eligible per MnDOT
- Cemeteries

Environmental Resources

- Fen Study Area - Phase 1
- Fen Study Area - Phase 2
- National Wetland Inventory (NWI)
- Seminary Fen Scientific and Natural Area (SNA)
- Floodplain

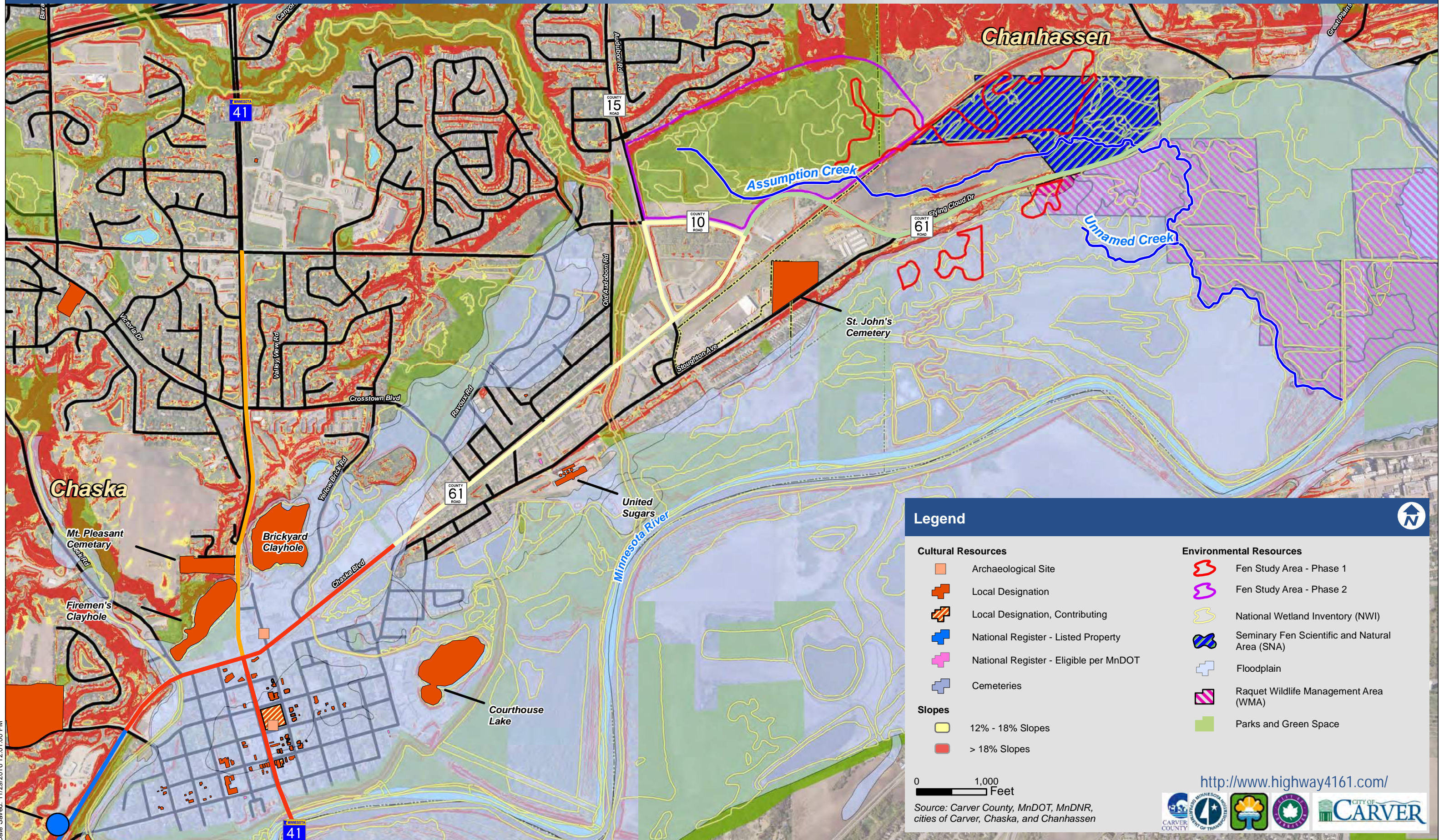
- Raquet Wildlife Management Area (WMA)
- Parks and Green Space
- Slopes
 - 12% - 18% Slopes
 - > 18% Slopes

0 1,000 Feet

Source: Carver County, MnDOT, MnDNR, cities of Carver, Chaska, and Chanhassen

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Appendix D: Goals, Objectives and Performance Measures



County Highway 61 / Highway 41 Improvements

Carver County, Minnesota

June 2, 2016

Goals, Objectives and Performance Measures

Downtown Chaska Subarea

FINAL

PURPOSE

The purpose of this document is to outline the goals and objectives for the Downtown Chaska Subarea which will guide the development and evaluation of improvement alternatives. The goals and objectives are intended to align with state and local transportation plans as much as possible. They build off the existing conditions, issues, needs and concerns outlined in the Downtown Findings of Fact and define desired results or outcomes. Multiple objectives are identified supporting each goal. These objectives provide additional details on how the goal can be achieved. The performance measures are tied to the objectives and will be used during the alternatives evaluation process to assess and compare improvement alternatives. The goals, objectives and performance measures will be transferred into an evaluation matrix in the next phase of the project to facilitate the evaluation of alternatives.

GOALS, OBJECTIVES AND PERFORMANCE MEASURES

GOAL A: Preserve and enrich the ambience of historic Downtown Chaska

The ambience of a small town downtown is challenging in Chaska due to high volumes of vehicular traffic on TH 41 and CSAH 61. This goal and its objectives are aimed at supporting the City of Chaska's Downtown vision to, "Revitalize downtown Chaska as the hub of community destinations and gathering places that reflect and celebrate the city's historic character, traditional small town atmosphere and values." The transportation objectives and performance measures of this goal are focused on the local roadway system in downtown Chaska. Goal D focuses on the regional transportation system (i.e., CSAH 61 and TH 41) in this area.

Objectives

Maintain or enhance access for local trips
Expand the permeability of local access in/out of downtown

Performance Measures

Side street delay accessing or crossing Highways 41 and 61 during peak periods and off-peak
Average travel speeds to enter and exit downtown nodes
Number of access points by access type (e.g., full access, $\frac{3}{4}$ access, right-in/right-out, etc.)
Number of new local roadway access connections in/out of downtown by movements allowed
Modifications to existing local roadway and private accesses



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County Highway 61 / Highway 41 Improvements

Carver County, Minnesota

June 2, 2016

Objectives

Maintain or enhance parking in close proximity to the front door of downtown businesses
Support future land use plans
Enhance community identity
Provide context sensitivity in improvement recommendations

Performance Measures

Number of on-street parking stalls
Parking assessment/comparison
Proximity of parking to front door of businesses
Compatibility with future land use plans
Requires modifications to future land use plan
Impact to common areas (i.e., Downtown Square)
Space for streetscape elements and landscaping opportunities
Space for signature gateways at downtown entrances
Distance between curb and buildings

GOAL B: Provide a comprehensive network for multimodal transportation that is compatible with the major transportation corridors

Major transportation corridors in downtown Chaska include TH 41 and CSAH 61. Both TH 41 and CSAH 61 are challenges to pedestrians, bicyclists and transit users in downtown Chaska. This goal and its objectives are aimed at enhancing the multimodal (pedestrian, bicycle and transit) network connections in downtown including crossings of the major transportation corridors.

Objectives

Provide a comprehensive and connected pedestrian and bicycle system meeting accessibility requirements
Align pedestrian accommodations with user needs
Accommodate reasonable space for pedestrians/bicyclists
Identify treatments for high demand crossings of the major transportation corridors
Provide convenient and comfortable pedestrian routes that are compatible with the vehicular needs of TH 41 and CSAH 61
Serve transit needs to meet demand

Performance Measures

North/south and east/west pedestrian and bicycle connections through the downtown
Function and location of pedestrian/bicycle accommodations and crossings
Available pedestrian/bicycle space
Buffer between pedestrian/bicycle space and vehicles (parked or moving)
Pedestrian travel times, delay, and Level of Service
ADA/PROWAG compliance
Function and location of transit routes and stops



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County Highway 61 / Highway 41 Improvements

Carver County, Minnesota

June 2, 2016

GOAL C: Safely accommodate all users along the major transportation corridors

This goal and its objectives strive to provide a safe transportation network for all users in downtown Chaska.

Objectives

Maintain crash and severity rates below statewide averages for comparable facilities
Accommodate safe pedestrian and bicycle travel along and across roadways.
Accommodate safe and efficient transit service
Provide reasonable and responsible access

Performance Measures

Forecasted crash and severity rates
Effectiveness of treatment options to accommodate pedestrians crossing TH 41 and CSAH 61.
Benefit of intersection design and roadway section to improve safety.
Vehicle to vehicle and vehicle to pedestrian conflict points.
Bike lane and or trail accommodations.
Ability to provide adequate bus stops or pull outs.
Proposed access spacing compared to county and state guidelines

GOAL D: Provide efficient and reliable vehicle mobility on major transportation corridors

CSAH 61 and TH 41 are arterial roadways providing an important function for the region. The objectives identified for this goal are aimed at ensuring continued efficient and reliable movement of vehicular traffic on these corridors, consistent with their arterial function.

Objectives

Maintain acceptable system reliability
Maintain acceptable vehicle delay and travel times for arterial highways
Serve the projected regional and local growth demands
Ability to accommodate the upper range of projected traffic volumes
Accommodate regional freight hauler needs
Maintain compatibility with a Future TH 41 River Crossing
Manage access to optimize mobility

Performance Measures

Volume to capacity ratio on CSAH 61 and TH 41 for the range of forecasted growth scenarios
Vehicle Delay/Level of Service on CSAH 61 and TH 41 for the range of forecasted growth scenarios
Average mainline speeds and travel times for the range of forecasted growth scenarios
Roadway design standards
Compatibility with future TH 41 River Crossing
Proposed access locations, spacing and treatments on CSAH 61 and TH 41



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County Highway 61 / Highway 41 Improvements

Carver County, Minnesota

June 2, 2016

GOAL E: Provide infrastructure improvements compatible with the natural and human environment

This goal and its objectives direct improvement alternatives to be sensitive to the context of the downtown environment considering natural, historic, cultural resources, and the built environment.

Objectives

Avoid impacts to historic properties/ Walnut Street Historic District
Provide recommendations sensitive to the historic setting
Avoid impacts to cultural resources
Minimize impacts to the built environment
Meet or exceed stormwater management requirements
Improve air quality
Minimize noise impacts

Performance Measures

Impacts to historic/cultural resources
Impacts to natural resources
Right-of-way impacts
Volume/area of stormwater runoff treatment
Compare forecasted vehicle emissions using the traffic simulation model
Effectiveness of stormwater management features to meet or exceed WMO standards
Compare noise impacts and potential mitigation measures.

GOAL F: Develop a financially responsible infrastructure implementation plan

This goal and its objectives strive to ensure improvements serve current and future needs while being cost effective and economically viable.

Objectives

Improve roadway, traffic signal, signage, sidewalk, trail and storm sewer conditions.
Enhance pedestrian, transit, parking, lighting, aesthetics and landscaping features as applicable.
Replace deficient bridges.
Replace deficient water and sanitary sewer utilities.
Utilize County Turnback Funds for CSAH 61 as much as possible.
Seek federal and state grants to leverage program funds and minimize local costs.
Develop project phases that meet schedule and funding constraints

Performance Measures

Lifecycle costs
Right-of-way cost
Comparison of County Turnback funds versus local funds needed for CSAH 61 improvements.
Percent of benefit compared to cost to achieve
Screen potential projects for federal regional solicitation grants and state grants (e.g., TED and Corridors of Commerce).
Funding eligibility and availability



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Goals, Objectives and Performance Measures

Carver, Chaska, Chanhassen – **FINAL**

PURPOSE

The purpose of this document is to outline the County Highway 61/Highway 41 Improvements Project goals and objectives for four of the five project subareas (all except Downtown Chaska which is covered in a separate document) illustrated in the project area map below. The goals and objectives will guide the development and evaluation of improvement alternatives. They are intended to align with state and local transportation plans and build off the existing conditions, issues, needs and concerns outlined in the Corridor Findings of Fact. Multiple objectives are identified supporting each goal and provide additional details on how the goal can be achieved. Performance measures are also tied to the objectives and will be used during the alternatives evaluation process to assess and compare improvement alternatives. The goals, objectives and performance measures will be used in the next phase of the project to facilitate the evaluation of alternatives.





County Highway 61 / Highway 41 Improvements

Carver County, Minnesota

December 2016

CORRIDOR GOALS, OBJECTIVES AND PERFORMANCE MEASURES

GOAL A: Provide efficient and reliable mobility on major transportation corridors accommodating the projected local and regional growth demands.

Objectives

Maintain acceptable system reliability.
Maintain acceptable vehicle delay and travel times.
Serve the projected regional and local growth demands.
Accommodate regional freight hauler needs.
Manage access to optimize mobility.

Performance Measures

Volume to capacity ratio on CSAH 61 and TH 41
Vehicle delay/Level of service on CSAH 61 and TH 41
Side street delay accessing or crossing major corridors.
Intersection delay for forecasted growth scenarios.
Average mainline speeds and travel times
Support future land use plans.
Impacts to developable land.
Support economic development.
Roadway design standards
Proposed access locations, spacing and treatments on CSAH 61 and TH 41

GOAL B: Safely accommodate all users (vehicles, freight, pedestrians, bicyclists)

Objectives

Maintain crash and severity rates below statewide averages for comparable facilities.
Accommodate safe pedestrian and bicycle travel along and across roadways and to schools.
Provide reasonable and responsible access

Performance Measures

Forecasted crash and severity rates.
Intersection and roadway design accommodations for pedestrians/bicyclists.
Vehicle to vehicle and vehicle to pedestrian conflict points.
Proposed access spacing compared to county and state guidelines.



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County Highway 61 / Highway 41 Improvements

Carver County, Minnesota

December 2016

GOAL C: Provide a comprehensive network for non-motorized transportation that is compatible with the major transportation corridors.

Objectives

Provide a comprehensive and connected pedestrian and bicycle system meeting accessibility requirements.
Accommodate pedestrian/bicycle crossings of the major transportation corridors.
Identify treatments for high demand crossings of the major transportation corridors.

Performance Measures

Accommodate planned connections of future off-road trails.
Impacts to regional trail connections.
Compliance with Americans with Disabilities Act (ADA) and Public Rights of Way Accessibility Guidance (PROWAG)
Function and location of pedestrian/bicycle accommodations and crossings.
Pedestrian delay and level of service.

GOAL D: Provide infrastructure improvements compatible with the historic and natural environment.

Objectives

Avoid impacts to historic properties.
Avoid impacts to cultural resources.
Minimize impacts to the built environment.
Avoid direct and indirect impacts to the Seminary Fen Wetland Complex, the Seminary Fen Scientific and Natural Area, Assumption Creek, and the Raquet Wildlife Management Area.
Meet or exceed stormwater management requirements.
Provide context sensitivity in improvement recommendations.
Provide opportunities for environmental enhancements.

Performance Measures

Impacts to historic resources.
Impacts to cultural resources.
Acquisition of property.
Impacts to natural and protected resources.
Effectiveness of stormwater management features to meet or exceed WMO standards.
Impacts to steep slopes, ravines, drainage ways.



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County Highway 61 / Highway 41 Improvements

Carver County, Minnesota

December 2016

GOAL E: Develop a financially responsible infrastructure implementation plan.

Objectives

Utilize State Turnback Funds for CSAH 61.
Seek federal and state grants to leverage program funds and minimize local costs.
Right-size improvements to address needs yet maximize use of existing infrastructure where possible.
Develop project phases that meet schedule and funding constraints.

Performance Measures

Comparison of County Turnback funds versus local funds needed for CSAH 61 improvements.
Screen potential projects for federal and state grants.
Cost of Improvements – Lifecycle and Right-of-Way
Funding eligibility and availability.



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Appendix E: Concept Evaluation

Downtown Chaska Evaluation Matrix

Highway 41 Concepts (South of 4th Street)

October 2016

Goals	No Build	Concept A	Concept B1	Concept B2	Concept B3	Concept D1
	Mill & Overlay	3-Lane No Median, Parking Both Sides	3-Lane Divided No Parking	3-Lane Divided NB Parking	3-Lane Divided Parking Both Sides	5-Lane Divided
Goal A: Preserve and enrich the ambience of historic Downtown Chaska	58%	97%	75%	83%	85%	20%
Goal B: Provide a comprehensive network for nonmotorized transportation that is compatible with the major transportation corridors	26%	58%	94%	80%	72%	18%
Goal C: Safely accommodate all users along the major transportation corridors	25%	10%	100%	53%	40%	70%
Goal D: Maintain acceptable vehicle mobility on major transportation corridors	64%	44%	78%	55%	48%	100%
Goal E: Provide infrastructure improvements compatible with the natural and human environment	55%	75%	93%	88%	85%	53%
Goal F: Develop a financially responsible infrastructure implementation plan	68%	63%	93%	60%	63%	65%
Total	49%	58%	89%	70%	65%	54%

Downtown Chaska Evaluation Matrix

Highway 41 / 61 Intersection Area Concepts

October 2016

Goals	No Build	Concept A Single Left Turn Lanes	Concept B Dual NB Left Turn Lanes
Goal A: Preserve and enrich the ambience of historic Downtown Chaska	100%	86%	76%
Goal B: Provide a comprehensive network for nonmotorized transportation that is compatible with the major transportation corridors	10%	90%	90%
Goal C: Safely accommodate all users along the major transportation corridors	27%	83%	93%
Goal D: Maintain acceptable vehicle mobility on major transportation corridors	10%	65%	98%
Goal E: Provide infrastructure improvements compatible with the natural and human environment	70%	90%	80%
Goal F: Develop a financially responsible infrastructure implementation plan	33%	93%	93%
Total	42%	84%	88%

Downtown Chaska Evaluation Matrix

Highway 61 East Area Concepts

October 2016

Goals	No Build	Concept A Full Access at Walnut Street	Concept B Full Access at Walnut Street w/ EBL Restrictions	Concept C Right-in/Right-Out at Walnut Street	Concept D1 Expanded Full Access at Walnut Street
Goal A: Preserve and enrich the ambience of historic Downtown Chaska	100%	80%	67%	30%	73%
Goal B: Provide a comprehensive network for nonmotorized transportation that is compatible with the major transportation corridors	67%	100%	100%	40%	90%
Goal C: Safely accommodate all users along the major transportation corridors	53%	75%	65%	70%	95%
Goal D: Maintain acceptable vehicle mobility on major transportation corridors	23%	72%	70%	92%	87%
Goal E: Provide infrastructure improvements compatible with the natural and human environment	100%	80%	80%	80%	75%
Goal F: Develop a financially responsible infrastructure implementation plan	33%	88%	83%	100%	78%
Total	63%	82%	77%	69%	83%

Evaluation Measure	No Build	Replace Existing Alignment	Concept 1	Concept 2	Concept 3	Concept 4	Concept 5	Concept 6	Concept 7	Concept 8	Concept 9	Concept 9a	Concept 9b	Notes
Total Number of Full Acquisitions (Both Cities)	0	0	6	4	5	5-7	5-7	6-7	6	6-8	5-6	4	2	
Land Use Impacts- Chaska														
Number of Full Acquisitions	0	0	4	2	3	1	4	3	3	1-2	2	2	0	
Chaska - Remaining Developable Acreage	Remaining developable acreage is within the same order of magnitude for all options. The differences are related to how the remaining areas are split based on the road location.													
Chaska - Supports future land use plans	Good	High	Low	Low	High	Medium	Low	High	Low	High	High	High	High	Alignment 3 allows for reasonable development in all four quadrants of roundabout.
Chaska - Supports economic development to Downtown	Good	High	Low	Low	High	Medium	Low	High	Low	High	High	High	High	Alignment 3 provides good levels of access (perceived) to downtown Chaska. Alignment 6 provides for acceptable, but lower levels of access (perceived) to downtown Chaska.
City Supports Keeping Alignment for Future Study	N/A	Yes	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	
Land Use Impacts- Chanhassen														
Number of Full Acquisitions	0	0	2	2	2	4-6	1-3	3-4	3	5-6	3-4	2	2	
Chanhassen - Remaining Developable Acreage	Remaining developable acreage is within the same order of magnitude for all options. The differences are related to how the remaining areas are split based on the road location.													
Chanhassen - Supports future land use plans	High	High	Low	Low	Low	High	Medium	High	Medium	High	High	High	High	
City Supports Keeping Alignment for Future Study	N/A	Yes	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	
Regional Trail System Impacts														
Requires Relocation of Existing Regional Trail	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	No	No	
Length of Trail Reconstruction in feet	None	None	945	940	890	None	945	450	1531	None	None	None	None	
Number of New Roadway Crossings	0	0	1	1	0	0	1	1	1	0	0	0	0	This criteria assumes the regional trail connection would be restored near its existing alignment on the north side of CSAH 61.
Environmental Impacts														
Risk of Impacts to Cemetery (based on proximity)	Low	Low	Low	Low	Medium	High	Low	Low	Low	Medium	Low	Low	Low	
Roadway Impacts														
Length of New Roadway (ft)	0	0	5,800	5,700	5,950	6,200	6,100	6,170	6,130	6,900	6,900	6,300	6,300	
Safety - Estimated Reduction of Total Crashes (Future)	Poor	Fair	Good	Good	Good	Good	Good	Fair	Good	Good	Fair	Fair	Fair	
Meets Design Standards	No	Yes	Yes	No - 50 mph design speed (4% super on curves)	Yes	No - 50 mph design speed (4% super on curves)	No - 50 mph design speed (4% super on curves)	Yes	No - 50 mph design speed (4% super on curves)	No - 50 mph design speed (4% super on curves)	Yes	Yes	Yes	
Estimated Construction Cost	-	\$2.6 M	\$2.6 M	\$2.6 M	\$2.6 M	\$2.6 M	\$2.6 M	\$2.6 M	\$2.6 M	\$2.6 M	\$2.6 M	\$2.6 M	\$2.6 M	
Estimated Right of Way Cost	-	Lowest	Low	Low	Low	Medium	Low	Medium	Low	High	Highest	High	High	
Total Estimated Cots	-	Lowest	Low	Low	Low	Medium	Low	Medium	Low	High	Highest	High	High	
Project Team Recommendation		Yes	No	No	No	No	No	No	No	No	No	No	*	*Carver County may reconsider this alternative in the future if property owner willingness would support a roadway realignment.

Appendix F: Preliminary Stormwater Management Plan



Real People. Real Solutions.

TH 41/CSAH 61 Preliminary Stormwater Management Plan

Downtown Chaska Corridor Stormwater Improvements

April 24, 2017

Submitted by:

Bolton & Menk, Inc.
12224 Nicollet Ave
Burnsville, MN 55337
P: 952-890-0509
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Real People. Real Solutions.

12224 Nicollet Avenue
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Ph: (952) 890-0509
Fax: (952) 890-8065
Bolton-Menk.com

April 21, 2017

TO: Water Resources Stakeholders Group

RE: TH 41/CSAH 61 Preliminary Stormwater Management Plan
Downtown Chaska Corridor and Stormwater Improvements

Water Resources Stakeholders Group:

In partnership with the City of Chaska, Carver County and the Minnesota Department of Transportation (MnDOT) are developing long term improvements to County State Aid Highway (CSAH) 61 and Trunk Highway (TH) 41 through the Downtown Chaska Area. The project will result in a broad understanding of the needs and opportunities on the target roadways and an implementation plan that will guide recommended improvement implementation. With the roadway improvements, stormwater management requirements will be triggered that include floodplain management, surface drainage and storm sewer system design, rate control, volume control and water quality considerations. Significant coordination and planning has resulted in the guidance described herein.

The Water Resources Stakeholder Group consists of key team members from a number of agencies at the federal, state and local levels. The combined expertise has guided Bolton & Menk and Carver County through the development of a planning framework that describes the necessary stormwater management techniques to meet all applicable permitting requirements and achieve the goals of each stakeholder group.

The following document is not static. It is intended to set in motion a plan for future project implementation by documenting the guidance provide by the stakeholder groups and formulating several options for effective project delivery and improved water quality. This particular document is specific to the projects anticipated in the Downtown Chaska Project Subarea. When projects are scheduled for construction, this document should represent the foundation for recommended stormwater management improvements. It should also consider and incorporate any and all new permitting requirements and best management practices developed since the generation of this document.

We have formulated effective implementation strategies under the guidance and expertise of the Water Resources Stakeholders Group. The resulting partnerships will ensure that future projects will be constructed with traffic, pedestrian and environmental safety at the highest priority.

Sincerely,

Bolton & Menk, Inc.

Timothy J. Olson, PE, CFM
Water Resources Project Manager

I. Introduction

Carver County and the Minnesota Department of Transportation (MnDOT), in partnership with the City of Chaska are working together to identify a long-term vision for transportation system improvements on County State Aid Highway (CSAH) 61 and State Trunk Highway (TH) 41. The project will result in a broad understanding of the needs and opportunities on the target roadways and an implementation plan that will guide recommended improvement implementation as they are achieved incrementally in the future. **Figure 1** illustrates the project area in its entirety. This memo details the agency coordination and planning that went into developing a Preliminary Stormwater Management Plan for the Downtown Chaska subarea.



Figure 1. TH 41/CSAH 61 Corridor Project Area Map.

The objectives of this Plan are aimed at determining stormwater management requirements and qualitatively describing the storm water management features and facilities needed to meet or exceed requirements based on preliminary roadway design improvements within the corridors.

To achieve this end goal, the following identifies a mix of best management practice (BMP) features that will likely be needed for compliance. The Stormwater Management Plan includes brief descriptions of existing and proposed conditions, applicable stormwater management rules, qualitative descriptions of BMP features and applicable locations. In the future when individual projects are funded, the intent is for this Preliminary Stormwater Plan to be picked up and used as the basis to begin detailed stormwater design as individual roadway projects move through the preliminary and final design phases of project development. All figures referenced in this document are included in **Appendix A**.

II. Agency Involvement

Multiple agencies were involved in the development of the Stormwater Management Plan for the Downtown Chaska subarea portion of the Highway 41/CSAH 61 Improvements Project. Contributing agencies included:

- Carver County Water Management Organization (WMO)
- Lower Minnesota Watershed District
- City of Chaska
- U.S. Army Corps of Engineers (USACE)
- U.S. Fish and Wildlife Service (USFWS)
- MN Valley National Wildlife Refuge (NWR)
- Carver County Soil & Water Conservation District (SWCD)
- Minnesota Department of Natural Resources (MnDNR)
- Metropolitan Council
- Minnesota Department of Transportation (MnDOT)
- Carver County

The water resources group combined expertise to identify the uniqueness of area water resources as they pertain to fens and wetlands, stormwater management, bridge and culvert crossings, floodplain management, USACE flood control project, and the anticipated permitting that would accompany road construction projects in the future.

The group reviewed jurisdictions of Chaska, the Carver County WMO and the Lower MN Watershed District to identify parties responsible for ensuring projects meet stormwater management standards as well as rule requirements. The group also discussed a range of stormwater BMPs and general feasibility.

Appendix B includes copies of the minutes from the Water Resource Meetings held as part of this project.

III. Existing Conditions

Surface Water Features

The significant surface water features near the TH 41/ CSAH 61 study area includes the Minnesota River, Chaska Creek, East Creek, Firemen's Lake, Clay Hole Lake, Courthouse Lake and several wetlands. The Minnesota River flows along the southeastern edge of Chaska. Chaska Creek and East Creek drain southeasterly through Chaska to the Minnesota River. Firemen's Lake and Clay Hole Lake provide fishing and swimming recreational opportunities and aesthetics in the downtown area. Both lakes are remnants of historic clay mining operations for brick manufacturing in Chaska's past.¹

The Lower Minnesota River Watershed District commissioned a recent study of East Chaska Creek. The East Chaska Creek Restoration Project report explained that: "East Chaska Creek is unique relative to other streams in the region as (1) the channel within the Project area is likely completely manmade and (2) flow through the channel within the project area is controlled by an upstream diversion structure." The

¹ City of Chaska, Local Surface Water Management Plan, Bonestroo, December 2007

report recommendations include channel maintenance, debris removal, bank stabilization, and erosion control at specific locations. Recommendations also include several other potential water quality improvements to address impairments on the creek and mitigate sediment transport to the Minnesota River.² One of the potential water quality improvement projects involves creating a wetland along East Chaska Creek through rehabilitation of an existing parking area along the north side of the CSAH 61 corridor. **Figure 2 (Appendix A)** illustrates TH 41/ CSAH 61 study area surface water features.

Existing Stormwater Collection and Water Quality BMPs

Chaska Creek flows within a Corps of Engineers concrete flood control channel in the study area. While East Chaska Creek is a vegetated channel with fish and wildlife habitats, the Chaska Creek Corps of Engineers concrete flood channel has very little habitat value and is much less of an environmental amenity and therefore less of an environmental concern. Flood flows in East Creek are intercepted by a Corps of Engineers diversion channel and carried around downtown Chaska to the Minnesota River. A Corps of Engineers flood control levee system reduces Minnesota River flood damages to the downtown area.

Parts of the existing TH 41/ CSAH 61 corridor includes curb & gutter and storm drains. Other parts of the corridor include rural highway sections with highway runoff directed to adjacent grassed ditches. Proposed conditions within the TH 41/ CSAH 61 corridor include use of curb & gutter and storm drains throughout the Downtown Chaska project corridor.

Figure 3 (Appendix A) shows the existing storm drains in the study area. In general, much of the area along the CSAH 61 corridor drains easterly to East Creek, and much of the area along TH 41 drains southerly to the Minnesota River.

Storm drains within the western end of the CSAH 61 project area drain to an existing stormwater treatment device before outletting into the West Chaska Creek Corps of Engineers Flood Channel. The storm drains on CSAH 61 extending easterly from Creek Road drain to the East Creek. A portion of CSAH 61 runoff, at the Pine Street intersection, is routed into the City's stormwater storage and reuse system at Firemen's Park.

The storm drains along TH 41 generally flow straight toward the river, but all of the drains are consolidated along the base of the levee and routed to gate wells and pump stations. The gates are closed and the stormwater is pumped over the levee during floods. The levee also includes pressure relief wells which outlet to the storm drains on the "dry side" of the levee.

The City has a number of existing Stormceptors installed within the storm drain system to provide water quality treatment by removing sediments and nutrients. One of the existing storm drain treatment systems is installed within the TH 41 system at 1st Street. The city has also planned for several additional Stormceptors for treatment of runoff along CSAH 61 near the existing storm drain outfall locations on East Creek and also one block downstream at 6th Street.³ The existing and proposed Stormceptors are shown on the map in **Figure 3 (Appendix A)**.

Figure 4 illustrates the impaired waters within the study area. Chaska Creek, East Creek and the Minnesota River are each listed as impaired. Chaska Creek has an Environmental Protection Agency (EPA)-approved impairment for: Fecal Coliform. These impairments are considered non-construction related and do not require any additional BMPs or plan review for compliance with the NPDES/SDS construction permit.

² East Chaska Creek Restoration Project, Lower Minnesota River Watershed District & the City of Chaska, Burns & McDonnell Engineering Co. Inc., February 2016

³ TH 41 and CR61 Storm Water Exhibit, City of Chaska, Stantec, 2016-10-25

East Creek has an EPA-approved impairment for Fecal Coliform, Fishes Bioassessments, and Turbidity. The Minnesota River has an EPA-approved impairment for Mercury in Fish Tissue, Mercury in Water Column, PCB in Fish Tissue, and Turbidity. These impairments are considered to be construction related parameters and require the additional BMPs found in Appendix D of the permit (C.1 & C.2 reprinted below) if the project has a discharge point on the project within one mile (aerial radius measurement) of, and flows to the impaired stream.

Appendix D C.1, During construction:

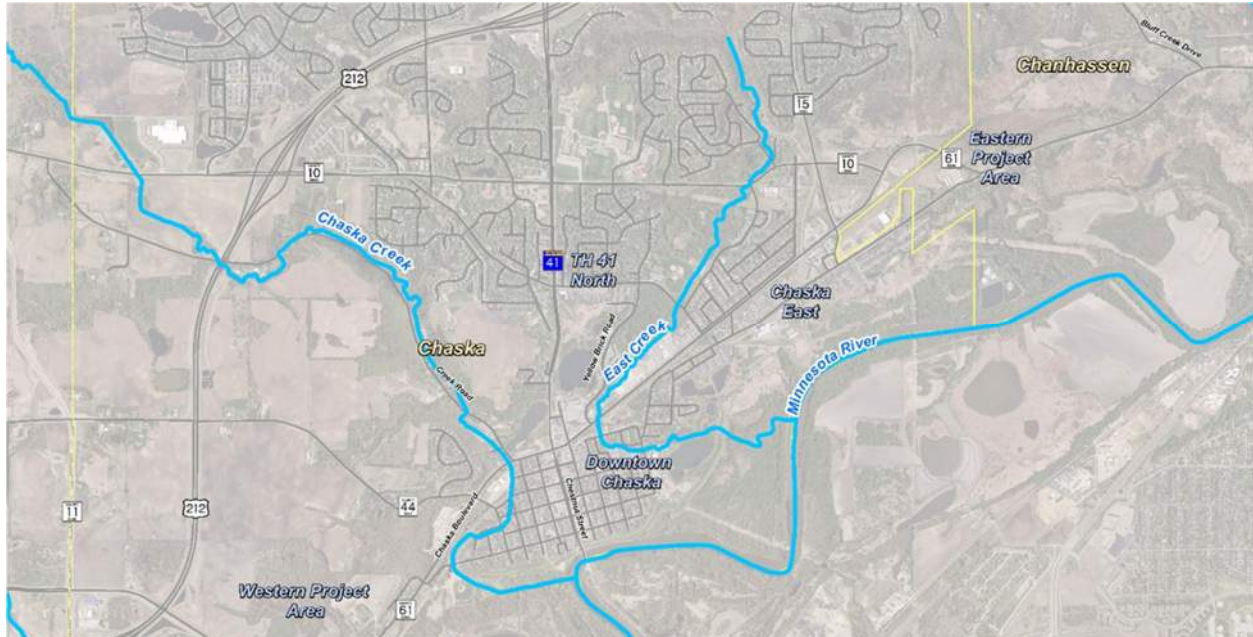


Figure 4. Impaired Waters in the Greater Project Area

a. Stabilization of all exposed soil areas must be initiated immediately to limit soil erosion but in no case completed later than seven days after the construction activity in that portion of the site has temporarily or permanently ceased.

b. Temporary sediment basin requirements described in Part III.C must be used for common drainage locations that serve an area with five or more acres disturbed at one time.

Appendix D C.2, Post construction:

The water quality volume that must be retained on site by the project's permanent stormwater management system (as described in Part III.D) shall be one inch of runoff from the new impervious surfaces created by the project.

Also, a mandatory Stormwater Pollution Prevention Plan (SWPPP) review is required by the MPCA if the project will disturb over 50 acres and has a discharge point on the project within 1 mile (aerial radius measurement) of, and flows to the impaired water. Owners must submit the application for coverage and the Storm Water Pollution Prevention Plan at least 30-days before the construction start date. The SWPPP can be attached electronically when using the online application.⁴

⁴ <http://pca-gis02.pca.state.mn.us/CSW/index.html>

IV. Proposed Conditions

Figure 5 (Appendix A) illustrates recommended improvements to TH 41 as it traverses through Downtown Chaska. This preferred option recommends a 3-lane section with median and turn lanes at various intersections along the corridor that maintain access across TH 41.

Figure 6 (Appendix A) illustrates recommended roadway improvements along CSAH 61 west and east of TH 41. This layout is focused on realigning CSAH 61 at Pine St and Walnut St maintaining those as primary access locations while limiting Cedar St to a right-in/right-out access. One access to Fireman's Park is relocated to Creek Road.

V. Stormwater Management Rules

The TH 41/ CSAH 61 Downtown project is located within the City of Chaska, the Lower Minnesota River Watershed District (LMRWD), and the Carver County Watershed Management Organization (WMO). The Lower Minnesota River Watershed District does not currently have a permit program, but the City of Chaska has the responsibility to make sure that projects meet watershed district standards. The rules of each organization for stormwater management have many similarities and also some differences. **Table 1** provides a summary of the general stormwater rules of the City of Chaska and the Carver County WMO. **Table 2** provides a summary of MN/DOT and NPDES standards.

City of Chaska

For new development projects, there shall be no net increase from pre-project conditions for stormwater TSS and TP. For redevelopment projects, there shall be a net decrease from pre-project conditions for stormwater TSS and TP. Water quality treatment performance is based on NURP with permanent pool volumes equal to runoff from 2.5 inch rainfall. Non-pond BMPs must show similar performance using the MIDS model, for example.

Carver County WMO

The Carver County WMO general rules require water quality treatment for a volume of runoff of 1" over the new impervious surfaces plus 0.1" of runoff over the existing reconstructed surfaces. For the purposes of this report, we have assumed that all existing highway surfaces within the project corridor will be reconstructed. Carver County WMO rules allow alternate compliance volume control since the highway corridor is constrained, therefore, volume control will be reduced to ½" over new impervious surfaces and 0.05" over reconstructed impervious surfaces. The Carver County WMO BMP Calculator can be used to determine whether proposed BMPs meet the requirements of Carver County. The calculator assigns credits to proposed stormwater BMPs toward meeting the requirements for volume reduction and TP and TSS water quality treatments.

NPDES Construction Stormwater Permit

The NPDES Construction Stormwater Permit requires the retention and treatment of the water quality volume of 1.0 inch over new impervious surfaces. The acreages of existing and proposed new impervious surfaces within the TH 41/ CSAH 61 corridor is listed within **Table 3**. We have assumed that all existing impervious surfaces within the study area highway corridor will be reconstructed.

The NPDES Construction Stormwater Permit requires the retention and treatment of the water quality volume of 1.0 inch over new impervious surfaces. Less than 1.0 acres of new impervious surfaces are expected in the combined downtown corridor projects, so the NPDES Construction Stormwater Permit volume control requirements will not apply.

Rate Control

The City of Chaska and the Carver County WMO both require rate control, therefore, peak rates must not exceed existing for 2-, 10-, and 100-year events. Chaska also requires that the net 100-year peak flow per acre from new development, and increased impervious surfaces in redevelopment areas, must meet the calculated City average of 0.2 cfs/acre. Additional temporary storage may be required to reduce flow from increased impervious surfaces.

Table 1: City of Chaska and Carver County WMO Stormwater Rules

	City of Chaska	Carver County
General	For new development projects, there shall be no net increase from pre-project conditions for stormwater TSS and TP. For redevelopment projects, there shall be a net decrease from pre-project conditions for stormwater TSS and TP	...for New impervious and reconstructed impervious.... c) Increase in impervious surface. Projects that reconstruct or create 1 acre or more of impervious (10,000 square feet in a sensitive area) and result in an increase in impervious surface (e.g. an expansion of an existing roadway) must meet the following treatment requirements: (i) New impervious: must meet treatment requirements described below for rate, water quality, and volume for all new impervious created as part of the project. (ii) Existing impervious: must provide treatment that results in a 10% reduction from pre-project conditions (for a 1.0 inch storm) for water quality (total suspended solids and total phosphorus), and volume for impervious areas reconstructed as part of the project.
Rate Control	Peak rates must not exceed existing for 2-, 10-, and 100-year events. The net 100-year peak flow per acre from new development, and from increased impervious surfaces in redevelopment areas, must meet the calculated City average of 0.2 cfs/acre.	Peak rates must not increase for 2-, 10-, and 100-year events....using Atlas 14 precipitation depths and storm distributions.
Conveyance / Quantity	10-year rational equation design, 100-year check. Directly connected impervious areas to ponds must be modeled separately from remaining areas for proper basin sizing.	10-year design, 100-year check.
Extended Detention		2-year discharge to streams reduced to 50% of existing.
Water Quality	Treatment performance is based on NURP with permanent pool volumes equal runoff from 2.5 inch rainfall. Non-pond BMPs must show similar performance using the MIDS model, for example.	Treatment of 1 inches of rainfall on new impervious surfaces plus 0.05" of runoff over the existing reconstructed surfaces. (See Chapter 153 Water Resources Management (3) Linear Transportation Projects)
Phosphorus Removal	<i>MS4 requirements seek a net reduction in phosphorus.</i> Minimum phosphorus requirement must meet NURP design standards. Highly susceptible (lakes, creeks, streams & rivers) and moderately susceptible wetland waterbodies require 150 ppb and 200 ppb pretreatment (Table 4-4 LSWMP).	Remove 90% of phosphorus generated by site. (Calculated using Appendix A: volume and Water Quality Calculations or industry standard WQ models)
Total Suspended Solids Removal	Ponds designed in accordance with NURP and MPCA Stormwater Manual.	Remove 90% of TSS generated by site. (Calculated using Appendix A: volume and Water Quality Calculations or industry standard WQ models)
Volume Control	The City does not regulate volume control, as explained 11-22-2016 by City's Consultant, Dan Edgerton of Stantec.	Volume control from new and reconstructed impervious surfaces calculated using Appendix A: Volume and Water Quality Calculations or approved equivalent. Standard rules require volume control for 1" over the new impervious surfaces plus 0.1" of runoff over the existing reconstructed surfaces. The new rules allow alternate compliance volume control since the highway corridor is constrained, therefore, volume control will be reduced to ½" over new impervious surfaces and 0.05" over reconstructed impervious surfaces.
		New trails or sidewalk projects that create impervious surfaces 12 feet or less in width, are created independently from road projects, and will be bordered on the downgradient side(s) by a pervious buffer averaging at least one-half the width of the sidewalk or trail are exempt from requirements;
Topsoil Management Plan	If site pervious areas are not deep ripped to a minimum 12 inch depth, hydrologic soils group must be modeled one group lower than in existing conditions.	Carver County has established a topsoil standard, with requirements for gradation, organic content, pH, and compaction. Construction projects will be required to place 6" topsoil that meets EITHER the County standard, or a site-specific standard developed per new 2016 CCWMO guidelines. Applicants must submit topsoil management plan including: ▮ Methods for stripping and stockpiling topsoil ▮ Topsoil stockpile sampling methods and re-application procedures

		<ul style="list-style-type: none"> ¶ Construction schedule and phasing ¶ Quantity of topsoil needed ¶ Total green space area ¶ Location/size of stockpiles ¶ Reapplication locations Note required depth (6in) ¶ Note verification by WMO/City is required
--	--	--

Table 2. Mn/DOT and NPDES Stormwater Standards

	MnDOT	NPDES Construction Stormwater
General	<p>MnDOT follows NPDES Requirements as well as those of the local water management agencies. Criteria for storm drain capacity and inlet spread calculations shall be in accord with the MnDOT Technical Memorandum No. 16-05-B-02 dated September 13, 2016. The storm drain and catch basin spread design for TH 41 will need to be completed using a rational equation 10-year design (since ADT will exceed 5000 VPD).⁵</p> <p>Criteria for location of infiltration BMPs within MnDOT right of way is provided within Technical Memorandum No. 14-06-ENV-01, dated July 9, 2014. In general water cannot be infiltrated under the driving lanes or areas contributing to the "...base, sub-base, or existing soil above the groundwater table.... For urban cross-sections... Infiltration may be allowed within 1' of the back of the curb if an impermeable barrier is used to protect the base, sub-base, and subgrade."⁶</p>	<p>For work on linear projects with lack of right-of-way where the Permittee(s) cannot obtain an easement or other permission for property needed to install treatment systems capable of treating the entire water quality volume on site, the Permittee(s) must maximize the water quality volume that can be treated prior to discharge to surface waters. Treatment can be provided through other methods or combination of methods such as grassed swales, filtration systems, smaller ponds, or grit chambers, prior to discharge to surface waters. A reasonable attempt must be made to obtain right-of-way during the project planning process. Documentation of these attempts must be in the SWPPP per Part III.A.5.m. in the section addressing infeasibility.</p>
Volume Control		<p>III.D Permanent Stormwater Management System Where a project's ultimate development replaces vegetation and/or other pervious surfaces with one (1) or more acres of cumulative impervious surface, the Permittee(s) must design the project so that the water quality volume of one (1) inch of runoff from the new impervious surfaces created by the project is retained on site (i.e. infiltration or other volume reduction practices) and not discharged to a surface water. For purposes of this part, surface waters does not include man-made drainage systems that convey stormwater to a compliant permanent stormwater management system.</p> <p>For those projects where infiltration is prohibited (see Part III.D.1.j.), the Permittee(s) shall consider other methods of volume reduction and the water quality volume (or remainder of the water quality volume if some volume reduction is achieved) must be treated by a wet sedimentation basin, filtration system, regional ponding or equivalent methods prior to the discharge of stormwater to surface waters.</p> <p>Where the proximity to bedrock precludes the installation of any of the permanent stormwater management practices outlined in Part III.D., other treatment, such as grassed swales, filtration systems, smaller ponds, or grit chambers, is required prior to the discharge of stormwater to surface waters.</p> <p>Part III. D. 5. a. (2) (b) For redevelopment projects – a net reduction from pre-project conditions (on an annual average basis) of:</p> <ol style="list-style-type: none"> 1) Stormwater discharge Volume, unless precluded by the stormwater management limitations in Part III.D.5.a(3)(a) 2) Stormwater discharges of TSS 3) Stormwater discharges of TP

⁵ Minnesota Department of Transportation, Technical Memorandum No. 16-05-B-02, Storm Drain Design Frequency and Catch Basin Spacing, September 13, 2016

⁶ Minnesota Department of Transportation, Technical Memorandum No. 14-06-ENV-01, Storm Water Infiltration System Location Guidelines for MNDOT ROW, July 9, 2014

Table 3. Existing and New Impervious Surfaces in TH 41/ CSAH 61 Study Corridor

	Existing Impervious (acre)	New Impervious (acre)	Total Impervious (acre)
<i>CSAH 61 (West of TH 41)</i>	2.81	.21	3.02
<i>CSAH 61 (Downtown Corridor)</i>	1.7	.3	2.0
<i>TH 41(Downtown Corridor)</i>	5.5	.3	5.8

VI. Recommendations

CSAH 61 West of TH 41

CSAH 61, west of TH 41, lies within the Carver County WMO. City of Chaska and WMO rules and permitting will apply in this area. BMP alternatives for CSAH 61 West of TH 41 include:

- Median Greenspace.
- Bioretention/Sand Filter with iron-enhanced phosphorus removal.
- Sumps & Separators (Chaska Creek).
- Irrigation and reuse (additional impervious acreage to Firemen's Park system).
- Amended soils (along Creek Road).

Discussion of BMPs and treatment alternatives for CSAH 61

Soils in the CSAH 61 Highway Corridor west of TH 41 include 3 to 7 feet of fill materials within the previously compacted embankments. The site is constrained for volume control and the volume control standard is therefore reduced.

- Median greenspace: Use of median greenspace is planned for two areas—which has helped to reduce total new impervious surfaces. **Figure 7 (Appendix A)** shows the areas planned for green space.
- Sumps, grit chambers & separators: The City has an existing Stormceptor recently installed and in place on the CSAH 61 storm drain near the outlet to the Corps Flood Channel. A storm drain on Creek Road is planned to collect stormwater and carry it to an outfall to Firemen's Clayhole Lake. A SAFL Baffle or grit removal device is planned for installation near the outlet. WMO and Watershed staff advised that it is a better idea to route Creek Road stormwater to the Corps Flood Channel rather than the Firemen's Clayhole Lake, since the stormwater could negatively impact the swimming beach and fishing in the lake, and Firemen's Lake has an existing outlet to the Corps Chaska Creek channel.
- Irrigation and reuse: The City's existing stormwater reuse system in Firemen's Park presently irrigates 4 acres and receives runoff from 1.5 acres of impervious surfaces. The CSAH 61 project has the potential to add 0.6 acres of impervious surface to the system. This area could include the eastbound lanes of CSAH 61 from Creek Road to Pine Street. Additional impervious surfaces will be beneficial to the reuse system and will increase the amount of runoff collected and reused for irrigation.

- **Bioretention Filters:** A bioretention filter is proposed in the right of way south of CSAH 61, approximately 250 feet west of the Corps Flood Channel. This site is a feasible location for stormwater to be drawn from the storm drainage system, passed through a sand filter (with iron enhancement) and routed back into the storm drain several hundred feet further east.
- **Amended Soils:** Amended soils are planned for an area between Creek Road and the Corps flood channel.

TH 41 and CSAH 61 East of TH 41

The TH 41/ CSAH 61 Downtown project corridor is located within the City of Chaska and the Lower Minnesota River Watershed District (LMRWD). Since the project area lies within the LMRWD, the Carver County WMO may likely review the project and offer suggestions, but will not have permit responsibility in the Downtown TH 41/ CSAH 61 project area. The City of Chaska, and the Lower Minnesota River Watershed District standards will apply to the TH 41/ CSAH 61 Project. The Lower Minnesota River Watershed District does not currently have a permit program, but the City of Chaska has the responsibility to make sure that projects meet watershed district standards.

The soil survey data for Carver County indicate that the project area generally includes Hydrologic Soils Group A, B, and B/D soil. City staff have explained that there are sandy soils with potential for infiltration along TH 41 south of 4th Street, but elsewhere in the study corridors soils are less suited toward infiltration systems and filters with underdrain tiles will likely be needed.

The water quality and volume control treatments for the project are proposed to be provided within multiple BMP features including planters and tree trenches, soil amendments in turf areas, subsurface treatment and infiltration, and grit chambers/separators. There was general consensus that these BMPs have potential for use in the downtown corridor:

- Tree Trenches and Planters (TH 41).
- Amended soils (along CSAH 61 and old Railroad corridor near East Creek).
- Perforated storm pipes (on TH 41 south of 4th street).
- Sumps, Grit Chambers & Separators (on CSAH 61 storm drain outfalls to East Creek).
- Pervious Pavers

Discussion of BMPs and treatment alternatives for the TH 41/ CSAH 61 Downtown Corridor

A. Tree Trenches and Planters

Figure 8 and 9 (Appendix A) illustrate potential streetscape design for TH 41 with pedestrian access routes and amenity zones. Amenity zones will be areas where tree trenches and planters may be located. Tree trenches and planters are stormwater BMPs because they reduce impervious areas and provide for stormwater treatment as water and nutrients are taken up by the plant roots and water is infiltrated below the tree trench. Some runoff can be directed to planters directly from the sidewalks, additional stormwater can be routed to the planters using subsurface drain tiles from the storm drain catch basins in the street. This concept for the TH 41/ CSAH 61 corridor includes catch basins with sumps to remove sediment and debris, a tile to carry stormwater from the catch basin to the tree trench or planter, and a weir (or raised storm drain outlet pipe) so the tile and the void space within the tree trench soil media are filled before any runoff is discharged to the storm drain outlet. MnDOT

infiltration guidance will call for an impervious barrier (a clay layer for example) between the tree trench and the back of curb to keep the area below the streets dry.⁷ The City of Chaska is generally supportive of water quality BMPs including tree trench and planter systems as long as they are effective and require low levels of maintenance.

B. Amended soils.

Figure 10 shows the CSAH 61 corridor between N. Walnut Street and East Creek. The area along CSAH 61 and the old railroad corridor includes turf areas that have potential for soil amendments. Amending soil decreases the volume and rate of runoff by enhancing soil absorption and plant uptake capacity. Amending soils with compost also reduces the need to fertilize turf. The work expected in order to amend the soils includes several passes with deep tillage equipment as well as incorporation of 2 to 3 inches of compost. Mature compost from yard waste is preferred. Soil testing may be necessary to document the qualities of the amendment.



Figure 10. CSAH 61 Corridor Amended Soils between N. Walnut St and East Creek.

The area between the old rail embankment and the highway also has potential for a surface BMP--such as a temporary ponding area for rate control or a bioretention/infiltration basin for water quality treatment improvement and volume control.

C. Perforated Storm Drains.

The use of perforated storm drains is a potential BMP for use in the sandy soils along the TH 41 corridor between 1st Street and 4th Street. Perforated storm drains might be used to infiltrate storm water and thereby provide volume control and water quality treatment.

⁷ Minnesota Department of Transportation, Technical Memorandum No. 14-06-ENV-01, Storm Water Infiltration System Location Guidelines for MNDOT ROW, July 9, 2014

An existing perforated pipe storm drain system in Belle Plaine has been operating for 10 years. The Belle Plaine system is installed in sandy soils similar to those in parts of downtown Chaska. The Belle Plaine system uses weirs in manholes spaced along the pipe alignment to detain water in the perforated pipes to promote infiltration. Once the weirs are overtopped, stormwater flows through the pipe system to the outlet. The Belle Plaine system is reported to work well in infiltrating runoff with little or no outflow in most storm events.

The Corps levee system includes strong restrictions on what can be constructed nearby so proposed BMPs in the 4th Street to 3rd Street area will likely be easier to get built than trying to fit features in nearer to the Corps levees.

MnDOT will not support placement of BMPs under any of the driving lanes. Placement of perforated pipes or other BMPs under the boulevards, for example, could be acceptable. The MnDOT Technical Guidance Memorandum No. 14-06-ENV-01 should be consulted regarding specific criteria for infiltration BMPs within highway right of ways. Perforated storm drains have good potential along the TH 41 corridor although additional study will be needed to work out the details. MnDOT guidance indicates that infiltration BMPs should not be located within 12 feet from the back of curb, unless an impermeable barrier is installed to exclude infiltrated water from the base, sub-base and underlying soil area.⁸ **Figure 11** shows MnDOT's "No Infiltration Area."

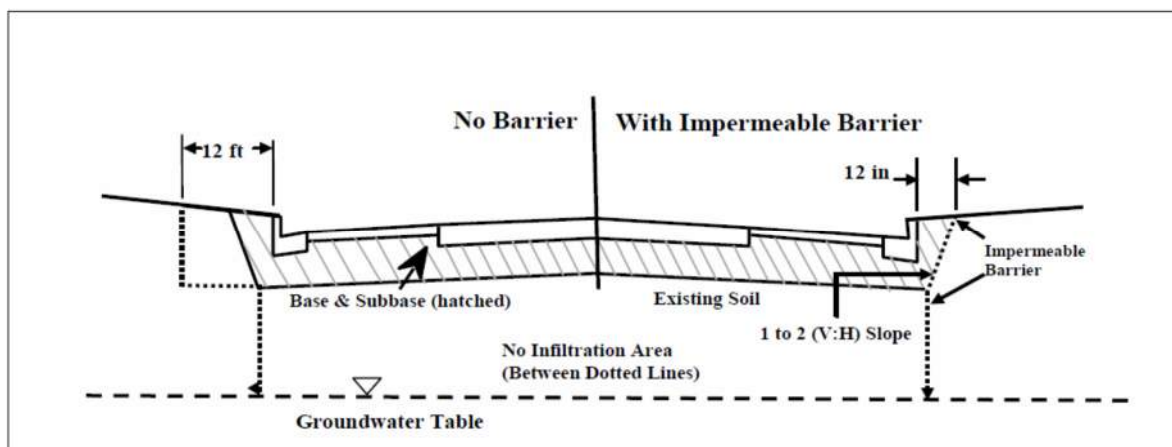


Figure 11. Urban Road Section – No Infiltration Area

D. Sumps & Separators (East Creek)

The City has a number of existing Stormceptors installed within the storm drain system to provide water quality treatment by removing sediments and nutrients. One of the existing storm drain treatment systems is installed within the TH 41 system at 1st Street. The city has also planned for several additional Stormceptors for treatment of runoff along CSAH 61 near the existing storm drain outfall locations on East Creek and also 1 block downstream at 6th Street.⁹

Sumps and separators will also likely be a BMP for treating the TH 41/CSAH 61 corridors. The Carver County WMO requires BMP structures to be installed at points of discharge to surface waters. Potential cooperative efforts of the Road Authority, City, Watershed District and WMO to provide sumps & separators on the outfalls from the CSAH 61 storm drains to East Creek seem very

⁸ Minnesota Department of Transportation, Technical Memorandum No. 14-06-ENV-01, Storm Water Infiltration System Location Guidelines for MNDOT ROW, July 9, 2014

⁹ TH 41 and CR61 Storm Water Exhibit, City of Chaska, Stantec, 2016-10-25

worthwhile. These BMPs will provide important water quality treatment and help to meet rule requirements for the highway corridor improvement projects.

E. Pervious Pavers

Pervious pavers are recommended along sidewalk areas or in sections of parking lanes along the Downtown Corridor. The pervious pavers should be constructed with washed gravel bedding to a depth below the heavily compacted urban soil complexes in order to access infiltration soils. Otherwise, an underdrain should be provided and the system utilized to filter suspended solids and particulate phosphorus from stormwater. In parking lane areas, the City should develop a maintenance plan to ensure that sanding and salting is not used in the pervious pavement areas during winter months.

VII. Next Steps

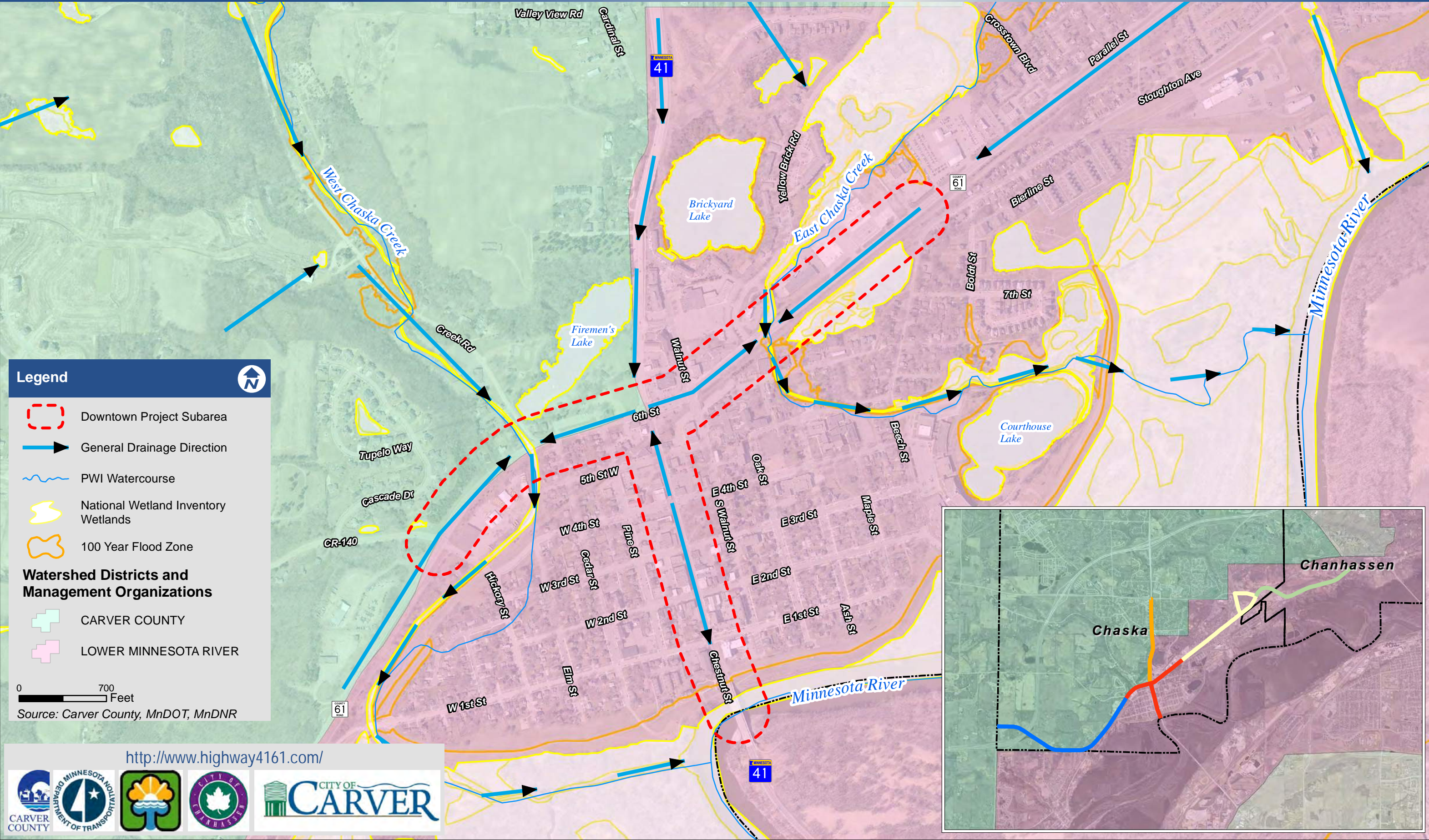
The planning phase of the Highway 41/CSAH 61 Improvement Project is projected to be complete by the summer of 2017. The end goal is to have an agreed upon footprint and general corridor vision for future improvement projects on both highways in downtown Chaska. CSAH 61 from CSAH 44 to TH 41 is programmed for construction in 2017. Project coordination has begun for this including permit acquisition efforts. The timing of future improvements on TH 41 in Downtown Chaska and CSAH 61 east of TH 41 remain unknown but are likely within the next ten years.

Operations and maintenance plans should be developed depending on the stormwater management practices that are selected during preliminary and final design. Further, maintenance agreements should be established with the permitting agencies as appropriate at the time of project design development.

Once funding is identified for these other portions of the downtown Chaska project area, the jurisdictions and agencies will regroup to move forward into more detailed design, building off of the work established during this planning phase. The detailed design phases will define the appropriate stormwater treatments based on the recommendations of this plan.

Appendix A

Figures



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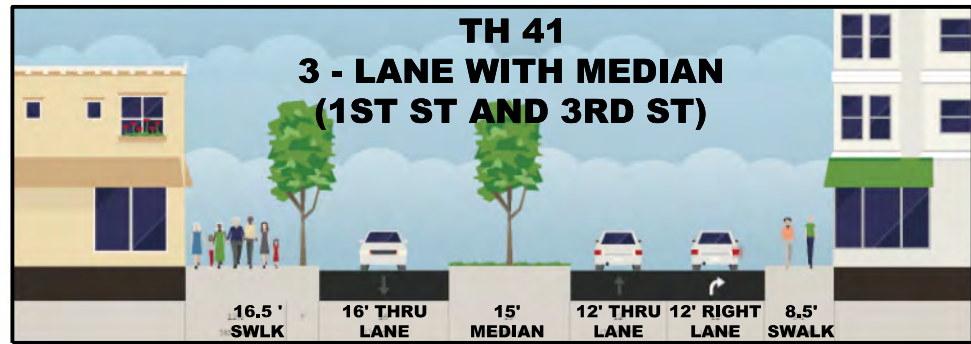
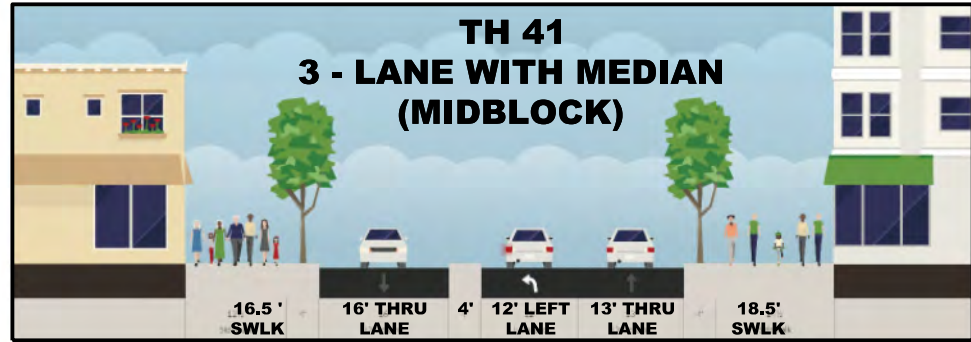
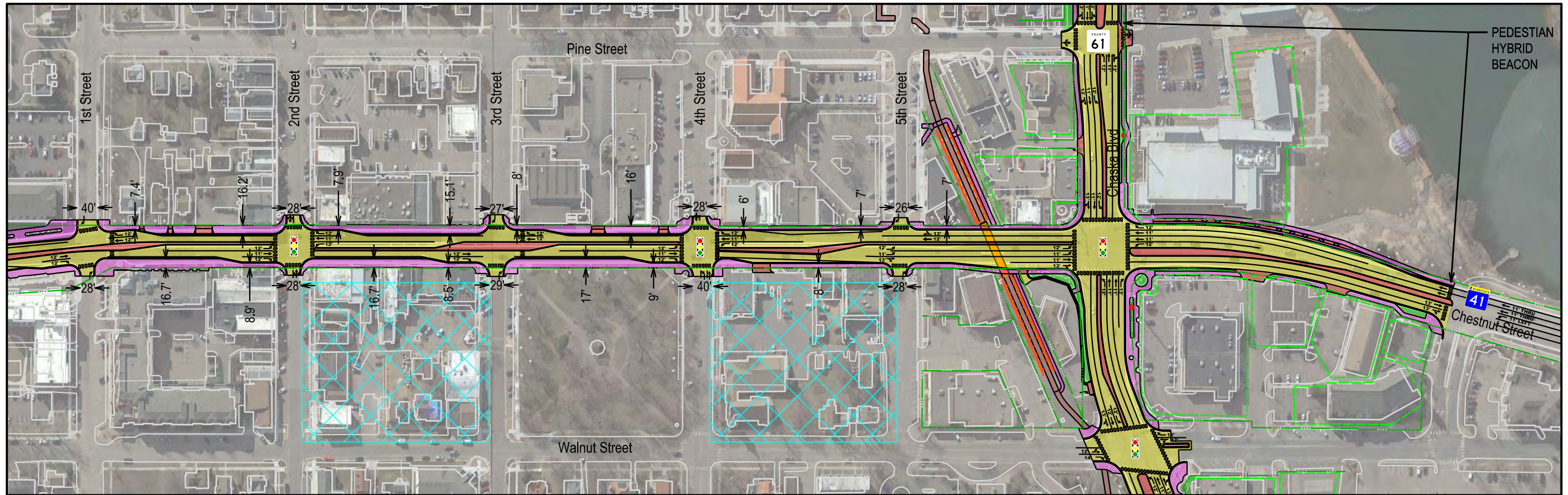
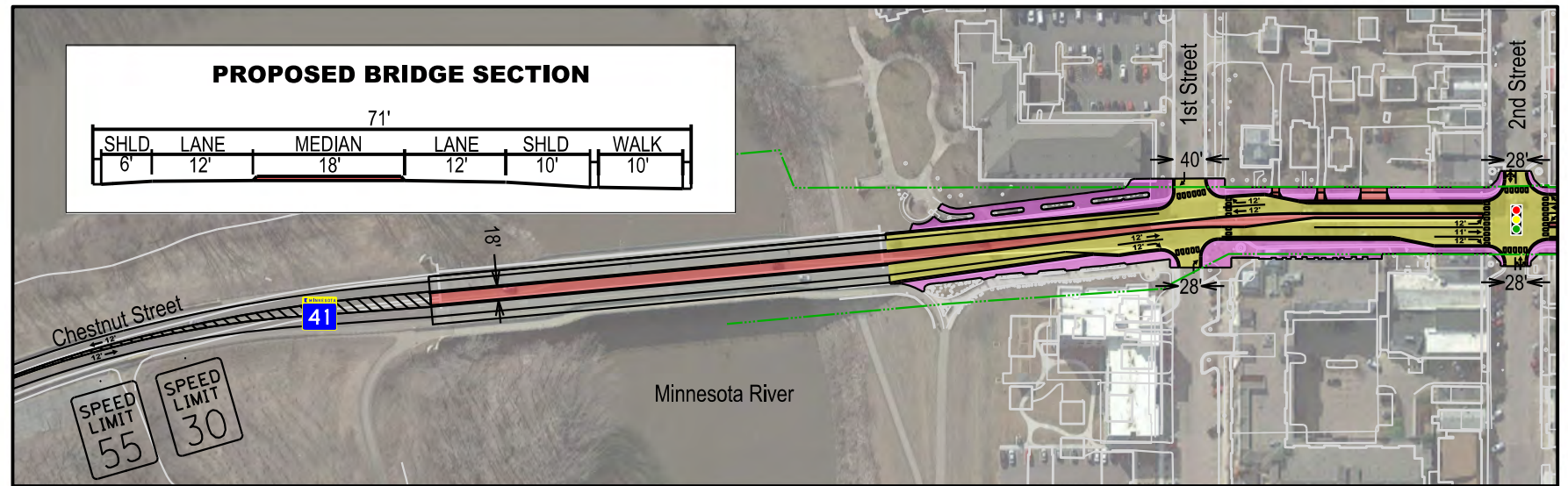
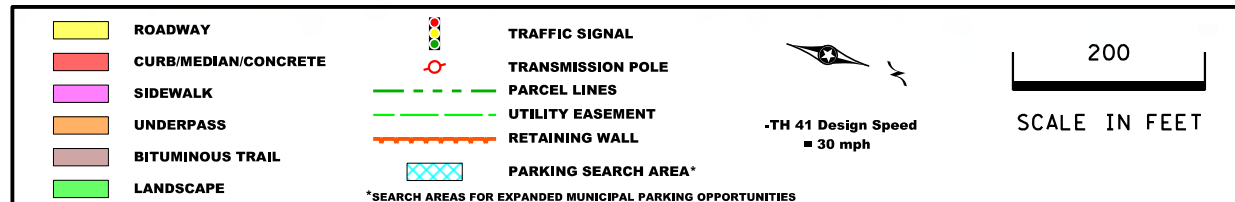


Figure 5



CHESTNUT STREET 2

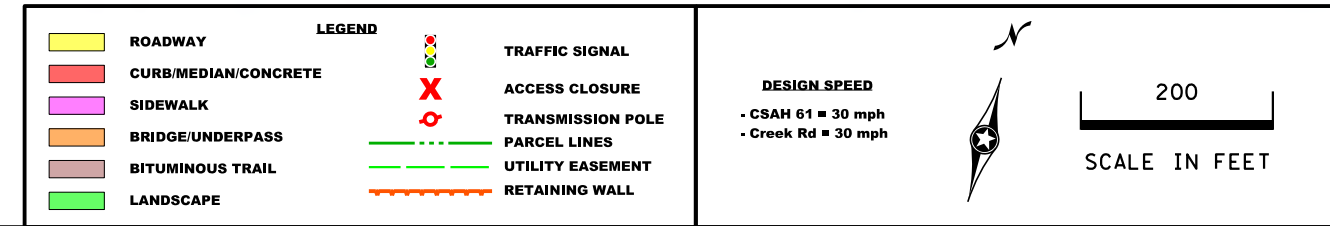
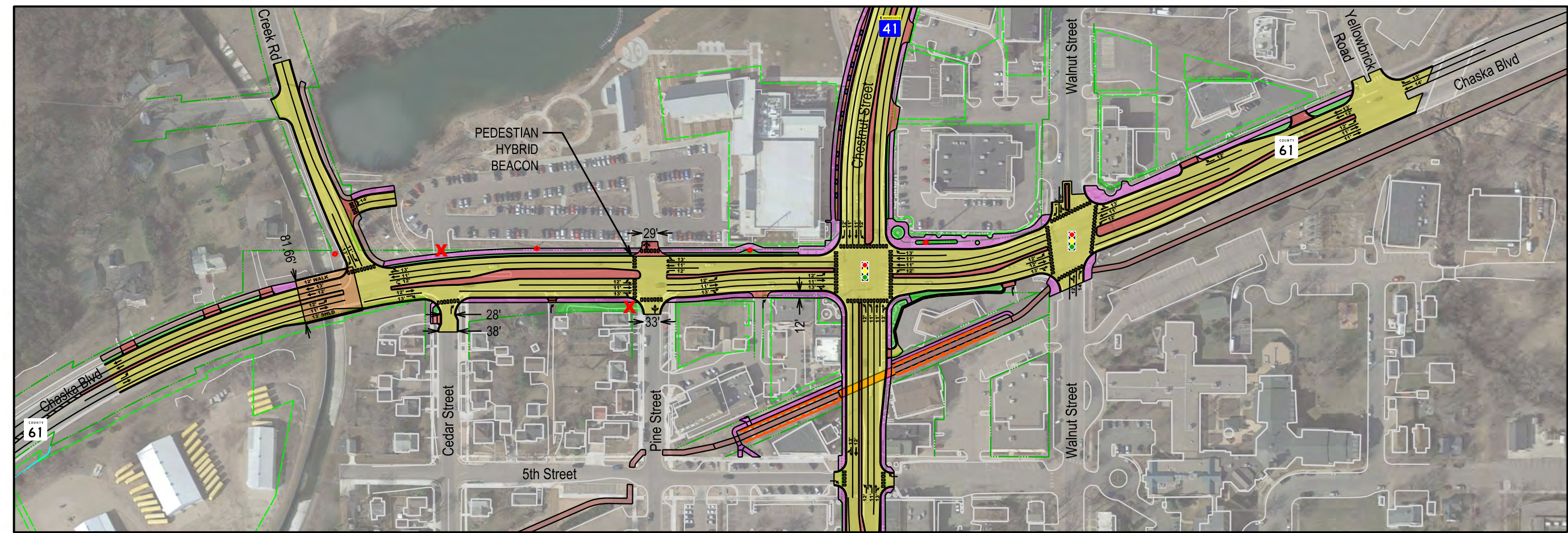
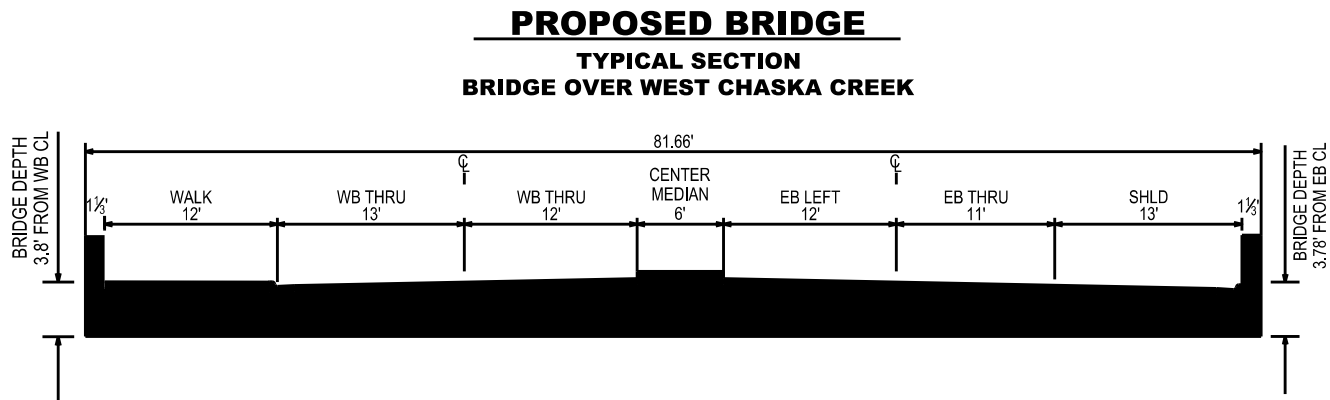


TH 41 3-LANE MEDIAN NO PARKING

DOWNTOWN CHASKA SUBAREA
CSAH 61 - CHASKA BOULEVARD



Figure 6



CHASKA BLVD 3

CSAH 61 - CREEK TEE REALIGN CSAH 61 AT PINE/WALNUT ST	
DOWNTOWN CHASKA SUBAREA CSAH 61 - CHASKA BOULEVARD	

Figure 7

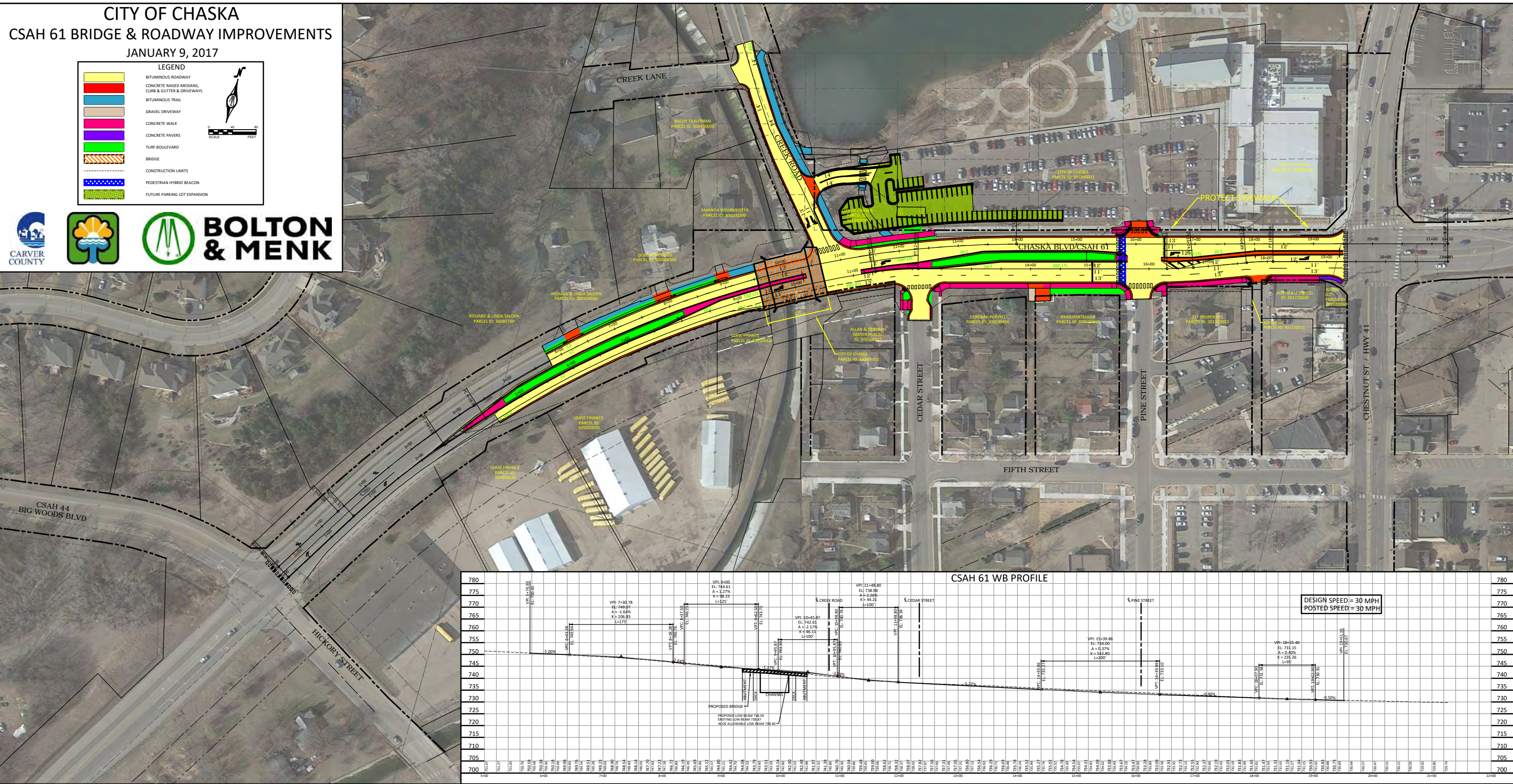
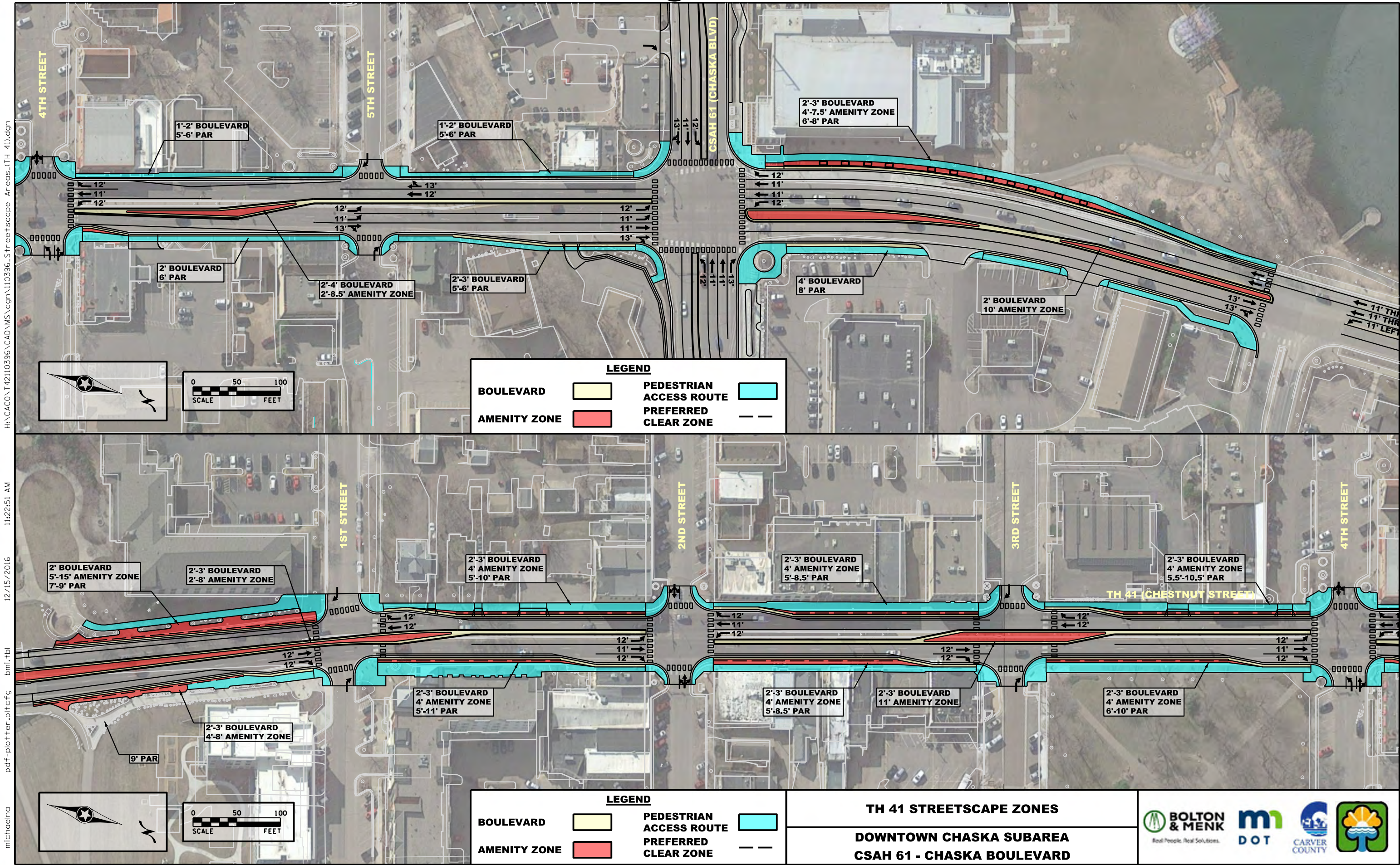
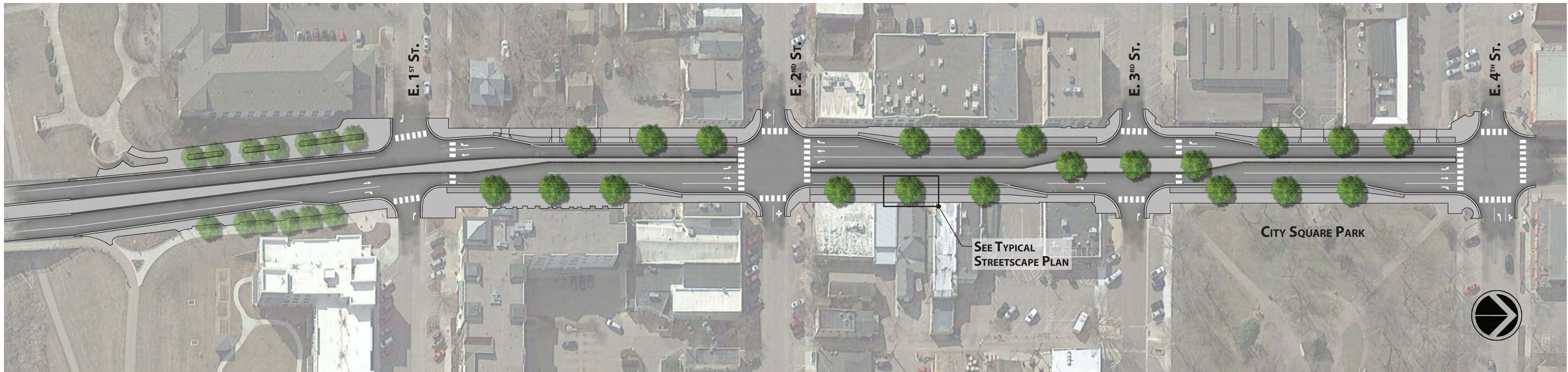
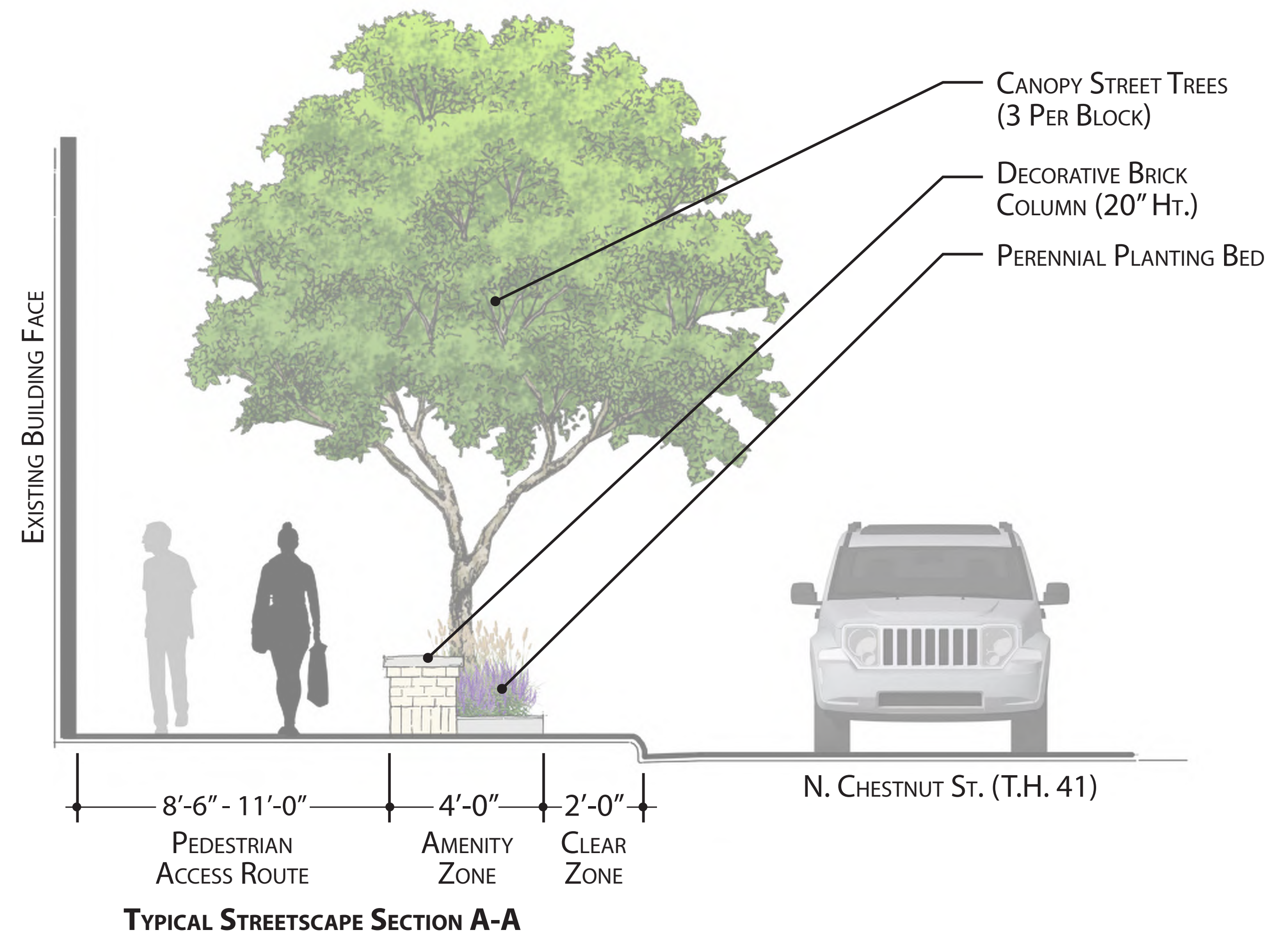
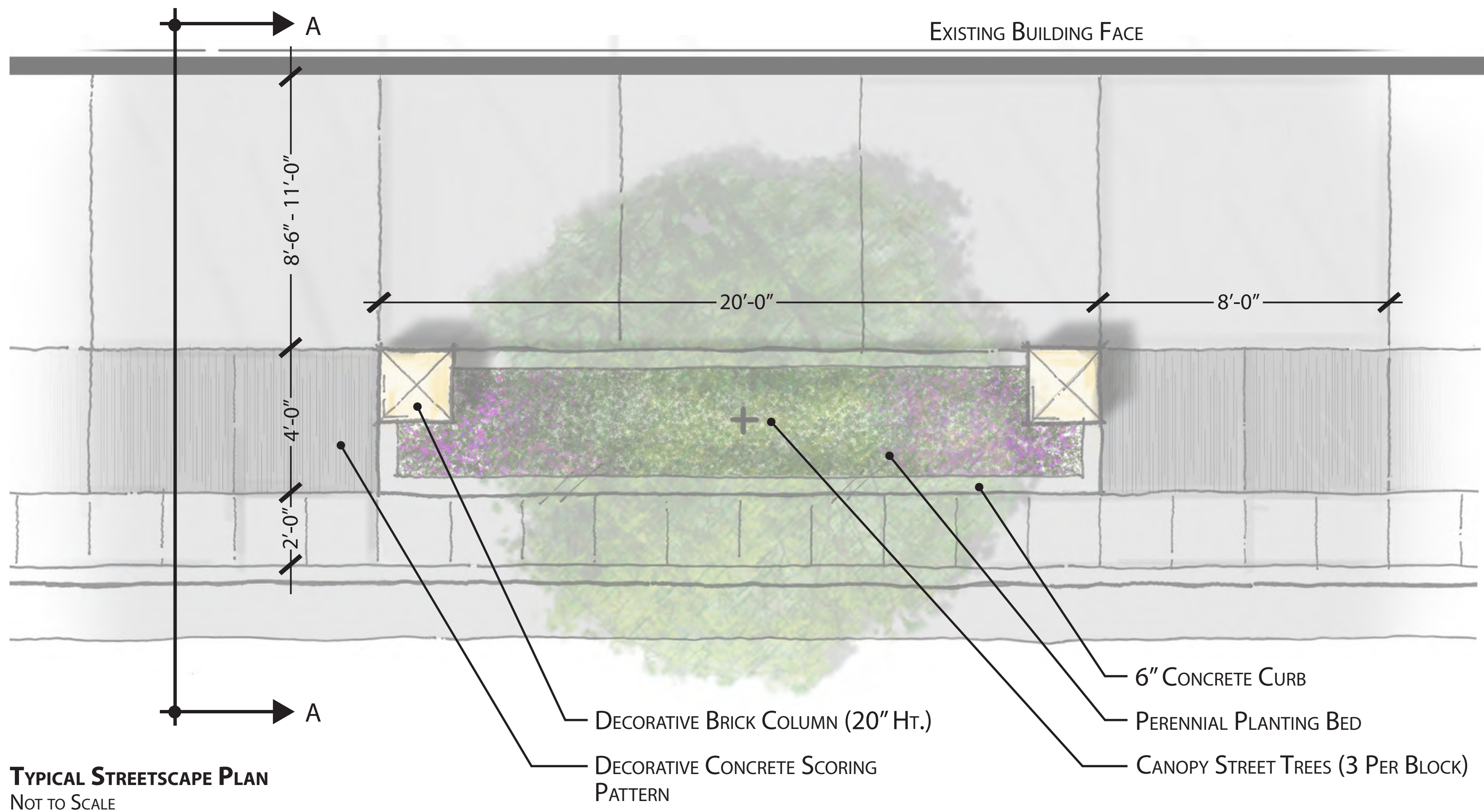


Figure 8





NORTH CHESTNUT DRIVE CORRIDOR TREATMENT CONCEPT PLAN

TRUNK HIGHWAY 41 - CHASKA, MINNESOTA

STREETScape CONCEPTS

Figure 9



**BOLTON
& MENK**



Appendix B

Meeting Minutes

Highway 41/61 Corridor Improvements

WATER RESOURCES MEETING #1

January 12, 2016

10:00 AM – 12:00 PM

Carver County Government Center (Township Hall Room)

MINUTES

ATTENDEES:

Scott Milburn, Midwest Natural Resources	Jim Larsen, Met Council
Ben Orne, USACE	Bill Monk, City of Chaska
Nathan Walleistedt, USACE	Kate Miner, Carver County
Vicki Sherry, USFWS/MN Valley NWR	Jennie Skancke, DNR
Matthew Clark, City of Chaska	Molly Kline, MnDOT
Ken Anderson, Stantec (Chaska)	Katie Heinz, MnDOT
John Smyth, Stantec (Chaska)	Tim Olson, Bolton & Menk
Aaron Finke, SWCD	Brent Johnson, Bolton & Menk
Terry Jeffrey, City of Chanhassen	Eric Johnson, Bolton & Menk
Della Young, Burns & McDonnell (UNRWD)	Angie Bersaw, Bolton & Menk
Paul Moline, Carver County WMO	

1. Introductions

- Angie opened the meeting and began with a round of introductions. The sign-in sheet is attached.

2. Project Overview

a. Project Area

- Eric explained the CSAH 61/TH 41 project area and extent as well as the study purpose and the major issues and challenges that we're currently aware of. This plan is intended to set the vision for multiple future projects.

b. Project Approach

- Angie outlined the study approach and plan for public involvement.

c. Schedule



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- *The study schedule was discussed with work ongoing in 2016 and study completion in early 2017.*
- d. Upcoming Construction Projects
 - *Eric explained that the CSAH 61 Bridge Replacement is scheduled for 2016/17 and reconstruction of TH 41 in downtown Chaska is scheduled for 2019. Other work to construct the corridor improvements will follow as funding is arranged and designs are completed.*

3. Project Area Context

a. Fens and Wetlands

- *Scott gave an overview of calcareous fens in Minnesota and described the fens found within the project area. He explained the legal protections of fens as well as the establishment of the Seminary Fen Scientific and Natural Area within the study area. Jennie explained that a fen management plan will be needed.*
- *Scott also described the other wetland resources within the project area. The group discussed that the study will use existing data on wetlands and will not include field work delineations. MnDOT completes wetland conservation act work within their right-of-ways. The group agreed that there are probably few wetlands within the highway right-of-ways, but a lot of adjacent wetlands.*

b. Stormwater Management

- *Brent compared the stormwater management rules and guidelines of Chaska, Chanhassen and Carver County WMO. Terry explained that Chanhassen has additional water quality requirements for Assumption Creek—which drains through Seminary Fen—including temperature controls due to its trout stream status.*
- *Bill said there is currently no stormwater treatment anywhere along the CSAH 61 alignment, so planning for stormwater and natural resources will be needed along the whole corridor. TH 41 includes some existing stormwater collected and routed to treatment ponds. Existing CSAH 61 stormwater system primarily includes ditches draining from the road system to the Minnesota River. Bill emphasized that in planning for the 1st Phase of CSAH 61 Construction, it will be critical to treat runoff draining to Chaska Creek.*
- *Paul asked that the planning effort also identifies opportunities for improvements, beyond just what is required, so that the WMO, Watershed and Cities can plan for and cooperate on building future improvement projects.*
- *The group was asked to consider whether the Cities, WMO and Watershed would individually review the project or whether they may assign jurisdiction for review to one entity. Bill offered that it is too early to decide on a jurisdictional question.*



- *Brent mentioned that the Lower Minnesota River Watershed District has not typically reviewed individual projects but has rather focused on reviewing the water management plans of its member MS4s. Della explained that the District will likely review this project due to the sensitive natural resources in the study area. She also noted the District is currently reviewing their policies and has plans to take a more active role in reviewing projects within their jurisdiction.*

c. Bridge and Culvert Crossings

- *Brent described the primary bridge and culvert crossings in the study area. Chaska Creek, East Creek and Assumption Creek are DNR Protected Waters and will require DNR review and permits for bridge, culvert or channel modifications. Paul described two ravines (near the intersection of CSAH 61 and County Road 140) with erosion problems that should be added to the list of significant crossings.*

d. Floodplain Management

- *Brent mentioned that Chaska, Chanhassen and Carver County WMO manage the standard zoning/permitting of the established FEMA flood zones, and that Chanhassen and Carver County WMO also require no net loss of floodplain storage. The Minnesota River floodway abuts CSAH 61 in Chanhassen and adjustments to alignments and highway embankments will need to be carefully considered in regard to floodplain management.*
- *Chip explained that a RIM Easement is now in place on the Minnesota River floodplain lands south of CSAH 61 in Chanhassen.*

e. Corps of Engineers Flood Control Project

- *The Corps of Engineers constructed the Chaska Flood Control Project in 1989 and 1990. Within the 408 Review Process, the Corps will review any proposed work within the easements of the flood control project. Nathan said the Corps will review project components such as storm drainage to see that proposed work does not overtax the pump stations, or affect the levees.*

f. Anticipated Permitting

- *The water and wetland related permits were summarized including: Section 404, Section 10, Section 408, DNR Protected Waters, Floodplain, Grading, Stormwater Management, NPDES Construction Stormwater, Erosion and Sediment Control/SWPPP.*

4. Stakeholder Input

a. Other Issues/Resources

b. Jurisdiction

- *Angie B explained that information on alternatives and environmental screenings will be presented to the group at a meeting. Attendees can then review the project with others from their organizations and provide feedback and comments.*



- *Meeting minutes will be prepared by BMI and distributed to the meeting participants. The PowerPoint slides will also be made available to the participants.*

5. Next Meetings

- a. July 2016– Discuss Downtown Alternatives
 - b. October 2016 – Discuss CSAH 61 Alternatives
- *Angie reviewed the anticipated timing of the next meetings of this group. She noted individual or small-group meetings with some agencies may occur between now and the next meeting to discuss individual topics such as jurisdiction.*

Highway 41/61 Corridor Improvements

WATER RESOURCES MEETING #2

October 13, 2016

9:30 AM – 11:00 AM

Chaska City Hall (Council Chambers)

MINUTES

ATTENDEES:

Linda Loomis, LMRWD	Tou Vu, MN/DOT
Diane Langenbach, MN/DOT	Angie Bersaw, Bolton & Menk
Bill Monk, City of Chaska	Matthew Clark, City of Chaska
Eric Johnson, Bolton & Menk	Darin Mielke, Carver County
Paul Moline, Carver County WMO	Brent Johnson, Bolton & Menk
Hailu Shekur, MN/DOT	

1. Introductions

- *The meeting commenced with informal introductions.*

2. Project Overview Of Existing and Proposed Conditions

a. Project Area

- *Eric explained the CSAH 61/TH 41 project area and extent as well as the study purpose. We discussed the general features of the CSAH 61 and TH 41 improvement concepts.*
- *Bill discussed that the scale of the project is mainly reconstruction with fairly small quantities of new impervious surface. He explained the general drainage routes to East Creek, Chaska Creek and Minnesota River. Much of TH 41 drains south direct to the MN River. Much of CSAH 61, and TH 41 north of 61, drains easterly to East Creek. He also outlined the current stormwater treatments in the area—ponds way upstream along TH 41, reuse system within Firemen's Park (north of CSAH 61), as well as grit chambers on some of the trunk lines.*

- *Brent provided data on the existing and proposed impervious surfaces.*

<i>Downtown Corridor Improvement</i>	<i>Existing Impervious (acres)</i>	<i>Proposed Impervious (acres)</i>	<i>Increased Impervious (acres)</i>
<i>CSAH 61</i>	<i>4.46</i>	<i>4.93</i>	<i>.47</i>
<i>TH 41</i>	<i>5.47</i>	<i>5.74</i>	<i>.27</i>
<i>Creek Road</i>	<i>.38</i>	<i>.40</i>	<i>.02</i>

- *Linda explained that existing stormwater treatment is very limited in the Downtown area but there are opportunities for stormwater improvements.*
- *Paul stressed need to consider what can be done and what enhancements can be implemented.*
- *Both Carver County WMO and the Lower Minnesota River WD want to obtain the maximum amount of storm water treatment practicable.*
- *Bill mentioned that grades in Downtown area are difficult (mild) for stormwater conveyance.*
- *Matt described the existing Firemen's Park reuse system.*

3. Stormwater Management

- Jurisdictions of Chaska, Carver County WMO & Lower Minnesota R. Watershed District
 - *Bill explained that the City looks for every opportunity to hold and treat stormwater to meet the rate, volume and water quality requirements.*
 - *Linda explained that the watershed district does not currently have a permit program, but the City of Chaska is responsible to make sure that projects meet watershed district standards.*
 - *Linda offered that grant monies are also available for water quality improvements and the Lower Minnesota River Watershed District will consider spending money on projects—even outside of their boundaries—if waters drain to the Minnesota and benefits will be seen within the River.*
 - *Much of the Downtown area is not within the Carver County WMO, except areas generally north of CSAH 61.*
- Rule Requirements
 - *Brent compared the stormwater management rules and guidelines of Chaska and the Carver County WMO.*
 - *Eric explained that areas of existing impervious surface within the study corridors will be fully reconstructed including reconstructing the storm drains and other utilities. The profile on TH41 within the downtown area will likely remain the same in order to match existing doors.*

- *MnDOT conforms to NPDES requirements as well as to local water management agencies.*
- *Paul asked that the stormwater planning effort follow a similar process as the transportation planning with identification of various options for stormwater treatment and consideration of up-front costs and maintenance costs.*
- c. Discussion of BMPs and Potential Use in Downtown Chaska
 - *Brent described a range of stormwater BMPs and the group discussed the general feasibility.*
 - *Bill said the City would consider use of pervious pavers along sidewalks and within medians, as well as with planters and street-scaping. Paul suggested that urban street section BMPs be considered as a combined approach for stormwater and landscaping.*
 - *Bill said there is potential for infiltration along TH 41 south of 4th Street, but elsewhere in the study corridors filtration systems with underdrain tiles would be needed.*
 - *Bill said that in previous studies the city considered using perforated storm trunk lines to foster infiltration—but chose not to implement this feature due to concerns for potential danger from reverse flows during floods on the Minnesota River.*
 - *Hailu said a key point in the discussion of BMPs is the decision of who will be responsible for future maintenance of the pavements and storm sewer systems. In general, MnDOT will not consider any BMPs under driving lanes. MnDOT is not much in favor of underground BMPs.*
 - *Bill and Matt described previous City projects to improve water quality with grit chambers. Bill: “We spent \$¾ Million on 5 monster grit chambers...and they really work well.”*
 - *We discussed the benefits of iron-enhanced filters for phosphorus removal.*
 - *Brent asked whether credits could be earned by providing “extra” treatment in open country for use in the downtown area where building BMPs is challenging. Bill suggested that we should first do our best in the downtown area before looking elsewhere for credits. Paul explained that although the WMO rules allow for banking, no deposits have been made so no credits are available for purchase. Bill suggested that we identify every potential BMP that we can before screening them out, and if truly beneficial, the City, County and Watershed will work together to find a way to implement them.*
 - *Bill and Matt identified several potential areas for green space BMPs and sketched the outlines on a map. One of the potential sites is the NE quadrant of CSAH 61 and Creek Drive where green space will be create when the realignment of Creek Drive occurs.*

- *Matt described the city reuse system at Firemen’s Park. This system includes an underground storage tank (10 feet diameter culvert by 200 feet long which provides a volume for a double watering of the irrigation area. The City will look to maximize this system and will determine whether the CSAH 61 project could make use of the existing reuse system, or whether the system can be enlarged to take more storm water.*
 - *The group discussed the existing storm drainage system. Matt recommended that we focus on the system collectors first to best understand the system.*
 - *Eric explained that a pedestrian tunnel is being planned to provide a crossing of TH 41 along the alignment of the old railroad. Bill and Matt mentioned that this tunnel will complicate the storm conveyance on TH 41. Drainage along this portion of TH 41 drains easterly along the old railroad alignment to East Creek.*
 - *Eric described next steps. CSAH 61 improvements are targeted for construction during the 2017 construction season. Therefore, detailed plans are needed ASAP. Bill would like to see an overall plan soon, including the details of stormwater collection and treatment along CSAH 61 very soon. Eric said that the schedule calls for 60% plans to be completed by the end of 2016*
 - *Paul suggested that we need to agree on not just what we can do for BMPS, but what we will do. He asked that we consider using highway medians as green space, and although these spaces may not be feasible for ponding or filtration basins, the use of turf in these medians will reduce the overall project impervious areas and may even be enough to offset the impervious area increase. Paul also advised that any stormwater draining to a water body must have a structural treatment device (such as a sump manhole, grit chamber, etc. at a minimum).*
- d. Opportunities for Additional Improvements/Project Enhancements
- *Bill identified three areas for potential stormwater enhancement opportunities on CSAH 61...*
 - *Paul suggested Bolton & Menk use the group’s input on feasible stormwater BMPs in the downtown area and identify potential locations for implementation.*
 - *Paul said it would be beneficial to understand the landscaping plan in downtown first before agreeing on BMPs as they will go hand in hand.*
 - *The City of Chaska will provide Bolton & Menk with a map showing the entire stormwater system and drainage patterns in Chaska.*

4. Next Steps

- a. Downtown Recommendations – October/November
- b. Restart Study on Other Corridors – Fall
- c. Next Water Resources Meeting – November
- d. CSAH 61 Construction (CSAH 44 to TH 41)
- e. TH 41 Construction – 2019 or later

- *Angie reviewed the next steps and anticipated schedule. She said the Water Resources Group will meet again in early to mid-November to review stormwater BMP's and opportunities in downtown Chaska.*



Highway 41/61 Corridor Improvements

WATER RESOURCES MEETING #3

November 23, 2016

12:30 AM – 2:00 PM

Carver County Public Works, Cologne, MN

MINUTES

ATTENDEES:

Linda Loomis, LMRWD	Matt Clark, City of Chaska
Molly Kline, MN/DOT	Scott Smith, Carver County
Hailu Shekur, MN/DOT	Eric Johnson, Bolton & Menk
Paul Moline, Carver County WMO	Josh Eckstein, Bolton & Menk
Brent Johnson, Bolton & Menk	

1. Introductions

- The meeting commenced with informal introductions. Brent presented PowerPoint slides (attached) which were followed by group discussion of the CSAH 61 project and the TH 41/CSAH 61 corridor study.

2. Minutes from October 13th Meeting

- The minutes from the October meeting were distributed.

3. CSAH 61 for 2017 Construction

- Layout- The CSAH 61 project layout was presented and discussed.
- Impervious Areas: New impervious surfaces are expected to cover 0.21 acres—in part due to use of median greenspaces.

	Existing Impervious (acre)	New Impervious (acre)	Total Impervious (acre)	Carver County WMO Alternate Volume Control Treatment (0.05"*Existing + 0.5"*New) (cubic feet)
CSAH 61 Watershed	2.81	0.21	3.02	891

- c. Existing stormwater collection, conveyance, and treatment. *The existing stormwater drainage system was discussed. The west end of the CSAH 61 project area drains to West Chaska Creek Corps of Engineers Flood Channel. The group agreed that while East Chaska Creek is a natural channel with fish and wildlife habitats, the Corps concrete flood channel has very little habitat value and is much less of an environmental concern.*
- d. Discussion of BMPs and treatment under consideration for CSAH 61
Soils in the CSAH 61 Highway Corridor include 3 to 7 feet of fill materials within the previously compacted embankments. The site is constrained for volume control and the volume control standard is therefore reduced.
 - i. Median greenspace: *Use of median greenspace is planned for two areas—which has helped to reduce total new impervious surfaces.*
 - ii. Sumps, grit chambers, separators: *Matt Explained that the City has an existing Stormceptor recently installed and in place on the CSAH 61 storm drain near outlet to the Corps Flood Channel. The existing Stormceptor is expected to be adequate to treat the proposed CSAH 61 project area.*

Brent: A storm drain on Creek Road was proposed to collect stormwater and carry it to an outfall to Firemen's Clayhole Lake. A SAFL Baffle or grit removal device would also be included near the outlet. Paul and Linda advised that it is a better idea to route Creek Road stormwater to the Corps Flood Channel rather than the Firemen's Clayhole Lake, since the stormwater could negatively impact the swimming beach and fishing in the lake.

- iii. Irrigation and reuse: *We discussed the City's existing stormwater reuse system in Firemen's Park. Presently the system irrigates 4 acres and receives runoff from 1.5 acres of impervious surfaces. The CSAH 61 project has the potential to add 0.6 acres of impervious surface to the system. This area could include the eastbound lanes of CSAH 61 from Creek Road to Pine Street. Additional impervious surfaces would be beneficial to the reuse system and would increase the amount of runoff collected and reused for irrigation.*
Matt and Paul explained that the reuse system can handle runoff from an additional contributing area, and cautioned that the CSAH 61 road elevations will govern how much additional area can be collected and routed to the existing tank.
- iv. Bioretention Filters: *A bioretention filter is proposed in the right of way south of CSAH 61, approximately 250 feet west of the Corps Flood Channel. This site may be a feasible location for stormwater to be drawn from the storm drainage system, passed through a sand filter (with iron*

enhancement) and routed back into the storm drain several hundred feet further east. Matt encouraged building out the storm treatment features for maximum benefits, so future highway projects to the east could use some of the surplus benefits. Paul cautioned that treatment works within a different drainage basin have double treatment requirements.

- v. *Amended Soils: Amended soils are being considered for an area between Creek Road and the Corps flood channel.*

e. **Treatment Required vs Provided**

The CCWMO calculator was used to determine that the estimated treatment volumes, for volume control, Total Suspended Solids (TSS) and Total Phosphorus (TP), provided by the proposed Best Management Practices (BMPs) exceed the volumes required by the CCWMO rules. The City of Chaska has a stringent rate control standard: The net 100-year peak flow per acre from new development, and from increased impervious surfaces in redevelopment areas, must meet the calculated City average of 0.2 cfs/acre. Additional temporary flood storage may be needed to satisfy this requirement. Matt indicated that the City will help us address and work through the rule requirements.

4. TH 41/CSAH 61 Corridor in Downtown Chaska

- a. Layout / Project Timing
- b. Impervious Areas
- c. Existing stormwater collection, conveyance, and treatment
- d. Discussion of BMPs and treatment under consideration within Downtown Chaska
 - i. Streetscaping
 - 1. Tree Trenches and Planters
 - a. Curb cuts
 - b. *Drain tile from catch basins to tree trenches. Brent explained concepts for catch basins with sumps and weirs to hold water in the tiles. Matt mentioned that the City is not excited for tiles from catchbasins to “water” tree trenches, because they won’t want to do maintenance and haven’t any experience with seeing planters and storm BMPs working. As long as the planter systems are effective and low maintenance, Matt thinks the City would be supportive. Paul suggested that if we’re doing landscaping, we can do stormwater treatment, and that hopefully maintenance isn’t the reason that a project doesn’t get built. Since the highway construction will probably last for 50 years, we need to consider this opportunity.*

2. Permeable Pavers

- a. Paul asked whether permeable pavers were considered for sidewalk and median areas, and recommended that permeable paver in non-driving areas should be added to our proposed BMP list. Brent mentioned that pavers have been considered, but the City was not in favor due to concern for potential plugging and/or required maintenance. Matt explained that the City presently hauls all snow from the downtown area.*
- ii. Amended Soils: Brent described a potential soil amendment area along CSAH 61 and the old RR corridor.*
- iii. Perforated storm pipes south of 4th Street: Brent described the use of perforated storm mains in a stormwater project in Belle Plaine and the potential for use of perforated pipes in sandy soils along the TH 41 corridor. Matt said that everything south of 3rd Street is sand and 1st Street is sugar sand. Matt cautioned that the Corps levee system includes severe restrictions on what can be constructed nearby. Matt explained that installing BMPs in the 4th Street to 3rd Street area will be easier to get built than trying to fit features in near the Corps levees. Molly and Hailu advised that MN DOT will not support placement of BMPs under any of the driving lanes. Placement of perforated pipes or other BMPs under the boulevards, for example, could be acceptable.*

Matt explained that the City storm drains along TH 41 generally flow straight toward the river, but all of the drains are consolidated along the base of the levee and routed to gate wells and pump stations. The gates are closed and the stormwater is pumped over the levees during floods. Levees also include pressure relief wells which outlet to the storm drains.

- iv. Sumps, grit chambers, separators: Brent suggested that sumps and separators would also likely be a BMP for treating the TH 41/CSAH 61 corridors. Matt explained that the City has an existing system of Stormceptors installed to provide water quality treatment. The city has also planned for several additional Stormceptors for treatment of runoff along CSAH 61 prior to the outfall locations on East Creek.*
- f. Cost Estimates: Paul asked whether cost estimates have been completed for the recommended BMPs? Eric explained that we currently have high level placeholders in the estimates for BMPs, but we haven't gone into detail on BMPs. The intent is just to understand the scale and magnitude of what will be required. Paul further explained that cost estimates for BMPs are very helpful in requesting grant funds.*

- g. **Recommendations / Next Steps:** *Matt mentioned that the area leading to East Creek is the most viable for installing BMP improvements, and improving treatment along the TH 41 downtown corridor would be challenging. Paul thinks the key to TH 41 BMPs is to tie them directly to the landscaping, and if landscaping is proposed, then stormwater BMPs fall right in line.*

Linda mentioned that the Lower Minnesota River Watershed District commissioned Burns & McDonnell to inspect and report on East Chaska Creek opportunities for rate and volume control improvements. Linda will provide the report to Eric. Matt thinks these opportunities may be bigger picture options for regional BMPs, and wonders whether the transportation projects could build BMPs along East Chaska Creek for mitigation of project impacts. Linda thinks the watershed district would definitely participate with funds and/or support for those kinds of multiple benefit BMPs.

5. **Opportunities for Additional Improvements/Project Enhancements:** *We discussed opportunities for enhancements. More details including costs are needed for watershed and WMO consideration.*

- a. *Expand Firemen's Park Reuse System with expanded collection area and/or increased available storage.*
- b. *Expand iron-enhanced filter.*
- c. *Upgrade sumps to include higher performance separators or filters.*

6. **Next Steps**

- a. *Continued Coordination / 2017 Permitting*
 - i. *CSAH 61 final design is underway and permit materials will be submitted for review in early 2017.*
 - ii. *TH 41/CSAH 61 downtown corridor study: proposed plan will be written and shelved until funding is arranged (possibly 5 to 10 years).*
 - iii. *Other study areas including CSAH 61 Chaska West, CSAH 61 Chaska East, CSAH 61 Chanhassen, TH 41 North, will include conceptual level studies, not to the detail level of the downtown corridor study, but sufficient to document the study considerations for when the projects are picked up again. Paul advised that just mapping the opportunities for improvements will be helpful when the projects resume—even if only the potential BMP locations are shown, if BMP type is not yet determined.*
- h. *Paul suggested that the recommended options from the group should be listed to help out in the future when the project is revisited.*
 - i. *There was general consensus that the BMPs discussed for use in the downtown corridor have potential. The following are the BMPs having potential for use in the downtown corridor:*
 - 1. *Tree Trenches and Planters. Low maintenance is important.*

2. *Amended Soils. The area along CSAH 61 and the old RR corridor looks promising.*
3. *Perforated storm pipes south of 4th Street. BMPs cannot be placed within the driving lanes, but there is potential for infiltration along TH 41 south of 4th Street. Additional study will be needed.*
4. *Sumps, Grit Chambers and Separators. There is potential for additional sumps and separators in the study corridor. The City has an existing system of Stormceptors installed to provide water quality treatment. The city has also planned for several additional Stormceptors for treatment of runoff along CSAH 61 prior to the outfall locations on East Creek.*

Appendix C

Agency Comments and Responses

April 21, 2017

Della Schall Young, PMP, CPESC
Young Environmental Consulting Group, LLC

RE: TH41/CSAH 61 Preliminary Stormwater Plan—Downtown Chaska Corridor
Carver County
Project No.: T42.110396

Dear Ms. Young:

Thank you for the comments that you provided on behalf of the Lower Minnesota River Watershed District in your memo dated March 30, 2017 regarding the TH41/CSAH 61 Preliminary Stormwater Plan—Downtown Chaska Corridor. I have reprinted several of your comments below in italics font followed by our response.

This Plan, however, falls short of providing substantive information for consideration. For example, East Chaska and the Minnesota River have impairments that must be addressed during design of temporary construction and permanent post-construction features. The Plan neither qualitatively address the increase in nutrients and sediment discharges to adjacent water resources, nor does it discuss how each BMP (or suite of BMPs) will mitigate it as a percent of the proposed impacts. Again, the BMPs being considered are commendable, but is it safe to assume that there will be no net change or a decrease in nutrient and sediment discharge to adjacent water resources based on the BMPs being considered?

Response: As the Downtown Corridor Project enters the final design stage, the specific BMPs required to satisfy the City's MS4 provisions for special or impaired waters will be designed and incorporated in the construction plans. These will include the specific BMPs such as temporary sediment basins and stabilization of exposed soil areas that are listed in approved TMDLs and construction related waste load allocations.

The District has a restoration project planned for East Chaska Creek. How can this restoration project, mentioned in the Plan, be considered in conjunction with the Downtown Chaska Corridor Improvement Project? The District sees a great opportunity for collaboration.

Response: We recognize that a candidate wetland restoration/creation project has been identified on East Creek. During the final design phase of the corridor improvement project, all potential BMPs will be considered including the potential multi-agency cooperative effort for rate control, volume control and water quality treatment along East Creek.

Sincerely,

Bolton & Menk, Inc.

A handwritten signature in black ink, appearing to read "Timothy Olson", with a stylized flourish at the end.

Timothy Olson, PE, CFM
Water Resources Project Manager

April 21, 2017

Paul Moline
District Manager
Carver County WMO

RE: TH41/CSAH 61 Preliminary Stormwater Plan—Downtown Chaska Corridor
Carver County

Dear Mr. Moline:

Thank you for the comments that you provided on behalf of the Carver County WMO in your email dated April 6, 2017 regarding the TH41/CSAH 61 Preliminary Stormwater Plan—Downtown Chaska Corridor. I have reprinted several of your comments below in italics font followed by our response.

The original project scheduled noted that the scope would include “development of Downtown Conceptual Alternatives and Cost Estimates for several items including “drainage”. The findings in this memo do not appear to meet that in terms of stormwater. It is recommended that the stormwater/drainage component be identified as alternatives and go through the same evaluation and analysis as other items in that scope (e.g. streetscaping). This could lead to more of a recommended stormwater treatment design. There can still be more than one BMP included in the recommended alternatives for treatment options. Stormwater BMP’s should be identified as alternatives and not “considerations”.

Response: The intent of this report is to describe future options to be considered as project phases are planned and funded. At that time, a more comprehensive “stormwater treatment design” will occur which prioritize the recommended alternatives in terms of the exact roadway improvements and landscape plan. The term “Considerations” has been replaced with “Alternatives” in the report.

The rules summary should be clarified (item 5 – table 1)

- a. CCWMO rules are stated differently in the memo than in ordinance (e.g. 0.05” reduction in reconstructed surfaces). Although they result in similar standard, it is possible that a future user of this memo may misinterpret the language. It is recommended that the direct language from the ordinance be used.*
- b. The CCWMO rule language for linear projects should be referenced.*
- c. The NPDES language for redevelopment should be included.*
- d. Permit No: MNR040000, PART III. D. 5. a. (2) (b) For redevelopment projects – a net reduction from pre-project conditions (on an annual average basis) of:*
 - i. Stormwater discharge Volume, unless precluded by the stormwater management limitations in Part III.D.5.a(3)(a)*

- ii. Stormwater discharges of TSS
- iii. Stormwater discharges of TP

Response: These rule amendments have been incorporated into the report.

Part 6 – recommendations for the CSAH 61 section (west) should be updated or reference the approved project as the BMP's are now more final.

Response: The report was amended to include the more final plan west of TH 41.

Downtown BMP alternatives should include pervious pavers per the 2/23 meeting. Recollection is they were discussed as potentially fitting in portions of the walkway/sidewalk areas.

Response: The report was amended to include a brief discussion of pervious pavement.

Figure 9 should be amended or supplemented with and edited figure 9 that shows how the tree/vegetated planters stormwater BMP's would work. This way, the intent of the groups' comments on this BMP can be carried forward. Applicable examples were sent to BMI. Examples shown at the 10/13/16 meeting are not applicable to the downtown area and seemingly may have misled some TAC members on what these features might look like.

Response: The graphics in Figure 9 are intended to be schematic representations of a potential tree trench/planter box layout. Also, they are landscape architectural renderings previously used as place holders for future landscape considerations. All of the preliminary BMPs discussed in the report shall endure rigorous final design considerations, construction sequencing and details and cost estimating and will incorporate all comments provided by the TAC (including the Capital Region Watershed design guidance, or similar). We do not anticipate final design considerations until future phases are planned.

Sincerely,

Bolton & Menk, Inc.

A handwritten signature in black ink, appearing to read "Timothy Olson", with a stylized flourish at the end.

Timothy Olson, PE, CFM
Water Resources Project Manager

Services Provided:

Civil & Municipal Engineering
Water & Wastewater Engineering
Transportation Planning & Engineering
Structural Engineering
Aviation Services
Water Resources Engineering
Landscape Architecture
Land Surveying
Geographic Information System
Project Funding & Financing

Bolton-Menk.com





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& MENK**

Real People. Real Solutions.

TH 41/CSAH 61 Preliminary Stormwater Management Plan

Project Subarea Stormwater Improvements

June 9, 2017

Submitted by:

Bolton & Menk, Inc.
12224 Nicollet Ave
Burnsville, MN 55337
P: 952-890-0509
F: 952-890-8065





Real People. Real Solutions.

12224 Nicollet Avenue
Burnsville, MN 55337-1649

Ph: (952) 890-0509
Fax: (952) 890-8065
Bolton-Menk.com

June 9, 2017

TO: Water Resources Stakeholders Group

RE: TH 41/CSAH 61 Preliminary Stormwater Management Plan
Project Subarea Corridor Improvements

Water Resources Stakeholders Group:

In partnership with the City of Chaska, Carver County and the Minnesota Department of Transportation (MnDOT) are developing long term improvements to County State Aid Highway (CSAH) 61 and Trunk Highway (TH) 41 through the project subareas outside of Downtown Chaska. With the roadway improvements, stormwater management requirements will be triggered that include floodplain management, surface drainage and storm sewer system design, rate control, volume control and water quality considerations. Significant coordination and planning has resulted in the guidance described herein.

The Water Resources Stakeholder Group consists of key team members from a number of agencies at the federal, state and local levels. The combined expertise has guided Bolton & Menk and Carver County through the development of a planning framework that describes the necessary stormwater management techniques to meet all applicable permitting requirements and achieve the goals of each stakeholder group.

The Preliminary Stormwater Management Plan for the Project Subareas is part of a more comprehensive corridor planning study which addresses roadway section improvements to accommodate traffic safety and pavement section rehabilitation. Construction projects throughout the project subarea corridor will be implemented as part of county, local and state capital improvement plans and programs. The following document is not static. It is intended to set in motion a stormwater management plan for future project implementation by documenting the guidance provide by the stakeholder groups and formulating several options for effective project delivery and improved water quality. This particular document is specific to the projects anticipated in project subareas outside of the Downtown Chaska corridor. When projects are scheduled for construction, this document should represent the foundation for recommended stormwater management improvements. It should also consider and incorporate any and all new permitting requirements and best management practices developed since the generation of this document.

We have formulated effective implementation strategies under the guidance and expertise of the Water Resources Stakeholders Group. The resulting partnerships will ensure that future projects will be constructed with traffic, pedestrian and environmental safety at the highest priority.

Sincerely,

Bolton & Menk, Inc.

Timothy J. Olson, PE, CFM
Water Resources Project Manager

I. PROJECT OVERVIEW

This report is intended to summarize a set of pre-project planning recommendation for stormwater management along the project corridor. While the document is part of a larger corridor planning study, future roadway improvement projects in the project subareas have not been completely identified. During future work phases, this document will serve as guidance for BMP selection when preliminary roadway improvement concepts are selected.

Two major roadways traverse Downtown Chaska, Trunk Highway (TH) 41 (Chestnut St) and County State Aid Highway (CSAH) 61 (Chaska Boulevard). These roadways are scheduled for improvements to accommodate future traffic loading in conjunction with anticipated development. The proposed roadway improvements will require coordination and planning to:

- Protect regional drainage ways.
- Accommodate state and local stormwater management rules for rate control, volume reduction and water quality.
- Consider impacts to federally designated floodplains.
- Reduce wetland impacts, particularly at the Seminary Fen, and develop mitigation strategies.

The project area is delineated into five subareas, each with their own set of drainage restrictions and potential regional impacts. This report focuses on the Chaska West Growth Area, TH 41 North, Chaska East, and Eastern Project Area. The Downtown Chaska subareas were completed in separate studies. Refer to Figure 1 for a Project Subarea Map describing the anticipated project areas.



Figure: Project subarea map.

II. EXISTING DRAINAGE FEATURES

The significant surface water features near the TH 41/61 study area corridor include the Minnesota River, Chaska Creek, East Chaska Creek, Assumption Creek, Firemen's Lake, Clay Hole Lake, Courthouse Lake, Seminary Fen and several wetlands. Further, municipal storm sewer collection

systems and roadway ditch sections serve stormwater runoff along the corridor. **Figure 2** is a map showing the 41/61 study area corridor and the surface water features near the corridor. **Figure 3** shows the jurisdictional boundaries including the municipal limits and watershed district boundaries.

The Minnesota River flows along the southeastern edge of Chaska. Chaska Creek and East Chaska Creek drain southeasterly through Chaska to the Minnesota River. Firemen's Lake and Clay Hole Lake provide fishing and swimming recreational opportunities and aesthetics in the downtown area. Both lakes were created by clay mining operations for brick manufacturing in Chaska's past.¹

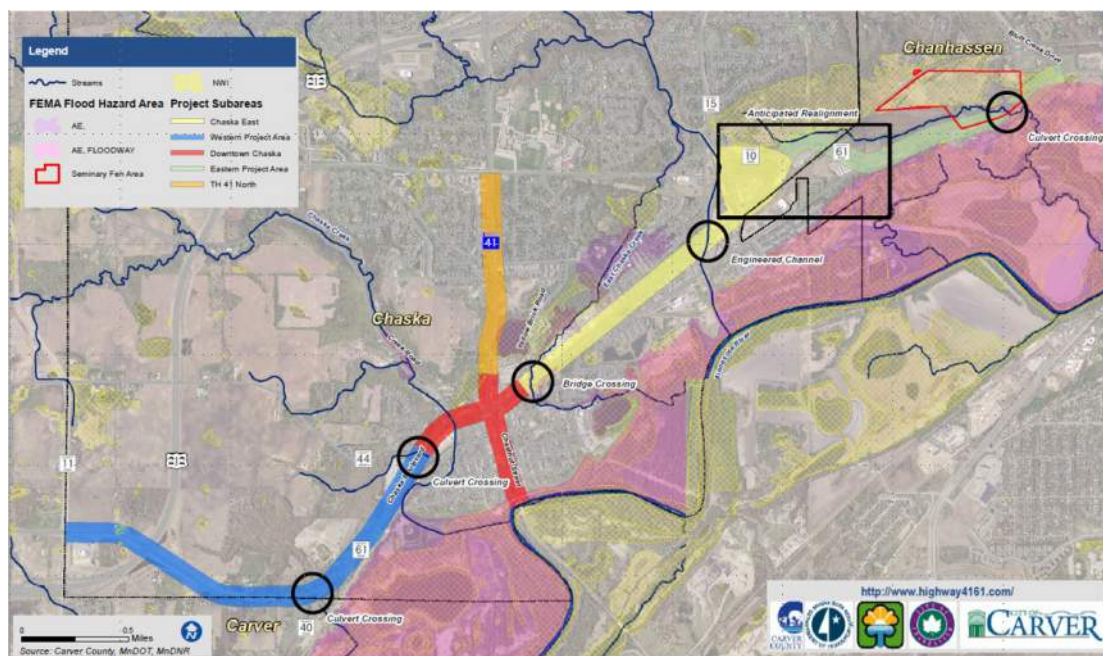


Figure 1: Overall project water resources exhibit.

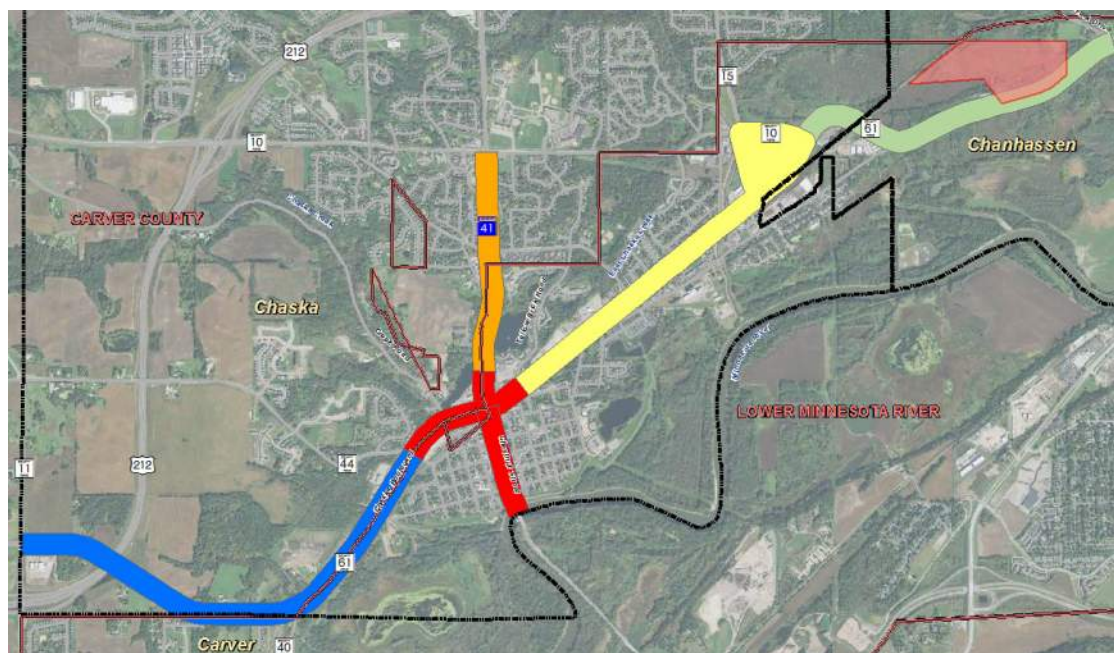


Figure 2: Watershed District boundaries and municipal limits.

¹ City of Chaska, Local Surface Water Management Plan, Bonestroo, December 2007

The Lower Minnesota River Watershed District commissioned a recent study of East Chaska Creek. The report recommendations include channel maintenance, debris removal, bank stabilization and erosion control in specific locations as well as several other potential water quality improvements to address impairments on the creek and mitigate sediment transport to the Minnesota River.² Improvements to the bridge spanning Chaska Creek along TH 61 were accommodated in the Downtown Area Improvements project.

Parts of the existing 41/61 corridor includes curb & gutter and storm drains. Other parts of the corridor include rural highway sections with highway runoff directed to adjacent grassed ditches. Proposed conditions within the 41/61 corridor include use of curb & gutter and storm drains throughout the Downtown Chaska project corridor.

Chaska Creek, East Chaska Creek and the Minnesota River are each listed as impaired. Assumption Creek is a trout stream and Seminary Fen is a calcareous fen. Chaska Creek has an EPA-approved impairment for: Fecal Coliform. These impairments are considered non-construction related and do not require any additional best management practices (BMPs) or plan review for compliance with the NPDES/SDS construction permit. East Chaska Creek has an EPA-approved impairment for: Fecal Coliform; Fishes Bioassessments; Turbidity. Minnesota River has an EPA-approved impairment for: Mercury in Fish Tissue; Mercury in Water Column, PCB in Fish Tissue; Turbidity. These impairment(s) are considered to be construction related parameters and require the additional best management practices (BMPs) found in Appendix A of the permit (C.1 & C.2 reprinted below) if the project has a discharge point on the project within 1 mile (aerial radius measurement) of, and flows to the impaired stream.

Assumption Creek is identified as a trout stream. Projects discharging to trout streams must incorporate the additional best management practices (BMPs) found in Appendix A of the permit (C.1 C.2 C.3 & C.4) if the project has a discharge point on the project within 1 mile (aerial radius measurement) of, and flows to the trout stream.

The Seminary Fen is a calcareous fen and must incorporate the additional best management practices (BMPs) found in Appendix A of the permit (C.1 & C.2) if the project has a discharge point on the project within 1 mile (aerial radius measurement) of, and flows to the calcareous fen.

Most calcareous fens are protected under Minnesota Pollution Control Agency (MPCA) rules as Outstanding Resource Value Waters (ORVWs), see Minnesota Rules 7050. Some calcareous fens are not listed in MPCA rules (DNR Calcareous Fens). The MDNR has a more comprehensive list of calcareous fens and has certain types of review and approval authority for these fens.

Bluff Creek discharges through Highway 101 and CSAH 61 near the far east side of the East Project Area. Bluff Creek is not within the project boundary, but all future BMPs near the east end of CSAH 61 should include any protections to the watershed contributions to Bluff Creek.

Also, a mandatory Storm Water Pollution Prevention Plan (SWPPP) review is required by the MPCA if the project will disturb over 50 acres and has a discharge point on the project within 1 mile (aerial radius measurement) of, and flows to the impaired water. Owners must submit the application for coverage and the SWPPP at least 30-days before the construction start date. The SWPPP can be attached electronically when using the online application.

III. STORMWATER MANAGEMENT REQUIREMENTS

Stormwater management planning under future design implementation phases must comply with a multitude of rules and regulations. The Chaska West, Chaska East and Eastern Project Areas are located within the City of Chaska, City of Chanhassen, the Lower Minnesota River Watershed District (LMRWD), and the Carver County Watershed Management Organization (WMO). The

² East Chaska Creek Restoration Project, Lower Minnesota River Watershed District & the City of Chaska, Burns & McDonnell Engineering Co. Inc., February 2016

Lower Minnesota River Watershed District does not currently have a permit program, but the City of Chaska has the responsibility to make sure that projects meet watershed district standards. The rules of each organization for stormwater management have many similarities and also some differences. The following summarize some of the most critical components of rules and regulations provided by the water resources stakeholders. During future design and construction planning phases, the comprehensive and up to date rules and regulations must be carefully considered during BMP sizing and locating.

A. City of Chaska:

For new development projects, there shall be no net increase from pre-project conditions for stormwater TSS and TP. For redevelopment projects, there shall be a net decrease from pre-project conditions for stormwater TSS and TP. Water quality treatment performance is based on NURP with permanent pool volumes equal to runoff from 2.5 inch rainfall. Non-pond BMPs must show similar performance using the MIDS model, for example.

B. City of Chanhassen:

The City of Chanhassen generally follows the regulations of the NPDES Construction Stormwater Permit and their own MS4 Permit. The City requires rate control for 1-year, 2-year, 10-year and 100-year events. Treatment is required for 1" of runoff from impervious surfaces. Water quality requirements include removal of 60% of total phosphorus and 90% of total suspended solids. Temperature controls will also apply to the Assumption Creek trout stream. All proposed stormwater BMPs in the Eastern Project Area will comply with all rules and regulations defined by the City and other permitting agencies.

C. Carver County WMO

The Carver County WMO general rules require water quality treatment for a volume of runoff of 1" over the new impervious surfaces plus 0.1" of runoff over the existing reconstructed surfaces. For the purposes of this report, we have assumed that all existing highway surfaces within the project corridor will be reconstructed. Carver County WMO rules allow alternate compliance volume control since the highway corridor is constrained, therefore, volume control will be reduced to ½" over new impervious surfaces and 0.05" over reconstructed impervious surfaces.

The Carver County WMO BMP Calculator can be used to determine whether proposed BMPs meet the requirements of Carver County. The calculator assigns credits to proposed stormwater BMPs toward meeting the requirements for volume reduction and TP and TSS water quality treatments.

D. NPDES Construction Stormwater Permit

The NPDES Construction Stormwater Permit requires the retention and treatment of the water quality volume of 1.0 inch over new impervious surfaces. We have assumed that all existing impervious surfaces within the study area highway corridor will be reconstructed. However, the total new impervious area has not yet been determined during this feasibility phase.

The full depth removal of pavement to expose the Class 5 is considered maintenance by the MPCA. The Class 5 is considered to be an engineered soil and part of the pavement, so milling can cut into Class 5 and still be considered maintenance. However, if shoulders are being widened, or water/sanitary work will include deeper excavations into native soils below the Class 5, then if disturbance exceeds 1 acre a permit is needed.

E. Rate Control:

The City of Chaska, the City of Chanhassen and the Carver County WMO require rate control. Therefore, peak rates must not exceed existing for 2-, 10-, and 100-year events.

Chaska also requires that the net 100-year peak flow per acre from new development, and increased impervious surfaces in redevelopment areas, must meet the calculated City average of 0.2 cfs/acre. Additional temporary storage may be required to reduce flow from increased impervious surfaces.

IV. PRELIMINARY STORMWATER MANAGEMENT OPTIONS

As proposed roadway alignments are developed, stormwater management features will be located and sized based on local drainage patterns, available right of way, stormwater regulations and regional benefit. The following summarizes the recommended approach to locating and sizing the required stormwater management features as roadway alignments and right of way needs are defined.

1. Review the most current regulatory requirements of all water resources stakeholders, identify potential joint projects in line with local watershed planning efforts and identify potential regional solutions to stormwater management when final road way improvement concepts are developed.
2. Determine the amount of impervious surface that will require full reconstruction and the total area of new impervious to quantify the required rate control, volume control and water quality treatments.
3. Identify existing right of way availability; local, county and state owned property along the corridor; regional opportunities within the watershed; and potential areas to be acquired.
4. Delineate wetland boundaries, minimize impacts and determine appropriate mitigation procedures.
5. Identify significant drainage way crossings along the corridor and understand how road way improvements affect regional hydraulics. Work with Carver County to identify crossing replacements.
6. Locate and size BMPs that minimize property impacts and maximize regional benefit.

A. Western Project Area

Current Conditions

The Western Project Area extends from Chaska's western municipal limits at County Road 11 to County Road 44. The section is currently rural with open ditch conveyances to low points. There are no medians along the corridor. A ravine bisects the Western Project Area that includes a major culvert crossing under Hwy 61. The CCWMO and City of Chaska have expressed concern regarding significant erosion issues in the area that will be perpetuated by rapid development upstream unless mitigated.

Slopes are relatively steep through much of the Western Project Area ranging from less than 2% to 44% with an average of approximately 7.7% adjacent to the corridor. Soils are primarily Hydraulic Soil Group A and B in the area with moderate to good infiltration capacity. The sandy nature of the soil in conjunction with rapid development upstream has led to advancing erosion in the main drainage ravine and culvert crossing at approximately the midpoint of the Western Project Area.

Preliminary Stormwater Management Options

Refer to **Figure 4** for a preliminary corridor layout and potential stormwater management

options for the Western Project Area. The following strategies should be considered during preliminary and final design of the corridor to address stakeholder issues, water quality and volume control and permitting requirements.

- Utilize vegetated medians to replace existing impervious area and regulate the amount of new impervious generated by turn lanes or roadway expansion.
- Consider utilizing a combination of rural and urban road sections to best utilize the existing ditch section. By maintaining the ditches, the natural volume and water quality capacity of the existing system is maintained. Simple retrofits to driveway culvert crossings, such as replacing aprons with overflow structures, over excavation of the existing ditch or native vegetation replacements can cost effectively meet permitting requirements while maximizing the environmental benefit of the existing system.
- Expand existing wet sedimentation basins to accommodate newly constructed impervious surfaces.
- Correct erosion issues near the primary culvert crossing at the midpoint of the corridor.
- Replace the culvert, if needed, to ensure sustainable drainage through the corridor as the upstream area develops.

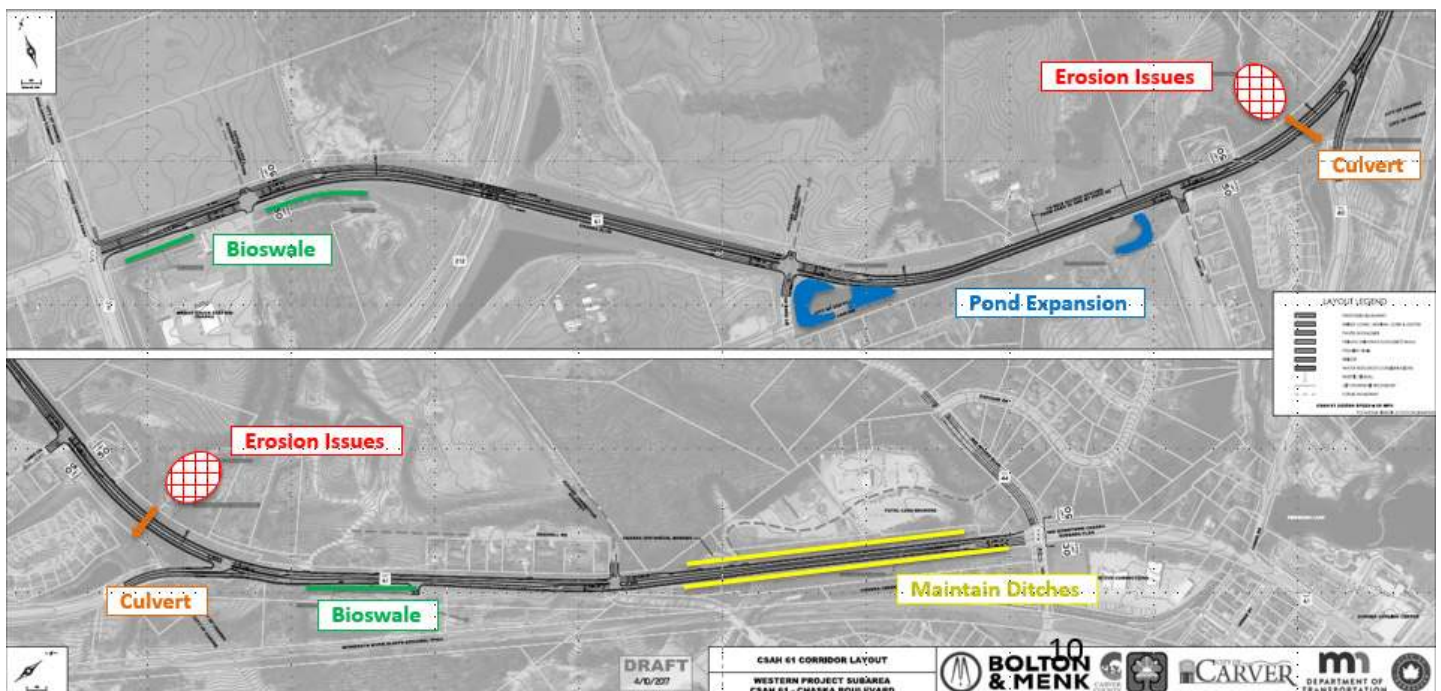


Figure 3: Western Project Area preliminary stormwater management exhibit. BMPs identified above are conceptual only. Sizes and locations of BMPs shall be further refined under future preliminary road way improvement and construction planning phases.

B. TH 41 North Area

Current Conditions

The TH 41 North Area extends from Engler Boulevard south to Walnut Street and is largely developed. The corridor is situated on the edge of the Minnesota River valley, leading to roadway slopes between 4% and 6% along the south half of the project area. Soils are primarily Hydraulic Soil group C with low infiltration capacity. The south section of the project area spans Brickyard Clayhole Lake.

Preliminary Stormwater Management Options

Refer to **Figure 5** for a preliminary corridor layout and anticipated stormwater management options. Currently, the roadway improvements are projected to result in minimal increases in impervious surface. Therefore, the following stormwater improvements should be considered to minimize environmental impact and meet permitting requirements.

- Utilize vegetated medians to replace existing impervious area and regulate the amount of new impervious generated by turn lanes or roadway expansion.
- Maintain open ditch sections and retrofit with native vegetation.
- Identify local opportunities with the adjacent schools, community center and churches to develop water quality practices that have a higher regional benefit.

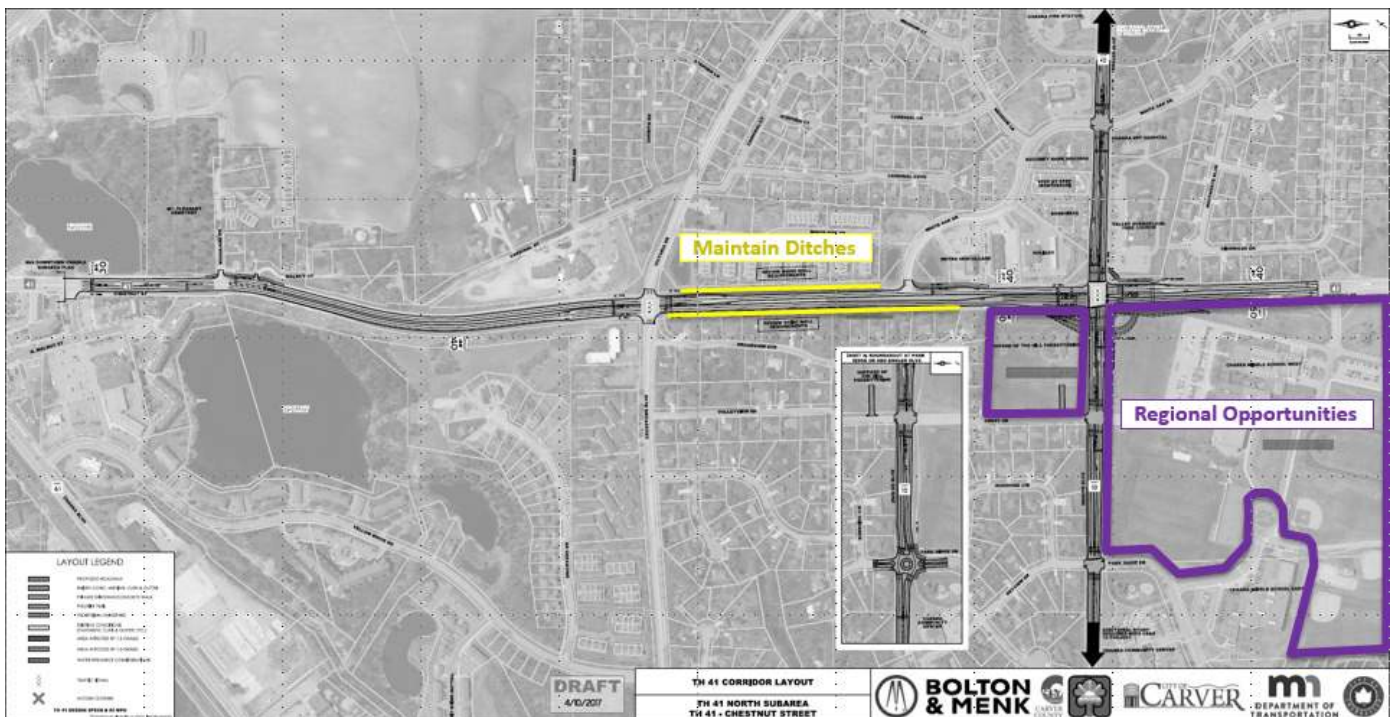


Figure 4: TH 41 North preliminary stormwater management exhibit. BMPs identified above are conceptual only. Sizes and locations of BMPs shall be further refined under future preliminary road way improvement and construction planning phases.

C. Chaska East Area

Current Conditions

The Chaska East Area is largely developed with commercial, single family residential and high density residential development throughout. Slopes are relatively flat with roadway sections transitioning between rural and urban. East Chaska Creek crosses the corridor on the south side of the project area via a bridge. The Army Corp of Engineers flood diversion channel also crosses the project area near the north end. Soils in the area are primarily Hydraulic Soil Group B with moderate infiltration capacity.

Preliminary Stormwater Management Options

Refer to **Figure 6** for a preliminary corridor layout and anticipated stormwater management options. The roadway improvements also include local and regional trail connections along the abandoned rail road corridor. It is anticipated that additional development and redevelopment will occur along the north and east side of the project area near the existing residential developments. The City of Chaska has considered rerouting or eliminating the

current frontage road to reduce impervious surfaces.

The Lower Minnesota River Watershed District (LMRWD) has also proposed and documented water quality improvement projects in the vicinity of East Chaska Creek area and these features should be considered in preliminary design. All current project planning and preliminary design should be coordinated with this project to ensure all stakeholder goals are accommodated.

The following stormwater management options should be considered.

- Reduce impervious area by reducing road width or eliminating the frontage road in the vicinity of the residential area.
- Utilize green space to establish native vegetation in the vicinity of the regional trail connection to provide aesthetic and water quality improvements.
- Maintain existing ditch system and utilize simple retrofits to enhance the capacity of the existing drainage system and improve water quality.
- Carefully consider the hydraulics of the existing East Chaska Creek and Flood Channel crossings. Also, consider hydrologic and environmental impacts in the channel areas up and downstream of the engineered channel.
- Identify potential regional opportunities in the higher bluff areas to reduce the amount of stormwater runoff that enters the corridor area.
- Maintain close coordination with the LMRWD to utilize combined project planning and execution thereby reducing overall design and construction costs and achieving multiple stakeholder goals.

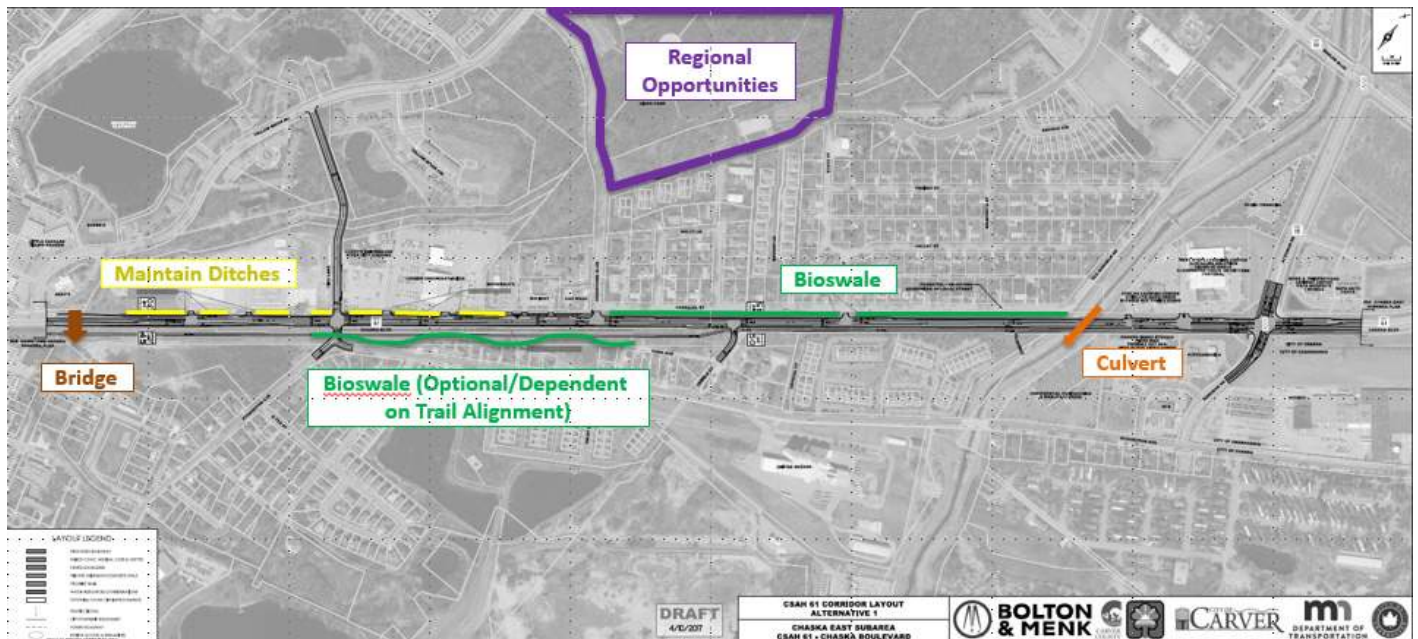


Figure 5: East Chaska Area preliminary stormwater management exhibit. BMPs identified above are conceptual only. Sizes and locations of BMPs shall be further refined under future preliminary road way improvement and construction planning phases.

D. Eastern Project Area

Current Conditions

The East Chaska and Eastern Project Area corridors cross the Seminary Fen, (which is highly protected and has regional water quality and habitat significance), and Assumption Creek, (which is a protected trout stream). **Figure 7** shows the primary environmental features in

the Eastern Project Area. Roadway improvements in the area include potential straightening of a currently noncompliant curve to increase driver safety. This alignment change will create a unique opportunity to preserve the current right of way, combined with required new right of way and construct regional stormwater management features to minimize water quality, volume and rate impacts to the fen and trout stream.

The Seminary Fen is under continuous study, monitoring and rehabilitation with the MnDNR and other project partners. The primary goals of the roadway improvements in this project area must be compatible with the requirements for protection of the Seminary Fen. Potential fen impacts include the following.

- Road embankment fill required to widen the road in order to meet road design standards and accommodate future traffic loading and safety.
- Construction activity including replacement of subsurface soils needed to stabilize the roadway section.
- Potential surficial or groundwater impacts that have the potential to change the water surface elevation or flow in the fen.
- Other construction related impairments due to erosion and sediment control issues.

Assumption Creek is a designated trout stream and runs through the Eastern Project Area. The combination of the trout stream and fen wetland makes this area particularly critical. Potential impacts to the trout stream include the following.

- Temperature impairments related to construction activity.
- Discharge of construction sediment into the stream.
- Impacts to fish passage if replacement of the CSAH 61 culvert is necessary.
- Sediment control during culvert replacement, if necessary.
- Trout streams often require infiltration or filtration BMPs that promote base flow, sediment removal and protect channels from erosion. Ponds are typically discouraged because they cause stream warming.

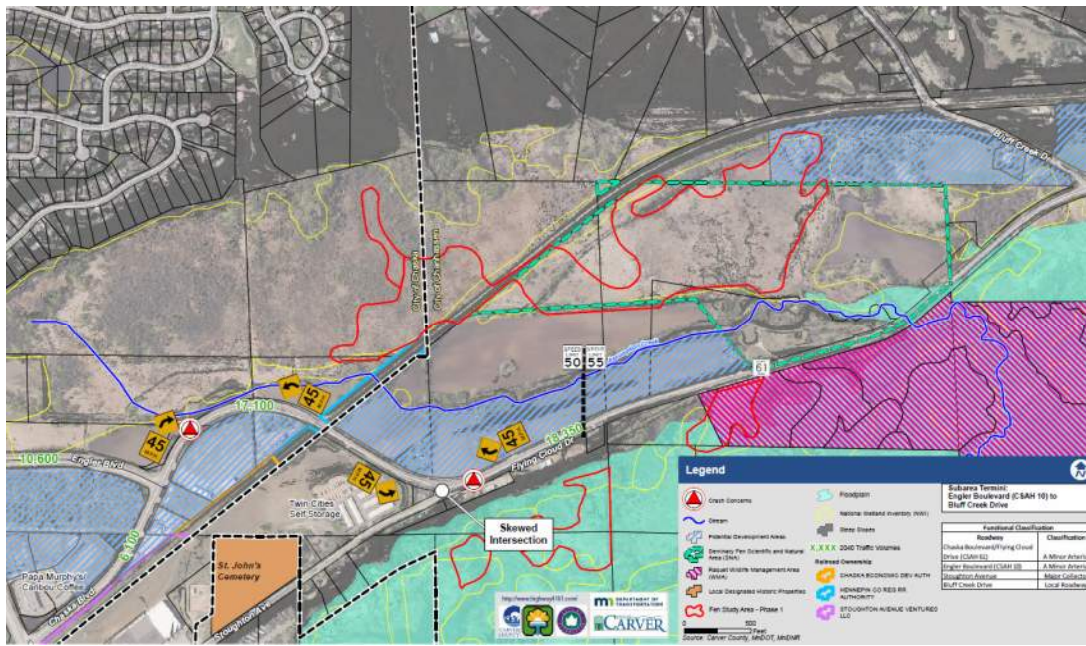


Figure 6: Primary water resources and environmental features in the Eastern Project Area. BMPs identified above are conceptual only. Sizes and locations of BMPs shall be further refined under future preliminary road way improvement and construction planning phases.

Preliminary Stormwater Management Options

Refer to **Figure 8** for a preliminary corridor layout and anticipated stormwater management options. Stormwater management and water quality improvements should focus on protection of the Seminary Fen and Assumption Creek. The following stormwater management options should be considered as preliminary and final roadway alignment and construction plans are complete.

- Utilize available right of way near roadway straightening improvements for stormwater management.
- Clearly identify and vet solutions immediately adjacent to the Seminary Fen to develop the most viable lane configurations and road widths to safely accommodate future traffic needs.
- Utilize wetland impact fees or other mitigation costs to help fund specific improvements to the Seminary Fen.
- Assign project costs to removal of existing infrastructure, brush clearing or controlled burns within the fen area.
- Coordinate the City of Chanhasen's future development needs in the area with protection of Assumption Creek and the Seminary Fen.
- Preserve the Seminary Fen and Assumption Creek areas in a permanent easement or regional park. Tie the regional trail into the park area to enhance public access. Develop education and outreach around the trout stream and fen area.
- Identify grant opportunities for water quality, wetland restoration and regional park designation.
- Protect trout stream in the event that the culvert under CSAH 61 requires replacement.

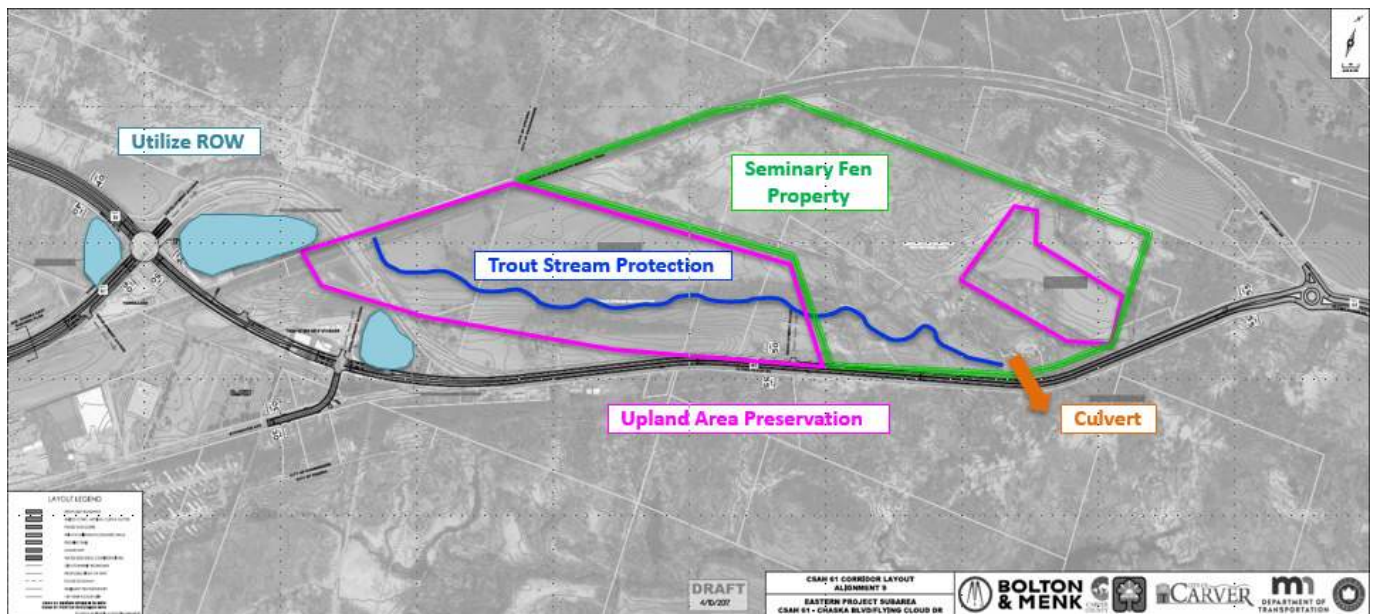


Figure 7: Eastern Project Area preliminary stormwater management exhibit. BMPs identified above are conceptual only. Sizes and locations of BMPs shall be further refined under future preliminary road way improvement and construction planning phases.

that the Seminary Fen area is protected. **Figure 9** below is an exhibit taken from the MnDNR's Calcareous Fen Fact Sheet that shows a cross section of a calcareous fen in a river valley terrace. Construction practices should carefully consider the following.

- Removing unstable material should be done in phases to avoid “unloading” of deeper soils and potential upwelling of the drift material. This could cause cracks in the confining later which would deplete the wetland’s surface storage.
- Open trenches should be backfilled as soon as possible to avoid the unloading phenomenon described above.
- Any piling activity or other pounding or vibratory methods should carefully consider the potential for cracking in the confining layer.

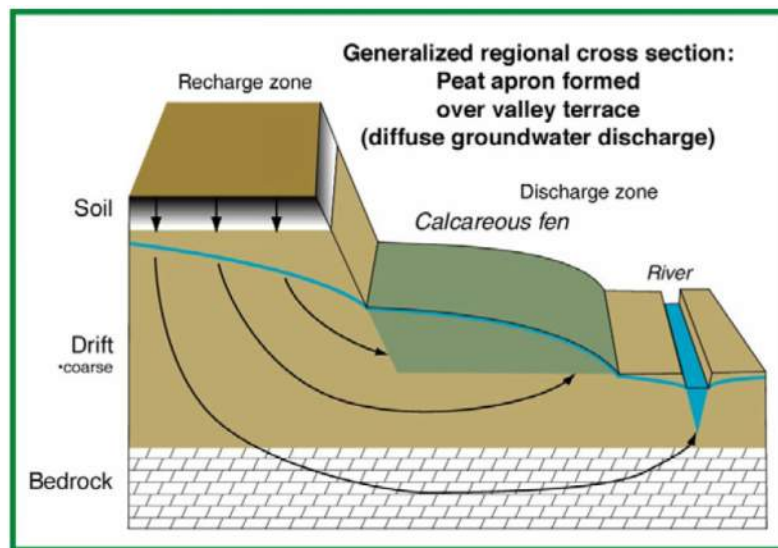


Figure 8: Calcareous Fen cross section, courtesy of MnDNR Calcareous Fen Fact Sheet.

Appendix A

Meeting Minutes

Highway 41/61 Corridor Improvements

WATER RESOURCES MEETING #1

February 23, 2017

1:30 PM – 3:00 PM

Carver County Government Center (Oak Lake Conference Room)

AGENDA

Linda Loomis, LMRWD	Matt Clark, City of Chaska
Paul Moline, Carver County WMO	Scott Smith, Carver County
	Eric Johnson, Bolton & Menk
Tim Olson, Bolton & Menk	

1. Introductions (5 min)

The meeting commenced with informal introductions and project roles. Tim Olson and Eric Johnson presented PowerPoint slides in line with the following agenda. Presentation slides are attached.

2. Project Overview (15 min)

a. Review Project Areas

Overall project areas were reviewed. Defined this portion of the project as the areas outside of downtown. Additional questions and comments were addressed regarding the project area to understand that the current schedule can be defined in three project segments: 1) Current construction plan development for a portion of CSAH 61 east of Downtown, 2) the Downtown segment and 3) All other areas outside of Downtown.

b. Update on Project Schedule

Project schedule was reviewed. 90% plans for the CSAH 61 area just east of Downtown are nearly complete. Final recommendations were presented via hydraulics memo for the remainder of Downtown have been presented to the water resources stakeholders group and initial planning level options and considerations for areas outside of Downtown are currently being prepared.

c. Update on Downtown Area Progress



www.highway4161.com





Progress on Downtown areas was discussed. Request for comments on the draft hydraulics memo was discussed. Project areas were further defined based on group questions.

d. Areas Outside of Downtown

Areas outside of downtown were defined, leading into remainder of presentation.

3. Review of Project Subareas (45 min)

a. Western Project Area

Western project area was defined. Erosion area was confirmed. It was also further reiterated that the areas outside of Downtown are “planning level” only.

b. TH 41 North Area

North area was discussed. Minor pavement improvements were discussed, likely minor increases in impervious area. Some regional opportunities with adjacent schools, community center and church was discussed.

c. Chaska East Area

Several opportunities for water quality improvement were discussed and confirmed by Lower Minnesota WD. The LMWD mentioned ongoing analysis and motivation for projects along this corridor. Bolton & Menk discussed reductions in impervious surface, conversion of frontage roads to bioretention areas and utilizing trail corridors for water quality improvements.

d. Eastern Project Area

Eastern area was discussed giving special attention to the trout stream and Seminary Fen. Preliminary roadway layouts were discussed by Bolton & Menk and Carver County specifically concerning available right of way, property acquisition, roadway safety, etc.

i. Seminary Fen

Potential financial contribution to current restoration efforts was discussed. MnDNR mentioned that dollars have been acquired recently to support restoration efforts. Bolton & Menk discussed infrastructure removal, clearing of brush and controlled burns as other potential contributions.

The trout stream and developing easements was discussed at length. Chanhassen anticipates some development in this area, but has some concerns regarding utilities. The stakeholder group discussed the potential to convert the area to Park Land, or at least set up easements to preserve the existing natural features. Opportunities to acquire grant funding was



discussed. These options will be discussed in the hydraulics memo for the areas outside of Downtown.

4. Stakeholder Input (30 min)

a. Other Issues/Resources

Conversation was engaging throughout the meeting. Questions were primarily focused around project schedule and defining project areas. The group discussed the entire project as three subprojects. 1) 90% construction plans for east of Downtown, 2) Downtown area feasibility planning and 3) Pre-project planning outside of Downtown.

b. Jurisdiction

Jurisdiction was discussed. Western Project area in CCWMO and City of Chaska. TH 41 North split along centerline – east is in LMWD, west in CCWMO, East of downtown areas in LWMD. Seminary Fen in Chanhassen.

5. Next Steps (10 min)

Bolton & Menk and Carver County discussed finalizing recommendations for areas outside of Downtown. Preliminary options and potential funding opportunities will be discussed.

Appendix B

Agency Comments and Responses

April 24, 2017

Darin Mielke, PE, LSIT, PMP

Assistant Public Works Director, Deputy County Engineer

Carver County, MN

RE: TH41/CSAH 61 Preliminary Stormwater Plan—Downtown Chaska Corridor
Carver County

Dear Mr. Mielke:

Thank you for the comments that you provided on behalf of the Carver County in your email dated April 24, 2017 regarding the TH41/CSAH 61 Preliminary Stormwater Management Plan—Project Subarea Stormwater Improvements. Your comments are summarized below in italics font followed by our response.

1. *Suggest using the preferred alignments/geometrics in all of the graphics.*

Response: All figures have been updated in the report to reflect the preferred roadway alignments.

2. *Suggest adding a map that shows the watershed district boundaries towards the beginning of the memo*

Response: A figure with watershed district and municipal boundaries has been included.

3. *In Figure 6 – The Trout Stream Restoration should maybe be labeled something different, as others will view restoration as something major. Maybe protection or something equivalent would be a better term to use, which would match the narrative.*

Response: The term “Restoration” was replaced with “Protection”.

4. *Show the actual fen boundaries instead of the seminary fen property boundary (or show both). There are fen locations north and south of CSAH 61.*

Response: An additional figure showing the primary environmental features in the East Project Area was included.

5. *Figure 5 – If possible, maybe show the bioswale on the north side of CSAH 61 as an option if the regional rail authority doesn’t want the bioswale on that property.*

Response: Since there was already a bioswale shown on the north side of CSAH 61, the bioswale label on the south side of CSAH 61 was changed to "Bioswale (Optional/Dependent on Trail Alignment)".

Sincerely,

Bolton & Menk, Inc.

A handwritten signature in black ink, appearing to read "Timothy Olson", with a long horizontal flourish extending to the right.

Timothy Olson, PE, CFM
Water Resources Project Manager

May 16, 2017

Krista Spreiter
Natural Resources Technician
City of Chanhassen

RE: TH41/CSAH 61 Preliminary Stormwater Plan—Project Subarea Corridor
Carver County

Dear Ms. Spreiter:

Thank you for the comments that you provided on behalf of the Carver County in your email dated May 11th, 2017 regarding the TH41/CSAH 61 Preliminary Stormwater Management Plan—Project Subarea Stormwater Improvements. Your comments are summarized below in italics font followed by our response.

1. *Chanhassen's Stormwater Management Rules should be included in the discussion under Section V. Stormwater Management Rules. Article VII, Chapter 10 of Chanhassen City Code describes the required stormwater management develop standards. It states that for propose projects in a watershed that directly discharges into a "preserve" water feature, of which Assumption Creek and the Seminary Fen are listed (Table 20 of the Surface Water Management Plan), NURP plus enhanced treatment is required.*

Response: The City of Chanhassen's rules for stormwater management were referenced in Section III. Stormwater Management Requirements.

Sincerely,

Bolton & Menk, Inc.

A handwritten signature in black ink, appearing to read "Timothy Olson", with a stylized flourish at the end.

Timothy Olson, PE, CFM
Water Resources Project Manager

May 15, 2017

Linda Loomis
Administrator, Lower Minnesota River Watershed District
Naiad Consulting, LLC

RE: TH41/CSAH 61 Preliminary Stormwater Plan—Project Subarea Corridor
Carver County

Dear Ms. Loomis:

Thank you for the comments that you provided on behalf of the Carver County in your email dated May 15th, 2017 regarding the TH41/CSAH 61 Preliminary Stormwater Management Plan—Project Subarea Stormwater Improvements. Your comments are summarized below in italics font followed by our response.

1. *The District is amending the Standards in its Watershed Management Plan. If adopted, proposed changes to the Standards present additional requirements necessary to protect, preserve, and restore high value resources (fens, trout streams, and trout lakes). The partnership team was invited to District stakeholder sessions and is encouraged to keep abreast of changes being considered as they will affect the TH41/ CSAH 61 PSMP, specifically in the area adjacent to Seminary Fen and Assumption Creek.*

Response: Understood. Upon selection of final corridor layouts and pavement improvements, all stormwater management BMPs will carefully consider all current stakeholder requirements. We also understand the extreme sensitivity of the Seminary Fen and Assumption Creek, which are largely the impetus for early stakeholder coordination. Additional language was added to the report to reiterate the plan's scope.

2. *In the Watershed Management Plan, the following language is considered for inclusion: "If an activity covered under these Standards is taking place in an area with overlapping jurisdiction, the Lower Minnesota River Watershed District would defer to the regulatory jurisdiction of the other water management organization, if that water management organization's requirements are more restrictive." The proposed language would principally affect the Western Project Area.*

Response: We have included language in the Preliminary Stormwater Management Plan to ensure that all stormwater management rules and recommendations presented by the permitting agencies shall be carefully followed.

Sincerely,

Bolton & Menk, Inc.



Timothy Olson, PE, CFM
Water Resources Project Manager

May 15, 2017

Nathan Wallerstedt, PE, PMP

U.S. Army Corps of Engineers, St. Paul District

RE: TH41/CSAH 61 Preliminary Stormwater Plan—Project Subarea Corridor
Carver County

Dear Mr. Wallerstedt:

Thank you for the comments that you provided on behalf of the Carver County in your email dated May 15th, 2017 regarding the TH41/CSAH 61 Preliminary Stormwater Management Plan—Project Subarea Stormwater Improvements. Your comments are summarized below in italics font followed by our response.

1. *In general from the USACE perspective when it comes to stormwater is just to make sure that changes to runoff rates etc. don't have a negative impact on the pumping station of the flood risk management project.*

Response: The scope of this project phase is to summarize, at a high level, stormwater management concepts that should be considered when preliminary and final roadway improvements are established. Further, all rate control and regional flooding impacts will be carefully considered to ensure that all federal, state and local requirements are met.

2. *It looks like you are proposing lots of BMPs and have rate control requirements etc. to keep that under control we just don't want anyone to have flood damage because the pump station can't keep up if there is an increase of stormwater to the station beyond what it is designed to handle.*

Response: The pump station will be carefully considered when final stormwater BMPs are selected during future project phases.

Sincerely,

Bolton & Menk, Inc.

A handwritten signature in black ink, appearing to read "Timothy Olson", with a stylized flourish at the end.

Timothy Olson, PE, CFM
Water Resources Project Manager

May 16, 2017

Paul Moline
District Manager
Carver County WMO

RE: TH41/CSAH 61 Preliminary Stormwater Plan—Project Subarea Corridor
Carver County

Dear Mr. Moline:

Thank you for the comments that you provided on behalf of the Carver County in your email dated May 15th, 2017 regarding the TH41/CSAH 61 Preliminary Stormwater Management Plan—Project Subarea Stormwater Improvements. Your comments are summarized below in italics font followed by our response.

1. *Overall: references to East Chaska Creek and West Chaska Creek should be consistent. In some spots, they are discussed as East Creek or Chaska creek.*

Response: All references to Chaska Creek, East Chaska Creek and/or West Chaska Creek have been corrected for accuracy and consistency.

2. *Figure 3. Watershed boundaries are confusing. The outlying islands/parcels do not match the watershed district/CCWMO boundary.*

Response: The Watershed Boundaries in Figure 3 reflect the best available information from the Minnesota Geospatial Commons dated 2015. We have not been granted access to any newer GIS information. Figure 3 gives the reader a general sense of the jurisdictional boundaries. All future design development and construction planning will ensure accurate determinations of the Watershed jurisdiction.

3. *Section III. Could use the table matrix pulled together for the downtown report.*

Response: The Downtown Area Stormwater Report was intended to provide more detail in terms of BMP selection and directly applicable rules based on known preliminary options. The Project Subareas Stormwater Report provides a higher level look at potential stormwater considerations that should be utilized when determining preliminary roadway layouts, project design and construction planning. We intend to further define the applicable watershed and city stormwater rules during the preliminary engineering phase of the project.

4. *Project areas indicate preliminary BMP's. The figures and description should have more explanation regarding the BMP's being at conceptual locations. At the TAC meeting the group*

discussed that these sites seemed too specific and were meant to be just an idea of where BMP's could be located. No association with whether these locations meet the requirements described in section III has been made. No analysis has been completed. This comment was made at the TAC meeting by BMI, but this document could be interpreted as a preliminary analysis/proposal for stormwater treatment and BMP's. If that is the goal for this document, more work is needed.

Response: Additional clarifying language has been added throughout the report to support the intended scope of the project.

5. *Western project area – referring to above comment, the bio-swales, could be located in other areas, the existing ditches could become bio-swales, the pond expansion could include filtration, offset treatment could be possible. Figures should be expanded to include more areas, or the possible BMP's should just be described in text.*

Response: Additional clarifying language has been added throughout the report to support the intended scope of the project.

6. *All figures, the pdf version I received was too grainy to tell what the legends say.*

Response: Higher resolution figures have been added where possible.

7. *Eastern project area – unsure which stormwater BMP's are shown.*

Response: Higher resolution figures have been added where possible.

Sincerely,

Bolton & Menk, Inc.

A handwritten signature in black ink, appearing to read "Timothy Olson", with a stylized flourish at the end.

Timothy Olson, PE, CFM
Water Resources Project Manager

May 16, 2017

Vicki Sherry
Wildlife Biologist
Minnesota Valley NWR

RE: TH41/CSAH 61 Preliminary Stormwater Plan—Project Subarea Corridor
Carver County

Dear Ms. Sherry:

Thank you for the comments that you provided on behalf of the Minnesota Valley NWR in your email dated May 26th, 2017 regarding the TH41/CSAH 61 Preliminary Stormwater Management Plan—Project Subarea Stormwater Improvements. Your comments are summarized below in *italics font* followed by our response.

1. *On the Agency Involvement Page note that Minnesota Valley National Wildlife Refuge is part of the U.S. Fish and Wildlife Service.*

Response: Noted and corrected.

2. *[As] stated in a previous email ... the Refuge supports the protection of Seminary Fen. We are also interested in the protection of Bluff Creek (near Hwy 101) since it enters or Upgrala Unit (if the project extends to that vicinity).*

Response: Where appropriate, references were made indicating the Refuges support of environmental protection.

3. *On page 4 under "Existing Stormwater Collection and Water Quality BMP's" it is stated that "the Chaska Creek Corps of Engineers concrete flood channel has very little habitat value and is much less of an environmental amenity and therefore less of an environmental concern." However, since this creek eventually drains adjacent Refuge lands and to the Minnesota River, we are concerned about the water quality downstream of the channelized area. This downstream area including the Chaska Unit of Minnesota Valley NWR and the Minnesota River is important floodplain forest and wetland and aquatic habitat for many species of plants and animals. We would like to continue to work with you to protect these unique resources.*

Response: The language was adjusted to state that, while the engineered flood channel has little habitat value, the areas upstream and downstream are still critical and will require protection as projects are developed.

Sincerely,

Bolton & Menk, Inc.



Timothy Olson, PE, CFM
Water Resources Project Manager

Appendix G: Implementation Plan



Highway 41/CSAH 61 Improvements Project
Implementation Plan
January 2018



Priority	Project Number	Sub-Area	Project Description	Potential Funding	Lead Agency	Cost													Comments	
						Construction			Project Development and Delivery			ROW			Total (2017 Dollars)			Year		Total Expected Cost (with 3% inflation)
						Low (5th %)	Expected (85th %)	High (95th %)	Low	Expected	High	Low Estimate (1.25x EMV)	Expected	High Estimate (3.0x EMV)	Low Estimate	Expected Estimate	High Estimate			
Short-Term (2018-2020)	S1	TH 41 North	CSAH 10 Corridor Study (CSAH 43 to CSAH 61)	CO, Local	County	\$0	\$0	\$0	\$270,000	\$300,000	\$330,000	\$0	\$0	\$0	\$270,000	\$300,000	\$330,000	2018	\$310,000	
	S2	Downtown	Dolce Vita Site Modifications	TH, TBACK	County	\$80,000	\$120,000	\$130,000	\$20,000	\$40,000	\$50,000	\$40,000	\$90,000	\$130,000	\$140,000	\$250,000	\$310,000	2019	\$270,000	Includes moving sign and constructing new driveway to Walnut Street
	S3	Downtown	Brickyard Commercial Area Improvements	TEDI, Local	Chaska	\$380,000	\$560,000	\$600,000	\$90,000	\$130,000	\$170,000	\$110,000	\$190,000	\$270,000	\$580,000	\$880,000	\$1,040,000	2019	\$930,000	Local road connections between Walnut Street and Yellow Brick Road Chaser's site connection
	S4	Downtown	South Parking Lot Construction (Phase 1 - lower level of structure between 2nd and 3rd Streets)	TH, Local	Chaska	\$340,000	\$380,000	\$420,000	\$70,000	\$100,000	\$130,000	\$0	\$0	\$0	\$410,000	\$480,000	\$550,000	2020	\$520,000	
	S5	Downtown	208-210 Chestnut Sidewalk Breakthrough & Rear of Building Modifications	Local, PRIV	Chaska	\$500,000	\$560,000	\$620,000	\$30,000	\$50,000	\$70,000	\$0	\$0	\$0	\$530,000	\$610,000	\$690,000	2020	\$670,000	ROW cost included in construction estimate
	S6	Downtown	North Parking Lot Construction (Moravian Church Area)	TH, Local	Chaska	\$420,000	\$470,000	\$520,000	\$80,000	\$90,000	\$100,000	\$400,000	\$400,000	\$400,000	\$900,000	\$960,000	\$1,020,000	2020	\$1,050,000	
	Subtotal					\$1,720,000	\$2,090,000	\$2,290,000	\$560,000	\$710,000	\$850,000	\$550,000	\$680,000	\$800,000	\$2,830,000	\$3,480,000	\$3,940,000		\$3,750,000	
Mid-Term (2021 - 2025)	M1	Downtown	TH 41 Reconstruction From Minnesota River Bridge to Walnut Street	STP, MHFP, COC, TED, LRIP, MA, TIGER, TH, TE, CO, WR, Local	Chaska	\$8,760,000	\$11,160,000	\$11,720,000	\$1,620,000	\$2,280,000	\$2,980,000	\$110,000	\$180,000	\$260,000	\$10,490,000	\$13,620,000	\$14,960,000	2022	\$15,790,000	Includes city utilities, lane modifications, on-street parking removal, streetscape/landscape enhancements, TH 41 HAWK, stormwater management and TH 41 underpass. May shift to 2024(25) if 41/10 project not ready or funded.
	M2	Downtown	CSAH 61 Reconstruction From TH 41 to Yellow Brick Road	STP, TBACK, CO, WR, Local	County	\$2,350,000	\$2,930,000	\$3,070,000	\$420,000	\$590,000	\$770,000	\$10,000	\$10,000	\$10,000	\$2,780,000	\$3,530,000	\$3,850,000	2022	\$4,090,000	Includes roadway, access modifications, landscape/streetscape, stormwater management, East Chaska Creek bridge replacement with box culvert. May shift to 2024(25) if 41/10 project not ready or funded.
	M3	Eastern	CSAH 61 Reconstruction From Stoughton Ave to Bluff Creek Drive	STP, TBACK, CO, WR, Local	County	\$2,000,000	\$3,060,000	\$3,330,000	\$410,000	\$670,000	\$890,000	\$100,000	\$160,000	\$220,000	\$2,510,000	\$3,890,000	\$4,440,000	2023	\$4,640,000	Includes roadway, access modifications, Bluff Creek roundabout modification Does not include City Utilities
	M4	TH 41 North	TH 41/CSAH 10 Intersection Improvements	COC, MA, MHFP, STP, TIGER, TH, CO, HSIP, WR, Local	County	\$3,810,000	\$5,690,000	\$6,150,000	\$730,000	\$1,180,000	\$1,590,000	\$50,000	\$80,000	\$110,000	\$4,590,000	\$6,950,000	\$7,850,000	2025	\$8,800,000	Includes lane additions, medians, stormwater management. Does not include City Utilities. CSAH 10 reconstruction extends from White Oak Dr to Park Ridge Dr; Roundabout at Park Ridge Dr included in Most Likely and High Cost.
	M5	TH 41 North	TH 41 SB Expansion to 2 Lanes From CSAH 10 to Walnut Court	COC, MA, MHFP, STP, TIGER, TH, CO, WR, Local	MnDOT	\$2,210,000	\$3,040,000	\$3,240,000	\$520,000	\$1,000,000	\$1,400,000	\$230,000	\$430,000	\$640,000	\$2,960,000	\$4,470,000	\$5,280,000	2025	\$5,660,000	Restripe TH 41 southbound from CSAH 10 to Walnut Court to include two thru lanes. Add southbound TH 41 right turns lanes at public intersections. Potential Noise Wall (Scoping Report 1008-77) Noise Wall High Cost Estimated at \$2.4 Mill. Does not include City Utilities.
	Subtotal					\$19,130,000	\$25,880,000	\$27,510,000	\$3,700,000	\$5,720,000	\$7,630,000	\$500,000	\$860,000	\$1,240,000	\$23,330,000	\$32,460,000	\$36,380,000		\$38,980,000	
Long-Term (2026 - 2030)	L1	Chaska East	CSAH 61 Reconstruction From Yellow Brick Road to CSAH 15	STP, TBACK, CO, WR, Local	County	\$4,780,000	\$6,140,000	\$6,460,000	\$900,000	\$1,270,000	\$1,660,000	\$100,000	\$170,000	\$240,000	\$5,780,000	\$7,580,000	\$8,360,000	2027	\$10,190,000	Includes roadway, trail, sidewalk, access modifications, stormwater management Does not include City Utilities
	L2	Eastern	CSAH 61 Reconstruction (and roundabout) From CSAH 15 to CSAH 10	STP, TBACK, CO, HSIP, WR, Local	County	\$1,970,000	\$2,880,000	\$3,100,000	\$370,000	\$590,000	\$790,000	\$100,000	\$160,000	\$230,000	\$2,440,000	\$3,630,000	\$4,120,000	2027	\$4,880,000	Includes roadway, CSAH 10/CSAH 61 roundabout- 3 legs, trail reconnection Does not include City Utilities
	L3	Downtown Chaska East	Trail on former RR From Walnut Street to the existing Southwest LRT Regional Trail	TE, Local	Chaska	\$520,000	\$700,000	\$740,000	\$110,000	\$220,000	\$300,000	\$10,000	\$20,000	\$30,000	\$640,000	\$940,000	\$1,070,000	2027	\$1,260,000	Includes Pedestrian Bridge and Removal of Railroad Bridge
	L4	Western	CSAH 61 Reconstruction From east of CSAH 11 to CSAH 44	TBACK, CO	County	\$4,590,000	\$6,740,000	\$7,270,000	\$840,000	\$1,370,000	\$1,840,000	\$60,000	\$90,000	\$120,000	\$5,490,000	\$8,200,000	\$9,230,000	2030	\$12,040,000	Roadway, access modifications, trail, stormwater management. Includes \$1.5 Mil Pedestrian Bridge over 212 - in high cost scenario, No inflation. Does not include City Utilities
	L5	Eastern	CSAH 61 Reconstruction From CSAH 10 to Stoughton Ave	STP, TBACK, CO, WR, Local	County	\$1,670,000	\$2,520,000	\$2,730,000	\$340,000	\$550,000	\$740,000	\$70,000	\$110,000	\$150,000	\$2,080,000	\$3,180,000	\$3,620,000	2030	\$4,670,000	Project on existing alignment or do O8. Revisit approach for this segment with Projects M3 and L2.
	Subtotal					\$13,530,000	\$18,980,000	\$20,300,000	\$2,560,000	\$4,000,000	\$5,330,000	\$340,000	\$550,000	\$770,000	\$16,430,000	\$23,530,000	\$26,400,000		\$33,040,000	
Total 12 Year Investment						\$34,380,000	\$46,950,000	\$50,100,000	\$6,820,000	\$10,430,000	\$13,810,000	\$1,390,000	\$2,090,000	\$2,810,000	\$42,590,000	\$59,470,000	\$66,720,000		\$75,770,000	
Opportunity / Development Driven	O1.1	Western	Local Roads - City of Chaska	Local, PRIV	Chaska													-	-	Mt Hope Rd Connection (North of CSAH 61) - Chaska, CSAH 40 Frontage Rd Connection (South of CSAH 61) - Chaska/Carver, Edgehill Rd Connection (North of CSAH 61) - Chaska, W. 1st Street Frontage Road Connection Chaska
	O1.2	Eastern	Local Roads - City of Chaska	Local, PRIV	Chaska													-	-	Chaska Development Connection
	O1.3	Chaska East	Local Roads - City of Chaska	Local, PRIV	Chaska													-	-	Fire Lane/Stoughton Ave Connections Zemble St Connection
	O1.4	Western	Local Roads - City of Carver	Local, PRIV	Carver													-	-	Lano Ln Connection (South of CSAH 61) - Carver in coordination with Chaska
	O1.5	Eastern	Local Roads - City of Chanhassen	Local, PRIV	Chan.													-	-	Chanhassen Development West Connection Chanhassen Development East Connection
	O2	TH 41 North	Pedestrian Safety Signal Modifications at TH 41/CSAH 10 (No Rights On Red)	TH, HSIP	MnDOT	\$30,000	\$30,000	\$30,000	\$10,000	\$10,000	\$10,000	\$0	\$0	\$0	\$40,000	\$40,000	\$40,000	2019	\$40,000	
	O3	Downtown	Parking Lot Construction (Phase 2 - upper level of structure between 2nd and 3rd Streets)	Local, PRIV	Chaska	\$590,000	\$650,000	\$720,000	\$120,000	\$160,000	\$220,000	\$0	\$0	\$0	\$710,000	\$810,000	\$940,000	2022	\$940,000	ROW cost included in construction estimate
	O4	Downtown	Trail On former RR from Pine Street to West Chaska Creek	Local, TE	Chaska													2024	-	
	O5	TH 41 North	Grade separated ped/bike crossings of TH 41 and CSAH 10	SRTS, TE, Local	Chaska	\$1,700,000	\$2,770,000	\$3,030,000	\$320,000	\$570,000	\$770,000	\$140,000	\$230,000	\$330,000	\$2,160,000	\$3,570,000	\$4,130,000	2026	\$4,660,000	If City gets funded combine with TH 41 North Improvements (L1 and L2). Additional study required, possibly with CSAH 10 Corridor Study (S3).
	O6	Western	Pedestrian trail (Mt. Hope to CSAH 40) and Grade separated ped/bike crossing of CSAH 61 near CSAH 40	Local, TE	Chaska													2030	-	
	O7	Eastern	Official Map of CSAH 61 Realignment	CO, TBACK	County	\$0	\$0	\$0	\$50,000	\$60,000	\$70,000	\$0	\$0	\$0	\$50,000	\$60,000	\$70,000	TBD	#N/A	From proposed CSAH 10/CSAH 61 roundabout thru Stoughton Avenue. Revisit approach for this segment with Projects M3 and L2.
	O8	Eastern	CSAH 61 Reconstruction From new CSAH 10/CSAH 61 roundabout thru Stoughton Ave	STP, TBACK, CO, HSIP, WR, Local, PRIV	Chan.	\$1,700,000	\$2,570,000	\$2,790,000	\$800,000	\$1,060,000	\$1,300,000	\$1,570,000	\$3,600,000	\$5,630,000	\$4,070,000	\$7,230,000	\$9,720,000	2030	\$10,620,000	Includes 4th leg of roundabout at CSAH 10/CSAH 61, roadway, access modifications, trail. Residual Land Value is included. Finalize plan in CSAH 10 study

FUNDING KEY

COC	Corridors of Commerce Funds (State)	MA	Municipal / Cooperative Agreement Funds (State)	TE	Transportation Enhancement Funds (Federal)	TBACK	Turnback Funds (State)
CO	County State Aid Highway, County Sales Tax, Wheelage, or Other County Funds	MHFP	Minnesota Highway Freight Program Funds (State)	TED/I	Transportation Economic Development (State)	WR	Lower Minnesota and/or CCWMO
HSIP	Highway Safety Improvement Program Funds (Federal)	PRIV	Private Funding / Development (Private)	TH	Trunk Highway Funds (State)		
LOCAL	City Funding MSAS	SRTS	Safe Routes to School	TIGER	Transp. Invest. Generating Economic Recovery (Federal)		
LRIP	Local Road Improvement Program Funds (State)	STP	Surface Transportation Program Funds (Federal)	TRLF	Transportation Revolving Loan Fund (Federal)		



Highway 41/CSAH 61 Improvements Project

Funding Needed by Year to Deliver Key Projects

January 2018



	Preliminary Design / Environmental Documentation / Funding	Final Design / ROW	Construction Services	ROW Cost	Construction Cost	TOTAL
2018	\$332,500	\$90,000	\$0	\$300,000	\$0	\$722,500
2019	\$372,500	\$755,000	\$70,000	\$0	\$720,000	\$1,917,500
2020	\$295,000	\$725,000	\$70,000	\$660,000	\$1,030,000	\$2,780,000
2021	\$160,000	\$80,000	\$1,345,000	\$47,500	\$11,915,000	\$13,547,500
2022	\$440,000	\$1,322,500	\$545,000	\$612,500	\$4,935,000	\$7,855,000
2023	\$0	\$1,687,500	\$320,000	\$950,000	\$3,650,000	\$6,607,500
2024	\$0	\$0	\$795,000	\$0	\$7,335,000	\$8,130,000
2025	\$120,000	\$80,000	\$795,000	\$40,000	\$7,335,000	\$8,370,000
2026	\$0	\$240,000	\$580,000	\$120,000	\$6,530,000	\$7,470,000
2027	\$300,000	\$200,000	\$580,000	\$0	\$6,530,000	\$7,610,000
2028	\$0	\$600,000	\$0	\$130,000	\$0	\$730,000
2029	\$0	\$0	\$900,000	\$0	\$9,900,000	\$10,800,000
2030	\$0	\$0	\$360,000	\$0	\$3,700,000	\$4,060,000
TOTAL	\$2,020,000	\$5,780,000	\$6,360,000	\$2,860,000	\$63,580,000	\$80,600,000
TOTAL (w/ CSAH 61 S-Curve Realign.)	\$2,130,000	\$6,080,000	\$6,700,000	\$7,990,000	\$63,650,000	\$86,550,000
TOTAL (w/o 41/10 Ped Grade Sep.)	\$1,910,000	\$5,480,000	\$6,030,000	\$2,560,000	\$59,970,000	\$75,950,000

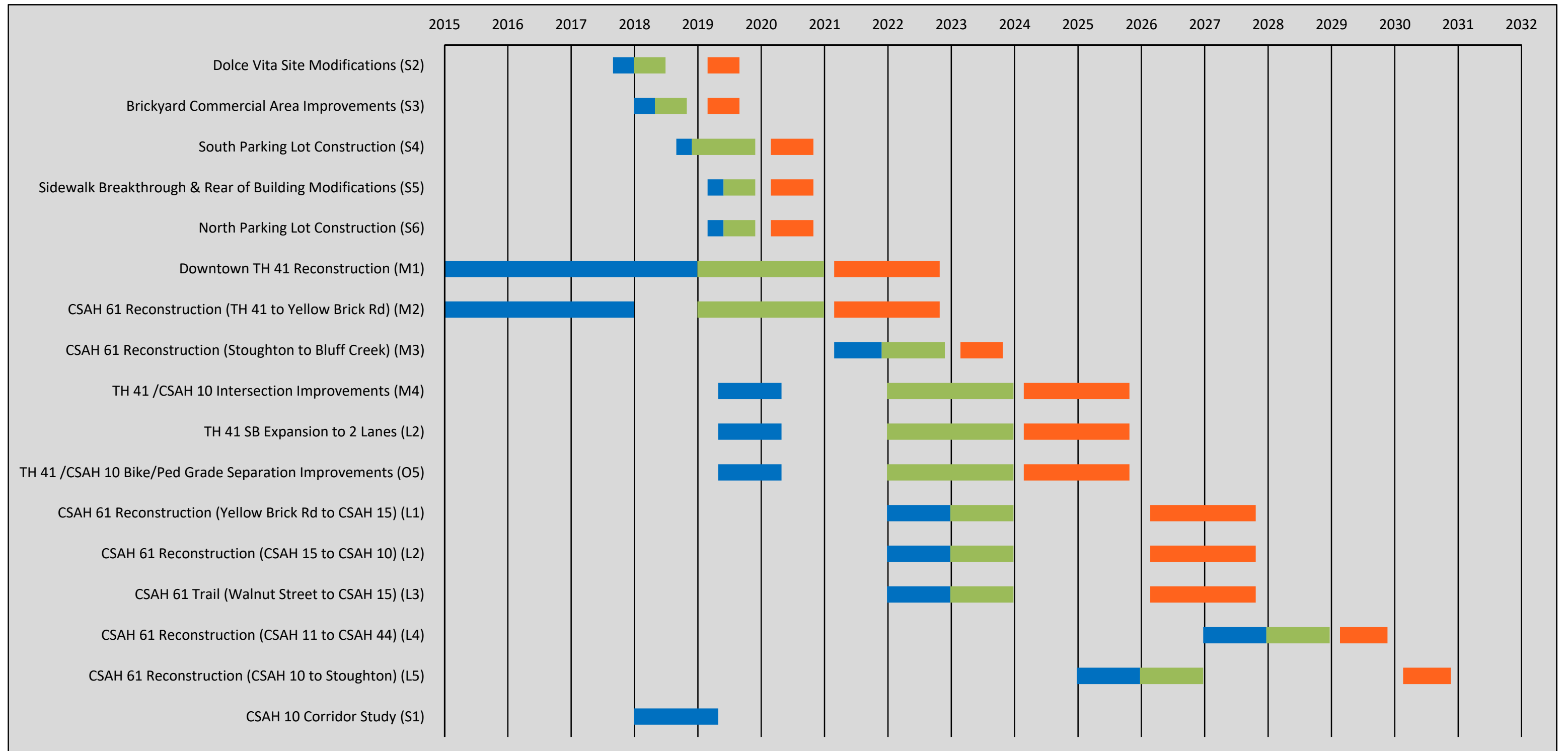




Highway 41/CSAH 61 Improvements Project

Schedule to Deliver Key Projects

January 2018



Preliminary Engineering / Funding

Legend

Design / ROW Acquisition

Construction





Highway 41/CSAH 61 Improvements Project
Turnback Funding Needed by Year to Deliver Key Projects
January 2018



		Preliminary Design / Environmental Documentation / Funding	Final Design / ROW	Construction Services	ROW Cost	Construction Cost	TOTAL
2018	Dolce Vita Site Modifications (S2)	\$0	\$10,000	\$0	\$50,000	\$0	\$60,000
2019	Dolce Vita Site Modifications (S2)	\$0	\$0	\$10,000	\$0	\$65,000	\$75,000
	CSAH 61 Reconstruction (TH 41 to Yellow Brick Rd) (M2)	\$0	\$155,000	\$0	\$0	\$0	\$155,000
	Total	\$0	\$155,000	\$10,000	\$0	\$65,000	\$230,000
2020	CSAH 61 Reconstruction (TH 41 to Yellow Brick Rd) (M2)	\$0	\$155,000	\$0	\$10,000	\$0	\$165,000
2021	CSAH 61 Reconstruction (TH 41 to Yellow Brick Rd) (M2)	\$0	\$0	\$170,000	\$0	\$1,700,000	\$1,870,000
	CSAH 61 Reconstruction (Stoughton to Bluff Creek) (M3)	\$160,000	\$80,000	\$0	\$47,500	\$0	\$287,500
	Total	\$160,000	\$80,000	\$170,000	\$47,500	\$1,700,000	\$2,157,500
2022	CSAH 61 Reconstruction (TH 41 to Yellow Brick Rd) (M2)	\$0	\$0	\$170,000	\$0	\$1,700,000	\$1,870,000
	CSAH 61 Reconstruction (Stoughton to Bluff Creek) (M3)	\$0	\$240,000	\$0	\$142,500	\$0	\$382,500
	CSAH 61 Reconstruction (Yellow Brick Rd to CSAH 15) (L1)	\$260,000	\$192,500	\$0	\$0	\$0	\$452,500
	CSAH 61 Reconstruction (CSAH 15 to CSAH 10) (L2)	\$120,000	\$80,000	\$0	\$0	\$0	\$200,000
	Total	\$380,000	\$512,500	\$170,000	\$142,500	\$1,700,000	\$2,905,000
2023	CSAH 61 Reconstruction (Stoughton to Bluff Creek) (M3)	\$0	\$0	\$320,000	\$0	\$3,650,000	\$3,970,000
	CSAH 61 Reconstruction (Yellow Brick Rd to CSAH 15) (L1)	\$0	\$577,500	\$0	\$230,000	\$0	\$807,500
	CSAH 61 Reconstruction (CSAH 15 to CSAH 10) (L2)	\$0	\$240,000	\$0	\$220,000	\$0	\$460,000
	Total	\$0	\$817,500	\$320,000	\$450,000	\$3,650,000	\$5,237,500
2025	CSAH 61 Reconstruction (CSAH 10 to Stoughton) (L5)	\$120,000	\$80,000	\$0	\$40,000	\$0	\$240,000
2026	CSAH 61 Reconstruction (Yellow Brick Rd to CSAH 15) (L1)	\$0	\$0	\$340,000	\$0	\$4,125,000	\$4,465,000
	CSAH 61 Reconstruction (CSAH 15 to CSAH 10) (L2)	\$0	\$0	\$180,000	\$0	\$1,935,000	\$2,115,000
	CSAH 61 Reconstruction (CSAH 10 to Stoughton) (L5)	\$0	\$240,000	\$0	\$120,000	\$0	\$360,000
	Total	\$0	\$240,000	\$520,000	\$120,000	\$6,060,000	\$6,940,000
2027	CSAH 61 Reconstruction (Yellow Brick Rd to CSAH 15) (L1)	\$0	\$0	\$340,000	\$0	\$4,125,000	\$4,465,000
	CSAH 61 Reconstruction (CSAH 15 to CSAH 10) (L2)	\$0	\$0	\$180,000	\$0	\$1,935,000	\$2,115,000
	CSAH 61 Reconstruction (CSAH 11 to CSAH 44) (L4)	\$300,000	\$200,000	\$0	\$0	\$0	\$500,000
	Total	\$300,000	\$200,000	\$520,000	\$0	\$6,060,000	\$7,080,000
2028	CSAH 61 Reconstruction (CSAH 11 to CSAH 44) (L4)	\$0	\$600,000	\$0	\$130,000	\$0	\$730,000
2029	CSAH 61 Reconstruction (CSAH 11 to CSAH 44) (L4)	\$0	\$0	\$900,000	\$0	\$9,900,000	\$10,800,000
2030	CSAH 61 Reconstruction (CSAH 10 to Stoughton) (L5)	\$0	\$0	\$360,000	\$0	\$3,700,000	\$4,060,000
TOTAL		\$960,000	\$2,850,000	\$2,970,000	\$990,000	\$32,835,000	\$40,605,000
TOTAL (w/ CSAH 61 S-Curve Realign.)		\$1,070,000	\$3,150,000	\$3,310,000	\$6,120,000	\$32,905,000	\$46,555,000





Highway 41/CSAH 61 Improvements Project

Implementation Plan

January 2018

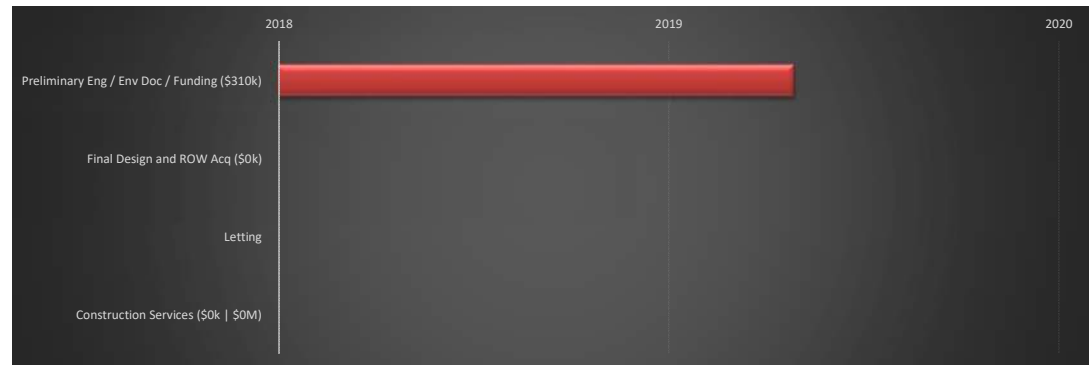


CSAH 10 Corridor Study (S1)

	2017 Dollars	2019 Dollars
Construction Cost	\$0	\$0
ROW Cost	\$0	\$0
Project Development and Delivery	\$300,000	\$310,000
Total Cost to Deliver Project	\$300,000	\$310,000

2018 Study

Item	Duration (months)	Start Date	Days	End Date	% of Proj Dev and Deliv	Proj Dev / Delivery
Preliminary Eng / Env Doc / Funding (\$310k)	16	1/1/2018	485	5/1/2019	100%	\$310,000
Final Design and ROW Acq (\$0k)						\$0
Letting						\$0
Construction Services (\$0k \$0M)						\$0
TOTAL					100%	\$310,000

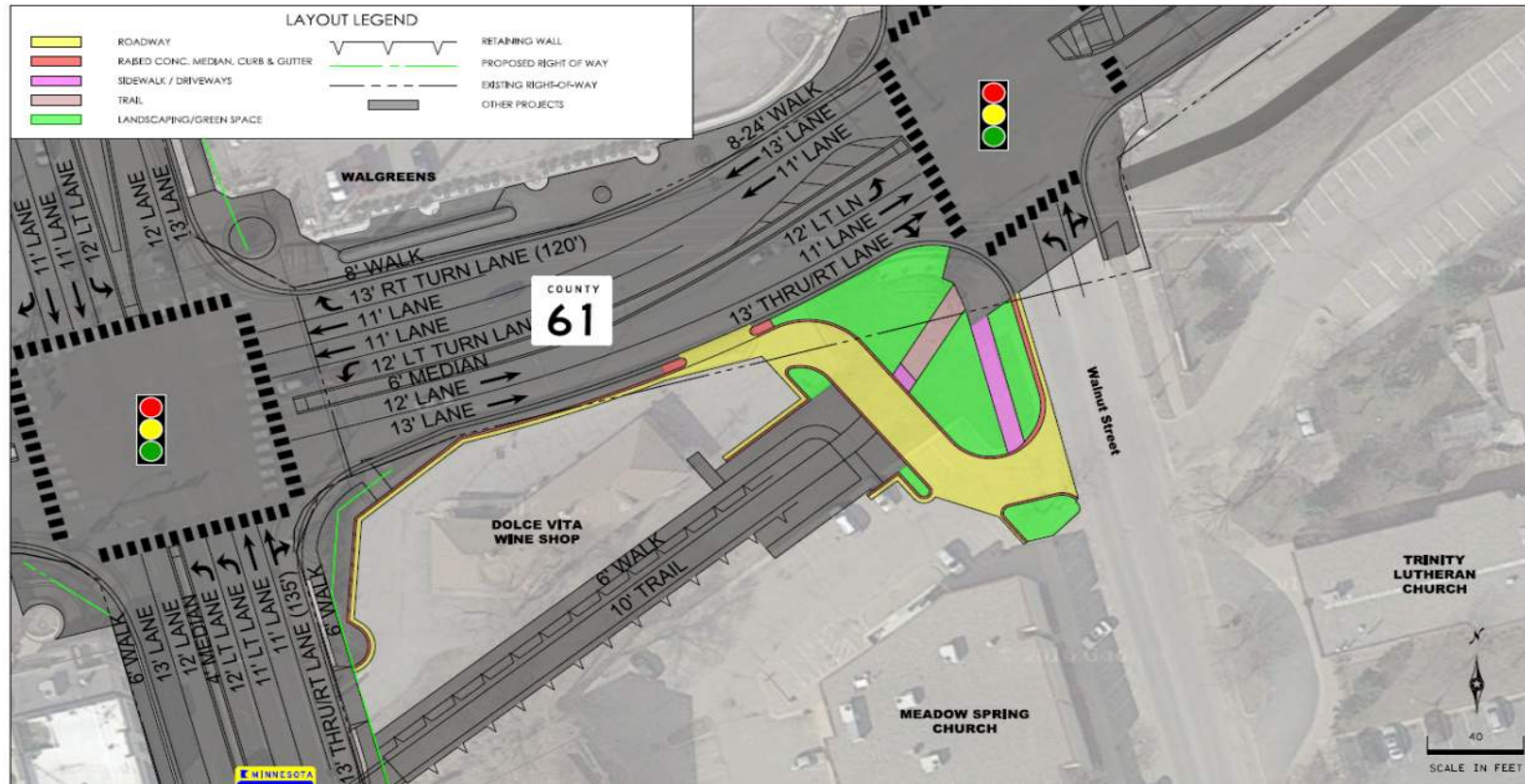


Highway 41/CSAH 61 Improvements Project

Implementation Plan

January 2018

Dolce Vita Site Modifications (S2)

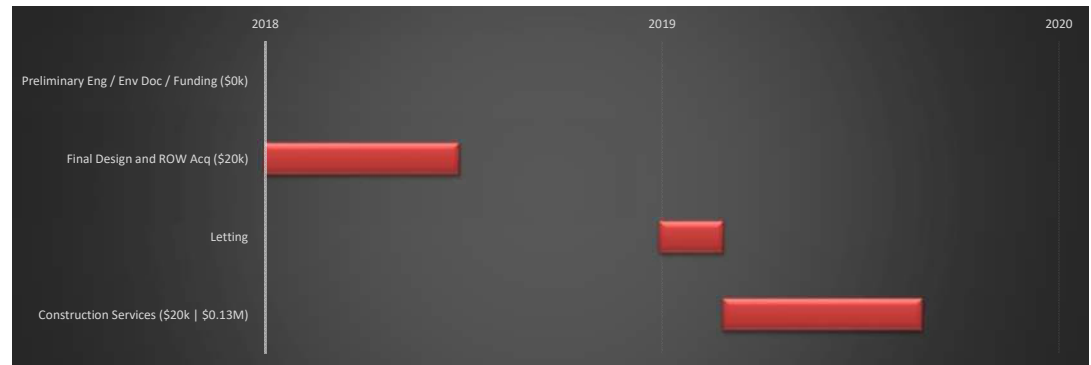


	2017 Dollars	2019 Dollars
Construction Cost	\$120,000	\$130,000
ROW Cost	\$90,000	\$100,000
Project Development and Delivery	\$40,000	\$40,000
Total Cost to Deliver Project	\$250,000	\$270,000

2019 Construction

Assumes 50% Turnback Eligible

Item	Duration (months)	Start Date	Days	End Date	% of Proj Dev and Deliv	Proj Dev / Delivery
Preliminary Eng / Env Doc / Funding (\$0k)	4	9/1/2017	122	1/1/2018		\$0
Final Design and ROW Acq (\$20k)	6	1/1/2018	181	7/1/2018	50%	\$20,000
Letting	2	1/1/2019	59	3/1/2019	0%	\$0
Construction Services (\$20k \$0.13M)	6	3/1/2019	184	9/1/2019	50%	\$20,000
TOTAL					100%	\$40,000



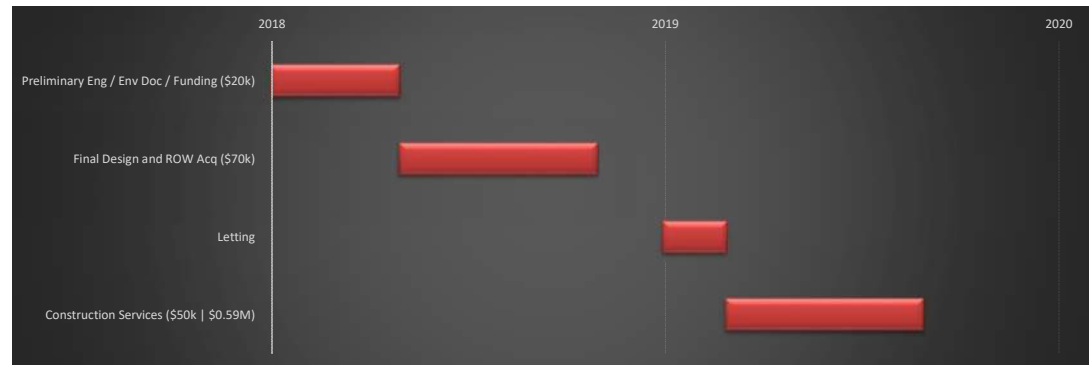
Brickyard Commercial Area Improvements (S3)



Construction Cost	\$560,000	\$590,000
ROW Cost	\$190,000	\$200,000
Project Development and Delivery	\$130,000	\$140,000
Total Cost to Deliver Project	\$880,000	\$930,000

2019 Construction

Item	Duration (months)	Start Date	Days	End Date	% of Proj Dev and Deliv	Proj Dev / Delivery
Preliminary Eng / Env Doc / Funding (\$20k)	4	1/1/2018	120	5/1/2018	15%	\$20,000
Final Design and ROW Acq (\$70k)	6	5/1/2018	184	11/1/2018	50%	\$70,000
Letting	2	1/1/2019	59	3/1/2019	0%	\$0
Construction Services (\$50k \$0.59M)	6	3/1/2019	184	9/1/2019	35%	\$50,000
TOTAL					100%	\$140,000



Highway 41/CSAH 61 Improvements Project

Implementation Plan

January 2018

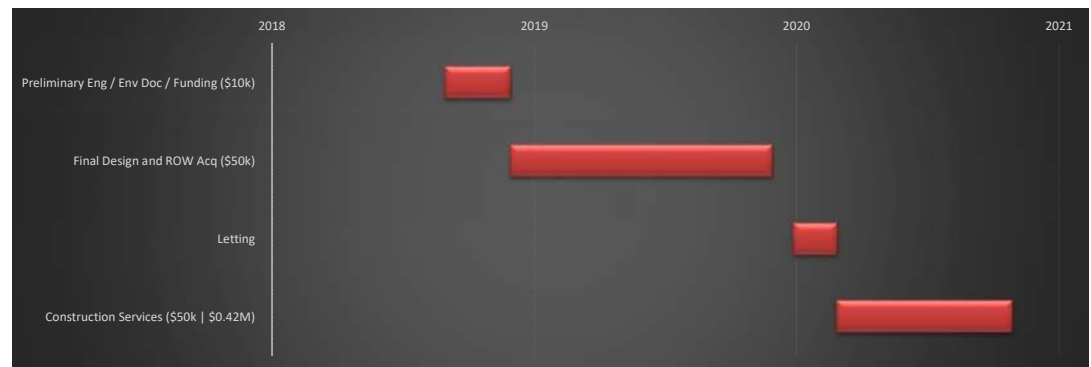
South Parking Lot Construction (S4)



	2017 Dollars	2020 Dollars
Construction Cost	\$380,000	\$420,000
ROW Cost	\$0	\$0
Project Development and Delivery	\$100,000	\$110,000
Total Cost to Deliver Project	\$480,000	\$530,000

2020 Construction

Item	Duration (months)	Start Date	Days	End Date	% of Proj Dev and Deliv	Proj Dev / Delivery
Preliminary Eng / Env Doc / Funding (\$10k)	3	9/1/2018	91	12/1/2018	10%	\$10,000
Final Design and ROW Acq (\$50k)	12	12/1/2018	365	12/1/2019	45%	\$50,000
Letting	2	1/1/2020	60	3/1/2020	0%	\$0
Construction Services (\$50k \$0.42M)	8	3/1/2020	245	11/1/2020	45%	\$50,000
TOTAL					100%	\$110,000



Highway 41/CSAH 61 Improvements Project

Implementation Plan

January 2018

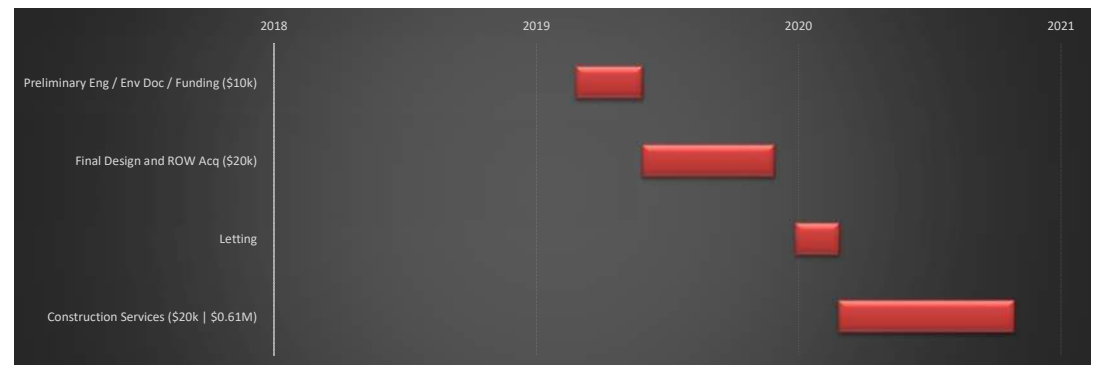
Sidewalk Breakthrough & Rear of Building Modifications (S5)



	2017 Dollars	2020 Dollars
Construction Cost	\$560,000	\$610,000
ROW Cost	\$0	\$0
Project Development and Delivery	\$50,000	\$50,000
Total Cost to Deliver Project	\$610,000	\$660,000

2020 Construction

Item	Duration (months)	Start Date	Days	End Date	% of Proj Dev and Deliv	Proj Dev / Delivery
Preliminary Eng / Env Doc / Funding (\$10k)	3	3/1/2019	92	6/1/2019	15%	\$10,000
Final Design and ROW Acq (\$20k)	6	6/1/2019	183	12/1/2019	40%	\$20,000
Letting	2	1/1/2020	60	3/1/2020	0%	\$0
Construction Services (\$20k \$0.61M)	8	3/1/2020	245	11/1/2020	45%	\$20,000
TOTAL					100%	\$50,000

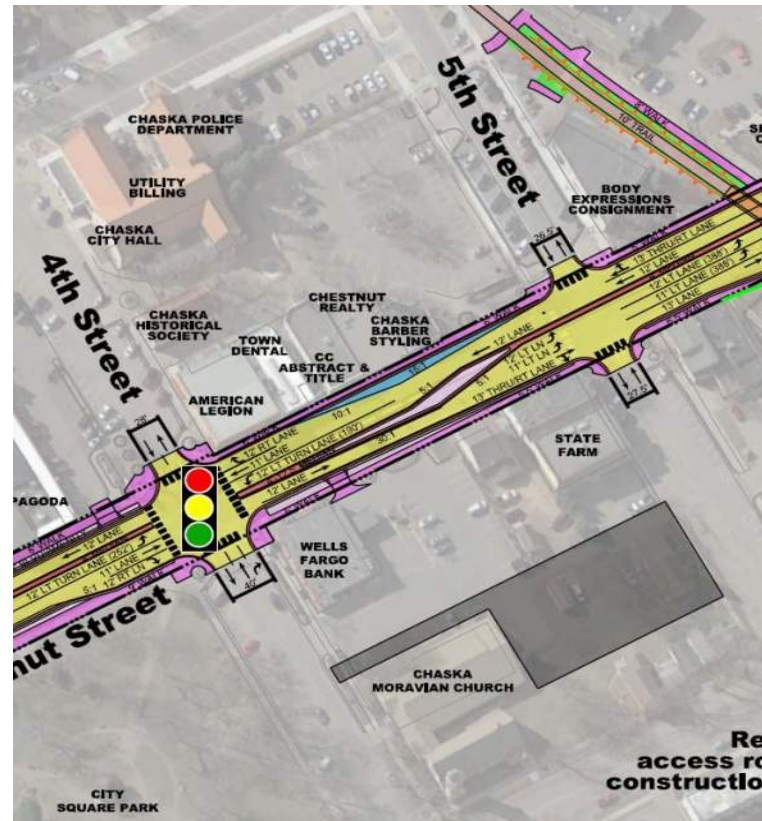


Highway 41/CSAH 61 Improvements Project

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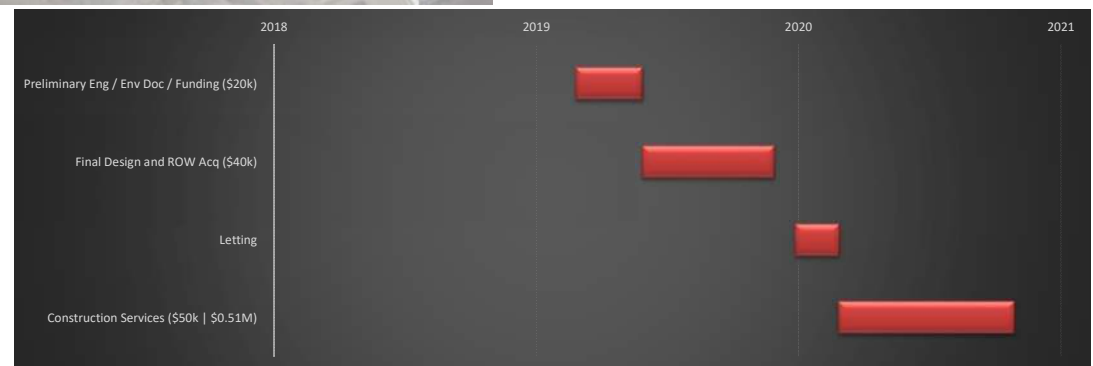
North Parking Lot Construction (S6)



	2017 Dollars	2020 Dollars
Construction Cost	\$470,000	\$510,000
ROW Cost	\$400,000	\$440,000
Project Development and Delivery	\$90,000	\$100,000
Total Cost to Deliver Project	\$960,000	\$1,050,000

2020 Construction

Item	Duration (months)	Start Date	Days	End Date	% of Proj Dev and Deliv	Proj Dev / Delivery
Preliminary Eng / Env Doc / Funding (\$20k)	3	3/1/2019	92	6/1/2019	15%	\$20,000
Final Design and ROW Acq (\$40k)	6	6/1/2019	183	12/1/2019	40%	\$40,000
Letting	2	1/1/2020	60	3/1/2020	0%	\$0
Construction Services (\$50k \$0.51M)	8	3/1/2020	245	11/1/2020	45%	\$50,000
TOTAL					100%	\$110,000



Highway 41/CSAH 61 Improvements Project

Implementation Plan

January 2018

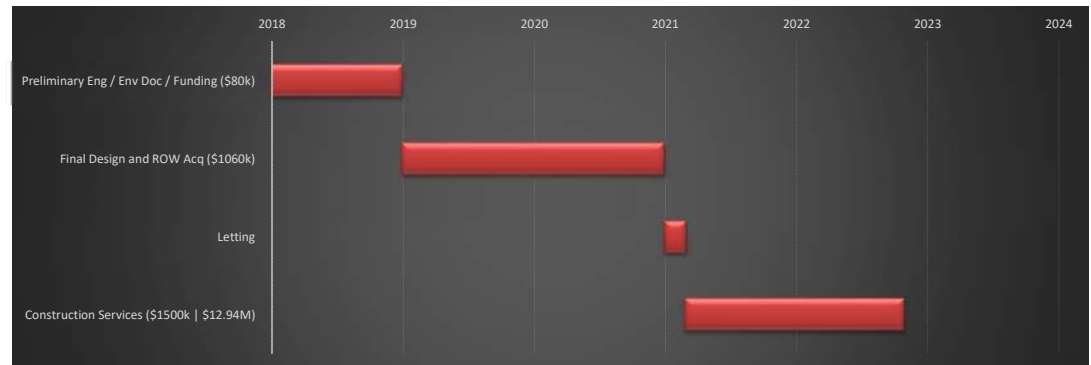
Downtown TH 41 Reconstruction (M1)



	2017 Dollars	2022 Dollars
Construction Cost	\$11,160,000	\$12,940,000
ROW Cost	\$180,000	\$210,000
Project Development and Delivery	\$2,280,000	\$2,640,000
Total Cost to Deliver Project	\$13,620,000	\$15,790,000

2022 Construction

Item	Duration (months)	Start Date	Days	End Date	% of Proj Dev and Deliv	Proj Dev / Delivery
Preliminary Eng / Env Doc / Funding (\$80k)	48	1/1/2015	1461	1/1/2019	3%	\$80,000
Final Design and ROW Acq (\$1060k)	24	1/1/2019	731	1/1/2021	40%	\$1,060,000
Letting	2	1/1/2021	59	3/1/2021	0%	\$0
Construction Services (\$1500k \$12.94M)	20	3/1/2021	610	11/1/2022	57%	\$1,500,000
TOTAL					100%	\$2,640,000



Highway 41/CSAH 61 Improvements Project

Implementation Plan

January 2018

CSAH 61 Reconstruction (TH 41 to Yellow Brick Rd) (M2)

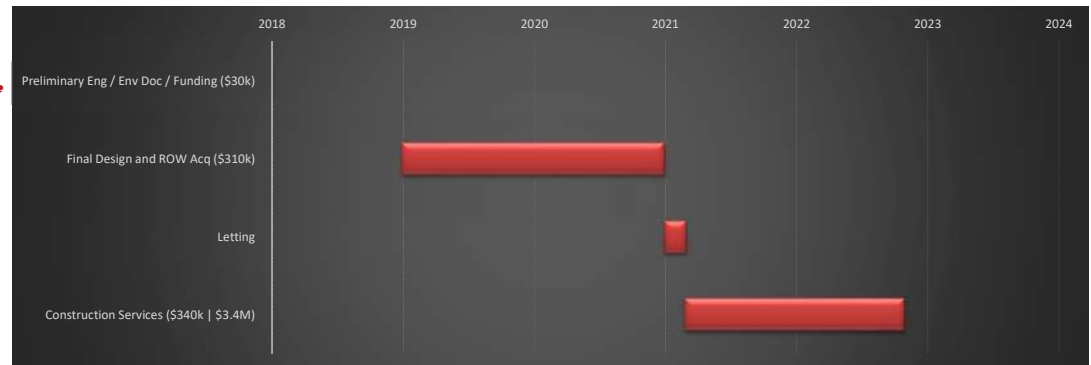


	2017 Dollars	2022 Dollars
Construction Cost	\$2,930,000	\$3,400,000
ROW Cost	\$10,000	\$10,000
Project Development and Delivery	\$590,000	\$680,000
Total Cost to Deliver Project	\$3,530,000	\$4,090,000

2022 Construction

Assumes 100% Turnback Eligible

Item	Duration (months)	Start Date	Days	End Date	% of Proj Dev and Deliv	Proj Dev / Delivery
Preliminary Eng / Env Doc / Funding (\$30k)	36	1/1/2015	1096	1/1/2018	5%	\$30,000
Final Design and ROW Acq (\$310k)	24	1/1/2019	731	1/1/2021	45%	\$310,000
Letting	2	1/1/2021	59	3/1/2021	0%	\$0
Construction Services (\$340k \$3.4M)	20	3/1/2021	610	11/1/2022	50%	\$340,000
TOTAL					100%	\$680,000



Highway 41/CSAH 61 Improvements Project

Implementation Plan

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CSAH 61 Reconstruction (Stoughton to Bluff Creek) (M3)

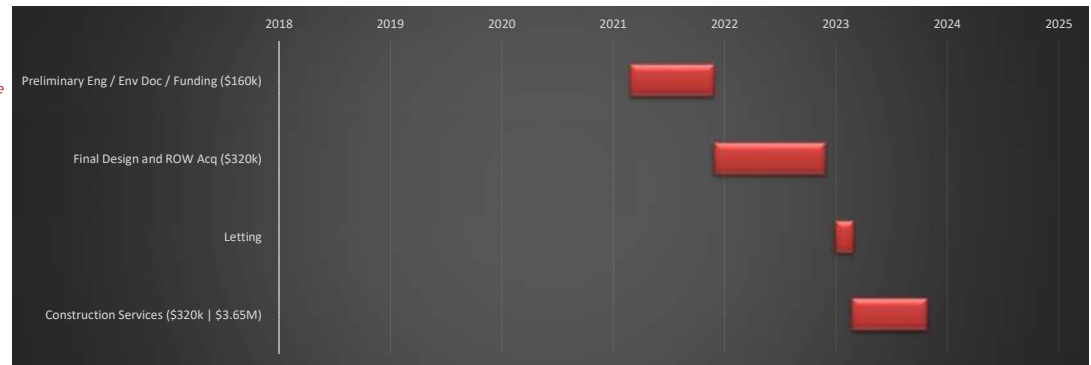


	2017 Dollars	2023 Dollars
Construction Cost	\$3,060,000	\$3,650,000
ROW Cost	\$160,000	\$190,000
Project Development and Delivery	\$670,000	\$800,000
Total Cost to Deliver Project	\$3,890,000	\$4,640,000

2023 Construction

Assumes 100% Turnback Eligible

Item	Duration (months)	Start Date	Days	End Date	% of Proj Dev and Deliv	Proj Dev / Delivery
Preliminary Eng / Env Doc / Funding (\$160k)	9	3/1/2021	275	12/1/2021	20%	\$160,000
Final Design and ROW Acq (\$320k)	12	12/1/2021	365	12/1/2022	40%	\$320,000
Letting	2	1/1/2023	59	3/1/2023	0%	\$0
Construction Services (\$320k \$3.65M)	8	3/1/2023	245	11/1/2023	40%	\$320,000
TOTAL					100%	\$800,000

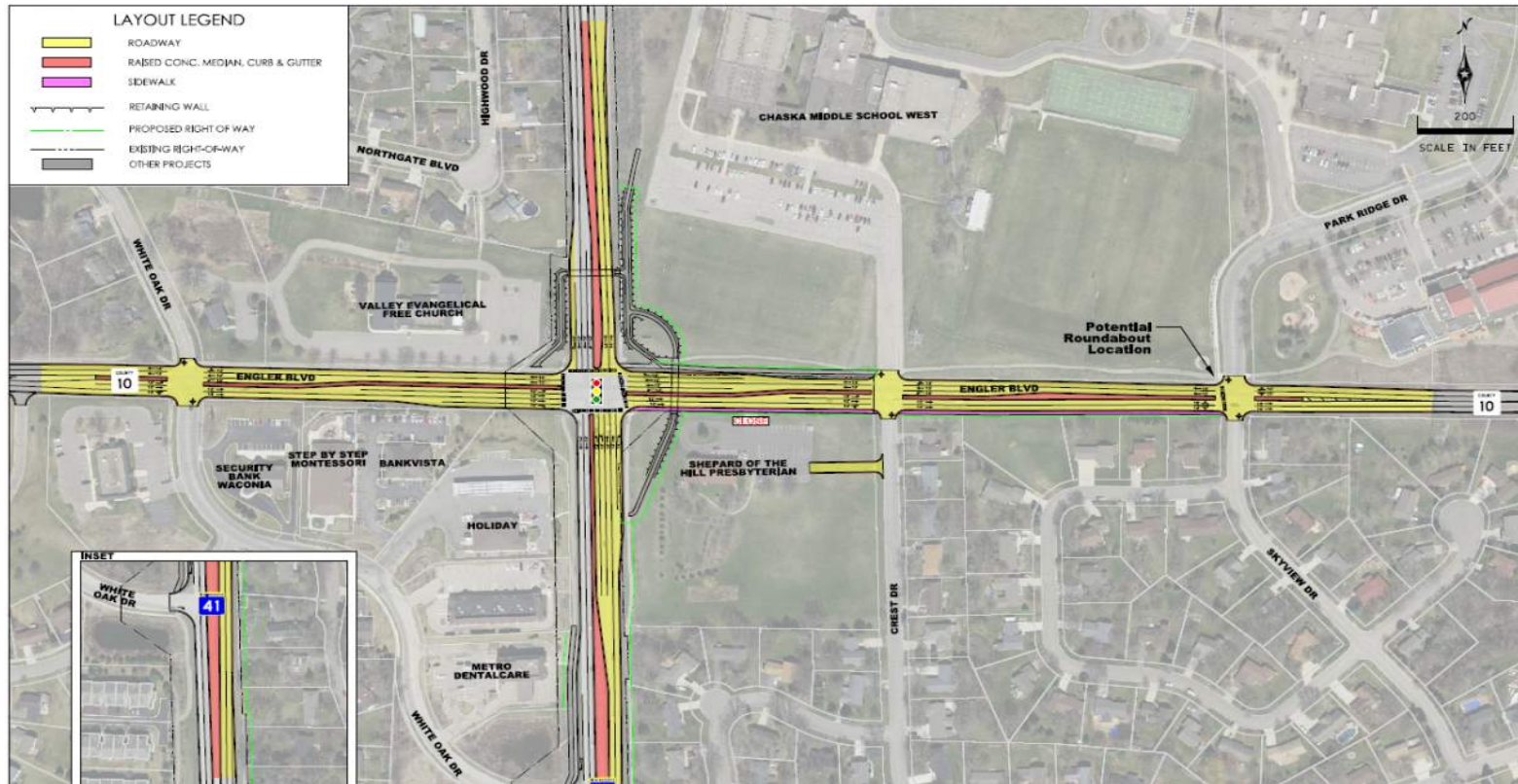


Highway 41/CSAH 61 Improvements Project

Implementation Plan

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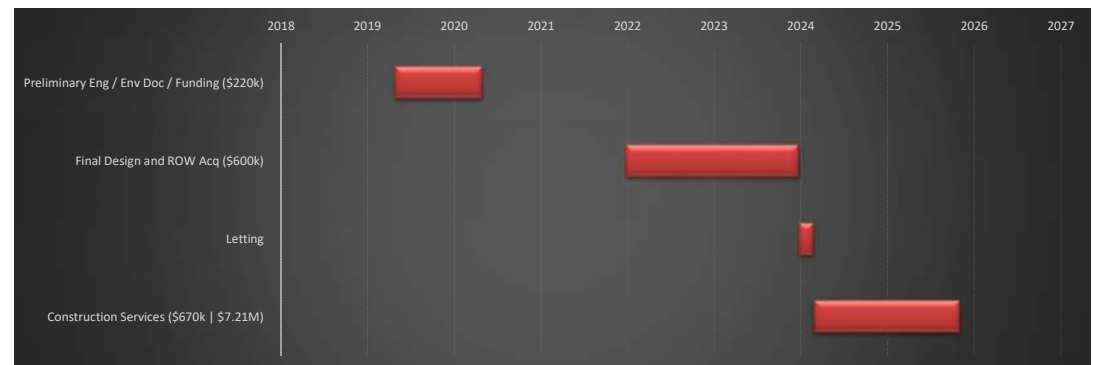
TH 41 /CSAH 10 Intersection Improvements (M4)



	2017 Dollars	2025 Dollars
Construction Cost	\$5,690,000	\$7,210,000
ROW Cost	\$80,000	\$100,000
Project Development and Delivery	\$1,180,000	\$1,490,000
Total Cost to Deliver Project	\$6,950,000	\$8,800,000

2025 Construction

Item	Duration (months)	Start Date	Days	End Date	% of Proj Dev and Deliv	Proj Dev / Delivery
Preliminary Eng / Env Doc / Funding (\$220k)	12	5/1/2019	366	5/1/2020	15%	\$220,000
Final Design and ROW Acq (\$600k)	24	1/1/2022	730	1/1/2024	40%	\$600,000
Letting	2	1/1/2024	60	3/1/2024	0%	\$0
Construction Services (\$670k \$7.21M)	20	3/1/2024	610	11/1/2025	45%	\$670,000
TOTAL					100%	\$1,490,000



Highway 41/CSAH 61 Improvements Project

Implementation Plan

January 2018

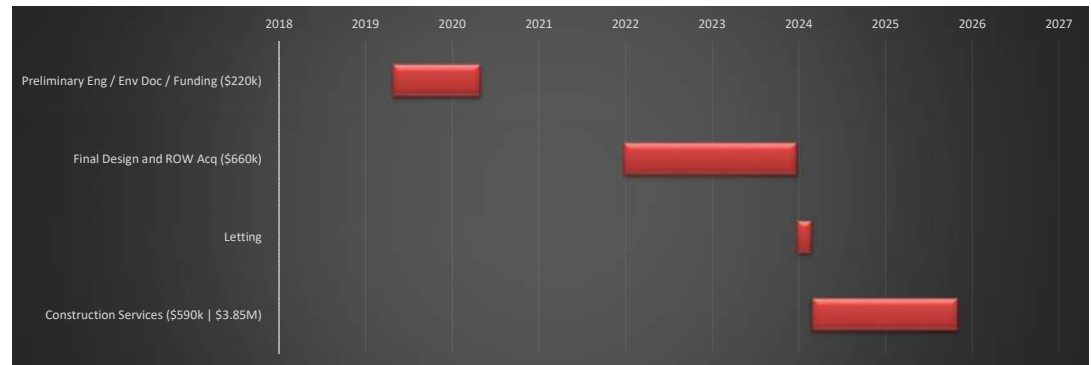
TH 41 SB Expansion to 2 Lanes (L2)



	2017 Dollars	2025 Dollars
Construction Cost	\$3,040,000	\$3,850,000
ROW Cost	\$430,000	\$540,000
Project Development and Delivery	\$1,000,000	\$1,470,000
Total Cost to Deliver Project	\$4,470,000	\$5,860,000

2025 Construction

Item	Duration (months)	Start Date	Days	End Date	% of Proj Dev and Deliv	Proj Dev / Delivery
Preliminary Eng / Env Doc / Funding (\$220k)	12	5/1/2019	366	5/1/2020	15%	\$220,000
Final Design and ROW Acq (\$660k)	24	1/1/2022	730	1/1/2024	45%	\$660,000
Letting	2	1/1/2024	60	3/1/2024	0%	\$0
Construction Services (\$590k \$3.85M)	20	3/1/2024	610	11/1/2025	40%	\$590,000
TOTAL					100%	\$1,470,000

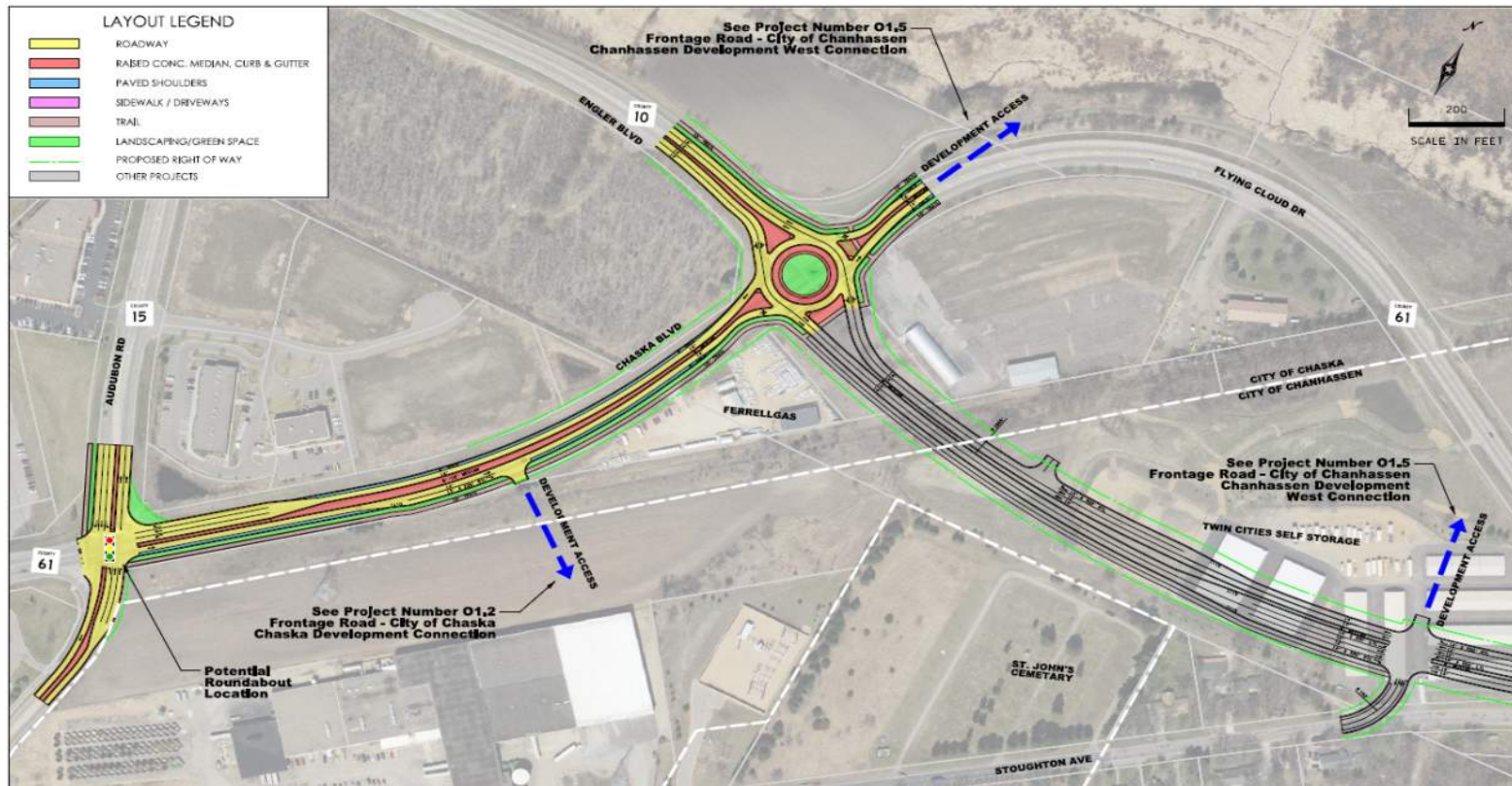


Highway 41/CSAH 61 Improvements Project

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January 2018

CSAH 61 Reconstruction (CSAH 15 to CSAH 10) (L2)

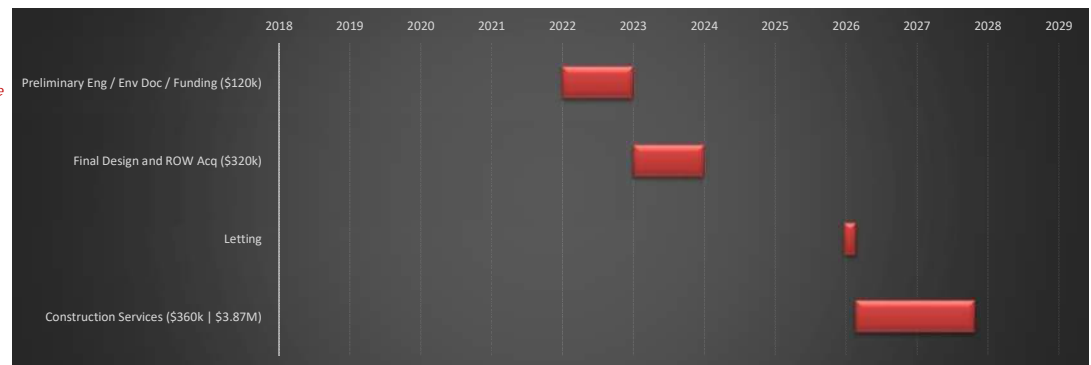


	2017 Dollars	2027 Dollars
Construction Cost	\$2,880,000	\$3,870,000
ROW Cost	\$160,000	\$220,000
Project Development and Delivery	\$590,000	\$790,000
Total Cost to Deliver Project	\$3,630,000	\$4,880,000

2027 Construction

Assumes 100% Turnback Eligible

Item	Duration (months)	Start Date	Days	End Date	% of Proj Dev and Deliv	Proj Dev / Delivery
Preliminary Eng / Env Doc / Funding (\$120k)	12	1/1/2022	365	1/1/2023	15%	\$120,000
Final Design and ROW Acq (\$320k)	12	1/1/2023	365	1/1/2024	40%	\$320,000
Letting	2	1/1/2026	59	3/1/2026	0%	\$0
Construction Services (\$360k \$3.87M)	20	3/1/2026	610	11/1/2027	45%	\$360,000
TOTAL					100%	\$800,000



Highway 41/CSAH 61 Improvements Project

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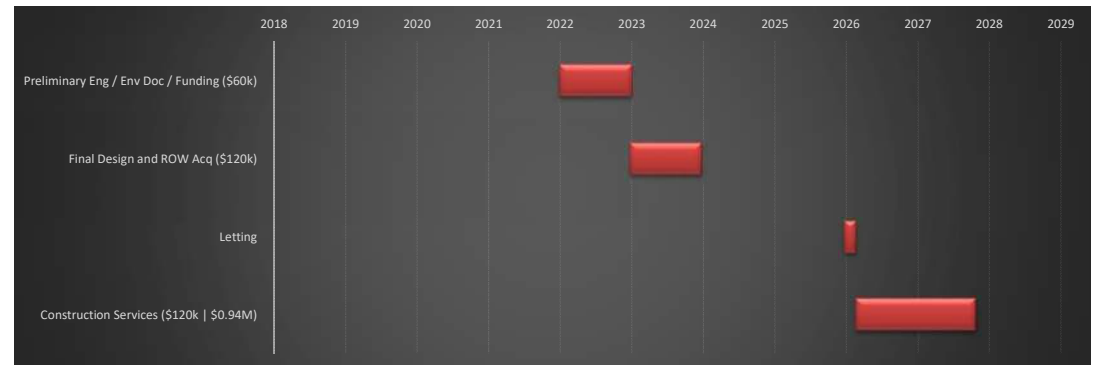
CSAH 61 Trail (Walnut Street to CSAH 15) (L3)



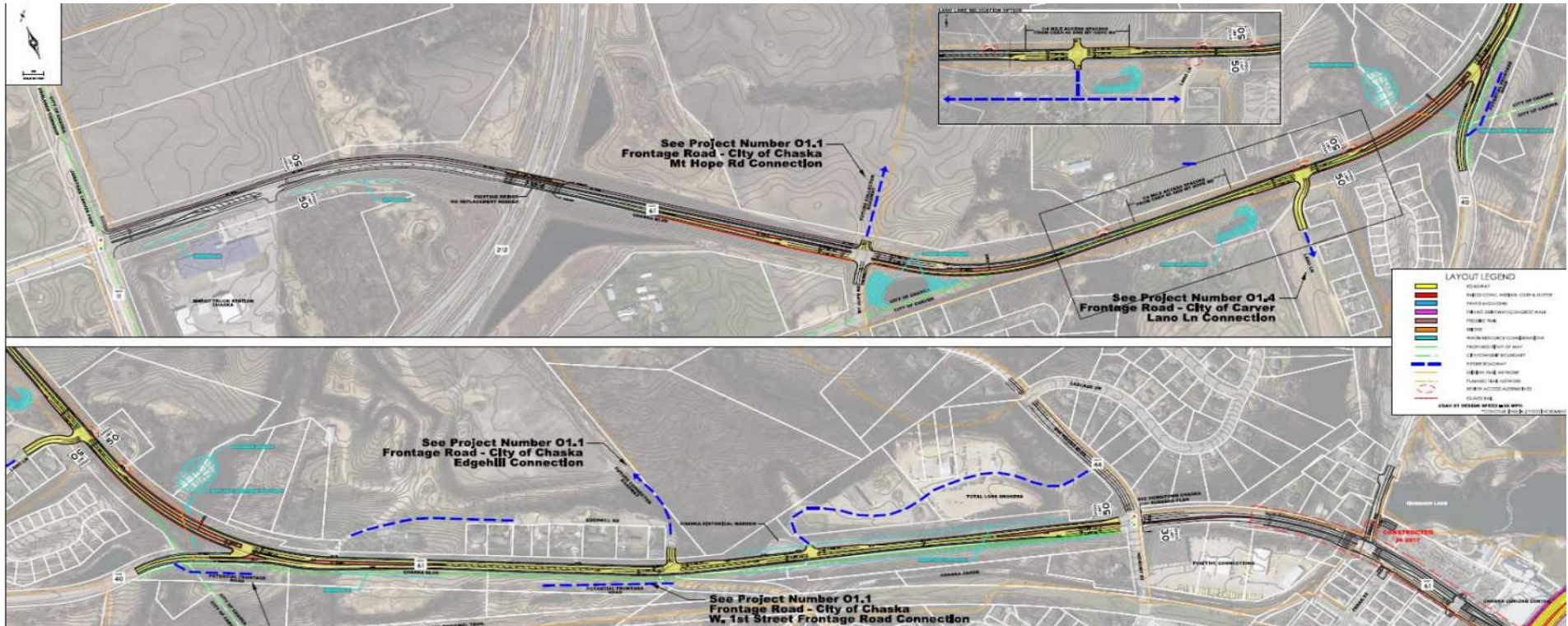
	2017 Dollars	2027 Dollars
Construction Cost	\$700,000	\$940,000
ROW Cost	\$20,000	\$30,000
Project Development and Delivery	\$220,000	\$300,000
Total Cost to Deliver Project	\$940,000	\$1,270,000

2027 Construction

Item	Duration (months)	Start Date	Days	End Date	% of Proj Dev and Deliv	Proj Dev / Delivery
Preliminary Eng / Env Doc / Funding (\$60k)	12	1/1/2022	365	1/1/2023	20%	\$60,000
Final Design and ROW Acq (\$120k)	12	1/1/2023	365	1/1/2024	40%	\$120,000
Letting	2	1/1/2026	59	3/1/2026	0%	\$0
Construction Services (\$120k \$0.94M)	20	3/1/2026	610	11/1/2027	40%	\$120,000
TOTAL					100%	\$300,000



CSAH 61 Reconstruction (CSAH 11 to CSAH 44) (L4)



	2017 Dollars	2030 Dollars
Construction Cost	\$6,740,000	\$9,900,000
ROW Cost	\$90,000	\$130,000
Project Development and Delivery	\$1,370,000	\$2,010,000
Total Cost to Deliver Project	\$8,200,000	\$12,040,000

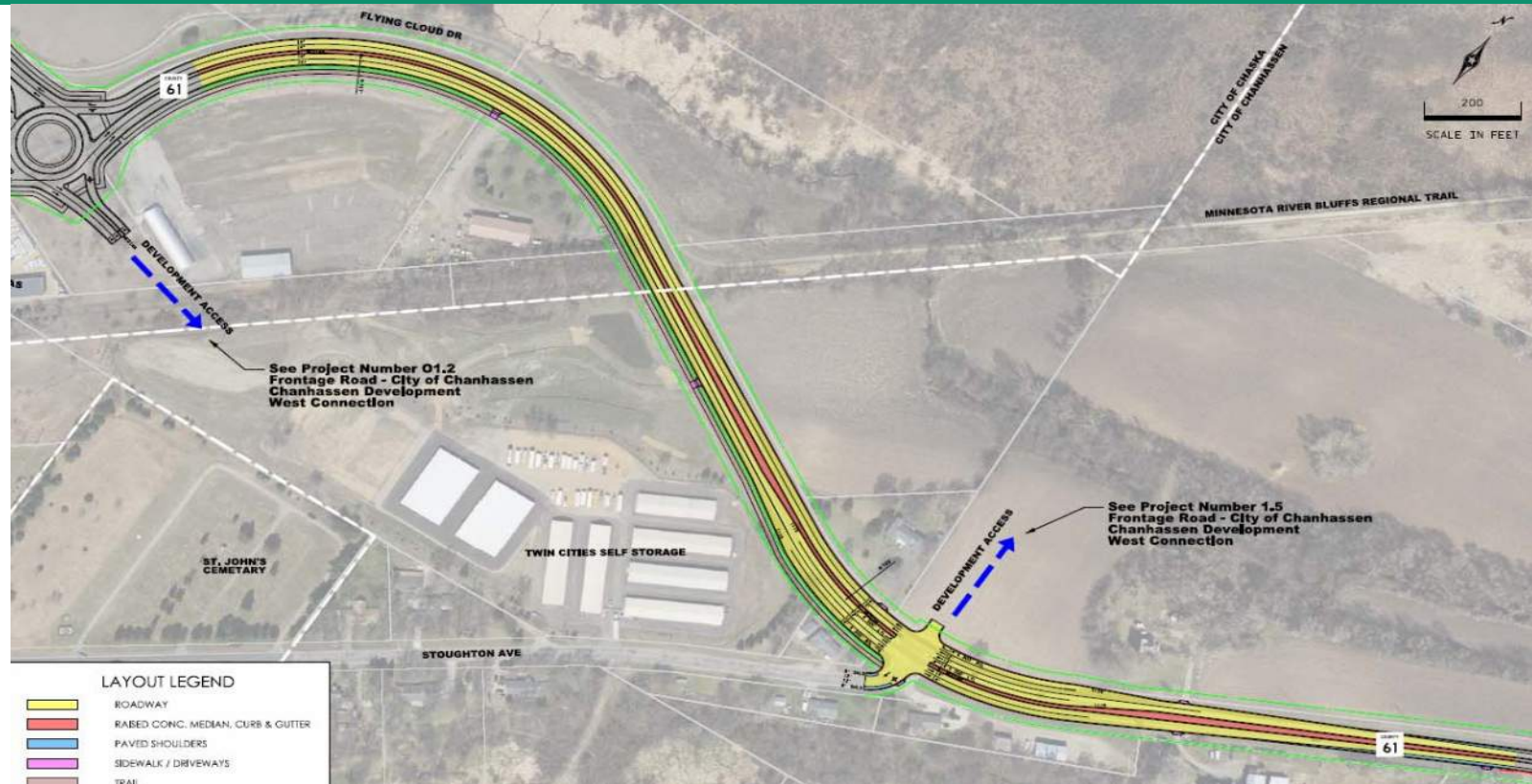
2030 Construction

Assumes 100% Turnback Eligible

Item	Duration (months)	Start Date	Days	End Date	% of Proj Dev and Deliv	Proj Dev / Delivery
Preliminary Eng / Env Doc / Funding (\$300k)	12	1/1/2027	365	1/1/2028	15%	\$300,000
Final Design and ROW Acq (\$800k)	12	1/1/2028	366	1/1/2029	40%	\$800,000
Letting	2	1/1/2029	59	3/1/2029	0%	\$0
Construction Services (\$900k \$9.9M)	9	3/1/2029	275	12/1/2029	45%	\$900,000
TOTAL					100%	\$2,000,000



CSAH 61 Reconstruction (CSAH 10 to Stoughton) (L5)

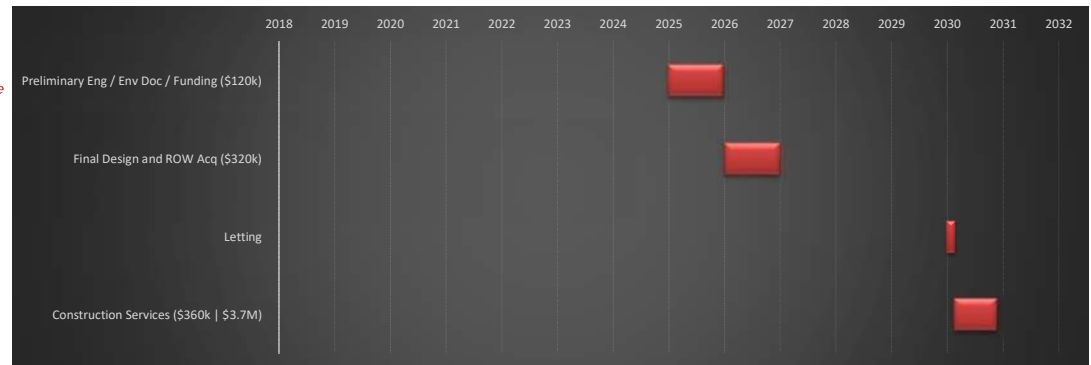


	2017 Dollars	2030 Dollars
Construction Cost	\$2,520,000	\$3,700,000
ROW Cost	\$110,000	\$160,000
Project Development and Delivery	\$550,000	\$810,000
Total Cost to Deliver Project	\$3,180,000	\$4,670,000

2030 Construction

Assumes 100% Turnback Eligible

Item	Duration (months)	Start Date	Days	End Date	% of Proj Dev and Deliv	Proj Dev / Delivery
Preliminary Eng / Env Doc / Funding (\$120k)	12	1/1/2025	365	1/1/2026	15%	\$120,000
Final Design and ROW Acq (\$320k)	12	1/1/2026	365	1/1/2027	40%	\$320,000
Letting	2	1/1/2030	59	3/1/2030	0%	\$0
Construction Services (\$360k \$3.7M)	9	3/1/2030	275	12/1/2030	45%	\$360,000
TOTAL					100%	\$800,000

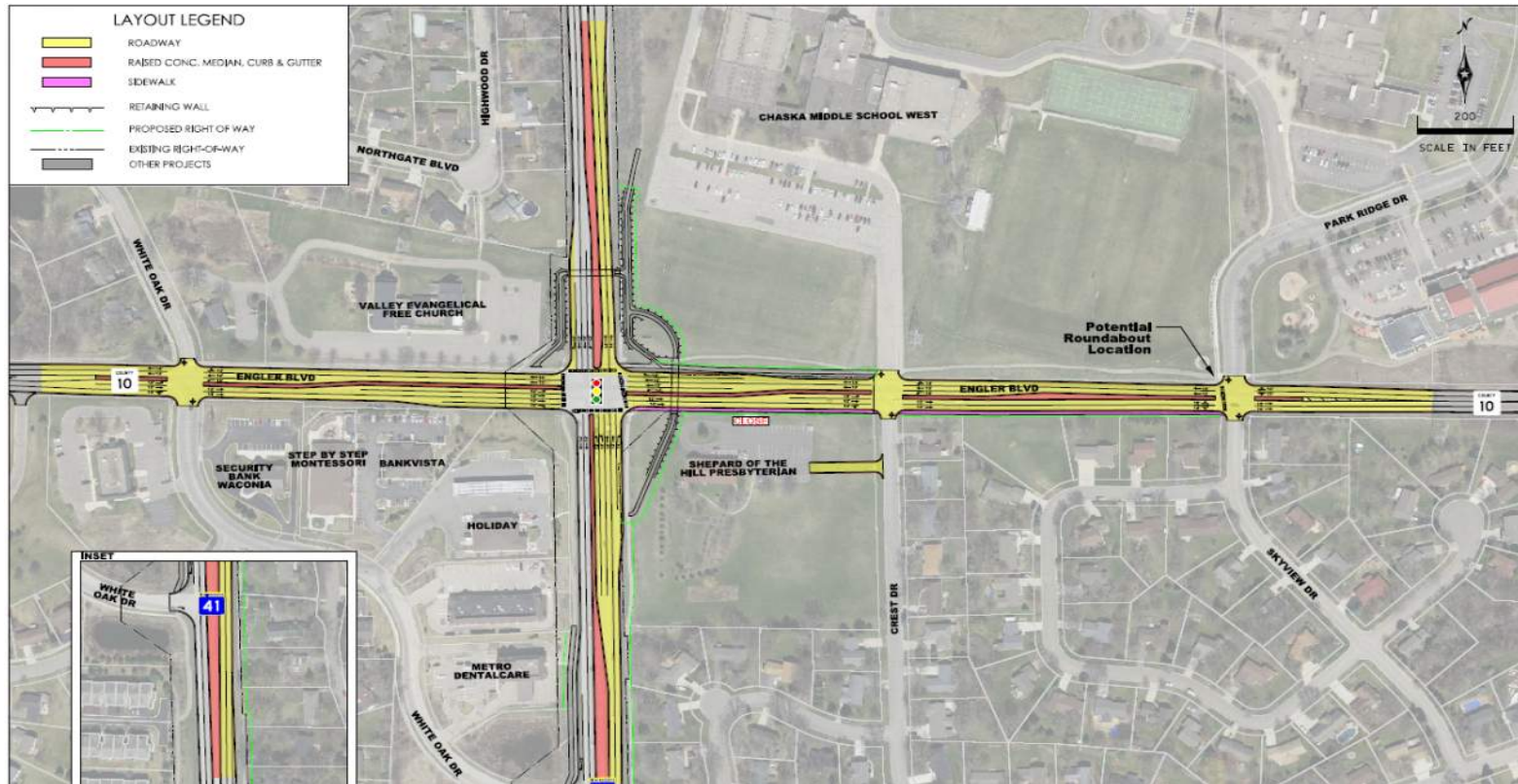


Highway 41/CSAH 61 Improvements Project

Implementation Plan

January 2018

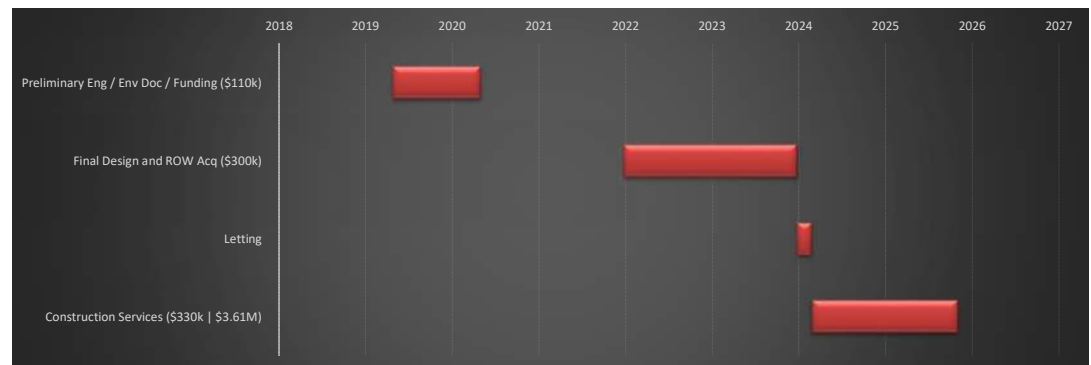
TH 41 /CSAH 10 Bike/Ped Grade Separation Improvements (O5)



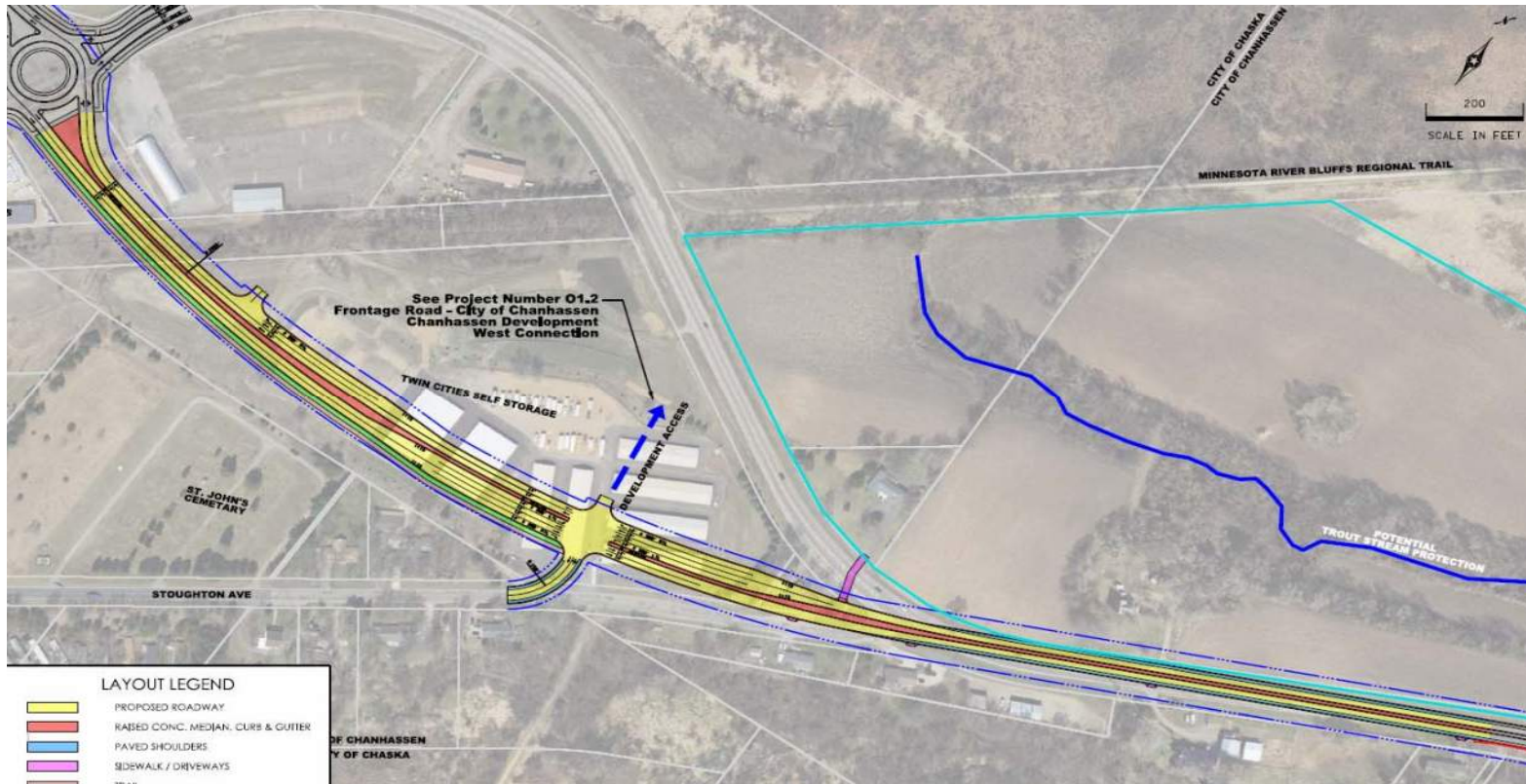
	2017 Dollars	2026 Dollars
Construction Cost	\$2,770,000	\$3,610,000
ROW Cost	\$230,000	\$300,000
Project Development and Delivery	\$570,000	\$740,000
Total Cost to Deliver Project	\$3,570,000	\$4,650,000

2026 Construction

Item	Duration (months)	Start Date	Days	End Date	% of Proj Dev and Deliv	Proj Dev / Delivery
Preliminary Eng / Env Doc / Funding (\$110k)	12	5/1/2019	366	5/1/2020	15%	\$110,000
Final Design and ROW Acq (\$300k)	24	1/1/2022	730	1/1/2024	40%	\$300,000
Letting	2	1/1/2024	60	3/1/2024	0%	\$0
Construction Services (\$330k \$3.61M)	20	3/1/2024	610	11/1/2025	45%	\$330,000
TOTAL					100%	\$740,000



CSAH 61 S-Curve Realignment (O8)

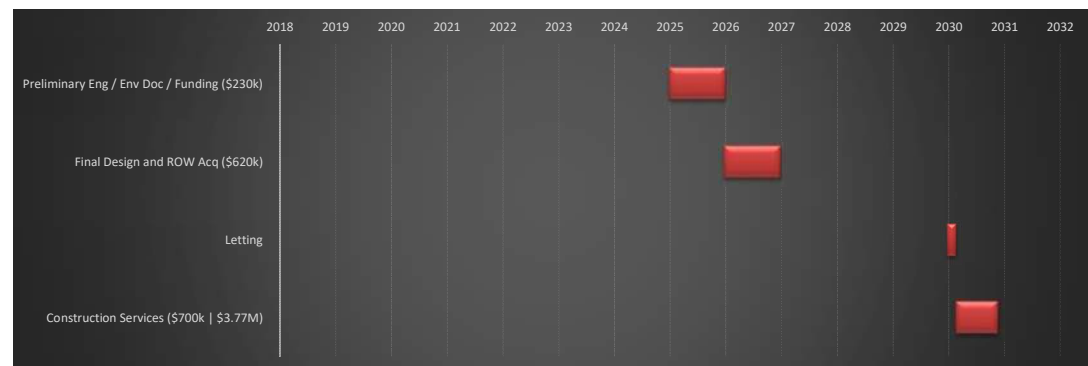


	2017 Dollars	2026 Dollars
Construction Cost	\$2,570,000	\$3,770,000
ROW Cost	\$3,600,000	\$5,290,000
Project Development and Delivery	\$1,060,000	\$1,560,000
Total Cost to Deliver Project	\$7,230,000	\$10,620,000

2030 Construction

Assumes 100% Turnback Eligible

Item	Duration (months)	Start Date	Days	End Date	% of Proj Dev and Deliv	Proj Dev / Delivery
Preliminary Eng / Env Doc / Funding (\$230k)	12	1/1/2025	365	1/1/2026	15%	\$230,000
Final Design and ROW Acq (\$620k)	12	1/1/2026	365	1/1/2027	40%	\$620,000
Letting	2	1/1/2030	59	3/1/2030	0%	\$0
Construction Services (\$700k \$3.77M)	9	3/1/2030	275	12/1/2030	45%	\$700,000
TOTAL					100%	\$1,550,000




Appendix H: Resolutions of Support

CERTIFICATION

STATE OF MINNESOTA)
) ss
COUNTY OF CARVER)

I, Todd Gerhardt, City Manager of the City of Chanhassen, Minnesota, do hereby certify that I have compared the foregoing copy of **Resolution No. 2019-32 “Approving A Resolution Supporting Study Findings for the Highway 61/41 Corridor, PW067E3”** adopted by the Chanhassen City Council on July 8, 2019 with the original copy now on file in my office and have found the same to be a true and correct copy thereof.

Witness my hand and official seal at Chanhassen, Minnesota, this 8th day of July, 2019.


Todd Gerhardt, City Manager

**CITY OF CHANHASSEN
CARVER AND HENNEPIN COUNTIES, MINNESOTA**

DATE: July 8, 2019 **RESOLUTION NO:** 2019-32

MOTION BY: Coleman **SECONDED BY:** Campion

**APPROVE A RESOLUTION SUPPORTING STUDY FINDINGS FOR
THE HIGHWAY 61/41 CORRIDOR - PW067E3**

WHEREAS, the City of Chanhassen, Carver County and the Minnesota Department of Transportation (MnDOT) are responsible for the planning and development of a safe and functional multimodal transportation system within their jurisdictional boundaries; and

WHEREAS, the City of Chanhassen joined in partnership with MnDOT, Carver County, and the cities of Carver and Chaska to identify transportation system improvements on County State Aid Highway (CSAH) 61 from CSAH 11 in the City of Carver to Bluff Creek Drive in the City of Chanhassen and Trunk Highway (TH) 41 from the Minnesota River to CSAH 10 in the City of Chaska; and

WHEREAS, the Highway 61/41 Corridor Study includes a mutually agreed upon implementation plan between the City of Chanhassen, MnDOT, Carver County and the Cities of Carver and Chaska for phased improvements along the CSAH 61 and TH 41 corridors; and

WHEREAS, the Highway 61/41 Corridor Study recommends planning level alternatives for short-, mid-, and long-term improvements along these corridors to support projected future growth and infrastructure needs; and


WHEREAS, the City of Chanhassen recognizes that the recommended planning level alternatives establish a future vision for all agencies to jointly work towards, noting additional design and environmental review will be required.

NOW THEREFORE, BE IT RESOLVED by the Chanhassen City Council:

1. The Mayor and City Council do hereby support the findings, recommended improvements, and the proposed implementation plan of the Highway 61/41 Corridor Study.

Passed and adopted by the Chanhassen City Council this 8th day of July, 2019.

ATTEST:



Todd Gerhardt, City Manager



Elise Ryan, Mayor

YES
Campion
Coleman
McDonald
Ryan

NO

ABSENT
Tjornhom



**CITY OF CARVER
CARVER COUNTY, MINNESOTA
RESOLUTION 116-18**

RESOLUTION TO APPROVE HIGHWAY 61/41 CORRIDOR STUDY

WHEREAS, the City of Carver, Carver County, and the Minnesota Department of Transportation (MnDOT) are responsible for the planning and development of a safe and functional multimodal transportation system within their jurisdictional boundaries; and

WHEREAS, the City of Carver joined in partnership with MnDOT, Carver County, and the cities of Chaska and Chanhassen to identify transportation system improvements on County State Aid Highway (CSAH) 61 from CSAH 11 in the City of Carver to Bluff Creek Drive in the City of Chanhassen and Trunk Highway (TH) 41 from the Minnesota River to CSAH 10 in the City of Chaska; and

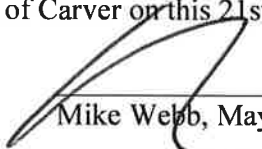
WHEREAS, the Highway 61/41 Corridor Study includes a mutually agreed upon implementation plan between the City of Carver, MnDOT, Carver County and the cities of Chaska and Chanhassen for phased improvements along the CSAH 61 and TH 41 corridors; and

WHEREAS, the Highway 61/41 Corridor Study recommends planning level alternatives for short-, mid-, and long-term improvements along these corridors to support projected future growth and infrastructure needs; and

WHEREAS, the City of Carver recognizes that the recommended planning level alternatives establish a future vision for all agencies to jointly work towards, noting additional design and environmental review will be required.

NOW, THEREFORE, BE IT RESOLVED, that the City Council of Carver does hereby support the findings, recommended improvements and the proposed implementation plan of the Highway 61/41 Corridor Study as a plan to guide future investments in the project area.

Adopted by the City Council of the City of Carver on this 21st day of May 2018.


Mike Webb, Mayor

ATTEST:


Vicky Sons-Eiden, City Clerk/Treasurer