



## STAFF REPORT

DATE: November 21, 2023  
**REGULAR**

**AGENDA ITEM:** Accept Preliminary Design Recommendations and Authorize Preparation of Plans and Specifications for the 2024 Collector Street Improvements

**SUBMITTED BY:** Jack Griffin, City Engineer

**REVIEWED BY:** Karissa Goers, Administrative Services Director  
Clarissa Hadler, Finance Director  
Marty Powers, Public Works Director  
Chad Isakson, Assistant City Engineer

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**ISSUE BEFORE COUNCIL:** Should the City Council accept the Preliminary Design Recommendations and Authorize Plans and Specifications for roadway each segment of the 2024 Collector Street Improvements, and authorize the preparation of feasibility reports for the Hudson Boulevard Segment A Improvements and 15th Street North Improvements?

**BACKGROUND:** On August 15, 2023, the City Council authorized the preliminary design engineering for the 2024 Collector Street Improvements consisting of three separate roadway segments; including Hudson Boulevard, from Inwood Avenue (CSAH 13) to approximately 1,350 feet east of Jade Trail; 15th Street North, from the Oakdale City limits to Inwood Avenue (CSAH 13); and 30th Street North, from Lisbon Avenue to 650 feet west of Manning Avenue (CSAH 15). Each of these roadway segments were identified to be improved in 2024 in the City's 10-year Street Capital Improvement Program.

**PROPOSAL DETAILS/ANALYSIS:** FOCUS Engineering and KLJ have completed the preliminary design work for the 2024 Collector Street Improvements, including detailed topographic surveys, review of existing pavement conditions, a preliminary review of stormwater management and drainage, a preliminary review and evaluation of existing and required right-of-way and easements, review of the geotechnical investigations completed by Braun Intertec, and a review of the as-built plans and approved plans for adjacent street segments.

From this work, a preliminary design and layout has been prepared together with improvement recommendations for each collector street segment, including proposed pavement rehabilitation, curb and gutter improvements, street widths, turn lanes, lane configuration, pedestrian pathways, and stormwater management. The preliminary findings and recommendations will be presented by staff at the council meeting and are summarized below:

- Hudson Boulevard Improvements – Segment A (“Project”). The Project includes either a 2-inch mill and overlay pavement rehabilitation or a full-depth reclamation (based on city discretion and budget), drainage improvements, and urbanizing the north side of Hudson Boulevard with a new bituminous trail. The Project will coordinate the design and construction with the segments of Hudson Boulevard to be improved through the Amira and Hendrix developments. From Jade Trail to the Hendrix development, approximately 1,300 feet of Hudson Boulevard will be widened to accommodate a 3-lane section with a two-way continuous turn lane due to the existing commercial access spacing. Stormwater management will be required resulting in either a new storm water basin or reconfiguration and expansion of existing city storm water ponds. Due to the construction of the new bituminous trail, there will be small utility conflicts to address as well as limited temporary easement acquisition. It is intended that this improvement will be designed and constructed as a separate project and will be partially paid for through Municipal State Aid funds. Special assessments are recommended to be levied against benefitting commercial properties if a full-depth reclamation improvement is constructed.

- 15th Street North Improvements (“Project”). The Project includes a full-depth reclamation pavement rehabilitation with minor narrowing of the existing pavement surfaces. No storm water management will be required, no easement acquisition appears necessary and limited to no drainage improvements are needed. It is intended that this improvement will be designed and bid together with the 30th Street North Gap Segment Improvements, and will also be partially paid for through Municipal State Aid funds. Special assessments are recommended to be levied against benefitting commercial and residential properties. The preliminary design work also reviewed the option to urbanize the north boulevard with the construction of a new bituminous trail, consistent with the 15th Street typical section existing at the border with Oakdale.
- 30th Street North Gap Segment Improvements. The Project includes pavement rehabilitation areas by full-depth pavement reclamation and by a 2-inch mill and overlay. The separate pavement rehabilitation method being driven by the existing pavement distresses. Similarly, there are areas that will receive full removal and replacement of concrete curb and gutter, and areas where newer curb and gutter will be preserved. The existing trail along the south boulevard will be removed and replaced in its current location. No storm water management will be required, no easement acquisition appears necessary and limited to no drainage improvements are needed. Two options will be presented for potential incorporation into the final design. The first option includes a new westbound left turn lane at Lisbon Avenue into the Heritage Farms subdivision. The second option includes a mill and overlay of Lisbon Avenue, north of 30th Street. It is recommended that this improvement be fully funded through cash and bonds with no Municipal State Aid allocation. No special assessments are recommended to be levied for this improvement.

**FISCAL IMPACT:** \$172,200 for final design engineering support services; including \$118,600 for the Hudson Boulevard Improvements – Segment A, \$22,800 for the 15th Street North Improvements, and \$30,800 for the 30th Street North Gap Segment Improvements. The projects are being funded through improvement bonds, the general tax levy and potentially a portion through municipal state aid funds.

**RECOMMENDATION:** Staff is recommending that the City Council accept the Preliminary Design Recommendations and approve a Resolution authorizing the Preparation of a Feasibility Report(s) and Plans and Specifications for the Hudson Boulevard Improvements – Segment A and the 15th Street North Improvements, and authorizing the Preparation of Plans and Specifications for the 30th Street North Gap Segment Improvements. The recommended motion for this action is as follows:

***“Move to approve Resolution No. 2023-125, authorizing the Preparation of Feasibility Report and Plans and Specifications for the Hudson Boulevard Improvements – Segment A and the 15th Street North Improvements, and authorizing of the Plans and Specifications for the 30th Street North Gap Segment Improvements.”***

Staff is also recommending that the City Council authorize Professional Engineering Design Phase Services contracts to KLJ, Inc. in a not to exceed amount of \$97,500 for the Hudson Boulevard Improvements – Segment A, in a not to exceed amount of \$14,800 for the 15th Street North Improvements, and in a not to exceed amount of \$21,800 for the 30th Street North Gap Segment Improvements. The recommended motion for this action is as follows:

***“Move to approve a Professional Engineering Design and Construction Support Services Contracts to KLJ, Inc. in a not to exceed amount of \$97,500 for the Hudson Boulevard Improvements – Segment A, in a not to exceed amount of \$14,800 for the 15th Street North Improvements, and in a not to exceed amount of \$21,800 for the 30th Street North Gap Segment Improvements.”***

**ATTACHMENTS:**

1. Resolution Ordering the Preparation of a Feasibility Report(s) and Preparation of Plans and Specifications for the 2024 Collector Street Improvements.
2. Project Location Map.
3. Preliminary Design Memorandum for Hudson Boulevard Improvements – Segment A.
4. Preliminary Design Memorandum for 15th Street North Improvements.
5. Preliminary Design Memorandum for 30th Street North Gap Segment Improvements.

**CITY OF LAKE ELMO  
WASHINGTON COUNTY  
STATE OF MINNESOTA**

**RESOLUTION NO. 2023-125**

**A RESOLUTION ORDERING THE PREPARATION OF FEASIBILITY  
REPORT(S) AND PREPARATION OF PLANS AND SPECIFICATIONS  
FOR THE 2024 COLLECTOR STREET IMPROVEMENTS**

**WHEREAS**, the City has developed a 10-year Street Capital Improvement Program which provides long-term planning and management of street and transportation infrastructure throughout the city and provides a schedule of public improvements based on present and future needs and priorities; and

**WHEREAS**, the public collector streets along Hudson Boulevard, from Inwood Avenue (CSAH 13) to approximately 1,350 feet east of Jade Trail; 15th Street North, from the Oakdale/Lake Elmo City limits to Inwood Avenue (CSAH 13); and 30th Street North, from Lisbon Avenue to 650 feet west of Manning Avenue (CSAH 15) have been identified for improvement in 2024; and

**WHEREAS**, it is proposed to potentially assess the benefiting properties for all or a portion of the cost of one or more of the improvements, pursuant to the City's Special Assessment Policy and Minnesota Statutes, Chapter 429.

**NOW, THEREFORE, BE IT RESOLVED**, That each proposed improvement, called Hudson Boulevard Improvements – Segment A (Inwood – Hendrix) and 15th Street North Improvements, be referred to the City Engineer and FOCUS Engineering, to complete a feasibility report in accordance with Minnesota Statutes, Chapter 429 for the proposed improvements, and to report to the council with all convenient speed advising the council in a preliminary way as to whether the proposed improvement is necessary, cost-effective, and feasible; whether it should be best made as proposed or in connection with some other improvement; the estimated cost of the improvement as recommended; and a description of the methodology used to calculate individual assessments for affected parcels.

**NOW, THEREFORE, BE IT FURTHER RESOLVED**, The City Engineer is hereby designated as the engineer for making this improvement. The engineer, together with KLJ, shall oversee the preparation of the Plans and Specifications for the Hudson Boulevard Improvements – Segment A (Inwood – Hendrix), 15th Street North Improvements, and the 30th Street North Gap Segment Improvements.

**ADOPTED BY THE LAKE ELMO CITY COUNCIL ON THE TWENTY-FIRST DAY OF NOVEMBER, 2023.**

**CITY OF LAKE ELMO**

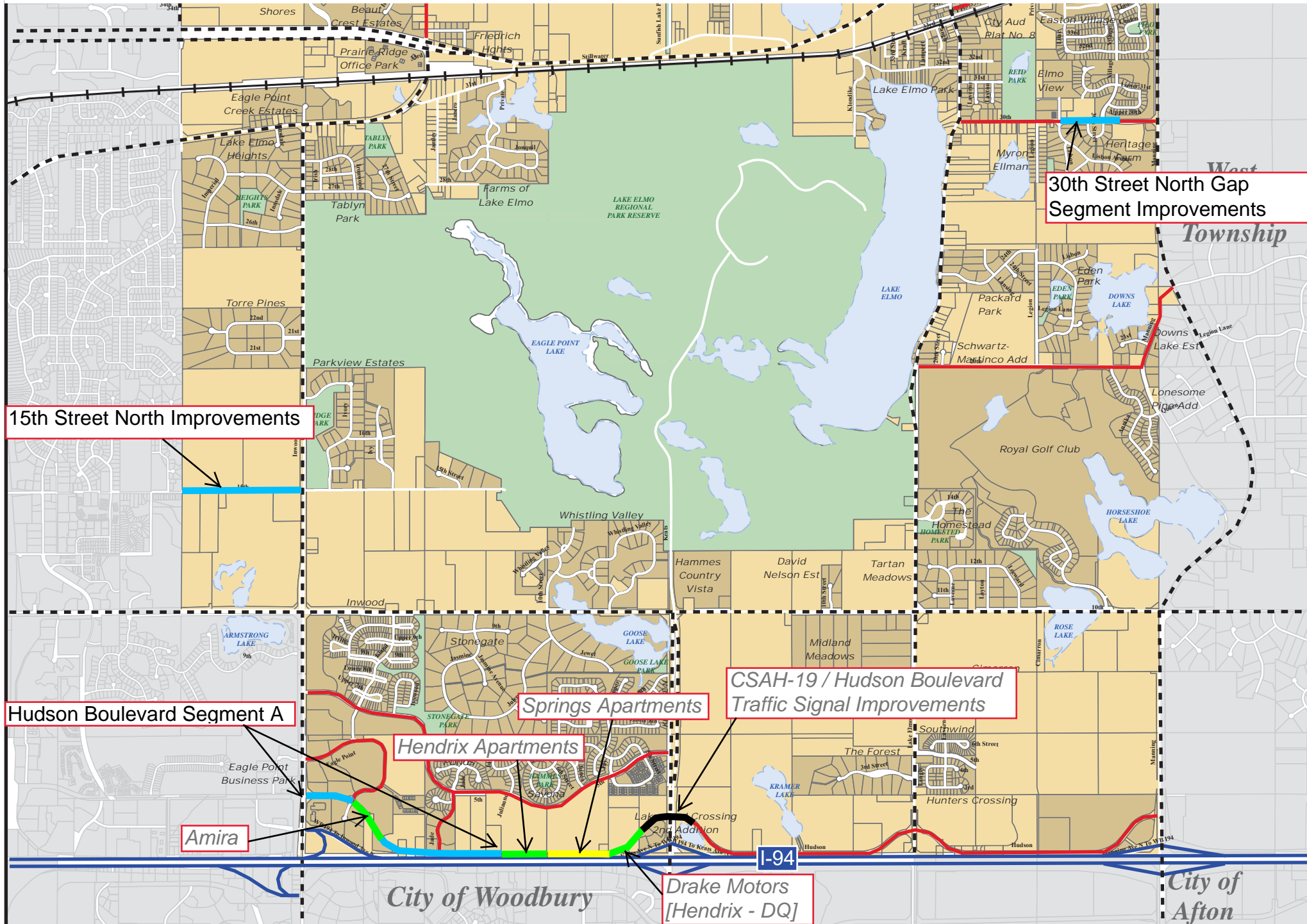
(Seal)  
ATTEST:

By: \_\_\_\_\_  
Charles Cadenhead  
Mayor

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Julie Johnson  
City Clerk

# CITY OF LAKE ELMO

## 2024 COLLECTOR STREET IMPROVEMENT PROJECTS



# MEMORANDUM



Date: November 27, 2023

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To:	File	Re:	2024 Collector Street Improvements
	Marty Powers, Public Works Director		Preliminary Design Memorandum
Cc:	Chad Isakson, PE, Assistant City Engineer		<b>Hudson Boulevard Improvements – Segment A</b>
From:	Jack Griffin, PE, City Engineer		<b>Project No. 2023.120</b>

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**LOCATION:** Hudson Boulevard North, from Inwood Avenue (CSAH 13) to approx. 980 feet west of Julia Avenue.

**EXISTING CONDITIONS:** Current posted speed 40 MPH.

- 2019 AADT from Inwood Avenue (CSAH 13) to Jade Trail is 7,300.
- 2019 AADT from Jade Trail to Julia Avenue is 5,467.

## PROJECT SCOPE

- Project includes pavement rehabilitation of approx. 0.71 miles (3,730 ft.) of commercial access frontage road with full reconstruction in areas of roadway widening and turn lanes, to improve corridor consistency and pedestrian access.
- Pavement rehabilitation to be either full depth reclamation or mill and overlay.
- Includes urbanizing north boulevard with concrete curb and gutter, 5-ft. boulevard and 8-ft. bituminous trail to create a continuous bituminous trail from Inwood Avenue (CSAH 13) to Julia Avenue.
- Includes coordination with other Private development projects, including Amira and Hendrix.

## PROPOSED IMPROVEMENTS/DESIGN RECOMMENDATIONS

- Pavement rehabilitation of approx. 0.71 miles (3,730 ft.) of collector road existing pavements, to include either full depth reclamation with 8-inch recycled base with 3-1/2 inch bituminous, or 2-inch mill and overlay. Approx. 164,204 SF.
- Widen roadway to accommodate 3-lane section with two-way continuous turn lane. Approx. 11,810 SF. Roadway widening to be constructed to city standard collector pavement sections.
- Includes approx. 2,800 feet new concrete curb and gutter.
- Includes construction of 3,025 feet new bituminous trail, including ADA pedestrian ramps at crossings.
- Storm sewer recommendations. The proposed improvements will increase impervious surfaces and stormwater runoff that will require stormwater management mitigation in accordance with SWWD rules. The urbanization of the north boulevard with new bituminous trail will alter drainage patterns within the public right-of-way, requiring storm sewer piping to replace existing open ditches. The Final Design will need to review if existing detention ponds have available excess capacity to accommodate the added runoff. If not, then modifications to the existing detention ponds will be needed and/or a new BMPs created. A potential location for a new detention pond was identified during the preliminary design phase.
- Right-of-way/easements.
  - Permanent right-of-way acquisition may be required for new or expanded stormwater management. Parcel 8650 Hudson Boulevard has been identified as a potential BMP site.
  - Permanent easements may be required for trail construction at 9200, 9220, and 9242 Hudson Boulevard. This determination will require City Attorney review of the existing MnDOT right-of-way turnback.
  - Temporary construction easements will be required for trail construction and driveways/approaches, including 8500, 8550, 8511/8515, 8910, 8980 Hudson Boulevard, and 158 Jade Trail.

- Small/dry utility conflicts. The Project will require careful utility coordination with existing electrical and telecommunication utility owners. The urbanization of the north boulevard and construction of the new trail may incur several conflicts that require mitigation. Utility coordination efforts will be initiated at 30% construction plans.

**TOTAL ESTIMATED PRELIMINARY DESIGN PROJECT COST (FDR). \$2,200,000** (2024 CIP Budget is \$1,716,000).

#### **DESIGN OPTIONS**

- Mill and Overlay (2-inch) existing pavements instead of FDR.
- **Total Preliminary Estimated Project Cost (M&O). \$1,856,000.**

#### **PROJECT FINANCING CONSIDERATIONS**

- Assessments assume full depth reclamation improvement. No assessments for a Mill and Overlay.
- Apply Municipal State Aid Funds. Estimated 65% of total project costs or \$1,436,000.
- Assess 10 commercial properties at 100% front footage. \$102 per LF.
- Assessments range from \$18,639 to \$63,189, based on 7,460 LF total frontage.
- Assessments range from \$14,545 to \$49,308 assuming additional 2,100 LF Amira frontage.
- Improvement bonds requires minimum 20% of bonding costs to be assessed.

#### **CORRIDOR DESIGN PARAMETERS**

- State Aid Urban Design [8820.9936] Collector with AADT < 10,000; 40 mph design speed.
- 4-lane road not required in foreseeable future.
- Urban section required along north side; existing section to remain along south side when undeveloped or when approved by city.
- Maintain existing access to surrounding landowners after project construction.
- Minimum right-of-way north from existing roadway centerline is 50 feet. Minimum 10-foot utility easement required immediately adjacent to right-of-way.
- Minimum right-of-way south from existing roadway centerline is 50 feet. South right-of-way when parallel to I-94 is Section Line 34.
- Through Lanes must be 12-feet wide with 4-foot curb reaction zone for urban sections; 6-foot paved shoulder for rural section.
- 13-foot continuous left-turn lane from 300-ft. west of Jade Trail to Julia Avenue.
- North side Bituminous Trail. 8-foot-wide trail with 2-foot clear zone and 5-foot minimum boulevard.
- Minimum 1.5 feet clearance from face of curb to fixed objects.
- See Preliminary Concept Layout Plans for access management and approved full access locations.
- Left turn lanes required at all full access intersections.
- Right turn lanes required for all non-residential areas and residential areas with 25 units or greater.
- Residential driveway access prohibited.
- Maintain existing access to surrounding landowners after project construction.
- No on-street parking. If parking is incorporated, minimum parking lane width is 10 feet.
- Pave to remove existing superelevation at existing curves.
- Pave normal crown road at 2.5%.
- Pavement Section must meet minimum City Standard Pavement Section for Collector Street.

#### **STORMWATER MANAGEMENT**

- Project creates approx. 0.81 ac. (35,000 SF) new impervious surfaces.
- Runoff rate increases: 0.86 cfs (2-year); 0.76 cfs (10-year); 0.58 cfs (100-year).
- Runoff volume increases: 0.110 ac-ft (2-year); 0.121 ac-ft (10-year); 0.131 ac-ft (100-year).

- Watershed is South Washington Watershed District (SWWD). Stormwater Management is required to mitigate peak runoff rate and runoff volume increase.
- Existing drainage patterns will be generally maintained. Reconfiguration of existing stormwater basins will need to be evaluated.
- SWWD Erosion and Sediment Control permit required.
- NPDES Construction Permit required.
- The Project poses potential wetland impacts, dependent upon the final stormwater design and sidewalk location. Wetland delineation and wetland impact permits may be required.

#### **GEOTECHNICAL INVESTIGATION FINDINGS AND RECOMMENDATIONS**

- Estimated 20-year pavement loading is 1,314,000 ESALs.
- Existing pavement section: 4 to 6 inches bituminous; 8 to 12 inches aggregate base. GE 14.7. 10-Ton.
- Existing R-Value between 42 and 83 with 56 average.
- Full Depth Pavement Reclamation (FDR). 8-inch recycled base with 3-1/2 inch bituminous. Based on the testing performed and the in-place pavement layer thicknesses, there is sufficient material to perform FDR. The FDR approach provides a design life similar to that of reconstruction and is less expensive. It also disrupts crack patterns, reducing the potential for reflective cracking. Structurally, the overall capacity of the street meets 10 tons.
- Mill and Overlay Improvement. Mill-and-overlay can be considered for the pavement rehabilitation with a risk for reflection of any distresses that exists in the left-in-place pavement section to the surface of the new pavement.

# MEMORANDUM



Date: November 27, 2023

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To:	File	Re:	2024 Collector Street Improvements
	Marty Powers, Public Works Director		Preliminary Design Memorandum
Cc:	Chad Isakson, PE, Assistant City Engineer		<b>15th Street North Improvements</b>
From:	Jack Griffin, PE, City Engineer		<b>Project No. 2023.121</b>

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**LOCATION:** 15th Street North, from Oakdale/Lake Elmo city limits to Inwood Avenue (CSAH 13).

**EXISTING CONDITIONS:** Current posted speed 50 MPH. 2021 AADT is 2,485.

## PROJECT SCOPE

- Project includes pavement rehabilitation of approx. 0.49 miles (2,594 ft.) of collector road, consisting of FDR Improvement.
- Pavement surface width is reduced from 40-ft to 36-ft. Existing 8-ft shoulder is reduced to 6-feet.
- Pave existing driveways to standard.

## PROPOSED IMPROVEMENTS/DESIGN RECOMMENDATIONS

- Full depth reclamation of existing pavements. Includes 0.49 miles (2,594 ft.) and 11,500 SF of FDR.
- Storm sewer recommendations. No storm sewer replacement, repairs or corrections anticipated or identified as part of preliminary design work.
- Right-of-way/easements. Minor temporary construction easements potentially required to repair driveways/approaches. Remaining Project elements to be within prescriptive easement limits or existing right-of-way.
- Small/dry utility conflicts. No conflicts identified with small/dry utilities in preliminary design.

**TOTAL ESTIMATED PRELIMINARY DESIGN PROJECT COST. \$508,000** (2024 CIP Budget is \$1,380,000).

## DESIGN OPTIONS

- Full depth reclamation with urbanized north boulevard (concrete curb and gutter) with 5-ft. boulevard and 8-ft. bituminous trail. **Total Preliminary Estimated Project Cost = \$870,000.**

## PROJECT FINANCING CONSIDERATIONS

- Assumes FDR improvement with no curb and trail addition (Option 1).
- Apply Municipal State Aid Funds. Estimated 65% of total project costs or \$330,000.
- Assess 1 commercial property at \$34 per LF. Assessment amount is approx. \$35,000.
- Assess 6 residential properties 9 units. Assumes 4 units at 8167 15th Street N.
- Unit residential assessment is \$4,800.
- Requires planning department determination of number of equivalent residential units.
- Improvement bonds requires minimum 20% of bonding costs to be assessed.

## **CORRIDOR DESIGN PARAMETERS**

- State Aid Urban Design [8820.9920] Collector with AADT > 1,500; 50 mph design speed.
- 4-lane road not required in foreseeable future.
- Through Lanes must be 11 to 12-feet wide with 6-foot shoulder for rural section.
- No on-street parking.
- Requires 1:4 in-slopes and 30-feet clear zone.
- Maintain existing access to surrounding landowners after project construction.
- Pave existing driveways to city standard requirements.
- Match existing horizontal and vertical roadway alignment.
- Pave normal crown road at 2.5%.
- Pavement Section must meet minimum City Standard Pavement Section for Collector Street.

## **STORMWATER MANAGEMENT**

- Impervious surface is reduced. FDR does not trigger watershed permit requirements. No stormwater management mitigation is required.
- Option to urbanize north boulevard with new trail would increase impervious surfaces and would require stormwater rate and volume control mitigation per VBWD/SWWD rules.
- Existing drainage patterns are maintained.
- SWWD and VBWD Erosion and Sediment Control permits required. Project resides on watershed border.
- No wetland impacts anticipated.
- NPDES Construction Permit required.

## **GEOTECHNICAL INVESTIGATION FINDINGS AND RECOMMENDATIONS**

- Estimated 20-year pavement loading is 336,000 ESALs.
- Existing pavement section: 2 to 3 inches bituminous; 9 to 11 inches aggregate base. GE 14.4. 10-Ton.
- Existing R-Value between 24 and 44 with 36 average.
- Full Depth Pavement Reclamation (FDR). 8-inch recycled base with 3-1/2 inch bituminous. Based on the testing performed and the in-place pavement layer thicknesses, there is sufficient material to perform FDR. The FDR approach provides a design life similar to that of reconstruction and is less expensive. It also disrupts crack patterns, reducing the potential for reflective cracking. Structurally, the overall capacity of the street meets 10 tons.

# MEMORANDUM



Date: November 27, 2023

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To:	File	Re:	2024 Collector Street Improvements
Cc:	Marty Powers, Public Works Director Chad Isakson, PE, Assistant City Engineer		Preliminary Design Memorandum
From:	Jack Griffin, PE, City Engineer		<b>30th Street North Gap Segment Improvements Project No. 2023.122</b>

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**LOCATION:** 30th Street North, from Lisbon Avenue to approx. 650 feet west of Manning Avenue (CSAH 15).

**EXISTING CONDITIONS:** Current posted speed 30 MPH. 2021 AADT is 995.

## PROJECT SCOPE

- Project includes pavement rehabilitation of approx. 0.27 miles (1,410 ft.) of collector road, consisting of FDR Improvement and mill and overlay.
- Includes 19,080 SF of FDR (distressed pavements) + 28,534 SF 2-inch Mill & Overlay (newer pavements).
- Includes removal and replacement of 2,262 feet existing concrete curb and gutter.
- Includes bituminous removal with new 2.5-inch bituminous surface over 1,105 feet existing trail. No new concrete pedestrian ramps required.

## PROPOSED IMPROVEMENTS/DESIGN RECOMMENDATIONS

- Pavement rehabilitation of approx. 0.27 miles (1,410 ft.) of collector road.
- Full depth reclamation for pavement in poor condition (Sta. 302+42 to 311+20). Approx. 19,100 SF.
- 2-inch Mill & overlay for the remaining (newer) bituminous pavements. Approx. 28,500 SF.
- Final bituminous lift for both FDR and Mill & Overlay to be paved at the same time to ensure one cohesive finished wear course pavement surface.
- Replace all existing mountable curb with barrier curb. Approx. 2,300 LF.
- Storm sewer recommendations. No storm sewer pipe or structure replacement is identified as part of preliminary design work. Drainage inlet castings will be replaced to conform to the new barrier curb.
- Remove existing guardrail (Sta. 305+00 to Sta. 305+80). Proposed barrier curb & gutter places existing gas utility facilities outside of clear zone.
- Replace trail surface with 2.5-inch bituminous pavement over recompacted existing aggregate base. Approx. 1,100 LF. Concrete pedestrian ramps recently completed to remain in place.
- Right-of-way/easements. No right-of-way or easement acquisition is anticipated.
- Small/dry utility conflicts. No conflicts identified with small/dry utilities in preliminary design.

**TOTAL ESTIMATED PRELIMINARY DESIGN PROJECT COST. \$655,000** (2024 CIP Budget is \$483,000).

## DESIGN OPTIONS

- 30th Street West bound left turn lane to southbound Lisbon Avenue (Heritage Farms subdivision). Estimated 2,400 SF of new impervious surface. **Added estimated cost is \$18,000.**
- Lisbon Avenue, north from 30th Street, 2-inch Mill and Overlay. Requested by Public Works for 2024 Street Maintenance work plan. Estimated 6,600 SF pavement rehabilitation. **Added estimated cost is \$14,000.**

## **PROJECT FINANCING CONSIDERATIONS**

- Staff recommends no assessments.
- No MSA funds to be applied to avoid increased MSA standard requirements and costs.
- Only 1 Assessable property at 11580 30th Street (McLeod property). Future development will revise driveway access to Liberty Court North (Northport subdivision).
- If assessed, unit residential assessment is \$2,100. Qualifies for MSA traffic discounts.
- Improvement bonds requires minimum 20% of bonding costs to be assessed. Threshold would not be met.
- Lisbon Avenue North M&O paid from 2024 Street Maintenance budget. EOC is \$14,000.
- Trail resurfacing along south boulevard includes trail pavement rehabilitation for 1,100 LF.

## **CORRIDOR DESIGN PARAMETERS**

- State Aid Urban Design [8820.9936] Collector with AADT < 10,000; 35 mph design speed.
- 4-lane road not required in foreseeable future.
- Urban section required for entire length project.
- Maintain existing access to surrounding landowners after project construction.
- South side Bituminous Trail. 8-foot-wide trail with 2-foot clear zone.
- Minimum 1.5 feet clearance from face of curb to fixed objects.
- No on-street parking.
- Match existing horizontal and vertical roadway alignment.
- Pave normal crown road at 2.5%.
- Pavement Section must meet minimum City Standard Pavement Section for Collector Streets.

## **STORMWATER MANAGEMENT**

- Impervious surfaces not increased. FDR does not trigger watershed permit requirements. No stormwater management mitigation is required.
- Turn lane option creates 2,400 SF new impervious, but remains less than 6,000 SF mitigation trigger.
- Existing drainage patterns are maintained.
- VBWD Erosion and Sediment Control permit required.
- No wetland impacts anticipated.
- NPDES Construction Permit required.

## **GEOTECHNICAL INVESTIGATION FINDINGS AND RECOMMENDATIONS**

- Estimated 20-year pavement loading is 186,000 ESALs.
- Existing pavement section: 3-1/2 inches bituminous; 6 inches aggregate base. GE 12.4. 8.5-Ton.
- Existing R-Value between 30 and 82 with 44 average.
- Full Depth Pavement Reclamation (FDR). 8-inch recycled base with 3-1/2 inch bituminous. Based on the testing performed and the in-place pavement layer thicknesses, there is sufficient material to perform FDR. The FDR approach provides a design life similar to that of reconstruction and is less expensive. It also disrupts crack patterns, reducing the potential for reflective cracking. Structurally, the overall capacity of the street meets 10 tons.
- Mill and Overlay Improvement. A 2-inch mill and overlay is being recommended over the newer pavement areas with minimal distresses to create a final renewed wear course pavement throughout the project limits.