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Memorandum

To: Bassett Creek Watershed Management Commission (BCWMC)
From: Barr Engineering Co. (Josh Phillips, Jim Herbert, and Joe Welna)
Subject: Item 4F: Non-NASSCO Deep Tunnel Inspection (3rd Ave. & Unsubmerged Portions of 2nd St. Tunnels)
BCWMC December 18, 2025 Meeting Agenda
Date: December 11, 2025
Project: 23270051.65 1080 002

4F Non-NASSCO Deep Tunnel Inspection Report (3rd Ave. & Unsubmerged Portions of 2nd St. Tunnels)

Background

The Bassett Creek tunnel system conveys Bassett Creek through downtown Minneapolis to the Mississippi River where it discharges between the Upper and Lower St. Anthony Falls as shown in Attachment 1. The tunnel system was constructed in three phases including the I-94/2nd Street (St.) tunnel (Phase 1 shown in green), the 3rd Avenue (Ave.) tunnel (Phase 2 shown in yellow), and the Double Box Culvert (Phase 3 shown in orange).

The entirety of the I-94/2nd St. tunnel and 3rd Ave. tunnel was most recently inspected in 2020. The portion of the I-94 tunnel upstream of the 3rd Ave. tunnel junction was most recently inspected under a separate contract for the City of Minneapolis (City) in 2020. The Double Box Culvert (including the Single Box Culvert section) (shown in orange) were most recently inspected by Barr Engineering Co. (Barr) in November 2024. Findings from these inspections are documented in separate reports.

Several years ago, the BCWMC's Technical Advisory Committee (TAC) reviewed the BCWMC's Bassett Creek Flood Control Project inspection program and conveyed its recommendations in an April 12, 2022 memorandum to the BCWMC. The BCWMC reviewed, discussed and approved TAC recommendations at its April 21, 2022 meeting. A primary change to the inspection program included adding a non-NASSCO interim deep tunnel inspection. Tunnel condition inspections are typically based on pipeline assessment and a certification program developed by the National Association of Sewer Service Companies (NASSCO). The interim non-NASSCO inspections are intended to be a brief tunnel inspection looking for significant changes without coding existing or new defects or preparing detailed reports. Table 1 summarizes the BCWMC-approved updated program.

Table 1 Updated Flood Control Project Inspection Program

Item	Current/ Recommended Inspection Cycle	Cost/Inspection[1]	20-Year Cost[1,2] Current/Recommended
Annual inspection of the FCP features, except double box culvert & the deep tunnel	Annually	$15,000	$200,000 / $300,000
Double box culvert inspection (NASSCO)[3]	Every 5 years	$45,000	$128,000 / $180,000
Deep tunnel (2nd St. & 3rd Ave.) inspection (NAASCO)[3]	Every 10 years	$65,000	$65,000 / $130,000
Two additional deep tunnel inspections of 3rd Ave. tunnel and unsubmerged portions of 2nd St. tunnel (non-NASSCO)[4]	Every 10 years – 5 years after full deep tunnel inspection above (two total inspections)	$20,000	$0 / $40,000
Total[2]	Not Applicable	Not Applicable	**$428,000 / $650,000-$670,000**

[1] 2021 dollars
[2] Simple summation (annualized or present worth not calculated)
[3] Tunnel condition inspection based on pipeline assessment and certification program developed by the National Association of Sewer Service Companies (NASSCO)
[4] Brief tunnel inspections looking for significant changes without coding existing or new defects or preparing detailed report, includes preparation of technical memorandum.

Summary of 2020 Comprehensive Inspection of the I-94/2nd St. and 3rd Ave. Tunnel

In 2020, BCWMC retained Barr to inspect the entirety of the I-94/2nd St. tunnel and 3rd Ave. tunnel. The tunnel ratings were evaluated separately from both 1) Operations and Maintenance and 2) Structural perspectives as defined below:

- Good: The tunnel liner is structurally adequate, and defects are not causing deterioration. The tunnel requires monitoring, but no maintenance or rehabilitation is currently necessary.
- Fair: The tunnel liner is structurally adequate, but defects are causing deterioration. The tunnel requires monitoring, but no maintenance or rehabilitation is currently necessary.
- Poor: The tunnel liner is structurally inadequate, and defects have caused advanced deterioration. The tunnel requires rehabilitation.
- Urgent: The tunnel liner is structurally inadequate or has a service-impending defect. The tunnel requires immediate rehabilitation.

In 2020, Barr found the 15'-6" tall by 10'-0" wide cathedral arch section of the tunnel from STA 23+25 to 64+94 to be in fair condition from both an operation and maintenance standpoint and a structural standpoint. In 2020, Barr found the overall 3rd Ave. tunnel from STA 100+54 to 116+34 to be in fair condition from an operation and maintenance standpoint and good condition from a structural standpoint.

2025 Deep Tunnel Inspection

Following the schedule in Table 1, this year the Commission Engineer conducted a non-NASSCO inspection of the 3rd Ave. tunnel and the unsubmerged portions of the 2nd St. tunnel. The approximate inspection extents performed for BCWMC are shown on Attachment 1 with a red-dashed line. The purpose was to perform a brief interim inspection to identify significant issues or defects that may have appeared since the 2020 inspection.

On September 16, 2025, Josh Phillips (Barr), Joe Welna (Barr), and Joe Klewja (City of Minneapolis) inspected the 3rd Ave. tunnel and approximately 400 feet of the unsubmerged portions of the I-94/2nd St. tunnel from STA 64+90 to 61+00. Barr and City of Minneapolis staff arrived at the access/egress location around 8:30 a.m. Barr's subcontractor, PCi Roads (PCi), was already onsite and had removed the top slab of the Washington Ave. shaft, tested the air quality of the tunnel, and tested the crane and basket. After a pre-entry safety meeting and discussion, PCi, Barr, and City of Minneapolis staff entered the tunnel at approximately 9:30 a.m. Following completion of the inspection, Barr, City of Minneapolis, and PCi staff exited the tunnel at approximately 10:45 a.m.

The inspection was conducted by the three-person team (two Barr staff and one city staff). PCi supported the inspection by providing a qualified crane operator, a surface attendant, and two team members in the tunnel to handle communications and operational inspection assistance. PCi also supplied a crane and basket to ensure safe access and egress, issued the confined space entry permit in accordance with OSHA safety requirements, and maintained radio communication throughout the work. A summary of the inspection extents is provided in Table 2. Photos taken during the inspection are available upon request.

Table 2 Summary of Tunnel Inspection Extents

Tunnel Segment	Inspection Date	Station Interval Inspected	Length Inspected (feet)	Access/Egress
I-94/2nd St. tunnel	9/16/2025	64+90 to 61+00	390	Washington Ave. Shaft
3rd Ave. tunnel	9/16/2025	100+53 to 116+10	1,557	Washington Ave. Shaft

Washington Ave. Shaft and Drift Tunnel Access

Barr's subcontractor, PCi, provided access and egress via the Washington Ave. shaft. PCi mobilized its crane, removed the top slab over the Washington Ave. shaft and then connected the basket to prepare for tunnel access. Photos of the Washington Ave. shaft are included in Figure 1.

For access and egress, PCi lowered entrants into the tunnel via the 8-foot-diameter, 70-foot-deep shaft using a 2-person basket and the crane. At the bottom of the shaft, there is a 4-foot-deep sump that prevents the basket from having a dry landing. Therefore, PCi marked the cable of the crane and ensured that the 2-person basket stayed suspended above the water. Once near the bottom, PCi's crane operator positioned the basket near the 6-foot-diameter drift tunnel for the entrants to exit the basket.

Once the entrants exited the basket, they walked through the 6-foot-diameter, 75-foot-long drift tunnel to the connection to the 3rd Ave. tunnel. The drift tunnel connects to the 3rd Ave. tunnel approximately 8 feet above the invert of the 3rd Ave. tunnel, therefore, PCi installed a ladder at the connection and secured it to an existing eyebolt to reach the invert of the 3rd Ave. tunnel, as shown in shown in Figure 2.

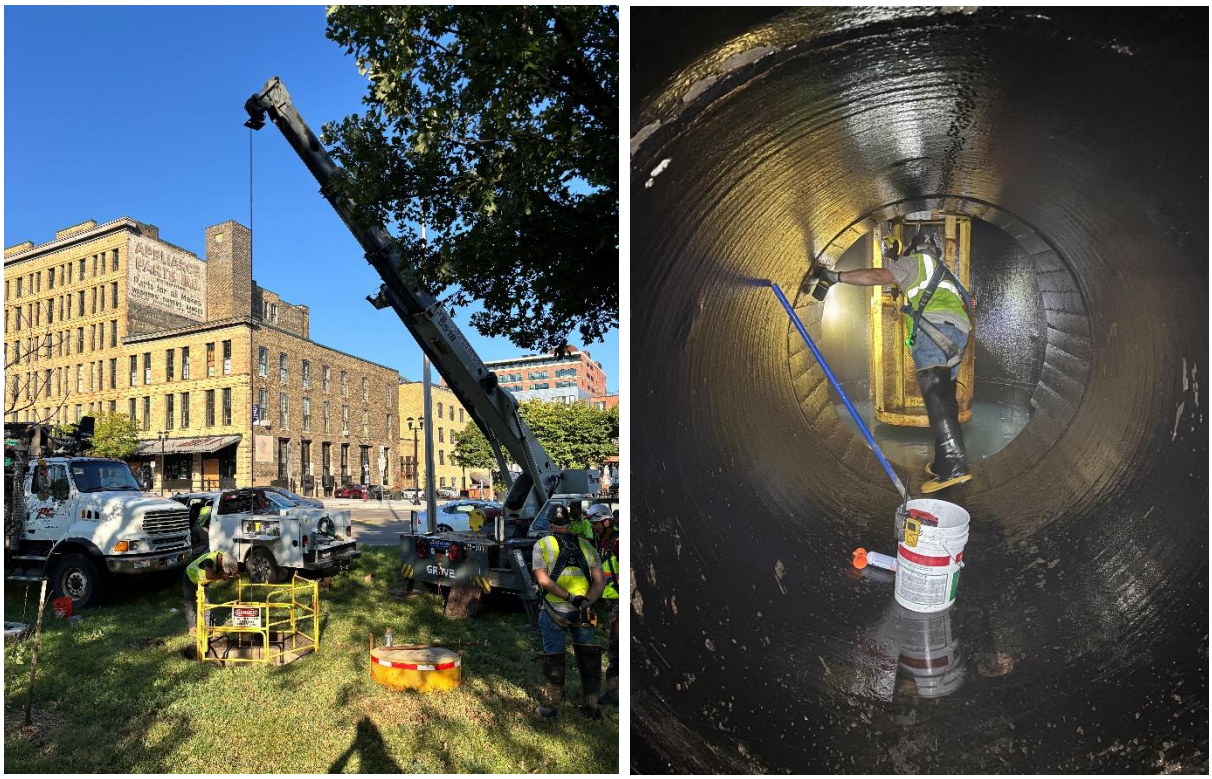

Figure 1: Washington Ave. Shaft and Drift Tunnel (facing shaft)

Figure 2: Drift Tunnel and Ladder Access (in 3rd Ave. Tunnel)

2025 Inspection Findings

Barr did not identify any significant changes in the tunnel condition since the 2020 inspection. General photos of the drop structure, 3rd Ave. tunnel and the inspected portions of the I-94/2nd St. tunnel are shown in Figure 3, Figure 4, and Figure 5, respectively. Photos of the drop structure are slightly blurry due to heavy mist. While they do not appear to change the overall condition of the tunnel, Barr noted the following minor changes and defects within the 3rd Ave. tunnel and the inspected portions of the I-94/2nd St. tunnel:

- There were five previously identified infiltration runners (IR) that were not observed in 2025 or were downgraded to an infiltration weeper (IW) at STA 101+52, 102+66, 105+24, 109+11, and 109+90. This is likely due to variation in groundwater levels between inspections or deposits attaching, calcifying, and temporarily sealing portions of the cracks in the tunnel wall. The difference between water weeping into the tunnel vs flowing into the tunnel is difficult to see in photos, but an example of an infiltration weeper (IW) and an infiltration runners (IR) is shown in Figure 6. An infiltration runner is considered a more significant defect than an infiltration weeper.

- There were approximately nine new infiltration runners (IR) observed in 2025 at STA 64+57, 103+85, 103+86, 104+20, 104+30, 105+59, 106+44, 108+77, 109+98, 112+73, 113+18, 114+90 . Similar to above, this is likely due to variation in groundwater levels between inspections.

- A new area of surface aggregate visible (SAV) was observed at approximately STA 61+80 in the 2nd St. tunnel (Figure 7). This is likely due to continued wear-and-tear on the tunnel.

Figure 3: **Drop Structure from Double Box Culvert to 3rd Ave. Tunnel (blurry due to heavy mist)**

Figure 4: 3rd Ave. Tunnel

Figure 5: I-94/2nd St. Tunnel

Figure 6: Example of an Infiltration Weeper (IW) (left photo) and an Infiltration Runner (IR) (right photo)

Figure 7: Location and closeup of new area of surface aggregate visible (SAV)

Stationing

Phase 1: I-94/2nd Street Tunnel

Phase 2: 3rd Avenue Tunnel

Phase 3: Double Box Culvert

2025 Planned Inspection Extents

N

0 750 1,500

Feet

Imagery: USDA NAIP 2023

System Overview
2025 3rd Avenue Tunnel &
I-94/2nd St. Tunnel Inspection
Performed for the Bassett Creek
Watershed Management Commission

ATTACHMENT 1

BARR