

| Location      | Problem                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Show Stopper | Responsibility    | Discussion/Recommendation                        |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------------|--------------------------------------------------|
| East Levee    | 1. Numerous animal burrows on both sides of the levees.                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | More Study   | Corps             | Fix Through Normal Maintenance                   |
|               | 2. Levee toe erosion on the wet side (Embankment stability per EC 1110-2-6067)                                                                                                                                                                                                                                                                                                                                                                                                                                                     |              | Corps             |                                                  |
|               | 3. Tree at levee toe on the wet side (ETL 1110-2-571).                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Yes          | Corps             | Remove                                           |
|               | 4. Trees and heavy vegetation within the 15' wide vegetation-free zone on the dry side in the upper reach, near the control weir (ETL 1110-2-571).                                                                                                                                                                                                                                                                                                                                                                                 | Yes          | Corps             | Remove                                           |
|               | 5. Grass cover exceeded the 12" height limitation (ETL 1110-2-571).                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              | Corps             | Normal Mowing                                    |
|               | 6. No as-built drawings for utility crossing downstream of control weir.                                                                                                                                                                                                                                                                                                                                                                                                                                                           |              | City of Massillon | Aquire As-Built                                  |
|               | 7. 66" RCP culvert through East Levee near control weir has several offset joints throughout the structure, several broken joints, moisture present at several joints, and the pipe is showing distress from water moving outside the structure. The rating for the pipe is "Unacceptable" or "Immediate Attention" per Corps and PACP criteria, respectively.                                                                                                                                                                     | Yes          | City of Massillon | Pipe will need to be lined                       |
|               | 8. 48" RCP/CMP gravity drain south of Arch Avenue pump station showed some signs of settlement that could be due to movement of water underneath the structure caused by the up gradient CMP structure. The CMP is severely corroded, with the invert missing, and the pipe is starting to deflect. The rating for the RCP is "Acceptable to Minimal Acceptable" or "Fair" per Corps and PACP criteria, respectively. The rating for the CMP is "Unacceptable" or "Immediate Attention" per Corps and PACP criteria, respectively. | Yes          | City of Massillon | Pipe will need to be lined                       |
| Levee Arm "A" | 1. Several trees along levee toe on the wet side within the 15' wide vegetation-free zone. (ETL 1110-2-571).                                                                                                                                                                                                                                                                                                                                                                                                                       | Yes          | Corps             | Trees need cut                                   |
|               | 2. Grass cover exceeded the 12" height limitation (ETL 1110-2-571).                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              | Corps             | Normal Mowing                                    |
|               | 3. No as-built drawings available for utility crossing at upstream connection to high ground; missing cover on gate valve shut-off.                                                                                                                                                                                                                                                                                                                                                                                                |              | City of Massillon | Aquire As-Built                                  |
| West Levee    | 1. Trees and heavy vegetation within the 15' wide vegetation-free zone on the dry side in the upper reach, near the control weir (ETL 1110-2-571).                                                                                                                                                                                                                                                                                                                                                                                 | Yes          | Corps             | Real Estate / Operations may need to be involved |
|               | 2. Grass cover exceeded the 12" height limitation (ETL 1110-2-571).                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              | Corps             |                                                  |
|               | 3. Two (2) illegal drains from the adjacent private properties discharging water toward levee toe on the dry side. One was discharging substantial amount of water, causing water ponding for approximately 100' along the levee toe. (EC 1110-2-6067).                                                                                                                                                                                                                                                                            | Yes          | Corps             | Real Estate / Operations may need to be involved |
|               | 4. 42" Dia. outlet upstream of Cherry St. is partially silted and blocked. Inlet was completely buried and plugged. Significant joint leakage was occurring at the third joint from the inlet. The rating for the pipe is "Unacceptable" or "Immediate Attention" per Corps and PACP criteria, respectively.                                                                                                                                                                                                                       | Yes          | City of Massillon | Pipe needs to be cleaned and lined               |

Levee Arm “B”

- 1. 18” side drain missing flap gate at the outlet structure (EC 1110-2-6067). Outlet manhole severely deteriorated, partially collapsed during testing, significant amount of root intrusion, several offset joints throughout the structure. The rating for the pipe is “Unacceptable” or “Immediate Attention” per Corps and PACP criteria, respectively.
- 2. Several warped wooden stoplogs at the railroad closure structures (EC 1110-2-6067).
- 3. Deteriorated sandbags in the storage room (EC 1110-2-6067).
- 4. Missing ratchet for tightening rods/nuts (in the City’s maintenance yard) (EC 1110-2-6067).
- 5. Missing caulking “Cinders” (about 10 bags are required) (EC 1110-2-6067).
- 6. Metal access door (on the west side) of the storage room can’t open fully (EC 1110-2-6067).
- 7. Trees and heavy vegetation within the 15’ wide vegetation-free zone on both wet and dry side (ETL 1110-2-571).
- 8. Grass cover exceeded the 12” height limitation (ETL 1110-2-571).
- 9. Operation and maintenance manual should explicitly call out equipment needs (i.e., backhoe on site) for erecting the stoplog closure.
- 10. The current O&M crew has never erected the stoplog structure.
- 11. There is no drain on the landward side of the retaining wall closure structure. The exit hydraulic gradient on the landside of the retaining wall is high, i.e. greater than 2. Based on this hydraulic gradient, the factor of safeties against piping and uplift are less than 1. To control piping and uplift, installation of relief wells may be required at this location.

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| Yes | City of Massillon |                                                                          |
| Yes | City of Massillon |                                                                          |
| Yes | City of Massillon |                                                                          |
| Yes | City of Massillon |                                                                          |
| Yes | City of Massillon |                                                                          |
| Yes | Corps             | Trees need cut / Mow Grass                                               |
|     | Corps             | Normal Mowing                                                            |
|     | City of Massillon |                                                                          |
|     | City of Massillon |                                                                          |
| Yes | Corps             | This will require further Study...May need to drill additional borings.. |

Arch Avenue  
Pump Station

- 1. Evidence of roof leakage and resulting corrosion of structural steel components and electrical equipment. It was not evident if the replacement of the roofs in March 1997 has halted this leakage. The July 23, 2002 inspection indicated roof leakage as being of a serious nature. The operation and maintenance manual should be updated to include visual inspection of roof during storm events to verify that the roofs are sound.
- 2. Vegetation in the downspouts could be obstructing flows from the roof.
- 3. Missing bolts in the gate guides for the north outlet culvert of the twin outlet box culverts.
- 4. No check valves on the pump discharges.
- 5. Asbestos packing in the pumps.
- 6. Mercury switches/floats.
- 7. Pumps must be operated manually to prevent short cycling and to restart pumps if automatically shut down by sump floats. Exterior brick façade exhibits expansive cracking.
- 8. Sluice gate position indicators are non-functional.
- 9. No fire extinguishers.

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Sippo Creek  
Pump Station

10. All three discharge pipes (3-24" DIP) have moderate to severe corrosion at the joints, missing protective coating also noted in flat areas and bends. The rating for these pipes is "Minimally Acceptable" or "Poor" per Corps and PACP criteria, respectively (Arch Avenue Rated as 4s).

Yes      City of Massillon      Pipe will need to be lined

11. Two 6'x6' RCBs gravity drains showed water movement at entrance in crown and headwall, open joints between barrels, moisture present in some of the joints, offset joint in box at gatewell. Offset joint in crown of box, spalling in crown near gatewell, pipe at outlet is offset and leaking, signs of potential soil movement. The rating for the RCBs is "Minimal Acceptable" or "Fair to Poor" per Corps and PACP criteria, respectively (Arch Avenue Rated as 3 or 4).

Yes      City of Massillon      Pipe will need to be lined

- 1. Evidence of roof leakage and corrosion of electrical equipment resulting. It was not evident if the replacement of the roofs in March 1997 has halted this leakage. The operation and maintenance manual should be updated to include visual inspection of roof during storm events to verify that the roofs are sound.
- 2. Vegetation in the downspouts could be obstructing flows from the roof.
- 3. No check valves on the pump discharges.
- 4. Asbestos packing in the pumps.
- 5. Mercury switches/floats.
- 6. Pumps must be operated manually to prevent short cycling and to restart pumps if automatically shut down by sump floats. Exterior brick façade exhibits expansive cracking.
- 7. 12-inch flap gate into the pump station intake structure has been sealed shut. This is believed to be a toe drain outlet, although the available as-constructed drawings do not accurately reflect the current system layout.
- 8. Sluice gate position indicators are non-functional.
- 9. No fire extinguishers.

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10. All three discharge pipes (3-24" DIP) have moderate to severe corrosion at the joints, missing protective coating also noted in inverts and haunches of the pipes. Middle pipe has a severe offset point with potential leakage. The rating for these pipes is "Minimally Acceptable" or "Poor" per Corps and PACP criteria, respectively (Sippo Creek PS rated as 4s).

Yes      City of Massillon      Protective Coating should be repaired as needed and

11. 10' W x 15' H RCB pressure conduit next to the Sippo pump station showed most of the joints appear to have some weeping and/or signs of staining at the joints. Invert is rough in areas indicating moderate scouring. Rebar exposed and some spalling noticed in areas. The rating for the RCB is "Minimal Acceptable" or "Fair to Poor" per Corps and PACP criteria, respectively. (Rated as 3 or 4)

Yes      City of Massillon      ???

Federal Pump  
Station

- 1. Evidence of roof leakage and corrosion of electrical equipment resulting. It was not evident if the replacement of the roofs in March 1997 has halted this leakage. The operation and maintenance manual should be updated to include visual inspection of roof during storm events to verify that the roofs are sound.
- 2. Vegetation in the downspouts could be obstructing flows from the roof.
- 3. No check valves on the pump discharges.
- 4. Asbestos packing in the pumps.
- 5. Mercury switches/floats.
- 6. Pumps must be operated manually to prevent short cycling and to restart pumps if automatically shut down by sump floats. Exterior brick façade exhibits expansive cracking.
- 7. Interior brick is cracked as well. Especially under the southeast column supporting the crane rail.
- 8. Sluice gate position indicators are non-functional.
- 9. No fire extinguishers.
- 10. Utility transformer bank is undersized for simultaneous operation of three 100hp pumps.
- 11. Relief valves in ponding area of pump station do not have check valves.

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12. All three discharge pipes (3-24" DIP) have moderate to severe corrosion at the joints, missing protective coating also noted in flat areas and bends. It appears in some sections point repairs have been made on the protective coating. The rating for these pipes is "Minimally Acceptable" or "Poor" per Corps and PACP criteria, respectively.

Yes

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13. Two 5' RCP/CMP Federal pump station outlets showed CMP bituminous coating missing in haunches and moderate corrosion. RCP appears to be in good condition with moisture present at some of the joints. The rating for the pipes is "Acceptable to Minimal Acceptable" or "Fair to Poor" per Corps and PACP criteria, respectively.

Yes

City of Massillon

James Avenue  
Pump Station

- 1. Evidence of roof leakage and corrosion of electrical equipment resulting. It was not evident if the replacement of the roofs in March 1997 has halted this leakage. The July 23, 2002 inspection indicated roof leakage as being of a serious nature. The operation and maintenance manual should be updated to include visual inspection of roof during storm events to verify that the roofs are sound.
- 2. Vegetation in the downspouts could be obstructing flows from the roof.
- 3. No check valves on the pump discharges.
- 4. Asbestos packing in the pumps.
- 5. Mercury switches/floats.
- 6. Pumps must be operated manually to prevent short cycling and to restart pumps if automatically shut down by sump floats. Exterior brick façade exhibits expansive cracking.
- 7. Efflorescence of concrete pump station outlet gate structure and east side gravity outlet structure was noted.

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8. Sluice gate position indicators are non-functional.

9. No fire extinguishers.

10. Utility transformer bank is undersized for simultaneous operation of three 100hp pumps.
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11. All three discharge pipes (3-30” DIP) have moderate to severe corrosion at the joints. Missing protective coating was missing not only at the joints but in flat areas and sharp bends. It appears that point repairs of the protective coating have been made in sections. The rating for these pipes is “Minimally Acceptable” or “Poor” per Corps and PACP criteria, respectively. (Rated as 4s)

Yes

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12. 48” RCP gravity drain showed sagging visible from inlet to gatewell, joint more open on bottom, and several joints weeping water. The rating for the pipe is “Minimally Acceptable” or “Poor” per Corps and PACP criteria, respectively. (Rated 4)

Yes

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Sponsor Familiarity with System and O&M Manual Status

1. Sponsor has recently (6 months) transferred maintenance responsibility of the pump stations and gates closures from the street department to the water department. Operators were not familiar with O&M Manuals and were not fully familiar with levee system components (EC 1110-2-6067).

2. O&M Manual is present at pump stations and gate closures, but has not been updated to reflect changes to electrical equipment (ie utility transformer locations, motor control center replacement, secondary power distribution modifications) and potential changes of railroad contacts.
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Siphons

1. Control Weir Siphon

- a. This siphon serves to drain a ponding area on the protected side of the west levee between the control weir and the James Avenue Pump Station. It would also provide positive shutoff of the siphon in the event of failure of the siphon. A sluice gate at the outlet in the James Avenue Pump Station also serves this purpose.

i. The trash grate is severely corroded and requires repair or replacement.

ii. The rising stem sluice gate operator on the inlet gate structure does not appear to be well lubricated.

iii. The sluice gate is dirty and the intake structure is moderately silted.
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b. 42” DIP is moderately corroded and several stained and leaking at joints in RCP pipe. Heavy flow was observed from joint at 173 feet. Radial and diagonal cracks are noted in several areas along the upstream side of the structure. The rating for the siphon is “Unacceptable” or “Immediate Attention” per Corps and PACP criteria, respectively.

Yes

City of Massillon

Pipe will need to be lined

Sanitary Sewer Siphons

2. New Cherry Street Siphon

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------------|
| a. No valves on the inlet or outlet end (west and east sides interior of the levee). The siphon can overflow to the Old Cherry Street Siphon on the west bank in the event of excess flow or failure of the siphon.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |            | City of Massillon |
| <b>b. The siphon consists of 24", 14", and 20" DIP. Minor corrosion was observed at the joints and the protective coating was coming off in sheets in several areas of the siphon. No gate valves/cut off valves were installed on the system. The rating for these pipes is "Acceptable to Minimal Acceptable" or "Fair" per Corps and PACP criteria, respectively.</b>                                                                                                                                                                                                                                                                                                                                                                                              | <b>Yes</b> | City of Massillon |
| <b>3. Old Cherry Street Siphon</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |            |                   |
| a. Valve vault on the outlet end (east side interior of the levee) was filled with standing water. Two of three valves, 10" and 18", were exercised, but could not tell if they were fully operational. The third valve, 16", was not operational and assumed to be stuck in the open position. These valves are intended to provide positive shutoff of the siphon in the event of failure of the siphon.                                                                                                                                                                                                                                                                                                                                                            |            | City of Massillon |
| b. Sluice gates on the inlet end gatewell (west bank interior of the levee) were not operational. One of the 24" sluice gates is intended to allow diversion of the Wooster trunk system directly into the river, which is not permitted by the EPA, and is in the closed position. The other 24" gate and the 18" gate are intended to prevent backflow into the protected area in the event the siphon fails, and are stuck in the open position due to damaged or corroded actuators.                                                                                                                                                                                                                                                                              |            | City of Massillon |
| <b>c. The siphon consists of 18", 10", and 15" DIP. Gate valve for 18" DIP was difficult to turn and was severely corroded above the waterline. Gate valves for 10" DIP and 15" DIP were frozen mid position, therefore, both pipes could not be inspected. The rating for these pipes is "Minimal Acceptable to Unacceptable" or "Poor" per Corps and PACP criteria, respectively.</b>                                                                                                                                                                                                                                                                                                                                                                               | <b>Yes</b> | City of Massillon |
| <b>4. Tremont Avenue Siphon</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |                   |
| a. A 10" and 12" gate valve are located at the outlet end of the siphon (east bank interior of the levee) to provide positive cut-off of flows into the interior drainage area in the event of a failure of the siphon. The 12" valve was exercised. The 10" valve was inoperable and assumed to be stuck in the open position.                                                                                                                                                                                                                                                                                                                                                                                                                                       |            | City of Massillon |
| b. There are no valves on the inlet side of the siphon (west bank interior of the levee), which is a manhole, due to its high ground elevation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            | City of Massillon |
| <b>c. The siphon consists of 8" and 10" VCP. Gate valves were broken on both pipes and the diversion board on inlet was rotted through. The metal pipe at gate valves was severely corroded. Significant offset/and or debris build up at outlet of 8" VCP, several offset joints in 10" VCP. The rating for the 8"VCP is "Minimal Acceptable to Unacceptable" or "Poor" per Corps and PACP criteria, respectively. The rating for the 8" VCP is "Unacceptable" or "Immediate Attention" per Corps and PACP criteria, respectively. The rating for the 8"VCP is "Minimal Acceptable to Unacceptable" or "Poor" per Corps and PACP criteria, respectively. The rating for the 10" VCP is "Minimal Acceptable" or "Poor" per Corps and PACP criteria, respectively.</b> | <b>Yes</b> | City of Massillon |

Note: The failure or inability to provide positive cut-off of the sanitary siphons may negatively impact the interior drainage of the project and may erode the foundation of the levee. Therefore, it is recommended that the Operation and Maintenance Manual be updated to include clear procedures to mitigate this condition in case of a siphon failure that would allow exterior waters to be released into the interior of the levee system and foundation materials to be eroded. The city has access to inflatable plugs that are used to provide positive cut-off of the sewer system for maintenance. The system also has a designed 24-inch overflow into the Arch Avenue Pump station to relieve the system during times of excessive discharges. These components are part of the City's sewer operations and maintenance program and should be considered in updating the Operation and Maintenance Manual.

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