Portage Creek Sediment Remediation Project
Kalamazoo, Michigan

Pre-Sediment Removal Structure Feature Assessment
Removal Area SA6

Prepared For:

Environmental Quality Management, Inc.

Prepared By:

FLEIS & VANDENBRINK
ENGINEERING, INC.

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General Notes:

- The following list of structures was generated based on a field review of the removal area supplemented with a review of available construction records. It may not be an exhaustive list of constructed features in the removal area. If additional constructed features are encountered during sediment removal operations, F&V should be notified of the discovery to allow for review of their potential impact on the project.

- Pre-Sediment Removal review was focused on the channel and bank areas, including structures potentially impacted directly by the removal of sediment. There are other structures in the general project area which should be avoided or protected from damage from construction equipment during removal and transportation of sediment.

- As is the case when undertaking any underground work, Miss Dig should be contacted to locate active utilities in the project area prior to commencing removal operations.

Designation: SA6-S01

Location: SA6-S01 is the Stockbridge Avenue Bridge crossing Portage Creek, just south of the southern limits of area SA6.

Description: SA6-S01 is a single span bridge. Constructed in 1984, the superstructure consists of side by side prestressed concrete box beams, concrete sidewalks, concrete parapet railings and an asphalt wearing surface. The substructure consists of concrete caps, presumably constructed in 1984, which carry the superstructure and bear on older concrete abutments.

Pre-existing Condition:

- The asphalt approach pavement has moderate to severe longitudinal and transverse cracking, partially sealed, with some alligator and block cracking in the wheel paths.
- The asphalt surface has moderate transverse cracking along the reference lines and ~3 lines of moderate longitudinal cracking.
- The northwest approach sidewalk has settled ~1-1.5" at the reference line. The northeast sidewalk has settled ~1.5-2" at the reference line. The sidewalk in the southwest is newer.
- The concrete parapet railing has sustained collision damage in the northeast.
- There is a newer concrete retaining wall supporting the southwest slope. The southeast slope is supported by a concrete block type wall with moderate to severe vertical cracking and minor erosion around the end. The northeast has a smaller concrete block type wingwall extension with separation of the vertical joint. The northwest has a concrete block type wall which is overgrown, has minor vertical/step cracking and end is undermined ~12-18".
- The channel area has scattered trash and debris. The channel bottom is approximately 6.5' below bottom of beam, however the channel bottom is uneven. The banks are steep and partially brush covered.
- The northeast abutment is severely spalled and abraded at the waterline. The abutments have moderate abrasion along the waterline throughout.
- Heavy leakage with efflorescence and stalactites was noted on box beam joints 1N, 2N and 1-5S.
- There are 2 utilities crossing the creek beneath the south side of the structure through the abutment walls. The northern pipe has moderate surface corrosion. The southern pipe has heavy surface corrosion and scale with minor to moderate section loss, especially on the bottom.
- There is a moderate vertical crack in the southeast abutment and diagonal crack in the southwest. There is a minor vertical crack near the centerline of the east abutment.
- There are culvert outlets through the northwest, southwest and southeast (2) abutment areas and northeast wingwall extension. There is a scour hole 1-2' deep around the northeast outlet.
- Brush growth was noted in all 4 quadrants.

Protective Measures:

- Although the support condition of the original abutments is unknown, the structure is located far enough south of the southernmost cofferdam limits that the sediment removal work should not impact the bridge structure. Therefore, no special protective measures should be required.

Structure viewed from northwest approach area

Elevation view of structure

Settlement of sidewalk in the northeast

Newer retaining wall and riprap in the southwest

Trash in the channel area

Overgrown wingwall extension in the northwest

Spalling and abrasion along northeast waterline

Efflorescence and stalactites along box beam joints

Culvert outlet through abutment at waterline

Culvert outlet through abutment above waterline

Utility crossings and stalactites along box beam joints

Vertical cracking in abutment

Diagonal cracking in southwest abutment

Cracking in concrete block wingwall extension

Severe corrosion and section loss on bottom of utility pipe

Spalling and abrasion along northeast waterline

Culvert outlet through northeast wingwall

Northeast wingwall extension

Gap between northeast wingwall and extension

Bank erosion and undermining around northwest wingwall extension

Structure: SA6-S01 Date: April 14, 2012

Close-up of undermining at northwest wingwall extension

Designation: SA6-S02

Location: SA6-S02 is located on the west bank of Portage Creek approximately 50 feet north of Stockbridge Avenue.

Description: SA6-S02 is an upturned 8-inch diameter steel pipe of unknown purpose. There is an Ameritech flag located in the bank.

Pre-existing Condition:

- The pipe has moderate surface corrosion and pitting with heavy scale at the waterline.
- There is severe bank erosion around the pipe, approximately 18-24 inches deep.

Protective Measures:

- It may be possible to remove the structure if its purpose can be established. However, the structure is located far enough south of the southernmost cofferdam limits that the sediment removal work should not impact it. Therefore, no special protective measures should be required.

Structure: SA6-S02 Date: April 14, 2012

Overall view of the structure from the channel

Heavy scaling and bank undermining at the base of the structure

Designation: SA6-S03

Location: SA6-S03 is located on the east bank of Portage Creek just north of Stockbridge Avenue.

Description: SA6-S03 is a series of concrete slabs placed along the bank for erosion protection.

Pre-existing Condition:

- Several of the slabs are cracked and spalled.
- Most of the slabs are undermined to some degree.

Protective Measures:

- Remove the slabs as needed to facilitate sediment removal and replace them in kind as directed by the City of Kalamazoo.

Overall view of the structure with the railroad tracks in the background

View of the slabs adjacent to the northeast wingwall extension of the Stockbridge Bridge

Structure: SA6-S03 Date: April 14, 2012

Undermining around concrete slabs

Northernmost slabs in the area

Designation: SA6-S04

Location: SA6-S04 is located on the west bank of Portage Creek approximately 100 feet north of Stockbridge Avenue.

Description: SA6-S04 is a 12-inch diameter clay storm sewer outlet with concrete collar/headwall.

Pre-existing Condition:

- The concrete headwall is severely abraded and cracked. The upstream lower corner has spalled off.
- The exposed end of the clay tile is spalled.
- The channel is approximately 8 inches below the invert of the pipe, but no undermining was noted.
- The bank has eroded approximately 2.5 feet around the headwall.

Protective Measures:

- Because SA6-S04 is located in an area not planned for dewatering, a cofferdam is not anticipated to be required. To prevent undermining of the outlet, avoid sediment removal in the immediate area of the outlet, leaving approximately 4 feet of clearance.

Structure: SA6-S04 Date: April 14, 2012

View of the outlet from the channel

View of the outlet from the downstream bank

Designation: SA6-S05

Location: SA6-S05 is located on the west bank of Portage Creek approximately 200 feet north of Stockbridge Avenue.

Description: SA6-S05 is a small concrete wall extending into the channel approximately 4 feet near the water surface. Its purpose could not be identified.

Pre-existing Condition:

- The concrete wall has shallow surface scaling.
- The bank has minor erosion around the wall.

Protective Measures:

- It is recommended that the City of Kalamazoo be contacted to confirm that the wall can be removed in conjunction with sediment removal and the area restored.

Structure: SA6-S05 Date: April 14, 2012

View of the wall from the channel

View of the wall from the upstream bank

Designation: SA6-S06

Location: SA6-S06 is the sanitary sewer running along the west side of Portage Creek and crossing between Stockbridge Avenue and Lake Street.

Description: SA6-S06 is a 48-inch diameter reinforced concrete pipe, which reduces to 36-inch where it crosses the creek. There are manholes on both sides of the creek crossing. According to the construction drawings, the creek crossing is quite shallow, however, probing did not reveal its location.

Pre-existing Condition:

- The sewer was constructed around 1977, according to the construction drawings.
- The sewer is suspected to be in fair condition, however, it likely has leaking joints.

Protective Measures:

- Sediment removal in the southernmost section of SA6 is to be accomplished using the cofferdam for isolation only, and the area will not be dewatered. This, combined with the depth of cover (approximately 3 feet) should be sufficient to protect the sewer running parallel to the creek.
- The excavation contractor should hand expose the 36-inch crossing pipe to more accurately establish its location and alignment within the excavation area. It is recommended that a 3-foot isolation distance be used between the limits of sediment removal and the footprint of the sewer pipe to avoid disturbance.
- It may be beneficial to televise the sanitary sewer in the area prior to cofferdam installation to more accurately assess its pre-existing condition.

Location flagging on the west bank at the crossing

The east bank at the crossing viewed from the channel

Structure: SA6-S06 Date: April 14, 2012

Location flagging along the west bank where the sewer is parallel to the creek

Sanitary manhole on the west side of the crossing

Designation: SA6-S07

Location: SA6-S07 is located on the east bank of Portage Creek, approximately 30 feet north of the sanitary sewer crossing between Stockbridge Avenue and Lake Street.

Description: SA6-S07 is a section of chain link fence extending into the channel area.

Pre-existing Condition:

- At the time of the Pre-Sediment Removal Structure Feature Assessment, the fence was partially removed. The section in the channel area was leaning severely and not anchored on the channel side.

Protective Measures:

- From the technical memorandum, we understand this fence is to be removed prior to sediment removal operations and replaced in kind.

Structure: SA6-S07 Date: April 14, 2012

View of the fence from the channel

Designation: SA6-S08

Location: SA6-S08 is located on the west bank of Portage Creek, approximately 30 feet north of the sanitary sewer crossing between Stockbridge Avenue and Lake Street and 5 feet from the waterline.

Description: SA6-S08 is a utility pole and guy wire supporting an overhead utility crossing.

Pre-existing Condition:

- The utility pole has a slight easterly lean, but otherwise appears to be in fair condition.

Protective Measures:

- The pole and guy should be protected from damage during excavation operations by installing construction fencing around them or other means to make operators and drivers aware of their location.
- Excavation should be avoided within a 1:1 projection of the surface at the pole and guy to avoid compromising their support. Based on their location relative to the channel, it does not appear that this will dramatically restrict sediment removal in the area.

Structure: SA6-S08 Date: April 14, 2012

Pole and guy area viewed from the west bank

Designation: SA6-S09

Location: SA6-S09 is located in the channel area of Portage Creek approximately 50 feet north of the sanitary sewer crossing between Stockbridge Avenue and Lake Street and 3 feet from the bank.

Description: SA6-S09 is a pair of steel posts installed in the channel for an unknown purpose.

Pre-existing Condition:

- The surface of the sections has moderate surface corrosion and both are bent in the downstream direction, likely due to impact from channel debris.

Protective Measures:

- It is recommended that the City of Kalamazoo be contacted to confirm that the posts can be removed in conjunction with sediment removal.

Structure: SA6-S09 Date: April 14, 2012

Steel posts viewed from the channel area

Designation: SA6-S10

Location: SA6-S10 is located on the west bank of Portage Creek, approximately 100 feet north of the sanitary sewer crossing between Stockbridge Avenue and Lake Street.

Description: SA6-S10 is a 12-inch diameter PVC storm sewer outlet with splash block and a 3½" capped PVC outlet. The sewer is a discharge pipe for a lift station and flows intermittently.

Pre-existing Condition:

- The 12-inch sewer is undermined approximately 12 inches, with 2-3 feet of bank erosion around the pipe.
- There is a 12 inch gap between the pipe and the splash block below. The invert is approximately 2 feet above the waterline.
- The smaller capped pipe extends approximately 2 feet into the channel.

Protective Measures:

- We understand that the lift station outlet is to be plumbed to discharge beyond the cofferdam limits to facilitate dewatering.
- The splash block should be removed and replaced in kind to facilitate sediment removal.
- The 3½" pipe should be cut back toward the bank and re-capped as required to facilitate sediment removal.

Structure: SA6-S10 Date: April 14, 2012

View of the outlet from the channel area

View of the outlet from the upstream bank area

Structure: SA6-S10 Date: April 14, 2012

Close-up of the smaller capped outlet

View of the outlet during discharge

Designation: SA6-S11

Location: SA6-S11 is located on the west bank of Portage Creek, approximately 150 feet north of the sanitary sewer crossing between Stockbridge Avenue and Lake Street.

Description: SA6-S11 is a steel outlet pipe located at the waterline.

Pre-existing Condition:

- The pipe is severely corroded and has been crushed. It appears to be abandoned.

Protective Measures:

- It is recommended that the City of Kalamazoo be contacted to confirm that the outlet can be removed in conjunction with sediment removal.

Structure: SA6-S11 Date: April 14, 2012

View of the outlet from the channel area

Designation: SA6-S12

Location: SA6-S12 is located on the west bank of Portage Creek, approximately 200 feet north of the sanitary sewer crossing between Stockbridge Avenue and Lake Street.

Description: SA6-S12 is a steel outlet pipe located at the waterline.

Pre-existing Condition:

- The pipe is severely corroded and has been crushed. It appears to be abandoned.

Protective Measures:

- It is recommended that the City of Kalamazoo be contacted to confirm that the outlet can be removed in conjunction with sediment removal.

Structure: SA6-S12 Date: April 14, 2012

View of the outlet from the channel area

Designation: SA6-S13

Location: SA6-S13 is located on the east bank of Portage Creek, approximately 10 feet south of the overhead electrical crossing between Stockbridge Avenue and Lake Street.

Description: SA6-S13 is a chain link fence section extending approximately 6 feet into the channel.

Pre-existing Condition:

- The concrete base at the bank is nearly completely exposed from bank erosion.
- There is moderate debris on the upstream face of the fence.

Protective Measures:

- From the technical memorandum, we understand this fence is to be removed prior to sediment removal operations and replaced in kind.

Structure: SA6-S13 Date: April 14, 2012

View of the fence from the channel area

View of the concrete base at the bank and support post in the channel

Structure: SA6-S13 Date: April 14, 2012

Close-up of the concrete base exposed by bank erosion

Designation: SA6-S14

Location: SA6-S14 is the overhead electrical crossing between Stockbridge Avenue and Lake Street.

Description: SA6-S14 is an overhead crossing with a utility pole and guy west of the creek, set back from the waterline.

Pre-existing Condition:

- The utility pole appears to be in fair condition.
- The guy wire is noticeably slack and not supporting the pole.
- The asphalt surface between the pole and the channel is severely deteriorated.

Protective Measures:

- The pole and guy should be protected from damage during excavation operations by installing construction fencing around them or other means to make operators and drivers aware of their location.
- Excavation should be avoided within a 1:1 projection of the surface at the pole and guy to avoid compromising their support. Based on their location relative to the channel, it does not appear that this will restrict sediment removal in the area.

View of the pole and guy from the downstream channel

Condition of the asphalt surface between the pole and channel

Designation: SA6-S15

Location: SA6-S15 is located on the west side of Portage Creek just north of the overhead electrical crossing between Stockbridge Avenue and Lake Street.

Description: SA6-S15 is a City of Kalamazoo storage building with asphalt access road between the building and Portage Creek.

Pre-existing Condition:

- The building appears to be in fair condition.
- The asphalt access road is severely deteriorated with cracking and potholes throughout and large areas of missing pavement.

Protective Measures:

- The building should be protected from damage during excavation operations by proper operational planning and construction staging.
- It appears that the building is a sufficient distance from the excavation area that sediment removal will not impact its foundation.

North end of the building viewed from the channel

South end of the building viewed from the channel

Severe deterioration of the asphalt access road

Severe deterioration of the asphalt access road

Severe deterioration of the asphalt access road

Severe deterioration of the asphalt access road

Designation: SA6-S16

Location: SA6-S16 is located on the east bank of Portage Creek approximately 100 feet north of the overhead electrical crossing between Stockbridge Avenue and Lake Street.

Description: SA6-S16 is a 24-inch diameter concrete pipe storm sewer outlet. It has a headwall consisting of manhole blocks and retaining wall blocks.

Pre-existing Condition:

- The headwall has severe step cracking. It is leaning toward the channel. The north side is worst, leaning severely at approximately 20 degrees.
- The channel is approximately 2-3 inches below the invert of the outlet, however, no undermining was detected.
- There is significant tree growth behind the headwall, which is contributing to its outward lean.
- There is a ½" gap between the pipe and the headwall mortar.
- The bank is eroded and undermined approximately 12-18" in the area of the structure.
- The last section of pipe appears to have been broken back as the channel bank eroded.

Protective Measures:

- The outlet should be isolated with a cofferdam to allow for dewatering during excavation. It is recommended that the cofferdam be located a minimum of 4 feet from the structure. Because of the severe bank erosion in the area, the headwall is no longer functioning as intended. Therefore it is recommended that the City of Kalamazoo be contacted to confirm that it can be removed in conjunction with sediment removal or cofferdam installation.

Structure: SA6-S16 Date: April 14, 2012

Overall view of the structure from the upstream channel

Bank erosion and root growth around the headwall

Structure: SA6-S16 Date: April 14, 2012

Severe cracking and leaning of north side of headwall

Gap between concrete pipe and headwall mortar

Structure: SA6-S16 Date: April 14, 2012

Severe leaning of north side of headwall with root growth behind

Overall view of structure from downstream channel

Designation: SA6-S17

Location: SA6-S17 is located on the east bank of Portage Creek approximately 150 feet north of the overhead electrical crossing between Stockbridge Avenue and Lake Street.

Description: SA6-S17 is a clay tile, approximately 8-inch diameter, extending approximately 2½' into the channel.

Pre-existing Condition:

- The end section of the pipe has failed and is deflected downward into the channel.
- The channel bank is severely eroded and undermined in the area of the pipe.

Protective Measures:

- The end section of pipe should be removed and replaced to with corrected alignment or cut off at the bank to accommodate sediment removal.

Structure: SA6-S17 Date: April 14, 2012

View of the structure from the channel

End section deflected and supported on the channel bottom

Designation: SA6-S18

Location: SA6-S18 is located on the east bank of Portage Creek approximately 150 feet south of Lake Street.

Description: SA6-S18 is a fence section extending approximately 6 feet into the channel.

Pre-existing Condition:

- The fence is overgrown with channel debris caught on the upstream face.
- The concrete base near the bank has been completely exposed from bank erosion.

Protective Measures:

- From the technical memorandum, we understand this fence is to be removed prior to sediment removal operations and replaced in kind.

Structure: SA6-S18 Date: April 14, 2012

View of the fence from the channel

Steel support post in the channel

Structure: SA6-S18 Date: April 14, 2012

Concrete base exposed by bank erosion

Designation: SA6-S19

Location: SA6-S19 is 504 East Lake Street, located on the southeast quadrant of Lake Street and Portage Creek.

Description: SA6-S19 is a two-story single family home with concrete foundation walls. There is a chain link fence between the home and the channel.

Pre-existing Condition:

- The fence is leaning severely in the area of the gate and has a missing section just south of the gate.
- The bank along the property has been cleared. It is very steep, near vertical in places, and undercut approximately 12 inches with exposed roots throughout.
- The current resident indicated that the basement area routinely floods with about 4 feet of standing water. The elevation of the basement floor slab appears to be at or near the normal water surface of the creek. The sump pump crock had standing water just below the floor slab at the time of the review.
- The concrete floor slab in the basement has severe cracking and heaving throughout, with prior grout seal and re-cracking. The west foundation wall has vertical, horizontal and diagonal cracking with grout seal and re-cracking. Cracking in the wall appears to concentrate around the window penetrations.

Protective Measures:

- We understand that the fencing will be removed by the current resident. It should be replaced in kind after sediment removal operations at the discretion of the property owner.
- The foundation of the home appears to be of sufficient depth and distance from the excavation area that it will not require special protection. However, because the foundation is severely deteriorated, vibration from cofferdam installation could impact the structure. Therefore, it may be advisable to monitor vibration near the structure to supplement this report should a claim arise.

Structure: SA6-S19 Date: April 14, 2012

View of the structure from the upstream channel

Bank erosion and undercutting along the property

Structure: SA6-S19 Date: April 14, 2012

Bank erosion and undercutting along the property

Severe cracking and heaving of concrete slab in basement

Cracking in west concrete foundation wall

Cracking in west concrete foundation wall

Severe cracking and heaving of concrete slab in basement

Severe cracking and heaving of concrete slab in basement

Severe cracking and heaving of concrete slab in basement

Sump pumps in southwest corner of basement

Cracking in southwest foundation wall

Sump pump outlet pipe

Cracking in foundation wall reflecting through newer coating

View of fence from top of bank

Designation: SA6-S20

Location: SA6-S20 is the Lake Street Bridge crossing Portage Creek, just north of the northern limits of SA6.

Description: SA6-S20 is a single span bridge constructed in 1986. The superstructure is composed of side by side prestressed concrete box beams, concrete sidewalks, concrete parapet railings and an asphalt wearing surface. The substructure is composed of concrete curtain walls supported on cast in place concrete piles. Concrete block type retaining walls were constructed in all 4 quadrants to support the slopes.

Pre-existing Condition:

- The asphalt approach pavement has longitudinal and transverse cracking at 2-10 foot spacing on the west and 2-4 foot on the east, which is mostly sealed. The asphalt surface has map cracking throughout at 1-2 foot spacing, which is mostly sealed. There is spalling and cold patch along centerline. Severe transverse cracking and spalling with cold patch was noted along the reference lines.
- No significant deterioration was noted on the concrete parapet railings or sidewalks. The approach sidewalks have settled approximately ½" at the structure.
- The southwest wingwall extension is made of concrete rubble supported by fence posts. It is severely undermined with bank undercut approximately 2-3 feet. The original concrete block wall in the southwest has tree growth behind, mortar gaps and ½"-1" gap to the concrete curtain wall. The concrete block wall in the northwest has ¼"-½" gap to the curtain wall and severe horizontal cracking approximately mid-height. It also has severe bank erosion and undermining around the end. The concrete block wall in the northeast has moderate bank erosion and undermining around the end with a failed block at the waterline. There is scattered cracking in the wall and 1/8"-1/4" gap to the curtain wall. The concrete block wall in the southeast has 1/8"-1/4" gap to the curtain wall, moderate to severe horizontal cracking approximately mid-height and scattered moderate to severe vertical cracking. The south end is failing from severe bank erosion and undermining with material behind the wall settling.
- Local scour was noted along the faces of the abutments, however no undermining was detected. According to the construction drawings, the bottom of the concrete abutments is approximately 8 feet below the bottom of beam. The channel is currently approximately 4-5 feet below the bottom of beam. There is a large debris pile under the structure.
- The joints between box beams are grouted except for approximately 4-6" at the abutments. Efflorescence was noted at the centerline joint and scattered at others.
- There is a 12" concrete culvert outlet through the northwest abutment and 24" concrete through the southeast.
- There is a water main crossing along the north fascia.

Protective Measures:

- The primary structure is north of the cofferdam limits for SA6 and is founded on piles. Therefore, no special protective measures are anticipated. However, the northernmost cofferdam is located within the concrete block wingwalls in the southeast and southwest. It is recommended that a U-shaped cofferdam be created to allow the cofferdam to be extended into the banks south of the wingwalls and avoid undermining the walls during sediment removal. The cofferdam should be placed with a minimum 4' clearance to the walls.

Structure: SA6-S20 Date: April 14, 2012

View of the structure from the approach area

Elevation view of the structure from the upstream channel

Concrete rubble wingwall extension in the southwest

Concrete block wall in the southwest

Gap between southwest concrete block wall and curtain wall

Water main along north fascia and debris pile under the structure

Structure: SA6-S20 Date: April 14, 2012

Cracking in the northwest concrete block wingwall

Cracking and vegetation growth in the northwest wingwall

Structure: SA6-S20 Date: April 14, 2012

Severe bank erosion and undermining around the end of the northwest wingwall

Overall view of the northeast concrete block wingwall

Bank erosion and undermining around the end of the northeast wingwall

Sealed gap between the northeast wingwall and curtain wall

Structure: SA6-S20 Date: April 14, 2012

Cracking in the southeast concrete block wingwall

Cracking and vegetation growth in the southeast wingwall

Structure: SA6-S20 Date: April 14, 2012

Severe bank erosion and undermining around the end of the southeast wingwall

Loss of backfill behind the southeast wingwall

Cracking in the asphalt surface area

Cracking and cold patch in the asphalt surface along centerline