# Appendix A: 2019 Site Visits

US Army Corps of Engineers ®
Omaha District

# Summary Report of WOTS Requested Site Visit for the Papillion Creek Watershed Stream Degradation Study

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On the morning of 18 April 2019, a site visit was taken to multiple locations in the Papillion Creek Watershed. The goal of these visit was to all USACE Subject Matter Expert (SME) Mr. Chris Haring of the USACE Engineer Research and Development Center – Coastal and Hydraulics Lab (ERDC-CHL) to view multiple locations that encompass three identified project sites for preliminary design as scope in the Project Management Plan (PMP).
Those three sites are summarized as A) South Papillion Creek from the confluence with West Papillion Creek to Beetle Creek (6.75 miles), B) Bridge and utilities crossing at 132nd Street on West Papillion Creek (0.1 miles), and C) Cole Creek between Hillside Drive and Seward Street (0.16 miles).
The Water Operations Technical Support (WOTS) proposal that provided for Mr. Haring to visit and write a summary reports is as follows:

The Omaha District's Hydrologic Engineering Branch, through the Water Operations Technical Support (WOTS) program, requests the technical assistance of Mr. Chris Haring of ERDC-CHL River Engineering Branch, regarding design of bank stabilization and grade control measures for the Section 22 project address systemic degradation of the Papillion Creek Urban Watershed in the Omaha, NE metropolitan area.

The project completed the Phase I review and scoping and has entered Phase II, which will identify and prioritize areas impacted by degradation and develop solutions for three example sites, covering a range of channel lengths, and may include multiple solutions. Ideally, solutions will be identified that have benefits that extend well past the local construction area. In most cases, new solutions will have to be intertwined with existing grade control from railroad or highway bridges, or from a scattered collection of structures installed over the past few decades.

Omaha District requests assistance consisting of a site visit, a brief discussion with the Omaha District and Local Sponsor, followed by a concept level report on applicable methods that would meet project needs with reference design guidance. The Omaha team expects to have the sites selected before the site visit, and would include these sites as well as any others that can be viewed in the allowable time.
The Omaha team has vetted dates with Mr. Haring in the early spring, and is looking to execute the site visit by 30APR19 with subsequent draft report by 30MAY19.

Project coordination within Omaha District is through Paul Boyd, Hydraulic Engineer, River and Reservoir Engineering Section, and Tim Goode, Project Manager, Planning Division.

Multiple stops associated with Site A, and Sites B and C are summarized here to support the recommendations and report by Mr. Haring.
The City of Omaha is currently collecting surveys at the confluence of West and South Papillion Creeks for a sewer line replacement. Surveys at sites B and C are being explored under new tasks by the City. It is hoped that the surveys will be complete by the end of August, 2019. Appendix A shows the extents of the proposed surveys.

**A) South Papillion Creek from the confluence with West Papillion Creek to Beetle Creek (6.75 miles)**

South Papillion Creek joins West Papillion Creek just upstream of the Hell Creek drop structure, just west of South 110th Street and Harry Andersen Blvd. The entire confluence area is highly degraded. The Hell Creek invert elevation has been set by a constructed drop structure to eliminate significant head cutting to the channel. Figure 1 shows the Hell Creek outlet structure.


**Figure 1. Hell Creek outlet structure**

Degradation continues on the West and South Papillion Creeks in the vicinity. The city of Omaha has identified a sewer line on West Papillion Creek, approximately 200 feet upstream of the confluence that has become exposed. Figure 2. Identifies the location of the sewer line.


**Figure 2. Exposed sewer line on West Papillion Creek just above confluence with South Papillion Creek (looking upstream from the confluence). Pipe location highlighted.**

The mouth of South Papillion Creek is in a similar condition, experiencing 10-15 feet of degradation in places. Figure 3. Looks up from the mouth on South Papillion Creek.


**Figure 3. Mouth of South Papillion Creek (looking upstream)**

Approximately 0.4 miles upstream of the confluence, the Giles Road Bridge, just east of S 120th St. shows the impacts of channel degradation.


**Figure 4. South Papillion Creek channel at the downstream side of Giles Road Bridge (looking downstream)**

The channel below the bridge appears to be partially stabilized with broken slab concrete waste, however, the concrete bridge piers appear to be partially exposed at their base. Directly upstream of the bridge extreme bank erosion continues. It does not appear that in the past, the bridge has served

as grade control, although as degradation continues, additional hard material will be exposed, possibly slowing degradation.


**Figure 5. Right bank erosion above the Giles Road Bridge (looking upstream)**

Past this point, channel degradation and bank erosion continue as the South Papillion Creek travels a relatively straight course through an industrial area with five bridge crossings before running along the back yard property line of the Giles Ridge neighborhood, just east of 156th Street. Figures 6 and 7 show the incised channel and bank protection measures installed by the NRD to protect a sewer line, and the railroad bridge that serves as grade control at the top of this reach. These sites were not visited in April 2019.


**Figure 6. Newly constructed right bank slope and toe to protect sewer line (looking upstream)**


**Figure 7. Railroad Bridge just east of 156th St. (looking upstream)**

It is unknown to what extent the five bridge crossing between 120th St. and 156th St. provide any grade control. Above this structure, the channel develops a more sinuous path through residential neighborhood for approximately 1.0 mile before passing under 168th St. This site was also not visited in April 2019. Figures 8 and 9 show the incision and neighborhood runoff detention structure feeding into South Papillion Creek just above the 168th St. Bridge.


**Figure 8. Channel incision upstream of 168th St. Bridge**


**Figure 9. NRCS designed neighborhood runoff detention structure**

Approximately 1.3 miles above the 168th St. Bridge, Beetle Creek enters South Papillion Creek. Beetle Creek drains multiple neighborhoods to the north, and exhibits extreme erosion and degradation up to the large culvert through 180th St. The Beetle Creek watershed is almost fully developed into residential and industrial areas. The change in hydrology has led to increased peak discharges on Beetle Creek and the occasional overtopping of 180th St. Figure 10 shows the upstream inlet to the 180th St. culvert, and Figure 11 looks downstream and the outflow basin from the culvert.

Figure 10. Upstream inlet to Beetle Creek culvert

**Figure 11. Outlet of Beetle Creek culvert**

The invert change through the culvert likely exceeds 10 feet, though not measured. The channel incision below the culvert extends down to South Papillion Creek, approximately 0.2 miles below the culvert. The culvert is actively working a grade control.

On the South Papillion creek proper, the farthest upstream structure that is considered part of this project site is the concrete culvert at Giles Rd., approximately 0.4 miles above the mouth of Beetle Creek. Figure 12. Shows this structure.

**Figure 12. Culvert structure at Giles Rd. Upstream limit of site.**

Significant bank erosion is seen below the structure and there were signs that the rock protecting the wing wall was recently place, though not by the NRD. Figure 13. Show the bank erosion below the structure.

**Figure 13. Bank erosion below the culvert structure on Giles Rd. near 180th St.**

**B) Bridge and utilities crossing at 132nd Street on West Papillion Creek (0.1 miles)**

This site is located 2.9 miles above the West/South Papillion Creek confluence. Along the 2.9 mile stretch, West Papillion Creek is almost perfectly straight, indicating that significant channel straightening and modifications were done as industrial and residential areas grew.
At the 132nd St. bridge location, the I-beams driven into the subsurface to support the bridge piers are exposed due to channel degradation. The condition is exacerbated by the discharge of surface runoff into the channel directly below the bridge. Due to degradation, the surface discharge is now perched 10 feet above the channel, and the momentum of the discharge carries it to the far bank, increasing bank erosion. Figure 14. Shows the bridge with surface discharge pipe delivering from the right.

**Figure 14. 132nd St. Bridge over West Papillion Creek.**

**Figure 15. Bank erosion caused by channel degradation and surface water discharge into channel perpendicular to bank. Note telecom lines exposed by erosion.**

There has been some attempt to stabilize the bed of the channel by dumping concrete waste, cinder blocks, etc. in the area directly above the bridge. Some of this material appears to have moved under and below the bridge. It is unknown how effective this material is at preventing further bed degradation.

### C) Cole Creek between Hillside Drive and Seward Street (0.16 miles)

This site extends approximately one city block in midtown Omaha. Cole Creek drains this area into the Big Papillion Creek, approximately 1.0 miles above its mouth. According to the City of Omaha, flooding concerns resulted in some property buyouts in the reach in the near past. Not all the properties were bought out, and some are still at high risk for flooding.

The creek travels through an older neighborhood and channel degradation has been ongoing for decades. The channel has a very large amount of waste concrete along the channel. The channel was likely straightened when the neighborhoods were put in, and the distribution of the concrete material has returned some sinuosity within the high banks.

Extreme bank erosion can be observed on the left bank, resulting the fences and backyards falling into the river. Throughout the reach, the left bank averages 15-20 feet high. The reach is controlled by under-street culverts on each end. Work was done in the past to increase the capacity of the culvert to reduce localized flooding. Figure 16. Shows a fence falling into the creek, and Figure 17. Provides left bank height scale.

**Figure 16. Bank erosion along Cole Creek results in fences and trees falling into the creek.**

**Figure 17. Cole Creek left bank failure.**

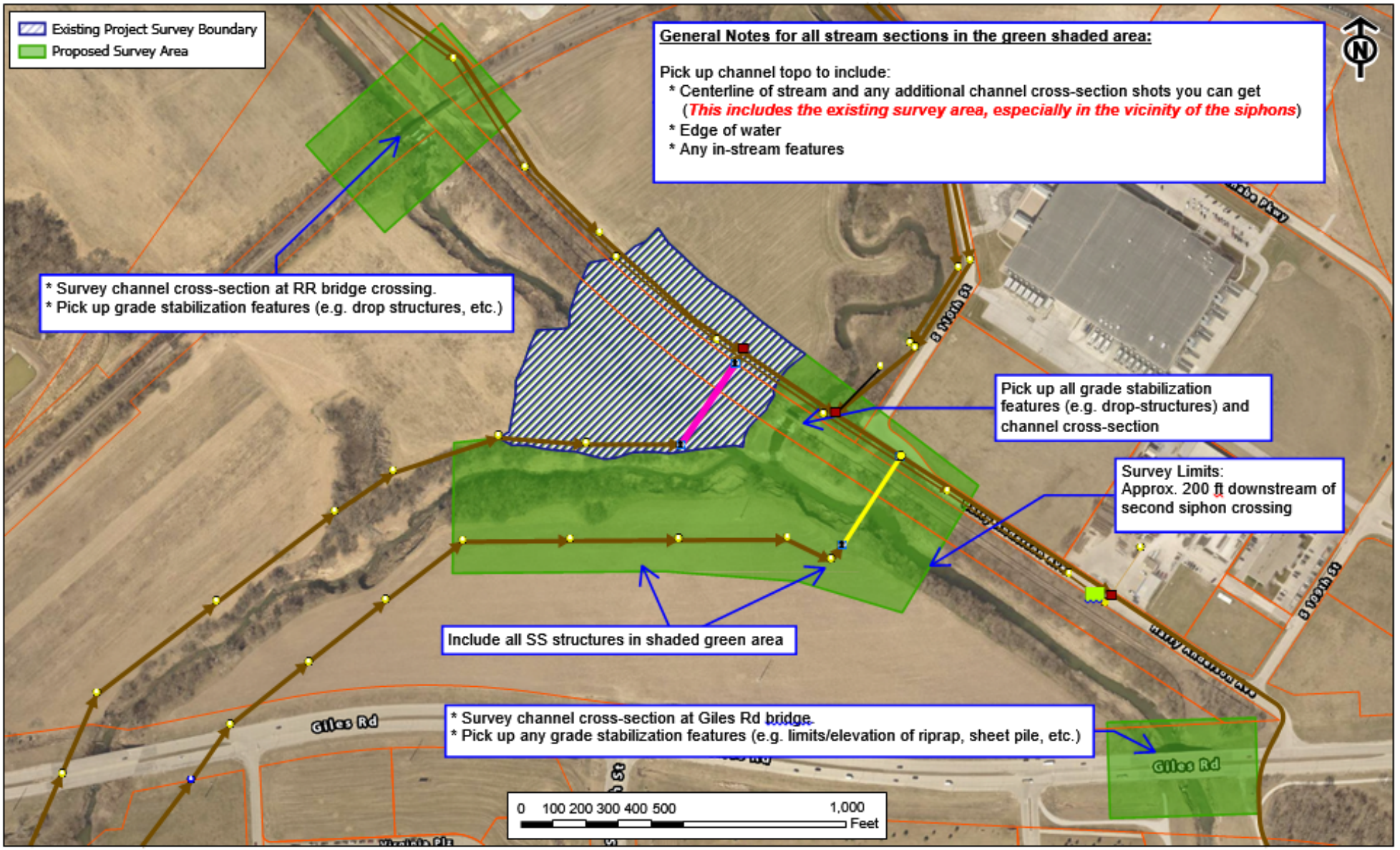
This one block reach is indicative of others in the watershed. The overall grade of the channel is controlled by the culverts at each road crossing, but channel degradation between crossings in extreme. Figure 18 shows the downstream outlet of the Hillside Drive culvert with large hole. Broken concrete makes up the majority of the bed material.

**Figure 18. Cole Creek channel below Hillside Drive culvert.**

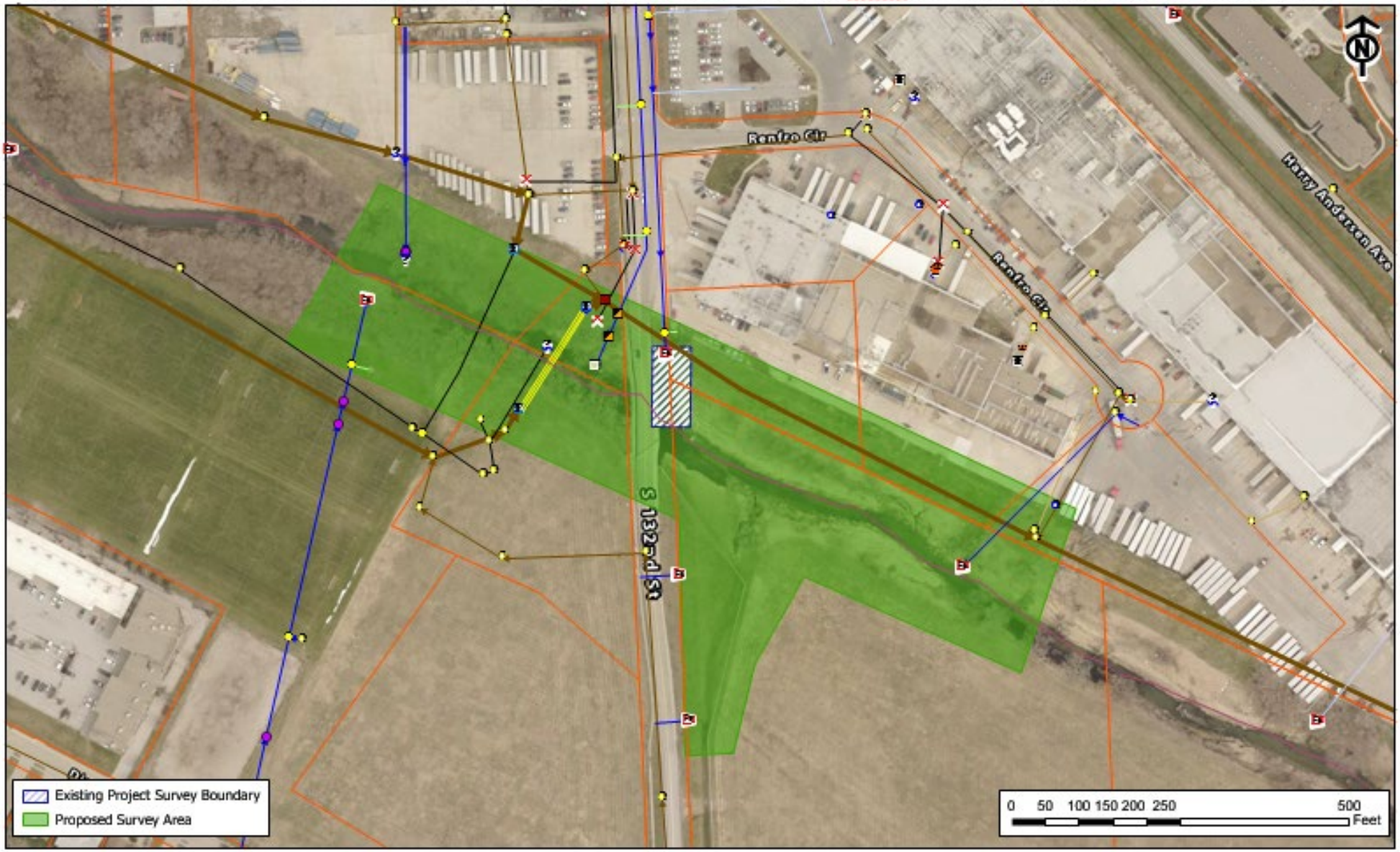
Each of these sites is experiencing channel degradation coupled with bank erosion through a change in watershed hydrology, channel morphology, sediment supply, and flow restrictions.
This summary provides a few photographic examples of each site. Additional photos are available upon request.

## Extents of Proposed Surveys by contract from the City of Omaha

## Site A: Downstream Boundary Surveys - OPW 53538: Giles Road Siphon Replacement



## Site B: Bridge and Utilities West Papillion Creek at 132nd St. - OPW 53429: West Papio Storm Repairs - 132nd to Harry Andersen



## Site C: Cole Creek Culvert at Hillside Dr