Village of Bartlett
Country Creek Streambank Stabilization

HAMPTON, LENZINI AND RENWICK, INC.

PROJECT OVERVIEW

We analyzed the project site and developed three concept design alternatives.

Project Site

- West Branch Tributary No. 2 (WBW2) from West Country Drive to Francine Drive
- High rates of erosion with risk to structures and utilities

Project Goals

1. Reduce erosion throughout the project site
2. Remove the risk of damage to structures and utilities
3. Improve water quality via sediment load reduction
4. Minimize impacts to the riparian corridor, and utilize vegetative solutions when possible

HISTORICAL CONDITIONS

Farmed up to edge of stream in mid-20th century

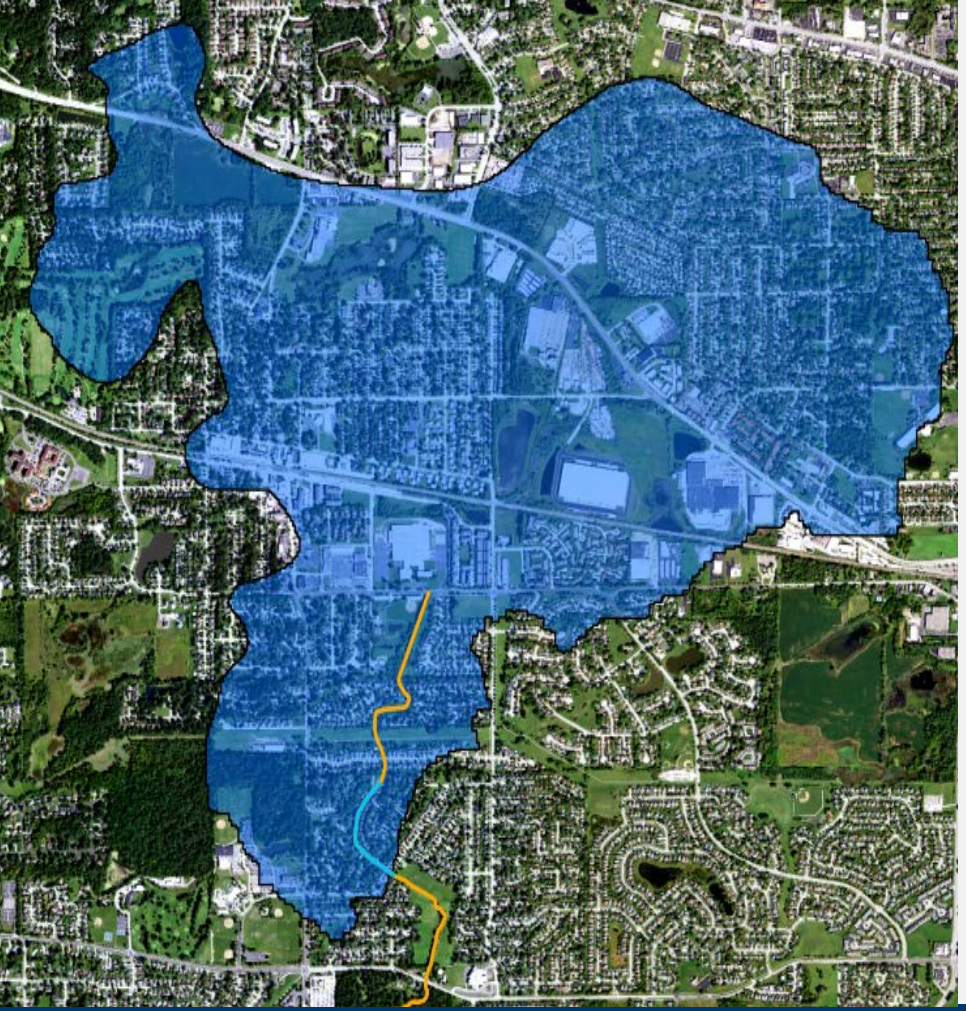
Stream straightened over time, with loss of natural meanders

Structures located near the top of the streambank in present conditions

RIGHT-OF-WAY

Privately-owned residential lots

Drainage easement extending 20 feet perpendicular to the stream along each lot line



WATERSHED CONSIDERATIONS

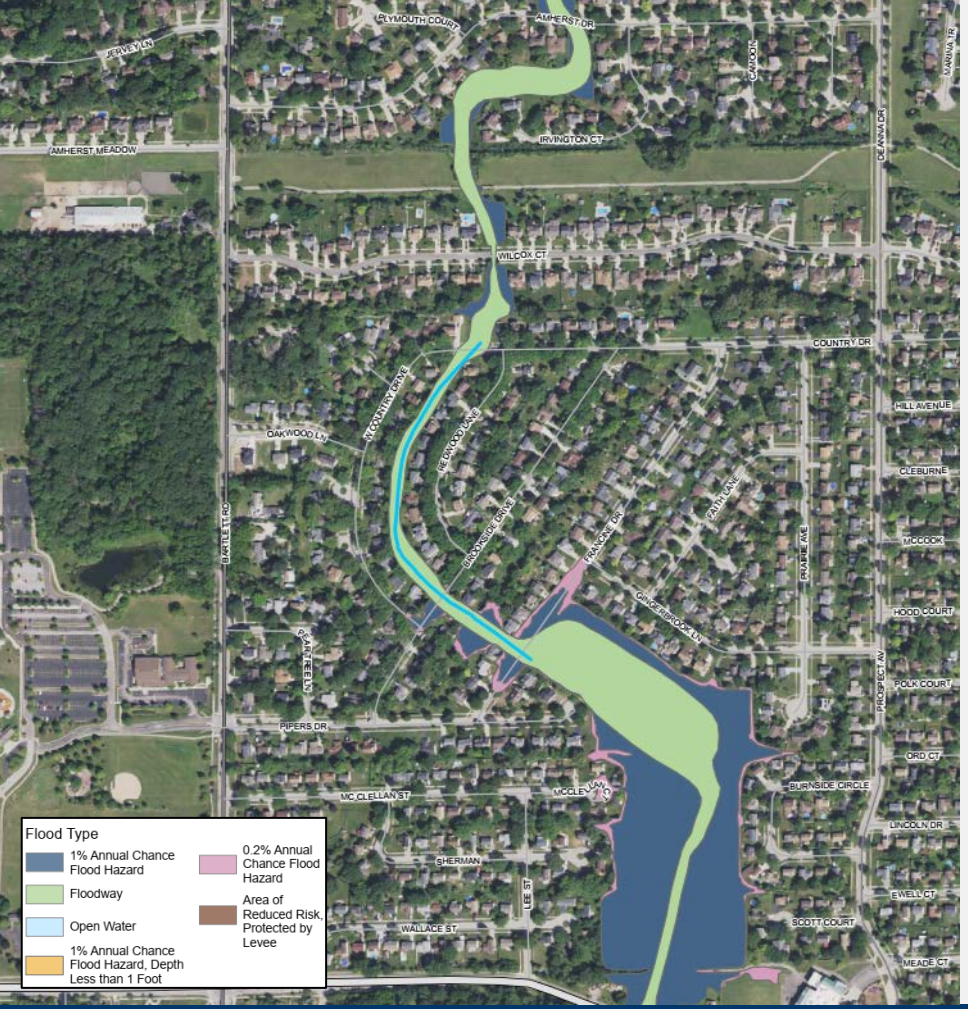
Drainage area of 2.8 square miles with primarily commercial and residential land uses

Located in the Upper West Branch DuPage River Watershed

1.25 miles upstream of the confluence with the West Branch of the DuPage River

Downstream, the West Branch of the DuPage River is impaired for sedimentation and phosphorus

- Proposed project will reduce erosion and improve these impairments



FLOODPLAIN & FLOODWAY

Floodplain and floodway present along WBW2

Narrow floodplain and floodway throughout project site

- Mostly contained within streambank

PROJECT CHALLENGES

Steep banks and severe erosion

Failing retaining walls

Undermining of trees, fences, sheds

Compromised storm sewers


Risk to utilities


Limited construction area

CONCEPT DESIGN ALTERNATIVES

ALTERNATIVE 1

Streambank stabilization and culvert extensions

ALTERNATIVE 2

Stream piping and mitigation

ALTERNATIVE 3

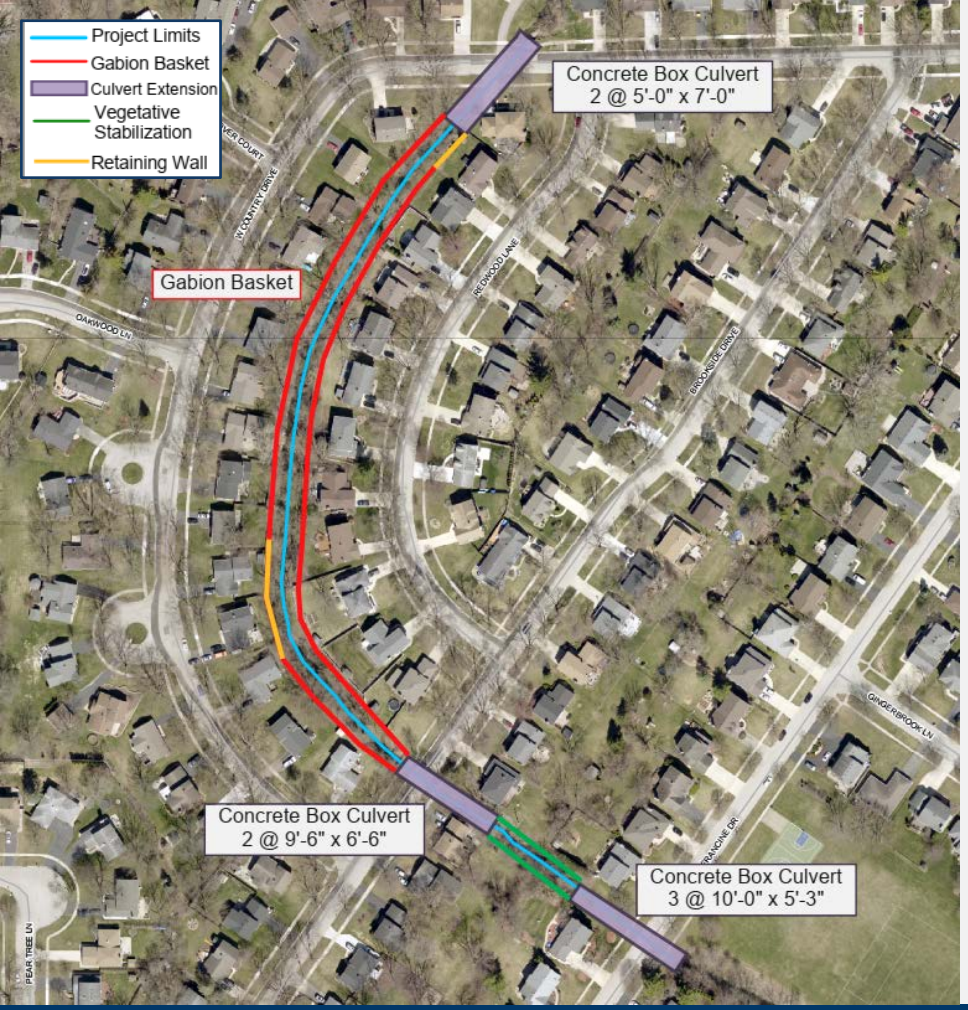
Stream diversion, streambank stabilization, and stream mitigation

DESIGN ELEMENTS

Retaining wall

Gabion Baskets

Floodplain bench and rock toe



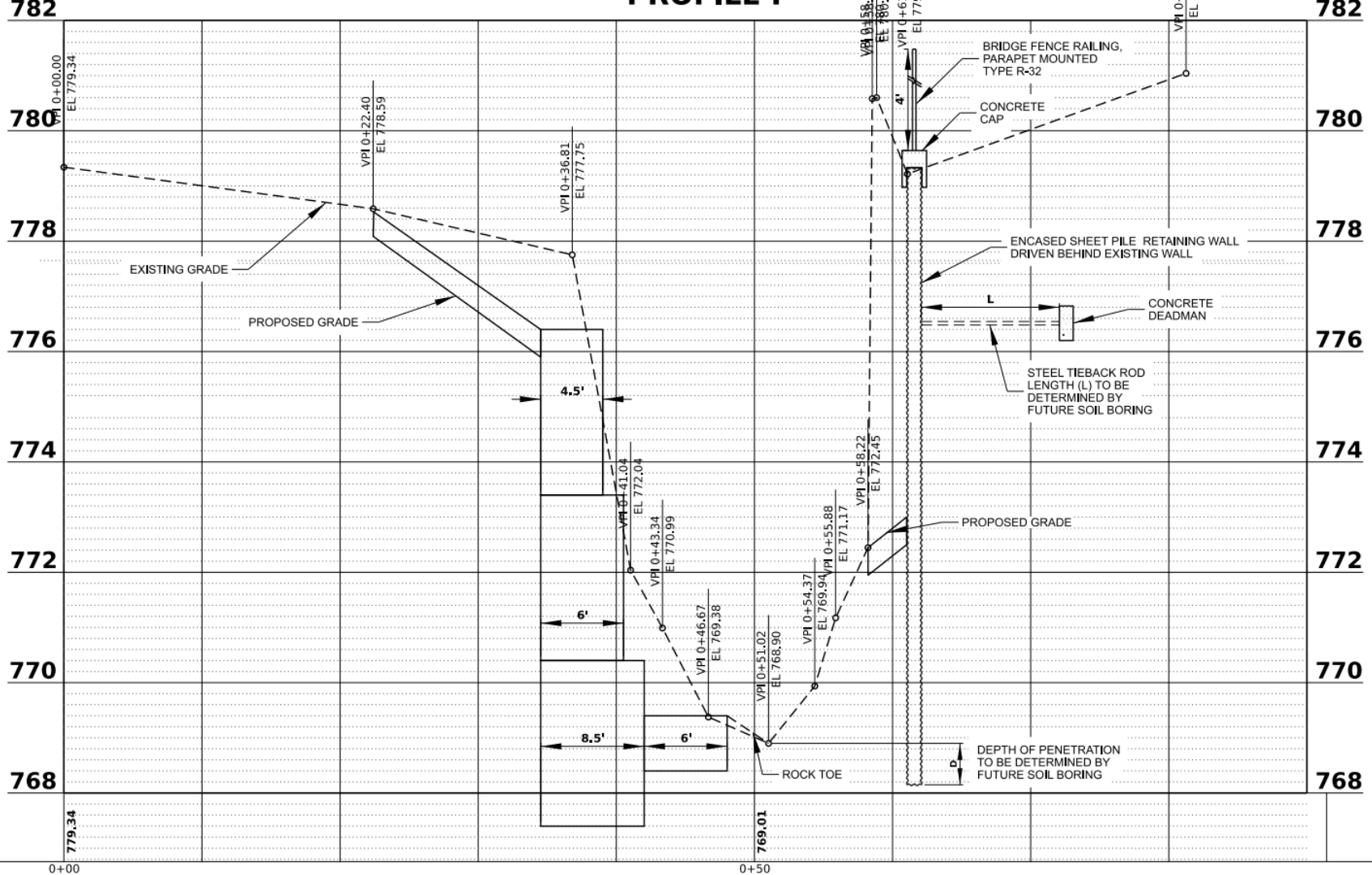
ALTERNATIVE 1

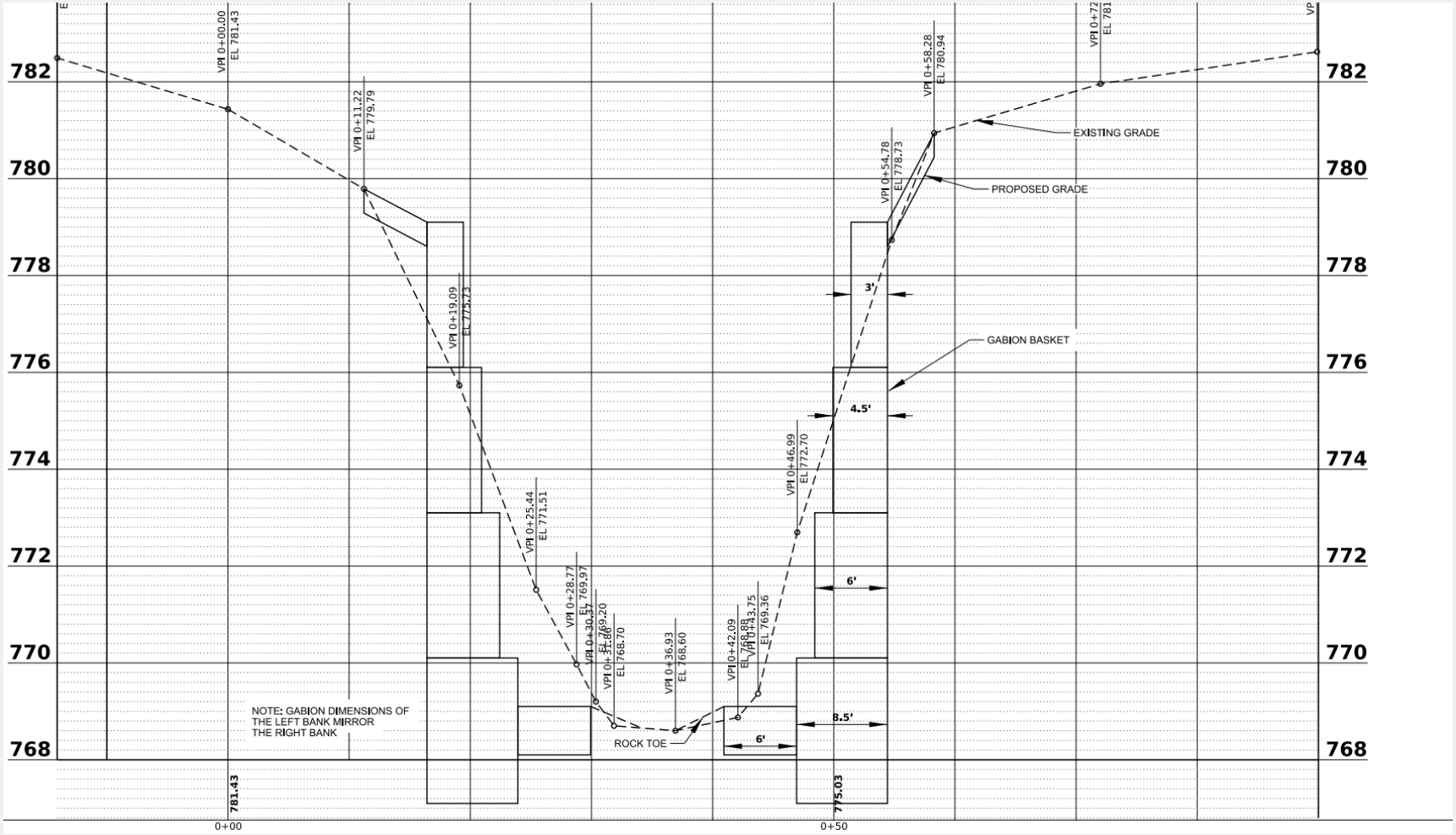
Utilize a variety of stabilization methods based on severity of erosion and proximity to structures

- Retaining wall
  - Minimal use, only in most severe areas
- Gabion Baskets
  - Used along most of streambank, can be integrated with vegetation
- Floodplain bench with rock toe
  - Used in least severe areas

Existing culverts replaced and extended in select areas of severe erosion and close proximity to structures

All impacted areas seeded with native riparian vegetation and planted with native trees


PROFILE
782
780
778
776
774
772
770
768
VPI 0+00.00
EL 779.34
VPI 0+22.40
EL 778.59
VPI 0+36.81
EL 777.75
VPI 0+41.04
EL 772.04
VPI 0+43.34
EL 770.99
VPI 0+46.67
EL 769.38
VPI 0+51.02
EL 768.90
VPI 0+54.37
EL 769.94
VPI 0+55.88
EL 771.17
VPI 0+58.22
EL 772.45
EXISTING GRADE
PROPOSED GRADE
4.5'
6'
8.5'
6'
BRIDGE FENCE RAILING,
PARAPET MOUNTED
TYPE R-32
4'
CONCRETE
CAP
ENCASED SHEET PILE RETAINING WALL
DRIVEN BEHIND EXISTING WALL
L
CONCRETE
DEADMAN
STEEL TIEBACK ROD
LENGTH (L) TO BE
DETERMINED BY
FUTURE SOIL BORING
PROPOSED GRADE
ROCK TOE
D
DEPTH OF PENETRATION
TO BE DETERMINED BY
FUTURE SOIL BORING
779.34
769.01
0+00
0+50


782
780
778
776
774
772
770
768
VPI 0+00.00
EL 781.43
VPI 0+11.22
EL 779.79
VPI 0+19.09
EL 775.73
VPI 0+25.44
EL 771.51
VPI 0+28.77
EL 769.97
VPI 0+30.31
EL 769.20
VPI 0+31.88
EL 768.70
VPI 0+36.93
EL 768.60
VPI 0+42.09
EL 768.88
VPI 0+43.75
EL 769.36
VPI 0+46.99
EL 772.70
VPI 0+54.78
EL 778.73
VPI 0+58.28
EL 780.94
EXISTING GRADE
PROPOSED GRADE
GABION BASKET
3'
4.5'
6'
8.5'
6'
ROCK TOE
NOTE: GABION DIMENSIONS OF
THE LEFT BANK MIRROR
THE RIGHT BANK
781.43
775.03
0+00
0+50

ALTERNATIVE 2

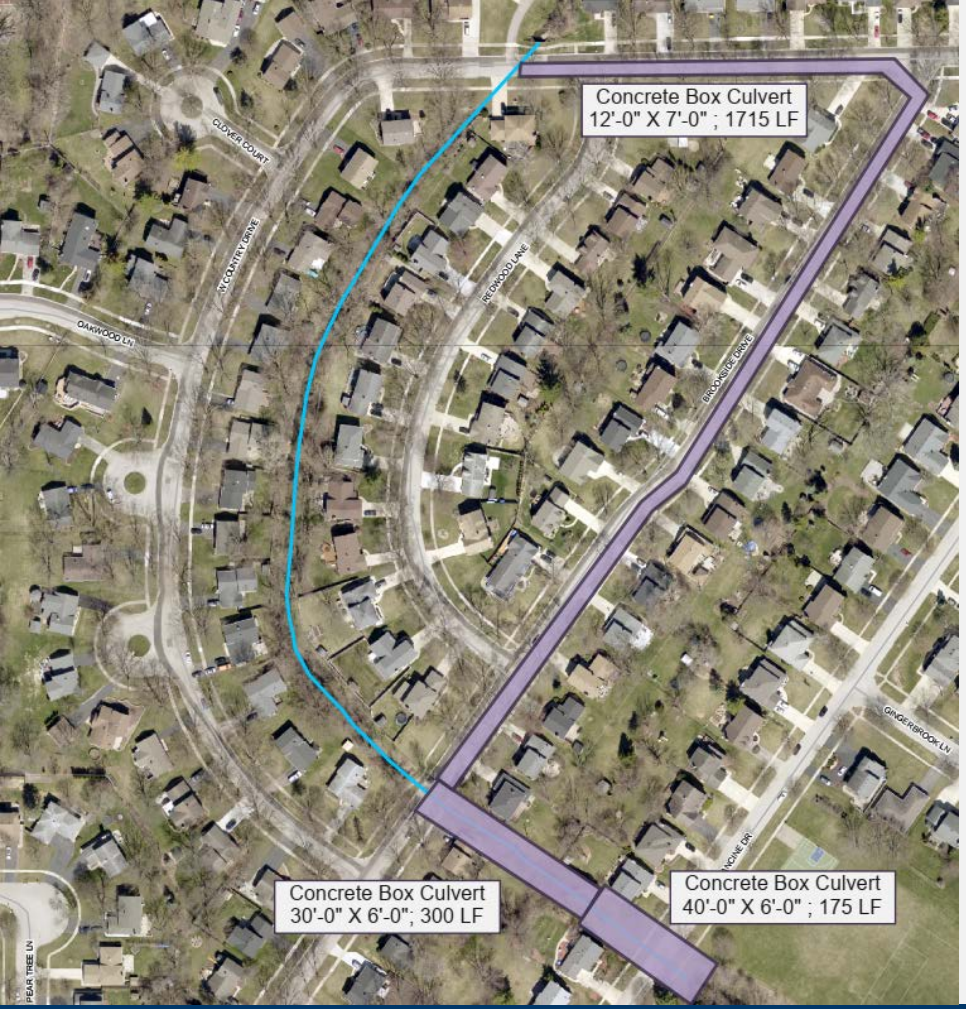
Stream to be piped via a series of box culverts

Vegetated swale graded above culvert to convey the stream's natural drainage area

- Seeded with native vegetation and planted with native trees

Requires stream mitigation to offset ecological impacts

This is unlikely to be approved by the USACE- It would be approximately 5 years of permit processing



ALTERNATIVE 3

Stream to be diverted along West Country Drive and Brookside Drive via a series of box culverts

Existing stream to be regraded to achieve lower bank slopes and stabilized with vegetative solutions

- Seeded with native vegetation and planted with native trees

Stream bottom to be raised, with low or no flow in stream under typical conditions

Requires stream mitigation to offset ecological impacts

STREAM MITIGATON

Required by U.S. Army Corps of Engineers to offset impacts to streams.

“The manipulation of the physical, chemical, and/or biological characteristics of a stream with the goal of restoring or replacing functional capacity that may be impacted by authorized activities”

Potential site – Marianne Cordell Park

Restore historical meanders
- o Improve natural stream function

Create riparian buffer
- o Restored wetland habitat
- o Improved ecological value and water quality

Activate floodplain
- o Flood resiliency

Valuable community space
- o High-quality natural area with aesthetic value

Simulate a “reference reach”
- o West Branch of DuPage River

ALTERNATIVE ANALYSIS

CRITERIA	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
Cost	$7,209,329 Potential grant funding	$14,008,726 Grant funding unlikely	$15,933,357 Grant funding unlikely
Stream function	**Some** natural stream function loss.	Removes **all** natural stream function.	**Significant** stream function loss.
Ecological and Aesthetic Value	Potential to implement vegetative solutions.	Stream mitigation to offset impacts, provide high quality habitat.	Stream mitigation to offset impacts, provide high quality habitat.
Permitting	No major challenges	US Army Corps of Engineers permitting challenges expected	US Army Corps of Engineers permitting challenges expected
Watershed	Reduced erosion will reduce sediment loading	Stream mitigation will provide valuable ecosystem services	Stream mitigation will provide valuable ecosystem services

CRITICAL PROJECT COMPONENTS

COMMUNITY INVOLVEMENT

Pursue an alternative that benefits community members

AGENCY COORDINATION

Involve regulatory agencies early-on to minimize permitting challenges

POSITIVE IMPACT

Balance impacts to erosion control, stream function, and community

Village of Bartlett
Country Creek Streambank Stabilization

HAMPTON, LENZINI AND RENWICK, INC.