



## BECKER ADDITION STORMWATER CHANNEL

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BG Consultants, Inc.  
Engineers | Architects | Surveyors  
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# PRESENTATION OUTLINE

- General Information
- Technical Analysis & Environmental Impacts
- Alternative Improvement Options
- Project Schedule

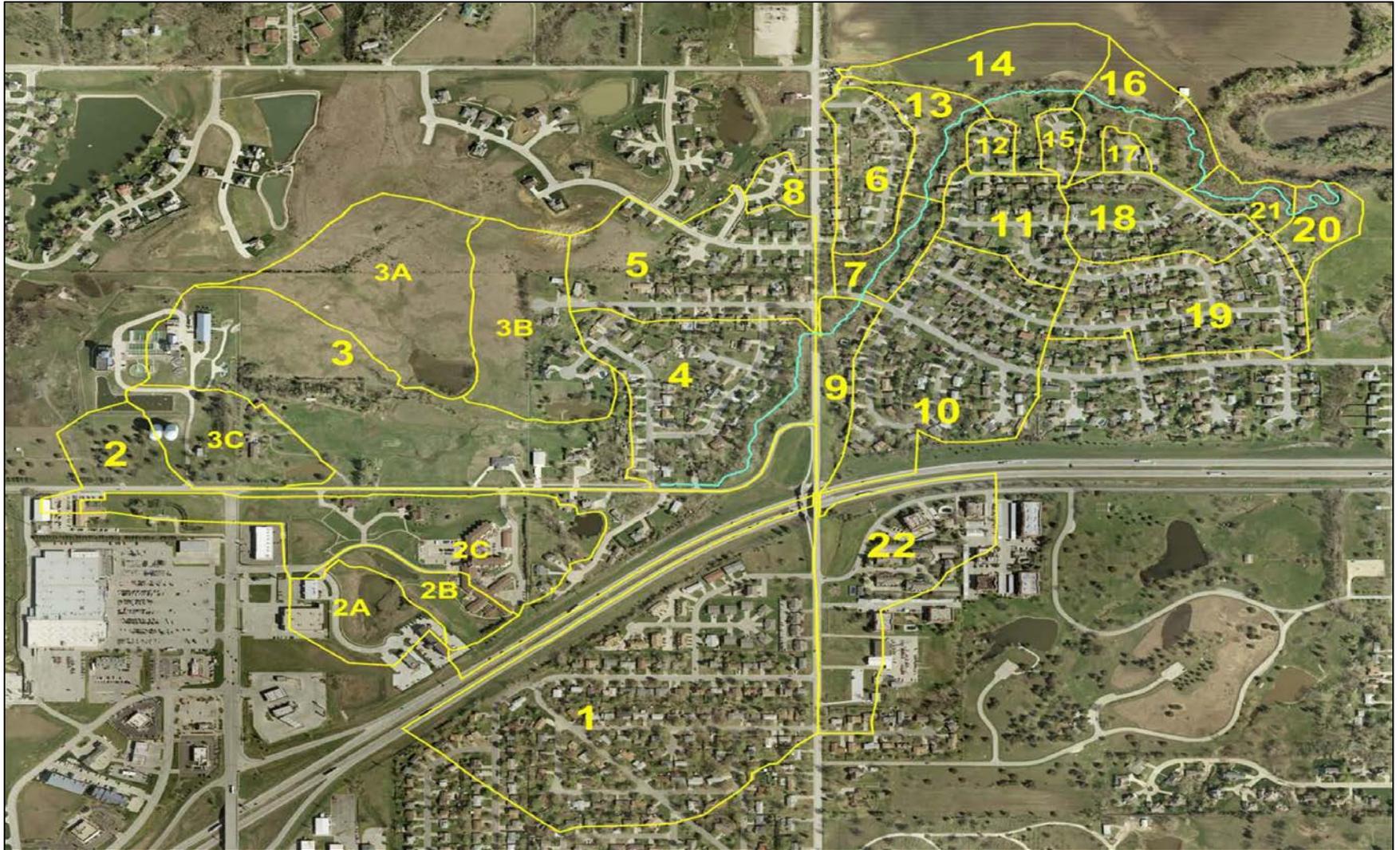
# WATERSHED AREA



# WATERSHED AREA

- Drainage area = 326 acres
  - 22 sub-basins
  - Drains Northeasterly directly to the Neosho River
  - Existing improvements are mostly in easements or right-of-way
  - Far West is water treatment plant, KFC restaurant, South of I-35 to catch Arrowhead Drive and portion of 4 Seasons Apartments, and most of Becker addition
  - Basin is mostly built and the areas that are not currently developed will be required to provide storm water detention improvements to control the run-off from the site to be the same (pre vs. post).

# WATERSHED AREA



# EXISTING CONDITIONS



## PROXIMITY TO STRUCTURES

# EXISTING CONDITIONS



## PROXIMITY TO STRUCTURES

# PUBLIC MEETING JANUARY 6, 2015

## ■ Public Concerns

- Erosion to public and private improvements
- Velocities of the stormwater & safety
- Environmental impacts and trees
- Disturbances to homeowners
- Initial and long term costs to possible solutions

# TECHNICAL ANALYSIS

- City GIS & 2' LiDAR contours, County Aerial maps, new hard survey data.
- HEC-HMS - Hydrologic Engineering Center-Hydrologic Modeling System by the U.S. Army Corps of Engineers is computer modeling software designed to simulate the precipitation-runoff processes
- HEC-RAS - Hydrologic Engineering Center-River Analysis System by the U.S. Army Corps of Engineers is computer modeling software designed to simulate one-dimensional hydraulic calculations
- Modeled the drainage system for 2, 5, 10, 25, 50, 100 design storms; both existing and proposed improvements

# ENVIRONMENTAL IMPACT

- US Corp of Engineer (COE) walked the channel and determined hard surfaced improvements would have a negative environmental impact.
- Mitigation costs would be required for hard surfaced improvements (+-\$500,000).
- Recommend further preliminary planning, engineering, and communication with Corps representatives for a Least Environmentally Damaging Practicable Alternative (**LEDPA**) Plan.

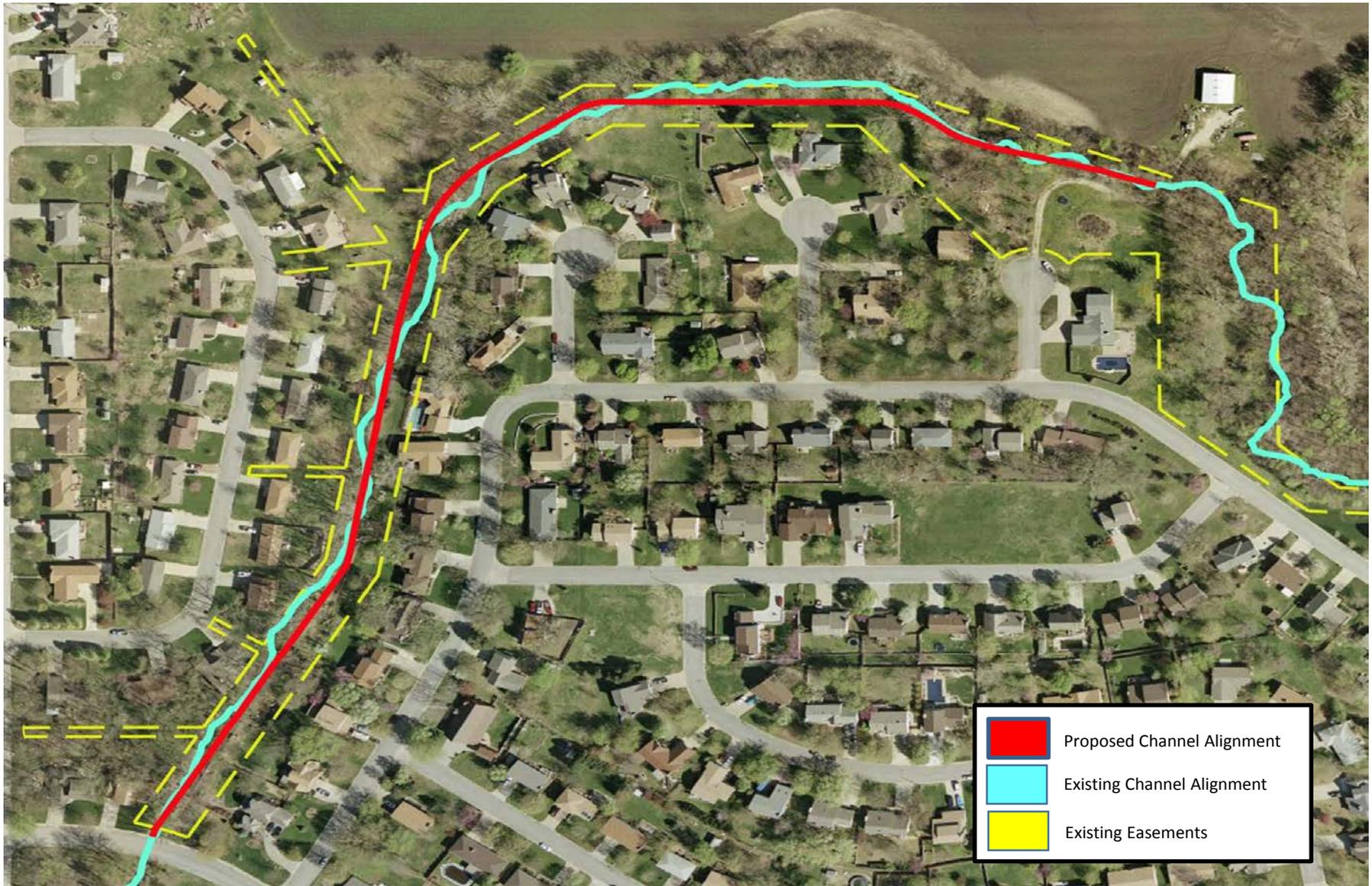
# EASEMENTS

- Permanent Easements
- Temporary Construction Easements
- Access Easements
- Utility Easements

# ALTERNATIVE IMPROVEMENT OPTIONS

- Concentrated evaluation from Prairie Street east to Neosho River
- Channel elevations and velocities were evaluated for existing and compared to three different possible improvements
  - Concrete lined channel (open ditch)
  - Gabion lined channel with concrete bottom and natural bottom (gabion are steel/metal baskets that are filled with rocks and then stacked like blocks)
  - Natural Revetment (improvements using natural materials and selected vegetation)

# PROPOSED CONCRETE AND GABION ALIGNMENT



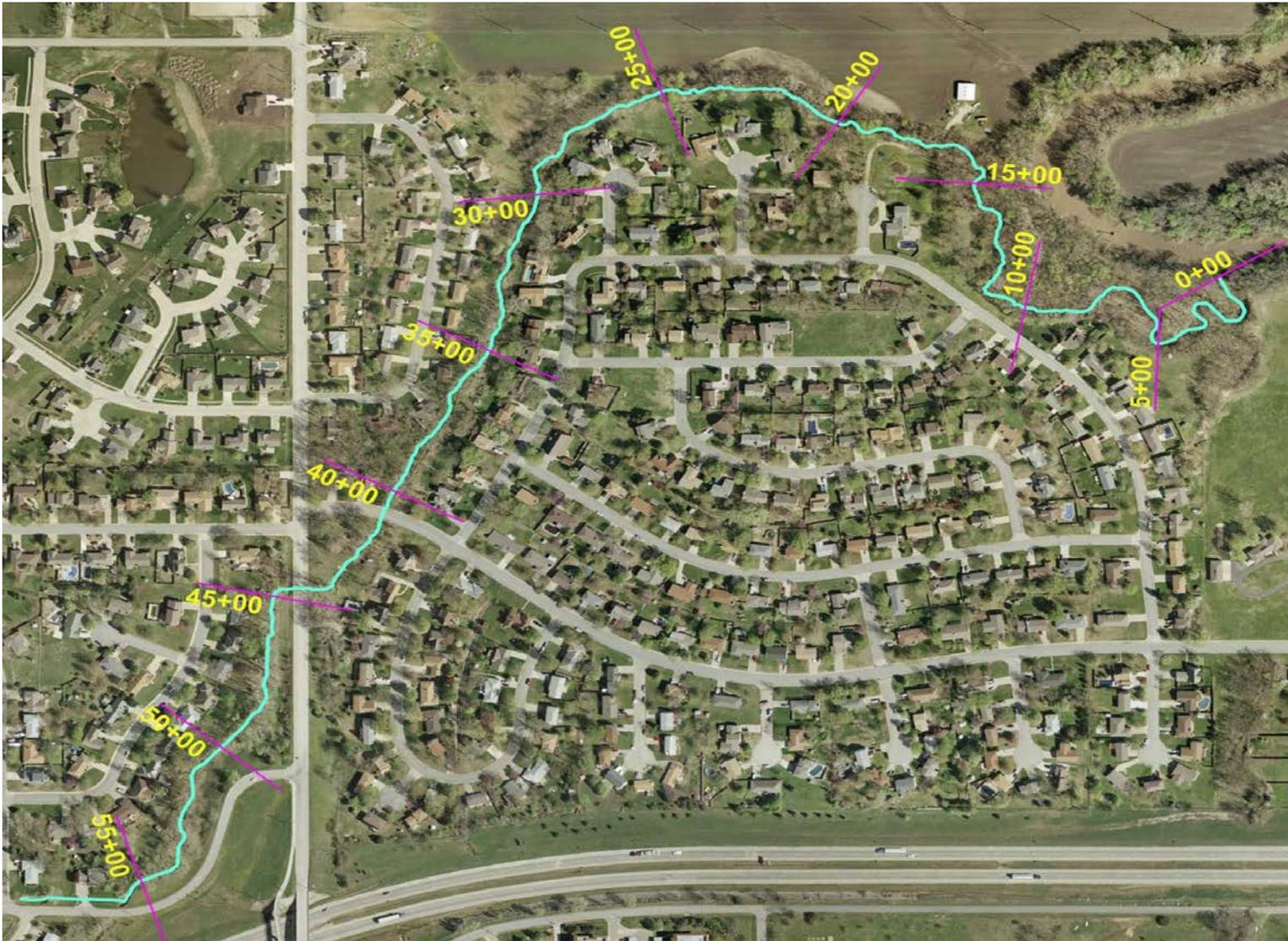
# PROPOSED NATURAL REVETMENT STREAM ALIGNMENT



# ALTERNATIVE IMPROVEMENT OPTIONS

- Project Costs - \$2,000,000 to \$5,000,000 depending on improvements
- Considerations
  - Proposed cross section impacts
  - Safety
  - Loss of backyards & trees
  - Constructability
  - Project costs
  - Maintainable improvements

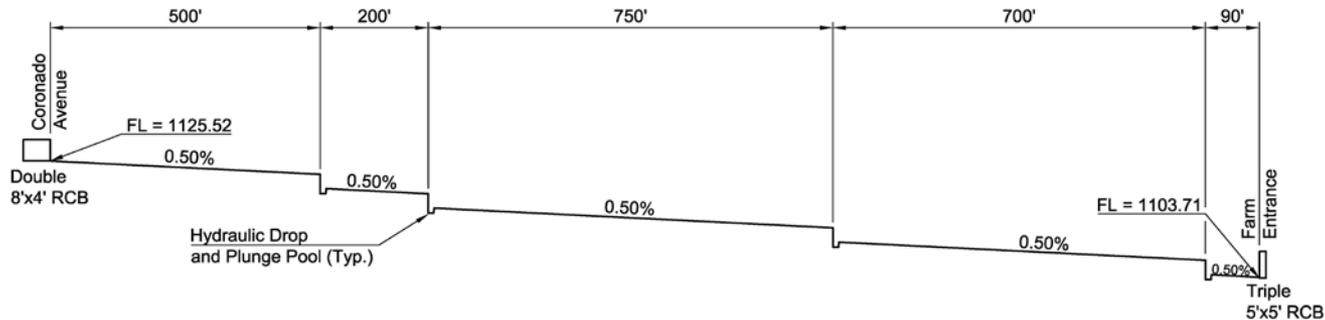
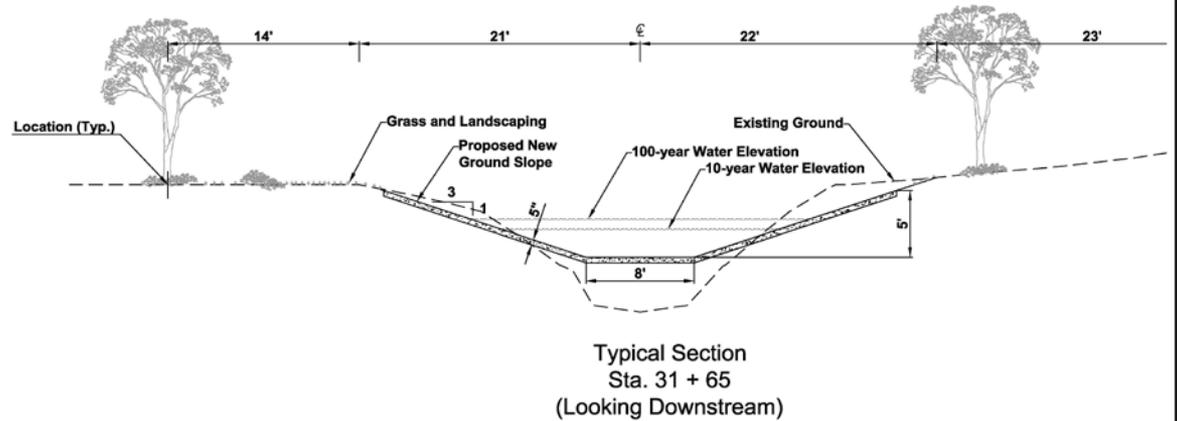
# WATERSHED AREA – CENTERLINE STATIONING



# ALTERNATIVE IMPROVEMENT OPTIONS



Preliminary Alignment (2,240')



OPTION 1 : CONCRETE - LINED CHANNEL

\$ 2.85M

Figure ES.7

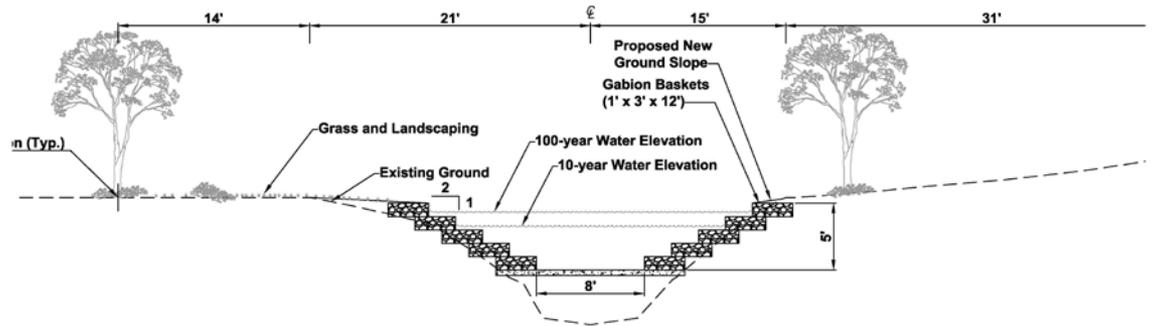
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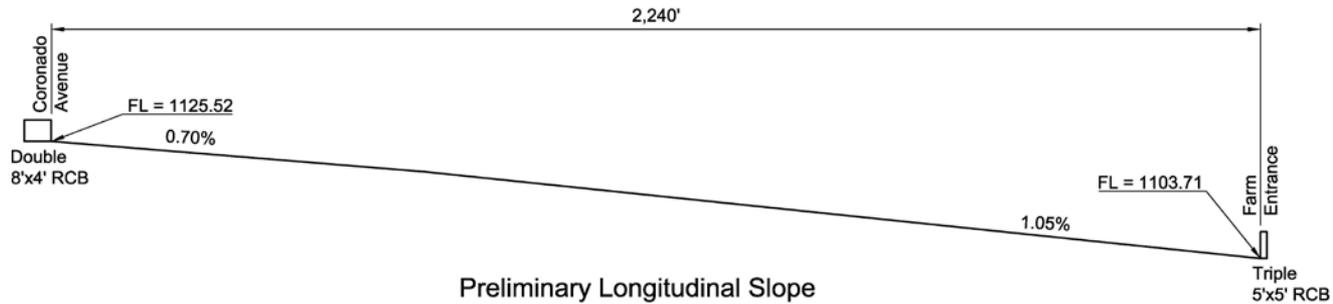
# ALTERNATIVE IMPROVEMENT OPTIONS



Preliminary Alignment (2,240')



Typical Section  
Sta. 31 + 65  
(Looking Downstream)



Preliminary Longitudinal Slope

OPTION 2 & 3 : GABION - LINED CHANNEL

\$ 4.18M CONCRETE BOTTOM

\$ 3.92M NATURAL BOTTOM

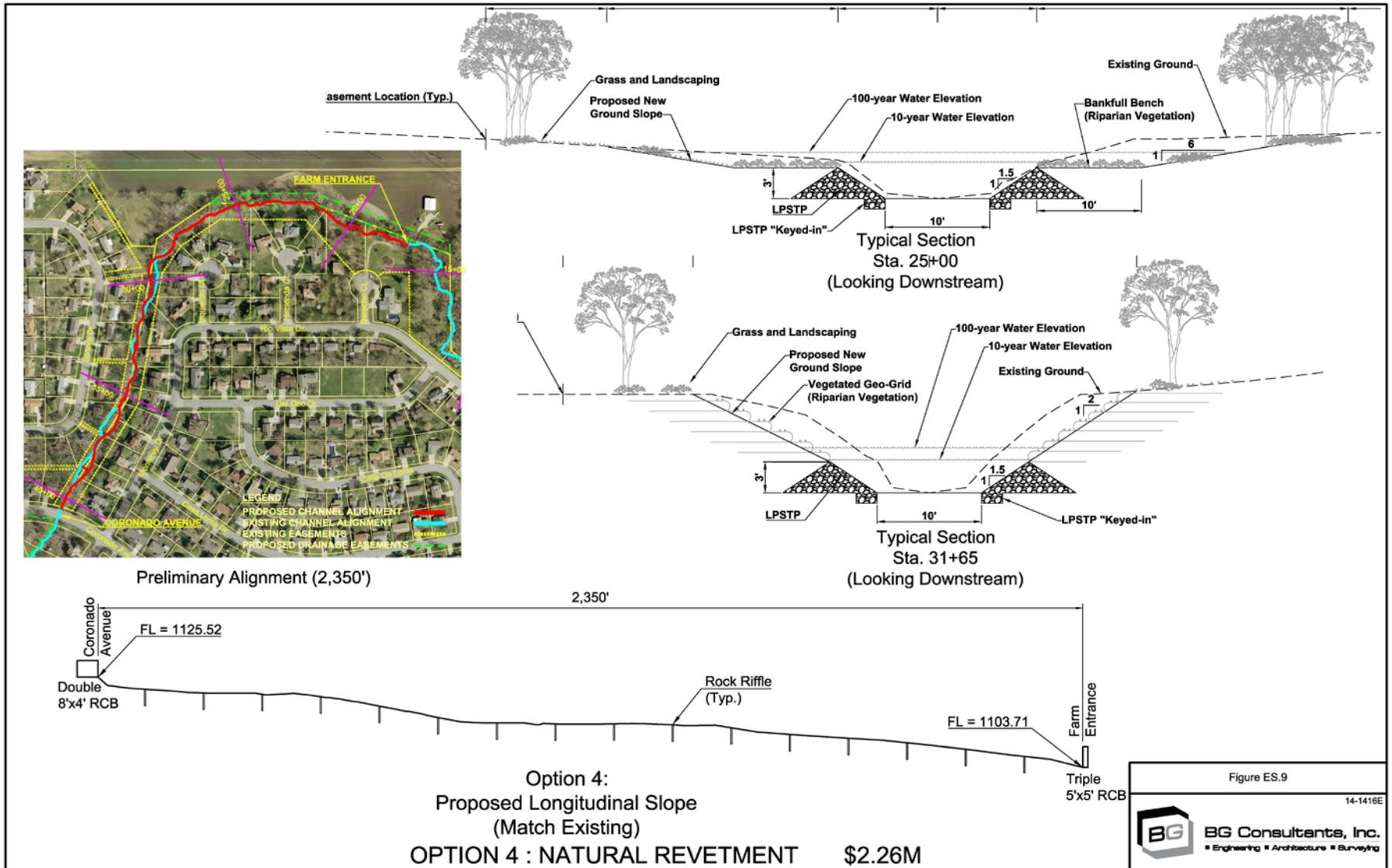
Figure ES.8

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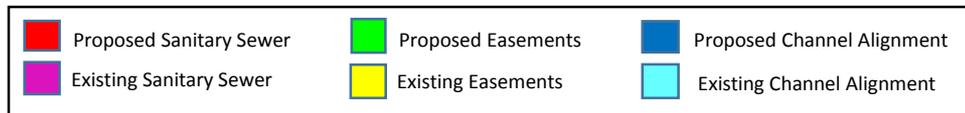


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# ALTERNATIVE IMPROVEMENT OPTIONS



# PROPOSED SANITARY SEWER ALIGNMENT



# ALTERNATIVE IMPROVEMENT OPTIONS

- Concrete lined Channel \$2.85M
- Gabion-lined Channel w/Concrete \$4.18M
- Gabion-lined Channel w/Natural \$3.92M
- Natural Revetment \$2.25M

# SCHEDULE

- Phase 1 – Preliminary/Evaluation
  - Completed
  
- Phase 2 – Study and Analysis
  - Current
  
- Phase 3 – Design and Contractor Selection
  - 6 Months to 2 years
  
- Phase 4 – Construction
  - 6 Months to 2 Years

# DISCUSSION & DECISIONS

- Decision on Proceeding Forward
- Improvement Selection
- Permitting
  - Easements
  - Environmental
- Design & Construction

# PROCEEDING FORWARD

- Schedule or next steps for Study & Analysis
  - Present findings to City Commission
  - Update/modify report per City Commission comments
  - Schedule a public meeting to present finding and gain comments back from public



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