Keys to a Successful Stormwater Project in a Fully Developed Residential Area

Lessons Learned from the Keystone/Chartres Stormwater Project

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PROJECT BACKGROUND

PROBLEM DESCRIPTION

FLOODING

JULY 23, 2011
(5.25 INCHES)

JUNE 26, 2013
(3.53 INCHES)
Detention (5 yr. storm)

Flooding Area

24-inch Storm Sewer
MSMP Project Cost $635,000

Budgeted Amount $1,128,010

Actual Cost $959,660

MSMP underestimated project costs
Detention (50 yr. storm)

Flooding Area

36-inch Storm Sewer

Fill Area

UPDATED CONCEPT PLAN
DESIGN CHALLENGES

Engineering Design kick-off meeting - 9/19/16
NBK Park District Board Meeting - 1/1/17
MWRD Permit revision deadline - 4/28/17
NBK Park District Pool Opening – Memorial Day Weekend 2017
MWRD Permit Issued – 7/20/17
Construction Start – 8/28/17
3050 Koepke Road Wedding Date – Labor Day weekend
Park Restoration Deadline – 10/6/17
Construction Completion Deadline – 11/10/17
PROJECT CHALLENGES

- Proposed 36-inch Storm Sewer
- Arborvitae Trees
- Residential Home
- Shrubs

TIGHT WORK AREAS
PROJECT CHALLENGES

SPECIAL WORK AREA

TREE PROTECTION REQUIREMENTS

EQUIPMENT SIZE RESTRICTIONS

TIGHT WORK AREAS

SOLUTION

SPECIAL WORK AREA
PROJECT CHALLENGES

PRESERVING TREES

Maple

Oak Trees

Original Fill Area

Oak Trees

Original Pond
PROJECT CHALLENGES

PRESERVING TREES

SOLUTION

ADDITIONAL DETENTION POND

GRADED AROUND PROTECTED TREES
PARK DISTRICT REQUIREMENTS

NATIVE BASIN

PROBLEM
SAFETY/ASTETIC CONCERNS
INCREASED MAINTENANCE
PARK DISTRICT REQUIREMENTS

NATIVE BASIN

SOLUTION

CONVERTED TO DRY DETENTION POND
ADDED STORM SEWER
ADDITIONAL RECREATIONAL SPACE
Bio-retention System

VOLUME CONTROL

PROBLEM
PARK DISTRICT & VILLAGE PROJECT AREA OVERLAP
TIMING FOR POOL OPENING
MWRD & PARK DISTRICT REQUIREMENTS

VOLUME CONTROL

SOLUTION

MWRD PERMIT MODIFICATION
INfiltration TRENCH
NATIVE GRASS FILTER STRIP
DESIGN CHALLENGES

GRADING

PROBLEM
BUDGETARY CONSTRAINTS
DETENTION POND OVERFLOW ROUTE
DESIGN CHALLENGES

GRADING

SOLUTION

BALANCE EARTHWORK
ON-SITE

RE-GRADE EXISTING
LANDSCAPE ISLAND
DESIGN CHALLENGES

UTILITIES

PROBLEM
CONFLICTS WITH EXISTING UTILITIES
UNKNOWN HOUSE SERVICE LOCATIONS
DESIGN CHALLENGES

UTILITIES

SOLUTION

POTHOLE UTILITIES DURING DESIGN

RELOCATE GAS MAINS & SERVICES PRIOR TO CONSTRUCTION
BALANCE DESIGN NEEDS AND BUDGET

DYNAMIC SITES

ENGINEERING DESIGN COST

Low Cost       High Cost

PLAN DETAILS

Less Detailed   More Detailed

EXAMPLES:
DESIGN / BUILD PROJECTS
STREAMBANK STABILIZATION

DYNAMIC SITES
LOWER ENGINEERING COST
LESS DETAILED DESIGN
BALANCE DESIGN NEEDS AND BUDGET

ENGINEERING DESIGN COST
- Low Cost
- High Cost

PLAN DETAILS
- Less Detailed
- More Detailed

TYPICAL PROJECT

TYPICAL DESIGN
- AVERAGE ENGINEERING COST
- SOME CONSTRUCTION ISSUES

EXAMPLE:
- SINGLE – LOT PROJECT SITE
BALANCE DESIGN NEEDS AND BUDGET

ENGINEERING DESIGN COST
- Low Cost
- High Cost

PLAN DETAILS
- Less Detailed
- More Detailed

COMPLEX PROJECTS
- Higher Engineering Cost
- Fewer Construction Issues

EXAMPLE:
- Construction in developed areas
KEYSTONE / CHARTRES PROJECT

**BALANCE DESIGN NEEDS AND BUDGET**

- **ENGINEERING DESIGN COST**
  - Low Cost
  - High Cost

- **PLAN DETAILS**
  - Less Detailed
  - More Detailed

MORE DETAILED DESIGN

HIGHER ENGINEERING COST

FEWER CONSTRUCTION ISSUES

SAVINGS DURING CONSTRUCTION OUTWEIGHED HIGHER ENGINEERING COSTS
SUMMARY OF LESSONS LEARNED

1. DISCUSS PROJECT GOALS UPFRONT

2. INVOLVE KEY STAKHOLDERS EARLY

3. RELOCATE UTILITIES IN ADVANCE

4. COORDINATE CONSTRUCTION PROJECTS WITH OTHER AGENCIES

5. PROVIDE SUFFICIENT DETAIL FOR THE TYPE OF PROJECT
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