Happy Valley Flood Mitigation Project

Toby Spalding, PE
City Engineer
City of Radcliff

Neal Crawford, PE
Project Manager
Qk4, Inc.
Happy Valley
Flooding Problems
Happy Valley
Flooding Problems
1997
Happy Valley Flooding Problems
1997
Happy Valley Flooding Problems
1997 Happy Valley Flooding Problems
1997
Happy Valley Flooding Problems
2008
Happy Valley Flooding Problems
2008

Happy Valley Flooding Problems
Liberty Street Acquisition Project

- Grant process 2009.
- 2970 & 2980 Liberty Street.
- Federal Grant award of $161,550 with a 12% State match & 13% local match.
- Purchased homes according to FEMA acquisition process.
- Fire Dept. burned the homes for training.
- Closed out in January 2012.
Maximum Head at Lake Road swallow hole
Elevation 770 ft.

“Happy Valley”

Quiggin’s swallow hole

Dry Well

Maximum Elevation: 716 ft.

Twin Lakes

Elevation: 627 ft.

St. Louis Ls.

700 ft

716 ft

600 ft

800 ft

Salem Ls

14,200 feet

Harrodsburg Ls

KGS Study – Quiggins Karst Profile
Quiggins Outfall Rating Curve

The stage at Quiggins swallow hole rises abruptly when flow into the swallow hole exceeds the pipefull outflow rate of 11.9 ft³/sec.

\[
Q_{\text{inflow}} = (1.8905 \times \text{Stage}) - 2.8346
\]

\[
N = 14 \quad R^2 = 0.93
\]

\[
Q_{\text{inflow}} = (0.0585 \times \text{Stage}) + 11.4812
\]

\[
N = 16 \quad R^2 = 0.99
\]
Happy Valley Flood Zone
HAPPY VALLEY FLOOD CONTROL
GRANT APPLICATION

December 2008
• Applied for grant
• Denied due to lack of supporting documentation

February 2009
• Began hydraulic study / design
• Eventually led to award

April 2009
• Re-applied for grant
Grant Application
Project Scope

Acquire approximately 36 acres of undeveloped land to be utilized as detention basins, designating the area “greenspace” and increasing the storm-water run-off storage capacity for the Quiggins Sinkhole. The proposed design will alleviate flood hazards to homes and to the City’s two most critical transportation arteries, S. Wilson and US 31-W.
Projected Schedule

October 2015 – March 2016
- Update project costs
- FEMA approval of Award Modification

April 2016 – November 2018
- Design & Acquisitions
- Construction
- FEMA project closeout
Current Status

• **FEMA approved funding** request for additional $1,231,569.14 (Updating 2008 construction and property acquisition values)

• FEMA currently evaluating proposal for Scope of Work Change to include Alternate basin in lieu of the Cato Basin.

• Turner Lane Basin and Quiggins Basin designed and under construction.

• Wilson Road Basin designed and under construction

• Song Basin nearing design completion.
Radcliff Storm Water Utility
Hydraulic Study

### Storage Volume with Associated Rainfall and South Wilson Road Closure Duration, Existing Conditions

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### NOAA Frequencies, Existing

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**Evaluated Rainfall Data from 1993-2008.**

Calibrated hydrologic model based on 1997 and 2008 known flood elevations and rainfall amounts.
Hydraulic Study
Turner Lane Basin

CITY OF RADCLIFF

TURNER LANE STORMWATER BASIN
HAPPY VALLEY FLOOD MITIGATION PROJECT

CONTRACTOR: PHILLIPS BROTHERS
CONSTRUCTION, LLC

CONSTRUCTION COST: $616,581

FUNDDED IN PART BY FEMA & KYEM

For information call Radcliff City Hall at (270) 351-4714
Turner Lane Basin
Turner Lane Basin
Turner Lane Basin
Turner Lane Basin
Turner Lane Basin
Turner Lane Basin Video
QUIGGINS STORMWATER BASIN
HAPPY VALLEY FLOOD MITIGATION PROJECT

CONTRACTOR: RAME CONTRACTING
CONSTRUCTION COST: $1,828,146

Funded in part by FEMA & KYEM

For information call Radcliff City Hall at (270) 351-4714
Quiggins Basin
Quiggins Basin
Quiggins Basin
Quiggins Basin
Quiggins Basin
KYTC Hauling Permit
KYTC Hauling Permit Project Cost Savings

- Special KYTC hauling permit acquired by City to allow contractor to utilize articulated trucks (off-road trucks) to haul spoils across US 31 W.
  - City provided temporary signal modifications and guard rail removal.
  - Allows contractor to reduce the hauling distance and number of trips required due to increased capacity of articulated trucks.
- Contractor in process of Hauling approx. 84,000 CY
KYTC Hauling Permit Cost Savings Realized

- Average Hauling Costs ~ $6 - $10 / CY
- Quiggins Basin Savings = $306,900
  - Actual Hauling Cost = $4.35 / CY
Stream Restoration
Stream Restoration Cost Savings Methods

- City staff MSHA trained to select stone needed for project direct from the quarry.
- Special KYTC hauling permit acquired by City to allow articulated trucks (off-road trucks) to haul stone from quarry to site.
  - City provided temporary street closures and fire/police escort.
- 599 tons of boulders purchased ($25/ton or $2.17 / LF)
- Hauling took 27 trucks ($6.76/ton or $0.59 / LF)
- City purchased all other stream stabilization stone required @ $5.32 / LF
Stream Restoration Cost Savings Realized

• Average Stream Restoration Costs ~ $132 - $137 / LF

• Turner Lane Basin Savings = $74,030
  • Actual Stream Restoration Cost = $72.58 / LF

• Quiggins Basin Savings = $317,770
  • Actual Stream Restoration Cost = $61.10 / LF

• Total Project Savings to Date = $391,800
Road and Box Culvert
Road and Box Culvert
Road and Box Culvert
Road and Box Culvert
Wilson Road Basin
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Questions?

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