

WESTOVER MUNICIPAL AUTHORITY

**STORM WATER IMPROVEMENTS
FEASIBILITY STUDY**

**WESTOVER BOROUGH
CLEARFIELD COUNTY, PA**

JANUARY 2009

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Section 1

PURPOSE AND SCOPE

Westover Borough has requested Gwin, Dobson & Foreman, Inc. to perform a comprehensive study of the stormwater collection and conveyance system serving the Borough. Specifically, council has asked that attention to specific system deficiencies involving inundation and flooding of the low lying areas of the Borough be evaluated and remediation alternatives provided.

In general, this study evaluated the entire stormwater collection and conveyance system identifying existing system structural components, conveyance piping diameters, structural integrity of collection basins, and carrying capacities. Additionally, topographic features and land use were evaluated to analysis the drainage area characteristics and receiving area limitations. Capital improvement projects have been identified and analyzed including a cost-effectiveness and alternatives evaluation. Cost estimates have been provided for the proposed stormwater system upgrades and improvements'. System maps have been developed for the existing stormwater systems, in addition to mapping for proposed upgrades and improvements. A summary of proposed system recommendations and project implementation schedule is also included as part of the overall evaluation for upgrades to the stormwater network within Westover Borough.

The following project components were addressed by Gwin, Dobson & Foreman, Inc. (GD&F) in this report:

1. Evaluation of the existing stormwater system components.
2. Compilation of available mapping and tabulation of stormwater system drawings
3. Review of current stormwater management regulations
4. Identification of undersized pipes.
5. Identification of any additional areas requiring stormwater drainage.
6. Determine upgrades and improvements with cost estimates.
7. Development of proposed maps of the stormwater collection and conveyance system.
8. Summarization of recommendations.

Section 2

HISTORY

Clearfield County was formed on March 26, 1804, from parts of Huntingdon and Lycoming Counties, and named for Clearfield Creek. Clearfield County functioned as part of Centre County, not electing its own commissioners until 1812. It was organized for judicial purposes in 1822. Clearfield, the county seat, was incorporated as a borough on April 21, 1840. The borough of Westover was incorporated September 6, 1895.

The town is situated in Chest Township, in the southwestern portion of the county; it is reached by SR. 0036 and S.R. 3006. The principal industry of Westover was the large tannery of the William F. Mosser Company, however no industry exists today.

Over the years the Borough has integrated state of the art water and wastewater treatment facilities to provide the highest quality of life to its residents. The once combined sewer and stormwater collection and conveyance systems have exceed their useful life and are now under sized causing localized flooding and related issues.

Section 3

PREVIOUS PLANNING REPORTS

The following report was evaluated:

Westover Flood Study - May 2008. This report, prepared by Sacevic, Piccolomini and Kucher Engineering, Inc. (SPK), included the FEMA LOMR (Letter of Map Revision) which recommends a new flood elevation to FEMA. The report also recommended the Borough investigate the storm drain network as relayed by SPK. Unfortunately, a copy of the report was not able to be released to GD&F or the Borough, per phone correspondence with SPK, PennDOT and FEMA.

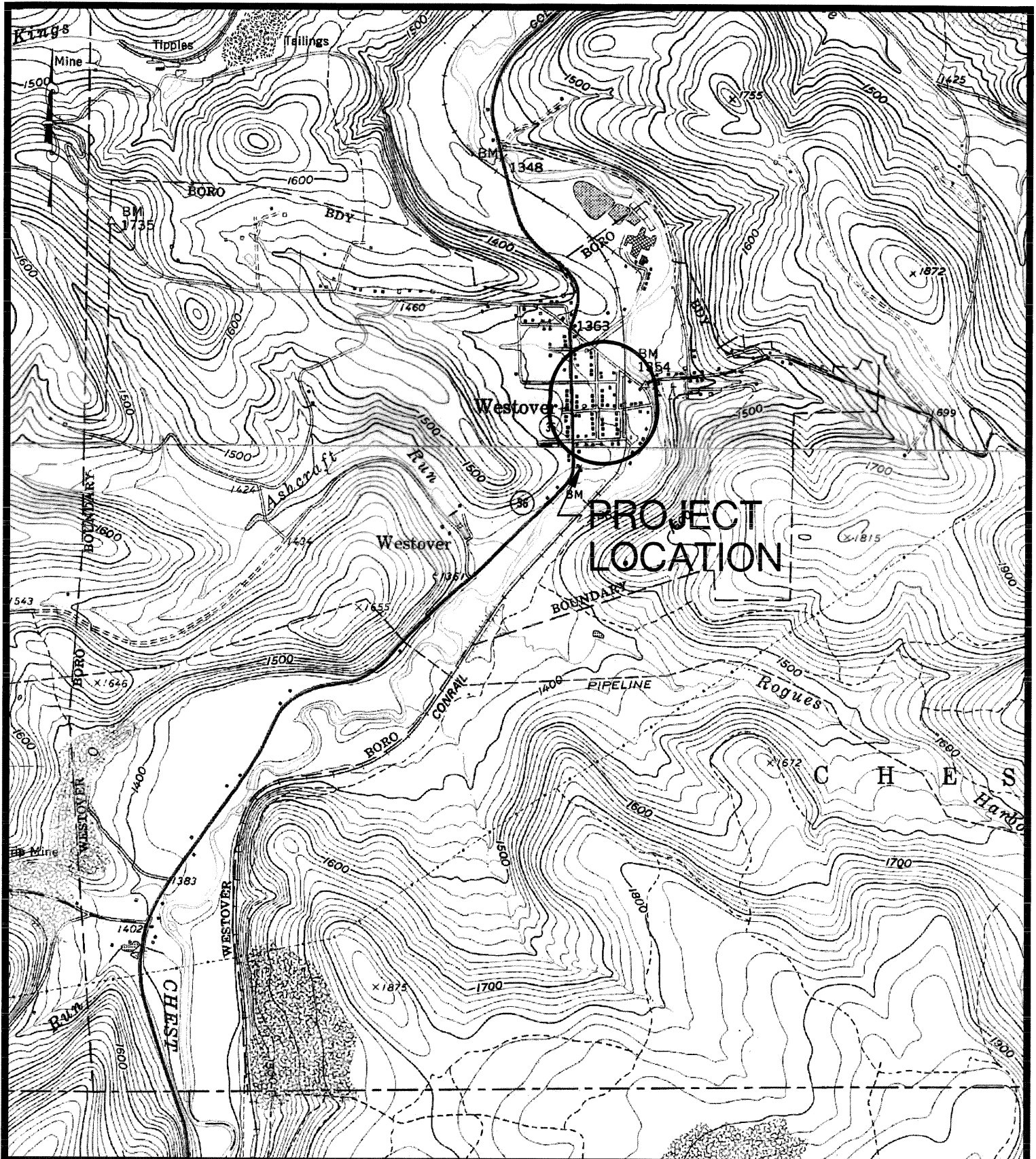
Section 4

LOCATION AND DESCRIPTION

Westover Borough is located in the southwestern corner of Clearfield County, PA. The area is geographically situated in Subbasin 8, in watershed C which includes the upper West Branch of the Susquehanna River, Chest Creek and Anderson Creek. Refer to Figure 1: Location Map.

The project lies in the Pittsburgh Low Plateau Section of the Appalachian Plateaus Province. The Pittsburgh Low Plateau Section consists of a smooth undulating upland surface cut by numerous, narrow, relatively shallow valleys. The uplands are developed on rocks containing the bulk of the significant bituminous coal in Pennsylvania. The landscape reflects this by the presence surface mining, as can be seen throughout the watershed. The local relief on the uplands is generally less than 200 feet. Local relief between valley bottoms and upland surfaces may be as much as 600 feet. Valley sides are usually moderately steep except in the upper reaches of streams where the side slopes are fairly gentle. Elevations range from 660 to 1,700 feet. Some of the land surface in the southwestern part of the Section is very susceptible to landslides.

Land uses within the Borough are primarily residential, with forested areas, riparian areas and some agricultural areas located in the headwaters region of the watershed. The drainage area is dissected by secondary state highways (S.R. 3006 and S.R. 0036), borough streets, and alleys. Such structures and appurtenances serve as part of the overall stormwater collection and conveyance system.



LOCATION MAP

Portion of Westover, PA USGS Quad

**WESTOVER MUNICIPAL AUTHORITY
CLEARFIELD COUNTY, PENNSYLVANIA**

Project No: 04103

Scale: 1" = 2000'

GD&F

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Section 5

STORMWATER AND DRAINAGE ANALYSIS

The Clearfield County Planning design standards require communities to design stormwater facilities for the 10-year storm event except where stormwater problems exist, then more stringent criteria is mandated. Due to the stormwater problems experienced, the existing storm drain network was evaluated using the 25-year storm event.

Evaluation of the stormwater collection and conveyance system found several storm drain conduits were undersized for the required storm event. Locations were also identified where bottlenecks exist, (i.e. a large pipe draining into a smaller pipe). The majority of the existing storm drain layout consists of short lengths of pipe connected by roadside swales. Furthermore, downstream inlets were found to be undersized for this type of system. Such deficiencies have resulted in improper conveyance and discharge of stormwater, thus causing the inundation and flooding issues currently experienced. The analyses have shown that connecting the pipes will allow the upstream flow to bypass the downstream inlets, thereby allowing the inlets to efficiently drain a smaller area.

Storm drain conduits were found to be combined in the area bound by Railroad and Chest Streets and Michaels and McEwen Streets. This allows for one main outfall through the Water Street area into Chest Creek. This area experiences flooding as the even the 10-Year Storm elevation in Chest Creek (1354.01 ft msl) and a portion of the drainage area is at or below the 10-year flood elevation; thereby, forever causing inundation to occur without proper discharge conditions.

Another option evaluated is to reroute the collection system discharge across State Route 3006 (East Bridge Street), and outfall to an Unnamed Tributary to Chest Creek further downstream of the existing outfall where the flood elevation is lower. This will minimize the stormwater inundation potential within this troublesome area. However, it should be noted that no feasible option exists that will completely prevent the potential for stormwater inundation within these low lying areas of the Borough.

Two (2) options were evaluated and analyzed using hydrologic and hydraulic modeling and are as follows:

- Option A: Combining storm drain conduits within the Railroad Street and Chest Street area and discharging to the Water Street area of Chest Creek for alleviation of inundation within this portion of the borough. In addition, these modifications shall be coupled with significant upgrades to line size and catch basin quantity throughout the Borough.
- Option B: Route the storm drain conduits across State Route 3006 and discharge to an Unnamed Tributary to Chest Creek further downstream of the existing outfall for more through drainage and alleviation of inundation within the lower lying areas of the Borough. In addition, these modifications shall be coupled with significant upgrades to line size and catch basin quantity throughout the Borough.

Plan drawings showing each option are included as Appendix 3 attached hereto.

Section 6

FINANCIAL EVALUATION

Each stormwater improvement recommendation has been evaluated and cost estimates developed (Refer to Appendix A). The estimated construction and implementation cost for Option A is \$669,239; while Option B is estimated at \$730,119. Significant grant funds should be acquired to make this an affordable project.

Minor stormwater inundation may continue in low lying areas along Railroad Street with either option. Option A is the more feasible and will solve the majority of the Borough's stormwater problems; however, those areas of primary concern would still be subject to the existing stormwater issues. Option B, although slightly more costly, ensures more effective conveyance of stormwater away from the developed and low lying areas of the Borough, and significantly reduces the potential of continued stormwater issues.

Funding for such a project can be obtained through PennVest low interest loans, USDA-RUS loans, or other funding sources such as Community Development Block Grants (CDBG), H2O Infrastructure improvement funds, Safe Water Funds etc.

SUMMARY

The Borough currently experiences storm drainage deficiencies through documented examples. A major problem is that a portion of the Borough is below the 10-year storm elevation of Chest Creek; thereby impeding the natural drainage of collected stormwater. Other problems that exist are undersized, disconnected, and bottlenecked conduits, and low-lying areas that do not currently have storm drainage collection and conveyance components.

The proposed site layout plans depict the recommended conduits that need replaced or enlarged to accommodate the needed capacities. The plans also show areas where new conduits are recommended to provide adequate drainage.

Two (2) feasible options were determined as a result of the stormwater and drainage analysis. Option A combines the stormwater system conduits within the Railroad Street and Chest Street area with discharge through the existing outfall on the Water Street area of Chest Creek,

coupled with significant system upgrades and additions thereto. Option B routes the same area across State Route 3006 with discharge to an Unnamed Tributary to Chest Creek where the 10-year storm elevation of Chest Creek is lower, thus minimizing stormwater inundation and backwater issues.

Minor stormwater inundation may continue in low lying areas along Railroad Street with either option; however, such issues will be significantly reduced by improvements to the overall carrying capacity of the proposed system. Although Option A is slightly more feasible and will resolve the majority of the Borough's stormwater deficiencies, it is recommended to consider a more effective alternative. Option B ensures that the needed conveyance of stormwater from within the documented problem areas is able to occur. By continuing to rely on discharge to Chest Creek through the existing outfall, storm flows will be hydraulically and hydrologically restricted by stream elevations. Continuation of the existing problems will likely persist. Thus, it is being recommended that selection, design and implementation of Option B emerge as the proposed stormwater improvements and management restoration plan.