Design Report:

TOWN OF CAPITOL
HEIGHTS WATTS BRANCH
HEADWATER PROJECT:

Preliminary Floodplain Analysis and Concept Report

Town of Capitol Heights
Prince George's County
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ABOUT

This report provides the results of a preliminary floodplain analysis conducted for a 2.34 acre cluster of parcels (the study area) within the Town of Capitol Heights. The study area lies directly across from the Capitol Heights Metro and is bisected by a 350-ft long channelized stream. Two potential development designs have been proposed:

- Concept 1 involves keeping the stream within the existing channel and placing development on a portion of the study area that is suitable for development (i.e., outside of the 100-year floodplain). Under this option, a portion of the 100-year floodplain extends beyond the subject area and into Capitol Heights Blvd.

- Concept 2 involves permanently closing Faye Street and converting the existing 350-ft long concrete stream channel into a naturalized, winding stream, with park features on either side. Under this option, the 100-year floodplain is completely contained on site and does not enter the right-of-way.

For questions related to this report and its recommendations, please contact the Low Impact Development Center, Inc. (LID Center). Questions about the National Fish and Wildlife Foundation’s Local Government Capacity Building Initiative and how your community can benefit from this program should be sent directly to the National Fish and Wildlife Foundation.

INTRODUCTION

The Town of Capitol Heights, MD, is an older, relatively compact Prince George’s County municipality with a population of 4,160 people on the outskirts of Washington, DC. In 2012, the Town of Capitol Heights began acquiring an approximately 2.34 acre cluster of properties located directly across from the Capitol Heights Metro Station. The area is bordered by Davey St. on the north, Emmett St. on the south, Sultan Ave. on the east, and Capitol Heights Blvd. on the west. The purpose was to tear down the existing, dilapidated buildings and make way for sustainable redevelopment opportunities that encourage economic, environmental, and community revitalization.

The 2.34 acre cluster of parcels is in a prime location within walking distance to the Metro. Two features divide the property: Faye Street, running east to west, and a 350-ft long channelized tributary to Watts Branch, running north to south. The tributary is of particular concern to the Town because the area is suspected of being flood prone and no detailed floodplain study exists. In 2013, the Town hired G&C Consultants, Inc. to prepare a preliminary 100-year floodplain study to gain a better understanding of the extent of the channelized stream’s drainage area. The Town then received a technical assistance grant from the National Fish and Wildlife Foundation’s Local Government Capacity Building Initiative to review the preliminary floodplain study and identify the study area’s 100-year floodplain discharge limits and to analyze the impacts of two potential design development alternatives on the extent of the 100-year floodplain.
PART 1: PRELIMINARY FLOODPLAIN STUDY – ANALYSIS OF EXISTING CONDITIONS

PURPOSE

Prince George’s County requires that a floodplain study be prepared and approved by the County for any project where the stream(s) or channel(s) have a drainage area of 50 acres or greater. The purpose of this study is to establish the 100-year floodplain limits within or near a development in order to preserve the natural resources within the 100-year floodplain, to protect property and persons, and to apply a unified, comprehensive approach to floodplain management. Comprehensive floodplain studies can be expensive, however, and are generally not necessary prior to submitting a site development concept plan to Prince George’s County for approval. In lieu of this, the Town of Capitol Heights commissioned C&G Consultants to prepare a Preliminary 100-Year Floodplain Study for the 2.34 acre study area in 2013. The resulting report prepared by G&C Consultants, Inc. determined the drainage area for the existing rectangular concrete channel that runs through site and through culverts under Emmet, Faye, and Davey Streets to be 503 acres. The LID Center utilized the preliminary study and other information to analyze the flooding potential of the study area.

FLOODPLAIN STUDY PARAMETERS

The LID Center utilized HEC-RAS software to determine whether any potential flooding risk exists within the study area along the unnamed tributary to Watts Branch. The scope of the study did not include a detailed survey of the channel or surrounding topography. Limited survey data was obtained from the G&C Consultants, Inc. report (2013). Additional topographical data was obtained from Prince George’s County GIS records and District of Columbia GIS files. The model uses the Base Flood Elevation (BFE) found at the confluence with Watts Branch as published in the District of Columbia Flood Insurance Study (September 27, 2010, Flood Insurance Study Number 110001V000A) as the boundary condition. Cross sections were created from the confluence with Watts Branch to approximately 150’ upstream of the culvert under Dole Street. Flow data was also obtained from the G&C Consultants, Inc. report (2013) and used to run a steady state flow model.

EXISTING CONDITIONS ANALYSIS: 2-YEAR AND 100-YEAR FLOODPLAIN

Figure 2 provides the limits of the floodplain for two different storm events: the 2-year flood, which represents a fairly common flood event that has a one in two chance of occurring each year, and the 100-year flood, where development is normally not allowed. In general, to upstream flooding elevations are governed by the culvert under Davey Street and through the metro site. The study found that the 2-year flood is contained within the concrete channel but widespread flooding occurs during the 100-year flood, with flood waters extending onto Capitol Heights Blvd.
PART 2: DEVELOPMENT OF DESIGN CONCEPTS

Two preliminary concept designs were identified for the 2.34 acre study area. Concept One takes advantage of the site’s location to establish a transit-oriented development anchored by Capitol Heights Metro station. Concept Two envisions the naturalization of the concrete-lined stream channel and placed in a community park setting, establishing a highly visible community amenity intended to attract redevelopment around the metro in parcels with fewer environmental constraints.

CONCEPT ONE: DEVELOPMENT ANCHORED BY CAPITOL HEIGHTS METRO STATION

The Town of Capitol Heights’ Community Sustainability Plan identifies the study area one of several places within the Town where development and redevelopment efforts should be directed (GMA and Green reVisions, 2011). A concept was prepared to identify a potential development footprint for a mixed-use development and to incorporate several green infrastructure features to treat stormwater on-site (see Figure 3). The intent was to determine whether the development’s footprint would impact the 2-year and 100-year floodplain boundaries.

IMPACT TO THE 2-YEAR AND 100-YEAR FLOODPLAIN

The proposed development site for Concept One lies outside of the 100-year floodplain. Because of the relatively small site footprint compared to the size of the total drainage area, no significant impact is expected. Figure 2 shows the boundary of the 100-year floodplain.

Figure 3. Concept One: Development Anchored by Capitol Heights Metro
CONCEPT TWO: ESTABLISHING A COMMUNITY PARK AS A VITAL AMENITY

Concept Two envisions the 2.34 acre study area in a community park setting, establishing a highly visible community amenity intended to attract development in other parcels near the metro. In this scenario, Faye Street is permanently closed and the associated culverts removed. The existing 350-ft long concrete stream channel is converted into a naturalized, winding stream which includes pools and banks, and even riffles – which are rocks that help aerate water as it flows over them.

The proposed park design incorporates amenities including a children’s play area, picnic area, plaza, open recreation area, nature walk, amphitheater, and an extension of the community garden. Increased green space and public amenities could help increase property values and have a positive impact on the economic, social, and environmental vitality in the Town of Capitol Heights.

Figure 4. Concept Two: Establishing a Community Park
Both Concept One and Concept Two help further the Town of Capitol Heights’ commitment to sustainable development and revitalization and strengthen existing communities. Either scenario will provide direct benefits to the Town, the Anacostia watershed, and Prince George’s County. It must be emphasized that the preliminary flood study utilized to perform this analysis lacked a full survey of cross sections and bridges which could significantly impact the results. It is suggested that a full floodplain study should be performed before development is considered on this site.

**IMPACT TO THE 2-YEAR AND 100-YEAR FLOODPLAIN**

Under this option, a winding, natural stream bottom and sloped bank are utilized to completely contain the 2-year and 100-year floodplain within the study area (Figure 5). This reduces the potential for costly flooding along Capitol Height Blvd. as seen in both the existing conditions and in Concept One, while providing as much storage as possible behind the culvert at Davey Street.

**FUTURE RECOMMENDATIONS**

Figure 5. Concept Two: 2-Year and 100-Year Floodplain