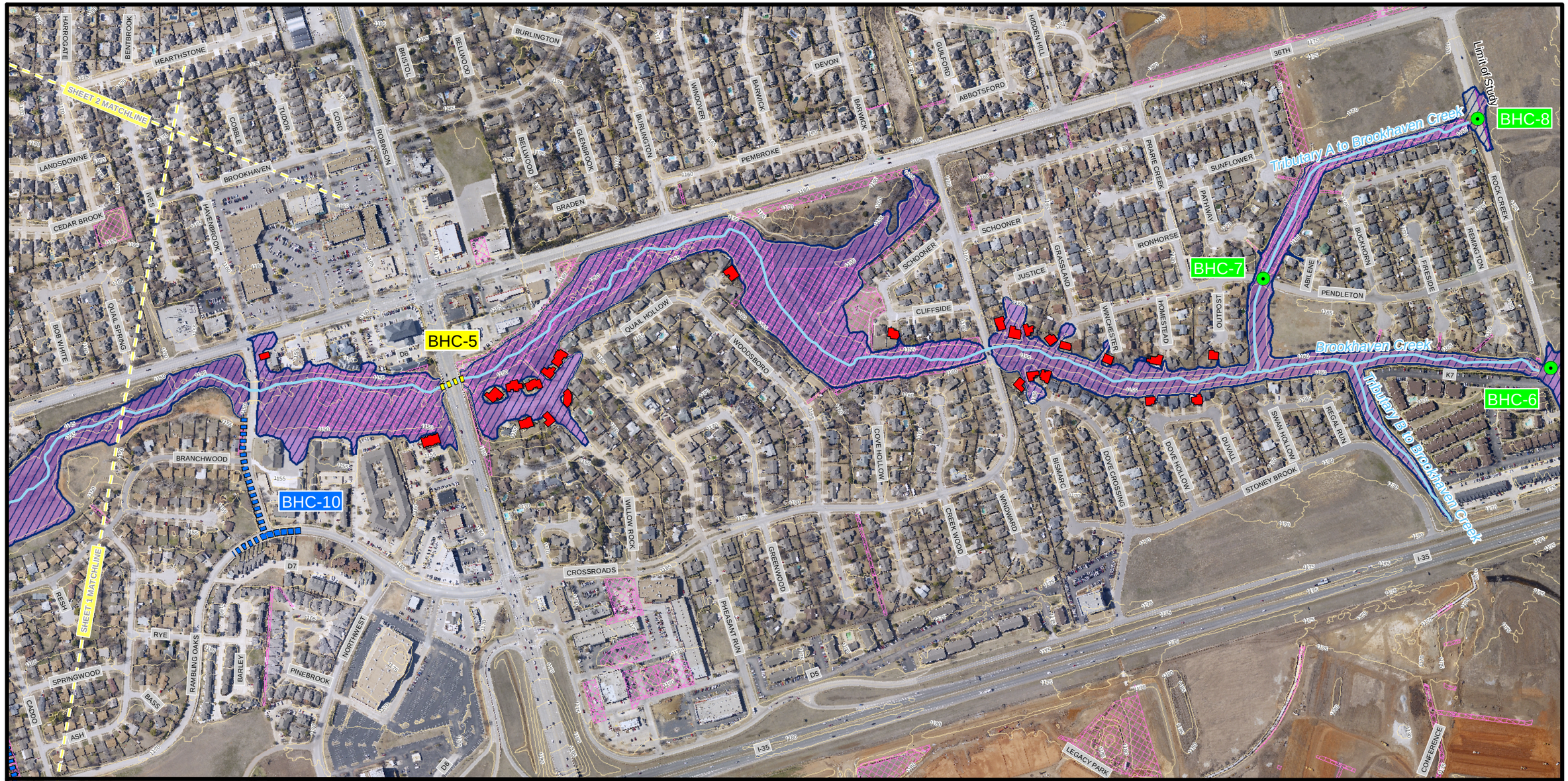



0 250 500 1,000 Feet

Aerial Photography: 2007
Coordinate System: Oklahoma State Plane, South Zone
Horizontal Datum: NAD 1983
Vertical Datum: NAVD 1988

## Legend

City Boundary
Existing Drainage Easement

Stream Centerlines
Level 1 and 2 (Detailed)
Level 3 and 4 (General)

Floodplains
100-year Baseline
100-year Solution

Buildings in Floodplain
100-year Baseline
100-year Solution

Recommended Solutions
Road Crossing Upgrade
Property Buyouts
Floodwall
Channel Stabilization
Channel Improvements
Storm Sewer Improvements
Storm Water Detention

# Storm Water Master Plan

## Exhibit 6-3

### Baseline Floodplain and Recommended Solutions Overview Brookhaven Creek Plus Tributaries A and B

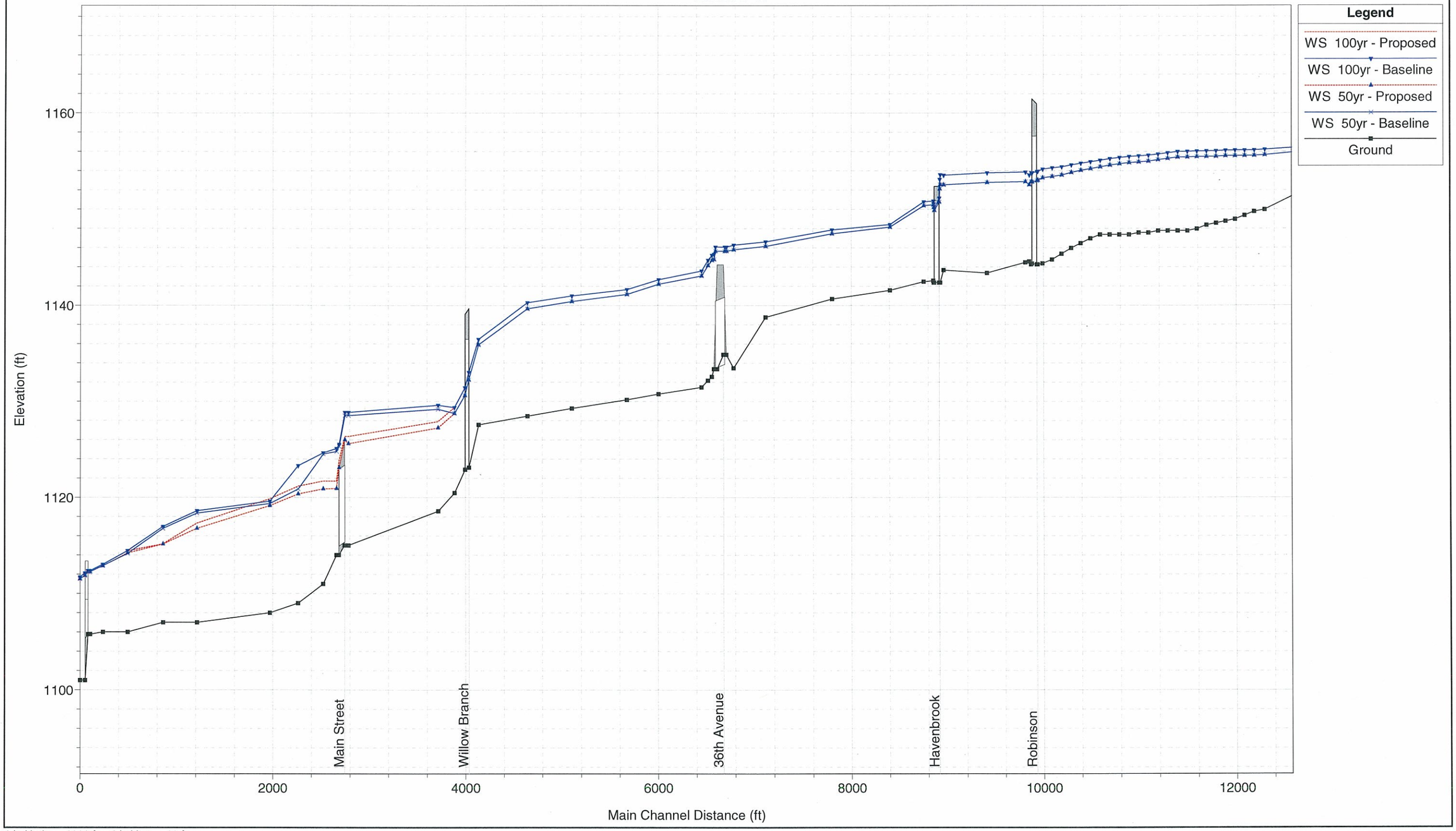
Sheet 3 of 3

| Job No.: 044194100 | Date: 12-11-08 | Scale: 1 inch = 500 Feet |
|---|---|---|

File: W:/WR/proj/441941_Norman/Report/Figures/Brookhaven_3.mxd

Brookhaven Creek Mainstem

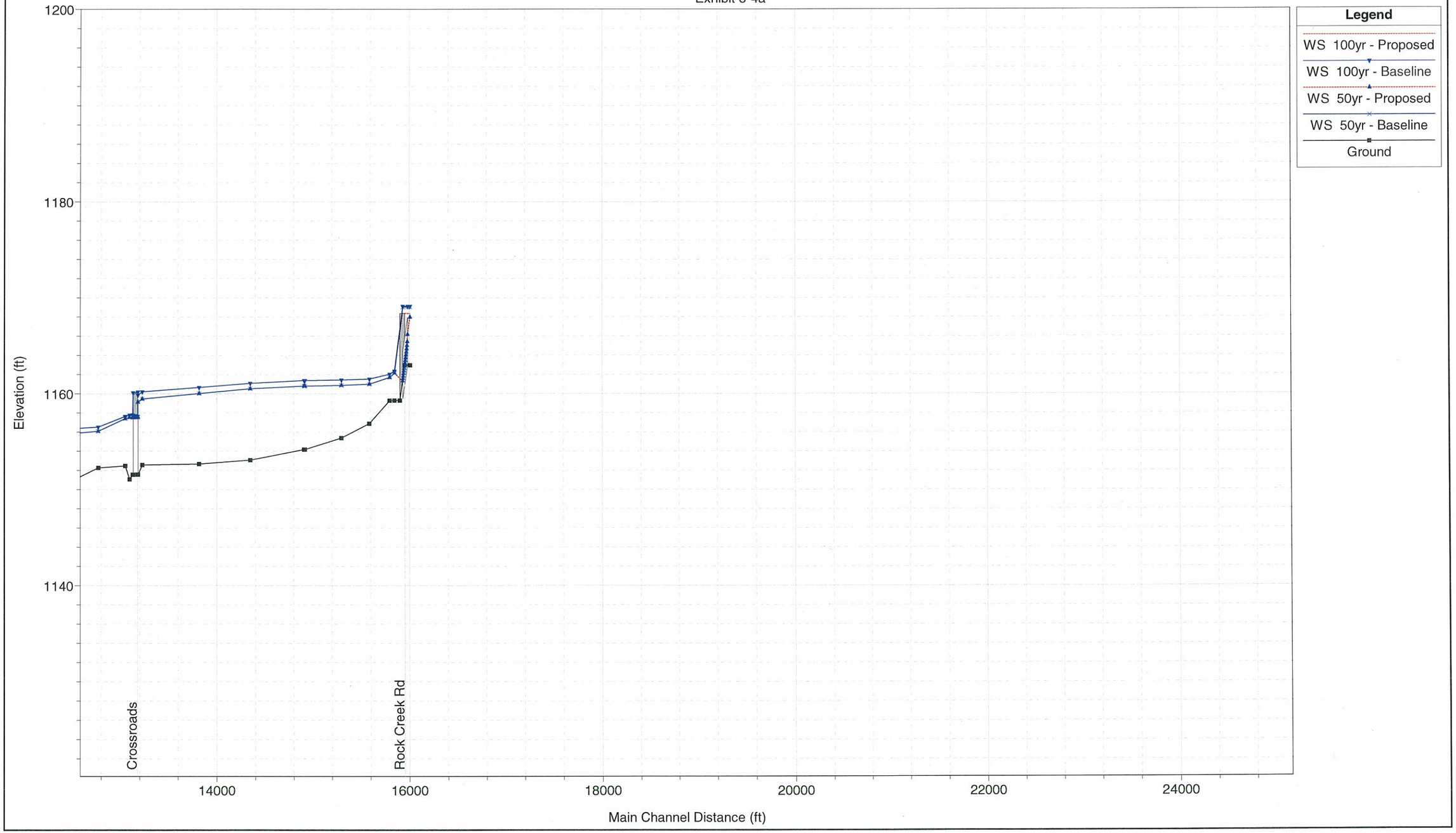
Exhibit 6-4a




1 in Horiz. = 1000 ft  1 in Vert. = 10 ft

Brookhaven Creek Mainstem

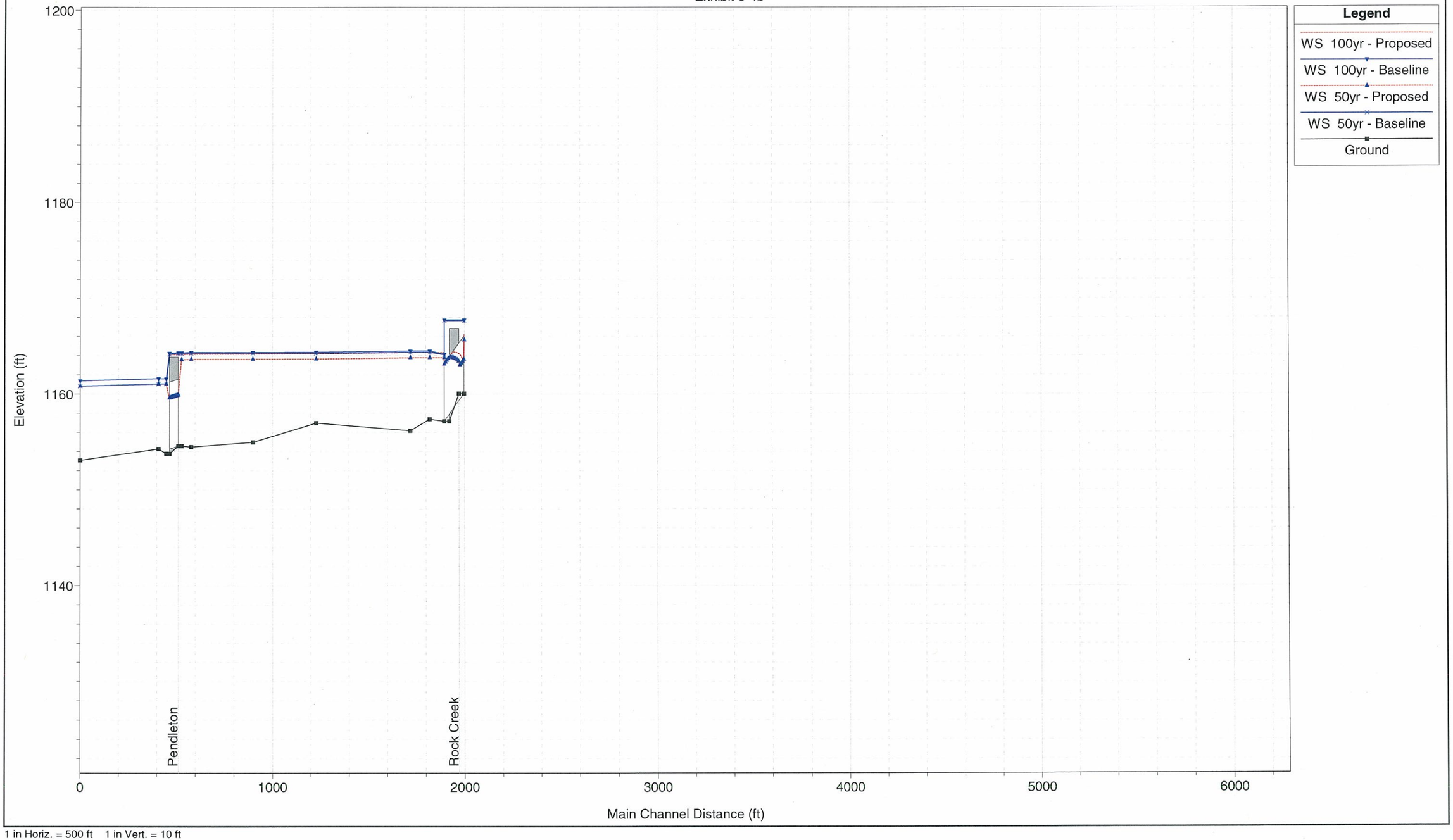
Exhibit 6-4a




1 in Horiz. = 1000 ft  1 in Vert. = 10 ft

Brookhaven Creek - Tributary A

Exhibit 6-4b




1 in Horiz. = 500 ft  1 in Vert. = 10 ft

## Dave Blue Creek

Although the only solutions in this watershed are DBC-1 and DBC-2 which are relatively straight-forward road crossing designs as outlined in Table 6-2. The baseline 100-year floodplains and flood profiles for Dave Blue Creek and its two tributaries studied are shown in Exhibits 6-5a, 6-5b, 6-6a, and 6-6b. No stream erosion or localized problems were identified in the watershed.

## Imhoff Creek

Solutions for problems in the Imhoff Creek watershed are by far the most significant compared to solutions in other watersheds. As Table 6-1 shows, solution costs to alleviate problems in this watershed amount to approximately $43.7 million and account for almost 53% of the total costs for the entire City. Additionally, costs in this watershed are 3.7 times larger than those in the next most costly watershed (Bishop Creek). Originally, six primary problems were identified in the watershed although one of them, IC-3, was so large it was subdivided into eight sub-reaches (IC-3A through IC-3H) resulting in a total of 13 problems. As shown in Exhibit 6-7a and overviewed in Table 6-2, evaluation of the baseline 100-year floodplain determined that 360 structures are within the footprint of the event with the proposed solutions removing 265 of these structures from the floodplain. Structures elevated above surrounding ground that are within the floodplain's footprint may not be actually flooded. Solutions for 15 road crossings in IC-3 were also conceptually developed to significantly reduce their flooding. Two significant solutions were also developed for stream erosion problems in the lower mile of the stream to alleviate a problem that has been getting worse for many years. Finally, a major solution for a very significant local flooding problem in the area of the Lindsey Street and McGee Drive intersection was conceptually developed as discussed subsequently below.

It is important to note that the Imhoff Creek watershed is fully developed for practical purposes so flooding for existing watershed development conditions were assumed to be identical with baseline (full build-out development) conditions. Also and importantly, solutions in the Imhoff Creek watershed targeted the 10-year flood event, rather than the baseline 100-year event, as improvements at the 100-year level would add significantly to the watershed's already high solutions costs due to the significantly undersized drainage system along the creek as well as right-of-way and easement constraints. There are exceptions at road crossings where many of the crossing openings were designed for the 50- or the 100-year event at the City's direction as discussed below. The design flows assume maximum detention provided to the IC-4A solution level in the Andrews Park area as outlined below as well as the reduction in flow caused by the flow diversion at Lindsey Street and McGee Drive.

Table 6-2 as well as Exhibits 6-7a and 6-8 provide problem locations, descriptions, and respective solutions. Solutions IC-4 and IC-4A are being counted as separate solutions although they both primarily relate to reducing flows throughout Imhoff Creek as well as reflect the need for a one- or two-celled storm water detention facilities in the Andrews Park vicinity. From a stream flooding standpoint, solutions are needed to solve problems in the lower, middle, and upper reaches of the creek. Structure flooding occurs along the entire reach of Imhoff Creek as documented in Table 6-2. There are approximately 154 structures located in the baseline floodplain near Highway 9 with 49 structures being downstream of the highway (40 of which are east of the creek) and 105 located immediately upstream of the highway and on the east side of the creek. As stated in Section 5, the structure flooding and its solution have been linked to IC-4 or IC-4A as conceptual hydrologic modeling indicates that these structures can be removed from the floodplain with sufficient storm water detention provided in the Andrews Park area and the implementation of the IC-5 solution for the Lindsey Street – McGee Drive intersection area discussed subsequently below. The reduction in downstream flows with the IC-4A and IC-5 solutions alleviates flooding in the lower natural channel reaches of the creek near SH 9 as well as reduces the size of proposed creek channel and road crossing openings (IC-3) in the middle and upper reaches of Imhoff Creek. Exhibit 6-7a shows these flooded structures in the lower portion of the creek as well as the IC-4 and IC-4A proposed detention facilities in the upstream reaches of the creek. Exhibit 6-7b locates the IC-5 solution which is subsequently discussed below. These flood prone structures were not historically shown in the most recent FEMA floodplain update but SWMP corrections to the hydraulic model used in FEMA studies resulted in these structures being located in the floodplain footprint. Finished floor elevations of many of these structures may be above the 100-year flood elevations since flood waters only exceed the creek top of bank by small amounts in the affected areas and spread out over flat floodplain areas.

The IC-4 and IC-4A solutions were developed as options with IC-4 using the open portions of Andrews Park (approximately 7.7 acres) as well as a two acre area near its southwest corner (north of Daws Street and West of Webster Avenue) to store approximately 36 acre-feet (ac-ft) of runoff during the 100-year baseline flood and reduce flows from 1,165 cubic feet per second (cfs) to 763 cfs (35% reduction) in Imhoff Creek near the facility's downstream outlet. Option IC-4A uses that same area as IC-4 plus a mostly triangular area (6.5 acres) located to the north of Acres Street and west of the Burlington Northern and Santa Fe Railroad (BNSF) to store approximately 48 ac-ft of runoff and a peak flow reduction from 1,165 cfs to 666 cfs (43% reduction) in Imhoff Creek for the 100-year baseline event. Reductions for the 10-year event are from 714 cfs to 436 cfs (39% reduction) for the IC-4 solution and down to 364 cfs (51% reduction) for the IC-4A solution. It is noted that the effect of the storm water detention as represented above as a percent reduction in flows will progressively decrease as you move downstream from the facility. Details of the modeling are provided in Section 4. Other key design elements of the detention facilities are:

- IC-4: Primary detention areas (approximately 7.7 acres) are the existing water tank (to be removed) location and the open park space adjacent to, and south of, Acres Street
  - Area that drains to IC-4 is 858 acres
  - Inflows at the northeast corner of the facility from flow along BNSF railroad and diversion from near intersection of Jones and Beal under BNSF railroad and across James Garner Blvd. through three 36-inch RCPs, 220 ft long
  - Low flows will bypass the facility in order to reserve runoff storage to the high runoff periods
  - If flows are high enough, water elevation will rise in the existing water tank area (following tank removal) providing runoff storage
  - If flows are high enough, water elevation will rise above elevation 1,166 ft, then excess flows will inflow into the lowered/excavated open space (detention) area adjacent to Acres Street via an overflow weir or wall
  - The detention area will generally slope toward the southwest at 1% grade with several small concrete pilot channels