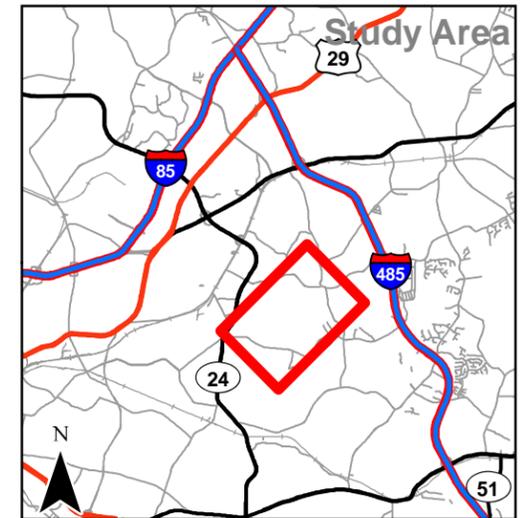
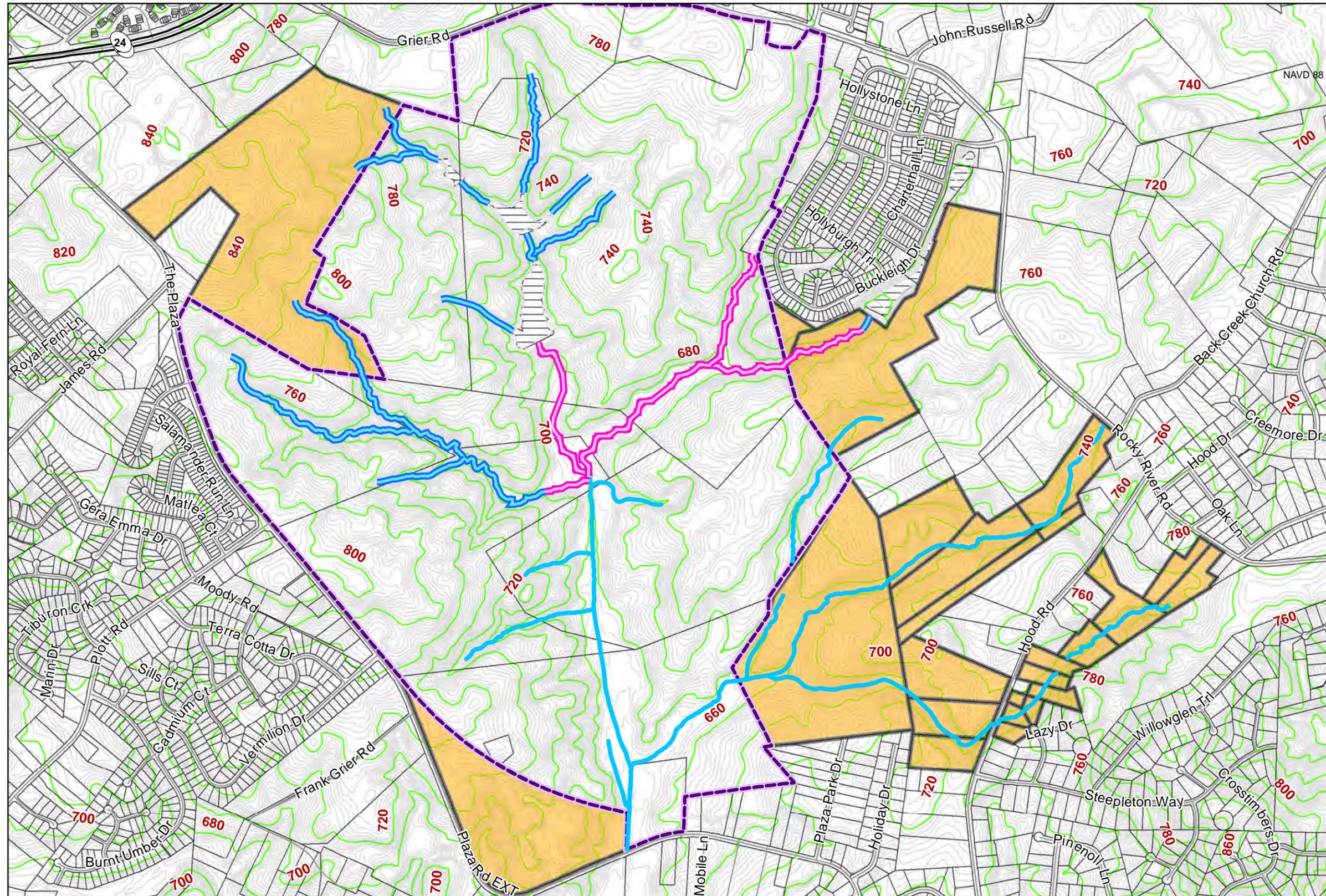


# Appendix 9

**Figure 1**  
Studied Streams

# Reedy Creek Feasibility Study

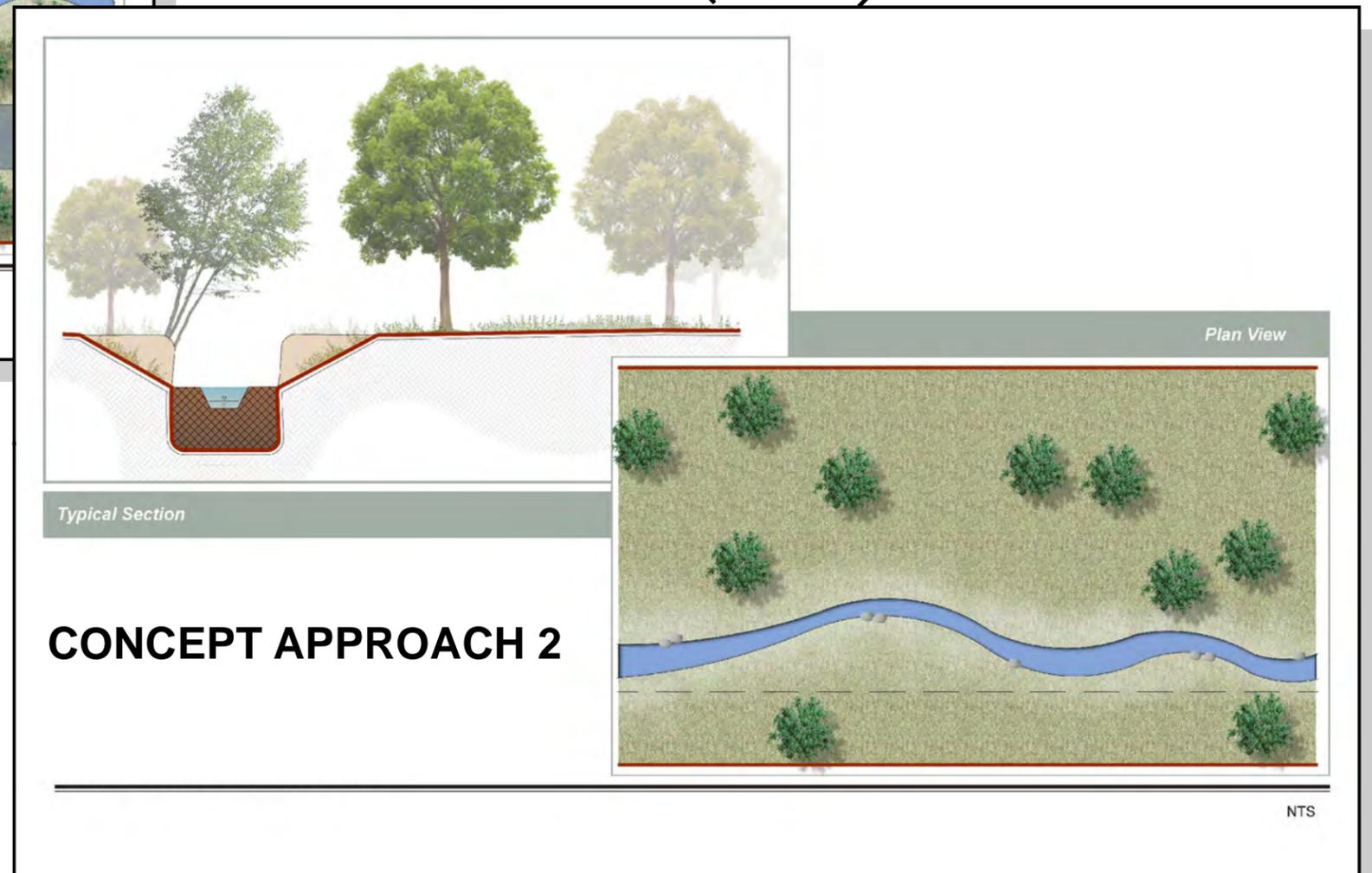
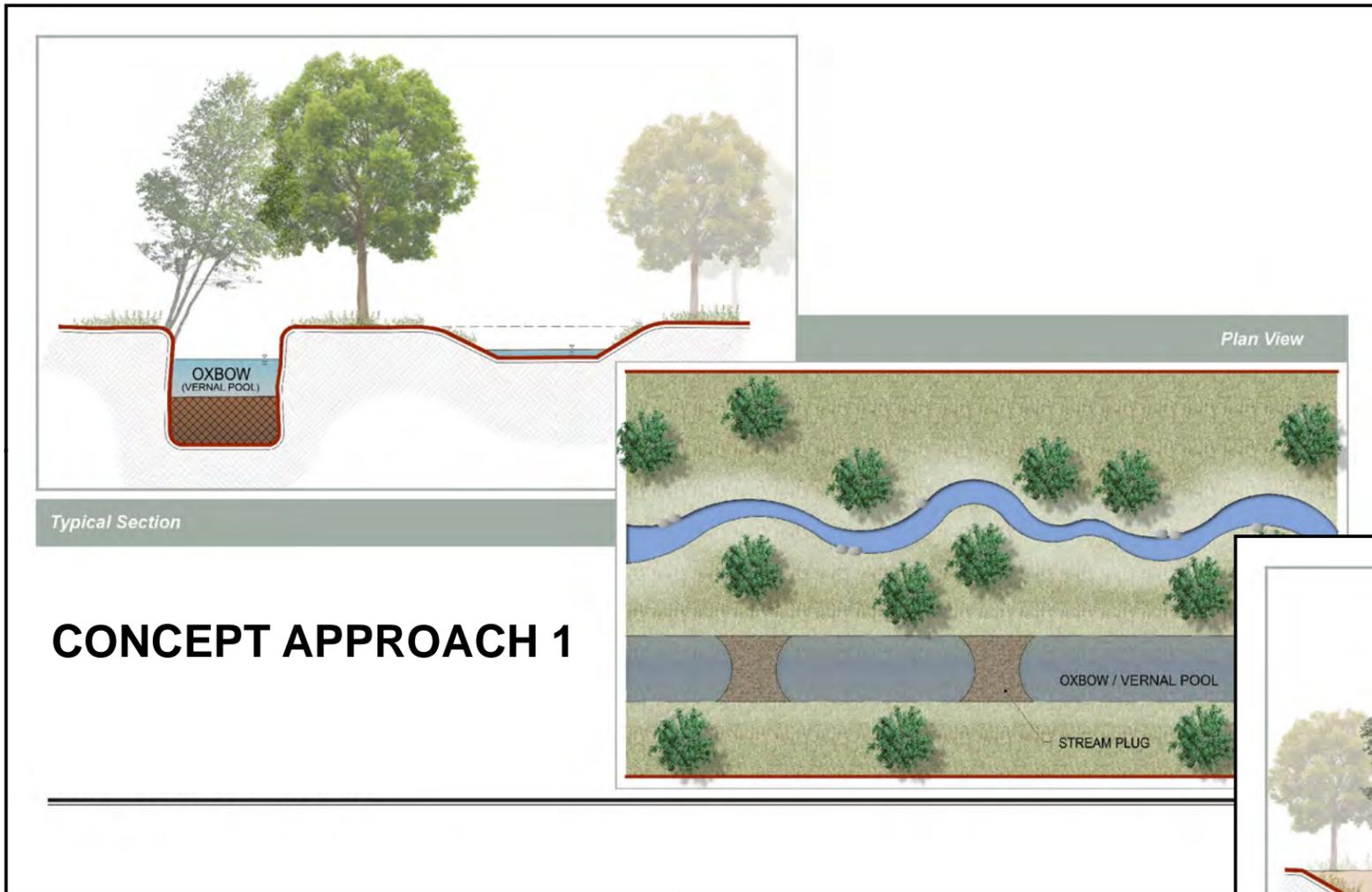


**Legend**

-  Reedy Creek Nature Preserve
-  Potential Additional Parcels
-  Impounded Areas
-  Proposed Stream Restoration
-  Proposed Stream Preservation
-  In Progress (Stream)



**Figure 2**  
Concept Restoration Approaches





## Preservation Reaches



## Restoration Reaches



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**Reedy Creek Stream Restoration and  
Watershed Enhancement Project  
November 22, 2011 – 10:00 a.m.  
On-Site @ Reedy Creek Nature Preserve and Park**

**Attendees:**

- Jarrod Karl - Charlotte Mecklenburg Storm Water Services (CMSWS)
- William Harris – CMSWS
- Steve Kichefsky – U.S. Army Corp of Engineers (USACE)
- Alan Johnson – N.C. Division of Water Quality (NC DWQ)
- Will Wilhelm – Kimley-Horn and Associates, Inc. (KHA)

**Meeting Purpose:**

The purpose of the meeting was to field review the proposed Reedy Creek restoration site and get USACE and DWQ's opinion on the site as a candidate for restoration and/or enhancement and inclusion into the City's Umbrella Mitigation Bank.

**Project Site and Field Walk:**

The site contains five stream reaches that have potential for restoration – See attached figure. During the meeting the field team walked to upper reach 5 (proposed as a reference) to gain visual perspective on the reference stable state stream system. The group then walked to lower Reach 2 and Reach 1 both proposed for restoration. The group then walked up to the outlet of Dragonfly Pond which is the start of the proposed restoration area on Reach 2. The team then drove around to the Buckleigh neighborhood and walked to Reach 3 in the Park/Nature Preserve. Reach 4 and lower Reach 5 were not field reviewed. KHA stated that Reach 4 is in a very similar impaired condition to Reach 3 and the lower ~500 feet of Reach 5 is in a similar impaired condition as lower Reach 1 and 2.

**Comments on the Site:**

Overall USACE and NC DWQ agreed the site had mitigation potential based on this cursory field review and that the City could proceed forward with a Site Specific Mitigation Plan (SSMP). The following comments were made about each reach.

Reach 5

- The group agreed that the upper portions of Reach 5 was a stable reach and provided a good reference.
  - o KHA also noted that the upper sections of Reach 2 above the ponds are also stable and could also be used as reference.

Reach 1

- Agencies agreed that this reach is visually the most impaired they saw in the park.
- NC DWQ expressed concern that if priority one restoration (i.e. raising the stream bed 6-8 feet) is used, would ground water respond .
  - o CMSWS pointed out that similar projects in the County (i.e. Edwards Branch Phase III) where priority one was used, the ground water has responded favorably and stream base flow returned almost immediately to the newly constructed channel.
  - o KHA pointed out that it will be important to plug the old channel to prevent it from being a drain which could pull down ground water.

- KHA also pointed out that some initial soil borings were done and those would be reviewed in more detail as it relates to existing and proposed groundwater stream base flow hydrology.
- All parties agreed that additional investigation and analysis will need to be performed and documented in the SSMP.

### Reach 2

- All parties agreed that this stream segment is entrenched (i.e. has abandoned its historic floodplain) with bank heights over six feet.
- NC DWQ noted some areas of stable banks among the vertical eroding banks.
  - KHA noted that although there are some short segments where the bank has sloughed in and have become temporarily stable the overall reach is unstable and still actively eroding.
  - City noted that the stream lacked habitat/bed form diversity (i.e. no riffle and pools).
- All agreed the outlet of Dragonfly Pond provided a good starting point and the elevated invert elevation of the outlet pipes allowed for an opportunity to raise the stream bed up.
- The group also noted some relic gabion baskets and/or Reno mattress downstream of the pond outlet. The group agreed that this area could be improved.

### Reach 3

- The group agreed this reach is incised/entrenched with vertical eroding banks.
- USACE and NC DWQ asked about storm water inputs from the neighborhood into reach 3 and 4.
  - The City stated that a portion of the neighborhood drains to a wet pond on Reach 4.
  - KHA stated that a priority one restoration would allow the existing stream segments around stormwater inputs to be converted into pocket BMPs to provide treatment prior to the stormwater reaching the relocated priority one restored stream.

The meeting adjourned at approximately 12:15 pm. The Agencies supported the City further pursuing this site as a potential mitigation project. However, the above comments or concerns raised will need to be addressed in future submittals.

These minutes of the meeting between staffs of CMSWS, USACE, NC DWQ, and KHA represents KHA's understanding of the issues discussed. Please review these minutes carefully, and advise the undersigned of any corrections or additions within 21 days.

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William R. Wilhelm, P.E., CFM, CPESC

Date: November 29, 2011



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Coordination Meeting For:  
Reedy Creek Stream Restoration  
February 3, 2012, 9:00 am  
Meeting Minutes

Attendees:

Amy Bice (Charlotte-Mecklenburg Storm Water Services (CMSWS))  
Jarrod Karl (CMSWS)  
William Harris (CMSWS),  
Chris Matthews (Mecklenburg County Park and Recreation Department (P&R))  
Michael Kirschman (P&R)  
Will Wilhelm (Kimley-Horn and Associates, Inc. (KHA))  
Jason Diaz (KHA)

This meeting occurred so that CMSWS and KHA could explain the potential proposed stream restoration project in the Reedy Creek Nature Preserve and Park. The meeting focused on communicating the potential project limits and overall goals.

Chris Matthews began the meeting with a brief introduction to the project, explaining that stream restoration is proposed for the degraded stream reaches within the park/nature preserve boundary. The City has performed a detailed feasibility study on the streams and wetlands within the project area and potential restoration alternatives. The restoration would seek to improve water quality, aquatic and terrestrial habitat, and aesthetics while minimizing the impact to the park users.

In order for the project to move forward, Park and Recreation would need to provide a conservation easement or similar agreement to allow CMSWS to build, monitor, and maintain the restoration project. This agreement would also need to provide long term protection/conservation of the restored reaches and riparian corridors. If P&R is agreeable, CMSWS would move forward with the planning and design of the proposed reaches inside P&R properties.

If P&R participates in this restoration project, CMSWS will contact the several adjacent property owners (WSOC Television, Grier, and Hodges) to look to expand the project. However, if these owners chose not to participate the project would still continue forward because the stream reaches in Reedy Creek Nature Preserve and Park are of sufficient length to be a stand-alone project. P&R indicated that they have long term interest in these adjacent parcels and would like to work with CMSWS to potentially purchase the entire parcels. P&R discussed that they have previously reached out to these owners without success.

KHA gave an overview of the potential project and the feasibility study that was prepared for the City. KHA explained how there were some really "nice" stable reaches within the nature preserve and some very degraded reaches. This project will look to make improvements only to the degraded reaches - see

attached Figure. KHA further explained how the degraded streams' water quality and habitat have been reduced by accelerated erosion and sediment input.

It was also noted that as part of the feasibility study, KHA looked at potential constraints such as access, construction phasing, timing, endangered species, existing vegetation, and historic sites. The constraints will dictate the design and construction of the project.

CMSWS noted that the US Army Corps of Engineers and NC Division of Water Quality have been to the site and have given positive feedback on the potential restoration project.

Other items that were discussed include:

- Reedy Creek is in the process of becoming a State Nature Preserve.
  - The City and P&R will work with Real Estate Services to understand potentially stacking conservation easement or other agreements on the nature preserve stream corridors.
  - Language for access, maintenance, and the restoration work may need to be written into the State's easement agreement.
- P&R expressed an interest in expanding the project area to include Reedy Creek to their southern border. The City will add this segment into planning phase if the project moves forward.
- Grading a subtle bank on abandoned channel sections for amphibian access to vernal pool areas.
- The existing pedestrian bridges should be incorporated into the design.
  - The new bridges are fiberglass and 8 feet wide.
  - These bridges will be surveyed. Avoidance and protection of the bridges will be incorporated into the planning and design.
- The BMP pond on the adjacent CMS property is not functioning properly and is causing sediment issues at Slider Pond. CMSWS will check in on the requirements for the BMP and ask CMS to properly operate and maintain this device.
- The P&R Director and park Citizen Advisory Council will have to approve the project prior to getting a commitment for P&R to participate.
  - Chris Matthews will facilitate an internal informal meeting with the Director.
  - CMSWS and KHA may be required to present to the park/preserve Citizen Advisory Council. The presentation should be 10-15 minutes long and should address what the project is, why we need it, where we are with the project, and the benefits (including biology and biodiversity) of the project. P&R stated that they would tentatively add this to the regularly scheduled meeting the 2nd week in May.
  - P&R stated that Park and Recreation Council (PRC) may not need to be involved.
- Access, marketing, and education through social media, mailers, and/or signage will be a critical component for park users prior to, during, and after construction if the project moves forward.
- CMSWS to investigate viability of Slider and Dragonfly Ponds as potential pond improvement projects.

These minutes of the meeting between staffs of CMSWS and KHA represents KHA's understanding of the issues discussed. Please review these minutes carefully, and advise the undersigned of any corrections or additions within 14 days of the date below.

Date: February 22, 2012

A handwritten signature in black ink, appearing to read "Jason Claudio-Diaz". The signature is written in a cursive style with a large initial "J".

---

Jason Claudio-Diaz, P.E., CFM

Diaz, Jason

---

From: Karl, Jarrod <jkarl@ci.charlotte.nc.us>  
Sent: Friday, June 22, 2012 11:17 AM  
To: Harris, William  
Cc: Diaz, Jason; Wilhelm, Will  
Subject: FW: Reedy Creek Part II

FYI...

---

From: Johnson, Alan [<mailto:alan.johnson@ncdenr.gov>]  
Sent: Thursday, June 21, 2012 5:11 PM  
To: Jones, Amanda D SAW; Karl, Jarrod  
Subject: Reedy Creek Part II

As with most streams in the Charlotte area, all channels observed were "incised" and over widen. However, the banks along the channels were relatively stable, but there were areas of notable erosion (under cut trees/root wads, etc). Pools were nonexistent, except in eddies created by logs and debris. But, fish/minnows were observed in the channel. The area along the channels was well wooded, but no large trees were observed. The large trees tend to range from 6"-10" in diameter with a nice understory of smaller saplings and shrubs. We noted the upper end of reach 7 and observed the reference reach and the obvious 6 ft head cut. Of course we don't know how quickly the head is moving. My thoughts:

- 1) Diameter of tree size to save should be reduce from the typical 10" to 12" diameter. If the larger tree diameter guide is used, shading and trees will be nonexistent.
- 2) Priority 1 may be the best option. There is an onsite "reference".
- 3) Enhancement should mostly (strive to be) within the channel (inner berms/benches). An effort should be made to retain 50% of the bank, where minimal impact occurs that protects the riparian corridor. This may be alternating stream bank/channel shaping. This is a conceptual thought.
- 4) Habitat uplift (pool creation, woody debris) should be relatively easy to attain in the with enhancement. Grade control should be similar. The biggest question is reducing erosion of the stream bank.

Thanks  
Alan

Alan Johnson - [Alan.Johnson@ncdenr.gov](mailto:Alan.Johnson@ncdenr.gov)  
North Carolina Dept. of Environment & Natural Resources  
Div. of Water Quality  
610 E. Center Ave., Suite 301  
Mooresville, NC 28115  
Ph: (704) 663-1699 Fax: (704) 663-6040

E-mail correspondence to and from this address may be subject to the North Carolina Public Records Law and may be disclosed to third parties unless the content is exempt by statute or other regulation.

Diaz, Jason

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From: Karl, Jarrod <jkarl@ci.charlotte.nc.us>  
Sent: Friday, June 22, 2012 11:18 AM  
To: Harris, William  
Cc: Diaz, Jason; Wilhelm, Will  
Subject: FW: Reedy Creek #2

FYI...

---

From: Johnson, Alan [<mailto:alan.johnson@ncdenr.gov>]  
Sent: Friday, June 22, 2012 8:47 AM  
To: Karl, Jarrod; Jones, Amanda D SAW  
Subject: Reedy Creek #2

One more thought:

What would be the issue if the project is enhancement, if the project was limited to mostly in stream structures to create pools/areas for habitat as well as localized areas of heavy channel work that might facilitate a reduction in stream velocity. Also, breaching the berms sporadically along the channel.

Alan Johnson - [Alan.Johnson@ncdenr.gov](mailto:Alan.Johnson@ncdenr.gov)  
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Diaz, Jason

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To: Karl, Jarrod  
Subject: RE: Reedy Creek Feasibility Study Area

From: Jones, Amanda D SAW [<mailto:Amanda.D.Jones@usace.army.mil>]  
Sent: Tuesday, June 26, 2012 12:21 PM  
To: Karl, Jarrod  
Cc: Johnson, Alan ([alan.johnson@ncdenr.gov](mailto:alan.johnson@ncdenr.gov))  
Subject: Reedy Creek Feasibility Study Area

Below are my comments in response to our 06/21/12 field walk. Please let me know if there can be anything done in the near future to address comment #4.

In general, the site is a large contiguous, forested, headwater system which is very rare for proposed bank projects. Stream channels are incised, sand bed, with moderately eroding banks and no access to floodplain. The buffer is providing great canopy cover even though larger trees (>15 inches) are mostly absent. There also doesn't appear to be an invasive/exotic species problem in the buffer. The area is proposed for inclusion into the bank and is in the early planning stages. Please consider/address the comments below as you move forward:

1. Justification needs to be provided as to why this area should be considered a candidate for preservation credit given its current status as a park. What are the developmental threats/pressures to this area, what protection does it receive currently as a park and how those protections could be changed. What would be the protections afforded by inclusion into the bank and how those are different from its current park status.
2. Buffers: Limited buffer disturbance with this project will be crucial for approval to move forward. Tree surveys for dbh's smaller than 12" will likely be required and detailed plans showing tree disturbance should be provided early on in planning with stringent contract oversight during construction. We recommend re-planting with larger caliper trees/shrubs. We also recommend that wider buffers should be acquired (greater than 50') since there are no constraints and the buffer is a contiguous/undisturbed forest for the most part.
3. We support a Priority 1 design given the available floodplain, lack of constraints, current state of stream channels, and concerns over vegetation disturbance. Any design should incorporate woody structures and minimize the use of rock due to the size and natural substrate of the existing stream channels.
4. There is a reference headwater stream and wetland system located on the site (Reach 7) which should be considered during design. We would also recommend that immediate action be taken to stop the existing headcut from moving further upstream and impacting this reference site. Only minimal in-stream would be required which would preserve this as a reference reach for the future regardless if/when this project moves forward.
5. Wetland E: high quality wetland area and reference reach. Any design should not impact this area. Also recommend conducting NCWAM assessments on existing wetlands which will likely be mandatory in the future.
6. Title opinions: I strongly recommend that title opinions/searches be conducted as soon as possible versus waiting until after design/bank approval. The value of this site as a potential bank site is tied to how relatively undisturbed it is for a piedmont, urban headwater forest. Any future easements/rows that may be present will affect the site's preservation value and ultimately overall credit generation.
7. In-stream macroinvertebrates: As noted on-site, portions of streams have scored high in the upstream reaches versus poor for downstream reaches. Considerations and further discussions should be had regarding how uplifts in this area will be tracked/monitored.
8. The request for the revised jurisdictional determination needs to include one overall map that shows jurisdictional areas from the November 2011 submittal/approval, the areas added from the May 2012 submittal, and any jd areas associated with the sewer line annexation project. We recommend that these areas be surveyed.

*Amanda Jones  
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US Army Corps of Engineers  
Asheville Regulatory Field Office  
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web: <http://www.saw.usace.army.mil/wetlands>*