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## MEMORANDUM

Date:      August 24, 2023

To:        Tiffany Faro, AICP
           Planning Director
           City of Belmont
           1401 East Catawba Street
           Belmont, NC 28012

From:      Chad Ponce (BMI) – chad.ponce@bolton-menk.com

CC:        Jake Bachman – Jacob.bachman@bolton-menk.com
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### Subject:    Henry Chapel Tree Inventory

At the request of ASF TAP NC II, LLC (Client), Bolton & Menk completed a tree inventory at the Henry Chapel property (**Exhibit A**). The 262.62-acre property includes three Gaston County Parcels with parcel identification numbers: 3593584931, 3593578135, and 3593781409.

The purpose of the tree inventory is to meet the City of Belmont's 2017 tree ordinance prior to site development. The methods used in the inventory were approved by Tiffany Faro with the City of Belmont on July 27th, 2023.

To meet the requirements of the ordinance, at least 25% of the healthy Heritage Trees located on the property shall be preserved. Based on the results of our tree inventory, approximately 31% of heritage trees located on the property are preserved within the Tree Save areas.

### Setting

The study area is in the Piedmont region of North Carolina in the Mountain Island Lake – Catawba River watershed (HUC 0305010114). Tributaries at the site drain to the Catawba River, which is located approximately 500 to 1,000-feet east of the site. Topography at the site ranges from approximately 700-feet NAVD at the northwest corner to 580-feet NAVD at the eastern side of the site. Steep slopes are present near the stream channels.

Dominant forest communities at the site include both oak-hickory-pine forest (considered deciduous forest or mixed-deciduous forest for the purpose of the study) and pine stands. The species observed within these forest communities were generally consistent across the site. It is notable that the invasive shrub species autumn olive (*Elaeagnus umbellata*) was present across the site, particularly within the hardwood forested areas, at a high percentage of cover across the shrub layer. Within the oak-hickory-pine forest community the following were commonly observed:

Trees: American beech (*Fagus grandifolia*), black walnut (*Juglans nigra*), mockernut hickory (*Carya tomentosa*), red maple (*Acer rubrum*), sweetgum (*Liquidambar stryaciflua*), tulip poplar (*Liriodendron tulipifera*)

Shrubs: American holly (*Ilex opaca*), autumn olive (*E. umbellata*), Chinese privet (*Ligustrum sinense*)
Evergreen species observed within the oak-hickory-pine forest and pine stands included: loblolly pine (*Pinus taeda*), shortleaf pine (*P. echinata*), and Virginia pine (*P. virginiana*).

## Method
A study grid method was utilized. The size of the study grids is 100 feet by 100 feet. There are twenty study grids evenly spaced across the site as denoted on the attached map (**Exhibit B**). Data collected within the study grids was extrapolated across the remainder of the site using average values.

The study grids within the pine stands (PS-1 through PS-5) were used to extrapolate the number of heritage trees within the pine stand areas. The study grids outside of the pine stands (DA-1 through DA-15) were used to extrapolate the number of heritage trees outside of the pine stand areas (deciduous forest) and characterize the maturity and health of the deciduous forest.

The deciduous tree canopy was identified by studying aerial images taken during dormant season to confirm pre-development acreage of deciduous tree canopy required for preservation. As pine is not a deciduous tree type, the pine stands have been identified via aerial imagery and highlighted in light green on the attached map. This area is not included as part of the healthy maturing deciduous tree canopy. The maturity of the deciduous tree canopy was characterized during the survey.  For the purposes of this inventory, a tree is considered mature if it is at least twenty feet in height and providing canopy.

Data Provided:
- Percentage of healthy mature deciduous canopy cover for each study grid (Table 1).
    - Percentage of any dead or dying trees within the study grids to not be counted towards the healthy mature deciduous tree canopy.
- Number of healthy Heritage Trees within each of the study grids (Table 1)
    - Number of Heritage Pines
    - Number of Heritage Deciduous
- Extrapolated data (Table 2)

## Results
The tree inventory was completed on August 11, 14, 15, and 16, 2023. Trees within the study grids were found to be mature, generally healthy and providing approximately 100 percent canopy cover.

The percentage of healthy mature deciduous canopy (HMDC) was calculated for each study grid by dividing the number of deciduous heritage trees by the total number of heritage trees (deciduous + pine) and multiplying the product by 100. The result is that the deciduous areas are considered to have an average of 72% healthy mature deciduous canopy (Table 1).

One large diameter (28 inches DBH) tulip poplar in study grid DA-14 was observed to be unstable/dying with holes in trunk and signs of root rot (Photo 5 in **Attachment 1**). This tree was not counted toward the total number of heritage trees within study grid DA-14. Several dead tree snags were observed throughout the study grids which is normal for a maturing forest. These snags were not counted toward the number of heritage trees.

The results of the tree inventory are shown on Table 1.

Table 1. Tree inventory results – number of and percentage of heritage trees

| Grid Designation | Deciduous >12" (#) | Pine >12" (#) | Total Heritage (#) | Healthy Mature Deciduous Canopy (%) |
|---|---|---|---|---|
| DA-1 | 16 | 2 | 18 | 89 |
| DA-2 | 12 | 11 | 23 | 52 |
| DA-3 | 9 | 4 | 13 | 69 |
| DA-4 | 19 | 0 | 19 | 100 |
| DA-5 | 12 | 2 | 14 | 86 |
| DA-6 | 11 | 3 | 14 | 79 |
| DA-7 | 10 | 7 | 17 | 59 |
| DA-8 | 11 | 16 | 27 | 41 |
| DA-9 | 10 | 8 | 18 | 56 |
| DA-10 | 12 | 5 | 17 | 71 |
| DA-11 | 15 | 8 | 23 | 65 |
| DA-12 | 16 | 2 | 18 | 89 |
| DA-13 | 12 | 9 | 21 | 57 |
| DA-14 | 15 | 2 | 17 | 88 |
| DA-15 | 12 | 3 | 15 | 80 |
| PS-1 | 0 | 14 | 14 | 0 |
| PS-2 | 1 | 21 | 22 | 5 |
| PS-3 | 0 | 11 | 11 | 0 |
| PS-4 | 0 | 16 | 16 | 0 |
| PS-5 | 0 | 9 | 9 | 0 |
| Deciduous Avg | 13 | 5 | 18 | 72 |
| Pine Avg | 0 | 14 | 14 | - |
| Total Avg | 10 | 8 | 17 | - |

The percentage of healthy mature deciduous tree canopy (HMDC) was not calculated for the pine stand areas per the approved work plan. The HMDC in acres was calculated for the tree save area by multiplying the total mixed-deciduous acres by the deciduous average from Table 1 (72%). The percentage of HMDC was calculated by dividing the HMDC (acres in TSA) by the HMDC (acres at site) multiplying that product by 100. The result is that approximately 55 acres of HMDC or 37 percent of the HMDC occurring at the site will be saved within the tree save area (Table 2).

The number of heritage trees within the tree save area was calculated by multiplying the acres of pine area (5 acres) by the pine average in Table 1 (14) and dividing by the size of the study area (100 x 100 feet or 0.2296 acres) and similar for the mixed deciduous area. A percentage of trees within both areas was then derived from the number of heritage trees within each divided by the total extrapolated number of heritage trees at the site (20,305). The result is that 31 percent of heritage trees at the site will be preserved within the tree save area (Table 2).

Table 2. Extrapolated data for the tree save area

| Tree Save Area (TSA) | Acres | Saved within TSA | | | |
|---|---|---|---|---|---|
| | | HMDC (acres )* | HMDC (%)* | Heritage Trees (#)* | Heritage Trees (%)* |
| Pine Stand | 5 | - | - | 305 | 2 |
| Deciduous Forest | 76 | 55 | 37 | 5,958 | 29 |
| | | | Total | 6,263 | 31 |

*extrapolated data

## Conclusions

The tree inventory to meet the City of Belmont's 2017 tree ordinance was completed on August 11, 14, 15, and 16, 2023. Based on the results of our tree inventory:

- approximately 37 percent of the healthy maturing deciduous tree canopy occurring at the site will be saved within the tree save area
- approximately 6,263 heritage trees are preserved within the Tree Save area
- approximately 31% of the heritage trees located on the property are preserved within the Tree Save area

Respectfully,

Chad Ponce, PWS
Natural Resources Specialist
Bolton & Menk, Inc.
116 N. Markley Street, Suite 101
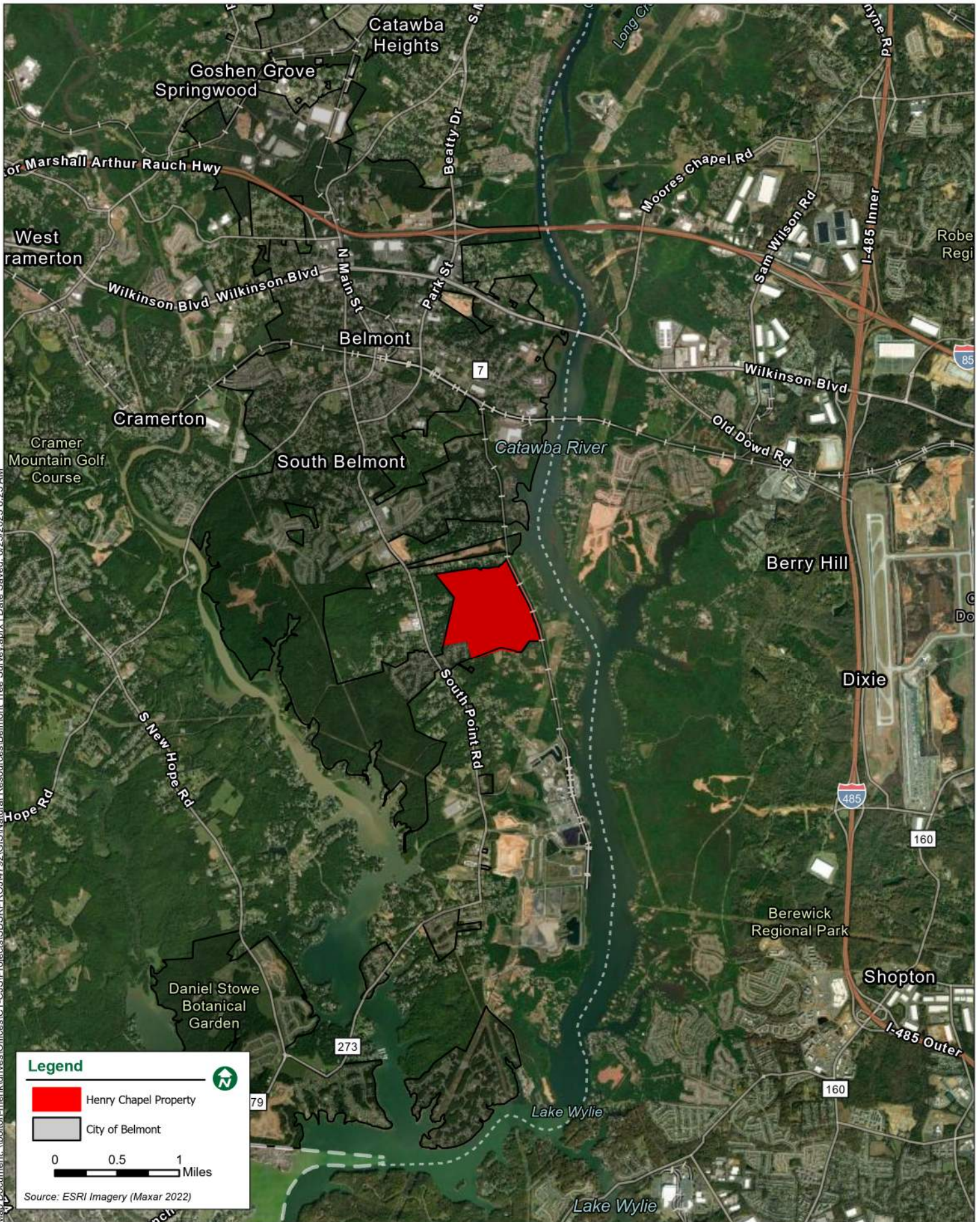Greenville, SC 29601
Cell 813-833-2592

**Exhibits:**
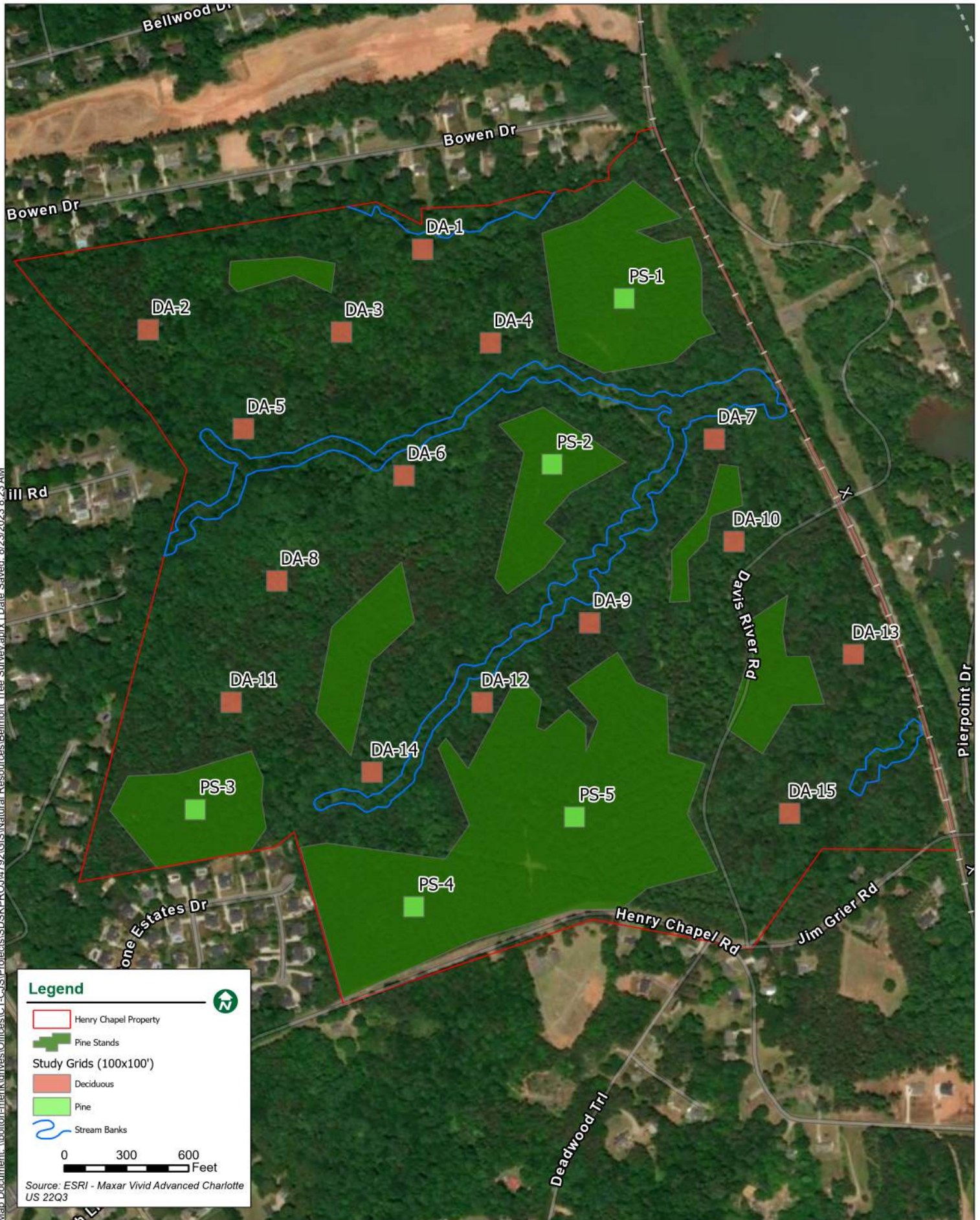A. Site Location Map
B. Study Grid Map

**Attachments:**
1. Photograph Log

# Henry Chapel Tree Survey

Belmont, NC

**Exhibit A: Site Location Map**

August 2023

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Legend

■ Henry Chapel Property

▭ City of Belmont

0    0.5    1 Miles

Source: ESRI Imagery (Maxar 2022)

Map Document: \\bolton-menk\drives\Offices\CT-CJS\Projects\SDSK\PROJ\4792\GIS\Natural Resources\Belmont Tree Survey.aprx | Date Saved: 8/23/2023 8:23 AM

# Henry Chapel Tree Survey

Belmont, NC

**Exhibit B: Representative Study Grids**

**August 2023**

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Legend

- Henry Chapel Property
- Pine Stands

Study Grids (100x100')
- Deciduous
- Pine
- Stream Banks

0    300    600 Feet

Source: ESRI - Maxar Vivid Advanced Charlotte US 22Q3

Photo 1:
Tree snag at DA-1. Several snags were observed within the study grids.
Photograph taken at DA-4.



Photo 2:
Photograph taken at DA-2. Typical photo from the oak-hickory-pine forest type. Heavy cover of autumn olive can be seen at the shrub layer.

Photo 3:
Photo taken at DA-3. Heavy shrub and sapling density obscures the view in many areas.



Photo 4:
Photo taken at DA-4. A tree snag and view of canopy shown in the photo.

Photo 5:
Photo taken at DA-14. Holes and root rot observed in this large diameter tulip poplar.



Photo 6:
Photo taken at PS-3. A hunting stand can be seen in the photo.

Photo 7:
Photo taken at PS-4. A partial view of the canopy and dense understory vegetation can be seen in the photo.



Photo 8:
Photo taken at PS-5. Typical pine forest with hardwood saplings.