

**Appendix H – Sewage Disposal (Correspondence and Figures H-1 through H-17)**

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H-1 Index Sheet to Proposed Sewer Routes

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H-2 Sheet 2 Proposed Sewer Route

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H-3 Sheet 3 Proposed Sewer Route

---

H-4 Sheet 4 Proposed Sewer Route

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H-5 Sheet 5 Proposed Sewer Route

---

H-6 Sheet 6 Proposed Sewer Route

---

H-7 Sheet 7 Proposed Sewer Route

---

H-8 Sheet 8 Proposed Sewer Route

---

H-9 Sheet 9 Proposed Sewer Route

---

H-10 Sheet 10 Proposed Sewer Route

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H-11 Sheet 11 Proposed Sewer Route

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H-12 Sheet 12 Proposed Sewer Route

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H-13 Sheet 13 Proposed Sewer Route

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H-14 Sheet 14 Proposed Sewer Route

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H-15 Sheet 15 Proposed Sewer Route

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H-16 Sheet 16 Proposed Sewer Route

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H-17 Sheet 17 Proposed Sewer Route

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# ORANGE WATER AND SEWER AUTHORITY

*A public, non-profit agency providing water, sewer and reclaimed water services  
to the Carrboro-Chapel Hill community*

2010 MAR 19 AM 11:34

March 18, 2010

John D. Masson, Project Manager  
Facilities Planning Department  
Campus Box 1090  
Giles F Horney Building  
Chapel Hill, NC 27599-1090

**SUBJECT: POTENTIAL IMPACTS OF CAROLINA NORTH ON OWASA  
OPERATIONS**

Dear Mr. Masson,

This letter is in response to your request that we confirm OWASA's ability to meet the projected water and sewer service needs of the Carolina North development. Because it is our understanding that significant technical aspects of the water and wastewater design are still at the concept level, our analysis is necessarily subject to change. We will, of course, remain engaged with you and other University representatives as plans are further refined and formalized so that OWASA can meet its commitments to the University and our other customers. There is no question about OWASA's legal obligation to provide water and sewer service to Carolina North. The original Sale and Purchase Agreement between UNC and OWASA is very clear about that.

We understand and support the University's intent to meet the water needs of Carolina North through the integrated use of all available resources, including rainwater recovered from building rooftops, parking lots, and other impervious surfaces; and through on-site wastewater treatment that will provide a source of reclaimed water, perhaps supplemented by domestic wastewater "mined" from a nearby OWASA sewer line and treated for non-potable use. We also understand and support the University's intent to use these waters conjunctively for irrigation, toilet flushing, cooling-tower makeup, and other non-potable requirements at Carolina North.

OWASA can meet Carolina North's projected potable water needs for the foreseeable future through our existing Cane Creek/University Lake/Quarry Reservoir system (which will be expanded in the mid 2030s) and with no further expansion of our 20 million gallons per day (mgd) Jones Ferry Road Water Treatment Plant. The recently completed update of OWASA's Long-Range Water Supply Plan included "placeholder" average daily potable water demand projections of 1.14 and 1.43 mgd for Carolina North at buildout under Expected and High demand scenarios, respectively. We note that McKim & Creed's Technical Memorandum dated January 25, 2010 indicates average daily and peak day potable water demands of 0.38 and 0.64 mgd, respectively, which are lower than our placeholder estimates. Similarly, for the water line connections proposed near the intersection of Martin Luther King Jr. Boulevard/ Piney Mountain Road and at Seawell School Road in our 740-foot pressure zone, and for the connection proposed at Estes Drive in our 640-foot pressure zone, we are confident that OWASA's existing distribution system can meet Carolina North's potable water needs for the foreseeable future without further upgrade.

The capacity of our Mason Farm Wastewater Treatment Plant was recently increased to 14.5 mgd and is not expected to require further expansion until after 2030. It is unlikely that wastewater generated at Carolina North will have significant hydraulic effects on our treatment plant, especially if the innovative technologies proposed for Carolina North are implemented. Additional analysis and evaluation will be needed to ensure conformance with OWASA's sewer use ordinance and pre-treatment requirements as the Carolina North utility plans are more fully developed.

We recently completed design work, which included flow projections for Carolina North, and obtained all required permits to upgrade our Bolin Creek wastewater interceptor beginning at McKim & Creed's proposed connection point at Estes Drive. When this work is completed, we are confident that this portion of the wastewater collection system will be able to meet the peak daily flow demands outlined in McKim & Creed's Technical Memorandum.

Additionally, a consultant is conducting a major flow monitoring and modeling study of our entire collection system. When completed later this year, we expect this study to confirm the collection system's ability to meet the needs of Carolina North. If portions of the sewer system have to be replaced due to condition or capacity constraints, those replacement pipes will be placed in existing utility corridors wherever possible. If that is not feasible, then OWASA will make every reasonable effort to construct the new utility corridor outside of any wetland areas and away from any surface waters.

Carolina North will offer unique utility opportunities and challenges that we expect to manage largely through existing OWASA policies and procedures. Based on UNC's demonstrated improvements in water efficiency and its visionary plans for integrated water management, Carolina North's water and wastewater needs are well within the capacity projections of our own long-range planning efforts. New arrangements may be needed for operating and managing certain innovative/alternative water-related technologies, but we foresee no undesired water and/or sewer utility impacts on OWASA's existing or future infrastructure or customer base.

We look forward to our continued partnership with the University and other stakeholders as we develop and implement the necessary plans for meeting the water, wastewater, and reclaimed water needs of Carolina North.

If you have any questions or would like any additional information, please contact Ed Holland at 919-537-4215.

Sincerely,



Ed Kerwin  
Executive Director

cc: John Greene, P.E., Operations Manager  
Mason Crum, P.E., Director of Engineering and Planning  
Ed Holland, AICP, Planning Director



### Proposed Sewer Routes

#### Legend

##### Proposed OWASA Sanitary Sewer

- Sanitary Sewer
- Sanitary Sewer Scalloping Force Main
- Proposed Pump Station

##### Potential OWASA Upgrades (Need further analysis)

- Possible Pipe Upsize

##### Existing OWASA Sanitary Sewer

- Interceptors
- Force Main
- Manholes
- Pump Stations
- Gravity Sewer Mains
- Wastewater Treatment Plant

##### Geographic Information

- Railroad
- CN Surveyed Boundary
- CN Development Area - 228 Acre - 50 Years
- CN Development Area - 133 Acre - 20 Years
- Town of Chapel Hill Streams
- Hydrography Polygons
- Orange County Parcels
- JordanLakeBuffer - 30 foot
- JordanLakeBuffer-50 foot

Data Sources:  
 Proposed Sanitary Sewer - UNC Consultants  
 Existing Sanitary Sewer - OWASA  
 Stream Buffers - UNC Energy Services using Town of Chapel Hill stream data

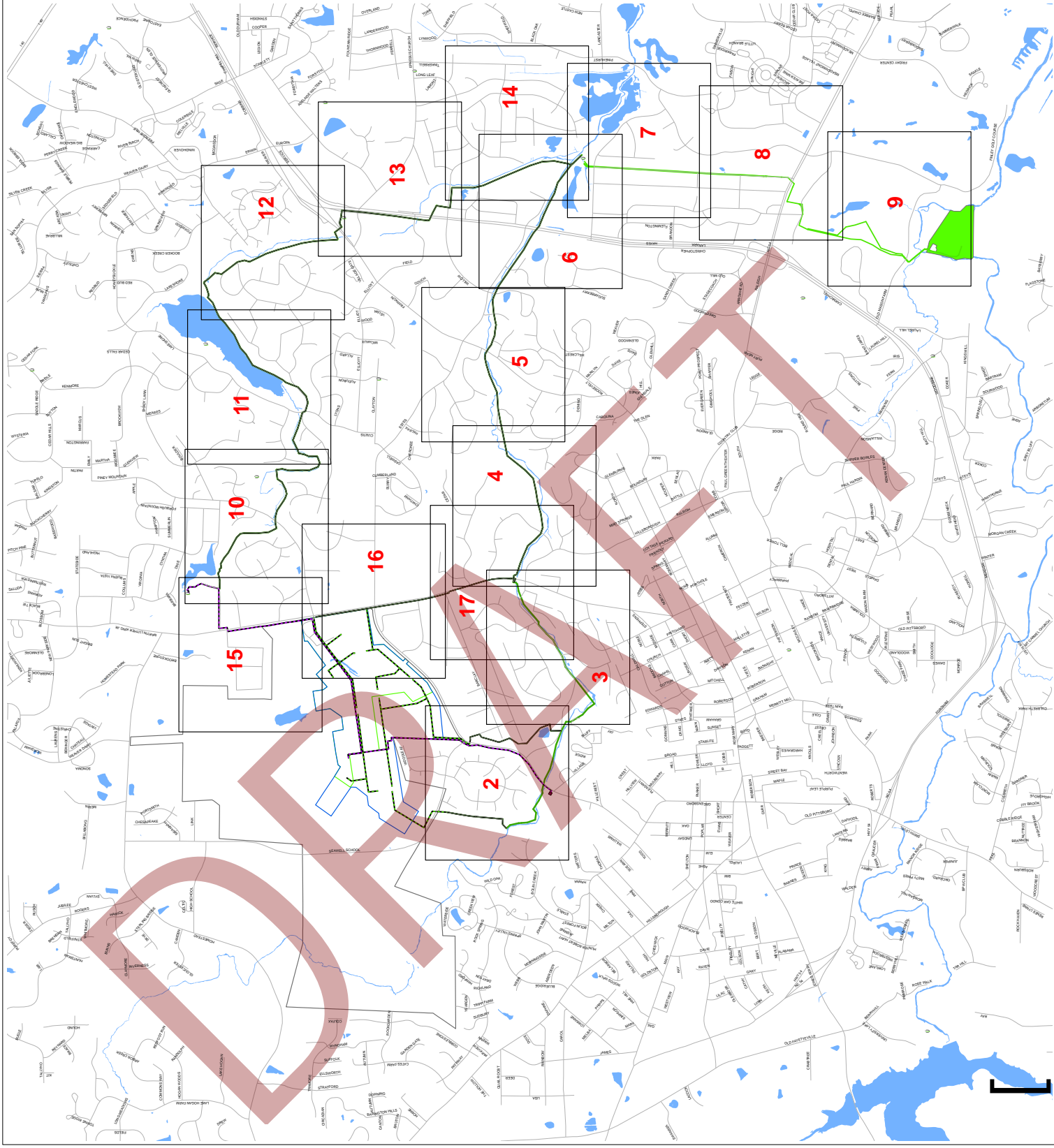


FIGURE H-1



## Proposed Sewer Routes

### Legend

#### Proposed OWASA Sanitary Sewer

- Sanitary Sewer
- Sanitary Sewer Scapling Force Main
- Proposed Pump Station

#### Potential OWASA Upgrades (Need further analysis)

- Possible Pipe Upsize

#### Existing OWASA Sanitary Sewer

- Interceptors
- Force Main
- Manholes
- Pump Stations
- Gravity Sewer Mains
- Wastewater Treatment Plant

#### Geographic Information

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Data Sources:  
 Proposed Sanitary Sewer - UNC Consultants  
 Existing Sanitary Sewer - OWASA  
 Stream Buffers - UNC Energy Services using Town of Chapel Hill stream data

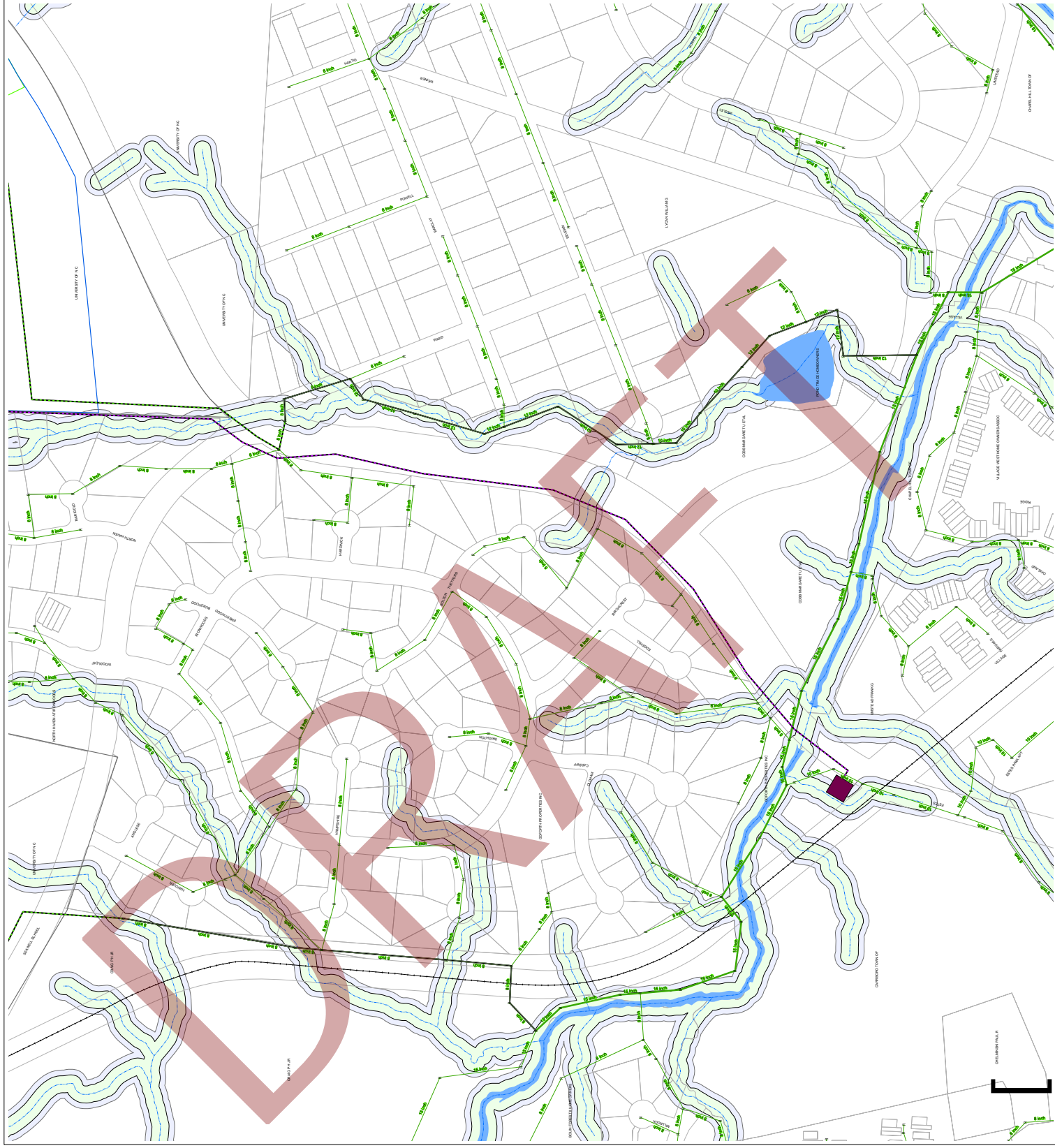


FIGURE H-2





### Proposed Sewer Routes

#### Legend

##### Proposed OWASA Sanitary Sewer

- Sanitary Sewer
- Sanitary Sewer Scalloping Force Main
- Proposed Pump Station

##### Potential OWASA Upgrades (Need further analysis)

- Possible Pipe Upsize

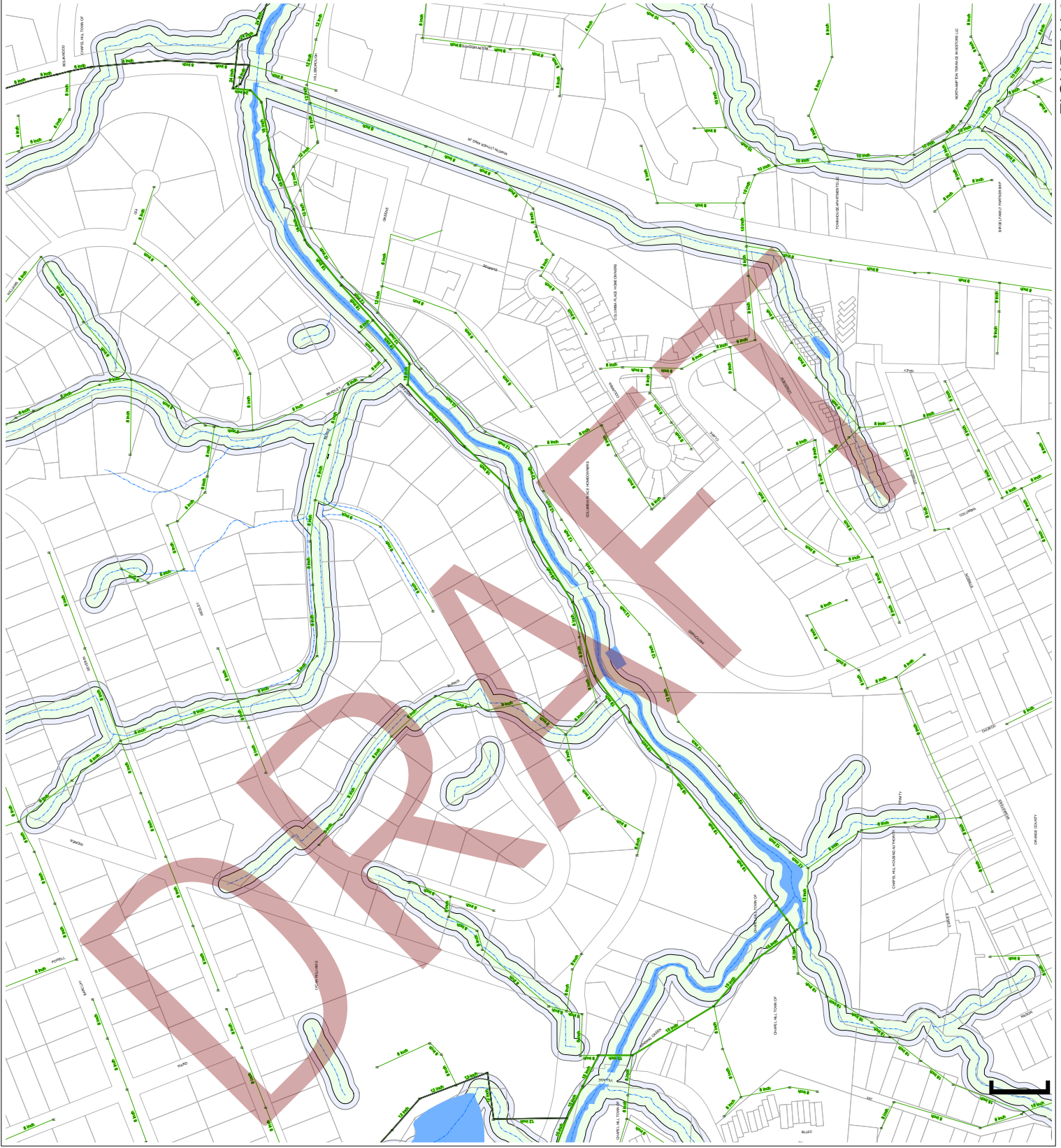
##### Existing OWASA Sanitary Sewer

- Interceptors
- Force Main
- Manholes
- Pump Stations
- Gravity Sewer Mains
- Wastewater Treatment Plant

##### Geographic Information

- Railroad
- CN Surveyed Boundary
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- CN Development Area - 133 Acre - 20 Years
- Town of Chapel Hill Streams
- Hydrography Polygons
- Orange County Parcels
- JordanLakeBuffer - 30 foot
- JordanLakeBuffer-50 foot

Data Sources:  
 Proposed Sanitary Sewer - UNC Consultants  
 Existing Sanitary Sewer - OWASA  
 Stream Buffers - UNC Energy Services using Town of Chapel Hill stream data





### Proposed Sewer Routes

#### Legend

##### Proposed OWASA Sanitary Sewer

- Sanitary Sewer
- Sanitary Sewer Scalloping Force Main
- Proposed Pump Station

##### Potential OWASA Upgrades (Need further analysis)

- Possible Pipe Upsize

##### Existing OWASA Sanitary Sewer

- Interceptors
- Force Main
- Manholes
- Pump Stations
- Gravity Sewer Mains
- Wastewater Treatment Plant

##### Geographic Information

- Railroad
- CN Surveyed Boundary
- CN Development Area - 228 Acre - 50 Years
- CN Development Area - 133 Acre - 20 Years
- Town of Chapel Hill Streams
- Hydrography Polygons
- Orange County Parcels
- JordanLakeBuffer - 30 foot
- JordanLakeBuffer-50 foot

Data Sources:  
 Proposed Sanitary Sewer - UNC Consultants  
 Existing Sanitary Sewer - OWASA  
 Stream Buffers - UNC Energy Services using Town of Chapel Hill stream data

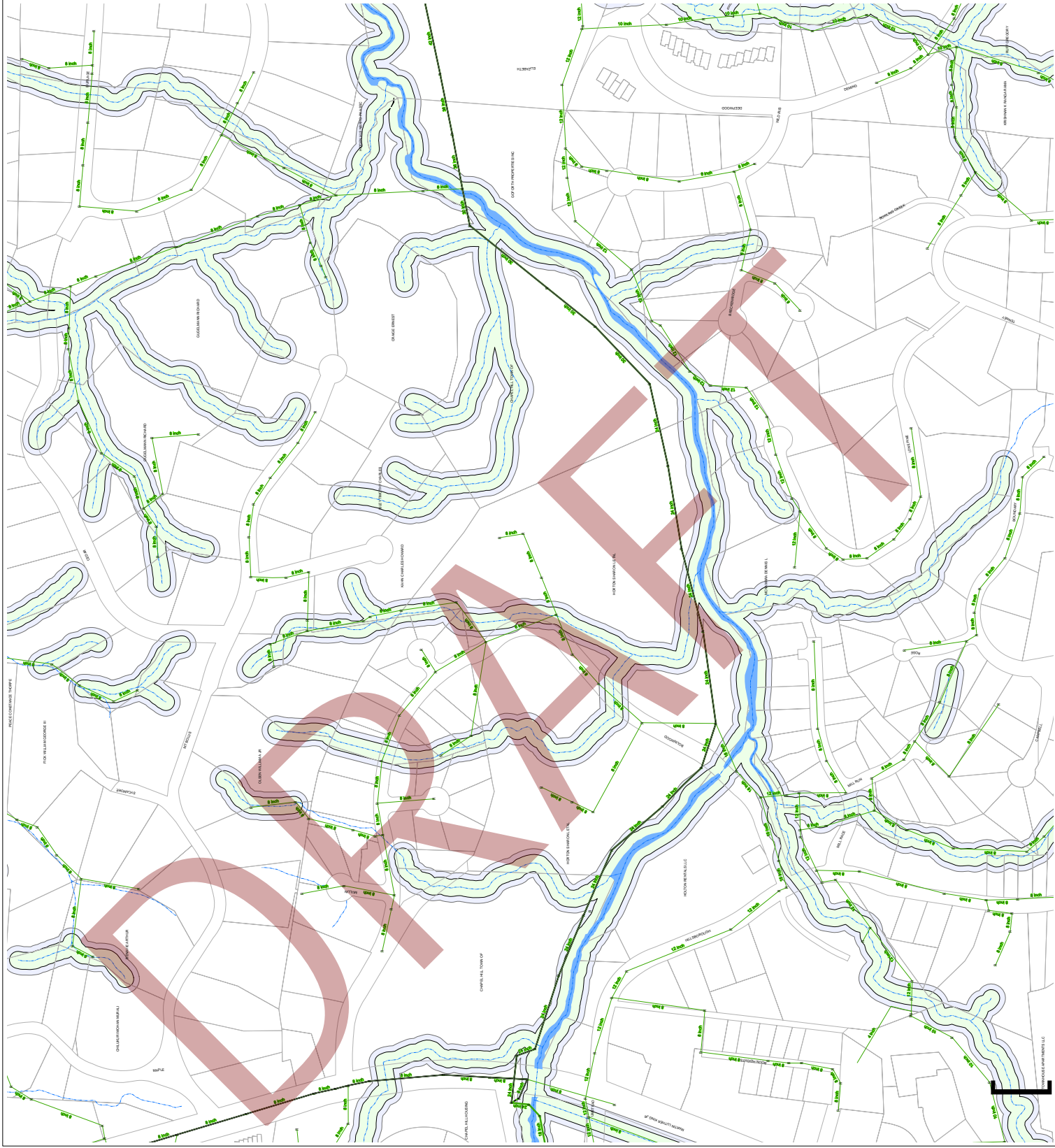


FIGURE H-4



### Proposed Sewer Routes

#### Legend

##### Proposed OWASA Sanitary Sewer

- Sanitary Sewer
- Sanitary Sewer Scalloping Force Main
- Proposed Pump Station

##### Potential OWASA Upgrades (Need further analysis)

- Possible Pipe Upsize

##### Existing OWASA Sanitary Sewer

- Interceptors
- Force Main
- Manholes
- Pump Stations
- Gravity Sewer Mains
- Wastewater Treatment Plant

##### Geographic Information

- Railroad
- CN Surveyed Boundary
- CN Development Area - 228 Acre - 50 Years
- CN Development Area - 133 Acre - 20 Years
- Town of Chapel Hill Streams
- Hydrography Polygons
- Orange County Parcels
- JordanLakeBuffer - 30 foot
- JordanLakeBuffer-50 foot

Data Sources:  
 Proposed Sanitary Sewer - UNC Consultants  
 Existing Sanitary Sewer - OWASA  
 Stream Buffers - UNC Energy Services using Town of Chapel Hill stream data

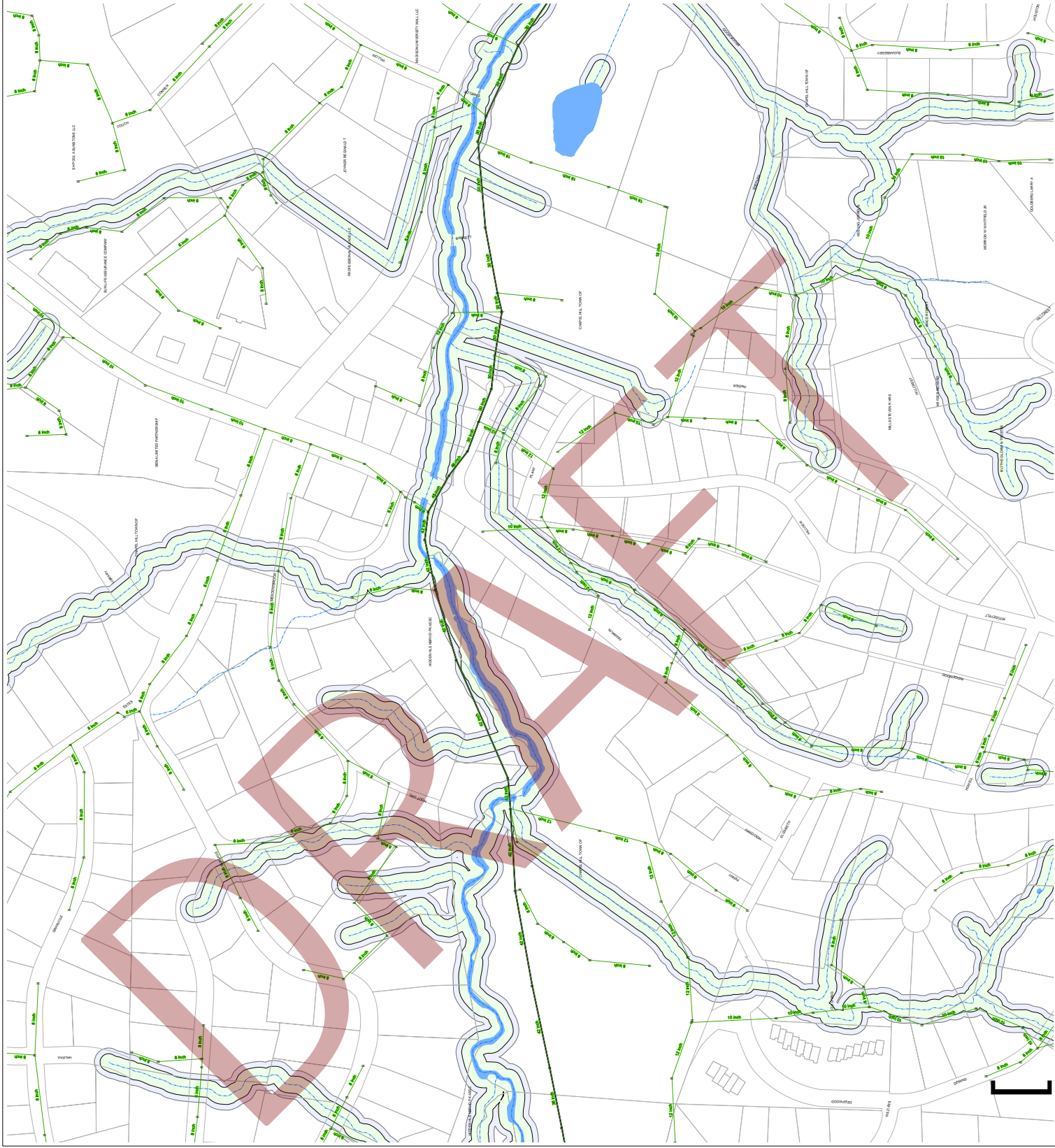


FIGURE H-5



### Proposed Sewer Routes

- Legend**
- Proposed OWASA Sanitary Sewer
  - Sanitary Sewer
  - Sanitary Sewer Scalloping Force Main
  - Proposed Pump Station

### Potential OWASA Upgrades (Need further analysis)

- Possible Pipe Upsize

### Existing OWASA Sanitary Sewer

- Interceptors
- Force Main
- Manholes
- Pump Stations
- Gravity Sewer Mains
- Wastewater Treatment Plant

### Geographic Information

- Railroad
- CN Surveyed Boundary
- CN Development Area - 228 Acre - 50 Years
- CN Development Area - 133 Acre - 20 Years
- Town of Chapel Hill Streams
- Hydrography Polygons
- Orange County Parcels
- JordanLakeBuffer - 30 foot
- JordanLakeBuffer-50 foot

Data Sources:  
 Proposed Sanitary Sewer - UNC Consultants  
 Existing Sanitary Sewer - OWASA  
 Stream Buffers - UNC Energy Services using Town of Chapel Hill stream data

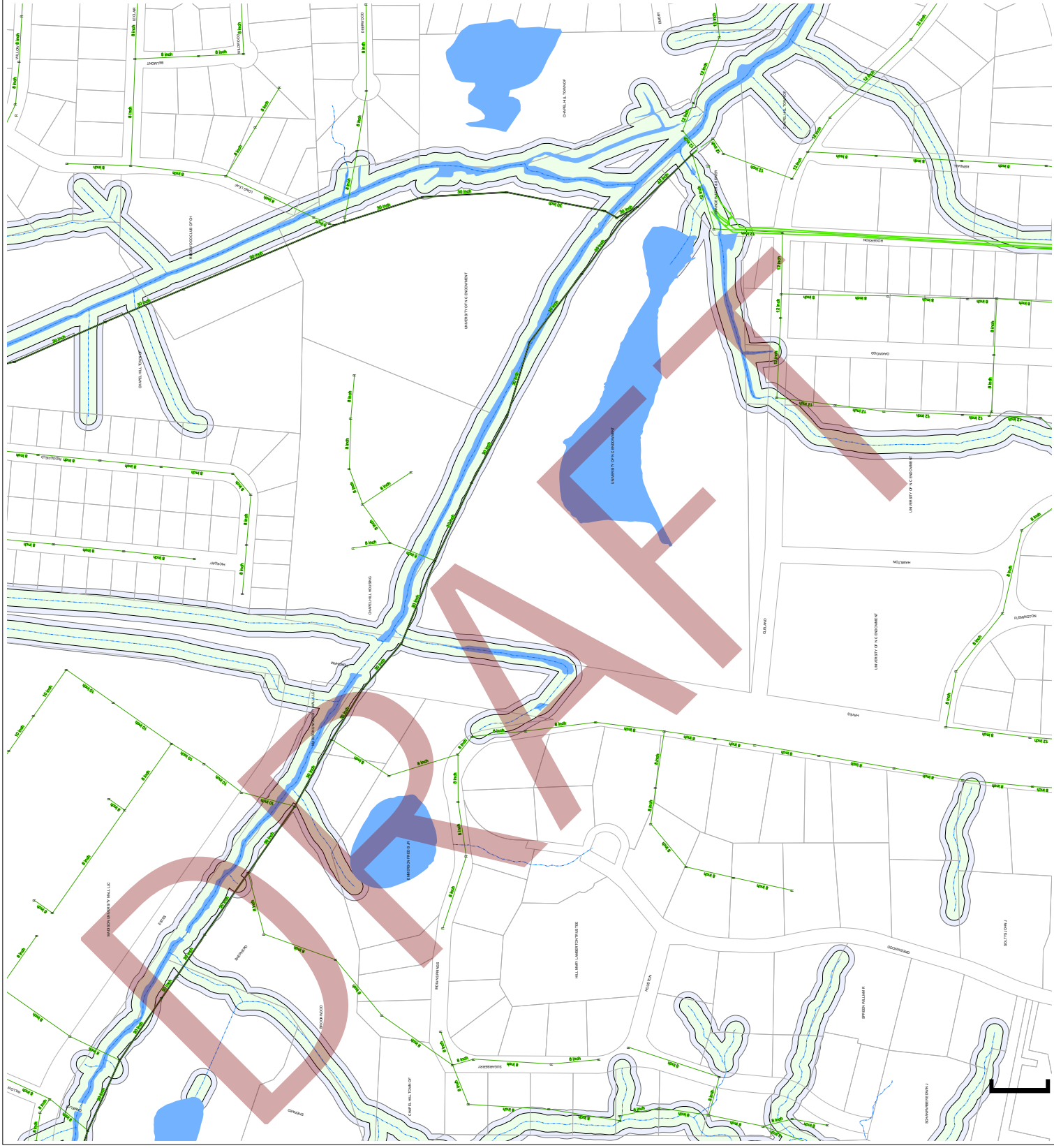


FIGURE H-6



# UNC - Chapel Hill Carolina North

## Proposed Sewer Routes

### Legend

#### Proposed OWASA Sanitary Sewer

- Sanitary Sewer
- Sanitary Sewer Scalloping Force Main
- Proposed Pump Station

#### Potential OWASA Upgrades (Need further analysis)

- Possible Pipe Upsize

#### Existing OWASA Sanitary Sewer

- Interceptors
- Force Main
- Manholes
- Pump Stations
- Gravity Sewer Mains
- Wastewater Treatment Plant

#### Geographic Information

- Railroad
- CN Surveyed Boundary
- CN Development Area - 228 Acre - 50 Years
- CN Development Area - 133 Acre - 20 Years
- Town of Chapel Hill Streams
- Hydrography Polygons
- Orange County Parcels
- JordanLakeBuffer - 30 foot
- JordanLakeBuffer-50 foot

Data Sources:  
 Proposed Sanitary Sewer - UNC Consultants  
 Existing Sanitary Sewer - OWASA  
 Stream Buffers - UNC Energy Services using Town of Chapel Hill stream data



FIGURE H-7



# UNC - Chapel Hill Carolina North

## Proposed Sewer Routes

### Legend

#### Proposed OWASA Sanitary Sewer

- Sanitary Sewer
- Sanitary Sewer Scalloping Force Main
- Proposed Pump Station

#### Potential OWASA Upgrades (Need further analysis)

- Possible Pipe Upsize

#### Existing OWASA Sanitary Sewer

- Interceptors
- Force Main
- Manholes
- Pump Stations
- Gravity Sewer Mains
- Wastewater Treatment Plant

#### Geographic Information

- Railroad
- CN Surveyed Boundary
- CN Development Area - 228 Acre - 50 Years
- CN Development Area - 133 Acre - 20 Years
- Town of Chapel Hill Streams
- Hydrography Polygons
- Orange County Parcels
- JordanLakeBuffer - 30 foot
- JordanLakeBuffer-50 foot

Data Sources:  
 Proposed Sanitary Sewer - UNC Consultants  
 Existing Sanitary Sewer - OWASA  
 Stream Buffers - UNC Energy Services using Town of Chapel Hill stream data

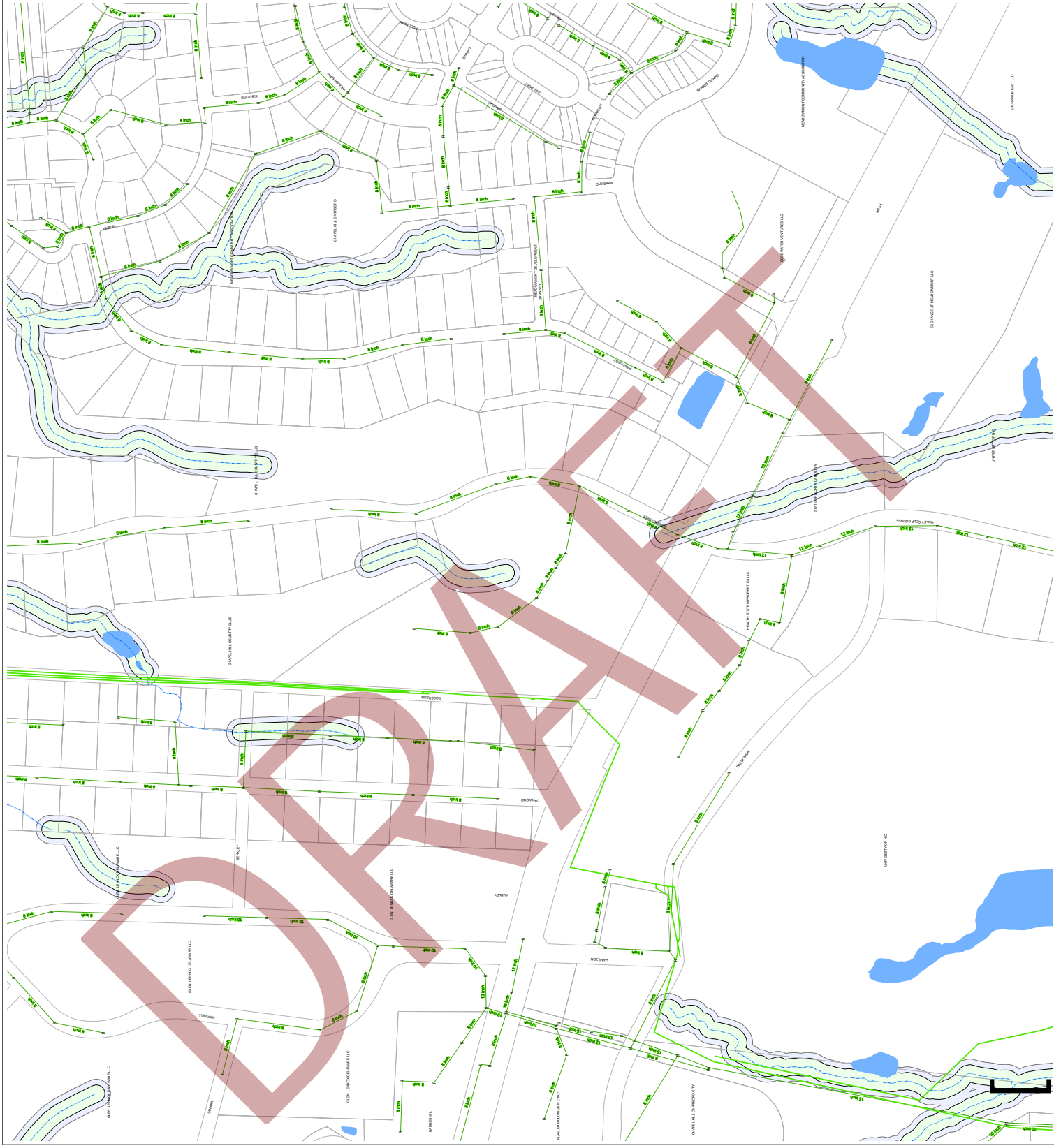


FIGURE H-8



### Proposed Sewer Routes

#### Legend

##### Proposed OWASA Sanitary Sewer

- Sanitary Sewer
- Sanitary Sewer Scalloping Force Main
- Proposed Pump Station

##### Potential OWASA Upgrades (Need further analysis)

- Possible Pipe Upsize

##### Existing OWASA Sanitary Sewer

- Interceptors
- Force Main
- Manholes
- Pump Stations
- Gravity Sewer Mains
- Wastewater Treatment Plant

##### Geographic Information

- Railroad
- CN Surveyed Boundary
- CN Development Area - 228 Acre - 50 Years
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- Orange County Parcels
- JordanLakeBuffer - 30 foot
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Data Sources:  
 Proposed Sanitary Sewer - UNC Consultants  
 Existing Sanitary Sewer - OWASA  
 Stream Buffers - UNC Energy Services using Town of Chapel Hill stream data

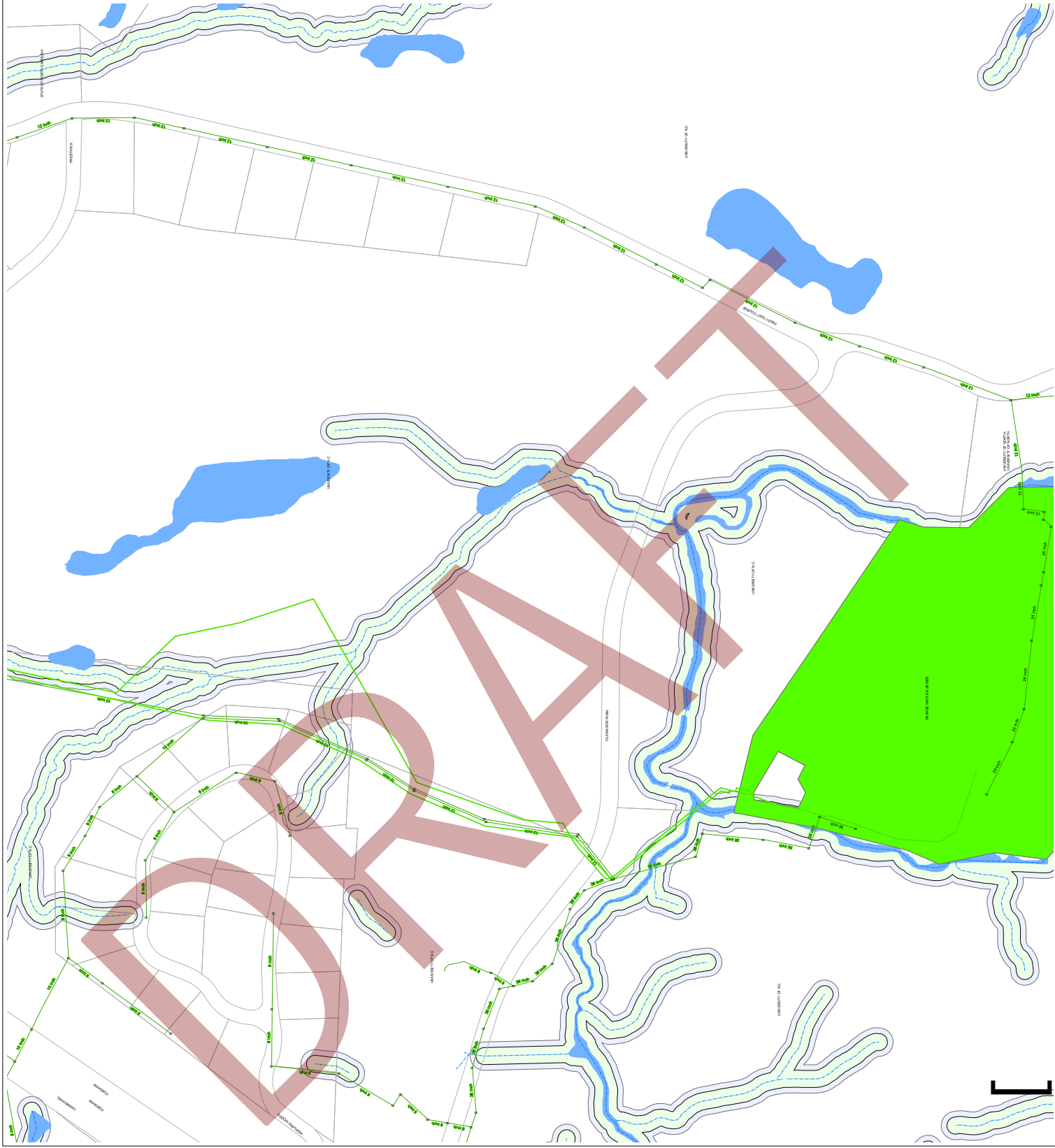


FIGURE H-9



### Proposed Sewer Routes

#### Legend

##### Proposed OWASA Sanitary Sewer

- Sanitary Sewer
- Sanitary Sewer Scoping Force Main
- Proposed Pump Station

##### Potential OWASA Upgrades (Need further analysis)

- Possible Pipe Upsize

##### Existing OWASA Sanitary Sewer

- Interceptors
- Force Main
- Manholes
- Pump Stations
- Gravity Sewer Mains
- Wastewater Treatment Plant

##### Geographic Information

- Railroad
- CN Surveyed Boundary
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- Town of Chapel Hill Streams
- Hydrography Polygons
- Orange County Parcels
- JordanLakeBuffer - 30 foot
- JordanLakeBuffer-50 foot

Data Sources:  
 Proposed Sanitary Sewer - UNC Consultants  
 Existing Sanitary Sewer - OWASA  
 Stream Buffers - UNC Energy Services using Town of Chapel Hill stream data

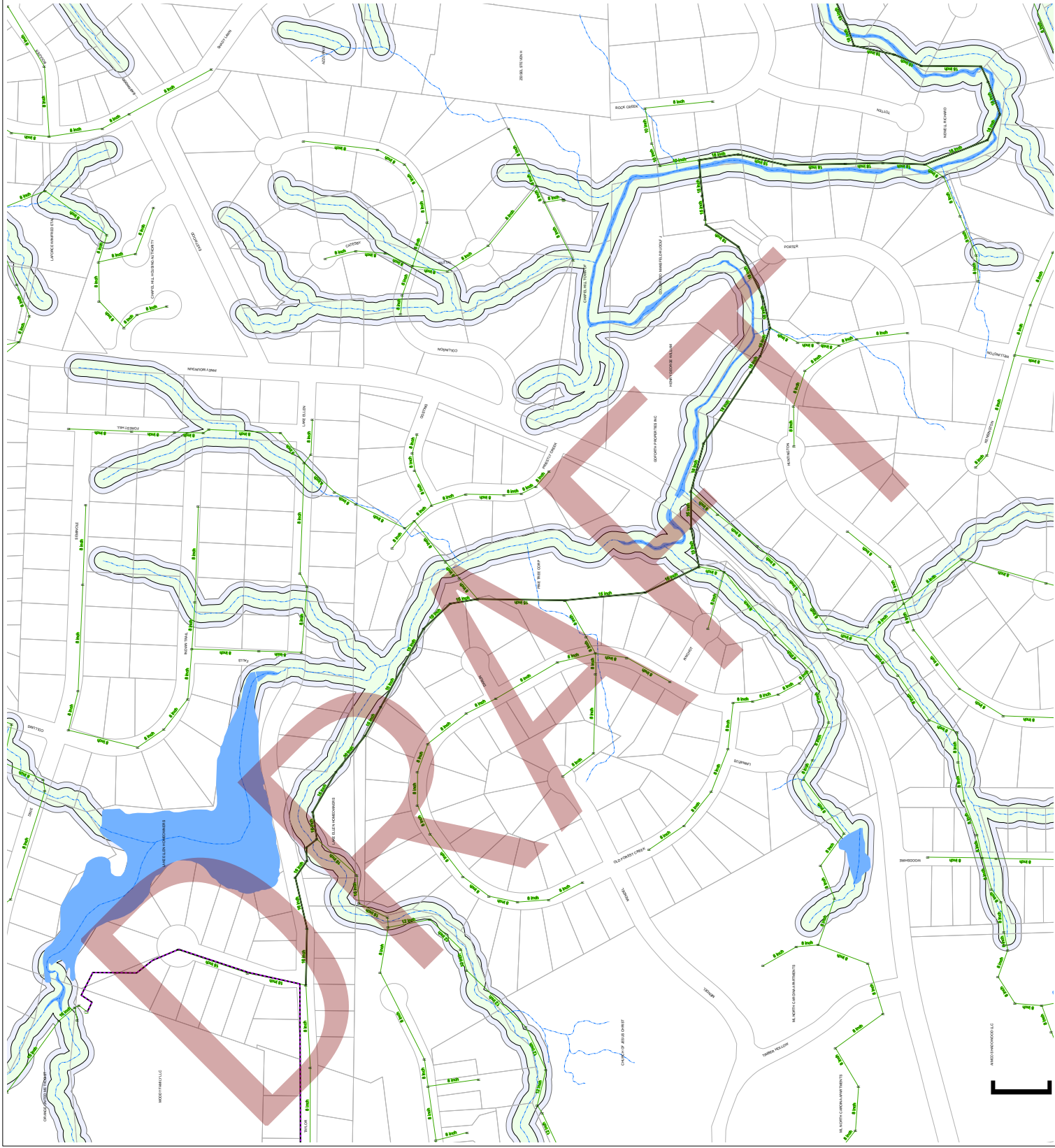


FIGURE H-10





### Proposed Sewer Routes

#### Legend

##### Proposed OWASA Sanitary Sewer

- Sanitary Sewer
- Sanitary Sewer Scalloping Force Main
- Proposed Pump Station

##### Potential OWASA Upgrades (Need further analysis)

- Possible Pipe Upsize

##### Existing OWASA Sanitary Sewer

- Interceptors
- Force Main
- Manholes
- Pump Stations
- Gravity Sewer Mains
- Wastewater Treatment Plant

##### Geographic Information

- Railroad
- CN Surveyed Boundary
- CN Development Area - 228 Acre - 50 Years
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- Town of Chapel Hill Streams
- Hydrography Polygons
- Orange County Parcels
- JordanLakeBuffer - 30 foot
- JordanLakeBuffer-50 foot

Data Sources:  
 Proposed Sanitary Sewer - UNC Consultants  
 Existing Sanitary Sewer - OWASA  
 Stream Buffers - UNC Energy Services using Town of Chapel Hill stream data

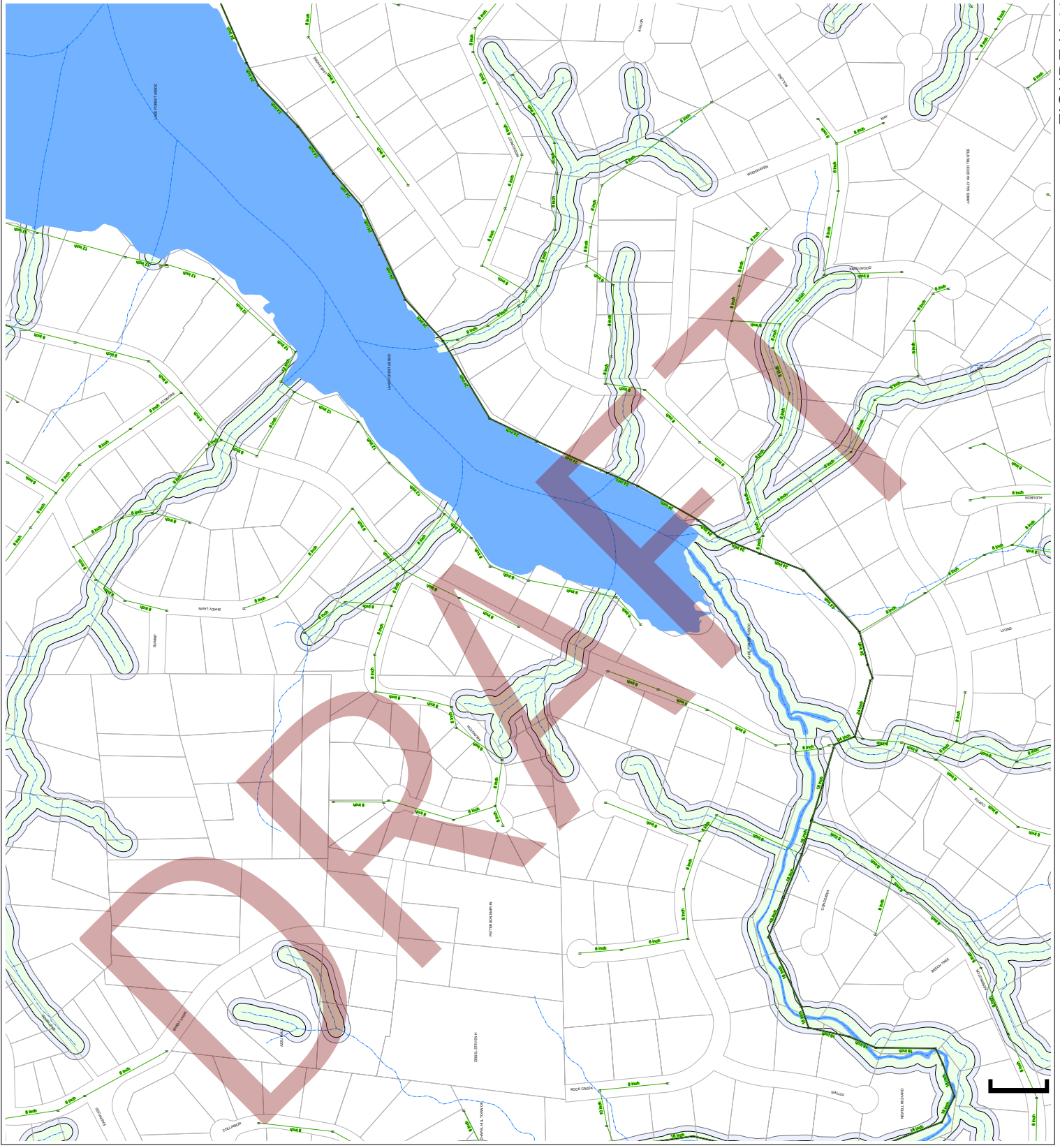


FIGURE H-11



## Proposed Sewer Routes

### Legend

#### Proposed OWASA Sanitary Sewer

- Sanitary Sewer
- Sanitary Sewer Scalloping Force Main
- Proposed Pump Station

#### Potential OWASA Upgrades (Need further analysis)

- Possible Pipe Upsize

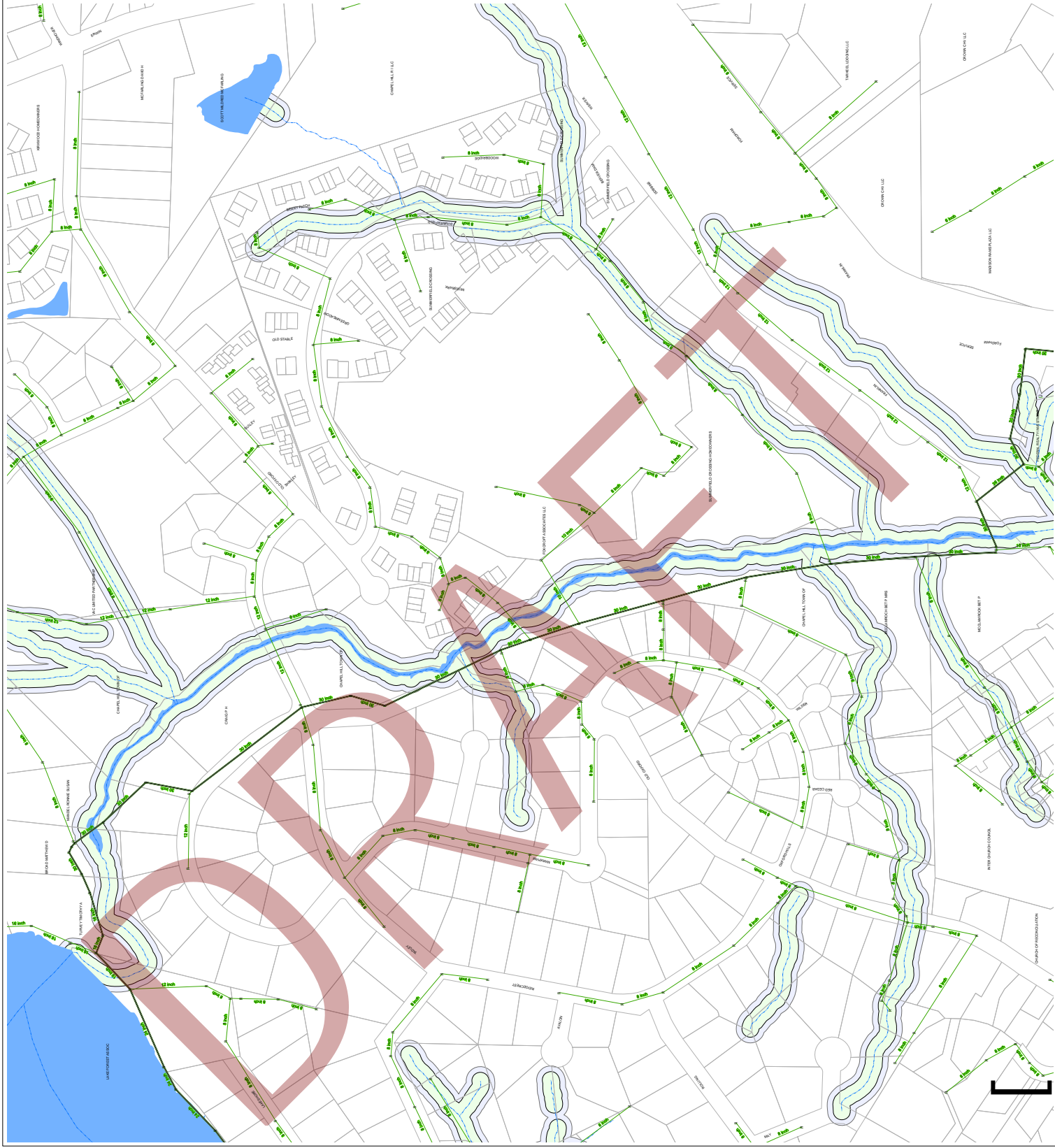
#### Existing OWASA Sanitary Sewer

- Interceptors
- Force Main
- Manholes
- Pump Stations
- Gravity Sewer Mains
- Wastewater Treatment Plant

#### Geographic Information

- Railroad
- CN Surveyed Boundary
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- Town of Chapel Hill Streams
- Hydrography Polygons
- Orange County Parcels
- JordanLakeBuffer - 30 foot
- JordanLakeBuffer-50 foot

Data Sources:  
 Proposed Sanitary Sewer - UNC Consultants  
 Existing Sanitary Sewer - OWASA  
 Stream Buffers - UNC Energy Services using Town of Chapel Hill stream data



**FIGURE H-12**



# UNC - Chapel Hill Carolina North

## Proposed Sewer Routes

### Legend

#### Proposed OWASA Sanitary Sewer

- Sanitary Sewer
- Sanitary Sewer Scapling Force Main
- Proposed Pump Station

#### Potential OWASA Upgrades (Need further analysis)

- Possible Pipe Upsize

#### Existing OWASA Sanitary Sewer

- Interceptors
- Force Main
- Manholes
- Pump Stations
- Gravity Sewer Mains
- Wastewater Treatment Plant

#### Geographic Information

- Railroad
- CN Surveyed Boundary
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- Town of Chapel Hill Streams
- Hydrography Polygons
- Orange County Parcels
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Data Sources:  
 Proposed Sanitary Sewer - UNC Consultants  
 Existing Sanitary Sewer - OWASA  
 Stream Buffers - UNC Energy Services using Town of Chapel Hill stream data

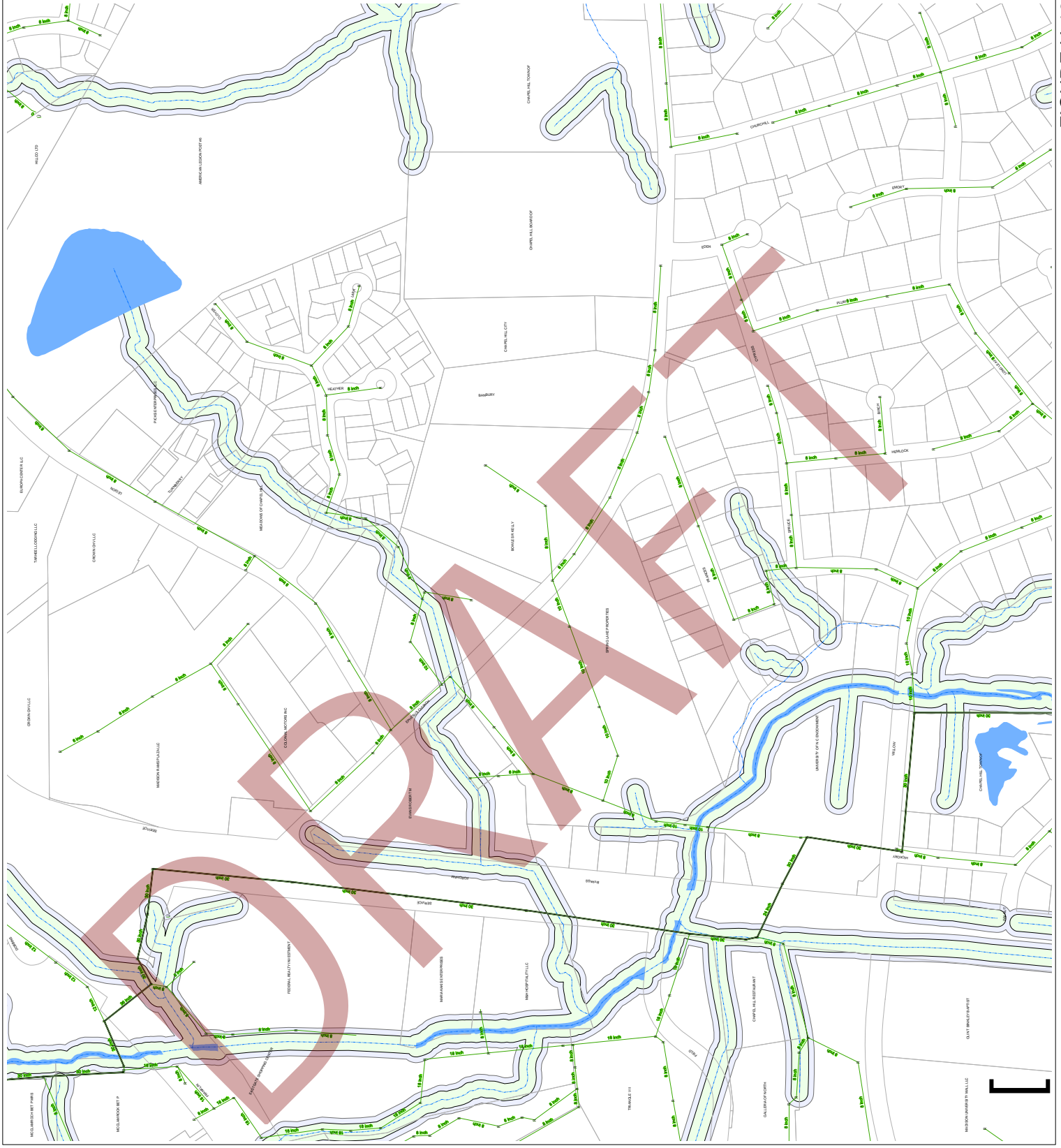


FIGURE H-13



### Proposed Sewer Routes

#### Legend

##### Proposed OWASA Sanitary Sewer

- Sanitary Sewer
- Sanitary Sewer Scalloping Force Main
- Proposed Pump Station

##### Potential OWASA Upgrades (Need further analysis)

- Possible Pipe Upsize

##### Existing OWASA Sanitary Sewer

- Interceptors
- Force Main
- Manholes
- Pump Stations
- Gravity Sewer Mains
- Wastewater Treatment Plant

##### Geographic Information

- Railroad
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- Orange County Parcels
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- JordanLakeBuffer-50 foot

Data Sources:  
 Proposed Sanitary Sewer - UNC Consultants  
 Existing Sanitary Sewer - OWASA  
 Stream Buffers - UNC Energy Services using Town of Chapel Hill stream data



FIGURE H-14



### Proposed Sewer Routes

#### Legend

##### Proposed OWASA Sanitary Sewer

- Sanitary Sewer
- Sanitary Sewer Scalloping Force Main
- Proposed Pump Station

##### Potential OWASA Upgrades (Need further analysis)

- Possible Pipe Upsize

##### Existing OWASA Sanitary Sewer

- Interceptors
- Force Main
- Manholes
- Pump Stations
- Gravity Sewer Mains
- Wastewater Treatment Plant

##### Geographic Information

- Railroad
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Data Sources:  
 Proposed Sanitary Sewer - UNC Consultants  
 Existing Sanitary Sewer - OWASA  
 Stream Buffers - UNC Energy Services using Town of Chapel Hill stream data

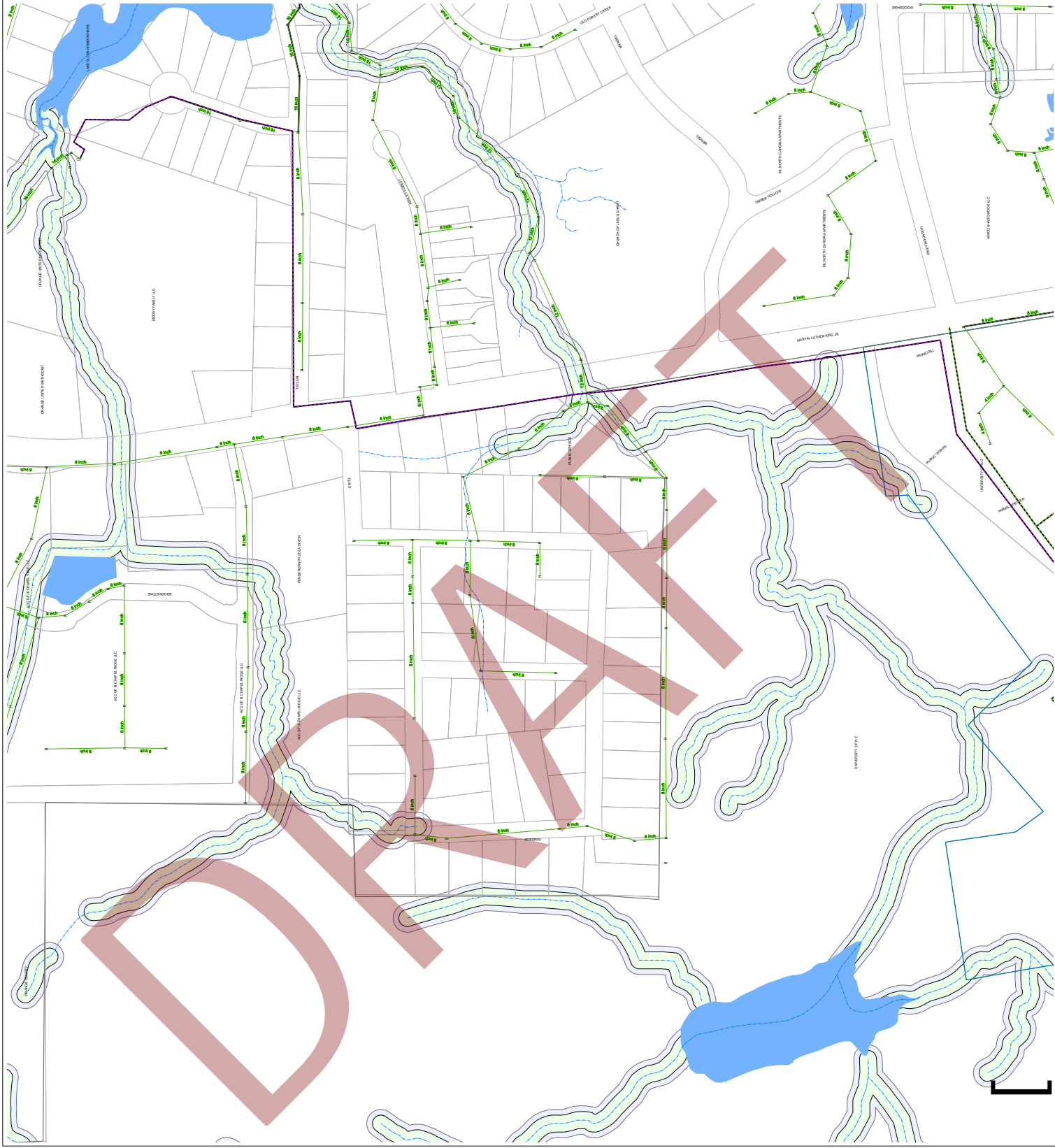


FIGURE H-15



# UNC - Chapel Hill Carolina North

## Proposed Sewer Routes

### Legend

#### Proposed OWASA Sanitary Sewer

- Sanitary Sewer
- Sanitary Sewer Scalloping Force Main
- Proposed Pump Station

#### Potential OWASA Upgrades (Need further analysis)

- Possible Pipe Upsize

#### Existing OWASA Sanitary Sewer

- Interceptors
- Force Main
- Manholes
- Pump Stations
- Gravity Sewer Mains
- Wastewater Treatment Plant

#### Geographic Information

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Data Sources:  
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 Existing Sanitary Sewer - OWASA  
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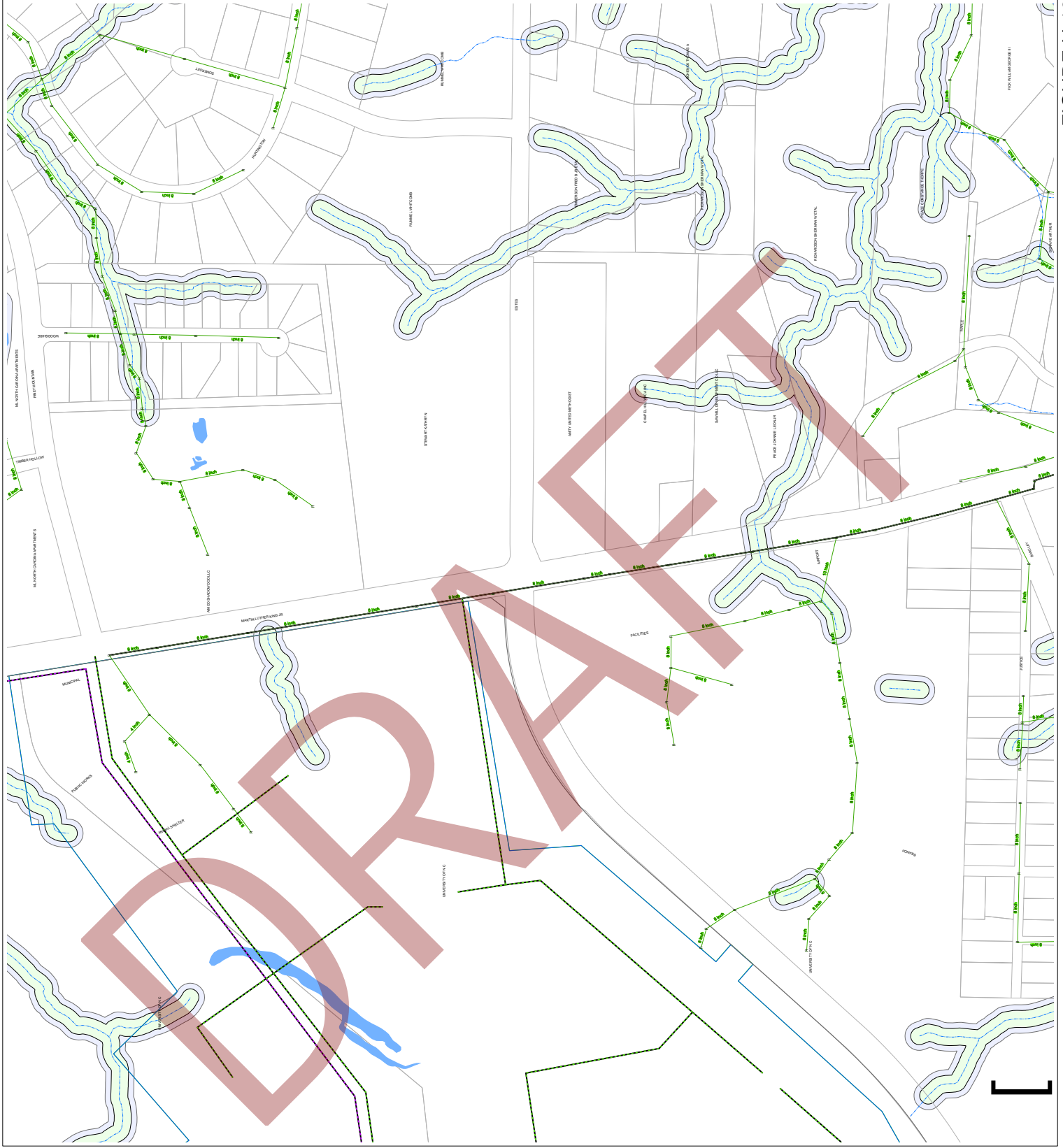


FIGURE H-16



### Proposed Sewer Routes

#### Legend

##### Proposed OWASA Sanitary Sewer

- Sanitary Sewer
- Sanitary Sewer Scalloping Force Main
- Proposed Pump Station

##### Potential OWASA Upgrades (Need further analysis)

- Possible Pipe Upsize

##### Existing OWASA Sanitary Sewer

- Interceptors
- Force Main
- Manholes
- Pump Stations
- Gravity Sewer Mains
- Wastewater Treatment Plant

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 Existing Sanitary Sewer - OWASA  
 Stream Buffers - UNC Energy Services using Town of Chapel Hill stream data

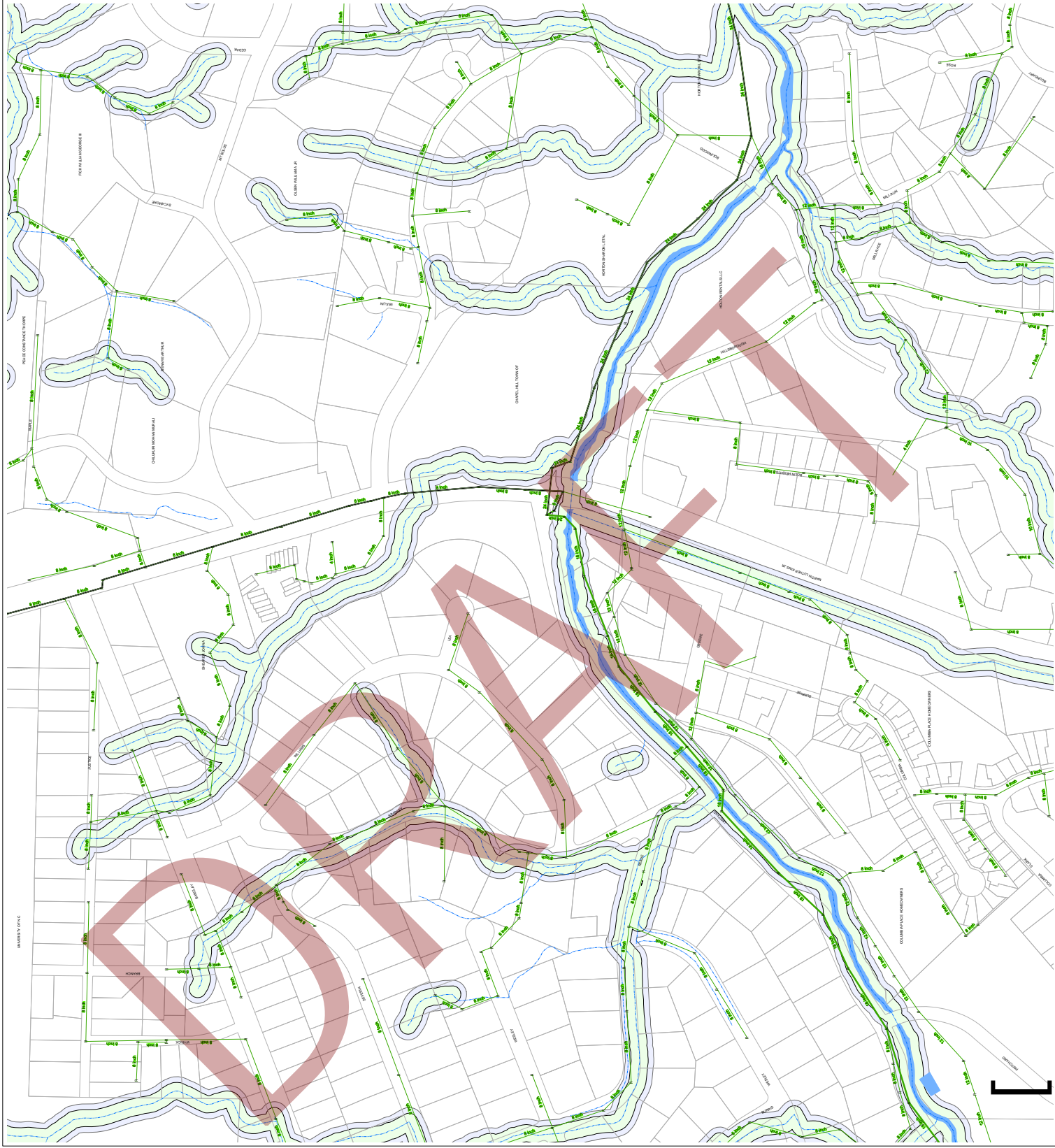


FIGURE H-17