

tennessee valley authority



Muscle Shoals Reservation adaptive re-use study

Conditions/Market/Planning/Implementation

July 31, 2009
Revised August 25, 2009

LORD • AECK • SARGENT
ARCHITECTURE



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intro

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CATALYSER BLDGS.
U.S.N.P.#2
MUSCLE SHOALS, ALA.
5-79-1919

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Introduction

The Tennessee Valley Authority (TVA) has engaged Lord, Aeck and Sargent (LAS) to perform a detailed study that determines potential and appropriate uses for the underutilized TVA Muscle Shoals Reservation. The site, which was first utilized by the U.S. Army in 1917 and then became TVA property in 1933, is bounded by the cities of Muscle Shoals and Sheffield, Alabama. The border for the study area is recognized State Highway 133 to the east, 2nd Street to the south, and Woodward Avenue/Hatch Boulevard to the west, and Reservation Road to the north.

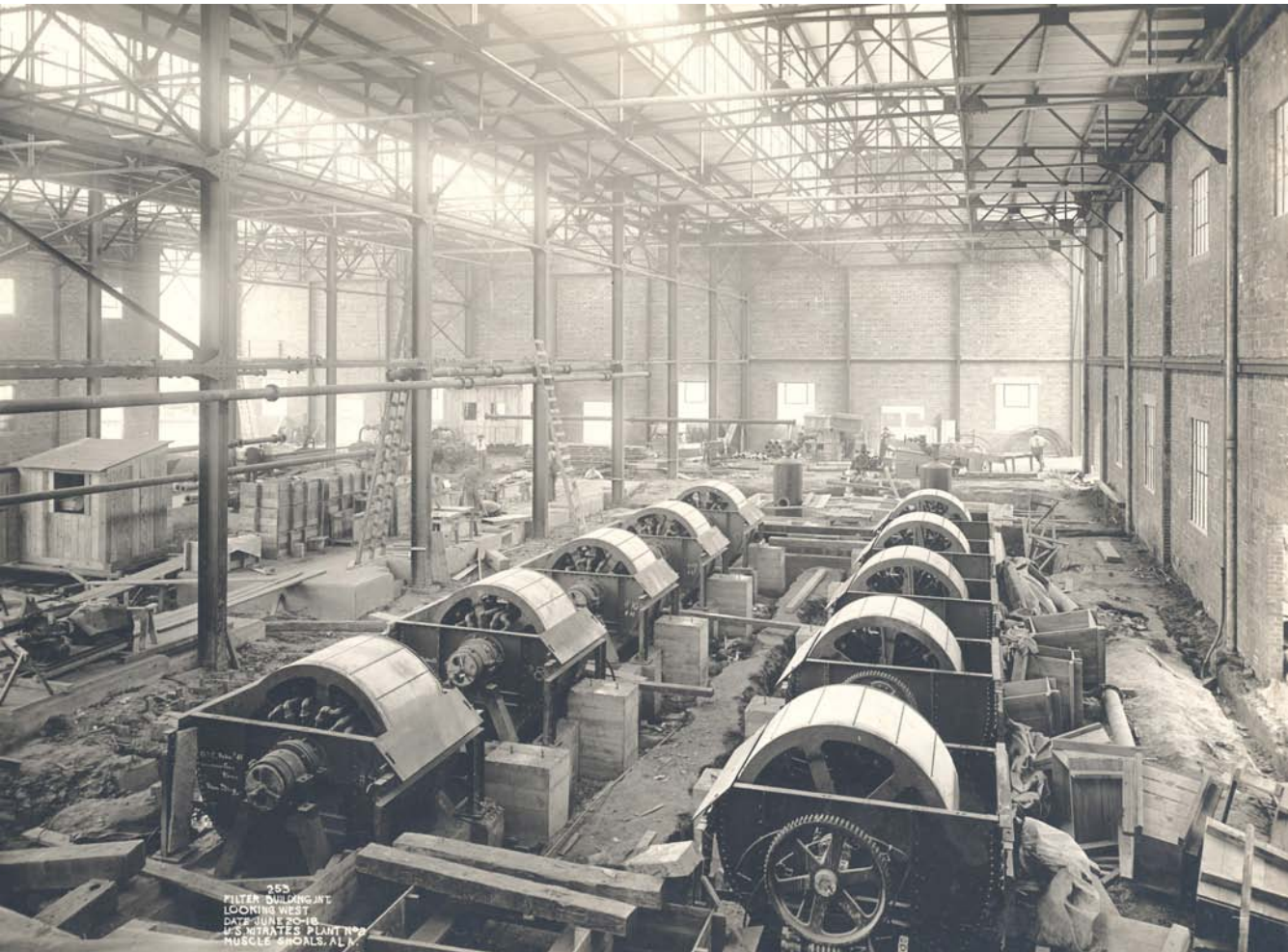
The Adaptive Re-Use Study assesses the physical condition of the 57 industrial, office and laboratory structures built prior to 1950 and considered historic, as well as applies urban design “best practices” to the entire 1340-acre site to best determine appropriate land uses for the property. It also includes a comprehensive market analysis performed by Robert Charles Lesser Company (RCLCO) that projects development potential over the next 20 years for the Shoals area and the Reservation site.



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The building assessment includes a determination of the historic characteristics, a review of the architectural details and material conditions, and a complete structural analysis of each structure (performed by MACTEC Engineering) to determine the overall condition of buildings on the reservation. A review of all these conditions was completed for each of the buildings and a “degree of adaptability” was determined for each building.

- Description of existing building systems
- Description of building height/dimensions (or drawing)
- Description of historic/current use
- Description of general architectural condition
- Description of adaptability/flexibility for re-use
- Photo documentation of building’s interior and exterior - select, typical and for purpose of identification.
- Description of steps necessary to rehabilitate based on the secretary of the interior’s standards
- Evaluation and statement of significance based on the national register criteria for evaluation
- Description of existing structural components
- Description of general structural condition
- Statement of suitability for re-use based on structural condition
- Photo documentation of structural components requiring repair
- Description of steps necessary to repair damaged or failing structural components



LAS and MACTEC then entered the building information into a 2-D REVIT database format, to allow for quick and easy review of the building information compiled, and also allow TVA and future users an opportunity to manipulate and expand the information on each building.

The entire 1340 acres of the Reservation study area were analyzed by LAS and a “vision” or general concept plan was created for the site.

- Conduct workshop with representatives from TVA/Alabama Historical Commission focus groups to gather further perspective and substantiate the market analysis.
- Conceptual plan view drawing illustrating potential adaptive reuse of buildings
- Graphic site inventory and analysis of the property
- Graphic opportunities and constraints analysis of the property
- Concept planning for potential development based on suitability of individual buildings for re-use and all site condition/findings: the Conceptual Master Plan and the Workshop.

The planning effort for the site began with a detailed analysis of influential factors from the surrounding area as well as important characteristics of the site. The research material included historic maps, archived records, United States Geological Survey Data, Surrounding District Plans, Zoning Information and Demographic Data. The following pages graphically summarize this background information.

The market study performed by RCLCO was an in-depth review of all critical economic development data available. This information was manipulated into a detailed assessment of specific development potential such as office, retail, hospitality, entertainment and multi-family/single family residential uses. Specific determinations of best uses for the existing buildings were to create jobs and to become a job center. Research and development was determined to be the best possible use of the structures to build from the research legacy related to fertilizer research that has been the primary focus at the site, and to create the greatest number of higher paying jobs.

- Evaluation of the market area (local, regional, national)
- Establishment of primary market area
- Development of a thorough primary market overview
- Development of market area trends/demand analysis and establishment of potential uses based on present demand, potential future demand, and restrictions for development north of reservation road[1]
- Evaluation of potential uses based on the existing site conditions/restrictions
- Recommendations for land uses based on existing site conditions/restrictions
- Recommendations for phased development

The results of the market study were the critical element in creating the concept plan process. This information was utilized as a basis point for LAS to outline types of land uses to plan for the property and the total square footage demands there would be over the next 20 years.

Location decisions for the uses were determined by incorporating sustainable development concepts accepted as best practices. Walking distances of 10 to 15 minutes were the basis point for creating development areas within the 1340 acres, then the constraints such as wetlands and environmental issues, as well as easements and other issues that had to be designed around in determining where these development centers, or Districts, were to be located. The results were three (3) development Districts at the original center of the existing concentration of buildings and the southwest and southeast corners of the property.

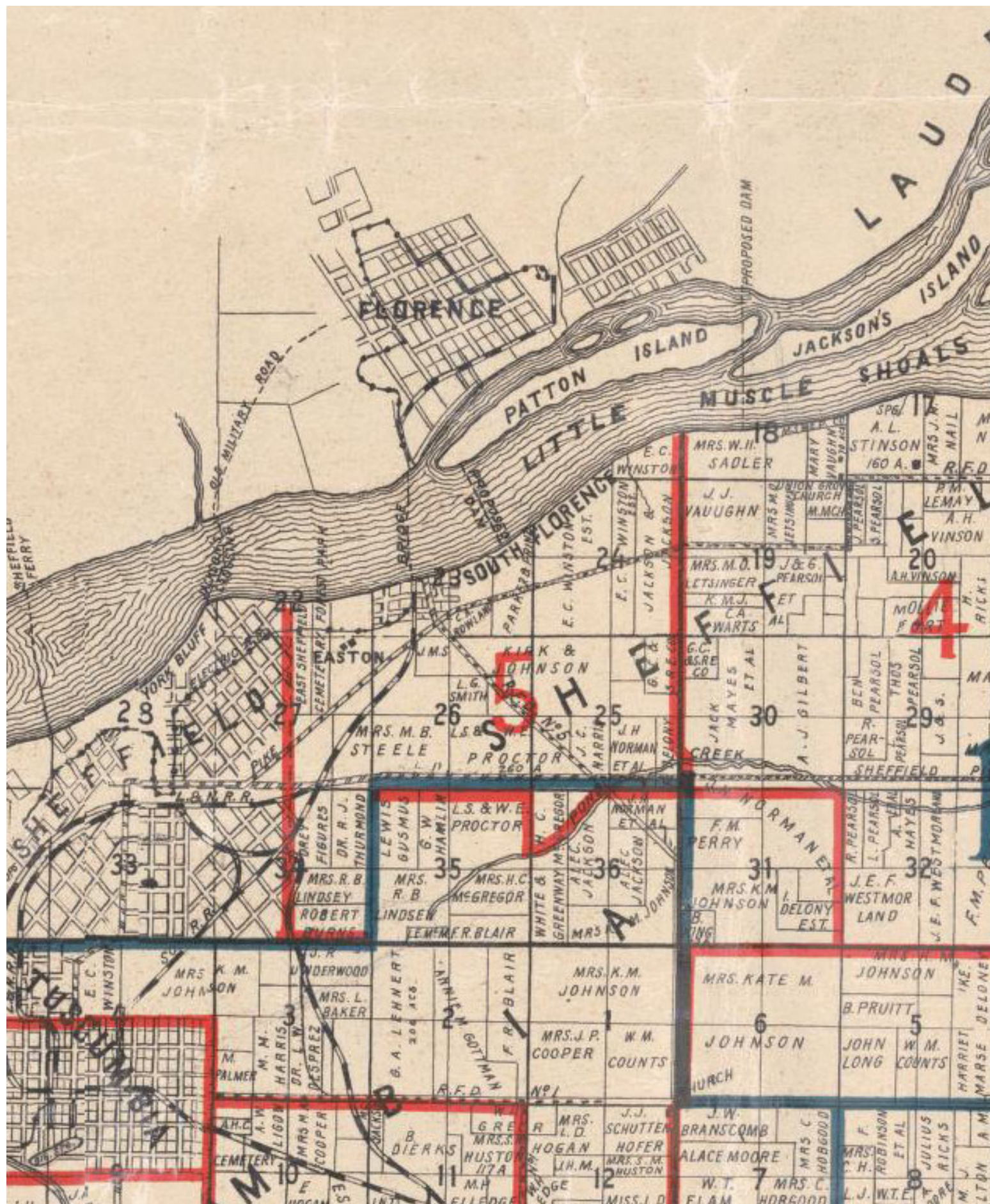
The LAS concept plan is a professional exercise based solely on the market report and existing conditions on the property and does not reflect a typical process whereby owner issues, stakeholders and the general public are participants are an integral part of the decision making and determination process.



Background

The buildings on the Muscle Shoals Reservation stand as the most tangible reminder of an important segment of our nation’s history. Collectively they represent a succession of engineering and research related activities and accomplishments that contributed to the knowledge base and continued development of defense, agriculture and energy.

The buildings included in this study generally fall within two groups: those built in the early twentieth century as a part of Nitrate Plant No. 2, later becoming the National Fertilizer Development Center (NFDC), and those built by the Tennessee Valley Authority in the mid-twentieth century. Nitrate Plant No. 2, was constructed between February and October 1918 by the U.S. War Department to produce nitrates for World War I munitions. History indicates that the Nitrate Plant was being tested at 20 percent capacity when the armistice was signed in November 1918 ending World War I, placing the plant on standby due to the reduction in need for large quantities of munitions-grade nitrate. In 1933, TVA was created and as a part of the TVA Act, acquired the facilities (including the Nitrate Plant) at Muscle Shoals. Work began immediately to modify the nitrate facilities to produce fertilizers. During WWII the plant supplied more than 60% of the elemental phosphorus needed for munitions and the facilities produced more than 200,000 tons of calcium carbide for the manufacture of synthetic rubber. Following the war the TVA expanded the research and development activities at the NFDC complex. In 1990, the NFDC was renamed the National Fertilizer and Environmental Research Center. In 1994, the National Fertilizer and Environmental Research Center was renamed the TVA Environmental Research Center. During this era of TVA ownership, TVA added buildings to support the evolving use of the site, including the TVA Environmental Research Center (c. 1947, two buildings), the TVA Greenhouse Research Complex (c. 1945), and the Support Building (c. 1940s), all designed to support fertilizer research programs. Two buildings were added to the water treatment facility during this period, the Chemical Feed House (c. 1941) and the Filter Building (c. 1941-1942). Also constructed during this period was the Phosphate Development Works Warehouse (1950s), the only remaining building from the Phosphate Development Works (PDW) Complex. The PDW complex was built to serve the U.S. nerve gas program and produced elemental phosphorous, a principal agent in the manufacture of nerve gas. The TVA operated this complex under U.S. Army oversight. The NFDC complex and the TVA facilities described above are the subject of this building assessment.



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02.2

Previous Studies

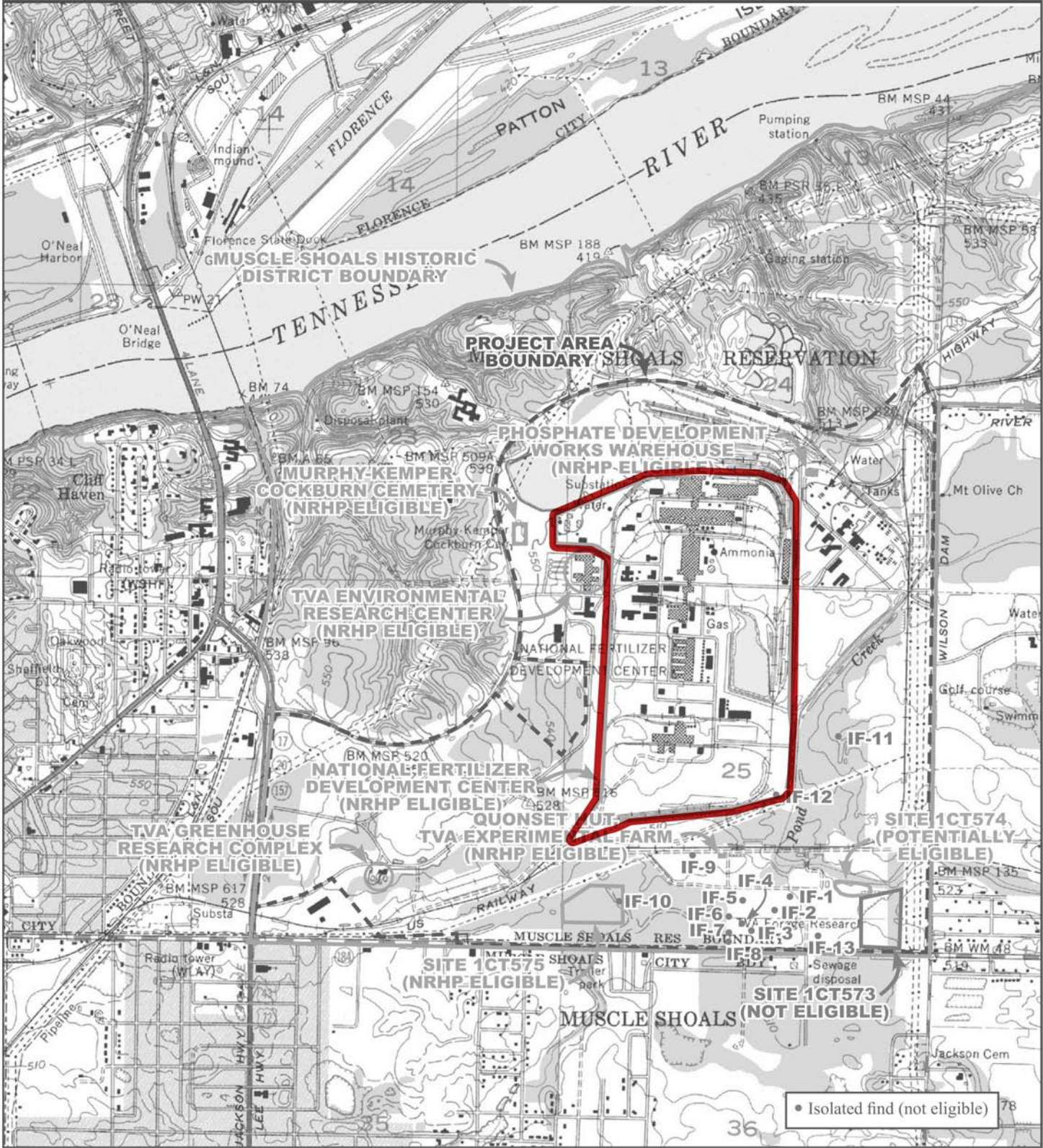
There have been numerous studies to identify and evaluate the significance and National Register eligibility of the buildings included in this building assessment. The current effort will utilize the results of those previous studies. Those studies are summarized below.



02.2.1

TVA Study of National Fertilizer Development Center Complex

In 1996, TVA conducted a survey of architectural resources at the NFDC complex, completing Building Evaluation and Land Assessment Inventory forms for each individual building within the complex. Based upon this survey and consultation with the Alabama Historical Commission (the State Historic Preservation Office), the NFDC complex was recommended eligible for the National Register of Historic Places (NRHP), with 39 buildings and structures recommended as contributing resources. The complex was recommended eligible under Criterion A (association with significant events) for its role as a research facility during the World War I and World War II period and thereafter. It was also recommended eligible under Criterion C (architecture) for the architectural integrity of its buildings and structures. The period of significance was cited as 1916 – 1970.

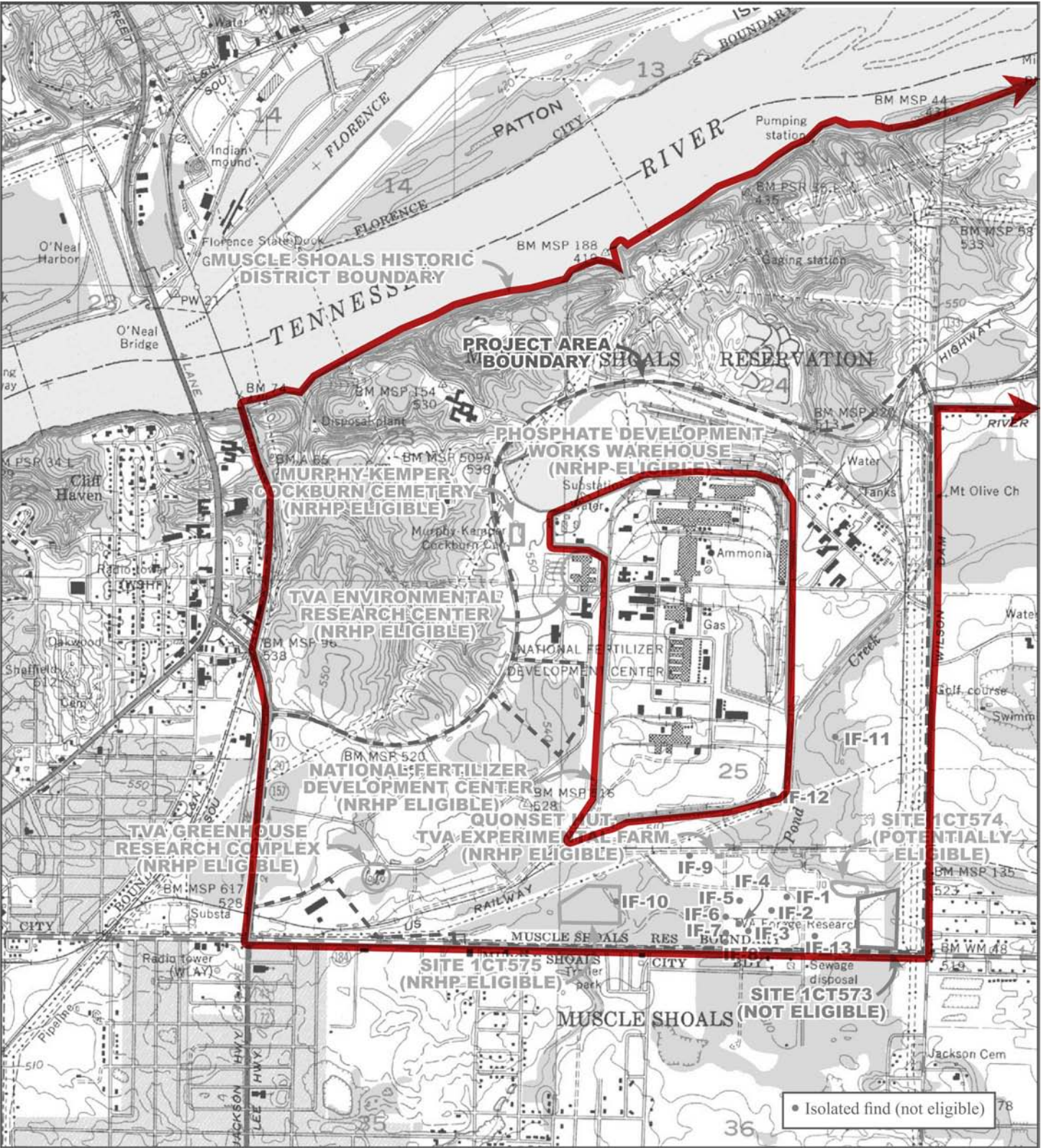


02.2.2

TRC Muscle Shoals Phase 1 Cultural Resource Survey

In 2002, TRC conducted a cultural resource survey for TVA of architectural and archaeological resources within a 1,087 acre area of the Muscle Shoals Reservation. This survey included resources beyond the scope of this current study and only those resources pertinent to the current study will be mentioned here. The survey identified a NRHP eligible Muscle Shoals Historic District, including much of the Muscle Shoals Reservation as well as Wilson Lock and Dam. The survey established five historic contexts for the Muscle Shoals Historic District (MSHD):

- Prehistoric mortuary complex
- The Civil War
- Wilson Dam
- The New Deal Era (1933-1942)
- TVA development of Muscle Shoals after the New Deal (1942-1970)



Greenhouse Complex



TVA Environmental Research Complex

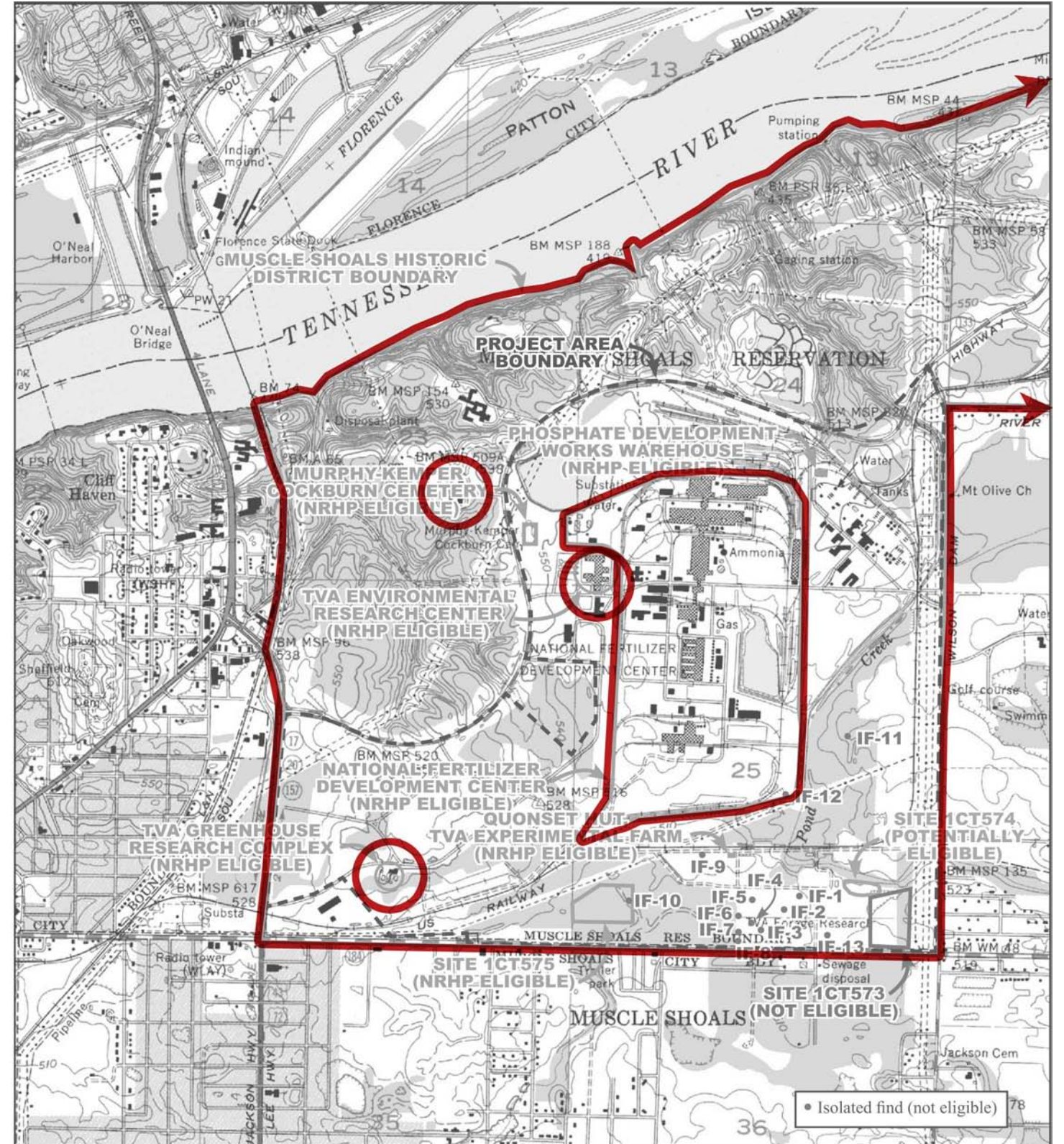


Support Building



The following resources were identified as contributing resources to the MSHD:

- NFDC complex, previously identified as NRHP eligible
- TVA Environmental Research Complex, recommended individually eligible under Criterion C for embodying the distinctive features of the International Style and as a contributing resource to the MSHD
- TVA Greenhouse Research Center, recommended individually eligible under Criterion A for its association with the NFDC and as a contributing resource to the MSHD
- One-story Support Building, recommended as a contributing resource to the MSHD



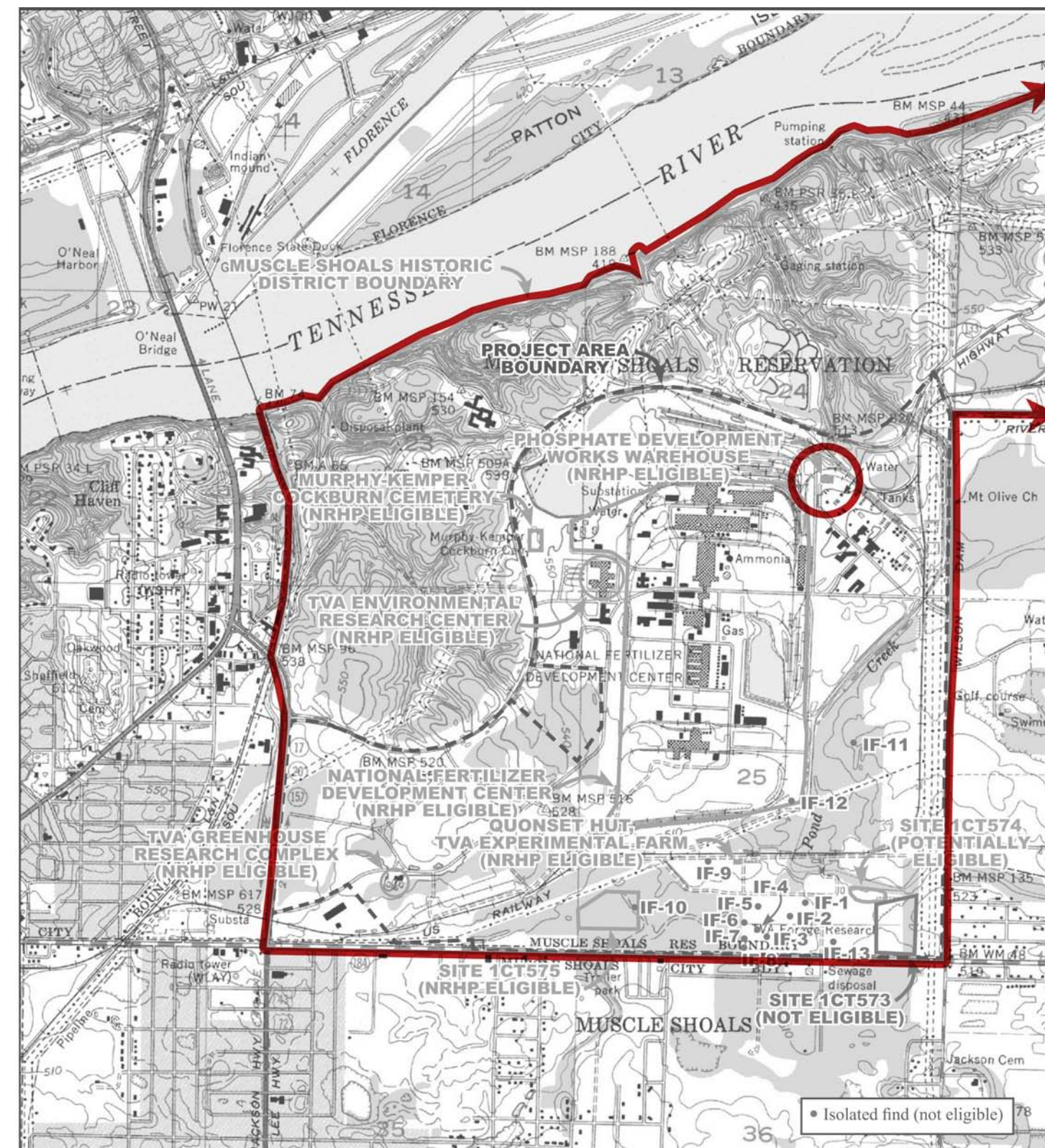
**Phosphate Development
Works Warehouse**



02.2.3

TRC Muscle Shoals LUP Cultural Resource Survey

In 2006, TRC conducted a second survey of areas within the Muscle Shoals Reservation. This survey included all buildings, structures and objects 50 years old or older. As with the 2002 survey it included a project area and resources beyond the scope of this current study and only those resources pertinent to the current study will be mentioned here. In addition to the resources identified in the 2002 survey, the 2006 survey identified the Phosphate Development Works Warehouse and recommended it individually eligible under Criterion A for its association with the Phosphate Development Works program and the development of nerve gas components. This resource was also recommended as a contributing resource to the MSHD.



02.3.1

Building Assessment Introduction

Methodology

To establish the boundaries for the current study, a list of buildings to be included was provided by TVA. That list and a map showing the buildings are shown on the following page. All buildings on the list had been previously evaluated in one or more of the previous studies. Each building was reviewed by a team of assessors that included an architect, experienced in working with historic structures, and a structural engineer. The architectural assessments occurred during the week of April 19, 2009 and the structural assessments occurred during the week of April 26, 2009. The buildings were surveyed and evaluated to determine their

- Significance (NRHP eligibility)
- Adaptability (relative suitability for rehabilitation)
- Condition

Significance

The current survey relied on the recommendations of the previous studies to establish NRHP eligibility. Each building was reviewed in the field to determine if changes had occurred since the previous survey that would affect the building’s NRHP eligibility.

Adaptability

During the survey, the assessment team observed qualities that would affect the future adaptability of a building such as plan configuration, location of load bearing or character-defining walls and structural considerations. Using the potential uses for the Shoals area as identified by the market analysis, each building was evaluated for its ability to be adapted to serve these uses. It should be noted that a determination of potential for adaptability is highly subjective. A building with a rigid floor plan and load bearing interior partition walls may not possess flexibility for a range of uses but may be highly adaptable for uses such as offices that do not require large open spaces. This rating is more of an indicator of flexibility and therefore should not be used as an absolute indicator of viability of successful reuse.

Condition

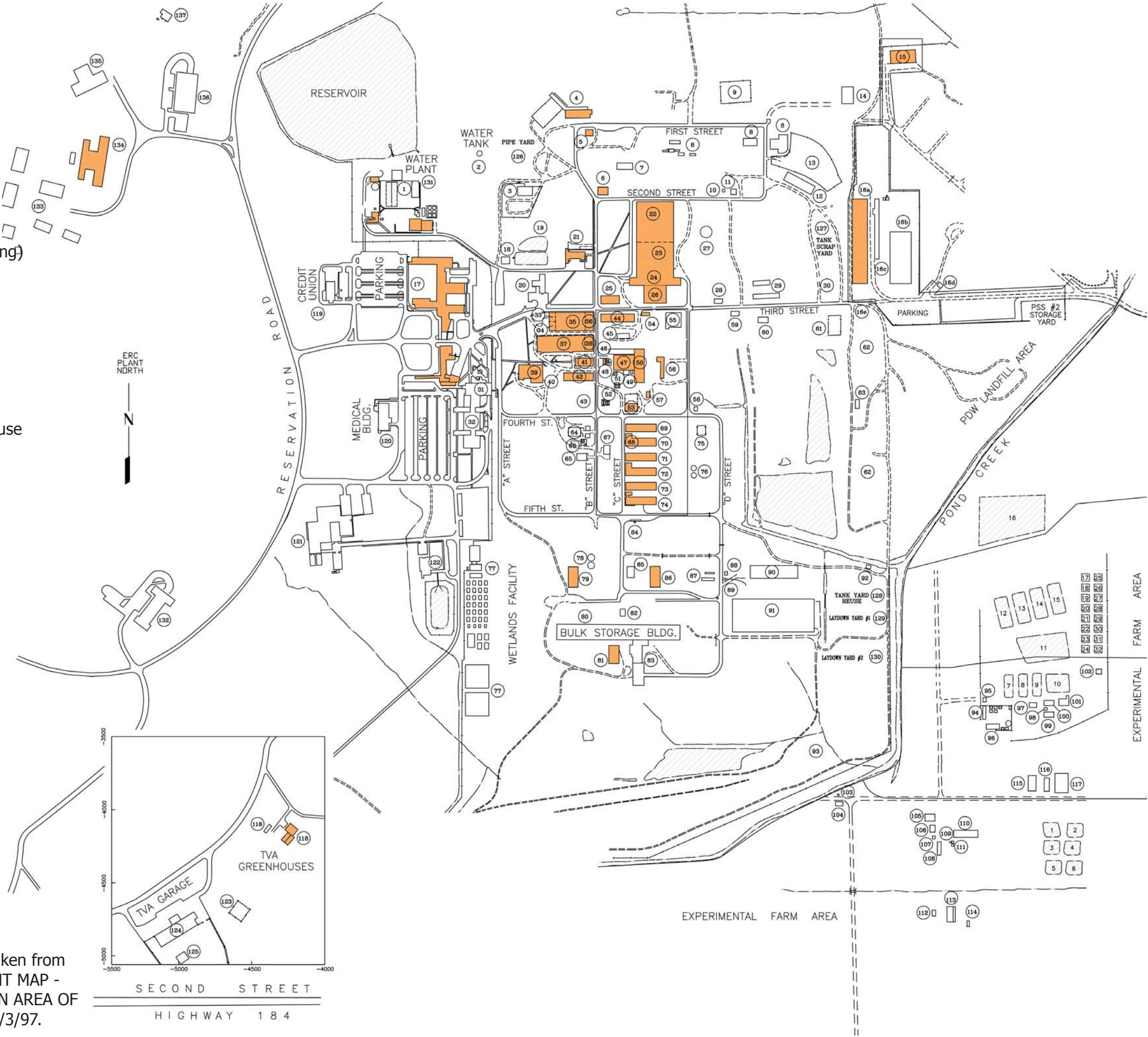
The survey team assessed all primary exterior and interior architectural and structural features to determine their current physical condition. The condition of the various components was then used to create an overall rating of the building’s condition.

Assessment

Buildings Assessed*

- 1 Water Plant (4 Buildings)
- 4 Switch House (Substation #1)
- 5 Drum Storage Area Building
- 6 R/M Lab
- 15 PDW Receiving Warehouse
- 16 Power Service Shop No. 2
- 17 Environmental Research Center
- 21 Old Medical Building (Field Engineering)
- 22 L/N Building
- 23 Power Service Shop Storage Area
- 24 Warehouse No. 4
- 25 Project Operations Office Building
- 26 Grounds Maintenance Shop
- 33 Shipping and Receiving Office
- 34 Instrumentation/Electric Shop
- 35 Chemical Plant Warehouse
- 36 Projects Operations Storage Warehouse
- 37 Machine Shop
- 38 Gas and Diesel Repair Shop
- 39 Engineering Lab
- 41 Sheetmetal Shop
- 42 Pipe Shop
- 44 Project Operations Bath House
- 47 Pilot Plant Building
- 48 Paint Storage Building
- 50 Autoclave Building
- 53 Tin Shop
- 54 Grinding Building
- 56 Boiler House
- 57 Substation No. 2
- 68 Substation No. 4
- 69 Catalyzer Building No. 1
- 70 Catalyzer Building No. 2
- 71 Catalyzer Building No. 3
- 72 Catalyzer Building No. 4
- 73 Catalyzer Building No. 5
- 74 Catalyzer Building No. 6
- 79 3A Building
- 81 5A Building
- 86 2A Shop
- 118 Greenhouse
- 134 Office Service Warehouse

*Building numbering and naming system taken from drawing number E231856C-R9, titled "PLANT MAP - BUILDING LOCATION AND IDENTIFICATION AREA OF ENVIRONMENTAL RESPONSIBILITY" dated 6/3/97.



02.3.2 Architectural Assessment

The results of the architectural assessment were recorded on a three page form, one form for each building. These forms are included as an appendix to this report. The header of each page documents basic building information including:

- Building Name
 - Period of Construction
 - NRHP Eligibility
 - Building Height
 - Building Area
 - Current Use
 - Potential Use / Adaptability
- Codes used to indicate potential uses are as follow:

- CO - Conventional Office** - Office space arranged in traditional configuration.
- CR - Creative** - Film or music production.
- LI - Light Industrial** - Assembly, fabrication, manufacturing, packaging, and repairing or processing materials.
- LO - Loft Office/Studio** - Loft/studio space for artists; creative business; work space.
- RE - Research** - Office or labratory space devoted to research; incubator space.
- ST - Storage** - conditioned or unconditioned space for storage of materials.
- WH - Warehouse** - large open space dedicated to the use, fabrication, or storage of large equipment.

The assessment team also analyzed the structures to determine the overall level of adaptability, based on our experience with this project type. The team considered building condition, the structure’s flexibility to accommodate a number of uses, and if the building was designed or modified to fit such a specific purpose that the practicality of adaptability is diminished. The Adaptability Ratings are defined as follows:

- 1 High Adaptability** - The building, due to it’s size and configuration, as well as condition, is well suited to adaptive re-use. The possible uses are listed in the assessment.
- 2 Moderate Adaptability** - The building, due to it’s size and configuration, as well as condition, has a moderate degree of flexibility in terms of its potential for adaptive re-use.
- 3 Slight Adaptability** - The building, due to it’s size, configuration, and/or equipment, as well as condition, can accomodate several adaptive re-uses after moderate improvements to its current state.
- 4 Limited Adaptability** - The design team has determined that the building needs extensive improvements to the structural system and enclosure, and/or the structure’s configuration prior to adaptive re-use.
- 5 Very Limited Adaptability** - Due to the condition of the building and the limitations of the structure’s or equipment, the design team considers the possibility of adaptive re-use very limited.

The design team has assumed that all of the existing structures, especially those constructed in 1918, will require significant waterproofing and envelope improvements prior to re-use, including new roofing, windows, air filtration barriers and insulation.

- Building Diagram showing general footprint of building



The header also indicates an Overall Building Condition rating. This is a numerical rating that is derived as a weighted average of the individual building component ratings described below. The Overall Building Condition Ratings are defined as follows:

- 1 **Excellent** – Building is currently in use or in move-in condition with minimal remedial work requirements; excluding use change requirements.
- 2 **Good** – Building needs some remedial work, which should not impact current occupancy (if any); excluding use change requirements.
- 3 **Fair** – Building needs remedial work for continued use or prior to occupancy for a new use.
- 4 **Deteriorated** – Building needs substantial work (50%-75%) prior to any form of occupancy.
- 5 **Critical** – Building needs extensive work to the majority (over 75%) of its materials to allow any form of occupancy





The body of the first page of each assessment form contains a list of the building’s character-defining features. The features have been organized into two columns, exterior and interior. They have been further categorized as Primary and Secondary features. While both primary and secondary features are important to retain, it is anticipated that some modification to secondary features is likely to be required to adapt these structures for most viable uses. That said, any rehabilitation should strive to retain all character-defining features to the greatest extent possible.

The bottom of the first page of each form contains a statement of resource significance. This information correlates with the results of the previous studies.

Building Information		Overall Building Condition	2	Overall Structural Condition	3
Building Name		81 - 5A Nitrate House			
Period of Construction		1918			
National Register Eligibility		Contributing MSHD, NFDC Context			
Building Height		2 story			
Building Footprint		8,594 SF			
Current Use		Rented - Storage, Manufacturing and Machine Shop Operations			
Potential Use Adaptability		LI, LO, RE, ST, WH 2			
Character Defining Features					
Exterior		Interior			
Primary		Primary			
Building Form: Rectangular Form with Moderate Sloped Gable Roof and Interrupted Clerestory		Spatial Form: Open Central Clerestory, 2 story open Mezzanines at sides of 2 story clerestory			
Building Walls: Hollow Clay Tile w/ Brick Quoins; Expressed Concrete Mezzanine Structure		Mezzanine Visibility: to and from 2 story open clerestory			
Roofing: Corrugated Metal		Secondary			
Windows: Steel with operable hopper		Spatial Form: Open Floor Plan between Clerestory and Adjacent Space; Exposure of Steel and Concrete Structure; Exposure of Hollow Clay Tile with Brick Quoins			
Window Headers and Sills: Precast concrete, sills shaped					
Doors: Rail and Stile, metal covered					
Resource Significance					
The National Fertilizer Development Center (formerly known as Nitrate Plant No. 2) has been recommended eligible to the National Register of Historic Places as a contributing resource in the Muscle Shoals Historic District. The property retains architectural integrity and is historically significant for its' role as a research facility during the World War I and World War II periods and thereafter. The period of significance dates between 1916 and 1970.					







Building Information		
Building Name	81 - 5A Nitrate House	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	2 story	
Building Footprint	8,594 SF	
Current Use	Rented - Storage, Manufacturing and Machine Shop Operations	
Potential Use Adaptability	LI, LO, RE, ST, WH 2	
<div></div>		
Exterior Materials and Conditions		
Building Component	Building Material	Condition
Roofing Decking	Gable; Deck: Metal	2
Exterior Envelope	Hollow Clay Tile; Brick quoins at openings/corners	3
Exterior Doors	Wood, rail & stile; metal wrapped	5
Windows	Steel with operable hopper	3
Lintels	1st: Concrete; 2nd: Brick, soldier course	1
Loading Dock	North: 1 bay centered	2
Porch	N/A	
Additions	North: Shed, attached to Bulk Storage Bldg	2
Comments		
Clerestory consists of steel windows with brick at corners only Concrete mezzanine structure projects onto exterior on East, West, and South facades Historic metal clad sliding door at Loading Dock		



The second and third pages contain the individual building component descriptions and condition ratings. Most components listed and evaluated are historic. Where non-historic components have been included they are indicated as "non-historic". The second page is devoted to exterior components and the third page to interior components. At the bottom of each page is a Comments section containing relevant notes. The rating system used for the assessment of components is as follows:

- 1 **Excellent** – Visual observation indicates no remedial work required. Estimated less than 10% repair work needed.
- 2 **Good** – Visual observation indicates minimal remedial work required. Estimated less than 10% replacement and/or 25% repair work needed.
- 3 **Fair** – Visual observation indicates remedial work is required. Estimated up to 25% replacement and/or 50% repair work needed.
- 4 **Deteriorated** – Visual observation indicates significant remedial work is required. Estimated up to 50% replacement and/or 75% repair work needed.
- 5 **Critical** – Visual observation indicates greater than 50% replacement and/or 75% repair work needed.

Building Information		
Building Name	81 - 5A Nitrate House	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	2 story	
Building Footprint	8,594 SF	
Current Use	Rented - Storage, Manufacturing and Machine Shop Operations	
Potential Use Adaptability	LI, LO, RE, ST, WH 2	
<div></div>		
Interior Materials and Conditions		
Building Component	Building Material	Condition
Corridors	N/A	
Primary Space	Open	1
Secondary Space	Mezzanine/Loft at each side	1
Secondary Space	Office: N/A; Walls: Hollow Clay Tile	2
Secondary Space	N/A	
Flooring	Concrete, unfinished	2
Walls	Hollow Clay Tile	2
Ceiling	Exposed Beams: Steel; Corrugated Metal	2
Comments		
<p>Center bay is open from ground level to Celerestory</p> <p>Mezzanine on each side consists of exposed concrete structural floor and beams</p> <p>Most windows at Clerestory intact and in good condition</p> <p>Concrete structure exposed at ground level, steel structure exposed above</p>		



02.3.3 Structural Assessment

Summary of Assessment Methodology and Documentation

A team of MACTEC representatives conducted a general visual structural assessment of the designated buildings at the site from April 27 through April 30, 2009. The team leader made a general observation of each building and conducted detailed inspections of roof structures in selected locations by utilizing a hydraulic lift with the aid of an experienced MACTEC lift operator. The buildings were divided into two groups, and each group was evaluated by a team of two personnel. Field notes regarding the general condition of structural components and specific structural defects were collected at each building, as well as representative photographs of corresponding features. The field data collected on-site serves as the basis of the General Structural Assessment of each building, which consists of five parts:

- 1. **General Information**, which includes a general description of the building structure, a general description of the building structural condition, a summary of recommended structural repairs, and recommendations for additional specific evaluations when applicable.
- 2. **Table 1: Structural Systems Assessment**, which lists the applicable structural components of each building, a numeric rating of the condition of each component, and an indication of whether or not specific defects for each component are itemized in Table 2. See "Condition Code Description" below regarding criteria for numeric ratings ascribed to each component.
- 3. **Table 2: Itemized Structural Defects**, which lists specific defects as described in field notes collected as the buildings were being visually assessed. Some entries in Table 2 are general observations; some are descriptions of specific defects with corresponding quantities and repair codes. The repair codes, when provided, are followed at the end of Table 2 with corresponding generic descriptions of the types of structural repairs that will be required. References to corresponding photographs, when provided, are also listed in Table 2.
- 4. **Reference Plan(s)**, which are typically scanned images of original building drawings, with graphic indications of approximate locations of the Photolog photographs added.
- 5. **Photolog**, which contains representative photographs of the general building condition and of specific structural defects that are characteristic of observed deficiencies.

Condition Code Description: The numeric ratings for the Structural Systems Assessment are based on the following criteria as described in Table 1 for each building:

- (1) **Excellent** – Visual observation indicates no remedial work required. (less than 10% repair)
- (2) **Good** – Visual observation indicates minimal remedial work required. (less than 10% replacement and/or 25% repair)
- (3) **Fair** – Visual observation indicates remedial work required. (up to 25% replacement and/or 50% repair)
- (4) **Deteriorated** – Visual observation indicates significant remedial work required.(up to 50% replacement and/or 75% repair)
- (5) **Critical** - Visual observation indicates extensive replacement and/or repair. (over 50% replacement and/or 75% repair)

The preceding Condition Code criteria is also the basis for the following Summary of General Building Conditions. However, the Summary is not determined by the numeric average of the various structural systems of any given building. The Summary numeric ranking is based on professional judgment regarding the overall building condition, taking into account characteristic defects of each structural system as a proportion of the total building structure.

Summary of General Building Conditions:

Buildings in "Excellent" Structural Condition:	#17 (Environmental Research Center building)
Buildings in "Good" Structural Condition:	#17 (Service building), #25
Buildings in "Fair" Structural Condition:	#1A, #1B, #4, #5, #15, # 16, #21, #33,34,35,&36, #37&38, #39, #41, #42, #44, #47, #48, #50, #54, #57, #68, #69, #71, #74, #79, #81, #86, #118, #134
Buildings in "Deteriorated" Structural Condition:	#1C, #1D, #6,#22,23,24,&26, #53, #56, #70, #72, #73
Buildings in "Critical" Structural Condition:	None

Non-Structural Observations of Note:

It should be noted in summation of the General Structural Assessment that the general structural condition of the majority of the observed buildings appeared to be directly related to the condition of each building's roof covering system. Although the evaluation of roof coverings was beyond the scope of the visual structural assessment, numerous opportunities to observe roofing deficiencies were afforded to the inspection teams from below and occasionally from above the building roof structure. Buildings that were found to be "Deteriorated" in the Summary of General Building Structural Conditions were consistently observed to have significant roof covering deficiencies. The nature of such roofing deficiencies is that they will continue to contribute to further structural deterioration of the building structures until they are remediated.

02.4 Summary of Findings

Significance – National Register Eligibility

The findings of the current study are generally consistent with the findings of the previous studies. The deviations from previous studies are noted below:

- The water plant (a complex of four buildings) is recommended eligible as a contributing resource to the MSHD. This resource is not identified under a specific historic context in the previous studies.
- Two resources, the Switch House (Substation No. 1) and the Office Service Warehouse are recommended non-contributing due to extensive alterations.

National Register Eligibility
The following list and map documents NRHP eligibility for each resource included in this study.

Buildings Assessed

- 5

Drum Storage Area Building
- 6

R/M Lab
- 16

Power Service Shop No. 2
- 21

Old Medical Building (Field Engineering)
- 22

L/N Building
- 23

L/N Power Service Shop Storage Area
- 24

L/N Warehouse No. 4
- 25

Warehouse 2
- 26

Grounds Maintenance Shop
- 33

Shipping and Receiving Office
- 34

Instrumentation/Electric Shop
- 35

Chemical Plant Warehouse
- 36

Projects Operations Storage Warehouse
- 37

Machine Shop
- 38

Gas and Diesel Repair Shop
- 39

Engineering Lab
- 41

Sheetmetal Shop
- 42

Pipe Shop
- 44

Project Operations Bath House
- 47

Pilot Plant Building
- 48

Paint Storage Building
- 50

Autoclave Building
- 53

Tin Shop
- 54

Grinding Building
- 56

Boiler House
- 57

Substation No. 2
- 68

Substation No. 4 & 5
- 69

Catalyzer Building No. 1
- 70

Catalyzer Building No. 2
- 71

Catalyzer Building No. 3
- 72

Catalyzer Building No. 4
- 73

Catalyzer Building No. 5
- 74

Catalyzer Building No. 6
- 79

3A Building
- 81

5A Building
- 86

2A Building
- 1

Water Plant (4 Buildings)
- 17

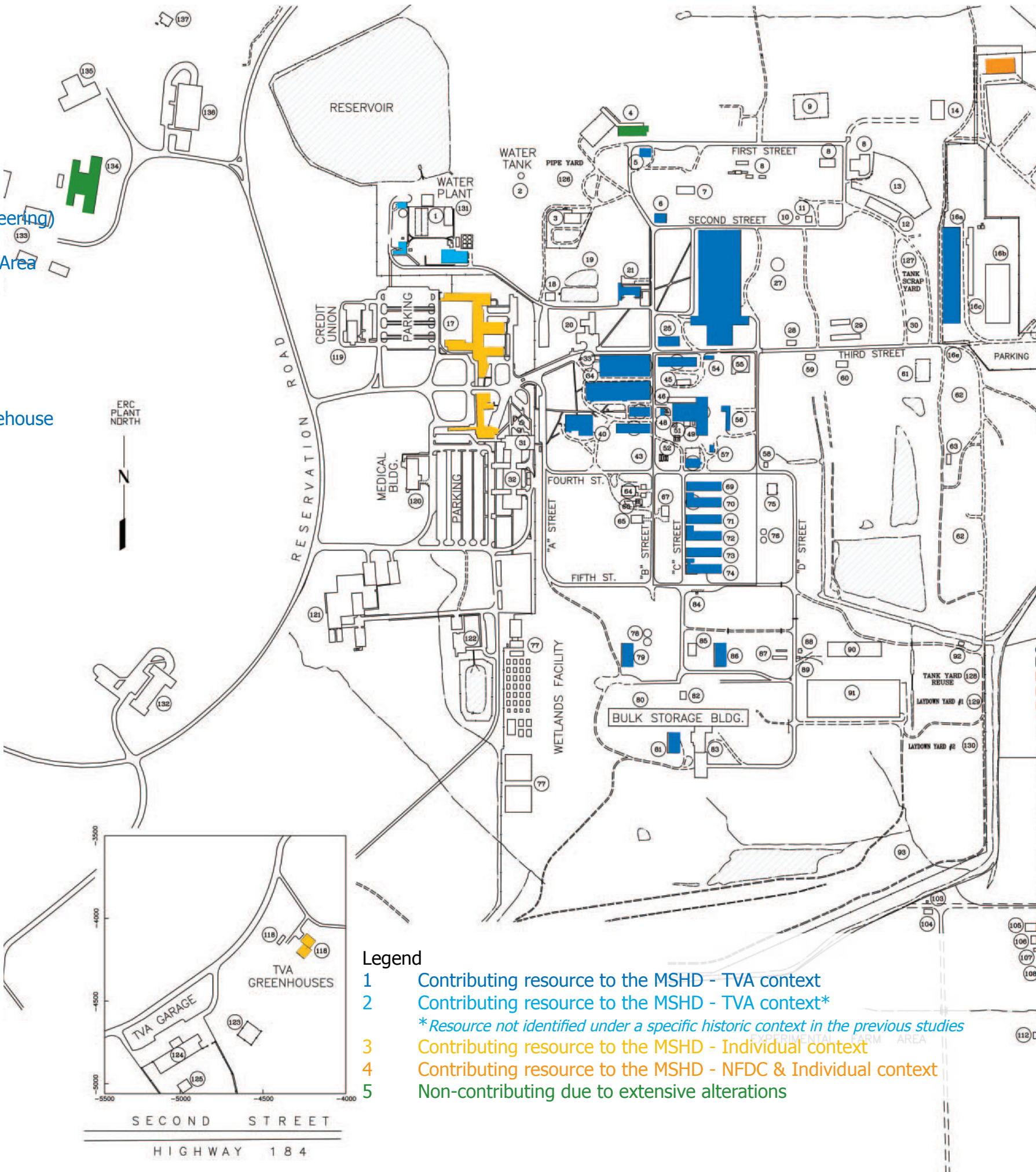
Environmental Research Center
- 118

Green House
- 15

PDW Receiving Warehouse
- 4

Switch House (Substation #1)
- 134

Office Service Warehouse



Architectural Building Condition Summary
The following list and map documents the overall building condition rating for each resource included in this study.

Buildings Assessed

- 17a

25

118
- Environmental Research Center/Service Building

Project Operations Office Building

Greenhouse
- 4

16

17b

41

57

68

81

134
- Switch House (Substation #1)

Power Service Shop No. 2

Environmental Research Center

Sheetmetal Shop

Substation No. 2

Substation No. 4 & 5

5A Building

Office Service Warehouse
- 1

5

6

15

21

33

34

35

36

42

44

48

53

69

70

71

72

73

74

79

86
- Water Plant (3 Buildings – 01a, 01b and 01c)

Drum Storage Area Building

R/M Lab

PDW Receiving Warehouse

Old Medical Building (Field Engineering)

Shipping and Receiving Office

Instrumentation/Electric Shop

Chemical Plant Warehouse

Projects Operations Storage Warehouse

Pipe Shop

Project Operations Bath House

Paint Storage Building

Tin Shop

Catalyzer Building No. 1

Catalyzer Building No. 2

Catalyzer Building No. 3

Catalyzer Building No. 4

Catalyzer Building No. 5

Catalyzer Building No. 6

3A Building

2A Shop
- 1d

22

23

24

26

37

38

39

47

50

54

56
- Water Plant (1 Buildings – 01d)

L/N Building

L/N Power Service Shop Storage Area

L/N Warehouse No. 4

Grounds Maintenance Shop

Machine Shop

Gas and Diesel Repair Shop

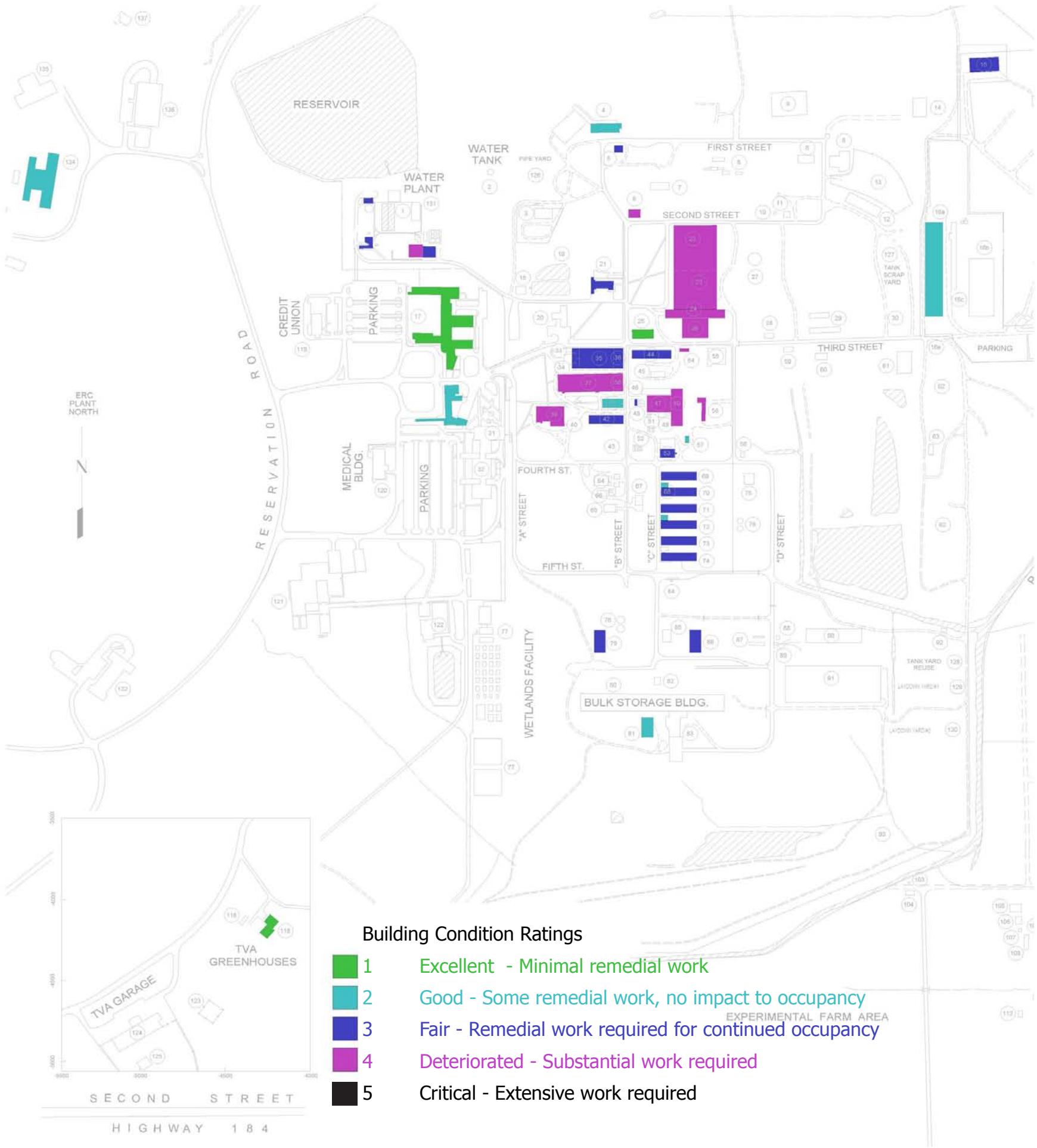
Engineering Lab

Pilot Plant Building

Autoclave Building

Grinding Building

Boiler House



Adaptability Summary

The following list and map documents relative adaptability/ flexibility for each resource included in this study.

Buildings Assessed

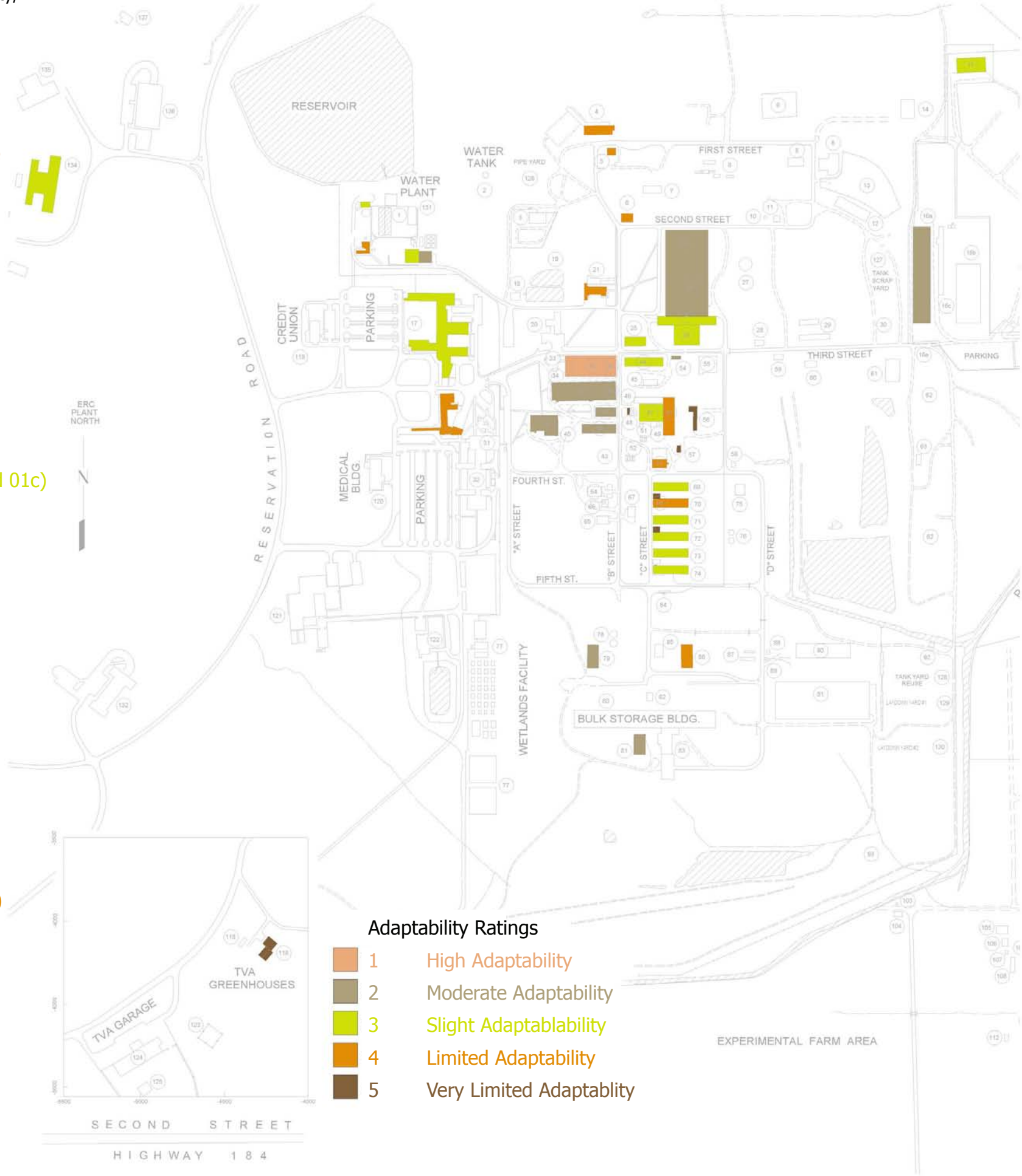
- 33 Shipping and Receiving Office
- 34 Instrumentation/Electric Shop
- 35 Chemical Plant Warehouse
- 36 Projects Operations Storage Warehouse

- 1d Water Plant (1 Buildings – 01d)
- 15 PDW Receiving Warehouse
- 16 Power Service Shop No. 2
- 22 L/N Building
- 23 L/N Power Service Shop Storage Area
- 37 Machine Shop
- 38 Gas and Diesel Repair Shop
- 39 Engineering Lab
- 41 Sheetmetal Shop
- 42 Pipe Shop
- 79 3A Building

- 1 Water Plant (3 Buildings – 01a, 01b and 01c)
- 5 Drum Storage Area Building
- 6 R/M Lab
- 17a Environmental Research Center
- 25 Project Operations Office Building
- 24 L/N Warehouse No. 4
- 26 Grounds Maintenance Shop
- 44 Project Operations Bath House
- 47 Pilot Plant Building
- 69 Catalyzer Building No. 1
- 71 Catalyzer Building No. 3
- 72 Catalyzer Building No. 4
- 73 Catalyzer Building No. 5
- 74 Catalyzer Building No. 6
- 81 5A Building
- 134 Office Service Warehouse

- 17b Environmental Research Center
- 21 Old Medical Building (Field Engineering)
- 53 Tin Shop
- 50 Autoclave Building
- 54 Grinding Building
- 70 Catalyzer Building No. 2
- 86 2A Shop

- 4 Switch House (Substation #1)
- 48 Paint Storage Building
- 56 Boiler House
- 57 Substation No. 2
- 68 Substation No. 4 & 5
- 118 Green House



Structural Condition Summary

The following list and map documents the overall structural condition rating for each resource included in this study.

Buildings Assessed

- 17a

Environmental Research Center
- 17b

Environmental Research Center
- 25

Project Operations Office Building
- 1A

Water Plant
- 1B

Water Plant
- 4

Switch House (Substation #1)
- 5

Drum Storage Area Building
- 15

PDW Receiving Warehouse
- 16

Power Service Shop No. 2
- 21

Old Medical Building (Field Engineering – RBO)
- 33

Shipping and Receiving Office
- 34

Instrumentation/Electric Shop
- 35

Chemical Plant Warehouse
- 36

Projects Operations Storage Warehouse
- 37

Machine Shop
- 38

Gas and Diesel Repair Shop
- 39

Engineering Lab
- 41

Sheetmetal Shop
- 42

Pipe Shop
- 44

Project Operations Bath House
- 47

Pilot Plant Building
- 48

Paint Storage Building
- 50

Autoclave Building
- 54

Grinding Building
- 57

Substation No. 2
- 68

Substation No. 4 & 5
- 69

Catalyzer Building No. 1
- 71

Catalyzer Building No. 3
- 74

Catalyzer Building No. 6
- 79

3A Building
- 81

5A Building
- 86

2A Shop
- 118

Green House (Includes 7 Buildings)
- 134

Office Service Warehouse
- 1C

Water Plant
- 1D

Water Plant
- 22

L/N Building
- 23

L/N Power Service Shop Storage Area
- 24

L/N Warehouse No. 4
- 26

Grounds Maintenance Shop
- 53

Tin Shop
- 56

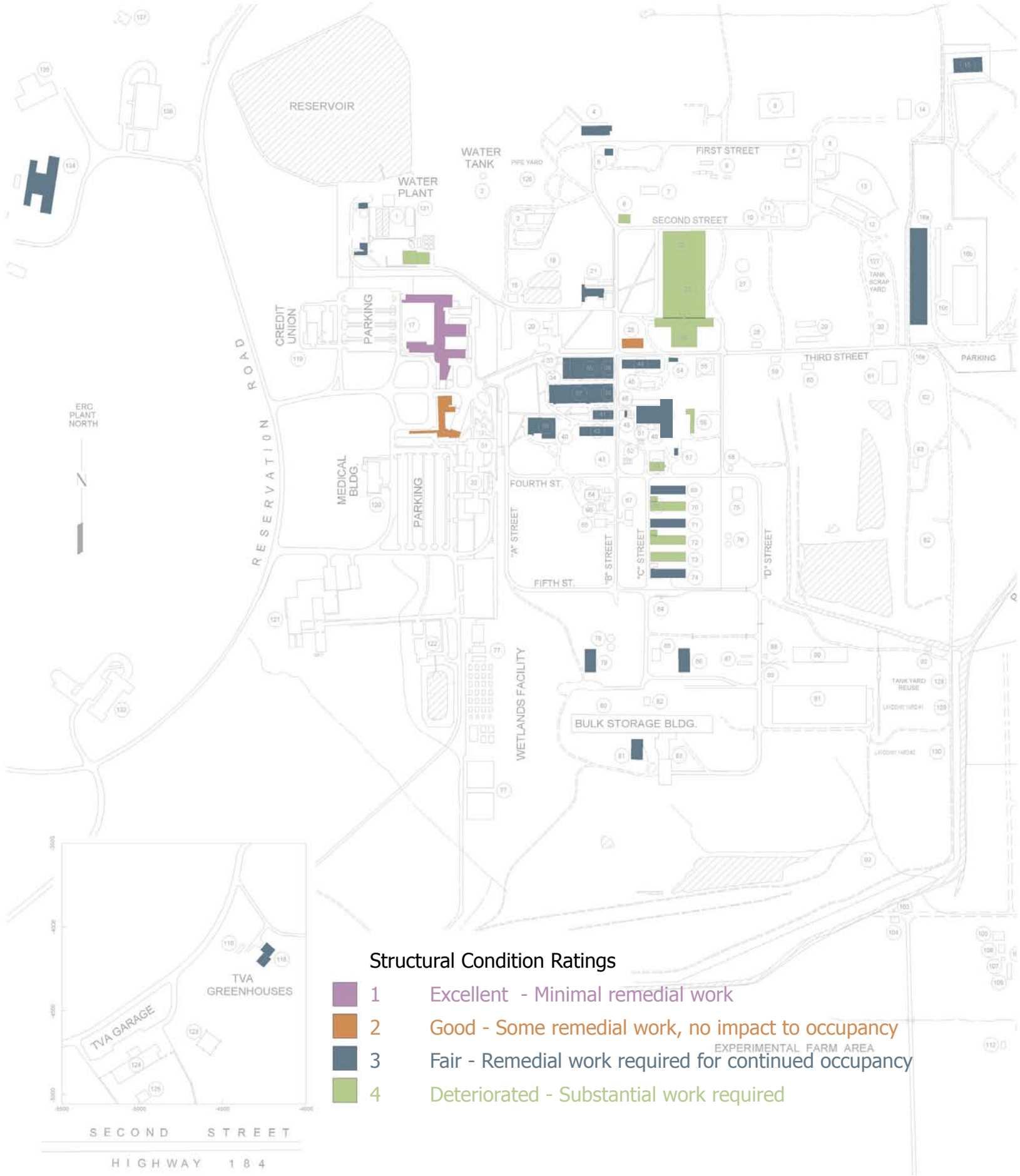
Boiler House
- 70

Catalyzer Building No. 2
- 72

Catalyzer Building No. 4
- 73

Catalyzer Building No. 5
- 6

R/M Lab

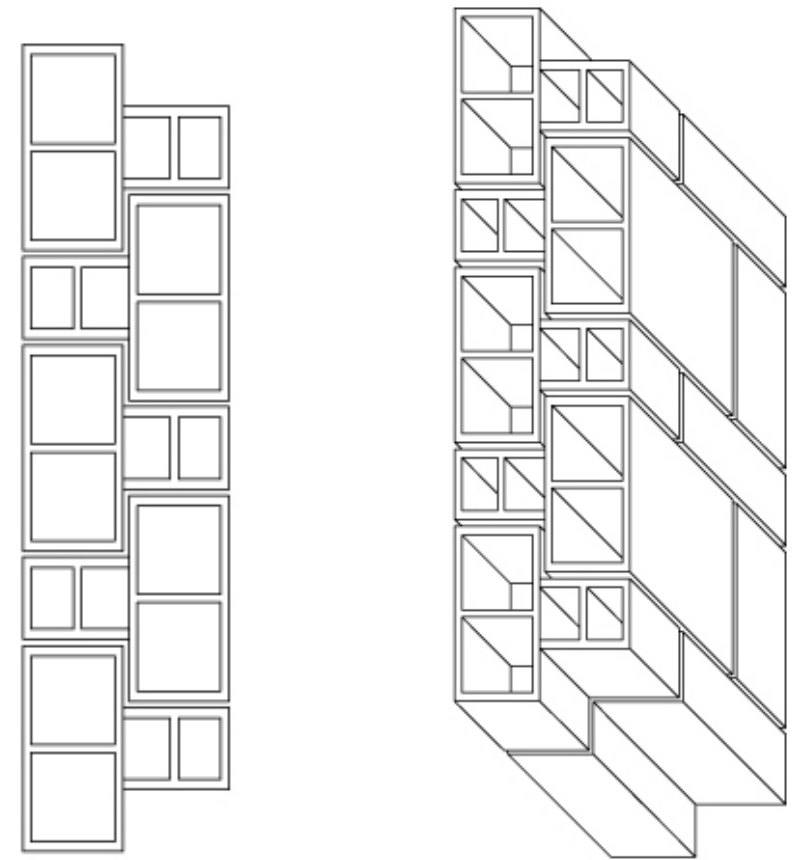


02.5 Treatment Recommendations

The buildings assessed in this study are unique historic resources that stand as testament to an important phase of national history. Their long term preservation is an important goal that will require them to be renewed and repurposed to serve new functions that are economically viable in today’s Shoals community. The market analysis portion of this study identifies an array of potential uses for the Muscle Shoals Reservation and its historic resources. The adaptation of the buildings to serve these uses will require some modification to these structures. This work will require striking a careful balance between making the necessary modifications and retaining the important character-defining qualities of each resource. To achieve this goal, a rehabilitation approach as defined by the Secretary of the Interior’s Standards for the Treatment of Historic Properties should be utilized. In the Standards, rehabilitation is defined as “the act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features which convey its historical, cultural, or architectural values”.

A successful rehabilitation will require both understanding and then protecting these key features. The building assessment forms indicate the survey team’s assessment of the character-defining features for each building. They also indicate the team’s general assessment of the condition of these features. Through performing this analysis, certain issues common to the majority of the buildings became apparent. These issues, described below, are primarily applicable to the NFDC buildings constructed c. 1918. These buildings share a common design, material and construction vocabulary, clearly expressed on both the exterior and interior. This consistency of design is in and of itself a character-defining feature of the entire complex, making a comprehensive approach to the rehabilitation of these buildings paramount. Below are several of the issues common to the NFDC complex buildings accompanied with general recommendations for treatment.



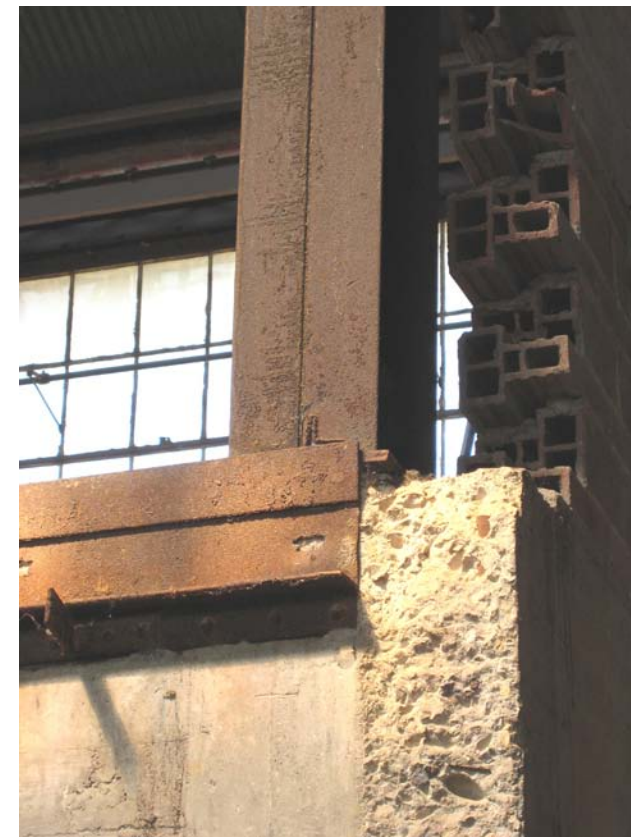


section and axonometric view of hollow clay tile construction

Exterior Wall Construction

One of the most striking features of the NFDC complex is the unique hollow clay tile wall construction. Two wythes of "T-shaped" tiles are interlaced to form the walls, expressing both dimensions of the "T" in alternating bands on the exterior and interior wall surfaces (see illustration). This hollow clay tile construction forms the field of most exterior walls in the complex. The hollow clay tile terminates in brick quoins at the building corners and at junctures with windows and doors. This wall construction currently exhibits many of the conditions common in solid masonry walls: cracking due to settlement or impact, weathering of mortar joints and localized deterioration of masonry units. Cracks and other areas of deteriorated mortar have often been filled with sealants or non-matching mortars. To address these conditions the follow general recommendations are offered:

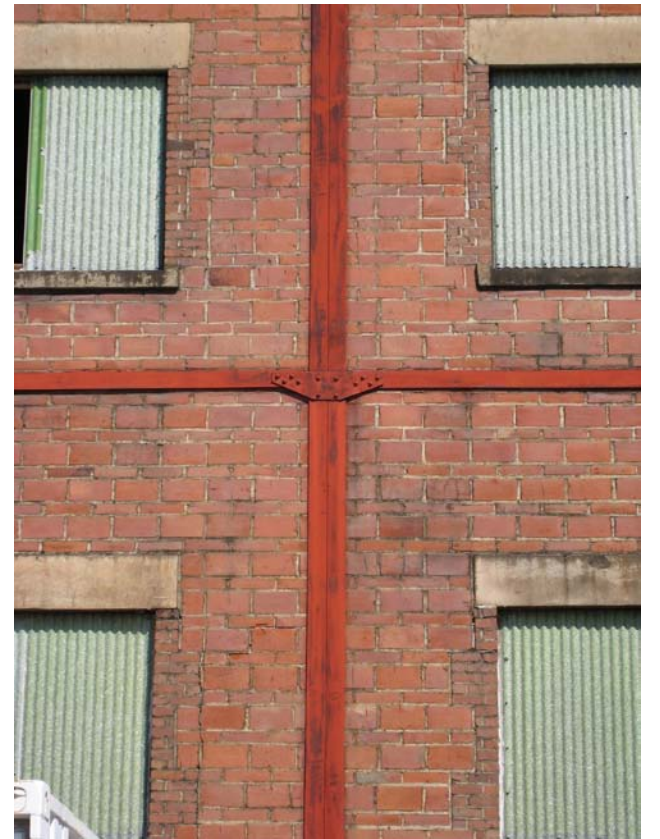
- Address the cause of significant structural settlement prior to making masonry repairs.
- After settlement has been addressed and in areas of inactive settlement, repair cracks by removal of sealants and incompatible mortars. Repoint cracks in mortar joints using repair mortar formulated to match historic mortar in both properties and appearance.
- Where mortar joints have deteriorated, repoint joints using repair mortar formulated to match historic mortar in both properties and appearance.
- Where masonry units are cracked repair where possible by filling cracks with repair mortar formulated to be compatible with masonry properties and matching masonry color.
- Where masonry units must be replaced, replace in kind. This may require casting of custom units which may be practical considering the scale of the project. If demolition of any structure must occur, deconstruct the building to allow salvaging of materials for use in repair of other structures.
- Clean all surfaces to remove staining and biological growth.

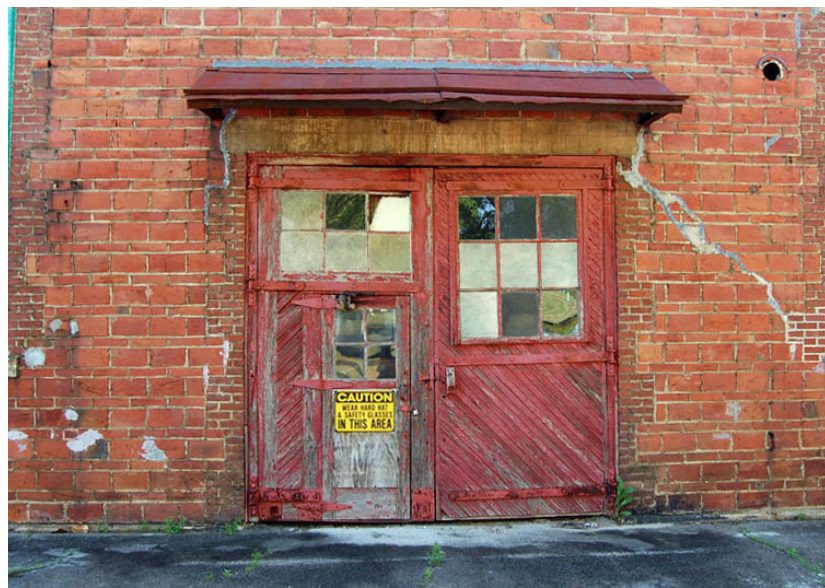


Exposed Structure

Most of the buildings in the NFDC complex utilize a primary structural system of structural steel columns, beam and roof trusses. In many of these buildings, the structural steel columns are expressed on the exterior walls, with the hollow clay tile forming an infill panel between columns. In almost all of the buildings, the structural steel members are exposed on the interior of the spaces with the columns, beams and trusses being primary form-givers within these spaces. Exposed concrete columns and beams and exposed heavy timber wood construction are used in a few buildings and, similarly to the structural steel, are important character-defining elements. Depending upon the future use of these buildings, the exposure of the structural elements may create a challenge for code compliance. Since code issues are use-dependent and since it is also necessary to evaluate code issues holistically during a project design phase, the following recommendations are very general in nature:

- At the time for project design carefully evaluate the options for addressing the exposed structural steel, with a goal of achieving safe conditions for building occupancy while retaining the character of the exposed structure to the greatest extent possible.
- Consider painting exposed steel with protective coatings instead of covering with other materials. Choose paint colors carefully to approximate the color of the exposed steel.
- Exposure of the heavy timber structure will be permissible for certain uses. Try to find uses for the buildings with heavy timber structure that will allow for the continued exposure of these structural elements.

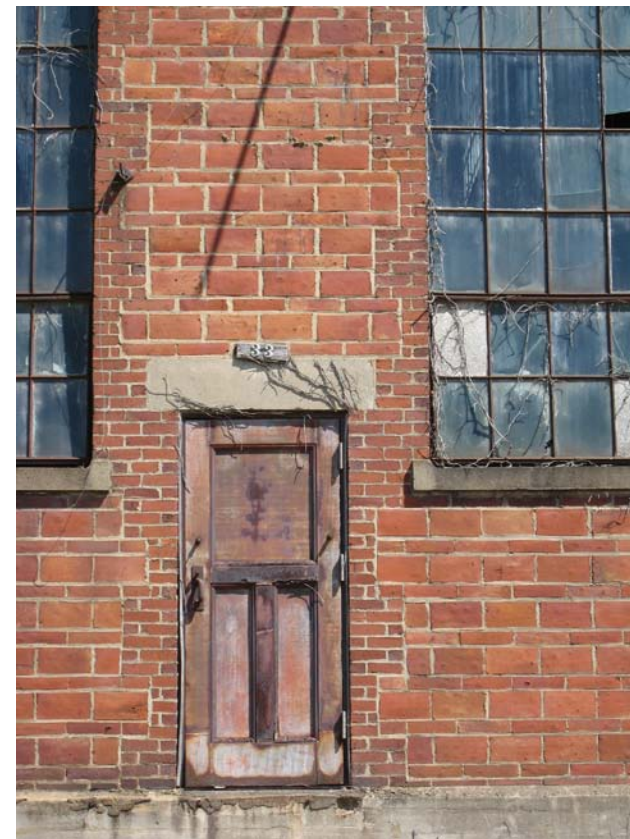




Doors and Entrance Canopies

Throughout the NFDC complex, there are a variety of historic exterior and interior doors. Many of the buildings had heavy wood stile and rail doors, with panels of wood boards and frequently reinforced with wood cross bracing. At the exterior, these doors were often protected with canopies with a heavy wood structure consisting of curved brackets supported on brick corbelled from the adjacent walls. Colorful but worn and possibly historic paint finishes remain on many exterior doors and canopies. This paint treatment would have enhanced the visual impact of these elements. There are also a number of metal-clad doors, ranging from metal clad stile and rail doors to metal-clad sliding industrial doors and metal canopies at loading docks. Each of these doors and canopies represents an important character-defining detail of the individual buildings and the overall complex. While the conditions of these doors vary, most are significantly deteriorated. The following recommendations are offered:

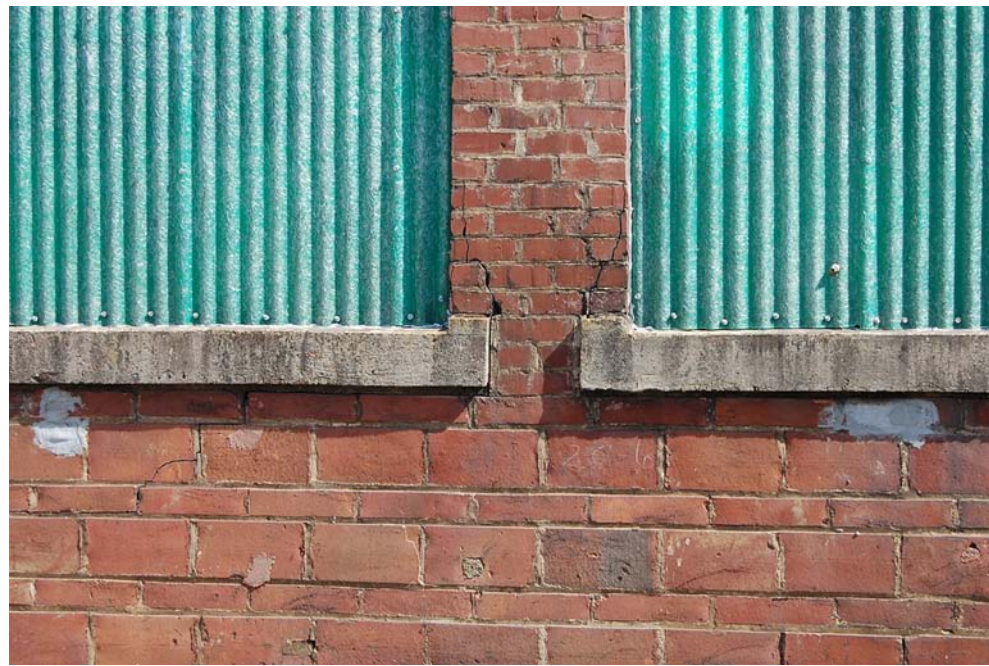
- Wood doors of this period are typically made from old-growth lumber which is a highly durable material. Despite the advanced deterioration, most of these doors and canopies could still be wholly or partially restored.
- Where historic doors cannot be retained, base the design of new doors on the historic precedent.
- Conduct paint analysis to determine the historic paint colors and use these colors on rehabilitated or reconstructed doors and canopies.



Lintels and Sills

Both the windows and doors of the NFDC complex typically have precast concrete lintels and sills. The lintels are typically flat and flush with the face of the masonry. The sills project from the masonry and have a molded end detail. Both lintels and sills are typically in good condition with only minor cracks and staining. However in a few locations, the sills have become weathered, exposing the steel reinforcement within. When this condition occurs, the steel corrodes and expands further deteriorating the sills. In the case of the most severely deteriorated sills, replacement will likely be required. The following recommendations are offered:

- Repair small cracks and spalls using cementitious grout formulated to be compatible with existing concrete.
- Clean all surfaces to remove staining and biological growth.
- Cast new sills where deterioration has caused exposure of the reinforcing steel. New sills should match the historic in material and appearance.



Windows

The industrial steel windows are primary character-defining features of the NFDC complex. These windows create ribbons of light in the clerestories as well as punched openings in the building facades. Most sashes had a section or sections of operable hopper windows. In many cases these steel windows still exist and in some cases the steel operating hardware remains as well. Most windows have been covered with a green corrugated translucent plastic sheet material. While most windows exhibit the corrosion that is typical for steel windows that have been unpainted for some time, many of these windows are still in repairable condition. The following recommendations are offered:

- Determination for repair versus replacement of windows should be made on a case by case basis. Where repair is possible, retain the historic sash and frame and make the necessary repairs. Remove surface corrosion. Where corrosion has compromised the member, replace only damaged members. Reglaze, prime and repaint.
- Where replacement is necessary or where windows are no longer existing, use steel replacement units that match the historic condition as closely as possible. If replacement with steel units is not possible, select replacement units to match the width, depth and profile of the historic frames and muntins. Match historic muntin and mullion patterns.
- Address energy efficiency of the windows during repair and replacement. Explore the opportunities for reglazing with thin insulating units if the historic muntins can support the increased thickness. Consider the use of light Low E coatings to reduce the thermal transmittance of the glass. Consider the installation of interior applied secondary glazing (interior storms) if reglazing with insulating units is not feasible. Ensure that through the restoration process all cracks are filled and windows fit tightly within openings. It should be possible to achieve significantly increased energy efficiency without compromising the essential characteristics of the historic windows.



Precast Roof Panels

One of the most widely deteriorated elements in the NFDC complex are the roof decks. The roof decking of most buildings consists of precast concrete panels. These panels are typically exposed on the interior of the buildings. The majority of precast concrete decking panels are covered with various built-up bituminous appearing roofing materials, some with stone ballast. Standing water on the roof surfaces has caused water to penetrate the joints between panels and eventually to erode the concrete exposing the reinforcement steel. The reinforcement steel has corroded, further deteriorating the concrete. Today the concrete panels exhibit cracking, spalling, breakage and corroded reinforcement. Extensive replacement of roof panels will be required. The following recommendations are offered:

- Retain and repair existing concrete panels where repair is possible.
- Where repair is not possible replace with new precast concrete panels. Considering the scale of the project it should be feasible to cast new panels for replacement.
- In the event that replacement with new concrete panels is not feasible, explore replacement alternative that will be consistent with the appearance of the historic materials.
- Strive to maintain the concrete panels at least within the clerestories (see issues following regarding Open Interior Space and Expression of Exterior Wall Construction on Interiors)



Open Interior Space

One of the most essential character-defining features on the interiors of the buildings of the NFDC complex is the volume of large and open spaces within these buildings. This may also prove to be very challenging to retain while adapting these buildings for new use. While it will not be possible to retain every space, an effort should be made to creatively consider ways to use the large spatial volumes to enhance the quality of the new spaces within these buildings. The following general recommendations are offered:

- Try to find uses that will allow maintaining the open spaces to the greatest extent possible.
- Prioritize the spaces within each building and organize new arrangements to retain the most important spaces.
- Try to preserve the openness of the clerestories both for their spatial quality and for the natural light that they can contribute.
- Consider the use of interior walls with glazing and openings to maximize views from space to space.
- Try to maximize the spatial volumes exposed in public spaces such as lobbies and corridors.



Expression of Exterior Wall Construction on Interiors

Another challenging aspect of adapting the interior of the NFDC buildings will be retaining the quality of the expression of the exterior wall construction on the interior. This is most notably the expression of the hollow clay tile wall material. Reuse of these buildings will most certainly require climate control which did not exist historically in the buildings. The exterior walls have little insulating value. The introduction of insulated and weathertight wall and ceiling constructions within the exterior walls is likely to be needed to serve most new functions. As with the maintaining of open space (discussed above) this will require a creative approach to maximize retention of character defining features while creating functional new space. The following general recommendations are offered:

- Once building use has been determined, carefully analyze the building envelope to understand its thermal and moisture vulnerabilities.
- Utilize energy modeling to design solutions that maximize the efficiency of systems to reduce the impact on the building envelope to the greatest extent possible.
- Prioritize the spaces within each building and try to expose materials in key locations.
- Knowing that the interiors of these building will be significantly altered by rehabilitation to function for new uses, consider retaining a building that is well representative of the complex to use for a purpose that will not require extensive modification and can retain its open spaces and expression of materials. The building could serve as an open air community space, recreation use, events venue, farmer's market etc. that could be used by occupants of the surrounding rehabilitated buildings and new development.



Equipment and Signage

One very unique feature of the buildings in the NFDC complex is the remains of manufacturing and research equipment and related signage both within the buildings and on the grounds. These features present an opportunity to add texture and a layer of meaning to the rehabilitated spaces within these buildings. Consider retaining and incorporating some of these features into the rehabilitated spaces.



03.1 Overview of Scenarios

03.1.1 Background and Objectives

TEAM:
Todd LaRue, Principal
Erica Champion, Senior Consultant
David Pierce, Senior Associate

Background:
RCLCO was retained by Lord Aeck Sargent as part of a multidisciplinary team to conduct a preliminary test of the development opportunity for a variety of candidate land uses at the Muscle Shoals site.

Objectives:
For the candidate land uses:

Assess the site characteristics and location relative to the development potential;

Understand the underlying demand fundamentals for candidate land uses via socioeconomic trends, development trends, and economic development efforts in the local area and region;

Determine the key target market audiences fueling demand for candidate land uses;

Survey the competitive landscape to understand supply conditions in the market place; and

Provide initial/ preliminary development conclusions regarding the likely market success for each land use.

03.1.2 Methodology

Site Analysis

Identify levels of opportunity and potential positioning through attributes of site and relationship to market.

- Local and regional access and visibility
- Character and type of surrounding developments
- Proximity of regional attractions/destinations, services, and employment
- Planned and proposed improvements to surrounding areas

Market Depth

Understand target markets and supportable units and/or square feet based on current and future market growth and demonstrated demand.

Evaluate existing and projected local and regional economic and demographic composition and growth to understand key target markets that will fuel demand for candidate land uses at the site

Determine the magnitude of demand for each of the land uses based on the existing size and projected growth of the key target markets

Competitive Market Analysis

Understand opportunities in the market in relationship to competitive supply.

Evaluate a sample of competitive and comparable new and existing product and/ or projects of each candidate land use

Determine the potential supportable types of product and the correlating estimated number of units or square footage of each land use at the site

Recommendations/Market Position

Advise on critical success factors for the development, creating a set of recommendations that responds to the analysis undertaken

03.2 Overview of Scenarios

THE OPPORTUNITY FOR TVA RESERVATION REDEVELOPMENT HAS BEEN INVESTIGATED UNDER THREE DIFFERENT SCENARIOS

Steady-State Moderate Growth (Scenario 1): Growth in the Shoals area will continue at the same demonstrated pace as posted over the past few decades

- Through 2030, only the rail car facility will add a volume of new jobs that surpasses employment growth in the Shoals over the past 40 years

Aggressive Steady-State Growth (Scenario 2): The impact of the rail car facility will be more dramatic, bringing a greater employment and household growth than demonstrated in the past

- This scenario is unlikely, given the type of employment created by the rail car facility and historical precedence of job and household growth in the area

TVA Reservation Redevelopment is a Catalyst for Economic Growth (Scenario 3): The Reservation is converted into a research and development campus that focuses on promoting energy innovation and attracts other industries, as well

- Additional supporting employment can be significant because white collar energy-related jobs have a higher likelihood of spurring other professional support and specialized manufacturing jobs
- We believe that this scenario can be achieved if the timing is right and the appropriate and strategic partnerships and funding are pursued

THE CATALYST SCENARIO SIGNIFICANTLY INCREASES THE OPPORTUNITY FOR DEVELOPMENT OF ALL USES AT THE SITE

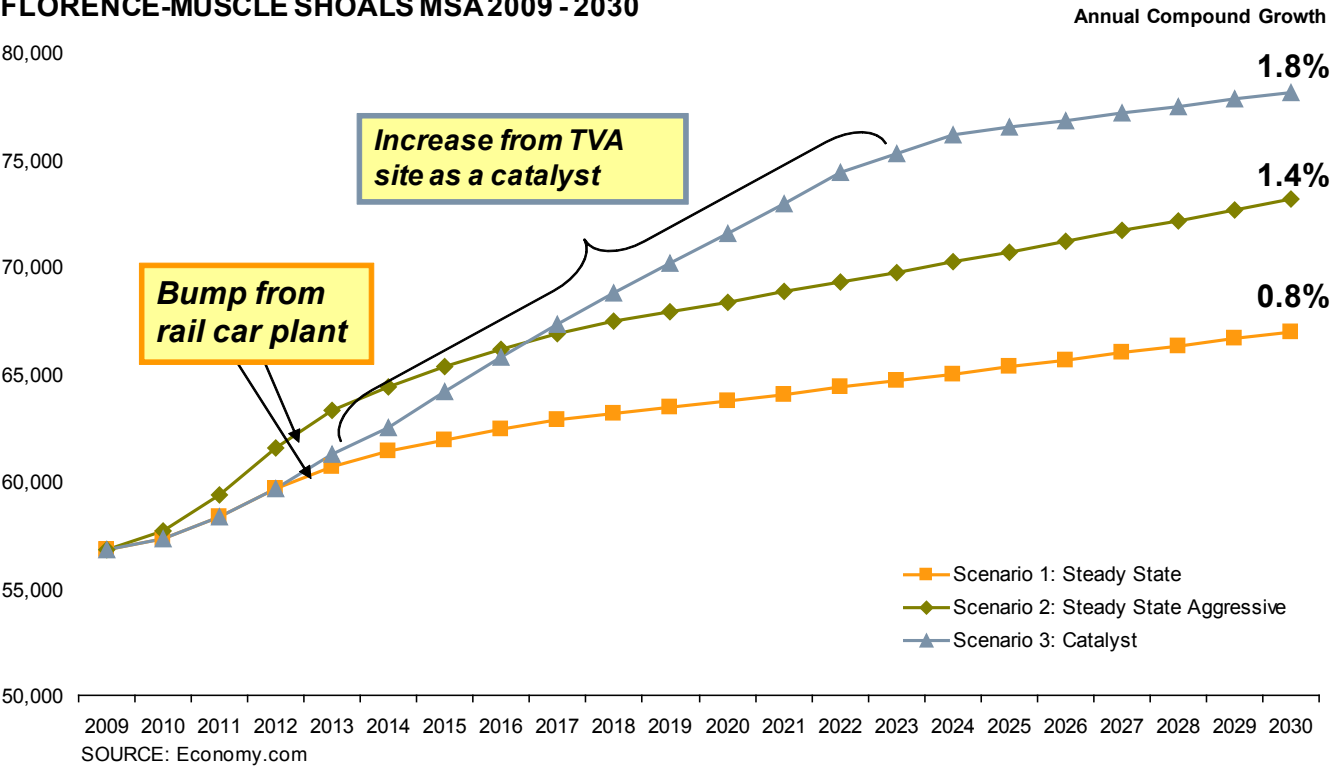
REDEVELOPING PART OF THE SITE AS A LARGE-SCALE R&D PARK WILL BE A CATALYST, BRINGING ROBUST EMPLOYMENT GROWTH TO THE SHOALS AREA

Total Development Supportable at the Site Through 2030

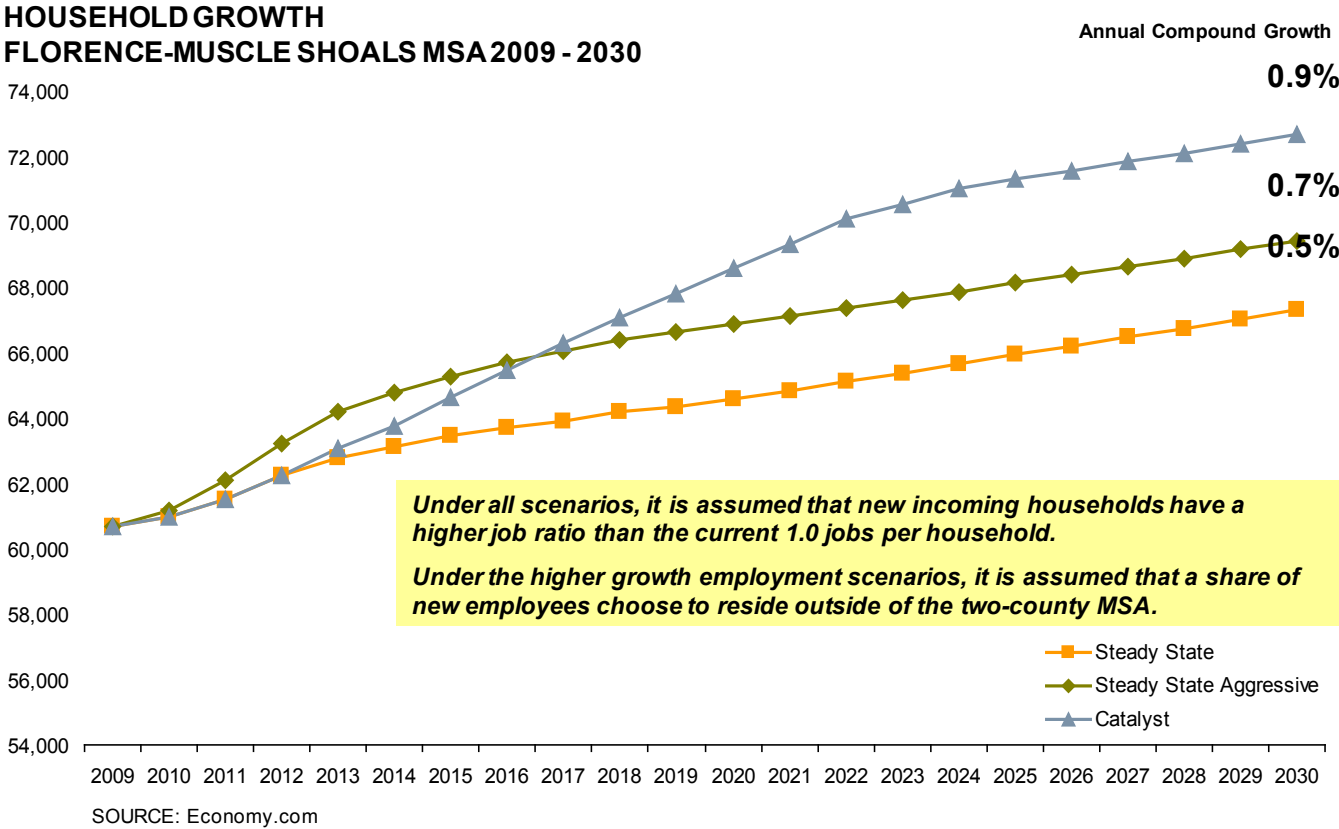
SCENARIO	1: MODERATE STEADY-STATE	2: AGGRESSIVE STEADY-STATE	3: TVA SITE AS A CATALYST
Development Opportunity at the TVA Reservation			
OFFICE/INDUSTRIAL	400K SF Total 125K SF Office 275K SF Flex ¹ & Industrial	680K SF Total 230K SF Office 450K SF Flex ¹ & Industrial	3.2 Million SF Total 70 – 80% Office/ Flex 20 – 30% Industrial (Retain existing structure as appropriate for character, condition, and potential use)
RETAIL	120K SF	200K SF	325K SF
ENTERTAINMENT	Limited	Up to 30K	50 – 85K SF
HOSPITALITY	170 Keys	175 Keys	275 Keys
RESIDENTIAL (Only SFD was studied and is presented)	600-650 units	700-750 units	1,100-1,200 units

¹ Flex space is employment serving space designed to be versatile and may include a mix of research and development, quasi-retail sales, industrial processing, specialized assembly, or high tech space (e.g., information, call centers, back-office reconciliation or support services).

TOTAL EMPLOYMENT
FLORENCE-MUSCLE SHOALS MSA 2009 - 2030



DRIVEN BY EMPLOYMENT GROWTH, THE AREA WILL ADD NEARLY 7,000 MORE HOUSEHOLDS WITH THE TVA CATALYST DEVELOPMENT THAN WITHOUT



SUSTAINABILITY SHOULD BE A CORNERSTONE OF THE RESERVATION REDEVELOPMENT

Development that is driven by sustainability principals is more than just a trend, it is becoming a standard

- With so many developers actively using “green” and sustainable development principals to differentiate their projects, this is a movement being broadly implemented today making it necessary to compete in the near future, especially on a national level

Sustainability is defined not only as the use of environmentally-friendly planning and execution of development, but also creating a place that is supportable from a market demand perspective

- Delivering more residential, retail, office, or other land uses (supply) than demand in the market place can absorb will lead to high vacancies, eroding the sense of place and potential for long-term success

A focus on green building and employment will increase the potential for site development to qualify for public funding, grants and other types of financing

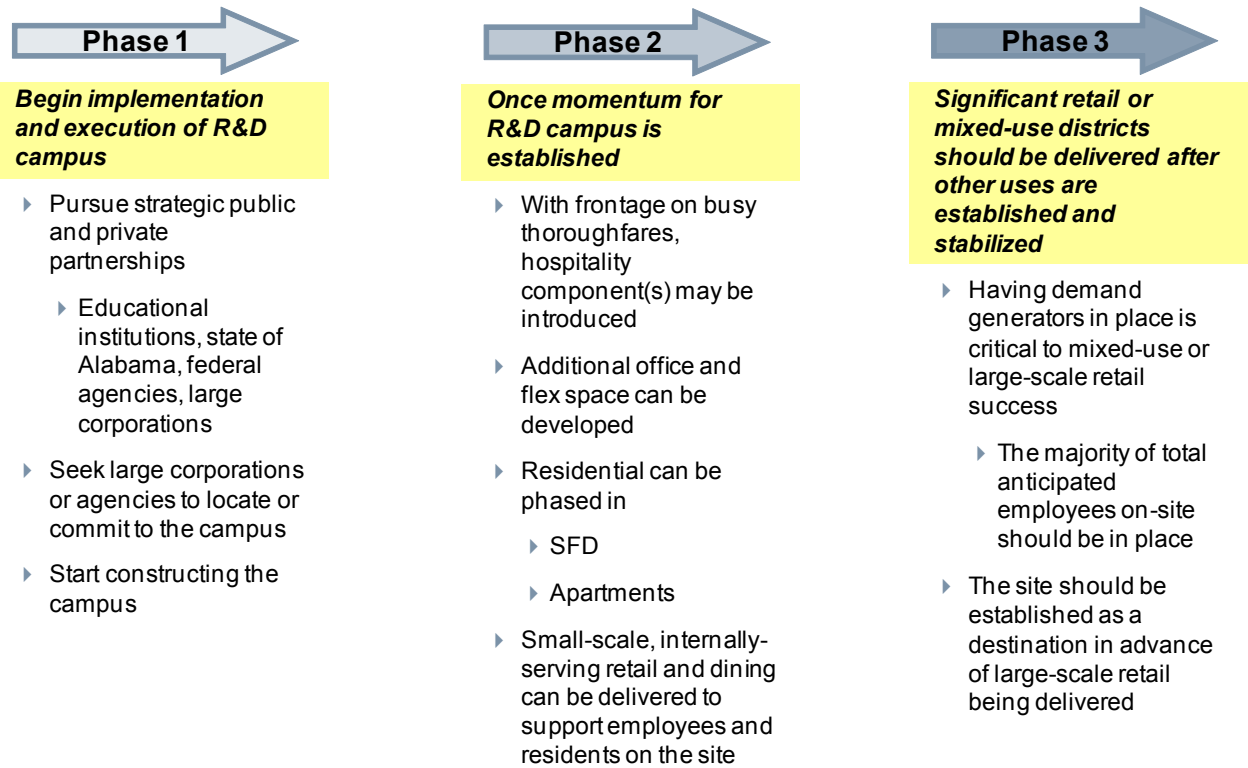
- Currently available are brownfield conversion grants, federal stimulus funding ear-marked for clean energy technology research, among other incentives and funds for green-related development and activities

THE APPLICATION OF SUSTAINABILITY IN DESIGN AND EXECUTION WILL MAXIMIZE THE CHARACTER AND APPEAL OF PROJECTS AT THE SITE

A focus on sustainability is critical for morphing perceptions of the site and maximizing the character and place that is created with the redevelopment

- Green development of the site can help combat lingering negative perceptions of the Reservation due to known contamination
- Preservation of the historic character of the site – existing street grid, and to the extent possible, historic buildings – will give the development a more authentic feel and differentiate the character of the project in a way that is difficult to replicate with a greenfield development
- Creative treatment of environmentally sensitive areas (i.e., contaminated or otherwise undevelopable areas) into open space will transform challenging aspects of the site into assets
 - Plentiful open space is an appealing amenity to both potential residents as well as employers that are concerned about providing an appealing work environment
- Delivering a master plan that mixes land uses in a walkable format will make amenities of park space, open space, retail, and other conveniences/ assets immediately accessible to all users at the site

TO BE SUCCESSFUL, THE EMPLOYMENT CAMPUS MUST COME FIRST, MAJOR RETAIL SHOULD COME LAST



03.3 Summary of Conclusions and Recommendations

THE R&D CAMPUS WILL ACT AS AN ANCHOR FOR THE TVA RESERVATION REDEVELOPMENT

The TVA Reservation should be redeveloped in multiple districts that blend and mix land uses which are anchored by a research and development employment campus that can accommodate a significant level of highly skilled employment

As a major R&D campus, the reservation will draw the employment and households needed to support the development of residential, retail, hospitality, and other uses at the site

In order to transform the site into a major research and development campus with national draw, the campus should have a primary focus on innovation in the energy industry, leveraging the history of the site and legacy of the TVA

- A multitude of other industries/ disciplines can also be accommodated at the employment campus, particularly highly-skilled professional services and highly-skilled manufacturing
- These can be supporting industry or an industry that is not related to energy

It is important to note that the land plan should be flexible enough to respond to unique opportunities that are difficult to quantify and therefore not considered in this analysis

03.3.1 **Employment-Serving Space**

ADDITIONAL EMPLOYMENT AT THE SITE COULD INCLUDE BACK-OFFICE OPERATIONS, MOVIE-RELATED INDUSTRY AND SPECIALIZED MANUFACTURING

Interviews with local economic development officials indicate interest in the Shoals area as a back-office/ support operations (short-sleeve white collar employment¹) location has increased

- Existing security infrastructure at the site could be very attractive for users with more sensitive industry back-office operations

The site’s existing facilities can be used to attract highly-specialized research and development or manufacturing companies that are similar or related to those currently located at the site (e.g., Fertilizer research and development)

Existing large, bulk space buildings are candidates for conversion to movie sound stages, interest has already been expressed by the movie industry

- Newly passed State of Alabama movie industry incentives will help to convert interest on the part of the industry into demand/ usage and supporting industries, such as small production studios, digital or graphics services could likely follow
- Potential space demanded by the movie industry is not included in this analysis

Most large supply component manufacturing plants require interstate proximity in site selection

However, the Shoals area has a new emphasis on rail-related manufacturing that can possibly be exploited

- Manufacturing companies seeking to control costs in an economic environment with volatile oil prices may be influenced to choose rail over truck distribution

OTHER IMPLEMENTATION RECOMMENDATIONS FOR MAKING THIS POTENTIAL CATALYST SCENARIO A REALITY

Pursue strategic partnerships with public organizations, universities and the state

- Private industry partnerships with public agencies, federal labs, and universities are a large macrotrend in innovation
- Time is of the essence, start building relationships now

Create an enterprise or similar zone providing incentives for businesses locating at the site

Capitalize on the energy focus of the park to try to attain federal stimulus funds and other public grants/ funds to offset the development costs

Create a master plan for the site to communicate the vision of the TVA Reservation redevelopment to a multitude of different parties, regardless of discipline or role (e.g., elected officials, executives, local planners, public)

Utilize place-making and sustainability principals, thoughtfully design the campus to maximize employer, prospective user, appeal

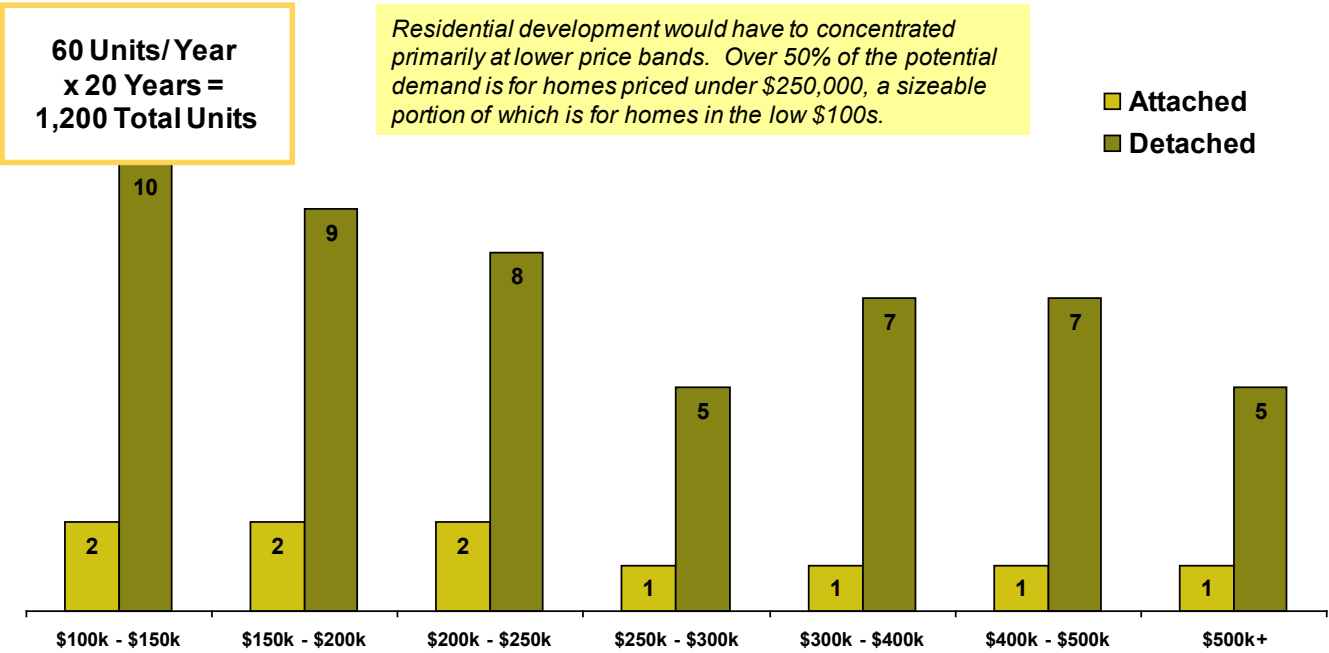
- Many employers have been increasingly attracted to locations with natural settings and amenities such as trails, as they recognize that employee retention and productivity are tied to employee wellness
- Employment space with small-scale retail, hospitality, and residential adjacent will be attractive amenities for employers looking to provide a convenient environment that offers shopping and dining options nearby, lodging for employees (short-term) and business associates/ clients, and housing (e.g., apartments) for longer-term, but temporary employees

1 Short-sleeve white collar employment is moderate-income professional employment that tends not to be located in Class A or Class B office space, but rather flex space. Examples include call centers, "back-office" support services (such as a bank reconciliation center), tech and information companies, R&D centers, light industrial and distribution facilities (such as a computer assembly center), etc.

03.3.2 Residential

LARGELY VALUE-ORIENTED, THERE IS DEMAND FOR APPROXIMATELY 1,200 RESIDENTIAL UNITS AT THE SITE OVER A 20-YEAR HORIZON

ESTIMATED ANNUAL DEMAND FOR RESIDENTIAL AT THE TVA SITE



SOURCE: RCLCO

SIGNIFICANT EMPLOYMENT AT THE SITE IMPROVES THE POTENTIAL FOR SUCCESSFUL RESIDENTIAL DEVELOPMENT

Development of the site into a major employment core (coupled with extensive environmental remediation) will help site overcome existing locational and perception challenges

Skilled and professional employees brought to the site and greater area will likely be more accepting of higher density residential, as it tends to be more preferred among college-educated buyers

Utilizing sustainability principals as a basis for design, an opportunity exists to deliver a more unique and sophisticated community and greater variety of product type to the market:

- Deliver a variety of residential products that are more dense, with a portion integrated with retail
 - Higher density will yield a greater volume of units to diffuse cost of remediation
 - Apartments, although not studied in this analysis, could provide housing for short-term researchers and students in the area and would work well mixed with retail in a town center format
 - Offset dense development with ample open and park space
- Configure the land plan to be pedestrian-friendly, providing residents and residences:
 - Connectivity to the trail system along the river
 - Connectivity (pedestrian and vehicular) to concentration of employment on the site
 - Amenities and retail within walking distance

Given the value-oriented nature of the market, deliver competitively priced product in order to compete with other residential in the market

- To meet the market where demand is concentrated, most product should be priced under \$200,000

SMALL-SCALE, INTERNALLY-SERVING AND LARGE-SCALE RETAIL COMPONENTS SHOULD BE INTRODUCED AT THE SITE

Small-scale, internally-serving retail can be phased in with residential and office/ flex space

- This will provide an attractive amenity to employers and residents looking for convenience shopping and dining options on-site
- Small-scale space will likely thrive when configured as a ground-level retail for office, where residential-serving retail may work as ground level in apartments, or a small, free-standing retail node (<15,000 SF)

Large-scale retail be delivered in the final phase of development, after most of the employment campus is filled and the site has been established as a destination

- It is important to note that current retail demand is satisfied. Demand for 400,000 square feet (325,000 of retail + 75,000 square feet of entertainment retail) is a 20-year demand number not expected to be fully-realized until 2030.

Large-scale retail should have visibility on a major thoroughfare and designed in a town center format, integrated with office and residential and entertainment

- Although the majority of demand is for big box retail, the retail center can still be executed in a more unique, town center format
 - Many of the largest department stores and typical co-tenant junior anchors have footprints that work very well in a mixed-use format, including Wal-Mart, Target, PetSmart, Staples, and grocers
- This will create a well-rounded and sustainable district of development, resembling the mix of uses in Downtown Florence and Downtown Tuscumbia, historical town centers still thriving today

03.3.3 Retail and Entertainment

APPLY SUSTAINABILITY PRINCIPALS TO THE DESIGN AND DEVELOPMENT OF RETAIL FOR INCREASED VITALITY

Retail should not be isolated in a single purpose district or concentrated in one area

- Retail will thrive more if it is integrated with other uses
 - When mixed and/ or adjacent to residential and employment-serving space, retail can infuse extra energy and life into a development node or district and vice-versa
 - The scale of retail suggested will be made possible by employees and residents located on the site; adjacency to these demand generators will improve patronage by the users and increase overall viability

Open space, parks, mature trees and other natural features should be incorporated into the layout of the retail

Trails throughout the development should connect all other uses to the retail node(s)

Retailers or retail developers seeking LEED certification for stores or buildings should be pursued

- Many national retailers are incorporating more LEED certified stores into their portfolio, with some committing to build all new stores to LEED certification standards
 - Big box retailers such as Target, Wal-Mart, Best Buy, Office Depot and many grocers have made such a commitment
 - Retail developers have started integrating features like green roofs into their center design
 - Even fast food franchises like McDonalds have jumped on the bandwagon

03.3.4 Hospitality

THE EMPLOYMENT CAMPUS AND OTHER SITE DEVELOPMENT WILL BE A DESTINATION COMPELLING TOURISTS TO STAY ON-SITE

ESTIMATED HOTEL DEMAND AT THE SITE
BASED ON NEW DEMAND & ROOM OBSOLESCENCE FROM 2008 – 2030

Total Hotel Rooms Supportable by Tourism Increase	70
+ Hotel Rooms Needing to be Replaced Due to Obsolescence	776
+ Additional Hotel Rooms Supportable Due to Increased Demand from Employment Located on Site	72
Total New Hotel Rooms Demanded	918
x Site Capture %	30%
Total Hotel Rooms Supportable at the Site	275
Potential Conference Center Space Supportable at the Site (100 SF per Room)	27,500

It is important to note that although the employment on site is crucial for generating sufficient demand to support a hotel(s), lodging and conference facilities located in the development will also be an important amenity to businesses, as well as residents and retail.

Additionally, tourists staying in hotels on-site will also likely patronize retail and dining on-site, providing critical support for these uses.

REDEVELOPMENT SHOULD BE ANCHORED BY AN R&D CAMPUS AND INTEGRATE A VARIETY OF LAND USES

Land Use Mix:
Employment-Serving Space: Up to 3.2 million square feet

- Execute primarily in a research and development campus format with a focus on innovation in energy-related disciplines; include additional space for other industries, professional services, and specialized manufacturing

Residential: Up to 1,200 for-sale units, as well as other product types not studied

- Deliver a variety of higher-density (than conventional) housing types – both for-sale and for-rent, and integrated with other land uses when possible and appropriate
- Offset density with ample open space and providing walkable connectivity to other development districts and amenities on the site

Retail & Entertainment: Up to 325,000 square feet of retail, Up to 85,000 square feet of entertainment

- Integrate small-scale retail into employment and residential areas
- Develop large-scale retail in the latter phases of development, locate for visibility on major thoroughfares, mix vertically or horizontally with residential and town center office space

Hospitality:

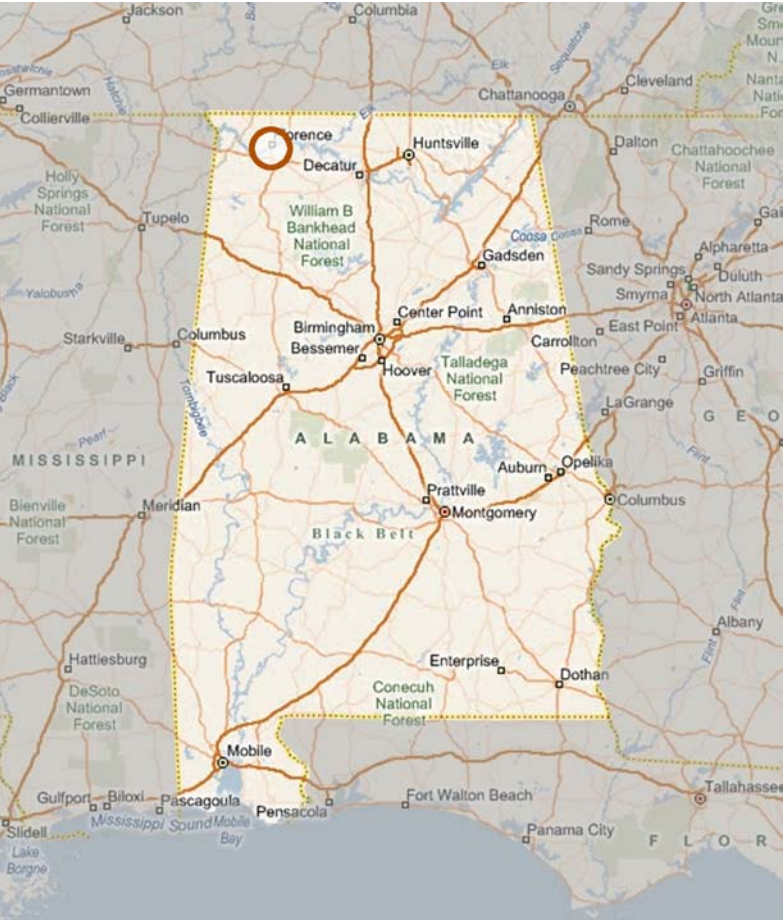
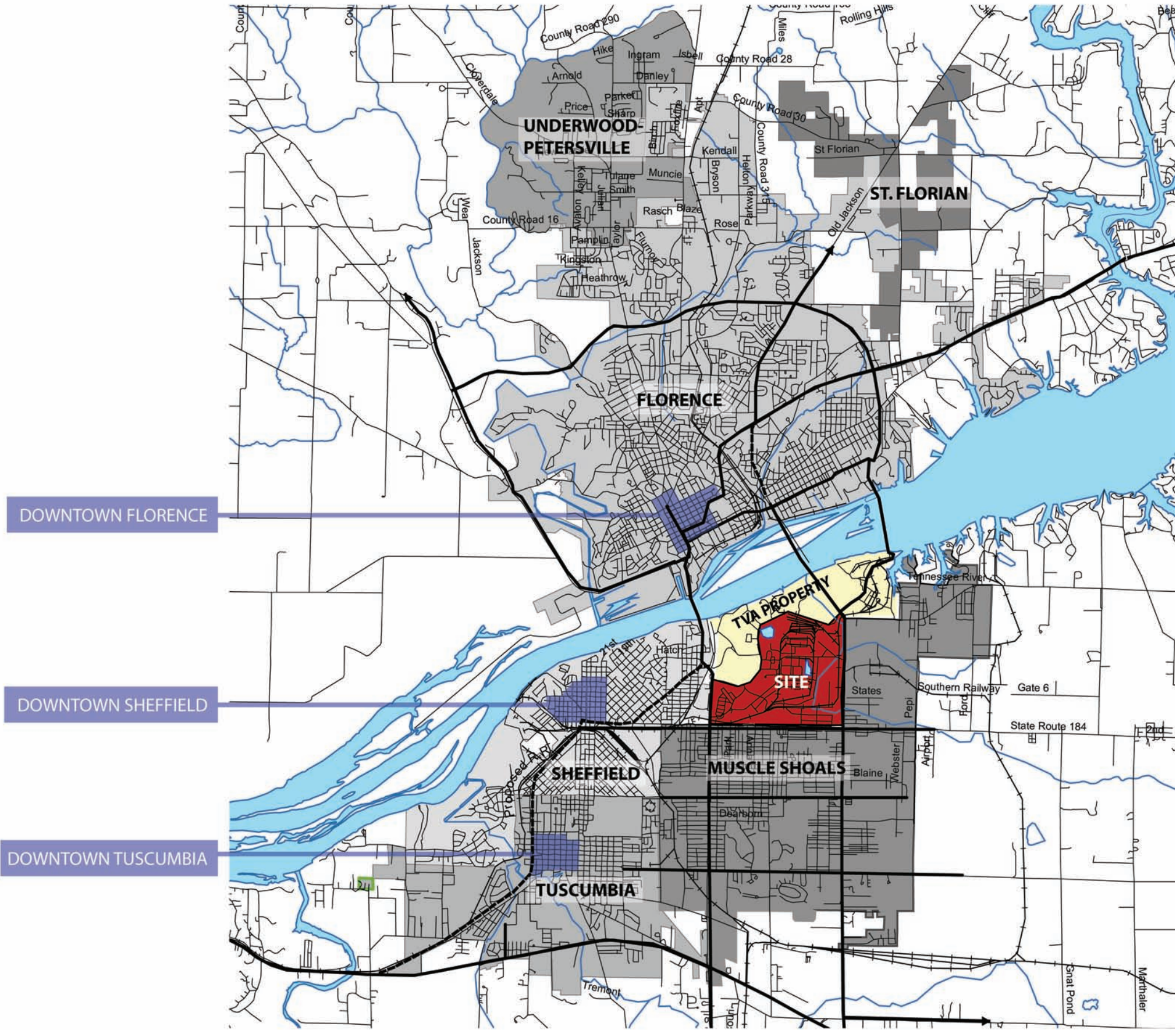
- Deliver one or two hotels, depending on the size and class, at any stage of the development
- Locate for visibility on major thoroughfares

04.1 Existing Conditions Analysis

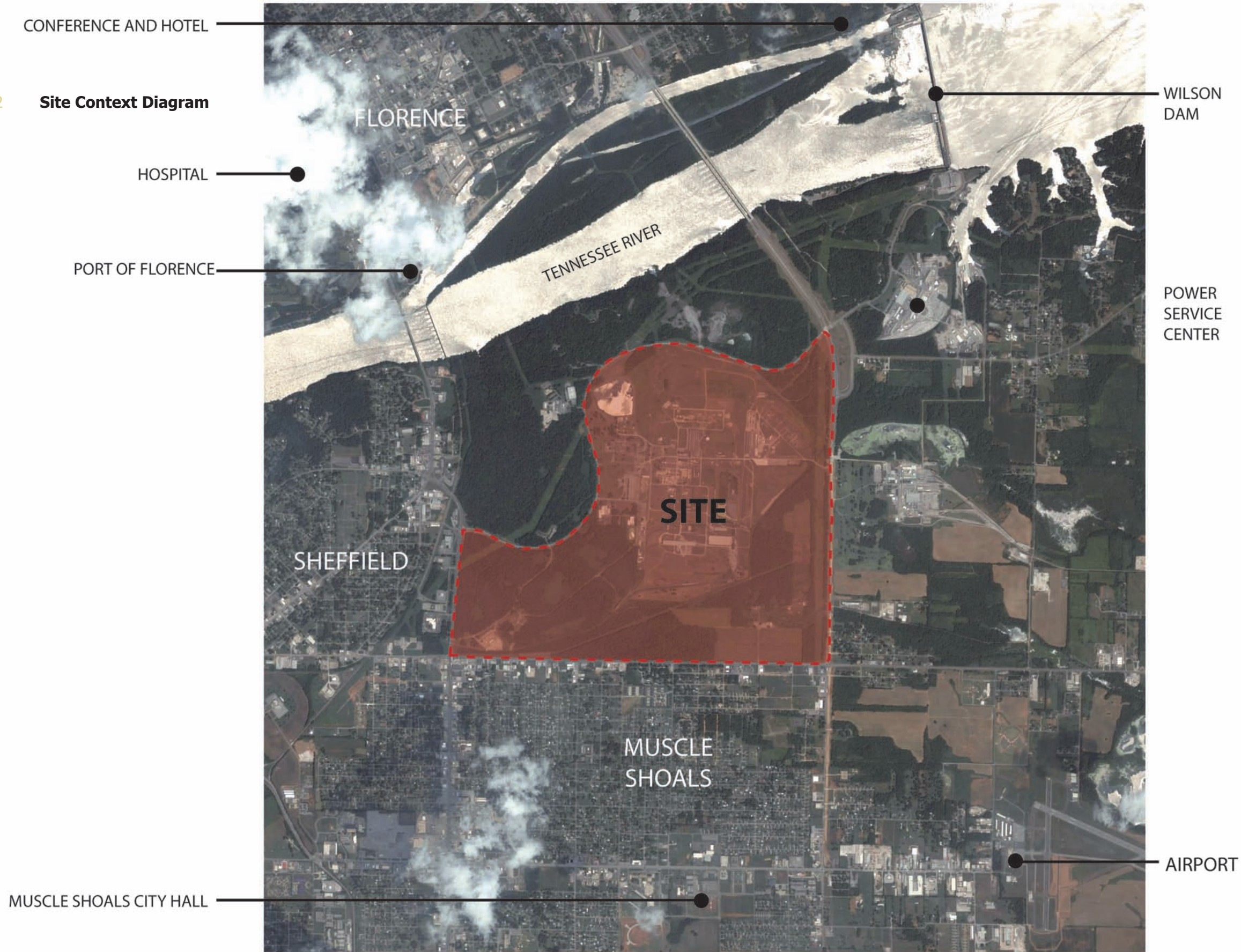
The planning effort for the site began with a detailed analysis of influential factors from the surrounding district as well as important characteristics of the site. The research material included historic maps, archived records, United States Geological Survey Data, Surrounding District Plans, Zoning Information and Demographic Data. The following pages graphically summarize this background information.

04.1.1 Vicinity Map

The study area (indicated in red), representing a portion the TVA Muscle Shoals Reservation, consists of approximately 1,366 Acres in the Shoals Area of Northwest Alabama. The site is bounded by North Wilson Dam Road to the East, Woodward Avenue to the West, Second Street to the South, and Reservation Road to the North and West. This map illustrates that the site area is nearly equivalent to the area of the combined central business districts for the cities of Florence, Muscle Shoals, Sheffield and Tuscumbia.



04.1.2 Site Context Diagram

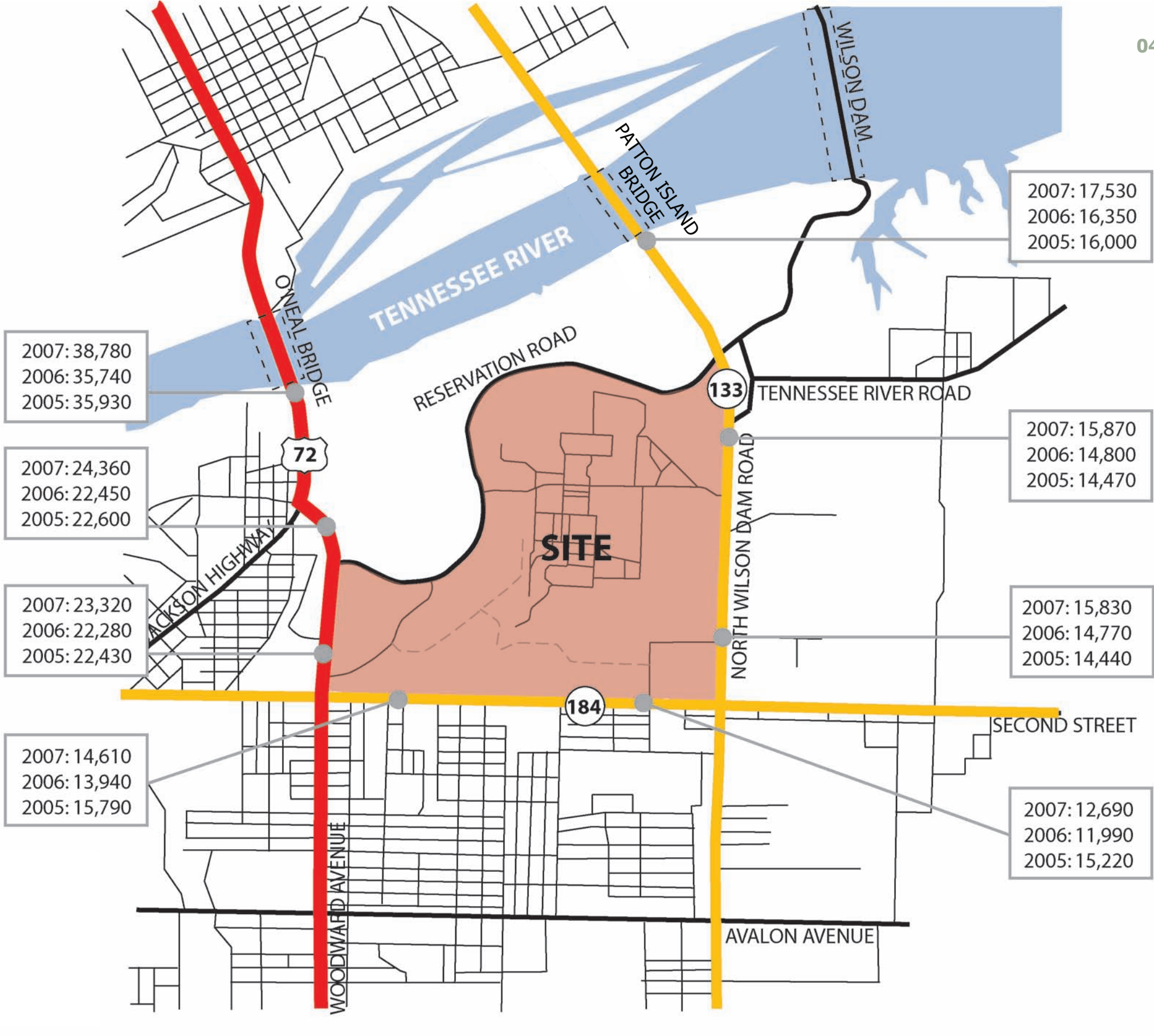


04.1.3

Major Corridors

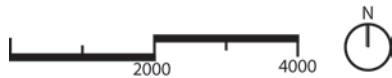
(source: ALDOT Transportation Planning Bureau)

This diagram illustrates the character of the major corridors that bound the site and provides annual traffic counts on the corridors from 2005 – 2007. Note that the traffic counts are trending upward on Woodward Avenue and North Wilson Dam Road. These figures precede the more recent completion of the Wilson Dam Road widening project.



U.S. HIGHWAY
STATE ROUTE
MAJOR ROAD TO SITE

TRAFFIC COUNT

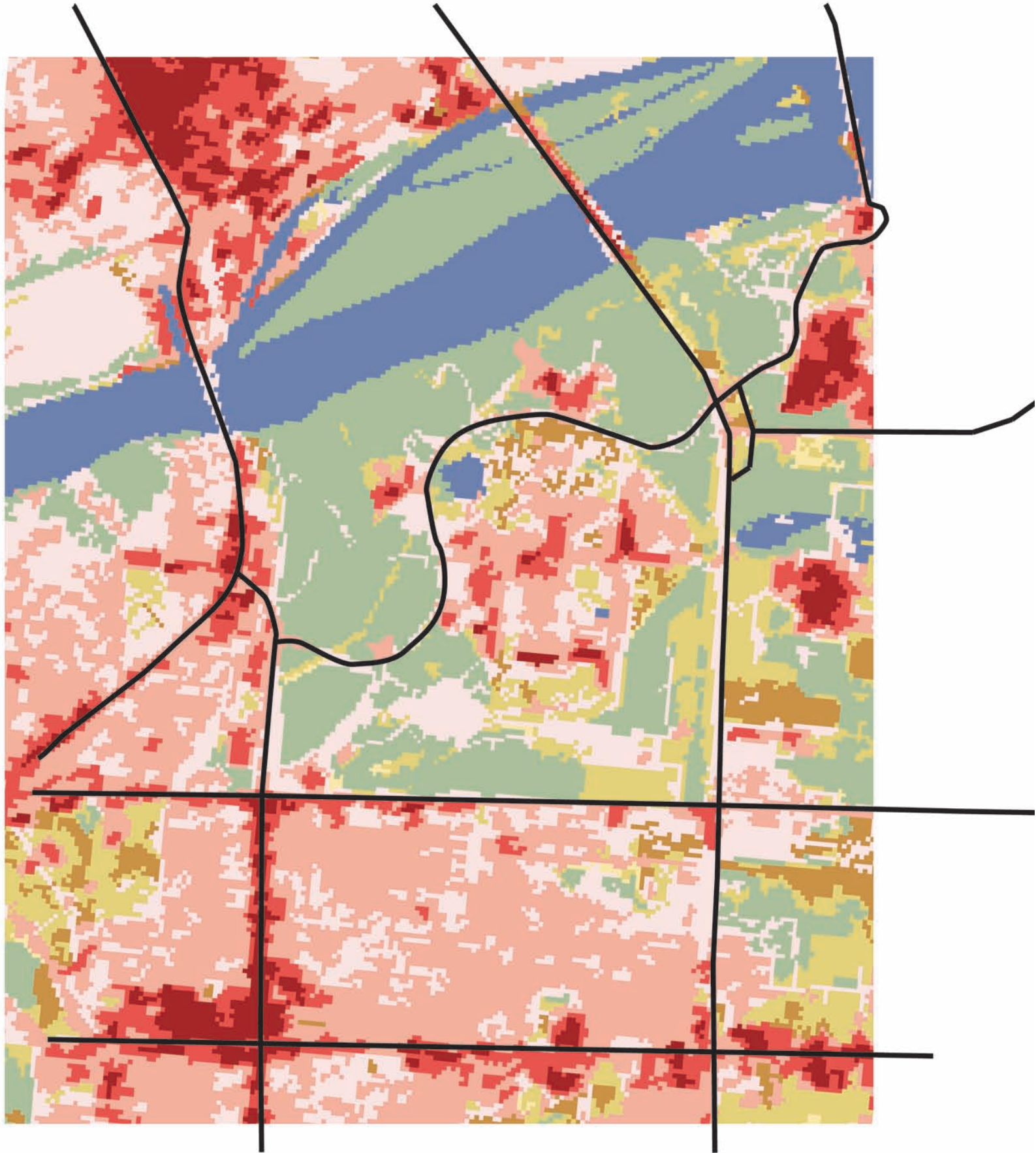
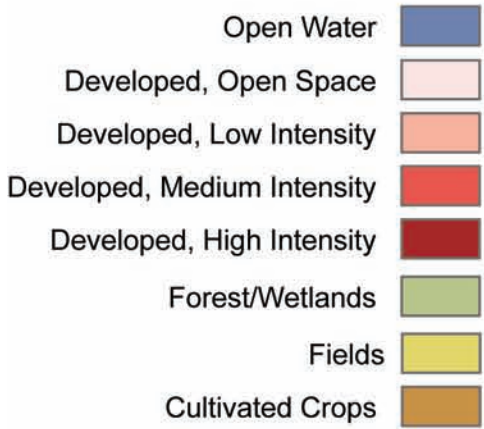


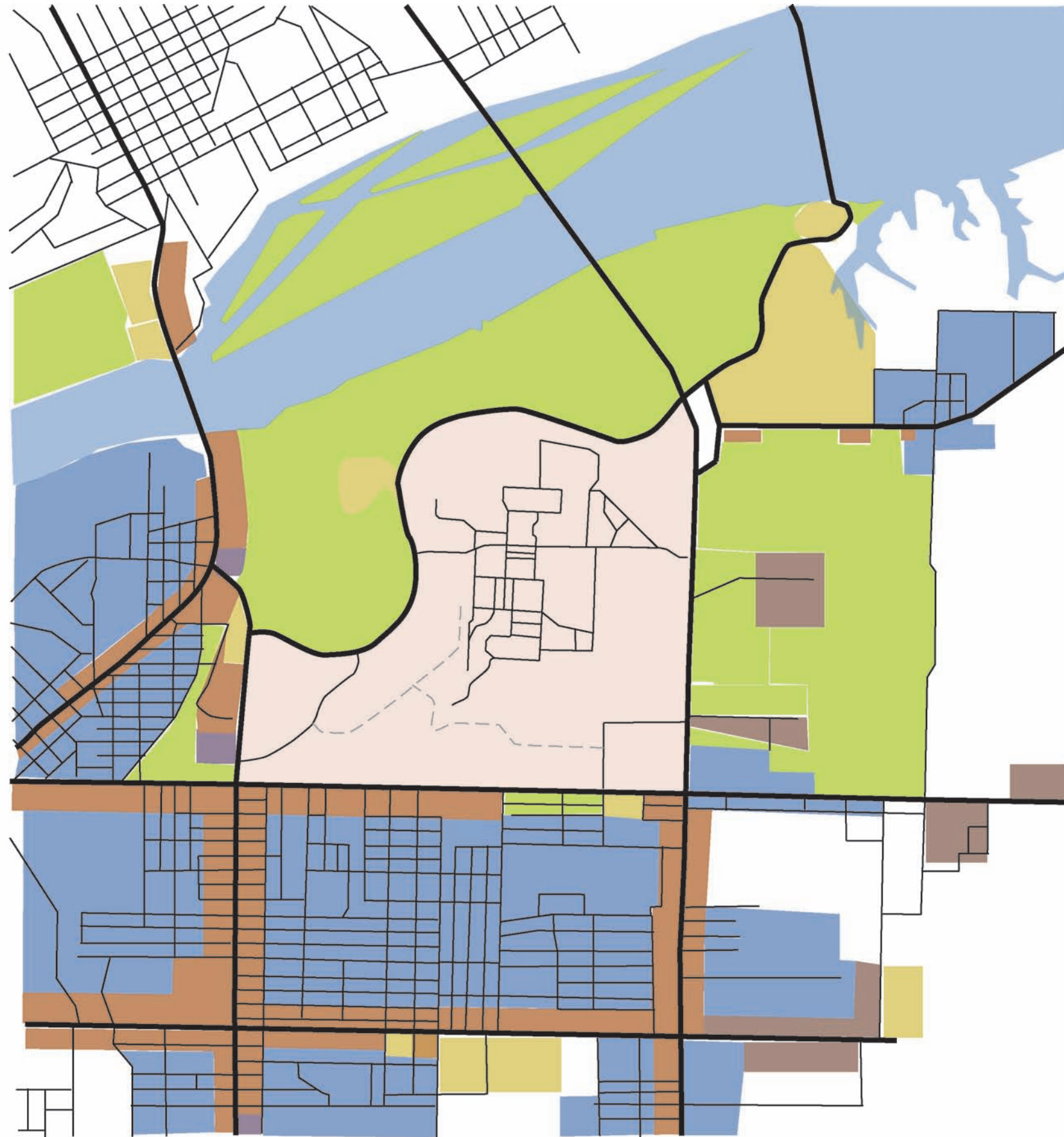
04.1.4

Land-Use Intensity Map
(source: U.S. Geological Survey)

This map indicates the current conditions of land on the site and in the surrounding area. The area on the Northwest side of Reservation Road is primarily wooded with some open green space and a few existing structures currently planned to remain. It is important to note the wooded character of the majority of the site, in contrast with the balance of the immediate surroundings.

The planning team felt that this is an important consideration when moving forward with redevelopment of the site.

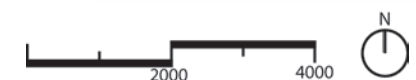




04.1.5 Existing Land-Use

The site is surrounded primarily by existing low-density (one and two story with surface parking) commercial uses along the major corridors, that are basically compatible with the present zoning requirements for their respective parcels. The majority of the surrounding area consists of primarily low density (single-family) residential use with some industrial uses and open space. The area on the Northwest side of Reservation Road is planned to remain as permanent open space for public use.

- RESIDENTIAL
- COMMERCIAL
- HOTEL
- INSTITUTIONAL
- MIXED-USE
- INDUSTRIAL
- OPEN SPACE



04.1.6 Rail Diagram

The reservation has always had good access to rail traffic. There are some remnants of the original extensive rail network still remaining on the site (not indicated on this plan). There is an opportunity to connect to the rail spurs to the East of the study area, but the strongest rail connection is to the West. Re-routing of the connection may be preferred in order to best accommodate future development on the site.

ACTIVE RAIL - - - - -
INACTIVE RAIL





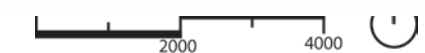
04.1.7

Recreation Diagram

(source: Sheffield Revitalization & Redevelopment Plan
Shoals Environmental Alliance)










This diagram indicates the existing and proposed recreation areas and network of trails that surround the site. Existing and proposed parks as well as former golf courses are also indicated. The existing trail networks have been routed primarily around the study area, based on security concerns related to current and former uses. Future plans should be developed to better connect the site to the surrounding bikeway and trail networks.

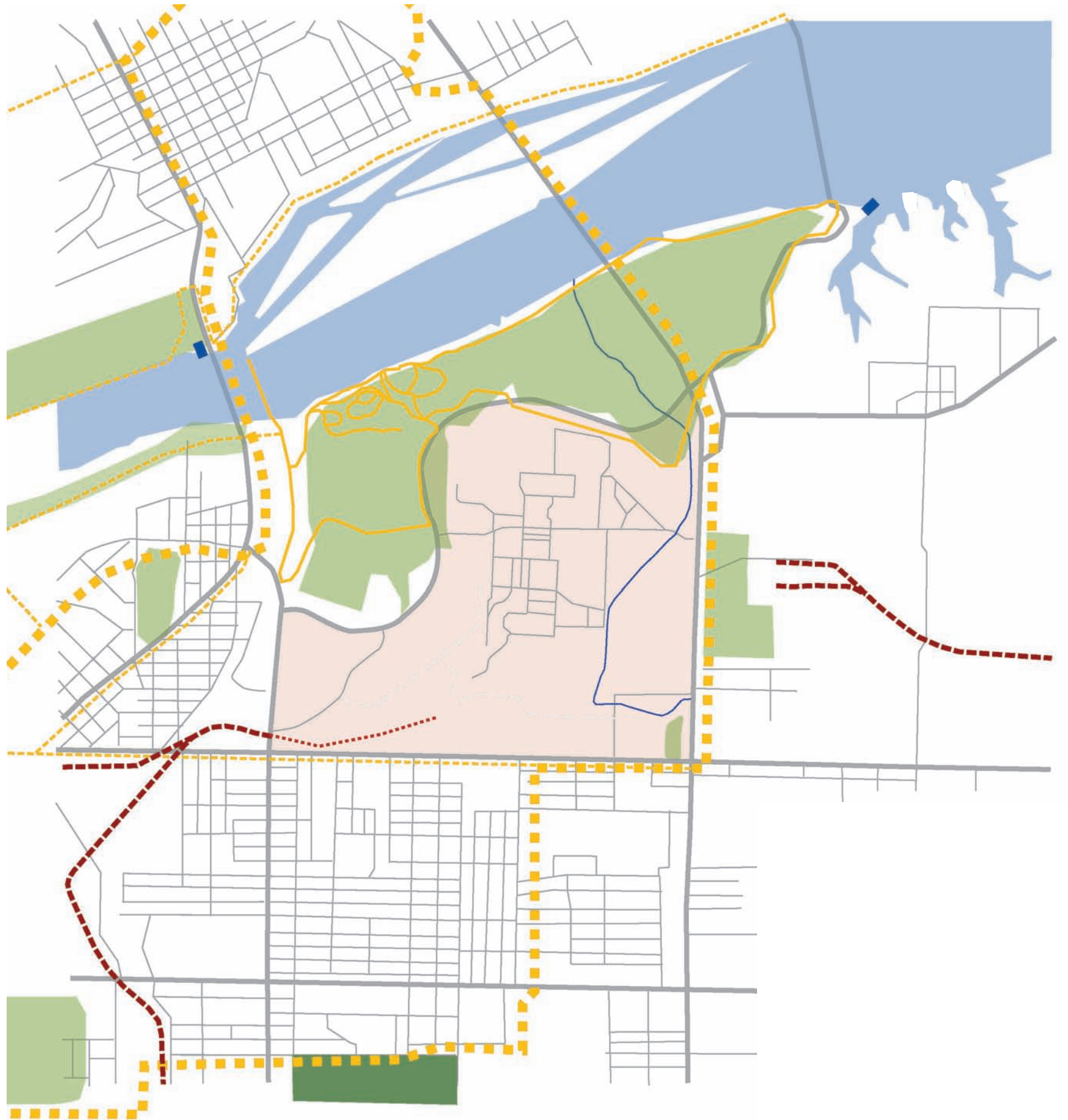
- LAUNCHING RAMP
- ■ ■ FOUR CITIES BIKEWAY
- EXISTING TRAIL
- ... PROPOSED TRAIL
- GOLF COURSE
- PARK/GREENSPACE



04.1.8 Site Amenities

The Planning team superimposed all of the items perceived as site amenities onto this single diagram of the study area and the surrounding districts in order to better inform conceptual planning efforts. Note that some elements such as Pond Creek are treated as both constraints and amenities.

-  POND CREEK
-  ACTIVE RAIL
-  INACTIVE RAIL
-  LAUNCHING RAMP
-  FOUR CITIES BIKEWAY
-  EXISTING TRAIL
-  PROPOSED TRAIL
-  GOLF COURSE
-  PARK/GREENSPACE





04.1.9

Flood Boundary

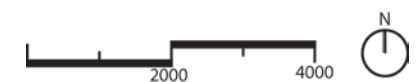
(source: FEMA Map Service Center)

Pond Creek bisects the Eastern portion of the site as it flows into the site from pipes under Wilson Dam Highway and runs north to the Tennessee River. The floodplain and the currently designated wetlands areas on the reservation are also indicated on this plan.

100-YEAR FLOOD
BOUNDARY

POND CREEK

WETLAND



04.1.10 Easement Diagram

This diagram indicates areas on the site that must remain undisturbed and protected due to environmental and cultural constraints, as well as the location of overhead power transmission lines from Wilson Dam that cross the site to serve the surrounding areas.

- TRANSMISSION LINES
- CULTURAL CONSTRAINTS
- EASEMENTS
- SOLID WASTE MANAGEMENT





04.1.11 Site Constraints

The Planning team superimposed all of the site constraints onto this single diagram of the study area and the surrounding districts in order to better understand the remaining developable area on the site. Some mitigation of wetlands and transfer of existing flood plain area may be required in order to increase the functionality of some of the prime developable area on the site. The team did not feel that any of these constraints, even when analyzed together, were excessive for an infill site of this size.

100-YEAR FLOOD
BOUNDARY

POND CREEK

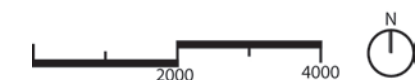
WETLAND

TRANSMISSION LINES

CULTURAL CONSTRAINTS

EASEMENTS

SOLID WASTE MANAGEMENT



04.2 Planning Strategy

The design team synthesized the information gathered during the Conceptual Planning Analysis, and developed a Planning Strategy for the reservation. Our initial concept was to create a flexible framework for the study area, based on historic patterns, as well as guiding principles for Smart Growth and Sustainability. The intent for this framework was to accommodate the uses identified in the Market Assessment as well as the expected level of change in a plan that would be executed over the course of 15-20 years.

04.2.1 Guiding Principles

The Market Assessment suggests that sustainability should be a cornerstone for the reservation redevelopment, and that some of the likely new users for the site may be new businesses in the sustainability field.

"As a major R&D campus, the reservation will draw the employment and households needed to support the development of residential, retail, hospitality, and other uses at the site.

In order to transform the site into a major research and development campus with national draw, the campus should have a primary focus on innovation in the energy industry, leveraging the history of the site and legacy of the TVA"

The planning team felt that this type of user would likely be attracted to a location in a walk-able, vibrant, environmentally sustainable district, planned for a mixture of uses. There is considerable opportunity for this type of development to take place on the reservation.

04.2.1.1 Smart Growth Principles

Smart Growth is a concept that is being promoted nationally as an alternative to current development patterns, or “sprawl” to enhance resident health and quality of life in our communities. Smart Growth developments accomplish these objectives by creating more pedestrian oriented environments with a mixture of uses that are designed to preserve open space. The following is a list of the basic principles of Smart Growth, most of which are easily applicable to the Muscle Shoals Reservation:

- Mix land uses, to create better places to live and work.
- Take advantage of Compact Building Design and utilize higher densities to minimize impact on the land and preserve open space.
- Create a range of housing opportunities and choices to accommodate multiple income levels.
- Create walk-able communities in order to create better places and promote a healthy lifestyle.
- Foster distinctive, attractive communities with a “sense of place”, with standards for development and construction that respond to community values.
- Preserve open space (farmland, natural beauty, and critical environmental areas) and improve quality of life in our communities.
- Strengthen and direct development toward existing communities already served by infrastructure to better utilize existing neighborhood resources.
- Provide a variety of transportation choices.
- Make Development decisions predictable, fair and cost effective in order to engage the private sector in development.
- Encourage community and stakeholder collaboration to respond to community needs.

from "Getting to Smart Growth II: 100 More Policies for Implementation" by the Smart Growth Network and the International City/County Management Organization at www.smartgrowth.org

04.2.1.2 Planning Approach

The Planning team applied the principles of Smart Growth and developed the following set of overarching planning strategies for the reservation.

- Develop a set of interconnected walk-able districts on the site, including an Incubator district that encompasses the center of the historic nitrate plant and the majority of the existing structures on the reservation. The new districts would be centered on the incubator district and based on the potential uses identified in the Market Analysis and sized based on a 10 to 15 minute cross-district walk.
- Re-imagine the street framework in the Incubator District with new pedestrian-oriented street designs and usable public open space in order to take the most advantage of the existing structures and develop a sense of “place” at the heart of the reservation.
- Connect the district street network to the original historic street grids to the south, east and west of the site, and generate a new flexible, walkable block structure on the reservation. The proposed blocks are appropriately sized to create a safe pedestrian environment within in the districts, accommodate a variety of uses and parking on the blocks, as well as align with the existing historic block patterns to the South, East and West of the site.
- Integrate the new “edge districts” within the surrounding neighborhoods in order to reduce the traffic burden on the surrounding neighborhoods by creating numerous ways in and out of the reservation, placing cross-district connection streets inside the site, and developing direct connections to surrounding features, such as the center of Muscle Shoals. This would physically reinforce the importance of the continued development and improvement of the surrounding areas as the site is developed.
- Encourage density within in the connected Districts, and preserve the wooded, natural character of the site by growing “up” instead of “out”. The plan for the reservation promotes low rise and mid-rise vertically integrated mixed-use structures and multi-level single use structures within the districts. This level of density, combined with efficient shared-parking areas in order to meet or exceed the development program proposed in the market analysis while preserving open space both within the districts and in designated areas between the districts.
- Create public access to the River, and connect to the districts to the river with a network of multi-use trails as well as new streets designed with pedestrians in mind.



04.2.1.3 The LEED-ND Neighborhood Development Program

The Leadership in Energy and Environmental Design Rating System Program was developed by the US Green Building Council in collaboration with the Congress for New Urbanism and the Natural Resources Defense Council. The Program, in its pilot phase as of this writing, is intended to create a national rating system for neighborhood design to certify that the design and location of a development meets demonstrably high levels of environmental responsibility and sustainability. The program emphasizes compact, walk-able, vibrant, mixed-use design with strong connectivity in order to reduce urban sprawl and create more livable communities. Many of the objectives are similar to Smart Growth, and the rating system includes the following points:

- Smart Location and Linkage - encourage development in the most suitable locations from a sustainable standpoint, and encourage alternate transit
 - Wetland and Water Body Conservation
 - Brownfield Redevelopment
 - Create a Bicycle Network
- Neighborhood Pattern and Design - promote more vibrant, livable communities and encourage alternate transit and pedestrian-friendly development
 - Compact Development
 - Diversity of Uses
 - Walk-able Streets
- Green Construction and Technology – reduce the environmental impacts of new construction, conserve natural resources and reduce waste.
 - Reduced Water Use
 - Reuse of Historic Buildings
 - Infrastructure Energy Efficiency
 - Recycled Content in Infrastructure
- Innovation and Design Process – encourage innovative solutions to sustainable challenges and exceptional performance above the requirements of the rating system and

From the Leadership in Energy and Environmental Design Rating System Pilot Program by the Congress for New Urbanism, Natural Resources Defense Council and the US Green Building Council

04.2.1.4 Sustainable Planning Principles

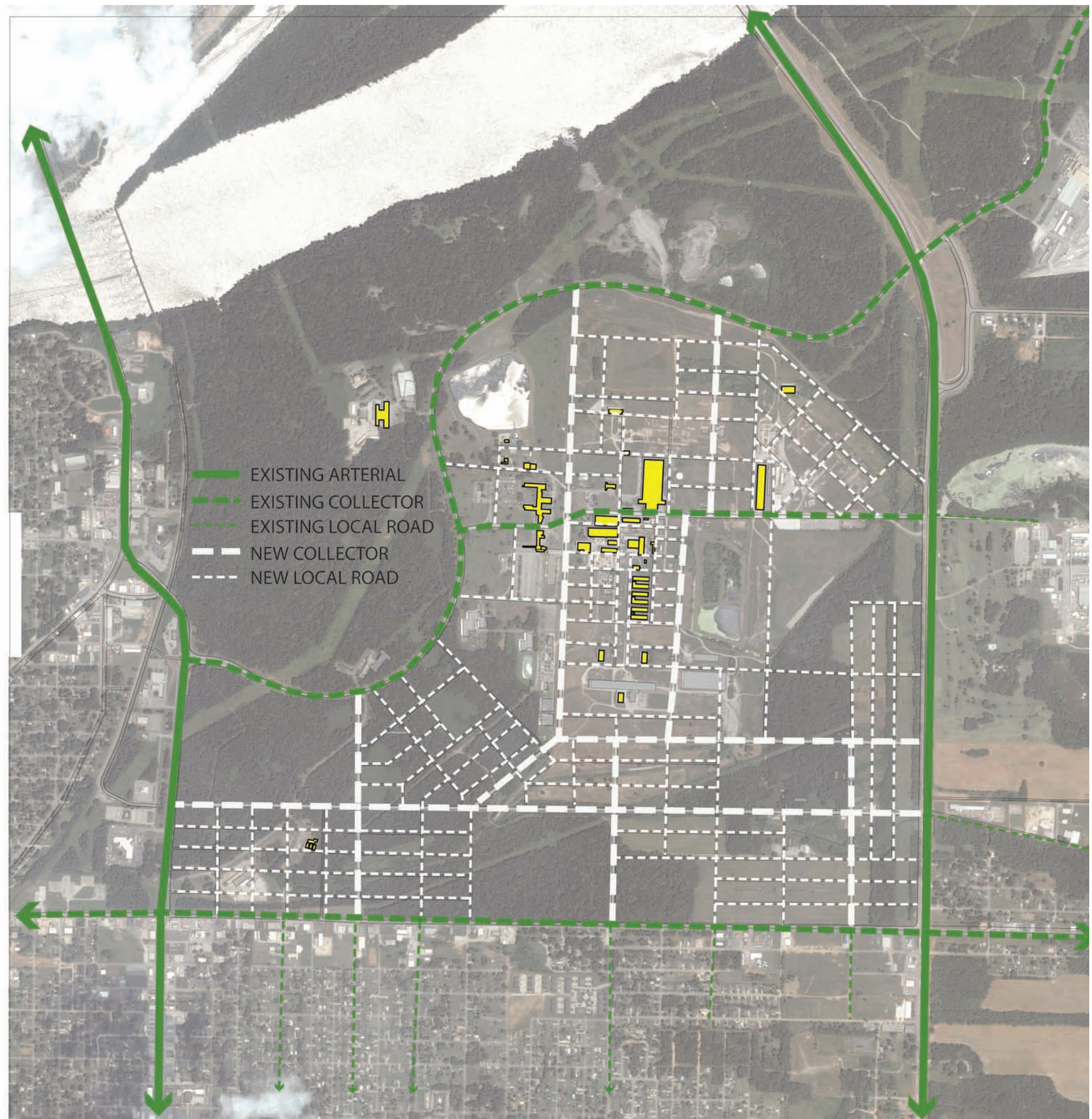
These are some achievable ideas for developing the site in a sustainable manner. The planning team realized the opportunity on the reservation to develop a new model for sustainable development in the region. The following development and planning strategies are from the LEED-ND program, or from other recent sustainable development case studies.

- Remediation and re-use of the current Brownfield (former industrial) areas on the reservation to the extent possible is considered a far more sustainable approach than new development on Greenfield sites (currently vacant land formerly used for farming, natural areas or recreation).
- Adaptive re-use of the existing historic structures is considered more sustainable due to the decrease in waste from demolition and the reduction in new construction, thereby reducing energy consumption, material use as well as waste generation from construction activities.
- Plan for Mixed-uses in the district, Encourage Alternative Transit. This strategy will reduce some of the negative impacts of growth as well as relieve the traffic burden from new development both within the site and from the site to the surrounding areas.
- Use compact planning principles to preserve open space on the reservation for Farming, Wetlands, and Recreational uses. This can be accomplished by promoting low rise and mid-rise vertically integrated mixed-use structures and multi-level single use structures within the districts.
- Develop High-Performance new construction and rehabilitation standards for the design of new structures and adaptive use of the existing structures on the site, such as the USGBC LEED rating system, or the EarthCraft House program. This will encourage energy efficient design, water use reduction, and the use of sustainable or recycled materials
- Develop high performance standards for new or replacement infrastructure (Sustainable Streetscape Designs, Pervious Paving, Recycled Materials, Local Materials, Energy Efficient Infrastructure)
- Use planning and design to encourage pedestrian activity on the site in order to restore and develop a new walk-able street grid network, as well as develop a recreational network of walking paths and trails.
- Develop on-site facilities for both Recycling and Environmental Education
- Utilize innovative storm water management techniques, such as bio-swales, to improve water quality and reduce the speed of run-off from the site, and reduce the quantity and size of underground storm water piping.
- Develop a rainwater harvesting network on the site in order to collect rainwater on the site for irrigation use, and reduce the storm water outflow from new development.

04.2.2.1 Street Network

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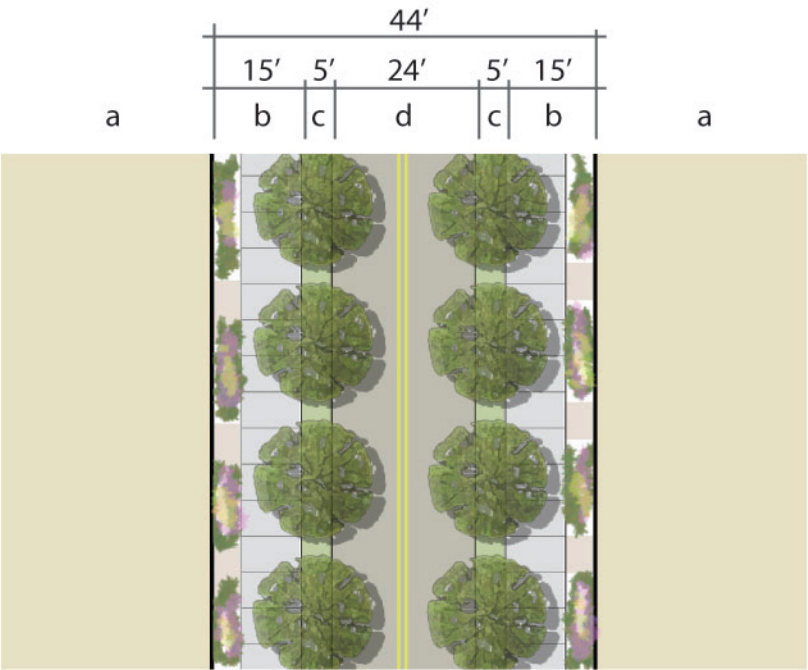
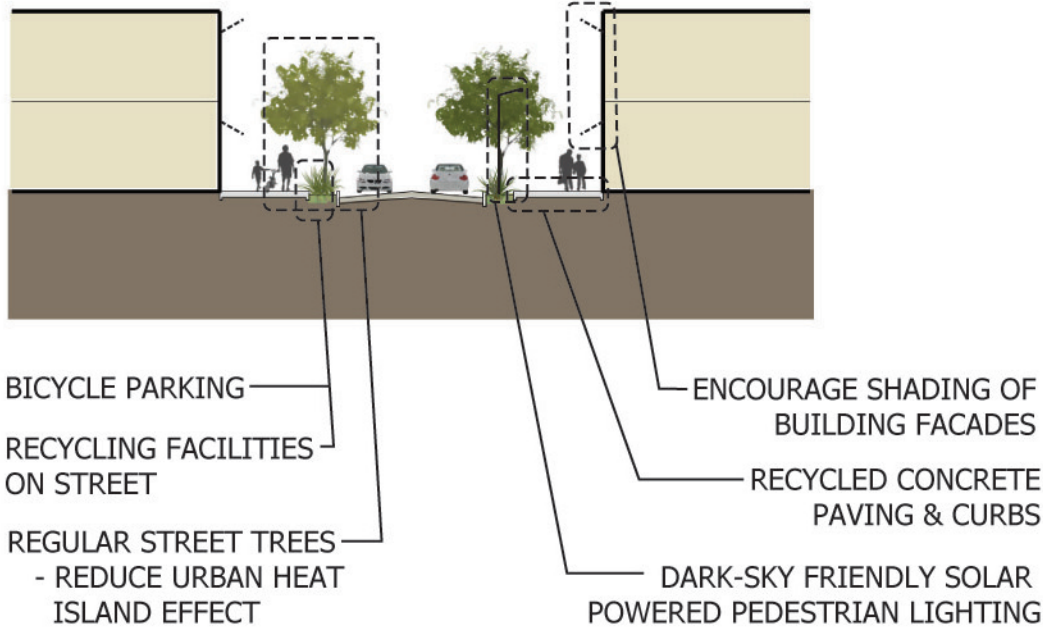
Street Network Diagram
(proposed street types described
in more detail on following pages)



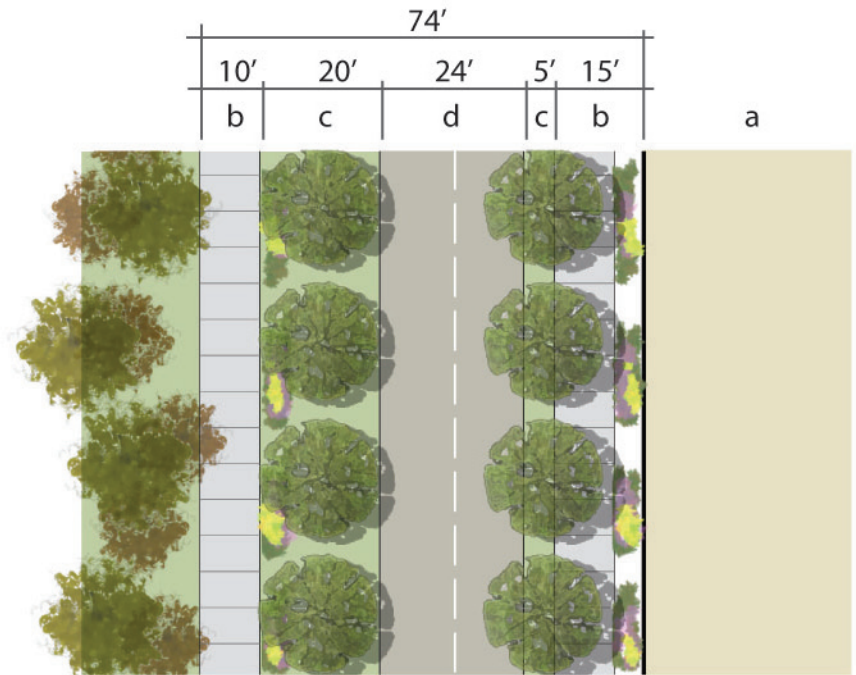
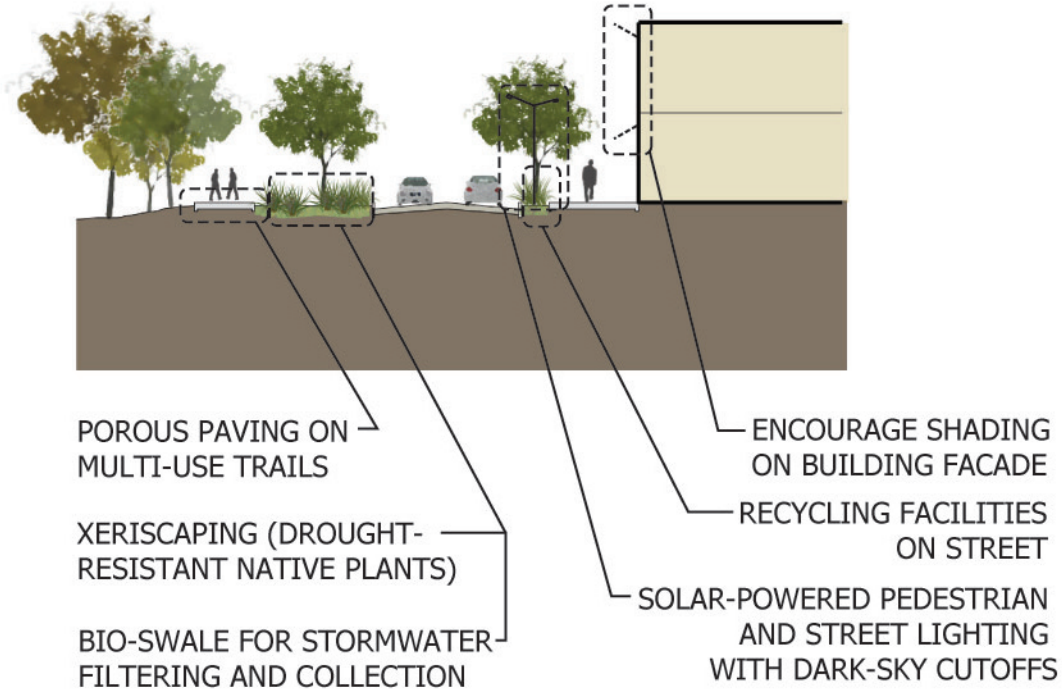
04.2.2.2 Streetscape

These streetscape diagrams illustrate some examples of the sustainable and pedestrian-friendly features that can be incorporated into the street framework. The framework is intended to support a wide variety of potential uses. The significant features include pedestrian-oriented site furnishings, pedestrian-scaled energy-efficient street lighting, generous sidewalk zones that are protected from vehicle traffic by parallel parking and planting zones, bio-swale storm water collection and detention areas, as well as pervious paving on multi-use trails. Refer to the previous pages for proposed locations of the different street configurations on the reservation.

LOCAL ROAD
2-lanes - buildings on both sides

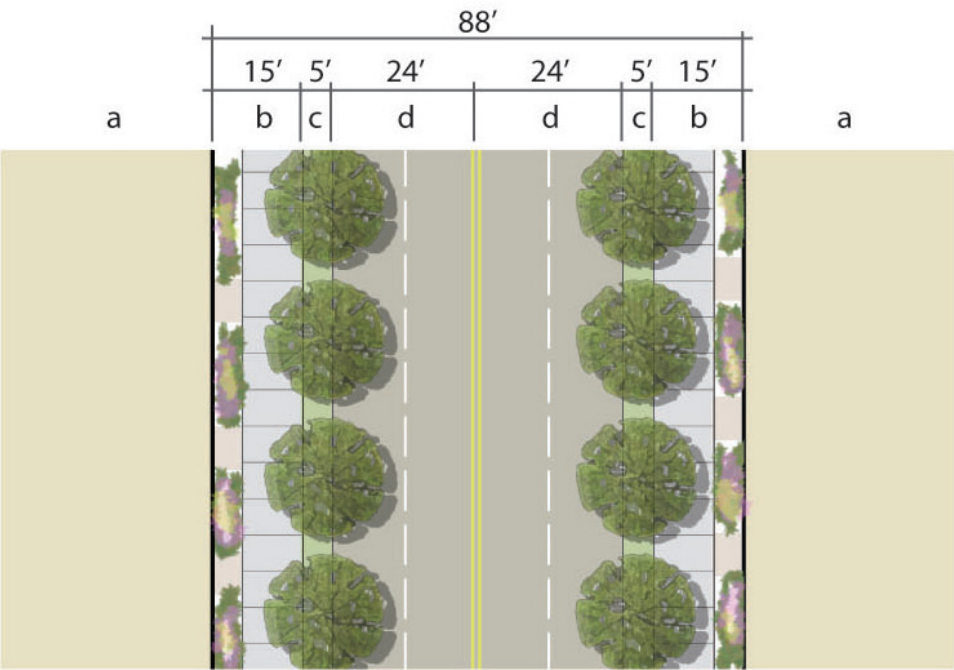
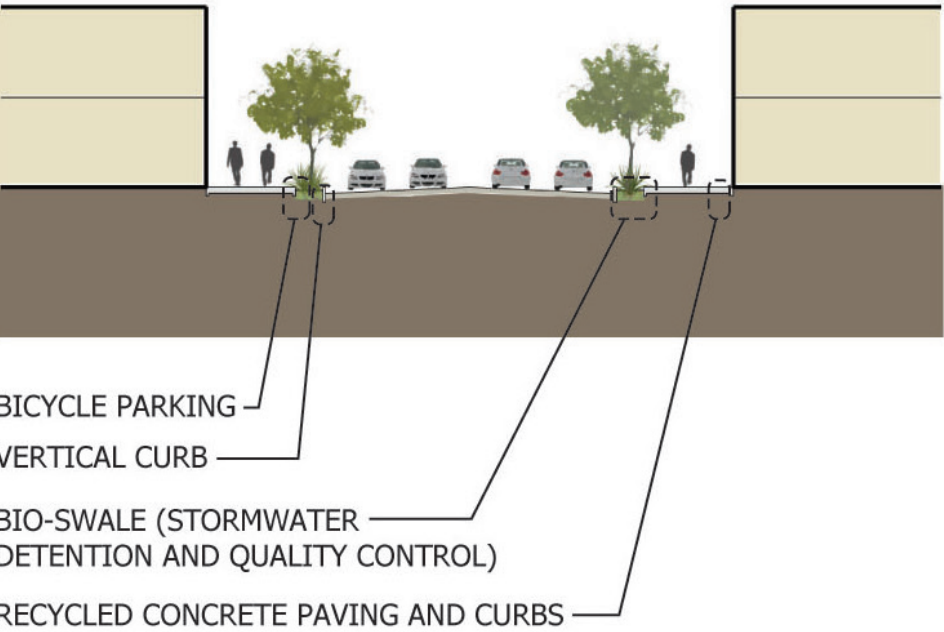


LOCAL ROAD
2-lanes - buildings on one side

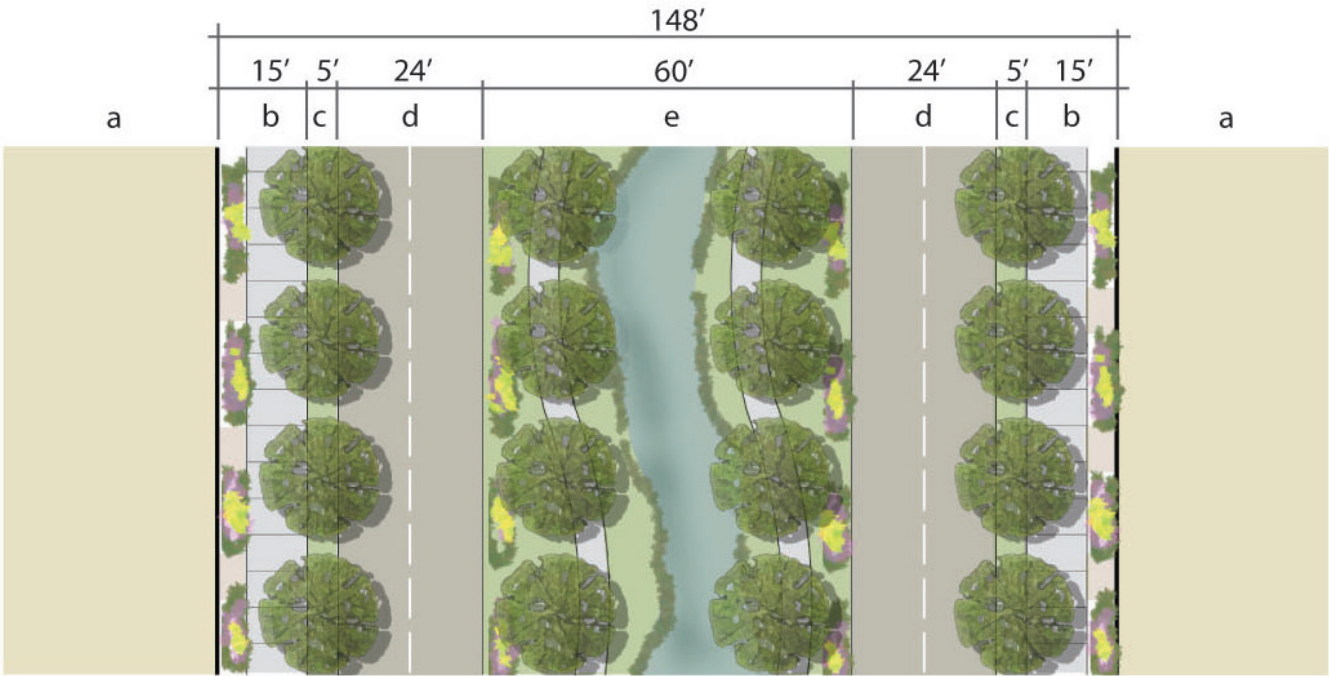
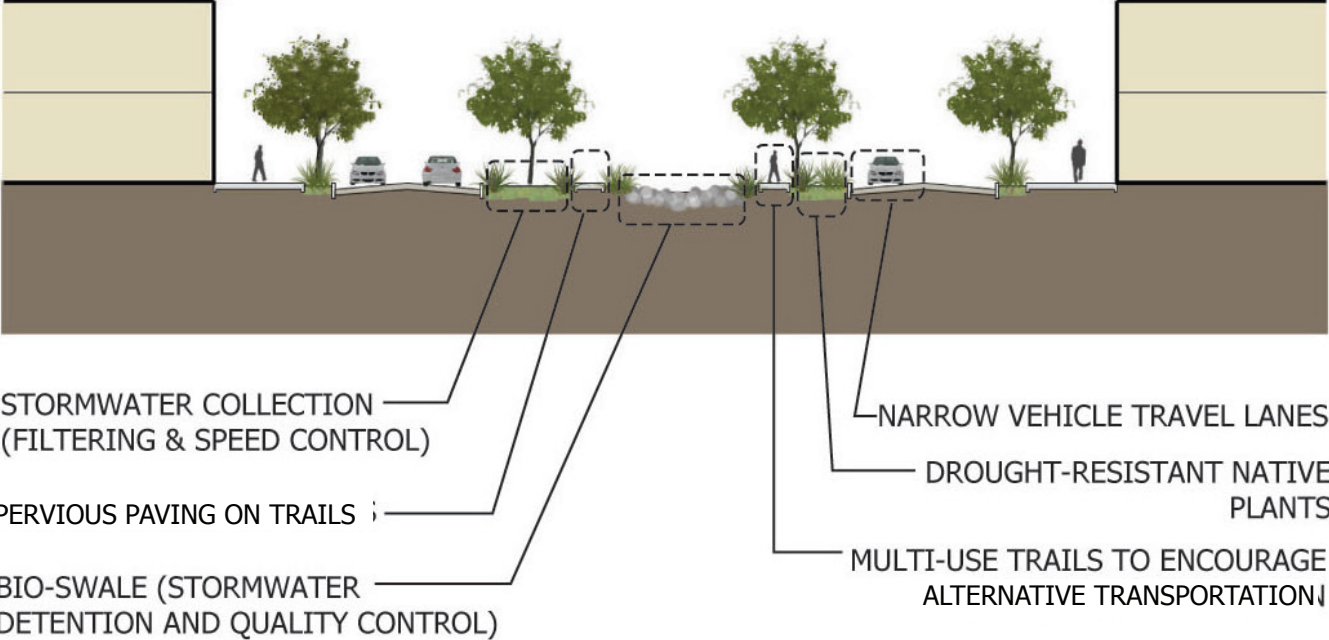


- a. BUILDING
- b. SIDEWALK
- c. PLANTING ZONE
- d. STREET
- e. VEGETATION

COLLECTOR
4-lanes



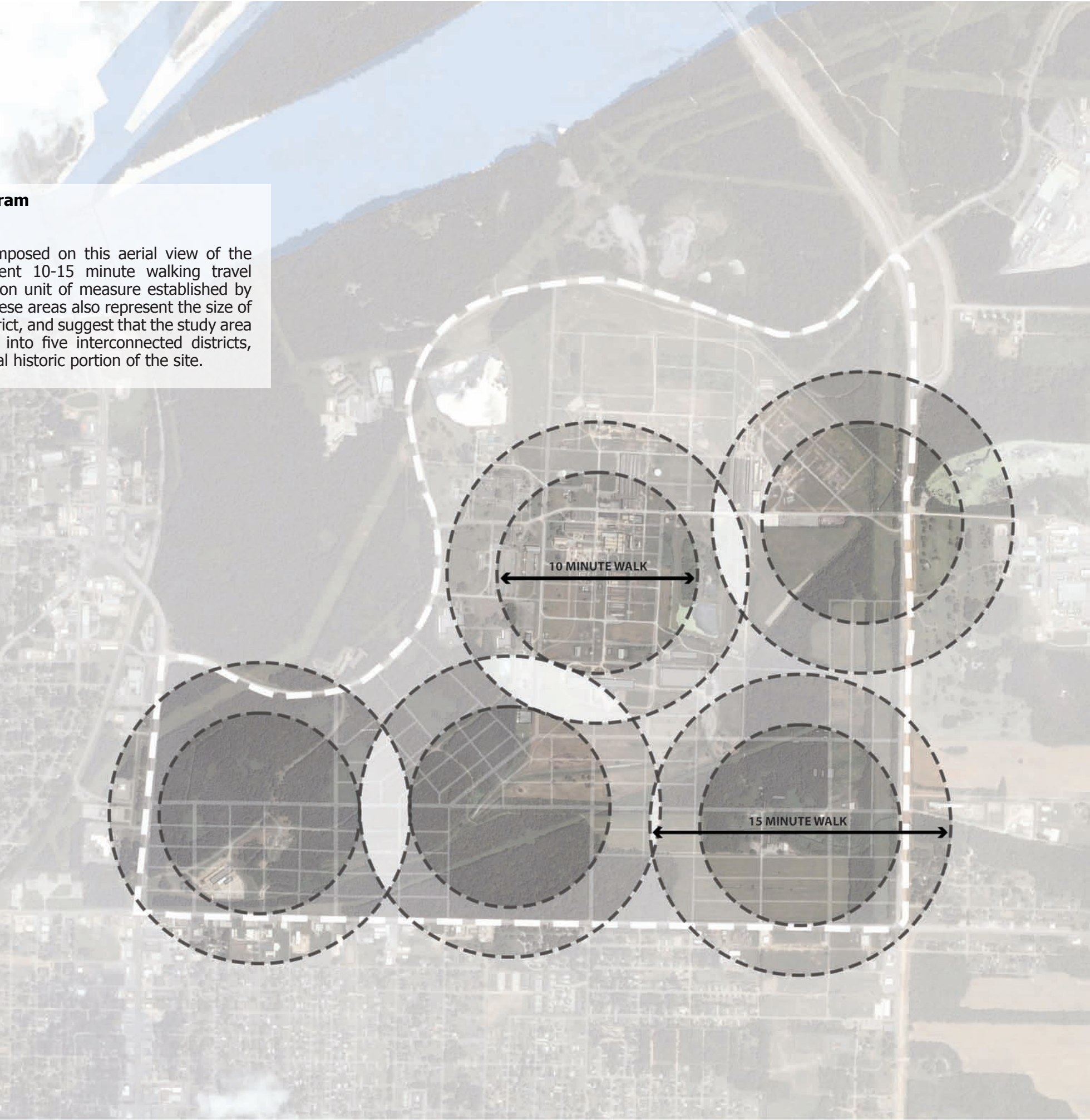
PARKWAY COLLECTOR
4-lanes - vegetation/bioswale between



04.2.2.3

Walkability Diagram

The circles superimposed on this aerial view of the reservation represent 10-15 minute walking travel distances, a common unit of measure established by urban planners. These areas also represent the size of a typical urban district, and suggest that the study area is best subdivided into five interconnected districts, including the central historic portion of the site.



04.2.2.4 District Diagram

Utilizing the walkability diagram as a basis for the design of the master plan and potential development areas, and based on the market study results, the “Districts” were created as specific areas within the property to be developed in a sustainable manner. The constraints of the various issues on the property such as wetlands and easements, determined the specific locations, and the uses were arranged based on surrounding areas in a collaborative effort with RCLCO.



04.2.3 Planning Concepts

04.2.3.1 Site Principles

In developing the concept plan, the design team reviewed the existing site and any issues or limitations, and then utilized an approach that created a plan centering on the core of existing historic structures and then planned the remaining property to inter-connect and complement the heart of the property. Finally, sustainable principles of design were incorporated in all decision-making and unique concepts were utilized to ensure the efficient, economic and long term viability of the Reservation property.

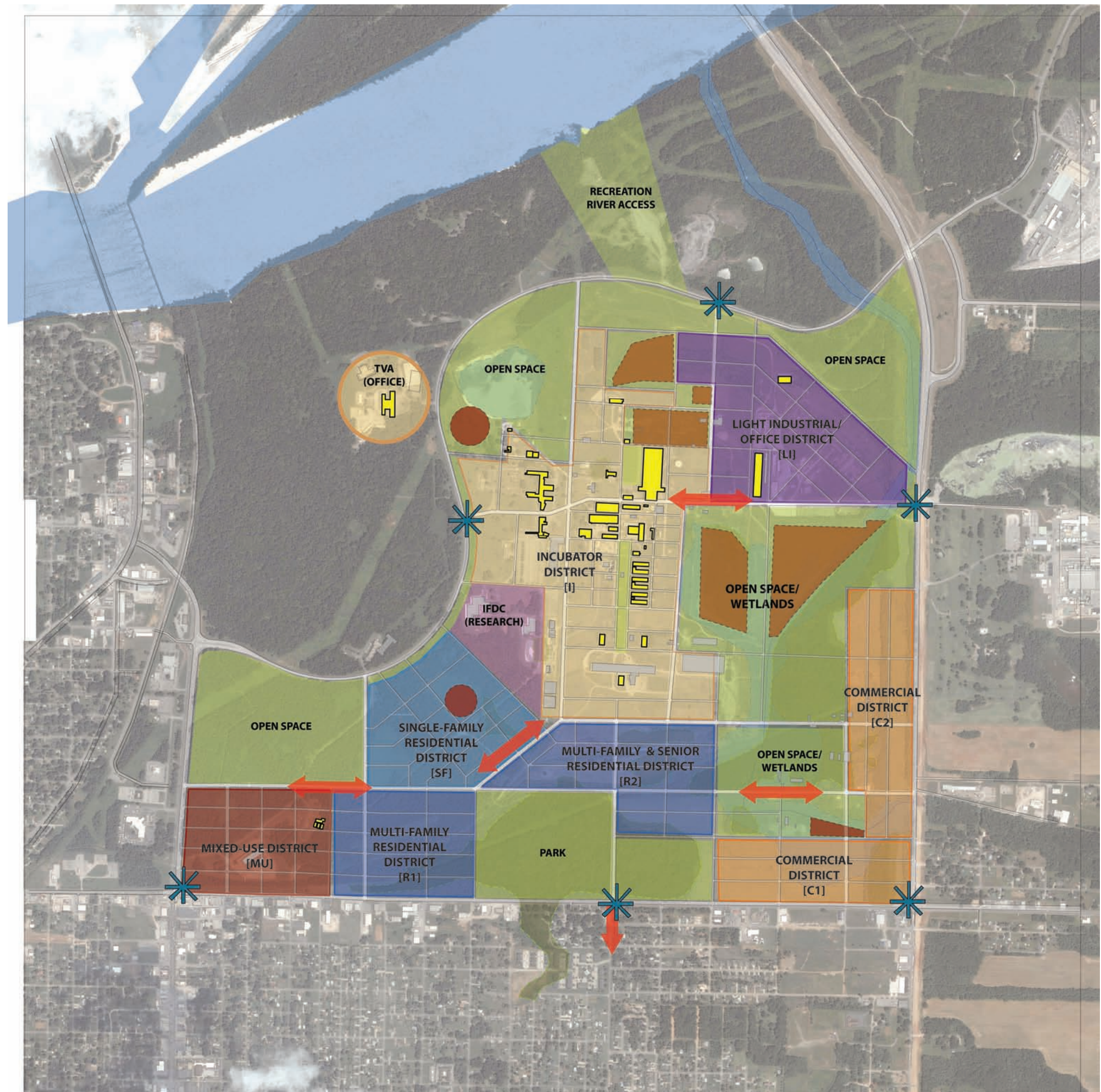
04.2.3.2 Concept Plan

Planning Approach

- Develop a set of Interconnected, Walk-able Districts on the site, based on the uses identified in the Market Analysis
- Re-imagine the original street framework in the Incubator District
- Re-connect the original street grids to the south, east and west of the site
- Integrate the new “edge districts” within the surrounding neighborhoods
- Encourage density in the connected Districts, and preserve the wooded, natural character of the site
- Create access to the River, and connect to the Districts

Sustainable Planning Principles

- Brownfield Site is an Advantage (Brownfield Remediation)
- Adaptive Re-Use of Existing Historic Structures
- Plan for Mixed uses, Encourage Alternative Transit
- Use Compact Planning to Preserve Open Space – Farming, Wetlands, and Recreation
- Develop High-Performance New Construction and Rehabilitation Standards for the Site
- Develop High Performance Infrastructure Standards (Sustainable Streetscape Designs, Pervious Paving, Recycled Materials, Local Materials, Energy Efficient Infrastructure)
- Restore and Develop new Walk-able Street Grid Networks
- Facilities for Recycling and Environmental Education On-Site
- Innovative Stormwater Management



■ planning

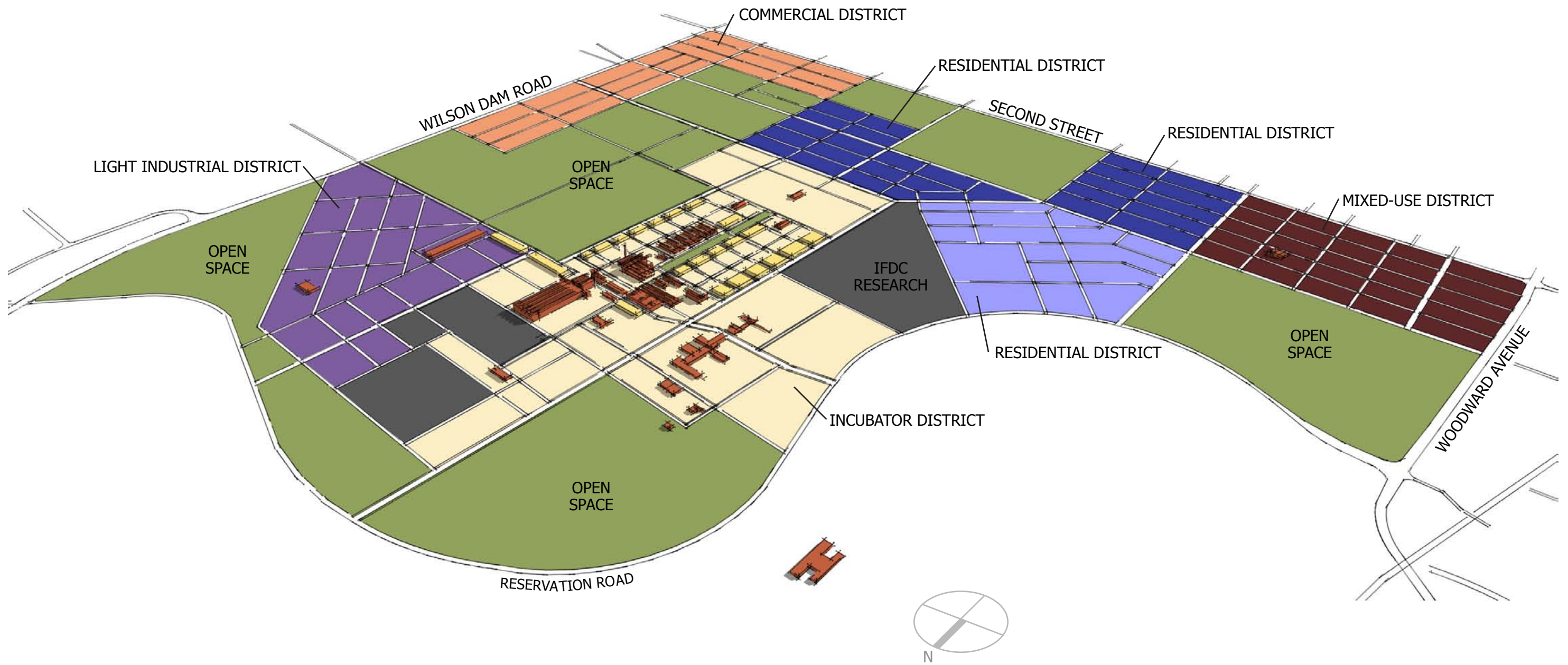
04

Planning Strategy
planning concepts
districts

04.2.3

Districts

On the following pages, we will walk through each of the proposed development districts in greater detail. The districts are interconnected by the proposed street framework and sized to meet the development program outlined in the Market Assessment, protect open spaces and wetland areas outside of the districts, as well as preserve a target percentage of open space within each individual district.



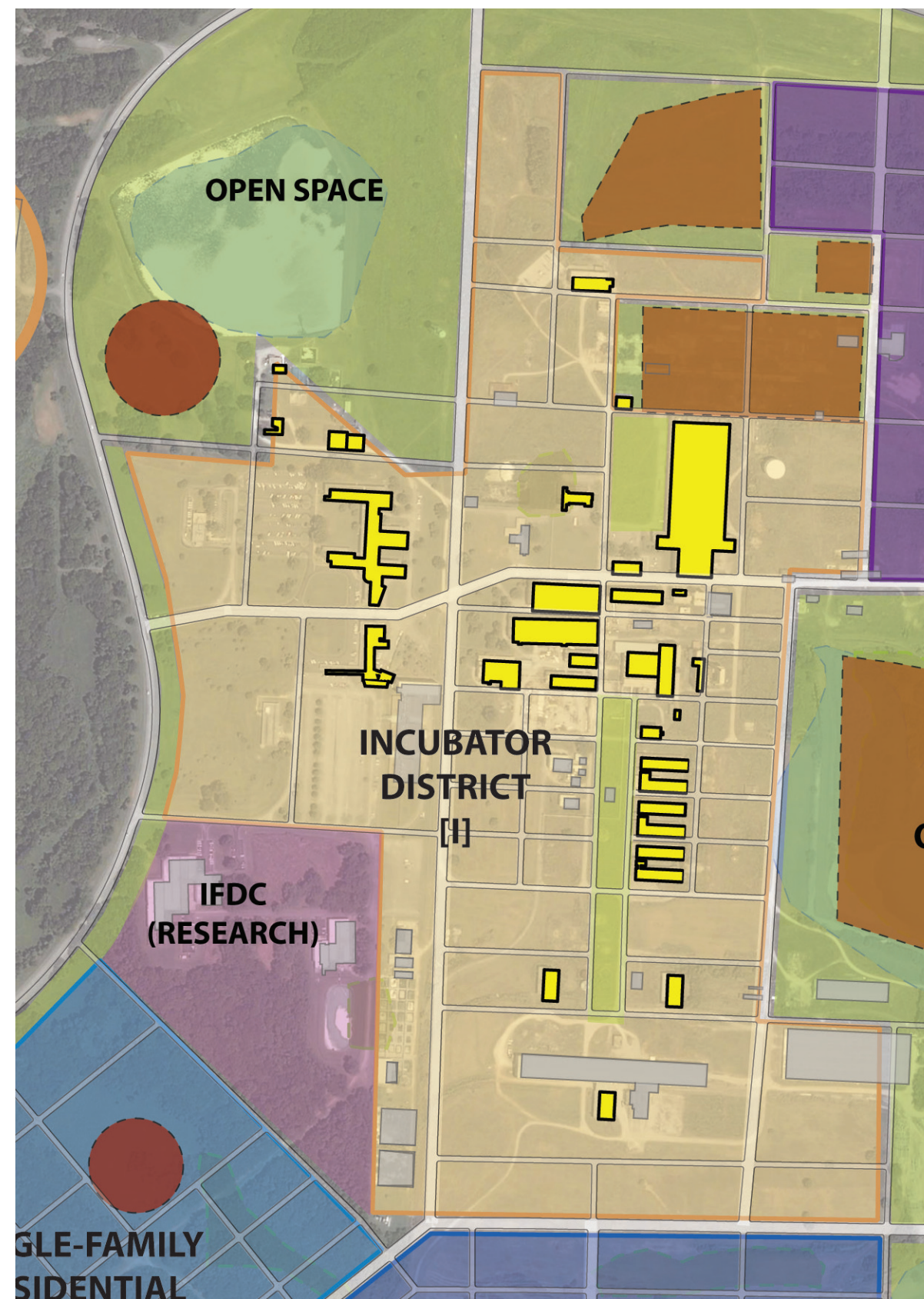
04.2.3.3a

Incubator District

Located on 21 acres in the center of the Reservation, the Incubator District is made up primarily of the 57 historic structures that are part of this study, as well as a few others in the general area. The Market Study identified this area as the heart of a Research and Development area that would provide small, innovative companies to benefit from an Incubator approach that promotes collaboration to build concepts into realities. The character of these buildings and their ability to be adapted to a number of uses, make for an opportunity to create flexible and creative spaces that typically draw high-tech and design related professionals. This District is the critical piece of the entire 1340 acres and must be redeveloped prior to any other areas of the property. Along with the creative office uses, support activities such as coffee shops, restaurants, dry cleaners and other support services to the office would be created within the building structures as well. Utilizing the concentration of existing structures and taking advantage of their historic character establishes an area that provides a unique character and provides a sense of place. Combined with strong urban design components, this area could take on the feel of a central city of an historic nature and seem as it has been a “downtown” for decades.



Total Area: 225 Acres
Proposed:
Existing: 765,650sf
New Const: 471,350sf
Open Space: 30% (68 Acres)



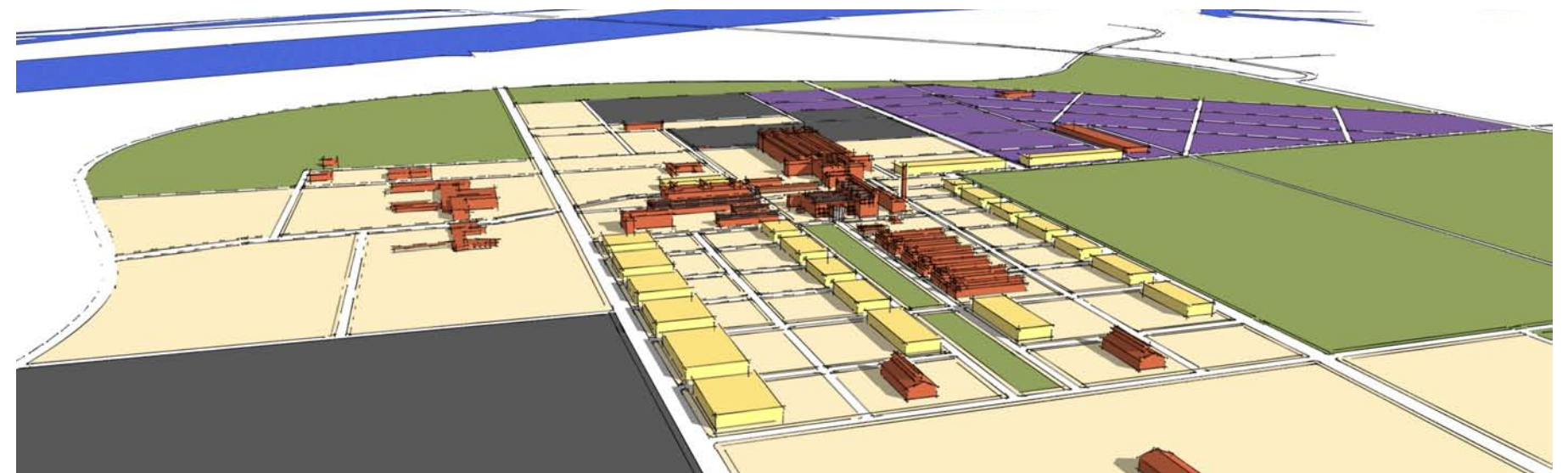


Incubator District Enlarged Concept Plan



Incubator District Perspective View

The Incubator District plan allows for significant open space creating public gathering places and defining the district as the center of the Reservation. The streets and sidewalk areas would be designed with street trees, street furniture and period lighting as well as crosswalk identification details to ensure the area has an identity and becomes the heart of the community. Existing structures are promoted through urban design techniques that bring focus to the history and character of the buildings as they are integrated into the street network.



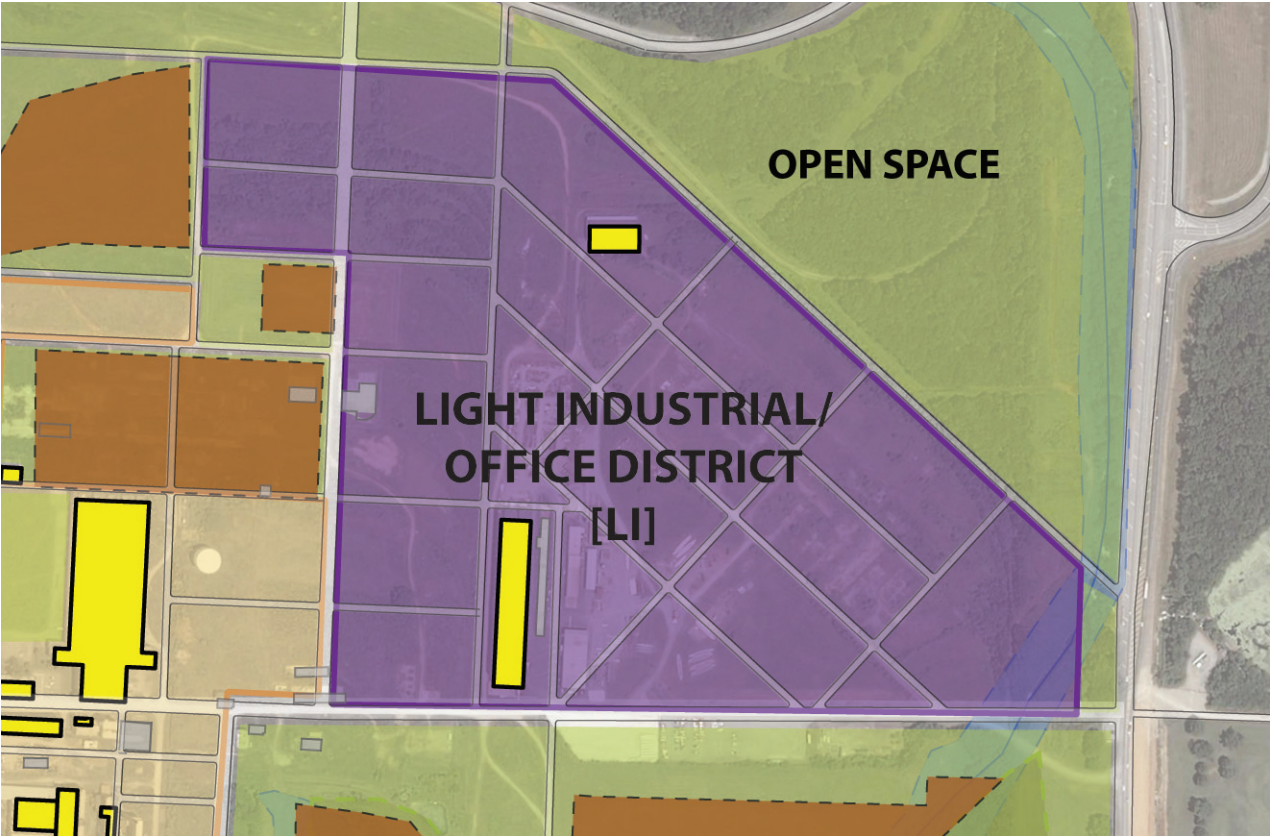
Incubator District Aerial

04.2.2.3b

Light Industrial District

The northeast portion of the property is proposed to be a Light Industrial District that is initiated out of support to the Incubator District. Consisting of 104 acres, this area has a few existing industrial type structures along with 2 considered historic however the concept plan suggest that the area would become a new construction light industrial district that at a minimum serves the Incubator District to allow expansion for those businesses that need larger square footages and for more typical industrial uses. Additionally, having an inexpensive building type for a development entity, allows for the a balance in the pro-forma business analysis, providing more potential viability of the development.





Total Area: 94 Acres
Proposed: 601,000sf
Use: 30% (28 Acres)
Open Space:

04.2.2.3c

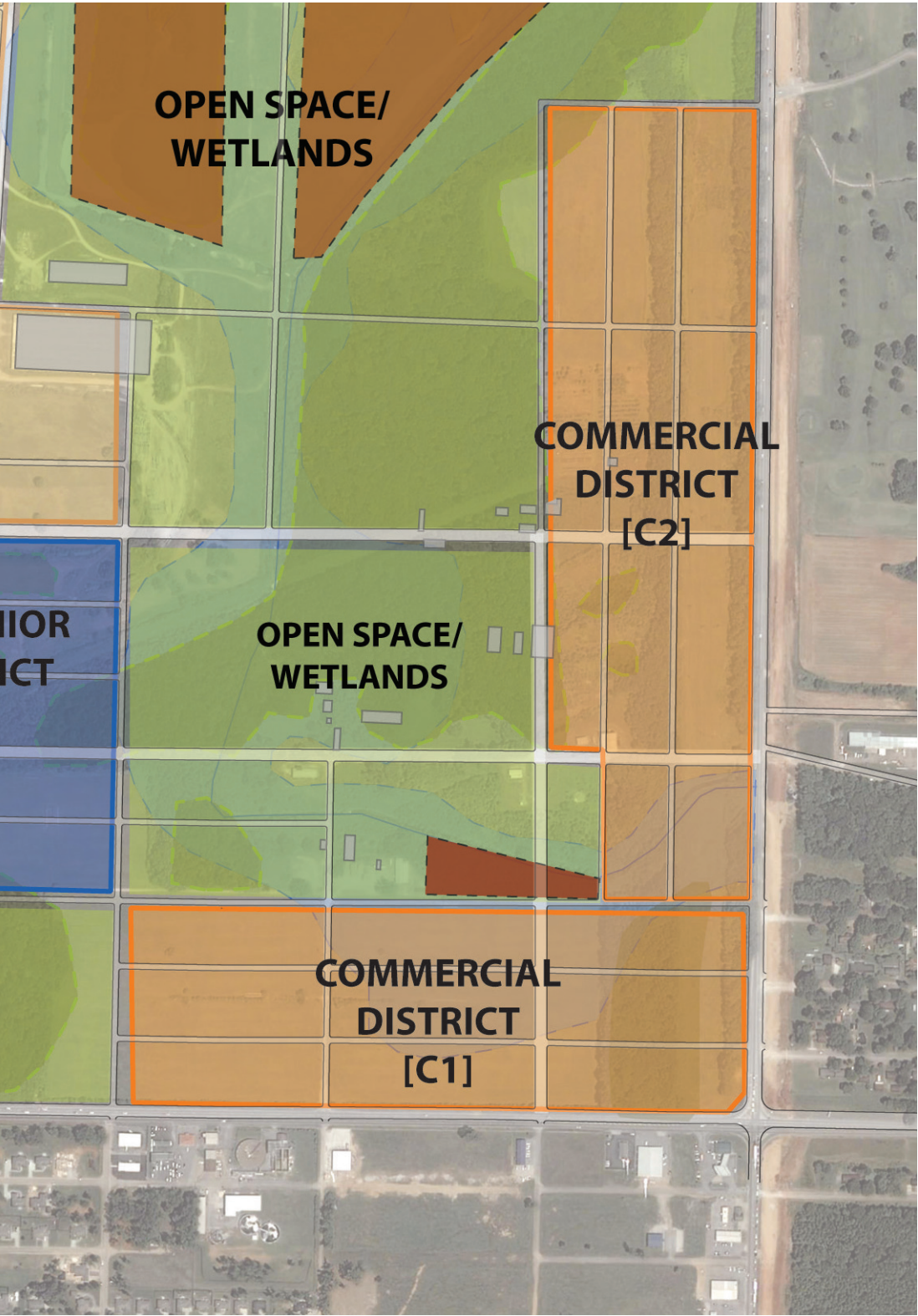
Commercial District

Upon the establishment and significant build out of the Incubator and Light Industrial Districts, the first concentration of commercial retail and office would occur at the busy southeast corner of Highway 133 and 2nd Street. This area has approximately 96 acres in two sections that would consist of more traditional retail of one and two stories. The retail would primarily consist of support services and as a result would have some support office that might offer medical office, law and accounting firms.



Total Area:	52 Acres
Proposed:	
Retail:	50,000sf
Office/Hotel:	270,000sf
Open Space:	30% (16 Acres)

Total Area:	49 Acres
Proposed:	
Retail/Rest:	45,000-75,000sf
Office/Hotel:	160,000sf
Open Space:	30% (15 Acres)

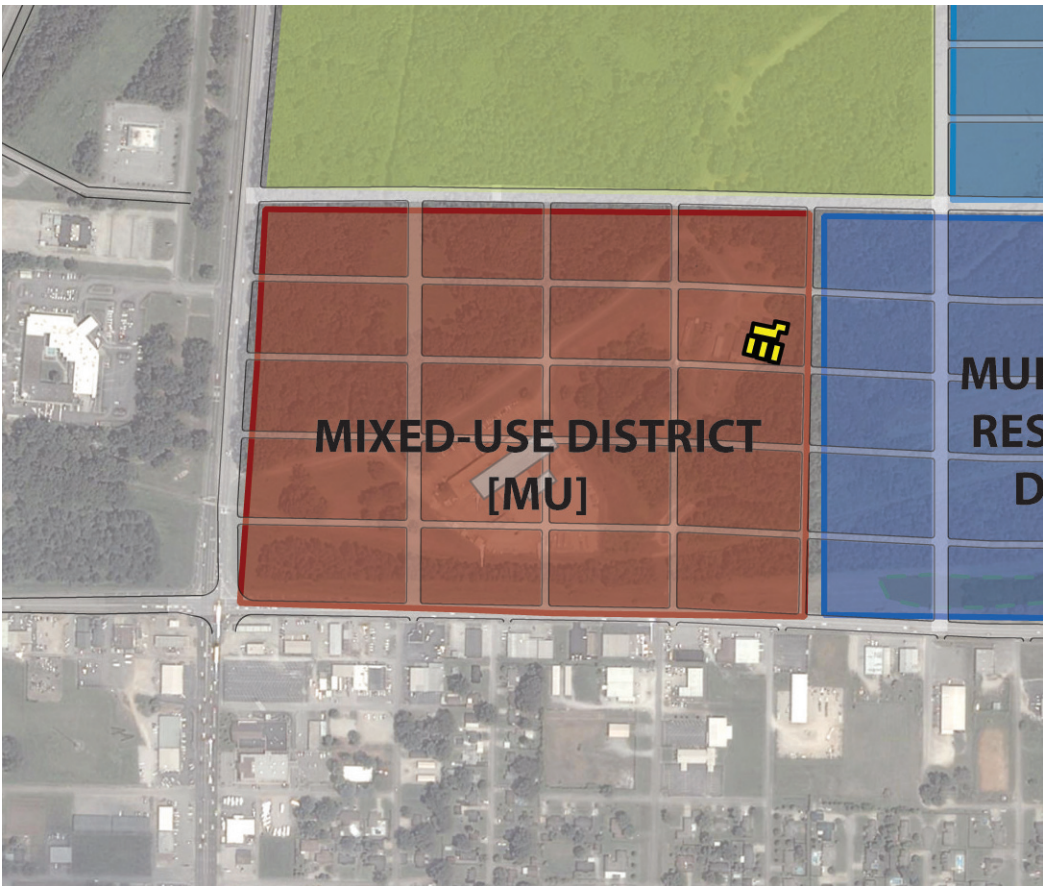


04.2.2.3d

Mixed-Use District

The Mixed Use District would be developed on 61 acres of the southwest portion of the Reservation. Located at the prime commercial corner of Woodward Avenue and 2nd Street and at the connection of Muscle Shoals and Sheffield, this vibrant district would serve to provide the most significant mix of uses including, retail, office, hotel, residential and even entertainment. The area would consist primarily of mid-rise structures and have the highest density urban character of any of the district within the Reservation.





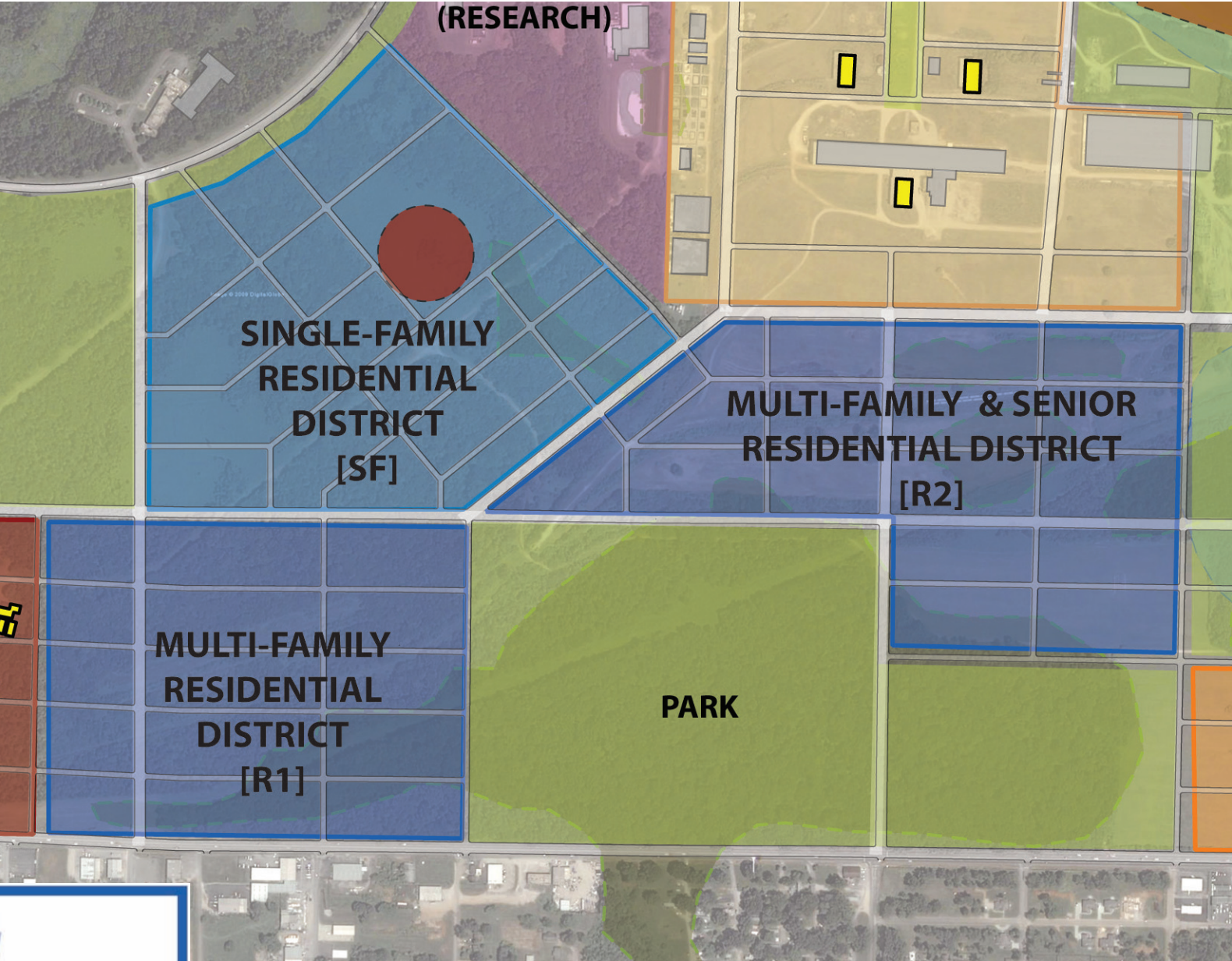
Total Area:	61 Acres
Proposed:	
Residential:	500 Units
Hotel:	200 Keys
Retail:	350,000sf
Entertainment:	45,000-75,000sf
Boutique Office:	50,000-100,000sf
Open Space:	30% (21 Acres)

04.2.2.3e

Residential Districts

There are 3 distinct residential districts within the concept plan and primarily consists of multi-family properties. The densest area of housing would be located along 2nd Street next to the Mixed Use District. Planned for 360 units on 44 acres, this district would accommodate conventional multifamily development. The largest number of residential units would be located in the area just below the Incubator District, having 620 units on 74 acres, and is planned to accommodate townhomes, apartments, condos and also senior housing of various types. The wooded area that fronts Reservation Road is planned for approximately 300 single family homes on lots that would be designed to preserve as many of the trees as possible. Placed on 76 acres, these homes could be designed to reflect historic character of the local residential architecture, take advantage of the amenities the other districts have to offer, and create a distinctive community for the Shoals.





Total Area: 74 Acres
Proposed:
Multi-Family: 340 Units
Senior: 200 Units
Open Space: 30% (25 Acres)

R1

Total Area: 44 Acres
Proposed:
Residential: 360 Units
Retail: 45,000sf (max)
Open Space: 30% (15 Acres)

R2

Total Area: 72 Acres
Proposed:
250 Houses
Open Space: 30% (22 Acres)

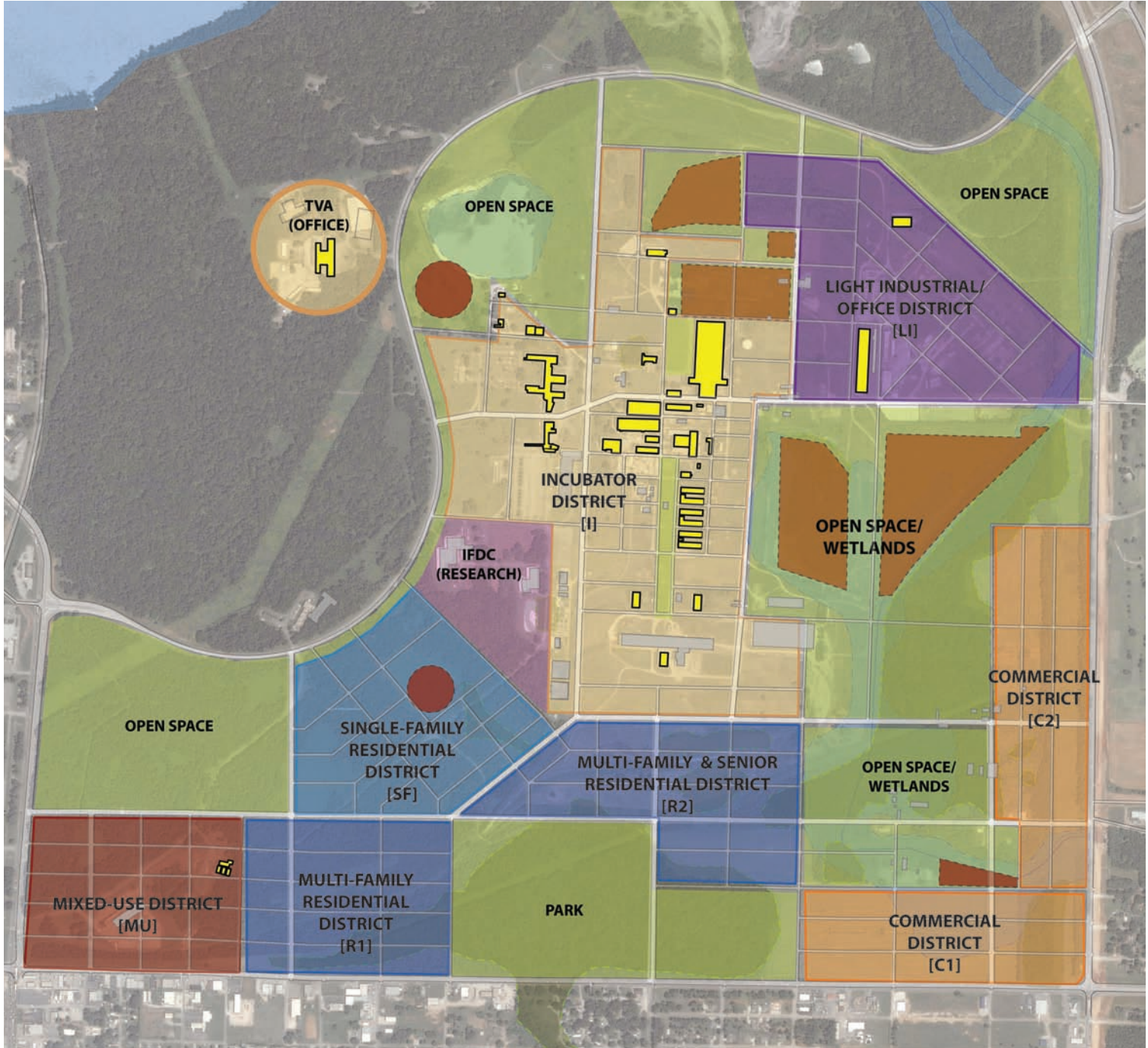
SF

04.2.2.3e

Park/Open Space

The most dominant land use on the Reservation in this concept plan is park and open space. Of the 1340 acres, approximately 865 acres (64%) of the property are proposed to remain as open space. Furthermore, another 142 acres within the various developed districts are proposed as parks and open space space, resulting in 30% of the land in each district being green space. The net acreage of open space is approximately 1000 of the total 1340 acres. This design approach, using compact design techniques, will preserve the existing character of the site, bring a unique aspect to the redevelopment of the Reservation, while improving the marketability of the site.





04.2.2.4 **Phasing Concept**

The number and scale of the buildings combined with total acreage of the site, demands the property be developed in a practical and planned manner. Therefore, LAS and RCLCO collaborated to combine appropriate planning and urban design concepts with market demands and anticipated land uses, to create a logical phasing approach to the development plan.

Phase 1 consists of the central area of the property where existing structures now exist with Phase 1B connected and located just to the northeast of the center.

Phase 2 is located at the southeast corner at the intersection of highway 133 and 2nd Street. Phase 2B is connected and located at the northwest edge of the property.

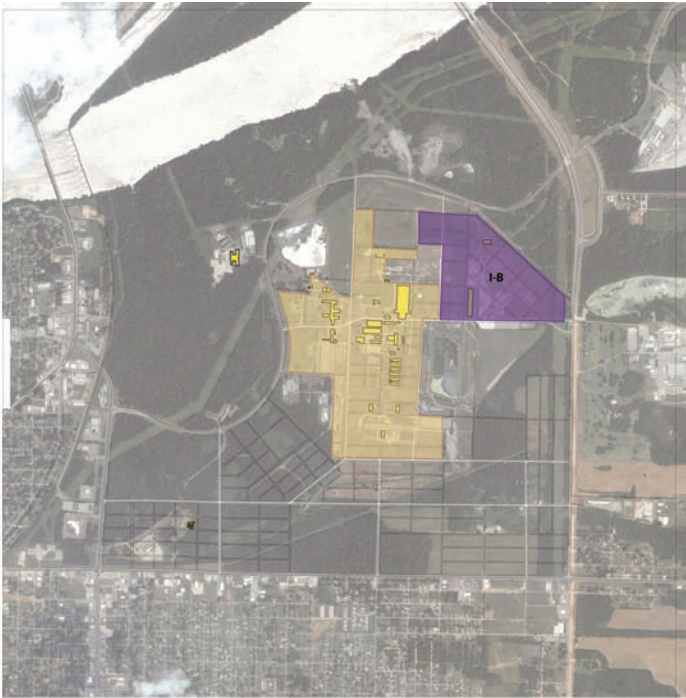
Phase 3 is a larger area located at the southwest corner at 2nd Street and Woodward Avenue and spreads east and northeast as Phase 3B and 3C.

Phase 4 is a wooded area located West of the Incubator District. These areas represent the potential development that could occur over the 20 year phasing plan outlined in the Markey Study.

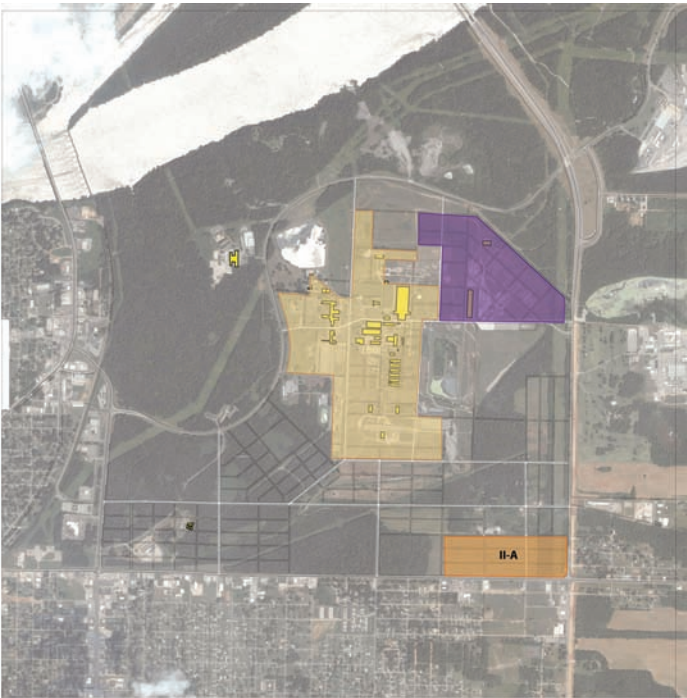


phase 1

I-A

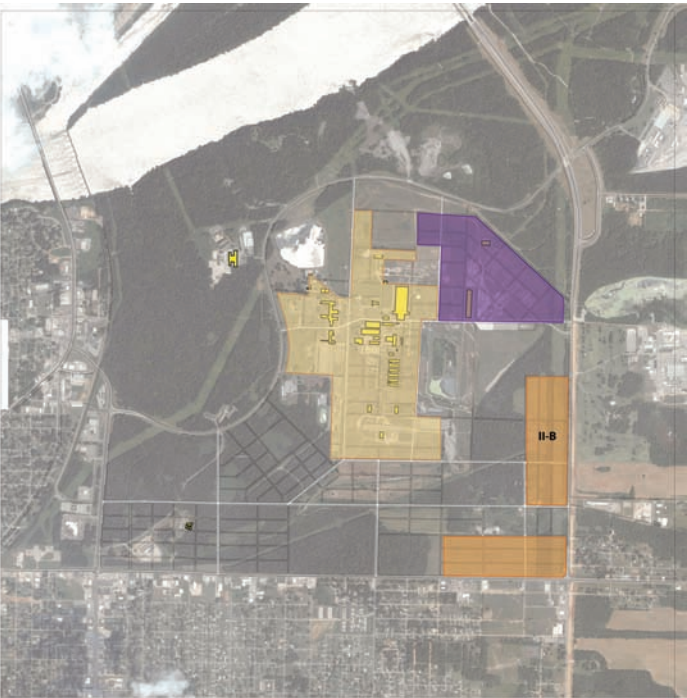


I-B

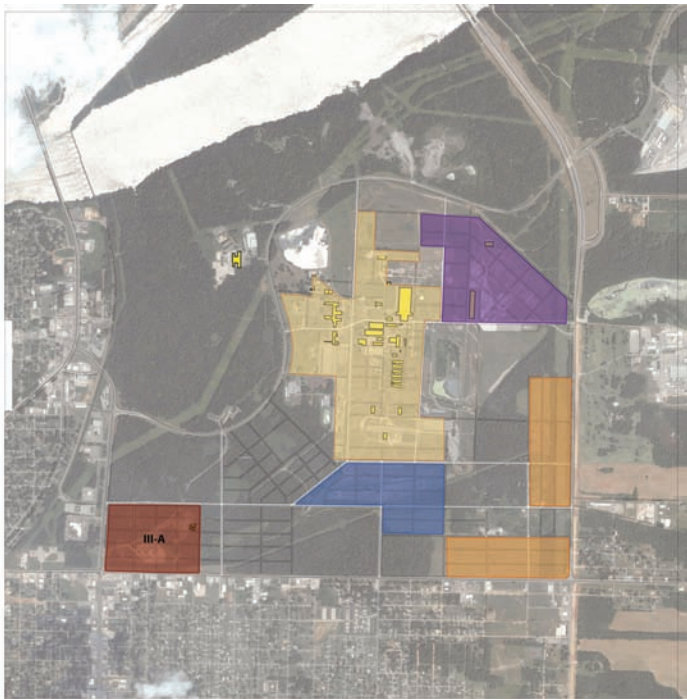


phase 2

II-A

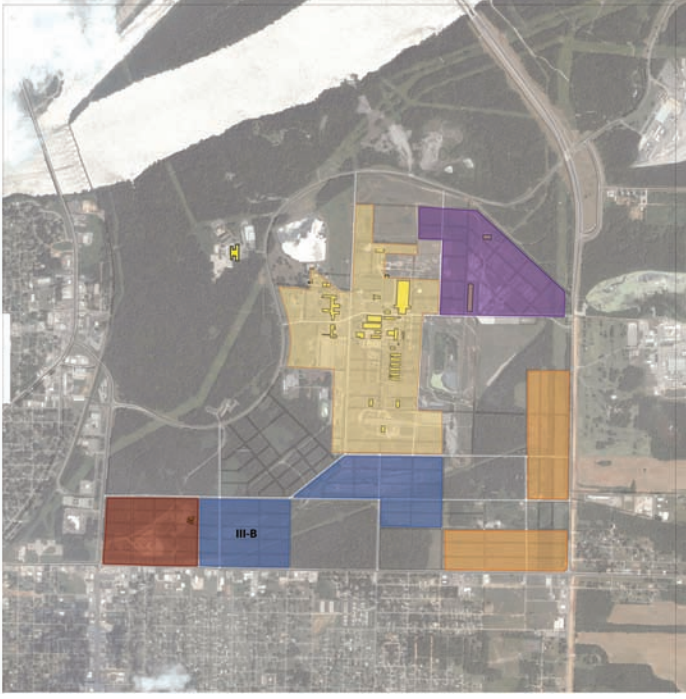


II-B

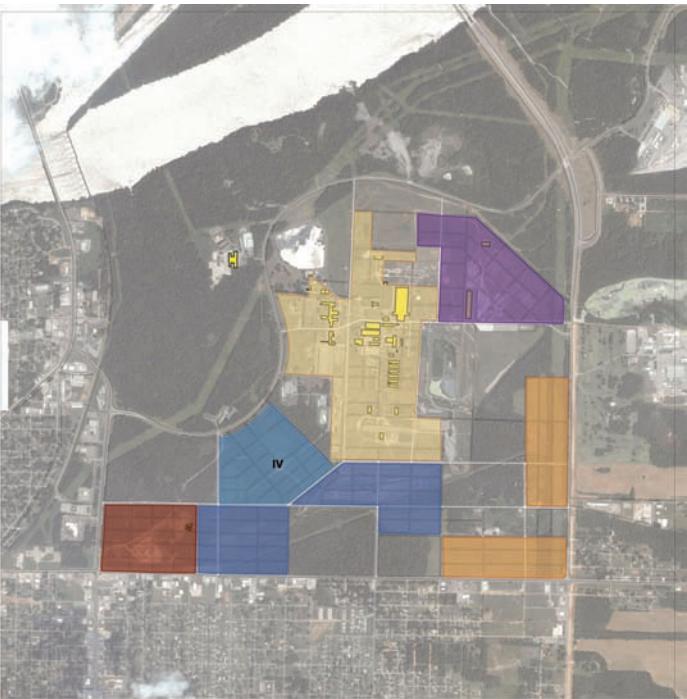


phase 3

III-A

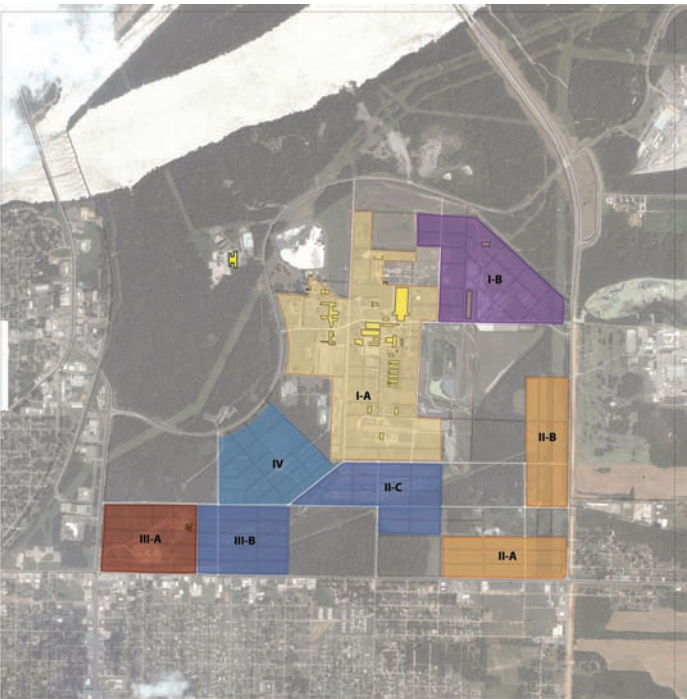


III-B



phase 4

IV-A



completion

05 Implementation – Next Steps

The Adaptive Re-Use Study serves as a basis point for the Tennessee Valley Authority to better understand the development potential for the existing structures as well as the balance of the 1340 acre study area. Long-term development of the reservation will require TVA to work in tandem with the adjacent municipalities, as a sale of the property is not likely to occur unless the municipalities agree to be responsible for the property. Recently the cities of Muscle Shoals, Sheffield, Tuscumbia and Florence, along with Colbert and Lauderdale counties, created the Northwest Alabama Cooperative District (NACD). TVA and the NACD are intending to establish a cooperative agreement to determine the relationship going forward and the role of NACD. The nature of this agreement will have a significant impact on the future of the property.

TVA and NACD should determine next steps to ensure the concept plan developed in this Adaptive Re-Use Study becomes viable. The concept plan developed in this study provides a broad view of the potential development of the reservation based on the Market Analysis. A viable plan requires an open and comprehensive process in order to incorporate the ideas and input from the many stakeholders that will eventually benefit from development activity on the Reservation property. The team recommends that TVA and NACD work together to create an initiative to develop a Shoals Reservation Comprehensive Planning Program.

05.1 The Muscle Shoals Reservation Comprehensive Planning Program

Public Participation Process

The Shoals Reservation Comprehensive Plan should have a number of components, with the most important being a “public participation” process. In our experience, an effectively managed public process can be effective in generating public interest in the property and its future, as well as providing ideas and potential solutions to particular planning challenges. Stakeholder Group input, consisting of local community groups, is invaluable, as agencies and organizations that are critical to the success of the Shoals community can provide significant and valuable information. Additionally, these stakeholder groups are able contribute to the strategic understanding of any issues that must be addressed during a successful redevelopment of the Reservation property. The process consists of a series of coordinated public meetings with structured agendas that allow for an exchange of input and information. Referred to as the “Charette” approach, it includes an explanation to the public as to how their input is incorporated into the Master Plan, while simultaneously promoting effective feedback from the public. More strategic and targeted focus group meetings can be planned to allow the Stakeholders to participate in detailed assessment of the Master Plan as it is developed.

Comprehensive Master Plan

The Comprehensive Plan will consist of a series of narratives and design illustrations that represent the ideas derived from the Public Participation Process and the Stakeholders input. The Comprehensive Plan process schedule would range from 6-12 months, provides a significant amount of time for TVA and NACD to learn more about potential options for the property, while also developing a business relationship that will be beneficial in leading to productive solutions, including definition of specific terms for the sale of the property and the future roles of each.

Adaptive Use Cost Estimates for Select Buildings / Developer Review

The 57 historic buildings in the Incubator District are physically located at the core of the property, and exist as a significant resource for marketing the Reservation. The financial viability of the re-use of the structures is critical information to the due diligence process that a development partner will need to evaluate to determine their level of interest. Therefore, an important next step would be to select an appropriate sample number of buildings of various type and condition, and do a detailed design and cost estimate, while also placing each into a model pro-forma that can be analyzed in a due diligence scenario. This vital information will assist in marketing a property with unique structures that have varying levels of adaptability, and ensures that all potential concerns have been answered. In addition, this step provides an opportunity to involve select developers to review the building cost estimates along with all property information, and to provide a critical analysis of the development potential.

Design and Development Criteria

Several more components are important for the eventual development of the Study Area and the existing buildings. Creation of the following design guidelines and development controls should be considered:

- Historic District Nominations and Guidelines
- Architectural and Design Review Guidelines
- Smart Growth and Development Controls
- Zoning Overlay District Guidelines
- Sustainable and LEED ND and Building Guidelines

Completion of these tasks will represent a level of commitment to a proper and sustainable development of the Reservation property, and will contribute to a competitive site marketing program and package.

05.2 Fiscal and Economic Development Impact Analysis

A critical factor in finding solutions for the future development of the Reservation property lies in the determination of the financial as well as economic impact on the area, more specifically the municipalities. As stated previously, the NACD or “District” will become responsible for the property at some point in time, and therefore it is vital for the leaders of both TVA and the District are clear on the potential revenues and expenses attached to the transfer of the property. The Fiscal and Economic Development Impact Analysis will serve to answer these issues and in the process aid in building the relationship between TVA and NACD. Detail numbers and formulas that would be based on financial assumptions derived from realistic expectations for development, and drawing on the Market Analysis in the Adaptive Re-Use Study, will produce a working document that highlights potential terms for an agreement between TVA and NACD.

Public Private Partnerships - Financing Options and Strategies

Current economic conditions make it more difficult to encourage development on the Reservation property. As a result, creative solutions will be necessary to compete with other areas in the country that are attempting to attract researchers, businesses and industries that might consider locating to Northwest Alabama. Public Private Partnerships (PPP) have for years been a part of a healthy and dynamic development area, industrial or technology park. The proper legal structure of a PPP can allow for numerous financial incentives to be implemented in the competitive recruitment process. The PPP options and potential strategies for implementation would be a significant component of the Fiscal and Economic Development Impact Analysis.

Marketing and Public Relations Strategy / Package

It is important to produce a package that promotes the assets and advantages of the Reservation property. Once TVA has completed the Comprehensive Master Plan as well as the other items mentioned in this section, it will have a competitive marketing package that answers any and all issues that a potential development entity would find valuable for their decision making. In a highly competitive national and international economic development arena, addressing all questions and concerns of a potential development partner will provide the Reservation with a competitive edge, and lead to a positive future for the property and the Shoals Area.

a c k n o w l e d g e m e n t s

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