FINAL REPORT
JUNE 2020

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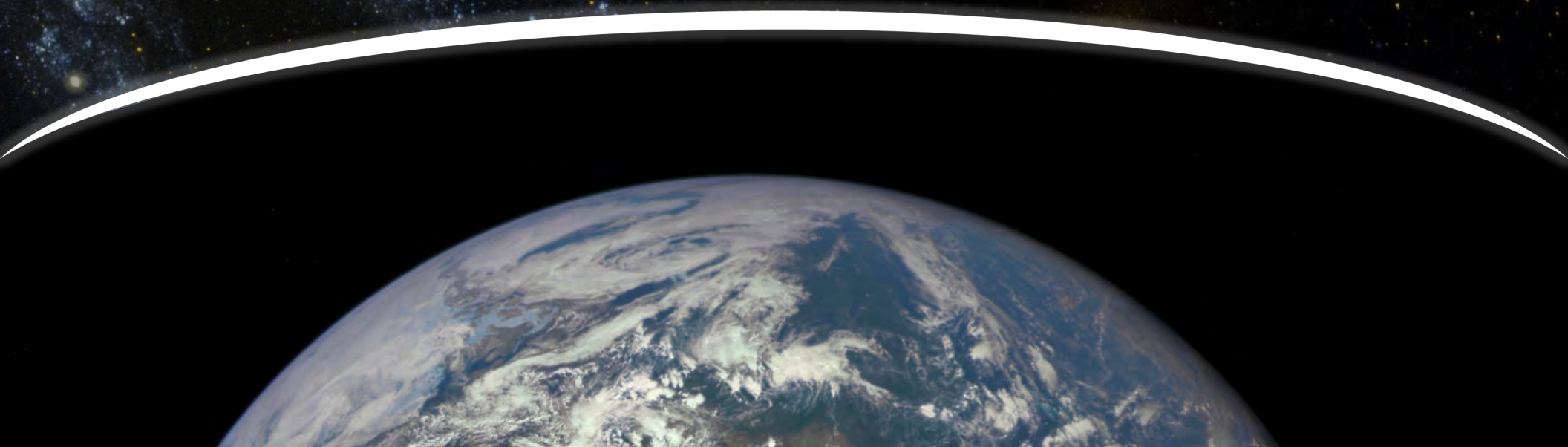
STENNIS SPACE CENTER

ENTERPRISE PARK SPECIAL STUDY

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STENNIS SPACE CENTER
ENTERPRISE PARK SPECIAL STUDY

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Under Contract Order Number:

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PART I
EXECUTIVE SUMMARY

South Gate and Reception Center

Overview

OVERVIEW

John C. Stennis Space Center (SSC) has contributed to the local and regional economy since 1961 as the National Aeronautics and Space Administration's (NASA) primary rocket propulsion test center. Today, it provides propulsion test services for NASA, the Department of Defense (DOD), and the private sector. The main campus, known as the Fee Area, boasts world-class facilities, a seven and a half mile canal waterway system, and a 125,000 acre Acoustical Buffer Zone that enables large-scale testing of rocket engines and components. This distinctive site layout is shown on the following page in the Vicinity Map.

SSC is positioned to fulfill both the Agency-wide Vision and Goals and the SSC Planning Vision by offering a new development opportunity for commercial companies to co-locate at SSC. Enterprise Park is a development model that provides a site for the co-location of complimentary commercial and federal operations. Enterprise Park will exist within the site boundary of SSC near the campus core, but it will be situated outside of the secured perimeter. This key differentiator allows the private sector to bypass the security and costs structures that may be barriers to locating within the secured perimeter. By meeting the demand of growing industries that are closely aligned with current SSC operations, Enterprise Park has the potential to be a major economic development engine benefiting the region, NASA, and federal tenants located at SSC.

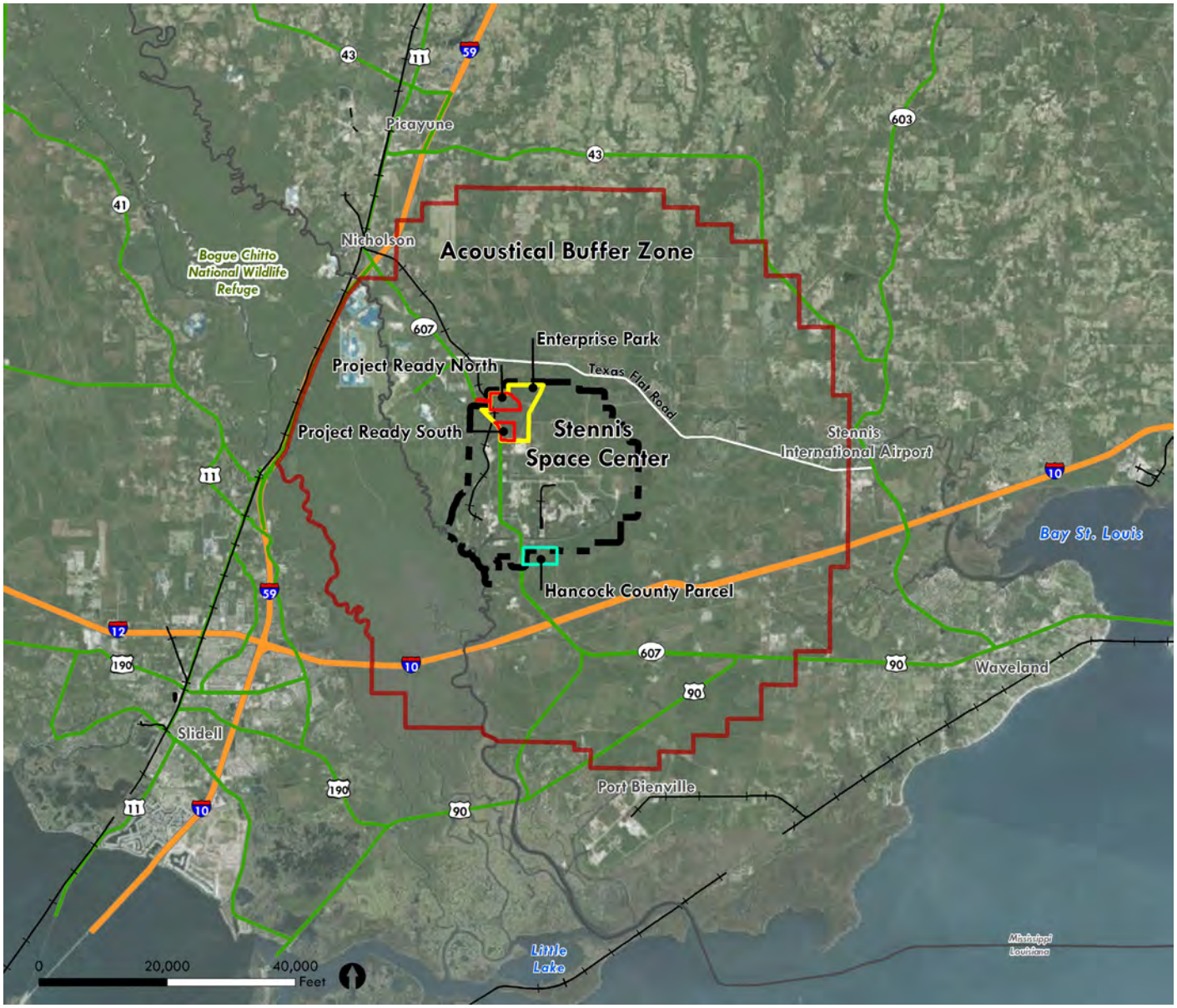
This report closes the development due diligence gap that has slowed partnership opportunities with a master developer and in site development. It contains the following analyses:

- Previous planning efforts conducted by NASA
- Site suitability
- Alternative plans
- Economic feasibility
- Potential risks

The most recent NASA and SSC master planning products were used to frame this analysis. Primary documents include Explore Stennis, 2018 Strategic Plan; SSC Vision Plan; and Enterprise Park Industry Day presentation material.

RS-25 Engine Test on the A-1 Test Stand

Overview



Vicinity Map

VICINITY AND STRATEGIC LOCATION

The vicinity map of SSC shows the distinguishing features that characterize the site, along with the regional assets surrounding SSC. The Fee Area, represented by the black dashed outline, is approximately 13,800 acres in size and is home to SSC's operations. It is surrounded on all sides by an approximately 125,000 acre Acoustical Buffer Zone, which extends about 6 miles in all directions from the Fee Area. The Acoustical Buffer Zone has a perpetual restrictive easement that prohibits habitation, occupancy, and the construction of buildings. It enables SSC to fulfill its primary mission as the nation's largest rocket propulsion test facility while mitigating disturbances to the surrounding community.

Overview

PREVIOUS PLANNING EFFORTS

The SSC Mission is defined by its unique testing capabilities and site design. It states:

Stennis Space Center is the partner of choice for providing propulsion test capabilities to the nation. Stennis utilizes its unique location and assets to collaborate with other agencies, academia, and industry to develop and test autonomous systems, enhance national security, and increase knowledge of the Earth and its oceans.

This mission aligns with the goals of Enterprise Park. It will help SSC and NASA reach its long-term strategic goals through:

- Maintaining unique, world-class facilities and infrastructure
- Enabling commercial propulsion providers and others in the appropriate markets to locate at SSC
- Meeting commercial provider needs across the entire value stream (design/manufacturing/assembly/test)
- Creating economic development opportunities that support the NASA and Federal City tenant missions
- Strategically investing and divesting in facilities
- Leveraging SSC's unique location and site attributes

SITE SUITABILITY ANALYSIS

The site suitability analysis evaluates the area that was first designated for Enterprise Park and compares each of the two parcels within that boundary with a site located in the southern portion of SSC, referenced as the Hancock County Parcel. Project Ready North and Project Ready South, the parcels within the Enterprise Park boundary, are evaluated using data provided in the Mississippi Power Company (MPC) Project Ready® Program documents, a site visit, and Geographic Information Systems (GIS) analysis. The Hancock County Parcel was evaluated using information collected though a site visit and publicly-available GIS data. All sites were considered using anecdotal information gathered through stakeholder interviews. Each site will propel SSC towards implementing the Agency and Center Visions and Goals. Analysis was conducted for the following site selection considerations:

- Compatibility
- Environmental
- Transportation
- Marketability
- Security
- Utilities

Project Ready North

ECONOMIC FEASIBILITY ASSESSMENT

The economic feasibility assessment explores barriers and opportunities to the development of a research park at SSC based on market conditions for the Gulfport-Biloxi-Pascagoula, MS and New Orleans-Metairie, LA Metropolitan Statistical Areas (referred to as the Enterprise Park Region). To better understand how the Enterprise Park Region is performing in relation to potential

Overview

competitor research parks in the southeast United States, the assessment also includes a comparative analysis of the regions surrounding Redstone Gateway Office Park and Cummings Research Park, AL and Exploration Park, FL.

Industry, socioeconomic, workforce, and real estate trends are analyzed from the geographies depicted in Figure 4-6 to determine market viability and outline an economic development strategy for the future development of Enterprise Park. Findings of trends and recommendations are highlighted below.

INDUSTRY TARGETS

The four primary industry targets for Enterprise Park include aerospace, unmanned systems, shared services, and research and development (R&D), with the highest potential in aerospace and unmanned systems. The economic feasibility assessment explores current industry trends and SSC's competitive advantages.

SOCIOECONOMIC AND WORKFORCE

As a summary of findings, the Enterprise Park Region has generally lagged in growth behind its competitors. Population, for example, has only grown by 7.8% over the past nine years. The region continues to regain losses from Hurricane Katrina in 2005. Perhaps more significant, the Enterprise Park Region's employment growth in the aerospace cluster has had stagnant or negative growth across most subsectors, including the Professional, Scientific, and Technical Services industry, which is a major sector at SSC. These trends impact industry confidence in attracting a skilled workforce.

COMMERCIAL REAL ESTATE

Demand for industrial and office space throughout the region, specifically in the vicinity of SSC, has largely stagnated in recent years. Indicators include negative absorption, minimal sales activity, and dissipating rent growth. Competitor regions demonstrate more activity, particularly the Cummings-Redstone Region which has seen considerable real estate additions. While there is a lack of excitement in the Enterprise Park Region's real estate market, and hence less opportunity to organically attract business interest, it is evident that the concept proposed for the Enterprise Park will be a product type that is unique to the entire region.

ENTERPRISE PARK REGION
Gulfport-Biloxi-Pascagoula, MS and New Orleans-Metairie, LA MSAs

CUMMINGS-REDSTONE REGION
Huntsville, AL and Decatur, AL MSAs

EXPLORATION PARK REGION
Palm Bay-Melbourne-Titusville, FL, and Orlando-Kissimmee-Sanford, FL MSAs

Figure 1-1: Metropolitan Statistical Areas (MSA) Used for Analysis
Source: Esri

Overview

"Stennis Space Center could not ask for a better partner than the state of Mississippi. There are countless instances of Stennis Space Center and Mississippi growing and working together to attract businesses, to strengthen the economy and to improve the quality of life in this great state. We are committed to continuing that partnership effort at every opportunity."

Richard J. Gilbrech, Ph.D., Director, John C. Stennis Space Center

ECONOMIC DEVELOPMENT STRATEGY

Given challenges that stem from the study area's socioeconomic, workforce, and real estate trends, an economic development strategy must rely on SSC's existing relevance as a Federal City and the nation's largest rocket engine test facility. The seeds for Enterprise Park's success are already sown through the existing R&D and innovation programs at SSC. The strategy recommends mitigating locational limitations, to include:

- Consider relocating the existing security gates and open Mississippi State Route 607 (MS 607) to public access to increase Enterprise Park's accessibility and marketability from a site selection standpoint;
- Develop a coordinated marketing and branding approach that sells and positions SSC and Enterprise Park within the context of Mississippi and Louisiana Gulf Coast communities that offer affordable living and quality of life amenities.
- Collaborate with the Gulf Coast region's research universities and local community colleges to encourage the placement and retention of STEM academic program students into the region's aerospace and marine technology industries.
- Invest in SSC facilities. Real property investments have been directed towards horizontal infrastructure, such as the utility systems, to sustain aging facilities. SSC should invest in vertical infrastructure to keep pace with facility construction at other NASA Centers across the nation.

Finally, addressing perceptions pertaining to perceived safety risks of locating a R&D park within SSC's Acoustical Buffer Zone with active rocket testing and military exercising is critical to advance the future development of Enterprise Park.

Attracting state-level leadership is important to ultimately advance the creation of a special purpose authority in Mississippi for all aerospace-related functions. The strategy also recommends development of an Enterprise Park Master Plan and Strategic Business Plan. A master plan is essential to fully understand the park's access, utilities, layout, and design features and elements, including identifying supporting amenities that are critical for attracting and retaining workforce.

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PART II
INTRODUCTION

Space Launch System Core Stage being lifted into the B2 Test Stand on January 21-22, 2020

NASA Vision and Mission

NASA VISION:

To discover and expand knowledge for the benefit of humanity.

NASA MISSION:

Lead innovative and sustainable program of exploration with commercial and international partners to enable human expansion across the solar system and bring new knowledge and opportunities back to Earth. Support growth of the Nation's economy in space and aeronautics, increase understanding of the universe and our place in it, work with industry to improve America's aerospace technologies and advance American leadership.

The National Aeronautics and Space Administration (NASA) Agency-wide vision and mission reflect its commitment to exploring new frontiers, discovering new knowledge, and developing new technology. Success is achieved through the planning and investments taken today. The Agency vision and mission statements are critical to aligning real property decisions with the overall Agency initiatives.

NASA FACILITIES

Each NASA center and facility supports a unique element of the Agency's mission. The 10 major centers, eight smaller facilities, and headquarters organized across the United States are united in the commitment to pioneering advancements in science and aeronautics. Cooperation and support from commercial and international partners bring private sector innovation into NASA missions, while enabling the Agency to focus on fulfilling its vision and mission.

JOHN C. STENNIS SPACE CENTER (SSC)

SSC is located in Hancock County, MS, where it has supported NASA missions since 1961 through premier rocket propulsion systems testing. Each Space Shuttle main engine was tested at SSC and the engine for the Space Launch System (SLS) Program continues to be tested at SSC, supporting the goal of taking astronauts beyond low-Earth orbit. SSC provides propulsion test and engineering services for NASA, the Department of Defense (DOD), and commercial customers. It supports the NASA Human Exploration and Operations (HEO) and Space Technology Mission Directorate (STMD). In addition to meeting Agency and Mission requirements, SSC sets a high standard for real property management. SSC contributes state-of-the-art facilities, a highly-trained workforce, and a commitment to its tenants and customers.

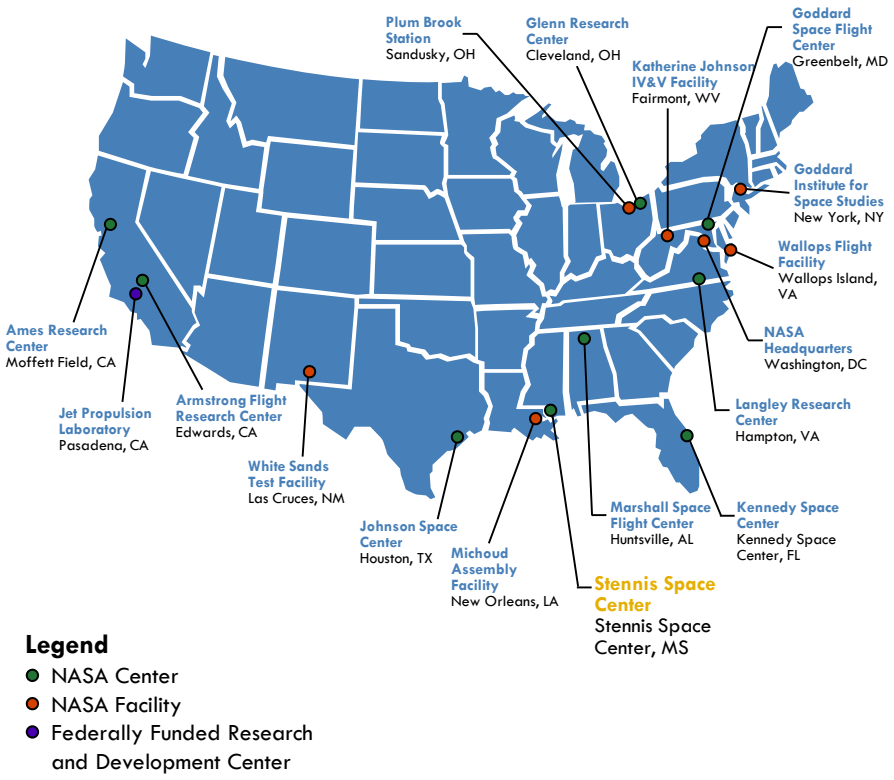


Figure 2-1: Map of NASA Facilities Across the U.S.

SSC History, Vision, and Mission

SSC VISION:

Stennis Space Center leads Propulsion Testing and enables Partner mission success.

SSC MISSION:

Stennis Space Center is the partner of choice for providing propulsion test capabilities to the nation. Stennis utilizes its unique location and assets to collaborate with other agencies, academia, and industry to develop and test autonomous systems, enhance national security, and increase knowledge of the Earth and its oceans.

THE WAY TO THE MOON

The site known today as SSC was first established as the location for a national rocket engine test site to be used in the Apollo program. Its advantageous location can be attributed to two primary factors:

- Proximity to the manufacturing facility at MAF in Louisiana and the launch facility at KSC in Florida
- Access to the East Pearl River through canal waterways, which offers critical access to the Gulf of Mexico for transport

The site boasts 13,800 acres for the test facilities site, known as the Fee Area, and an additional 125,000 acres in a surrounding Acoustical Buffer Zone. The Acoustical Buffer Zone is a perpetually protected buffer zone allowing uninhibited propulsion testing capabilities.

Stennis is both America's largest rocket engine test facility and a federal city, home to over 50 federal, state, academic and private organizations and several technology based companies.

SHIFTING FOCUS

SSC has generated invaluable contributions to America's space program. It fulfilled its primary mission by certifying the first and second stages of the Saturn V rocket for the Apollo program, which were successfully used in the Apollo missions. In the 34 years after SSC began testing for the Space Shuttle Program, it performed more than 2,300 space shuttle main engine tests which included over one million seconds of test firing. Post-Apollo, in the early 1970's, the site then transitioned to a multi-tenant facility. Underutilized buildings were filled and a cost-sharing mechanism was deployed to share facility costs with other government agencies.

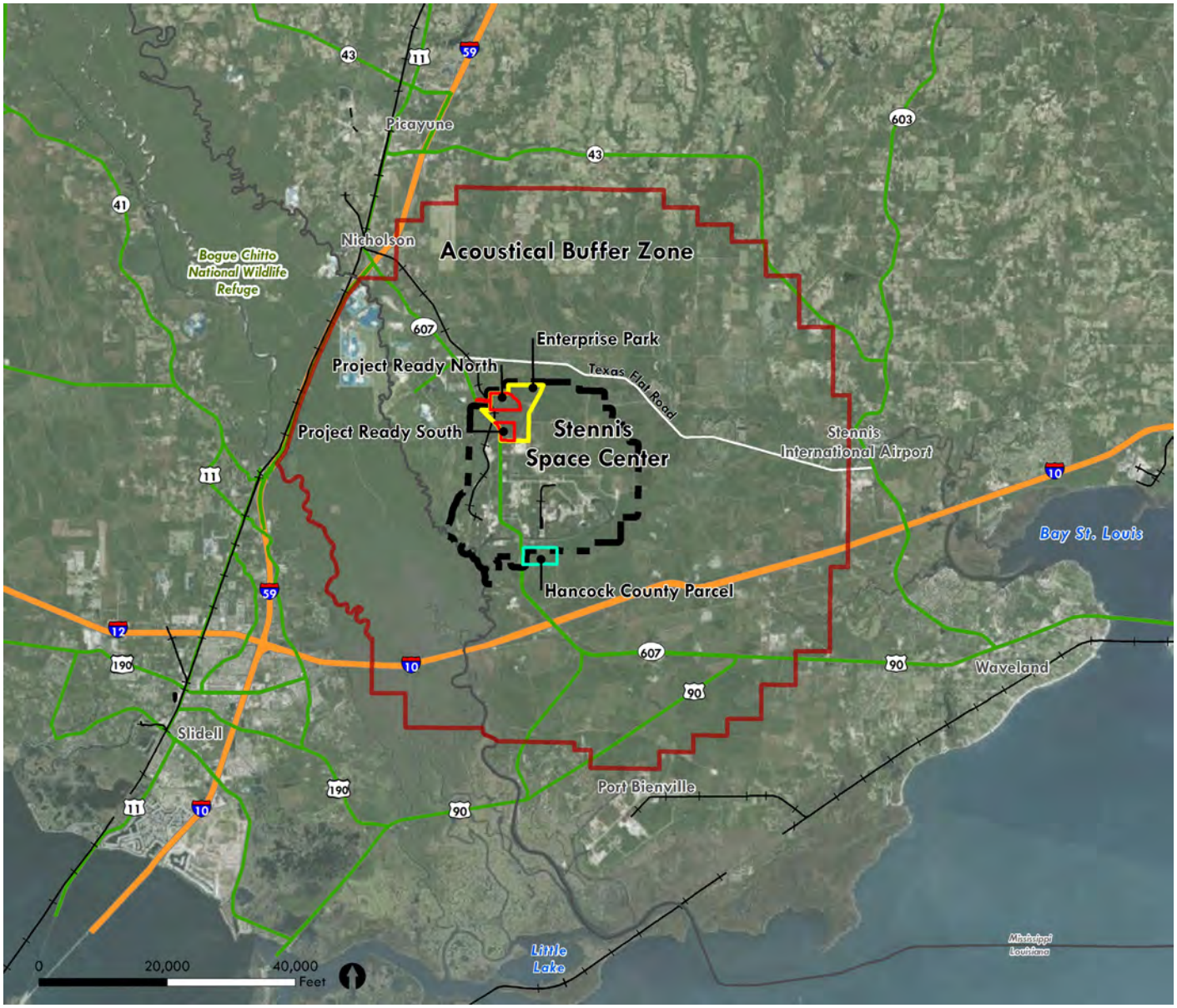
PRESENT DAY

Test stands at SSC are now used by both NASA and the commercial enterprises that are located on site. Over 50 federal, state, private, and academic organizations and technology-based companies now call Stennis home. SSC benefits from increased land utilization and co-location of enterprises with related missions. However, the core mission of supporting NASA's space programs prevails. The Acoustical Buffer Zone is SSC's most distinguishing feature. It separates the site from the surrounding community, allowing for uninhibited rocket propulsion testing capabilities, cryogenic propellant systems, and eight test stands with 13 test positions, three of which test positions are under long-term commercial lease within the protected text complex.

THE PATH FORWARD

SSC must align all future growth and development decisions with the Agency and Center goals. SSC's Vision and Mission have provided a means for leading innovation within NASA and enabling commercial partner success.

Vicinity Map



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Enterprise Park Background

As the nation's premier rocket propulsion test center, SSC is home to an array of test and engineering services for NASA, the DOD, and commercial customers. Over the past five years, SSC has received an increasing number of inquiries from commercial customers looking to capitalize on the assets at SSC. However, a number of internal and external factors limit commercial customers' ability to establish operations within the Fee Area. These limitations include:

- Lack of available facility space or existing test facilities
- Overhead burden of operating within a secure federal site
- Cost models associated with SSC
- Lack of appropriated funding to accommodate commercial opportunities within the secured perimeter

To support growing demands in the aerospace and autonomous systems industries, SSC leadership commissioned several studies to determine other operating models for non-federal/commercial entities.

Since 1991, Stennis has been recognized by NASA as the Center of Excellence for large propulsion system testing.

SSC SITE OVERVIEW

Operations at SSC occur within the boundaries of the Fee Area (shown in the Vicinity Map). The Fee Area represents federally owned and operated land. An Acoustical Buffer Zone surrounds the Fee Area, extending approximately 6 miles in all directions. The properties within the buffer zone are subject to a perpetual restrictive easement that prohibits human habitation or occupation of dwellings or buildings. The easement was established to protect the ability of NASA to test large rocket engines at any time without negatively impacting nearby communities or structures with noise or vibrations.

Existing tenants include over 50 different entities. The primary federal tenants include the Commander, Naval Meteorology and Oceanography Command; Naval Research Laboratory; Naval Oceanographic Office; and the Naval Special Warfare Center. Department of Commerce agencies include the National Oceanic and Atmospheric Administration (NOAA) and several other DOD and federal agencies. Commercial tenants include notable companies such as Rolls Royce, Lockheed Martin, Aerojet Rocketdyne, and Relativity Space.

Under the Federal City model, SSC uses a cost reimbursable model to provide essential services to all its tenants, ranging from electric, water, sewage, and building and grounds maintenance. Feedback from tenants indicates that this model is perceived as cumbersome and more costly than local service fees.

Aerial View of SSC Test Complex

Enterprise Park Background

PREVIOUS PLANNING OVERVIEW

As a result of industry interest, SSC is exploring a development model that operates in a more competitive and responsive manner than the current Federal City model. The first phase of the study, called Project Wild Boar, surveyed existing tenants to understand their perceptions of and challenges to operating within the Federal City at SSC. Additionally, the project team identified several industries that could benefit from a technology corridor on SSC – aerospace, autonomous systems, shared services, and universities or R&D. After reviewing successful case studies for commercial corridors at Kennedy Space Center, Marshall Space Flight Center, and Ames Research Center, the Project Wild Boar team concluded that a public-public or public-private partnership would help meet industry needs while minimizing risk to NASA and SSC. This concept has the potential to allow distinct but complimentary commercial and federal operating models and enable partnership opportunities for an economic development engine that would benefit the region, NASA, and federal tenants at SSC.

With those model options in mind, the project team investigated potential sites on SSC that could support a technology corridor. A parcel of land identified in the northern edge of the Fee Area was deemed the preferred site and further due diligence was authorized. This site is known as Enterprise Park.

SSC has invested in several due diligence studies for two parcels within Enterprise Park. To enhance the marketability of the sites, these parcels, Project Ready North and Project Ready South, have been certified as Project Ready® by MPC.

Enterprise Park
STENNIS SPACE CENTER

STUDY PROCESS

This report examines sites under consideration for private development in order to understand the suitability, economic feasibility, and potential risks prior to moving forward with a partnership with a master developer.

The development concept is evaluated in several contexts:

- How well does it align with NASA and SSC Visions and Strategic Plan?
- How suitable are the potential sites, particularly from a private developer's perspective, but also in maintaining the strategic assets of SSC?
- What market exists for this type of development?
- How would Pro Forma expectations compare to other local development opportunities?

Aerojet Rocketdyne Tests an RS-25 Engine on the A-1 Test Stand

NASA Strategic Goals Alignment

NASA's strategic goals and corresponding strategic objectives are outlined in Figure 2-3. They are reflected throughout the Agency's activities across the world. Three of the strategic goals: **explore, develop, and enable** are closely tied to SSC. The 2018 SSC Strategic Plan defines this connection through its work in testing engines and rocket stages and in working to grow and maximize a Federal City. As the Federal City expanded, SSC leaders recognized the need to provide an alternative model for the burgeoning private space industry. This process demands coordinated efforts among SSC, economic development organizations, and a master developer. The Federal City model offers benefits such as secured perimeter that is uncommon in commercial technology corridor models. However, potential tenants have indicated they desire other models to be economically successful.

Enterprise Park is envisioned as an economic and technological engine for the region and the nation. In addition to meeting mission goals, this model will extend to Agency-wide programmatic goals, such as to reduce facility footprints. It will help SSC and NASA reach its long-term strategic goals through:

- Maintaining unique, world-class facilities and infrastructure
- Enabling commercial propulsion providers and others in the appropriate markets to locate at SSC
- Meeting commercial provider needs across the entire value stream (design/manufacturing/assembly/test)
- Creating economic development opportunities that support the NASA and Federal City tenant missions
- Strategically investing and divesting in facilities
- Leveraging SSC's unique location and site attributes

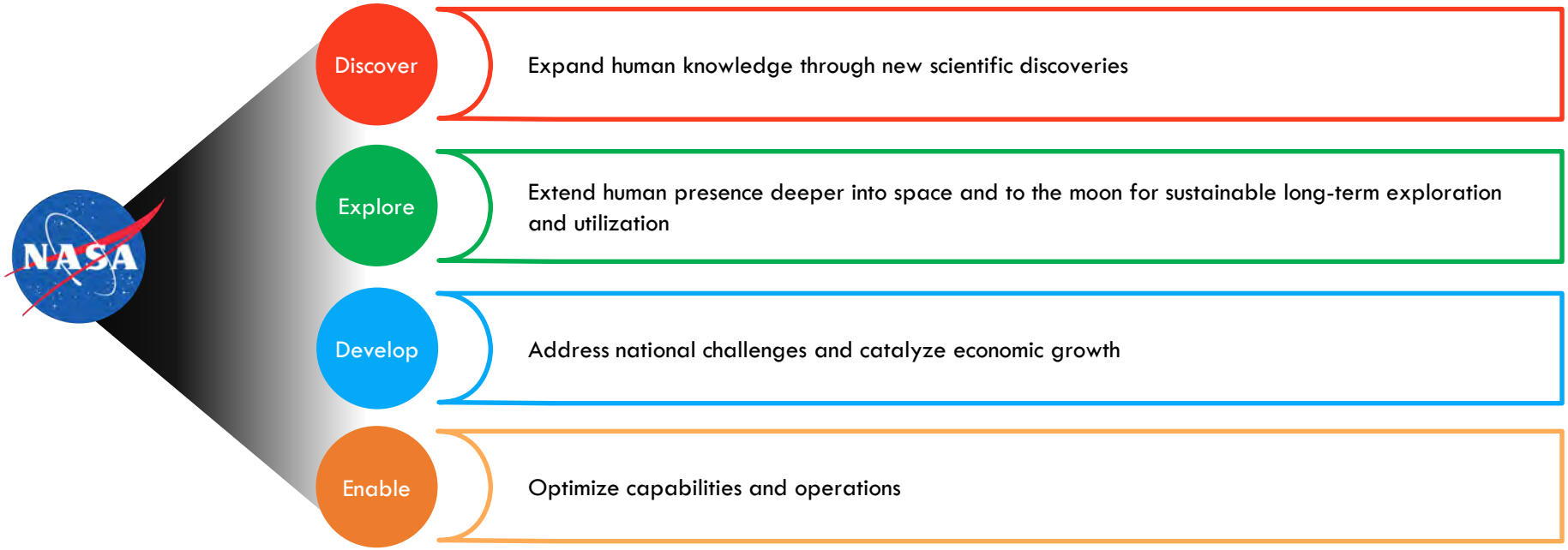
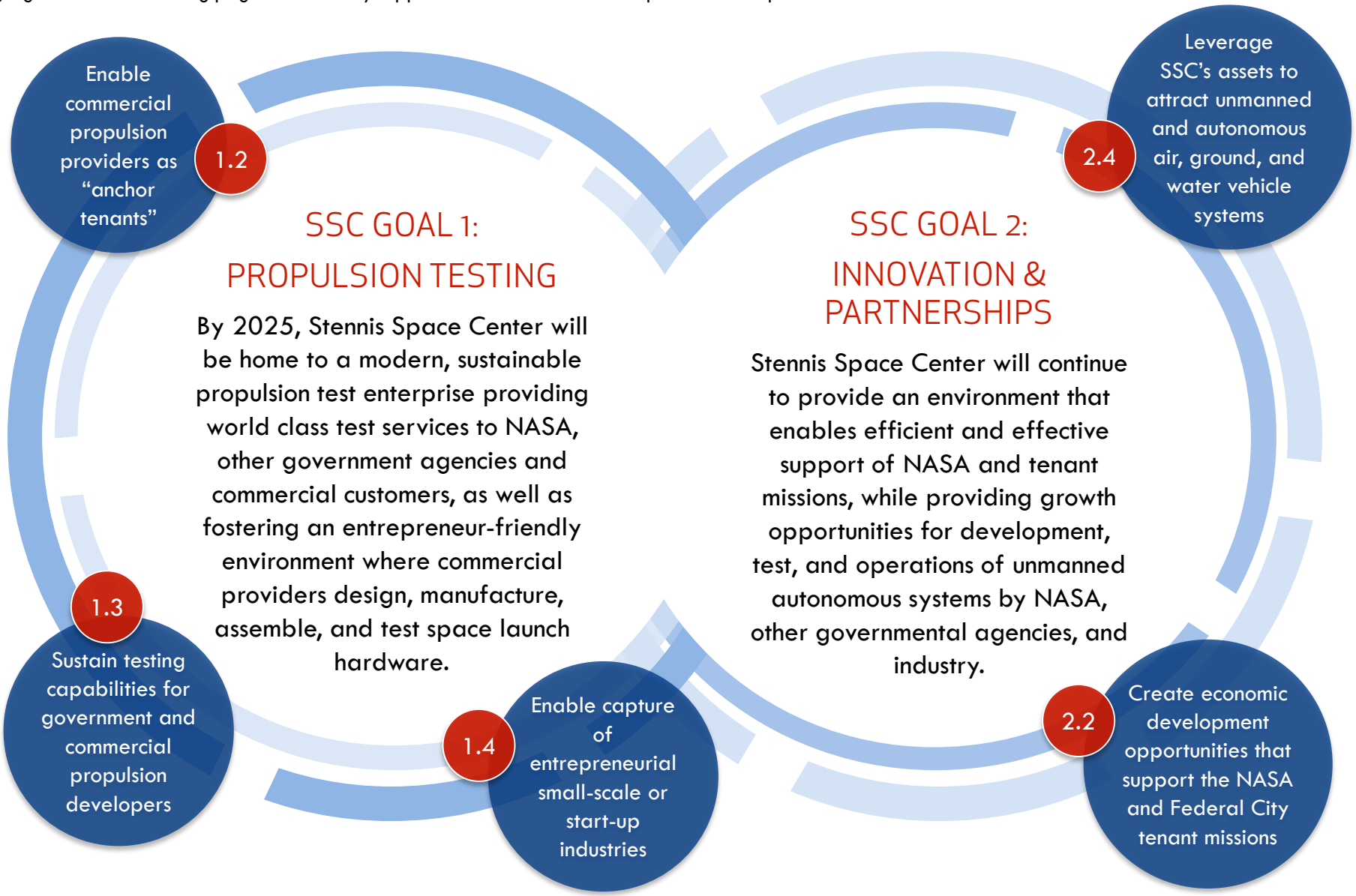


Figure 2-3: NASA 2018 Strategic Plan Framework

SSC Strategic Plan Alignment

The SSC Vision Plan identified two specific SSC Strategic Plan Goals that are relevant to the implementation of the Master Plan. Several of the objectives are highlighted on the following pages that directly support the creation and development of Enterprise Park.



SSC Strategic Plan Alignment

GOAL 1: PROPULSION TESTING

By 2025, Stennis Space Center will be home to a **modern, sustainable propulsion test enterprise** providing **world class test services** to NASA, other government agencies and commercial customers, as well as **fostering an entrepreneur-friendly environment** where commercial providers design, manufacture, assemble, and test space launch hardware.

Transporting an RS-25 Engine

1.2 Enable commercial propulsion providers in the large/medium launch vehicle market segment to locate at Stennis as long-term "anchor" tenants, ensuring the long-term viability of Stennis as a propulsion testing hub.

Provide a range of opportunities across the entire value stream (design/manufacturing/assembly/test) to meet commercial provider needs (including timeliness), including government facilities, green field sites and Enterprise Park.

1.3 Sustain a robust, unique national capability for high-pressure component and subsystem development testing that will be available to government and commercial propulsion developers.

1.4 Enable capture of entrepreneurial small-scale or start-up propulsion providers' business.

Develop and demonstrate flexible, industry-friendly business and test operations models that provide responsive test capabilities and services at reasonable, predictable costs for small-scale or start-up propulsion system customers.

Strategically invest in facilities, such as green field sites and agile test facilities, to provide cost- effective test capabilities required to support the developing small-scale and start-up space industry. Leverage these capabilities as a test bed to develop and test new technologies.

Establish a research-and-development operating model, including cost structure and safety oversight, for the commercial market segment. Tailor incident responses based on the inherent risks associated with research and development of novel propulsion systems.

SSC Strategic Plan Alignment

GOAL 2: INNOVATION & PARTNERSHIPS

Stennis Space Center will continue to provide an environment that enables **efficient and effective support** of NASA and tenant missions, while providing **growth opportunities** for development, test, and operations of unmanned autonomous systems by **NASA, other governmental agencies, and industry.**

2.2 Create economic development opportunities that support the NASA mission and federal city tenant missions.

Develop partnership solutions for emerging economic development opportunities to define a set of options dependent on degree of tenant autonomy and the cost of services and support to be provided.

Facilitate access (short-term and long-term) to underutilized NASA land, infrastructure and airspace for potential partners, including design, manufacturing, assembly and test of propulsion systems and unmanned/autonomous systems.

2.4 Leveraging Stennis' unique location, buffer zone, restricted airspace, partnerships and technical resources to attract and support the design, manufacture, test and operation of unmanned and autonomous air, ground and water vehicle systems.

Station 46042, Owned and Maintained by National Data Buoy Center

SSC Vision and Plans Alignment

In September 2019, the SSC Vision Plan was published. Stakeholders from the vision workshop included SSC employees, tenants, and contractors; Johnson Space Center (JSC) employees; and Congressional, state, and local representatives. It defines the SSC planning vision that is grounded in NASA's Agency-wide goals for synchronization.

PLANNING VISION FOR SSC:

The Stennis Space Center Master Plan shall 'Create a **collaborative "main street" campus** with **state-of-the-art** and **flexible facilities, modern infrastructure,** and **secure mission areas** to inspire our partners and communities in pursuit of testing, research, and exploration from the bottom of the ocean to the stars.'

During the Visioning workshop, stakeholders discussed the development of Enterprise Park and innovative ideas for implementation. Amenities such as restaurants, a fitness center, and drug stores, were identified for consideration as Enterprise Park applies smart growth principles that align with changes in population density and demand. This development generates a sense of community and enhances the marketability of SSC by meeting the needs and interests of current and future tenants.

ESTABLISHING GOALS

Four goals emerged to guide implementation of the Master Plan, each of which can shape and support development of Enterprise Park. The planning of Enterprise Park and core SSC campus cannot occur separately, and implications of how each site affects the other must be considered.

1. COLLABORATIVE "MAIN STREET" CAMPUS

The Vision Plan and preliminary future development concept imagines a 'main street' environment within the SSC Business Area, which will be the hub of all NASA administrative activities. The intent of the area is to encourage collaboration through well-designed spaces that promote walkability and personnel interactions. Any Enterprise Park development must take care to not detract from the main street campus of SSC.

2. STATE-OF-THE-ART AND FLEXIBLE FACILITIES

Although Enterprise Park will operate independent of SSC core missions, the need for flexible and state-of-the-art facilities is one of the driving forces for the development of Enterprise Park. Tenant feedback has indicated the existing facilities on SSC do not offer the flexibility needed to innovate quickly and compete globally. Specifically, Enterprise Park should offer flexibility for scalable testing missions for small to medium private industries.

3. MODERN INFRASTRUCTURE

SSC has invested heavily in necessary infrastructure upgrades, ensuring the missions can continue to grow. As Enterprise Park advances to the master developer stage, SSC leadership must consider the implications of greatly expanding access to SSC-owned and -operated utility systems.

4. SECURE MISSION AREAS

Protecting the core missions of SSC and its tenants is critical to ensuring the long-term viability of SSC, as well as the marketability of SSC to potential private industries. Any potential tenants of Enterprise Park must be compatible and complementary to the core missions of SSC and its long-term federal partners.

Enterprise Park Goals and Objectives

Enterprise Park is a direct implementation of NASA's and SSC's Strategic Plan Goals, as described on the previous pages. The following goals and guidance were outlined to guide the development and execution of this technology development park concept.

NASA's Vision for Enterprise Park

Public-private or public-public partnership for build-out, management, and long-term operation of commercial technology park that:

- Provides commercial companies a more traditional operating model by providing an "outside of the gate" option for co-location to support NASA and SSC tenant missions; and
- Enables a long-term economic development opportunity for future growth at SSC to support NASA, SSC tenant missions, and the region.

To achieve this vision, NASA intends to issue an Enhanced Use Lease (EUL) with a master developer under the authority of 51 United States Code (USC) Section 20145. The lease term may extend up to 50 years.

It is critical that the irreplaceable asset of SSC be protected, therefore NASA will maintain approval oversight for potential tenants to ensure mission compatibility and long-term viability of the space industry in and around SSC.

PROPOSED TENANT ELIGIBILITY GUIDELINES:

- Aerospace contractors and commercial space service providers supporting U.S. government and private space initiatives
- Spacecraft and/or rocket propulsion fabrication, assembly, component manufacturing, and testing
- Contractors and commercial service providers supporting SSC tenant missions and initiatives
- Autonomous and unmanned systems spanning air, marine, and ground
- Advanced technology supporting NASA and SSC tenant missions
- Information Technology
- Advanced Security Technology
- Education/university high-tech research
- Support services reasonably required by Enterprise Park tenants and/or SSC tenants (e.g., technical support, business services, etc.)
- Limited retail support services and lodging as deemed appropriate to support Enterprise Park tenants and/or SSC tenants

Entry Point to Enterprise Park

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PART III
SITE SUITABILITY ANALYSIS

Existing Infrastructure in Enterprise Park

Purpose and Process

PURPOSE

The purpose of the site suitability analysis is to evaluate the strengths and weaknesses of the proposed Enterprise Park site, as well as evaluate if an alternative location at SSC may be more favorable for a technology park opportunity.

PROCESS OVERVIEW

Three sites were evaluated for their suitability of hosting a public-private/public-public partnership technology park development: Project Ready North, Project Ready South, and the Hancock County Parcel. The site suitability analysis was conducted by a registered civil engineer and site planners with land development experience.

Each site was evaluated in the following categories:

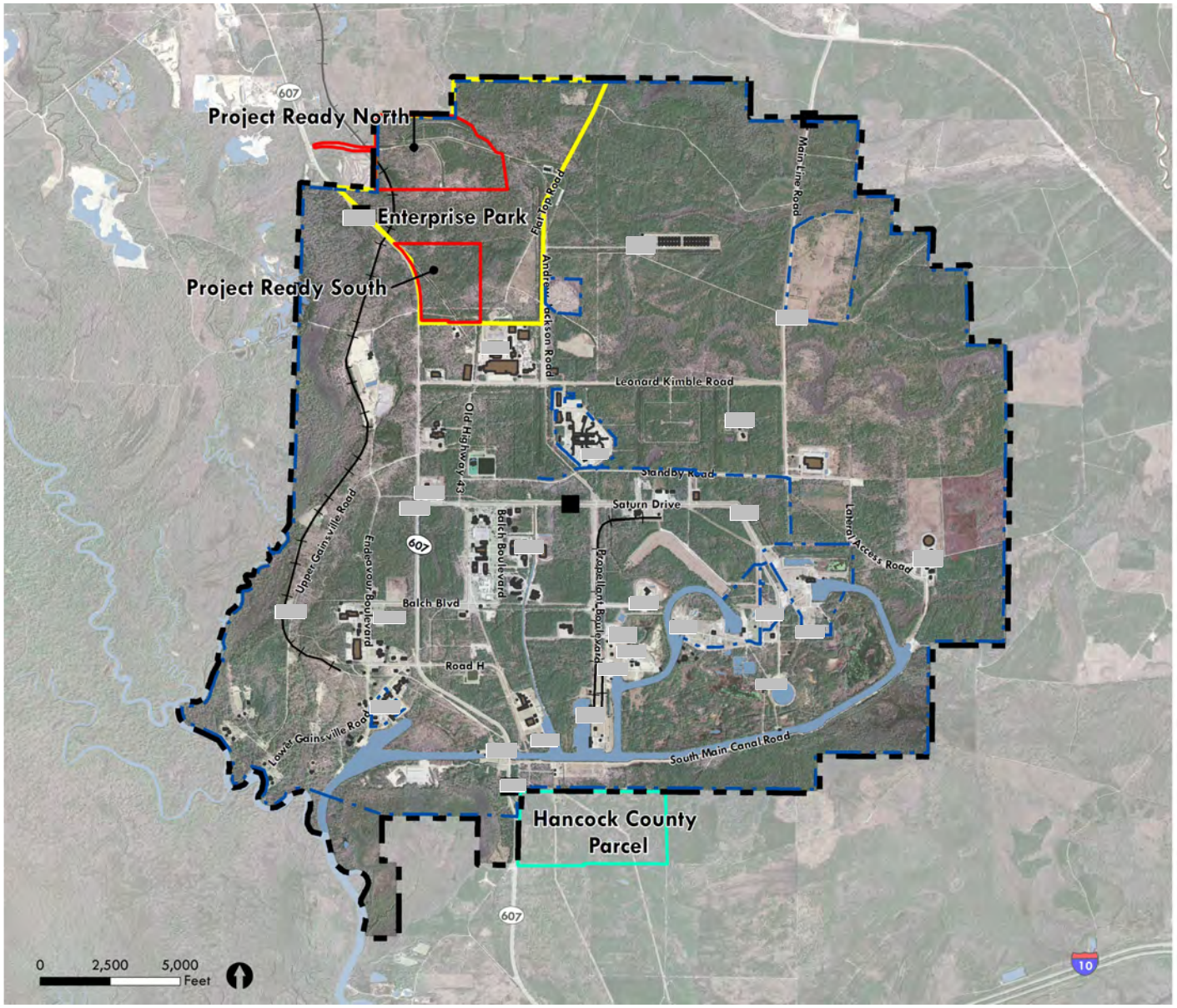
- Compatibility with Enterprise Park Vision, Goals, and Priorities
- Compatibility with SSC Mission and tenant missions
- Compatibility with Future Development Concept
- Transportation
- Utilities
- Environmental Restrictions
- Security Concerns
- Marketability

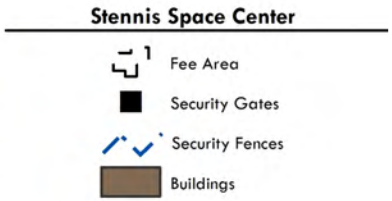
Two of the sites, Project Ready North and Project Ready South, are located in Enterprise Park in the northern portion of the Fee Area. These sites have already undergone a series of due diligence analyses to explore development and certify each through the MPC Project Ready® Program. These analyses were reviewed and evaluated.

The Hancock County Parcel analysis does not have the benefit of the due diligence that was performed for the Enterprise Park Project Ready sites. The site suitability analysis was conducted using publicly available data on existing and known constraints. Additional site investigation must be performed prior to development and permitting activities.

Access Road in Enterprise Park

Site Suitability Study Areas





The Fee Area is NASA-owned property that lies within a secured perimeter, which is represented by the black dashed boundary line. While the test complex is the central focus of the site, SSC is also home to various federal, DOD, and commercial tenants with complementary missions.

Each site considered for development – Project Ready North, Project Ready South, and the Hancock County Parcel – offers a unique advantage for continued development at SSC.

Source: SSC geodatabase

Project Ready North

The Project Ready North site, located within Enterprise Park at SSC, has an area of approximately 250 acres. Conceptual development layouts have been proposed for the site, though detailed engineering studies will be required for a more accurate development pad layout.

COMPATIBILITY WITH ENTERPRISE PARK VISION, GOALS, AND PRIORITIES

This location is compatible with the vision of providing development sites within close proximity to the Fee Area while remaining outside of the controlled access perimeter.

It offers flexibility in terms of the potential tenants, particularly foreign companies or employees that currently face hurdles to obtain access badges.

COMPATIBILITY WITH SSC MISSION AND TENANT MISSIONS

Development of Project Ready North aligns with the SSC planning vision through partnerships that foster collaboration, offering space for state-of-the-art and flexible facilities, modern infrastructure, and in its location within the Fee Area, but outside of the secured perimeter.

While the site location is within the Fee Area of SSC, it is not directly adjacent to the Federal City, which can be viewed as both an advantage and disadvantage.

Project Ready North is directly adjacent to the Navy's Western Maneuver Area (WMA) and aerial range sites. It is important that the Navy, a key stakeholder with significant security requirements, is involved in the planning process. This will mitigate any concerns that introducing tenants in a non-secure area may pose a threat to the long-term viability of the aerial range.

COMPATIBILITY WITH FUTURE DEVELOPMENT CONCEPT

As the Future Development Concept is implemented, many additional facilities will be demolished to reduce facility operating costs. This will create a reduction in available facilities for non-federal tenants. Providing development parcels at the far northern end of the Fee Area may encourage sprawl and a disjointed sense of place. Conversely, locating at the edge of the Fee Area allows further investment in the 'Main Street' and Federal City concepts at the core of SSC.

Project Ready North

Project Ready North

TRANSPORTATION

The site is in the northern-most portion of the Fee Area, where it is outside of the North Gate and easily accessible by MS 607 by an access road. MS 607 leads directly to the North Gate and continues through the Fee Area. Meanwhile, MS 603 parallels SSC to the east, intersecting Texas Flat Road. Texas Flat Road connects to MS 607 and ultimately to the Fee Area. This is best illustrated in the Vicinity Map.

Approximately two-thirds of the current employees at SSC enter the site through the South Gate. Population trends suggest that employees of companies that would fit well in Enterprise Park may live south of SSC. These employees may not have the security badges to enter the site through the South Gate and travel through the center of SSC to Project Ready North. While consideration has been given to opening MS 607 through the site for public access, in its current state employees would travel circuitously around SSC to access MS 607 from Interstate 59 (I-59).

ACCESS – The site will require construction of an access road for connection to the MS 607 corridor. The site also requires the majority of users to access the site from the north, which opposes the primary access patterns of current employees.

GATE SECURITY – There is no gate security of the site itself and it is situated before the North Gate when accessing the site via I-59. The most direct route to the site from the south requires users to travel through the South and North Gates to access Project Ready North.

RAIL – The site has existing railbeds that require new ties and rails to be constructed for access. Additionally, the primary north-south rail line will need to be rebuilt as well to service this area. Rail service may be re-instated to the site if the infrastructure is fully reestablished. This is not expected to be of significant importance due to the type of development intended for Enterprise Park.

BARGE – The site has no direct access to the canal system that connects to the Pearl River and outward to the Gulf of Mexico.

NEEDED IMPROVEMENTS – Interchange with MS 607, including access road construction, railbed improvements and/or removal, and earthmoving to prepare development sites.

UTILITIES

ELECTRIC – Electric is provided from the on-site substation at SSC's core area outward to the new development site. However, a new substation may be needed for development. Currently, inactive electric lines are located within Project Ready North. The site requires a substantial investment in infrastructure to supply the power feed to the development area.

GAS – The main gas feed to SSC runs adjacent to the development area. However, a new branch must be constructed to provide natural gas to the development area.

WATER – The water supply to the site will come from the nearest main feed within the SSC Fee Area. The new supply line will require over 2.5 miles of new waterline to be constructed.

WASTEWATER – Sanitary sewer can be supplied by the SSC-operated sewer system and is treated onsite. The system has capacity to accept an additional 250,000 gallons per day (GPD) of sewage flows. The new site requires construction of a sewer main to connect the site with the SSC system that has a capacity of 300,000 GPD of flow.

ENVIRONMENTAL

The Project Ready North site is a relatively flat area largely characterized by wetland areas. Approximately 45.4 acres of the site are in the 100-year flood plain, none of which is proposed for development.

SPECIES – The U.S. Fish and Wildlife Service has reviewed a threatened and endangered species study for the site and determined that ongoing activities within SSC are not likely to adversely affect federal listed species at this time. There are multiple endangered or threatened species within SSC that may impact the project area. This will require further study at the time of development to identify supporting habitats, soils and other evidence.

Project Ready North

WETLANDS – The presence of aquatic resources on the site detracts from the use of portions of the overall acreage. The intent is to avoid disturbance and develop areas outside the wetland areas. The development of areas adjacent to wetlands will require adherence to stormwater controls and pre-treatment to avoid impacts to the wetlands in the future.

SOILS – No environmental contaminants are documented. The site soils are generally problematic for the development of facilities. Limitations include poor soil strength, shallow depth to saturated soils, and limited depth to hard pan clay. The site will require improvement to the soil to facilitate construction. The specific types of improvements will need to be determined on a case by case basis. This condition is common across all sites within the area and does not provide an advantage or disadvantage to any of the sites.

TOPOGRAPHY – The topography of Enterprise Park is relatively flat, with the greatest elevation change located in floodplain and wetland areas.

SECURITY

Access to Project Ready North is available from the north without passing through one of the restricted gates, but it is within the secured perimeter. The fence line would need to be reconfigured to circumvent the parcel. Depending on the extent of any proposed testing operations on the site, additional security may be required. Policing would be provided by Hancock County law enforcement entities.

Mission requirements have critical impacts to site security. The WMA borders the Fee Area to the west. This area is regularly used by the Navy for training exercises. Additional areas including the B-2 test stand noise contour and restricted airspace area create noise disturbances. Neither is expected to restrict development. The B-2 test stand is preparing for SLS Core Stage testing. However, while the noise disturbances are unavoidable, current tenants have not reported them to have a negative impact to operations.

In addition to physical security, NASA must consider the security implications of allowing commercials entities to tie directly into NASA-owned and operated systems, particularly water and electric. This could introduce greater risk of intentional or unintentional damage to critical infrastructure. For this reason, new infrastructure may need to be constructed to the site.

MARKETABILITY

Project Ready North's location within Enterprise Park position it well for phased growth as demand increases. This benefits both current tenants at SSC that may want to expand, as well as incoming tenants. Additionally, establishment of a technology park at SSC capitalizes on the prestige of NASA's status, while lowering the barrier to entry for location on a federal site through partnership with a master developer.

Mississippi Power Company Project Ready Designation Sign

Project Ready South

The Project Ready South site, located within Enterprise Park at SSC, has an area of approximately 150 acres. The area is south of Project Ready North within Enterprise Park. It is directly adjacent to existing development and utilities within the Federal City in the secured perimeter.

COMPATIBILITY WITH ENTERPRISE PARK VISION, GOALS, AND PRIORITIES

The site has many of the same benefits as Project Ready North, though it is immediately adjacent to the Federal City. It is compatible with the vision of providing development sites within the Fee Area, but outside of the controlled perimeter.

COMPATIBILITY WITH SSC MISSION AND TENANT MISSIONS

The location of Project Ready South is within the Fee Area and would sit just outside of the secured perimeter. This site is the closest to other facilities on site and may provide a closer integration with the government facilities that other locations do not. Special care will have to be taken to ensure that the site does not detract from SSC's core mission.

Similar to Project Ready North, the southern site is adjacent to the WMA and the Navy aerial range, driving the need for coordination with the Navy to protect against perceived conflicts with training activities.

COMPATIBILITY WITH FUTURE DEVELOPMENT CONCEPT

Providing development parcels at the northern end of SSC may encourage sprawl and a disjointed sense of place. Conversely, the edge of SSC allows further investment in the 'Main Street' and Federal City concepts at the core of SSC. The Project Ready South location introduces far less sprawl than the northern site and creates opportunities for synergies with the surrounding amenities.

On-site Substation

Project Ready South

TRANSPORTATION

ACCESS – Project Ready South is bordered by MS 607 in the west and Moses Cook road in the south. Both the state route and access road are valuable assets. However, much like Project Ready North, vehicular traffic would have easy access from the north and be redirected around SSC because of the MS 607 security restrictions from the south.

GATE SECURITY – The site is currently located within the gated area if accessing the site from the north or south. The North Gate will likely need to be moved further south to accommodate a change in the secured fence line.

RAIL – The site does not have direct access to rail lines. Rail lines pass nearby the site and could be extended into the site with investment.

BARGE – The site has does not have direct access to the canal system that connects to the Pearl River and outward to the Gulf of Mexico.

NEEDED IMPROVEMENTS – Interchange with MS 607, railbed improvements if rail service is desired, and earthmoving to prepare development sites.

UTILITIES

ELECTRIC – Electric is provided from the on-site substation at SSC's core area outward to the new development site. An investment in infrastructure to supply the power feed to the development area to the site is required. However, an entirely new substation may be needed for development.

GAS – The main gas feed to SSC runs directly through the development area. Connection to the main will require little to no additional piping.

WATER – The water supply to the site will come from the nearest main feed within SSC area. The new supply line will require the least amount of new water main to be constructed, when compared between the three alternative sites.

WASTEWATER – Sanitary sewer is supplied by the SSC sewer system and is treated onsite. The system has capacity to accept an additional 250,000 GPD of sewage flows. The new site will require construction of a sewer main to connect the site with the SSC system that has a capacity of 200,000 GPD of flow. The connection point is located just south of the development area, requiring minimal extension costs.

ENVIRONMENTAL

Project Ready South has some wetland areas within the site boundary, none of which are expected to restrict development potential.

SPECIES – There is no indication of rare and endangered species on the proposed site. However, due to the mobility of many of the threatened and endangered species in the area, the Fish and Wildlife Service recommends additional surveys to be conducted each year prior to any ground disturbing activities.

WETLANDS – The presence of aquatic resources on the site will require the mitigation of the impacts through credits from offsite mitigation banks. The development of areas adjacent to the remaining wetlands will require strict adherence to stormwater controls and pre-treatment to avoid impacts to the wetlands in the future.

FLOODPLAINS – Floodplains do not exist within the Project Ready South Site.

SOILS – No environmental contaminants are documented. The site soils are generally problematic for the development of facilities. Limitations include poor soil strength, shallow depth to saturated soils, and limited depth to hard pan clay. The site will require improvement to the soil to facilitate construction. The specific types of improvements will need to be determined on a case by case basis. This condition is common across all sites within the area and does not provide and advantage or disadvantage to any of the sites.

TOPOGRAPHY – The topography of Enterprise Park is relatively flat, with the greatest elevation change located in floodplain and wetland areas.

Project Ready South

SECURITY

Project Ready South is intersected by the B-2 test stand noise contour and Restricted Airspace classification R4403A. However, operations within this airspace are not anticipated to limit development opportunities within the site. Episodic noise may occur during rocket engine testing from the test complexes, however, it has not historically exceeded levels that have caused disruptions to operations within the Fee Area. Project Ready South lies outside of the WDZ arcs.

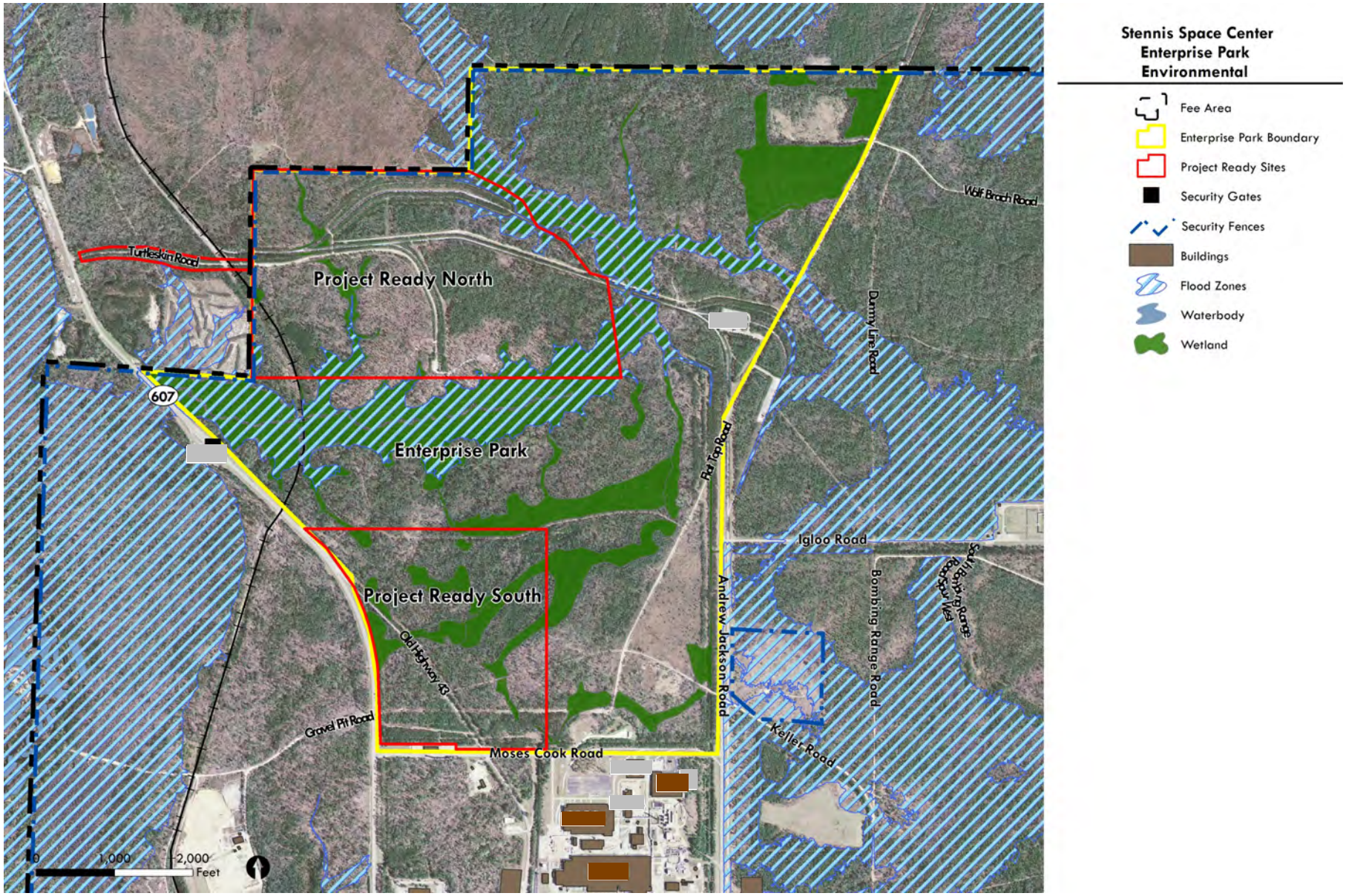
In addition to physical security, NASA must consider the security implications of allowing private entities to tie directly into NASA-owned and operated systems, particularly water and electric. This could introduce greater risk of intentional or unintentional damage to critical infrastructure. For this reason, new infrastructure may need to be constructed to the site.

MARKETABILITY

Project Ready South's location within Enterprise Park position it well for new growth as demand increases. This benefits both current tenants at SSC that may want to expand, as well as incoming tenants. The site is expected to have higher visibility than Project Ready North at SSC because it is closer to the main campus area.

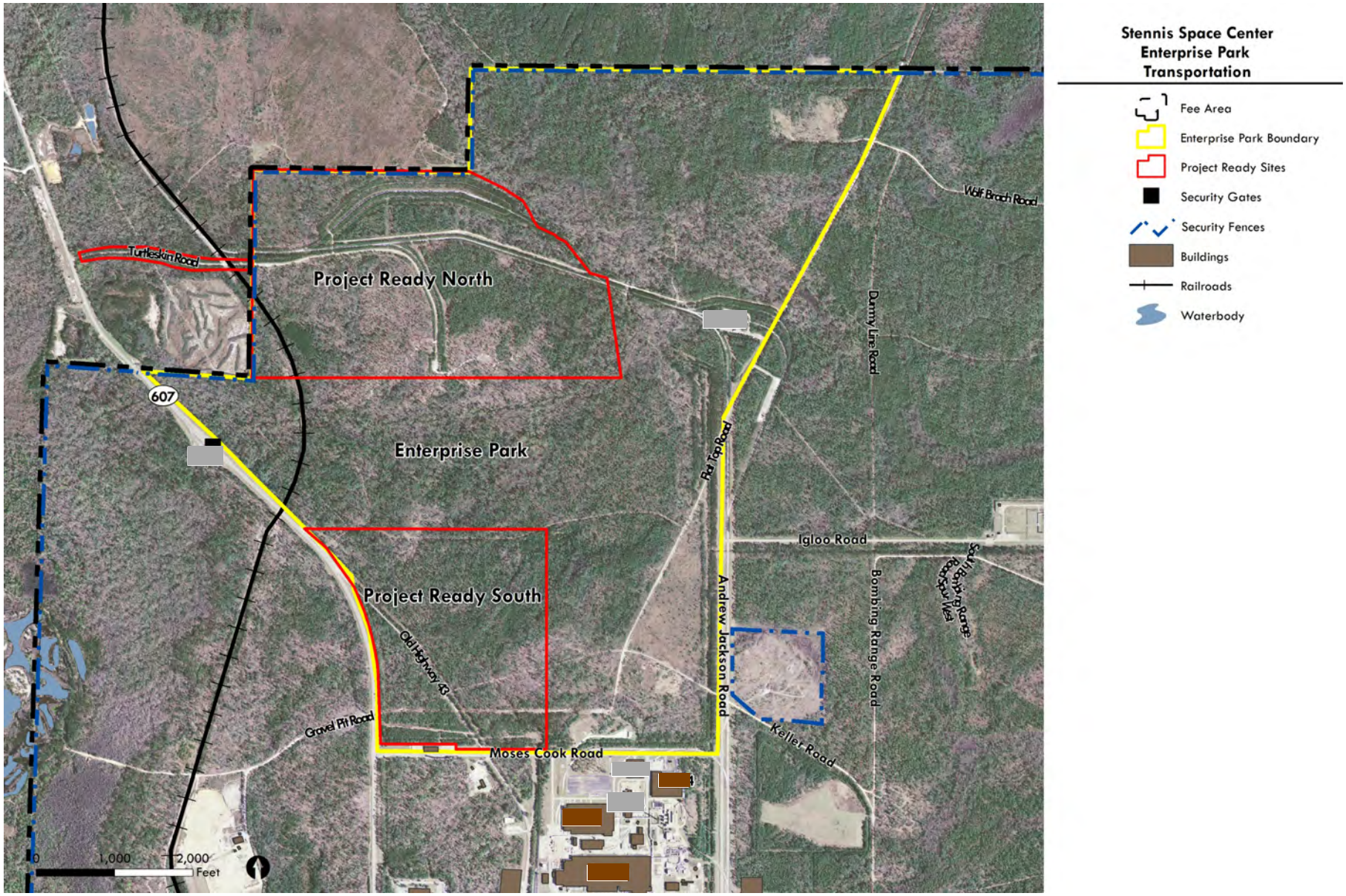
Water Tower Within the Fee Area

Project Ready Site Data – Environmental



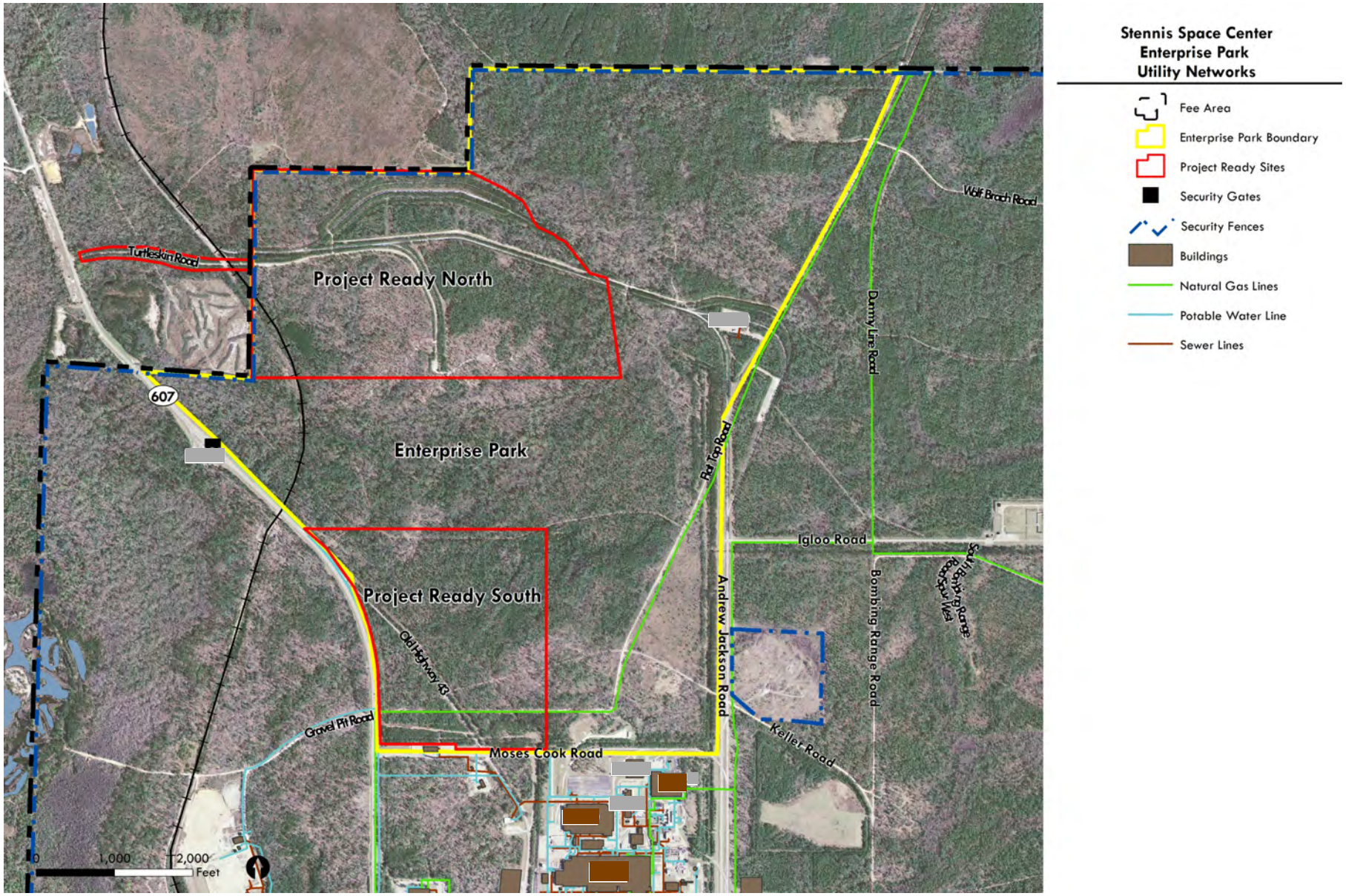
Source: SSC geodatabase

Project Ready Site Data – Transportation



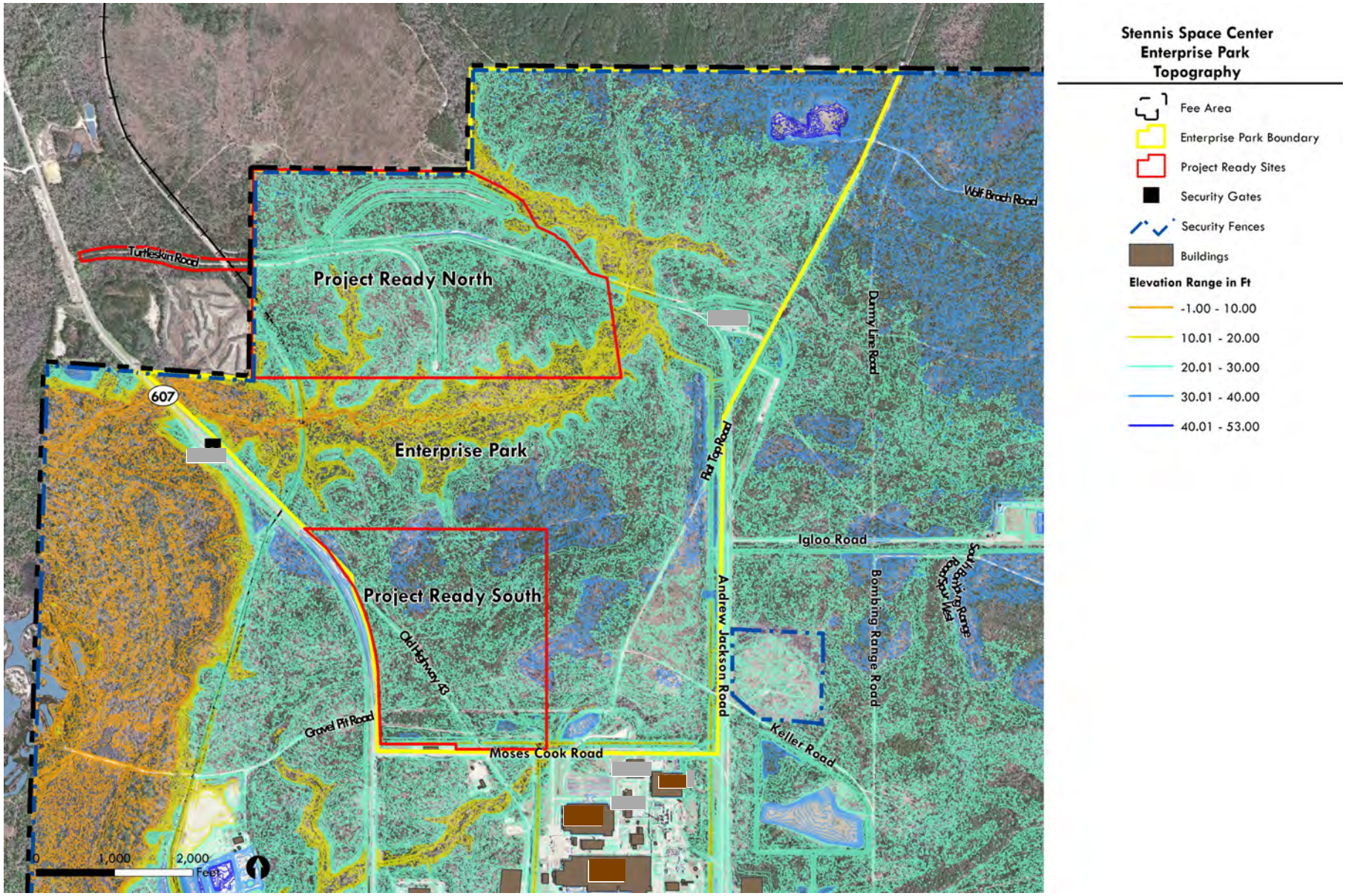
Source: SSC geodatabase, Census Data Tiger files

Project Ready Site Data – Utility Networks



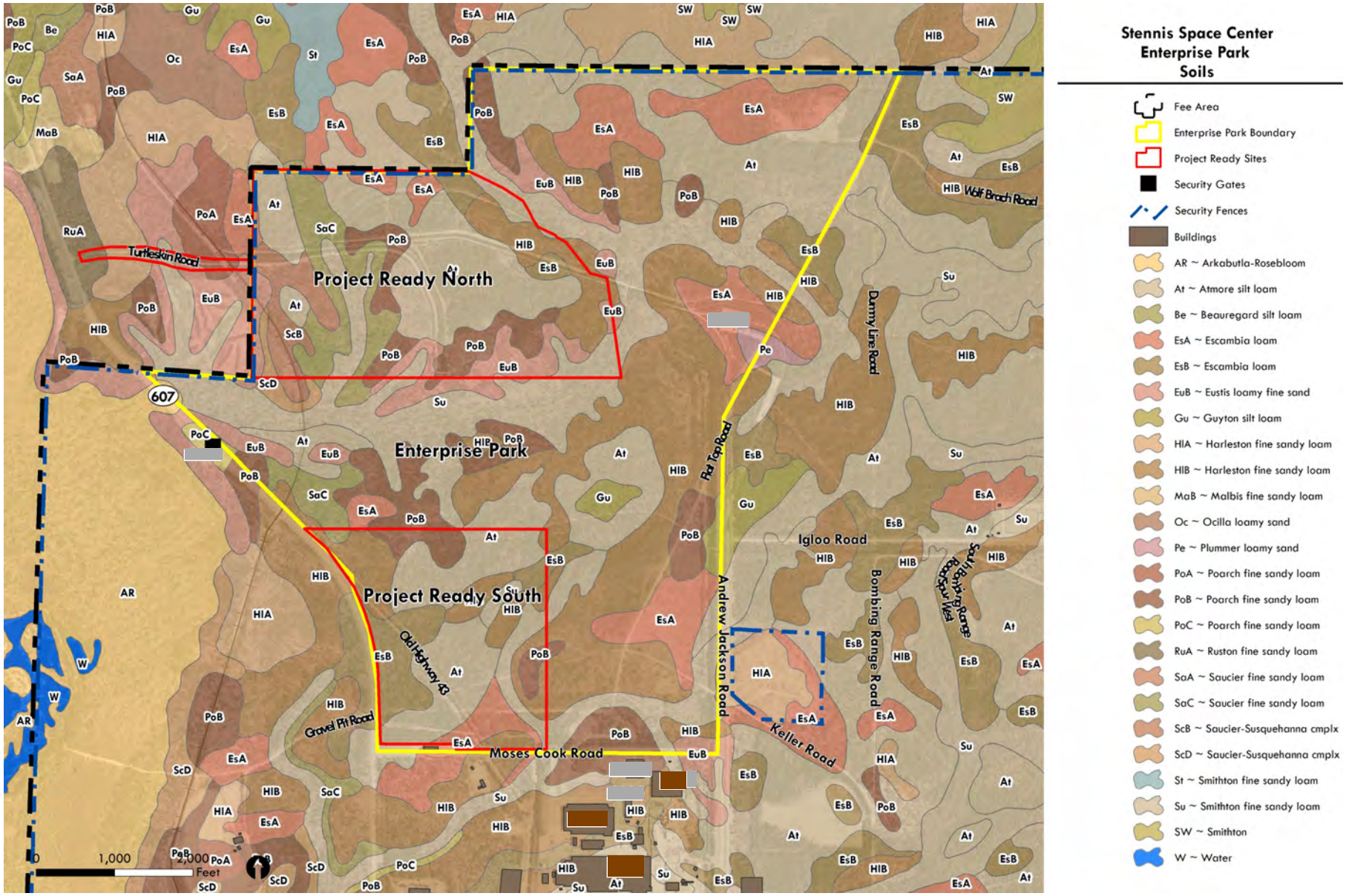
Source: SSC geodatabase

Project Ready Site Data – Topography



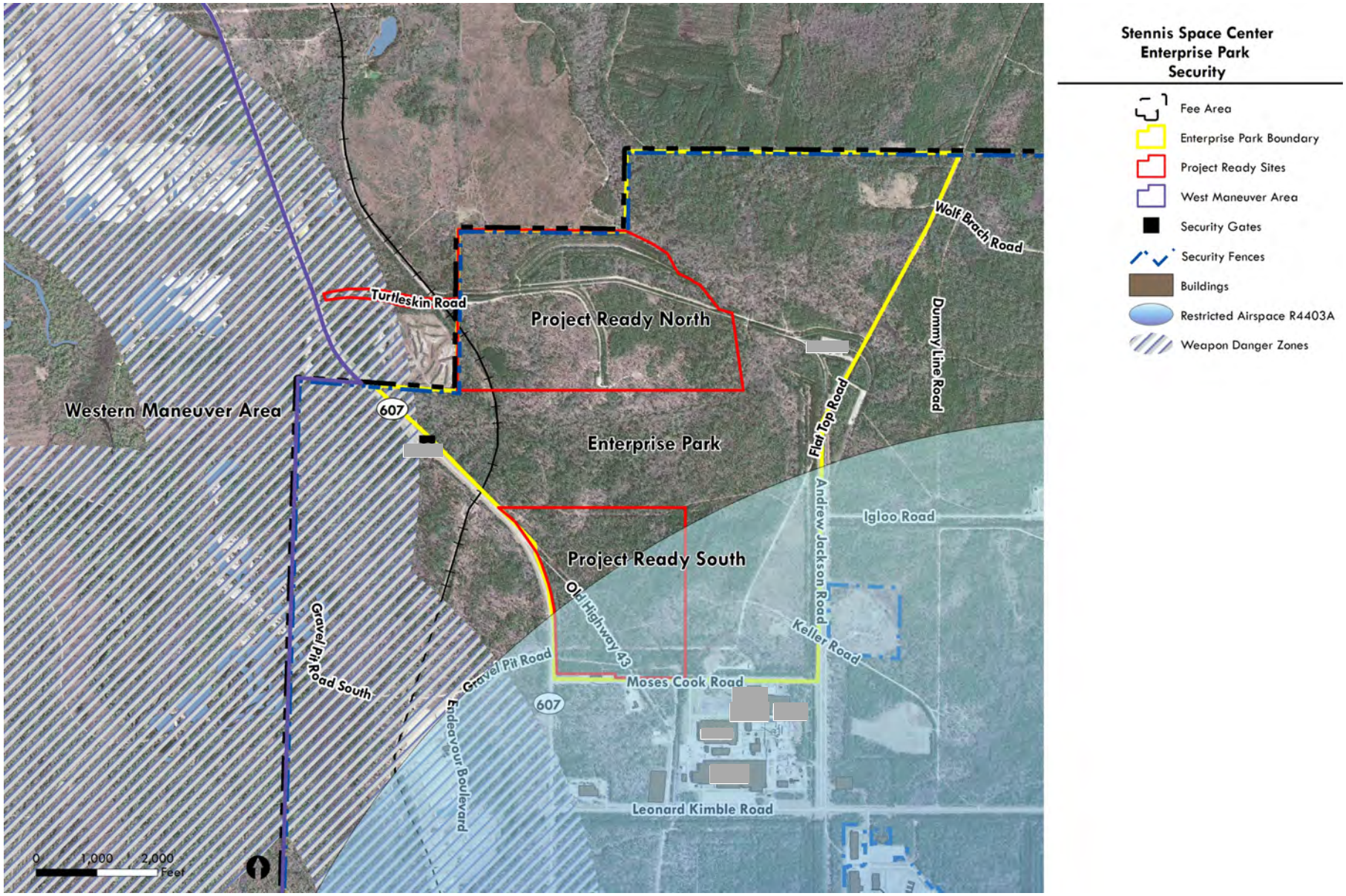
Source: SSC geodatabase

Project Ready Site Data – Soils



Source: SSC geodatabase, United States Geological Survey (USGS)

Project Ready Site Data – Security



Source: SSC geodatabase

Hancock County Parcel

The Hancock County Parcel is located south of the secured perimeter within the Acoustical Buffer Zone and includes a portion of property not owned by NASA, in addition to land within the Fee Area. The site is approximately 325 acres. This development alternative is only feasible through two potential courses of action:

- A land swap between Hancock County and NASA
- Hancock County retains ownership, but a consent agreement to the existing easement is granted by NASA

Due to site ownership, publicly-available data is limited. Detailed site documentation may need to be developed.

COMPATIBILITY WITH ENTERPRISE PARK VISION, GOALS, AND PRIORITIES

This parcel is compatible with the vision of providing development sites within close proximity to SSC operations, while still remaining outside of the secured perimeter. The site is closest to the test complex if any potential Enterprise Park tenants would be involved in related operations.

COMPATIBILITY WITH SSC MISSION AND TENANT MISSIONS

The Hancock County Parcel is adjacent to the main campus area and is the only site directly adjacent to the canal system. Its proximity to the campus area may provide a greater opportunity for integration with those working within the secured perimeter. Additionally, the site location would have a high visibility at SSC for all employees that use the South Gate. This site places commercial development away from the WMA and the Naval campus at SSC.

COMPATIBILITY WITH FUTURE DEVELOPMENT CONCEPT

The site will work with the overall development concept even though it was not initially considered. It will require extensive coordination between Hancock County and SSC to fully integrate the parcel with SSC. Development on this parcel could serve as a 'gateway' into the SSC Federal City and further connect SSC to the Infinity Science Center.

SLS Core Stage is Transported Through the SSC Lock on its way to the B2 Test Stand on January 12, 2020.

Hancock County Parcel

TRANSPORTATION

The Hancock County site is located south of the secured perimeter. This location is advantageous because most employees currently enter the site through the South Gate. This accounts for approximately two-thirds of all employees, which demonstrates high visibility for Enterprise Park. For this reason, the Hancock County Parcel is well suited to attract and retain tenants.

ACCESS – The Hancock County Parcel is immediately adjacent to MS 607, which connects to I-10. It is the only development alternative with direct access to the canal. It falls just outside the controlled perimeter of SSC, providing unrestricted access with close adjacency to the Federal City.

GATE SECURITY – There is no gate security for the site itself, but it sits adjacent to the South Gate.

RAIL – The site does not have direct access to rail.

BARGE – Negotiated access to the canal system connecting the site to the test complex, the Pearl River, and outward to the Gulf of Mexico may be achieved for the parcel.

NEEDED IMPROVEMENTS – Earthmoving to prepare development sites.

UTILITIES

ELECTRIC – Electric power will be provided by Mississippi Power and/or Coastal Electric. The Hancock County Parcel requires an investment in infrastructure to supply the power feed to the development area. However, an entirely new substation may be needed for development.

GAS – The main gas feed to the SSC runs adjacent to the development area. However, a new branch must be constructed to provide natural gas to the development area.

WATER – The water supply to the site will come from the nearest main feed within the Fee Area. While water infrastructure is located at the South Gate Reception Center, it is of insufficient size and capacity for the development site connection. The new supply line will require a relatively short amount of new waterline to be constructed, but it will be required to be constructed under the canal system.

WASTEWATER – Sanitary sewer is supplied by the SSC sewer system and is treated onsite. The system has capacity to accept an additional 250,000 GPD of sewage flows. The Hancock County Parcel will require a new connection to the SSC system and will require the installation of a pump station. Similar to the waterline, the force main will require construction under the canal system.

ENVIRONMENTAL

SPECIES – There are multiple endangered or threatened species within the project area that will require further study at the time of development to identify supporting habitats, soils, and other evidence. They are likely similar to those found in Enterprise Park.

WETLANDS – The presence of aquatic resources on the site are narrowed to limited areas in the north portion of the site and have minimal impact on the site development. The intent is to avoid disturbance and develop areas outside the wetland areas. The development of areas adjacent to wetlands will require strict adherence to stormwater controls and pre-treatment to avoid impacts to the wetlands in the future.

FLOODPLAINS – There are not flood hazard areas present on the site, which should have no impact to development.

SOILS – Environmental contaminants will need to be studied and are not currently documented. The site soils are generally problematic for the development of facilities. Limitations include poor soil strength, shallow depth to saturated soils, and limited depth to hard pan clay. The site will require improvement to the soil to facilitate construction. The specific types of improvements will need to be determined on a case by case basis. This condition is common across all sites within the area and does not provide and advantage or disadvantage to any of the sites.

Hancock County Parcel

SECURITY

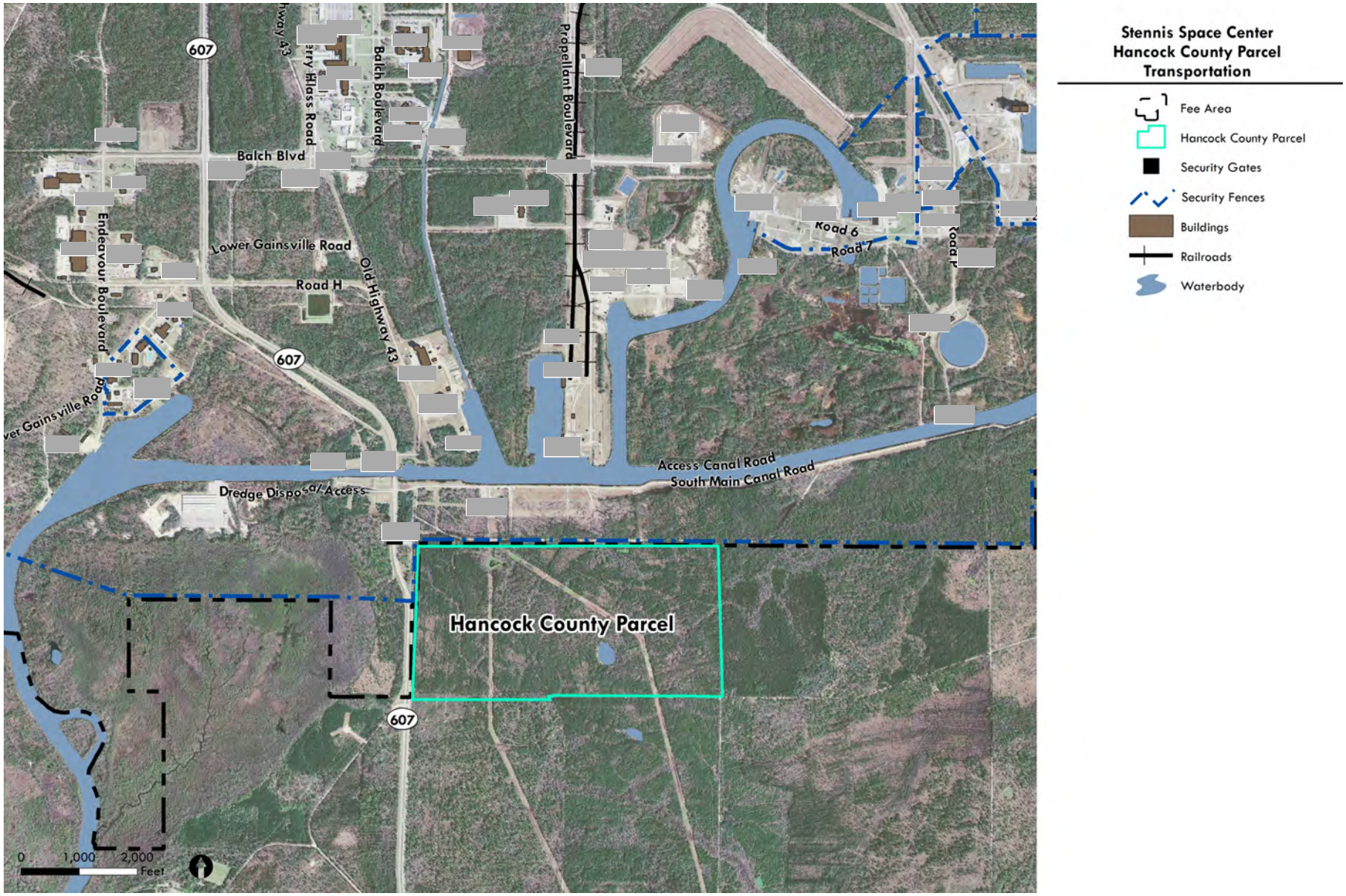
The Hancock County site has a minimal impact to SSC security operations because the area is outside the controlled perimeter of the SSC. The site is also outside of the flight path for the Naval aerial range, minimizing potential concern.

MARKETABILITY

While the site is located in a favorable location, it requires extensive coordination with local authorities to facilitate development. Potential access to the canal system is also valuable. The Hancock County site has the closest proximity to the largest population source for users.

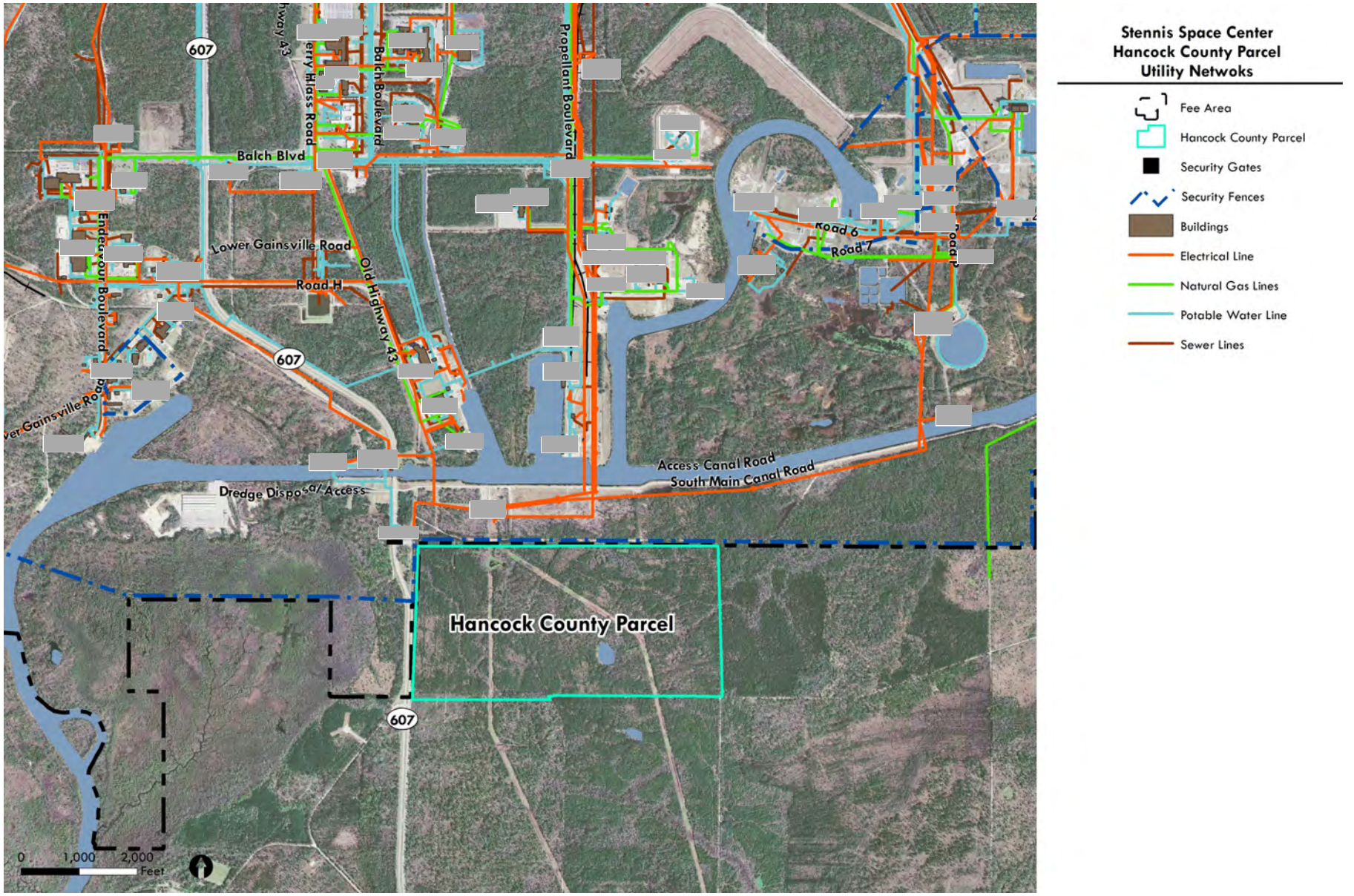
Waterways Utilized by Tenants

Hancock County Parcel Data – Transportation



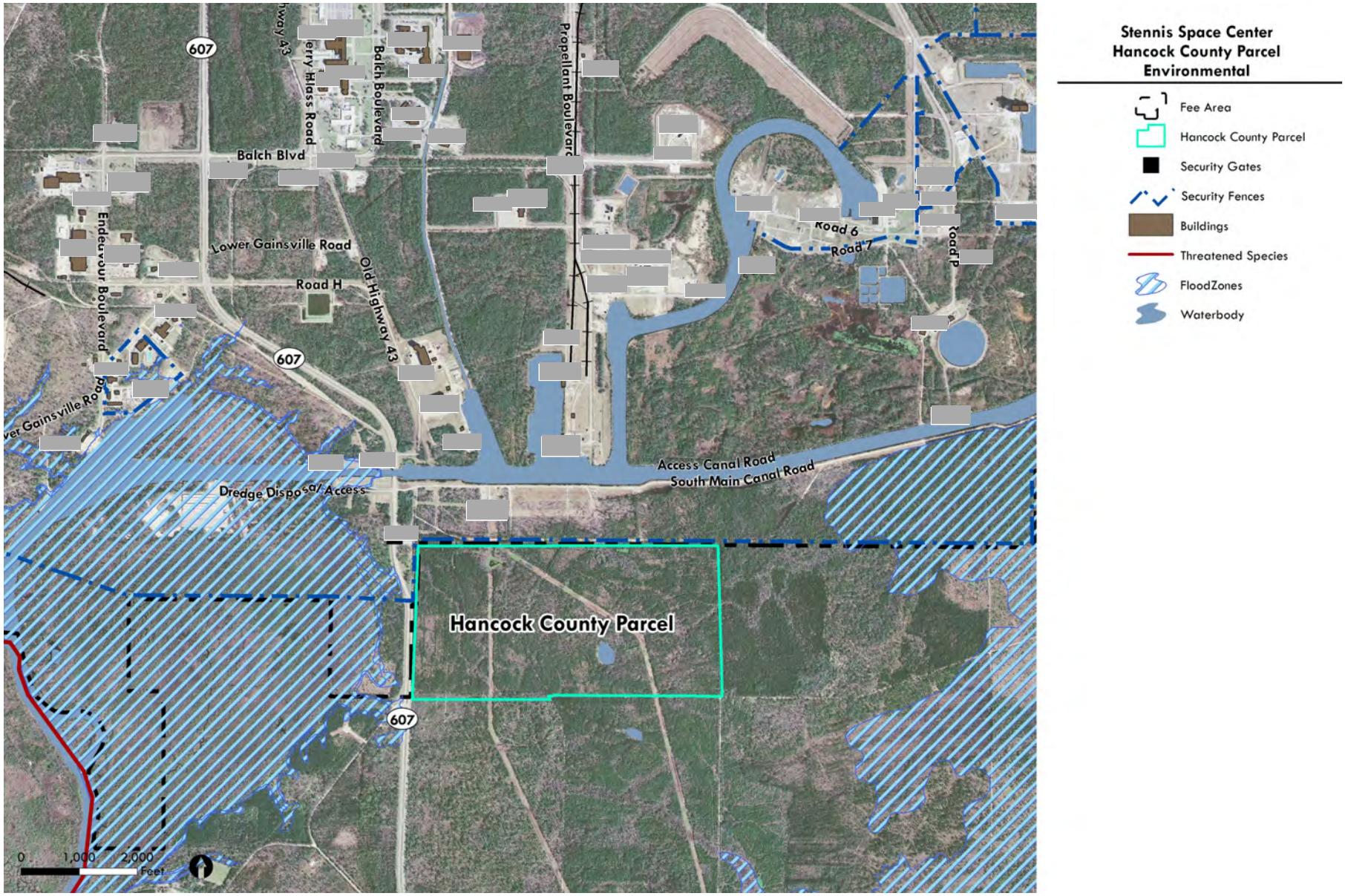
Source: SSC geodatabase, Mississippi Geospatial Clearinghouse

Hancock County Parcel Data – Utility Networks



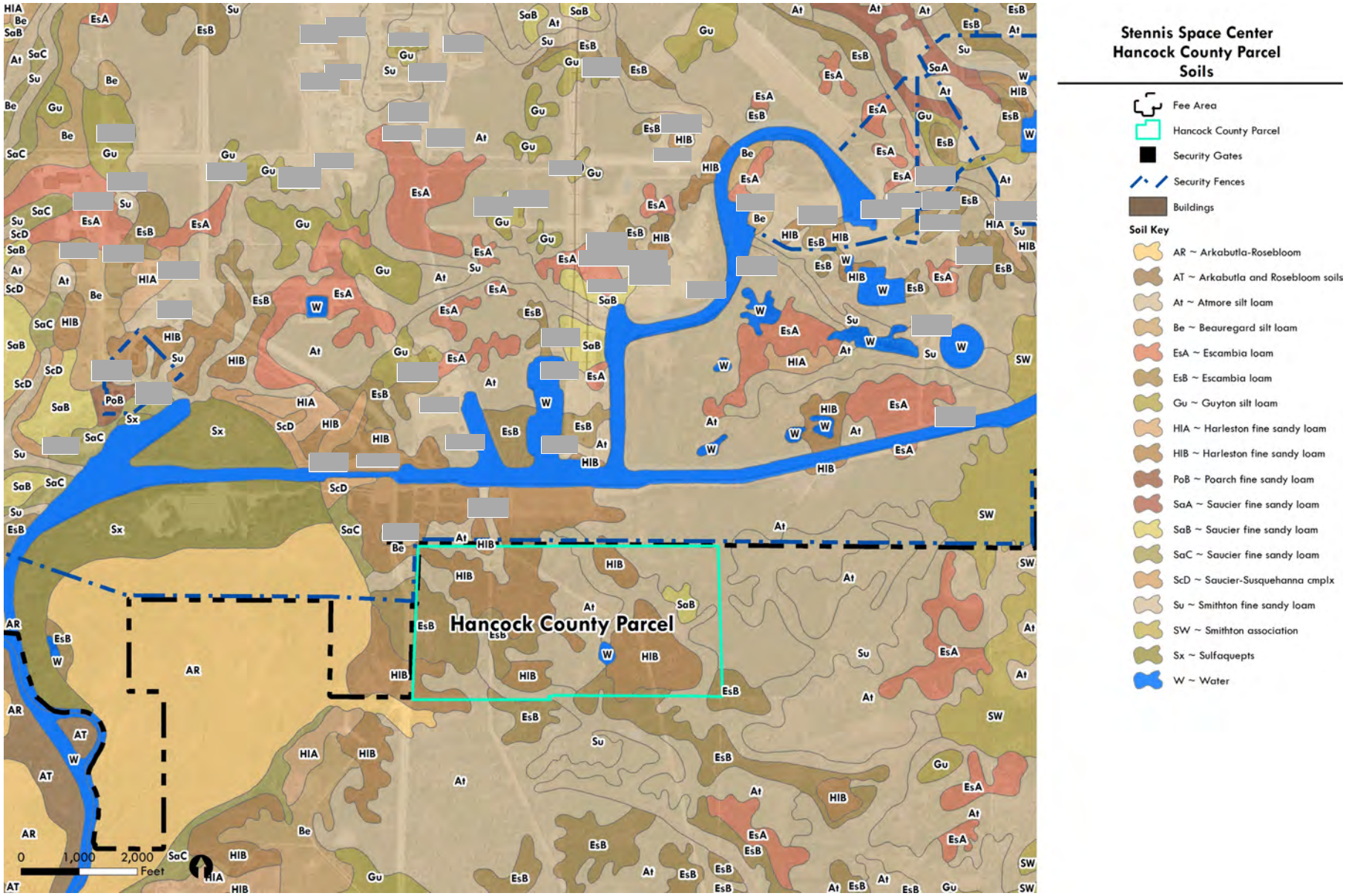
Source: SSC geodatabase, Mississippi Geospatial Clearinghouse

Hancock County Parcel Data – Environmental



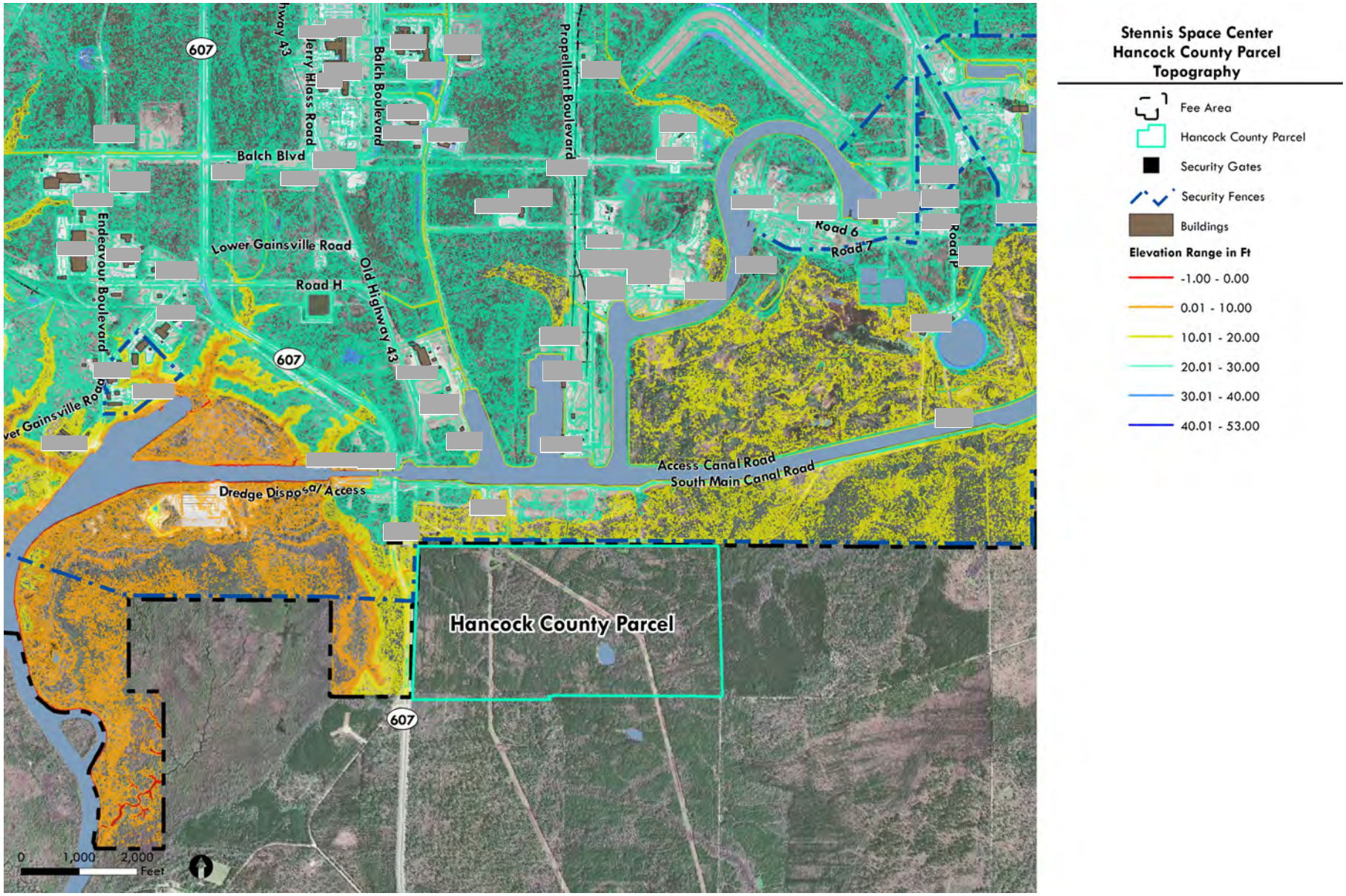
Source: SSC geodatabase, Mississippi Geospatial Clearinghouse

Hancock County Parcel Data – Soils



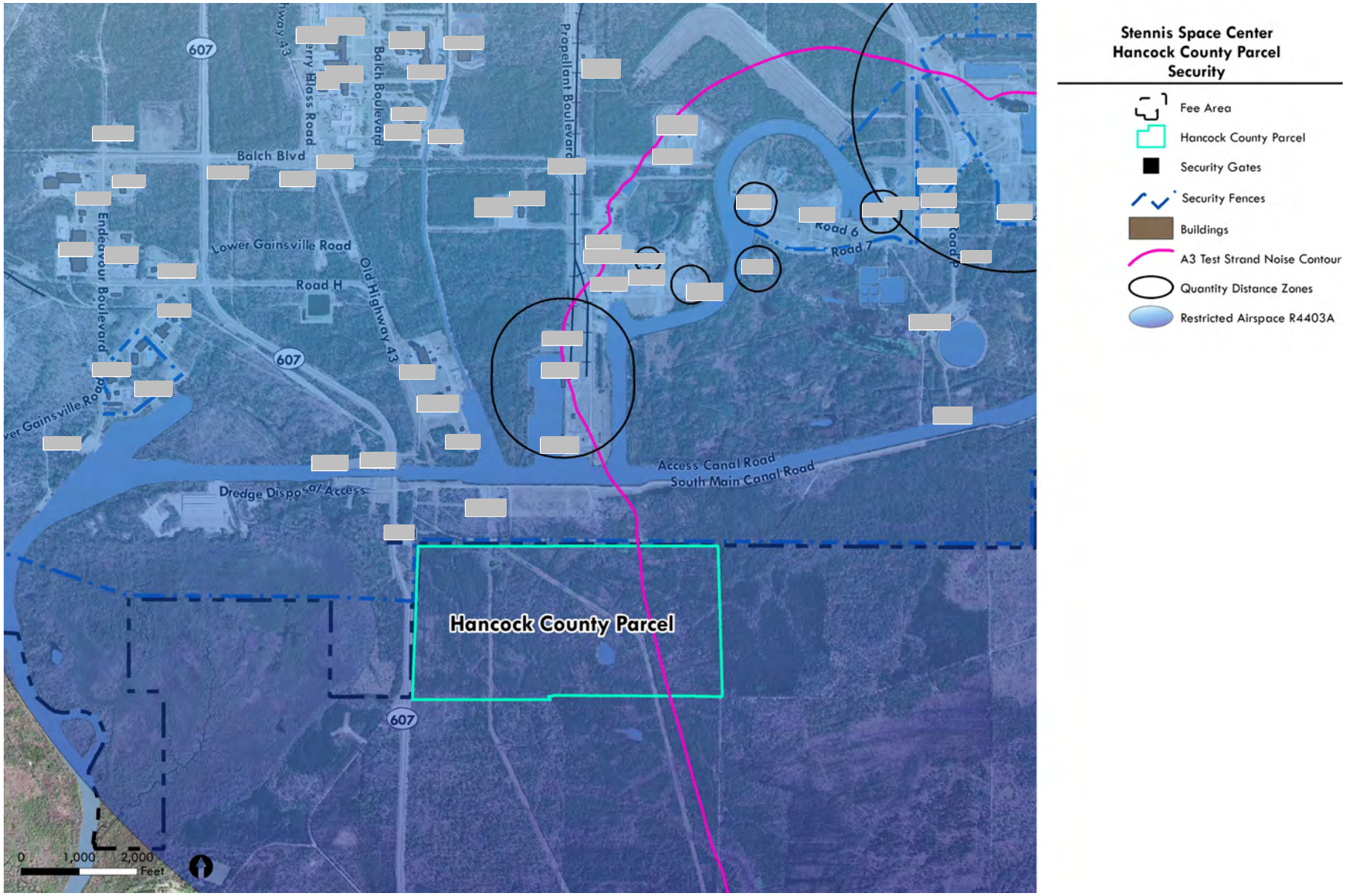
Source: SSC geodatabase, Mississippi Geospatial Clearinghouse

Hancock County Parcel Data – Topography



Source: SSC geodatabase, Mississippi Geospatial Clearinghouse

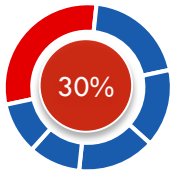
Hancock County Parcel Data – Security



Source: SSC geodatabase, Mississippi Geospatial Clearinghouse

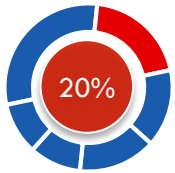
Site Suitability Summary

A site suitability matrix is used to analyze key decision-making factors for development. Each consideration is defined by a goal that provides context for Enterprise Park. The considerations are weighted based on impact to development. The completed matrix on the following page evaluates current site conditions and available data and provides a scored ranking of the three sites based on their comparative site suitability for the proposed Enterprise Park development.



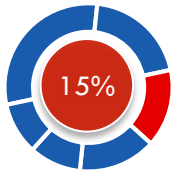
COMPATABILITY

Development of Enterprise Park will have compatible land use and operations in relation to the SSC secured perimeter to fulfill the master plan concept.



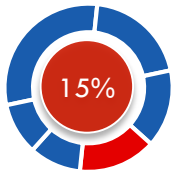
ENVIRONMENTAL

Environmental integrity will be preserved through proper stewardship of natural resources, sustainable site design, and health & safety risks.



TRANSPORTATION

Transportation infrastructure should connect Enterprise Park to the surrounding network, provide functional multi-modal development, and foster an attractive destination for its tenants.

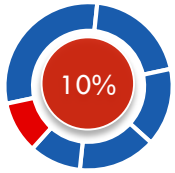


MARKETABILITY

Enterprise Park should have an economic development strategy that supports the goals and value of SSC, while providing a new platform for co-location of adjacent uses.

SECURITY

Development of Enterprise Park will be coordinated with and will not supersede the security systems that support NASA and the tenants within the secured perimeter.



UTILITIES

Utility systems should reliably and efficiently serve Enterprise Park's future service needs and be developed in alignment with the systems and objectives within the secured federal city.

Site Suitability Summary

	PROJECT READY NORTH		PROJECT READY SOUTH		HANCOCK COUNTY PARCEL	
COMPATABILITY	26/30	The site is situated on the northern edge of the Fee Area and is deemed highly compatible with SSC's land use and operations.	28/30	The site is located immediately adjacent to development within the secured fence line in the north and is deemed highly compatible with SSC's land use and operations.	15/30	The parcel is has high visibility near the South Gate, but is outside of the Fee Area and requires an exemption or land swap with Hancock County as the land owner.
ENVIRONMENTAL	10/20	Significant aquatic resources and floodplain intrusion. Further study of endangered and threatened species required for development. Site located immediately adjacent to WDZ.	12/20	Some aquatic resources and floodplain intrusion. Further study required for endangered and threatened species. Site located near WDZ. Partially located within restricted airspace.	15/20	The overall site has minimal flood hazard, but further study of endangered and threatened species are required. Fully located within restricted airspace.
TRANSPORTATION	11/15	Requires widening and improving access to MS 607, which connects to I-59. Internal roads are present, but need to be improved. No access to canal system.	13/15	Immediately adjacent to MS 607, which connects to I-59. An access road borders the southern boundary. Internal road network needs to be established. No access to canal system.	14/15	Immediately adjacent to MS 607, the South Gate, and I-10. Internal road network needs to be established. Full access to the canal system.
MARKETABILITY	14/15	The site has been certified through the MPC Project Ready Program.	14/15	The site has been certified through the MPC Project Ready Program.	10/15	The site is in a prominent location, but requires extensive coordination with local authorities.
SECURITY	7/10	Located close to the WMA and WDZ, which are critical assets to the Navy.	7/10	Located close to the WMA and WDZ, which are critical assets to the Navy.	8/10	Little to no risk in encroaching on NASA or tenant operations.
UTILITIES	8/10	Requires extensive infrastructure construction. Power feed is the longest of all sites. Water and sewer improvements longest of all sites. Analysis may change if connecting to current systems is infeasible.	9/10	All utilities in close proximity or already present within the development site. Relatively short distance to connect to all utilities. Analysis may change if connecting to current systems is infeasible.	6/10	Most utilities in proximity of site. Connection distance to water and sewer about equal to south site. Distance to substation for power is about equal to north site. Analysis may change if connecting to current systems is infeasible.
TOTAL	76/100		83/100		68/100	

Table 3-1

Site Suitability Summary

The site suitability matrix generated the scores illustrated in Figure 3-1 for each site. The sum of the scores for each criterion is added to identify total score for each site:

Project Ready North: 76/100
Project Ready South: 83/100
Hancock County Parcel: 68/100

The weighted scores were determined by evaluating both quantitative and qualitative data to summarize critical site selection data, while accounting for anecdotal input from current SSC employees, potential stakeholders, and local authorities.

Project Ready South emerged as the best site for establishing Enterprise Park. Key factors that led to this result include:

- Absence of land within the 100-year floodplain elevation
- Adjacency with MS 607 and local connector road
- Certification through the Project Ready Program
- Location where buildout provides a natural extension/expansion path to Project Ready North

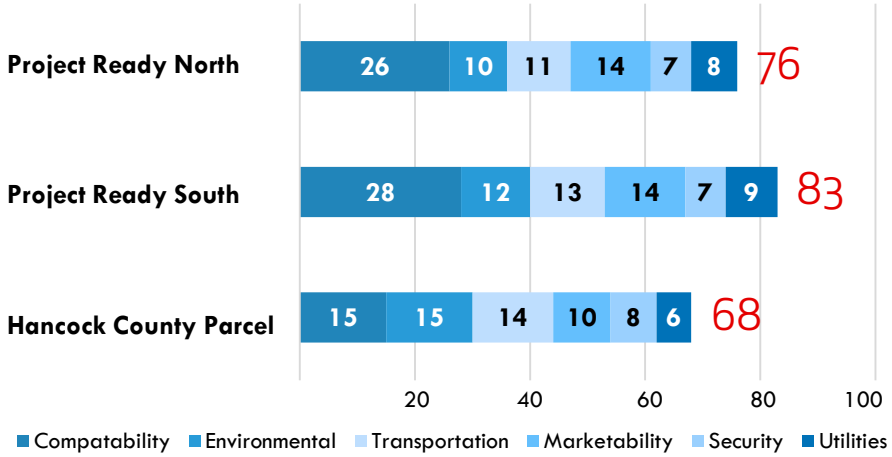


Figure 3-1: Site Suitability Scores

J-2X Engine is Tested on the A-2 Test Stand

PART IV
ECONOMIC FEASIBILITY ASSESSMENT

SSC Test Stands

Introduction

SSC has bolstered the local and regional economy since 1961 through both NASA and its tenants, which include federal, state, and academic organizations and technology-based companies. In recent years, SSC has received growing interest from prospective commercial tenants, but internal and external factors have limited private sector ability to establish operations at SSC. This is largely attributed to the absence of a development opportunity outside of SSC's secured Fee Area. The concept of developing Enterprise Park into a technology corridor has been identified as an opportunity to attract private sector demand and foster growth and partnership at SSC.

Since the 1960s, Stennis Space Center has grown into the nation's largest rocket engine test site, featuring facilities collectively valued at more than $2 billion and considered national assets.

Enterprise Park's ability to advance an environment of innovation-sharing across the federal, state, commercial, and academic partners is integral to fulfilling the Planning Vision and Strategic Plan Goals of SSC. This ability closely aligns with that of a "Research Park" or "Innovation District," defined by the Association of University Research Parks as "**a physical environment that can generate, attract and retain science and technology companies and talent in alignment with sponsoring research institutions that include universities, as well as public, private and federal research laboratories.**" Research parks not only drive innovation, but also afford the sharing of ideas and talent that attracts investment from all sectors.

This market assessment seeks to identify barriers and opportunities to the development of a research park at SSC, and includes:

- A review of SSC's regional economic impact;
- An analysis of identified target industries and prospective tenants;
- Interviews with Enterprise Park stakeholders including existing SSC tenants, academic institutions, local and state elected officials, economic development agencies, and commercial real estate industry professionals;
- An analysis of regional socio-economic and employment trends;
- An assessment of industrial and office real estate markets trends that provide insight into the economic feasibility of the development of Enterprise Park; and
- Recommended economic development strategies to advance the future development of Enterprise Park.

, Located Within the Fee Area

SSC Economic Impact

The NASA reputation, established over 60 years ago, and the respected experience and reputation of the SSC tenant companies and personnel is a key strength at SSC. As stated in the Introduction, SSC is home to more than 50 federal, state, academic, and commercial tenants and a growing workforce of approximately 5,200 people. The workforce is comprised of 1,830 NASA personnel and contractors, 2,118 DOD/U.S. Navy personnel and contractors, 197 Department of Commerce personnel and contractors, and 1,121 employees from other resident agencies. Table 4-1 provides further detail on the breakdown of SSC's major tenants.

Workforce Composition

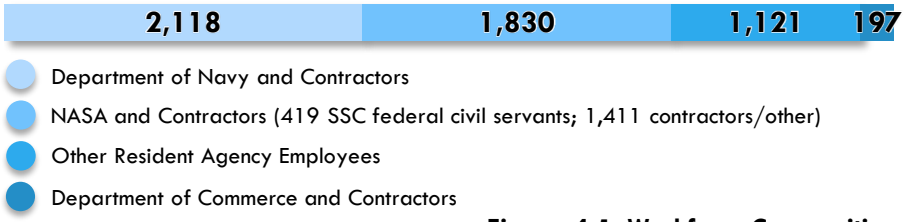


Figure 4-1: Workforce Composition

Federal

NASA
- NASA Rocket Propulsion Test Program
- NASA Shared Services Center (NSSC)
- National Center for Critical Information Processing & Storage (NCCIPS)

Department of Commerce
- National Oceanic & Atmospheric Administration
- National Weather Service
- National Data Buoy Center
- NOAA National Marine Fisheries Service
- NOAA National Center for Environmental Information
- NOAA Navigation Response Team-1

DOD
- Army Corps of Engineers
- Commander, Naval Meteorology and Oceanography Command (CNMOC)
- Navy Detachment Stennis
- Navy Facilities Southeast
- Naval Oceanographic Office
- Navy Office of Civilian Human Resources
- Naval Research Laboratory
- Navy Small Craft Instruction and Technical Training School
- Navy Special Boat Team TWENTY TWO
- Naval Special Warfare Center

Department of Energy
- Strategic Petroleum Reserve

Department of Homeland Security (DHS)
- DHS Data Center 1
- Immigration & Customs Enforcement
- U.S. Citizenship & Immigration Services

Department of Interior
- U.S. Geological Survey
- Hydrologic Instrumentation Facility

Department of Transportation
- Information Systems at NCCIPS

Government Publishing Office
- Passport Production Facility

Government Services Agency
- Information Systems at NCCIPS

Contractors

- A2 Research
- Bastion
- Booz Allen Hamilton
- General Dynamics Information Technology (GDIT)
- Deltha Corporation
- Leidos
- NAVAR
- Northrop Gruman
- Pacific Architects and Engineers
- Pinnacle Solutions
- RiverTech
- SAITECH
- Science Applications International Corp.
- Science Systems and Applications Inc.
- Syncom Space Services (S3)

Commercial Companies

- Aerojet Rocketdyne
- Lockheed Martin Information Systems & Global Solutions Defense Systems
- Relativity Space
- Rolls-Royce North America
- Geocent
- AQST

Academia

Mississippi State University
- Northern Gulf Institute

University of Southern Mississippi
- Business & Innovation Assistance Center
- Dept. of Marine Science

Center for Higher Learning
- Mississippi State University
- Pearl River Community College
- University of Mississippi
- University of New Orleans
- University of Southern Mississippi
  - USM Department of Marine Science

State

State of Mississippi
- Mississippi Enterprise for Technology (MSET)
- Marine Industries Science & Technology (MIST) Cluster

State of Louisiana
- Louisiana Technology Transfer Office
- Louisiana Business & Technology Center – LSU

Table 4-1: SSC Existing Tenants by Sector

SSC Economic Impact

Through propulsion testing and related missions, SSC had a direct global economic impact of $849.4 million in Fiscal Year (FY) 2019. SSC also continues to be a major contributor to the Gulf Coast economies of Louisiana and Mississippi. In FY19, SSC had a direct regional economic impact of $569.1 million within a 50-mile radius, which includes the economies of Hancock, Harrison, and Pearl River counties in Mississippi and St. Tammany Parish in Louisiana. The vast majority (88%) of SSC personnel reside in this four county/parish area. With an average annual salary of $89,000, the SSC workforce is highly skilled and educated; 64% of SSC employees have an Associate's degree or higher, 30% have a scientific or engineering skillset, and an additional 26% have technical or production skills.

The development of Enterprise Park is positioned to leverage SSC's already significant regional economic impact and its highly respected and skilled personnel. Creating opportunities for new companies to co-locate at SSC will further expand the knowledge of the workforce, help attract external investment, enhance research and development activities, and provide stability for SSC. Development of Enterprise Park is the proposed next step.

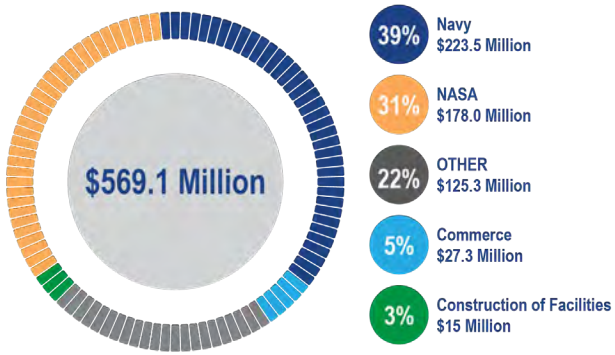


Figure 4-2: Regional Economic Impact of SSC by Major Tenants

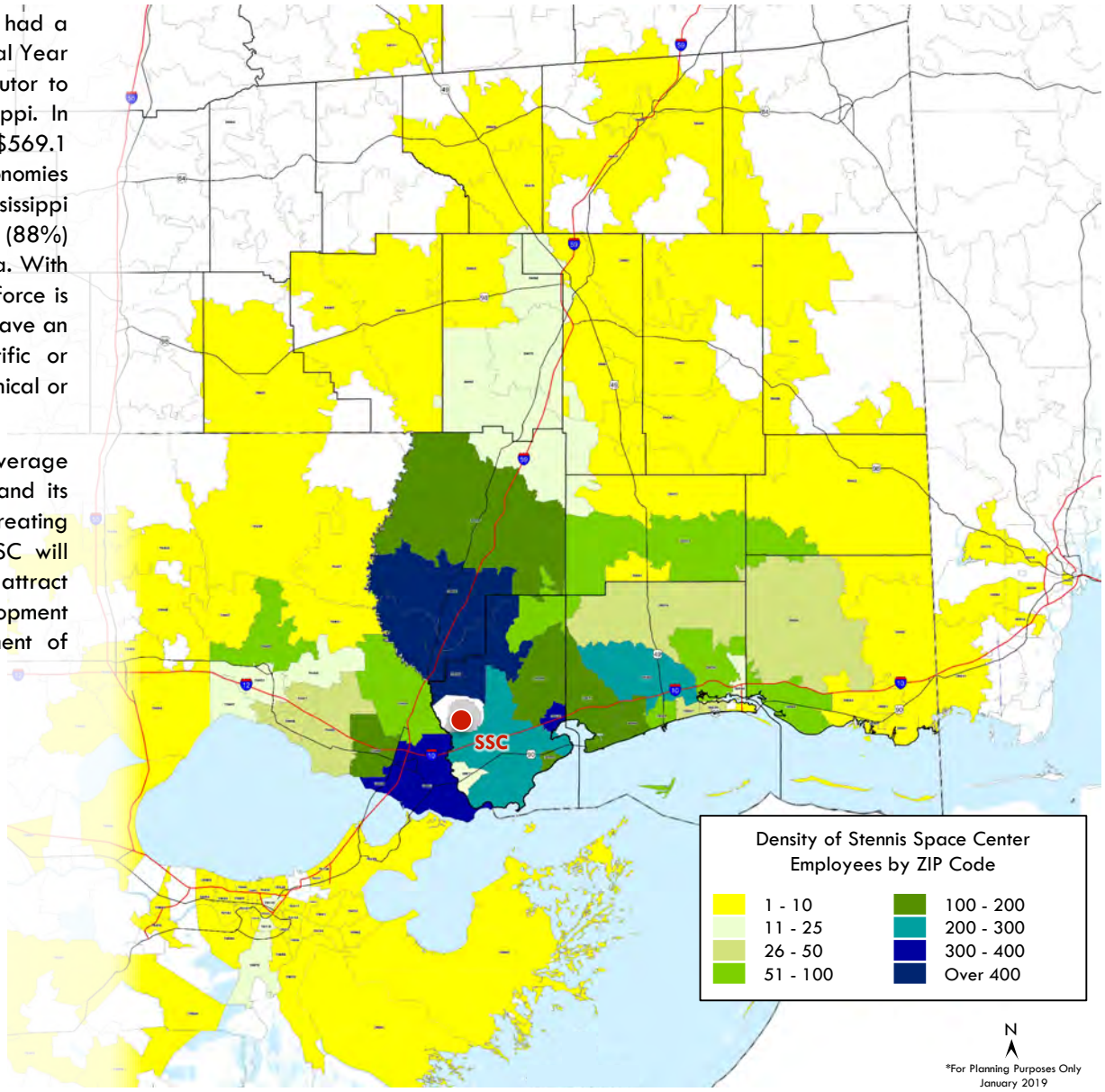


Figure 4-3: Residential Distribution of SSC Personnel by ZIP Code

Target Industries

Existing tenants at SSC were interviewed to better understand the types of companies that support their missions and the potential within those industries for co-location at SSC. These discussions also explored whether additional portions of their supply chains could benefit from co-location at SSC. Resulting from these interviews, four target industries were identified as potential drivers of demand:

- Aerospace,
- Unmanned Systems (aircraft and maritime),
- Shared Services, and
- Academic Institutions and R&D.

This identification is largely based on industries that support and complement the missions of NASA, SSC, and its tenants, rather than on prevalent regional trends in industry and employment.

To further explore the demand potential within these four target industries, SSC retained the University of Southern Mississippi's Trent Lott National Center for Excellence in Economic Development and Entrepreneurship to conduct a "Highest and Best Use Study" (H&BU Study) for the Enterprise Park site. The key findings of this study were extracted from the report. The initial demand potential identified during Project Wild Boar is highlighted in Table 4-2.

Based on these findings, this assessment focuses on the target industries that continue to be identified with the highest potential for generating demand at Enterprise Park: Aerospace and Unmanned Systems. Additionally, the potential for Academic Institutions and R&D programs will also be reevaluated from a different perspective, recognizing that partners in academia and research are critical components of the research park development model.

	CHALLENGES	KEY FINDINGS
Shared Services Initial Demand Potential: **MODERATE**	• Political influence drives consolidation • Consolidation causes job loss • NASA's core mission is not focused on shared services	• Expanding NSSC would align more readily with the facilities within the protected, fenced area • Private-sector companies supporting NSSC might occupy space at Enterprise Park
Aerospace Initial Demand Potential: **STRONG**	• Large capital investment required to build or expand facilities • Large financial investments often require state and local organizations to provide major incentive package support to the relocation of companies	• Aerospace industry is strong and growing particularly in commercial launch sector • Enterprise Park could be attractive for space-related products and services such as earth observation, global atmospheric monitoring, and geolocation transportation services
Unmanned Systems Initial Demand Potential: **STRONG**	• High barriers of entry into the industry and the need for significant capital investment • State public investments in unmanned systems appears to be centering around Gulfport	• Unmanned Aircraft Systems is a well-established sector • Unmanned Maritime Systems is growing with limitless potential • Enterprise Park could attract commercial companies desiring close affiliation with U.S. Navy and universities at SSC
Academic Institutions and R&D Initial Demand Potential: **MODERATE**	• Growth of public university research is focused near Gulfport • Research universities facing pressures that could reduce number of graduate assistants • Growth is not as viable for Enterprise Park due to low human capital/infrastructure investments associated with research • No plans to expand university presence at SSC	• Research is a key component to NASA's overall agency mission • Enterprise Park could potentially attract private sector R&D focused on rocket engine testing or unmanned systems and would align with technology-based tenant companies

Table 4-2: Summary of Initial Findings from USM on Identified Target Industries

Target Industries – Aerospace

The global commercial aerospace sector is expected to have continuous, steady investment in new and existing space technologies with primary investors being governments and venture capitalists. While innovation in space technologies is imminent, most remain in the R&D phase and will likely continue to need external funding until "proven." The U.S. is projected to continue to be a leader in driving growth in the aerospace industry.

In 2018, the overall global space economy was estimated to be $360 billion. The vast majority of the market share ($277.4 billion, 7%) came from the manufacture and launch of satellites and the ground equipment to support those satellites. An additional 22% ($80.7 billion) is comprised of government budgets, the majority of which is attributed to the U.S. government.

Looking at the larger $277.4 billion global commercial ground-to-satellite industry, steady growth has occurred since 2014. Satellite manufacturing in 2018 increased by 26%. The launch services industry, a key focus for SSC, represented $6.2 billion of the greater satellite industry with $2.3 billion attributed to the United States. In 2018, revenues in the launch industry increased 34% globally with a total of 93 commercially procured launches. Based on these figures, and the continued growth in the space economy, business growth opportunities in this industry are possible.

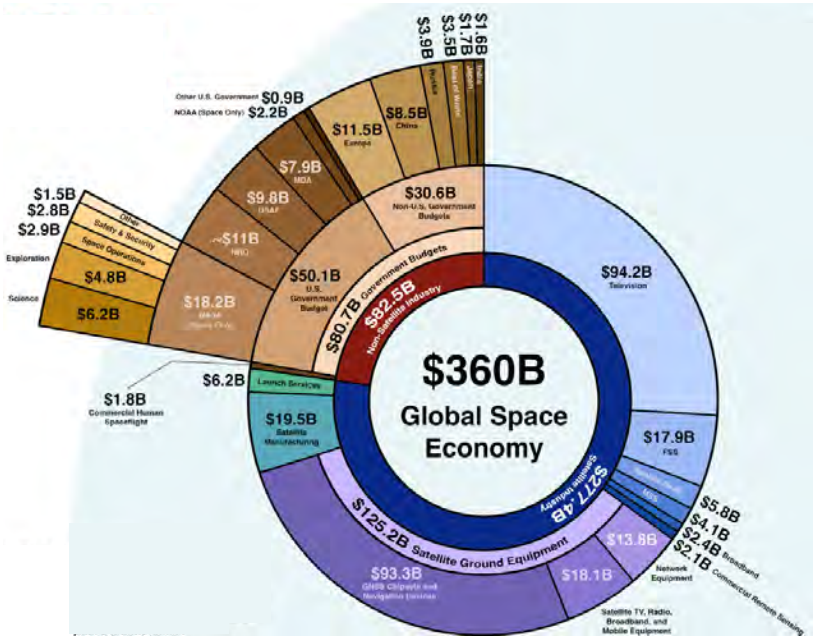


Figure 4-4: 2018 Global Space Economy

Source: Bryce Space and Technology

THE LAUNCH INDUSTRY

The core mission of SSC continues to be in supporting the space launch industry. Since 1961, SSC has been the nation's largest rocket propulsion test facility. As such, SSC has the potential to build on its NASA legacy, and through Enterprise Park, leverage a competitive advantage in the launch industry subsector focused on developing and testing rocket engine and propulsion systems.

As identified in the 2018 H&BU Study, one group of prospective commercial tenants of Enterprise Park are private sector companies in need of proximity to rocket engine test stands. **Because there is capacity to support additional testing at existing sites, there is no immediate need for the new construction of testing infrastructure, which minimizes a significant potential barrier to business attraction.** At the time of publication of the H&BU Study, on-site test stands and supporting infrastructure were routinely operating at 23% capacity.

According to the Federal Aviation Administration's (FAA) most recent Annual Compendium of Commercial Space Transportation, launch activity had a significant year in 2018 with a record of 33 launches from sites licensed under FAA's Office of Commercial Space Transportation (FAA AST). This is the highest number of annual launches since the first licensed launch in 1989. Additional growth is projected to be driven by latent demand of small satellites operators as approximately 50 new small launch vehicles are being developed worldwide.

There are no launch sites in the State of Mississippi. Therefore, the pending FAA AST licensure for the Stennis International Airport as a spaceport is particularly significant for SSC, and should be considered an opportunity to promote the connection from testing to launch. This will better position SSC to capture some of the projected demand in the launch industry. Further connections could be drawn from the close proximity of NASA's Michoud Assembly Facility in New Orleans, Louisiana. The unique and compelling capacity to design, test, manufacture, and launch space vehicles is concentrated within this geography.

Target Industries – Aerospace

The effort to align SSC, NASA, Stennis International Airport, academia, and commercial industry has also gained traction within the legislature with the proposed Licensing Innovations and Future Technologies in Space (LIFTS) Act sponsored by U.S. Senator Roger Wicker and U.S. Senator Cindy Hyde-Smith in 2019. This Act is intended to position SSC as a leader in commercial spaceflight licensing training programs, an effort that would support the research park concept at Enterprise Park. This act is also in recognition of the proliferation of FAA AST licensed sites, and is a strategy to establish competitive advantage for SSC. However, the pending spaceport license at Stennis International Airport will be competing with established licensed facilities nationally. A list of current FAA AST licensed, non-federal commercial launch and reentry sites in the U.S. is provided in Table 4-3.

There are also other active launch and reentry sites owned and operated by the U.S. government in Florida, California, Virginia, New Mexico, and the Marshall Islands. Additionally, non-licensed sites are operated by commercial companies for the purpose of launching their own licensed or permitted vehicles. SpaceX has two sites in Texas, one for testing and another for launching. Blue Origin also owns a launch facility in Texas. However, unlike some of these other facilities, commercial companies located within the Fee Area of SSC are afforded the capability of working outside of the general public's view, which can be a competitive advantage in attracting companies with sensitive operations.

Spaceports are sites that are not federally owned, but have been licensed by the FAA AST to launch either government-owned or commercial vehicles into space. Existing spaceports in the U.S. support vertical or horizontal launches, or both.

SPACEPORT	LOCATION	OPERATOR	LICENSE DATE	SERVICES
Cape Canaveral Spaceport*	Cape Canaveral, FL	Space Florida, NASA, U.S. Air Force	1997	Governmental, commercial, payload processing, scientific
Mid-Atlantic Regional Spaceport	Wallops Island, VA	VA Commercial Space Flight Authority	1997	Commercial, governmental, scientific, academic
Pacific Spaceport Complex	Kodiak, AK	AK Aerospace Dev. Corporation	1998	Commercial, governmental
Mojave Air and Space Port	Mojave, CA	Mojave Air and Space Port	2004	Research and testing, commercial
Oklahoma Spaceport	Burns Flat, OK	OK Space Industry Dev. Authority	2006	Commercial
Spaceport America	Sierra County, NM	NM Spaceport Authority	2008	Commercial
Cecil Spaceport	Jacksonville, FL	Jacksonville Aviation Authority	2010	Commercial
Midland International Air and Space Port	Midland, TX	Midland International Airport	2014	Commercial, scientific
Houston Airport	Houston, TX	Houston Airport System	2015	Commercial, payload processing, scientific
Colorado Air and Space Port	Watkins, CO	Adams County (Front Range Airport)	2018	Commercial, research

**Includes 2 licensed sites.*

Table 4-3: Current FAA AST Licensed, Non-Federal Commercial Launch and Reentry Sites

Sources: FAA AST, Space Florida

Target Industries – Aerospace

Figure 4-5 shows the geographic concentration of licensed launches since 1989. Florida is most notable with the greatest number of licensed spaceports and launches. The coordinated and significant efforts of Space Florida have contributed to the State's continued relevancy in this industry. This economic development agency was created in 2006 as "an independent special district and political subdivision of the State" for the purpose of guiding development of Florida's comprehensive and interconnected spaceport system. **Space Florida could serve as a model for Mississippi to support coordination between SSC and pending spaceport at Stennis International Airport.** The Space Florida model is discussed in detail in the Economic Development Strategy.

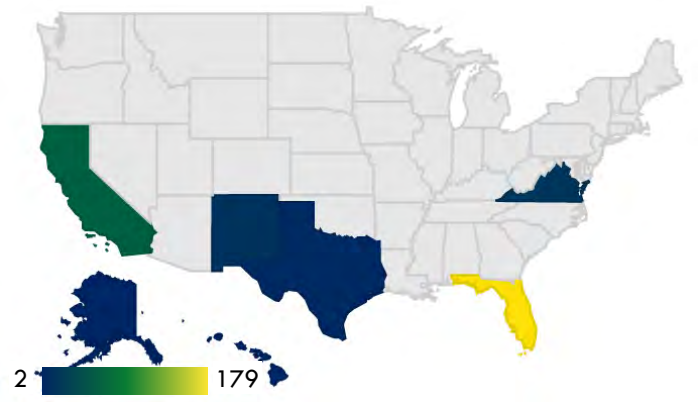


Figure 4-5: Total Operations Since 1989, FAA AST-Licensed Spaceports
Source: FAA AST
Note: Not all licensed spaceports have had licensed activities.

PROJECTIONS

FAA AST forecasted 10-year worldwide demand in the commercial space launch industry from 2018 to 2027 divided in the following payload segments:

- Commercial Telecommunications
- Commercial Remote Sensing
- Commercial Cargo and Crew Transportation Services
- Other Commercially Launched Satellites
- Launch Vehicle Test and Demonstration

Over this period, FAA AST projects 423 total commercial launches. **Of particular significance to Enterprise Park is the growth in remote sensing due to the concentration of expertise at SSC in the fields of oceanography, physical science, physics and meteorology, as well as the military presence.** NOAA is the licensing agency for commercial remote sensing systems and the number of licenses has substantially increased in recent years. Between 1996 and 2010, 26 licenses were issued; by 2017 that number increased to 93.

Major U.S.-based companies active in this field include Airbus Defense and Space, Astro Digital, Capella Space, DigitalGlobe, Hera Systems, Planet, Spaceflight Industries, SpaceVR, GeoOptics, Spire Global, and HawkEye 360, a subsidiary of Lockheed Martin. The FAA estimates that more than 1,600 commercial remote sensing satellites will be launched through 2020, of which the majority are small, including CubeSats.

Also influencing this growth are commercial crew and cargo resupply flights to the International Space Station. Both of these activities require medium-to-heavy vehicles. Another major contributor is the demand to launch smaller payloads from newly introduced small launch vehicles.

START-UPS AND INVESTMENTS

In 2020, Bryce Space and Technology released a report on the investment landscape in the space start-up industry and identified three prevalent trends:

- Investment capital continues to flow in the start-up space venture industry at increasing rates.
- After years of investment, many start-ups have yet to prove profitability.
- The government as a potential customer is becoming ever more significant to the success of start-ups.

In 2016, more than 100 investors provided $2.8 billion of investment to 43 space start-up ventures. By 2019, space start-ups attracted $5.7 billion of investment across 135 ventures. Nearly 70% of total investment went to five companies: SpaceX and Blue Origin, combined $1.9 billion; OneWeb, $1.25 billion; Virgin Galactic, $682 million; and Relativity Space, $140 million.

Target Industries – Aerospace

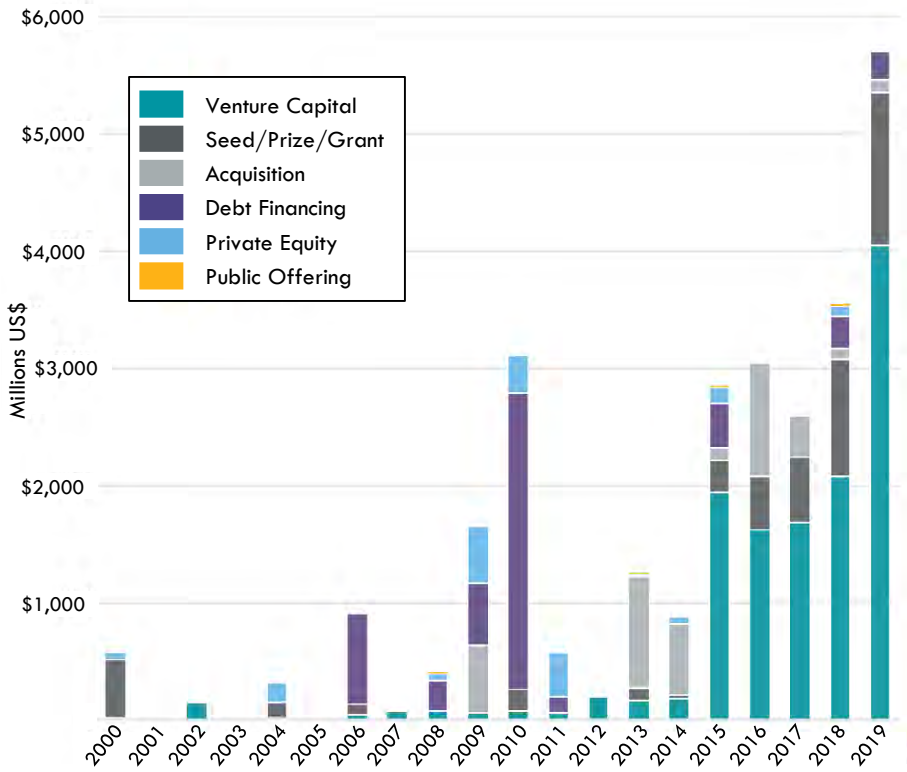


Figure 4-6: Investment in Space Companies by Type, 2000-2019
Source: Bryce Space and Technology

Figure 4-6 included in the Bryce report provides a clear indication that growth in investment continues to be substantial. The figure shows a 34% increase in investment between 2018 and 2019. However, this strong surge was in some part due to increased investment in non-U.S. ventures.

In 2019, the government also provided a direct source of funding for space start-up ventures. This funding is becoming increasingly attractive with the formation of the U.S. Space Force and increased research-focused contracts. **The start-up industry is becoming an increasingly important driver of innovation for the government.** SSC and Enterprise Park could take advantage of this growing link between government and the start-up industry, which could be a particularly compelling aspect of the research park concept. However, start-ups still largely locate near their primary source of funding. Of particular note is the significance of Silicon Valley as a result of the concentration venture capitalists, as well as NASA Research Park at NASA's Ames Research Center. Despite this, SSC maintains advantages, like the Acoustical Buffer Zone, that may be a draw for emerging companies. Relativity Space recently established operations at SSC while maintaining its headquarters in the Los Angeles region. Additionally, the cost of living in Mississippi is substantially lower than in California and other competitive states, as explored in the Regional Socioeconomic Profile.

NASA

In 2017, U.S. President Donald Trump issued a space policy directive that called for a renewed effort to send humans to moon and to Mars. The policy authorized government partnership with private industry to fulfill this mission, now called the Artemis program. In 2020, President Donald Trump announced his goal to raise NASA's annual budget to $25.2 billion, a 12% increase from the current fiscal year. In March 2020, NASA announced that SpaceX will be the first commercial provider under the Gateway Logistics Services contract to deliver cargo to the agency's Gateway in lunar orbit.

These recent events solidify the government's commitment to move forward with this mission in partnership with commercial companies, fostering innovation and continued exploration. **SSC is already involved in activities that support the Artemis program, and based on its deep history, is well-positioned to continue this support as new engines are designed and tested.**

TARGET COMPANIES

In 2018, there were 90 orbital launch vehicles in use worldwide with another 50 new systems in development. The FAA's 2018 Annual Compendium of Commercial Space Transportation provides a summary of commercial companies with liquid rocket engines currently available in the U.S. The following list provides a foundational understanding of prospective Enterprise Park tenants:

- Blue Origin
- Aerojet Rocketdyne
- SpaceX
- Virgin Orbit
- Orbital ATK
- Rocket Lab

Target Industries – Aerospace

The report identifies several other U.S. companies with systems under development, but are projected to be commercially available in the near future:

- Firefly Aerospace
- CubeCab
- Stratolaunch Systems
- Vector Space Systems
- United Launch Alliance (ULA)

Lastly, the report cites six major U.S.-based aerospace companies developing and manufacturing commercially launched spacecrafts, three of which are also in the launch industry as noted below:

- Ball Aerospace
- Boeing (launch)
- Lockheed Martin (launch)
- Northrop Grumman
- Orbital ATK (launch)
- Space Systems Loral (SSL)

The 2019 outreach strategy developed by Bryce Space and Technology outlines in greater detail potential commercial aerospace companies with which SSC should begin forming relationships, many of which are also key firms in the industry. The strategy recommended seven potentially promising partners, nine companies that SSC should further investigate, and 16 companies that may be long-term candidates for partnership. These are provided in Table 4-4.

Promising Potential Partners	Rocket Lab, Blue Origin*, Aerojet Rocketdyne*, exos Aerospace, Virgin Orbit, Boeing*, Relativity*	**Promising Companies Requiring Further Investigation**	abl, SpaceX*, GTL, Astra, SNC Sierra Nevada Corporation, Momentus Space, Masten, Virgin Galactic
Potential Long-Term Candidates (Propellant not currently support by SSC)	UP Aerospace, Stoffel Aerospace, SpinLaunch, Northrop Grumman, (h[s]) HyperScience, Aphelion	**Potential Long-Term Candidates** (Funding Status)	Aevum Space Delivery Services, JP Aerospace, Blushift Aerospace, CubeCab, Rocket Crafters, Thor Launch Systems, Cloud IDC

* *Indicates current or past SSC tenant*

Table 4-4: Potential Target Commercial Aerospace Companies

Source: Bryce Space and Technology

Target Industries – Unmanned Systems

Unmanned systems are autonomously operated air, ground, and maritime vehicles that can be used for a wide variety of purposes including defense, intelligence, emergency management, and research. As noted in the 2018 Highest and Best Use Study, this is a multi-billion-dollar industry that continues to grow and evolve as new technologies emerge.

UNMANNED AIRCRAFT SYSTEMS (UAS)

The UAS industry has continued to experience growth nationally and worldwide. This industry not only includes unmanned aerial vehicles (UAVs), but also the communication links, radio systems, sensors, and supporting software. After a period of decline in government spending, industry market analysts anticipate new military and defense investments in intelligence technologies including unmanned systems. R&D spending is speculated to increase by approximately 25% through the end of the decade. Regardless, continued growth of the industry through years of fluctuating government spending indicates strong commercial markets and diversification of end-use application. Opportunities are evolving for UAVs to be employed in public safety, transportation, infrastructure, and agriculture.

In southern Mississippi, there are a number of companies already active in the UAS industry including Northrop Grumman with their Unmanned Systems Center in Jackson County. This company is just one of three that manufacture UAVs in the state. While not currently supporting these operations in Mississippi, major commercial companies located in the state are developing UAS divisions, including Lockheed Martin. There may be potential to target these companies to explore whether additional operations could be expanded at Enterprise Park. Also significant for the state's advancements in this field is the Alliance for System Safety of UAS through Research Excellence (ASSURE), which serves as the FAA's Center of Excellence for UAS Research and is led by Mississippi State University. In September 2018, FAA awarded funding to Mississippi State University's Center of Excellence to expand its research on the integration of UAS into the National Airspace System.

SSC is poised to leverage its more than 100 square miles of restricted airspace that can be utilized by the DOD, NASA, FAA, and commercial industry to attract companies in UAS. The restricted airspace affords low- to high-altitude testing supporting both civilian and military UAVs. SSC may also leverage its proximity and access to both Stennis International Airport and Picayune Municipal Airport. Building off of its test center identity, SSC could promote not only the testing and development of UAVs, but also their support systems. Additionally, the ability for SSC to support both UAS and unmanned maritime systems (UMS) may be attractive for developers and users requiring a range of activities and platforms.

UNMANNED MARITIME SYSTEMS (UMS) AND THE BLUE ECONOMY

Southern Mississippi has a long-recognized specialization in the maritime (or blue) economy afforded by two deep-ocean ports in Gulfport and Pascagoula and the presence Ingalls Shipbuilding, the largest manufacturing employer in the State. But Mississippi's blue economy stretches beyond shipbuilding, and fostering continued growth in this economy necessitates a focus on innovation and drawing connections to the region's military and naval presence.

The blue economy can be broadly defined as all economic activity related to the maritime sector. In Mississippi, this includes, but is not limited to, shipbuilding, tourism, commercial fishing, oil and gas production, logistics, naval operations, and R&D activities.

Source: Mississippi's Blue Economy: An Analysis of Mississippi's Maritime Commerce, July 2014

In addition to the prominent presence of NASA, SSC benefits from a unique concentration of maritime assets that affords SSC a role in the State's blue economy. These include NOAA's National Data Buoy Center, the U.S. Geological Survey Hydrologic Instrumentation Facility, CNMOC, NRL, the Naval Oceanographic Office the U.S. Navy SEAL's Special Boat Team TWENTY TWO, and the University of Southern Mississippi's (USM) Department of Marine Science. CNMOC in collaboration with NRL, are leading the Navy's research efforts in exploring more efficient and effective way to employ unmanned systems in naval operations. Therefore, building on existing assets, SSC has the potential to become a center for the UMS industry.

Target Industries – Unmanned Systems

In response to the naval initiative to expand the use of UMS, former Mississippi Governor Phil Bryant established the Ocean Task Force in 2017 to evaluate and recommend courses of action to expand the state's blue economy. The primary focus was recognizing Mississippi's unique opportunity to advance the UMS industry in partnership with U.S. Navy, academic institutions, and private industry. The Task Force identified 12 federal agencies, eight state agencies, and 36 commercial companies already involved in UMS in the State, and another 30 companies that have capabilities to support UMS. Additionally, the Task Force identified existing industries that use UMS and other related technologies in operations. The oil and gas, ports and transportation, commercial fishing, and aquaculture industries are all looking to expand investments in UMS technologies. Finally, based on identified gaps in capacity, workforce education, and application, the Task Force developed recommended actions, some of which are concepts that could be supported at or strengthened by Enterprise Park:

- Establish a maritime systems innovation and commercialization center to foster new systems and platforms—focused on, but not limited to, UMS—within academic, industry, and business development spaces.
- Establish a federally supported regional engineering and development center, co-located with the innovation and commercialization center, to support development and application of maritime systems and platforms for ocean exploration, forecasting, and data collection.
- Enhance high school, community college, and university education and workforce training programs to create a pipeline for success and retention of Mississippi students.
- Establish and operate a UMS warehouse and depot to serve as a centralized facility to manage the [potential operational] range.

In May 2018, MSET and USM released an extensive report on the economic outlook of the UMS industry in Mississippi. Table 4-5 from this report provides an overview of the industry. The report indicates that contractors supporting the U.S. Navy comprise most of the work performed in this industry. This will continue with the U.S. Navy's goal of doubling its UMS survey fleet to 300; should the U.S. Navy decide to integrate UMS into fleet operations, that demand could be as many as 1,000. **The largest external driver of the industry continues to be federal spending.**

While there are a number of large companies with satellite offices in Mississippi, smaller companies are also coming into the UMS market as new technologies are reducing entry costs. MSET and USM surveyed all UMS companies in the State, the results of which indicated a growing industry in part due to technology advancements as systems are employed for uses beyond the military. In addition to naval operations, other primary UMS users are the oil and gas industry and oceanic researchers.

Life Cycle Stage: Growing	High demand and high technology change
Revenue Volatility: Varied	Past heavy dependence on federal defense spending created unpredictability; new non-military uses proving more consistent environment
Capital Intensity: Medium	Requires a fair amount of infrastructure and capacity investment
Industry Assistance: Medium	The industry receives moderate assistance from federal R&D efforts
Concentration Level: Growing	National and State efforts are working toward a higher concentration in the State
Regulation Level: Varied	Regulations vary by type of system. Airborne systems are currently heavily regulated, while satellite and water systems are less regulated
Technology Change: High	Systems are continually becoming more advanced, agile, and accessible
Barriers to Entry: Medium	As costs decrease, barriers to entry decrease
Industry Globalization: Growing	UMS are being used for military and non-military purposes globally
Competition Level: Growing	As demand increases, more companies are entering the market

Table 4-5: UMS Industry Overview
Sources: FAA AST, Space Florida

Target Industries – Unmanned Systems

A February 2020 report commissioned by the Mississippi Defense Initiative further emphasizes the importance of UMS in southern Mississippi and identified enterprises well positioned to work together as an emerging blue economy cluster. While recognizing UMS as a key enterprise for this effort, the report also identifies potential in sea-space systems as a result of SSC's unique regional presence. Opportunities within sea-space systems exist at "the intersection of ocean engineering, marine science and space science," and more specifically in remote sensing and unmanned systems. Further, one of three recommended paths for advancing the blue economy is to develop the region into a center for testing new technologies. This path aligns with SSC's historical identity as a national testing center, which could be a tremendous asset to this approach.

While SSC may be disadvantaged due to its location inland from the coast, **its direct access to the Gulf of Mexico and strong partnership with the U.S. Navy and NOAA make a compelling argument for investing in Enterprise Park.** The 2018 Highest and Best Use Study also highlights the potential for Enterprise Park to serve as a centralized unmanned systems facility due to its open land, rivers, and restricted airspace. The study acknowledges opportunities to attract UMS developers and manufacturers based on these same advantages.

COMMERCIAL UMS COMPANIES IN MISSISSIPPI

As previously mentioned, the 2018 MSET and USM study identifies major companies in the state that design, manufacture, and/or operate UMS. A list of these companies and how they support the industry are included below; descriptions were extracted directly from the report.

- **Lockheed Martin's Mississippi Space and Technology Center** at SSC manufacturers major components for nearly any type of satellite launched, including those with sensors that monitor the ocean environment.
- **Leidos**, in partnership with U.S. Marines, is currently designing and building unmanned surface ships for the Navy.
- **VT Halter Marine** is building survey ships for the Navy, the latest of these designed specifically for the easier deployment of unmanned underwater systems.
- **Boeing**, like many other larger companies, often relies on smaller companies for the next technology leap in UMS, then purchases the company that continues to operate as a wholly owned subsidiary. Two of the UMS companies owned by Boeing and located in Mississippi are Aurora Flight Services and Insitu.
- **General Atomics** is working with the University of Mississippi to begin an on-campus collaborative effort focusing on acoustic sensing and navigation technologies for water-based UMS to aid DOD operations in deep-sea areas.
- **General Dynamics's** Information Technology division and Vencore Services and Solutions currently support the use of data from UMS within Navy environmental support tools, products, maps, and forecasts/predictions.

Additionally, the 2017 report on Governor Bryant's Ocean Task Force states that there are 30 companies with a presence in the Mississippi that do not currently support the UMS industry, but are well positioned to build on these capabilities. These included Huntington-Ingalls Shipbuilding, BAE Systems, GE Aviation, Raytheon, and Tyonek.

NOAA Warehouse Within the Fee Area at SSC

Target Industries – Academic Institutions and R&D

R&D is a basic component of NASA's overall agency mission that complements and supports the other target industries that are prospective drivers of demand at Enterprise Park. While this is an area identified as having potential at SSC, the 2018 Highest and Best Use Study recognized several limitations such as competition with the Gulf Coast for resources and the absence of expansion plans for existing universities at SSC. Therefore, the study recommended that R&D efforts focus on private sector investment. Despite these potential limitations, it remains important to identify and evaluate potential academic institutions that are essential partners to advancing the research park concept at Enterprise Park.

Existing SSC tenants with a focus on R&D include: NRL; USM's Division of Marine Science (DMS), Hydrographic Research Science Center, and the Center for Gulf Studies; Mississippi State University (MSU); Business & Innovation Assistance Center - Louisiana State University (LSU), Louisiana Technology Transfer Office; and Mississippi Enterprise for Technology (MSET). While there are no current plans for these entities to expand their current physical presence at SSC, there are several opportunities to consider:

- Potential NRL expansion with the U.S. Navy's increased development of UMS along the Gulf Coast;
- Potential increase to CNMOC or NOAA operations, driving a need for USM's Department of Marine Science to expand;
- Potential to nurture growth in MSET's incubator companies to encourage long-term sustainability and expansion into Enterprise Park; and
- Anticipated need for more engineering and unmanned systems certification programs.

ACADEMIC PARTNERSHIPS

The Center of Higher Learning (CHL) was created in 1989 to coordinate academic activity at SSC. CHL is a consortium of four institutions that provides a coordinated, multi-university approach for interdisciplinary education and offers several graduate degree programs and individual academic classes through the USM, MSU, the University of New Orleans, and Pearl River Community College (PRCC). There remains potential to expand relationships with these universities that offer programs essential to developing a skilled workforce in industries supporting SSC. For example, USM's School of Computing is focused on developing advanced algorithms for big data analytics, which could provide leading technologies for collecting, processing, and analyzing large amounts of data. MSU leads a wide range of research and other programs that support the State's blue economy. Specifically, the Bagley College of Engineering at MSU offers undergraduate, master's, and doctoral degrees that support the State's coastal industries, including those with a presence at SSC.

Different partnership models may have potential to attract new academic institutions and expand the presence of existing universities at SSC. A noteworthy local example is PRCC's recent ground-breaking on the Phil Bryant Aviation and Aerospace Workforce Academy across from the Stennis International Airport in December 2019. The development of the academy will be a new and expanded presence for PRCC at the airport, with direct access to Stennis International Airport runways, service, and fueling facilities. State-of-the-art learning spaces for students will include computer and video enhanced classrooms and adjacent hands-on labs and shop spaces. The Academy's curriculum will focus on airframe and propulsion technology, unmanned aerial systems, and precision manufacturing.

As the industry continues to expand, PRCC's role as a key workforce development partner presents an opportunity for SSC. Enterprise Park and SSC provide similar and expanded facilities compared to Stennis International Airport, and any potential future expansion of PRCC's academic and training programs would find an ideal home at SSC. Similarly, this academic partnership model could be explored with other institutions that have specialized programs in aerospace and maritime fields. This could include identifying ways to expand existing relationships with CHL institutions. Table 4-6 highlights several other relevant programs offered at area institutions.

Target Industries – Academic Institutions and R&D

ACADEMIC INSTITUTION	LOCATION	DISTANCE FROM SCC	SAMPLE OF RELEVANT PROGRAMS
Tulane University	New Orleans, LA	52 miles	Computer Science, Mathematics, Materials Science and Engineering, Physics and Engineering Physics, River-Coastal Science and Engineering
University of New Orleans	New Orleans, LA	45 miles	Computer Science, Electrical Engineering, Mathematics, Chemical Engineering, Naval Architecture and Marine Engineering, Physics
Loyola University	New Orleans, LA	52 miles	Computer Science, Marine Biology, Mathematics, Physics
Mississippi Gulf Coast Community College	Perkinston, Gulfport, and Gautier, MS	47-70 miles	Aerospace Engineering, Aviation, Chemical Engineering, Computer Science, Electrical Engineering, Fight Operations, Industrial Engineering, Marine Biology, Mathematics, Meteorology, Petroleum Engineering, Polymer Science Engineering
Delgado Community College	Slidell and New Orleans, LA	21-49 miles	Computer Aided Design and Drafting, Computer and Electronics Service Technology, Computer Network Technology, Electrical and Electronics Engineering Technology, Industrial Maintenance Technology, Precision Machining, Welding
Pearl River Community College	Poplarville, MS	40 miles	Aerospace, Chemical, Computer, Mechanical, and Electrical Engineering; Geospatial Analysis and Intelligence; Marine Science; Meteorology; Petroleum Engineering, Polymer Science Engineering
Nunez Community College	Chalmette, LA	45 miles	Aerospace Manufacturing Technology, Coastal Studies and GIS Technology, Business Information Technology
University of Southern Mississippi	Hattiesburg, MS	75 miles	Computer Engineering, Information Technology, Marine Science, Ocean Engineering, Polymer Science
Mississippi State University	Starkville and Meridian, MS	162-255 miles	Aerospace Engineering, Aerospace Studies, Chemical Engineering, Geospatial and Remote Sensing, Geographic Information Systems

Table 4-6: Academic Institutions and Programs Related to SSC Industries

Mississippi Gulf Coast Community College (MGCCC) has a strong emphasis on workforce development, and partnered with Mississippi Power Company and the Harrison County Development Commission to create the Mississippi Gulf Coast Advanced Manufacturing and Technology Center (AMTC) in Gulfport. This facility serves as a model for cooperation between education and business for the state. The focus of AMTC is to provide advanced manufacturing, industrial, technical, and professional skills training and support economic development on the Mississippi Gulf Coast. In addition, MGCCC is home to the Haley Reeves Barbour Maritime Training Academy, which was established in 2013 in Pascagoula.

The University of Alabama's Huntsville's College of Engineering is another model for SSC to explore. The College of Engineering has experienced significant growth over the past decade. In particular, the Mechanical and Aerospace Engineering Department (MAE) is witnessing a 50% increase in full-time faculty positions, lecturers, and support staff. The University features 16 high-tech research centers and labs, which oversee nearly $90 million in research expenditures and serves as the anchor tenant for the second largest research park in the nation, Cummings Research Park. It maintains strong partnerships with federal agencies including NASA's Marshall Space Flight Center.

Target Industries – Academic Institutions and R&D

The Mississippi Research Consortium (MRC) is another group that could play a key role in growing an academic presence and R&D at SSC. MRC was formed in 1986 and includes the state's four research universities: Jackson State University, Mississippi State University, the University of Mississippi, and the University of Southern Mississippi. Some of MRC's objectives include enhancing the state's science and technology infrastructure, improving collaboration resources and federal laboratory partnerships, and expanding economic opportunities through technology and knowledge transfer.

Strategies to attract academic institutions to SSC should also cater to perceived and anticipated university needs and desires. During stakeholder interviews, universities expressed interest in academic space outside the Fee Area to better service the market. Additional classroom space, forming a satellite or extension campus, identifying adjunct professors and faculty, and creating an internship program are potential priorities for academic institutions in the region. **By building incremental relationships with academic institutions, SSC can position itself to be home to a cluster of up-and-coming talented professionals who will be the next wave of innovators. Not only will this make SSC more attractive to other academic intuitions, but these efforts also support the larger business attraction strategy.** Private R&D companies in the technology and aerospace fields will be drawn to locating in an innovative environment with a strong existing workforce. While current SSC tenants have indicated that regional workforce initiatives have been valuable in developing and attracting talent, there remains an opportunity to continue building on these efforts.

MISSISSIPPI ENTERPRISE FOR TECHNOLOGY AND R&D OPPORTUNITIES

MSET helps foster business opportunities among public and private entities in Mississippi and is working to advance its vision for SSC to be a focal point in attracting high-tech companies to the state. MSET has an incubator at SSC and administers other programs designed to inform candidate companies about procurement opportunities at SSC to facilitate economic development and business opportunities in and around the region. These include weekly lunch and learns, Stennis Business Consortium (SBC) meetings, technology transfer forums, and more.

MSET has also been involved with two regional innovation clusters. The first, Enterprise for Innovative Geospatial Solutions (EIGS), is a cluster for remote sensing and the Geographic Information Systems (GIS) industry. EIGS leverages its cluster support by coordinating services with regional resource providers. The cluster moved off-site from SSC and has continued to secure funding through the Small Business Administration (SBA) in the past five years. The second is the Marine Industries Science and Technology (MIST) cluster, which is supported by USM and is focused on the development and implementation of applied technologies for operating in, working around, and monitoring the marine and coastal environments. The cluster is in its fifth year of a five-year contract, and USM plans for its continuation after the contract. Stakeholder interviews indicated that there may be a desire for one more cluster, potentially in the aerospace field. Since clusters grow organically, it is important to consider the difference in the aerospace and maritime industries at SSC and in the region, including the supporting infrastructure and workforce. While there are big aerospace names at SSC, there lacks supply-chain support and limited workforce development in the field. Enterprise Park could potentially serve as a future home for either of the two existing innovation clusters or a possible third aerospace innovation cluster.

A creative example of private investment that may have applicable lessons for SSC is Chevron's Fab Lab (fabrication lab), which was opened in Jackson County in 2018. Chevron provided a $1.2 million grant to fund a mobile Fab Lab unit and stationary lab located in Vancleave. This was the ninth lab that Chevron has opened in areas where the company operates, and the concept promotes the idea of STEM curriculum. A Fab Lab-type facility at Enterprise Park could provide start-up companies and innovation clusters with access to tools that would otherwise potentially be cost-prohibitive. Private investment in such a facility would create a highly marketable amenity at Enterprise Park.

The potential for a third cluster, the ability to leverage opportunities presented by existing clusters, and the ability to nurture the growth of MSET's incubator companies are important factors for attracting companies with a R&D focus. A major hinderance to realizing these opportunities is the lack of space outside the gate. R&D development may be a more challenging industry for SSC and Enterprise Park to grow, but there are many opportunities and models that can help advance opportunities in this sector.

Stakeholder Interviews

A comprehensive stakeholder engagement strategy was implemented to augment quantitative market data collected for this assessment. Stakeholders were identified by Michael Baker International in conjunction with NASA and included representatives from a range of organizations including local and state elected and appointed officials, educational institutions, and businesses. Interviews were conducted between March 12, 2020 and March 27, 2020. In total, 54 individuals representing 41 organizations participated in over 40 conference calls. General observations were grouped by input pertaining to SSC, Enterprise Park, and partners/partnerships.

STENNIS SPACE CENTER

NATIONAL ASSET

SSC was identified by several stakeholders as a one-of-a-kind national asset for high hazard/high risk testing and training primarily due to the 125,000-acre Acoustical Buffer Zone and 100+ square miles of restricted airspace. Both public and private entities conduct R&D activities associated with aerospace engine testing for NASA and commercial industry, Naval Warfare Training Operations, and autonomous systems.

EMPLOYMENT CENTER

SCC serves as a significant regional employment center and economic generator in the southern Mississippi and Louisiana region, employing approximately 5,200.

REMOTE TESTING ADVANTAGE

The Acoustical Buffer Zone combined with the restricted airspace will continue to draw both established and start-up aerospace companies requiring a remote testing environment.

ASSET POTENTIAL NOT FULLY ACHIEVED

Several stakeholders recognized that although SSC is a national asset, it has not yet achieved its full potential. The following activities, both in progress and to be explored, were identified as potential opportunities to maximize SSC as a national and regional asset:

- **Expanded Aerospace Engine Testing** – SSC provides a remote environment for aerospace engine testing unlike any other in the nation The Acoustical Buffer Zone gives public and private sector entities a location to maximize aerospace engine testing capabilities.
- **LIFTS Act Training Center** – Sponsored by U.S. Senators Roger Wicker and Cindy Hyde-Smith, this act would modernize training for the federal commercial space licensing workforce. If passed, the bill would facilitate collaboration between academia and industry to create a centralized training facility for the safety and licensing of space personnel at SSC.
- **FAA AST-Licensed Spaceport** – Hancock County Port & Harbor Commission (HCPHC) applied to the FAA AST to license Stennis International Airport as a spaceport. The designation would leverage the R&D capabilities at SSC. If approved, Stennis International Airport would be the 12th licensed spaceport in the nation.
- **Need for Precision Calibration** – The need to address accuracy of sensors is a growing research emphasis after the BP oil spill and Hurricane Katrina. Companies developing new sensor prototypes require precision calibration services to ensure instrumentation is evaluated and adjusted to reduce and eliminate variations in repeated measurements. There is a void in precision calibration laboratories across the nation.

MSU Building at SSC

SSC ROLE, VISION, AND MISSION

Several stakeholders inquired about SSC's role in space exploration over the next 25 years. Should SSC complete the test stand build out as originally master planned in the 1960s or should SSC be repurposed to serve a different need in the nation's pursuit of space exploration? While the answer to these questions will be ultimately answered by NASA as an organization, defining the role that SSC plays in the future was identified as a need. To that end, a few stakeholders thought the role of Enterprise Park would be clearer once SSC's role in the greater NASA organization is identified.

Stakeholder Interviews

ENTERPRISE PARK

SUPPORTED AS A REGIONAL NEED

Overwhelmingly, stakeholders were supportive of the Enterprise Park concept as a regional R&D campus. Stakeholders also supported the identification of Cummings Research Park in Huntsville, Alabama and Exploration Park in Cape Canaveral, Florida as R&D park models to consider for SSC.

POTENTIAL COMPETING R&D FACILITIES

While Enterprise Park was identified as a regional need, there are several regional R&D facilities in place and associated with Mississippi and Louisiana educational institutions:

- USM Innovation and Commercialization Park and Accelerator
- LSU Innovation Park | Louisiana Business & Technology Center
- University of New Orleans Research and Technology Park
- New Orleans BioInnovation Center, Inc.
- MSU Thad Cochran Research Park

LOCATION TO SERVE THE AEROSPACE AND BLUE ECONOMY SECTORS

Stakeholders discussed that Enterprise Park should serve as the location to advance and support the region's economic development in the aerospace and blue economy sectors.

PROPOSED LOCATION

Stakeholders identified advantages and disadvantages of Enterprise Park at the Project Ready North and South locations and at the Hancock County Parcel. In addition, a few stakeholders identified other locations that could be competing development opportunities. Site observations and other potential competing development sites as identified by stakeholders are included in Tables 4-7 and 4-8.

BENEFITS	BARRIERS
Project Ready North/South	
• Outside the flood zone • Direct, unrestricted access to/from I-59 • Outside security gate affording access to public and private users not requiring a badge • Outside the gate is most conducive to business attraction and economic development • Satisfies need for aerospace and defense contractors requiring secure and non-secure operations space • Remote, but provides opportunities for supporting commercial development (hotels, restaurants, etc.) at I-59 (Exit 1)	• Limited to no access from I-10 (assumes MS 607 will remain closed to public access) • Perceived conflict with Naval Warfare Training Operations may limit the ability to successfully attract private industries to Enterprise Park due to health and safety risks • Limited supporting commercial/retail development; key to successful R&D parks
Hancock County Parcel	
• Close access to I-10 and population centers near the Gulf Coast • Outside security gate affording access to public and private users not requiring a badge • Outside the gate is most conducive to business attraction and economic development • Satisfies need for aerospace and defense contractors requiring secure and non-secure operations space	• Flood zone and wetlands constraints • Mississippi Power electric transmission lines traverse the property and junctions with a significant power distribution system to SSC

Table 4-7: Enterprise Park Site Location Observations

Stakeholder Interviews

LOCATION	EXPLANATION
I-59, Exit 1	• Good Interstate transportation access • Land at the north east quadrant of Exit 1, I-59 is available for development • Pearl River County has the highest badge distribution of existing SSC workforce • Pearl River County has existing workforce and education infrastructure in place • Higher elevation and lower flood risk than a Hancock County location
I-10 at Infinity Science Center	• Direct access from I-10 and population centers near the Gulf Coast • Established infrastructure in place • SAA in place and could be expanded
1,200-Acre Site West of Stennis International Airport	• Upland location without flood and wetland constraints • Outside of the Fee Area of SSC, off government property which is more conducive to private sector business growth • Acoustical Buffer Zone constraint would need to be addressed
Master Planned Location in Diamondhead	• 900 SSC employees live in Diamondhead • Diamondhead has live/work/play environment employees are seeking • Central location along the Gulf Coast

Table 4-8: Potential Competing Development Sites

ADDITIONAL CONSIDERATIONS

Establishing an Aerospace Technology Corridor

Several stakeholders suggested opening MS 607 to become an "Aerospace Technology Corridor." Opening MS 607 to public traffic would create east-west, north-south transportation access via I-10 and I-59.

Naval Warfare Training Operations Concerns

Additional commercial activity at SSC and within the Acoustical Buffer Zone should not impact the Naval Warfare Training Operations area. However, stakeholder engagement will need to address corporate concerns for proprietary business operations as well as employee safety.

STEM Workforce Marketing

An innovative marketing and branding approach is needed to attract the STEM workforce of the future to southern Mississippi and Enterprise Park. Marketing should address perceptions about the region's rural and remote location and available amenities.

Reinvest in Existing SSC Campus

Stakeholders identified the need to revitalize the existing SSC to make it a modern, innovative place to work for the Millennial and Generation Z workforce.

PARTNERS/PARTNERSHIPS

TECHNOLOGY TRANSFER CAPABILITIES

MSET, the USM Business & Innovation Assistance Center, and LSU Technology Transfer Office are critical economic and business development entities currently operating at SSC. These organizations effectively link private sector businesses, particularly startups, with federal contracting opportunities.

MSET'S REAL ESTATE ASSET MANAGEMENT

MSET's partnership with NASA enables MSET to negotiate facility leasing at SSC directly with private sector companies. MSET also removes burden from private companies by overseeing administration of economic development incentive administration. This arrangement removes NASA from day-to-day landlord-tenant administration and should be further matured to create a competitive business model for SSC.

PRESERVING THE FEDERAL CITY MODEL

Stakeholders identified that preserving the Federal City model at SSC is important and necessary to ensure a critical mass of R&D contracting opportunities remains viable at SSC.

Stakeholder Interviews

PARTNERSHIP WITH MISSISSIPPI DEVELOPMENT AUTHORITY

Mississippi Development Authority (MDA) is key partner for Enterprise Park going forward. Stakeholders identified several ways in which MDA can work with NASA and its partners to strengthen the assets of SSC and advance the development of Enterprise Park.

Leverage Resources of the Aerospace Alliance

The State of Mississippi through MDA is part of a four-state Aerospace Alliance established to position the Gulf Coast region of the nation as a world-class aerospace and aviation corridor. The Alliance is comprised of Alabama, Florida, Louisiana and Mississippi.

Untapped Economic Opportunity

Mississippi is underutilizing its capacity to expand and attract space industry companies due to the lack of tax incentives and available operating space at and near SSC.

Governor's Policy Focus

Governor Reeve's Administration is new and formulating its economic development policy. Stakeholders noted that future policy should be supportive of SSC and growth in the aerospace and blue economy sectors.

Implement a Space Florida Model

Several stakeholders identified the potential for Mississippi to establish its own aerospace authority modeled after Space Florida.

Leverage Funding Sources

Funding sources such as the BP Oil Gulf Coast Restoration Fund, identified at $750 million/year for the next 14 years, should be identified and leveraged to maximize limited funding sources to support the growth of the aerospace and blue economy sectors.

SUCCESSFULLY IMPLEMENTING ENTERPRISE PARK

Stakeholders identified several considerations needed to successfully advance Enterprise Park.

Develop a Unified SSC Strategic and Master Plan

A Strategic Plan and Master Plan should be developed for SCC. It should incorporate and clearly articulate Enterprise Park's Vision and Mission.

Designate a Lead Partner

A lead pubic entity or authority should oversee real estate development and improvements at Enterprise Park. The entity should also be given responsibility to secure state and federal funding incentives for private sector tenants at Enterprise Park.

Develop a Regional R&D Consortium

The vast capabilities of the Mississippi's universities should be tapped to ensure Enterprise Park is a federally competitive R&D science and technology innovation center.

Leverage the Federal City Model

The Federal City should be maximized and strengthened through opportunities such as the LIFTS Act.

Deconflict Competing Business Models

NASA should take care in outlining the differences between the Federal City model and Enterprise Park. The Federal City may suit the needs of tenants such as NASA and MSET within the gate, while the private sector via MDA or a new Mississippi aerospace authority may be better suited outside of the gate.

Supporting Infrastructure in the Test Complex Area

Enterprise Park Analysis Areas

In evaluating the market potential of Enterprise Park, data points from the following Metropolitan Statistical Areas (MSA) were analyzed to identify trends in socioeconomic characteristics, labor, and employment.

GULFPORT-BILOXI-PASCAGOULA, MS AND NEW ORLEANS-METAIRIE, LA MSAS (ENTERPRISE PARK REGION)

Given the unique specialization of industries at SSC, the existing SSC workforce is comprised of employees living within the Gulfport-Biloxi-Pascagoula and the New Orleans-Metairie MSAs, which are generally within a one-hour drive of SSC. As illustrated in Figure 4-7, this area includes Harrison, Jackson, Hancock, and Stone Counties in Mississippi and Jefferson, Orleans (City of New Orleans), St. Tammany, St. Charles, St. Bernard, St. John, Plaquemines, and St. James Parishes in Louisiana. Consistent with the geographic distribution of where the current SSC workforce resides, this area, referred to as the Enterprise Park Region, was used to analyze current socioeconomic and employment dynamics.

HUNTSVILLE, AL AND DECATUR, AL MSAS (CUMMINGS-REDSTONE REGION)

The Huntsville and Decatur MSAs represent the regional location of Redstone Gateway Office Park and Cummings Research Park (CRP) in Huntsville, Alabama. For the purposes of this study, these sites have been identified as competitive research park properties in the Southeast United States and are used to understand how the employment and socioeconomic dynamics of Enterprise Park compare to the dynamics in the Huntsville and Decatur MSAs. The Huntsville and Decatur MSA geography, referred to as the Cummings-Redstone Region, is used to provide an illustrative comparison. As shown in Figure 4-8, this area includes Madison, Limestone, Morgan, and Lawrence Counties in Alabama.

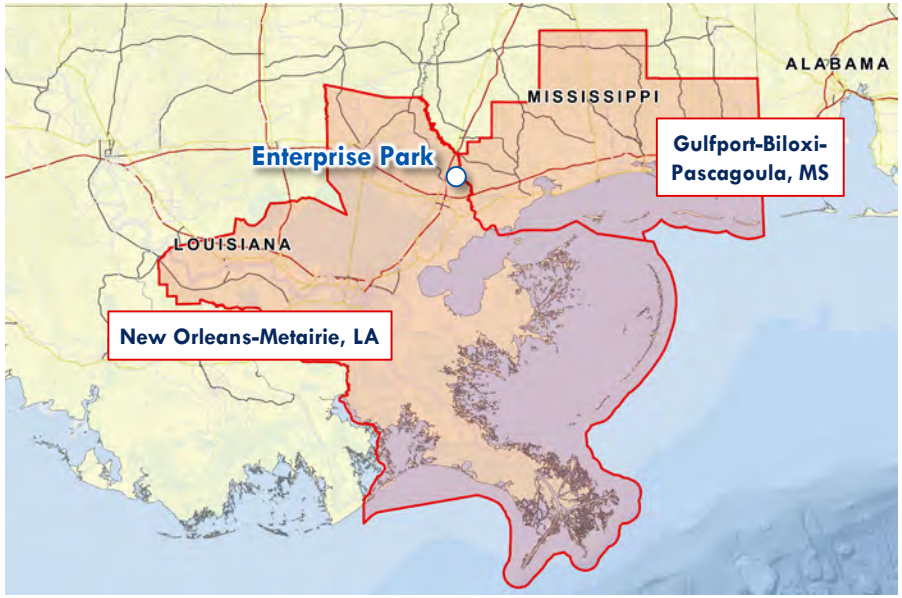


Figure 4-7: Enterprise Park Region
Source: Esri

Figure 4-8: Cummings-Redstone Region
Source: Esri

Enterprise Park Analysis Areas

PALM BAY-MELBOURNE-TITUSVILLE, FL, AND ORLANDO-KISSIMMEE-SANFORD, FL MSAS (EXPLORATION PARK REGION)

The Palm Bay-Melbourne-Titusville and Orlando-Kissimmee-Sanford MSAs represent the regional location of Exploration Park in Cape Canaveral, Florida. Exploration Park has also been identified as a competitive research park in the Southeast United States. Therefore, this region is similarly used to compare the employment and socioeconomic dynamics of Enterprise Park to those surrounding Exploration Park. The Palm Bay-Melbourne-Titusville and Orlando-Kissimmee-Sanford MSA geography, referred to as the Exploration Park Region, is used to provide an illustrative comparison. As indicated in Figure 4-9, this area includes Brevard, Orange, Seminole, Osceola, and Lake Counties in Florida.

STATE OF MISSISSIPPI

Data for the State of Mississippi as a whole is provided for context and comparison purposes, where appropriate. Providing the larger geography as a basis for comparison supports the identification of trends that are regionally specific.

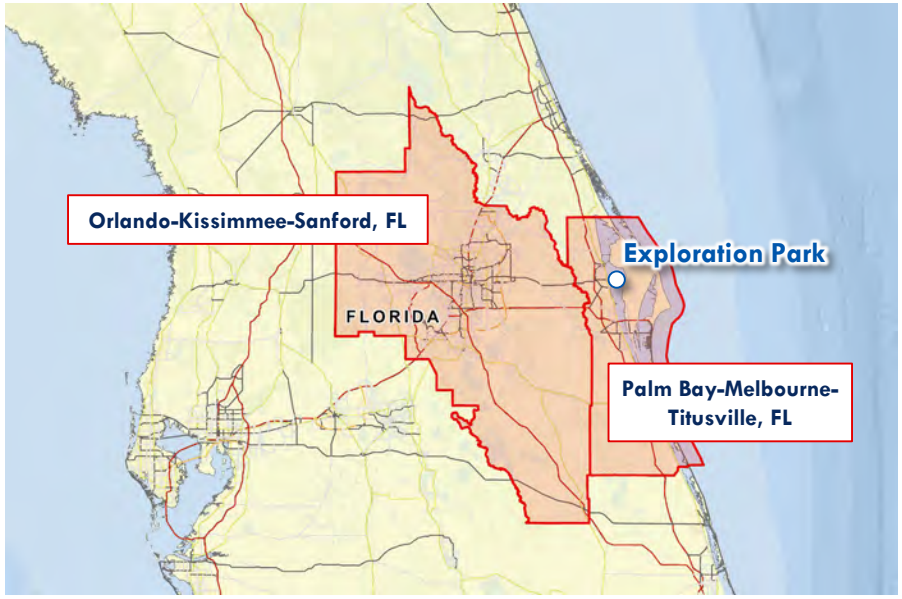


Figure 4-9: Exploration Park Region
Source: Esri

Regional Socioeconomic Profile

An important factor in understanding the local workforce and in measuring the depth of any real estate market is assessing population and household trends. With respect to Enterprise Park, the population represents the local workforce that could potentially be tapped to support target industries. Data used in analyzing the socioeconomic profile for the region was obtained from ESRI Business Analyst, which provides tabulations of data from the U.S. Census Bureau and other government sources together with current-year estimates and five-year projections.

	Enterprise Park Region	Cummings -Redstone Region	Exploration Park Region	State of MS
2019 Population	**1,682,020**	**621,005**	**3,171,504**	**3,053,165**
Change 2010-2019	121,452	49,583	922,449	85,868
Change 2019-2024	44,113	26,562	267,259	34,180
% Change 2010-2019	7.8%	11.7%	56.1%	2.9%
% Change 2019-2024	2.6%	5.7%	10.4%	1.1%

Table 4-9: Population Trends

POPULATION TRENDS

In 2019, the Enterprise Park Region had a total population of 1,682,020. In comparison to the competitive research properties, the Enterprise Park Region's population falls in the middle. The Cummings-Redstone Region has a significantly lower population at 621,005 in 2019, or roughly a third of the residents in the Enterprise Park Region. Alternatively. Exploration Park Region's population was 3,171,504 in 2019, more than twice the size of the Enterprise Park Region.

In addition to sheer numbers, population growth trends are an important indicator of market conditions. After experiencing a substantial decline from 2000 to 2010, the population within the Enterprise Park Region is estimated to have increased by 7.8% from 2010 to 2019. This trend can be largely attributed to population displacement as a result of Hurricane Katrina in 2005, as well as significant post-disaster efforts to rebuild impacted communities that continue to occur today. By 2024, the population in the Enterprise Park Region is projected to surpass the 2000 Census count. While growing, the region has had to overcome the substantial impact of nationally declared disaster to restore its population and economy to pre-Hurricane Katrina levels.

Conversely, the Cummings-Redstone and Exploration Park Regions have experienced strong growth dating as far back as 2000. The Cummings-Redstone Region grew by 11.7% from 2010 to 2019 and is estimated to increase by an additional 5.7% by 2024. The Exploration Park Region boasts even larger gains, having doubled its population from 2010 to 2019 (56.1% increase). The region is estimated to grow by another 10.4% by 2024. According to the Orlando Economic Partnership, Orlando is gaining 1,000 new residents every week and has a growth rate double that of the United States. In fact, the Orlando MSA (Lake, Orange, Osceola, and Seminole Counties) has the fastest growth rate of the 30 largest cities in America. The Orlando Economic Partnership estimates that approximately 19% of region's growth is organic through births and deaths, while approximately 81% is attribute to net migration in the region. In other words, growth is driven by residents relocating to the MSA.

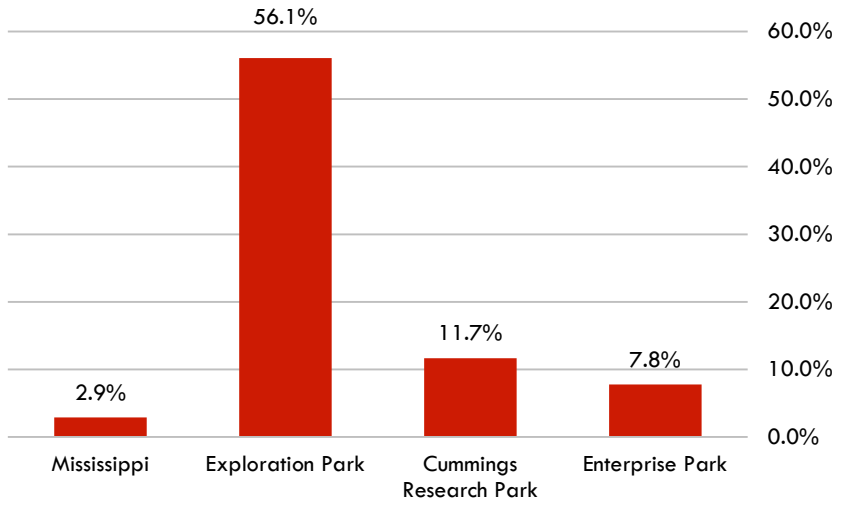


Figure 4-10: Population Growth Percent Change, 2010-2019

Regional Socioeconomic Profile

EDUCATIONAL ATTAINMENT

According to 2019 estimates, slightly less than one-third of the Enterprise Park Region population is college-educated, having received a Bachelor's or Graduate Degree. This is slightly less than the Cummings-Redstone Region and Exploration Park Region, where 34% and 32% of the population have received a Bachelor's or Graduate Degree, respectively. By percentage, the three regions have relatively comparable education attainment levels, as visually depicted in Figure 4-11. Numerical, however, the difference is more significant. The Enterprise Park Region has approximately 327,000 residents with a higher education compared to 705,526 residents in the Exploration Park Region.

Based on the specialization of fields at SSC and proposed for Enterprise Park, having a large pull of qualified candidates is an important site location factor. This discussion of qualified workforce is further vetted in the Employment Profile.

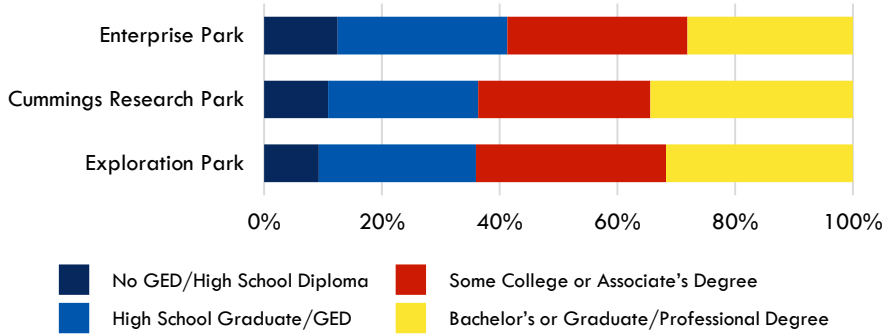


Figure 4-11: 2019 Population 25+ by Educational Attainment

COST OF LIVING

Cost of living refers to the amount of money needed to support life expenditures including housing, food, and healthcare. This data is often presented in the form of an index based on price indices of consumer goods and services to allow for comparisons across geographies. As part of the 2019 Bryce Space and Technology outreach strategy report, a national cost of living index was provided to demonstrate potential opportunity SSC may have in business attraction efforts.

	Enterprise Park Region	Cummings-Redstone Region	Exploration Park Region
2019 Avg. Home Value	$187,674	$178,561	$224,772
2024 Avg. Home Value	$207,464	$199,862	$257,474

Table 4-10: Average Home Values, 2019 and 2024

In 2020, the State of Mississippi, with an index of 86.1, has a below average cost of living in comparison to the United States as a whole. In fact, Mississippi has the lowest cost of living of all 50 states. Alabama's cost of living is similarly low with an index of 89.3, the 11th lowest cost index in the country. While Florida's cost index of 97.9 is higher, the difference is not as significant as other states prominent in the aerospace industry, such as California with a cost of living index of 151.7.

As an illustration of cost of living, the Enterprise Park Region's 2019 average home value, which includes owner-occupied, rental, and vacant housing units, was $187,674. In comparison, the 2019 average home values for the Cummings-Redstone Region and Exploration Park Region were $178,561 and $224,772, respectively. The average home value in the Enterprise Park Region is approximately 16% lower than that of Exploration Park, but is comparable to the average home value in the Cummings-Redstone Region.

Workforce Profile

When assessing the dynamics of a local economy, an important factor is the employment growth of its economic base. A current snapshot of employment dynamics is provided for the Enterprise Park Region based on data obtained from the U.S. Bureau of Labor Statistics' Local Area Unemployment Statistics (LAUS) and the U.S. Census Bureau's Longitudinal Employer-Household Dynamics (LEHD). Additionally, LEHD data for the Cummings-Redstone Region and Exploration Park Region are provided for comparison purposes. Finally, data for the industry cluster analysis was provided by the U.S. Cluster Mapping Project from the Economic Development Administration and Harvard Business School Institute for Strategy and Competitiveness.

REGIONAL LABOR FORCE AND EMPLOYMENT TRENDS

Within the past two decades, there have been two significant surges in unemployment in the Enterprise Park Region. The first occurred as a result of Hurricane Katrina, which had a devasting impact on the regional economy and along the Gulf Coasts of Louisiana and Mississippi. Between 2004 and 2005, labor force participation decreased while the unemployment rate increased in the New Orleans-Metairie MSA, highlighting the displacement and loss of both people and jobs. During this same period, the unemployment rate in the Gulfport-Biloxi-Pascagoula MSA nearly doubled, jumping 10.5%, influencing a spike in unemployment statewide. After 2006, labor force participation and the unemployment rate quickly recovered before heading into the next period of economic downturn caused by the Great Recession. Economic recovery from this was gradual as illustrated by a slow, but steady decline in unemployment rates from 2010 through 2018. This trend largely mirrors that of the U.S. as a whole, which was generally slow to rebound from the recession. By 2018, unemployment rates across all three geographies returned to similar levels experienced pre-recession and before Hurricane Katrina.

EMPLOYMENT DYNAMICS

CURRENT EMPLOYMENT

For business attraction efforts, the availability of a qualified workforce is a critical consideration companies weigh during the site selection process, particularly in the aerospace sector. For the purpose of exploring past and current employment dynamics in the three regions, this assessment utilizes seven industries at the three-digit North American Industry Classification System (NAICS) code level. The seven industries were in part selected based on the top NAICS codes that support SSC operations, as reported by NASA's Office of Small Business Programs. For descriptive purposes, these seven industries are referred to as an aerospace cluster and include:

- Air Transportation
- Chemical Manufacturing
- Computer and Electronic Product Manufacturing
- Data Processing, Hosting, and Related Services
- Fabricated Metal Product Manufacturing
- Professional, Scientific, and Technical Services
- Transportation Equipment Manufacturing

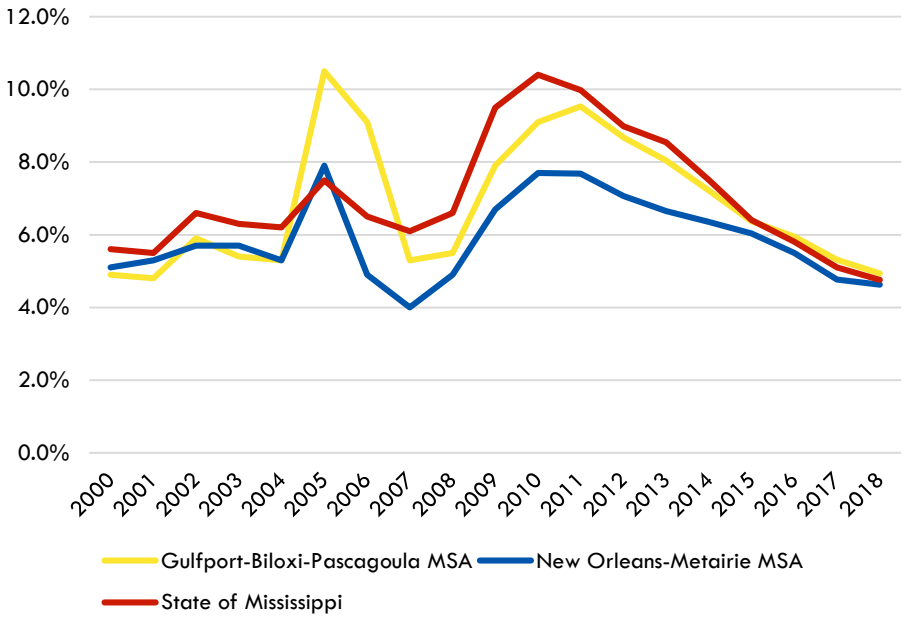


Figure 4-12: Unemployment Rate, 2000-2018

Workforce Profile

Based on the most recent LEHD data, in 2018, the Enterprise Park Region had 62,454 jobs in the aerospace cluster, closely aligned to the Cummings-Redstone Region, which reported 61,954 jobs during the same year. In contrast, the Exploration Park Region in Florida reported well over double the number of jobs in the aerospace cluster at 154,353. The strength of Florida's aerospace workforce is undoubtably more robust than the other two regions. However, the Enterprise Park Region does lead in the number of jobs in Chemical Manufacturing and Transportation Equipment Manufacturing, providing a competitive advantage in these two as it relates to workforce availability. However, in the Professional, Scientific, and Technical Services industry, which is a major sector at SSC, the Exploration Park Region clearly outpaces the other two regions with approximately 60,000 more existing jobs in the industry.

EMPLOYMENT GROWTH TRENDS

Employment growth is an important indicator of economic health. While the Enterprise Park Region has comparable employment figures in the aerospace cluster to the Cummings-Redstone Region, employment growth across the cluster has stagnated in the Enterprise Park Region. In contrast, both the Cummings-Redstone and Exploration Park Regions have posted strong employment gains in many of the cluster's industries.

The Enterprise Park Region's main aerospace cluster industry, as reported by the U.S. Census Bureau's LEHD, is Professional, Scientific, and Technical Services with 37,810 jobs in 2018. However, from 2005 to 2018, the industry has only grown by 5%, or less than half a percent annually. In contrast, this industry sector in the Cummings-Redstone Region has grown by 29% during the same time period and by 37% in the Exploration Park Region. As another example, the Enterprise Park Region experienced a 10% decline in Chemical Manufacturing jobs. While the Enterprise Park Region still boasts the strongest employment of the three regions, both the Cummings-Redstone and Exploration Park Regions have posted gains in Chemical Manufacturing during the same time period.

The employment growth analysis of the aerospace cluster reveals that the Enterprise Park Region has had stagnant or negative growth across most of the seven industry clusters, which contrasts greatly to the other regions. Statewide, Mississippi has also seen a decline across the aerospace cluster, with the exception of the Data Processing, Hosting, and Related Services sector. However, at only 1,053 jobs statewide, the industry is not a major driver of economic activity.

	ENTERPRISE PARK REGION		CUMMINGS-REDSTONE REGION		EXPLORATION PARK REGION		STATE OF MISSISSIPPI	
Aerospace Cluster Industries	**2018 Total**	**% Change 2005-18**	**2018 Total**	**% Change 2005-18**	**2018 Total**	**% Change 2005-18**	**2018 Total**	**% Change 2005-18**
Air Transportation	1,013	6%	118	-47%	11,487	115%	256	-24%
Chemical Manufacturing	6,114	-10%	3,433	25%	2,395	10%	6,144	-9%
Computer and Electronic Product Manufacturing	1,280	5%	5,012	-52%	17,608	-4%	1,378	-47%
Data Processing, Hosting, and Related Services	626	-2%	348	138%	4,093	-29%	1,053	647%
Fabricated Metal Product Manufacturing	2,841	-12%	4,187	5%	5,443	14%	10,345	-8%
Professional, Scientific, and Technical Services	37,810	5%	38,099	29%	101,614	37%	32,886	-5%
Transportation Equipment Manufacturing	12,770	-50%	10,757	-2%	11,713	17%	25,718	-8%

Table 4-11: 2018 Aerospace Cluster Employment

Workforce Profile

INDUSTRY CLUSTERS

A cluster analysis provides information on the health and specialization of industries in a particular region. A region's "traded clusters" are engines of the regional economy serving external markets (exporting of goods and services) and, given the concentration of specialization, offer a competitive advantage in those industry clusters.

Based on information provided by the U.S. Cluster Mapping Project, the Enterprise Park Region is not classified as an Aerospace & Defense Cluster. In contrast, the Cummings-Redstone Region is recognized as an Aerospace & Defense Cluster having a high employment specialization. The Exploration Park Region is recognized as having high employment specialization and market share. For companies looking to invest, the lack of an existing Aerospace & Defense Cluster in Mississippi and Louisiana may be a deterrent, giving other locations like Cummings-Redstone and Exploration Park a competitive advantage.

A cluster is a regional concentration of related industries in a particular location. Clusters are a striking feature of economies, making regions uniquely competitive for jobs and private investment.

Source: https://www.clustermapping.us/content/clusters-101

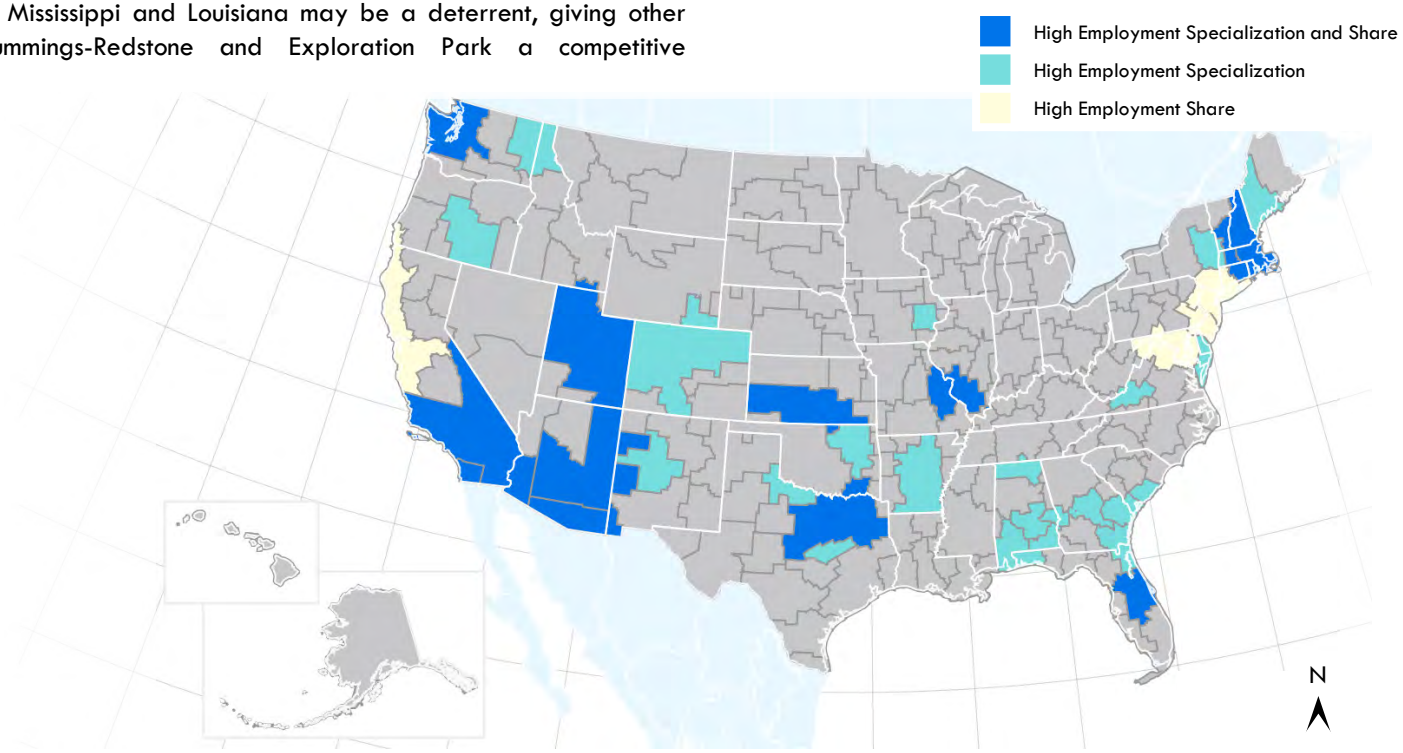


Figure 4-13: Specialization in Aerospace & Defense Cluster, 2016

Commercial Real Estate Market

A market area is the geographic area from which a property draws demand and competes with existing and proposed real estate. The primary market area for SSC and Enterprise Park is defined as the Gulfport-Biloxi-Pascagoula, MS MSA. A secondary market area was also identified to help provide additional regional context, and due to the unique laborshed of SSC. This secondary market area was defined as the Slidell and St. Tammany Parish, LA submarkets of the New-Orleans-Metairie, LA MSA; this area does not include the City of Covington.

Data and information used in this commercial real estate market analysis was obtained using CoStar, a national provider of real estate industry data and analysis. CoStar divides major metropolitan areas into real estate markets for the purposes of comparisons and statistical analysis. While these market areas are often further divided into sub-markets based on geographic barriers and local dynamics, CoStar has not identified any submarkets for the Gulfport-Biloxi-Pascagoula MSA. Due to the sheer volume and the varying scale and composition of the real estate landscape across the New Orleans-Metairie MSA, this metro area has been divided into more than 20 submarkets. The two submarkets most relevant to SSC are those of Slidell and St. Tammany Parish. All data from CoStar was obtained in March of 2020.

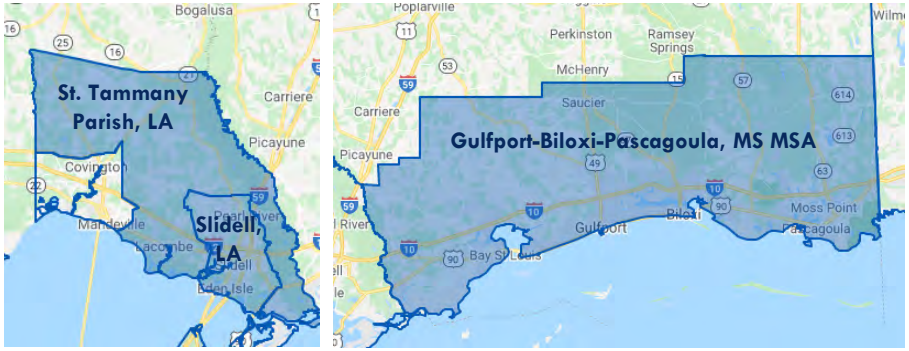


Figure 4-14: Primary and Secondary Market Areas

INDUSTRIAL MARKET

Key indicators for the industrial real estate market are provided in Table 4-12 on the following page. As shown in the table, despite a slow market in the primary market area, growth in rents for industrial space continues with asking rents rising at an above-average pace. However, vacancies in the primary market area, which have been steadily rising over the past few years, are now above the 10-year historical average. Additionally, net absorption has been negative for the past five consecutive quarters. In 2018, 300,000 square feet of industrial distribution space was delivered in one development in Harrison County, representing a cumulative inventory expansion of roughly 2.5%. This was the largest project since 2009, which then added 150,000 square feet of warehouse space in Gulfport. No additional sizable projects are currently under construction. However, there is an abundance of vacant industrial land that is actively being advertised for development.

The secondary market area of St. Tammany Parish and Slidell is smaller than the primary market area in terms of real estate inventory, and is similarly a slow market. Rental growth in the area at approximately 3% over the past 12 months falls short of the growth in the MSA. However, growth rates are exceeding historical averages. Similar to the primary market area, 12-month net absorption was negative. Over the past two years, 38,700 square feet of industrial space was delivered in two developments in Slidell; one a 30,000 square-foot industrial warehouse and the other a 7,500-square-foot flex space. In St. Tammany Parish, recent deliveries were minimal with just one property coming online in 2018 at 2,400 square feet. Over the next two years, there is only one proposed development totaling 15,000 square feet of industrial distribution space anticipated for 2021. The secondary market area also has a number of vacant and available industrial sites.

REGIONAL DRIVERS

Demand for industrial space throughout the region, and specifically in the vicinity of SSC, has largely stagnated in recent years. However, businesses supporting the MSA's three ports and operations at the Stennis International Airport have generated some demand. As a result of the region's extensive multimodal infrastructure including port, airports, freight rail lines, and major highways, logistics is a major industry.

Commercial Real Estate Market

Leveraging the polymer and chemical manufacturing cluster in southern Mississippi, Hancock County has made recent efforts to expand this field and its advanced manufacturing industry. The region also has a strong military presence, largely near the ports and at SSC. As previously indicated, marine science and other activities related to Mississippi's blue economy will be key to supporting future growth in the area. The largest area employer is Ingalls Shipbuilding located in Pascagoula, contributing to the MSA's water transportation industry cluster, which is the third largest in the nation.

Pascagoula is also home to Chevron's largest refinery worldwide. The presence of these two major employers is driving growth in this part of the MSA. Chevron is helping to revitalize the city's downtown through a new mixed-use development, funded in part by the company and the local redevelopment authority. This step helps Chevron begin to realize its vision of developing Pascagoula into an innovation center, attracting talent and start-ups in the tech industry. In 2018, Chevron also provided grant funding for the establishment of a fabrication lab in Vancleave. While this particular programed space is targeted to school-aged children, the concept poses an interesting consideration for Enterprise Park.

PRIMARY MARKET AREA: GULFPORT-BILOXI-PASCAGOULA MSA

Annual Trends	12 Month	Historical Average	Forecast Average	Peak	When	Trough	When
Vacancy Change (YOY)	0.5%	6.0%	8.0%	10.4%	2014 Q3	1.4%	2008 Q4
Net Absorption SF	(73.1 K)	35,755	(843)	609,107	2008 Q4	(365,898)	2019 Q4
Deliveries SF	0	80,891	53,747	367,086	2009 Q2	0	2019 Q4
Rent Growth	4.2%	1.6%	2.1%	6.8%	2018 Q4	-3.9%	2009 Q4
Sales Volume	$2.2 M	$4.3 M	N/A	$24.8 M	2018 Q4	$0	2012 Q3

SECONDARY MARKET AREA: SLIDELL SUBMARKET

Annual Trends	12 Month	Historical Average	Forecast Average	Peak	When	Trough	When
Vacancy Change (YOY)	2.4%	12.2%	7.2%	21.1%	2010 Q3	2.0%	2016 Q3
Net Absorption SF	(24.5 K)	4,898	(6,755)	212,518	2016 Q3	(306,545)	2009 Q1
Deliveries SF	31.2 K	8,661	5,975	35,139	2013 Q4	0	2019 Q2
Rent Growth	3.1%	1.3%	0%	6.0%	2019 Q1	-4.4%	2010 Q2
Sales Volume	$4.8 M	$1.5 M	N/A	$5.1 M	2019 Q4	$0	2018 Q1

SECONDARY MARKET AREA: ST. TAMMANY PARISH SUBMARKET

Annual Trends	12 Month	Historical Average	Forecast Average	Peak	When	Trough	When
Vacancy Change (YOY)	0.8%	21.4%	7.0%	39.8%	2012 Q4	4.2%	2007 Q1
Net Absorption SF	(8.8 K)	20,839	(3,018)	310,687	2016 Q1	(73,900)	2009 Q1
Deliveries SF	0	20,044	572	177,883	2016 Q1	0	2019 Q4
Rent Growth	3.0%	1.0%	0%	6.0%	2019 Q2	-4.3%	2010 Q2
Sales Volume	$155 K	$172.0 K	N/A	$589.0 K	2018 Q3	$0	2017 Q3

Table 4-12: Key Industrial Market Indicators – Annual Trends

Note: All data obtained March 2020; 12-month estimates are from this date.

Commercial Real Estate Market

LEASING AND SALES

Over the past 12 months, rents have increased by 4.2% in the primary market area. However, rental growth took a sharp decline at the end of 2019. The growth rate is forecasted to continue dissipating over the next four years. Despite a decline in the growth rate, market rents per square foot are projected to steadily rise. Market rents for flex space far exceed the other industrial property types. As opposed to logistics properties, which are typically larger distribution and warehouse facilities, flex space is defined by CoStar as a building that is capable of multiple uses, typically in a single facility, including office, R&D, retail sales, light manufacturing, and small warehousing and distribution space. This type of property is generally more consistent with the potential development of Enterprise Park. During the current quarter, the average market rent for flex space is $9.66 per square foot, with an overall vacancy rate of 1.8%. This is the strongest performer of the three industrial property types highlighted.

In the secondary market area, market rents also increased by approximately 3% over the past 12 months. However, growth rates are forecasted to drop as market rents begin to level out. During the current quarter, the average asking rent for flex space is $9.46 per square foot in St. Tammany Parish and $18.66 in Slidell. However, while the vacancy rate for flex space in Slidell was 1%, the availability rate was over 15%.

CoStar identified 41 properties with available for-lease industrial space in the combined primary and secondary market areas, 24 of which are classified as warehouse or distribution facilities largely concentrated in the Gulfport area. Based on a survey of the other available properties, there are 11 flex, manufacturing, or other industrial spaces that provide a reasonable sample of this product type in the region. The details of these properties are provided in Table 4-14.

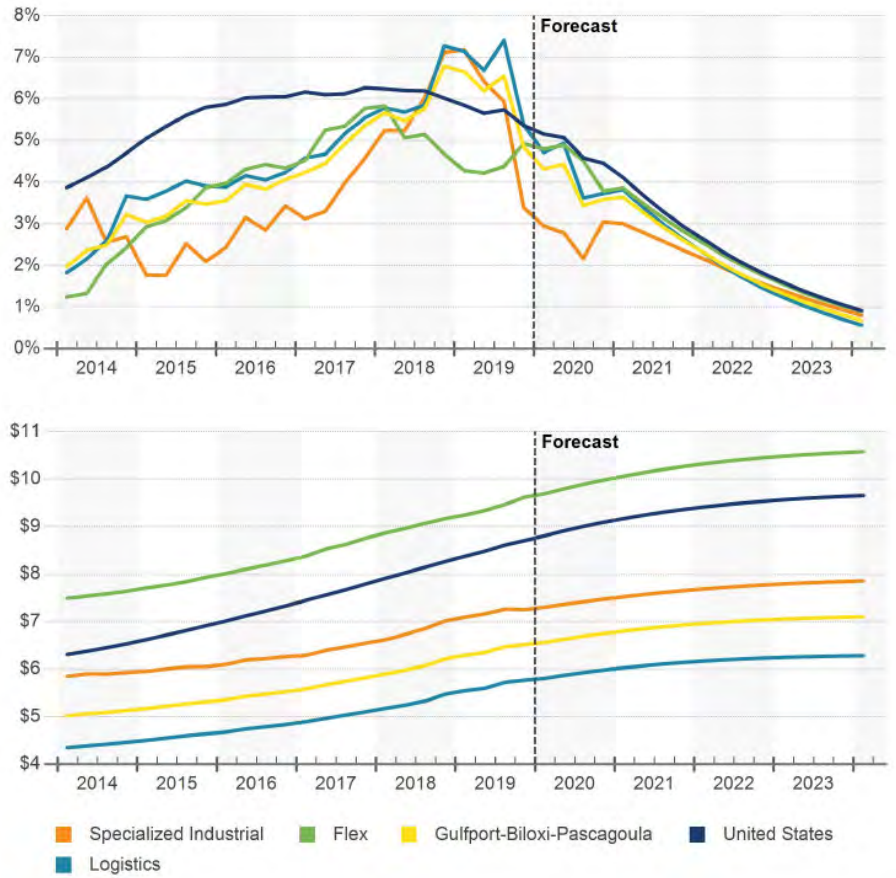


Figure 4-15: Industrial Market Rents and Rental Growth Rate in the Primary Market Area

Current Quarter	Rentable Building Area	Vacancy Rate	Market Rent	Availability Rate	Net Absorption SF
Logistics	9,154,901	8.1%	$5.79	11.0%	73,476
Specialized Industrial	2,764,980	5.3%	$7.29	8.0%	150,000
Flex	1,559,662	1.8%	$9.66	3.1%	(2,576)
Market	13,479,543	7.0%	$6.55	9.5%	220,900

Table 4-13: Key Industrial Market Indicators in the Primary Market Area – 2020 Q1

Commercial Real Estate Market

PROPERTY ADDRESS	LOCATION	PROPERTY TYPE	YEAR BUILT/ RENO	RENTABLE BUILDING AREA (SF)	TOTAL AVAIL. SPACE (SF)	RENT PER SF
4607 Hospital Rd.	Pascagoula	Flex	1967	12,000	3,370	$4.28-5.23
10031 Lorraine Rd.	Gulfport	Industrial	1968	12,000	11,861	$6.00
2818 22nd Ave.	Gulfport	Flex	1995	9,000	3,000	$4.40
14355 Big John Rd.	Biloxi	Flex	1996	5,040	5,040	$5.52
4030 Suzanne Dr.	Diberville	Flex	1998	15,000	15,000	$5.00
10415 Express Dr.	Gulfport	Industrial	1998	5,075	10,000	$12.00
278 General Patton Ave.	Mandeville	Flex/Light Mfg	2007	18,000	11,880	$6.25
21180 Johnson Rd.	Long Beach	Industrial/Mfg	2008	360,500	143,784	$3.00-6.00
9140 Canal Rd.	Gulfport	Flex	2011	37,117	5,500	$12.00
106 Birdie Dr.	Slidell	Flex	2019	7,500	7,500	$8.80
69069 Sky Brook Rd.	Mandeville	Industrial	2021	15,000	15,000	$7.25

Table 4-14: Select Industrial Properties for Rent in the Primary and Secondary Market Areas

PROPERTY ADDRESS	LOCATION	PROPERTY TYPE	YEAR BUILT/ RENO	RENTABLE BUILDING AREA (SF)	FOR-SALE PRICE	SALE PRICE PER SF
3421 Industrial Rd.	Pascagoula	Flex	1969	28,000	$1,980,000	$71
14355 Big John Rd.	Biloxi	Flex	1996	5,040	$325,000	$64
12071 Seaway Rd.	Gulfport	Industrial	1997	41,489	$3,400,000	$82
10415 Express Dr.	Gulfport	Industrial	1998	5,075	$550,000	$108
10250 Larkin Smith Dr.	Gulfport	Industrial	2000	8,214	$1,350,000	$164
198 Main St.	Biloxi	Flex	2006	6,384	$558,000	$87
14411 Highway 49	Gulfport	Industrial	2006	27,000	$840,000	$31
73526 Bollfield Dr.	Covington	Industrial	2006	13,700	$598,000	$44
278 General Patton Ave.	Mandeville	Flex/Light Mfg	2007	18,000	$1,395,000	$78
210 General Patton Ave.	Mandeville	Industrial	2007	19,772	$1,800,000	$91
106 Birdie Dr.	Slidell	Flex	2019	7,500	$750,000	$100
2589 Front St.	Slidell	Industrial	N/A	26,871	$6,415,000	$239

Table 4-15: Select Industrial Properties for Sale in the Primary and Secondary Market Areas

Sales activity remained minimal over the past four quarters, prolonging a multi-year stretch of limited investment in this MSA's industrial market. Over the past 12 months, there were 17 sales transactions at an average price per square foot of $46. The highest price per square foot was $87 for 6,600 square feet of flex space in Gulfport, while the lowest was $17 for 14,000 square feet of manufacturing space in Long Beach. All sales last year were concentrated on the coast near ports. Sales in the secondary market area were similarly nominal in 2019 with a total of 13 transactions, the majority of which were in Slidell. The average price per square foot was $52 in St. Tammany Parish and $71 in Slidell.

There are currently 52 industrial properties on the for-sale market in the combined primary and secondary market areas, 32 of which (62%) are warehouse spaces. A survey of the remaining for-sale properties identified 12 properties that reasonably demonstrate for-sale flex-type space in the region, the details of which are provided in Table 4-15. Some of these properties are also for rent.

For-sale and for-lease properties included in the tables above ranged in size from 5,000 to more than 360,000 square feet. All are in moderate to good condition and received a two- or three-star ranking from CoStar based on a five-star system, but none are Class A.

Commercial Real Estate Market

COMPETITIVE SUPPLY OF INDUSTRIAL SPACE

The majority of industrial properties (53%) in the Gulfport-Biloxi-Pascagoula MSA are classified as distribution or warehouse space. A reflection of the major area ports and other key transportation infrastructure. Nearly one quarter (22%) of space is identified as manufacturing or flex, representing a closer comparison to the proposed concept at Enterprise Park. Within the secondary market area, 70% of industrial properties are for warehousing and distribution and 10% are recognized as flex or manufacturing space. While information on select available flex and other industrial space throughout the region is provided in Tables 4-14 and 4-15, this data does not account for the significant amount of industrial vacant land actively being marketed or competitive properties that may be fully occupied.

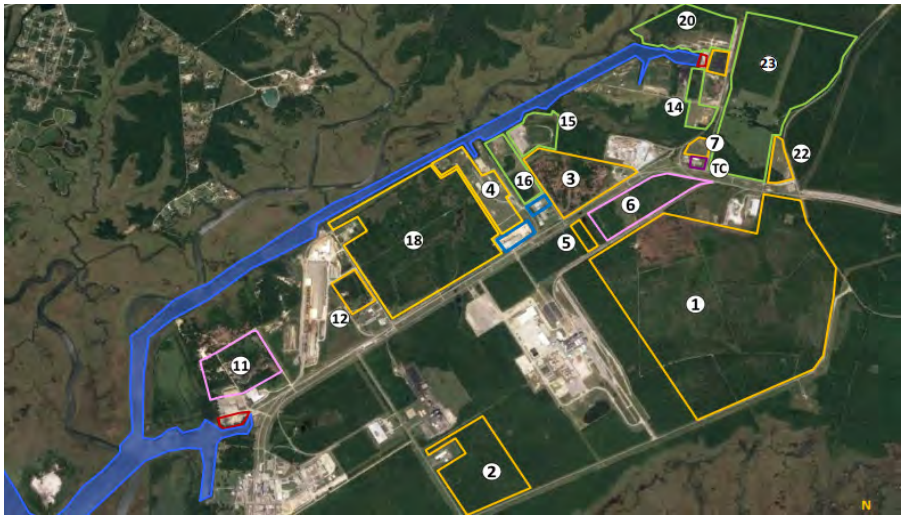
The wide availability of vacant industrial land provides an indication that developers are not moving forward with construction until tenants are secured, a trend that was confirmed during stakeholder interviews. In addition to the two sites at Enterprise Park, there are six other vacant sites certified as Project Ready by Mississippi Power Company:

- Gulfport-Biloxi International Airport Site (Mississippi Gulf Coast Aerospace Center) – Harrison County
- Helena Industrial Park – Jackson County
- Jackson County Aviation Technology Park – Jackson County
- Moss Point Industrial and Technology Complex – Jackson County
- Port Bienville Sites 6 and 11 (Port Bienville Industrial Park) – Hancock County

The Mississippi Gulf Coast Aerospace Center is a 241-acre vacant site adjacent to and owned by the airport. The site is being marketed as located in close proximity to the runway, the Port of Gulfport, rail, Interstate 10, and the Gulf of Mexico flight testing range. The Gulfport-Biloxi International Airport also notes a future 100,000-square-foot office park near to the site.

All three of the Jackson County sites are located in Moss Point. The Jackson County Aviation Technology Park is targeting aerospace companies, with its first tenant being the Northrop Grumman Unmanned Systems Center. While there are still 230 acres available at this technology park, the Northrop Grumman facility is approximately 131,000 square feet of flex/light manufacturing space on roughly 62 acres with an estimate market rent of $7.00-$9.00 per square foot. The other two sites in Moss Point remain vacant (131 and 202 acres) and are largely targeting the logistics industry, one site with freight rail access and the other with channel/barge access. In addition to the three industrial parks, the Jackson County Economic Development Foundation, Inc. has eight other industrial parks with available vacant land, most of which are either entirely vacant or are leveraging the proximity to the County's chemical manufacturing cluster. SUNPLEX Light Industrial Park has 35 acres available with the opportunity to join other tenants including Northrop Grumman's Electronic Systems.

Closer to SSC in Hancock County, Port Bienville Industrial Park (PBIP) is being developed and managed by Hancock County Port & Harbor Commission (HCPHC). Site 6 is 45 acres and Site 11 is 45 acres, and both are vacant. In total, PIBIP is 3,600 acres and in addition to Sites 6 and 11, PBIP has 14 other vacant and available sites ranging in size from five to 475 acres. Leveraging its strategic port location and access to freight rail, PBIP currently has 14 tenants concentrated in polymer, chemical, and metal manufacturing. HCPHC is also marketing the property for logistics, citing its multi-model connections. Market rents are estimated to be between $7.00 and $8.00 per square foot. There is one existing building currently for-sale.



Port Bienville Industrial Park
Source: Hancock County Port and Harbor Commission

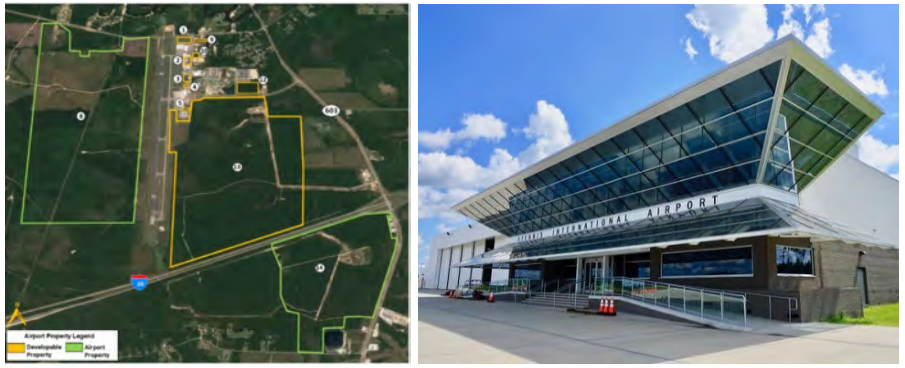
Commercial Real Estate Market

HCPHC is also developing and managing a second 1,800-acre industrial park at Stennis International Airport. Stennis International Airpark has 10 available, vacant sites ranging from one to 885 acres. One of the Airpark's target industries is geospatial technologies. Among the current tenants are Optech, a leader in developing and manufacturing lidar equipment, and the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX), supporting lidar development for U.S. Army Corps of Engineers, CNMOC, and NOAA. As previously mentioned, PRCC is also planning a new 25,000-square foot Aviation and Aerospace Workforce Academy at the airport. Existing space at the airport includes both office and industrial space. Industrial distribution and warehouse space is approximately $2.00 to $3.00 per square foot, while office is $13.00 per square foot. There are vacancies in office space.

In St. Tammany Parish, including Slidell, there are five vacant, shovel-ready industrial sites being actively promoted by St. Tammany Corporation, the economic development organization for the Parish. These available sites range from 25 to 352 acres. Additionally, there is another 35.1-acre commercial site being advertised as a Technology and Business Park. One proposed development includes two of the five proposed industrial sites as part of a master planned community with residential and other commercial office uses. The industrial park sites are adjacent to one another and are 48 and 32 acres. Of particular note is that the community proposed an innovation district in partnership with Northshore Technical Community College.

The competitive advantage maintained by Enterprise Park is the close proximity to NASA and SSC's other tenants that play a major role in the regional economy. Enterprise Park will have to leverage SSC's unique concentration of federal and state agencies, academic institutions, and commercial tenants to remain regionally competitive amongst an abundance of developing industrial parks. Additionally, an active marketing campaign may be essential, both inside and outside of the region. From a regional perspective, location and access may be a challenge for SSC. Enterprise Park could be competing with other locations that may be more convenient in relation to housing and other amenities.

The concept of Enterprise Park as a modern, high-technology R&D park that serves as a hybrid between manufacturing and office space. To that end, trends in the market for commercial office space were explored.



Stennis International Airport and Airpark
Source: Hancock County Port & Harbor Commission

OFFICE MARKET

Key indicators for the office real estate market are provided in Table 4-16 on the following page. As shown in the table, the outlook for the office market is similar to that of the industrial market in the Gulfport-Biloxi-Pascagoula MSA, both of which have been slow over the past few years. Within this primary market area, office rents in increased by 1.3% over the past 12 months, marking a slowdown from recent trends. The increase in the vacancy rate was minimal and well below the MSA's historical average. Despite only a small uptick in the vacancy rate, absorption over the past 12 months was negative. Since 2017, 57,078 square feet of office space has been delivered, representing a cumulative inventory expansion of merely one percent. The vast majority of that growth (83%) is attributed to additional medical office space in Gulfport and Biloxi. There are no sizable projects are currently under construction.

The secondary market area is significantly smaller in terms of the volume of space, and is overall underperforming. The one exception in 2019 was sales volume. Slidell established a new peak for the area with transactions totaling $9.3 million, exceeding that of the primary market area for the year. Over the past 12 months, rent growth was stagnant, signaling a decline of office market rents. Similar to the primary market area, 12-month absorption was negative. Since 2018, four properties have added 24,464 square feet of office space, mostly in Slidell, representing a minimal 1.3% increase in office inventory for the secondary market area. In Slidell, 60,000 square feet of medical office space is under construction with delivery anticipated in 2020.

Commercial Real Estate Market

REGIONAL DRIVERS

The office market has seen little growth in the past few years. Demand for space is largely driven by the health care industry, which has a high employment share throughout the region. In St. Tammany Parish, the top four largest employers are area hospitals and medical centers. Many of the other top employers are in construction, wholesale, and logistics, which are not primary users of office space. The landscape is similar in the primary market area. Outside of health care, major employers are in the fields of manufacturing, retail trade, and hospitality (casinos), which are influencers in other commercial real estate markets. However, there may be some overlap in the office market. Additionally, the large concentration of government employment in the region and the presence of contractors that support public sector work at the state and federal level could also be potential drivers of office space demand.

There is a Fortune 500 firm headquartered in the region, Hancock Holding Company, located in Gulfport. The company operates the Hancock Bank and Whitney Bank brands throughout the southeast. While the majority of this business outside of the headquarters functions typically relies on other commercial real estate opportunities, the firm's presence and its branch locations could generate some office demand.

PRIMARY MARKET AREA: GULFPORT-BILOXI-PASCAGOULA MSA

Annual Trends	12 Month	Historical Average	Forecast Average	Peak	When	Trough	When
Vacancy Change (YOY)	0.4%	5.8%	4.6%	9.1%	2013 Q4	3.0%	2007 Q4
Net Absorption SF	(17.2 K)	23,443	(1,816)	160,599	2019 Q1	(218,880)	2013 Q3
Deliveries SF	8.5 K	33,615	8,538	122,358	2008 Q3	0	2014 Q2
Rent Growth	1.3%	0%	0.8%	3.6%	2016 Q4	-5.5%	2010 Q2
Sales Volume	$4.6 M	$4.3 M	N/A	$12.7 M	2018 Q3	$110.1 K	2010 Q2

SECONDARY MARKET AREA: SLIDELL SUBMARKET

Annual Trends	12 Month	Historical Average	Forecast Average	Peak	When	Trough	When
Vacancy Change (YOY)	0.6%	12.6%	9.2%	19.3%	2008 Q3	6.7%	2016 Q4
Net Absorption SF	(6.9 K)	13,752	(16,579)	87,954	2016 Q1	(82,472)	2008 Q2
Deliveries SF	9.7 K	14,062	18,710	60,507	2011 Q1	0	2018 Q4
Rent Growth	-1.1%	0.4%	-1.5%	5.4%	2008 Q2	-5.4%	2011 Q1
Sales Volume	$9.3 M	$1.6 M	N/A	$8.5 M	2019 Q4	$40.0 K	2016 Q3

SECONDARY MARKET AREA: ST. TAMMANY PARISH SUBMARKET

Annual Trends	12 Month	Historical Average	Forecast Average	Peak	When	Trough	When
Vacancy Change (YOY)	4.7%	9.4%	9.6%	18.0%	2009 Q2	1.9%	2007 Q3
Net Absorption SF	(23.5 K)	14,102	(1,133)	208,937	2010 Q1	(62,513)	2017 Q4
Deliveries SF	0	17,684	129	219,129	2010 Q2	0	2019 Q4
Rent Growth	0.2%	0.3%	-1.4%	4.3%	2008 Q2	-3.2%	2016 Q1
Sales Volume	$0	$4.0 M	N/A	$26.2 M	2012 Q2	$0	2019 Q4

Table 4-16: Key Office Market Indicators – Annual Trends

Note: All data obtained March 2020; 12-month estimates are from this date.

Commercial Real Estate Market

LEASING AND SALES

Over the past 12 months, rents have increased by 1.3% in the primary market area driven by growth in four-star spaces; there are no five-star buildings. Despite a declining rental growth rate, market rents per square foot are projected to rise, although very minimally. Market rents for office space in the primary market area are far below that of the United States as a whole.

Market rents for four-star properties far exceed those with lower star ratings. While these properties only represent less than 7% of the total supply, there are no reported vacancies. There is a total of 13 four-star office buildings scattered on the Gulf Coast. The majority were built after 2000, and six were classified as medical office space. As the vision for Enterprise Park promotes the concept of a modern, competitive facility, and because it will be newly constructed, it is possible that four-star properties could provide a comparison for potential office rents. However, the vast majority (75%) of office real estate, are two-star properties.

In the secondary market area, office rents overall decreased over the past 12 months and are forecasted to continue to drop. Similar to the MSA, 74% of office space in the secondary market area has a two-star rating, priced between $14.50 and $15.30 per square foot. There is only one four-star property in the secondary market area, a medical office building in Slidell. Additionally, the vacancy rate in three-star office space is extremely high, which could be a sign of weak demand at a higher price point.

CoStar identified 103 available for-lease office spaces in the combined primary and secondary market areas, 33 of which are classified as medical office. Excluding medical offices, Table 4-18 includes select for-rent spaces that provide a reasonable sample of available office space.

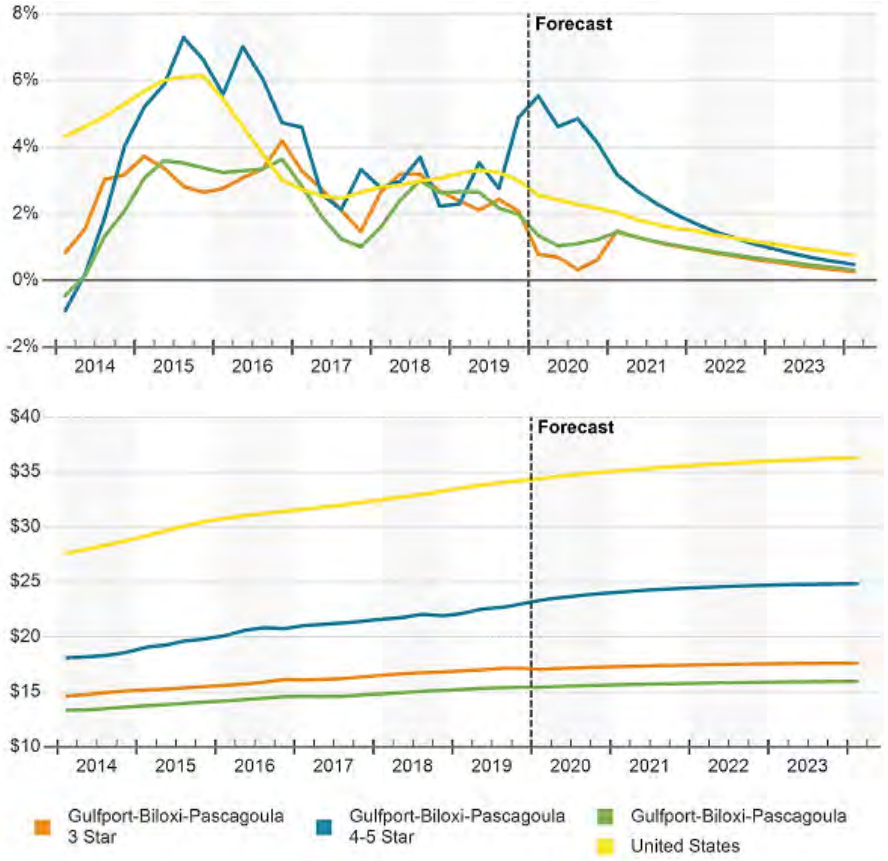


Figure 4-16: Office Market Rents and Rental Growth Rate in the Primary Market Area

Current Quarter	Rentable Building Area	Vacancy Rate	Market Rent	Availability Rate	Net Absorption SF
4 & 5 Star	449,752	0%	$23.28	0%	0
3 Star	2,209,900	6.1%	$17.04	8.2%	13.636
1 2 Star	4,121,420	4.4%	$13.68	6.0%	(2,789)
Market	**13,479,543**	**4.6%**	**$15.41**	**6.3%**	**10,847**

Table 4-17: Key Office Market Indicators in the Primary Market Area – 2020 Q1

Commercial Real Estate Market

PROPERTY ADDRESS	LOCATION	STARS	YEAR BUILT/ RENO	RENTABLE BUILDING AREA (SF)	TOTAL AVAIL. SPACE (SF)	RENT PER SF
1317-1319 26th Ave.	Gulfport	3	1903	31,000	17,136	$16.00-19.25
1315 25th Ave.	Gulfport	3	1922	3,480	3,480	$16.00
2501 14th St.	Gulfport	2	1922	9,600	1,749	$20.76+
1349 Corporate Blvd.	Slidell	2	1950	10,000	1,100	$12.00
2012 Highway 90	Gautier	3	1968	40,000	1,444	$15.60
636 Gause Blvd.	Slidell	2	1980	13,800	5,393	$12.00
249 Beauvoir Ave.	Biloxi	2	1986	8,429	8,088	$7.75
12260 Intraplex Pky.	Gulfport	2	1990	5,000	5,000	$13.00
13157 Shriners Blvd.	Biloxi	3	2004	2,500	2,500	$12.00
13131 Highway 603	Bay Saint Louis	3	2007	28,734	900	$10.00
660 Oak Harbor Blvd.	Slidell	2	2007	15,000	9,000	$12.30-15.03
1311 Spring St.	Gulfport	3	2008	4,900	2,490	$15.00
796 Howard Ave.	Biloxi	3	2009	7,700	3,300	$21.21
60491 Doss Dr.	Slidell	3	2010	15,000	3,575	$8.40

Table 4-18: Select Office Properties for Rent in the Primary and Secondary Market Areas

PROPERTY ADDRESS	LOCATION	STARS	YEAR BUILT/ RENO	RENTABLE BUILDING AREA (SF)	FOR-SALE PRICE	SALES PRICE PER SF
1317-1319 26th Ave.	Gulfport	3	1903	31,000	$3,750,000	$121
1349 Corporate Blvd.	Slidell	2	1950	10,000	$759,500	$76
2012 Highway 90	Gautier	3	1968	40,000	$83,125	$58*
3112 Canty St.	Pascagoula	2	1972	9,056	$399,000	$44
249 Beauvoir Ave.	Biloxi	2	1986	8,429	$395,000	$47
1311 Spring St.	Gulfport	3	2008	4,900	$695,000	$142

**Based on 1,444 square feet of available space*

Table 4-19: Select Office Properties for Sale in the Primary and Secondary Market Areas

Sales activity in the primary market area increased over the past four quarters, aligning with the historical average. Over the past 12 months, there were 17 sales at an average price per square foot of $82. All sales were for properties near the coast. Most transactions were for smaller buildings being advertised as medical offices. None of the spaces appeared to be part of traditional office parks, but some were in smaller strip centers. These properties received between $55 and $162 per square foot for space ranging from 5,000 to 8,000 square feet. While there were no sales in St. Tammany Parish over the past 12 months, there were 24 in Slidell; the average price per square foot was $99. Several sales were in smaller office park settings, ranging from $77 to $136 per square foot for spaces between 1,800 and 15,000 square feet.

There are currently 84 office spaces on the for-sale market in the combined market areas, 21 of which are characterized as medical office. Excluding these spaces, Table 4-19 shows select for-sale spaces to provide a reasonable sample of the for-sale office market in the region. All of these properties are also included in Table 4-18.

For-sale and for-lease properties included in the tables ranged from 900 to 31,000+ square feet. It is evident that higher spec office space is being marketed to medical office users, a sign that health care is truly driving the market. The users are likely able and willing to afford higher rents.

Commercial Real Estate Market

Based on the inventory of for-lease space, as well as a survey of recently sold and for-sale spaces, it is apparent that there are minimal spaces available on the market that provide a direct comparison to the proposed development at Enterprise Park. The most comparable, existing property is Stennis Technology Park at 13131 Highway 603 in Bay Saint Louis. The details of this property are outlined in the following section.

COMPETITIVE SUPPLY OF OFFICE SPACE

While the healthcare industry appears to be driving recent trends in office space, the majority of the region's existing office supply is not categorized as medical office space. Despite this trend, the region overall has a limited number of existing higher end office park developments, particularly in close proximity to SSC, that provide market comparisons for the proposed development of Enterprise Park.

Built in 2007, the Stennis Technology Park in Hancock County is the only Class A office building in the primary and secondary market areas and provides a reasonable market comparison for Enterprise Park. Located approximately 15 miles from SSC, this property has approximately 30,000 square feet of rentable space. This property is included in the Table 4-17, as there is one advertised 900-square-foot space available at $10 (modified gross) per square foot. Additionally, as previously mentioned, the Stennis International Airpark in Hancock County also has available office space with rents at $13.00 per square foot.

The Gulfport and Biloxi areas of Harrison County offers a greater number of office park properties. The Gulf Coast Professional Tower in Biloxi was built in 2003 and is a four-story office building with approximately 64,000 square feet of rentable space. Although marketed as medical space, the building has a variety of tenants and rents are estimated to be between $16.00 and $23.00 (modified gross) per square foot. Additionally, One Hancock Plaza in Gulfport, owned by Hancock Bank, is a 210,000-square-foot, mid-rise office building. There are no advertised vacancies and the estimated market rent is $20.00 to $25.00 (modified gross) per square foot. Additionally, there is a proposed 50,000-square foot office building in Gulfport near to the Hancock Bank building. Proposed market rent for space in this building ranging from 2,500 to 11,250 square feet is $22.00 (full service) per square foot.

Stennis Technology Park
Source: CoStar

Concourse Office Park is located adjacent to the Gulfport-Biloxi Airport and is comprised of six buildings with approximately 12,000 square feet of rentable area. While there are no advertised vacancies, market rents are estimated to be $21.00 to $23.00 (full service) per square foot. The Gulfport-Biloxi International Airport is also promoting a future 100,000-square-foot office park is proposed near to the site of the Mississippi Gulf Coast Aerospace Center.

In St. Tammany Parish, existing and proposed Class A office parks are concentrated in Covington, which is outside of the defined market areas. Examples of existing Class A properties include:

- River Chase: 42,000 square feet built in 2017, market rent $22.00 per square foot (triple net)
- Northpark: 72,000 square feet built in 2014-16, market rent $21.00 per square foot (triple net)
- Cypress Bend Office Building: 96,000 square feet built in 2009, market rent $30.00 per square foot (triple net)

Within the defined market areas, as compared to industrial properties, it is apparent that there are fewer advertised office development opportunities. This is an indication that the logistics and manufacturing industries are driving demand in commercial real estate. Additionally, it is evident that the concept proposed for the Enterprise Park will be a product type unique to this region.

Commercial Real Estate Market

COMPETITIVE RESEARCH PARK PROPERTIES

Enterprise Park will not just compete for tenants in the regional marketplace, but will also face competition from research park properties in the Mississippi and Louisiana region, as well as similar developments at and near to other NASA campuses nationally. Based on prior studies of Enterprise Park and recent stakeholder interviews, the following have been identified as potentially competitive research park properties:

Southeast United States:

- Redstone Gateway Office Park (Huntsville, Alabama)
- Cummings Research Park (Huntsville, Alabama)
- Exploration Park – Kennedy Space Center (Cape Canaveral, Florida)

Mississippi and Louisiana:

- MSU Thad Cochran Research Park
- USM Innovation and Commercialization Park and Accelerator
- Louisiana Business & Technology Center
- University of New Orleans Research and Technology Park
- New Orleans BioInnovation Center, Inc.

REDSTONE GATEWAY OFFICE PARK

Redstone Gateway Office Park is a new, state-of-the-art office and technology park located at Redstone Arsenal in Huntsville, Alabama. First opened in ~2010, Redstone Gateway will feature up to 4.6 million square feet of Class A office space, a data center, and on-site amenities including a hotel, restaurants, and retail. The campus features an attractive urban design with pedestrian-friendly streets, pathways, open spaces, and public art, which are purposed to attract companies and a talented workforce. Development options include high bay, build-to-suite, and single and multi-tenanted options. The office park is located on a 468-acre site situated just outside of Redstone Arsenal's Gate 9, with acreage also available behind the secured fence. With the presence of NASA's Marshall Space Flight Center, US Army Materiel Command, Army Aviation and Missile Command, and Missile Defense Agency, among others, the park is marketed to the defense industry. Current tenants include Boeing and DRS Technologies.

The project is being developed over the next 10 to 15 years through a joint venture by Corporate Office Properties Trust (COPT) and Jim Wilson & Associates, LLC, in partnership with the U.S. Army and Redstone Arsenal. According to news sources, the City of Huntsville has also contributed to infrastructure improvements. COPT is a real estate investment trust (REIT) that specializes in developing land located near or adjacent to hi-tech and cybersecurity-oriented United States defense installations. Currently, 88 percent of the company's investment portfolio is in its defense and IT locations, which includes Fort Meade in Maryland. The remaining 12 percent of COPT's portfolio is in urban regional office with a focus on mixed-use, transit-served locations.

CUMMINGS RESEARCH PARK, HUNTSVILLE, AL

CRP is a renowned science and technology center located in Huntsville, Alabama. Established in 1962, CRP has grown into the country's second largest research park and is the fourth largest in the world, spanning over 3,800 acres with more than 300 companies. Approximately 26,000 employees work in the park and more than 13,258 students attend University of Alabama in Huntsville and Calhoun Community College.

The park's establishment was founded on its proximity to Redstone Arsenal, a large garrison featuring several U.S. Army organizations, and Marshall Spaceflight Center. Over the course of the 1960's and 1970's, CRM was able to attract prominent private companies in the aerospace, defense, and technology industries, including IBM, Lockheed, Northrop, as well University of Alabama at Huntsville. Anchor tenants in the park also include Teledyne Brown Engineering, Redstone Federal Credit Union, ADTRAN, Dynetics, and HudsonAlpha. Today, CRP carries forward its vision of "reserving land for scientific industry adjacent to higher education and linked to the Redstone Arsenal and NASA's Marshall Spaceflight Center". The park caters to not only Fortune 500 companies, but also start-ups and mid-size companies spanning aerospace/defense, bioscience, information technology, environmental, R&D, manufacturing, and related industries.

CRP is owned by the City of Huntsville and has staffing support from the Madison County Chamber, which owns and operates several industrial parks in the Huntsville/Madison County area. Currently, there are approximately 240 acres of land available for development. Land parcels available range in size and cost, scaling upwards from a minimum of four acres. According to the CRP website, the price per acre for each parcel is determined by its proximity to amenities within the park, including transportation and water features. The City

of Huntsville is responsible for site preparation improvements, including road access, curbing, utilities, telecommunication, and drainage. The City has outlined a land development approval process and has adopted design guidelines for the park. In addition to new development opportunities, tenants in CRP offer existing office space for lease.

The City of Huntsville's vision for CRP emphasizes placemaking and a cohesive "ecosystem" to leverage knowledge transfer, a skilled workforce, and the regional supply network.

EXPLORATION PARK, CAPE CANAVERAL, FL

In 2006, the Florida Legislature passed the Space Florida Act, consolidating Florida's three existing space entities (Florida Space Authority, Florida Space Research Institute, and Florida Aerospace Finance Corporation) into a single new organization, Space Florida. The organizational realignment was driven by the Governor's 2006 Commission Report on Space & Aeronautics, which outlined the potential benefits of realigning the structure and functionality of Space Florida's three predecessor organizations into a new structure. Accordingly, Space Florida serves as the state's aerospace economic development organization whose mission is to strengthen Florida's position as a global leader in aerospace research, investment, exploration, and commerce. As an independent special district, Space Florida has eminent domain, taxing, and financing authorities and powers, and operates a number of aerospace facilities including Exploration Park.

Commercial Real Estate Market

Established in 2011 and located outside the main entrance to NASA's Kennedy Space Center, Exploration Park is occupied by commercial and institutional research entities specializing in the following areas:

- Aerospace contractors and commercial space service providers
- Supporting US government and private space initiatives
- Biotechnology and life/environmental sciences
- Clean energy research, development and demonstration
- Advanced technology for automation, robotics, and micro-electronics
- Spacecraft fabrication, assembly, and component manufacturing IT, cyber security and homeland security
- Education/university high-tech research

Based on an interview with Space Florida representatives, Exploration Park was built on NASA-owned property facility through Space Act Agreements between Space Florida and NASA, with the leverage of Hurricane Disaster funding support. Initial development was challenged by the park's remote location. However, Space Florida cultivated relationships with Kennedy Space Center and Cape Canaveral Air Force Station and participated in strategic planning of both, enabling private sector companies to access the advantages of being located in proximity to Kennedy Space Center and the Air Force Station. Exploration Park's "outside the gate" location provides ease of access for the park's tenant employees. In addition, Space Florida has prioritized a marketing campaign through social media to help attract a young workforce.

COMPARISON OF REAL ESTATE TRENDS

Key indicators for the industrial and office real estate markets where Redstone Gateway Office Park/CRP and Exploration Park are located are compared with those of the Gulfport-Biloxi-Pascagoula MSA. Both the Huntsville MSA and Melbourne, FL markets are larger than the Gulfport-Biloxi-Pascagoula MSA in terms of real estate inventory.

Over the past 12 months, the Huntsville, AL MSA and the Melbourne, FL markets have been more active. In particular, there have been considerable additions to real estate in the Huntsville MSA, and further additions are in the pipeline with more than 1.5 million square feet of industrial and more than 310,000 square feet of office space currently under construction. Additionally, absorption within the market remains substantial. Market rent growth and vacancy rates are comparable to those of the Gulfport-Biloxi-Pascagoula MSA. While Melbourne, FL boasts the highest rents of the three geographies, 12-month net absorption was negative and 12-month additions the commercial real estate supply were much less significant than those in the Huntsville MSA.

	INDUSTRIAL			OFFICE		
	Gulfport-Biloxi-Pascagoula MSA	Huntsville MSA	Melbourne, FL	Gulfport-Biloxi-Pascagoula MSA	Huntsville MSA	Melbourne, FL
Inventory (SF)	13,479,543	37,293,814	29,202,848	6,781,072	20,789,113	16,175,695
12-Month Deliveries (SF)	0	382,500	22,500	8,500	349,562	37,247
12-Month Net Absorption (SF)	(73,100)	622,200	(39,800)	(17,200)	581,962	(91,399)
Under Construction	0	1,568,700	569,100	0	310,559	0
12-Month Rent Growth	4.2%	4.1%	3.9%	1.3%	1.1%	4.2%
Market Rent	$6.55	$7.03	$8.99	$15.41	$18.16	$18.53
Vacancy Rate	7.0%	7.8%	5.2%	4.6%	5.8%	7.2%

Note: Gulfport-Biloxi-Pascagoula MSA data pulled in March 2020, Huntsville MSA and Melbourne, FL data pulled April 2020

Table 4-20: Key Market Indicators

Commercial Real Estate Market

MISSISSIPPI AND LOUISIANA RESEARCH PARKS

The following provide general descriptions of competitive research parks that exist throughout Louisiana and Mississippi. The information was obtained through desktop analysis of the organizations' respective websites and has not been validated with organizational representatives. At a high level, the MSU Thad Cochran Research Park may be a strong competitor to Enterprise Park, offering a competitive advantage with its 25-year operating history and direct access to MSU's research investments and student talent pool. However, the MSU Research Park is located approximately four hours north of SSC. Close proximity to NASA and military installations is a critical site selection criterion for companies in the aerospace and defense industry, which well positions SSC to attract investment.

MSU THAD COCHRAN RESEARCH PARK

The Thad Cochran Research, Technology and Economic Development Park is Mississippi's first and largest research park, located on 272 acres adjacent to the Mississippi State University (MSU) in Starkville, Oktibbeha County. The park was founded in 1984 and is operated by a university affiliate, the Research and Technology Corporation, a nonprofit company that facilitates relationships between the university, researchers, and public and private partners. Today, the Thad Cochran Research, Technology and Economic Development Park spans 272 acres, features 11 buildings, and supports more than 1,500 employees across a range of private businesses and academic organizations.

The park has experienced steady growth since 2009. In 2018, the Corporation was awarded a $1.8 million US Department of Economic Development Administration grant to build a new Analytical Center for Advanced Microscopy and Microanalysis. Construction bids for the project were solicited in January 2020. A major driver of growth is the Park's immediate proximity to MSU which invests over $240 million in research activities annually.

USM INNOVATION AND COMMERCIALIZATION PARK AND ACCELERATOR

The University of Southern Mississippi (USM) began the establishment of the Innovation and Commercialization Park and Accelerator in 2002, dedicating approximately 400 acres of University owned land for a high-tech park to be driven by the USM's Polymer Science Institute. Planning for the project was funded through federal grants and a master plan was completed in 2004.

In 2010, USM established the first building on the site, a 60,000 square-foot facility known as The Accelerator. The approximately $28 million technological and entrepreneurial facility features labs, offices, equipment, amenities, and services intended to help companies progress ideas from development to commercialization. The facility features 15,000 square feet of shared resources. The Accelerator is home to 14 companies at this time, specializing in a range of specialties including bio, chemical, polymer, and information technology. It is the only facility currently located in Innovation and Commercialization Park.

LOUISIANA BUSINESS & TECHNOLOGY CENTER

The Louisiana Business & Technology Center, located in Baton Rouge, is a research park affiliated with LSU. Planning for the Center began in 2005 and today, it features dozens of tenants supporting more than 600 employees. The Center spans 200 acres located approximately five miles from LSU's main campus and is owned by the Louisiana State University Property Foundation.

A major aspect of the Louisiana Business & Technology Center is its entrepreneur programs supported by the Louisiana Technology Transfer Office (LTTO), which supports the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs, the Center's Business Incubator, and the LSU Student Incubator. Together, these programs encourage technology R&D with the purpose of fostering commercialization. LLTO maintains an office at SSC.

NEW ORLEANS BIOINNOVATION CENTER, INC.

The New Orleans BioInnovation Center, Inc. is a private, not-for-profit business incubator located in New Orleans, Louisiana. According to its website, the Center has helped create 225 new companies supporting approximately 500 jobs. The company provides capital options through its New Orleans BioFund program, offering loans with low interest rates and no closing costs or origination fees.

Today, the Center is home to over 30 companies in its 66,000 square foot, state-of-the-art facility in New Orleans' Central Business District. The LEED Gold-certified building features a wet-lab, office space, and conference space. The business incubator supports a wide range of companies with a focus in biotech and biomedical industries. For lease, New Orleans BioInnovation Center, Inc. offers a variety of options, ranging from cubicles to office and lab suites.

Economic Development Strategy

Starting with NASA's Apollo program in the early 1960s, Mississippi has played a pivotal role in the nation's aerospace industry and today it is home to some of the world's most renowned names in the business. SSC serves as the cornerstone of Mississippi's aerospace industry and is a major driver of the Gulf Coast economies of Louisiana and Mississippi. Stennis is responsible for contributing more than $875 million to the economies of Hancock, Harrison, and Pearl River counties in Mississippi and St. Tammany Parish in Louisiana. It is an integrated multi-agency federal laboratory employing over 5,200 workers with an average annual salary of $89,000. 89% of all SSC employees reside in the four-county/parish area.

Through Governor Reeve's leadership, Mississippi is poised to leverage SSC and capitalize on its unrealized economic development value through Enterprise Park. Enterprise Park at SSC has significant potential to serve as the State of Mississippi's premier location for aerospace and marine technology R&D enabling the flow of ideas between innovation generators such as the state's research universities, federal labs, and established and "start-up and accelerator" companies that require SSC's unique testing and research environment. Enterprise Park can serve as the state-of-the-art platform to harness early stage technology R&D and innovation commercialization efforts of state and federal agencies, research universities, businesses and individuals that in turn are directed at fostering high-tech business growth and economic development within the state as well as supporting federal and state agencies in meeting their mission goals.

The seeds for Enterprise Park's success are already sown through the existing R&D and innovation programs at SSC. These include:

- NASA's Innovative Partnership Program;
- Commander, Naval Meteorology and Oceanography Command;
- Mississippi Enterprise for Technology;
- Marine Industries Science and Technology;
- University of Southern Mississippi's Business and Innovation Center;
- Louisiana Technology Transfer Office; and
- Mississippi Research Consortium, a coalition of Mississippi's four research universities: Jackson State University, Mississippi State University, University of Mississippi, and the University of Southern Mississippi.

MAXIMIZING THE VALUE OF FEDERAL CITY, MS 39529

Enterprise Park's proposed location at SSC is key to their mutual success. Located at the 39529 ZIP code address, SSC is home to the nation's largest rocket engine test facility and its unique federal city environment hosts more than 50 federal, state, academic and private organizations and numerous technology-based companies employing a large skilled and highly trained workforce. SSC truly is a city unto itself, complete with a post office, bank, credit union, daycare center, fitness center, convenience store, fuel station, and more.

The economic strength of SSC's federal city model cannot be underestimated, and it provides the developed environment needed to jumpstart Enterprise Park's success. Likewise, Enterprise Park provides SSC with a much-needed state-of-the-art platform necessary to harness early stage technology R&D and innovation commercialization.

MITIGATING LOCATIONAL LIMITATIONS

Enterprise Park's location at SSC does, however, have its limitations. From a marketability and site selection perspective, site location and accessibility are paramount and the Site Suitability Analysis section above outlines each site's access constraints. However, Enterprise Park's location anywhere else in Hancock County or neighboring Pearl River County cannot effectively leverage the power of SSC's federal city environment.

Retired Watercraft from the U.S. Navy

Economic Development Strategy

While locating Enterprise Park at either Interstate 10 (I-10) or Interstate 59 (I-59) interchanges with MS 607 is logical from a pure site location analysis perspective, separation distances between Interstates 10 and 59 do pose challenges for public and private entities desiring to be located on a federal installation with immediate access to SSC's host of testing assets and amenities.

Relocating the existing security gates and opening MS 607 to public access would increase Enterprise Park's accessibility and marketability, but doing so will require addressing and mitigating the following:

- **Ensuring the continued security of the Navy's WMA from public access and intrusion.** This could be addressed by revising access control points to SSC's and the Navy's secured perimeter.
- **Ensuring the safety of motorists using MS 607 from both the WMA and SSC test complexes.** This may be addressed through NASA's existing control of the air space and testing environments whereby MS 607 could be closed during live fire or live testing periods.
- **Addressing the maintenance of MS 607 (including the drawbridge) with Mississippi Department of Transportation (MDOT).** This may be addressed through a maintenance agreement with MDOT whereby NASA continues to maintain all or portions of the existing MS 607 including the drawbridge structure until MDOT assumes ownership.
- **Providing a new bridge structure to replace the existing drawbridge structure.** The new structure would need to meet the design requirements of SSC's restricted airspace and clearance requirements for the canal barge traffic. As discussed below, a new state authority could be leveraged to finance the new bridge structure, which will be under MDOT's authority.

Enterprise Park should be located outside the security gate of SSC to provide immediate access to personnel not requiring secure access within SSC's secured perimeter. All sites considered for development accommodate this need. Enterprise Park's reduced barriers to entry will increase the site's accessibility and marketability to both domestic and foreign users by eliminating the extensive and costly SSC federal city badging process. However, buildings and facilities located within Enterprise Park may be designed to include both secure and non-secure areas depending upon each tenant's requirements and specifications.

From a workforce quality of life perspective, SSC's location within the 125,000-acre Acoustical Buffer Zone coupled with southern Mississippi's predominantly rural setting is not conducive to Enterprise Park's marketability to attract today's knowledge-based, STEM (science, technology, engineering and mathematics) workforce. Therefore, it will be critical to develop a coordinated marketing and branding approach that sells and positions SSC and Enterprise Park within the context of Mississippi and Louisiana Gulf Coast communities that offer affordable living and quality of life amenities to both retain and grow the existing local workforce, as well as attract new talent from other parts of the United States or from around the world. This coordinated approach should include collaborations with the Gulf Coast region's research university's and local community colleges to encourage the placement and retention of their respective STEM academic program students into the region's aerospace and marine technology industries.

During the past several decades lack of investment at SSC in both physical plant and building improvements as well as R&D funding, has severely limited its ability to keep pace with growth at other NASA facilities around the nation. This issue highlights the need for the Partners for Stennis & Michoud to continue being a strong advocate for SSC to ensure its sustainability and growth as a federal city.

Finally, addressing perceptions pertaining to perceived safety risks of locating an R&D park within SSC's Acoustical Buffer Zone with active rocket testing and military exercising is critical to advance the future development of Enterprise Park. A well thought out messaging strategy mitigating each safety risk must be developed and proactively and transparently communicated to existing and prospective tenants. A key communication approach includes a dedicated and dynamic website for Enterprise Park.

Economic Development Strategy

ADVANCING ENTERPRISE PARK VIA STATE-LEVEL LEADERSHIP

The State of Mississippi has been a crucial partner for more than 50 years and has been instrumental in the growth and development of SSC as a world-class facility and vital economic engine.

State-level leadership is even more critical to harnessing the economic development potential of Enterprise Park at SSC and the extensive aerospace assets of Hancock County to further strengthen and advance the state's economy, and fully demonstrate its competitive advantage with its state Aerospace Alliance partners in Alabama, Florida, and Louisiana. State-level leadership is paramount to achieving and executing a coordinated approach that engages key stakeholders that include federal and state legislators, MDA, HCPHC, NASA, the U.S. Navy, the Mississippi Research Consortium, and economic development entities from surrounding counties.

"Stennis Space Center could not ask for a better partner than the state of Mississippi. There are countless instances of Stennis Space Center and Mississippi growing and working together to attract businesses, to strengthen the economy and to improve the quality of life in this great state. We are committed to continuing that partnership effort at every opportunity."

Richard J. Gilbrech, Ph.D., Director, John C. Stennis Space Center

Similar to Space Florida, an aerospace economic development agency of the State of Florida created by legislation, Mississippi should consider designating a special purpose authority (e.g., Mississippi Aerospace Authority) to serve as the state's lead agency for all aerospace-related functions. The Mississippi Aerospace Authority would also serve as the lead financier, developer and manager of Enterprise Park, akin to Space Florida's Exploration Park.

As a special purpose authority, the Mississippi Aerospace Authority could be allocated state funds for Enterprise Park's initial operating and working capital until revenues from tenant leases are sufficient to cover operating and capital expenses. The Authority could operate in this capacity through a specially devised agreement or leasing arrangement with NASA to give full autonomy for Enterprise Park's management and operations as well as create a market-competitive environment for commercial business attraction and retention.

The Authority, in collaboration with Partners for Stennis & Michoud, would also serve as the lead advocate for SSC's and Enterprise Park's advancement and investment with Mississippi's state and federal legislative delegation. Strengthening and diversifying SSC's federal city model is key to its sustainability and preservation, and ultimately the success of Enterprise Park. Furthermore, reestablishing SSC's role as an R&D facility is critically important to increasing R&D dollars that have been waning in recent years. In turn, increased R&D investment will lead to greater amounts of technology transfer, solidifying SSC's importance in the Aerospace Alliance and around the nation.

Federal legislative initiatives such as the LIFTS Act is a prime example of leveraging SSC's unique assets and strengthening the federal city model. The act, which was co-sponsored by U.S. Senator Roger Wicker and Senator Cindy Hyde-Smith, seeks to "modernize training for the federal commercial space licensing workforce and promote collaboration with academia and industry by creating a centralized training facility for safety and licensing personnel." The training program would be coordinated between the FAA, NASA, the commercial space industry, and academic partners.

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PART V
RISK ANALYSIS AND IMPLEMENTATION

A-1 Test Stand at Night

Introduction

As in all major real estate development projects, Enterprise Park will be achieved through a complex, multi-step process that will include both risks and rewards for SSC and its development partner. Each step of the process must balance tradeoffs to ensure mutual success for all parties.

As outlined by the Urban Land Institute[1], various risks encountered in any real estate development partnership often include:

- **Market risk**: Will the projected demand for space actually be realized?
- **Construction risks**: Will the project meet the budget and schedule?
- **Ownership risks**: Will all the risks of owning and operating a development, such as tenant leasing, be overcome?
- **Interest-rate risk**: Will the interest rate increase?
- **Performance risk**: Will the project achieve the public purpose for which government justified its participation?

As the current project owner, SSC has assumed responsibility of evaluating the early stage/pre-development risks of the proposed Enterprise Park development project. This was accomplished through the Wild Boar Study and this due-diligence study of Enterprise Park, which begins to provide the critical information needed to proceed with the real estate development process. Both the Wild Boar Study and the previous sections of this study help address many of the risks listed above. Section V of this report will further this evaluation by considering the ownership and financial performance risks of Enterprise Park.

SLS Rocket Installed on the B-2 Test Stand

[1] Corrigan, Mary Beth, et al. Ten Principles for Successful Public/Private Partnerships. Washington, D.C.: ULI–the Urban Land Institute, 2005.

Pro Forma Analysis

The basis of the ownership and financial performance risk are evaluated through a conceptual pro forma analysis. The conceptual pro forma:

- Provides the initial estimate of Enterprise Park's financial performance
- Represents the starting point for evaluating the partnership approach and initiating development discussions

The partnership approach may be in a public-public or public-private venture. Development discussions will follow with either prospective development partners, such as MDA, or a private entity, such as a real estate investment trust (REIT) that is experienced in federal government real estate development ventures.

The summary pro forma results presented in Tables 5-1 and 5-2 on the following pages are based on the Project Ready South site, which received the highest score in the Site Suitability Analysis (Part III). The pro forma results are presented for both public-public and public-private partnership models. Both models are based on the assumptions presented in Table 5-3.

A detailed pro forma analysis for each model (i.e., public-public and public-private) was developed in Microsoft Excel. These models offer SSC flexibility to manipulate the assumptions and data inputs based on discussion with MDA or a private development partner. Each entity can then further refine the pro forma results to evaluate the Enterprise Park investment opportunity. Additionally, SSC may also use the models to compare the proposed Enterprise Park lease rates with the current SSC Federal City tenant lease rates. This will help SSC devise a lease rate structure that is competitive with that proposed for Enterprise Park (e.g., Triple Net) and mitigate the potential for any competing or conflicting rate structures.

As shown in Tables 5-1 and 5-2, the internal rate of return (IRR) is 28.74% and 16.68% for the public-public and public-private models, respectively. The IRR – also known as yield on project – is the rate at which an investment in a project promises to generate a return during its useful life. More specifically, it is the discount rate at which the present value of a project's net cash inflows becomes equal to the present value of its net cash outflows (i.e., the net present value is zero). The IRR is often the measure used to evaluate the financial attractiveness of a specific investment or project (i.e., the higher a project's IRR, the more desirable it is to undertake).

IRR is uniform for investments of varying types. It can be used to rank multiple prospective projects on a relatively even basis. In the case of Enterprise Park, the pro forma models assume a higher risk of investment for the public-private partnership model given that a private developer will most likely require an upfront equity investment in the project to secure a commercial loan to finance the project. In contrast, the pro forma assumes a much lower risk of investment for the public-public partnership model given that a public-sector partner like MDA would not need to obtain financing through a commercial lender and that such an investment is likely a policy driven decision based on the state's economic development strategy and goals. Therefore, the public-private pro forma assumes a commercial loan debt equity expenditure while the public-public pro forma model does not. As such, the public-public partnership model generates a higher IRR (28.74%), but the public-private IRR of 16.68% may also be deemed an acceptable rate of return depending upon the private development partner's financial goals and level of acceptable financial risk in the project.

Pro Forma Analysis

Public-Public Model

Pro Forma Results	Year 1	Year 25
Return on Investment (NOI/Total Investment)	1.64%	13.17%
Average ROI Through Lease Period	10.00%	
Return on Equity (BTC/Equity)	N/A	N/A
Average ROE Through Lease Period	N/A	N/A
Internal Rate of Return (IRR) Through Lease Period	28.74%	
NPV Through Lease Period at Loan Rate	$1,624,313,084	
NPV of Lease Revenue at Discount Rate	$204,715	

Table 5-1: Project Ready South Site Pro Forma (Public-Public Model)

Public-Private Model

Pro Forma Results	Year 1	Year 25
Return on Investment (NOI/Total Investment)	1.64%	14.54%
Average ROI Through Lease Period	10.00%	
Return on Equity (BTC/Equity)	-43.57%	145.35%
Average ROE Through Lease Period	54.54%	
Internal Rate of Return (IRR) Through Lease Period	16.68%	
NPV Through Lease Period at Loan Rate	$1,160,228,771	
NPV of Lease Revenue at Discount Rate	$204,715	

Table 5-2: Project Ready South Site Pro Forma (Public-Private Model)

Tables continue on the following page.

Pro Forma Analysis

Pro Forma Assumptions and Variables

Assumptions	Values
Project Ready South Site	122 net developable acres (150 acres less 28 acres of undevelopable land area)
Development Mix	75% Class A commercial office + 25% industrial flex space
Buildout	70% coverage for both development types and the Class A office space will be built at three stories
Commercial Office Rent/Sq. Ft. (Triple Net)	$15.41 (Gulfport-Biloxi-Pascagoula MSA CoStar data, March 2020)
Industrial Flex Space Rent/Sq. Ft. (Triple Net)	$6.55 (Gulfport-Biloxi-Pascagoula MSA CoStar data, March 2020)
Commercial Office Site Development Cost	$150/sq. ft. (total site development + building improvements price / sq. ft. cost)
Industrial Flex Site Development Cost	$70/sq. ft. (total site development + building improvements price / sq. ft. cost)
Real Estate Value	$1,200/acre (estimated value not based on an official real estate appraisal)
Ground Lease Value	$180,000
Years of lease	30
Discount Rate for Ground Lease Value	3.50%
Commercial Loan Interest Rate (Taxable Entities)	3.00% (MDA Capital Improvements Revolving (CAP) Loan Program)
Commercial Loan Interest Rate (Non-taxable Entities)	2.00% (MDA CAP Loan Program)
1st Year Annual Ground Lease Payment	$9,786
Annual Ground Lease Increase	1.00%
Vacancy Rate	9.2% (CoStar Slidell submarket forecast average)
Commercial Loan Debt Equity	Applied only to the Public-Private Model due to an assumed higher risk associated with a private developer partnership scenario

Table 5-3: Project Ready South Site Pro Forma Assumptions and Variables

Partnership Models

In the case of the public-public partnership model, SSC should work with MDA (or the proposed Mississippi Aerospace Authority) to optimize its real estate asset through NASA's Public-Public Venture out-grant lease agreement approach that includes EULs. The PPV approach, authorized under NASA Procedural Requirements (NPR) 8800.15C, permits SSC to furnish its real property to the Authority for a specified period of years and invest its own capital to construct, renovate, or improve that real property and to operate the asset in a manner consistent with the agreement and mission of the SSC federal city to include Enterprise Park.

SSC may also consider partnering with a private development entity such as a real estate investment trust (REIT) experienced in federal government real estate development ventures. One such REIT is Corporate Office Properties Trust (COPT), which specializes in developing land located near or adjacent to high-technology and cybersecurity-oriented U.S. defense installations. COPT recently partnered with the U.S. Army, Redstone Arsenal, and a local private developer to develop Redstone Gateway Office Park, which is a new, state-of-the-art office and technology park located adjacent to Redstone Arsenal in Huntsville, AL. Out-grant lease agreements include all nonpermanent granting of the use of NASA real property to either government or nongovernment entities by means of lease (or any other form of acceptable legal instrument that recognizes NASA as the landlord and the lessee as the tenant), permit, easement, right-of-way, license, Space Act Agreement (SAA), and agreement, such as Memorandum of Understanding (MOU), Memorandum of Agreement (MOA), and concessionaire agreement. Out-grant agreements with nongovernment entities requires NASA to openly advertise the leasing opportunity through public announcements, such as Fed Biz Ops or other federally authorized advertising methods. Out-grant agreements with government entities are not subject to the open advertising requirement.

Redstone Gateway Office Park
Source: waff.com

Risk Analysis

The following table summarizes the risks often encountered in any real estate development partnership. The analysis evaluates each risk from both an internal (SSC) and external (both public and private sector development partner) perspective. It also provides a recommended course of action for SSC to mitigate the real and perceived risks, which may vary based on audience. The risk analysis is a baseline analysis of known risks based on current circumstances and information. Therefore, an ongoing evaluation of risks associated with the Enterprise Park real estate development project is imperative given changing circumstances (such as the COVID-19 pandemic) to ensure they are effectively mitigated.

	Internal	External	SSC Action
Market risk: Will the projected demand for space actually be realized?	SSC is not well-positioned to capture a competitive share of the growing global commercial aerospace sector that is expected to have continuous, steady investment in new and existing space technologies. Contributing risk factors include the SSC cost recovery model, security protocols, aging campus environment, demolition of existing and reusable facilities, and remote location that lacks amenities sought by the STEM workforce. NASA's limited ability to use "in-kind consideration" under its current EUL authority is further contributing to SSC's limited competitiveness in the commercial aerospace market sector. As successfully proven by other federal agencies, the ability to accept in-kind consideration under more broad EUL authorities have consistently lead to more private partnerships.	Other NASA centers and facilities, as well as new privately-owned commercial aerospace sites, are more competitively attractive than SSC and are capturing a large share of the commercial aerospace industry market. The growing number and diversity of FFA-licensed spaceport and commercial launch facilities is increasing the supply of aerospace R&D, testing, production, and launching locations that are in direct competition with SSC's capabilities.	SSC's leadership must maximize Stennis' unique location, resources, and capabilities to capture a greater share of the global commercial aerospace sector through reinvestment in SSC facilities and implementation of the Enterprise Park vision. The need to effectively market and promote SSC's Rocket Propulsion Test Program and Advanced Technology and Technology Transfer Branch is increasingly critical to ensure SSC's overall sustainability and competitive position in the global marketplace. This includes achieving expanded EUL authority (i.e., include in-kind consideration) to enable SSC to repair its aging infrastructure while facilitating the growth of commercial aerospace industry. In addition to Enterprise Park, SSC should also leverage HCP&HC's Stennis International Airport and its pending FAA-spaceport operator license to further diversify SSC's capabilities and strengthen its position in the commercial aerospace industry sector. Enterprise Park provides SSC and the State of Mississippi with a high-technology, R&D-driven platform that will not only help capture and grow the aerospace market, but diversify its economy through increased maritime systems innovation and commercialization to include unmanned systems technologies.

Risk Analysis

	Internal	External	SSC Action
Construction risks: Will the project meet the budget and schedule?	SSC is reliant on an external development partner to achieve the Enterprise Park vision. SSC's current ownership of the Enterprise Park property is advantageous and its location in the Gulfport-Biloxi-Pascagoula and the New Orleans-Metairie MSAs makes its competitively attractive from a construction cost (labor wages, materials, permitting, etc.) perspective compared to other regions of the U.S.	Based on the conceptual pro forma analyses and the resulting IRRs, greater financial risk will likely be realized by a private sector partner than with a public sector partner. However, risks pertaining to construction budget and schedule are often far less considerable with a private sector partner than with a public sector partner due to the private sector's need to have a positive return on investment.	SSC and its development partner (either public or private) must approach and operate Enterprise Park as a private business operation and ensure both it and SSC are equally competitive in the marketplace.
Ownership risks: Will all the risks of owning and operating a development, such as tenant leasing, be overcome?	SSC will optimize the Enterprise Park real estate asset through an EUL agreement with a public and or private development partner. NASA's current EUL authority – authorized under Section 20145(g) of Title 51, United States Code – expires on December 31, 2021 pursuant to the FY2020 Further Consolidated Appropriations Act (H.R. 1865).	Ownership risk in Enterprise Park will be greater with a private sector partner due to the policies and regulations associated with conducting business with the federal government. Such risk includes the upfront time and financial resource investments required to reach an EUL agreement with NASA. This is further complicated by the December 31, 2021 expiration of NASA's current EUL authority and the unknown long-term impacts that the COVID-19 pandemic will have on the economy and commercial real estate development sector. However, the opportunities associated with a long-term (up to 55 years) EUL agreement – including government and community relationships and access to tenant markets previously inaccessible – may have rewards that outweigh the risks.	SSC should minimize the ownership risks with Enterprise Park by securing a development partner relationship with the State of Mississippi via MDA or a new aerospace authority. Alternatively, a public-private partnership opportunity may still be viable if the private developer deems the risks of ownership are acceptable given the potential rewards.

Risk Analysis

	Internal	External	SSC Action
Interest-rate risk: Will the interest rate increase?	As previously discussed, SSC is reliant upon an external development partner to assume the financial risks associated with the Enterprise Park project as conceptually quantified in the pro forma analysis.	The pro forma analysis assumes a higher investment risk for the public-private partnership model given that a private developer will most likely require an upfront equity investment in the project to secure a commercial loan to finance the project. In contrast, the pro forma assumes a much lower risk of investment for the public-public partnership model given that a public-sector partner like MDA would not need to seek financing through a commercial lender and that such an investment is likely a policy driven decision based on the state's economic development strategy and goals. For the private sector partner, commercial interest rates are expected to remain low and possibly be reduced even further as a mechanism to mitigate negative economic impacts of the COVID-19 pandemic. Therefore, the financial risk may be reduced for the private sector development partner and in turn generate a greater IRR. However, COVID-19 may have a negative impact on the credit rating of municipal bonds, which are debt instruments used by state and local governments (including municipal authorities) to finance significant capital projects. Municipal bonds bear interest that is paid to its investors at either a fixed or variable rate, depending on the terms of the bond. The severe tax revenue shortfalls currently realized by many state and local governments may create a downgrade in the credit rating of municipal bonds. This will increase investor's risk in municipal bonds and make it more challenging for state and municipal governments to use them as a debt financing tool.	The impacts of the COVID-19 pandemic are very recent and the long-term impacts on state and local economies are unknown. However, both the nation and the State of Mississippi have weathered previously unprecedented events (such as Hurricane Katrina, the Deepwater Horizon oil spill, and the Great Recession) that have created extreme uncertainties in the commercial markets. Therefore, SSC should continue in earnest with its Enterprise Park vision and communication strategy to the State of Mississippi (as its preferred development partner) via Governor Reeve's Administration with support from its federal and state legislative delegation.

Risk Analysis

Performance risk: Will the project achieve the public purpose for which government justified its participation?

Internal	External	SSC Action
SSC has assumed the responsibility of evaluating the early stage/pre-development risks of the proposed Enterprise Park development project. SSC has completed this through the Wild Boar Study and this due diligence study that provides the critical information needed to address the project's various feasibility and performance risk factors.	Both the Wild Boar Study and this Enterprise Park special study provide significant information that both public and private sector partners need to evaluate and determine the project's performance risks. With respect to the State of Mississippi, Enterprise Park will need to support the current administration's economic development and performance goals related to the aerospace and blue economy sectors. This goal will contribute to the state and local economies. With respect to the private sector, Enterprise Park will need to meet support the entity's financial performance goals based on its commercial development project portfolio.	Enterprise Park has significant potential to greatly contribute to SSC's existing economic impact and the State of Mississippi's participation in the project may be rightly justified. Therefore, the State has the opportunity to use Enterprise Park as its platform to invest and grow the state's aerospace and blue economy industry sectors.

Planning and Implementation

Building 1100

PLANNING AND IMPLEMENTATION: ENTERPRISE PARK MASTER PLAN AND STRATEGIC BUSINESS PLAN

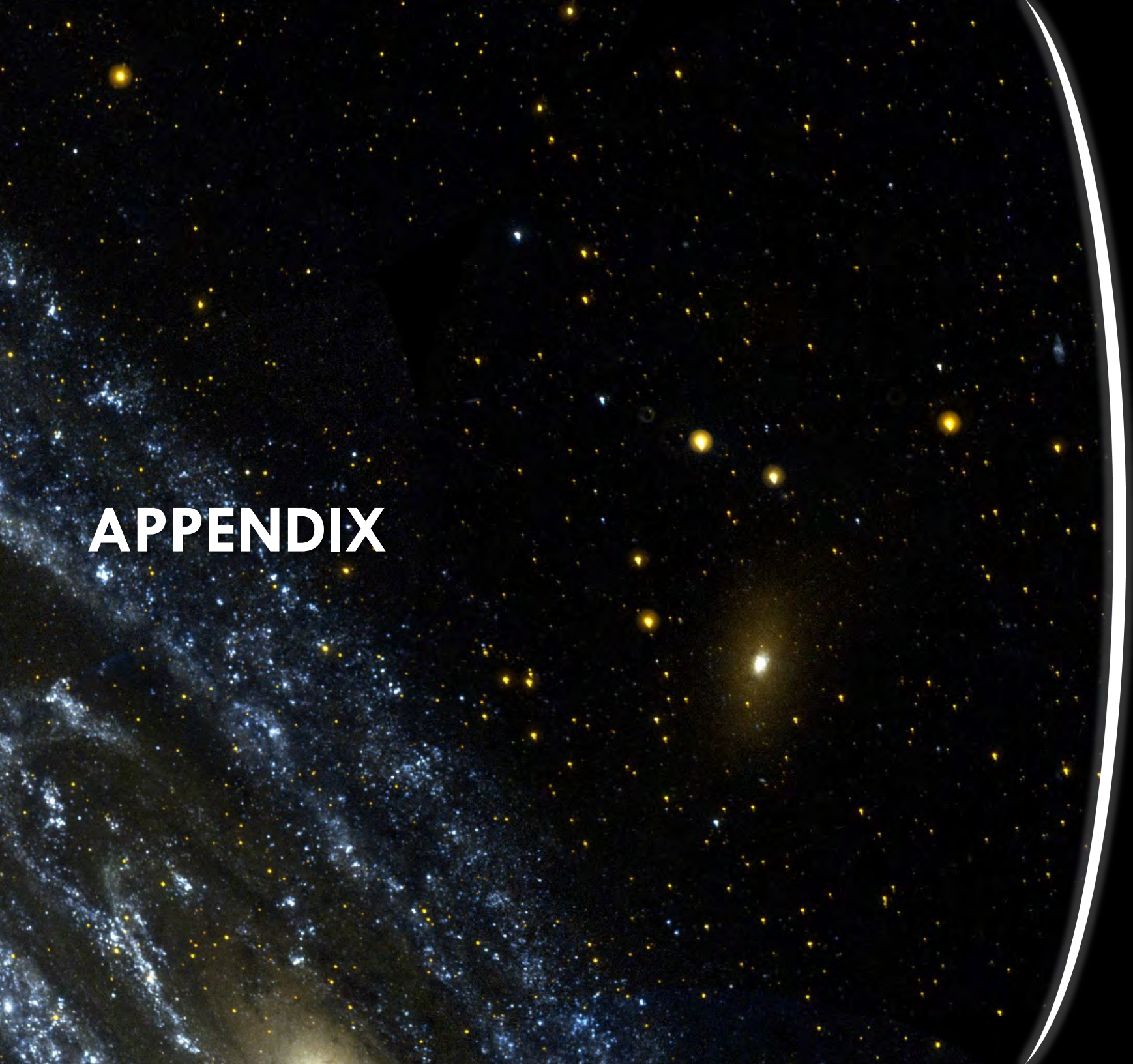
A key next step to advancing Enterprise Park is the development of a master plan. The master plan should be developed in collaboration with the state and local partners (via the Partners for Stennis & Michoud) to clearly articulate the vision, mission and purpose of the park as Mississippi's premier location for aerospace and marine technology R&D. The master plan is essential to fully understand the park's access, utilities, layout and design features and elements, including identifying supporting amenities that are critical for attracting and retaining STEM workforce.

Furthermore, it is necessary to ensure a coordinated master planning approach is achieved for both Enterprise Park and SSC. This coordinated approach will demonstrate the secure and non-secure interrelationships between SSC and Enterprise Park, as well as their facility asset interdependencies. This master planning approach must use an urban design approach to both demonstrate the significant reinvestment and modernization needs of SSC's existing core campus area and showcase Enterprise Park as a well-designed, future-focused, "Smart City" urban campus environment that includes outdoor amenities with multimodal accessibility features including pedestrian and bicycle pathways, and autonomous vehicle connections between both Enterprise Park and SSC's core campus development areas.

Synergistic to the master plan, a strategic business plan must also be developed for Enterprise Park to clearly articulate the park's vision and mission, as well as a business model and five-year financial operating budget forecast that includes a competitive tenant leasing and cost structure. The strategic business plan will also need to consider and address the tenant lease agreement structures between Enterprise Park and SSC. Specifically, SSC's existing cost recovery model needs to be aligned with Enterprise Park's tenant lease rate structure to ensure both are equally competitive in the commercial real estate marketplace.

Together, the master plan and strategic business plan will serve as the foundation for Enterprise Park's business recruitment and retention strategy including partnerships with key business development and technology transfer organizations such as current SSC tenants MSET, USM's Business & Innovation Center, and Louisiana Technology Transfer Office. These university assets are key partners to foster business opportunities at SSC.

Effectively and thoughtfully planned and implemented in conjunction with regional partners, Enterprise Park will serve as a future catalyst to attract not only increased private and public investment at SSC, but increased investment in business and industrial parks throughout the Gulf Coast. New investment in SSC and Enterprise Park will set the stage to create the strong business environment that neighboring NASA centers in Alabama, Louisiana and Florida enjoy.



APPENDIX

A double rainbow appears during an RS-25 engine test.

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Acronyms

Below are a list of acronyms used throughout this report:

AMTC	Advanced Manufacturing and Technology Center
BTC	Before Tax Cash
CHL	Center of Higher Learning
CNMOC	Commander, Naval Meteorology and Oceanography Command
CRP	Cummings Research Park
DOD	Department of Defense
EIGS	Enterprise for Innovative Geospatial Solutions
ETD	Engineering and Test Directorate
EUL	Enhanced Use Lease
FAA	Federal Aviation Administration
GIS	Geographic Information Systems
GPD	Gallons Per Day
HCPHC	Hancock County Port & Harbor Commission
IRR	Internal Rate of Return
JSC	Johnson Space Center
LSU	Louisiana State University
LTTO	Louisiana Technology Transfer Office
MAE	Mechanical and Aerospace Engineering Department
MDA	Mississippi Development Authority
MDOT	Mississippi Department of Transportation
MGCCC	Mississippi Gulf Coast Community College
MIST	Marine Industries Science and Technology
MRC	Mississippi Research Consortium
MSET	Mississippi Enterprise for Technology
MSU	Mississippi State University
NAICS	North American Industry Classification System
NASA	National Aeronautics and Space Administration
NOAA	National Oceanic and Atmospheric Administration
NOI	Net Operating Income
NRL	Naval Research Laboratory
NPV	Net Present Value
R&D	Research & Development
RBA	Rentable Building Area
ROE	Return on Equity
ROI	Return on Investment
SBA	Small Business Administration
SBC	Stennis Business Consortium
SBIR	Small Business Innovation Research
SLS	Space Launch System
SSC	Stennis Space Center
SSL	Space Systems Loral
STEM	Science, Technology, Engineering and Mathematics

Acronyms

Below are a list of acronyms used throughout this report:

STTR	Small Business Technology Transfer
UAS	Unmanned Aircraft Systems
ULA	United Launch Alliance
UMS	Unmanned Maritime Systems
USC	United States Code
USM	University of Southern Mississippi
WMA	Western Maneuver Area

Glossary of Terms

A list of terms used throughout this report are listed below:

Absorption Rate	The amount of real estate that will be leased or sold in a given period, typically one year. This does not include lease renewals, unless the renewal would result in an increase in occupied space, or pre-lease of non-existing space. For example, if the absorption rate is lower than the availability, then there will be an expected increase in vacant properties or a potential downward pressure on rents or sales prices.
Acoustical Buffer Zone	The area extending about 6 miles in all directions from the perimeter of the Fee Area. The Acoustical Buffer Zone has a perpetual restrictive easement that prohibits habitation, occupancy, and the construction of buildings. It is approximately 125,000 acres.
Asking Rent	The rent that a landlord is asking, typically per square foot, for a property. This does not mean the asking rent represents the actual rent that would be paid.
Availability Rate	This is the percentage of property that is currently available for sale or lease on the market as a percentage of total inventory in the market. It is measured on the last day of each quarter or the current date of the current quarter. Low availability rates mean an extremely tight market and less choice for lessees or buyers. A high availability rate means more choice.
Building Class	The office building class designation is a way of differentiating buildings of the same building type into different categories of quality. These classes represent a combination of a subjective and objective quality rating of buildings that indicates the competitive ability of each building to attract similar types of tenants. Assigning class codes allows us to compare individual buildings within a market as well as across markets, and also to compare office market conditions between areas in peer groups. For the purposes of comparison, CoStar groups office buildings into four classes. The options are Class A, B, C, or F, with assignment depending on a variety of building characteristics, such as total rentable area, age, building finishes and materials, mechanical systems standards and efficiencies, developer, architect, building features, location/accessibility, property manager, design/tenant layout, and much more.
Building Rating System	The CoStar Five Star Building Rating System is the industry's first nationally consistent building quality rating system that can be applied across all commercial real estate property types and across all markets. To quantify these ratings, we are using the universally recognized five-star system. Each star rating in this system represents a particular level of quality with five stars indicating the nation's highest quality assets.
Cap Rate	The income rate of return for a property that divides the net operating income (the actual or anticipated rental income after operating expenses are deducted, but before debt service or other expenditures are deducted) by the sale price or value of the property. This is a way to compare investment returns on an annual basis similar to how different loans would be compared with an APR. This is important to developers, investors, and landlords as it indicates potential profit.
Comparable (Comps)	These are similar properties to the subject property or study area that can be compared to reach an estimate on the study area or subject property's market value. It is important that similar types of properties, with sales or leases within a reasonable time period (typically one to two years) and a proximate geographic area are studied to help determine potential rents or sales prices as these are recent indicators of what the market commands.

Glossary of Terms

A list of terms used throughout this report are listed below:

Deliveries	This is the amount of construction, typically in square feet, that was built during a period, typically one year
Demolition	The deletion of available building stock in the market due to destruction of the property, typically measured in one year.
Federal City Model	The composition of government, private, and academic facilities in the Fee Area that use a cost reimbursable model to provide essential services to all its tenants, ranging from electric, water, sewage, and building and grounds maintenance.
Fee Area	The approximately 13,800 acre campus area that houses all SSC operations. The Fee Area is owned by the Federal Government and is surrounded by the Acoustical Buffer Zone.
Flex	A type of building that is capable of multiple uses, typically in a single facility, including office, research and development, retail sales, light manufacturing, and small warehousing and distribution space.
Ground Lease	Also known as a land lease, ground lease separates ownership of the land from ownership of the building and improvements constructed on the land. Usually land is leased for a relatively long period of time (50-99 years) to a tenant that constructs a building on the property.
Inventory	The total amount, typically in square feet, of a particular structure type in the market at a given point in time.
Logistics	These are industries that deal with the supply chain, including shipping, transport, warehousing and distribution.
Market Rent	This is the rent that the landlord would receive, typically per square foot, for a property (what the market would command). This differs from asking rent in that this is the actual negotiated rent, and not what is being asked.
Modified Gross	Modified Gross is a general type of lease rate where typically the tenant will be responsible for their proportional share of one or more of the expenses. The Lessor (landlord) will pay the remaining expenses. For example: Plus Electric means the tenant pays rent plus their own electric expense, or Plus Janitorial means the tenant pays the rent plus their own janitorial expense. Both of these are types of Modified Gross Leases, which may vary from tenant to tenant.
MSA	Metropolitan Statistical Area. A geographic area with a large population nucleus and includes adjacent counties which have a high degree of economic and social integration with that nucleus.
Net Absorption	The change in square feet of occupied inventory over a specified period, including the addition or deletion of building stock during that period of time, typically one year. This also includes subtraction for properties that are vacated during the same period of time, such as a tenant moving out.
Price per Square Foot	Sale price divided by the rentable square feet of the building. This is used in properties for sale or sold as opposed to properties leased or for lease.

Glossary of Terms

A list of terms used throughout this report are listed below:

Project Ready® Program	Mississippi Power Company's site certification that examines site suitability by examining environmental and economic development considerations.
Pro Forma	A financial statement that projects gross income, operating expenses, and net operating income for a future period for a specific property or development. A pro forma takes into account a specific building or development, construction costs, operations and maintenance, financing and debt, permitting, and expected income through lease or sale. It also considers a time period assumption for vacancy to full occupancy. A real estate market analysis can help inform inputs into a pro forma, such as expected rent, sales, and vacancy rates. The pro forma helps a developer or investor determine the performance of the potential investment, risk, and whether it is financially feasible.
RBA	Rentable Building Area. This is the actual square footage of a building that is available for rent. This includes all usable portions of the building and shared common spaces. This is like gross leasable area in retail estate market analysis.
Real Estate Market Analysis	The study of demand and supply of real estate including property and/or buildings. The demand consists of users or would be users of the property, and the supply consists of a mix of existing property, buildings and future buildings that will be coming onto the market soon. The market analysis provides a snapshot on what could potentially be built or leased. This serves as part of the cash flow analysis that developers and investors use when calculating their proformas (calculations of costs and profits for individual development).
Rent Growth	The change in actual rent per square foot within a given period, typically one year.
Risk	The potential that the return on an investment or loan will not be as high as expected.
Sales Volume	This is the total amount of dollars, in nominal value, of real estate sales in a given period, typically one year.
Specialized Industrial	Buildings typically built to house specific industry types that require highly customized environments such as specialized food manufacturing.
Tenant Improvements	Improvements made to the property either at the tenant's expense or made by the landlord as part of the lease agreement negotiation.
Triple Net	(NNN) A lease in which a tenant is responsible for all expenses associated with their proportional share of occupancy of the building.
Under Construction	This is the amount, typically in square feet, of promised new inventory that is currently still in the construction phase. Construction phasing typically means that permits have been obtained and at least a foundation has been completed. For example, the mass grading of land with no structural construction is not considered "under construction."
Vacancy Rate	The amount of existing inventory by square feet of structure that is unoccupied and available for sale or lease.
Wild Boar Study	The first strategic study completed in 2015 that defined the potential of an aerospace/R&D technology corridor model within the Fee Area that is managed differently than the Federal City.