

Smithsonian

Suitland Collections Center Master Plan

Draft NCPC Submission

November 2019

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Smithsonian Institution
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Executive Summary

The Smithsonian Institution is requesting NCPC's review of the Master Plan for the Suitland Collections Center (SCC). While this submission covers 20 years of development, the Master Plan addresses the enhancement of the SCC over the next 40 years. The Plan seeks to improve the Smithsonian's stewardship of the collections on the 110-acre Maryland site, addressing facilities, landscape, sustainability and security.

The Smithsonian has stored collections at the SCC since the 1950s, when curator Paul E. Garber used its metal buildings for the aircraft collection he was amassing. The continued growth of these and other Smithsonian collections has led to overcrowded, inadequate facilities, and a dependence on costly rental space elsewhere to fill the gap. The resulting situation has hindered staff and researcher access.

The purpose of the Master Plan is to:

- Address space needs
- Preserve and broaden access to the collections
- Consolidate collections locations
- Reduce reliance on leased space

The Smithsonian hopes to establish the SCC as an integrated, welcoming and sustainable campus that also reinforces the Institution's singular identity, fosters pan-Institutional collaboration and maximizes the use of shared amenities.

The site will remain a secure campus with non-Smithsonian visitors required to make appointments.

Facilities

The development will combine buildings to remain (37%) and new construction (63%). The current facilities of 1.3 million gross square feet (gsf) in collections storage, office, laboratory and amenity spaces will grow to 2.4 million gsf in 40 years. Over that time, the number of employees and visitors is expected to increase from 350 to more than 900.

The site plan for new construction creates a campus quad in which buildings fan out around a green commons. Workspaces will face the quad and collections storage will be on the perimeter. The strategy encourages walking and limits vehicular traffic. It also incorporates an efficient loading scheme that directs deliveries to the perimeter, thereby creating a pedestrian-friendly campus. Paths connect all the buildings on the site.

Landscape

The landscape design highlights the wooded backdrop of the site and visually connects each facility to the next, using a palette of native plants. The landscape strategy for the SCC includes:

- Gathering spaces that encourage interaction
- Efficient circulation that enhances accessibility and connectivity
- Immersive workspace with views of nature and abundant sunlight
- Performing landscape that is both beautiful and useful in managing resources
- Forest preservation and restoration

Landscape recommendations also include ways of safeguarding the pedestrian route from public transit to the SCC campus, displaying outdoor sculpture and creating pervious paths through the woods.

Sustainability

To abate the environmental impact of the development, the following strategies are addressed in the Master Plan:

- Greenhouse gas reduction
- Sustainable buildings
- Renewable energy
- Fleet management
- Transportation demand management
- Stormwater management
- Building water use reduction
- Waste reduction
- Resiliency

Stormwater management recommendations include green roofs on non-collections buildings to mitigate heat island effects and absorb rainfall; bioswales and retention ponds to retain and treat runoff; parking lots where practical and paths paved with porous materials; and rainwater harvested for irrigation, flushing and boiler make-up.

Security

The Master Plan proposes reducing the site's four entrances to two entrances, one with a vehicle inspection area, Security Booth and Visitor Center. Staff with official key-cards can enter through either entrance; visitors are required to check in at the Visitor Center.

The Plan includes new perimeter fencing augmented with a video surveillance system (VSS).

Process

The SCC Master Plan builds on the findings of the Smithsonian's 2014 Collections Space Framework Plan, 2016 Suitland Campus Visioning Report, 2017 Collections Space Analysis, workshops with stakeholders and meetings with federal, state and local agencies.

INTRODUCTION



Figure 1-1: Suitland Collections Center Aerial View

Project Description

Currently, the Smithsonian has more than 155 million objects and specimens, 163,200 cubic feet of archives, and 2.2 million library volumes that include irreplaceable national icons, examples of everyday life, and scientific material vital to the study of the world's natural and cultural heritage, covering subjects from art to zoology. These are housed in more than 2.1 million square feet of collections space. The SCC is one of the primary offsite facilities for collections storage; however, many of its facilities are in need of replacement or renewal.

The overriding goal of the SCC Master Plan is to improve the stewardship of the Smithsonian's collections and address current and future space requirements in a strategic and integrated manner.

The Master Plan intends to

- Preserve and broaden access to the collections
- Address space needs
- Consolidate collections locations
- Reduce reliance on leased space
- Increase the capacity and quality of the SCC
- Improve circulation and environmental stewardship

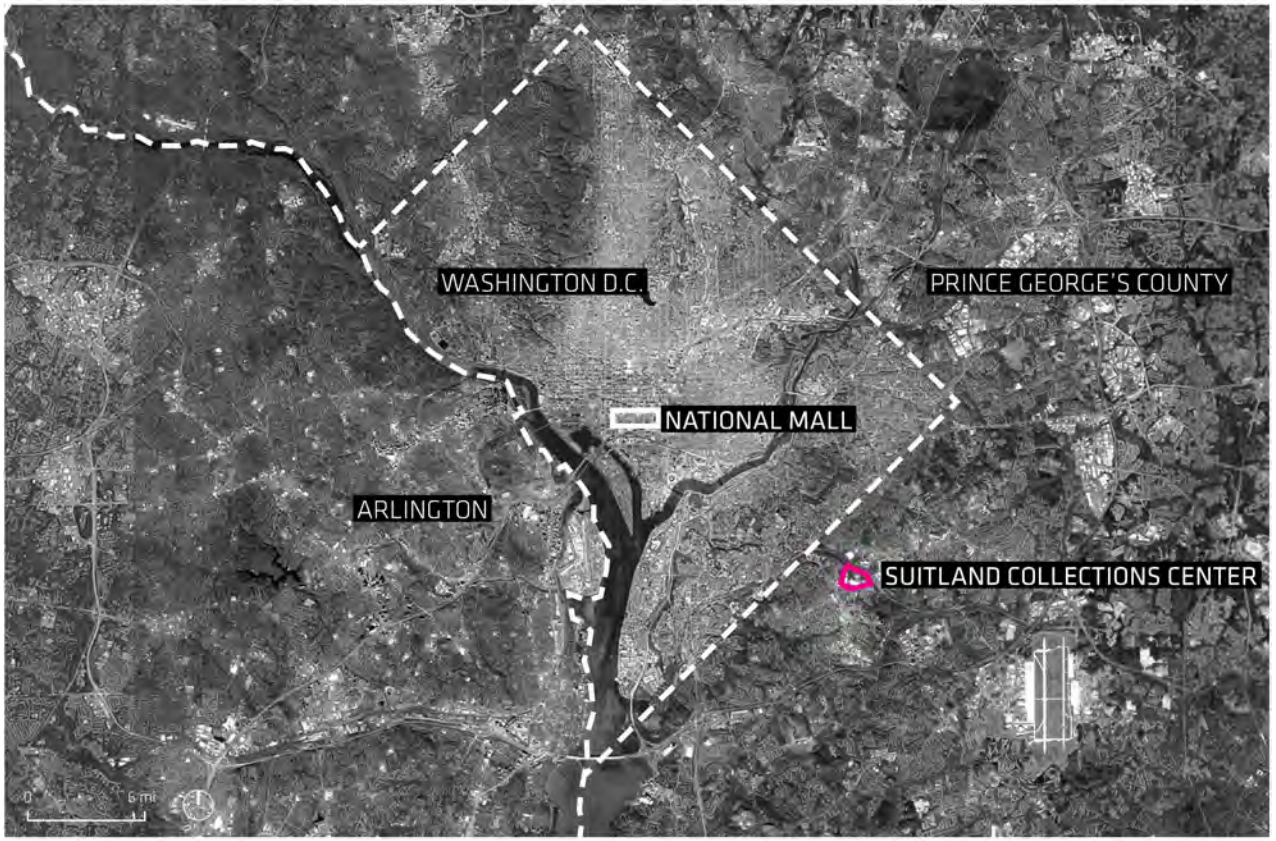


Figure 1-2: Washington D.C. Regional Map

Regional Context

The SCC is a 110-acre campus located in the inner beltway of Prince George's County, Maryland. Bordering Washington DC to the east, the County is also home to Joint Base Andrews Naval Air Facility, the US Census Bureau and NASA Goddard Space Flight Center.

It is situated within the gently rolling hills and valleys of the Chesapeake Bay watershed, approximately one mile to the east of Oxon Run, a tributary of the Potomac River.

Historic Context

There are no local, state or federal designated historic resources located within the SCC.

Suitland Parkway, adjacent to the northern boundary and under the jurisdiction of the National Park Service (NPS), is listed in the National Register of Historic Places. It is also recorded in the Maryland Inventory of Historic Properties (MIHP) as PG:76A-22.

The Parkway was developed during World War II to provide transportation for defense industry employees. As the main route from Andrews Air Force Base to Washington, D.C., Suitland Parkway has served the return of leaders from diplomatic victories, the funeral procession of President John F. Kennedy, and other historic events. Its signature landscaping has been duly maintained.

To the northeast of the SCC and across the Suitland Parkway is the Suitland Federal Center Historic District (PG: 75A-37). Its principal resources include Federal Office Building 3 (1942), Federal Office Building 4 (1947), and the Suitland House (1937), among other MIHP resources in the general area, including the National Oceanic and Atmospheric Administration and the U. S. Census Bureau.

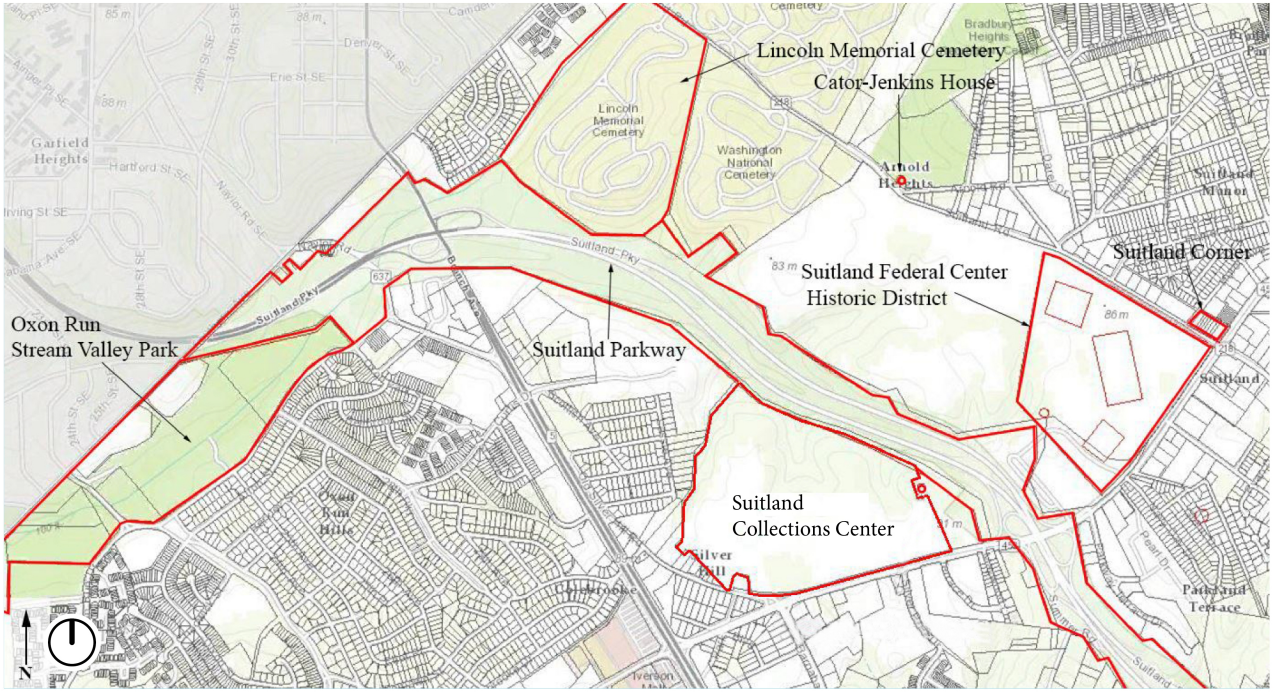


Figure 1-3: Historic Resources in the Suitland Area relative to the SCC (Source: ETH Traceries)

Surrounding Zoning and Land Uses

The SCC campus is situated among homes, businesses and government buildings.

The areas to the west and south of the SCC campus are zoned Residential (R-10 -- High Density and Multi-Family Residential; through R-80 -- Low-Density Single Family Residential). These areas are occupied by 1- and 2-story homes, although several residential buildings to the northwest are 7 stories.

Commercial districts run along Silver Hill Road and Branch Avenue, with a large commercial cluster at the intersection of Branch Ave and Silver Hill Road. These areas contain 1- or 2-story businesses, with several buildings of up to 9 stories near the intersection of Suitland Parkway and Branch Avenue.

To the north and east of the SCC are Mixed-Use and O-S zones. Further north and east are R-80 zones.

At the intersection of Suitland and Silver Hill Roads is Suitland Corner (PG: 75A-34), a small commercial strip developed between 1938 and 1955 that includes a gas station, restaurants and shops.

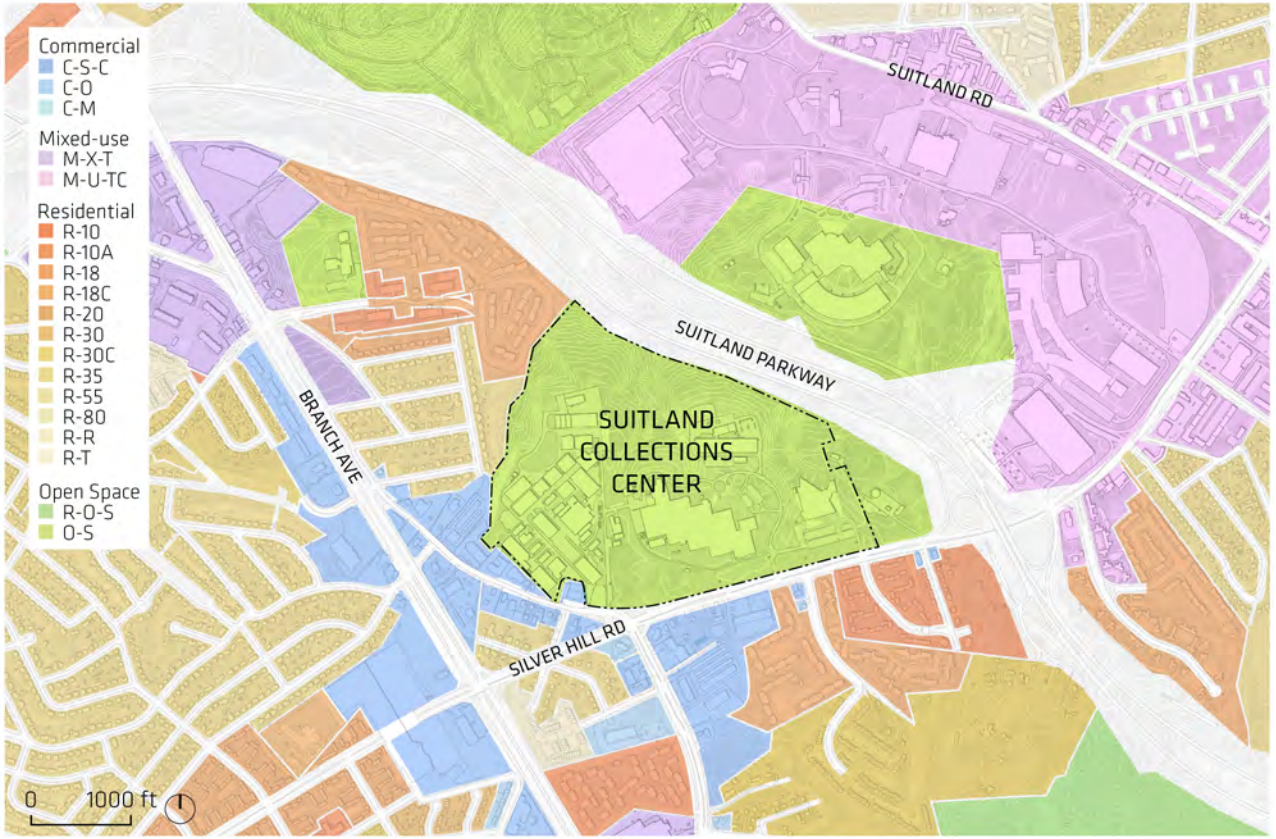


Figure 1-4: Zoning Map (Source: Prince George's County, MD Planning Department)

Neighboring Buildings

1. Overlook Elementary School
2. Carriage Hall Residences
3. Single Family Homes
4. McDonald's
5. Wendy's
6. CVS
7. Jessie B. Mason Regional School
8. Iverson Mall
9. Silver Hill Volunteer Fire Station
10. BP Gas Station
11. Hickory Hill Apartments
12. Verona at Silver Hill Apartments
13. Residences at Silver Hill
14. Suitland Metro Stop
15. U.S. Census Bureau
16. Suitland Federal Center
17. National Oceanic and Atmospheric Administration

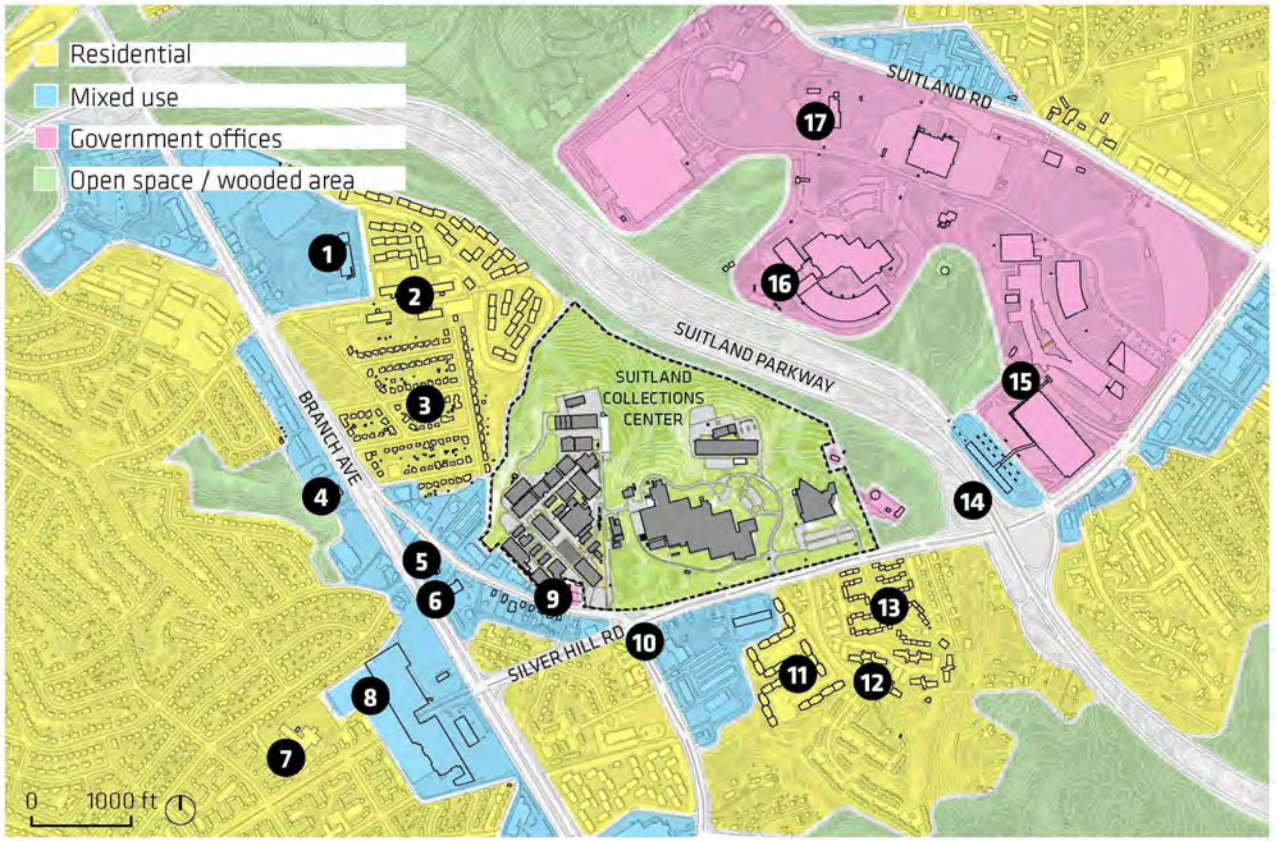


Figure 1-5: Land Use Map

Views of the SCC



Figure 1-6: Aerial View Looking Southeast



Figure 1-7: Aerial View Looking West



Figure 1-8: Key Plan: View Locations

View from Suitland Parkway

When traveling along Suitland Parkway, buildings are hidden from view by a densely wooded area, an aspect that the Master Plan intends to maintain.



Figure 1-9: View from Suitland Parkway Looking Southeast - May 2017



Figure 1-10: View from Suitland Parkway Looking South - December 2018



Figure 1-11: Key Plan: View Locations

View from Suitland Parkway



Figure 1-12: View from Suitland Parkway Looking West - May 2017



Figure 1-13: View from Suitland Parkway Looking South - December 2018

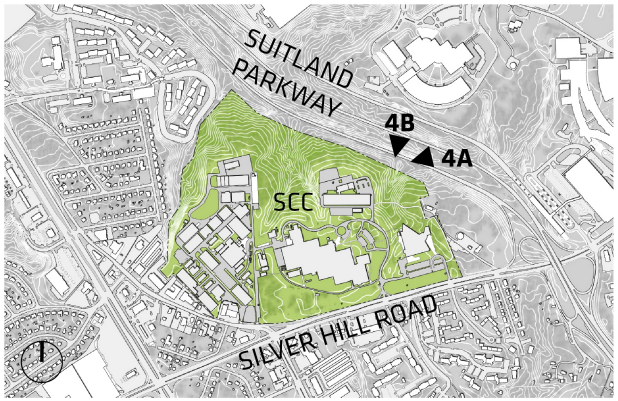


Figure 1-14: Key Plan: View Locations

View from SIlver Hill Road

When driving west on Silver Hill Road, the route by which most visitors and staff approach the site, the Museum Support Center (MSC), National Museum of the American Indian - Cultural Resources Center (NMAI-CRC), and several Garber buildings are partially visible from the road.



Figure 1-15: View from Silver Hill Road Looking West



Figure 1-16: View from Silver Hill Road Looking West



Figure 1-17: Key Plan: View Locations

Neighborhood Views



Figure 1-18: View from Old Silver Hill Road Looking West



Figure 1-19: View from Lassie Avenue Looking East



Figure 1-20: Key Plan: View Locations

Campus History

The 110-acre SCC site was acquired in two phases. In the early 1950s, 21 acres were obtained by Paul E. Garber, first curator of the National Air Museum, now National Air and Space Museum (NASM), after whom the site is named. The prefabricated metal buildings that existed at the site have exceeded their life expectancy by 40 to 50 years.

In the mid-1970s, the Smithsonian acquired the remaining acreage from the General Services Administration to develop the MSC.

The MSC opened in 1983 with 4 Pods and added Pod 5 for wet collections in 2007. Pod 3 was renovated in 2011. The Smithsonian has begun the design for the final MSC Pod 6.

At the Garber complex, additional buildings were constructed including the Fleet Management Building in 2011 and Building 37 in 2016 which replaced Building 21.

Additionally, the NMAI-CRC was constructed in 1998 and the Smithsonian Gardens (SG) Greenhouse was completed in 2010.



Figure 1-21: 1965 Aerial Photograph Showing Site Features



Figure 1-22: 1993 Aerial Photograph of SCC Campus

1993 Suitland Collections Center Master Plan

In 1993, the Smithsonian issued the first Suitland Collections Center Master Plan to increase the quantity and quality of collections storage.

The 1993 Plan was intended to complement the MSC, providing facilities on the remaining portion of the site with adequate storage capacity to accommodate the Smithsonian's needs through the year 2010. The new Collections Center facilities (expected to reach 3 million sf by 2010) were meant to enhance access, security and environmental conditions, and provide a better setting for collections management and research.

The 1993 Plan (Figure 1-23) was a phased development plan. The dozen or more buildings included in the completed Plan ranged from 1 to 8 stories, from 10,000 sf to over 900,000 sf, and were divided into 2 areas. The East Zone was public-oriented facilities (for research-based access), while the West Zone was staff-oriented facilities.

Of the site's 110 acres, the proposed building footprint was to cover approximately 24%, while roads, parking and pedestrian walkways encompassed another 13% of total site area.

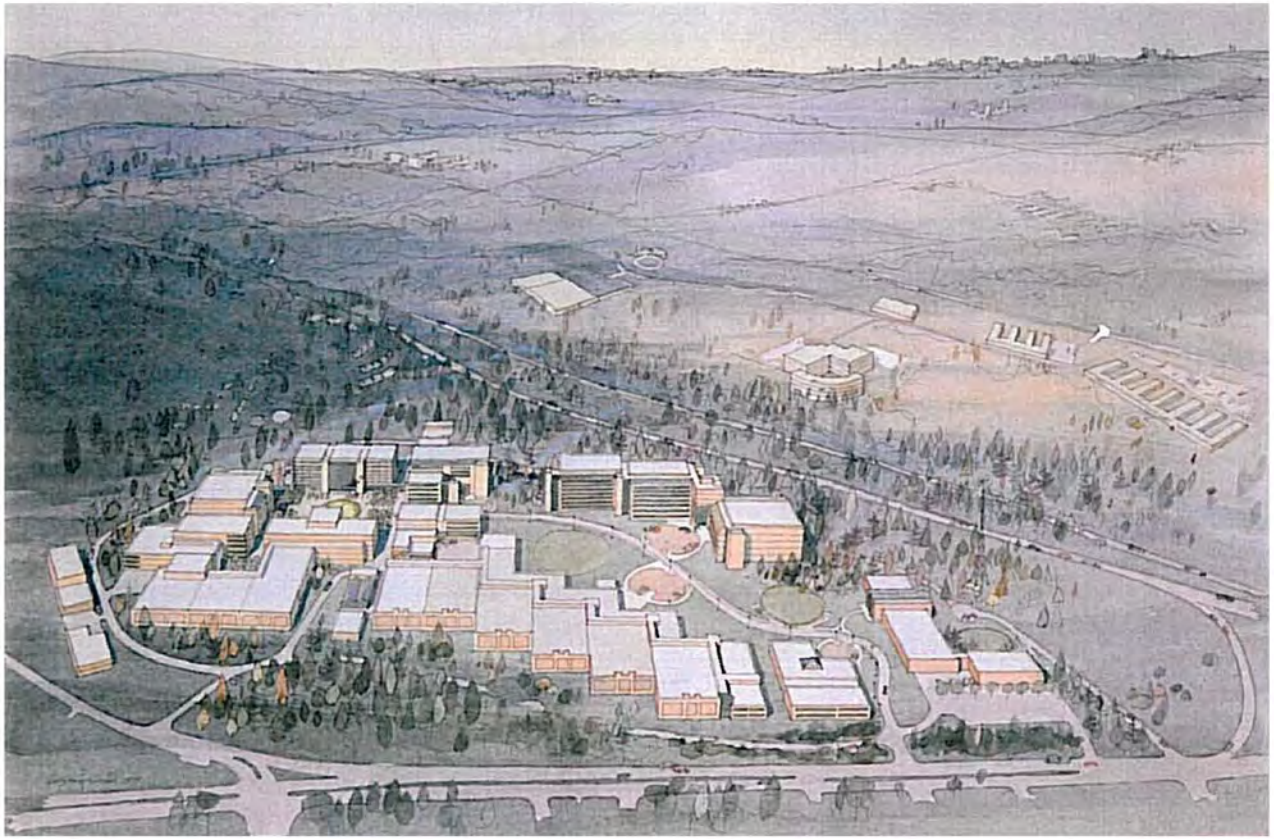


Figure 1-23: Rendering of 1993 SCC Master Plan

Out of the proposed projects only 4 sites were ever developed (Figure 1-24).

Location 1 was developed as the NMAI-CRC. Location 2 was built as MSC Pod 5, while Location 3 is currently in the planning stages as MSC Pod 6. Location 4 was originally planned to be a shared facility for the National Museum of American History, the Anacostia Community Museum and the Smithsonian art museums. However, this site was instead developed as the SG Greenhouse.

The 1993 Plan was ambitious and envisioned programmatic strategies that were not realized.

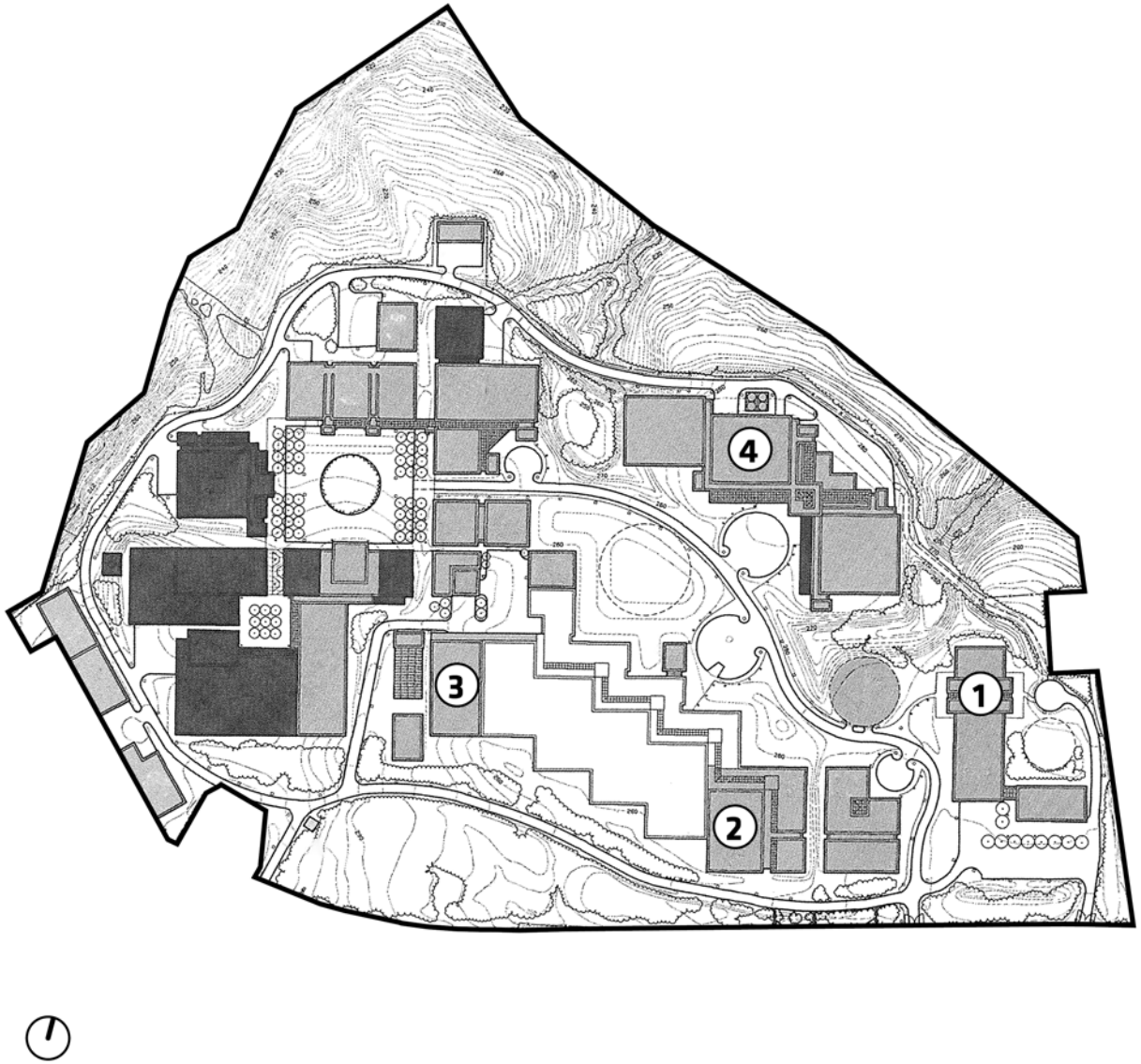


Figure 1-24: 1993 Suitland Collections Center Master Plan

SCC Campus Development 1993 - Today

By 2010, the Smithsonian had developed several of the projects proposed in the 1993 Master Plan. These included:

- The NMAI-CRC, completed in 1998
- MSC Pod 5, completed in 2007
- The Botany Greenhouse and Osteo Prep Lab, opened in 1994.

Additionally, the Smithsonian developed the following buildings which were not originally part of the 1993 Master Plan:

- SG Greenhouse, completed in 2010. It was built on a site originally designated in the 1993 MP as an 8-story "History & Art Center" collections building
- Fleet Management Building, built in 2011
- Garber Building 31 & 34
- Garber Building 37, built in 2016, replacing the original Garber Building 21 which collapsed in the February 2010 blizzard known as "Snowmageddon."



Figure 1-25: Aerial Site Photograph from 2017

Planned Development

The following projects were included in the Smithsonian Collections and NMAI Framework Plans and will be brought for review by NCPC individually as they are funded and implemented as projects.

- MSC Pod 6 addition for collections storage
- The construction of Pod 6 will require the relocation of the National Museum of Natural History (NMNH) Botany Greenhouse to the area north of the SG Greenhouse.
- The NMAI-CRC renovation and addition for collections processing spaces, and collections storage for the growing collection of contemporary art.

This SCC Master Plan addresses the intentions of the earlier plan while advancing the Smithsonian's long-range, sustainable, campus development goals.

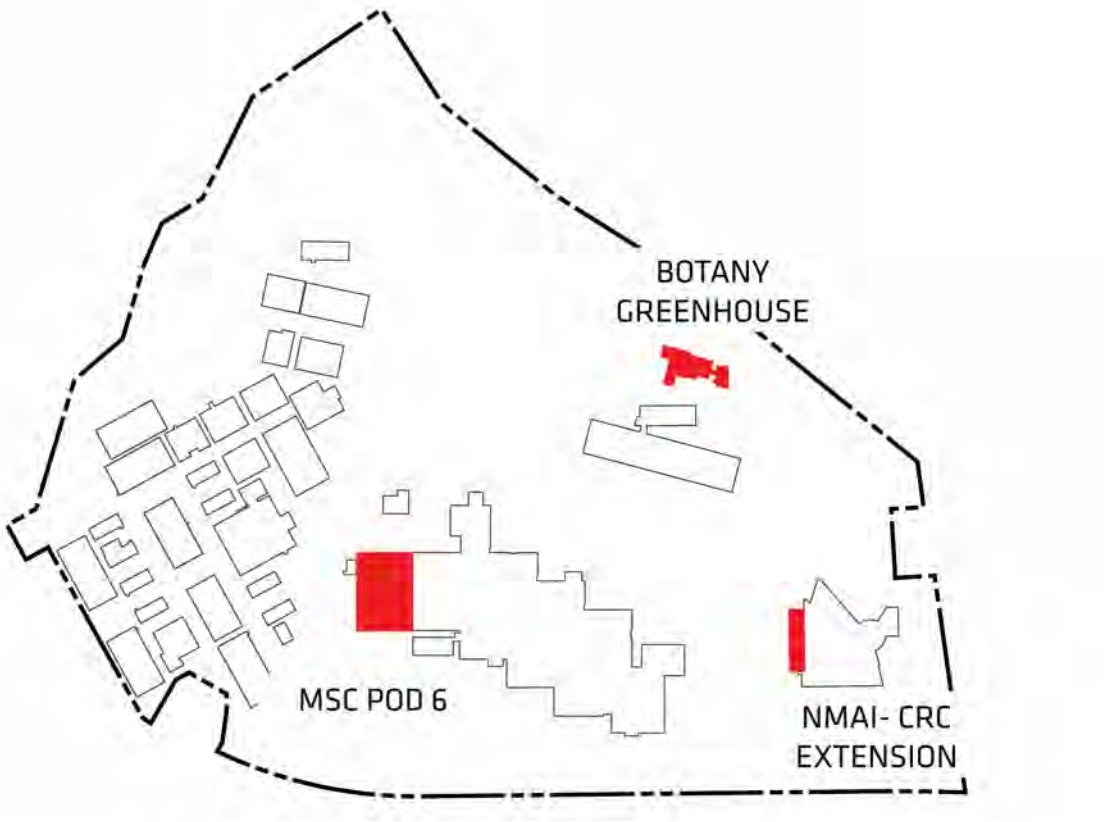


Figure 1-26: Planned Development

Intent of the SCC Master Plan

Many of the facilities that currently house Smithsonian collections are substandard, requiring replacement to improve environmental conditions and alleviate overcrowding, while the storage needs of the collections continue to expand. In addition, most of the collecting units have collections stored in 3 or more facilities outside of their primary museum or research location, creating management and accountability challenges. Currently, 19 units are spread over 40 different facilities.

To solve the Institution's long-term needs, three changes to the existing collections space portfolio are considered a priority:

- Replace the outdated and unacceptable Garber buildings at SCC.
- Reduce reliance on leased spaces.
- Provide adequate space to address the overcrowding of existing collections space and anticipated growth.

Based on the Smithsonian's 2014 Collections Space Framework Plan and subsequent analysis done as part of this Master Plan, the Smithsonian needs approximately 2.8 million net square feet (nsf) of new collections space to replace existing unacceptable facilities and provide for 40 years of collections growth. The SCC will accommodate 40% of this need. The remaining 60% of the Institution's collections space need and future collections growth will be accommodated elsewhere. Phasing will enable efficient and coordinated development.

The diagram on the next page (Figure 1-27) illustrates the allocation of the Institution's collections space needs over the next 40 years.

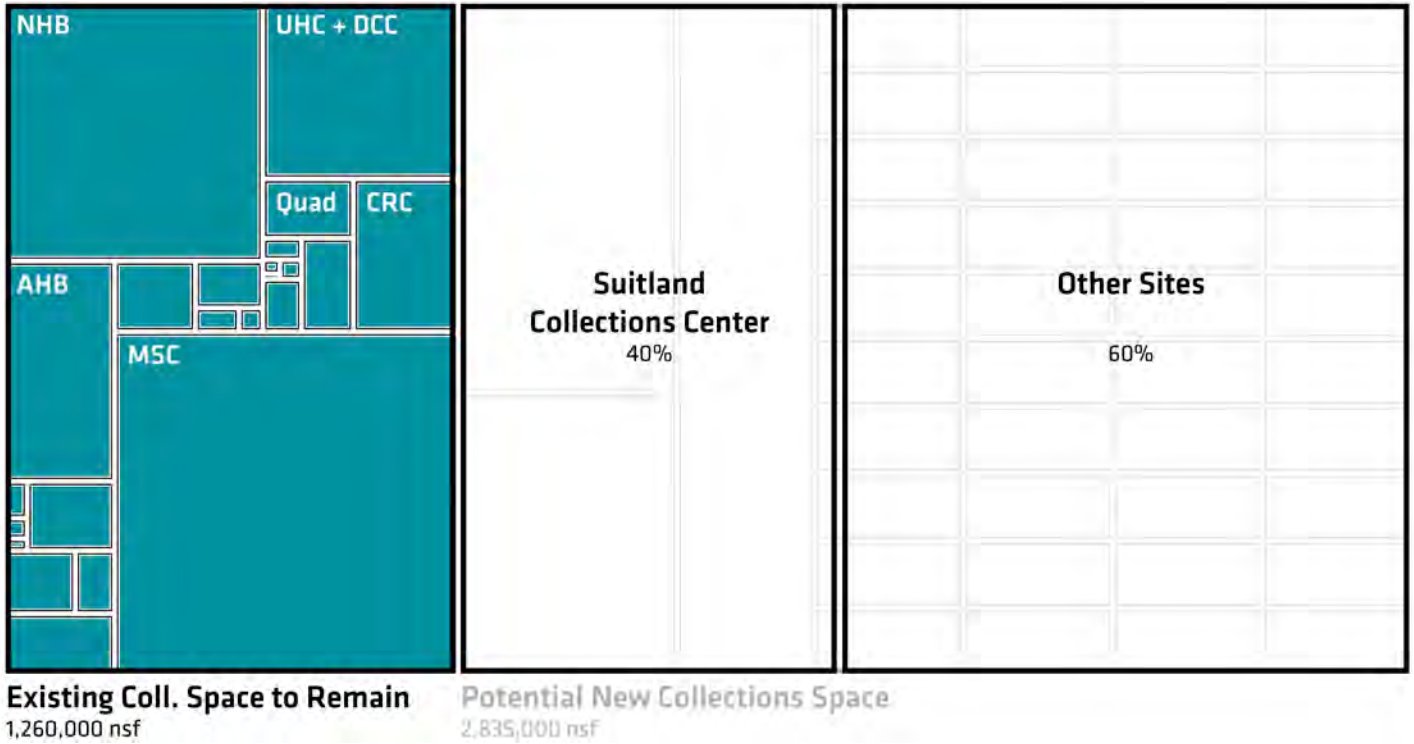


Figure 1-27: Smithsonian Collections Space Needs

Goals and Objectives

The Smithsonian's collections research and analysis includes the 2014 Collections Space Framework Plan, 2016 Suitland Campus Visioning Report and the 2017 Collections Space Analysis. The Master Plan builds on the findings of these reports and on a series of work sessions with Smithsonian stakeholders and representatives of local, state and federal agencies.

The goals and objectives developed through this process are identified on this page.

Reinforce a singular identity

The SCC will play a critical role in supporting the Smithsonian's collections and unifying the Institution as a singular entity comprised of diverse fields, expertise and knowledge.



Figure 1-28: Smithsonian as a singular entity

Foster pan-Institutional collaboration

The SCC will foster interdisciplinary collaboration and the exchange of knowledge and ideas.

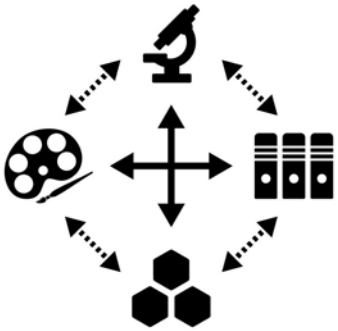


Figure 1-29: Institutional collaboration

Maximize shared amenities

The SCC will maximize the use of shared amenities and economies of scale to enhance efficiency and cost-effectiveness, including more efficient use of energy and other resources.

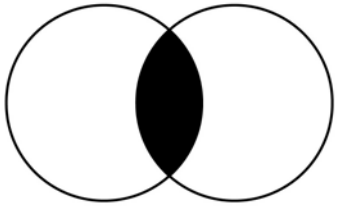


Figure 1-30: Sharing amenities

Create a welcoming and connected campus

The SCC will become a beautiful, healthy and collegial environment for staff and visitors.



Figure 1-31: Welcoming campus

Campus Growth Projection

When fully developed over 40 years, the SCC campus will house approximately 2.4 million gsf of facilities.

The chart on the right shows the square footage of buildings that will remain and those that are envisioned in the new development.

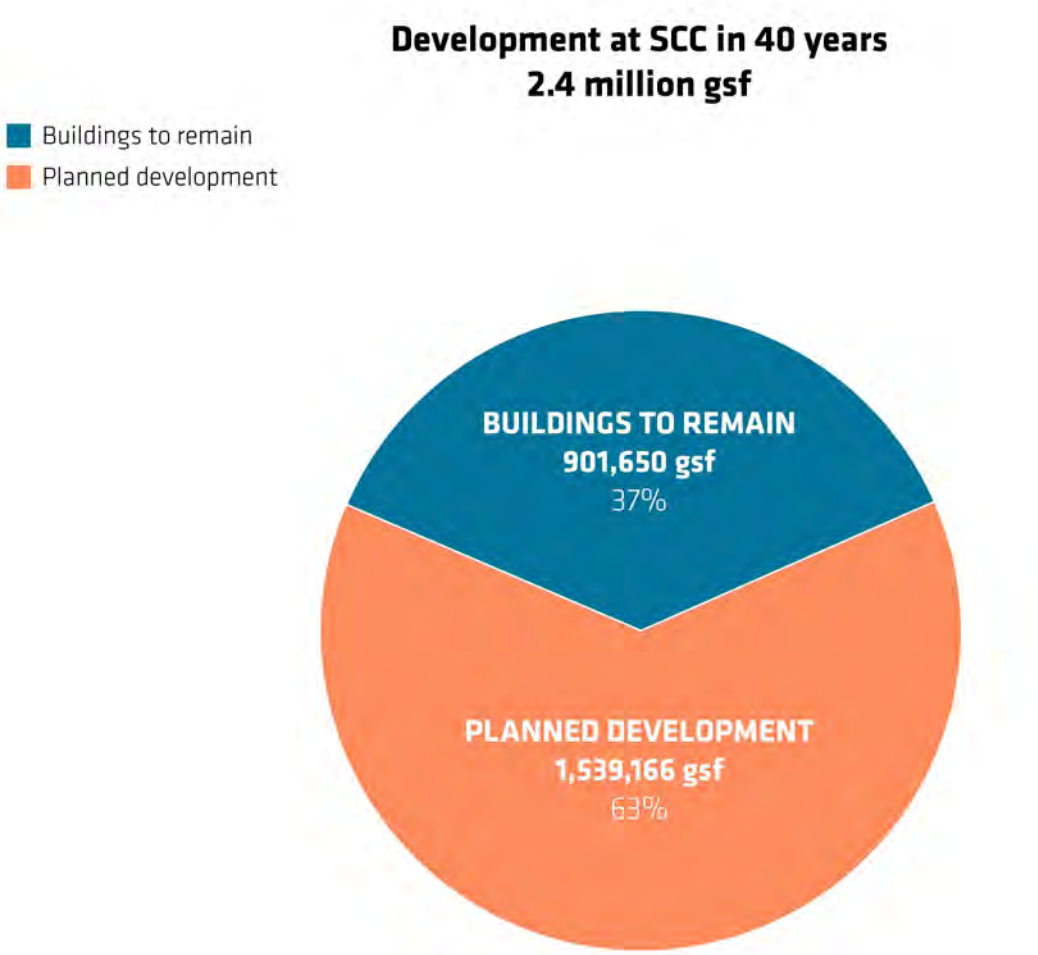


Figure 1-32: Existing and Planned Development Breakdown

Master Plan Compliance

Most relevant among the elements of the current NCPC Comprehensive Plan are those outlining goals and policies for the Federal Workplace and Transportation.

The following aspects of the SCC distinguish it as a workplace:

- Employee population and density at the site is quite low, as most building space and some of the site is devoted to the storage and processing of collections, crates and packing materials, plants and landscape materials, and so forth. A goal of the project is to use the available land more efficiently with taller buildings.
- This is a secure campus with non-Smithsonian visitors required to make appointments. The plan will create an improved Visitor Center at a new main entrance.
- Employees based at or visiting the SCC represent several dozen different Smithsonian units (including museums, research centers and central services such as facilities and security). A key purpose of this plan will be to implement a more unified, healthy, sustainable campus for employees.
- There is a significant amount of travel by Smithsonian staff and visitors between the SCC, the Mall, and NASM facilities at Dulles. Many employees divide their time between multiple locations.

The following aspects of the SCC are relevant in applying the Transportation Element to the project:

- This site falls into the "Suburban" category (parking ratio of 1:1.5 to 1:2) since the walking distance from the Suitland Metro platform to the southeast corner of the site (pedestrian entrance gate near the CRC) is just over 2,000 feet. Walking distances to all building entrances exceed that, and the Garber buildings are roughly a mile from the station. The latter is the area available to locate most of the new and replacement collections storage construction.
- Almost half of employee trips to the site use transit or other non-single occupancy vehicle means. Barriers to increased transit use include the unsafe pedestrian path to the Metro (three unsigned ramps to the Suitland Parkway and a 100' curb cut at the sidewalk line for the driveway to adjacent federal facilities.
- The current overall parking supply is adequate but inflexible. Substandard pedestrian paths between separately managed (and in some cases separately fenced) sections of the campus result in overcrowding at MSC lots while space is available elsewhere.

Additional local and state policies governing roads and stormwater are discussed in relevant chapters.

Smithsonian policies related to Facilities design and construction, Security, Fire Protection and Collections stewardship have governed the plan and will apply to individual projects.

Outreach

The project team has conducted the following agency meetings for the purpose of coordination with other agencies goals and requirements.

August 25, 2016	**Agency Staff Meeting with NCPC and M-NCPPC**
September 11, 2018	**Agency Staff Presentation, including NCPC, M-NCPPC, NPS**
November 8, 2018	**Agency Staff Meeting, including M-NCPPC, MDOT SHA Traffic, NCPC**
December 13, 2018	**Stormwater Management Meeting with MDE**
December 13, 2018	**Agency Staff Meeting with NCPC**
March 6, 2019	**Traffic Studies Meeting with M-NCPPC, MDOT SHA**

The Smithsonian has extended an invitation to the Suitland Civic Association regarding their interests in a presentation of the draft Master Plan at one of their public meetings.

CAMPUS OVERVIEW



Figure 2-1: Aerial View from Southeast

Existing Facilities

The SCC campus has four primary zones of facilities (Figure 2-3).

1. Paul E. Garber Preservation, Restoration, and Storage Facility (Garber)
2. Museum Support Center (MSC)
3. SG Greenhouse
4. NMAI-CRC

These divisions are designated by physical boundaries such as fences, plantings and roads.

Overall, the campus lacks cohesion and unity. Each facility has its own distinct character, and they are not well connected to each other. While roads provide access across the site, there are few pedestrian or bike paths and limited outdoor seating and gathering areas, with the exception of the NMAI-CRC. This makes the campus feel disjointed and discourages staff interaction.



Figure 2-2: Aerial View from South



Figure 2-3: SCC Site Plan

Garber

The buildings that make up Garber were built from the 1950s-2010s. By 2019, most Garber buildings had exceeded their life expectancy by 20-50 years.

In addition, overcrowding, building degradation and inadequate systems have put the collections in jeopardy, while hampering the ability of staff to work effectively.

The collections will be strategically relocated to facilities on and off the SCC campus.



Figure 2-4: Aerial Map of Garber



Figure 2-5: Key Plan: Garber



Figure 2-6: View of Garber



Figure 2-7: Interior View of Garber Building 28

MSC

The MSC is the Smithsonian's principal off-site collections preservation and research facility. Completed in 1983, the building originally included four pods, offices and laboratories at the Suitland campus.

In 2007, Pod 5 -- the first MSC addition -- and its related laboratories were opened at the east end of the facility to house NMNH's biological collections preserved in alcohol and formalin (known as "wet collections"), using the latest technology for the safe use of flammable liquids.

By 2011, Pod 3 was renovated, converting the space to a two-level repository for art collections, physical anthropology, and collections requiring specialized environments for the NMNH and the National Zoological Park. These collections included film requiring cold storage, Antarctic meteorites maintained in a Class 10,000 clean room, Paleobiology core samples, frozen tissue samples, DNA, and related materials preserved in liquid nitrogen and at ultra-low temperatures, and anthropological objects requiring low humidity.



Figure 2-8: Aerial Photograph of MSC



Figure 2-9: Key Plan: MSC

Today, the five pods total over 783,000 gsf and house more than 77 million objects, or approximately 55% of the Institution's total collections. The building has a unique zig-zag shaped design and internal corridor, referred to as the "Street," that serves as the main circulation corridor of the MSC. This feature will be replicated in the new development.



Figure 2-10: Entry View of MSC



Figure 2-11: Collections Storage at MSC

SG Greenhouse

Built in 2010 to sustain living collections and landscaping throughout the Institution, the SG Greenhouse is home to the Smithsonian Orchid Collection, tropical plant specimens, interior display plants, and thousands of annuals, perennials, trees and shrubs. This facility also houses the nectar plants used in the Butterfly Pavilion at the National Museum of Natural History. The existing development contains a series of greenhouses, offices and surplus storage. These facilities will remain in their current capacity.



Figure 2-12: SG Greenhouse



Figure 2-13: Key Plan: SG Greenhouse

NMAI-CRC

Completed in 1998 and opened in 1999, the NMAI-CRC provides state-of-the-art facilities and resources for the storage, conservation, documentation, research and study of the museum's collection of nearly 850,000 Native American archaeological and ethnographic artifacts in over 164,000 gsf.

In all of its activities, the museum acknowledges the diversity of cultures and the continuity of cultural knowledge among indigenous peoples, incorporating Native methodologies for the handling, documentation and care of collections.

The CRC is specifically designed to house the museum's collections in a manner sensitive to both tribal and museum requirements for access and preservation.

The facility holds the museum's curatorial and repatriation offices, as well as conservation laboratories, library, archives, and collections management workspaces. Indoor and outdoor spaces provide locations for Native traditional care practices and cultural use of the collections.



Figure 2-14: NMAI-CRC



Figure 2-15: Key Plan: NMAI-CRC

Fleet Management Building

The Fleet Management Building, constructed in 2011, is the Smithsonian's vehicle repair shop, serving light- and heavy-duty trucks and buses. This single-story building contains a large service bay and offices, workrooms and break rooms, and is in good working condition.



Figure 2-16: Fleet Management Building



Figure 2-17: Key Plan: Fleet Management Building

Botany Greenhouse

Though the NMNH Botany Greenhouse continues to function efficiently within its current building, the construction of Pod 6, a long-planned addition to the MSC, requires the demolition of this building. The greenhouse, constructed in 1994, will be rebuilt north of the existing SG Greenhouse.

Osteo Prep Lab

The Osteo Prep Lab, constructed in 1994, is home to one of the Institution's most vital and curious operations. In this lab, a colony of dermestid beetles clean the bones of deceased animals. Organizations ranging from the U.S. Marine Mammal Stranding Network to zoos around the nation send animal remains to the facility to be processed and organically stripped for studies and exhibitions. The operations at the Osteo Prep Lab will be relocated to a new, free-standing facility on the SCC campus prior to demolition of the current building.



Figure 2-18: Key Plan: Botany Greenhouse & Osteo Prep Lab



Figure 2-19: Botany Greenhouse



Figure 2-20: Osteo Prep Lab

Existing Buildings to Remain

Four buildings at the SCC have been assessed as suitable for their purpose and do not need to be replaced: the MSC, SG Greenhouse, NMAI-CRC and Fleet Management Building.

Planned Demolition

The improvement of the Institution's storage at the SCC must begin with relocating collections so that the obsolete buildings can be demolished. Those facilities are:

- Garber
- Osteo Prep Lab (OPL)
- Botany Greenhouse (BG)

Garber

Deemed unacceptable by Collections Space Framework Plan

Structures date from the 1950s

Exceeded life expectancy

Collections are overcrowded

Collections will be relocated

Botany Greenhouse

Houses NMNH Botany research collections

Planned demolition as part of Pod 6 development

Will be rebuilt and relocated north of SG Greenhouse

Osteo Prep Lab

Processing site for animal remains

Deemed unacceptable by Collections Space Framework Plan

Operation will be relocated on SCC campus

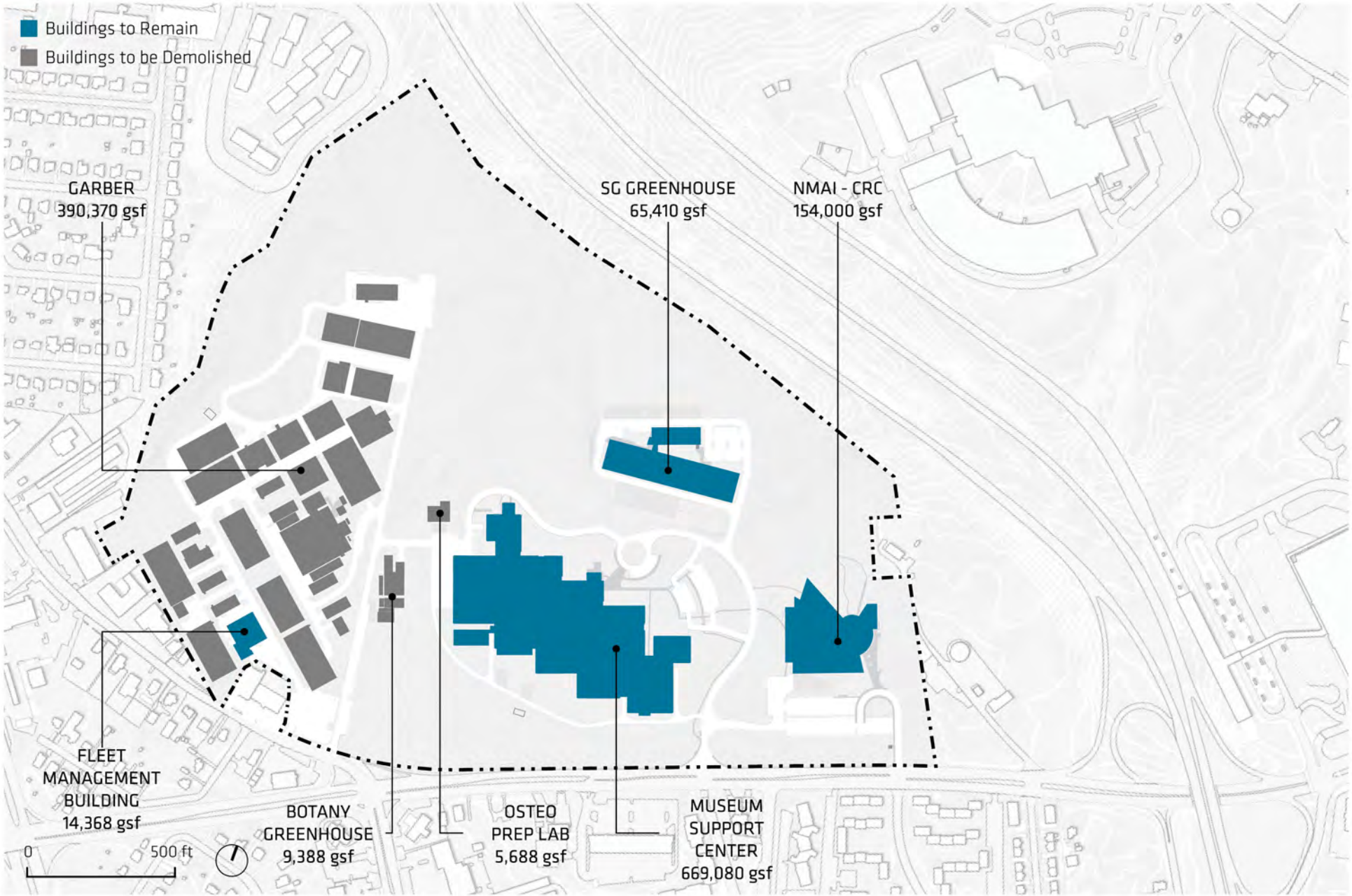


Figure 2-21: Site Plan of Existing Buildings at SCC

Existing Natural Resources

Landscape

The woods on the north side of the site create a strong buffer to the Suitland Parkway. This helps to preserve and enhance the landscape of the Parkway and the site. A fence prevents access to the woods in most areas, except at the NMAI-CRC, where paths and gathering spaces are provided.

A mixture of evergreen and deciduous trees forms a buffer at some parts on the south side of the site. This creates a partial separation from the traffic on Silver Hill Road and from the surrounding neighborhood. Visibility and access to the site are provided at the entry points.

The woods on the north and south are comprised of deciduous canopy trees including oak, maple, hickory, beech, white pine and tulip poplar, as well as under-story trees such as magnolia and serviceberry. Intermittent streams run through the northern woodland along steep slopes and are used as outlets for detention ponds collecting stormwater from the site. A fence surrounds the property.



Figure 2-22: Aerial View from Northwest



Figure 2-23: Aerial View from Southeast

Vegetation and Topography

The MSC landscape is dominated by lawn with canopy trees, but there are gardens by the main entry and picnic areas. The parking lot is shaded by mature willow oak trees and other ornamental species.

The SG area has lawn and a deep stormwater detention pond.

The Garber exterior spaces are nearly all paved.

In contrast, the NMAI-CRC landscape consists of several outdoor spaces heavily planted with native species. A meadow landscape forms the edge of the CRC with native grasses, flowers, shrubs, and trees. A similar planting strategy is used in the parking lot and the entry plaza. Access to the woodlands is not blocked by a fence but rather encouraged by paths that lead to outdoor gathering areas.

SG oversees the landscape across the campus, working with Office of Facilities Management & Reliability (OFMR) as needed to operate and maintain the campus with limited resources. There is no intensive display garden due to maintenance costs, irrigation demands and ongoing issues with deer and geese. The lawn that dominates the campus is mowed every two weeks and is not fertilized or watered. The CRC meadow must be cut once a year.

The site ranges in elevation from 200-300 feet above sea level. The topography of the site is a fragmented plateau that generally slopes from south to north with gradually steeper grades along the northern fringe of the site. Fingers of steeper grade divide and drain the plateau through intermittent streams. The building sites in each of the four SCC areas have been leveled to provide a uniform finished floor and relatively gentle site grading around each of the buildings.

The steep slopes restrict the development area of the site.



Figure 2-24: Composite Vegetation Plan and Topography

Forest Composition

The project team surveyed areas around the existing fence lines to assess the composition of the forest at the SCC. The following observation notes were provided by the Smithsonian arborist.

Stand 1: Highest quality forest dominated by mature yellow-poplar (Liriodendron tulipifera) - 25" average diameter at breast height (dbh) up to 40" dbh , averaging 90' height. Other species widely represented included sweetgum (Liquidambar stryraciflua) in the midstory and American holly (Ilex opaca) in the understory.

Other species noted include black cherry (Prunus serotina), red maple (Acer rubrum), white oak (Quercus alba), , northern red oak (Quercus rubra), sycamore (Platanus occidentalis) and American beech (Fagus grandifolia). Greenbriar was sporadically present throughout shrub layer, including heavy on the edges. Shrubby invasive-exotic species were not present. Some windthrow of large trees was present in this stand, generally near the transition to Stand 2.

Planning Notes: Where this stand adjoins the existing greenhouse fence, approximately 5 trees greater than 12" dbh were within 25' of the existing fence and and 15 trees >12" dbh within 50' of the fence. It is worth noting that given the size of the largest trees, their structural root plate would have a 10'-15' radius and their critical root zone would have a 30-80' radius, which would limit the extent of construction (excavation, compaction, trenching) possible near these trees before removal would become necessary.

Stand 2: This approximately 50' wide strip is located adjacent and north of the greenhouse fence. It is generally comprised of younger trees (<12" dbh). Species noted include sweetgum (Liquidambar stryraciflua), red maple (Acer rubrum), and yellow poplar (Liriodendron tulipifera). The very large tree directly adjacent to the existing fence has one yellow-poplar stem and one sweetgum stem. Greenbriar is heavy in this area.

Stand 3: Forest comprised of drier-site trees: white oak (Quercus alba), northern red oak (Quercus rubra), Virginia pine (Pinus virginiana), and black cherry (Prunus serotina). Yellow poplar (Liriodendron tulipifera) and sweetgum (Liquidambar styraciflua) were also present. Lower quality around the edges with lower stocking/density and a number of invasive trees and shrubs. Edges along fence, in places, had princess tree (Paulownia tomentosa, (an invasive exotic tree) and black locust (Robinia pseudoacacia, a native invasive tree).

Stand 4: Fenced-in area comprised of heavy invasive exotics: bush honeysuckle, (Lonicera maackii), Japanese honeysuckle (Lonicera japonica), others.

Stand 5: Similar to Stand 3.

Stand 6: Grove of large chestnut oaks (Quercus prinus).

Stand 7: Lowest quality stand due to invasive species. Invasive trees included princess tree, (Paulownia tomentosa), Siberian elm, (Ulmus pumila), and black locust (Robinia pseudoacacia, native invasive tree). Density and health of native trees is low due to heavy infestation of English ivy (Hedera helix) and other invasive plants.

Stand 8: Stand of moderate quality comprised of immature sized trees (averaging maybe 12" dbh) and dominated by red maple (Acer rubrum) and sweetgum (Liquidambar styraciflua). Other tree species present include Virginia pine (Pinus virginiana), American beech (Fagus grandifolia) in the midstory, and American holly (Ilex opaca) scattered in the understory.

Forest stocking/density was higher to the west and lower to the east. Greenbriar is present in high numbers. Invasive English ivy was noted along Silver Hill Road.

Highlighted Natural Assets (Forest Resources)

Stand 1 – Mature yellow-poplar forest

Stand 6 – Grove of mature chestnut oaks

Stand 8 – Immature forest area with native species mix that could be managed as natural area or forested landscape area.

Note on Greenbriar (Smilax rotundifolia): This shrubby vine with thorns and green stems is widespread throughout Suitland campus forest. This is a valuable native that provides good wildlife cover and a soft mast food source for wildlife. It can also be a weedy and widespread plant that can impede access, detract from aesthetic values, and discourage regeneration of young trees.

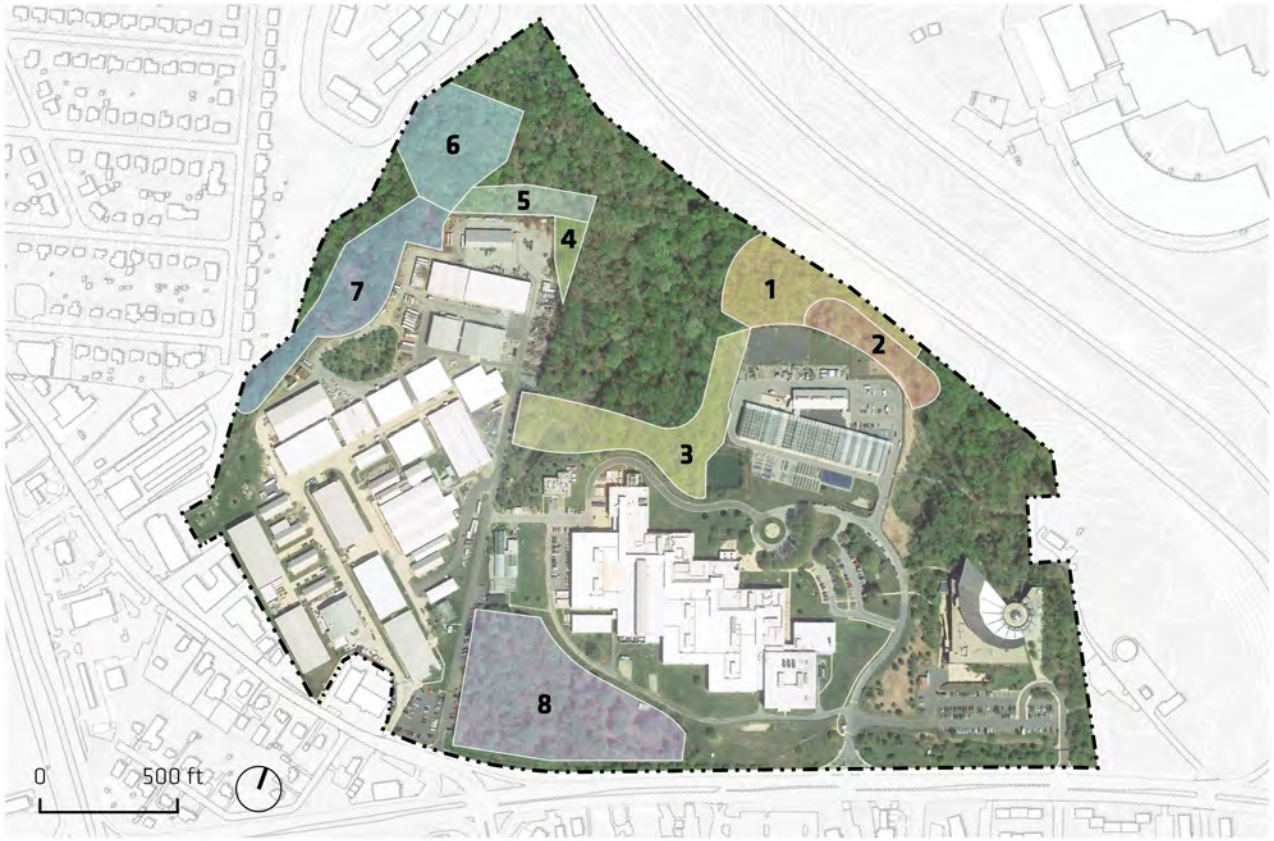


Figure 2-25: Forest Composition Survey Areas

Existing Campus Circulation

Regional Transportation

The SCC is approximately a 25 minute drive from the National Mall and it takes a total travel time of approximately 45 to 65 minutes including train ride and walking.

The SCC campus is also served by Metrobus routes P12 and D12, as well as TheBus operated by Prince George's County.

Employees based at or visiting Suitland live throughout the DC, Virginia and Maryland region and typically must commute into downtown DC in order to take the Metro or the Smithsonian shuttle to Suitland or commute to Suitland to take the Smithsonian Shuttle or the Metro to downtown DC. The shuttle does not currently run early or late enough to serve as part of a regular commute for employees. This makes it difficult for many employees to commute by transit.

Campus Access

Despite the challenges to transit access, the SCC campus already exhibits a strong culture of multi-modal commuting and the Smithsonian is committed to encouraging transit, bicycle, pedestrian and carpool/ vanpool use.

As part of the SCC Master Plan, the Smithsonian has developed a Transportation Management Plan (TMP) that incorporates several strategies tailored to the unique needs of a suburban campus with limited access to public transit.

As part of this commitment, the Smithsonian will partner with Prince George's County, the National Park Service (NPS), and Maryland Department of Transportation to improve pedestrian and bicycle facilities.

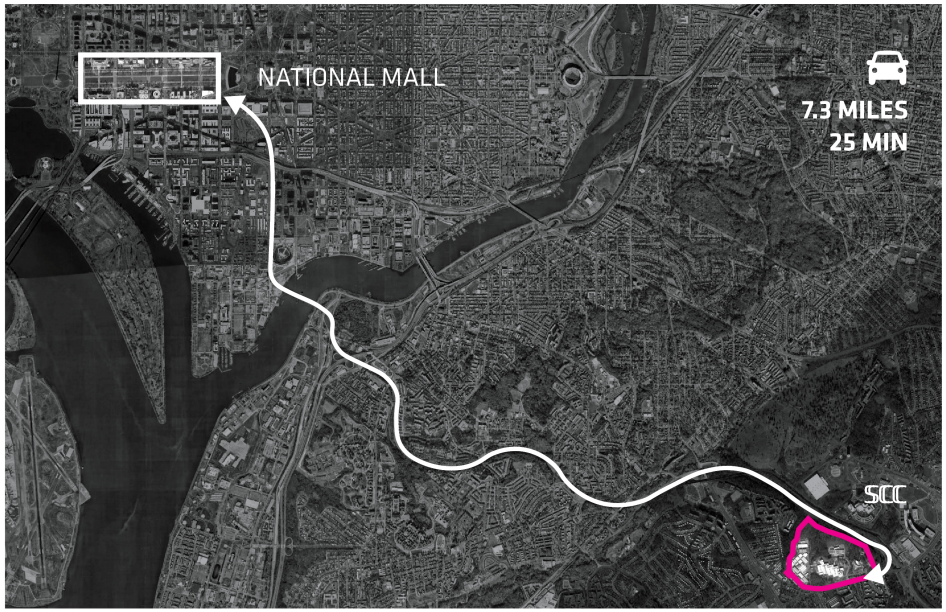


Figure 2-26: Campus Access via Car

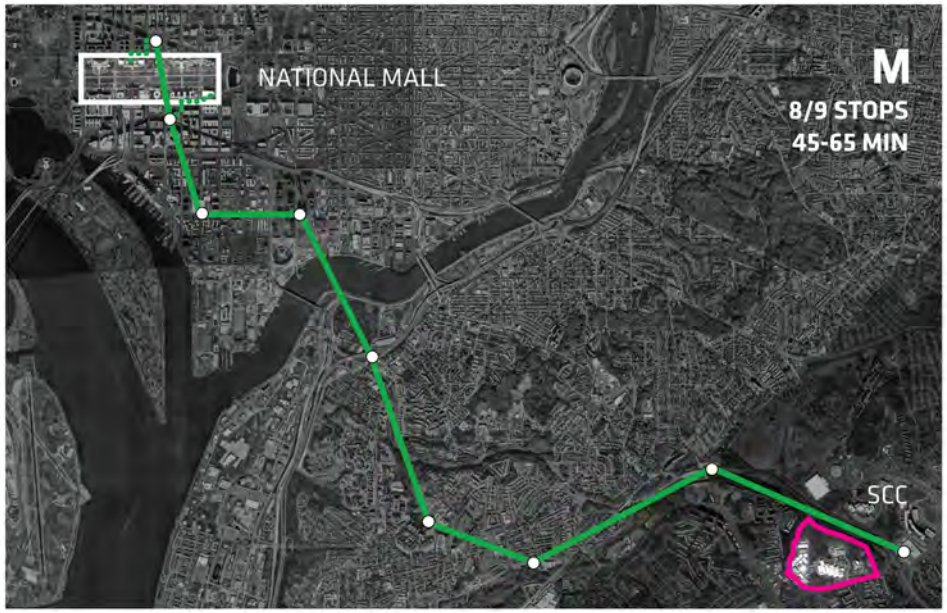


Figure 2-27: Campus Access via Metro

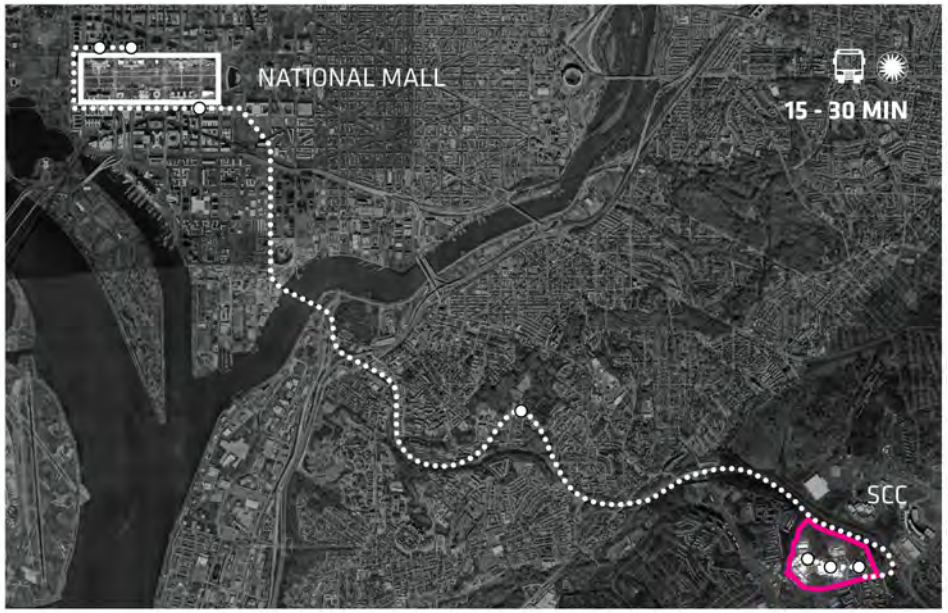


Figure 2-28: Campus Access via Smithsonian Shuttle Service

Public Transit

Along Silver Hill Road there are four entry points to the SCC campus. Three for vehicles (labelled 2, 3 and 4 on Figure 2-29) and one for pedestrians (1). Entry points 3 and 4 provide access to the Garber facilities, whereas 2 and 1 are closest to MSC and NMAI-CRC, respectively. Entry points 1 and 3 are not staffed. Entry points 2 and 4 are staffed by security and offer access for vehicles and pedestrians.

Consolidating staff, visitor, and delivery access to a single entrance will minimize the number of security staff required at the site and streamline accessibility. The NMAI-CRC entrance would function as an additional pedestrian and bicycle entrance for Smithsonian staff and emergency vehicles. The new campus entrance is discussed further in the Master Plan section, as well as in the TMP.

An in-depth assessment of traffic conditions, transportation, and recommendations for future improvements are provided in the TMP.

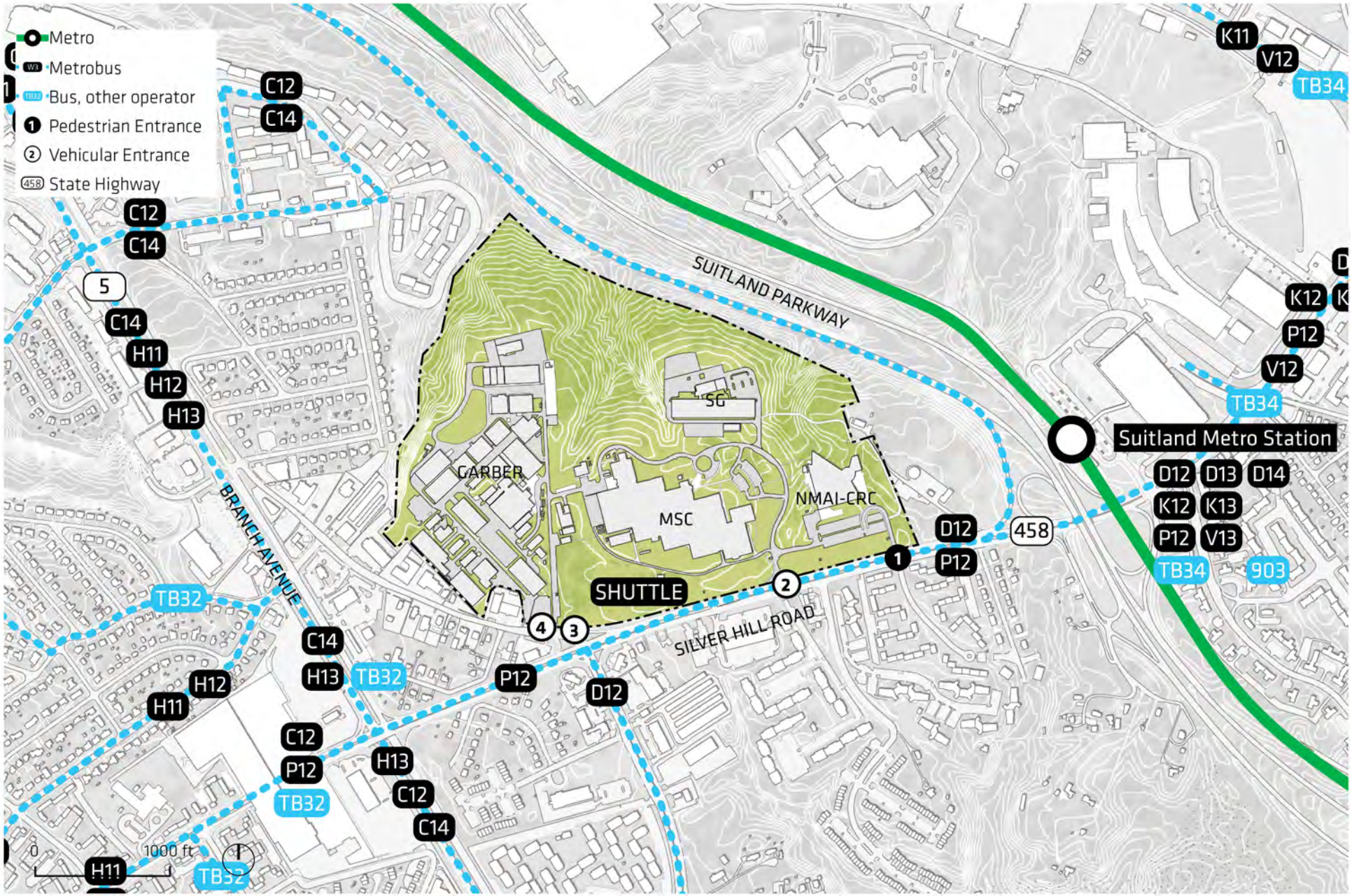


Figure 2-29: Existing Campus Access and Public Transit Map

Access to Suitland Metro Station

Public transportation is an alternative to personal vehicles for SCC staff, but as a recent survey indicates, fewer than half of the respondents take the Metro, commuter rail or SI shuttle to work.

The Suitland Metro station is more than a 2,000 foot walk from the pedestrian gate at NMAI-CRC, and approximately 1 mile from the Garber facility entrance. It is a 10- to 25-minute walk to facilities on the SCC campus. The pedestrian route runs along the heavily trafficked Silver Hill Road, and crosses three Suitland Parkway ramps and a driveway to an NPS maintenance facility with a 100' wide curb cut, creating a route that many consider unpleasant and unsafe.



Figure 2-30: Approximate Walking Distance from SCC Campus Buildings to Suitland Metro Station



Figure 2-31: Walking Distance from Suitland Metro Station to NMAI-CRC Gate



Figure 2-32: Sidewalk Along North Side of Silver Hill Road



Figure 2-33: Sidewalk Ramp Depressed Below Silver Hill Road Roadway

Transportation Evaluation

As a collection storage and research center, the SCC differs from other federal campuses across the DC metropolitan area. At almost 110 acres and a variable population of 350 staff, researchers, interns and volunteers, its low density is a singular characteristic of the campus, particularly considering the impact on commuting and parking.

Although the site is located near the Suitland Metro, an onsite employee may be stationed on the campus anywhere from approximately ½ mile to more than 1 mile from the station. The low-density and elongated nature of the site make it difficult to apply traditional transportation demand management strategies.

Despite the suburban location and distance to the Metro station, the SCC campus has a non-auto driver mode share of 47%. While overall on-site parking is adequate, it is not flexible enough to meet regular staff needs. Most staff choose to park near the MSC and NMAI-CRC, but these lots cannot accommodate staff plus parking demands generated by events and visitors. In order to understand transportation and parking behaviors, an evaluation and assessment process was undertaken that included the following tasks:

- Site investigation to evaluate internal roadways/circulation, pedestrian facilities, loading facilities, and parking, as well as external accessibility to the Metro station
- Shuttle ridership evaluation
- Parking utilization counts in May 2016 (before summer interns arrived) and June 2016 (after summer interns started, but prior to public schools closing)
- Parking utilization counts in October 2019
- A survey of Smithsonian staff to evaluate commuting patterns and identify potential alternatives.

Survey

A voluntary employee survey was conducted from June 7 to July 8, 2016. It was distributed to the Smithsonian employees, volunteers, interns and researchers, including long-term research fellows with Smithsonian email accounts and badges (Smithsonian staff). A hard copy of the survey was made available at the MSC security desk for visitors.

Survey questions investigated the modes by which respondents travel to work, working hours, origin/destination, possible improvements to transit options, reasons for



Figure 2-34: Survey Results - Employee Status

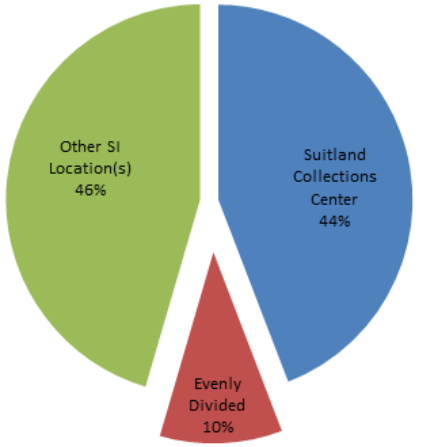


Figure 2-35: Survey Results - Primary Duty Station

mode choice, and if mode choice would change based on transportation improvements.

A detailed analysis can be found in the TMP.

Summary of Survey Results

The survey was distributed via email to all Smithsonian employees, from which 537 completed survey responses (6%) were obtained. Of those, 235 responses came from people based at the SCC, representing approximately 83% of all staff working on the campus. The campus buildings are well-represented: 68% of respondents work at the MSC, 26% work at Garber, 25% work at the CRC, 13% work in the SG, 7% work at the NMNH Botany Greenhouse, and 7% listed their work location as "other."

Most respondents maintain a typical work week and drive themselves to work between 6:00 AM and 9:00 AM. More respondents drive alone to the SCC than to any other Smithsonian location they regularly visit, reflecting the SCC's suburban location and the walking distance from the Metro station.

Some respondents reported taking multiple methods of transportation to work. Although not endorsed by the Smithsonian, some respondents noted that to get to work at other Smithsonian locations, they drive to the SCC and then take the SI shuttle into Washington, DC.

Results indicate a strong culture of alternative transportation with approximately 47% of survey respondents indicating that they use modes other than driving alone to the SCC. Approximately 42% of employees who drive alone to the site would be willing to change their mode of travel if public transportation became a more efficient option. However, few of these employees live in areas where that is likely.

Many respondents indicated that they would like the SI shuttle to stop at Metro stations, primarily in Virginia, where public transportation to the SCC takes significantly longer than driving. Other employees were willing to take the Metro to work if the total commute time could be reduced.

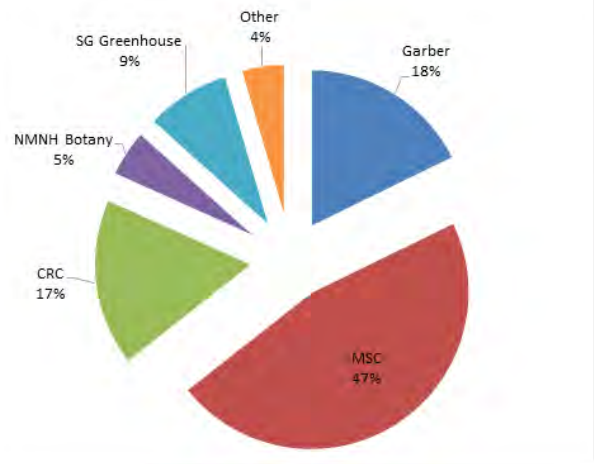


Figure 2-36: Survey Results - Primary SCC Location

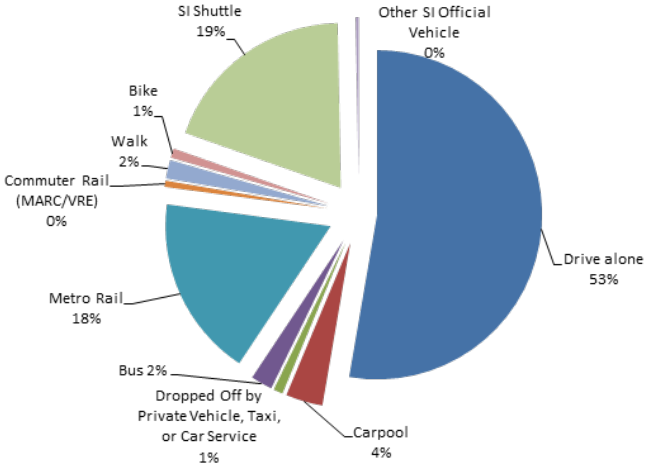


Figure 2-37: Survey Results - Primary Transit Method

Existing Parking

More than half of SCC employees drive to work. Currently the site contains 429 parking spaces, distributed among four sites. The locations of the parking areas are shown in Figure 2-39 and their capacities are listed in Figure 2-38.

Previous assessments indicate that some parking areas on-site currently are over capacity while others are underutilized. The MSC parking lot is historically over capacity, resulting in vehicles parked on the side of the circulation roadway and the grass. The parking areas for SG and NMAI-CRC are underutilized, with less than 80% of the spaces occupied.

The Master Plan addresses the disproportionate use of parking spaces over the site, taking into account the anticipated growth in staff population.

Building Connectivity

The campus has sidewalks alongside internal roads leading to each building entrance. Once past security, the internal circulation roads are shared by vehicles and pedestrians. The current campus circulation creates difficult connectivity, especially around the Garber buildings, as there are few direct routes to the main gates.

Existing parking lots and the buildings they serve are not well-connected to other buildings and lots by pedestrian and vehicle paths, and in some cases are fenced off from others. This reflects the historical development of the campus in phases and the management of each major facility by a different Smithsonian museum.

The Master Plan aims to create a single connected campus environment.

For pedestrians within the site, few paths are available. The only pedestrian-friendly route connects the MSC and the NMAI-CRC. Gravel roads surround most of the facility; while these roads are serviceable for vehicles, they can be hazardous for pedestrians. As a part of the Smithsonian's goal of creating a more welcoming campus, the Master Plan proposes improvements to the pedestrian and bicyclist experience on campus. This is discussed further in the Master Plan section.

	Capacity			Utilization: October 23, 2019			Utilization: October 29, 2019		
Location	ADA	Emp/ Visitor	SI Veh Only	ADA	Emp/ Visitor	SI Veh	ADA	Emp/ Visitor	SI Veh
1. Garber Main Lot	2	63	2	0	41	17	0	38	18
2. Garber B29	0	0	3	0	0	3	0	0	2
3. Garber Gate Road & Construction Trailer Parking	2	39	0	0	37	1	1	32	0
4. NMNH Botany GH	0	2	1	0	1	0	0	2	0
5. MSC Loading Dock	2	55	1	1	44	4	1	39	3
6. OPL Parking	0	3	4	0	1	4	0	1	3
7. SG Greenhouse	2	42	1	0	14	8	1	16	5
8. MSC Circle	4	8	0	4	8	0	4	8	0
9. MSC Parking	0	56	0	0	66	2	0	64	1
10. NMAI-CRC	6	123	8	0	96	9	1	100	9
TOTAL	**18**	**391**	**20**	**5**	**308**	**48**	**8**	**300**	**41**

Figure 2-38: Table: Parking Lot Capacity and Utilization

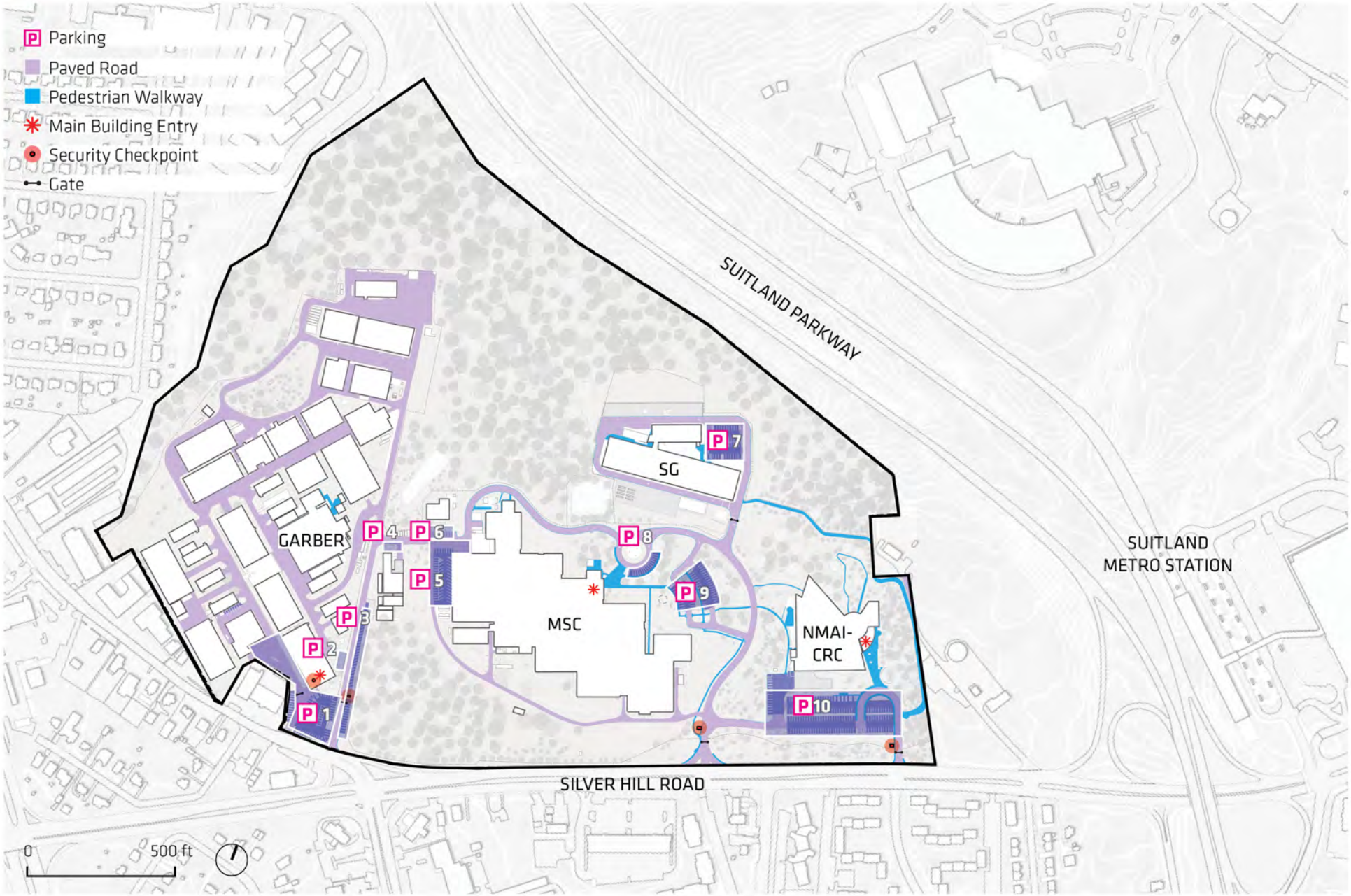


Figure 2-39: Campus Circulation Map

Existing Utility Infrastructure

Stormwater Management

Existing stormwater management consists of large detention ponds surrounded by fences. The stormwater outfalls to the multiple stream tributaries throughout the SCC campus.

The Master Plan proposes to replace the ponds with micro-bioretention areas and bioswales.

Pond 1

Stormwater Management Pond 1 was intended to be an interim pond and collects a combination of overland flow, channel flow and closed storm sewer piping. It was adapted for SG Greenhouse

Pond 1 appears to be in good condition with regularly performed maintenance.

Water depth: 5 feet

Pond 2

Pond 2 is located on the north side of the MSC and was built for drainage from the building, parking lot and open space. Most of the drainage out falling into this facility comes from underground storm sewer and not from overland.

The pond is in very poor condition.

Water depth: 5 feet

Pond 3

Pond 3 is located on the north side of the Botany Greenhouse. The flows contributing to Pond 3 are a combination of overland flow, channel flow and closed storm sewer piping. Ponds 2 and 3 both outfall to a common intermittent downstream tributary.

The pond is in poor condition.

Water depth: 5 feet

Pond 4

Pond 4 is located on the far western side of the site. Pond 4 was built for drainage from the Fleet Management Building and its 0.72-acres of impervious surfaces. Pond 4 collects most of the drainage from Garber as well. Contributing to Pond 4 are a combination of channel flow and closed storm sewer piping.

The pond is in fair condition.

Water depth: 4 feet

Pond 5

Pond 5 is located on the south side of the MSC building. Pond 5 was designed to collect water from the open grassy areas behind the MSC building, and from portions of the rooftop.

The pond is in decent condition.

Water depth: 5 feet

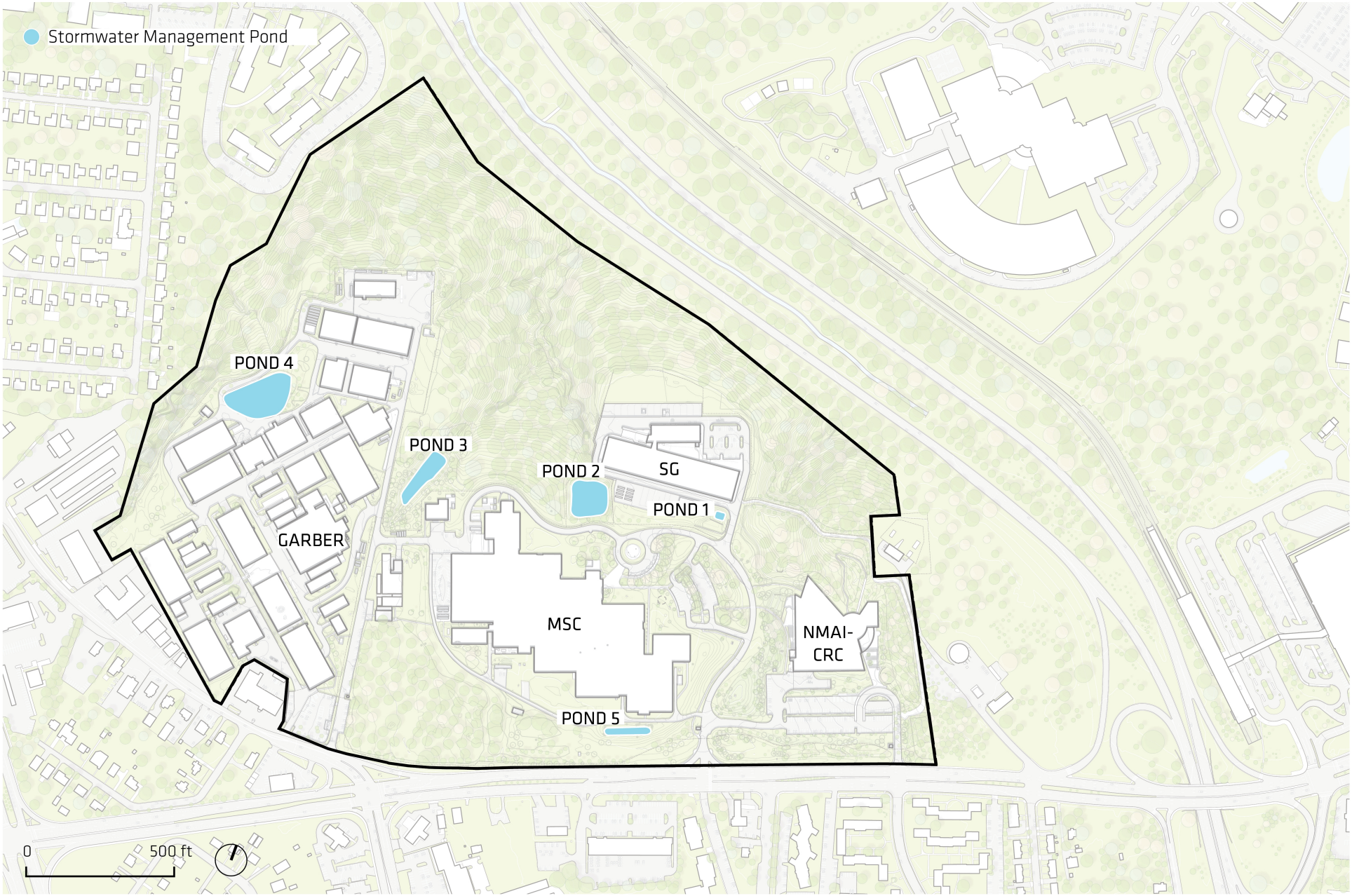


Figure 2-40: Campus Stormwater Management Facilities Map

Storm Sewer

The on-site storm sewer network is extensive, complex and conveyed in separate stand-alone networks.

On-site runoff is collected by open channels, gravity site piping, or pumped through the building's interior plumbing. There are five major closed-piping networks for the SCC campus, located at MSC, Botany Greenhouse, NMAI-CRC, SG and Garber.

The drainage behind NMAI-CRC is collected into a closed system then connected to the southern parking lot storm system. The ultimate outfall is released into an existing open channel. (Outfall #0).

Drainage around the SG building flows from north to south into stormwater management Pond 1. The outfall is released into the same channel as the NMAI-CRC outfall (Outfall #1).

The drainage system around the MSC building is more elaborate than the other systems. It is a closed system that collects flow from the roof, street and overland drainage, as well as Pond 5 to the south. The system was designed to drain from south to north into a storm water facility (Outfalls #4 and #6).

The Garber drainage system is composed of open concrete channels, grass lined channels and closed systems. Sheet flow within the Garber area outfalls into open concrete channels that ultimately outfalls into stormwater management Pond 4 via Outfalls #10 and #11.

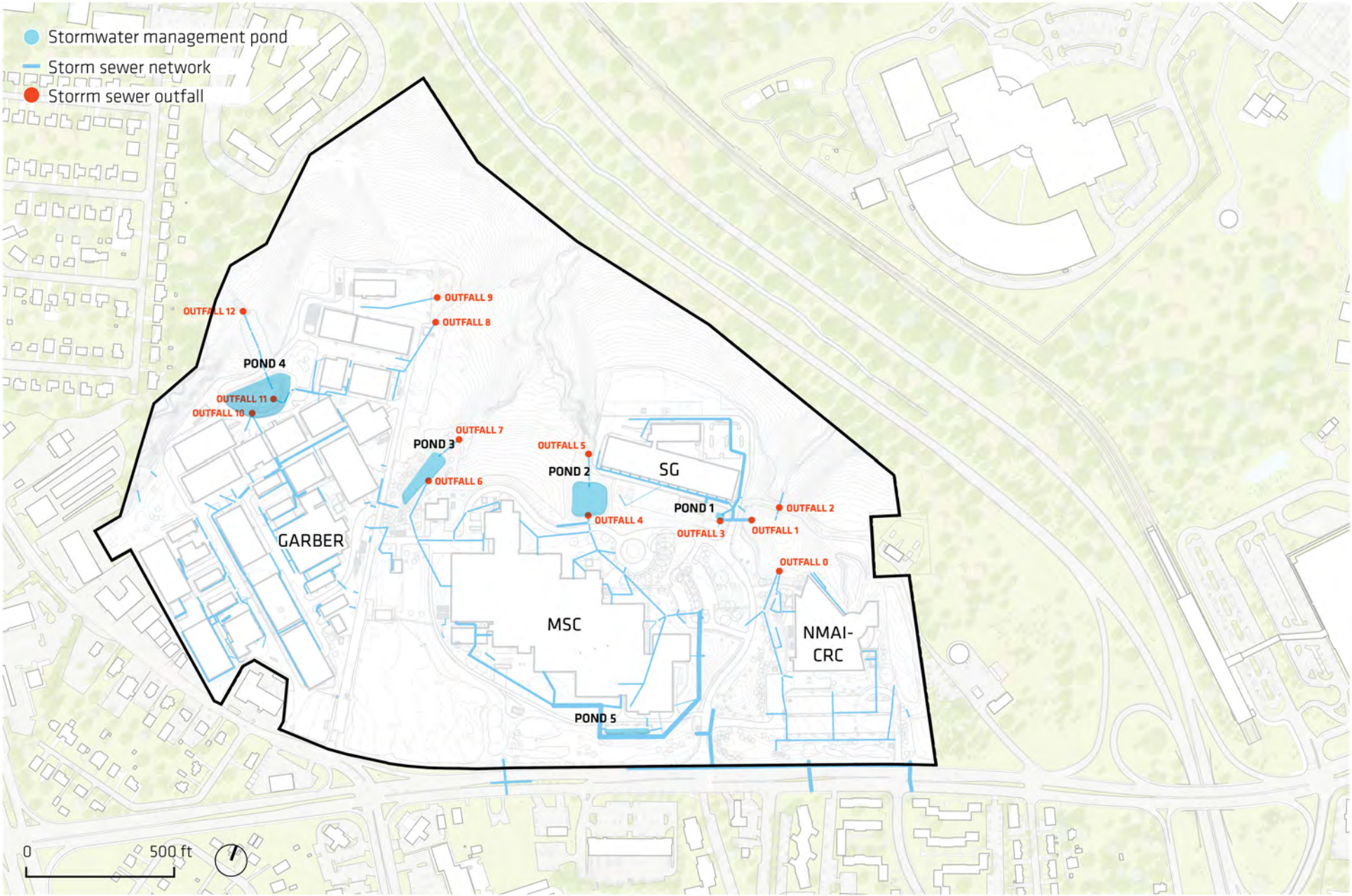


Figure 2-41: Campus Storm Sewer Network Map

Water

Washington Suburban Sanitation Commission (WSSC) provides water to the SCC campus. The campus is serviced by two separate water lines from a single water main source

There is a 24-inch waterline within Silver Hill Road and a 12-inch waterline within Old Silver Hill Road. There are five service connections to the site. Three water service connections are located along the 24-inch waterline. The other two water service connections are located along the 12-inch waterline.

Waterline Connection 1 is west of the intersection of Suitland Parkway and Silver Hill Road, directly south of the NMAI-CRC building and leads to the SG Greenhouse located on the north side of campus.

Waterline Connection 3 is directly south of the MSC building on Silver Hill Road and loops around the MSC building. This waterline services the MSC, Osteo-Prep Lab and Botany Greenhouse. It is also connected to the NMAI-CRC and SG Greenhouse, via a connection south of the SG Greenhouse.

Waterline Connection 4 is located at the intersection of Old Silver Hill Road and Silver Hill Road and provides water service for most of Garber.

Waterline Connection 5 is west of the Garber access road connection and travels under Old Silver Hill Road meandering through Garber to provide water pressure.

All waterlines have multiple fire hydrants located along the waterline to provide fire coverage. Adequate fire hydrants are provided along the waterlines in each of the areas within the Suitland facility.

The water main along Silver Hill Road is the only water source for the campus. Per Smithsonian's Office of Safety, Health and Environmental Management (OSHEM) Fire Protection requirements, a secondary water source is required for fire protection. This source will be provided by a 416,000-gallon water tank, to be built as part of the Pod 6 addition to the MSC building.

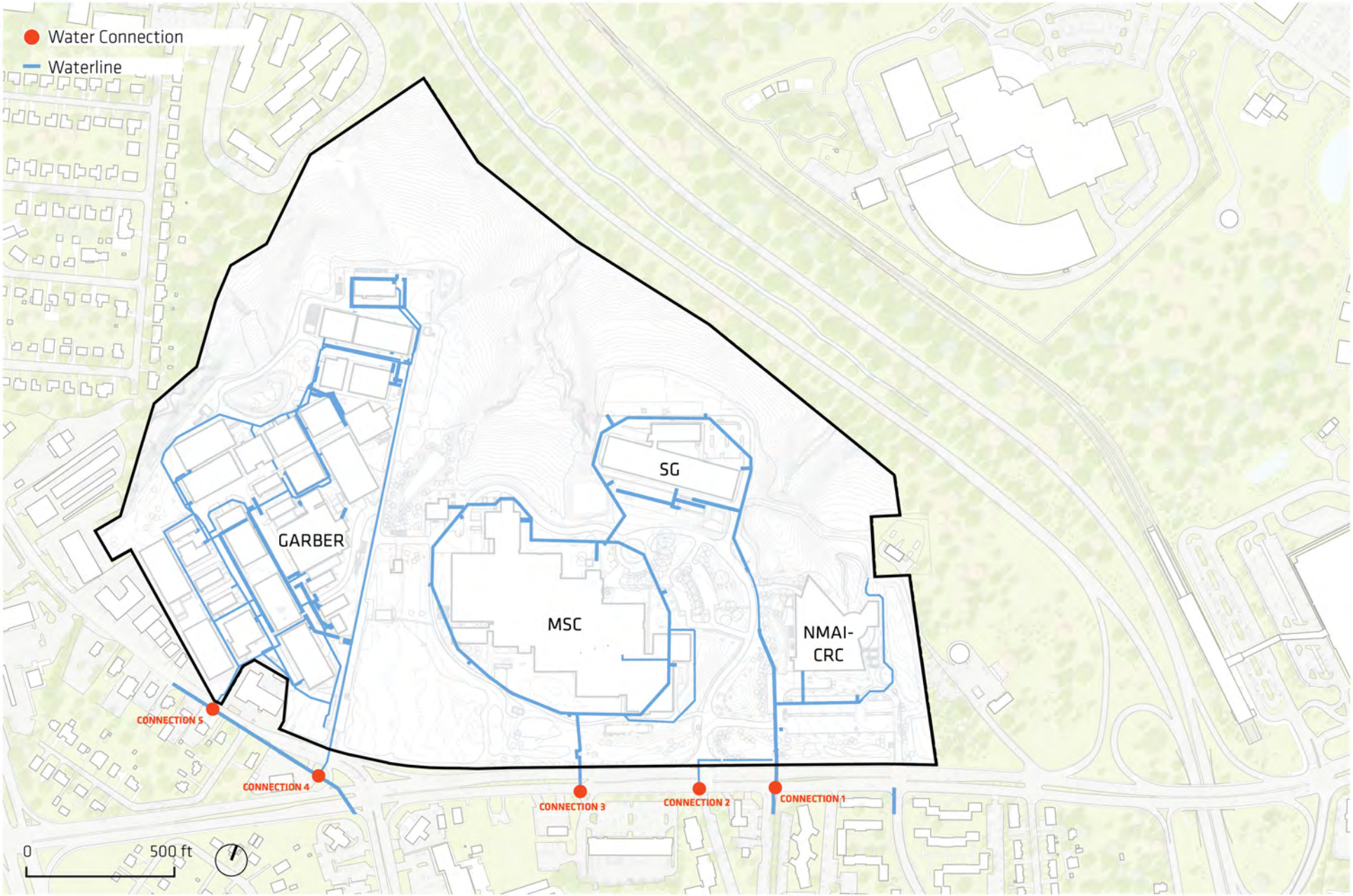


Figure 2-42: Campus Waterline Network Map

Electricity

Potomac Electric Power Company (PEPCO) provides electricity to the SCC campus and there are two main electrical feeders (14031 and 14032) servicing the campus. The power source for these electrical feeders comes from PEPCO's Suitland, Prince George's County substation #134.

Feeder 14031 services the NMAI-CRC building, SG Greenhouse and sections of the MSC building. Electrical feeder 14032 services the security check point near the NMAI-CRC building, the security check point near the MSC building and sections of the MSC building. Electrical feeder 14032 also services two transformers located at the entrance of Garber and provides electricity to multiple Garber buildings.

Overhead electrical lines are used predominantly on the western side of the campus and underground electrical lines provide service to all the buildings located on the eastern side of the campus. New development projects should utilize underground electrical lines. PEPCO has authority over all electrical utility and streetlight related abandonments, renovations, or new installations.

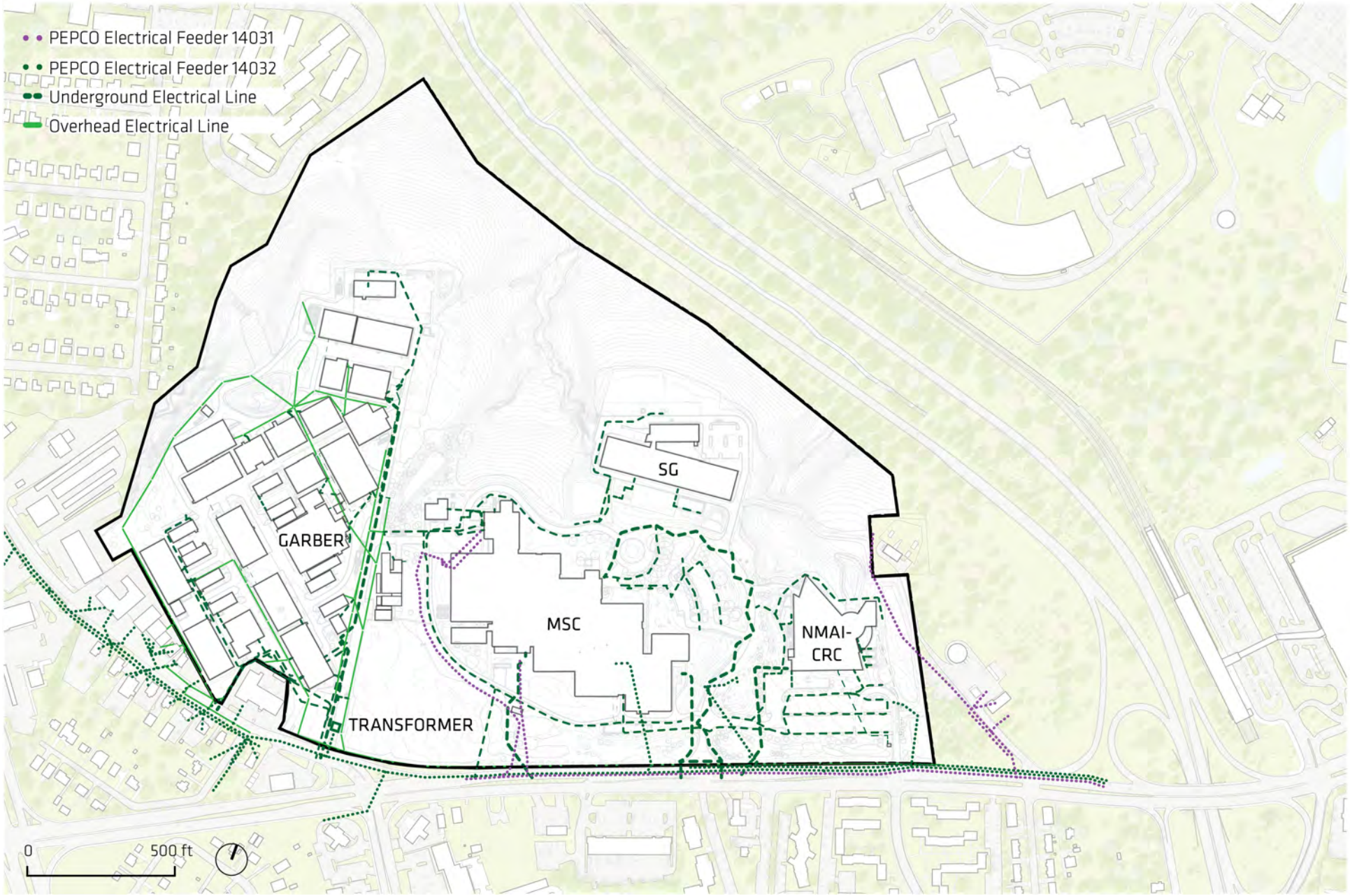


Figure 2-43: PEPCO Electrical Feeder and On-Site Network Map

MASTER PLAN



Figure 3-1: Rendered Aerial View of the SCC from Southeast

Planned Development

40-Year Development

Over the next 40 years, the SCC is likely to remain at approximately the same proportion of collections to non-collections spaces. As the collections increase, so will the number of employees who occupy the non-collections spaces, but not necessarily at a 1:1 ratio.

Development of the Suitland campus will be impacted by the needs of museums on the National Mall, including any new museums. The trend has been for new museums to incorporate a minimal amount of collections storage space in favor of maximizing the available space for public programs and to avoid construction of storage space in below grade areas subject to flooding. Similarly, existing museums are following a similar pattern of relocating some collections to higher ground or to make room for visitor and exhibit space.

As a pan-Smithsonian campus, the SCC may also be an ideal location to house new initiatives that cut across boundaries between existing museums and research centers.

Collections Spaces and Non-Collections Spaces

Collections spaces that include areas for storage, management and laboratories comprise approximately 80% of the overall space at the SCC.

Non-collections areas such as workspaces, people support and building service spaces will represent approximately 20% of the SCC. These percentages reflect the current ratio of collections to non-collections spaces at the MSC as well.

Outdoor areas such as stormwater management zones, pedestrian and bicycle paths, roads and parking are not represented in Figure 3-2 but are integral to the Master Plan.

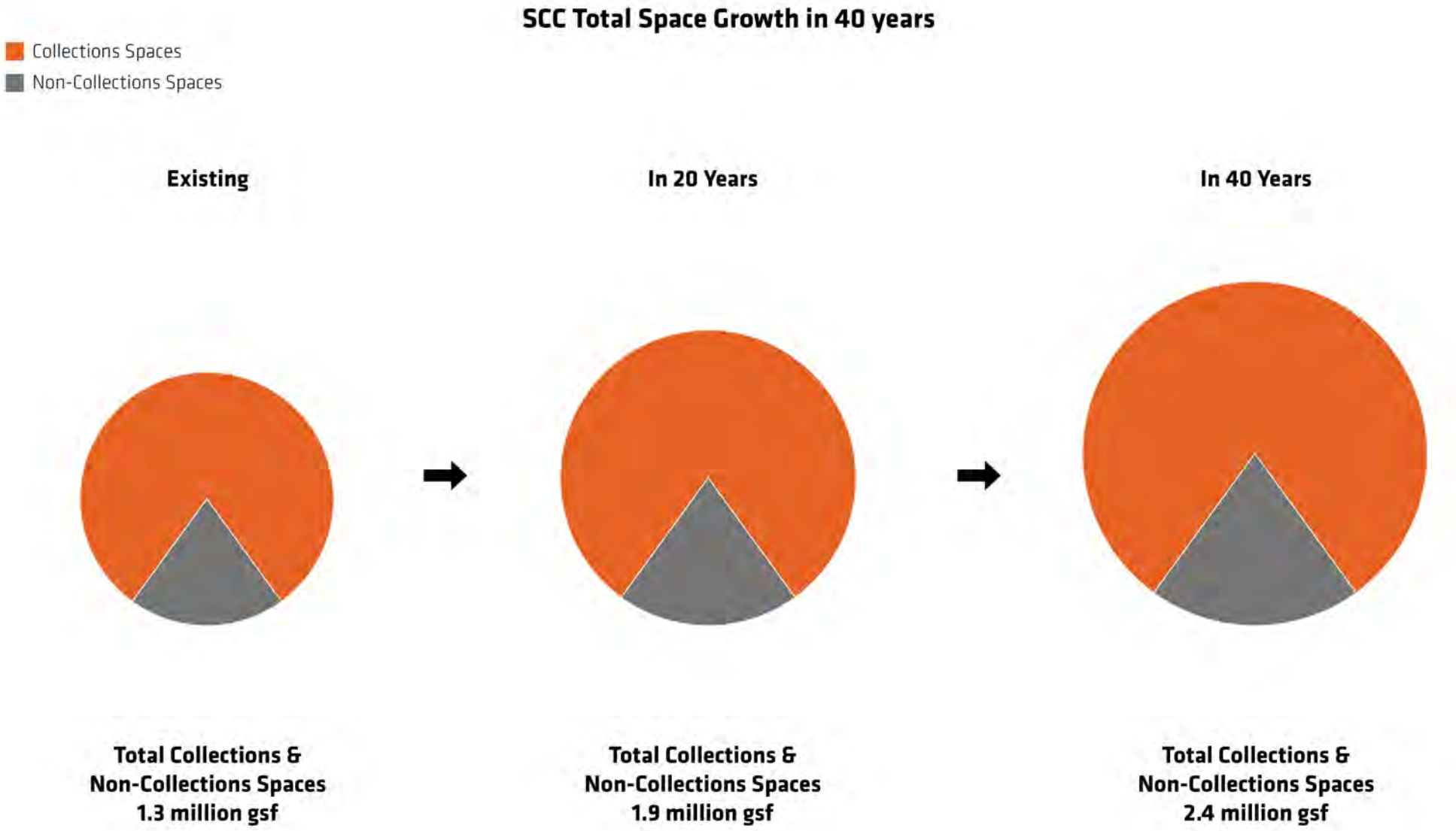


Figure 3-2: 40-Year Space Growth Projection

Campus Population

The population of the SCC is approximately 350, consisting of the following:

- Full-time Smithsonian employees assigned to the SCC who maintain regular hours on campus
- Smithsonian-badged employees, contractors, fellows, interns etc.
- Smithsonian staff who spend part of their time at the SCC, but also maintain hours at other Smithsonian facilities (Rotating employees)
- Visiting researchers and scholars who spend an extended period at the SCC
- Non-Smithsonian visitors who come to the campus for scheduled appointments
- All other visitors who park including vendors, service people, short term scholars, tribal delegations, AEs, etc. who come for meetings and short-term visits

On-campus activities by the users and visitors of the SCC related to collections management, research, campus and facility maintenance are unique and dispersed. As a result, the campus population of the SCC can fluctuate.

Campus Population Growth

In order to estimate the employee capacity of the campus when the Master Plan is fully realized, several factors were considered:

- Overall facility expansion
- Increase in the number of rotating employees, visiting researchers and scholars
- A gradual trend for museums to expand public spaces by relocating back-of-house activities to other facilities

Given the planned expansion at the SCC, the number of full-time employees is expected to grow to approximately 400 in 20 years.

Additionally, the number of rotating employees, visiting scholars and support personnel will increase as the SCC campus accommodates more collections management activities, research and collaboration. Therefore, an additional 150 users are estimated, bringing the total campus population to approximately 550 people in 20 years.

The Master Plan anticipates a campus population of 910 (550 full-time and 360 rotating staff and visiting researchers) at the SCC campus in 40 years.

As the population increase at the SCC will likely be intermittent and irregular, the number of users for different space types should be surveyed and verified at each design phase.

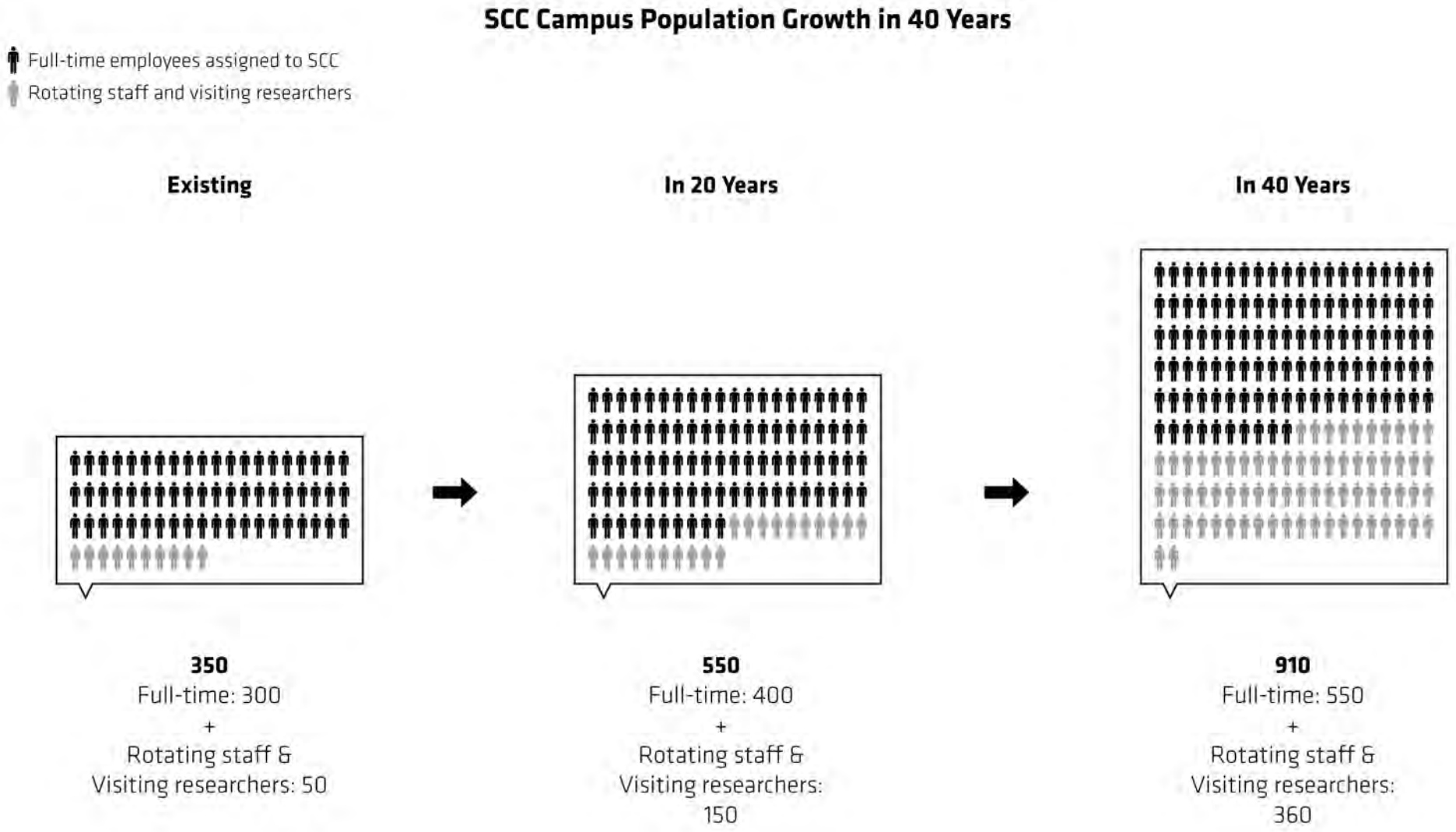


Figure 3-3: 40-year Population Growth Projection

Program Adjacencies

The SCC will continue to be a restricted site where security clearances will be required for staff, visitors and deliveries. The program adjacencies identify the two principal levels of security needed on campus, as indicated on the next page.

The diagram also illustrates how programmed spaces should be situated in relation to each other.

The first line of campus security will be a gate and a Visitor Center -- the campus access point where staff, visitors and deliveries will be screened.

Those with clearance will be directed to appropriate destinations. Staff and researchers will proceed to higher security workrooms, offices, laboratories and collections processing spaces.

Collections spaces will be the most restricted and tightly controlled program spaces on the SCC campus.

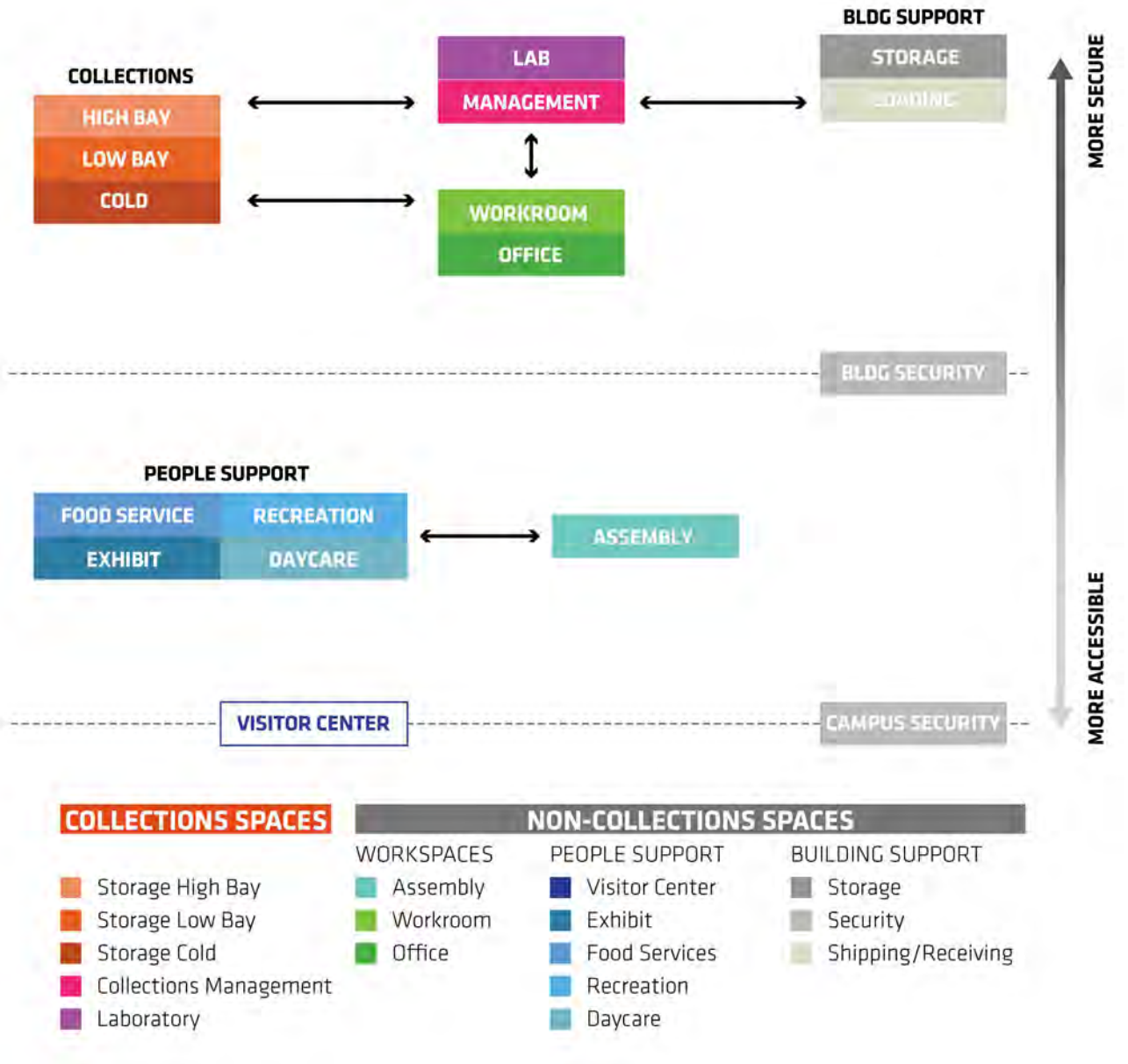


Figure 3-4: Program Adjacencies

Summary of Site Plan Alternatives

The SCC has 1.3 million gsf currently dedicated to collections storage and supporting amenities. An additional 1.1 million gsf must be built to accommodate the growth of the Art, Archives & Libraries and Science collections in the next 40 years.

To envision how the program areas might expand, four site development strategies were proposed and given shorthand titles that describe their strongest attributes.



Figure 3-5: Site Plan Alternative: Northern Extension



Figure 3-6: Site Plan Alternative: Service Courtyard



Figure 3-7: Site Plan Alternative: People Plaza



Figure 3-8: Site Plan Alternative: Campus Quad

Summary of Site Plan Alternatives

- Collecting Units - Art
- Collecting Units - Archives & Libraries
- Collecting Units - Science
- Pan-Institutional Facilities
- Vehicular Circulation
- P Parking
- Loading Zones
- Pedestrian Circulation



Figure 3-9: Site Plan Alternative: Northern Extension

Northern Extension

Taking advantage of a relatively flat topography around the existing Garber area, the new complex in this scheme extends to the northern portion of the campus

Office spaces are located at the outer edges of the new development and have views of the natural landscape on campus.

Pros

Limits disturbance to the Garber area

Compact building massing

Cons

No connection to the MSC

Disturbs the woods to the north

Sharp angles that would hinder internal circulation



Figure 3-10: Site Plan Alternative: Service Courtyard

Service Courtyard

This strategy consolidates service functions such as loading docks to the central area of the new development and collections spaces face the courtyard.

Similar to the previous scheme, office spaces are on the outer perimeter of the new complex with views looking out to the natural landscape.

The proposed service courtyard provides a central loading zone between the new development and the existing MSC.

Pros

Compact building massing

Continuous internal circulation

Cons

No connection to the MSC

Limited flexibility

Unfinished appearance for a long time

Collecting Units - Art
Collecting Units - Archives & Libraries
Collecting Units - Science
Pan-Institutional Facilities
Vehicular Circulation
Parking
Loading Zones
Pedestrian Circulation

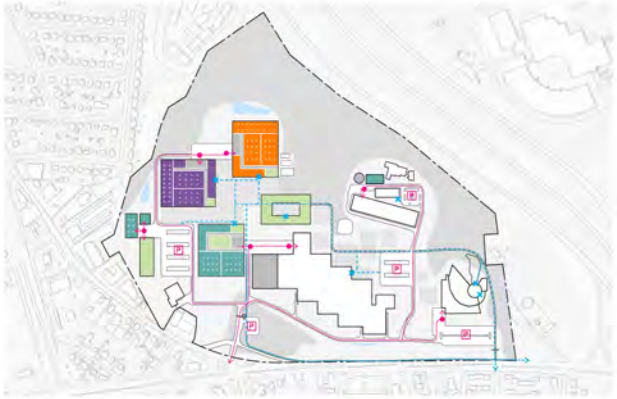


Figure 3-11: Site Plan Alternative: People Plaza

People Plaza

This strategy proposes to create a new campus plaza around which the new SCC complex is developed. Pedestrian-centric plaza is surrounded by four clusters of development for each thematic grouping of units.

Along with the pan-Institutional building that would be centrally located on the campus, the plaza creates a new gathering place for the SCC community.

Pros

Thematic grouping of units

College campus ambiance

Cons

Disconnected development

Does not allow for efficiency of shared resources

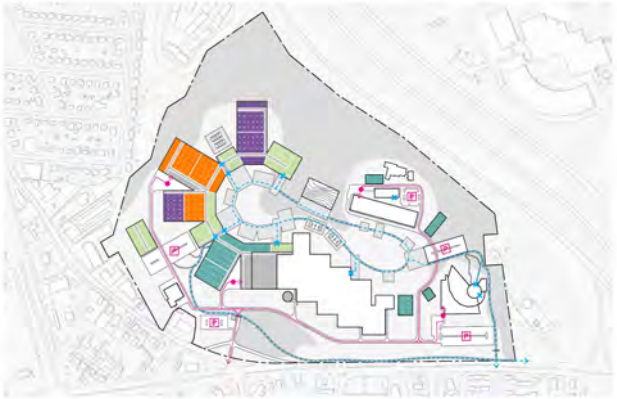


Figure 3-12: Site Plan Alternative: Campus Quad

Campus Quad

This plan proposes a pedestrian-friendly campus quad that connects the new complex, MSC and SG Greenhouse and NMAI-CRC.

This plan suggests locating one primary loading dock and allows for a direct connection between MSC and the new complex, creating a continuous interior circulation through the existing and new buildings.

Pros

Connected campus

Allows flexible growth

Continuous internal circulation

Physically connected to MSC

Consolidated security and loading

Cons

Larger building envelope area

Creation of the quad will require extensive landscape improvements

Proposed Development

Stakeholders across the Smithsonian evaluated the options, addressing professional practices, requirements and elements to develop further. Ultimately, they selected the Campus Quad strategy, highlighting its elements of connectivity, flexibility and sense of community.

The Campus Quad scheme connects the MSC and the new complex directly with a continuous interior corridor. Workspaces will face the quad and collections storage will be on the perimeter.



Figure 3-13: Rendered Aerial View from Northwest



Figure 3-14: Axonometric View of Proposed Site Organization

Proposed Development

The strategy encourages walking and other environmentally friendly transportation such as bikes, electric scooters or electric carts, while limiting car and truck traffic on the campus. The ring design clusters programs together, enabling employees to walk easily from one department to another.

The plan for loading and unloading directs deliveries to the perimeter, creating a pedestrian-friendly campus.

The orientation of the buildings draws natural light inside, creates open spaces for congregating and provides opportunities for shared, accessible amenities.

Perhaps more than other options, the Campus Quad plan reinforces a singular identity, fosters pan-Institutional collaboration, maximizes shared amenities and creates a welcoming and connected campus.



Figure 3-15: Rendered Aerial View from Southeast



Figure 3-16: Proposed Site Plan

Transportation Demand Management

People choose their mode of travel based on several factors, including convenience, cost, time, and habit/familiarity. An effective transportation demand management (TDM) program provides a variety of strategies that affect one or more of these factors.

The approach to TDM at the SCC must be tailored to the unique needs of the site. The relatively large square footage, but low population will make traditional TDM strategies, such as carpooling, vanpooling, and shuttle services more challenging.

Additionally, because employees based at the SCC also work at other Smithsonian locations, live across the greater DC, Maryland, and Virginia areas, and have varied schedules requiring their presence on the Mall, it is challenging to form car and van pools. Therefore, after careful consideration of site-specific needs, the following TDM strategies were developed to reduce single occupancy vehicle trips at the SCC:

- Employee Transportation Coordinator
- Carpool/Vanpool Incentives
- Transit Incentives
- Last-Mile Connectivity Improvements
- Telecommuting Program
- Flexible Work Schedules
- Bike/Walk to Work Incentives

Silver Hill Road Improvements

The Maryland-National Capital Park and Planning Commission (M-NCPPC) has plans underway for bicycle lanes along Silver Hill Road, and there are bicycle racks and lockers now located at the Suitland Metro station. These improvements signify a willingness to invest in pedestrian access to the station. The Smithsonian will work with NPS and MDOT SHA to encourage improvements to the path to the Metro station.

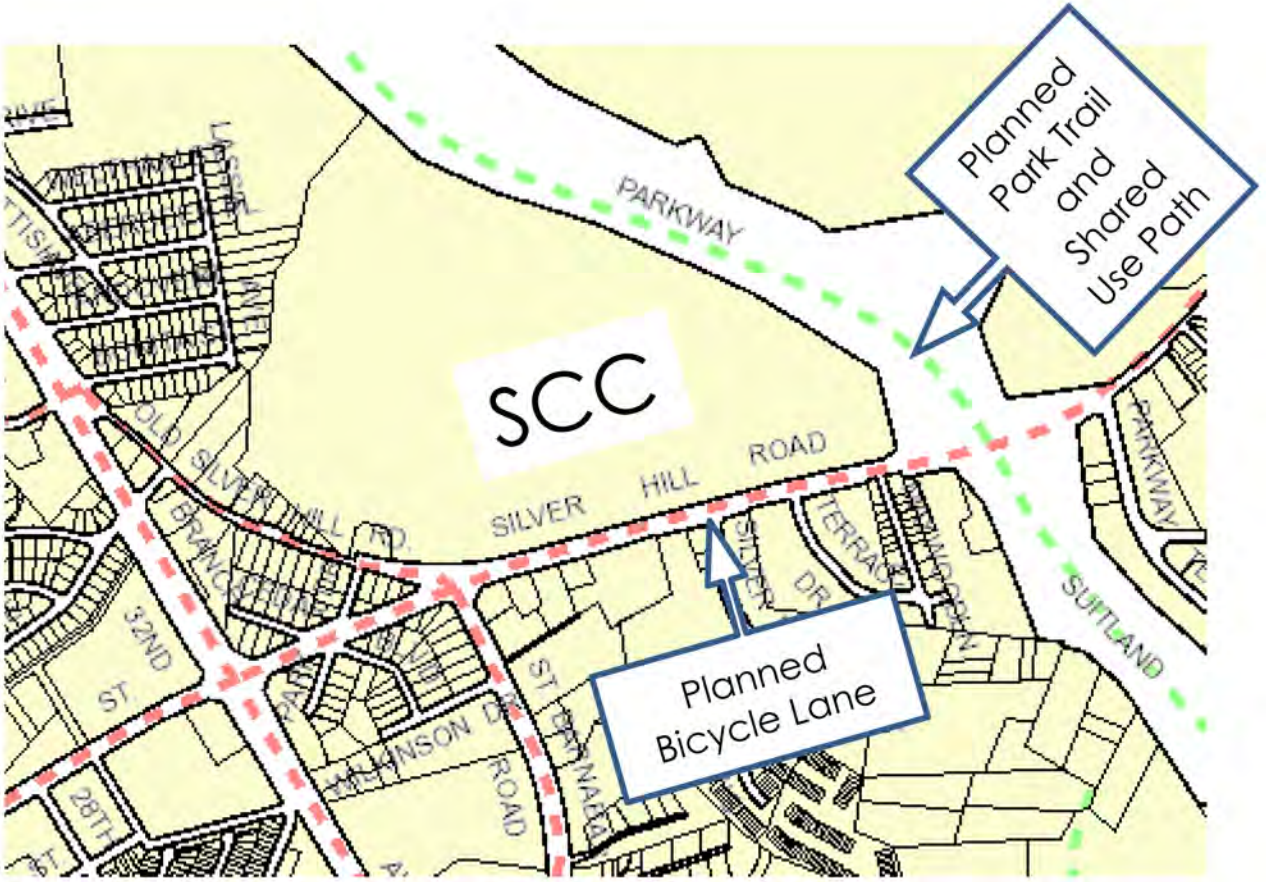


Figure 3-17: Planned Bicycle Lanes Surrounding SCC

Silver Hill Road Improvements

A landscaped buffer, broad sidewalk, crosswalk signage, pavement markings and a designated stop at the Metro station for the SI shuttle will promote increased use of public transportation for SCC employees and visitors, and will benefit the surrounding community.

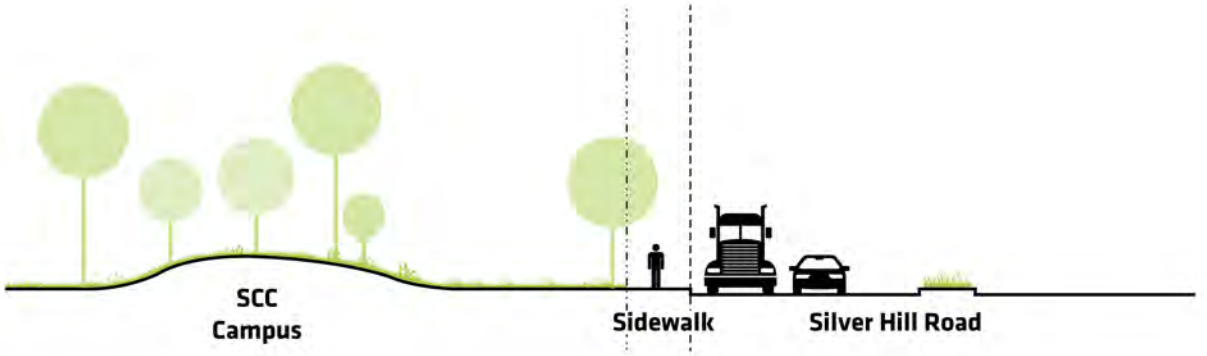


Figure 3-18: Section Diagram of Existing Silver Hill Road

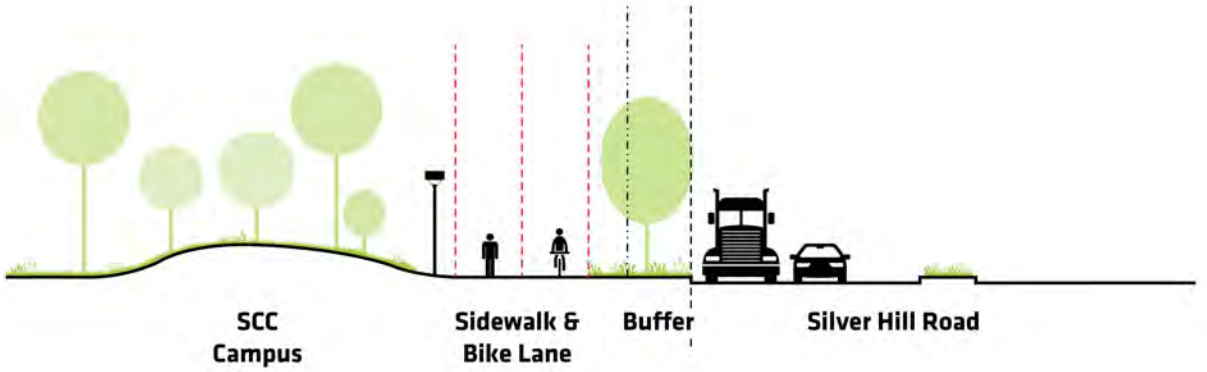


Figure 3-19: Proposed Section Diagram of Silver Hill Road

Silver Hill Road Improvements



Figure 3-20: Existing Condition of Silver Hill Road



Figure 3-21: Rendered Image of Proposed Silver Hill Road Improvements

Silver Hill Road Improvements

MDOT SHA advised to identify the right of way (ROW) for Silver Hill Road, which is a state highway. Using the boundary survey conducted by the Smithsonian (Figure 3-22) and plat drawings provided by MDOT, the Smithsonian GIS staff identified the ROW at Silver Hill Road and Old Silver Hill Road (Figure 3-23, 3-24, 3-25).

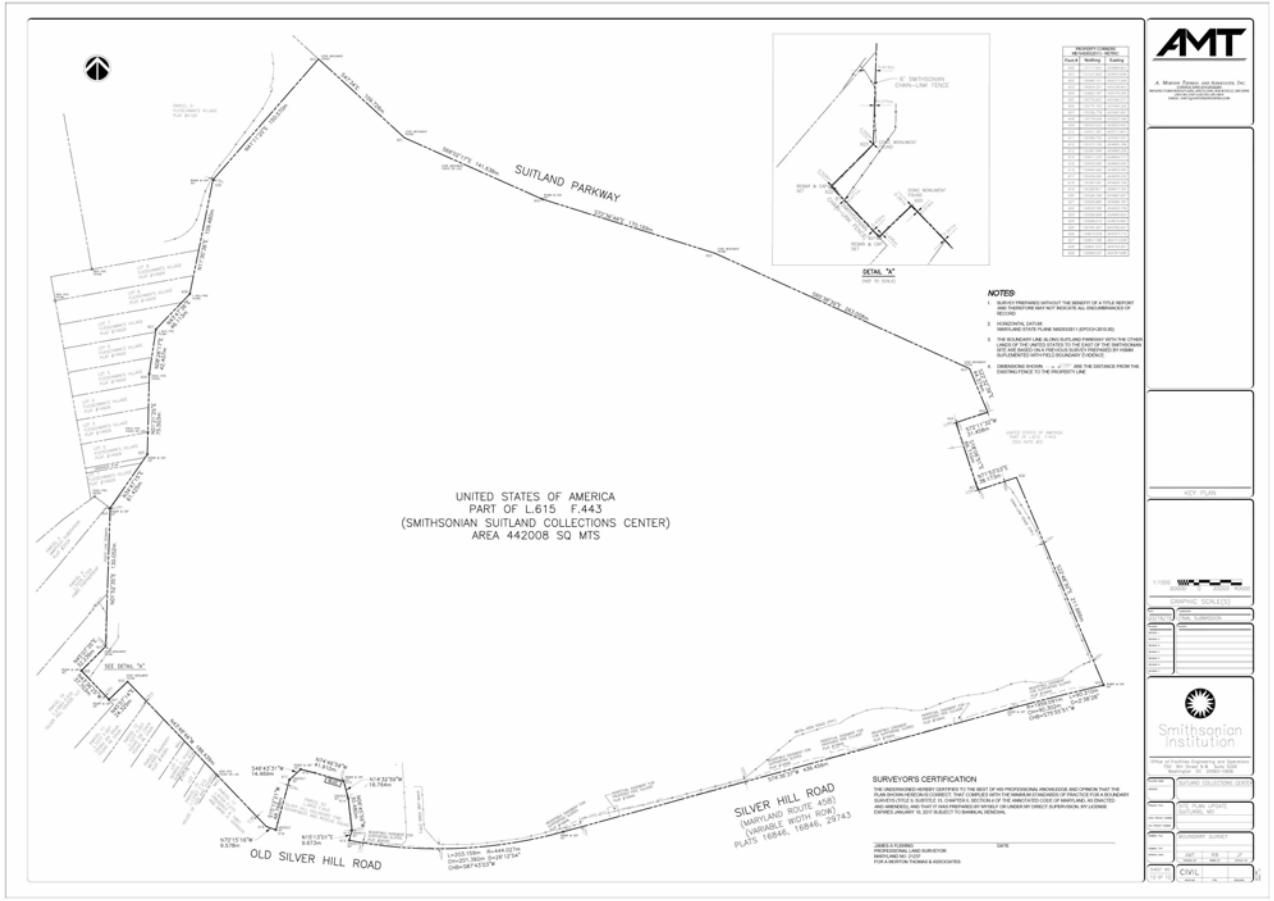


Figure 3-22: SCC Boundary Survey

Silver Hill Road Improvements



Figure 3-23: SCC Boundary Survey and ROW at Silver Hill Road



Figure 3-24: SCC Boundary Survey and ROW at Silver Hill Road and St. Barnabas Road



Figure 3-25: SCC Boundary Survey and ROW along Old Silver Hill Road

Campus Circulation

The Master Plan proposes three circulation paths designed to knit together the buildings on the SCC campus.

The outermost path is the primary vehicular road to access parking, loading and unloading.

A wide, naturally-lit interior pathway will run the length of the buildings, linking with the Street at the MSC, and providing access to workspaces on one side and collections storage on the other.

The third path will be the outdoor campus loop connecting most of the buildings at the SCC. It is the central element in a network of exterior pathways through the landscape. The paths will connect gathering areas, sites for sculpture, and bicycle and electric cart docking areas.

Proposed Campus Entrance

The Master Plan proposes to limit campus entrances to two points of access.

The primary campus entrance would be in the approximate location of the current Garber/Suitland entrance and align with the intersection of Silver Hill Road and Old Silver Hill Road. Vehicle access must accommodate tractor-trailers, SI shuttles and personal vehicles. The entrance is set back to ensure that queuing does not extend to the main road.

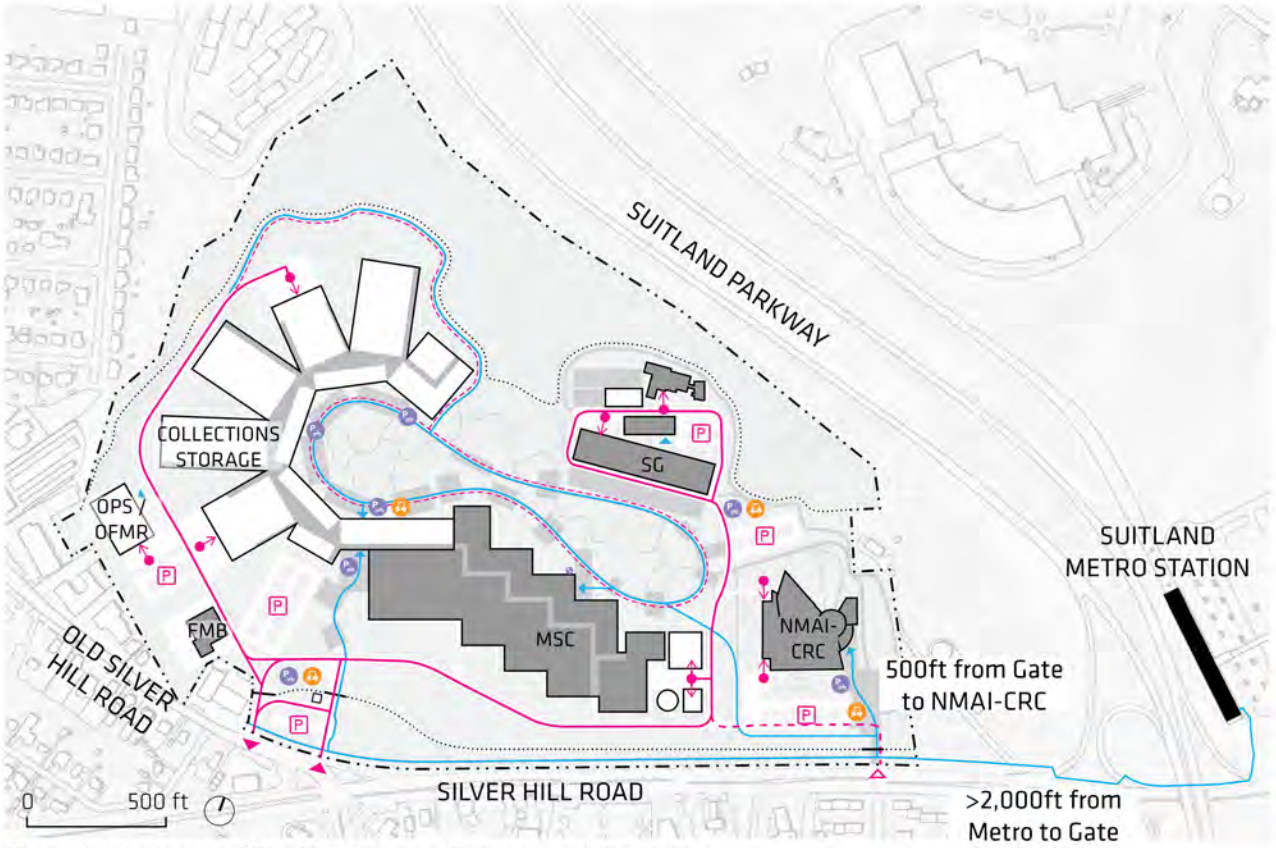


Figure 3-26: Proposed Site Plan: Campus Entrance and Circulation

At the main campus entrance, a large vehicle inspection area is recommended to accommodate tractor-trailers that may need to wait outside the gate. This area enables screening of the trucks and drivers prior to entering. There is a small parking lot outside the gate for visitors, who will then proceed to the Visitor Center / Security Booth.

The Security Booth will be on an island between the in-bound and out-bound lanes of traffic. All lanes will be equipped with rated active vehicle barriers and traffic control arms.

The entrance near the NMAI-CRC will remain in place and will provide access to pedestrians with Smithsonian credentials. This entrance will also be used for emergency vehicular access.

The NMAI-CRC security booth may be staffed when required.

1. Visitor Center
2. Security Gate
3. Fence
4. Visitor Parking
5. Large Vehicle Inspection

Ingress Traffic
Egress Traffic
Rejected Vehicle Path
Existing Traffic Lights

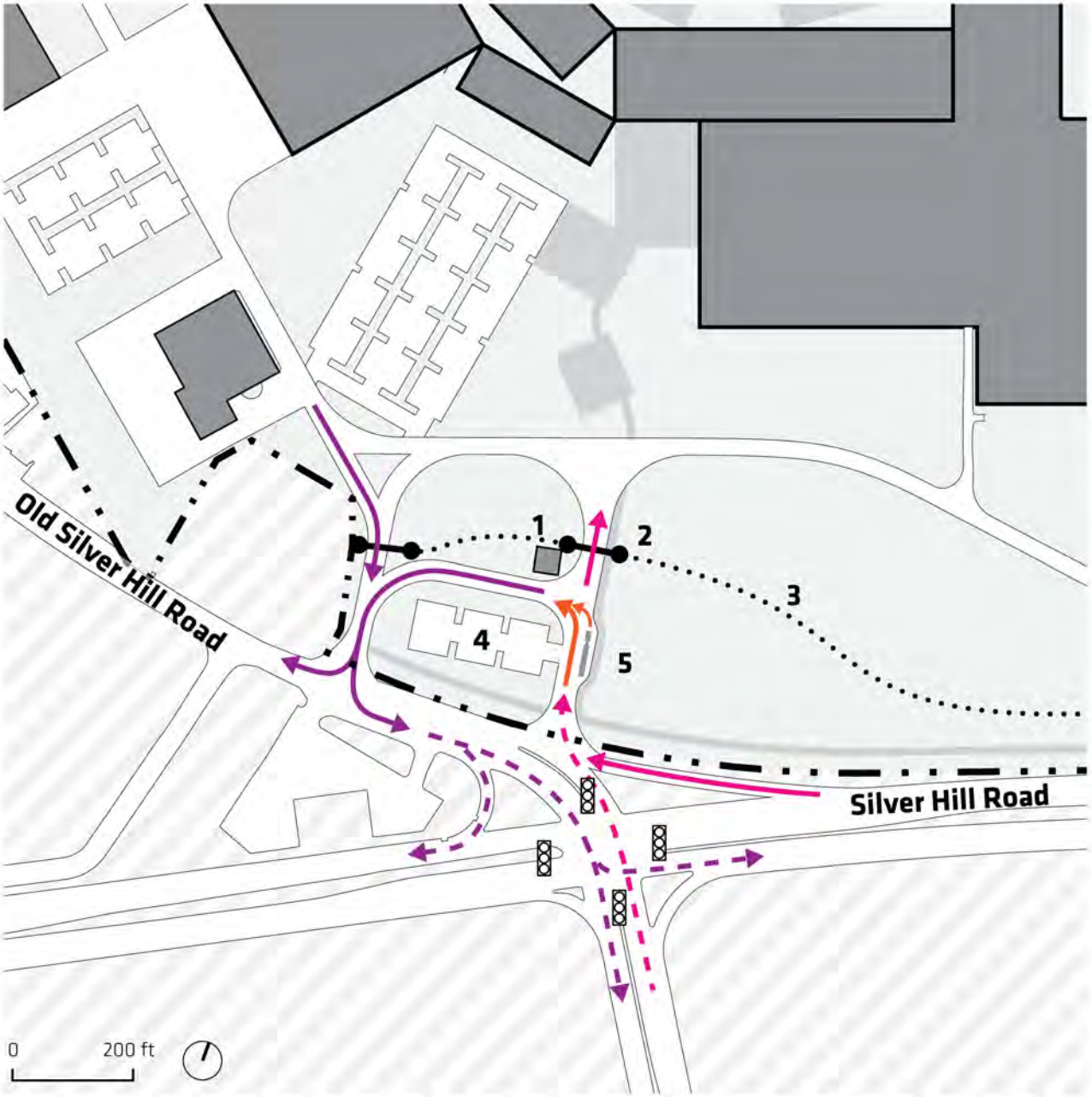


Figure 3-27: Proposed Campus Entrance: Vehicular Circulation

Alternative Campus Entrance

An alternative campus entrance was considered in the event the Master Plan's recommended entrance is not feasible.

The alternative proposes to reconfigure the existing MSC building entrance to create a primary entrance within the quad. The reconfigured primary entrance would serve staff, visitors, and delivery vehicles, also allowing full time security to be concentrated to one entry point. In this scheme the main access point is from the central campus quad where the new development meets the MSC.

This campus access scheme brings vehicular circulation into the campus quad, allowing staff to park in an improved parking lot in the existing location near MSC. From this lot, pedestrians can use the campus loop to access the new development.

The alternative option has limitations. Due to the restricted space, there is virtually no vehicular queuing room, essentially guaranteeing that traffic will back up onto Silver Hill Road. It may be difficult and unsafe for trucks to turn into the NMAI-CRC loading dock or the perimeter campus road.

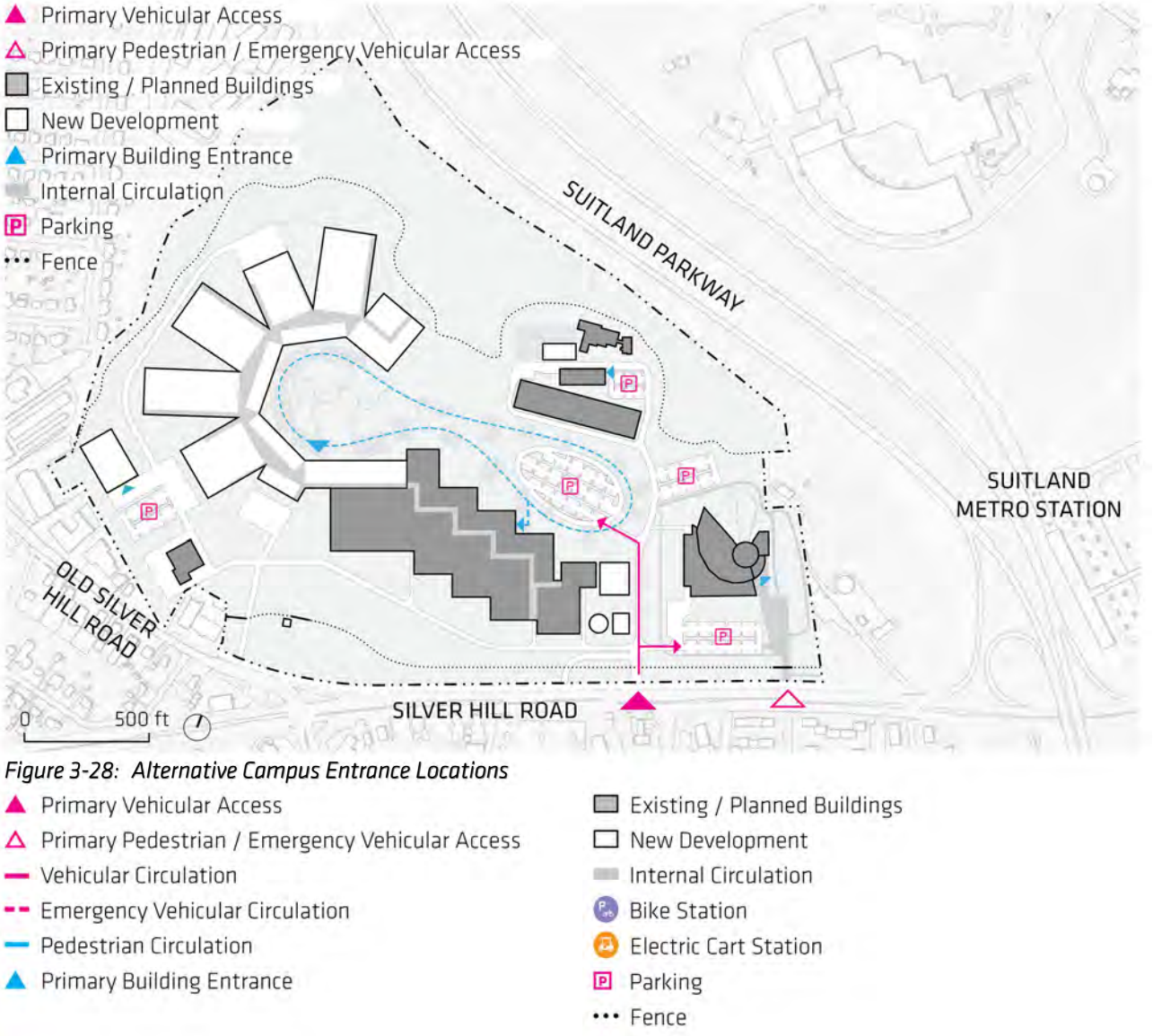


Figure 3-28: Alternative Campus Entrance Locations

M-NCPPC and MDOT SHA provided recommendations for coordination of improvements including:

1. Reconvene with M-NCPPC and MDOT SHA staff prior to moving forward with the design and construction of the new driveway to verify the plan and begin developing the final traffic impact study scope.

2. Coordinate with NPS to evaluate potential options to improve pedestrian and bicycle connections from the SCC frontage to the Suitland Metrorail station.

3. The Smithsonian should consider constructing the multiuse trail along their frontage consistent with the "Suitland-Silver Hill Greenway" plans in the Green Line Plan.

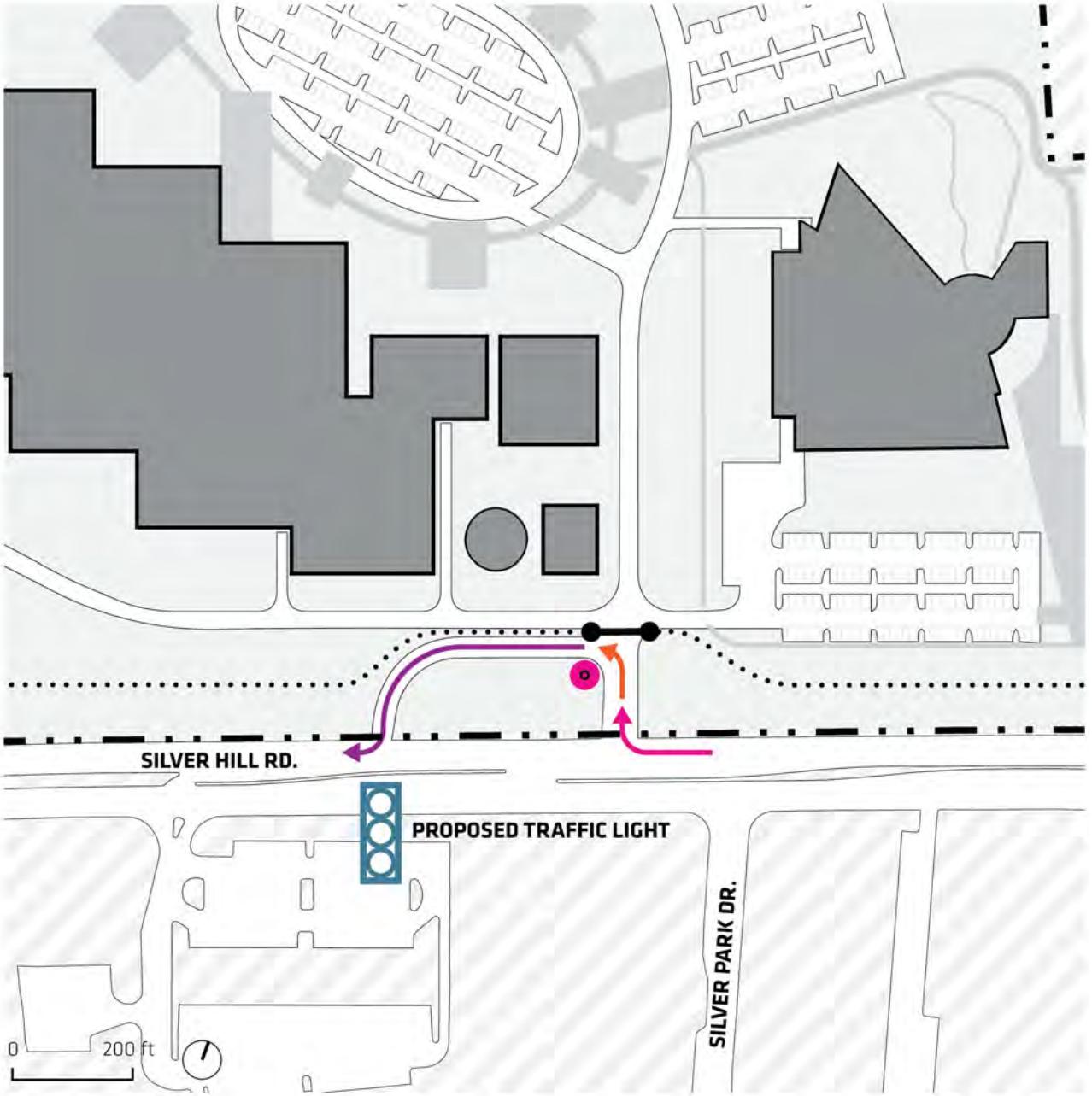


Figure 3-29: Alternative Entrance Vehicle Circulation Diagram

20-Year Site Development

As the Master Plan will be developed over a course of four decades, the project team devised a 20-year site plan. The SCC campus will be a development in progress, as it has always been. Large areas of landscape and site infrastructure improvements will have occurred, and several of the structures proposed in the Master Plan will be constructed in twenty years.

Approximately half of the Garber buildings will have been demolished, and the SCC campus will grow approximately 626,000 gsf and house 1.9 million gsf of facilities.



Figure 3-30: Axonometric View of SCC Campus in 20 years

- Existing / Planned Buildings
- New Development - Collections / Non-Collections
- New Development - Internal Circulation
- New Development - OPS/OFMR
- Primary Vehicular Access
- Pedestrian / Emergency Vehicular Access
- Parking
- Loading Zone
- Vehicular Circulation
- Primary Building Entrance
- Pedestrian Circulation
- Fence line
- Woodland
- Bioretention Zone

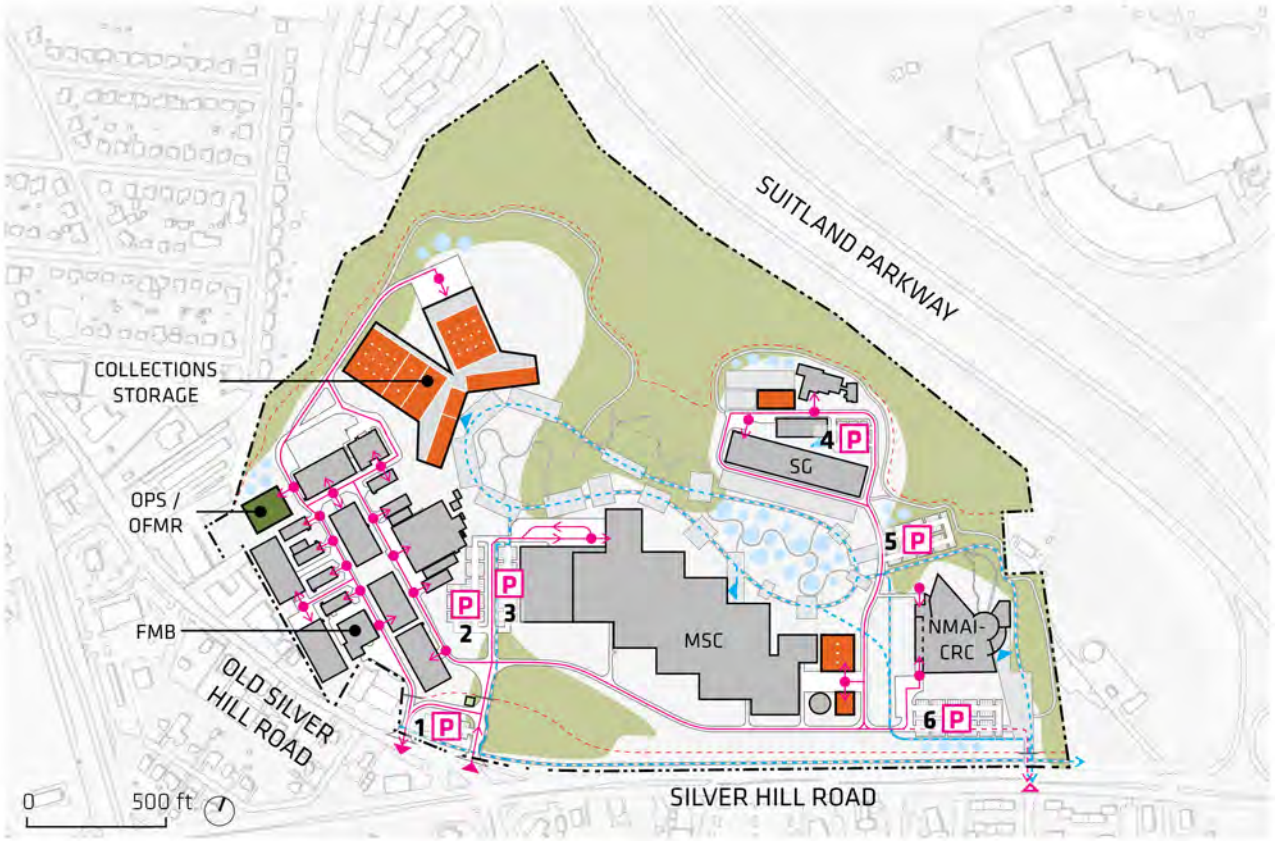


Figure 3-31: 20-Year Site Development Plan

#	CAPACITY	TOTAL
1	30	
2	80	
3	50	
4	48	
5	70	
6	104	
	PROPOSED PARKING	**382**

Figure 3-32: Table: Proposed Parking Supply for 20-Year Development

Parking

The NCPC Transportation Element requires a parking ratio of 1:1.5 (1 parking space for every 1.5 employees) with a desired reduction in parking to a ratio of 1:2 (1 parking space for every 2 employees) over the course of the 20-year master plan for suburban facilities. With a non-auto driver mode share of 47%" on the SCC campus already, the Smithsonian is committed to striving for the 1:2 parking ratio goal over the 20-year master plan for employees.

However, with the location of the campus on an endline Metrorail station, and the distance between the station and the campus facilities, there are challenges to providing a reduced parking ratio. Furthermore, given the varied nature of the types of vehicles/users on the campus, parking must be considered differently for different users.

The Smithsonian plans to provide more access to the campus through scheduled public events and lectures, school trips, and with the increased collections space, it is likely to see an increase to its existing visiting researcher activity. These types of uses cannot be lumped in with employee parking because they typically result in short-term peaks in demand, and with the distance to transit, are likely to be more auto based. Some visitors come from outside the DMV region

Therefore, the Smithsonian will utilize a parking ratio of 1:1.5 (1 parking space per 1.5 visitors) to be in line with the NCPC Transportation Element but also provide the Smithsonian with the flexibility it needs to accommodate visitor activity.

Finally, the Smithsonian stores and maintains SI fleet vehicles and other mobile equipment (lifts, snowplows, golf carts, etc.) on the SCC campus; thus, parking will be required for these vehicles. Parking for this equipment will be provided at a 1:1 ratio considering an anticipated increase in fleet vehicles and equipment that is in line with the anticipated population growth. In order to determine the number of parking spaces that would be included in the Master Plan, the Smithsonian evaluated the actual utilization of each type of parking (ADA, employee, visitor, and SI fleet vehicle/mobile equipment) based on the utilization counts described in Section 2.2 of the TMP. Figure 3-32 includes the breakdown of parking to be provided for the 20-year site development of the SCC campus. The calculations are based on the following evaluation:

- ADA Parking: Maintain the existing parking spaces (18). Although this number exceeds ADA requirements for total parking, the parking provided on the site will be divided into separate lots, each requiring its own minimum number of ADA parking spaces. Furthermore, with an anticipated increase in employee and visitors, the number of ADA parking spaces should not be reduced over what is being currently provided.

- Employee Parking: Parking provided at a ratio of 1:2 (1 parking space for every 2 employees).

- Visitor Parking: Parking provided at a ratio of 1:1.5 (1 parking space for every 1.5 visitors).

- SI Fleet/Mobile Equipment: Increase proportionately to the increase in employees over 20 years.

The parking supply proposed for the 20-year horizon is 382 parking spaces, 47 fewer parking spaces than exist today. This will allow the Smithsonian to meet the 1:2 parking ratio goal for employees, a 1:1.5 ratio for visitors, and to provide additional parking for SI fleet vehicles.

The amount of parking needed will be assessed throughout the duration of the Master Plan implementation to ensure that the site is not overparked. Thus, with the anticipated changes to the transportation landscape in the coming years, a 40-year parking projection was not made in the Master Plan.

Transportation Needs and Opportunities

TMP recommendations for the 20-year timeframe include:

- **Provide a bike rack on the shuttle**

  Some survey respondents requested the ability to take their bicycles on the SI shuttle when commuting. Since the Metro prohibits bicycles on trains during peak periods, allowing them on the shuttle would optimize its use.

- **Provide a shuttle stop at Suitland Metro station**

  The current sidewalk connection to the Suitland Metro station was noted as a barrier to transit use by some survey respondents. A shuttle would help eliminate employee safety concerns and reduce the travel time it would take to use the Metro. The infrequency of the shuttle remains a hindrance, however.

- **Provide pavement markings and signs to identify crosswalks on the Suitland Parkway ramps**

  High-visibility crosswalk guides and vehicle yield signs would increase pedestrian safety when crossing from the Metro to get to the SCC and reduce the width of the current 100' plus wide curb cut for the NPS maintenance driveway as recommended also in PGC plan for improving Green Line access.

- **Provide a pedestrian and bicycle-friendly path along Silver Hill Road.**

  Constructing a well-lit path along Silver Hill Road separated from the street and wide enough for cyclists and pedestrians would make it more attractive to both.

- **Provide bicycle storage on the SCC campus as well as at the Suitland Metro station.**

  Providing bicycle lockers for Smithsonian employees would encourage Metro use by providing the "last mile" connection to the campus. The Smithsonian could coordinate with a bike share or electric scooter provider.

- **Provide earlier, later and more frequent shuttle service.**

  Some employees who work during regular business hours felt the shuttle schedule was inadequate. By instituting earlier and later runs, as well as providing more frequent service, particularly during peak travel periods, more employees would use it.

- **Establish real-time shuttle information system.**

  Several employees complained the shuttle frequently runs late, and they had no way of knowing its status. A real-time shuttle information app would alleviate this problem.

- **Provide carpooling information and support.**

  Some respondents indicated their willingness to join a carpool to commute to work. The Smithsonian could engage RideSmart to provide on-site transportation fairs and ride matching services.

- **Provide on-campus electric scooters and carts, and bicycles at kiosks near building entrances.**

- **Encourage installation of electrical charging stations for employee and Smithsonian vehicles at all new or renovated parking lots.**

- **Design the SCC campus with visually engaging and extensive pedestrian paths of porous pavement.**

Development Footprints and Building Heights

When fully constructed, the proposed development will occupy a larger footprint than the existing buildings on the SCC campus.

The diagrams on the right compare the building footprints of the 1993 Master Plan and this Master Plan superimposed over the existing building footprints at the SCC.

The 1993 Master Plan recommended several 8-story structures with the roofs of buildings approaching 400' above sea level. The roofs of the proposed buildings of this Master Plan will reach approximately 340' above sea level.



Figure 3-33: Superimposed Site Plans: 1993 Master Plan + Existing Conditions



Figure 3-34: Superimposed Site Plans: Proposed Master Plan + Existing Conditions

Site Sections: 1993 Master Plan & Proposed Development



Figure 3-35: Key Plan: 1993 Master Plan

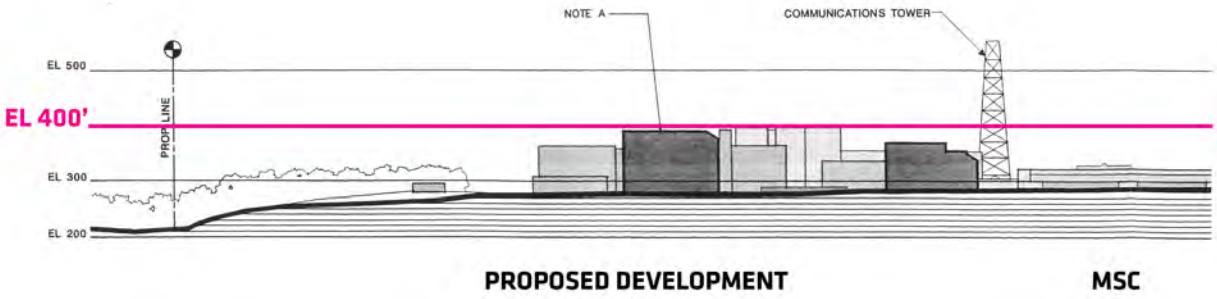


Figure 3-36: Proposed Development Site Section F-F Looking East

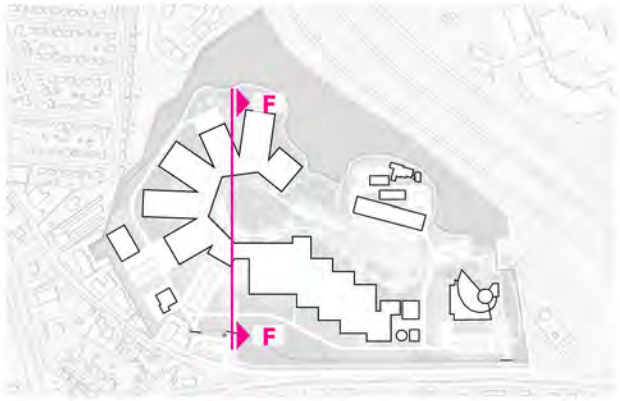


Figure 3-37: Key Plan: Proposed Development

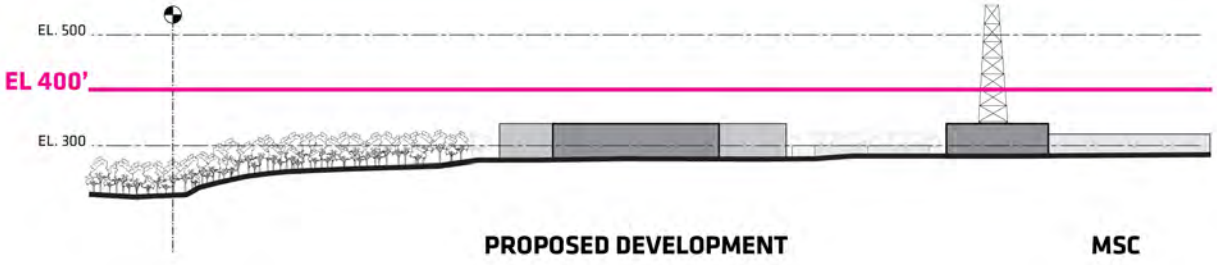


Figure 3-38: 1993 Master Plan Site Section F-F Looking East

Views from Suitland Parkway

The project team visited the SCC in May 2017 and December 2018 to survey the views of the site from Suitland Parkway, Silver Hill Road and from the residential neighborhood to the west of the SCC. The timing of the trip provided an opportunity to see the forest along the parkway with and without leaves.

In both seasons, the dense trees and steep elevation along Suitland Parkway hid the existing structures, as viewed from the southbound Parkway lanes. Visibility simulations on the next page approximate visibility of the structures of the 1993 Master Plan and the proposed development from Suitland Parkway (Figure 3-41 & 3-43).

Visibility of the site from the outside is limited. The campus and buildings will be minimally lit at night, and collections storage spaces have few or no windows. The proposed development should not cast light towards the wooded area between the SCC campus and Suitland Parkway.



Figure 3-39: Visibility Survey Photo 1: Existing



Figure 3-40: Key Plan: Existing Conditions



Figure 3-41: Visibility Simulation of 1993 Master Plan



Figure 3-42: Key Plan: 1993 Master Plan



Figure 3-43: Visibility Simulation of Proposed Development



Figure 3-44: Key Plan: Proposed Development

Views from the Neighborhood

Campus Entrance on Silver Hill Road

The existing entrance on Silver Hill Road near the NMAI-CRC will be upgraded. It will provide access to pedestrians with Smithsonian credentials and will also be used for emergency vehicular access.



Figure 3-45: Rendered View of Proposed NMAI-CRC Entrance

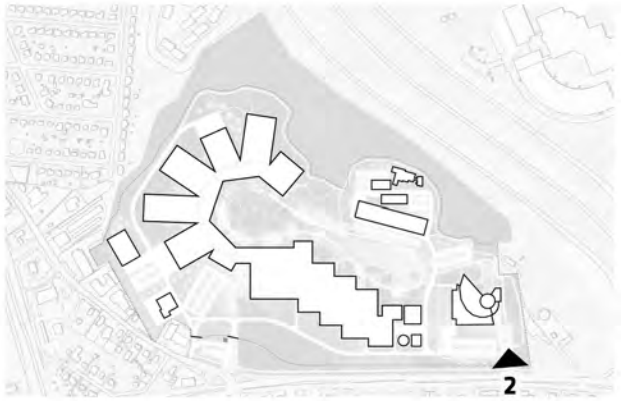


Figure 3-46: Key Plan: Proposed Development

Primary Campus Entrance on Old Silver Hill Road

The primary campus entrance will be near the intersection of Silver Hill Road and Old Silver Hill Road.

There will be a new staffed Visitor Center at this entrance. The other proposed buildings will be located further away than the existing structures of Garber. However, those structures will be three to four stories, reaching approximately 50' and will be taller than the existing storage buildings at Garber. Some of the new buildings will be visible from the road.



Figure 3-47: Rendered View of Proposed Primary Campus Entrance



Figure 3-48: Key Plan: Proposed Development

Lassie Avenue

A densely wooded area separates the SCC and the residential neighborhood west of the campus.

From the intersection of Lassie Avenue and Bonita Street, the existing Garber buildings are visible through the trees in winter. The new development will also be visible in winter.



Figure 3-50: Visibility Survey Photo 4: Existing



Figure 3-49: Key Plan: Existing Conditions



Figure 3-51: Visibility Simulation of Proposed Development



Figure 3-52: Key Plan: Existing Conditions Superimposed with Proposed Development

Phasing and Implementation Plan

Developing the SCC campus to meet the current space needs and future expansion goals of the Institution is inherently challenging and complex.

Phasing plays a critical and intricate role in this Master Plan. The SCC campus will need to be developed incrementally over time, and the development strategy will require some of the Smithsonian's collecting units to relocate within the SCC campus, from other Smithsonian locations to SCC and from SCC to another site.

SCC was identified as the primary collections storage campus to house the Science, Art, Archives & Libraries collecting units, some of which currently reside at SCC.

The SCC campus, when fully developed according to the Master Plan, will house approximately 40% of the Institution's potential new collections space required. To accommodate the remaining 60% of the relocated and future collections space, other sites are needed. A carefully planned development of the two sites will be critical for the success of the Master Plan.

The phasing of the Master Plan can be categorized in three steps: 1) Vacate Garber; 2) Build for current space needs and vacate leased spaces; and 3) Build for expansion.

Step 1: Build new spaces for the collecting units currently housed in the Garber Facility, allowing for those collections to be moved to their new locations at the SCC and/or the other sites, allowing for those facilities at Garber to be demolished.

Step 2: Build spaces for the collections' current needs, including and relocation from leased collections spaces.

Step 3: Build for future expansion at the SCC and other sites to accommodate the projected growth of the collections based on historical growth and interviews with unit collections staff.

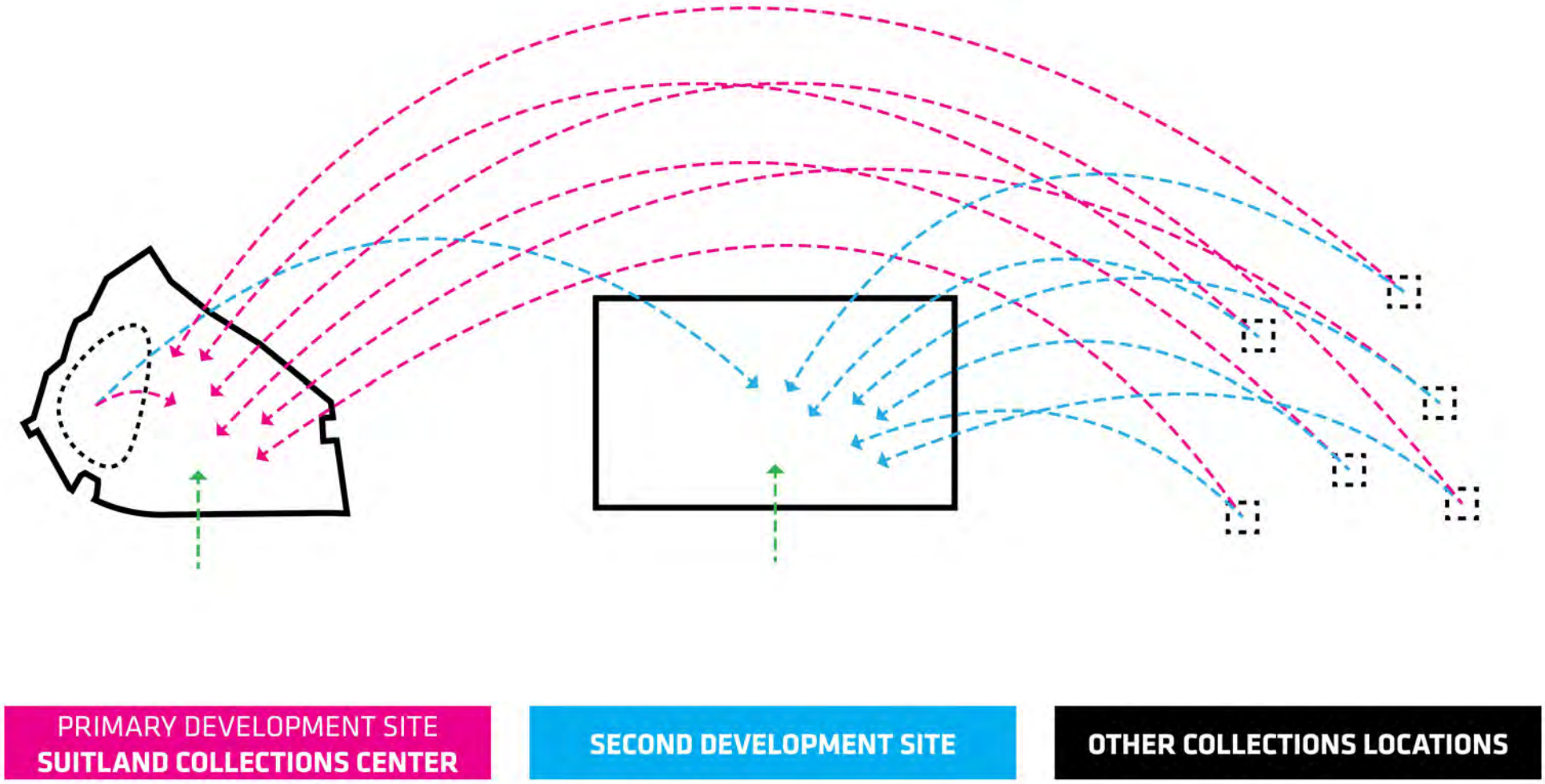


Figure 3-53: Phasing Concept Diagram

Master Plan Steps

Figure 3-54 on the next page describes the sequence of steps to be taken at the SCC and the other development sites under this Master Plan. One of the initial critical steps of the master plan is to vacate the Garber buildings. In order for this to happen, construction of facilities must be realized either at the SCC or the other development sites.

As illustrated in the figure, new spaces need to be built before collections can be transferred and the Garber buildings vacated, which in turn will allow demolition of those buildings. The Smithsonian's currently planned Pod 6 project will allow some of the needed transfers.

Building collections storage spaces at the other development sites will help create areas for development at the SCC. Additionally, relocation of the NASM collections from the SCC to Dulles is a critical step in the success of the Master Plan.

While many of the steps described in the figure need to occur in sequence, some steps could be implemented independently. For example, if new facilities at the other development sites were constructed early in the implementation of the Master Plan, it could allow for more of the collections to be relocated from the Garber Facility, enabling more of the existing facilities to be demolished.

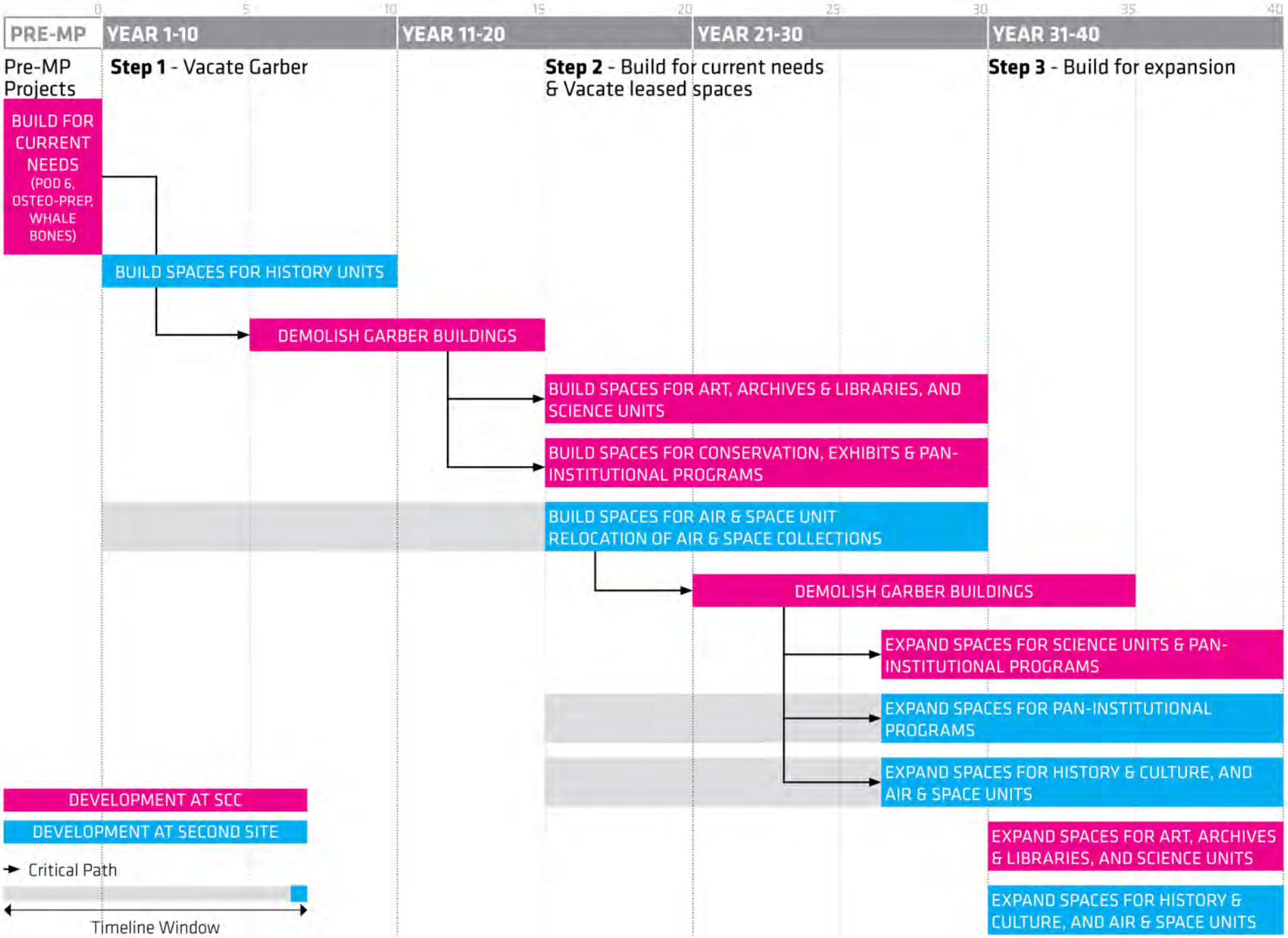


Figure 3-54: Master Plan Steps

Phasing Diagrams

Pre-Master Plan Projects

This phase includes the projects that are currently being planned by the Smithsonian.

0.1 NMAI-CRC renovation & expansion.

0.2 Construction of the new NMNH Botany Greenhouse, adjacent to the SG Greenhouse.

0.3 Demolition of the existing NMNH Botany Greenhouse.

0.4 Construction of Pod 6 and fire protection water tank.

The water storage tank and fire pump will be located adjacent to MSC and connected to the existing 10-inch service fire loop around MSC.

Improvement of pedestrian paths connecting underutilized Garber and NMAI-CRC parking lots is needed to provide better connectivity from these lots to MSC.

Some of the currently planned projects are in development and may differ slightly from the illustration shown in this report.

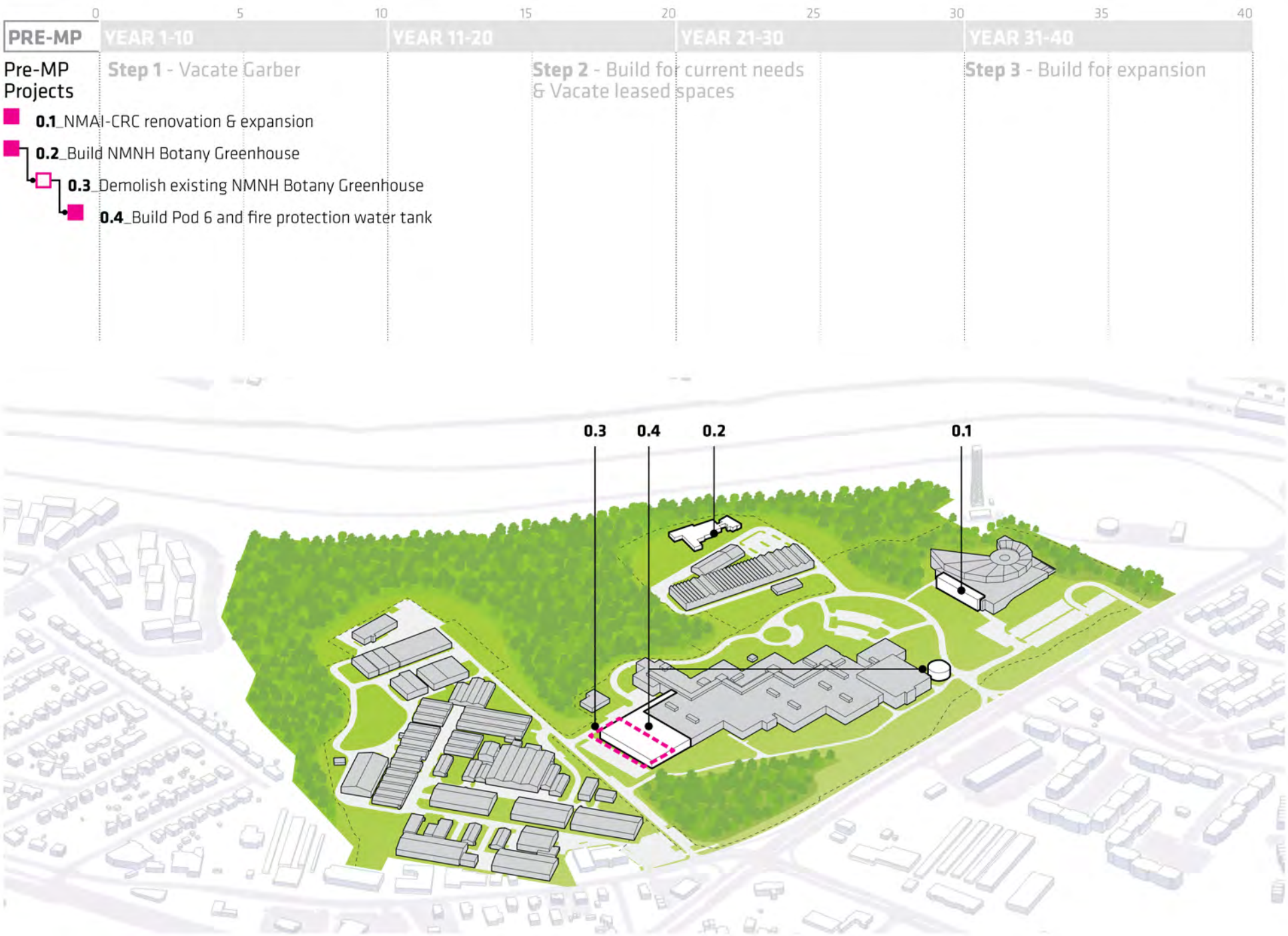


Figure 3-55: Axonometric Diagram: Pre-Master Plan Projects

Phase 1 - New Campus Entrance

The objective of this phase is to reconfigure the entrance condition of the site. The existing campus entrance near MSC will remain operational until the new campus entrance is completed.

1.1 Relocation of collections in Garber buildings and subsequent demolition.

Vacate collections from leased space and relocate to Pod 6. Detailed space allocations in Pod 6 and other planned developments should be verified during design phases of the development.

1.2 Reconfiguration of the existing Garber entrance, including a security gate, staffed Visitor Center, truck turnaround area and a visitor parking lot.

1.3 Construction of a new ornamental perimeter fence along Silver Hill Road at the reconfigured entrance. Also included in this work are sidewalk improvements along Silver Hill Road.

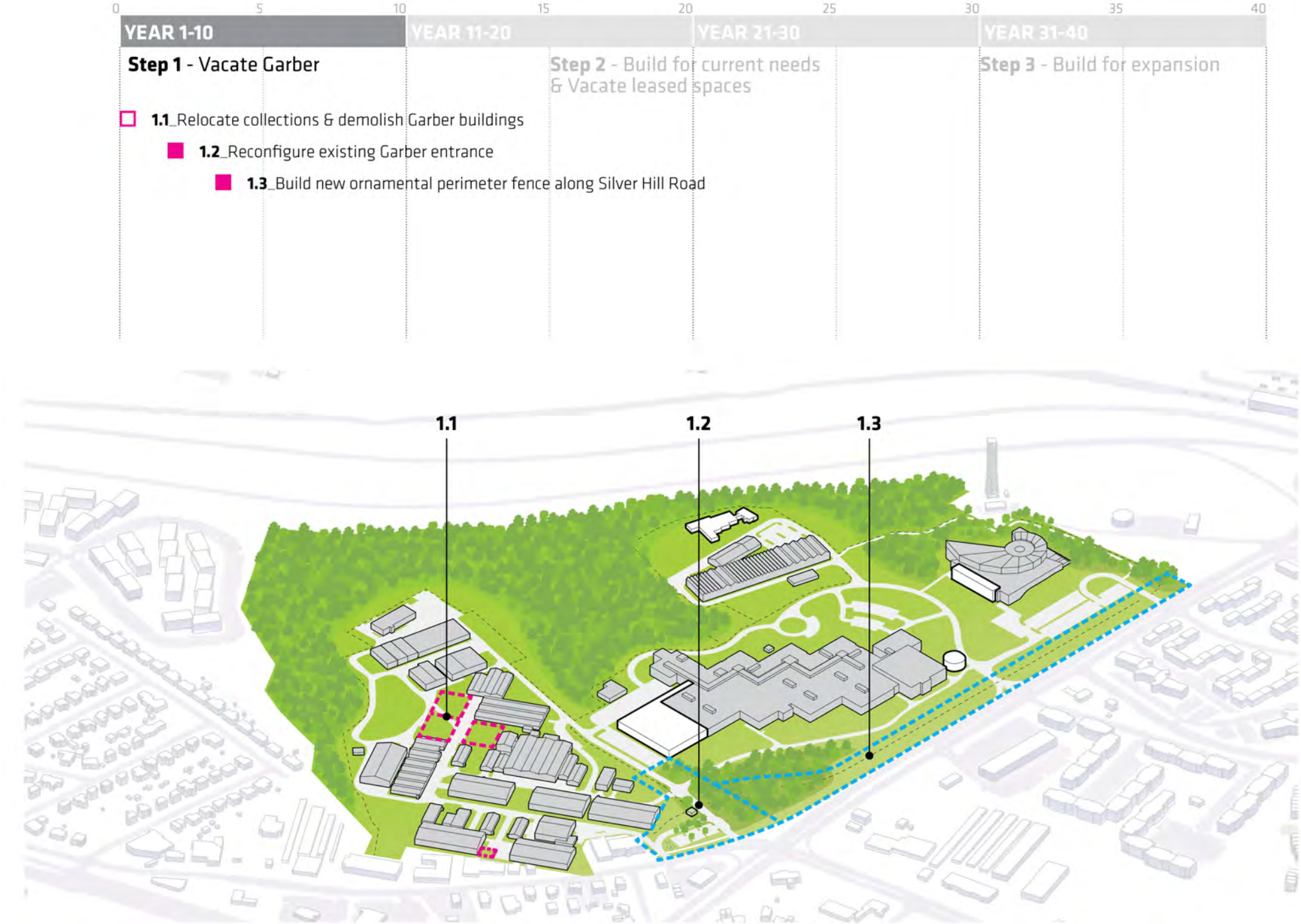


Figure 3-56: Axonometric Diagram: Phase 1

Phase 2 - Relocation within SCC Campus

This phase will include construction of new facilities to house collections that will be relocated within the SCC campus.

2.1 Construction of a new building for the Institution's security (OPS) and facilities management (OFMR).

2.2 Construction of a new building for SG, allowing to vacate buildings at Garber. Construction of SG outdoor storage.

2.3 Construction of Osteo Prep Lab and collections storage near MSC to allow relocation of collections from Garber.

2.4 Reconfiguration of the campus entrance near NMAI-CRC as a pedestrian friendly entrance, also as a secondary and emergency vehicular access point. Installment of pervious surface at the existing parking lot at NMAI-CRC.

2.5 Construction of new parking lot to the north of NMAI-CRC, replacing existing MSC parking with stormwater management landscape at MSC.

Adequate number of accessible parking spaces and paths should be provided to connect parking areas and building entrances.

2.6 Construction of a new back-of-house perimeter security fence along SG Greenhouse.

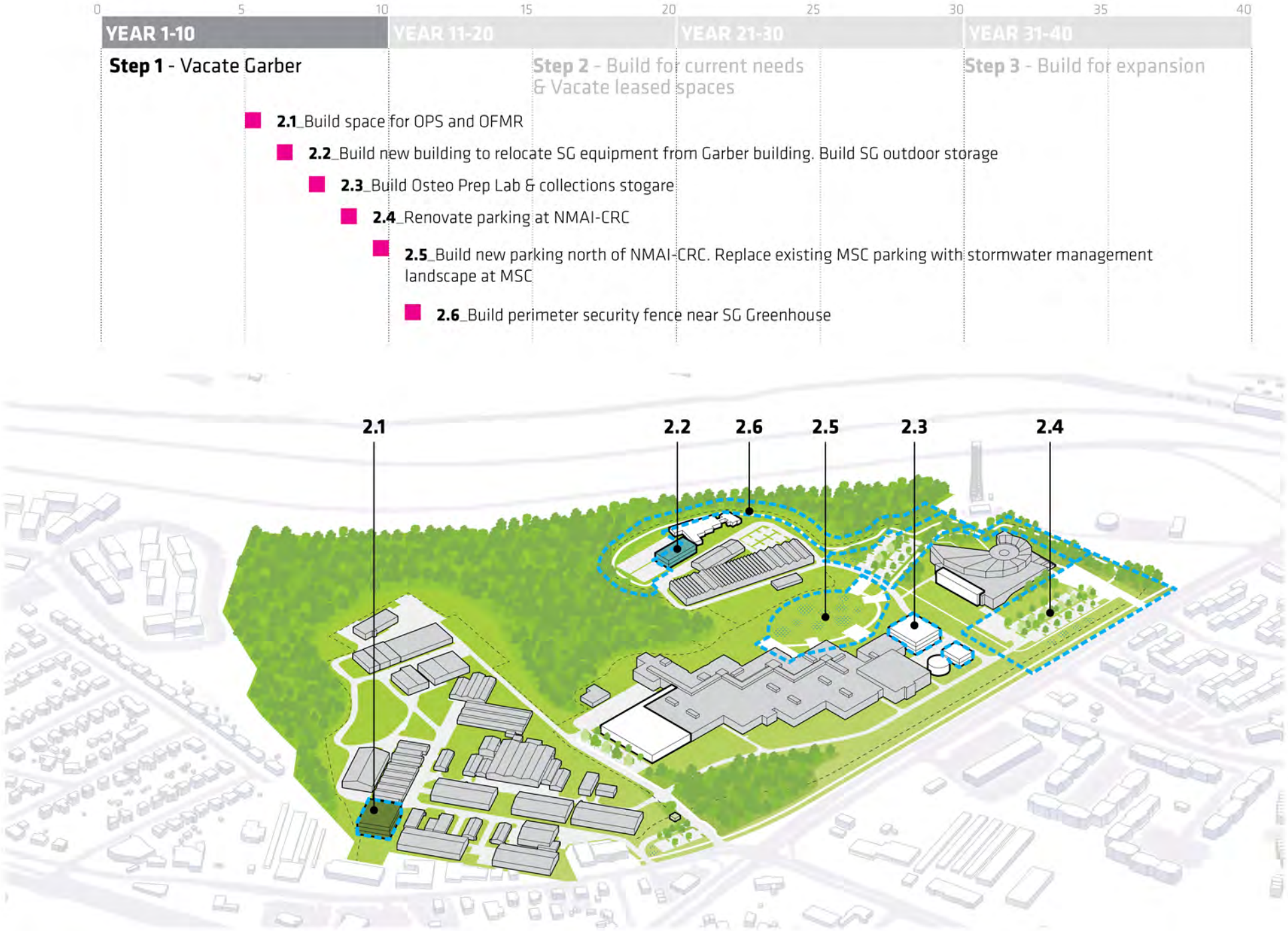


Figure 3-57: Axonometric Diagram: Phase 2

Phase 3 - Garber Demolition and Site Work

Phase 3 involves the demolition of more existing buildings at Garber.

3.1 Relocation of collections, and demolition of Garber buildings.

3.2 Relocation of SG grounds equipment to new building. Relocation of collections to swing space. Demolition of Garber building.

3.3 Relocation of the NMNH marine mammal collections and demolition of the Osteo Prep Lab and Garber buildings 25 & 26.

3.4 Construction of new facility at other development sites for relocation of collections from SCC.

3.5 Relocation of collections and demolition of Garber buildings.

3.6 Landscape work at MSC, including stormwater management and outdoor gathering areas and sculpture display and pathways.

3.7 Construction of the back-of-house perimeter security fence, bordering the new forest trail around SG Greenhouse and along the north end of the campus.

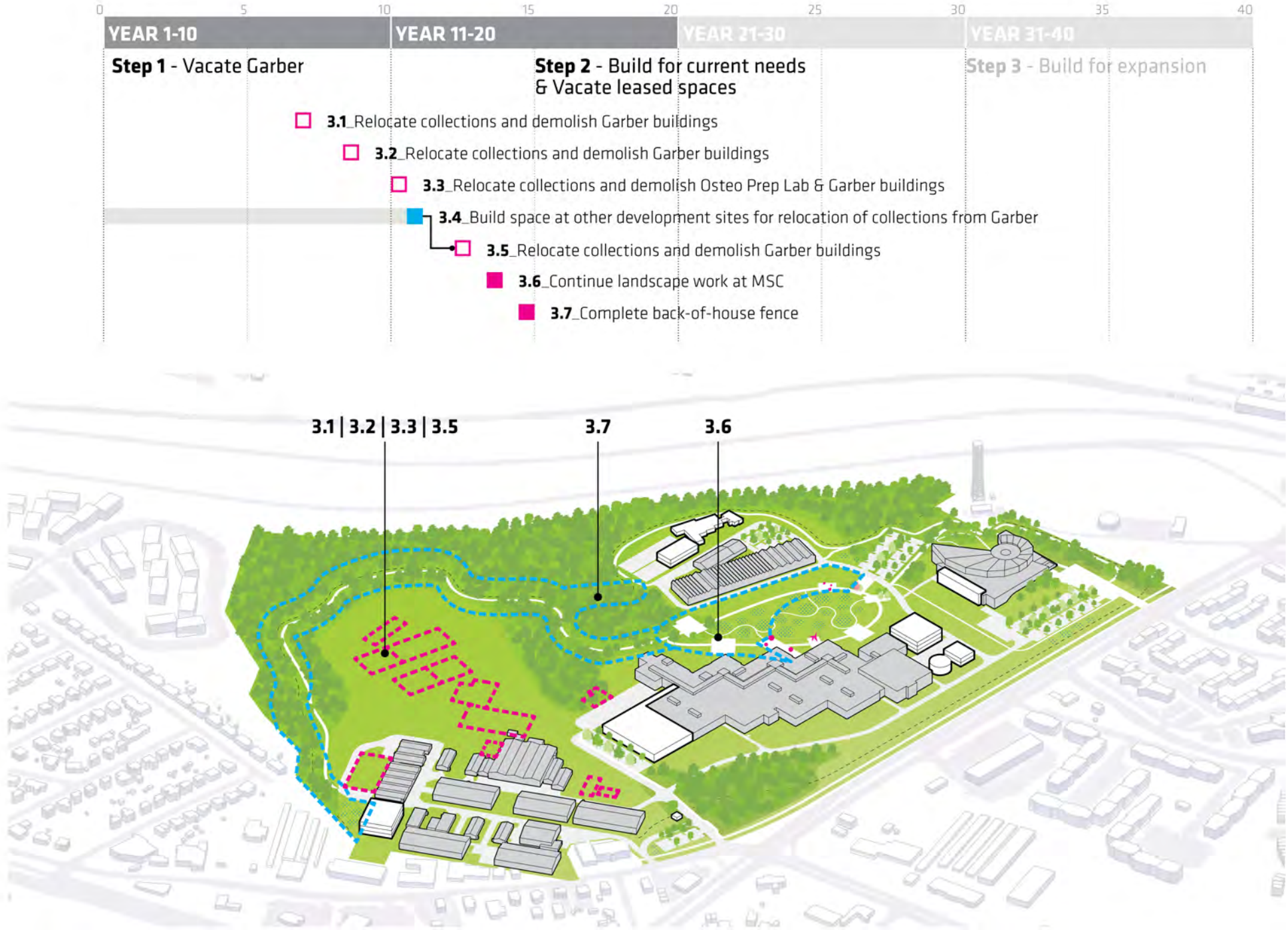


Figure 3-58: Axonometric Diagram: Phase 3

Phase 4 – Construction of New Collections Storage Building

This phase is one of the first steps to build a large collections storage facility at the SCC campus.

4.1 Construction of a new collections storage building. The development will include:

- Loading zone
- Central Utility Plant
- Collections management & storage
- Cold Storage
- Shared amenities
- Site infrastructure (geothermal grid and rainwater collection)
- Temporary parking lot next to Pod 6

4.2 Relocation of collections to the new facility, vacating leased facilities.

4.3 Completion of the landscape work at MSC which expands to become the Campus Quad, connecting the new development to the rest of campus.

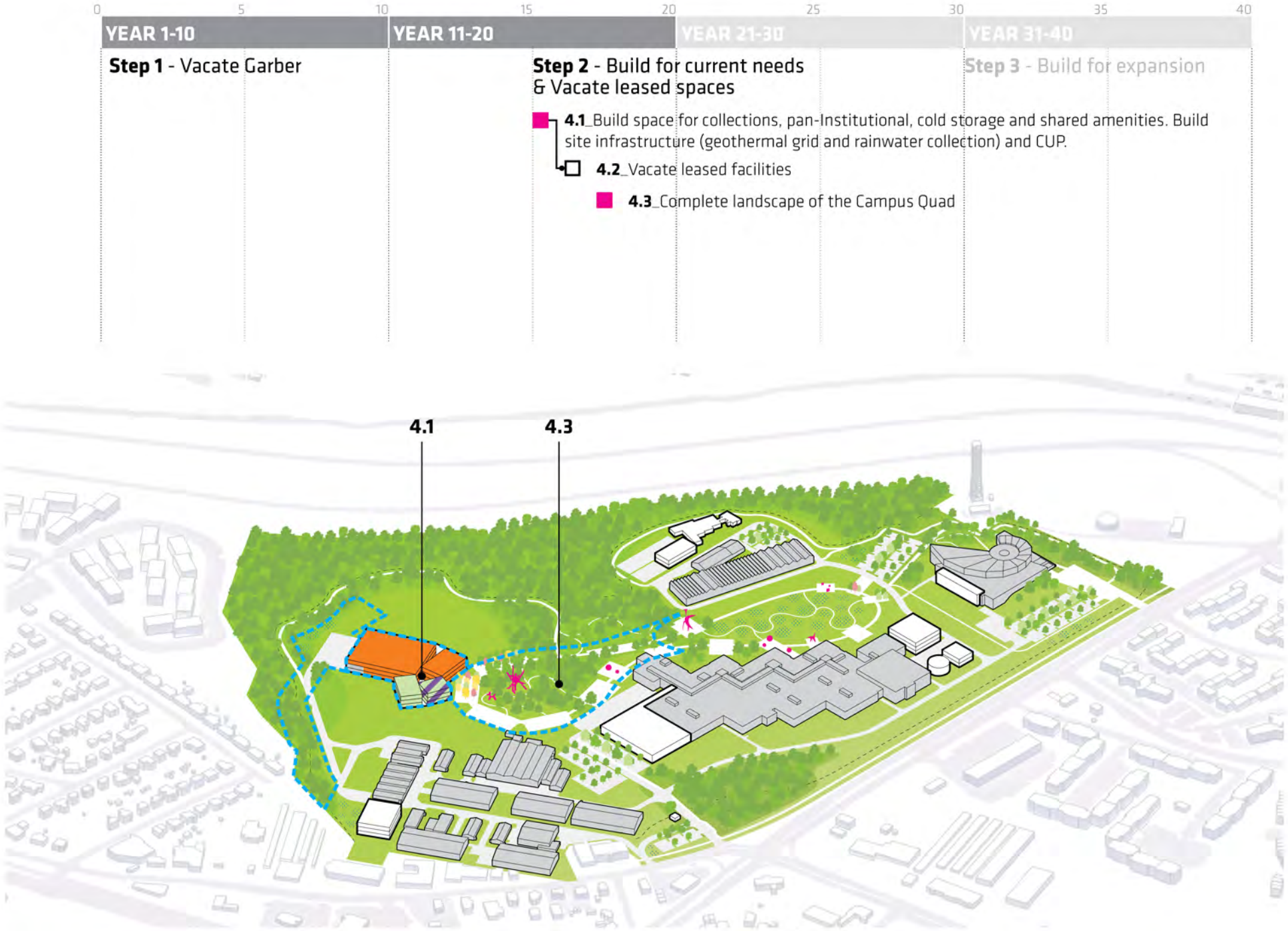


Figure 3-59: Axonometric Diagram: Phase 4

Phase 5 – Additional Collections Storage

In this phase, additional collections storage modules are added, expanding the footprint of the new development.

5.1 Construction of additional space for collections storage.

5.2 Construction of additional space for pan-Institutional cold storage and nitrate storage, support spaces and shared amenities.

5.3 Construction of collections storage.

5.4 Vacating of leased facilities.

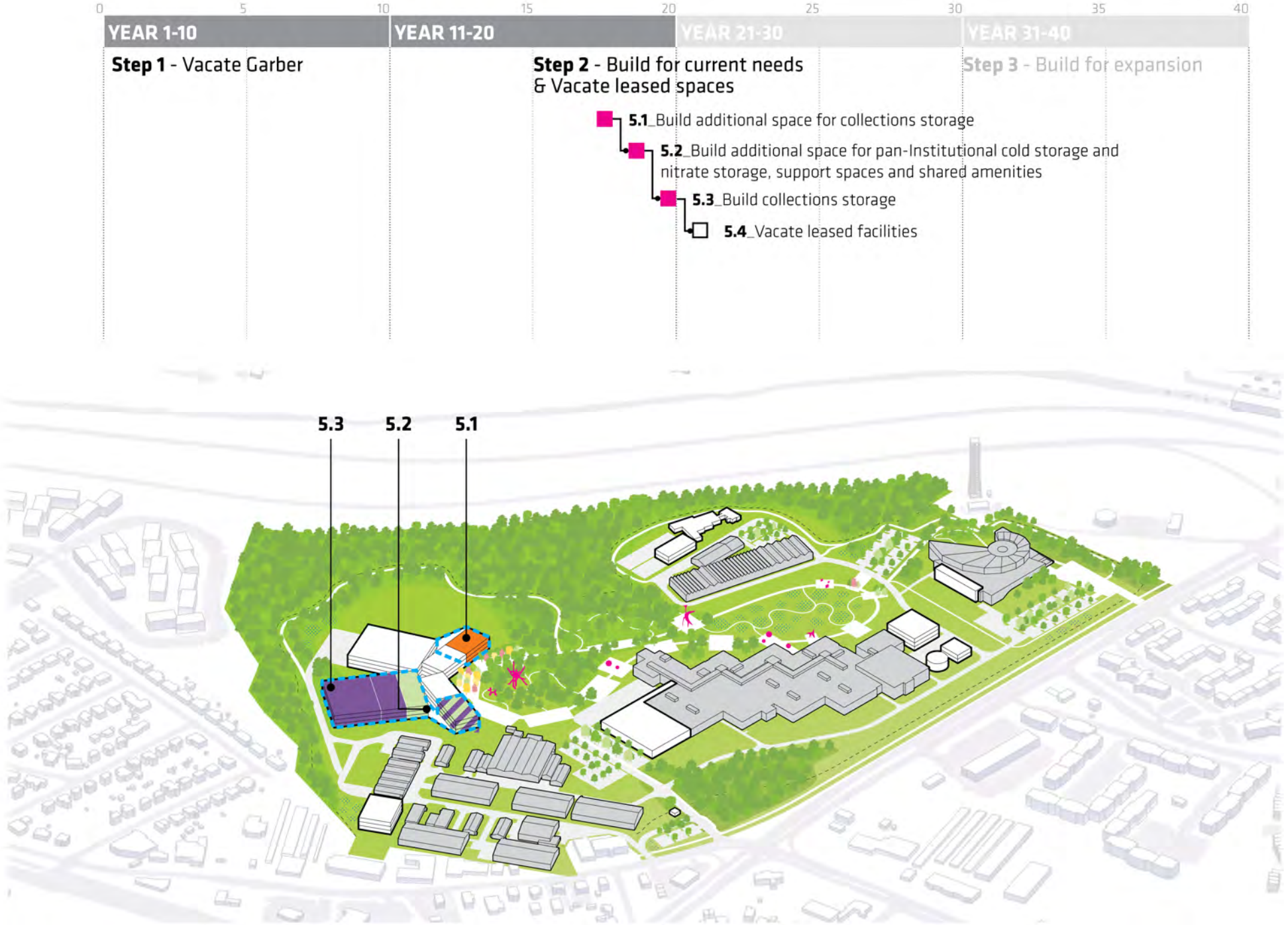


Figure 3-60: Axonometric Diagram: Phase 5

20-Year Implementation Plan

Although the SCC campus will be fully developed over the course of approximately 40 years, the Master Plan identified a 20-year implementation plan that includes up to Phase 5 of the Master Plan since projection beyond this timeframe is challenging.

The first several projects of the Master Plan will be geared toward site improvement, including campus entrance, perimeter security, stormwater management, landscape and site infrastructure such as geothermal wells and rainwater collection.

The site plan on the right shows the SCC campus layout in approximately 20 years and the chart on the next page lists the projects to be implemented over the 20-year timeframe.

Part of this 20-year plan will require development of facilities at the other development sites to accommodate relocation of collections from Garber buildings which will enable demolition of those vacant buildings to make way for the new development.

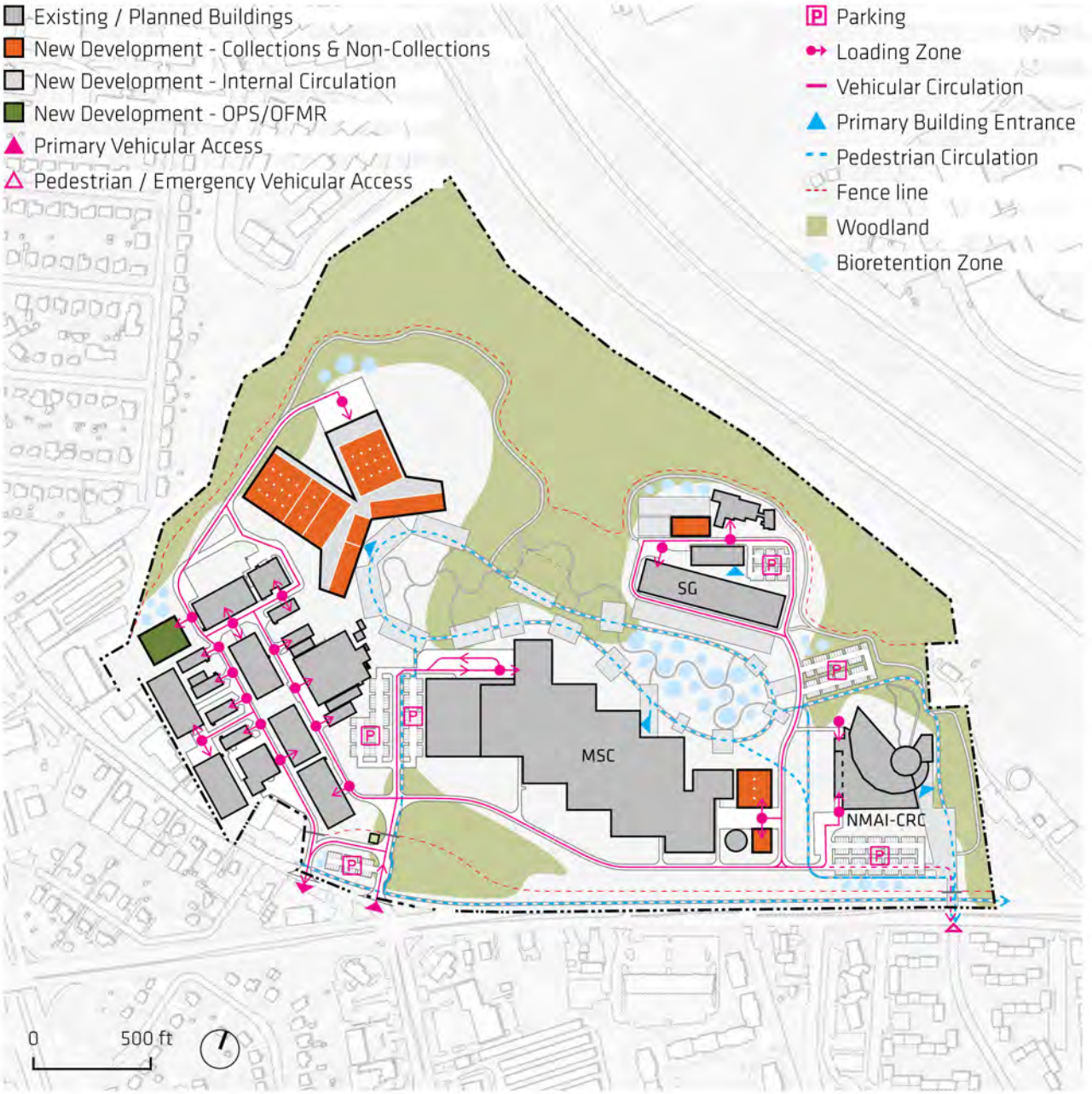


Figure 3-61: SCC Campus Plan in 20 Years

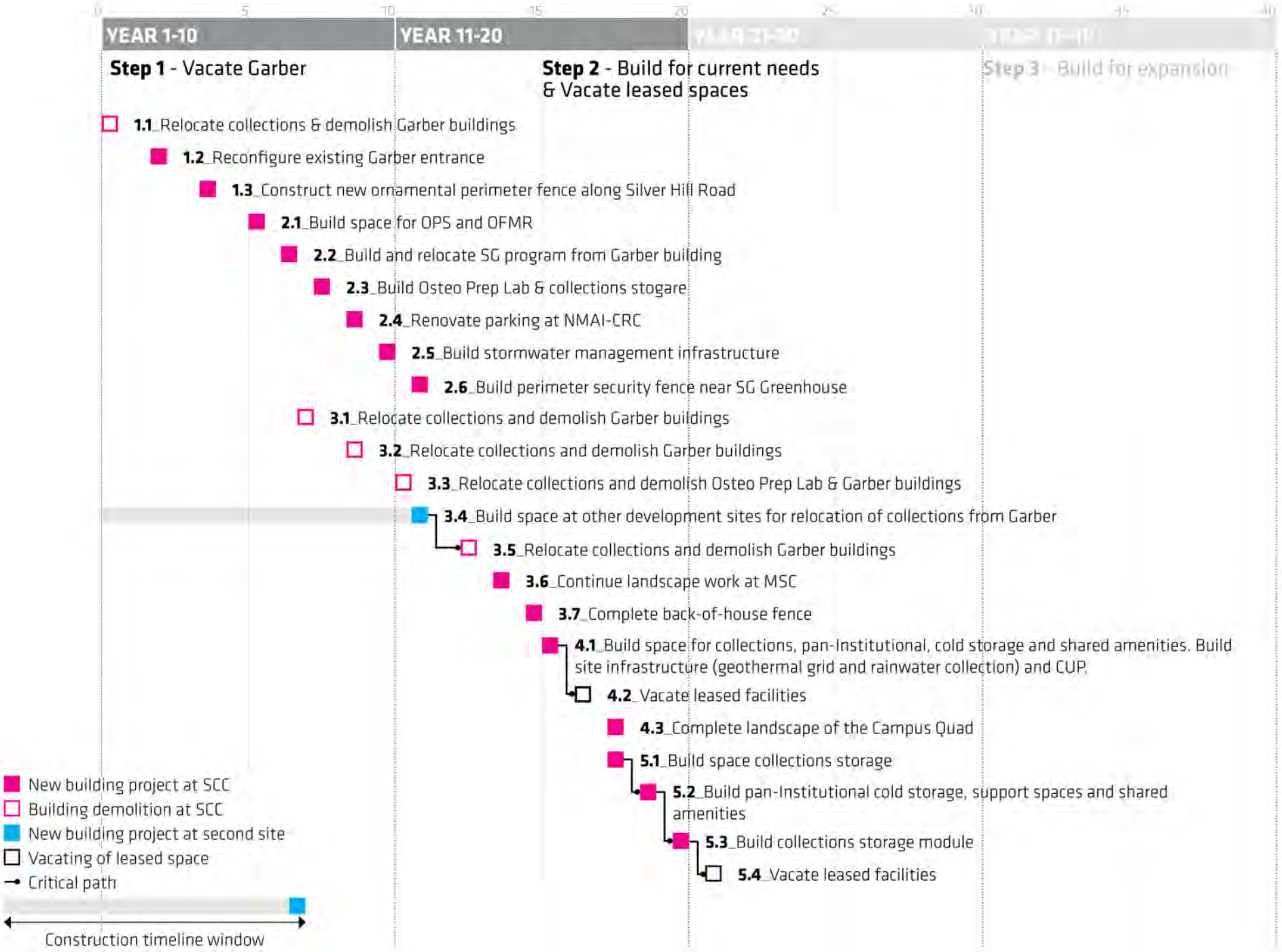


Figure 3-62: SCC Development Projects over 20 Years

Design Guidelines

Building Organization

The new development of the Master Plan is organized around a central campus quad and will physically connect to the existing MSC.

As defined by the Smithsonian's Collections Space Framework Plan, the square footage for a single collections storage space should be limited to 30,000 gsf to minimize the risk of fire and smoke damage to collections.

The collections storage buildings will be developed in modules, and will continue the Street, the internal circulation spine between collections storage and workspaces. Each building module will be three- to four-stories tall in order to minimize the footprint while avoiding high-rise construction.[1]

By placing the collections storage spaces on the outer perimeter, the Master Plan provides the flexibility to add modules or extend existing modules as needed over time.

The location of certain spaces within the site plan are based on their security requirement. Spaces with public use are oriented towards the main entrance of the campus.

Collections spaces will be the most restricted and tightly controlled program spaces on the SCC campus.

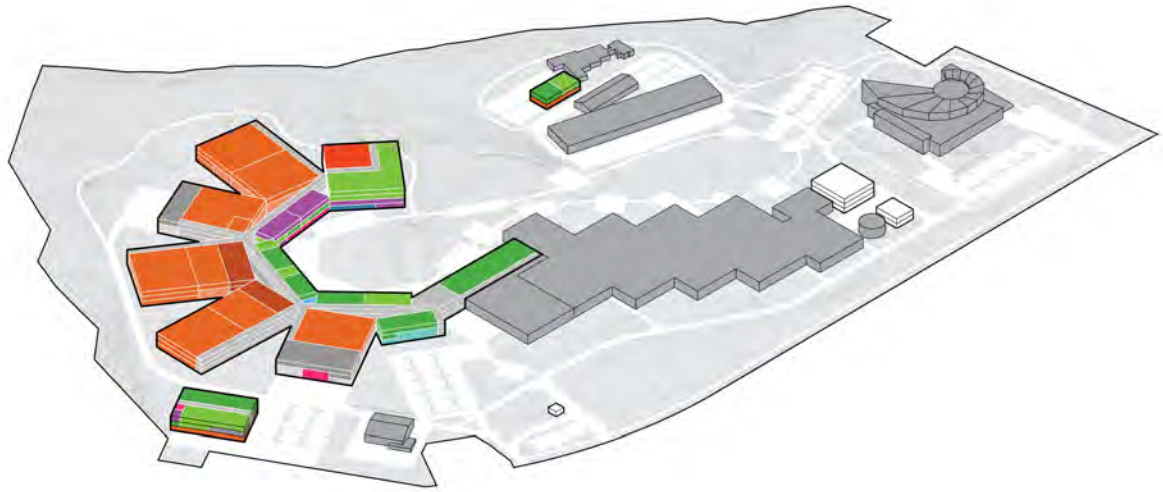


Figure 3-63: Building Space Organization Diagram

1 The Smithsonian defines high-rise construction as having upper occupied floors no more than 70' above lowest level of fire emergency vehicle access.

The diagram on the previous page illustrates the general programmatic organization of the proposed development.

The building module will be designed with a 16-foot floor-to-floor dimension, resulting in a 48' tall for three-story or 64' tall for four-story structure. The building module can also include double story space which would create a 29-foot "high-bay" collections storage space.

The diagrammatic building section on the right (Figure 3-64) shows the sectional organization of the collections storage space and workspaces, based on the recommendations from the Collections Space Framework Plan.

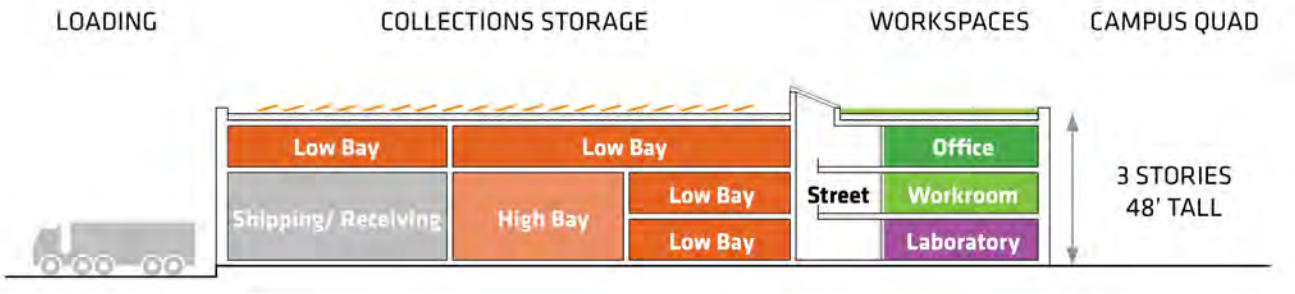


Figure 3-64: Diagrammatic Building Section A-A



Figure 3-65: Key Plan

Design Guidelines

Fire and Life Safety

Fire protection is governed by multiple codes with enforcement by Smithsonian OSHEM. Generally, the most stringent regulations will apply.

The IBC strictly controls user group occupancies, height and areas of non-separated, mixed-use buildings. Egress requirements and other special occupancy requirements will be in accordance with NFPA 101, The Life Safety Code. Fire and smoke barriers will comply with IBC, NFPA and the Fire Protection & Life Safety Design Manual.

Specific fire barrier wall requirements per Fire Protection & Life Safety Design Manual for the SCC campus are described below:

- Collections storage should be separated from all other areas with minimum 2-hour fire-rated walls, and barriers should also be constructed as smoke barriers.
- The 2-hour minimum separation is required for both horizontal and vertical separation of collections. Higher fire ratings may be required depending on the materials stored and hazard presented, as determined by OSHEM.
- An example of the above is MSC, which includes 4-hour fire barrier walls separating each pod and 3-hour exterior fire barrier walls. The 3-hour exterior walls and 4-hour pod separation walls meet or exceed both NFPA 101 and IBC for exterior wall, occupancy separation and building fire separation distance based rating requirements for any occupancy (as required in IBC Tables 601 and 602; NFPA 101, Chapter 6, 8 and occupancy chapters), providing an additional level of fire protection for the collections and the adjacent spine, laboratory, workspace, people and building support spaces.
- Wet collections storage spaces that utilize alcohols and other preservative agents require more stringent fire protection.

Sustainable Design Plan

The Master Plan aims to reduce the environmental impact of the development by incorporating multiple strategies into the construction and maintenance of the campus. Key strategies proposed for the SCC are shown in Figure 3-66, including the stormwater management, water conservation, heat island reduction, energy efficiency, and resiliency measures that define environmental stewardship.

The Smithsonian follows the requirements of Executive Order 13834 Efficient Federal Operations and has a strong commitment to sustainability.

Smithsonian Institution Sustainability Goals

Greenhouse Gas Emissions

- Track Scope 1 and Scope 2 greenhouse gas (GHG) emissions reductions relative to FY 2008 Baseline.

Facility Energy Efficiency & Measures/Investment

- 30% reduction in building Energy Use Intensity (EUI) from FY 2003 Baseline.
- Achieve a reduction in EUI from the prior year.
- Complete EISA 432 energy efficiency evaluations for more than 90% of buildings every four years.
- Use performance contracting to achieve energy, water, building, and infrastructure goals.

Renewable Energy

- Offset at least 7.5% of the total electricity through renewable electricity.

Fleet Management

- 20% reduction in petroleum use compared to FY 2005 Baseline.
- Achieve a reduction in GHG emissions from the prior year.

Water Efficiency

- Minimum 20%reduction in potable water use intensity from FY 2007 Baseline.
- Reduce potable water use intensity from the prior year.

High Performance Sustainable Buildings & Sustainable Acquisition

- Meet sustainable building criteria in Guiding Principles or third-party building sustainability certification for at least 15 percent of building gross square footage (GSF).
- Increase percentage of building GSF meeting sustainable building criteria annually.
- Increase percentage of sustainable acquisitions (recycled content, biobased materials, Energy Star appliances, etc.) annually.

Stormwater Management

- Implementation of green infrastructure and stormwater best practices.
- Meet the Municipal Separate Storm Sewer System (MS4) Permit goals.

Waste Reduction

- Divert 50% of non-hazardous waste from landfill disposal.
- Divert 50% of construction and demolition debris from landfill disposal.

Resiliency

- Incorporation of climate-resilient design and management elements.

Energy and Thermal Comfort

Implementing passive energy strategies like well insulated high-performance building enclosures and programs will reduce heating and cooling loads of the new buildings at the SCC. The following should be considered for building design:

- Grouping collections by space conditioning criteria will help save energy.
- Installing photovoltaic panels on collections storage roofs will provide on-site renewable energy.
- Well-insulated building envelopes with infrared-reflecting glazing will reduce heating and cooling loads, and enhance occupant comfort in work areas.
- Design of collections storage spaces should aim to minimize energy use while providing required environmental conditions.

Resiliency and Adaptability

For the SCC to be a resilient and adaptive campus and able to override electricity outages due to natural or man-made disasters, the Smithsonian aims to implement a resiliency plan that addresses energy, water, damage and safety.

To minimize the impact of energy brownouts and blackouts, Passive Survivability strategies should be employed in addition to automatic generators, on-site photovoltaics, battery storage and water reuse systems.

As storms grow stronger because of climate change, storage facilities must be purposefully designed to safeguard the collections.

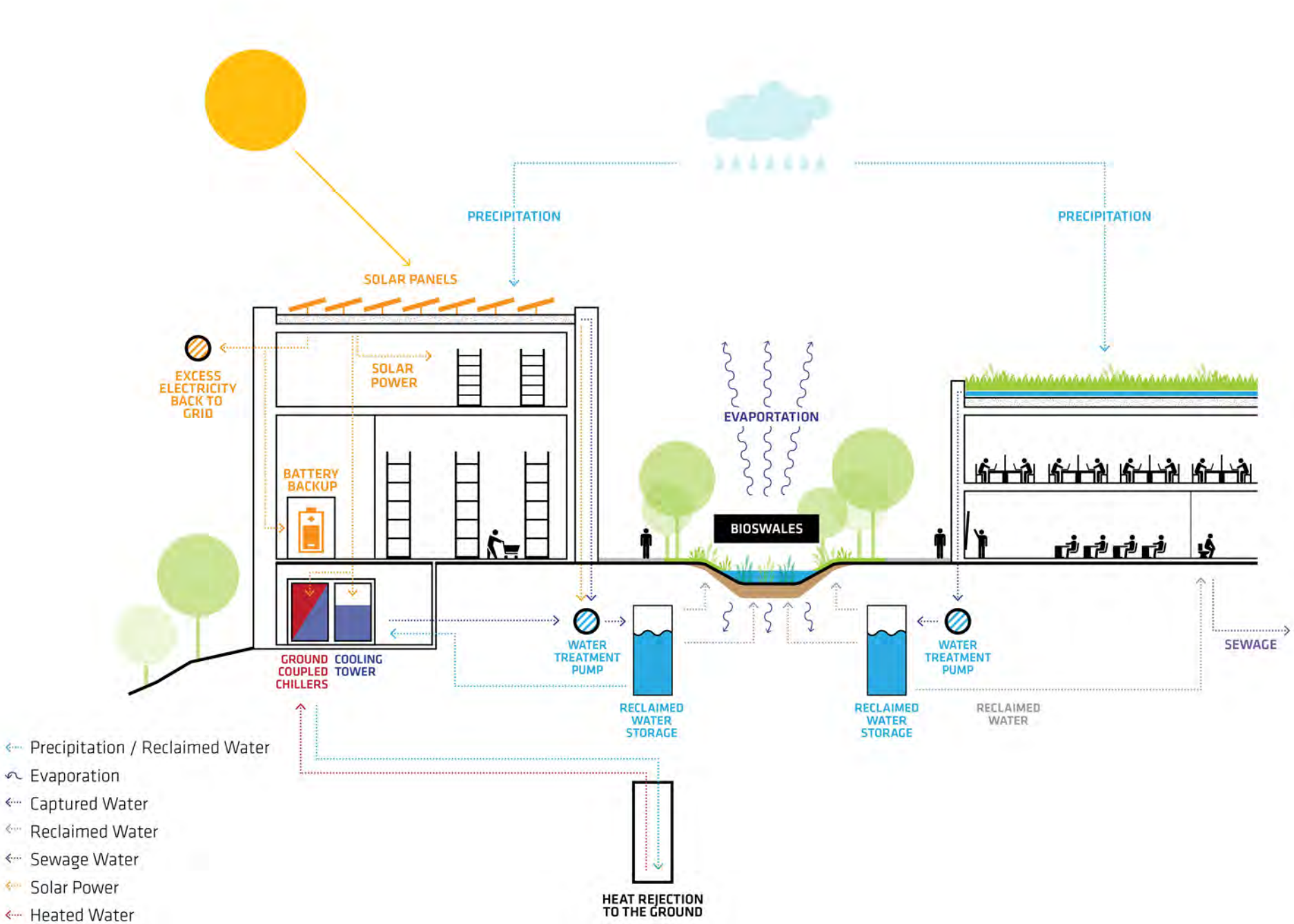


Figure 3-66: Sustainability Strategy Concept Diagram

Landscape Plan

The SCC campus will be developed with a unified landscape that promotes a healthy and inviting outdoor environment with gathering spaces for work and interaction, efficient circulation to each facility and open spaces, and a landscape that promotes nature and the surrounding forest ecology.

Security and building access should be integrated into the landscape plan in an environmentally sensitive way, and future maintenance should be considered in material selection.

The four pillars of landscape strategies of the Master Plan are described on the right:



Gathering and functional spaces

Provide gathering spaces that encourage user interaction and allow communal activities. Identify program and messaging opportunities that celebrate the campus function. Where possible, integrate outdoor sculpture and artifacts from the Smithsonian's collections.



Immersive workspace

Incorporate landscape design elements that offer indoor / outdoor visual connections to nature. Facilitate views of campus open spaces from indoors. Consider seasonal planting for outdoor gathering spaces and pathways. Offer areas of shade, as well as open spaces that allow light. Provide visibility and access to functioning landscape systems such as stormwater management structures, meadow and forest.

Efficient circulation

Support access to buildings and reinforce connectivity through efficient circulation systems. Design roads and pathways to accommodate the people and vehicles that will use them. Evaluate alternative transportation methods through the campus, such as shared bicycles, scooters and golf carts. Provide well-placed benches and wayfinding signage to enhance the pedestrian experience.



Performing landscape

The campus landscape should be beautiful and perform sustainable functions. Open spaces should transition to cultivated landscapes, bioretention ponds and bioswales and meadow grasslands.



Figure 3-67: Illustrative Landscape Plan

Planting Strategies

Planting strategies should make use of the surrounding forest landscape, help establish visual connections to buildings and offer functional gardens and open spaces. The following goals should be implemented into the plant design:

- Increase plant and wildlife species diversity.
- Set canopy goals for each zone of planting throughout the campus.
- Provide a native and diverse palette of plants.
- Develop a reforestation plan that promotes diversity and plant layering (canopy tree layer, mid-level understory tree layer, and low ground cover layer.)
- Preserve and protect the existing forest areas of value.
- Create an invasive removal strategy.
- Carefully transition between various zones of planting.
- Develop ongoing maintenance strategies.
- The new landscaping should be integrated with the CRC landscape while preserving the latter's culturally specific plantings that are an important component of its design.

Soil Characteristics

The soils of the SCC site are comprised of natural soils and fills with a range of bearing capacities. The proposed area for the Master Plan development, where the current Garber facility is located, is comprised of primarily level fills. Some of the other development areas will need to be leveled and require structural infill.

The SCC site is in a region known for slickensides, a condition where the internal friction of the soil drops significantly under certain conditions of moisture content and pressure. This can cause instability during deep excavations and on steeply sloped sites. A study of the proposed site grading and phasing should be undertaken. Approved amendments should be incorporated into future planting.

Structural Considerations

Soils are assumed to be suitable for traditional spread footings with low bearing capacities ranging from 4,000-9,000 psf. Where larger loads are necessary deep or mat foundations will likely be required.

Alternatively, various soil improvement techniques might be considered to increase the bearing capacity of the existing soils in the vicinity of shallow foundations. These might include vibro-compaction, compacted aggregate piers, or chemical injection techniques.

A Seismic Site Classification "E" is assumed based on the available information contained in previous geotechnical studies obtained from the Smithsonian Archives. This must be verified by a geotechnical engineer during design phase.

Forest Preservation

The existing forest will be preserved and enhanced through the selective removal of invasive plants, conservation of existing trees of value, and replanting using materials targeted for the preservation zone.

The function of the forest is to capture and filter stormwater runoff, slope stabilization, improving air quality, control the microclimate, buffer the Suitland Parkway, and support diverse ecosystems.

Conduct an inventory of all existing trees. Determine any risks to the existing tree canopy and establish a management plan. Select trees that are considered mature, native, and in good condition should be evaluated by SI's certified arborist to determine if special maintenance is needed to preserve long-term health. During construction, identify the critical root zone of the trees and provide protection measures.

When trees are removed, or fall, leave standing trunks to contribute to future wildlife when it doesn't pose a safety risk.

Ongoing evaluation of the preservation area should be implemented to ensure the establishment and ongoing protection.



Figure 3-69: Forest Preservation and Restoration Areas



Figure 3-70: Example of a Nature Path

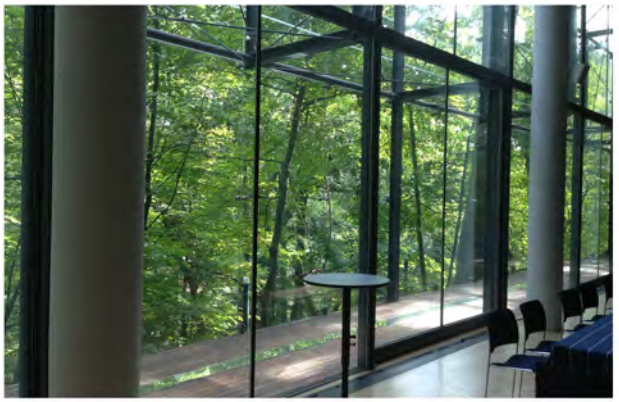


Figure 3-71: Example of an Immersive Workspace

Forest Landscape

The SCC forest is a closed tree canopy that includes understory tree and groundcover species. It includes well adapted plant species that are suited to a variety of conditions. The lowlands and north facing slopes can support planting that prefers more moisture.

To enhance biodiversity, a variety of native species should be added to the forest landscape. The mixture of canopy trees, understory trees, shrubs and groundcover should be maintained. Planting diversity will also reduce the chances that the forest will be destroyed by insects or disease.

Garden and Bioswale Planting

The entrance gateways and amenity spaces should serve as gateways to the natural campus experience. Native species should be selected to provide greater visual impact.

Within the individual plaza gardens and bioswale zones, native species should be clustered to create the planting design for that plaza or area of bioswale. Primary plants should change from garden to garden to promote overall species biodiversity for the site.

Meadows

Grassland and meadow planting should be integrated into open areas to reduce the demand of ongoing maintenance. In addition to grasses, perennial flowers will provide seasonal interest. The meadow areas can also be periodically mowed for flexible programming space when needed and should be offset from the buildings buffered by managed landscape areas.

Lawns

Lawns should be maintained in areas of active use and as a pest management strategy closer to buildings. They should be irrigated using water collected and treated through the water collection system.

Gathering Areas

The campus quad and entry plazas will offer shared amenities, and outdoor workspaces. These spaces should be programmed and designed to support potential outdoor amenities such as:

- Gathering spaces with outdoor sculpture
- Play areas for the day care
- Outdoor café seating areas
- Spaces that can accommodate outdoor workspaces
- Spill over areas for indoor event spaces

Gathering areas should be supported by safety lighting.



Figure 3-72: Proposed Outdoor Gathering Areas



Figure 3-73: Examples of Outdoor Sculpture on Display

Bioswales

Bioswales are designed to capture and filter stormwater runoff. The sides of the bioswale are planted with shrubs and groundcover. During light rain events, retention areas capture and slowly filter the water through the soil medium to be absorbed by the plant materials. During heavier rain, the excess water passes through the soil media layer and is picked up in the underdrain below.

Low Impact Development (LID)

The planting medians within parking lots are used to provide safe zones for pedestrian traffic and serve as planted stormwater collection zones for runoff from the walkways and the parking lot. LID areas should be planted with shade trees, shrubs, and groundcover material that can filter contaminated runoff from the parking areas. Curb cuts should be located to allow flow into the planting areas and splash pads should be incorporated to prevent soil erosion. The shade trees will also reduce the heat island effect often created by hardscape. Overall, the planting of LID areas will enhance the landscape design of the campus.

Permeable Paving

Permeable paving may be incorporated at key locations of the SCC campus landscape to increase stormwater management capacity. The use of permeable paving should be evaluated for ease of maintenance where other stormwater management options are not meeting the requirement.

See Stormwater Management section for additional information.

Setbacks

Planting setback are required to reduce potential issues from roots and branching in areas of activity. Service roads and along pathways and multi- use trails provide a 5ft limited landscape zone of planting that includes low evergreen ground covers, shrubs and perennials. Beyond the 5ft zone begin to integrate mixed stands of canopy and understory trees. Trees can be planted within the zone if root barriers are incorporated into the design.

Maintenance

Extended Maintenance should be a long-term program that includes the observation, and documentation of the landscape performance. Actions should be taken for plant replacements, invasive removal and pest management.

Installation of irrigation and supplemental irrigation systems will allow for the establishment of planting communities. Extended irrigation may be required in areas with higher pavement. Drip irrigation systems are recommended where feasible.

Pruning should only occur to assist with access and visibility as it relates to public safety, and if die back occurs.

Invasive Species

Invasive species have both direct and indirect impact to native plant habitats. They can cause direct mortality by attacking the native species, or indirectly by changing the natural ecosystem, causing native plant's decline. A management plan should be implemented to identify the invasive species and to create a course of action that will reduce and ultimately eliminate the species.

This is an ongoing process, as invasive species can survive due to lack of natural controls. Birds and wildlife can also spread the invasive seeds, and seeds can fall dormant and germinate a for several years after the plant was removed. The management effort of removing invasive plants and introducing natives should be ongoing and periodically re-evaluated.

The management plan should include the type of invasive plants present onsite and visual information on the plant character (male and female) and how they germinate. The implantation plan should include a comprehensive list of each plant, a diagram that maps the location, the phasing approach, lists each species' control measures, and the ongoing approach for final removal.

In many instances, the invasive plant area should be treated multiple times throughout the year. A removal procedure will need to be implemented to avoid further spreading. This could include drying and burning onsite, or packaging and removing to an offsite location suited to properly dispose of the plants. Approved pesticides should be administered through spot spray application vs. broadcast spray.

Suggested Plant List

Mixed forest dominant canopy upland
- Acer saccharum
- Carya cordiformis, tomentosa, ovata
- Catalpa speciosa
- Cedrus atlantica
- Junglans nigra
- Magnolia grandiflora
- Pinus virginiana, strobus
- Populus nigra
- Quercus alba, falcata, phellos, prinus, rubra, stellata, velutina, coccinea
- Tilia americana
- Tsuga canadensis

Mixed forest dominant canopy for moist sites, north facing slopes, low lying areas, bioretention swales:
- Acer rubrum
- Fagus grandifolia
- Quercus bicolor, michauxii, nigra, palustris, phellos
- Liquidambar styraciflua
- Liriodendron tulipifera
- Nyssa sylvatica
- Platanus occidentalis
- Quercus macrocarpa
- Taxodium distichum
- Ulmus americana

Understory canopy
- Amelanchier arobrea
- Asimina triloba
- Carpinus caroliniana
- Cercis canadensis
- Cornus florida
- Crataegus viridis
- Ilex opaca
- Magnolia virginiana
- Sassafras albidum

Understory canopy for moist sites, north facing slopes, low lying areas, bioretention swales:
- Amelanchier laevis
- Asimina triloba
- Betula nigra
- Chionanthus virginicus
- Nyssa sylvatica
- Ginkgo biloba

Understory shrubs
- Dryopteris marginalis
- Gaylussacia frondosa
- Hamamelis virginiana
- Ilex verticillata
- Kalmia angustifolia
- Myrica cerifera, pensylvanica
- Rhododendron maximum
- Vaccinium pallidum
- Viburnum dentatum



Figure 3-74: Example of Mixed Forest

Understory shrubs for moist sites
- Aronia arbutifolia
- Cephalanthus occidentalis
- Clethra alnifolia
- Cornus sericea
- Hydrangea arborescens
- Ilex glabra
- Lindera benzoin
- Myrica cerifera, pensylvanica
- Rhus glabra, aromatica
- Staphylea trifolia

Woodland floor

- Ageratina altissima
- Andropogon gerardii
- Asarum canadense
- Carex pensylvanica
- Chasmanthium latifolium
- Chrysogonum virginianum
- Delphinium tricorne
- Elymus hystrix
- Festuca rubra
- Ferns
- Panicum virgatum
- Schizachyrium scoparium
- Tridens flavus

Meadow

- Schizachyrium scoparium
- Elymus virginicus
- Panicum clandestinum
- Tridens flavus
- Chamaecrista fasciculata
- Coreopsis lanceolata
- Echinacea purpurea
- Rudbeckia hirta
- Verbena hastata
- Heliopsis helianthoides
- Penstemon digitalis
- Liatris spicata

Bioretention ground cover

- Asclepias incarnata
- Chasmanthium latifolium
- Carex stricta
- Hypericum perforatum
- Juncus effusus
- Muhlenbergia capillaris
- Schizachyrium scoparium



Figure 3-75: Example of Meadow



Figure 3-76: Example of Meadow

Stormwater Management

Managing stormwater runoff is crucial to maintaining a sustainable campus. An effective stormwater management plan will employ green infrastructure and low-impact development to reduce runoff volume, improve the quality of the runoff and retain it on site.

On December 13th, 2018, the project team met with the Maryland Department of the Environment (MDE) and discussed the proposed approach for stormwater management.

MDE provided the following guidance:

- To meet MDE Stormwater Management requirements, all improvements shall meet water quality, Environmental Site Design, and water quantity requirements as listed in the Maryland Stormwater Management and Erosion & Sediment Control Guidelines for State and Federal Projects, February 2015.
- MDE recommends that the SCC be designed as an Institutional Stormwater Management Plan according to Section 5.6 of the Maryland Stormwater Management and Erosion & Sediment Control Guidelines for State and Federal Projects, February 2015.
- Stormwater credits of 50% may be earned by removing existing impervious areas. The credits can be stored in a stormwater management bank to be debited in the future.
- Stormwater management (Quantity) and Best Management Practice (Quality) should be designed separately because they will be reviewed separately; however, the credits described in the above bullet point will be kept in the same stormwater management bank.
- Refer to Technical Memorandum No. 10 - SWM Overview and Technical Memorandum No. 11 - MDE Spreadsheets Instructions for additional guidance.

The following stormwater strategies should be considered:

- Install green roofs to mitigate heat island effects and absorb rainfall. Because the Smithsonian prohibits the use of green roofs on buildings storing collections, green roofs should be placed on non-collections buildings.
- Divert stormwater from roofs and impervious areas to vegetated areas where runoff can soak into or filter over the ground. This will reduce the amount of stormwater directed to the storm drainage system and reduce the pollutants delivered to receiving waters. Ensure the site has adequate infiltration and does not pond water adjacent to buildings when utilizing this measure.
- Install micro-bioretention areas throughout the site to provide treatment as close as possible to the source. (Figure 3-77) Design teams will need to coordinate with MDE on size and locations of bioretention areas.
- Install sloped, vegetated bioretention swales (bioswales) next to roads and parking lots to retain and treat runoff. (Figure 3-78)
- Harvest and filter stormwater for reuse in irrigation, flushing and evaporative cooling tower, boiler makeup, etc.
- Install meters with automatic data logging in new and existing buildings to encourage less use of potable water.
- Consider utilizing MDE approved maintenance procedures to fulfill the stormwater management requirements. Examples of maintenance procedures include mechanical street sweeping, catch basin cleaning, and storm drain vacuuming.

MS4 Permit

The Smithsonian has entered into an agreement with MDE concerning the SCC by submitting a Notice of Intent to discharge stormwater under Maryland's new small municipal separate storm sewer (MS4) general permit No. 13-SF-5501. The MS4 permit requires that the SCC perform actions that will reduce the amount of pollution draining to the Chesapeake Bay. This agreement went into effect October 31, 2018 and will conclude on October 30, 2023.

All individual projects at the SCC being designed and/or constructed during this timeframe shall consider incorporating measures to help the Smithsonian achieve the goals of the MS4 permit, primarily the reduction of impervious area by 20%.

Existing impervious areas not treated by existing best management practices (BMPs) can be reduced utilizing one or a combination of the following:

- Convert existing impervious areas not treated by existing BMPs to pervious areas.
- Directing additional existing impervious area not treated by existing BMPs to newly installed BMPs. See BMP options listed previously in this section.
- Implementing MDE approved maintenance procedures for existing impervious areas not treated by existing BMPs. See list of potential maintenance procedures provided previously in this section.



Figure 3-77: Example of Micro-Bioretention



Figure 3-78: Example of Bioretention Swale

Stormwater Collection

Localized clean steam generation equipment will be installed in individual buildings to maintain the required relative humidity in critical spaces. The system will consist of a reverse osmosis / de-ionized water system to pretreat incoming domestic water and steam generators with the associated dispersion headers located in air handling units.

Three to four centralized stormwater collection and treatment systems for non-potable water use are recommended to serve both new and existing buildings, due to the long distance between buildings as well as varying building ground elevations. The sizes of the stormwater tanks are to be determined per future collections areas. The stormwater treatment system should be provided with an area of 2,000 sf for each stormwater filtration and treatment system, day tank, and non-potable booster pump station assembly.

Recycled stormwater can be utilized for non-potable water uses such as cooling tower makeup, irrigation, and toilet flushing. The roof area of the proposed buildings has been calculated to determine the amount of stormwater that can be collected.

BUILDING #	DESCRIPTION	BUILDING ROOF AREA (FT^2)	ROOF USE
1	-	46,820	GREEN ROOF AND WATER COLLECTION
2	-	22,350	GREEN ROOF AND WATER COLLECTION
3	-	24,250	GREEN ROOF AND WATER COLLECTION
4	-	22,330	GREEN ROOF AND WATER COLLECTION
5	-	43,200	GREEN ROOF AND WATER COLLECTION
6	-	29,490	GREEN ROOF AND WATER COLLECTION
7	VISITOR CENTER	1,500	GREEN ROOF AND WATER COLLECTION
8	SG NON-COLLECTIONS STORAGE	11,540	SLOPED ROOF AND WATER COLLECTION
9	OSTEO PREP LAB	5,090	SLOPED ROOF AND WATER COLLECTION
10	NMNH COLLECTIONS STORAGE	14,990	SOLAR PANELS AND WATER COLLECTION
11	COLLECTIONS STORAGE	65,920	SOLAR PANELS AND WATER COLLECTION
12	COLLECTIONS STORAGE	46,740	SOLAR PANELS AND WATER COLLECTION
13	COLLECTIONS STORAGE	65,920	SOLAR PANELS AND WATER COLLECTION
14	COLLECTIONS STORAGE	66,960	SOLAR PANELS AND WATER COLLECTION
15	COLLECTIONS STORAGE	56,160	SOLAR PANELS AND WATER COLLECTION
16	COLLECTIONS STORAGE	10,800	SOLAR PANELS AND WATER COLLECTION
SUBTOTAL		344,120	ROOF WATER COLLECTION ONLY
SUBTOTAL		189,940	GREEN ROOFS ONLY
TOTAL		**534,060**	ROOF WATER COLLECTION (INCL. GREEN ROOFS)

Notes:
1. Green roof area does not account for MEP equipment, venting, and other roof mounted equipment.

Figure 3-79: Table of Proposed Roof Areas

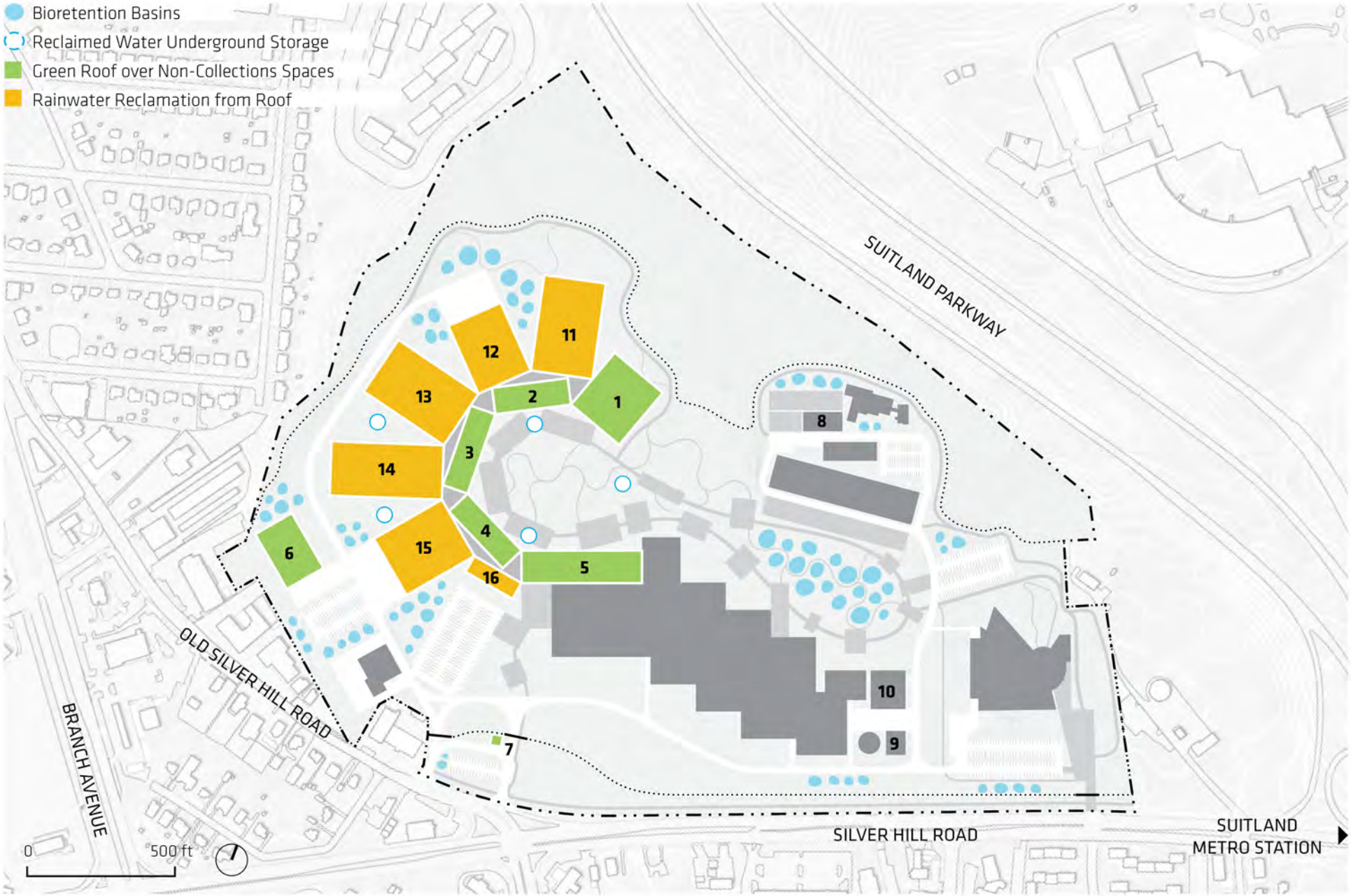


Figure 3-80: Proposed Stormwater Management Site Plan

Reducing Impervious Areas

The existing SCC campus has many impervious surfaces, partly due to the clusters of buildings at the Garber Facility.

Using the SI Geospatial information and verification by the Smithsonian staff, the project team calculated the areas of impervious surfaces at the SCC, shown on the right.

Although the proposed development will increase the overall building footprint on the site, the Master Plan will reduce the total impervious area of the SCC.



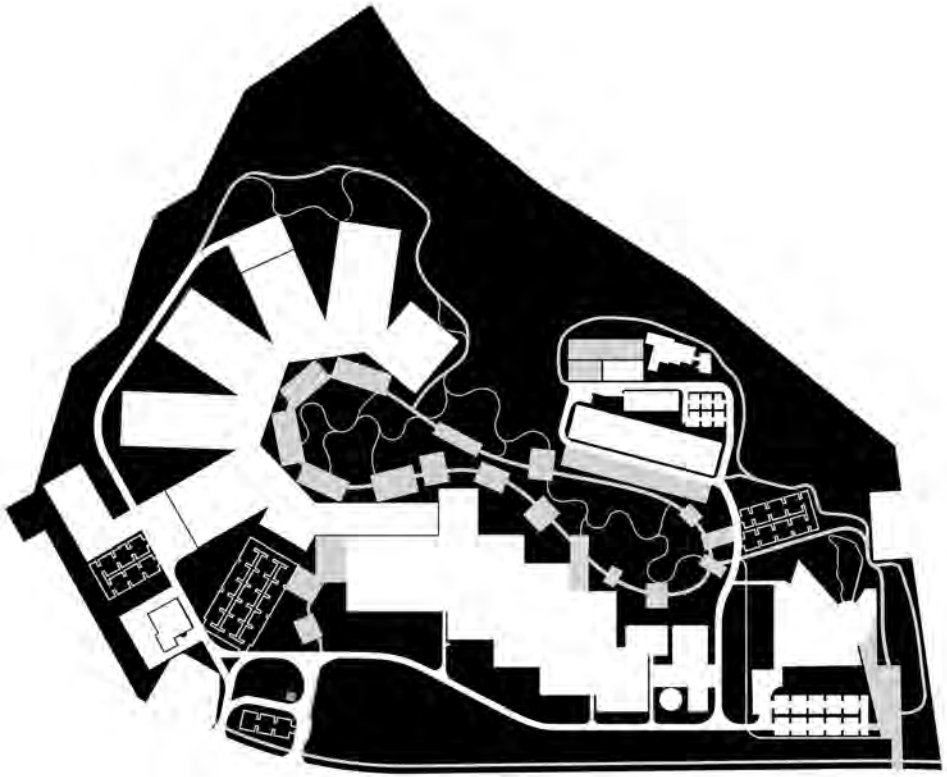
LEGEND

- Pervious Areas
- Impervious Areas

Existing Conditions

Total Impervious Area:	1,847,015 sf = 42.4 acres
Total Pervious Area:	2,928,902 sf = 67. 2 ac
Total Site Area:	**4,775,918 sf = 109.6 acres**

Figure 3-81: Site Plan Area Take-off of Existing Pervious and Impervious Surfaces



LEGEND

Pervious Areas

Impervious Areas

Propoesd Conditions

Total Impervious Area:	1,388,249 sf = 31.9 acres
Total Pervious Area:	3,387,669 sf = 77. 7 ac
Total Site Area:	**4,775,918 sf = 109.6 acres**

Figure 3-82: Site Plan Area Take-off of Proposed Pervious and Impervious Surfaces

Security Plan

The main security threat is from crime. The plan will limit the number of site and building entrances; reconfigure the main site entrance, adding a guard booth, screening, and a Visitor Center with designated parking; and improve and connect perimeter security.

Fencing

The SCC campus has been separated into a few zones by barbed wire fencing. However, the fencing between the Garber and MSC areas has been removed and the Smithsonian plans to remove the existing barbed wire fencing between the MSC and SG areas.

The new perimeter fence will be a combination of decorative and chain link fencing augmented with VSS. Publicly visible areas including along Silver Hill Road and Old Silver Hill Road will be protected by 10-foot-high, black picket fencing.

The proposed clear zone for the perimeter fencing in the wooded areas is 25 feet (10 feet outside and 15 feet inside the fence) inclusive of a trail for security.

The landscape in the clear zone needs to be cut back to support natural and video surveillance of the perimeter. This strikes a balance between the security requirements while maintaining the tree canopy adjacent to the perimeter fence and clear zone.

New fencing will require a VSS and lighting system sufficient to support the VSS and natural surveillance.

The SCC has had issues in the past with deer as well as thefts of outdoor equipment. Various planting strategies should be employed to deter these intruders. These strategies include deer repelling plants and thick hedges around borders.

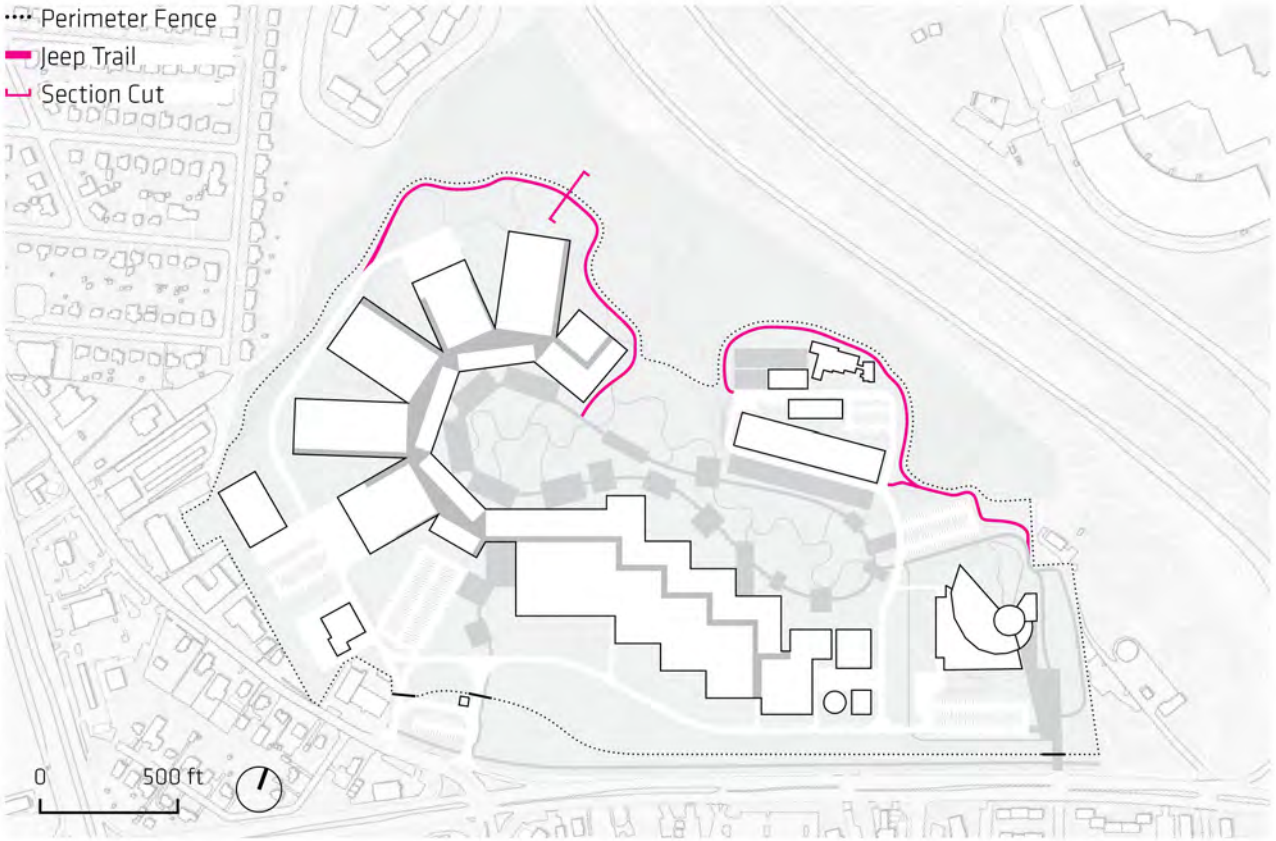


Figure 3-83: Proposed Fence in Wooded Areas

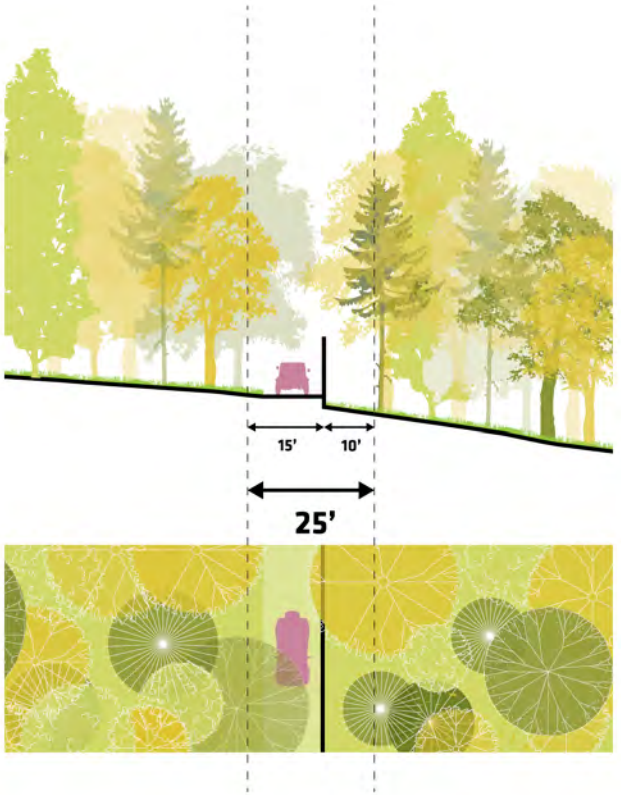


Figure 3-84: Proposed Jeep Trail Plan and Section Diagram



Suitland Collections Center Master Plan

Draft NCPC Submission

November 2019

Transportation Management Plan

Smithsonian Suitland
Collections Center

4210 Silver Hill Road
Camp Springs, MD 20746



Prepared for:
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November 7, 2019

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Abbreviations

ETC	Employee Transportation Coordinator
HOV	High Occupancy Vehicle
MDOT	Maryland Department of Transportation
M-NCPPC	Maryland-National Capital Park and Planning Commission
MPO	Metropolitan Planning Organization
MTA	Maryland Transit Administration
MWCOG	Metropolitan Washington Council of Governments
NADMS	Non-Auto Driver Mode Share
NCPC	National Capital Planning Commission
SHA	State Highway Administration
SI	Smithsonian Institution
SOV	Single-Occupancy Vehicle
TDM	Transportation Demand Management
TMP	Transportation Management Plan
WMATA	Washington Metropolitan Area Transit Authority

Glossary

Autonomous Vehicles	A vehicle that is capable of operating on public roadways and in mixed traffic without the aid of a human driver.
Bikeshare	A service in which bicycles are made available for shared use to individuals on a short-term basis.
Bus Rapid Transit	A high-quality bus-based transit system that delivers efficient service that may include dedicated lanes, busways, traffic signal priority, off-board fare collection, elevated platforms and enhanced stations.
Carpool/Vanpool	An arrangement among a group of commuters that live and work within the same area to commute together in one vehicle, rather than driving individually.
Carshare	A service in which vehicles are made available for shared use to individuals on a short-term basis.
Connected Vehicles	Vehicles that have the capability of communicating with other vehicles and infrastructure to improve operation and safety.
Employee Transportation Coordinator	An employee or contractor whose responsibility is to administer and manage a TDM program.
Flexible/Alternative Work Schedule	An alternative work schedule that allows employees to work additional hours for a portion of a work week to take an additional day off. For example, four 10-hour workdays, rather than five 8-hour workdays.
Guaranteed Ride Home	The Guaranteed Ride Home (GRH) program provides commuters who regularly (twice a week) carpool, vanpool, bike, walk or take transit to work with a free and reliable ride home when unexpected emergencies arise. The existing GRH program sponsored by Metropolitan Washington Council of Governments provides up to four annual free rides home to registered commuters for unexpected personal emergencies or unscheduled overtime.
Last Mile Connectivity	Mobility solutions to connect transportation hub with user's final destination.

Light Rail Transit	Rail-based transit that can operate on exclusive right-of-way, dedicated lanes, or within mixed-traffic.
Live Near Your Work	Strategies, such as pedestrian, bicycle and transit/shuttle connections, that encourage employees to live close to their place of work and commute by modes other than driving alone.
Mass Transit Facility	Systems that are intended to transport a large number of people by means that include buses, trains, subways, and elevated rail.
Non-Auto Driver Mode Share	The percentage of commuters that commute utilizing modes other than driving alone. This includes carpooling/vanpooling, rideshare, transit, pedestrian, and bicycle modes.
Rideshare	Transportation in a private vehicle driven by its owner, for free or for a fee, especially as arranged by means of a website or app.
Road Diet	A reduction in vehicle travel lanes along with other geometric mitigation measures that enhance operations for all users including pedestrians and bicyclists.
Telecommuting	A program that allows an employee to work from home or at an off-site location at least one day per week.
Transit/Vanpool Subsidies	A financial incentive designed to encourage commuters to use public transit (or vanpools) by providing them with a monthly payment to cover a portion of their commuting expenses.
Transportation Demand Management	Strategies and policies that encourage employees to commute via other modes than driving alone, such as transit, carpool/vanpool, or walking and biking.
Transportation Management Plan	A guide to the implementation of transportation demand management strategies/policies that is specific to an employer.

Executive Summary

Introduction

The Smithsonian Institution (SI) is currently engaging in a master planning process that will direct the development at the Suitland Collections Center (SCC) campus over the next 40 years. The SCC campus includes the Paul E. Garber Facility, Museum Support Center (MSC), NMAI Cultural Resources Center (CRC), and Smithsonian Gardens (SG) Greenhouses. The Master Plan will address existing deficiencies of the SCC campus, which currently consists of 1.3 million square feet of building area on 110 acres, with the goal of housing approximately 2.4 million square feet of facilities upon completion. While the existing ratio of collections storage and non-storage spaces (80:20) is expected to remain approximately the same as the campus redevelops over the 40-years, individual construction projects will likely vary from this ratio. For example, the upcoming Botany Greenhouse relocation and Pod 6 projects will generate very few, if any, additional Smithsonian employees based at SCC because the emphasis is on maximizing collections storage and these projects largely replace existing space.

The Master Plan aims at meeting SI's growing needs while creating a more walkable and integrated campus. Two components of the Master Plan include enhancing internal site circulation and transportation options to and from the campus. Over the 40-year Master Plan period, population at the SCC is anticipated to grow from 350 people to 910 people. However, some of these trips (approximately 20%) would occur during off-peak hours given the unique use of SCC as a research and storage facility. The SCC is currently non-public and will remain so, with visitors coming for a scheduled purpose such as scholarly research or rotational duty between other SI locations.

Purpose

The purpose of this report is to assess existing and projected future commuting patterns of the SCC employees, researchers, volunteers, visitors, and contractors (staff), and develop a Transportation Management Plan (TMP) that:

- Reduces single-occupancy vehicle (SOV) trips;
- Promotes the use of alternative transportation modes, such as transit, carpooling, and vanpooling; and,
- Increases vehicle occupancy.

This TMP will be supported and reviewed by other agencies including the National Capital Planning Commission (NCPC) and the Maryland Department of Transportation State Highway Administration (MDOT SHA). NCPC provides guidance for the development of TMP documents, and as part of the master planning approval process, NCPC will review and provide comments on this document and its recommendations and implementation plan.

In addition, the MDOT SHA will be responsible for reviewing and approving modifications to access to the SCC campus that impact the state highways around the site.

Goals

Based on results of the employee survey, the campus has a relatively high percentage of commuters that commute utilizing modes other than driving (non-auto driver mode share (NADMS) of 47%), which is significant for a suburban campus. This includes carpooling/vanpooling, rideshare, transit, pedestrian, and bicycle modes. Furthermore, 42% of employees currently driving alone to the campus are willing to consider alternative travel modes if efficiency, safety, and access is improved. Therefore, this TMP must help to maintain the existing mode split while providing improvements to existing services to continue the transition from single-occupancy vehicles.

It should also be noted that the proposed SCC Master Plan is intended to be implemented over the next 40 years. Over this time, transportation technology and commuting patterns will likely change, and parking demands and requirements will change incrementally with the phased development. Thus, this TMP will provide the framework for transportation demand management (TDM) for a typical master plan duration (20 years) with consideration to how new transportation technologies may change commuting modes and patterns in the long-term (20-40 years). Furthermore, this plan should be considered a living document and should be updated by SI as needed for major projects that add significant numbers of visitors and staff, when major changes to policies and available transportation options require new strategies, when major assumptions change, or when the 20-year horizon is met (whichever comes first), so that it can reflect the changing needs of their employees.

Based on coordination with the SI, the following goals were identified:

- While the Master Plan is being implemented, maintain the NADMS of 47% for all existing and new staff assigned to the SCC as well as for visiting researchers/staff that will be working on the SCC campus for at least one year.
- Increase NADMS of all permanent SCC staff as well as for visiting researchers/staff that will be working on the SCC campus for at least one year, to 50% by 2040 by encouraging transition from single-occupancy vehicles.
- Improve travel options with other SI locations by extending shuttle service and improving carsharing options.
- Update the TMP when assumptions significantly change as major projects are implemented, or when the 20-year horizon is met, whichever comes first. Establish new NADMS targets for the 20 to 40-year period of the Master Plan.

Travel Demand Management

While the total number of onsite staff is anticipated to reach 910 employees, it is expected to take at least 40 years for full build-out to achieve those numbers. It is anticipated that over this time, transportation technology and commute habits will change significantly as well as what may ultimately be required or built onsite by SI. Thus, developing a TMP that addresses needs

through 2060 is not practical. Therefore, this TMP identifies potential TDM strategies that can be implemented within the next 20 years (a more typical master plan time frame), while also assessing potential needs beyond 20 years.

Proposed Strategies (Within 20 Years)

People choose their mode of travel based on several factors, including convenience, cost, time, and habit/familiarity. An effective TDM program provides a variety of strategies that affect one or more of these factors. The approach to TDM at the SCC will have to be tailored to the unique needs of the site. The relatively large square footage, but low population will make traditional TDM strategies, such as carpooling, vanpooling, and shuttle services more challenging. Additionally, because employees based at SCC also work at other SI locations, live across the greater DC, Maryland, and Virginia areas, and have varied schedules requiring their presence on the Mall, it is challenging to form car and vanpools. Therefore, after careful consideration of site-specific needs, the following TDM strategies were developed to reduce single occupancy vehicle (SOV) trips at the SCC (see Section 5 for additional details):

- Employee Transportation Coordinator (ETC): Identify an employee or team of employees who would take the responsibility of TDM monitoring and management on the SCC campus.
- Carpool/Vanpool Incentives:
  - Support regional transportation agencies' creation of commuter corridors.
  - Provide preferred parking and employee ride-matching and assist employees with joining the guaranteed ride home program (GRH) sponsored by Metropolitan Washington Council of Governments.
  - Provide access to shuttle service, transit reimbursement or department-owned vehicles for work-related travel
- Transit Incentives:
  - Given the significantly more limited access to transit and the presently unsafe pedestrian route at this site as compared to the National Mall or National Zoo, assist staff with obtaining the maximum allowable subsidies and guaranteed ride home services.
  - Provide new staff and visitors with access to real time transit and shuttle information including links to smartphone apps.
  - Explore the feasibility of funding an extension of the employee shuttle to begin at 6:00 AM and extend to 6:00 PM to facilitate it's use as the last leg of Suitland-based employees' commutes. For example, the shuttle could be used by SCC staff that could commute to the National Mall via transit (bus or Metrorail) to make the final connection between the National Mall and the SCC campus. To restrict commuter use of the shuttle to only SCC employees, implement a registered parking program on the SCC campus.
  - Work with WMATA to provide bus shelters with benches at the bus stops located at the main campus entrance.
  - Establish programs to destigmatize transit travel, including a transit user group.
  - Explore the feasibility of expanding the hours of operation and frequency of the SI shuttle, particularly to the Metro station and National Mall during midday periods. This would encourage staff visiting from the Mall to use these methods of transportation rather than driving alone to the SCC campus.
- Last-Mile Connectivity Improvements:

  - Provide bicycle lockers for employee use on the campus and support access to shared bicycles and scooters at the Suitland and Naylor Road Metro Stations.
  - Encourage WMATA to install additional bike lockers at Suitland and Naylor Road and to introduce Capital Bikeshare stations at these locations if feasible. Improve pedestrian and bicycle connections to the Suitland Metro station by:
    - Providing a shared-use path along the site frontage and improving connectivity and circulation within the SCC campus.
    - Working with Prince George's County, MDOT SHA, and the National Park Service to improve the pedestrian and bicycle safety at the Suitland Parkway interchange.
  - Extend the existing shuttle service to provide regular connections between the campus and the Suitland Metro station.
  - Consider purchase of a van/smaller shuttle vehicle that can provide frequent service to and from the Suitland Metro station during peak commuting periods.
  - Work with ridesharing companies such as Uber, Lyft, or a taxi service to provide on-demand service to the Suitland Metro station. Provide a pick-up and drop-off area at the main gate, outside of the secure area.
- Telecommuting Program
  - Determine if there are any positions that can be successfully completed from home or a teleworking center one or more days per week and provide eligible employees with laptops or other mobile workstations.
  - Encourage telecommuting during peak commuting days, which are typically Tuesday and Wednesday.
- Flexible Work Schedules
  - Establish policies that allow employees to arrive off-peak.
- Bike/Walk
  - Work with MDOT SHA, NPS, and Prince George's County to improve external pedestrian/bicycle facilities within the surrounding area of the campus, as well as to the Suitland Metrorail station.
  - Provide shower and locker facilities on site.
  - Provide sheltered bicycle racks near the building. Sheltered bicycle racks should also include tool and pump stations to allow employees to maintain their bicycles.
  - Design the site to be pedestrian and bicycle friendly.
  - Establish an internal bikeshare, scooter share, or electric cart system to allow staff to travel easily between areas of the campus without driving. Placing stations near the secondary pedestrian entrance will be particularly critical for reducing the potential walk distance to Metrorail.
  - Install bike lockers on campus as well as at the Metrorail station and/or provide bikeshare/scooter stations in both locations.
  - Establish a bicycle and pedestrian commuter group to provide support, advice, and advocacy for commuters.

Beyond 20 Years

Transportation and workplace technology are anticipated to change the way people work and commute. Therefore, many of the strategies listed above may not be applicable or may need to be heavily modified in the future. While the extent of the changes to commuting are not yet known, SI can begin to anticipate future needs in the Master Plan by ensuring smart and flexible

site design. Policies that may need to be considered as the plan develops include, but are not limited to:

- Autonomous Vehicles: Understanding their potential impact on parking, as well as their potential for last-mile connections. Evaluate policies for campus access and provide passenger loading areas.
- Teleworking: Evaluate how technology changes such as detailed 3-D scans would allow some researchers to work remotely.
- Parking Management:
  - Construct parking in phases that correspond to the demand that each phase would generate.
  - When additional parking is required to accommodate anticipated visitor demand, consider constructing this parking with permeable pavement or stabilized turf to reduce storm water impacts.
  - Assess the impacts of shared vehicles on parking and potentially provide more dense parking where vehicles can park in closer proximity, thus reducing the overall size of parking areas.

Monitoring

This TMP is a flexible document that can be shaped and reshaped as commuting patterns and needs change. Each of the TDM strategies must be evaluated and changed as seen fit by the ETC as the SCC development occurs. The ETC will evaluate each strategy by setting the goals and then documenting the progress of each goal. It is expected that the TMP will be updated as needed for major projects that add significant numbers of visitors and staff, when major changes to policies and available transportation options require new strategies, when major projects are implemented, or after the site reaches the 20-year horizon. Several options are available to the ETC to gauge the success of these programs, including:

- Encourage participation in GSA's annual federal employee transportation mode surveys.
- The ETC will perform periodic surveys of employees and reevaluate the program. This would include determining whether the goals are being met and, based on the employee trends, identifying programs which are successful and need to be emphasized and those that are not working. The survey's goal will be to identify potential changes in trip characteristics. An example survey is contained in Appendix A.
- Perform traffic counts at all the access points at all entrances to employee and visitor parking.
- Provide program participation documentation (e.g. application of transit subsidies, van registration, preferential parking registration).
- Provide packages to existing and new employees that identify the transit services and the incentives being offered.

1.0 INTRODUCTION

The Smithsonian Institution (SI) is currently engaging in a master planning process that will direct the development at the 110-acre Suitland Collections Center (SCC) campus over the next 40 years. The SCC campus currently consists of 1.3 million square feet of building area, including the Paul E. Garber Facility, Museum Support Center (MSC), NMAI Cultural Resources Center (CRC), and Smithsonian Gardens (SG) Greenhouses**.** The Master Plan will address existing and future collections storage needs for SI with the goal of housing approximately 2.4 million square feet of facilities upon completion. While the existing ratio of collections storage and non-storage spaces (80:20) is expected to remain approximately the same as the campus redevelops over the 40-years, individual construction projects will likely vary from this ratio. For example, the upcoming Botany Greenhouse relocation and Pod 6 projects will generate very few, if any, additional Smithsonian employees based at SCC because the emphasis is on maximizing collections storage and these projects largely replace existing space.

The Master Plan aims at meeting SI's growing needs while creating a more walkable and integrated campus. Two components of the Master Plan include enhancing internal site circulation and transportation options to and from the campus. Over the 40-year Master Plan period, population at the SCC is anticipated to grow from 350 people to 910 people. However, some of these trips (approximately 20%) would occur during off-peak hours given the unique use of SCC as a research and storage facility. The SCC is currently non-public and will remain so, with visitors coming for a scheduled purpose such as scholarly research or rotational duty between other SI locations.

The SCC campus is located in a suburban environment, which poses several challenges that are typical to suburban employment centers. One of the most significant is the limited direct suburb-to-suburb connections that are typical of a transit system, which is typically oriented to the downtown core. In addition, the campus is relatively large and, depending on the user's campus work location, the Suitland Metro station can be as far as a one-mile walk and the Naylor Road Metro station can be as far as a two-mile walk (Figure 1). Furthermore, the walking environment between the campus and the Suitland Metro station is not pedestrian-friendly. The relatively narrow sidewalk along Silver Hill Road is located immediately adjacent to a travel lane, and pedestrians must cross several uncontrolled ramp crossings at the Silver Hill Road/Suitland Parkway interchange. Safety is also a concern due to recent crime issues within the adjacent neighborhoods, as well as traffic accidents. A shuttle provides connection between the campus and the Smithsonian facilities near the National Mall. This shuttle is relatively well-utilized by SI staff but is not available for commuting given current restrictions on employee commute subsidies.

This Transportation Management Plan (TMP) has been developed to help the SI encourage employees and visitors to the SCC to commute by modes other than driving alone. Towards this, the TMP aims to:

- Inventory existing and future transportation facilities, including the local roadway network, parking, pedestrian, bicycle, and transit;
- Understand existing and future employee commuting patterns and needs;
- Identify transportation demand management (TDM) strategies that reduce single-occupant vehicle trips and promotes the use of alternative transportation modes such as transit, carpooling, and vanpooling;
- Implement each TDM strategy through a work plan for each product and/or service; and
- Use specific bases of measurement to effectively monitor and evaluate achievement of goals and adjust TDM strategies as necessary.

Figure 1: Smithsonian Collections Center Campus and Suitland Metro Station



1.1 PURPOSE

Within the last decade, regional, state, and local planning agencies within the National Capital Region (NCR) have recognized the critical need to reduce peak period traffic congestion, protect the region's environment, and reduce greenhouse gas emissions. A review of several key planning documents, described herein, reveals that each agency has formulated transportation-related goals and objectives to be achieved through several strategies that are monitored and evaluated with specific performance measures. A common strategy noted in the various key planning documents calls for transportation system improvements and utilization of Transportation Demand Management (TDM) methods that fully support opportunities to reduce single-occupancy trips and promote alternative modes of transportation.

The purpose of this report is to assess existing and projected future commuting patterns of SCC employees, researchers, volunteers, visitors, and contractors (staff), and develop a Transportation Management Plan (TMP) that:

- Reduces single-occupancy vehicle (SOV) trips;
- Promotes the use of alternative transportation modes, such as transit, carpooling, and vanpooling; and,
- Increases vehicle occupancy.

1.1.1 Regional

1.1.1.1 National Capital Planning Commission (NCPC)

The Comprehensive Plan for the National Capital guides planning and development in Washington, DC and the surrounding region. It is a unified plan comprised of two components – the Federal and District Elements. The Federal Elements, prepared by NCPC, provide a policy framework for the federal government in managing its operations and activity in the NCR. The District Elements are developed by the District of Columbia and address traditional city planning issues such as land use, housing, and economic development.

The Federal Elements of the Comprehensive Plan is a living document that is updated periodically to ensure that policies remain current, reflect recent planning initiatives, and are consistent with federal requirements and guidance. In 2016, NCPC adopted the Comprehensive Plan for the National Capital: Federal Elements, including a new Urban Design Element. The Parks & Open Space Element was not part of this update. NCPC adopted an update to Parks & Open Space Element, effective February 15, 2019. The updated document proposed a few new guiding principles whereas consolidated, modified or removed some of the existing policies. The new additions include:

- Protect the Parks and Open Space Design Legacy
- Provide stewardship of natural and cultural resources
- Provide access to and connections between Parks and Open Space

- Balance multiple uses within Parks
- Balance commemorative works within Parks
- Build partnerships and coordination among multiple landowners and jurisdictions

The eight Federal Elements include Urban Design, Federal Workplace, Foreign Missions & International Organizations, Transportation, Parks & Open Space, Federal Environment, Historic Preservation, and Visitors & Commemoration. The goal within the Transportation Element is to "develop and maintain a multi-modal regional transportation system that meets the travel needs of workers, residents, and visitors, while improving regional mobility and air quality through expanded transportation alternatives and transit-oriented development." Each section within the Transportation Element lays outs policies regarding each type of transportation mode, including mass transit, driving, and bicycling and walking. In particular, sections C and D encourage federal workplaces to utilize TDM strategies to comply with other applicable policies.

1.1.1.2 Metropolitan Washington Council of Governments (MWCOG)

In 2010, the MWCOG Board of Directors approved Region Forward: *A Comprehensive Guide for Regional Planning and Measuring Progress in the 21st Century*. COG's Region Forward Vision focuses on creating a more prosperous, accessible, livable, and sustainable metropolitan Washington. It maps out ambitious goals and targets to guide future decisions and measure progress for land use, transportation, climate & energy, environment, public safety, education, housing, health & human services, and economy.

Accessibility		
Goals	***Targets***	***Indicator***
• Transit-oriented mixed-use communities emerging in Regional Activity Centers that will capture new employment and household growth. • A transportation system that maximizes community connectivity and walkability and minimizes ecological harm to the Region and world beyond. • A variety of housing types and choices in diverse, vibrant, safe, healthy, and sustainable neighborhoods, affordable to persons at all income levels. • A broad range of public and private transportation choices for our Region which maximizes accessibility and affordability to everyone and minimizes reliance upon single occupancy use of the automobile.	• Beginning in 2012, capture 75% of the square footage of new commercial construction and 50% of new households in Regional Activity Centers • Reduce daily vehicle miles traveled (VMT) per capita • The region's transportation system will give priority to management, performance, maintenance, and safety of all transportation modes and facilities • Transportation investments will link regional Activity Centers • Increase the rate of construction of bike and pedestrian facilities from the Transportation Planning Board's plan • By 2020, the housing and transportation costs in Regional Activity Centers will not exceed 45 percent of area median income • Beginning in 2012, at least 80% of new or preserved affordable units will be located in Regional Activity Centers • Increase the share of walk, bike, and transit trips • All Regional Activity Centers will have transit accessibility (bus or rail)	• Triennial Aerial Survey of Freeway Congestion • Vehicle Registration per capita • Transit, bicycle and walk share in Regional Activity Centers • Accessibility to jobs within 45 minutes • Street/node ratio for Regional Activity Centers • Accessibility of passengers and cargo to the region's airports • Square feet of mixed-use development

1.1.1.3 Transportation Planning Board (TPB)

The TPB is the metropolitan planning organization (MPO) for metropolitan Washington. In October 2018, the TPB approved the region's new long-range transportation plan, Visualize 2045, and the FY 2019-2024 Transportation Improvement Program (TIP).

Visualize 2045 takes a multi-modal approach, relying on multiple travel modes to accommodate anticipated growth and address the region's diverse transportation challenges. In addition to projects that the region's transportation agencies expect to be able to afford between now and 2045, the plan includes aspirational initiatives that go beyond financial constraints. Though the focus of the financially constrained element is on regionally significant road and transit projects, Visualize 2045 also highlights bicycle and pedestrian projects, freight planning, and other transportation programs aimed at reducing congestion and improving air quality. The plan also highlights how the region is incorporating new federal Performance-Based Planning and Programming (PBPP) requirements into the regional transportation planning process. Overall, the plan aims to:

- Bring jobs and housing closer together
- Expand Bus Rapid Transit regionwide
- Move more people on Metrorail
- Provide more telecommuting and other options for commuting
- Expand express highway network
- Improve walk and bike access to transit
- Complete the National Capital Trail

The TIP is a document describing the planned schedule in the next six years for distributing federal, state and local funds for state and local transportation projects in accordance with Visualize 2045. The TIP represents an agency's intent to construct or implement specific projects and identifies the anticipated flow of federal funds and matching state or local contributions.

TPB is dedicated to achieving these measurable objectives through supporting individual organization TDM strategies, including pricing strategies, subsidies, incentives and disincentives, and better transit options. This TMP will help SI direct their TDM strategies to remain consistent with TPB's Vision and achieve its goal.

1.1.2 State

The Maryland Department of Transportation (MDOT) continually takes steps to plan, invest in and evaluate the transportation system to ensure it connects customers to key destinations–enabling a growing economy. MDOT's strategic approach is presented through the State Report on Transportation (SRT) which is comprised of three documents: (1) a vision for the transportation system through the Maryland Transportation Plan (MTP); (2) the six-year budget for transportation projects, produced annually as the Consolidated Transportation Program (CTP); and (3) an evaluation and report of the performance of Maryland's transportation system through the

Annual Attainment Report on Transportation System Performance (AR), focusing on the goals adopted in the MTP.

MTP Goals:

- Economic prosperity – support a healthy and competitive Maryland economy
- Safety and security – enhance the safety of transportation system users and provide a transportation system that is resilient to natural or man-made hazards
- System preservation – preserve and maintain the state's existing transportation infrastructure and assets
- Quality of service – Maintain and enhance the quality of service experienced by users of Maryland's transportation system
- Environmental stewardship – Ensure that the delivery of the State's transportation infrastructure program conserves and enhances Maryland's natural, historic, and cultural resources
- Community vitality – Provide options for the movement of people and goods that support communities and quality of life

The Office of Planning and Capital Programming at MDOT has developed the 2040 Maryland Transportation Plan (2040 MTP). The MTP outlines the State's overarching transportation priorities and helps create a larger context for transportation decision-making through these goals:

- Ensure a safe, secure, and resilient transportation system
- Facilitate economic opportunity and reduce congestion in Maryland through strategic system expansion
- Maintain a high standard and modernize Maryland's multimodal transportation system
- Improve the quality and efficiency of the transportation system to enhance the customer experience
- Ensure environmental protection and sensitivity
- Promote fiscal responsibility
- Provide better transportation choices and connections

The MTP contains statewide transportation strategies to meet the seven goals, including Better Transportation Choices and Connections. The objective of Better Transportation Choices and Connections is to enhance mobility and accessibility along with informing and educating customers on transportation options. Some strategies noted in the 2040 MTP towards these objectives are:

- Coordinate activities across MDOT and with regional and local agencies to incentivize changing travel behavior.
- Encourage local jurisdictions to identify desired bicycle and pedestrian facilities in comprehensive plans, and then to secure those facilities through private development and other opportunities.

- Expand commuter transportation options, including commuter bus, car/vanpooling, park-and-ride facilities, cycling, walking, and transit, as well as promoting opportunities for teleworking.
- Promote innovative public involvement strategies for projects such as use of social media and text message surveys to expand outreach and engagement.
- Strengthen employer commute incentive programs by increasing marketing and financial/and or tax-based incentives for employers, schools, and universities to encourage walking, biking, public transportation usage, carpooling, and teleworking.

In coordination with the MTP, the Bicycle and Pedestrian Master Plan (BPMP) establishes a 20-year vision for bicycling and walking as transportation in Maryland. The BPMP provides guidance and investment strategies to support bicycling and walking through education, enforcement, and infrastructure solutions.

MDOT, the State Highway Administration (MDOT SHA), and Maryland Transit Administration (MTA) track performance of these strategies and goals through travel demand management (TDM) and Transportation Emission Reduction Measures (TERMs), including: Commuter Choice Maryland, Commuter Connections, Telework Partnership, transit marketing and subsidy programs, and statewide park-and-ride facilities. MDOT also tracks performance through transportation-related emissions by region and greenhouse gas emissions.

1.1.3 Local

Prince George's County Planning Department, part of the Maryland-National Capital Park and Planning Commission (M-NCPPC) developed the Plan Prince George's 2035 Approved General Plan (Plan 2035) (published in 2014). The 2035 Transportation and Mobility Goal is to provide and maintain a safe, affordable, accessible, and energy efficient multimodal transportation network that supports the county's desired land use pattern and Plan 2035 vision. Plan 2035 recognizes that implementation of the various planning documents will require continued and timely coordination and collaboration of local, state, and regional agencies, and the development community.

Plan 2035 designates eight Regional Transit Centers, which are the focus of the county's planned growth and mixed-use development, and which have the capacity to become major economic generators. Six Neighborhood Reinvestment Areas are designated for coordinated funding and resources needed to stabilize and revitalize these areas. Also identified in the plan are Rural and Agricultural Areas composed of low-density residential, agricultural uses, and significant natural resources that are recommend for continued protection and investment to maintain critical infrastructure. The Plan 2035 transportation policies and strategies build on the 2009 Approved Countywide Master Plan of Transportation (MPoT). The MPoT identifies appropriate transportation system elements to support the General Plan development pattern and policies and proposes implementation mechanisms for these elements. To facilitate inter-agency coordination on implementation, strategies that should be pursued within the first five years following Plan 2035's approval are:

- Identify new transitway corridors that will support the Plan 2035 development priorities and amend the Master Plan of Transportation Transit Element to include the updated corridors.
- Update the Transit Services Operating Plan (TSOP) to reflect the Plan 2035 future land use plan and local and regional transit planning initiatives.
- Adopt a single set of multimodal LOS standards (superseding the standards for each mode) at a future time when multimodal LOS analysis procedures have been fully accepted.
- Coordinate the county complete streets policy with a school route analysis, planning, and implementation by the Prince George's County Planning Department, the Board of Education, the Department of Public Works & Transportation, Maryland State Highway Administration, and municipalities.
- Identify areas with high pedestrian accident incidents and implement appropriate traffic-calming measures to increase safety while maintaining designated levels of service.
- Develop a coordinated approach to pursuing a range of diverse transportation funding sources.
- Develop a priority parking initiative for alternative fuel and carpooling vehicles at county buildings, commuter parking lots, and other popular areas to encourage the use of alternative fuel vehicles and carpooling countywide.

One goal of this document is to guide the County in managing capacity and minimizing congestion of the streets, roads, and highways network by safely and efficiently providing access for all users to existing and planned land uses, with emphasis on General Plan corridors and centers. One strategy to achieve this goal is to "implement TDM practices that reduce trips (through park-and-ride lots and other strategies) and trip length, manage routes and peak-period travel, and generally focus on changing travel behavior." Transit-oriented development (TOD) represents a major opportunity to implement the development vision for Prince George's County at Metrorail stations.

2014 Southern Green Line Station Area Plan and Sectional Map Amendment

The 2014 *Southern Green Line Station Area Plan and Sectional Map Amendment (SMA)* seeks to bring TOD to southern Prince George's County by way of the Metro Green Line. This sector plan establishes a vision for the individual station areas, the sector plan area as a whole, and presents a comprehensive strategy for achieving TOD. There is already a Mixed-Use Town Center (M-U-TC) District in place at Suitland (recommended and approved by the 2006 Approved Suitland Mixed-Use Town Center Zone Development Plan), reducing the process burden in this station area. Some existing zones are appropriate for specific locations within the station and outlying areas near the various stations. Policy recommendations to increase multimodal mobility in the Suitland station area include:

1. Remove the Pearl Drive and Randall Road intersections with Silver Hill Road and consolidate traffic access to the Navy Day Drive intersection.

2. Work with MDOT SHA, GSA, and private property owners to improve the pedestrian environment and redevelopment potential along Silver Hill Road from Suitland Parkway to Suitland Road. Continue planning for a multiway boulevard along the south side of Silver Hill Road, including a slow drive lane and parallel parking lane utilizing existing right of way and private property.
3. Work with MDOT SHA and the National Park Service to reconfigure ramp termini to and from Suitland Parkway, to reduce turning radius and intersection widths to improve pedestrian crossing in the Metro station area.
4. Work with MDOT SHA to implement Suitland Road Complete Street projects, that will include on-street bicycle lanes.
5. Study the potential for a new express bus service from the Suitland Metro station down Suitland Parkway to MD 4, to serve Westphalia and Upper Marlboro.
6. Promote the proposed Suitland-Silver Hill Greenway concept and improved access to the Metro station via an off-street multi-use trail on the Suitland Federal Center frontage along Suitland Road and Silver Hill Road, along Smithsonian property frontage along Silver Hill Road, and continuing to MD 5 and Iverson Mall.
7. Improve the pedestrian facilities across Silver Hill Road in the Metro station area, including intersections with the Metro access road, Navy Day Drive, and Swann Road.

1.2 DATA COLLECTED

The basis for this report is a site assessment, an employee survey conducted in December 2016, and parking utilization counts conducted in April and June of 2016.

1.3 TMP GOALS AND OBJECTIVES

Based on results of the employee survey, the campus has a relatively high non-auto driver mode share (NADMS) of 47%, which is significant for a suburban campus. Furthermore, 42% of employees currently driving alone to the campus are willing to consider alternative travel modes if efficiency, safety, and access is improved. Therefore, this TMP must help to maintain the existing mode split while providing improvements to existing services to continue the transition from single-occupancy vehicles.

This TMP document will support SI's effort to comply with regional TDM initiatives and requirements. It will be reviewed as part of the overall SCC Master Plan by NCPC and also defines the steps for future MDOT SHA approvals for access changes to the campus that affect the nearby state roadways. However, it should also be noted that the proposed SCC Master Plan is intended to be implemented over the next 40 years. Over this time, regional policies, transportation technology and commuting patterns will likely change, and parking demands and requirements will change incrementally with the phased development. Thus, this TMP will provide the framework for TDM for a typical master plan duration (20 years) with consideration to how new transportation technologies may change commuting in the long-term (20-40 years) to ensure that the campus has the facilities to accommodate the future technology to the

extent possible. Furthermore, this plan should be considered a living document and should be updated by SI as needed for major projects that add significant numbers of visitors and staff, when major changes to policies and available transportation options require new strategies, or when major projects are implemented, so that it can reflect the changing needs of their employees and continue to comply with regional agency policies and practices.

Based on coordination with the SI, the following goals were identified:

- While the Master Plan is being implemented, maintain the NADMS of 47% for all existing and new staff assigned to the SCC as well as visiting researchers/staff that will be working on the SCC campus for at least one year.
- Increase NADMS of all permanent SCC staff as well as visiting researchers/staff that will be working on the SCC campus for at least one year, to 50% by 2040 by encouraging transition from single-occupancy vehicles.
- Update the TMP on a regular basis and establish new NADMS targets for the 20 to 40-year period of the Master Plan.

2.0 TRANSPORTATION SYSTEM

2.1 LOCAL ROADWAY NETWORK

The SCC campus is well-connected to the local and regional roadway network. The campus can be directly accessed via Silver Hill Road (MD 458) and Old Silver Hill Road (MD 967). It is located within one mile of the Suitland Parkway, which connects Washington, DC with Andrew's Air Force Base; within one mile of MD 5, which connects Washington, DC with Prince George's, Charles, and St. Mary's counties; and within three miles of the nearest Capital Beltway interchange. This level of accessibility provides commuters with a wide variety of potential commute routes. It should be noted that trucks are restricted from the Suitland Parkway. The majority of trucks that service the site utilize Branch Avenue to Pennsylvania Avenue to I-295, Branch Avenue (MD 5) to I-495, or Pennsylvania Avenue (MD 4) to I-495, or St. Barnabas Road to I-495.

The Capital Beltway (Interstate 495/95) is an eight-lane divided freeway with a posted speed limit of 55 miles per hour, and annually carries approximately 200,000 average daily vehicles (2017 MDOT SHA ITMS data). A full-movement, grade-separated interchange is provided at MD 5 (Branch Avenue).

MD 5 (Branch Avenue) is a six-lane north-south divided arterial highway with posted speed limit of 45 miles per hour. Branch Avenue approximately carries 50,000 average daily vehicles (2017 MDOT SHA ITMS data). Turn lanes are provided at major intersections and traffic signals are provided at the MD 5 & Auth Way and MD 5 & Auth Road intersections. MDOT recently completed large-scale improvements to Branch Avenue (MD 5), as well as the MD 5/I-495 interchange to accommodate the proposed Town Center at Camp Springs development located about 2 miles south of the SCC along Branch Avenue.

Suitland Parkway (MD 337) is a curbed four-lane divided urban expressway with a posted speed limit of 50 mph. Suitland Parkway annually carries approximately 40,000 average daily vehicles (2017 MDOT SHA ITMS data) and connects Washington, DC with Andrew's Air Force Base.

Silver Hill Road (MD 458) is a six-lane divided arterial with a posted speed of 35 mph. The right-most lane in both directions is designated as a shared lane for bicycles. The SCC campus main gate is located off of Silver Hill Road. There is also a secondary gate on the eastern end of the campus that is currently used as a pedestrian-only entrance for employees that walk to/from the Suitland Metrorail station.

Old Silver Hill Road (MD 967) is a two-lane arterial with a posted speed of 30 mph. The two gates on Old Silver Hill Road are both accessed by full-access unsignalized driveways.

2.2 PARKING FACILITIES

There are currently 10 parking areas on the SCC campus with a total of 429 parking spaces, of which 42 are located in a separately gated area within the campus for use of the Smithsonian Gardens greenhouse only. The locations of the parking areas are shown in Figure 2 and their capacities are listed in Table 1. In order to evaluate parking trends on campus, SI conducted a recent parking assessment on Wednesday, October 23, 2019 and Tuesday, October 29, 2019 after the morning peak period to measure parking utilization by vehicle type. This recent data should supersede those conducted in 2016 and documented in the Existing Conditions Report.

The type of vehicle was recorded as one of three categories:

- employee/visitor
- ADA
- SI fleet vehicle or other mobile equipment (bobcats, carts, maintenance equipment, etc.) occupying general use parking lot spaces or designated SI vehicle spaces in parking lots. SI equipment and vehicles awaiting service in the Fleet Maintenance yard or parked within loading and outdoor work areas such as those at Smithsonian Gardens were not included.

The results of the parking lot utilization counts indicate an overall site-wide utilization of 84% on October 23, 2019, and 81% on October 29, 2019 (Table 1). The MSC parking facility was over capacity on both days, resulting in vehicles parked on the side of the circulation roadway in the grass. Other parking areas that are close to capacity include Garber (92%), Garber Gate Road (92%), and the MSC Loading Dock parking (85%). All other parking areas were less than 85% occupied.

The unbalanced utilization of parking speaks to issues regarding internal site circulation and the location of the parking. For example, the MSC is the primary destination for most staff and visitors on the campus. While the CRC parking lot, which is typically only 80% utilized, is only approximately 1,000 feet from the main entrance of the MSC, the perceived distance between the CRC lot and the MSC entrance is likely greater given that there is no defined and direct connection between the CRC parking lot area and the MSC building. Thus, additional parking is not needed. Rather, in the short-term, improvements to pedestrian circulation could be used to improve the utilization of the CRC parking lot. In the long-term, parking should be located near main entrances or employee entrances.

Figure 2: SCC Parking Lot Locations

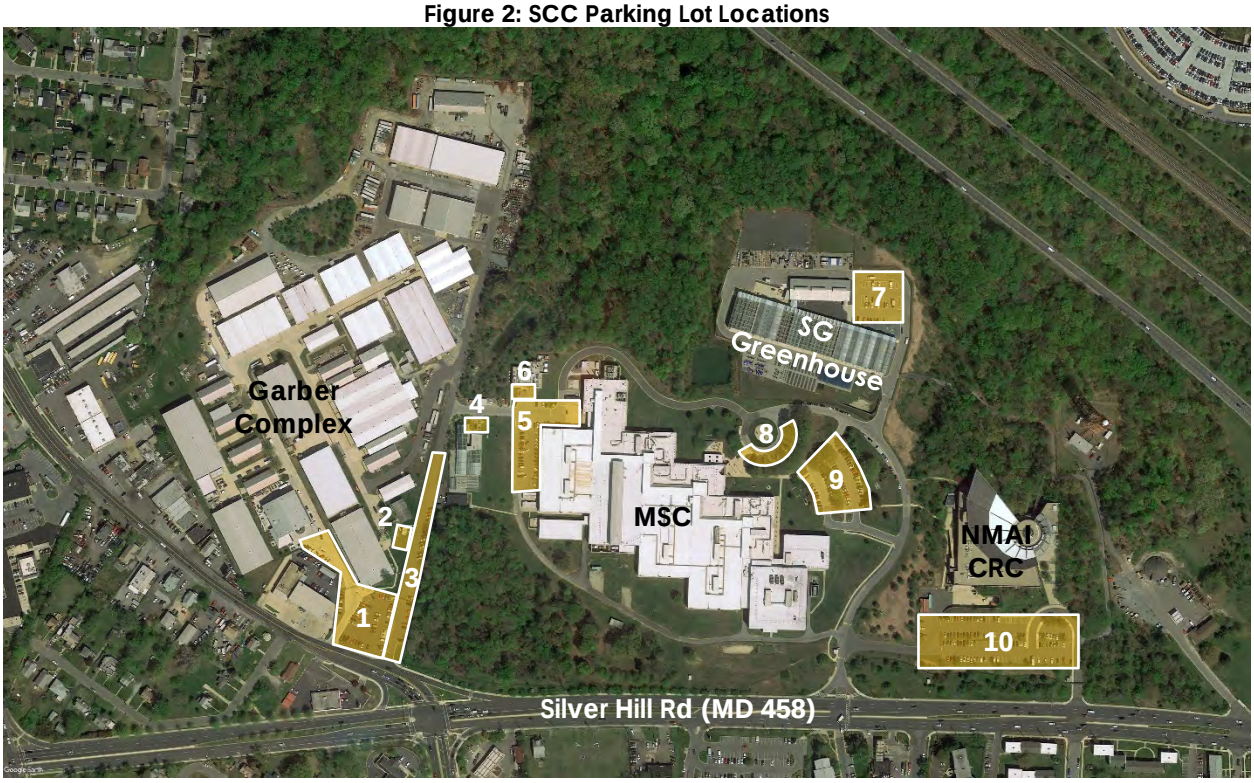


Table 1: Parking Lot Capacity and Utilization

Location	Capacity			Utilization: October 23, 2019			Utilization: October 29, 2019		
	ADA	Emp/ Visitor	SI Veh Only	ADA	Emp/ Visitor	SI Veh	ADA	Emp/ Visitor	SI Veh
1. Garber Main Lot	2	63	2	0	41	17	0	38	18
2. Garber B29	0	0	3	0	0	3	0	0	2
3. Garber Gate Road & Construction Trailer Parking	2	39	0	0	37	1	1	32	0
4. NMNH Botany GH	0	2	1	0	1	0	0	2	0
5. MSC Loading Dock	2	55	1	1	44	4	1	39	3
6. OPL Parking	0	3	4	0	1	4	0	1	3
7. SG Greenhouse	2	42	1	0	14	8	1	16	5
8. MSC Circle	4	8	0	4	8	0	4	8	0
9. MSC Parking	0	56	0	0	66	2	0	64	1
10. NMAI CRC	6	123	8	0	96	9	1	100	9
TOTAL	**18**	**391**	**20**	**5**	**308**	**48**	**8**	**300**	**41**

2.3 TRANSIT FACILITIES

2.3.1 Metrorail

The Washington Metropolitan Area Transit Authority (WMATA) Metrorail system connects downtown Washington, DC to the adjoining areas in Maryland and Virginia. Six lines, including the Red, Blue, Orange, Green, Yellow, and Silver, interconnect within Washington, DC. The Metrorail system opens at 5:00 a.m. on weekdays and at 7:00 a.m. on weekends and closes at 12:00 a.m. every night. Trains arrive approximately every six minutes during the peak hours and every twelve minutes during the non-peak hours.

The SCC campus is within one mile of the Suitland Metro station, as well as within two miles of the Naylor Road Metro station. Both stations are located on Metro's Green line. The Green Line operates between Branch Avenue and Greenbelt in Prince George's County. This line has 21 stations and has transfer points with the Red Line at Gallery Place and Fort Totten and with the Orange and Blue Lines at L'Enfant Plaza (Figure 3). The line runs along the same path as the Yellow Line from L'Enfant Plaza to Fort Totten. The Line operates at a 8- to 12-minute headway during weekdays and Saturdays, and a 15-minute headway on Sundays. The Suitland station has 1,890 parking spaces and the Naylor Road station has 368 parking spaces. The Suitland Metro station is the closest and is connected to the campus by a sidewalk (see Figure 4). Depending on where the staff member works on the campus, the Suitland Metro station can be as close as a 10-minute walk, or as far as a 20- to 25-minute walk. The Naylor Road Metro station is not directly accessible from the campus because there is no contiguous sidewalk along Old Silver Hill Road. Furthermore, walk times to the Naylor Road station on a contiguous sidewalk network via MD 5 would range from approximately 20 to 40 minutes.

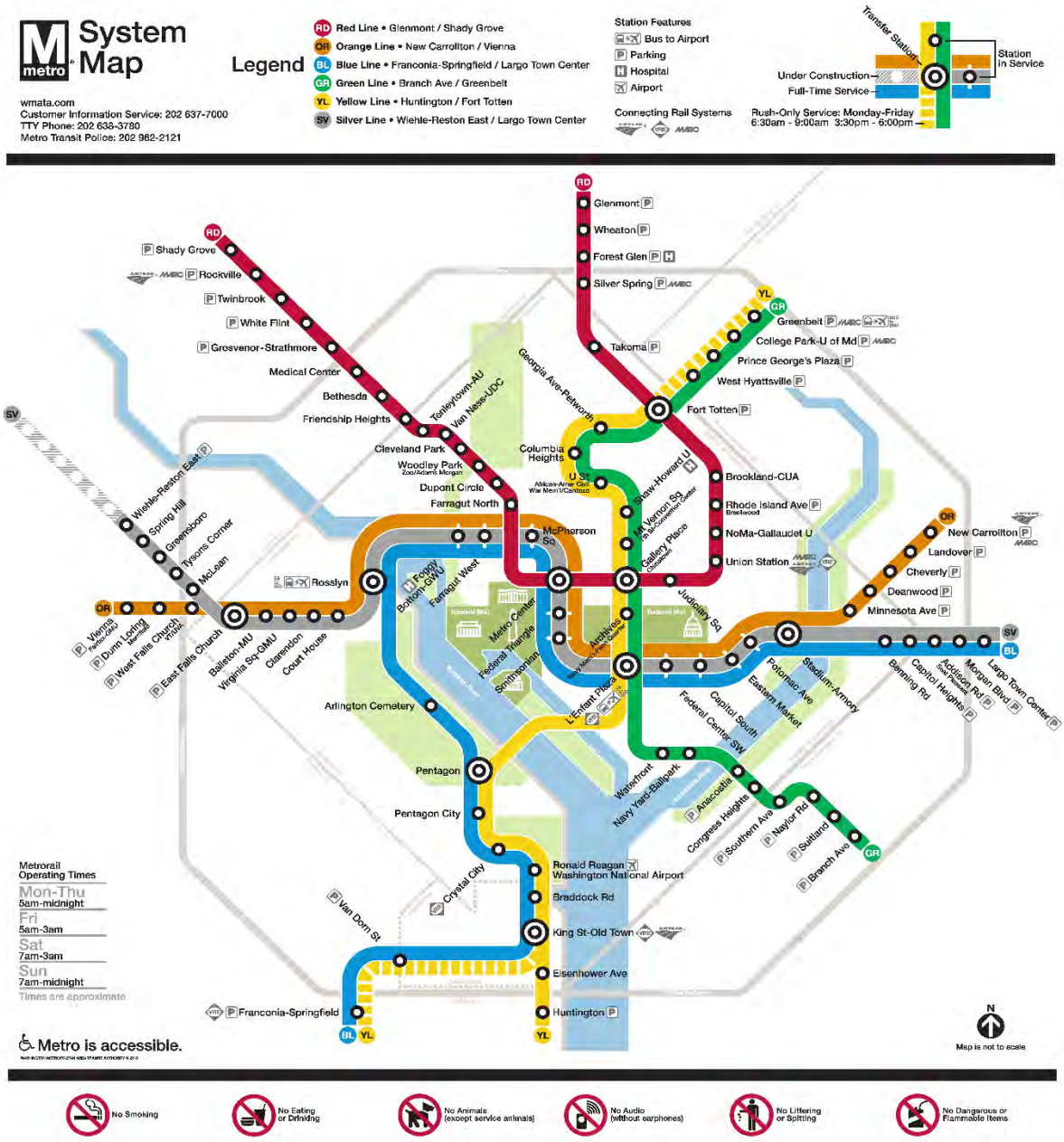


Figure 3: Metrorail System Map (Not to Scale)

Origin on SI Campus	Distance to Suitland Metro Station (Miles)	Walking Time to Suitland Metro Station (Minutes)
MSC	0.7	16
Pedestrian Gate	0.4	9
NMAI CRC	0.5	11
Greenhouse	0.8	18
Garber Gate	0.82	18
Garber B15	1.04	23

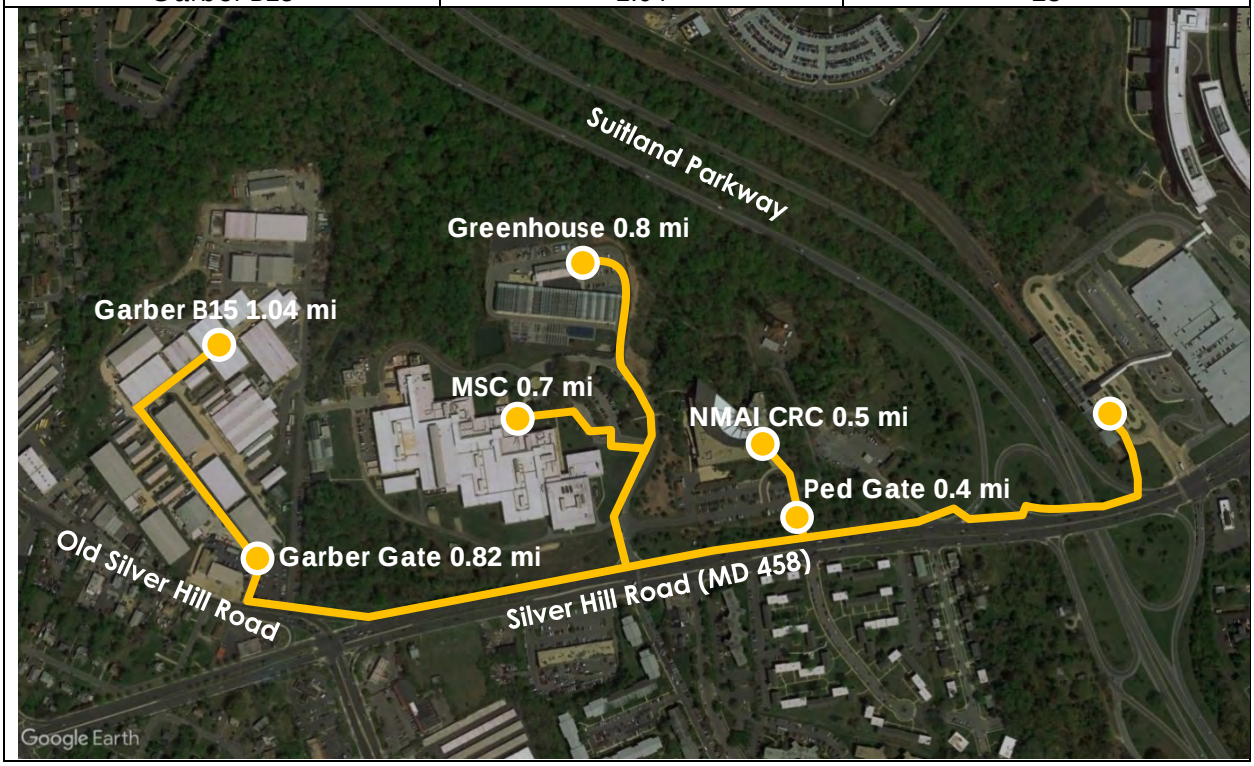


Figure 4. Walking Time and Distance from SI Campus Buildings to Suitland Metro Station

2.3.2 Bus

The SCC campus is also served by Metrobus routes P12 and D12 as well as THE BUS operated by Prince George's County. Route P12 operates at approximately 30-minute headways and provides local service that connects the Eastover Shopping Center to the Addison Road Metro station. It also connects to the Southern Avenue and Suitland Metro stations. Route D12 operates approximately every 20 minutes during the AM and PM peak periods and once an hour during in the midday off-peak hours. The D12 bus provides local service around the nearby communities of Suitland and Oxon Hill and provides access to the Suitland and Southern Avenue Metro stations. Routes P12 and D12 have stops along Silver Hill Road at the main and secondary campus gates. However, these stops only consist of signs. No shelters or benches are provided. The Suitland and Naylor Road stations also have connections to additional bus routes, including 30, 32, 34, 36, 39, C12, C14, D13, D14, F14, H11, H12, H13, and M2.

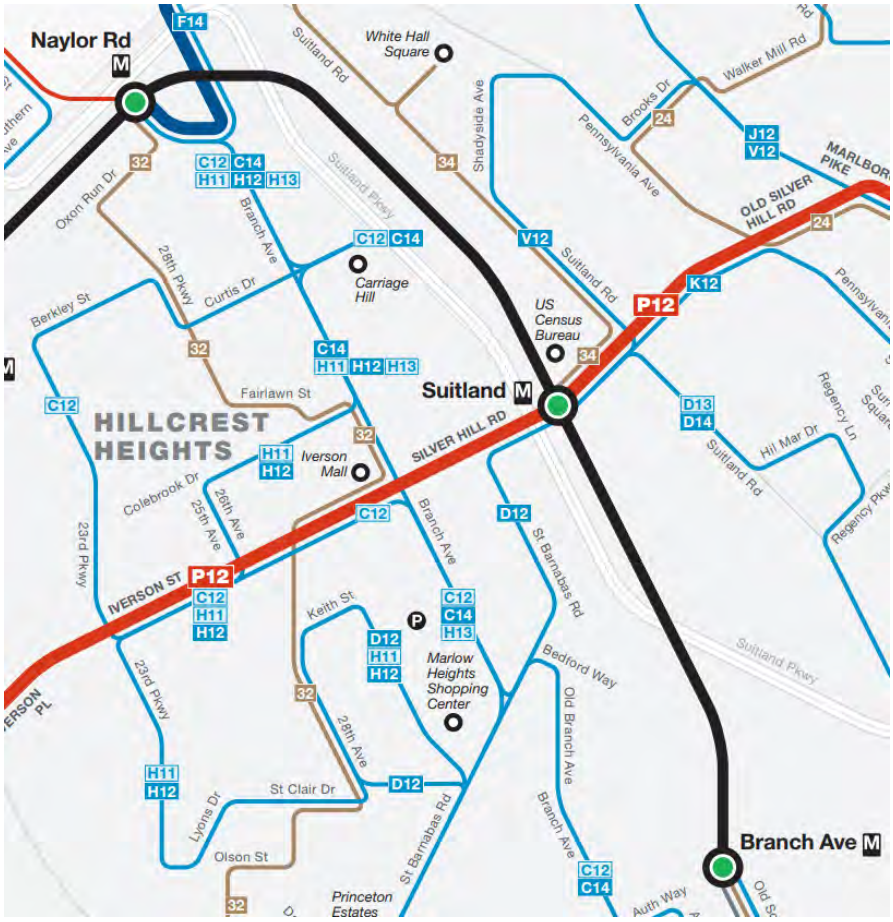


Figure 5: Metrobus and THE BUS Route Map (Not to Scale)

2.3.3 Shuttle

The campus is also served by a SI-operated shuttle which provides a connection between the campus and the Smithsonian facilities on the National Mall. The shuttle operates every hour between 8:00 AM and 6:00 PM and is intended to facilitate staff movement between the campus and the Mall facilities. It is currently not structured to be used for commuting, although some SI staff have noted utilizing it for commuting. Shuttle stops include:

- Natural History Building (NHB)
- National Museum of American History (NMAH)
- National Air and Space Museum/National Museum of the American Indian (NASM/NMAI)
- Anacostia Museum (on request)
- NMAI Cultural Resources Center (CRC)
- Museum Support Center (MSC)
- Paul E. Garber Facility
- Naylor Road Metro (on request during evenings)
- Capital Gallery

All shuttle buses are bio-diesel and have a 39-passenger capacity.

SI provided daily boarding and alighting (descending from a train or bus or other form of transportation) data for the SCC campus for the weeks of September 28 through October 2, 2015, which represents an average week, and June 1 through June 5, 2015, which represents the period when SI summer interns have started but public schools are not yet out for the summer. In addition, total ridership was provided by month between March 2015 and March 2016.

The monthly ridership data indicates a trend of higher utilization during the summer months (Table 2). This is likely due to a combination of summer interns and other summer research activity. January was noted as having the lowest ridership. However, this may be due to winter weather causing delays or cancellations to the shuttle service.

Table 2: Total Monthly Ridership (March 2015 - March 2016)

Month	Monthly Ridership
March 2015	2,945
April 2015	2,879
May 2015	3,067
June 2015	4,390
July 2015	4,594
August 2015	3,258
September 2015	2,749
October 2015	3,697
November 2015	3,255
December 2015	2,859
January 2016	729
February 2016	3,354
March 2016	3,302

The daily boarding and alighting data provided by SI was analyzed to determine an average weekday ridership for the AM travel period (8:00 AM - 9:00 AM), midday travel period (9:00 AM - 3:00 PM), and PM travel period (3:00 PM – 6:00 PM) during both weeks of data (Tables 3 and 4). The results indicate that on an average weekday (September/October) the majority of activity occurs during the AM and PM travel periods. On average, eight passengers board on the SCC campus and 26 alight during the AM period, four board and seven alight during the midday period, and 16 board and three alight during the PM period. During an average summer (June) weekday, six passengers board and 19 alight during the AM period, eight passengers board and 12 passengers alight during the midday period, and 18 passengers board and six passengers alight during the PM period.

The data indicates a much higher usage during the AM and PM periods, coinciding with peak commuting periods, as well as a higher midday ridership during June than in September. In both data sets, the highest number of passengers boarded/alighted at the MSC, while Garber had the fewest passengers. It should also be noted that the shuttle operates as much as 66% full during the AM and PM periods.

Table 3: Average Weekday Ridership (September 28 – October 2, 2015)

Period	On/Off	CRC	MSC	Garber	Total
AM (8:00 AM – 9:00 AM)	**On**	2	4	2	**8**
	Off	5	20	1	**26**
Midday (9:00 AM – 3:00 PM)	**On**	1	2	1	**4**
	Off	1	5	1	**7**
PM (3:00 PM – 6:00 PM)	**On**	3	13	0	**16**
	Off	1	2	0	**3**
Total		**13**	**46**	**5**	**64**

Table 4: Average Weekday Ridership (June 1 – June 5)

Period	On/Off	CRC	MSC	Garber	Total
AM (8:00 AM – 9:00 AM)	**On**	1	3	2	**6**
	Off	5	9	5	**19**
Midday (9:00 AM – 3:00 PM)	**On**	3	4	1	**8**
	Off	2	9	1	**12**
PM (3:00 PM – 6:00 PM)	**On**	5	11	2	**18**
	Off	2	4	0	**6**
Total		**18**	**40**	**11**	**69**

2.4 PEDESTRIAN AND BICYCLE FACILITIES

While the campus is connected to the local pedestrian and bicycle network via sidewalks along the north and south sides of Silver Hill Road and along the Old Silver Hill Road campus frontage, as well as shared bicycle lanes on Silver Hill Road, several issues were identified during the field visits that likely present a barrier to pedestrian, bicycle, and transit use on the campus. The sidewalks are relatively narrow (approximately four feet in width) and immediately adjacent to the curb, with no buffer from the travel lanes. While the posted speed limit on Silver Hill Road is 35 mph, actual travel speeds are much higher. Thus, the proximity of the sidewalk to traveling vehicles creates an unpleasant walking experience, and reduces the effective width of the sidewalks, particularly when sign poles are also located within the sidewalk area (Figure 6).

Figure 6: Sidewalk Along North Side of Silver Hill Road



Accessing transit utilizing the existing pedestrian facilities is also a challenge. In order to access the bus stops on the eastbound side of Silver Hill Road, a transit user has to cross an unsignalized pedestrian crosswalk that is located adjacent to the main entrance to the campus. Pedestrians must cross seven lanes of traffic at this location without a pedestrian refuge island in the median, a distance of approximately 90 feet. This is a relatively long distance for an unsignalized crosswalk across a major arterial which creates more potential for pedestrian-vehicle conflicts. The nearest signalized pedestrian crossing is approximately ¼ mile to the west of the main entrance.

Pedestrian access to the Suitland Metro station is provided by three uncontrolled ramp crossings at the Silver Hill Road/Suitland Parkway interchange. During the field investigation, vehicles were observed to be entering and exiting the ramps at relatively high speeds. In addition, recent ADA upgrades to the crossings have resulted in sections of sidewalk that are depressed below the road surface (Figure 7). This combination of factors can create an intimidating walking experience which may discourage SI staff from utilizing Metro.

Figure 7: Sidewalk Ramp Depressed Below Silver Hill Road Roadway Surface



The shared bicycle lanes are also likely intimidating for many bicycle riders. The right-most lanes on Silver Hill Road are designated with sharrows meaning that both bicycles and vehicles can use the lane (refer to Figure 6). However, the lanes are only slightly wider than a standard travel lane (13 feet) and vehicle speeds on Silver Hill Road are relatively high. Thus, these facilities are not likely to be an asset to the campus unless greater separation of vehicle/bicycle traffic can be provided.

According to the PGAtlas website, M-NCPPC's Geographic Information Systems (GIS) tool for Prince George's County, Silver Hill Road has planned bicycle lanes (Figure 8). The map also shows planned bike lanes along Branch Avenue and planned shared lanes near Branch Avenue Metro Station. In addition, there are 10 bicycle racks and bicycle lockers located at the Suitland Metrorail station.

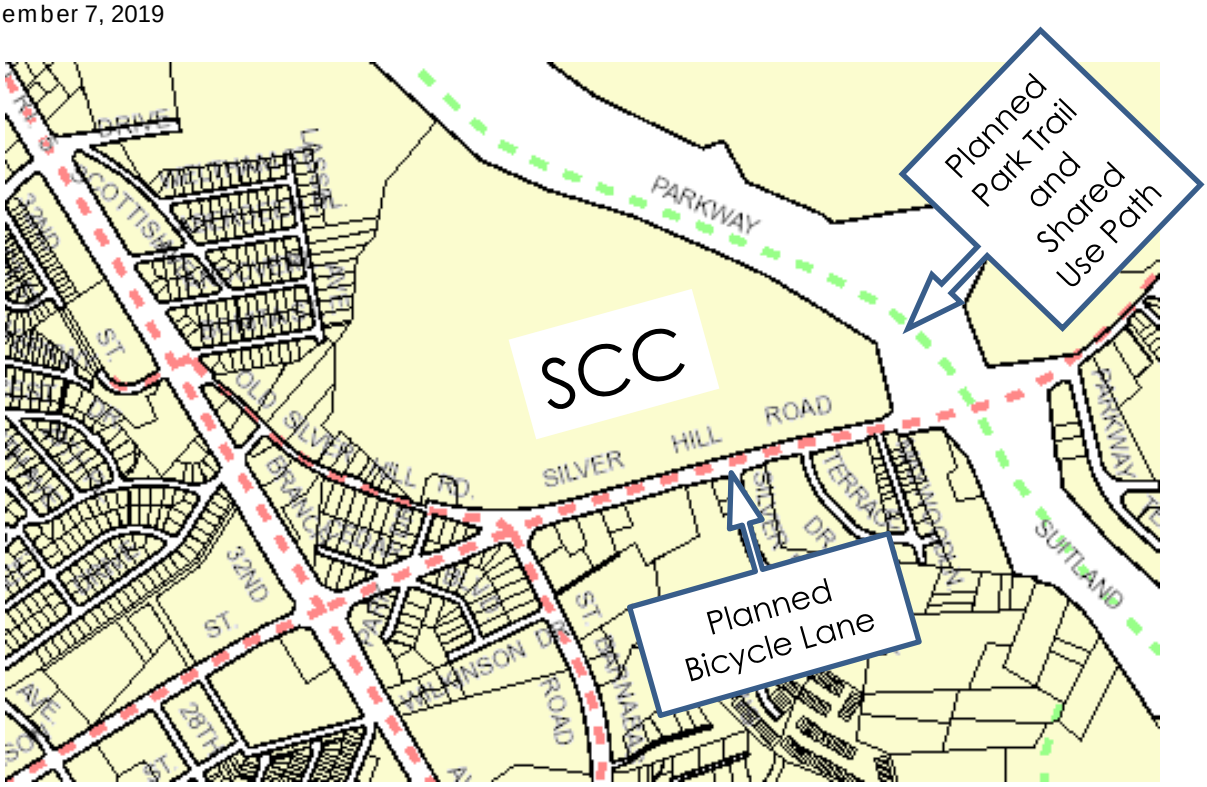


Figure 8: Planned Bicycle Facilities in Study Area

3.0 EMPLOYEE SURVEY

A 20-question voluntary employee survey was conducted via SurveyMonkey from June 7 to July 8, 2016 to evaluate current commuting patterns and identify potential opportunities that could encourage alternative commute modes (transit, carpool, walk/bike, etc.). The survey was distributed to 8,383 SI email addresses that included SI employees, volunteers, interns and researchers, and long-term research fellows with SI email accounts and badges (SI staff). The email addresses included all SI employees and others with SI email accounts, most of whom are not based on the SCC campus or are regular visitors to the campus. A hard copy of the survey was made available at the MSC security desk for visitors. Approximately 6% percent, or 537, SI staff completed the survey, 235 of whom listed the SCC campus as their normal duty station. This is a statistically significant sample size with a confidence level of 95% and a confidence interval of ± 4%.

The survey investigated the modes by which employees travel to work, working hours, origin/destination, possible improvements to transit options, reasons for mode choice, as well as how mode choice could be changed based on transportation improvements. The data obtained from the surveys was used to evaluate current commute patterns, as well as to provide data for the developing TMP goals and strategies. Appendix B contains an analysis of the results, as well as the questions utilized in the survey.

The survey found that at the SCC campus, the most common mode of commute was single-occupancy vehicle, and this was primarily because it was the fastest method available or because mass transit was perceived to cost more than driving (Figure 9). The respondents commuting via rail to the SCC are more likely to come from Washington, DC. Rail is not efficient for those who live at the end of the metro lines in Virginia and Maryland. Commuters from these stations have to take Metro into Washington, DC, and then back out again along the Green line to the Suitland Metro station. This is not an efficient commute as driving to work for these commuters likely would take less time. Bus service connects the site to other locations in Prince George's County, Maryland. However, there are no bus routes that connect the Suitland Metro Station to other areas around Washington, DC. Only 23.8 % of commuters to the SCC campus commute from Washington, DC, as most employees live in the suburbs. Approximately 9% of SCC-based employees lived outside of the reach of mass transit and park and ride centers. Most employees who live south or east of the SCC would be unable to take mass transit to work, since the nearest mass transit stop for them would be in close proximity to the SCC.

Employee Survey
November 7, 2019

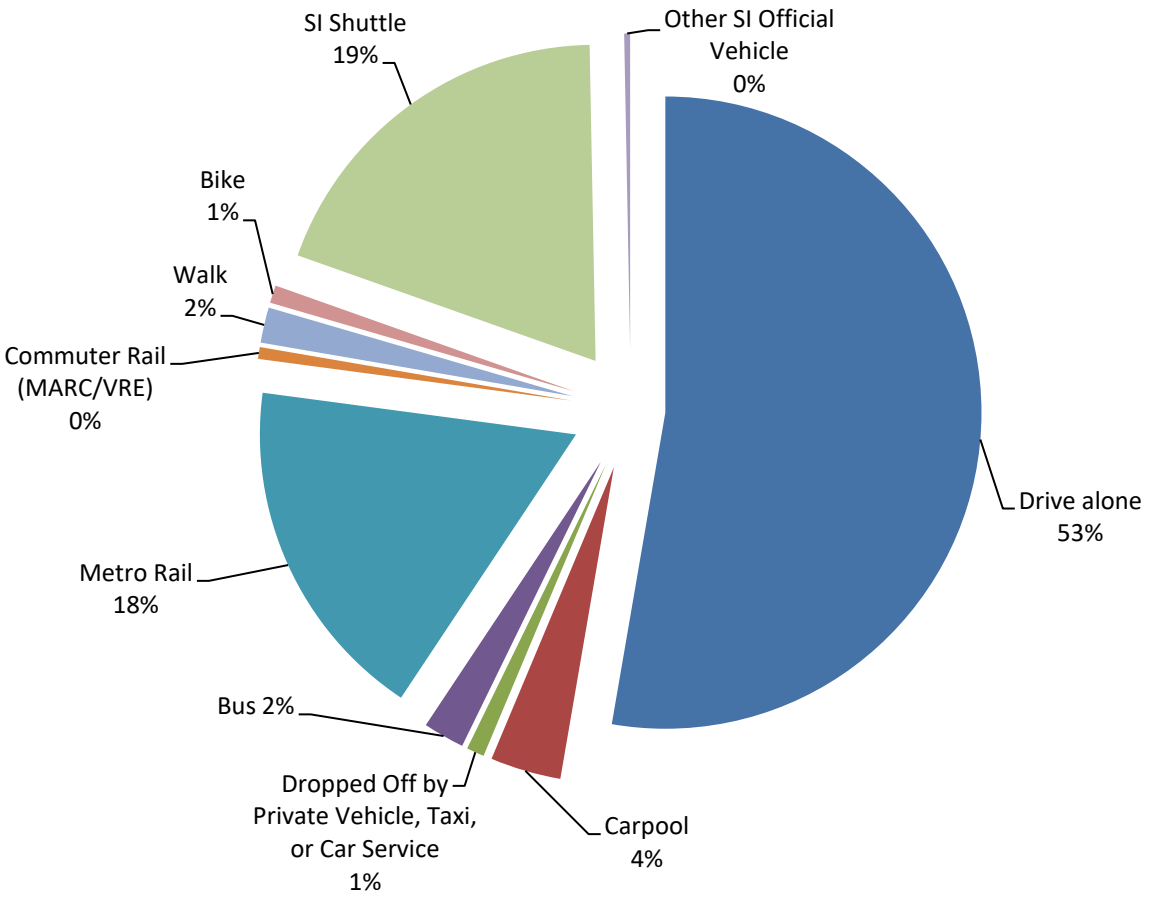


Figure 9. SCC-Based Employee Commute Method Survey Result

The results for the Smithsonian employee survey indicate a culture of mixed uses of transportation to the site. However, many employees choosing to drive alone to the site would be willing to change their mode of travel if public transportation became a more efficient option. However, many of these employees live in areas where public transportation most likely will never be a more efficient option. Many respondents indicated that they would rather see the Smithsonian shuttle make stops at metro stops, primarily in Virginia, where public transportation to the SCC takes significantly longer than driving. Other employees willing to take Metro to work wished the time it took to get from the Suitland Metro station to work would take less time.

There were also many employees whose commute time was faster by car than by train and the difference was so great that no changes to the transit connections would improve travel time and make transit more attractive. These employees generally lived outside of the downtown DC core. Thus, traveling to the site via transit would require traveling into the DC core and back out again.

By organizing the respondent's data from their surveys, the following needs and opportunities were noted that could enhance transportation connections to SCC and influence commute mode choice:

- **Provide a bike rack on the shuttle.** Some survey respondents requested the ability to take their bike on the SI shuttle when commuting. The Metro line prevents commuters from bringing their bicycles on trains during peak periods. Allowing bicycles on the shuttle would optimize how many employees can use the shuttle as a method of commuting.
- **Provide a shuttle stop at Suitland Metro station.** The current sidewalk connection to the Suitland Metro station was noted as a barrier to transit use by some survey respondents. They felt the walk was too far, and that they felt unsafe walking at night or during the winter. A shuttle would help eliminate employee concerns for their safety walking to and from the shuttle along with reducing the travel time it would take employees to travel by Metro. However, it would likely need to be independent from the existing shuttle service in order to provide the frequency needed to service Metro riders.
- **Provide a pedestrian and bicycle-friendly facility along Silver Hill Road.** Constructing a well-lit path along Silver Hill Road separated from the street and wide enough for bicyclists and pedestrians would make it more attractive to both bicyclists and pedestrians.
- **Provide more bicycle storage on the SCC campus and encourage WMATA to install additional bicycle parking at the Suitland Metro station as needed.** Providing bicycle lockers for Smithsonian employee use could encourage Metro use by providing the "last mile" connection to the campus. SI could also consider coordinating with a bikeshare provider.
- **Provide earlier/later and more frequent shuttle service.** Some employees who work during regular business hours felt that the shuttle schedule was not flexible enough to match their schedule. By instituting an earlier and later shuttle schedule, as well as providing more frequent service, particularly during peak travel periods, more employees may use it for commuting.
- **Establish real-time shuttle information system.** Several employees complained that the shuttle frequently runs late and had no way of knowing if the shuttle was running on time. By implementing a real-time shuttle information system, riders could determine when the next shuttle will arrive, and if it is running late.
- **Provide carpooling information and support.** Some respondents indicated their willingness to join a carpool to commute to work. By organizing carpools between employees who live lose to each other, more carpooling groups can be formed. SI could engage RideSmart to provide onsite transportation fairs and ride matching services.

4.0 EXISTING CONDITIONS REPORT

An assessment of existing conditions, needs and opportunities was completed in December 2016 utilizing the results of the employee survey, parking utilization counts, and field site visits. The results of the Existing Conditions analysis reveal several needs and opportunities for onsite and offsite transportation facilities that would help to transform the facility from an auto-oriented suburban campus to one that improves the balance between all modes of transportation. Many of the same needs and opportunities were noted in the field assessments as well as the survey. The identified needs and opportunities, as well as potential enhancement measures are summarized in Table 5, below.

Table 5: Summary of Needs, Opportunities, and Potential Enhancements

Transportation Facility Type	Need/Opportunity	Potential Enhancements
Internal Site Circulation	Clearly define an internal circulation roadway that provides access to all facilities and contains pedestrian and bicycle facilities.	A well-defined circulating roadway that enhances accessibility and safety by clearly defining main paths of travel and separating vehicles, pedestrians, bicycles, and transit/shuttles.
Internal Pedestrian/ Bicycle	Create a more cohesive internal pedestrian and bicycle network that would enhance internal circulation, provide collaboration opportunities, and encourage an active workforce.	A comprehensive network of pedestrian facilities that directly and efficiently connect the various buildings on the campus. Pedestrian sidewalks and bicycle lanes could be provided on an improved circulating roadway, and pocket parks and open space should be considered to encourage pedestrian movement across the campus.
Parking	Address the parking capacity deficiency at the MSC.	Consider new construction and/or better pedestrian connections to the CRC parking facility.
	Discourage parking on grassy areas adjacent to the circulating roadway.	Utilize a combination of design and enforcement to discourage parking in grassy areas along the circulation roadway.
Loading	Improve access to loading facilities.	Work with SI operations staff to identify loading needs and enhance access to loading facilities by providing wider and more direct connections to loading docks.
External Site Access	Provide a traffic signal at the main entrance gate on Silver Hill Road.	Consider a traffic signal to provide safer and more efficient vehicle access, particularly improving left-turn egress, as well as a controlled pedestrian crossing at the main entrance gate on Silver Hill Road.
External Pedestrian/ Bicycle	Improve external pedestrian and bicycle facilities.	Provide a wider (8-10 foot) sidewalk along the campus frontage which would be separated from the curb by a grass or landscape buffer that is at least five feet wide.

		Rectangular rapid flashing beacons or other high-visibility pedestrian treatments could be considered for ramp crossings. Traffic volumes along Silver Hill Road could be evaluated to determine if the right-most lane could be converted to a full bike lane (road diet).
	Provide bicycle storage on the Suitland Collections Center campus as well as at the Suitland Metro station.	Provide bicycle lockers for Smithsonian employee use on the campus as well as at nearby destinations, including the Suitland and Naylor Road Metro stations.
	Consider bikeshare to provide the "last mile" connection between the Suitland Collections Center and the Suitland Metro station.	Work with a bikeshare provider to place bikeshare stations on the campus and at nearby transit stops, including the Suitland and Naylor Road Metro stations. Ensure safe and efficient bike facilities to connect the campus and the Metro stations.
Transit/SI Shuttle	Enhance bus stop facilities.	Work with WMATA to provide bus shelters with benches at the bus stops located at the main campus entrance.
	Begin the shuttle service earlier in the morning.	Begin the shuttle service at 6:00 AM and revise current policies to allow it to be used as a "last-mile" connection for commuting.
	Increase the frequency of shuttle service during the AM and PM travel periods.	Increase the shuttle frequency to 30 minutes during the AM and PM travel periods to provide more flexibility for riders.
	Provide a bike rack on the shuttle.	The Metro line prevents commuters from bringing their bicycles on trains during peak periods. Allowing bicycles on the shuttle would optimize how many employees can use the shuttle as a method of commuting.
	Provide shuttle service to the Suitland Metro station.	Provide direct shuttle connection between the campus and the Suitland Metro station. New technology, such as driverless shuttles could be considered to improve frequency and reduce operating costs.
	Establish real-time shuttle information system.	Implement a real-time shuttle information system so that riders could determine when the next shuttle will arrive, and/or if it is running late.
	Provide carpooling information and support.	Begin an internal program or engage RideSmart to provide onsite transportation fairs and ride matching services.

4.1 TRAFFIC IMPACT ANALYSIS

Due to the long-term nature of the Master Plan as well as the anticipated growth of on-site population will be spread over an extended timeframe, MDOT State Highway Administration (MDOT SHA) and Maryland National Capital Park and Planning Commission (M-NCPPC) staff determined that a traffic impact study (TIS) would not be required as part of the Master Plan documentation. In a letter dated December 10, 2018, MNCPPC staff indicated that the overall plan is acceptable from a transportation standpoint with the following recommendations (see Appendix C):

1. The applicant should coordinate any changes to their vehicular entrances along Silver Hill Road with MDOT SHA.

2. The applicant should "scope" a TIA with transportation planning staff to establish parameters for a future traffic study.

3. The applicant should consider constructing the multiuse trail along their frontage consistent with the "Suitland-Silver Hill Greenway" plans in the Green Line Plan.

4. The applicant should consider improvements at the intersection of Maywood Lane and Silver Hill Road consistent with the Green Line Plan recommendations to increase pedestrian safety.

5. The applicant should consider improvements at their entrance opposite Hickory Hill Apartments consistent with the Green Line Plan recommendations to increase pedestrian safety.

The SI project team met with M-NCPPC and MDOT SHA staff on March 6, 2019 to discuss a potential future scope for the future traffic study that would be required prior to the construction of the proposed reconfigured entrance on Old Silver Hill Road. As a result of the meeting, the following guidance was provided for a future traffic analysis:

1. Reconvene with M-NCPPC and MDOT SHA staff prior to moving forward with the design and construction of the new driveway to verify the plan and begin developing the final traffic impact study scope.

2. Coordinate with NPS to evaluate potential options to improve pedestrian and bicycle connections from the SI frontage to the Suitland Metrorail Station.

3. The traffic impact study should comply with the most recent update to MDOT SHA guidelines for traffic impact analyses.

Current MDOT SHA guidelines indicate that a traffic impact study may be required for sites generating more than 50 peak hour trips. The guidelines also establish trip generation thresholds that relate to the intensity of the traffic impact study, i.e. study area size, analysis tools, and mitigation triggers. For a site like the SCC campus that generates between 101 and 750 peak hour trips, the following requirements apply:

Study Area

- All site access driveways.
- All intersections involving at least two state highways and all intersections of a state highway and a county/local collector, within ½ mile radius of the outermost site access driveways.

Analysis Tools (software-based analytical procedures and methodologies that support different aspects of traffic and transportation analyses)

- CLV
- HCS
- Synchro/SimTraffic
- SIDRA
- VISSIM
- Others as Needed

Mitigation

- Developer generated impacts for any intersection movements operating below LOS D.
- Any storage or blocking issues caused by the development.
- Any merge, diverge, weaving issues caused by the development.

Based on the guidance above it is anticipated that a traffic impact study for the SCC campus would include the following intersections. However, this study area would need to be verified with MDOT SHA and M-NCPPC prior to starting the study.

- Silver Hill Road (MD 458) and Suitland Parkway NB Ramps/Metro Station Driveway
- Silver Hill Road (MD 458) and Suitland Parkway SB Ramps
- Silver Hill Road (MD 458) and Suitland Campus Driveway/Hickory Hill Apartment Driveway
- Silver Hill Road (MD 458) and St. Barnabas Road (MD 414)/Old Silver Hill Road
- Old Silver Hill Road and Existing Suitland Campus Driveways
- Old Silver Hill Road and Colebrooke Drive
- Colebrook Drive and Branch Avenue (MD 5)
- Silver Hill Road (MD 458) and Branch Avenue (MD 5)

It should also be noted that at the March 6, 2019 meeting, MDOT SHA personnel expressed concern regarding the proximity of the proposed entry driveway to the intersection of Silver Hill Road (MD 458) and St. Barnabus Road (MD 414)/Old Silver Hill Road. While MDOT SHA and M-NCPPC generally accept the overall design plan, modifications may be required during design to improve the distance between the entry driveway and the intersection.

5.0 TRAVEL DEMAND MANAGEMENT

While the total number of on-site staff is anticipated to reach approximately 910 employees, it is expected to take at least 40 years to full build-out to achieve those numbers. It is anticipated that over this time, transportation technology and commute habits will change significantly as well as what may ultimately be required or built on-site by SI. Thus, developing a TMP that addresses needs through 2060 is not practical. Therefore, this TMP identifies potential TDM strategies that can be implemented within the next 20 years (a more typical master plan time frame), while also assessing potential needs beyond 20 years.

5.1 TRIP GENERATION, FUTURE POPULATION AND PARKING

5.1.1 Trip Generation

Based on the Master Plan, it is anticipated that the site will have a total population of approximately 910 people, including 550 full-time employees and up to 360 visiting researchers upon full implementation of the Master Plan. Within the twenty-year time frame of the TMP, it is anticipated that the site population would be approximately 550 people (400 full-time and 150 rotating staff and visiting researchers). While there is not an exact Land Use Code in the Institute of Transportation Engineers (ITE) Trip Generation Manual (10th Edition) that mirrors the research/museum-oriented nature of the SCC campus, Table 6, below, estimates the existing, 20 year, and full build trip generation utilizing the Land Use Code 760 (Research and Development Center), based on the population rather than square footage. Furthermore, to be conservative, Stantec assumed that the existing Non-Auto Driver Mode Share (NADMS) of 47% obtained from the employee commuter survey would remain relatively the same in both future conditions.

Table 6: Trip Generation Estimate by Phase

	AM Peak Hour	PM Peak Hour	Total Daily
Existing (350 ppl)	179	182	1,311
NADMS (47%)	84	86	616
Total Existing Vehicle Trips	**95**	**96**	**695**
20 Year (550 ppl)	281	286	1,863
NADMS (47%)	132	134	876
Total 20-Year Vehicle Trips	**149**	**152**	**987**
Full Build (910 ppl)	464	473	2,994
NADMS (47%)	218	222	1,407
Total Full Build Vehicle Trips	**246**	**251**	**1,587**
Increase in Trips Between Existing and Full Build	**+151**	**+155**	**+892**

5.1.2 Parking

The NCPC Transportation Element requires a parking ratio of 1:1.5 (1 parking space for every 1.5 employees) with a desired reduction in parking to a ratio of 1:2 (1 parking space for every 2 employees) over the course of the 20-year master plan for suburban facilities. With an NADMS of 47% on the SCC campus already, SI is committed to striving for the 1:2 parking ratio goal over the 20-year master plan for employees. However, with the location of the campus on an end-line Metrorail station, and the distance between the station and the campus facilities, there are challenges to providing a reduced parking ratio. Furthermore, given the varied nature of the types of vehicles/users on the campus, parking must be considered differently for different users.

SI plans to provide more access to the campus through scheduled public events and lectures, school trips, and with the increased collections space, it is likely to see an increase to its existing visiting researcher activity. These types of uses cannot be lumped in with employee parking because they typically result in short-term peaks in demand, and with the distance to transit, are likely to be more auto based. Therefore, SI will utilize a parking ratio of 1:1.5 (1 parking space per 1.5 visitors) to be inline with the NCPC Transportation Element but also provide SI with the flexibility it needs to accommodate visitor activity.

Finally, SI stores and maintains SI fleet vehicles and other mobile equipment (lifts, snowplows, golf carts, etc.) on the SCC campus; thus, parking will be required for these vehicles. Parking for this equipment will be provided at a 1:1 ratio considering an anticipated increase in fleet vehicles and equipment that is in line with the anticipated population growth.

In order to determine the number of parking spaces that would be included in the Master Plan, SI evaluated the actual utilization of each type of parking (ADA, employee, visitor, and SI fleet vehicle/mobile equipment) based on the utilization counts described in Section 2.2. Table 7 includes the breakdown of parking to be provided at the 2020 master plan. The calculations are based on the following evaluation:

- ADA Parking: Maintain the existing parking spaces (18). Although this number exceeds ADA requirements for total parking, the parking provided on the site will be divided into separate lots, each requiring its own minimum number of ADA parking spaces. Furthermore, with an anticipated increase in employee and visitors, the number of ADA parking spaces should not be reduced over what is being currently provided.

- Employee Parking: Parking provided at a ratio of 1:2 (1 parking space for every 2 employees).

- Visitor Parking: Parking provided at a ratio of 1:1.5 (1 parking space for every 1.5 visitors).

- SI Fleet/Mobile Equipment: Increase proportionately to the increase in employees over 20 years.

The parking supply proposed for the 20-year horizon is 382 parking spaces, 47 fewer parking spaces than exist today. This will allow SI to meet the 1:2 parking ratio goal for employees, a 1:1.5 ratio for visitors, and to provide additional parking for SI fleet vehicles.

Table 7: Parking Recommendations

	Existing	20-Year Horizon
Number of Employees	300	400
Number of Visitors	50	150
Parking Demand		
ADA	18	18
Employees	308	200
Visitors	N/A*	100
SI Vehicles and Mobile Equipment***	48	64
Total	**374**	**382**
Supply	**429**	**382**
Employee/Visitor** Parking Ratio	1:1.2	1:2

**A breakdown of existing visitors was not available – total visitor and employee parking demand included in employee line. **Excludes ADA and SI Fleet parking. ***For SI vehicles in parking lots. Does not include areas for these vehicles within loading dock apron areas, Fleet Management facility, Smithsonian Gardens outdoor work areas or similar locations separate from parking lots.*

The amount of parking needed will be assessed throughout the duration of the Master Plan implementation to ensure that the site is not overparked. Thus, with the anticipated changes to the transportation landscape in the coming years, a 40-year parking projection was not made in the Master Plan.

5.2 PROPOSED STRATEGIES WITHIN 20 YEARS

People choose their mode of travel based on several factors, including convenience, cost, time, and habit/familiarity. An effective transportation demand management (TDM) program provides a variety of strategies that affect one or more of these factors. The approach to TDM at the SCC will have to be tailored to the unique needs of the site. The relatively large square footage, but low population will make traditional TDM strategies, such as carpooling, vanpooling, and shuttle services more challenging. Additionally, because employees based at SCC also work at other SI locations, live across the greater DC, Maryland, and Virginia areas, and have varied schedules requiring their presence on the Mall, it is challenging to form car and van pools. Therefore, after careful consideration of site-specific needs, the following TDM strategies were developed to reduce single occupancy vehicle (SOV) trips at the SCC:

- Employee Transportation Coordinator

- Carpool/Vanpool Incentives
- Transit Incentives
- Last-Mile Connectivity Improvements
- Telecommuting Program
- Flexible Work Schedules
- Bike/Walk to Work Incentives

5.2.1 Employee Transportation Coordinator

An Employee Transportation Coordinator (ETC) is a "champion" of alternative commute modes. Given the limited on-site population, SI should consider establishing the ETC position as an employee or team of employees who would take the responsibility of TDM monitoring and management for the entire SI organization, including the SCC campus. ETC responsibilities include, but are not limited to:

- Educating employees through emails, mailings, and regular transportation fairs/brown bag lunches.
- Provide ride matching for carpool and vanpools.
- Assist employees in obtaining subsidies or registering for Guaranteed Ride Home programs.
- Maintain transportation information stations within all building lobbies that provides real-time traffic and transit information, as well as route schedules, and information on other commute modes.
- Encourage employee participation in events such as Car Free Day, Park(ing) Day, and Bike to Work Day.
- Coordinate directly with agencies such as MWCOG, WMATA, MTA, Prince George's County, etc., to discuss methods to reduce SOV trips.
- Monitor the performance of the TDM program by conducting annual employee commuter surveys and maintaining statistics on the number of employees utilizing each mode of transportation.
- Reach out to on-campus support staff and contractors to encourage them to utilize modes other than driving alone. At a minimum, consider including them in the carpool/vanpool and transit programs.
- Work with a carshare or fleet management firm to provide vehicles on-site for employees that commute by modes other than driving alone to use to get to meetings or other errands during the day, or establish an account with a rideshare company, such as Uber or Lyft.

5.2.2 Carpool/Vanpool

The employee survey revealed that SCC's employment base is distributed throughout Maryland, Virginia, and Washington, DC. Given that a majority of employees at the SCC live in areas where mass transportation takes significantly longer than driving to work, additional carpooling and vanpooling assistance and resources could increase usage.

The results of the survey, summarized in Table 6, show the highest concentration of employee residences in Washington, DC (25%). These employees are more likely to utilize Metrorail or the existing SI shuttle and would not likely be strong candidates for carpooling or vanpooling. However, employees living in suburban counties, such as Montgomery, Prince George's and

Fairfax Counties, among others, would have a more difficult time utilizing transit and/or the SI shuttle because of the nature of the hub-and-spoke system. The ETC should begin by utilizing employee zip codes to identify clusters of employees and conducting outreach to provide advanced ride matching and to discuss carpooling/vanpooling benefits.

However, given the relatively low site population, it may be challenging to identify enough candidates with similar schedules in one particular area. Therefore, rather than focusing on employees that live within the same area, the SI ETC should support regional transportation agencies' creation of commuter corridors, i.e. major freeways such as I-270, US 50, I-495, I-95, and I-66 with park-and-rides. An employee vanpool could be established along these routes with set schedules for pick-ups and drop-offs at park-and-ride facilities that are easily/directly accessible from the freeway. To provide additional flexibility, SI could consider working with ridesharing services such as UberPool, Lyft Line, or Chariot, which allow riders to coordinate with a larger pool of potential commuters, and thus have more options for arrival and departure times.

Table 8: Employee Survey Response – Area of Residence

Location of Residence	Number of Responses	Percentage of Responses
Washington, DC	126	24.8%
Montgomery County, Maryland	76	15.0%
Fairfax County, Virginia	72	14.2%
Prince George's County, Maryland	71	14.0%
Arlington County, Virginia	39	7.7%
Anne Arundel County, Maryland	26	5.1%
Alexandria City, Virginia	24	4.7%
Charles County, Maryland	17	3.3%
Calvert County, Maryland	12	2.4%
Howard County, Maryland	9	1.8%
Baltimore City, Maryland	7	1.4%
Frederick County, Maryland	7	1.4%
Other	3	4.2%

To encourage and facilitate carpooling/vanpooling, several incentive strategies should be considered:

- *Preferred Parking*:

  - Locate parking spaces for carpool and vanpool vehicles at locations which provide more convenient access to the building than would be provided for single occupant vehicle spaces.
  - Guarantee parking spots for carpool and vanpool vehicles. Special permits should be issued to monitor the use of these spaces.
  - Consider providing additional preferential parking for vanpools since they have a greater impact on trip reduction.
- *Employee Ride Matching*:
  - Create a database of employees interested in carpooling and vanpooling.
  - The ETC should match people according to their residential proximity and work schedule. Based on the survey results the ETC should start with identifying potential carpool/vanpool participants in suburban counties such as Montgomery, Prince George's, and Fairfax County. Utilizing zip code information, the ETC could plot out potential carpool or vanpool routes that travel along major corridors with park-and-ride facilities.
  - The ETC should facilitate the employees meeting each other by organizing the first meeting.
  - The ETC should follow up with employees to determine if the employees are a good fit and/or if new arrangements should be made. Furthermore, if the ETC takes an interest in the employees finding "good" pool partners, employee matching will most likely be self-promoting and may facilitate other employees taking this option under consideration.
- *Vanpooling*:
  - The ETC should encourage employees to participate in vanpooling because it has a greater impact on SOV trip reductions.
  - Provide transit subsidies to vanpool participants to help cover the cost of the van.
  - Support regional transportation agencies' creation of commuter corridors, such as I-270, I-95, I-495, US 50, and I-66, where employees can be picked up at park-and-ride facilities.
- *Ridesharing:*
  - If employees require greater flexibility in arrival and departure times, the ETC could work with ridesharing companies that provide more flexible vanpool and carpool options, such as UberPool, Lyft Line, or Chariot. These services allow riders to coordinate with a larger pool of potential commuters, and thus, have more options for arrival and departure times.
- *Guaranteed Ride Home Service*: A guaranteed ride home service provides free transportation to transit, carpool, and vanpool commuters when an emergency, like an illness, arises. The ETC should facilitate employee registration to the MWCOG Commuter Connections Program, which includes a Guaranteed Ride Home service.
- *Carsharing/Ridesharing*: One of the barriers to carpooling and vanpooling is the need to have access to a car during the day for business. SI could consider employing one of the below potential strategies to provide access to vehicles during the day for business:
  - SI works with SCC central operating unit to provide a fleet of SI vans that can be utilized by employees for vanpooling.
  - SI works with a carsharing company, such as ZipCar to locate vehicles near the visitor's center, outside the security line for use as an on-demand service for employees that need a quick reservation.
  - SI provides expanded shuttle services to typical destinations that employees travel to during the day.

- SI works with a ridesharing company, such as Uber or Lyft, and provides a designated pick-up and drop-off lane with a sheltered waiting area near the main entrance outside security line for on-demand use.

5.2.3 Transit

Because transit services in the Washington, DC metropolitan areas are oriented to bring people into the center of an urban area, a suburb-to-suburb transit trip can often double the commute time for an employee. Being located in a suburban area, it is recommended that SI consider a two-fold transit incentive program which focuses on the different needs of employees that live within the Beltway, and employees that live outside the Beltway.

- *Inside the Beltway*: These employees live in the urban center, and therefore, likely have easier access to bus services and Metrorail and would have a shorter commute utilizing transit than those living outside of the Beltway. Therefore, the focus of the strategy for these employees is encouraging commuting by Metrorail through transit incentives and improvements to last-mile connections (see Section 5.2.4).
- *Outside the Beltway*: Transit is likely to be less attractive for employees living outside the Beltway because the current transit system is oriented to connect the suburbs to the urban center. Thus, a suburb to suburb trip would increase commute time and require multiple seat changes. Accordingly, SI should focus on carpool and vanpool strategies, including UberPool, Lyft Line, and Chariot, as discussed in section 5.2.2.
- *Transit Incentives*: The following incentives should be considered for transit users, both inside and outside the Beltway.
  - Given the significantly more limited access to transit and the presently unsafe pedestrian route at this site as compared to the National Mall or National Zoo, assist employees in obtaining the maximum transit subsidy allowed by the Federal government.
  - Provide new staff and visitors with access to real time transit and shuttle information including links to smartphone apps.
  - Assist employees in registering for a guaranteed ride home service.
  - Explore the feasibility of funding an extension of the employee shuttle to begin at 6:00 AM and extend to 6:00 PM to facilitate it's use as the last leg of Suitland-based employees' commutes. For example, the shuttle could be used by SCC staff that could commute to the National Mall via transit (bus or Metrorail) to make the final connection between the Mall and the SCC campus. To restrict commuter use of the shuttle to only SCC employees, implement a registered parking program on the SCC campus.
  - Work with WMATA to provide bus shelters on Silver Hill Road, in close proximity to the main entrance and secondary pedestrian entrance.
- *Change Perceptions:* Establish programs to de-stigmatize bus transit:
  - Conduct annual or semi-annual commute challenges which offers prizes for documented transit use.
  - Conduct transportation fairs on board buses and/or at the Metro station to explain fare payment, transfers, and other aspects of transit to novice users.
  - Establish a transit ambassador program, where existing experienced riders promote transit use and will ride along with novice riders and help to navigate the system.

- *Public Transit User Group:* Establish a public transit users' group that meets at least once per month to discuss public transit issues, advocate for improved services, and coordinate a transit ambassador program.

- *Carsharing/Ridesharing*: One of the barriers to transit use is the need to have access to a car during the day for business. SI could consider employing one of the below potential strategies to provide access to vehicles during the day for business:
  - SI works with SCC Central Operating Unit to identify a fleet of vehicles that can be reserved by employees for carpooling during the day. These vehicles might be shared between units.
  - SI works with a carsharing company, such as ZipCar to locate vehicles near the office building.
  - SI provides expanded shuttle services to typical destinations that employees travel to during the day.
  - SI establishes an account with a ridesharing company, such as Uber or Lyft, and provides a designated pick-up and drop-off lane with a sheltered waiting area near the main entrance.

5.2.4 Last Mile Connectivity

The employee survey and site visit indicate that more employees may consider utilizing transit if connectivity to transit stations is improved. SI should consider the following strategies:

- Provide bicycle lockers for employee use on the campus and support access to shared bicycles and scooters at the Suitland and Naylor Road Metro Stations.
- Encourage WMATA to install additional bike lockers at Suitland and Naylor Road and to introduce Capital Bikeshare stations at these locations if feasible. Work with a bikeshare provider to place bikeshare stations on the campus and at nearby transit stops, including the Suitland and Naylor Road Metro stations.
- Improve pedestrian and bicycle connections to the Suitland Metro station by:
  - Providing a shared-use path along the site frontage and improving connectivity and circulation within the SCC campus.
  - Working with Prince George's County, MDOT SHA, and the National Park Service to improve the pedestrian and bicycle safety at the Suitland Parkway interchange.
- Explored the feasibility of extending the existing shuttle service to provide regular connections between the campus and the Suitland Metro station. Consider purchase of a van/smaller shuttle vehicle that can provide frequent service to and from the Suitland Metro station during peak commuting periods. New technology, such as driverless shuttles, could be considered in the future to improve frequency and reduce operating costs.
- Work with ridesharing companies such as Uber, Lyft, or a taxi service to provide on-demand service to the Suitland Metro station. Provide a pick-up and drop-off area at the main gate, outside of the secure area.

5.2.5 Telecommuting

SI should determine if there are any positions that can be successfully completed from home or a teleworking center one or more days per week and provide eligible employees with laptops or other mobile workstations. Telecommuting should be encouraged during peak commuting days, which are typically Tuesday and Wednesday. Regular telework opportunities for the group of SI employees based at SCC are more limited than in other SI locations because most jobs at SCC involve direct onsite interaction with collections, landscape materials, fleet vehicles, facilities maintenance and security.

5.2.6 Flexible Work Schedule

SI should consider establishing policies that allow employees to arrive off-peak. For example, a common strategy is to establish core working hours, typically 10:00 AM – 3:00 PM in which all employees are expected to be working. This would allow employees greater flexibility in selecting a commute time. For example, one employee could work from 7:00 AM – 3:00 PM while another could work 10:00 AM – 6:00 PM.

5.2.7 Internal/External Pedestrian/Bicycle Circulation

Given the size of the campus, as well as the need to connect to nearby services, such as the Suitland Metrorail station. The following incentives should be considered:

- Work with MDOT SHA, NPS, and Prince George's County to improve external pedestrian/bicycle facilities within the surrounding area of the campus, as well as to the Suitland Metrorail station. This includes providing a multi-use pathway along the SCC Campus frontage, which is called out in the Green Line Station Area plan.
- Provide shower and locker facilities on site.
- Provide sheltered bicycle racks near the building. Sheltered bicycle racks should also include tool and pump stations to allow employees to maintain their bicycles.
- Design the site to be pedestrian and bicycle friendly.
- Establish an internal bikeshare, scooter share, or electric cart system to allow staff to travel easily between areas of the campus without driving. Placing stations near the secondary pedestrian entrance will be particularly critical for reducing the potential walk distance to Metrorail.
- Install bike lockers on campus as well as at the Metrorail station and/or provide bikeshare/scooter stations in both locations.
- Establish a bicycle and pedestrian commuter group to provide support, advice, and advocacy for commuters.

5.3 LOOKING BEYOND 20 YEARS

Transportation and workplace technology are anticipated to change the way people work and commute. Therefore, many of the strategies listed above may not be applicable or may need to be heavily modified in the future. While the extent of the changes to commuting are not yet

known, SI can begin to anticipate future needs in the Master Plan by ensuring smart and flexible site design.

5.3.1 Autonomous Vehicles

It is anticipated that autonomous vehicles will be more widely available at the end of the 40-year Master Plan period, and that they will likely have a significant impact on travel and commuting patterns and behaviors. While the exact impact is unknown at this time, it is anticipated that there will be a mixture of privately-owned autonomous vehicles and shared autonomous vehicles/shuttles. Both types of vehicles present potential safety and logistics concerns for secure campuses. It is likely to be undesirable to allow empty vehicles entry into the site, or vehicles that have other non-SI passengers. Thus, SI should begin to consider how these types of vehicles could be accommodated.

If SI wishes to keep these vehicles outside of the secure area, consideration must be given to providing a pick-up and drop-off area that provides queuing for vehicles as well as a sheltered area for passengers to wait for their vehicle to arrive. The proposed Master Plan calls for a separate visitor parking area and information/security building at the relocated gate entrance. Section 5.2 also addresses the need to provide ridesharing pick-up and drop-off facilities with sheltered waiting areas outside the secure area, near the main gate. The ridesharing pick-up and drop-off area could be converted in the future for use by autonomous vehicles. Furthermore, depending on the impact of autonomous vehicles, SI could reclaim space from the visitor parking lot to use for vehicle queuing, and expand the visitor information and security building to include areas for waiting passengers.

5.3.2 Teleworking Technology

In addition to transportation technology, workplace technology may change the way people work and interact. While much of the work being conducted at the SCC is “hands on” with the materials and artifacts stored onsite, advancement in virtual workplace technology and archiving technology may make it easier to work remotely. For example, detailed 3-D scans of dinosaur bones would allow some research to be conducted without needing to handle the bone itself. This could potentially reduce the daily population of SI employees and reduce the need for scholars and researchers to visit the site. While teleworking technology may not affect the Master Plan directly, SI should continue to monitor the technology and make accommodations for its use.

5.3.3 Parking

Reducing the number of vehicles onsite, whether through transportation technology such as autonomous vehicles, or teleworking technology, could result in significantly less parking being required in the long-term. However, simply not constructing parking may not be an option if short-term needs exceed long-term projections. Therefore, SI could consider several strategies to better manage parking supply and demand:

- Construct parking in phases that correspond to the demand that each phase would generate.
- When additional parking is required to accommodate anticipated visitor demand, consider constructing this parking with permeable pavement or stabilized turf to reduce storm water impacts.
- Assess the impacts of shared vehicles on parking and potentially provide more dense parking where vehicles can park in closer proximity, thus reducing the overall size of parking areas.

5.3.4 Conclusion

While the overall impact of advancing technology cannot be full anticipated or accommodated in this TMP, the above strategies of flexible spaces for shared vehicle pick-up and drop-off, providing virtual workspace and archiving technology for teleworking, and managing parking supply, should be considered now in the Master Plan. Furthermore, the TMP should be updated on a regular basis to continue to monitor and accommodate changing commuting needs.

5.4 ROLES AND RESPONSIBILITIES

Implementing a travel demand management program for the proposed development of the SCC campus will require coordination between SI, the federal government and local jurisdictions, including SI, MDOT SHA, MWCOG, NCPC, NPS, and Prince George's County. The following lists recommended roles and responsibilities for each agency.

SI

- Structure policies that affect mode choice, such as parking and work hours.
- Establish ETC to implement and manage the TDM program.
- Coordinate with local agencies to advocate for improved transit services and pedestrian and bicycle facilities.

NCPC and MWCOG

- Provide TDM strategy guidance.
- Maintain the Commuter Connections program with Guaranteed Ride Home services.

MDOT SHA/NPS/Prince George's County

- Work with SI to identify opportunities for improved transit services, as well as improved regional pedestrian and bicycle facilities.

6.0 IMPLEMENTATION

The following guidance should be considered in the implementation of the transportation demand management (TDM) strategies:

6.1 INITIAL IMPLEMENTATION (WITHIN 10 YEARS)

The initial implementation of this TMP includes efforts to enhance existing commuting methods as well as to begin laying the groundwork for strategies that can be implemented as population increases and components of the Master Plan, such as internal and external circulation elements, are completed.

Employee Transportation Coordinator (ETC)

As discussed above, the ETC is extremely important to the overall success of the TDM program. The ETC will be an advocate for employees as well as for alternative commute modes and will be responsible for implementing, evaluating, and monitoring the program. Given the limited on-site population, an employee or team of full-time employees would take the responsibility of TDM monitoring and management for the entire SI organization, including the SCC campus.

Carpooling/Vanpooling

- Begin to identify potential carpool clusters for interested employees.
- Provide guaranteed preferential parking for each carpool vehicle close to the building entrance.
- Assist employees in registering for a guaranteed ride home service.

Transit

- Provide staff and visitors with access to real-time transit arrival and departure information, shuttle information, and real time traffic information, along with links to smartphone apps.
- Advertise transit subsidies and assist employees in obtaining the maximum amount permitted.
- Assist employees in registering for a guaranteed ride home service.
- Expand the current shuttle to serve the Suitland Metrorail station. Explore the feasibility of increasing shuttle service frequency to the Metrorail station as needed and consider expanding hours of operation to/from the National Mall.
- Encourage WMATA to install bus shelters at the main SCC campus entrance.

Telecommuting

- Consider developing a training program to provide potential telecommuters and their managers with goals, objectives, and guidelines of the program.
- Work with managers to identify jobs/employees that would be good candidates for telecommuting.
- Supply telecommuting employees with mobile workstations.

Flexible Work Schedules

- Work with SI leadership to establish a core set of hours that provides employees with the flexibility to arrive off-peak.
- Work with managers to identify opportunities for compressed days off.

Bicycling/Walking

- Begin coordination with MDOT SHA, NPS, and Prince George's County to discuss methods to improve the pedestrian/bicycle connection between the campus and the Suitland Metrorail station.
- Begin improving internal and external pedestrian and bicycle infrastructure.
- Provide conveniently located shower and locker facilities.
- Provide sheltered bicycle parking near the building entrances tool and pump stations.
- Begin to site locations for bikeshare, scooters, and/or electric cart stations.

Last-Mile Connectivity

- Work with WMATA and SI leadership to add bicycle lockers and/or bikeshare/scooters for employee use on the campus as well as at nearby Metro stations.
- Work with SI leadership to explore the feasibility of funding an extension of the employee shuttle to begin at 6:00 AM and extend to 6:00 PM to facilitate it's use as the last leg of Suitland-based employees' commutes.
- Expand the current shuttle to serve the Suitland Metrorail station.

6.2 MID-TERM (WITHIN 20 YEARS)

Within 20 years, many of the strategies discussed in Section 5 will be implemented to some degree. Monitoring of the program will begin once population increases by at least 100 full-time on-site staff members. In addition to the actions identified in Section 6.1 (Initial Implementation) the following actions should be considered within 20 years:

Employee Transportation Coordinator (ETC)

Identify an employee or team of employees who would take the responsibility of TDM monitoring and management for the entire SI organization, including the SCC campus. Although the ETC may not be located onsite, they should establish a centralized location within building where all transportation information is located and easily available to employees. The ETC should also set up an SI-wide website or intranet so that employees can access transportation information online and should conduct regular transportation fairs or brown bag lunches to educate employees about their commuting options.

Carpooling/Vanpooling

- Continue ride-matching potential carpool clusters for interested employees.
- Identify vanpool corridors and begin operations on at least one heavily-traveled corridor.

- Hold meetings of the carpoolers/vanpoolers and help them identify meeting spots and resolve any potential issues.
- Provide guaranteed preferential parking for each carpool and vanpool vehicle close to the building entrance.
- Assist employees in registering for a guaranteed ride home service.
- Coordinate a method for providing access to SI-owned shared vehicles during the day, including carsharing using, a fleet management company, or ridesharing service for employee use for meetings or other off-site needs.

Transit

- Increase shuttle service frequency to the Metrorail station as needed and investigate the feasibility of expanding hours of operation to/from the National Mall from 6:00 AM – 6:00 PM.

Telecommuting

- Implement telecommuting plan and hold meeting with existing and potential telecommuters. Offer additional incentives for those that are willing to telecommute on a Tuesday, Wednesday, or Thursday.
- Supply telecommuting employees with mobile workstations.

Flexible Work Schedules

- Implement and monitor flexible work schedules.

Bicycling/Walking

- Work with NPS. MD SHA, and Prince George's County to implement improvements to external connectivity to the Suitland Metrorail station by addressing/enhancing safety at the Suitland Parkway interchange.
- Complete all internal and external pedestrian and bicycle network improvements within completed areas of the campus, as well as along the Silver Hill Road frontage.
- Install bikeshare, scooters, and/or electric vehicle stations throughout campus, with focus on providing connectivity to the secondary pedestrian entrance on Silver Hill Road.

Monitoring Program

- Begin monitoring program once full-time staffing increases by 100 or other major changes are implemented, as discussed in Section 7.0.

6.3 LONG-TERM (20 YEARS TO FULL BUILD OUT)

As the implementation of the Master Plan continues to evolve beyond 20 years, SI should move the TMP into a monitoring and enhancing phase where the ETC continues to monitor the performance of the existing strategies while evaluating the need for potential changes or new strategies as technology evolves how and when people work. As such, the following strategies/policies may need to be considered:

- Evaluate how shared autonomous vehicles could be used for last-mile connections to nearby Metrorail stations.
- Develop a policy for accommodating autonomous vehicles onsite. Consider if or how empty vehicles, or those containing other non-SI passengers, would enter secured areas of the site. If SI requires that these vehicles stay outside of the secure area, consideration must be given to providing a pick-up and drop-off area that provides queuing for vehicles as well as a sheltered area for passengers to wait for their vehicle to arrive.
- Construct parking in phases that correspond to the demand that each phase would generate.
- When additional parking is required to accommodate anticipated visitor demand, consider constructing this parking with permeable pavement or stabilized turf to reduce storm water impacts.
- Assess the impacts of shared vehicles on parking and potentially provide more dense parking where vehicles can park in closer proximity, thus reducing the overall size of parking areas.

Re-evaluate parking needs and develop a plan to repurpose underutilized parking if needed.

7.0 MONITORING AND EVALUATION

This Transportation Management Plan (TMP) is a flexible document that can be shaped and reshaped as commuting patterns and needs change over the 40-year period. Each of the TDM strategies must be evaluated and changed as seen fit by the ETC as the program grows. The ETC will evaluate each strategy by setting the goals and then documenting the progress of each goal. It is expected that the TMP will be updated as needed for major projects that add significant numbers of visitors and staff, when major changes to policies and available transportation options require new strategies, when assumptions significantly change, or when the site reaches the 20-year horizon, whichever comes first. During each evaluation period, the following steps must be performed:

- Determine the extent to which each program has achieved its objective.
- Plan the degree of consistency of program implementation.
- Detail the relationship of different strategies to the effectiveness of the overall program.

Several options are available to the ETC to gauge the success of these programs, including:

- Encourage participation in GSA's annual federal employee transportation mode surveys.
- Perform periodic surveys of employees and re-evaluate the program. This would include determining whether the goals are being met and, based on the employee trends, identifying programs which are successful and need to be emphasized and those that are not working. The survey's goal will be to identify potential changes in trip characteristics. An example survey is contained in Appendix A.
- Perform traffic counts at all the access points at all entrances to employee and visitor parking.
- Re-evaluate parking needs to assess impact of new buildings and other major changes.
- Provide program participation documentation (e.g. application of transit subsidies, van registration, preferential parking registration).
- Provide packages to existing and new employees that identify the transit services and the incentives being offered.

APPENDIX A:
EXAMPLE ANNUAL EMPLOYEE SURVEY

Suitland Center Transportation Survey

Please answer the following questions about your current work/volunteer schedule and commute mode. The anonymous information you provide will be used to inform important decisions regarding the future of the Suitland Collections Center Campus. Please note that "Suitland Collections Center" is used when referring to the campus, including Paul E. Garber Facility, Museum Support Center (MSC), NMAI Cultural Resources Center (CRC), and Smithsonian Gardens (SG) Greenhouses.

1. **Please indicate the category below that best represents your role at Smithsonian.**
    a. Full-Time SI Employee
    b. Part-Time SI Employee
    c. Contractor
    d. Researcher
    e. Volunteer
    f. Intern

2. **Where is your normal SI duty station?**
    a. Suitland Collections Center

    b. Other SI Location(s) Specify: ☐

    c. Evenly divided between the Suitland Collections Center and another location(s). Specify: ☐

3. **When on the Suitland Collections Center campus, in which facility do you work/visit?**
    a. Garber
    b. MSC
    c. CRC
    d. NMNH Botany
    e. SG Greenhouses
    f. Other

4. **In which unit do you work?**

    ☐

5. **Which best describes your current work or volunteer schedule?**

    a. Full Time:
        i. Typical work week (i.e. Monday – Friday, "9 to 5")
        ii. Non-typical work week (late hours and/or odd shifts)
        iii. Alternate work schedule (work longer days to get an extra day off every week or every other week).
    b. Part time – Hours per week: ☐

6. **How often are you on the Suitland Collections Center campus?**

    a. Every work day
    b. 3 – 4 days a week
    c. 1 – 2 days a week
    d. 2 – 3 times per month
    e. Once per month
    f. Rarely (less than once per month)

7. **What is your typical arrival and departure time to/from the Suitland Collections Center when working or volunteering?**

    a. Arrival Time: ☐

    b. Departure Time: ☐

8. **How do you typically travel to and from the Suitland Collections Center? Select all that apply.**

    a. Drive alone
    b. Carpool
    c. Slug
    d. Registered Vanpool
    e. Dropped Off by Private Vehicle, Taxi, or Car Service
    f. Bus
    g. Metro Rail
    h. Commuter Rail (MARC/VRE)
    i. Walk
    j. Bike
    k. SI Shuttle
    l. Other SI Official Vehicle

9. **If you drive to the Suitland Collections Center, where do you typically park?**

    a. NMAI CRC Parking Lot
    b. MSC Primary Parking Near Front Entrance
    c. MSC Parking Near Loading Dock/Pod 4
    d. Garber Lot
    e. SG Greenhouse Lot
    f. Outside of the Old Silver Hill Road Sliding Gate
    g. Inside of the Old Silver Hill Road Sliding Gate
    h. Other Areas (Botany Greenhouses, OPL, Construction Trailer)

10. **In your opinion,**

    a. There is not enough parking available.
    b. There is adequate parking available.
    c. There is too much parking available (more parking than is needed).

11. **If you typically carpool, slug, or vanpool to/from the Suitland Collections Center, how many persons are usually in the vehicle, including yourself?** ☐

    How many persons in the vehicle are typically destined for the Suitland Collections Center, including yourself? ☐

12. **If you utilize rail transit (MARC/VRE or Metro) to travel to the Suitland Collections Center, at which Metro/rail station do you first board your train?**

13. **If you currently drive alone to the Suitland Collections Center, would you be willing to consider any alternative forms of travel?**

    a. Yes
    b. No

14. **If you answered No to question 13, please give a reason?**

    a. Other modes are more costly
    b. Prefer the comfort and convenience of my own vehicle
    c. Need car during the day for work
    d. Need car during the day for personal use
    e. No park-and-ride or transit stop close to home
    f. Unpredictable schedule
    g. Other

15. **If you currently drive alone to the Suitland Collections Center, are there any improvements to services that would encourage you to commute by transit, walking, or biking?** (For example, an express bus service, increase in the frequency of transit service, shuttle/bus connection between a nearby Metro station and the Campus, bicycle path, etc.).

16. **Do you currently use the SI shuttle to travel to/from the Suitland Collections Center?**

    a. Yes
    b. No

17. **If you answered Yes to Question 16, how often do you use the shuttle?**

    a. Less than once a month
    b. Once or twice a month
    c. Once or twice a week
    d. Three or four times a week
    e. Everyday

18. **If you answered No to Question 16, indicate the reasons why you do not use the shuttle.**

    a. I don't need to travel to other locations during the workday.
    b. I travel to multiple locations during the day, some of which are not served by the shuttle.
    c. The shuttle schedule is not frequent enough to meet my needs.
    d. I prefer the comfort and convenience of my own vehicle.
    e. Other: ☐

19. **What is the five-digit Zip code for your current place of residence?**

20. **Additional Comments:**

APPENDIX B:
EMPLOYEE COMMUTER SURVEY ANALYSIS

1.0 TRANSPORTATION SURVEY

An employee survey was conducted via Survey Monkey from June 7 to July 8, 2016 to evaluate the commuting patterns of the employees as well as identify potential opportunities that could encourage alternative commute modes (transit, carpool, walk/bike, etc.). The survey was distributed to all SI employees, as well as visitors, contractors, volunteers, interns and researchers (SI staff). A copy of the survey is located in Appendix A. The survey investigated the modes by which employees travel to work, working hours, origin/destination, possible improvements to transit options, reasons for mode choice, as well as how mode choice could be changed based on transportation improvements. The data obtained from the surveys was used to evaluate current commute patterns, as well as to provide data for the recommendations provided in Section 5.

A link to the survey was emailed to 8,383 SI staff emails, approximately 6% percent, or 537 employees completed the survey. The Survey Results in Tables 4 to 24 includes all the respondents' answers.

1.1 SURVEY RESULTS

The survey results for each question are summarized below.

Question 1: Please indicate the category below that best represents your role at Smithsonian.

Table 4 shows the number of respondents by organizational role. The majority of respondents were full-time SI employees. One respondent did not answer this question.

Table 4: Number of Respondents by Organizational Role

Role	Number of Responses	Percentage of Responses
Full-Time SI Employee	386	72.0%
Contractor	71	13.3%
Intern	29	5.4%
Volunteer	23	4.3%
Visiting Researcher	15	2.8%
Part-Time SI Employee	12	2.2%

Question 2: Where is your normal SI duty station?

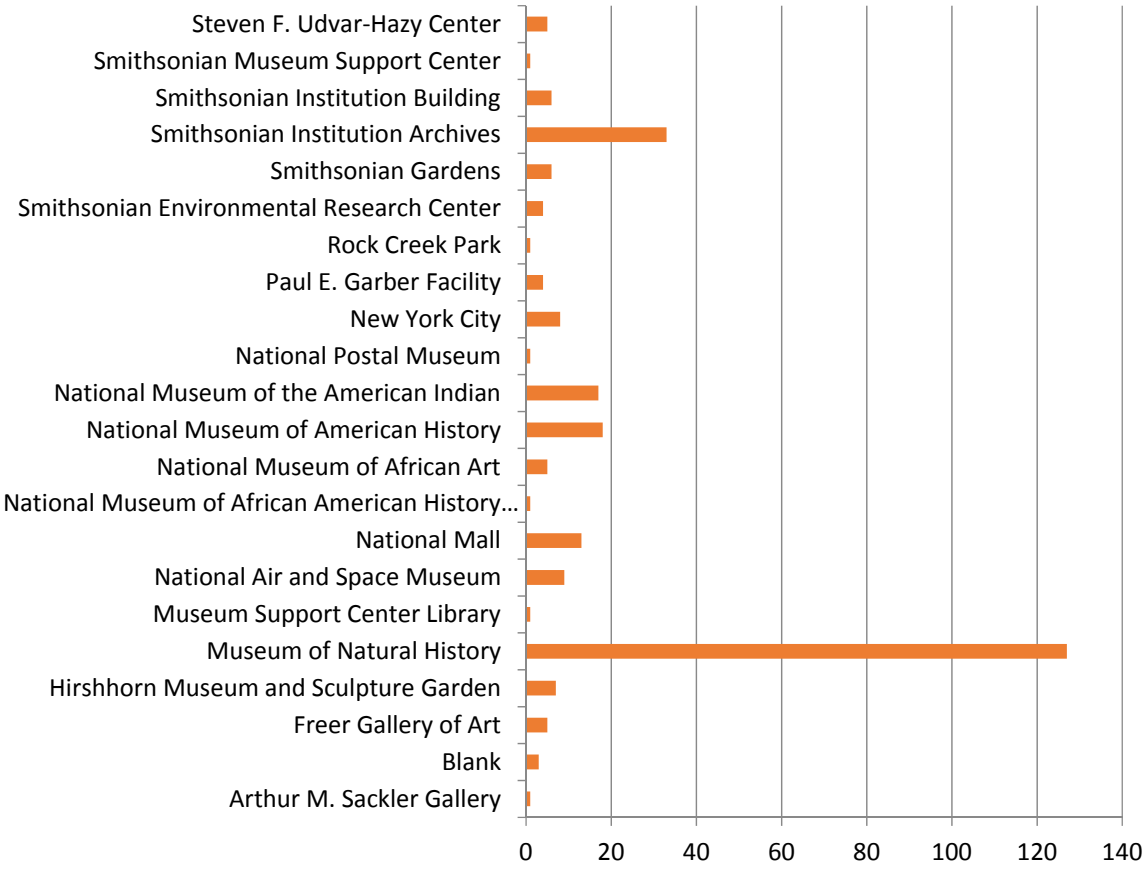
Table 5 shows the number of respondent's normal duty station. Respondents were relatively evenly split between those that normally work at other SI locations and those that work on the campus. Five respondents did not answer this question.

Table 5: Number of Respondents by Normal SI duty Station

SI Duty Station	Number of Responses	Percentage of Responses
Other SI location(s)	242	45.5%
Suitland Collections Center	235	44.2%
Evenly divided between the Suitland Collection Center and another location(s)	55	10.3%

Respondents who selected options "evenly divided between the Suitland Collection Center and another location(s) and "other SI location(s)" were asked to specify the other SI location they work at for their job. Figure 11 shows a summary of their responses.

Figure 11: Other SI Locations



Question 3: When on the Suitland Collections Center campus, in which facility do you work/visit? Select all that apply.

Table 6 shows the number of respondents for each Suitland Collections Center campus facility. The majority of respondents indicated that they work/visit the MSC. Two respondents did not answer this question.

Table 6: Number of Respondents by Normal SI Duty Station

Facility	Number of Responses	Percentage of Responses
MSC	363	67.9%
Garber	138	25.8%
CRC	135	25.2%
SG Greenhouses	69	12.9%
NMNH Botany	38	7.1%
Other	36	6.7%

Question 4: In which unit do you work?

Table 7 shows the number of respondents for each Suitland Collections Center campus facility. 35 respondents did not answer this question.

Table 7: Number of Respondents by Unit

Unit	Number of Responses	Percentage of Responses
NMAI	42	8.3%
Anthropology	41	8.1%
NMNH	38	7.5%
Vertebrate Zoology	33	6.5%
Invertebrate Zoology	23	4.6%
NMAH	22	4.4%
MCI	21	4.2%
Collections	20	4.0%
Smithsonian Gardens	18	3.6%
Botany	17	3.4%
NASM	13	2.6%

Smithsonian Facilities	12	2.4%
Conservation	10	2.0%
Entomology	9	1.8%
LAB	8	1.6%
CRC	7	1.4%
FSG	7	1.4%
MSG	7	1.4%
Archives	6	1.2%
Exhibits	6	1.2%
NAA	6	1.2%
OPS	6	1.2%
Paleobiology	6	1.2%
CSS	5	1.0%
Greenhouses	5	1.0%
Orchid Collections	5	1.0%
Freer and Sackler Gallery	4	0.8%
HMSG	4	0.8%
Library	4	0.8%
MSC	4	0.8%
OSHEM	4	0.8%
SF	4	0.8%
SG	4	0.8%
SIL	4	0.8%
27	3	0.6%
IT	3	0.6%
Mineral Sciences	3	0.6%
NMAA	3	0.6%

OFMR	3	0.6%
Pod 2	3	0.6%
Pod 4	3	0.6%
Transportation	3	0.6%
WRBU	3	0.6%
Admin	2	0.4%
Education & Museum Programs	2	0.4%
Mammals	2	0.4%
NHB	2	0.4%
OFEO	2	0.4%
OPDC	2	0.4%
Provost Office	2	0.4%
Repatriation	2	0.4%
Shipping & Receiving	2	0.4%
ADS	1	0.2%
Advancement	1	0.2%
AV Branch	1	0.2%
Building 13	1	0.2%
CFCH	1	0.2%
CPU	1	0.2%
Craft Shop	1	0.2%
Curatorial	1	0.2%
Foxtrap	1	0.2%
Hotel Company	1	0.2%
Museum Assets and Operations	1	0.2%
NCP	1	0.2%
NMAAHC	1	0.2%

NPM	1	0.2%
NZP	1	0.2%
OCA	1	0.2%
OCIO	1	0.2%
OCON	1	0.2%
OPA	1	0.2%
OSCAR	1	0.2%
Photo	1	0.2%
Pod 3	1	0.2%
Pod 5	1	0.2%
Pod 6	1	0.2%
PRU	1	0.2%
Security	1	0.2%
SED/HVG	1	0.2%
SERC	1	0.2%
SIE	1	0.2%
SIMS lab	1	0.2%
SITES	1	0.2%
Technology	1	0.2%
USRO	1	0.2%
Web Office	1	0.2%

Question 5: Which best describes your current work or volunteer schedule?

Table 8 shows the number of respondents for each work schedule. The majority of respondents indicate that they work full time. Two respondents did not answer this question.

Table 8: Number of Respondents by Work Schedule

Work Schedule	Number of Responses	Percentage of Responses
Full Time: Typical Work Week	365	68.2%
Part Time	69	12.9%
Full Time: Alternate Work Schedule	59	11.0%
Full Time: Non-Typical Work Week	42	7.9%

Question 6: How often are you on the Suitland Collection Campus?

Table 9 shows the number of respondents for each answer choice. 16 respondents did not answer this question. Most (38%) of respondents indicate that they are on the campus every work day. The remaining responses were relatively evenly distributed.

Table 9: Number of Respondents by How Often they are on Suitland Collections Campus

Answer Choice	Number of Responses	Percentage of Responses
Every Work Day	203	37.9%
Rarely (less than once a month)	95	17.8%
2-3 Times a Month	69	12.9%
1-2 Days a Week	61	11.4%
3-4 Days a Week	55	10.3%
Once per Month	52	9.7%

Question 7: What is your typical arrival time to/from Suitland Collections Center when working or volunteering?

Table 10 shows the number of respondents for each answer choice. The majority of respondents indicated that they typically arrive during the AM peak period. Two respondents did not answer this question.

Table 10: Respondent Arrival Time

Answer Choice	Number of Responses	Percentage of Responses
During AM Peak (6:00 AM – 9:00 AM)	388	72.5%
Outside of AM Peak	104	19.5%
Varies	43	8.0%

Question 8: How do you typically travel to and from the Suitland Collections Center? Select all that apply.

Table 11 shows the number of respondents for each commuting method. The majority of respondents (59%) indicated that they drive alone to the campus. Metro rail was the second highest commute mode. Four respondents did not answer this question.

Table 11: Number of Respondents by Commuting Method

Commuting Method	Number of Responses	Percentage of Responses
Drive Alone	316	59.3%
Metro Rail	100	18.8%
Carpool	40	7.5%
Bus	11	2.1%
Dropped Off by Private Vehicle, Taxi, or Car Service	3	1.3%
Commuter Rail	3	0.6%
Slug	0	0.0%
Registered Vanpool	0	0.0%

Question 9: If you drive to the Suitland Collections Center, where do you typically park?

Table 12 shows the number of respondents for each parking lot. 158 respondents did not answer this question.

Table 12: Number of Respondents by Parking Lot

Parking Lot	Number of Responses	Percentage of Responses
MSC Primary Parking Near Front Entrance	155	40.9%
NMAI CRC Parking Lot	78	20.6%
MSC Parking Near Loading Dock/Pod 4	44	11.6%
Garber Lot	40	10.6%
SG Greenhouse Lot	33	8.7%
Other Areas	18	4.8%
Inside of Old Silver Hill Road Sliding Gate	10	2.6%
Outside of Old Silver Hill Road Sliding Gate	1	0.3%

Question 10: Respondent's Opinion on Parking

Table 13 shows the number of respondents for each opinion on the current parking situation. The majority of respondents (64%) believe that there is adequate parking, while on 4% believe that there is too much parking. 116 respondents did not answer this question since this question does not apply to all respondents.

Table 13: Number of Respondents by Opinion

Opinion	Number of Responses	Percentage of Responses
There is adequate parking available	270	64.1%
There is not enough parking available	147	34.9%
There is too much parking available	4	1.0%

Question 11: Number of Passengers in Carpool.

Table 14 shows the number of passengers in a respondent's carpool vehicle. The respondents were then asked how many people in their carpool are also destined for the Suitland Collections Center, which is shown In Table 15. 487 respondents did not answer this question since it does not apply to all respondents. Some employees mentioned in the survey that they would be willing to carpool, indicating that a more organized employee carpool system can reduce the number of employees driving to the site alone.

Table 14: Number of Respondents by Carpool Passengers

Number of Passengers	Number of Responses	Percentage of Responses
2	31	62.0%
3	10	20.0%
4	5	10.0%
8	2	4.0%
5	1	2.0%
7	1	2.0%
6	0	0.0%

Table 15: Number of Respondents by Carpool Passengers whose Destination is the Suitland Collections Center

Number of Passengers	Number of Responses	Percentage of Responses
2	17	34.0%
1	12	24.0%
3	8	16.0%
0	5	10.0%
4	4	8.0%
5	2	4.0%
7	1	2.0%
8	1	2.0%
6	0	0.0%

Question 12: If you utilize rail transit (Metro or MARC/VRE) to travel to the Suitland Collections Center, at which Metro/rail station do you first board your train?

Table 16 shows the number of respondents by the train station at which they board. 483 respondents did not answer this question since this question does not apply to all respondents.

Table 16: Number of Respondents by Metro Station

Station	Number of Responses	Percentage of Responses
L'Enfant Plaza	12	10.3%
Takoma	5	4.3%
Columbia Heights	4	3.4%
Court House	4	3.4%
Pentagon City	4	3.4%
Bethesda	3	2.6%
Foggy Bottom	3	2.6%
Glenmont	3	2.6%
Greenbelt	3	2.6%
Huntington	3	2.6%
Navy Yard-Ballpark	3	2.6%
Prince George's Plaza	3	2.6%
Rosslyn	3	2.6%
Silver Spring	3	2.6%
Union Station	3	2.6%
Waterfront	3	2.6%
West Hyattsville	3	2.6%
Archives	2	1.7%
Braddock Rd	2	1.7%
Congress Heights	2	1.7%
Dupont Circle	2	1.7%
Federal Triangle	2	1.7%

Fort Totten	2	1.7%
Friendship Heights	2	1.7%
Georgia Ave-Petworth	2	1.7%
Largo Town Center	2	1.7%
Pentagon	2	1.7%
Rockville	2	1.7%
Shady Grove	2	1.7%
U St	2	1.7%
Wiehle-Reston East	2	1.7%
Woodley Park	2	1.7%
Addison Rd	1	0.9%
Ballston	1	0.9%
Branch Ave	1	0.9%
Brookland	1	0.9%
Capitol Heights	1	0.9%
Cleveland Park	1	0.9%
College Park	1	0.9%
Crystal City	1	0.9%
Eisenhower Ave	1	0.9%
Grosvenor-Strathmore	1	0.9%
Kensington	1	0.9%
Kings St-Old Town	1	0.9%
Leeland Road	1	0.9%
Mt Vernon Sq	1	0.9%
NoMa–Gallaudet U	1	0.9%
Shaw-Howard U	1	0.9%
Silver Spring	1	0.9%

Smithsonian	1	0.9%
Tenleytown-AU	1	0.9%
Vienna	1	0.9%
West Falls Church	1	0.9%
Wheaton	1	0.9%

Question 13: If you currently drive alone to the Suitland Collections Center, would you be willing to consider any alternative forms of travel?

Table 17 shows the number of respondents that are willing to consider an alternative mode if they currently drive to work alone. At least 42% of respondents indicated that they would be willing to consider alternative forms of travel, while 58% indicated that they would not. 195 respondents did not answer this question since this question does not apply to all respondents.

Table 17: Number of Respondents by Consideration

Consideration	Number of Responses	Percentage of Responses
No	198	57.9%
Yes	144	42.1%

Question 14: If you answered No to question 13, please give a reason?

Table 18 shows the reason behind respondents answering "No" to question 13. 15 respondents who answered "No" to considering an alternate mode of travel did not give a reason behind their choice.

Table 18: Number of Respondents by Reason

Consideration	Number of Responses	Percentage of Responses
Other modes are more costly	56	28.0%
Unpredictable schedule	36	18.0%
No park-and ride or transit stop close to home	35	17.5%
Prefer the comfort and convenience of my own vehicle	34	17.0%
Need car during the day for personal use	13	6.5%
Need car during the day for work	8	4.0%
Train schedule is not flexible enough	8	4.0%
Feel unsafe taking metro to work	4	2.0%
Metro doesn't run during working hours	3	1.5%
Live Nearby	1	0.5%
Not physically able to take public transportation	1	0.5%
Suitland Metro Station is too far	1	0.5%

Question 15: If you currently drive alone to the Suitland Collections Center, are there any improvements to services that would encourage you to commute by transit, walking, or biking? (For example, an express bus service, increase in the frequency of transit service, shuttle/bus connection between a nearby Metro station and the campus, bicycle path, etc.).

Table 19 shows a summary of the open-ended responses. The most popular response, other than "none" was to provide a shuttle connection between the campus and the Suitland metro station. Providing more frequent shuttle service was also a popular response. 273 respondents did not answer this question since this question does not apply to all respondents.

Table 19: Improvements to Make Alternative Commute Modes More Attractive

Consideration	Number of Responses	Percentage of Responses
None	128	48.5%
Shuttle from Suitland Metro	51	19.3%
More Frequent Shuttle	21	8.0%
Express Bus Service To Virginia	14	5.3%
Express Shuttle	7	2.7%
Make Metro Stop/Area More Safe	6	2.3%
Make Sidewalk to Metro more safe	5	1.9%
Continue Purple Metro line into Virginia	4	1.5%
Bicycle path	3	1.1%
Express Bus	2	0.8%
More Frequent MARC Trains	2	0.8%
On-Time Shuttle	2	0.8%
Sidewalk to Metro is Dangerous	2	0.8%
Better Bike Lanes from DC	1	0.4%
Better Bus Service in PG County	1	0.4%
Better Metro Service	1	0.4%
Bus to Pentagon Metro	1	0.4%
Carpooling	1	0.4%
Cheaper Metro Bike Lockers	1	0.4%

Express Buses do not Stop in Area	1	0.4%
Express Metro Service	1	0.4%
Extend Green Metro Line	1	0.4%
Increase in Shuttle Schedules	1	0.4%
Metro bus linking Huntington to Branch Ave	1	0.4%
Metro Running at Night	1	0.4%
More Bus Service	1	0.4%
MTA Buses stopping nearby	1	0.4%
Park and Ride along Shuttle Route	1	0.4%
Shuttle from Alexandria.	1	0.4%
Shuttle to Southeastern Maryland	1	0.4%

Question 16: Do you currently use the SI shuttle to travel to/from the Suitland Collections Center?

Table 20 shows the number of respondents that utilize the SI shuttle to travel to/from the Suitland Collections Center. 12 respondents did not answer this question.

Table 20: Number of Respondents by consideration

Consideration	Number of Responses	Percentage of Responses
Yes	392	74.7%
No	133	25.3%

Question 17: If you answered Yes to Question 16, how often do you use the shuttle?

Table 21 shows the number of respondents based on how often they use the SI Shuttle. The majority of respondents (68%) utilize the shuttle once or twice a month or less. 132 respondents did not answer this question since they answered "No" to Question 16.

Table 21: Number of Respondents by how often the use the shuttle

Consideration	Number of Responses	Percentage of Responses
Less than once a month	149	36.8%
Once or twice a month	126	31.1%
Once or twice a week	70	17.3%
Three or four times a week	30	7.4%
Everyday	30	7.4%

Question 18: If you answered No to Question 16, indicate the reasons why you do not use the shuttle.

Table 22 shows the number of respondents based on how often they use the SI Shuttle. Other than responding that they do not have to travel during the workday, the top responses included preferring their own vehicle and noting that the shuttle is not frequent enough to meet their needs. 10 respondents who answered "No" to Question 16 did not give a reason behind their choice.

Table 22: Number of Respondents by Reasons they do not Use the Shuttle

Consideration	Number of Responses	Percentage of Responses
I don't need to travel to other locations during the workday	47	35.1%
I prefer the comfort and convenience of my own vehicle	24	17.9%
The shuttle schedule is not frequent enough to meet my needs	18	13.4%
Commute is faster without shuttle	13	9.7%
Need to carry materials for work (Use SI vehicle)	12	9.0%
I travel to multiple locations during the day, some of which are not served by the shuttle	10	7.5%
No Shuttle stop at work station	3	2.2%
Shuttle does not arrive early enough	3	2.2%
Campus is too big to walk around	1	0.7%
Carpool Instead	1	0.7%
Live Nearby	1	0.7%
Shuttle is late too often	1	0.7%

Question 19: What is the five-digit Zip code for your current place of residence?

Table 23 shows a table of employee residencies summarized by county. The majority of respondents (68%) live within close proximity to Washington, DC, including Washington, DC itself (25%), Montgomery County (15%), Fairfax County (14%), and Prince George's County (14%). 29 respondents did not list a zip code.

Table 23: Respondents County of Residency

Consideration	Number of Responses	Percentage of Responses
Washington, DC	126	24.8%
Montgomery County, Maryland	76	15.0%
Fairfax County, Virginia	72	14.2%
Prince George's County, Maryland	71	14.0%
Arlington County, Maryland	39	7.7%
Anne Arundel County, Maryland	26	5.1%
Alexandria City, Virginia	24	4.7%
Charles County, Maryland	17	3.3%
Calvert County, Maryland	12	2.4%
Howard County, Maryland	9	1.8%
Baltimore City, Maryland	7	1.4%
Frederick County, Maryland	7	1.4%
Baltimore County, Maryland	3	0.6%
Prince William County, Virginia	3	0.6%
Saint Mary's County, Maryland	3	0.6%
Stafford County, Virginia	3	0.6%
Cecil County, Maryland	1	0.2%
Fairfax City, Virginia	1	0.2%
Falls Church City, Virginia	1	0.2%
King George County, Virginia	1	0.2%
Loudoun County, Virginia	1	0.2%
Montgomery County, Pennsylvania	1	0.2%

Queen Anne's County, Maryland	1	0.2%
Queens County, New York	1	0.2%
Spotsylvania County, Virginia	1	0.2%
York County, Pennsylvania	1	0.2%

Question 20: Additional Comments

Table 24 shows any additional comments that were made at the end of the survey. 447 respondents chose not to provide any additional comments

Table 24: Additional Comments Summary

Consideration	Number of Responses	Percentage of Responses
More Frequent Shuttle	15	16.7%
Need More Parking	15	16.7%
Metro Takes too Long	10	11.1%
Cannot go to Work Without Car	6	6.7%
Notifications for a Late Shuttle	5	5.6%
Shuttle to Suitland Metro	5	5.6%
Suitland Metro Station is Dangerous	5	5.6%
Need Traffic Light Outside the Suitland Center	4	4.4%
Sidewalk to SCC is Dangerous	4	4.4%
The Shuttle is Bumpy	4	4.4%
Need Car for Job Requirements	3	3.3%
Shuttle Runs Late too Often	2	2.2%
Silver Hill Road is Dangerous to Bike on	2	2.2%
Add a Crystal City Shuttle	1	1.1%
Don't take Away Free Parking	1	1.1%
Earlier Shuttle Schedule	1	1.1%
Electric Car Charger at Suitland	1	1.1%
Open-Ended Response	1	1.1%
Shuttle at Capitol Gallery	1	1.1%
Shuttle is Slow	1	1.1%
Shuttle Needs Bike Racks	1	1.1%
Shuttle Stop at the Zoo	1	1.1%
Shuttle Takes too Long	1	1.1%

1.2 SURVEY ANALYSIS

The results of the survey show that more respondents drive alone to work at the Suitland Collections Center than at other Smithsonian locations (Figures 12 and 13). Some respondents took multiple methods of transportation to get to work. More employees at the other Smithsonian locations utilized the shuttle to get to work than at the Smithsonian Collections Center. Some respondents noted that to get to work at other Smithsonian locations they would drive to the Smithsonian Collections Center and then commute on the Smithsonian shuttle into Washington, DC.

Figure 12: Suitland Collections Center Based Employees Commute Methods

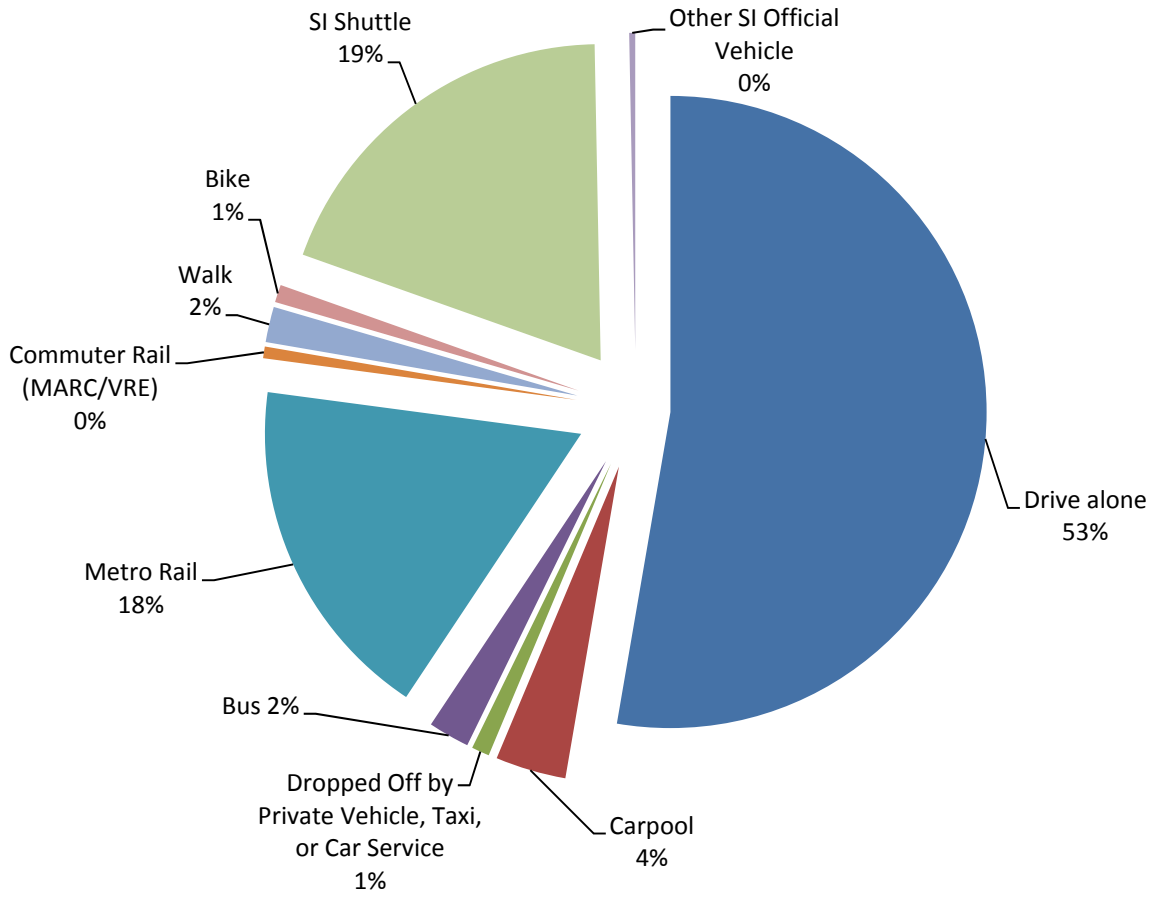
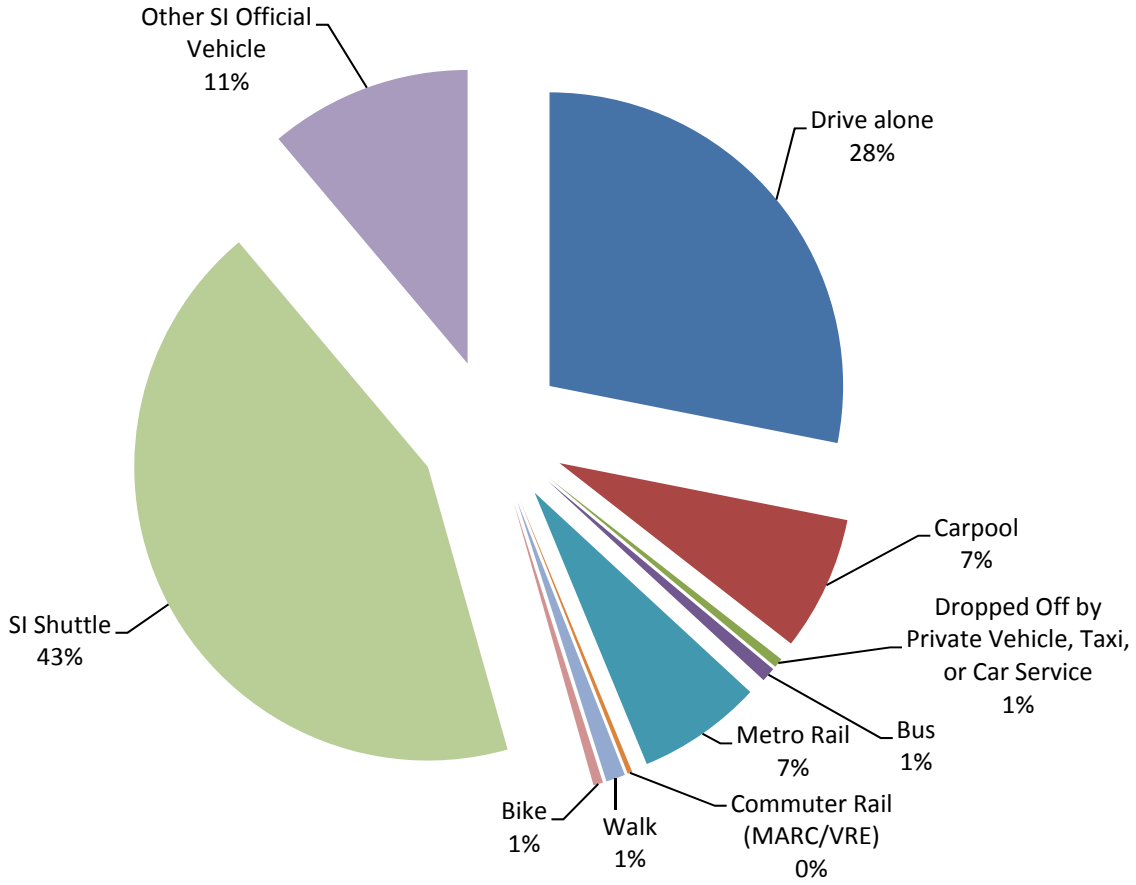


Figure 13: Other Smithsonian Locations Based Employees Commute Methods



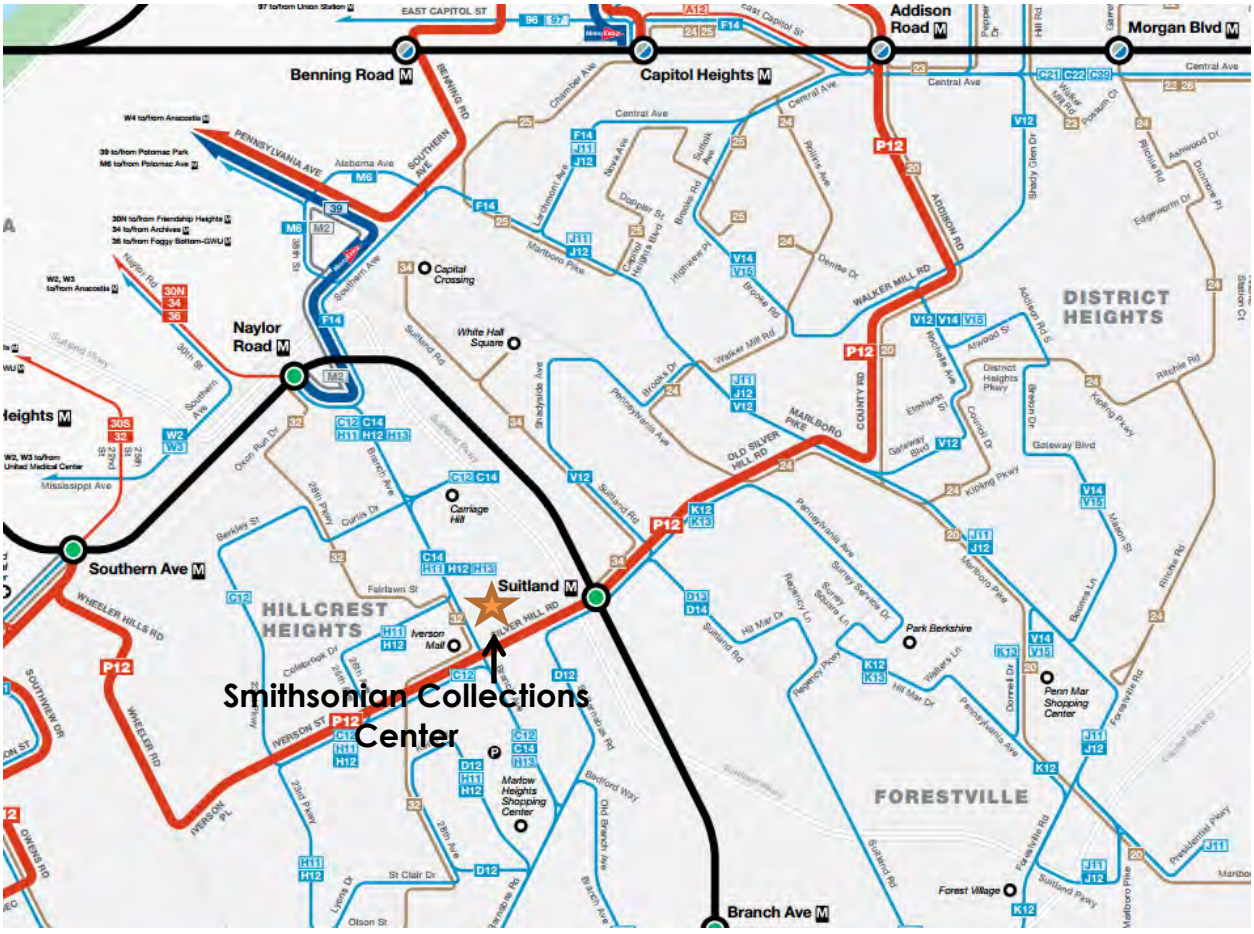
5.2.1 Rail Commuters

Of all the respondents who are commuting to the Suitland Collections Center on a daily basis, only 68 commute via rail, and respondents commuting via rail to the Suitland Collections Center are more likely to come from Washington, DC. Rail is not efficient for those who live at the end of the metro lines in Virginia and Maryland. Commuters from these stations have to take Metro into Washington, DC, and then back out again along the Green line to the Suitland Metro station. This is not an efficient commute as driving to work for these commuters likely would take less time. Bus service connects in the site to other locations in Prince George's County, Maryland. However, there are no bus routes that connect the Suitland Metro Station to other areas around Washington, DC. Only 23.8 % of commuters to the Suitland Collections Center commute from Washington, DC, as most employees live in the suburbs (Table 23).

1.2.2 Bus Commuters

Only 2% of employees at the Smithsonian Collection Center and 1% of employees at other locations utilize bus transit to get to work. Only two bus lines go past the Suitland Collections Center (Figure 14 14). Route P12 operates at approximately 30 minute headways. It provides local service that connects the Eastover Shopping Center to the Addison Avenue Metro station. It also connects to the Southern Avenue and Suitland Metro stations. Route D12 operates approximately every 20 minutes during the AM and PM peak periods and once an hour during the midday off-peak hours. The D12 bus provides local service around the nearby communities of Suitland and Oxon Hill and provides access to the Suitland and Southern Avenue Metro stations. Routes P12 and D12 have stops along Silver Hill Road at the main and secondary campus gates. However, these stops are signed only. No shelters or benches are provided.

Figure 14



1.2.3 Carpool Commuters

Out of the respondents who regularly work at the Smithsonian Collections Center, approximately 11% of them carpool to work. However, 57 respondents who currently drive alone indicated that

they would be interested in carpooling if additional resources were provided to link them with other potential carpoolers. Given that a majority of employees at the Smithsonian Collections Center live in areas where mass transportation takes significantly longer than driving to work, carpooling could increase if employees were provided with resources to form carpools.

Approximately 7% of employees who regularly work at sites other than the Smithsonian Collections Center carpool to work. Although these employees are spread out over a larger area, the other Smithsonian locations are in an urban environment and thus more carpooling options are likely available.

1.2.4 Drive Alone Commuters

Commuters who drove alone to work did so mainly because it was the fastest method available or because mass transit was perceived to cost more than driving. Approximately a third of commuters who drive alone would be willing to consider an alternate method. Some drivers (17.8%) were content with driving. For example, some employees preferred the comfort of their own vehicle while some had to run personal errands before and after work that are not possible to do on mass transit.

Approximately 9% of Suitland Collections Center-based employees lived outside of the reach of mass transit and park and ride centers. Most employees who live south or east of the Suitland Collections Center would be unable to take mass transit to work, since the nearest mass transit stop for them would be in close proximity to the Suitland Collections Center.

1.3 SUITLAND COLLECTIONS CENTER FACILITY RESULTS

To identify any unique patterns between the different facilities on the Smithsonian Collections center campus, the responses for Questions 8, 9, 10, 13, 14, 15, 16, 17, and 18 were compiled in accordance with the facility the respondent visits when on the Suitland Collections Center.

Question 8 Results Compiled by Suitland Collections Center Facility

Table 25 shows the percentages for each commute mode when compared to the total respondents for the respective facility. The data does not indicate a trend in commute mode by facility. The percentage of respondents that utilize the various modes is relatively consistent between each facility.

Table 25: Commuting Method by Facility Percentages

Commuting Method	Garber	MSC	CRC	NMNH Botany	SG Greenhouses	Other
Drive Alone	38.6%	39.1%	42.9%	46.6%	42.9%	44.9%
SI Shuttle	33.2%	32.8%	28.8%	25.9%	26.5%	30.6%
Metro Rail	11.4%	12.0%	12.6%	8.6%	12.2%	18.4%
SI Vehicle	7.4%	5.6%	7.6%	8.6%	10.2%	0.0%
Carpool	5.9%	5.0%	3.0%	3.4%	4.1%	2.0%
Walk	1.5%	1.9%	3.0%	1.7%	2.0%	0.0%
Bus	1.5%	1.3%	1.0%	1.7%	0.0%	2.0%
Taxi or Car Service	0.5%	1.1%	0.0%	1.7%	1.0%	2.0%
Bike	0.0%	0.7%	0.5%	1.7%	1.0%	0.0%
Commuter Rail (MARC/VRE)	0.0%	0.6%	0.5%	0.0%	0.0%	0.0%
Slug	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Registered Vanpool	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Question 9 Results Compiled by Suitland Collections Center Facility

Table 28 shows the percentage of respondents that reported parking in the various onsite parking lots by the facility in which they work. The data indicates that there are a significant number of employees that are not parking in the area nearest to the facility in which they work. For example, 29% of the respondents which list the CRC as their primary work location, park in the MSC primary parking area. It is not clear why this occurs, it could be related to where a person typically starts their day. However, it does indicate the need to further evaluate parking trends on campus to determine if a better balance between the over utilized and underutilized lots could be achieved.

Table 26: Parking Lot Utilization by Facility Percentages

Parking Lot	Garber	MSC	CRC	NMNH Botany	SG Greenhouses	Other
MSC Primary Parking Near Front Entrance	33.7%	43.7%	29.2%	30.0%	26.9%	26.9%
NMAI CRC Parking Lot	21.4%	17.5%	28.1%	30.0%	21.2%	38.5%
MSC Parking Near Loading Dock/Pod 4	12.2%	14.3%	12.5%	13.3%	5.8%	7.7%
Garber Lot	15.3%	9.1%	12.5%	16.7%	11.5%	7.7%
SG Greenhouse Lot	10.2%	6.7%	8.3%	6.7%	25.0%	11.5%
Other Areas (Botany Greenhouses, OPL, Construction Trailer)	3.1%	5.2%	4.2%	0.0%	5.8%	3.8%
Inside of the Old Silver Hill Road Sliding Gate	4.1%	3.2%	5.2%	3.3%	3.8%	3.8%
Outside of the Old Silver Hill Road Sliding Gate	0.0%	0.4%	0.0%	0.0%	0.0%	0.0%

Question 10 Results Compiled by Suitland Collections Center Facility

Table 27 shows the percentage of respondents who believe there is adequate parking based on the respective facility. Despite there being a parking capacity issue at the MSC, the number of respondents that indicate that there is not enough parking available is relatively consistent among the various facilities.

Table 27: Opinion on Parking by Facility Percentages

Opinion on Parking	Garber	MSC	CRC	NMNH Botany	SG Greenhouses	Other
There is adequate parking available.	68.5%	61.3%	65.3%	62.5%	78.6%	51.9%
There is not enough parking available.	30.6%	37.3%	34.7%	37.5%	21.4%	48.1%
There is too much parking available	0.9%	1.4%	0.0%	0.0%	0.0%	0.0%

Question 13 Results Compiled by Suitland Collections Center Facility

Table 28 shows the percentage of respondents who drive alone to work but are willing to consider an alternate commuting method, organized by facility.

Table 28: Respondents Willing to Consider an Alternative Commute Method by Facility Percentages

Response	Garber	MSC	CRC	NMNH Botany	SG Greenhouses	Other
No	52.4%	59.2%	59.1%	57.1%	54.0%	63.0%
Yes	47.6%	40.8%	40.9%	42.9%	46.0%	37.0%

Question 14 Results Compiled by Suitland Collections Center Facility

Table 29 shows the percentage of respondents who drive alone and are unwilling to consider an alternative method by facility and response type. The responses are relatively consistent among the various facilities. However, the most common response for respondents that work in the Paul E. Garber facility was that they had an unpredictable work schedule. The most common response from respondents working in the MSC was that it is cheaper and faster to drive to work, while respondents working at the CRC indicated that they prefer the comfort of their own vehicle as well as that it is cheaper and faster to drive.

Table 29: Respondents Reasons for Wanting to Drive to Work by Facility Percentages

Response	Garber	MSC	CRC	NMNH Botany	SG Greenhouses	Other
Prefer the Comfort and Convenience of my Own Vehicle	17.6%	16.1%	19.6%	31.3%	15.4%	33.3%
Faster/Cheaper To Drive to Work	19.6%	20.3%	19.6%	6.3%	15.4%	16.7%
Unpredictable Schedule	21.6%	18.9%	7.1%	12.5%	11.5%	11.1%
No Park-and-Ride or Transit Stop Close to Home	11.8%	14.7%	16.1%	18.8%	19.2%	11.1%
Other Mode are More Costly	9.8%	6.3%	8.9%	6.3%	15.4%	0.0%
Blank	11.8%	5.6%	5.4%	0.0%	7.7%	16.7%
Need Car During the Day for Personal Use	2.0%	5.6%	3.6%	0.0%	0.0%	5.6%
Public Transportation is not Flexible Enough	2.0%	4.2%	0.0%	12.5%	3.8%	0.0%
Need Car During the Day for Work	0.0%	2.8%	8.9%	0.0%	0.0%	0.0%
Need Car for Job	2.0%	2.1%	1.8%	6.3%	3.8%	0.0%
Feel Unsafe Taking Metro to Work	0.0%	1.4%	3.6%	6.3%	0.0%	5.6%
Metro Doesn't Run During Working Hours	0.0%	0.0%	3.6%	0.0%	3.8%	0.0%
Not Physically Able to take Public Transport	2.0%	0.7%	1.8%	0.0%	0.0%	0.0%
Don't Live Near Public Transportation	0.0%	0.7%	0.0%	0.0%	0.0%	0.0%
Live Nearby	0.0%	0.7%	0.0%	0.0%	0.0%	0.0%
Suitland Metro Station too Far	0.0%	0.0%	0.0%	0.0%	3.8%	0.0%

Question 15 Results Compiled by Suitland Collections Center Facility

Table 30 shows the percentage of respondents who drive alone to work and are willing to consider an alternative method by facility and response type. The most common answer was "none"; however, providing a shuttle service to the Suitland Metro was listed as the second most common answer.

Table 30: Improvements that Will Convince Drivers to take Alternative Method to Work Percentages

Response	Garber	MSC	CRC	NMNH Botany	SG Greenhouses	Other
None	52.4%	47.7%	50.7%	57.1%	55.9%	36.4%
Shuttle from Suitland Metro	20.6%	19.0%	15.1%	14.3%	20.6%	36.4%
More Frequent Shuttle	3.2%	8.0%	12.3%	14.3%	11.8%	0.0%
Express Bus Service to Virginia	6.3%	4.6%	6.8%	4.8%	2.9%	4.5%
Express Shuttle	1.6%	3.4%	0.0%	0.0%	0.0%	13.6%
Make Metro Stop/Area More Safe	1.6%	2.3%	2.7%	4.8%	2.9%	0.0%
Make sidewalk to Metro more safe	6.3%	1.7%	1.4%	0.0%	0.0%	4.5%
Express Bus	3.2%	1.1%	1.4%	0.0%	2.9%	0.0%
Continue Purple Metro line into Virginia	0.0%	1.7%	1.4%	0.0%	0.0%	0.0%
Bicycle Path	0.0%	1.1%	0.0%	0.0%	0.0%	4.5%
Increase in shuttle schedules.	1.6%	0.6%	1.4%	0.0%	0.0%	0.0%
More Frequent MARC Trains	0.0%	1.1%	0.0%	4.8%	0.0%	0.0%
Better Bike Lanes from DC	1.6%	0.6%	0.0%	0.0%	0.0%	0.0%
Sidewalk to Metro is dangerous	1.6%	0.6%	0.0%	0.0%	0.0%	0.0%
On-Time Shuttle	1.6%	0.0%	1.4%	0.0%	0.0%	0.0%
Better Bus Service in PG County	0.0%	0.6%	0.0%	0.0%	0.0%	0.0%
Better Metro Service	0.0%	0.6%	0.0%	0.0%	0.0%	0.0%
Bus to Pentagon Metro	0.0%	0.0%	0.0%	0.0%	2.9%	0.0%
Carpooling	0.0%	0.6%	0.0%	0.0%	0.0%	0.0%
Cheaper metro bike lockers	0.0%	0.6%	0.0%	0.0%	0.0%	0.0%
Express Buses do not stop in area	0.0%	0.6%	0.0%	0.0%	0.0%	0.0%
Express Metro Service	0.0%	0.6%	0.0%	0.0%	0.0%	0.0%
Extend Green Metro Line	0.0%	0.0%	1.4%	0.0%	0.0%	0.0%
Metro bus linking Huntington to Branch Ave	0.0%	0.0%	1.4%	0.0%	0.0%	0.0%
Metro Running at Night	0.0%	0.0%	1.4%	0.0%	0.0%	0.0%
More Bus Service	0.0%	0.6%	0.0%	0.0%	0.0%	0.0%
MTA Buses stopping nearby	0.0%	0.0%	1.4%	0.0%	0.0%	0.0%
Park and Ride along Shuttle Route	0.0%	0.6%	0.0%	0.0%	0.0%	0.0%
Shuttle from Alexandria.	0.0%	0.6%	0.0%	0.0%	0.0%	0.0%
Shuttle to Southeastern Maryland	0.0%	0.6%	0.0%	0.0%	0.0%	0.0%

Question 16 Results Compiled by Suitland Collections Center Facility

Table 31 shows the percentage of respondents who use the SI shuttle to travel to/from the Suitland Collections Center campus by facility. Usage of the shuttle is relatively consistent across all facilities. However, respondents that worked at NMNH Botany or the SG Greenhouses were the least likely to have used the shuttle.

Table 31: Respondents who use the SI Shuttle by Facility Percentages

Response	Garber	MSC	CRC	NMNH Botany	SG Greenhouses	Other
Yes	72.9%	74.6%	71.4%	64.9%	65.2%	75.0%
No	27.1%	25.4%	28.6%	35.1%	34.8%	25.0%

Question 17 Results Compiled by Suitland Collections Center Facility

Table 32 shows how often respondents use the SI shuttle to travel to/from the Suitland Collections Center organized by facility. Only respondents who answered "Yes" to Question 16 are considered in this chart. Again, the data indicates relatively consistent shuttle use characteristics between the facilities.

Table 32: How Often Respondents use the SI Shuttle Percentages

Response	Garber	MSC	CRC	NMNH Botany	SG Greenhouses	Other
Less than once a month	46.5%	36.4%	42.4%	32.0%	36.4%	48.3%
Once or twice a month	25.3%	29.8%	26.3%	12.0%	31.8%	24.1%
Once or twice a week	15.2%	18.8%	16.2%	44.0%	22.7%	17.2%
Three or four times a week	5.1%	7.7%	6.1%	0.0%	2.3%	6.9%
Everyday	8.1%	7.4%	9.1%	12.0%	6.8%	3.4%

Question 18 Results Compiled by Suitland Collections Center Facility

Table 33 shows why respondents do not utilize the SI Shuttle organized by facility. Only respondents who answered "No" to Question 16 are considered in this chart. The most common response among all facilities was that the respondent does not need to travel to other locations during the workday.

Table 33: Reason why Respondents do not Utilize the SI Shuttle Percentages

Response	Garber	MSC	CRC	NMNH Botany	SG Greenhouses	Other
I don't need to travel to other locations during the workday.	39.4%	36.6%	44.4%	36.4%	44.4%	42.9%
The shuttle schedule is not frequent enough to meet my needs.	18.2%	12.2%	16.7%	27.3%	27.8%	14.3%
Commute is faster without the shuttle	9.1%	13.4%	2.8%	18.2%	11.1%	14.3%
Need to carry materials for work	9.1%	6.1%	13.9%	9.1%	11.1%	14.3%
I prefer the comfort and convenience of my own vehicle.	3.0%	11.0%	11.1%	0.0%	5.6%	14.3%
I travel to multiple locations during the day, some of which are not served by the shuttle.	9.1%	11.0%	0.0%	9.1%	0.0%	0.0%
Shuttle does not arrive early enough	3.0%	3.7%	2.8%	0.0%	0.0%	0.0%
No shuttle stop at work station	6.1%	2.4%	0.0%	0.0%	0.0%	0.0%
Campus is too big to walk around	0.0%	1.2%	2.8%	0.0%	0.0%	0.0%
Carpool instead	3.0%	1.2%	0.0%	0.0%	0.0%	0.0%
Live nearby	0.0%	1.2%	2.8%	0.0%	0.0%	0.0%
Shuttle is late often	0.0%	0.0%	2.8%	0.0%	0.0%	0.0%

1.4 SUITLAND COLLECTIONS CENTER FACILITY ANALYSIS

Overall, there were no significant differences in commuting methods or opinions between the respondents who visit the different facilities on Smithsonian Collections Center. Garber respondents were the most likely to commute via the SI shuttle and also the least likely to drive alone. However, they were the second least likely to take the Metro Rail to work. There were no strong deviations from the average of 12% utilization of the Metro Rail between facilities.

Garber and Smithsonian Gardens employees were also more likely than employees at other facilities to suggest adding a shuttle stop at the Suitland Metro. This coheres with the idea that employees at Garber and Smithsonian Gardens will less likely to take the Metro to work since their walk to work will be the farthest out of all the facilities.

APPENDIX C:
M-NCPPC AND MDOT SHA SCOPING LETTER

THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

Countywide Planning Division
Prince George's County Planning Department

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December 10, 2018

Ms. Jane Passman
Senior Facilities Master Planner
Smithsonian Institution
600 Maryland Avenue SW, Suite 5001
P.O. Box 37012, MRC 511
Washington DC 20013-7012

RE: Smithsonian Institution's Museum Support Center Redevelopment

Dear Ms. Passman:

The Transportation Planning Section is providing recommendations to assist the Smithsonian Institution staff and consultants with their initial scoping of developing a master plan recommendation for the redevelopment of the Smithsonian Institution's Museum Support Center. The property is located between Silver Hill Road (MD 458) and Suitland Parkway approximately a quarter of a mile from the Suitland Metrorail Station. To accommodate future growth, the Smithsonian Institution (SI) is proposing to construct new buildings, reconstruct existing buildings, and improve access and circulation within the campus and surrounding area.

This proposal was reviewed for conformance with the 2009 *Approved Master Plan of Transportation* (MPOT), the 2014 *Approved Southern Green Line Station Area Sector Plan and Sectional Map Amendment* (Green Line Plan), and Transportation Review Guidelines – Parts 1 and 2 to provide the appropriate recommendations.

Background:

The net result of the new proposed buildings will increase the total square footage on-site from 1.4 million square feet of "warehouse" space today to 2.5 million square feet of "warehouse" space by 2060.

Traffic Study Analyses:

When the SI staff decide to move forward with local review of this proposal, the project will most likely be reviewed under the Mandatory Referral process and will not require a traffic study. However, SI has stated that they plan to submit a Traffic Impact Analysis (TIA) to assess the traffic impacts that may be caused by the expected redevelopment.

The applicant will not be submitting a TIA for several years, which is appropriate because our Transportation Review Guidelines do not accept a traffic study with counts more than a year old. As such the Transportation Planning Section (TPS) would recommend the applicant or their representative meet with TPS staff to discuss a scoping agreement that would establish guidelines for a future traffic study.

The scoping agreement establishes; 1) the relevant intersections that will be studied as part of a future TIA, 2) how much additional traffic will be generated by the additional square footage, 3) what entrances will allow vehicular access, and 4) any additional traffic related changes that may be necessary, including, but not limited to new traffic signals. This scoping agreement will be valid when the applicant provides a TIA.

The applicant stated that the number of total employees (permanent and rotating) will increase from 350 in 2018 to 910 by 2060. The future TIA will have to address how the growing number of employees will match the additional "warehouse" square footage. The applicant has also stated that the number of employees that will access the site during the peak hour will increase from 180 in 2018 to 464 in 2060. These counts and assumptions, along with trip generation, trip distribution, mode choice, and trip assignment will be addressed in the scoping agreement and the future TIA.

Master Plan, Site Review

The applicant indicated that they are considering changes to their entrances outlined as "Option 6." This options states:

> "Similar to the previous option 2, this scheme proposes to reconfigure the existing Garber entrance. However, unlike option 2, this option does not require a new traffic light [signal]. This option requires that the access to the main entrance is from east and when exiting the site, one must turn west."

Any changes to vehicular entrances along State maintained highways such as Silver Hill Road must be coordinated with the State Highway Administration (SHA). If the applicant maintains their commitment to changing their entrance to "Option 6" or decides to pursue another option, staff encourages the applicant to coordinate any changes with SHA, since they have jurisdiction over the roadway and its access points.

Review Comments for Bicycle and Pedestrians

The MPOT calls for at least a six-foot wide sidewalk and designated bike lanes on Silver Hill Road (MPOT p. 22). The Green Line Plan recommends the Suitland-Silver Hill Greenway off-street trail, which would cross the frontage of the Smithsonian property. Text is below:

> "Add off-street multi-use trail along the Federal Campus frontage, across the pkwy, along Smithsonian frontage to Old Silver Hill Rd and to MD 5 and Iverson Mall" (Green Line Plan p.120)

The applicant has proposed constructing a wide sidewalk and off-road bicycle facility along their frontage of Silver Hill Road. The SHA may restripe Silver Hill Road for designated bicycle lanes in the future as part of resurfacing the roadway.

Comment: The applicant should consider constructing the multiuse trail along their frontage consistent with the "Suitland-Silver Hill Greenway" plans in the Green Line Plan.

The Green Line Plan calls for improvements at the intersection of Maywood Lane at Silver Hill Road: "Reconfigure angle of north approach for improved pedestrian crossing." (Green Line Plan p. 120)

Comment: The applicant should consider improvements at the intersection of Maywood Lane and Silver Hill Road consistent with the Green Line Plan recommendations to increase pedestrian safety.

The Green Line Plan calls for improvements at the Smithsonian campus entrance at Silver Hill Rd: "Install flashing beacon at marked crosswalk." (Green Line Plan p. 120)

Comment: The applicant should consider improvements at their entrance opposite Hickory Hill Apartments consistent with the Green Line Plan recommendations to increase pedestrian safety.

The applicant has proposed an extensive trail and sidewalk network on their property with redevelopment to encourage walking and cycling onsite. In addition, the applicant has indicated they will study providing a shuttle bus to the Suitland Metrorail Station.

Comment: Staff appreciates the applicant's commitment to encouraging active transportation on site and a shuttle bus to and from Suitland Metrorail Station. Staff looks forward to working with the applicant to ensure that bicycle and pedestrian accommodations are effective.

Transportation Staff Recommendations
The TPS staff will await submission of a TIA later to make additional comments. Overall from the standpoint of transportation, it is determined that this proposed redevelopment plan is acceptable with the following recommendations:

1. The applicant should coordinate any changes to their vehicular entrances along Silver Hill Road with the SHA.

2. The applicant should "scope" a TIA with transportation planning staff to establish parameters for a future traffic study.

3. The applicant should consider constructing the multiuse trail along their frontage consistent with the "Suitland-Silver Hill Greenway" plans in the Green Line Plan.

4. The applicant should consider improvements at the intersection of Maywood Lane and Silver Hill Road consistent with the Green Line Plan recommendations to increase pedestrian safety.

5. The applicant should consider improvements at their entrance opposite Hickory Hill Apartments consistent with the Green Line Plan recommendations to increase pedestrian safety.

Thank you for allowing us the opportunity to provide early transportation suggestions for the proposed project. If you have any questions or need additional information on the transportation recommendations, please contact either Marc Lewis-Degrace, Senior Planner, at 301-952-3867 or email at Marc.Lewis-Degrace@ppd.mncppc.org.

Sincerely,

Bryan Barnett-Woods, Acting Supervisor
Transportation Planning Section

cc: Marc Lewis-DeGrace, AICP, Transportation Planning Section, Countywide Planning Division
Thomas Masog, Transportation Planning Section, Countywide Planning Division
Christine Osei, Special Projects Section, Countywide Planning Division
Iftin Thompson, Transportation Planning Section, Countywide Planning Division
Kwesi Woodroffe, Acting Regional Engineer, Maryland State Highway Administration