



Acadia National Park

Data Collection and Evaluation Report:

Park Loop Road, Sand Beach Entrance Station, Sand Beach, Jordan Pond, and Eagle Lake



Image Source: Parking Lot Full, Friends of Acadia; Entrance Booth, Volpe Center; Roadside Parking, Volpe Center; Multimodal Facilities, Volpe Center.

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14. ABSTRACT Acadia National Park (ACAD) faces increasing visitor demand and congestion at key sites including Park Loop Road, Sand Beach Entrance Station and parking area, Jordan Pond, and Eagle Lake. This report documents data collection, analyzes transportation challenges, and presents actionable recommendations to improve the visitor transportation experience that emphasizes public transportation to reduce congestion and minimize resource impacts. Field data collection included computer vision video analysis of right-lane parking on Park Loop Road, a pneumatic tube counter on Schooner Head Road, and license plate turnover tracking at key sites. Findings reveal that peak entrance demand exceeds processing capacity, causing queue lengths up to 600 feet in the late morning and early afternoon. Parking lots reach full occupancy by mid-morning, resulting in turn away rates as high as 78 percent and encouraging right-lane parking. A phased intervention framework is recommended; including installing a transit express lane on Park Loop Road ahead of the Sand Beach Entrance Station and terminating at the Sand Beach parking area, executing a phased four-year elimination of right-lane parking, restoring parking pavement markings, deploying real-time Intelligent Transportation Systems (ITS), and implementing a Transportation Demand Management (TDM) strategy to discourage driving and parking demand, and shift trips to transit and non-motorized modes. The recommendations contained in this document are advisory in nature and are provided to support informed decision-making by NPS and its partners. Adoption or implementation of any action identified herein is solely at the discretion of NPS and its partners.					
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Executive Summary

Overview

Acadia National Park (ACAD) faces increasing visitor demand and congestion at key sites including Park Loop Road, Sand Beach Entrance Station, Sand Beach, Jordan Pond, and Eagle Lake. This report evaluates data collection efforts, analyzes transportation and parking challenges, and presents actionable recommendations to improve the transportation experience for all visitors that emphasizes public transportation to preserve the character of the park and minimizes impact at the highest demand sites.

The project included comprehensive data collection at the Sand Beach Entrance Station, parking data at Sand Beach, Jordan Pond, and Eagle Lake, right lane and roadside parking data along Park Loop Road and Eagle Lake Road, and transit systems data for the Island Explorer. The analysis focused on processing capacity, transit mode share, parking occupancy, roadside congestion, and bus ridership patterns.

Major Findings and Recommendations

Visitor congestion peaks at Sand Beach Entrance Station, the Sand Beach parking lots, and the Park Loop Road roadside parking in the late morning and are sustained throughout the early afternoon. Congestion is expected during days with high visitation, which coincides with favorable weather. Transit operations are significantly impacted during periods of congestion as the bus experiences delays through the entrance station, along Park Loop Road, and through the Sand Beach Lower Parking Lot. The transit delays lead to bus bunching, unreliable schedules, and over capacity buses that turn away passengers. These have significant negative impacts to the visitor experience.

Parking lots routinely reach capacity and require visitors to find alternative parking along a nearby roadway or divert from their original plan. Many current pavement markings and signage are in poor condition, adding to confusion and increasing parking in prohibited locations. Right lane and roadside parking are unsafe and undesirable as it occupies significant amount of space, creates a negative visual impact to the park natural landscape, and requires visitors to spill into the travel lanes adjacent to the parked vehicle.

The six primary recommendations include:

1. **Refresh and Restore Pavement Markings and Signage in Parking Lots:** Enhance visibility and clarity to improve parking efficiency, improve vehicle circulation through the parking lot, and improve safety for people walking and driving in the parking lot.
2. **Install Sand Beach Transit Express Lane:** Establish a dedicated transit lane to reduce bus delays for buses and encourage visitors to use transit. This will not impact entrance processing as the transit lane will end prior to the entrance station and begin again after the entrance station.
3. **Eliminate Right Lane Parking along Park Loop Road:** Remove unsafe right lane parking along Park Loop Road in phases to reduce congestion due to friction and improve safety for all road users. The elimination of the right lane parking should be completed in phases over the next four years.
4. **Modify Public Transportation Communication to the Public:** Provide clearer information about the transit schedules to the public and eliminate the inaccurate timetable related to the high ridership bus routes.
5. **Implement Intelligent Transportation Systems (ITS) and Robust Transportation Demand Management (TDM) Strategy:** Deploy technology-driven solutions to optimize visitor information before arriving at the park entrance station or parking lot. Create a demand management program to encourage alternative modes of transportation and limit visitor automobile usage through strategies related to infrastructure, pricing, and operations.
6. **Continue Collecting Transportation Data and Perform Analysis and Monitoring:** Maintain ongoing data collection and evaluation to track improvement impacts, adapt strategies, and inform future decision-making.



An implementation strategy prioritized the recommendations for a phased approach, balancing immediate improvements with long-term strategies. Collaboration with partners, ongoing data collection and monitoring, and leadership input will ensure sustained progress and positive visitor outcomes.

Adopting these recommendations will help Acadia National Park manage visitor congestion, enhance safety, improve transportation efficiency, and protect natural resources for future generations.



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1. Introduction

1.1. *Project Background*

Acadia National Park (ACAD) preserves approximately 50,000 acres in Hancock and Knox Counties along the mid-coast of Maine. The popularity of the park is growing, with visitation doubling over the past 20 years to over four million visits in 2025. One of the many reasons to visit the park is to experience the scenic and historic transportation corridors, including historic motor roads, hiking trails, and carriage roads. Most visitors arrive via motor vehicle and access their desired destination via the park's historic motor roads. The park's transportation infrastructure was constructed in the early 20th century and consists of narrow, twisting roads and low, narrow historic bridges that were designed for automobile types, speeds, and volumes different than those of today. Increased automobile traffic volumes and speeds, along with visitors choosing to travel the park roads on foot or by bicycle, recreational vehicle (RV), or commercial bus, have created safety challenges, resource protection concerns, and adverse impacts to visitor experience in the park.

Visitors can experience ACAD through a diverse network of roadways including local roads, park roads, carriage roads, and hiking trails. The 27-mile Park Loop Road is the primary circulatory road within the park. Park Loop Road was designed specifically so that visitors could experience the park's natural beauty via automobile. Congestion related to right lane parking in the right lane of the road disrupts the visitor experience as visitors are often stuck in traffic and cannot access their destination. People walking and biking also must navigate complex congestion challenges, often leading to safety problems. Visitors sometimes park outside of designated parking areas or outside of the paved roadway, damaging tree roots and vegetation.

This report presents an analysis of transportation data collected at selected key locations throughout the park to support ACAD's implementation of recommended actions from the ACAD Transportation Plan published in 2019. The ACAD Transportation Plan outlined a comprehensive approach to providing safe and efficient transportation to visitors while ensuring that park resources and values are protected, and visitors can enjoy a variety of experiences. While the ACAD Transportation Plan envisions visitor use management at the three primary destinations in the park; Ocean Drive (which will be referred to throughout this report as Park Loop Road), Jordan Pond House, and Cadillac Mountain, only Cadillac Mountain has a vehicle reservation system. The park does not have immediate plans to implement a reservation system for Park Loop Road or the Sand Beach Entrance Station. The park piloted a reservation system along Park Loop Road/the Sand Beach Entrance Station in 2020 but had trouble operating the system given the configuration of the access points at the park. Transportation challenges persist throughout the park and remain unresolved since the initial pilot study did not achieve the original intended goals. Those transportation challenges include:

- **Full Parking Lots:** Parking lots at key points throughout the park are consistently at capacity and visitors cannot find parking at the desired locations.
- **Roadside Parking Challenges:** Roadside parking along Park Loop Road between Sand Beach and Otter Cliff Road and along Eagle Lake Road near the Eagle Lake parking lots are dangerous for visitors and undesirable for the park as it detracts from the overall visitor experience.
- **Entrance Station Congestion:** The Sand Beach Entrance Station can be congested, especially in the late morning, and visitors can experience long waiting times travelling through the entrance.
- **Unmet Transit Demand:** Transit service is not frequent enough and visitors need to plan their day around the schedule, which limits visitors' ability for flexibility. Some visitors cannot get on the bus when it does arrive, which results in a negative visitor experience.
- **Transit Vehicles Stuck in Congestion:** Transit vehicles can get stuck in congestion at the Sand Beach Entrance Station and at bus stops due to passenger vehicles blocking their path.
- **Bicycles Sharing Lanes with Vehicles:** Bicycling along Park Loop Road is shared with vehicles driving and the roadside parking which decreases safety for people riding their bikes.



- **Emergency Response Delay Due to Congestion:** It can be difficult for emergency vehicles to access the park, especially through Sand Beach Entrance Station due to congestion.

1.2. *Study Purpose*

The primary goal of this project is to gather and analyze transportation data at the critical sites within the park. The analysis helps to evaluate and refine the recommended strategies from the ACAD Transportation Plan by providing insight into parking patterns, congestion levels, and entrance station capacity and demand. The findings will inform future decisions, enabling the park to better manage transportation challenges, improve visitor access, and protect natural resources. Additionally, the report will outline how these strategies can be prioritized and implemented to address ongoing and emerging transportation needs throughout the park. This report may also be shared with external partners and agencies as well as members of the public.

1.3. *Study Area Locations*

In coordination with NPS staff, the project team focused data collection efforts on the following high-traffic locations:

- Sand Beach Entrance Station including Schooner Head Road
- Parking Lots:
 - Sand Beach Parking Lots, upper lot and lower lot.
 - Jordan Pond Parking Lots, north lot and south lot.
 - Eagle Lake Parking Lots, Eagle Lake Parking Lot and the Boat Launch Parking Lot.
- Right lane Parking along:
 - Park Loop Road, between the Sand Beach Entrance Station and Otter Cliff Road.
 - Confusion Corner, the intersection of Park Loop Road at Stanley Brook Road and Jordan Pond Road where Park Loop Road transitions from one-way to two-way.
 - Eagle Lake Road (SR-233), between the Eagle Lake Bridge and Duck Brook Road.

Each study area has two primary parking lots, which regularly reach capacity, and nearby overflow right lane parking areas. The Sand Beach Entrance Station on Park Loop Road was further included in the Sand Beach site to inform visitation trends, congestion, and evaluate transit operations entering the park. A map of the study area is provided in Figure 1.

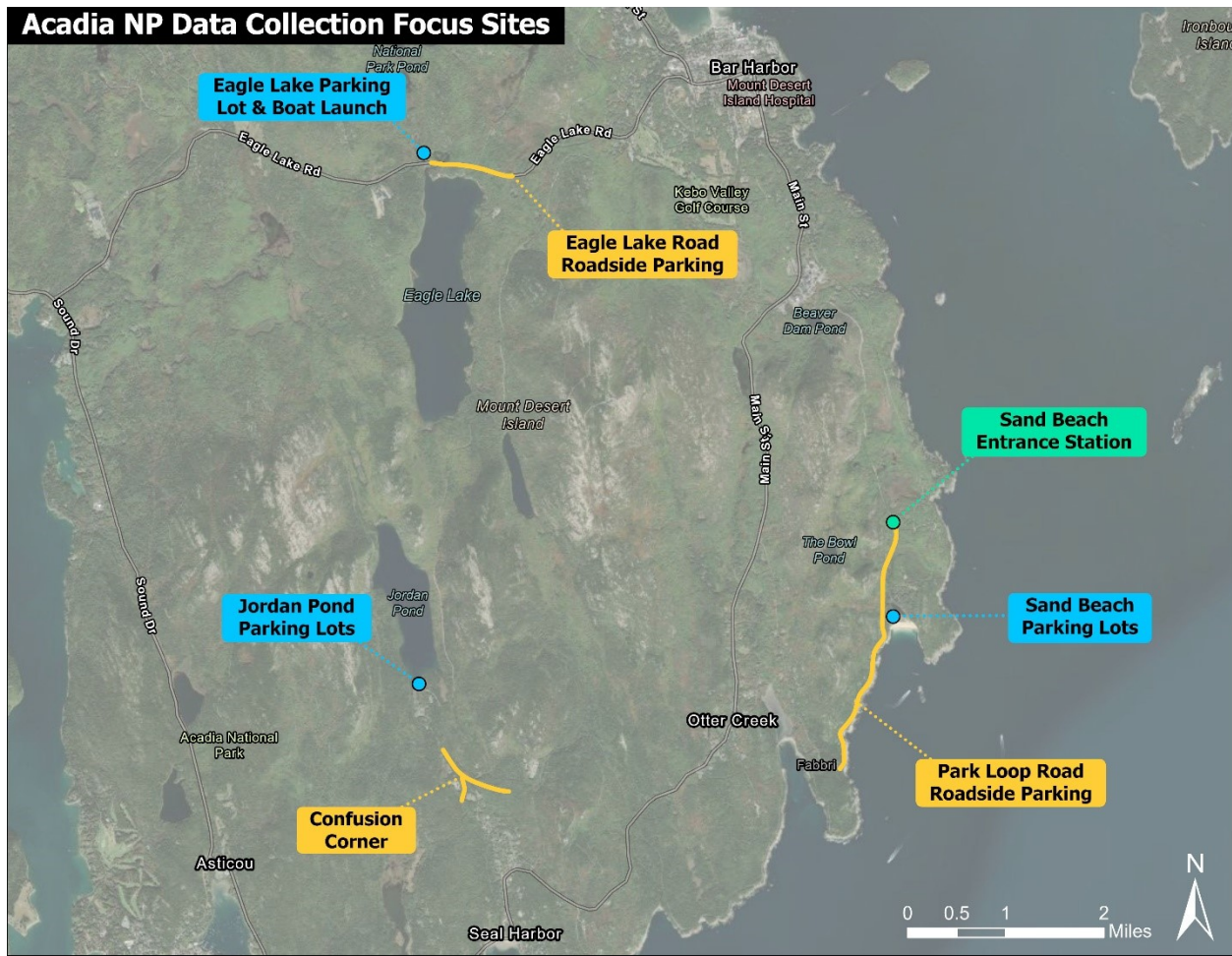


Figure 1: Study Area Focus Sites

Source: Volpe Center

1.4. Ongoing ACAD Efforts

ACAD has several ongoing efforts that impact transportation decisions, behavior, and trends around the park. Efforts highlighted here mainly relate to transit improvements and parking lot reconstruction and expansion.

1.4.1. Transit Improvements

The Acadia Gateway Center is a new intermodal transit hub, shown in Figure 2. The Gateway Center opened in September 2025 and provides a variety of new opportunities for transit visitors when the service is operational. The 300 new vehicle parking spaces and 110 existing spaces in the connected park and ride lot allow visitors to leave their vehicle while visiting the park and Mount Desert Island. Visitors can purchase a park pass or obtain information about the park. Downeast Transportation Inc. (DTI), the operator of the Island Explorer transit system, now has a more centralized hub to provide services to visitors.

Transit service will also be improved during the first full season of operation. Route 1 (Gateway Center) and Route 4 (Park Loop Road) will operate from May 20 to June 22, 2026, at 30-minute headways. All routes will operate from June 23 to October 13, with headways decreasing to 20 minutes on Route 1.

Additionally, U.S. Department of Transportation awarded Maine Department of Transportation a Nationally Significant Federal Lands and Tribal Projects Program grant to purchase 40 low-emission



buses to replace the current Island Explorer fleet of 34 buses and expand by six buses, which are scheduled to enter service in two phases starting in 2028 and 2031. The new buses will improve safety and service reliability, as well as reduce maintenance costs. Fleet expansion may also allow increased transit service to be offered during peak times, including express service from the Acadia Gateway Center to Hulls Cove and Village Green (Bar Harbor).



Figure 2: Island Explorer Bus at shelter outside the new Acadia Gateway Center

Source: Friends of Acadia

1.4.2. Parking Reconstruction and Expansion

As part of implementing the 2019 Transportation Plan, ACAD is working toward expanding and improving the following parking lots, including the three focus sites of this report.

- **Sand Beach Parking Lot Redesign:** Park staff have initiated a proposed redesign of the Sand Beach parking lot. This project is in the early stages of development, so specific information is not yet available.
- **Jordan Pond Parking Lot Redesign:** A project to redesign and expand the Jordan Pond North and South parking lots has been initiated by the park. The project will be completed in conjunction with the Jordan Pond House restaurant reconstruction. The project will expand parking capacity by at least 20 percent, provide a transit hub separate from private vehicles, implement a vehicle reservation system, and improve pedestrian and bicyclist safety.
- **Hulls Cove Transportation Hub:** A project to redesign and expand the Hulls Cove Visitor Center parking lot has been initiated by the park. The plan for redeveloping the site includes a substantial expansion of parking capacity and a new and enlarged visitor center. The plan would include approximately 200 to 250 parking spaces (in addition to the current capacity of 270). The new parking lot would be designed to separate bus circulation from passenger vehicle traffic. It would include parking for buses and RVs and queuing space for bus staging. The new parking capacity at Hulls Cove would be intended to provide visitors a place to park and transfer to alternate transportation systems in the park.
- **New Eagle Lake Parking Lot:** Parking at Eagle Lake will be improved by constructing a 135-space parking lot at Liscomb Pit, the existing gravel yard east of Eagle Lake's current parking facilities. The project will include an improved bus stop with a designated turnaround and driveway and the phasing out of shoulder parking along Eagle Lake Road.



1.5. Literature Review Summary

The project team reviewed relevant transportation plans, studies, and technical memos to identify previous key findings and management decisions related to traffic and parking congestion in ACAD. A common objective to understand and mitigate congestion, optimize visitor access and experience, and sustain park resources through data-driven, multimodal transportation management strategies emerged across the literature. Table 1 provides a summary of the purpose, key findings, and recommendations of the relevant literature reviewed. A detailed literature review is provided in the Appendix.

Table 1. Literature Review Document Summary

Source: Volpe Center

Document Name and Date (Newest to oldest)	Purpose	Key Findings & Recommendations
Acadia Transit Assessment Memo (Volpe, 2025)	Provides a high-level cost/operational assessment of Island Explorer service and identifies potential funding structures and operational efficiencies	Modernization of operations, real-time information, integration with transit hubs (Hulls Cove and Acadia Gateway Center) and reservation-based parking policies, robust fleet planning, and exploring alternative service models (on-demand, cost-sharing) are proposed to sustain and expand Island Explorer service.
Acadia National Park Traveler Data Collection and Analysis (Volpe, 2023)	Identified data and analysis needed to monitor long-term visitor transportation behavior and trends	Emerging data sources (connected vehicle/mobile data) and traditional counters, magnetometers, and license plates readers can be used to monitor congestion thresholds and trigger decisions at major sites (Cadillac Summit Road, Ocean Drive, Jordan Pond, Sand Beach, Bass Harbor Head Lighthouse, and Schoodic Peninsula).
An Assessment of Visitor Use Experience with the Implementation of the First-Year Cadillac Mountain Summit Road Vehicle Timed-Entry Reservation System in Acadia National Park, Maine (Stanley, 2023)	Analyze how the reservation system affects visitors' user experience and to provide park managers with insights to make adaptive management changes to the system	Reservation system can be labeled as effective in its first year of implementation based on visitor survey responses. Survey results indicated that visitors had a satisfying experience with many transportation and social factors within the timed-entry reservation system. The top reported issue with obtaining a vehicle permit was the unavailability of preferred time slots or days, with the sunrise block being the most frequently mentioned.
Island Explorer Operations under the Transportation Plan Preferred Alternative: Memo 2 (Volpe, 2019)	Evaluates how current capacity and operations would respond to reservation systems for prioritized locations	Hulls Cove expansion and limited Island Explorer transit service growth can absorb a portion of displaced demand but will likely require substantial fleet expansion (Park Loop Road to ten-minute headways, Jordan Pond Route additions), with remaining unmet demand likely at Sand Beach and Jordan Pond.



Document Name and Date (Newest to oldest)	Purpose	Key Findings & Recommendations
Acadia National Park Final Transportation Plan/Environmental Impact Statement (Final Plan/EIS) (2019)	Analyzes environmental impacts of alternatives and documents preferred alternative and proposed action	Recommended implementation of a vehicle reservation system at high-demand locations during peak periods. Right-lane parking along Park Loop Road will be retained in the near term but eventually phased out as other options become available. Additional parking will be provided at Hulls Cove as part of visitor center redesign. Visitor services at the Thompson Island Information Center will be removed once the Acadia Gateway Center becomes operational.
Record of Decision for Transportation Plan/Environmental Impact Statement (Final Plan/EIS) (2019)	Documents EIS preferred alternative decision and proposed action	Selection of Alternative C: Corridor Management from the Final Plan/EIS for implementation.
Visitor Traffic Tracking Cell Phone Application (WPI, 2018)	Evaluates GPS-tracking app potential to collect mobility data to inform transportation/congestion decisions	GPS-tracking mobile apps can collect facility use, travel routes, and timing of congested periods if scaled up to include iOS parity, data privacy and integration with existing park apps.
Existing Transit Capacity: Memo 1 (Volpe, 2018)	Documents current capacity and operations to support anticipated reservation systems	Baseline data shows pronounced crowding in the Jordan Pond, Park Loop Road, Sand Beach, and Oceanarium routes that are presently straining transit capacity on peak directions with significant, but imperfect, indicators of unmet demand and substantial variability in directional and daily and hourly demand.
Measuring and Managing the Quality of Transportation at Acadia National Park (Otak, 2012)	Case study analysis of indicators and quality standards for multimodal transportation	Implement multimodal, data-driven visitor-centered management approach combining traffic metrics (LOS, vehicles in/out, parking occupancy, vehicle counts) with congestion thresholds and visitor experience indicators.
Acadia National Park ITS Field Operational Test: Parking Report (University of Maine, 2003)	Evaluates use of Intelligent Transportation Systems (ITS) to reduce congestion at eight parking areas	Leverage ITS technologies including real-time parking information and digital signs to supplement traditional counters and signage.



2. Data Collection Methodology

The project team conducted a site visit in August 2025 to collect data at all identified locations. The team collaborated with park and Friends of Acadia staff to communicate with stakeholders, test data collection methods, and identify data collection challenges. Separate data collection methods were developed for each data element which included data collection at the Sand Beach Entrance Station, parking lots, and areas with roadside parking. Figure 3 shows a Volpe team member setting up data collection equipment at the Sand Beach Entrance Station.



Figure 3: Project Team Members at Sand Beach Entrance Station
Source: Volpe Center

2.1. Sand Beach Entrance Station

Data collection at and around the Sand Beach Entrance Station on Park Loop Road included video data, standard vehicle counts through pneumatic tubes, and automatically recorded transit vehicle locations. The video output at the Sand Beach Entrance Station is shown in Figure 4.

- **Video Data:** Video data was collected at the entrance station on Park Loop Road on Tuesday, August 26, 2025, from 9 a.m. to 4 p.m. A GoPro Max (360° video capture) camera was mounted on the window of the westernmost entrance station booth, capturing a clear view of vehicle activity at the central and westernmost entrance lanes. A GoPro Hero7 Black (standard video capture) was mounted to the light pole on the eastern side of Park Loop Road, capturing an overhead view of vehicle activity at all the entrance lanes. Video data was collected to capture the volume, class, and processing time of vehicles at the entrance station on Park Loop Road.
- **Vehicle Counts:** NPS staff temporarily deployed a pneumatic tube counter on Schooner Head Road immediately east of Park Loop Road to gather data on how many vehicles enter the park or turn off from Park Loop Road via Schooner Head Road. Eastbound and westbound vehicle counts were recorded each hour from August 22 through September 3. Additionally, Acadia



regularly collects hourly vehicle counts via an inductive loop counter on Park Loop Road between the entrance station and Sand Beach Parking Lot, near the trailhead for the Beehive.

- **Transit Vehicle Locations:** DTI provided island Explorer Automatic Vehicle Location (AVL) data to determine the average processing time and congestion for transit vehicles at the entrance station.



Figure 4: Computer vision recognition of vehicles passing through the Sand Beach Entrance Station.
Source: Volpe Center

2.2. Key Parking Lots

Unique vehicles were identified by recording the final three digits of license plate numbers of parked vehicles. Vehicle identifiers and the space in which they were parked were collected via cell phone using a custom PowerApp every 15 minutes from 9 a.m. to 4 p.m. for one day to determine parking occupancy at different times of day, turnover rate, and length of stay at selected parking lots. Limited data was collected between 2 and 3 p.m. to provide staff with a break. In cases where PowerApp access was limited due to credentials or device battery power, vehicle identifiers were collected on paper.

In addition to identifying parked vehicles, Friends of Acadia staff collected counts of vehicles entering and exiting the parking lot in 15-minute time increments. Counts were collected on paper and additional vehicle turning movements tracked varied by parking lot design. A staff member recorded counts of pick-up and drop-off activity in and around the bus loading area at Sand Beach and Jordan Pond. Details on data collection at each parking area are provided below.

2.2.1. Sand Beach Parking Lots

Data was collected at Sand Beach Lower and Upper Lots from 9 a.m. to 4 p.m. on Tuesday, August 26, 2025. Vehicle identifiers in the Sand Beach Lower lot were collected on paper after 2 p.m.

Counts of vehicles entering, exiting and looping through the lower lot were collected on paper by sitting at the bottom of the driveway into each lot. In the Sand Beach Lower Lot, looping was defined as a vehicle turning back into the rightmost aisle of the parking lot after having already driven through the parking lot aisles in search of a spot. Looping is not possible at the Sand Beach Upper Lot because there is only one row of parking and can get easily congested with conflicts between vehicles and pedestrians, as shown in Figure 5.



Figure 5: Vehicle Congestion and Pedestrian Conflicts at Sand Beach Upper Parking Lot

Source: Volpe Center

2.2.2. Jordan Pond Parking Lots

Data was collected at Jordan Pond South and North Lots from 9 a.m. to 4 p.m. on Wednesday, August 27, 2025. Vehicle identifiers in the Jordan Pond North lot were partially collected on paper. Counts of vehicles entering and exiting each lot were recorded in 15-minute increments.

At the Jordan Pond South Lot, vehicle “turnaways” were counted in addition to entries and exits. A vehicle was considered as turning away from the lot when a vehicle drove straight through the one-way driveway rather than circulating the parking lot itself. At the Jordan Pond North Lot, vehicle maneuvers were observed from a point midway up the driveway, where the lot splits into two sections. Though the actual entrance to the lot from Park Loop Road was not in sight, it would have been difficult for vehicles to turn around and exit the parking lot prior to this point. Thus, it is assumed that all entering and exiting vehicles were visible from this vantage point. In addition to counting the number of vehicles entering and exiting the lot overall, a count of the number of vehicles that turned into the upper portion of the lot was recorded.

2.2.3. Eagle Lake Parking Lots

Data was collected at the Eagle Lake trailhead and boat launch parking lots from 9 a.m. to 4 p.m. on Thursday, August 28, 2025. All data was collected via the custom PowerApp. Due to the small size of the parking lots at Eagle Lake, parked vehicle counts were recorded as each vehicle arrived and left the lot.

2.3. Right Lane and Roadside Parking

Right lane and roadside parking data were collected by driving a vehicle or bicycle along each route. Computer vision video analysis and additional manual review were later applied to recognize vehicles and parking locations. Right lane parking occurs along Park Loop Road, and roadside parking occurs along Eagle Lane Road and near Confusion Corner. Details on data collection at each right lane or roadside parking segment are provided below.

2.3.1. Park Loop Road

A GoPro Max video camera and Pelsee P12 Pro 4K dash cam was mounted on the interior of the front windshield of a vehicle, output shown in Figure 6. This camera continuously recorded the right side of the vehicle and geotagged the video footage. The video footage identified parked vehicles in the right lane. The vehicle was driven on a continuous loop, passing the entrance station roughly every 30 minutes from 9 a.m. to 4 p.m. on Tuesday, August 26, 2025. Limited data was collected between 2 and 3 p.m. to provide staff with a break.



Figure 6: Computer Vision Recognition of Vehicles Parked in the Right Lane on Park Loop Road
Source: Volpe Center

2.3.2. Jordan Pond - Confusion Corner

A GoPro Max video camera was mounted on bicycle handlebars to collect data geotagged video footage of vehicles parked on the shoulder of Park Loop Road in the vicinity of Jordan Pond, including the intersection of Park Loop Road and Stanley Brook Road, known locally as Confusion Corner. A lap was completed every 30 minutes from 9 a.m. to 4 p.m. on Wednesday, August 27, 2025. Limited data was collected between 2 and 3 p.m. to provide staff with a break.

2.3.3. Eagle Lake

A GoPro Max video camera and Pelsee P12 Pro 4K dash cam were mounted on the interior of the front windshield of a vehicle. The vehicle was driven on a loop every 20 minutes from 9 a.m. to 4 p.m. on Thursday, August 28, 2025, to collect geotagged video footage of vehicle parking in the shoulder of Eagle Lake Road. Limited data was collected between 2 and 3 p.m. to provide staff with a break.

2.4. Island Explorer Transit Data

This data collection and evaluation plan also included public transportation data. The Volpe team did not collect new data for transit vehicles, but rather leveraged Island Explorer's vehicle position and automatic passenger counter (APC) data dashboard provided by Avail Technologies. This data includes historical logs of vehicle positions while in service, which are linked to the assigned routes, schedules, and boarding and alighting counts. Filtering can be applied to review APC counts by stop, trip, route, or other variables across historical service. The dashboard does not provide estimations of how many passengers are aboard the shuttle at any given point, but that information can be inferred by adding the boarding and subtracting the alighting passengers. APC data also cannot capture the number of passengers left behind at a shuttle stop when the bus is at capacity. Additionally, the project team found that not all bus trips are recorded in the data dashboard. When DTI sends an unscheduled bus to a busy route, it is often not properly programed with the route or station information, which results in an incomplete dataset. Adjustments and assumptions were made as necessary.



3. Data Summary and Data Outputs

3.1. Sand Beach Entrance Station

Visitor demand at the Sand Beach Entrance Station is highest starting in the late morning and continuing through the early afternoon. Vehicular access through the entrance station is primarily provided via Park Loop Road. Vehicles can also access Sand Beach via Schooner Head Road, which allows vehicles to turn onto Park Loop Road and travel through the entrance station or turn off Park Loop Road and avoid entering the park. Figure 7 shows the hourly traffic volumes at the three points near the entrance station. The southbound Park Loop Road traffic counter is near Sand Beach and counts vehicles that travel through the entrance station. Vehicles traveling along Schooner Head Road Connector westbound (entering the park) and eastbound (exiting Park Loop Road) are also shown. From about 10:00 a.m. to 4:00 p.m., on a typical nice day, between 300 and 400 vehicles enter the park per hour.

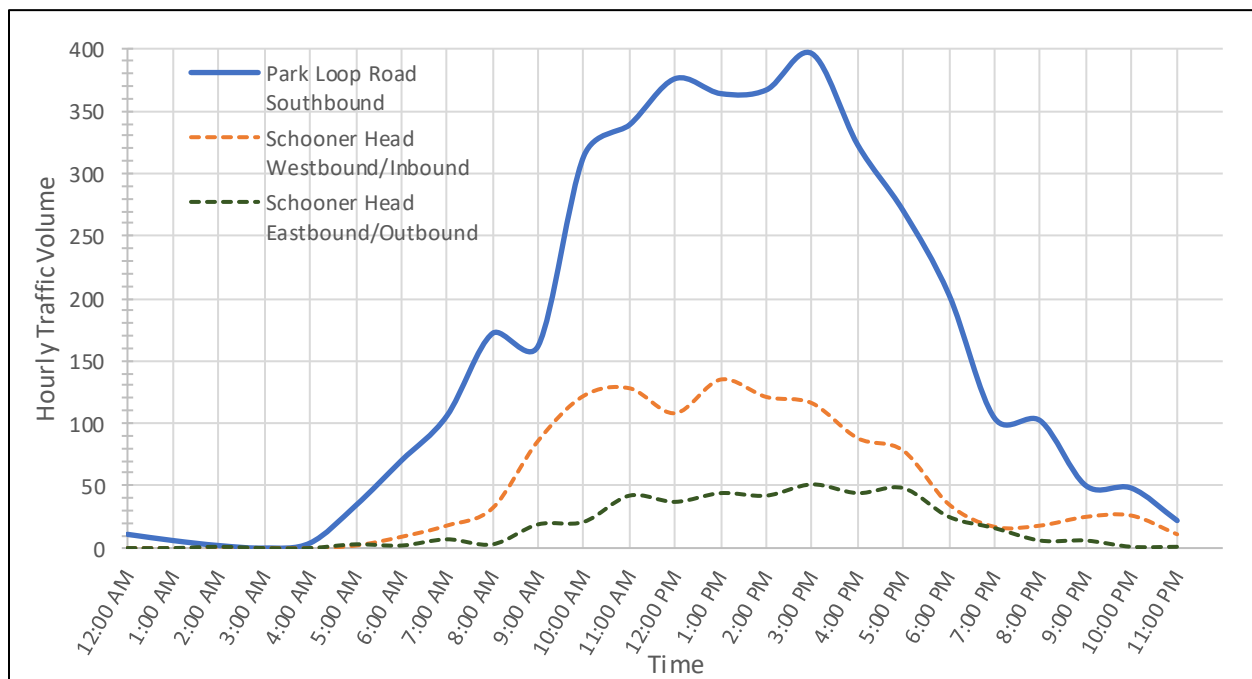


Figure 7: Hourly Traffic Volume at Park Loop Road

Source: Volpe Center

The Sand Beach Entrance Station assessment evaluated the processing time at the entrance station booths, identified the peak demand at the entrance station, and analyzed the impact of visitors using Schooner Head Road to either enter the park or exit Park Loop Road.

3.1.1. Sand Beach Entrance Station Processing Capacity

One of the key metrics identified at the Sand Beach Entrance Station is the processing rate at each entrance booth, which is the amount of time each entrance booth takes to process a vehicle. Each entrance booth operates slightly differently. The right-most lane was typically used by vehicles with an existing park pass and transit vehicles, which were able to process quickly. The right-most lane was also used by oversized vehicles, such as RVs. The middle lane and left-most lane were used by other visitors, some of which may have had a park pass but may have had questions for the ranger in the booth. During busy times, all vehicles that entered via Schooner Head Road were forced to enter the park via the left-most booth. According to park staff, locals are more associated with using Schooner Head Road.



Two metrics were used to assess vehicle processing at the entrance station. The first, the Time at Entrance Station, is the time it takes when the vehicle to actively at the entrance booth to communicate with the staff, possibly make a payment or ask questions, and then proceed through the booth. The second, Follow-up Time, is time it takes for the next vehicle to notice the previous vehicle has departed and pull up to the booth. Follow-up time is also considered to be a type of “lost time.” Both metrics are shown in Table 2 and are broken into percentile outputs and the average as well as the overall processing time by lane and the most vehicles processed per hour.

Table 2. Entrance Station Processing Time

Source: Volpe Center

Metric	Left Entrance Booth	Middle Entrance Booth	Right Entrance Booth
Time at Entrance Station (sec)			
Average	26.9	23.4	13.5
25 th percentile	5.4	2.1	1.2
50 th percentile	16.2	14.6	6.7
75 th percentile	35.9	35.0	18.8
90 th percentile	66.7	54.5	34.9
Follow-up Time (sec)			
Average	10.3	16.1	18.5
25 th percentile	1.7	4.2	5.0
50 th percentile	2.9	5.4	6.7
75 th percentile	5.4	15.3	17.9
90 th percentile	18.8	43.8	54.2
Average Total Processing Time	37.2	39.5	32.0
Most Vehicles Processed per Hour	132	111	144

As shown in Table 2, even though the right-most lane has the quickest processing time, the follow-up time appears to be slower than the other two lanes. When analyzing the data, the follow-up times can be deceptive, especially when the station did not have any congestion or queue forming. For example, when a vehicle was not waiting to be processed, the follow-up time could be several minutes even though the booth was open. Additionally, the average processing time can be significantly skewed by vehicles that take a long time to proceed through the entrance station, typically because the visitor group has questions for the ranger at the booth. In the middle and right lanes, about one of every ten vehicles took about one minute to proceed through the entrance station, resulting in an average time almost double the median time. During data collection, the right lane processed the most vehicles, with the left lane a close second, and the middle lane processed the fewest. This result can be explained by the fact that some RVs and other large vehicles slow down the right lane, and locals that use Schooner Head Road speed up processing in the left lane.

As shown, the most vehicles processed over a 60-minute period was 387 vehicles. Accounting for some variability, the capacity of the entrance station is estimated at about 360 to 400 vehicles per hour, or about one vehicle per booth every 27 to 30 seconds. This estimate also correlated well to the existing inductive loop counter near Sand Beach Parking Lot, which showed the highest hourly volume of around 400 vehicles per hour over the entire summer, shown in Figure 7.

During times of high demand, a queue formed at the entrance station. The queue indicated that the demand to enter through the station was higher than the capacity. The maximum queue length observed during the field visit was estimated to be about 600 feet along Park Loop Road and about 150 feet along Schooner Head Road. These lengths were confirmed by park staff as being the typical queue length during a busy day. Traffic volumes were not collected before the entrance station, so demand is estimated.



The queue length indicates that about 50 vehicles were waiting to enter but could not be processed, therefore the peak demand fluctuated from about 400 to 450 vehicles per hour while the maximum capacity is about 360 to 400 vehicles. A long queue was only present from about 10:30 a.m. to 12:30 p.m. and then dissipated in the afternoon to a maximum of five vehicles. Therefore, the peak demand at the entrance station generally occurs in the late morning but remains high through most of the early afternoon.

3.1.2. Schooner Head Road Connector

Schooner Head Road parallels Park Loop Road to the east and is owned and maintained by the town of Bar Harbor. Before the Sand Beach Entrance Station, Schooner Head Road connects to Park Loop Road via a 650-foot connector road (referred to as Schooner Head Road Connector). This geometrical alignment provides a way for vehicles to enter the Sand Beach Entrance Station via Schooner Head Road and potentially skip the queues along Park Loop Road. Visitors may believe this allows them to enter the park more quickly.

According to traffic data, about 100 to 140 vehicles per hour enter via Schooner Head Road and about 25 to 50 vehicles per hour exit Park Loop Road to Schooner Head Road. Since the vehicles from Schooner Head Road are forced into the left-most entrance booth (and alternate with vehicles from Park Loop Road), they are processed at a much slower rate, about one vehicle per minute, than vehicles approaching from Park Loop Road, at a rate of about five vehicles per minute, which can use any of the three entrance booths. After considering the maximum observed queue lengths, vehicles entering from both Park Loop Road and Schooner Head Road took about six minutes to be processed through the entrance station, meaning it generally took visitors about the same amount of time to enter the park via Schooner Head Road compared to Park Loop Road. This is a typical trend since the rise of GPS navigation and real-time traffic projections. Vehicle route choice generally reaches an equilibrium over time.

Additionally, the data showed that throughout the middle of the day, about 25 percent to 40 percent of the visitors traveled through the entrance station via Schooner Head Road. At 9:00 a.m. over 50 percent of the visitors traveled through the entrance station via Schooner Head Road. This aligns with the premise that most of the visitors that enter via Schooner Head Road are locals or regular visitors that know to enter the park early and believe it is easier to enter the park via Schooner Head Road to avoid long queues.

3.1.3. Sand Beach Entrance Station Transit Mode Share

Understanding how people access the park is an important step in improving transportation for visitors. This analysis provides an estimate of the transit mode share using the Sand Beach Entrance Station. Data related to people walking or biking was not included, so a full mode split could not be determined.

As determined through the transit data, between 750 and 1,000 transit passengers boarded Route 3 or Route 4 and traveled through the Sand Beach Entrance Station. As previously mentioned, the transit data is likely undercounted since DTI sends additional buses, especially during busy days, that are not properly coded in the data. Alternatively, on a typical busy day, about 3,500 vehicles entered the park via the Sand Beach Entrance Station. According to the Visitor Use Counting and Reporting procedures¹ at the park, the average vehicle contains approximately three people per vehicle resulting in 10,500 total visitors entering via automobile. Accounting for a slight adjustment in the transit ridership, this results in a transit mode share of about 10 percent that enter through the Sand Beach Entrance Station. According to IRMA,² the summertime transit mode share park-wide is closer to 5 percent.

¹ <https://irma.nps.gov/Stats/FileDownload/22391>

² <https://irma.nps.gov/Stats/Reports/Park/ACAD> <https://irma.nps.gov/Stats/Reports/Park/ACAD>



3.2. Key Parking Lots

On average across all parking lots, approximately three different passenger vehicles parked in any given parking spot over the course of the day. Parking lots filled early in the morning and continued to see high traffic throughout the day, with many visitors arriving at parking lots between 9 a.m. and 2 p.m. ultimately exiting the lot without finding parking. Lot capacities are displayed in Table 3 and calculated parking metrics are displayed in Table 4. Each study parking lot is discussed below. A figure is included for each parking lot depicting parking lot activity (the number of vehicles entering the lot) and occupancy over the course of the day.

Table 3. Parking Lot Capacities

Source: Volpe Center

Characteristic	Sand Beach Lower	Sand Beach Upper	Jordan Pond South	Jordan Pond North	Eagle Lake Parking Lot	Eagle Lake Boat Launch
Standard Parking	96	22	65	185	26	6
ADA Parking	5	0	6	0	2	2
Total Visitor Parking	101	22	71	185	28	8
NPS/Maintenance Parking	2	0	0	1	1	0

Table 4. Calculated Parking Metrics

Source: Volpe Center

Characteristic	Sand Beach Lower	Sand Beach Upper	Jordan Pond South	Jordan Pond North	Eagle Lake Parking Lot	Eagle Lake Boat Launch
Total Daily Vehicles Parked	376	58	226	586	94	20
Average Number of Unique Vehicles per Space per day	3.92	2.64	3.48	3.17	3.62	3.33
Average Number of Unique Vehicles per Space per day	3.92	2.64	3.48	3.17	3.62	3.33
Average Number of Unique Vehicles per Space per day	3.92	2.64	3.48	3.17	3.62	3.33
Average Number of Unique Vehicles per Space per day	3.92	2.64	3.48	3.17	3.62	3.33
Average Vehicle Stay (Minutes)	83	80	107	120	101	104
Total ADA Vehicles Parked	23	--	20	--	10	8
Average Number of Unique Vehicles per ADA Spot	4.60	--	3.33	--	5.00	4.00



3.2.1. Sand Beach Lower Lot

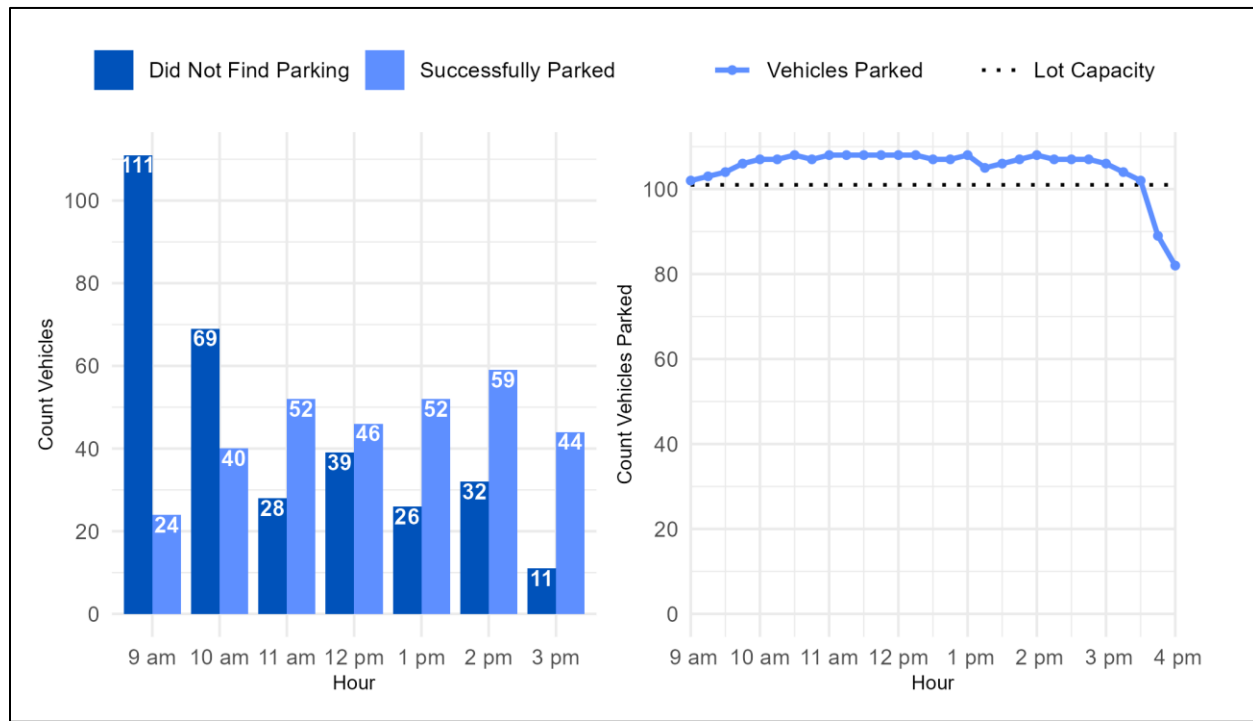


Figure 8: Sand Beach Lower Lot Parking Activity and Capacity on Tuesday, August 26, 2025

Source: Volpe Center

The main parking lot at Sand Beach was already full when the team arrived at 8:30 a.m. on Tuesday morning, a sunny morning following a rainy day. Throughout most of the day more vehicles were parked in the lot than available parking spots, as shown in Figure 8. Excluding the two rows of parking closest to the changing rooms and bus loading area, vehicles parked on either end of each row of parking spots, often with the vehicle's wheels on one side atop the sidewalk to fit into the claimed spot. This parking behavior did not appear to limit vehicle movement throughout the parking lot.

Demand for parking is far greater than the available capacity. Between 9 and 11 a.m., 244 vehicles entered the lot and only 64 (26 percent) of vehicles were able to find a parking spot. Though the lot remained beyond capacity throughout the day, vehicles entering the lot later in the day were increasingly successful in finding a parking spot. Lot occupancy dropped sharply after 3 p.m., with the parked vehicle count reducing from 106 (105 percent) at 3 p.m. to 82 (81 percent) at 4 p.m. After 3:45 p.m., the parking lot was no longer over capacity.

The smaller Sand Beach lot filled up quickly at the beginning of the day and remained busy until 2 p.m., after which there were open spots available in the lot, as shown in Figure 9. The narrow lot has one lane of parking spots, limiting vehicle turn maneuvers and potential for vehicles to park in unmarked areas. Still, two vehicles parked in the lot outside of designated parking spots. Vehicle turnover allowed ten vehicles to find parking spots in the lot between 9 and 11 a.m., only ten percent of the 98 vehicles that entered the lot during that two-hour period. Fewer vehicles entered the lot in the following hours.



3.2.2 Sand Beach Upper Lot

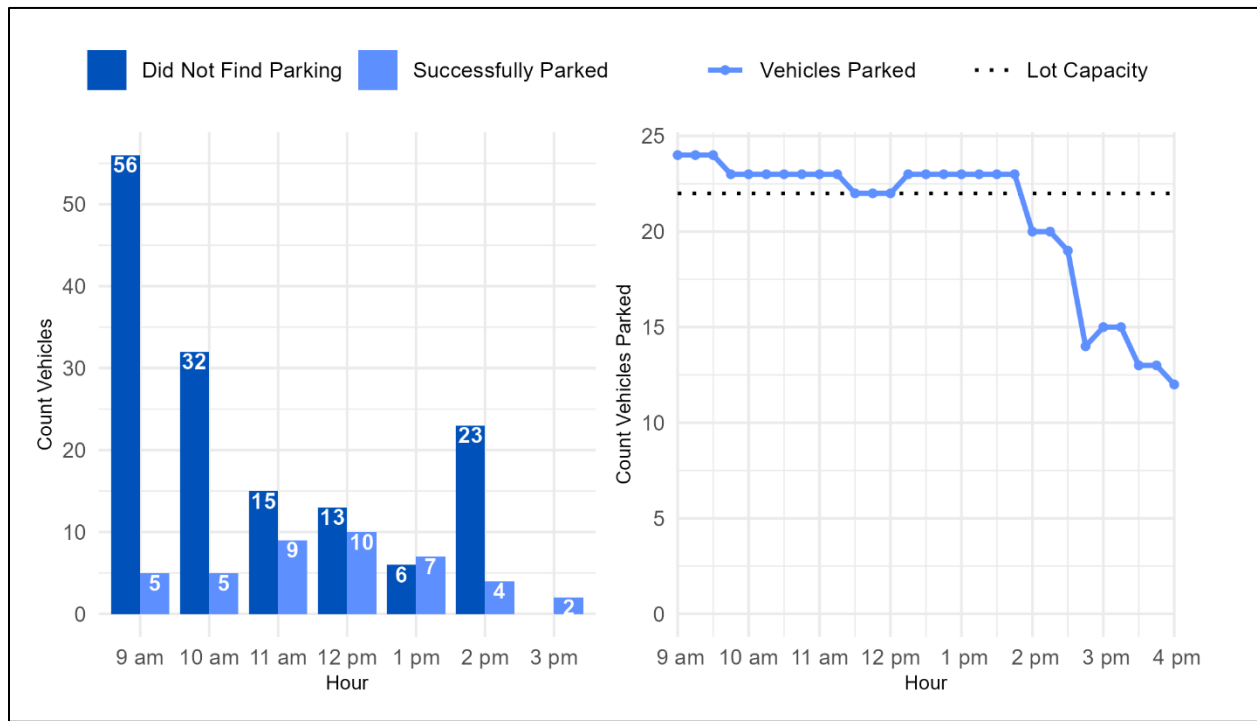


Figure 9: Sand Beach Upper Lot Parking Activity and Capacity on Tuesday, August 26, 2025

Source: Volpe Center

3.2.3 Jordan Pond South Lot

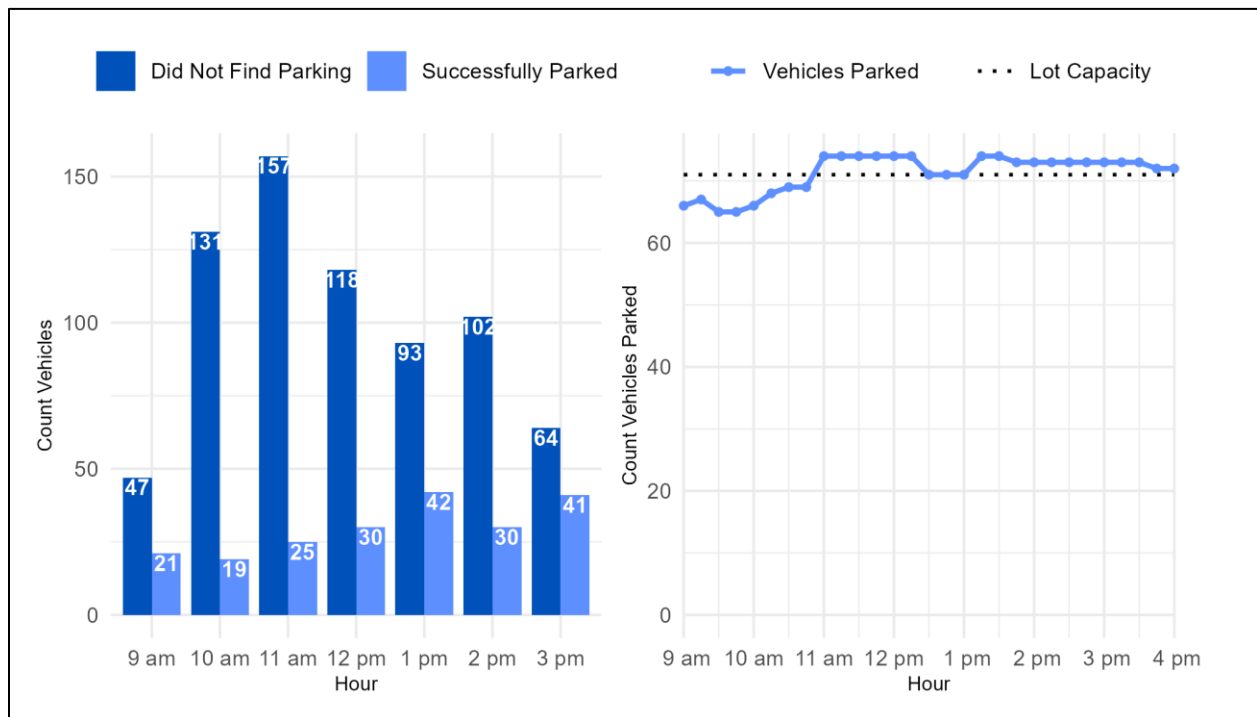


Figure 10: Jordan Pond South Parking Lot Activity and Capacity on Wednesday, August 27, 2025

Source: Volpe Center



Jordan Pond South Lot, with 101 parking spaces, experienced high demand for parking all day, as shown in Figure 10. Over 100 vehicles entered the 71-spot parking lot each hour from 10 a.m. to 4 p.m. With the average vehicle in the lot parking for one hour and 47 minutes, only a small proportion (22 percent) of vehicles entering the lot after 10 a.m. succeeded in obtaining a parking spot. The lot's six accessible parking spots did not initially fill at the start of the day, leading to the appearance of open spaces in the lot. Approaching lunchtime, the accessible spots were occupied and in frequent use throughout the remainder of the day.

3.2.4 Jordan Pond North Lot

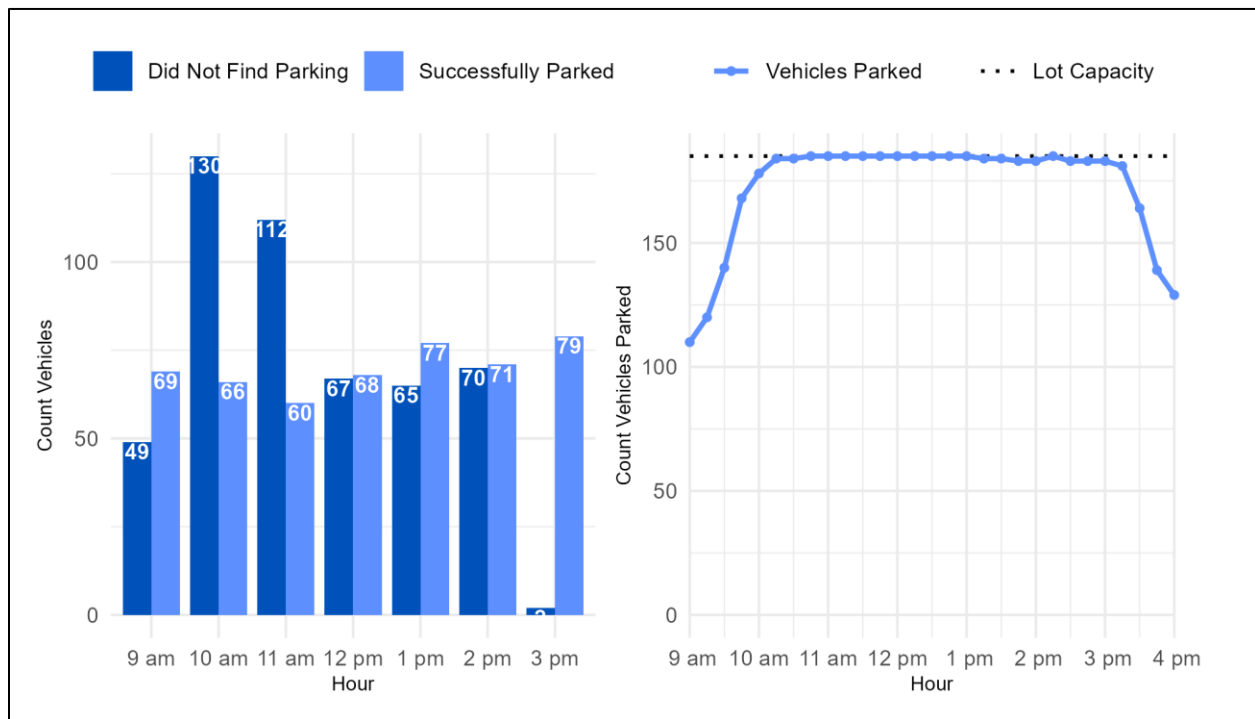


Figure 11: Jordan Pond North Parking Lot Activity and Capacity on Wednesday, August 27, 2025

Source: Volpe Center

Jordan Pond's north parking lot is larger than the south lot with capacity for 185 vehicles. The lot gradually filled over the course of the early morning, reaching capacity by 10:15 a.m. The lot remained full until 1:15 p.m., at which point a few parking spots were not immediately filled after the prior parked vehicle left, and occupancy began to sharply decrease at 3:30 p.m., as shown in Figure 11.

Five of the lot's parking spots are reserved for large vehicles. There is an additional block of eight parking spots which were previously reserved for large vehicles but are no longer subject to this limitation, though there is faded but legible paint on the parking spots. Even after the rest of the lot was full, circling vehicles were hesitant to use these parking spots. Once one standard vehicle turned into one of the spots at 10:45 a.m., the eight spots filled immediately and were in use throughout the rest of the day.

Eagle Lake parking lot has capacity for 28 vehicles, including two ADA parking spots. Parking lot capacity is difficult to determine in these lots due to faded and missing parking stall markings. Faded markings allowed vehicles parked early in the day to park with awkward gaps between vehicles, limiting the vehicle types that could fit in the remaining open space. Additionally, this made it difficult for visitors to identify ADA parking spots. Pavement markings are discussed further in section 4.1.



3.2.5. Eagle Lake Parking Lot

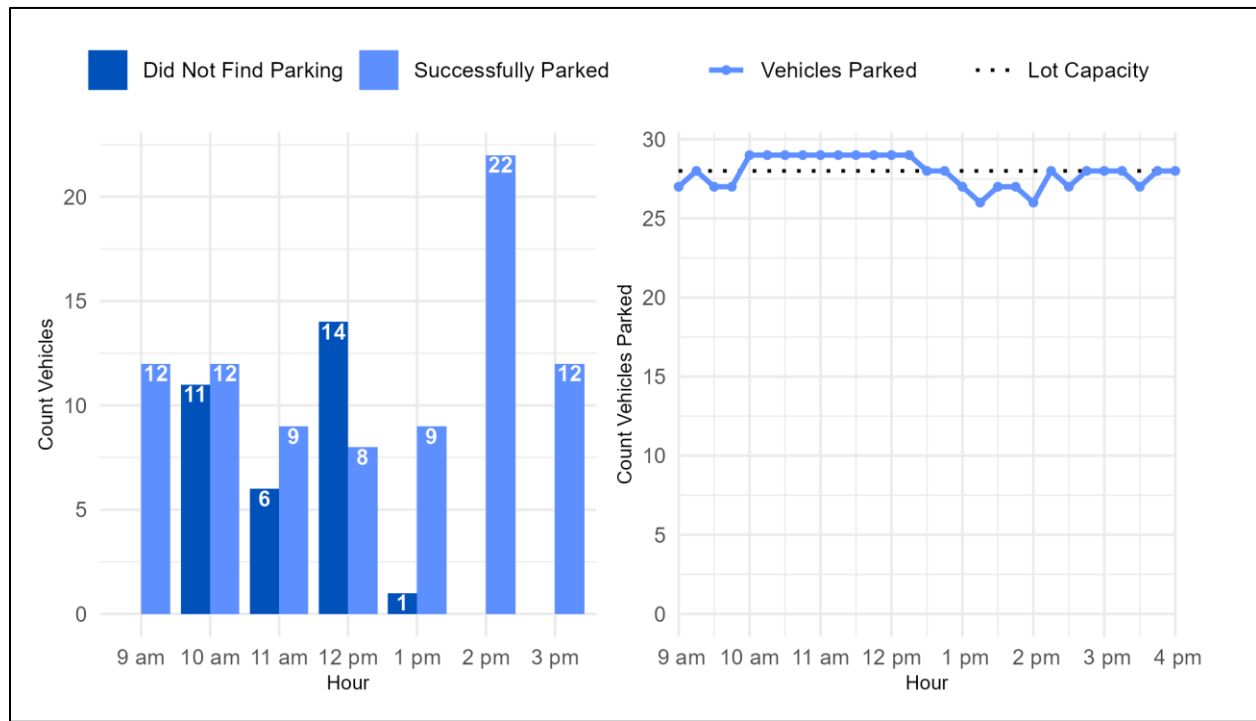


Figure 12: Eagle Lake Parking Lot Activity and Capacity on Thursday, August 28, 2025

Source: Volpe Center

Eagle Lake parking lot was full from 9 a.m. until 1 p.m., with empty parking spots quickly claimed by incoming vehicles when a parked vehicle departed. The faded parking stall markings indicated that there was space for another vehicle, however vehicles that arrived early to the lot had been parked such that newly arriving vehicles could not park within pavement markings. After 1 p.m., the parking lot continued to be full or nearly full, with spots sitting empty for slightly longer after a vehicle departed. As seen in Figure 12, the parking lot was beyond capacity from 10 a.m. until noon because a vehicle claimed an unmarked spot by parking directly at the carriage trail entrance. Vehicle arrivals lined up with vehicle departures later in the afternoon, and all vehicles that entered the lot after 1:30 p.m. were able to find a parking spot.

The Eagle Lake Boat Launch parking lot has only eight parking spots, including two accessible parking spots. Similar to the main Eagle Lake lot, it is difficult to determine capacity in this lot due to faded and missing parking stall markings. There appeared to be three vehicles parked in non-permitted spots at the beginning of observation, as shown in Figure 13. Throughout the day, additional vehicles occupied the same non-permitted spots. This lot did not experience high demand beyond its capacity, with at most 13 vehicles entering the lot during a one-hour period (1 to 2 p.m.). Some vehicles entered the lot and then exited, even though parking spaces were available. Some of these vehicles were recorded as turnaways, however that may be inaccurate. It is possible that vehicles were picking up or dropping off, using the lot as a turnaround area, or other unknown reasons.



3.2.6 Eagle Lake Boat Launch Lot

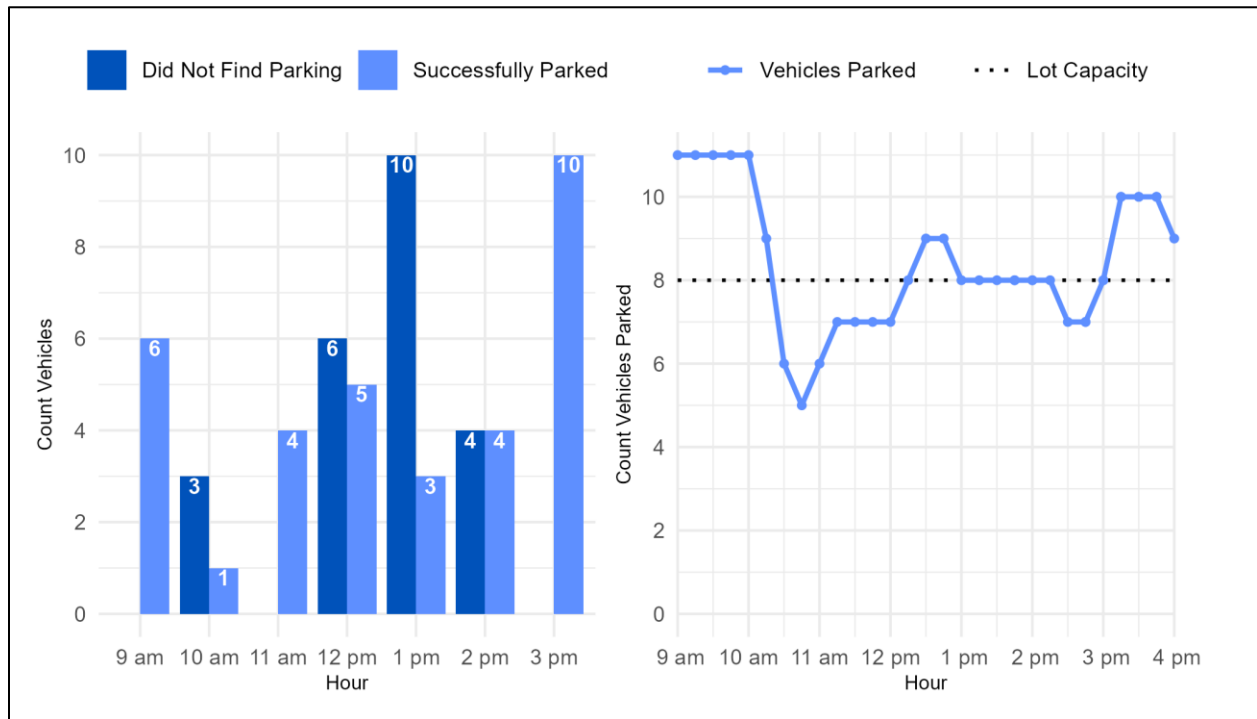


Figure 13: Eagle Lake Boat Launch Parking Lot Activity and Capacity on Thursday, August 28, 2025
Source: Volpe Center

3.3. Right Lane and Roadside Parking

The right lane and roadside parking data included less detail than the parking data at the parking lots because unique vehicle identifiers were not collected. Therefore, length of stay and turnover rate cannot be determined, especially during periods of high demand. Additionally, since marked spaces are not provided, vehicle locations shift overtime, creating spaces between vehicles that are not long enough for a vehicle to park. When parking data was recorded, a vehicle parking space was either occupied or empty. The key metrics allowed the project team to analyze how often a vehicle was occupying a parking space, and how usage of the right lane parking changed throughout the day.

3.3.1. Park Loop Road

Right lane parking along Park Loop Road gradually increased over the course of the morning as visitors found the parking lots at Sand Beach full. By 11 a.m., over 300 vehicles were parked in the right lane of Park Loop Road between the Sand Beach Entrance Station and Otter Cliff Road. Figure 14 shows the parking demand throughout the day along Park Loop Road. Right lane parking began to decline after 1:30 p.m., though there were still more vehicles parked on the road at 4:20 p.m. (121 vehicles) than there were at 9:35 a.m. (86 vehicles). This is in contrast to Sand Beach parking lot, which was full at the start of the morning and continued to be at capacity until 3:30 p.m.

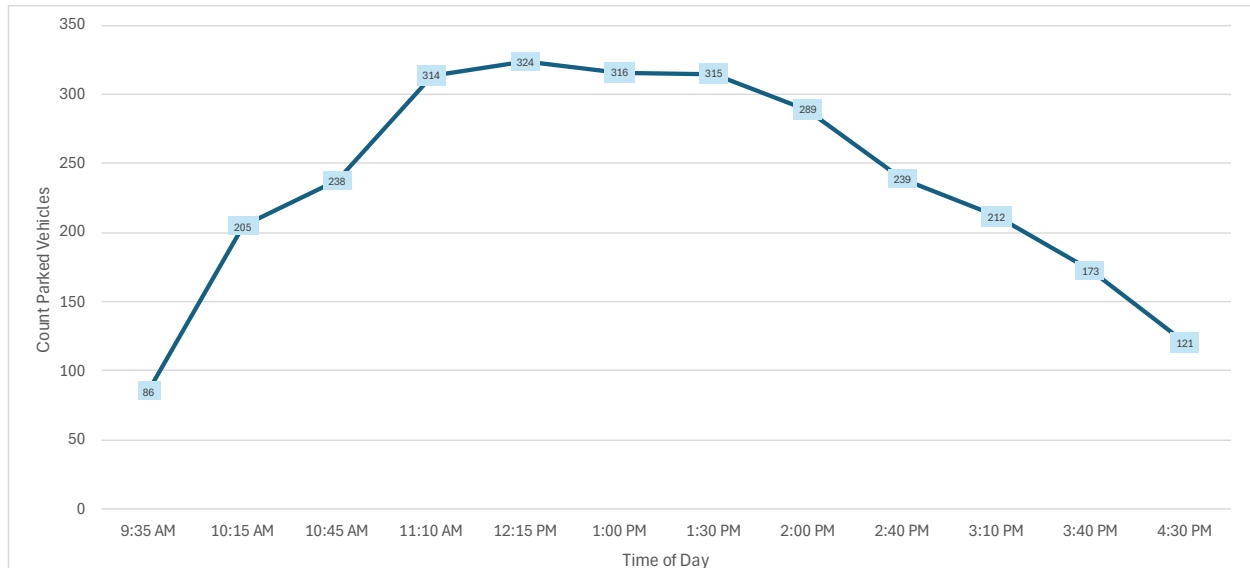


Figure 14: Right Lane Parking along Park Loop Road on Tuesday, August 26, 2025

Source: Volpe Center

Figure 15 shows the extent and duration vehicles were parked along Park Loop Road. Signs indicating permitted parking were largely followed, with occasional exceptions of one additional vehicle parked into the no-parking zone at each end of the permitted parking stretch. A heatmap was generated by attributing each recorded vehicle occurrence to a corresponding 15-foot road segment (a “parking spot”). As previously mentioned, the parking spaces were observed 12 times throughout the day. If a vehicle were parked in a space, it was assumed to be occupied for period of time until the spaces were observed again. The total duration indicates approximately how long the parking space was occupied throughout the day and does not mean that it was continuously occupied for that duration. While Figure 14 provides the number of confirmed counts of vehicles parked on Park Loop Road during each data collection period. Figure 15 illustrates the range of locations and duration of where vehicles park in the different stretches of roadway.

Right lane parking was most consistently observed throughout the day in the immediate stretch of road south of the Sand Beach parking lot driveway. Visitors frequently attempted to park in the Sand Beach parking lot, determined that the lot was full, then then parked as soon as possible on the road after leaving the lot. As captured in the Sand Beach area inset in Figure 15. Right lane parking was also often occupied near the main points of interest such as Keyhole and Gram Mountain, both of which also have designated parking lots. Right lane parking near Thunder Hole (see Figure 15 inset) occurred, although was less occupied generally due to the rapid turnover at the site.

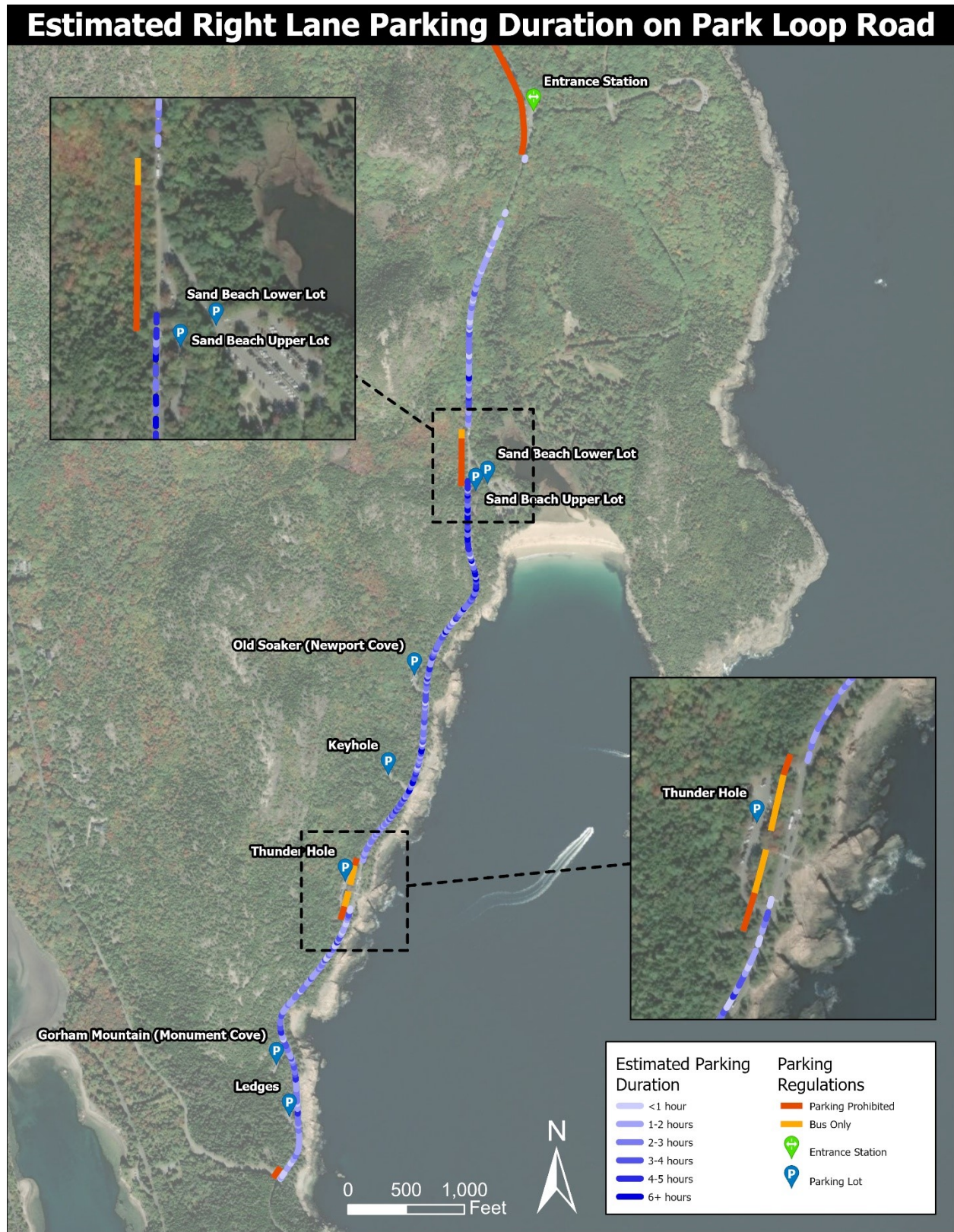


Figure 15: Heatmap of Right Lane Parking along Park Loop Road on Tuesday, August 26, 2025
Source: Volpe Center



3.3.2 Jordan Pond - Confusion Corner

Right lane parking at Confusion Corner increased quickly after 11 a.m., after the parking lots of Jordan Pond had reached capacity, as shown in Figure 16 and in advance of the lunchtime rush. Though there were only four vehicles parked around Confusion Corner at 10:45 a.m., parked vehicles arrived quickly and filled in the permitted parking along the shoulder by noon with 25 parked vehicles.

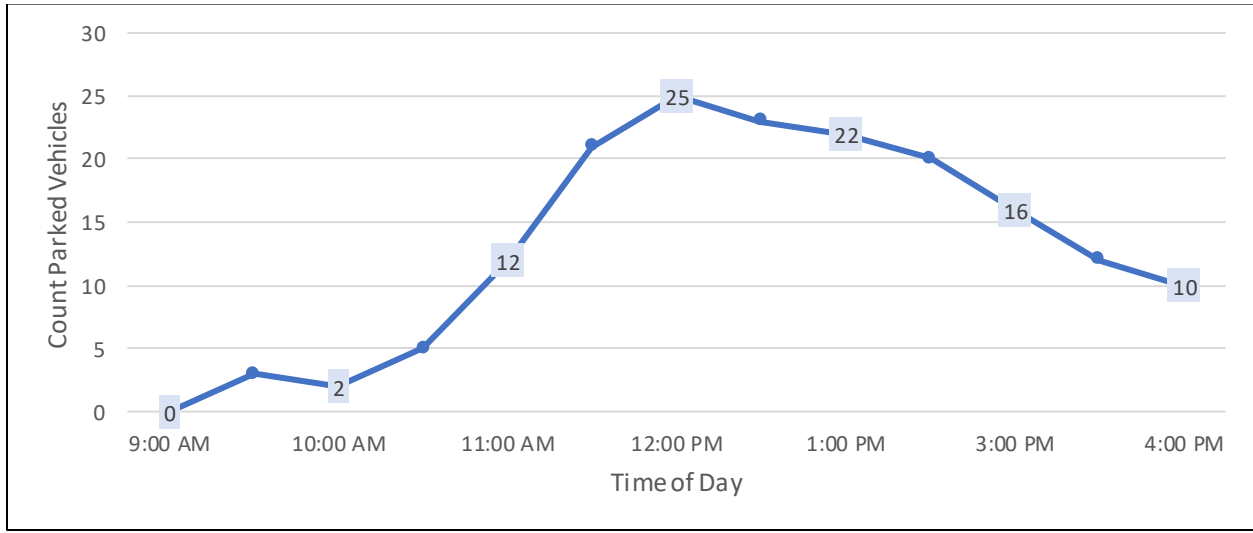


Figure 16: Parked Vehicles at Confusion Corner on Wednesday, August 27, 2025

Source: Volpe Center

Signage (both permanent and temporary), cones, boulders, and wooden fences are in place along the road to constrain roadside parking to permitted areas, as shown in Figure 17.



Figure 17: Traffic Cones and Temporary Signage around Confusion Corner

Source: Volpe Center on Wednesday, August 27, 2025



Figure 18: Permitted Parking Areas at Confusion Corner

Source: Volpe Center

Figure 18 shows permitted parking areas around Confusion Corner in green, with each area labeled A through E. Parking areas B and C were the most congested areas in confusion corner, filling up with nine vehicles and 12 vehicles, respectively. Parking was not common in other areas. Only one vehicle parked briefly by the cemetery in parking area D. Parking areas A and E on Park Loop Road each saw two vehicles parked over the course of the day, though there was space for additional vehicles. Vehicles were not observed parking on the road in non-permitted areas, though many vehicles were seen stopping briefly with their hazard lights on where parking was not permitted along Park Loop Road between Confusion Corner and the Jordan Pond parking lots. The hourly parking is shown in Table 5.

Table 5. Confusion Corner Parking on Wednesday, August 27, 2025

Source: Volpe Center

Hour	A	B	C	D	E	Total
9:00 a.m.	0	0	0	0	0	0
10:00 a.m.	0	2	0	0	0	2
11:00 a.m.	0	7	3	1	1	12
12:00 p.m.	2	9	12	0	2	25
1:00 p.m.	1	8	11	0	2	22
2:00 p.m.	1	8	10	0	1	20
3:00 p.m.	2	8	6	0	0	16
4:00 p.m.	1	6	3	0	0	10



3.3.3. Eagle Lake

Over the 23 observations throughout the day, roadside parking near the carriage trails entrance at the northern end of Eagle Lake increased quickly through the morning and reduced after lunchtime. Vehicles parked along the road shoulder were generally in compliance with shoulder parking signage, with the occasional exception of a single vehicle parked too close to the parking lot entrance on the westbound road shoulder.

Figure 19 shows the count of vehicles parked on Eagle Lake Road near Eagle Lake over the course of the day. Shoulder parking peaked at 48 vehicles at 12:20 p.m., with 30 vehicles or more parked on the road from 10:20 a.m. until 1:40 p.m.

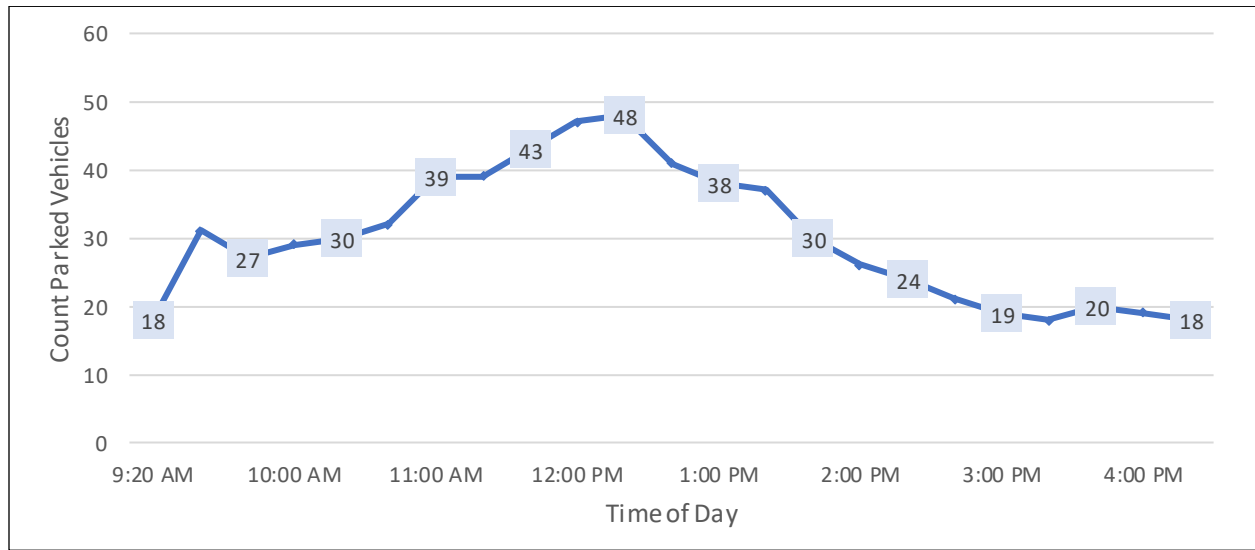


Figure 19: Roadside Parking along Eagle Lake Road on Thursday, August 28, 2025

Source: Volpe Center

Figure 20 shows where vehicles were parked on Eagle Lake Road. Roadside parking was most common on the westbound shoulder immediately east of the Eagle Lake parking lot. At the beginning of observations at 9:20 a.m. 13 vehicles were parked in the westbound shoulder. Westbound roadside parking peaked with 34 vehicles parked at noon. Vehicles parked in the roadside largely adhered to signage indicating where parking was permitted or not, with the occasional exception of one vehicle parked close to the parking lot entrance.

Roadside parking was less frequent on the eastbound shoulder, where drivers adhered to parking signage. At the beginning of observation at 9:20 a.m. five vehicles were parked in the eastbound shoulder. Eastbound roadside parking peaked with 14 vehicles at noon. Parking in the eastbound shoulder was most common immediately east of the Eagle Lake boat launch parking entrance.

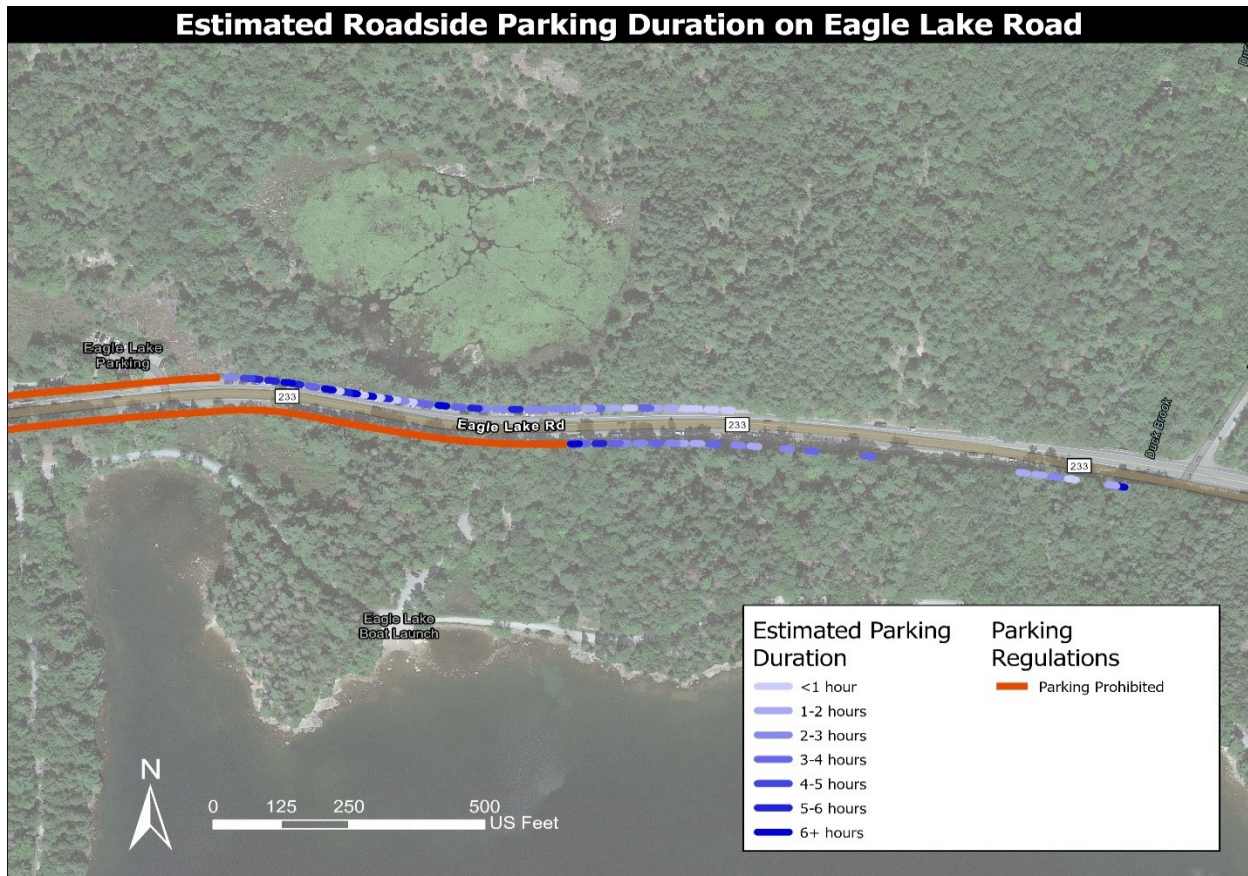


Figure 20: Heatmap of Roadside Parking along Eagle Lake Road on Thursday, August 28, 2025
Source: Volpe Center

3.4. Bus Ridership & GPS

The Island Explorer transit system faces challenges meeting visitor demand in the park and helping to reduce burdens on the roads and parking networks. ACAD has one of the highest ridership transit systems within the entire NPS, with about 500,000 annual trips. These trips are primarily served in the peak season between mid-June to September where ridership averages about 5,000 daily trips and peaks at almost 7,000 daily trips. Route 4, Loop Road, which serves Sand Beach and Jordan Pond, has the highest ridership along with Route 2, Eden Street, which connects the nearby lodging and ferry dock to the Village Green and operates in the afternoon and evening hours.

3.4.1. Ridership and Headways

The project team analyzed transit service to the three primary study areas:

- Sand Beach: Served by two routes (Route 3 and Route 4), both of which operate at about 30- to 40-minute headways and together average one bus every 17 minutes. At some points in the day, buses arrive as close as five minutes apart while at other times, buses arrive as far as 30 minutes apart.
- Jordan Pond: Served by three routes (Route 3, Route 5, and Route 6), with a total of 51 buses between 9:00 a.m. and 6:00 p.m. and an average headway of 11 minutes. At some points in the day, buses arrive as close as five minutes apart while at other times, buses arrive as far as 30 minutes apart.
- Eagle Lake: Served by one route (Route 12), with 30-minute headways and capacity for up to 16 bicycles.



The variation in headway at Sand Beach and Jordan Pond can cause buses to bunch during arrivals and lead to crowding at the stop. Depending on where visitors are going and what route they are waiting for, visitors may choose to wait for a more direct route extending wait times further. Poor cell phone service and a lack of real-time information in the park can further create a stressful transit experience for visitors. Average daily boarding and alighting at key stops is shown in Table 6.

Table 6. August Average Daily Passenger Boarding and Alighting at Key Transit Stops

Source: Volpe Center

Transit Data	Village Green	Visitor Center	Sand Beach	Thunder Hole	Otter Cliff	Jordan Pond
Routes	3, 6	4, 5	3, 4	3, 4	3, 4	4, 5, 6
Boarding	195	442	260	124	73	202
Alighting	153	240	282	115	72	216

3.4.2. Bus Congestion with Timestamped GPS Location

Data from the Island Explorer Routes 3 and Route 4 was analyzed to calculate the delays due to congestion at the Sand Beach Entrance Station and along Park Loop Road, using timestamped GPS coordinates. Vehicle location pings were recorded every 90 to 120 seconds, preventing greater granularity of results. Some trips may have had pings immediately before and after the geography of interest, which are not reflected in estimation of travel time across these limited geographies.

Travel time variability through the Sand Beach Entrance Station is approximated using the 2.0-mile segment from Egg Rock Overlook to the Beehive Trailhead immediately before the Sand Beach parking lot. The entrance station is about 1.5 miles into this segment of road. Figure 21 shows the approximate free-flow travel time, determined as generally the typical travel time without congestion at about four and a half minutes (278 seconds), as well as the median travel time and 85th percentile travel time. Travel times longer than the free flow travel time can indicate delays due to vehicle congestion along the roadway or at the entrance station. Bus trips through the entrance station typically take longer between 11 a.m. and 2 p.m. Median bus travel time through the entrance station was approximately three and a half minutes slower than free flow travel between 11 a.m. and noon with similar slowdowns between 1 and 2 p.m. after a decrease in congestion delays over the noon hour. While this dataset does not provide granular-enough time and geography data to further investigate bus delays through the Sand Beach Entrance Station, it demonstrates that transit service becomes less efficient when vehicle congestion and on-road parking on Park Loop Road are highest.

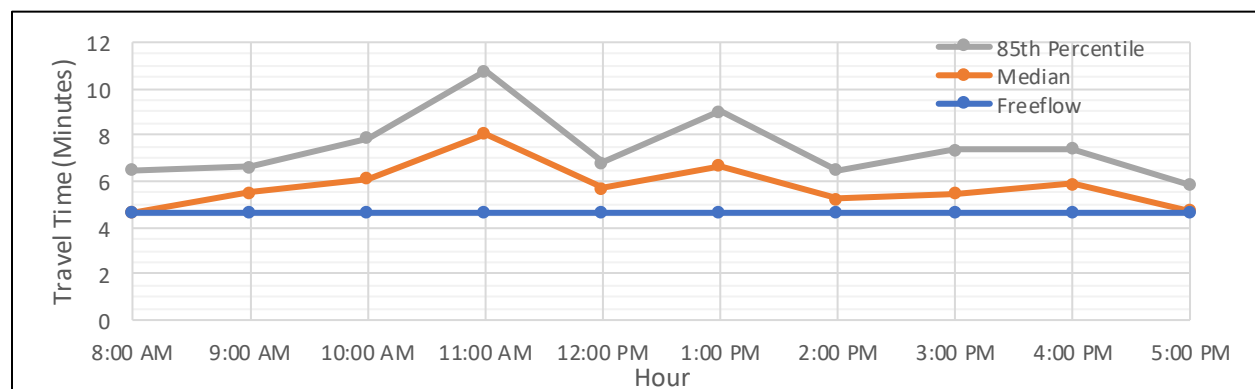


Figure 21: Island Explorer Bus Travel Times through Sand Beach Entrance Station, August 2025

Source: Volpe Center

Similarly, Figure 22 shows travel time along Park Loop Road along the 1.3-mile section from the Sand Beach parking lot to Otter Cliff Road. Bus trips take longer between 10 a.m. and 3 p.m., at the same time as



when parking on Park Loop Road is most heavily used. Free flow bus travel time along this segment of Park Loop Road was about four and a half minutes (275 seconds). Median travel time peaked at about ten minutes (596 seconds) during the noon hour, with 85th percentile travel times reaching almost 13 minutes (769 seconds) between 11 a.m. and noon. During this sample week, 16 trips exceeded ten minutes, with all but one of those trips taking place between 10 a.m. and 2 p.m.

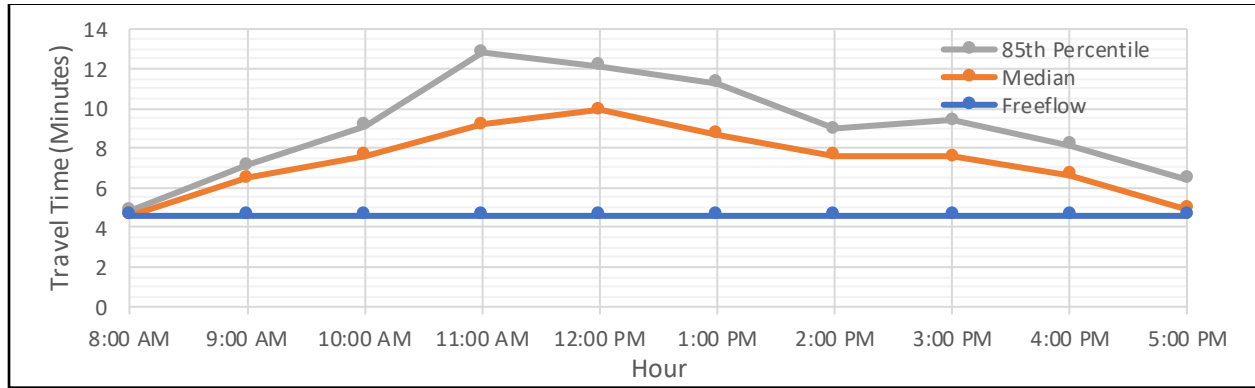


Figure 22: Island Explorer Bus Travel Times on Park Loop Road, August 2025

Source: Volpe Center

3.5. Data Validation Challenges

As previously stated, innovative data collection and data analysis methods were piloted in this transportation study, specifically through the use of computer vision video analysis at the entrance station and for right lane and roadside parking. Whenever new data methods are used, some trial and error is necessary and lessons are learned. The automated data collection and analysis were successful overall; however, some manual validation was necessary to confirm and edit the data processed by the computer vision video analysis. Data challenges and related manual fixes or shortfalls included:

- Video data at the Sand Beach Entrance Station was corrupted after noon and therefore data was only collected between about 8:15 and 11:45 a.m. According to traffic volume data, peak demand and throughput occurred between about 10:15 and 11:30 a.m., therefore the team is confident that the maximum processing capacity was captured. More data and longer analysis would add a higher level of confidence to the output. Additionally, the right lane parking data required continuous loops along Park Loop Road of about every 30 minutes. Therefore, video data of a vehicle traveling through the Sand Beach Entrance Station every 30 minutes provided an update on the queue length and operations at the entrance station.
- Glare in the video feed for the vehicle circulating Park Loop Road impeded the computer vision analysis. The glare disrupted the computer's ability to identify vehicles in the right lane and mark them as an occupied space and record the GPS coordinates. Manual validation was performed on the sections that were missing data. The location generally changed with the sun throughout the day and the reflection of the sun. Potential improvements could come from mounting cameras outside of the windshield with non-reflective material below to reduce glare.
- The study team used several video cameras to collect data. These cameras created various video file formats. The Go Pro 360 cameras create complex files that are difficult to process outside of the cameras and cause challenges with the computer vision video analysis. Additional effort was necessary to convert the video format to a more user-friendly format that was compatible with the YOLO model.
- Video file naming conventions and time calibration could have been established before the data collection to capture the time at which the video began. Timestamps should be visible in the video frame. As a secondary measure, the user should display the time (using a watch or phone) to be held in view of the camera at the beginning of filming to ensure timestamps can be accurately calibrated.



4. Recommendations

The following section outlines key recommendations designed to address the transportation challenges identified through recent data analyses and operational evaluations at ACAD. Drawing from synthesized findings on congestion, parking, transit operations, and entrance station activity, these recommendations aim to enhance visitor experience, improve operational efficiency, and support sustainable management practices. The strategies presented reflect both immediate actions and longer-term improvements, with a focus on aligning resources and infrastructure to meet current and future needs. By prioritizing practical solutions and partner collaboration, this section also provides a roadmap for effective implementation and measurable success. The following recommendations are designed to address key transportation concerns identified at ACAD and support ongoing improvements in operations and visitor experience. The Volpe team presented these recommendations to ACAD staff on May 21, 2026. Additional recommendations that were considered but deferred are included in the Appendix.

4.1. *Refresh and Restore Pavement Markings and Signage in Parking Lots*

One of the simplest and lowest cost methods to communicate parking information to visitors is through pavement markings and signage. Existing degradation of pavement markings in the parking lots is shown in Figure 23. Pavement markings should be clearly marked and in good condition. Signage should include parking restrictions and align with pavement markings. Signage can also include static signage installed on typical signposts throughout the park, or variable message boards that change and can be moved throughout the day or season. While ACAD has many instances where people park in unpermitted locations, most visitors wish to follow the rules and park in permitted parking spaces, reasonably close to their destination.



Figure 23: Pavement Marking Degradation 2007, 2019, and 2025

Source: 2007 - Google Street View, 2019 - Google Street View, 2025 - Volpe Center

This recommendation includes an assessment of all parking lots, and especially lots that reach capacity or have frequent parking violations, for pavement marking clarity on an annual basis and to schedule frequent restoration of faded pavement markings. The evaluation should assign a rating to each parking lot to identify the quality of the pavement markings. The ratings should range from:

- **Excellent** – The markings are new and in pristine condition, offering maximum retroreflectivity. The markings are crisp and do not have noticeable visible wear, fading, or discoloration, ensuring perfect visibility during both daytime and nighttime.
- **Good** – The markings are fully functional and highly visible, with only minor signs of wear or fading. The lines remain continuous and effective for driver guidance during both daytime and nighttime.
- **Fair** – The markings show noticeable degradation, including moderate chipping, fading, or discoloration. While still discernable they are approaching the end of their lifespan and should be scheduled for restriping soon.
- **Poor** – The markings are severely faded or missing entirely compromised to the point of creating a safety hazard. The markings offer no retroreflectivity and fail to provide any guidance to drivers. These markings should be replaced immediately.



Throughout the park, larger boulders can be placed to supplement pavement markings and signage. However, in some parking lots, larger vehicles may need additional space to maneuver which limits the ability to physically restrict parking and/or driving. Parking restrictions should be posted in areas that are easily visible from the parking space and should align with the restricted parking location. All accessible parking spaces should be clearly defined with both pavement markings and signage.

4.2. *Install Sand Beach Transit Express Lane*

Transit-only lanes can speed up existing service and lead to several benefits. First, they allow faster rides for bus passengers, allowing them to reach their destination more quickly. Second, they allow the bus to complete a cycle more quickly, allowing the service to run more often and improve frequency. Third, by removing potential congestion points, the bus can operate more predictably and remain on schedule further improving the planned operational timing.

In conjunction with a summer 2026 paving project along Park Loop Road, ACAD will install a transit express lane that will provide a dedicated bus lane along Park Loop Road starting about 1,000 feet before the Sand Beach Entrance Station and ending after the Sand Beach Parking Lot. A small break in the bus lane at the Sand Beach Entrance Station will allow visitors to utilize all three entrance station booths, so as not to limit the throughput at the entrance station and allow RVs and other large vehicles to use the recommended right-most entrance booth. The bus lane will continue again after the entrance station and end approximately 200 feet past the Sand Beach Parking Lot driveway. Roadside parking will be prohibited along this stretch of Park Loop Road to dedicate space for transit vehicles. The bus lane will be physically separated from the general traffic lane by flexible delineator posts and a solid double white line pavement marking. A rendering is presented in Figure 24 and detailed drawings of the Sand Beach Transit Express Lane are provided in the Appendix.



Figure 24: Transit Express Lane Rendering

Source: Volpe Center, Google Gemini

Monitoring and evaluation of the transit express lane is critical to the long-term success of the lane. ACAD staff should regularly monitor the lane to confirm it is functioning as intended. Passenger vehicles, RVs, or other non-transit vehicles should be prohibited from using the bus lane. Additionally, ACAD and DTI should evaluate the performance of the transit express lane through data collection and evaluation. As detailed in Table 7, the following performance measures should be collected:

- Transit vehicle delay at the entrance station
- Bus ridership through transit express lane
- Entrance station throughput



- Vehicle delay at the entrance station
- Vehicle queue length approaching Sand Beach Entrance Station
- Bus lane violations (vehicles traveling or parking in the bus lane)
- Emergency services use of the transit express lane
- Visitor feedback and satisfaction for both transit riders and visitors using automobile
- Staff feedback

Most importantly, the park should define success. In 2018, when the transit lane was previously introduced, some users felt that it was successful while others felt it was not successful. ACAD should evaluate the transit lane performance using data and feedback from a variety of users and staff. Publishing the data will also show stakeholders the overall impact rather than allowing anecdotes to impact evaluation of the project.

Table 7: Performance Metrics for Sand Beach Transit Express lane

Source: Volpe Center

Performance Metric	Description	Success Metric/Goal
Transit vehicle delay at the entrance station	The amount of time throughout the day that the bus is waiting at the entrance station to enter the park.	Entrance station delay is reduced by 20% during periods of high congestion.
Transit Ridership	The number of people riding the bus through the Sand Beach Entrance Station.	Transit ridership increases
Entrance Station Throughput	The maximum number of vehicles per hour that can travel through the Sand Beach Entrance Station.	The entrance station continues to process a maximum of about 360-400 vehicles per hour when all three booths are operational.
Vehicle delay at the entrance station	The amount of time visitors wait to enter through the Sand Beach Entrance Station.	Visitors are waiting 10% less time at the entrance station
Vehicle queue length	The length of vehicle queuing along Park Loop Road waiting to enter through the Sand Beach Entrance Station. Currently the maximum length was measured at about 600 feet long.	The queue length extends past the beginning of the Transit Express Lane for no more than 60 minutes during the busiest days.
Transit lane violations	The number of vehicles traveling or parking in the bus lane	Violations should be minimal due to clear traffic control and enforcement
Parking and Visitor Displacement	The number of visitors displaced by the lost parking spaces (about 75 parking spaces) to other trails (Gorham Trail) and parking lots (Schooner Head Point, Otter Point, and Fabbri Picnic Area)	Parking lots and trail maintain similar level of operations with slight increase in demand and usage
Emergency vehicle usage	Emergency vehicles are able to efficiently enter through the Sand Beach Entrance Station	Qualitative feedback from local emergency responders is positive more than negative.
Visitor feedback	How do visitors respond to the transit lane	Qualitative feedback from drivers and transit riders is positive more than negative and qualitative feedback from drivers is generally acceptable.
Staff feedback	How do NPS personnel view the installation, including staff time and law enforcement response	Qualitative feedback from staff and law enforcement is positive more than negative



4.3. Eliminate Right Lane Parking along Park Loop Road

One of the key strategies identified in the Transportation Plan and the Record of Decision was to phase out roadside parking along Park Loop Road, specifically “as other options and parking become available.” With ongoing projects to expand the parking lots at Sand Beach, Jordan Pond, and Eagle Lake, as well as the opening of the Acadia Gateway Center, expansion to Halls Cove, and scheduled increase in transit frequency planned for the summer 2026, ACAD should begin phasing out roadside parking along Park Loop Road and replace it with accommodations for transit or pedestrians. If roadside parking is not eliminated or phased out in coordination with these improvements, it may adversely affect transit ridership, further exacerbate existing congestion and parking challenges, and fail to leverage the potential of integrating parking reduction strategies with alternative access solutions.

In coordination with the Sand Beach Transit Express Lane, as detailed in section 4.2, roadside parking will be eliminated between the Sand Beach Entrance Station and the Sand Beach Parking Lot, resulting in about 75 to 120 parking spaces being removed. Eliminating the remaining approximately 250 to 400 roadside parking spaces should be completed in phases to minimize the impact to visitors. Focusing on one smaller parking area at a time will also be easier to monitor and enforce. ACAD should include strategies to enforce and monitor the effectiveness of the parking restriction. The phased approach should include the following:

- Phase One – Summer 2026: Eliminate roadside parking along Park Loop Road from the Sand Beach Entrance Station to the Sand Beach Parking Lot.
- Phase Two – Spring 2027: Eliminate roadside parking along Park Loop Road from the Thunder Hole Parking Lot to Otter Cliff Road.
- Phase Three – Spring 2028: Eliminate roadside parking along Park Loop Road from the Old Soaker (Newport Cove) Parking Lot to the Thunder Hole Parking Lot.
- Phase Four – Spring 2029: Eliminate roadside parking along Park Loop Road from the Sand Beach Parking Lot to the Old Soaker (Newport Cove) Parking Lot.

As right lane parking is eliminated, the resulting road space should be reserved for transit service, especially if initial evaluation of the transit express lane is positive. If right lane parking is eliminated and not replaced with other roadway uses, the right travel lane will become a de facto general vehicle travel lane. Providing a second general travel lane has the potential to cause additional safety challenges including high speeds, conflicts with bicyclists and transit vehicles, and frequent lane changing to bypass slower moving or turning vehicles. In certain areas, the additional roadway space may be prioritized for pedestrian accommodation. Removal of roadside parking will also be offset through additional parking in other areas such as the Gateway Center, Lipscomb Pit, Sand Beach Parking Lot, Jordan Pond Parking Lot, and increased public transportation service through Island Explorer.

4.4. Modify Public Transportation Communication to the Public

The park should work with the Island Explorer and DTI to evaluate how schedule information is published and distributed to the public. Ideally, headways of 10 to 15 minutes are necessary on a high ridership route and allow visitors to rely on the service without checking the schedule. Headways of 30 minutes or longer require users to rely on the schedule to plan their trip. While the schedule indicates that the high ridership routes have 30-minute headways, specifically Route 3 – Sand Beach and Route 4 – Loop Road, they appear to run more frequent service. DTI indicated that the buses typically operate with better service than the timetable that is published in the schedule, especially during days with favorable weather. DTI frequently sends additional buses during peak times to serve the high volume of passengers. This may cause confusion as visitors expect service to generally follow the schedule.

DTI should consider updating the published schedule with expected frequencies and provide more information about bus locations. DTI should provide real-time transit boards, placed in high ridership



locations, so that visitors can track where the bus is and plan their experience based on the real-time information. Additionally, DTI should consider communicating service frequencies that correlate with the weather and expected demand, such as:

- “Weather-Responsive Service:” Focuses on matching service to the predicted weather forecast of the day.
- “Service Optimized for Peak Conditions:” Focuses on providing the best service when most visitors want to travel and adjusting the service based on the predicted or actual demand.
- “Seasonal/Favorable Weather Enhancement:” Emphasizes more service during pleasant weather days to meet expected demand.

4.5. Implement Technology and Demand Management Strategies

4.5.1. Implement Intelligent Transportation Systems (ITS)

In a parallel project, through the NPS National Traveler Information project, innovative traveler information and Intelligent Transportation Systems (ITS) will be installed at several NPS units, including ACAD. This technology will include real time transit information with information signage at key transit stops and real time parking availability information. This technology will allow visitors to make more informed decisions about how to access the park and plan their trip in real time. The information may be able to answer visitor inquiries such as the wait time at the entrance station, the number of available parking spaces, and next bus arrival times.

In addition, the project will continue to support the General Transit Feed Specification (GTFS) real-time transit information for visitors via digital arrival boards as well as third-party navigation applications, ensure that the data provided by the transit agency is accurate and up-to-date, and share best practices between NPS units to continuously improve the service.

4.5.2. Implement a Transportation Demand Management (TDM) Strategy

Transportation Demand Management (TDM) is a set of strategies and policies that focus on the demand side of the transportation equation. A strategic TDM framework encourages the use of alternative travel modes such as transit, bicycling, walking, and high occupancy vehicles to reduce vehicle trips and vehicle miles traveled while also reducing the parking demand and congestion. Although most TDM strategies are created for cities and target businesses and commuting to work trips, several TDM strategies can be adapted to address transportation congestion and parking challenges at Acadia.

A robust TDM strategy is grounded in the establishing of baseline transportation statistics to understand existing mode breakdown or “mode share” for how visitor and staff transportation travel to the park. This is usually done through surveys and data collection. A key aspect of a robust TDM strategy is to establish a target goal for mode share and performance metrics. To ensure the park continues to make decisions that will meet the target goal, annual data collection and monitoring to track progress over time as TDM strategies are implemented, is necessary.

ACAD is implementing and/or planning to implement many TDM strategies already. Figure 25 shows a strategic TDM framework with a focus on shifting demand away from driving and parking and towards alternative transportation, as much as possible. Creating one holistic framework allows the park to take an “all of the above” approach. Even if the park is already implementing many of these initiatives, it is important to tie it to the TDM framework and continue to track and expand the initiative.

The following items are recommended to include in the TDM strategy:

- Infrastructure: Physical modifications to the infrastructure help provide more space for alternative modes so they can operate more efficiently.
 - Transit only express lanes and loading/unloading driveways
 - Off-site parking and bus transfer lots
 - Enhanced pedestrian and bicycle infrastructure



- Wayfinding and maps for people walking and biking
- Pricing: Cost is a powerful mechanism to impact user behavior and trip planning. By increasing the cost of driving and reducing the cost of alternative modes, people that can switch to alternative modes will have more motivation to do so.
 - Discounted fees for Alternative Travel Modes
 - Discounted Cost for High Occupancy Vehicles (3+ persons)
 - Increased cost of driving to the park during high demand periods
 - Increase cost of larger vehicles
- Operations and Policy: The park should develop policies that prioritize alternative travel modes and improve operations for the visitors using alternative travel modes.
 - High frequency transit
 - Reservation systems
 - Shuttle only access areas such as roadways or trailheads
 - Real-time information to visitors

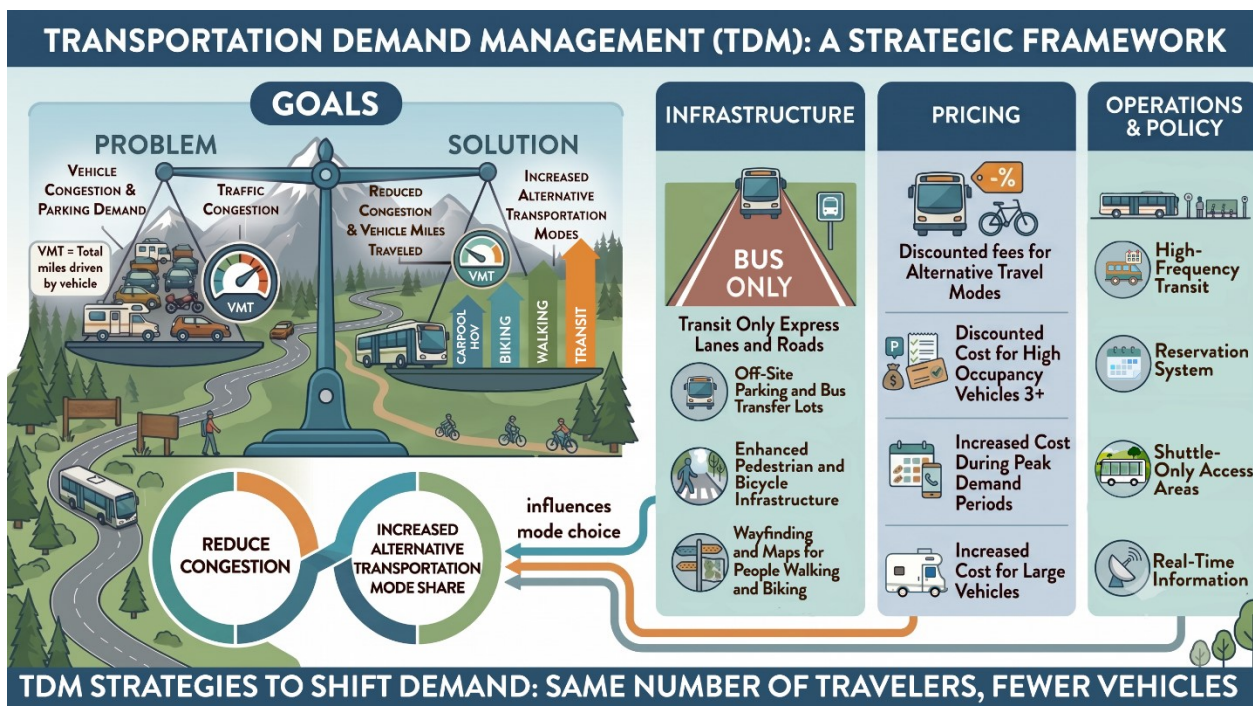


Figure 25: Overview of Transportation Demand Management Framework

Source: Volpe Center, Google Gemini

4.6. Collect Transportation Data and Perform Analysis and Monitoring

Transportation data is critical to understating the effects of the ongoing initiatives, proposed recommendations, and visitor behavior trends. Without data, the park may not fully understand transportation impacts or future needs. While the park collects some data, such as recreational visits, campground and overnight stays, transit data, and traffic volume data, additional data sources may provide significant benefits to effectively measure the impacts to the park. This is especially necessary as more ITS and TDM initiatives are developed and implemented.

To evaluate the Sand Beach Transit Express Lane, the park should collect data related to bus travel time, transit ridership, vehicle queue length and delays, entrance throughput, emergency service use, and visitor satisfaction, as noted in section 4.2: Install Sand Beach Transit Express Lane. This data should also be evaluated as noted in Table 7 to determine how much impact the project has on visitor behavior, traffic congestion, and visitor satisfaction.



The park should establish a baseline transportation mode share, as discussed in section 4.5: Implement a Transportation Demand Management (TDM) to track how additional projects and strategies impact the mode share over time. The park should also track more traditional traffic metrics to measure congestion, such as Level of Service (LOS), parking activity at popular parking lots, and vehicle volumes, to communicate information to visitors. Equipment such as traffic counters, magnetometers, and license plate readers could be installed throughout the park to continuously collect data that can be used for further evaluation, as necessary.

Lastly, more advanced transportation metrics will can reveal more information about traveler trends and behavior such as tracking visitors throughout the park (trip chaining, which strings together multiple destinations along one journey) to understand how visitors experience multiple destinations throughout their daily trip or even their entire trip to the region and connect origin destination pairs for locals and travelers. Newer data sources related to connected vehicles and mobile data can further help monitor congestion thresholds and trigger congestion management decisions at major sites.



5. Implementation Strategy

The Implementation Strategy section provides a high-level framework for acting on the preceding recommendations. This section outlines the key steps, partnerships, and timeline necessary to ensure that each recommendation is carried forward efficiently and effectively. By detailing the approach for operationalizing improvements, it guides the transition from planning to results, supporting the park's goals for enhanced transportation, visitor experience, and congestion management. The implementation strategy is shown in Table 8, Table 9, Table 10, and Table 11 for 2026, 2027, 2028, and 2029, respectively.

Table 8: Implementation Strategy for 2026

Source: Volpe Center

Action Item	Related Recommendation	Responsibility
Incorporate the Sand Beach Transit Express Lane into the existing Denver Service Center contract for repaving Park Loop Road around Sand Beach Entrance Station.	Install Sand Beach Transit Express Lane	Volpe DSC
Publish and promote real-time transit (GTFS) data to Google Maps, NPS app and NPS.gov.	Implement ITS	Avail Volpe WASO
As part of the Sand Beach Transit Express Lane installation, restrict roadside parking along Park Loop Road.	Eliminate Right Lane Parking along Park Loop Road	Volpe DSC
Develop Transit Express Lane evaluation plan and collect data related to the bus and vehicle operations, per recommendation.	Collect Transportation Data and Perform Analysis and Monitoring	Volpe DTI FOA
Evaluate the parking lot pavement marking and signage condition at Sand Beach Lower Lot, Sand Beach Upper Lot, Jordan Pond North Lot, and Jordan Pond South Lot and rate Excellent, Good, Fair, or Poor.	Refresh and Restore Pavement Markings and Signage in Parking Lots	ACAD FOA

Table 9: Implementation Strategy for 2027

Source: Volpe Center

Action Item	Related Recommendation	Responsibility
Refresh and restore pavement markings at parking lots the received a poor grade. Perform another annual assessment of the pavement marking conditions at parking lots the received a fair rating.	Refresh and Restore Pavement Markings and Signage in Parking Lots	ACAD NER
Eliminate right lane parking along Park Loop Road, Phase Two from the Thunder Hole Parking Lot to Otter Cliff Road.	Eliminate Right Lane Parking along Park Loop Road	ACAD NER
Eliminate fixed transit schedule for the Island Explorer bus route for Route 3 and Route 4. Provide transit maps that scale to the level of detail needed, based on the context.	Modify Public Transportation Communication to the Public	DTI
Install visuals on screens and at transit stops to include QR code signage, route maps, real-time transit boards and information about parking lot congestion at visitor centers, kiosk areas, hotels, and other popular visitor areas. Provide trip planning information on website.	Implement ITS	Avail Volpe WASO
Establish a TDM baseline by estimating the number of visitors using private automobiles, public transportation, walking, and biking to access the park. Develop a five- and 10-year goal for the desired transportation mode share.	Implement a TDM Strategy	ACAD FOA Volpe

**Table 10: Implementation Strategy for 2028**

Source: Volpe Center

Action Item	Related Recommendation	Responsibility
Refresh and restore pavement markings at parking lots the received a poor grade and continue tracking on an annual basis.	Refresh and Restore Pavement Markings and Signage in Parking Lots	ACAD NER
Eliminate right lane parking along Park Loop Road, Phase Three from the Old Soaker (Newport Cove) Parking Lot to the Thunder Hole Parking Lot.	Eliminate Right Lane Parking along Park Loop Road	ACAD NER
Initiate a project to assess the existing Island Explorer bus network and consider developing a full bus network redesign that incorporates the Hulls Cove expansion.	Modify the Public Transportation Communication to the Public	DTI ACAD FOA Volpe
Collect advanced transportation metrics related to trip behavior trends, origin-destination tracking, and trip chaining.	Collect Transportation Data and Perform Analysis and Monitoring	ACAD FOA Volpe

Table 11: Implementation Strategy for 2029

Source: Volpe Center

Action Item	Related Recommendation	Responsibility
Refresh and restore pavement markings at parking lots that received a poor grade and continue tracking on an annual basis.	Refresh and Restore Pavement Markings and Signage in Parking Lots	ACAD NER
Eliminate right lane parking along Park Loop Road, Phase Four from the Sand Beach Parking Lot to the Old Soaker (Newport Cove) Parking Lot.	Eliminate Right Lane Parking along Park Loop Road	ACAD NER
Continue transit express lane through Park Loop Road to Otter Cliff Road	Install Sand Beach Transit Express Lane	ACAD NER



Appendix

- Appendix A – Previous Studies Literature Review
- Appendix B – Ideas Considered but Deferred
- Appendix C – Sand Beach Transit Express Lane



Appendix A: Previous Studies Literature Review

Transportation Plan and Record of Decision

[Record of Decision \(ROD\) for the Acadia National Park Transportation Plan/Environmental Impact Statement \(Final Plan/EIS\) \(2018\)](#)

The Selected Action aligns with the Preferred Alternative of the Transportation Plan / Environmental Impact Statement (Final Plan/EIS), establishing a phased implementation of the timed-entry reservation system managing vehicle access specifically for the Ocean Drive corridor, Cadillac Summit Road, and Jordan Pond North Lot, while maintaining first-come, first-served access and parking availability at other park locations. The decision affirmed that right-lane parking along the Park Loop Road will be retained in the near term but endorses gradually phasing it out with expanded alternative parking facilities including Hulls Cove Visitor Center and Acadia Gateway Center visitor orientation and transit nodes, and improvement to Island Explorer (Island Explorer) season bus service. The decision also mandates the enforcement of vehicle size restrictions suitable to the historic narrow roads to enhance safety and protect road integrity. The decision reinforces adaptive management to respond to visitor demand shifts and commits to the ongoing monitoring of key indicators such as traffic and resource conditions to ensure desired conditions for visitor experience and resource preservation are maintained. If monitoring indicates traffic or resource conditions have worsened beyond acceptable thresholds, access to Island Explorer routes entering the park and other areas may be added to the reservation system. Since the ROD in 2018, a time-entry reservation system has been implemented for Cadillac Summit Road, and a pilot was conducted for Park Loop Road but encountered challenges due to multiple entry points, and no system has been attempted at the Jordan Pond North Lot.

[Acadia National Park Final Transportation Plan/Environmental Impact Statement \(Final Plan/EIS\) \(2019\)](#)

The primary purpose of the Transportation Plan is to establish a comprehensive strategy to provide safe and efficient visitor transportation, while preserving park resources and visitor experiences. Recognizing the challenges posed by increasing visitation and aging infrastructure designed for lower volumes and different vehicle types, the plan aims to address traffic safety, congestion, parking scarcity, and resource protection. NPS identified Alternative C as the Preferred Alternative and Proposed Action, selecting a timed-entry reservation system controlling access to the Park Loop Road Ocean Drive corridor, Cadillac Summit Road, and Jordan Pond North Lot during peak season. This goal of the transportation strategy is to enhance visitor experience quality by managing access, reducing right-lane parking incrementally while expanding parking and visitor facilities at Hulls Cove and Eagle Lake (Liscomb Pit), relocating some visitor services, providing off-island parking and better access to transit at the Acadia Gateway Center, and maintaining flexible adaptive management to potentially expand reservation coverage.

Transportation and Congestion Studies and Analyses

[Acadia National Park ITS Field Operational Test: Parking report](#) (University of Maine, 2003)

In 2002, as part of the Acadia National Park Field Operational Test, Intelligent Transportation Systems (ITS) components were deployed to assist visitors to travel around Mount Desert Island and in Acadia National Park. Real time travel information was collected and integrated with Island Explorer buses and disseminated to visitors via an automated annunciator that transmitted an audio message and displayed the next bus stop on an electronic sign within the bus. Electronic signs displayed real time departure times of the next bus at the Hulls Cove Visitor Center, Jordan Pond, and the Village Green in Bar Harbor. Other traveler information was provided to visitors such as real time parking conditions at Sand Beach and Jordan Pond, made available on the park web page and displayed on signs at the Visitor Center, Blackwoods Campground, and Seawall Campground.

An important goal of the Field Operational Test of Intelligent Transportation Systems (ITS) and multi-year evaluation (2000- 2002) of congestion at eight designated parking areas is to reduce vehicle congestion in the Park. The study uses direct observations of parking occupancy, measures of vehicles exceeding designated capacity,



time-of-day and day-of-week patterns, and analyses of specific lots (Sieur de Monts, Sand Beach, Jordan Pond, Bubble Pond, Eagle Lake, Ikes Point, Acadia Mountain, Echo Lake). Empirical evidence showed major parking overflow is concentrated at key sites (Sand Beach and Jordan Pond) during peak summer months (particularly August), with measurable spillover into adjacent road segments, ITS real-time parking information appears linked to changes in overflow patterns.

These findings help support the hypothesized relation that the ITS technologies, including real-time parking information/management, and integration with Island Explorer services, may be beneficial to influence visitor behavior, distribution of parking and transportation demand, and improve safety by reducing volume of on-road parking and in turn reduce hazardous conditions such as visitors walking along or crossing busy roads. The report also links parking overflow patterns to the overall increase in visitation and recommends additional strategies to reduce on-road congestion by shifting some visitor demand to transit service and other non-single occupancy vehicle trips).

[Measuring and Managing the Quality of Transportation at Acadia National Park](#) (Otak, 2012)

This study uses the Park as a case study to analyze indicators and standards of quality for multimodal transportation in parks. Perspectives from visitors across Park Loop Road (driving), carriage roads (bicycle/pedestrian), and Island Explorer transit riders were collected using surveys and visual simulations to elicit indicators of quality and normative density standards. A total of 252 complete surveys were collected along Park Loop Road (87% response rate). One indicator that clearly arose from responses open-ended questions asking visitors what they enjoyed most and least about their trip along Park Loop Road was density of use- “traffic,” “congestion,” and “crowds” were coded, and this was most frequently cited as what visitors enjoyed least about their trip (20% of respondents). Followed by “parking” (lack of parking, unauthorized parking) (19%), another indicator of vehicular congestion levels.

The research triangulates visitor perceptions with conventional LOS frameworks, arguing for integrating indicators (e.g., congestion, scenic quality) with standards to capture the quality of visitor experience traveling in the park. The paper highlights congestion as a recurrent indicator across modes and demonstrates how visitor perceptions can inform congestion thresholds and management actions (e.g., encouraging transit, dispersing use)

[Visitor Traffic Tracking Cell Phone Application \(WPI, 2018\)](#)

This research evaluates the potential to use a GPS-tracking mobile application(app) to collect visitor mobility data in the Park and using ArcGIS and SPSS for visualization and analysis to inform transportation and congestion related park management decisions. The study included the development of the app (Android-based, GPS data capture, secure server-backed storage with HTTPS transmission, and anonymized UID-based data), surveys, and data visualization. Findings highlight the feasibility and limitations of a mobile-tracking approach to collect mobility data in the short term, issues with deploying the app publicly (e.g., Google Play Protect blocking APKs), and the value of combining GPS traces with surveys to understand visitor movement, occupancy patterns, and potential operational responses. The report illustrates how GPS data could illuminate facility use, travel routes, and timing of congested periods if scaled up, including iOS parity, and privacy-conscious data handling (anonymous UID, HTTPS transmission, geofencing). And proposes integration pathways with existing park apps (OnCell or Chimani) to reach broader visitors, emphasizing iterative development and stakeholder alignment.

[Acadia National Park Traveler Data Collection and Analysis](#) (Volpe, 2023) (NPS Internal File)

The Data Collection and Analysis Plan (DCAP) outlines transportation indicators, a decision framework for monitoring emphasizing thresholds and triggers to guide park actions at major sites (e.g., Cadillac Summit Road, Ocean Drive, Jordan Pond, Sand Beach, Bass Harbor Head Lighthouse, and Schoodic Peninsula), and data collection methods (traffic counters, magnetometers, license plate readers, etc.) to inform operational decisions under the 2019 Transportation Plan framework. The second part of the DCAP evaluates StreetLight Data as an emerging data source, comparing StreetLight’s AADT and Free Flow Factor to FHWA/FOTSC and Maine DOT counter data across the park. Key findings emphasize relative data stability in StreetLight’s Free Flow Factor, limitations in year-to-year



comparability and benchmarking due to evolving data sources (Location Based Services (LBS) to Connected Vehicle Data (CVD)), and the potential for StreetLight to provide relative within-year insights and historical context without heavy infrastructure.

Transit Analysis Technical Memos

Acadia National Park Island Explorer Transit Analysis Technical Memorandum 1: Existing Transit Capacity (Volpe, 2018)

Memo documents the current capacity of Island Explorer transit service to support an anticipated reservation system by establishing baseline operating conditions. The study uses automatic passenger counter (APC) data from 2017, supplemented by leave-behind (LB) counts, to compute route- and stop-level loads by time of day with an emphasis on 85th percentile “typical busy day” loads. The analysis breakdowns capacity by route and by direction (e.g., inbound vs outbound, loop segments) to identify where ridership concentration approaches or exceeds capacity, using the distribution of LBs as a proxy for unmet demand. The analysis finds Jordan Pond, Eden Street, Sand Beach, Loop Road, and Oceanarium as the system’s busier corridors, with Brown Mountain consistently underutilized. It documents significant variability in crowding based on peak directions and times of day, 43-passenger buses constrain system capacity, and LB data suggested additional unmet demand, particularly on busy routes and at key stops. Limitations include data gaps (null data from GPS issues) and incomplete LB coverage, which likely understate unmet demand. The Phase 1 memo provides the benchmarks necessary for subsequent expansion scenarios and Phase 2 modeling.

Acadia National Park Island Explorer Transit Analysis Technical Memorandum 2: Island Explorer Operations under the Transportation Plan Preferred Alternative (Volpe, 2019)

Memo evaluates how Island Explorer operations would respond to the NPS Final Plan/EIS-Preferred Alternative, which introduces a timed-entry reservation system for select locations (Hulls Cove, Park Loop Road-Ocean Drive Corridor, Jordan Pond). The methodology uses Final Plan/EIS People at One Time (PAOT) targets, 2014 parking data, and 2017 APC data by stop under existing conditions and then models displaced demand and new demand generated by the reservation system. The memo presents two scenarios: Scenario 1-Island Explorer capacity to support Hulls Cove parking expansion, with partial displacement to other sites and Scenario 2-maximized Island Explorer service to accommodate displaced demand on Park Loop Road and Jordan Pond. Key findings indicate that Hulls Cove expansion and limited Island Explorer service growth can absorb a portion of displaced demand but will likely require substantial fleet expansion (Park Loop Road to 10-minute headways, Jordan Pond Route additions) to reach PAOT targets. And unmet demand will remain likely at Sand Beach and Jordan Pond. The memo emphasizes the fleet implications (e.g., existing 29 buses, potential needs beyond the current fleet) and the sequential phasing of the Hulls Cove parking expansion relative to Island Explorer service growth.

[Acadia Transit Assessment Memo](#) (Volpe, 2025)

This memo provides a high-level cost and operations assessment of the Island Explorer transit service in the context of rising transit costs and opportunistic cost-sharing arrangements, including Federal Lands Recreation Enhancement Act (FLREA)/NPS, MaineDOT, and other contributing partners. It summarizes Island Explorer ridership (nearly 0.5 million annual boardings) and total system metrics (36 vehicles, 37,015 service hours, ~\$3.3M annual budget; cost per boarding ~ \$6.69) in 2024. The document highlights funding structures and potential efficiency opportunities, including GTFS publication (to Google Transit, Apple Maps, and other transit apps, agency/transit portal websites, data portals and open data repositories, and regional data aggregators (e.g., GTFS feeds registries)), potential on-demand or express concepts, fleet modernization, and route consolidation. The memo cautions about the potential negative effects of higher headways or service reductions on transit access and rider experience. It also highlights the Acadia Gateway Center (opened summer 2025) as a key future transit hub and emphasizes balancing cost-saving measures with preserving accessibility and service quality. The memo frames Island Explorer service as a critical component of park transportation access and discusses governance, data needs, and revenue diversification as essential to long-term sustainability.



Taken together, the literature argues for a multimodal, data-enabled congestion management framework that (a) clearly defines indicators and thresholds—combining parking occupancy, vehicle counts, and congestion metrics with visitor experience measures; (b) leverages emerging data sources and ITS technology to supplement traditional traffic counters and signage and; (c) structures management responses around transportation options (transit, reservation systems) and ITS real-time information to disperse demand and protect park natural, historic, and cultural resources.



Appendix B: Ideas Considered but Deferred

Through this study, several additional recommendations were considered and evaluated but eventually deferred and not recommended at this time. These recommendations may be successful if certain park characteristics evolve to benefit and support the recommendation. While these ideas are not recommended, they are documented here to be further evaluated in the future. The ideas considered but deferred include:

- Convert Schooner Head Road Connector to One-Way Eastbound
- Relocate the Sand Beach Entrance Station
- Construct a Second Set of Entrance Booths at the Sand Beach Entrance Station
- Implement a Reservation System at the Sand Beach Entrance Station
- Convert One Sand Beach Entrance Station Booth to Transit Only
- Restore Park Loop Road to Two-Way Traffic Circulation

Convert Schooner Head Road Connector to One-Way Eastbound

Schooner Head Road parallels Park Loop Road to the east, past the Sand Beach Entrance Station. The Schooner Head Road Connector connects Schooner Head Road to Park Loop Road before the entrance station. As shown in the data, in the morning, about 50% of the visitors enter the park via Schooner Head Road instead of Park Loop Road. When Park Loop Road is congested, visitors arriving via Schooner Head Road may be perceived as taking a short cut. Converting Schooner Head Road would force all visitors to use Park Loop Road but also create the opportunity for the Schooner Head Road Connector to be used for transit or emergency vehicles only. It would also restrict vehicles from visiting the Schooner Head Overlook and then quickly accessing the park without traveling back into Bar Harbor.

Relocate the Sand Beach Entrance Station

ACAD has identified the idea of relocating the Entrance Station from the existing location to somewhere closer to the Wild Gardens of Acadia and possibly along Sieur de Monts Road. While this recommendation may be considered, specific data and evaluation were not provided in this report. Additional evaluation is necessary to make a formal decision on this relocation.

Construct a Second Set of Entrance Booths at the Sand Beach Entrance Station

The Sand Beach Entrance Station currently has three entrance booths and visitors take anywhere between five seconds to 70 seconds at the booth asking questions and processing the payment. Without expanding the number of lanes, the park could increase the capacity at the entrance station by constructing a second set of entrance booths in parallel with the existing booths. This will allow two vehicles to be processed in one lane at a time. While it would not double the capacity, it would increase the processing volume and have significantly less impact than widening the station to accommodate more lanes or relocating the entrance station.

Implement a Reservation System at the Sand Beach Entrance Station

As previously mentioned, implementing a reservation system along Park Loop Road between Sand Beach Entrance Station and Otter Cliffs Road was a foundational recommendation from the Acadia Transportation Plan and highlighted in the Directors Record of Decision. Timed entry and reservation systems continue to gain popularity within the NPS, including the already implemented reservation system at Cadillac Summit Road, to maintain an acceptable level of visitation and ensure the park remains safe, enjoyable, and protected. Per the Record of Decision, the timed-entry reservation system would only apply to vehicles and not apply to people walking or biking, therefore the number of reservations is directly correlated to the parking capacity at the park.



A reservation system was piloted in 2020 the park had trouble operating the system given the configuration of the access points at the park. One of the primary challenges was related to the one-way orientation of Park Loop Road. Visitors without a reservation were unable to turn around at the entrance station, which created significant congestion. A reservation system could still be explored in the future even if it is not feasible now. Additional recommendations such as converting Park Loop Road to two-way traffic, relocating the entrance booths, or creating an easier exit route near the entrance station could lead to higher success.

Convert One Sand Beach Entrance Station Booth to Transit Only

The park has consistently indicated that improving transit is a priority. Transit only lanes and queue jumps are effective at prioritizing transit vehicles in areas of congestion. Eventually the recommendation in this study suggested a transit express lane before the entrance station but to stop it short of the fee booth to maintain adequate capacity at the entrance station for all other vehicles. At the current level of service, transit vehicles do not make up enough of the overall visitation trips to justify a transit lane through the entrance station. If additional buses were added and those buses were being filled by passengers, then visitation may be high enough to justify a transit lane thought the station.

Restore Park Loop Road to Two-Way Traffic Circulation

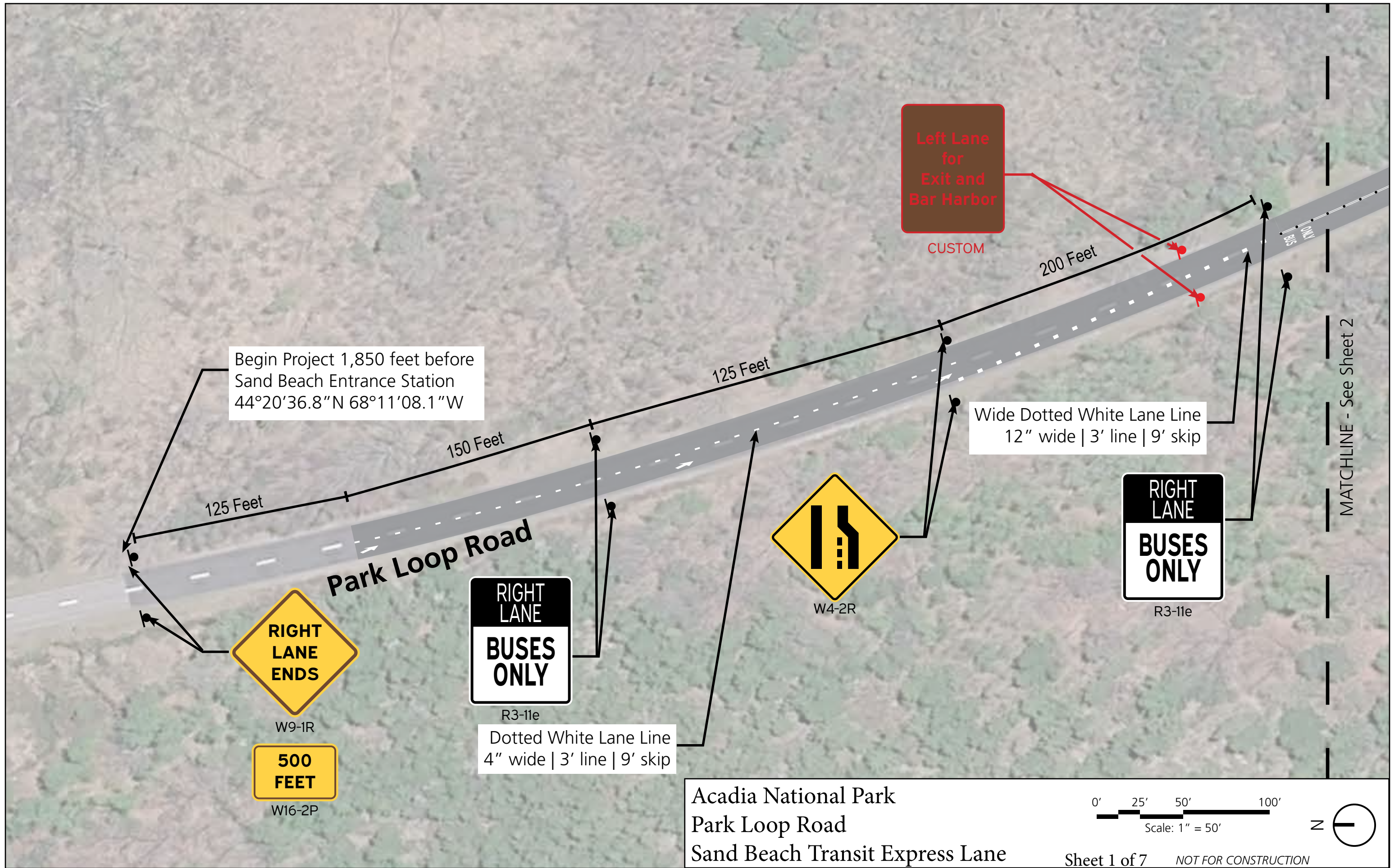
Historically, Park Loop Road provided for two-way traffic circulation when it was originally constructed. While the park has stated that Park Look Road will not be converted back to two-way, the recommendation should not be omitted from this report. Converting Park Look Road back to two-way traffic will likely have a wide range of impacts, some negative and some positive and has the potential to significantly change how visitors access and experience the park.

Bus routes can be reevaluated to provide counterclockwise service along Park Loop Road, especially by providing access from Sand Beach northbound back to Bar Harbor without using Otter Cliff Road. A formal reservation or timed entry system may become more feasible with two-way operations as visitors could more easily navigate the entrance station if they do not have a pass. The eventual elimination of right lane parking on the Park Loop Road section may become more feasible to maintain if two-way traffic circulation is restored because it restricts parking without relying solely on enforcement.

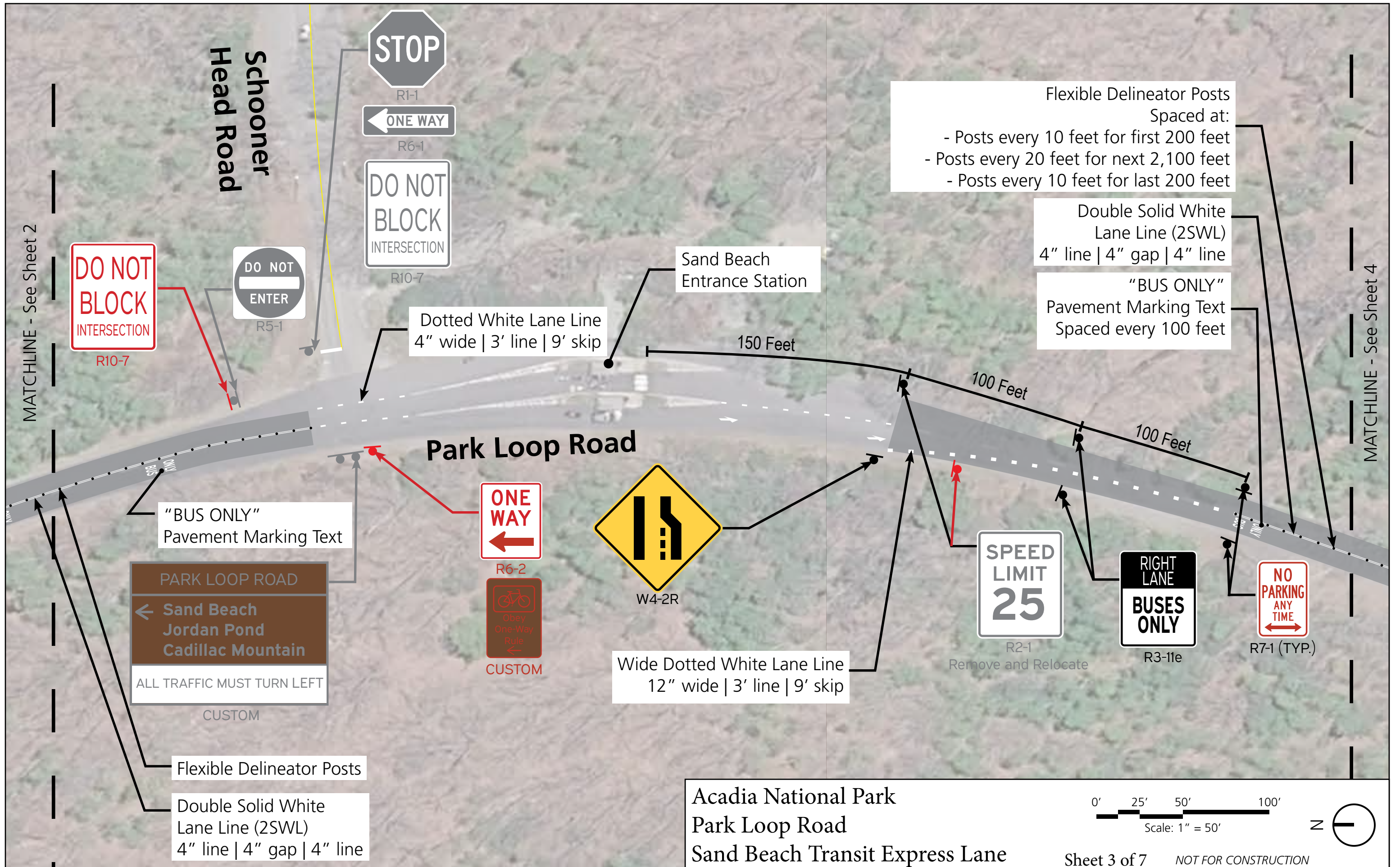
Evaluating two-way traffic operations along Park Loop Road will likely require a more robust traffic analysis to better understand potential changes to visitation patterns, potential vehicle flows, traffic operations, and congestion mitigation strategies.

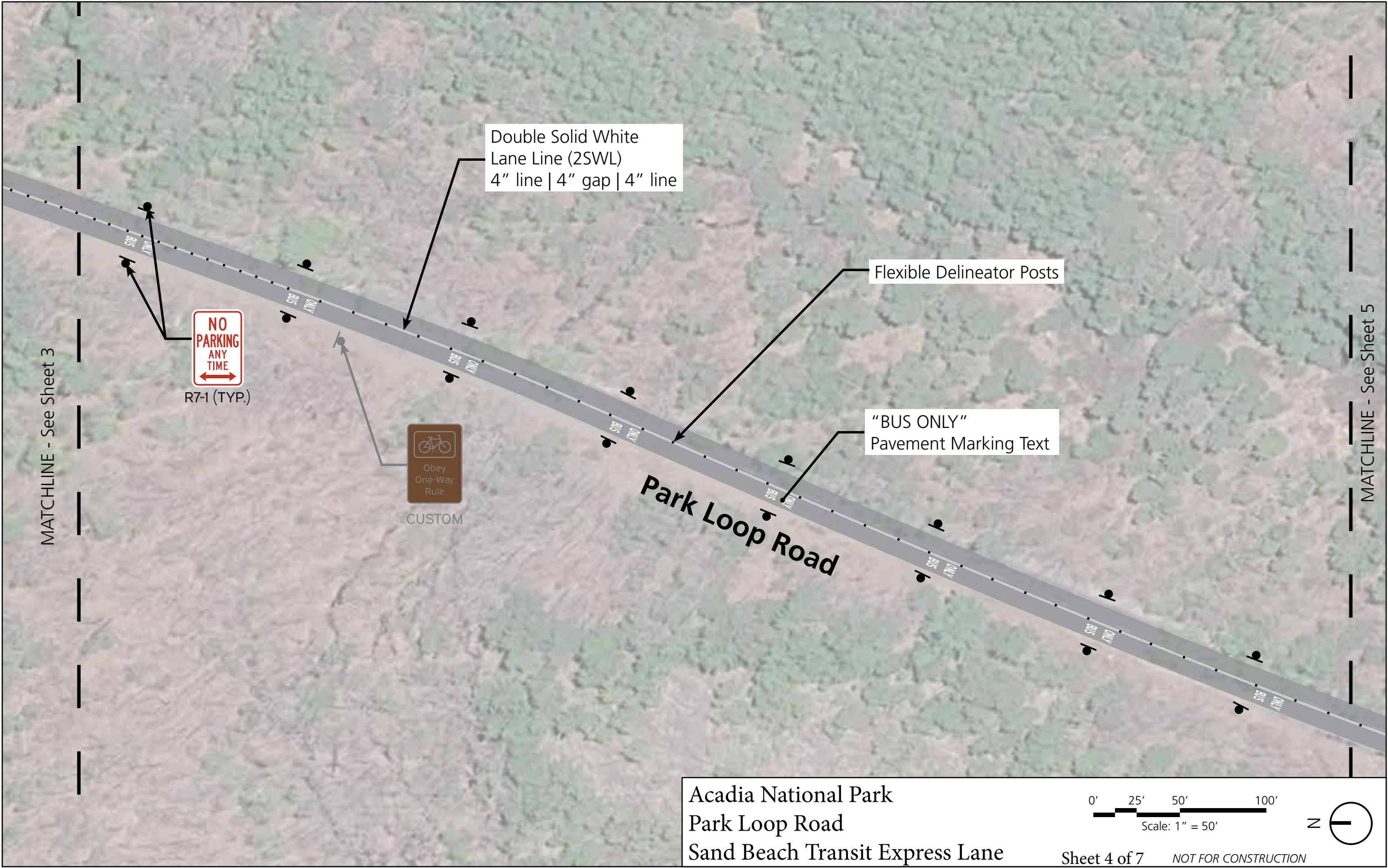


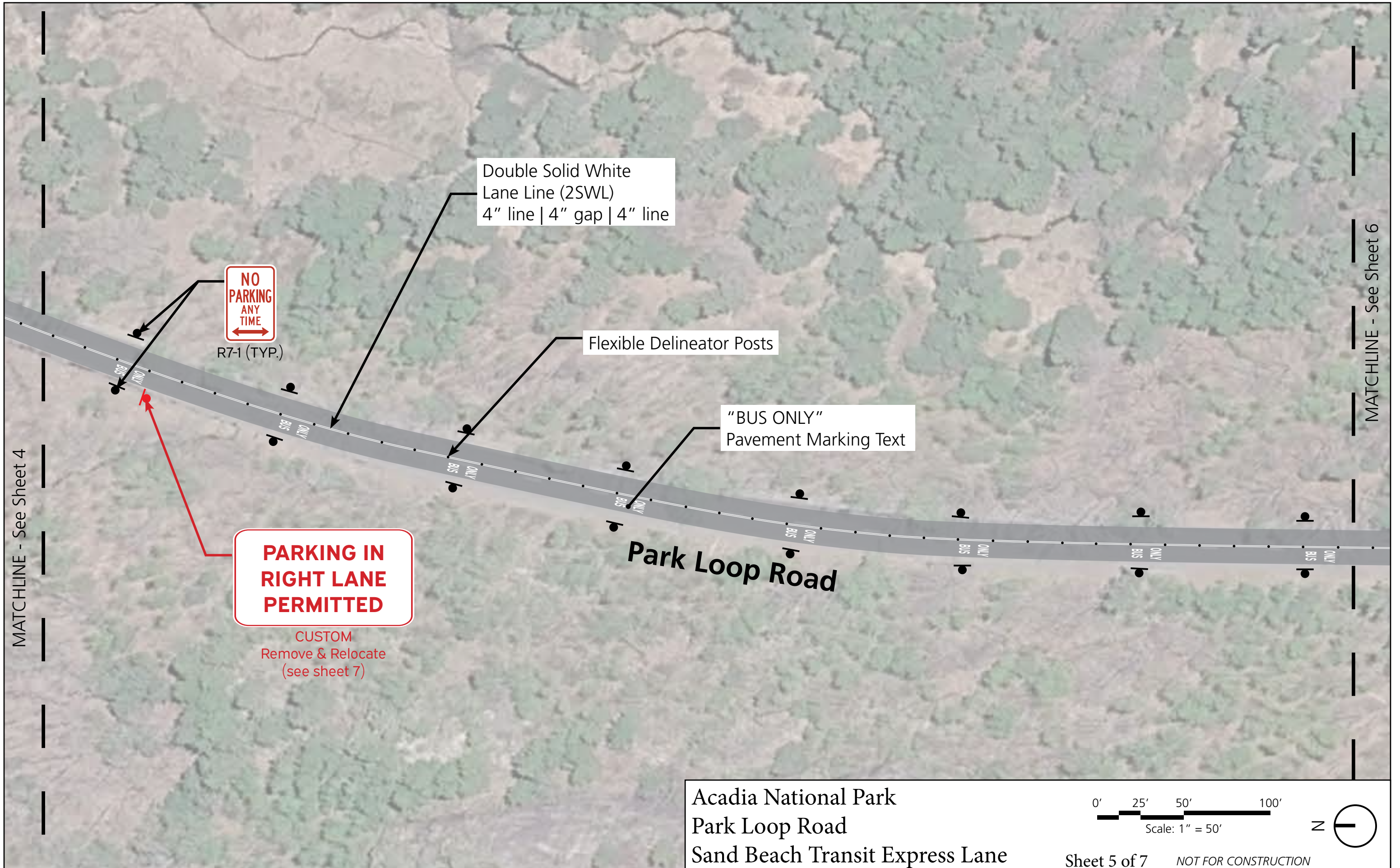
Appendix C: Sand Beach Transit Express Lane

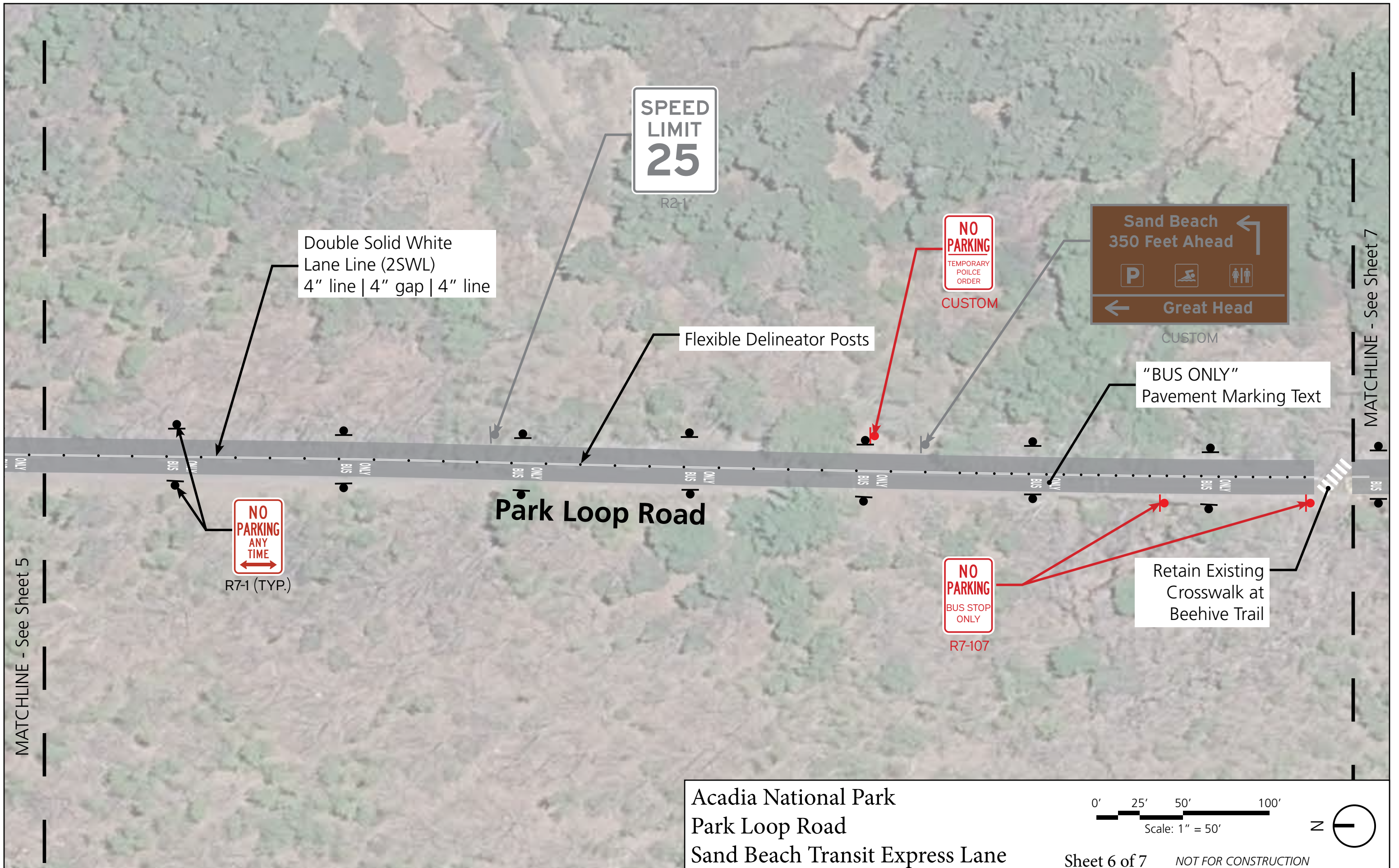












Sand Beach Parking Lot

"BUS ONLY"
Pavement Marking Text

End Transit
Express Lane

Park Loop Road

200 Feet

Double Dashed White
Lane Line (2DWLL)
4" line | 4" gap | 4" line
10' line | 30' skip

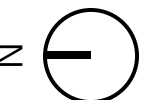
BUS
LANE
ENDS

**PARKING IN
RIGHT LANE
PERMITTED**

CUSTOM
Relocated from Sheet 5

Acadia National Park
Park Loop Road
Sand Beach Transit Express Lane

0' 25' 50' 100'
Scale: 1" = 50'



Sheet 7 of 7 NOT FOR CONSTRUCTION

MATCHLINE - See Sheet 6



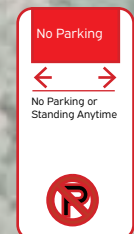
R7-1 (TYP.)



CUSTOM



R6-2



CUSTOM



CUSTOM



R5-1



R5-1a