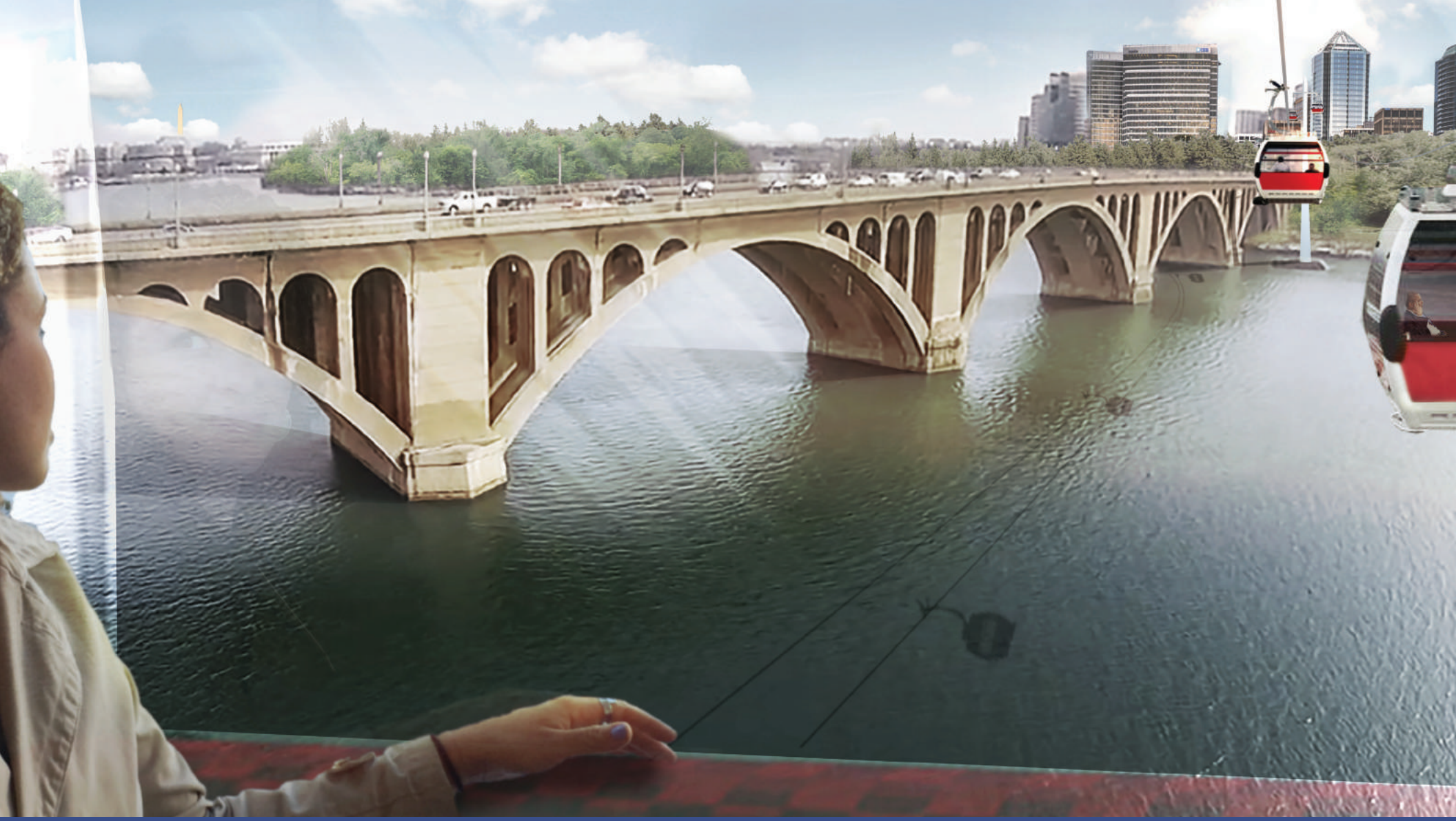
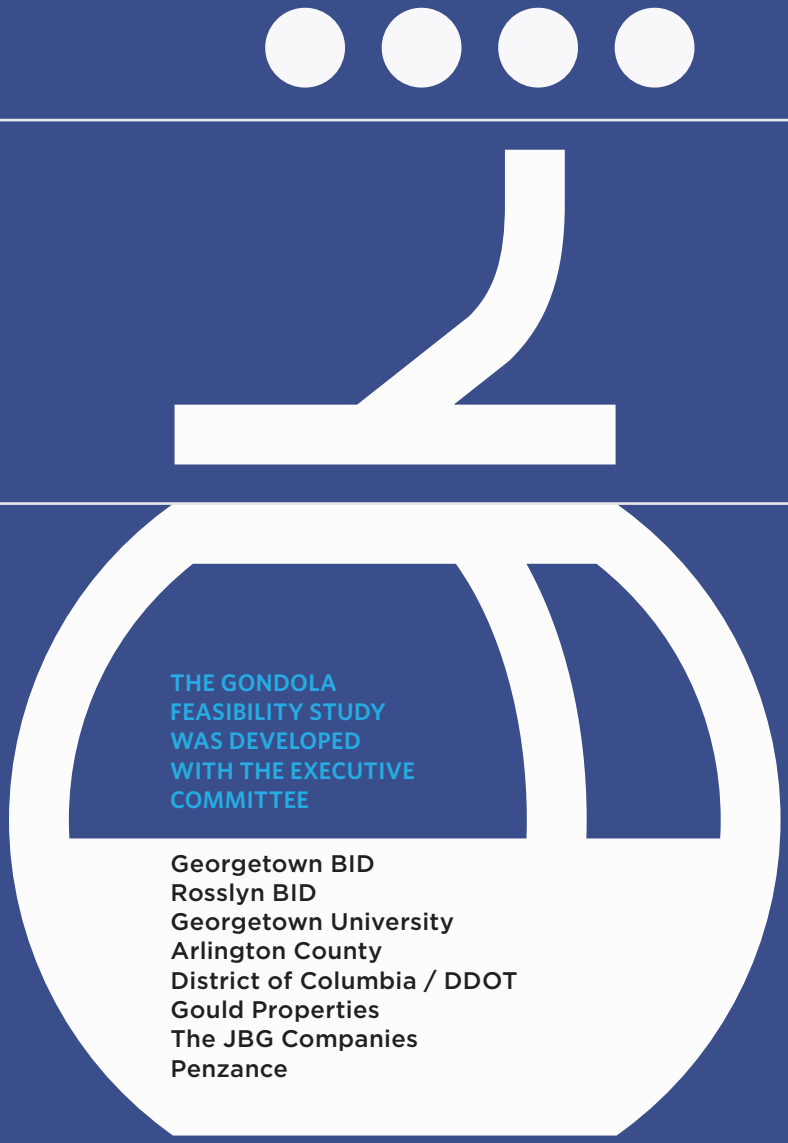


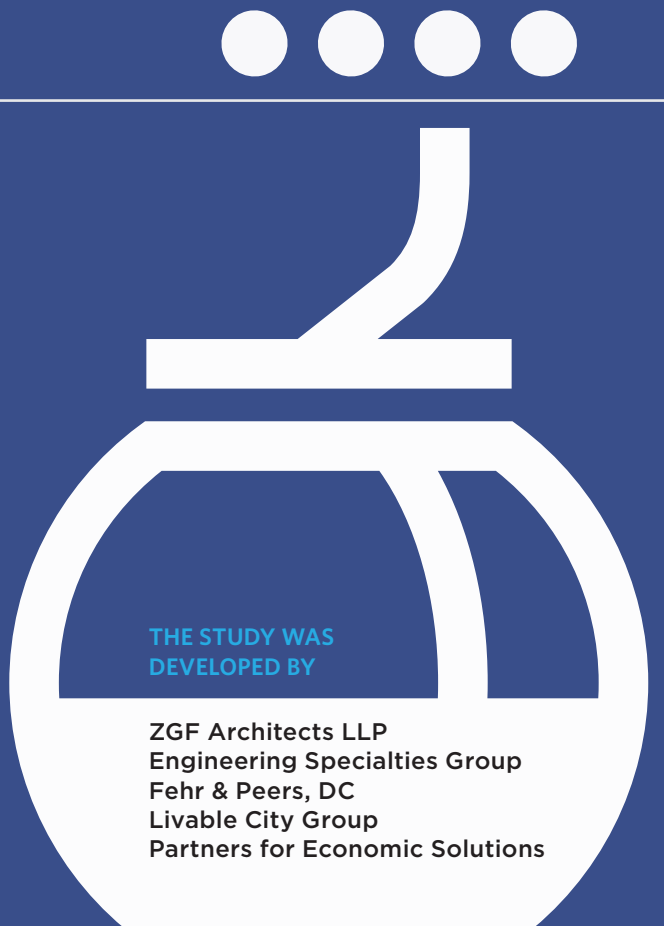
GEORGETOWN – ROSSLYN GONDOLA FEASIBILITY STUDY

TECHNICAL SUMMARY :: November 3, 2016



THE GONDOLA FEASIBILITY STUDY WAS DEVELOPED WITH THE EXECUTIVE COMMITTEE

Georgetown BID
Rosslyn BID
Georgetown University
Arlington County
District of Columbia / DDOT
Gould Properties
The JBG Companies
Penzance



THE STUDY WAS DEVELOPED BY

ZGF Architects LLP
Engineering Specialties Group
Fehr & Peers, DC
Livable City Group
Partners for Economic Solutions

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01 STUDY CONTEXT AND FINDINGS

Scope of Study

The Georgetown-Rosslyn Feasibility Study process included a broad series of meetings and interviews with project stakeholders. An Executive Committee comprised of public-private partners who funded the effort, directed the study through regular meetings with the consultant team. The members of the Executive Committee included staff from the Arlington County and District of Columbia governments, the Georgetown and Rosslyn Business Improvement Districts, Georgetown University, and three real estate developers with property in the study area: the JBG Companies, Penzance, and Gould Property Company.

The study and this technical summary is intended to be a high-level preliminary assessment of feasibility and not an extensive analysis. Should there be a decision to pursue implementing a gondola, many of the elements touched upon in this document will need to be studied further and evaluated in greater detail.

The Executive Committee charged the ZGF team with investigating the following:

FEASIBILITY STUDY QUESTIONS

1. Can the Georgetown – Rosslyn Gondola contribute to a more effective multi-modal transit system?
2. Can it provide enhanced service for commuters and residents, and also serve tourists?
3. Can a gondola support economic development, complement current and planned investments, and be catalyst for related improvements?
4. Can it be designed to complement the public realm on both sides of the river?
5. Can it be approved / permitted by the multiple agencies who have jurisdiction?
6. What would be the potential capital costs, funding opportunities, and operational costs?
7. Finally, is it a good idea?

Stakeholder Input

In addition to working with the Executive Committee, the consultant team interviewed and met with dozens of project stakeholders and agencies with jurisdiction over the potential gondola project. These meetings included representatives from more than 20 federal, state, and local agencies whose review or approval will be necessary for the gondola to be realized. More detail about team interactions with these agencies is included later in this document. Agencies included the National Capital Planning Commission, the Commission of Fine Arts/Old Georgetown Board, the National Park Service, and the DC and Virginia State Historic Preservation Officers, as well as the Federal Aviation Administration, the Army Corps of Engineers, and the U.S. Coast Guard.

Two public meetings bookended the study period, the first held in Rosslyn at the beginning of the feasibility study and the second in Georgetown as the study concluded. In between, the team met with the Rosslyn development community, Rosslyn hoteliers, a Citizens Advisory Committee that included representatives from Arlington and District of Columbia neighborhood associations as well as the rowing community, and meetings with both District of Columbia and Arlington County staff.

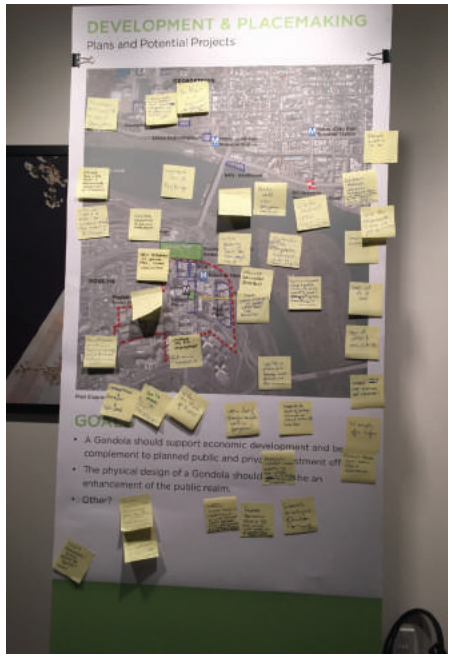
In addition to these meetings, the study team made presentations to the Arlington County Transportation, Planning, and Economic Development Commissions; and met with DDOT senior leadership, the Arlington County Manager and Deputy County Managers, and individual members of the Arlington County Board to brief them on study progress.

ISSUES

Throughout the course of the 4 month study, the following concerns/questions were identified by the various stakeholders:

- How will it impact views?
- Design is an issue - how will the system look?
- What would the relationship with Metro be, in terms of fares, connectivity and operations?
- Will it impact boating on the river?

Consequently, the study's investigation also included addressing these questions.



RIGHT AND ABOVE Public Meeting #1 on July 7, 2016 at Rosslyn Spectrum Theater. Images are of the open house to collect input and answer questions. 120 attendees were present for the open house.

The Study's Findings

SUMMARY

1. No fatal flaws have been identified. Project is technically feasible and legally permit-eligible.

2. A Gondola would provide improved transit for workers, residents, the university, and tourists. Projected minimum daily ridership is estimated at 6,500 riders.

3. A Gondola will induce some regional transit trips and may reduce some car trips due to:
   (i) elimination of wait time for second transit seat at transfer point, and
   (ii) expanded ½ hour transit travel shed makes Georgetown employment area more accessible to regional residents.

4. There are feasible alignments/station areas, with the most promising options identified.

5. A Gondola will need to be a high-quality design to enhance the public realm and support economic development.

6. Capital costs would be similar to other international gondola systems, approximately $80-$90M to construct. This is less than other public transit modes that offer similar performance metrics.

7. Operating costs would be similar to other international gondola systems, approximately $3.25 M/year. Anticipated net cost per ride is significantly less than other public transit modes that offer similar performance metrics.

8. Implementation will require an Environmental Impact Study that consolidates many federal reviews, as well as state and local approvals, that are estimated to take 3-4 years, plus 2 years to construct.

9. Implementation will require multi-jurisdictional collaboration and possibly a public-private partnership.

10. Georgetown-Rosslyn Gondola can serve as a model for future transit improvement projects - an affordable technology to connect activity centers to the regional transit network.

A COMPARATIVE LOOK

Ridership

- Rosslyn Metro = 13,666 faregate entries / 11th busiest Metro Station
- Projected Gondola Riders = 6500 daily users
- Potential station ridership approximates several Metro stations, as measured by faregate entrances, including:
  - » Virginia Square, East Falls Church, Dunn Loring, Cleveland Park, Potomac Avenue
  - » Potential Georgetown Gondola Station ridership could rank in the median of Metro stations
- A Gondola may potentially replace or reduce 164 GUTS bus daily trips currently using Key Bridge

User Convenience - Central Place to M Street:

- Gondola = 4 Minutes
- Driving = 6 to 10 minutes with traffic
- Bus = 6 to 20 minutes with traffic and wait time
- Walking = 12 - 18 minutes

Cost to Implement:

- Significantly less than a Metro infill station
  - » NoMA Station :: $104M ($131 million, 2016 $'s)
  - » Potomac Yard :: $130-180M (2016 $'s)
- Significantly less cost + time than Metro 2040 Plan for New Rosslyn-Georgetown Tunnel & Stations
  - » $2.5 billion in 2012 dollars
  - » Would optimistically require from twelve to sixteen years to implement Metro 2040 Plan

BELOW View of a gondola from the Potomac Heritage Trail

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02 POTENTIAL ALIGNMENTS AND STATION AREAS

Evaluation of Alignments

All potential alignments on both the Georgetown and Rosslyn sides of the study area were investigated. Access to businesses in both Georgetown and Rosslyn, access to Georgetown University, and connections to existing and potential transit were evaluated. The potential for economic development and access to other transit were other key factors. Alignments that terminate on public and private properties were considered on both sides of the study area. Because of existing entitled developments in Rosslyn, station locations on private property seem unlikely and were removed from consideration. Alignments in Rosslyn were organized by three public corridors: North Ft Myer Drive, North Moore Street, and North Lynn Street. Connections with six station locations in Georgetown were initially evaluated alongside the three Rosslyn corridors.

A GONDOLA AS TRANSIT

All alignments and station locations were evaluated on how the gondola system could serve as an effective multi-modal transit system. The Executive Committee was interested in a system that provides solutions to a transit problem -- being more than an attraction for tourists. Fast connections to the Metro in Rosslyn and close adjacency to businesses and the university in Georgetown are key to ensuring a gondola system could serve a transit need.

PUBLIC REALM AND HISTORIC INFRASTRUCTURE

The addition of a gondola system must be an enhancement to the public realm. In Rosslyn, activating the public space was a driving goal for station locations. Along Key Bridge and in Georgetown, complementing the existing infrastructure and built environment were key considerations.

APPROVALS AND PERMITTING

As alignments were investigated, potential issues with permitting and public agency approvals were evaluated and considered for all alignments.

COST

The cost to construct and operate gondolas along each alignment was considered as part of the vetting process. Potential costs to acquire land, construction of stations and towers along each alignment, the need for mid-line stations, and operating costs were evaluated for each alignment.

PUBLIC INPUT

Input from the first public meeting and online comments following the meeting were evaluated for each alignment.

RIGHT The gondola study area

System Type Overview

There are multiple aerial ropeway system types. Each of the following types were considered as part of the feasibility study. The scope of the initial study was for a gondola system, but the team also evaluated aerial trams as other successful ropeway systems operate as aerial trams in the United States. Each system type has ridership benchmarks for maximum efficiency as well as benefits and challenges to implement. Ultimately, based on the potential ridership and the desire to provide minimal waiting times at each station, a gondola system was determined to be the most effective system type for the Georgetown-Rosslyn corridor.

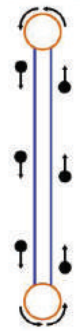
Aerial Trams

- Vehicles shuttle back and forth
- Generally larger cabins, 50-200 passengers
- Comparatively longer headways
- System Capacity: up to 2,000 pphpd (persons per hour per direction)
- Approximately 12 mph

Aerial Tram in New York, New York

Gondolas

- Vehicles continuously circulate
- Generally smaller cabins, 8-15 passengers
- System Capacity: >3,000+ pphpd (persons per hour per direction)
- Approximately 11 mph



Gondola in Tbilisi, Georgia

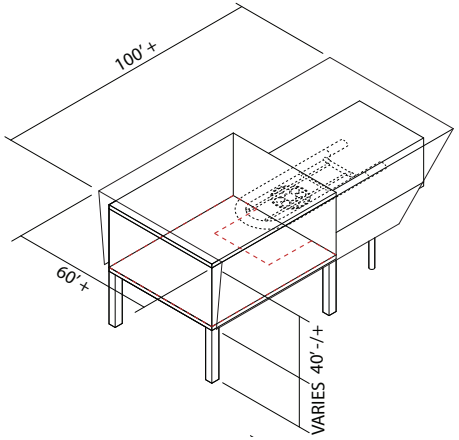
Diagrams Source: The Gondola Project

STATION TYPES

To test-fit the potential alignments and station areas, the following typical station and cabin sizes were used.

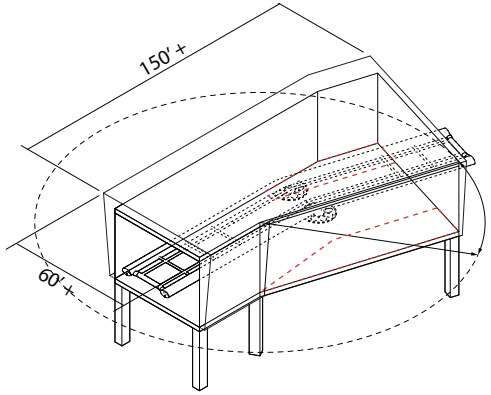
Terminus Station

Each end of the gondola alignment will have a terminus station where passengers can board and exit. One end station will also require space for storage and maintenance of gondolas.

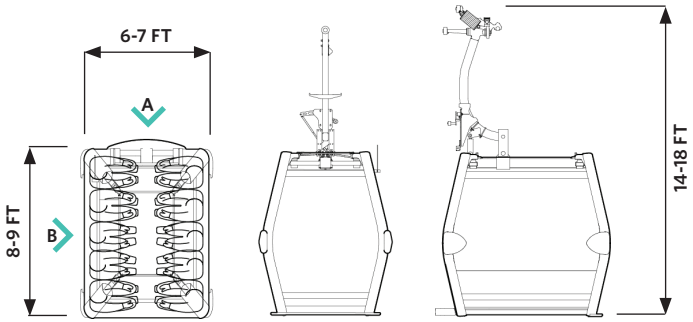


Angle Station

If the selected alignment includes a turn in the ropeway, an angle station will be required. An angle station can include passenger boarding and exiting if desired, but the primary reason for the station is for the equipment above the car that transitions the gondola from one ropeway to the next.

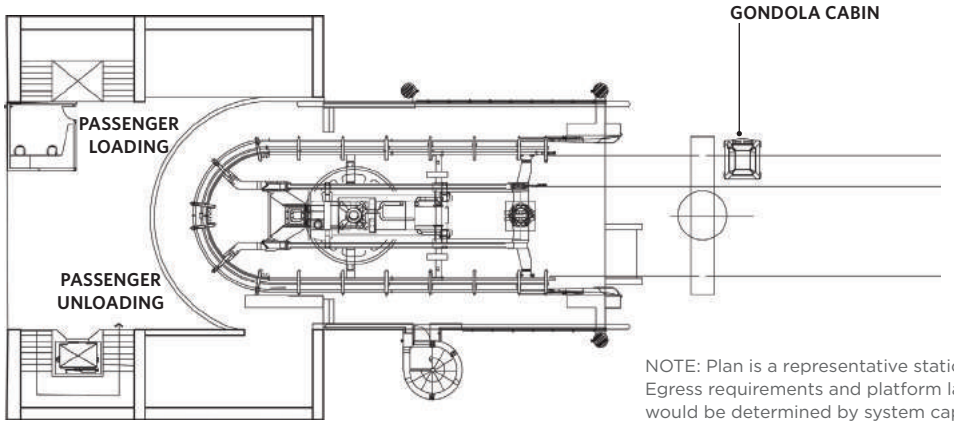


Gondola Cabins



Plan | Elevation A | Elevation B

Typical Terminus Station Plan



NOTE: Plan is a representative station layout. Egress requirements and platform layouts would be determined by system capacity.

OPERATIONS

Fundamentally, aerial gondolas operate by circulating a series of cabins—each with a capacity of roughly 8-12 passengers—around a cable (or wire rope) loop or loops. This operation contrasts with aerial tramways which traditionally have either one or two cabins (usually larger) that shuttle back and forth on one side of the loop. Because the gondola cabins are continuously circulating, cabins arrive at any given station at a frequency ranging from about every 10 seconds to about every minute. The exact frequency will be determined by the required capacity. In the event that the gondola ridership increases over time, additional cabins can be added to increase the system capacity. While other capacities can be achieved, common gondola capacities range from roughly 800-3000 people per hour, per direction.

When a cabin arrives at a given station, the cabin detaches from the hauling rope so that the cabin can slow to walking speed or stop while the hauling rope continues at a higher speed. This speed differential allows the passengers to enter or exit cabins while maintaining a relatively high transit speed for cabins not at a station. After detaching from the haul rope, the cabins are decelerated to an appropriate speed through an alighting and boarding area and then are accelerated back to the main line speed before being reattached to the haul rope. In typical operations, the time allowed for passengers to exit or enter is around one minute. If it is required, a cabin can be brought to a complete stop to accommodate special loading or unloading situations. Depending on the cabin spacing, this can often be done with little or no impact to the timing of other cabins.

Typical gondola installations employ station attendants at each station where passengers may need assistance or direction. While it is good practice to have two attendants at each passenger station, it is not uncommon for there to be one attendant at each station. These attendants provide customer assistance when needed and provide a human interface for riders.

The system should be planned with maintenance space to store parts and for mechanics to perform maintenance tasks. This space should also accommodate a number of cabins for the purpose of ongoing maintenance. The station should be designed to allow the removal of cabins directly to a maintenance area. Typically, this requires that a switching rail be installed at one of the stations so that the cabin, once removed from the haul rope, can be directed to the maintenance area. A very preliminary estimate of the maintenance space is 2500 square feet. The spatial requirements will be further defined in future stages of the project.

It is common for some people to raise questions about personal safety for urban gondolas. In general, with a properly sized system, a passenger who prefers to travel alone or in a small party (such as a family) may do so since the next cabin is only seconds away. During peak loading times, this may be impractical, but those times also generally are viewed as less risky exactly because there are many people. While it is possible, it is currently not common practice to install surveillance or communications equipment in each cabin.

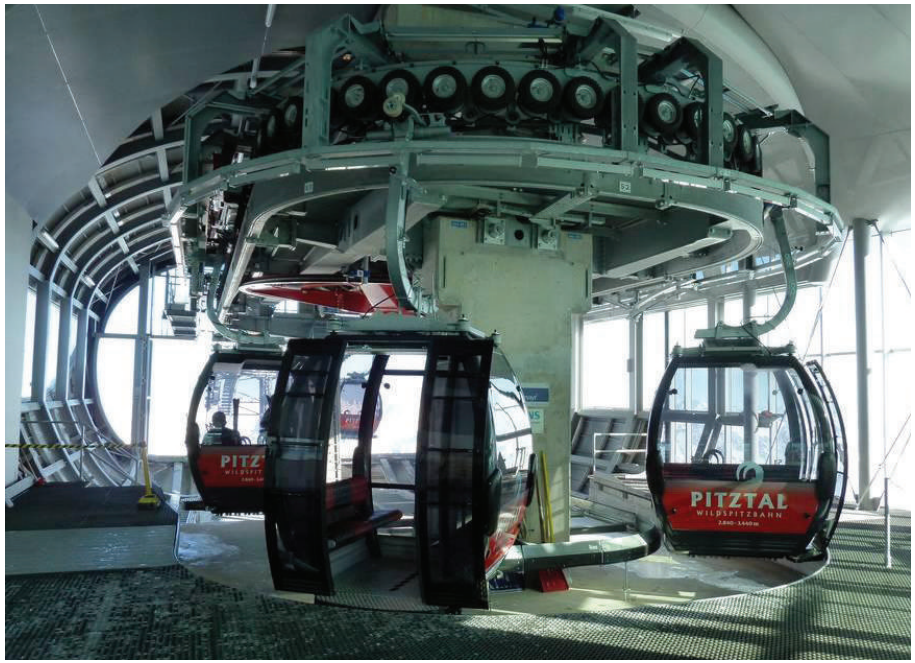
The matter of evacuation scenarios must be addressed. Vertical evacuation of passengers should always be considered a last resort. Systems can be and are designed to greatly reduce the probability of an evacuation event. For example, known wear components can be up-sized to allow a greater time window for maintenance before failure. Likewise

London, UK

Koblenz, Germany

Singapore

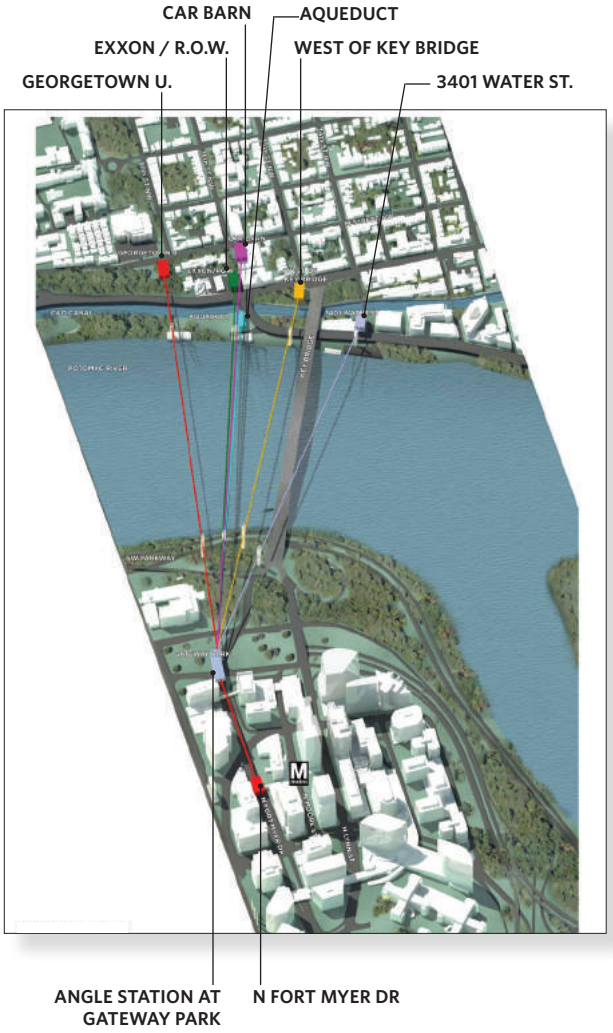
power systems can be arranged to provide redundancy and complete independence from the utility power. However, even with backups and design contingencies, we must make accommodations to evacuate passengers, should it become necessary. This will have to be done in close coordination with the appropriate emergency response agencies. We anticipate this will require multiple discussions with fire, police or other similar departments with jurisdiction. It is likely that the final resolution will involve a combination of ground access techniques (such as a boom truck or crane) and vertical descent techniques. Any aerial passenger installation is required by industry standards to have a detailed plan for evacuating passengers. This plan will address the means, methods, responsibilities and other factors for all locations along the alignment so that there is a well understood method to safely remove passengers, should it become necessary. These methods must be practiced at least annually, we may recommend more frequent practices. As a practical matter, we expect that should it become necessary to evacuate, the responsible parties will make field decisions that may vary from the evacuation plan. The matter of evacuation will require a great deal of discussion and coordination to arrive at a plan acceptable to all parties.



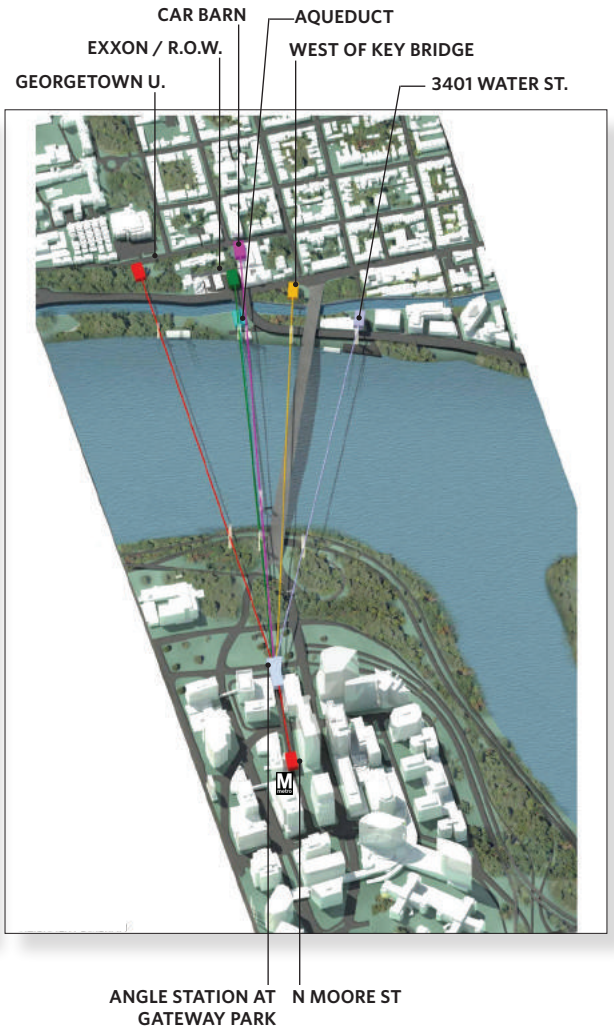
Gondola Station Loading Area, Pitzal, Austria


Gondola Interior, Emirates Line, London, UK

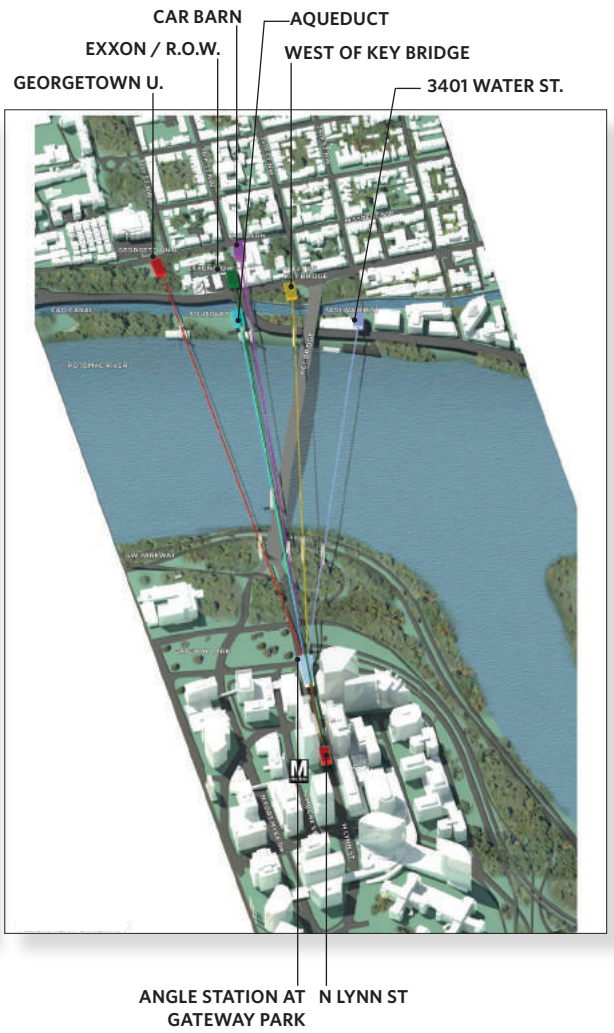
Corridor Alternative 1 :: N Fort Myer Drive



Corridor Alternative 2 :: N Moore Street



Corridor Alternative 3 :: N Lynn Street

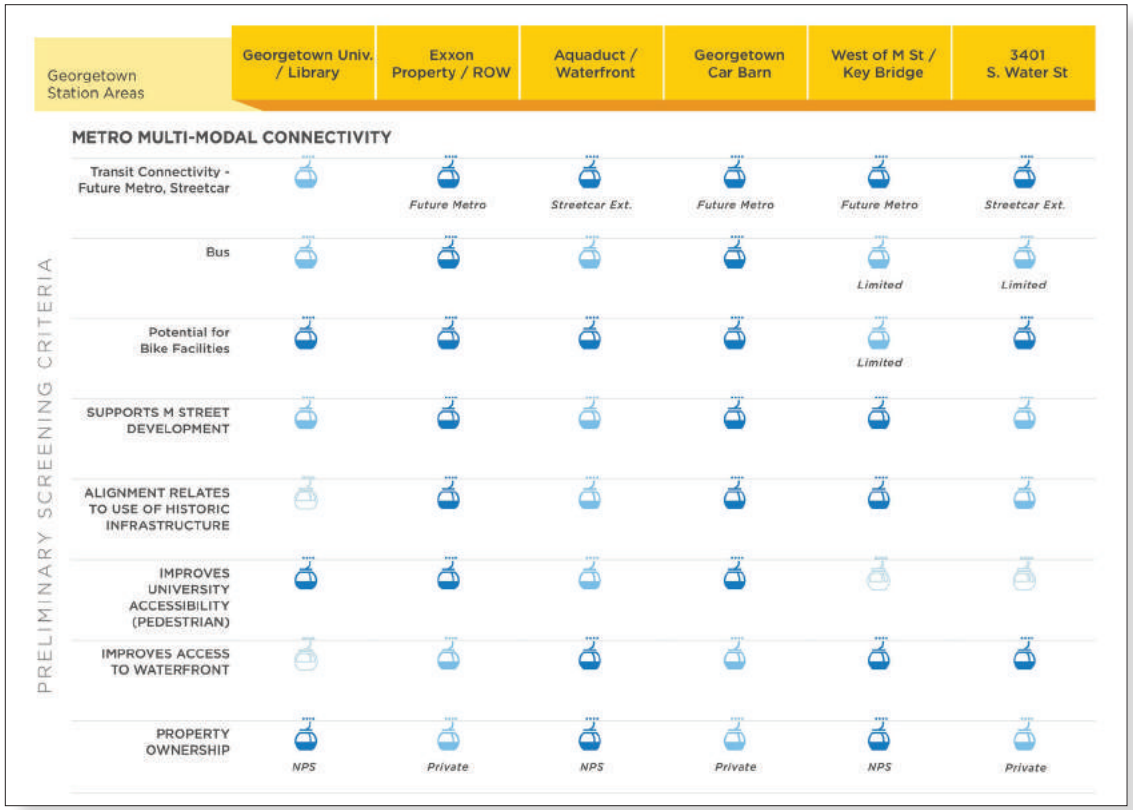


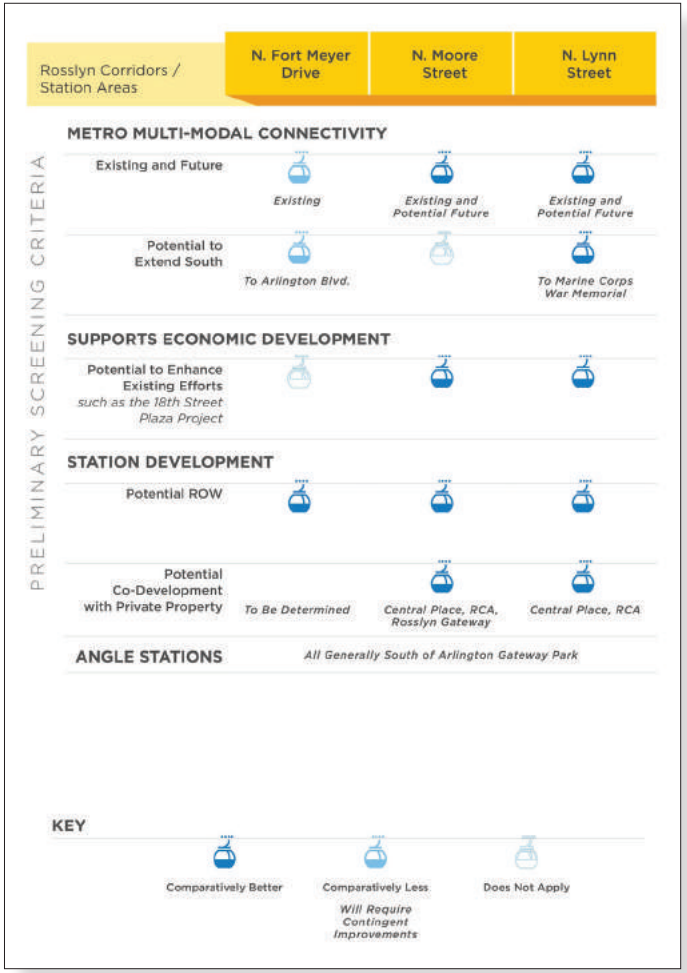
PRELIMINARY ALIGNMENT AND STATION AREA STUDIES

The preliminary evaluation of potential alignments and station areas looked at right-of-ways and landing areas on both public and private property. Six individual sites were identified in Georgetown, as were three corridors in Rosslyn that provided close proximity to the Metro Station.

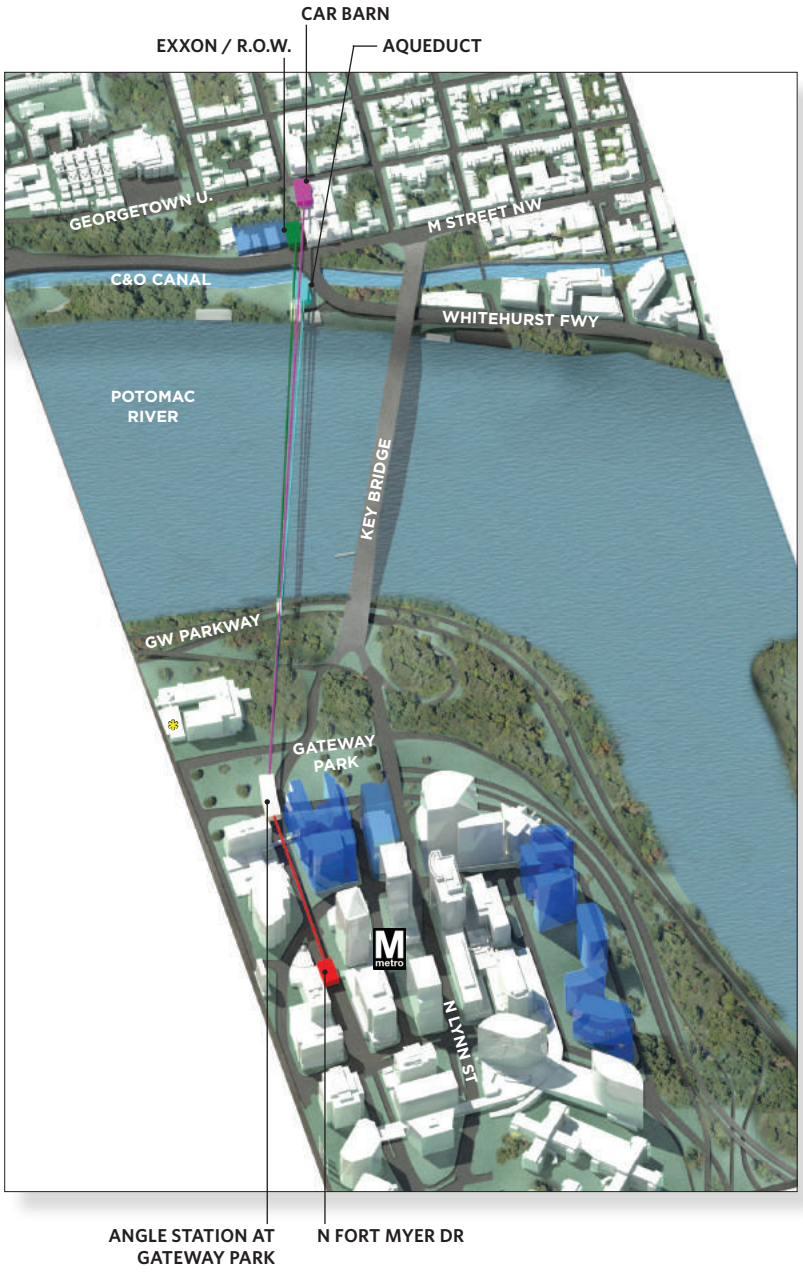
In Rosslyn, the potential corridor alignments were reduced to North Ft Myer Drive and North Lynn Street as both alignments could accommodate a potential extension to the U.S. Marine Corps War Memorial (commonly known as Iwo Jima), a critical criteria for Rosslyn stakeholders. North Moore Street was eliminated since it could not be extended, though implementation along North Moore Street could be similar to North Lynn Street.

In Georgetown, two station locations were eliminated - a parcel to the south of the Georgetown University Library, and a piece of land west of Key Bridge that is part of Francis Scott Key Park. The site near the Library was eliminated because it would not provide good connections to the business district, and the site west of Key Bridge was eliminated because it was physically constrained and would require significant regulatory approvals since it is part of Francis Scott Key Park.

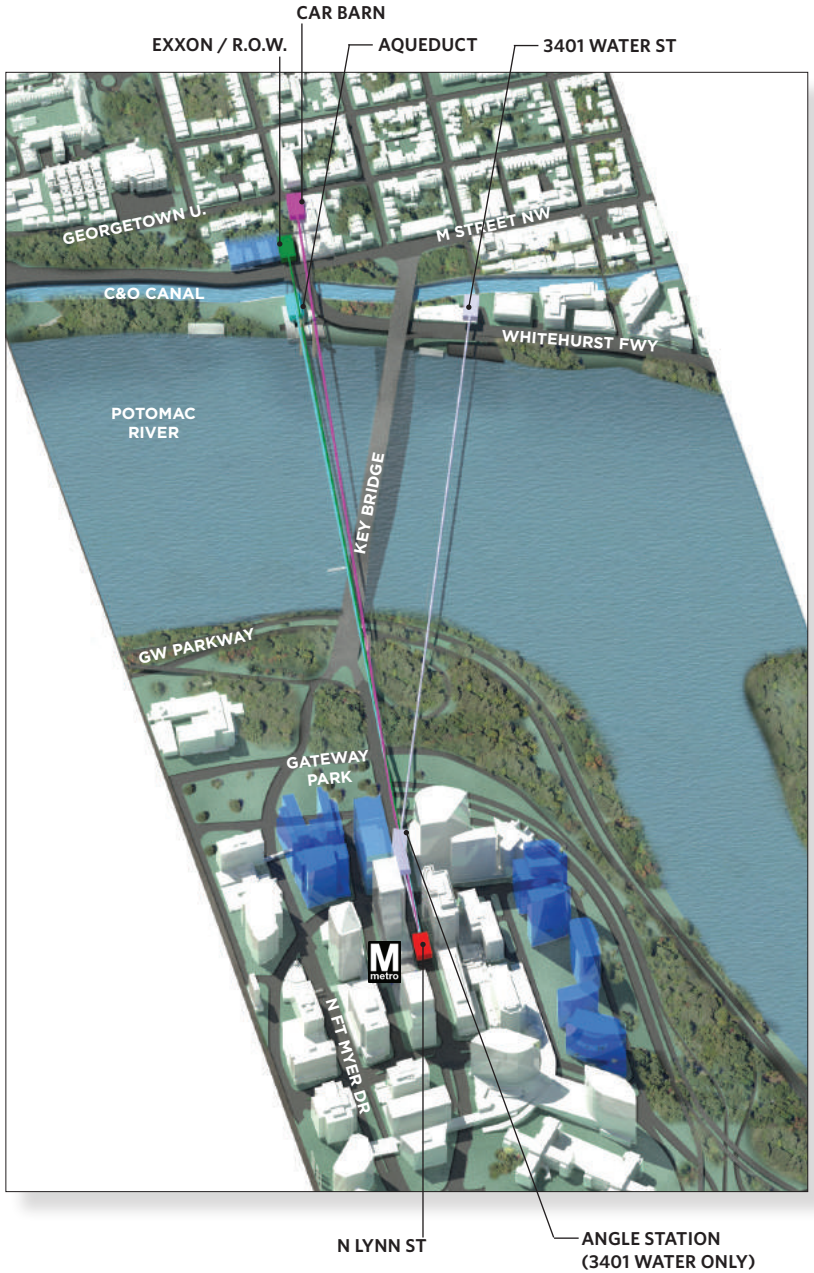




Corridor Alternative 1 :: Fort Myer Drive



Corridor Alternative 2 :: North Lynn Street



CORRIDOR ALTERNATIVE 1 AND CORRIDOR ALTERNATIVE 2

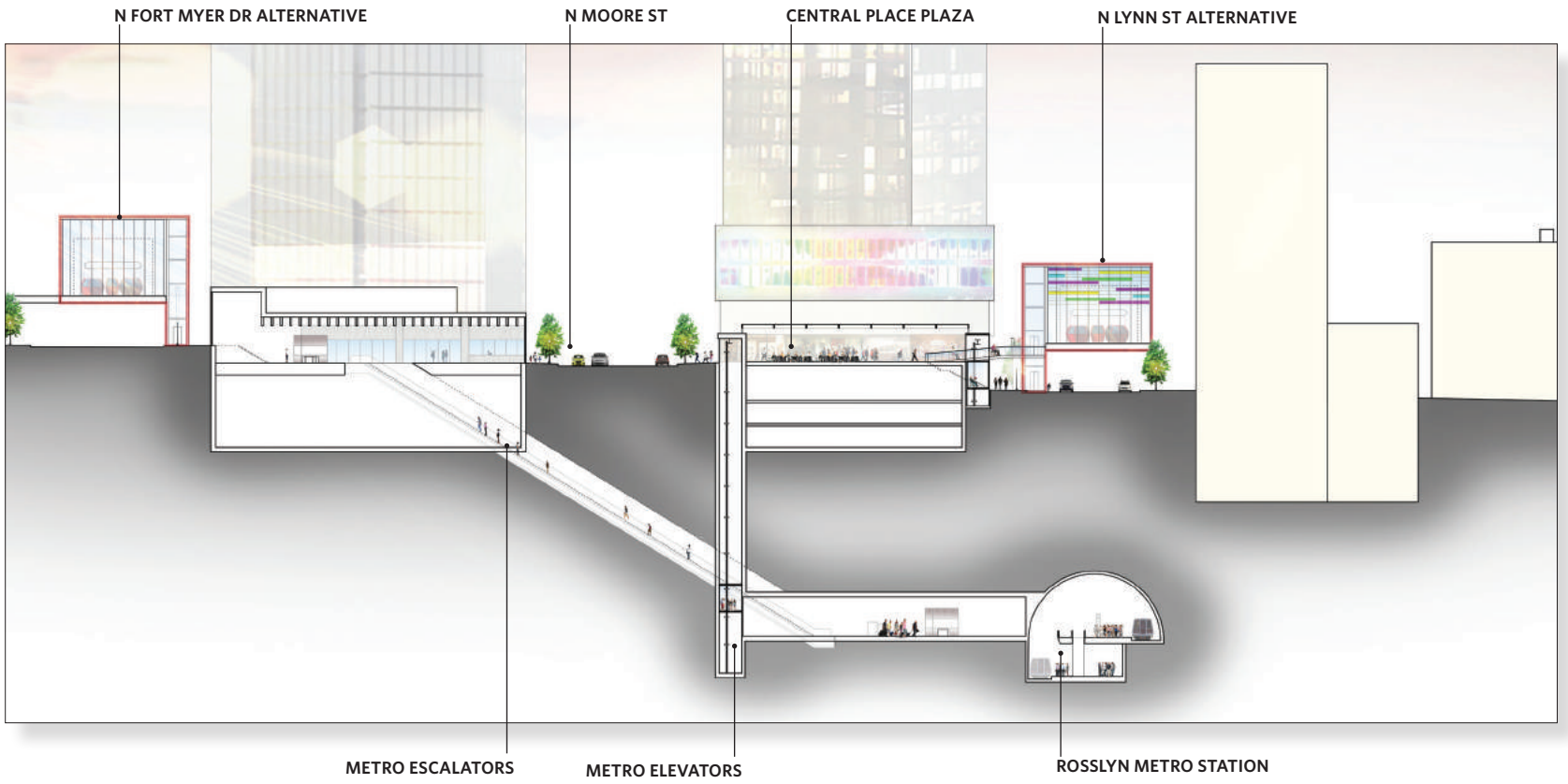
The alignments along both North Ft. Myer Drive and North Lynn Street were evaluated with stations in Georgetown at: the Exxon Site, the Carbarn building, the Aqueduct foundation, and 3401 Water Street. Each site on both sides of the river offers unique opportunities and challenges. Each alignment and station location has its own pros and cons. While this study is not intended to be a definitive determination of a preferred alignment, a high-level evaluation does suggest which alignments are more promising.

Fort Myer Drive

All Georgetown station locations require an angle station along this alignment. The 3401 Water St station would not be possible as it would require crossing Key Bridge at an unfeasible location.

North Lynn Street

The three Georgetown station locations west of Key Bridge would not require an angle station in Rosslyn. The alignment to 3401 Water St would require an angle station to the south of Gateway Park in Rosslyn.



RIGHT Illustrative section through Rosslyn showing connections to the Metro station for both N Lynn Street and Fort Myer Drive station locations.

GONDOLA TOWER STRUCTURES

Each alignment will have specific requirements for tower locations. Minimizing towers can reduce costs and visual impacts, but spacing towers further apart can require taller towers, greater sag in the cable and a lower cabin elevation. At greater distances between towers, there may be a need to use a bi-cable gondola system.

The tower design will be a critical issue for future project development and regulatory approvals, and to ensure that the Gondola infrastructure is a high-quality design that does not negatively impact viewsheds. The images to the right provide a few examples of tower structures around the world.

MEDELLIN, COLOMBIA

LONDON, UK

PORTLAND, OREGON

GERMANY

LISBON, PORTUGAL

SOUTH KOREA

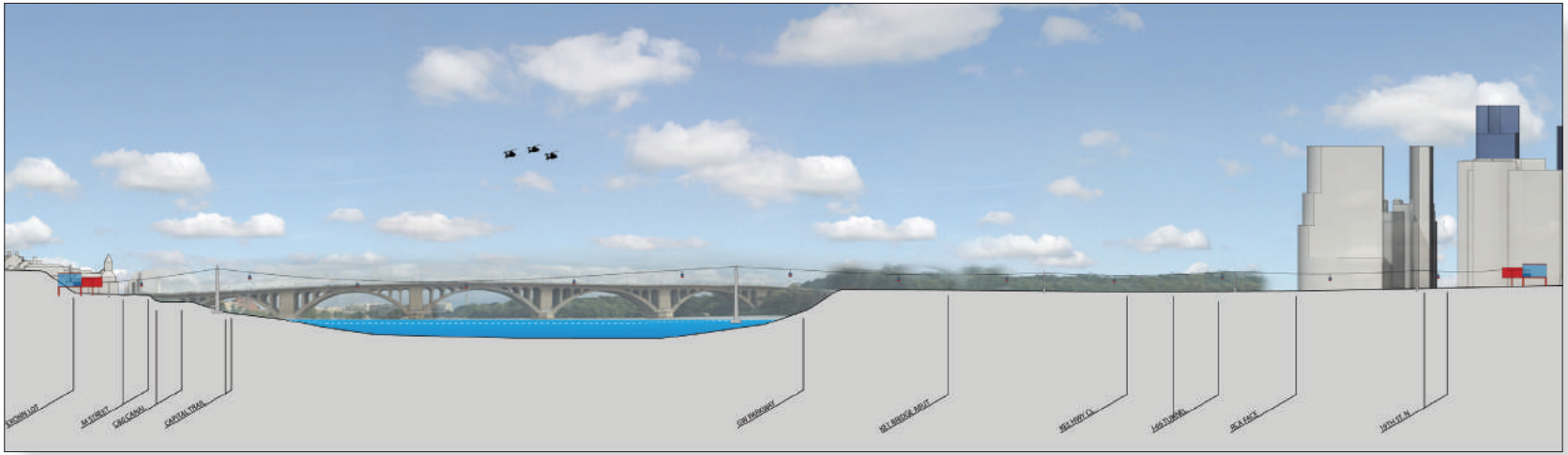
POTENTIAL GONDOLA TOWER LOCATIONS

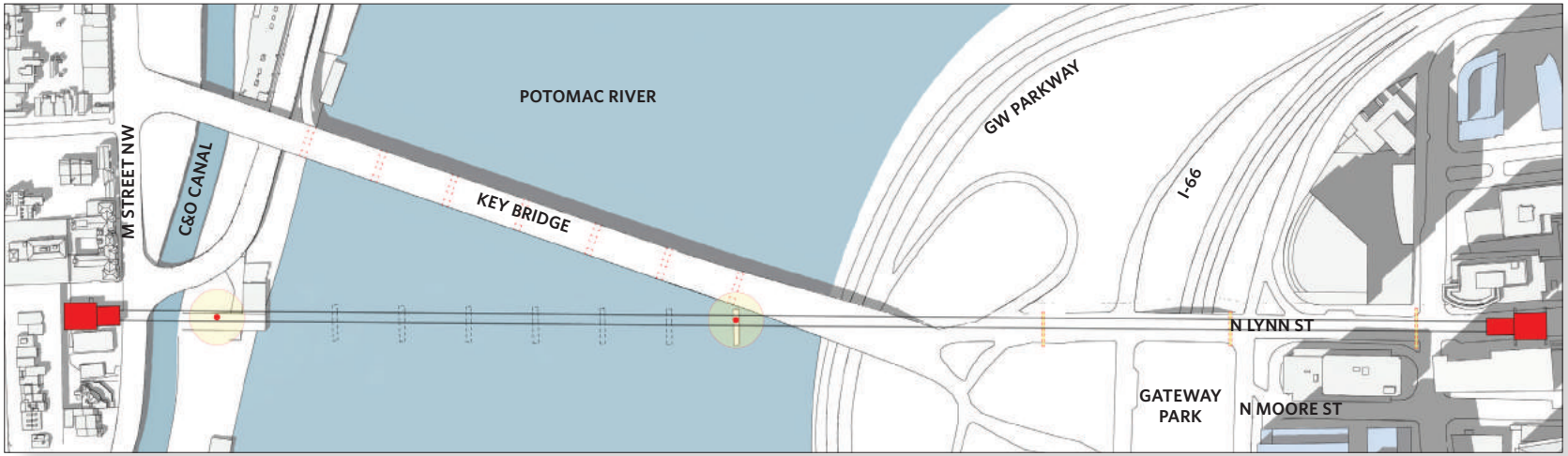
For this study, potential locations for towers assume the use of a monocable gondola, with towers less than 150' high, or approximately 65' higher than the Key Bridge deck. Towers between 130' and 150' high will generally allow for the cabin elevations and views to be above the bridge deck, while lower tower heights will result in the cabins being at, or below, the bridge structure resulting in limiting viewing opportunities for riders.

The following diagrams illustrate potential tower locations for the Lynn Street Alignment to the Exxon Site.

Towers on Land

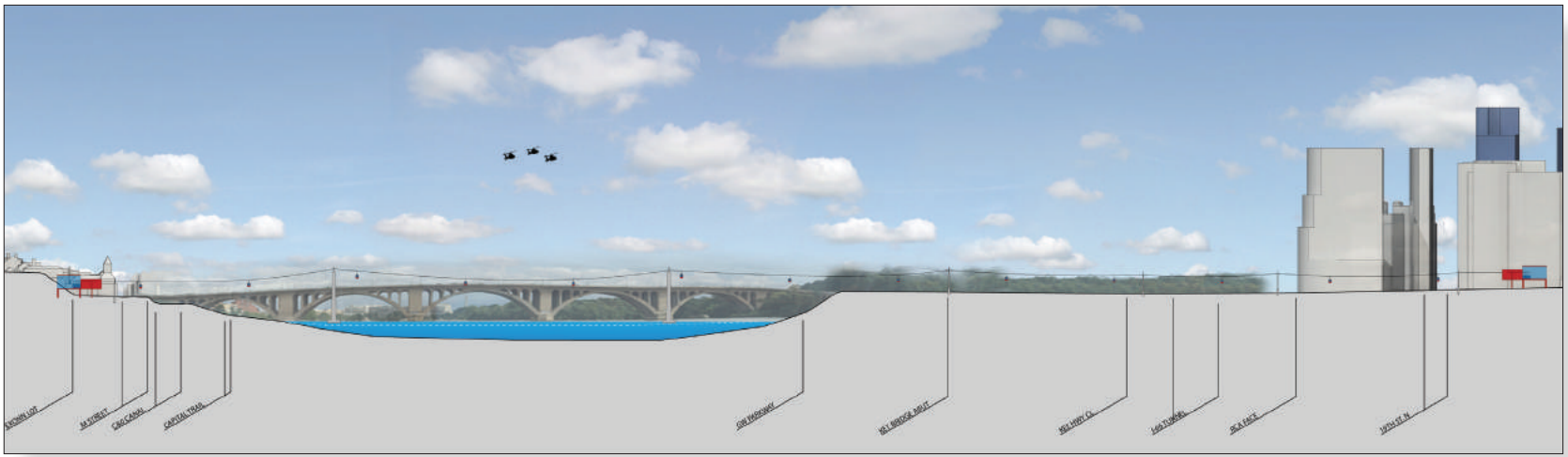
The alignment shown below includes one tower on land on the Georgetown side, and another tower on an existing aqueduct foundation near the Rosslyn river bank. Locating towers on land may be a more cost effective approach, however it will likely be more difficult to permit in consultation with the National Park Service.

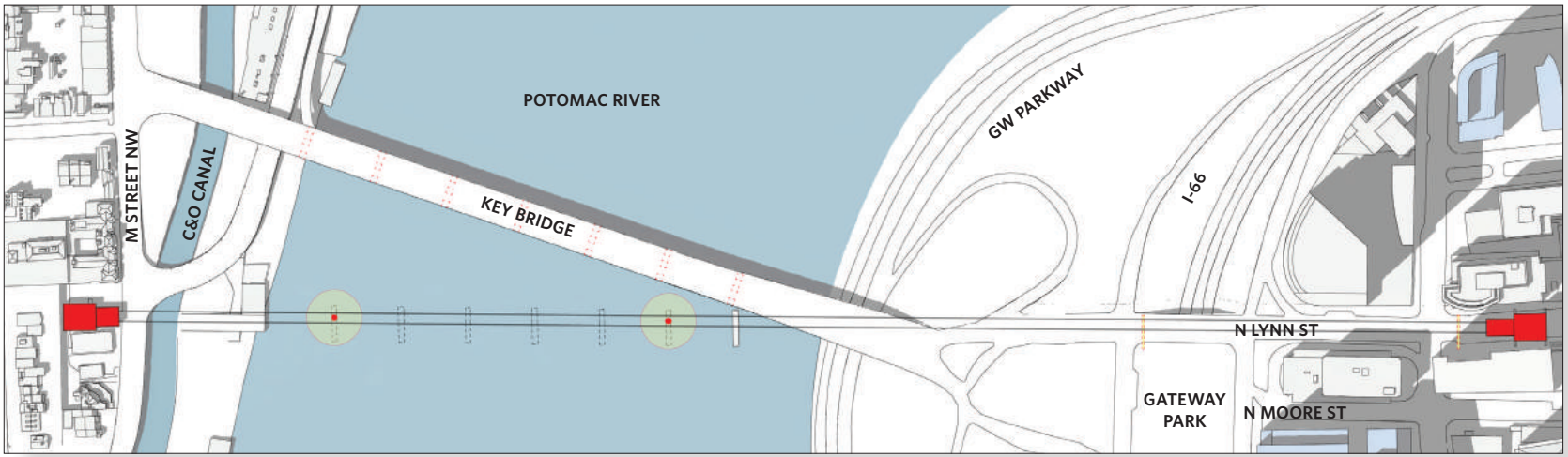




Towers in the River

The alignment below illustrates two towers in the Potomac River, located in alignment with the existing Key Bridge piers and avoiding identified boating lanes. By placing the towers in the river, negotiations with land owners could be avoided, potentially making the project easier to permit. However, locating towers in the river may be more expensive.





POTENTIAL ROSSLYN STATION LOCATIONS

The potential stations in Rosslyn would be elevated structures built within the existing street right-of-way. Access to the stations would include stairs or escalators, and elevators for accessibility, to provide access to street level.

North Fort Myer Drive

A station on Ft Myer Drive would have access to the existing Metro Station via construction of a new vertical connection (elevator and stairs) to the Metro Fare Gate area.

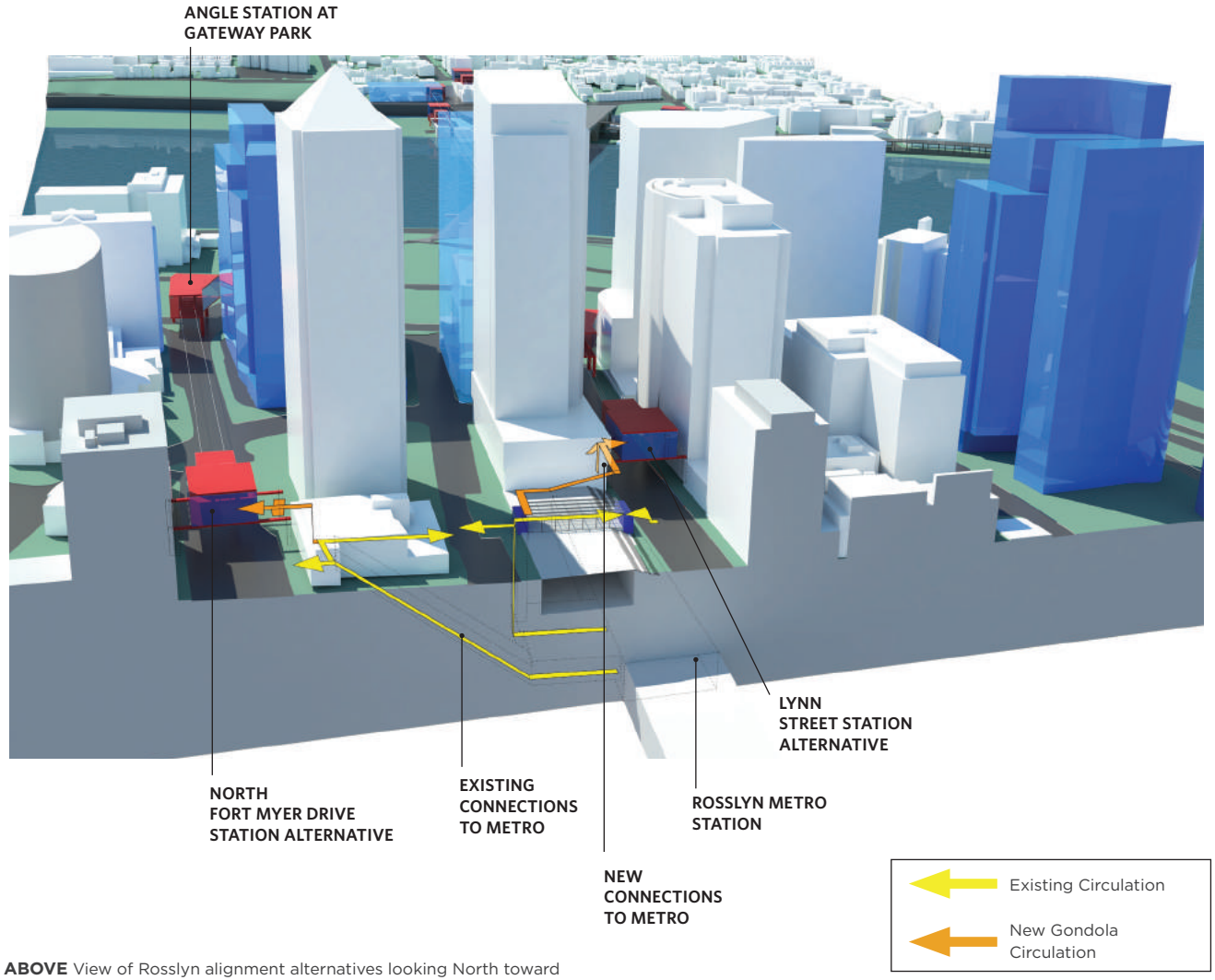
An existing sky-bridge over North Fort Myer Drive would need to be removed to accommodate this alignment.

All alignments along North Ft Myer Drive would require a turn station to connect with the Georgetown station sites. The turn station may be an additional visual impact along this corridor.

Lynn Street

A station on Lynn Street would have a direct connection to the Metro Station via the newly constructed elevators as part of the Central Place development. Access through the Central Place plaza could be quick and direct from Metro, providing a perceived "seamless" connection for people transferring from Metro to the Gondola, while also providing the opportunity to activate the plaza and support adjacent uses with increased foot traffic.

Lynn Street alignments that continue west of Key Bridge do not require a turn station, but alignments to the east of the bridge would require a turn station.



ABOVE View of Rosslyn alignment alternatives looking North toward Georgetown

POTENTIAL GEORGETOWN STATION LOCATIONS

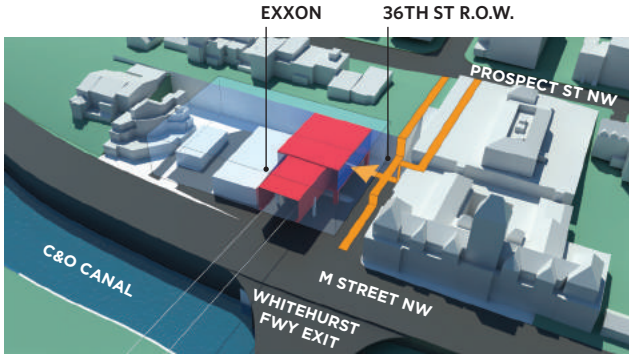
The four potential sites investigated in Georgetown identify distinct advantages and disadvantages. The two sites adjacent to M Street (Exxon/36th Street and the Carbarn) do look the most promising for providing access to both Georgetown University and the Georgetown business district.

Exxon/36th Street Right-of-Way Site

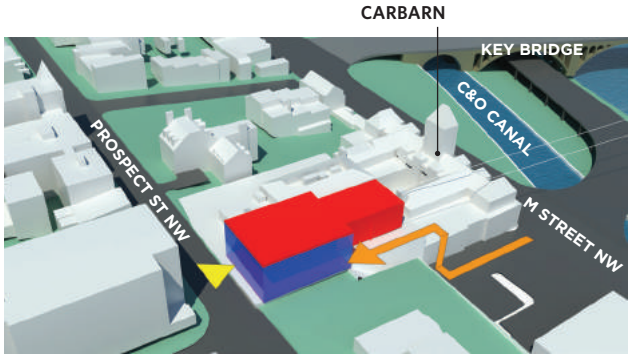
The Exxon/36th Street site would provide a balanced connection to both Georgetown University (GU) and businesses along M Street. It is located on both private and public property, so locating a station here would require either private land acquisition or a partnership with the site's owner. The District of Columbia owns the right of way for 36th Street at this location, so part of the street could be used for the station and transit-related improvements such as bus drop off or bike parking. Physical and land tenure conditions are essentially the same for the site directly north, on Prospect Street, west of the Exorcist Steps.

Carbarn

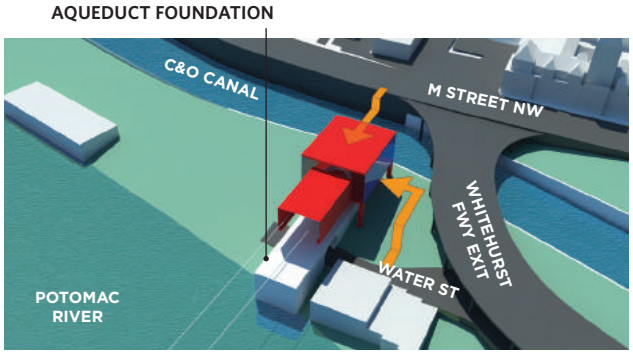
A gondola station at the top of the historic Car Barn building would provide direct access to Georgetown University via Prospect Street. Access to Georgetown businesses on M Street could potentially be provided by vertical circulation through the building. Use of this structure would require significant structural enhancements and/or locating the station on bedrock adjacent to the Prospect street side of the building. This would also require partnership with the private owner and its tenants, and/or the acquisition of the site by a public entity.



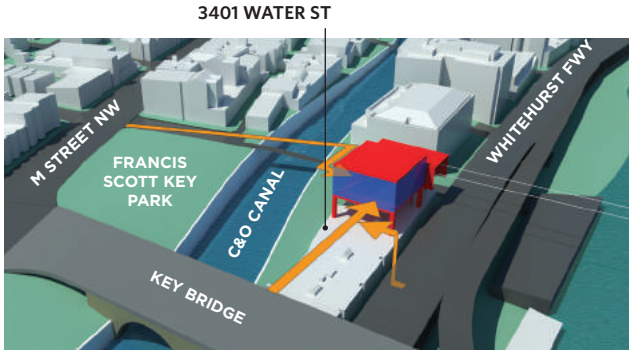
Exxon Site/36th St R.O.W. site would provide easy access to M Street and Prospect Street directly.



Carbarn site would allow for direct at grade access to Prospect Street. Access to M Street would have to be added within the existing Carbarn structure and/or provided via "the Exorcist Steps.'



Aqueduct Foundation site would be considered an impairment to the National Park Service property so it is not a viable station location. The site would also require significant new connections to be built that to provide minimal access.



3401 Water Street site would allow for access to M Street via a new bridge above the Canal. New vertical circulation could be developed to connect to Water Street and a connection could be provided to the Key Bridge.

Aqueduct Foundation

The Aqueduct Foundation location in Georgetown not require coordination with a private entity. It is located on National Park Service land and would be considered an 'impairment to Park Service property' which eliminates its use as a station. This station location does not provide a direct connection to Georgetown University and connection to Georgetown businesses would require modifications to the existing M Street traffic patterns to allow for safe pedestrian connections.

3401 Water Street

Locating a gondola station on top of a development at 3401 Water Street could provide direct connections to M Street businesses via a new bridge over the C&O Canal as well as Water Street businesses and future transit if the DC Streetcar extension is realized. This station location would not provide a significant connection to Georgetown University. Additionally, a pending entitlement for residential use would make partnering in this development challenging.

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03 RIDERSHIP

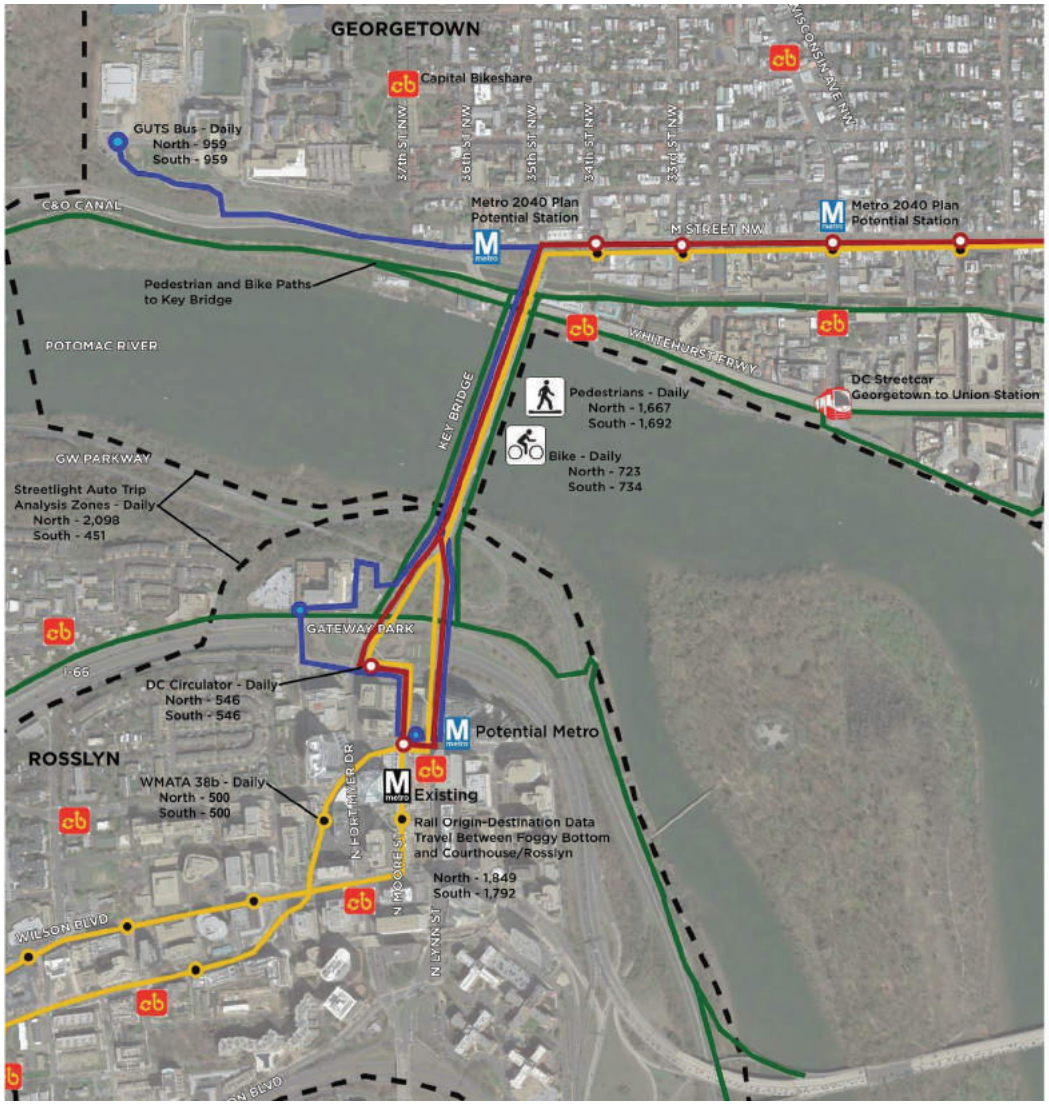
Summary

In terms of potential ridership, the findings of this study suggest that a Gondola connecting Rosslyn to Georgetown could significantly contribute to a more effective multi-modal transit system while addressing transportation needs in the immediate study area. This section provides an overview of the development of the ridership projections.

TRAVEL DEMAND

The potential range of ridership for a proposed gondola has been conceptually analyzed to determine the total demand for travel on the gondola in three components:

1. Current local trips between Rosslyn and Georgetown that might shift modes from walking, biking, transit, or auto to use the gondola
2. Current longer-distance trips that would use the gondola as one link in part of the trip
3. Induced new trips, either local or longer-distance, that are not taking place today, but would take place with the presence of a gondola that improves connectivity by shortening travel times and improving the passenger experience.



RIGHT Existing travel across the Potomac River in the Georgetown - Rosslyn corridor by transportation type and volume..

ANALYSIS METHODOLOGY

The estimates for the three components of ridership demand were tested to check their reasonableness against existing travel patterns in the region and against the existing operations of other ropeway systems ::

MWCOG Regional Travel Demand Model

This model accounts for all three components of demand, analyzing the gondola as part of the regional transportation system.

Transit Travel Shed Accessibility

This method illustrates the expansion of the potential market for transit-accessible travel with the gondola, highlighting downtown Washington D.C. as a potential transit market area for travel to Georgetown via gondola.

Existing Cross-Potomac Travel Patterns

These patterns illustrate existing trip-making across Francis Scott Key Bridge (Key Bridge) and the Rosslyn-Foggy Bottom tunnel as an estimate of existing local trips and a point of comparison to other forecasts.

Comparable Ropeway Systems

This method evaluates the operating characteristics of other ropeway systems around the world as additional points of ridership reasonableness comparison and as examples of the implications of a range of fares and headways.

Demographic and Ridership Comparison

This uses the system ridership levels and the demographic characteristics near the stations of two U.S. gondola systems to estimate ridership on the Rosslyn-Georgetown gondola.

The following sections describe each of these analyses in further detail. The Conclusion section presents a graphical summary of the ridership estimates and comparable ridership values from other ropeway systems, concluding that a range of ridership for the Rosslyn-Georgetown gondola of between 6,000 and 15,000 daily trips is likely. These forecasts should be used to define/scale two aspects of the project's feasibility:

(1) the lower-end of the forecast should be used to assess operating costs and revenue so as to have a conservative assessment of the proposed systems feasibility from a cost perspective; and

(2) the higher end of this range should be used to define the potential upper limits of ridership such that the system will have the capacity to meet the upper limits of potential demand.

MWCOG REGIONAL TRAVEL DEMAND MODEL

The Metropolitan Washington Council of Governments (MWCOG) Model provides the most robust estimate of gondola demand, analyzing the gondola link in the context of broader regional transportation demand and a regional transportation network. MWCOG maintains a regional travel demand forecasting model that estimates the demand for travel, primarily by private automobile and motorized public transportation, throughout the eight-county region surrounding Washington, D.C. The model divides the region into about 3,700 zones. The model then uses the land use characteristics of each zone, the interactions of land uses among all zones, and the connectivity among zones using transportation network "links" to estimate travel demand. The model accounts for the time and monetary cost of travel and the perceived quality of time spent traveling and waiting for various modes of transit.

To analyze potential gondola ridership, Fehr & Peers DC modified the MWCOG Model transportation network to include a new transit link between Rosslyn and Georgetown. The MWCOG model ridership estimate is particularly sensitive to the quality of perceived service on the gondola and the total time to transfer between Metrorail and the gondola, among other factors. A range of three potential service qualities and three potential Metro Rail transfer conditions were evaluated. It is expected that the Metrorail experience will most closely represent the high quality of gondola passenger experience, with features including smooth level boarding, reliable headways, climate-controlled cabins, and attractive views, and that gondola passenger experience potentially will exceed the quality experienced by Metrorail passengers. The gondola was also evaluated as a light rail system and as a bus rapid

transit (BRT) system, represented in the model as lower-quality passenger experiences, to provide points of comparison. To understand the ridership implications of a variety of Rosslyn gondola stations under consideration, the ridership model adjusted the Rosslyn gondola platform parameters in the Metrorail version of the model for three scenarios:

- A Direct Transfer, which assumes the gondola platform will be located immediately adjacent to the Rosslyn Metrorail station. The model represents the cost of this transfer as a 2.5-minute perceived transfer penalty.
- A 0.16-Mile Walk Transfer, which assumes the gondola platform will be located on the edge of the developed portion of Rosslyn and Arlington Gateway Park. The model represents the cost of this transfer as a 2.5-minute perceived transfer penalty and a 3.5 minute walk between Metrorail and the gondola platform.
- A 0.27-Mile Walk Transfer, which assumes the gondola platform will be located in Arlington Gateway Park. The model represents the cost of this transfer as a 2.5-minute perceived transfer penalty and a 6 minute walk between Metrorail and the gondola platform.

The Light Rail and BRT versions of the model both assume a 0.16-mile walk transfer, including a 2.5-minute perceived transfer penalty and a 3.5-minute walk between Metrorail and the gondola platform.

In all scenarios, the 2.5-minute perceived transfer penalty includes the need for vertical circulation between the rail platform and the gondola platform, as well as the perceived disutility of making a transfer. For all models, it was assumed the gondola fare in all scenarios would be a transit-like fare, integrated with Washington Metropolitan Area Transit Authority's (WMATA) Metro Rail distance-based fare structure, currently $1.75 during off-peak hours and $2.15 during peak hours for a trip the length of the gondola trip. All scenarios assumed a one-minute headway between gondola cabins, the shortest headway that could be evaluated using the MWCOG model. Actual headways could be as short as 20 seconds, meaning passengers will always be able to see the next arriving cabin, effectively eliminating the perception of wait time. Finally, all scenarios were evaluated for year 2015, the current base year for the MWCOG model, as a conservative estimate of ridership; future years include additional land use growth and constraints on travel through the Rosslyn Tunnel, which could further increase demand for trips via the gondola.

Results of the five modeling scenarios are summarized in **Table 1**. The model results range from 6,100 daily trips to 15,600 daily trips. The results suggest that ridership would not be reduced significantly by the introduction of a short walking transfer of 0.16 miles, but a transfer distance of 0.27 miles would reduce ridership by more than 30%. The model is also highly sensitive to the quality of passenger experience, as represented by the mode selected for analysis. Holding the transfer distance constant at 0.16 miles, compared to the high-quality mode represented by Metrorail, quality comparable to Light Rail would reduce ridership by more than 30% and quality comparable to Bus Rapid Transit would reduce ridership by more than 60%. This comparison indicates that gondola features like smooth level boarding, reliable headways, climate-controlled cabins, and attractive views will likely be important to the level of anticipated ridership.

TABLE 1 :: Year 2015 Gondola Ridership Forecast from MWCOG Model

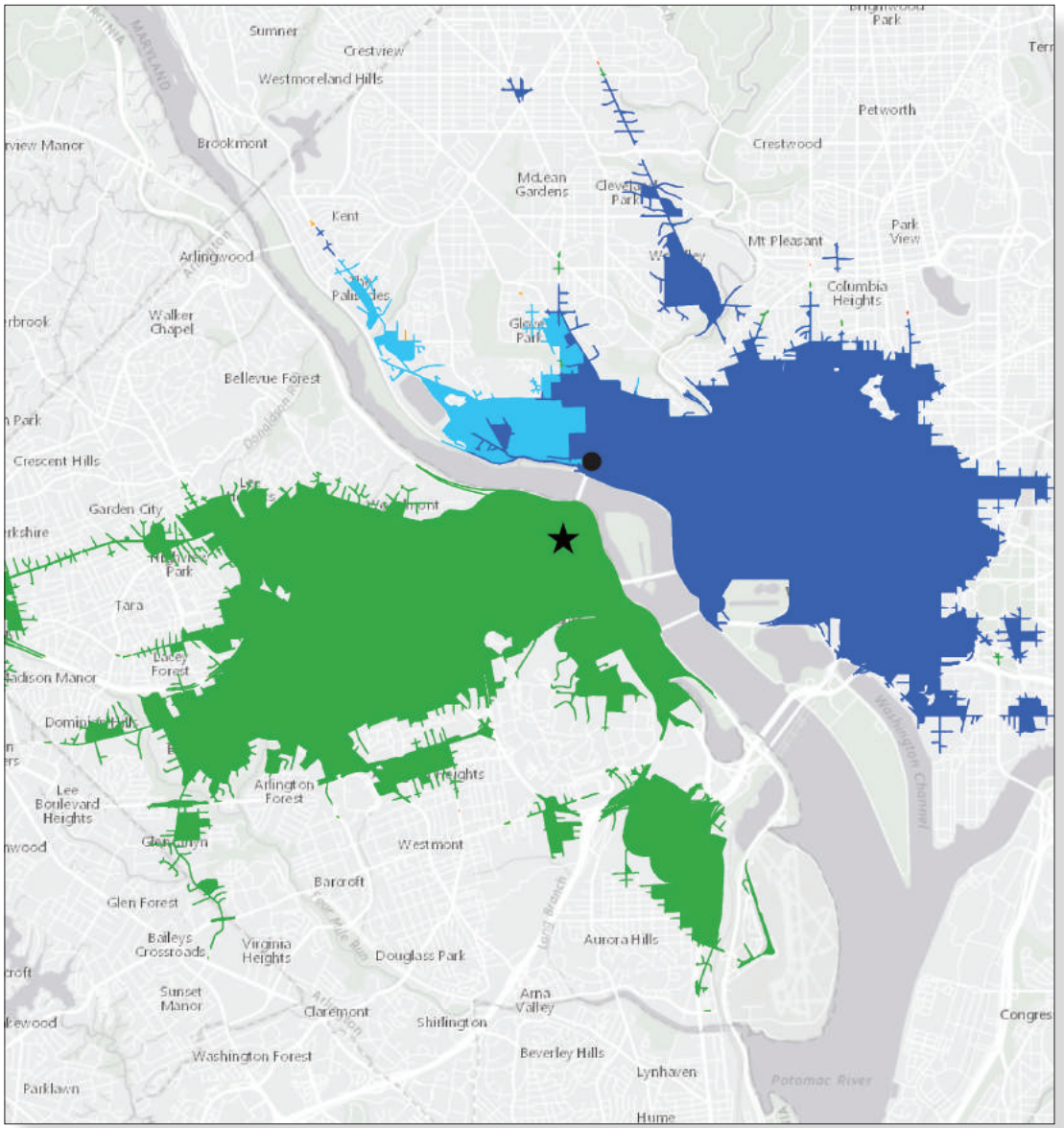
GONDOLA ANALYZED AS...	GONDOLA LOCATION	TRANSFER DISTANCE	PERCEIVED TIME PENALTY	WALK TIME	DAILY RIDERSHIP ESTIMATE
Metrorail	Rosslyn Metro Station	Direct Transfer	2.5 min	0 min	15,600
Metrorail	Edge of Arlington Gateway Park	0.16 mi	2.5 min	3.5 min	15,100
Metrorail	Arlington Gateway Park	0.27 mi	2.5 min	6 min	10,400
Light Rail	Edge of Arlington Gateway Park	0.16 mi	2.5 min	3.5 min	10,200
Bus Rapid Transit	Edge of Arlington Gateway Park	0.16 mi	2.5 min	3.5 min	6,100

TRANSIT TRAVEL SHED ACCESSIBILITY

To understand the potential travel market for trips including the proposed Rosslyn-Georgetown Gondola, a schedule-aware transit travel shed from hypothetical gondola station locations in both Rosslyn and Georgetown was prepared. Using General Transit Feed Specification (GTFS) data for the region's transit providers and the "Add GTFS to a Network Dataset" tool developed by Melinda Morang, all locations from which a traveler could reach the location of the Rosslyn gondola station using public transit within 30 minutes during the morning peak period were mapped.

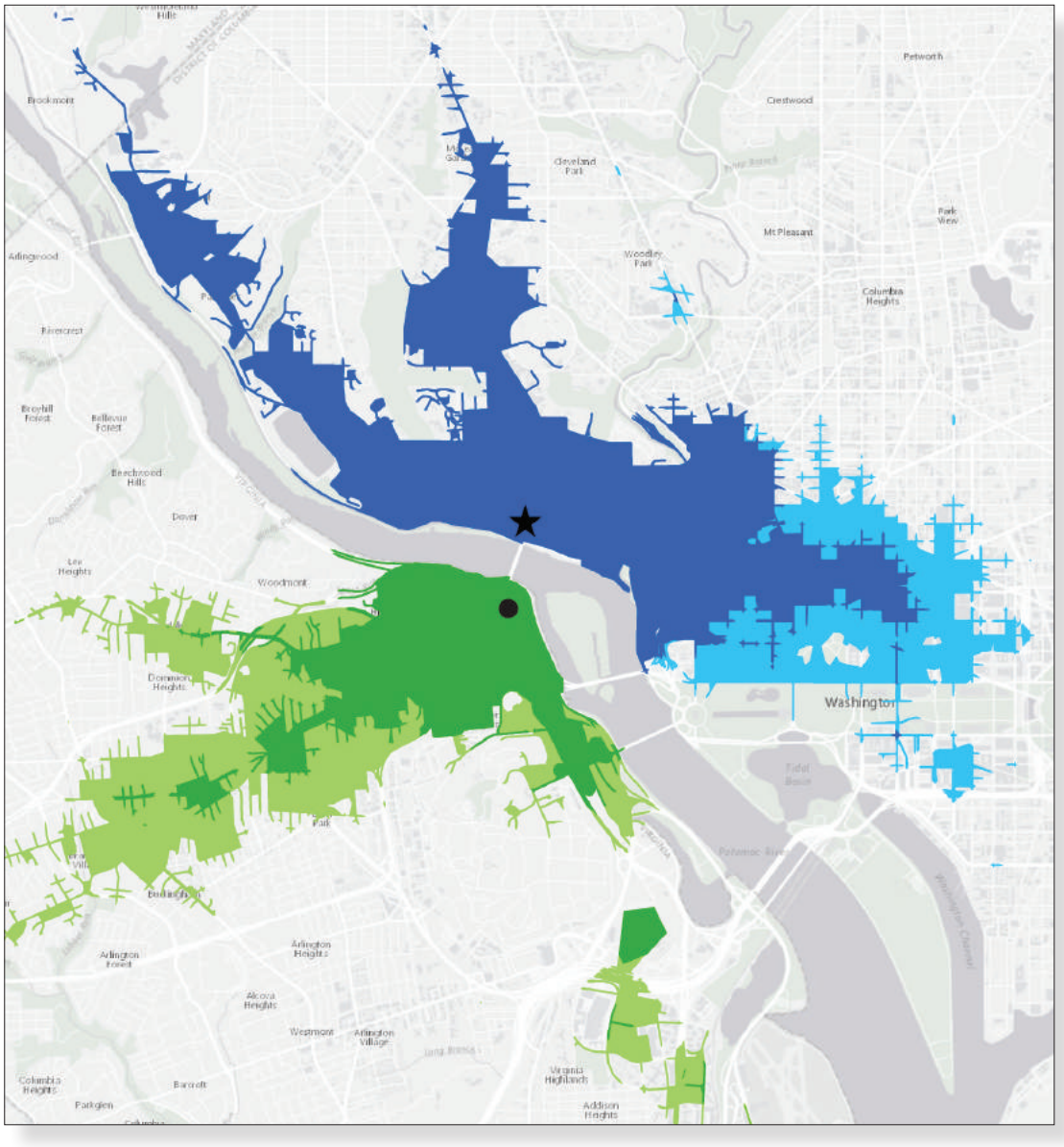
30-MINUTE TRANSIT SHED TO ROSSLYN

FIGURE 1 represents these locations shown in darker blue and green-shaded areas. The potential expansion in the transit shed afforded by a new gondola service is shown in lighter blue and green, with a 6-minute gondola travel time between the Georgetown and Rosslyn gondola stations, any trip that could reach the Georgetown station within 24 minutes could reach the Rosslyn station within 30 minutes. As shown by the green region in Figure 1, the Rosslyn-Georgetown gondola would not drastically expand the area accessible to Rosslyn by public transit, likely because Rosslyn is already especially well-served by transit, including Metrorail.



30-MINUTE TRANSIT SHED TO GEORGETOWN

Figure 2 presents a similar analysis focused on the proposed Georgetown gondola station, which shows a substantial increase in the area from which travelers can reach Georgetown within 30 minutes by transit with the new gondola service (green-shaded area), compared to existing conditions (blue-shaded area). Not surprisingly, the accessibility provided by the gondola service extends the 30-minute transit shed along the Rosslyn-Ballston corridor and toward Pentagon City and Crystal City, connecting via the Blue, Orange, and Silver lines at the Rosslyn Metrorail station. Expanding transit access from these areas to Georgetown can help to reduce the amount of cut-through automobile traffic passing through Rosslyn. In addition, there is a notable expansion of the transit shed along the north side of the National Mall, Downtown, Mount Vernon Square, Chinatown, Penn Quarter, and even Woodley Park. These areas, which cannot access the west end of Georgetown by transit within 30 minutes under existing conditions, would be within the 30-minute transit shed with the addition of the proposed gondola service, opening an additional potential transit market.



EXISTING CROSS-POTOMAC TRAVEL PATTERNS

To better understand existing transportation conditions in the project vicinity, the following was examined:

a) local trips made across the Key Bridge; and
b) local Metrorail trips made between Courthouse Rosslyn and Foggy Bottom.

Local trips made across Key Bridge include bike and walk trips, not all of whose origins and destinations are known, and bus and auto trips between Rosslyn and Georgetown. This category excludes other, longer-distance bus and auto trips across Key Bridge. In total, about 11,400 local trips are made across the Key Bridge on a typical weekday, with nearly 80% of those trips using non-auto modes.

Local Metrorail trips made between Courthouse/ Rosslyn and Foggy Bottom include all Metrorail trips between the Courthouse and Foggy Bottom stations and between the Rosslyn and Foggy Bottom stations, a total of approximately 3,600 trips on a typical weekday.

Together, approximately 15,000 short-distance, cross-Potomac trips occur in the project vicinity on a typical weekday.

Table 2 presents daily project vicinity cross-Potomac trip-making by direction and mode between origins and destinations in or near Georgetown and Rosslyn. To the extent possible, trips continuing beyond those neighborhoods were excluded.

Table 2 :: Existing Travel between Rosslyn and Georgetown

MODE	DATA SOURCE	DAILY TRAVEL NORTH	DAILY TRAVEL SOUTH	DAILY TRAVEL TOTAL
1 **Metrobus (38b)**	WMATA 38b weekday ridership boarding and alighting at stops between Courthouse and Rosslyn and in Georgetown	500	500	1,000
2 **DC Circulator**	Circulator monthly ridership and boarding/alighting data	546	546	1,092
3 **GUTS**	Georgetown University Transportation Shuttle annual boardings data	959	959	1,918
4 **Total Bicycles**	Key Bridge counter data *average weekday travel from June 2015 – June 2016*	723	734	1,457
Capital Bikeshare	3rd Quarter 2015 Capital Bikeshare station-to-station bike trips	36	30	66
5 **Pedestrians**	Key Bridge counter data *average weekday travel from June 2015 – June 2016*	1667	1,692	3,359
6 **Automobiles**	Streetlight zone-to-zone travel between Rosslyn and Georgetown	2,098	451	2,549
TOTAL BETWEEN ROSSLYN AND GEORGETOWN		**6,493**	**4,882**	**11,375**
7 **Local Metrorail**	WMATA rail origin-destination data by day of week; data reflects travel between Foggy Bottom and the Courthouse/Rosslyn stations	1,849	1,792	3,641
TOTAL BETWEEN ROSSLYN, GEORGETOWN AND LOCAL METRORAIL		**8,342**	**6,674**	**15,016**

COMPARABLE ROPEWAY SYSTEMS

The operational characteristics and ridership data on six currently operating ropeway systems, including two in the United States, two in Europe, one in Southeast Asia, and one in South America were collected and evaluated. Table 3 summarizes the characteristics of these ropeway systems. Daily ridership in these six systems ranges from 800 passengers per day on the Cologne Rheinseilbahn to approximately 30,000 on the Medellìn Metrocable's three lines, with most systems reporting daily ridership in the range of approximately 3,500 to 5,500 passengers.

With the exception of the Medellìn Metrocable, each of these systems has either a fare structure or service headway (the wait time between two departing vehicles) that, anecdotally, would suggest a dampening effect on ridership relative to the characteristics of the proposed Rosslyn-Georgetown gondola as analyzed.

Table 3 :: **Comparable Ropeway Systems**

The two comparable U.S. systems, the Portland Aerial Tram and Roosevelt Island Tramway, have fare structures that are generally in line with local transit trips with round trip fares of $4.55 and $5.00, respectively. However, their peak service headways are 5 and 8 minutes, respectively, both significantly longer than the Georgetown-Rosslyn Gondola's analyzed 1-minute headway. As suggested by the MWCOG model, increased transfer times can have a significantly dampening effect on ridership. Furthermore, neither the Portland nor the Roosevelt Island system connects a tourist destination, whereas Georgetown serves as a significant tourist destination in the Washington metropolitan area.

Although the international systems generally deliver short headways of between 12 and 65 seconds, other than the Medellìn Metrocable, they tended to target a tourist market with higher fares of up to $22.00 round trip. The Emirates Air Line caters especially to tourists in the evenings, slowing from 6 to 2 meters per second (from about 13 to about 4 miles per hour) to allow passengers more time with views of London. The Medellìn Metrocable, which has by far the highest daily ridership of comparable systems, features both short headways of between 12 and 65 seconds and low, transit-like fares of approximately 50 cents.

Table 3 :: Comparable Ropeway Systems

SYSTEM	DAILY RIDERSHIP	ROUNTRIP FARE (USD)	DISTANCE TRAVELED (METERS)	SPEED (M/S)	SPEED (MPH)	SERVICE HEADWAY	PEAK HOURLY CAPACITY	NOTES
Portland Aerial Tram (Portland, OR)	3,400	$4.55	1,000	10	22	5 mins	936	Free for OHSU patients, visitors, students, and employees
Roosevelt Island Tramway (New York, NY)	5,500	$5.00	940	7	16.2	8 min peak (15 min off-peak)	1,000	Same fare as MTA bus; Parallel subway link is available
Cologne Rheinseilbahn (Cologne, Germany)	800	$7.25	935	2.8	6	30 sec	1,000	Tourist Focus Car capacity: 4 passengers
Emirates Air Line (London, UK)	4,200	$14.00	$14.00	6*	13	30 sec	1,800	Tourist focus; Slows to 2 m/s after 7pm for views
Singapore Cable Car (Singapore)	3,400	$22.00	1,650	4	9	15 sec	1,400	Tourist Focus Car capacity: 6 passengers
Metrocable (Medellín, Colombia)	30,000 (total for 3 lines)	$0.50	2,800	5	11	12 sec	3,000	Public Transport Focus Free transfer from Metro
			2,100	5	11	12 sec	3,000	
			4,600	6.1	13.7	65 sec	550	
Georgetown-Rosslyn Gondola (DC/VA)	TBD	Modeled as $1.75 / $2.15 Metro Rail Fare	~ 1,100	Modeled as 4.5	Modeled as 10	Modeled as 1 min	TBD	---

DEMOGRAPHIC AND RIDERSHIP COMPARISON OF COMPARABLE U.S. GONDOLA STATION PAIRS

Worker and employment data available from the 2014 Longitudinal Employer-Household Dynamics (LEHD) database for the Roosevelt Island and Portland systems were the basis for analyzing an association between the number of workers and jobs surrounding stations at either end of the existing gondola systems and the level of existing ridership.

Table 4 presents the number of workers (at the home locations) and employment (at worksite locations) in the quarter mile radius surrounding the four stations of the existing Roosevelt Island and Portland systems.

The average of the values for the two systems is then compared with the values for the proposed Rosslyn and Georgetown stations. On average, the Rosslyn and Georgetown station areas have more employment than the comparable station areas in the Roosevelt Island and Portland systems, but fewer resident workers.

An average rate of daily ridership per combined worker and unit of employment was computed with this rate applied to the combined worker and employment values for the proposed Rosslyn-Georgetown system, yielding estimates of between 4,600 and 7,700 daily trips.

Gondolas and Travel Time

Travel time has consistently been found to be the strongest predictor of mode choice, stronger than monetary costs associated with modes, urban form, and personal socio-demographics.* The second seat wait time – the time that people perceive they will have to wait to transfer to a second train, or bus, often determines whether they are willing to even start a transit trip. While most transit riders are willing to wait 5-10 minutes for a transit vehicle, if they have to wait another 5-10 minutes for a second seat at a transfer point, many decide to drive instead. Gondola transit, with cabins arriving reliably every 20-60 seconds and visibly moving towards the station, eliminates the perception of a wait time for the second seat and induces transit trips – replacing some car trips.

*Yingling Fan, Ph.D, University of Minnesota (Cervero, 2002; Frank, Bradley, Kavage, Chapman, & Lawton, 2008)

Table 4 :: Comparable U.S. Gondola System Station Pairs

		2014 VALUES (LEHD ONTHEMAP DATA)*						
		STATION 1 - QUARTER MILE			STATION 2 - QUARTER MILE			
STATION PAIR	"EXISTING DAILY ROUND-TRIP RIDERSHIP"	WORKERS	EMPLOYMENT	WORKERS + EMPLOYMENT	WORKERS	EMPLOYMENT	WORKERS + EMPLOYMENT	RIDERSHIP PER COMBINED WORKERS + EMPLOYMENT
Roosevelt Island - Manhattan (NYC)	5,500	705	142	847	9,299	10,713	20,012	0.26
Portland - OHSU (Portland)	3,400	977	986	1,963	320	19,482	19,802	0.16
Average of NYC and Portland	4,450	841	564	1,405	4,810	15,098	19,907	0.21
Rosslyn-Georgetown	TBD	341	11,944	12,285	582	16,463	17,045	TBD; estimates below

* Longitudinal Employer-Household Dynamics data. The LEHD program combines federal, state, and Census Bureau data on employers and employees at the Census Block level.

"IMPLIED ROSSLYN-GEORGETOWN DAILY ROUND-TRIP RIDERSHIP BASED ON..."	
Roosevelt Island - Manhattan (NYC)	7,734
Portland - OHSU (Portland)	4,582
Average of NYC and Portland	6,158

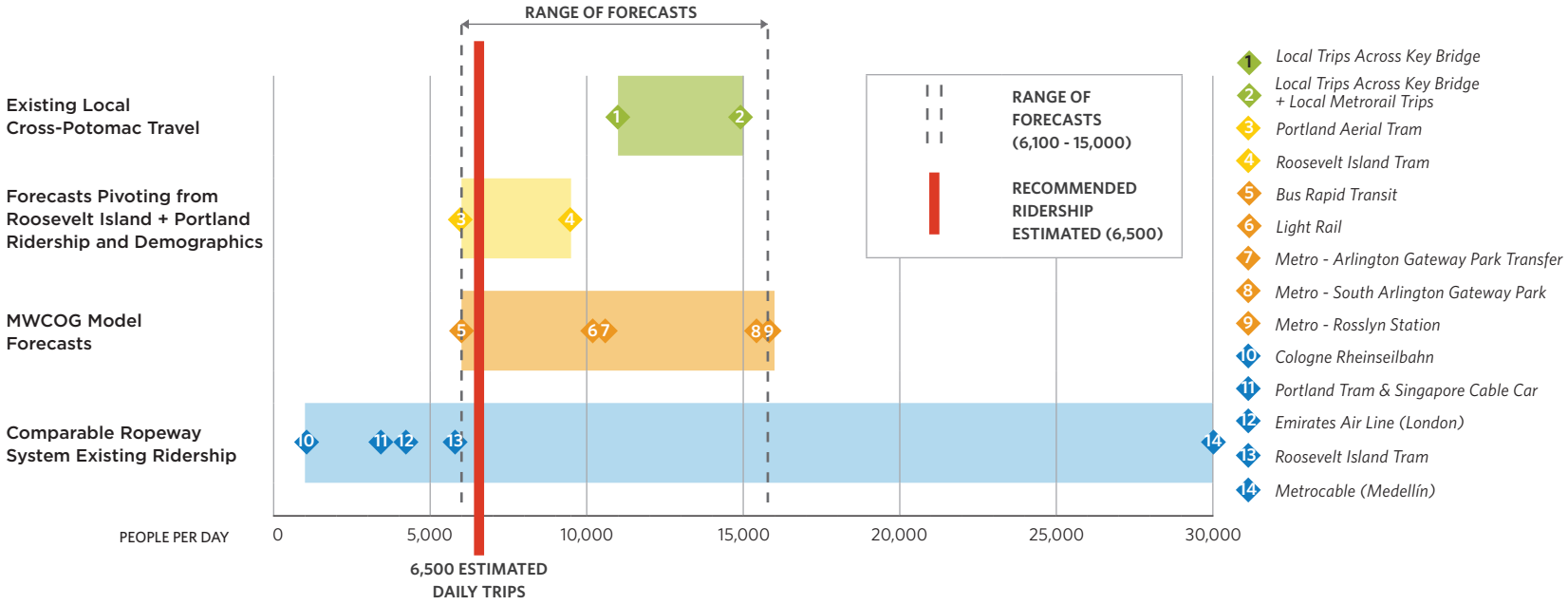
RIDERSHIP FORECAST SUMMARY

Figure 3 graphically summarizes the range of existing cross-Potomac travel in the Rosslyn Georgetown area, the land use-based forecasts from the Roosevelt Island and Portland systems, the MWCOG model forecasts, and the existing ridership of comparable ropeway systems. Depending on the methodology used and the specific characteristics of the gondola system analyzed, the ridership estimates range from 4,600 to 15,600 daily trips.

These forecasts depend on a number of factors which have not been determined at this stage of the project including, among others, the location of the gondola stations on the Rosslyn and Georgetown ends of the trip, the speed and headways of the gondola cabins, the fare structure, and factors affecting the passenger experience.

These forecasts have been used to define/scale two aspects of the project's feasibility: (1) the lower-end of the forecast should be used to assess operating costs and revenue so as to have a conservative assessment of the proposed systems feasibility from a cost perspective; and (2) the higher end of this range should be used to define the potential upper limits of ridership such that the system will have the capacity to meet the upper limits of potential demand. Unlike some other modes of transit, for which increasing passenger capacity increases operating costs from additional operators, a gondola can increase capacity to accommodate higher demand levels with little marginal cost: each additional cabin increases capital and some maintenance costs, but does not increase operating costs.

Figure 3 :: Summary of Existing, Travel, Gondola Forecasts, and Comparable Ropeway System Ridership



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04 ECONOMIC DEVELOPMENT

Summary

A high level economic assessment suggests that if implemented properly, a Gondola be a factor in success transit oriented development for both station areas.

In interviews with stakeholders, including the hotel industry and development community, there was found to be general interest in the gondola as long as it is done well to support current planning and development efforts.

The following pages describe a preliminary assessment on the potential economic impacts and benefits of a gondola.

RIGHT Currently planned and future development sites in Georgetown and Rosslyn.

ECONOMIC IMPACTS

Through the years, a series of rigorous academic analyses have demonstrated a clear rent/price premium for proximity to a rapid transit station. For office rents, the demonstrated premiums range from 9 to 44 percent. Residential prices were up to 45 percent higher. The size of the premium depended on the transit type (e.g., heavy versus light rail), distance from the station and extent of the transit network. Rosslyn itself already enjoys office rent premiums over other Northern Virginia office markets without Metro service. Clearly, Rosslyn's excellent connectivity via three Metro lines has generated significant increments in the scale of development and achievable rents/prices.

By linking Rosslyn to Georgetown's high transit demands, the gondola can be expected to positively impact economic activity, property values and tax revenues, though on a smaller scale than has Metro. Georgetown residents and employees will gain faster and more reliable access to Rosslyn and the Metro system, enhancing values for commercial and residential properties up to one-half mile of the station.

For Rosslyn, the gondola will provide faster connections to Georgetown's retail, restaurant, recreation and waterfront amenities, enhancing its appeal to potential residents and hotel guests. Georgetown attracts an estimated 1.5 to 2.0 million annual visitors. In combination with the new Central Place observation deck, the Iwo Jima Memorial and Arlington Cemetery, the gondola offers yet another reason for DC visitors to visit Rosslyn as well. Rosslyn hotels already attract large numbers of DC visitors by virtue of its convenient location, Metro service and lower room rates. Quick, appealing and reliable access to one of the region's most significant tourist destinations would enhance further Rosslyn hotels' ability to compete for Georgetown visitors, resulting in higher occupancies and/or room rates.

The increased flow of pedestrians through downtown Rosslyn will provide the greatest potential impact by enhancing activity and vitality. The 6,500 daily passengers will almost all arrive at the gondola station by foot, giving many the opportunity to take advantage of Rosslyn's new and existing restaurants and bars, generating sales to support these important urban amenities.

Activity begets activity, enlivening the area and attracting others to participate in Rosslyn events and frequent Rosslyn businesses. As greater activity increases the potential sales, more restaurants will be attracted to Rosslyn, giving it a vitality well beyond the traditional 8-5 workday. The expanded amenity base then makes Rosslyn more appealing to residents, workers and tourists, creating a "virtuous circle" of urbanity.

POTENTIAL GONDOLA INFLUENCES

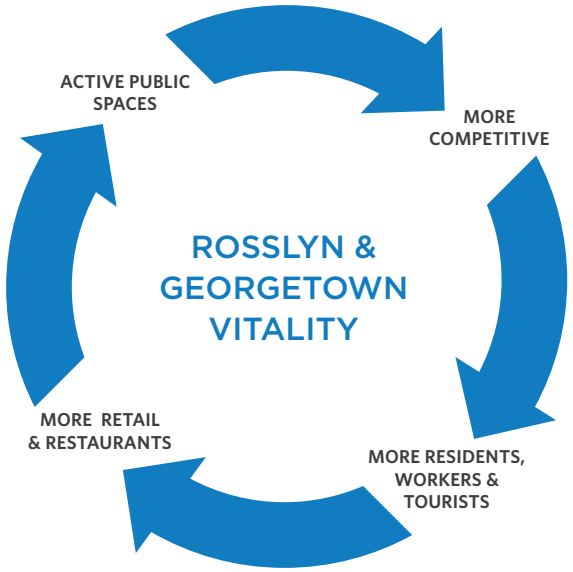
IMPROVED CONNECTIONS
Easier Commutes
Regional Access via Metro
Access to Shopping & Restaurants
Access to University, Hospital

ENHANCED VISITATION
Tourist Access to Georgetown
New Attraction with Observation Deck
Hotel Marketing Advantage

PUBLIC SPACE ACTIVATION
Gondola Riders and Tourist Activity
Support for Restaurants & Retail
Evening & Weekend Pedestrians

BETTER ABILITY TO COMPETE FOR
Restaurant Patrons
Shoppers
Hotel Guests
Residents
Office Tenants
Retail Tenants

SUPPORTING THE "VIRTUOUS CIRCLE" OF URBANITY



POTENTIAL ECONOMIC BENEFITS

The economic vitality generated by attracting more visitors, residents and workers to both Rosslyn and Georgetown may potentially translate into higher tax revenues for both jurisdictions.

The following tables illustrate the potential incremental increases in terms of economic activity and subsequent tax revenues:

POTENTIAL ROSSLYN ECONOMIC BENEFITS

The higher demand is likely to translate into more:

- Office tenants
- Residents
- Shoppers and restaurant patrons
- Hotel guests

POTENTIAL ROSSLYN ECONOMIC BENEFITS

IMPACT / CURRENT CONDITION	RESULTS OF 1% INCREASE
HOTEL OCCUPANCY RATES 76.9% in Arlington County 597,000 room-nights in Rosslyn	6,000 annual room-nights [1] $949,000 in annual revenue [2] $69,000 in Annual Hotel Tax Revenue [3]
HOTEL ROOM RATES $158.85 in Arlington County	$949,000 in annual revenue [1, 2] $69,000 in annual hotel tax revenue [3]
ROSSLYN RESTAURANT SALES $72.7 million in Rosslyn annual restaurant sales	$727,000 in Annual Revenue [4] $23,000 in annual hotel tax revenue [5]
RENTER HOUSEHOLDS 2,791 rental units within 0.5 mile 96.2% occupancy	27 households [5] $686,000 in annual rent revenue [7] $104,000 in annual property tax revenue [8, 9]
RESIDENTIAL RENTS Average monthly rent of $2,212 within 0.5 mile	$712,000 in annual revenue [10] $62,000 in annual property tax revenue [11]
GEORGETOWN EMPLOYEES LIVING IN ROSSLYN 18,000 workers within 0.5 mile of Georgetown gondola station	150 households [12] $4.0 million in annual revenue [7] $328,000 in annual hotel tax revenue [11]

[1] 2,128 rooms within 1/2 mile of gondola station and 2015 Arlington occupancy of 76.9% per STR Global

[2] 2015 Arlington Average Daily Rate of $158.85 per STR Global (conservative for Rosslyn)

[3] 7.25% Arlington hotel tax rate

[4] $72.7 million in annual restaurant sales in ZIP code 22209 per Arlington meal tax receipts

[5] 4.0% Arlington meal tax rate

[6] 2,685 current renter households within 1/2 mile of gondola station per CoStar

[7] $2,212 average rent in Rosslyn per CoStar

[8] $0.996 per $100 assessed value property tax rate

[9] $399,000 average per-unit assessed value for recent apartment buildings in Rosslyn per Department of Real Estate Assessments

[10] $2,212 average rent for 2,685 occupied units within 1/2 mile of gondola station per CoStar

[11] $2,230 average per unit real estate taxes for Rosslyn apartment buildings per CoStar

[12] 18,000 Georgetown employees work within 1/2 mile of gondola station per the Department of Employment Services with an estimated 1.2 Georgetown workers per household

SOURCE : Partners for Economic Solutions, 2016.

POTENTIAL DC ECONOMIC BENEFITS

The higher demand is likely to translate into

- Increased property value
- More shoppers and restaurant patrons
- Additional hotel guests

POTENTIAL DC ECONOMIC BENEFITS

IMPACT / CURRENT CONDITION	RESULTS OF 1% INCREASE
PROPERTY VALUES $3.5 billion in assessed value	$35 million in additional market value [1] $419,000 in annual revenue [2]
GEORGETOWN RESTAURANT SALES $109 million in annual sales in nearby Georgetown restaurants	$1.1 million in annual revenue [3] $109,000 in annual sales tax revenue [4]
GEORGETOWN RETAIL SALES $215 million in annual retail sales in nearby Georgetown establishments	$2.1 million in Annual Revenue [5] $124,000 in annual sales tax revenue [6]
GEORGETOWN HOTEL OCCUPANCY 72% occupancy in Georgetown 99,000 annual room-nights	990 annual room-nights [7] $375,000 in annual revenue [8] $54,000 in annual sales tax revenue [9]
GEORGETOWN HOTEL ROOM-RATES $379 in Georgetown	$375,000 in annual revenue [7, 8] $54,000 in annual sales tax revenue [9]

[1] $3.5 billion in total value of taxable property within 1/2 mile of gondola station per DC Office of Tax and Revenue files

[2] DC real property tax rates of $0.85 per $100 of residential assessed value, $1.65 per $100 of commercial assessed value and $5.00 per $100 of vacant land assessed value

[3] $109 million in Georgetown annual restaurant sales within 1/2 mile of gondola station per Esri

[4] 10-percent sales tax on restaurant sales

[5] $215 million in Georgetown annual retail sales within 1/2 mile of gondola station per Esri

[6] 5.75-percent sales tax on retail sales

[7] 377 rooms within 1/2 mile of gondola station and 2015 Georgetown occupancy of 72% per STR Global

[8] 2015 Georgetown Average Daily Rate of $379 per STR Global

[9] 14.5% transient accommodations sales tax rate

SOURCE : Partners for Economic Solutions, 2016.

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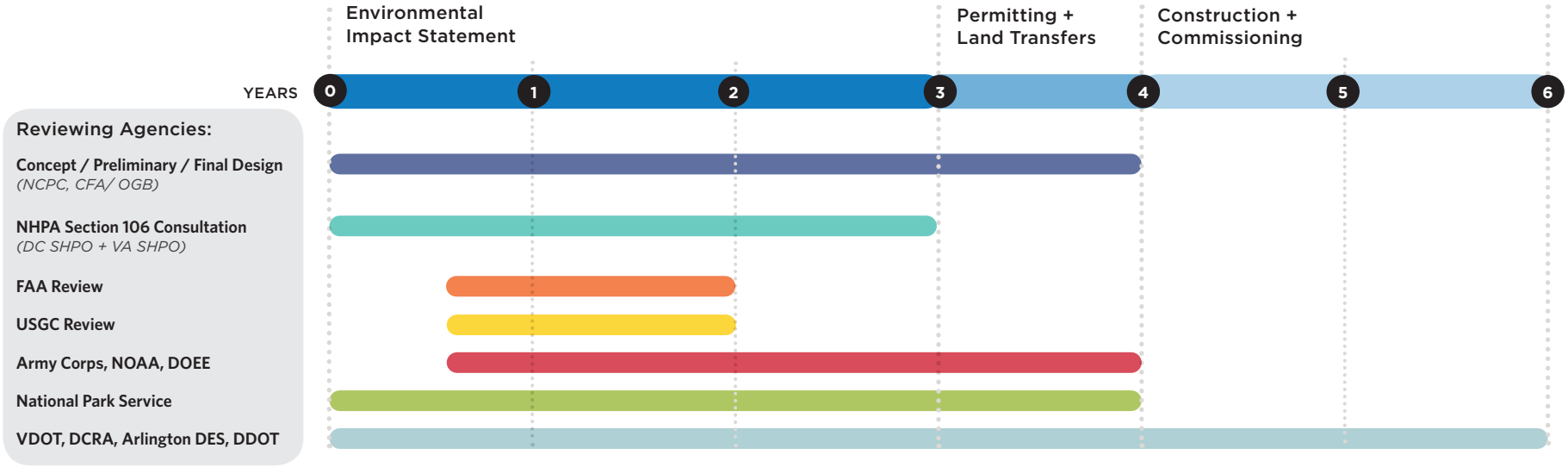
05

DESIGN APPROVALS AND PERMITTING

Summary

The team considered a range of alignments for the Georgetown-Rosslyn Gondola study, all of which would be partially constructed on or pass over federal lands, thereby requiring permits from federal agencies. Because some of these permits would constitute federal actions under the National Environmental Policy Act (NEPA), federal law requires that an environmental document be prepared. An environmental document under NEPA can be either an Environmental Assessment (EA) or an Environmental Impact Statement (EIS). In this case, it is likely that an EIS will be appropriate, but this decision and the decision on which federal agency will take the lead will be made at a later date. For the purposes of this feasibility study, it is assumed that the document will be an EIS.

The benefits of preparing an EIS include that its scope, process, and timeline allow it to be the organizing document for the many federal, state, and local design approvals and permits required for the Gondola to be realized. Permitting processes for the Gondola will be complex; involving the federal government, two localities, and two states (DC has state responsibilities as well). The scope and timeline required by the EIS will encompass all required permitting activities, and provide a vehicle for public input along the way. Preparing an EIS will take approximately three years, followed by the issuing of permits, construction, and commissioning– for an estimated project timeline of approximately four to six years.



CONSULTATION DURING STUDY

In preparing this feasibility study, the team consulted with 20 federal, state, and local agencies with jurisdiction over the Gondola project, and found no fatal flaws in the review path. Although complex, the review path for this project is navigable. The EIS will keep project planning and design review organized and accessible to the public, and analyze all of the potential project impacts on resources and stakeholder interests. EIS preparation will be coordinated with review under the National Historic Preservation Act (NHPA) Section 106 as well as with a number of other review and permitting activities. Federal agencies with jurisdiction over major infrastructure projects in the National Capital Region have extensive experience working in concert and in coordinating with state and local agencies to review large projects including transportation infrastructure.

Not all of the 20 agencies with which the team consulted will perform an independent project review; some will combine their review with others or fall within another's review process. For that reason, this report includes a discussion only of the agencies that will have a review or permitting lead. For example, the United States Secret Service directed the study team to the Federal Aviation Administration for a discussion of helicopter traffic in the study area, and the Federal Highway Administration directed the team to the Virginia Department of Transportation.

AGENCIES CONSULTED

Federal

- National Capital Planning Commission
- Commission of Fine Arts / Old Georgetown Board
- National Park Service (Regional Office and Helicopter operations)
- United States Secret Service
- Federal Aviation Administration
- United States Coast Guard
- United States Army Corps of Engineers
- Federal Highway Administration
- National Oceanic and Atmospheric Administration

State

- District of Columbia State Historic Preservation Office
- Virginia State Historic Preservation Office
- Virginia Department of Transportation

Local

- Arlington County Historic Preservation Office
- District of Columbia Department of Consumer and Regulatory Affairs
- District of Columbia Department of Transportation
- Arlington Department of Environmental Services, Transportation Division
- Arlington Department of Community Planning, Housing, and Development
- Arlington Planning Commission
- Arlington Economic Development Commission
- Arlington Transportation Commission

TOPIC AREA & AGENCY INVOLVED

Viewsheds and Project Design

- Old Georgetown Board / Commission of Fine Arts
- National Capital Planning Commission
- National Park Service
- District of Columbia State Historic Preservation Office
- Virginia State Historic Preservation Office
- Arlington Department of Community Planning, Housing, Development

Parklands

- National Park Service

River Construction and River Navigation

- U.S. Coast Guard
- Army Corps of Engineers
- National Park Service
- National Oceanic and Atmospheric Administration
- District Department of Energy and Environment

Air Rights/Rights-of-Way

- Arlington County Department of Environmental Services
- District Department of Transportation
- Virginia Department of Transportation
- National Park Service

Air Traffic (Fixed and Rotary Wing)

- FAA Seattle Office
- DCA Control Tower

Historic Resources and Preservation

- DC Historic Preservation Office
- Virginia Historic Preservation Office
- Arlington County Preservation Planner

District of Columbia Building Heights

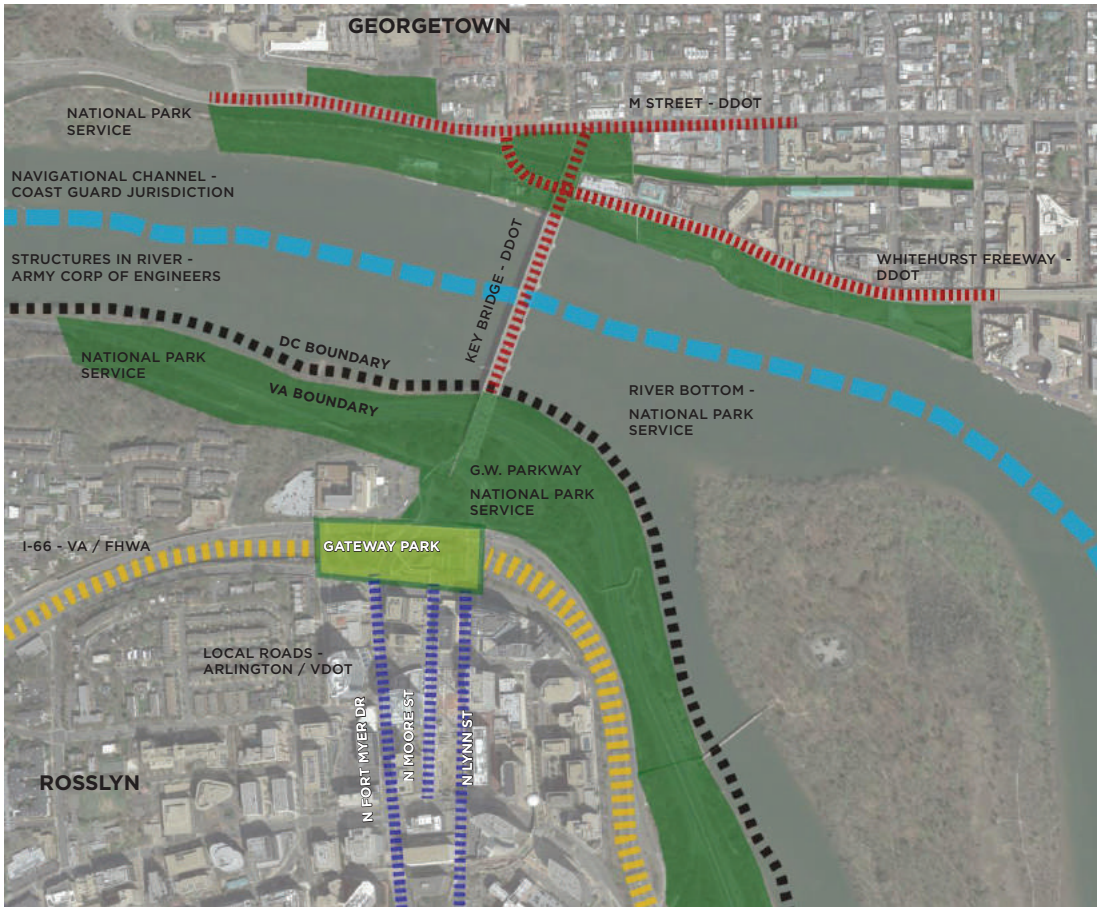
- DC Office of Planning
- DC Office of Zoning
- National Capital Planning Commission

Construction Permitting

- District Department of Consumer and Regulatory Affairs
- National Park Service
- Arlington County Department of Environmental Services
- Virginia Department of Transportation
- Army Corps of Engineers
- Arlington Transportation Commission

PERMITTING AGENCIES SUMMARY

The National Capital Region is a complex metropolitan area with multiple political jurisdictions. As the seat of the federal government, Washington, DC, is rich with historic and cultural resources of national value, and hosts the Executive, Legislative, and Judicial branches of the government. For these reasons, the federal government has a host of review and approval roles that overlap the normal local and state functions found in other jurisdictions. The project site area encompasses land under the control of two local jurisdictions (Arlington and the District of Columbia), two states (Virginia and the District of Columbia – which has state functions as well as local), and the federal government, as well as private properties. The site is within a complex urban and natural environment adjacent to and within historic areas and in proximity to historic resources, many of which are listed on the National Register of Historic Places. The Potomac River, over which the project crosses and in which project elements may be constructed, is itself controlled by multiple federal agencies. The Potomac riverbanks in the project area are under National Park Service (NPS) jurisdiction, and the overall project area is within the jurisdiction of multiple NPS park units. Because of these complexities, more than 20 local, state, and federal agencies have some level of jurisdiction over the project, but in coordinating with these agencies and laying out the potential review and approval pathways, the project team has not encountered any fatal flaws in the permitting required for the gondola project. That said, the selected design would determine the amount of time required for design approval and construction; the best-case scenario is 4-6 years. For the feasibility study, we assumed that an Environmental Impact Statement (EIS) will be required and that all local, state, and federal approvals will be conducted with the EIS framework.



ABOVE Generalized diagram indicating federal, state, and local Agency jurisdictions.

National Park Service

The National Park Service has jurisdiction over parkland on both sides of the Potomac River in the vicinity of Key Bridge. NPS parks in the area include the C&O Canal and Rock Creek Park (including Georgetown Waterfront Park) in the District of Columbia and the George Washington Memorial Parkway in Virginia. Proposed alignments for the gondola will cross portions of at least some of these parks, and in some scenarios towers for the gondola system would be constructed in or adjacent to them. NPS also controls the Potomac River bottom, where gondola towers may be anchored.

The NPS consideration of construction in a park or use of air rights over a park differs from one side of the river to the other because its authorities in the District of Columbia and the Commonwealth of Virginia differ. Further, the construction of transportation infrastructure in a park would invoke Section 4(f) of the U.S. Department of Transportation Act of 1966, which established the requirement for consideration of park and recreational lands, wildlife and waterfowl refuges, and historic sites in transportation project development. Section 4(f) applies to publicly owned parks, recreational areas, and wildlife and waterfowl refuges. Any project that affects Section 4(f) land must include a Section (4f) assessment. This additional assessment of park impacts considers whether there are prudent alternatives to placing infrastructure in a park and involves additional study over and above other EIS considerations.

In the District of Columbia, NPS could conduct a transfer of jurisdiction over land between the federal and District governments, and in Virginia, NPS could consider an "exchange of interests," which is an exchange of real property, something of equal value in the same state. This process could be conducted concurrent with the EIS. NPS permits required for construction could include riverbed permits, construction permits, and permission for use of air rights, as well as approval for parkland to be used for gondola towers. NPS, through the Secretary of the Interior, holds a seat on the National Capital Planning Commission, which must also approve the project.

If NPS favors approving the gondola project and there are no unmitigated adverse affects to historic resources, project sponsors would need to demonstrate that there is a net benefit to the park through a programmatic 4F evaluation. If such adverse affects were not mitigated, a full 4F evaluation would be required, resulting in the need to demonstrate that there is no prudent alternative to the proposal to use parkland for transportation purposes. These are two different paths with different timelines.

National Historic Preservation Act Section 106 Review

The gondola project would require review under Section 106 of the National Historic Preservation Act (NHPA) to determine whether it creates adverse affects to historic resources in the project area. An "APE" or area of potential affect would be developed in consultation with the DC and Virginia State Historic Preservation Offices, the Arlington County preservation planner, and consulting parties. The APE would identify historic districts and resources in the project area that must be considered when determining adverse affects. Adverse affects are required to be avoided, minimized, or mitigated as project planning and design proceeds. The Section 106 consultation process is most effectively conducted in concert with the preparation of an environmental document that complies with NEPA, the National Environmental Policy Act, which in the case of this project is most likely to be an Environmental Impact Statement or EIS. Section 106 involves a series of meetings during which consulting parties evaluate project proposals for adverse affect to historic resources. Historic resources in the project area include the Georgetown Historic District, the Alexandria Aqueduct, Key Bridge, the C and O Canal, the George Washington Memorial Parkway, Rock Creek Parkway, Roosevelt Island, the Kennedy Center, and the Watergate Complex in addition to other individual historic properties.

National Capital Planning Commission

The National Capital Planning Commission (NCPC) is the federal government's planning agency in the National Capital Region. NCPC has jurisdiction over projects on federal land in the region, with approval authority over projects in the District of Columbia. NCPC also reviews District of Columbia public projects in the city, holds a seat on the District of Columbia Board of Zoning Adjustment, and reviews some zoning actions for private projects on private land. As the gondola project will be constructed on and/or cross over federal land in the District of Columbia, NCPC would approve the gondola project, should it be built. NCPC's review of the project would include impacts to views and viewsheds, physical changes to federal land, transfers of federal land, project design, and other aspects of the project. Because NCPC would approve the project, the agency's actions are required to comply with the National Environmental Policy Act (NEPA) and Section 106 of the National Historic Preservation Act (NEPA). NCPC would satisfy these requirements by participating in the Environmental Impact Statement (EIS) or Environmental Assessment (EA) prepared by the lead federal agency for the gondola project. NCPC would likely be involved in the project in multiple review stages that include:

- Early planning and design consultation (multi-agency)
- Concept Review and Comments
- Preliminary Approval
- Final Approval (EIS complete)

Each of these review stages would be conducted in concert with other review agencies, such as the Commission of Fine Arts (CFA). Additionally, NCPC's review would be conducted in concert with EIS/EA preparation and NHPA Section 106 consultation. The above review stages may require multiple iterations, depending upon Commission concurrence with project planning and design and upon public input at Commission meetings and through the NEPA and NHPA processes.

Commission of Fine Arts / Old Georgetown Board

The Commission of Fine Arts (CFA) reviews and offers advice on projects affecting federal land in the District of Columbia. Because the project is located in the Georgetown Historic District, CFA's review of the Gondola would be handled through the Old Georgetown Board (OGB) process. OGB review would proceed in three phases:

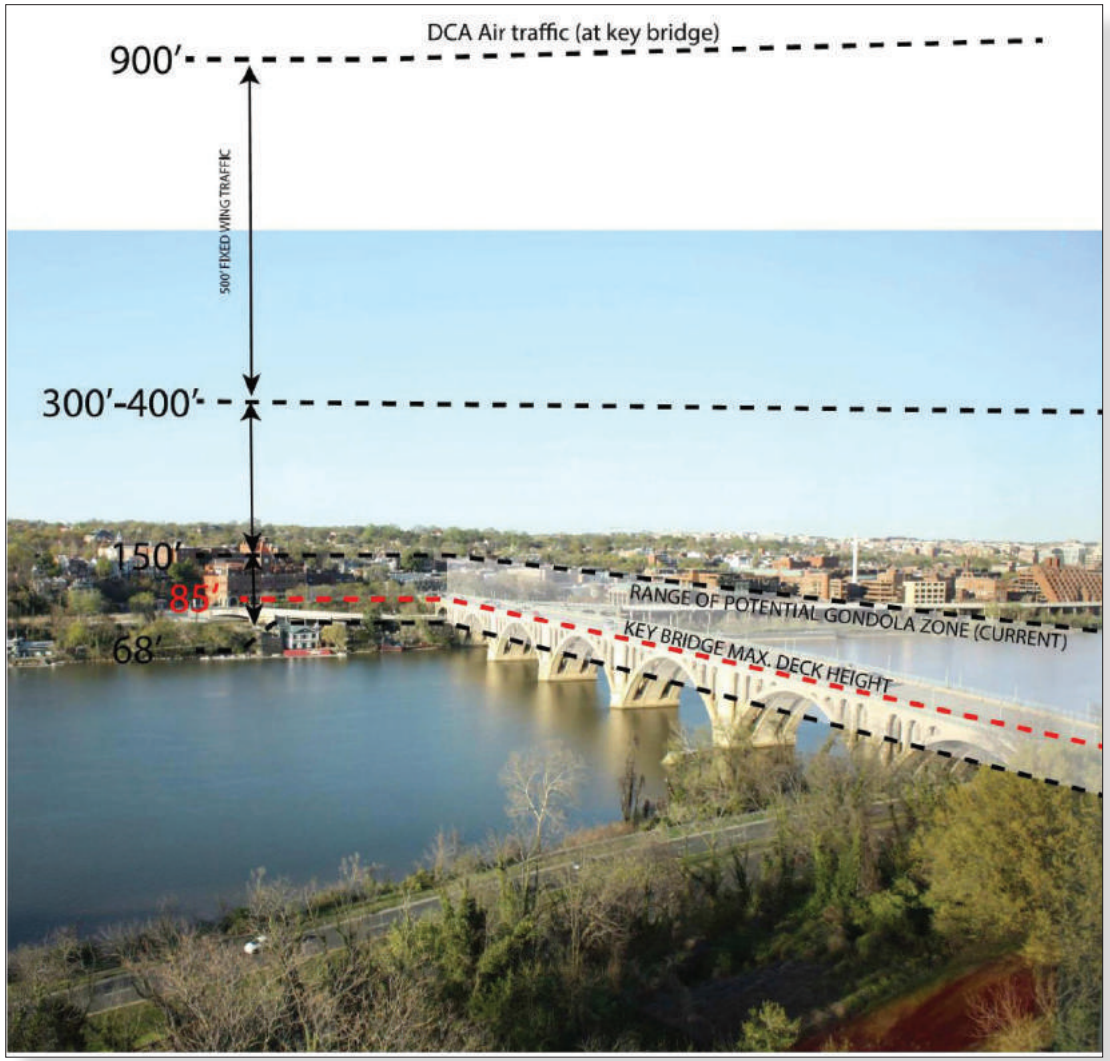
- Comments on Information Presentation
- Concept Review
- Final Review

An information presentation at CFA is optional, but for each of the last two phases – concept and final - OGB would refer its recommendations to CFA for formal action. In general, projects are submitted to OGB through DCRA, but federal and District agencies submit directly to CFA, which then refers applications down to OGB. In either case, the review process itself is the same.

Federal Aviation Administration
Seattle Obstruction Evaluation Group

The Federal Aviation Administration (FAA) controls the air space in the Washington, DC region for both fixed wing (aircraft) and rotary wing (helicopter) traffic. The FAA office in Seattle, Washington reviews potential airspace obstructions and the tower at National Airport controls the air traffic over the Potomac River. The gondola project area near Key Bridge sits directly below the flight path for both fixed wing and rotary wing air traffic in and out of National Airport and other landing areas nearby. Fixed wing traffic has a floor of 900 feet in this location, meaning that it must remain above 900 feet as it passes over Key Bridge. Rotary wing traffic is required to maintain a 500-foot separation from fixed wing traffic above. Rotary wing traffic does not have a floor, meaning that it is required to avoid all obstructions, which are marked on FAA maps. The elevation of Key Bridge at its highest point sits at 85 feet.

The project should be filed with the FAA after preliminary decisions have been made about tower heights, locations, and ropeway space between towers. The FAA will conduct an initial evaluation in approximately 45 days, after which any issues raised can be negotiated among the parties until a "determination of no hazard" is reached. The proposed towers for the gondola system would not penetrate the approach and departure zones for National Airport and do not exceed the height of obstructions required to employ special lighting and markers (200 feet). The presence of significant helicopter traffic in the area, however, may introduce a requirement for special lighting and markers. This will be determined during FAA review. Multiple FAA divisions, including the control tower at National Airport will be involved in project review.



ABOVE Diagram of air space zones for helicopter and airplane traffic as defined by the FAA in relation to Key Bridge.

Virginia Department of Transportation Right of Way Office

The Virginia Department of Transportation (VDOT) controls state roadways in the Commonwealth of Virginia. Arlington County is unique among other localities in the state in that it local responsibility for some roadways in the Rosslyn area. VDOT owns the roadways and interstate highways and manages permit approvals for them. The Virginia Department of Transportation is responsible for construction, maintenance, and permitting in and around roadways in the Commonwealth of Virginia. In some case, Arlington County has local control over these roadways.

Army Corps of Engineers :: Maryland Southern Section

The U.S. Army Corps of Engineers (USACE) Navigation Branch reviews the installation of structures in Section 10 navigable waters for obstructions to navigable channels and for potential impacts to aquatic vegetation, wetlands, and marine environments. The USACE would coordinate its review with the USCG, NOAA, and DOEE. The gondola project would most likely require a Department of the Army Permit, known as a Letter of Permission or LOP. Application for this standard permit is achieved by submitting the joint Maryland and DC application form and by including USACE as part of the multi-agency project planning process early on. In the District of Columbia, the permit application must also be shared with the District Department of Energy and the Environment (DOEE), Water Quality Division, and DOEE should be included in the planning process.

The Army Corps will review any proposed structures in the river, using profiles, plans, and details beginning at the concept design stage. The Army Corps will stay involved throughout the EIS process.

U.S. Coast Guard :: Maryland NCR, Waterways Management Division

The United States Coast Guard (USCG) regulates safe operation of watercraft in U.S. waterways. The Coast Guard will work closely with the Army Corps of Engineers in reviewing proposed gondola structures in the river, and will provide comments to the Corps on necessary marking devices for any structures.

National Oceanic and Atmospheric Administration

The National Oceanic and Atmospheric Administration (NOAA) provides nautical charts that map navigational channels in navigable U.S. waters. The study team worked with the USCG, NOAA, and the USACE to determine that marked navigation channels do not impact the study area and to determine the various riverbed depths in the study area.

District Department of Energy and Environment

The District Department of Energy and Environment (DOEE) is responsible for permitting activities that impact the quality of water bodies in the District of Columbia. DOEE permits will be required and will be coordinated with USACE review activities.

District of Columbia Department of Consumer and Regulatory Affairs (DCRA)

DCRA is the District's construction permitting agency, responsible for issuing building permits and for regulating construction activities. For District of Columbia oversight on the gondola project, DCRA would most likely take the lead on multi-agency review of planning, design, and commissioning by assembling a working group and an integrative design process similar to the District's Preliminary Design Review Meeting (PDRM) process. Such a group, involved from the start of the project, would include representatives from the District Department of Transportation, DC Office of Planning, DCRA, and FEMS, the District's Fire and Emergency Medical Services department. As the gondola is a unique project for the District, DCRA would develop a tailored process that also includes special inspections during construction and commissioning. DCRA would coordinate with Homeland Security and Emergency Management Agency (HSEMA) and Metropolitan Police Department (MPD) as needed.

Construction Permits in Virginia

Permits from both VDOT and Arlington Department of Environmental Services (DES) are required for construction over and within street rights-of-way on the Virginia side of the project.

Competitive and Collegiate Boating

Area high schools and colleges utilize the stretch of Potomac River in the vicinity of Key Bridge for competitive crew racing. Two established courses, a 1500-meter-high school course and a 2000-meter college course, use a straight 3-4 lane alignment through the 4th arch from DC shoreline (the first full arch from the Virginia shoreline). Courses begin at an upstream starting platform near the Three Sisters Islands and end at Washington Harbor near Georgetown Waterfront Park. The gondola project would avoid these areas."

CONCLUSION

Discussions with 20 independent federal, state and local agencies with jurisdiction over the planning, design, and construction of an aerial gondola between Georgetown and Rosslyn have not turned up any planning issues that represent fatal flaws for the project during the feasibility study. The review and approval process will be complex, but can be organized and coordinated through the EIS process. Ultimately, concurrence among the review agencies on planning and design will determine how and at what pace the project moves forward.

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06 DESIGN QUALITY AND VIEWSHEDS

Summary

Located near a significant and historic structure such as the Key Bridge, the design of a gondola system and its effect on view sheds from nearby areas will need to be considered carefully. Views of the gondola from key places in DC and Virginia are important to understanding how it would integrate into the existing built environment. Design agencies from DC and Virginia were engaged throughout the feasibility study to determine critical views, with each view point having been evaluated to determine the impact of the addition of a gondola system.

ABOVE View from a gondola cabin traveling to Georgetown looking back at Rosslyn.

SYSTEM, URBAN AND ARCHITECTURAL DESIGN

Quality design of each aspect of the gondola system will be key to a successful implementation.

Towers near Key Bridge, stations in Rosslyn and Georgetown, and other public ream improvements to implement the system will all need to be designed to positively contribute to the existing environment.

The towers will need to be high-quality and appropriate for the context. As noted informally by members of the design review agencies, the towers should not be too utilitarian, though also not too flamboyant so as to detract from the Washington environment.

In Georgetown, station development and other improvements will need to complement the existing historic infrastructure.

In Rosslyn, a gondola station has the potential to respond to the urban design goals outlined in the Rosslyn Sector Plan and as noted by several stakeholders, be an "iconic" feature near Central Place.

ABOVE View looking Northwest showing a gondola station above N. Lynn Street in Rosslyn. The station could be designed as an iconic, transparent, sustainable and artistically lit structure to complement the on-going revitalization efforts in Rosslyn. .

BASE IMAGE CREDIT
JBG / Central Place and Cliff Garten Studio

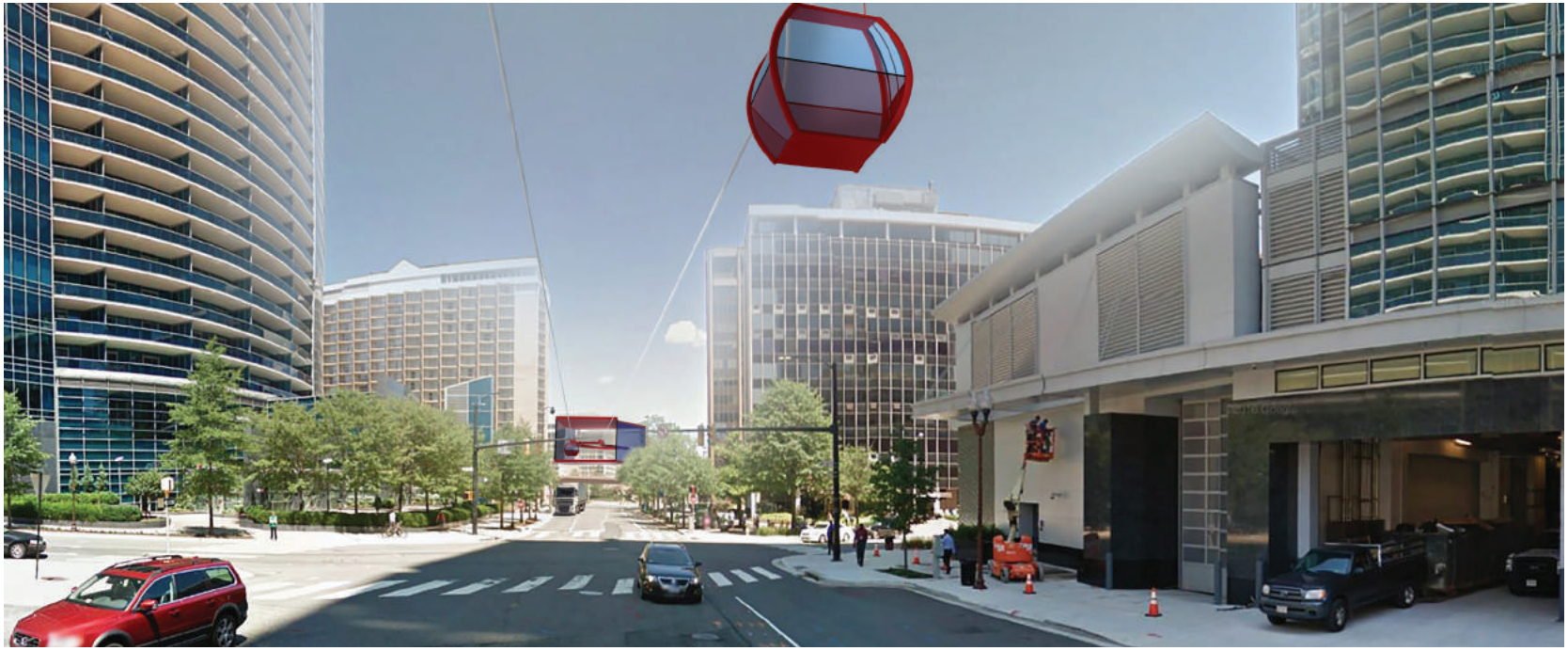
PUBLIC REALM CONSIDERATIONS

In both Rosslyn and Georgetown, the gondola will need to not impact the public realm, and enhance it, where possible.

In Rosslyn, where a station will be in public space, consideration will need to be given to locations where gondolas may travel in the public right-of-way by residences.

RIGHT View from an upper floor unit in Turnberry Tower in Rosslyn showing a gondola alignment and turn station on Ft Myer Drive.

BELOW View on Ft. Myer Drive looking North with an turn station visible in the distance.



Viewshed Analysis

As part of consultation with review agencies, the public and several stakeholders, the impact to views was identified as one of the most critical issue.

Consequently, as part of the feasibility study, a visual analysis from surrounding locations was performed, shown on the map to the right.

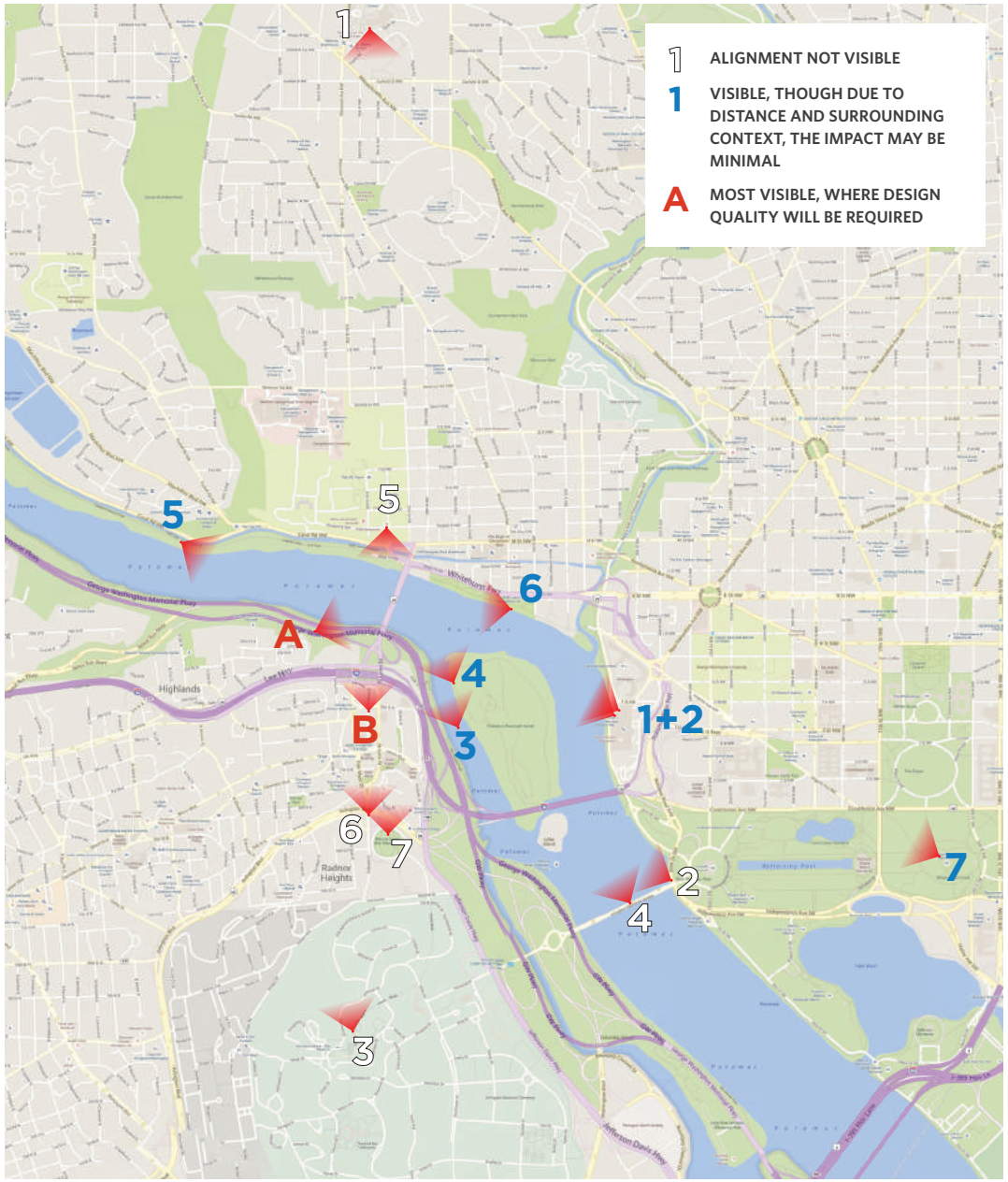
FINDINGS:

Views labeled with a white number and black outline indicate locations where the gondola would not be visible.

Viewpoints labeled with blue numbers reference locations where the gondola would be visible but may not be a significant impact due to the distance and surrounding context.

Viewpoints indicated in red letters indicate locations where the gondola would be most visible. The design of the gondola system, including its location and tower design will be most important to consider the impacts from these locations.

The following pages document the views from locations where the gondola would be most visible as well as partially visible. Alignments on both the east and west sides of Key Bridge have been represented in these images. In order to clarify the impact of the alignments where necessary, two images have been provided - one that shows the gondola with the context screened, and one with the gondola and context shown as it would actually appear.



POTOMAC HERITAGE TRAIL

Towers West of Key Bridge

A

CENTRAL PLACE DEVELOPMENT - 26TH FLOOR

Towers West of Key Bridge

B

Locations Where a Gondola Would Not be Visible.

1 National Cathedral

4 Memorial Bridge

2 Ohio Drive Steps

8 View from Arlington Blvd near the US Marine Corps War Memorial

KENNEDY CENTER ENTRANCE LEVEL TERRACE

Towers East of Key Bridge

1 context screened

1

KENNEDY CENTER ROOF TERRACE

Towers West of Key Bridge

1 context screened

1

KENNEDY CENTER ROOF TERRACE

Towers East of Key Bridge

2 context screened

2

THEODORE ROOSEVELT ISLAND PEDESTRIAN BRIDGE

Towers West of Key Bridge

3 context screened

3

THEODORE ROOSEVELT ISLAND PEDESTRIAN BRIDGE

Towers East of Key Bridge

3 context screened

3

THEODORE ROOSEVELT ISLAND

Towers West of Key Bridge

4 context screened

4

THEODORE ROOSEVELT ISLAND

Towers East of Key Bridge

4 context screened

4

CAPITAL CRESCENT TRAIL

Towers West of Key Bridge

5 context screened

5

CAPITAL CRESCENT TRAIL

Towers East of Key Bridge

5 context screened

5

GEORGETOWN WASHINGTON HARBOUR

Towers West of Key Bridge

6 context screened

6

GEORGETOWN WASHINGTON HARBOUR

Towers East of Key Bridge

6 context screened

6

WASHINGTON MONUMENT

Towers West of Key Bridge

7 context screened

7

CAPITAL CRESCENT TRAIL

Towers East of Key Bridge

7 context screened

7

07 PROJECT DEVELOPMENT

Summary

COSTS AND FUNDING

A gondola system connecting Rosslyn and Georgetown may be implemented for significantly less capital costs than a Metro infill station.

Depending on the which alignments and station locations may be pursued, development costs could vary. Generally, the construction and related improvements are estimated to cost approximately $80-90 Million. The annual operating costs would be approximately $3.2 Million, including the creation of 25 permanent jobs.

The costs for development as well as operations must be taken into account in order to inform and utilize the most appropriate funding options.

The following pages provide additional detail on the cost projections and potential funding options.

DEVELOPMENT ASSUMPTIONS

SYSTEM TYPE

Monocable Gondola

CAPACITY

Cabins, 8 - 12 passengers
2,400 people per hour / per direction

FREQUENCY

20 seconds - 1 minute,
between cabins

TRAVEL TIME

4 minutes, door-to-door

TOWERS

2 tall towers
2-4 smaller towers over roadway

STATIONS

2 Terminus Stations
1 Angle Station (if needed)

POTENTIAL COST

$80 - 90 Million

COST COMPARISON:

In the range of the Emirates Line, London, United Kingdom

DEVELOPMENT COSTS

Potential costs to construct a gondola system have been evaluated as part of the feasibility study. While the eventual alignment and design will have an impact on the total cost, a gondola system would likely cost in the range of $80 to 90 Million to design and construct.

Construction costs for a gondola system could vary based on whether towers are located on land or in the river, whether costs to acquire real estate for stations other needed right-of-ways are required, or if an alignment requires a turn station.

The cost to construct a gondola would be significantly less than other transit projects that have been undertaken in the region. For example, the NoMa-Gallaudet U Metrorail infill station cost $103.7 Million ($131 Million in 2016 dollars) to build, and the proposed Potomac Yard station is estimated to be between $130 and $180 Million to complete.

The Metro 2040 Plan for a new Rosslyn-Georgetown Tunnel and Stations was estimated to cost $2.5 Billion in 2012 dollars and take from twelve to sixteen years to implement.

SYSTEM COSTS			
Cabins, 23		$2.5	M
Line Equipment		$1.0	M
Station Equipment		$10.4	M
Station Structures		$2.0	M
River Foundations		$15.0	M
Tower Special Design		$6.0	M
Design / Engineering	8% [1]	$2.9	M
Contingency	25% [1]	$9.2	M
System Subtotal		**$49**	**M**
ALLOWANCES			
Station Vertical Circulation		$3.0	M
Station Enclosure - Rosslyn		$7.0	M
Station Enclosure - Georgetown		$7.0	M
Potential Turn Station	If Needed	$7.0	M
Real Estate Acquisition / Related Improvements	If Needed	$12.0	M
Environmental & Permits		$5.0	M
Potential Project Budget		**$90**	**M**

[1] Percentage of System Construction Cost

OPERATIONS ASSUMPTIONS

OPERATING SCHEDULE

Concurrent with Metro System

POTENTIAL JOBS

25

MAINTENANCE SPACE

Approximately 2500 SF
Parts storage, cabin repair / cleaning

PERSONNEL AND GENERAL/ADMINISTRATIVE EXPENSES ARE INCLUDED.

POTENTIAL ANNUAL BUDGET

$3.2M + / -

Comparison: Overall, in the range of the Emirates Line, United Kingdom and Telluride, Colorado

OPERATIONS COSTS

The projected annual operations costs include personnel expenses and general/administrative costs.

GENERAL OPERATIONS AND MAINTENANCE PLANNING:

Careful planning and design is required to provide continuous operation of an urban gondola.

In order to perform required maintenance, a shift of technical personnel will be required on night shift 10 pm to 6am 5 days per week. Such a maintenance schedule would allow for year around operation. Other urban systems schedule between 0 and 5 days of annual extensive maintenance where the system would not be operational.

Maintenance requirements vary from system to system. It will likely be necessary to change the haul rope every 4-6 years. That may require 3-5 days of down time. The rope must be ordered 6 months in advance, so the outage can be scheduled at low demand times. Other major system items may need to be designed for replacement, rather than field repair as is common in the industry. .

PERSONNEL EXPENSES

Administrative Staff

General Manager Operations Manager Accounting		
Administrative Subtotal	2	$200,000

Operational Staff

Shift Supervisors	4	$350,000
Technicians	5	$350,000
Station Attendant	14	$450,000
Overtime Allowance	10%	$115,000
Operations Subtotal		$1,265,000

Payroll Taxes and Benefits	40%	$586,000

Personnel Total	**$2,051,000**

GENERAL AND ADMINISTRATIVE EXPENSES

Franchise, office, rent	$200,000
Insurance	$500,000
License, Consulting, Legal	$50,000
Building maintenance	$50,000
Personnel Training, Uniforms	$200,000
Gondola parts, supplies, tools	$150,000
General and Administrative Total	**$1,200,000**

ANNUAL OPERATIONS AND MAINTENANCE COST	**$3,251,000**

Funding and Financing Options

The Georgetown-Rosslyn gondola will require both a capital budget to build the system – estimated to cost between $80 and $90 million –and an annual operating and maintenance (O&M) budget, estimated to cost $3.25 million/year.

OPERATIONS & MAINTENANCE

The annual O&M costs could be funded through a mix of farebox revenues, sponsorships and reassignment of subsidies from existing shuttle services:

Farebox Revenues

The gondola will bring new riders to the Metro system (estimated at 1,900 per day), riders who can be served at minimal incremental cost. Their average fares of $2.50 per trip represent new revenues to Metro. Another 1,400 daily gondola riders are expected to walk up and pay an average fare of $2.00 per trip without accessing Metro. Assuming that 35 percent of the total fares from new Metro riders and 80 percent of the fares from walk-up riders would go to support the gondola O&M costs, the farebox would generate an estimated $1.17 million in annual operating revenues. Higher ridership or fare allocations would increase this amount.

Sponsorships

Commercial sponsorships and advertising could contribute to O&M costs.

Service Replacement

Subsidized public and private bus/shuttle services currently link Georgetown and Rosslyn.. If the gondola replaced portions of those services, the subsidy dollars could potentially be reassigned to support gondola O&M expenses. For example, the District would save over $1 million/year by eliminating the Key Bridge from the Dupont Circle – Rosslyn Circulator route.

Direct Subsidy

The region and its jurisdictions currently subsidize every transit trip on Metro and Metrobus at an average rate of roughly $2.74/ride. The gondola is projected to require less subsidy per ride than any existing transit mode in the Washington region.

CAPITAL FINANCING

The capital financing needed to build similar public transit infrastructure usually involves layering of multiple resources and may include any combination of the following:

Private Sources

Sponsorships

London's Emirates Air Line gondola links the North Greenwich Peninsula to Royal Victoria Dock over the River Thames. Emirates Airline contributed £36 million to the capital costs under a 10-year sponsorship agreement. A similar sponsor may be recruited to participate in financing this gondola project.

Joint Development

The owner on the property selected for the station could choose to contribute to the cost of development in return for enhanced values. It seems unlikely that any individual development could receive sufficient return to justify a significant investment. The scale of enhanced rent levels would not generate enough income to warrant that scale of investment. Most of the Rosslyn projects have already met their proffer requirements associated with development approvals and would not have additional value to direct to the cost of the gondola.

Direct purchase of the development rights will likely be necessary. The severe limits on development heights in Georgetown are not likely to change simply because of the gondola's appeal. It would be difficult to replace any space devoted to the gondola station and equipment through added density.

Accelerated development approvals for a new building with fewer delays and conflicts with the neighbors are not something the gondola project can assure.

Local Sources

Public-Private Partnership

A public-private partnership, such as the one now pursuing development of Maryland's Purple Line, is a possible vehicle for gondola financing. The fundamental structure engages long-term involvement by a private team to design, finance, build, operate and maintain the system. Funding is provided by the State or local government via "availability payments" that make up the difference between farebox revenues and required debt service and annual O&M costs. Such partnerships have the advantage of tapping the private sector's ingenuity, efficiency and access to capital while assuring quality performance through a series of carefully negotiated performance metrics.

Tax-Increment Financing (TIF)

Property values near new transit stations tend to rise. The Rosslyn and Georgetown districts will likely achieve higher property values following the gondola's opening with the largest increases coming from the completion and lease-up of the major development projects in Rosslyn. The tax revenues generated by the incremental increases in assessed value of properties within the defined TIF District can be pledged to fund revenue bonds. The property owner pays the same property tax rate, but a portion of those revenues attributed to the increased assessed value is earmarked for public improvements. Typically, TIF financing is restricted to projects where the private investment and increase in assessed values would not otherwise occur "but for" the public investment.

Paygo Expenditures

Governments can simply make cash contributions out of their general operating budgets to pay some or all of the costs for such projects and bypass borrowing altogether. This is the least expensive and most efficient way to finance relatively small capital expenditures. In some cases, payments can be spread over several years as funds are needed.

Federal Sources

TIGER Discretionary Grant

Authorized and funded annually, the Transportation Investment Generating Economic Recovery (TIGER) grants are allocated on a competitive basis. Selection criteria emphasize multi-modal, multi-jurisdictional projects providing regional benefits. Montgomery County has received a $10 million TIGER grant for Bus Rapid Transit in the U.S. 29 corridor.

CMAQ Funding

Federal Highway Administration funding for Congestion Mitigation and Air Quality (CMAQ) is distributed to State and local jurisdictions for projects that improve air quality and reduce congestion. Both the District and Arlington County have programmed use of their CMAQ dollars to other projects. However, a small reprogramming allocation might be possible, particularly in the context of a layered financing approach.

Capital Investment Grant (New Starts/Small Starts) Financing

Federal Transit Administration (FTA) New Starts and Small Starts transit funding could provide capital funding. Though gondola systems are not specifically enumerated as eligible for funding, this system would qualify as a transit project provided that its primary function is transit rather than tourism. The gondola would need to comply with the program's funding criteria and compete with other transit priorities.

TIFIA Loan

The Transportation Infrastructure Finance and Innovation Act (TIFIA) program provides credit assistance to projects of "regional significance" through direct loans, loan guarantees and standby lines of credit. Limited to 33 percent of expected eligible project costs, TIFIA requires a dedicated revenue source (e.g., farebox revenues and/or annual payments from the State or local jurisdiction) and investment grade ratings. Projects must be consistent with the State transportation plan and included in the metropolitan transportation plan.