STAFF RECOMMENDATION

NCPC File No. 1476

JOHN F. KENNEDY CENTER FOR THE PERFORMING ARTS
ACCESS IMPROVEMENTS, PLAZA AND BUILDINGS
2700 F Street, NW
Washington, DC

Submitted by the Federal Highway Administration and
John F. Kennedy Center for the Performing Arts

May 27, 2004

Abstract

The Federal Highway Administration and the John F. Kennedy Center for the Performing Arts have jointly submitted a project to improve vehicle, transit, pedestrian, and bicycle access to the Kennedy Center and to construct a new deck and plaza spanning the Potomac Freeway including two new buildings for the Kennedy Center’s use.

Commission Action Requested by Applicants

Approval of concept site and building plans pursuant to 40 U.S.C. § 8722(d) and Section 5 of the National Capital Planning Act (40 U.S.C. § 8722(b)(1)).

Executive Director’s Recommendation

The Commission:

Approves the concept site and building plans for the John F. Kennedy Center Access Improvements, Plaza and Buildings, as shown on NCPC Map File No. 3.10(08.21)-41346.

Directs the applicants to undertake the following as design proceeds:

In general:
- Improve pedestrian connectivity to the surrounding city and throughout the project site.
- Maximize connections to the existing and historic city street grid.
- Revise the project design to better activate the proposed plaza.
- Minimize impacts to important viewsheds in the project area, including views along L’Enfant streets, views to and from the Lincoln Memorial, views to and from the Old Naval Observatory, and views along the Rock Creek and Potomac Parkway.
- Ensure that bicycle trail connectivity will be established and maintained throughout the project site if elements of the project are eliminated or delayed due to budget constraints.
In the North Project Sector:
- Investigate eliminating the planned on and off ramps between 27th Street, NW and the Potomac Freeway.
- Demonstrate that planned improvements in the north project sector will not preclude re-connectivity of the District street grid in the future, and in particular the potential connection of I Street westward to the waterfront, and the re-establishment of 26th and 27th Streets north of Virginia Avenue, NW.
- Coordinate with the District Department of Transportation in the north project sector to ensure design compatibility with changes to the Whitehurst Freeway currently under study.

In the Center Project Sector:
- Modify the water feature in the median of E Street, NW to allow a crossing at the east end of the north and south buildings.
- Modify the plaza design to reduce the number of roadway segments and the impact of vehicular traffic on active and passive pedestrian use of the space.
- Design the structural system for the proposed Potomac River overlook and associated ramps to minimize impacts to the view corridor along Rock Creek Parkway.
- Explore alternate design solutions for the proposed Potomac River overlook and ramps that better integrate the Center both physically and visually with the Rock Creek and Potomac Trail, improve access from the waterfront to the Kennedy Center’s west terrace, and that do not block views of the river from the west terrace. Alternate designs considered should include ramps stretching north and south from the outer corners of the terrace.
- Demonstrate how the project addresses the major viewshed along New Hampshire Avenue, NW and investigate how the project can enhance the important pedestrian connection at this location.
- Redesign the plaza area so that it exhibits a clear hierarchy of interrelated public spaces with a central focal point.
- Investigate reducing the size of the plaza by pulling the north and south buildings in toward one another to allow future construction of other adjacent uses.
- Demonstrate that the project does not preclude the development of mixed-use buildings immediately north and northwest of the project area.
- Demonstrate that the project design does not preclude decking over other areas of the Potomac Freeway for roadway and building construction.
- Eliminate the redundant roadways that partition the green space proposed along the east front of the Kennedy Center.
- Investigate incorporating on-street parking on the roadways in front of the two new buildings that flank the plaza and reducing the size of the drop-off areas in front of the two new buildings.
- Include direct access from the plaza to the Education Building’s café.
- Design the proposed bicycle and pedestrian ways along the east sides of the proposed buildings with maximum sight lines and surveillance opportunities to increase public use and public safety.
- Locate active spaces, such as rehearsal spaces, along the perimeter walls of the two buildings.
- Modify the design of the west and east façades of both buildings to create better transparency to and functional interaction with the adjacent sidewalks and trails.
Demonstrate that the design of the Education Building is responsive to the view from the Theodore Roosevelt Bridge upon entering the city.

Indicate how the proposed water features will be used during the winter months.

Investigate increasing the number of tour bus parking spaces below grade to accommodate tour buses serving venues other than the Kennedy Center.

Modify the design of the north building and/or the alignment of 25th Street, NW to provide a more direct visual and physical connection between the city street grid and the plaza, and to serve as a gateway into the performing arts complex.

Incorporate project perimeter security requirements into the design at the earliest possible stage.

Consider the impact of the project on security requirements of the Potomac Naval Annex (Old Naval Observatory) and the State Department headquarters.

In the South Project Sector:

- Modify the design in the south project sector to conform to major components of the District Department of Transportation’s proposed Theodore Roosevelt Bridge improvements, in particular the westbound ramp connecting Constitution Avenue to the Bridge.
- Demonstrate that the design does not preclude the development of a pedestrian connection between the Kennedy Center, the Lincoln Memorial and the Mall.

Reminds the Kennedy Center and the Federal Highway Administration of the requirement to comply with Section 106 of the National Historic Preservation Act.

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PROJECT SUMMARY

Site Description

The project is located in the vicinity of the Kennedy Center for the Performing Arts (Kennedy Center or Center) on the east bank of the Potomac River in the northwest quadrant of the District of Columbia. The project site extends from just north of K Street, NW on the north to the Lincoln Memorial on the south, and from the Potomac River on the west to 22nd Street, NW on the east. The Kennedy Center is isolated from both the river and the city by the system of ramps and roadways connecting the Rock Creek and Potomac Parkway and the Theodore Roosevelt Bridge on the west to the Potomac Freeway and the E Street Expressway on the north, south and east. The Potomac Freeway is depressed as it passes the Kennedy Center.

Access Improvements for the project affect areas to the north, south, east, and west of the Kennedy Center. Central to the project is the proposed plaza flanked by two new buildings, which will affect primarily the area directly east of the Center.

The project site has been divided into three sectors due to its complex nature and because the required funding will become available over an extended time period. The north section extends from Rock Creek Parkway just north of K Street, NW to Juarez Circle. The center section extends from Juarez Circle to C Street, NW. The south section extends from C Street to the
Lincoln Memorial. Although improvements proposed for the various site sections complement one another, they are designed to be constructed in independent phases, with the center section to be constructed first.

Background

During 2002 and 2003, NCPC staff served on a multi-agency steering committee that included representatives from the District of Columbia Office of Planning (DCOP), the District Department of Transportation (DDOT), the National Park Service (NPS), the Commission of Fine Arts, (CFA), the Federal Highway Administration (FHWA), and the Kennedy Center for the Performing Arts (Kennedy Center or Center). The purpose of the steering committee was to guide the project through the Environmental Assessment phase, which culminated in the selection of a preferred alternative and a Finding of No Significant Impact (FONSI). NCPC staff provided comments throughout the process. The preferred alternative selected is the project presented herein.

History of the Kennedy Center Site

Conceived and constructed at the same time as the Theodore Roosevelt Bridge and the Potomac Freeway, the Kennedy Center has been isolated from the surrounding city from its very inception. Originally designed to be connected to the city on the north and east and integrated into its Potomac riverfront setting, the Center’s design suffered from a combination of budgetary constraints and highway planning methods that rendered it an island among a tangle of ramps and roadways connecting the Bridge to the Freeway. The result was a cultural center and presidential memorial that was virtually inaccessible by foot. Even as the Metrorail system became a reality in the 1970s, the Kennedy Center’s walkable distance from Metrorail’s Foggy Bottom station has proven an impediment for patrons because of the difficult roadway crossings that lie between the station and the Center.
As the number of auto commuters has burgeoned over the decades since the Kennedy Center’s completion, the Center has struggled to provide access to patrons who by design must arrive by car and mix with the rush hour traffic congestion that frequently coincides with performance times. In recent years, the Kennedy Center has made important strides in improving both transit and pedestrian access by operating a shuttle from the Foggy Bottom Metro station and by constructing a new grand staircase connecting the foot of New Hampshire Avenue, NW to the Center’s entrance near the Hall of States. However, much work remains to be done to fully integrate the Kennedy Center into the fabric of the surrounding city and to provide easy access to patrons and casual visitors alike.

Legacy Plan

The idea for an urban plaza spanning the Potomac Freeway has its roots in the Commission’s 1997 Extending the Legacy Plan. The Plan envisioned a lively public gathering space perched atop a deck that spanned the Freeway below and connected the front of the Center directly to the city street network north and east. The central focus of the Legacy plaza was an amphitheater surrounded by pedestrian space and flanked by two new buildings on the north and south. Twenty-Fifth Street and 26th Street were shown extended into the site, demarcating the east and west sides of the plaza respectively. A new surface-level E Street, NW joined the plaza to 23rd Street, NW to the east.

Authorizing legislation

This project is authorized by Public Law 107-224, the John F. Kennedy Center Plaza Authorization Act of 2002. The Act amends the John F. Kennedy Center Act to authorize “…the Secretary of Transportation to carry out a project for construction of a plaza adjacent to the John F. Kennedy Center for the Performing Arts, and for other purposes.” The Act directs the Secretary of Transportation to plan, design, engineer and construct the project, with the exception of the two proposed buildings flanking the proposed plaza. The Act directs the Board of Directors of the Kennedy Center for the Performing Arts to “…undertake such activities as may be necessary to construct buildings on the Plaza for the Project.” In general, the Act
outlines all of the responsibilities the parties involved in planning, designing and constructing the Project as outlined in the report of the Secretary of Transportation submitted to Congress under section 1214 of the Transportation Equity Act for the 21st Century (TEA-21 report).

*Kennedy Center Access Study*

Building on the Commission’s Legacy Plan, the Federal Highway Administration produced the Kennedy Center Access Study in cooperation with the National Park Service, the District of Columbia Department of Public Works (now the District Department of Transportation) and the John F. Kennedy Center for the Performing Arts. Section 1214 of the Act, subsection (a), relates to “Access to John F. Kennedy Center for the Performing Arts.” The Act required the Secretary of Transportation to conduct a study of “…methods to improve pedestrian and vehicular access…” to the Kennedy Center. The Act further required FHWA to complete and transmit a report to the Committee on Environment and Public Works of the Senate, containing the results of the study with an assessment of the impacts associated with the implementation of each of the methods examined under the study. The Act authorized $500,000 for fiscal year 1998 to be appropriated out of the Highway Trust Fund to carry out the study. The Kennedy Center Access Study is the study required under this Act.

*Environmental Assessment Steering Committee*

In 2002/2003, staff participated in a multi-agency steering committee to provide input to the FHWA Environmental Assessment (EA) phase of the project. Staff attended monthly meetings at the Kennedy Center, providing both oral and written comments on the EA over the course of approximately 18 months. Following publication of the draft EA at the end of this process and incorporation of public comments, FHWA selected the design represented by the applicant’s submission as the preferred alternative and published a Finding of No Significant Impact (FONSI) in December of 2003.

*Land Ownership*

Land ownership patterns in the project area are complex and include land owned by the District of Columbia, the National Park Service, the Kennedy Center for the Performing Arts, and others. The legislation authorizing the access and building improvements directs the District of Columbia to transfer the air rights over District-owned land as needed by the Secretary of Transportation to construct the project.

*Memorandum of Agreement: Land Ownership and Maintenance Issues*

A 2004 Memorandum of Agreement among the parties participating in the design and construction of the project outlines the terms under which ownership and maintenance of the proposed plaza, roadways and other project areas will be determined. The project’s authorizing legislation specifies that the Kennedy Center will own and maintain the new buildings, plaza and associated green spaces and that the District will own and maintain streets running below the plaza deck. Still in question are the ownership and maintenance responsibilities for E Street, NW between 23rd Street and the east end of the plaza. All ownership and maintenance responsibilities will be determined and documented prior to advertisement of the first construction contract.
Impetus for the project

Access Improvements

The Kennedy Center is both isolated and constrained by the system of roadways that surrounds it. The roadway network not only creates a barrier to pedestrian movement, but the heavy volume of through traffic that it serves interferes with the movement of patrons to and from the Center by automobile. Rush hour traffic is a particular problem because the frequent back-ups block the Center’s access points from both the District and Virginia, and performance times often coincide with rush hour traffic. The overall objective of the Kennedy Center Access Project is to improve access to the Center for both patrons and visitors by improving roadway, sidewalk, bike trail and transit connections to the Center from the surrounding city and region.

Specific problem areas identified include:

- Lack of connection between the Center and the Potomac riverfront
- Lack of connection between the Center and city streets immediately north and east
- Traffic congestion at the intersection of the Potomac Freeway with ramps from the Theodore Roosevelt Bridge
- Traffic congestion at the intersection of Virginia Avenue, NW with the Rock Creek and Potomac Parkway
- Traffic Congestion and safety hazards in the vicinity of the intersection of the Potomac Freeway with Ohio Drive and the Rock Creek and Potomac Parkway
- Difficulty in reaching the Center on foot from the Foggy Bottom Metro station
- Disconnects in the regional bicycle trail network in the vicinity of the Center

Buildings

The Kennedy Center has a three-fold mission: serving as a living memorial to President John F. Kennedy, functioning as a major performing arts center for the city and the region, and educating the public on the history and role of performing arts in America. The two new buildings proposed in this project will enhance The Center’s ability to serve that mission by providing additional rehearsal, office and support space for both the Kennedy Center and the Washington National Opera, and by housing a state of the art educational outreach center related to the performing arts.

Proposal

The proposal includes two projects that will be funded separately by two different applicants. These projects will be designed and constructed in concert with one another and are described herein as “the project.”

Concept

The concept modifies Legacy’s Plan for a new plaza and surface level connections to the surrounding street grid. Taking its cue from the city’s other memorials, the concept inscribes the Kennedy Center within a monumental circle and adorns its approach with water in the spirit of a reflecting pool. The two new buildings capture the essence of the existing Center’s design with their use of slender-columned colonnades and white stone on their exterior, but they simultaneously infuse a new spirit of light, transparency and playfulness by incorporating large areas of glazing into their facades and producing fluid forms that counteract the still, staid and isolated nature of the existing Center building, blending it into the site that surrounds it. The effect is powerful, but incomplete.
Buildings

The project includes two new buildings for the Kennedy Center’s use, funded separately from the access improvements. Funding for the buildings will come from private donations raised by the Kennedy Center. A rehearsal building is planned for a site on the north edge of the proposed plaza and an education building for the south. The buildings are envisioned as a transition between the new surface level E Street, NW and the front of the Kennedy Center, encompassing a public plaza between them. They are designed to enhance the urban form of the new plaza, creating a frame for the Kennedy Center as viewed from E Street, NW. The fronts of the two new buildings form sweeping curves from southeast to northwest, creating a plaza that fans open as it progresses toward the Center from E Street. The new buildings rise in height to just below the parapet of the existing Kennedy Center building, and although their designs complement the color and columnar progression of the existing building, their façades are comprised primarily of glass and they are curvilinear in form. The two proposed buildings are the Rehearsal Building on the north and the Education Building on the south. The Rehearsal/Opera Building will provide rehearsal and administrative space for both the Kennedy Center and the Washington National Opera. The Education Building will provide exhibit and teaching space, as well as house a gift shop and café.
Access Improvements

The access improvements portion of the project, submitted by the Federal Highway Administration, includes the design and construction of all vehicular, bicycle, pedestrian and transit access improvements, including the construction of the deck that is proposed to span the Potomac Freeway on the east side of the Center as well as the connection between the Center and the Rock Creek Parkway trail on the west side. Because of the project size and complexity, the access improvements have been divided into three project sectors. Existing conditions and proposed changes for each sector are described below:

North Sector: Extents and Existing Character

The north project sector extends from approximately K Street, NW on the north to Juarez Circle on the south. The western boundary of the north sector is the Rock Creek and Potomac Parkway, while the eastern boundary is formed by the far side of the Potomac Freeway. The area currently contains a mix of open space, parkland, freeway ramps, surface roadways and overpasses, with a few remaining retail uses near the south end. Significant archeological resources are believed to lie beneath the surface near the north end of the sector and the historic remains of lime kilns sit just north of the intersection of K Street, NW with 27th Street, NW.

North Sector: Proposed changes:

Vehicular Network Changes/Improvements

- Removing two ramps connecting the intersection of K Street, NW and 27th Street, NW with the Rock Creek and Potomac Parkway
- Constructing a new intersection that will provide a direct connection between the Rock Creek and Potomac Parkway and the Potomac Freeway
- Removing two ramps connecting 27th Street, NW to the Potomac Freeway
- Constructing two new ramps connecting 27th Street, NW to the Potomac Freeway
- Lowering the Potomac Freeway
Bicycle Network Changes/Improvements

- Improving the trail connection between the Georgetown Waterfront and the Rock Creek and Potomac Parkway
- Improving the crossing of Rock Creek and Potomac Parkway at the intersection of Virginia Avenue, NW

Pedestrian Network Changes/Improvements

- Improving the crossing of Rock Creek and Potomac Parkway at the intersection of Virginia Avenue, NW

Transit Network Changes/Improvements

- There are no transit network improvements planned for the north project sector.

Proposed Intersection of Potomac Freeway with Rock Creek and Potomac Parkway looking south

South Sector: Extents and Existing Character

The south project sector extends from approximately C Street, NW on the north to Lincoln Circle on the south. The western sector boundary is the shoreline of the Potomac River and the eastern boundary is comprised of the Old Naval Observatory and 23rd Street, NW. The sector contains the ramp system that connects the Theodore Roosevelt Bridge to the Potomac Freeway, E Street Expressway, Constitution Avenue, NW, the Rock Creek and Potomac Parkway, Ohio Drive, NW and Constitution Avenue, NW where it intersects 23rd Street, NW. Interspersed among these ramps are various parcels of federally-owned parkland controlled by the National Park Service. Also winding through this area, the Rock Creek and Potomac Trail connects to Lincoln Circle and Memorial Bridge. The area is characterized both by heavy vehicular traffic and active and passive park uses.
South Sector: Proposed changes

Vehicular Network Changes/Improvements

- Constructing a new grade separated intersection in place of the at-grade intersection of Ohio Drive with the Potomac Freeway
- Reconfiguring the existing off-ramp from the in-bound lanes of the Theodore Roosevelt Bridge to southbound Ohio Drive and northbound Rock Creek and Potomac Parkway to segregate traffic bound for the Kennedy Center from other traffic at the intersection of Ohio Drive with the Potomac Freeway

Bicycle Network Changes/Improvements

- Constructing new bicycle trail connections

Pedestrian Network Changes/Improvements

- Constructing new sidewalk connections

Transit Network Changes/Improvements

- There are no transit network improvements planned for the south project area.
Center Sector: Extents and Existing Character

The center project sector extends from Juarez Circle on the north to approximately C Street, NW on the south. The western boundary of the sector is the shoreline of the Potomac River and the eastern boundary extends to approximately 22nd Street, NW, where surface level E Street, NW will tie into Virginia Avenue, NW. The sector includes the Kennedy Center itself, portions of the Rock Creek and Potomac Parkway, the Rock Creek and Potomac Trail, portions of the Potomac Freeway, and the entire E Street Expressway and E Street west of Virginia Avenue, NW. The area is primarily characterized as a highway environment, flanked by a mix of hotel, residential, cultural, and retail uses, and federal and foreign government facilities.

Center Project Sector: Existing Conditions

Center Sector: Proposed changes:

Vehicular Network Changes/Improvements

- Constructing a new surface level section of E Street, NW, connecting the proposed plaza to Virginia Avenue, NW near 22nd Street, NW
- Constructing a plaza deck that spans the Potomac Freeway and connects the front of the Kennedy Center to E Street, NW
- Connecting 25th Street, NW to the plaza
- Constructing three new levels of parking including a new central loading dock beneath the proposed plaza and buildings
- Depressing the entire Potomac Freeway to allow the deck to be constructed above
- Eliminating the ramp that connects southbound Potomac Freeway to the E Street Expressway to allow the deck to be constructed above
- Depressing the out-bound ramp connecting the E Street Expressway to the Theodore Roosevelt Bridge in a tunnel section beneath the Potomac Freeway

Bicycle Network Changes/Improvements

- Establishing new connections to bicycle trails in the vicinity of the Kennedy Center to the Center and points beyond by means of the deck
- Constructing a new set of bicycle and pedestrian ramps on the west side of the Center, connecting the proposed plaza to the Rock Creek and Potomac Parkway trail

Pedestrian Network Changes/Improvements

- Establishing new connections to sidewalks in the vicinity of the Kennedy Center to the Center and points beyond by means of the deck
- On the plaza: constructing a new amphitheater and fountains, new green space, new roadways and sidewalks

Transit Network Changes/Improvements

- Constructing a new boat landing (also proposed in the Legacy Plan) at the foot of the new ramps on the Potomac Riverfront

Building Improvements

- The Center Project Sector includes the two buildings proposed by the Kennedy Center on the north and south sides of the plaza.

Plaza Design

The applicant proposes to construct a public plaza atop the freeway deck that would connect the Kennedy Center to the new buildings as well as to 25th Street, NW, E Street, NW and bicycle and pedestrian trails in the vicinity. The plaza would be centered on a new outdoor amphitheater that would be programmed by the Kennedy Center for uses including the Millennium Stage. The Millennium Stage hosts daily free performances that are open to the public 365 days a year. When not in use for performances, the amphitheater would be available to the public for passive
use. Integral to the design of the amphitheater is an active water feature that surrounds both the seating and the stage, incorporating a water fall into the stage backdrop. Pedestrian bridges connect plaza walkways to the amphitheater seating area.

Proposed Kennedy Center Plaza Amphitheater

Multimodal Access Improvements

Set Delivery and Truck Access

Backstage access to the Kennedy Center’s main venues is from the east front of the building through several large doors that open onto the Center’s front drive aisle. Because of the difficulty and expense that would be associated with relocating backstage access, set delivery to the main building will continue to occur at this location after the proposed improvements have been constructed. All other future delivery functions to both the existing building and the two new buildings will occur below ground through the proposed central truck loading facility located beneath the proposed plaza.

Tour Bus and School Bus Parking

The Kennedy Center has just completed a parking expansion project that accommodates parking for a limited number of tour buses and school buses in a surface parking area at the south side of the Center. The proposed project will build between 15 and 30 new bus parking spaces on the loading level of the underground garage.

Vehicular Access and Private Vehicle Parking

Vehicles will access the Kennedy Center and the two new buildings from the Rock Creek and Potomac Parkway, 25th Street, NW and E Street, NW. Vehicles dropping off patrons and heading for the parking garage will move over and throughout the plaza area. The two-level underground parking garage expansion proposed beneath the plaza will provide between 500 and 600 parking spaces to be used primarily by visitors and patrons, bringing the total number of parking spaces at the Center to approximately 2500.
**Water Taxi Landing**

The project design includes the water taxi landing introduced in the Commission’s 1997 *Legacy Plan*. The landing is located along the bank of the Potomac River directly below the center of the proposed river overlook promenade, accessible directly from the Rock Creek and Potomac Parkway trail as well as from the Kennedy Center by means of two proposed ramps leading from the promenade.

**Connection to River and Rock Creek Trail**

The project includes a river overlook that will extend from the existing lower terrace over the Rock Creek and Potomac Parkway. The overlook is connected to two ramps that cross one another in scissors-fashion on the far side of the Parkway and descend to connect back into the trail after extending over the river. The slope of the ramps allows the access to conform to the Americans with Disabilities Act (ADA) and will allow both pedestrians and cyclists to travel between the trail and the proposed plaza on the east side of the Center.

**Pedestrian Access**

The proposed deck over the Potomac Freeway and reconstruction of surface level E Street, NW will provide a much improved pedestrian connection to the Kennedy Center from the east. For the very first time, the Center will have a true “front door” to the city it serves. Pedestrians will be able to travel from the east at 23rd Street, NW down E Street to the plaza, the Kennedy Center and the two planned Kennedy Center buildings. A newly constructed grand staircase at the foot of New Hampshire Avenue, NW enhances pedestrian access from the north including pedestrians originating at the Foggy Bottom Metro station.
PROJECT ANALYSIS

Executive Summary

The proposed access improvements, plaza and new buildings at the Kennedy Center represent a once in a generation opportunity to mitigate the significantly detrimental impacts created by the construction of the Potomac Freeway between the Kennedy Center and the rest of the city. The project also promises to mitigate the failings of the Kennedy Center’s original design, including its lack of connection to the Potomac waterfront and the inwardly-focused and self-contained nature of the building’s design. The project must improve access for patrons arriving by automobile, but it must also repair the disconnects in the bicycle trail network passing through and around the project area as well as maximize the opportunities for reconnecting to the city’s street and sidewalk network in order to become part of the daily life of the city around it. Only by doing so will the Kennedy Center reap the benefits of improved pedestrian connections which promise to enliven the proposed plaza and draw new patrons from the revitalizing residential city to its east.

The schematic approach analyzed herein is a positive beginning that will initialize a healthy and lively dialog among the project’s stakeholders. Only through ongoing analysis and design refinement will the final design for the project serve both the Center’s patrons and the city that it calls home. Design modifications will be required for the project’s north sector, the plaza, the connection to 25th Street on the north and the ramps over the river in particular. Additional design modifications are outlined herein. The project should move forward at this point in time to provide a structured opportunity within which such a dialog can foster positive and progressive change in the project’s design.
Buildings

The applicant describes the proposed buildings as free-standing sculptural elements intended to be viewed from all sides as part of an orchestrated composition of buildings and plaza. They are designed to contain the new plaza and frame the existing building. The buildings will utilize the “column vocabulary” of the existing Center and will be clad in a mix of glass and stone “…allowing a light, but monumental structure.” The maximum height of the new buildings will not exceed the parapet height of the existing Center in order that they complement it rather than overshadow it. The maximum use of glass on the new buildings’ facades will create much more transparency than present in the existing building’s facades. The new buildings’ flowing sculptural forms will provide relief to the much staid architecture of the existing Kennedy Center, while blending it into the entire composition. All three buildings will be linked below ground by parking levels, loading docks and staff passageways.

As design progresses, staff requests that the applicant pay particular attention to the design of the new buildings’ sides that face away from the plaza to ensure maximum transparency of these facades and take every opportunity to activate them visually and physically by manipulating the program of the buildings’ uses. The applicant’s plan to place the café at ground level on the front façade and pursue the option of outdoor café seating is a good example of how the project itself may help to activate the public space planned for the new development.

Access Improvements

North Sector

The proposed improvements for the north project sector include the construction of new ramps connecting the Potomac Freeway with 27th Street, NW to replace existing ramps serving the
same function. Staff is troubled by this element of the project. The project goals include relieving congestion at the intersection of Virginia Avenue, NW and the Rock Creek and Potomac Parkway, yet the very ramp connections that are causing this congestion are being retained. The applicant states that these ramp connections are necessary to serve traffic moving between K Street, NW and the Potomac Freeway, and that such traffic will not be able to use the new direct connection between the Rock Creek and Potomac Parkway and the Potomac Freeway. Staff is concerned that retaining the ramps that connect 27th Street, NW to the Potomac Freeway will result in continued traffic congestion on Virginia Avenue and requests that the applicant explore other options to serve the traffic moving between K Street and the Freeway.

As the north sector design proceeds, the project design must be coordinated with the District Department of Transportation (DDOT’s) plans for modifying the Whitehurst Freeway. DDOT is just beginning a study of major modifications to the Whitehurst Freeway. The design of project roadways in the north sector may be required to change based on DDOT’s developing plans for the Whitehurst Freeway.

The applicant proposes major construction in the north project sector, including significant grade changes. The District of Columbia Office of Planning wishes to explore future reconnection of the city street grid in this area. Staff requests that the applicant verify that the proposed north sector project improvements will not hinder reconnecting the street grid in the future.

South Sector

As the south sector design proceeds, the project design must be coordinated with the District Department of Transportation’s (DDOT’s) plans for rehabilitating the Theodore Roosevelt Bridge, currently in the Environmental Assessment (EA) stage. Currently, there are major differences between the ramp configurations of the proposed Kennedy Center/FHWA project and those proposed by DDOT in some alternatives under study. Although DDOT and the Kennedy Center/FHWA has been actively coordinating on these projects, much design work needs to be accomplished in the south sector before this part of the project can proceed.

The most significant difference is in accommodating the movement from Constitution Avenue westbound to the Roosevelt Bridge near 23rd Street, NW. The proposed project retains the existing ramp, while most of the options under consideration in DDOT’s Roosevelt Bridge environmental assessment call for removing the ramp and replacing the movement at grade by extending the Constitution Avenue alignment further west. The proposed project also places an important bicycle connection along the existing ramp. Therefore, this “disconnect” in project planning places both vehicular and bicycle movements at risk. Staff recommends that the applicant resolve this conflict in the south project sector prior to moving forward in design.
Center Sector

Plaza

This project represents a unique opportunity to create a vibrant new public space integrated into the city’s street network. The streets and sidewalks that feed into this space and the uses that surround it must generate the pedestrian activity necessary to enliven it. Staff has several significant concerns about the current design’s ability to generate such activity. These are:

1. The scale of the plaza may siphon off pedestrian activity.
2. The lack of a central focus to the plaza and creation of many individual pedestrian spaces may siphon off pedestrian activity. Because of its size, the plaza is broken into smaller public spaces separated from one another by the roadways that serve drop-off and parking areas. The amphitheater is isolated from other pedestrian space in the plaza by surrounding roadways.
3. The focus on auto movements through the space and the potential difficulty of pedestrian crossing of roadways in the space may impact pedestrian use of the space. The large triangular water feature at the east side of the plaza limits pedestrian movement.

4. The indirect nature of the connection between the plaza and 25th Street, NW may discourage pedestrian movement from Foggy Bottom/West End into the plaza, including pedestrian movement from the Foggy Bottom Metro station.

5. The relative isolation from other uses is likely to contribute to the possibility that it will be underutilized, in spite of programming planned by the Kennedy Center.

6. The water feature between E Street and the plaza is very large and its shape may preclude any winter time use.

The plaza design should be reconsidered in light of the above concerns to create a smaller, more intact, more comprehensive, pedestrian-oriented space with improved connections to the north.

Overlook

The proposed pedestrian promenade that overlooks the Potomac River is a bold and dramatic design feature that will help to connect the Center to its riverside setting. This project element requires careful design consideration as the project moves forward. The applicant must thoughtfully consider the qualities of the space created below the overlook with an eye toward light and openness of views. In particular, analysis of the required structural supports for the overlook must take into consideration views along the Parkway below to Georgetown and Key Bridge in the distance. Additionally, the ramp must be sloped appropriately for wheelchair users and cyclists alike, and space enough for pedestrians, wheelchairs and cyclists must be provided. The need for elevators at this location might be reassessed by the applicant.
Twenty-Fifth Street, NW

The applicant proposes to connect 25th Street, NW to the northwest corner of the plaza, bending it around the north side of the proposed north building. Twenty-Fifth Street is an original L’Enfant Street. The proposed configuration for the street places it in the historic alignments of both 25th Street and 26th Street, allowing the position of the north building to block views down the street into the plaza. Additionally, the “feel” of the street is more likely to be similar to an alley due to the relatively lack of planned pedestrian amenities and pedestrian-related uses in this location. Staff recommends that the applicant reconsider the alignment of 25th Street, NW as well as the position of the north building relative to the street to improve views into the plaza and that the applicant be cognizant to place active uses on the northwest side of the north building to help activate the street for pedestrians.

Function/condition of water features during winter months

Staff is concerned that the large and unusually-shaped water features incorporated into the project’s design will interrupt pedestrian flow along E Street, require excessive amounts of maintenance and be abandoned during the winter months, leaving large sections of the public space as dry ponds. The design of these features should be refined to allow for more pedestrian crossing points and to accommodate a winter use, or they should be replaced with landscaping. The applicants should consider carefully their size and complexity in the context of the ownership and maintenance agreement that will be executed between the District of Columbia and the Kennedy Center. The final design of the water features should result in a facility that can be realistically maintained in a functional and aesthetically pleasing manner.

Access

Set Delivery

The applicant states that set delivery and removal must continue to occur at grade level through the front of the existing Kennedy Center building because no other economical solutions are available. Set delivery and removal will occur at times when the adjacent roadways and public space are least likely to be in use. Staff has no concerns with the planned set delivery scheme.

Other Truck Access and Delivery

The applicants propose to construct a new loading dock below the public plaza. With the exception of set delivery, all loading will occur below ground. Access to the loading area will occur from 25th Street, NW. Staff has no concerns with planned loading operations at this time.

Tour Bus and School Bus Access and Parking

The applicant states that a limited number of tour bus parking spaces may be accommodated below the plaza at the loading dock level to serve the Kennedy Center directly. Staff recommends that the applicant consider the possibility of providing additional paid tour bus parking within this area to serve tour buses visiting other nearby sites.
Private Vehicle Access and Parking

In addition to comments made herein reflecting staff concerns about auto traffic on the plaza, staff reminds the applicant that parking to be provided for federal employees should conform to NCPC guidelines provided in the Comprehensive Plan for the National Capital Region. These guidelines were developed to encourage federal employees to utilize commuting modes other than the single-occupant vehicle. The parking ratio that applies currently to the Kennedy Center recommends one parking space for every three federal employees (1:3).

Water Taxi Access

The project proposes to construct a water taxi landing as recommended in the Commission’s Legacy Plan. The water taxi landing will provide direct access to the Center by means of ADA-compliant ramps that lead directly to the plaza level. As the design progresses, details such as the exact configuration of the ramps, the size and shape of the land mass required to be assembled to accommodate the water taxi landing and the environmental permitting required to construct the landing will need to be worked out.

Transit Access

While the proposed project accommodates a bus stop to serve Metrobus, the submission does depict a route for the Kennedy Center shuttle. Additionally, the project should indicate how the project site can accommodate the District Department of Transportation’s plans for a future light rail system in the District of Columbia. Finally, the project design should include specific pedestrian improvements in the area between the Foggy Bottom Metro station and the Center to encourage more visitors and patrons to arrive at the Center by Metrorail.

Pedestrian Access

Although the applicant proposes significant pedestrian access improvements by way of a new surface level E Street and the various public spaces planned for the plaza, staff finds the project needs greater focus on accommodating pedestrian movement as the design develops further. Specifically, staff recommends better pedestrian connections to the north, including the Foggy Bottom and West End neighborhoods and the Foggy Bottom Metro station as well as better pedestrian connectivity among the various buildings and public spaces planned in and around the plaza. Pedestrian-vehicle conflicts at the plaza level must be resolved in favor of pedestrian movement.

Bicycle Access

The project’s design, in addition to improving conditions for automobile movement, takes significant strides toward completing the bicycle trail network within its environs. Currently, the area around the Center impedes the through movement of cyclists, with disconnects in the trail and dangerous roadway crossings. The proposed project will reconnect the trail system at several key areas. The first is the intersection of Ohio Drive, NW with the Rock Creek and Potomac Parkway and the Potomac Freeway where a grade separation will allow unimpeded bike movement. The second is in the vicinity of 23rd Street, where a new trail connection will be constructed along the south side of the Naval Observatory. The third is at the landing of the
Roosevelt Bridge, where cyclists can connect from the bridge itself to the plaza and the west end of the National Mall. Finally, the project will connect bike movements through the development site itself, both at the water’s edge and by artfully weaving new trails directly into and through the proposed new buildings and their public plaza. Staff is encouraged by the extent of planned bicycle trail connections in the proposed project, but cautions that project budget constraints should not result in the elimination of bicycle improvements from the project scope. Additionally, staff recommends that bicycle parking facilities at the Kennedy Center be accommodated in the design. Finally, staff recommends that the bicycle trail shown between the Naval Observatory and the new south building of the Kennedy Center be carefully designed with maximum visibility through the site so that it does not become a public safety hazard.

Proposed Bicycle Trail between 23rd Street, NW and Kennedy Center Plaza

Drop-off areas and curb-side parking

The roads fronting the proposed north and south buildings serve as extensions of E Street, NW to the east of the project site. Ownership and maintenance of these roads will be the responsibility of either the District of Columbia or the Kennedy Center upon the project’s completion. Although some clear drop-off areas will be required to serve persons entering and leaving these buildings, the majority of the building frontage along these roadways should accommodate short-term on-street parking. The spaces will help to integrate the project into the daily life of the city by allowing for short visits by car to the Center’s café, gift shop and other offerings. Additionally, the spaces could serve uses fronting surrounding blocks, creating a more active use of the sidewalks around the plaza and introducing the Center’s offerings to passers-by.

Park Land Impacts

The applicants indicate that the proposed projects will result in a net overall increase in park land in the project area. The projects will however cause both temporary and permanent changes to land controlled by the National Park Service. In the south project sector, proposed changes to the intersection of the Potomac Freeway with Ohio Drive, NW will create a depressed roadway
crossed overhead by a new vehicular overpass within Park service lands. In the north project sector, a new intersection will connect the Potomac Freeway directly to the Rock Creek and Potomac Parkway. Finally, the proposed pedestrian promenade and ramp system will overhang and connect directly to the Rock Creek and Potomac Parkway Trail. The applicants have coordinated extensively with the Park Service during project development and will continue to do so as the project proceeds into preliminary design. Staff will continue to monitor parkland impacts as the project proceeds.

Security

Integrating security into the design

Since the terrorist events of September 11, 2001, perimeter security has become an integral part of facility design for public, private and government buildings alike. Additionally, owners and operators of existing buildings have sought to retrofit their buildings in order to add perimeter security features. The Commission has seen numerous proposals to retrofit existing buildings in the years since September 11, 2001, and has struggled along with applicants to develop perimeter security devices that adequately protect these facilities while at the same time blending as much as possible into the urban landscape. Because the applicants’ project is currently under development, it is imperative that the applicants consider early on in the design process how any necessary perimeter security measures or other building protection schemes can be implemented into the design process. If considered early on, it is much more likely that such security features can be rendered indistinguishable from the design of the buildings and their surrounding grounds. No information on perimeter security or other desired security features has been included in the applicants’ submission. Staff strongly urges that such information be provided during the preliminary design submission that will follow later this year.
Impact to Old Naval Observatory security

As project design proceeds, the applicant must consider the perimeter security requirements of the Old Naval Observatory site and assure that the project design does not have a negative impact on that facility.

Impacts to State Department Headquarters security

As project design proceeds, the applicant must consider the perimeter security requirements of the State Department headquarters and assure that the project design does not have a negative impact on that facility.

Viewsheds

Views along the Potomac River

The proposed design includes a pedestrian promenade that sweeps out over the Rock Creek and Potomac Parkway, in fact out over the Potomac River itself. The promenade is connected to the river side of the Rock Creek and Potomac Trail by means of two ramps that cross one another in “scissors” fashion after leaving opposite sides of the promenade above to join the trail below. The concept design for the promenade and ramps depicts a cantilevered structure, one having no columns or other means of support. It is unlikely that these structures will be constructed in such a fashion, and likely that necessary structural supports will impact the viewshed along the Parkway and the river. As the design progresses toward preliminary review, the applicant will need to demonstrate that these structures will not have a detrimental impact on views along the Parkway and to Georgetown and Key Bridge beyond.
Views to and from the Old Naval Observatory

The two new buildings proposed by the applicant pose the potential to block views either to or from the Old Naval Observatory, a registered national landmark immediately east of the project site. In particular, the south building sits immediately adjacent to the grounds of the Old Naval Observatory. Although the Observatory sits on a hill, significantly higher than the proposed building sites, the height of the new buildings could result in their roofs partially impacting views to and from the Observatory. The applicants should consider this factor as the design moves forward with an eye toward minimizing visual impacts.

Views to and from the Lincoln Memorial

The Lincoln Memorial is highly visible from the front of the existing Kennedy Center. The project is likely to obscure this view. The applicant should carefully consider how the proposed south building impacts the view to the Lincoln Memorial and take steps to mitigate view impacts during further design. Existing views toward the Lincoln Memorial from the upper levels of the Kennedy Center are not likely to be impacted by the project, and the design of the south building will include an auditorium space with glazing on the wall facing the Memorial. The new view from the auditorium of the south building does not adequately mitigate the loss of view from public space.

PROJECT CONFORMANCE

Federal Capital Improvements Program

The Kennedy Center Plaza Project, which includes the plaza and all of the access improvements described herein, is included in NCPC’s FY2004-FY2009 Federal Capital Improvements Plan. The project is listed as “recommended and strongly endorsed” in the Plan. The estimated total cost of the project is given as $390,000,000; the project has received $10,000,000 in prior funding for planning, environmental review and preliminary engineering.

National Environmental Policy Act

The FHWA completed an Environmental Assessment (EA) of the planned project consistent with the National Environmental Policy Act (NEPA) of 1969, as amended, and the Council of Environmental Quality’s (CEQ) regulations implementing NEPA. The FHWA is the lead entity responsible for the NEPA review and the Commission is a cooperating agency. The EA analyzes the potential environmental impacts of implementing the proposed action via three alternatives (the No Action Alternative and two action alternatives).

The proposed action would improve pedestrian, bicycle, motorized vehicle, transit, and water transport access to the Kennedy Center as well as create an urban design setting for the Kennedy Center that emphasizes re-connection of the Kennedy Center southeast to the National Mall and east to President’s Park and downtown.

The current submission, as a concept design proposal, does not require the Commission to complete its NEPA determination at this stage of project review. Nevertheless, based on the
final FHWA determination arrived at by its Finding of No Significant Impact signed on December 9, 2003, the FHWA has concluded the project does not require preparation of an environmental impact statement since no effects of the planned project have been found to be significantly impacting the human or natural environment, and that mitigation of any minor impacts is feasible.

Review by NCPC staff has determined that the proposed action would have significant, long-term beneficial effects on the urban design setting of the Kennedy Center, long-term improvements to transportation system access, and limited beneficial improvements to the local economy. The proposal is consistent with plan objectives of the NCPC Extending the Legacy Plan and the Comprehensive Plan's general environmental goals. The presence of a new education center on the plaza dedicated to the performing arts would potentially draw new visitors to the Kennedy Center. Improvements would have limited effects on nearby historic architectural resources assuming that the improvements are designed in a sensitive and contextual manner. While a small amount of National Park Service parkland adjacent to existing park roadways would be displaced for these improvements, new public use areas would be created on the plaza.

Because significant archaeological sites are present in the North Sector of the project area, further studies would be undertaken to ensure that the proposed connection between Rock Creek Parkway and the Potomac Freeway does not disturb presently unknown sites. Construction of a pier and floating dock envisioned in the concept would cause temporary disturbances of the river bottom and nearby waters and would require permits issued by the U.S. Army Corps of Engineers. Full evaluation of the river environment modifications has not been undertaken at this stage and these aspects of the plan will be further reviewed by the Corps and the National Marine Fisheries Service as the project design progresses.

Construction of the submitted concept design would create temporary, short-term impacts on traffic routing, noise levels, and dust levels. All other potential impacts would be negligible. The staff will conclude further review and adoption of the FHWA prepared EA when the project design is submitted at a preliminary review phase, and when further issues concerning the pier and potential river effects are further evaluated by the Corps of Engineers and the National Marine Fisheries Service. There is the potential that the river wharf or pier, and its associated elements, may remain an extended phase of the proposed concept and not be implemented in the initial final approved design of the project should the Kennedy Center not achieve further evaluation of those features prior to submission of the preliminary project design.

The National Park Service, in its review of the proposal as it might affect NPS park lands, has concurred in a programmatic section 4(f) approval pursuant to the requirements of Section 4(f) of the U.S. Department of Transportation Act of 1966, as amended, indicating the taking of less than one acre of park property for roadway improvements is required and that no prudent feasible alternative exists. Mitigation of the taking would include incorporation of measures to minimize the extent of land area required; building two new trails in the project vicinity; ensuring the necessary new overpass bridge near the Lincoln Memorial, if implemented, will feature a complementary design appropriate for the setting; and providing to NPS former transportation right-of-way and additional riverfront improvements, which offer more area (0.68 acres) to NPS as parkland than is impacted.
National Historic Preservation Act

The project encompasses two separate undertakings under Section 106 of the National Historic Preservation Act.

FHWA has formally initiated consultation with the DC State Historic Preservation Officer (DC SHPO) for the portion of the project that involves the reconfiguration of the highways and the creation of the deck and landscape and water features. FHWA plans to draft and execute a Programmatic Agreement (PA) to establish the process for the future Section 106 consultation on this phased, long-term project. FHWA has not yet begun consultation with all the parties and should do so as soon as possible. FHWA has determined that the affected historic resources include: the L’Enfant Plan, Rock Creek Parkway, the Old Naval Observatory, the Lincoln Memorial, the Lime Kilns, and potential archaeological sites. One important aspect of the consultation will be the assessment of effects on significant views and vistas. FHWA will consult with the DC SHPO, other agencies including the Commission, and the public to determine where adverse effects may occur and how they may be avoided, minimized, or mitigated.

The Kennedy Center will shortly initiate Section 106 consultation with the DC SHPO on the portion of the project that involves the construction of the new Kennedy Center buildings. In consultation with the DC SHPO and other parties, the Kennedy Center will identify the effects of its undertaking on National Register-listed properties and establish its process for consultation and public participation. Many of the same historic resources may be affected, especially the L’Enfant Plan and the views of the nearby historic properties.

Legacy Plan

The Commission first introduced the concept of a freeway deck at the Kennedy Center in its 1997 Legacy Plan. Legacy envisioned the deck hosting a grand plaza and fountain connecting the Center to new north and south buildings, E Street and 25th Street, and creating a lively new pedestrian gathering space for both the Kennedy Center and the city at large. The deck was envisioned as rectangular in shape, flanked by rectangular buildings. Its surrounding streets
were connected to the District street grid in orthogonal fashion, with 25\textsuperscript{th} Street passing directly in front of the existing Kennedy Center building.

It is most desirable that the proposed projects connect the Kennedy Center to the city to the greatest extent possible, and that the plaza and new buildings become an integral part of the daily life of the city. New sidewalks, bike trails and roadways and the pattern of the plaza and the buildings themselves should become a natural extension of the city itself. There is a real danger that this project could create a vast, underutilized, wind-swept plaza that is only truly accessible by car, that hosts auto traffic at the expense of pedestrian life, that is used only by tourists arriving by bus, and passed through by patrons in cars. The project design must be improved so that it can become fully-integrated, rather than a stand-alone destination that is part of the city only in some passive, disconnected and coincidental fashion. The Legacy design however, should not be considered a literal indication of what the design must become. The final should incorporate the concepts depicted in Legacy, but not duplicate them. The Vinoly concept with its plaza and surface connections to E Street and 25\textsuperscript{th} Street is a good beginning.

**Comprehensive Plan for the National Capital**

The proposal is consistent with the overall goals of the Federal Elements of the Comprehensive Plan, and specifically with the Federal Facilities; Parks, Open Space and Natural Features; and Visitor elements. The proposed project will improve access to and connectivity among parks and recreation trails, remove obstacles to pedestrian movement and enhance linkages between a presidential memorial and major cultural site and the surrounding city. The project will also provide a docking opportunity for existing and new waterborne visitor transportation services and enhance the safety of existing forms of transportation in the project vicinity.

**CONSULTATION**

**Coordinating Committee**

This project was presented at the February 2004 Coordinating Committee meeting, with all participating agencies with the exception of the District of Columbia Office of Planning voting to coordinate.

**Commission of Fine Arts**

The Commission of Fine Arts (CFA) approved the concept design for the Kennedy Center at its March 29, 2004 meeting, finding it to be “well thought out and thorough in scope.” CFA recognized that “…there is much more work to be done on the design of the roads, bridges, and pathways, and the members hope that there is additional thought given to the pedestrian access from the north…the primary route…for those arriving on foot and the most direct path from the Metro station.” CFA encouraged that every effort be taken to make the approach from the north as welcoming as possible to avoid having patrons feel as though they have arrived at the Center’s “side door.”

**District Department of Transportation**

The District Department of Transportation (DDOT) participated in the steering committee for the Environmental Assessment phase of this project and continues to work with FHWA and the
Kennedy Center to coordinate this project with the ongoing Theodore Roosevelt Bridge Environmental Assessment. DDOT believes that these two projects must be closely coordinated due to the proximity of these two facilities and their interdependent access requirements. DDOT will also soon be undertaking a study of changes to the Whitehurst Freeway in the north sector of the Kennedy Center Access Improvements project area.

DDOT generally supports the concept design for Kennedy Center access improvements and expansion. However, there are several transportation issues currently being examined in the Theodore Roosevelt Bridge Environmental Assessment that could impact some of the design elements of the Kennedy Center project. Of particular concern is the configuration of the westbound ramp from Constitution Avenue to the Roosevelt Bridge. Previous issues regarding the number of traffic lanes on various other ramps have been resolved.

District of Columbia Office of Planning

The Kennedy Center concept submission was originally placed on the April 2004 Commission meeting agenda. In March of 2004, the District of Columbia Office of Planning (DCOP) expressed numerous concerns with the proposed concept design and asked that the project be deferred to the May Commission meeting to allow them additional review time. The applicants complied and deferred their submission. DCOP requested a meeting with the Kennedy Center and the Federal Highway Administration to gain a better understanding of the project and to air their concerns. This meeting was held on March 25, 2004. Following the meeting, DCOP continued to express reservations to the project moving forward, citing major issues with the project concept. In April, DCOP again requested that the project be deferred to allow them time to develop alternative design solutions responding to their areas of concern. Again, the applicants deferred their submission. To date, no design alternatives have been submitted by DCOP for staff’s consideration. Attachments 1 and 2 are DCOP’s written comments and the applicants’ responses, respectively.