final environmental impact statement

June 1983

NATIONAL CAPITAL PARKS
WEST POTOMAC PARK AND
Proposed FRANKLIN DELANO ROOSEVELT MEMORIAL

WASHINGTON D.C.
Responsible agencies
National Capital Region, National Park Service
   U.S. Department of the Interior
Franklin Delano Roosevelt Memorial Commission

Title of proposed action:
The construction of a memorial to the late President Franklin Delano Roosevelt.

Location of proposed action:
West Potomac Park, Washington, D.C.

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Abstract
This Final Environmental Impact Statement for West Potomac Park and the proposed FDR Memorial was prepared pursuant to Section 102 (2)(c) of the National Environmental Policy Act of 1969. It is a revision of the 1978 Draft Environmental Statement (DES 78-57) and includes substantial changes to the proposed memorial design as well as a summary of public involvement comments which respond to the DES. As the result of design changes, the cost of the memorial and its visual impact on the site have been reduced. Only the core memorial elements, such as the bermed, tree-lined alley and series of landscaped garden spaces within granite walls will be retained. Traffic circulation patterns will be changed permanently and there will be short-term disruptions to traffic flow during construction operations. Replacement parking will be provided and sports fields will be relocated or reoriented within West Potomac Park. The effects of the proposal on the natural environment will be mitigated by replacement of plant materials removed during construction.
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SUMMARY

The joint Final Environmental Impact Statement (FEIS) for West Potomac Park and the proposed Franklin Delano Roosevelt Memorial concludes a lengthy planning effort initiated in Congress in 1946 with the resolution to establish the FDR Memorial Commission. This FEIS is a revision of the Draft Environmental Statement (DES 78-37) and responds to agency and public comments received following review of that document. Congress and the President have authorized construction of the memorial and, once funds are appropriated, final drawings and construction will take approximately five years. Ultimately, the memorial will be an important area of interest, beauty, and historical value in keeping with the L'Enfant and McMillan Plans for Washington's monumental core.

In light of federal budgetary constraints and review comments, the FDR Memorial design by Lawrence Halprin has been revised and the changes are reflected in this document. Alternatives to this proposal include a no-build option as well as former memorial designs. These designs have proved to be either of major impact to the site or are inappropriate to the intent of the FDR Commission. The original memorial design included an interpretive center, Tourmobile shelter, information kiosk, and a separate Tourmobile access road. These elements have been eliminated from the design. Further, the acreage the memorial will occupy has been reduced from 10 acres to 8.8 acres. What remains is the essence of the memorial—a sequence of landscaped garden spaces linked and defined by granite walls. Upon the walls will be displayed sculptures and quotations representing the multiple images of President Roosevelt. Water, an important element in the president's life, will flow through the memorial in the form of waterfalls, pools, and runnels. From the memorial, visitors will glimpse beautiful views of the Tidal Basin, Chary Walk, Lincoln and Jefferson Memorials, and the Washington Monument.

Associated with the memorial will be a new traffic circulation system on West Potomac Park, a Tourmobile stop at the memorial entrance, and handicapped parking. Additional parking will be provided for tourbuses and cars between the 14th Street bridges. A pedestrian walkway will be provided between the parking area and the memorial. Most of the 18 sports fields in West Potomac Park either will be relocated to a site between Independence Avenue and the reflecting pool or reoriented within their existing location.

Plant materials removed due to construction operations will be replaced and remaining plants will be protected and supplemented by additional landscape plantings. Parking spaces eliminated by the removal of West Basin Drive will be replaced with the new parking areas at the 14th Street bridges. The amount of playing area presently available to the public will not be decreased, only rearranged. There will be short-term disruption of traffic flow during construction and a permanent change in traffic circulation patterns as the result of the proposal.

Written comments from agencies, organizations, and individuals responding to the Draft Environmental Statement, are included in Appendix C. Refer
to the DES for agency comments prior to 1978. Transcripts of the public hearing held November 1, 1978, are available for review at the National Park Service, National Capital Region, 1100 Ohio Drive, S.W., Room 208, Washington, D.C. 20242.
1.1 General Background

1.1.1 The Setting

West Potomac Park is composed of 394 acres and extends from Constitution Avenue on the north to the railroad bridge beyond the 14th Street Bridges on the south. It is bounded by the Potomac River on the west and eastern edge of the Tidal Basin and 17th Street on the east. It comprises one of four sections of "The Mall area in the Nation's Capital," the others being the National Mall from First to 14th Streets, the Washington Monument Grounds from 14th to 17th Streets, and the President's Park including the Ellipse and Lafayette Park. Descriptions of all of these park units are contained within the Mall Master Plan of 1966. The purpose of this Environmental Impact Statement is to evaluate the proposals which remain to be implemented within the subarea of the Mall called West Potomac Park.

West Potomac Park presently contains the Lincoln and Jefferson Memorials, John Ericsson Memorial, a monument to John Paul Jones and the Equestrian Statue Groups on the Arlington Memorial Bridge, as well as the Watergate Plaza, the Tidal Basin, the reflecting pool, Constitution Gardens, numerous ballfields for organized sports, Independence Avenue and Kutz Memorial Bridge, a portion of Interstate 395 and other park and local roads.

1.1.2 Design History of the Mall and West Potomac Park

Plans and designs in this area date back to 1791, when a mall within the Capital City was included in the first grand design for Washington, prepared by Major Pierre Charles L'Enfant. Since then, major revisions of the original scheme have been adopted at about half-century intervals. These plans include the Downing plan of 1851, the McMillan Commission plan of 1901, and several plans of the National Park Service from 1966 to 1973. The plans are described in detail in Section 2.1.

Planning for the Franklin Delano Roosevelt (FDR) Memorial was begun in 1946 when a resolution was introduced in Congress to set up a memorial commission whose purpose it was to create a memorial to the late president. The resolution was signed into law in 1955, Public Law 84-372 (see Appendix A). Planning for the memorial has since been in the hands of the FDR Memorial Commission.

In 1959, Congress passed Public Law 86-214 which reserved that 66-acre portion of West Potomac Park which lies between Independence Avenue and the Inlet Bridge for the site of a memorial to President Franklin Delano Roosevelt. The resolution stipulated that no more than 27 acres of the 66 acres could be utilized for the memorial (see Appendix A).

In 1972, Congress authorized the National Park Service to participate with the FDR Commission in the design. Since that time, the design of the memorial has been completed and has received the necessary approvals of the FDR Commission, the Commission of Fine Arts, the National Capital Planning Commission, the Joint Committee on Landmarks, and the Secretary of the Interior's National Capital Memorial Advisory Committee.
The necessary congressional approval, authorization, and appropriation of funds for construction of this design is the responsibility of the FDR Commission. Congress and the president have approved this authorization, and it is estimated that further design refinements and, in turn, construction of the memorial could be completed in approximately 5 years.

1.2 Description of West Potomac Park Proposal

The design concepts for the memorial pursuant to D.C. Code, Section 5–428, have been approved by the National Capital Planning Commission.

1.2.1 The FDR Memorial Design

Introduction: The basic concept of the memorial design is to involve the visitor in a landscape in which he moves through a sequence of garden spaces. These spaces are set along a long granite wall from which water falls into pools and runnels, and on which are sculpted images of President Roosevelt and inscriptions of his most memorable speeches and sayings. The design of the memorial has evolved as this sequence of spaces, but has also drawn on historical precedent, and has responded to the strict geometry as laid down by L'Enfant in his plan for the Nation's Capital (see L'Enfant Plan). The design departs from L'Enfant's Plan though by locating the major entrance to the memorial on a spot designated by the "kite" form of the 1901 McMillan Plan for Washington. Major pedestrian access is from Ohio Drive from a Tourmobile stop were special facilities are provided for handicapped visitors.

Imagery will be an important element in the interpretation of Franklin Delano Roosevelt's life, and his impact on American society, and will be placed on a long granite garden wall through carvings, bas-reliefs, and full sculpture in the round.

Visitors arriving at the memorial via Tourmobile will reach the site at Ohio Drive and leave their buses at the entrance plaza on the Potomac side of the peninsula. This 100-foot-long space will also provide facilities for orienting visitors, indicating how they might proceed into the memorial. The entrance will be a location where people hiking, biking, and boating along the Potomac can gain access to the memorial.

Leaving the entrance plaza, visitors will walk across the peninsula along a 245-foot tree-lined alley between 6 and 8 foot bermed earth mounds. Before them in the distance the Washington Monument will be seen across the Tidal Basin. The terminus of the alley will be the "lobby" of the memorial: a plaza that signifies arrival at the beginning of the memorial's sequence of experiences. It is a unique location at one of the juncture points on the "kite" of the McMillan Plan that has long been designated for a special memorial function.

After crossing the plaza, the visitor will begin experiencing the FDR Memorial Garden. This 740-foot-long series of garden spaces contained on 2–3 sides by a sculptured granite wall, will commemorate FDR, the happenings of his career, his service to the people, and the qualities of
THE FRANKLIN DELANO ROOSEVELT MEMORIAL
BY LAWRENCE HALPRIN FOR THE FRANKLIN DELANO ROOSEVELT COMMISSION
AND THE NATIONAL PARK SERVICE.

MARCH 1968

DRAWING OF THE LAWRENCE HALPRIN PLAN BY NATIONAL PARK SERVICE STAFF.
environment and society that characterized his presidency. Many varieties and kinds of treatment will embellish the wall including bronze bas-reliefs of people and events, inscriptions and incised sayings and sentiments. The floor of the memorial will consist of warm-colored granite pavers creating a walking surface 30 to 60 feet wide. Throughout there will be places to sit and contemplate the memorial.

The central element will be a water garden with its source in the sculptured wall. This water garden will extend from the garden wall towards the Cherry Walk and the Tidal Basin. As the natural element most identified with President Roosevelt—sailing at Campobello, his career as Secretary of the Navy, mid-Atlantic war-time meetings, swimming in the therapeutic waters of Warm Springs—water becomes the highlight of the Franklin Delano Roosevelt Memorial. Water throughout the memorial will take on the character of rivulets, sheets, pools, or places where people can walk over it on terraces or platforms.

The garden will extend past the water garden, continuing on towards a symbolic gate at a location where people can linger and observe the only view of the Capitol from the site. This "gate" will act as the entrance to the memorial for people approaching on foot from the Jefferson Memorial. In contrast to much of the rest of the memorial, this area will be much less structured, consisting primarily of a meandering path threading through low berms and tree plantings. The visitor will have the option of continuing toward the Jefferson Memorial on foot, or walking along the Cherry Walk.

The memorial will be one of many uses people will make of the peninsula. The playing fields which now attract many people to the site will be retained and rearranged to co-exist with the memorial. The long, bermed mound that will contain the memorial wall will screen the memorial from these exterior spaces, and will also act as a viewing podium for the people watching some of the sports, such as cricket, being played on the fields. Here also, people will be able to relax, picnic, and watch activities on the river.

Visitor Services: Visitor services will consist of three components: a Tourmobile and bus loading area, parking for the handicapped, and toilets at the southeastern end of the site.

The Tourmobile stop will be located along Ohio Drive at the entry to the memorial. It will provide a loading and unloading space for Tourmobiles. It will also be a point of control for the memorial. Adjacent to the Tourmobile stop will be six spaces for handicapped parking, one of which may be used for administrative purposes (see FDR Memorial Site Plan). Curb cuts and specially designed facilities will provide unlimited access to all areas for the handicapped.

A small restroom facility, with unlimited access for the handicapped, will be contained within the garden wall at the far end of the memorial. Its further description in terms of construction, materials, grading, utilities, etc., will be treated as part of the memorial itself.
Construction: Construction of the proposed memorial will require actual modification of 8.8 acres of the site in West Potomac Park. Modification will include grading (berming), paving, and construction of walls and fountains.

The area to be affected by construction extends from Ohio Drive in a northeast direction to a point on West Basin Drive, where it presently divides. From this point, construction would continue in a southeast direction along the existing alignment of West Basin Drive to a point east of the present comfort station. Construction of the memorial would require modification of all the existing roadbed of West Basin Drive—removing it entirely in the area of the memorial, downgrading it in the areas between the memorial and Independence Avenue and between the memorial and the Inlet Bridge.

A traffic turnout from Ohio Drive will be provided at its entrance. The turnout will be approximately 42,000 square feet, and will consist of a new roadbed, berming and a Tourmobile stop.

Extending northeast from the entrance will be an alley of paving, berming and planting, covering approximately 12,000 square feet. The main body of the memorial will be made up primarily of paving, garden wall, water features and planting; it will extend for approximately 1000 feet in a southeast direction, and will cover about 8 acres of which 4.4 acres will be berms or soil with sod or planting. The rest of the memorial is comprised of:

- A walkway linking the east end of the memorial with the Inlet Bridge, to be constructed of gravel on asphalt.
- The turnout and entry alley described previously.

The restrooms will be concrete slab on grade, with concrete roofing which will be covered with ground cover to minimize visual intrusion of the structure on the natural landscape, as seen from the air.

The walls will be reinforced concrete with anchored stone veneer of split face granite. Piles will be provided as required. The pools will be reinforced concrete slabs under a granite floor. Granite paving will be placed on concrete slabs. The paving base will be perforated to provide for vertical drainage. A drainage medium will be utilized between paving and paving base to provide lateral drainage. Paving will be jointed in an apparent random pattern and some peripheral joints will be filled with soil to promote growth of ground cover.

Excavation will be 3-feet deep for typical wall pile cap. Excavations will be 7 to 10 feet deep for fountain pools. There might be excavation of 7 feet under berms in order to replace existing soil with lighter material. Excavated materials will be disposed of offsite.

Imported fill, possibly including a special lightweight expanded shale aggregate, will be placed and compacted for construction of a maximum 14-foot high earth berm. It might be necessary to create voids in the berm to lighten surcharge and provide utility chase. All planting in
compacted areas of the berm will be provided with lateral drainage. Imported granular fill will be placed behind retaining walls and under slabs on grade. Perforated pipes will be provided in drain rock blanket in fill behind retaining walls in order to drain water.

**Utilities:** Domestic water and irrigation service will be taken from local water mains. Fountain water will be recirculated requiring only a small amount for make-up. Sanitary sewer will connect to the existing sewers.

Separate underground electrical facilities will serve the FDR Memorial. Service will come from an existing Potomac Electric Power Company distribution feeder presently serving the comfort station at the east end of the site. Telephone service to the restrooms will be derived from existing facilities at the west end of the site.

**Lighting:** Lighting of the proposed project is divided into two distinct categories: the lighting of the objects and the environmental elements, and the general illumination providing pedestrian pathway security. The southern side of the memorial will be lighted using concealed sources to highlight each characteristic wall and water event as well as the sculpture and various entablatures. This will create a band of low-level, ambient light along the southern perimeter. In addition, the plantings behind and below many of the stone walls will receive low-level illumination.

The nature of the course of the trees through the memorial will be emphasized by lighting them from below. This is to establish an overhead lighted element that carries from space-to-space a sense of enclosure during the summer and a lacy network of branches during the winter months. The water elements will be treated to emphasize the movement and the surface reflections of the water itself. The bottom of the pools will not be emphasized as this would detract from the surface texture of the water movement.

Where certain stone wall elements form natural gateways between spaces, each will be emphasized by providing a pool of brightness at this juncture. There will be an attempt to emphasize points of interest by varying the importance of the focal points with stronger light.

The large expanse of area across the walkway to the north (Tidal Basin) side of the memorial will enable an aesthetic distance to be created by including walkway wash lighting emanating from fixtures concealed in the low walls between the benches. This, however, will not provide enough lighting for adequate general illumination and a rhythm of light standards as well as lights concealed in the benches in the center areas will be necessary. The light standards will be "low brightness" luminaries which have concealed or cut-off sources. This second band of illumination is to create a secure sector from which the viewer can comfortably see the points of interest. High intensity discharge (low-energy) light sources will be used wherever it is feasible. Spotlighting and certain wash lighting will utilize quartz/incandescent light sources and flourescent light with "incandescent" color spectrum tubes.
1.2.2 Ballfields

The 66-acre section of West Potomac Park that Congress designated as the site of the FDR Memorial presently contains a polo field, a rugby field, 2 cricket pitches, 3 soccer fields and 11 softball fields. (See Existing Conditions map.)

Construction of the memorial will require relocation or reorientation of most of these fields. All three soccer fields, the rugby field and two softball fields will be moved to the area formerly occupied by the Folklife Festival. All other sports facilities will be retained adjacent to the memorial. The eastern section between the memorial and Ohio Drive will contain five softball fields and two cricket pitches. The western section, between the memorial and Independence Avenue will retain the polo field in its present position and contain four softball fields. Refer to the revised Site Plan of West Potomac Park.

1.2.3 Circulation and Parking

Construction of the memorial will require the removal of the central section of West Basin Drive and redesign of portions of Ohio Drive.

The extreme eastern portion of West Basin Drive (approximately 400 feet in length) will be retained on its present alignment and will remain one-way in a westerly direction. However, it will be scaled down to two from its present four lanes and no parking will be permitted. Four hundred feet from the egress from the Inlet Bridge it will turn left (southwest) to link with Ohio Drive. It is herein described as the West Basin Inlet Loop.

Ohio Drive will become a two-way system with two lanes of parking accommodating 261 cars in West Potomac Park. It will, as at present, carry the Tourmobile.

In order to facilitate access to Independence Avenue from Ohio Drive, a one-way turning roadway will be provided approximately 220 feet from the intersection, at 23rd and Independence Avenue. Traffic moving west on Independence Avenue onto Ohio Drive and from Ohio Drive to Rock Creek Parkway will be allowed to negotiate the intersection as at present.

No parking other than that in designated areas along Ohio Drive and West Basin Drive will be provided for the public in this section of West Potomac Park. This will amount to 325 spaces. Spaces for use by the handicapped will be available at the main entrance to the memorial.

Additional visitor parking for automobiles (200 spaces) will be provided at a lot in West Potomac Park between the southern span of the 14th Street Bridge and the railroad bridge across the Potomac River. This lot would bring the total number of parking spaces available to sports field users and memorial visitors to about 525 spaces, about 60 fewer spaces than are currently available. This lot will accommodate nearly all of the spaces lost due to the closing of West Basin Drive. The lot is illustrated on the Parking Plan at 14th Street Bridges map. The lot will be visually screened from Ohio Drive by the planting of trees between Ohio Drive
and the edge of the lot and can also be partially screened from I-295 by plantings of trees along I-395. The lot can be further screened from the Metrorail line by similar plantings and covered further by trees and shrubs planted within the lot. Parking for buses (20 spaces) will also be provided at a lot in this section of West Potomac Park. The lot is located between the spans of the 14th Street bridges. This area is designed to adequately accommodate the bus parking demand generated by the memorial. This lot can be similarly screened from Ohio Drive and I-395 with plantings of trees and shrubs. Due to the flatness of the two sites, minimum grading will be required. Low retaining walls may be necessary where the parking lots abut the three fill slopes of the highways.

Pedestrian circulation will be as follows:

- Retention of the "Cherry Walk" intact.
- Retention of the walks and trails along the Potomac.
- Removal of the walk along West Basin Drive and its replacement by meandering trails through heavily landscaped areas. Plant materials will include many of the existing trees, but these will be reinforced. In certain areas berming will be used to reinforce planting.
- Provision of new walkways north of Ohio Drive and the remaining section of West Basin Drive to strengthen linkages to the Lincoln and Jefferson Memorials.
- Provision of new walks from the Cherry Walk to reinforce pedestrian linkage to the Washington Monument and Constitution Gardens

1.2.4 Tourmobile

The Tourmobile will serve the FDR Memorial on its route between the Jefferson and Lincoln Memorials. It will enter the present intersection at 23rd Street to cross Independence Avenue to the Lincoln Memorial. Only one stop will be provided in this section of West Potomac Park, that at the main entry to the memorial. Refer to the Circulation and Parking Plan map.

1.2.5 Access and Storage During Construction

During the 24-month construction period, West Basin Drive, along its entire length, would be closed to public use to allow its utilization as access to the construction site.

In order to allow two-way access throughout West Potomac Park and from Independence Avenue, the Jefferson Memorial, and East Potomac Park (and vice versa), Ohio Drive would have to be modified to accept two-way traffic in West Potomac Park prior to memorial construction.

Construction equipment, materials, and personnel would have access to the construction site primarily from West Basin Drive, but also from Ohio Drive when necessary. West Basin Drive would function as a two-way street for construction traffic and would have to be modified at Independence Avenue to allow access to the site from that street.

All materials will be stored on existing hard surfaces or where designated. Existing plant materials will be protected at all times. Bulk
construction materials will require a maximum of 2 acres or an area approximately 200 by 400 feet. Storage for small manufactured components and mechanical or electrical hardware will require an area of approximately 8000 square feet, including the space required by two or three construction trailers.
DESCRIPTION OF THE ENVIRONMENT
2.1 History of Planning and Design for Washington, West Potomac Park and the FDR Memorial

2.1.1 The L'Enfant and Jefferson Plans

L'Enfant had begun planning the "Federal City" for President Washington early in 1791, the same year in which Jefferson had put down his ideas in plan form. Fitting his grand design to the site necessitated considerable compromise, but L'Enfant effected much of the design that has been handed down to us essentially as conceived in Jefferson's "map of dotted lines" (1791).

L'Enfant set the "Congress House," the "President's House," City Hall, and the present site of the Washington Monument as the major hubs from which the major avenues would radiate. Further, these were sited on higher ground or, in the case of the latter, on a peninsula in the Potomac.

The basic geometry used by L'Enfant is readily apparent in later plans and in the existing layout of Washington. It was to L'Enfant's long-forgotten plan that the McMillan Commission returned over a century later.

The executed plan of Washington was completed by Ellicott, and was presented in graphic form in 1800. Ellicott responded to many of Washington's wishes and thereby probably derived a more successful plan. Chief among the changes was the realignment of Massachusetts Avenue. In addition, he was able to restore to the plan some of the items Washington had wanted to delete. In this respect Ellicott's drawing represents L'Enfant's plan in its most complete form.

2.1.2 The Bingham and McMillan Plans

At the time the eventual use of Potomac Park was not anticipated, and in 1895 an attempt in Congress to have the land declared a public park was defeated. However, in 1897, the land was declared Potomac Park, and in 1900 the Office of Chief Engineers, under Colonel Thomas Bingham, prepared a plan entitled "Design for the Mall." In creating the land the U.S. engineers also formed the Tidal Basin.

The overall plan to be followed in Potomac Park was dictated by the United States Senate in the report of the Senate Committee on the District of Columbia submitted on January 15, 1902, and sponsored by Senator James McMillan. The plan specified locations on both the east-west axis and north-south axis, terminating in West Potomac Park, as sites for major memorials. The one at the end of the east-west axis would honor Abraham Lincoln and the other would be left for future decision. In time these two aspects of the plan were fulfilled in the building of the Lincoln and Jefferson Memorials, but most of the details of the McMillan plan were never fully carried out.

An important element of the McMillan Commission's reconstruction of L'Enfant's plan involved creation of what will be referred to as the "Kite Plan." See McMillan Commission Plan map. In this plan Maryland Avenue
Map E: L'Enfant Plan, 1791
Diagram of a portion of city showing proposed sites for future public buildings.

Scale: 2400 ft.

Dec 1901

Commission on the Improvement of the Park System

Daniel H. Burnham, Chicago
Augustus St. Gaudens, New York
Charles F. McKim, New York
Frederick Law Olmsted Jr., Brookline

Map G: McMillan Commission Plan, 1901
was extended onto a section of land adjacent to the Tidal Basin where there were to be housed an aggregation of memorials and a formal pool. The pool was to lie at the location of the present forecourt of the Jefferson Memorial, and was, further, to be on axis with the White House and Washington Monument.

Elsewhere, an avenue was to be extended south-southeast from the present site of the Lincoln Memorial to a point in West Potomac Park where it intersected another avenue running west-northwest from the present site of the Jefferson Memorial. This point was directly south of, and was a mirror image of the intersection of New York and Virginia Avenues, north of Constitution Avenue. Both locations have since been regarded to have had high potential as memorial sites, but neither has been utilized up to this time.

2.1.3 National Park Service Plans for the Mall – 1966 and 1976

In the last decade master planning for the entire Mall to include West Potomac Park has been undertaken by the National Park Service. The initial plan was approved in 1966 and was updated to reflect developments for the Bicentennial (1976). The 1976 development plan for the Mall represents both the implementation of the McMillan plan and incorporation of some of the more recent proposals and achievements such as the Air and Space Museum, the National Sculpture Garden, the Hirshhorn museum, Constitution Gardens and the renovation of the Mall from 3rd to 14th Streets.

The 1966 Master Plan for the Mall addressed circulation of Tourmobiles, pedestrians and cyclists, and indicated locations for visitor services and provided conceptual plans for lighting and site planning. The concepts were endorsed by the various reviewing agencies and thus began a program to improve the year-round attractiveness of the Mall. The specific goals were to augment plantings; to provide visitor refreshment, orientation and rest facilities with minimal intrusion on the natural environment of the Mall; to eliminate incompatible and unnecessary structures; to remove major surface traffic from park areas; and to provide a public transit system on the Mall.

Major facilities that have grown out of these concepts are as follows:

- Development of Constitution Gardens between 17th and 23rd Streets, north of the Lincoln Memorial reflecting pool in West Potomac Park.
- Provision of Tourmobile service.
- Construction of comfort stations and information kiosks at various locations on the Mall.
- Removal of roads (and parking) on the Mall between 3rd and 14th Streets and Madison and Jefferson Drives, as part of a National Park Service commitment to minimize the impact of the automobile within parklands in the Nation's Capital.
Map H: National Park Service Plan, 1976
(With Axial Geometry of McMillian Commission Plan Overlaid)
2.1.4 1985 Comprehensive Plan for the National Capital

The 1985 Comprehensive Plan (officially adopted in 1974), and its unadopted forerunner prepared in 1967 focuses particular attention on monumental Washington, and again stresses the need to refine and complete the L'Enfant and McMillan plans. "New monuments and memorials should express contemporary life and be placed in prominent locations throughout the city."

2.1.5 South Leg of the Inner Loop Freeway

In 1966, as part of the interstate highway system, a tunnel was proposed under West Potomac Park which would have replaced Independence Avenue. Since that time this proposal has been dropped from active consideration by the Department of Interior and the District of Columbia Government. Thus, for the purposes of this statement Independence Avenue will remain as a four lane, on-grade major thoroughfare.

2.2 Social and Cultural Environment

2.2.1 Land Use and Demographic Character

Uses and Ownerships - The Mall and West Potomac Park are considered to be part of a national open space. Responsibility for administration is assigned to the Secretary of the Interior through the National Park Service's regional office, National Capital Region. However, policy decisions regarding its design and development require consultation and coordination with several other agencies.

The Mall is the setting for several museums such as the two buildings of the National Gallery of Art and the seven buildings of the Smithsonian Institution. In addition, the adjacent Federal Triangle contains major visitor attractions such as the National Archives.

For the purpose of description, West Potomac Park can be subdivided into seven separate land areas.

1. Jefferson Memorial - This structure, lying at the south edge of the Tidal Basin on direct axis with the White House, is a memorial to Thomas Jefferson. It was dedicated on April 13, 1943, the 200th anniversary of Jefferson's birth. The structure was designed by John Russell Pope in a style associated with Jefferson. Inside the memorial is a 19-foot bronze statue of Thomas Jefferson sculpted by Rudolf Evans, together with four excerpts from Jefferson's writings which are carved on the walls.

The annual visitation to the Jefferson Memorial is approximately 1.7 million. During the peak visitation month of August 1981, 229,022 individuals visited that memorial. The memorial is served by a 66-car parking area which is adequate to accommodate the demand. The site to the south of the memorial is the crossing of Interstate 395 as it proceeds from Virginia into the District of Columbia. Also in this complex is the main line of the RF&P Railroad and a spur route from the Metro system. These transporation elements result in four bridges across the Potomac River. Approximately 10 acres of the park have been devoted to these transportation elements.
Four military bands perform weekly outdoor concerts during the summer months at the Jefferson Memorial Plaza. These concerts draw approximately 5,000 people each. The concerts were previously played at the Watergate Plaza but were relocated because of noise from airplanes using the Potomac River flight pattern.

2. The Lincoln Memorial and reflecting pool - In 1867, 2 years after Abraham Lincoln's death, Congress organized the Lincoln Monument Association to plan a monument to Lincoln's memory. Work finally began in 1914 and the memorial was dedicated on May 30, 1922. The building was designed by Henry Bacon and the 18-foot statue of Lincoln was sculpted by Daniel Chester French.

The Lincoln Memorial is one of the most highly visited attractions in Washington, receiving approximately 2.8 million persons annually. During the peak visitation month of August 1981, 436,000 individuals visited the site.

In 1976, the National Park Service implemented three revisions to the original memorial area. First, elevators were constructed in the memorial and second, the traffic circle which carried vehicles around the memorial was closed. Third, a two-way system was implemented on the north and west sides of the memorial. These proposals were addressed in an environmental assessment produced at the time. The traffic system is functioning well and the National Park Service intends to retain the traffic patterns as they are today. Subject to further study are the permanent traffic control and safety devices which need to be placed around the memorial. These will require very sensitive detailing and design to ensure that the devices do not intrude nor drastically alter the original design of the memorial circle.

The reflecting pool, constructed as a visual link between the Lincoln and Washington Monuments along the east/west axis of the Mall, is 2,026.8 feet long, 160 feet wide and 3 feet deep. The rainbow pool, located at the eastern end of the reflecting pool, is 300 feet long and 160 feet wide.

3. Constitution Gardens - The 52-acre site for Constitution Gardens is bounded on the east by 17th Street, on the west by 23rd Street, by the Lincoln Memorial and reflecting pool on the south, and by Constitution Avenue on the north. Approximately 26 acres of Constitution Gardens are covered with trees, and 7½ acres are covered with a lake with 2,650 feet of undulating shoreline and a maximum depth of 4 feet. At the center of the lake, is a 1-acre island where a memorial to the 56 Signers of the Declaration of Independence was built in 1982. Just north of the lake is the Vietnam Veterans Memorial, dedicated in 1982. Both memorials are accessible to visitors by garden paths. There are 2,510 feet of bicycle paths, over 3 miles of pedestrian paths (including 6,500 feet of sidewalk along streets bordering the site and 9,405 feet of path in the interior of the site). The paths widen in eight locations into paved (wood chips, compacted crushed stone) areas ranging in size from 5,800 to 18,000 square feet. These areas are intended for use as open air "stages" for activities which would not disrupt such proposed regular on-site activities as picnicking, walking, and bicycling. These paths and paved areas are illuminated for night use.
Approximately 13.8 acres have been left as open grass areas. The rolling contours are intended to create a desirable setting for picnics and informal sports, but not for large gatherings and events. A refreshment kiosk with a terrace for tables is located in the central part of the site at the west end of the lake. A pavilion will be placed on the terraces at the east end in the future. Access to the park is via municipal and charter buses and by Tourmobile. A 14-foot wide Tourmobile roadway with two discharge/loading areas is located along Constitution Avenue.

Two thousand five hundred trees, such as oak and maple, and a variety of flowering trees and shrubs have been planted in the garden. There are two rows of regularly spaced elms bordering the reflecting pool as well as the spaced elms bordering Constitution Avenue.

4. Tidal Basin - The distance around the basin is approximately 2 miles and contains 126 acres. The basin was created between 1910 and 1920 when East and West Potomac Parks were filled by the U.S. Corps of Engineers with dredge material following the dredging of the Washington Channel. The existing boating use is considered to be desirable and will be retained.

5. Old Folklife Festival Site - This area of approximately 50 acres is located directly south of the reflecting pool and extends to Independence Avenue. Half of the site is wooded with a combination of beech, oak, and extensive plantings of camellias and azaleas. The remaining half of the site is an open field and has been traditionally used as space for organized sports. The Smithsonian Institution and National Park Service have utilized this open space for the Festival of American Folklife. As a result of this activity, extensive underground electrical systems have been installed on the southern edge of the open space. A comfort station was constructed in 1974. In the wooded portion of the site, the D.C. War Memorial, which was dedicated in 1931, is located on the axis with 19th Street. Due to its isolated location, this memorial receives little visitation.

A temporary stable facility for the United States Park Police horses is located within this area. This facility was constructed to respond to the increased visitation of the Bicentennial. A study is currently underway to determine the long-range needs of the Park Police Horse Mounted Division. It is not anticipated that a permanent location for a stable facility will be located in West Potomac Park.

6. Franklin Delano Roosevelt Memorial - The 66-acre site bounded by Independence Avenue and the Inlet Bridge and the Potomac River and the Tidal Basin was set aside by Congress in 1959 as a memorial to Pres. Franklin Delano Roosevelt. The resolution stipulated that no more than 27 acres could be utilized for the memorial. The area presently contains Ohio Drive along the western side and West Basin Drive along the eastern side. The open space within these roadways is entirely dedicated to organized sports. This includes 11 softball fields, 2 cricket pitches, 1 polo field, 3 soccer fields and 1 rugby field. The roadways are lined predominantly with elm trees varying in size from 3 to 48 inches in diameter. The roadways accommodate 560 parking spaces which are utilized for visitors and participants in the sporting events and visitors to the Lincoln Memorial and Tidal Basin area.
An existing temporary boat dock is located along the Potomac shoreline. This dock serves commercial boat tours. A separate study will be undertaken to determine the long-term desirability of this facility. If it is determined to be a necessary visitor service, a permanent location for the boat dock along the Potomac shoreline in this section of the park will be chosen.

7. Independence Avenue - Independence Avenue bisects West Potomac Park. It is presently four lanes with a median strip containing mature American elms. In 1966 it was proposed to construct a tunnel through the Independence Avenue corridor which would have replaced the existing road. Since that time the concept of what became known as the South Leg of the Inner Loop Freeway has been deferred from active consideration by the Department of the Interior and the government of the District of Columbia. Thus, for the purposes of this statement, Independence Avenue will remain as it currently exists.

2.2.2 Existing Visitation and Past Trends

The most recent estimates of total visitation in the Washington metropolitan area were prepared by Gladstone Associates (Visitors and Their Contribution to the Washington Economy, 1974). On the basis of limited available data, this study estimated that a total of 7.4 million overnight and between 1.5 and 3.0 million same-day visitors arrived in Washington in 1974. Overnight visitors' estimated average stay is 2.7 days, giving an estimated total of approximately 22 million visitor days.

The Gladstone Associates study estimates were based on an evaluation of visitor information from a variety of existing sources and an up-to-date and comprehensive inventory of commercial accommodations. No direct measurements of people travelling to the area are available, and sample surveys of visitors have been infrequent. However, the estimates appear to be adequate as an order of magnitude measure for comparison with earlier studies. The estimates, however, are substantially lower than the projections to 1976 made by Wilbur Smith and Associates (Bicentennial Transportation Study for the National Capital Area, 1973).

Visitation appears to have increased at a faster rate in the late 1960s and early 1970s than it did during the earlier 1960s. The general trend in visitation at the Washington Monument and the Lincoln and Jefferson Memorials was dramatically upward from the mid-1950s until about 1967. Since that time visitation has shown only a gradual increase.

Data for 1981 indicated annual visitation at the Jefferson Memorial at 1.7 million and 2.8 million at the Lincoln Memorial. Peak monthly visitation (April) at both memorials is approximately equal. During the cherry blossom season in April 1981 there were 311,975 visitors to the Lincoln Memorial and 340,178 visitors to the Jefferson Memorial. The average visitation at these memorials is 12,000 to 14,000 a day. Between 13,000 and 16,000 could visit these memorials on a given peak day. Visitation patterns have fluctuated during the past several seasons.

Of the sports fields uses, softball is by far the most actively pursued and in July there is a total of 68,000 visitor hours. Soccer and cricket
each generate around 20,000 visitor-hours per month in their respective seasons. Polo, which is only played on Sunday afternoons in summer, attracts up to 4,200 visitor-hours per month. Figures are not available for rugby or field hockey.

2.2.3 Projected Visitation

Studies on tourism in Washington, D.C., made during the late 1960s, anticipated the continuation of population, economic, and tourism growth rates experienced during the 1950s and early 1960s and projected an annual increase in visitors to the metropolitan area of between 3 and 6 percent per year. Wilbur Smith and Associates, in the Bicentennial Transportation Study for the National Capital Area, 1973, projected a normal level of 11,523,000 overnight tourists in 1967 based on an annual growth rate of 6 percent. Over and above this annual increase it was anticipated that the Bicentennial, although not on the scale of the heavy and sustained visitation to a world's fair, would attract another 40 percent of normal overnight, same-day and resident tourist visits. This would give a total of approximately 25 million tourist visitors to the Capital during 1976, in addition to some 10 million business and convention visitors. Assuming an average stay of two days by overnight tourists, total tourist visitor-days in 1976 were projected at approximately 41 million. However, actual counts during the Bicentennial were 16.8 million tourists, only slightly above 1974 and 1975 figures.

As discussed above, visitation records for visitor attractions in the Mall area indicate a leveling off from approximately 1968, and the most recent estimate of total visitation suggests a much lower growth rate than upon which the Bicentennial projects are based. Economic conditions in the early 1970s may account for much of the leveling off or declining visitation figures. Previous studies have concluded that normal trends in visitors to the museums are closely tied to general economics and tourist trends.

The social profile of the typical museum visitor was described by the survey as "white, middle-aged, in the upper middle-class according to income, with an above average education; and he is at the Smithsonian museums for enjoyment with friends or family." Forty-one percent of the interviewees were over 35. Some 62 percent came with other adults and 30 percent with children.

2.2.4 Visual Character

The site has a visual character derived from its recent history, from its vegetation, from its uses, and most importantly, from its location in monumental Washington.

The site is landfill derived from dredging operations in the late 19th century. It appears as a part of the essentially horizontal landscape of the Potomac floodplain and has in the past (1942) been subject to flooding as it is low-lying and flat. It is bounded on its river and Tidal Basin edges by a stone seawall which rises quite rapidly (within 40-50 feet) to a plateau.
Soon after its creation, West Potomac Park was extensively planted. The legacy of the plantings undertaken in the period from 1900 to 1915 remains primarily in the form of mature elms planted along Ohio and West Basin Drives and in the several hundred Japanese cherry trees along the Tidal Basin. To this original palette have been added many other trees while age and disease have required the replacement of many others.

Since the removal of temporary wartime buildings in the early 1960s, the open land of West Potomac Park has been adapted for recreational uses which are an essential part of the visual character of the site for much of the year. Such activities include softball, soccer, rugby, cricket, and polo.

In addition, all roads on the site are utilized for parking by commuters and tourists during the day and by tourists and sportsfield users on evenings and weekends. The automobile has a high visual impact on the site.

Much of the Commission's concern in the selection of this site over others had to do with its high visibility in the landscape of the Lincoln and Jefferson Memorials and the Washington Monument. In the 1960 competition booklet they published a photograph of the site as seen from the Washington Monument and thus was captioned "view of the site seen by over one million persons annually. . . ." The Commission went on to state, "The Commission unanimously decided to recommend the Tidal Basin site. It suggested a more reflective expression and, because of its location, a less dominant form than the Lincoln, Jefferson, and Washington Monuments."

2.2.5 Historic Environment

The project site is within Federal property boundaries and has been listed on the National Register of Historic Places. The Register entry is listed as "East and West Potomac Parks." In brief, the Register cites the significance of the park as being an urban park area, site of commemorative events and major social demonstration, a setting for monuments and memorials, and, finally, the result of the combined efforts of architects, artists, and landscape architects that have for over 100 years developed a dynamic rather than static parkscape.

2.3 Urban Systems

2.3.1 Traffic and Parking

Existing Roadways: The existing roadway network in the vicinity of the memorial is illustrated on the Existing Road Network map. By comparison with other Mall areas, the relatively few streets are widely spaced. Furthermore, the FDR site is isolated in many respects from traffic which originates at or is destined for the heavy employment and commercial areas of the city. The Tidal Basin, the reflecting pool and the Potomac River all tend to protect the site from significant through-traffic volumes and limit traffic to localized trips.
Key: Numbers Indicate 1977 Average Weekday Traffic

Map J: Existing Road Network
Map K: Distribution of 1977 Weekend Traffic
(Volumes at Entrances and Exits to the Site by Purpose)

Key:
0000 Total Traffic
000 Sportsfield Users
000 Boat Tour Patrons
00 Lincoln Memorial Visitor
0 Through Trips

3722 (967)
2059 (419)
1978 (660)
2515 (112)
2198 (0)

(000) Total Traffic
(000) Sportsfield Users
(000) Boat Tour Patrons
(000) Lincoln Memorial Visitor
(000) Through Trips

897 (20010)
Ohio and West Basin Drives between the Inlet Bridge and Independence Avenue carry relatively low traffic volumes (see Existing Road Network map) and serve a combination of types of traffic. The first type is comprised of work-related travel which is destined for National Park Service buildings in East Potomac Park or the major employment areas of the southwest part of the city via I-395. Use is primarily on weekday mornings and evenings. See Distribution of 1977 Weekend Traffic.

The second type of traffic served by these roads is related to the Lincoln Memorial and other visitor attractions in the Mall area. Many visitors to the Lincoln Memorial and other attractions park in West Potomac Park along Ohio and West Basin Drives; many of these visitors subsequently ride the Tourmobile.

The third type of traffic on these roadways is associated with sports fields users who make up a significant portion of the total traffic on summer weekends and evenings. Other types of traffic using Ohio and West Basin Drives comprise visitors to the Jefferson Memorial, Hains Point, and the golf course in East Potomac Park.

Many of the types of traffic cited above also park in spaces along Ohio and West Basin Drives. The two most important parking uses which have been identified are those for the Lincoln Memorial and for sports fields. Many visitors who travel to the Lincoln Memorial by auto currently park in a designated zone along Ohio Drive just south of Independence Avenue. This area is most heavily utilized during spring and summer. The parking provided along Ohio and West Basin Drives is heavily utilized by sports field users. This important use is evaluated in this statement.

During the winter months, commuters park along West Basin Drive near Independence Avenue and at other locations in the park. During the spring and summer months, all-day parking is prohibited. However, some commuters continue to park, depending on the degree of enforcement of the parking prohibition.

The other principal roadway near the site of the FDR Memorial is Independence Avenue. To a certain extent, Independence Avenue serves the same types of traffic as Ohio and West Basin Drives. However, Independence Avenue is classified as a principal artery and carries much greater traffic volumes. It serves an important function in the regional transportation network by linking Memorial Bridge and suburban Virginia with major activity and employment areas in Washington. Parking is prohibited on Independence Avenue, and this prohibition is strictly enforced.

Tourmobile: An interpretive shuttle/tour-bus, the Tourmobile, currently operates on five routes in and near the Mall area (see Tourmobile Route map). The easternmost route travels along the length of the Mall linking the Washington Monument, Smithsonian Institution, National Visitor Center, Union Station, and the Capitol. The central route links the Washington Monument, Bureau of Engraving, the Lincoln and Jefferson Memorials, Constitution Gardens and the buildings near Constitution Avenue, and the White House. The third route connects the Lincoln Memorial with the Kennedy Center where parking is provided. Another
Map L: Existing Tourmobile Routes
route links the Lincoln Memorial with Arlington Cemetery via Memorial Bridge, and the last route provides shuttle-loop service within Arlington Cemetery.

The central route presently serves the site of the memorial. This route starts at the Washington Monument and travels via 15th Street to the Bureau of Engraving and on to the Jefferson Memorial on East Basin Drive. From the Jefferson, the Tourmobile travels to the Lincoln Memorial via the Inlet Bridge and West Basin and Ohio Drives. It travels along French Drive, northeast of the Lincoln Memorial to the service roadway at Constitution Gardens. From Constitution Gardens, the Tourmobile circles the Ellipse, stopping at the north edge to serve visitors to the White House. The route returns to the Washington Monument via Constitution Avenue and Fifteenth Street.

The completion of the Metrorail system (discussed below) will likely have significant impacts on tourist travel characteristics, although no Metro lines intersect with this route. The system can be expected to increase Tourmobile ridership in the Mall area and on the route which will serve the memorial.

Currently fares on the Tourmobile are $6.00 for adults and $3.25 for children under 12. Trends in Tourmobile ridership are not very predictable. In the late 1970s ridership was decreasing, but from 1980 to 1982, ridership doubled. Some of this increase may be attributable to the addition of new Tourmobile routes.

### Annual Ridership

<table>
<thead>
<tr>
<th>Year</th>
<th>Ridership</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>116,000</td>
</tr>
<tr>
<td>1981</td>
<td>120,000</td>
</tr>
<tr>
<td>1982</td>
<td>302,959</td>
</tr>
</tbody>
</table>

Metrorail: By the early 1990s, the full 101-mile Metrorail rapid transit system is expected to be in full operation with many of the stations serving the Mall area (see the Metrorail Transit Stations map).

The impact that Metro will have on the number of people traveling to the Lincoln, Jefferson, and FDR Memorials and their modes of transportation is not clear. However, it seems likely that Metro will somewhat decrease the percentage of memorial visitors traveling by auto and increase those traveling by the Tourmobile. Since few of the rail stations are close to the memorial site, the number of visitors traveling to the site exclusively by transit is not expected to be large. However, several of the Metro lines intersect with the eastern and western Tourmobile routes. While no line intersects the central route which will serve the site, visitors to the memorial may well choose to board the Tourmobile on another route at a Metro station and transfer to the central route which serves the memorial.

Bus Transit: The site of the proposed memorial is currently indirectly served by several Metrobus routes along Constitution Avenue and 14th Street near the Bureau of Engraving (see Area Bus Routes map).
Map N: Area Bus Routes

Key:
- Local Bus Routes
- Express Bus Service
Although numerous routes travel on these streets, the quality of existing transit service for people who may be traveling to the site is poor. At best, only a handful of stops along Constitution Avenue are within a 10 minute walk of the northermost portion of the site. Most of the site, in fact, lies between 10 and 20 minutes of any bus stops at an average walking speed. Furthermore, when the full 101-mile Metrorail rapid transit system opens in the early 1990s, many of the bus routes which now serve the area will be eliminated.

2.3.2 Utilities

Power Utilities: The area of the proposed project is presently served by a PEPCO 4kV (kilovolt) line which terminates at the existing comfort station at the east end of the memorial site.

Service to the site has a total capacity of 2.2 MVA (megavolt amps) or approximately 2.2 million watts. The present load on this feeder is .6 MVA leaving 1.6 MVA capacity to serve the memorial project. The electrical substation providing power to this line has a total capacity of 11.2 MVA.

Telephone Utilities: A Chesapeake and Potomac Telephone Company underground line traverses the site from east to west along the south side of West Basin Drive.

2.4 Physical and Biological Environment

2.4.1 Climate

General: Washington's climate is made up of a wide range of conditions with no lengthy periods of excessively inclement weather. The mountain mass 40 miles west of the city protects it from winter storms. August and September can be extremely wet with precipitation well above the annual mean. High or continuous winds are not characteristic but strong northwesterlies occur in spring and late fall, and occasionally a tropical storm disturbs the summer calm. Nights are characteristically calm throughout the year.

Temperature: Over very short periods the area experiences temperatures above 105°F except where heat is trapped by structures and stored by paving and walls. About 500 hours in summer have temperatures between 85° and 105°F. This is typical of July afternoons and creates uncomfortable conditions as there is no breeze and it is usually accompanied by vapor pressure of 15 mm. Only intense shading can ameliorate this condition outdoors. Summer evening temperatures can drop to between 65° and 85°F. Outdoor activity is limited for most people when temperatures exceed 85°F.

The predominant winter climate is characterized by frequent frost, freeze, then occasional snow and muddy conditions with temperatures between 25° and 45°. Outdoor activities are obviously more limited toward the lower end of the temperature range.
Cold periods occur occasionally on winter nights but temperatures below 25° do not normally extend far into the morning. Outdoor activity is almost entirely precluded and many plant materials suffer permanent damage.

**Solar Radiation:** Fifty-eight percent of daylight hours experience sunny conditions which are distributed evenly throughout the year. Forty-six percent of winter hours, and 63 percent of summer hours are actually sunny. Cloudy conditions are most prevalent in winter but also characterize many hot summer afternoons.

In mid-winter at noon, the sun rises to only 28° above the horizon and provides only 9 1/2 hours of daylight.

**Wind:** High winds are infrequent in Washington—the highest record velocity over 5 minutes is 53 mph and gusts up to 73 mph have been recorded but are rare.

In summer, the primary prevailing wind is from the south, and the secondary is from the northwest. In winter, northwest and west winds predominate. A large number of evenings and nights are calm or experience light winds throughout the year but especially in summer. Afternoons are the breeziest part of the day, ameliorating what would be extremely "muggy" weather.

Winter and early spring are the windiest parts of the year with afternoon gusts from the northwest reaching 47 mph.

**Precipitation, Humidity, and Vapor Pressure:** Annual rainfall averages 40 inches. July is the "wettest" month (average of 4.16 inches) and November is the driest (2.65 inches). Throughout the year rainfall is normally sufficient to support native plant materials.

Annual snowfall averages 22 inches with most falling in January and February. Snow generally occurs on only 12 days each year and rarely remains on the ground more than 2-3 days. Major storms occur every decade but have never exceeded 28 inches.

Average relative humidity ranges between daytime levels of 65 percent (winter) and 52 percent (summer). Nighttime levels average 75 percent in winter and 86 percent in summer.

When vapor pressure rises above 15 mm and temperatures above 65°F there is a sensation of discomfort and a tendency for most people to perspire under calm conditions even though inactive. Vapor pressures in the 20s (with temperatures over 65°F) are unbearable without a breeze. Below 10 mm vapor pressure causes a sensation of chill even with temperatures as high as 70°F.

For 50 percent of the year vapor pressure is low (below 7.9 mm) producing a drying stress on the body. Twenty-five percent of the year occurs in the comfort zone and another 25 percent in the high zone (14.2 - 26.2 mm). Evaporation of water from plant materials and water bodies can provide essential cooling during periods of high vapor pressure.
2.4.2 Air Quality

Introduction: Section 2.3.1 describes the existing traffic and circulation patterns at, and adjacent to, the proposed FDR Memorial site. This section focuses on the air quality aspects of those traffic patterns in the vicinity of the memorial site—specifically the projected carbon monoxide concentrations at locations near the memorial itself, and at existing nearby recreation areas.

National Ambient Air Quality Standards: The 1970 Amendments to the Clean Air Act provided for the establishment of National Ambient Air Quality Standards by the administrator of the U.S. Environmental Protection Agency (EPA). Thus far, the EPA administrator has established standards for carbon monoxide, hydrocarbons, nitrogen oxides, photochemical oxidants, particulates, and sulfur oxides. For projects whose air quality impact is due to vehicular sources, major concern is ordinarily focused on carbon monoxide (CO), hydrocarbons, and nitrogen oxides since these are the pollutants which are traceable primarily to vehicular emissions. Of these three, carbon monoxide is by far the most important in assessing the impacts of this proposal.

Carbon monoxide is a colorless and odorless gas, most of which, in urban zones, is produced by the incomplete combustion of fuels used for vehicles, space heating and industrial processing, or materials burned as refuse. Transportation activities account for the major portion of carbon monoxide emissions—an estimated 80 to 90 percent. CO is a site-specific pollutant whose major concentration is usually found immediately adjacent to the source. The National Ambient Air Quality Standards for carbon monoxide reflect the importance of duration of exposure as well as level of concentration; the one-hour standard is 35 parts per million (PPM) and the eight-hour standard is 9 PPM. Neither the one- nor the eight-hour standard is to be exceeded more than one per year; they are, therefore, intended to cover worst case conditions.

In general, hydrocarbons and nitrogen oxides—two of the basic components of photochemical smog—are of great interest in the National Capital area. These pollutants react in the presence of sunlight to form photochemical oxidants, the principal cause of eye and lung irritations attributed to smog. This reaction requires several hours to occur and during that interval the pollutants are transported far downstream of the source. As a result, examination of these two pollutants is performed on a region-wide basis instead of the site-specific basis noted for carbon monoxide.

Any traffic and circulation proposal must be examined to determine its potential to effect levels of hydrocarbons and nitrogen oxides in this regional context. A proposal could have a significant effect if one or two factors were to occur: (1) if it would result in a significant change in a regional vehicle miles of travel (VMT) or, (2) if it would result in a significant change in traffic speeds.

Relationship to the Washington Area Transportation Control Plan: The 1970 Amendments to the Clean Air Act originally contemplated the achievement of air quality standards by 1975-76. The legislation
contained several strategems for achieving this goal including auto emission controls, which are discussed later, and transportation controls in certain areas where standards would not otherwise have been achievable by the mid-1970's deadline. The Washington region (officially the National Capital Interstate Air Quality Control Region) was one of the areas for which transportation controls were required.

The Transportation Control Plan, which was ultimately promulgated by EPA, contained strategies which were designed to reduce vehicle miles of travel in the area, to reduce vehicle emissions, and to achieve reductions in other nonmobile sources of pollutants.

The National Capital Interstate Air Quality Control Region has been designated a nonattainment area for oxidents. The District of Columbia portion of the region has been designated a nonattainment area for carbon monoxide.*

This relationship is discussed in Section 3.3, Impact of the Proposal on Physical and Biological Environment. Under the provisions of the Clean Air Act amendments, a regional plan outlining measures for attaining the standards by 1987 was finalized June 1982.

Assessment Methodology: Detailed discussion of this methodology by which air quality predictions were made is contained within Appendix E. Discussion includes prediction methods, emission factors, background concentrations (one and eight hour) and description of prediction sites.

Setting (Background Concentrations): Monitoring sites exist within a few kilometers of the proposed FDR Memorial site, but none is typical of present or future source configurations, since they are within the CBD and are adjacent to the street network. The memorial site, on the other hand, is located in open parkland, along the Potomac River.

EPA's "Volume 9" present a hierarchy of recommended methods for estimating background concentrations. The first method requires onsite monitoring for a period of at least 90 days at a representative location within the impact area of the proposed project. This level of analysis was not felt to be commensurate with the scale of this action and its expected impact. In addition, an adequate alternative method was available.

The second option for estimating background CO concentrations requires data from existing representative sites. As indicated above, none existed in this case. Thus, the third alternative method utilizing a calibrated meso-scale prediction model was employed to arrive at estimates of 8-hour background concentrations.

Eight-Hour Background: The Washington Council of Governments has calibrated the Gifford-Hanna Dispersion model for the Washington metropolitan area. The model uses a system of 5 kilometer square grids as the prediction "zones," and utilizes worst case meteorology and emission assumptions associated with the most likely transportation system in the forecast year; this includes a two-year delay in the implementation of emission standards—the same assumption which was made in calculating concentrations in the immediate vicinity of the project. Eight-hour background CO concentrations for 1980 and 1985 were obtained from the Council of Governments for the grid in which the project lies. It was necessary to interpolate between the two years to determine a value of 1983.

The resulting eight-hour background level was 6.162 parts per million. This level is thought to be higher than would actually occur for several reasons. First, the site of the FDR Memorial is very open and well ventilated. The model, which is intentionally conservative in its meteorological assumptions, does not consider such localized factors. Second, the ambient temperature assumed by the model was 30°F., a reasonable assumption for regional predictions, but very conservative for this project.

One-Hour Background: Since the Gifford-Hanna model is not used to predict one-hour CO, an alternative method of determining background was used. Data from two carbon monoxide monitoring stations were examined; the data used were 1975 and 1976 maximum averages from the West End Library monitoring station—the station nearest the site—and 1974, 1975 and 1976 one-hour maximum averages from the D.C. General Hospital station. The second highest one-hour average for each year and each station was determined and the average of those five hourly concentrations has been used as the one-hour background. The result of this calculation is a background concentration of 20 PPM. Again, it is likely that this value is considerably higher than that which would occur at the FDR Memorial site.

If the FDR Memorial were not constructed, local air quality would be characterized by dispersed and uniform CO concentrations. The concentrations attributable to local sources range from 0.67 to 1.10 PPM for eight hours, and from 1.76 to 2.68 PPM for one hour. There are no sites which will be significantly impacted under this alternative. The main reason for this is that traffic circulation and parking are distributed relatively evenly throughout the site. Because of this distribution, however, several sites experience higher local concentrations. Among these are the polo field, Cherry Walk, and Inlet Bridge/West Basin sites. Sites showing somewhat lower concentrations are the softball field, sidewalk route, memorial entrance, and the parking lots at the 14th Street Bridges.

2.4.3 Sound Levels

The noise levels at the proposed FDR Memorial site are presently dominated by three primary sources:
Aircraft approaching and leaving National Airport.
Highway traffic primarily on Independence Avenue.
Recreation noise from the adjacent ballfields.

A summary of the ambient sound levels at the proposed FDR Memorial site is given in figure 1. These values were determined from actual site measurements conducted on November 24, and 25, 1975. During the field measurement program, the sound pressure level was continuously micro-sampled over 24-hour intervals at the proposed site. The data were obtained using a micro-sampling technique (i.e. record was produced only 1 1/2 seconds out of every 30 seconds in real time). This methodology decreases the data analysis time by a factor of 20, while maintaining the statistical accuracy of the analysis.

Data obtained during the measurement program documented both the spectral and temporal characteristics of the noise associated with the measurement position. For each one-hour period (represented by three minutes of sampled data), a statistical analysis was made of the A-weighted sound level.

The data obtained from these analyses were used as the input to an environmental impact analysis computer program. The program computes the statistical level function associated with each sample period. Further manipulation of this function was subsequently used in arriving at the hourly equivalent sound levels at the site, illustrated in figure 2, and finally at the day/night weighted sound level, $L_{dn} = 75dBA$.

The hourly equivalent sound level ($L_{eq}$) values shown in figure 2 are the steady noise levels that would convey the same noise energy as the actual time-varying noise levels for the same hourly time intervals. Figure 3 illustrates the statistical analysis of the noise level measurements at the site for the same time period as shown in figure 2. For each hour during the day the noise level which is exceeded 10 percent of the time ($L_{10}$), 50 percent of the time ($L_{50}$), and 90 percent of the time ($L_{90}$), are noted. These three descriptors are commonly used to describe the ambient ($L_{eq}$), average ($L_{ave}$), and peak ($L_{p}$) noise levels of a particular acoustic environment. The fact that the $L_{eq}$ levels in figure 3 exceed the $L_{50}$ levels by such a substantial margin indicates that peak noise levels at the site are caused by short term, transient, high level events. These are represented by aircraft flyovers which dominate the overall noise environment. Figure 4 illustrates the octave band analysis of the range of aircraft flyovers measured at the site. It can be seen that peak noise levels are in excess of 90 dB for some flyovers.

Generally accepted criteria to characterize acoustic environments and access impact have been developed by the following agencies:
SUMMARY OF AMBIENT SOUND LEVEL MEASUREMENTS
FDR MEMORIAL SITE

24-25 November 1975

\[ L_{\text{max}} \quad 97\text{dB} \]
\( (\text{during aircraft flyover}) \)

\[ L_{\text{eq}}(8) \quad 75\text{ dBA} \]
\( (0700 - 1500) \)

\[ L_0 \quad 75\text{ dBA} \]
\( (0700 - 2200) \)

\[ L_{\text{dn}} \quad 75\text{ dBA} \]

\[ L_{\text{eq}}(24) \quad 73\text{ dBA} \]
Figure 2: Equivalent Sound Level Measurements

\[ L_{dn} = 75 \text{ dBA} \]

\[ L_{eq}^{(24)} = 73 \text{ dBA} \]
Figure 3: Statistical Analysis of Noise Levels
Figure 4: Range of Aircraft Flyovers
The ambient measurements indicate that the existing noise levels at the proposed FDR Memorial site are relatively high. In fact they exceed the recommended criteria levels of all three agencies listed above as shown in the following summary.

Calculations from the sound level data shown in figure 2 yield a 24-hour equivalent sound level of $L_{eq} = 73$ dBA. These measured levels exceed those identified by the EPA (for recreational areas) as requisite to protect the public health and welfare with an adequate margin of safety. The $L_{10}$ levels shown in figure 3 also exceed criteria established by the Department of Transportation for Land Use Category B - Parks.

Although the Highway Research Board does not have recommended design criteria for parks as a specific category, the measured $L_{50}$ and $L_{10}$ levels shown in figure 3 at the site exceed sound levels recommended outside residences and schools, observer category 2.

2.4.4 Land Form, Geology, and Soils

West Potomac Park resulted from the placing of dredge material taken from the Potomac by the U.S. Army Corps of Engineers in the last decade of the 19th Century. The dredging took place during efforts to clear channels in the river and fill material was placed on a bar that had existed at least since 1791, as Jefferson indicates it on his plan for Washington.

In 1976, field exploration was undertaken by Foundation Test Service, Inc., of Bethesda, Maryland. Field work consisted of drilling and logging of six test borings varying in depth from 20 to 83.4 feet below existing grade.

Geologic data indicates that the site contains artificial fill placed over natural fluvial or estuarine deposits of silt, and gravel, commonly referred to as the "Pamlico Formation."

The borings generally indicate that the site contains a surficial deposit of fill from 5 to 7.5 feet in thickness, which overlies generally soft to firm but somewhat variable gray clayey silt to silty clay containing layers of fine sand and occasional organic and wood fragments. Although difficult to define in the field, it appears that the fine sands and silts below the surficial fill may be old hydraulic fill placed around 1900.

Some sand lenses were apparent in 7-foot deep test pits. In areas where construction activity has been concentrated since World War I, "urban soils" containing a high proportion of debris and generally of abnormal pH value and density can be expected.

Most of the soils that have historically been under grass or planting are of moderate to good fertility, although those at the Tidal Basin and Potomac peripheries are subject to flooding and seasonal high water table.
In 1975 the Ecological Services Laboratory of the National Capital Region (National Park Service) undertook fieldwork at the site which yielded the following agronomic analysis of soils in three pits. Fertility decreased with depth but was generally good in the upper levels. It was counteracted in some instances by low percentage of pore spaces (high degree of compaction), requiring aeration to restore soils to a good growing medium. Compaction potential was also high. Permeability was generally moderate but winter conditions could bring water table to within 18 inches of the surface, and occasionally cause flooding at low elevations.

2.4.5 Hydrology

Groundwater is encountered between 5.5 and 9.5 feet below existing grade. The groundwater is affected somewhat by the tidal changes which approximate 3 feet.

West Potomac Park is subject to periodic flooding. Design flood level is set at elevation 16.5 feet. Since all of the site is below this elevation major flooding is conceivable, although historically only the lower sections (below elevation 10) on the Potomac River and Tidal Basin peripheries have been affected.

Flooding is sometimes exacerbated when high tides combine with high flood states and high winds. Mitigative measures to prevent flooding would require the seawall to be elevated considerably from its present average elevation of 5.0 to 6.0 feet above mean water level. The site was last subject to inundation in 1942 to an elevation of 13.2 feet. River depths and hydraulic characteristics have changed somewhat in the interim. The Potomac River is subject to occasional freezing and ice floes.

2.4.6 Vegetation and Wildlife

Plant Species: All flora in West Potomac Park has been planted in the last 70 years; much of the stock dates from 1905 to 1915. The original planting included Japanese cherries (Prunus yedoensis), 1800 of which were planted around the Tidal Basin in 1912. The cherries are subject to much stress from vandalism and flooding.

There are approximately 250 American elms (Ulmus americana) in West Potomac Park, below Independence Avenue. Although originally selected for their hardiness and grandeur, the elms suffer many stresses: Dutch elm disease; windblow (crowning); and root damage from soil compaction. Many have been lost; others show signs of ill health. However, their number has remained stable due to intensive treatment for structural damage and Dutch elm disease and through replacement with disease-resistant species (some from the Princeton clone) and other varieties, Smooth Leaf (carpinfolia); Scotch (glabra); Dutch (hollandica); and English (procera). Thus the elm population includes magnificent old and mature specimens, and replacements 3 to 15 years old.

Over 38 genera of trees have been recorded on the site, notable among them, because of their success of rarity, are the Amur cork (Phellodendron amurense), Japanese raisin (Hovenia dulcis), American
holly (Ilex opaca), ash (Fraxinus sp.), oak (Quercus sp.), and sweetgum (Liquidambar styraciflua). Other genera, doing less well on the site, include dogwood (Cornus florida), catalpa (Catalpa sp.), Canadian hemlock (Tsuga canadensis), and Norway spruce (Picea abies). A number of shrubs occur at certain locations on the site and most appear extremely healthy, i.e., camellia. The balance of the site is planted in grass.

Wildlife Species: No specific fauna list exists for West Potomac Park. However, in the case of birds it is likely to approximate that prepared by Dr. George Watson, a Smithsonian ornithologist, containing species that regularly use the Mall between the Capitol and 17th Street. These include: American kestrel, herring gull, ring-billed gull, rock dove (pigeon), mourning dove, barn owl, nighthawk, chimney swift, downy woodpecker, cardinal, common crow, fish crow, blue jay, mockingbird, American robin, starling, house sparrow, red-winged blackbird, common grackle, brown-headed cowbird.

A large number of species occur as a result of migration. While these species do not contribute to the urban ecosystem of the Mall, they do affect the diversity and quality of the Mall environment to the extent that visitors to the Mall may be able to observe and enjoy them.

Rodents in the area include grey squirrels, mice, and rats. No endangered animal species are known to inhabit the project site.
3.1 Social and Cultural Environment

3.1.1 Land Use

The FDR Memorial will occupy approximately 8.8 acres in West Potomac Park. In addition to removing a major section of West Basin Drive and its connector to Ohio Drive, construction of the memorial will require relocation of several ballfields.

As a consequence, the proposal includes a total redistribution of ballfields in West Potomac Park. This redistribution was arrived at as a result of criteria supplied by the Washington, D.C. Department of Recreation, and by management staff of the National Capital Region of the National Park Service. It will result in the following modifications:

- Reduction of softball fields south of Independence Avenue from 11 to 9. The balance of two fields will be relocated to the area between Independence Avenue and the reflecting pool.
- Removal of all soccer fields and the rugby field to the same area.
- Provision of at least one field hockey field to the same area, possibly sharing with soccer.
- Minor shifts in location of cricket pitches and polo field from present locations.

The relocation of the Tourmobile route and stops, certain paths and trails, as well as the existing comfort station and utilities are discussed below.

3.1.2 Visitation and Use of Sportsfields

The proposal, once complete, will attract an estimated 2 to 3 million people to the site each year. The majority will arrive at the memorial by Tourmobile or tourbus, but some will drive their own cars and seek parking at the site, while others will walk from other sections of the Mall. Access and parking will be provided to accommodate these numbers of visitors, as well as serving ballfield users. Circulation and parking impacts and mitigating proposals are indicated below.

The existing comfort station will be removed intact, and relocated in parkland at another National Park Service site.

3.1.3 Visual Character

Every effort has been made in the planning and design of the proposal to minimize its visual impact on the monumental landscape in which it is set. The proposal retains almost all of the existing vegetation and augments it, and is primarily made up of landscape elements that blend into the existing site. Where structures are used they are low and horizontal in character, walls are screened by planting and berms, and restrooms have ground cover roofs. Lighting will be low key and barely visible from the Lincoln and Jefferson Memorials or from the Mall. Stone work used in walls and other structures will be a soft red granite, and will not impact the visual environment beyond a short distance.
3.1.4 Historic Environment

Pursuant to the provisions of Section 106 of the Historic Preservation Act, the Historic Preservation Officer for the District of Columbia has been consulted on the affect that placement of the FDR memorial will have on the historic properties of West Potomac Park. The Historic Preservation Officer has concurred with the National Park Service's determination that the proposed FDR Memorial will not have an adverse effect on the National Register properties involved. The concerns of the Historic Preservation Officer over the size and height of the interpretive center proposed in the Draft Environmental Statement (1978) have been resolved by the elimination of the interpretive center from the design.

Compliance with Executive Order 11593 has been accomplished in that the very nature of the memorial and monuments within the area present a multitude of coverages and inventory. The question of subsurface archeological resources does not apply to this situation because the entire construction site is made up of land created by the deposition of dredge material in the early 1900s. Any artifacts or subsurface structures would at best be out of context with the area and thus of little value other than their intrinsic value. However, to ensure against the chance of loss or destruction of a discovered archeological artifact, all materials found shall be preserved by National Park Service curatorial staff and given proper recording and storage.

3.2 Urban Systems

3.2.1 Estimate of FDR Memorial Visitors

The National Park Service, in cooperation with the D.C. Departments of Recreation and Transportation, and others, conducted a traffic and parking study as a basis for forecasting traffic values and parking utilization in the project area. The study described the methodology and assumptions used and includes survey results. A study report is contained in Appendix D. Heaviest daily visitation to the FDR Memorial is estimated at 12,000 to 14,000 people on days when the Lincoln and Jefferson Memorials have similar amounts of visitation. Experience has shown that this may occasionally peak from 15,000 to 18,000 per day. Counts taken in May 1977 at the Jefferson Memorial reveal visitor use of the following modes of transportation: Auto-21.4 percent; Bus-58.9 percent; Tourmobile-12.1 percent; Bicycle-2.4 percent; and Walking-5.2 percent. All sports fields users and boat tour patrons were assumed to arrive by auto.

The Proposed Circulation and Parking Plan: The proposed circulation and parking plan associated with the FDR Memorial is illustrated on the Circulation and Parking Plan map. The road connecting West Basin and Ohio Drives would be removed along with West Basin Drive from Independence Avenue to approximately 500 feet north of the Inlet Bridge. This remaining 500 feet of West Basin Drive would be connected to Ohio Drive by a curvilinear roadway approximately 750 feet north of the bridge (hereafter, the combination of this portion of West Basin Drive and the connecting roadway will be referred to as the West Basin Inlet Loop).
Ohio Drive would carry two-way traffic between Independence Avenue and its junction with the West Basin Inlet Loop, while the portion of Ohio Drive between its junction with the West Basin Inlet Loop and the Inlet Bridge, would serve only southbound traffic. The West Basin Inlet Loop would carry traffic only from the Inlet Bridge to Ohio Drive.

A turning lane would be constructed to serve traffic moving north on Ohio Drive which is destined east on Independence Avenue. It would be located approximately 220 feet from the intersection and would not interfere with sports fields use. This turning road is designed to replace the similar function that West Basin Drive currently serves.

The Tourmobile would operate on the same route as it currently does. The only change from the Tourmobile's present operation would be that the portion of its route which currently uses West Basin Drive and the roadway connecting West Basin and Ohio Drives would use the West Basin Inlet Loop. The stops on the existing route would be relocated to a single location at the main entrance of the memorial. The Tourmobile may face delays associated with visitors and sports fields users parking along Ohio Drive.

The proposed parking and circulation plan will have relatively little impact on the quality of traffic service which will be provided in West Potomac Park. Generally speaking, traffic volumes in the vicinity of the site will be very similar with or without the memorial. In all cases, the changes that will occur will not be sufficient to cause a decrease in operating speeds. The traffic volumes which have been forecast for roadways in the vicinity of the memorial are shown on the Traffic Circulation and Parking Plan map.

The congestion which is currently experienced on Ohio Drive north of the memorial site is associated with the parking that is allowed. Persons parking in that area on weekdays are now visiting the Lincoln Memorial and they remain parked for comparatively short periods of time, resulting in high daily turnover rates. These high turnover rates are the principal cause of existing congestion. If the FDR Memorial is constructed, many of these visitors to the Lincoln Memorial will also visit the FDR Memorial, resulting in longer parking periods per vehicle, lower turnover rates, and decreased congestion.

One of the major impacts of the memorial will be to increase the average time required for people parking at the site to walk to their ultimate destination within the park. Two sites were selected to measure the increase in average walking times. The first site is located at the center of the sports fields areas north of the memorial entrance and the second is located at the center of the sports fields areas southwest of the memorial. The increase in the average walk time as compared with the no-build alternative of visitors who are travelling to the northern site is approximately 137 percent during the peak 12-hour period. The increase in the average walk time to the second site is somewhat lower than the first site. Walk times for travellers to the second site are expected to be 65 percent greater during the peak 12-hour period when compared to the no-build alternative.
Map O: Traffic Circulation and Parking Plan

Key: 1983 Traffic Volumes: Peak 10-Hr. Auto and Bus Volumes 0000 00
     Peak 1-Hr. Auto and Bus Volumes (0000) (00)

- Tourmobile Stops
- Bus Parking Lot
- Curbside Parking
- Auto Parking Lot
On an average summer weekend, the auto parking lot at the 14th Street Bridges will be filled or nearly filled about three hours of the day. Both sports fields users and memorial visitors would use this lot. For sports fields users, the area would nearly replace all the parking removed along West Basin Drive. The bus parking lot has been designed to adequately accommodate the demand for bus parking generated by the memorial and will be filled about five hours per day; i.e., it would never be over capacity on an average day.

Traffic volume on Ohio Drive near the parking lots at the 14th Street Bridges will increase by about 40 percent compared to the no-build alternative. These increases will not have any effect upon speed, since both the increases and the total volume are very small in comparison with the carrying capacity of the roadway. Some motorists on Ohio Drive may experience some delay as a vehicle enters or leaves the parking area. Any such delay would be very small to any motorist and would not affect most drivers. Directional guide signs will be posted at the exit of the parking area to aid tourists who may be unfamiliar with the area.

The amount of parking accommodated within various walking distances is also a similar measure of the quality and convenience of parking provided.

The following table shows parking volume by walking distance intervals:

<table>
<thead>
<tr>
<th>Walking Time from the Site</th>
<th>Accommodated Parking Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 minutes</td>
<td>1,182</td>
</tr>
<tr>
<td>10 minutes</td>
<td>662</td>
</tr>
<tr>
<td>10+ minutes</td>
<td>184</td>
</tr>
</tbody>
</table>

3.2.2 Utilities

Power Utilities: Minor modifications to the existing PEPCO 4 kV service to the site may be required in order to maintain continuity of the existing site lighting system. Existing service will remain active during the initial phases of construction in order to provide temporary power and light for the construction equipment and trailer used on the site. Cable serving these lighting fixtures will be affected by grading operations and may, therefore, be abandoned in place. Prior to abandonment the cable can be used to distribute temporary power along the length of the site. This technique will largely preclude the use of aerial power lines.

The Potomac Electric Power Company (PEPCO) will extend its 4 kV line to concrete pad mounted distribution transformers located in the swale area behind the berm and between fountain retaining walls. Four such transformer pad locations are contemplated, one in the vicinity of each
equipment room. Potomac Electric Power Company will furnish and install both the concrete transformer pads and the distribution transformers with a maximum 300 kVA (kilovolt amperes) capacity.

The maximum estimated connected load for the memorial project is 915.5 kW (kilowatts) or approximately .92 MVA or 56 percent of the capacity of the existing feeder.

Grading operations to extend the feeder will be minimal since conduit for the service conductors can be placed in the backfill behind fountain walls. There are no existing large trees in the path of the main distribution feeder except at the extreme west and east ends of the site. At these locations approximately 640 lineal feet of trenching and backfilling are required for the extension of conduits. This work involves temporary displacement and recompaction of about 48 cubic yards of earth.

In addition, fine hand grading will be required for five concrete transformer pads each measuring 7 feet 6 inches by 6 feet and located adjacent to fountain mechanical/electrical equipment rooms.

All branch circuit conduit emanating from the five major distribution points will be small and capable of being installed in paving slabs. The total amount of grading, trenching, and backfilling; therefore, is kept to a minimum relative to the size of the overall project site.

Telephone Utilities: Except for the eastern and westernmost extremeties, the existing underground line is below anticipated finished grades and therefore can be abandoned in place. New telephone service will be derived from an existing manhole. The manhole has sufficient cable capacity to service this project without need of additional telephone lines.

Approximately 750 lineal feet of trenching and backfilling will be required to extend telephone service to the first mechanical/electrical equipment room and to the Tourmobile stop. Extension of service to the remaining equipment rooms can be placed in the backfill behind fountain walls thereby avoiding additional grading. Installation of telephone service will require displacement and recompaction of approximately 58 cubic yards of earth.

3.2.3 Energy and Water Consumption

Electricity: The impact of this project on energy is difficult to assess in the context of various national consumption and generation forecasts. Scenarios for energy self-sufficiency plans typically postulate about a 3.2 percent per annum growth rate in electrical consumption through 1985, with a 6.2 percent per annum increase in electrical generating capacity during the same period.

The Potomac Electric Power Company's megawatt capacity is derived from fossil fuel-fired steam plants and combustion turbines.

The estimated electrical demand load for the memorial is approximately 80 percent of the connected load of 915 kilowatts (.915 megawatts). This
figure assumes a 24-hour operating schedule, year-round, with all systems operating at full capacity. Estimated yearly power consumption computed on the above schedule is about 8.08 million kilowatt hours.

The load imposed by the memorial represents less than 0.02 of PEPCO's total system capacity, a small fraction of the projected national average consumption rate. Based on PEPCO's average system heat rate, energy to operate the memorial converts to approximately 2,324 tons of coal of 2,766 barrels of oil per year. These quantities reflect the same small percentage (0.02 percent) of the resources required by the utility for total system operation.

The use of local electrical systems employing renewable energy sources to further reduce consumption of depletable coal and oil is not practical for a project of this type. Seventy percent of connected electrical load and about 86 percent of the yearly demand load for the memorial is attributable to the operation of electric motor-driven pumps.

The production of sufficient electrical power to maintain constant operations using helioelectrical, heliothermal, biofuel, or tidal-powered systems would require vast areas for collection and generation systems, and large storage conversion systems, all at great cost in terms of dollars, visual impact and land use allocation. The potential use of wind-powered electric generators is counter productive since wind power might be used to drive pumps directly without incurring the efficiency lost in the additional power transformation process. Solar heating will be studied further and utilized wherever possible for water heating systems.

Lighting will be an extremely critical aspect of both design and energy consumption. There will be a major effort to precisely control intensity and color of light in the proposed project.

A proper balance of color with the combination of the many types of light sources which are anticipated must be carefully maintained. The inherent harshness of many high-intensity discharge (HID) light sources tend to cause us to avoid their use. However, with energy conservation being a very real consideration, use of these sources will be used wherever possible. Special tinted lense reflectors will be designed to accommodate the unpleasant color spectra found with these sources.

An estimate of the maximum increase in vehicle travel miles in the metropolitan area which can be attributed to the construction of the FDR Memorial was three thousandths of one percent. This increase will not result in a significant increase in energy consumption and would result in an increase in total gasoline consumption on the order of 60 gallons on peak visitation days.

Water: The visitor use facilities including toilets and drinking fountains will have an average use during full operations of 27.5 gallons per minute. This computes to 7,225,000 gallons per year.

The fountains and pools, based on monthly average figures for evaporation, airborne spray, and flushing, will utilize approximately 10 gallons per minute. This computes to an annual consumption of 5,256,000 gallons.
The sprinkler systems for the planted areas will be operational nine months of the year. Although use will be dependent on weather variations it is anticipated the system will consume 2 million gallons of water per year.

3.2.4 Police and Fire Protection/Public Safety

Construction of the FDR Memorial will introduce a much higher number of vehicles and visitors than utilize this section of West Potomac Park at present. Increased visitation and use will undoubtedly require stepped up police and fire surveillance.

The U.S park police force patrolling West Potomac Park will be augmented by two officers who will be stationed permanently in the memorial, and whose primary job will be as pedestrian patrolmen. Additional patrolmen will be assigned as necessary to provide protection of visitors and to direct traffic operations during periods of peak use.

A higher number of vehicles in West Potomac Park will only marginally increase the risks to public safety since traffic flows and speeds, along Ohio Drive particularly, will be reduced from present levels.

The risks associated with fire at any location in the memorial will be reduced to an absolute minimum through provision of fire access and equipment. Fire protection vehicles will have access to all walks and facilities.

3.3 Physical and Biological Environment

3.3.1 Climate

The impact upon the general climate of Washington, D.C. will be both minimal and unquantifiable in terms of the meteorological forces that shape the weather pattern. These forces are at the very least regional in scale.

Microclimatic changes to the actual site of the memorial and its immediate surroundings would occur and would, in some cases, be encouraged to occur to promote a more enjoyable experience of the memorial. High temperatures would be lowered because of the additional shade in those areas where trees will be planted, thus enhancing visitor experience of the exterior spaces in the memorial.

In order to mitigate severe heat conditions it will be important to provide high branching deciduous trees giving shade but not preventing breezes or outgoing radiation. Shade will be particularly important where paving and walls with either high heat reflectivity or high heat absorption characteristics are involved. West facing walls and south facing spaces are most susceptible to heat absorption and will be treated accordingly.

Trees, other plantings, and walls would, however, be placed so as to not block out winter sunlight (at an angle as low as 28° at noon in December) to the same extent. Most summer days experience temperatures between 65° and 86°. The major factor of discomfort occurring under these
The conditions are the associated high humidity occurring on most days in July and August, and many of the days in June and September.

Provision of shade and encouragement of breezes will mitigate this discomfort to some degree. It is also anticipated that provision of more shade and water bodies (fountains and pools) in the memorial will lower temperatures, increase air movement, and therefore decrease vapor pressure to comfortable levels.

During cooler periods, when temperatures range between 45° and 65°, spaces admitting direct sunlight, heat-retaining materials, and shelter breaks against breezes (and radiation loss) will be most comfortable.

Snow and sleet can damage plants and make sloping walks hazardous. When these occur in the memorial, ready snow removal will be provided.

The plantings of the FDR Memorial will likely require irrigation, especially in summer when evaporation due to prevailing high temperatures negates precipitation. Lawns and shrubs will require year-round irrigation.

Rainfall levels demand that the site be well-drained and that public spaces be paved and graded to minimize periods of standing water. Construction of the memorial will involve removal of West Basin Drive and replacement of only part of it as an access road in asphalt. Removal and minimization of asphalt surfaces will reduce radiant energy absorption and heat build-up. The memorial will replace much of the existing asphalt and gravel paving with natural stone paving and walls of high reflectivity, low heat absorption, and retention capabilities.

There will be slight changes in localized wind patterns and possibly in wind velocities as a result of the introduction of new trees, of walls, berms, and buildings. Summer prevailing winds (from the south) will be deflected over and around berms and will penetrate the memorial over walls and through openings. Where possible, plant windbreaks will provide protection against northwest gusts and prevailing northwest and west winter winds. Numerous walls within the memorial will also act as windbreaks. Windbreaks that could also be adapted to allow passage of summer breezes between the Tidal Basin and the Potomac River (northwest to southwest) in summer would be desirable.

3.3.2 Air Quality

Assessment Methodology: Detailed discussion of the methodology by which air quality predictions were made is contained within Appendix E. General discussion of methodological assumptions is included where relevant in this section.

Impacts: The air quality impacts of the proposed action are summarized in figure 7. As indicated by the one-hour and eight-hour carbon monoxide estimates, none of the predicted concentrations exceed National Ambient Air Quality Standards.

The sites which are predicted to experience the largest local concentrations of CO are the sidewalk route and the memorial entrance.
Figure 5: Air Quality Impacts of the Proposed Traffic Circulation Plan

<table>
<thead>
<tr>
<th>Site*</th>
<th>Local Traffic Contribution</th>
<th>Background Contribution</th>
<th>Total CO Concentration</th>
<th>Standard</th>
<th>Local Traffic Contribution</th>
<th>Background Contribution</th>
<th>Total CO Concentration</th>
<th>Standard</th>
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* See Air Quality Analysis Sites map for specific site locations.
(eight-hour), and the softball field, sidewalk, and 14th Street bridges parking lot sites (one-hour).

The impact of the proposed traffic and circulation plan for the FDR Memorial will not significantly affect local air quality; its major effect will be to change the distribution of pollutant sources in the area. The net effect will be a small increase in CO concentrations along the river side of the park and a slight decrease in CO on the Tidal Basin side. Thus, the air quality impact within the memorial area itself and along the Cherry Walk will be beneficial. This is due to two factors—the diversion of traffic sources to Ohio Drive and the displacement of a large amount of the area's present parking capacity to the 14th Street Bridges parking lots.

The location of parking is an important factor in air quality impact. It is especially important because about 80 percent of the light duty vehicles in 1983 will be equipped with catalytic converters, with their attendant short cool-down period and high cold-start emissions. The location of a parking area between the 14th Street Bridges, therefore, benefits air quality at the memorial site at the expense of a 6-7 percent increase in CO at the parking lot compared with the no-build alternative. However, the area of the 14th Street Bridges parking lot is less intensively utilized than the memorial area with the major activity area being the river walk opposite the parking along Ohio Drive.

High values for eight-hour CO concentrations at the memorial entrance derive in part from the incorporation of on-street parking impacts on air quality predictions. Each parking lane was thus treated as a traffic lane. Similarly, figures were adjusted upward to take into account idling buses and Tourmobiles at the memorial entrance.

3.3.3 Sound Levels

No negative, long-term acoustic impacts on the surrounding environment are expected due to the FDR Memorial project. The percentage increase in vehicular traffic due to the project on the surrounding streets is insignificant and far less than the 25 percent increase in traffic that would be required to raise the surrounding environmental noise levels (due to traffic alone) by more than 1 dB.

The only possible source of environmental impact from noise would be local disturbance from nighttime use of the FDR Memorial. The potential nighttime noise problem can only be evaluated after a specific description of the projected nighttime use and traffic levels is developed.

It should be noted that the only potential areas to be impacted would be the adjacent recreation field and the nearby Cherry Walk. Since people would normally not be using these facilities at night, the nighttime impact should be insignificant. A minor short-term acoustic impact, however, will occur during the construction process.

3.3.4 Land Form, Geology, and Soils

Some local general subsidence of existing ground surface will occur due to a change of existing grade with placement of new fills. Surface soils will
be reworked and recompacted under structures and paving. New fills will compress surface and subsurface soils. No permanent dewatering (localized lowering of the ground water table by pumping out water) is anticipated.

3.3.5 **Hydrology**

No significant changes in surface water runoff are expected as a result of construction because the hard surfaces in the memorial are only nominally greater in area than those on West Basin Drive and the connector road that will be removed as a result of construction.

All paved and other walking surfaces as well as planting beds within structures, will drain into a storm drain system designed to accept maximum expected precipitation and runoff loads.

3.3.6 **Vegetation and Wildlife**

Construction of the proposal and ancillary elements, and relocation of ballfields will cause the loss of some existing trees. During design every effort will be made to protect existing trees in order to preserve the character of the site as much as possible.

The loss of trees and construction of a major memorial to include massive planting will undoubtedly alter the habitat of a number of birds and mammals presently occupying the site. Damage to existing ground cover by traffic, trailers, materials storage, and work areas will result.

3.4 **Short-Term Construction Impacts**

3.4.1 **Noise**

Construction of the FDR Memorial will result in noise related to construction activity. Section 1.2.5 estimates timing of the construction period. During this period, numerous activities will be occurring at various points along the construction site. In general, these activities can be subdivided into five discreet phases. These phases are:

- Ground Clearing
- Excavation
- Foundation
- Erection
- Finishing

Based on a publication by the Environmental Protection Agency, examining numerous construction sites throughout the United States, noise levels at the construction site will be as follows:

The greatest sound levels that would be expected as a result of construction are a $L_{eq}$ of 89 dBA during the excavation and finishing periods, assuming all pertinent equipment was present on site. On the other hand, with the use of minimum equipment, the maximum sound level could be reduced to approximately 74 dBA. Of course construction will not occur at all points on the site simultaneously. Construction will progress down the site.
The existing daytime ambient sound level at the site of $L_{eq} = 75$ dBA, resulting from existing aircraft and vehicular traffic, is already more than 15 dBA above the Highway Research Board criteria level of $L_{eq} = 58$ dBA. This indicates an existing condition of great impact even without the added construction noise.

However, given existing conditions, construction noise levels of $L_{eq} = 84$ dBA at 50 feet from the site boundary will raise the existing ambient by 9 dBA, indicating a condition of "some impact." Not until the construction noise levels decrease with distance from the site to within 5 dBA above the ambient and begin to blend into the existing ambient will impact from construction noise become negligible.

### 3.4.2 Air Quality (Mobile and Fixed Source)

**Mobile Sources of Air Pollution:** Traffic congestion which may occur due to construction activities will result in higher vehicle emissions. Added to this will be the emissions from delivery vehicles carrying materials to the site (primarily diesel-powered with consequent low CO emission characteristics).

**Fixed Sources of Air Pollution:** Primary sources from the site will be exhaust emissions from construction equipment. Most of this equipment will be diesel-powered with low CO emission characteristics. Another source will be fugitive dust becoming suspended from trucks travelling over exposed areas, and from wind erosion of earth mounds.

As an indirect result of the construction, dust will occur over localized areas due to earth moving.

### 3.4.3 Hydrology

Temporary localized lowering of groundwater table may occur during pumping of groundwater.

### 3.4.4 Traffic

Increased heavy vehicle traffic will occur in the area, requiring stringent protection of existing trees.
UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS AND MITIGATION MEASURES
4.1 Social and Cultural Environment

4.1.1 Land Use

The proposal will connect 8.8 acres of presently open parkland into landscaped garden space and associated visitor services. It is the opinion of the National Park Service that this is not an adverse impact and no mitigation is required.

4.1.2 Vistitation and Use of Sports Fields

The proposal will cause relocation of sports fields. While this may cause inconvenience and minor shifts in patterns of usage, adequate mitigation will be supplied in the form of new facilities a short distance away.

4.1.3 Visual Character

The proposal will change the site's present appearance from one of a roadway with parking on either side to one of a series of landscaped spaces which will offer many varied experiences for the visitor. In the opinion of the National Park Service this is not an adverse impact and no mitigation is required other than to assure the highest quality of workmanship in implementation of the project. The proposal received the approvals of the Commission of Fine Arts and the National Capital Planning Commission.

4.1.4 Historic Environment

The proposal will result in visual changes in West Potomac Park, a site listed on the National Register of Historic Places. The State Historic Preservation Office has concurred with the National Park Service in adjudging such changes to be minimal, especially so since obvious structures such as the interpretive center, Tourmobile shelter and kiosk have been eliminated from the design. Since the site originated from fill material, no items of archeological significance are anticipated to exist there. Nonetheless, in compliance with 36 CFR 800, a qualified cultural resources specialist will be on hand when excavations are made.

4.2 Urban Systems

4.2.1 Traffic and Parking

Introduction: Traffic volumes on Ohio Drive will increase approximately 30 percent, due to the removal of West Basin Drive and construction of the memorial (as traffic generator) and increased demand on a reduced number of parking spaces. The proposed action would provide approximately 500 automobile spaces along Ohio Drive and between the 14th Street Bridges, and 20 tourbus spaces between 14th Street Bridges. Automobile parking spaces are thus reduced from the existing level of 560 spaces.

Alternative Parking Schemes: Several alternative measures for mitigating the impact of removing West Basin Drive in addition to the parking provided along that roadway have been studied. These analyses have
focused on the environmental impacts which are associated with each of the alternative measures.

In developing alternative schemes for managing traffic and parking after the memorial is constructed, a thorough investigation was conducted of the options for providing circulation and parking in the vicinity of the site. Basic traffic and parking design concepts which form the building blocks of alternative schemes were identified early in the process of developing rational alternatives. Each of these concepts was summarily evaluated in terms of its impact on transportation service and the environment. These elements were subsequently combined to form rational parking and traffic management schemes for the portion of West Potomac Park in which the memorial is to be located.

During the initial formulation of alternatives, it became evident that a very large number of schemes could be drawn. Each of the alternatives was examined, and it became clear that several parking schemes deserved detailed analysis. One circulation scheme was clearly superior to all others in providing excellent access and circulation while producing relatively minor environmental impacts in comparison with other traffic schemes. In each alternative, this circulation scheme was combined with different options for providing parking for memorial visitors and users of sports fields. This is the same process as that previously described for the proposed action.

In each alternative the road connecting West Basin and Ohio Drives would be removed along with West Basin Drive from Independence Avenue to approximately 500 feet north of the Inlet Bridge. The remaining 500 feet of West Basin Drive would be modified as described in each alternative and connected to Ohio Drive by a curvilinear roadway approximately 750 feet north of the bridge. In the descriptions which follow, the combination of this portion of West Basin Drive and the connecting roadway is referred to as the West Basin Inlet Loop.

In each alternative, Ohio Drive would carry two-way traffic between Independence Avenue and its junction with the West Basin Inlet Loop, while the portion of Ohio Drive between its junction with the West Basin Inlet Loop and the Inlet Bridge, would serve only southbound traffic. The West Basin Inlet Loop would carry traffic only from the Inlet Bridge to Ohio Drive.

In the build alternative, a turning lane would be constructed at the intersection of Ohio Drive, Independence, and 23rd Street to serve northbound traffic on Ohio Drive which turns right (eastbound) onto Independence. It would be located approximately 220 feet from the intersection and would not interfere with sports fields use.

The Tourmobile would operate on the same route. The only change from its present operation would be that the portion of its route which currently uses West Basin Drive and the roadway connecting West Basin and Ohio Drives would use the West Basin Inlet Loop. Stops on the existing route would be relocated to the main entrance of the memorial and to the West Basin Inlet Loop along the Tidal Basin. The Tourmobile would also stop at Arlington National Cemetery and the Arlington Metro
stop to pick up FDR Memorial visitors using the 2,000-car Arlington National Cemetery lot as a remote parking facility, or arriving by Metro. The 640-car parking lot at the National Capital Region Headquarters building in East Potomac Park may also be used as a visitor parking facility during evening hours and on weekends and holidays.

Mitigation

The parking lost along West Basin Drive would be replaced. Parking would be allowed along Ohio Drive between Independence Avenue and the Inlet Bridge and West Basin Drive between the memorial and Independence Avenue (325 spaces), but not along the West Basin Inlet Loop. A parking lot (200 spaces) is also proposed to be built between the southern span of the 14th Street Bridge (Rochambeau Bridge) and the railroad, both of which cross the Potomac River. Also a parking lot for buses (20 spaces) is proposed to be constructed between the two spans (Mason and Rochambeau Bridges) of the 14th Street Bridges (see the Proposed Parking Plan map). This would ultimately provide a total of 525 auto parking spaces and 20 bus parking spaces.

In addition, visitors would be encouraged to use the Arlington National Cemetery lot (2,000 auto and 20 bus spaces) and the National Capital Region (NCR) Headquarters lot (640 cars) in East Potomac Park as offsite parking areas. The NCR lot will be available only on evenings, weekends, and holidays.

| Total Auto Parking Spaces | 525 |
| Total Bus Parking Spaces   | 20  |

Vehicle Volumes: US Federal Highway Administration figures for vehicle volumes in West Potomac Park and the Tidal Basin area are shown on figure 6.

The build alternative will result in traffic volumes on Ohio Drive in West Potomac Park, which were higher than those that would result if the memorial were not constructed. This increase is too low, however, to reduce vehicle running speeds in the park and surrounding areas below the legal speed limit, and the only effect will be a lessening in comfort and convenience which drivers will experience due to subtle changes in traffic volumes.

An increase or decrease in the walking time which sports fields users and other visitors to the area experience as they walk from their cars to their destination in the park is a meaningful measure of the adequacy of parking areas provided.

Changes in the average walking times for visitors to the park have been estimated for two locations. The first location is at the center of the sports fields area north of the entrance to the memorial and the second is at the center of the sports fields area southwest of the memorial. In all cases the average walking time would increase.
Figure 6. Vehicle Volumes--November 1980 West Potomac Park and Tidal Basin

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<tr>
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<tr>
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<td>31</td>
<td>8</td>
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<td>111</td>
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<tr>
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<td></td>
<td>6:00 - 7:00</td>
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<td>9</td>
<td>128</td>
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<td>8:00 - 9:00</td>
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<td>11</td>
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<td>73</td>
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<tr>
<td></td>
<td>9:00 - 10:00</td>
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<td>9</td>
<td>64</td>
<td>63</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10:00 - 11:00</td>
<td>9</td>
<td>8</td>
<td>48</td>
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<td></td>
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<tr>
<td></td>
<td>11:00 - 12:00</td>
<td>3</td>
<td>6</td>
<td>41</td>
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<tr>
<td>TOTALS</td>
<td>1,794</td>
<td>2,243</td>
<td>282</td>
<td>308</td>
<td>3,743</td>
<td>2,582</td>
</tr>
</tbody>
</table>
Map P: Walking Times to Alternative Parking
Another measure of the adequacy of parking which is quite similar to the change in average walk time is the number of cars that are accommodated within specified walking distances. These totals are summarized below for each alternative.

Total of the Twelve-Hour Parking Demand Accommodated Within Various Walking Distances from the Site

<table>
<thead>
<tr>
<th>Walking Time from the Site</th>
<th>Accommodated Parking Demand</th>
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</thead>
<tbody>
<tr>
<td>2 minutes</td>
<td>1,678</td>
</tr>
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<td>4 minutes</td>
<td>232</td>
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<tr>
<td>10 minutes</td>
<td>80</td>
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<tr>
<td>10+ minutes</td>
<td>66</td>
</tr>
</tbody>
</table>

Air Quality Impacts

The proposal was analyzed for its air quality impact. The results are summarized in figure 7.

4.2.2 Utilities

Exposed pad-mounted distribution transformers are required by regulations. Without sensitive location these transformers could have potential adverse effects on visual quality within the memorial. Transformers will be placed in concealed locations between berms and fountain retaining walls or will be screened with vegetation and walls.

4.2.3 Energy and Water Consumption

As proposed the memorial will consume approximately 6.46 million kilowatt hours per year.

Conservation of resources is practical and readily achieved by the direct reduction of energy consumption. An automatic control system which regulates the operations of the memorial in accordance with schedule usage will substantially reduce yearly power requirements.

By reducing pumping operations by two-thirds and site lighting by three-fourths after midnight, the total yearly consumption is lessened to 4.6 million kilowatt hours, a savings of 30 percent. Reduced operation in off hours saves nearly 543 tons of coal and 636 barrels of oil each year.

Further energy and resource savings will occur by the recapture and use of waste heat produced in mechanical heating and cooling systems. The bulk of this waste heat to be utilized will come from the various pumping systems required to maintain the fountains for the memorial. The waste heat from the pumping systems in the exhaust air and motor heat losses will be used for space heating and, if practical, for ice and snow melting around the various fountains and walkway. Other waste heat recovery systems such as those associated with exhaust, air, solid waste, and heat producing equipment will also be investigated and used wherever possible on this project.
Figure 7: Air Quality Impacts of Proposal

<table>
<thead>
<tr>
<th>Site*</th>
<th>Local Traffic Contribution</th>
<th>Background Contribution</th>
<th>Total CO Concentration</th>
<th>Standard</th>
<th>Local Traffic Contribution</th>
<th>Background Contribution</th>
<th>Total CO Concentration</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Softball Field</td>
<td>1.14</td>
<td>6.16</td>
<td>7.31</td>
<td>9</td>
<td>2.56</td>
<td>20</td>
<td>22.56</td>
<td>35</td>
</tr>
<tr>
<td>2. Sidewalk</td>
<td>1.44</td>
<td>6.16</td>
<td>7.60</td>
<td>9</td>
<td>3.62</td>
<td>20</td>
<td>23.62</td>
<td>35</td>
</tr>
<tr>
<td>3. Polo Field</td>
<td>0.43</td>
<td>6.16</td>
<td>6.59</td>
<td>9</td>
<td>0.96</td>
<td>20</td>
<td>20.96</td>
<td>35</td>
</tr>
<tr>
<td>4. Memorial Entrance</td>
<td>0.84</td>
<td>6.16</td>
<td>7.00</td>
<td>9</td>
<td>1.86</td>
<td>20</td>
<td>21.86</td>
<td>35</td>
</tr>
<tr>
<td>5. Cherry Walk</td>
<td>0.70</td>
<td>6.16</td>
<td>6.86</td>
<td>9</td>
<td>1.82</td>
<td>20</td>
<td>21.82</td>
<td>35</td>
</tr>
<tr>
<td>6. Amphitheater</td>
<td>--</td>
<td>6.16</td>
<td>6.16</td>
<td>9</td>
<td>--</td>
<td>20</td>
<td>20.00</td>
<td>35</td>
</tr>
<tr>
<td>7. Inlet Bridge/ W. Basin Loop</td>
<td>0.69</td>
<td>6.16</td>
<td>6.85</td>
<td>9</td>
<td>2.48</td>
<td>20</td>
<td>22.48</td>
<td>35</td>
</tr>
<tr>
<td>8. 14th Street Bridge Lot</td>
<td>1.19</td>
<td>6.16</td>
<td>7.35</td>
<td>9</td>
<td>3.91</td>
<td>20</td>
<td>23.91</td>
<td>35</td>
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<tr>
<td>9. National Park Service Lot</td>
<td>0.05</td>
<td>6.16</td>
<td>6.21</td>
<td>9</td>
<td>0.16</td>
<td>20</td>
<td>20.16</td>
<td>35</td>
</tr>
</tbody>
</table>

* See Air Quality Analysis Sites map for specific site locations.
Economy cycles will be part of all air conditioning systems on the project. Automatic resetting of temperatures, as well as control setback and shutoff will be provided to control energy usage. Adequate insulation for piping and duct systems will be provided wherever necessary. Electric motors will be sized at or near rate capacity.

Other general aspects of energy conservation to be studied and carefully taken into consideration will be:

- Proper maintenance and operation including preventive maintenance.
- Better building envelope design for all structures, as well as reduction of infiltration and air leakage to reduce heating and cooling loads which will reduce electric consumption. Reduction of heating and cooling loads will also occur through careful consideration of building orientation, configuration, glazing, and roof and wall transmission coefficients with the use of insulation.
- Consideration of heat storage systems to reduce power peaks.

The annual water consumption of the memorial is estimated at approximately 36,000,000 gallons. There is adequate water from the U.S. Corps of Engineers Washington Aqueduct Division to absorb this demand. However, the only source of water to the Washington Aqueduct System is the Potomac River. In anticipation of periods of low flow in the Potomac River, the Washington metropolitan area water users have a low flow allocation agreement. This agreement specifies methods for controlling uses during those periods. The frequency of this low flow occurrence is only anticipated once in 10 years for a period not to exceed 2 weeks.

In the event of low flow in the Potomac, the water supply to the FDR Memorial, the lake in Constitution Gardens and the Reflecting Pool in West Potomac Park may be restricted. In this event, the nonessential water consumptive facilities within the park area will be turned off. In the event of extreme drought, the sprinkler systems within the park area could be replaced with temporary facilities which would be supplied by direct pumping from the Potomac River.

The matter of an emergency water supply plan for federal facilities in the Washington area is currently under study by the National Capital Planning Commission. The National Park Service is participating in this effort and will conform to its recommendations for conservation during periods of low flow emergency.

4.2.4 Police and Fire Protection/Public Safety

The United States Park Police will patrol the area on a 24-hour-basis and will have an officer assigned to the memorial during the hours of operation. The site is completely accessible for all fire protection vehicles and equipment.
4.3 Physical and Biological Environment

4.3.1 Climate

To provide adequate shade in the summer and allow sun penetration in the winter the garden will be heavily planted and shade will be provided by high branching deciduous trees.

4.3.2 Air Quality

Carbon monoxide concentration will not exceed ambient air quality standards.

4.3.3 Sound Levels

The 160-300 KVA transformers will generate sound levels of 55 dBA. These units will be located behind walls and other masses adjacent to fountain water falls generating "masking sound" in excess of 55 dBA. See figure 24.

4.3.4 Land Form, Geology, and Soils

Ground settlement affecting paving and playfields may occur due to fill and utilities placement. This will be controlled to acceptable value by adjusting the total weight of new berms by using light-weight fill, creating large air voids in the berm, excavating, disposing of spoil off-site, and replacing with light-weight material under the new berm. Acceptable differential settlement will be limited to 3/8 inch in paving areas and to 2 percent in playfield areas. Systems and fittings will be designed to accommodate movement. The potential for movement will be limited through design.

4.3.5 Hydrology

Inundating Flood: The most recent flood (1942) inundated the site almost entirely, and reached 13.2 feet in elevation. The predicted 100-year flood would flood the site to an elevation of 16.5 feet. Flood waters are relatively slow moving in the vicinity of the memorial. No structural damage is expected in exterior spaces.

Increased runoff due to a 30 percent increase in impermeable surface area from paving, asphalt, and restroom construction, as well as provision of an irrigation system, will be mitigated through the provision of adequate storm (roof and site) drainage systems to include resizing present 24 inch storm lines to the Tidal Basin and Potomac, if necessary. Specially designed rain lines beneath planting areas and at the base of berms will remove excess and irrigation water. Storm drain lines from new roadbeds will be provided to existing inlets and lines.

4.3.6 Vegetation and Wildlife

Damage to existing trees and shrubs will be mitigated by predrilling for piles to the bottom elevation of roots so that ground compaction and vibratory effects are eliminated. A minimum clearance around trees will be maintained with fences, etc. Structural platforms will be constructed around bases of trees as required to minimize soil compaction. Use of
heavy equipment will be limited to existing roadway areas where soil is already compacted, or to areas sufficiently distant from trees to avoid harm. A stiff contractor penalty will be specified for harming trees. Trenching for placing lighting conduit will be restricted to the periphery of tree drip lines.

Impacts on wildlife adapted to this urban environment may be disruptive for short periods of time.

4.4 Short-Term Construction Impacts

4.4.1 Noise

The noise from pile drivers, trenching, and backfilling will be mitigated by the use of diesel-powered hammers with sound reduction devices and by predrilling though the upper layer of existing fill. Major noise vibration will occur only during relatively short times while pile is being seated in rock. Hours of operation for all construction equipment will be limited. The number of construction equipment items will be reduced and under strict maintenance and control. Unnecessary warm-up and engine revving will be eliminated. Use of above methods and of engine enclosures, mufflers, and intake silencers will reduce $L_{eq}$ from 80 dBA to 74 dBA at 85 feet.

4.4.2 Air Quality

There will be temporary air quality impacts associated with the construction of the memorial during the 24-month period while construction is in progress. The principal impacts will be from exhaust emissions and airborne dust, but both, however, will be minor in the volume generated and the duration during which they are generated, and will occur in open space areas.

Several measures will be taken to substantially reduce and control construction air quality impacts:

- All construction equipment used will comply with established exhaust emission standards.

- West Basin Drive will be maintained as a paved service roadway for construction vehicles as long as possible to avoid extensive passage of construction vehicles across unpaved areas which would otherwise generate large quantities of airborne dust.

- The construction site will be enclosed by a board fence as a security measure. The fence will also help to reduce and contain airborne dust generated at the construction site.

- Other dust control measures such as watering or oiling among others will be used as conditions require.

4.4.3 Hydrology

Dewatering discharge will be returned to the storm drainage system to the Potomac River to avoid possible damage to the existing elm trees during
pumping of groundwater. Special irrigation will be applied to those trees if pumping occurs during the growing season.

4.4.4 Traffic

Hours of operations will be limited to avoid conflict with late afternoon, evening, and weekend recreation use of the site. Routes to the site will be limited to avoid conflict with rush hour traffic. Delivery of oversized loads will be scheduled during very light traffic periods—in the early morning hours or well after the evening rush period to minimize traffic disruption.
RELATIONSHIPS BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE OF LONG-TERM PRODUCTIVITY
5.1 Relationships Between Short-Term Uses of the Environment and the Maintenance of Long-Term Productivity

Construction costs of the memorial and ancillary actions, including relocation of ballfields and removal of existing structures and utilities are estimated at approximately 30 million dollars. Removal of existing facilities are expected to result in only nominal savings in maintenance costs. The proposed action will result in major short-term and long-term benefits by providing a major national memorial and in improving the quality of recreation opportunities in the affected sections of West Potomac Park.

Discontinuing the use of most of West Basin Drive as a traffic circulation corridor and parking area will result in certain inconveniences to those presently using this area. However, the proposed action will not prevent visitation or use of this and adjacent areas such as the Cherry Walk and ballfields. In addition, the proposed action would replace almost all parking spaces lost with others within a walking distance of 5-8 minutes.

There will be short-term disruption of some pedestrian movement and ballfield use during construction. Yet in the long-term the proposed action will result in enhancement of these activities that is over and above the provision of recreation opportunities represented by the memorial itself.

Construction of the memorial and ancillary facilities will cause the loss of a number of existing trees including five elms. These will be replaced by large specimens immediately upon completion of construction and augmented by extensive and varied planting inherent in the memorial design. This planting will include disease-resistant elms, cherries, birch, Austrian pine, willow, oak, crabapples, hollies, azaleas and rhododendrons, in addition to the major thematic plant—roses.
IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES
6.1 Irreversible and Irretrievable Commitments of Resources

The proposed action would result in the commitment of a number of resources for the construction of the memorial and ancillary facilities. These resources include land, capital, labor, fossil fuels, and construction materials.

With the exception of the land, each of these resources can be considered irretrievable in the sense that, once expended, they cannot be exactly replicated. Below is a general discussion on the effects of construction of the memorial on consumption and depletion of these resources.

Actual construction of the memorial will require commitment of the following irretrievable resources: granite for walls, paving, and fountains and some elements of exterior furniture; steel and concrete for piles, pile caps, foundations, beams, framing systems, and architectural support systems; bronze and other metals for facias, architectural lighting and furniture detailing including column capitals, window and door frames, and hardware; fossil fuels to provide electrical power for pumps, lighting, space heating, and cooling.

The proposed action will result in increased visitation to West Potomac Park with visitors arriving primarily by Tourmobile and tourbus, but also, to a lesser extent, by private automobile and by taxi. Inherent in this visitation is the irretrievable expenditure of fuel by vehicles. The increase in fuel consumption over present use is a function of increase in vehicle miles traveled in Washington. While the increase of three thousandths of 1 percent is not significant, it does focus attention on the necessity to fully serve Washington's monuments and memorials by an energy efficient transportation system.

Construction activity will require an average workforce of about 80 for a period of approximately 400 working days. During that period the transportation of materials and the operation of construction equipment would involve commitment of fuel and labor. However, the commitment of labor, like that of capital, in the construction does not represent as absolute or quantifiable commitment of resources as that of fuels and materials. This is particularly significant in the light of the proposed action providing the nation and its Capital with resources of great significance but which again are not quantifiable.

The land making up West Potomac Park is landfill placed on marsh or submerged ground primarily in the period of the last two decades of the 19th century. As landfill it does not contain any artifacts of archeological significance. Thus, this factor can be discounted in the commitment of resources. While construction of the memorial will require significant subterranean modifications to support placed loads, implementation of the proposal does not represent an irreversible commitment of the site, especially as only a small portion of it will require modification.
7.1 No Action (A No-Build Alternative)

A no-build alternative would involve no further commitment of design or construction funds and would allow retention of all existing land uses in West Potomac Park. It would also represent the elimination of potential maintenance costs on the part of the National Park Service.

On the other hand, a no-build alternative would be contrary to a 30-year commitment by Congress to memorialize FDR. It would fail to fulfill the legislative mandate approved and authorized by Congress and the President for construction of such a memorial. It would represent, in all likelihood, the final abandonment of a design process which has resulted in what all reviewing bodies consider to be an appropriate memorial to Roosevelt. It would also be a denial of the National Capital Planning Commission's goals for West Potomac Park, and would result in the loss of a great potential city and national resource.

The no-build alternative would maintain traffic and parking as follows:

Traffic Operations - Ohio Drive would carry two-way traffic on the segment from Independence Avenue to the road connecting it to West Basin Drive. The portion of Ohio Drive from the connector to the Inlet Bridge would carry southbound traffic only. West Basin Drive would carry northbound traffic from the Inlet Bridge to Independence Avenue. The road connecting West Basin Drive and Ohio Drive would carry traffic westbound.

Parking - Two-hour parking would be provided along both sides of Ohio Drive from Independence Avenue to the road connecting Ohio and West Basin Drives (approximately 105 spaces).

Three-hour parking would be allowed on both sides of the remainder of Ohio Drive and on both sides of West Basin Drive (approximately 455 spaces).

Bus parking would be permitted along the south side of the connector road (approximately 11 bus spaces).

<table>
<thead>
<tr>
<th>Type</th>
<th>Spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two-Hour Spaces</td>
<td>105</td>
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<tr>
<td>Three-Hour Spaces</td>
<td>455</td>
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<tr>
<td>Bus Parking Spaces</td>
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</tbody>
</table>

Tourmobile - The Tourmobile would travel its current route from the Washington Monument to the Bureau of Engraving via 15th Street. It would use East Basin Drive to the Inlet Bridge stopping at the Jefferson Memorial. After crossing the Inlet Bridge, the Tourmobile would stop on West Basin Drive immediately north of the bridge, and on the connector road near the polo field. From there, it would travel along Ohio Drive to the Lincoln Memorial, and back to the Washington Monument via the service road at Constitution Gardens and the Ellipse.

The traffic impacts of the no-build alternative would be as follows: The traffic on Ohio and West Basin Drive will increase by approximately 2
percent per year. The vehicle volumes will be fairly low, as compared to the capacity of the roadway, and vehicle operating speeds will not be affected by the traffic flows.

The principal congestion problems will occur on Ohio Drive between Independence Avenue and the connector road. This congestion, however, will be caused by parking rather than by traffic flows.

The quality of parking service which will be provided for the users of sports fields and visitors to the Lincoln Memorial will be excellent. Virtually all of the 12-hour parking demand will be accommodated along Ohio and West Basin Drives. The average time required for a sports field user or park visitor to walk from where they have parked their car to the center of the sports field area would be only 50 percent of that which is associated with the proposed action.

The impact on local air quality of not constructing the FDR Memorial is summarized in figure 8. As can be seen, the air quality is characterized by fairly uniform CO concentrations. The concentrations attributable to local sources range from 0.67 to 1.10 PPM for eight-hours, and from 1.76 to 2.68 PPM for one-hour. There are no sites which will be significantly impacted under this alternative. The main reason for this is that traffic circulation and parking are distributed relatively evenly throughout the site. Because of this distribution, however, several sites will experience significantly higher local concentrations than under the proposed action. Among these are the polo field, Cherry Walk, amphitheater, and Inlet Bridge/West Basin sites. Sites showing a significant decrease in concentrations are the softball field, sidewalk route, memorial entrance, and 14th Street Bridge parking lot. The locations of these latter sites lie within the zone of increased vehicular activity associated with the proposed action. On the whole, however, it cannot be said that the no-build alternative will result in a significant improvement in local air quality over the proposed action.

While this pattern of predicted CO concentrations differs from that produced by the proposed plan, it does not indicate significant benefit over the proposed action, either as a whole or at any specific site.

7.2 Former Designs

No attempt is made here to comprehensively describe the designs emanating from the 1960 design competitions or from the subsequent attempts to create a memorial to FDR.

For a complete review of the first competition, reference should be made to The Architecture of Monuments, by Thomas H. Creighton, 1962.

Review of the history of the FDR Memorial competition indicates that many alternative designs utilizing all possible areas of the memorial have been undertaken in the period since 1959. There were over 500 entries to the original competition and the designs ran the gamut from architectonic and monumental to "soft" landscape solutions covering major portions of the ±66-acre site. In fact, some designs utilized the entire site while others proposed structures of a scale to compete with the existing monuments
Key: 1983 Traffic Volumes: Peak 10-Hr. Auto and Bus Volumes 0000 00
Peak 1-Hr. Auto and Bus Volumes (0000)(00)

- - - - - Tourmobile Stops
- - - - - - - - Curbside Parking

Map Q: Traffic Circulation and Parking Plan — No-Build
Figure 8: Air Quality Impacts of the No-Build Alternative Traffic Circulation Plan

<table>
<thead>
<tr>
<th>Site*</th>
<th>Local Traffic Contribution</th>
<th>Background Contribution</th>
<th>Total CO Concentration</th>
<th>Standard</th>
<th>Local Traffic Contribution</th>
<th>Background Contribution</th>
<th>Total CO Concentration</th>
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</tr>
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<tr>
<td>2. Sidewalk</td>
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<td>2.68</td>
<td>20</td>
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<td>4. Memorial Entrance</td>
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<td>6. Amphitheater</td>
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<td>6.16</td>
<td>7.26</td>
<td>9</td>
<td>2.58</td>
<td>20</td>
<td>22.58</td>
<td>35</td>
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<tr>
<td>7. Inlet Bridge/ W. Basin Loop</td>
<td>1.10</td>
<td>6.16</td>
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<td>9</td>
<td>2.58</td>
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<td>22.58</td>
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<td>8. 14th Street Bridge Lot</td>
<td>0.81</td>
<td>6.16</td>
<td>6.98</td>
<td>9</td>
<td>1.76</td>
<td>20</td>
<td>21.76</td>
<td>35</td>
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<tr>
<td>9. National Park Service Lot</td>
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<td>6.16</td>
<td>6.16</td>
<td>9</td>
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<td>20</td>
<td>20.00</td>
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* See Air Quality Analysis Sites map
and memorials on the Mall. In this latter category was the eventual winner of this first competition. The design by Pederson & Tilney and Associates of New York was finally rejected by reviewing bodies partially on the basis of its visual intrusion into the landscape between the Lincoln and Jefferson Memorials and the Washington Monument.

Other designs achieved their monumentality through use of large portions of the site. Included in this category were two of six finalists. These designs would have occupied the entire eastern portion of the site and while they would have created minor visual intrusion, they would, however, have caused the loss of a major portion of the existing recreational area.

Subsequent to the eventual rejection of the Pederson & Tilney design in 1965, the design of Marcel Breuer of New York was submitted, but likewise was considered inappropriate to Roosevelt or the site. A later concept of a simple rose garden was also rejected as not being a strong enough statement on the man considered by so many to be one of the four great presidents of the United States.

The foregoing history of the commission's actions and of the professional and public response indicates that virtually every avenue was explored to find a memorial appropriate to the man, to the site, and to the times. Indeed, the FDR Memorial has been instrumental in causing a universal reappraisal of the optimum nature of memorials. In this regard, reference is made to the article reproduced in Appendix B by Barry Mackintosh, Some Monumental Thoughts, 1973; and also, see John Ely Buchard, "Debating the FDR Memorial: A Plea for Relevance," in the Architectural Record, March 1961; Katherine Kuh, "Must Monuments be Monumental," in the Saturday Review, February 1961; Wolf Van Eckardt, "Monumental Decision," in the New Republic, April 1962.
8.1 Consultation and Coordination with Others

During the evolution of the design of the proposed project, consultation and coordination for the purpose of a) obtaining design restraints and criteria, and b) reviewing design and program development, has occurred as follows:

February 1975

District of Columbia Highway Department Administrative and Planning Staff (on Interstate 695, South Leg).

April 1975

FDR Memorial Commission Members.
Commission of Fine Arts (Interim Review of Concept in an Informal Session).
Landmark Services (on Tourmobile Service).
Department of Health, Education and Welfare Staff (on Handicapped Services).
Hyde Park Library and Archives Staff (Review of Available Media Resources).
Warm Springs, Georgia (Little White House) Staff.

May 1975

FDR Memorial Commission (Concept Review and Approval).

June 1975

Joint Committee on Landmarks of the National Capital.
National Capital Planning Commission (Concept Review and Approval).
Commission of Fine Arts (Concept Review and Approval).
The Secretary of the Interior's National Capital Advisory Committee (Concept Review and Concurrence).

July 1975

Commission of Fine Arts (Concept Development Review and Approval).

June 1976

Commission of Fine Arts (Design Review and Approval).

February 1977

FDR Memorial Commission (Design Development Review and Approval).
Commission of Fine Arts (Design Development and Approval).
April 1977
FDR Memorial Commission (Sculptor Search).
District of Columbia, Department of Recreation.

July 1977
FDR Memorial Commission (Selection of Sculptors).

November 1977
Commission of Fine Arts (Status Report on Sculptor Selection).

March 1978
FDR Memorial Commission (Final Design and Sculpture Concept Approval).
Commission of Fine Arts (Final Design and Sculpture Concept Approval).

May 1978
National Capital Planning Commission.
Joint Committee on Landmarks.

November 1978
Public Hearing.

January 1982
Senate Committee on Rules and Administration Hearing.
APPENDIX A. FDR MEMORIAL LEGISLATION
Joint Resolution

To authorize and direct the Secretary of the Interior, subject to the supervision and approval of the Franklin Delano Roosevelt Memorial Commission, to proceed with the construction of the Franklin Delano Roosevelt Memorial, and for other purposes.

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of the Interior is authorized and directed, subject to the supervision and approval of the Franklin Delano Roosevelt Memorial Commission, to construct the Franklin Delano Roosevelt Memorial in accordance with the general design developed by the Franklin Delano Roosevelt Memorial Commission and approved by the Commission of Fine Arts on September 20, 1979. Such memorial shall be constructed in that portion of West Potomac Park in the District of Columbia which lies between Independence Avenue and the inlet bridge, reserved for the memorial by a joint resolution approved September 1, 1959 (Public Law 86-214).

Sec. 2. The Franklin Delano Roosevelt Memorial shall be operated and maintained by the Secretary of the Interior subject to the provisions of the Act of August 25, 1916 (39 Stat. 635), as amended and supplemented.

Sec. 3. There are authorized to be appropriated for fiscal years beginning after September 30, 1982, such sums as may be necessary to carry out the provisions of this joint resolution.

APPROVED
JUL 28 1982

[Signatures]
Joint Resolution

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled. That (a) the joint resolution approved August 11, 1955 (69 Stat. 694), providing for the establishment of a Commission to formulate plans for a memorial to Franklin Delano Roosevelt, is amended by redesignating section 3 as section 4 and inserting the following new section:

"Sec. 3. The Secretary of the Interior is authorized, upon the request of the Commission, to participate in the planning and design of the memorial."

(b) Section 4, as herein redesignated, of such joint resolution is amended to read as follows:

"Sec. 4. There are hereby authorized to be appropriated such sums as may be necessary to carry out the provisions of this joint resolution."

Approved June 30, 1972.
THE PRESIDENT

Proclamation 3891

FRANKLIN DELANO ROOSEVELT MEMORIAL PARK

By the President of the United States of America

A Proclamation

Because of the deep debt of gratitude of the American people to Franklin Delano Roosevelt for his leadership in America’s struggle for peace, well-being, and human dignity, the Congress established the Franklin Delano Roosevelt Memorial Commission, by the Act of August 11, 1955, 69 Stat. 694, for the purpose of considering and formulating plans for the design, construction, and location of a permanent memorial to Franklin Delano Roosevelt in the City of Washington, District of Columbia, or in its immediate environs.

In furtherance of the objectives of that Act, the Act of September 1, 1959, 73 Stat. 445, reserved, for the erection of a memorial to Franklin Delano Roosevelt, a site comprising that portion of West Potomac Park in the District of Columbia which lies between Independence Avenue and the inlet bridge, being twenty-seven acres, more or less, and also provided for a competition for the design of such memorial.

Although the Commission has not yet reported to the Congress its selection of an appropriate memorial, it is desirable that the site be maintained, pending the Commission’s final determination, as a park dedicated to the memory of Franklin Delano Roosevelt.

NOW, THEREFORE, I, LYNDON B. JOHNSON, President of the United States of America, do proclaim that the following described land reserved by the Act of September 1, 1959, be designated as the Franklin Delano Roosevelt Memorial Park area of the West Potomac Park:

That portion of West Potomac Park, in the District of Columbia, which lies between Independence Avenue and the inlet bridge, being twenty-seven acres, more or less.

IN WITNESS WHEREOF, I have hereunto set my hand this twentieth day of January, in the year of our Lord nineteen hundred and sixty-nine, and of the Independence of the United States of America the one hundred and ninety-third.

[F.R. Doc. 69-902; Filed, Jan. 21, 1969; 10:31 a.m.]
Public Law 87-842
87th Congress, H. J. Res. 712
October 18, 1962

Joint Resolution

To direct the Franklin Delano Roosevelt Memorial Commission to consider possible changes in the winning design for the proposed memorial or the selection of a new design for such memorial.

Whereas by joint resolution approved August 11, 1955, the Franklin Delano Roosevelt Memorial Commission was duly established for the purpose of formulating plans for the design, construction, and location of a permanent memorial to Franklin Delano Roosevelt in the city of Washington or its environs; and

Whereas by joint resolution approved September 1, 1959, there was reserved as a site for said memorial that portion of the West Potomac Park in the District of Columbia which lies between Independence Avenue and the inlet bridge: and the said Commission was authorized to hold a competition for the proposed memorial, and to award a prize of $50,000 to the winner thereof: and

Whereas the competition was duly held, and the winning prize was awarded to Pedersen and Tilney, of New York, by the jury of award; and

Whereas the winning design was thereafter approved by the said Commission, with the inclusion of a statue or bas-relief of President Roosevelt, and the result of the competition and the approval of the winning design duly reported to the President and to the Congress, as provided by the joint resolution of September 1, 1959; and

Whereas said design has created considerable controversy and is subject to specific criticism, and lacks the approval of the Commission of Fine Arts: Therefore be it

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That pursuant to Public Law 372, Eighty-fourth Congress, the Franklin Delano Roosevelt Memorial Commission is hereby authorized and directed to consult with the Commission of Fine Arts to determine whether the winning design of Pedersen and Tilney, of New York, may be so changed or modified to secure the approval of the Commission of Fine Arts. If it is determined that such changes or modifications are not practical, the Commission is authorized and directed to select, with the advice and approval of the Commission of Fine Arts, such other design among those already submitted in the competition for the proposed memorial, or to consider a living memorial such as the stadium, an educational institution, information center, memorial park or any other suitable or worthy project.

Sec. 2. The Commission shall report its findings and recommendations to the Congress for its approval and to the President not later than June 30, 1963.

Sec. 3. There is authorized to be appropriated not more than $25,000 to carry out the provisions of this joint resolution.

Approved October 18, 1962.
JOINT RESOLUTION

To reserve a site in the District of Columbia for the erection of a memorial to Franklin Delano Roosevelt, to provide for a competition for the design of such memorial, and to provide additional funds for holding the competition.

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That, in furtherance of the joint resolution approved August 11, 1955 (69 Stat. 694), providing for the establishment of a Commission to formulate plans for a memorial to Franklin Delano Roosevelt, and of the interim report of the said Commission made to the President and to Congress, on January 2, 1959, recommending a site for the memorial and a competition for the design thereof, there is hereby reserved that portion of West Potomac Park, in the District of Columbia, which lies between Independence Avenue and the inlet bridge, being twenty-seven acres more or less, to be used as a site for the proposed Franklin Delano Roosevelt Memorial.

Sec. 2. The Commission is authorized to hold a competition or competitions for the proposed memorial, and to award a suitable prize or prizes in connection therewith, but may refuse to employ any successful competitor if it deems that his design should not be used. The competition for the proposed memorial shall be carried out so as to insure that it will be harmonious as to location, design, and land use with the Washington Monument, the Jefferson Memorial, and the Lincoln Memorial. In holding the competition the Commission shall avail itself of the assistance and advice of the Commission of Fine Arts, of the National Capital Planning Commission, and of the National Park Service, and such Commissions and Service shall, upon request, render such assistance and advice.

Sec. 3. The Commission shall report the result of the competition, together with its recommendations, to the President and Congress at the earliest practicable date.

Sec. 4. There is authorized to be appropriated not more than $150,000 to be expended by the Franklin Delano Roosevelt Memorial Commission in organizing the competitions for plans for the design of the memorial, as authorized by subsection (c) of section 2 of the joint resolution, approved August 11, 1955.

Approved September 1, 1959.
JOINT RESOLUTION

Whereas the American people feel a deep debt of gratitude to Franklin Delano Roosevelt for his leadership in America's struggle for peace, well-being, and human dignity: Therefore be it

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That there is hereby established a commission, to be known as the "Franklin Delano Roosevelt Memorial Commission" (hereinafter referred to as the "Commission"), for the purpose of considering and formulating plans for the design, construction, and location of a permanent memorial to Franklin Delano Roosevelt in the city of Washington, District of Columbia, or in its immediate environs. The Commission shall be composed of twelve Commissioners appointed as follows: Four persons to be appointed by the President of the United States, four Senators by the President of the Senate, and four Members of the House of Representatives by the Speaker of the House of Representatives. The Commissioners shall serve without compensation, but may be reimbursed for expenses incurred by them in carrying out the duties of the Commission. The Commission shall report such plans, together with its recommendations, to the President and Congress at the earliest practicable date, and in the interim shall make annual reports of its progress to the President and Congress.

Sec. 2. The Commission is authorized to—

(a) make such expenditures for personal services and otherwise for the purpose of carrying out the provisions of this joint resolution as it may deem advisable from funds appropriated or received as gifts for such purpose;

(b) accept gifts to be used in carrying out the provisions of this joint resolution or to be used in connection with the construction or other expenses of such Memorial;

(c) hold hearings, organize committees, enter into contracts for personal services and otherwise, and do such other things as may be necessary to carry out the provisions of this joint resolution;

and

(d) avail itself of the assistance and advice of the Commission of Fine Arts, the National Capital Planning Commission, and the National Capital Regional Planning Council, and such commissions and council shall, upon request, render such assistance and advice.

Sec. 3. There is authorized to be appropriated not more than $10,000 to carry out the provisions of this joint resolution.

Approved August 11, 1955.
The day for conventional monuments, statues, memorials, etc. has pass'd away... they are superfluous and vulgar.

Walt Whitman

SOME MONUMENTAL THOUGHTS
by Barry Mckintosh
from his History of the FDR Memorial Competition

Although Whitman was not the first to attack "conventional monuments," his view was clearly characteristic of neither his century nor much of our own. Monumental memorials have been popular from the days of the pyramids to the construction of the Jefferson Memorial in the early 1940s and there have been a few notable examples—like Eero Saarinen's Gateway Arch in St. Louis—as late as the past decade. On the whole, however, monumentation in our time has come increasingly into question. It was thus inevitable that Washington's greatest memorial undertaking of the post-war years would stimulate debate not only over particular designs but also on monumentation per se.

The task of the Franklin Delano Roosevelt Memorial Commission was not eased in an age asked questions like those of John Ely Buchard:

Is it possible in these days to memorialize anybody in a significant way through artifacts? If it is possible is a monumental artifact possible? Do we know how to make one? Do artists have their hearts in the job when they try?

Lewis Mumford, who had served on the Advisory Committee to the Memorial Commission, refused to serve on the selection jury, partially because, as he said, "In the present state of the arts today the odds were heavily against finding a memorial design that would effectively symbolize Franklin D. Roosevelt." In the Saturday Review, Katherine Kuh asked "Must Monuments be Monumental?" Responding to a subsequent letter from Francis Biddle defending the Pedersen-Tilney design, she emphasized that she did not oppose it as architecture:

It is the conception I question, the idea of another huge, costly monument... The great human qualities of FDR seem curiously misrepresented by such false giganticism. As I said in my article, what I had hoped was that "we in America might even have pioneered in design, as Roosevelt did in government, to come up with a fresh idea..."


The *New York Times* was another source of doubt:

Should any more monuments *qua* monuments (as opposed to ornamental buildings dedicated to useful purposes) be erected in an already monument-ridden city? The fact that a good monument today seems impossible to design could be proof that we do not really believe in monuments any more.

In a 1961 editorial the *Times* had advocated Representative McDowell's proposal of a memorial garden. Today the Franklin Delano Roosevelt Memorial Commission—with access to the greatest contemporary architectural talent and after sponsoring two critically acclaimed designs—has come at last to espouse a similar plan. Perhaps the *Times* was right: we may not really believe in monuments any more.

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APPENDIX C. SUMMARY OF PUBLIC INVOLVEMENT
SUMMARY OF PUBLIC INVOLVEMENT

The Draft Environmental Statement for this memorial (DES 78-37) was submitted to the Environmental Protection Agency, organizations, and the public on September 15, 1978.

This environmental statement addressed the planning, design, and construction of the FDR Memorial; rehabilitation of West Potomac Park south of the Reflecting Pool, to include provision of Tourmobile service, parking for visitors' cars and for tour buses, and relocation of all sports fields within the memorial area. The plan also proposed relocation of sports fields in the FDR Memorial area in such a manner that no playing areas would be lost. Existing sports fields in the vicinity of the Lincoln Memorial were unaffected by the proposal. Notice of these proposed sports fields relocations, together with drawings illustrating the changes, was sent to 430 ball teams who have used, or are presently using, the West Potomac Park ballfields, as well as to all other known users of sports fields within this park.

In addition, copies of the Draft Environmental Statement were made available for inspection at:

- National Park Service
  National Capital Region
  1100 Ohio Drive, S.W., Room 208
  Washington D.C. 20242

- Martin Luther King, Jr. Library
  9th and G Streets, N.W., Room 417
  Washington, D.C. 20001

- District of Columbia
  Department of Recreation
  3149 16th Street, N.W.
  Washington, D.C. 20010

Notices of a public hearing held on Wednesday, November 1, 1978, at 7:05 p.m. were published in the Washington Post and Washington Star on October 14, 22 and 29, 1978. Thirty-five individuals attended the meeting and 14 testified. The hearing was followed by a 30-day comment period, which was extended to 45 days upon receipt of a request for the extension from a member of the public. During this period 52 written comments were received. Of these, 17 were from agencies or organizations and are reproduced in their entirety. The remaining comments were from individuals and included two petitions of 160 signatures protesting construction of the memorial. A summary of individual's comments follows and includes NPS responses to the concerns raised.

Every individual who responded in writing to the Draft Environmental Statement was either partially or wholly against the proposed memorial. The objections which they raised consistently touched on at least one of
the seven primary concerns which are summarized below. The numbers following each concern represent the names of those who expressed that concern. See the list of names following this section.

1. The modest memorial near the National Archives honors President Roosevelt in the simple way he requested. No other memorial is necessary. (1, 2, 9, 11, 12, 14, 17, 26, 27, 30) (See response to no. 2.)

2. The idea of a memorial to the late president is acceptable, but a different location and/or design should be found. (Constitution Gardens was mentioned by several persons as an appropriate alternative site. A couple of individuals recommended a rose garden as an alternative design) (3, 5, 19, 20, 21, 25)

NPS Response
In 1969, President Johnson, by proclamation, designated the 66 acres between Independence Avenue and the Inlet Bridge as the FDR Memorial area of West Potomac Park. In 1972 legislation was enacted to authorize the Secretary of the Interior to participate with the FDR Commission in the planning and design of the memorial. The design was approved in 1979 by the Commission of Fine Arts and the National Capital Planning Commission and is in keeping with the McMillan plan for the nation's monumental core. Senate Joint Resolution 95, authorizing construction of the memorial according to the approved design was passed by the 97th Congress and approved by President Reagan on July 28, 1982 (see section containing enabling legislation). These representatives of all the American people have, therefore, deemed the design and locations to be appropriate.

Constitution Gardens does not have the aesthetic properties considered important for this memorial and now includes two new memorials—the Vietnam Veterans and 56 Signers memorials.

3. The memorial will destroy the open space beauty of West Potomac Park and obstruct vistas around the Tidal Basin. (2, 10, 11, 14, 16, 18, 19, 20, 21, 22, 23, 25, 30)

NPS Response
The memorial design has been modified and will be less imposing on the site. The interpretive center, service areas, theatre, and restaurant have been eliminated from the design, thus reducing the memorial site from 10 acres to 8.8 acres. As a result, the 16-foot high walls intended for the interpretive center will not be built. The garden walls will be no higher than 14 feet. The dirt berms also will be no higher than 14 feet, and many will be lower. Disturbance to the natural beauty of the site will be ameliorated by replacement of existing vegetation removed during construction and by intensive landscaping. The separate tourmobile road has been deleted from the design and the proposed parking areas at the 14th Street Bridges will be screened by tree and shrub plantings.
Views of the Tidal Basin and monuments will be obstructed only for pedestrians within the garden rooms, or for passers-by on the southwestern side of the memorial.

4. The high cost of the memorial is unacceptable to taxpayers, especially during these inflationary times. (2,3,4,5,6,7,8,9,11,13,15,16,17,18,19,25,26,27,30) (See response to no. 5.)

5. The money necessary to construct and maintain the memorial should be directed to a more worthy cause. (One suggestion was to use the money to make facilities accessible to the handicapped). (11,14,24,28,29)

NPS Response
Through design modifications, the cost of the memorial has been reduced from $46 million to $31 million. Savings include reduced expense for maintaining, lighting, and securing the area. The only service facility which will remain is a restroom at the southeastern end of the memorial.

Construction of the FDR Memorial will create employment for those engaged in its design and execution. It will also stimulate cash flow into the mainstream economy from the spent income of those employed and from dollars spent on visitor services.

6. The memorial's presence will increase traffic congestion and parking problems in and around West Potomac Park. (7,9,10,14,19,20,21,25)

NPS Response
Measures have been taken to mitigate traffic problems, which the presence of the FDR Memorial may create. Please refer to the sections on traffic and parking.

The proposed parking lots for West Potomac Park will provide week-long parking for visitors within easy walking distance of the proposed memorial. In addition, the National Capital Region lot, comprising 640 spaces, could be made available evenings and weekends. These areas, together with proposed on-street parking provide parking for 1,165 cars and 20 buses. Also visitors will be encouraged to park their cars in the Arlington Cemetery lot (2,000 auto and 20 bus spaces) or to utilize the Arlington Metro station, where they can be picked up by the Tourmobile.

Those visitors unable to walk long distances may use the handicapped parking area at the memorial. Also, passengers can be dropped off at the memorial entrance on Ohio Drive.

7. The recreation activities in West Potomac Park will be curtailed or hampered by memorial activities. (9,14,19)
NPS Response

There will be no decrease in the number of sports fields in West Potomac Park as a result of the construction of the FDR Memorial. Some sports fields will, however, be relocated.

List of individuals who responded in writing at least once. (Petition signatures are not included here).

1. William L. Asher
2. Mary E. Bane
3. Mrs. Chesley Bonestell
4. Alice H. Brown
5. Robert Brown
6. James Gibson Buttfield
7. John E. Cannaday
8. Mrs. Lula Caryl
9. Wilbur G. Dickinson
10. Frances R. Fagan
11. Margaret Forsythe
12. Sue Glickstein
13. Jean Gresham
14. John R. Harpold
15. Shawn Isralow
17. Mrs. Joseph A. Kubizna
18. M. J. Malcolm
19. Marjorie McPhillamey (3 letters)
20. Marjorie & Robert McPhillamey
21. M. A. Meier
22. Mrs. Jerome T. Miller
23. N. Barr Miller
24. Carol B. Ney
25. Joseph B. Norbury
26. Kate Davis Quesada
27. Clark R. Renninger
28. Rolf H. Rermer
29. Carl & Ethel Snow
30. Thomas P. Wood

List of organizations that received the draft environmental statement.

Advisory Council on Historic Preservation
American Institute of Planners
Architect of the Capitol
Architectural & Transportation Barriers Compliance Board
City Administrator
C&P Telephone Company
Citizen's Permanent Conference on the Potomac River Basin
Commission of Fine Arts
Committee of 100 on the Federal City
Council on Environmental Quality
D.C. Chamber of Commerce
D.C. City Council Chairman
D.C. Department of Environmental Services
D.C. Department of Recreation
D.C. Department of Transportation
D.C. Development Corporation
D.C. Metropolitan Police Department
D.C. Office of General Services
D.C. Office of Municipal Planning
D.C. Office of Planning & Management
D.C. Historic Preservation Officer
Environmental Defense Fund
Environmental Protection Agency
Field Hockey Association
General Services Administration
George Washington University
Guest Services, Inc.
Izaak Walton League of America
Mayor, District of Columbia
Metropolitan Washington Council of Governments
National Capital Planning Commission
National Capital Polo Association
National Endowment for the Arts
National Gallery of Art
National Soccer Association
Parks and History Association
Pennsylvania Avenue Development Corporation
Potomac Boat Tours
Potomac Electric Power Company
Potomac Rugby Union
Smithsonian Institution
Tourmobile (Landmark Services)
U.S. Department of Agriculture
U.S. Department of Health, Education and Welfare
U.S. Department of Housing and Urban Development
U.S. Department of Transportation
U.S. Army Corps of Engineers
Virginia Department of Highways
Washington Area Convention and Visitors Bureau
Washington Cricket Association
Washington Ecology Center
Washington Metropolitan Area Transit Authority
Washington Suburban Sanitary Commission
Mr. Manus J. Fish, Director
National Capital Region
National Park Service
1100 Ohio Drive, S.W.
Washington, D.C. 20242

Dear Mr. Fish:

The National Capital Planning Commission, at its meeting on November 2, 1978, authorized transmittal of the following comments to the National Park Service on the Draft Environmental Impact Statement on the planning, design and construction of the proposed Franklin Delano Roosevelt Memorial and other proposals affecting West Potomac Park west of Seventeenth Street, N.W.

1. The Final Environmental Impact Statement should more fully compare the aesthetic and visual impacts of various alternative off-street parking solutions and alternative measures to ameliorate the aesthetic and visual impacts of the parking proposed for 200 automobiles and 20 buses in West Potomac Park in two lots between the 14th Street highway and railroad bridges.

2. The Final Environmental Impact Statement should more fully address the expanding tourmobile service in order to reduce automobile traffic and air quality impacts in the memorial area and minimize the need for replacement of off-street parking in West Potomac Park.

3. The alignment of the tournobile right-of-way leading to the Memorial proposed to be immediately adjacent to the relocated playfields may require special treatment in order to insure the safety of those using the fields and the effective operation of the tournobiles. In addition, visual and other possible impacts of the tournobile roadway 40 feet away from Ohio Drive in the area of the playfields should be given further consideration.

4. The Park Service should submit the proposed sub-area Master Plan for West Potomac Park west of Seventeenth Street to the Commission in conjunction with its submission of the preliminary site and building plans for the Franklin Delano Roosevelt Memorial.

A copy of the Executive Director’s Recommendation, as approved by the Commission, is enclosed for your information.

Sincerely yours,

Charles H. Conrad
Executive Director

Enclosure
The Executive Director recommends that the Commission authorize transmittal of the following comments to the National Park Service on the Draft Environmental Impact Statement on the planning, design and construction of the proposed Franklin Delano Roosevelt Memorial and other proposals affecting West Potomac Park west of Seventeenth Street, N.W.

1. The Final Environmental Impact Statement should more fully compare the aesthetic and visual impacts of various alternative off-street parking solutions and alternative measures to ameliorate the aesthetic and visual impacts of the parking proposed for 200 automobiles and 20 buses in West Potomac Park in two lots between the 14th Street highway and railroad bridges.

2. The Final Environmental Impact Statement should more fully address the expanding tourmobile service in order to reduce automobile traffic and air quality impacts in the memorial area and minimize the need for replacement of off-street parking in West Potomac Park.

3. The alignment of the tourmobile right-of-way leading to the Memorial proposed to be immediately adjacent to the relocated playfields may require special treatment in order to insure the safety of those using the fields and the effective operation of the tourmobiles. In addition, visual and other possible impacts of the tourmobile roadway 40 feet away from Ohio Drive in the area of the playfields should be given further consideration.

4. The Park Service should submit the proposed sub-area Master Plan for West Potomac Park west of Seventeenth Street to the Commission in conjunction with its submission of the preliminary site and building plans for the Franklin Delano Roosevelt Memorial.

Description of Proposed Action

The Draft Environmental Impact Statement on the Franklin Delano Roosevelt Memorial and West Potomac Park has been prepared by the National Park Service and discusses its proposed actions relative to the planning, design and construction of the Franklin Delano Roosevelt Memorial; rehabilitation of...
West Potomac Park south of the reflecting pool to include provision of Tourmobile service; parking for handicapped visitors at the Memorial entry; parking for visitors' cars and for tour buses between the 14th Street bridge off Ohio Drive; and relocation of all sports facilities.

The proposed memorial would consist of a sequence of gardens set along a 900-foot granite wall varying in heights up to 14 feet from which water would fall into pools and runnels, and on which would be sculptured images of President Roosevelt and inscriptions of his most memorable speeches and sayings. To the left of the arrival plaza, on the Potomac side of the peninsula, will be an interpreting center containing: a staffed information and waiting area; a memorial bookstore; a small theater seating approximately 200; a cafe with a large enclosed garden space; and public restrooms. In addition to public facilities, the interpreting center will house various staff functions and services.

The Tourmobile would serve the FDR Memorial on its route between the Jefferson and the Lincoln Memorials. From the Inlet Bridge the Tourmobile will follow the remaining short spur of West Basin Drive and the proposed West Basin - Inlet Loop to an exclusive right-of-way approximately 40 feet north of Ohio Drive. The one stop provided in this section of West Potomac Park will be at the main entry to the Memorial.

An estimated six parking spaces would be provided for handicapped visitors at the main entrances to the memorial.

Public parking for 200 automobiles and 20 business is proposed to be provided in two landscaped lots located in West Potomac Park between the spans of the 14th Street Bridge.

Construction of the FDR Memorial will require relocation or reorientation of a number of athletic fields in the area of the Memorial. Three soccer fields, two softball fields, a rugby field, and a field hockey field are proposed to be located in the area formerly occupied by the Folklife Festival. This area will be redesigned for these uses.

Previous Commission Actions

1. Franklin Delano Roosevelt Memorial

On June 26, 1975, the Commission endorsed the following site development concepts for the Franklin Delano Roosevelt Memorial to be located in West Potomac Park:

1. use of 27 acres more or less, on the northwest side of the Tidal Basin between the Cherry Walk and Ohio Drive, including the removal of West Basin Drive;
2. an entrance feature extending between the Potomac River and the Tidal Basin that includes a tourmobile stop, boat docking, a rose garden, a theater, restrooms, and other facilities for the comfort and convenience of visitors;
3. a linear sectional wall ranging to 16 feet in height which through the media of carvings, bas reliefs, and sculpture will portray the life of FDR;
4. a water garden using water in combination with landscape features and a secondary plaza with tourmobile stop and visitor facilities at the southeastern end of the Memorial; and
5. retention of recreational activities and sports fields to the south and west of the Memorial screened by earth forms that will serve as a viewing podium for athletic events.

The Commission also recommended that the National Park Service, in the preparation of preliminary plans:

1. prepare a pedestrian circulation plan for West Potomac Park south of Independence Avenue providing controlled pedestrian crossings of Independence Avenue to the FDR Memorial from the Folklife Festival grounds and the Washington Monument, possibly at such prominent points as French Drive and the War Memorial;
2. consider locating the entrance walk and plaza further to the northwest along the existing connecting road between West Basin and Ohio Drives to save the large existing trees and provide a better viewing point at the Basin;
3. submit a plan and program for accommodating the parking for visitors and particularly users of the sports field that currently park on West Basin Drive;
reconsider the size of the curved earth form proposed along Independence Avenue and design any proposed screening devices so that the views of the Tidal Basin and the Jefferson Memorial are not blocked from Independence Avenue;

5. determine the feasibility of food service facilities in this area of West Potomac Park and in planning any such facility, avoid any adverse impact on the character, quality, or serenity of the Memorial; and

6. submit an appropriate plan for the interpretation of the site and its theme.

On May 4, 1978 the Commission reviewed the current plans and designs of the Memorial to see how the Franklin Delano Roosevelt Memorial Commission had responded to its earlier recommendations. Because an Environmental Impact Statement was required in connection with any further Commission action on the Memorial, the Commission, under the requirements of the National Environmental Policy Act of 1969, took no action on the proposed plans and designs at the time of its May 4 review and will not take any further action on the plans until the environmental review process is completed. At the May 4th presentation, however, the Commission members reacted favorably to the current plans and designs for the Memorial indicating that the plans responded favorably to the recommendations it made in its 1975 approval of the development concepts. Park Service officials, at that time, indicated that they would be submitting for Commission review a pedestrian circulation and parking plan for West Potomac Park as requested to do so by the Commission in its June 26, 1975 meeting. These two items are discussed in the context of the present draft environmental impact statement.

2. West Potomac Park

The Commission endorsed the concepts incorporating the proposed General Development Plan for the Mall on September 15, 1966—excluding that portion of West Potomac Park west of Seventeenth Street, N.W. Since then the Commission has approved: (1) the Site Development Plan for the 1976 Bicentennial Development on the Mall between 3rd and 14th Streets, N.W. (May 20, 1974); (2) the modified final development plan for the 1976 development of the Washington Monument Grounds (April 3, 1975), and (3) the final site development plan for Constitution Gardens in West Potomac Park north of the Reflecting Pool between 17th Street and Henry Bacon Drive (August 7, 1974).

No sub-area master plans or site development plans for that portion of West Potomac Park south of the Reflecting Pool and west of the Tidal Basin have been submitted for Commission review since action on the overall General Development Plan for the Mall. The proposed sub-area master plan for West Potomac Park west of 17th Street and the preliminary site and building plans for the FDR Memorial will therefore be the first such plans for this area to be submitted by the Park Service since 1966.

Evaluation

The Final EIS should more fully address the following:

1. The aesthetic and visual impact of the three alternative locations proposed for off-street parking lots — at the memorial, at Independence Avenue and West Basin Drive and along Ohio Drive between the 14th Street bridges. All three sites would have an aesthetic and visual impact on West Potomac Park—particularly the Jefferson Memorial, the Tidal Basin and Independence Avenue as well as the new FDR Memorial. In further addressing this issue, the Final EIS should consider the extent to which measures such as landscaping, walls, etc. would be successful in ameliorating or eliminating the potentially adverse aesthetic and visual impacts at each of the sites.

The two sites proposed in the Draft EIS for off-street parking lots for 200 automobiles and 27 buses between the highway and railroad bridges in the 16th Street corridor will have an aesthetic and visual impact. Portions of these sites will be exposed daily to the view of numerous passersby on: (1) the 14th Street highway bridge; (2) the recently completed metrorail bridge; (3) the bridge for the main north-south railroad lines through the City; (4) Ohio Drive (pedestrians, bicycles and automobiles); and (5) the Potomac River (both visitor tour boats and private boats). Anything developed on these sites will be exposed to the daily view of thousands of area residents, tourists and visitors. Further consideration should be given to the extent to which these aesthetic and visual impacts can actually be ameliorated or eliminated by the proposed landscaping shown in the Draft EIS.

2. The potential and feasibility of expanding the proposed tourmobile service in West Potomac Park to enable visitors to park at locations outside of the Park and still be able to visit the Memorials and FDR Memorials and the Tidal Basin area conveniently. This would aid in reducing automobile traffic in the memorial area, reducing air quality impacts and reduce the need to convert parkland to surface parking lots.
3. The proposed courtyard for the Tourmobile operation is shown in diagrams in the draft EIS located some forty feet north of Ohio Drive. This wide separation would result in both visual and functional intrusion of this roadway strip and the moving vehicles in the fields area. This wide separation may be necessary because of the configuration of the memorial entrance. The visual and functional impacts on the playing fields should be considered, however, with the objective of minimizing the intrusive into the fields to the extent possible.

4. In view of the fact that there is no current sub-area master plan for West Potomac Park west of the Washington Monument Grounds and south of the Reflecting Pool, the National Park Service should submit the proposed sub-area master plan for West Potomac Park west of 17th Street as described in the Draft EIS for Commission review in conjunction with the preliminary site and building plans for the FDR Memorial.
Mr. Manus J. Fish, Jr.
Regional Director
National Park Service
National Capital Region
1100 Ohio Drive, S.W.
Washington, D.C. 20242

Re: West Potomac Park and the Proposed Franklin Delano Roosevelt Memorial, Washington, D.C.

Dear Mr. Fish:

We have reviewed the draft Environmental Impact Statement for the above proposed project and have classified it as LO-1 in EPA's Reference Category. We have enclosed a copy of the Definition of Codes for the General Nature of EPA Comments to provide a more detailed description of this rating. Also, in accordance with our responsibilities under Section 309 of the Clean Air Act to inform the public of EPA's views on the potential environmental effects of Federally assisted actions, this rating will be published in the Federal Register.

We hope that we have assisted you in meeting your responsibilities under the National Environmental Policy Act of 1969. If you have any questions, or if we can be of further assistance, please contact us.

Sincerely yours,

Sam R. Little
Acting Chief
EIS Review Section

Enclosure
APPENDIX II
DEFINITION OF CODES FOR THE GENERAL NATURE
OF EPA COMMENTS

ENVIRONMENTAL IMPACT OF THE ACTION

LO—Lack of Objection

EPA has no objections to the proposed action as described in the draft impact statement; or suggests only minor changes in the proposed action.

ER—Environmental Reservations

EPA has reservations concerning the environmental effects of certain aspects of the proposed action. EPA believes that further study of suggested alternatives or modifications is required and has asked the originating Federal agency to reassess these aspects.

EU—Environmentally Unsatisfactory

EPA believes that the proposed action is unsatisfactory because of its potentially harmful effect on the environment. Furthermore, the Agency believes that the potential safeguards which might be utilized may not adequately protect the environment from hazards arising from this action. The agency recommends that alternatives to the action be analyzed further (including the possibility of no action at all).

ADEQUACY OF THE IMPACT STATEMENT

Category 1—Adequate

The draft impact statement adequately sets forth the environmental impact of the proposed project or action as well as reasonable alternatives available to the project or action.

Category 2—Insufficient Information

EPA believes that the draft impact statement does not contain sufficient information to assess fully the environmental impact of the proposed project or action. However, from the information submitted, the Agency is able to make a preliminary determination of the impact on the environment. EPA has requested that the originator provide the information that was not included in the draft statement.

Category 3—Inadequate

EPA believes that the draft impact statement does not adequately assess the environmental impact of the proposed project or action, or that the statement inadequately analyzes reasonable available alternatives. The Agency has requested more information and analysis concerning the potential environmental hazards and has asked that substantial revision be made to the impact statement.
November 8, 1978

Mr. Manus J. Fish, Jr.
Regional Director
National Capital Region
1100 Ohio Drive, SW
Washington, D.C. 20242

Dear Mr. Fish:

This is in reference to your draft environmental impact statement entitled "National Capital Parks West Potomac Park and Proposed Franklin Delano Roosevelt Memorial Washington, D.C." The enclosed comment from the National Oceanic and Atmospheric Administration is forwarded for your consideration.

Thank you for giving us an opportunity to provide this comment, which we hope will be of assistance to you. We would appreciate receiving six (6) copies of the final statement.

Sincerely,

Sidney R. Galler
Deputy Assistant Secretary for Environmental Affairs

Enclosure memo from: Mr. Gordon G. Lill
National Ocean Survey
NOAA
TO: PP - William Aron  
FROM: OA/Cxl - Gordon G. Lill  
SUBJECT: DEIS #7810.08 - National Capital Parks

The subject statement has been reviewed within the areas of NOS responsibility and expertise, and in terms of the impact of the proposed action on NOS activities and projects.

The following comment is offered for your consideration.

Geodetic control survey monuments may be located in the proposed project area. If there is any planned activity which will disturb or destroy these monuments, NOS requires not less than 90 days' notification in advance of such activity in order to plan for their relocation. NOS recommends that funding for this project includes the cost of any relocation required for NOS monuments.

RESPONSES

5 The National Ocean Survey will be given 90 days notification should disturbance or relocation of any NOS monument be required and funds for such relocations will be provided.
Mr. Manus J. Fish, Jr.
Regional Director
National Capital Region
1100 Ohio Drive, S.W.
Washington, D.C. 20242

Dear Mr. Fish:

The Draft Environmental Impact Statement (DEIS) for West Potomac Park
and the proposed Franklin Delano Roosevelt Memorial was received by
this office and reviewed within our area of responsibility.

The project as presented would not affect any existing or proposed
Corps' project. The DEIS adequately addresses that the project location
is subject to periodic flooding due to its location in the flood plain.

We appreciate the opportunity to comment on this DEIS. Please keep
us informed of future developments in the study's progress.

Sincerely yours,

WILLIAM E. TRIESCHMAN, JR.
Chief, Planning Division
Mr. Manus J. Fish, Jr.
Regional Director
National Capital Region
1100 Ohio Drive, SW
Washington, DC 20242

Dear Mr. Fish:

We have reviewed the draft environmental statement for the proposed Franklin Delano Roosevelt Memorial and West Potomac Park. In accordance with HUD responsibilities, our office has the following comments on this project.

A separate right of way (ROW) for the Tourmobile along Ohio Drive is not justified according to the information in the statement. Only one Tourmobile stop will be provided along Ohio Drive. The highest tourmobile ridership days, Tuesdays and Wednesdays, do not conflict with the sport field users highest use days or time periods. In addition future traffic increases will not affect the speed of the carrying capacity of the roadways as mentioned on pages 34 and 35 of the Draft Statement. It seems that the Tourmobile could use the Ohio Drive public ROW and additional space could be set aside for the recreational areas.

The Memorial's horizontal design reduces its monumental effort. As a result, it does compete visually with the nearby memorial sites. No height relationship are mentioned for the enclosed areas facing the Cherry Walk and Tidal Basin. The unenclosed granite paved areas and pedestrian paths provide some degree of interaction between the Cherry Walk area and the Memorial.

We appreciate this opportunity to comment on this statement.

Sincerely,

Terry C. Chisholm
Area Manager
November 9, 1978

Dear Sir:

We have been advised of your Committee's action in considering the Franklin D. Roosevelt Memorial. We would like to express our view that such a Memorial should include consideration of the various physical activities which are a part of that area of the park. Particularly, we hope that your Committee will consider the importance of jogging and cycling paths to facilitate the enormous number of daily users who frequent the proposed Memorial site. The installation of this facility can be consistent with the Memorial, highly esthetic, and provide for exercise and health opportunities for hundreds of federal employees and visitors who are in great need of such opportunities.

If you have any questions on this matter or if we can be of any support, in the layout or design of facilities of this kind, please do not hesitate to call.

Sincerely,

Richard O. Keelor, Ph.D.
Director, Program Development

Regional Director
National Park Service
FDR Memorial Committee
1101 Ohio Dr., SW
Washington, DC 20242

cc: Mr. Tony Diamond

Jogging and cycling are considered important elements of the recreational activity presently occurring in West Potomac Park, but the plan assumes the present system of paths to be adequate and proposes no new system.
Mr. Manus J. Fish, Jr.
Regional Director
National Capital Region
1100 Ohio Drive, S.W.
Washington, D.C. 20242

Dear Mr. Fish:

In accordance with your request of September 29, 1978, the District of Columbia Government, Executive Branch, has reviewed the draft environmental statement (DES) on West Potomac Park and the proposed Franklin Delano Roosevelt Memorial. We find the DES to be generally satisfactory and complete. The Memorial appears to have adverse impacts which cannot be satisfactorily avoided or mitigated.

The Memorial will require approximately 36 million gallons of water a year for all uses, nearly enough to serve 300 homes. We understand that the Memorial will incorporate water conservation features and pollution controls. The final statement (FES) should indicate such strategies and controls, including the water saving devices to be used, recycling of water in fountains and pools, the design for drainage of runoff from impermeable surfaces, and any needed increases in water consumption and sewer service. Any increase in water use and sewer service must be within Federal allocations. The final statement (FES) should also describe how erosion and sedimentation will be controlled during construction.

Development of the Memorial is expected to require resizing of a 24-inch storm drain to the river and a possible force main for sanitary sewage. The District Government, through its Department of Environmental Services, will work with the National Park Service in the design of these and other sewer and water facilities to ensure that they are compatible with existing facilities and consistent with Federal and District regulations.
The District supports the proposed parking level of approximately 500 spaces. We believe the FES should assess possible further reductions in parking to encourage increased access by tour bus or Tourmobile. Automobile spaces should be restricted to short term use. It is the District's policy to limit commuter parking to support increased Metrorail ridership, improved air quality, and easier visitor access to attractions and services.

We are pleased to have the opportunity to present this coordinated reply on behalf of the District of Columbia. The monument, we believe, will be a significant addition to West Potomac Park, the City, and nation.

Sincerely,

Ben W. Gilbert
Director
November 13, 1978

MEMORANDUM

To: Ben W. Gilbert, Director
    Municipal Planning Office

From: Douglas N. Schneider, Jr.
      Director

Subject: FDR Memorial Environmental Impact Study

Based on our review, we have the following comments for submission to the National Park Service.

We wish it to be stated that it is unclear as to the parking proposed for the Memorial. It appears that the parking will be less than is currently available. Current parking includes 105 spaces for 2 hour parking and 455 spaces for 3 hour parking - a total of 560 spaces. Page 45 of the statement indicates that these spaces would be reduced to about 500 spaces. However, there was no commitment to hold these spaces to short term use. In the interest of consistency of transportation policy, these spaces should not become available for long term commuter parking and therefore, should be specifically designated for limited intervals of parking only.

We do not anticipate effects on city traffic circulation as a result of alterations to the park road system. Independence Avenue is recognized by the Park Service as a continuing principal arterial roadway.
Mr. Manus J. Fish  
Regional Director  
National Park Region  
National Park Service  
1100 Ohio Drive, S.W.  
Washington, D.C. 20242

RE: FDR Memorial

Dear Mr. Fish:

In response to your letter of September 29, 1973, we have reviewed the draft environmental impact statement concerning the subject project. Our comments were sent to the Municipal Planning Office for consolidation with other District agencies. It should be forthcoming to you from that Office.

Thank you for the opportunity to comment on this project.

Sincerely yours,

Herbert L. Tucker  
Director
COMMENTS

Mr. Manus J. Fish, Jr.
Regional Director
National Capital Region
1100 Ohio Drive, S.W.
Washington, D.C. 20242

Dear Mr. Fish:

Thank you for providing the Virginia Department of Highways and Transportation with an opportunity to evaluate the above noted proposal.

We have reviewed the subject document and do not have any comments to offer concerning the proposal's effect on transportation or our highway system in the area.

If we can be of any future assistance, please advise.

Sincerely,

[Signature]

R.L. Hundley
Environmental Quality Engineer

RESPONSES

[List of names and titles]

In reply please refer to Mr. Hundley Y.

Environmental Quality Engineer
Dear Mr. Fish:

The National Capital Area Chapter of the American Institute of Planners received a copy of the Draft Environmental Statement for the West Potomac Park and Proposed Franklin Delano Roosevelt Memorial. The report was originally sent to the national office of the American Institute of Planners.

I have, as an individual, undertaken a brief review of the report. In general, I wish to commend the Park Service for its thorough analysis of conditions. I have several specific suggestions to offer in the way of topics which may merit further consideration.

1. Availability of water supply.
   a. Inasmuch as this metropolitan area has recently experienced periods of drought during the summer, more attention should be given to how the park, which is a water-oriented aesthetic experience, will function during periods of water shortage.
   b. Water conserving bathroom fixtures should be installed to help conserve the water supply.

2. Non-point source pollution.
   Although the plan describes specific procedures for removing the increased stormwater from the site, no attention is given to the fact that such stormwater can be highly polluted. Depending upon the location of the stormwater outfall, it will, at best, do nothing to improve the current receiving water quality and, at worst, will further degrade the water quality.

3. Accessibility
   a. The site plan indicates that the new park will be conveniently accessible to the tourmobile. However, private autos and...
Manus J. Fish

will be required to park a considerable distance away from the entrance to the facility. The background information included in the Environmental Impact Statement notes that approximately 12% of the current visitors to the nearby memorials arrive on a tourmobile. More than 60% arrive in tourbuses. It would therefore seem appropriate to include more elaborate provisions for tourbus loading and unloading.

b. Although the Environmental Impact Statement notes the need for improved pedestrian access to this memorial from the Lincoln and Jefferson Memorials, not one of the site plans clearly addresses the problem. Perhaps one pedestrian sketch ought to be included to complement the myriad of illustrations of alternative automobile access plans.

The intent on the part of the National Park Service to employ numerous waste heat recovery systems is highly commendable. And the overall landscape theme seems to be an appropriate use of the site.

I wish to thank you for the opportunity to review the Draft Environmental Impact Statement. Please do not hesitate to contact me if I can be of further assistance.

Sincerely,
Carol D. Barrett, AICP
President
315 Chesapeake Ave.
Annapolis, Md. 21403

RESPONSES

13 A tourbus loading area is provided at the entrance to the memorial.

14 The proposed plan addresses pedestrian access to and from the memorial, where change is anticipated in detail. No alteration of the existing pedestrian circulation patterns in the remainder of West Potomac Park is proposed.
October 17, 1978

Manus J. Fish, Jr.
Regional Director
National Park Service
National Capital Region
1100 Ohio Drive, S.W.
Washington, D. C. 20242

Dear Mr. Fish:

We are in receipt of your letter of September 29, 1978 concerning
the draft environmental statement prepared by the Park Service on
the West Potomac Park and the proposed Franklin D. Roosevelt Memorial.

The sports fields we use do not appear to be included within your
proposal. Thus, we, as an organization, have no comments upon it.

Thank you for providing us with this opportunity to comment.

Sincerely,

Cheryl A. Calloway, Manager
Wonder Women Softball Team
COMMENTS

October 28, 1978

Regional Director
National Capital Region
National Park Service
1100 Ohio Drive S.W.
Washington, D.C. 20242

Dear Sir:

This is to express my concern with respect to the proposed plan to relocate sports fields in West Potomac Park in relation to the construction of a Franklin D. Roosevelt Memorial.

While an FDR Memorial will be a fitting monument in recognition of a great American leader, the selection of a site for such a memorial should take into account the growing number of sports field users in the West Potomac Park area. There is currently a need for more sports fields to accommodate present users. Even without construction of the FDR Memorial, a major effort should be made to expand the amount of space available for various sports activities. Given the site plan for the location of the proposed FDR Memorial, the problem of limited space for sports users will be further compounded by the attraction of more tourists to the West Potomac Park area. This may create congestion and other problems, especially related to parking, during the peak periods for softball and other sports seasons.

Since West Potomac Park has experienced great success in stimulating and facilitating athletic competition among sports minded people from all walks of life in the Washington, D.C. metropolitan area, I respectfully suggest that no plan should be formulated which has the effect of decreasing the number of sports fields in West Potomac Park.

Sincerely,

Henry Loving
Manager and Founder
Henry Loving Athletic Club

RESPONSES

This will be no decrease in the number of sports fields in West Potomac Park as a result of the construction of the FDR Memorial. Some sports fields will, however, be relocated.

Henry Loving Athletic Club
735 Kentucky Ave, S.E.
Washington, D.C. 20003
Phone 547-8267
Fax 629-9200
November 8, 1978

Mr. Manus J. Fish, Jr.
Regional Director, National Capital Region
United States Department of the Interior
National Park Service
1100 Ohio Drive, S. W.
Washington, D. C. 20242

Dear Mr. Fish:

I am writing this letter as President of the National Capital Polo Association which uses the polo field near the Lincoln Memorial and in response to your letter of September 29, 1978 concerning the proposed Franklin D. Roosevelt Memorial.

The National Capital Polo Association has no objection to the plans as proposed, however, we do wish to point out that the engineers who surveyed for this project did encroach about 20 or 30 feet onto the polo field. If in fact the memorial did extend this far, it would, of course, be necessary to move the field over a similar distance. In that event, I would assume that your plans would call for this relocation and that your budget would be similarly adjusted.

Sincerely yours,

Marion H. Smoak, President
National Capital Polo Association

Please refer to the revised Site Plan of West Potomac Park (Map B), which shows the modified memorial design. This new approved design does not encroach onto the polo field.
In 1969, President Johnson, by proclamation, designated the 66 acres between Independence Avenue and the Inlet Bridge as the FDR Memorial area of West Potomac Park. In 1972 legislation was enacted to authorize the Secretary of the Interior to participate with the FDR Commission in the planning and design of the memorial. Senate Joint Resolution 95, authorizing construction of the memorial according to the design approved by the Commission of Fine Arts in 1979, was passed by the 97th Congress and approved by President Reagan on July 28, 1982 (see Appendix A--FDR Memorial Legislation). These representatives of all the American people have, therefore, deemed the design and location to be appropriate.
The number of fields is increased under the new plan, but only 5 fields are spaced properly in the area northeast of the Maryland Park Field without a number of separate games becoming intertwined due to the proximity of adjoining fields. As you know, this already is a somewhat of a problem with the softball fields facing each other in the main area of West Potomac Park. The end fields -9 different games at times are either back to back or alongside one another because the fields are close to one another.

Further parking will become even more of a problem if the FDR Memorial is located in West Potomac Park and there is no public transportation for non-transit in the area.

I do not imagine that the athletic fields have ever been high priority in the planning scheme, but this obviously the fully utilized within the given limits and some consideration should be given the many uses of these fields.

If the FDR Memorial has to be located in West Potomac Park, I suggest that some fields be re-opened on the west side of the ellipse (away from the main flow of tourist traffic) and also in the area of the Park Police.

Athletic fields were very high priority items in the planning effort. All known users of these fields were sent copies of the draft environmental assessment, including 430 ball clubs.

The Ellipse is not a part of West Potomac Park and is, therefore, not being directly included in this planning effort. Numerous sports fields do exist in this area, however.
21 Copies of this final environmental impact statement will be made available all interested parties.

Headquarters: These fields would also help some of the congestion that now occurs in West Potomac Park.

Please keep the West Potomac Park informed of the situation as it develops. While I am writing on my own behalf as a long-time participant in Recreation programs in West Potomac, I know I can also speak for most of the members of the Commerce Employees Recreation Association softball organization.

Thank you,

Bill Allen
CERA Softball Rep.
Mr. Mamis J. Fish, Jr.
Regional Director, National Capital Region
National Park Service
1100 Ohio Drive, S.W.
Washington, D.C. 20242

Dear Jack,

Thank you very much for forwarding a copy of the draft environmental statement on West Potomac Park and the Franklin Delano Roosevelt Memorial. We regard the plans for the Memorial in a positive fashion from the standpoint of environmental impact. Not only do we consider the design appropriate and in keeping with the West Potomac Park area but we support the Tourmobile Shelter as presently planned.

Additionally we would like to have you take into consideration provision of a parking area for tour buses close to the new Memorial. As you well know the nearest area permanently reserved for Tour Buses is at the Lincoln Memorial some distance from the new Memorial. Anticipating continued expansion of tour bus traffic to Washington in years to come, it would seem sensible to make special arrangements for tour buses at that location. Please bear in mind that this Memorial is likely to be very popular with Senior Citizens many of whom come here on tour buses.

The plan for the new Memorial fits in nicely with our expectation that a permanent boat dock will be established in close proximity to that area. Such an arrangement will provide easy access to Potomac River tour boat service at an important touristic attraction. Also it will be useful in terms of establishing an excellent transfer point for tourists interchanging between Tourmobile and Potomac Boat Tours and vice versa.

Regarding the study of the tour boat facility noted on page 16 of the statement please let me know if we can assist in any way. We believe your office has at hand all of the pertinent information pertaining to our operation. As a closing note we would like to acknowledge once again the superior support we have received from your organization this season. Our growth reflects the support and confidence you have shown.

Sincerely,

Potomac Boat Tours, Inc.
P.O. Box 3758 Washington, D.C. 20007 (202) 338-6661
Traffic and Parking Survey

Methodology:

The methodology for forecasting traffic volumes and parking utilization has been designed to focus on the impacts associated with each of the alternative traffic and parking schemes which have been studied for the project. The methodology incorporates some important assumptions which should be recognized. A description of these assumptions and of the methodology which was used is presented below.

A summer Sunday in 1983 was selected as the period of analysis for impact assessment. A Sunday was chosen because vehicle volumes in the immediate vicinity of the memorial are expected to be the highest on summer Sundays when sports fields receive the heaviest use. An analysis year of 1983, one year after the year of opening, was selected since it is recommended by the U.S. Environmental Protection Agency for air quality analysis.

As a part of the traffic and parking analyses conducted for the study, counts and field observations were made during the late spring and early summer of 1977. Traffic counts were taken at three intersections in the vicinity of the site. The data recorded during these counts included total vehicle volume counts, the temporal distribution of traffic, vehicle classification counts and turning movements. Counts were also taken at the Jefferson Memorial to ascertain the vehicle occupancy rate for auto trips to the memorial, the percentage of trips arriving by mode of transportation (i.e., auto, bus, Tourmobile, bicycle, and walking), and the temporal distribution of visitor arrivals. In addition, field interviews with bus drivers were conducted to more fully understand charter and tourbus operations.

Several federal and local agencies, as well as consultants who have produced previous studies, were contacted to obtain data which were used in the analysis. These sources are noted in Section 8 "Consultation and Coordination with Others." The specific results of these data gathering activities are discussed in the appropriate sections below:

Estimates of FDR Memorial Visitors

The visitation to the Franklin Delano Roosevelt Memorial was estimated to be between 12,000 and 14,000 people on days when the Lincoln and Jefferson Memorials were experiencing visitor volumes of 14,000 and 12,000 respectively. The estimate of 14,000 visitors per day to the Franklin Delano Roosevelt Memorial was adjusted to an average day of the

2. Guidelines for Air Quality Maintenance Planning and Analysis, Volume 9, Evaluation of Indirect Sources, U.S. Environmental Protection Agency.
peak summer months using the estimates of visitation to the Lincoln and Jefferson Memorials cited above and daily counts of visitor volumes taken in 1977.

A temporal distribution of future visitor arrivals to the Lincoln and Franklin Delano Roosevelt Memorials was estimated based upon field counts taken in May of 1977 at the Jefferson Memorial and estimates made by Central Visitors Services at National Capital Parks.

The number of sports fields users was estimated from the monthly totals listed by the National Park Service in "Monthly Public Use Reports." The data are based upon weekly counts and field use statistics collected and reported by the District of Columbia Department of Recreation. An estimate for a typical Sunday was evaluated based upon the highest three month volume in the three years from 1973 to 1975, and the fraction of monthly games in each sport which occur on a Sunday. A temporal distribution was estimated for arrivals and departures of sports fields users based upon the starting times of each sport and the length of stay in the park by sport as reported by the Department of Recreation.

Based upon data provided by Potomac Boat Tours, Inc., the number of patrons boarding the tourboats in West Potomac Park was determined and a uniform temporal distribution of auto trips was assumed over the length of the day in which the boats were operating from the park. Counts were taken in May of 1977 at the Jefferson Memorial to ascertain the percentage of visitors who would be arriving by the various modes of transportation: auto, bus, Tourmobile, bicycle, and walking. The fractions of visitors arriving by mode are cited below:

<table>
<thead>
<tr>
<th>Mode</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto</td>
<td>21.4%</td>
</tr>
<tr>
<td>Bus</td>
<td>58.9%</td>
</tr>
<tr>
<td>Tourmobile</td>
<td>12.1%</td>
</tr>
<tr>
<td>Bicycle</td>
<td>2.4%</td>
</tr>
<tr>
<td>Walking</td>
<td>5.2%</td>
</tr>
</tbody>
</table>

The total visitor volumes to the memorials by mode were evaluated for each mode of transportation. The sports fields users and boat tour patrons were all assumed to arrive by auto.

A vehicle occupancy of 3.2 persons per auto was estimated from field counts for auto trips to the Jefferson memorial to determine the number of auto trips to the site. A vehicle occupancy of 2.6 persons per vehicle was assumed for sports fields users. This value was confirmed as reasonable for softball players based upon an analysis of sports fields use statistics.

Estimates of Vehicle Volumes

Vehicle volume counts were taken on two Sundays and a Saturday for the 10-hour period from 9:00 a.m. to 7:00 p.m. in May and June of 1977. The counts were taken at three locations between Independence Avenue and the Inlet Bridge each day. These counts were supplemented by counts taken by the National Park Service, the District of Columbia Department of Transportation, and consultants, together with volumes obtained from traffic flow maps for 1969 through 1975 prepared by the D.C. Department of Transportation. These numbers were compiled to form a complete traffic inventory of the site.

The volume of auto trips attributed to sports fields users and boat tour patrons that enter or leave the site from each entrance and exit was estimated. The distribution of population within the Capital Beltway which is best served by each entrance and exit roadway was determined and the arrivals and departures of sports fields users and boat tour patrons were predicted based upon this distribution.

The distribution to the roadways in this area of Lincoln Memorial traffic which parks at the site was judgmentally estimated based upon the expected travel patterns associated with Lincoln Memorial visitation. The through auto trips—trips which do not stop and park at the site—were similarly estimated. An analysis was conducted of these estimated distributions for through trips and memorial trips in the area as well as those associated with sports fields, to ascertain whether these distributions were reasonable. By comparing traffic volumes throughout the area, these distributions appear reasonably accurate.

Auto traffic volumes for all existing trip purposes were assumed to grow at 2 percent per year for each year from the present to 1983. This growth rate was estimated based upon past trends in vehicle miles of travel in the District of Columbia and traffic volumes on the Potomac River bridges over the last decade.

The temporal distribution of 1983 traffic and its distribution to the area roadways was assumed to be the same as that observed or estimated for 1977. Bus volumes on roads in the immediate vicinity of the site were counted in May of 1977 and future volumes of buses which will carry visitors to the Franklin Delano Roosevelt Memorial were calculated based upon the fraction of visitors riding buses to the Jefferson Memorial. All of these buses are assumed to park at the bus parking lot between the spans of the 14th Street Bridges.


Estimate of Parking Demand and Distribution

The demand for parking was assigned to each lot in the vicinity of the site for each hour based upon the number of spaces which were available in each hour. The parking areas were assumed to exhibit a hierarchy in terms of the order in which they were filled. For example, all of the spaces along Ohio Drive would be filled before cars would park at the 14th Street Bridges.

The volume of parked cars which were departing in each hour from each location was also recorded for each purpose—sports fields users, boat tour patrons and memorial visitors. The temporal distribution of arrivals and the length of stay by purpose were used to calculate the volume of trips which were departing. The vehicle volumes which were arriving and departing from the parking areas were calculated and assigned to the roadways which they would use. This selection of routing is based upon the analysis cited above on the entrances and exits that trips would take for each purpose.

The number of cruise trips on each link was also estimated; cruise trips are those trips that drive through a parking area without finding a place to park. The number of trips that cruise a parking area was judgmentally assumed to be one-third of the demand in a given hour which cannot be accommodated by a given site. For example, if 90 cars were still searching for a parking space in a particular hour after parking area "A" had been filled, 30 of these cars would be assumed to cruise area "A" before traveling to the next preferred alternative site.

The total number of vehicles on each roadway was assumed and compared against capacity to ascertain congestion effects on speed.

Evaluation Criteria

The measures that were selected to evaluate traffic service and parking are cited below:

- The running speeds of vehicles on roadways in and around the park.
- The average length of time required to walk from a car parked by a sports field user or a memorial visitor to the site over the peak 12-hour period.
- The number of people who park during the peak 12-hour period who are accommodated within specified intervals of walking from the site.

After the forecasts were generated, it was clear that speed was not an adequate measure to evaluate differences in the alternative schemes for two reasons. First the vehicle volumes traveling on all the roadways in the vicinity of the site during peak hours are not large enough to cause congestion in and of themselves under any of the schemes studied, and vehicle operating speeds would not be affected by traffic flows. However, this does not mean that congestion will not occur. Drivers will suffer delays along Ohio Drive while cars are parallel parking, but the magnitude of this delay is principally a function of parking turnover rates and the parking demand/supply relationship.

Consequently, vehicle volumes were selected as a measure of the quality of service afforded to drivers. That is, as traffic volumes increase on a roadway, the comfort and convenience which drivers experience declines. In cases where vehicle volumes are low and there is little difference between alternatives being considered, an adequate evaluation measure is lacking. However, in order to assess differences between alternatives in terms of the traffic service they provide, vehicle volumes may be cited to describe the relative quality of traffic service.

A number of related studies have been reviewed by the staff during the course of the project to ensure that a thorough understanding of present and future traffic conditions was obtained. The studies that have been reviewed are cited below.


APPENDIX E: AIR QUALITY
Air Quality Assessment Methodology

The prediction of localized carbon monoxide concentrations undertaken for this project has four main components. These are the prediction method itself, vehicle emission factors used in the analysis, the "background" or ambient levels of CO, and the location of "receptor" sites. These components are discussed in turn below. It should be noted that the methods used and the assumptions made in performing this analysis were, in general, conservative. As a result, predicted concentrations are probably higher than would actually occur with any traffic and circulation alternative.

Prediction Method

The source of the methodology used in this study is EPA's publication Guidelines for Air Maintenance Planning and Analysis, Volume 9: Evaluating Indirect Sources. EPA characterized this method as a "screening procedure" which is "... intended to be conservative so that if no potential problem is identified, there may be reasonable assurance that none will occur." The procedure was developed for use in evaluating new facilities such as shopping centers, office buildings, and sports stadiums which may attract vehicular traffic and therefore indirectly increase pollutant levels. The screening procedure takes into account two components of CO concentrations at a particular site: (1) concentrations attributable to vehicles operating in the immediate vicinity of the site and (2) background concentrations due to more remote sources. The screening technique focuses on the first of these components.

Emission Factors

Once the traffic parameters have been established for each alternative traffic and circulation option and receptor location, the vehicle emission characteristics must be determined. This involves making a series of determinations about vehicle operating conditions.

The basis of vehicle emission factors is EPA's document "Supplement No. 5 for Compilation of Air Pollutant Emission Factors." The emission factors for the various automotive source pollutants presented in Supplement 5's tables, calculated based upon certain assumed conditions are: (1) the achievement of light duty vehicle emission rates mandated in the 1970 Clean Air Act Amendments (3.4 grams per vehicle mile) by the 1978 model year; (2) a traffic speed of 19.6 miles per hour; (3) a mix of 80 percent

2. Ibid.
"hot" vehicles and 20 percent "cold" vehicles; and (4) an ambient temperature of 75°F. 3

Supplement 5 also presents methods for readjusting the emission factors to more accurately represent conditions peculiar to the project being evaluated. In the case of the FDR Memorial, several of these factors required adjustment.

The most obvious change was in the area of traffic speeds. Emissions of carbon monoxide are sensitive to vehicle speed changes, with lower speeds producing higher emissions. The traffic projections for the FDR alternatives indicated that speeds would be above the 19.6 mph which Supplement 5 assumes. In fact, based on operating conditions, speeds were predicted to be above the legal speed limit of 25 mph in some locations; however, 25 mph was the speed assumed for the analysis.

The issue of the date of achievement of Congressionally mandated vehicle emission rates is particularly confused at this time since Congress is now in the process of amending the Clean Air Act. Several alternative dates for achievement as well as alternative emission standards are being proposed and the outcome is still unclear. For the analysis presented here, some assumption about this issue was needed since it is obvious that the 1978 model year compliance deadline incorporated in Supplement 5 was no longer realistic. Therefore, based in part on an analysis of the pending legislation and in part on similar assumptions made by the air quality forecasters of the Metropolitan Washington Council of Governments, it was assumed that the 3.4 grams per mile standard would be met by the 1980 model year and that the present 15 grams per mile standard would continue until that time.

The percentages of "hot" versus "cold" vehicles on the roadways in the project area were assumed to be the same as that incorporated in Supplement 5, that is 20 percent "cold" and 80 percent "hot." The terms "hot" and "cold" refer to the engine operating condition after start up; EPA has determined that an engine which is "cold" emits substantially greater amounts of CO than one which is "hot" (that is, warmed up). A "cold" vehicle is either a noncatalyst-equipped vehicle which has been turned off for more than four hours or a catalyst-equipped vehicle which has been off for more than one hour. The "cold" condition lasts for approximately 500 seconds after engine start up.

Although the Supplement 5 hot/cold percentage was reasonable for roadway traffic near the memorial site, it did not adequately reflect conditions in parking lots associated with the traffic and circulation options. This is because the majority of vehicles operating in 1983 will be catalyst equipped. Therefore, after they have been parked for an hour, these vehicles will be cold and will have higher emissions at start up. Because of this, the calculations of emissions from vehicles in parking lots assumed all exiting vehicles equipped with catalytic converters were cold—an estimated 80 percent of the vehicles.


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The final factor which was adjusted was the ambient temperature. Ambient temperature acts to increase CO emissions, particularly for cold vehicles and those with catalytic converters. The peak traffic period for the memorial is expected to be a summer weekend when visitor traffic to the site of the memorial is characteristically highest. Because this peak could occur on a relatively cool, springlike day, a 60°F. ambient temperature was assumed for this analysis.

Background Concentrations

EPA's "Volume 9" presents a hierarchy of recommended methods for estimating background concentrations. The first method requires on-site monitoring for a period of at least 90 days at a representative location within the impact area of the proposed project. This level of analysis was not felt to be commensurate with the scale of this action and its expected impact. In addition, an adequate alternative method was available.

The second option for estimating background CO concentrations requires data from existing representative sites. Although existing monitoring sites do exist within a few kilometers of the site, they are in no way typical of the existing or future source configurations, since these sites lie within the CBD and are adjacent to the street network, while the memorial will be located in open parkland along the Potomac River. The third alternative requires the use of a calibrated meso-scale prediction model. This is the method that has been used to determine the eight-hour background.

Eight-Hour Background

The Washington Council of Governments has calibrated the Gifford–Hanna Dispersion model for the Washington metropolitan area. The model uses a system of 5 kilometer square grids as the prediction "zones," and utilizes worst case meteorology and emission assumptions associated with the most likely transportation system in the forecast year; this includes a two-year delay in the implementation of emission standards—the same assumption which was made in calculating concentrations in the immediate vicinity of the project. Eight-hour background CO concentrations for 1980 and 1985 were obtained from the Council of Governments for the grid in which the project lies. It was necessary to interpolate between the two years to determine a value for 1983, one year after the year of opening of the proposed memorial.

The resulting eight-hour background level was 6.162 parts per million. This level is thought to be higher than would actually occur for several reasons. First, the site of the FDR Memorial is very open and well-ventilated. The model, which is intentionally conservative in its meteorological assumptions does not consider such localized factors. Second, the ambient temperature assumed by the model was 30°F., a reasonable assumption for regional predictions, but very conservative for this project.
One-Hour Background

Since the Gifford-Hanna model is not used to predict one-hour CO, an alternative method of determining background was used. Data from two carbon monoxide monitoring stations were examined; the data used were 1975 and 1976 maximum averages from the West End Library monitoring station—the station nearest the site—and 1974, 1975, and 1976 one-hour maximum averages from the DC General Hospital station. The second highest one-hour average for each year and each station was determined and the average of those five hourly concentrations has been used as the one-hour background. The result of this calculation is a background concentration of 20 PPM. Again, it is likely that this value is considerably higher than that which would occur at the FDR Memorial site.

Air Quality Prediction Sites

The final component in the prediction methodology is the selection of "receptor" sites—that is, sites where air quality conditions will be predicted. Three criteria were applied in the selection of sites for one- and eight-hour carbon monoxide predictions:

- sites must be reasonably accessible to the public

- sites must be in areas where a person could reasonably be expected to remain for an extended period; and

- sites must be located near roadways affected or parking facilities created or affected by each alternative traffic circulation option.

The first criterion is self-explanatory, and reflects site selection recommendations in EPA's "Volume 9," described above. The second criterion is designed to exclude potentially high-CO sites, which are exclusively pass-through areas, such as roadway-median crosswalks. It specifically does not exclude sidewalks. The third criterion is to assure that comparisons among alternatives are possible and that the worst locations for each alternative will be considered.

A total of nine prediction sites were selected based on these criteria. A brief description of each site is given below and the sites are illustrated on the Air Quality Analysis Sites maps.

Site 1

This site lies at the edge of the existing softball field nearest the intersection of Ohio Drive, Independence Avenue, and 23rd Street. Concentrations at this site reflect the predicted impacts of congestion occurring at this busy intersection, both with and without the memorial.

Site 2

Site 2 is actually an average concentration, calculated in a manner that represents the movement of a pedestrian on the sidewalk from the
Map R: Air Quality Analysis Sites
Ohio/Independence/23rd Street intersection to Site 4 at the entrance to the memorial, a distance of approximately 1,400 feet. The calculation method is that prescribed in "Volume 9."

Site 3
For the no-build option, Site 3 lies at the north edge of the existing connector road between Ohio and West Basin drives. For the proposed plan, the site is near the edge of the polo field—a location which would likely accommodate spectators at the weekly matches.

Site 4
With the no-build, this site is southeast of the Ohio/West Basin connector in one of the softball fields. For the build alternative, the site is at the main entrance and will reflect emissions from autos and buses in the vicinity.

Site 5
This site lies on the Cherry Walk near the western edge of the Tidal Basin. With the no-build, West Basin Drive will continue to carry traffic nearby. West Basin Drive is eliminated in the proposed plan and no traffic generators are close to the site.

Site 6
Site 6 lies along West Basin Drive with the no-build and at the site of the FDR Memorial amphitheater with the build alternative. Under the build alternative, this site is far removed from traffic carriers.

Site 7
This site lies about 400 feet from the western end of the Inlet Bridge. With both the no-build and build alternatives, the site is between West Basin Drive and the Tidal Basin. With the build alternative, this portion of West Basin Drive is retained, but turns southwest just beyond this point to form a smaller loop road connecting to Ohio Drive.

Site 8
Site 8 is east of the Inlet Bridge in the area under and between the 14th Street Bridge spans. The site is adjacent to two parking areas which would serve as replacements for on-street parking eliminated by the memorial. With the proposed plan, both lots could be possible—a bus parking lot for 20 buses on the west side and an auto lot with 200 spaces on the east side. With the no-build alternative, neither lot would be created.

Site 9
Site 9 is to the east of site 8 and is adjacent to an existing parking lot. The lot, which houses National Park Service employee vehicles during the week, is a likely candidate to accommodate overflow parking on busy weekends. This is projected to occur with all alternatives.