DES MOINES RECREATIONAL RIVER AND GREENBELT
ENGINEERING DOCUMENTATION REPORT
DES MOINES RIVERWALK, PHASE I

DES MOINES, IOWA

February 2007

US Army Corps
of Engineers ®
Rock Island District

ACKNOWLEDGEMENTS

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EXECUTIVE SUMMARY

This Engineering Documentation Report (EDR) recommends the construction of a trail loop approximately 1.2 miles in length in downtown Des Moines, Iowa as part of the Des Moines Recreational River and Greenbelt. The project will provide recreation opportunities in the downtown area as well as a connection to existing trails. The recommended project is part of a larger riverfront development project in the downtown Des Moines area led by the City of Des Moines and several private entities.

The project would consist of a multipurpose trail segment connecting the John Pat Dorrian Trail upstream on the Des Moines River toward Saylorville Lake and the Riverpoint Trail downstream on the Des Moines River and upstream on the Raccoon River to the Gray's Lake Recreation Area and additional trails downstream on the Des Moines River to Lake Red Rock. A pedestrian trail would be constructed at the street level which would offer a trail loop through the downtown area. The project would include the rehabilitated Des Moines Union Railway Pedestrian Bridge and the new Center Street Bridge to cross the River near the upstream and downstream ends of the project. A Federal levee system would be modified to co-exist with the planned recreational features. The project is a cooperative effort between the City of Des Moines and the U.S. Army Corps of Engineers (Corps). In general the Corps is responsible for the design and construction of riverwalk elements south of Grand Avenue, excluding the Des Moines Union Railway Pedestrian Bridge.

A cost-sharing Design Agreement (DA) (75 percent Federal and 25 percent non-Federal) was executed in April of 2004 for preparation of this EDR, including an Environmental Assessment (EA), and for the preparation of plans and specifications. This EDR establishes designs and cost estimates for the recommended project and establishes a schedule for project implementation. The estimated cost to implement the project is $35,844,300. The total shared project cost is $34,249,800, which would be cost-shared 50 percent Federal and 50 percent non-Federal. The benefit-cost ratio is 1.10. A Project Cooperation Agreement (PCA) would be developed and executed following approval of this EDR and before completing real estate activities or initiating construction.

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1. PROJECT BACKGROUND

1.1 PROJECT AUTHORITY AND PURPOSE

The Des Moines Recreational River and Greenbelt, hereafter referred to as "Greenbelt," was funded and authorized by Public Law 99-88 as approved on August 15, 1985, the 1985 Supplemental Appropriations Act, which reads:

> "The Secretary of the Army acting through the Chief of Engineers is authorized and directed to proceed with planning, design, engineering, and construction of the following projects substantially in accordance with the individual report describing such project as reflected in the Joint Explanatory Statement in the Committee of Conference accompanying the Conference Report for H.R. 2577: … Des Moines Recreational River and Greenbelt …"

The Conference Report on H.R. 2577, dated July 29, 1985, provides a description of the Des Moines Recreational River and Greenbelt:

> "Des Moines Recreational River and Greenbelt, IA. – The project will provide central Iowa and the City of Des Moines with environmental protection of scarce river bottom timberlands and greatly enhance opportunities for recreation. The project is for the development, operation and maintenance of a recreation and greenbelt area on, and along the Des Moines River, Iowa, between the point at which the Des Moines River is intersected by United States Highway 20 to the point downstream at which relocated United States Highway 92 intersects the Des Moines River. The project shall include, but not be limited to: (1) the construction, operation and maintenance of recreational facilities and streambank stabilization structures; (2) the operation and maintenance of all structures constructed before the date of authorization of this project (other than any such structure operated and maintained by any person under a permit or agreement with the Secretary) within the area described in the Des Moines Recreational River and Greenbelt Map and on file with the Committee on Public Works and Transportation of the House of Representatives; (3) such tree plantings, trails, vegetation, and wildlife protection and development and other activities as will enhance the natural environment for recreational purposes; and (4) the prohibition or limitation by the Secretary of the killing, wounding, or capturing at any time of any wild bird or animal in such areas as may be directed by the Secretary.
>
> In carrying out the project described in subsection (a) of this section, the Secretary may acquire by purchase, donation, exchange, or otherwise land and interests therein, as the Secretary determines necessary to carry out such project. If the Secretary purchases any land or interest therein from any State or local agency, he shall not pay more than the original cost paid by such State or local agency for such land or interest therein. No land or interest therein may be required by the United States to carry out such project without the consent of the owner and nothing herein shall constitute an additional restriction by an owner upon the use of any land or any interest therein which is not owned by the United States.

> An advisory committee shall be established for consultation with the Department of the Army and shall include: (A) five persons appointed by the Governor of Iowa; (B) two persons appointed by the respective board of supervisors to represent each county within the study area; (C) one person appointed by the Mayor of the City of Des Moines and one additional person appointed by the mayor of each other incorporated municipality within whose boundaries a portion of such recreation area lies, and (D) three employees or officials of the Corps of Engineers."

Greenbelt legislation is also contained in 101 Stat. 1329-109, Energy and Water Development Appropriations Act, 1988, Public Law 100-202, dated December 23, 1989, as shown below:

> "The Secretary of the Army, acting through the Chief of Engineers, is directed to continue with planning, design, engineering and construction of the Des Moines Recreational River and Greenbelt project in accordance with the General Design Memorandum dated September 1987 and Public Law 99-591 using funds heretofore, herein, or hereafter appropriated."

Significant Greenbelt legislation is contained in Section 122 of the FY 2003 Omnibus Appropriations Act, Public Law 108-7. This legislation stated:

> "The non-Federal sponsor shall receive credit in an amount not to exceed $10,000,000 toward their share of the cost of Des Moines Recreational River and Greenbelt, Iowa, projects for work performed by the sponsor, or others on behalf of the sponsor, including planning, design, and construction performed after October 1, 2002, provided the Secretary of the Army, acting through the Chief of Engineers, determines that such work is completed in accordance with U.S. Army Corps of Engineers standards and procedures and is integral to the Des Moines Recreational River and Greenbelt project."

The most recent Greenbelt legislation was the 2005 Energy and Water Development Appropriations Act, Public Law 108-137, which has resulted in a funding allocation of $3,109,000.

1.1.1 The Greenbelt Advisory Committee

The Greenbelt Advisory Committee (GAC) was established in accordance with the Conference Report in H.R. 2577, dated July 29, 1985. This committee is composed of local officials from the cities, counties, and state government in the Greenbelt project areas as well as from the U.S. Army Corps of Engineers, Rock Island District (District). The GAC approved the Riverwalk as part of the Greenbelt at the July 8, 2003 GAC meeting. The Riverwalk was included as part of the Greenbelt in the 2003 Annual Program Management Report (APMR) dated October 2003.

Principles and guidelines for the Des Moines Recreational River and Greenbelt were accomplished by a combination of activities documented in the September 1987 General Design Memorandum (GDM), as amended by subsequent APMRs, and Programmatic Environmental Impact Statement (PEIS). A number of alternatives for the Greenbelt were addressed in the PEIS and the plans were formulated in the GDM for each separable element in coordination with the local sponsors and the Advisory Committee. Extensive public involvement activities and public meetings have been conducted on a continuing basis under the guidance of the Advisory Committee. The Des Moines Riverwalk (Riverwalk) is one of several Greenbelt projects.

1.1.2 Purpose of the Engineering Documentation Report

This Engineering Documentation Report (EDR) is a detailed site-specific document describing the project including a cost estimate, engineering considerations, economic analysis, environmental documentation and coordination, items of local cooperation, and Federal/non-Federal cost allocation. It also documents the planning and design work-in-kind (WIK) credits previously approved and afforded under the Design Agreement (DA). The EDR is a post-authorization decision document that will serve as the basis for the Project Cooperation Agreement (PCA).

Improvements related to the Riverwalk that will be physically located in the Des Moines River below the normal high water mark (i.e. in "the waters of the United States") will be addressed in a separate Phase II EDR. Features for River Improvements may include methods to make the Center Street and/or Scott Street Dams safer, adding boat ramps or other similar structures, and construction of a river trail, which may include whitewater kayak and/or canoe routes and viewing areas for competitions.

1.2. ITEMS OF LOCAL COOPERATION AND THE DESIGN AGREEMENT

The local sponsor for the Riverwalk project will be the City of Des Moines, Iowa. Principal Financial Group (Principal) has committed to donate approximately $10 million to the City to help fund the project.

A DA between the City of Des Moines and the District was executed on April 12, 2004 (Appendix I). The DA allows the City credit for Work-in-Kind (WIK) that is completed in accordance with Government standards and procedures, is integral to the project, and is suitable for inclusion in the design of the project. The authority to allow this credit is included in Section 122 of Public Law 108-7. The non-Federal sponsor is responsible for a 25 percent share of design credit as defined by the DA. Work-in-Kind credits must amount to at least 25 percent of the design credits or the sponsor may need to provide cash in order to meet the required contribution.

The WIK credits are generated as a result of expenditures incurred during the Preconstruction Engineering and Design phase of the project. The WIK credits allowed are for work performed by the non-Federal sponsor, specifically for the project's purpose, as specified and agreed upon in the DA executed between the non-Federal sponsor and the District, on April 12, 2004. The DA authorizes the non-Federal sponsor to receive credit in an amount not to exceed $10,000,000 and specifically states that all WIK activities are to be directly related to the planning, design and construction of the project. The DA also states that the period of design shall mean the time period commencing on October 1, 2002 and ending when a Project Cooperation Agreement (PCA) for the project has been executed.

The WIK credits submitted by the City for consideration under the stipulations of the DA through 30 March 2006 amounts to $484,560.15 in labor and $1,655,272.76 in professional services, for a total of $2,139,832.91. See Appendix L for additional documentation of the WIK credits. An estimated additional $630,000 will be spent in FY 2006 prior to execution of the PCA, for an estimated subtotal WIK of $2,777,000 to be counted as WIK credit under the DA. The approved creditable amount through March 2006 of $2,139,832.91 exceeds 25 percent of the design cost covered under the DA costs (estimated at $6,240,310.00). Table 1 shows that no cash is required of the sponsor at this time.

Table 1. Summary of Planning and Design Work in Kind Credits (Design Agreement)

City Labor through December 2005	$144,162.27
Labor by Others on Behalf of the City through December 2005	$340,397.88
Professional Services through December 2005	$1,655,272.76
Subtotal	**$2,139,832.91**
Estimated Remaining Planning and Design WIK	$630,000.00
TOTAL	**$2,769,832.91**

1.3. PREVIOUS INVESTIGATIONS AND OTHER REPORTS

1.3.1 General Design Memorandum

The General Design Agreement (GDM) for the Greenbelt (September 1987), as amended by subsequent APMRs, covers the administration, comprehensive plan, initial development and coordination of the overall Greenbelt, and conditions for Federal participation. The comprehensive plan addresses the entire Greenbelt. The Riverwalk project is one of the projects included in the comprehensive plan. The GDM project number of the Riverwalk is 315.1.

1.3.2 Other Reports

Feature Design Memorandum #8 with Environmental Assessment, Downtown Riverfront Plaza/Amphitheater, Revised August 1992

Phase I Environmental Site Assessment, Downtown East, Four Mile Creek, and 7th Ward Ditch (Stanley Consultants), May 2002

Stanley Consultants, Inc. Phase I Environmental Site Assessment, Downtown West Levee Reach 4, Raccoon Levee Reach 6, Reach 7, Des Moines – West Des Moines Reach 8, and Walnut Creek, (Stanley Consultants), May 2002

Preliminary Design Report for Des Moines River Outfall and Overflow, City of Des Moines, IA (Stanley Consultants), September 2003

Rediscovering the Rivers, Des Moines Riverfront Master Plan (Principal Financial Group), August 2003

Flood Study for Principal Riverwalk, Des Moines River, prepared for Wallace, Roberts, and Todd, LLC (Stanley Consultants), April 2004

Principal Riverwalk Recreation Assessment, Report to the United States Army Corps of Engineers (Des Moines Parks and Recreation Department), June 2004

Preliminary Phase IIA Environmental Site Assessment, Flood Damage Reduction For the Des Moines and Raccoon Rivers Project, Des Moines, Iowa (Missman Stanley and Associates), September 2004

Feasibility Study for Flood Damage Reduction, Des Moines and Raccoon Rivers, Des Moines, Iowa, Hazardous, Toxic and Radioactive Waste Documentation Report, May 2005

1.4. PROJECT DESCRIPTION

The project area is located within Sections 3, 4, 9, & 10 of Township 78 N, Range 24 W, Polk County, Iowa (1956 Des Moines 7.5' USGS quadrangle) along the east and west banks of the Des Moines River and the Raccoon River at approximately river mile (RM) 202, from the vicinity of the Center Street Dam downstream to the vicinity of the Des Moines Union Railway Pedestrian Bridge (main downtown trail loop) and along the Des Moines and Raccoon Rivers to the Gray's Lake Recreational Area (Riverpoint Trail), as shown on figures 1 and 2.

The project involves the reconstruction of an existing railroad bridge and the construction of a public trail, bridge, public restroom facilities and plaza systems to form an approximately 1.2-mile loop in the downtown Des Moines area adjacent to the Des Moines Riverfront. The Riverwalk will connect the Riverpoint Trail from Gray's Lake on the Raccoon River to the west, (figure 2) to the John Pat Dorrian Trail, continuing north along the east bank of the Des Moines River from the project site (figure 3).

The total project site is approximately 27.5 acres: approximately 14.5 acres for the Riverwalk project (figure 1) owned by the City of Des Moines; and approximately 13 acres, also owned by the City, for the Riverpoint Trail (figure 2). Further real estate data can be found in Appendix I of this report.

1.4.1 Pertinent Project Data

Project Purpose	Recreation
Physical Features	
Center Street Bridge Span	400 feet (approximate)
Des Moines Union Railway Pedestrian Bridge	420 feet (approximate)
Riverwalk Pedestrian Trail	1.2 miles
Riverwalk Multipurpose Trail	0.7 miles
Riverpoint Multipurpose Trail	2.0 miles
Trail Width	12 feet minimum
Real Estate Acquisition	27.5 acres +/-, owned by the City of Des Moines

1.4.2. Riverpoint Trail

Construction plans and specifications for the Riverpoint Trail (a.k.a. American Discovery Trail)—a multipurpose trail connecting downtown Des Moines to Gray's Lake Recreation Area, upstream on the Raccoon River (figure 2)—have been completed. National Environmental Policy Act compliance was completed by the Iowa DOT and the Federal Highway Administration. The trail will be integrated into the Riverwalk project to ensure a smooth transition from one trail to the other. The trail is approximately 2.0 miles in length and has a 12-foot wide asphalt surface. It includes the rehabilitated Jackson Street Bridge over the Raccoon River, which is a steel truss structure with a wooden deck.

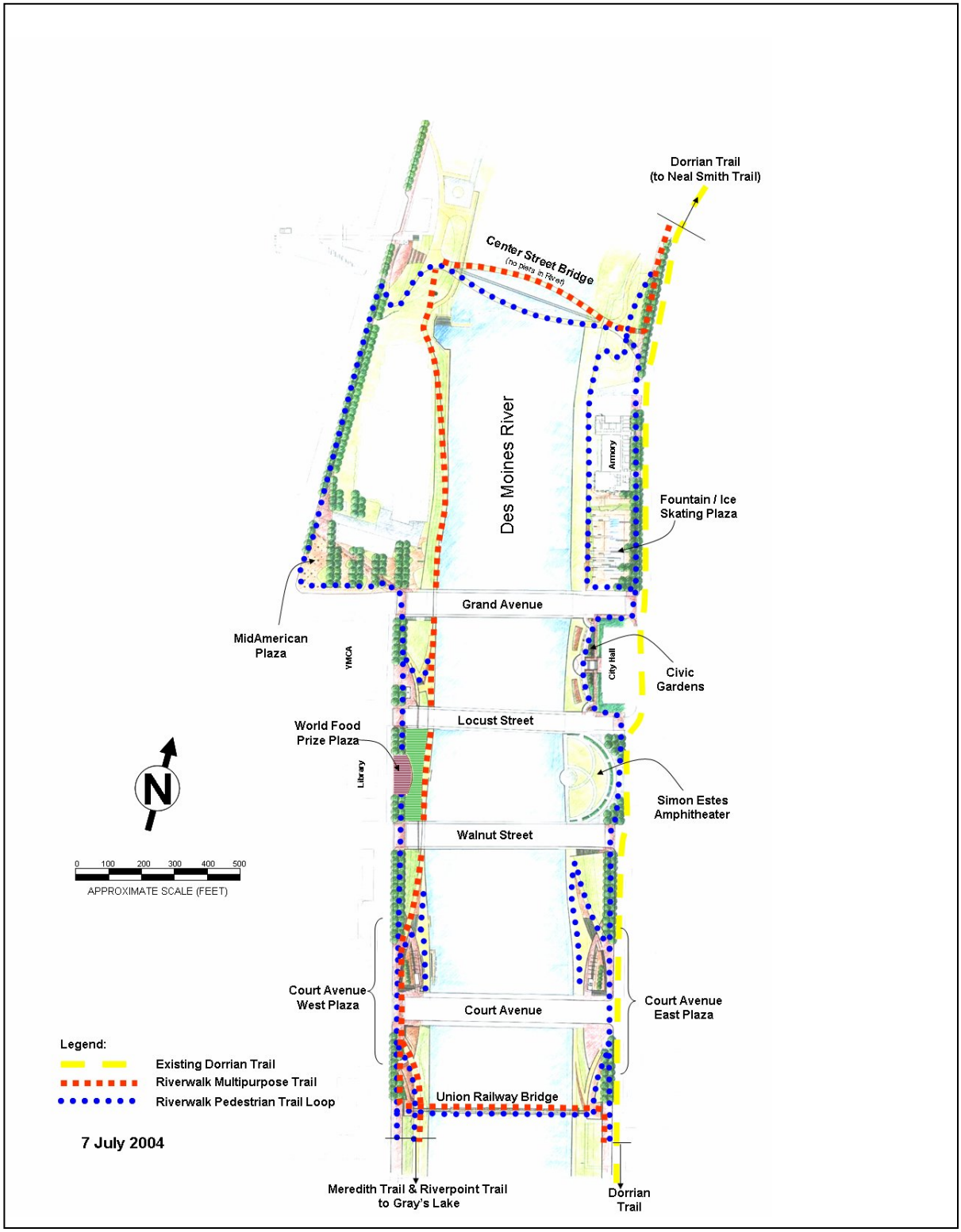

Figure 1. Downtown Des Moines Riverwalk

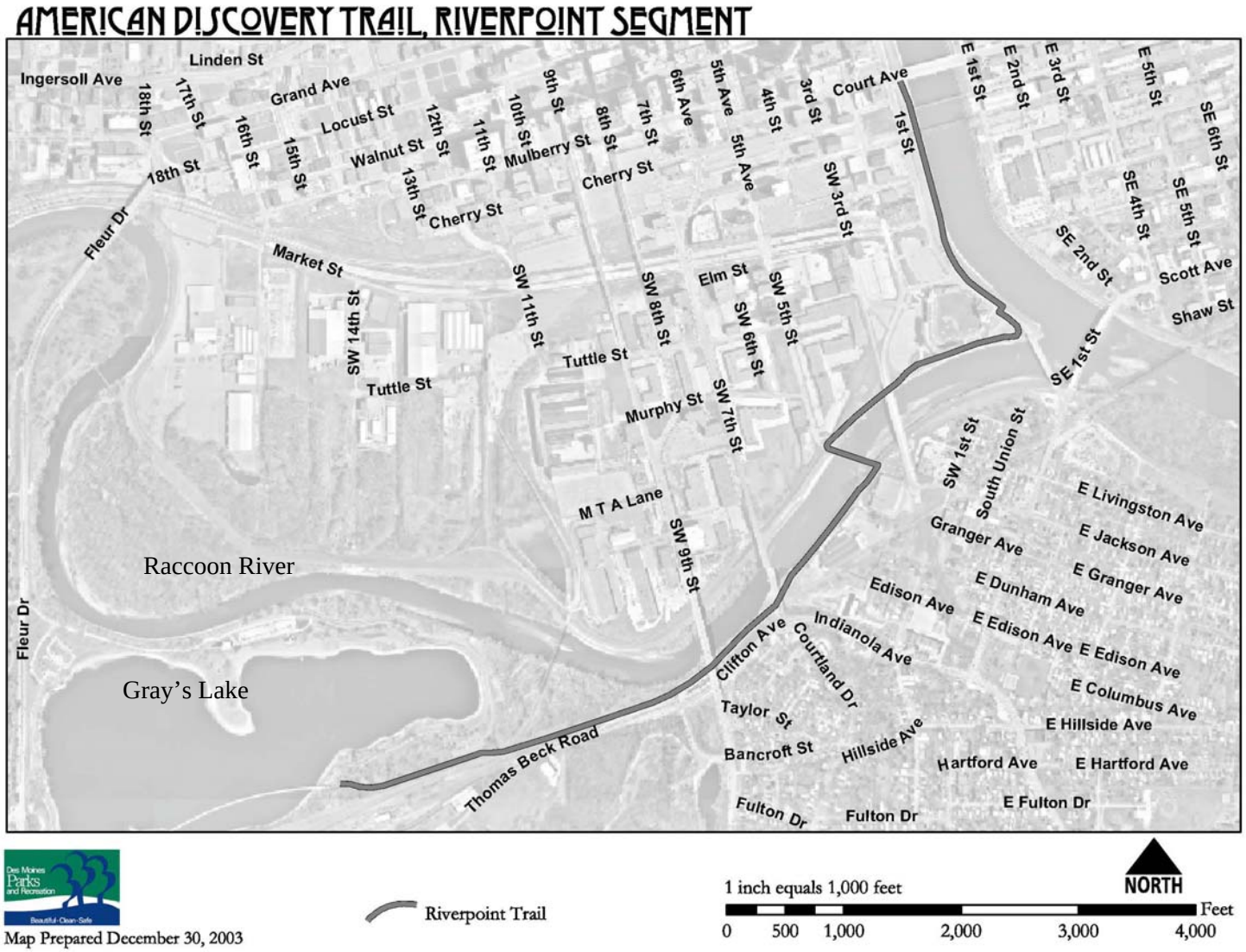

Figure 2. Riverpoint Trail

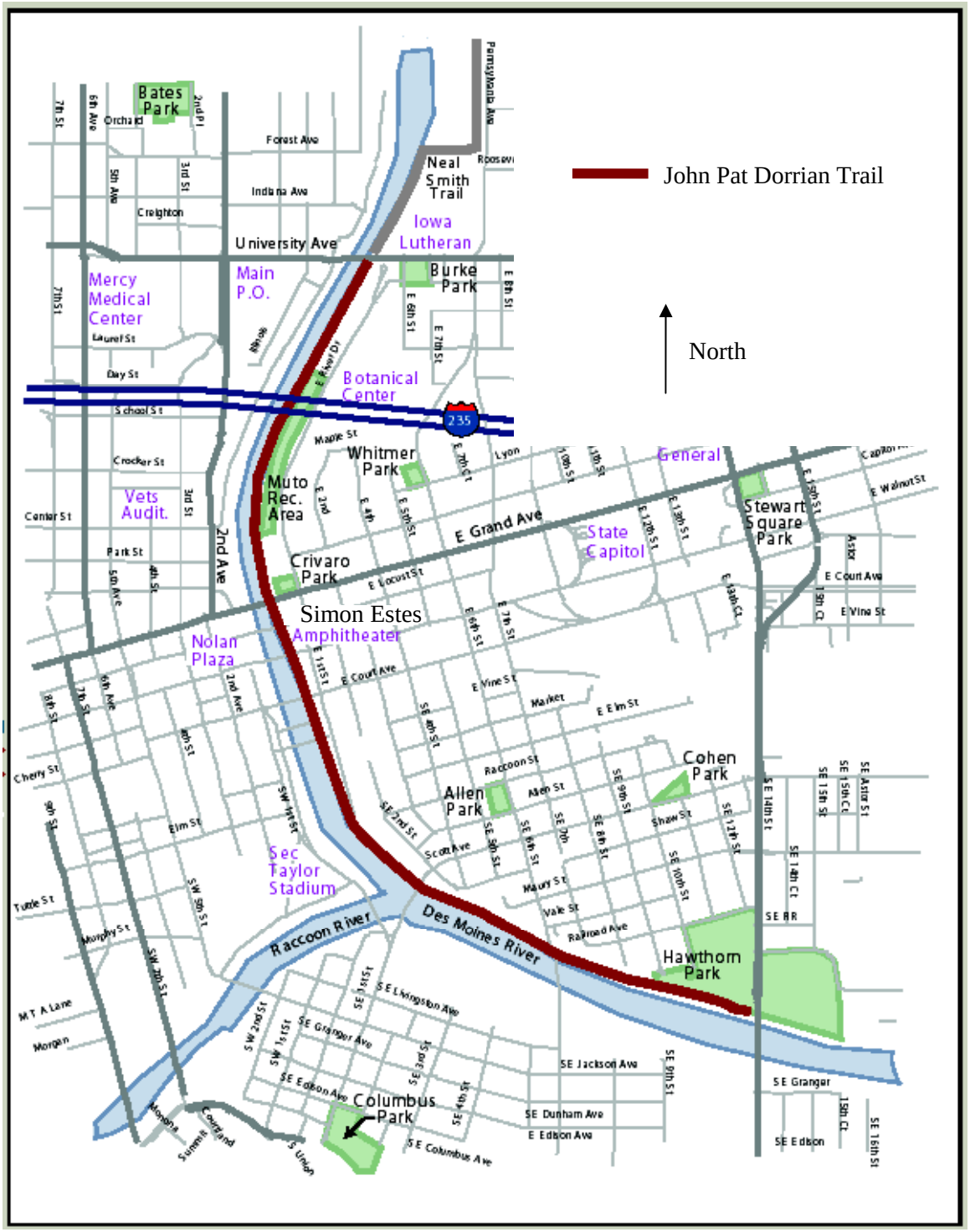

Figure 3. John Pat Dorrian Trail

1.4.3. Riverwalk – West Side

The central features of the west side Riverwalk are the plazas, upper walking trail and the lower multipurpose trail (figure 1 and Appendix A, plates C221 through C323). The trails will be a mixture of asphalt and concrete pavers and will be a minimum of 12 feet wide except where bridge underpasses constrict the width to approximately 10 feet. The lower trail runs adjacent to the existing balustrade and is designed to meet American Association of State Highway and Transportation Officials (AASHTO) guidelines for multipurpose trails. The point of the multipurpose trail is to allow for the safe movement of pedestrians, joggers, cyclists, and in-line skaters through the downtown area.

The multipurpose trail will connect with the existing Meredith Trail at the Des Moines Union Railway Pedestrian Bridge, passing under existing bridges, except at the Court Avenue Bridge where currently no opening under the bridge exists. At this location, the multipurpose trail will rise and cross over the flood protection line and merge with the upper pedestrian walking trail before crossing Court Avenue at the existing signalized intersection. The multipurpose trail will pass the Court Avenue Plaza and re-cross the flood protection line and return to an alignment adjacent to the existing balustrade. The multipurpose trail will remain adjacent to the balustrade until a point just south of the Center Street Dam, where it will cut across the slope and move through the flood protection line. The multipurpose trail merges with the upper walking trail at the base of the Center Street Bridge.

The upper pedestrian walking trail is located behind the flood protection line and parallel to the existing Water Street, where it is designed as a pedestrian promenade for slower strolling and all season use. The width of the upper walking trail will facilitate its temporary use for festivals and other City events. The trail provides continuity from the Des Moines Union Railway Pedestrian Bridge Plaza to the Center City Bridge, linking the City to the Riverwalk. Plaza spaces are located in each block along the pedestrian walking trail, providing opportunities for gathering, events, kiosks, and vendors along the Riverwalk.

1.4.3.1. Des Moines Union Railway Pedestrian Bridge Plaza (West). The West Plaza is divided into two areas by the lower multipurpose path rising to merge with the upper trail. The southern portion of the West plaza provides a connection to the Des Moines Union Railway Pedestrian Bridge from the upper trail, and an overlook to the Des Moines River. The northern portion of the plaza is a tree shaded overlook to the river, adjacent to the Court Avenue Bridge. Steps from the street provide access to both areas. Handicapped accessibility is accommodated through ADA-compliant ramps.

1.4.3.2. Court Avenue West Plaza (West). The Court Avenue West Plaza is one of the gateways of the Riverwalk. The plaza is located at the end of Court Avenue, a major entertainment destination for residents and visitors in Des Moines and at the point where both the multipurpose trail and the upper pedestrian walking trail merge. This venue serves as a major gathering, performance and focal point for visitors to the Riverwalk. The main features of this plaza will be a building containing kiosk space, restrooms and storage space for potential Riverwalk vendors.

1.4.3.3. The World Food Prize Plaza. This plaza is centered on the future World Food Prize Building (currently the library) located between Walnut and Locust Streets. The plaza's paving will be a different material than the surrounding Riverwalk and will match the World Food Prize building to the greatest extent possible.

1.4.3.4. YMCA Plaza. The YMCA Plaza is located adjacent to the northwest corner of the Locust Street Bridge. The plaza is designed as a passive gathering space with two large grass mounds providing seating areas to view river.

1.4.4. Center Street Bridge

This bridge will span the Des Moines River (approximately 400 feet) in the vicinity of the existing Center Street Dam and will connect the East Side and West Side street-level trails (Appendix A, plates 1 through 8). A bridge exclusive of any betterments, as required by ER 1105-2-100, *Planning Guidance Notebook Appendix E, Exhibit E-2,* has been assumed for cost sharing purposes; any costs for betterments above and beyond an austere bridge, as estimated, would be assumed by others. The sponsor's current plan is to have a bifurcated bridge, with one lane of the bridge reserved for pedestrian traffic, while the other side will be open to cyclists, in-line skaters, runners and other higher-speed traffic. The traveled way width of the bridge lanes is 10 feet. This design exception was approved by the Iowa Department of Transportation (DOT). This structure will be an arch structure visible from Interstate 235, the main vehicular traffic corridor through Des Moines, and will not only serve to carry non-vehicular traffic from one side of the River to the other, but will also allow scenic views of the Center Street Dam, the Des Moines River, and the downtown area.

1.4.5. Riverwalk – East Side

The east side of the Riverwalk loop features an upper level pedestrian trail similar in design and character to the west side pedestrian trail (figure 1 and Appendix A, plates C121 through C127). The trail will be a mixture of asphalt and concrete pavers with a minimum width of 12 feet. A balustrade level multipurpose trail is not possible, due to the lack of openings under bridges on the east side. The trail alignment follows 1st Street from Vine Street to Walnut Street. The Simon Estes Amphitheater interrupts 1st Street between Walnut and Locust Streets. The trail will continue across the plaza adjacent to and east of the amphitheater.

The pedestrian trail will cross Locust Street at the intersection of Robert D. Ray Drive and will follow Locust Street along the south side of City Hall to the west side of the building. The existing East Gateway paving design will be maintained along Locust Street, while the upper trail paving standard will be maintained along the west and north sides of City Hall. The trail will cross Grand Avenue at the intersection of Robert D. Ray Drive. The pedestrian trail will follow the alignment of Robert D. Ray Drive to the Center Street Bridge where the trail connects to the west side of the Riverwalk. The design concepts established for the west side are replicated on the east side. The east side has plaza spaces and/or public use areas located in each block along the pedestrian walking trail. The plazas provide opportunities for gathering, events, kiosks and vendors along the Riverwalk.

1.4.5.1. Des Moines Union Railway Pedestrian Bridge Plaza (East). The East Plaza provides a connection to the Des Moines Union Railway Pedestrian Bridge from the upper trail and an overlook of the Des Moines River. Steps from the street provide access to the plaza. Handicapped accessibility is accommodated by a ramp compliant with the Americans with Disabilities Act (ADA). While the bridge is eligible for cost sharing, the cost of lead paint removal is not.

1.4.5.2. Court Avenue Plaza (East). This plaza provides a multipurpose gathering space at the street level. The plaza in the future may contain a small kiosk structure similar to the west side.

1.4.5.3. Long Look Garden (Civic Gardens). This venue is located on the river side of City Hall. It provides views of the river and serves as a display area for public art.

1.4.5.4. Simon Estes Amphitheater. Located between Locust and Walnut Streets on the east side of the Des Moines River, this existing amphitheater serves as an events center, picnic area, and walking area. The Amphitheater includes a transition to the balustrade level and handicapped access to the balustrade level. This feature is related to the Riverwalk but is not part of the Project and is not eligible for cost sharing.

1.4.6. Des Moines Union Railway Pedestrian Bridge

This abandoned railway bridge has been renovated and integrated into the Riverwalk trail system. Construction plans and specifications have been developed with the assistance of Principal on behalf of the City, and the project will be integrated into the Riverwalk project to ensure that bridge transitions match up to the Riverwalk project smoothly. The Iowa DOT has approved a design exception to allow the bridge deck to be constructed with a 10-foot wide center section flanked by 1-foot steel grating on each side. Overlooks constructed of steel grating are located on the upstream and downstream sides at the mid span of the structure. National Environmental Policy Act and Section 106 compliance was completed through the Iowa DOT and the Federal Highway Administration. Abrasive blasting, lead removal, and painting of the structure were completed in May 2005 as Phase I of the renovation. Phase 2 was let through the Iowa DOT on May 17, 2005. Phase 2 included the overlook structure, deck, glass rail, and lighting. This work will be completed in July 2006. While renovation of the bridge is a cost-sharing eligible expense, lead removal is not.

2. ENGINEERING STUDIES, INVESTIGATIONS, AND DESIGN

Following is a list of basic data and criteria used in the design:

1. *EC 1110-2-268, Engineering and Design for Civil Works Projects,* 1 July 1991
2. *EM 1110-2-1913, Design and Construction of Levees,* 31 March 1978
3. *City of Des Moines Standard Specifications for Construction of Public Improvements,* Aug 1984
4. *As-Built Construction Drawings, Des Moines Flood Control Project, Drawing No. DM-1, Stage 1 (Reach 3),* 5 January 1972
5. *Water Service System Maps, Construction Notes, and Flow Test, Des Moines Water Works,* 20 March 1991
6. *EM 1110-2-2906, Design of Pile Foundations,* 15 January 1991
7. *EM 1110-2-2502, Retaining and Flood Walls,* 29 September 1989
8. *ETL 1110-2-312, Strength Design for Reinforced Concrete Hydraulic Structures,* 10 March 1988
9. *ACI 318-89, Building Code Requirements for Reinforced Concrete*
10. *ASCE 7-88, Minimum Loads for Buildings and Other Structures,* July 1990
11. *Aluminum Construction Manual - Specifications for Aluminum Structures and Engineering Data for Aluminum Structures,* January 1975
12. *EM 1110-2-1612, Ice Engineering,* 15 October 1982
13. *Illuminating Engineering Society document RP-33-99, Lighting for Exterior Environments*
14. *Illuminating Engineering Society document RP-8-00, Roadway Lighting*
15. *ER 1165-2-213, Hazardous, Toxic and Radiological Waste (HTRW) Guidance for Civil Works Projects,* 26 June 1992
16. *AASHTO, Guides for the Development of Bicycle Facilities and Shared Use Paths,* 1999.2.1

2.1. RIVERWALK CONSIDERATIONS

The project site was selected by the City of Des Moines, and the Riverwalk is part of the Riverfront Master Plan and the Vision 2000 Plan for the City of Des Moines. The conceptual design for the project was done by the Architectural Firm of Wallace, Roberts & Todd LLC of Philadelphia acting as a consultant for the project sponsor and proponents.

A design which preserves the Des Moines Riverwalk characteristics and setting within the National Register of Historic Places Civic Center Historic District is required by 36 CFR Part 800 and the Secretary of Interior's Standards for Rehabilitation. The design must maintain the line-of-protection afforded by the existing Federal levee which is part of the Des Moines Local Flood Protection Project (LFPP). The LFPP to be impacted by the Riverwalk project will be reconstructed to afford the current level of protection, which is one foot above the estimated 500-year Des Moines River flood profile, as outlined in section 1.4.1 of this report, and in accordance with the Des Moines and Raccoon River Feasibility Study report referenced in section 1.3.2 of this report. Appendix A, plates 9 and 10, and Appendix D, plate D-1, show the alignment of the as-built LFPP in the project area.

2.1.1. Design Coordination

To account for all potential environmental and hydraulic impacts, the planning and design of the all of the project features will be full coordinated and integrated. This approach will provide a consistency in design elements and site features over the entire length of the trail system. The project elements described in this EDR may be modified in response to changes in design philosophy or funding constraints

2.1.2. Aesthetics

The project will be designed, to the greatest extent possible within funding limitations, in the most aesthetically pleasing manner possible. The design will increase the public use of the Riverwalk and attract a great number of non-local visitors. The project's architectural language reflects the movement and spirit of the Des Moines River. The flood protection line creates a divide between the realms of the City and of the river. Walls and plazas on the river side of the flood wall are composed of smooth curves and slopes echoing the effects of water movement across the site. The dynamic effect of water across this area is further expressed through benches and paving inserts which appear scattered like driftwood along the multipurpose trail. Located on the city side of the flood wall, the pedestrian loop is formal in structure reflecting the adjacent urban environment. A canopy of trees provides a shaded alley for both walking and festival activities. Paving and site furnishings reflect the character of both the surrounding city and the river environment. The materials used in the project were selected to:

- create a unique identity for the Riverwalk
- create a unique visual identity for distinct Riverwalk areas
- construct an appropriate architectural foreground for historic buildings
- express Master Plan concepts

The floodwalls will be designed with a cut stone veneer or other suitable finish that matches many of the surrounding buildings. The pedestrian loop is intended to be constructed of bituminous concrete with cut stone inserts to match the floodwalls. The multipurpose trail is designed as bituminous concrete. The trail will be constructed of bituminous concrete in all other areas. These materials will provide a safe and smooth surface, which meets AASHTO standards, for bikers, walkers and

rollerbladers. Plazas on the riverside of the floodwall will be exposed aggregate concrete with cut stone inserts. Plazas on the city side of the floodwall will be pre-cast concrete unit pavers. Smooth slopes and arcs will be incorporated into the design so that views from the many downtown bridges over the Des Moines River, and from the high-use Interstate 235 just upstream from the project, will be pleasing and attractive to potential users of the site. Landscaping will be incorporated into the design to reinforce the project's formal language and to improve the physical environment. The pedestrian loop will feature canopy trees providing shade along with an under story of perennial grasses in planting beds, randomly spaced in the paving surface.

2.1.3. West Side Sewer Coordination

The Riverwalk project will be designed and constructed in coordination with the City of Des Moines' on-going Combined Sewer Overflow (CSO) system along the west bank of the Des Moines River. The CSO project is a 100 percent City-funded project.

Stage 1 of the CSO project consists of construction of a large concrete box culvert from the vicinity of Principal Park's north parking lot (downstream of the project area on the Des Moines River) to a location just south of Court Avenue, along Riverside Drive, which is approximately at the balustrade level (i.e. along the riverbank rather than at street or promenade level). Stage I has been constructed without any conflict with the Riverwalk project, and the Riverpoint Trail in this vicinity will be located directly on top of the box culvert.

Stage 2 of the CSO project will be constructed immediately prior to the Riverwalk project, and will continue the Stage 1 CSO from the vicinity of Court Avenue through Grand Avenue on the west side of the Des Moines River. Since temporary flood protection will be required and a large, deep excavation will be necessary to complete the CSO project, the CSO will be installed before the Riverwalk project is constructed. In order to minimize the time that the area is under construction, the Riverwalk project will utilize the CSO project's temporary flood control (in the form of sheet piling) along much of the new levee and floodwall alignment, and the Riverwalk project will be staged such that it follows directly after the completion of the CSO project.

The new permanent flood control will be sheet piling topped with a concrete wall above ground. This wall will replace the existing earthen levee and will allow the area to be graded lower to meet the needs of Riverwalk facilities. Preliminary grading will be completed during the Stage 2 CSO construction. An alignment of the CSO project as presently planned can be found in Appendix A, plate 11.

2.1.4. Utilities

MidAmerican Energy Company owns and operates 69kV Transmission and Distribution systems in the area. Fire hydrants on the south side of Grand Avenue shall be maintained. Other underground utilities (electrical, cable, telephone, fiber optic, sewer, and water) are shown on the "existing conditions" drawings in Appendix A.

2.1.4.1. Site Lighting and Power. Service is to be supplied by MidAmerican Energy Company (MEC) at different locations to various lighting controllers and electrical distribution panels along both sides of the river. There will be a 400A electrical distribution panel located at the west end of the Court Avenue, Locust Street, Walnut Street, and Grand Avenue Bridges for event power requirements.

General ambient lighting on all pathways, roadways and other vertical circulation areas is designed to meet lighting level criteria as outlined in the Illuminating Engineering Society documents RP-33-99 Lighting for Exterior Environments and RP-8-00 Roadway Lighting.

One prominent style of fixture is used throughout the entire project. All roadways and walkways are illuminated with an indirect lighting system. The fixture selected provides semi-cutoff optics and full glare control. Due to the indirect nature of the optical design, it is virtually vandal resistant as all lamp, reflector and electrical connections are concealed from public view and access.

All lighting fixtures, with the exception of the pole lights, are specified with a UL Wet label and an IP68 (submersible) rating. Additional precautions are in place in the lighting controllers to extinguish electrical supply to all fixtures outside of the flood line of protection so that additional damage is avoided during periods of flooding.

Lighting for safety will be installed along all reaches of the Riverwalk. The Simon Estes Amphitheater may require lighting changes to be consistent with the rest of the Riverwalk. The lighting change would incorporate aesthetic, safety, and operation and maintenance requirements. Night use lighting will also be installed throughout the Riverwalk.

All of the lower level lighting next to the river is controlled by a section of each lighting controller which has a control input from a level transmitter located at the Union Railway pedestrian bridge. Receptacles (20 amps) will be ground fault circuit interrupting (GFCI) where located outdoors and suitable for wet locations while in use. The receptacles on the Plazas (intended for event power for events such as the art show) shall be mounted in nearby floodwalls, buildings or other structures as appropriate.

2.1.4.2 Communications/Telephone. There will be emergency telephones spaced at adequate distances along each side of the river (approximately one each block, with the exception of the City Hall block), to match the existing system already in place along the Riverpoint Trail.

2.1.4.3 Drainage and Water/Irrigation. Surface drainage is conveyed primarily by overland flow. The exception will be in areas where a sidewalk is adjacent to a sloped stone wall, where surface drainage will be collected and carried by a concrete curb to the lower sidewalk near the balustrade walls that line the riverfront.

On the riverside of the line of protection, storm water will sheet flow down slope to either the balustrade wall or to a variable width sidewalk adjacent to the balustrade wall. In either case, intake scuppers will be placed at 80-100’ intervals to carry the water down and through the wall to the river.

On the landside of the line of protection, flow will be directed by sloping pavement surfaces to the curb where it will be carried away through the existing street storm sewer system.

The project includes public restrooms which will require connection to a sanitary sewer. Water and sanitary sewer connections will be required at the Court Avenue plaza location north of Court Avenue on the west side of the river.

Where needed, water will be provided for irrigation. Potable water will be supplied to landscape areas landward of the line of protection, and non-potable water will furnished to plantings on the riverward

side of the line of protection. This will prohibit cross contamination of the City's water supply system. Fire protection will be provided from existing hydrants.

2.2 CIVIL ENGINEERING CONSIDERATIONS

2.2.1 Traffic Control

A study is being performed by the Center for Traffic Research and Education, and a solution for vehicular and pedestrian traffic control in the high-use downtown area will be incorporated into the Riverwalk design to ensure safety and ease of use. A system of lights, signals, and signs will be constructed as an integral part of the Riverwalk project, and will meet all applicable Americans With Disabilities Act (ADA) and AASHTO standards.

2.2.2 Trails

The balustrade-level (i.e. riverbank or lower level) and promenade-level (i.e. street or upper level) trails will connect periodically with stairs, ramps and sloped walkways to allow movement between the two levels. Wherever possible, the multipurpose trail will be a minimum of 12-feet wide to allow fast-moving traffic safe passing room. Bridge underpass crossings may reduce the trail to a 10-foot width. Bridge underpasses also reduce head clearance. The main reason for trail width constriction underneath the bridges will be to ensure at least 8 feet of "headroom" under the curved bridge arches.

The surfacing of the trail will allow for smooth walking and riding and will offer adequate traction. The surfacing will also facilitate cleaning for those portions that are expected to be submerged due to flooding of the balustrade-level trail sections. At-grade street crossings for the multipurpose trail have been avoided except at Court Avenue where a bridge underpass is infeasible. All other pedestrian street crossings will be at grade, and appropriate traffic controls and pavement markings will accompany those crossings to provide safety for both vehicles and pedestrians. Appropriate way finding, informational and safety-related signage will be installed as a part of the project. Trail slopes will meet ADA and AASHTO standards. Cross slopes will allow for drainage. The relatively slow intended speeds on the trail preclude the need for excessive cross slopes or "superelevations" on curves.

The historic balustrade will be used as a "handrail" at the riverward side of the multi-purpose trail. Presently, this structure does not meet guidelines regarding space between spindles. The City has confirmed with their building official that changes are not required. However, due to expected uses, the design team will be looking for options that make the existing balustrade safer. Repairs to this deteriorating structure may be necessary to make it fit to be used as a handrail, and it may be necessary to modify it to meet AASHTO standards (i.e. use as a bike trail guardrail, etc.). Some methods may be to install cables between the existing spindles, or to apply a wire mesh to the riverward side of the structure which will be essentially "invisible," thereby retaining the historic look of the balustrade.

2.2.3. Local Flood Protection Project (LFPP) and Line of Protection Considerations

Where feasible, the line of protection will be realigned such that trails and streets can remain open at as high a flood elevation as possible without substantially modifying bridges. In most cases, this involves tying floodwalls into bridge end walls, and aligning the line of protection such that the upper, or promenade, level can remain open under all normal levee and floodwall operations during periods of high water. Floodgates will be added where grade limitations require lower crossings through the

line of protection. Utility penetrations will be sealed at the line of protection. All closure equipment except closures across streets will be installed on-site for ease of maintenance and expediency of operation when needed.

Appendix A, plates 9 and 10, and Appendix D, plate D-1, show the as-built LFPP. The line of protection through the project site currently consists of a grass-covered earthen levee and concrete/sheet pile based floodwalls, with a design grade elevation of three feet above the 100-year flood level as estimated at the time that the LFPP was built in the 1970s. Generally, the line of protection on the west side of the river will utilize the sheet piling driven as a part of the City's CSO project (Section 2.5.2). That sheet piling will be encased with reinforced concrete, and an architecturally-treated surface above the ground line will be incorporated up to the top of the line of protection. On the east side, a combination of sheet piling and reinforced concrete "L" and "T" walls may be used. Several swing gates will be included where grades do not allow ramps over the line of protection. Gate locations include: south of Court Avenue on the west side, two gates north of Court Avenue at the Court Avenue West Plaza, a gate on the west side just downstream of the Center Street Bridge, gates at the Long Look Gardens (Civic Gardens), and gates north and south of Court Avenue on the east side of the River. These gates will be steel swing gates with rubber seals against steel plate inserts, and will include architectural treatments on the side that is not normally hidden when the gates are open (in recess).

2.3 HYDROLOGIC AND HYDRAULIC CONSIDERATIONS

River stage hydrographs were developed for the Des Moines River (Appendix C). The ordinary high water elevation (approximately 50 percent exceedance) is at an elevation approximately equal to that of the existing balustrade base, which can essentially be considered the "top of bank" along this reach of the river. All new construction landward of the river wall (which serves as the balustrade base) will be above this elevation. Hydraulic analyses were performed to determine the impacts of the proposed project (Appendix C). These analyses showed that, assuming construction of all Riverwalk features, the level of protection of the LFPP is maintained as originally designed and there will be no rise in existing flood surface elevations.

2.4 GEOTECHNICAL CONSIDERATIONS

A detailed discussion of geology and specific geotechnical analyses pertinent to the proposed project area is presented in Appendix D. Numerous borings were taken for the existing project during 1963 and 1967. These borings were used to evaluate engineering properties of the proposed project. Boring logs are included in Appendix D. Subsurface investigation information was also obtained from private engineering firms engaged in sewer construction and other construction projects in the vicinity of the proposed flood protection. No unusual geological condition is present in the areas which would affect the proposed construction project. Some further exploratory work will be necessary for final design of major features before construction.

2.5 STRUCTURAL CONSIDERATIONS

2.5.1 Structural Elements Related to Flood Protection

The primary purpose of the floodwall is to protect lives and properties adjacent to the Des Moines River from flood waters. Secondarily, it is desirable for the flood protection to be aesthetically pleasing, and to be an integral part of the architectural Riverwalk plan. Cantilever steel sheet pile

walls and concrete T-walls or L-walls will be used to establish the line of protection. Sheet pile walls driven for the braced excavation for installation of the new CSO project along the west bank will be incorporated into the floodwalls. Cantilever sheet pile walls will also be used near existing structures to minimize re-construction costs and disruption to vehicular traffic. Concrete T-walls or L-walls will be used in all other locations.

Steel framed swing gates will be used to close openings in the flood walls. The gates will be supported on one side, top and bottom. The top hinge will incorporate a gate lifting mechanism, so that the gate can be raised slightly and swung. The gates will be stored at their location of use in a wall recess. A three inch ledge on many of the wall faces is planned to provide support for a limestone façade. All walls that receive a limestone cover will also have a four inch thick limestone cap. A detailed discussion of the floodwall and gate closures can be found in Appendix E.

2.5.2 Other Structural Elements

Structural elements not exclusively related to flood protection include:

- Permanent sheet piling driven by City of Des Moines Combined Sewer Outflow (CSO) project on the west side of the Des Moines River as part of temporary flood protection and excavation protection related to sewer construction. Sheet piling remaining after Stage 2 CSO construction will be incorporated into the Riverwalk line of protection.
- Terraced concrete planters at Long Look Gardens (Civic Gardens)
- Court Avenue Plaza West kiosk building
- Court Avenue Plaza West overhead trellis
- Des Moines Union Railway Pedestrian Bridge

2.6 ARCHITECTURAL CONSIDERATIONS

The Riverwalk project plan, elevation and section views are shown in Appendix A on plates C121 through C323, and plates L370 through L377. The design includes the required provisions for the physically disabled and will meet all applicable ADA guidelines. The design has been, and will continue to be, coordinated closely with the Iowa State Historic Preservation Office to assure that the requirements of the National Historic Preservation Act are met. Architectural treatments will also add to the aesthetics of the project, hence attracting increased use of the site. Appendix E has additional information regarding architectural features for the Riverwalk.

2.7 ENVIRONMENTAL

An Environmental Assessment (EA) addressing the impacts of the proposed project has been prepared by the District, and was circulated for a public review period that began on April 28, 2005 and expired on May 31, 2005. The EA is entitled *Des Moines Recreational River and Greenbelt, Environmental Assessment, Des Moines Riverwalk, Des Moines, Iowa*, dated April 2005 The Finding of No Significant Impact (FONSI) for this project was signed on June 3, 2005. Due to project changes pertaining to the Center Street Bridge construction process, some sections of the original EA needed to be amended to maintain NEPA compliance. Consequently, another NEPA document was written entitled *Des Moines Recreational River and Greenbelt, Des Moines Riverwalk, Des Moines, Iowa, Environmental Assessment, Amended*, dated April 2006). The amended EA was comprised only of

those sections of the original EA that had changed. These sections and amended FONSI were circulated for public review from April 3, 2006 to May 3, 2006. The amended FONSI was signed on May 9, 2006.

The original FONSI and the amended FONSI are based on the following factors:

- the project would have no significant adverse impacts on fish and wildlife resources or on water quality;
- the proposed project would have no impacts on flood heights, or prolong periods of high water;
- this project, as proposed, is expected to produce beneficial recreational impacts in the downtown riverfront area with no significant adverse impacts to natural, cultural, economic, or social resources; and implementation of the project, as proposed, would not result in increases in cost or prices for consumers, individual industries, Federal, State, or local government agencies, nor would it impair in any way the ability of the United States to compete with foreign-based enterprises in domestic or export markets.

2.8 HAZARDOUS, TOXIC AND RADIOACTIVE WASTE (HTRW) INVESTIGATIONS

The Riverwalk project shares a footprint with another ongoing Corps study—the Des Moines and Raccoon River Flood Damage Reduction Project (DMRR)—in which the City of Des Moines is the project sponsor. Specifically, the Des Moines Riverwalk project location overlaps the Downtown East and Downtown West levee systems studied in the DMRR. The Downtown East flood protection system extends from the vicinity of Interstate 235 (upstream of the project site) well downstream of the project site on the east side of the Des Moines River. The Downtown West flood protection system extends from the vicinity of the Center Street Dam to the confluence of the Des Moines and Raccoon Rivers, and then upstream on the Raccoon River. Both the Downtown East and Downtown West systems overlap with the Des Moines Riverwalk project footprint. The design team therefore determined that HTRW investigations conducted for the DMRR adequately addressed the Des Moines Riverwalk project activities.

Phase I and Phase IIA HTRW Environmental Site Assessments (ESA) were conducted in accordance with ER 1165-2-132, *HTRW Guidance for Civil Works Projects*, and ER 405-1-12, *Real Estate Handbook*. The Phase I assessments revealed recognized environmental conditions in the following locations: Downtown West and Downtown East project areas. These conditions were confirmed via Phase IIA sampling, revealing metals and polycyclic aromatic hydrocarbon (PAH) concentrations in excess of the Iowa Department of Natural Resources (IA DNR) Land Recycling Program Standards.

Due to ongoing construction activities related to a sewer project at the Downtown West Levee project area, between Center Street and Riverside Park, no Phase IIA ESA was conducted at the time of construction. Construction in this area removed the contaminated material, and replaced it with clean, manufactured sand, thereby removing the environmental concerns in this area.

ER 1165-2-132 requires non-Federal sponsors to supply contaminant-free land to the Federal government. Therefore, before the project could proceed on the Downtown East and Downtown West levee alignments the areas had to receive HTRW clearance from the IA DNR. The City of Des Moines received a letter from the IA DNR dated February 7, 2005 stating that the contaminants pose a minimal threat to human health and environment, and therefore, no further investigation is required.

According to the District's Environmental Engineering Section and Office of Counsel, the Corps can proceed with work in these areas, provided the appropriate construction safeguards are in place.

There are no environmental concerns associated with this project (reference a coordination letter from the Iowa Department of Natural Resources in Appendix H); however, there are still contaminants present on site. Appropriate safeguards must be identified during plans and specifications to ensure that workers remain safe during construction, that excavation of contaminated material does not create an RCRA hazardous waste pile, and that all material disposed of off-site is done so appropriately.

No ESA can wholly eliminate uncertainty regarding the existence of recognized environmental conditions concerning a property. This assessment is intended to reduce, but not eliminate, uncertainty regarding the existence of recognized environmental conditions in connection with a property with reasonable limits of time and cost. Continuing the Environmental Due Diligence Audit process beyond these ESAs may reduce uncertainty, or reveal unidentified environmental liabilities. If any previously unaddressed recognized environmental condition should arise, this report will be revisited. Further information regarding the HTRW Investigations can be found in Appendix H of this report or on file with the District's Environmental Engineering Section.

2.9. VALUE ENGINEERING

A Value Engineering (VE) study for this EDR was prepared to determine if measures for adding value to the project were possible, while still maintaining adequate project function. Changes recommended by the VE team and adopted by the design team will be implemented during the Plans and Specifications phase of the Riverwalk project. Table 2 outlines the VE team's suggestions that have been adopted to date. These changes will be implemented during the Plans and Specifications phase of the Riverwalk. Additional savings may result from further investigation and suggestions approved by the design team.

Table 2. Value Engineering Suggested Changes and Estimated Savings

Suggestions	Est. Savings
Eliminate irrigation north of Grand and plant native grasses	$350,920
Simplify kiosk/restroom building and reduce trellis	$344,720
Replace pre-cast concrete curbs with cast-in-place north of Grand	$32,240
Cut emergency phones (by at least half)	$53,320
Eliminate stairs at YMCA	$45,880
Eliminate stone inserts in the promenade paving	$43,400
Eliminate (some) traffic signals	$90,120
Change precast steps to cast-in-place	$107,880
Decrease area of stadium steps and replace with grassy areas	$33,480
Lower wall and add railing near railway bridge	$8,680
Simplify railway bridge approach on east side	$333,560
Replace bituminous pavers on multi-purpose trail with asphalt	$254,540
Eliminate the semicircle at the library	$110,360
Simplify railway bridge approach on west side	$240,560
Total VE savings as of July 8, 2005	**$2,049,660**

2.10. PERMIT REQUIREMENTS

A permit application has been submitted through the District's Regulatory Branch to appropriate Iowa Department of Natural Resources and Office of Water Resources offices. A copy of this report and the District's permit letter response is included in Appendix B of this report. Since all construction activities for the Center Street Bridge are covered under Nationwide Permits (NWP) 14 and 33, no Clean Water Act Section 404(b)(1) Evaluation will be required. The State of Iowa has issued State Water Quality Certification for these NWPs. No additional floodplain permits will be required. No adverse impact to flood heights or degradation of the integrity of the levee/floodwall system will result from the project. Since the Corps of Engineers is designing the new line of protection, a levee modification permit is not required by the City of Des Moines.

A storm water discharge or National Pollutant Discharge Elimination System (NPDES) permit for construction activities will be required. Effective March 10, 2003, the NPDES storm water discharge permit is required when a construction activity disturbs more than 1 acre. The construction contract for the Riverwalk will trigger the need for the contractor to apply for this permit. With or without the permit, the Corps requires an environmental plan that addresses contaminants as well as erosion control measures. The work near the River would require extra care and erosion control measures. Contract requirements should require the use of an erosion control mat or fence to control erosion and sedimentation of soil prior to establishing vegetative cover. The contractor would be required to prepare an erosion control plan to ensure that unprotected soil is not allowed to leave the project site work limits. The contractor would be required to comply with all local codes and permit requirements.

3. CONSTRUCTION CONSIDERATIONS

3.1 DEMOLITION

Plates D101 through D303 of Appendix A show the Demolition Plan and Details. Existing sidewalk will be removed to accommodate new construction. Parking meters and barrier posts will be salvaged and transferred to the City of Des Moines.

The City's Phase 2 CSO project will be constructed immediately ahead of the Riverwalk project, in order to minimize disruption to traffic and public use of the general area. The CSO project involves the degradation of the existing line of protection. Along much of the Des Moines River's existing levee alignment, the line of protection will be replaced with floodwalls and gates.

Typical features that will require removal for construction of this project are existing pavements, vegetative features, and other miscellaneous structures and appurtenances. Pavements to be removed include roadways, such as existing Riverside Drive north of Center Street; and other asphalt and concrete driveways, sidewalks, and street crosswalks. Existing plant materials that will be removed include trees, shrubs, hedges and grass-covered areas. Other miscellaneous items to be demolished include: existing floodwalls (both concrete and sheet pile); other retaining walls; parking bollards in the parking lot at the Armory building; existing parking meters where new sidewalk pavements will be placed; a flag pole near City Hall; and other various landscaping features such as stone and concrete benches and old stonework on the west side of the river between Locust Street and Grand Avenue. See Appendix A, plates D101 through D303 for more details.

Most of the trail work adjacent to the banks of the Des Moines River will require that the line of protection be demolished or modified during construction. To the extent possible, the existing line of protection will remain until the new line of protection is completed; however, it may be necessary to construct a new temporary line of protection or to have material on hand to close gaps in the line of protection prior to degradation of existing levees and/or floodwalls. In general, there is low risk with degrading the levee to the street level between the months of August and December, and the District's Flood Area Engineer and Emergency Management Division may grant, on a case by case basis, permission to do so provided that the City has a plan to implement emergency measures in a timely manner should flood waters rise unexpectedly. As a general rule, however, a competent line of protection must be maintained during construction.

3.2 GRADING

Most of the rough grading will have been completed following the end of construction activities for the previously mentioned CSO project on the west side of the river. (Reference section 2.1.3 of this report.) Final finish grading will involve excavation for the stone and concrete walls and activities necessary for placement of sidewalk pavements and tree wells. Rough and finish grading will be completed concurrently for work on the east side of the river. Carefully stockpiled levee material may be used as an interim line of protection during construction. Plans for such use will be developed and approved by the District during the Plans and Specifications phase of the project.

3.3 SCHEDULING

It is preferred to construct the Riverwalk project with a maximum of two phases, west side and east side; however, the Riverwalk project may have to be phased construction due to anticipated funding stream limitations. Construction contracts including a base bid plus options pending additional funding are also possible. Plans and specifications will be developed in a modular format such that appropriately sized sections of the project can be constructed with the funding available.

There are several elements of the Riverwalk which would be constructed prior to a Corps of Engineers project. Specifically, these items include the Long Look Gardens (Civic Gardens); the floodwall adjacent to the Brenton Ice Skating Plaza; the Riverpoint Trail; the Des Moines Union Railway Pedestrian Bridge, work included in the CSO project (sheetpiling, water service, curbs, etc); and tree purchase. In addition, construction on the Center Street Bridge is planned to begin prior to the Corps of Engineers' project. This also applies to the CSO Stage 2 project on the west side of the river, for which Riverwalk funding is anticipated to cost-share any deviation of the sheet piling (line of protection) from the needs of the CSO project, and which is scheduled to be constructed in advance of the Corps' Riverwalk construction contract.

4. OPERATIONS AND MAINTENANCE CONSIDERATIONS

Operation and Maintenance (O&M) costs associated with the Riverwalk project will consist of salaries, wages and benefits; contractual services; commodities; and capital outlay beginning in 2004 and continuing throughout the life of the project. These costs will be in the form of engineering, parks and recreation, police, and public works departments of the City of Des Moines.

The incremental annual costs used in the economic analysis are a small portion of the above costs, since the City already mows the levees, picks up trash, removes snow, repairs sidewalks, etc. The incremental costs were estimated to be $25,000 annually, and are included in Appendix G, *Economic Analysis.*

4.1 OPERATION

The City of Des Moines will be responsible for the operation of the project. Operation will include control of heating, ventilating and air conditioning systems, irrigation and electrical equipment, closing floodgates ahead of rising floodwaters, staffing of public kiosks as appropriate, and patrolling as required for safety and public well-being. The City will be responsible for paying utility bills as well, i.e. electricity, water, emergency phone charges, etc.

4.2 MAINTENANCE

The City of Des Moines will be responsible for project maintenance. Maintenance activities will include trash removal, removal of graffiti, snow removal, watering, mowing and gardening, cleaning, regular servicing of machinery and equipment, miscellaneous repairs, etc. The City may seek the aid of other local entities to assist with maintenance of the project. The City will be responsible for taking care of tables, umbrellas and other appurtenances.

4.3 OPERATION AND MAINTENANCE MANUAL

The Corps will prepare an O&M manual for the project. The manual will be prepared as the completion of construction for each element nears. For those elements of the project that were designed by others on behalf of the Sponsor, the Corps will use cut sheets and other information supplied by the designer to develop the O&M manual.

5. REAL ESTATE CONSIDERATIONS

The project is located in the City of Des Moines, Polk County, Iowa, Sections 3, 4, 9, & 10 of Township 78 N, Range 24 W, 5th Principal Meridian. All of the project lands are on Sponsor-owned fee title lands. A full description of the project area and Real Estate information is noted in the Real Estate Plan, included in Appendix I.

Approximately 16 percent of the project lands fall within the Des Moines Flood Control Project; therefore, these lands are considered part of an existing Federal project. Lands considered part of an existing Federal project cannot be considered for Lands, Easements, Rights-of-Way, Relocations, and Disposal (LERRD) crediting. The total amount of required project lands consists of approximately 27.5 acres. Approximately 23.2 acres are eligible for LERRD crediting, whereas the remaining 4.3 acres cannot be allowed as credit. The Real Estate Plan identifies the lands that are eligible for crediting, and identifies those lands that are not eligible to receive credit.

6. COST ESTIMATE

The Microcomputer Aided Cost Estimating System (MCACES) was used by Stanley/INCA JV to prepare the cost estimate for the Riverwalk project. The results of the MCACES estimate can be found in Appendix K. The total cost of the project is $35,844,300. The total shared project cost is $34,249,800 and will be cost-shared 50/50 by the Federal Government and the City of Des Moines. The following table shows a total project cost estimate of all cost accounts.

Table 3. Project Cost Estimate

Item	Total Project Cost (July 2005)	Fully Funded Estimate
1 Lands and Damages	$2,984,500	$2,984,500
1A. Incidental Real Estate Expenses [1]	$55,000	$55,000
14 Recreation Facilities	$25,135,500	$26,215,200
30 Planning, Engineering & Design	$5,418,100	$5,656,400
31 Construction Management	$2,251,200	$2,348,600
Total Riverwalk (MCACES)	**$35,844,300**	**$37,259,700**

[1] Includes: Appraisal and Credit Review; Boundary Surveys; Title Evidence; Closing Costs; and Appraisals

The estimated cost for each project reach is presented in table 4.

7. ECONOMIC ANALYSIS

The benefit-cost ratio for the Riverwalk project is estimated at 1.10. Following is a summary of the benefits and cost estimates—with a 5-3/8% Discount Rate and a , 50-year Evaluation Period—for the project. A detailed economic analysis can be found in Appendix G of this report.

Annual Recreation Benefits:	$2,398,500
Annual Project Costs:	$2,186,600
Net Annual Benefits:	$211,900
Benefit Cost Ratio:	1.10

Table 4. Estimated Cost Per Project Reach

Project Element	Related Project Feature	WIK Eligible Construction	Corps Construction [1]	Est. Cost (Jul 05 $)	Fully Funded Estimate [2]
West Side					
Vine St to Court Ave	Union Railway Pedestrian Bridge (W)	Union Railway Pedestrian Bridge & a portion of the CSO project	Pedestrian trails, grading, utilities, landscaping, & floodwalls	$3,005,900	$3,132,800
Court Ave to Walnut St	Court Avenue Plaza (W)	CSO Project, Court Ave Plaza (W)	Pedestrian trails, grading, utilities, landscaping, & floodwalls	$5,752,400	$6,016,800
Walnut St to Locust St	World Food Plaza			$2,116,700	$2,212,200
Locust St to Grand Ave	YMCA Plaza	CSO Project	Pedestrian trails, grading, utilities, landscaping, & floodwalls	$2,993,200	$3,129,300
Grand Ave to Center St	Hansen Co. Triangle	CSO Project and Union Railway Pedestrian Bridge	Pedestrian trails, grading, utilities, landscaping, & floodwalls	$3,589,200	$3,720,900
Subtotal West Side				$17,457,400	$18,212,000
East Side					
Vine St to Court Ave	Union Railway Pedestrian Bridge (E)	Union Railway Pedestrian Bridge	Pedestrian trails, grading, utilities, landscaping, & floodwalls	$1,885,300	$1,967,700
Court Ave to Walnut St	Court Avenue Plaza (E)	Court Plaza (E)	Pedestrian trails, grading, utilities, landscaping, & floodwalls	$4,435,300	$4,630,000
Walnut St to Locust St			Pedestrian trails, curb cuts & ancillary trail improvements	$281,700	$293,000
Locust St to Grand Ave	Long Look (Civic) Gardens	Long Look (Civic)Gardens	Pedestrian trails, grading, utilities, landscaping, & floodwalls	$2,117,100	$2,207,800
Grand Ave to Center St		Center St Bridge w/out betterments	Pedestrian trails, grading, utilities, landscaping, & floodwalls	$3,935,300	$4,092,000
Subtotal East Side				$12,654,700	$13,130,500
Center St. Bridge [3]		Center St. Bridge		$2,653,500	$2,778,500
Union Railway Pedestrian Bridge [4]		Union Railway Pedestrian Bridge		$2,523,100	$2,523,100
Riverpoint Trail		Riverpoint Trail		$500,600	$500,600
Incidental Real Estate Expenses				$55,000	$55,000
TOTAL				**$35,844,300**	**$37,259,700**

[1] Utilities are new construction.
[2] construction midpoint – July 2007
[3] without betterments
[4] complete

8. PROJECT IMPLEMENTATION

An Independent Technical Review for the October 2005 Draft EDR was conducted by the District from 13 June 2005 through 1 July 2005 and comments and resolutions were entered into the Dr. Checks on-line tracking system. All comments have been resolved and there are no outstanding issues with the project.

9. PROJECT SCHEDULE

The following schedule (table 5) presents steps leading to completion of the project, assuming availability of funding.

Table. 5 Project Implementation Schedule

Project Milestone	Scheduled Completion Date
Complete Plans and Specifications	October 2006
EDR Approval	October 2006
PCA Approval by Assistant Secretary of the Army (Civil Works)	February 2007
Execute PCA	March 2007
Real Estate Acquisition / Right of Entry	May 2007
Advertise First Construction Contract	May 2007
Award First Construction Contract	July 2007
Complete Construction	September 2010

10. IMPLEMENTATION RESPONSIBILITIES

Approval of the decision document (EDR) is required prior to completion of a Project Cooperation Agreement (PCA) between the non-Federal sponsor and the Corps. Upon execution of the PCA, the non-Federal sponsor will become responsible for 50 percent of the total sharable project costs including Planning and Design costs.

Project implementation is based on a cost share of 50 percent Federal and 50 percent non-Federal as shown in tables 6 and 7. The Federal cost share is estimated to be $17,124,900 (July 2005 price level). Total project cost includes planning, engineering and design; Lands, Easements, Rights-of-Way, Relocations, and Disposal (LERRD); construction contracts; supervision and administration; WIK; and engineering during construction. The local sponsor is responsible for preparing and reviewing the design and providing input as needed, obtaining the necessary right-of-way, and paying for 50 percent of the total project cost; including approved credits for WIK. The City of Des Moines is planning to plan, design and construct portions of the Riverwalk and to seek credit for this WIK under the provisions of Public Law 108-7 as discussed in Section 1.1.

Features being proposed for WIK credit include:

- Riverwalk Master Planning and design efforts
- Des Moines Union Railway Pedestrian Bridge renovation (without lead-based paint abatement or betterments)
- Long Look Gardens (Civic Gardens) portion of the downtown Riverwalk trails
- Center Street Bridge (without betterments)
- Riverpoint Trail
- Trail / Floodwall between Grand Avenue and the Armory
- Sheetpiling, Curbs, Floodwalls and appurtenances installed for the Riverwalk during the CSO project
- Purchase of specimen trees for use on the project

All claimed expenditures are to conform to the provisions of the Office of Management and Budget Circular A-87 and are subject to an Army audit.

Table 6. Estimated Work-in-Kind Summary

Cost Item	Estimated Amount
WIK under Design Agreement (see Section 1.2)	$ 2,770,000
WIK under PCA [1]	
Remainder of Riverwalk Design	$ 956,500
Riverpoint Trail	$ 414,400
Des Moines Union Railway Pedestrian Bridge [2]	$ 2,388,400
Trail between Grand Avenue and the Armory	$ 276,400
Long Look Gardens (Civic Gardens)	$ 1,158,500
Center Street Bridge [3]	$ 2,653,500
Sheetpiling, Curbs, Floodwalls, etc., West Side	$ 900,000
Purchase of Specimen Trees	$ 76,800
Subtotal	$ 8,824,300
Total WIK Credit	**$11,594,500**
Allowable WIK Credit [4]	**($10,000,000)**
Excess WIK Credit Not Subject to Cost Sharing	**$ 1,594,500**

[1] WIK credits include PE&D, construction and S&A costs
[2] Excludes HTRW remediation
[3] without betterments
[4] P.L. 108-7 SEC 122

In addition to WIK credit previously discussed in relation to the DA, LERRD costs will be allowed for work performed by the non-Federal sponsor specifically for the acquisition of the LERRD needed for the Project's construction as determined by the Corps, and will be specified and agreed upon in the

Project Cooperation Agreement (PCA). The non-Federal sponsor is entitled to credit against their share of total project costs for the value of the approved LERRD that the non-Federal sponsor provides for the Project. The amount of credit allowed for the LERRD will directly affect the amount of the cash contribution that the non-Federal sponsor must provide for construction of the project. Specific provisions of the PCA will govern the crediting for the LERRD. In general, the value of the LERRD is the fair market value of the real property interests plus certain incidental costs of acquiring those interests (surveys, appraisals, attorney fees, associated administrative costs, etc.). Federally-owned lands which can be used for Project purposes are not creditable. Also, the non-Federal sponsor cannot receive credit for any lands that are part of a previous Federal project, or for lands acquired with other Federal funds, unless specifically authorized by statute. The following table shows the estimated distribution of project costs to the various credit and cost share categories.

Table 7. Project Cost Distribution

Total Project Cost Estimate	**$35,844,300**
Excess WIK (not subject to cost sharing)	($1,594,500)
Total Shared Project Cost	**$34,249,800**
Federal Cost Share (50% of shared project cost)	$17,124,900
Non-Federal Cost Share (50% of shared project cost)	$17,124,900
LERRDS	($2,984,500)
Incidental Real Estate Expenses	($55,000)
WIK Credit	($10,000,000)
Total Non-Federal Cash Contribution	**$4,085,400**

Within the PCA, the sponsor must agree to:

- Provide, without cost to the Federal Government, during the period of construction, all lands, easements, rights-of-way, and utility and facility alterations and relocations required for construction and maintenance of the project, regardless of their value.
- If the value of the items listed above is less than 50 percent of total project costs, the sponsor shall, during the period of construction, make such additional cash payments as are necessary to bring its total contribution in cash and the value of the WIK and LERRD credits, to an amount equal to 50 percent of the total project cost.
- Hold and save the Federal Government free from all damages arising from the construction, operation, maintenance, repair, and rehabilitation of the completed project, except for damages due to the fault or negligence of the Federal Government or its contractors.
- Operate, maintain, repair, and rehabilitate the project upon completion in accordance with regulations or directions prescribed by the Secretary of the Army.
- Accomplish, without cost to the Federal Government, all alterations and relocations of buildings, transportation facilities, storm drains, utilities, and other structures and improvements made necessary due to project construction.

- Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, PL 91-646, approved January 2, 1971, in acquiring lands, easements, and rights-of-way for construction and subsequent operation and maintenance of the project and inform all affected persons of applicable benefits, policies, and procedures in connection with said Act.
- Comply with Section 601 of Title VI of the Civil Rights Act of 1964 (PL 88-352) and Department of Defense Directive 5500.11 issued pursuant thereto and published in Part 300 of Title 32, CFR, in connection with the construction, operation, and maintenance of the project.
- Prior to construction, grant the Federal Government a right to enter, at reasonable times and in a reasonable manner, upon land which the sponsor owns or controls for access to the project, for the purpose of inspection, and, if necessary, for the purpose of completing, operating, maintaining, repairing and rehabilitating the project.

11. CONSTRUCTION RESPONSIBILITIES

The City has purchased specimen trees to be planted as part of the project's landscaping and is responsible for the design and construction of:

- Long Look Gardens (Civic Gardens)
- Riverpoint Trail
- Center Street Bridge
- Combined Sewer Overflow Project
- Des Moines Union Railway Pedestrian Bridge

The project elements to be constructed by the Corps are listed in table 4.

12. COORDINATION

Throughout project development, the District has strived to inform, educate and involve the many groups who may have an interest in the project. This coordination is paramount to assuring all interested parties have the opportunity to be a part of the project development process. The City and Principal Financial Group have conducted Master Planning activities and public forums in coordination with the District to ensure compliance with the Greenbelt Authority and the City's needs.

Close coordination between the District and the City of Des Moines was maintained during the design period. Monthly meetings and weekly telephone conferences were held with the City's Engineering Department and other design team partners such as representatives from Principal Financial Group; Stanley Consultants, Incorporated; Wallace, Roberts and Todd, LLC; Hansen Company; Parks Department; Department of Public Works, the Mayor's office, and several other organizations.

Public review of the EA for the Riverwalk Project was done in compliance with NEPA, and an open house was held in Des Moines on May 24, 2005 to present draft recommendations for the Des Moines and Raccoon Rivers Flood Control Project Feasibility Study. Information about the Des Moines Riverwalk project was also available at the open house.