

BIDDING SCHEDULE NOTES

1. Bidders must register on line at www.mvs.usace.army.mil in order to receive a CD.
2. All quantities shown on the BIDDING SCHEDULE are estimated quantities except when the unit is shown as lump sum "LS".
3. When bids are solicited on a unit price basis, bidders shall insert in the spaces provided therefore in the SCHEDULE both the "unit price" and the "estimated amount" resulting from applying the said unit price to the estimated quantity shown. In event the bidder quotes only a total price ("estimated amount") in its bid and fails to quote the unit price, the Government will determine such unit price by dividing the total price quoted by the quantity of the item set out in the SCHEDULE. The bidder agrees that the unit price so determined shall be used for the purpose of bid evaluation, award and all payments to the Contractor including final payment.
4. All extensions of the unit prices shown will be subject to verification by the Government. In case of variation between the unit price and the extension, the unit price will be considered to be the bid and the extension will be corrected accordingly.
5. If a modification to a bid based on unit prices is submitted, which provides for a lump sum adjustment to the total estimated cost, the application of the lump sum adjustment of each unit price in the bid schedule must be stated. If it is not stated, the bidder agrees that the lump sum adjustment shall be applied on a pro rata basis to every unit price in the bid schedule.
6. Bidders are required to bid on all items listed on the Bidding Schedule in addition to inserting a total quoted bid in the appropriate space provided. Failure to do so will be considered good cause to disqualify the bid.
7. Bidders are encouraged to pay particular attention to the requirements on lab "validation" in Section 01440 of the contract specifications.
8. EVALUATION OF SUBDIVIDED ITEMS (MAR 1995) EFARS 52.211-5000
Item Nos. 0008 thru 0010 are subdivided into two or more estimated quantities and are to be separately priced. The Government will evaluate these items on the basis of total price of their sub-items.
9. VARIATIONS IN ESTIMATED QUANTITIES - SUBDIVIDED ITEMS (MAR 1995) EFARS 52.211-5001
This variation in estimated quantities clause is applicable to Item Nos. 0008 thru 0010.
 - (a) Variation from the estimated quantity in the actual work performed under any second or subsequent subitem or elimination of all work under such a second or subsequent subitem will not be the basis for an adjustment in contract unit price.
 - (b) Where the actual quantity of work performed for Item Nos. 0008 thru 0010 is less than 85 percent of the quantity of the first subitem listed under such item, the Contractor will be paid at the contract unit price for that subitem for the actual quantity of work performed, and, in addition, an equitable adjustment shall be made in accordance with the Contract Clause FAR 52.211-18, Variation in Estimated Quantities.
 - (c) If the actual quantity of work performed under Item Nos. 0008 thru 0010 exceeds 115 percent or is less than 85 percent of the total estimated quantity of the subitem under that item, and/or if the quantity of work performed under the second subitem or any subsequent subitem under Item Nos. 0008 thru 0010 exceeds 115 percent or is less than 85 percent of the estimated quantity of any such subitem, and if such variation causes an increase or a decrease in the time required for performance of this contract, the

contract completion time will be adjusted in accordance with the contract Clause FAR 52.211-18, Variation in Estimated Quantities.

NOTICES

The requirements specified in the documents entitled, "AGREEMENT COVERING THE LEVEE CONSTRUCTION (Item 4B Contract) AT THE MERAMEC RIVER BASIN, VALLEY PARK, MISSOURI, FLOOD CONTROL PROJECT AT VALLEY PARK, ST. LOUIS COUNTY, MISSOURI, THE BURLINGTON NORTHERN AND SANTA FE RAILROAD COMPANY" AND "4B-AGREEMENT COVERING THE LEVEE CONSTRUCTION AT THE MERAMEC RIVER BASIN, VALLEY PARK, MISSOURI, FLOOD PORTECTION PORJECT AT VALLEY PARK, ST. LOUIS COUNTY, MISSOURI, THE UNION PACIFIC RAILROAD COMPANY" BETWEEN THE GOVERNMENT, THE CITY OF VALLEY PARK, AND THE BURLINGTON NORTHERN SANTA FE RAILROAD AND THE UNION PACIFIC RAILROAD, furnished at the end of the specifications, form a part of this document. The contractor is advised to become familiar with this agreement and shall comply with the requirements stated therein.

There is a possibility that public or private utilities will be relocating portions of their installed infrastructure during the duration of this contract. The contractor is obligated to coordinate with these companies prior to commencement of work. Additional information can be found in Section 00800.

SUPPLIES OR SERVICES AND PRICES/COSTS

ITEM NO.	DESCRIPTION	QUANTITY	U/I	UNIT PRICE	AMOUNT
0001	Mobilization and Demobilization	1	Lump Sum	_____	_____
0002	Piezometers	1	Lump Sum	_____	_____
0003	Clearing, Grubbing & Stripping	1	Lump Sum	_____	_____
0004	Removals and Debris Clearing	1	Lump Sum	_____	_____
0005	Impervious Embankment				
0005AA	First 545,000	545,000	Cubic Yard	_____	_____
0005AB	All Over 545,000	100,000	Cubic Yard	_____	_____
0006	Crushed, Recycled Concrete and Engineered Fill				
0006AA	First 120,000	120,000	Cubic Yard	_____	_____
0006AB	All Over 120,000	55,000	Cubic Yard	_____	_____
0007	Scale and Scalehouse	1	Lump Sum	_____	_____
0008	Excav/Disposal of Freon Based Appliances:				
0008AA	First 20 Appliances	20	Each	_____	_____
0008AB	All Over 20 Appliances	20	Each	_____	_____
0009	Excav/Disposal of Tires:				
0009AA	First 200 Tires	200	Each	_____	_____
0009AB	All Over 200 Tires	200	Each	_____	_____
0010	Excav/Disposal of Batteries				
0010AA	First 30 Batteries	30	Each	_____	_____

0010AB	All Over 30 Batteries	30	Each	_____	_____
0011	Riprap, 1000 lb. Topsize	6,000	Net Ton (2,000 LB)	_____	_____
0012	Crushed Stone Bedding Material	2,000	Net Ton (2,000 LB)	_____	_____
0013	Pipe Culverts/Storm Sewers	1	Lump Sum	_____	_____
0014	Care of Water	1	Lump Sum	_____	_____
0015	Aggregate Surfacing Material	5,000	Net Ton	_____	_____
0016	Ramp Entrance Gates	1	Lump Sum	_____	_____
0017	Establishment of Turf	1	Lump Sum	_____	_____
0018	Fishpot Creek Storm Drain and Diversion Structure	1	Lump Sum	_____	_____
0019	Arnold's Landing Gravity Drain	1	Lump Sum	_____	_____
0020	3rd Street Gravity Drain	1	Lump Sum	_____	_____
0021	5th Street Gravity Drain	1	Lump Sum	_____	_____
0022	Outlet Works	1	Lump Sum	_____	_____
0023	Relief Wells	1	Lump Sum	_____	_____
0024	Well Development and Testing	1	Lump Sum	_____	_____
0025	Well Abandonment	4	Each	_____	_____
0026	Graded Stone C	4,500	Net Ton (2,000 LB)	_____	_____

0027	Random Fill	1	Lump Sum	_____	_____
0028	RR Insurance Requirements (See Section 00800)	1	Lump Sum	_____	_____
0029	Floodwall at Meramec Valley Plaza	1	Lump Sum	_____	_____
	TOTAL				_____

00800.4

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SECTION 00800 - SPECIAL CLAUSES

1. REFERENCE DRAWINGS.

a. One set of the reference drawings listed on Drawing No. ME-VP-7/G-1 which cover details of the existing structures, current construction limits, and mandatory borrow areas, will be included in each set of the contract drawings furnished the Contractor without charge, in accordance with Contract Clause DFARS 252.236-7001. Drawings showing additional details are available for examination at the Dept. of the Army, St. Louis District, Corps of Engineers, St. Louis, Missouri. Additional prints of reference drawings will be furnished the Contractor on request at the cost of reproduction.

b. The stationing and dimensions shown on the contract and reference drawings for the existing structure have been taken from the original contract drawings and the shop drawings for the original construction. The Contractor shall verify all the above stationing and dimensions and shall be responsible for making the new material and work fit the existing conditions.

2. PAY REQUESTS. Pay requests authorized in the Contract Clause entitled "Payments Under Fixed-Price Construction Contracts", will be paid pursuant to the clause entitled "Prompt Payment for Construction Contracts". Pay requests shall be submitted on ENG Form 93 and 93a, "Payment Estimate-Contract Performance" and "Continuation", respectively. All information and substantiation required by the identified contract clauses shall be submitted with the ENG Form 93, and the required certification shall be included on the last page of the ENG Form 93a, signed by an authorized official of the Contractor and dated when signed. The designated billing office is the Office of the Area Engineer.

3. PHYSICAL DATA (APR 1984). FAR 52.236-4. Data and information furnished or referred to below is furnished for the Contractor's information. The Government shall not be responsible for any interpretation of or conclusion drawn from the data or information by the Contractor.

a. Physical Conditions. The indications of physical conditions on the drawings and in the specifications are the result of site investigations by surveys and borings. Information regarding these borings and additional information regarding shear, and other test results are available for inspection upon 48 hours notice at the Dept. of the Army, St. Louis District, Corps of Engineers, 1222 Spruce Street, St. Louis, Missouri. The Government has acquired permits pertaining specifically to this contract. After award a copy of each permit will be provided to the Contractor. Following is a partial listing of items acquired by the Government, some of which may be found on the CD-ROM under Additional Information:

(1) Approval of Section 404 authorization for construction of a 3.1 mile flood control levee around the City of Valley Park, St. Louis County, Missouri, St. Louis District, Corps of Engineers, June 30 1992

(2) Missouri Department of Natural Resources letter conditionally approving the beneficial use of solid waste in the Valley Park flood protection project, June 6, 2001

(3) St. Louis County Health Department letter conditionally approving the beneficial use of solid waste in the Valley Park

flood protection project, June 22, 2001.

(4) General State Operating Permit for land disturbance activity, Missouri Department of Natural Resources, Permit Number MO-R109304, May 17, 2002

(5) Extension, Modification and Mitigation of Section 404 Permit for the Valley Park, Missouri Flood Protection Project (P-1844, 199250463, St. Louis District, Corps of Engineers, December 23, 2002

(6) Nationwide Permit Summary, No. 7, Outfall Structures, St. Louis District, Corps of Engineers, December 23, 2002

(7) Section 401 Water Quality Certification, Missouri Department of Natural Resources, P-1844/CES000332, February 27, 2003

(8) Draft Missouri State Operating Permit for the three outfalls that serve relief well areas, Missouri Department of Natural Resources, Permit Number MO-0128791, March 14, 2003

b. Weather Conditions. Information with respect to temperatures and precipitation may be obtained from the National Weather Service.

c. Transportation Facilities. Railroads and highways serve the general area of the work.

d. Datum and Gages. The plane of reference as used in these specifications is the zero stage of the Valley Park, Missouri gage, elevation 392.92 feet NGVD (National Geodetic Vertical Datum). Plotted stage hydrograph information at the Valley Park gage is attached at the end of this Special Clauses section.

4. RIGHT-OF-WAY.

a. Right-of-way for construction purposes will be furnished by the Government without cost to the Contractor. Where right-of-way for access to a work site is not available over existing public roads, access through private lands as shown on the contract drawings will be furnished by the Government without cost to the Contractor. If the right-of-way furnished for access is used, the Contractor will be required at its own expense, to do all work necessary to make such right-of-way suitable for traveling to and from the work site without interrupting the existing drainage. Upon completion of the contract work, any such access roadway and right-of-way furnished by the Government shall be left in a condition satisfactory to the Contracting Officer.

b. The Contractor shall procure without expense to the Government all additional lands, access roads, or right-of-way necessary for its use in the performance of the work. Any agreements or permits with levee boards, counties, or political subdivisions for moving material and equipment will also be the responsibility of the Contractor. Any delays to the Contractor resulting from delays in procuring such additional lands, access roads, right-of-way, or permits for moving material and equipment for its own use will not be made a basis of any claim for increases in the cost of performance of the work. The Contractor shall make its own investigations to determine the conditions, restrictions, and difficulties which may be encountered in the transportation of material and equipment to the work sites shown on the drawings.

5. PUBLIC UTILITIES AND PRIVATE IMPROVEMENTS.

a. Unless otherwise specified, shown on the drawings, or stated in writing by the Contracting Officer, the Contractor shall not move or

disturb any public utilities or private improvements. Such removals, alterations, and/or relocations, where necessary, will be made by others. The locations shown on the drawings for underground utilities are approximate only. The exact locations of such utilities shall be determined by the Contractor in the field prior to commencing construction operations in their vicinity.

b. The attention of the Contractor is directed to the possibility that public utilities or private improvements may be encountered within the construction limits, some of which may be buried, and the existence of which is presently not known. Should any such utilities or improvements be encountered, the Contractor shall immediately notify the Contracting Officer so that a determination may be made as to whether they shall be removed, relocated, or altered. After such determination is made, the Contractor shall, if so directed by the Contracting Officer, remove, relocate, or alter them as required and an equitable adjustment will be made. In the event the Contracting Officer arranges for such removals, alterations, or relocations to be performed by others, the Contractor shall cooperate with such others during the latter's removal, alteration, or relocation operations.

c. The Contractor's attention is directed to the possibility that public or private utilities will be relocating portions of their installed infrastructure during the duration of this contract. The Contractor shall coordinate with these companies. If the Contractor feels that its progress is being delayed by the utility, the Contractor should notify the Contracting Officer's Representative.

6. DAMAGE TO WORK. The responsibility for damage to any part of the permanent work shall be as set forth in the Contract Clause entitled "Permits and Responsibilities." However, if in the judgment of the Contracting Officer any part of the permanent work performed by the Contractor is damaged by flood or earthquake, which damage is not due to the failure of the Contractor to take reasonable precautions or to exercise sound engineering and construction practices in the conduct of the work, the Contractor shall make the repairs as ordered by the Contracting Officer and full compensation for such repairs will be made at the applicable contract unit or lump sum prices as fixed and established in the contract. If in the opinion of the Contracting Officer there are no contract unit or lump sum prices applicable to any part of such work, an equitable adjustment pursuant to the Contract Clause entitled, "Changes," of the contract will be made as full compensation for the repairs of that part of the permanent work for which there are no applicable contract unit or lump sum prices. Except as herein provided, damage to all work (including temporary construction), utilities, materials, equipment, and plant shall be repaired to the satisfaction of the Contracting Officer at the Contractor's expense, regardless of the cause of such damage.

7. LAYOUT OF WORK.

a. The Government will establish the following horizontal and vertical control at the site of the work:

- (1) five intervisible sets of horizontal control points
- (2) five vertical control points

b. From the horizontal and vertical control established by the Government, the Contractor shall complete the layout of the work and shall be responsible for all measurements that may be required for the execution of the

work to the location and limit marks prescribed in the specifications or on the contract drawings, subject to such modifications as the Contracting Officer may require to meet changed conditions or as a result of necessary modifications to the contract work.

c. The Contractor shall furnish at its own expense such items as stakes, templates, platforms, equipment, tools and material, and all labor as may be required in laying out any part of the work from the horizontal and vertical control established by the Government. It shall be the responsibility of the Contractor to maintain and preserve all stakes and other marks established by the Contracting Officer until authorized to remove them, and if such marks are destroyed by the Contractor or through its negligence prior to their authorized removal, they may be replaced by and at the discretion of, the Contracting Officer, and the expense of replacement will be deducted from any amounts due or to become due the Contractor. The Contracting Officer may require that work be suspended at any time when location and limit marks established by the Contractor are not reasonably adequate to permit checking of the work.

8. NOT USED.

9. PARTIAL PAYMENT. At the discretion of the Contracting Officer, partial payment will be made for equipment delivered and stored on site or off site providing such storage is in accordance with the provisions of these specifications and the Contractor furnishes satisfactory evidence that title to such equipment has been acquired and that it will be utilized on the work covered by these specifications. Partial payment is defined as the invoice amount plus shipping costs. If the equipment is stored off site, the Government shall have the right to inspect the equipment.

10. CERTIFICATES OF COMPLIANCE. Any certificates required for demonstrating proof of compliance of materials with specification requirements shall be executed in 3 copies. Each certificate shall include the signature and title of an official authorized to certify in behalf of the manufacturing company and shall contain the name and address of the Contractor, the project name and location, and the quantity and date or dates of shipment or delivery to which the certificates apply. Copies of laboratory test reports submitted with certificates shall contain the name and address of the testing laboratory and the date or dates of the tests to which the report applies. Certification shall not be construed as relieving the Contractor from responsibility for furnishing satisfactory material if, after tests are performed on selected samples, the material is found not to meet the specific requirements.

11. PURCHASE ORDERS. Two copies of all purchase orders for other than stock materials showing the firm names and addresses and list of material shall be furnished to the Contracting Officer or an authorized representative as soon as issued.

12. SAFETY AND HEALTH REQUIREMENTS MANUAL EM 385-1-1. The Safety and Health Requirements Manual EM 385-1-1 forms a part of these specifications. EM 385-1-1 and its changes are available at <http://www.hq.usace.army.mil> (at the HQ homepage, select Safety and Occupational Health). The Contractor shall be responsible for complying with the current edition and all changes posted on the web as of the effective date of this solicitation. EM 385-1-1 is provided on the CD-ROM and the St. Louis District web site for each solicitation, however the Contractor shall be responsible for obtaining any changes to the manual which are available on the above web site.

13. ACCIDENT INVESTIGATIONS AND REPORTING. Refer to EM 385-1-1, Paragraph 01.D. Accidents shall be investigated and reports completed by the immediate supervisor of the employee(s) involved and reported to the Contracting Officer or an authorized representative within one working day after the accident occurs. The accident Investigation report shall be made on ENG Form 3394.

14. ACCIDENT PREVENTION PROGRAM. Refer to Contract Clause FAR 52.236-13 entitled, "Accident Prevention". Within 15 days after receipt of Notice of Award of the contract, and at least 7 days prior to the prework conference, the original and one copy of the Accident Prevention Program shall be submitted to the Contracting Officer for review. The program shall be prepared in the following format:

a. An executed MVS Form 385-33, Administrative Plan.

b. An executed MVS Form 385-359-R, Hazard Analysis.

c. A copy of company policy statement of accident prevention and any other guidance statements normally provided new employees. Each company employee shall be required to sign the company policy statement of accident prevention to verify that all employees have been informed of the safety program, and such signed statements shall be maintained at the project site.

The Contractor shall not commence physical work at the site until the program has been reviewed and found acceptable by the Contracting Officer, or an authorized representative. At the Contracting Officer's discretion, the Contractor may submit its Activity Hazard Analysis only for the first phase of construction provided that it is accompanied by an outline of the remaining phases of construction. All remaining phases shall be submitted and accepted prior to the beginning of work in each phase. Also refer to Section 1 of EM 385-1-1.

15. DAILY INSPECTIONS. The Contractor shall perform daily safety inspections and record them on the forms approved by the Contracting Officer.

Reports of daily inspections shall be maintained at the job site. The reports shall be records of the daily inspections and resulting actions. Each report shall include, as a minimum, the following:

a. Phase(s) of construction underway during the inspection.

b. Locations of areas inspections were made.

c. Results of inspection, including nature of deficiencies observed and corrective actions taken, or to be taken, date, and signature of the person responsible for its contents.

16. ENVIRONMENTAL LITIGATION.

a. If the performance of all or any part of the work is ordered by a court of competent jurisdiction to be suspended, delayed, or interrupted as a result of environmental litigation, as defined below, the Contracting Officer, at the request of the Contractor, shall determine whether the order is due in any part to the acts or omissions of the Contractor or a Subcontractor at any tier not required by the terms of this contract. If it is determined that the order is not due in any part to acts or omissions of the Contractor or a Subcontractor at any tier other than as required by the terms of this contract, such suspension, delay, or interruption shall be

considered as if ordered by the Contracting Officer in the administration of this contract under the terms of the Contract Clause entitled "Suspension of Work".

b. The term "environmental litigation", as used herein, means a lawsuit alleging that the work will have an adverse effect on the environment or that the Government has not duly considered, either substantively or procedurally, the effect of the work on the environment.

17. TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER.

a. This provision specifies the procedure for the determination of time extensions for unusually severe weather in accordance with the Contract Clause entitled, "Default (Fixed-Price Construction)". In order for the Contracting Officer to award a time extension under this clause, the following conditions must be satisfied:

(1) The weather experienced at the project site during the contract period must be found to be unusually severe, that is, more severe than the adverse weather anticipated for the project location during any given month.

(2) The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the Contractor.

b. The following schedule of monthly anticipated adverse weather delays is based on National Oceanic and Atmospheric Administration (NOAA) or similar data for the project location and will constitute the base line for monthly weather time evaluations. The Contractor's progress schedule must reflect these anticipated adverse weather delays in all weather dependent activities.

MONTHLY ANTICIPATED ADVERSE WEATHER DELAY
WORK DAYS BASED ON (5) DAY WORK WEEK

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
(5)	(6)	(8)	(6)	(7)	(8)	(8)	(9)	(6)	(6)	(7)	(7)

c. Upon acknowledgement of the Notice to Proceed (NTP) and continuing throughout the contract, the Contractor shall record on the daily CQC report, the occurrence of adverse weather and resultant impact to normally scheduled work. Actual adverse weather delay days must prevent work on critical activities for 50 percent or more of the Contractor's scheduled work day. The number of actual adverse weather delay days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated in paragraph b, above, the Contracting Officer will convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days, and issue a modification in accordance with the Contract Clause entitled "Default (Fixed Price Construction)".

18. SUBCONTRACTS. In accordance with the Contract Clause entitled "Subcontracts", the Contractor shall, within seven days after the award of any subcontract by the Contractor or a Subcontractor, deliver to the Contracting

Officer two copies of a completed Standard Form 1413. Both copies must contain the original signatures of both parties.

19. REQUIRED INSURANCE - WORK ON A NON-GOVERNMENT INSTALLATION.

a. The Contractor shall, at its own expense, provide and maintain during the entire performance period of this contract at least the kinds and minimum amounts of insurance required in the following schedule:

(1) Workmen's Compensation. Amounts required by applicable jurisdictional statutes.

(2) Employer's Liability Insurance. \$100,000

(3) Comprehensive General Liability Insurance.

Bodily Injury - \$500,000 per occurrence

(4) Comprehensive Automobile Insurance.

Bodily Injury - \$200,000 each person

\$500,000 each accident

Property Damage - \$ 20,000 each accident

And, the Contractor and any subcontractor shall obtain additional insurance naming Simpson Sand and Gravel Company as an additional insured. These insurance requirements shall be obtained prior to commencement of work and maintained during the entire period of performance of this contract while working on property owned by Simpson Sand and Gravel Company. The certificate of insurance shall state that the insurance carrier will give Simpson Sand and Gravel 30 days written notice, of cancellation or changes. These requirements shall contain the following minimum coverage:

(1) General Liability Insurance.

Bodily Injury and Property Damage:
\$2,000,000 per occurrence with
\$4,000,000 aggregate total

(2) Automobile Protective Liability Insurance.

Bodily Injury and Property Damage:
\$2,000,000 per occurrence

b. Within 15 days after receipt of Notice of Award and before commencing work under this contract, the Contractor shall notify the Contracting Officer in writing that the required insurance has been obtained. The policies evidencing required insurance shall contain an endorsement to the effect that any cancellation or any material change adversely affecting the Government's interest shall not be effective (1) for such period as the laws of the State in which this contract is to be performed prescribe, or (2) until 30 days after the insurer or the Contractor gives written notice to the Contracting Officer, whichever period is longer.

c. The Contractor shall insert the substance of this clause, including this paragraph c, in subcontracts under this contract and shall

require subcontractors to provide and maintain the insurance required in paragraph a above. The Contractor shall maintain a copy of all subcontractor's proofs of required insurance, and shall make copies available to the Contracting Officer upon request.

d. Statements of insurance should be submitted to the following address:

Department of the Army
St. Louis District, Corps of Engineers
Central Area Office; CEMVS-CO-CA
301 Riverlands Way
West Alton, Missouri 63386

20. PROTECTION OF MATERIAL AND WORK. The Contractor shall at all times protect and preserve all materials, supplies, and equipment of every description (including property which may be Government-furnished or owned) and all work performed. All reasonable requests of the Contracting Officer to enclose or specially protect such property shall be complied with. If, as determined by the Contracting Officer, material, equipment, supplies, and work performed are not adequately protected by the Contractor, such property may be protected by the Government and the cost thereof may be charged to the Contractor or deducted from any payments due to the Contractor.

21. CONTAMINATION OF WATER. In addition to the requirements set forth in 01130-3.3, Protection of Water Resources, the Contractor shall take positive protective measures to prevent spillage of potential pollutant materials such as fuel, emulsion materials, chemicals etc., from storage containers or equipment, into lakes or tributary waters. Such positive protective measures may include, but not limited to, the following:

(1) A berm enclosure of sufficient capacity to contain such materials.

(2) Security measures to prevent acts of vandalism which could result in spillage of such materials (fences, guards, etc.).

(3) Storage of such materials in an area where the terrain would preclude leakage into lake or tributary waters.

(4) Utilization of secure Government storage areas if the Contracting Officer indicates such space is available. No storage past immediate needs (2 days) without the consent of the Contracting Officer.

The Contractor shall submit its proposals for implementing the above provisions in accordance with 01130-1.5, Environmental Protection Plan.

22. COMMERCIAL WARRANTY. The Contractor agrees that the standard commercial equipment furnished under this contract shall be covered by the most favorable commercial warranties the manufacturer gives to any customer for such equipment, and that the rights and remedies provided herein are in addition to and do not limit any rights afforded to the Government by any other clause of this contract. The Contractor shall furnish two copies of the warranties to the Contracting Officer.

23. ORDER AND COORDINATION OF WORK. The Contractor may start and complete the work in such order and sequence as desired subject to compliance with the following paragraphs:

a. Coordination of Work. It will be the Contractor's responsibility to coordinate its activities to the satisfaction of the various parties and agencies that have an interest in the progress and completion of the work. The Contractor shall notify land owners and businesses a minimum of 30 days in advance of any work being done on temporary construction locations. Among those parties are:

Union Pacific Railroad
James Pratt, Manager of Track Maintenance, St. Louis Office
314-992-2381
314-808-4430 cellular

Burlington Northern Santa Fe
Randy McQueary, Roadmaster
314-768-7030
314-578-4895 cellular

City of Valley Park
David Cusack
314-225-9029 or 314-225-6892

Missouri Department of Transportation
Belinda Niswonger
314-340-4332

Simpson Sand and Gravel Company
Mark Simpson, President
225-4944

Southwestern Bell Telephone
Sherelene Schmidle, Manager - Design
Phone: 636 256-1468

St. Louis County Department of Health
Susan Taylor, Supervisor, Waste Management Branch
314-615-4116

St. Louis County, Department of Highways and Traffic
Tom Newport or Mr. Fred Akers
314-615-8504

Valley Park Fire District
Chief Rick Wilken
636-225-4288

Ameren UE
Christine Grunbaum
314-344-9501

Laclede Gas
Brian Kelly
314-658-5449

MSD
Mike Borgard
314-768-6310 or
Steve Lindhall

314-768-6392

Charter Cable
Steve Gerrein
636-305-3333

Sprint
Brian George
816-329-7055

AT&T
Dick McCord
314-406-2112

Digital Teleport
Charlie Stachowiak
314-880-1880

Level 3 Communication
Tom Debruin
314-242-5603

Missouri-American Water Company
Derek Linam
314-996-2336

Missouri Dept. of Natural Resources
Air Pollution Control Program
Tom Markowski
314-416-2960

b. Upon notice to proceed, the Contractor shall initiate and complete these three items in the order specified:

(1) Before beginning any construction activities, the Contractor shall videotape the existing condition of all roads to be used in the hauling operation. The Contracting Officer's Representative will be present during all videotaping. Representatives of the St. Louis County Highway Department will be present during the videotaping of roads under County maintenance. Representatives of the City of Valley Park will be present when videotaping roads under City maintenance. The Contractor shall also videotape the asphalt drive on the south side of the Meramec Valley Plaza building. Three copies of the tape shall be provided to the representatives present.

(2) The test fill and all associated measurements specified in SECTION 02214 - CRUSHED, RECYCLED CONCRETE AND ENGINEERED FILL MATERIALS shall be completed.

(3) After completion of the test fill, the Contractor shall then complete all work in the Arnolds Landing area from the Union Pacific railroad embankment to the tie-in with Highway 141 including the Fishpot Creek diversion pipeline and the Fishpot Creek Diversion Structure. The requirements for staging the closure-structure gatewell construction (item g in this clause) and for proof rolling recent earthwork completed by another Contractor (item l(2) in this clause) are in effect.

The Contractor may begin other activities at the same time, but these shall not detract from progress on these three items.

c. Contractor shall notify all utilities 24 hours in advance prior to any and all excavation.

d. All public roads used for hauling borrow from the borrow pits and/or engineered fill shall be cleaned on a daily basis.

e. Contractor's operations in the off-site borrow pit located on the Simpson Sand and Gravel property shall be limited to the hours of 6:00 a.m. to 6:00 p.m. CST or CDST Monday through Friday. Contractor's operations in this off-site borrow pit shall not be permitted on Saturday, Sunday or legal holidays.

f. The Contractor shall not operate any heavy equipment before 6:30 a.m. or after 6:30 p.m. CST or CDST, Monday through Friday in any residential area of the City of Valley Park with the exception of the Arnolds Landing area. The Contractor shall not operate any heavy equipment on weekends or holidays in any residential area of the City of Valley Park except by special permit issued by the Director of Community Development, City of Valley Park. Approved weekend work shall not start before 8:00 a.m. nor continue beyond 4:00 p.m. CST or CDST.

g. Construction of the Route 141, 3rd Street or 5th Street gravity drain gatewells shall not proceed above an elevation 12-feet above the base slab of the gravity drain until all construction within a 100-foot radius of the gatewell is complete to this elevation. This includes all items of work associated with the reinforced concrete gravity-drain pipe construction, placement and compaction of pervious backfill, impervious embankment, or engineered fill.

h. All equipment shall enter and exit the project using these existing public roads:

(1) From the intersection of Highway 141 and Vance Road: South on Meramec Station Road to the project site. The Contractor may use River Road between the Arnold Landing area and a point 500-feet east of the Burlington Northern/Santa Fe Railroad Meramec River Bridge. Clearance under the bridge is limited.

(2) From the intersection of Highway 141 and Marshall Avenue: East on Marshall Avenue to the at-grade Burlington Northern/Santa Fe railroad crossing, continue East on Marshall for another 150-feet, turn South across the Burlington Northern/Santa Fe spur line and proceed on the unimproved road to the project.

(3) From the intersection of Highway 141 and Marshall Avenue: East on Marshall Avenue to 3rd Street. Turn south on 3rd Street and proceed to the project.

(4) From the intersection of Highway 141 and Marshall Avenue: East on Marshall Avenue to the project.

(5) The Contractor shall not operate heavy equipment on River Road any farther east than 500-feet east of the Burlington Northern/Santa Fe Meramec River Bridge. The Contractor shall not operate heavy equipment on City of Valley Park streets/avenues or roads north of Marshall

Avenue except to haul borrow from the three on-site mandatory borrow pits. When hauling from the Simpson Lake Borrow Area, the Grand Glaize Borrow Area and the Borrow Area south of Pyramid and east of Pharoah, the Contractor shall leave the borrow pit, and proceed on 9th Street and Pharaoh Avenue to the project. When hauling from the west pit, the Contractor shall leave the borrow pit, and proceed south to Vest Ave then west on Vest Ave. to Becket Memorial Drive then south on Becket Memorial Drive to St. Louis Ave. Continue south on St. Louis Ave. to Marshall Rd., then east on Marshall Rd. to 3rd St. and proceed to the project site.

i. The requirements specified in the document entitled "AGREEMENT COVERING THE LEVEE CONSTRUCTION (Item 4B Contract) AT THE MERAMEC RIVER BASIN, VALLEY PARK, MISSOURI, FLOOD CONTROL PROJECT AT VALLEY PARK, ST. LOUIS COUNTY, MISSOURI, THE BURLINGTON NORTHERN AND SANTA FE RAILWAY COMPANY", between the Government, the City of Valley Park, Missouri, and the Burlington Northern Santa Fe Railroad, furnished at the end of the specifications form a part of the contract requirements. The Contractor shall become familiar with this agreement and shall comply with the requirements stated therein. A complete copy of said agreement will be provided to the Contractor at the Pre-Construction meeting. The attached version of the agreement does not include Exhibit B - CORPS PLANS, but may be viewed in accordance with Special Clause 3.

j. The requirements specified in the document entitled "4B- AGREEMENT COVERING THE LEVEE CONSTRUCTION AT THE MERAMEC RIVER BASIN, VALLEY PARK, MISSOURI, FLOOD PROTECTION PROJECT AT VALLEY PARK, ST. LOUIS COUNTY, MISSOURI, THE UNION PACIFIC RAILROAD COMPANY", between the Government, the City of Valley Park, Missouri, and the Union Pacific Railroad, furnished at the end of the specifications form a part of the contract requirements. The Contractor shall become familiar with this agreement and shall comply with the requirements stated therein. A complete copy of said agreement will be provided to the Contractor at the Pre-Construction meeting. The attached version of the agreement does not include Exhibit A - PLAN AND PROFILE DRAWINGS FOR UNION PACIFIC RAILROAD and Exhibit A1 - RIGHT OF WAY DRAWINGS FOR UNION PACIFIC RAILROAD, but may be viewed in accordance with Special Clause 3.

k. The existing 24-inch diameter, RCP storm drain that crosses the project centerline in the vicinity of project station 38+85 shall remain in service until the Contractor has completed construction of new manholes, pipeline through the existing steel casing under the Burlington Northern railroad embankment, and established drainage from the Meramec Valley Plaza and 141 highway embankment through Detention Area B to the Meramec River.

l. The Contractor shall remain cognizant of four interruptions in the inspection trench that are shown on the drawings. These are located at project station 31+72 to 34+50 (buried phone lines), 38+75 to 40+25 (existing 24-inch diameter, RCP), 87+75 to 88+75 (buried phone line and gas line), 101+90 to 102+50 (concrete encased fiber optics cable). The Contractor shall repair any damage to the buried property at these locations caused by the Contractor's operations to the owners' satisfaction, and at no cost to the government.

(1) The Contractor shall install the new reinforced concrete pipe storm drain under the concrete encased fiber optics cable within station 101+90 and 102+50 using construction techniques that minimize excavation in this vicinity and without disturbing the concrete encased fiber optics cable.

(2) The Contractor shall proof-roll recently completed earthwork over the buried phone lines in the vicinity of project station 32+10. Proof rolling shall consist of 10-passes of the approved sheepsfoot roller over an area that is 10-foot wide and 230-feet long extending between the points 10-feet beyond the landside and riverside levee toes. The Contracting Officer's representative shall determine the exact location of these buried phone lines.

m. The crusher and all supporting equipment specified in SECTION 02214 - CRUSHED, RECYCLED CONCRETE AND ENGINEERED FILL MATERIALS shall be located within the construction limits between project stations 56+00 and 64+00. Location of the crusher, appurtenant equipment and stockpiles shall not hinder construction of the engineered fill section in this vicinity.

n. The test fill specified in SECTION 02214 - CRUSHED, RECYCLED CONCRETE AND ENGINEERED FILL MATERIALS shall be constructed on the project centerline somewhere between project stations 55+50 and 59+50. The test fill shall be built in an area that has been cleared, grubbed and stripped according to the requirements of SECTION 02110 - CLEARING, GRUBBING AND STRIPPING. The test fill location shall be excavated to grade as shown on the drawings and the centerline inspection trench shall have been excavated, inspected and backfilled as per SECTION 02220 - EXCAVATION. If necessary, additional compacted clay shall be added to the grade to ensure that there is at least two-feet of clay below the test fill as required by SECTION 02220 - EXCAVATION.

o. The Contractor shall coordinate train schedules with the Burlington Northern Santa Fe Railroad, determine an appropriate schedule and perform work in order that all concrete within 50 feet of the centerline of the track at the existing railroad closure structure shall be in place a minimum of 6 hours prior to the passing of a train. The Contractor shall coordinate with the railroad 14-days ahead of the desired no-train window.

p. River Stage Limitations. Construction operations may be prevented due to high Meramec River stages. The Contractor shall examine the National Weather Service 3-day forecast to be alerted to possible high river stages and to prepare for preventing damage to already completed work. At high river stages, the Contractor may be directed by the Contracting Officer to perform emergency actions to prevent damage to work-in-place under this contract. The Contracting Officer will determine the extent of the delay to the work due to high river stages and the time fixed for completion of the contract will be extended for the period of the delay in accordance with SECTION 00700, Contract Clause entitled "Default".

q. The Contractor shall complete the earthwork shown on the drawings for the two areas described below within 180 calendar days of notice to proceed. The area at the east edge of the US Cotton Company property, between levee stations 70+00 and 73+00, where two rectangular treatment ponds were located. The area at the south edge of the US Cotton Company parking lot, between levee stations 62+00 and 65+00 around the current process water treatment works. The Contractor shall provide the property owner 30 days advance notice before commencing work in either of these two areas.

r. When installing the Fishpot Creek Bypass pipeline through the Valley Plaza Associates Inc. property at #1 Beckett Plaza, the Contractor shall utilize trench boxes to support the pipe excavation. The Contractor shall open no more than 75-feet of trench at any given time and shall complete all work on that segment (with the exception of final paving) within 7 working

days to limit the impacts on the adjacent businesses. The Contractor shall provide the property owner 30 days advance notice before commencing work in either of these two areas.

s. When installing the 18-inch RCP and the concrete I-wall between levee stations 35+00 and 39+00, the Contractor shall not block a 16-foot wide strip of the delivery lane on the south side of Meramec Valley Plaza. The Contractor shall provide the property owner 30 days advance notice before commencing work on these items.

t. Contractors constructing pipe culverts and storm sewers shall be licensed drain layers in St. Louis County, Missouri. Before beginning work on the pipe culverts and storm sewers, the Contractor shall obtain a construction permit from the Metropolitan St. Louis Sewer District Permit Office, at the address shown below.

METROPOLITAN ST. LOUIS SEWER DISTRICT
2350 MARKET ST.
ST. LOUIS, MO. 63103

u. If necessary, the Contractor can request permission from the Missouri Department of Transportation (MO-DOT) to temporarily close the outer lane in the southbound direction of Highway 141 when constructing the shoring system for the 141 gravity drain excavation. MO-DOT will require the Contractor to devise a traffic control plan that meets the requirements of the Federal MUTCD (Manual for Uniform Traffic Control Devices) guidelines. MO-DOT will also require the Contractor to post a refundable bond before issuing the permit. MO-DOT will determine the value of the bond. The Contractor shall submit his traffic control plan to:

Ms. Belinda Niswonger
Traffic/Permits Section, MO-DOT
14301 South Outer Forty
Chesterfield, MO 63107

When the 141 gravity drain shoring system is in place, the Contractor shall provide and install the necessary barricades in front of the shoring system to provide for the safety of motorists on southbound Highway 141. The Contractor shall provide details of this safety barricade to MO-DOT.

v. The Contractor shall give the City of Valley Park a 30-day advance notice before closing off street access to River Road.

24. AS-BUILT DRAWINGS.

a. "As-Built" Contract Drawings. The Contractor shall maintain a separate set of full-size contract drawings, marked up in red, to indicate as-built conditions. Each as-built contract drawing shall include the Contract Number (DACW43-XX-C-XXXX) associated with the contract. These drawings shall be maintained in a current condition at all times until completion of the work and shall be available for review by Government personnel at all times. All variations from the contract drawings, for whatever reason, including those occasioned by modifications, optional materials, and the required coordination between trades, shall be indicated. These variations shall be shown in the same general detail utilized in the contract drawings. Upon completion of the work, two (2) sets of the marked-up drawings shall be furnished to the Contracting Officer prior to acceptance of the work. The Government will withhold two percent of the total bid price of the items for which as-built

contract drawings have not been submitted.

b. "As-Built" Shop Drawings. Upon completion of items of work, the Contractor shall revise the shop drawings to show "as-built" conditions. The notation "Revised to show 'as-built' conditions" shall be placed in red in the lower right corner of each drawing along with the initials of a responsible company representative. Each as-built shop drawing or catalog cut shall be identified by the Contract Number (DACW43-XX-C-XXXX) associated with the contract, and corresponding transmittal number from ENG Form 4025. "As-built" shop drawings of each Contractor-prepared construction drawing should be prepared as soon as possible after the construction detailed on a given drawing has been completed. After the "as-built" shop drawings have been prepared as described above and within 15 days after the contract completion date, the Contractor shall submit four (4) complete sets of as-built shop drawings, including catalog cuts, to the Contracting Officer. The Government will withhold two percent of the total bid price of the item for which as-built shop drawings have not been submitted.

25. WORK ADJACENT TO RAILROADS. In as much as this contract contemplates work on or about the premises of Union Pacific and Burlington Northern Santa Fe, hereinafter referred to as "the Railroad", the Contractor shall comply with the following:

a. Notify the Railroad, in writing, at least 30 days in advance of commencing work adjacent to or on the Railroad's property and obtain approval as to its methods of construction and operations.

b. All such work shall be fully coordinated with the operations of the Railroad.

c. In performing such work, all established pertinent regulations and requirements of the Interstate Commerce Commission and the Railroad shall be closely adhered to.

d. All work adjacent to or on the Railroad's property shall be performed so as not to interrupt or delay the operation of trains over the tracks in use, or to interfere with communications and signal lines adjacent to said tracks or upon said premises, except under arrangements effected between the Contractor and the Railroad. During the progress of such work, the Contractor shall contact and maintain liaison with such of the Railroad's officers or representatives as shall be designated by the Railroad so as to ascertain the time of passage of trains at the site of the work, and to clear the Railroad's tracks and facilities of men, equipment, and obstructions to permit free flow of railroad traffic.

e. The Contractor shall, at all times during the period of construction, keep the Railroad's tracks and roadbed free of earth, mud, rocks, materials, or debris that might be caused to accumulate thereon during progress of the work.

f. The Contractor shall not store or pile any materials, supplies, or equipment closer than 12 feet to the nearest rail of the Railroad's tracks over which trains are currently being operated.

g. The Contractor shall at all times keep covered any pits or openings near or under the Railroad's tracks over which trains are currently being operated, except during the time required for actual operations in making such pits or openings and performing work therein.

h. No crossing of any track or tracks shall be installed nor any vehicles or equipment operated over or across any tracks or under or within 15 feet of any communication, signal, or power lines of the Railroad without the prior consent of the Superintendent of the Railroad. Temporary track crossings, by agreement with the Superintendent of the Railroad, shall be installed by Railroad forces at the Contractor's expense.

i. The Contractor will comply with the Union Pacific and Burlington Northern Santa Fe railroad agreements, and all exhibits attached to the agreements, reproduced at the back of these specifications.

j. The Railroad may, without expense to the Contractor, maintain a resident engineer and inspectors at all times when work is being performed by the Contractor on or adjacent to the right-of-way of the Railroad and/or construction of new track. When, in the opinion of such engineer or inspector, any work is being performed which may interfere with or endanger Railroad traffic, or whenever any work is being performed within 24 feet of any operating track of the Railroad or any excavation made so that the top of the slope on a 1-1/2V to 1H slope will be within 12 feet of any track, flagmen may be maintained by the Railroad at the Government's expense. Before any such work is performed, the Contractor shall contact the Railroad Company's Superintendent and arrange for such flagmen, who shall be employees of the Railroad Company. Such inspectors, flagmen, and engineer will be employees of the Railroad. The inspectors or engineer shall request the Contracting Officer to stop any work which is being performed when, in their opinion, dangerous conditions have developed or are developing because of such work, provided that said inspector shall specifically inform the Contracting Officer and the Contractor as to the nature of such dangerous conditions. After such stoppage of work, the Contractor shall correct the developed conditions and revise its method of operations as required to meet the inspectors' objections and thereafter proceed with the work in a manner approved by the Railroad and the Contracting Officer.

26. SPECIAL RAILROAD INSURANCE REQUIREMENTS. In addition to the insurance requirements in Special Clause 00800-19, the Contractor, and any subcontractors of the Contractor, shall obtain the insurance described in the Burlington Northern and Santa Fe Railway Company ("BNSF") and Union Pacific Railroad Company ("UP") agreements, and in the exhibits attached to those agreements, all of which are reproduced in the back of these specifications. These insurance requirements shall be obtained prior to commencement of work and maintained during the entire period of performance of this contract while working adjacent to or on property owned by the Railroads.

27 THRU 31. NOT USED.

32. STONE SOURCES.

a. On the basis of information and data available to the Contracting Officer, stone meeting the quality requirements of these specifications has been produced from the sources listed at the end of these Special Clauses.

b. Stone may be furnished from any of the currently listed sources or, at the option of the Contractor, may be furnished from any other source designated by the Contractor and accepted by the Contracting Officer, subject to the conditions hereinafter stated.

c. It is the Contractor's responsibility to determine that the stone source or combination of sources selected are capable of supplying the quantities and gradation needed and at the rate needed to maintain the scheduled progress of the work.

d. After the award of the contract, the Contractor shall designate in writing only one source or one combination of sources from which stone will be furnished. If the Contractor proposes to furnish stone from a source not currently listed, only a single additional source for stone may be designated. Samples for acceptance testing shall be provided as required by SECTION 02270 - STONE PROTECTION. If a source for stone so designated by the Contractor is not accepted for use by the Contracting Officer, the Contractor may not propose other sources but shall furnish the stone from a source listed at no additional cost to the Government.

e. Acceptance of a source of stone is not to be construed as acceptance of all material from that source. The right is reserved to reject materials from certain localized areas, zones, strata, or channels when such materials are unsuitable for stone as determined by the Contracting Officer. Materials produced from a listed or unlisted source shall meet all the requirements of SECTION 02270 - STONE PROTECTION, of the Technical Provisions of these specifications.

33. NOT USED.

34. PARTNERING. In order to most effectively accomplish this contract, the Government is willing to form a cohesive partnership with the Contractor. This partnership would strive to draw on the strengths of each organization in an effort to achieve a quality project done right the first time, within budget, and on schedule. This partnership would be bilateral in make-up and partnership will be totally voluntary. Any cost associated with effectuating this partnership will be agreed to by all parties and will be shared equally with no change in contract price.

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01025.4

SECTION 01025
MEASUREMENT AND PAYMENT

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DIVISION 1 - GENERAL REQUIREMENTS

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No.

1.1 GENERAL
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SECTION 01025
MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 GENERAL. Payment items for the work of this contract for which contract lump sum or unit price payments will be made are listed in SECTION 00010 BIDDING SCHEDULE and are described in paragraph 1.2 below. All costs for items of work which are not specifically mentioned to be included in one of the listed payment items shall be included with the payment item or items most closely associated with the work involved.

1.2 PAYMENT ITEMS.

1.2.1 Mobilization and Demobilization. Payment for mobilization and demobilization as specified in SECTION 00700, will be made at the contract lump sum price for "Mobilization and Demobilization", which price and payment shall constitute full compensation for providing all plant, labor, material, and equipment and performing all operations necessary for project mobilization and demobilization.

1.2.2 Piezometers. Payment for piezometers as specified in SECTION 02010 will be made at the contract lump sum price for "Piezometers ", which price and payment shall constitute full compensation for providing all plant, labor, material and equipment and performing all operations necessary to complete the work as specified and as shown on the drawings.

1.2.3 Clearing, Grubbing, and Stripping. Payment for clearing, grubbing, and stripping as specified in SECTION 02110 will be made at the contract lump sum price for "Clearing, Grubbing, and Stripping", which price and payment shall constitute full compensation for providing all plant, labor, material and equipment and performing all operations necessary to complete the work as specified and as shown on the drawings.

1.2.4 Removals and Debris Clearing. Payment for removals and debris clearing as specified in SECTION 02070 will be made at the contract lump sum price for "Removals and Debris Clearing", which price and payment shall constitute full compensation for providing all plant, labor, material and equipment and performing all operations necessary to complete the work as specified and as shown on the drawings. Payment for removal and disposal of freon-based appliances, tires, batteries or special wastes is included with payment items as described below in paragraphs 1.2.6.2, 1.2.6.3, 1.2.6.4 and 1.2.6.5, respectively.

1.2.5 Impervious Embankment.

1.2.5.1 Measurement. Impervious embankment will be measured for payment by the cubic yard, and quantities will be determined by the average end area method. The basis for the measurement will be cross sections of the areas to be filled taken prior to clearing, grubbing, and stripping operations and the theoretical cross sections or actual cross sections of the embankments constructed within the specified tolerance. Embankments not constructed to design grade and section including allowable tolerance as indicated on the Contractor's compliance survey will not be accepted. Volumes occupied by drainage structures will not be included in measurement of embankment for payment.

1.2.5.2 Payment. Payment for impervious embankment will be made at the applicable contract subdivided item unit price per cubic yard for "Impervious Embankment", which prices and payments shall constitute full compensation for

all plant, labor, material and equipment and performing all operations necessary to complete the work as specified and as shown on the drawings.

1.2.6 Excavation. Except as specified below, excavation work specified in SECTION 02220 will not be measured for payment nor will any separate payment be made for the excavation, hauling and/or stockpiling of topsoil, suitable and unsuitable materials, sand or clay/sand mixtures. All costs in connection therewith will be included in the payment to which the work pertains. Payment for the excavation and removal of unsuitable material from the site will be made at an equitable price as determined by the Contracting Officer's Representative in accordance with the Contract Clause entitled Changes. If the Contractor excavates below the depth directed by the Contracting Officer as specified in SECTION 02220 paragraph 3.2.1.1, the material shall be excavated and removed at the Contractor's expense. No payment will be made for any kind of additional fill or concrete resulting from the over excavation. No separate payment will be made for the maintenance, dust and traffic control of the haul roads; all costs in connection therewith will be included in the payment for work specified in SECTION 02220.

1.2.6.1 Scalehouse. Payment for construction and operation of the scale and scalehouse as specified in SECTION 02220 will be made at the contract lump sum price for "Scale and Scalehouse", which price and payment constitutes full compensation for furnishing, installing, operating and removing the scale, scalehouse and all related work as required.

1.2.6.2 Excavation and Disposal of Freon Based Appliances. Payment for removal and disposal of all freon-based appliances encountered during removals and debris clearing operations as specified in SECTION 02070, will be made at the applicable contract unit price for: "Excav/Disposal of Freon Based Appliances: 'a. First 20 Appliances', and 'b. All Over 20 Appliances'", which prices and payment shall constitute full compensation for excavation and disposal of all freon based appliances.

1.2.6.3 Excavation and Disposal of Tires. Payment for removal and disposal of all tires encountered during removals and debris clearing operations as specified in SECTION 02070, will be made at the applicable contract unit price for: "Excav/Disposal of Tires: 'a. First 200 Tires and 'b. All Over 200 Tires'", which prices and payment shall constitute full compensation for excavation and disposal of all tires.

1.2.6.4 Excavation and Disposal of Batteries. Payment for removal and disposal of all batteries encountered during removals and debris clearing operations as specified in SECTION 02070, will be made at the applicable contract unit price for: "Excav/Disposal of Batteries 'a. First 30 Batteries and 'b. All Over 30 Batteries'", which prices and payment shall constitute full compensation for excavation and disposal of all tires.

1.2.6.5 Excavation and Disposal of Special Wastes. Payment for excavation and disposal of any special wastes, other than batteries, freon-based appliances or tires, encountered during the removal and debris clearing operations as specified in SECTION 02070, will be paid for at an equitable price as determined by the Contracting Officer in accordance with the Contract Clause entitled "Changes".

1.2.7 Stone Material. Payment for stone material as specified in SECTION 02270 will be made at the applicable contract unit price per ton for "Riprap, 1000-Lb. Topsize", "Crushed Stone Bedding Material" and "Graded Stone C", which prices and payments shall constitute full compensation for all costs of furnishing, hauling, handling, placing and maintaining the stone material

as specified. Stone material will be measured for payment by the ton (2,000 lbs.). The weights to be paid for will be determined from certified weight tickets which shall be furnished by the Contractor at no additional cost to the Government. A certified weight ticket shall be defined as each truck being weighed empty, and again when loaded and the ticket, identified by the Contractor's name and the contract number, shall be signed by the approved quarry representative with the statement "Certified Correct". This procedure will be followed for each load hauled. The Contractor shall verify the accuracy and the completeness of each ticket before submitting it the Government. The Contractor shall initial each ticket to reflect verification. Certification stating that the scales used were tested and approved by the local authority shall be furnished by the Contractor.

1.2.8 Pipe Culverts and Storm Sewers. Payment for pipe culverts and storm sewers as specified in SECTION 02513 will be made at the contract lump sum price for "Pipe Culverts/Storm Sewers", which price and payment shall constitute full compensation for providing all plant, labor, materials and equipment and performing all operations necessary to complete the work as specified and as shown on the drawings.

1.2.9 Care of Water. Payment for care of water as specified in SECTION 02530 will be made at the contract lump sum price for "Care of Water", which price and payment shall constitute full compensation for providing all plant, labor, material and equipment and performing all operations necessary for designing, furnishing, installing, testing, operating, maintaining and removing systems to unwater and control surface and storm water in all work areas during construction operations.

1.2.10 Levee Roads and Gates. Subgrade preparation, including geotextile as specified in SECTION 02240, will not be paid for separately, and all costs in connection therewith will be included with payment for the items being constructed on the subgrade as specified in SECTION 02600, as shown on the drawings, and as described in paragraphs 1.2.12.1 and 1.2.12.2 below.

1.2.10.1 Aggregate Surfacing Material. Payment for the aggregate as specified in SECTION 02600 will be made at the contract unit price per ton for "Aggregate Surfacing Material", which price and payment shall constitute full compensation for providing all plant, labor, material and equipment and performing all operations necessary for the hauling, placing and compacting of the aggregate surfacing material, including subgrade preparation. The aggregate will be measured by the ton (2,000 lbs). The weights to be paid for will be determined from certified weight tickets which shall be furnished by the Contractor at no additional cost to the Government. A certified weight ticket shall be defined as each truck being weighed empty, and again when loaded and the ticket, identified by the Contractor's name and the contract number, signed by the approved quarry representative with the statement "certified correct". This procedure will be followed for each load hauled. The Contractor shall verify the accuracy and completeness of each ticket before submitting to the Government. Each ticket shall be initialed to reflect verification. Certification stating that the scales used were tested and approved by the local authority shall be furnished by the Contractor.

1.2.10.2 Ramp Entrance Gates. Payment for the ramp entrance gates as specified in SECTION 02600 will be made at the contract lump sum price for "Ramp Entrance Gates", which price and payment shall constitute full compensation for providing all plant, labor, material and equipment and for performing all operations necessary to complete the work as specified and as shown on the drawings.

1.2.11 Establishment of Turf. Payment for establishment of turf as specified in SECTION 02900 will be made at the contract lump sum price for

"Establishment of Turf", which price and payment shall constitute full compensation for providing all plant, labor, material and equipment and for performing all operations necessary to complete the work as specified and as shown on the drawings.

1.2.12 Fishpot Creek Storm Drain and Diversion Structure. Payment for the Fishpot Creek Storm Drain and Diversion Structure, including payment for **pavement**, pervious material as specified in SECTION 02213, for excavation as specified in SECTION 02220, for steel sheet piling as specified in SECTION 02411, for reinforced concrete gravity drain pipe as specified in SECTION 02520, for geotextile as specified in SECTION 02240, for formwork, joints, reinforcement, and concrete as specified in SECTIONS 03101, 03150, 03210 and 03301, for metal fabrications as specified in SECTION 05500, for plastic fabrications as specified in SECTION 06600, for painting as specified in SECTION 09940, and for sluice gates and gate hoists as specified in SECTION 15100, will be made at the contract lump sum price for "Fishpot Creek Storm Drain and Diversion Structure", which price and payment shall constitute full compensation for providing all plant, labor, material and equipment and for performing all operations necessary to complete the work as specified and as shown on the drawings.

1.2.13 Crushed, Recycled Concrete and Engineered Fill.

1.2.13.1 Measurement. Crushed, recycled concrete and engineered fill will be measured for payment by the cubic yard, and quantities will be determined by the average end area method. The basis for the measurement will be cross sections of the areas to be filled taken prior to clearing, grubbing, and stripping operations and the theoretical cross sections or actual cross sections of the embankments constructed within the specified tolerance. Embankments not constructed to design grade and section including allowable tolerance as indicated on the Contractor's compliance survey will not be accepted. Volumes occupied by drainage structures will not be included in measurement of embankment for payment.

1.2.13.2 Payment. Payment for Crushed, recycled concrete and engineered fill will be made at the applicable contract subdivided item unit price per cubic yard for "Crushed, Recycled Concrete And Engineered Fill", which prices and payments shall constitute full compensation for all plant, labor, material and equipment and performing all operations necessary to complete the work as specified in SECTION 02214 and as shown on the drawings.

1.2.14 Gravity Drains. Payment for all work associated with the gravity drains as specified herein will be made at the contract lump sum price for "Route 141 Gravity Drain", "3rd Street Gravity Drain", and "5th Street Gravity Drain", which price and payment shall constitute full compensation for providing all plant, labor, material and equipment and for performing all operations necessary to complete the work, including pavement if applicable, as specified and as shown on the drawings.

1.2.15 Outlet Works. Well guards will be measured for payment by the completed well guards installed. Payment will be made at the contract lump sum price for "Outlet Works", which price and payment shall constitute full compensation for furnishing, assembling and installing the well guards, including the concrete pads, bollards and attendant hardware, and completing the work as specified in SECTION 02715 and as shown on the drawings.

1.2.16 Relief Wells. Payment for relief wells as specified in SECTION 02715 will be made at the contract lump sum price for "Relief Wells", which price and payment shall constitute full compensation for providing all plant, labor, material and equipment and for performing all operations necessary to

complete the work as specified and as shown on the drawings and shall include mobilization and demobilization, well drilling, well screen, riser pipe and blank pipe, gravel pack materials, cement grout, pumps and all appurtenant equipment.

1.2.17 Well Development and Testing. Continuous rate pumping tests will be measured for payment for each pumping test successfully performed as specified herein, and as otherwise directed by the Contracting Officer. Testing time will not include time required to place and remove testing and pumping equipment. Payment for pumping tests will be made at the contract lump sum price, for "Well Development and Testing", which price and payment shall constitute full compensation for all costs necessary to perform satisfactory pumping tests as specified herein. No payment will be made for pumping tests not successfully completed.

1.2.18 Well Abandonment. Wells ordered abandoned by the Contracting Officer before installation of well screen and riser due to no fault of the Contractor will be paid for at the contract unit price per each for "Well Abandonment", which prices and payments shall constitute full compensation for abandoning the well, based on the actual well depth. Wells ordered abandoned by the Contracting Officer after installation of well screen and riser due to no fault of the Contractor will be paid for at the contract lump sum price for "Relief Wells", and "Well Abandonment" based on the actual number of feet of well screen and riser pipe actually placed. No payment will be made for placement or replacement of temporary drilling casings or repair of damage resulting from Contractor operations.

1.2.19 Random Fill. Payment for random fill as specified in SECTION 02210 will be made at the contract lump sum price for "Random Fill", which price and payment shall constitute full compensation for furnishing all plant, labor, material and equipment and performing all operations necessary to complete the work as specified and as shown on the drawings.

1.2.20 Railroad Insurance Requirements. Payment for costs associated with Special Clause 00800-26 entitled, SPECIAL RAILROAD INSURANCE REQUIREMENTS will be made at the lump sum price for "RR Insurance Requirements".

1.2.21 Floodwall at Meramec Valley Plaza. Payment for all work associated with the floodwall at Meramec Valley Plaza as specified herein will be made at the contract lump sum price for "Floodwall at Meramec Valley Plaza", which price and payment shall constitute full compensation for furnishing all plant, labor, material and equipment and performing all operations necessary to complete the work as specified and as shown on the drawings.

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02220.4

SECTION 02220
EXCAVATION

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SECTION 02220
EXCAVATION

PART 1 - GENERAL

1.1 SCOPE. The work covered by this section consists of furnishing all plant, labor, materials, and equipment, and performing all operations necessary for excavation in the off-site borrow area, required excavations and drainage ditches, removal of unsuitable material from embankment foundations, excavation of inspection trench, on-site stockpiles, structures and all other excavation incidental to the construction of embankments and berms as specified herein or as shown on the drawings. As required by SECTION 02213 - PERVIOUS MATERIAL, the Contractor is required to furnish all pervious material.

1.2 QUALITY CONTROL.

1.2.1 General. The Contractor shall establish and maintain quality control for excavation operations to assure compliance with contract requirements, and maintain records of quality control for all construction operations including but not limited to the following:

- (1) Borrow Areas. Location, limits, allowable depths, drainage, and substitute borrow areas.
- (2) Disposition of Materials. Suitability of materials and waste areas.
- (3) Ditches. Location, grade and cross section.
- (4) Traverses. Locations and dimensions.
- (5) Retaining Dikes. Check elevations and waste water.
- (6) Quantity Surveys. Accuracy and timeliness.
- (7) Weight Tickets. Accuracy and timeliness.

1.2.2 Reporting. A copy of these records and tests, as well as the records of corrective action taken, shall be furnished the Government daily.

1.3 REFERENCES. The following publications, referred to hereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto:

1.3.1 Corps of Engineers Manual (EM).

EM 385-1-1

Safety and Health Requirements Manual

1.4 SUBMITTALS. Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01300 SUBMITTAL PROCEDURES:

1.4.1 Statements. Excavation Plan; GA. Submit complete and detailed descriptions of proposed excavation plan. This plan shall include, but not be limited to, the Contractor's proposed sequence of construction for all excavation; methods and types of equipment to be utilized for all excavation operations; quantity, type and final disposition of stockpiled materials; location and drainage of proposed stockpiles; proposed disposition of all

excavated materials, including items which are anticipated to be disposed of off-site. Excavation plan shall be submitted to the Government not less than 30 days prior to initiating any excavation.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXCAVATION IN OFF-SITE BORROW AREA.

3.1.1 General. All references to the "off-site borrow pit" or "off-site borrow area" in these specifications refer to the Government-furnished borrow area located on the property of the Simpson Sand and Gravel Company. All embankment material shall be obtained from the on-site stockpiles, the required excavations and the Government-furnished off-site borrow pit shown on the drawings. The rights-of-way and earth materials in the off-site borrow area will be furnished without cost to the Contractor, at locations specified herein and/or as shown on the drawings. The off-site borrow area is located within the active quarry operated by Simpson Sand and Gravel Company. This quarry is located on the South side of the Meramec River, approximately 1.5 miles West of the city of Peerless Park, Missouri. Access to the quarry is as follows: West 1.5 miles on the North Service Road of Interstate 44 from the intersection of I-44 and Missouri Highway 141. Turn right into the Simpson Sand and Gravel Company quarry and proceed along the primary haul road (defined below), crossing the Burlington Northern Railroad tracks. Areas 8, 9 and 10 (as shown on Exhibit B-2) are available for borrow in this contract.

3.1.2 Excavation Equipment. All extraction and related work performed by the Contractor shall be done using a hydraulic excavator (scrapers, bulldozers or other bucket machines will not be allowed), sitting on the original field elevation, loading trucks working off the lower elevation where the river run gravel has been completely exposed. The contractor may elect to enter into an agreement with the Simpson Sand and Gravel Company to excavate the borrow material and load it into the contractor's trucks."

3.1.3 Haul Roads. During construction the Contractor shall provide access and temporary relocated roads as necessary to maintain traffic. The Contractor shall maintain and protect traffic on all affected roads during the construction period as specified herein and as directed by the Contracting Officer. Measures for the protection and diversion of traffic, including the provision of watchmen and flagmen, erection of barricades, placing of lights around and in front of equipment and the work, and the erection and maintenance of adequate warning, danger, and direction signs, shall be as required by the State and local authorities having jurisdiction. The traveling public shall be protected from damage to person and property. The Contractor's traffic on roads selected for hauling material to and from the site shall interfere as little as possible with public traffic. The Contractor shall investigate the adequacy of existing roads and the allowable load limit on these roads. The Contractor shall be responsible for the repair of any damage to roads caused by construction operations.

3.1.3.1 Primary and Secondary Haul Roads at Off-site Borrow Area. The locations of the Primary and Secondary Haul Roads are shown on Exhibits 'C' and 'D' located at the end of this section. The primary haul road crosses the Burlington Northern Railroad at grade and is subject to intermittent blockages by trains. When the primary haul road is blocked by the railroad, the Contractor shall use the secondary haul road. The Contractor shall share the use of the Primary and Secondary Haul Roads with the Simpson Sand and Gravel Company and its customers. The contractor's use of these roads shall not unreasonably nor materially interfere with the current ongoing quarry operations. The Contracting Officer may direct the Contractor to use only the

secondary haul roads. Such direction will be done with 3-day notice. The secondary haul road shall not be used for three days following a Williams Creek flood event to elevation 408 (approximate elevation of the secondary haul road at Williams Creek).

3.1.3.2 Maintenance of Haul Roads at Off-Site Borrow Area. All haul roads constructed and/or maintained by the Contractor shall be constructed and maintained with Meramec-based sand and gravel which may be left in place at the end of the project. Haul roads shall be graded and otherwise maintained to keep the surface free from potholes, ruts, and similar conditions that could result in unsafe operation.

3.1.3.3 Traffic Control at Off-Site Borrow Area. The Contractor shall be responsible for traffic control necessitated by its operations in the Simpson Sand and Gravel property. The Contractor shall make all reasonable efforts to minimize any interference with the Simpson Sand and Gravel Company's on-going daily business operations. The Contractor shall hire a crossing guard who shall be present at the at-grade crossing during all hours of excavation. The Contractor shall hire a crossing guard who shall control traffic on the Secondary Haul Road where the road crosses under the Burlington Railroad trestle. This guard shall be present at the trestle whenever the Secondary Haul Road is in use.

3.1.3.4 Dust Control at Off-Site Borrow Area. The Contractor shall be responsible for dust control which includes cleaning the Primary and Secondary Haul Roads of excess dirt. Dust abatement shall permit observation of objects on the roadway at a minimum distance of 300 feet. When hauling borrow from the off-site borrow pit, all loads shall be covered.

3.1.3.5 Other Haul Roads. Other existing haul roads used by the Contractor which are not specifically mentioned here shall be maintained on an as-needed basis during their use in accordance with paragraph 3.1.3.2.

3.1.3.6 Barricades. The Contractor shall erect and maintain temporary barricades to limit public access to hazardous areas. Such barricades shall be required whenever safe public access to paved areas such as roads, parking areas or sidewalks is prevented by construction activities or as otherwise necessary to ensure the safety of both pedestrian and vehicular traffic. Barricades shall be securely placed, clearly visible with adequate illumination to provide sufficient visual warning of the hazard during both day and night.

3.1.4 Scalehouse. The Contractor shall provide a scale and scalehouse near the location designated on Exhibit 'D', and one or more employees to weigh the trucks and record the weights. Every truck leaving the off-site borrow area which is loaded with borrow material shall be weighed. The Contractor may elect to enter into an agreement with the Simpson Sand and Gravel Company to use the existing Simpson scalehouse operation to weigh the Contractor's trucks as they leave the offsite borrow pit. All weight tickets shall be delivered to the Contracting Officer daily with a daily summary total sheet. The Contracting Officer, accompanied by representative of the Simpson Sand and Gravel Company may inspect and audit the weighing process. These weight tickets will not be used as measurement for payment purposes.

3.1.5 Excavation Sequence in Off-Site Borrow Area. The Contractor shall follow the sequence of extraction set forth on Exhibit 'B' located at the end of this section. Each area shall be completely excavated before the Contractor moves onto the next area. Each area shall be excavated in the direction shown on the Exhibit B-1. To conserve arable land and make optimum use of available borrow, the excavation of the borrow areas shall be made continuous throughout the length of the borrow areas to the permissible borrow

depths, in such manner that all suitable available material within the required width shall be utilized.

3.1.6 Depth of Excavations in Off-Site Borrow Area.

3.1.6.1 General. The Contractor shall excavate all earth to a depth at which the underlying river run gravel is completely exposed before moving on to the next area. Based on observed conditions in the ongoing Simpson Sand and Gravel quarry excavations, the average thickness of the topsoil is 2-feet, the average thickness of useable clay is 13-feet, and the average thickness of clay/sand mixes is 2-feet. The approximate areas of areas 8 through 10 delineated on Exhibit B-2 are 8 acres each.

3.1.6.2 Topsoil Excavation. The Contractor shall excavate the top 2 feet of material from the borrow area and haul it to one of the "Stockpile Area for Topsoil" designated on Exhibit 'F' located at the end of this section. All topsoil shall be stockpiled when it is in its normal dry condition. All topsoil shall remain the property of the Simpson Sand and Gravel Company.

3.1.6.3 Clay/Sand Mixture Excavation. When the Contractor reaches the depth where there is a mixture of clay and sand, the Contractor shall use its best efforts to separate the clays and sands thereby minimizing the amount of unusable clay/sand mixture. The excavation of clay/sand mixtures more than 1-foot thick will be deemed unacceptable. The Contractor shall cease operations until the excavation procedures are corrected.

3.1.6.3.1 Suitable Material Stockpiling. All materials which the Contractor separates from this mixture which are suitable for incorporation in the embankment, or other fills shall either be placed directly therein, or stockpiled and subsequently used in the embankment or other fills. All sands which the Contractor separates from this mixture shall be stockpiled in one of the designated "Stockpile Area for Sand" shown on Exhibit 'G' located at the end of this section. The Contractor shall stockpile any remaining clay/sand mixture in one of the "Stockpile Area for Clay/Sand Mixture" as shown on Exhibit 'H'. All sand and clay/sand mixture which is stockpiled in the areas described above shall remain the property of the Simpson Sand and Gravel Company.

3.1.6.3.2 Unsuitable Material Stockpiling. Any excavated material other than suitable material, sand or clay/sand mixture shall be stockpiled in one of the "Stockpile Areas for Unusable Dirt" as shown on Exhibit 'H'.

3.1.6.3.3 Other Areas. The Contracting Officer may direct the Contractor to use the other of the aforementioned areas by giving the Contractor three (3) days prior notice.

3.1.7 Disposition of Materials in Off-Site Borrow Area. Four inspection trenches have been excavated in the off-site borrow area and one representative soil sample was obtained from each inspection trench. The natural moisture content, Atterberg Limits, and Standard Proctor compaction curves were determined for each sample. These results are included as Exhibits 'A-1' through 'A-9' at the end of this section. The Corps of Engineers has compaction records for this material from previous contracts. Contractors wishing to review these records should refer to SECTION 00800, SPECIAL CLAUSES, paragraph 3.

3.1.8 Drainage of Off-Site Borrow Area. The off-site borrow area shall be drained and kept dry during excavation, as excavation will not be permitted in water nor shall excavated material be scraped, dragged or otherwise moved through water. Drainage of borrow areas shall be accomplished by ditching,

sump pumping, or other approved methods. The borrow areas excavated under this contract and flooded from rains or high river stages shall be drained and allowed to dry as quickly as practicable after the high river stage has passed.

3.1.9 Contractor Furnished Borrow. If the Contractor elects to use Contractor furnished borrow as specified in paragraph 3.3, then the items specified in paragraph 3.1 do not apply.

3.2 EXCAVATION IN OTHER AREAS.

3.2.1 General. Excavation in other areas shall consist of required excavations of material in preparing the embankment foundations to the lines and grades shown on the drawings, removal of materials from ditches and channels, excavations for structures, inspection trench excavation, and removal of unsuitable materials as defined in SECTION 02210-3.2.

3.2.1.1 Depth of Excavations in Other Areas. Excavation below the lines and grades specified or the depth directed shall be backfilled by the Contractor at no additional cost to the Government. Such backfill shall be brought to grade with suitable material with each layer placed and compacted as specified in SECTION 02210-3.2.

3.2.1.2 Suitable Materials. Soil borings have been taken in the vicinity of the required excavations. The locations and logs of these borings are shown on the drawings. The natural moisture content, Atterberg Limits, and Standard Proctor maximum dry density and optimum water content for selected samples are shown on the boring logs. Excavated materials which are suitable for incorporation in the embankment, or other fills shall either be placed directly therein, or stockpiled and subsequently used in the embankment or other fills.

3.2.1.3 Unsuitable Materials. Materials from required excavation which, as defined in SECTION 02210-2.2.1, are unsuitable for embankment or fill material will be ordered wasted and shall be properly disposed of off-site. Where possible, the excavation of unsuitable materials in required excavations shall be minimized. Whenever unsuitable foundation material is encountered, the unsuitable material shall be removed to the depth directed by the Contracting Officer. Care shall be exercised by the Contractor in excavating to the lines and grades shown and in removing unsuitable materials so as not to excavate below the grades specified or depth directed.

3.2.1.4 Stockpiles.

(1) When necessary, the Contractor shall stockpile suitable excavated materials. Stockpiles shall not exceed 15 feet in height and slopes shall not be steeper than 1V on 2H. The toe of the stockpiled material shall be at least 50 feet from top of any excavated slope or the natural bank of any ditch or stream.

(2) There are two on-site mandatory stockpiles that shall be completely excavated and utilized before proceeding to the off-site borrow pit. The location of these stockpiles is shown on the drawings. Mandatory stockpile #1 is located immediately landside of the completed levee near project station 165+00. Mandatory stockpile #2 is located immediately landside of the completed levee in the far northeast corner of the project near project station 112+00. The Contractor shall take care to excavate the stockpiles to the lines and grades shown on the drawings. The Corps of Engineers has compaction records for this material from previous contracts. Contractors wishing to review these records should refer to SECTION 00800, SPECIAL CLAUSES, paragraph 3.

3.2.1.5 Temporary Slopes. Temporary excavated earth slopes shall not be steeper than 1V on 1.5H or steeper than the slopes shown on the drawings unless the excavation is shored. All excavation shall be done when no standing water is present.

3.2.2 Inspection Trench.

3.2.2.1. An inspection trench of dimensions shown on the drawings shall be excavated in the embankment foundation at the locations shown on the drawings. The trench shall be completed at least 200 feet in advance of embankment construction. If the Contractor encounters any buried utilities in the inspection trench that are not shown on the drawings, the provisions of paragraph 5 in SECTION 00800 will prevail. Buried utilities which can be abandoned in-place shall be neatly cut off at both sides of the inspection trench and grouted shut to the points 5-feet beyond the landside and riverside levee toes.

3.2.2.2. The Contractor is forewarned of four interruptions in the inspection trench that are shown on the drawings and listed in SECTION 00800 - SPECIAL CLAUSES, paragraph 23.1. The Contractor shall repair any damage to the buried property at these locations caused by the Contractor's operations to the owners' satisfaction, and at no cost to the government.

3.2.2.3. When the inspection trench excavation is complete, the Contracting Officer's representative will examine the foundation stratigraphy in the side walls of the inspection trench to determine if there is at least two-feet of in-situ clay remaining at the surface. If not, the Contractor shall place and compact the necessary thickness of impervious fill across the entire levee foot print (riverside to landside) at those stations where the inspection trench does not show two-feet of in-situ clay.

3.2.3 Drainage Ditches.

3.2.3.1 General. Drainage ditches shall be excavated to the cross sections, lines, and grades shown on the drawings. Excavated materials which are suitable for incorporation in the embankment, or other fills shall either be placed directly therein, or stockpiled and subsequently used in the embankment or other fills. Any excess material or material unsuitable for use in the embankment shall be properly disposed of off site.

3.2.3.2 Additional Excavation. Prior to the acceptance of the work, the Contracting Officer may require additional excavation of sediments from channels and ditches as necessary to restore them to grade and section and require other ditching which can be performed without unreasonable difficulty by the equipment on the job. Suitable material excavated from such ditching may, at the option of the Contractor, be used in the embankment or properly disposed of off site. Additional ditching work will be paid for by an equitable adjustment to the contract price.

3.2.4 Excavation for Structures.

3.2.4.1 General. Excavation for structures shall be performed as necessary to permit construction of the structures and work incidental thereto, to the lines, dimensions, and elevations shown on the drawings. Excavation shall extend a sufficient distance from walls and footings to allow for placement and removal of shoring and forms (except where the concrete for walls and footings is authorized to be deposited directly against excavated surfaces), performance of all work in the excavations, and inspection.

3.2.4.2 Inspection. After completion of excavation, and prior to

construction of the structures, the Contracting Officer will inspect the excavation to insure that suitable foundations or depths have been established. The Contractor shall not excavate below the depths indicated on the drawings unless otherwise specified or directed by the Contracting Officer. Where the excavation is made below the prescribed elevation, the excavation shall be restored to the proper elevation with densified pervious material or the depths of the walls or footings shall be increased as directed by the Contracting Officer. Where excavation is made below the prescribed depths through the fault of the Contractor, the additional backfill or concrete required shall be at no additional expense to the Government.

3.2.4.3 Shoring. Shoring shall be constructed when and where required by, and in accordance with the provisions of EM 385-1-1, for the protection of the work, existing structures, and for the safety of the personnel. The Contractor shall design, furnish and install sheet piling, cribbing, bulkheads, bracing, shores or whatever means that may be necessary to support earthen material carrying structures and other improvements, and shall maintain such piling, cribbing, bulkheads, bracing, shores in position until they are no longer needed. All shoring rendered unnecessary by the placement of backfill shall be removed as the backfilling progresses so that the backfill is placed directly against the undisturbed excavation face. Shoring deemed necessary by the Contracting Officer shall remain in place during the backfill operations. Shoring removal shall be performed in such a manner as not to disturb or damage the completed work or any adjacent property. The Contractor shall submit, for review, his design of shoring for the locations marked on the drawings as requiring shoring. All shoring shall be designed so that it is effective to the bottom of the excavation, and shall be based upon calculation of pressures exerted by the earthen materials to be retained, including the condition and nature of those materials as well as any surcharge loads imparted to the excavation by slopes, equipment, traffic, or stored materials. A Registered Professional Engineer, registered in the State of Missouri, shall seal the shoring design. If any problems are encountered during excavation, the Contractor shall stop his excavation operation and notify the Contracting Officer.

3.2.4.4 Gravity Drain - Route 141. All excavation for the new manhole, 54-inch reinforced concrete pipe and gatewell associated with the Gravity Drain - Route 141 as shown on drawing C-17 shall be completed using shoring as described in paragraph 3.2.4.3. This shored excavation shall, at a minimum, extend from the new manhole at station 0+00 to the south edge of River Road at station 2+25. If necessary, this shored excavation shall be wide enough to accommodate the contractor's storm water control methods for the existing Missouri Department of Transportation, 48-inch diameter storm drain.

3.2.4.5 Embankment Monitoring - Route 141. The contractor shall establish five survey points along the West edge of the highway 141 pavement immediately adjacent to the shored excavation for the new manhole, 54-inch reinforced concrete pipe and gatewell associated with the Gravity Drain - Route 141. These survey points shall be approximately 30-feet apart and shall be appropriate for monitoring vertical and horizontal movements. The contractor shall monitor these five survey points three times daily during installation of the shoring system. If any of the survey points show more than 0.5-inch of pavement movement, either vertically or horizontally, the contractor shall modify the installation of the shoring system to arrest this movement. After the shoring system is installed, the contractor shall monitor these five survey points daily for the first month and weekly after that for the duration that the shoring system is in place. If any of the survey points show more than 0.50 inch of movement, either vertically or horizontally, the contractor shall immediately modify the shoring system to arrest this movement. The contractor shall also inspect the embankment in the

vicinity of the shoring system, looking for signs of distress that indicate movement of the earth mass held in place by the shoring system. The contractor shall make the necessary changes/improvements to the shoring system to arrest any embankment distress.

3.2.5 Excavations for Pipe Culverts and Storm Sewers. Excavation for pipe culverts and storm sewers shall in accordance with SECTION 02513.

3.2.6 Excavation of Glass Plant Ruins.

3.2.6.1 General. The crumbling concrete and brick ruins of the former St. Louis Glass Company exist between project stations 59+00 and 70+00. This plant was built and operated in the early 1900's and was subsequently flooded and burned before closing. Recent testing performed by the Corps of Engineers shows slightly elevated levels of beryllium, benzo(a)pyrene, arsenic and lead in the soils and concrete foundations of the glass plant ruins. The samples are non-hazardous according to the limits set by the United States Environmental Protection Agency and do not reveal any immediate threat to public safety

3.2.6.2 Excavation and Removal. The concrete and brick ruins shall be removed to the lines and grades shown on the drawings. All embedded metals shall be removed from the ruins and properly disposed of off-site. The excavated concrete and brick shall be crushed, blended, placed and compacted per the requirements of SECTION 02214 - CRUSHED, RECYCLED CONCRETE AND ENGINEERED FILL.

3.2.6.3. Dust Control. During the excavation of the glass plant ruins, the Contractor shall provide dust control measures as per SECTION - 01130 ENVIRONMENTAL PROTECTION. The contractor shall cover all loads when hauling excavated glass plant ruins.

3.2.6.4. Control of Water. The Contractor shall minimize surface runoff from entering the glass plant excavation. The Contractor shall cover the active face of the glass plant excavation at the end of each workday or as necessary to prevent direct contact with rainfall. Water that does collect in the excavated area shall be used as spray to control dust at the crushing operation. When disposing of the surface runoff, he must verify that it meets all local and state water quality standards before releasing it.

3.2.7 Excavation of Gypsum Waste Products.

3.2.7.1 General. Between 1918 and 1963, by-products of cotton scouring and bleaching, typical processes used in the cotton industry, were stored in holding ponds located behind the building formerly owned and operated by the Absorbant Cotton Company, between project stations 58+00 and 67+00. Studies of the residual material found during exploration show that the material is similar to gypsum and creates no health concern.

3.2.7.2 Excavation and Removal. The gypsum material within detention area c shall be removed. The excavated gypsum materials shall be thoroughly mixed with crushed concrete and brick material and placed in the embankment per SECTION 02214 - CRUSHED, RECYCLED CONCRETE AND ENGINEERED FILL and as shown on the drawings.

3.2.7.3. Dust Control. During the excavation of the gypsum materials, the Contractor shall provide dust control measures as per SECTION - 01130 ENVIRONMENTAL PROTECTION. The contractor shall cover all loads when hauling excavated gypsum waste products.

3.2.7.4. Control of Water. The Contractor shall prevent surface runoff from entering the gypsum material excavation. Water that does collect in the excavated area shall be used as spray to control dust at the crushing operation. If the Contractor wished to dispose of the surface runoff, he must verify that it meets all local and state water quality standards before releasing it.

3.2.8. Excavation in Mandatory Stockpiles. The Contractor shall plan to use all of the available material located in two mandatory stockpiles. The stockpile locations are shown on drawings C-35 and C-36. All borrow material shall be excavated from these two mandatory stockpiles to the lines and grades shown on the drawings.

3.2.9. Chemical Testing of Soil.

3.2.9.1. General. The Contractor shall be required to obtain soil samples and test those samples for RCRA metals in the area bounded by project station 51+50 (on the West); Station 68+00 (on the East); the North edges of detention areas B and C; and the landside levee toe or the northern edge of the excavation to elevation 407 (as shown on drawing C-12).

3.2.9.2 Sampling and Testing. When the Contractor completes the excavation of the detention areas B and C to within 1-foot of the lines and grades shown on the drawings, he shall obtain representative soil samples to a depth of 3-feet at a minimum of 10 sites within the area described above. These samples shall be tested for RCRA metals according to SECTION 01130 - ENVIRONMENTAL PROTECTION, paragraph 1.5.6. If these results are lower than the regulatory limits for RCRA metals, then the Contractor shall excavate this area to the lines and grades shown on the drawings.

3.2.9.3 Required Overexcavation. If the contaminant level in the sample results exceed regulatory limits, the Contractor shall over-excavate the area two feet below the lines and grades shown on the drawings, and backfill this over-excavation with compacted impervious fill from the approved borrow sites. The Contractor shall not add any contingencies to his bid price for this work, rather a suitable adjustment will be made to the contract price and schedule if the need for the over-excavation arises. At the time of this work, the Contracting Officer's Representative will decide if the excavation material can be properly used on-site. If not, the Contractor shall dispose of it off-site.

3.2.10 Hazardous or Special Wastes. If the Contractor encounters any buried materials or objects that may classify as hazardous during these excavations, he shall immediately cease working in the area where the waste or object was uncovered and notify the Contracting Officer's Representative.

3.2.11 Excavation of Cinders and Slag.

3.2.11.1. The piles of cinders, slag and broken glass that exist on the ground surface surrounding the Glass Plant ruins are remnants of the coal-fired furnaces that once operated in the Glass Plant.

3.2.11.2 Excavation and Removal. The cinders, slag and broken glass shall be removed to the lines and grades shown on the drawings. This cinders, slag and glass shall be excavated and blended with the crushed concrete and Absorbant Cotton by-products as specified in SECTION 02214 - CRUSHED, RECYCLED CONCRETE AND ENGINEERED FILL.

3.2.11.3. Dust Control. During the excavation of the cinders, slag and

broken glass, the Contractor shall provide dust control measures as per SECTION - 01130 ENVIRONMENTAL PROTECTION. The contractor shall cover all loads when hauling excavated cinders, slag and broken glass.

3.2.11.4. Control of Water. The Contractor shall prevent surface runoff from entering the cinders, slag and broken glass excavation. Water that does collect in the excavated area shall be used as spray to control dust at the crushing operation. If the Contractor wished to dispose of the surface runoff, he must verify that it meets all local and state water quality standards before releasing it.

3.2.12. Excavation of Highway 141 Rock Fill Blanket. MO-DOT construction drawings for the Highway 141 Meramec River bridge show a 3-foot thick Type 2 Rock Blanket underlain by 4-feet of additional rockfill at the surface of the abutment. The contractor shall excavate this material within the plan limits shown on drawing C-2. The excavated Type 2 rock blanket shall be stockpiled for future use. Once the levee is completed, the stockpiled Type 2 rock blanket shall be placed on the riverside slopes of the levee immediately adjacent to the similar rock blanket material existent under the bridge. The excavated rockfill can be used as random fills.

-- END OF SECTION 02220 --

SECTION 02513
PIPE CULVERTS AND STORM SEWER CONSTRUCTION

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SECTION 02513
PIPE CULVERTS AND STORM SEWER CONSTRUCTION

PART 1 - GENERAL

1.1 SCOPE. The work consist of furnishing all material, labor, tools, equipment and supervision necessary for the construction of the pipe culverts, storm sewers and appurtenances as specified herein and as shown on the drawings.

1.2 QUALITY CONTROL. The Contractor shall establish and maintain quality control for all operations to assure compliance with contract requirements and maintain records of quality control for all construction operations, including but not limited to the following:

- (1) Preparation of pipe foundation and bedding (line, grade and compaction).
- (2) Portland cement concrete (forms, mixing, placing and finishing).
- (3) Reinforced concrete pipe culverts and storm sewers (material, line, grade and installation).
- (4) Inlets and manholes for Storm Sewers (material, line, grade and installation).
- (5) Pipe covering and backfilling of trench excavation for Storm Sewers.
- (6) The Contractor shall be responsible for ensuring that all required testing and any additional testing required by the Contracting Officer is performed. All testing shall be performed by a commercial testing laboratory which performs soil testing and which has been certified by the Corps of Engineers.
- (7) Material certifications by appropriate governing authority.

1.2.1 Reporting. A copy of these records and tests, as well as the records of corrective action taken, shall be furnished to the Government daily.

1.2.2 Testing By The Government. During the life of this contract, the Government will perform quality assurance tests to check the Contractor's work for compliance with these specifications. The performance of such tests may temporarily delay the Contractor and shall not be the basis of additional compensation and/or time.

1.3 REFERENCES. The following publications of the current issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the reference thereto.

1.3.1 American Society for Testing and Materials (ASTM).

C 76-90	Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
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1.3.2 Metropolitan St. Louis Sewer District (MSD) Standards. References to Sections and Articles pertaining to storm sewers and appurtenances are to the 2000 edition of MSD's "Standard Construction Specifications for Sewers and Drainage Facilities" unless otherwise specified. The term "Engineer" as used in the edition specified above shall be interpreted to mean "Contracting Officer". The Metropolitan St. Louis Sewer District (MSD) "Standard Construction Specifications for Sewers and Drainage Facilities", dated 2000 shall govern the construction of the proposed work.

The MSD Standard Construction Details attached at the end this section shall be considered as a part of the Drawings included in the Contract Documents for this work. The MSD Specifications supplement these specifications and in case of conflict this specification shall take precedence and govern.

Contractors constructing pipe culverts and storm sewers shall be licensed drain layers in St. Louis County, Missouri. Before beginning work on the pipe culverts and storm sewers, the Contractor shall obtain a construction permit from the Metropolitan St. Louis Sewer District Permit Office, at the address shown below.

METROPOLITAN ST. LOUIS SEWER DISTRICT
2350 MARKET ST.
ST. LOUIS, MO. 63103

1.3.3 Missouri Department of Transportation (MO DOT).

MO DOT MO DOT Standard Drawings - Latest Edition

1.4 SUBMITTALS. Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01300 SUBMITTAL PROCEDURES:

1.4.1 Certificates. Pipe and Appurtenances; GA. Submit the manufacturer's certificate of conformance stating that the pipe and appurtenances meets or exceeds all requirements of this and referenced specifications.

1.5 SITE CONDITIONS. Underground facilities, structures, and utilities have been plotted from available records. Therefore, the relationship between proposed work and existing facilities, structures and utilities must be considered approximate and it is the Contractor's responsibility to determine their exact location and the existence of any not shown. (All utilities shall be located both horizontally and vertically to verify clearance/cover of any proposed grading, sewers, footings, etc. prior to construction, utility company representatives shall be on site during such times that excavation is taking place in the vicinity of their facilities.)

1.6 TESTING. Air Tests of the completed installation will not be required. Visual inspection of the work in progress and shortly after completion will be the acknowledgement of field approval as stated in MSD Specifications Part 1, Section "G". The final acceptance of the work will be the responsibility of the Contracting Officer.

PART 2 - PRODUCTS

2.1 MATERIALS.

2.1.1 Pipe, Inlets, and Manholes.

2.1.1.1 Reinforced Concrete Pipe shall be a minimum Class III, wall thickness "B", unless noted otherwise, conforming to ASTM C 76 and these specifications. A pipe of a higher class may be used at no additional cost to the Government. The type of pipe shall not be changed throughout the length of any individual pipe culvert.

2.1.1.2 Pipe Joints shall be bell and spigot with rubber gasket unless otherwise noted.

2.1.1.3 Precast Flared End Sections shall be purchased from the same manufacturer as that for the reinforced concrete pipe to ensure compatibility with pipe. The section shall be manufactured per MODOT Standard Drawing No. 732.00M "Flared End Section Pre-Cast Concrete".

2.1.1.4 Manholes shall be precast reinforced concrete manholes conforming to the standard specifications for precast reinforced concrete manhole sections, ASTM-C478 and the approved Metropolitan Sewer District Standard Details of Sewer Construction.

2.1.2 Bedding and Backfill.

2.1.2.1 Pipe Bedding material shall be MSD-1 or MSD-2 as determined by pipe diameter in accordance to MSD Specification Part 2, Section K. The pipe bedding operation shall be in accordance with MSD Specification Part 4, Section "C", designated Class "C" bedding.

2.1.2.2 Backfill shall be in accordance with MSD Specification Part 4, Section "H". The granular backfill shall be used under roadway structures as shown on the plans or as designated by the Contracting Officer.

2.1.3 Repairs and Replacement of Existing Pavements, Wearing Surfaces, Sidewalks and Driveways, Curbs, and Gutter. Materials used in the repairs of existing pavements, wearing surfaces, sidewalks and driveways, curbs, and gutters shall be in accordance with MSD Specification Part 8, Section "D".

PART 3 - EXECUTION

3.1 PIPE, INLETS, MANHOLES AND APPURTENANCES. The pipe, inlets, manholes and appurtenances shall be installed in accordance with the MSD standards and more specifically as modified herein this section.

3.1.1 Temporary Safeguards. Provide, maintain and later remove temporary safeguards for protection of personnel, the public, equipment and materials as required by the governing laws and regulations. Installation shall be by trenching. The Contractor will include procedures to ensure that the method does not damage the pipe sections during installation.

3.1.2 Trench excavation and backfilling for concrete culverts shall conform to MSD Specifications (except that jetting methods will not be allowed for compaction), and as directed by the Contracting Officer.

3.1.3 Installation. Each pipe section shall be laid accurately to conform with the line and grade shown on the contract drawings. Pipe shall be laid and centered so that the culvert has a uniform invert. Any culvert which is not in true alignment or which shows any undue settlement after laying, but before the fill is placed, shall be taken up and relaid at no additional cost to the Government.

3.1.4 Groundwater. If groundwater is encountered while excavating trenches, the trench shall be dewatered and kept reasonably dry until the pipe has been placed and backfill compacted in accordance with SECTION 02530.

3.1.5 Unsuitable Subgrade. Where unsuitable subgrade is encountered, "Crushed Limestone" shall be used to stabilize the soil as directed by the Contracting Officer, and an equitable adjustment to the contract price will be made.

3.1.6 Filling Lift Holes. Where permissible lift holes have been used, the holes shall be carefully filled with nonshrink grout to provide a

watertight section. The mortar shall be finished flush on the inside of the pipe and shall be properly cured on the outside. Lifting devices shall have sufficient bearing on the inside of the culvert to avoid damage resulting from a concentration of stresses around the lift holes.

3.1.7 Adjusting Existing Manholes. Existing manholes shall be adjusted to conform with the new grades by the Contractor. Adjusting rings or adapters shall be used wherever possible.

3.2 BEDDING AND BACKFILL. The bedding and backfilling shall be accomplished in accordance with the MSD standards and more specifically as modified herein this section.

3.2.1 Rock. If rock is encountered, an earth cushion having a thickness of not less than 1/2 inch per foot height of fill over the top of the pipe, with a minimum allowable thickness of 6 inches and a maximum thickness not to exceed 3/4 the inside diameter of the pipe, shall be constructed under the pipe. The pipe shall then be bedded as applicable.

3.2.2 Cushion Excavation. The width of the cushion excavation shall be one foot greater than the outside diameter of the pipe and the trench shall be backfilled with suitable material to provide a uniformly firm bed. If soft, spongy, or unstable material is encountered it shall be removed from the bedding foundation area and the space backfilled with suitable material to provide a uniformly firm bed.

3.3 STRUCTURES.

3.3.1 Appurtenances. The sewer appurtenances such as manholes, inlet-manholes, and the special junction box shall be constructed in accordance with the MSD Specifications and in particular Part 4, Section "G", and the contract drawings.

3.3.2 Inlets and Manholes. The inlets and manholes shall have cast iron frame and covers. The appropriate type "B" for inlets and "A" for manholes shall conform to the MSD Standard Detail of Sewer Construction Drawing attached at the end of this section.

3.3.3 The area inlet-manhole shown on the drawings, is a double area inlet open on 4 sides as shown on the MSD Standard Details of Sewer Construction Drawings attached at the end of this section.

3.3.4 Manhole Adjustments. Existing manholes require adjustment by raising or lowering them. The Contractor shall adjust each manhole to conform with the new grades by adjusting rings or adapters. The Contractor shall reinstall any of the appurtenances, including but not limited to the covers, onto the manholes. Modifications and reinstallation shall be constructed as nearly as practicable to the essential applicable requirements specified for new manholes, including all necessary concrete work, cutting, and shaping.

3.4 Repairs and Replacement of Existing Pavements, Wearing Surfaces, Sidewalks and Driveways, Curbs, and Gutter. The repairs and replacement procedures for existing pavements, wearing surfaces, sidewalks and driveways, curbs, and gutters shall conform to MSD Specifications Part 8, Section "D" (except for paragraph 8 and the payment paragraphs), and as directed by the Contracting Officer.

-- END OF SECTION 02513 --

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SECTION 02520
REINFORCED CONCRETE GRAVITY DRAIN PIPE

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SECTION 02520
REINFORCED CONCRETE GRAVITY DRAIN PIPE

PART 1 - GENERAL

1.1 SCOPE. The work covered by this section consists of furnishing all plant, labor, material, and equipment, and performing all operations necessary for the concrete pipe and appurtenances as specified herein and as shown on the drawings.

1.2 QUALITY CONTROL.

1.2.1 General. The Contractor shall establish and maintain quality control for all operations to assure compliance with contract requirements and maintain records of quality control for all construction operations, including, but not limited to the following:

- (1) Compaction
- (2) Installation of reinforced concrete gravity drain pipe.

1.2.2 Reporting. A copy of these records and tests, as well as the records of corrective action taken, shall be furnished to the Government daily.

1.3 REFERENCES. The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto:

1.3.1 American Society for Testing and Materials (ASTM).

C 361-92	Reinforced Concrete Low-Head Pressure Pipe
C 655-91	Reinforced Concrete D-Load Culvert, Storm Drain, and Sewer Pipe
C 923-89	Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals
C 1107-91 (Rev A)	Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
D 1310-86 (Reapproved 90)	Flash Point and Fire Point of Liquids by Tag Open-Cup Apparatus
D 2822-91	Asphalt Roof Cement

1.4 SUBMITTALS. Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01300 SUBMITTAL PROCEDURES:

1.4.1 Data.

- (1) Asphalt Roof Cement; GA. Submit manufacturer's literature.
- (2) Reinforced Concrete Gravity Drain Pipe; GA. Submit Contractor's design calculations and shop drawings.
- (3) Nonshrink Grout; GA. Submit manufacturer's literature.

(4) Flexible Manhole Adaptor; GA. Submit manufacturer's literature.

1.4.2 Reports. Reinforced Concrete Gravity Drain Pipe; GA. Submit results of tests specified in paragraph 1.5.

1.5 TESTING.

1.5.1 Shop Testing Concrete Pipe. The full length of concrete pipe and joints under levees shall be tested for leakage as follows: A hydrostatic test shall be made on the watertight joint types proposed. Only one sample joint of each type needs shop testing; however, if the sample joint fails because of faulty workmanship, an additional sample joint may be tested. During the test period, the joint shall be protected from high temperatures that might soften or adversely affect the jointing materials. The possibility that some water may be absorbed by concrete pipes during the test will be considered before rejecting any rubber seals proposed. Performance requirements for joints in reinforced concrete pipe shall conform to ASTM C 361 except that tests shall be performed at an internal hydrostatic pressure of 10 psi minimum for a 20-minute period.

1.5.2 Field Joint Tests. Hydrostatic pressure tests on all concrete pipe joints under levees shall be made by the Contractor after the pipe has been installed but prior to placing any backfill except that required for bedding the pipe. Testing of joints shall be made by use of a Contractor-furnished Joint Tester approved by the Contracting Officer. Joints shall be required to withstand an internal hydrostatic pressure 10 psi minimum without visible leakage for 20 minutes. After backfilling the pipe, the Contracting Officer may require additional hydrostatic tests of any joints which by inspection do not appear to be watertight.

PART 2 - PRODUCTS

2.1 MATERIALS.

2.1.1 Asphalt Roof Cement. Asphalt roof cement shall conform to ASTM D 2822, Type I, Class as appropriate. The solvent shall have a flash point of not less than 80 degrees F when tested in accordance with ASTM D 1310.

2.1.2 Gravity Drain Pipe. The gravity drain pipe shall be of the size indicated on the drawing and shall be reinforced concrete pipe conforming to the requirements of ASTM C 655. Part of the 3rd Street drain shall be designed to withstand a D-load of 4600 pounds per linear foot to produce a 0.01-inch crack and part of the 5th Street drain shall be designed to withstand a D-load of 4600 pounds per linear foot to produce a 0.01-inch crack.

2.1.3 Flexible Manhole Adaptor. A high performance flexible connector shall be used to install the reinforced concrete pipe at the gatewells (landside and riverside). The connector shall be designed to produce a positive watertight connection and shall provide 10 degrees of omnidirectional deflection. The connector shall meet material and performance requirements of ASTM C 923.

2.1.4 Precast Concrete Flared End Section. Precast concrete flared end section and galvanized trashrack shall be as shown on the drawings and on the details included at the end of this section, modified as shown on the drawings. Precast concrete inlet and trashrack shall be suitable for the use intended.

2.1.5 Geotextile. Geotextile materials shall conform to the requirements of SECTION 02240.

2.1.6 Nonshrink Grout. The nonshrink grout shall consist of a prepackaged material conforming to the requirements of ASTM C 1107.

2.2 PIPE FOUNDATION.

2.2.1 Backfill Materials. Materials for pipe foundation fill shall be in accordance with the requirements of SECTION 02210 for impervious fill and SECTION 02213 for pervious fill.

2.2.2 Compaction Equipment. Manual tampers shall weigh not less than 20 pounds and have a tamping face not larger than 6 inches by 6 inches. All hand-operated power tampers and vibratory compactors must be field checked prior to their use on the project to assure that the required results can be obtained. Such field checks shall be accomplished under the direction and supervision of the Contracting Officer. Equipment failing to achieve desired results will not be allowed on the project.

PART 3 - EXECUTION

3.1 NONSHRINK GROUT PLACEMENT. Nonshrink grout shall be used to fill the voids between pipe and structures and patching holes in concrete. Temporary forms or collars shall be provided to contain the grout until the grout has set. Grout that has not been placed, for any reason, within 30 minutes after mixing shall not be used and shall be removed from the job site. The Contractor shall submit to the Contracting Officer for approval, the method and equipment proposed for placement of the grout. The nonshrink grout shall be mixed, placed, and cured in accordance with the manufacturer's recommendations.

3.2 PIPE FOUNDATION.

3.2.1 Excavation. The pipe foundation shall be accurately shaped to accept the lower 18-inches of the gravity drain pipe. The excavation shall be maintained in-the-dry and the Contractor shall be prepared to pump any surface or seepage water.

3.2.2 Backfill Placement. Placement of pipe foundation fill shall be in accordance with the requirements of SECTION 02210 for impervious fill and SECTION 02213 for pervious fill. Material shall not be placed in standing water.

3.2.3 Backfill Compaction. Compaction of each layer shall be in accordance with the requirements of SECTION 02210 and SECTION 02213, as applicable. The backfill within 4 feet horizontally and within a vertical dimension above the pipe as recommended by the pipe manufacturer shall be compacted with the use of mechanical or pneumatic power impact tampers and with manual tampers. When compacting under the haunch of pipes, a pole or a 2-inch by 4-inch piece of lumber shall be used to achieve desired density in this area. Such effort will be followed by the use of power or manual tampers working as close to the pipe as possible without damaging the gravity drain pipe.

3.3 INSTALLATION OF GRAVITY DRAIN PIPE.

3.3.1 General. The gravity drain pipe foundation and backfill shall be installed in accordance with paragraph 3.2. Prior to installing the drainage pipe, excavation and foundation preparation shall have been completed as prescribed in paragraph 3.2.1. Under no circumstances shall the pipe be laid in water, or when conditions or the weather are unsuitable for work. The pipe shall be carefully inspected by the Contracting Officer immediately before it

is laid and defective pipe will be rejected. Proper facilities shall be provided for lowering sections of pipe into place, and pipe shall be cleaned and lowered into position in such a manner as to avoid damage to the pipe. Pipe laying lengths shall not exceed 12 feet. In addition, a short length of pipe shall be laid through the gatewell and outlet structure's walls and the wall cast around the pipe. The mating end of the pipe shall extend no more than 1 foot beyond the edge of the structure. The pipe shall be laid on a foundation to the grades and alignment as shown on the drawings. The pipe shall be supported in such a manner that does not damage the pipe or pipe joints and such that the pipe is at the grade and alignment shown on the drawings. Each section of pipe shall rest upon the pipe bed for its full length with recesses excavated or formed to accommodate the joints. Any pipe which has its grade or joint disturbed after laying shall be taken up and relaid. Any section of pipe already laid which is found to be defective or damaged shall be taken up and relaid or replaced as directed by the Contracting Officer, without additional cost to the Government. During installation, the pipe shall be handled with care. After all joining of sections has been accomplished, backfill shall be placed as specified in paragraph 3.2.2.

3.3.2 Pipe Joints. Joints between sections of reinforced concrete pipe and between the pipe and the flared end section shall be in accordance with ASTM C 361. Gaskets shall not have more than one factory-fabricated splice. Gaskets shall be as recommended by the particular manufacturer in regard to use of lubricants, cements, adhesives, and other special installation requirements. Surfaces to receive lubricants, cements, or adhesives shall be clean and dry. Gaskets shall be affixed to the pipe not more than 24 hours prior to the installation of the pipe, and shall be protected from the sun, blowing dust, and other deleterious agents at all times. Gaskets shall be inspected before installing the pipe; any loose or improperly affixed gaskets shall be removed and replaced. The pipe shall be aligned with the previously installed pipe, and the joint pulled together. If, while making the joint, the gasket becomes loose and can be seen through the exterior joint recess when the joint is pulled up to within one inch of closure, the pipe shall be removed and the joint remade.

3.3.3 Geotextile Installation Around Pipe Joints. Prior to placing geotextile, surfaces to receive the geotextile shall be coated with asphalt roof cement to hold the geotextile in place. The surface to receive the geotextile shall be prepared to relatively smooth condition, free of obstructions and debris. The geotextile shall be placed smooth and free of tension, stress folds, wrinkles, or creases. The geotextile shall be protected at all times during construction from contamination, and any geotextile so contaminated shall be removed and replaced with uncontaminated geotextile. All pipe joints shall be wrapped with geotextile for a distance of 3 feet each side of the joint. At the gate structures, geotextile shall be wrapped 2 feet along the length of the pipe and around the exterior face of the gatewell structure radially around the pipe. All geotextile wrapping shall be overlapped 6 inches and secured to prevent displacement during backfilling operations. The geotextile shall be covered with compacted backfill within 24 hours of placement. Any geotextile damaged during its installation or during backfilling shall be replaced by the Contractor at no additional cost to the Government.

3.3.4 Flexible Manhole Adaptor. A high performance flexible connector shall be used to install the reinforced concrete pipe at the gatewells (landside and riverside). The connector shall be designed to produce a positive watertight connection and shall provide 10 degrees of omni-directional deflection. The annular space between the pipe/adaptor and the wall opening shall be filled with nonshrink grout.

3.3.5 Precast Concrete Flared End Section. The joint between the reinforced concrete pipe and the flared end section shall be in accordance with ASTM C 361. Grating for the precast flared end section shall be as shown on the sketch at the end of this section.

-- END OF SECTION 02520 --

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SECTION 02715 - RELIEF WELLS

PART 1 GENERAL

1.1 SCOPE. The work covered by this section consists of furnishing all plant, labor, equipment and material, and performing all operations necessary for construction of relief wells as specified herein and as shown on the drawings. All work shall conform to the requirements of the Missouri Department of Natural Resources, Division of Geology and Land Survey, Missouri Well Construction Rules. Any permitting, licensing, and submittal requirements required by this Act are the responsibility of the Contractor. Relief wells 1 through 32 are to be installed in the Glass Plant area, an area in which the Missouri Department of Natural Resources (MO-DNR) has identified the presence of 1,1-dichloroethane (1,1-DCA); 1,1-dichloroethene (1,1-DCE); t-1,2-dichloroethene, cis-1,2-dichloroethene; tetrachloroethylene (PCE); 1,1,1-trichloroethane (TCA) and trichloroethylene (TCE) in the soils and groundwater. Concentrations have been detected in the part per billion range within MO-DNR monitoring wells.

The Corps completed its own exploration program of the Glass Plant area during the summer of 2002. A Site Safety And Health Plan was created for this work and to ensure the safety of the drill crew, an industrial hygienist (IH) accompanied the drill crew into the Glass Plant area. The IH completed real-time testing/monitoring on every soil sample obtained in that exploration program. Not once did the IH monitoring reveal the presence of any of the contaminants of concern. The St. Louis District Corps of Engineers maintains records of this testing and the relief well Contractor is welcome to review this information. Please contact Mr. Patrick Conroy of CEMVS-ED-GF (314-331-8432) to arrange a mutually agreeable time to do such a review.

This work will include certain monitoring/testing of the drill cuttings and pumping test effluent to ensure the safety of the contractor's personal and to prevent pollutants from entering the Meramec River.

Work on relief wells nos. 1 through 32 in the Glass Plant area shall not begin until the Contractor has completed all work to elevation 420 associated with the levee and landside detention area between stations 40+00 and 77+00, the 3rd Street and 5th Street gravity drains. The Contractor shall establish a method to temporarily hold water at the partially completed 3rd Street and 5th Street gravity drains

1.2 QUALITY CONTROL.

1.2.1 General. The Contractor shall perform the inspection, sampling and testing, corrective actions, and submit the required reports to substantiate compliance with the technical provisions of this specification. Responsibility for quality control of relief well construction shall be the Contractor's. To accomplish quality control of relief well construction the Contractor shall form an organization responsible through the quality control engineer to the Contractor's project manager. The Contractor's quality control organization shall have personnel sufficient in number to monitor at all times the relief well construction activities.

1.2.2 Inspection. The Contractor's quality control organization shall be responsible to observe and control, for compliance with the technical specifications, all well construction including but not limited to the

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Classification of Soils for Engineering
Purposes

1.3.3 The Aluminum Association (AA).

AA SAS-30 (1986) Aluminum Construction Manual Series - Section
Specifications for Aluminum Structures

1.3.4 American welding Society (AWS).

D 1.1-94 Structural Welding Code - Steel

1.3.5 Missouri Department of Natural Resources.

Misc Pubs #50 Missouri Private Water Well, Heat Pump System,
Pump Installation and Monitoring Well
Construction Rules.

1.4 SUBMITTALS. Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01300 - SUBMITTAL PROCEDURES:

1.4.1 Shop Drawings. GA. The Contractor shall submit to the Contracting Officer, shop drawings which present details of proposed methods for drilling, coupling well screen and riser sections together, installing the well screen and riser, backfilling, developing, pump testing, and installing the well guard. The shop drawings shall show the riser pipe material and schedule, the well screen material, size, slot size, shape and pattern, bottom plug and installation details. Also, the well guard details shall be shown on the shop drawings. Any Contractor proposed substitutes or alternates in material construction details or methods shall be detailed on the shop drawings. No phase of the work shall be initiated until all shop drawings concerning that activity have been approved. All work shall conform to the requirements of the MO-DNR Miscellaneous Publications #50. All permitting, licensing, and submittal requirements for well certification are the responsibility of the Contractor. The Contractor shall provide proof of certification as required by section 1.2.3 of this section.

1.4.2 Well Drilling Specialist. GA. The Contractor shall submit to the Contracting Officer, for review and approval within 10 days of Notice to Proceed, summaries of qualifications and references, including a copy of the State Well Drilling Certificate or License for the Well Drilling Specialist. Well drilling shall not proceed until the well drilling specialist has been approved by the Government.

1.5 Location. The exact locations of the new relief wells is as shown on the drawings and on Table 1 located at the end of this section. The Contracting Officer shall review the final locations of these relief wells.

1.6 Well Details. The well numbers, locations, lengths and dimensions of the relief wells are shown on the drawings and on Table 1 located at the end of this section.

1.7 Disposal of Debris. The Contractor shall dispose of all debris resulting from these construction operations off-site.

PART 2 PRODUCTS

2.1 WELL SCREEN AND RISER PIPE.

2.1.1 General. Well screen shall be of the type specified below and shall be of the dimensions hereinafter specified and as shown on the drawings. Screen openings shall be uniform in size and pattern, and shall be spaced approximately equally around the circumference of the pipe. Before installation all well screen shall be approved by the Contracting Officer.

2.1.2 Stainless Steel Well Screen.

2.1.2.1 General. The well screen shall be of the non-clogging, continuous slot, wire-wound design. It shall be fabricated by circumferentially wrapping a triangularly shaped wire around a circular array of internal rods. The wire configuration shall produce inlet slots with sharp outer edges, widening inwardly so as to minimize clogging. Each juncture between the horizontal wire and the vertical rods shall be fusion welded under water by the electrical resistance method. End fittings shall be welded to the screen body.

2.1.2.2 Materials. All pipes, rods, bars, wire, and fittings shall be stainless steel conforming to ASTM A 312, Grade TP-304.

2.1.2.3 Well Screen. The width of the clear space between the wire wrappings shall be 0.150-inches and shall provide a total open area not less than 226 square inches per foot of well screen. The screen shall have a minimum clear inside diameter of 10-inches. Collapse strength of the well screen shall be at least 29 psi. Column and tensile strengths of the well screen shall be adequate to allow safe installation and development of the wells.

2.1.2.4 Stainless Steel Riser Pipe. The relief well riser pipe and fittings shall be manufactured from stainless steel conforming to ASTM A 312, Grade TP-304. The pipe roundness, wall thickness, and straightness shall meet the ASTM specifications. The riser pipe shall have a minimum schedule 40 wall thickness with a minimum inside diameter of 10-inches. Discharge details at the top of the riser pipe shall be as shown on the sketches.

2.1.2.5 Bottom Plug for Well Screen. The bottom plug for each well screen shall be made from stainless steel conforming to ASTM A 312, Grade TP-304. Plugs shall be the same diameter as the outside of the screen and at least the same minimum thickness as the riser pipe.

2.1.2.6 Well Screen/Riser Pipe/Bottom Plug Coupling. End fittings for the stainless steel well screens shall be furnished with Schedule 40 flush threads compatible with ASTM F 480 requirements, and of the same alloy as the well screen and riser pipe. Flush joint fittings which join well screen to riser pipe shall adequately provide for the transition from well screen to riser pipe. Joints shall be designed and constructed to support the weight of the screen and/or pipe as it is lowered into the hole. All fittings shall contain a Viton O-ring on the male end.

2.2 GRAVEL PACK MATERIALS.

2.2.1 General. Material for the gravel pack around the riser pipes and screens shall be a washed sand and gravel composed of hard, noncarbonate, tough, and durable particles free from adherent coatings. The gravel pack material shall contain no detrimental quantities of organic matter or soft, friable, thin, or elongated particles. Gravel pack materials shall meet the gradation requirements of 2002 Missouri Standard Specifications for Highway Construction, Section 1009 - Aggregate for Drainage, paragraph 1009.2.3 - Grade 3. This section of the MO-DOT specifications refers to Sec 1005.1 - Gradation A, B, D or E. The gravel pack shall meet the following gradation requirements of Sec 1005.1.3 - Gradation D:

<u>U.S. Standard Sieve No.</u>	<u>Percent by Weight Passing</u>
3/8 inch	100
1/4 inch	0 - 88.4
No. 4	96 - 48.4
No. 8	15 - 1.6

2.2.2 Particle Size Distribution.

2.2.2.1 The particle size distribution of the gravel pack shall be sampled and tested by the Contractor using the U. S. Standard Sieve Nos. described in 02715-2.2.1. There shall be one particle size distribution test for the gravel pack material used in each well. No later than 48 hours before being placed in the relief well, the particle size distribution of the gravel pack shall be determined from a sample obtained from the material stockpiled and the results supplied to the contracting officer. The gravel pack material and its gradation shall be approved by the Contracting Officer before it is placed in the well.

2.2.2.2 The laboratory test procedure shall conform to that presented in EM 1110-2-1906, Appendix V. All points on individual grading curves obtained from representative samples of gravel filter material shall lie between the boundary limits as defined by smooth curves drawn through the tabulated grading limits plotted on a mechanical analysis diagram. The individual grading curves within these limits shall not exhibit abrupt changes in slope denoting skip grading, scalping of certain sizes, or other irregularities which would be detrimental to the proper functioning of the gravel filter.

2.2.3 Filter Pack Chlorination. Prior to placement the filter pack material shall be treated with a chlorine solution having a 50 mg/l free-chlorine residual.

2.3 Well Guard. The well guard shall consist of a section of 20-inch diameter, continuous slot well screen, constructed of stainless steel conforming to ASTM A-312 Type-304. The well guard shall be fabricated and attached to the concrete pad in accordance with details shown on the drawings and as specified herein. 1/2-inch diameter stainless steel threaded rods, washers and nuts shall be utilized. The 1/2-inch threaded rod shall be cut flush with the bolt following complete installation of the well guard.

2.4 Concrete Pad. The concrete pad shall be an extension of the concrete annular seal specified in paragraph 02715-3.7.3. Dimensions and details of the concrete are shown on the sketches.

2.5 Check Valve. The check valves shall be fabricated in accordance with details shown on the drawings and as specified herein. The aluminum parts, at the Contractor's option, may be any one or a combination of aluminum alloys 3005-H14, 6061-T-4, or T6. The 3/8-inch diameter aluminum guide rods shall be carefully bent to avoid flattening at the bends. The seat for the check valve shall be constructed as indicated on the drawings. The aluminum guide rods and aluminum lifting ring shall be connected to the plates by welding conforming to the applicable provisions of the AA Specification SAS-30. The check valve shall be temporarily installed on top of the riser pipe immediately after completion of the development pumping, and thereafter shall be kept in place on the pipe at all times, except during pumping, cleaning operations, and actual addition of riser pipe during installation until the total length of the riser pipe is installed. Immediately after the riser pipe is installed to final height, the top of the riser pipe shall be machined smooth and square for proper seating of the check valve.

2.6 Cover Plate. The top of the well guard shall be fitted with a detachable 21-inch diameter, stainless steel lid conforming to ASTM A-312 Type-304 as shown on the drawings.

2.7 Numbering. The well number shall be welded onto a stainless steel plate that is welded to the well guard. The steel plate shall face the levee. The number shall be 6-inches high and enough weld material shall be used to raise each number 0.25-inch above the plate's surface.

PART 3 EXECUTION

3.1 DRILLING.

3.1.1 General. Wells shall be drilled by the reverse rotary method, in such a manner to ensure proper placement of the well screen, riser pipe and gravel pack. Methods which involve significant displacement of the formation, or which may reduce the yield of the well, will not be permitted. Drilling and installation of well screen and gravel pack shall be completed for each well without interruption. Above ground mud tanks/containers shall be used to circulate drilling mud and accumulate cuttings. The digging of mud pits or similar excavations will not be allowed. Before drilling operation begins on each well, the Contractor shall demonstrate that all material, equipment, and experienced personnel are mobilized and that all equipment necessary for the job is adequate for an efficient operation and is operating in a satisfactory manner. Loss of a hole or well because of lack of material, inadequate or faulty equipment, or careless operating procedures will be considered cause for an abandoned well due to fault of the Contractor.

3.1.2 Well Drilling Specialist. The Contractor shall designate a well drilling specialist for each work shift. The well drilling specialist shall have a minimum of five years experience in the water well industry, and shall be familiar with the operation of all equipment and machinery required to install high-capacity water wells in Meramec River alluvium. The Contractor shall submit summaries of qualifications and references for any and all well drilling specialists to the Government for review and approval within 10 days of Notice to Proceed. Well drilling shall not proceed until the well drilling specialist has been approved by the Government. The well drilling specialist shall be at the field site at all times during drilling, installation of well materials, or development of installed wells.

3.1.3 Reverse Rotary Method. The borehole for the relief well shall be drilled using the reverse rotary method. The diameter of the hole shall be such that will permit the placement of the minimum thickness of gravel pack as shown on the sketches. The use of a bentonitic type drilling fluid is prohibited. Clay-free polymeric or organic drilling fluid additives that naturally break down may be used upon the Contracting Officer's approval. If the walls of the hole above the top of the gravel pack require support during development operations, a temporary casing similar to that specified in 02715-3.1.4 shall be placed so as to extend from the ground surface to at least one foot below the top of the gravel pack material. All cuttings and drilling fluid shall be recirculated through the aboveground mud tank/container. During the drilling, the cuttings and fluids shall be pumped from the drill rig to the aboveground mud tank/container through the atmosphere, not through a pipe.

3.1.4 Temporary Casing. A new or used temporary well casing of either iron or steel may be used to support the sides of the entire hole during drilling and placement of screen, riser pipe, and gravel pack and to support the sides of the unbackfilled portion of the hole during development of the well. Any temporary casing shall have an inside diameter large enough to provide the minimum filter thickness, specified by 02715-3.3.3.2 entirely around the well screen or riser pipe and shall have sufficient thickness to retain its shape and maintain a true section throughout its depth and may be in sections of any convenient length. The temporary casing shall be securely anchored to the drill rig or ground surface at all times until removed. The temporary casing shall be such as to permit its removal without interfering with the filter or riser pipe. Methods of installation which will create a cavity outside the temporary casing will not be permitted.

3.1.5 Obstructions Encountered. If obstructions are encountered in the foundation which, in the opinion of the Contracting Officer, render it impracticable to complete the well to the directed depth, the Contracting Officer may direct the Contractor to abandon the well as specified in 02715-3.7 and construct another well at an adjacent site. The Contractor shall provide and use drills and equipment that are capable of drilling through in-situ wood deposits within the alluvium and capable of removing cobbles up to 5-1/2 inches in diameter. The presence of cobbles up to 5-1/2 inches in diameter or in-situ wood which may be encountered during drilling, shall not be considered as obstructions or sufficient reason for abandonment of a well.

Where obstructions are encountered, drilling shall be continued until it is demonstrated to the Contracting Officer that further efforts to advance the drill hole are impracticable. Such demonstration shall include, but not be limited to, continuing drilling operations when no gain in depth is being made for a minimum of 30 minutes.

3.1.6 Testing of Cuttings. Prior to disposal, a representative sample of the cuttings shall be collected and tested for volatile organics according to Section 1130 - Environmental Protection.

3.2 INSTALLATION OF RISER PIPE AND SCREEN.

3.2.1 Assembly. All riser pipe and screen shall be in new and good condition before installation and all couplings and other accessory parts shall be securely fastened in place. The successive lengths of pipe shall be arranged to provide accurate placement of the screen sections in the soil strata. The bottom of the screen and riser assembly shall be equipped with an appropriate centering guide which will satisfactorily center the riser pipe and screen in the well and will hold it securely in position while the gravel

pack material is being placed. Centering guides may be placed at other locations along the screen and riser pipe assembly provided they do not interfere with placement of gravel pack materials as specified in 02715-3.3.

3.2.2 Joints. Sections of relief well pipe shall be jointed together as specified in 02715-2.1.2.6. Joints shall be designed and constructed to have the strength of the pipe capable to support the weight of the relief well string as it is lowered into the hole. When not practicable to construct joints that will support the weight of the relief well stem, the stem shall be supported at the lower end by any approved means that will assure that the joints do not open while being lowered into place in the well.

3.2.3 Installation. The assembled riser pipe and screen shall be placed in the hole in such manner as to avoid jarring impacts and to ensure that the assembly is centered and not damaged or disconnected. Two centering devices shall be attached to the well screen, one near the bottom of the well and the second near the middle of the well. After the screen and riser pipe have been placed, a gravel pack shall be constructed around the screen section as specified in 02715-3.3 and the well developed as specified in 02715-3.4. The top of the riser pipe shall be held at the designated elevation during placement of the gravel pack.

3.2.4 Plumbness and Alignment Tests. Each well shall be installed and maintained straight and plumb during the entire construction process. Immediately before placing the gravel pack and with the top of the well fastened securely in a vertical and horizontal position, the Contracting Officer may elect to perform plumbness and alignment tests. These tests, if performed, will be performed by Government personnel using Government-owned equipment. A variation of 12-inches per 100-feet will be permitted in the combined length of screen and riser pipe of the well. If the well fails to conform to the standard described above, the Contractor shall correct the plumbness of the well at no additional expense to the Government.

3.3 PLACING GRAVEL PACK.

3.3.1 General. After the screen and riser pipe have been placed, and alignment surveys and plumbness surveys (if performed by the Government) are conducted, the Contractor shall place the gravel pack using the tremie method or an approved alternative which prevents segregation.

3.3.2 Tremie.

3.3.2.1 Tremie Hopper. The gravel pack shall be placed in a tremie hopper so constructed and balanced that filter material will feed freely and equally to two tremie pipes located at 180 degrees on each side of the screen. Connections between the tremie pipe and the hopper shall be designed for quick connection or disconnection for adding or removing tremie pipe with least possible delay. The hopper shall contain the necessary fittings to introduce clean water at the bottom of the hopper to wash the filter pack into the tremie pipes.

3.3.2.2 Tremie Pipes. Tremie pipe shall consist of two rigid 4-inch inside diameter tremies with no obstructions. The tremie pipes shall consist of equal 5-foot lengths of standard 4-inch pipe with 1/16-inch wide equally spaced slotted openings. Tremie pipe shall be free of dents, flat spots, damaged threads, and holes, and shall be reamed and/or deburred to full inside diameter of the pipe. The tremie guide shall consist of a metal ring or rings of sufficient diameter to slip freely over riser pipe and screen with 4-inch

collars welded to the guide at 180 degrees to securely hold the tremie pipe in place.

3.3.3 Procedure.

3.3.3.1 The Contractor shall be equipped to quickly and efficiently add filter material to the hopper in any position from the ground surface to the maximum height of the hopper. No gravel pack material shall be allowed to enter the well except through the tremie pipes. At no time shall tremie guide or pipes be raised, lowered or supported by only one pipe. Ten feet of tremie pipe shall be installed below the lower tremie guide. The gravel pack material shall be placed in an approved manner and without significant segregation.

3.3.3.2 The gravel pack shall have a minimum thickness of not less than 6 inches between the outside of the well screen and the outside of the gravel pack and shall be placed above the top of the well screen to a level 12-inches above the top of the screen. At the commencement of placing operation, the tremie shall rest at the bottom of the hole and shall be filled with gravel pack material. The tremie shall then be raised in increments approximately equal to the increments of the gravel pack placed. At all times during the placing of the gravel pack, the tremie shall be kept filled to within five feet of its top. All filter pack material shall be sluiced with clean water as the gravel pack material leaves the hopper bottom and enters the tremie pipe.

3.3.3.3 If temporary casing is used, the gravel pack shall be placed in increments not to exceed 2 feet; the tremie and temporary casing shall be raised in small increments approximately equal to the increments of the gravel pack placed, except that at no time prior to the completion of placement of the gravel pack shall the bottom of the casing be less than 1-foot below the top of the gravel pack in the hole. The Contractor shall provide a means of measuring the gravel pack depth in the hole. The alternate placing of gravel pack material and withdrawing of the tremie and temporary casing shall be continued until the gravel pack has been placed to the level shown on the drawings.

3.3.3.4 During the development of the well, the top of the gravel pack material shall be maintained at the level specified. Prior to and during placement of the gravel pack, the top of the temporary casing or hole shall be covered or otherwise shielded to prevent the gravel pack from entering the space around the well except through the tremie pipe. Material which may have entered the well screen and riser pipe shall be removed before development of the well is commenced. Construction of the well guard specified in 02715-2.3 or of the backfilling specified in 02715-3.6 shall not commence until the development of the well is completed and the gravel pack has been placed to the elevation specified.

3.4 WELL DEVELOPMENT.

3.4.1 General.

3.4.1.1 Following placement of gravel pack materials the Contractor shall develop the relief well by high velocity jetting and simultaneous air-lift pumping. The well shall be free of drawdown or surging effects due to pump testing, developing, redeveloping or drilling at another location.

3.4.1.2 The Contractor shall be responsible for maintaining the needed access and work areas at the relief well and the necessary clearance in the relief well to accomplish development. The Contractor shall furnish, install and construct the necessary discharge lines to direct the discharge a sufficient distance from the work areas to prevent damage and contamination of any relief wells, or least 300-feet away from the well.

3.4.1.3 Development shall be conducted to achieve a stable well of maximum efficiency and shall be continued until little or no material from the foundation or gravel pack can be pulled into the well by pumping. Development of the well shall also remove drilling fluid residuals deposited on the borehole face and in adjacent portions of the aquifer during the drilling process. If organic drilling fluids were used, they must be broken down chemically according to the manufacturer's recommendations before or during development.

3.4.1.4 As development proceeds, gravel pack material shall be added to the annular space around the screen to maintain the top elevation of the gravel pack at the specified elevation.

3.4.1.5 The Contractor shall provide a bubbler tube or other approved means for accurately determining the water level in the well under all conditions.

3.4.1.6 If, at any time during the development or redevelopment process it becomes apparent in the opinion of the Contracting Officer that the well may be damaged, operations shall be immediately curtailed. The Contracting Officer may require a change in method if the Contractor's method does not accomplish the desired results.

3.4.1.7 All materials pulled into the well by the development or redevelopment process shall be removed prior to performing the pumping test.

3.4.2 Jetting and Air-Lift Pumping. The well development shall be accomplished by high-velocity, horizontal jetting and simultaneous air-lift pumping. The outside diameter of the jetting tool shall be 1/2 to 1 inch less than the inside diameter of the screen. The exit velocity of the jetting fluid shall be between 150 and 300 fps and have a pressure at the nozzle of approximately 200 psi. Circulation of the jetting water will not be allowed. The jetting shall proceed from the bottom of the screen to the top. The tool shall be rotated at a speed of 1 rpm. It shall be positioned at one level for not less than 2 minutes and shall then be raised to the next level. Individual jetting levels shall be spaced no more than 6 inches vertically apart. Sizing of the eductor pipe, air line, and air compressor shall be adequate to efficiently pump the well at a rate from 10 to 20 percent more than the volume of water introduced through the jetting tool. The eductor pipe shall be placed no more than 5 feet above the top of the jetting tool during development. At the start of the air-line pumping the quantity of air injected shall only be sufficient to initiate flow through the screen. The effluent air-lift pumping shall be pointed upwards at a 45-degree angle away from the well and the effluent propelled into the atmosphere above the well and allowed to splash onto the ground.

3.5 CONTINUOUS RATE PUMPING TEST.

3.5.1 General. The Contractor shall perform pumping tests to determine whether the well has been adequately developed. Development shall continue until the sand content of the discharge averages not more than 5 milligrams of

sand per Liter of discharge water (5 mg/L) for a complete pumping cycle of 2 hours duration when pumping at a constant rate of 800 gpm or a maximum drawdown of 8-feet. Sand content measurements shall be taken at equal 15 minute intervals to permit plotting sand content as a function of time and discharge and determination of average content for each cycle. After completion of the test, the depth of the well shall be measured, by means of an approved method, under the direction of a representative of the Contracting Officer.

3.5.2 Equipment.

3.5.2.1 Pump. The Contractor shall provide a deep-well submersible pump capable of producing the specified discharge over a period of time sufficient to satisfactorily perform the pumping test specified. The Contractor shall provide, without additional cost to the Government, the electrical power, control box and the necessary wiring that shall be removed at the completion of the pumping test.

3.5.2.2 Water Level. The Contractor shall provide means for accurately determining the water level in the well to within 0.01-foot, under all conditions.

3.5.2.3 Flow Meter. The Contractor shall furnish and install a calibrated flow meter of standard design for the purpose of measuring the discharge from the well during the pumping test. The calibration of the flow meter shall be checked at regular intervals.

3.5.2.4 Rossum Sand Sampler. The Contractor shall furnish an approved Rossum centrifugal sand sampler and appurtenant piping and valving for accurate determination of the discharge sand content.

3.5.3 Data. The following test data shall be obtained and recorded by the Contractor on WES Form 796, a copy of which is attached at the end of this section. Items (6) and (7) will be checked by the Contracting Officer.

- (1) Time of water level measurement.
- (2) Depth of water in well before, during, and after pumping. The time intervals for measuring the water levels shall be every 15 minutes for the duration of the pumping test.
- (3) Flow in gpm.
- (4) Elevation of water in well before and after pumping.
- (5) Elevation of water in closest adjacent well or piezometer before and during pumping, when requested by the Contracting Officer.
- (6) The depth of sand in well before, during, and after pumping.
- (7) Sand content of discharge in mg/L plotted against time of pumping.
- (8) Time and locations of water samples taken during the pump test.

3.5.4 Procedure.

3.5.4.1 The pumping and sand infiltration tests shall be conducted under the direction of the Contracting Officer. The Contractor shall test each well by pumping continuously for a minimum of two hours. The pumping shall be at a constant rate sufficient to produce a discharge of 800 gpm. No test pumping of a well will be permitted concurrently with drilling or pumping of any other well located within 500 feet of the test well. In the event that the test is interrupted, other than by order of the Contracting Officer, prior to the completion of the specified period of continuous operations, the test shall be re-run at no additional expense to the Government.

3.5.4.2 In addition to the test described above, the Contracting Officer may direct the Contractor to perform additional testing. Such additional testing shall conform in general to the requirements specified above with the exception that the duration of the tests and the approximate drawdown will be determined by the Contracting Officer. The test, to be successful, shall be continuous throughout the specified period.

3.5.4.3 In the event that sand or other material infiltrates into the well as a result of the pumping test, the following procedure will be followed: If the rate of sand infiltration during the latter part of the two hour pumping test has not been reduced to 5 mg/L or less, the well shall be surged by manipulation of the test pump for 20 minutes after which the test pumping shall be resumed and shall be continued at the constant rate specified above until the sand infiltration rate is reduced to 5 mg/L, but not for more than a total of eight hours.

3.5.4.4 If, at the end of eight hours of pumping, the rate of infiltration of sand is more than 5 mg/L, the well shall be abandoned, except that the Contractor may elect to continue the test pumping and perform such other approved remedial work considered desirable, all at the Contractor's own expense. If, after such additional test pumping and other remedial measures, the sand infiltration rate of a well is reduced to 5 mg/L, the well will be accepted. Unacceptable wells shall be abandoned in accordance with 02715-3.7 and a new well installed nearby at a location directed by the Contracting Officer.

3.5.4.5 When pumping wells nos. 33 through 41 in the Simpson Lake ponding area, the effluent shall be piped a minimum of 300-feet away from the well being pumped, to the existing perimeter ditch on the edge of the Simpson Lake ponding area. The effluent shall flow to the Simpson Lake through the existing, Simpson Lake gravity drain structure.

3.5.4.6 When pumping wells nos. 1 through 32, the effluent from the pumping tests shall not be allowed to flow directly to the Meramec River. Rather, the effluent shall be piped a minimum of 300-feet away from the well being pumped, toward the opposite edge of the ponding area. At this point the end of the effluent pipe shall be turned vertically upward. The effluent from the pump test shall exit the end of the vertical pipe at least 8-feet above the ground and fall back to the ground. The Contractor shall institute temporary erosion control measures to prevent the water from eroding or otherwise damaging any completed structures or earthwork. When pumping wells nos. 1 through 32, the Contractor may pump the effluent into an adjacent cell of the Glass Plant ponding area. Flow shall not be released from any Glass Plant ponding area until the testing specified in paragraph 3.5.4.9 shows that the effluent meets the necessary standards for volatile organics. The Contractor is responsible for scheduling pumping tests and chemical testing in such a fashion that pump test effluent held back in the ponding area doesn't impact the contractor's ability to complete the tests in a reasonable time.

Pump test effluent held back in a ponding area shall not negatively impact the results of the pumping tests.

3.5.4.7 The Contractor shall obtain two water samples from each pump test when pumping wells nos. 1 through 32. No tests are necessary when pumping wells nos. 33 through 41 in the Simpson Lake ponding area. The samples shall be obtained from the vertical fountain of effluent at the end of the 300-foot long pipeline. The first sample shall be obtained within the first 5-minutes of the pump test and the second sample obtained from the last 5-minutes of the pump test. These samples shall be tested for volatile organics according to Section 1130 - Environmental Protection.

3.5.4.8 Upon completion of the pumping test, any sand or filter material in the bottom of the well shall be removed by pumping or by other approved methods, after which the Contractor shall remove all equipment, discharge lines, etc., and restore the site to its original condition.

3.5.4.9 Before releasing co-mingled water to the Meramec River, the Contractor shall obtain a representative water quality sample of the co-mingled waters and test them for volatile organic compounds (VOC) per the requirements to SECTION 01130 - ENVIRONMENTAL PROTECTION. Upon receipt of negative test results for VOCs, the Contractor shall release the co-mingled waters to the Meramec River. If the test results are positive for VOC, the Contractor shall establish an air stripping system for the water. This will entail mobilizing and operating a portable pump capable of processing the entire volume of commingled water in one 8-hour period. The pump shall be capable of sending a 3-inch diameter stream of water at least 50-feet into the air and be equipped with an adjustable nozzle to control the dispersement of the water jet. The Contractor shall not add any contingencies to his bid price for this work, rather a suitable adjustment will be made to the contract price and schedule if the need for the air stripping system arises.

3.5.5 Additional Pumping Test Measurements. In addition to the measurements and record-keeping required of the Contractor, the Contracting Officer may require access to the well to perform additional water level measurements in the pumped well and nearby relief wells.

3.5.5 Records. The Contractor shall obtain and furnish to the representative of the Contracting Officer for record purposes the elevation of the water in each well before and after the development pumping, the flow in gpm at the completion of the pumping and the time of observation. The water surface elevation shall be obtained immediately before starting the surge pump and the water surface elevation and flow shall be obtained just before stopping the pump upon completion of the development pumping. This data shall be recorded on WES Form 797, a copy of which is attached at the end of this section.

3.6 WELL COMPLETION.

3.6.1 Backfill Sand. Following development, the Contractor shall reestablish the filter pack to its design elevation. A 2-foot layer of fine sand shall then be placed into the annular space between the riser and borehole wall above the filter pack.

3.6.2 Casing Grout. A neat cement grout shall be placed by tremie pipe from the top of the sand backfill to 4 feet below ground surface. The grout shall consist of a mixture of one bag, 94 lbs., of Portland Type 1 cement to

not more than 6 gallons of clean water. Bentonite, up to 6 percent by weight of cement, to reduce shrinkage, may be added.

3.6.3 Backfill Concrete. The Contractor shall fill the remainder of the annular space above the backfill sand with concrete. The concrete shall conform to the requirements of SECTION 03301.

3.6.4 Well Disinfection. The well shall be disinfected with a chlorine solution applied in such a manner that a concentration of at least 100 ppm chlorine is obtained in all parts of the well and plumbing system. A minimum contact time of 8 hours shall be provided before pumping the well to waste and flushing the chlorine solution from the distribution system. Recommended methods and required quantities of chlorine products are contained in the Missouri Well Construction Rules.

3.6.5 "D"-Type Outlet Works. The Contractor shall construct the concrete pad and the relief well guard assembly as specified herein and as shown on the drawings.

3.7 ABANDONED RELIEF WELLS. Wells to be abandoned shall be grouted to the ground surface with a cement grout by means of a grout pipe inserted to the bottom of the well. The grout pipe may be withdrawn but the end of the grout pipe must remain at least 2-feet below the surface of the grout. The grout shall be injected through the pipe and forced upwards towards the surface. When the grout reaches the surface, it shall be allowed to flow to waste until the Contracting Officer determines that the grouting has been satisfactorily accomplished. The grout mix shall consist of a mix of 1 bag cement, 300 lbs. of sand and 7 gallons of water. An expansive agent (Interplast N, made by Sika Corporation, or equal) shall be added to the mix, and shall be at a rate of 1-percent expansive agent by weight of the cement.

Well Number.	Station	Ground Surface	Northing Coord	Easting Coord	Top Well Guard	Top Conc Pad	Top Riser	Top Well Screen	Bottom Well Screen	Bottom Sump	Top Gravel	Top Filt Sand
Detention Area – B												
1	43+35	408.2	988233	822804	410.2	408.2	408.45	399	377.5	375.5	401.5	404
2	44+15	408.1	988247	822891	410.2	408.1	408.35	399	377.5	375.5	401.5	404
3	44+95	408.0	988260	822968	410.0	408.0	408.25	399	377.5	375.5	401.5	404
4	45+75	407.9	988275	823055	409.9	407.9	408.15	399	377.5	375.5	401.5	404
5	46+55	407.8	988291	823138	409.8	407.8	408.05	399	377.5	375.5	401.5	404
6	47+35	407.8	988302	823204	409.8	407.8	408.05	399	377.5	375.5	401.5	404
7	48+15	407.7	988316	823284	409.7	407.7	407.95	399	377.5	375.5	401.5	404
8	48+95	407.6	988330	823365	409.6	407.6	407.85	399	377.5	375.5	401.5	404
9	49+75	407.5	988344	823449	409.5	407.5	407.75	399	377.5	375.5	401.5	404
10	50+55	407.4	988360	823531	409.4	407.4	407.65	399	377.5	375.5	401.5	404
11	51+35	407.4	988373	823604	409.4	407.4	407.65	399	377.5	375.5	401.5	404
12	52+15	407.3	988387	823686	409.3	407.3	407.55	399	377.5	375.5	401.5	404
13	53+10	407.2	988402	823773	409.2	407.2	407.45	399	377.5	375.5	401.5	404
14	53+95	407.1	988417	823857	409.1	407.1	407.35	399	377.5	375.5	401.5	404
15	54+60	407.0	988426	823918	409	407.0	407.25	399	377.5	375.5	401.5	404
Detention Area – B												
16	55+40	406.9	988442	823995	408.9	406.9	407.15	393.5	375	373	396	398.5
17	56+15	407.5	988454	824074	409.5	407.5	407.75	393.5	375	373	396	398.5
18	56+90	407.7	988466	824151	409.7	407.7	407.95	393.5	375	373	396	398.5
19	59+10	408.5	988504	824365	410.5	408.5	408.75	393.5	375	373	396	398.5
20	61+30	409.3	988536	824582	411.3	409.3	409.55	393.5	375	373	396	398.5
21	63+50	408.6	988577	824806	410.6	408.6	408.85	397	375	373	399.5	402
22	64+60	408.2	988598	824910	410.2	408.2	408.45	397	375	373	399.5	402
23	65+70	407.8	988617	825023	409.8	407.8	408.05	397	375	373	399.5	402
24	66+80	407.5	988637	825114	409.5	407.5	407.75	397	375	373	399.5	402
25	67+90	407.4	988667	825222	409.4	407.4	407.65	397	375	373	399.5	402
Detention Area - C												
26	69+00	407.1	988694	825326	409.4	407.1	407.35	392	375	373	394.5	398
27	69+85	407.2	988713	825407	409.2	407.2	407.45	392	375	373	394.5	398
28	70+70	407.2	988737	825497	409.2	407.2	407.45	392	375	373	394.5	398
29	71+50	407.3	988758	825571	409.3	407.3	407.55	392	375	373	394.5	398

Well Number.	Station	Ground Surface	Northing Coord	Easting Coord	Top Well Guard	Top Conc Pad	Top Riser	Top Well Screen	Bottom Well Screen	Bottom Sump	Top Gravel	Top Filt Sand
30	73+20	407.4	988802	825739	409.4	407.4	407.65	392	375	373	394.5	398
31	74+90	407.6	988845	825898	409.6	407.6	407.85	392	375	373	394.5	398
32	76+60	407.8	988891	826070	409.8	407.8	408.05	392	375	373	394.5	398
Simpson Lake												
33	113+50	408.0	991039	827575	410.0	408.0	408.25	394.5	372.5	370.5	397	399.5
34	114+15	408.0	991090	827562	410.0	408.0	408.25	394.5	372.5	370.5	397	399.5
35	114+80	408.0	991155	827563	410.0	408.0	408.25	394.5	372.5	370.5	397	399.5
36	115+45	408.0	991218	827563	410.0	408.0	408.25	394.5	372.5	370.5	397	399.5
37	116+10	408.0	991283	827561	410.0	408.0	408.25	394.5	372.5	370.5	397	399.5
38	116+75	408.0	991348	827559	410.0	408.0	408.25	394.5	372.5	370.5	397	399.5
39	117+25	411.0	991402	827561	413.0	411.0	411.25	386.5	365.5	363.5	389	391.5
40	118+65	411.4	991545	827560	413.4	411.4	411.65	386.5	365.5	363.5	389	391.5
41	120+05	411.7	991679	827566	413.7	411.7	411.95	386.5	365.5	363.5	389	391.5



**Metropolitan
St. Louis Sewer
District**

2850 Market Street
St. Louis, MO 63103-2555
(314) 768-6200

APPROVAL DATE: July 1, 2003
MSD Reference No.: P-0021241-02
County PAC No.:

PROJECT TITLE: MARSHALL & 141 (VALLEY PARK LEVEE)

Site Address:

Plan Status: Addendum to Plans Approved 06/02/98

On this date the above referenced plans have been approved for construction work relating to these items:

- | | | | |
|--|--|--|--|
| <input checked="" type="checkbox"/> Storm Sewers | <input type="checkbox"/> Combined Sewers | <input type="checkbox"/> Sanitary Sewers | <input type="checkbox"/> Miscellaneous MSD |
| <input type="checkbox"/> Detention Basin | <input type="checkbox"/> Pump Station and Force Main | <input type="checkbox"/> House Connection Only | Inspection |

The following Permit will be required from MSD for this work:

- | | | | |
|--|---|---|--|
| <input checked="" type="checkbox"/> Construction | <input type="checkbox"/> House Connection | <input type="checkbox"/> Misc. MSD Inspection | <input type="checkbox"/> No MSD Permit |
|--|---|---|--|

 NO OCCUPANCY PERMITS ARE TO BE ISSUED UNTIL MSD CONSTRUCTION APPROVAL OF THIS WORK

Prior to the issuance of the required Permit the following fees must be paid and documents executed by the Project Owner:

- As-Built Deposit in the amount of N/A.
(Deposit may be paid by cash or personal check made payable to the Metropolitan St. Louis Sewer District).
- Construction Escrow Deposit in the amount of N/A.
(Deposit must be in a form of cash or a cashier's check payable to the Metropolitan St. Louis Sewer District).
- Pump Station Construction Escrow Deposit in the amount of N/A.
(Deposit must be in a form of cash or a cashier's check payable to the Metropolitan St. Louis Sewer District).
- Cash Deposit Agreement (two copies enclosed, execute and return both).

Please refer to Chapter 8 of the District's "Rules and Regulation and Engineering Design Requirements for Sanitary Sewage and Stormwater Drainage Facilities" for and explanation of these requirements. Questions regarding the deposits or agreement should be directed to Keith Milson, Escrow Group (768-6206).

Construction Permitting Information

1. Permits will only be issued to licensed and bonded drainlayers for all work related to sewer construction.
2. The Construction Permit fee is \$105.00 and must be paid at the time of the issuance of permits. The Construction Inspection fee is \$1.78 per lineal foot of sanitary sewer and \$2.49 per lineal foot of storm/combined sewer.
3. The House Connection Permit and Misc. MSD Inspection fees are \$15.00 for each connection or point of inspection. Where a Machine Tap is required, an additional fee of \$200.00 will be required.
4. All fees must be paid by the drainlayer, prior to issuance of the permits. Please refer to Chapter 10 of the District's "Rules and Regulations and Engineering Design Requirements for Sanitary Sewage and Stormwater Drainage Facilities" for additional information regarding the Construction Permits.
5. Questions regarding Permits should be directed to the Permit Section at 768-6286.
6. The approved plans will remain active for one year. If permits have not been applied for within the year a new set of plans will have to be submitted for approval.

NOTE: THIS APPROVAL IS SUBJECT TO STATE HIGHWAY REGULATIONS AND U.S. ARMY CORPS OF ENGINEERS REQUIREMENTS WHERE APPLICABLE.

Michael G. Borgard, P.E.
Manager of Plan Review

Consulting Engineer
Owner
Environmental Compliance
Municipality-Valley Park

St. Louis County Public Works
Office of Plumbing and Inspection
Permit



Metropolitan St. Louis Sewer District

2250 Market Street
St. Louis, MO 63103-2555
(314) 768-6200

PUBLIC STORM SEWER

DESCRIPTION	UNITS/ FOOTAGE	COST
24 RCP PIPE	750 LF	\$22,500.00
30 RCP PIPE	461 LF	\$17,518.00
33 RCP PIPE	293 LF	\$12,599.00
48 RCP PIPE	1667 LF	\$116,690.00
54 RCP PIPE	802 LF	\$68,170.00
60 RCP PIPE	775 LF	\$79,050.00
66 RCP PIPE	250 LF	\$32,500.00
72 RCP PIPE	112 LF	\$17,024.00
STRUCT Area Inlet, Single	12 EA	\$9,600.00
STRUCT 24" Flared End Section	2 EA	\$1,600.00
STRUCT Junction Chamber	3 EA	\$30,000.00
STRUCT Misc, Other	3 EA	\$0.00
STRUCT Manhole Storm	6 EA	\$5,700.00
STRUCT 30" Flared End Section	1 EA	\$965.00
STRUCT 48" Flared End Section	3 EA	\$4,500.00
STRUCT 54" Flared End Section	2 EA	\$3,460.00
STRUCT 72" Flared End Section	1 EA	\$2,850.00
MISC	1 EA	\$0.00
RIPRAP/REVEIEMENT/HEAVY	1010 SY	\$36,360.00

GRAND TOTAL

\$461,086.00